



Cellemetry Control Channel Data Technologies

Normal Roaming Analog Cellular Telephones:

When a normal roaming analog cellular telephone enters a foreign market, it will transmit an Autonomous Registration message over the Reverse Control Channel (RECC) to “make its presence known”, for pre-call authentication purposes. This initial Autonomous Registration message is forwarded to the phone’s Home switch (HLR) via an SS7/IS-41 *RegNot* (registration notification) message. The Home switch will respond with authentication parameters and the local switch will build a VLR database entry, so that the roaming phone can readily originate and terminate potential future calls. The cellular telephone will also regularly transmit additional Autonomous Registration messages, under a schedule provided by the cell, so that the cellular system will keep it authenticated, i.e. keep its VLR database entry active.

When the roaming analog cellular telephone does subsequently originate a call, it sends a different, larger message over the RECC – an Originate message indicating that a call setup is requested for the dialed digits.

Cellemetry® Data Service:

Cellemetry never transmits anything unless the underlying application has a monitoring or telemetry event to report. In this case, the data is placed into the 32 bit ESN field of the Autonomous Registration message and transmitted. To the cellular system, this appears as a normal Autonomous Registration message and is forwarded, via an SS7/IS-41 *RegNot* (registration notification) message, to the Home HLR, which, in this case, is the centralized Cellemetry Gateway. The centralized Cellemetry Gateway responds with permission parameters that deny all call Origination or Termination and a few seconds later sends a Registration Cancel message which removes the VLR just as quickly as it was built. The centralized Cellemetry Gateway then forwards the data to the MIN’s Application Provider. Since this is not a call origination, no voice channel is activated in any way. While Cellemetry’s current dynamic data payload size is 32 bits, the TR45.1 standards body is actively working on expansion of the field to 56 bits. The current Cellemetry data payload is 122 bits when you add the 32 bit dynamic data payload, the 10 decimal digit unit identification and the coarse geographic location of the IS41 MSCID field.

Features and Statistics

	Cellemetry® Data Service
Voice Channel impact	None
Control Channel impact per telemetry event transmission	3 radio link words
Non-telemetry event Control Channel impact	None
Non-telemetry event impact on network resources	A few seconds (~5 to 15) of VLR occupancy per telemetry event.
Fraud protection	Authentication parameters ALWAYS deny call Origination and call deny Termination
Overload Protection for RECC	Patented feature prevents transmission if Control Channel occupancy exceeds 75%
Overload Protection for FOCC	Cellemetry gateway permits the quantity of allowed MIN Pages to be throttled to a carrier established limit, per market, per hour
Suitability for battery powered applications (power consumed per telemetry event @ 3 Watt output)	Suitable: ? 1.9 Watts (12 volts, 1,300 mA for .125 seconds)
Data payload	32 bit integer, standards group TR45.1 offers potential for 56 bits



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Cellemetry Uses Excess Control Channel Capacity

Typically, the Analog Control Channel is occupied an average of 1% with an average of 10% during the busy hour. The busiest system measured was the Buenos Aires micro-center with one Control Channel serving 235 NAMPS voice channels. It had a busy hour average of 25% with peak occupancy at 51%. When Cellemetry achieves its business plan volume, its total consumption of FOCC Capacity is 3.4 % Refer to the chart below, which represents actual field measurements.

