



ELECTRONIC TECHNOLOGY SYSTEMS  
DR. GENZ GMBH

# TEST - REPORT

FCC RULES PART 15 / SUBPART C §15.249

FCC ID: T7VPAN8550

Test report no.:

G0M20605-0436-C-1



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 its 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:

09.05.2006

M. Handrik

*i.s. Handrik* 

Date

ETS-Lab.

Name

Signature

### Technical responsibility for area of testing:

09.05.2006

N.Kaspar

*N. Kaspar* 

Date

ETS

Name

Signature

## 1.2 Testing laboratory

### 1.2.1 Location

ELECTRONIC TECHNOLOGY SYSTEM DR. GENZ GMBH (ETS)  
Storkower Straße 38c  
D-15526 Reichenwalde b. Berlin  
Germany  
Telefon : +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

**DAR-REGISTRATION NUMBER:** BPT-ZE-026/96

**FCC FILED TEST LABORATORY REG. NO.** 96970

#### BLUETOOTH QUALIFICATION TEST FACILITY (BQTF)

Accredited by Bluetooth Qualification Review Board

**INDUSTRY CANADA FILED TEST LABORATORY REG. NO.** IC 3470

**A2LA ACCREDITED** Certificate Number 1983-01

## 1.3 Details of approval holder

Name : Panasonic Electronic Devices Europe GmbH  
Street : Zeppelinstr. 19  
Town : 21337 Lueneburg  
Country : Germany  
Telephone : +49.4131 899-304  
Fax : +49.4131 899-108  
  
Contact : Herr Heino Kaehler  
Telephone : +49.4131 899-304

## 1.4 Application details

Date of receipt of application : 02.05.2006  
Date of receipt of test item : 02.05.2006  
Date of test : 03.05.2006 – 04.05.2006

## 1.5 Test item

Description of test item : Z-Wave Module  
Type identification : EnW9xA01A3D8 (with antenna)  
Serial number : without  
Photos : See Appendix A

### Technical data

Frequency band : 908.42 MHz  
Frequency (ch 1) : 908.408 MHz  
Antenna : ceramic antenna  
Antenna type : -0.7 dBi  
Power supply : 3.0 V DC  
Operating mode : duplex  
Type of modulation : F3D

### Manufacturer: (if applicable)

Name : Panasonic Electronic Devices Europe GmbH  
Street : Zeppelinstr. 19  
Town : 21337 Lueneburg  
Country : Germany

## 1.6 Test standards

Technical standard: FCC RULES PART 15 / SUBPART C § 15.249

## 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

Details of power supply : Battery 3.0 V DC

Extrem conditions parameters: : test voltage - extreme min.: -- V  
max: -- V

Additional information : none

### 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 0007	Horn antenna	AT 4004	ar
ETS 0008	Antenna	Loop antenna	Siemens
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	Artificial mains	ESH3-Z4	R & S
ETS 0042	Artificial mains	ESH3-Z6	R & S

No.	Test equipment	Type	Manufacturer
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 0053	ECAT Control center	CE 40	Keytek/ EMC
ETS 0054	EFT simulator	E 412	Keytek/ EMC
ETS 0055	Module network coupler	E 4551	Keytek/ EMC
ETS 0056	Blank plug-in		Keytek/ EMC
ETS 0057	Module SURGE with DC coupler	E 501	Keytek/ EMC
ETS 0058	Capacitive coupling clamp	E 502 B	Keytek/ EMC
ETS 0059	Kikusui amplifier	PCR 2000L	Keytek/ EMC
ETS 0060	Xitron power analyzer		Keytek/ EMC
ETS 0061	Power/ Arb (Harm., Ramp)	EP 71	Keytek/ EMC
ETS 0062	Reference impedance		Keytek/ EMC
ETS 0063	Blank plug-in		Keytek/ EMC
ETS 0064	CDN IEC 61000-4-6		Keytek/ EMC
ETS 0065	ESD-generator minizap		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 Communication 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



No.	Test equipment	Type	Manufacturer
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 power synthesizer/ sweeper)	SMP 02 (SMP 22 / 02)	R & S
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 0133	EM coupling clamp	KEMZ-801	Schaffner
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	Aktive RF 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 0154			
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

No.	Test equipment	Type	Manufacturer
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
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

No.	Test equipment	Type	Manufacturer
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	Burst generator	EFT 200	EM-Test
ETS 0245	Load dump generator	LD 200	EM-Test
ETS 0246	Voltage drop simulator	VDS 200	EM-Test
ETS 0247	Micro Puls generator	MPG 200	EM-Test
ETS 0248	Switch unit	AN 200	EM-Test
ETS 0249	Coupling network	CNA 200	EM-Test
ETS 0250	Coupling clamp	ACC	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
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

No.	Test equipment	Type	Manufacturer
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
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	Holiday Ind., INC.
ETS 0329	VDT / VLF Radiation Measurement System	HI-3603	Holiday Ind., INC.
ETS 0330	Fiber Optic Remote Control	HI-3616	Holiday 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

No.	Test equipment	Type	Manufacturer
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
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

No.	Test equipment	Type	Manufacturer
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 Messenger	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 <sup>2</sup>	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
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-Network	ESH 3-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

No.	Test equipment	Type	Manufacturer
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 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 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

No.	Test equipment	Type	Manufacturer
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	Industrial Controller	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



## 2.4 General Test Procedure

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI STANDARD C63.4-2003 5.2 using a 50 $\mu$ H 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. The ambient temperature of the UUT was 25 °C with a humidity of 40 %.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB $\mu$ V) 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 dB $\mu$ V + 10.36 dB + 6 dB = 36.36 dB $\mu$ V/m @3m

**ANSI STANDARD C63.4-2003 6.2.1 MEASUREMENT PROCEDURES:** The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (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 10<sup>th</sup> harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings.

Measurements were made by ETS Dr. Genz GmbH 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 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

**ANTENNA & GROUND:**

The unit use a ceramic antenna.

### 3 Test results (enclosure)

TEST CASE	Required	Test passed	Test failed
Output Power (Field Strength) § 15.249(a)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions radiated - Transmitter operating § 15.249 (d)(e)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions conducted - Transmitter operating 15.249 (d)(e)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Out of Band Spurious Emission, Bandedge-Transmitter operating §15.249 (d)(e)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conducted Measurement at (AC) Power Line § 15.207	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

### 3.1 Output Power (Field Strength) FCC § 15.249 (a)

This measurement applies to equipment with an integral antenna and to equipment with an antenna connector and equipped with an antenna as declared by the applicant.

#### Limits:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 - 928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

The power was measured with modulation (declared by the applicant).

Test Conditions $T_{nom} = 25\text{ }^{\circ}\text{C}$ , $V_{nom} = 3.0\text{ V}$	Field strength of fundamental	Field strength of harmonics
Frequency [MHz]	[dB $\mu$ V/m]	
908.409	86.97	--
Measurement uncertainty	<3dB	

Test equipment used: ETS 0340

Remark: See attached diagrams.

### 3.1.2 De facto equivalent isotropic radiated power

Because using an permanent antenna there are no deviations from the radiated test results according 3.1.

### 3.1.3 Transmitter

At the transmitter the measurement was transacted with the modulation declared by the manufacturer and the maximum available output power of the EUT.

## 3.2 RF Exposure Compliance Requirements

Not applicable for this kind of device for the low power level.

## 3.3 Radiated Emissions; FCC § 15.249 (d)(e)

### 3.3.1 Out of Band Radiated Emissions

FCC Rule: 15.249(d)(e) , 15.35(b)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

For frequencies above 1000 MHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

#### Limits:

Frequency of Emission (MHz)	Field strength (microvolts/meter)	Field Strength (dB microvolts/meter)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

For frequencies above 1GHz (Peak measurements).

Limit + 20dB

$$54.0\text{dB}\mu\text{V/m} + 20\text{ dB} = 74\text{ dB}\mu\text{V/m} \quad \text{or}$$

$$46.0\text{dB}\mu\text{V/m} + 20\text{ dB} = 66\text{ dB}\mu\text{V/m}$$

Must be antenuatted at least 50dB below the level of fundamental emission

Test equipment used: ETS 0271

Remarks: See attached diagrams.

### 3.3.2 Spurious emissions (tx) FCC § 15.249(d)(e); 15.35(b)

Spurious emission was measured with modulation (declared by manufacturer).

SAMPLE CALCULATION OF LIMIT. All results will be updated by an automatic measuring system in accordance with point 2.3.

The peak and average spurious emission plots was measured with the average limits. The critical peak value listed in the table agree with the above calculated limits.

#### Summary table with radiated data of the test plots 920 MHz

Freq.	Frequency Marker [GHz]	Polarization	Max. Field Strength [dB $\mu$ V/m]	Compliance Limit [dB $\mu$ V/m]	Detector	BW [MHz]	Margin [dB]
3	1.818	H	41.42	54.00	P	1	-12.58
3	3.892	V	38.42	54.00	P	1	-15.58

Freq. – Frequency Range:

- 1: – 30 – 200 MHz
- 2: – 200 – 1000 MHz
- 3: – 1 – 4 GHz
- 4: – 4 – 8 GHz
- 5: – 8 – 12 GHz

**TEST RESULT (Transmitter):** The unit DOES meet the FCC requirements.

Test equipment used: ETS 0012; ETS 0013; ETS 0015; ETS 0018; ETS 0271; ETS 0253; ETS 0311

Remark: see attached diagrams

### **3.3.3 Radiated Emissions on the bandedge; FCC 15.249(d)(e), 5.35(b)**

From the following plots, they show that the fundamental emissions are confined in the specified band and they are at least 50 dB below the carrier level at band edge (902.0 and 928.0 MHz) or below the emission limits in section 15.209. It meets the requirement of section 15.249(d).

Test equipment used: ETS 0012; ETS 0013; ETS 0015;ETS 0018; ETS 0271;  
ETS 0253;ETS 0311

Remark: n.a.

### **3.4 Antenna requirement; FCC § 15.203**

In this arrangement the EUT fulfils the requirements of the FCC rules § 15.203 subpart c. This unit uses permanent antenna. There is no provision for an external antenna (see photo).

### 3.5 Conducted Measurement at (AC) Power Line; FCC § 15.207

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 in the table bellows 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.

Frequency	Level	
	quasi-peak	average
150kHz	lower limit line	lower limit line

#### Limits:

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi Peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Test equipment used: ETS 0288; ETS 0474

Remark: see attached diagrams.

## Appendix

- A Pictures
- B Fundamental Field Strength
- C Harmonics and Spurious Emissions radiated - Transmitter operating
- D Out of band Spurious Emissions, Bandedge - Transmitter operating
- E Conducted Measurement at (AC) Power Line