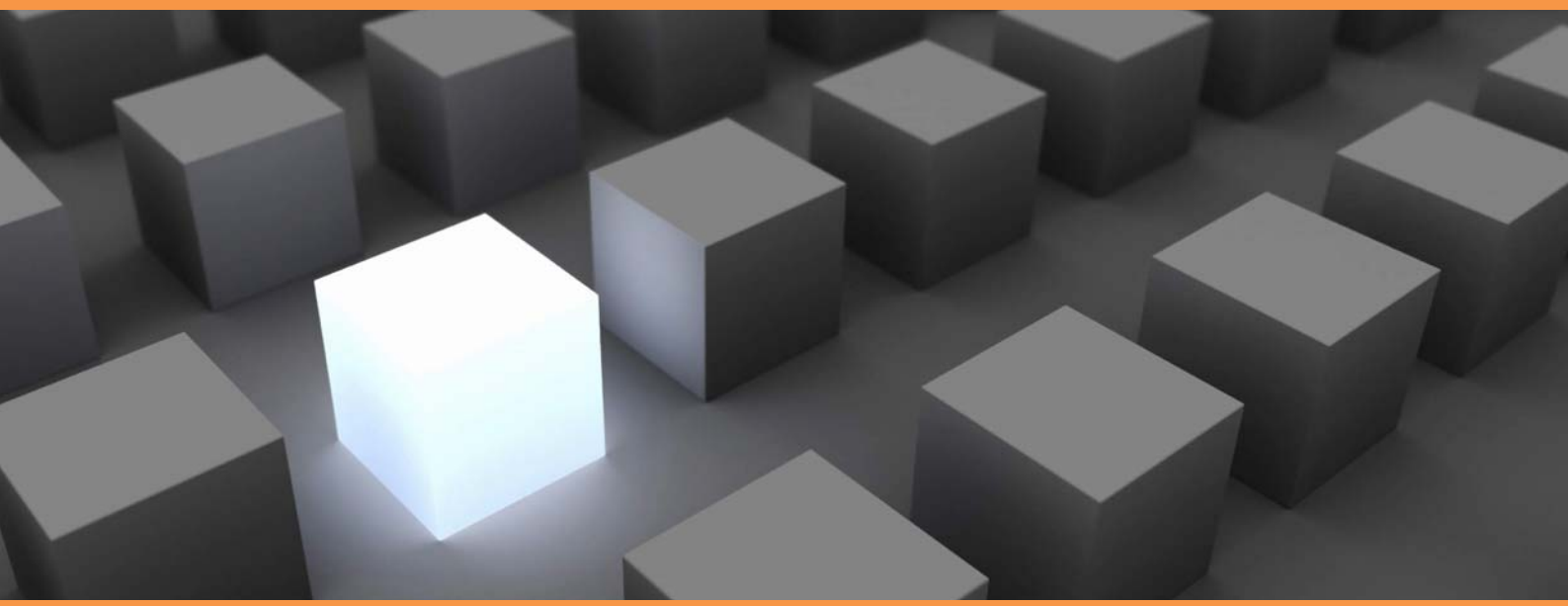
SYMEO LOCAL POSITIONING RADAR

Product: LPR-1DHP

Additional Documentation: FCC Certification Documentation – FCC ID RF Transmitter Feature



Content

The documentation for the LPR-1DHP Local Positioning Radar System is published by:

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HISTORY

Version	Date	Description
1.0	28.2.2012	Initial Release

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1 Preface

1.1 FCC Part 15.255 (i)

FCC Part 15.255 (i) requires, that systems with a peak power of more than 0.1 Watts, transmit a transmitter identification block with at least the following information:

- FCC-Identifier (factory programmed)
- Manufacturer serial number (factory programmed)
- 24 Byte user data for identification of a specific device (user programmable)

This transmitter identification block hast to be transmitted at least once per second.

For customers which only buy one LPR-1DHP device, Symeo provides a second LPR-1DHP device upon request at no cost for receiving and decoding the FCC transmitter.

2 Symeo transmitter identification system

The Symeo LPR-1DHP System transmits its FCC Identifier Block by means of an FSK modulation. The FCC Identifier block consists of 61 Bytes of data.

Figure 1 shows which data is transmitted in the FCC Identifier Block.

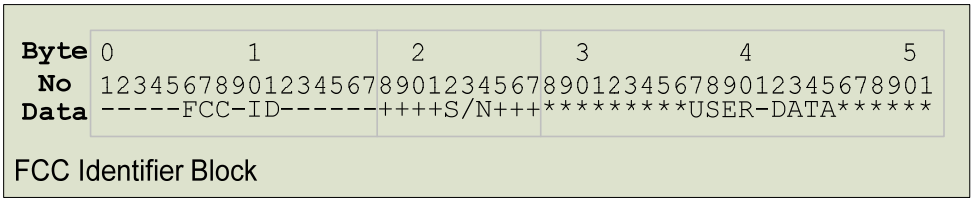

Figure 1: FCC Identifier Block

3 User Data Programming

The user data block consists of 24 Bytes. This data can be programmed by the user from the main menu. The recommended use of the user data is to enter data for contacting the operator of the LPR 1DHP system.

4 Transmitting the FCC identifier block

The FCC identifier data is transmitted by the following FSK modulation scheme:

- Carrier frequency: 61.006 GHz
- Deviation: ±2 MHz
- Signal duration: approx. 500 µs / Bit
- Transmitted frequency (space / bit = 0): 61.008 GHz
- Transmitted frequency (mark / bit = 1): 61.004 GHz

The FCC Identifier block is transmitted in symbols of 1 byte length. One start bit (logic high) is added to each symbol, thus 9 bits are transmitted per symbol. The symbols are transmitted when the LPR-1DHPs signal generator is not used for generating the measurement sweeps. 2 symbols can be transmitted in each measurement cycle. Thus, at a measurement rate of 40Hz up to 80 symbols can be transmitted per second.

Figure 2 depicts the repeated transmission of the data sequence 0x33 = 00110011. Two measurement cycles are shown. In the example given here, the following bits are transmitted during each cycle (from left to right).

- 1x logic high (start bit for first symbol)
- 2x logic low (first two bits of symbol 0x33)
- 2x logic high (second two bits of symbol 0x33)
- 2x logic low (third two bits of symbol 0x33)
- 3x logic high (last two bits of symbol 0x33 + start bit for next symbol)
- 2x logic low (first two bits of symbol 0x33)
- 2x logic high (second two bits of symbol 0x33)
- 2x logic low (third two bits of symbol 0x33)
- 2x logic high (last two bits of symbol 0x33)

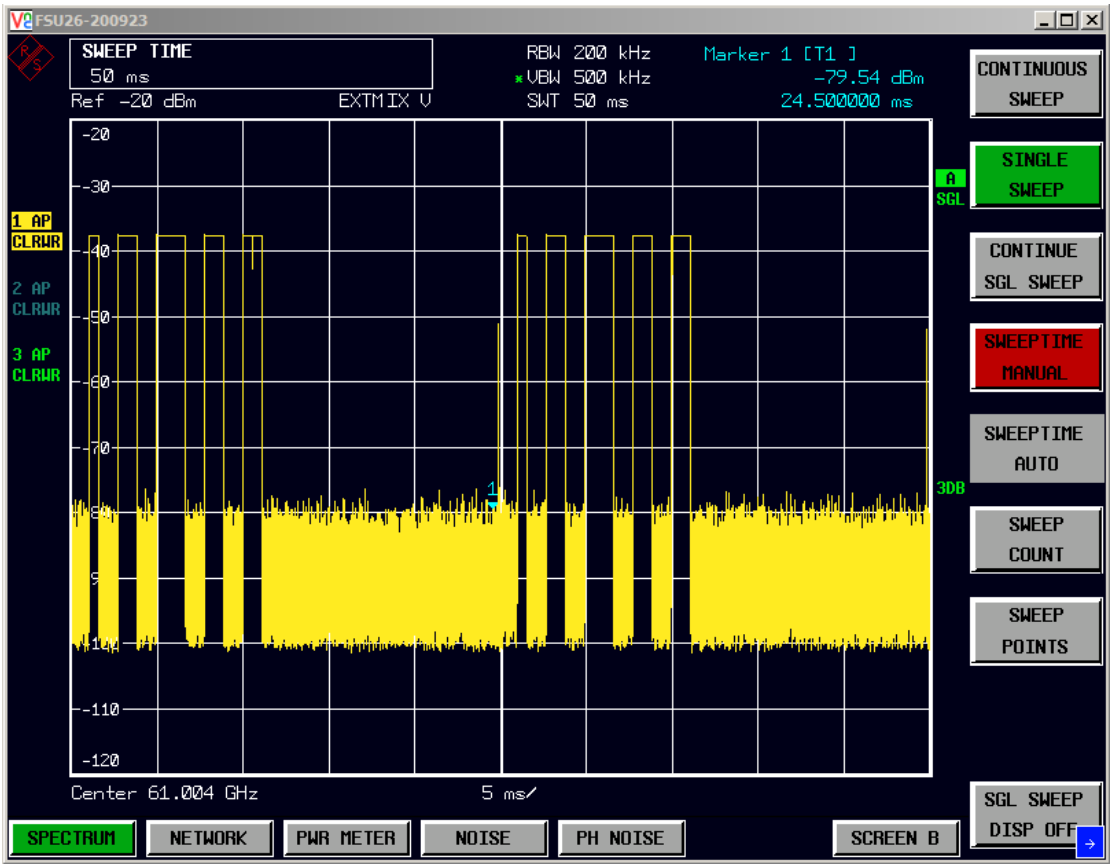

Figure 2: Repeated transmission of data sequence 0x33 (for 2 measurement cycles)

The start of a new FCC identifier block is indicated by a data transmit pause of at least 25ms. In practice, the LPR-1DHP does not transmit any FSK data for one measurement cycle. The new FCC identifier block is then transmitted byte wise as described above. If the

transmission is completed, there is another transmit pause of one measurement cycle, i.e. at least 25ms, before the FCC identifier block is repeated.

5 Receiving the FCC identifier block

In order to receive the FCC identifier block the FSK modulation described above must be decoded. This can be done with another LPR-1DHP station.

The data of interest is transmitted by each LPR-1DHP station continuously during the normal measurement operation. However, the FCC identifier cannot be received during normal measurement operation. The receive mode must be enabled explicitly from the main menu.

In the receive mode the FSK signal is mixed down into the baseband and the data is being decoded.

The receive mode can be accessed by pressing "r" in the main menu after cancelling measurement mode by pressing "x".

After decoding the entire FCC identifier block, the complete block is printed to the Debug Port of the LPR-1DHP system. This is the same port that has to be used to access the main menu. By default, TCP/IP port 3045 is used as the Debug port.