TEST REPORT

of the accredited test laboratory

TÜV Nr.:M/FG-02/102

Geschäftsbereich
Medizintechnik,
Nachrichtentechnik
und EMV

Prüfstelle für
Nachrichtentechnik
und EMV

Prüfzentrum Wien
A - 1230 Wien
Deutschstraße 10

Tel: +43-1-61091-0
Fax.: DW 6505
Mail: office@tuev.or.at

Akkreditierte Prüf-,
Überwachungs-,
Zertifizierungs- und
Kalibrierstelle

Notified Body 0408

Applicant:	Siemens AG Österreich Erdberger Lände 26 A-1030 Wien		
Tested Product:	Bluetooth LAN Access Point		
Type:	blue2net		
Manufacturer:	Siemens AG Österreich A-1030 Wien; Erdberger Lände 26		
Output power / field strength:	0 dBm nom. 4 dBm max. according to bluetooth power class 2	power supply:	4,4 VDC
Frequency range:	2400 – 2483,5 MHz	Channel separation:	1 MHz
Standard:	FCC: 47 CFR 15.247		

TÜV Österreich
Test laboratory for EMC

Deputy supervisor of EMC-laboratory:

Rundsiegel

checked by:

Ing. Wilhelm Seier 20. 2. 2002 Ing. Klaus Rötsch

Copy Nbr.: ____

The results of this test report only refer to the provided equipment.

DVR 0047 333
UID ATU 37086005

Ambient temperature: 22°C Relative humidity: 58%

LIST OF MEASUREMENTS

The complete list of measurements called for in 47 CFR 15.247 is given below.

Ambient temperature: 22°C Relative humidity: 58%

TEST OBJECT DATA

General EUT Description

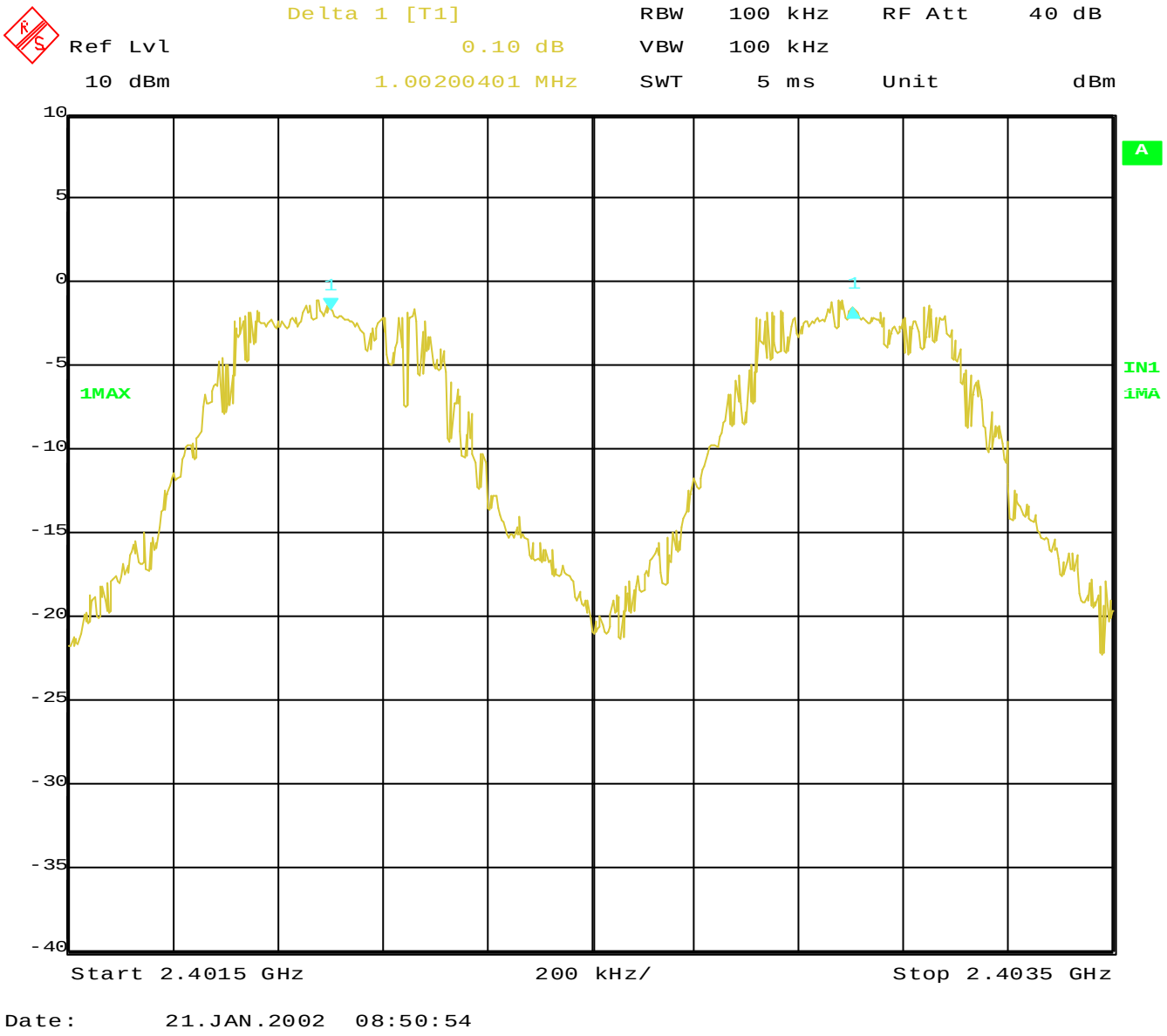
Bluetooth is a short-range radio link intended to be a cable replacement between portable and/or fixed electronic devices.

Bluetooth operates in the unlicensed ISM Band at 2,4 GHz. in the US a band of 83,5 MHz width is available. In this band, 79 RF channels spaced 1 MHz apart are defined. The channel is represented by a pseudo-random hopping sequence through the 79 channels. The channel is devided into time slots, with a nominal slot length of 625µs, where each slot corresponds to different RF hop frequencies. The nominal hop rate is 1600 hops/s. All frequencies are equally used. The average time of occupancy is 0,3797 s within a 30 second period. The symbol rate on the channel is 1 Ms/s.

The most parameters were measured conducted (on a test board), while the radiated emissions were measured with the blue2net Bluetooth LAN Access Point.

Ambient temperature: 22°C Relative humidity: 58%

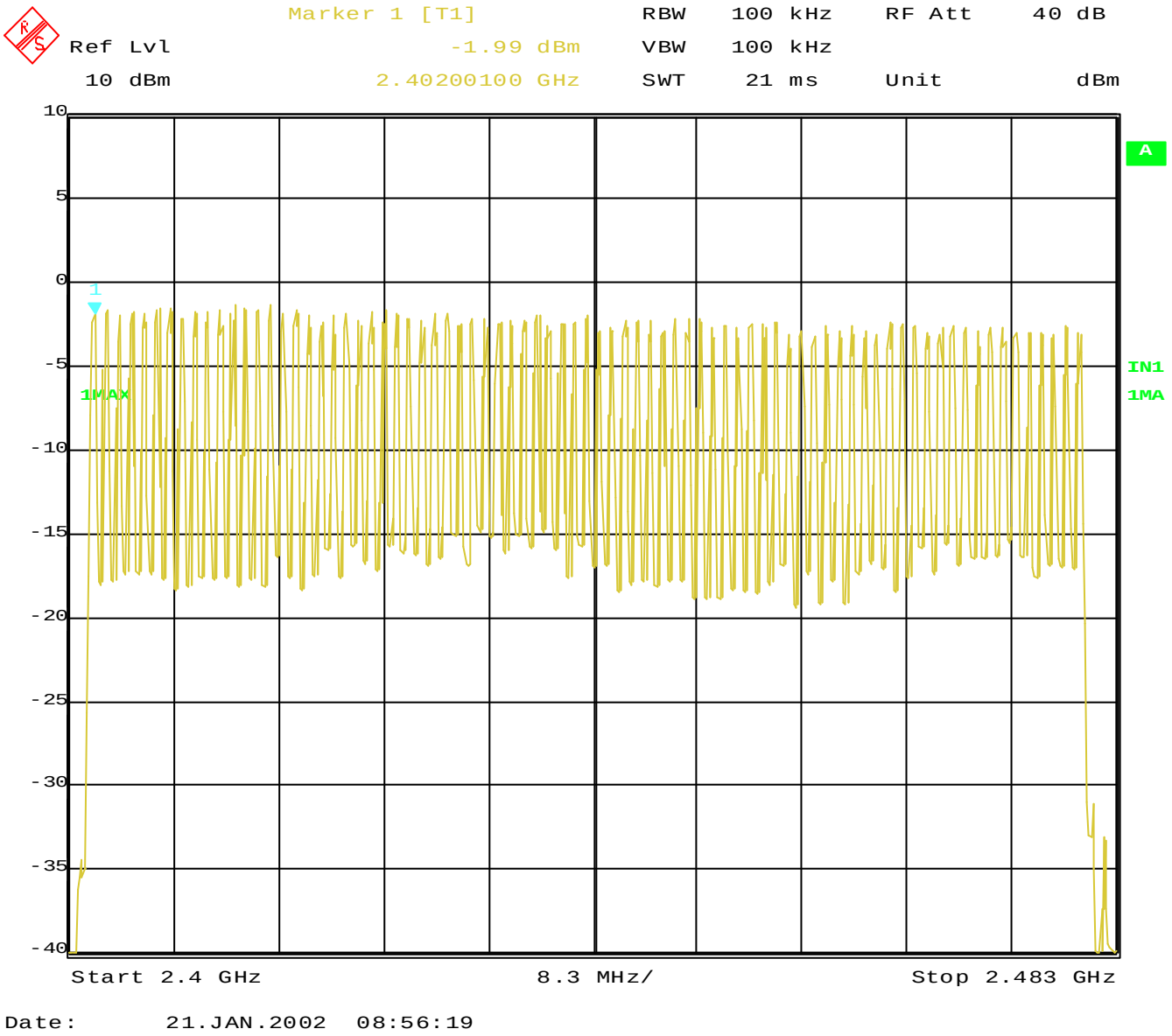
CHANNEL CARRIER FREQUENCY § 15.247/a



The channel separation is defined as 1 MHz in bluetooth specifications.

Ambient temperature: 22°C Relative humidity: 58%

NUMBER OF HOPPING CHANNELS § 15.247/a

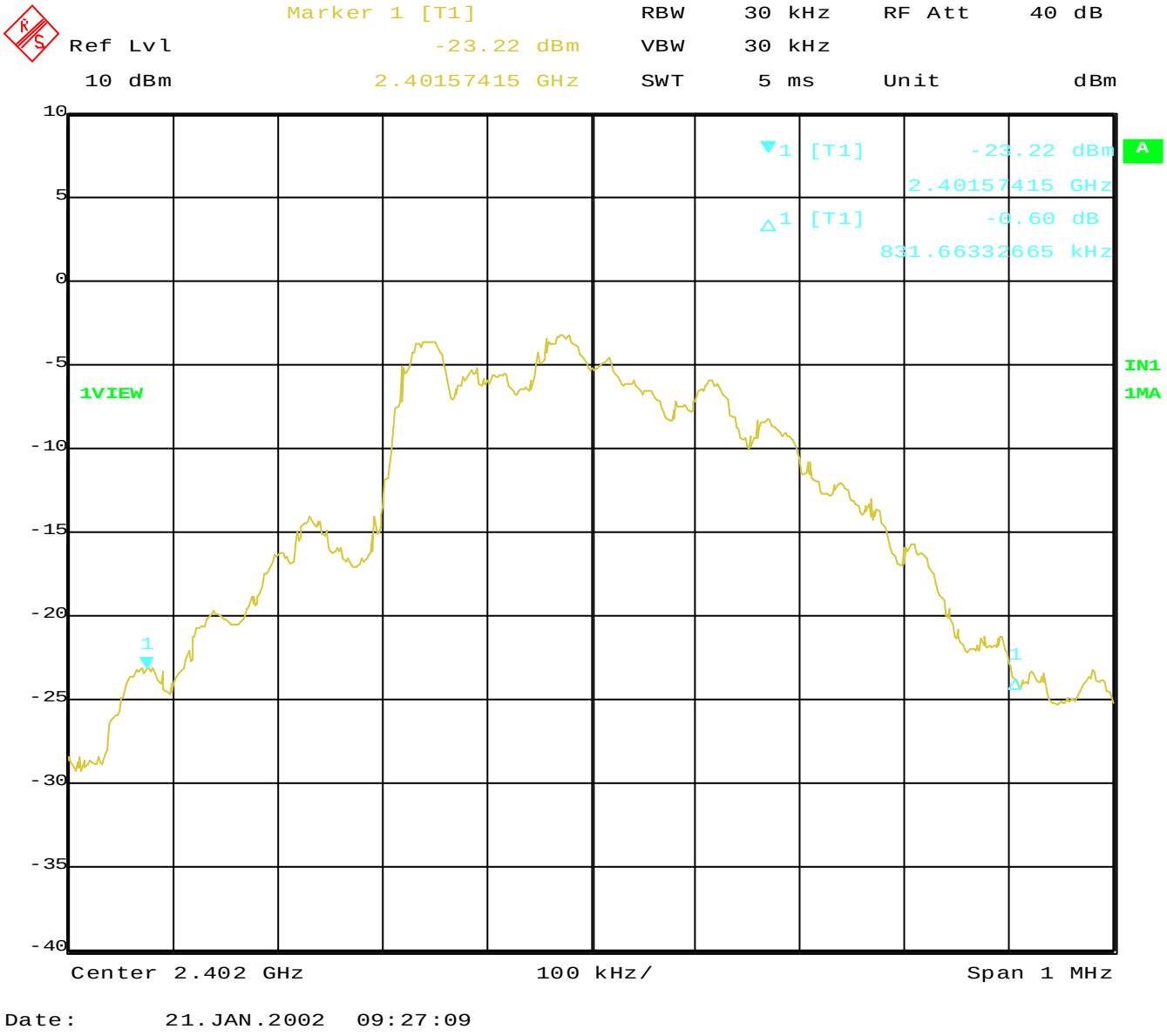


The number of hopping channels is defined as 79 in bluetooth specifications.

Ambient temperature: 22°C Relative humidity: 58%

20 dB BANDWIDTH § 15.247/a

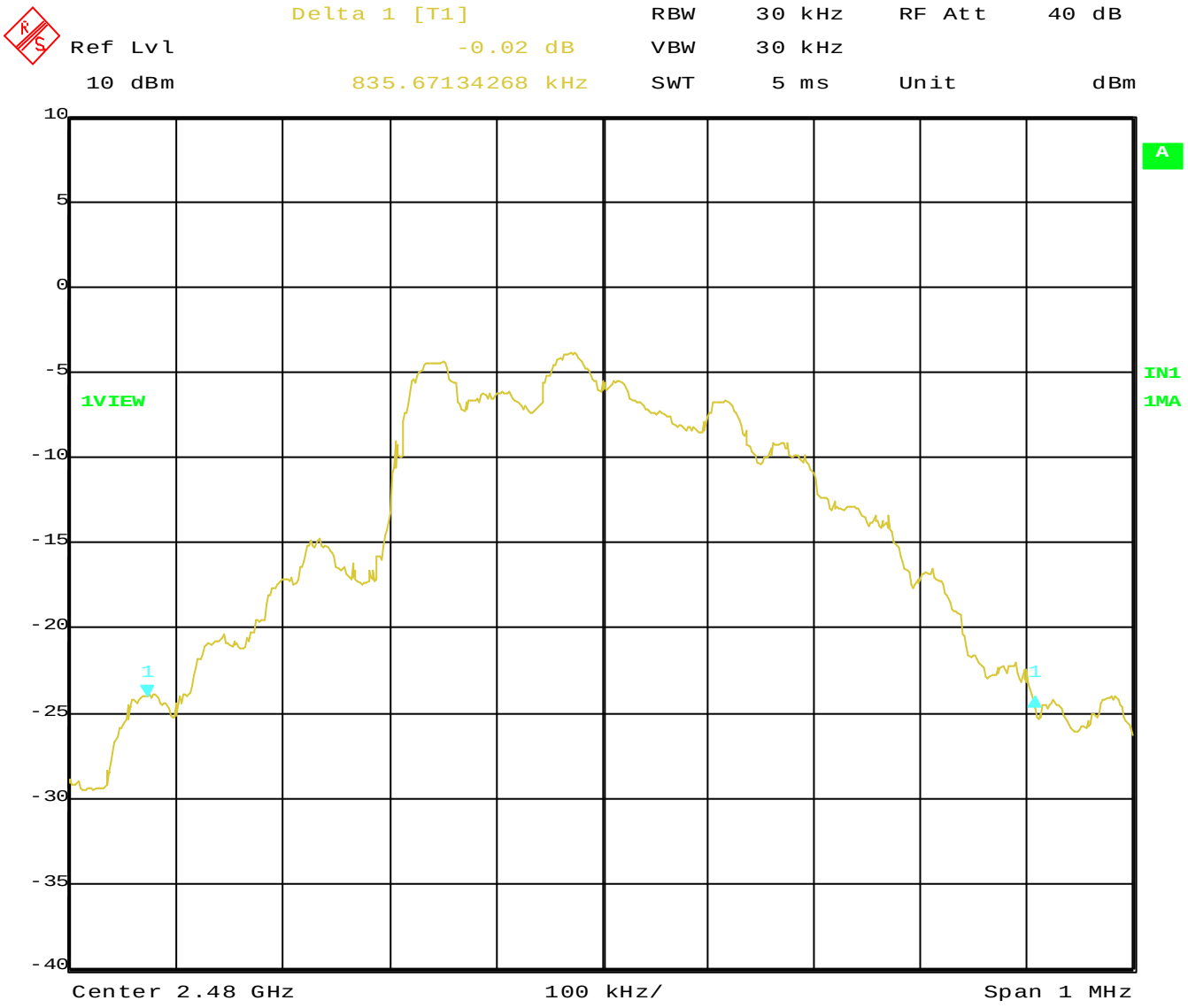
Measurements were made on the lowest and highest hopping channel frequency (channel 0; 2402 MHz and channel 78; 2480 MHz) with hopping disabled.
The measurements were carried out in 3 operating modes:
1. Data TX, mode DH1 (2 timeslots, one used)
2. Data TX, mode DH3 (4 timeslots, three used)
3. Data TX, mode DH5 (6 timeslots, five used)



channel 0, mode DH1 Bandwidth: 831,66 kHz

Ambient temperature: 22°C Relative humidity: 58%

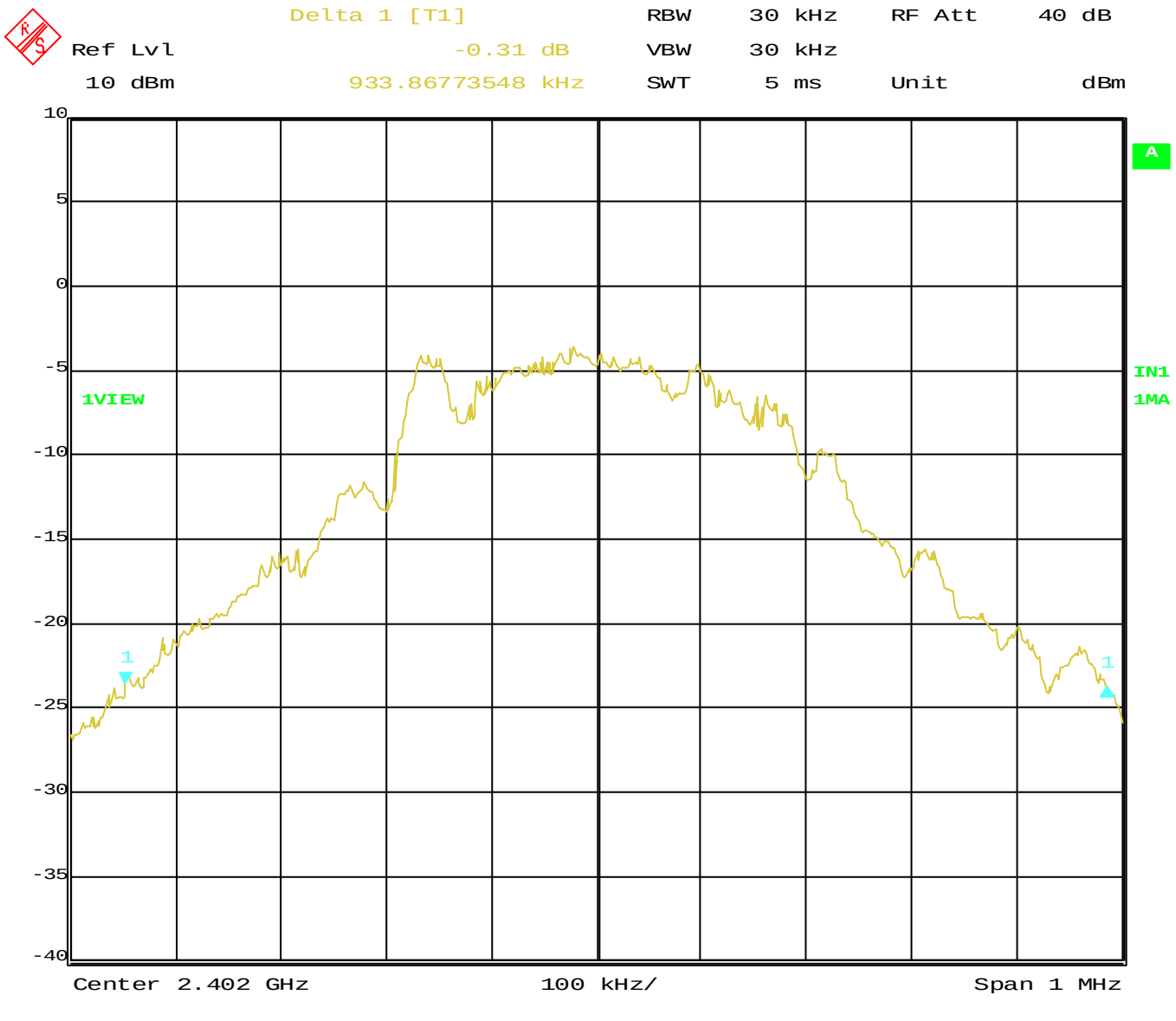
20 dB BANDWIDTH § 15.247/a



channel 78, mode DH1 Bandwidth: 835,67 kHz

Ambient temperature: 22°C Relative humidity: 58%

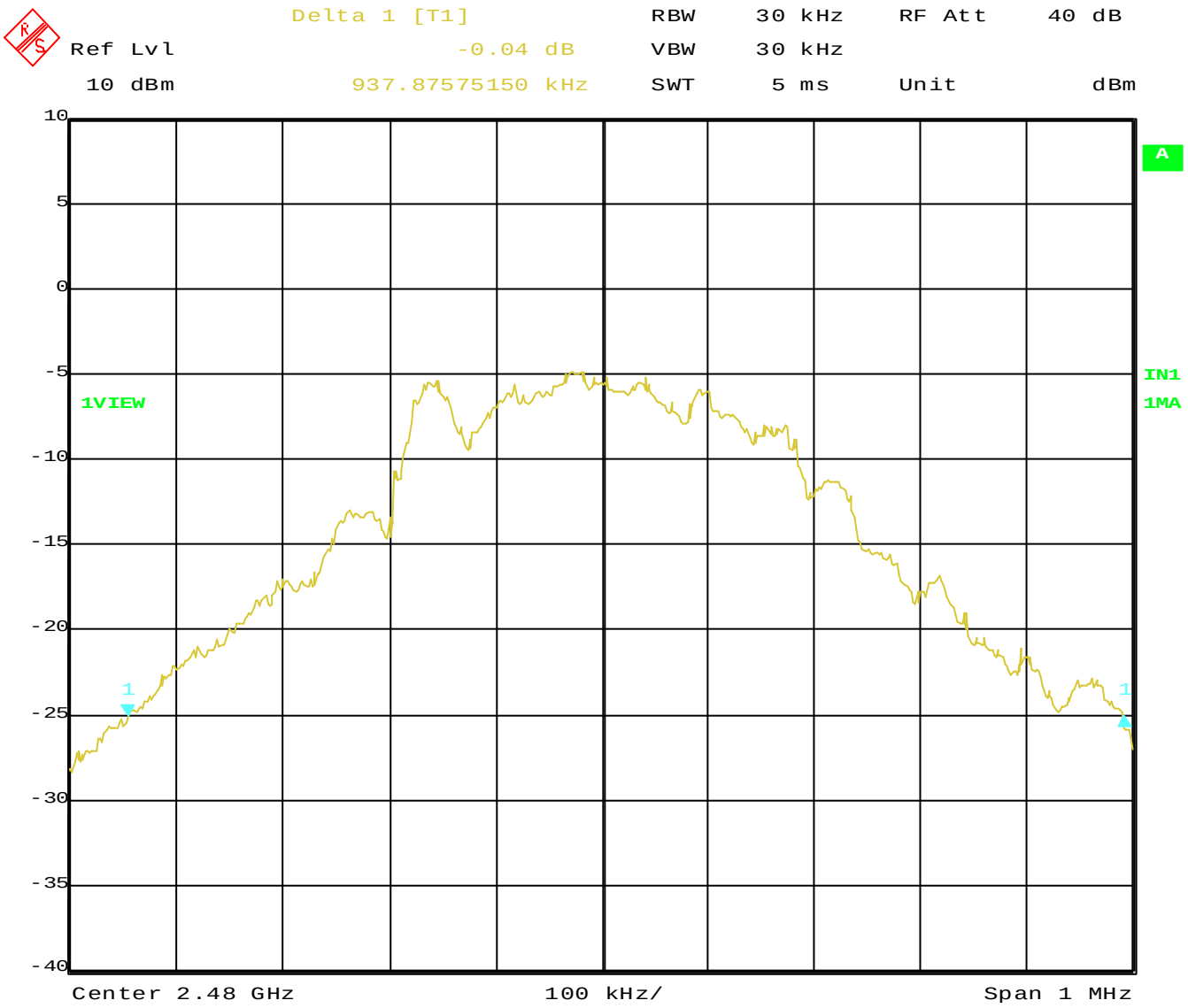
20 dB BANDWIDTH § 15.247/a



channel 0, mode DH3 Bandwidth: 933,87 kHz

Ambient temperature: 22°C Relative humidity: 58%

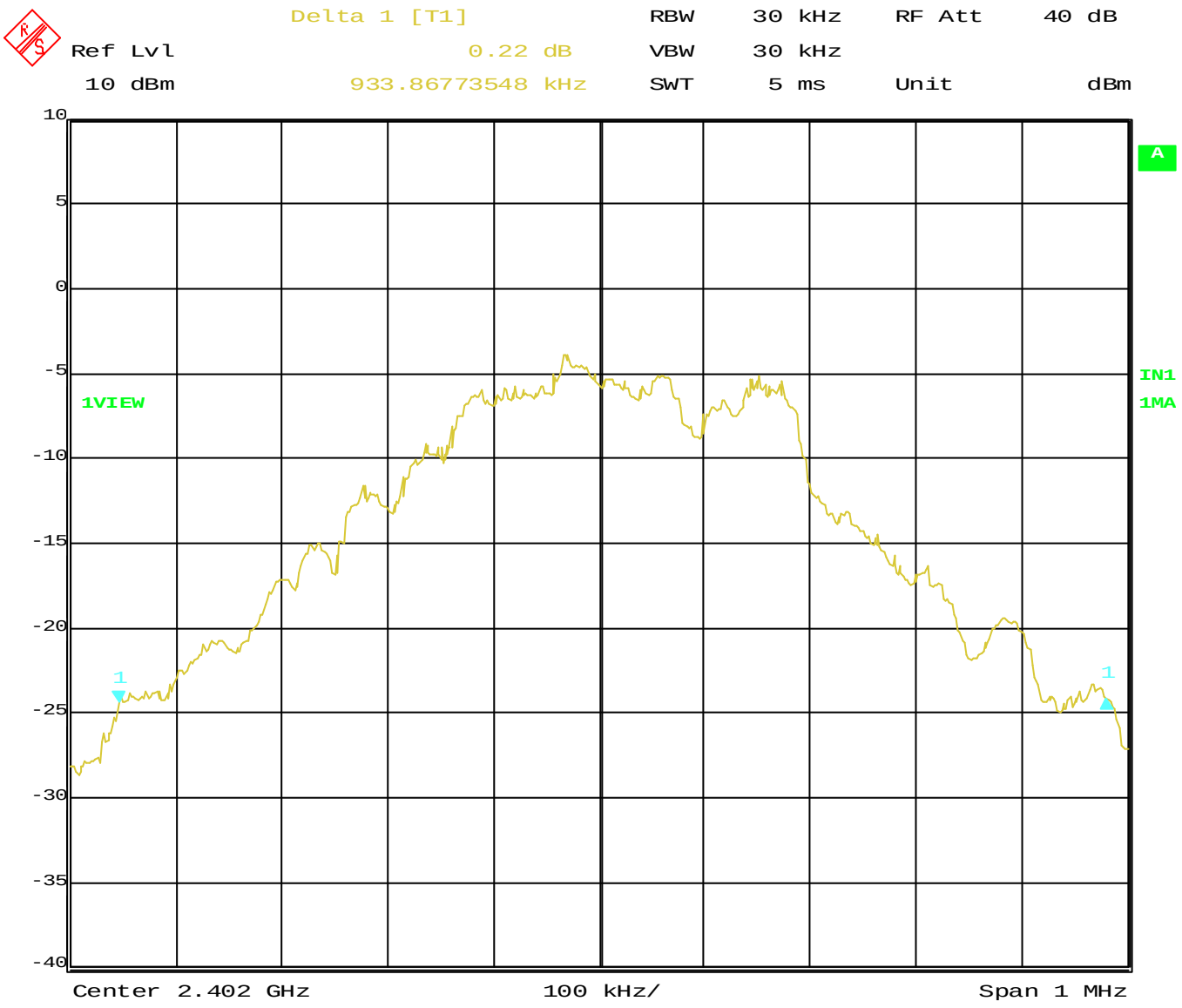
20 dB BANDWIDTH § 15.247/a



channel 78, mode DH3 Bandwidth: 937,88 kHz

Ambient temperature: 22°C Relative humidity: 58%

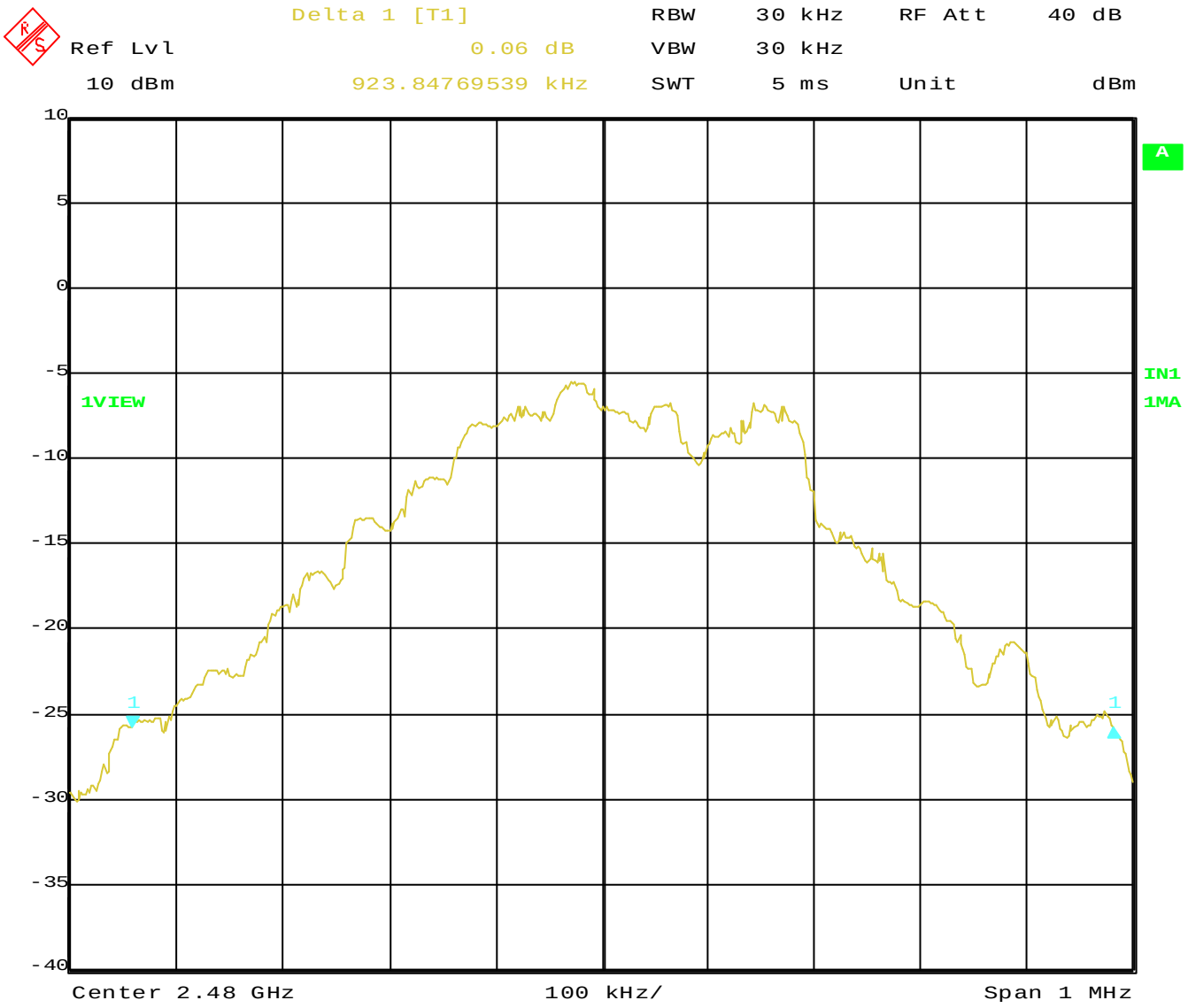
20 dB BANDWIDTH § 15.247/a



channel 0, mode DH5 Bandwidth: 933,87 kHz

Ambient temperature: 22°C Relative humidity: 58%

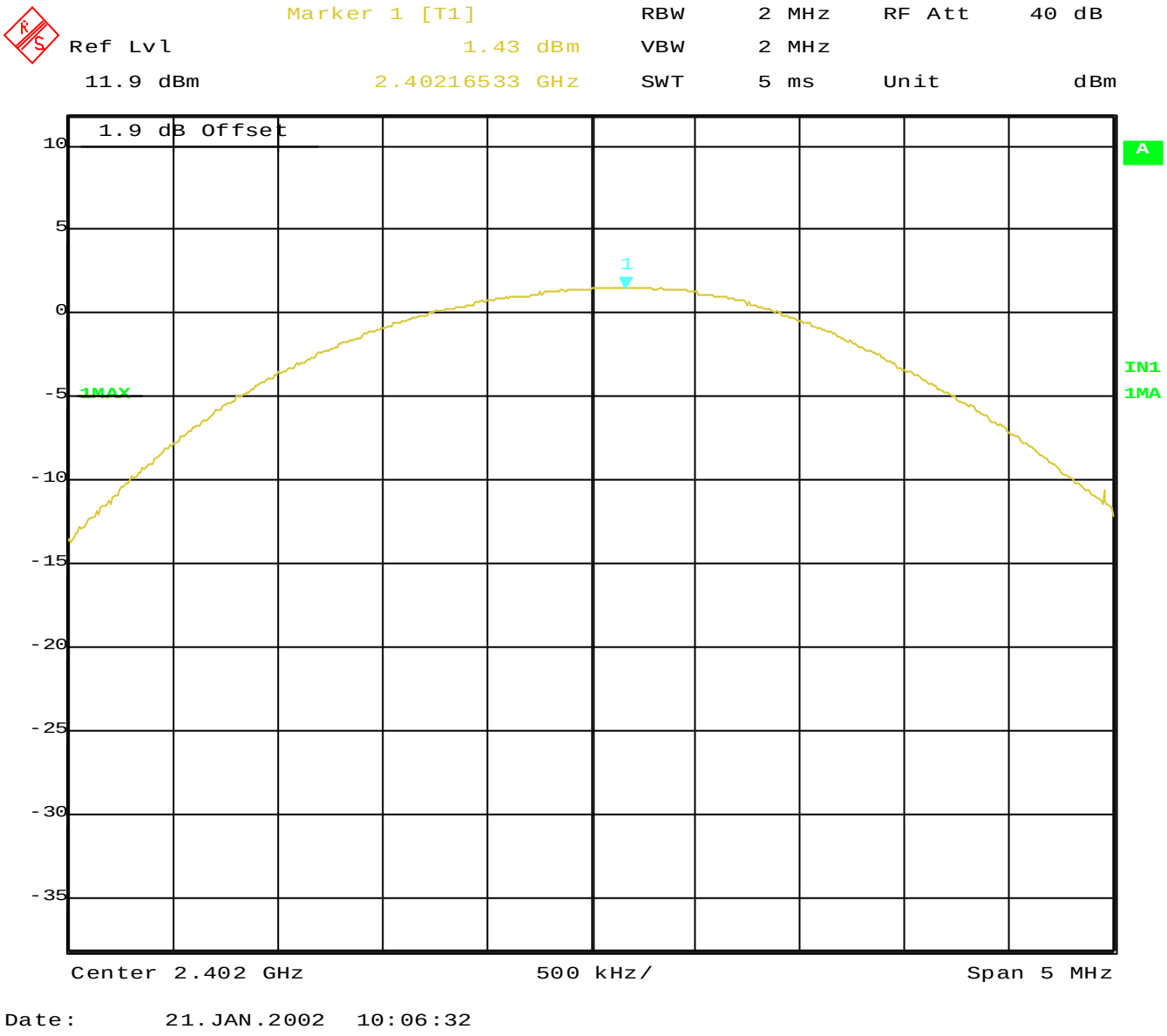
20 dB BANDWIDTH § 15.247/a



channel 78, mode DH5 Bandwidth: 923,85 kHz

Ambient temperature: 22°C Relative humidity: 58%

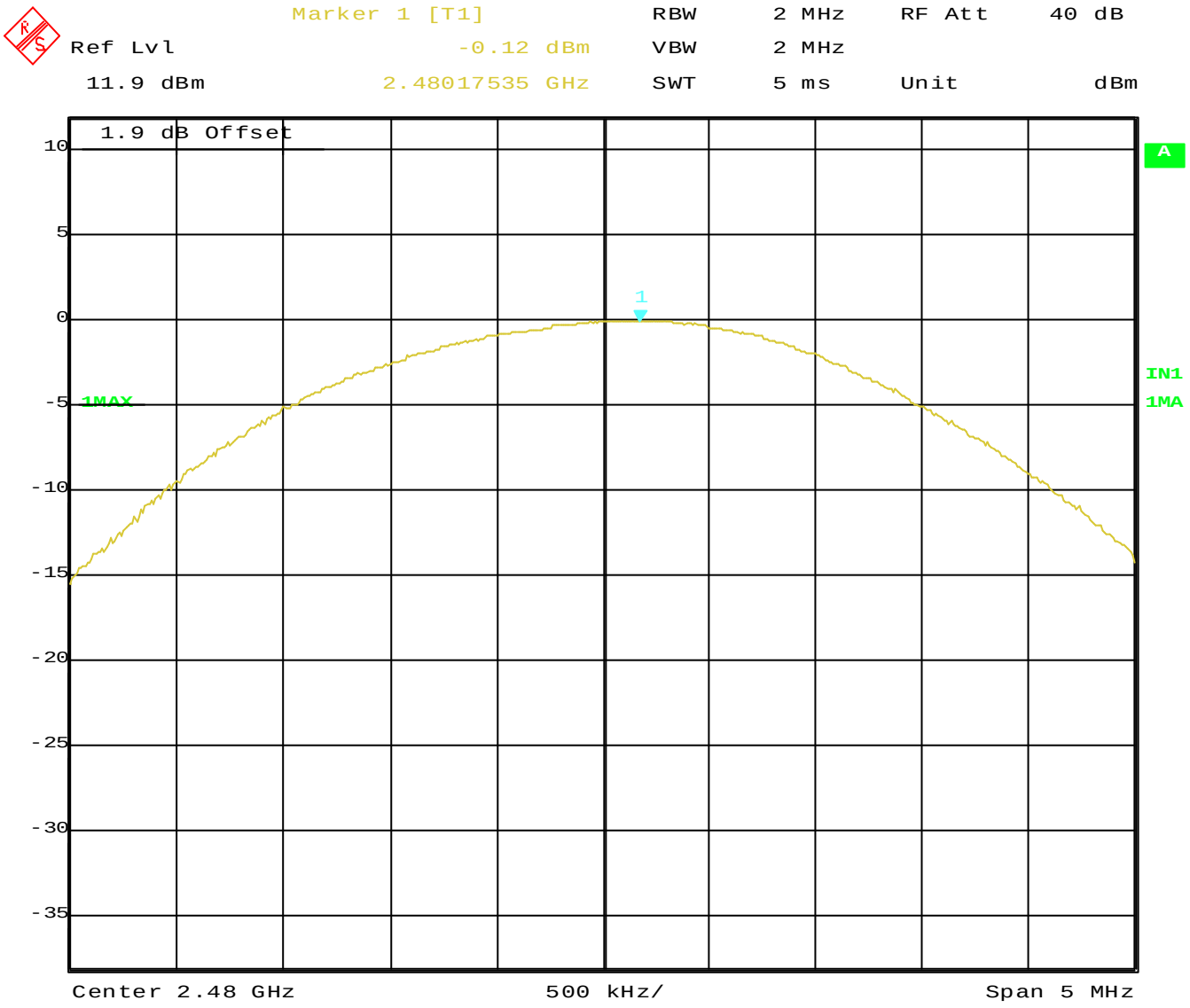
MAXIMUM PEAK OUTPUT POWER § 15.247/b



channel 0 Peak output power 1,43 dBm

Ambient temperature: 22°C Relative humidity: 58%

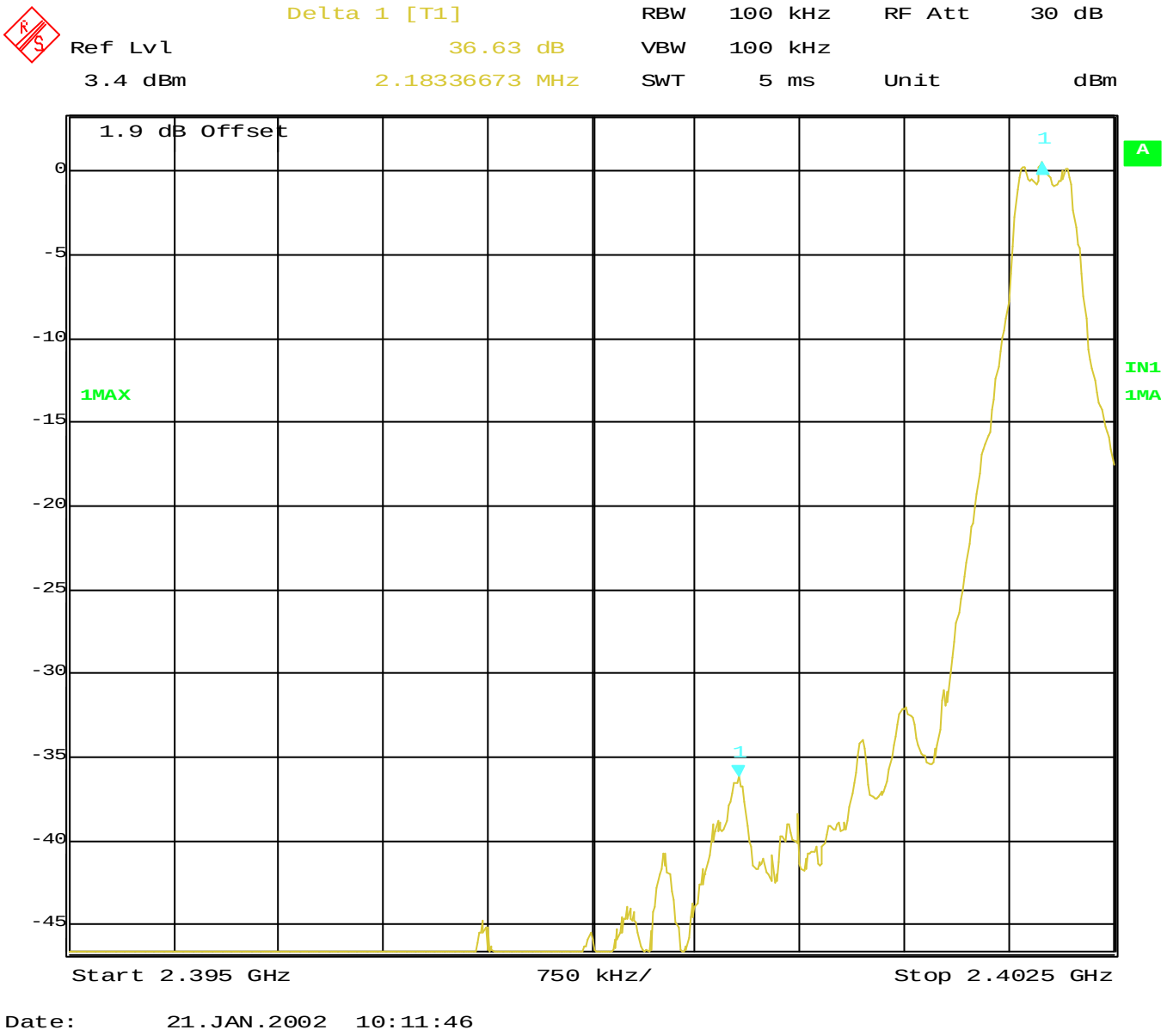
MAXIMUM PEAK OUTPUT POWER § 15.247/b



channel 78 Peak output power –0,12 dBm

Ambient temperature: 22°C Relative humidity: 58%

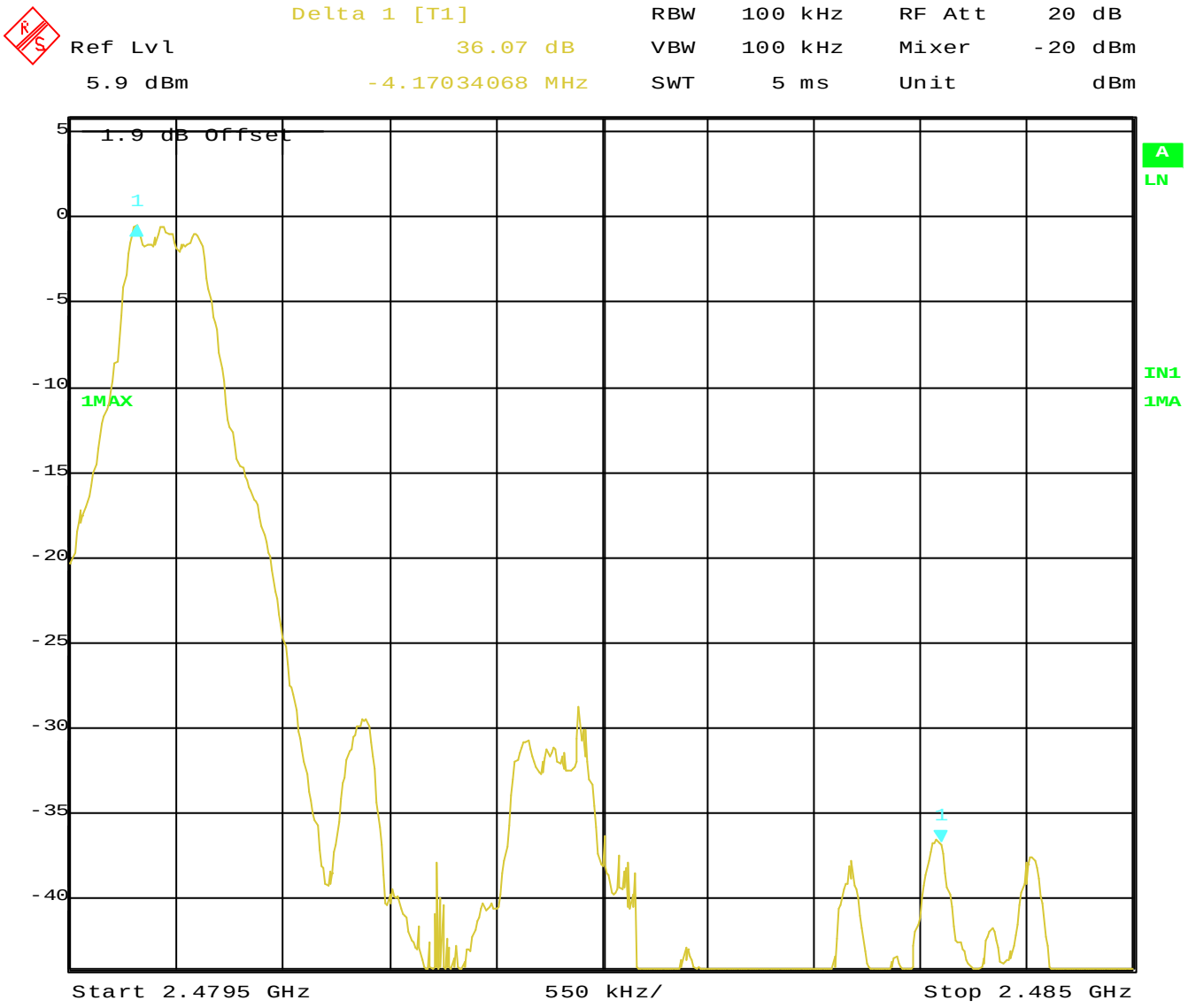
BAND EDGE REQUIREMENTS § 15.247/c



Peak power at the band edge or at the highest emission outside the band on channel 0: -36,63 dBc

Ambient temperature: 22°C Relative humidity: 58%

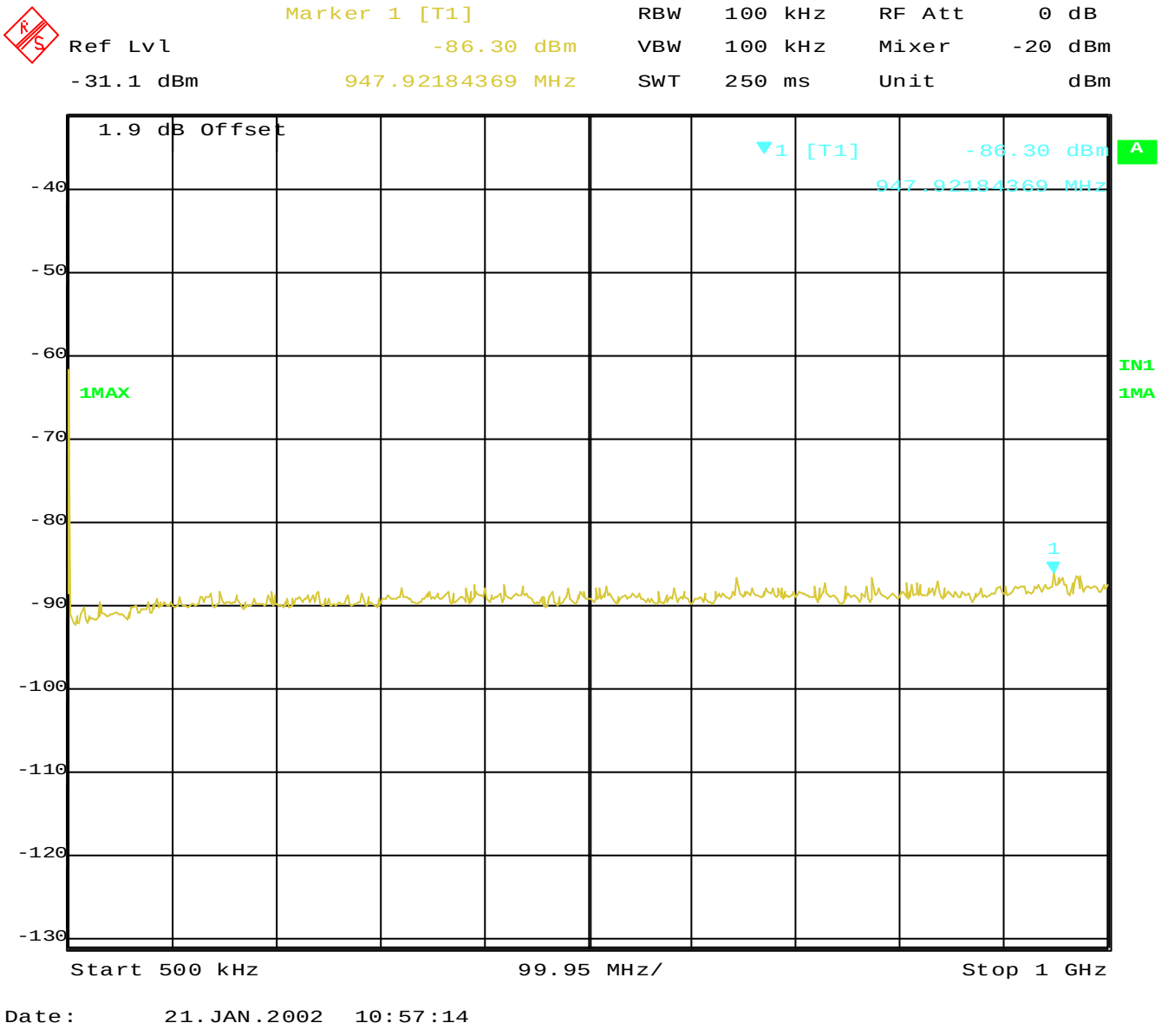
BAND EDGE REQUIREMENTS § 15.247/c



Peak power at the band edge or at the highest emission outside the band on channel 78: -36,07 dBc

Ambient temperature: 22°C Relative humidity: 58%

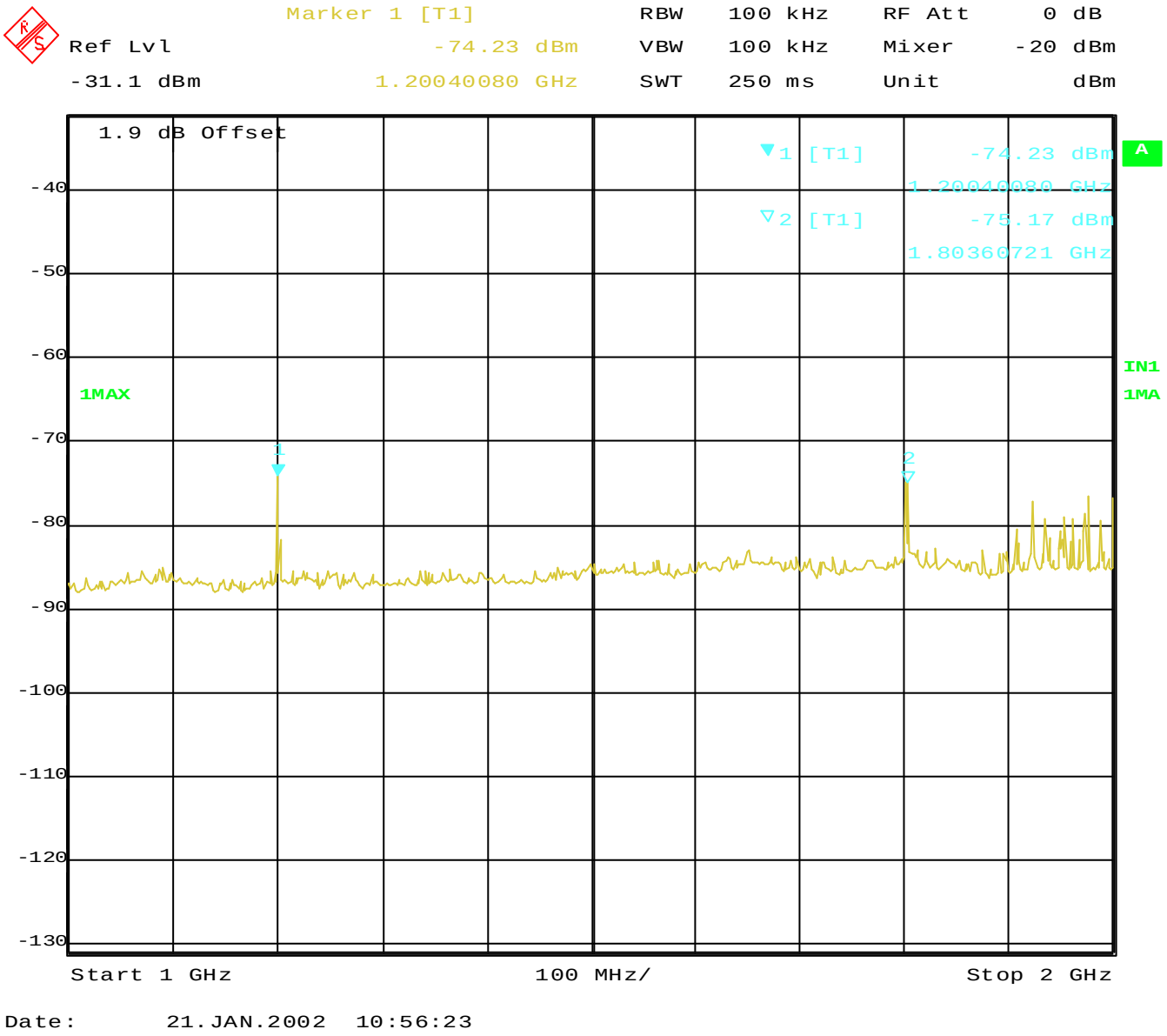
SPURIOUS EMISSIONS § 15.247/c



Emissions in the frequency range 500 kHz to 1 GHz operated on channel 0.

Ambient temperature: 22°C Relative humidity: 58%

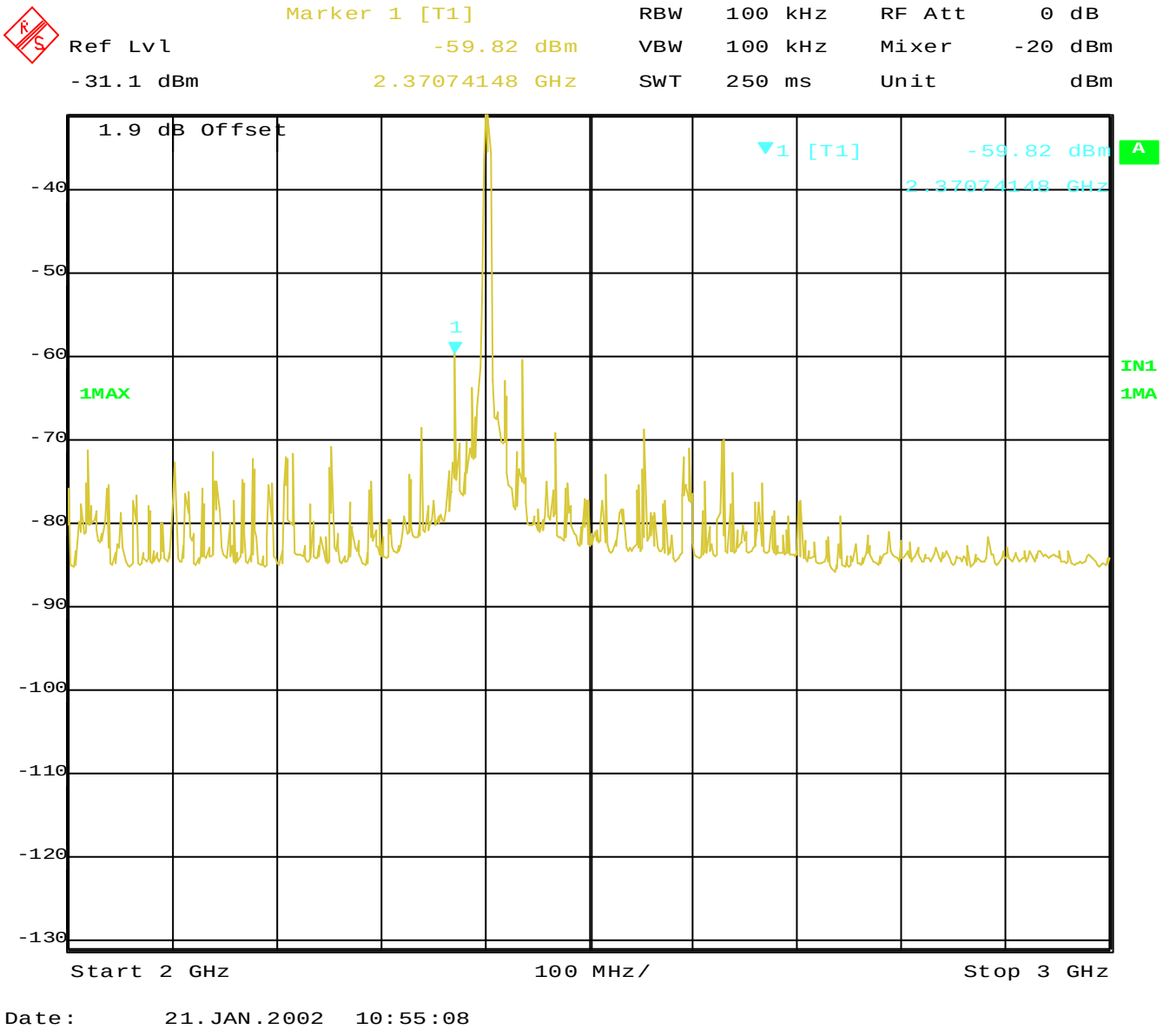
SPURIOUS EMISSIONS § 15.247/c



Emissions in the frequency range 1 GHz to 2 GHz operated on channel 0.

Ambient temperature: 22°C Relative humidity: 58%

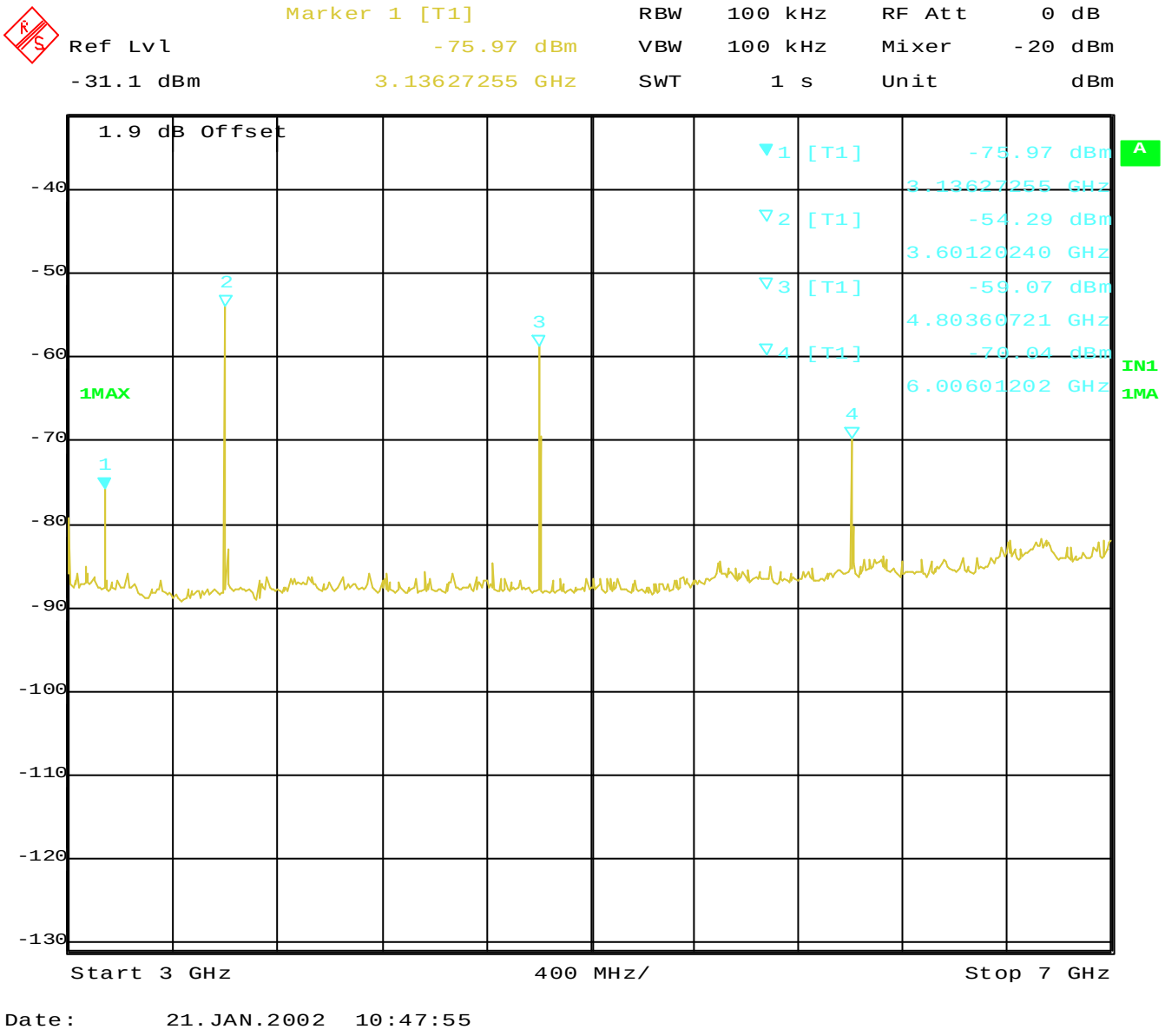
SPURIOUS EMISSIONS § 15.247/c



Emissions in the frequency range 2 GHz to 3 GHz operated on channel 0.

Ambient temperature: 22°C Relative humidity: 58%

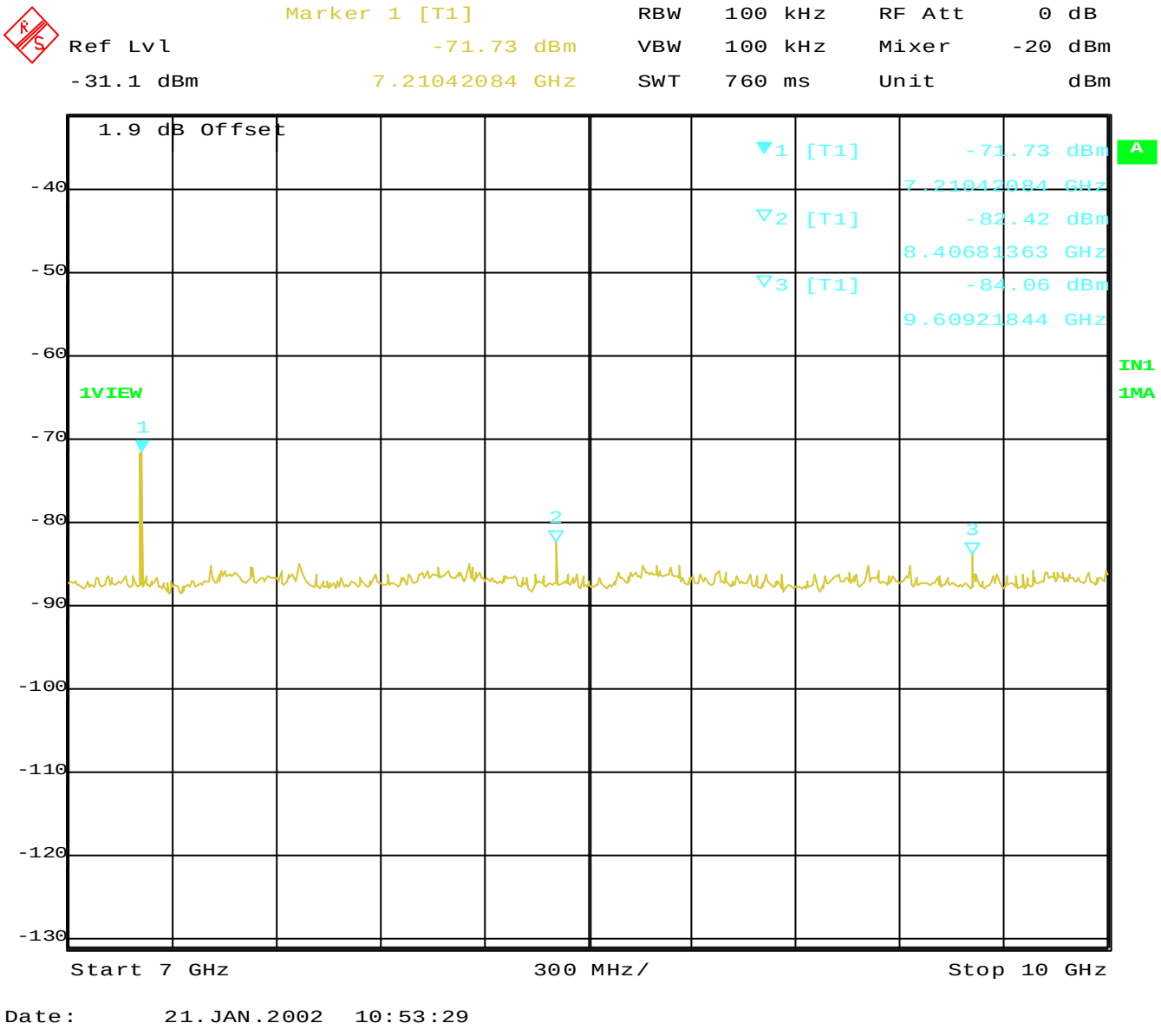
SPURIOUS EMISSIONS § 15.247/c



Emissions in the frequency range 3 GHz to 7 GHz operated on channel 0.

Ambient temperature: 22°C Relative humidity: 58%

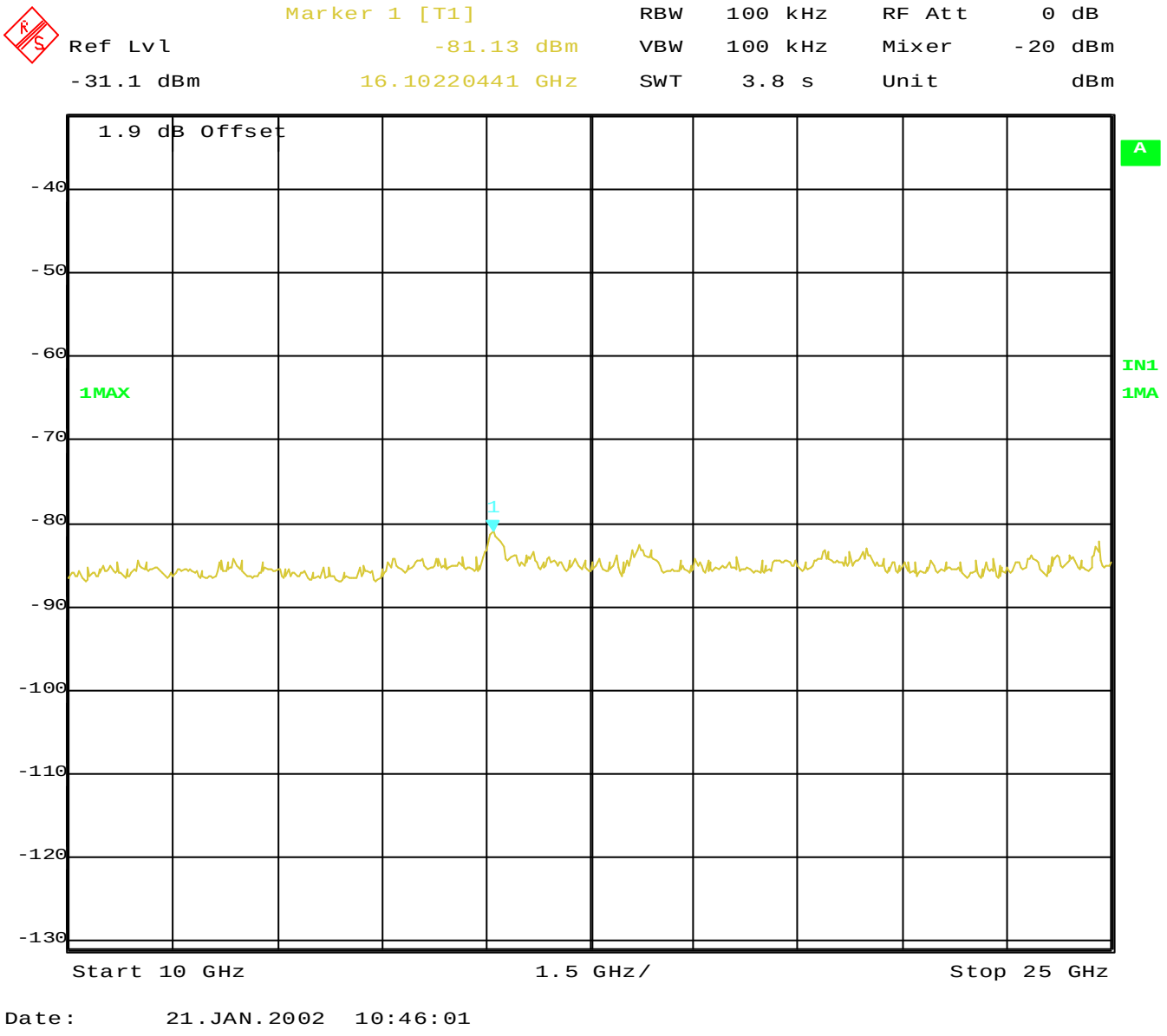
SPURIOUS EMISSIONS § 15.247/c



Emissions in the frequency range 7 GHz to 10 GHz operated on channel 0.

Ambient temperature: 22°C Relative humidity: 58%

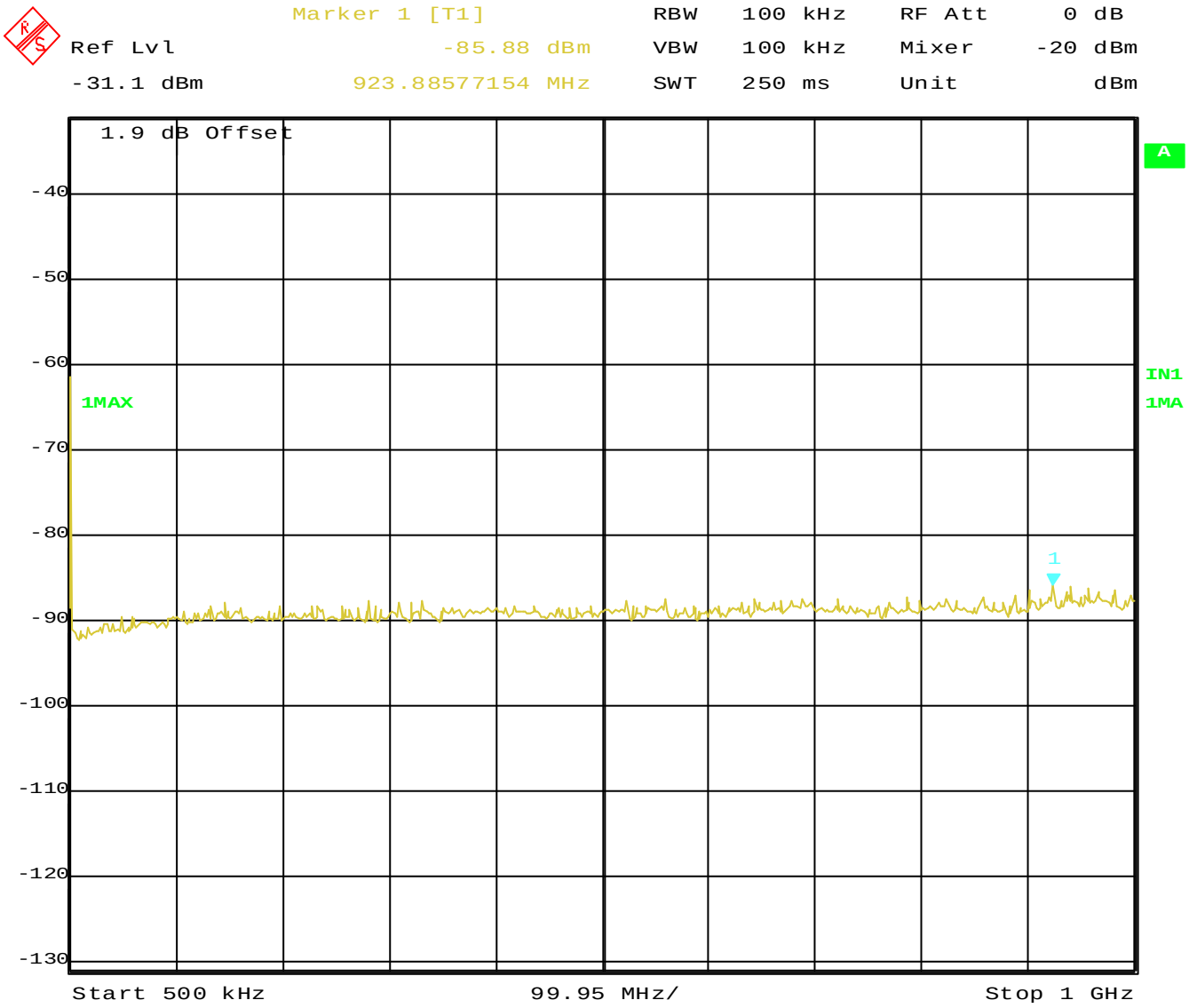
SPURIOUS EMISSIONS § 15.247/c



Emissions in the frequency range 10 GHz to 25 GHz operated on channel 0.

Ambient temperature: 22°C Relative humidity: 58%

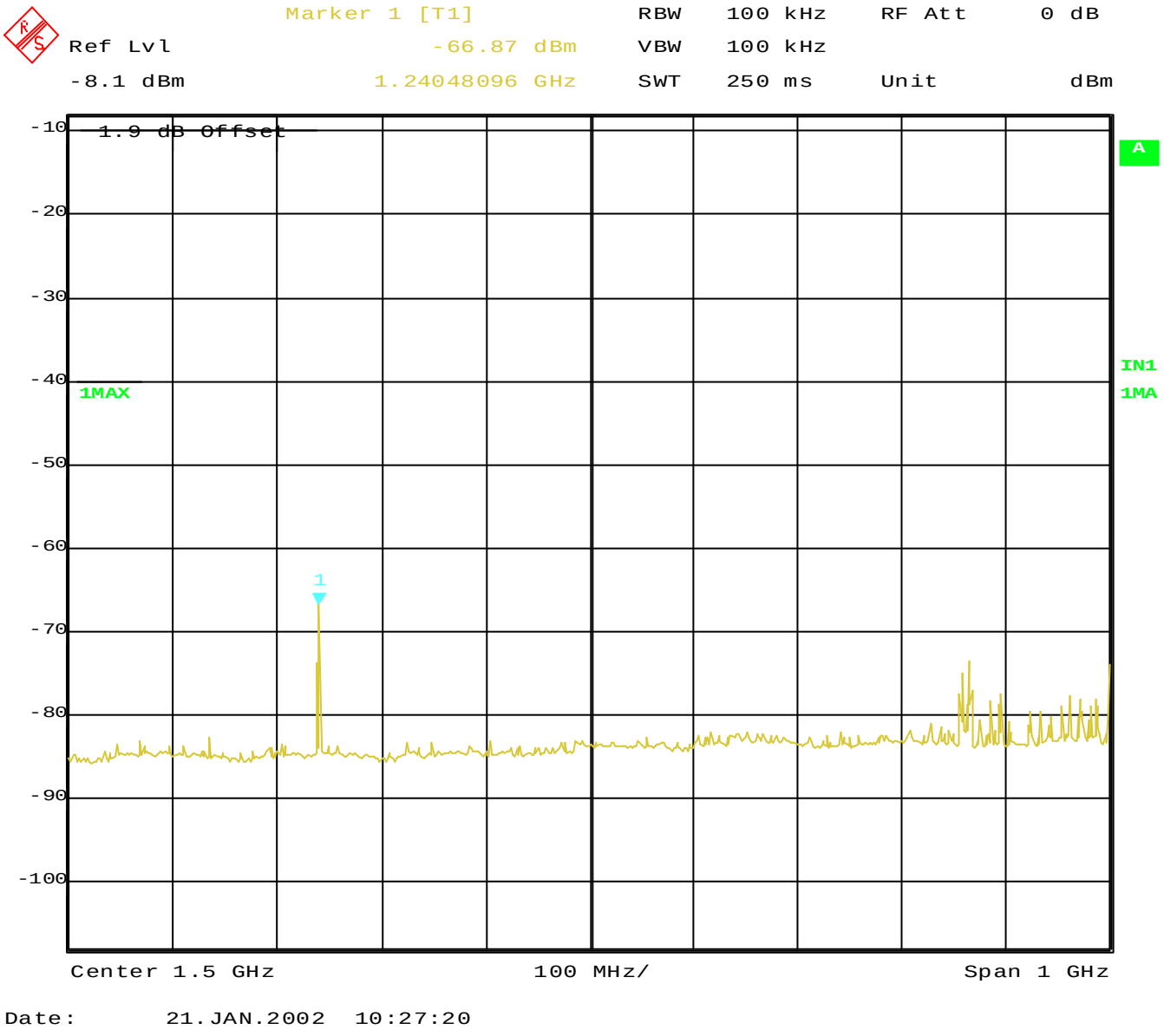
SPURIOUS EMISSIONS § 15.247/c



Emissions in the frequency range 500 kHz to 1 GHz operated on channel 78.

Ambient temperature: 22°C Relative humidity: 58%

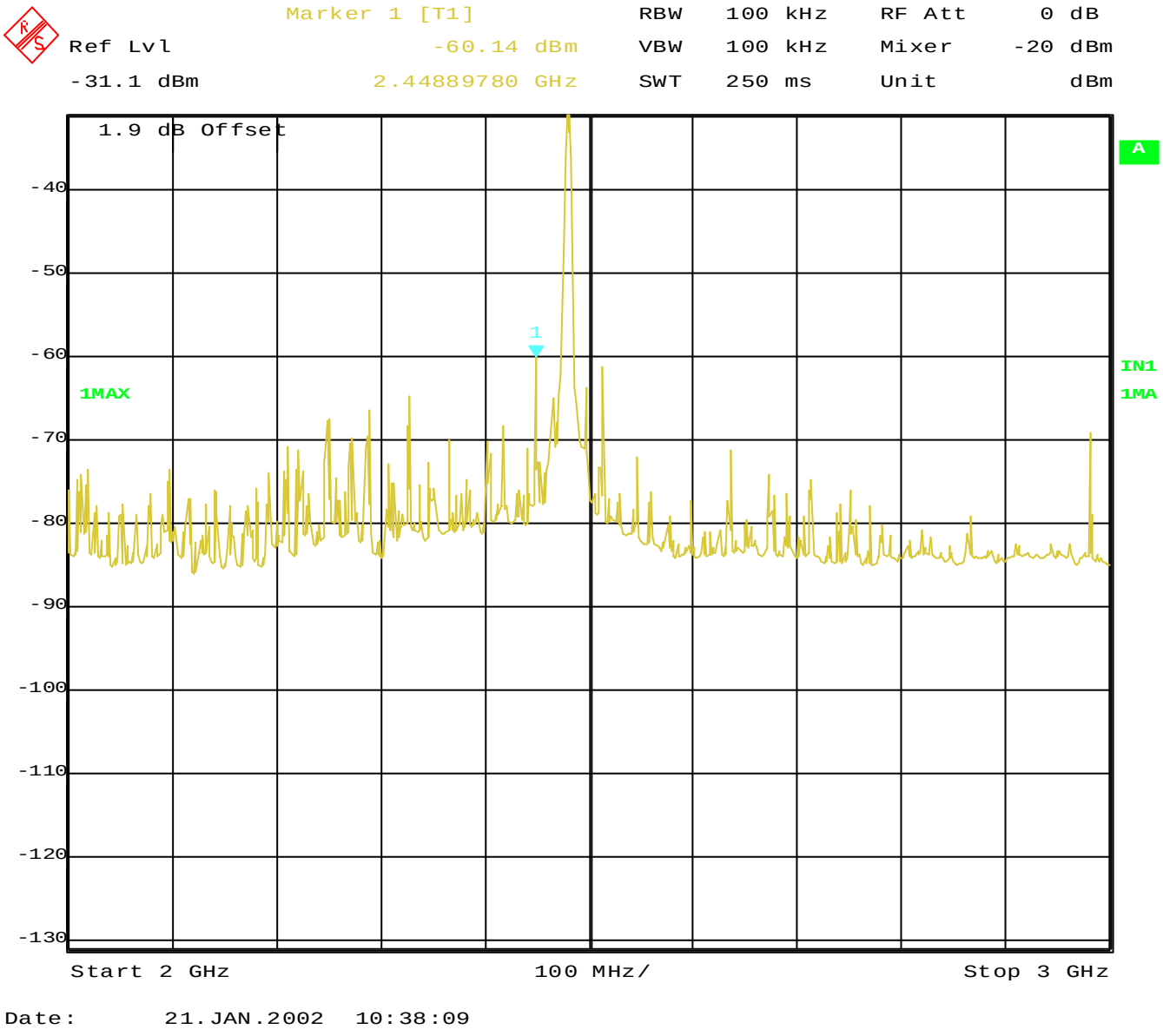
SPURIOUS EMISSIONS § 15.247/c



Emissions in the frequency range 1 GHz to 2 GHz operated on channel 78.

Ambient temperature: 22°C Relative humidity: 58%

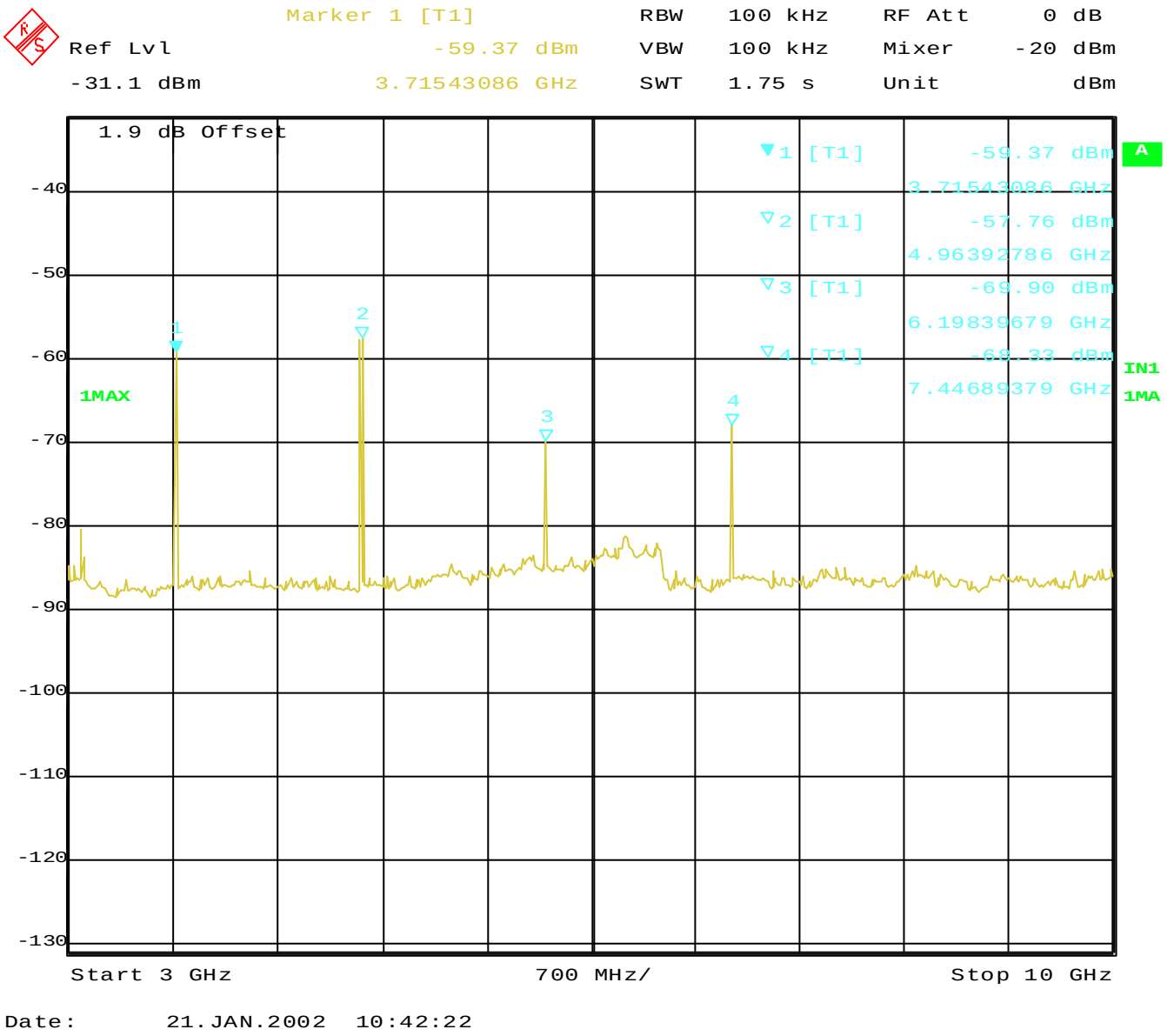
SPURIOUS EMISSIONS § 15.247/c



Emissions in the frequency range 2 GHz to 3 GHz operated on channel 78.

Ambient temperature: 22°C Relative humidity: 58%

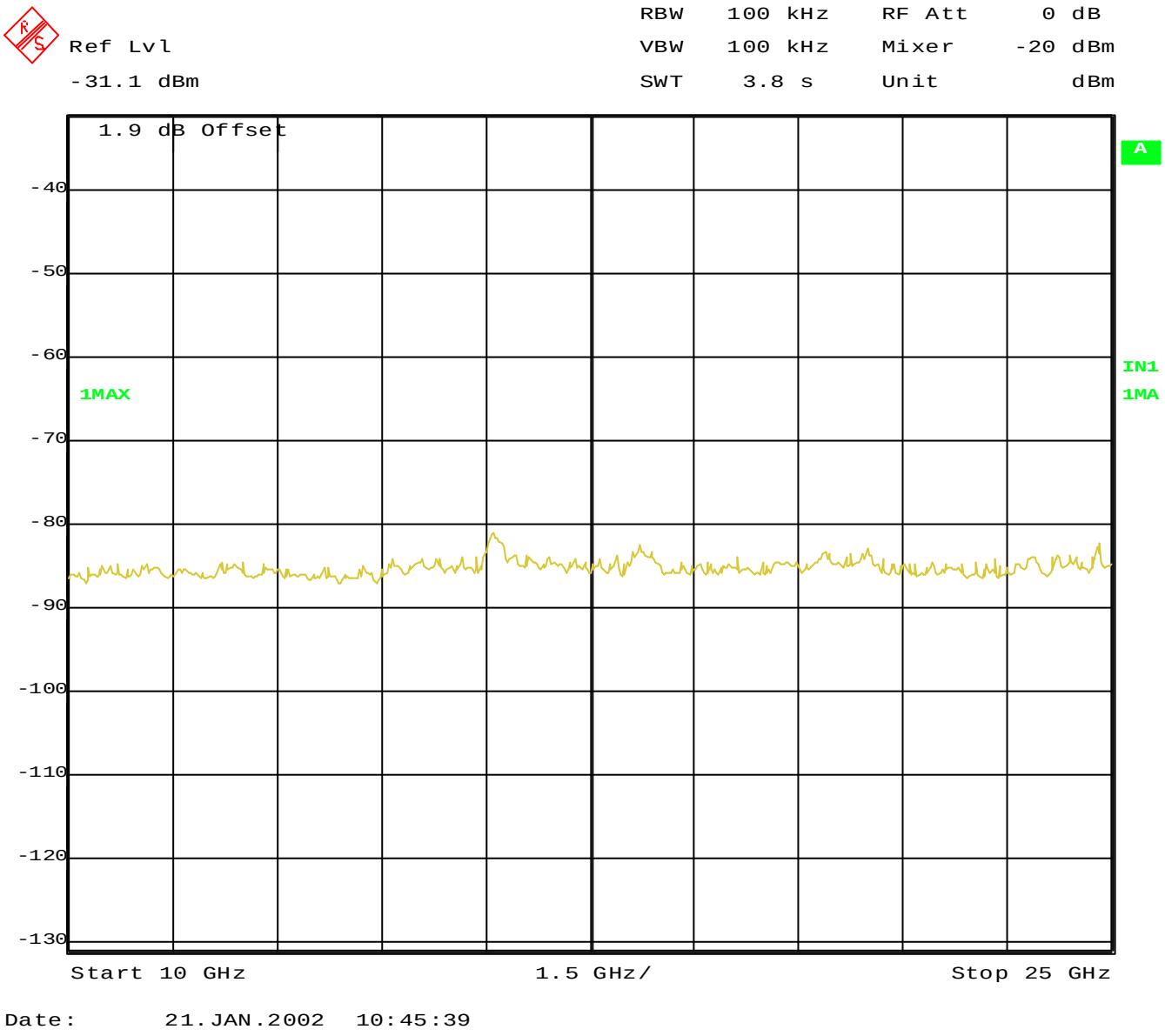
SPURIOUS EMISSIONS § 15.247/c



Emissions in the frequency range 3 GHz to 10 GHz operated on channel 78.

Ambient temperature: 22°C Relative humidity: 58%

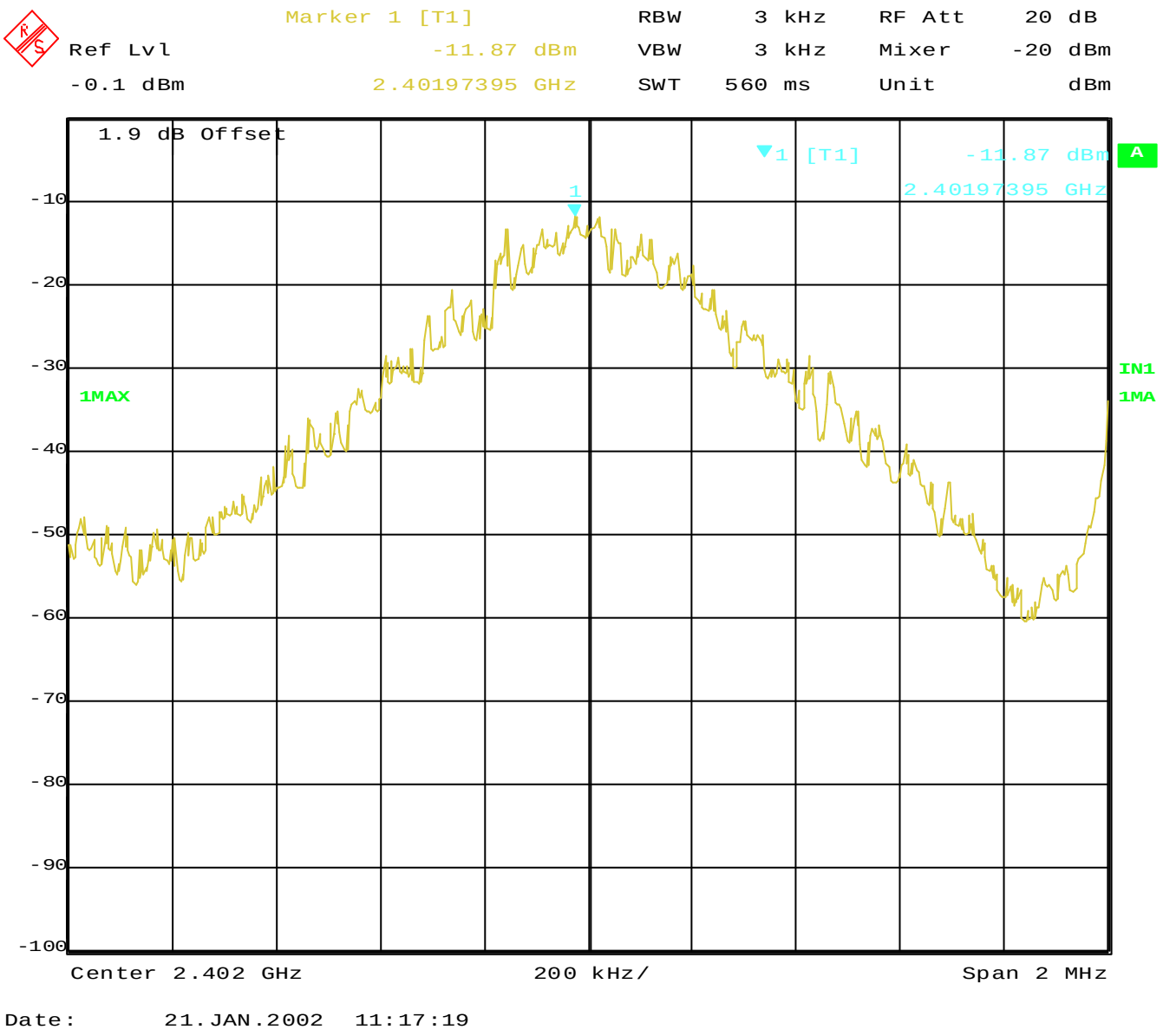
SPURIOUS EMISSIONS § 15.247/c



Emissions in the frequency range 10 GHz to 25 GHz operated on channel 78.

Ambient temperature: 22°C Relative humidity: 58%

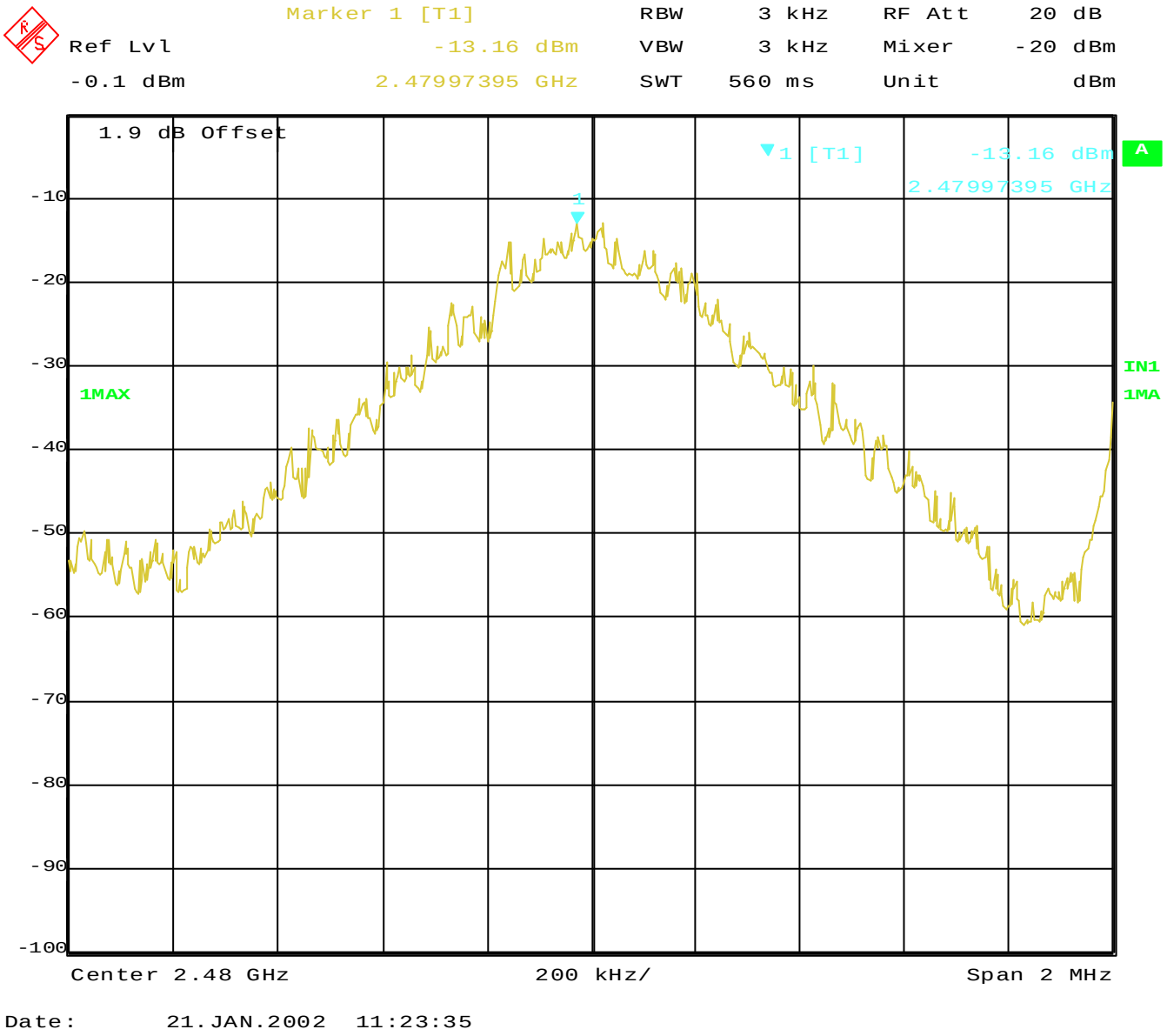
POWER SPECTRAL DENSITY § 15.247/f (d)



channel 0 Power density: -11,87 dBm

Ambient temperature: 22°C Relative humidity: 58%

POWER SPECTRAL DENSITY § 15.247/f (d)



channel 78 Power density: -13,16 dBm

Ambient temperature: 22°C Relative humidity: 58%

RADIATED EMISSIONS (Intentional Radiator) § 15.209/a

The radiated emission test was made with the equipment BT-LAP (CasSi), which was the former inofficial name for the Bluetooth LAN Access Point blue2net. For details see test report number: M/EMV-01/260.

Appendix 1
Test equipment used

☐	Anechoic Chamber with 3m measurement distance	NT-100
☐	MA 240 - Antenna mast 1 - 4 m height	NT-110
☐	DS 412 - Turntable 0 - 400 ° Azimuth	NT-111
☐	HD 100 Controller Mast+Turntable	NT-112
☐	HUF-Z2 - Bicon. Antennna 20 - 300 MHz	NT-120
☐	HUF-Z3 - Log. Per. Antenna 200 - 1000 MHz	NT-121
☐	HFH-Z2 - Loop Antenna. 9 kHz - 30 MHz	NT-122
☐	HFH-Z6 - Rod Antenna 9 kHz - 30 MHz	NT-123
☐	3121C - Dipole Antenna 28 - 1000 MHz	NT-124
☐	3115 - Horn Antenna 1 - 18 GHz	NT-125
☐	3116 - Horn Antenna 18 - 40 GHz	NT-126
☐	SAS-200/543 - Bicon. Ant. 20 MHz - 300 MHz	NT-127
☐	AT-1080 - Log. Per. Ant. 80 - 1000 MHz	NT-128
☐	HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-129
☐	HK-116 - bicon. Ant. 20 MHz - 300 MHz	NT-130
☐	3146 - Log. Per. Ant. 200 - 1000MHz	NT-131
☐	Loop Antenna H-Field	NT-132
☐	Horn Antenna 500 MHz - 2900 MHz	NT-133
☐	Log. per. Antenna 800 MHz - 2500 MHz	NT-134
☐	Log. per. Antenna 800 MHz - 2500 MHz	NT-135
☐	BiConiLog Antenna 26 MHz – 2000 MHz	NT-137
☐	Conical Dipol Antenna PCD8250	NT-138
☐	HZ-1 Antenna tripod	NT-150
☐	BN 1500 Antenna tripod	NT-151
☐	ESVP - Test receiver 20 - 1000 MHz	NT-201
☐	Switchbox	NT-202
☐	ESPC - Test receiver 9 kHz - 2,5 GHz	NT-203
☒	ESI26 – Test receiver 20 Hz – 26,5 GHz	NT-207
☐	Digital Radio Tester CTS55	NT-208
☐	Noise-gen., ITU-R 559-2 20 Hz – 20 kHz	NT-209
☐	CMTA - Radiocommunication analyzer ; 0,1 - 1000 MHz	NT-210
☐	3271 - Spectrum analyzer 100 Hz - 26,5 GHz	NT-211
☐	Radiocommunicationanalyzer Marconi 2945A	NT-212
☐	2855S - Communication analyzer	NT-213
☐	Mixer M28HW 26,5 GHz - 40 GHz	NT-214
☐	Diode Detector 0,01 GHz - 26,5 GHz	NT-215
☐	3160-10 Horn Antenna 26,5 GHz - 40 GHz	NT-216
☐	Radiocommunicationanalyzer SWR 1180 MD	NT-217
☐	Mixer M19HWD 40 GHz – 60 GHz	NT-218
☐	Mixer M12HWD 60 GHz – 90 GHz	NT-219
☐	TDS - 540 DSO Digital scope	NT-220
☐	PM97 Scopemeter	NT-221
☐	B9-DSP-IS Digital Analyzer for voltage fluctuations	NT-230
☐	DFT 555 - Power and harmonics analyzer	NT-231
☐	EFA-3 H-field- / E-field probe	NT-243
☐	E-field measuring instrument EMR-200; 100 kHz – 3 GHz	NT-244
☐	E-field probe (for use with EMR-200)	NT-245
☐	Magneticfield-Sensor 300 kHz – 30 MHz	NT-246
☐	MDS 21 - Absorbing clamp 30 - 1000 MHz	NT-250
☐	FCC-203I EM Injection clamp	NT-251
☐	FCC-203I-DCN Ferrite decoupling network	NT-252
☐	PR50 Current Probe	NT-253

Appendix 1 (continued)
Test equipment used

☐	Model 2000 Digital Multimeter	NT-261
☐	Fluke 97 Digital Multimeter	NT-262
☐	Fluke 97 Digital Multimeter	NT-263
☐	ESH2-Z5 Artificial mains network 4x25A	NT-300
☐	ESH3-Z5 Artificial mains network 2x10A	NT-301
☐	ESH3-Z6 Artificial mains network 1x100A	NT-302
☐	ESH3-Z4 T-Artificial network	NT-303
☐	PHE 4500/B Power amplifier	NT-304
☐	EZ10 T-Artificial network	NT-305
☐	MidiStar Telephone exchange	NT-306
☐	SMG - Signal generator 0,1 - 1000 MHz	NT-310
☐	PM 5518 TXVPS Video generator	NT-311
☐	RefRad Reference generator	NT-312
☐	SMP 02 Signal generator 10 MHz - 20 GHz	NT-313
☐	PEFT - Burst generator up to 4 kV	NT-320
☐	PSD - ESD generator up to 25 kV	NT-321
☐	ESD-Pistol	NT-322
☐	Vacuum-Relais up to 8 kV	NT-323
☐	PSURGE 4.1 Surge generator	NT-324
☐	TRANSIENT 1000 Immunity test system	NT-325
☐	VCS 500-M6 Surge-Generator	NT-326
☐	BTA-250 - RF-Amplifier 9 kHz - 220 MHz / 250 W	NT-330
☐	500W1000M7 - RF-Amplifier 80 - 1000 MHz / 500 W	NT-332
☐	AS0102-65R - RF-Amplifier 1 GHz - 2 GHz	NT-333
☐	APA01 – RF-Amplifier 0,5 GHz – 2,5 GHz	NT-334
☐	Preamplifier 1 GHz - 4 GHz	NT-335
☐	2-97201 Electronic load	NT-341
☐	TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-344
☐	TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-345
☐	VDS 200 Mobil-impuls-generator	NT-350
☐	LD 200 Mobil-impuls-generator	NT-351
☐	MPG 200 Mobil-Impuls-Generators	NT-352
☐	EFT 200 Mobil-impuls-generator	NT-353
☐	FP 16/3-1 3 ph. Coupling filter (Burst)	NT-400
☐	PHE 4500 - Mains impedance network	NT-401
☐	FP-SURGE 32.1 3 ph. Coupling filter (Surge)	NT-402
☐	IP 6.2 Coupling filter for data lines (Surge)	NT-403
☐	ESH2-Z3 - Probe 9 kHz - 30 MHz	NT-410
☐	IP 4 - Capacitive clamp (Burst)	NT-411
☐	HV-Attenuator 54,5 dB (Burst)	NT-420
☐	RF-Attenuator 20 dB 0,1 - 1000 MHz / 25 W	NT-421
☐	RF-Attenuator 10 dB 0,1 - 1000 MHz / 20 W	NT-422
☐	RF-Attenuator 30 dB 0,1 - 1000 MHz / 1 W	NT-423
☐	RF-Attenuator 30 dB	NT-424
☐	RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-425
☐	RF-Attenuator 6 dB 0,1 - 1000 MHz / 1 W	NT-426
☐	Voltage-divider 1:100	NT-427
☐	RF-Attenuator 6 dB	NT-428
☐	RF-Attenuator 0 dB - 81 dB	NT-429
☐	WRU 27 - Band blocking 27 MHz	NT-430

Appendix 1 (continued)
Test equipment used

☐	WHJ450C9 AA - High pass 450 MHz	NT-431
☐	WHJ250C9 AA - High pass 250 MHz	NT-432
☐	RF-Load 150 W	NT-433
☐	Impedance transducer 50 Ohm – 800 Ohm	NT-435
☐	I+P 7780 Directional coupler 100 - 2000 MHz	NT-440
☐	ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441
☐	Power Divider 6 dB/1 W/50 Ohm	NT-443
☐	Directional coupler 0,1 MHz – 70 MHz	NT-444
☐	Directional coupler 0,1 MHz – 70 MHz	NT-445
☐	Tube imitations according to EN 55015	NT-450
☐	FCC-801-M5-25 Coupling decoupling network	NT-460
☐	FCC-801-AF10 Coupling decoupling network	NT-461
☐	FCC-801-S25 Coupling decoupling network	NT-462
☐	FCC-801-T4 Coupling decoupling network	NT-463
☐	FCC-801-C1 Coupling decoupling network	NT-464
☐	F-16A - Current probe 1kHz - 70MHz	NT-465
☒	PC P450 - Test computer	NT-500
☐	SE 284 GPIB - Plotter	NT 502
☐	PC P133 Test computer #2	NT-504
☐	PC P200 MMX Notebook	NT-505
☐	PC PIII 933 MHz Notebook	NT-506
☐	7110 - Controlling device for E-Field probe	NT-510
☐	Monitoring camera with Monitor	NT-511
☐	BSR-V1 - Video transmission system (optical fiber link)	NT-512
☐	ES-K1 Test software	NT-520
☐	ESPC-K1 Test software	NT-521
☐	SPS_PHE - Test software voltage fluctuations/harmonics	NT-525
☐	SPS_EM - Test software for PHE 4500/B	NT-527
☐	Noise power test apparatus according to EN 55014	NT-530
☐	Vertical coupling plane (ESD)	NT-531
☐	Equipment for ESD-pulse verification.	NT-532
☐	TEM-Zelle	NT-533
☐	ESV-24 Plotter adapter	NT-540
☒	Test cables	NT-550
☐	Test cable #4 for EN 61000-4-6	NT-553
☐	Test cable #3 for conducted emission	NT-554
☐	Test cable #5 ESD-cable (2x470k)	NT-555
☐	Test cable #6 ESD-cable (2x470k)	NT-556
☐	Serial data - fiber optic link	NT-557
☐	Test cable #8 Sucoflex 104EA	NT-559
☐	Test cable #9 (for outdoor measurements)	NT-580
☐	Test cable #10 (for outdoor measurements)	NT-581
☐	Test cable #13 PBA-33PBC-10	NT-584
☐	Shield chamber	NT-600
☐	Climatic chamber -55°C to +180°C	M-512
☐	Control and simulation equipment for EUT	---