MICROWAVE RADIO COMMUNICATIONS

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Subject: FC3STATXU044T1AK

Date: July 31, 2007
From: Richard Miller
Manager, Systems Engineering Group
Microwave Radio Communications Inc.
To: Curtis Straus LLC

This transmitter is marketed under two specific applications, Mobile and Temporary Fixed Rapid deployment.
In the case of mobile application Microwave Radio Communications Inc. (MRC) will provide the instruction to allow the operator adequate information to allow power control of the device. The same device also used for Temporary fixed Rapid deployment or as MRC refers to this also as emergency restoration, potentially utilizes a variety of antennas none of which marketed direct by MRC exceeds the allowable limit of 26dBi. Since the transmitter would be factory limited to output power of 1W due to its 10 MHz designation we do not feel that this would be an issue. However, in the event that a user applies an antenna not offered or supplied by MRC, and this antenna exceeds the maximum allowable ERP then the same power reduction would apply as outlined in CFR 47 Part 90.1215 under sub part Y. MRC controls the maximum allowable output of the transmitter by factory imbedded routines to ensure that an operator, as in the case of a mobile user operating in the public safety band, cannot exceed 1W output. The operator has the ability of controlling this output power by initiating attenuation values up to 30 dB to meet the requirements stated by above part 90 rule.
Included with this response is the addendum MRC will include into its user manual as precaution and instruction to the user.

Sincerely,
Richard Miller

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Subject: Addendum to STRATA user manual
Ensuring Compliance with Effective Radiated Power Rules

Introduction
Governmental regulations require that careful control of microwave transmitter ERP (Effective Radiated Power) levels are maintained. MRC manufactured microwave transmitters provide an easy means by which end-users may control the transmitter RF output level to ensure compliance with these regulations. This brief memorandum describes the methods used to provide accurate and effective transmitter RF power output control.

RF Power Control Circuit
Figure 1. below shows the method by which the transmitter RF output power is monitored and controlled.

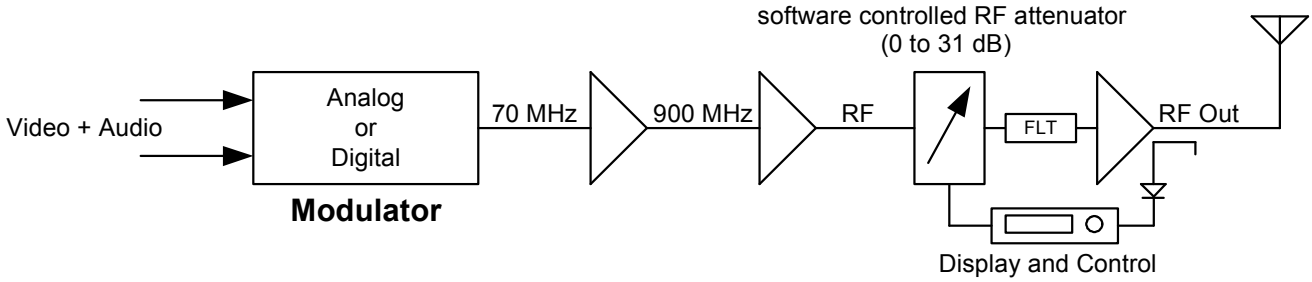

Figure 1 – Transmitter RF Output Control and Monitoring Circuit

Detailed Explanation
As shown in Figure 1 above, the 70 MHz modulated IF signal undergoes two stages of up-conversion to the appropriate RF band. A 5 bit (0 to 31 dB) software controlled RF attenuator is placed at the input to the RF power amplifier to provide RF output level adjustment capabilities. The RF power amplifier includes a built-in directional coupler that provides a small DC voltage output proportional to the actual RF output power level. Using special factory software tool, the transmitter front panel display is calibrated to provide an accurate RF output level indication. RF output levels can be controlled manually from the front panel or via preconfigured presets. Factory adjustments that "embed" a minimum amount of transmitter backoff attenuation may not be controlled by the user and are used to ensure that transmitted analog and digital signal quality are maintained.

Note: In the case of digital transmission, adding RF attenuation at the input to the RF power amplifier does not necessarily reduce RF output by the amount of attenuation added due to a moderate amount of non-linearity in the RF power amplifier. Therefore the user is advised to use the front panel calibrated RF output display value while making these adjustments.

Factory RF Power Output Calibration
MRC carefully tests and calibrates each RF transmitter to ensure the front panel display accuracy is within +/- .5 dB. Due to the non-linearity of the DC proportional voltage, RF display calibration is performed in 3 dB increments, e.g., the internal software controlled attenuator is reduced in steps of 3 dB and a look up table is created to ensure the highest possible accuracy is maintained. Figure 2 on the following page describes the factory RF power calibration test setup.

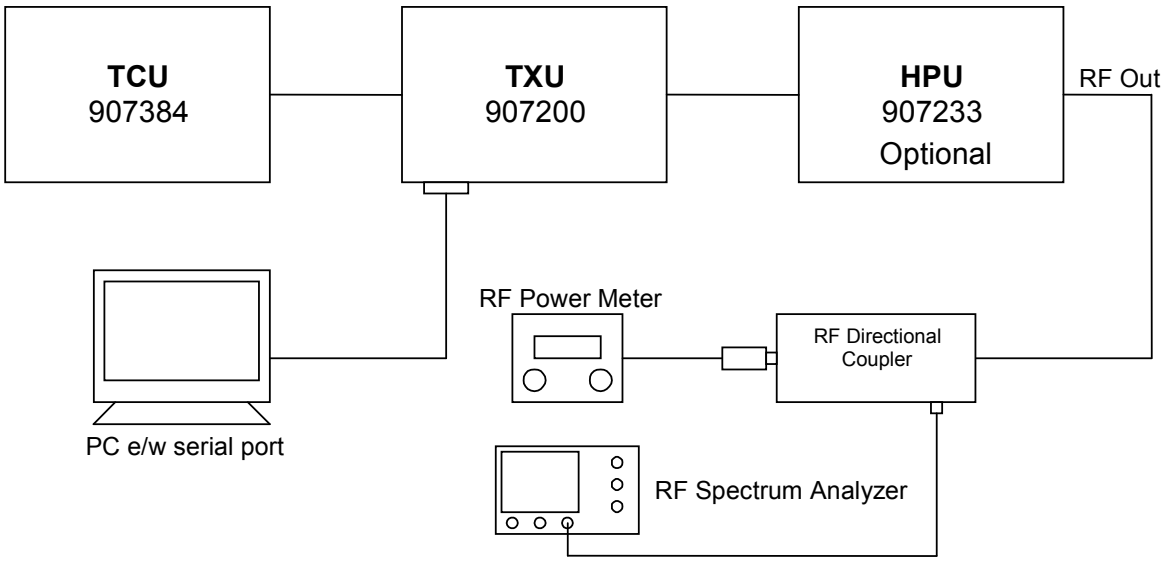

Figure 2 – Factory RF Output Power Calibration

Summary
To ensure end-users operate their microwave equipment in compliance with governmental regulations, particularly those having to do with maximum RF radiation levels, the user is provided with the ability to quickly calculate ERP given the following information:

1. Actual RF output power at the antenna connector of the microwave transmitter.
2. The antenna gain referenced to an isotropic radiator (stamped on each antenna).
3. Any known RF transmission line or other losses.

Finally, it should be noted that in the case of digital transmission, over-driving RF amplifiers will seriously degrade digital signal quality and therefore includes a self-limiting feature. Using firmware embedded, software controlled, transmitter backoff attenuation guarantees that microwave RF output power levels cannot be exceeded except where high gain directional antennas are used. In these cases the manufacturer's user documentation carefully describes how transmitter RF output levels can be reduced to ensure governmental compliance. In no case can an MRC factory adjusted microwave transmitter exceed our RF output level specifications, hence the user can only reduce RF output from their initial factory adjusted output levels.

Matrixes to assist in the proper transmit power output with MRC offered mobile antennas. This applies to the FCC CFR 47 part 90, rule part 90.1215 power limits.

Description	MRC Part Number	Antenna Gain	Power reduction from 1W (+30dBm)	Transmitter output in Watts(W)
Radiowaves MegaHorn Antenna, 4.4-5GHz, Vertical., 12dBi gain, twistlock adaptor	100779-231	12	3	0.5
Radiowaves MegaHorn Antenna, 4.4-5GHz, LCP, 12dBi gain, twistlock adaptor	100779-221	12	3	0.5
Radiowaves MegaHorn Antenna, 4.4-5GHz, RCP, 12dBi gain, twistlock adaptor	100779-211	12	3	0.5
Radiowaves MegaHorn Antenna, 4.4-5GHz, Horizontal., 17dBi gain, twistlock	100779-141	17	8	0.158
Radiowaves MegaHorn Antenna, 4.4-5GHz, Vertical., 17dBi gain, twistlock adaptor	100779-131	17	8	0.158
Radiowaves MegaHorn Antenna, 4.4-5GHz, LCP, 17dBi gain, twistlock adaptor	100779-121	17	8	0.158
Radiowaves MegaHorn Antenna, 4.4-5GHz, RCP, 17dBi gain, twistlock adaptor	100779-111	17	8	0.158
Radiowaves MegaHorn Antenna, 4.4-5GHz, Horizontal., 12dBi gain, type "N"	100737-241	12	3	0.5
Radiowaves MegaHorn Antenna, 4.4-5GHz, Vertical., 12dBi gain, type "N"	100737-231	12	3	0.5
Radiowaves MegaHorn Antenna, 4.4-5GHz, LCP, 12dBi gain, type "N" connector	100737-221	12	3	0.5
Radiowaves MegaHorn Antenna, 4.4-5GHz, RCP, 12dBi gain, type "N" connector	100737-211	12	3	0.5
Radiowaves MegaHorn Antenna, 4.4-5GHz, Horizontal, 17dBi gain, type "N"	100737-141	17	8	0.158
Radiowaves MegaHorn Antenna, 4.4-5GHz, Vertical., 17dBi gain, type "N"	100737-131	17	8	0.158
Radiowaves MegaHorn Antenna, 4.4-5GHz, LCP, 17dBi gain, type "N" connector	100737-121	17	8	0.158
Radiowaves MegaHorn Antenna, 4.4-5GHz, RCP, 17dBi gain, type "N" connector	100737-111	17	8	0.158
Radiowaves MegaHorn Antenna, 1.7-2.5GHz, 16dBi gain, type "N" connector	100560-212SP	16	7	0.2
Radiowaves Uplook/downlook Antenna (90 degrees), 8dB, weatherproof enclosure, HORZ., 4.4-5.0GHz	100885-141	8	*N/R	
Radiowaves Uplook/downlook Antenna (90 degrees), 8dB, weatherproof enclosure, VERT., 4.4-5.0GHz	100885-131	8	*N/R	
Radiowaves Uplook/downlook Antenna (90 degrees), 8dB, weatherproof enclosure, LCP, 4.4-5.0GHz	100885-121	8	*N/R	
Radiowaves Uplook/downlook Antenna (90 degrees), 8dB, weatherproof enclosure, RCP, 4.4-5.0GHz	100885-111	8	*N/R	
Radiowaves Omni 5 dBi antenna		5	*N/R	
Peak Antennas		5	*N/R	

If there is no power reduction required due to the gain of the antenna being less than 9dBi then N/R applies