4. GENERAL SPECIFICATION

4.1. Handset navigation calculator

4.1.1. Processor

- Samsung S3C2440 – 300 MHz for PNX960
- Samsung S3C2440 – 400 MHz for PNX970 / 970T

4.1.2. ROM Memory (NAND Flash):

- PNX960: 128MB up to 1GB (SLC NAND); First launch: 128MB
- PNX970 / 970T: 128MB up to 4GB (SLC NAND support only); First launch: 128MB
- The ROM memory upgrade must be possible through the SD card

4.1.3. RAM Memory:

- PNX960: 64MB (32MB x 2 chips); First launch: 64MB
- PNX970 / 970T: 64MB

4.1.4. Audio

- Audio CODEC
  - Resolution 16 bits
  - Sampling Rate 48 KHz max
  - Control interface: SPI
  - Digital audio interface: I2S

- Integrated PND speaker :
  - Sound level (dB): > 90 (SPL at 1kHz and d= 30 cm)
  - THD: <15%
  - Frequency response (Hz): 900 - 15 000

- **for PNX970 / 970T:**
  - Audio line out (differential) connected to docking station audio amplifier input through Molex Connector
  - Hardware sound control and redirection:
    - Earphone detection must switch off automatically the PND integrated speaker and the audio docking loudspeaker (control by VM AP selection)
    - FM antenna detection must not switch off automatically the PND integrated speaker and the audio docking loudspeaker (control by VM AP selection)
    - Car docking detection must switch off automatically integrated speaker
  - 1uni-direction integrated microphone and 1 omni-direction integrated microphone for HandsFree functionality:
    - Uni-direction mic sensitivity (dB) : > -47dB (0dB=1V/Pa)
    - Omni-direction mic sensitivity (dB) : > -42dB (0dB=1V/Pa)
    - Frequency (Hz): 120 – 3 400
    - Signal processing against echo and noise cancellation

4.1.5. Display

- Diagonal screen size: 3,5”
- Landscape TFT LCD
- Transmissive type
- LCM colors: 65,536 colors (16 bits) minimum

- Resolution: 320 x 240 pixels
- Brightness ≥ 200 cd/m² (or nit)
- Brightness adjustment application, the lowest brightness: minimum brightness

4.1.6. Touch Panel specificities

- Resistive Type Touch panel
- With anti-glare treatment (8% +/-3% meaning 5%<Haze<11%)
- Minimum activation force: 80g
- Hardness: ≥ 3H (testing force base on 45 degree/ 250g)
- Sensitivity: compatible with finger use

4.1.7. GPS Receiver

- Receiver: SIRF Star III
- Performance: Follow EVT/DVT test plan
  - Target to achieve equivalent performance to SIRF EVK when using GPS generator and injecting signal through external antenna connector
  - Acquisition Time (Average, open sky, no shelter and stationary, with CDS)
    - Hot Start: < 3 Sec (95%)
    - Warm Start: < 38 Sec (95%)
    - Cold Start: < 60 Sec (95%)
    - Update: 1s
    - Minimum Average C/N of 4 first satellites: 42 dB (95%)

  (95% criteria is transferred to the analysis & test method of the table below)

Items	Criteria	Engineering Test Phase Analysis	Production Test Method
Hot Start	<3 seconds	Failure rate < 5% with 200 test records (20 tests x 10 DUTs)	Failure is defined as continuous three acquisition time >3sec*
Warm Start	<38 seconds		NA(it takes too much time to provide warm-start scenario in production line)
Cold Start	<60 seconds		Failure is defined as continuous three acquisition time >60sec*

***note:** the failure rate of each item in production line is < 0.05x0.05x0.05 = 125ppm to meet CCI production line requirement for each failure symptom (<1000ppm)

- Built-in Internal antenna: PIFA
- Optional connector for external antenna
- No hardware impact in current design to support Instant Fix in the future
- Firmware version: 3.2.2 (which supports InstantFix™). InstantFix™ function disabled at first launch

4.1.8. FM / TMC / RDS Receiver for info traffic (for PNX970T only)

- FM stereo radio tuner with Radio Data System (RDS) and Radio Broadcast Data System (RBDS) demodulator and RDS/RBDS decoder, support RDS/ RDBS only
- Manual and automatic station selection for Traffic Program
- FM Frequency range: 76 to 108MHz
- Control Interface: I2C
- FM antenna path through Molex connector

- Performance: Follow EVT/DVT test plan

4.1.9. Bluetooth module (for PNX970 / 970T only)

- Bluetooth®: version 2.0 + EDR
- Class 2
- Range: > 3 meters
- Able to drive 2 devices at the same time (Hands Free module + Bluetooth Remote control)
- Bluetooth profiles 100% compatible with CSR stack
- Bluetooth function will be disable by the user via the settings menu
- SW profiles:
  - HANDS FREE
  - Be ready for Dial Up networking (data transfer through GPRS)
- Performance: Follow EVT/DVT test plan

4.1.10. Indicator

- 2 colors LED
- Operation:
  - Red: low power
  - Amber: Charging
  - Green: Full charge
  - LED Off: Stop charging / Over temperature (Protection system: while the device is over 50 degree, it stops charging)

4.1.11. Main device interface

- Power on/off button
- Reset button: Soft Reset function
- No battery switch
  - Battery on : SD card insertion or Power In (AC adapter or CLA or USB or CDS for PNX970 / 970T)
  - Battery off : Power + Reset buttons
- Hard Reset (Factory settings)
  - Turn off the device battery
  - Power In (SD or DC or USB...)
  - Right after power in, long-press and hold the power key within 3 seconds.
  - If the power key is still long-pressed more than 5 seconds, prompt the user with a message such as "Hard reset after 3 seconds."
  - If the Power key is still long-pressed after 3 seconds then run the Hard Reset
- FW upgrade

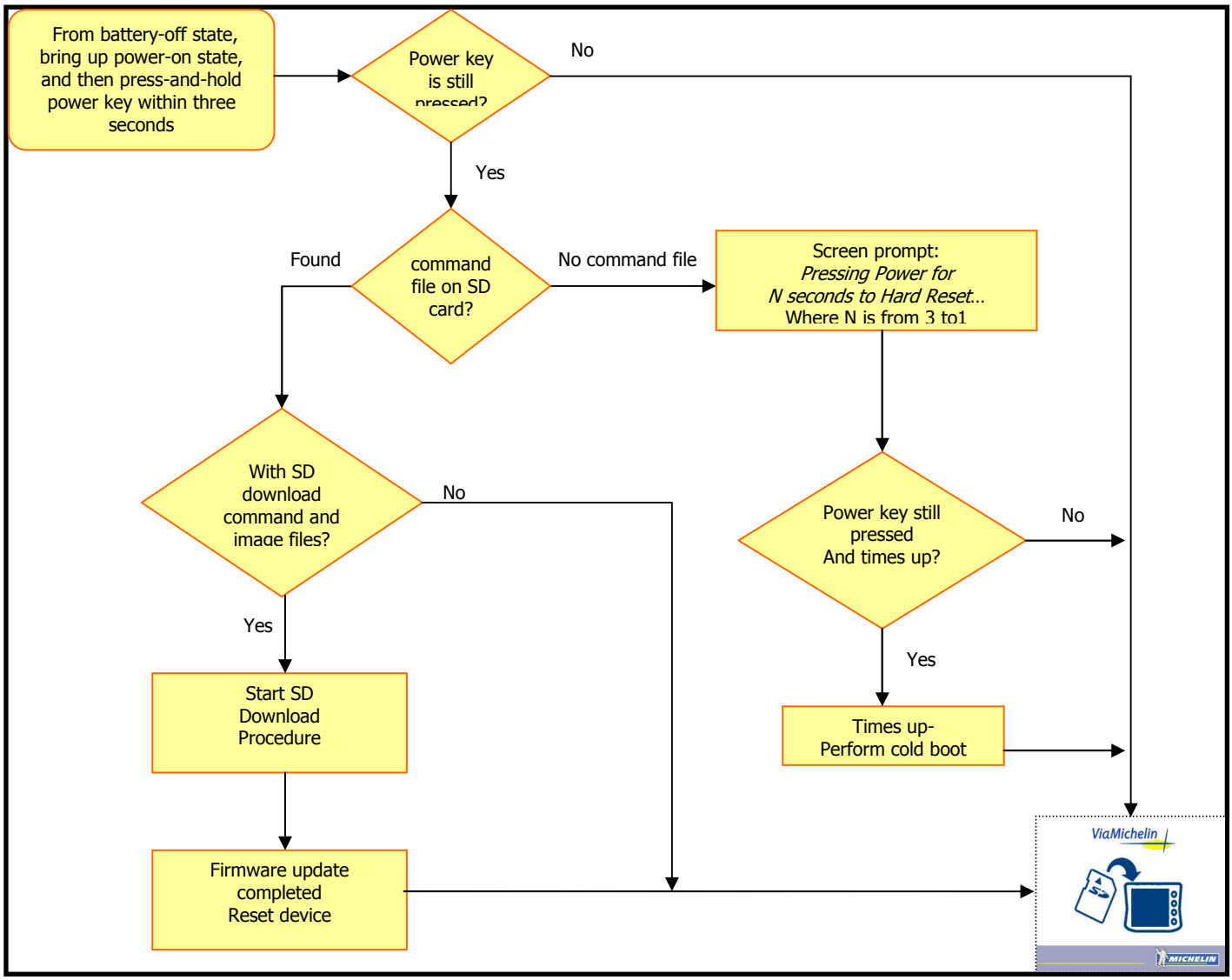
  Windows CE image update can only be used by CCI or VM service centre with SD card capacity equal to or less than 2GB. The scenario is as follows:
  - Turn off the device battery
  - Insert an SD card to turn on the device. In the SD, a special command file is defined and saved (File detail in SW spec.) Only with this command file can the upgrade process be started.
  - Right after SD in, long-press and hold the power key Within 3 seconds.

- The system will prompt the user to plug in the AC adapter, CLA, USB cable, or CDS to guarantee the power supply during image upgrade.
- If the external power supply is in, then the upgrade process will start.

  During the upgrade process, pressing power button is ignored by the system.

  For SiRF firmware update, a CE application is used to upgrade the firmware. Please notice this application can only be used by CCI or VM service centre.

- Recap



4.1.12. I/O Interface

- USB
  - Through mini B USB connector
  - USB client protocol: Full Speed (12 Mbps) and High Speed (480 Mbps) supported
- 1 DC-IN connector for +5V power supply
- 1 external GPS antenna connector

- Main connector: MOLEX Handylink 44828 SMT (**on PNX970 / 970T**)

SIGNALS AVAILABLE ON THE MAIN CONNECTOR

N°Pin	Signal name	Level	Type	Function
1	DGND	/	D Ground	Digital ground power path return
2	I2C CLK	3.3V LC100 pF	Output	Master I2C clock (400 Kb/s)
3	I2C Data	3.3V LC100 pF	Input / Output	Master I2C Data
4	MIC +	2.4Vpp	Input	External microphone input differential line through a 2.5mm 4-Rings connector
5	MIC -	2.4Vpp	Input	
6	AFM -	-	Input	External FM antenna Ground path
7	AFM +	-	Input	External FM antenna Signal path
8	CDS_DET	+5V	Output	Car Holder detection by pull up to +5V by 51K resistor
9	SPKR_L	3.3V	Output	Line out Left
10	SPKR_R	3.3V	Output	Line out Right
11	AGND	-	A Ground	Analog ground
12	Tx_PND	3.3V LC100 pF	Output	Data output UART
13	Rx_PND	3.3V LC100 pF	Input	Data Input UART
14	+5V	5V	Input	Power +5V charging
15	DIO	3.3V	Input / Output	Mute of the Car Holder speaker (active at low level)
16	DGND	-	D Ground	Digital ground power path return

- ESD protection on each I/O interface

4.1.13. Card Slot

- 1 X Secure Digital card (SD) / Multi Media Card (MMC): Driver must be compatible with 4GB cards
- Support for MMC cards must be assured
- Cards slots protection against ESD

4.1.14. Power

4.1.14.1. Sources

- Rechargeable main battery
- External supply voltage (5V):
  - through mini B USB input, when connected to USB synchronization cable
  - through DC-in connector when connected to Cigarette light adapter or AC adapter
  - **through the Molex connector when mounted on the car docking station (for the PNX970 / 970T)**

4.1.14.2. Performances (at an ambient temperature of 25°C)

- Battery autonomy:
  - PNX960:
    - 2 hours minimum (with brightness set to 50%, LED OFF, GPS tracking, Loudspeaker max)
    - 14 days in suspend mode
    - At least 6 energy information levels
  - PNX970 / 970T:
    - 3 hours minimum (with brightness set to 50%, LED OFF, GPS tracking, Bluetooth OFF, TMC ON, Loudspeaker max)
    - 15 days in suspend mode
    - At least 6 energy information levels

- Battery Full Charging: < 4 hours (with system on suspend mode)
- Battery shelf life: > 300 full cycles of charge and discharge with 80% of capacity yet.

4.1.15. Casing

4.1.15.1. Dimension

- PNX960
  77 x 100 x 20,5 mm
- PNX970 / 970T
  80 x 108 x 20,6 mm

4.1.15.2. Weight

- PNX960: 136g
- PNX970 / 970T: 155g

4.1.15.3. Outlook

- Plastic ABS+PC
- No painting for PNX960 and painting for PNX970 / 970T
- Color : Black or raw material color
- Exterior Casing: 3 pieces maximum: (Lower case, Upper case and Middle case)
- Exterior design will be provided by ViaMichelin (see Annex I)

4.2. Options and accessories

4.2.1. Cigarette light adapter (CLA)

- DC Input Voltage: 10V to 30V
- DC Output: 5V +/- 5% / 1A max
- Efficiency: > 75%@MAX LOAD 12VDC 25C
- Fuse protection
- LED indicator
- Protections against over voltage, over current, short circuit and reverse polarity
- Length: 1.2 to 1.8.meters (extensible)
- Connector: Car light / DC-in
- Connection interface adapted to handset navigation calculator and car docking station
- Marking: CE, FCC, Emark

4.2.2. AC adapter

- Input Voltage:
  - 100 to 240V
  - Frequency: 50 to 60 Hz
- Output Voltage: 5V +/- 5% / 1A
- Efficiency: > 60%
- Protection against over voltage, over current and short Circuit
- Length: around 1.5 meter
- Connector: AC outlet / DC-in,
- Universal world outlet adapter (EU, UK & US). EU plug will be mounted by default
- Marking: CE, FCC, UL + CUL or ETL, CEC (Efficiency Level IV)

4.2.3. USB Synchronization cable

- The USB synchronization cable is used for Synchronization (using ActiveSync) with PC.
- Supply of the device (5V power from PC) during data transfer
- Length: around 1.3 meter
- Connector: USB type A / mini USB type B

5. SPECIFICITIES BETWEEN PNX960 AND PNX970 / 970T

	PNX960	**PNX970 / 970T**	
Components			
CPU	2440 300MHz	2440 400MHz	
SDRAM	32 or 64 MB	64 MB	
NAND FLASH	128 MB or 1 GB	128 MB or 4 GB	
Bluetooth Module	NO	YES	
FM-RDS Module	NO	PNX970 NO	PNX970T YES
AEC module & Microphones	NO	YES	
Molex Connector	NO	YES	
Features			
Info Traffic (TMC)	NO	PNX970 NO	PNX970T YES
Hands Free	NO	YES	
Advanced Interface for Automotive and CDS	NO	YES	
Accessories			
CLA	YES	YES	
CDS	YES (Simple)	YES (Advanced)	
USB Cable	YES	YES	
AC adaptor	NO (sold as an accessory only)	YES	
FM antenna	NO	PNX970 NO	PNX970T YES