Date sent: *Mon, 25 Oct 1999 16:31:06 -0400*
From: *oetech@fccsun07w.fcc.gov (OET)*
Subject: *IM testing and channels per amplifier module*
To: *RGRANT@KTLCANADA.COM*

To: *RUSSELL GRANT, KTL OTTAWA*
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Re:	*FCC ID BCR-RPT-MR801*
Applicant:	*Allen Telecom Systems*
Correspondence Reference Number:	*10344*
731 Confirmation Number:	*EA95169*
Date of Original E-Mail:	*10/25/1999*

FCC questions are shown in italics; **Allen Telecom/KTL responses are shown in bold.**

The equipment manual indicates the amplifier/repeater will operate with 4 channels or 4 bands(unclear which). The intermodulation measurement data you have submitted is for 2 channels and indicates on page 138 that it does not comply with the limits. We understand that simply changing the reference will correct the apparent compliance problem but we need your correction in the record. If a single module amplifies 4 channels then we need a 3 channel IM measurement. **(KTL responses needed here – reference Frank C.\Kevin Carr's Email)** *In addition the RF output graph on pages 78, 92 indicates substantial degradation of the input signal. We note that some of the graphs indicate no degradation. Please explain.*

The MR801 Repeater duplexers covers the full 25 MHz in both uplink and downlink of the Cellular band. The MR 801B repeater family has a modular IF filter design and can be configured with different module types (See below for module types). The MR801B Power repeater configuration is the high power configuration and can have up to 6 modules installed. The MR801B repeater is the low power configuration can have 8 of any type of modules installed. The outputs of all modules are combined and amplified by the multicarrier power amplifier. The module types are as follows:

Module Type	Bandwidth	Modulation Type	# of Channels
CDMA modules	**1.23 MHz**	**CDMA Only**	**Single channel**
TDMA modules	**30 kHz**	**TDMA Only**	**Single channel**
Variable Bandwidth	**0.1 to 15 MHz**	**CDMA, TDMA, & Analog**	**Multiple channels (any channels within the bandwidth selected by the repeater software)**

As far as the measurement seen on page 138 which indicates a level above FCC limit of –13 dBm, it is an inband IM that is a result of two CDMA signals which is not specificed for inband IM in part 22. The intention of this measurement was to show out of band compliance. The measurements on page 78 & 92 do exhibit some signal degradation but the input signal plot on page 79 is also indicating spectral re-growth. The poor input signal source with spectral re-growth is the reason for an apparent signal degradation not the performance of the repeater.

We have not located an explanation of the number of channels per module and how they affect the total RF output power and the RF output power per channel. We need this information to complete the grant. Please cover all intended RF output power levels.

In order to protect the repeater amplifiers from overload and to prevent the system from spurious emission, the repeater have an Automatic Level Control, designed to limit the output power to a defined level. The power amplifiers are limited by the spurious output that they produce given the peak power of the composite input signal. The allowable power per carrier must, therefore, decrease as the number of RF carriers from the donor system increases. It is also dependent on the modulation format of the donor system since certain modulation types have a higher peak-to-average ratio than others do. We have issued guidelines for output power versus number of carriers (up to 8) in the specification of the repeater. Table 4 indicates the RF output power versus number of carriers per modulation format.

Please confirm that the amplifier is used only as a repeater.
RF output power levels

This product is strictly used as a repeater. The repeater is a wide-band device when the Variable Bandwidth Module is installed and a narrow-band device when the Channel Modules are installed. The RF power output is dependent on the number of RF channels amplified and the capacity of the multicarrier PA's (See Table 4).

Please explain the variable bandwidth feature of the amplifier, its control, the maximum and minimum bandwidths, identify the measurements taken in the variable bandwidth mode and confirm that the measurement data was worst-case for the variable bandwidth mode.

The repeater software controls bandwidth of the Variable Bandwidth Module is adjusted through the user inputs. The user must determine what frequency range to amplify and set the filter accordingly. The Variable bandwidth module has a bandwidth range from minimum of 0.1MHz to a maximum of 15 MHz. All data was taken with the Variable Bandwidth Module set at 15 MHz that is worst-case..

The items indicated above must be submitted before processing can continue on the above referenced application. Failure to provide the requested information within 60 days of the original e-mail date may result in application dismissal pursuant to Section 2.917 (c) and forfeiture of the filing fee pursuant to section 1.1108.

DO NOT reply to this e-mail by using the Reply button. In order for your response to be processed expeditiously, you must upload your response via the Internet at www.fcc.gov, Electronic Filing, OET Equipment Authorization Electronic Filing. If the response is submitted through Add Attachments, in order to expedite processing, a message which informs the processing staff that a new exhibit has been submitted must also be submitted via Submit Correspondence. Also, please note that partial responses increase processing time and should not be submitted.

Any questions about the content of this correspondence should be directed to the e-mail address listed below the name of the sender.