ETS
PRODUCT SERVICE AG

TEST - REPORT

FCC RULES PARTS 22H and 24E
IC RADIO STANDARDS RSS 132 and RSS 133

FCC ID: JYCC510

Model Name: C510

Test report no.: G5M206100083-P-2224

Certificate 1983.01

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1 General information

1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.
The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.
Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.
Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.
The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that is performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.
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Tester:

18.01.2007		M. Schlaps	i.s. Kurt
Date	ETS-Lab.	Name	Signature

Technical responsibility for area of testing:

18.01.2007		N. Kaspar	Norbert Kaspar
Date	ETS	Name	Signature

1.2 Testing laboratory

1.2.1 Location

ETS PRODUCT SERVICE AG
Storkower Strasse 38c
D-15526 Reichenwalde b. Berlin
Germany
Telephone : +49 33631 888 00
Telefax : +49 33631 888 660

1.2.2 Details of accreditation status

ACCREDITED TESTING LABORATORY
DAR-REGISTRATION NUMBER: DAT-P-201/96

ACCREDITED COMPETENT BODY
BNETZA-REGISTRATION NUMBER: BNETZA-ZS-026/96

FCC FILED TEST LABORATORY:
REG. NO. 96970

INDUSTRY CANADA FILED TEST LABORATORY
REG. NO. IC 3470

A2LA ACCREDITED
CERTIFICATE NUMBER: 1983.01

BLUETOOTH QUALIFICATION TEST FACILITY (BQTF)
ACCREDITED BY: BLUETOOTH QUALIFICATION REVIEW BOARD (BQRF)

1.3 Details of approval holder

Name	: Pantech Co., Ltd.
Street	: Shinsong Center Bldg., 25-12, Yeouido-dong
Town	: 150-711 Yeoungdeungpo-gu, Seoul
Country	: Korea
Telephone	: +82-2-3660-5862
Fax	: +82-2-3660-5990
Contact	: Mr. B.W. Kim
E-Mail	: +82-2-3660-5862

1.4 Application details

Date of receipt of application : 01.11.2006
Date of receipt of test item : 01.11.2006
Date of test : 12.01.2007 - 16.01.2007

1.5 Test item

Description of test item : Quad Band GSM 850 / 900 (E-GSM)/DCS 1800 / PCS 1900 (with WAP & GPRS)

Type identification : C510

Serial number : without

Photos : See annex A.

Technical data

Frequency range Tx - GSM 850	: 824.2 - 848.80 MHz	
Frequency range Tx - PCS	: 1850.2 - 1909.8 MHz	
Frequency range Rx - GSM 850	: 869.2 - 893.8 MHz	
Frequency range Rx - PCS	: 1930.2 - 1989.8 MHz	
Antenna Type	: internal antenna	
Antenna Gain	: GSM 850	-3.5 dBi (manufacturer declaration)
	PCS 1900	-2.5 dBi (manufacturer declaration)
Power supply	: 4.0 V DC	
Operating mode	: duplex	
Type of modulation	: GMSK (GSM modulation)	
Emission	: GXW	

Manufacturer:
(if applicable)

Name :
Street :
Town :
Country :

1.6 Test standards

Technical standard	: FCC Parts: 22H, 24E, 2, 15 IC Standards: RSS 132, RSS 133
Additional information	: Because of using the GSM 850 as an alternative technology in 850 MHz band, not all test cases of FCC Part 22 are required. This device contains 900/1800 MHz not operational in U.S. Territories. This filing is only applicable for 850/1900 MHz operations.

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

or

The deviations as specified in 2.5 were ascertained in the course of the tests performed. ☐

2.2 Test environment

Temperature	: 25 ° C
Relative humidity content	: 20 ... 75 %
Air pressure	: 86 ... 103 kPa

2.3 Test equipment utilized

No.	Test equipment	Type	Manufacturer
ETS 0001	ESD Gun	SESD 30000	Schlöder
ETS 0002	Test receiver	ESVP	R & S
ETS 0003	Diode Power Sensor	NRV-Z2	R & S
ETS 0004	Spektrum- and Network-Analyzer	FSMS 26	R & S
ETS 0005	RF amplifier matrix	RSU-ETS-CTR6	ETS
ETS 0006	HP-Filter	H1G04G01	Microwave
ETS 0007	Horn antenna	AT 4004	ar
ETS 0008	Antenna	Loop antenna	Siemens
ETS 0009	Comb Generator Emitter	CGE 02	York EMC Services
ETS 0011	Antenna (van Veen/Frame)	HM020Z3	R & S
ETS 0012	Biconical Antenna	HK 116	R & S
ETS 0013	LPD Antenna	HL 223	R & S
ETS 0014	Log Periodical Antenna	HL 025	R & S
ETS 0015	Log Periodical Antenna	HL 025	R & S
ETS 0016	Precision antenna kit	VHAP	Schwarzbeck
ETS 0017	Precision antenna kit	UHAP	Schwarzbeck
ETS 0018	Horn antenna	BBHA 9120 D	Schwarzbeck
ETS 0019	Horn antenna	BBHA 9120 D	Schwarzbeck
ETS 0020	Antenna	DP 21	MEB
ETS 0021	Antenna	DP 3	MEB
ETS 0022	Antenna	SAS-200/ 521	A.H. Systeme+D65
ETS 0023	Antenna	DP 1	MEB
ETS 0024	Antenna mast	AF 2	MEB
ETS 0025	Antenna mast	AF 2	MEB
ETS 0026	Tripod		Heinrich Deisel
ETS 0027	Tripod		Heinrich Deisel
ETS 0028	Tripod	STA 2	C. Lorenz AG
ETS 0029	Tripod		Berlebach
ETS 0030	Biconical Antenna	HK 116	R & S
ETS 0031	Turn table	DS 412	Heinrich Deisel
ETS 0032	Controller	HD 050	Heinrich Deisel
ETS 0033	Calibr. Set CDN	3x Adaptor 50-150 Ohm	ETS
ETS 0034	RF Generator/ Amplifier	SMLR	R & S
ETS 0035	RF Generator/ Amplifier	SMLM	R & S
ETS 0036	Zirc. Antenna	3102	EMCO
ETS 0037	Zirc. Antenna	3102L	EMCO
ETS 0038	RF amplifier	150L	Amplifier Research
ETS 0039	Absorbing clamp	MDS 21	R & S
ETS 0040	Artificial Mains Network	ESH3-Z5	R & S
ETS 0041	T-Artificial Mains Network	ESH3-Z4	R & S

No.	Test equipment	Type	Manufacturer
ETS 0042	Artificial Mains	ESH3-Z6	R & S
ETS 0043	Directional Coupler	1850	KRYTAR
ETS 0046	Power supply	2224.7	Statron
ETS 0047	Power supply	2224.7	Statron
ETS 0048	Power supply	2224.7	Statron
ETS 0049	Power supply	2228.1	Statron
ETS 0050	Power supply	2224.2	Statron
ETS 0051	Oscilloscope	TDS 640A	Tektronix
ETS 0051a	Probe a	P6139A	Tektronix
ETS 0051b	Probe b	P6139A	Tektronix
ETS 0052	Audio analyzer	UPA 4	R & S
ETS 0056	Ultra Compact Simulator	UCS 500 M4	EM Test
ETS 0057	Motor Variac	MV 2616	EM Test
ETS 0058	Capacitive coupling clamp	E 502 B	Keytek/ EMC
ETS 0059	Kikusui amplifier	PCR 2000L	Keytek/ EMC
ETS 0064	CDN IEC 61000-4-6		Keytek/ EMC
ETS 0066	EM Injection Clamp		FCC/ EMC
ETS 0067	Calibration Fixture	IEC 801-2031 CF	FCC/ EMC
ETS 0068	CDN IEC 1000-4-6	CDN	FCC/ EMC
ETS 0069	EM Radiation Monitor	EMR-20	W & G
ETS 0070	PC Transfer set EMR-20	EMR-20	W & G
ETS 0071	Video camera system	KMB012	Kocom
ETS 0072	Interphone system	JS-1400	Jiuh Sheng
ETS 0073	Audio noise meter	GSM 2	MKD/ RFT
ETS 0075	NF Generator	GF 22	Präcitronic
ETS 0076	Feeding bridge A	SBA 1000	ESP
ETS 0078	LCR meter	SR 720	SRS
ETS 0079	Functional Generator	MX-2020	Maxcom
ETS 0082	PC Novell network system	Novell	Esotronic
ETS 0085	Shielded room	SR 1	Frankonia
ETS 0086	Semi-Anechoic chamber	AC 1	Frankonia
ETS 0087	Climatic cell	HC 4033	Heraeus
ETS 0088	Color TV pattern Generator	PM 5518-TX VPS	Philips
ETS 0089	Radio Communicationication tester	CMS 54	R & S
ETS 0091	Signal Generator	SME 03	R & S
ETS 0092	Power Amplifier	150W1000	AR Amplifier Research
ETS 0093	Attenuator	57-20-33	Weinschel
ETS 0094	Power Sensor	NRV-Z55	R & S
ETS 0095	DECT system controller	PSMD	R & S
ETS 0096	DECT Signaling unit	PSMD-B11	R & S
ETS 0097	Rack, 19", 36 HU	TS 89RA	R & S
ETS 0098	System engineering and software	CS 893BE	R & S
ETS 0099	Extension unit for basic version	TS 8930B	R & S
ETS 0100	Signal Generator	SME-06	R & S
ETS 0101	Power Amplifier	50W1000B	AR Amplifier Research
ETS 0102	CDN	M3-801/6	MEB
ETS 0103	Magnetic field test set	MF1000	EMC-Partner
ETS 0105	RF Signal Generator (High	SMP 02	R & S

No.	Test equipment	Type	Manufacturer
	power synthesizer/ sweeper)	(SMP 22 / 02)	
ETS 0106	Antenna	Vamp 9243	Schwarzbeck
ETS 0108	DECT protocol tester TBR 22	TS 1220	R & S
ETS 0110	Real time Signaling unit	PSMD-B2	R & S
ETS 0111	PCM Real-time audio interface for PSM	PSMD-B3	R & S
ETS 0112	Synthesizer Module	PSMD-B4	R & S
ETS 0114	RF step attenuator	RSG	R & S
ETS 0116	Protokolltester	PTW 70	R & S
ETS 0117	Insertion unit	URV5-Z2	R & S
ETS 0120	RF step attenuator	TRI-50-20	INCO
ETS 0123	RF attenuator	RBU	R & S
ETS 0124	Tripod	STA 2	R & S
ETS 0136	Attenuator	33-6-34	Weinschel
ETS 0140	High voltage Generator	IP 6Wa	TPW
ETS 0141	Sliding bridge	J 573	RFT
ETS 0143	Impedance converter	TK 12	RFT
ETS 0144	Notch filter	WRCT 24000/2497-80-20SS	Wainwright
ETS 0145	Coaxial Directional	3002-20	Narda
ETS 0146	Active Voltage Probe	ESH2-Z2	R & S
ETS 0148	RF Current Probe	F-65	FCC
ETS 0149	Power divider	ZAPD-21	MCL
ETS 0150	Switcher	HR07-720	Wisi
ETS 0151	Interference pulse Generator	NSG 500C	Schaffner
ETS 0152	Simulator for Load-Dump-Impulse	NSG 506C (I)	Schaffner
ETS 0153	Simulator for Load-Dump-Impulse	NSG 506C (II)	Schaffner
ETS 0155	Signal Generator	SMG	R & S
ETS 0159	Programmable power supply	TOE 8815	Toellner
ETS 0160	Amplifier	AR 1W1000	Amplifier Research
ETS 0161	Harmonic / Flicker Analyzer	HFA 3000	Schlöder
ETS 0162	Acoustic chamber	403-A	IAC
ETS 0163	Test head	BK 4602	Brüel & Kjær
ETS 0164	Simulator ear	BK 4185	Brüel & Kjær
ETS 0165	Simulator mouth	BK 4227	Brüel & Kjær
ETS 0166	Sound level calibrator	BK 4231	Brüel & Kjær
ETS 0167	Communication Analysis System	CAS TE I	HEAD acoustics
ETS 0168	Acoustical test for DECT	CTR 10	HEAD acoustics
ETS 0169	Measurement - Front-end (analog)	MFE III	HEAD acoustics
ETS 0170	Measurement - Front-end (digital)	MFE IV	HEAD acoustics
ETS 0171	Electronic test cradle	TEH	HEAD acoustics
ETS 0172	Noise Generator	HNG III.1	HEAD acoustics
ETS 0173	Speaker	Canton S Pluss	HEAD acoustics
ETS 0174	Measurement - Front-end line interface	MFE V	HEAD acoustics

No.	Test equipment	Type	Manufacturer
ETS 0175	Software Line interface (analog)	COPTZV5	HEAD acoustics
ETS 0176	Acoustic volt meter	COP 4	HEAD acoustics
ETS 0177	Feeding bridge B	SBB 1000	ESP
ETS 0178	Open area test side	10m	ETS
ETS 0179	Open area test side	3 m	ETS
ETS 0186	Power supply	DF 1730	WJG
ETS 0189	Spectrum Analyzer	FSEB	R & S
ETS 0191	Sweep function Generator	7202	Dagatron
ETS 0218	RF probe	URV5-Z7	R & S
ETS 0219	Power sensor	NRV-Z2	R & S
ETS 0221	ISDN-S0-Analyzer	K1403	Siemens
ETS 0222	ISDN Protocol Analyzer	TE965	Tekelec Teleco.
ETS 0223	GSM/ PCN/ PCS-Simul.	TS8916B	R & S
	Radio Channel Simulator	SOFI 05	Sofimation
ETS 0224A	Millivolt meter	URV5	R & S
ETS 0224B	Diode Power Sensor	NRV-Z1	R & S
ETS 0224C	Programmable high resolution timer counter	PM6654G	Philips
ETS 0224D	RF Stepp Attenuator	RSP	R & S
ETS 0224E	Signal Generator	SMG	R & S
ETS 0225	SIM Simulator		Orga
ETS 0226	SIM Editor		Orga
ETS 0227	Vibration table	TIRA vib	GenRad
	Accelerator	PCB_M353B33	PCB Piezotronics Inc.
ETS 0228	Climatic chamber	VT 4010	Vötsch
ETS 0229	Radio Communication. Tester	CMT 54	R & S
ETS 0230	Radio Communication. Tester	CMD 65	R & S
ETS 0232	Radiation test source	VSQ 1	MEB
ETS 0233	Direction coupler	RK 100	MEB
ETS 0234	Power meter	NRVD	R & S
ETS 0235	RF-network-Analyzer	8752 C	HP
ETS 0236	RF-amplifier	100A100	ar
ETS 0237	RF-amplifier	100W1000M1	ar
ETS 0238	Field strong meter	FM 2000	ar
ETS 0239	Isotropic field probe 40 GHz	FP 2080 Kit	ar
ETS 0240	Isotropic field probe 1 GHz	FP 2000 Kit	ar
ETS 0241	Pulse Generator	4050	PicoSecond PL
ETS 0244	Ultra Compact Simulator	UCS 200 M	EM-Test
ETS 0245	Load dump Generator	LD 200 B1	EM-Test
ETS 0246	Voltage drop simulator	VDS 200	EM-Test
ETS 0247	Calibration adaptor	KW50	EM-Test
ETS 0248	Calibration adaptor	KW1000	EM-Test
ETS 0251	Climatic chamber	VT 4004	Vötsch
ETS 0252	System controller	PSM 12	R & S
ETS 0253	Spectrum Analyzer	FSIQ 26	R & S
ETS 0254	RF Generator	SMIQ 03	R & S
ETS 0255	RF Generator	SMIQ 03	R & S
ETS 0256	RF Generator	SMR 27	R & S
ETS 0257	Step attenuator	RSP	R & S

No.	Test equipment	Type	Manufacturer
ETS 0258	Rubidium standard	RSTU	DATUM GmbH
ETS 0259	Power meter	NRVD	R & S
ETS 0260	Power sensor	NRV-Z1	R & S
ETS 0261	Power sensor	NRV-Z1	R & S
ETS 0262	Switching unit	SSCU	R & S
ETS 0263	Signaling unit	PTW 60	R & S
ETS 0265	Loop antenna	HFRA 9150	Schwarzbeck
ETS 0266	Messadapter 1:100	50 Ohm	
ETS 0267	RF Signal Generator	SMT 03	R & S
ETS 0268	Signal Generator	SMP 02	R & S
ETS 0269	RF bridge 50 Ohm	86205 A	Agilent
ETS 0270	Signal Generator	SMP 04	R & S
ETS 0271	Spectrum Analyzer	FSEK 30	R & S
ETS 0272	Signal Generator	SME 03	R & S
ETS 0273	Signal Generator	SME 03	R & S
ETS 0274	Signal Generator	SMY 01	R & S
ETS 0275	Power sensor	NRV-Z51	R & S
ETS 0276	Audio Analyzer	UPL 16	R & S
ETS 0277	Power sensor	NRV-Z1	R & S
ETS 0278	Power sensor	NRV-Z31	R & S
ETS 0279	Step attenuator	RSP	R & S
ETS 0280	Power meter	NRVD	R & S
ETS 0281	Spectrum Analyzer	FSM	R & S
ETS 0282	RF bridge 75 Ohm	86207 A	HP
ETS 0283	RF bridge 50 Ohm	86205 A	HP
ETS 0284	Field probe	11940 A	HP
ETS 0285	Field probe	11941 A	HP
ETS 0286	Limither	11867 A	HP
ETS 0287	EMI Test receiver	ESHS10	R & S
ETS 0288	Artificial mains	ESH2-Z5	R & S
ETS 0289	Audio Generator	TAG 101	Troneer
ETS 0290	Audio Generator	TAG 101	Troneer
ETS 0291	Loop antenna	HFH2-Z2	R & S
ETS 0292	RF Generator	SMHU	R & S
ETS 0293	Artificial mains	NNBM 8125	Schwarzbeck
ETS 0294	Biconical antenna	HK 116	R & S
ETS 0295	LPD antenna	HL 223	R & S
ETS 0296	GTEM cell	GTEM 500	Schaffner
ETS 0297	Power pulse Generator	IGUF 2910	Schwarzbeck
ETS 0299	DECT protocol tester	TS 1220	R & S
ETS 0300	RF amplifier	75 A 250	ar
ETS 0301	Relay switch unit	RSU	R & S
ETS 0302	Data line CDN	CM-I/O CD	Keytek
ETS 0303	Telecom line CDN	CM-TEL CD	Keytek
ETS 0306	Function Generator	HP 33120A	HP
ETS 0307	Commu. Sign. Analyzer	CSA 803 A	Tektronix
ETS 0308	Spectrum analyzer	R 3361A	Advantest
ETS 0309	Anechoic chamber	AC 2	Frankonia

No.	Test equipment	Type	Manufacturer
ETS 0310	Anechoic chamber	AC 3	Frankonia
ETS 0311	Anechoic chamber	AC 4	Frankonia
ETS 0313	Power sensor	NRV-Z51	R & S
ETS 0314	LPD antenna	HL 223	R & S
ETS 0315	Biconical antenna	HK 116	R & S
ETS 0316	Switcher	Hr 07-720	WISI
ETS 0318	Dial pulse/ DTMF tester	210	HE
ETS 0319	Opto link	GPIB 140	NI
ETS 0320	Opto link	GPIB 140	NI
ETS 0322	Insertion unit	URV5-Z4	R & S
ETS 0328	ELF Field Strenght Measurement System	HI-3604	Holaday Ind., INC.
ETS 0329	VDT / VLF Radiation Measurement System	HI-3603	Holaday Ind., INC.
ETS 0330	Fiber Optic Remote Control	HI-3616	Holaday Ind., INC.
ETS 0331	TS 1220		
ETS 0332	PSM		
ETS 0333	Turn table	DE 350	Heinrich Deisel
ETS 0334	Controller	HD 100	Heinrich Deisel
ETS 0336	LPD antenna	HL 223	R & S
ETS 0338	Coupling network	KN002	ETS
ETS 0339	Isolating Transformer	KN003	ETS
ETS 0347	Current Probe	EZ-17	R & S
ETS 0348	RF Millivolt meter	URV 55	R & S
ETS 0349			
ETS 0350	Horn Antenna	BBHA 9120-C	Schwarzbeck
ETS 0351	RF amplifier	DWT-18057	Microwave
ETS 0352	RF amplifier		
ETS 0353	Hochpassfilter		
ETS 0354	RF amplifier	DBS-0408N423	Microwave
ETS 0355	high pass	H03G12G3	Microwave
ETS 0356	high pass	H03G12G3	Microwave
ETS 0357	high pass	H08G18G3	Microwave
ETS 0358	RF amplifier	AFD3-010040-15-ln	MITEQ
ETS 0359	RF amplifier	M/N AM-1331	MITEQ
ETS 0360	RF amplifier	DBS-0408N423	Microwave
ETS 0361	RF amplifier	DBS 1826N515	Microwave
ETS 0362	high pass	H03G12G3	Microwave
ETS 0363	high pass	H08G18G3	Microwave
ETS 0364	high pass	H08G18G3	Microwave
ETS 0365	Notch filter 2.4 GHz	WRCT2.40/248	Wain Wright
ETS 0366	high pass	H08G18G3	Microwave
ETS 0367	high pass	H03G12G3	Microwave
ETS 0368	Notch filter 0.5-1 GHz	BN86883	Schomandl
ETS 0369	Notch filter 210-500 MHz	BN86882	Schomandl
ETS 0370	Notch filter 15-90 MHz	BN86880	Schomandl
ETS 0371	Notch filter 85-250 MHz	BN86881	Schomandl
ETS 0372	Direction coupler	RK 100	MEB
ETS 0373	Direction coupler	DC3001	EMC

No.	Test equipment	Type	Manufacturer
ETS 0374	DC Power Supply	NGSM32	R & S
ETS 0375	Vector Signal Gener.	SMIQ03B	R & S
ETS 0376	Signal Generator	SMP22	R & S
ETS 0377	Advanced Signal Conditioning Unit	ASCU850	R & S
ETS 0378	Advanced Signal Conditioning Unit	ASCU190	R & S
ETS 0379	Advanced Signal Conditioning Unit	ASCU180	R & S
ETS 0380	Advanced Signal Conditioning Unit	ASCU900	R & S
ETS 0381	Ethernet HUB	CS-HUB	R & S
ETS 0382	Vector Signal Gener.	SMIQ03B	R & S
ETS 0383	Spectrum Analyzer	FSU26	R & S
ETS 0384	Main Frame Signal and Conditioning Unit	SSCU-GW	R & S
ETS 0385	Protocol Slave	CRTU-RU (CRTU-G)	R & S
ETS 0386	Power meter	NRVD	R & S
ETS 0387	Power Sensor	NRV-Z1	R & S
ETS 0388	Power Sensor	NRV-Z1	R & S
ETS 0389	Fading Simulator	ABFS	R & S
ETS 0390	System PC PC3600	TS-PC36	R & S
ETS 0391	Rubidium Frequency Standard	DATUM 8040	DATUM GmbH
ETS 0392	RF Distribution	DATUM 6502	DATUM GmbH
ETS 0393	Insertion unit	URV5-Z4	R & S
ETS 0394	Advanced Signal Conditioning Unit	ASCUFDD-WCDMA	R & S
ETS 0395	Universal Protocol Tester	CRTU-G	R & S
ETS 0396	Protocol Slave	CRTU-S	R & S
ETS 0397	Protocol Slave	CRTU-S	R & S
ETS 0398	Fading Simulator	ABFS	R & S
ETS 0399	Univ. Protocol Tester (Protocol Unit) (Radio Unit)	CRTU-W (CRTU-PU) (CRTU-RU)	R & S
ETS 0400	Univ. Protocol Tester (Protocol Unit) (Radio Unit)	CRTU-W (CRTU-PU) (CRTU-RU)	R & S
ETS 0401	MPEG2 Generator	DVG	R & S
ETS 0402	TV Messender	SFQ	R & S
ETS 0403	RF Current Probe	F-140	FCC
ETS 0404	Exposure Level Tester	ELT-400	Narda
ETS 0405	Magnetic Field Probe 100 cm^2	2300/90.10	Narda
ETS 0406	Signal Generator	SML 02	R & S
ETS 0407	EMC Emission tester	Harmonics 1000	EMC Partner
ETS 0408	Transient 2000	TRA1Z191N	EMC Partner
ETS 0409	Stripline	DC220	Schwarzbeck
ETS 0410	BAN	1	ETS
ETS 0411	Universal Protocol Tester	CRTU-G	R & S
ETS 0412	Spectrum Analyzer	FSU 3	R & S
ETS 0413	Signal Analyzer	FSIQ 26	R & S
ETS 0416	Power Supply	EX752M	TTi

No.	Test equipment	Type	Manufacturer
ETS 0417	Beacon Tester	BT100S	WS Tech. Inc.
ETS 0418	High pass filter 4 - 8 G		Microwave
ETS 0419	High pass filter 8 - 18 G		Microwave
ETS 0420	Amplifier 0.1-1 GHz	M/N AM-1331	MITEQ
ETS 0421	Amplifier 1-4 GHz	AFD3-010040-15-LN	MITEQ
ETS 0422	Amplifier 4-8 GHz	DBS-0408N423	Narda
ETS 0423	Amplifier 8-18 GHz	DWT-18057	Narda
ETS 0424	Amplifier 18-26.5 GHz	DBS-1826N515	Narda
ETS 0425	T-Artificial Mains Network	ESH3-Z4	R & S
ETS 0426	CDN	T4 HF	MEB
ETS 0427	Power sensor	NRV-Z6	R & S
ETS 0428	4-WIRE ISN with B1	ENY41	R & S
ETS 0429	Current Probe Test Jig	SW14 7LY	Chase
ETS 0430	Signal Generator	SML02	R&S
ETS 0431	AC Mains Adaptor	BS5733	Travel Emporium
ETS 0432	RF amplifier matrix	RSU-ETS-BT	ETS
ETS 0433	RF amplifier matrix	RSU-ETS-CTR6	ETS
ETS 0434	Reserviert Tre	RSU-ETS-GSM	
ETS 0435	HP-Filter	H1G04G01	Microwave
ETS 0436	HP-Filter	H1G04G01	Microwave
ETS 0437	HP-Filter	H04G08G1	Microwave
ETS 0438	HP-Filter	H0G408G1	Microwave
ETS 0439	Amplifier	DBS-1826N515	Narda-DBS-Microwave
ETS 0440	Amplifier	AM-1331	MITEQ
ETS 0441	Bluetooth Protocol Tester	PTW 60	R & S
ETS 0445	RF-Attenuator 6dB	50FH-006-300	JFK
ETS 0446	RF-Attenuator 30dB	50FH-030-300	JFK
ETS 0447	Artificial Mains Network	LN-KFZ/200	Heine
ETS 0448	RF Power Amplifier	AR 60S1G3	AR Amplifier Research
ETS 0449	Stäubli Robot	RX90B L	Stäubli
ETS 0450	Stäubli Robot Controller	CS/MBs&p	Stäubli
ETS 0451	DASY 4 Measurement Server		Schmid & Partner
ETS 0452	Control Pendant		Stäubli
ETS 0453	Compaq Computer	Pentium IV, 2GHz	Schmid & Partner
ETS 0454	Data Acquisition Electronics	DAE3V1	Schmid & Partner
ETS 0455	Dummy Probe		Schmid & Partner
ETS 0456	Dosimetric E-Field Probe	ET3DV6	Schmid & Partner
ETS 0457	Dosimetric E-Field Probe	ET3DV6	Schmid & Partner
ETS 0458	Dosimetric H-Field Probe	H3DV6	Schmid & Partner
ETS 0459	System Validation Kit	D900V2	Schmid & Partner
ETS 0460	System Validation Kit	D1800V2	Schmid & Partner
ETS 0461	System Validation Kit	D1900V2	Schmid & Partner
ETS 0462	System Validation Kit	D2450V2	Schmid & Partner
ETS 0463	Probe Alignment Unit	LBV2	Schmid & Partner
ETS 0464	SAM Twin phantom	V 4.0	
ETS 0465	Mounting Device	V 3.1	
ETS 0466	Directional Coupler	HP 87300B	HP
ETS 0467	Oval flat phantom	ELI 4	Schmid & Partner

No.	Test equipment	Type	Manufacturer
ETS 0468	Isotropic E-Field Probe	ER3DV6	Schmid & Partner
ETS 0469	Dielectric Probe Kit	85070D	Agilent
ETS 0470	Amplifier	AM-1300-1103	withEQ
ETS 0472	Antenna	BTA-H	Frankonia
ETS 0473	GSM / UMTS System Simulator	TS 8950	R&S
ETS 0474	EMI Test Receiver	ESCS 30	R&S
ETS 0475	Amplifier	AFS4-00101800-U	withEQ
ETS 0476	EMI Test receiver	ESCS 30	R&S
ETS 0477	GPS-System (active GPS-antenne)	4490	HOPF
ETS 0478	Crystal filter	MQF 127.50-2400/F	Vectron International
ETS 0479	System Validation Dipoles	D300V3	Schmid & Partner
ETS 0480	System Validation Dipoles	D450V3	Schmid & Partner
ETS 0481	40GHz Standard Gain Horn with Amplifier	22240-25 CBL26402075	Flann Microwave
ETS 0482	40GHz High Gain Antenna	AT4560	Amplifier research
ETS 0483	Amplifier	AFD3010040-15-LN	MITEQ
ETS 0484	Radio Communication Tester	CMU 200	R&S
ETS 0485	Radio Communication Tester	CMU 200	R&S
ETS 0486	Circular polarized antenna	3101L	EMCO
ETS 0487	Torso simulator		ETS
ETS 0488	EMI Test Receiver	ESHS10	R & S
ETS 0489	Rubidium Frequency Standard	MFS	DATUM
ETS 0490	Rubidium Frequency Standard	8040	DATUM
ETS 0491	RF Distribution	DATUM 6502	DATUM
ETS 0492	Indusrtial Cotroller	PSM12	R & S
ETS 0493	Protokoll Tester	PTW60	R & S
ETS 0494	Switching unit	SSCU	R & S
ETS 0495	RF Step Attenuator	RSP	R & S
ETS 0496	Spectrum Analyzer	FSP	R & S
ETS 0497	Power Meter	NRVD	R & S
ETS 0498	Diode Power Sensor	NRV-Z1	R & S
ETS 0499	Diode Power Sensor	NRV-Z1	R & S
ETS 0500	Signal Generator	SMIQ03	R & S
ETS 0501	Signal Generator	SMIQ03	R & S
ETS 0502	Power Splitter	DS-808-4	Macom
ETS 0503	Directional Coupler	IAW	Microwave Filter Company
ETS 0504	AMTS-Simulator A	Feeding Bridge A	Emmerich
ETS 0505	Diode Power Sensor	NRV-Z1	R & S
ETS 0506	Diode Power Sensor	NRV-Z6	R & S
ETS 0507	Power Divider	PS-Z101-4S	UMCC
ETS 0508	Power Divider	T-1000	Macom
ETS 0509	Power Divider	T-1000	Macom
ETS 0510	Power Divider	T-1000	Macom
ETS 0511	Power Divider	DS-409-4	Anzac
ETS 0512	Log Periodical Antenna	HL 025	R & S
ETS 0513	Flat Phantom	V4.4	Schmid & Partner

2.4 General test procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 5.2 using a 50 µH LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-2003 6.4 using a spectrum analyzer. The resolution bandwidth of the spectrum analyzer was 100 kHz for measurements below 1 GHz and RBW 1 MHz was used above 1 GHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

FORMULA OF CONVERSION FACTORS for Field strength: The Field Strength at 3 m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBµV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

Freq. (MHz)	METER READING + ACF + CABLE LOSS (to the receiver) = FS
33	20 dBµV + 10.36 dB + 6 dB = 36.36 dBµV/m @ 3 m

ANSI STANDARD C63.4-2003 6.2.1 MEASUREMENT PROCEDURES: The UUT was placed on a table 80 cm high and with dimensions of 1 m by 1.5 m (non metallic table). The UUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to at least 10^{th} harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings.
Measurements were made by ETS Product Service AG at the registered open field test site located at Storkower Str. 38c, 15526 Reichenwalde, Germany.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1 m to 4 m. The antenna was placed in both the horizontal and vertical planes.

ANTENNA & GROUND:
This unit uses internal antennas.

2.5 Test results

☒ 1st test ☐ test after modification ☐ production test

SECT.	TEST CASE	FCC 47 CFR PART	IC RSS	Required	Test passed	Test failed
3	*TRANSMITTER PARAMETERS*					
3.1	RF power output conducted	2.1046 22.913(a) 24.232(c)	Gen §4.6 132 §4.4 133 §4.3	☒	☒	☐
3.2	RF power output radiated (ERP, EIRP)	22.913(a) 24.232(c)	132 §4.4 133 §4.3	☒	☒	☐
3.3	Occupied bandwidth	2.1049	Gen §4.4.1	☒	☒	☐
3.3	Emission bandwidth	22.917(b) 24.238(b)	-	☒	☒	☐
3.4	Frequency stability	2.1055 22.355 24.235	Gen §4.5 132 §4.3 133 §4.2	☒	☒	☐
3.5	Spurious emission conducted (antenna terminal)	2.1051 22.917 24.238	Gen §4.7 132 §4.5 133 §4.4	☐	☐	☐
3.6	Spurious emission radiated	2.1053 22.917 24.238	Gen §4.7 132 §4.5 133 §4.4	☒	☒	☐
3.7	Block edge compliance	22.917(b) 24.238(b)	132 §4.5.1.1 133 §4.4	☒	☒	☐
3.8	AC power line conducted emissions	15.207	-	☒	☒	☐
4	*RECEIVER PARAMETERS*					
4.1	Radiated emissions	2.1053 15.109	Gen 4.8 132 §4.6 133 §4.5	☐	☐	☐

3 Transmitter parameters

3.1 RF power output, conducted

Reference

	Cellular telephone 850 MHz	PCS 1900 MHz
FCC	CFR part 22.913(a), 2.1046	CFR part 24.232(c), 2.1046
IC	RSS-132 Issue 2, §4.4 RSS-Gen Issue 1, §4.6	RSS-133 Issue 3, §4.3 RSS-Gen Issue 1, §4.6

Method of measurement

The transmitter output was connected to a calibrated coaxial attenuator, the other end of which was connected to a spectrum analyzer. Transmitter output was read off the spectrum analyzer in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the spectrum analyzer reading.
An HP power meter was also used to measure the RF power.
Tests were performed at three frequencies (low, middle, and high channels) and on all power levels, which can be set-up on the transmitters.

Test results

	Frequency channel	Peak output power	AVG output power
Cellular telephone 850 MHz	128	32.51 dBm	--
	188	32.56 dBm	--
	251	32.60 dBm	--
PCS 1900 MHz	512	29.52 dBm	--
	661	29.27 dBm	--
	810	29.20 dBm	--

See attached diagrams

Test equipment: ETS 0413, ETS 0416, ETS 0484

3.2 RF power output, radiated

Reference

	Cellular telephone 850 MHz	PCS 1900 MHz
FCC	CFR part 22.913(a)	CFR part 24.232(c)
IC	RSS-132 Issue 2, §4.4	RSS-133 Issue 3, §4.3

Method of measurement

The EUT was positioned on a non-conductive turntable, 0.8m above the ground plane on an open test site. The radiated emission at the fundamental frequency was measured at 3m distance with a test antenna and spectrum analyzer.

Worst case emission was recorded with the rotation of the turntable and the raising and lowering of the test antenna.

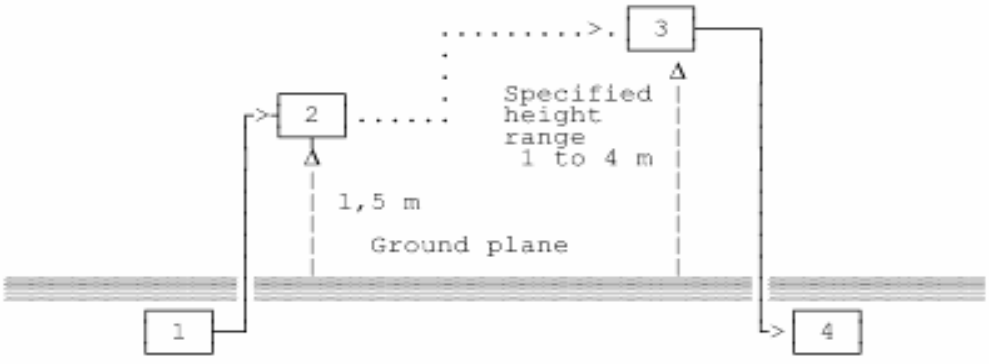
ERP in frequency band 824.2 - 848.8 MHz, and EIRP in frequency band 1850.2 - 1909.8 MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (824.2 - 848.8 MHz) or horn antenna (1850.2 - 1909.8 MHz) connected to a signal generator.

Substitution RF power measurement at ETS Product Service AG

General:

The applied substitution method follows ANSI/TIA/EIA-603, ANSI/TIA/EIA-102.CAAA or the appropriate ETSI rules respectively.

The actual signal generated by the EUT can be determined by means of a substitution measurement in which a known signal source replaces the device to be measured.



1) Signal generator;
2) Substitution antenna;
3) Test antenna;
4) Spectrum analyzer or selective voltmeter.

The substitution antenna replaces the transmitter antenna at the same position and in vertical polarization. The frequency of the signal generator shall be adjusted to the measurement frequency. The test antenna shall be raised or lowered, if necessary, to ensure that the maximum signal is still received. The input signal to the substitution antenna shall be adjusted in level until an equal or a known related level to that detected from the transmitter is obtained in the measurement receiver.
If a fully anechoic chamber is used as test site in order to provide free space conditions there is no need to change the height of the antenna.
The measurement will be repeated in horizontal position.

Calibration:
In order to make this kind of measurement more effective and to avoid subjective measurement faults ETS has installed automatic computer controlled measurement procedures.
With the above described substitution method a test site is calibrated over the full frequency range which is used in suitable frequency steps. For a certain power level on the substitution antenna the received power over the whole frequency range is documented. All necessary antenna gains, cable losses, filter losses and amplifications of preamplifiers are taken in consideration. The summary of this calibration measurement performs a transducer factor that is related to the considered test site and a certain measurement distance. Differences of the radiated power levels of different test samples are determined by internal attenuation of the measurement receiver. The proper function of such test site will be maintained by short term plausibility checks and periodical re-calibration.

Testing:
The test sample is put on the table at the defined position and the measurement receiver receives and documents the radiated power. On test sites with ground plane the measurement antenna will be lowered and raised to maximum values at significant frequencies.
For peak power measurements the sample is turned by the turntable over 360 degree in order to find the direction with the maximum radiation or to document the max reading with the MAXHOLD function during the rotation.

Limits

	Cellular telephone 850 MHz	**PCS 1900 MHz**
FCC	38,5 dBm (7 Watts), ERP	33 dBm (2 Watts), EIRP
IC	38 dBm (6.3 Watts), ERP	33 dBm (2 Watts), EIRP

Test Results

	Frequency channel	Radiated power ERP	Radiated power EIRP
Cellular telephone 850 MHz	128	26.96 dBm	--
	188	28.11 dBm	--
	251	29.97 dBm	--
PCS 1900 MHz	512	--	28.18 dBm
	661	--	24.45 dBm
	810	--	25.17 dBm

See attached diagrams

Test equipment: ETS 0014, ETS 0281, ETS 0295, ETS 0310, ETS 0416, ETS 0484

3.3 Occupied bandwidth, emission bandwidth

Reference

	Cellular telephone 850 MHz	PCS 1900 MHz
FCC	CFR part 22.917(b), 2.1049	CFR part 24.238(b), 2.1049
IC	RSS-Gen Issue 1, §4.4.1	RSS-Gen Issue 1, §4.4.1

Method of measurement

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power.
The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The RF output of the transceiver was connected to the input of the spectrum analyzer through sufficient attenuation.
Occupied Bandwidth was measured with a occupied bandwidth function of the analyzer.
To find the Emission Bandwidth (-26 dB) the delta markers were set –26 dB below transmitter power.

Test results

	Frequency channel	Occupied bandwidth	Emission bandwidth
Cellular telephone 850 MHz	128	246.492 kHz	312.625 kHz
	188	244.488 kHz	310.624 kHz
	251	246.492 kHz	312.625 kHz
PCS 1900 MHz	512	246.492 kHz	314.629 kHz
	661	246.492 kHz	310.621 kHz
	810	244.488 kHz	316.633 kHz

See attached diagrams

Test equipment: ETS 0413, ETS 0416, ETS 0484

3.4 Frequency stability

Reference

	Cellular telephone 850 MHz	PCS 1900 MHz
FCC	CFR part 22.355, 2.1055	CFR part 24.235, 2.1055
IC	RSS-132 Issue 2, §4.3 RSS-Gen Issue 1, §4.5	RSS-133 Issue 3, §4.2 RSS-Gen Issue 1, §4.5

Method of measurement

The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable, exited the chamber through an opening made for that purpose.
After the temperature stabilized the frequency output was recorded from the counter.

Limits

	Cellular telephone 850 MHz	PCS 1900 MHz
FCC	± 2.5 ppm	Must stay within the authorized frequency block
IC	± 2.5 ppm	± 2.5 ppm

Test results

Frequency stability vs. temperature

	ϑ / ° C	Frequency error (Hz)	Frequency error (ppm)
Cellular telephone 850 MHz	-30	-33	-0,03946
	-20	-39	-0,04664
	-10	-39	-0,04664
	0	-49	-0,05860
	+10	-45	-0,05381
	+20	-34	-0,04066
	+30	45	0,05381
	+40	-47	-0,05621
	+50	47	0,05621

	ϑ / ° C	Frequency error (Hz)	Frequency error (ppm)
PCS 1900 MHz	-30	91	0,04840
	-20	90	0,04787
	-10	86	0,04574
	0	104	0,05532
	+10	103	0,05479
	+20	53	0,02819
	+30	72	0,03830
	+40	87	0,04628
	+50	92	0,04894

Frequency stability vs. voltage

	U_B / V	Frequency error (Hz)	Frequency error (ppm)
Cellular telephone 850 MHz	3,70	53	0,02819
	3,50	52	0,02766
	3,30	51	0,02713

	U_B / V	Frequency error (Hz)	Frequency error (ppm)
PCS 1900 MHz	3,70	53	0,02819
	3,50	52	0,02766
	3,30	51	0,02713

Test equipment: ETS 0251, ETS 0416, ETS 0484

3.5 Spurious emission conducted (antenna terminal)

Reference

	Cellular Telephone 850 MHz	PCS 1900 MHz
FCC	CFR part 22.917, 2.1051	CFR part 24.238, 2.1051
IC	RSS-132 Issue 2, §4.5 RSS-Gen Issue 1, §4.7	RSS-133 Issue 3, §4.4 RSS-Gen Issue 1, §4.7

Method of measurement

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission. The magnitude of spurious emission which are attenuated more than 20 dB below the permissible value need not be specified. Tests are performed for lowest, middle and highest transmitter block frequency.

Limits

	Cellular telephone 850 MHz	PCS 1900 MHz
FCC	Pc - (43 + 10 log (P) dB)	Pc - (43 + 10 log (P) dB)
IC	Pc - (43 + 10 log (P) dB)	Pc - (43 + 10 log (P) dB)

Test results

	Harmonic	TCX 128 [MHz]	Level [dBm]	TCX 188 [MHz]	Level [dBm]	TCX 251 [MHz]	Level [dBm
Cellular telephone 850 MHz	1	--	--	--	--	--	--
	2	--	--	--	--	--	--
	3	--	--	--	--	--	--
	4	--	--	--	--	--	--
	5	--	--	--	--	--	--
	6	--	--	--	--	--	--
	7	--	--	--	--	--	--
	8	--	--	--	--	--	--
	9	--	--	--	--	--	--
	10	--	--	--	--	--	--

	Harmonic	TCX 512 [MHz]	Level [dBm]	TCX 661 [MHz]	Level [dBm]	TCX 810 [MHz]	Level [dBm
PCS 1900 MHz	1	--	--	--	--	--	--
	2	--	--	--	--	--	--
	3	--	--	--	--	--	--
	4	--	--	--	--	--	--
	5	--	--	--	--	--	--
	6	--	--	--	--	--	--
	7	--	--	--	--	--	--
	8	--	--	--	--	--	--
	9	--	--	--	--	--	--
	10	--	--	--	--	--	--

Not required.

Test equipment:
ETS 0375, ETS 0376, ETS 0377, ETS 0378, ETS 0379, ETS 0380, ETS 0382, ETS 0383, ETS 0384, ETS 0385, ETS 0386, ETS 0390, ETS 0394, ETS 0473

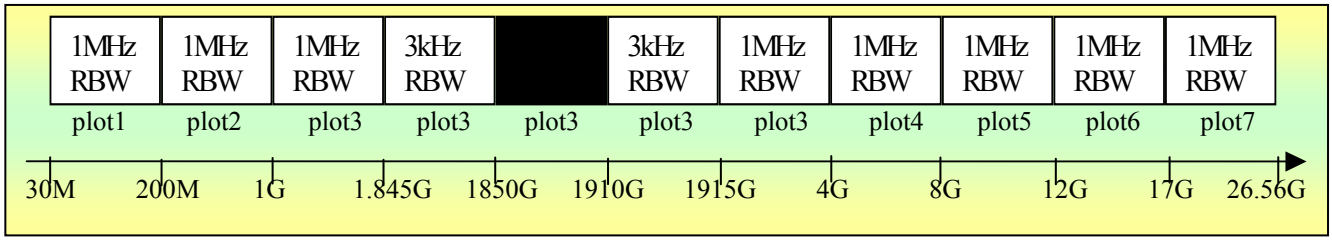
3.6 Spurious emission radiated

Reference

	Cellular telephone 850 MHz	PCS 1900 MHz
FCC	CFR part 22.917, 2.1053	CFR part 24.238, 2.1053
IC	RSS-132 Issue 2, §4.5 RSS-Gen Issue 1, §4.7	RSS-133 Issue 3, §4.4 RSS-Gen Issue 1, §4.7

Method of measurement

The EUT was positioned on a non-conductive turntable, 0.8m above the ground plane.
The radiated emission at the fundamental frequency was measured at 3 m distance with a test antenna and spectrum analyzer.



Worst case emission was recorded with the rotation of the turntable and the raising and lowering of the test antenna.

ERP was measured using a substitution method. The EUT was replaced by horn antenna connected to a signal generator.

The frequency range up to tenth harmonic was investigated.

The tests of spurious radiated emission have been carried out with the EKS-Software from Rohde & Schwarz.

The analyzer gives automatic the measurements of spectral plots to the EKS software.

In the 1st 1 MHz band outside the band edge nearest the channel of interest a 3 kHz res. BW is used. The measurements from 30 MHz to 1845 GHz and 1915 GHz to 26.56 GHz were performed with a measurement bandwidth of 1 MHz.

Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.

The peak and average spurious emission plots was measured with the average limits.
In the Table being listed the critical peak and average value an exhibit the compliance with the above calculated Limits.

Limits

	Cellular telephone 850 MHz	**PCS 1900 MHz**
FCC	Pc - (43 + 10 log (P) dB)	Pc - (43 + 10 log (P) dB)
IC	Pc - (43 + 10 log (P) dB)	Pc - (43 + 10 log (P) dB)

GSM 850

Summary table with radiated data of the test plots for Carrier Test Frequency 824,2 MHz

Spectral Plot	Frequency Marker Indication [MHz]	Indication Power Level [dBm]	External Attn. [dB]	Worst Case Emission Level [dBm]	Compliance Limit [dBm]	Results
vertical	186,373	-66,96	0	-66,96	-13	-53,96
horizontal	191,824	-49	0	-49	-13	-36
vertical	823,980	-23,37	0	-23,37	-13	-10,37
horizontal	823,980	-27,27	0	-27,27	-13	-14,27
vertical	3.934,000	-46,3	0	-46,3	-13	-33,3
horizontal	3.910,000	-45,64	0	-45,64	-13	-32,64
vertical	7.447,000	-43,19	0	-43,19	-13	-30,19
horizontal	7.519,000	-43,53	0	-43,53	-13	-30,53
vertical	11.936,000	-38,68	0	-38,68	-13	-25,68
horizontal	10.774,000	-37,34	0	-37,34	-13	-24,34

Summary table with radiated data of the test plots for Carrier Test Frequency 836,2 MHz

Spectral Plot	Frequency Marker Indication [MHz]	Indication Power Level [dBm]	External Attn.[dB]	Worst Case Emission Level [dBm]	Compliance Limit [dBm]	Results
vertical	31,363	-66,61	0	-66,61	-13	-53,61
horizontal	192,164	-50,02	0	-50,02	-13	-37,02
vertical	896,425	-50,19	0	-50,19	-13	-37,19
horizontal	865,411	-33,87	0	-33,87	-13	-20,87
vertical	3.892,000	-45,01	0	-45,01	-13	-32,01
horizontal	3.892,000	-46,06	0	-46,06	-13	-33,06
vertical	7.519,000	-42,96	0	-42,96	-13	-29,96
horizontal	6.661,000	-43,59	0	-43,59	-13	-30,59
vertical	10.725,000	-38,43	0	-38,43	-13	-25,43
horizontal	11.126,000	-38,4	0	-38,4	-13	-25,4

Summary table with radiated data of the test plots for Carrier Test Frequency 848,8 MHz

Spectral Plot	Frequency Marker Indication [MHz]	Indication Power Level [dBm]	External Attn.[dB]	Worst Case Emission Level [dBm]	Compliance Limit [dBm]	Results
vertical	30,000	-66,3	0	-66,3	-13	-53,3
horizontal	79,399	-49,8	0	-49,8	-13	-36,8
vertical	849,020	-16,92	0	-16,92	-13	-3,92
horizontal	849,010	-19,9	0	-19,9	-13	-6,9
vertical	3.892,000	-46,28	0	-46,28	-13	-33,28
horizontal	3.928,000	-45,74	0	-45,74	-13	-32,74
vertical	7.479,000	-43,11	0	-43,11	-13	-30,11
horizontal	7.575,000	-43,17	0	-43,17	-13	-30,17
vertical	10.725,000	-38,16	0	-38,16	-13	-25,16
horizontal	11.126,000	-38,7	0	-38,7	-13	-25,7

See attached diagrams.

PCS 1900

Summary table with radiated data of the test plots for Carrier Test Frequency 1850.2 MHz

Spectral Plot	Frequency Marker Indication [MHz]	Indication Power Level [dBm]	External Attn. [dB]	Worst Case Emission Level [dBm]	Compliance Limit [dBm]	Results
vertical	31,363	-57,54	0	-57,54	-13	-44,54
horizontal	31,022	-57,76	0	-57,76	-13	-44,76
vertical	985,571	-54,22	0	-54,22	-13	-41,22
horizontal	860,521	-52,38	0	-52,38	-13	-39,38
vertical	1.850,000	-20,52	0	-20,52	-13	-7,52
horizontal	1.850,000	-24,04	0	-24,04	-13	-11,04
vertical	7.535,000	-42,8	0	-42,8	-13	-29,8
horizontal	7.984,000	-42,68	0	-42,68	-13	-29,68
vertical	11.984,000	-37,81	0	-37,81	-13	-24,81
horizontal	11.880,000	-37,85	0	-37,85	-13	-24,85
vertical	17.880,000	-28,26	0	-28,26	-13	-15,26
horizontal	17.435,000	-28,29	0	-28,29	-13	-15,29
vertical	26,108	-35,02	0	-35,02	-13	-22,02
horizontal	26,006	-34,93	0	-34,93	-13	-21,93

Summary table with radiated data of the test plots for Carrier Test Frequency 1880.0 MHz

Spectral Plot	Frequency Marker Indication [MHz]	Indication Power Level [dBm]	External Attn.[dB]	Worst Case Emission Level [dBm]	Compliance Limit [dBm]	Results
vertical	31,022	-57,24	0	-57,24	-13	-44,24
horizontal	31,363	-57,12	0	-57,12	-13	-44,12
vertical	993,587	-53,98	0	-53,98	-13	-40,98
horizontal	857,315	-51,92	0	-51,92	-13	-38,92
vertical	3.921,000	-28	0	-28	-13	-15
horizontal	3.937,000	-27,37	0	-27,37	-13	-14,37
vertical	7.551,000	-43,08	0	-43,08	-13	-30,08
horizontal	7.992,000	-43,05	0	-43,05	-13	-30,05
vertical	11.246,000	-37,91	0	-37,91	-13	-24,91
horizontal	10.180,000	-38,04	0	-38,04	-13	-25,04
vertical	17.892,000	-28,81	0	-28,81	-13	-15,81
horizontal	17.435,000	-28,38	0	-28,38	-13	-15,38
vertical	26,057	-34,39	0	-34,39	-13	-21,39
horizontal	24,439	-35,73	0	-35,73	-13	-22,73

Summary table with radiated data of the test plots for Carrier Test Frequency 1909.8 MHz

Spectral Plot	Frequency Marker Indication [MHz]	Indication Power Level [dBm]	External Attn.[dB]	Worst Case Emission Level [dBm]	Compliance Limit [dBm]	Results
vertical	31,022	-57,95	0	-57,95	-13	-44,95
horizontal	31,022	-56,74	0	-56,74	-13	-43,74
vertical	996,794	-53,99	0	-53,99	-13	-40,99
horizontal	868,537	-52,4	0	-52,4	-13	-39,4
vertical	1.910,000	-20,44	0	-20,44	-13	-7,44
horizontal	1.910,000	-24,04	0	-24,04	-13	-11,04
vertical	7.623,000	-42,83	0	-42,83	-13	-29,83
horizontal	7.639,000	-42,25	0	-42,25	-13	-29,25
vertical	10.758,000	-38,02	0	-38,02	-13	-25,02
horizontal	10.709,000	-37,93	0	-37,93	-13	-24,93
vertical	17.904,000	-28,33	0	-28,33	-13	-15,33
horizontal	17.399,000	-27,97	0	-27,97	-13	-14,97
vertical	26,040	-34,85	0	-34,85	-13	-21,85
horizontal	25.955,000	-34,67	0	-34,67	-13	-21,67

See attached diagrams

Test equipment: ETS 0014, ETS 0294, ETS 0295, ETS 0310, ETS 0416, ETS 0484

3.7 Block edge compliance

Reference

	Cellular telephone 850 MHz	PCS 1900 MHz
FCC	CFR part 22.917(b)	CFR part 24.238(b)
IC	RSS-132 Issue 2, §4.5.1.1	RSS-133 Issue 3, §4.4

Method of measurement

In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter my be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth.

Limits

	Cellular telephone 850 MHz	PCS 1900 MHz
FCC	Pc - (43 + 10 log (P) dB)	Pc - (43 + 10 log (P) dB)
IC	Pc - (43 + 10 log (P) dB)	Pc - (43 + 10 log (P) dB)

Test results

	Frequency channel	RBW kHz	Worst case emission level dBm
Cellular telephone 850 MHz	128	3 kHz	32.51
	251	3 kHz	32.61
PCS 1900 MHz	512	3 kHz	29.52
	810	3 kHz	29.20

See attached diagrams.

Test equipment: ETS 0413, ETS 0416, ETS 0484

3.8 AC power line conducted emissions

Reference

	Cellular telephone 850 MHz	PCS 1900 MHz
FCC	CFR part 15.207	CFR part 15.207
IC	Not applicable	Not applicable

Method of measurement

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

Limits

	Cellular telephone 850 MHz	PCS 1900 MHz	
FCC	Frequency of emission [MHz]	Conducted limit field strength [dBµV] Quasi Peak	Average
	0.15 - 0.5	66 to 56	56 - 46
	0.5 - 5	56	46
	5 - 30	60	50
IC	Not applicable		

Test results

Frequency	Level	
	Quasi-peak	Average
150 kHz	Lower limit line	Lower limit line

Comment: See attached diagrams.

Test equipment: ETS 0059, ETS 0085, ETS 0288, ETS 0476

4 Receiver parameters

4.1 Radiated emissions

Reference

	Cellular telephone 850 MHz	PCS 1900 MHz
FCC	CFR part 15.109, 2.1053	CFR part 15.109, 2.1053
IC	RSS-132 Issue 2, 4.6 RSS-Gen Issue 1, §4.8	RSS-133 Issue 3, §4.5 RSS-Gen Issue 1, §4.8

Method of measurement

The receiver shall be operated in the normal receive mode near the mid-point of the band(s) over which the receiver is designed to operate.

The measurement method is the radiated emission measurement. The measurement starts at 30 MHz and ends at least 3 times the highest tunable local oscillator frequency (6 GHz).

Limits

	Cellular telephone 850 MHz	PCS 1900 MHz
FCC	Spurious frequency [MHz]	Field strength microvolt/m at 3 meters
	30 - 88	100
	88 - 216	150
	216 - 960	200
	above 960	500
IC	Not applicable	

Test Results

	Frequency marker indication [MHz]	Antenna polarization	Worst case emission level [dBm]	Compliance limit [dBm]	Results [dBm]
Cellular telephone 850 MHz	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--

	Frequency marker indication [MHz]	Antenna polarization	Worst case emission level [dBm]	Compliance limit [dBm]	Results [dBm]
PCS 1900 MHz	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--

Not required.

Test equipment: ETS 0014, ETS 0294, ETS 0295, ETS 0310, ETS 0416, ETS 0484

Appendix

A Pictures
B RF power output conducted
C RF power output radiated
D Occupied bandwidth, emission bandwidth
E Frequency stability
F Spurious emission conducted (antenna terminal)
G Spurious emission radiated
H Block edge compliance
I AC power line conducted emissions
J Receiver radiated emissions