

4 AGGREGATED RESULTS

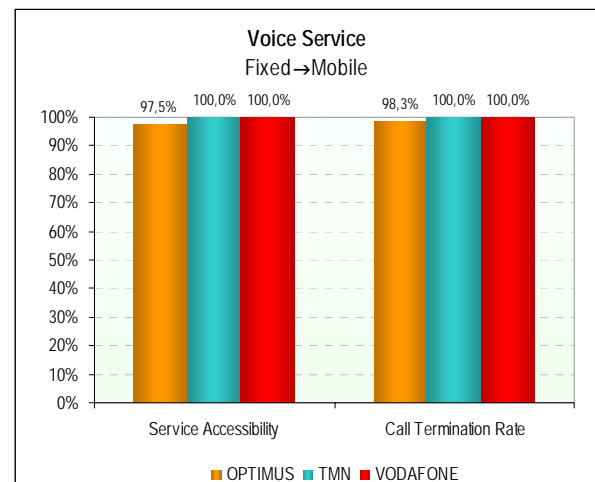
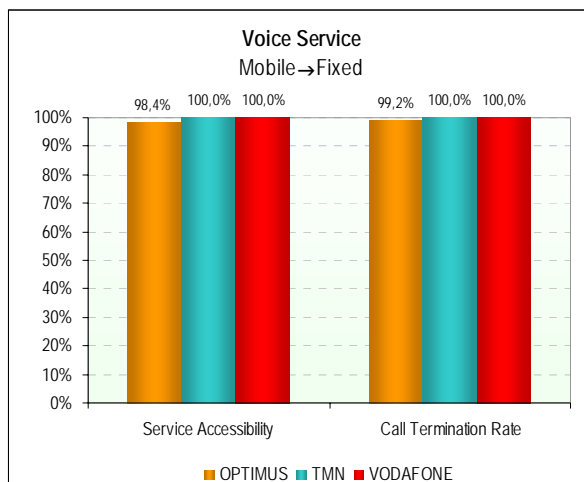
4.1 AUTONOMOUS REGION OF THE AZORES

4.1.1 URBAN AGGLOMERATIONS

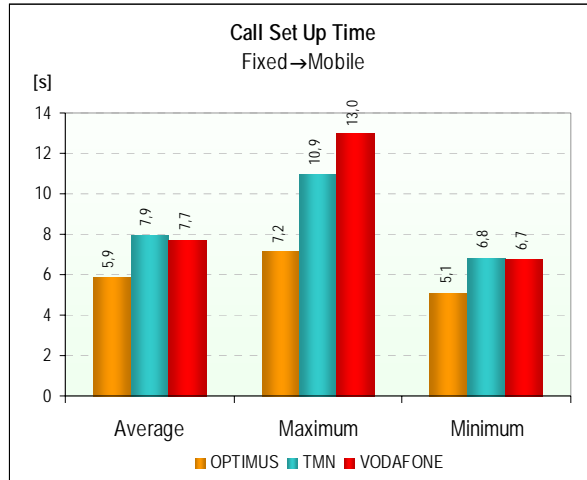
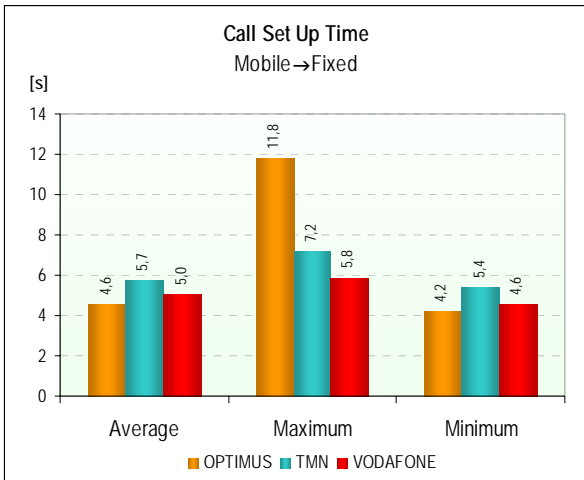
4.1.1.1 VOICE SERVICE (GSM)

		OPTIMUS		TMN		VODAFONE	
		Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile
Calls Made	Number of Calls	122	120	124	122	125	122
	Dropped on Set Up	2	3	0	0	0	0
	Dropped during Call	1	2	0	0	0	0
	With Normal Termination	119	115	124	122	125	122
	Service Accessibility	98,4%	97,5%	100,0%	100,0%	100,0%	100,0%
	Call Termination Rate	99,2%	98,3%	100,0%	100,0%	100,0%	100,0%
Call Set Up	Number of Samples (Calls)	120	117	124	122	125	122
	Average Time [s]	4,6	5,9	5,7	7,9	5,0	7,7
	Maximum Time [s]	11,8	7,2	7,2	10,9	5,8	13,0
	Minimum Time [s]	4,2	5,1	5,4	6,8	4,6	6,7
	Standard Deviation [s]	0,7	0,4	0,3	0,6	0,2	0,9
Audio Quality	Number of Samples (Calls)	234	234	246	246	247	247
	Average [MOS]	3,81	3,83	3,91	3,81	3,79	3,79
	Maximum [MOS]	3,96	3,97	3,96	3,96	3,96	3,96
	Minimum [MOS]	3,56	3,15	3,69	3,19	3,54	3,39
	Standard Deviation [MOS]	0,03	0,05	0,05	0,12	0,07	0,08

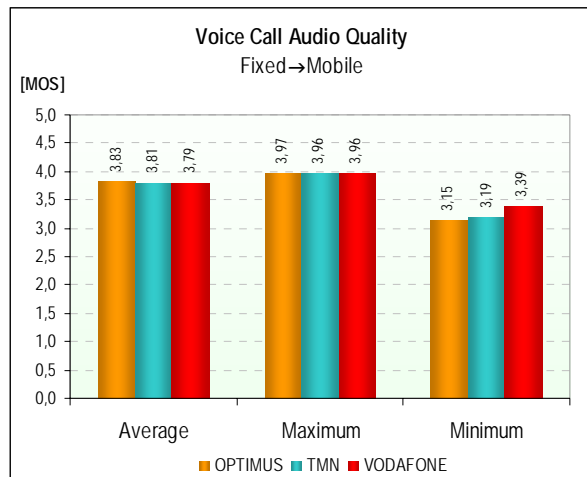
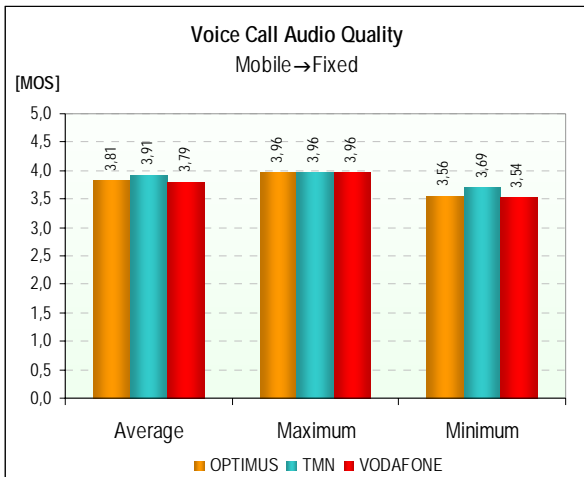
4.1.1.1.1 SERVICE ACCESSIBILITY AND CALL TERMINATION RATE INDICATORS



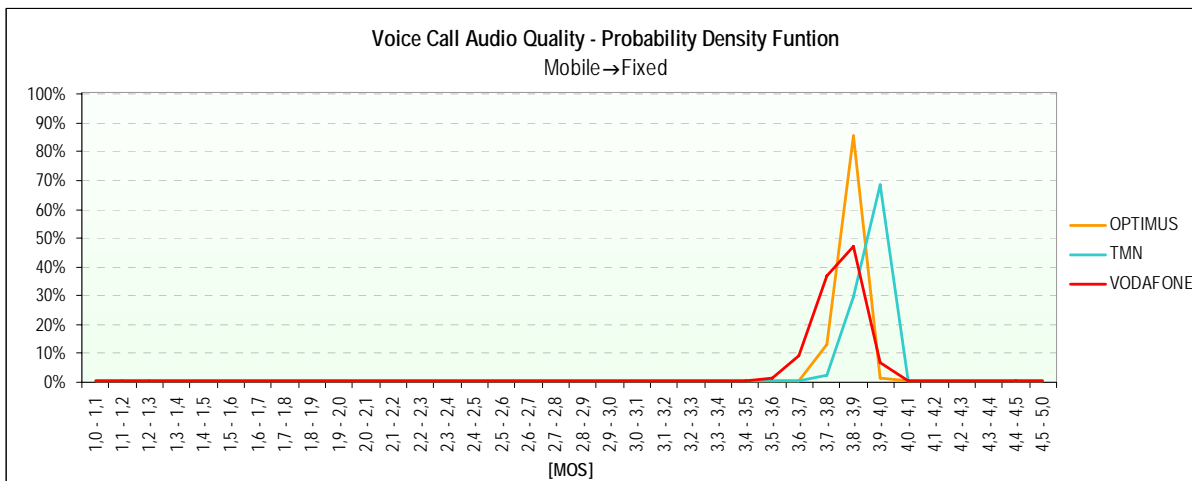
4.1.1.1.2 **CALL SET UP TIME INDICATOR**

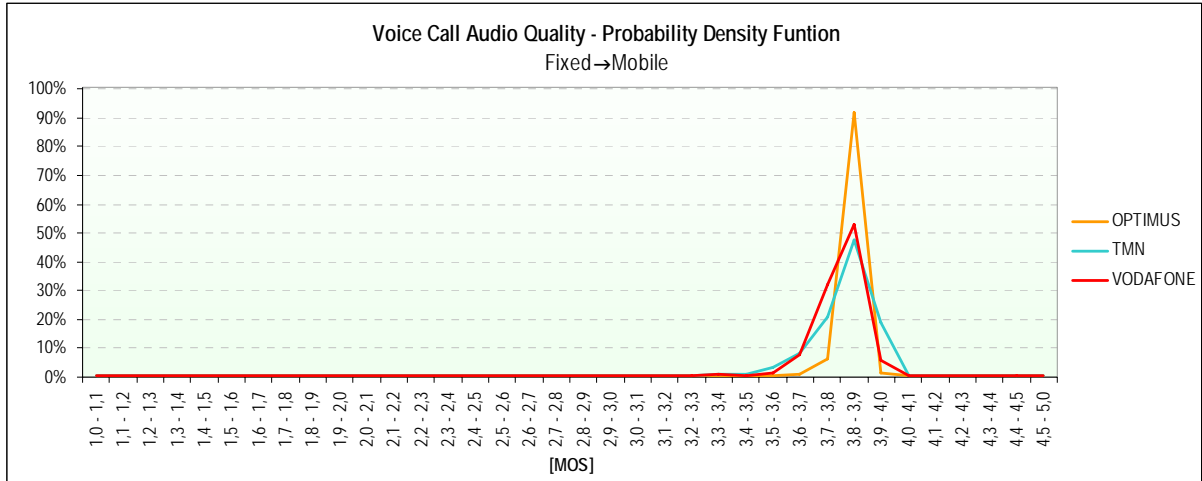


4.1.1.1.3 **VOICE CALL AUDIO QUALITY INDICATOR**



4.1.1.1.4 **PROBABILITY DENSITY FUNCTION OF THE VOICE CALL AUDIO QUALITY INDICATOR**

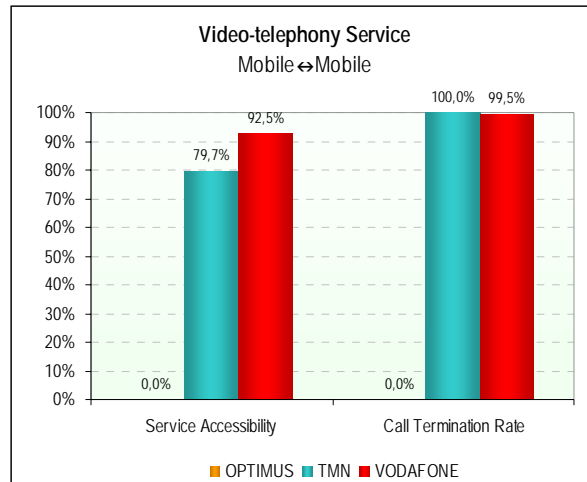




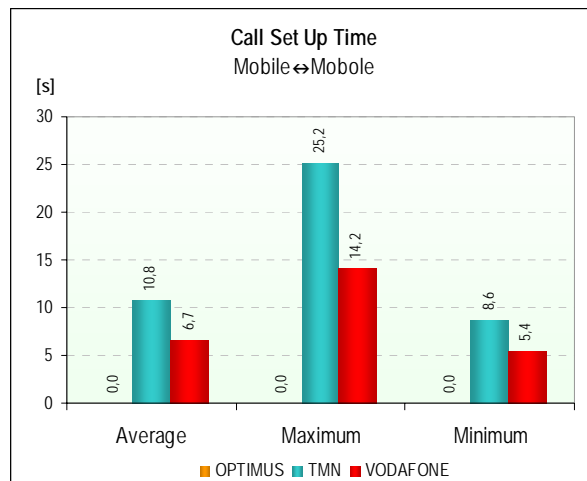
4.1.1.2 VIDEO-TELEPHONY SERVICE (UMTS)

		OPTIMUS	TMN	VODAFONE
		Mobile↔Mobile	Mobile↔Mobile	Mobile↔Mobile
Calls Made	Number of Calls	215	212	213
	Dropped on Set Up	215	43	16
	Dropped during Call	0	0	1
	With Normal Termination	0	169	196
	Service Accessibility	0,0%	79,7%	92,5%
	Call Termination Rate	0,0%	100,0%	99,5%
Call Set Up	Number of Samples (Calls)	0	169	197
	Average Time [s]	0,0	10,8	6,7
	Maximum Time [s]	0,0	25,2	14,2
	Minimum Time [s]	0,0	8,6	5,4
	Standard Deviation [s]	0,0	2,1	1,3
Audio Quality	Number of Samples (Calls)	0	335	392
	Average [MOS]	0,00	3,89	3,88
	Maximum [MOS]	0,00	4,06	4,06
	Minimum [MOS]	0,00	1,00	2,05
	Standard Deviation [MOS]	0,00	0,45	0,22
Video Quality	Number of Samples (Calls)	0	332	392
	Average [MOS]	0,00	3,21	2,99
	Maximum [MOS]	0,00	3,68	3,68
	Minimum [MOS]	0,00	1,70	1,89
	Standard Deviation [MOS]	0,00	0,54	0,54

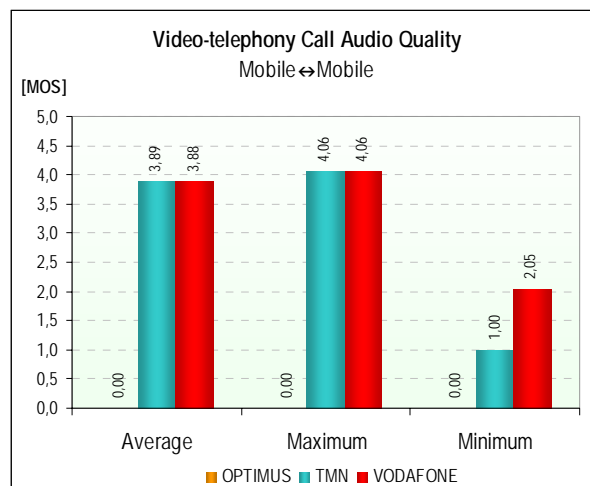
4.1.1.2.1 *SERVICE ACCESSIBILITY AND CALL TERMINATION RATE INDICATORS*



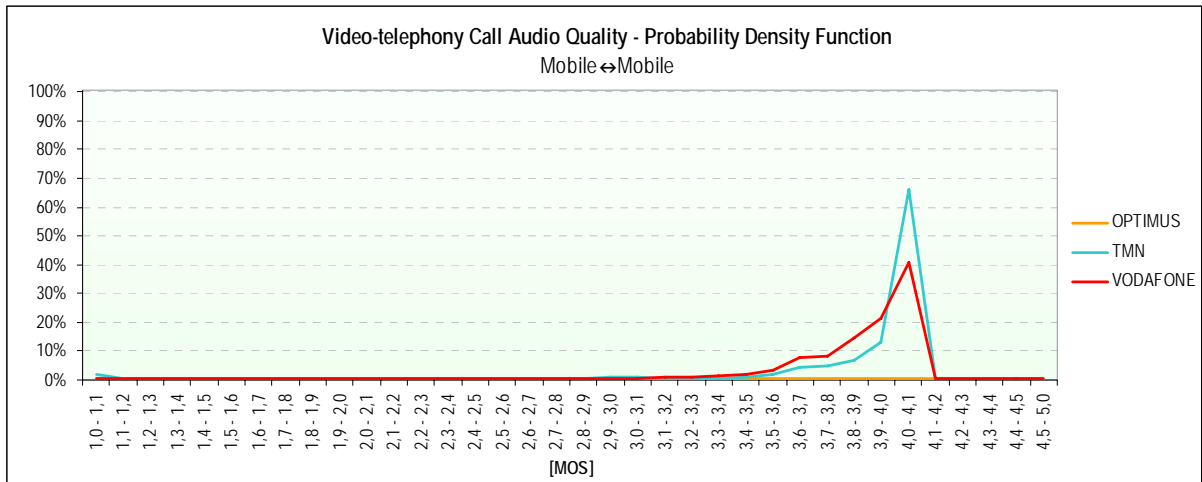
4.1.1.2.2 *CALL SET UP TIME INDICATOR*



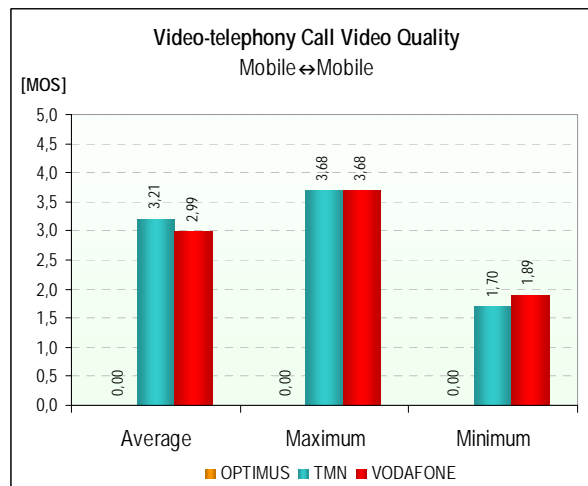
4.1.1.2.3 *VIDEO-TELEPHONY CALL AUDIO QUALITY*



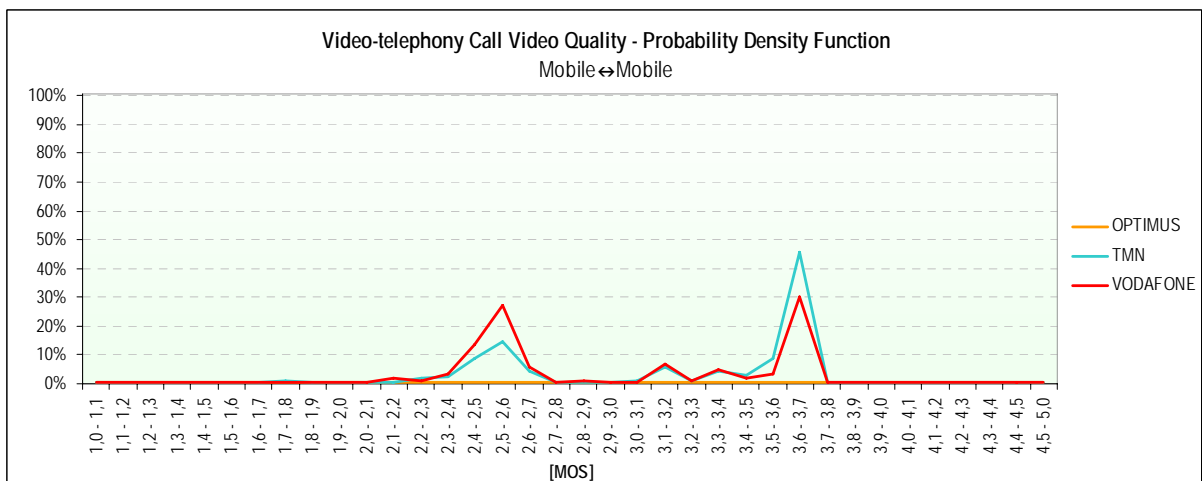
4.1.1.2.4 PROBABILITY DENSITY FUNCTION OF THE VIDEO-TELEPHONY CALL AUDIO QUALITY INDICATOR



4.1.1.2.5 VIDEO-TELEPHONY CALL VIDEO QUALITY INDICATOR



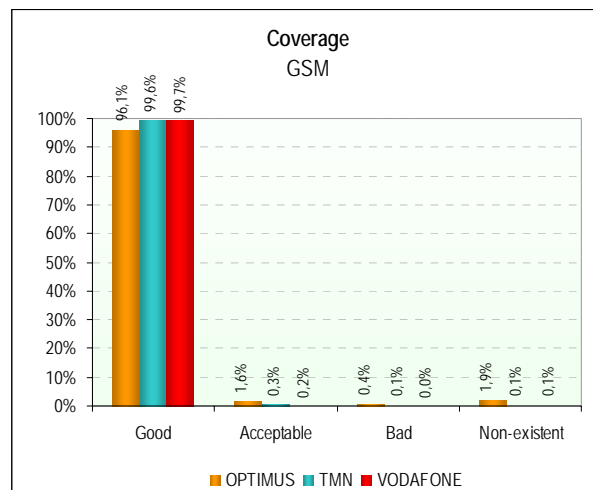
4.1.1.2.6 PROBABILITY DENSITY FUNCTION OF THE VIDEO-TELEPHONY CALL VIDEO QUALITY INDICATOR



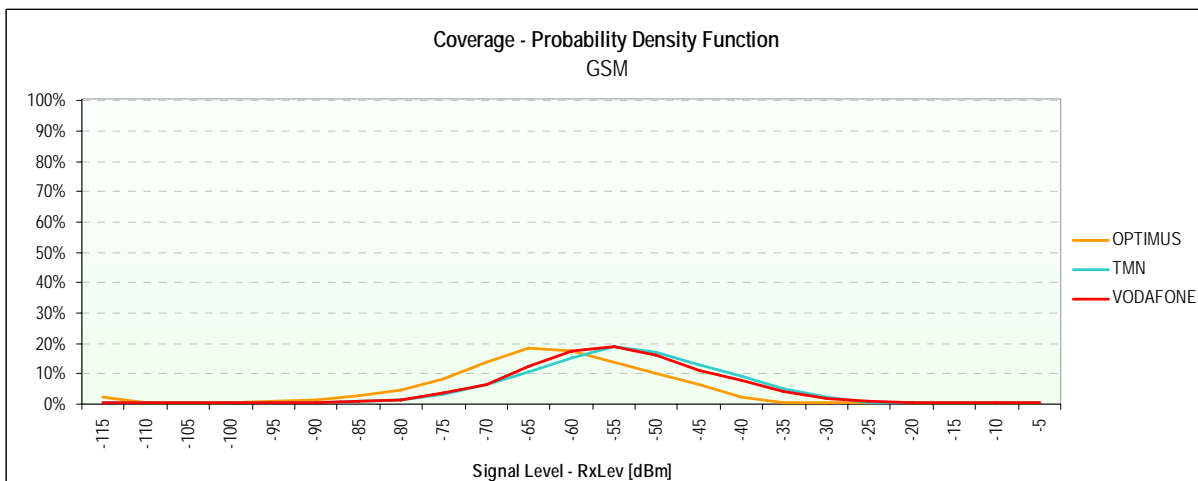
4.1.1.3 NETWORK COVERAGE

		GSM			WCDMA		
		OPTIMUS	TMN	VODAFONE	OPTIMUS	TMN	VODAFONE
Coverage	Number of Samples (Measurements)	45.444	45.176	45.444	18.094	18.011	18.090
	Signal Average Level [dBm]	-61	-51	-53	-122	-69	-69
	Signal Maximum Level [dBm]	-22	-14	-11	-115	-34	-32
	Signal Minimum Level [dBm]	-115	-115	-115	-127	-120	-117
	Standard Deviation [dBm]	13	11	11	1	13	13
	Good	96,1%	99,6%	99,7%	0,0%	97,7%	97,4%
	Acceptable	1,6%	0,3%	0,2%	0,0%	1,9%	2,3%
	Bad	0,4%	0,1%	0,0%	0,0%	0,4%	0,3%
Non-existent	1,9%	0,1%	0,1%	100,0%	0,0%	0,0%	

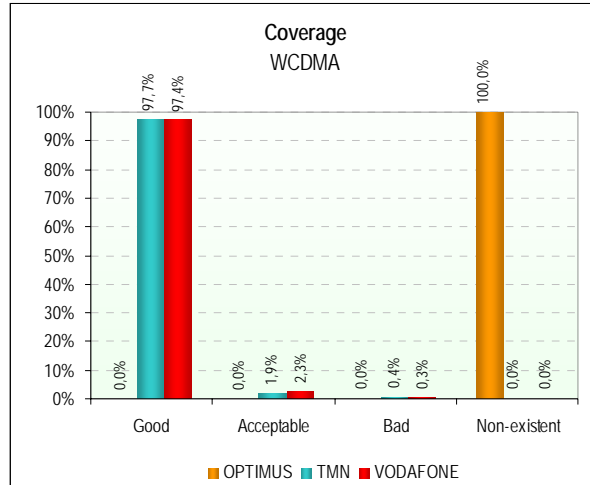
4.1.1.3.1 GSM



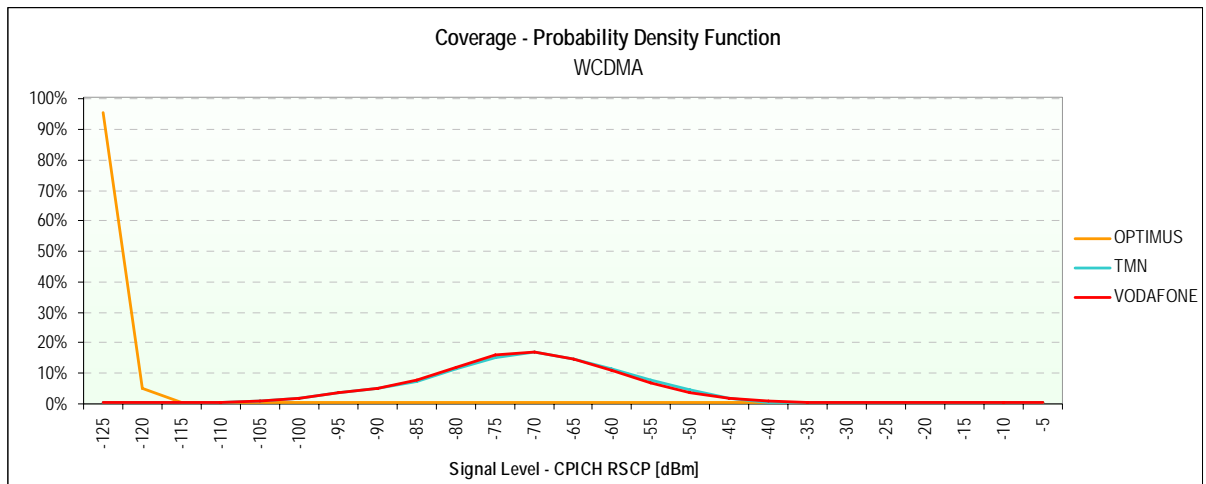
4.1.1.3.2 GSM – PROBABILITY DENSITY FUNCTION



4.1.1.3.3 WCDMA



4.1.1.3.4 WCDMA – PROBABILITY DENSITY FUNCTION

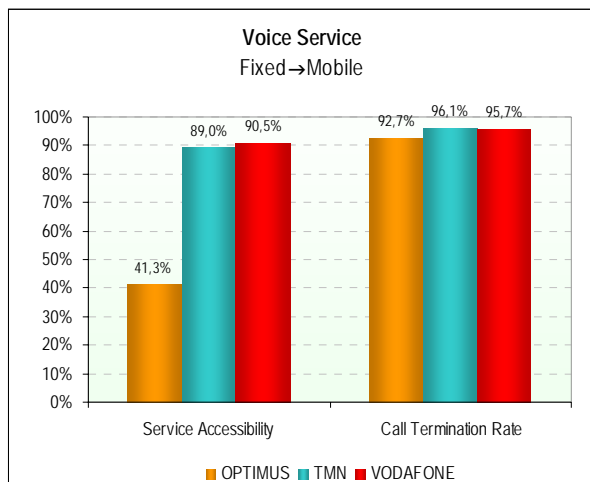
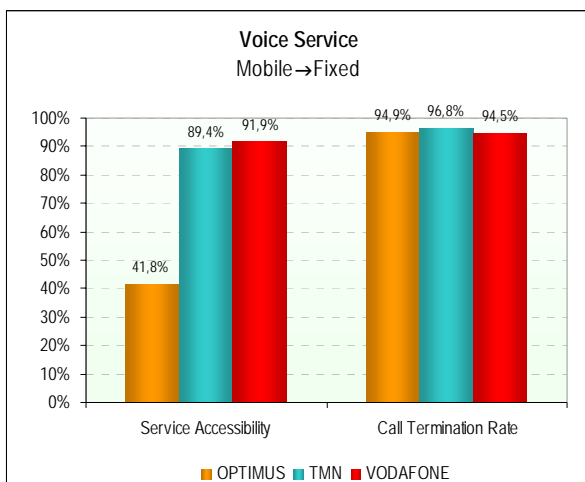


4.1.2 MAJOR ROADS

4.1.2.1 VOICE SERVICE (GSM)

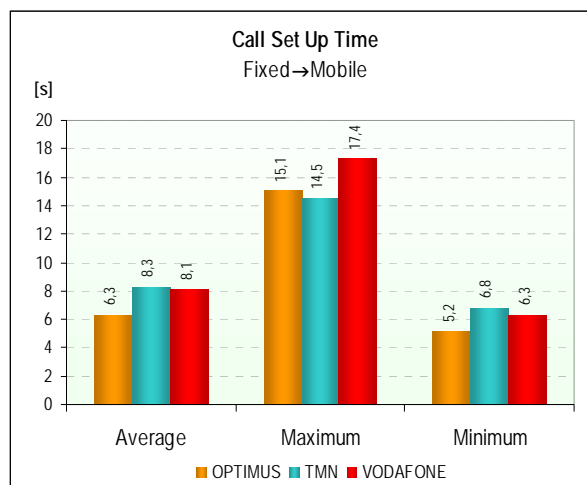
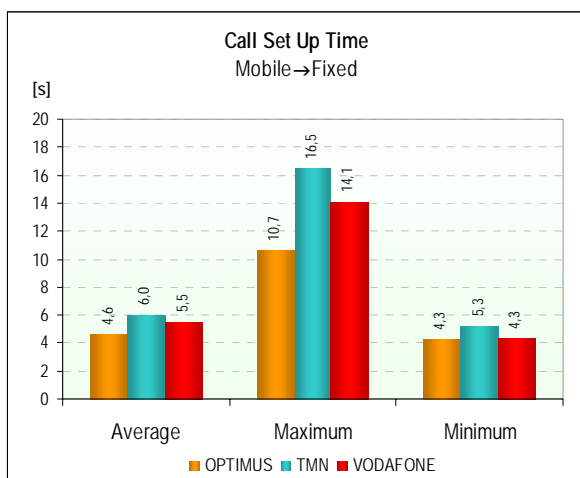
		OPTIMUS		TMN		VODAFONE	
		Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile
Calls Made	Number of Calls	474	462	483	465	479	464
	Dropped on Set Up	276	271	51	51	39	44
	Dropped during Call	10	14	14	16	24	18
	With Normal Termination	188	177	418	398	416	402
	Service Accessibility	41,8%	41,3%	89,4%	89,0%	91,9%	90,5%
	Call Termination Rate	94,9%	92,7%	96,8%	96,1%	94,5%	95,7%
Call Set Up	Number of Samples (Calls)	198	191	432	414	440	420
	Average Time [s]	4,6	6,3	6,0	8,3	5,5	8,1
	Maximum Time [s]	10,7	15,1	16,5	14,5	14,1	17,4
	Minimum Time [s]	4,3	5,2	5,3	6,8	4,3	6,3
	Standard Deviation [s]	0,7	1,3	1,3	1,1	1,6	1,6
Audio Quality	Number of Samples (Calls)	365	365	816	816	818	818
	Average [MOS]	3,76	3,76	3,92	3,89	3,79	3,77
	Maximum [MOS]	3,95	3,97	3,97	3,97	3,96	3,98
	Minimum [MOS]	2,31	2,49	2,79	2,62	2,81	2,02
	Standard Deviation [MOS]	0,18	0,19	0,09	0,13	0,11	0,20

4.1.2.1.1 SERVICE ACCESSIBILITY AND CALL TERMINATION RATE INDICATORS

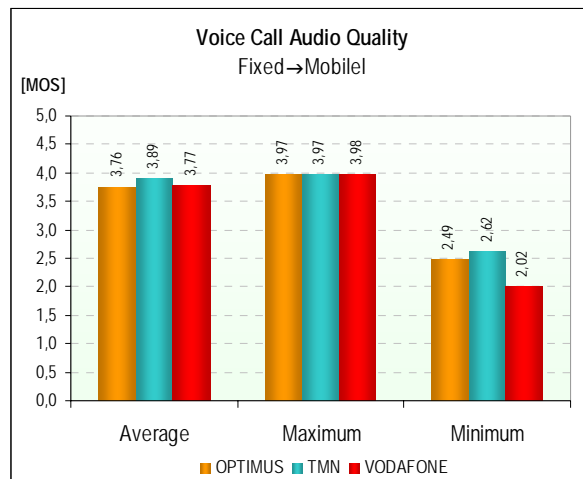
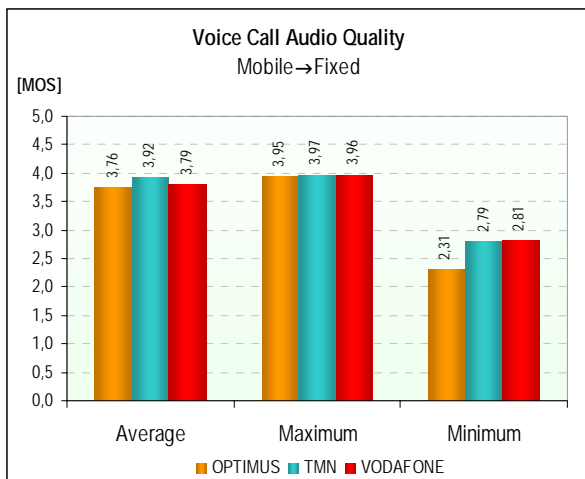




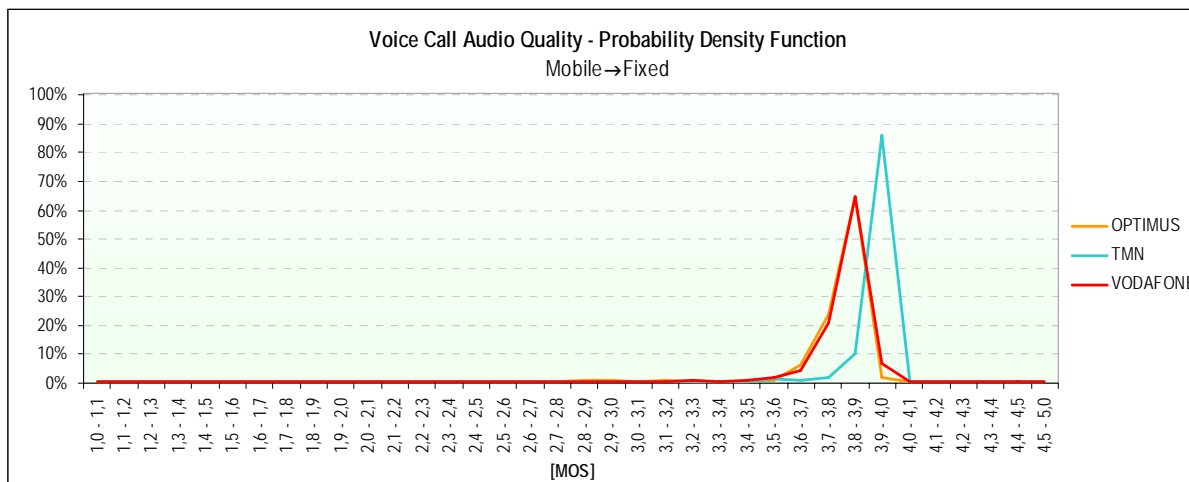
4.1.2.1.2 *CALL SET UP TIME INDICATOR*

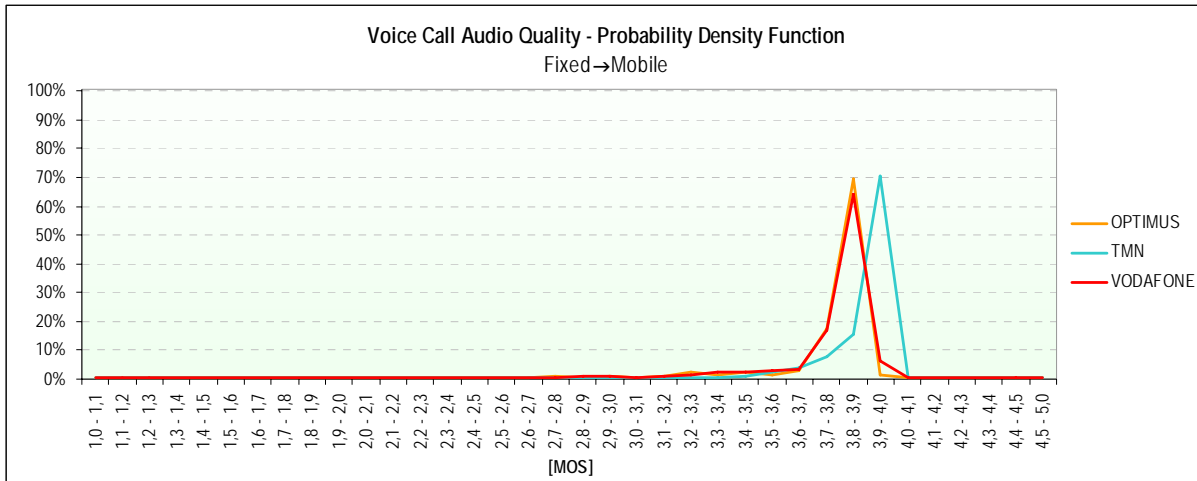


4.1.2.1.3 *VOICE CALL AUDIO QUALITY INDICATOR*



4.1.2.1.4 *PROBABILITY DENSITY FUNCTION OF THE VOICE CALL AUDIO QUALITY INDICATOR*

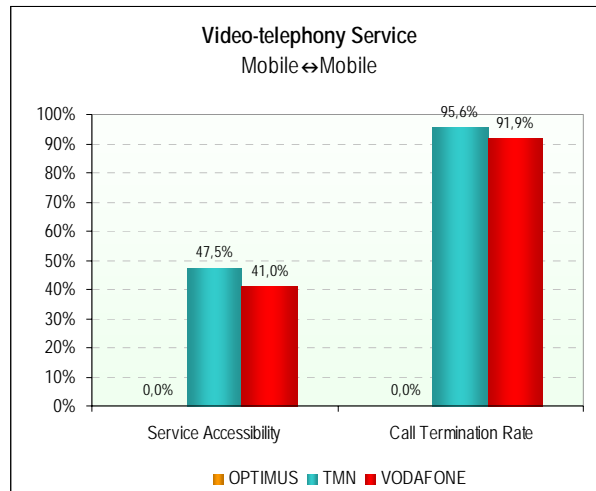




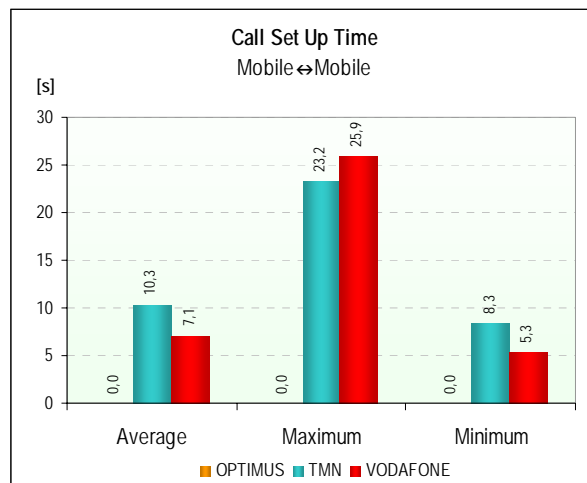
4.1.2.2 VIDEO-TELEPHONY SERVICE (UMTS)

		OPTIMUS	TMN	VODAFONE
		Mobile↔Mobile	Mobile↔Mobile	Mobile↔Mobile
Calls Made	Number of Calls	808	813	815
	Dropped on Set Up	808	427	481
	Dropped during Call	0	17	27
	With Normal Termination	0	369	307
	Service Accessibility	0,0%	47,5%	41,0%
	Call Termination Rate	0,0%	95,6%	91,9%
Call Set Up	Number of Samples (Calls)	0	386	334
	Average Time [s]	0,0	10,3	7,1
	Maximum Time [s]	0,0	23,2	25,9
	Minimum Time [s]	0,0	8,3	5,3
	Standard Deviation [s]	0,0	1,9	2,4
Audio Quality	Number of Samples (Calls)	0	731	610
	Average [MOS]	0,00	3,90	3,85
	Maximum [MOS]	0,00	4,06	4,06
	Minimum [MOS]	0,00	1,00	1,00
	Standard Deviation [MOS]	0,00	0,37	0,39
Video Quality	Number of Samples (Calls)	0	729	607
	Average [MOS]	0,00	3,16	2,95
	Maximum [MOS]	0,00	3,68	3,69
	Minimum [MOS]	0,00	1,91	1,78
	Standard Deviation [MOS]	0,00	0,54	0,53

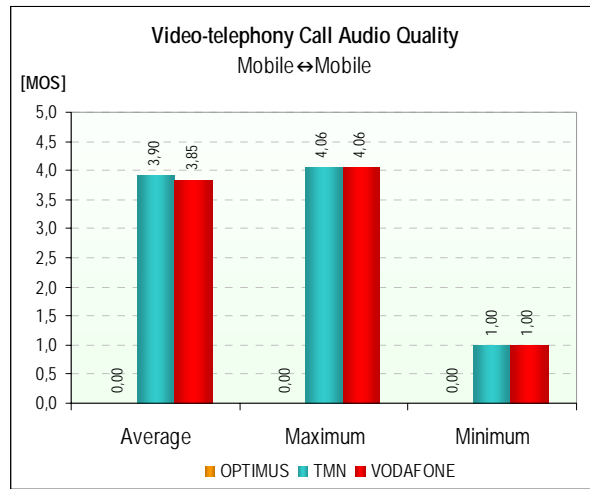
4.1.2.2.1 *SERVICE ACCESSIBILITY AND CALL TERMINATION RATE INDICATORS*



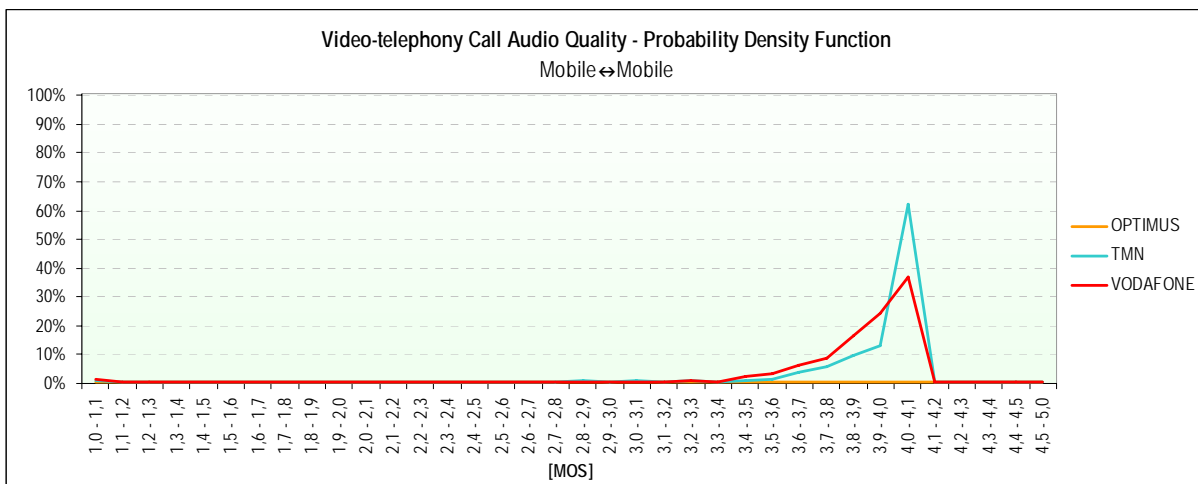
4.1.2.2.2 *CALL SET UP TIME INDICATOR*



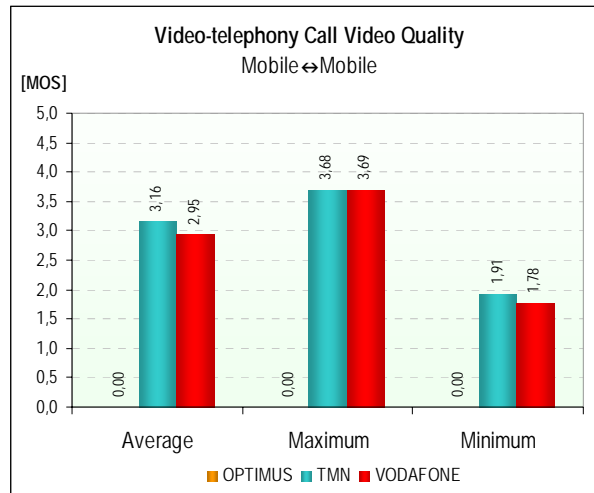
4.1.2.2.3 VIDEO-TELEPHONY CALL AUDIO QUALITY INDICATOR



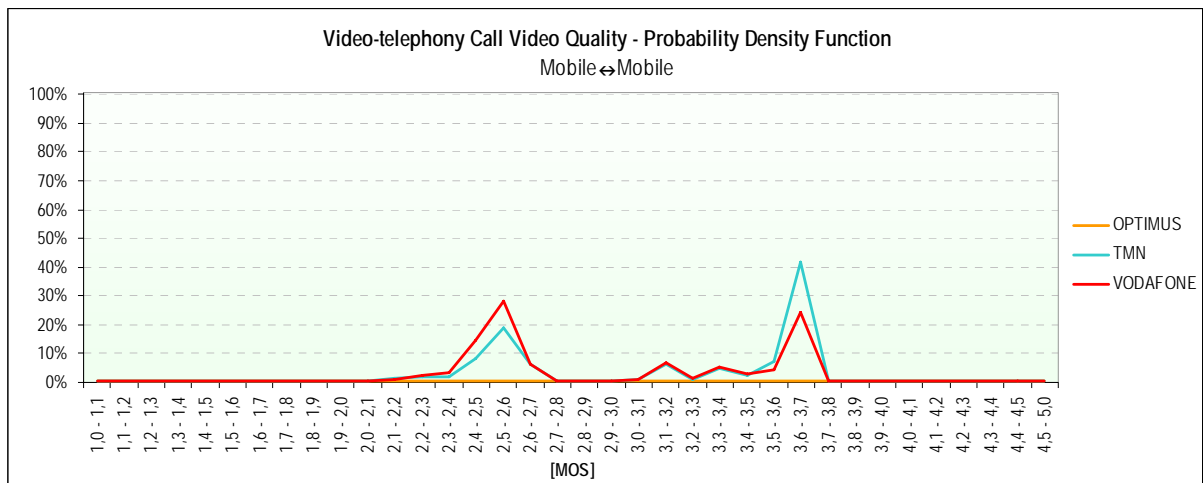
4.1.2.2.4 PROBABILITY DENSITY FUNCTION OF THE VIDEO-TELEPHONY AUDIO QUALITY INDICATOR



4.1.2.2.5 VIDEO-TELEPHONY CALL VIDEO QUALITY INDICATOR



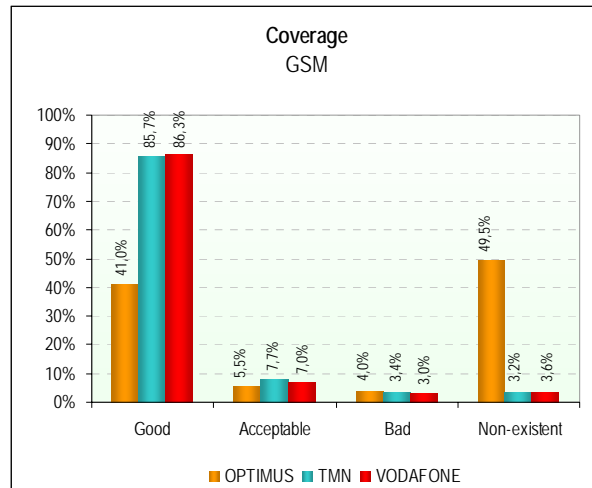
4.1.2.2.6 PROBABILITY DENSITY FUNCTION OF THE VIDEO-TELEPHONY CALL VIDEO QUALITY INDICATOR



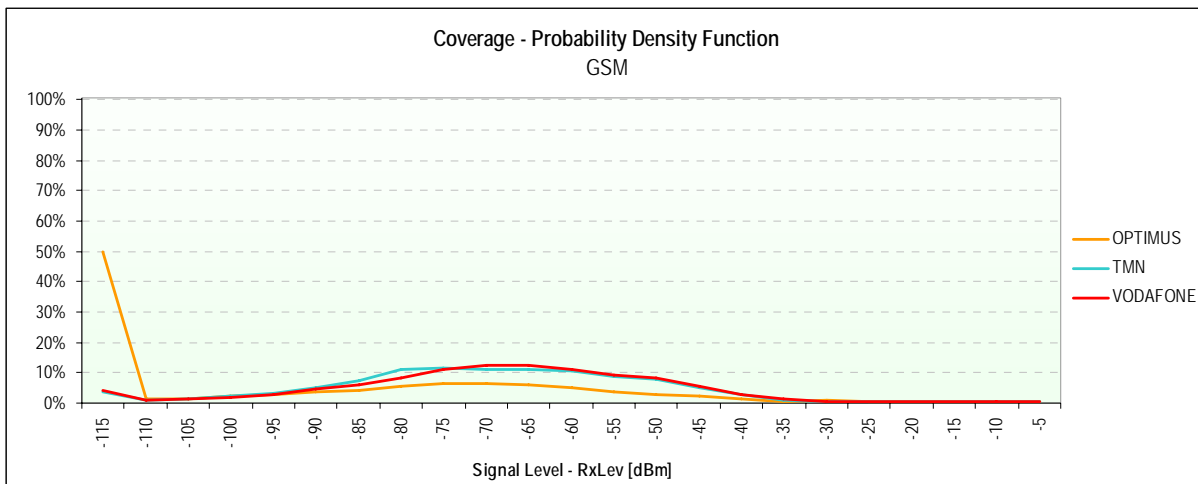
4.1.2.3 NETWORK COVERAGE

		GSM			WCDMA		
		OPTIMUS	TMN	VODAFONE	OPTIMUS	TMN	VODAFONE
Coverage	Number of Samples (Measurements)	174.169	174.096	174.169	69.331	69.304	69.297
	Signal Average Level [dBm]	-92	-68	-67	-122	-91	-98
	Signal Maximum Level [dBm]	-13	-22	-12	-114	-42	-32
	Signal Minimum Level [dBm]	-115	-115	-115	-127	-125	-126
	Standard Deviation [dBm]	25	17	18	2	19	21
	Good	41,0%	85,7%	86,3%	0,0%	60,0%	41,7%
	Acceptable	5,5%	7,7%	7,0%	0,0%	13,9%	11,9%
	Bad	4,0%	3,4%	3,0%	0,0%	8,3%	8,6%
	Non-existent	49,5%	3,2%	3,6%	100,0%	17,8%	37,8%

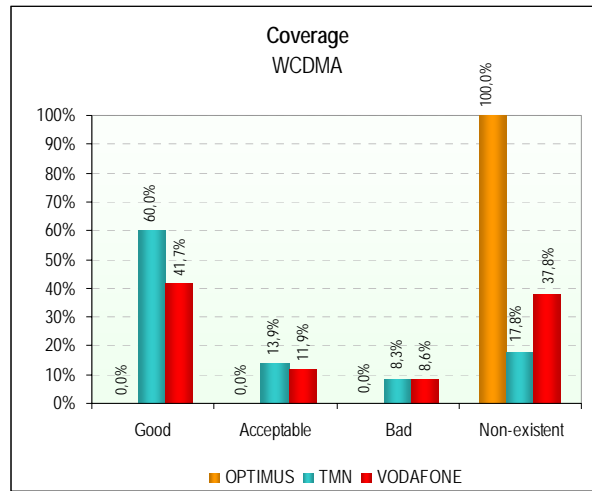
4.1.2.3.1 GSM



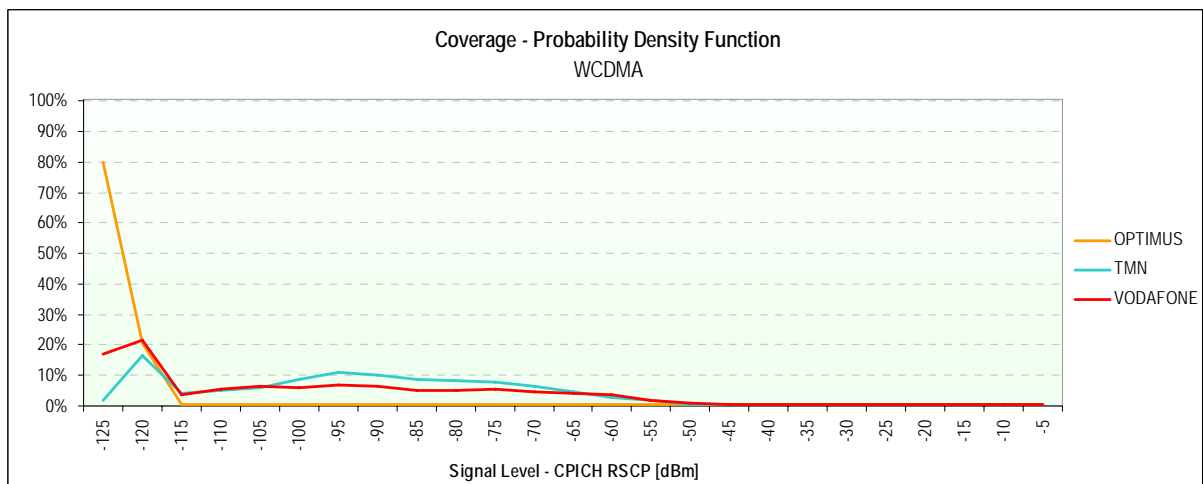
4.1.2.3.2 GSM – PROBABILITY DENSITY FUNCTION



4.1.2.3.3 WCDMA



4.1.2.3.4 WCDMA – PROBABILITY DENSITY FUNCTION



4.1.3 GLOBAL

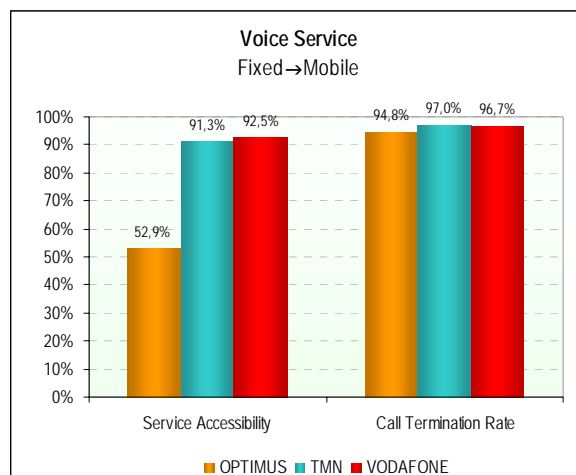
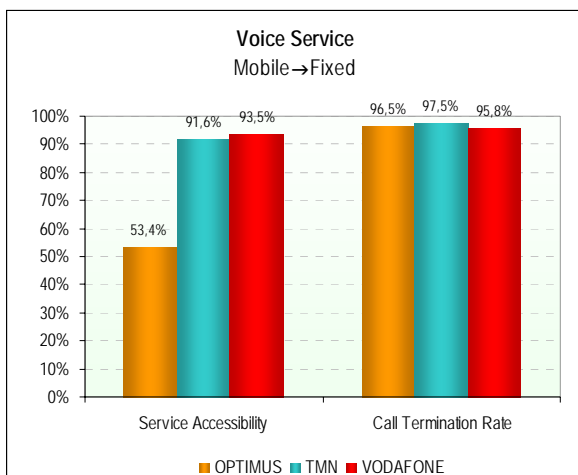
4.1.3.1 VOICE SERVICE (GSM)

		OPTIMUS		TMN		VODAFONE	
		Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile
Calls Made	Number of Calls	596	582	607	587	604	586
	Dropped on Set Up	278	274	51	51	39	44
	Dropped during Call	11	16	14	16	24	18
	With Normal Termination	307	292	542	520	541	524
	Service Accessibility	53,4%	52,9%	91,6%	91,3%	93,5%	92,5%
	Call Termination Rate	96,5%	94,8%	97,5%	97,0%	95,8%	96,7%
Call Set Up	Number of Samples (Calls)	318	308	556	536	565	542
	Average Time [s]	4,6	6,1	6,0	8,2	5,4	8,0
	Maximum Time [s]	11,8	15,1	16,5	14,5	14,1	17,4
	Minimum Time [s]	4,2	5,1	5,3	6,8	4,3	6,3
	Standard Deviation [s]	0,7	1,1	1,2	1,0	1,4	1,5
Audio Quality	Number of Samples (Calls)	599	599	1.062	1.062	1.065	1.065
	Average [MOS]	3,78	3,79	3,92	3,87	3,79	3,77
	Maximum [MOS]	3,96	3,97	3,97	3,97	3,96	3,98
	Minimum [MOS]	2,31	2,49	2,79	2,62	2,81	2,02
	Standard Deviation [MOS]	0,14	0,16	0,08	0,13	0,10	0,18

		OPTIMUS		TMN		VODAFONE	
		Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile
Error	Service Accessibility	4,1%	4,1%	2,5%	2,6%	2,3%	2,4%
	Call Termination Rate	2,6%	3,1%	1,7%	1,8%	2,0%	1,9%
	Call Set Up Time	0,077	0,124	0,096	0,088	0,115	0,127
	Audio Quality [MOS]	0,012	0,013	0,005	0,008	0,006	0,011

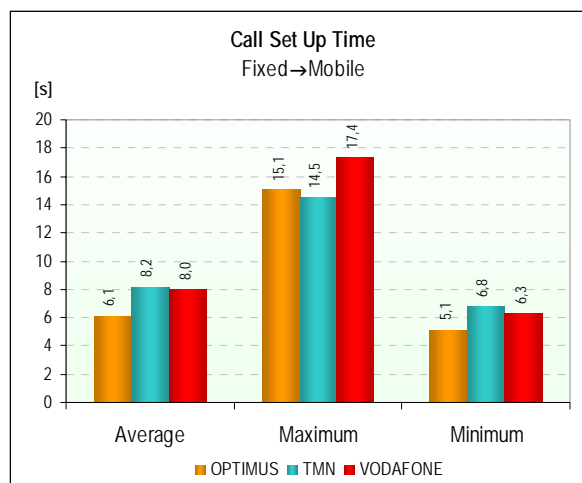
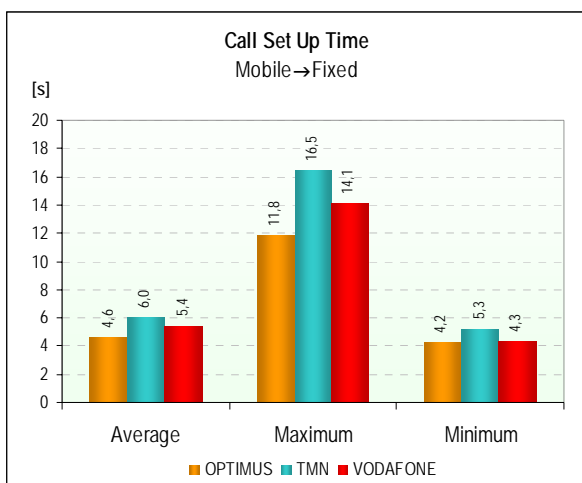
Confidence Level = 95 %

4.1.3.1.1 SERVICE ACCESSIBILITY AND CALL TERMINATION RATE INDICATORS

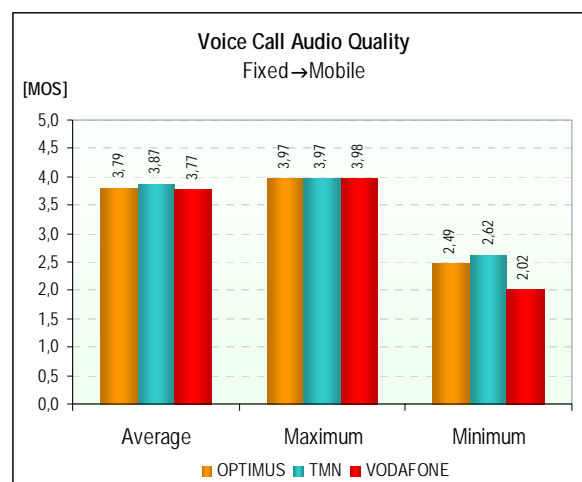
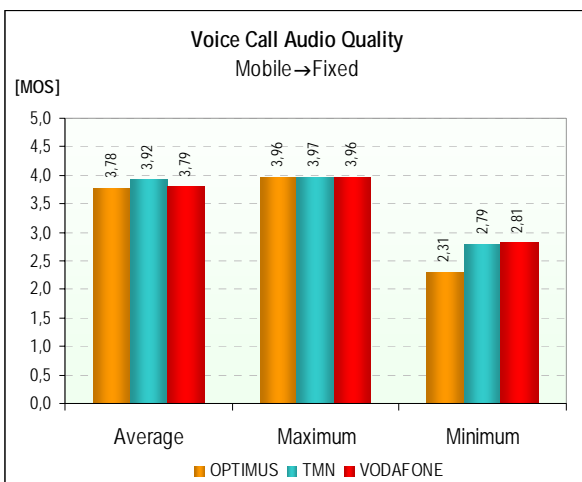




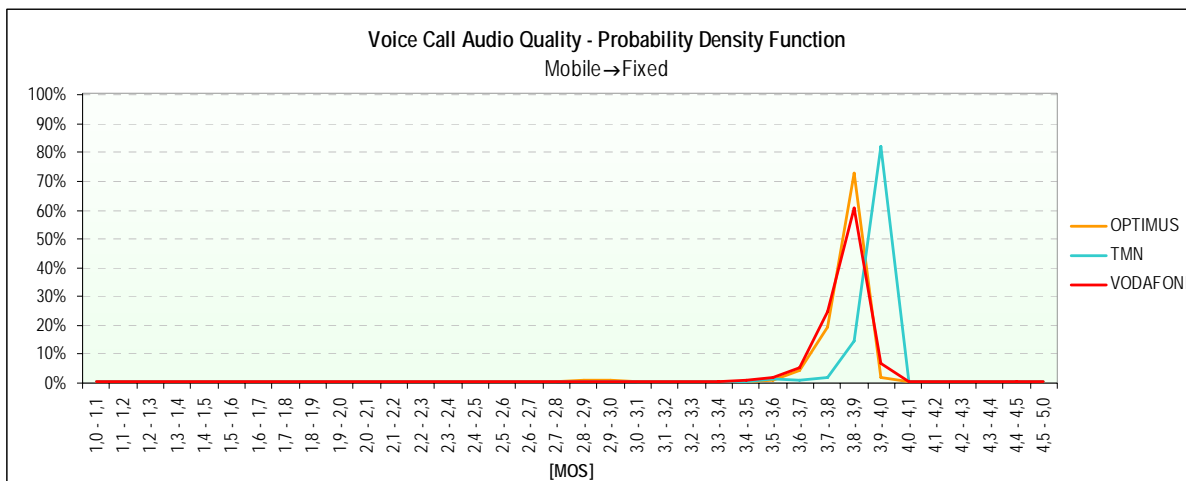
4.1.3.1.2 CALL SET UP TIME INDICATOR

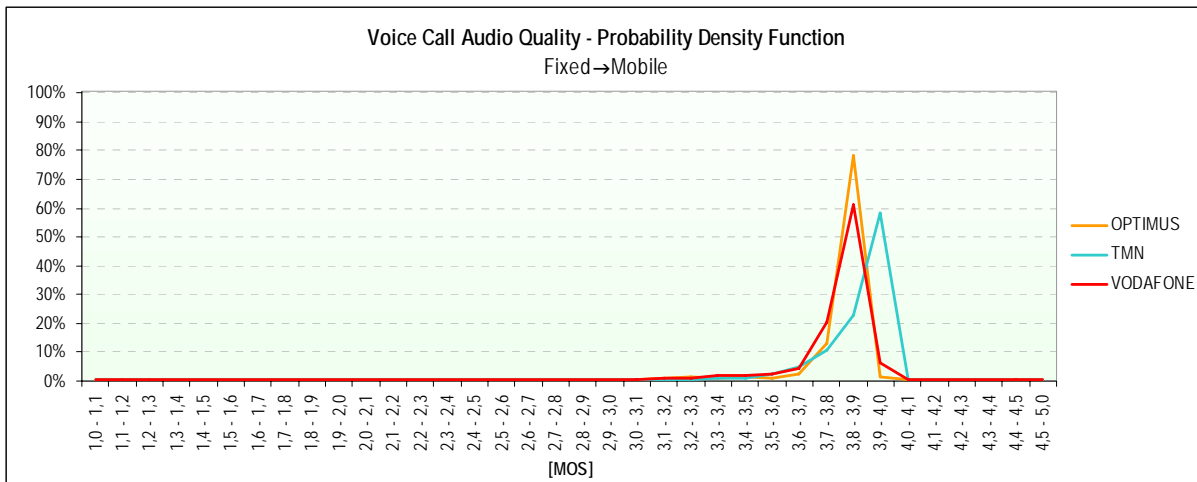


4.1.3.1.3 VOICE CALL AUDIO QUALITY INDICATOR



4.1.3.1.4 PROBABILITY DENSITY FUNCTION OF THE VOICE CALL AUDIO QUALITY INDICATOR





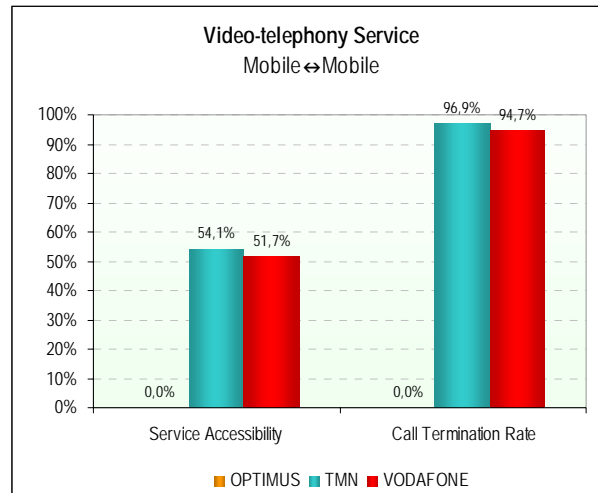
4.1.3.2 VIDEO-TELEPHONY SERVICE (UMTS)

		OPTIMUS	TMN	VODAFONE
		Mobile↔Mobile	Mobile↔Mobile	Mobile↔Mobile
Calls Made	Number of Calls	1.023	1.025	1.028
	Dropped on Set Up	1.023	470	497
	Dropped during Call	0	17	28
	With Normal Termination	0	538	503
	Service Accessibility	0,0%	54,1%	51,7%
	Call Termination Rate	0,0%	96,9%	94,7%
Call Set Up	Number of Samples (Calls)	0	555	531
	Average Time [s]	0,0	10,5	6,9
	Maximum Time [s]	0,0	25,2	25,9
	Minimum Time [s]	0,0	8,3	5,3
	Standard Deviation [s]	0,0	1,9	2,1
Audio Quality	Number of Samples (Calls)	0	1.066	1.002
	Average [MOS]	0,00	3,90	3,86
	Maximum [MOS]	0,00	4,06	4,06
	Minimum [MOS]	0,00	1,00	1,00
	Standard Deviation [MOS]	0,00	0,40	0,34
Video Quality	Number of Samples (Calls)	0	1.061	999
	Average [MOS]	0,00	3,18	2,96
	Maximum [MOS]	0,00	3,68	3,69
	Minimum [MOS]	0,00	1,70	1,78
	Standard Deviation [MOS]	0,00	0,54	0,53

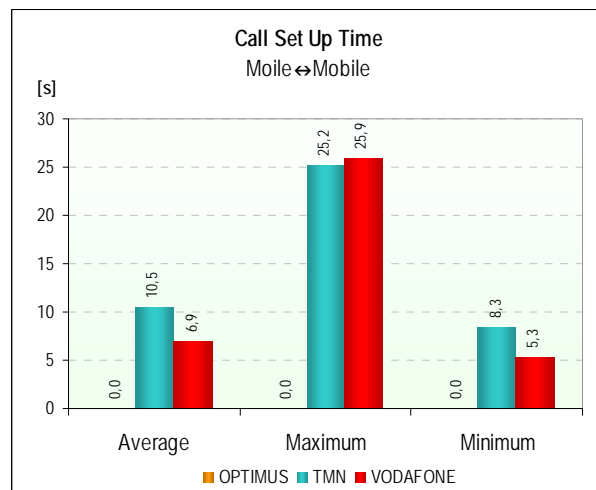
		OPTIMUS	TMN	VODAFONE
		Mobile↔Mobile	Mobile↔Mobile	Mobile↔Mobile
Error	Service Accessibility	0,0%	3,1%	3,1%
	Call Termination Rate	0,0%	1,8%	2,3%
	Call Set Up Time	0,000	0,160	0,179
	Audio Quality [MOS]	0,000	0,024	0,021
	Video Quality [MOS]	0,000	0,032	0,033

Confidence Level = 95 %

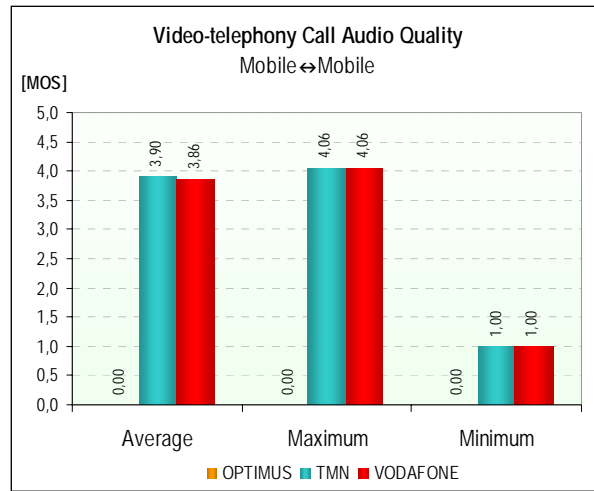
4.1.3.2.1 *SERVICE ACCESSIBILITY AND CALL TERMINATION RATE INDICATORS*



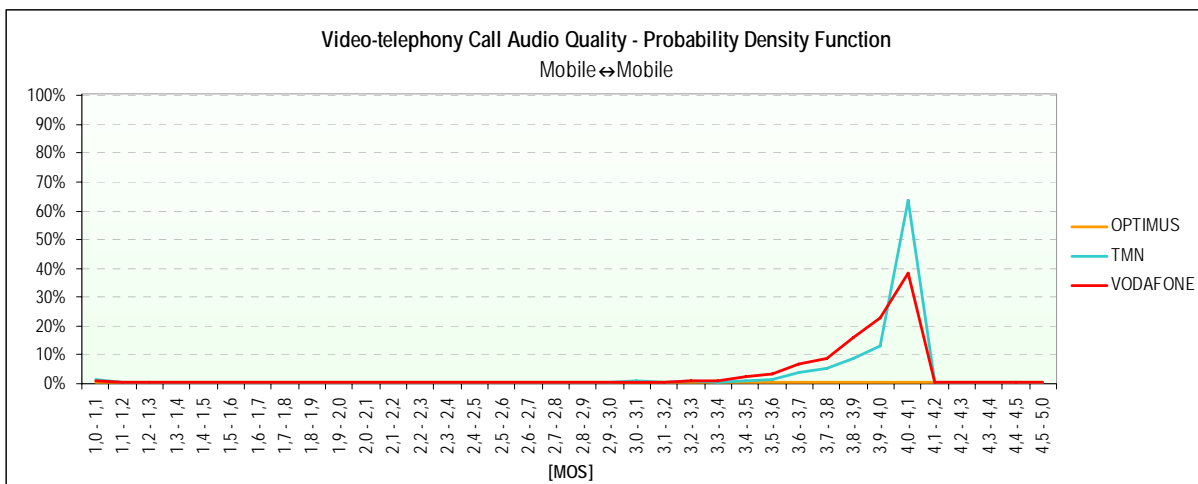
4.1.3.2.2 *CALL SET UP TIME INDICATOR*



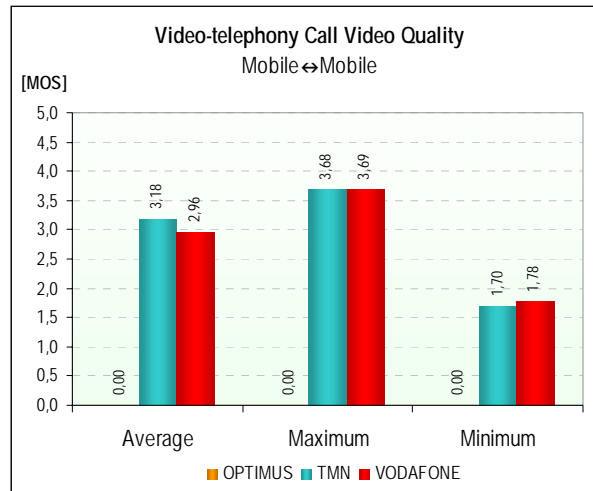
4.1.3.2.3 VIDEO-TELEPHONY CALL AUDIO QUALITY INDICATOR



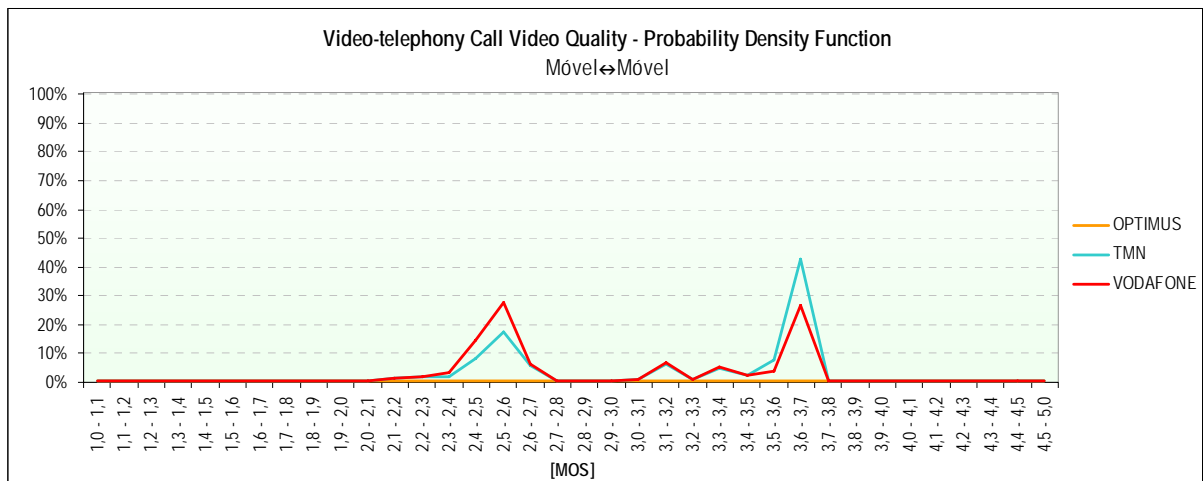
4.1.3.2.4 PROBABILITY DENSITY FUNCTION OF THE VIDEO-TELEPHONY CALL AUDIO QUALITY INDICATOR



4.1.3.2.5 VIDEO-TELEPHONY CALL VIDEO QUALITY INDICATOR



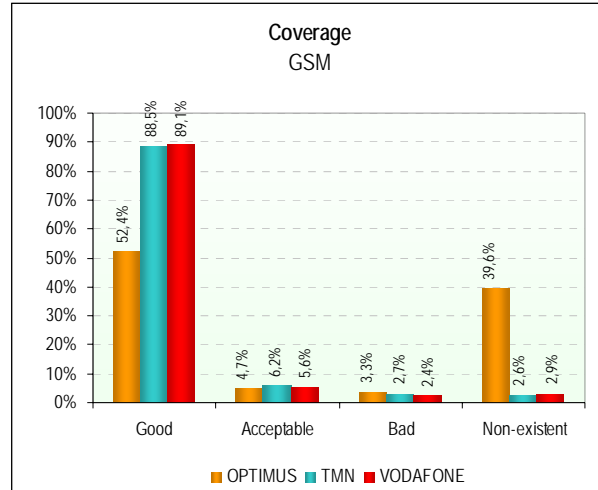
4.1.3.2.6 PROBABILITY DENSITY FUNCTION OF THE VIDEO-TELEPHONY CALL VIDEO QUALITY INDICATOR



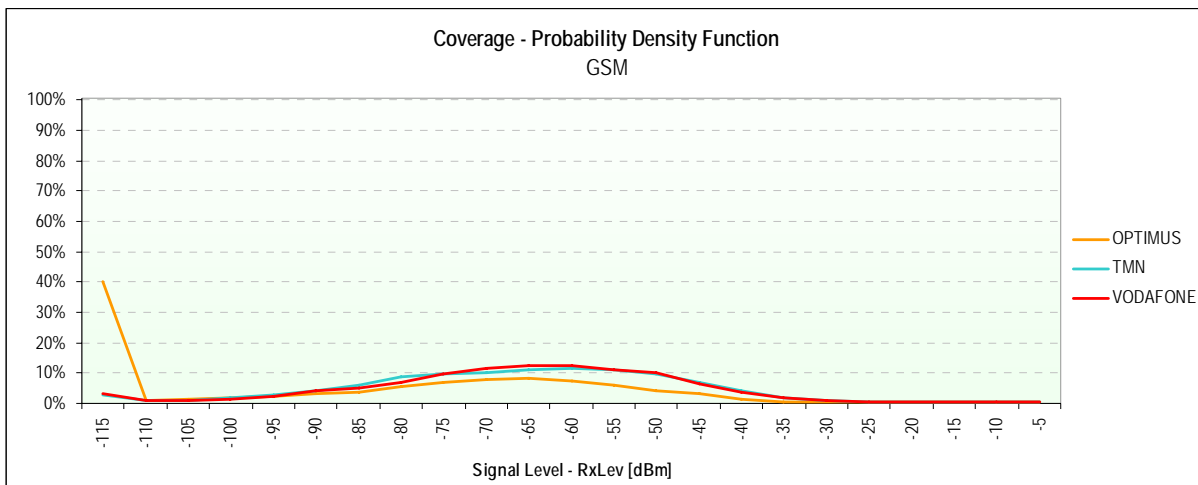
4.1.3.3 NETWORK COVERAGE

	GSM			WCDMA		
	OPTIMUS	TMN	VODAFONE	OPTIMUS	TMN	VODAFONE
Number of Samples (Measurements)	219.613	219.272	219.613	87.425	87.315	87.387
Signal Average Level [dBm]	-86	-65	-64	-122	-87	-92
Signal Maximum Level [dBm]	-13	-14	-11	-114	-34	-32
Signal Minimum Level [dBm]	-115	-115	-115	-127	-125	-126
Standard Deviation [dBm]	27	18	18	2	20	23
Good	52,4%	88,5%	89,1%	0,0%	67,8%	53,2%
Acceptable	4,7%	6,2%	5,6%	0,0%	11,4%	9,9%
Bad	3,3%	2,7%	2,4%	0,0%	6,6%	6,9%
Non-existent	39,6%	2,6%	2,9%	100,0%	14,2%	30,0%

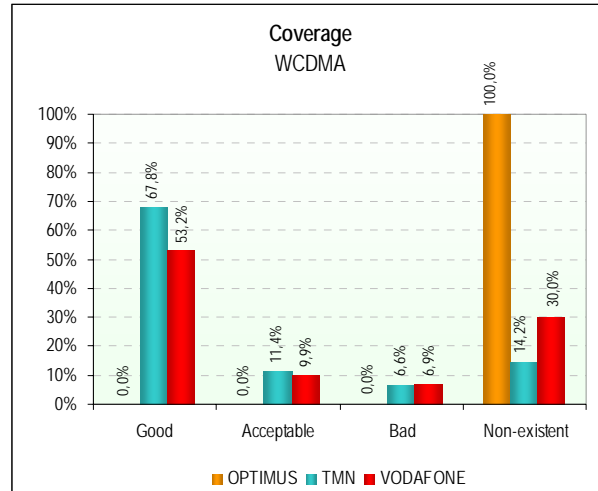
4.1.3.3.1 GSM



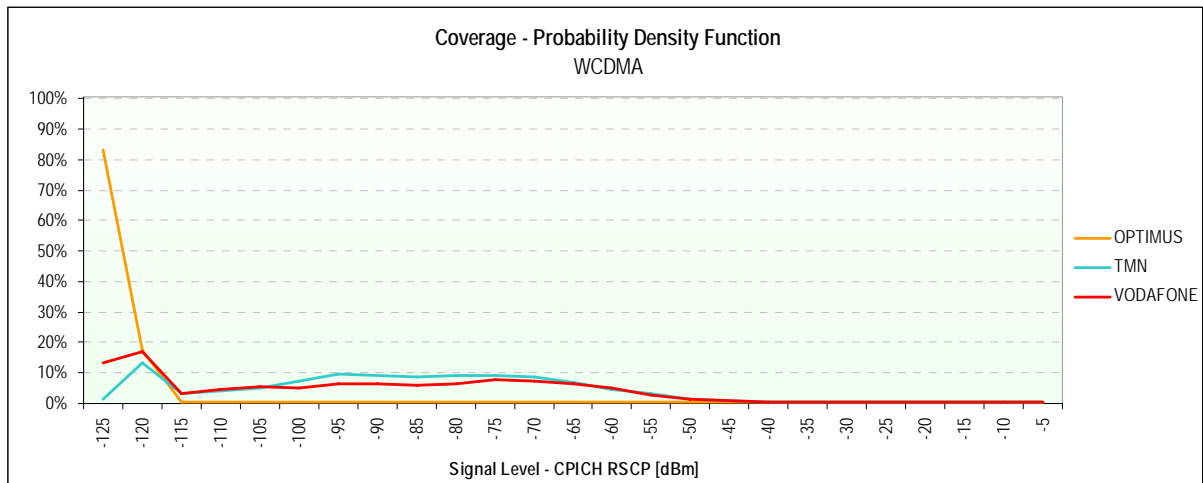
4.1.3.3.2 GSM – PROBABILITY DENSITY FUNCTION



4.1.3.3.3 WCDMA



4.1.3.3.4 WCDMA – PROBABILITY DENSITY FUNCTION



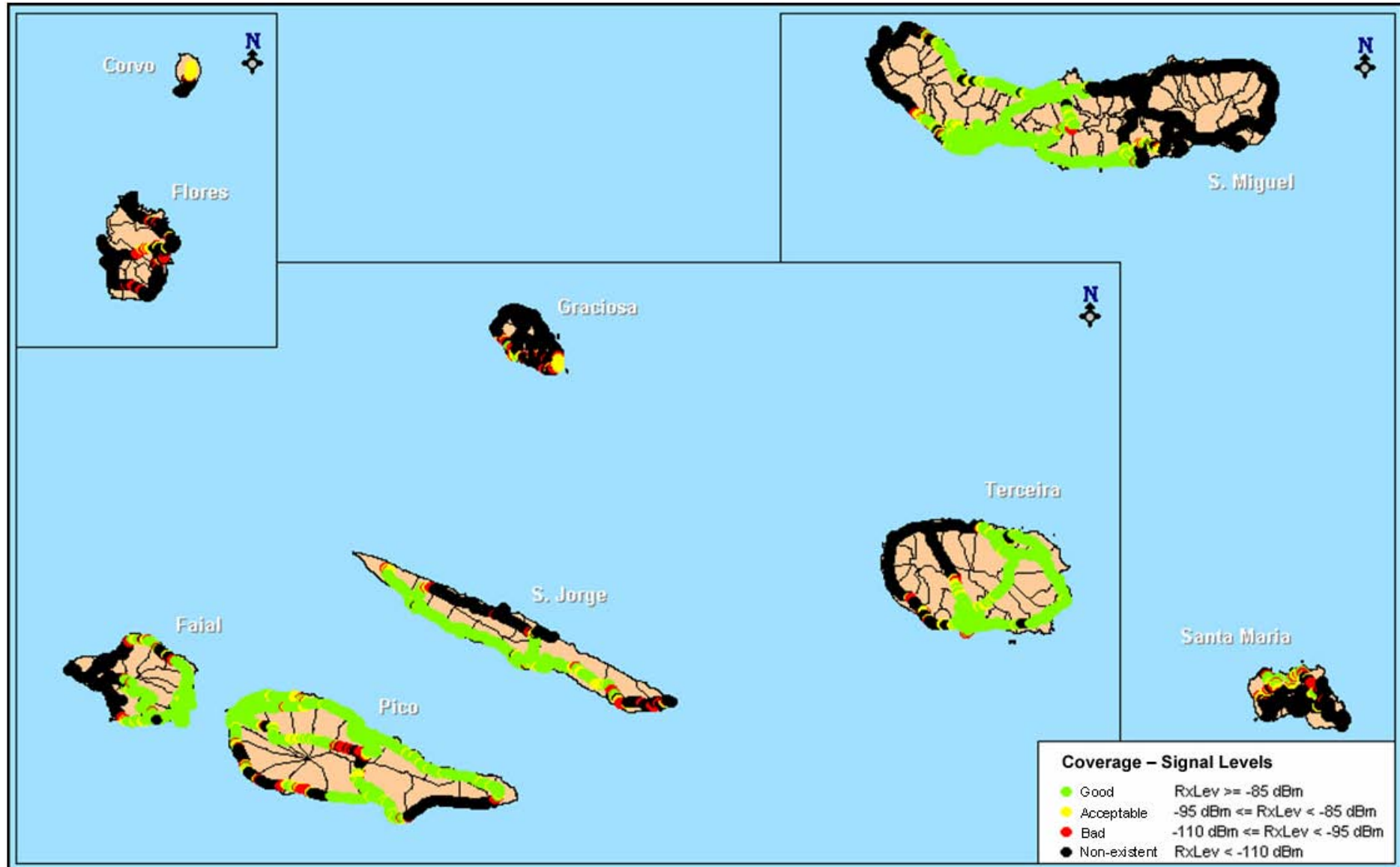
4.1.3.3.5 COVERAGE MAPS

(Following pages)



AUTONOMOUS REGION OF THE AZORES

OPTIMUS – GSM Coverage



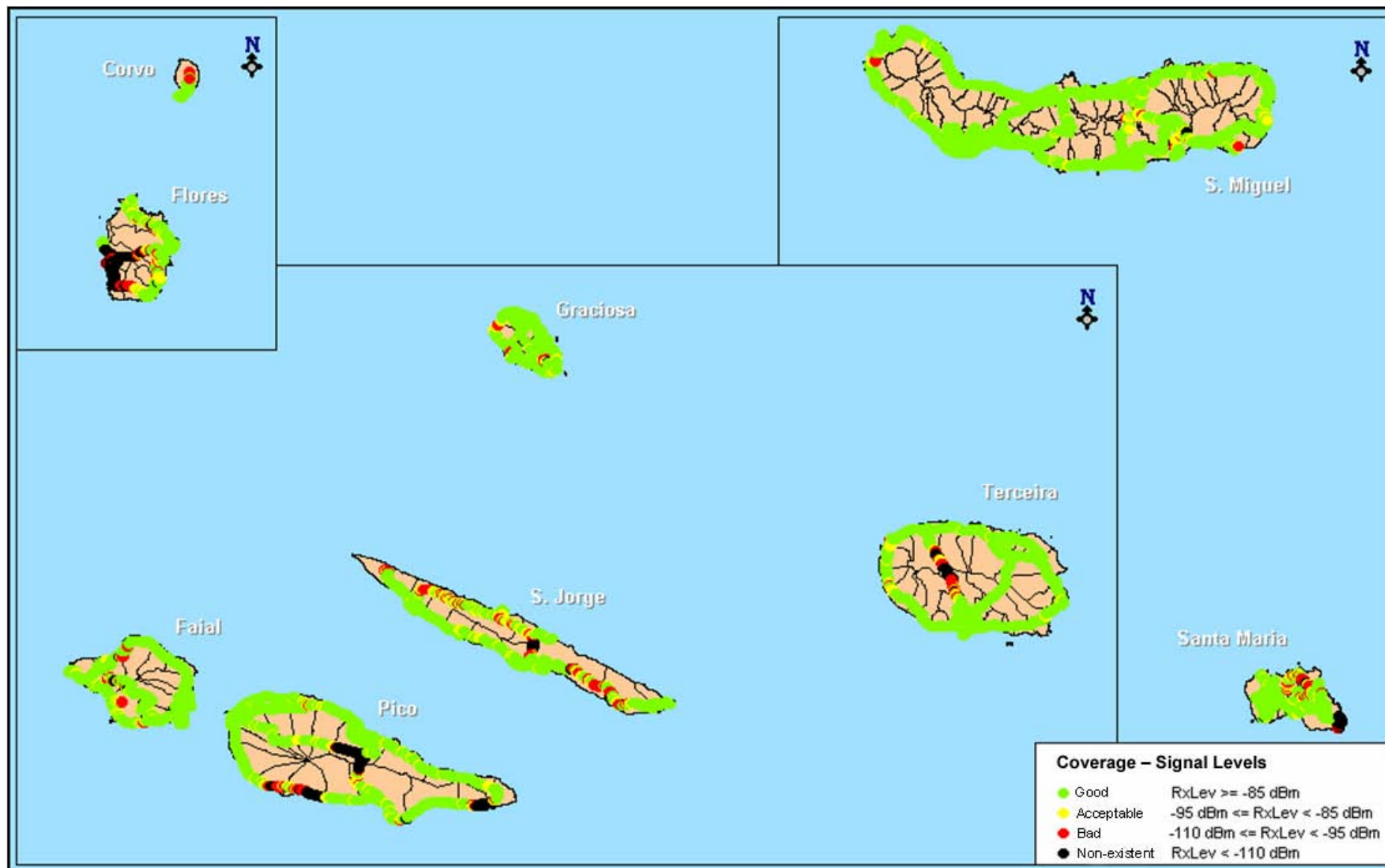


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AUTONOMOUS REGION OF THE AZORES

TMN – GSM Coverage



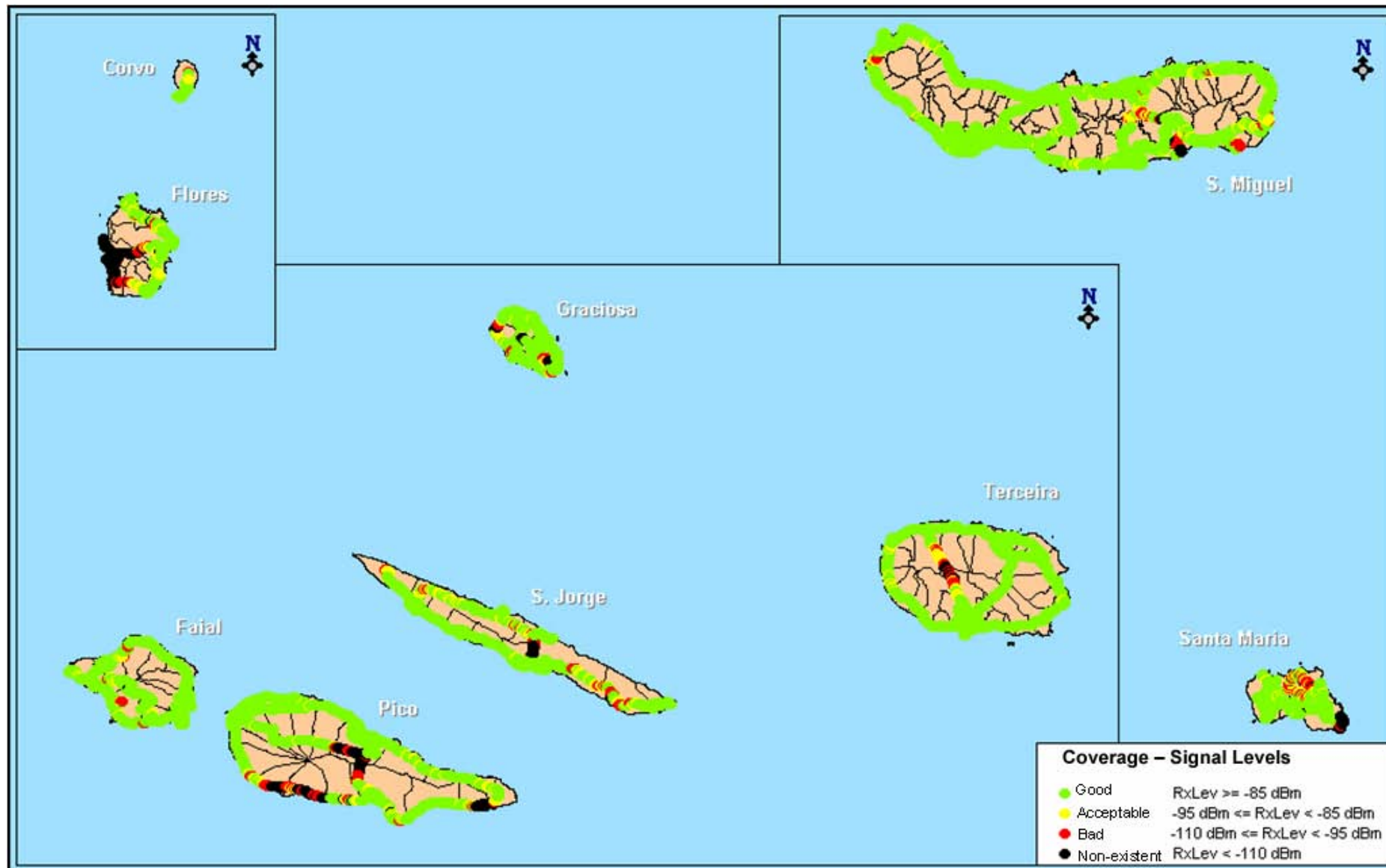


ANACOM

AUTORIDADE NACIONAL DE COMUNICAÇÕES

AUTONOMOUS REGION OF THE AZORES

VODAFONE – GSM Coverage



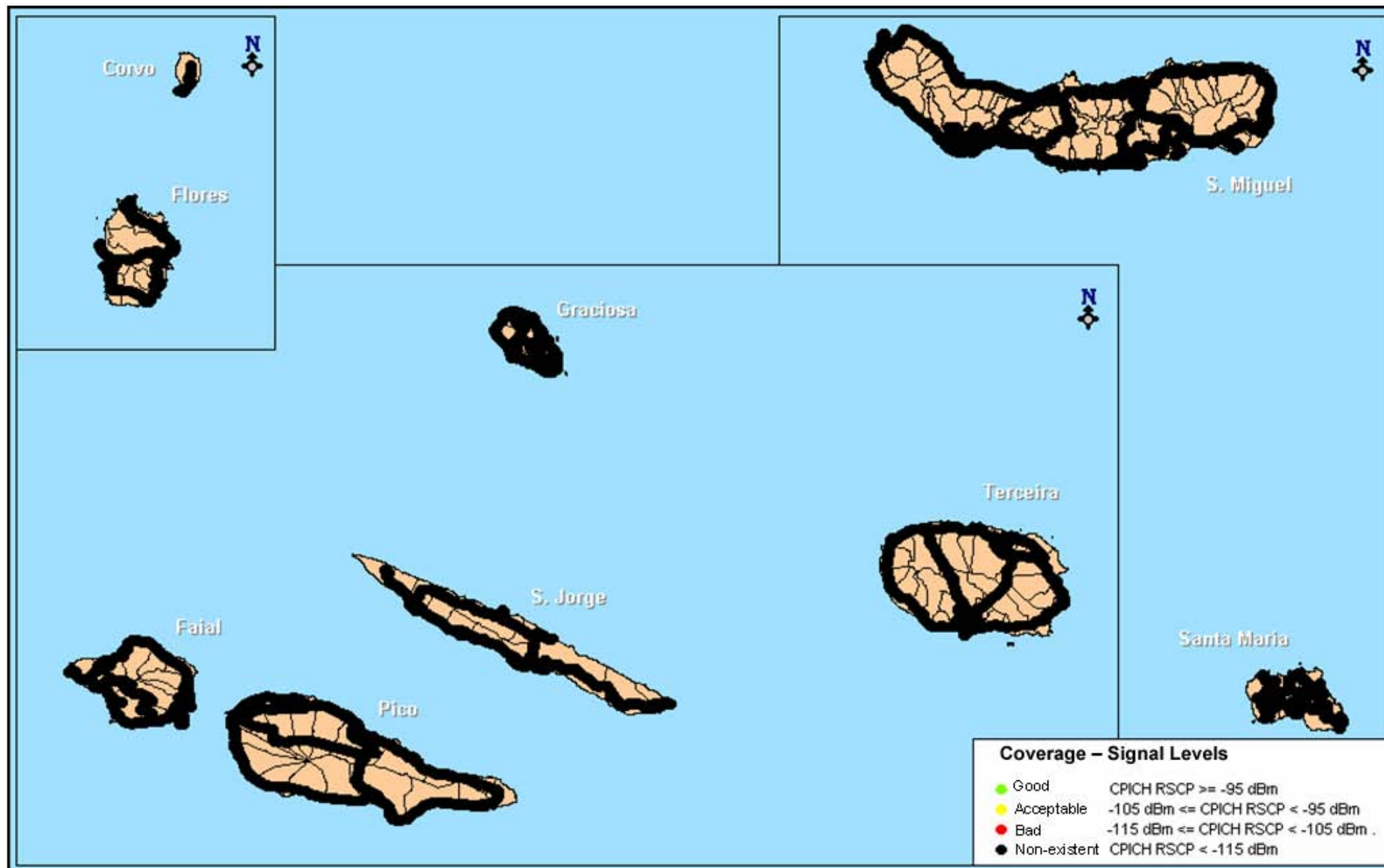


ANACOM

AUTORIDADE NACIONAL DE COMUNICAÇÕES

AUTONOMOUS REGION OF THE AZORES

OPTIMUS – WCDMA Coverage



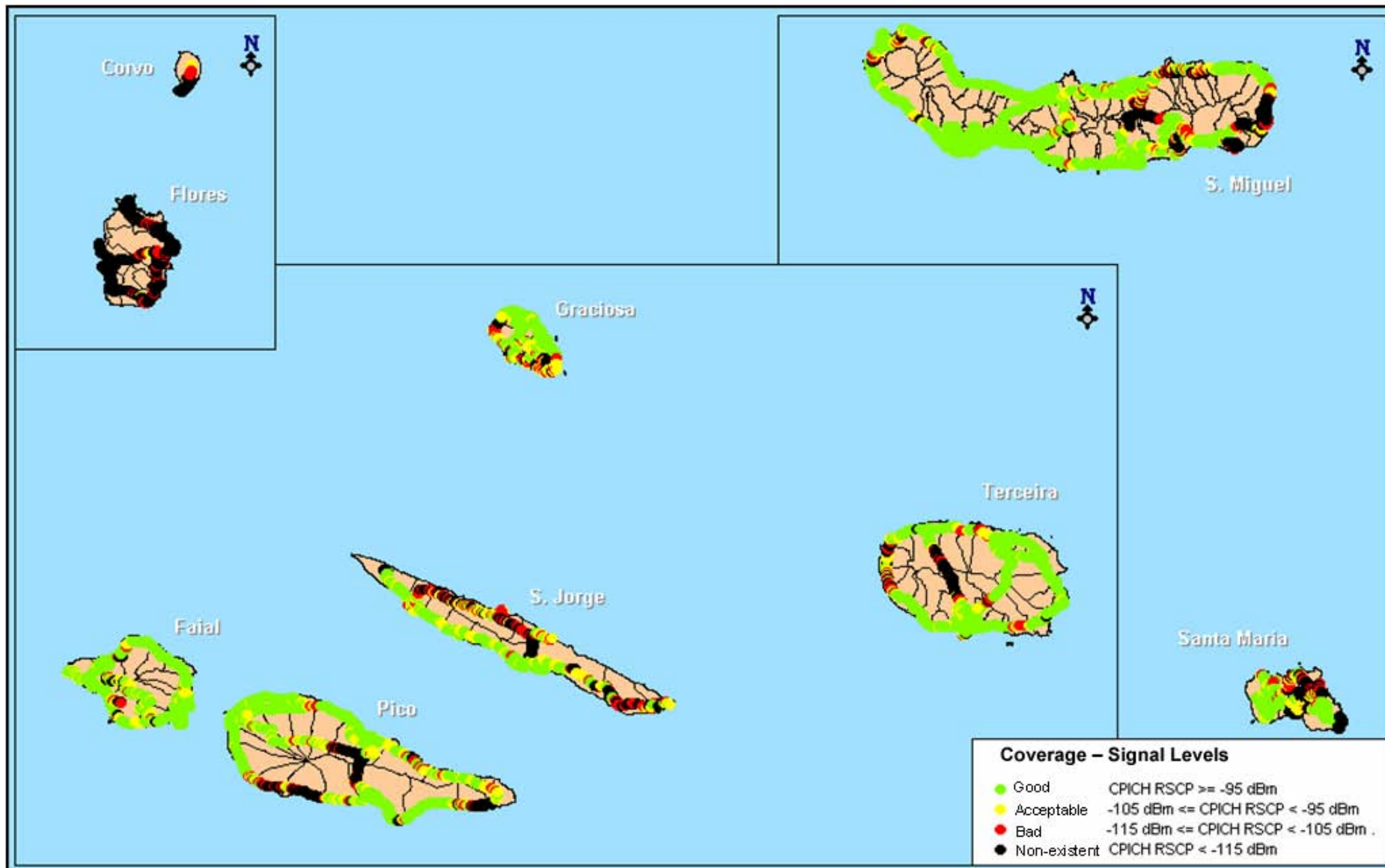


ANACOM

AUTORIDADE NACIONAL DE COMUNICAÇÕES

AUTONOMOUS REGION OF THE AZORES

TMN – WCDMA Coverage



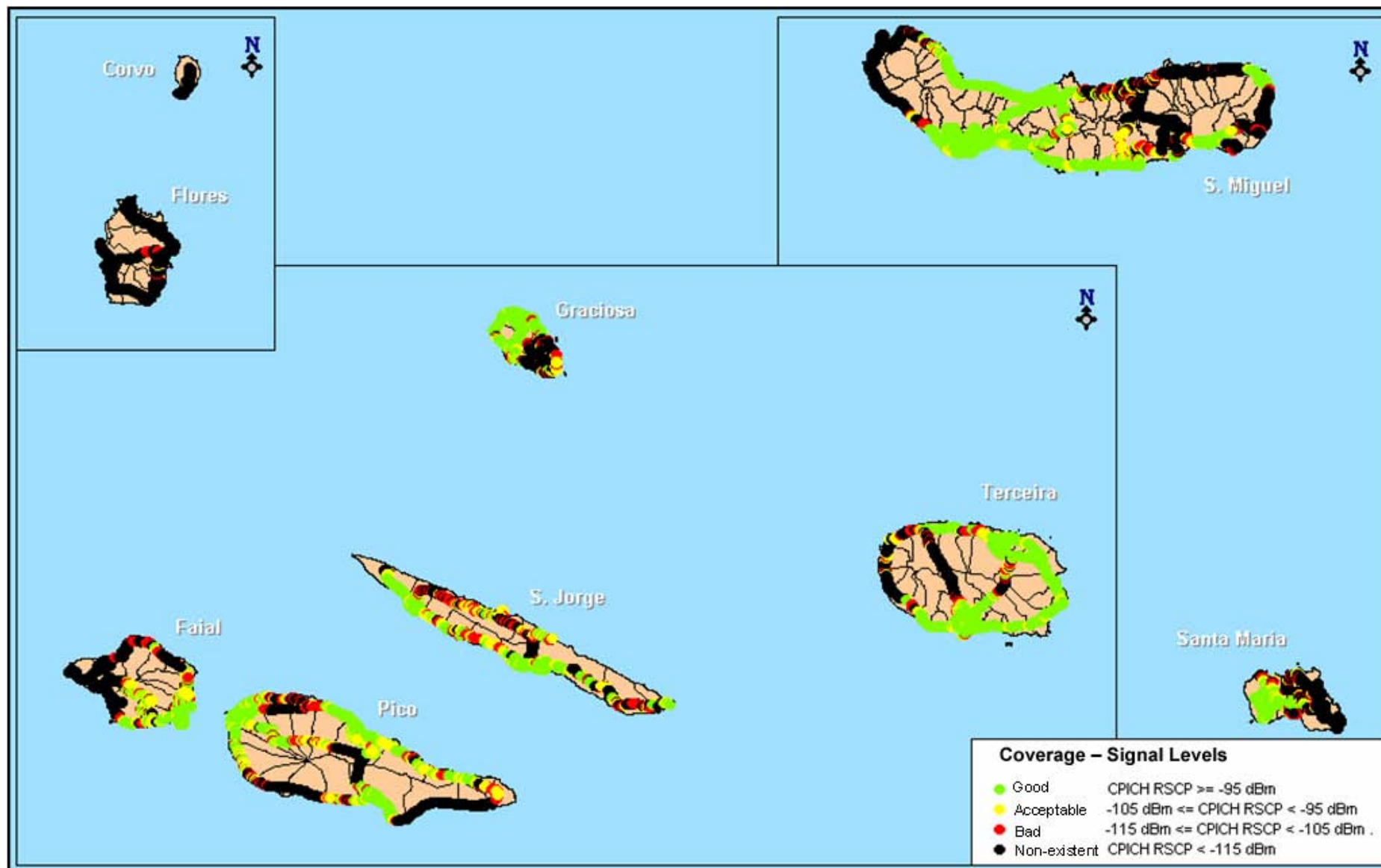


ANACOM

AUTORIDADE NACIONAL DE COMUNICAÇÕES

AUTONOMOUS REGION OF THE AZORES

VODAFONE – WCDMA Coverage



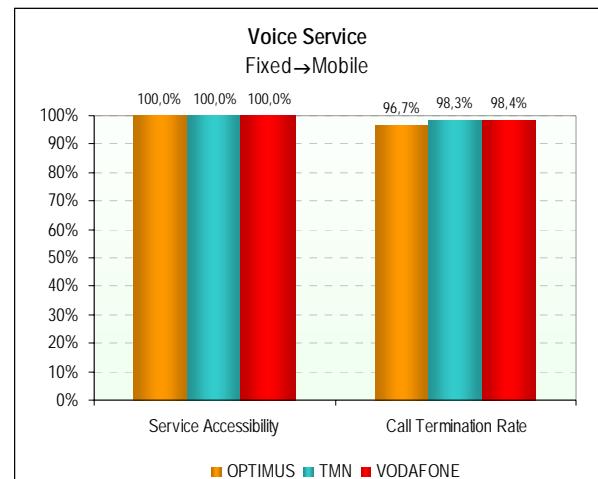
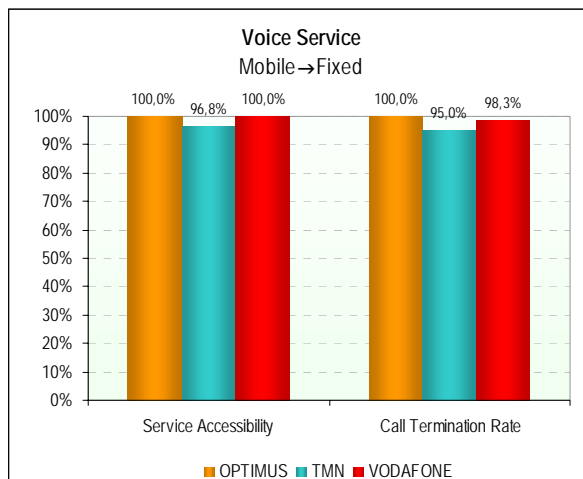
4.2 AUTONOMOUS REGION OF MADEIRA

4.2.1 URBAN AGGLOMERATIONS

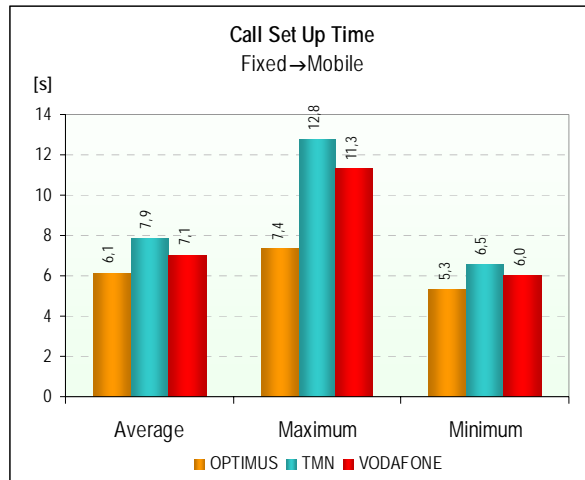
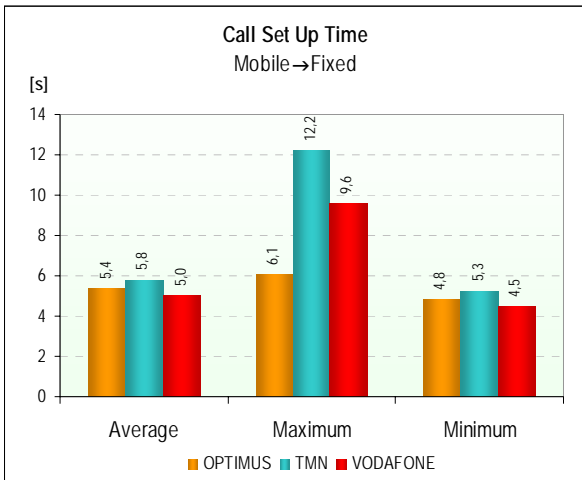
4.2.1.1 VOICE SERVICE (GSM)

		OPTIMUS		TMN		VODAFONE	
		Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile
Calls Made	Number of Calls	62	61	62	60	60	61
	Dropped on Set Up	0	0	2	0	0	0
	Dropped during Call	0	2	3	1	1	1
	With Normal Termination	62	59	57	59	59	60
	Service Accessibility	100,0%	100,0%	96,8%	100,0%	100,0%	100,0%
	Call Termination Rate	100,0%	96,7%	95,0%	98,3%	98,3%	98,4%
Call Set Up	Number of Samples (Calls)	62	61	60	60	60	61
	Average Time [s]	5,4	6,1	5,8	7,9	5,0	7,1
	Maximum Time [s]	6,1	7,4	12,2	12,8	9,6	11,3
	Minimum Time [s]	4,8	5,3	5,3	6,5	4,5	6,0
	Standard Deviation [s]	0,3	0,5	0,9	1,3	0,7	0,8
Audio Quality	Number of Samples (Calls)	121	121	116	116	119	119
	Average [MOS]	3,79	3,77	3,90	3,84	3,77	3,73
	Maximum [MOS]	3,96	3,97	3,94	3,95	3,96	3,97
	Minimum [MOS]	3,39	3,26	3,65	3,19	3,30	2,81
	Standard Deviation [MOS]	0,11	0,13	0,05	0,11	0,11	0,18

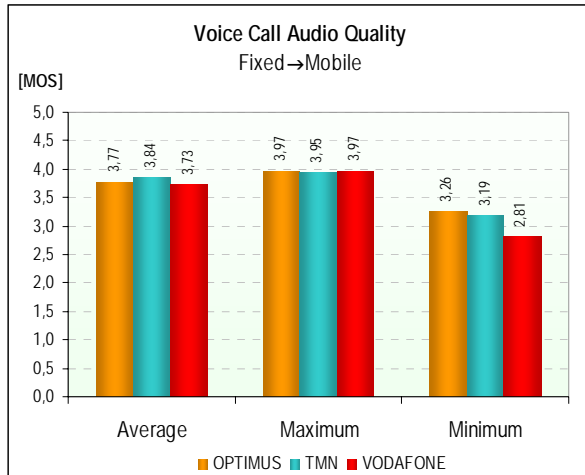
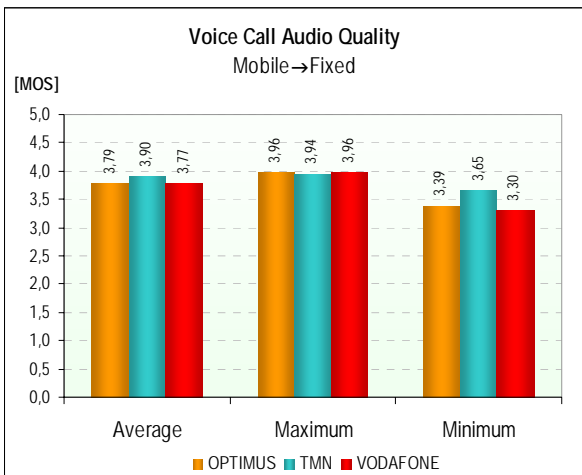
4.2.1.1.1 SERVICE ACCESSIBILITY AND CALL TERMINATION RATE INDICATORS



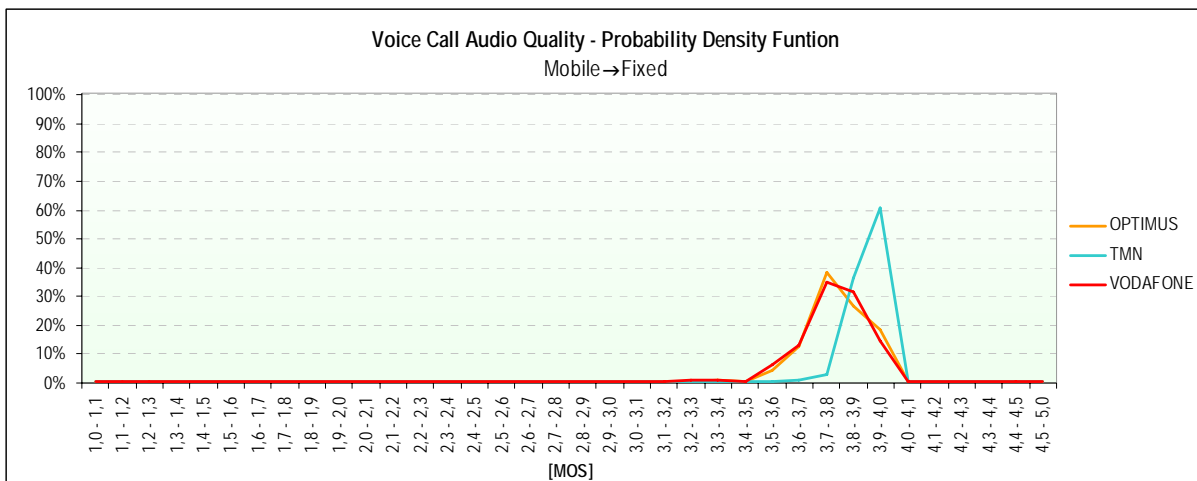
4.2.1.1.2 CALL SET UP TIME INDICATOR

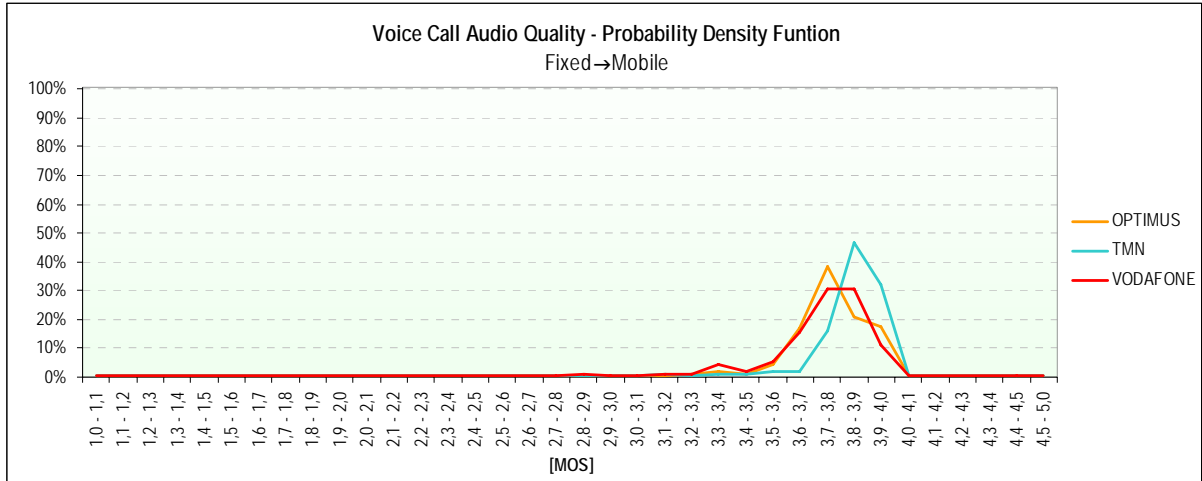


4.2.1.1.3 VOICE CALL AUDIO QUALITY INDICATOR



4.2.1.1.4 PROBABILITY DENSITY FUNCTION OF THE VOICE CALL AUDIO QUALITY INDICATOR

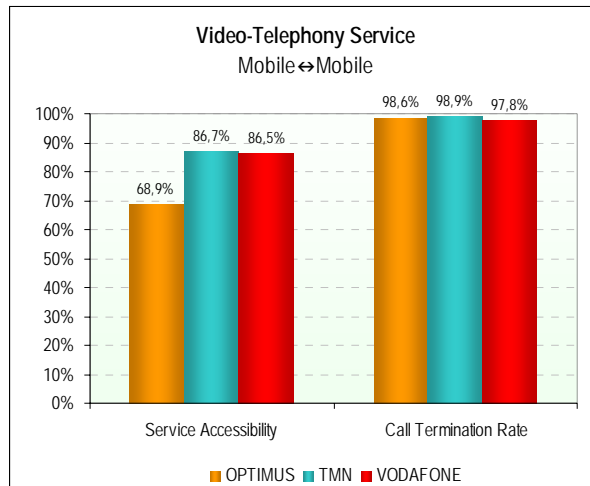




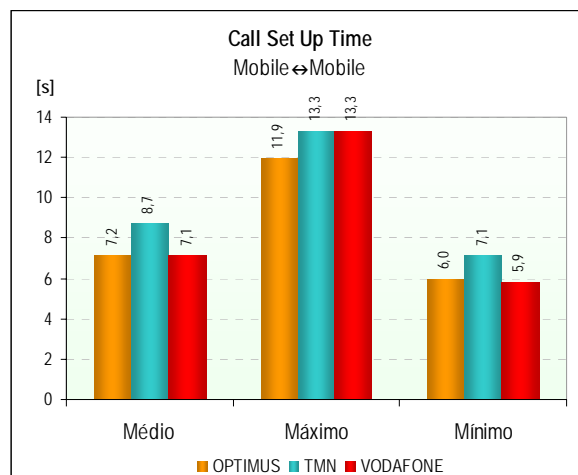
4.2.1.2 VIDEO-TELEPHONY SERVICE (UMTS)

		OPTIMUS	TMN	VODAFONE
		Mobile↔Mobile	Mobile↔Mobile	Mobile↔Mobile
Calls Made	Number of Calls	103	105	104
	Dropped on Set Up	32	14	14
	Dropped during Call	1	1	2
	With Normal Termination	70	90	88
	Service Accessibility	68,9%	86,7%	86,5%
	Call Termination Rate	98,6%	98,9%	97,8%
Call Set Up	Number of Samples (Calls)	71	91	90
	Average Time [s]	7,2	8,7	7,1
	Maximum Time [s]	11,9	13,3	13,3
	Minimum Time [s]	6,0	7,1	5,9
	Standard Deviation [s]	1,5	1,2	1,4
Audio Quality	Number of Samples (Calls)	140	179	176
	Average [MOS]	3,84	3,85	3,91
	Maximum [MOS]	4,06	4,06	4,06
	Minimum [MOS]	2,21	1,00	2,71
	Standard Deviation [MOS]	0,29	0,43	0,22
Video Quality	Number of Samples (Calls)	140	179	176
	Average [MOS]	3,04	3,03	3,15
	Maximum [MOS]	3,68	3,69	3,68
	Minimum [MOS]	2,24	1,88	1,88
	Standard Deviation [MOS]	0,58	0,55	0,54

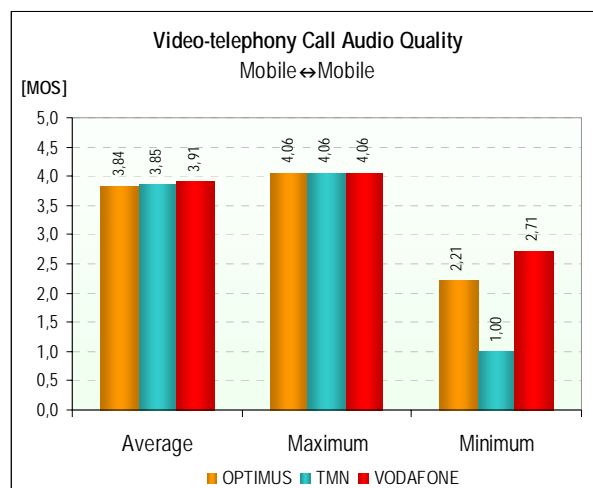
4.2.1.2.1 *SERVICE ACCESSIBILITY AND CALL TERMINATION RATE INDICATORS*



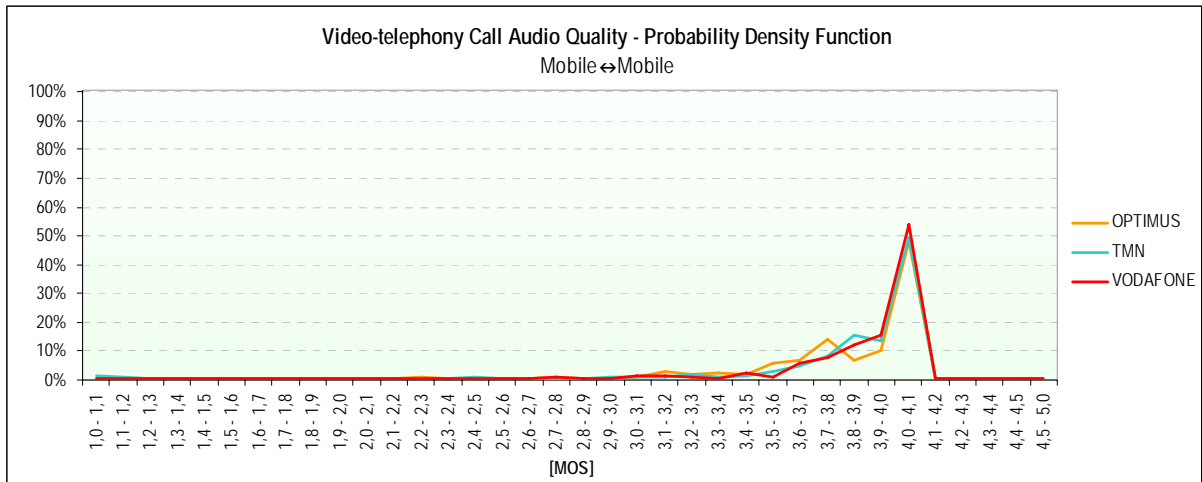
4.2.1.2.2 *CALL SET UP TIME INDICATOR*



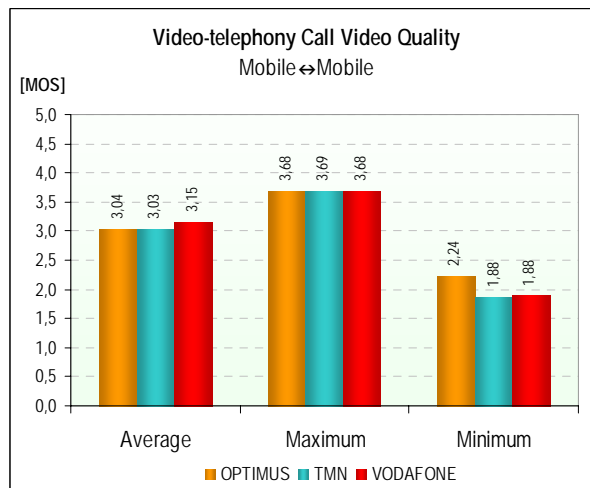
4.2.1.2.3 *VIDEO-TELEPHONY CALL AUDIO QUALITY INDICATOR*



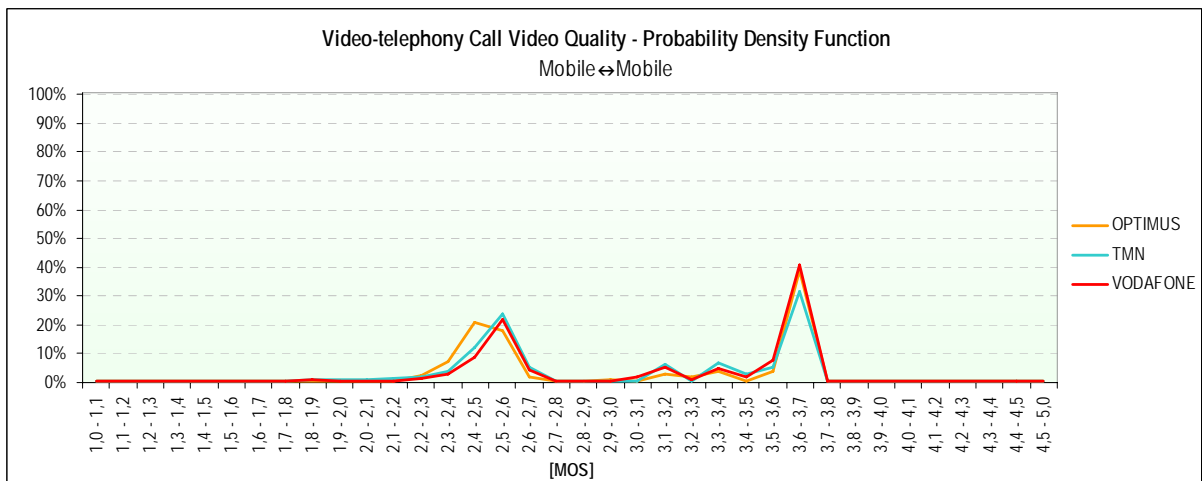
4.2.1.2.4 PROBABILITY DENSITY FUNCTION OF THE VIDEO-TELEPHONY CALL AUDIO QUALITY INDICATOR



4.2.1.2.5 VIDEO-TELEPHONY CALL VIDEO QUALITY INDICATOR



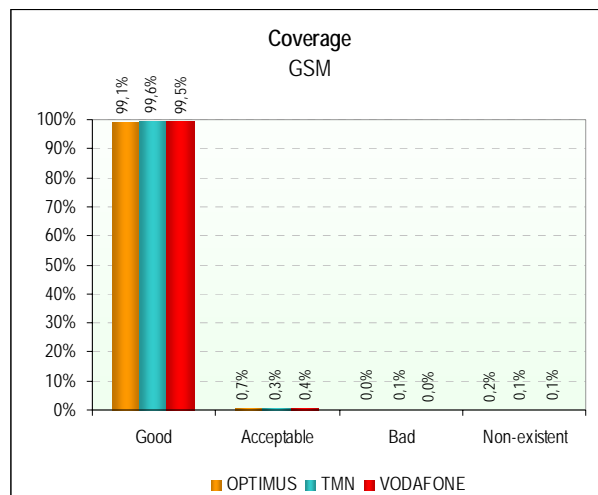
4.2.1.2.6 PROBABILITY DENSITY FUNCTION OF THE VIDEO-TELEPHONY CALL VIDEO QUALITY INDICATOR



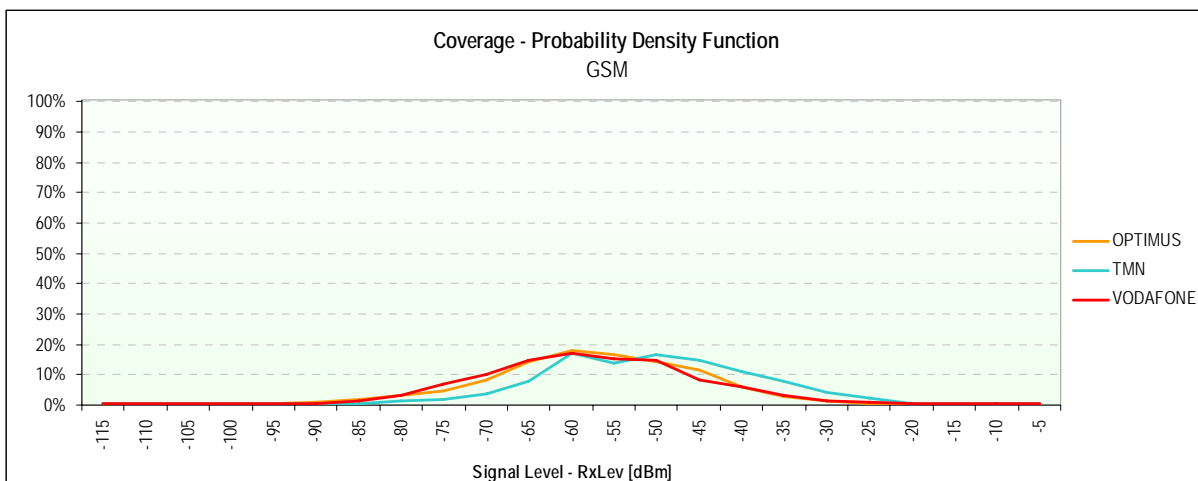
4.2.1.3 NETWORK COVERAGE

		GSM			WCDMA		
		OPTIMUS	TMN	VODAFONE	OPTIMUS	TMN	VODAFONE
Coverage	Number of Samples (Measurements)	22.249	22.321	22.249	8.910	8.916	8.912
	Signal Average Level [dBm]	-55	-48	-55	-75	-68	-73
	Signal Maximum Level [dBm]	-14	-7	-12	-36	-23	-29
	Signal Minimum Level [dBm]	-115	-115	-115	-120	-111	-118
	Standard Deviation [dBm]	12	12	12	12	12	14
	Good	99,1%	99,6%	99,5%	95,3%	97,9%	94,8%
	Acceptable	0,7%	0,3%	0,4%	4,2%	1,9%	4,6%
	Bad	0,0%	0,1%	0,0%	0,4%	0,2%	0,5%
Non-existent	0,2%	0,1%	0,1%	0,0%	0,0%	0,0%	

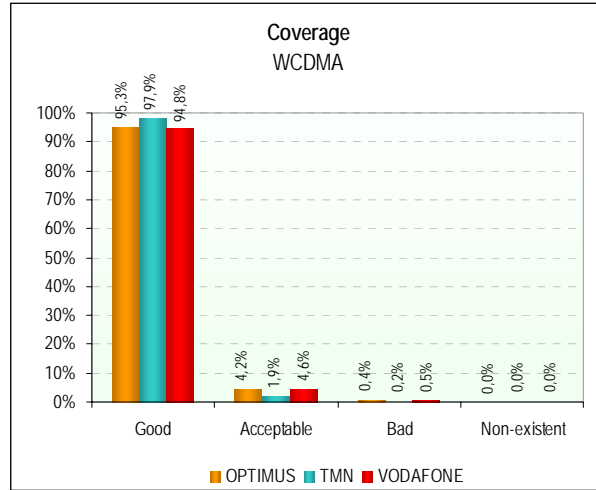
4.2.1.3.1 GSM



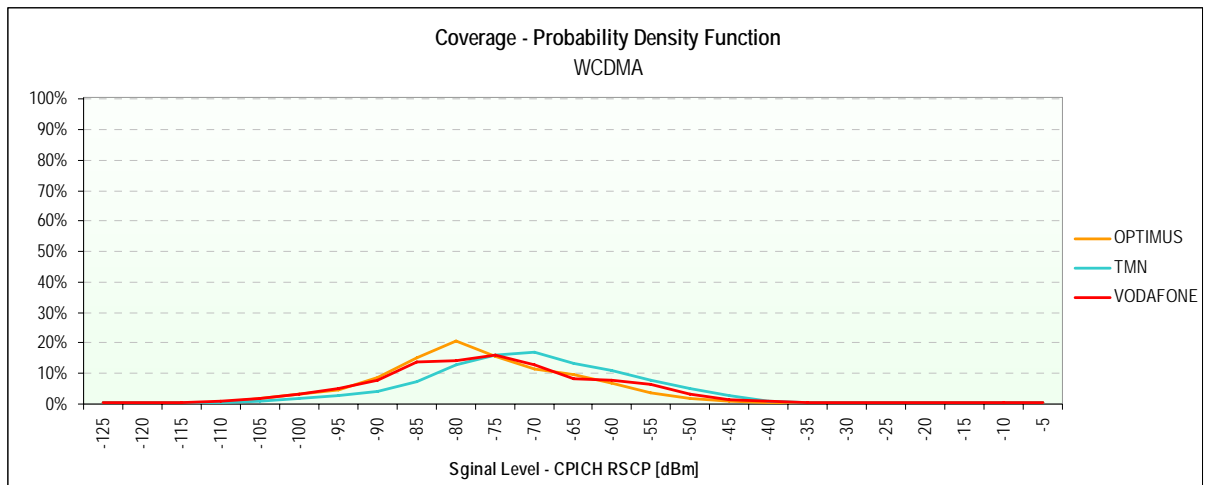
4.2.1.3.2 GSM – PROBABILITY DENSITY FUNCTION



4.2.1.3.3 WCDMA



4.2.1.3.4 WCDMA – PROBABILITY DENSITY FUNCTION

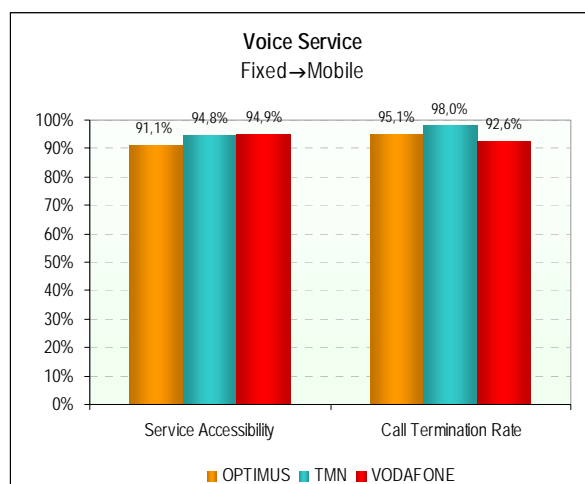
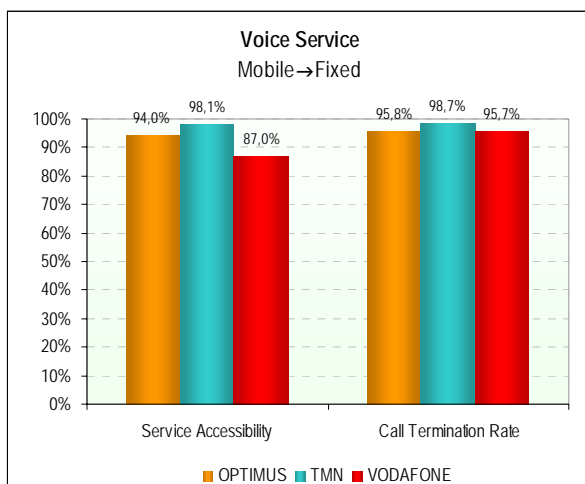


4.2.2 MAJOR ROADS

4.2.2.1 VOICE SERVICE (GSM)

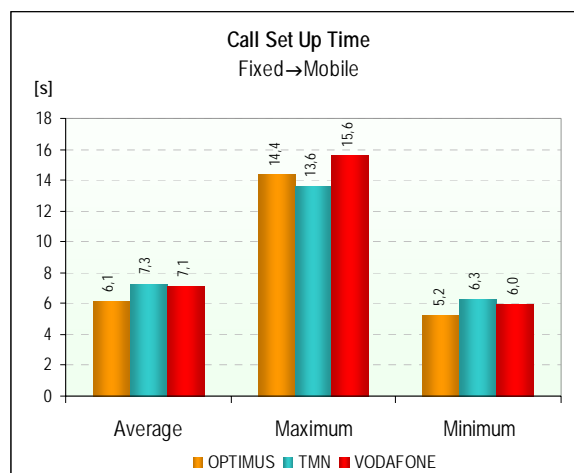
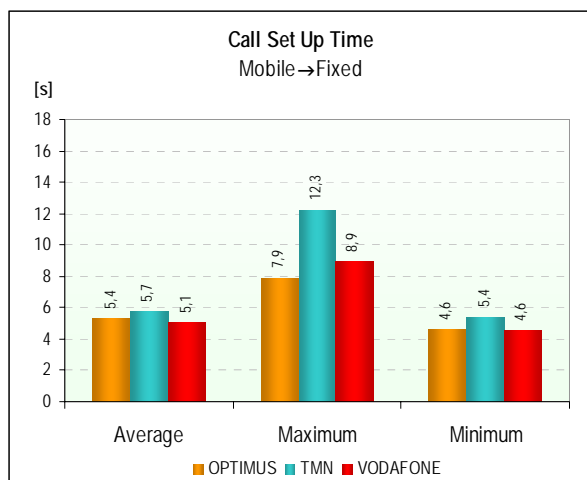
		OPTIMUS		TMN		VODAFONE	
		Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile
Calls Made	Number of Calls	151	157	159	155	161	157
	Dropped on Set Up	9	14	3	8	21	8
	Dropped during Call	6	7	2	3	6	11
	With Normal Termination	136	136	154	144	134	138
	Service Accessibility	94,0%	91,1%	98,1%	94,8%	87,0%	94,9%
	Call Termination Rate	95,8%	95,1%	98,7%	98,0%	95,7%	92,6%
Call Set Up	Number of Samples (Calls)	142	143	156	147	140	149
	Average Time [s]	5,4	6,1	5,7	7,3	5,1	7,1
	Maximum Time [s]	7,9	14,4	12,3	13,6	8,9	15,6
	Minimum Time [s]	4,6	5,2	5,4	6,3	4,6	6,0
	Standard Deviation [s]	0,4	0,9	0,6	0,8	0,5	0,9
Audio Quality	Number of Samples (Calls)	272	272	298	298	272	272
	Average [MOS]	3,81	3,82	3,92	3,89	3,80	3,81
	Maximum [MOS]	3,96	3,97	3,95	3,95	3,96	3,97
	Minimum [MOS]	3,41	3,20	3,45	3,19	3,35	3,16
	Standard Deviation [MOS]	0,09	0,10	0,05	0,10	0,08	0,09

4.2.2.1.1 SERVICE ACCESSIBILITY AND CALL TERMINATION RATE INDICATORS

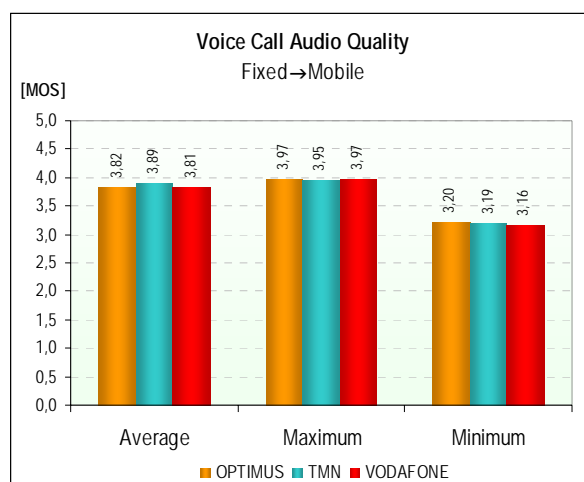
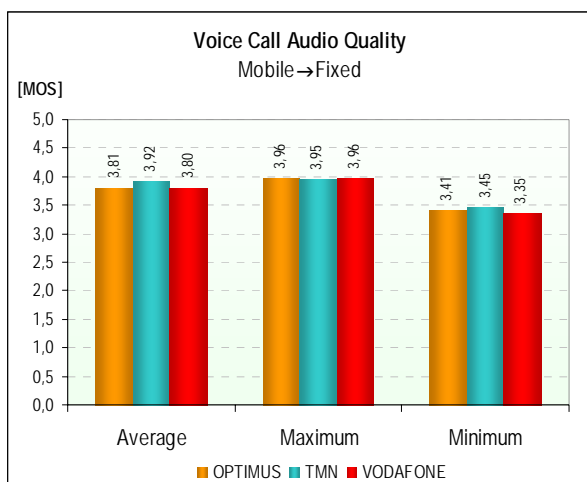




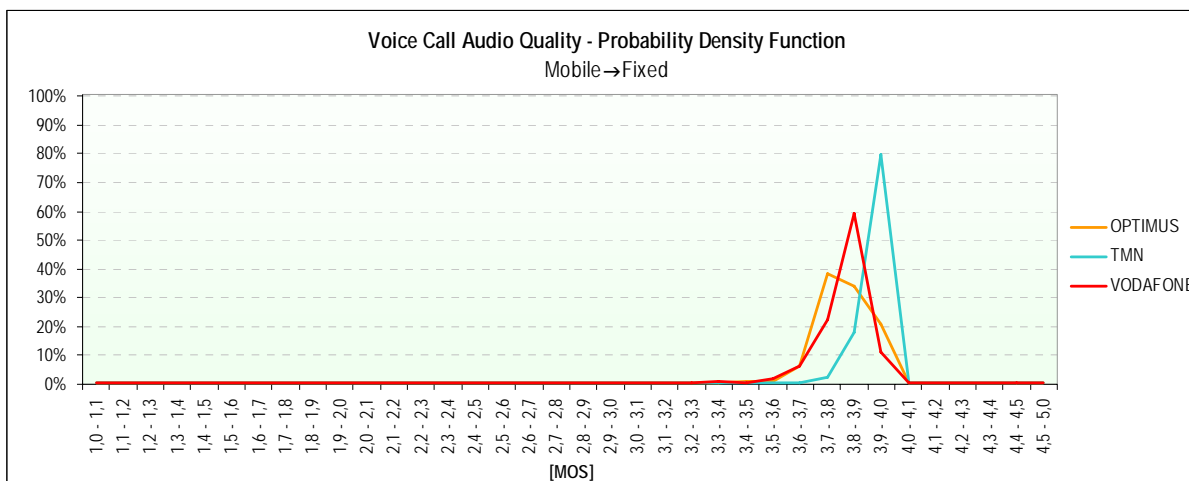
4.2.2.1.2 CALL SET UP TIME INDICATOR

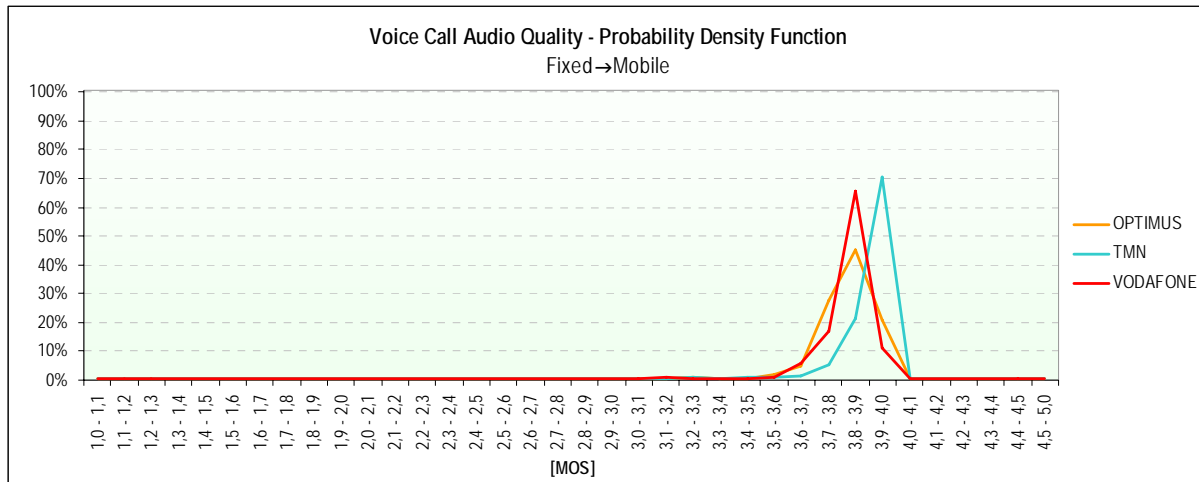


4.2.2.1.3 VOICE CALL AUDIO QUALITY INDICATOR



4.2.2.1.4 PROBABILITY DENSITY FUNCTION OF THE VOICE CALL AUDIO QUALITY INDICATOR

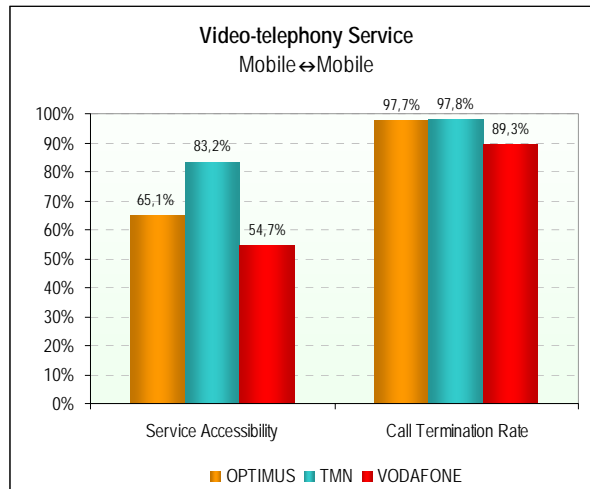




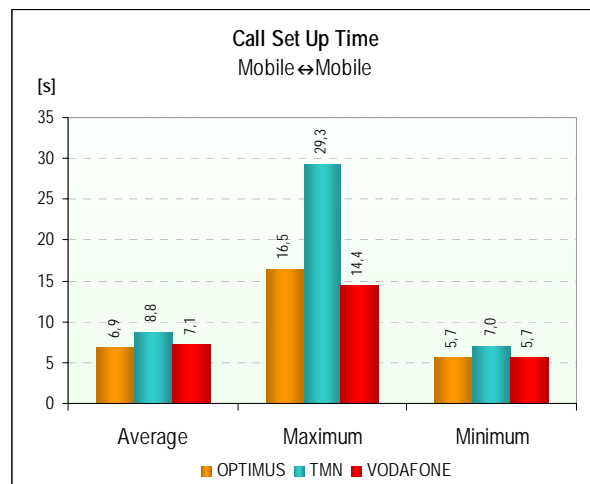
4.2.2.2 VIDEO-TELEPHONY SERVICE (UMTS)

		OPTIMUS	TMN	VODAFONE
		Mobile↔Mobile	Mobile↔Mobile	Mobile↔Mobile
Calls Made	Number of Calls	272	274	274
	Dropped on Set Up	95	46	124
	Dropped during Call	4	5	16
	With Normal Termination	173	223	134
	Service Accessibility	65,1%	83,2%	54,7%
	Call Termination Rate	97,7%	97,8%	89,3%
Call Set Up	Number of Samples (Calls)	177	228	150
	Average Time [s]	6,9	8,8	7,1
	Maximum Time [s]	16,5	29,3	14,4
	Minimum Time [s]	5,7	7,0	5,7
	Standard Deviation [s]	1,6	2,2	1,5
Audio Quality	Number of Samples (Calls)	342	432	268
	Average [MOS]	3,82	3,86	3,89
	Maximum [MOS]	4,06	4,06	4,06
	Minimum [MOS]	1,00	1,00	1,00
	Standard Deviation [MOS]	0,40	0,46	0,43
Video Quality	Number of Samples (Calls)	340	431	268
	Average [MOS]	3,07	3,05	3,19
	Maximum [MOS]	3,68	3,68	3,69
	Minimum [MOS]	1,90	1,79	1,40
	Standard Deviation [MOS]	0,57	0,55	0,56

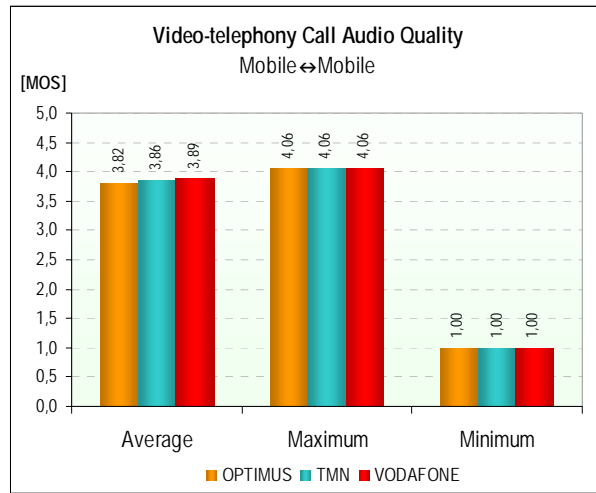
4.2.2.2.1 *SERVICE ACCESSIBILITY AND CALL TERMINATION RATE INDICATORS*



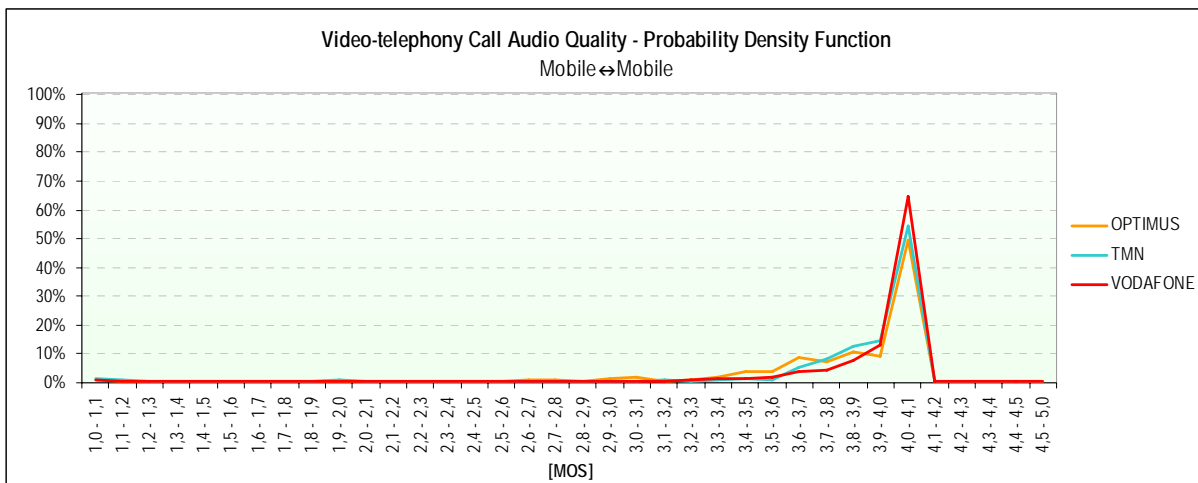
4.2.2.2.2 *CALL SET UP TIME INDICATOR*



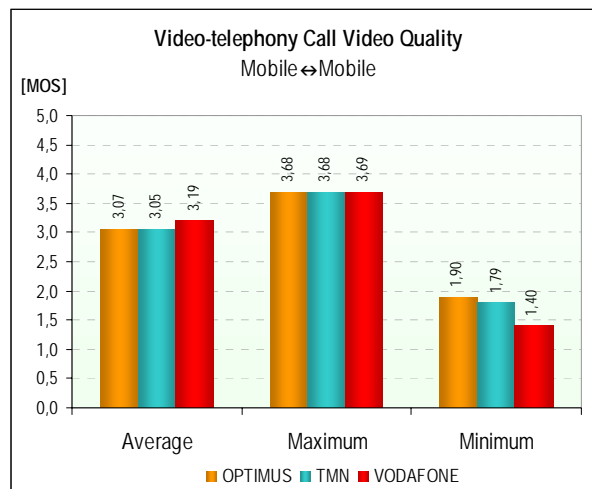
4.2.2.2.3 VIDEO-TELEPHONY CALL VOICE QUALITY INDICATOR



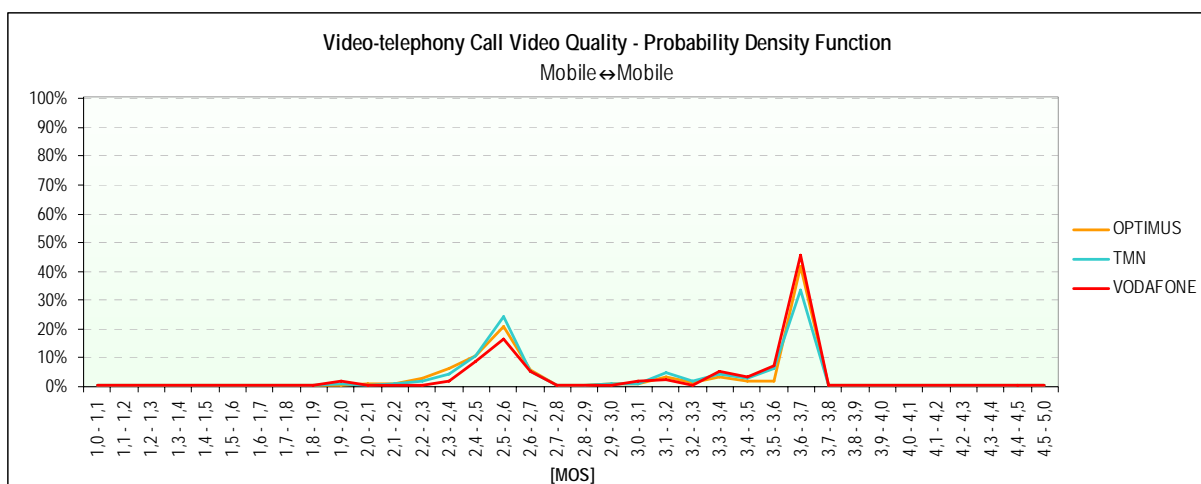
4.2.2.2.4 PROBABILITY DENSITY FUNCTION OF THE VIDEO-TELEPHONY CALL AUDIO QUALITY INDICATOR



4.2.2.2.5 VIDEO-TELEPHONY CALL VIDEO QUALITY INDICATOR



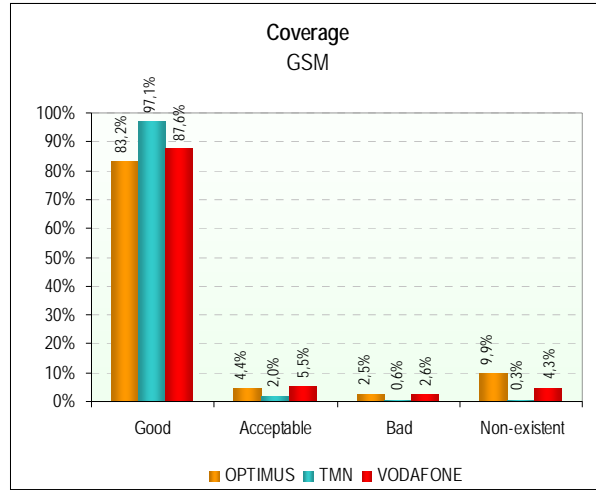
4.2.2.2.6 PROBABILITY DENSITY FUNCTION OF THE VIDEO-TELEPHONY CALL VIDEO QUALITY INDICATOR



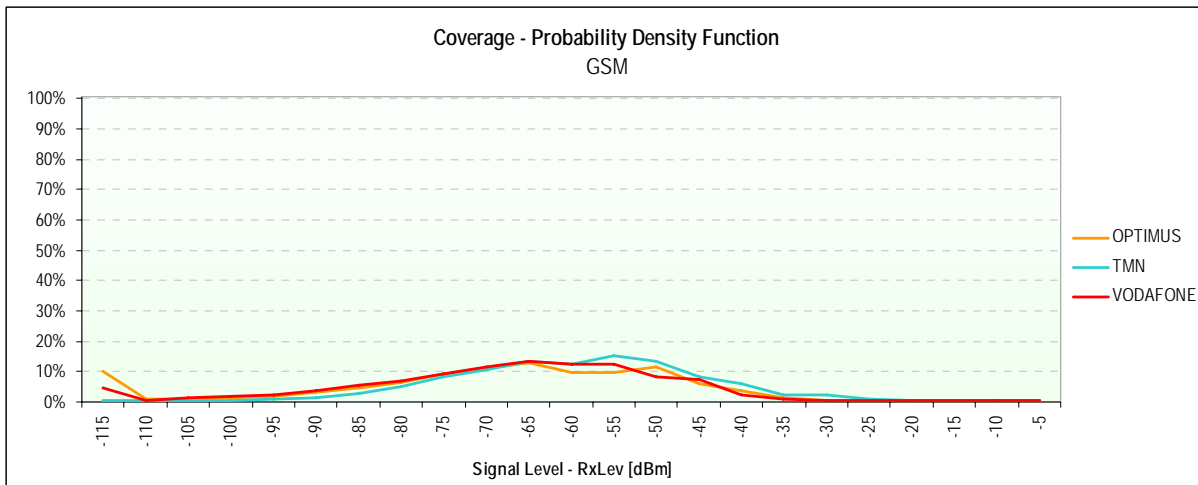
4.2.2.3 NETWORK COVERAGE

		GSM			WCDMA		
		OPTIMUS	TMN	VODAFONE	OPTIMUS	TMN	VODAFONE
Coverage	Number of Samples (Measurements)	58.424	57.960	58.424	23.400	23.222	23.393
	Signal Average Level [dBm]	-68	-57	-65	-82	-81	-93
	Signal Maximum Level [dBm]	-11	-12	-11	-34	-30	-35
	Signal Minimum Level [dBm]	-115	-115	-115	-126	-137	-137
	Standard Deviation [dBm]	21	14	18	20	17	22
	Good	83,2%	97,1%	87,6%	78,6%	80,2%	56,1%
	Acceptable	4,4%	2,0%	5,5%	8,2%	11,2%	9,7%
	Bad	2,5%	0,6%	2,6%	2,8%	4,2%	7,9%
	Non-existent	9,9%	0,3%	4,3%	10,4%	4,4%	26,3%

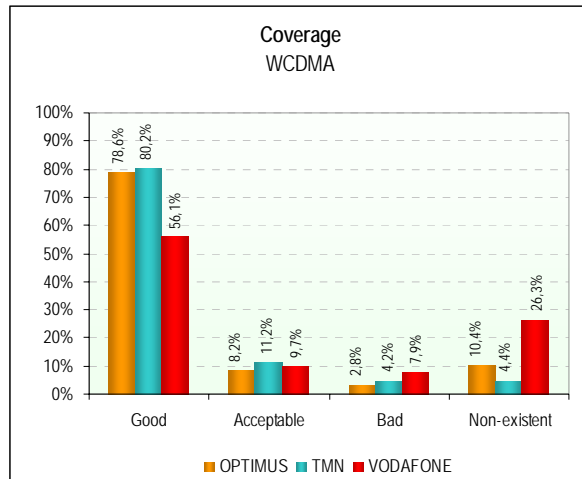
4.2.2.3.1 GSM



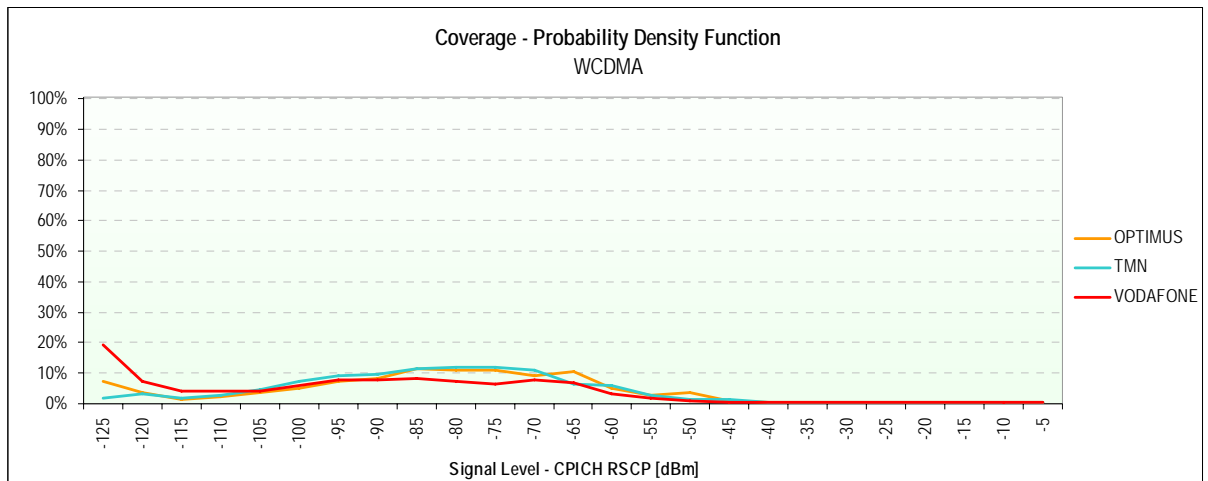
4.2.2.3.2 GSM – PROBABILITY DENSITY FUNCTION



4.2.2.3.3 WCDMA



4.2.2.3.4 WCDMA – PROBABILITY DENSITY FUNCTION



4.2.3 GLOBAL

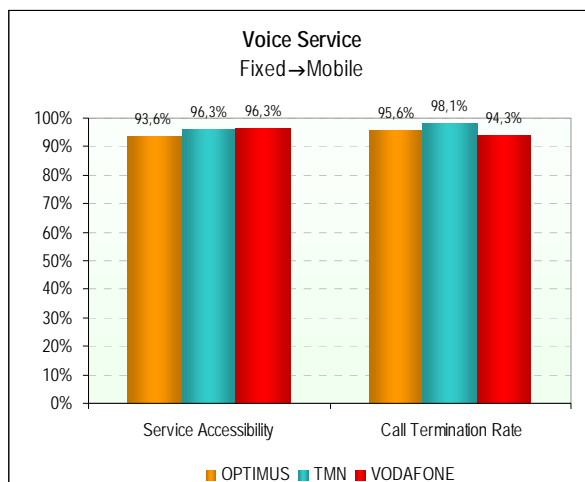
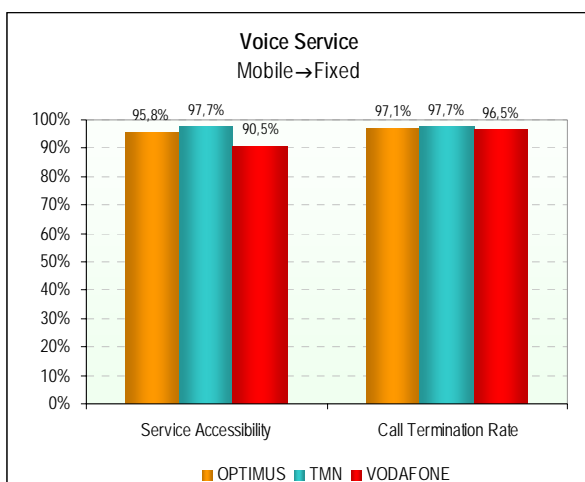
4.2.3.1 VOICE SERVICE (GSM)

		OPTIMUS		TMN		VODAFONE	
		Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile
Calls Made	Number of Calls	213	218	221	215	221	218
	Dropped on Set Up	9	14	5	8	21	8
	Dropped during Call	6	9	5	4	7	12
	With Normal Termination	198	195	211	203	193	198
	Service Accessibility	95,8%	93,6%	97,7%	96,3%	90,5%	96,3%
	Call Termination Rate	97,1%	95,6%	97,7%	98,1%	96,5%	94,3%
Call Set Up	Number of Samples (Calls)	204	204	216	207	200	210
	Average Time [s]	5,4	6,1	5,8	7,5	5,1	7,1
	Maximum Time [s]	7,9	14,4	12,3	13,6	9,6	15,6
	Minimum Time [s]	4,6	5,2	5,3	6,3	4,5	6,0
	Standard Deviation [s]	0,4	0,8	0,7	1,0	0,5	0,9
Audio Quality	Number of Samples (Calls)	393	393	414	414	391	391
	Average [MOS]	3,80	3,80	3,91	3,88	3,79	3,79
	Maximum [MOS]	3,96	3,97	3,95	3,95	3,96	3,97
	Minimum [MOS]	3,39	3,20	3,45	3,19	3,30	2,81
	Standard Deviation [MOS]	0,10	0,12	0,05	0,11	0,10	0,13

		OPTIMUS		TMN		VODAFONE	
		Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile	Mobile→Fixed	Fixed→Mobile
Error	Service Accessibility	3,6%	4,1%	2,9%	3,5%	4,7%	3,4%
	Call Termination Rate	3,4%	3,8%	3,0%	2,9%	3,6%	4,1%
	Call Set Up Time	0,055	0,107	0,088	0,133	0,074	0,122
	Audio Quality [MOS]	0,010	0,011	0,005	0,011	0,009	0,013

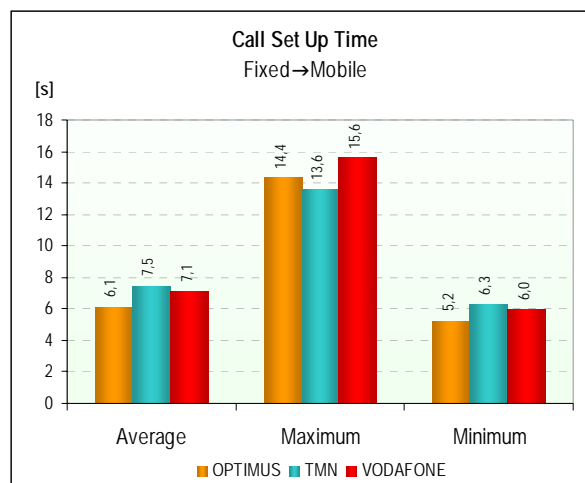
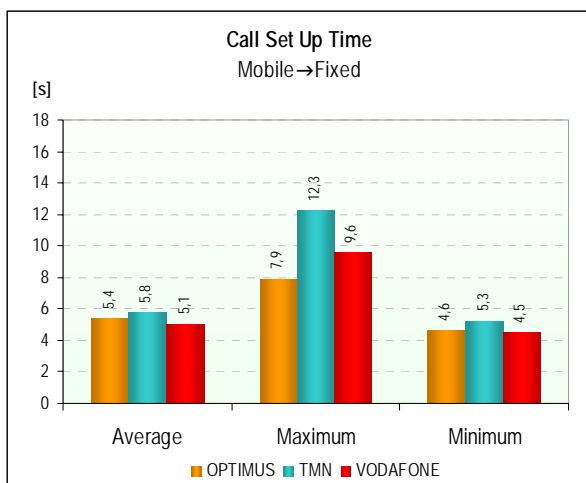
Confidence Level = 95 %

4.2.3.1.1 SERVICE ACCESSIBILITY AND CALL TERMINATION RATE INDICATORS

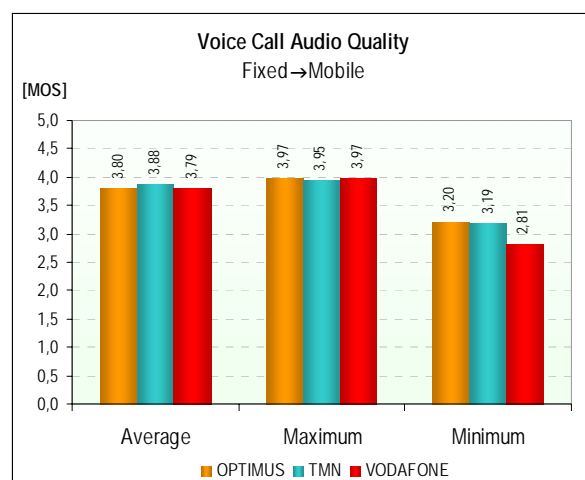
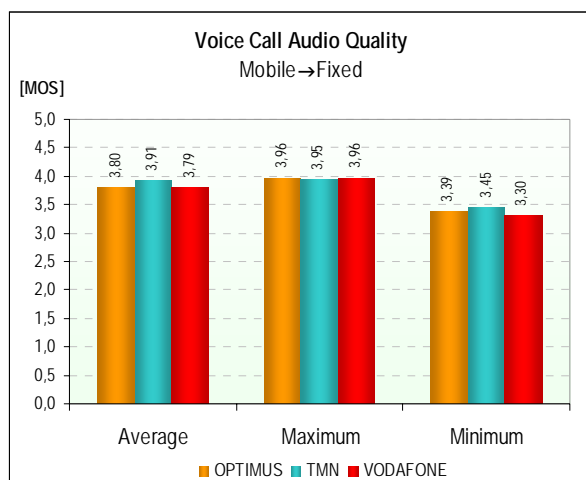




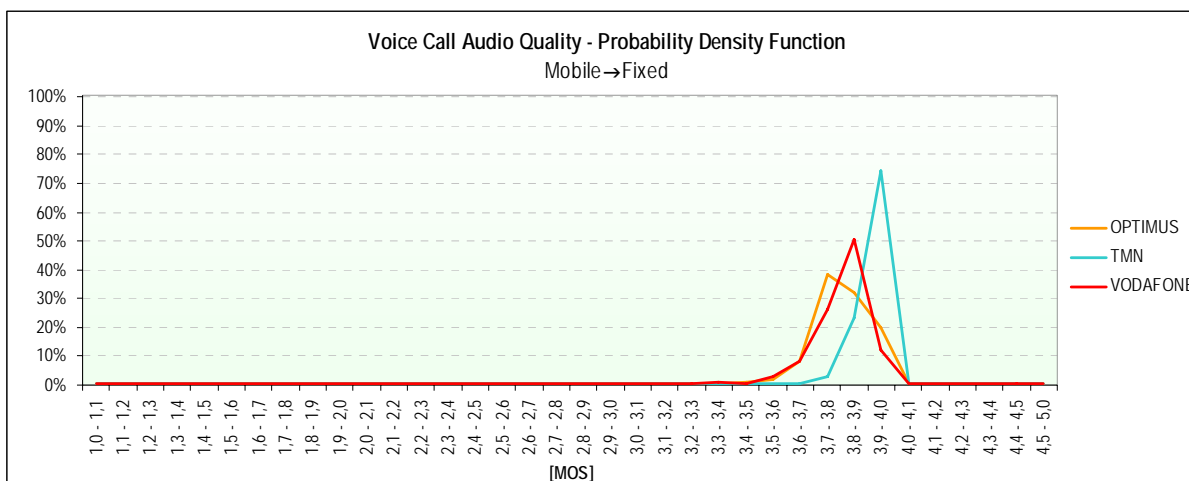
4.2.3.1.2 CALL SET UP TIME INDICATOR

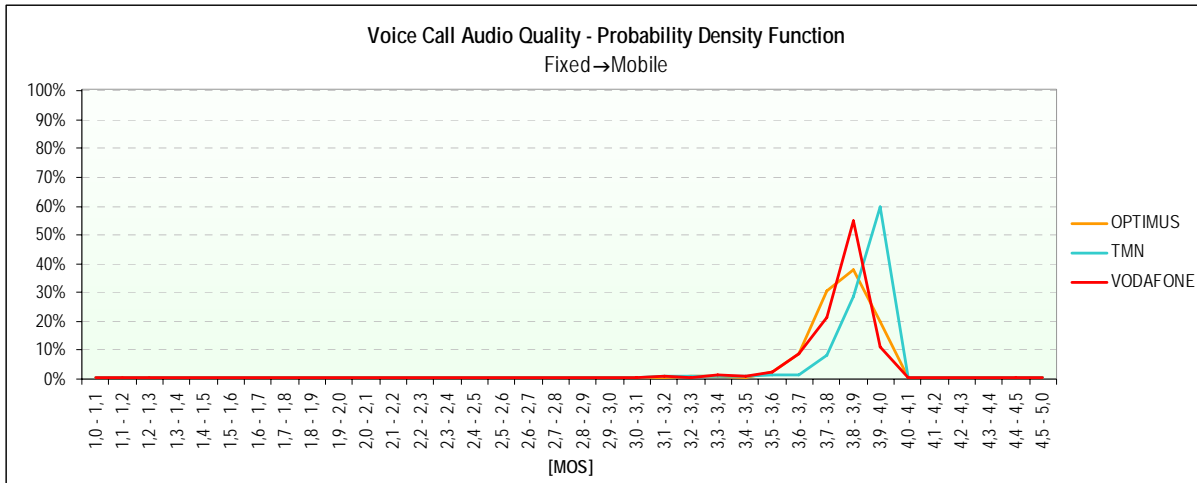


4.2.3.1.3 VOICE CALL AUDIO QUALITY INDICATOR



4.2.3.1.4 PROBABILITY DENSITY FUNCTION OF THE VOICE CALL AUDIO QUALITY INDICATOR



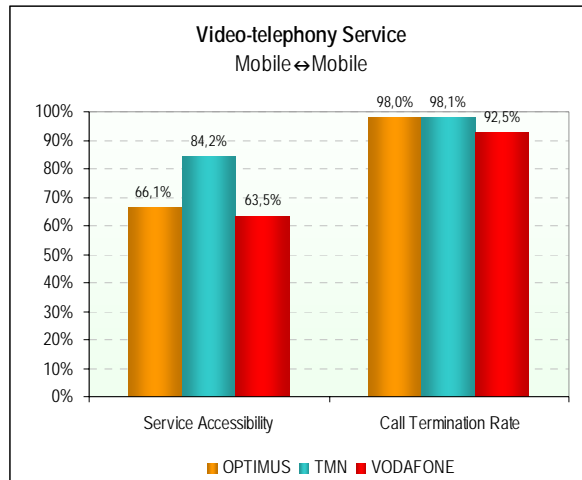


4.2.3.2 VIDEO-TELEPHONY SERVICE (UMTS)

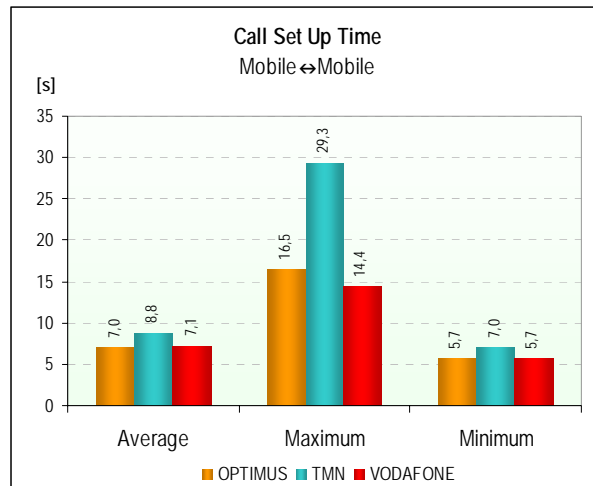
		OPTIMUS	TMN	VODAFONE
		Mobile↔Mobile	Mobile↔Mobile	Mobile↔Mobile
Calls Made	Number of Calls	375	379	378
	Dropped on Set Up	127	60	138
	Dropped during Call	5	6	18
	With Normal Termination	243	313	222
	Service Accessibility	66,1%	84,2%	63,5%
	Call Termination Rate	98,0%	98,1%	92,5%
Call Set Up	Number of Samples (Calls)	248	319	240
	Average Time [s]	7,0	8,8	7,1
	Maximum Time [s]	16,5	29,3	14,4
	Minimum Time [s]	5,7	7,0	5,7
	Standard Deviation [s]	1,5	2,0	1,5
Audio Quality	Number of Samples (Calls)	482	611	444
	Average [MOS]	3,83	3,86	3,90
	Maximum [MOS]	4,06	4,06	4,06
	Minimum [MOS]	1,00	1,00	1,00
	Standard Deviation [MOS]	0,37	0,45	0,36
Video Quality	Number of Samples (Calls)	480	610	444
	Average [MOS]	3,06	3,04	3,18
	Maximum [MOS]	3,68	3,69	3,69
	Minimum [MOS]	1,90	1,79	1,40
	Standard Deviation [MOS]	0,57	0,55	0,55

		OPTIMUS	TMN	VODAFONE
		Mobile↔Mobile	Mobile↔Mobile	Mobile↔Mobile
Error	Service Accessibility	5,0%	4,1%	5,1%
	Call Termination Rate	2,6%	2,2%	4,1%
	Call Set Up Time	0,191	0,217	0,187
	Audio Quality [MOS]	0,033	0,036	0,034
	Confidence Level = 95 %	0,051	0,044	0,051

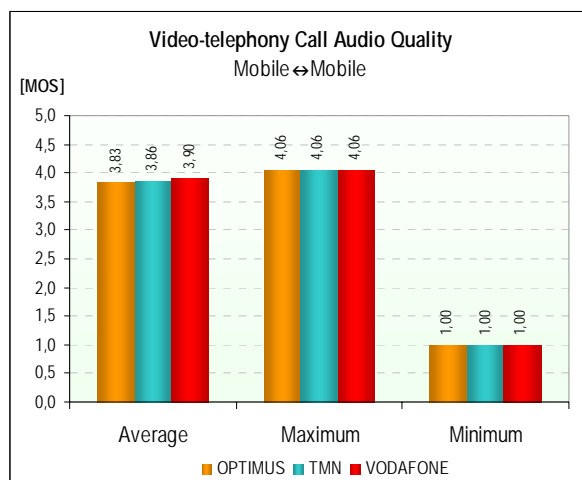
4.2.3.2.1 *SERVICE ACCESSIBILITY AND CALL TERMINATION RATE INDICATORS*



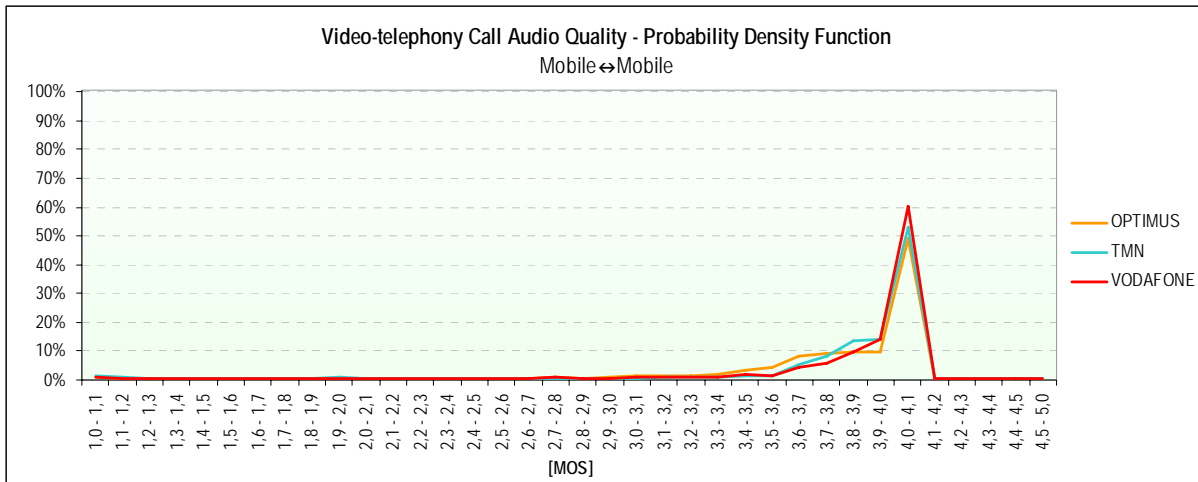
4.2.3.2.2 *CALL SET UP TIME INDICATOR*



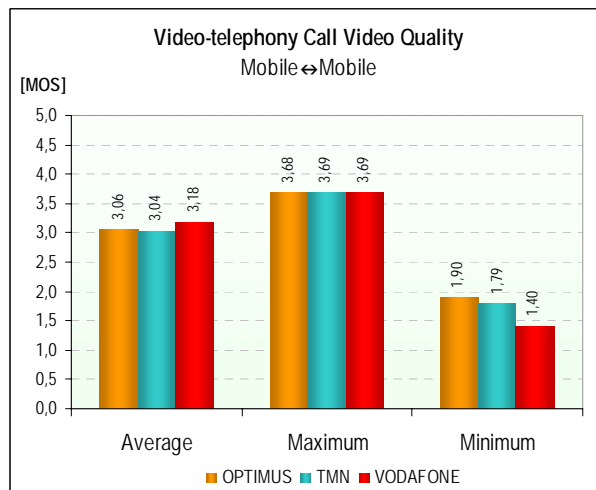
4.2.3.2.3 *VIDEO-TELEPHONY CALL AUDIO QUALITY INDICATOR*



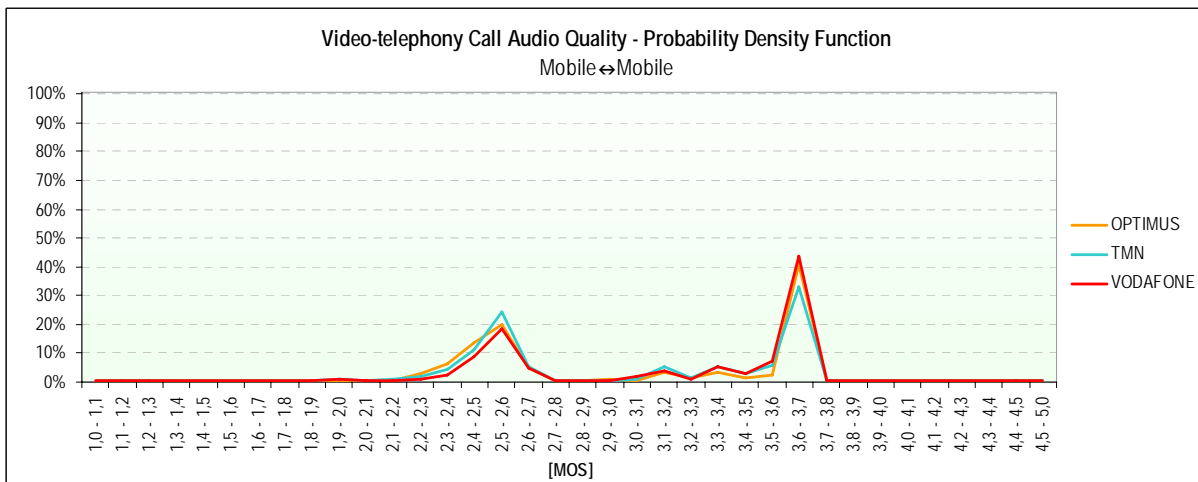
4.2.3.2.4 PROBABILITY DENSITY FUNCTION OF THE VIDEO-TELEPHONY CALL AUDIO QUALITY INDICATOR



4.2.3.2.5 VIDEO-TELEPHONY CALL VIDEO QUALITY INDICATOR



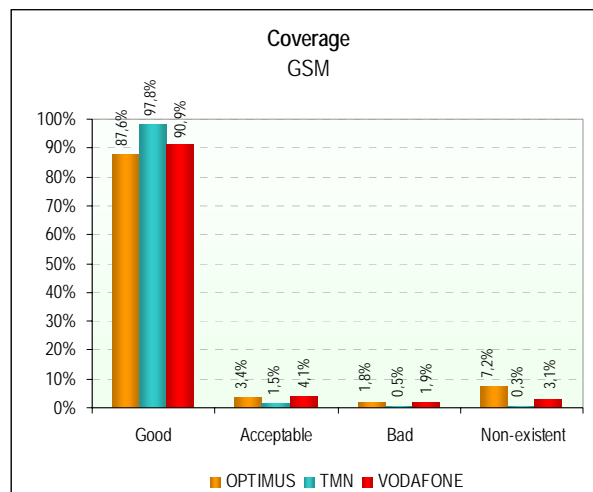
4.2.3.2.6 PROBABILITY DENSITY FUNCTION OF THE VIDEO-TELEPHONY CALL VIDEO QUALITY INDICATOR



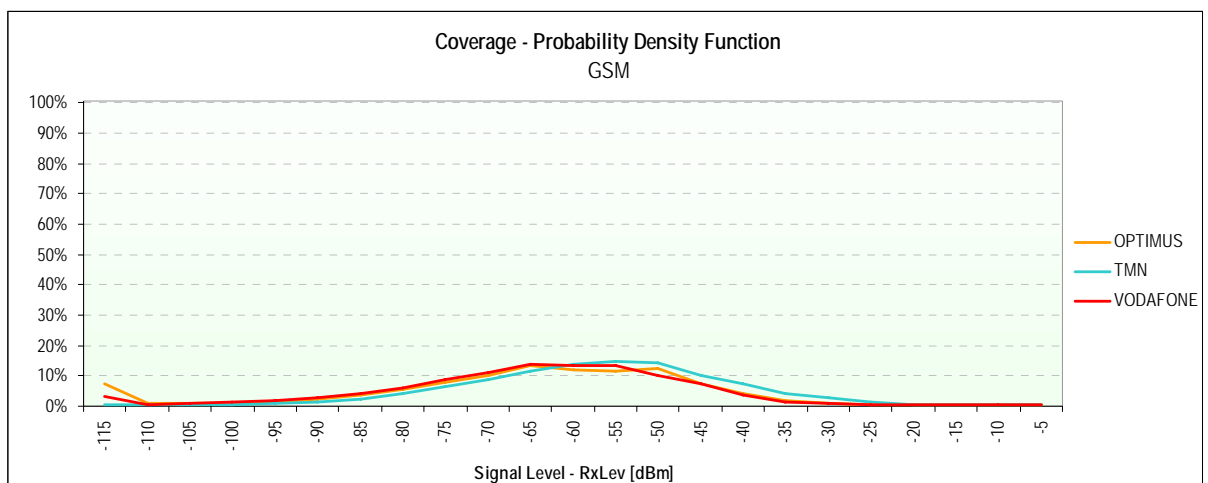
4.2.3.3 NETWORK COVERAGE

	GSM			WCDMA		
	OPTIMUS	TMN	VODAFONE	OPTIMUS	TMN	VODAFONE
Number of Samples (Measurements)	80.673	80.281	80.673	32.310	32.138	32.305
Signal Average Level [dBm]	-64	-55	-63	-80	-77	-87
Signal Maximum Level [dBm]	-11	-7	-11	-34	-23	-29
Signal Minimum Level [dBm]	-115	-115	-115	-126	-137	-137
Standard Deviation [dBm]	20	14	17	18	17	22
Good	87,6%	97,8%	90,9%	83,2%	85,1%	66,8%
Acceptable	3,4%	1,5%	4,1%	7,1%	8,6%	8,3%
Bad	1,8%	0,5%	1,9%	2,2%	3,1%	5,9%
Non-existent	7,2%	0,3%	3,1%	7,5%	3,2%	19,0%

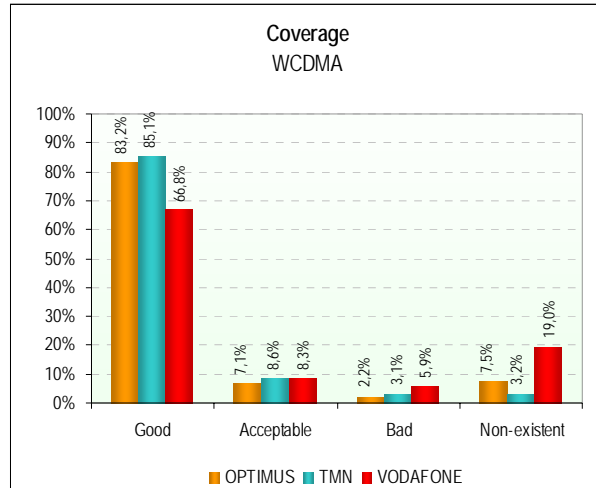
4.2.3.3.1 GSM



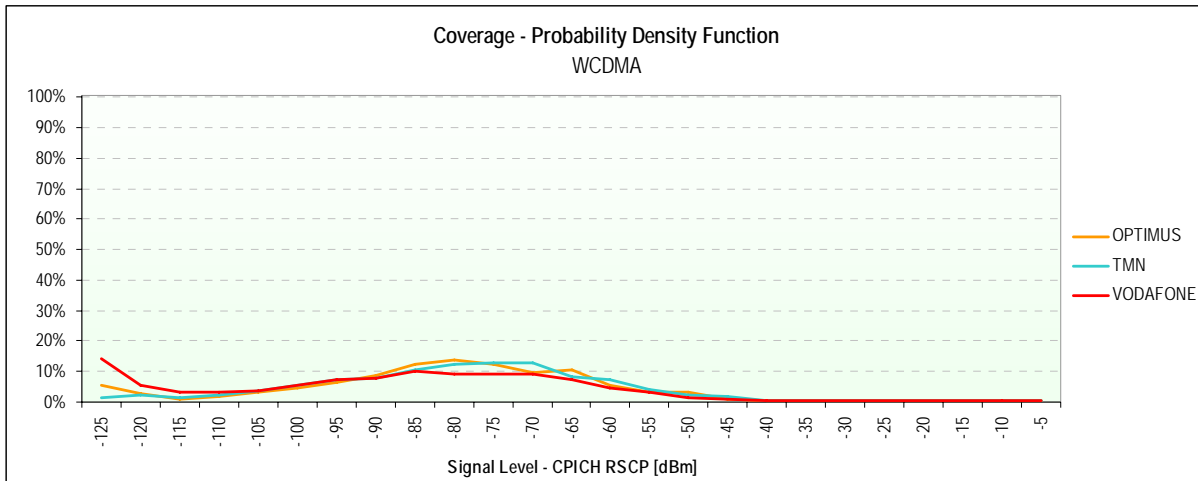
4.2.3.3.2 GSM – PROBABILITY DENSITY FUNCTION



4.2.3.3.3 WCDMA



4.2.3.3.4 WCDMA – PROBABILITY DENSITY FUNCTION



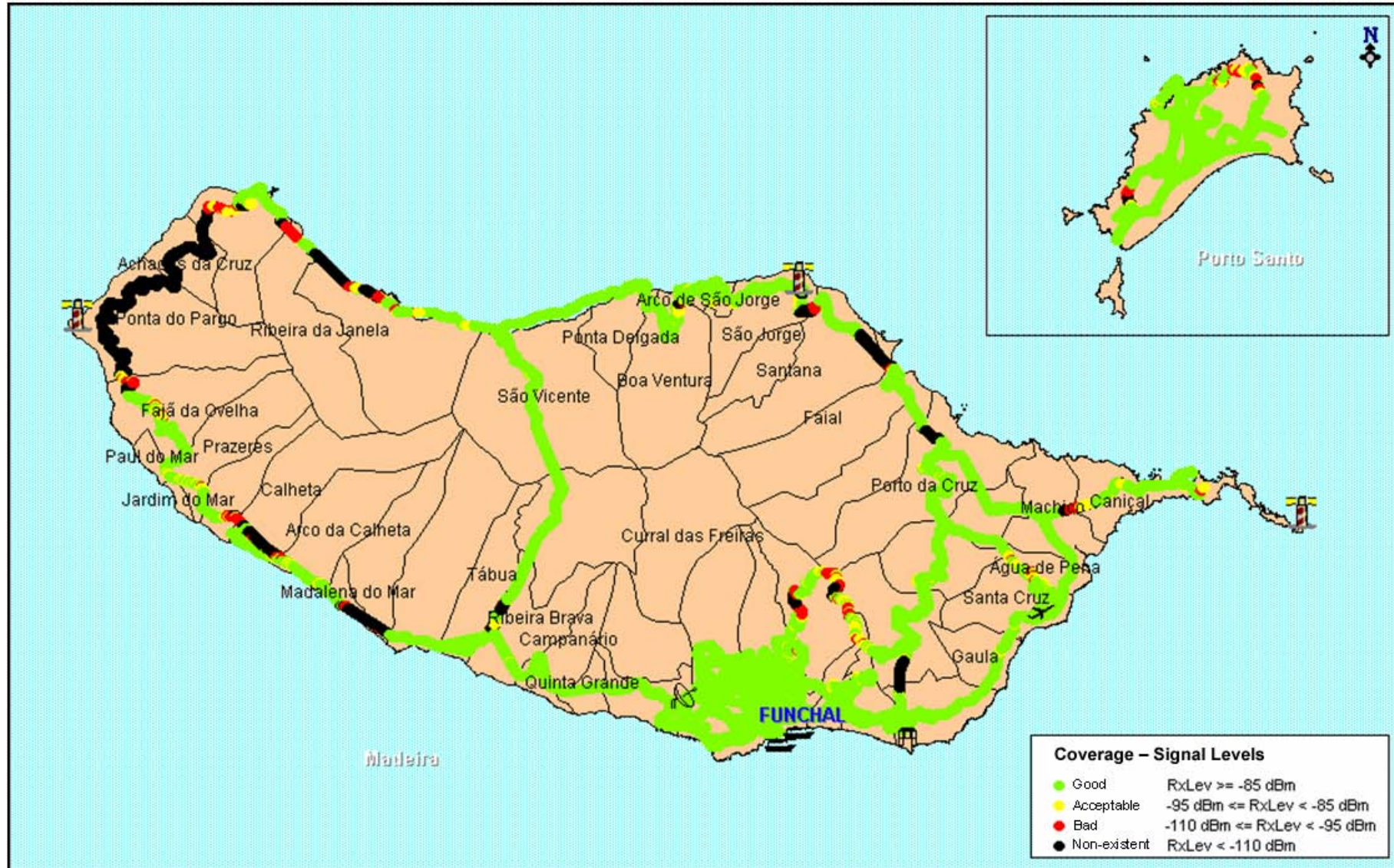
4.2.3.3.5 COVERAGE MAPS

(Following pages)



AUTONOMOUS REGION OF MADEIRA

OPTIMUS – GSM Coverage





AUTONOMOUS REGION OF MADEIRA

TMN – GSM Coverage





AUTONOMOUS REGION OF MADEIRA

VODAFONE – GSM Coverage





AUTONOMOUS REGION OF MADEIRA

OPTIMUS – WCDMA Coverage





AUTONOMOUS REGION OF MADEIRA

TMN – WCDMA Coverage





AUTONOMOUS REGION OF MADEIRA

VODAFONE – WCDMA Coverage

