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http://www.anacom.pt/template12.jsp?categoryId=186283

GSM Mobile Networks

Quality of Service Survey

Global Study

(Mainland Portugal)

September / October 2005

2 AGGREGATED RESULTS

2.1 DEFINITIONS

MOS	*Mean Opinion Score* – Audio quality rate of an end-to-end type of communication. Its value is 0 when there is no communication and 5 when the communication is perfect. Values 0 and 5 are only theoretical and thus never show on the measurements. Data presented refers to average values per call.
Routed Calls:	Telephone calls successfully established by the network and between the two relevant ends ("The call reached the called terminal").
Abandoned during Conversation:	Telephone calls successfully established by the network but dropped during the conversational phase.
Normal Termination:	Telephone calls successfully established by the network and terminated normally.
Not Routed Calls:	Telephone calls not established between the two relevant ends ("The call did not reach the called terminal").
Dropped Calls:	Calls that were dropped, either in the establishment phase or in the conversational phase.
Call Ending Causes:	Reasons leading to the communications drop.
No Service:	Out of service (no signal).
Congestion:	Network congestion.
Radio Link Failure:	Failure in the Radio link between the mobile terminal and the base station. It may occur when crossing a shadow zone of the network.
Other :	Other causes for call dropping.
RSSI Signal Level (dBm):	Received Signal Strength Indication – Indicates the strength of the signal received at the mobile terminal.
BCCH	*Broadcast Control Channel* – Routs information to all mobile terminals (MSs) served by a certain BTS (*Base Transceiver Station*). It is downlinked and carries several parameters, such as: CI (*Cell Identity*), LAC (*Local Area Code*), MCC (*Mobile Country Code*), MNC (*Mobile Network Code*), FH (*Frequency Hopping*) Algorithm.
FTS	Fixed Telephone Service.
PSTN	Public Switched Telephone Network.

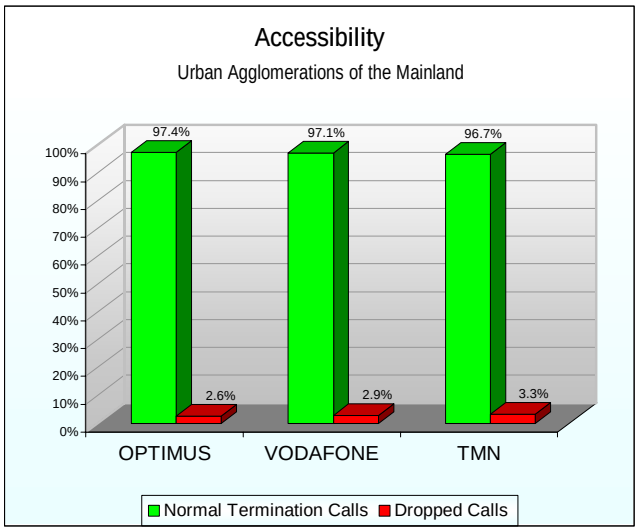
2.2 URBAN AGGLOMERATIONS

Indicator precision, at a 95% confidence level:

	OPTIMUS	VODAFONE	TMN
Accessibility	0.53%	0.56%	0.60%
Poor Audio Quality	0.29%	0.26%	0.22%
Acceptable Audio Quality	1.18%	1.20%	1.19%
Good Audio Quality	1.19%	1.20%	1.19%

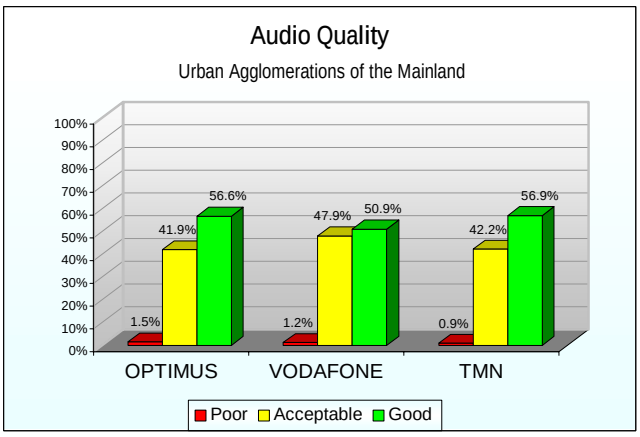
2.2.1 ACCESSIBILITY

		Operator	OPTIMUS	VODAFONE	TMN
Calls Made		Total	3,407 100%	3,409 100%	3,413 100%
Routed Calls	Total		3,356 98.5%	3,349 98.2%	3,347 98.1%
	Abandoned During Conversation		36 1.1%	39 1.1%	46 1.3%
	Normal Termination Calls		3,320 97.4%	3,310 97.1%	3,301 96.7%
Non-Routed Calls			51 1.5%	60 1.8%	66 1.9%
Dropped Calls	Total		87 2.6%	99 2.9%	112 3.3%
	Call Ending Causes	No Service	1 0.0%	0 0.0%	2 0.1%
		Congestion	44 1.3%	63 1.8%	48 1.4%
		Radio Link Failure	13 0.4%	13 0.4%	9 0.3%
		Other	29 0.9%	23 0.7%	53 1.6%



2.2.2 AUDIO QUALITY

		OPTIMUS	VODAFONE	TMN
Calls with Measurements	Total	6,683 100%	6,670 100%	6,665 100%
Audio Quality (MOS)	Poor	101 1.5%	77 1.2%	58 0.9%
	Acceptable	2,799 41.9%	3,197 47.9%	2,815 42.2%
	Good	3,783 56.6%	3,396 50.9%	3,792 56.9%



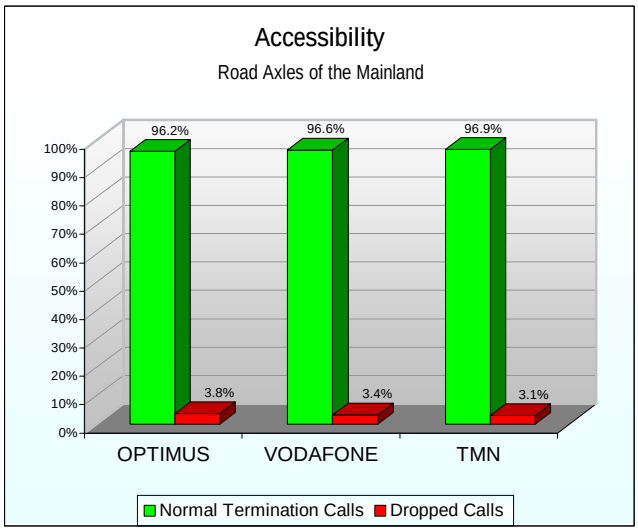
2.3 ROAD AXELS

Indicator precision, at a 95% confidence level:

	OPTIMUS	VODAFONE	TMN
Accessibility	1.03%	0.98%	0.94%
Poor Audio Quality	0.49%	0.24%	0.26%
Acceptable Audio Quality	1.93%	1.80%	1.83%
Good Audio Quality	1.94%	1.80%	1.83%

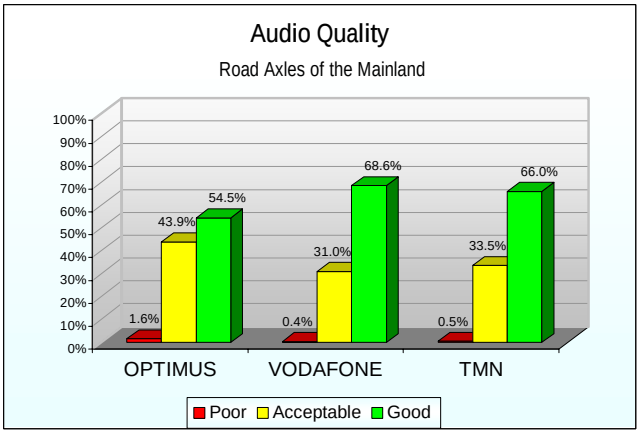
2.3.1 ACCESSIBILITY

		Operator	OPTIMUS	VODAFONE	TMN
Calls Made		Total	1,304 100%	1,303 100%	1,303 100%
Routed Calls	Total		1,275 97.8%	1,278 98.1%	1,285 98.6%
	Abandoned During Conversation		20 1.5%	19 1.5%	22 1.7%
	Normal Termination Calls		1,255 96.2%	1,259 96.6%	1,263 96.9%
Non-Routed Calls			29 2.2%	25 1.9%	18 1.4%
Dropped Calls	Total		49 3.8%	44 3.4%	40 3.1%
	Call Ending Causes	No Service	0 0.0%	0 0.0%	0 0.0%
		Congestion	29 2.2%	31 2.4%	21 1.6%
		Radio Link Failure	6 0.5%	8 0.6%	3 0.2%
		Other	14 1.1%	5 0.4%	16 1.2%



2.3.2 AUDIO QUALITY

		Operator	OPTIMUS	VODAFONE	TMN
Calls with Measurements		Total	2,535 100%	2,545 100%	2,562 100%
Audio Quality (MOS)	Poor		40 1.6%	10 0.4%	12 0.5%
	Acceptable		1,114 43.9%	790 31.0%	859 33.5%
	Good		1,381 54.5%	1,745 68.6%	1,691 66.0%



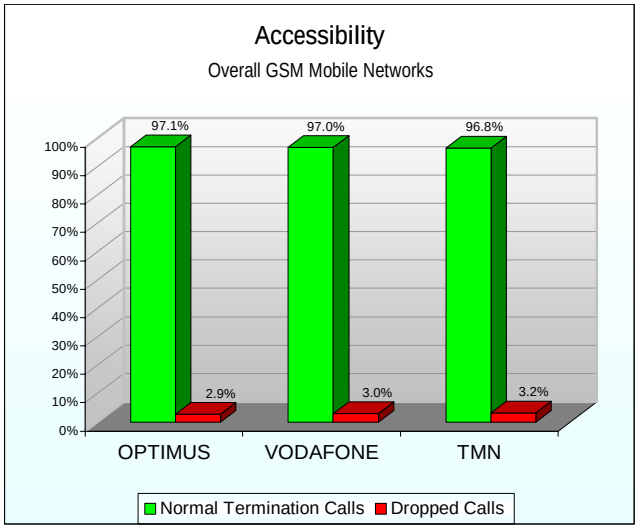
2.4 OVERALL

Indicator precision, at a 95% confidence level:

	OPTIMUS	VODAFONE	TMN
Accessibility	0.48%	0.49%	0.50%
Poor Audio Quality	0.25%	0.20%	0.18%
Acceptable Audio Quality	1.01%	1.01%	1.00%
Good Audio Quality	1.01%	1.01%	1.00%

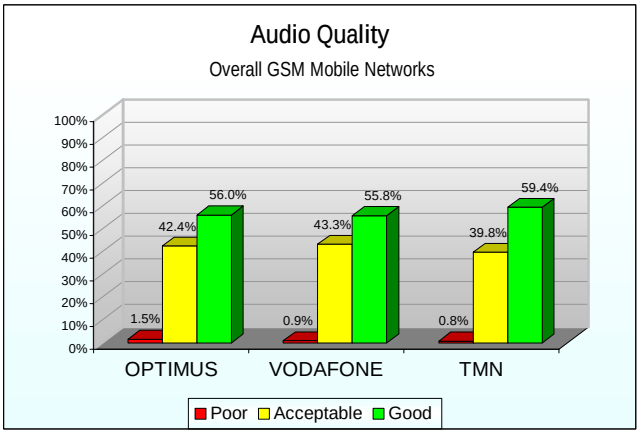
2.4.1 ACCESSIBILITY

			OPTIMUS	VODAFONE	TMN
Calls Made		Operator			
		Total	4,711 100%	4,712 100%	4,716 100%
Routed Calls		Total	4,631 98.3%	4,627 98.2%	4,632 98.2%
		Abandoned During Conversation	56 1.2%	58 1.2%	68 1.4%
		Normal Termination Calls	4,575 97.1%	4,569 97.0%	4,564 96.8%
Non-Routed Calls			80 1.7%	85 1.8%	84 1.8%
Dropped Calls		Total	136 2.9%	143 3.0%	152 3.2%
	Call Ending Causes	No Service	1 0.0%	0 0.0%	2 0.0%
		Congestion	73 1.5%	94 2.0%	69 1.5%
		Radio Link Failure	19 0.4%	21 0.4%	12 0.3%
		Other	43 0.9%	28 0.6%	69 1.5%



2.4.2 AUDIO QUALITY

		OPTIMUS	VODAFONE	TMN
Calls with Measurements	Operator			
	Total	9,218 100%	9,215 100%	9,227 100%
Audio Quality (MOS)	Poor	141 1.5%	87 0.9%	70 0.8%
	Acceptable	3,913 42.4%	3,987 43.3%	3,674 39.8%
	Good	5,164 56.0%	5,141 55.8%	5,483 59.4%

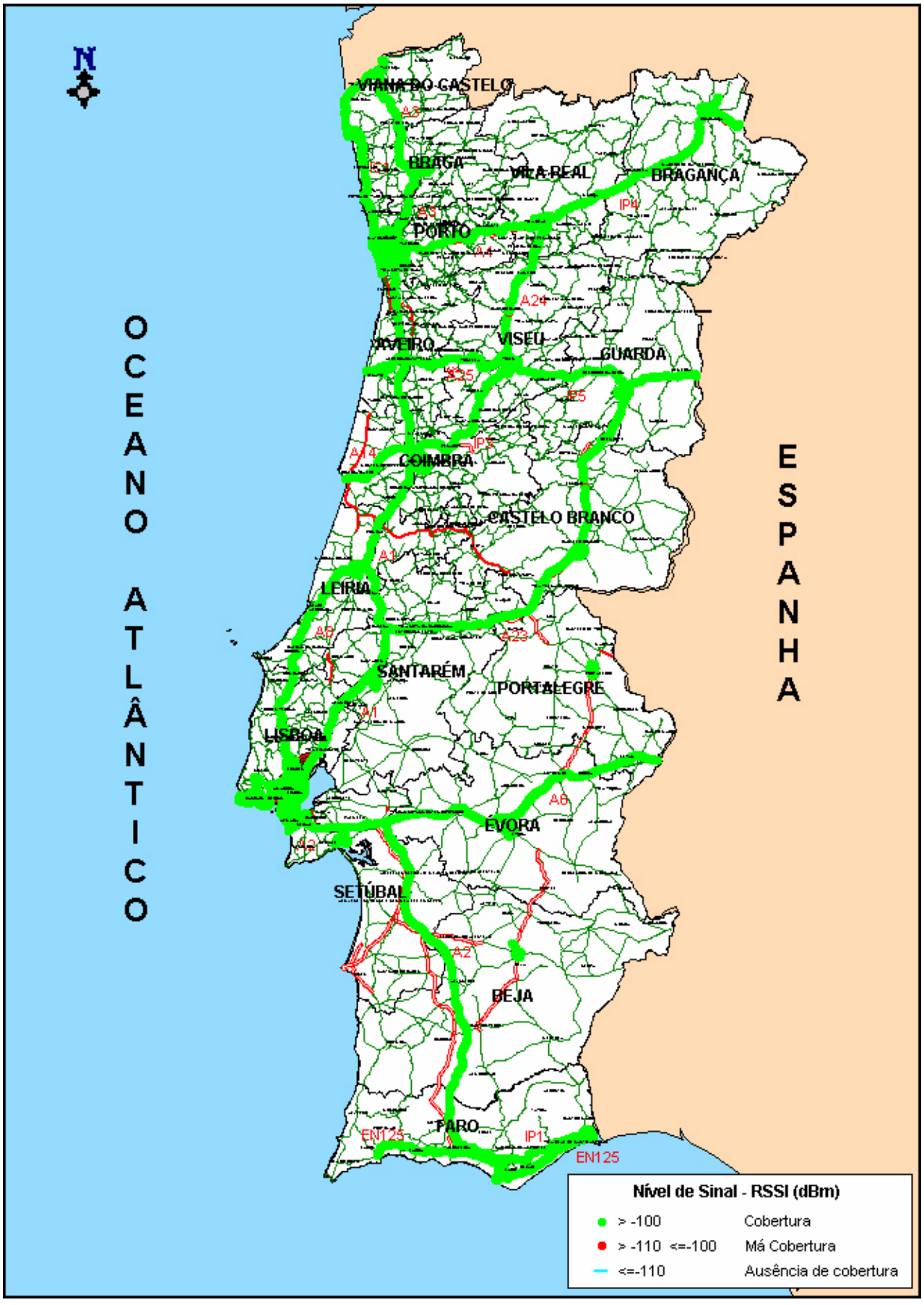


2.4.3 COVERAGE

(Following pages)

MAINLAND PORTUGAL

OPTIMUS – PSTN



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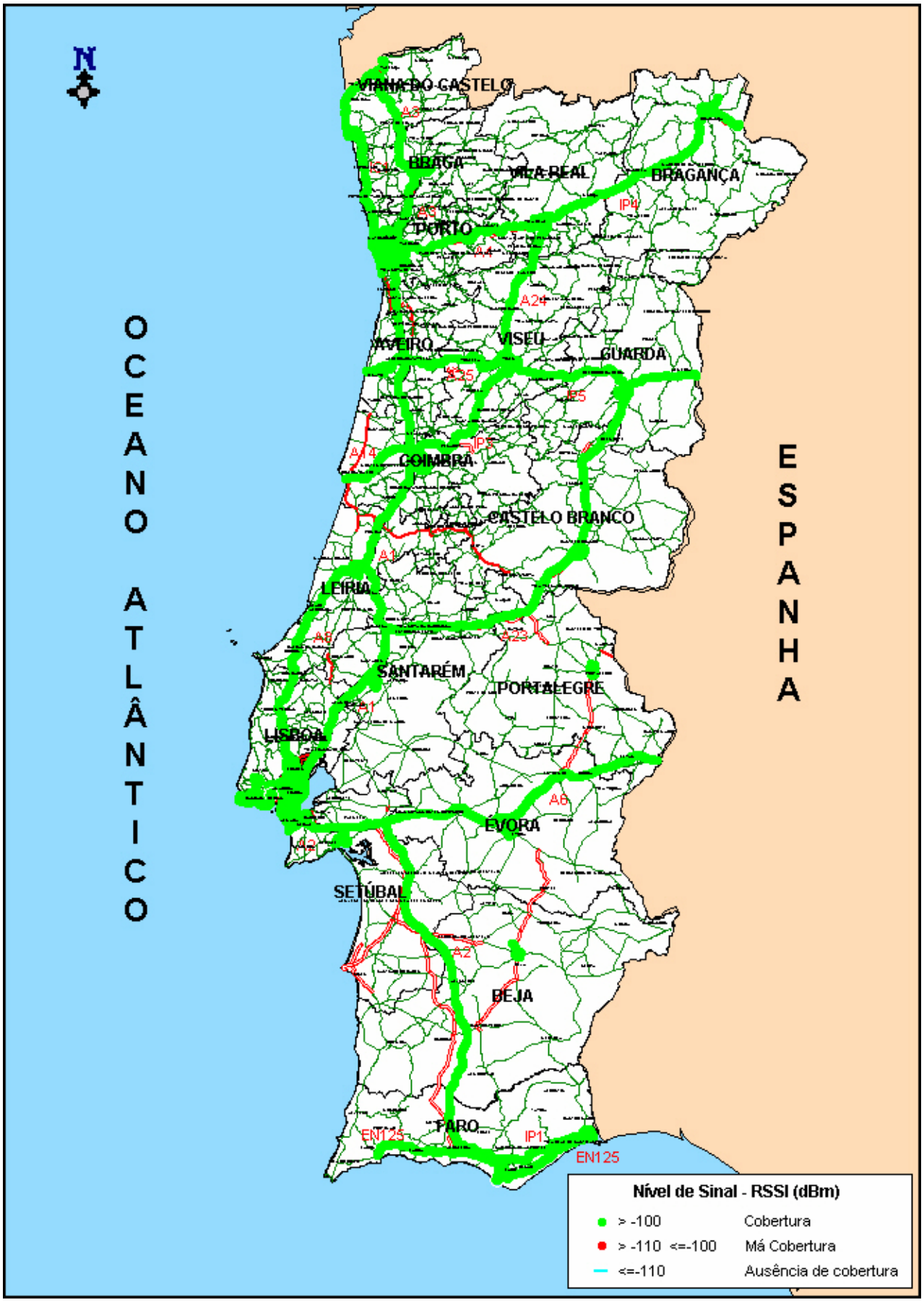
VODAFONE – PSTN



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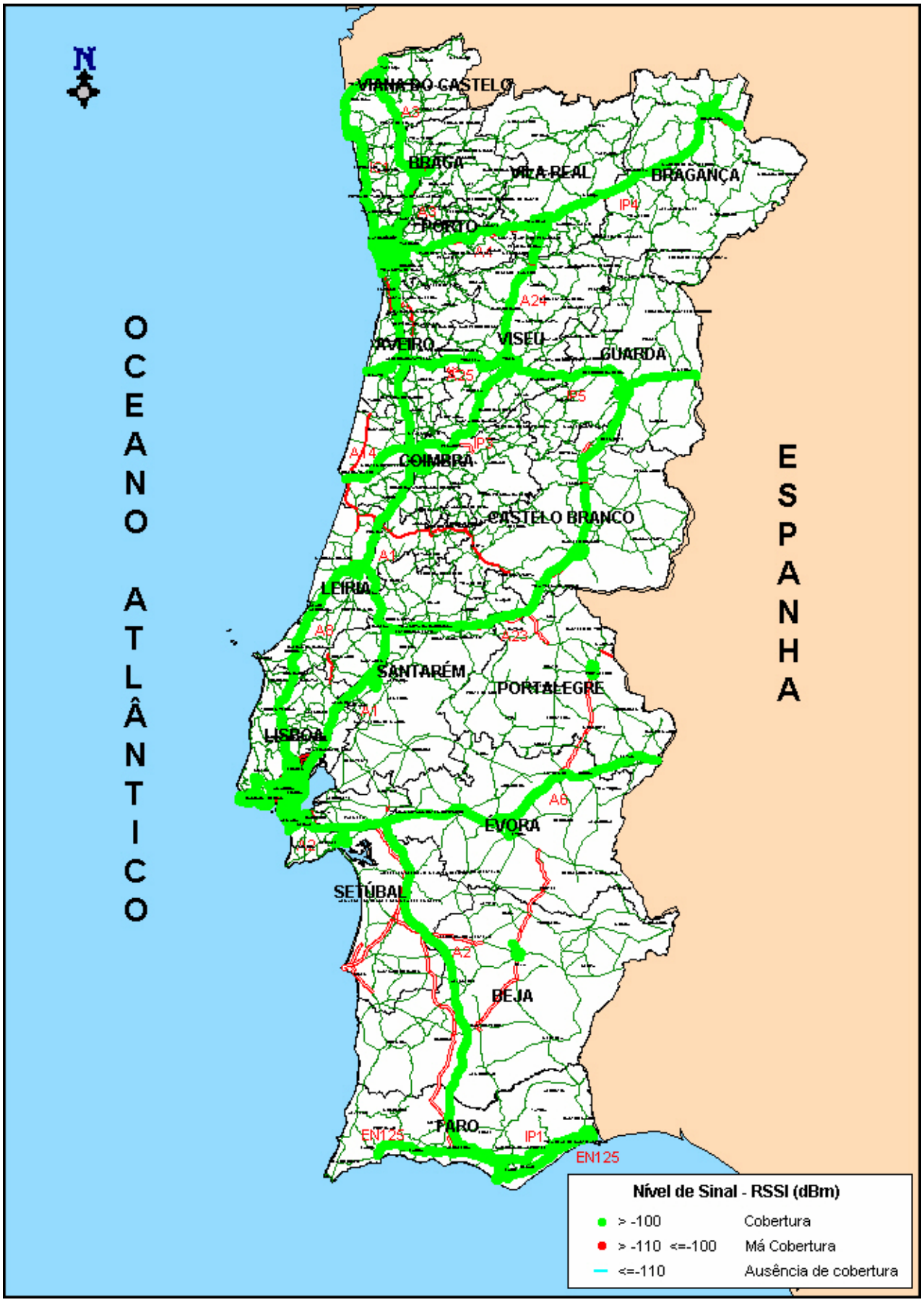
TMN – PSTN



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