

## Testing the Phazor for FCC Part 15 Certification:

The Phazor system uses a swept frequency transmitter that is gated on and off at a frequency of 667Hz. The sweep technique, definition, and measurement is the same as used and previously agreed upon by the FCC for similar devices manufactured by Checkpoint Systems Inc. and Ketec Inc. See included documents from Ed Gibbons and Rich Fabina of the FCC.

1. The Phazor will produce 8 pulsed emissions at 8 different frequencies. The generation and transmission of these frequencies constitutes the fundamental frequency band and will be considered as a frequency hopping swept emission. The bandwidth is considered to be the spectrum between the lowest and highest pulsed frequencies and is greater than 10%. This satisfies the swept frequency requirement of Section 15.205(d).
2. The 8 frequencies will be considered as one fundamental frequency centered at 8.175 MHz.
3. The ratio of the maximum restricted band infringed upon divided by the fundamental emission bandwidth must be less than 1% to satisfy Section 15.205.
4. The transmitter is microprocessor controlled and is not capable of stopping in any restricted band. By its' inherent design, the transmitter is also incapable of stopping the sweep during measurements.
5. Fundamental and harmonic emissions up to 10 MHz will be measured at their true peak value according to the analyzer. To measure true peak, the analyzer is set to a frequency span of 6-10 MHz, peak detector, 300KHz Bandwidth, in the "max hold" condition. (Increasing the bandwidth beyond 300KHz does not increase the peak reading.) The peak reading of the displayed emission is then compared to the average limit of 15.223 (100uv/m @ 30m or 40dbuv/m) plus 20db. The corrected limit will be 60dbuv/m @ 30m. This is done due to the swept and pulsed nature of the transmission and in agreement with the FCC.
6. Emissions above 10 MHz will be made using CISPR quasi-peak measurements.
7. Conducted emissions remain as specified in Part 15 rules.

Included are a copy of the FAX from Ed Gibbons to Checkpoint Systems, dated 8/2/96, agreeing with the above measurement method, a reprint of text for clarity, and a copy of the email from Rich Fabina to Ketec Inc. confirming the same method for a similar Ketec product.

Text clarification of the Ed Gibbons Fax. Corrections made by Mr. Gibbons edited in.

*Dear Mr. Gibbons,*

*Following up on our recent phone conversations, please confirm and if necessary correct our understanding of the points discussed below. Based on the details of our fax dated 7/3/96.*

- *Our pulsed emissions will be treated as frequency hopping, where the bandwidth will be considered the spectrum contained between the lowest and highest carrier frequency we pulse.*
- *A simple ratio of the maximum single restricted band infringed upon divided by the bandwidth of our fundamental emission must be less than 1% to satisfy section 15.205 of the rules.*
- *For fundamental and harmonic emissions in the band 1.705 - 10 MHz, a 20db reduction from the true peak is to be compared to the limits of 100 uv/m at 30 meters. The unit is modulated as normally installed. True peak refers to the point at which the analyzer bandwidth is adjusted for maximum pulse desensitization.*
- *For emissions outside the 1.705 - 10MHz band, CISPR quasi-peak measurements will be made with the unit modulating as normally installed. Based on the bandwidth plot, care must be given to measure multiples of the worst case emission points. Limits are specified in section 15.209.*
- *Conducted emissions remain as specified in part 15 of the rules.*

A copy of the fax from Ed Gibbons to Checkpoint and the email from Rich Fabina to Ketec:

MAR 13 '07 10:19 TO: 912105223396  
JUL 29 '00 15:10 TO: 918313446664

FROM: CHECKPOINT SYSTEMS INC  
FROM: CHECKPOINT SYSTEM INC

T-045 P. 02/02 --071  
T-031 P. 01/02 F-074



**CHECKPOINT SYSTEMS, INC.**  
**FACSIMILE TRANSMISSION COVER**

To: F.C.C. Lab

Date: 7/26/96

Attention: Mr. Ed Gibbons

Fax To: (908) 344-3088

No. of Pages: 2  
(Incl. Cover)

From: Mr. Gregory L. Sleet  
CHECKPOINT SYSTEMS, INC.  
181 WOLF DRIVE, P.O. BOX 188  
THIRTOP, N.J. 08086

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Dear Mr. Gibbons:

Following up on our recent phone conversations, please confirm and if necessary correct our understanding of the points discussed below. Based on the details of our fax dated 7/3/96:

- ✓ • Our pulsed emissions will be treated as frequency hopping, where the bandwidth will be considered the spectrum contained between the lowest and highest carrier frequency we pulse.
- ✓ • A simple ratio of the maximum single restricted band inflected upon divided by the bandwidth of our fundamental emission must be less than 1% to satisfy section 15.205 of the rules.  
*in the band 1.705-1.875 MHz*
- • For fundamental and harmonic emissions below 30 MHz, a 20 dB reduction from the true peak is to be compared to the limits of 100uV/meter and 30uV/meter respectively at 30 meters. The unit is modulated as normally installed. True peak refers to the point at which the analyzer bandwidth is adjusted for minimum pulse deconvolution.
- • For harmonics above 30 MHz, CISPR quasi-peak measurements will be made with the unit modulating as normally installed. Based on the bandwidth plot, care must be given to measure multiples of the worst case emission points. Limits are as specified in section 15.209.  
*emissions outside the 1.705-1.875 MHz band*
- ✓ • Conducted emissions remain as specified in part 15 of the rules.

*Ed Gibbons*  
8/2/96

**Rich F**

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**From:** Rich Fabina <RFABINA@fcc.gov>  
**To:** <richfro@snip.net>  
**Sent:** Friday, May 18, 2001 11:21 AM  
**Subject:** Re: Rule Interpretation

Rich,

Yes, the attached meets the conditions in our (Checkpoint) interpretation for frequency hopping field disturbance sensors to meet the swept frequency field disturbance sensor requirements in Section 15.295(d)(1) of the FCC Rules.

Please attach a copy of this correspondence to the application filed for this modified device.

I trust that this has responded to this inquiry.

Rich Fabina

>>> "Rich F" <richfro@snip.net> 05/15/01 11:50AM >>>

Dear Mr. Fabina,

Thank you for your recent response to my inquiry. Although we do not agree with your assessment, we are proposing an alternate method that we believe will meet all of the requirements (1-5) that you indicated in Section I of your reply. We propose the following:

1. Our device will produce 8 randomly sequenced pulsed emissions at 8 discrete frequencies which will be treated as frequency hopping, where the bandwidth will be considered the spectrum between the lowest and highest carrier frequency that we pulse. Frequency hopping satisfies the swept frequency requirement of Section 15.205(d). This method was agreed to between Ed Gibbons and Checkpoint Systems.
2. The generation and transmission of these 8 discrete frequencies constitutes the fundamental, which is centered at 8.11MHz and has a 1.1MHz bandwidth. Although there are 8 individual frequencies used, together they constitute the fundamental operating frequency or frequency band of the device. They are not 8 individual fundamentals.
3. The transmitter will be microprocessor controlled and will not be capable of transmitting in or stopping in any restricted band as per Section 15.205 of the rules. The frequencies proposed are:  
7.500000 MHz, 7.648077 MHz, 7.799078 MHz, 7.953059 MHz  
8.110081 MHz, 8.270204 MHz, 8.433487 MHz, 8.600000 MHz.
4. A simple ratio of the maximum restricted band infringed upon divided by the bandwidth of our fundamental emission (see item 1) must be less than 1% to satisfy Section 15.205 of the rules.

5/18/01

5. For the fundamental and harmonic emissions in the band between 1.7 MHz to 10 MHz, a 20db reduction from the true peak is to be compared to the limits of 100 uV/meter @ 30 meters. The unit will be modulated (pulsed) in its normal operating condition to produce the maximum emission level. True peak refers to the point at which the analyzer bandwidth is adjusted for minimum pulse desensitization.
6. For emissions outside the 1.705 MHz to 10 MHz band, CISPR quasi-peak measurements will be made with the device in the maximum emission level mode as described in item 5 above. Limits specified in Section 15.209 shall apply.
7. Conducted emissions remain as specified in Part 15 of the Rules.

Before we proceed with the expense and time required to redesign our product, please review this proposal and verify that it will meet the requirements of Section 15.205(d). Thank you.

Sincerely,

Rich Frohbergh  
Ketec Inc.  
richfro@snip.net

5/18/01