ELECTRONIC TECHNOLOGY SYSTEMS
DR. GENZ GMBH

TEST - REPORT

FCC RULES PARTS 15.247
IC RADIO STANDARDS RSS-210 Annex 8

FCC ID: BCE-A120
IC CN: 2386C-A120

Model Name: Jabra A120s

Test report no.: G0M20603-0298-P-15

Certificate 1983-01

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APPENDIX

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:

04.05.2006		J. Marquardt	i.s.
Date	ETS-Lab.	Name	Signature

Technical responsibility for area of testing:

04.05.2006		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
Telephone : +49 33631 888 00
Telefax : +49 33631 888 66

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

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	: GN Mobile A/S (Netcom A/S)
Street	: Metalbuen 66
Town	: DK-2750 Ballerup
Country	: Denmark
Telephone	: +45 7211 8686
Fax	: +45 7211 8689
Contact	: Mr. Jorn B. Rasmussen
E-Mail	: +45 7211 8686

1.4 Application details

Date of receipt of application : 13.03.2006
Date of receipt of test item : 13.03.2006
Date of test : 04.05.2006

1.5 Test item

Description of test item : Bluetooth music adapter

Type identification : Jabra A120s

Serial number : without

Photos : See annex A.

Technical data

Frequency band : 2.4 - 2.4835 GHz

Frequency Ch A : 2402 MHz

Frequency Ch B : 2441 MHz

Frequency Ch C : 2480 MHz

Transmitter	**Vnom**
Power (ch A)	: Conducted: 4.91 dBm
Power (ch B)	: Conducted: 5.06 dBm
Power (ch C)	: Conducted: 4.71 dBm

Antenna Type : internal antenna

Antenna Gain : 0 dBi

Power supply : 3.7 V DC

Operating mode : duplex

Type of modulation : FHSS

Emission : -

Host device : none

Classification :

Fixed Device	☐
Mobile Device (Human Body distance > 20 cm)	☐
Portable Device (Human Body distance < 20 cm)	☒

Manufacturer:
(if applicable)

Name : WKK Technology Ltd
Street : 33 WKK Road, Tutang, Changping
Town : Dongguan Guangdong Province
Country : PRC

Additional information: The test sample is designed as Bluetooth device. Its pseudorandom hopping scheme, authentication, receiver parameters, synchronization procedure and other parameters are determined by Bluetooth Core Specification.

1.6 Test standards

Technical standard:	FCC Parts:	15.247
	IC Standards:	RSS 210 Issue 6 Annex 8.1

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	Spectrum- and Network-Analyzer	FSM 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	Antenna	HL 025	R & S
ETS 0015	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
ETS 0043	Directional Coupler	1850	KRYTAR
ETS 0046	Power supply	2224.7	Statron

No.	Test equipment	Type	Manufacturer
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 1000-4-6		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 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

No.	Test equipment	Type	Manufacturer
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	Protocol tester	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	Active 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
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

No.	Test equipment	Type	Manufacturer
ETS 0166	Sound level calibrator	BK 4231	R & S
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 Step 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

No.	Test equipment	Type	Manufacturer
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 Pulse 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 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
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

No.	Test equipment	Type	Manufacturer
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	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 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	Temperature / humidity logger	OPUS10 THI	LUFFT
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

No.	Test equipment	Type	Manufacturer
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
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

No.	Test equipment	Type	Manufacturer
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
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
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

No.	Test equipment	Type	Manufacturer
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-antenna)	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
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	Protocol Tester	PTW60	R & S
ETS 0494	Switching unit	SSCU	R & S
ETS 0495	RF Step Attenuator	RSP	R & S

No.	Test equipment	Type	Manufacturer
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	HL025	R & S

2.4 General test procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 5.2 using a 50µH 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 @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 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 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 1 m to 4 m. The antenna was placed in both the horizontal and vertical planes.

RF Exposure Compliance Requirements
According to FCC OET Bulletin 65 Edition 97-01 Supplement C and RSS-102 § 2.5, this spread spectrum transmitter is categorically excluded from routine environmental evaluation because of the low power level, where there is a high likelihood of compliance with RF exposure standards.
The antenna used for this transceiver must not be co-located or operating in conjunction with any other antenna or transmitter.

ANTENNA & GROUND:
This unit uses internal antennas.

2.5 Test results

☒ 1st test ☐ test after modification ☐ production test

SECT.	TEST CASE	FCC 47CFR PART	IC RSS-	Required	Test passed	Test failed
3	*TRANSMITTER PARAMETERS*					
3.1	RF power output conducted	15.247 (b)	210 A8.4	☒	☒	☐
3.2	RF power output radiated (EIRP)	15.247 (b)	210 A8.4	☐	☐	☐
3.3	20dB bandwidth	15.247 (a)(1)	210 A8.1	☒	☒	☐
3.4	Time of occupancy (dwell time)	15.247 (a)(1)	210 A8.1	☒	☒	☐
3.5	Number of hopping channels	15.247 (a)(1)	210 A8.1	☒	☒	☐
3.6	Carrier frequency separation	15.247 (a)(1)	210 A8.1	☒	☒	☐
3.7	Spurious emission conducted	15.247 (d)	210 A8.5	☐	☐	☐
3.8	Spurious emission radiated	15.247 (d)	210 A8.5	☒	☒	☐
3.9	Band-edge compliance	15.247 (d)	210 A8.5	☒	☒	☐
3.10	AC power line conducted emissions	15.207	Gen 7.2.2	☒	☒	☐
4	*RECEIVER PARAMETERS*					
4.1	Radiated emissions	15.107	Gen 7.2.3	☒	☒	☐

3 Transmitter parameters

3.1 RF power output, conducted

Reference

FCC	47 CFR part 15.247 (b)
IC	RSS-210 A 8.4

Method of measurement

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.

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

Limits

Frequency band	FCC and IC
5725 - 5850 MHz	1 Watt (30 dBm) for systems with ≥ 75 hopping channels
2400 - 2483.5 MHz	1 Watt (30 dBm) for systems with ≥ 75 non - overlapping hopping channels 0.125 Watt (21 dBm) for all other hopping systems, but at least 15 hopping channels
902 - 928 MHz	1 Watt (30 dBm) for systems with ≥ 50 hopping channels 0.25 Watt (24 dBm) for all other hopping systems, but at least 25 hopping channels

Test results

Test conditions	Channel A	Channel B	Channel C
	[dBm]	[dBm]	[dBm]
T_{nom} = 25 ° C V_{nom} = 3.7 V	4.91	5.06	4.71
Measurement uncertainty	< 3 dB		

See attached diagrams

Test equipment: ETS 0253, ETS 0271

3.2 RF power output, radiated

Reference

FCC	47 CFR part 15.247 (b)
IC	RSS-210 A8.4

Method of measurement

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.

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

Limits

Frequency band	FCC and IC
5725 - 5850 MHz	4 Watt (36 dBm) for systems with ≥ 75 hopping channels.
2400 - 2483.5 MHz	4 Watt (36 dBm) for systems with ≥ 75 non – overlapping hopping channels 0.631 Watt (28 dBm) for all other hopping systems, but at least 15 hopping channels
902 - 928 MHz	4 Watt (36 dBm) for systems with ≥ 50 hopping channels 1.585 Watt (32 dBm) for all other hopping systems, but at least 25 hopping channels
FCC	The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
IC	Systems in the 2400 - 2483.5 MHz and 5725 - 5850 MHz which have an e.i.r.p. above 4 W are permitted only for point-to-point systems (i.e. point-to-multipoint systems and multiple co-located transmitters transmitting the same information are prohibited from exceeding 4 W e.i.r.p.). Point-to-point systems in these two bands may use higher e.i.r.p. as necessary for satisfactory operation provided that the higher e.i.r.p. is achieved by employing higher gain directional antennas and not higher transmitter output powers. However, remote stations of point-to-multipoint systems shall be allowed to operate under the same condition as point-to-point systems.

Test Results

Test conditions	Channel A	Channel B	Channel C
	EIRP [dBm]	EIRP [dBm]	EIRP [dBm]
T_{nom} = 25 ° C V_{nom} = 3.7 V	--	--	--
Measurement uncertainty	< 3 dB		

Test equipment: ETS 0012, ETS, 0013, ETS, 0015, ETS 0018, ETS 0253, ETS 0271, ETS 0311

3.3 20 dB bandwidth

Reference

FCC	CFR part 15.247 (a)(1)
IC	RSS-210 A8.1

Method of measurement

The 20 dB bandwidth is measured on the lowest, middle and highest hopping channel.
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400 - 2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Limits

Frequency band	FCC and IC
5725 - 5850 MHz	≤ 1 MHz
2400 - 2483.5 MHz	≤ carrier frequencies separation for hopping systems with max cond. power of 1 Watt ≤ 1.5 of the carrier frequencies separation for hopping systems with max cond. power of 0.125 Watt
902 - 928 MHz	< 250kHz for systems with ≥ 50 hopping channels 250kHz ≤ 500kHz for all other hopping systems

Test results

Test conditions	Channel A	Channel B	Channel C
	kHz	kHz	kHz
T_{nom} = 25 ° C V_{nom} = 3.7 V	874.35897	877.88461	877.88461
Measurement uncertainty	< 10 Hz		

System receiver input bandwidth:
The manufacturer declares that the receiver input bandwidth matches to the bandwidth of the transmitter signal.

See attached diagrams
Test equipment: ETS 0271

3.4 Time of occupancy (dwell time)

Reference

FCC	CFR part 15.247 (a)(1)
IC	RSS-210 A8.1

Method of measurement

The EUT has its hopping function enabled.
Spectrum analyzer settings:
Span: zero span, centered on hopping channel
RBW: 1 MHz
VBW: > RBW
Sweep: as necessary to capture the entire dwell time per hopping channel
Detector: peak
Trace: max hold

Limits

Frequency band	FCC and IC
5725 - 5850 MHz	≤ 0,4 s at measurement period of 30 seconds
2400 - 2483.5 MHz	≤ 0.4 s multiplied by the number of hopping channels employed
902 - 928 MHz	≤ 0,4 s at measurement period of 20 seconds for max 250 kHz 20 dB BW allowed ≤ 0,4 s at measurement period of 10 seconds for max 500 kHz 20 dB BW allowed

Test results

Test conditions	Operating mode	Measurement period	Time of occupancy
		[s]	[ms]
T_{nom} = 25 ° C V_{nom} = 3.7 V	normal transmitting	31,6	184.26
	inquiry mode	12.8	40.05
Measurement uncertainty	< 1 µs		

Test equipment: ETS 0271

3.5 Number of hopping channels

Reference

FCC	CFR part 15.247 (a)(1)
IC	RSS-210 A8.1

Method of measurement

According to FCC rules part 15 subpart C §15.247 frequency hopping systems operating in the 2400 - 2483.5 MHz and 5725 - 5850 MHz bands shall use at least 75 hopping frequencies.
According to FCC 00-312 appendix B systems in the 2400 - 2483,5 MHz band may utilize hopping channels whose 20 dB bandwidth is greater than 1 MHz provide the systems use at least 15 non-overlapping channels.

Limits

Frequency band	FCC and IC
5725 - 5850 MHz	≥ 75 hopping channels
2400 - 2483.5 MHz	≥ 75 hopping channels for > 0.125 Watt ≥ 15 hopping channels for ≤ 0.125 Watt
902 - 928 MHz	≥ 50 hopping channels for > 0.25 Watt ≥ 25 hopping channels for ≤ 0.25 Watt

Test results

Test conditions	Operating mode	Number of channel
T_{nom} = 25 ° C V_{nom} = 3.7 V	Normal transmitting	79
	Inquiry mode	32

See attached diagrams

Test equipment: ETS 0271

3.6 Carrier frequency separation

Reference

FCC	CFR part 15.247 (a)(1)
IC	RSS-210 A8.1

Method of measurement

Carrier frequency separation was measured with modulation (declared by manufacturer)

Limits

Frequency band	FCC and IC
5725 - 5850 MHz	minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater, but ≤ 1 MHz
2400 - 2483.5 MHz	minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater minimum of 25 kHz or 2/3 of the 20 dB bandwidth of the hopping channel, whichever is greater, for Pout ≤ 0.125 W
902 - 928 MHz	minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater

Test results

Test conditions	Channel B	Channel Separation
	[GHz]	[kHz]
T_{nom} = 25 ° C V_{nom} = 3.7 V	2.441	1004.807692
Measurement uncertainty	< 10 Hz	

See attached diagram

Test equipment: ETS 0271

3.7 Spurious emission conducted

Reference

FCC	CFR part 15.247 (d)
IC	RSS-210 A8.5

Method of measurement

The EUT is connected to the spectrum analyzer via a low loss cable. If the EUT is not equipped with and antenna connector, a temporary antenna connector has to be installed. The EUT is switched on, the hopping function is disabled.
The analyzer setting was as following:

Frequency range	RES bandwidth		Video bandwidth	
	Pk	Avg	Pk	Avg
f < 1 GHz	100 kHz	100 kHz	100 kHz	100 kHz
f > 1 GHz	1 MHz	1 MHz	1 MHz	1 MHz

Limits

FCC	20 dB below peak output power
IC	20 dB below peak output power

Test results

Frequency	**Result [dBm]**	**Limit [dBm]**	**Margin [dB]**	**Reference level [dBm]**
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--

3.8 Spurious emission radiated

Reference

FCC	CFR part 15.247(d), 15.205. 15.209, 15.35
IC	RSS-210 A8.5, RSS-210 2.7

Method of measurement

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

According to 47 CFR 15, Part 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.
In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Calculation of Limit:

All results are updated by an automatic measuring system in accordance to point 2.3

Limit = max. reading (because peak detector is used)
98.09 dBµV/m

Limit = Max. reading - 20 dB (because average detector is used)
98.09 dBµV/m - 20 dB = 78.09 dBµV/m

Limits for restricted bands

FCC & IC	20 dB below peak output power, emissions which fall in the restricted bands (15.205(a)) / (RSS-210 2.7) must comply the following limits: Frequencies below 1GHz:		
	Frequency of emission	Field strength	Field strength
	[MHz]	[µV / m]	[dBµV / m]
	30 - 88	100	40.0
	88 - 216	150	43.5
	216 - 960	200	46.0
	Above 960	500	54.0
	For frequencies above 1 GHz (Avg measurements): 54.0 dBµV / m For frequencies above 1 GHz (Pk measurements): Limit + 20 dB = 54.0 dBµV / m + 20 dB = 74 dBµV / m		

Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results.

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.

If in the column‘s correction factor states a value then the max. Field strength in the same row is corrected by a value gained from the “Marker-Delta-Method“ or the „Duty-Cycle Correction Factor“.

15.35 (c) Duty cycle correction **average value**

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

Duty cycle correction = 20 log (dwell time / 100 ms or less)

DA 00-705 Duty cycle correction **peak value**

The analyzer setting was as following:

Frequency range	RES bandwidth		Video bandwidth	
	Pk	Avg	Pk	Avg
f < 1GHz	100 kHz	100 kHz	10 Hz	10 Hz
f > 1GHz	1 MHz	1 MHz	10 Hz	10 Hz

Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20 log (dwell time / 100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

Test results

Summary table with radiated data of the test plots

Freq.	**Used Ch.**	**Frequency Marker [GHz]**	**Polari-zation**	**Δ corrections dB**	**Max. Field Strength [dBµV/m]**	**Complian ce Limit [dBµV/m]**	**Detec-tor**	BW **[MHz]**	**Margin [dB]**
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

Freq. – Frequency Range:

1: 30 – 200 MHz
2: 200 – 1000 MHz
3: 1 – 4 GHz
4: 4 – 8 GHz
5: 8 – 12 GHz
6: 12 – 17 GHz
7: 17 – 26,5 GHz

All other not noted test plots do not contain significant test results in relation to the limits.

See attached diagrams. No emissions near by limit have been found.

Test equipment: ETS 0012, ETS 0013, ETS 0015, ETS 0018, ETS 0271, ETS 0253, ETS 0311

3.9 Band edge compliance

Reference

FCC	CFR part 15.247 (d)
IC	RSS-210 A8.5

Method of measurement

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Limits

FCC	20 dB below peak output power
IC	20 dB below peak output power

Test results

Test conditions	**Single frequency (hopping disabled)**	
	Lower band-edge	Upper band-edge
T_{nom} = 25 ° C V_{nom} = 3.7 V	47.20 dB	47.91 dB
Measurement uncertainty	< 100 Hz	

Test conditions	**Hopping frequency (hopping enabled)**	
	Lower band-edge	Upper band-edge
T_{nom} = 25 ° C V_{nom} = 3.7 V	49.89 dB	48.97 dB
Measurement uncertainty	< 100 Hz	

See attached diagrams
Test equipment: ETS 0271

3.10 AC power line conducted emissions

Reference

FCC	CFR part 15.207
IC	RSS-Gen 7.2.2

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

	Frequency of emission	Conducted limit field strength [dBµV]	
	[MHz]	Quasi Peak	Avg
FCC & IC	0.15 - 0.5	66 to 56	56 - 46
	0.5 - 5	56	46
	5 - 30	60	50

Test results

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

See attached diagrams

Test equipment: ETS 0288, ETS 0474

4 Receiver parameters

4.1 Radiated emissions

Reference

FCC	Part 15.109
IC	RSS-Gen 7.2.3

Method of measurement

The compliance of the EUT Receiver with the Limits of spurious emissions was performed according to the radiated measurement method.

The spectrum analyzer RBW was set to 100 kHz for measurements below 100 kHz and 1.0 MHz above 1.0 GHz. The measurement results are evaluated according to the procedure described in section 2.4 of this test report.

Limits

	Spurious frequency	Field strength
	MHz	microvolt/m at 3 meter
FCC & IC	30 - 88	100
	88 - 216	150
	216 - 960	200
	above 960	500

Test Results

The below values are calculated from measurements conform to EN 300 328

Device Frequency 2402 MHz	Frequency marker indication [MHz]	Antenna polarization	Worst case emission level [µV/m]	Compliance limit [µV/m]	Results [µV/M]
	1.601	horizontal	224.11	500	-275.89
	1.601	Vertical	136.92	500	-363.08

Device Frequency 2480 MHz	Frequency marker indication [MHz]	Antenna polarization	Worst case emission level [µV/m]	Compliance limit [µV/m]	Results [µV/M]
	1.649	horizontal	236.84	500	-236.16
	1.649	Vertical	116.79	500	-383.21

See attached diagrams

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 (EIRP)
D 20dB bandwidth
E Time of occupancy (dwell time)
F Number of hopping frequencies
G Carrier frequency separation
H Spurious emission conducted
I Spurious emission radiated
J Band-edge compliance
K AC power line conducted emissions
L Receiver radiated emissions