Exhibit H: Spurious Radiated Emissions

FCC ID: CW21669-3

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Operating Band Investigated:
Low Channel - 152.87 MHz
Mid Channel – 161 MHz
High Channel – 170 MHz

Operating Modes Investigated:
Modulated with Random Data

Data Rates Investigated:
1200 baud (only data rate available)

Output Power Investigated:
+20 dBm (not user adjustable)

Power Input Settings Investigated:
Battery operated. Cannot be operated while connected to AC mains or any other power source.

Frequency range Investigated			
Start Frequency	30 MHz	**Stop Frequency**	2 GHz

Software\Firmware Applied During Test			
Exercise software	1669-3 Firmware	Version	1.4
Description			
The system was tested using standard operating production software to exercise the functions of the device during the testing.			

Equipment Modifications

No EMI suppression devices were added or modified. The EUT was tested as delivered.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Test Box	Rothenbuhler Engineering	1669-3	111

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial	No	1.8	No	Test Box	Unterminated
Test Probe	No	0.5	No	Test Box	Antenna Terminal

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8593EM	AAM	09/17/2001	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/25/2001	12 mo
Antenna, Horn	EMCO	3115	AHF	03/13/2001	12 mo
Spectrum Analyzer	Hewlett-Packard	8567A	AAB	08/21/2001	12 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQA	08/21/2001	12 mo
Pre-Amplifier	ARA	LN1000	APR	06/28/2001	12 mo
Antenna, Bicon	EMCO	3104C	ABA	01/18/2001	12 mo
Antenna, Log Periodic	EMCO	3146	ALA	01/18/2001	12 mo

Spurious Radiated Emissions

Test Description

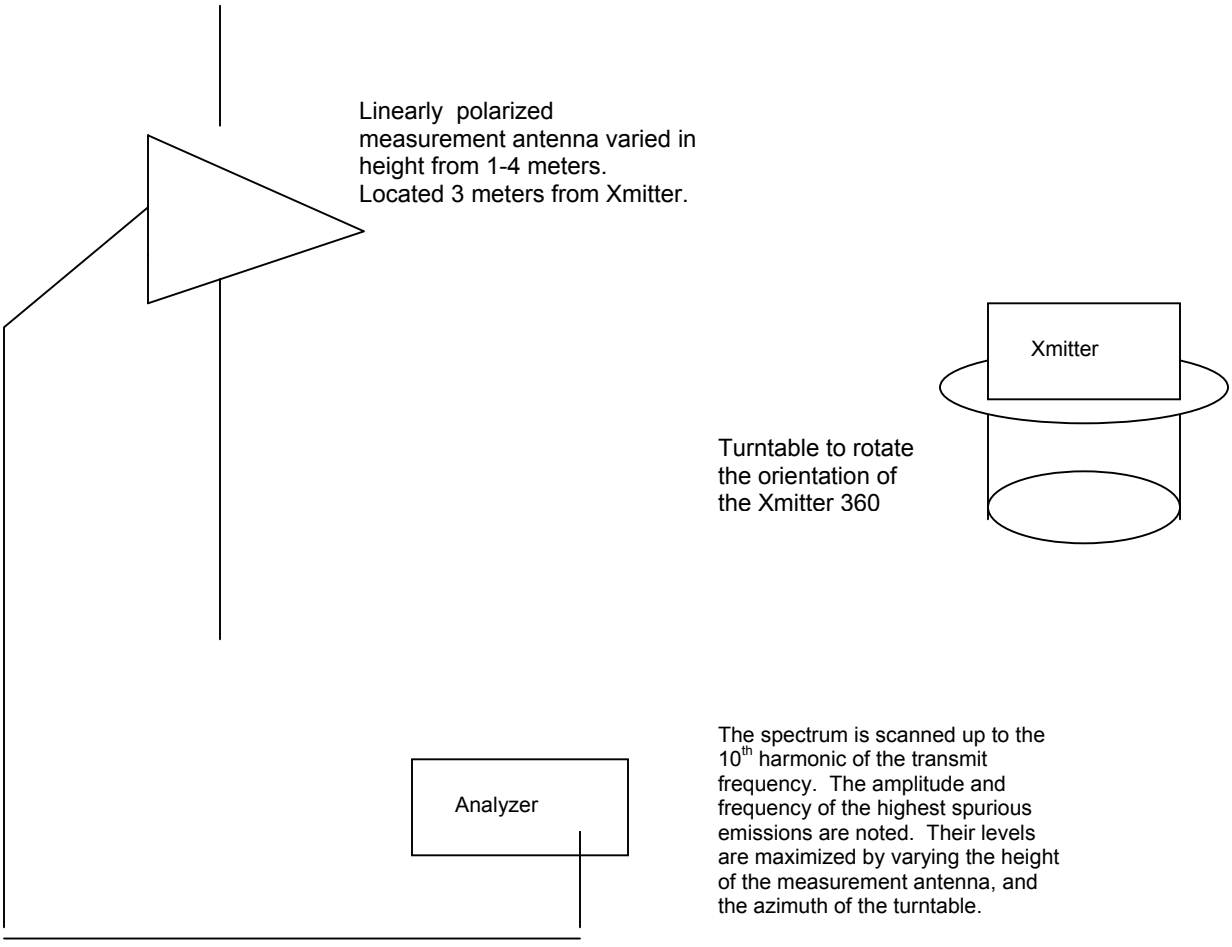
Requirement: Per 2.1053 and 90.217(b), the Field Strength of Spurious Radiation was measured in the far-field at an FCC Listed OATS up to 2 GHz. Spectrum analyzer, signal generator, and linearly polarized antennas were used to measure radiated harmonics and spurious emissions. The orientation of the EUT and measurement antenna were manipulated to maximize the level of emissions. The EUT was configured to transmit at the highest output power into a dummy load at low, mid, and high frequencies. The substitution method as described in TIA/EIA-603 Section 2.2.12 was used for the highest spurious emissions. Preliminary measurements were made using the alternate limit at 3 meters of 87.5 dBuV/m.

Test Methodology: For licensed transmitters, the FCC references TIA/EIA-603 as the measurement procedure standard. TIA/EIA-603 Section 2.2.12 describes a method for measuring radiated spurious emissions that utilizes an antenna substitution method:

At an approved test site, the transmitter is place on a remotely controlled turntable, and the measurement antenna is placed 3 meters from the transmitter. The turntable azimuth is varied to maximize the level of spurious emissions. The height of the measurement antenna is also varied from 1 to 4 meters. The amplitude and frequency of the highest emissions are noted. The transmitter is then replaced with a ½ wave dipole that is successively tuned to each of the highest spurious emissions. A signal generator is connected to the dipole (horn antenna for frequencies above 1 GHz), and its output is adjusted to match the level previously noted for each frequency. The output of the signal generator is recorded, and by factoring in the cable loss to the dipole antenna and its gain; the power (dBm) into an ideal ½ wave dipole antenna is determined for each radiated spurious emission.

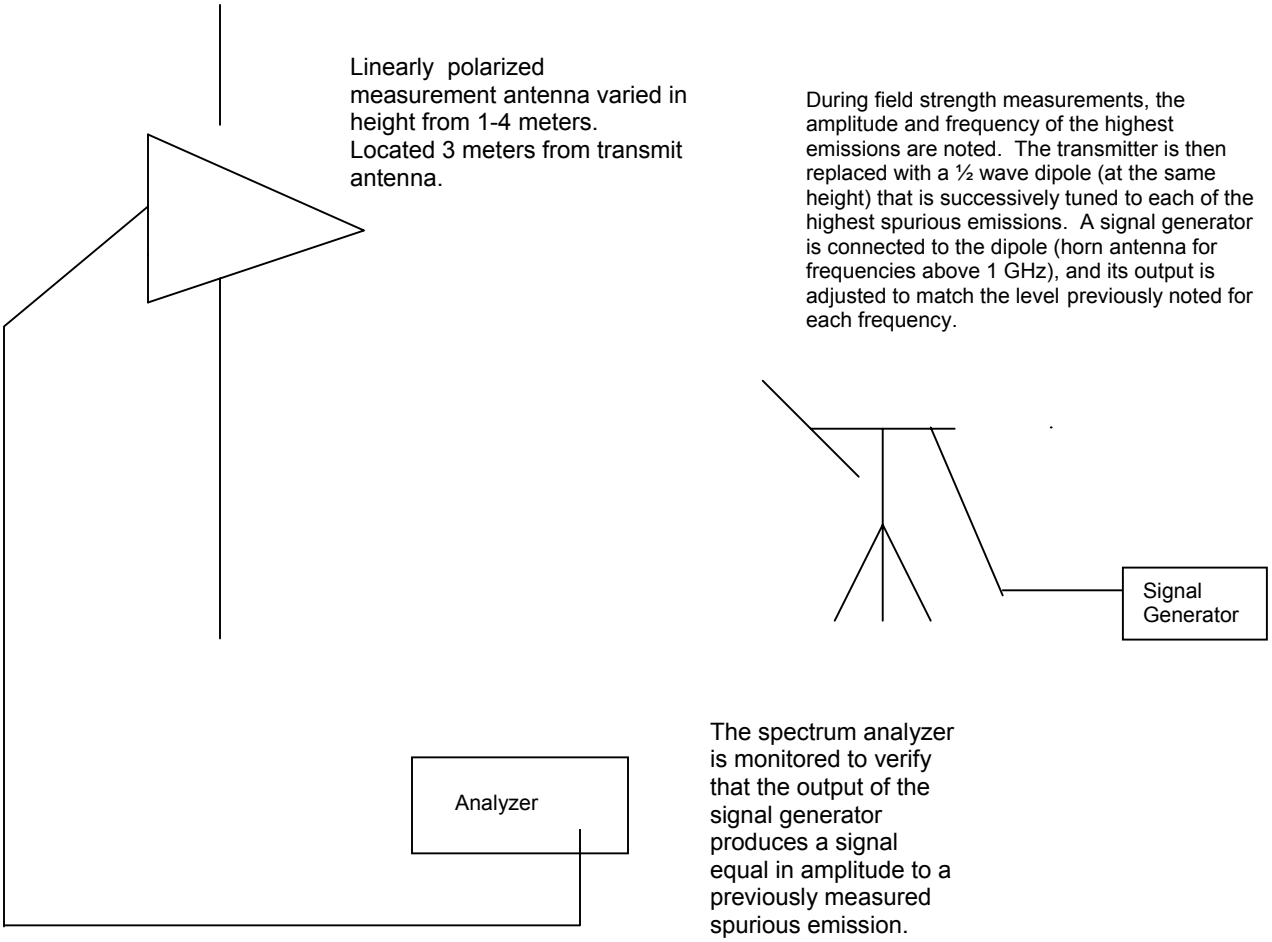
For the purposes of preliminary measurements, the field strength of the spurious emissions can be measured and compared with a 3 meter limit. The final measurements must be made utilizing the substitution method described above. The 3 meter limit was calculated to be 87.5 dBuV/m at 3 meters. This was based upon an output power of 104 mW.

Test Setup for Field Strength Measurements



The spectrum is scanned up to the 10^{th} harmonic of the transmit frequency. The amplitude and frequency of the highest spurious emissions are noted. Their levels are maximized by varying the height of the measurement antenna, and the azimuth of the turntable.

Test Setup for Power Measurements Utilizing the Antenna Substitution Method



Measurement Bandwidths

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.			

Completed by:

NORTHWEST EMC

Radiated and Conducted Emissions

Rev 4.10
07/06/01

EUT:	Test Box Model 1669-3			Work Order:	ROTH0001
Serial Number:	111			Date:	01/08/02
Customer:	Rothenbuhler Engineering			Temperature:	21
Attendees:	N/A	Tester:	Greg Kiemel	Humidity:	35%
Customer Ref. No.:	N/A	Power:	N/A	Job Site:	SU07 & SU04

TEST SPECIFICATIONS

Specification:	FCC 90.217(b)	Year:	Most Recent	Method:	TIA/EIA 603, Sec. 2.2.12	Year:	Most Recent

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Attenuation Factor - Amplifier Gain

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

1200 baud random data - max and only data rate.

EUT OPERATING MODES

See Comments

DEVIATIONS FROM TEST STANDARD

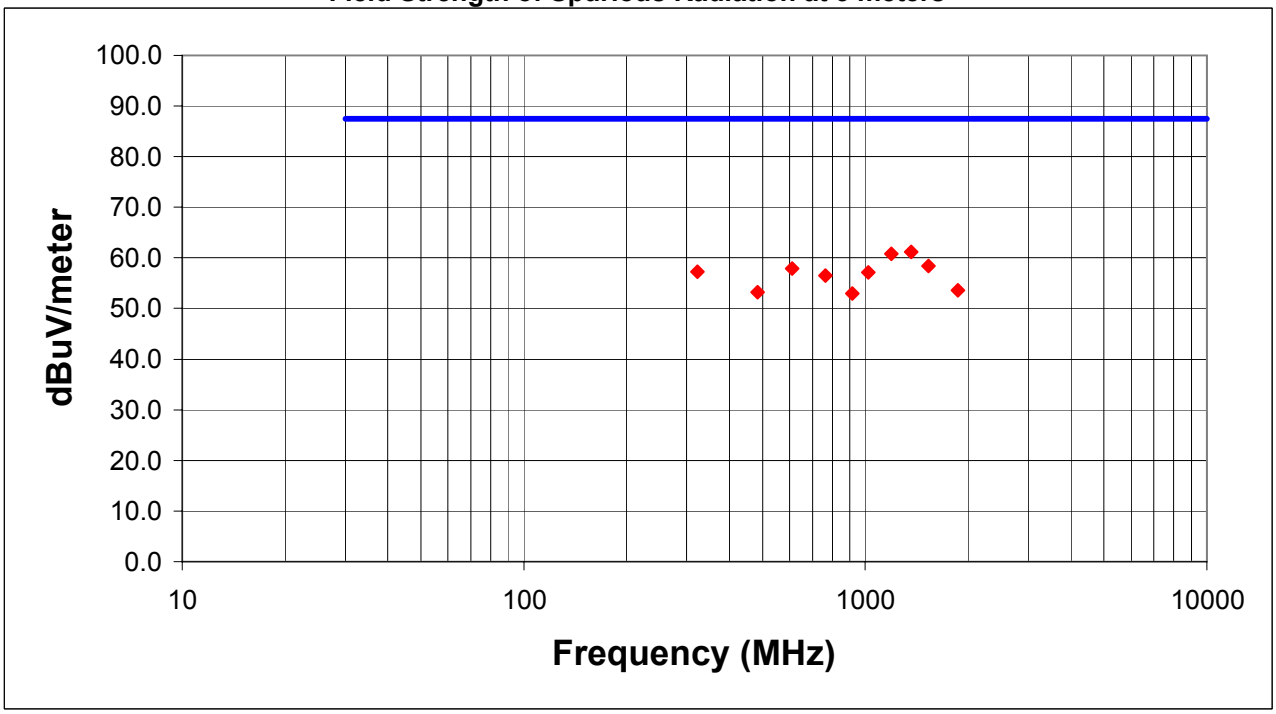
None

RESULTS	DISTANCE (m)	LINE	RUN
PASS	3		

OTHER

Tested By

Field Strength of Spurious Radiation at 3 meters



Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Polarity	Preamp Gain (dB)	Cable Loss (dB)	Table Azimuth (degrees)	Antenna Height (meters)	Adjusted Level (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)	Comment
1360.000	68.4	PK	26.9	VHRN	35.2	1.1	188.0	1.1	61.2	87.5	-26.3	High Channel
1190.000	68.6	PK	26.6	VHRN	35.4	1.0	290.0	1.1	60.8	87.5	-26.8	High Channel
1530.000	65.1	PK	27.4	VHRN	35.1	1.1	155.0	2.2	58.5	87.5	-29.0	High Channel
611.492	60.8	PK	19.3	VLPA	32.4	10.2	185.0	1.0	57.9	87.5	-29.6	Low Channel
322.003	67.0	PK	15.0	HLPA	31.9	7.2	173.0	1.0	57.3	87.5	-30.3	Mid Channel
1020.000	65.5	PK	26.2	VHRN	35.5	1.0	13.0	1.2	57.2	87.5	-30.4	High Channel
764.332	56.8	PK	21.2	VLPA	32.9	11.4	91.0	1.0	56.5	87.5	-31.1	Low Channel
1870.000	58.4	PK	28.9	VHRN	34.8	1.1	296.0	1.1	53.6	87.5	-33.9	High Channel
483.009	59.0	PK	17.3	VLPA	32.1	9.0	43.0	1.2	53.2	87.5	-34.3	Mid Channel
917.235	50.6	PK	22.5	HLPA	32.7	12.6	121.0	1.0	53.0	87.5	-34.5	Low Channel

NORTHWEST EMC

Radiated and Conducted Emissions

Rev 4.10
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EUT:	Test Box Model 1669-3			Work Order:	ROTH0001
Serial Number:	111			Date:	01/08/02
Customer:	Rothenbuhler Engineering			Temperature:	21
Attendees:	N/A	Tester:	Greg Kiemel	Humidity:	35%
Customer Ref. No.:	N/A	Power:	N/A	Job Site:	SU07 & SU04

TEST SPECIFICATIONS

Specification:	FCC 90.217(b)	Year:	Most Recent	Method:	TIA/EIA 603, Sec. 2.2.12	Year:	Most Recent

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Attenuation Factor - Amplifier Gain

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

1200 baud random data - max and only data rate.

EUT OPERATING MODES

See Comments

DEVIATIONS FROM TEST STANDARD

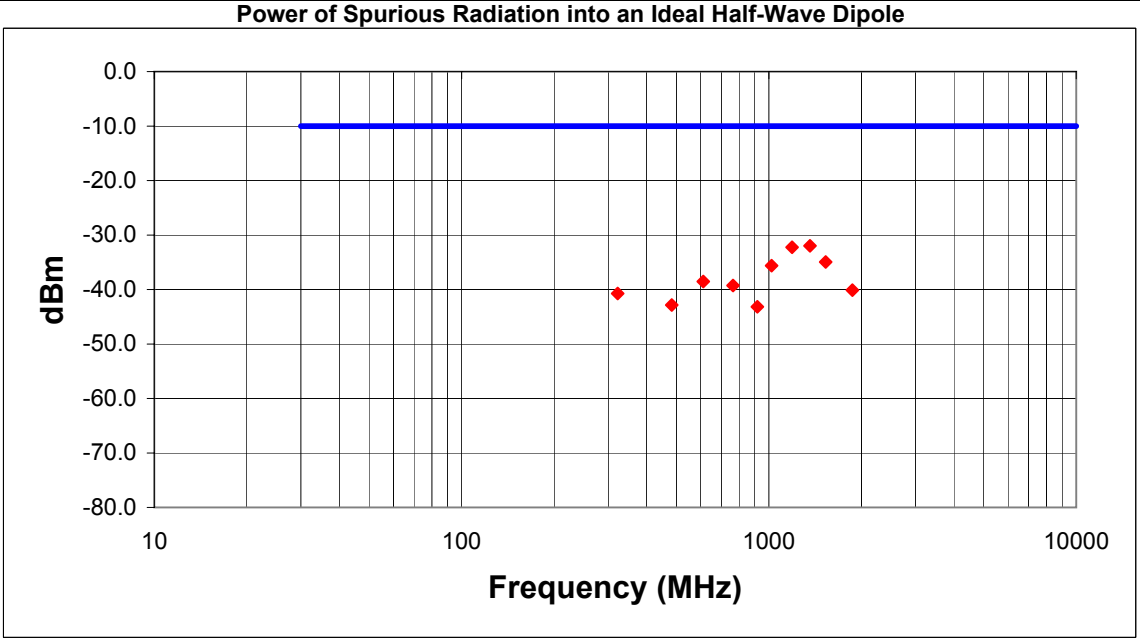
None

RESULTS	DISTANCE (m)	LINE	RUN
PASS	3		

OTHER

Tested By

Power of Spurious Radiation into an Ideal Half-Wave Dipole



Frequency (MHz)	Antenna Polarity	Table Azimuth (degrees)	Antenna Height (meters)	Power Into an Ideal Half-Wave Dipole (dBm)	Spec. Limit (dBm)	Margin (dB)	Comment
1360.000	VHRN	188.0	1.1	-32.0	-10.0	-22.0	High
1190.000	VHRN	290.0	1.1	-32.3	-10.0	-22.3	High
1530.000	VHRN	155.0	2.2	-35.0	-10.0	-25.0	High
1020.000	VHRN	13.0	1.2	-35.6	-10.0	-25.6	High
611.492	VLPA	185.0	1.0	-38.5	-10.0	-28.5	Low
764.332	VLPA	91.0	1.0	-39.3	-10.0	-29.3	Low
1870.000	VHRN	296.0	1.1	-40.1	-10.0	-30.1	High
322.003	HLPA	173.0	1.0	-40.7	-10.0	-30.7	Mid
483.009	VLPA	43.0	1.2	-42.9	-10.0	-32.9	Mid
917.235	HLPA	121.0	1.0	-43.2	-10.0	-33.2	Low