

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION**

In the Matter of)	
Inquiry Regarding Carrier Current Systems)	ET Docket No. 03-104 and
Including Broadband Power Line Systems)	ET Docket No. 04-37; FCC 04-29

**COMMENTS OF
SATIUS, INC.**

Satius, Inc. (“Satius”), respectfully submits its comments in response to the Federal Communication Commission’s (“Commission”) Notice of Proposed Rule Making regarding Carrier Current Systems, specifically Broadband over Power Lines (“BPL”) systems.¹

I. INTRODUCTION AND SUMMARY

Satius is pleased with the Commission’s focus on the deployment of BPL systems and shares the Commission’s belief that BPL systems can coexist, without interference, with preexisting power line infrastructures with minimal changes to its Part 15 rules.² As noted by the Commission, in the *BPL NOI*, as power lines reach nearly all communities in the United States, BPL can become a significant competitive method of providing broadband infrastructure to the residential market as well as rural and other underserved areas.³ Accordingly, the Commission has sought to obtain information on BPL technologies and evaluate possible adjustments to its Part 15 rules.

Satius contends that with minimal changes to the Commission’s Party 15 rules, as outlined below, BPL can be deployed without any low frequency disturbance in or out of a home

¹ *Inquiry Regarding Carrier Current Systems Including Broadband over Power Line Systems*, Notice of Inquiry, FCC 03-100, ET Docket No. 03-104 (rel. Apr. 28, 2003) (“*BPL NOI*”).

² Part 15 rule regulate carrier current systems that operate on an unlicensed basis, *see* 47 C.F.R §15 *et al.*

³ *BPL NOI* at ¶1.

or office. Furthermore, with standard equipment and power line communications systems, BPL can operate seamlessly within the frequency ranges of traditionally mature communications devices, such as television, radio and cellular phones. In order to allow this technology to develop such that it may become a competitive broadband technology, the Commission should establish emission limits for Access BPL Systems provided over utility poles and medium voltage electric power lines, as well as In-House BPL Systems, provided inside a building.⁴

II. BACKGROUND

Satius was established in 1992 to develop and license power line carrier technology and has obtained numerous patents for such Power Line Communication (“PLC”) technology. Satius-developed technologies can simultaneously transmit and receive signals at multi-channel frequency bands over power lines, with minimal and stable emission at operating frequencies with very low signal harmonics. In 1994, Satius began the production of its patented digital signal processing (“DSP”) BPL technologies for video, voice, and data at 2-30 Mhz frequency bands. Currently, one of Satius’ licensees is selling multi-channel power line video transmitters and receivers for security applications as well as multi-channel transmission and receiver devices that are placed in moving vehicles. Both types of products have been successful in international markets.

Satius’ most recent technology for the broadband “last mile” solution will provide the following: (1) very high-speed communications from each home to electric utility substation; (2) bidirectional connection from electric utility hubs to distribution transformers that do not require the traditional bridging devices to bypass the distribution transformers; (3) communications at greater distances than most current BPL technologies and requirement of

⁴ See *BPL NOI* at ¶3.

fewer line repeaters; and (4) stable and reliable signals with low emission at the operating frequencies and very low harmonics, measured only in the noise floor. TEST 1 and 2 shows emission measurement with a biconical antenna at 1 meter away from the transmitter and from 1 meter above ground. TEST 1 emission measurement was conducted with a 238 Mhz carrier frequency OFDM transmission system over the power line that clearly show no sign of harmonics. TEST 2 emission measurement was conducted for a 21 Mhz carrier frequency FM transmission system over the power line that clearly shows no sign of harmonics.

III. SATIUS RECOMMENDATIONS TO THE NPRM

4. Please note that Satius Access BPL systems operate in several different bands from 2 Mhz to several Ghz carrier frequencies. Satius recommends to use the frequency bands above 1 Ghz for Access BPL because the emission from the transmitter for such high frequencies goes down much faster than that from transmitter operating at lower than 30 Mhz frequency bands. Therefore BPL interference can be virtually eliminated.

Existing Part 15 Rules for BPL

5. OK

Notice of Inquiry

6. OK

7. OK

8. OK

9. Satius would like to add that Satius technology can reduce emission in certain bands by more then 40 dB where interference to other devices would occur otherwise.

Since Satus technologies do not have harmonics nor any IM products and Satus emission is stable from one location to the other even at different times therefore Satus can propose to reduce emission by at least 40dB at certain interfering frequencies. Consequently, Satus is proposing to adapt a RELAXING rule, which would say: If any BPL technology is capable to reduce emission at some of its transmission frequencies by at least 40 dB for interference control and create lower than -100 dBm level harmonics emission measurement and create no IM products and thereby will not interfere with any licensed devices in the area of operation then FCC would allow 10 dB higher emission from such devices than what the its part 15.109 Class A FCC rules allow.

Definition of Access BPL

10. OK

Access BPL Emission Limits

11. OK. Satus would like to add the RELAXING rule, which would say: If any BPL technology is capable to reduce emission at some of its transmission frequencies by at least 40 dB for interference control and create lower than -100 dBm level harmonics emission measurement and create no IM products and thereby will not interfere with any licensed devices in the area of operation then FCC would allow 10 dB higher emission from such devices than what the its part 15.109 Class A FCC rules allow.

12. Satus recommend to use the magnetic loop antenna to measure emission below 30 Mhz and to use the electric field sensing antenna to measure emission above 30 Mhz for both overhead and underground power lines and both antennas placed 1 meter above ground.

13. Satus believes that the measures herein are adequate and no further requirements are needed.

14. OK. Satus would like to add the RELAXING rule, which would say: If any BPL technology is capable to reduce emission at some of its transmission frequencies by at least 40 dB for interference control and create lower than -100 dBm level harmonics emission measurement and create no IM products and thereby will not interfere with any licensed devices in the area of operation then FCC would allow 10 dB higher emission from such devices than what the its part 15.109 Class A FCC rules allow.

Access BPL Operational Requirements

15. OK. Satus BPL technology can reduce power level transmission and can shut down certain frequency bands to avoid interference.

16. Satus BPL technology can reduce power level transmission and can shut down certain frequency bands to avoid interference.

17. Satus BPL technology can reduce power level transmission and can shut down certain frequency bands to avoid interference. Satus technology does not have harmonics nor IM products therefore Satus can reduce emission at certain frequency bands by 40dB to avoid any harmful interference should be adequate.

18. OK

Equipment Authorization and Measurement Guidelines

19. OK

20. OK. Satus agrees that emission measurements need to be made on 3 different locations and move the antenna down the line in parallel to the power line starting from the Access BPL equipment location to find the maximum emissions.

21. Satus opinion is that bringing the antenna up at 30 feet above the ground will serve no purpose, since at higher then 1 Ghz frequencies the coaxial cable that connects the

antenna will become an antenna itself and it will only bring constant dispute on how to calculate the real emission. Furthermore, if the standard emission measurement for all electronic devices is to use an antenna 1 meter above ground then so shall be BPL too. Remember the final goal is to avoid harmful interference and the antenna at 1 meter above the ground will measure the right and standard emission. Consequently, for both overhead and underground power lines and with either loop antenna or with electronic field sensing antenna the distance from the ground shall be the same standard as to any other electronic devices which is 1 meter. These type of measurements will capture the maximum emission from the power line.

22. (a) For both overhead and underground power lines and with either loop antenna or with electronic field sensing antenna the distance from the ground shall be the same standard as to any other electronic devices which is 1 meter. FCC should keep these measurements simple and easy because the final goal is only to avoid harmful interference. FCC should concentrate on making sure that BPL devices can shut down frequency bands or certain transmitters which interfere with licensed devices.

(b) It is not going to be safe or practical to measure emission at 11 meters above ground with an antenna. For example, every year at least one person dies in USA because the mid-voltage line is touching a branch of tree, which will be touched by someone. Satus does not even believe any utility company would allow to bring an antenna close to the mid-voltage line and to turn it even around. Satus does not think correction factor is needed to capture the maximum emission from an overhead line especially if the antenna will be moved around the area to find the maximum level of emission. If a BPL device does not match to the power line characteristic impedance and thereby it will cause serious emissions an antenna 1 meter above ground will measure such high emission.

In Satus' 20 years power line communication experience, if a PLC device does not match the power line characteristic impedance that device in at least one direction at any location will emit power at least 30 dB higher than what is allowed. Therefore there is no need to use any correction factors for calculation or to bring the antenna up in the air. A 3 store house where an in-house power line communication device will be communicating the emission could come from 11 meter height yet we do not believe a correction factor will need to be used or an antenna that will be up at 11 meter high in the air. The bottom line remains whether that BPL device will cause any harmful interference to licensed users or not. Therefore, all antennas shall be at 1 meter above the ground for BPL emission measurements.

23. Due to the change of power line characteristic impedance in time and in location Satus does not recommend to adapt conductive measurement limitations for BPL. Emission limitation shall be conducted as it was outlined before by FCC rule 15. Measure emission for BPL with antennas 1 meter above ground at 10 meter distance from the transmitter for Class A devices. Measure emission at different houses and around the houses.

24. OK.

III. CONCLUSION

For the reasons discussed above, Satus recommends that the Commission establish frequency limit standards for Access BPL Systems and In-House BPL Systems which are equivalent to current wire and wireless systems as discussed and which promote the deployment of BPL as a alternative, competitive broadband solution.

Respectfully submitted,

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