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**TSG-SA WG1 #19**  
**San Francisco, USA, 20-24<sup>th</sup> January 2003**

**S1-030258**  
**Agenda Item:**

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**Title:** LS on SIM Temperature Ranges

**Response to:**

**Release:**

**Work Item:**

**Source:** SA1

**To:** ETSI SCP

**Cc:** T3, SA, GSMA SCaG

**Contact Person:**

**Name:** Andrew Chow

**Tel. Number:** +1-719-884-2335

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**Attachments:** S1-030119 [UICC Temperature Range]

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**1. Overall Description:**

TSG SA1 thanks ETSI SCP for the work already undertaken on the definition of new form factors and next generation UICCs. TSG SA1 has been discussing a presentation (S1-030119, attached) which contains a use case for UICC cards with higher temperature ranges. This raises the issue of operating temperature range in other cases such as emergency use (e.g. when a mobile terminal has been left in an automobile or in a jacket on ski trips or a building fire situation). SA1 feels that it would be worthwhile to re-examine the operating temperature range of existing and new UICCs and kindly requests that ETSI SCP do so.

**2. Actions:**

**To ETSI SCP group.**

**ACTION:**

- To analyse the operating temperature range of UICCs taking into consideration use cases such as in-vehicle telematics and emergency use.

**3. Date of Next TSG-SA1 Meetings:**

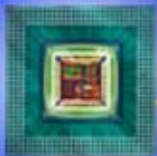
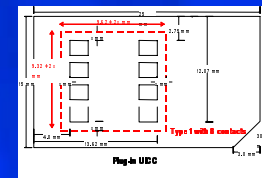
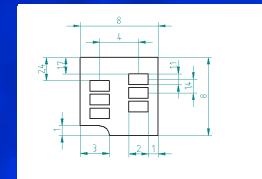
SA1#20	07-11 Apr. 2003	Tbd	Korea
SA1 SWGs	12-16 May 2003	San Diego	USA
SA1#21	07-11 Jul. 2003	Sophia Antipolis	France

**4. References:**

## UICC/SIM UD-2 Form Factor

# Temperature Range Proposal

Jan 20, 2003  
Andrew Chow  
Intel



# Proposal to Increase UICC temperature range

- Proposed new UD-2 temperature range is -40 to 85 °C versus present range of -25 to 70 °C with occasional peaks of 85 °C.
- Outline
  - Terminal types and their operating environments
  - Example of a terminal type that would benefit from increase temperature range
  - Market size and potential
  - Market requirements including temperature range
  - Typical components and temperature ranges
  - Choice between custom and standardization



# Wireless Terminals Types

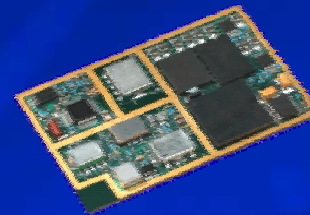
## Handsets



## PC-cards



## In-Vehicle Telematics

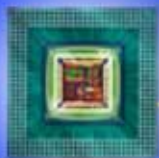


## Machine to Machine

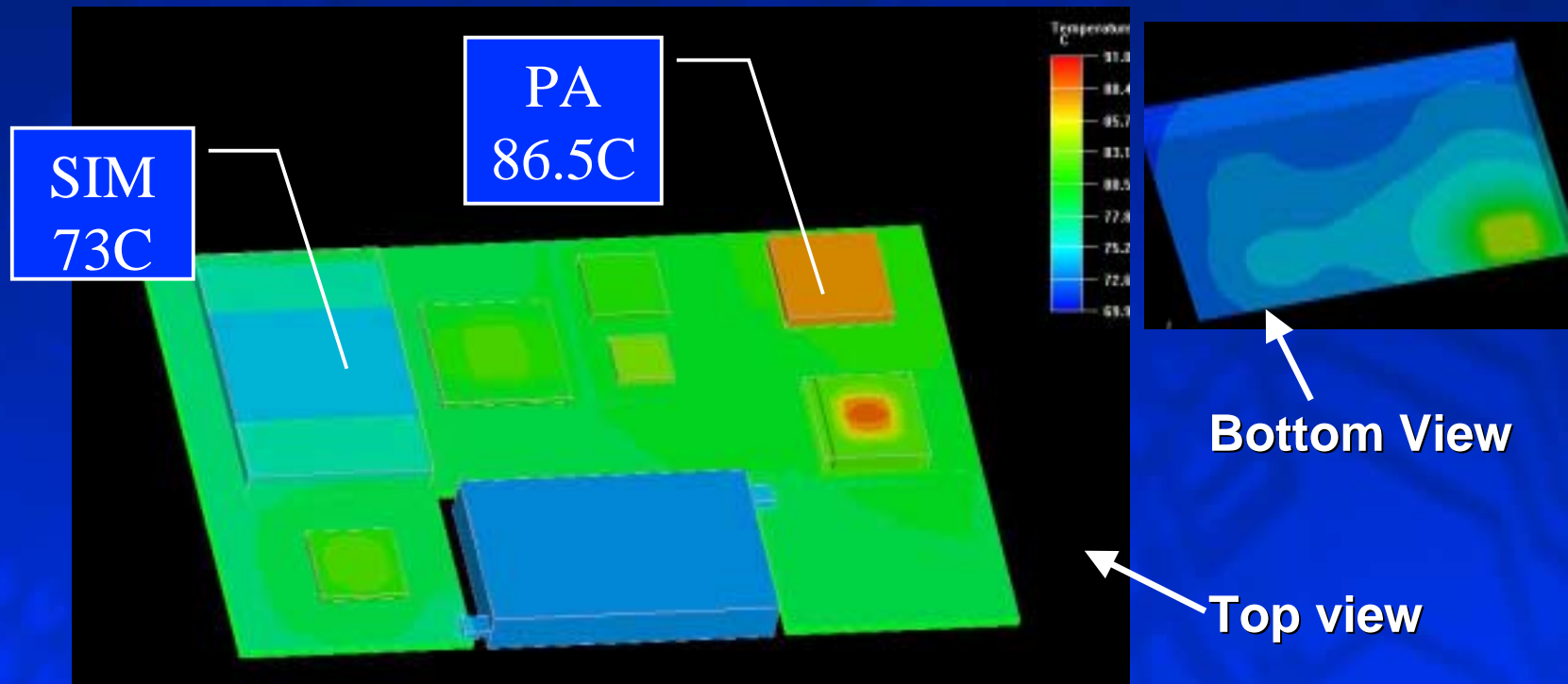


Use	voice (data)	data	data/voice	data
Market Size	400+ M / yr	small	4 m in '02 44m in '07	34 m '02 48 m '04
Physical Environ.	0 to 35 °C Office	up to 65 °C laptop	-40 to 85 °C industrial	-40 to 85 °C industrial

*Question: In the future, which terminal types will use the current SIM/UICC and which will use UD-2 ?*



# PCB Temperature Gradient



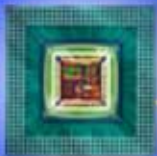
- For terminal designers, heat produced by components is also a concern
- Example shows, metal case GPRS class 10, prototype at 70 ° C ambient





# In-Vehicle Communication designs

- **Current market size is small compared to handsets**
- **However, potential for growth with fleet and new auto market segments**
- **Small form factor and temperature range are constraints to total available market for communication devices**
- **The new UICC/SIM form factor, UD-2, provides an opportunity to change the temperature range**



# In-vehicle Telematics Definition

- What is in-vehicle telematics?
  - Wireless exchange of data, information and content between the auto and external sources
    - A *Telematics-Enabled* vehicle contains a wireless communications system (i.e. cellular) and location-sensing device (GPS receiver)

Monitoring/Diagnostics  
(ACN, SOS,  
Diagnostics/Prognostics)

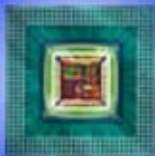
Communications Services  
(voice, e-mail, messaging)



Content/LBS Info  
(weather, traffic)

Entertainment  
(streaming video, audio, other)

Source: Telematics Research Group



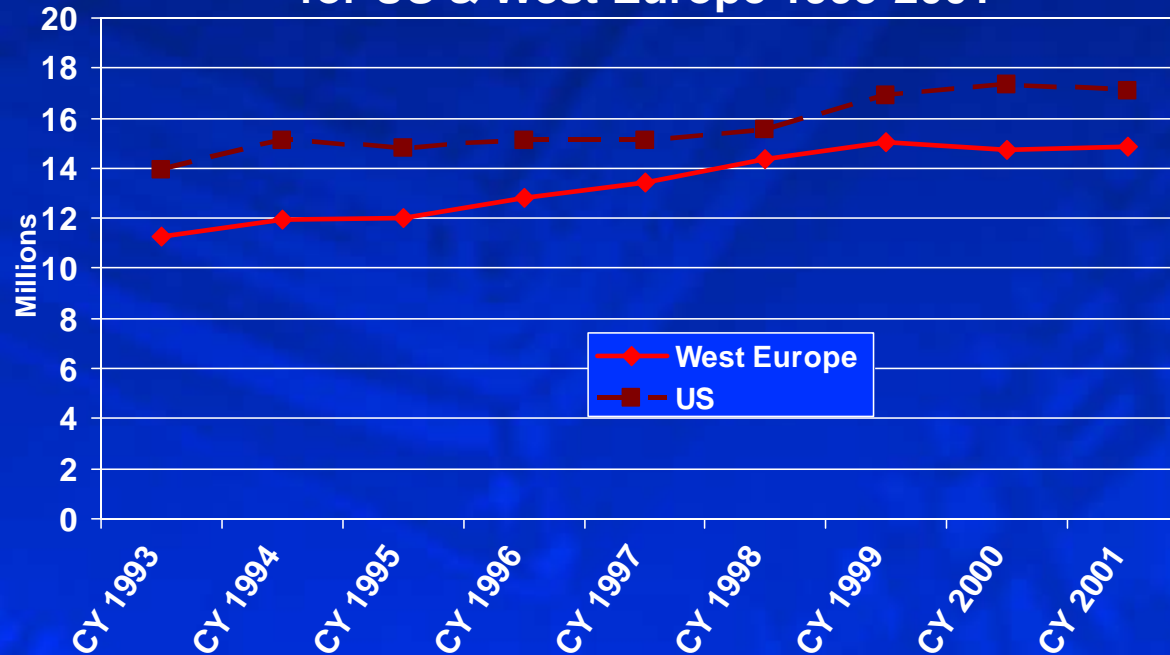
Intel Communications Group

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# Market Opportunity (Europe + US)

Historical Light Vehicle Sales  
for US & West Europe 1993-2001



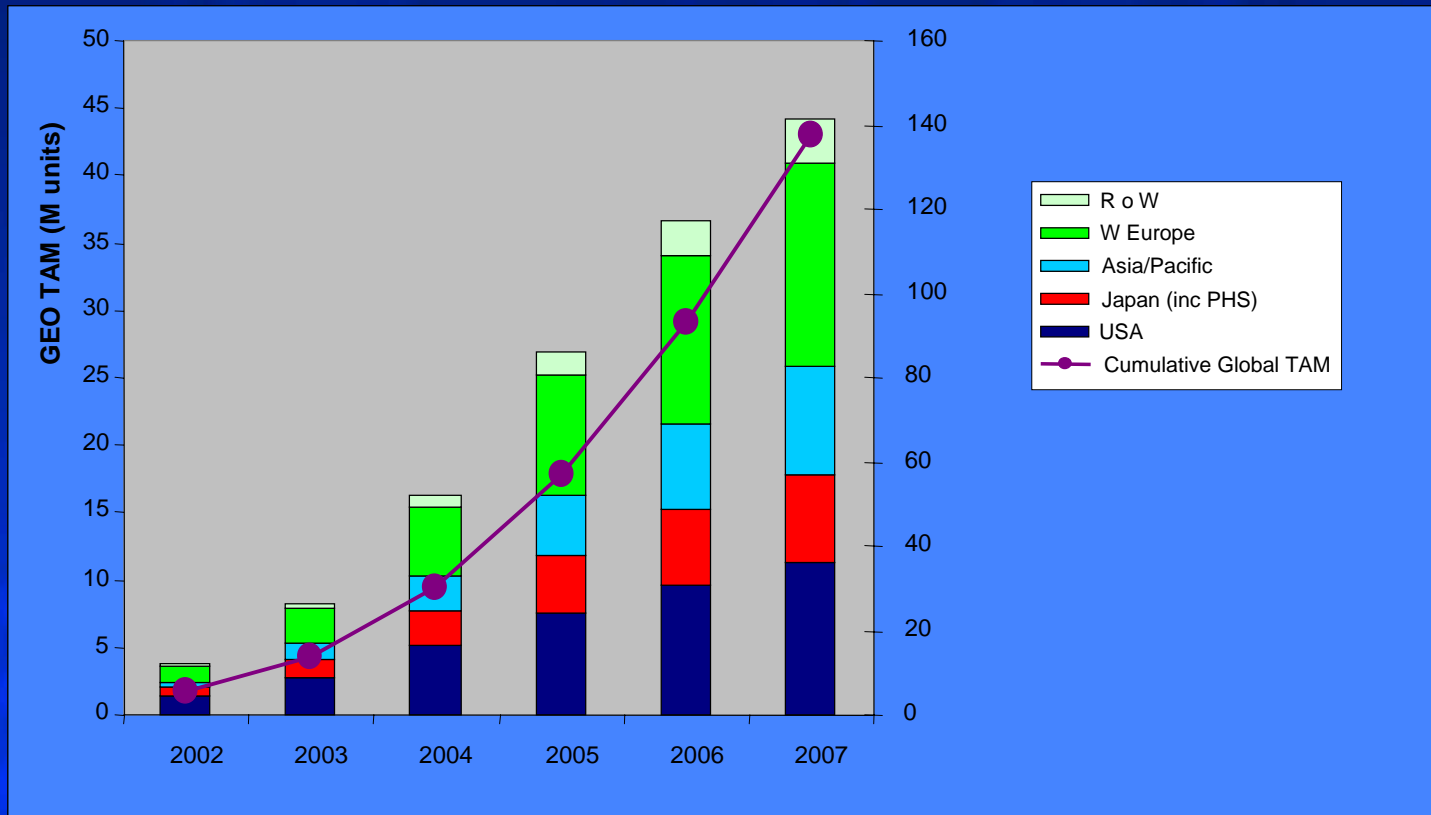
Source: ACEA and Ward's

- 3.5% of all vehicles sold have telematics; 11% in US
- 20% predicted by 2007; 42% in US

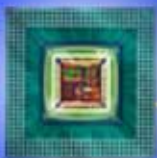




# In-vehicle Telematics Market Size



Source: ARC Group, EMC,  
Telematics Research Group &  
Intel estimates



Intel Communications Group

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# In-Vehicle Telematics Requirements

- **Basic Market requirements for telematics**

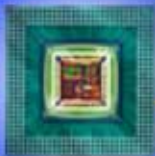
- Two way communications
- Long life supply (5+ years)
- Extended temperatures (-40 to +85 °C)



- **Basic Technology requirements for telematics**

Must Have	May Have
<ul style="list-style-type: none"> <li>• 2 way communications</li> <li>• Location technology</li> <li>• Control unit with auto electronics interface</li> </ul>	<ul style="list-style-type: none"> <li>• Telematics service monitoring</li> <li>• Remote auto control functions</li> <li>• Remote auto diagnostics</li> <li>• Automatic collision notification</li> <li>• Crash event data recorder</li> <li>• <i>Bluetooth</i></li> <li>• Speech user interface</li> <li>• Navigation</li> </ul>

Source: Telematics Research Group



# Component Temperature Ranges

<u>Part</u>	Min. Range	Max Range
Baseband processors	-20 to 85 °C	-40 to 85 °C
RF Components	-20 to 70	-40 to 85
SRAM and Flash Memory	-20 to 85	-40 to 85
Power Supply components	-40 to 85	-40 to 125+
TCVCO's	-20 to 75	-40 to 85
Digital Logic IC's	-40 to 85	-40 to 85
SIM card		<b>-25 to 70</b>

## Standardization or Specialized High Temp SIM/UICC's?

- Many terminal components can be purchased with different temperature ranges.
- Is this the best approach with SIM cards? *No, because*
  - Non-standardization of the UD-2 temperature range means each operator manages SIM/UICC part types depending on customer equipment
  - Temperature failure of parts in field may be difficult to trouble-shoot as devices may recover after cooling down
  - Development of high temperature variants means more than one temperature range allowable

