TEST REPORT
FROM
RADIO FREQUENCY
INVESTIGATION LTD.

Test Of: Basys Technology Ltd.
418MHz PAT

To: F.C.C. Part 15: 1997
(Intentional Radiators)
Subpart C. Section 15.231

Test Report Serial No:
RFI/EMCB1/RP38788A

This Test Report Is Issued Under The Authority Of Brian Watson Technical Director: 	**Checked By:** 
Tested By: 	**Release Version No:** **PDF01**
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Test Of: Basys Technology Ltd.
418MHz PAT
To: F.C.C. Part 15: 1997 Subpart C (Intentional Radiators) Section 15.231

Table of Contents

1. Client Information

Company Name:	Basys Technology Ltd
Address:	Mumby Road Gosport Hampshire PO12 1AF
Contact Name:	Mr S Grant

2. Equipment Under Test (EUT)

The client has supplied the following information (with the exception of the Date of Receipt):

2.1. Identification Of Equipment Under Test (EUT)

Brand Name:	Basys Technology Ltd
Model Name or Number:	418MHz PAT
Unique Type Identification:	63-20-36
Serial Number:	None stated by client
Country of Manufacture:	UK
FCC ID Number:	Awaiting Certification by the FCC
Date of Receipt:	4 May 1999

Brand Name:	Basys Technology Ltd
Model Name or Number:	418MHz PAT (Modified unit for continuous transmit)
Unique Type Identification:	63-20-36
Serial Number:	None stated by client
Country of Manufacture:	UK
FCC ID Number:	Awaiting Certification by the FCC
Date of Receipt:	4 May 1999

2.2. Description Of EUT

The equipment under test was a radio based short to long range tagging system for the protection and monitoring of assets and the management of personnel movement.

2.3. Modifications Incorporated In EUT

Two EUT samples were supplied for test purposes. The first device was left unmodified to enable bandwidth and timing measurement tests to be performed. The second device was modified to enable a continuous transmit unmodulated carrier which would enable electric field strength measurements to be performed.

2.4. Additional Information Related To Testing

Power Supply Requirement:	Internal battery supply of 3.0 V
Intended Operating Environment:	Commercial premises
Weight:	0.071 Kg
Dimensions:	60 mm x 107 mm x 25 mm
Interface Ports:	None

2.5. Support Equipment

No support equipment was used to exercise the EUT during testing.

3. Test Specification, Methods And Procedures

3.1. Test Specification

Reference:	FCC Part 15:1997 Subpart C. Section 15.231 (Intentional Radiators)
Title:	Code of Federal Regulations, Part 15 (47CFR15) Radio Frequency Devices: Digital Devices.
Comments:	A description of the test facility used for this test is on file with, and has been accepted by, the Federal Communications Commission as required by Section 2.948 of Federal Rules.
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.

3.2. Methods And Procedures

The methods and procedures used were as detailed in:

ANSI C63.2 (1987)
Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (1992)
Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)
Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)
Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16 (1987)
Title: Specification for Radio Interference measuring apparatus and measurement methods.

3.3. Definition Of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the Methods & Procedures section above. Appendix 1 contains a list of the test equipment used.

4. Deviations From The Test Specification

None.

5. Operation Of The EUT During Testing

5.1. Operating Conditions

The EUT was tested in a normal laboratory environment. During testing, the EUT was powered by an internal battery supply of 3.0 V.

5.2. Operating Modes

The EUT was tested in the following operating modes:

1- Continuous Transmit Mode: The EUT was set to operate in a continuous transmit mode at 2 different output levels (high and low). When the EUT was set for high power, this simulated both 'shock' and 'tamper' modes. When the EUT was set for low power, this simulated the 'routine report' mode. Continuous transmit modes were enabled to allow accurate field strength measurements to be performed.

2- Idle Mode: The EUT was set to operate in an idle condition, with no alarm condition set.

3- Normal Operating Mode: The EUT was set to operate as intended, to allow bandwidth and timing measurements to be performed in each operating condition.

5.3. Configuration And Peripherals

Throughout testing, the EUT was configured as a standalone device.

The reason for choosing this configuration was that it was defined by the client as being likely to be the worst case with regards EMC.

6. Summary Of Test Results

6.1. Radiated Emissions

Range Of Measurements	Specification Reference	Compliancy Status
Electric Field Strength, 30 MHz to 5.0 GHz	Section 15 of C.F.R. 47: 1997 Clause 15.231	Complied
Occupied Bandwidth	Section 15 of C.F.R. 47: 1997 Clause 15.231	Complied
Transmit Operation Time	Section 15 of C.F.R. 47: 1997 Clause 15.231	Complied

6.2. Location Of Tests

All the measurements described in this report were performed at the premises of Radio Frequency Investigation Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire. RG26 5RQ. England..

7. Measurements, Examinations And Derived Results

7.1. General Comments

7.1.1. Tests for radiated emissions were performed in 4 operating modes as stated in section 5.2 of this test report. This section contains test results only. Details of the test methods and procedures can be found in Appendix 2 of this report.

7.1.2. The measurement uncertainties stated were calculated in accordance with the requirements of NAMAS Document NIS 81 with a confidence level of 95%. Please refer to Section 8 for details of measurement uncertainties.

7.1.3. As the EUT was powered only from an internal 3V battery, no conducted AC emissions measurements were applicable.

7.2. Test Results For Radiated Emissions: Continuous Transmit

7.2.1. Electric Field Strength Measurements: Fundamental Frequency

7.2.1.1. The client has stated that the fundamental frequency of the EUT is 418 MHz.

7.2.1.2. Electric field strength measurements were performed with the EUT operated in both high and low power modes as stated in section 5.2 of this test report.

7.2.1.3. For high power operation, radiated emission limits stated in section 15.231 (b) were followed: Field strength limit for the fundamental is 3750 uV/m at 260 MHz rising linearly to 12500 uV/m at 470 MHz. Therefore this gives a limit at 418 MHz of 10351.4 uV/m. This level equates to 80.3 dBuV/m. This limit is specified using an Average detector at a test distance of 3m.

7.2.1.4. For low power operation, radiated emission limits stated in section 15.231 (e) were followed: Field strength limit for the fundamental is 1500 uV/m at 260 MHz rising linearly to 5000 uV/m at 470 MHz. Therefore this gives a limit at 418 MHz of 4133.4 uV/m. This level equates to 72.3 dBuV/m. This limit is specified using an Average detector at a test distance of 3m.

7.2.1.5. Plots of the initial scans can be found in Appendix 4.

7.2.1.6. The following table lists frequencies at which emissions were measured using an Average detector (results incorporate antenna factors and cable losses).

High Power

Frequency (MHz)	Ant. Pol.	Average Level (dBmV/m)	Average Limit (dBmV/m)	Margin (dB)	Result
417.994	Vert	73.8	80.3	6.5	Complied

Low Power

Frequency (MHz)	Ant. Pol.	Average Level (dBmV/m)	Average Limit (dBmV/m)	Margin (dB)	Result
418.007	Vert	71.2	72.3	1.1	Complied

7.3. Test Results For Radiated Emissions: Continuous Transmit

7.3.1. Electric Field Strength Measurements (30 to 1000 MHz)

7.3.1.1. The client has stated that the highest clock frequency for the EUT was 418 MHz. Therefore tests were performed up to 5000 MHz.

7.3.1.2. Radiated emission spurious limits stated in section 15.231 (b) and 15.231 (e) shall not exceed a level of 20dB below the fundamental carrier limit, or the limit specified in section 15.209, whichever is the higher limit. If the frequency of the spurious emission is located in one of the Restricted Bands of operation stated in section 15.205, then the level of emissions shall not exceed the limit specified in section 15.209.

7.3.1.3. Plots of the initial scans can be found in Appendix 4.

7.3.1.4. Final radiated emission measurements were performed on frequencies found to be within 20dB of the reference limit line.

7.3.1.5. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector (results incorporate antenna factors and cable losses).

High Power

Frequency (MHz)	Ant. Pol.	Quasi-Peak Level (dBmV/m)	Quasi-Peak Limit (dBmV/m)	Margin (dB)	Result
836.010	Horiz.	39.5	60.3	20.8	Complied

Low Power

Frequency (MHz)	Ant. Pol.	Quasi-Peak Level (dBmV/m)	Quasi-Peak Limit (dBmV/m)	Margin (dB)	Result
836.010	Horiz.	36.7	52.3	15.6	Complied

7.4. Test Results For Radiated Emissions: Idle Mode

7.4.1. Electric Field Strength Measurements (30 to 1000 MHz)

7.4.1.1. When the EUT was set to operate in idle mode, all spurious emissions were greater than 20dB from the reference limit line and therefore no final measurements were performed.

7.4.1.2. Plots of the initial scans can be found in Appendix 4.

7.5. Test Results For Radiated Emissions: Continuous Transmit

7.5.1. Electric Field Strength Measurements (1000 to 5000 MHz)

7.5.1.1. The client has stated that the highest clock frequency for the EUT was 418 MHz. Therefore tests were performed up to 5000 MHz.

7.5.1.2. Radiated emission spurious limits stated in section 15.231 (b) and 15.231 (e) shall not exceed a level of 20dB below the fundamental carrier limit, or the limit specified in section 15.209, whichever is the higher limit. If the frequency of the spurious emission is located in one of the Restricted Bands of operation stated in section 15.205, then the level of emissions shall not exceed the limit specified in section 15.209.

7.5.1.3. Plots of the initial scans can be found in Appendix 4.

7.5.1.4. Final radiated emission measurements were performed on frequencies found to be within 10dB of the reference limit line.

7.5.1.5. The following table lists frequencies at which emissions were measured using an Average and Peak detector.

High Power: Average Levels

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBmV/m)	Average Limit (dBmV/m)	Average Margin (dB)	Result
1.25396	Vert.	20.5	21.7	0.8	43.0	60.3	17.3	Complied
1.92000	Vert	27.5	22.2	0.9	50.6	60.3	9.7	Complied

High Power: Peak Levels

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBmV/m)	Peak Limit (dBmV/m)	Peak Margin (dB)	Result
1.25396	Vert.	24.2	21.7	0.8	46.7	80.3	33.6	Complied
1.92000	Vert	29.4	22.2	0.9	52.5	80.3	27.8	Complied

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Results (continued)

Low Power: Average Levels

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBmV/m)	Average Limit (dBmV/m)	Average Margin (dB)	Result
1.25396	Vert.	5.8	21.7	0.8	28.3	52.3	24.0	Complied
1.92000	Vert	9.3	22.2	0.9	31.9	52.3	20.4	Complied

Low Power: Peak Levels

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBmV/m)	Peak Limit (dBmV/m)	Peak Margin (dB)	Result
1.25396	Vert.	15.0	21.7	0.8	37.5	72.3	34.8	Complied
1.92000	Vert	19.8	22.2	0.9	42.9	72.3	29.4	Complied

7.6. Test Results For Radiated Emissions: Idle Mode

7.6.1. Electric Field Strength Measurements (1000 to 5000 MHz)

7.6.1.1. When the EUT was set to operate in idle mode, all spurious emissions were greater than 20dB from the reference limit line and therefore no final measurements were performed.

7.6.1.2. Plots of the initial scans can be found in Appendix 4.

7.7. Fundamental Bandwidth Measurement.

7.7.1. Section 15.231 (c) states that the bandwidth of the emission must not exceed 0.25% of the centre frequency for devices operating between 70 MHz and 900 MHz. The bandwidth is determined at the points 20dB down from the modulated carrier.

7.7.2. Measurements on the fundamental frequency (418 MHz) were measured with a resolution bandwidth of 120 kHz with the EUT operated in both of the alarm conditions, as stated in section 5.2.

7.7.3. The operating frequency of the EUT is 418 MHz, and therefore the allowable bandwidth for this EUT is 1.045 MHz.

7.7.4. Scans showing the fundamental bandwidth measurements can be seen in Appendix 4 of this test report.

Fundamental Bandwidth

EUT Operating Mode	Bandwidth (MHz)	Result
Shock Mode (Move Mode) (modulated)	0.262	Complied
Tamper Mode (modulated)	0.257	Complied
Continuous Transmit (Unmodulated). High Power	0.262	Complied
Continuous Transmit (Unmodulated). Low Power	0.269	Complied

7.8. Transmitter Operating Time.

7.8.1. Tamper and Shock Mode.

7.8.1.1. Section 15.231 states that a transmitter on/off time measurement is required to be performed. The transmitter used in this device is automatically activated and deactivated within a designated time frame. Therefore, as stated in section 15.231 (a(2)), this transmitter must cease transmission within 5 seconds after activation.

7.8.1.2. Once the transmitter has automatically activated and deactivated, the EUT returns to the standby condition.

7.8.1.3. A plot showing compliance with the above can be seen in Appendix 4 of this test report.

Mode of Operation	Operation Time in Seconds
Shock Mode	4.422
Tamper Mode	4.400

Note- When in shock mode, if the EUT is continuously triggered the alarm condition will be permanently activated.

7.9. Transmitter Operating Time. (continued)

7.9.1. Routine Report Mode.

7.9.1.1. When the EUT is operated in the routine report mode, the timing requirements of 15.231 (e) are applicable.

7.9.1.2. The client has stated that the 'routine report' transmission is effective for approximately 0.9 seconds, once every 60 minutes (± 10 minutes).

7.9.1.3. Tests were performed to determine the EUT meet the requirements of section 15.231 (e). It is stated that each transmission must not be greater than 1 second and he silent period between transmissions shall be at least 30 times the duration of the transmission, but in no case less than 10 seconds.

7.9.1.4. Due to the very short transmission time of the EUT over a large period of time it was virtually impossible to show compliance with this specification. Therefore it was decided that as the client has specified that the EUT transmits only for 0.9 seconds this would be used as the basis for the test.

Timing Requirement	**Limit**	**Result**
Client specified Transmit on for 0.9 seconds.	1.0 second	Pass
Silent Period	At Least 30 times Transmit. 27 seconds	Pass

The EUT was monitored for a period of 60 seconds, and during this time no transmission of the device was noted. Therefore the EUT is deemed to meet the requirements of the specification.

8. Measurement Uncertainty

8.1. Company Policy, as based on the NAMAS Accreditation Standard, M10, paragraph 12.11 (o), states that Test Reports shall include estimated uncertainty of the calibration or test result (this information need only appear in test reports and test certificates where it is relevant to the validity or application of the test result, where a client's instructions so require or where uncertainty affects compliance to a specification or limit).

8.2. The global uncertainties have been calculated in accordance with NAMAS NIS 81 (Edition 1, May 1994) as follows:

Measurement Type	Range	Confidence Level	Calculated Uncertainty
Radiated Emissions	30 MHz to 1000 MHz	95%	+/- 4.9 dB
Radiated Emissions	1 GHz to 5 GHz	95%	+/- 4.4 dB

8.3. Measurement uncertainties have been applied in accordance with NAMAS document NIS 81 (edition 1, May 1994), and in the absence of any specification criteria, guidance, or code of practice, compliance has been judged on the basis of shared risk.

8.4. In the case of emissions tests, the measured value of the disturbance from the product sample shall be compared directly with the limits. If the measured value is equal to or less than the limit the product is deemed to pass the test.

8.5. In the case of immunity tests, the equipment is deemed to pass the test if it fulfils the stated performance criteria at the required or a higher severity level. The measurement uncertainty has been taken into account in the calibration procedures stated in the relevant basic standard.

8.6. The methods used to calculate the above uncertainties are in line with those used for calibration laboratories contained in NAMAS document NIS 3003 Edition 8 “The Expression of Uncertainty and Confidence in Measurement” May 1995, which align with international recommendations “Guide to the Expression of Uncertainty in Measurement” ISO/IEC/OIML/BIPM (Prepared by ISO/TAG 4: January 1993).

Appendix 1. Test Equipment Used

Instrument	Manufacturer	Model	RFI No.
Radiated Electric Field Screened Room Scans / Occupied Bandwidth / Operating Time			
EMI Receiver	R & S	ESBI	M090
Bilog Antenna	Chase	CBL6112B	A1037
1 to 2 GHz Horn	Eaton	9188-2	A028
2 to 4 GHz Horn	Eaton	91889-2	A031
4 to 6 GHz Horn	Flann	12240-20	A428
Cable	Rosenberger	UFA210A-1-1181-70x70	C344
Open Area Test Site			
EMI Receiver	R & S	ESBI	M090
Bilog Antenna	Chase	CBL6112	A259
1 to 2 GHz Horn	Eaton	9188-2	A028
Test Receiver	R & S	ESVP	M002
Spectrum Monitor	R & S	EZM	M003
Cable	Rosenberger	UFA210A-1-1181-70x70	C344

NB In accordance with NAMAS requirements, all the measurement equipment is on a calibration schedule.

Appendix 2. Measurement Methods

A2.1. Radiated Emissions: FCC Part 15

A2.1.1. Radiated emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

A2.1.2. Initial measurements covering the entire measurement band in the form of swept scans in a shielded enclosure were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which the EUT should be re-measured in full on the open area test site. In order to minimise the time taken for the swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and for the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

A2.1.3. The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. Following the initial scans, graphs were produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested on the open area test site, at the appropriate distance, using a measuring receivers with a Quasi-Peak or Average detector (below 1000 MHz) where applicable, for measurements above 1000 MHz average and peak detectors were used.

A2.1.4. For the main (final) measurements the EUT was arranged on a non-conducting table on an open area test site, as detailed in the specification.

A2.1.5. All measurements on the open area test site were performed using broadband antennas.

A2.1.6. On the open area test site, at each frequency where a signal was found, the levels were maximised by initially rotating the turntable through 360°. For frequencies below 1000 MHz, the antenna was varied in height between 1 m and 4 m. For frequencies above 1000 MHz, the antenna was fixed at a height of 1.5m. At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT.

A2.1.7. The test equipment settings for radiated emissions measurements were as follows:

Receiver Function	**Initial Scan Below 1GHz**	**Final Measurements Below 1GHz**
Detector Type:	Peak	Quasi-Peak (CISPR) or Average
Mode:	Max Hold	Not applicable
Bandwidth:	100 kHz	120 kHz
Amplitude Range:	60 dB	20 dB
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

Receiver Function	**Initial Scan Above 1 GHz**	**Final Measurements Above 1 GHz**
Detector Type:	Peak	Peak/Average
Mode:	Max Hold	Not applicable
Bandwidth:	1 MHz	1 MHz
Amplitude Range:	60 dB	20 dB (typical)
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

Spurious radiated emissions were measured against the limits specified in Section 15.209 of C.F.R. 47 Part 15 Subpart C - Intentional Radiators OR those of Section 15.231 depending upon whichever permitted a higher field strength. Unless otherwise stated, the limits given in this report correspond to those specified in Section 15.209 as these are the most stringent.

A2.2. Occupied Bandwidth

A2.2.1. Measurements were performed to determine the occupied bandwidth of the fundamental frequency of the EUT.

A2.2.2. The EUT was set to operate in each of the operating modes detailed in section 5.2 of this test report, and also set to a continuous transmit unmodulated carrier.

A2.2.3. A peak, max hold scan was produced of the emission, and the bandwidth was determined at the points 20dB down from the peak level of the transmission.

A2.3. Transmitter Operation Time

A2.3.1. Measurements were performed to determine the transmitter operation time as specified in section 15.231(a(2)) and the automatic time limiting as specified in section 15.231 (e).

A2.3.2. For measurements concerning the transmitter operation time, the EUT was set to operate in a normal mode of operation at all times. The EUT was activated in each alarm condition and a scan of the time incurred was produced to show the deactivation time of the transmission.

A2.3.3. For measurements concerning the automatic time limiting, the EUT was set to operate in a normal mode of operation at all times. For this measurement the EUT was set to idle mode. The test receiver was set to display any spurious emission transmitted by the EUT. A scan of any spurious transmissions was produced.

Appendix 3. Test Configuration Drawings

This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\38788JD01ETF01\EMIRAD	Test configuration for measurement of radiated emissions
DRG\38788JD01ETF01\001	Schematic diagram of the EUT, support equipment and interconnecting cables used for the test

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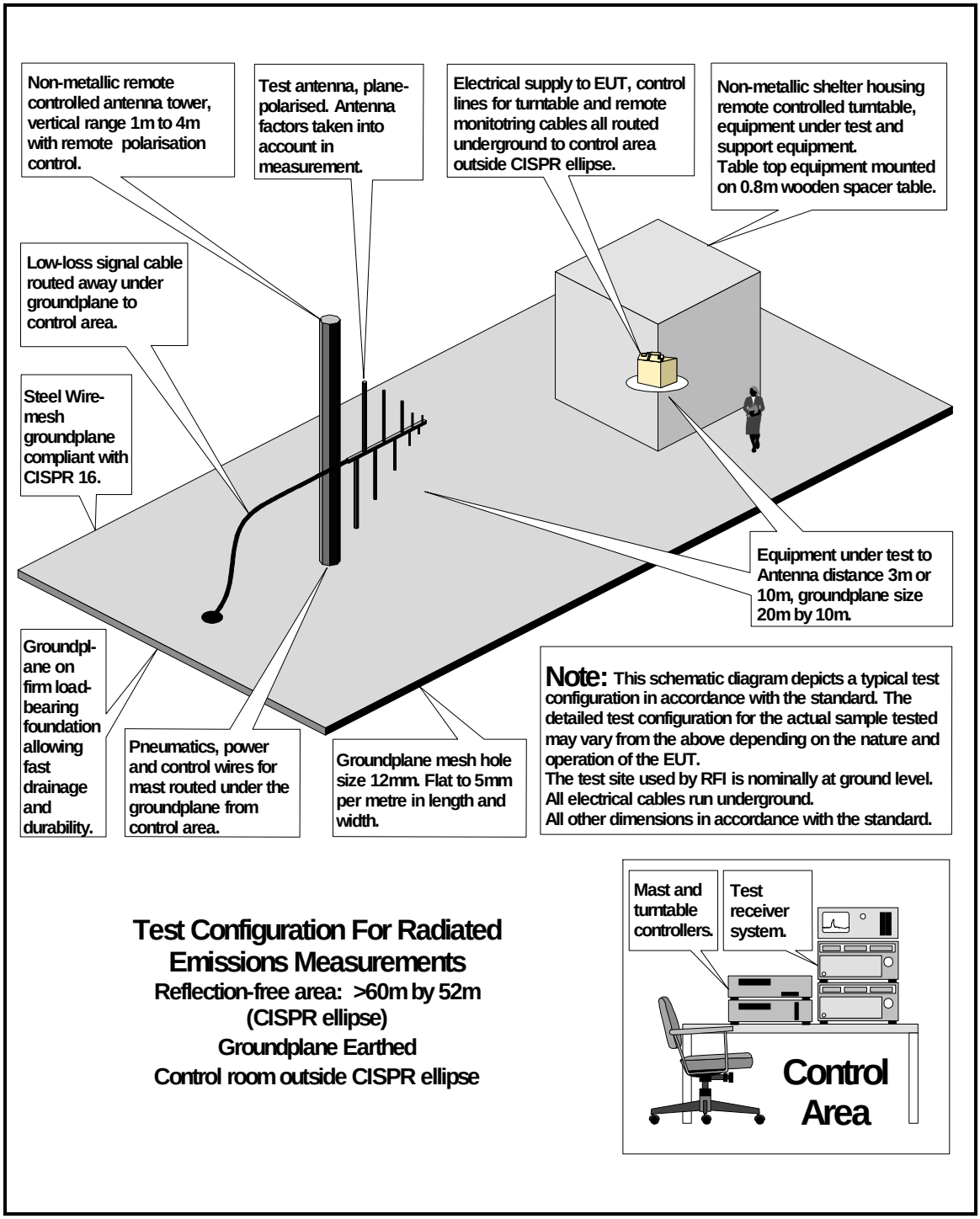
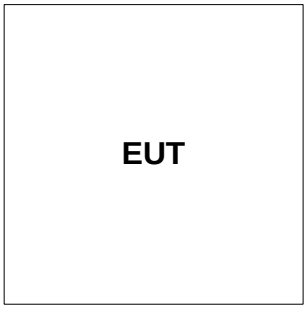
DRG\38788JD01ETF01\EMIRAD



Test Configuration For Radiated Emissions Measurements
Reflection-free area: >60m by 52m (CISPR ellipse)
Groundplane Earthed
Control room outside CISPR ellipse

DRG\38788JD01ETF01\001

Configuration of EUT and Local Support Equipment



Configuration of Remote Support Equipment

Appendix 4. Graphical Test Results

This appendix contains the following graphs:

Graph Reference Number	Title
GPH\38788JD01\001	Scan of Radiated Electric Field: (30 to 1000 MHz). Continuous Transmit. High Power Transmit.
GPH\38788JD01\002	Scan of Radiated Electric Field.(30 to 1000 MHz). Continuous Transmit. Low Power Transmit.
GPH\38788JD01\003	Scan of Radiated Electric Field.(1000 to 2000 MHz). Continuous Transmit. Low Power Transmit.
GPH\38788JD01\004	Scan of Radiated Electric Field: (1000 to 2000 MHz). Continuous Transmit. High Power Transmit.
GPH\38788JD01\005	Scan of Radiated Electric Field: (2000 to 4000 MHz). Continuous Transmit. High Power Transmit.
GPH\38788JD01\006	Scan of Radiated Electric Field.(2000 to 4000 MHz). Continuous Transmit. Low Power Transmit.
GPH\38788JD01\007	Scan of Radiated Electric Field: (4000 to 5000 MHz). Continuous Transmit. High Power Transmit.
GPH\38788JD01\008	Scan of Radiated Electric Field.(4000 to 5000 MHz). Continuous Transmit. Low Power Transmit.
GPH\38788JD01\009	Scan of Radiated Electric Field: (30 to 1000 MHz). Idle Mode.
GPH\38788JD01\010	Scan of Radiated Electric Field: (2000 to 4000 MHz). Idle Mode.
GPH\38788JD01\011	Scan of Radiated Electric Field: (1000 to 2000 MHz). Idle Mode.
GPH\38788JD01\012	Scan of Radiated Electric Field: (4000 to 5000 MHz). Idle Mode.
GPH\38788JD01\013	Occupied Bandwidth. 418 MHz. Tamper Mode
GPH\38788JD01\013A	Occupied Bandwidth. 418 MHz. Shock (Move) Mode
GPH\38788JD01\016	Occupied Bandwidth. 418 MHz. High Power Transmit Umodulated Carrier
GPH\38788JD01\017	Occupied Bandwidth. 418 MHz. Low Power Transmit Unmodulated Carrier

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Graphical Test Results (continued)

Graph Reference Number	Title
GPH\38788JD01\022	Periodic Measurements. 418 MHz. Transmit Operation Time. Tamper Mode.
GPH\38788JD01\023	Periodic Measurements. 418 MHz. Transmit Operation Time. Shock (Move) Mode.
GPH\38788JD01\032	Duration Measurements. 418 MHz. Routine Report Mode. Scan to show 15.231(e) is complied to.

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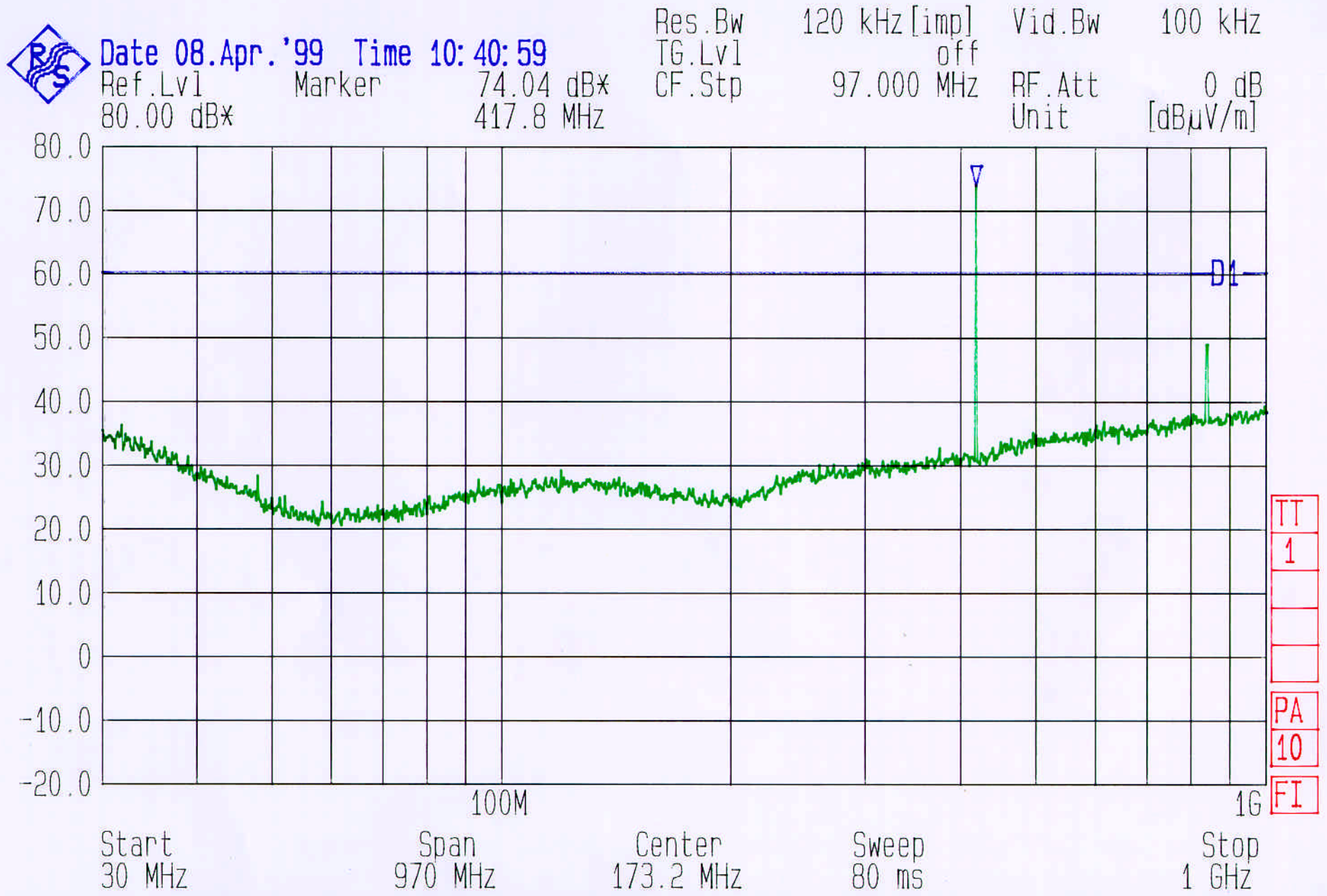
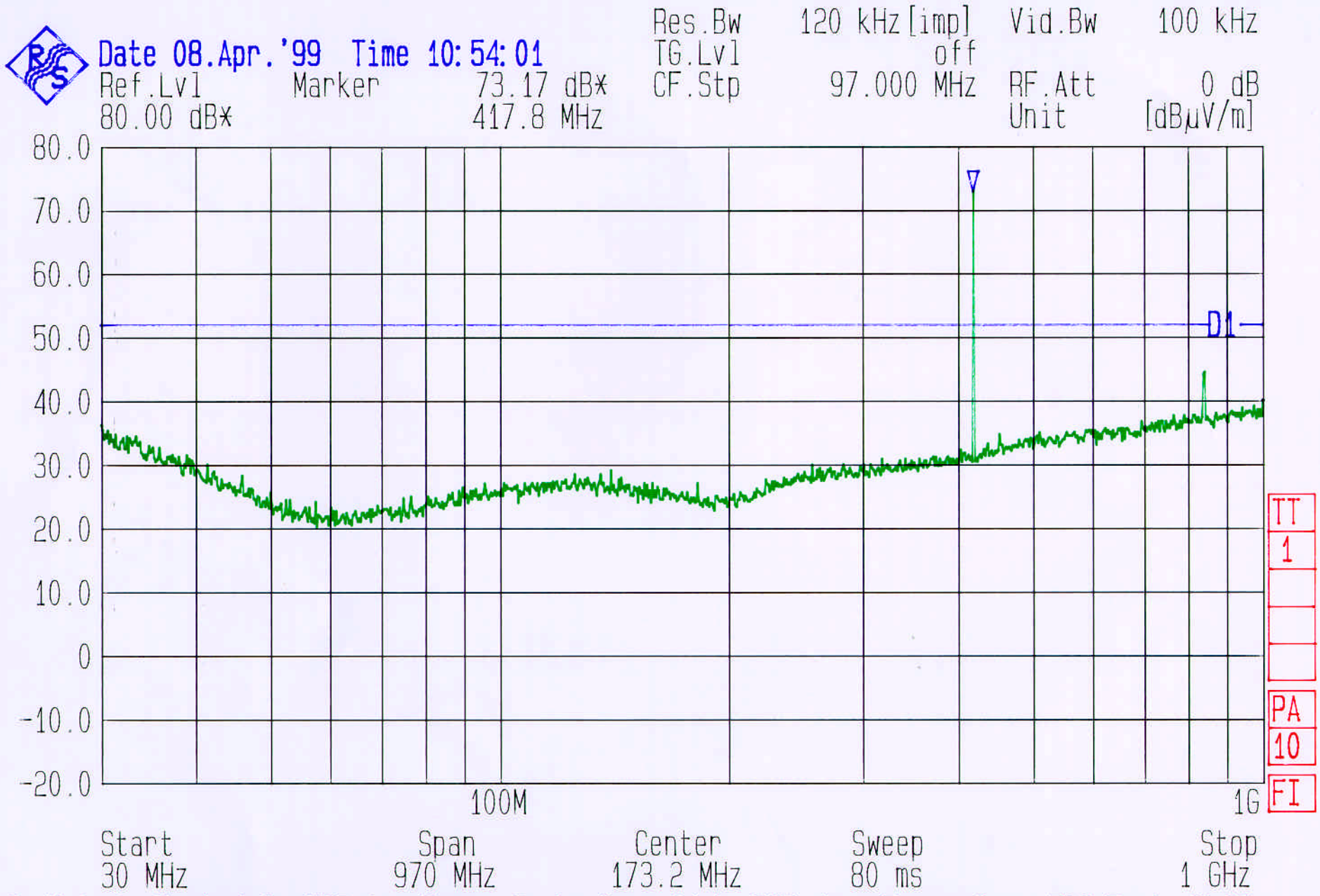
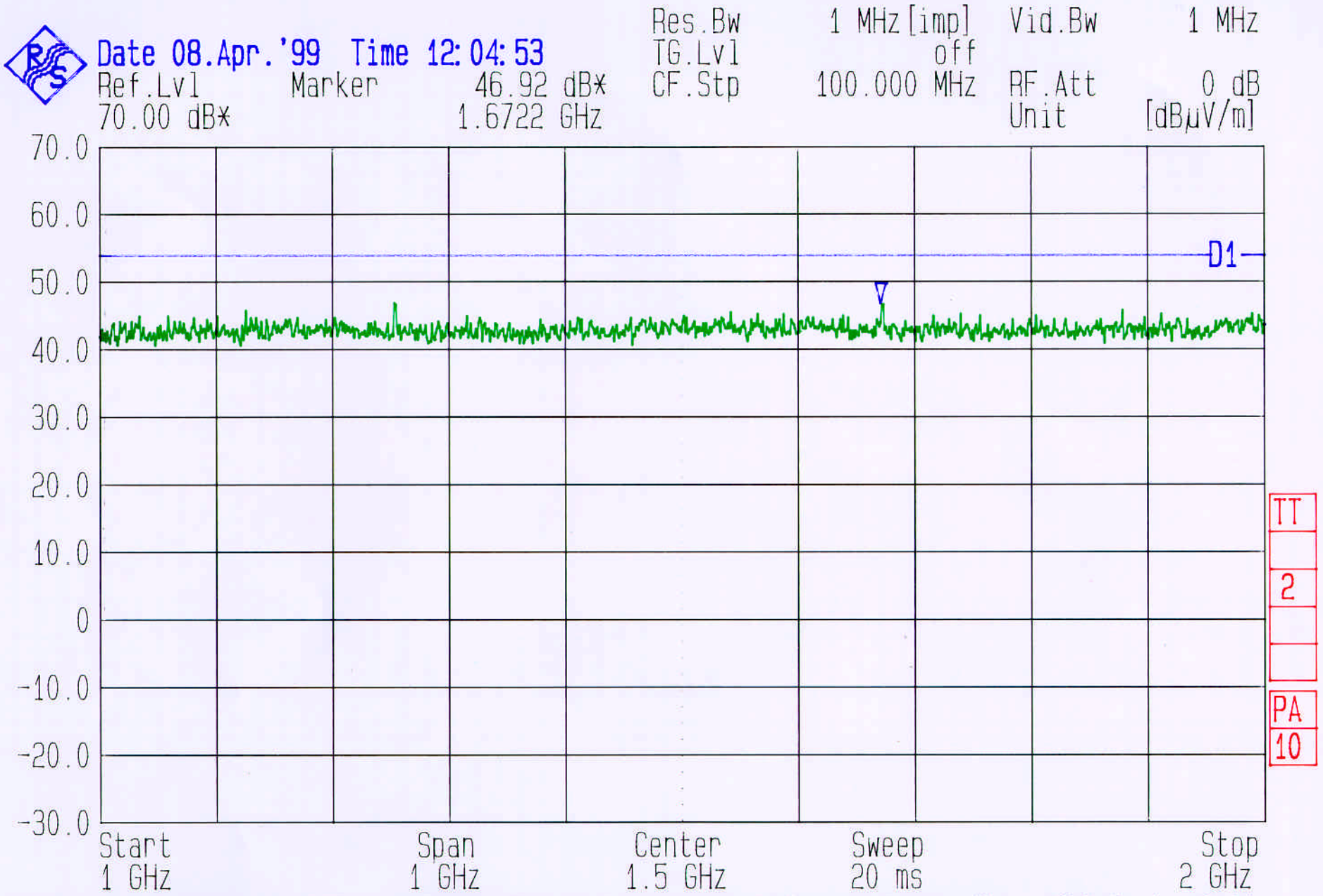


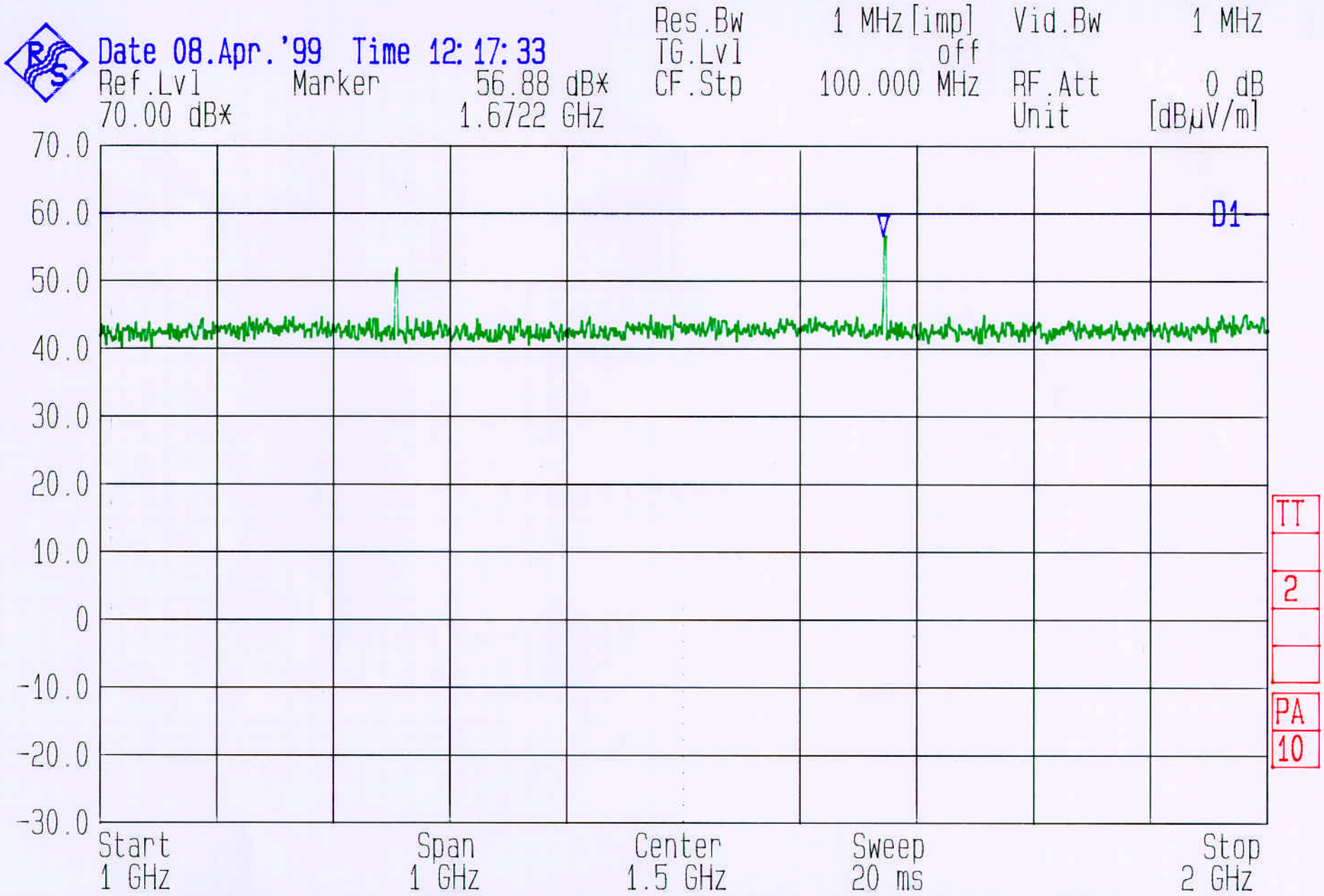
Radiated. Tested By RFI for Basys Technology Ltd. EUT: High Power Tx. FCC Part 15:98
Limit 15.231(b). Tx CW Mode at Full Power. GPH/38788/JD01/001



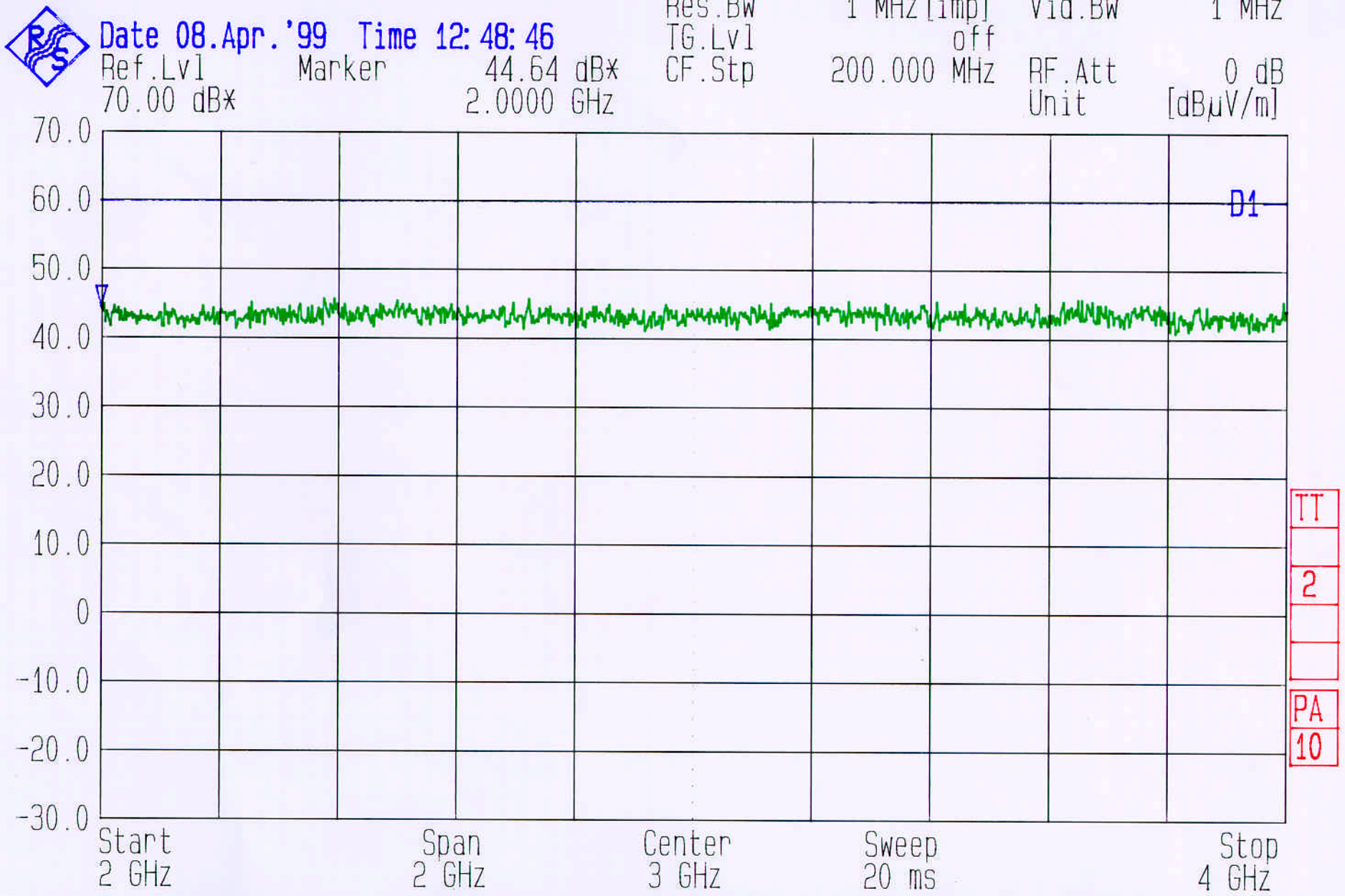
Radiated. Tested By RFI for Basys Technology Ltd. EUT: Low Power Tx. FCC Part 15:98
Limit 15.231(e). Tx CW Mode at Full Power. GPH/38788/JD01/002



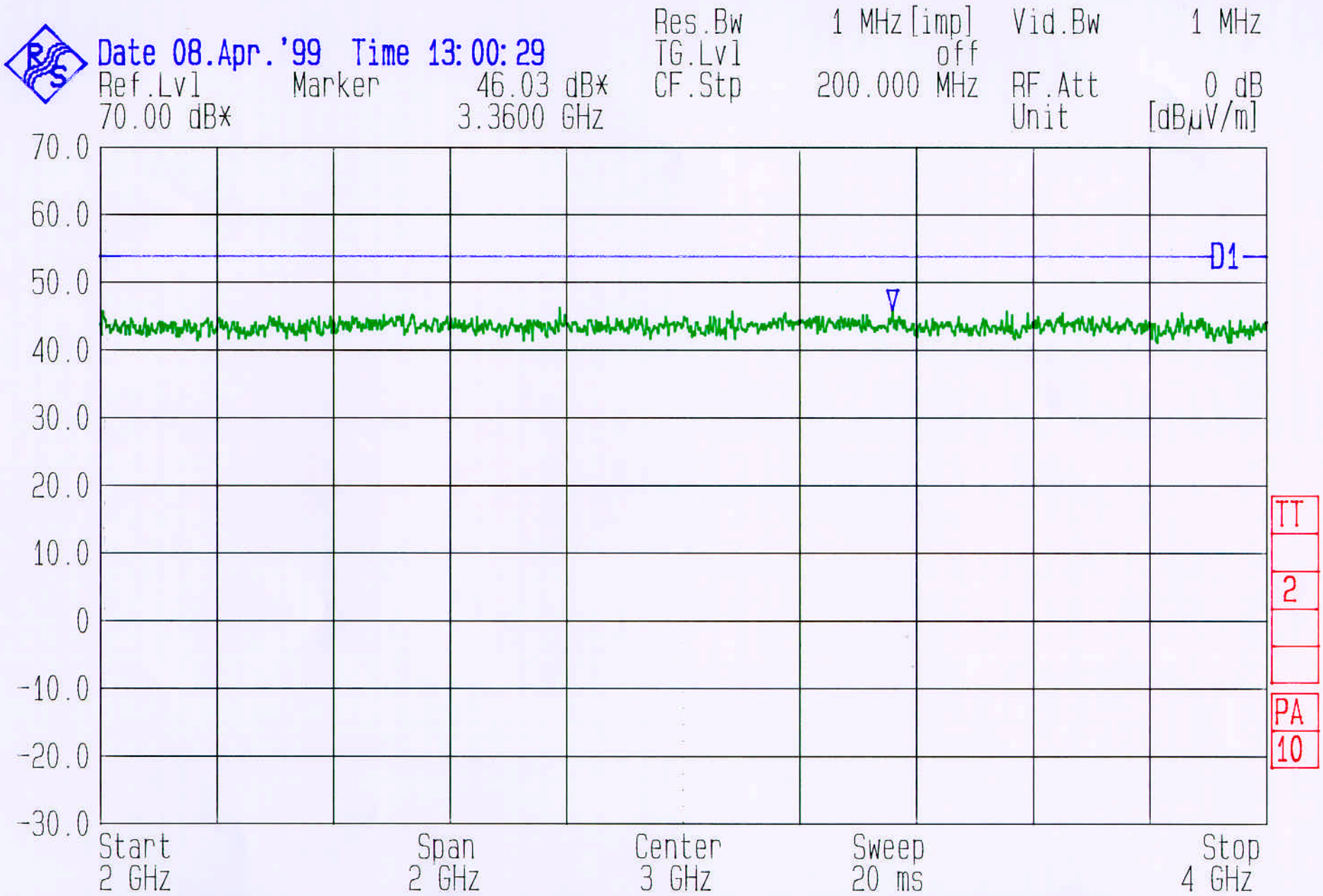
Radiated. Tested By RFI for Basys Technology Ltd. EUT: Low Power Tx. FCC Part 15:98
Limit 15.231(e). Tx CW Mode at Full Power. GPH/38788/JD01/003



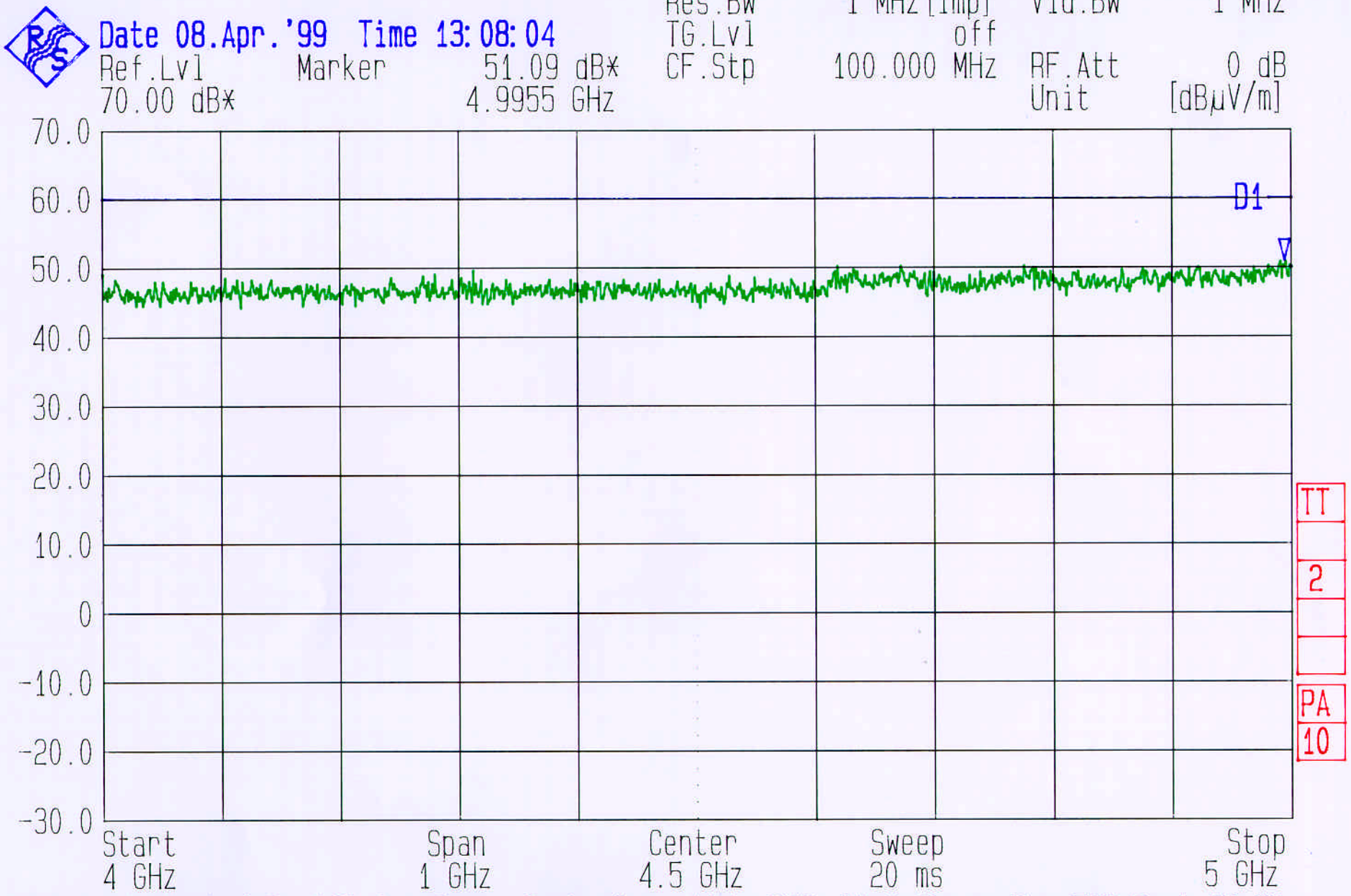
Radiated. Tested By RFI for Basys Technology Ltd. EUT: High Power Tx. FCC Part 15:98
Limit 15.231 (b). Tx CW Mode at Full Power. GPH/38788/JD01/004



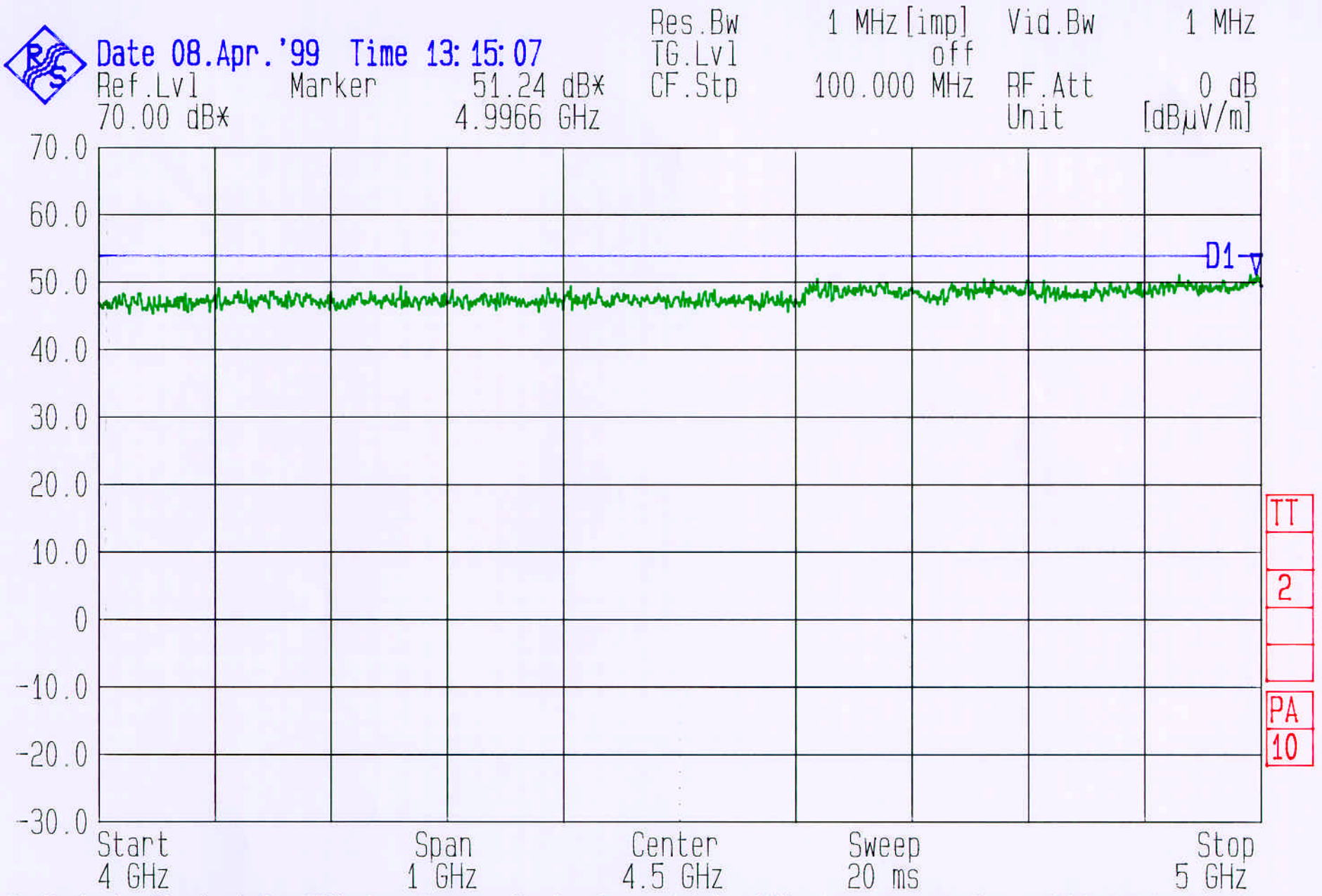
Radiated. Tested By RFI for Basys Technology Ltd. EUT: High Power Tx. FCC Part 15:98
Limit 15.231 (b). Tx CW Mode at Full Power. GPH/38788/JD01/005



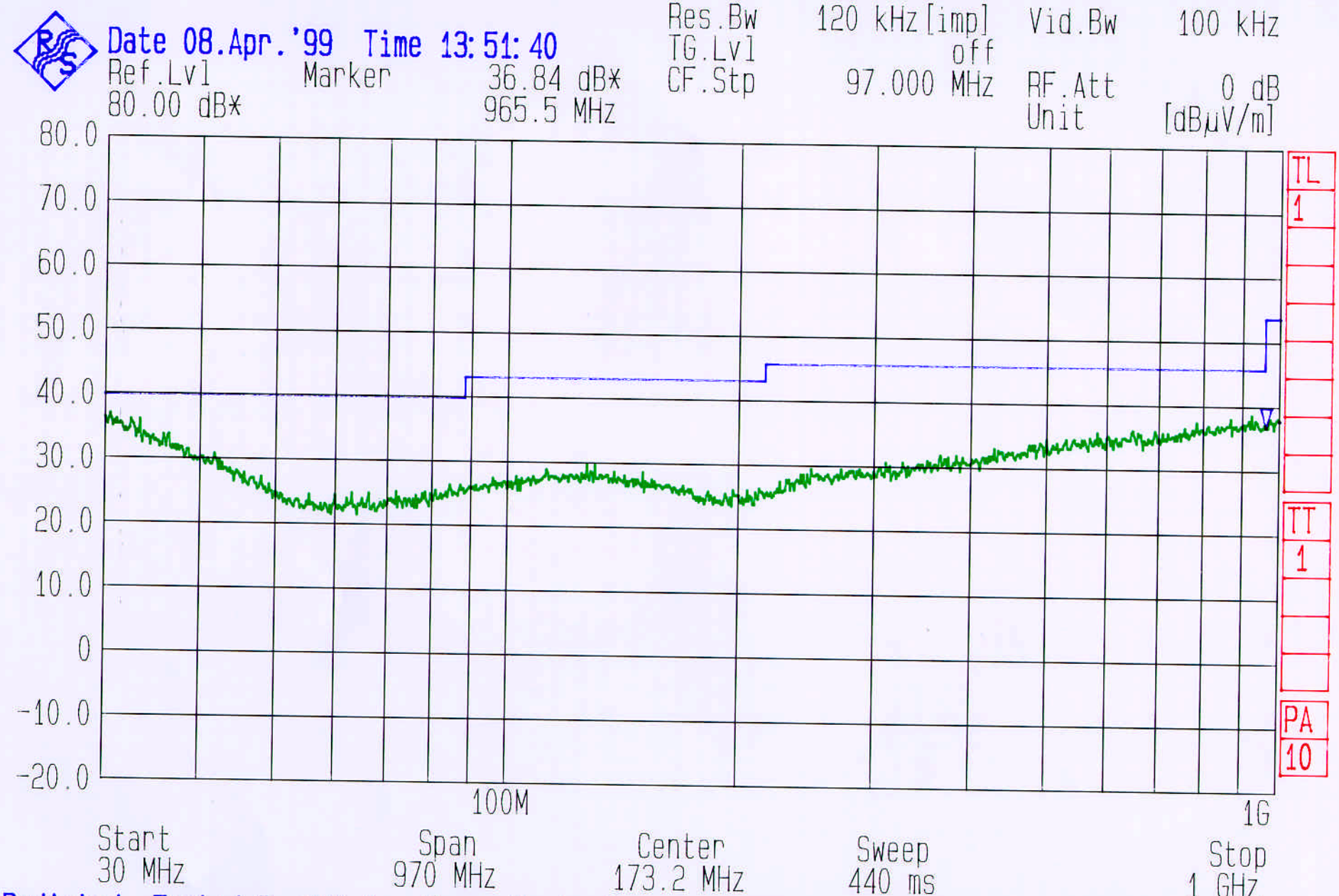
Radiated. Tested By RFI for Basys Technology Ltd. EUT: Low Power Tx. FCC Part 15:98
Limit 15.231 (e). Tx CW Mode at Full Power. GPH/38788/JD01/006



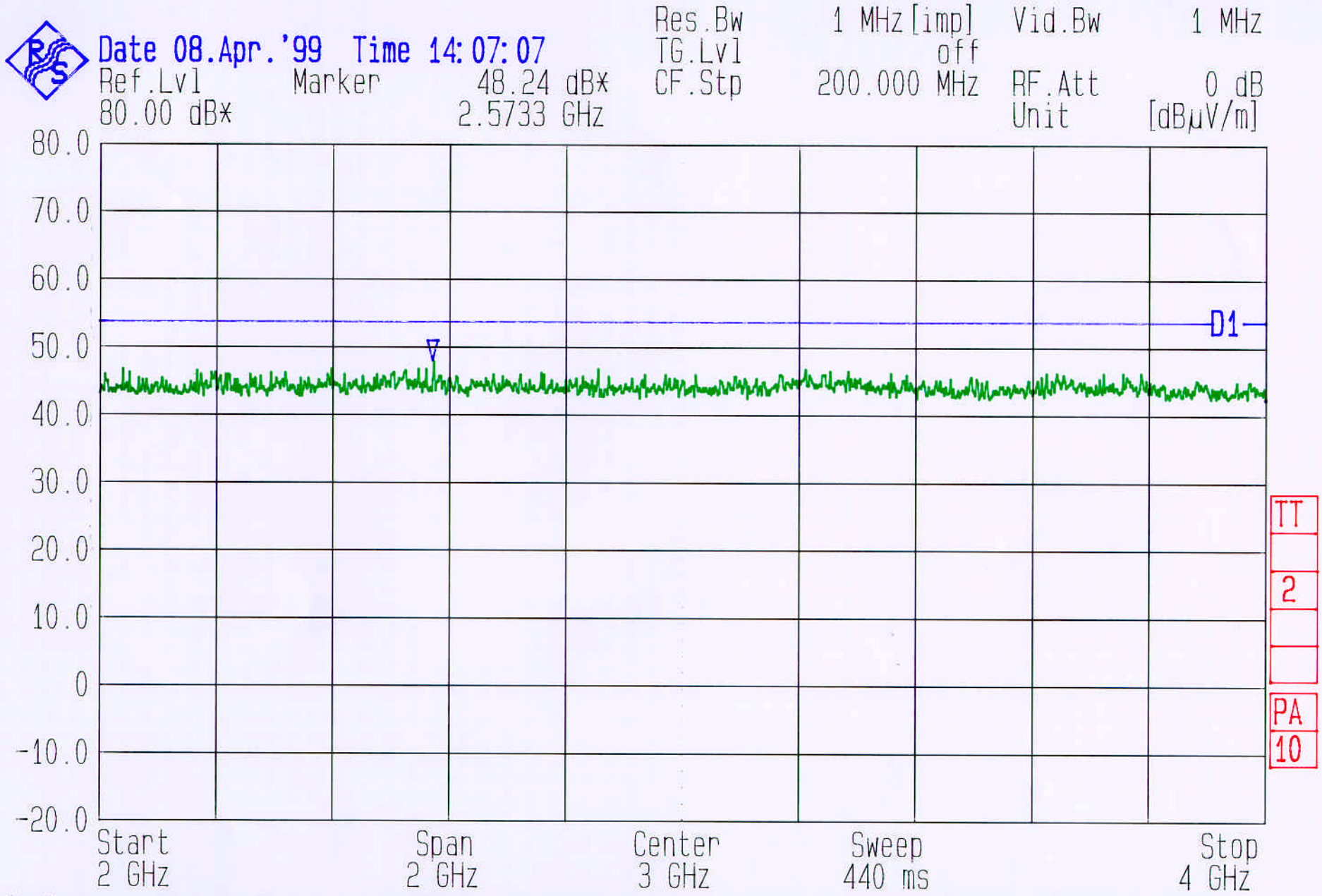
Radiated. Tested By RFI for Basys Technology Ltd. EUT: High Power Tx. FCC Part 15:98
Limit 15.231 (b). Tx CW Mode at Full Power. GPH/38788/JD01/007



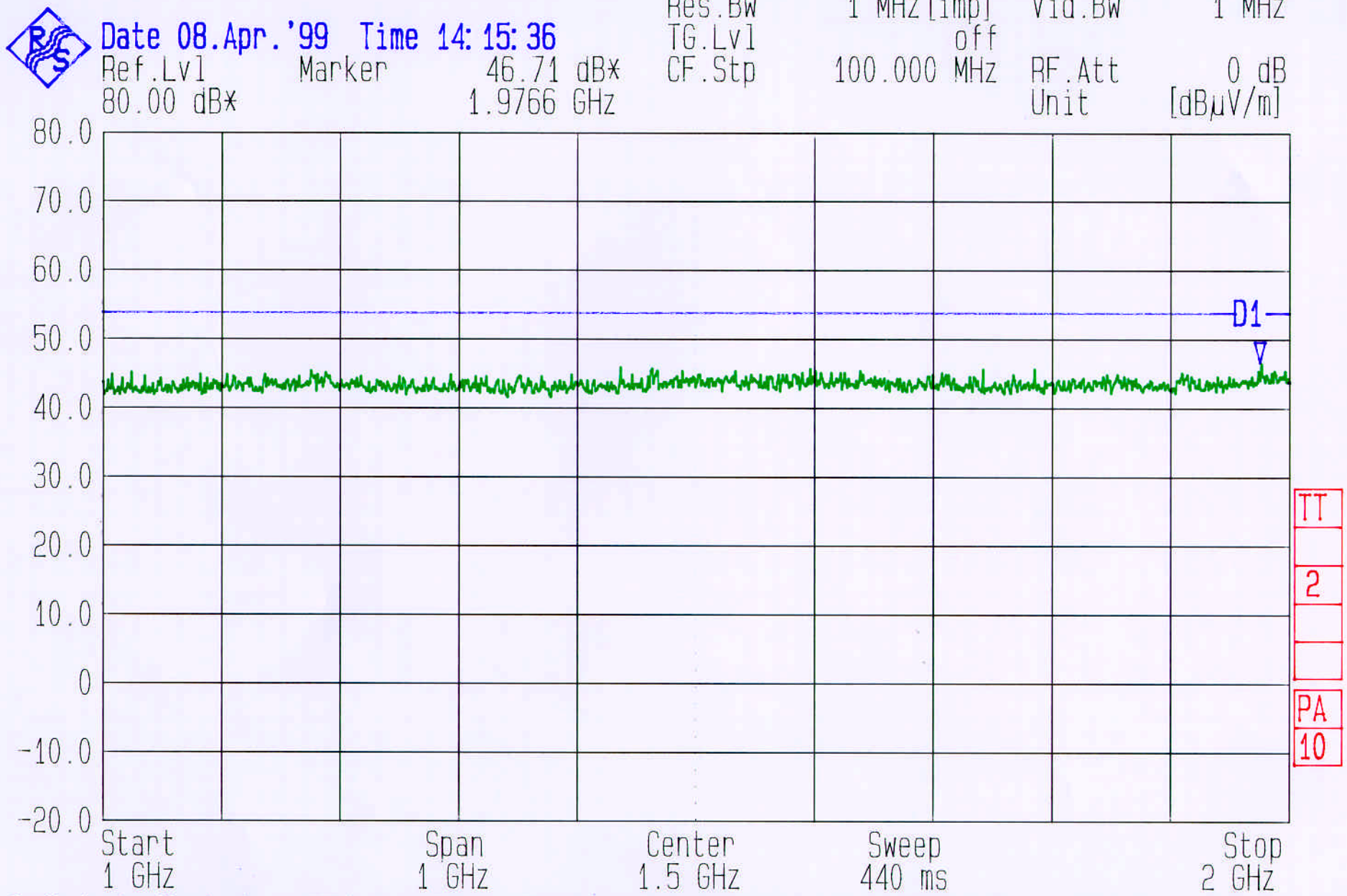
Radiated. Tested By RFI for Basys Technology Ltd. EUT: Low Power Tx. FCC Part 15:98
Limit 15.231 (e). Tx CW Mode at Full Power. GPH/38788/JD01/008



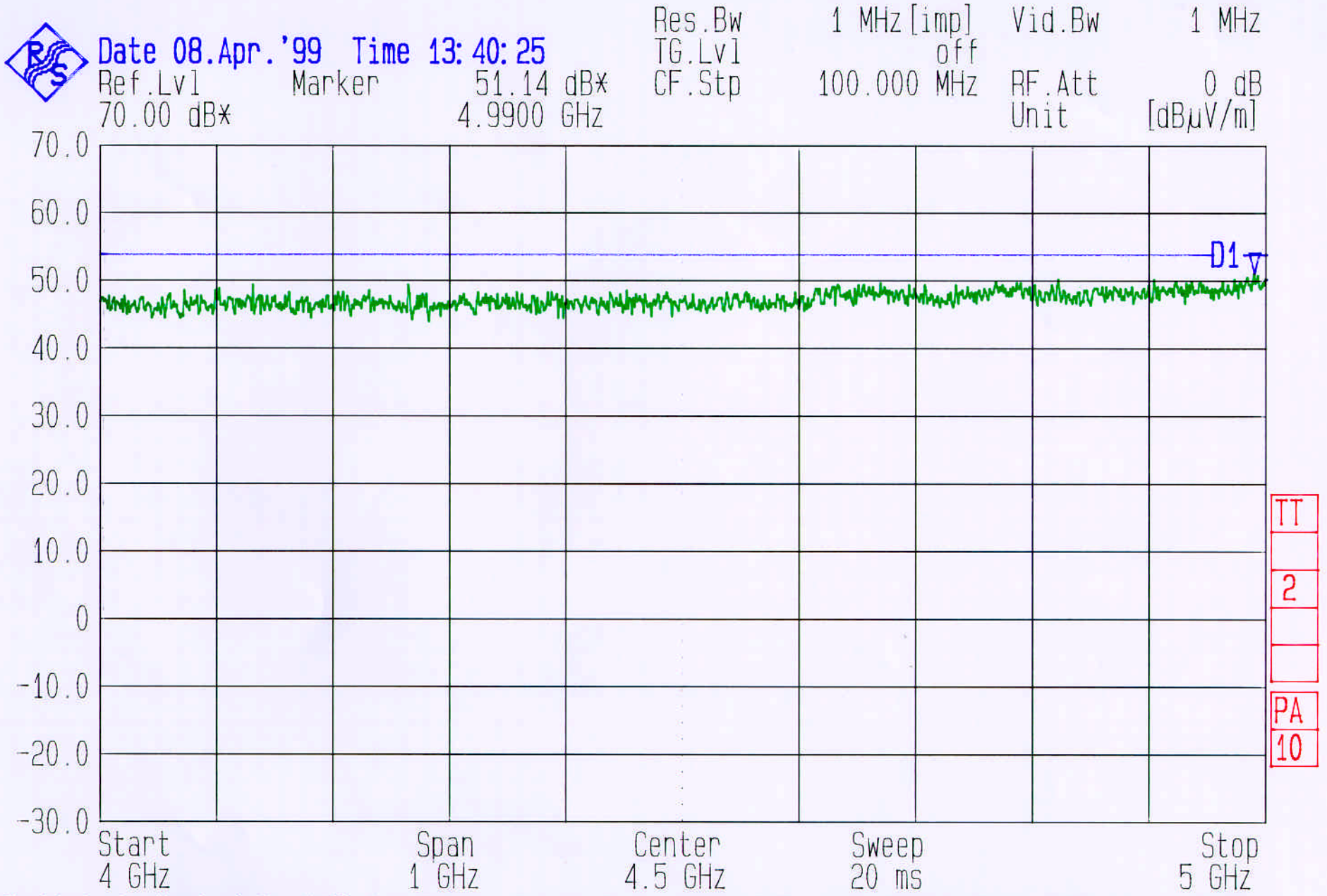
Radiated. Tested By RFI for Basys Technology Ltd. EUT: Low Power Tx. FCC Part 15:98
Limit Class B. Standby Mode. GPH/38788/JD01/009



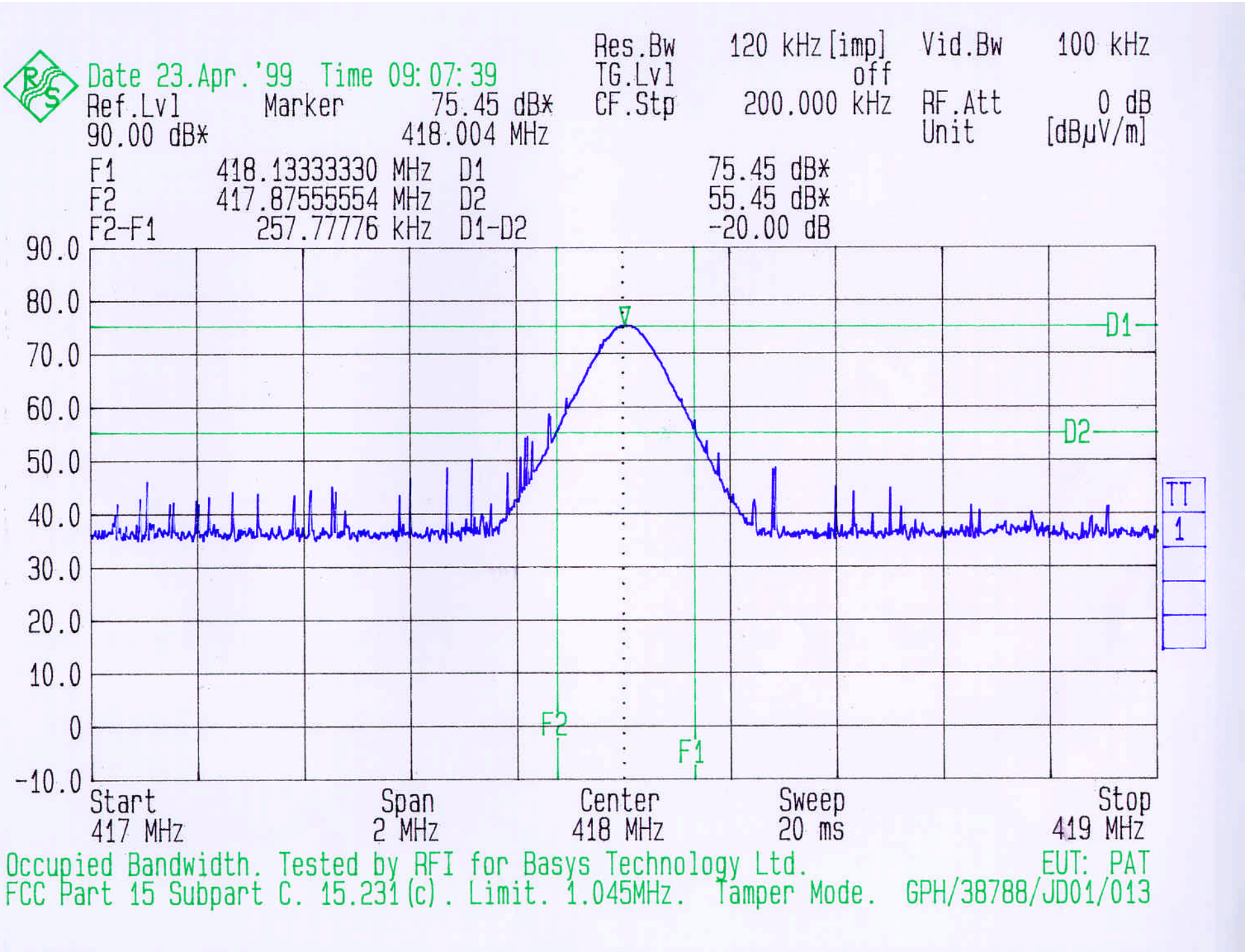
Radiated. Tested By RFI for Basys Technology Ltd. EUT: Low Power Tx. FCC Part 15:98
Limit Class B. Standby Mode. GPH/38788/JD01/010

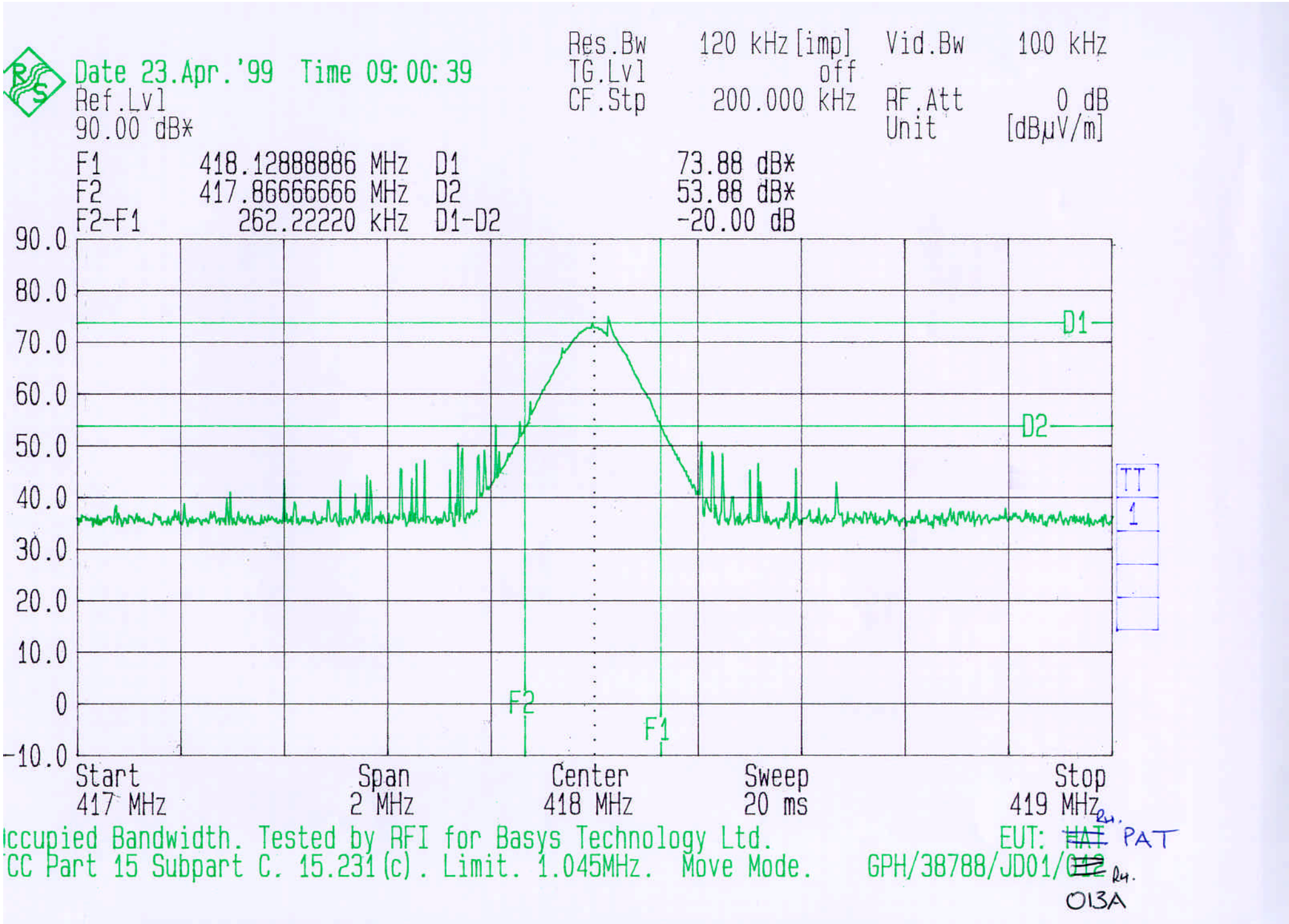


Radiated. Tested By RFI for Basys Technology Ltd. EUT: Low Power Tx. FCC Part 15:98
Limit Class B. Standby Mode. GPH/38788/JD01/011



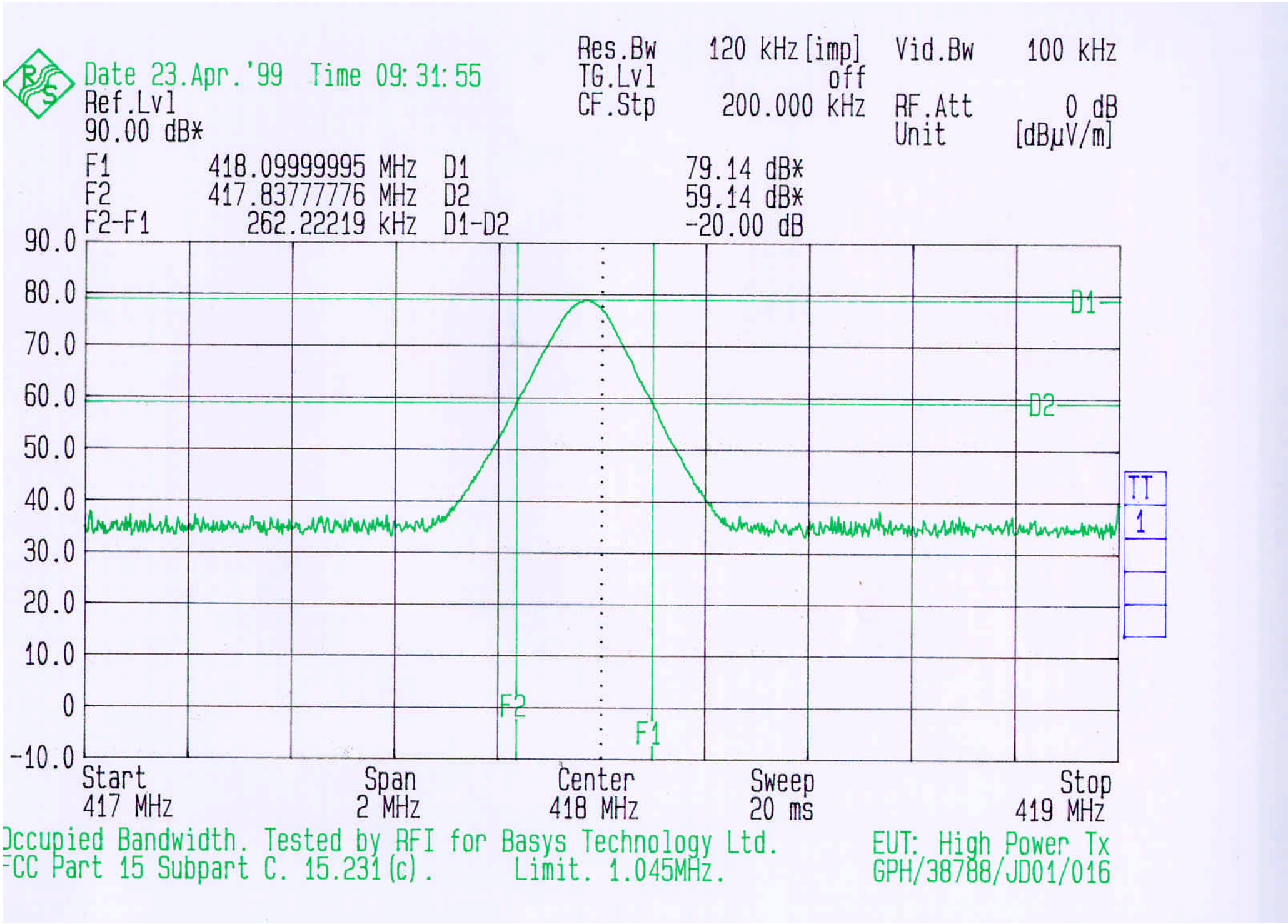
Radiated. Tested By RFI for Basys Technology Ltd. EUT: Low Power Tx. FCC Part 15:98
Limit Class B. Standby Mode. GPH/38788/JD01/012

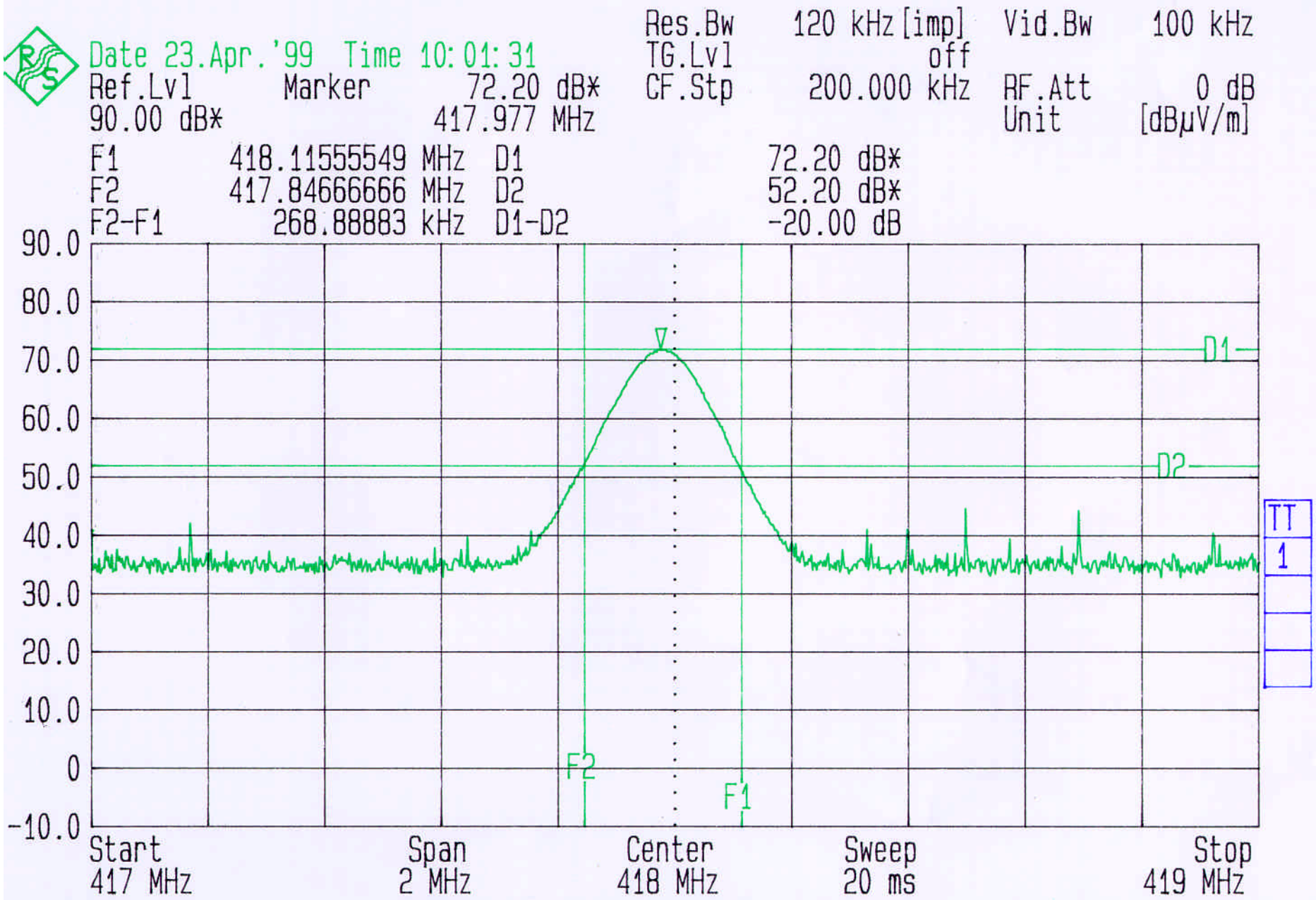

Date 23.Apr.'99 Time 09:07:39
Res.Bw 120 kHz [imp]
Vid.Bw 100 kHz
TG.Lvl off
CF.Stp 200.000 kHz
RF.Att 0 dB
Unit [dBµV/m]
Ref.Lvl 90.00 dB*
Marker 75.45 dB* 418.004 MHz
F1 418.13333330 MHz D1 75.45 dB*
F2 417.87555554 MHz D2 55.45 dB*
F2-F1 257.77776 kHz D1-D2 -20.00 dB
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
D1
D2
F2
F1
TT
1
Start 417 MHz
Span 2 MHz
Center 418 MHz
Sweep 20 ms
Stop 419 MHz
Occupied Bandwidth. Tested by RFI for Basys Technology Ltd.
EUT: PAT
FCC Part 15 Subpart C. 15.231(c). Limit. 1.045MHz. Tamper Mode. GPH/38788/JD01/013

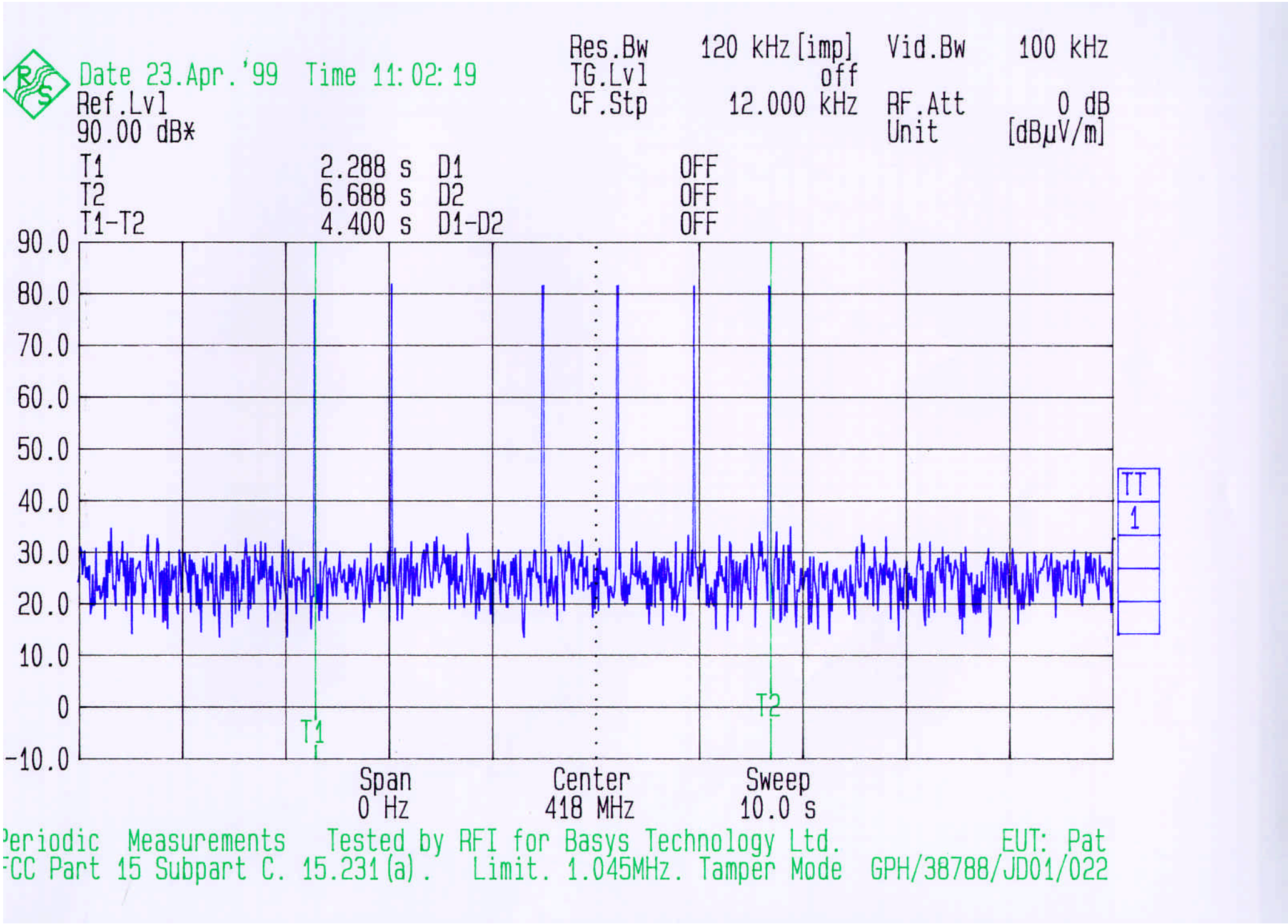


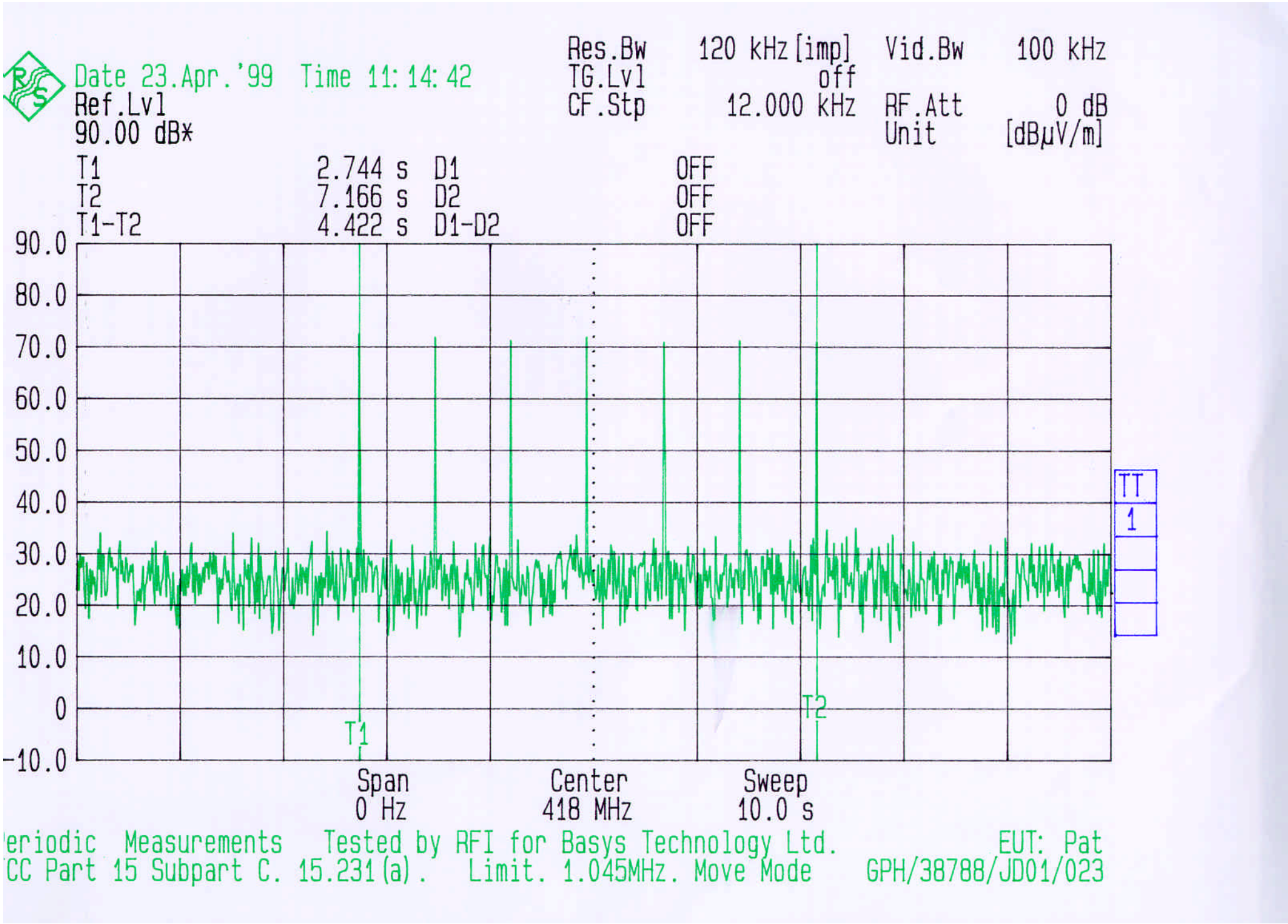
ccupied Bandwidth. Tested by RFI for Basys Technology Ltd.
CC Part 15 Subpart C. 15.231(c). Limit. 1.045MHz. Move Mode.

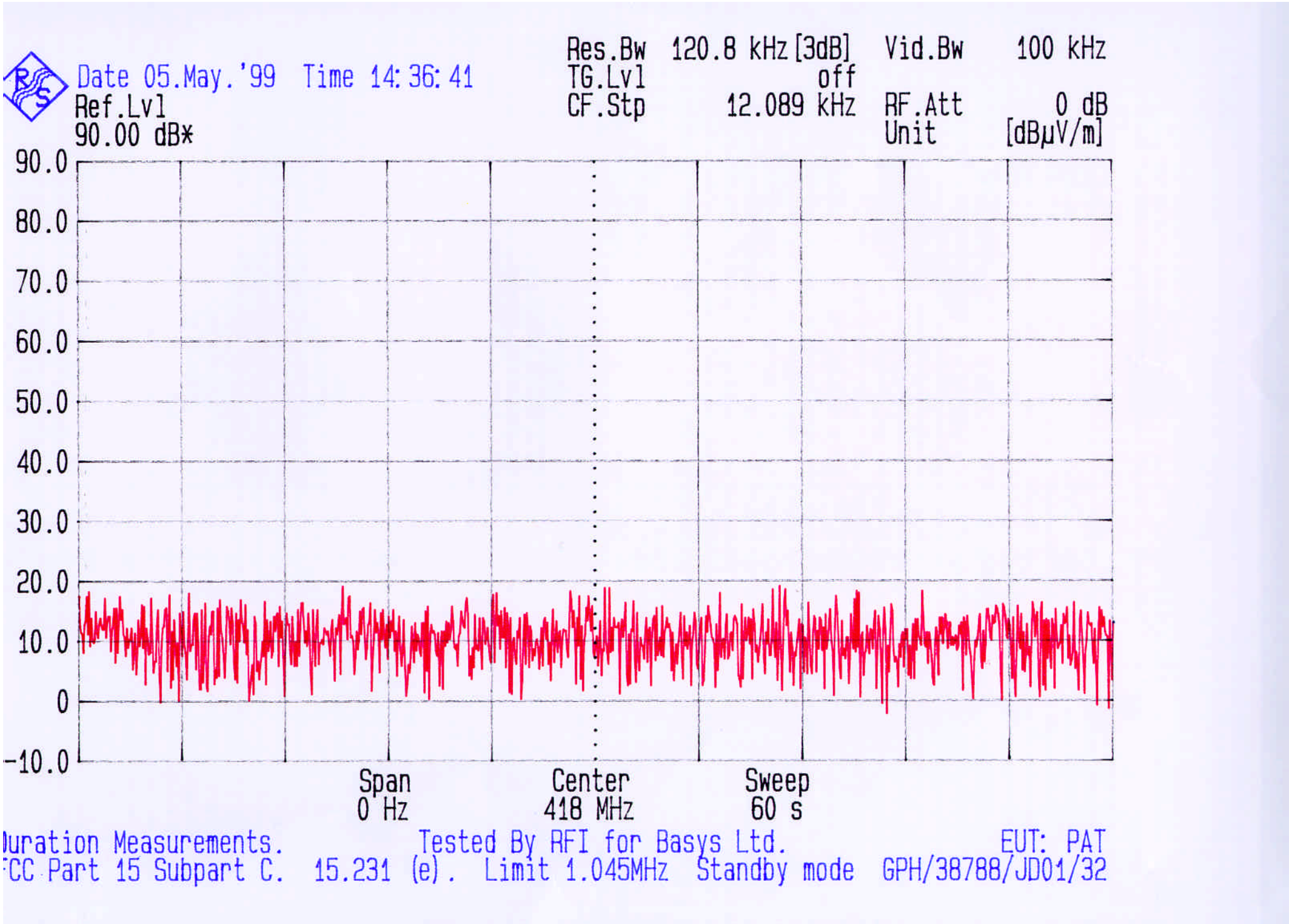
EUT: ~~HAT~~ PAT
GPH/38788/JD01/~~C12~~ R4.
013A


Date 23.Apr.'99 Time 09:31:55
Ref.Lvl
90.00 dB*
Res.Bw 120 kHz [imp]
TG.Lvl off
CF.Stp 200.000 kHz
Vid.Bw 100 kHz
RF.Att 0 dB
Unit [dBµV/m]
F1 418.09999995 MHz D1 79.14 dB*
F2 417.83777776 MHz D2 59.14 dB*
F2-F1 262.22219 kHz D1-D2 -20.00 dB
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
D1
D2
F2
F1
TT
1
Start 417 MHz
Span 2 MHz
Center 418 MHz
Sweep 20 ms
Stop 419 MHz
Occupied Bandwidth. Tested by RFI for Basys Technology Ltd.
FCC Part 15 Subpart C. 15.231(c). Limit. 1.045MHz.
EUT: High Power Tx
GPH/38788/JD01/016


Date 23.Apr.'99 Time 10:01:31
Res.Bw 120 kHz [imp]
Vid.Bw 100 kHz
TG.Lvl off
CF.Stp 200.000 kHz
RF.Att 0 dB
Unit [dBµV/m]
Ref.Lvl 90.00 dB*
Marker 72.20 dB* 417.977 MHz
F1 418.11555549 MHz D1 72.20 dB*
F2 417.84666666 MHz D2 52.20 dB*
F2-F1 268.88883 kHz D1-D2 -20.00 dB
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
D1
D2
F2
F1
TT
1
Start 417 MHz
Span 2 MHz
Center 418 MHz
Sweep 20 ms
Stop 419 MHz
Occupied Bandwidth. Tested by RFI for Basys Technology Ltd.
FCC Part 15 Subpart C. 15.231(c). Limit. 1.045MHz.
EUT: Low Power Tx
GPH/38788/JD01/017


Date 23.Apr.'99 Time 11:02:19
Res.Bw 120 kHz [imp]
TG.Lvl off
CF.Stp 12.000 kHz
Vid.Bw 100 kHz
RF.Att 0 dB
Unit [dBµV/m]
Ref.Lvl
90.00 dB*
T1 2.288 s D1 OFF
T2 6.688 s D2 OFF
T1-T2 4.400 s D1-D2 OFF
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
T1
T2
TT
1
Span
0 Hz
Center
418 MHz
Sweep
10.0 s
Periodic Measurements Tested by RFI for Basys Technology Ltd. EUT: Pat
FCC Part 15 Subpart C. 15.231(a). Limit. 1.045MHz. Tamper Mode GPH/38788/JD01/022


Date 23.Apr.'99 Time 11:14:42
Res.Bw 120 kHz [imp]
Vid.Bw 100 kHz
TG.Lvl off
CF.Stp 12.000 kHz
RF.Att 0 dB
Unit [dBµV/m]
Ref.Lvl
90.00 dB*
T1 2.744 s D1 OFF
T2 7.166 s D2 OFF
T1-T2 4.422 s D1-D2 OFF
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
T1
T2
TT
1
Span
0 Hz
Center
418 MHz
Sweep
10.0 s
eriodic Measurements Tested by RFI for Basys Technology Ltd.
EUT: Pat
CC Part 15 Subpart C. 15.231(a). Limit. 1.045MHz. Move Mode
GPH/38788/JD01/023


Date 05.May.'99 Time 14:36:41
Res.Bw 120.8 kHz [3dB]
Vid.Bw 100 kHz
TG.Lvl off
CF.Stp 12.089 kHz
RF.Att 0 dB
Unit [dBµV/m]
Ref.Lvl
90.00 dB*
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
Span
0 Hz
Center
418 MHz
Sweep
60 s
Duration Measurements.
Tested By RFI for Basys Ltd.
EUT: PAT
FCC Part 15 Subpart C. 15.231 (e). Limit 1.045MHz Standby mode GPH/38788/JD01/32

Appendix 5. Photographs of EUT

This appendix contains the following photographs:

Photo Reference Number	Title
PHT\38788\001	Front view of equipment under test.
PHT\38788\002	Rear view of equipment under test.

These pages are not included in the total number of pages for this report.

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Test Of: **Basys Technology Ltd.**
418MHz PAT
To: **F.C.C. Part 15: 1997 Subpart C (Intentional Radiators) Section 15.231**

PHT\38788\001 Front view of equipment under test.

Test Of: **Basys Technology Ltd.**
418MHz PAT
To: **F.C.C. Part 15: 1997 Subpart C (Intentional Radiators) Section 15.231**

PHT\38788\002 Rear view of equipment under test.