

RF Exposure Exhibit

NBS Payment Solutions Model: Noire510H HSDPA Point of Sale Terminal

Per FCC KDB Inquiry Tracking Number 305340, this device has been excluded from SAR testing based on duty factor analysis showing the time-averaged conducted power of each band to be less than $60/f_{GHz}$ (mW). This document serves as the RF exposure exhibit in the FCC Form 731 application in lieu of a SAR report.

RF Exposure Conditions

The NOIRE510H HSDPA point of sale terminal is intended for operation in the general population / uncontrolled RF exposure environment. The exposure conditions are primarily handheld and near body; the device is not normally body worn.

Operational Description

The NOIRE510H is an HSDPA point of sale terminal used in financial transactions. Data transmissions only occur very briefly after a transaction has been made to send the purchase information. Radio transmission is initiated by the customer in the financial transaction (after confirming the total amount and entering their PIN number.) The transmitter can utilize UMTS/EDGE/GPRS to send data.

The device has the following non source-based low duty factor characteristics cited in the 2009 TCB Presentation on “Low Transmission Duty Factor not Source Based”:

- No voice support
- Sporadic transmissions
- Transmits only short messages (<<1 second) for credit card and other purchase / transaction requests

Transmitter Description

Telit UC864-G Quad-Band (850/900/1800/1900) GSM/GPRS/EDGE Multislot Class 12 and Tri-Band (850/1900/2100) UMTS/HSDPA

FCC ID: RI7UC864G

IC ID: 5131A-UC864G

Nominal Power GPRS850: 33 dBm

Nominal Power GPRS1900: 30 dBm

Nominal Power UMTS: 24 dBm

Duty Factor

A typical financial transaction using this device sends about 350 bytes. Using the slowest upload rates of 9600 bits per second in GPRS mode and 64 kbps in UMTS mode, the transaction upload times are the following:

For GPRS:

$$1 / (9600 \text{ bps}) = 104.16 \text{ us / bit}$$

$$(104.16 \text{ us / bit}) \times (8 \text{ bits / byte}) = 833.28 \text{ us / byte}$$

$$(0.83328 \text{ ms / byte}) \times (350 \text{ bytes / upload}) = 291.648 \text{ milliseconds per upload in GPRS}$$

For UMTS:

$$1 / (64 \text{ kbps}) = 15.625 \text{ us / bit}$$

$$(15.62 \text{ us / bit}) \times (8 \text{ bits / byte}) = 125 \text{ us / byte}$$

$$(0.125 \text{ ms / byte}) \times (350 \text{ bytes / upload}) = 43.75 \text{ milliseconds per upload in UMTS}$$

The worst-case (lowest) time between transactions is assumed to be about two minutes (cashier scans merchandise, enters amount, hands over the terminal to customer, customer inserts / swipes a card, enters PIN, waits for receipt.) Taking 120 seconds then as the minimum time between transactions, the worst-case duty factor is:

For GPRS:

$$(0.291648 \text{ seconds per upload}) / (120 \text{ seconds per transaction}) = 0.002304$$

Application-Based Duty Factor = 0.23%

Source-based Duty Cycle = 4/8 uplink timeslots = 50%

Overall Duty Factor = 0.115% (theoretical maximum for GPRS)

For UMTS:

$$(0.04375 \text{ seconds per upload}) / (120 \text{ seconds per transaction}) = 0.0365$$

Duty Factor = 0.037% (theoretical maximum for UMTS)

RF Output Power

GPRS 850 Mode:

Nominal Conducted Output Power = 33 dBm (2 Watts)

Time-Averaged Output Power = $2W \times 0.00115 = 2.3 \text{ mW}$

$60 / f (\text{GHz}) = 70.7 \text{ mW}$

Time-Averaged Output Power < $60 / f$

GPRS 1900 Mode:

Nominal Conducted Output Power = 30 dBm (1 Watt)

Time-Averaged Output Power = $1W \times 0.00115 = 1.15 \text{ mW}$

$60 / f (\text{GHz}) = 31.4 \text{ mW}$

Time-Averaged Output Power < $60 / f$

UMTS Mode:

Nominal Conducted Output Power = 24 dBm (251.2 mW)

Time-Averaged Output Power = $251.2 \text{ mW} \times 0.00037 = 0.093 \text{ mW}$

Time-Averaged Output Power < $60 / f$ (for each $60 / f$ calculation from above)