Hunt Technologies, Inc.
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22 September 2005

TÜV America Inc, TCB
10040 Mesa Rim Road
San Diego CA 92121

RE: FCC ID: submittal as limited modular device
AirPoint Focus (AirPoint transmitter board)

1. The modular transmitter must have its own RF shielding. This is intended to ensure that the module does not have to rely upon the shielding provided by the device into which it is installed in order for all modular transmitter emissions to comply with Part 15 limits. It is also intended to prevent coupling between the RF circuitry of the module and any wires or circuits in the device into which the module is installed. Such coupling may result in non-compliant operation.

   The AirPoint transmitter board is mounted on the Focus Board which is only integrated into a Landis + Gyr Focus Meter. The AirPoint board was tested standalone because there are different meter forms for the Focus meter. Since the AirPoint board does not have it's own shielding on all sides, it could not be tested in an entirely standalone configuration, therefore requiring a limited modular approval application. Since there is ground plane on the back of the AirPoint board behind the RF section, that part of it is considered shielded. The front side, however, is not shielded. Since the Focus meter is the only thing past the plane of the front side of the AirPoint board, it was determined by Joe Dichoso of the FCC and Matt Karlgaard of Hunt Technologies, that it should be tested in a "standalone" configuration with the Focus board attached. *[FCC Communication attached.]* Since the Focus board is the same for all meter forms, it would cover everything needed for the approval. In order to allow the AirPoint board to stand up correctly, it was tested with the front part of the Focus meter housing and the Focus board attached. This provided the correct operating voltages (rather than using external dc power supplies), etc. The use of the Focus meter base did not provide any external shielding or filtering for the AirPoint board, so in effect it is a stand alone configuration. The housing used during testing is all plastic and will be present in every configuration.

   The Landis + Gyr housing part number is 70807.
   The Landis + Gyr Focus Board part number is 71216.
   The Landis + Gyr meter bases in which the AirPoint board may be installed are:

1S CL100, 120V	2K CL480, 240V	4S CL20, 240V
2S CL200, 240V	3S CL20, 120V	12S CL 200, 120V
2SE CL320, 240V	3S CL20, 240V	25S CL 200, 120V

2. The modular transmitter must have buffered modulation/data inputs (if such inputs are provided) to ensure that the module will comply with Part 15 requirements under conditions of excessive data rates or over-modulation.

   The AirPoint microprocessor communicates with the Focus meter to read the applicable data that it must transmit. It then provides modulation to the RF section. Therefore, the data rate of the communications between the AirPoint board and the Focus meter has no bearing on the data rate of the transmitted signal. In other words, there is no way for the Focus meter to make the AirPoint board transmit excessive data rates or over-modulate.

3. The modular transmitter must have its own power supply regulation. This is intended to ensure that the module will comply with Part 15 requirements regardless of the design of the power supplying circuitry in the device into which the module is installed.

   The AirPoint board takes +8 to +18 V DC from the Focus board and regulates it down to +5Vdc and +3.6Vdc. The regulated +5Vdc and +3.6Vdc supplies are used in the RF circuit.

   The Focus meter is powered by 220-240VAC since it is an electric meter for a residence and the feeds to most residences are 240VAC. However, the Focus meters that will be used with the AirPoint board will be powered with anywhere from 120VAC to 208V 3 phase. This falls under the FCC guideline for measuring a device which draws its power from a device which connects to the AC mains, it must be demonstrated that it does not cause the device which connects to the AC mains to become non-compliant. If it can be demonstrated that it will be compliant in a representative host, it does not have to demonstrate compliance in every possible host. Thus, the testing proves the AirPoint board, when connected to a compliant host connected to the AC mains, allows the host to remain compliant. The host that was provided for the testing operated at 60 Hz 220VAC.

4. The modular transmitter must comply with the antenna requirements of Section 15.203 and 15.204(c). The antenna must either be permanently attached or employ a "unique" antenna coupler (at all connections between the module and the antenna, including the cable). Any antenna used with the module must be approved with the module, either at the time of initial authorization or through a Class II permissive change. The "professional installation" provision of Section 15.203 may not be applied to modules.

   The antenna is integral to the printed circuit board.

5. The modular transmitter must be tested in a stand-alone configuration, i.e., the module must not be inside another device during testing. This is intended to demonstrate that the module is capable of complying with Part 15 emission limits regardless of the device into which it is eventually installed. Unless the transmitter module will be battery powered, it must comply with the AC line conducted requirements found in Section 15.207. AC or DC power lines and data input/output lines connected to the module must not contain ferrites, unless they will be marketed with the module (see Section 15.27(a)). The length of these lines shall be length typical of actual use or, if that length is unknown, at least 10 centimeters to insure that there is no coupling between the case of the module and supporting equipment. Any accessories, peripherals, or support equipment connected to the module during testing shall be unmodified or commercially available (see Section 15.31(i)).

   The transmitter was tested in a stand-alone configuration per number 1 above.

6. The modular transmitter must be labeled with its own FCC ID number, and, if the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: XYZMODEL1" or "Contains FCC ID: XYZMODEL1." Any similar wording that expresses the

same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or, must provide adequate instructions along with the module which explain this requirement. In the latter case, a copy of these instructions must be included in the application for equipment authorization.

The FCC ID is contained on a label on the AirPoint board itself as well as on a label on the outside of the meter saying "Contains FCC ID: TEB-AIRPT622 / IC: 5931A-AIRPT622"

7. The modular transmitter must comply with any specific rule or operating requirements applicable to the transmitter and the manufacturer must provide adequate instructions along with the module to explain any such requirements. A copy of these instructions must be included in the application for equipment authorization. For example, there are very strict operational and timing requirements that must be met before a transmitter is authorized for operation under Section 15.231. For instance, data transmission is prohibited, except for operation under Section 15.231(e), in which case there are separate field strength level and timing requirements. Compliance with these requirements must be assured.

   There are no special setup or operating conditions the installer or end user needs to be made aware of in order to make sure the transmitter operation complies with FCC Part 15 Subpart C Section 15.249.

8. The modular transmitter must comply with any applicable RF exposure requirements. For example, FCC Rules in Sections 2.1091, 2.1093 and specific Sections of Part 15, including 15.319(i), 15.407(f), 15.253(f) and 15.255(g), require that Unlicensed PCS, UNII and millimeter wave devices perform routine environmental evaluation for RF Exposure to demonstrate compliance. In addition, spread spectrum transmitters operating under Section 15.247 are required to address RF Exposure compliance in accordance with Section 15.247(b)(4). Modular transmitters approved under other Sections of Part 15, when necessary, may also need to address certain RF Exposure concerns, typically by providing specific installation and operating instructions for users, installers and other interested parties to ensure compliance.

   The FASY-0622-0001-NS AirPoint Focus complies with the RF exposure limits for humans as called out in FCC 2.1091 (mobile >20 cm) or 2.1093 (portable <20 cm) and RSS-210 (14). The transmitter is used to send data to meter readers. It is exempt from RF Evaluation based on its operating frequency of 913.67-916.14 MHz, and transmitted power of 445 microwatts based on: Ptrans = (4*pi()*Distance^2)/377 * (E(field)/(1*10^6))^2 = (4*pi()*3^2)/377 * (38503.5/(1*10^6))^2 = 0.000444745 W. This would be less than the 1.5 watts requirement for a mobile device and the 0.200 watts requirement for a portable device operating at 913.67-916.14 MHz.

Sincerely,

Dave Olson
Director of Engineering
Tele: (218) 562-5547
Fax: (218) 562-4878
daveo@turtletech.com

EMAILS REGARDING FCC DISCUSSIONS ON LIMITED MODULAR APPROVAL

-----Original Message-----
From: Joe Dichoso [mailto:Joe.Dichoso@fcc.gov]
Sent: Wednesday, June 01, 2005 11:51 AM
To: Matt Karlgaard
Cc: Joe Dichoso
Subject: RE: Limited modular approval

Hello Matt,
Yes, a standalone test with the boards attached. You will get a Limited Modular Approval. The module must be OEM installed in water meters with the specific L&G boards and will be installed as indicated in the Certification filing.
Regards,
Joe

-----Original Message-----
From: Matt Karlgaard [mailto:mattk@turtletech.com]
Sent: Wednesday, June 01, 2005 12:33 PM
To: Joe Dichoso
Subject: RE: Limited modular approval

Joe,

Indicating how we will control the install with only L&G boards and no other circuit boards will not be a problem. I will test standalone with the L&G PCB board. I have tried getting a hold of you to clarify this, but since I have been unable to reach you, I am moving forward in that direction.

Does this mean I will only have to run one test? (standalone with our PCB attached to the L&G PCB)

Matt

-----Original Message-----
From: Joe Dichoso [mailto:Joe.Dichoso@fcc.gov]
Sent: Tuesday, May 31, 2005 1:00 PM
To: Matt Karlgaard
Cc: Joe Dichoso
Subject: RE: Limited modular approval

Hello Matt,
You need to indicate how you will be able to control the installation of the LMA with only the Landis and Gyr PCB boards. You also need to indicate how you will ensure that the device will be installed in specific meters with no other circuit boards. If you can ensure these installation conditions, you can get a LMA with the appropriate grant conditions. You will still need to test standalone, but I suggest testing with the Landis and Gyr PCB boards.

Regards,
-Joe

-----Original Message-----
From: Matt Karlgaard [mailto:mattk@turtletech.com]
Sent: Tuesday, May 31, 2005 12:49 PM
To: Joe Dichoso
Subject: Limited modular approval

Joe,

I spoke with you earlier today on the phone. I would like to get limited modular approval for the T300 PCB for use with any Landis & Gyr "Focus" solid state electric meter.

The T300 circuit board is shown by itself in pictures 6 and 7. Picture 6 shows the side of the circuit board that the transmitter circuitry is on. Picture 7 shows the side of the circuit board that shields the transmitter circuit from the back of the meter. In both pictures 6 and 7, the area that the transmitter occupies is circled in red.

I was mistaken when I spoke with you on the phone and told you that all the meter circuitry is behind the plane of the sheilding surface of our PCB. Some of it is behind it, and some is on the side of the transmitter. Pictures 1, 2, and 4 show an earlier version of our circuit board with some of the meter plastic cut off. The product is in its final configuration. Pictures 5 and 8 show the view of the inside of the meter when it is taken apart. Picture 8 has our board installed and picture 5 has no board installed and the 10-pin connector is visible. Picture 9 shows the difference between a Landis & Gyr 1S and 2S meter. The black piece is the base of the meter and is the part that plugs into the meter socket. You can see there is a toroid around only 1 of the incoming lines on the 1S meter (on the bottom in picture 9) and the toroid is around both lines of the 2S meter (on top of picture 9).

In any case, to get a limited modular approval for this product, I am thinking we would need to test it in one or more of its final configurations as shown in these pictures. Do you agree?

Since the back of the circuit board sheilds the transmitter portion from the base of the meter, will we be able to get a Limited Modular Approval for this product without having to test it in all the different meter types we plan to sell? Note that the back of the circuit board doesn't sheild the transmitter portion of our PCB from the Landis and Gyr PCB, which may change from meter to meter. However, if we could guarantee that the Landis and Gyr meter PCB will not change, could we get a LMA for this without retesting all types of meters?

I am leaving the office at 2:00 CST today. I will be driving 2 hours to an FCC-approved test lab tomorrow morning. If you can get me a response by 2:00 CST (in 2 hours and 15 minutes), that would be ideal. If not, please let me know by that time when you will be able to get back to me. I could come back in and check my email later in the evening if I know I will hear back from you by then.

Regards,
Matt Karlgaard
RF Engineer
Hunt Technologies, Inc.
Pequot Lakes, MN 56472
(218)562-5198

Hunt Technologies, Inc.

6436 County Rd. 11
Pequot Lakes, MN 56472
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August 16, 2005

TCB
TÜV America Inc
10040 Mesa Rim Road
San Diego CA 92121

Re: Request of Confidentiality

Pursuant to Sections 0.457(d)(1)(ii) and 0.459 of the Commission's Rules, the Applicant hereby requests confidential treatment of information accompanying as outlined below:

- Schematics

The above materials contain trade secrets and proprietary information not customarily released to the public. The public disclosure of these matters might be harmful to the Applicant and provide unjustified benefits to its competitors. Since the end user won't be able to seethe AirPoint board when it is in its installed state (inside the meter), it is reasonable to hold the photographs confidential since they contain trade secrets and proprietary information.

The Applicant understands that pursuant to Rule 0.457(d)(1)(ii), disclosure of this Application and all accompanying documentation will not be made before the date of the Grant for this Application.

Sincerely,

Dave Olson
Director of Engineering
Tele: (218) 562-5547
Fax: (218) 562-4878
daveo@turtletech.com

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22 September 2005

TCB
TÜV America Inc
10040 Mesa Rim Road
San Diego CA 92121

To Whom It May Concern:

Hunt will be producing the AirPoint Focus module to be used in the Landis + Gyr solid state residential meter.

The AirPoint Focus module will be produced by Hunt Technologies, Inc and shipped directly to Landis + Gyr Inc. manufacturing facility located in Renosa, Mexico. The module will be integrated into the Landis + Gyr solid state residential electricity meter in a controlled manufacturing environment.

The manufacturing environment will assure that a module will not be wrongfully installed into an encompatible metering device or application that will violate our specified FCC approved application.

Hunt Technologies, Inc will not offer an option that would allow an end user to install AirPoint modules into any other electricity meter. This will alleviate the chance of wrongful use of the AirPoint module, thus violating our FCC approval.

Landis + Gyr contact:

Principal Engineer
Greg Dykstal
765.429.1451 Office

Sincerely,

Joe Klucas
Vice President Operations
Hunt Technologies, Inc
218 562 5588

September 22, 2005

TCB
TÜV America Inc
10040 Mesa Rim Road
San Diego CA 92121

To Whom It May Concern:

Landis+Gyr Inc. will assemble the AirPoint Focus electricity meter in its Reynosa, Mexico, manufacturing facility in accordance with installation instructions provided by Hunt Technologies, Inc.

The AirPoint Focus is an integrated assembly consisting of the AirPoint module produced by Hunt Technologies, Inc and the Focus solid-state residential electricity meter produced by Landis+Gyr in Reynosa, Mexico. The AirPoint module will be shipped directly to Reynosa from Hunt Technologies, Inc contract manufacturing facilities.

The Landis+Gyr manufacturing environment will assure that an AirPoint module will be installed in Focus meter housing part number 70807 and interconnected to the Focus measurement board part number 71216 and not be wrongfully installed into an incompatible metering device.

Sincerely,

Greg Dykstal
Engineering Project Manager
Landis+Gyr Inc.
2800 Duncan Road
Lafayette, IN 47904
765.429.1451

cc: L. Hernandez, A. Williams, M. Karlgaard, S. AlRawi, C. McGuire