

TRaC Radio Test Report : 8F1722WUS5

Applicant : GN Netcom A/S

Apparatus : Jabra PRO 9470 Base Station and
: SSA-5W-09 US 075065F SIL switching adapter

Test Standard : Title 47 of the Code of Federal Regulations
Part 15 Subpart C – Intentional Radiators.
Section 15.247

Authorised by :



: Radio Product Manager

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Section 1:

Introduction

1.1 General

This report contains an assessment of an apparatus against Electromagnetic Compatibility Standards based upon tests carried out on samples submitted to the Laboratory.

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As Above

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1.2 Tests Requested By

This testing in this report was requested by :

GN Netcom A/S
Lautrupbjerg 7
DK-2750
Ballerup
Denmark

1.3 Manufacturer

VTech Communications Ltd
Vtech Science Park,
Liaobu, Dongguan
Guangdong, 523411
P.R. China

1.4 Apparatus Assessed

The following apparatus was assessed between:

Jabra PRO 9470 Base Station and SSA-5W-09 US 075065F SIL switching adapter.

The above equipment was a RFP DECT base unit and plug top PSU for use with the Jabra PRO 9400 series headset.

The client declared that the Jabra PRO 9400 series contained the following base station variants:

Jabra PRO 9470 Base Station – A fully featured DECT & Bluetooth Base Station with display.
Jabra PRO 9450 Base Station – A feature reduces variant containing DECT and display.
Jabra PRO 9430 Base Station – A feature reduced variant containing DECT only.

Full testing was performed against the Jabra PRO 9470 Base Station only.

The client declared that the switching adapter has 4 variants:

- a UK variant SSA-5W-09 UK 075065F SIL switching adapter
- a EU variant SSA-5W-09 EU 075065F SIL switching adapter
- a US variant SSA-5W-09 US 075065F SIL switching adapter
- a AUS variant SSA-5W-09 AU 075065F SIL switching adapter

All 4 variants of the adapters are electrically identical with variations to the pin design only.

Full testing was performed against using the US variant SSA-5W-09 US 075065F SIL switching adapter only.

1.5 Test Result Summary

Full details of test results are contained within Appendix A. The following table summarises the results of the assessment.

The statements relating to compliance with the standards below apply ONLY as qualified in the notes and deviations stated in sections 1.6 to 1.7 of this test report.

Full details of test results are contained within Appendix A. The following table summarises the results of the assessment.

Test Type	Regulation	Measurement standard	Result
Radiated spurious emissions (Restricted bands)	Title 47 of the CFR: 2008, Part 15 Subpart (c) 15.247	ANSI C63.4: 2003	See Appendix A
Radiated spurious emissions Non-Transmitting mode	Title 47 of the CFR: 2008, Part 15 Subpart (b) 15.109	ANSI C63.4: 2003	See Appendix A
Conducted spurious emissions (Non-restricted bands)	Title 47 of the CFR: 2008, Part 15 Subpart (c) 15.247	Public Notice DA 00-705 March 30, 2000	Pass
AC Power conducted emissions	Title 47 of the CFR: 2008, Part 15 Subpart (c) 15.207	ANSI C63.4: 2003	Pass
20dB Bandwidth and Channel Spacing	Title 47 of the CFR :2008, Part 15 Subpart (c) 15.247(a)(1)(i)	Public Notice DA 00-705 March 30, 2000	Pass
Conducted Carrier Power	Title 47 of the CFR :2008, Part 15 Subpart (c) 15.247(b)(2)	Public Notice DA 00-705 March 30, 2000	Pass
Hopping Frequencies	Title 47 of the CFR :2008, Part 15 Subpart (c) 15.247(a)(1)	Public Notice DA 00-705 March 30, 2000	Pass
Channel Occupancy	Title 47 of the CFR :2008, Part 15 Subpart (c) 15.247(a)(1)(i)	Public Notice DA 00-705 March 30, 2000	Pass

Abbreviations used in the above table:

Mod	: Modification	ANSI	: American National Standards Institution
CFR	: Code of Federal Regulations	PLCE	: Power Line Conducted Emissions
REFE	: Radiated Electric Field Emissions		

1.6 Notes Relating To The Assessment

With regard to this assessment, the following points should be noted:

The results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

The apparatus was set up and exercised using the configurations, modes of operation and arrangements defined in this report only.

Particular operating modes, apparatus monitoring methods and performance criteria required by the standards tested to have been performed except where identified in Section 1.7 of this test report (Deviations from Test Standards).

For emissions testing, throughout this test report, "Pass" indicates that the results for the sample as tested were below the specified limit (refer also to Section 2, Measurement Uncertainty).

Where relevant, the apparatus was only assessed using the monitoring methods and susceptibility criteria defined in this report.

All testing with the exception of testing at the Open Area Test Site was performed under the following environmental conditions:

Temperature	: 17 to 23 °C
Humidity	: 45 to 75 %
Barometric Pressure	: 86 to 106 kPa

All dates used in this report are in the format dd/mm/yy.

This assessment has been performed in accordance with the requirements of ISO/IEC 17025.

TRAC TELECOMS & RADIO Hull is a listed electromagnetic compatibility Conformance Assessment Body (CAB) for EC access to the US market. (Decision No 3/2000 of the Joint Committee established under the Agreement on Mutual Recognition between the European Community and the United States of America. This decision was effective from 16th January 2001).

FCC Facility Registration number (3m semi anechoic chamber) : 90743

1.7 Deviations from Test Standards

There were no deviations from the standards tested to.

Section 2:

Measurement Uncertainty

2.1 Application of Measurement Uncertainty

The following table contains the measurement uncertainties for TRAC TELECOMS & RADIO measurements

The following procedure is used when determining the result of a measurement :

- (i) If specification limits are not exceeded by the measured result, extended by the positive component of the expanded uncertainty interval at a confidence level of 95%, then a pass result is recorded.
- (ii) Where a specification limit is exceeded by the result even when the result is decreased by the negative component of the expanded uncertainty interval, a fail result is recorded.
- (iii) Where result measured is below a limit, but by a margin less than the positive measurement uncertainty component, it is not possible to record a pass based on a 95% confidence level. However, the result indicates that a pass result is more probable than a fail result.
- (iv) Where a measured result is above a limit, but by a margin less than the negative measurement uncertainty component, it is not possible to record a fail based on a 95% confidence level. However the result indicates that a fail is more probable than a pass.

2.2 Trac Telecoms & Radio Measurement Uncertainty Values

For the test data recorded in accordance with note (iii) of Section 2.1 the following measurement uncertainty was calculated.

The following table contains the measurement uncertainties for TRaC Telecoms & Radio Ltd

Test type	Quantity	Quantity frequency range	Uncertainty
Radiated electric field emissions 3m alternative test site Effective Radiated Power 3m alternative test site	Amplitude	30MHz to 300MHz Horizontal	±4.6dB
		30MHz to 300MHz Vertical	±5.1dB
		300MHz to 1000MHz Horizontal	±5.2dB
		300MHz to 1000MHz Vertical	±5.5dB
		1GHz to 26.5GHz Horizontal and Vertical	±4.1dB
Conducted emissions		N/A	±0.9 dB
Absolute RF power (via antenna connector)		N/A	±0.9 dB
PSD		N/A	±0.9 dB
Frequency Range	Frequency	dc to 26.5GHz	3.611kHz

Section 3:

Modifications

3.1 Modifications Performed During Assessment

No modifications were performed during the assessment

Appendix A:**Formal Emission Test Results**

Abbreviations used in the tables in this appendix:

Spec : Specification
Mod : Modification

EUT : Equipment Under Test
SE : Support Equipment

L : Live Power Line
N : Neutral Power Line
E : Earth Power Line

Pk : Peak Detector
QP : Quasi-Peak Detector
Av : Average Detector

ALSR : Absorber Lined Screened Room
OATS : Open Area Test Site
ATS : Alternative Test Site

Ref : Reference
Freq : Frequency

MD : Measurement Distance
SD : Spec Distance

Pol : Polarisation
H : Horizontal Polarisation
V : Vertical Polarisation

CDN : Coupling & decoupling network

A1 Conducted Fundamental Carrier Power

Conducted carrier power was verified using a peak power meter, the EUT transmitting on its lowest, centre and highest carrier frequency in turn.

Test Details:	
Regulation	Title 47 of the CFR 2008, Part15 Subpart (c) 15.247(b)(1)
EUT sample number	S41 and S32
Modification state	0
SE in test environment	REF828
SE isolated from EUT	None
EUT set up	Refer to Appendix C

Channel No	Channel Frequency (MHz)	Measured Peak Conducted Carrier Power (W)	Limit (W) ≥ 79 channels	Result
0	2402	0.0009	0.125	Pass
39	2441	0.0009		Pass
78	2480	0.001		Pass

Notes

The carrier power was measured whilst varying the supply voltage between 85% and 105% of the nominal supply voltage as required by 15.31(e). No variation in carrier power was observed.

The peak carrier power did not vary between the three modulation modes.

Limit based on relaxed 20 dB Bandwidth requirement of 15.247(a)(1).

A2 RF Antenna Conducted Spurious Emissions

Measurement of conducted spurious emissions at the antenna port was performed using a peak detector with the RBW set to 100kHz and the VBW>RBW. Frequencies were scanned up through to the 10th harmonic with the EUT transmitting on its lowest, centre and highest carrier frequency in turn.

Test Details	
Regulation	Title 47 of the CFR 2008, Part 15 Subpart (c) Clause 15.247(d) and Clause 15.205
Measurement standard	ANSI C63.4:2003
Frequency range	9 kHz to 25 GHz
EUT sample number	S41 and S32
Modification state	0
SE in test environment	REF 838
SE isolated from EUT	None
EUT set up	Refer to Appendix C

No emissions within 20 dB of the tests limits were detected.

Notes:

1. The conducted emission limit for emissions outside the restricted bands, defined in 47CFR15.205(a) are based on a transmitted carrier level of 15.247(b). With the EUT transmitting on its lowest, centre and highest carrier frequencies in turn, emissions from the EUT are required to be 20 dB below the level of the highest fundamental as measured within a 100 kHz RBW in accordance with 15.247(d) using a peak detector.
2. The RBW = 100 kHz, Video bandwidth (VBW) > RBW and the radio spectrum was investigated up to the 10th harmonic in accordance 15.33 (a)(1).
3. The measurements at 2400 MHz and 2483.5 MHz were made to ensure band edge compliance.
4. The carrier level was measured whilst varying the supply voltage between 85% and 105% of the nominal supply voltage as required by 15.31(e). No variation in carrier level was observed.

The limit outside the restricted band in 100 kHz RBW is defined using the following formula in accordance with 15.247(d):

$$\text{The limit in 100 kHz RBW} = (\text{Maximum Peak Conducted Carrier}) - 20\text{dB}$$

Where:

The maximum peak conducted power was measured using a peak power meter. Please refer to section A1 of this test report.

Limit(dBμV)					
Channel No.	Channel Frequency (MHz)	Measured Peak Conducted Carrier Power (W)	Measured Peak Conducted Carrier (dBμV)	Measured Peak Conducted Carrier – 20dB (dBμV)	Average Emission Limit 15.247(d) Outside the restricted band in 100 kHz RBW (dBμV)
0	2402	0.0009	106.6	86.6	86.6
39	2441	0.0009	106.4	86.4	86.4
78	2480	0.001	107.2	87.2	87.2

A3 Radiated Electric Field Emissions Within The Restricted Band 15.205

The Bluetooth transceiver is co-located with The DECT transceiver. Details of radiated electric field emissions are contained within the DECT test report 8F1722WUS2.

A4 Power Line Conducted Emissions

Preview power line conducted emission measurements were performed with a peak detector in a screened room.

The effect of the EUT set-up on the measurements is summarised in note (b).

Where applicable formal measurements of the emissions were performed with a peak, average and/or quasi peak detector. The EUT was set to transmit on its lowest, centre and highest carrier frequency in turn. The formal measurements are detailed below:

Test Details:	
Regulation	Title 47 of the CFR 2008, Part 15 Subpart (c) Clause 15.207
Measurement standard	ANSI C63.4:2003
Frequency range	150kHz to 30MHz
EUT sample number	S02 and S40
Modification state	0
SE in test environment	REF 838
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Photographs (Appendix F)	Photograph 3

The worst-case power line conducted emission measurements are listed below:

Results measured using the average detector compared to the average limit

Ref No.	Freq (MHz)	Conductor	Result (dBuV)	Spec Limit (dBuV)	Margin (dB)	Result Summary
1	1.299	Live	17.8	46.0	-28.2	Pass
2	1.388	Live	24.2	46.0	-21.8	Pass
3	4.212	Live	21.7	46.0	-24.3	Pass
4	4.409	Live	22.4	46.0	-23.6	Pass
5	4.912	Live	20.4	46.0	-25.6	Pass
6	5.111	Live	19.9	46.0	-26.1	Pass
7	1.299	Live	16.5	46.0	-29.5	Pass
8	1.388	Neutral	20.3	46.0	-25.7	Pass
9	4.212	Neutral	13.7	46.0	-32.3	Pass
10	4.409	Neutral	12.6	46.0	-33.4	Pass
11	4.912	Neutral	12.5	46.0	-33.5	Pass
12	5.111	Neutral	12.4	46.0	-33.6	Pass
13	1.299	Neutral	17.8	46.0	-28.2	Pass

Results measured using the quasi-peak detector compared to the quasi-peak limit

Ref No.	Freq (MHz)	Conductor	Result (dBuV)	Spec Limit (dBuV)	Margin (dB)	Result Summary
1	1.299	Live	35.3	56.0	-20.7	Pass
2	1.388	Live	37.7	56.0	-18.3	Pass
3	4.212	Live	35.5	56.0	-20.5	Pass
4	4.409	Live	36.6	56.0	-19.4	Pass
5	4.912	Live	35.7	56.0	-20.3	Pass
6	5.111	Live	34.4	56.0	-21.6	Pass
7	1.299	Neutral	29.4	56.0	-26.6	Pass
8	1.388	Neutral	28.9	56.0	-27.1	Pass
9	4.212	Neutral	21.4	56.0	-34.6	Pass
10	4.409	Neutral	20.4	56.0	-35.6	Pass
11	4.912	Neutral	21.8	56.0	-34.2	Pass
12	5.111	Neutral	18.6	56.0	-37.4	Pass

Note: Power line conducted emissions were identical for all RF carrier frequencies

Specification limits :

Conducted emission limits (47 CFR 15:2008 Clause 15.207):

Conducted disturbance at the mains ports.

Frequency range MHz	Limits dB μ V	
	Quasi-peak	Average
0.15 to 0.5	66 to 56 ²	56 to 46 ²
0.5 to 5	56	46
5 to 30	60	50

Notes:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

Notes:

- (a) The levels may have been rounded for display purposes.
- (b) The following table summarises the effect of the EUT operating mode and internal configuration on the measured emission levels :
- (c) When the average limit was met using the peak detector, the EUT was deemed to meet both the average detector and quasi-peak detector limits and measurement with the average detector and quasi-peak detector was not required

	See (i)	See (ii)	See (iii)	See (iv)
Effect of EUT operating mode on emission levels				✓
Effect of EUT internal configuration on emission levels	✓			
(i) Parameter defined by standard and / or single possible, refer to Appendix C (ii) Parameter defined by client and / or single possible, refer to Appendix C (iii) Parameter had a negligible effect on emission levels, refer to Appendix C (iv) Worst case determined by initial measurement, refer to Appendix C				

A5 20 dB Bandwidth and Channel Spacing

Title 47 of the CFR: 2002, Part 15 Subpart (c) 15.247(a)(1)(i) requires the measurement of the bandwidth of the transmission between the -20 dB points on the transmitted spectrum. The results of this test determine the limits for channel spacing. The channel spacing shall be a minimum of 25 kHz or the 20 dB bandwidth, whichever is the 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. The formal measurements are detailed below:

Test Details:	
Regulation	Title 47 of the CFR: 2008, Part 15 Subpart (c) 15.247(a)(1)(i)
EUT sample number	S41 and S32
Modification state	0
SE in test environment	REF 838
SE isolated from EUT	None
EUT set up	Refer to Appendix C

Measured 20 dB Bandwidth (kHz)	Limit	Result
1435	N/A	N/A

Measured Channel Spacing (kHz)	Limit	Result
1000	25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater	Pass

Plots of the 20 dB bandwidth and channel spacing are contained in Appendix B of this test report. These are the worst-case values of all the modulations supported.

A6 Hopping frequencies

Hopping frequencies were verified using a spectrum analyser set to 20 MHz spans, displaying sub sets of the hopping channels in turn, while the EUT was operating in its normal frequency hopping mode.

Test Details:	
Regulation	Title 47 of the CFR :2008, Part 15 Subpart (c) 15.247(a)(1)(i)
EUT sample number	S41 and S32
Modification state	0
SE in test environment	REF 838
SE isolated from EUT	None
EUT set up	Refer to Appendix C

No. of Hopping Channels	Requirement	Result
79	For 1W conducted carrier power Limit, greater than 75	Pass

Plots showing the hopping channels are contained in Appendix B. These are identical for all modulation modes.

A7 Channel Occupancy

Channel occupancy time was verified using a spectrum analyser in zero span mode, centred on the middle hopping channel frequency (2441 MHz), while the EUT was operating in its normal frequency hopping mode. The other channels were then verified to ensure that the channel occupancy was identical for all channels.

Test Details:	
Regulation	Title 47 of the CFR2008, Part15 Subpart (c) 15.247(a)(1)
EUT sample number	S41 and S32
Modification state	0
SE in test environment	REF 838
SE isolated from EUT	None
EUT set up	Refer to Appendix C

Measured Channel Occupancy Time (ms)	Calculated Average Channel Occupancy Time (ms)	Average Channel Occupancy Time Limit (ms)	Result
0.423	134.9	400	Pass

Plots showing the channel occupancy time and time between successive transmissions are contained in Appendix B of this test report. These are identical for all modulation modes.

Average Channel Occupancy Time Calculation:

No. Of utilised hopping channels (N) = 79
 Repetition Time (T_{rep}) = 99 ms
 Measured channel occupancy time (T_{occ}) = 0.423 ms

No. of transmission cycles in specified averaging period =

$$\frac{400 \times 10^{-3} \times N}{(x)T_{rep}(ms)} = (x) \text{ cycles}$$

∴

$$\frac{400 \times 10^{-3} \times 79}{0.099} = 319 \text{ cycles}$$

∴ The Average Channel Occupancy Time =

Total activation time T_{occ} (ms) x No. of transmission cycles in specified averaging period = (x)ms
 Average Channel Occupancy Time = 0.423 x 319 ms
 = 134.9 ms

A8 Antenna Gain

The maximum antenna gain was calculated to be. -1.3 dBi.

This calculation was based on the difference between the measured radiated e.i.r.p. and the corresponding conducted carrier power at nominal conditions contained in test report 8F1722WEU3.

A9 Radiated Electric Field Emissions – Non Transmitting Mode

The Bluetooth transceiver is co-located with The DECT transceiver. Details of radiated electric field emissions are contained within the DECT test report 8F1722WUS2.

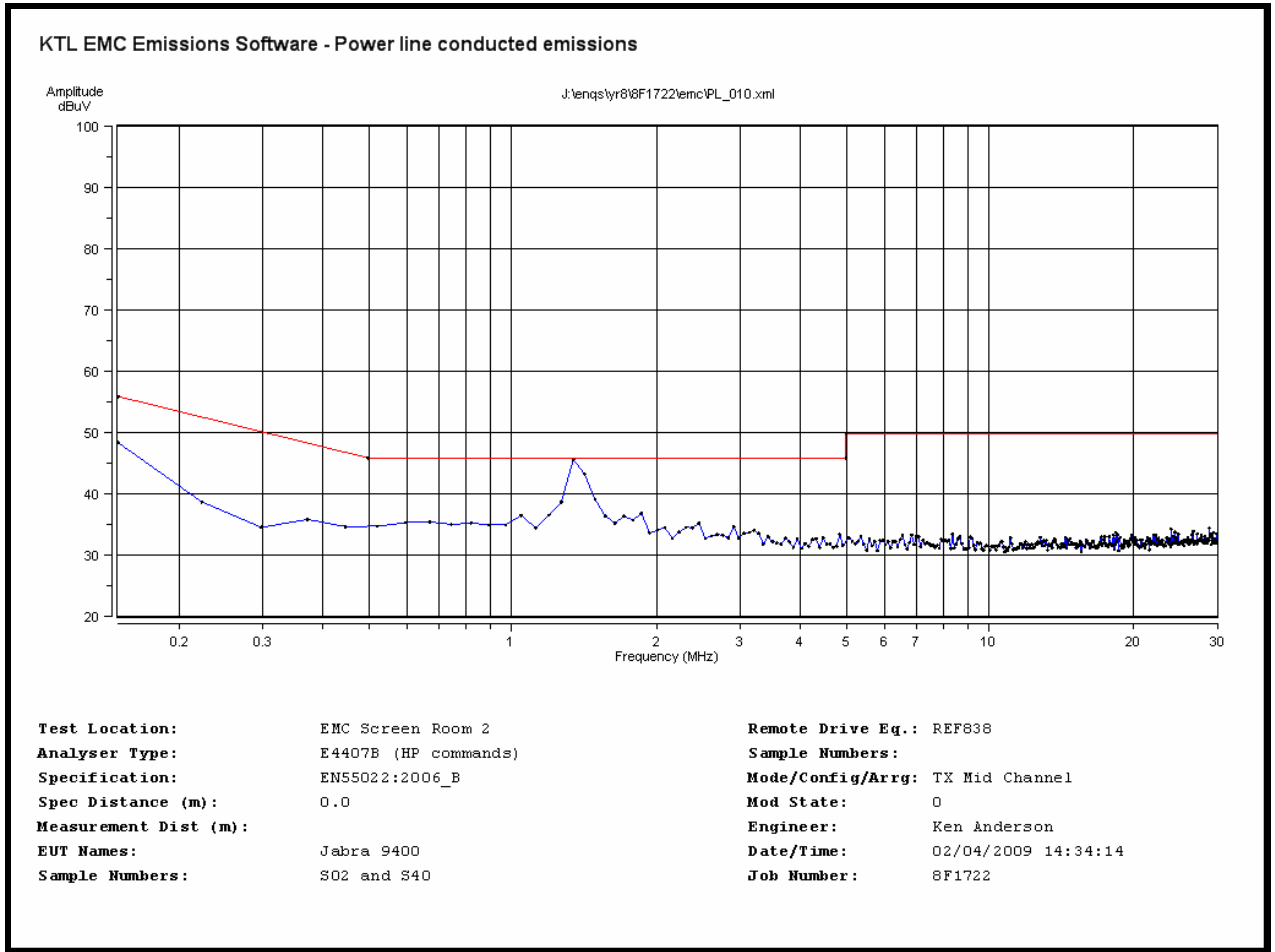
Appendix B:

Supporting Graphical Data

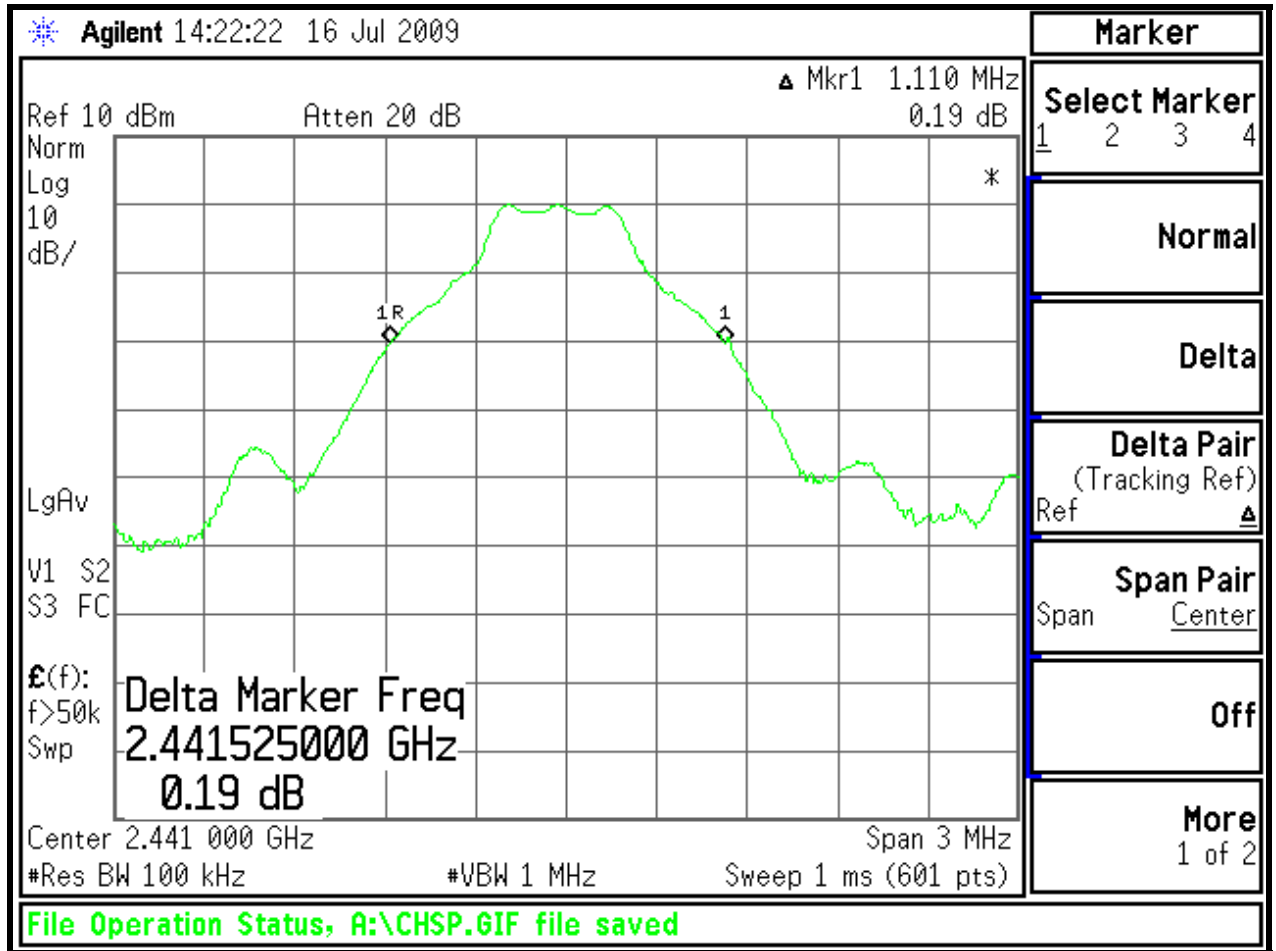
This appendix contains graphical data obtained during testing.

Notes:

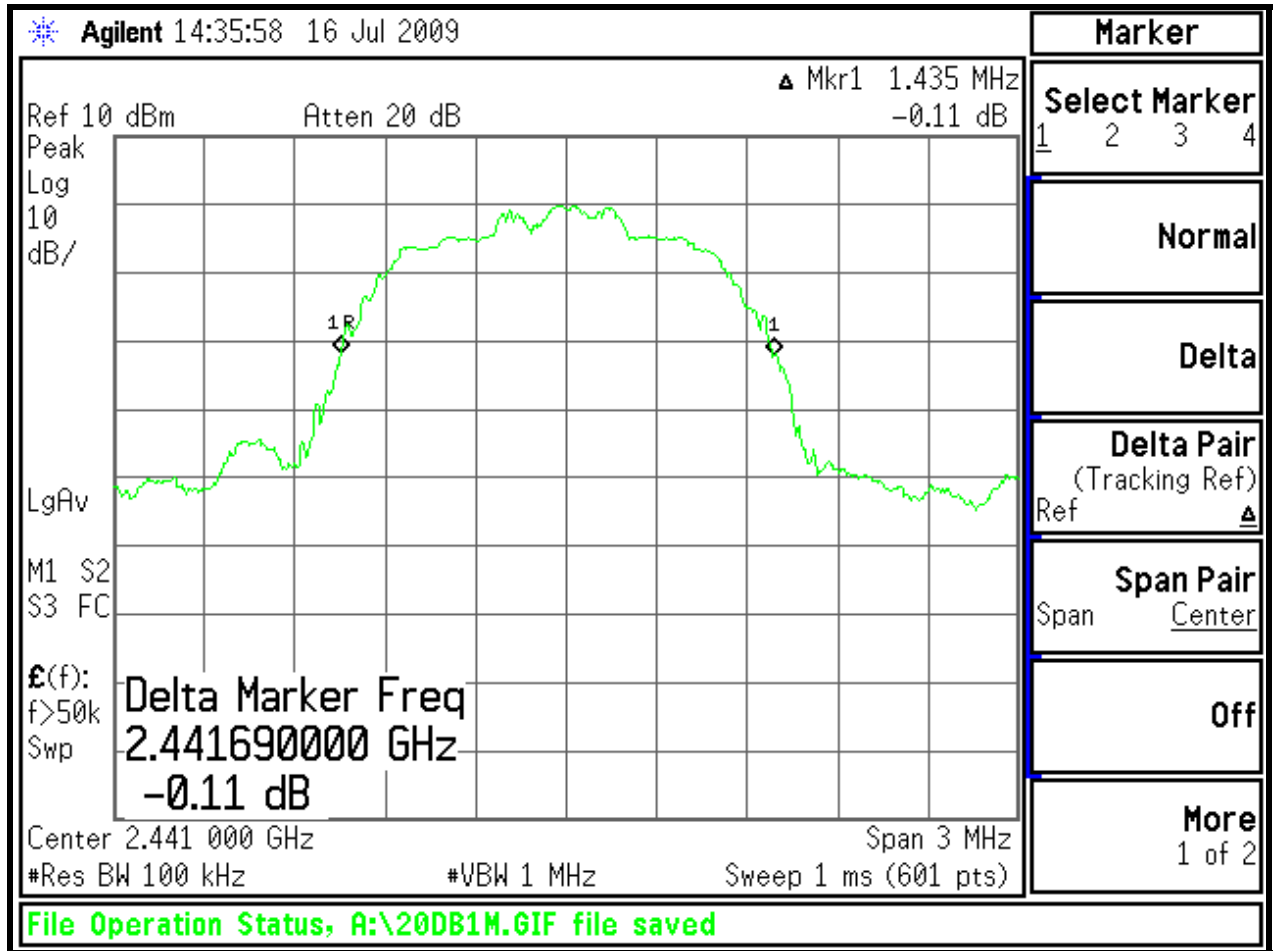
- (a) The conducted emissions graphical data in this appendix is preview data. Any emissions detected within the restricted band were formally assessed against the limits in 15.209. For details of formal results, refer to Appendix A and Appendix B.



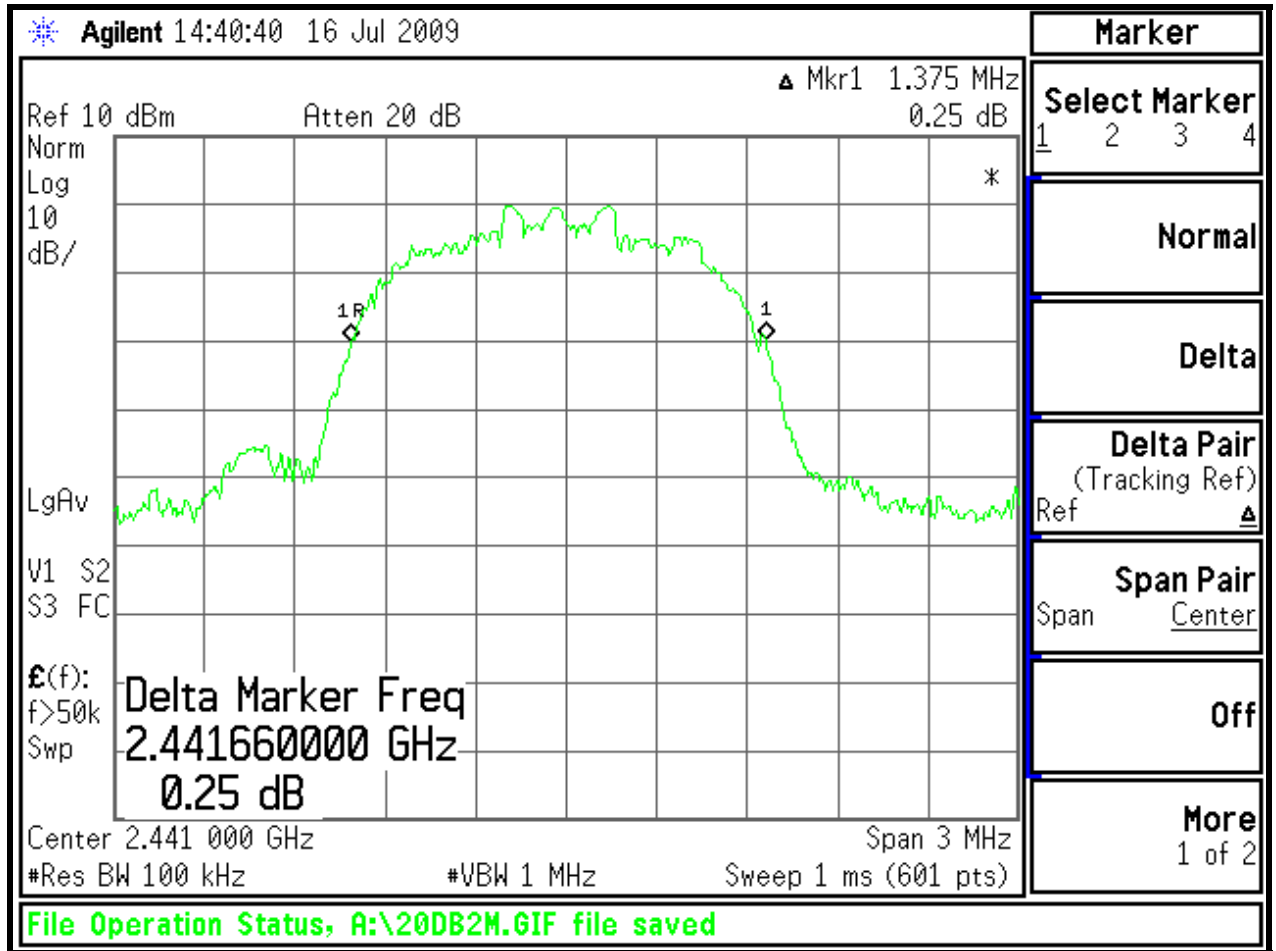
Power Line Conducted emissions



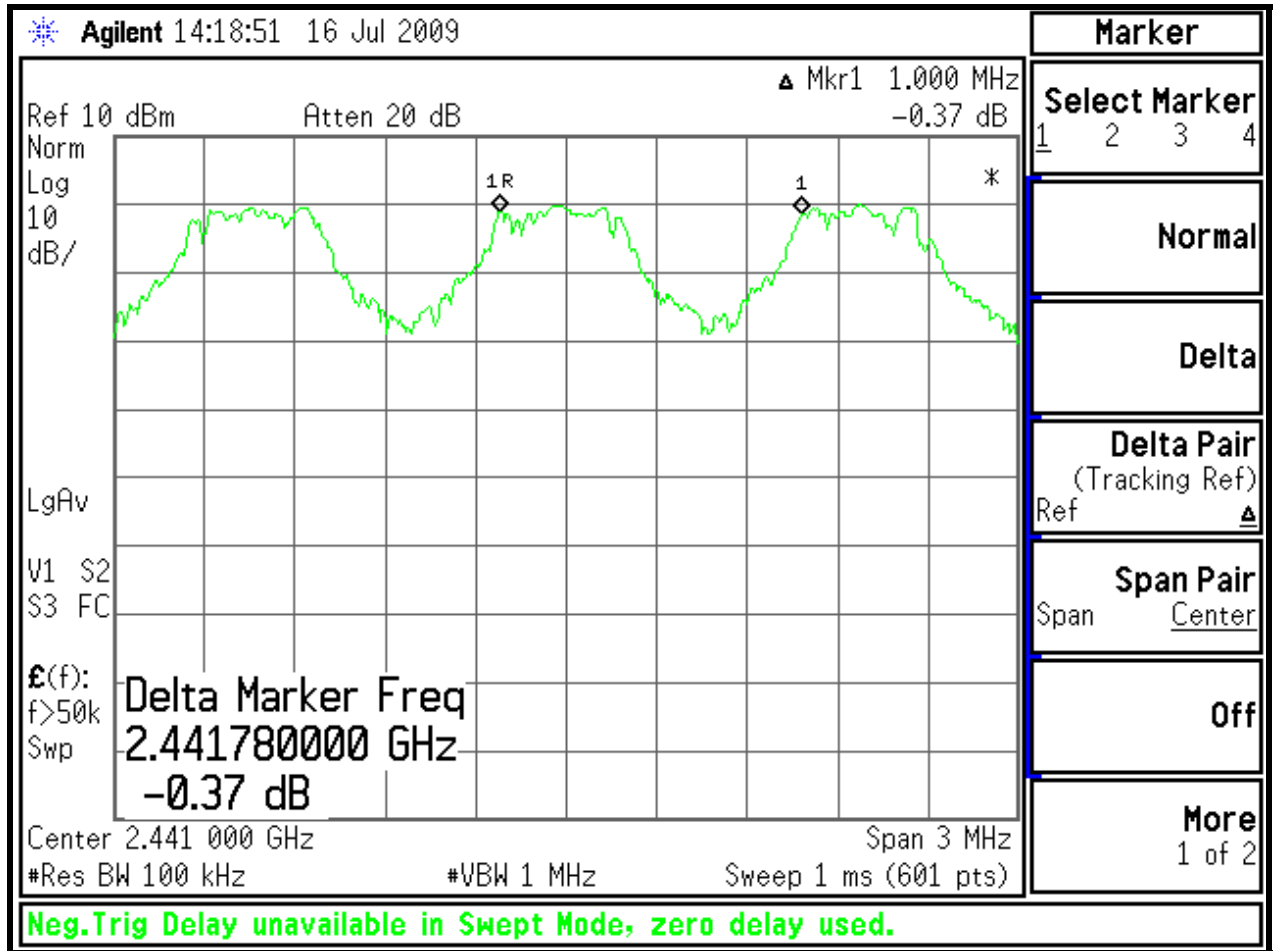
20 dB Bandwidth - 1MB/s



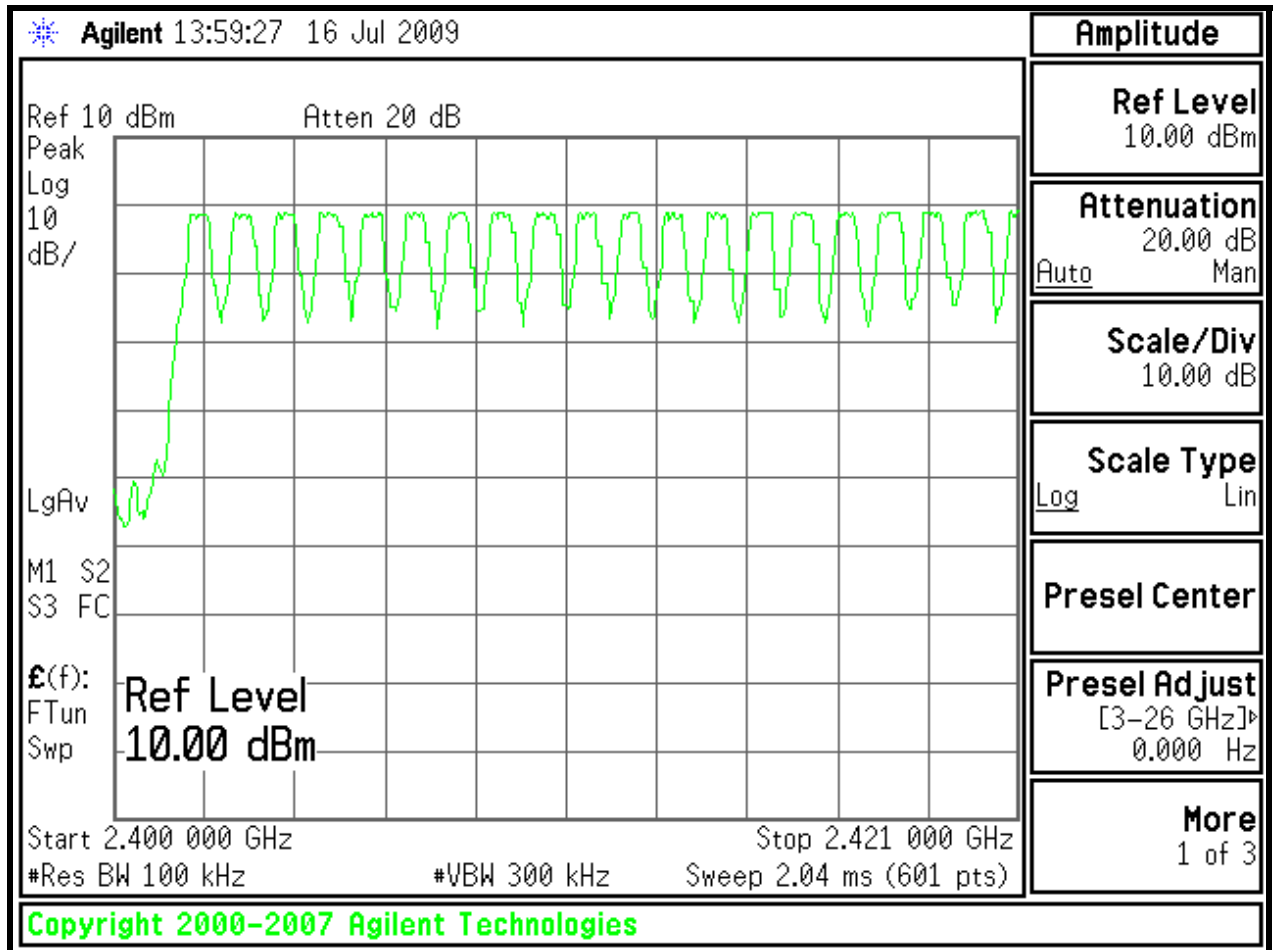
20 dB Bandwidth - 2MB/s



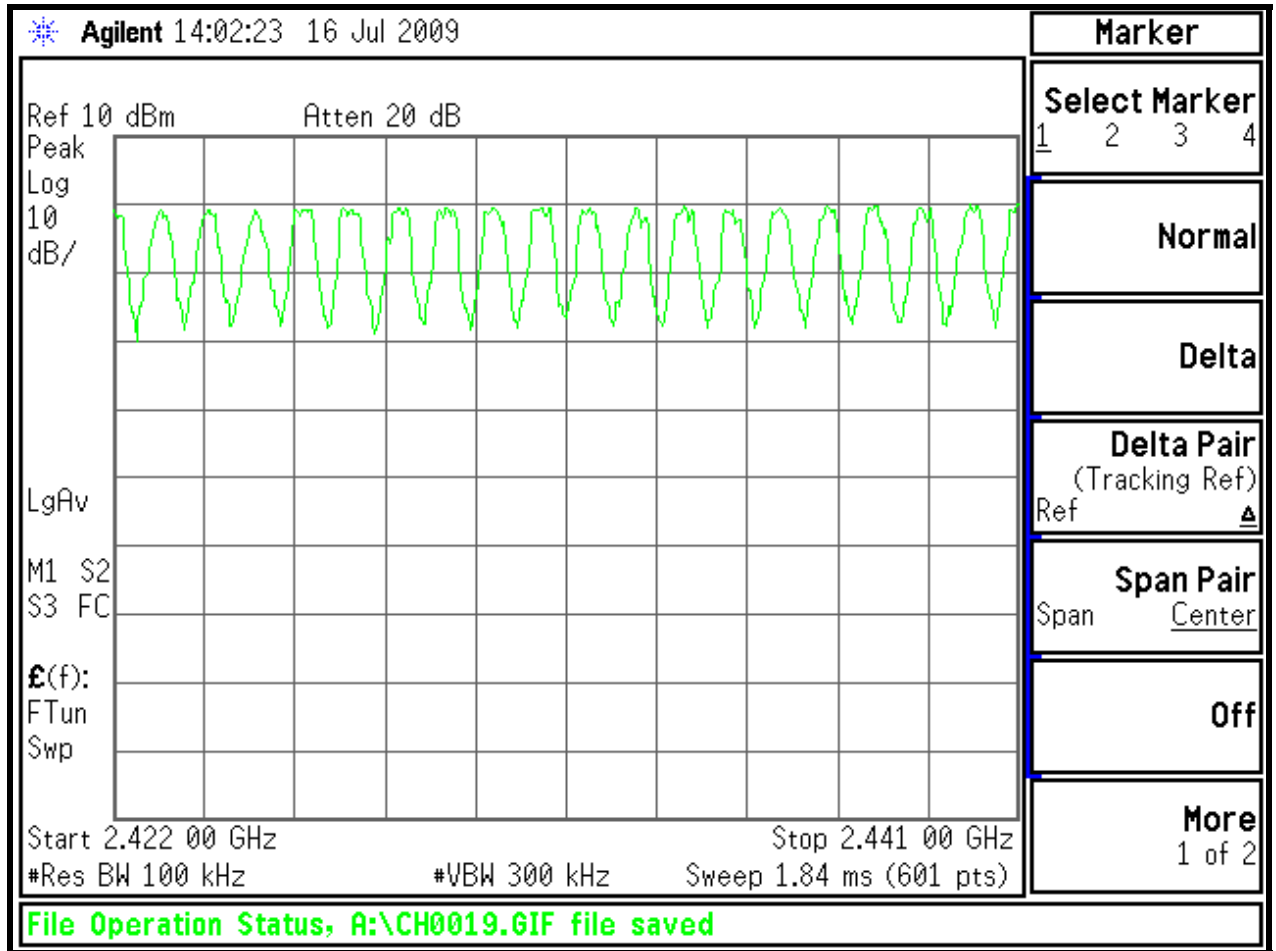
20 dB Bandwidth - 2MB/s



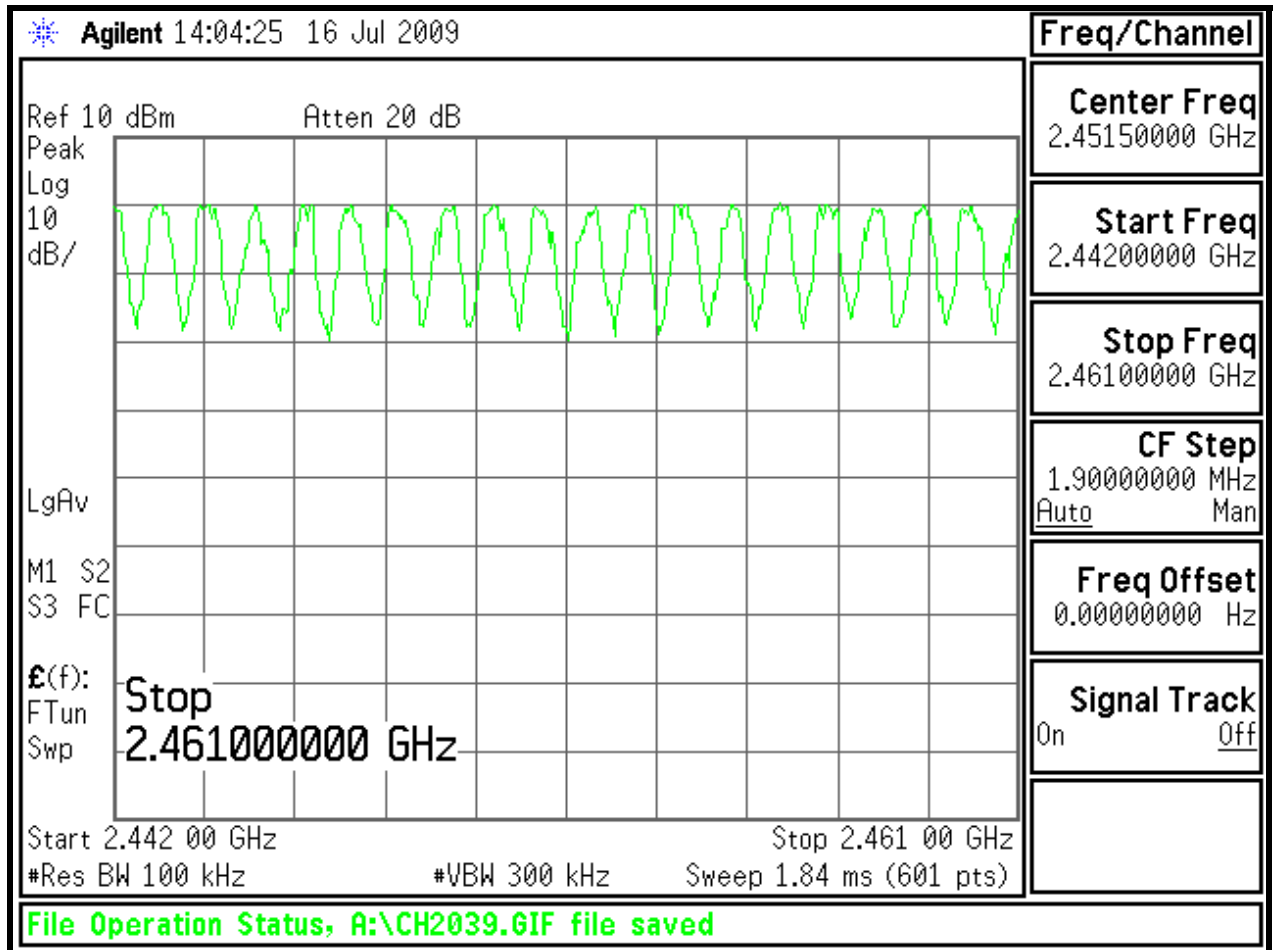
Channel Spacing



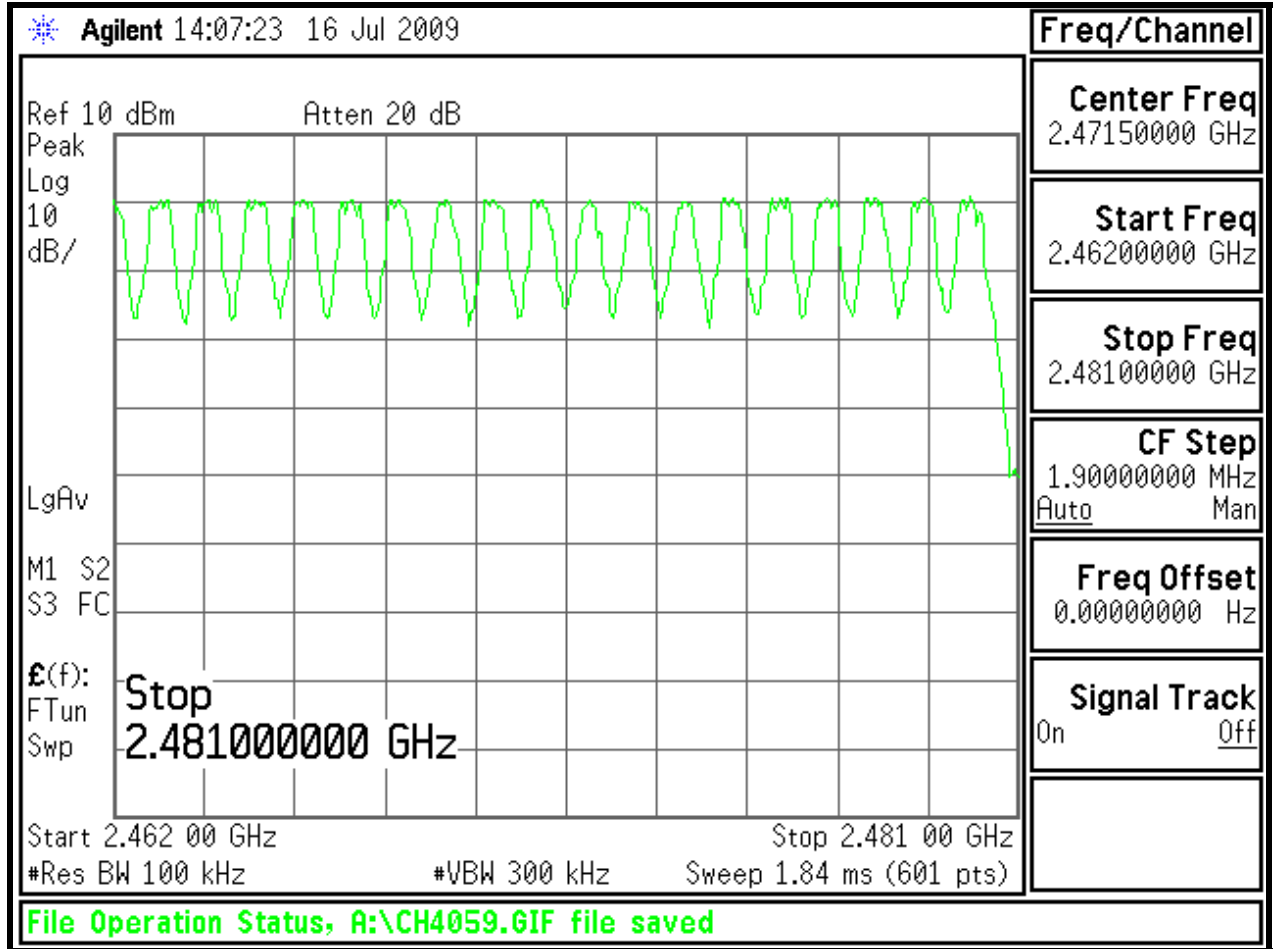
Channels 0 to 19



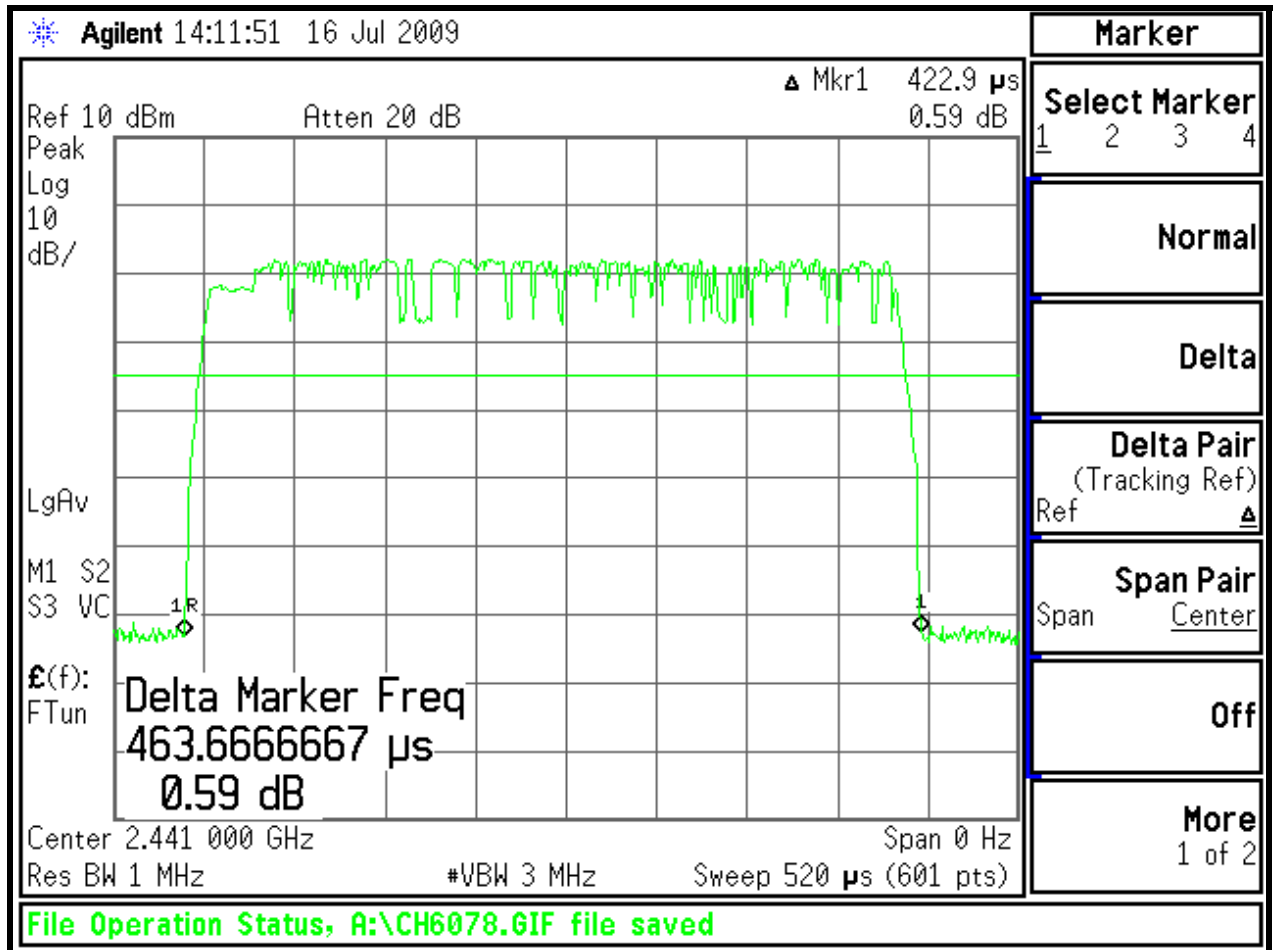
Channels 20 to 39



Channels 40 to 59

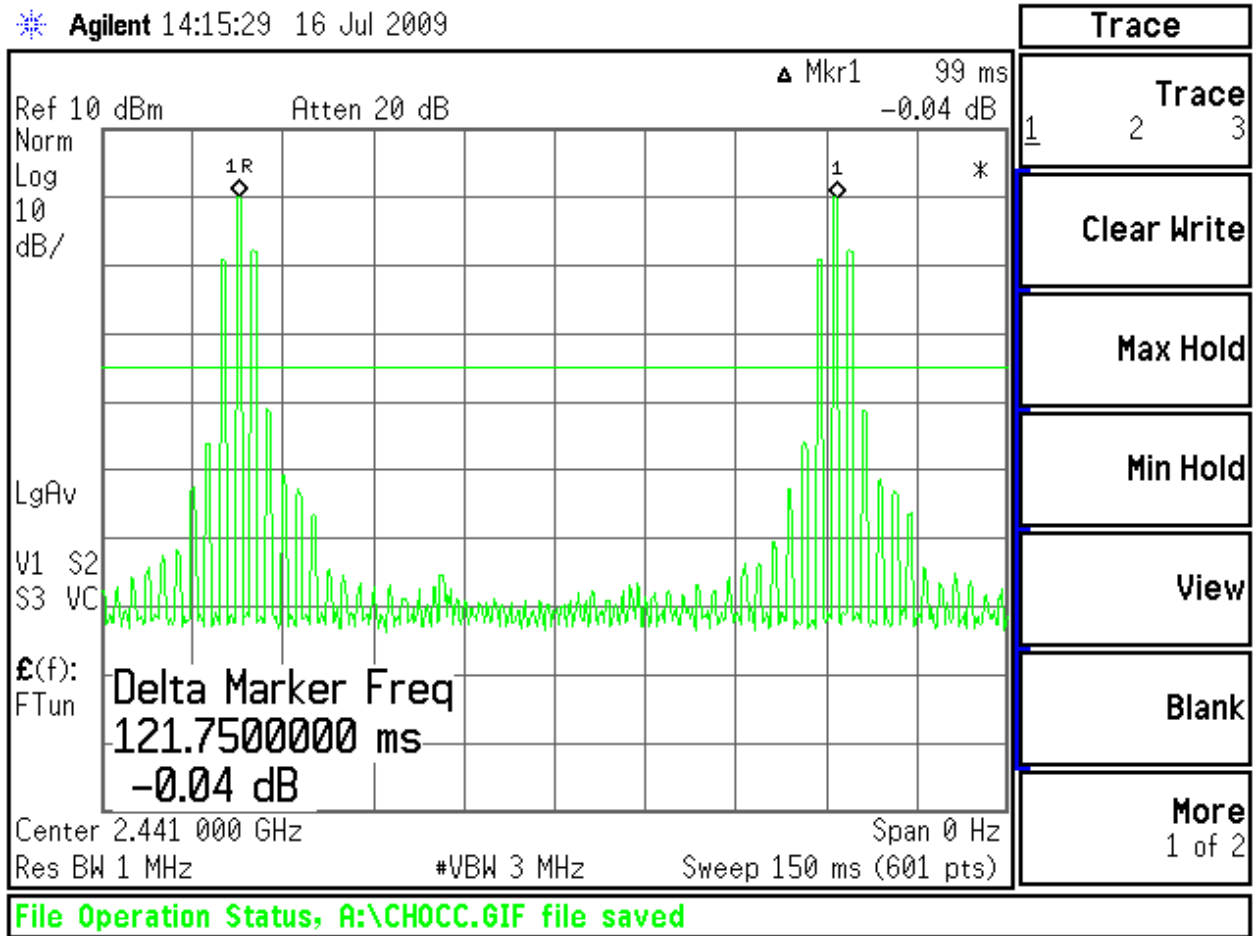


Channels 60 to 78

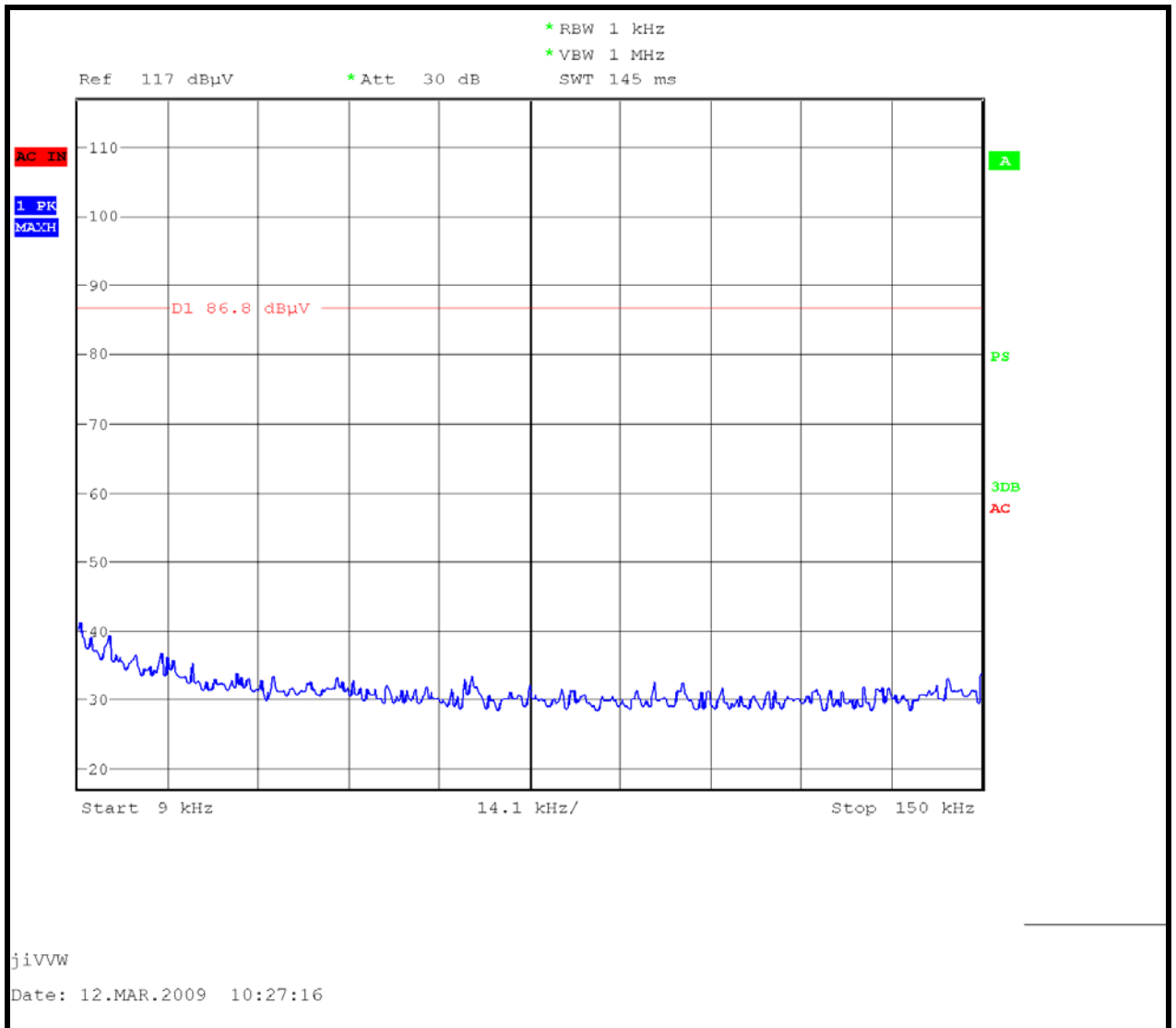


Channel occupancy

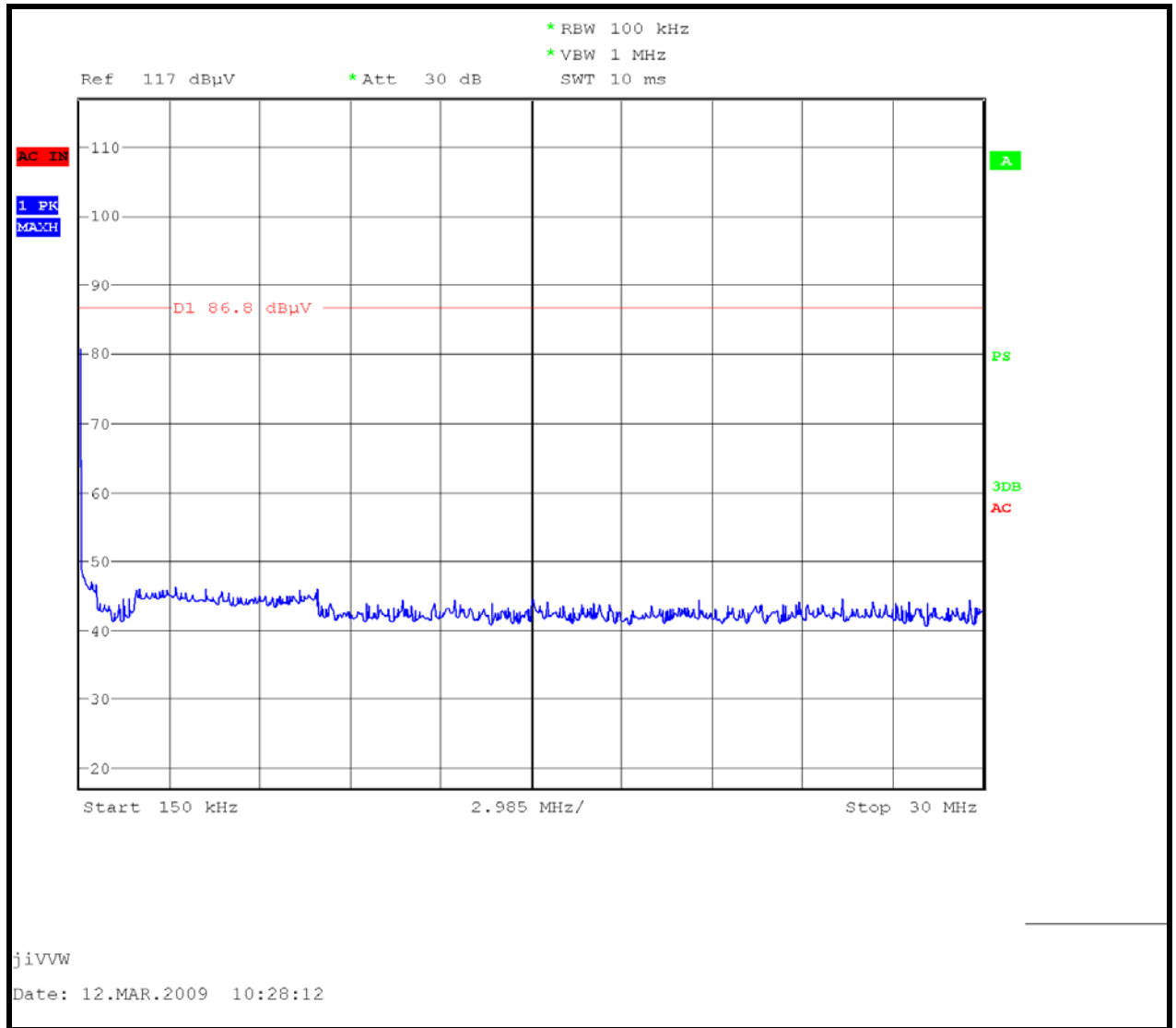
Agilent 14:15:29 16 Jul 2009



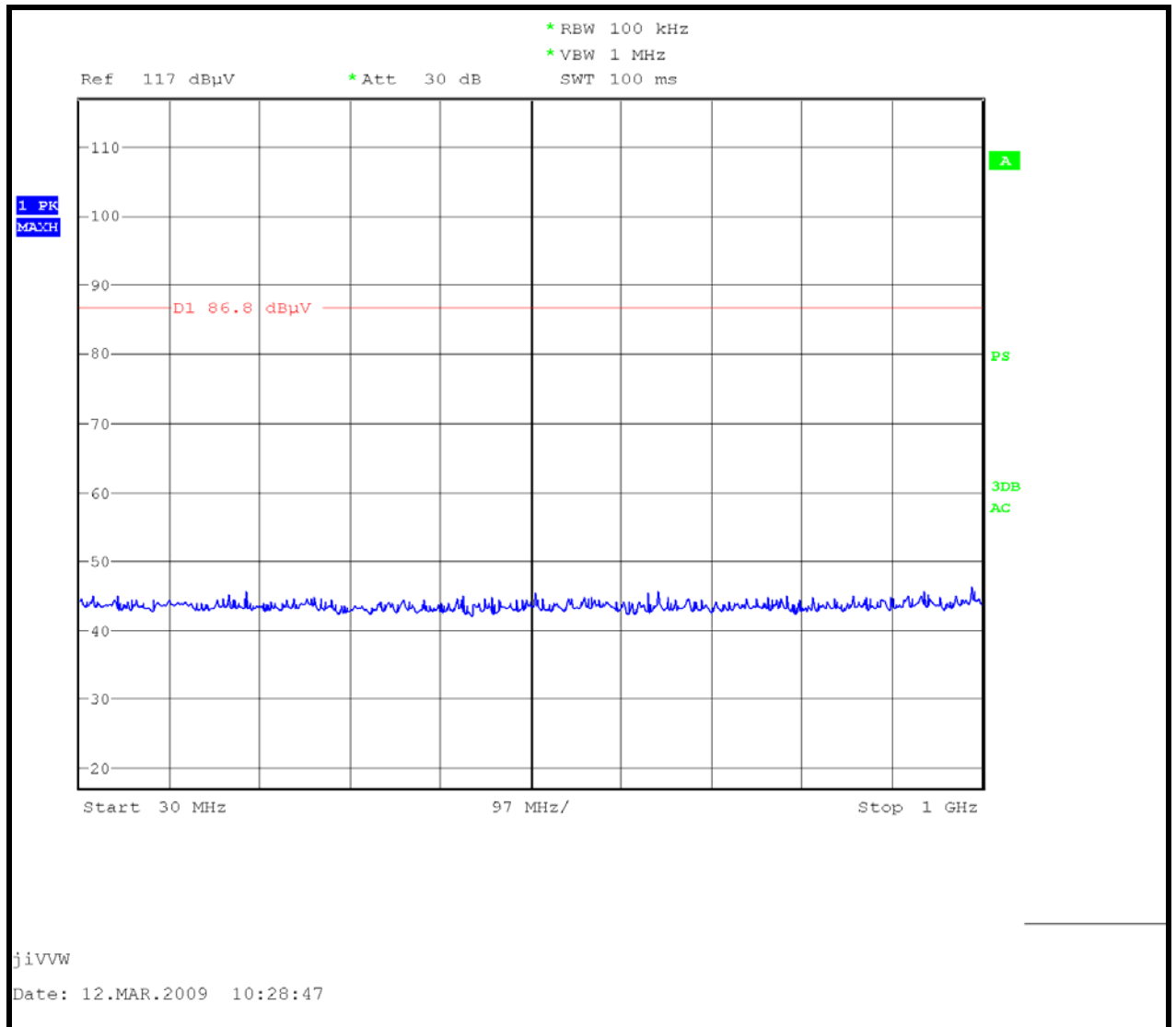
Channel repetition time



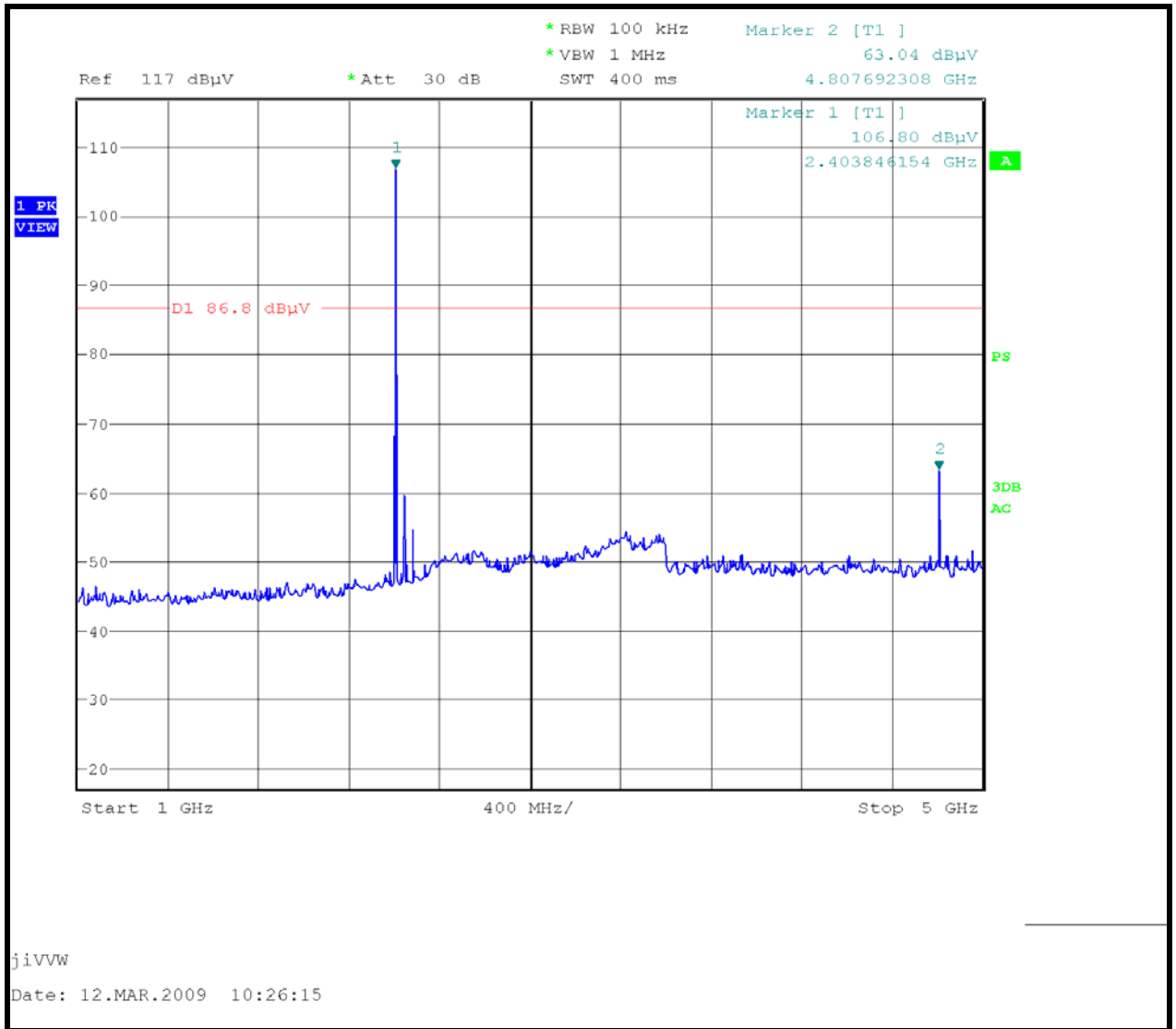
Conducted Spurious emissions 9 kHz to 150 kHz – 2402MHz 1Mb/s



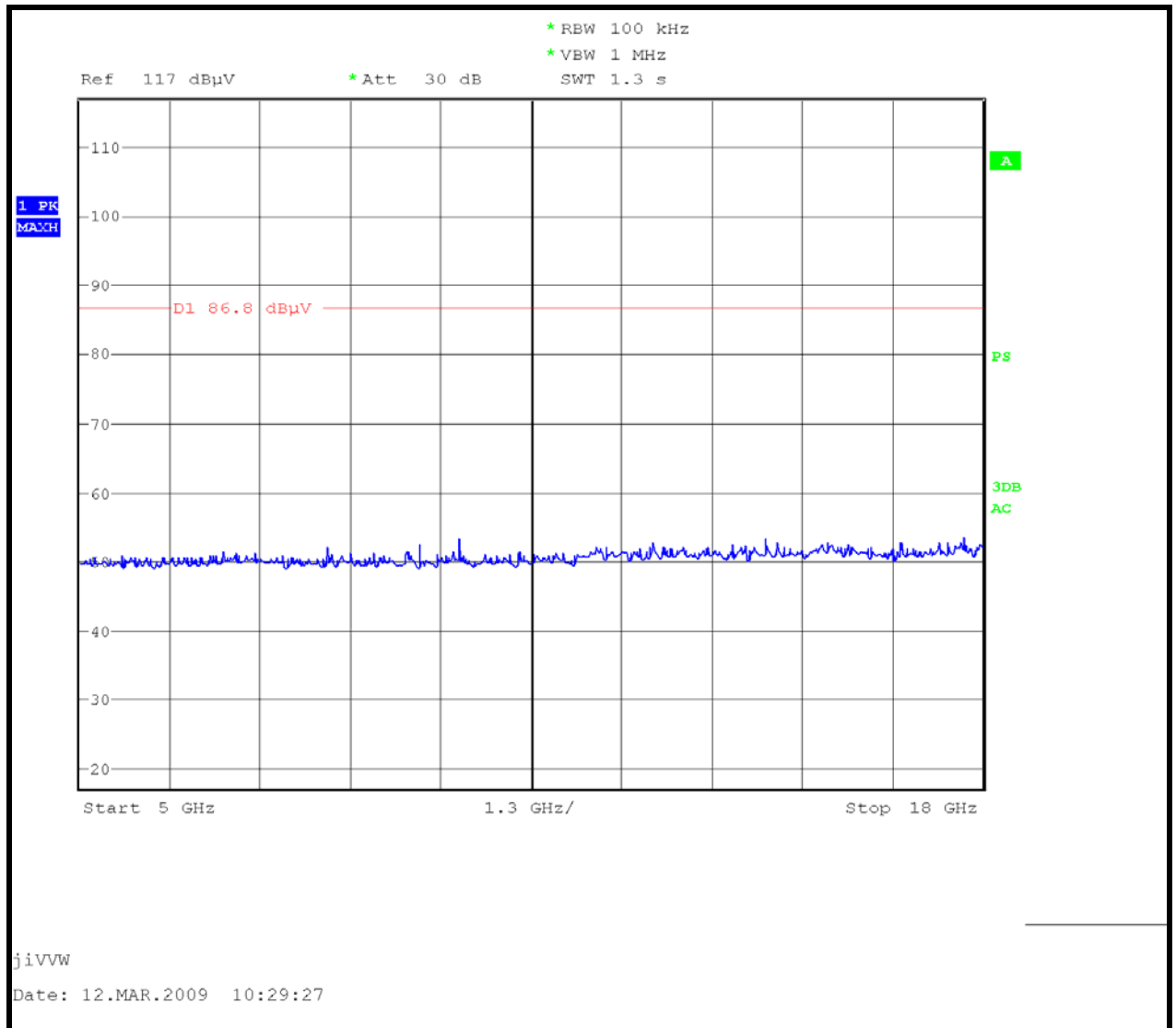
Conducted Spurious emissions 150 kHz to 30 MHz – 2402MHz 1Mb/s



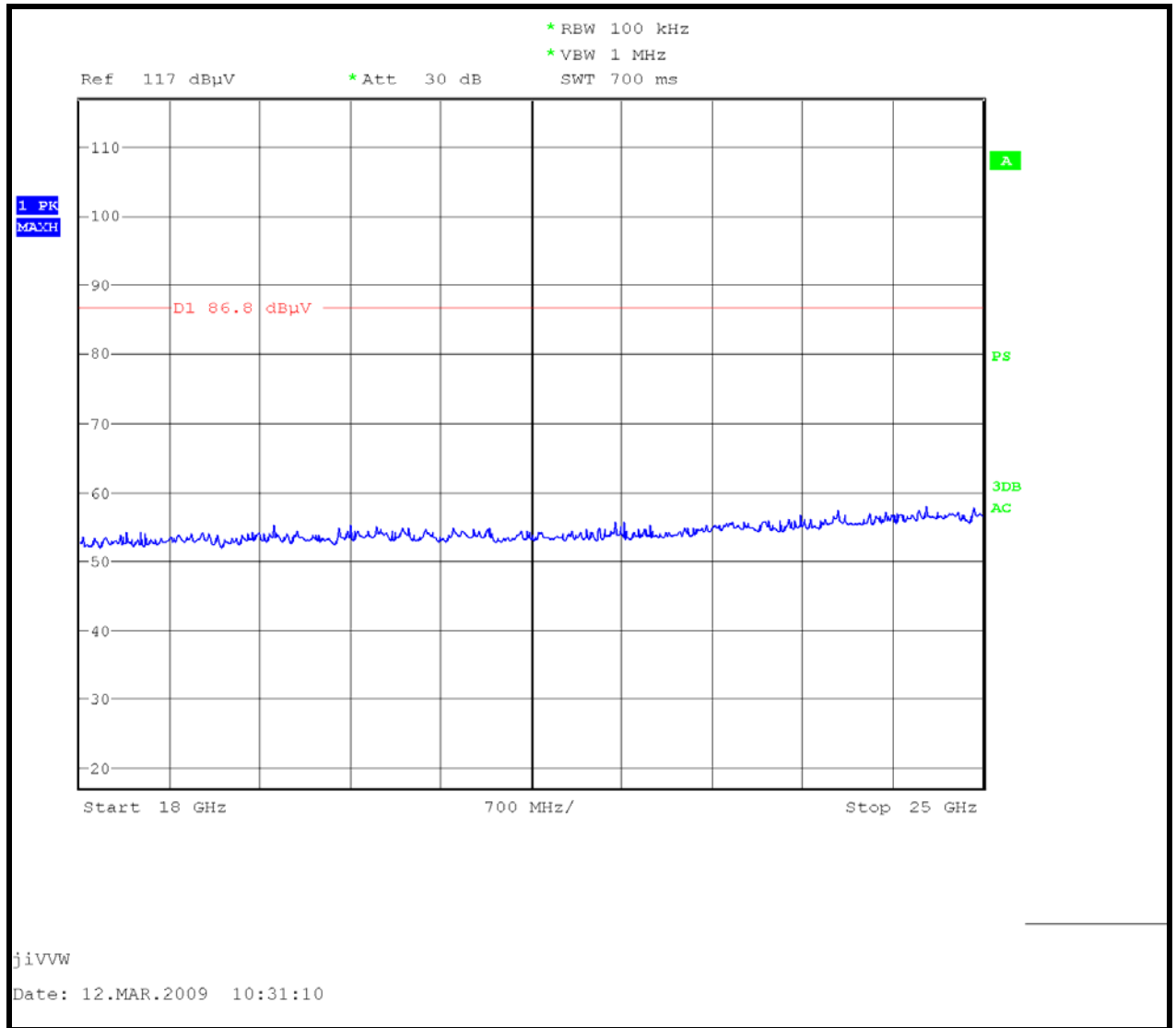
Conducted Spurious emissions 30 MHz to 1 GHz – 2402MHz 1Mb/s



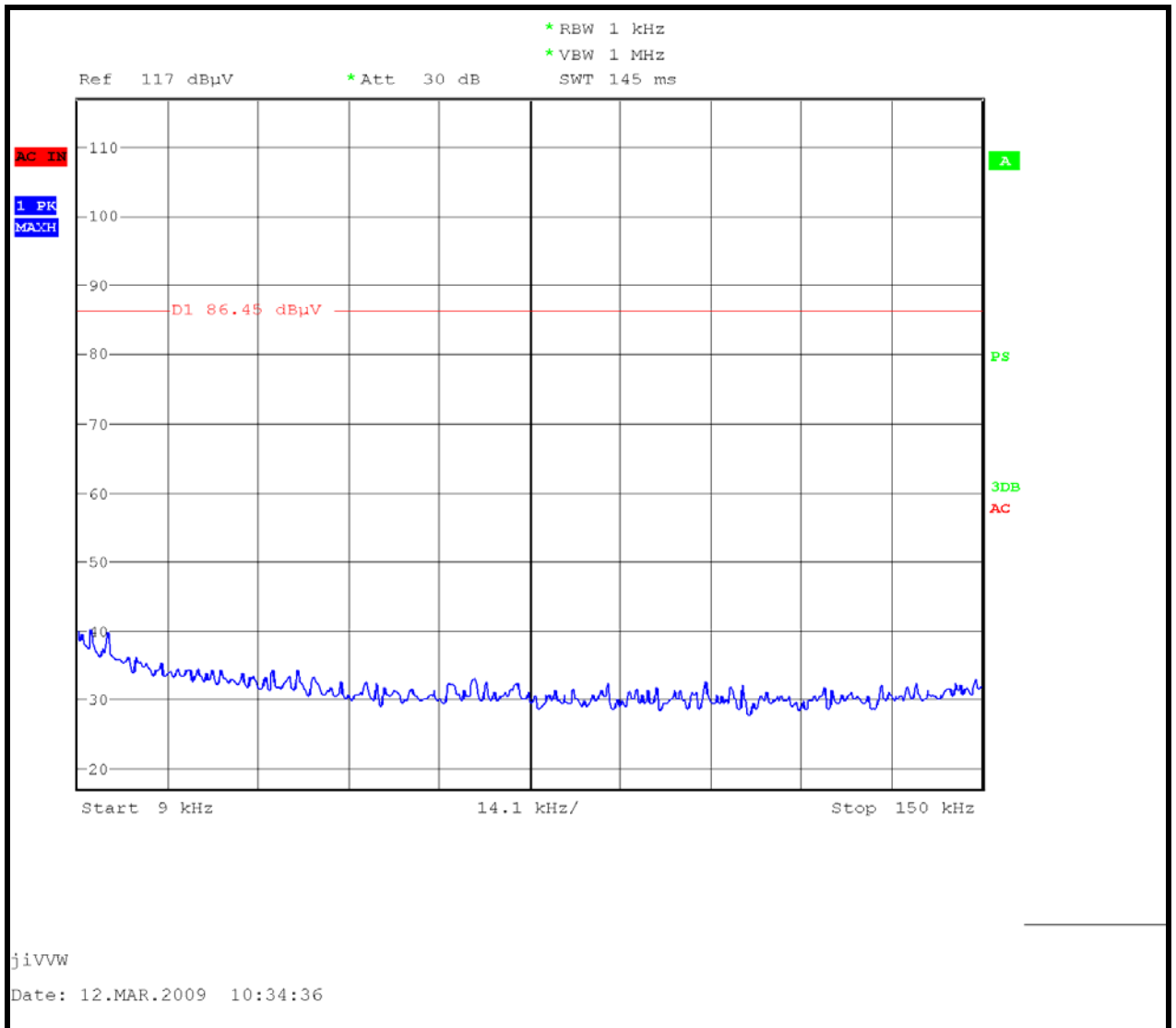
Conducted Spurious emissions 1 GHz to 5 GHz – 2402MHz 1Mb/s



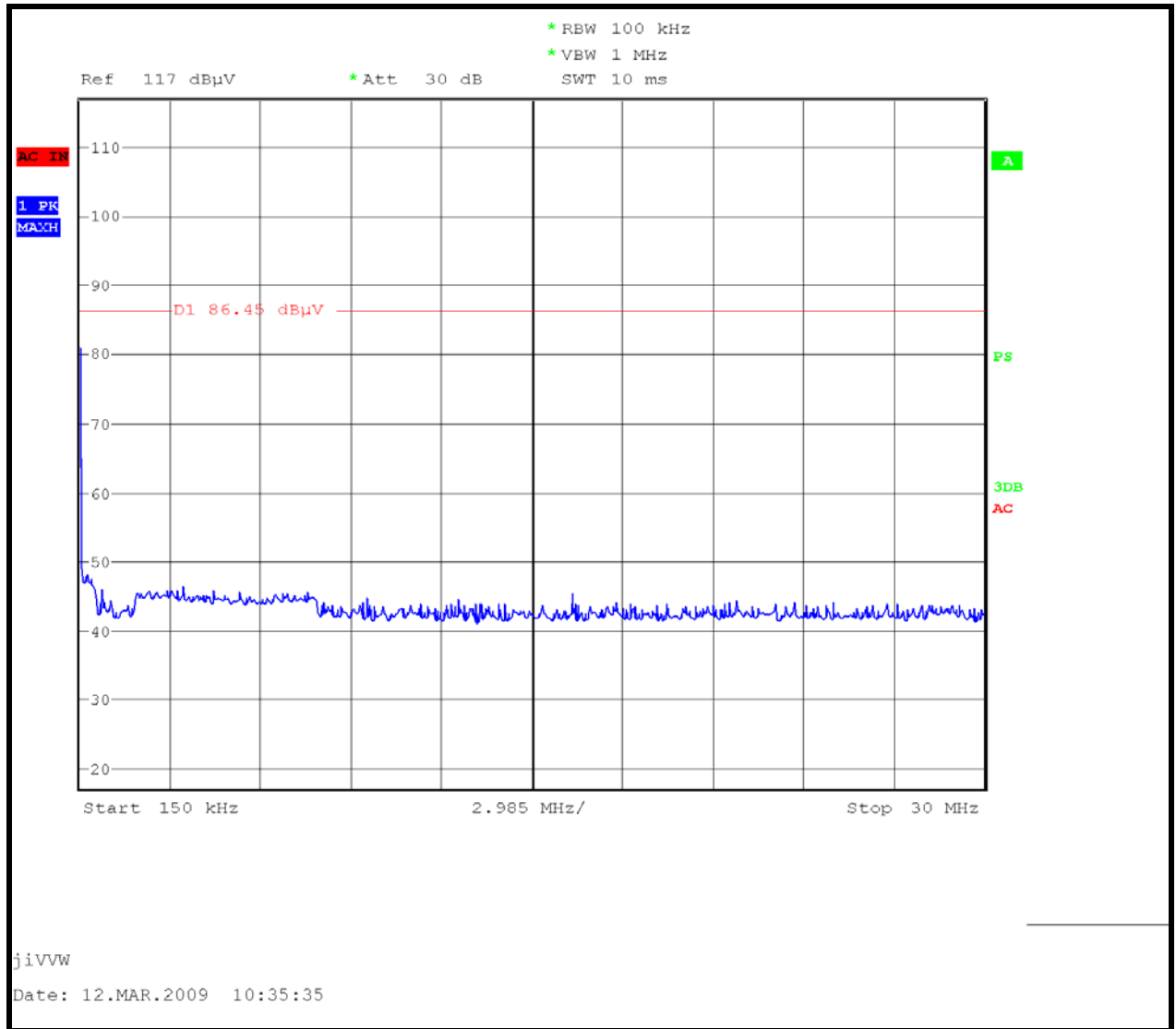
Conducted Spurious emissions 5 GHz to 18 GHz – 2402MHz 1Mb/s



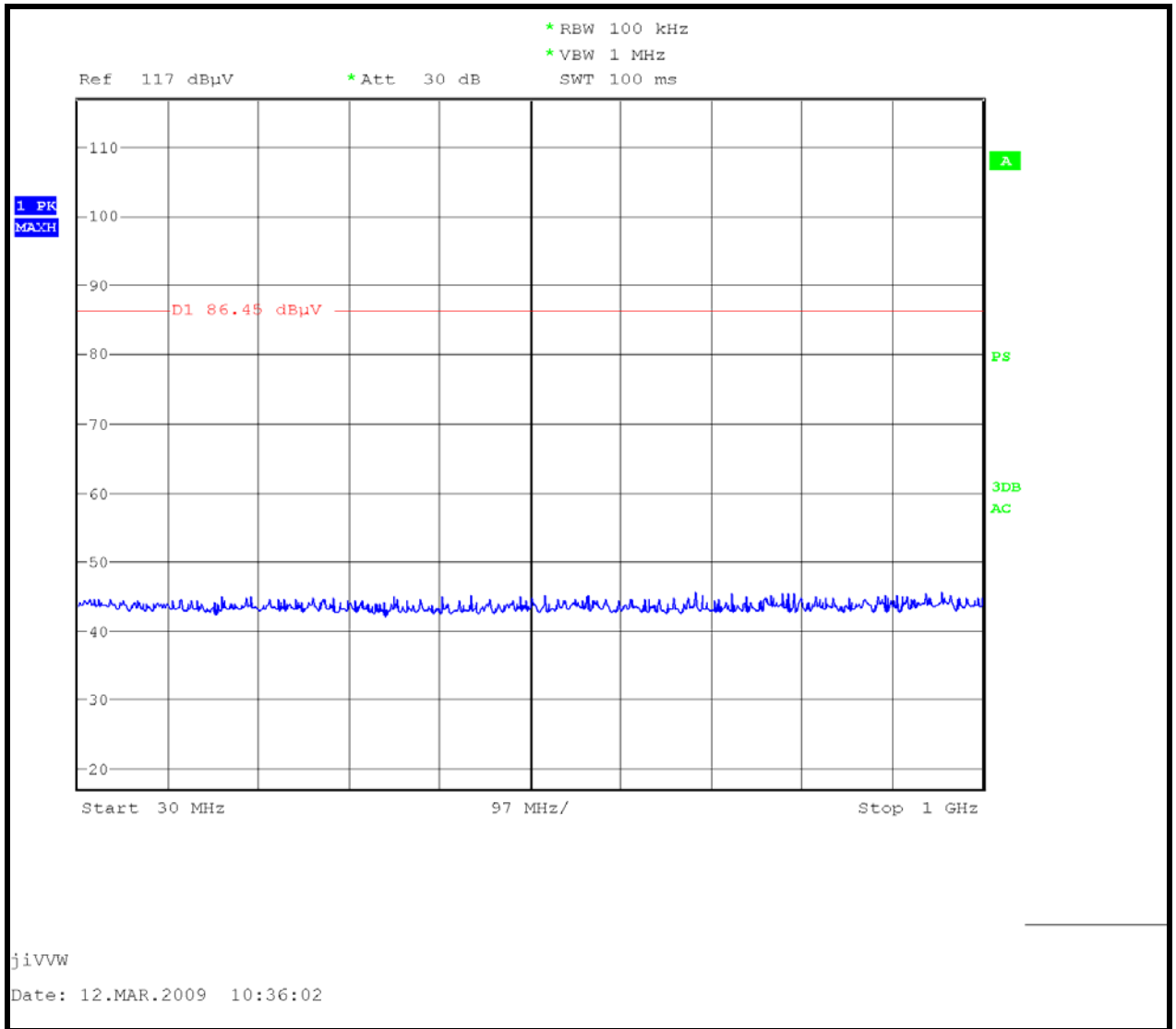
Conducted Spurious emissions 18 GHz to 25 GHz – 2402MHz 1Mb/s



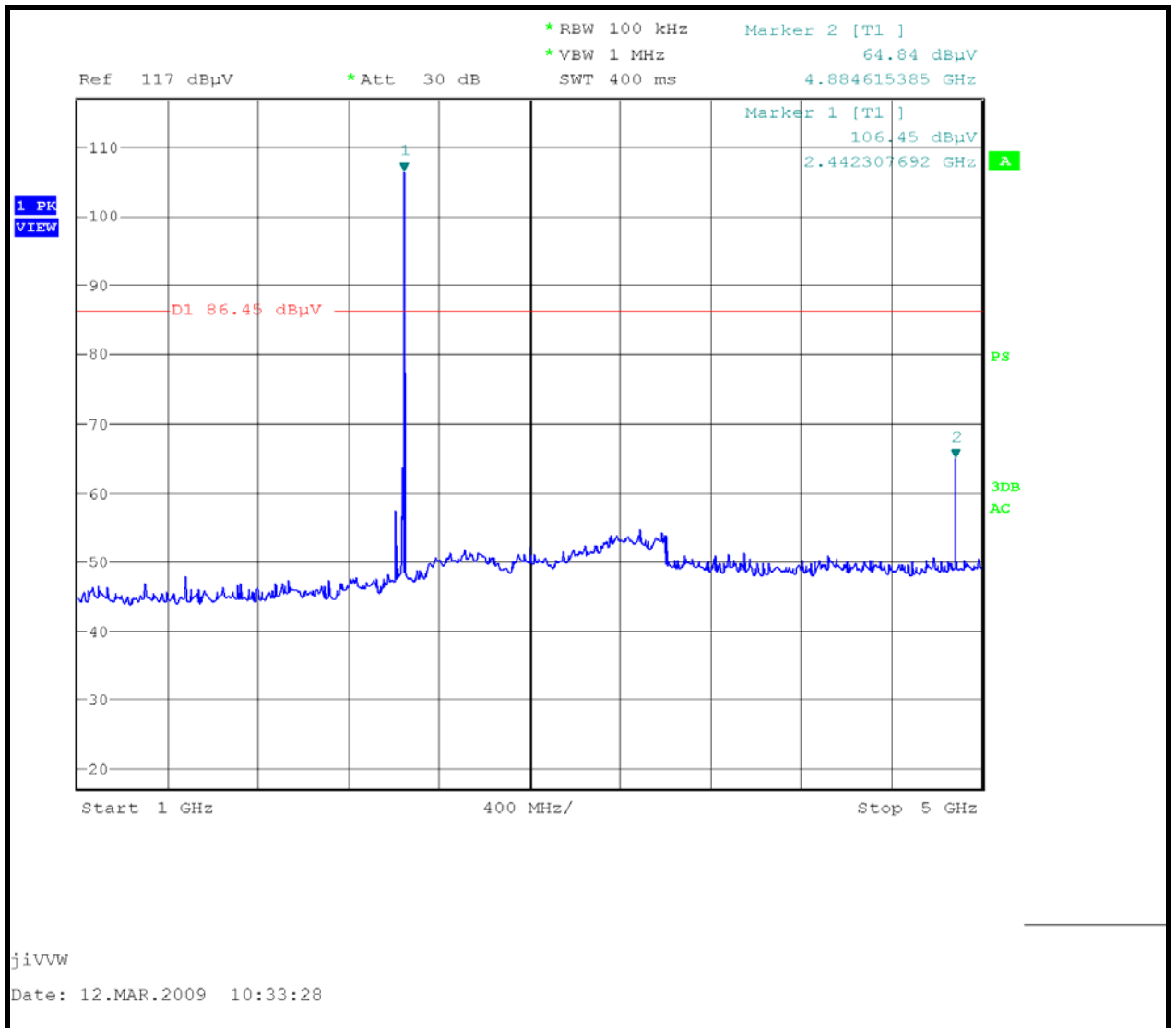
Conducted Spurious emissions 9 kHz to 150 kHz – 2441MHz 1Mb/s



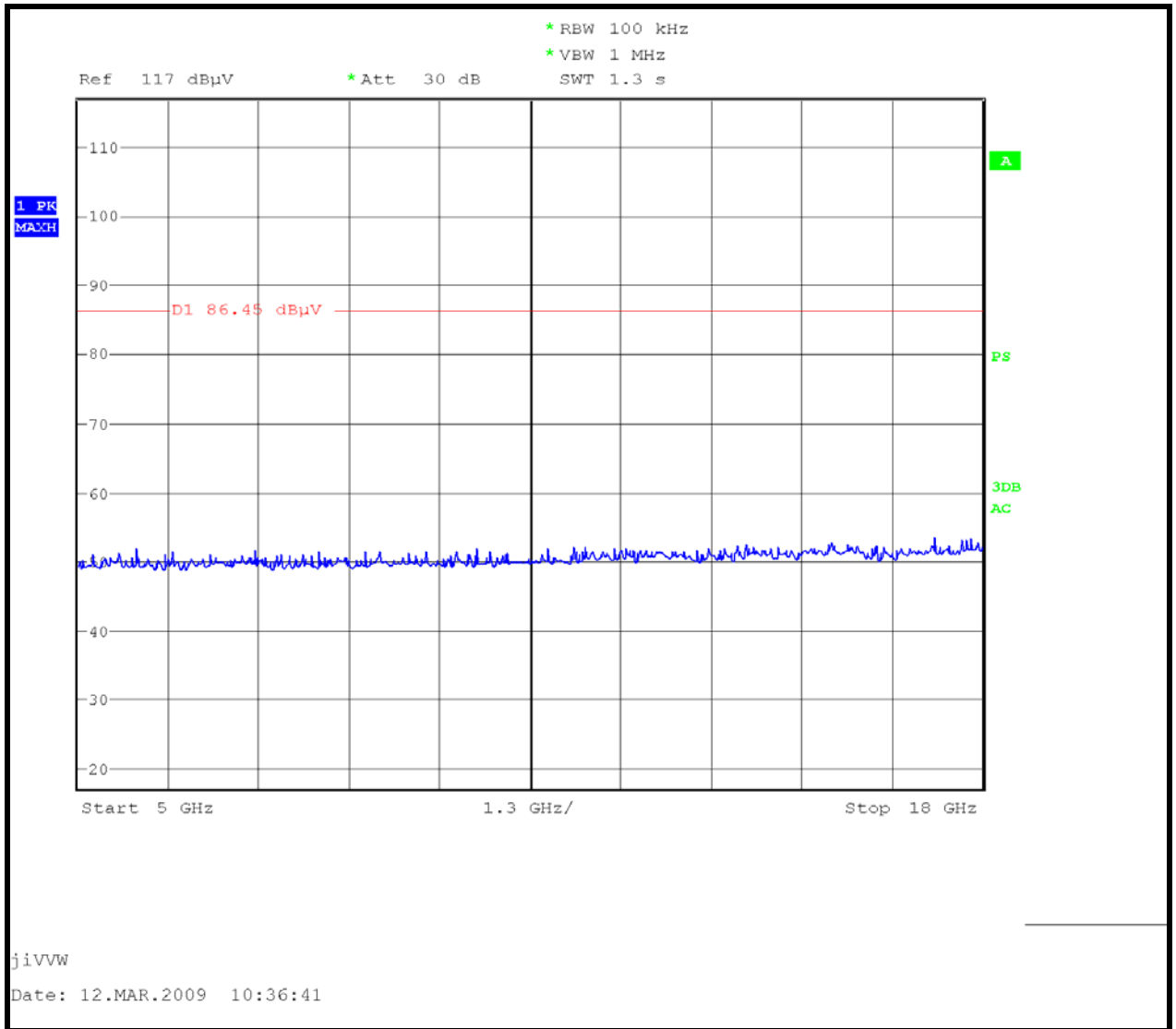
Conducted Spurious emissions 150 kHz to 30 MHz – 2441MHz 1Mb/s



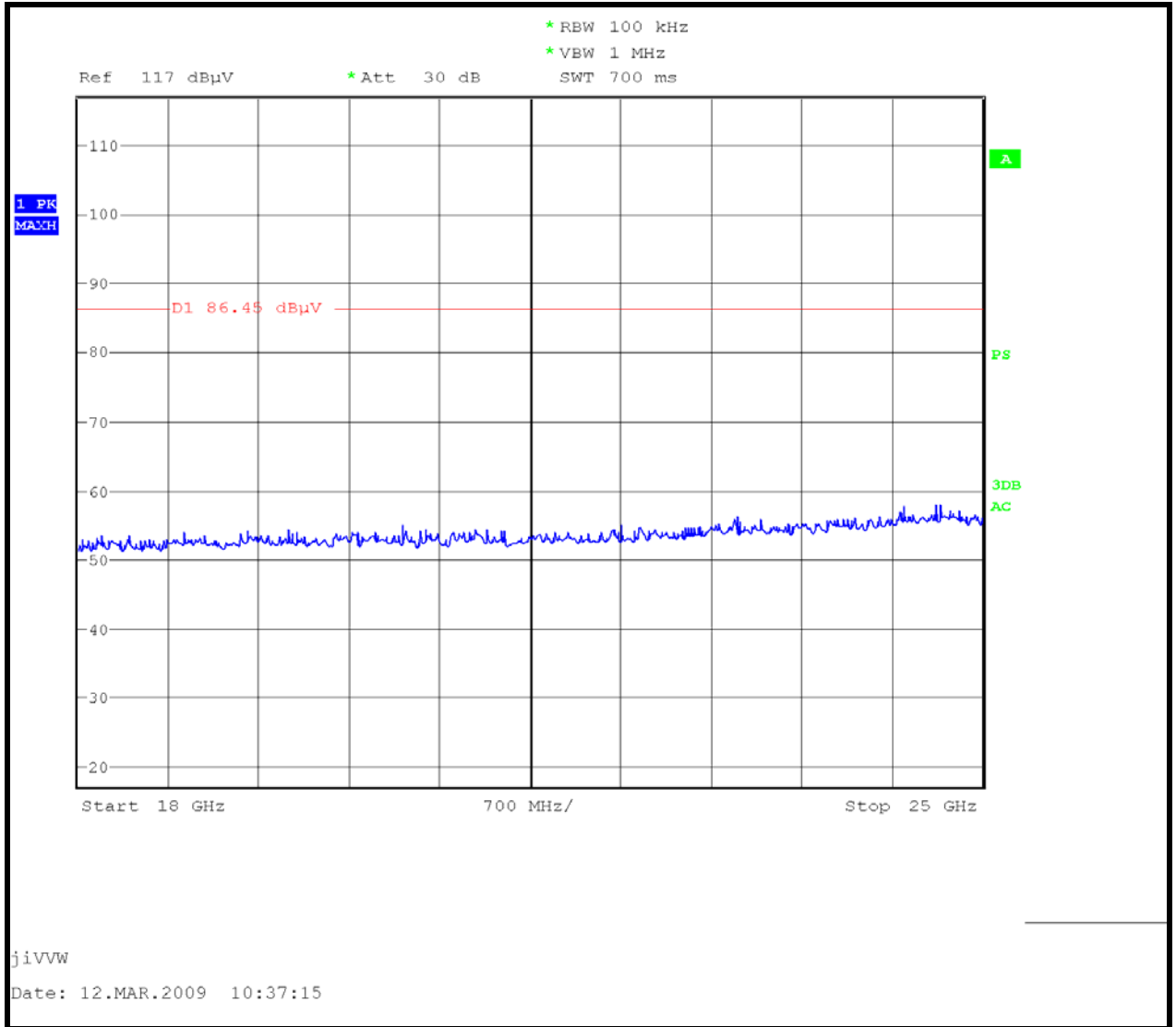
Conducted Spurious emissions 30 MHz to 1 GHz – 2441MHz 1Mb/s



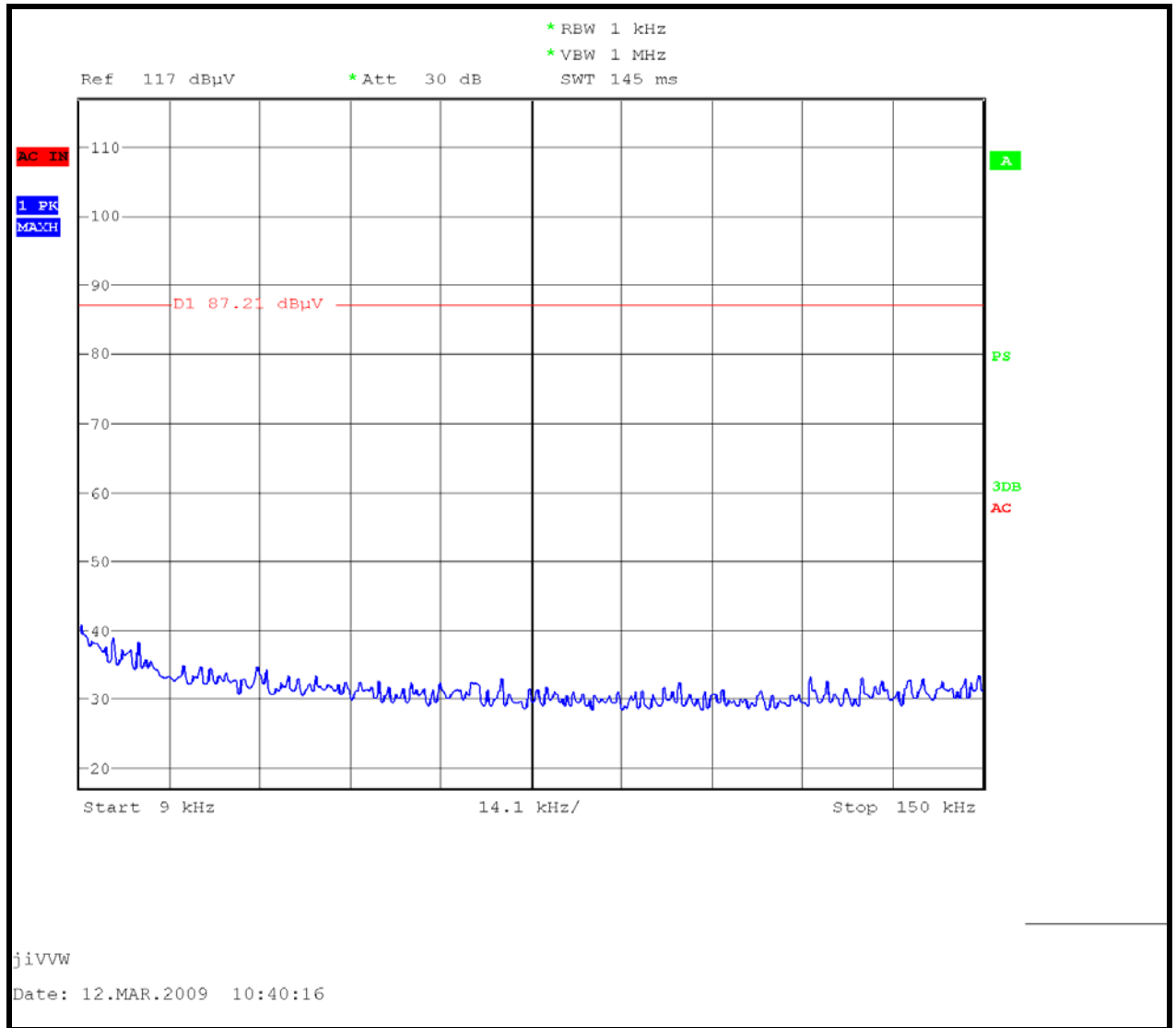
Conducted Spurious emissions 1 GHz to 5 GHz – 2441MHz 1Mb/s



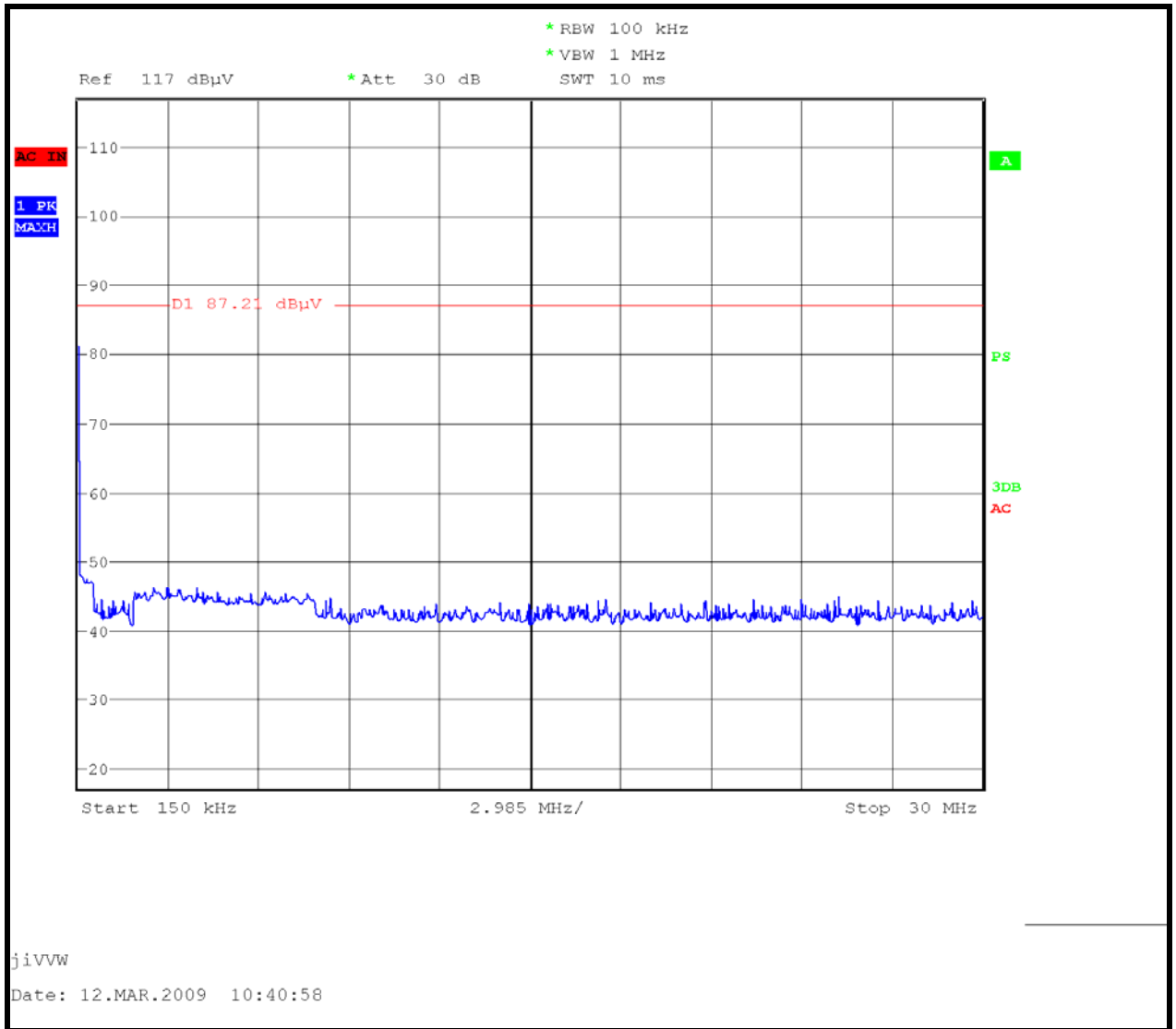
Conducted Spurious emissions 5 GHz to 18 GHz – 2441MHz 1Mb/s



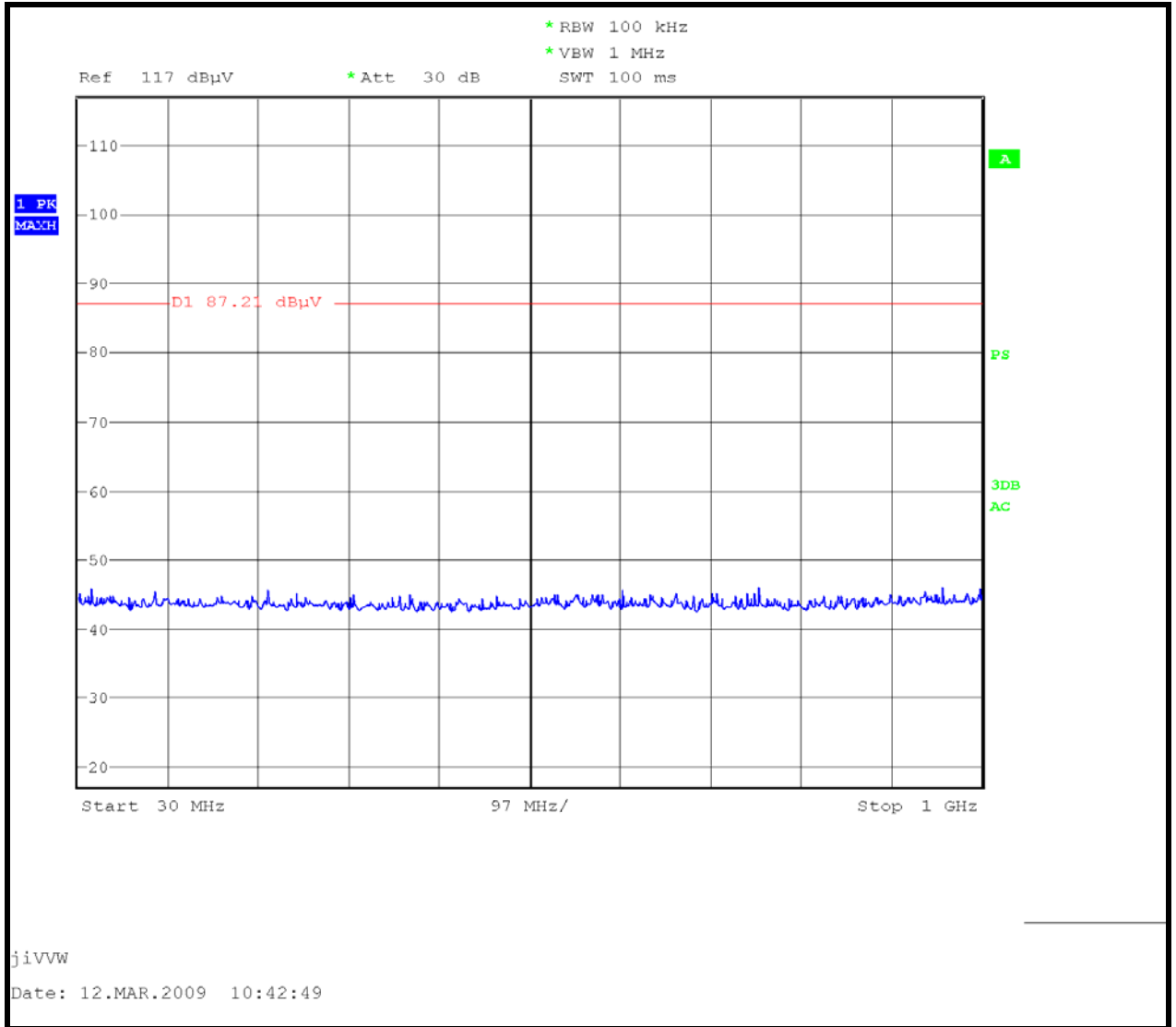
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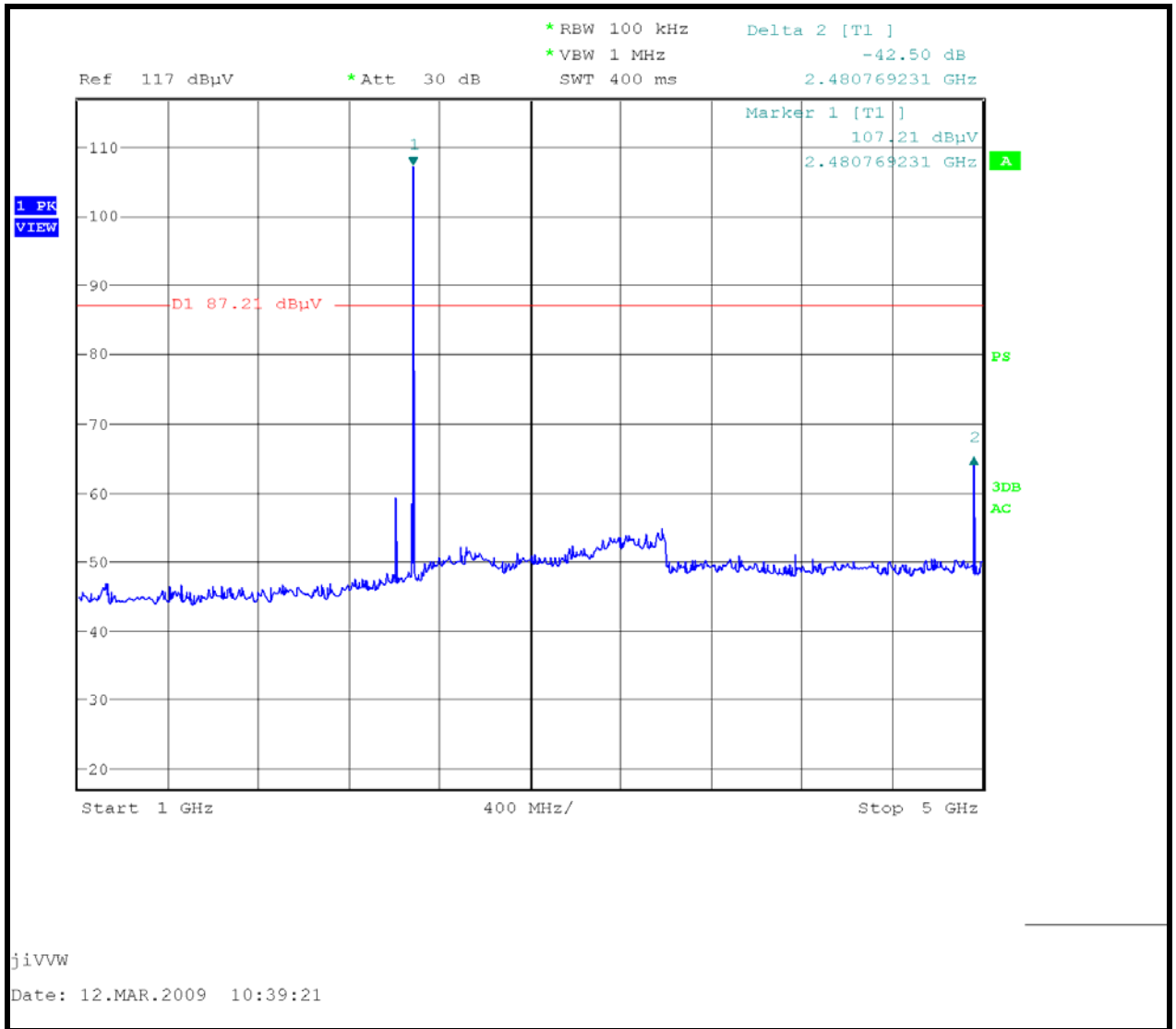
Conducted Spurious emissions 9 kHz to 150 kHz – 2480MHz 1Mb/s



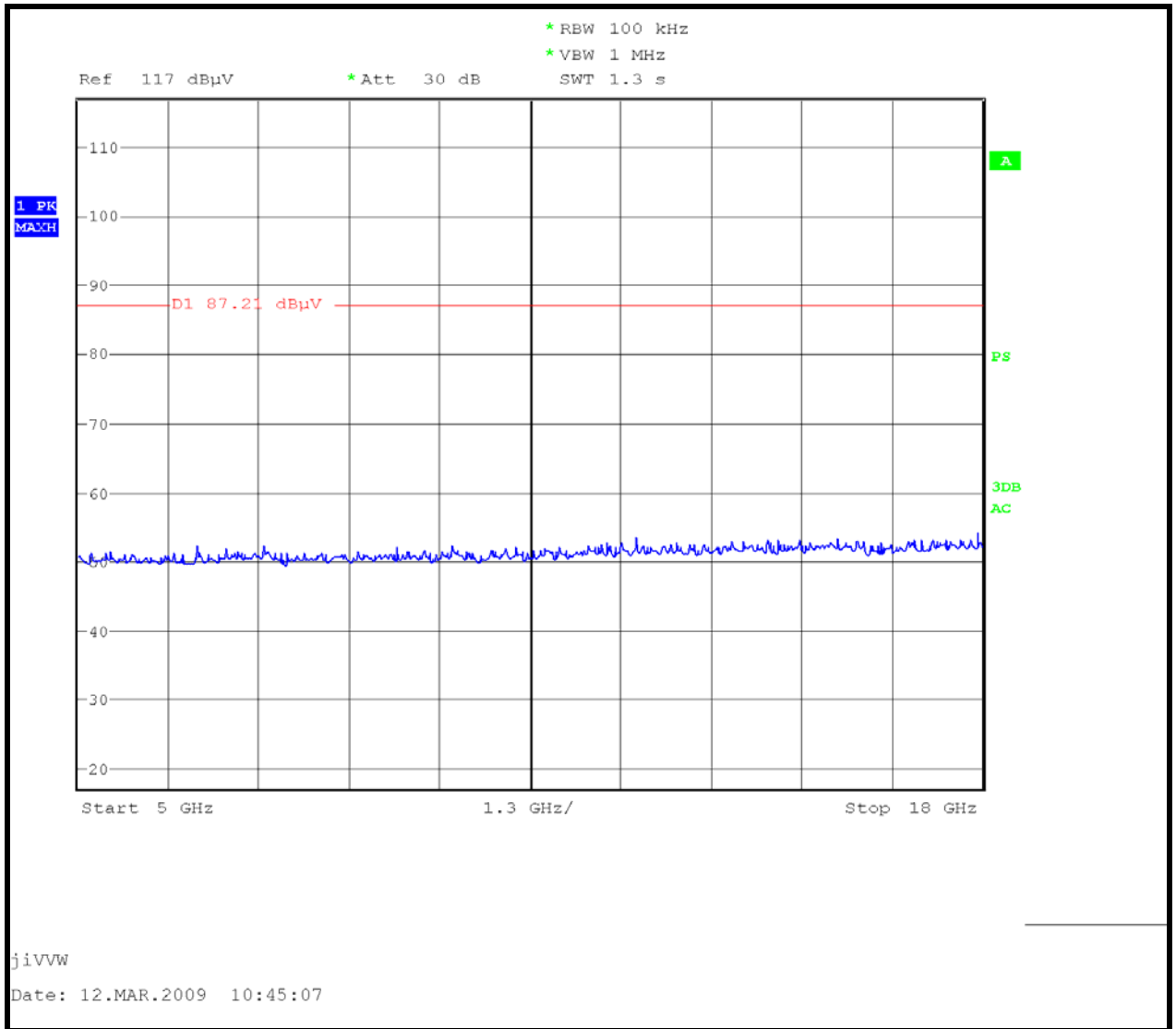
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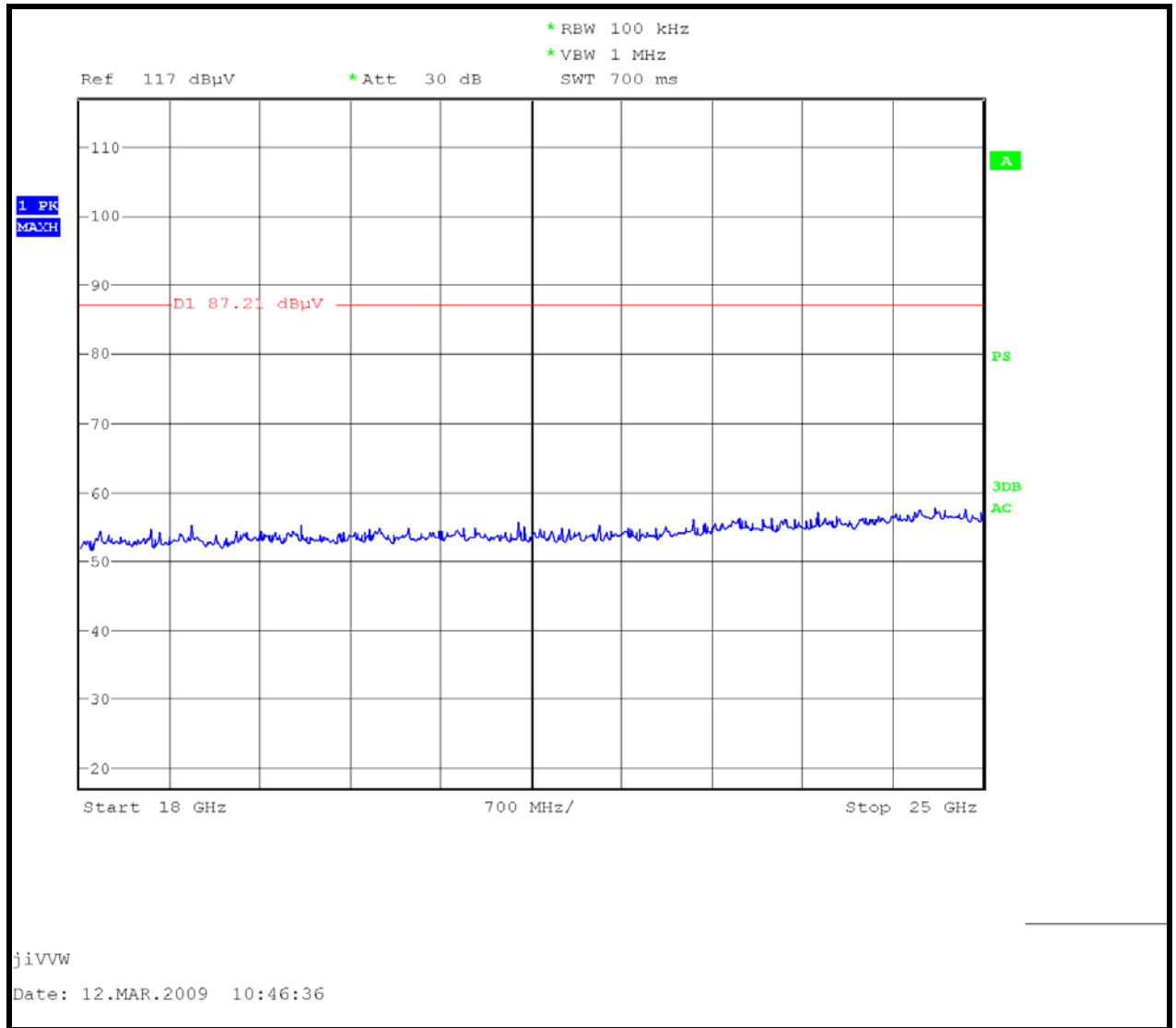
Conducted Spurious emissions 30 MHz to 1 GHz – 2480MHz 1Mb/s



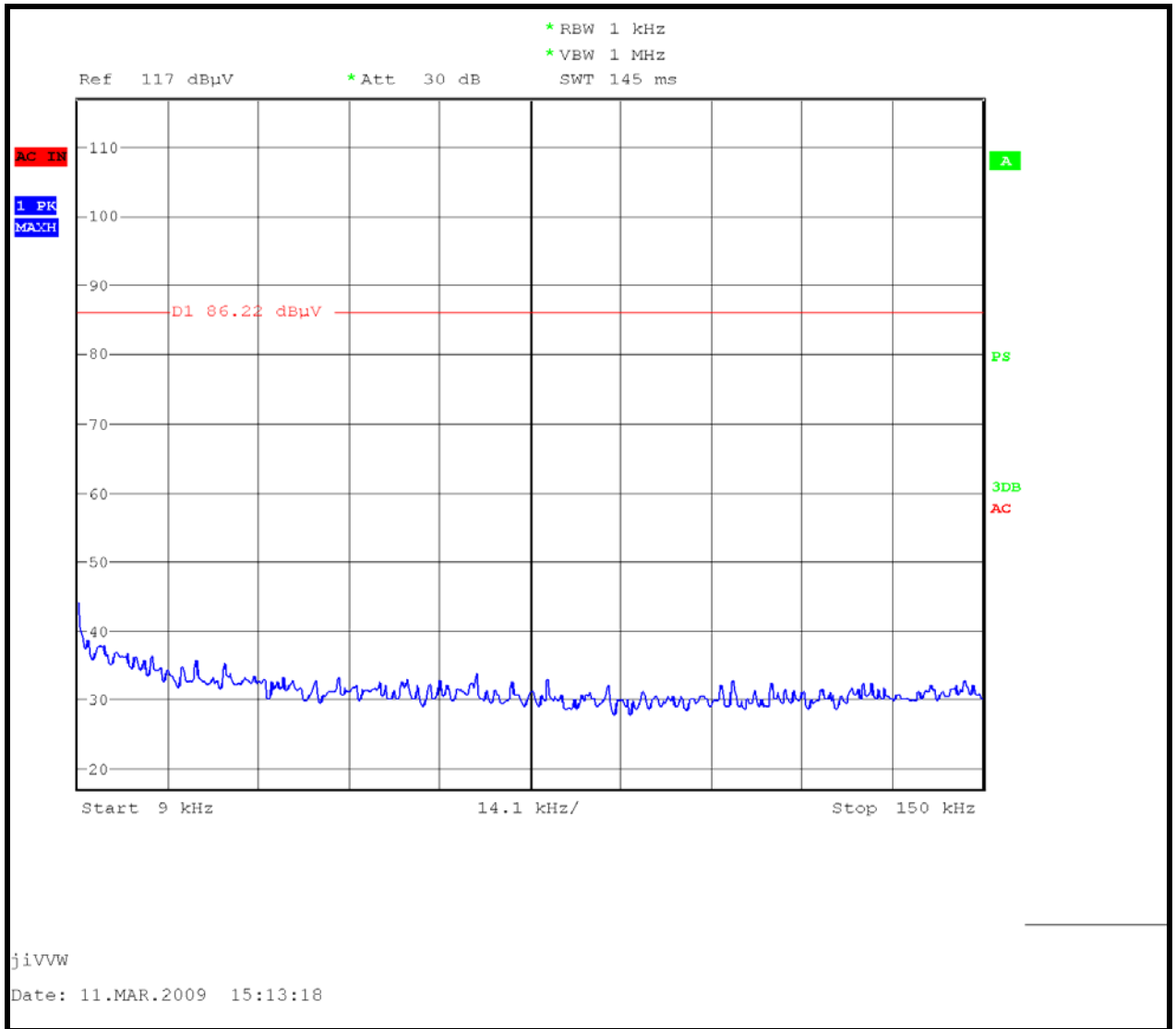
Conducted Spurious emissions 1 GHz to 5 GHz – 2480MHz 1Mb/s



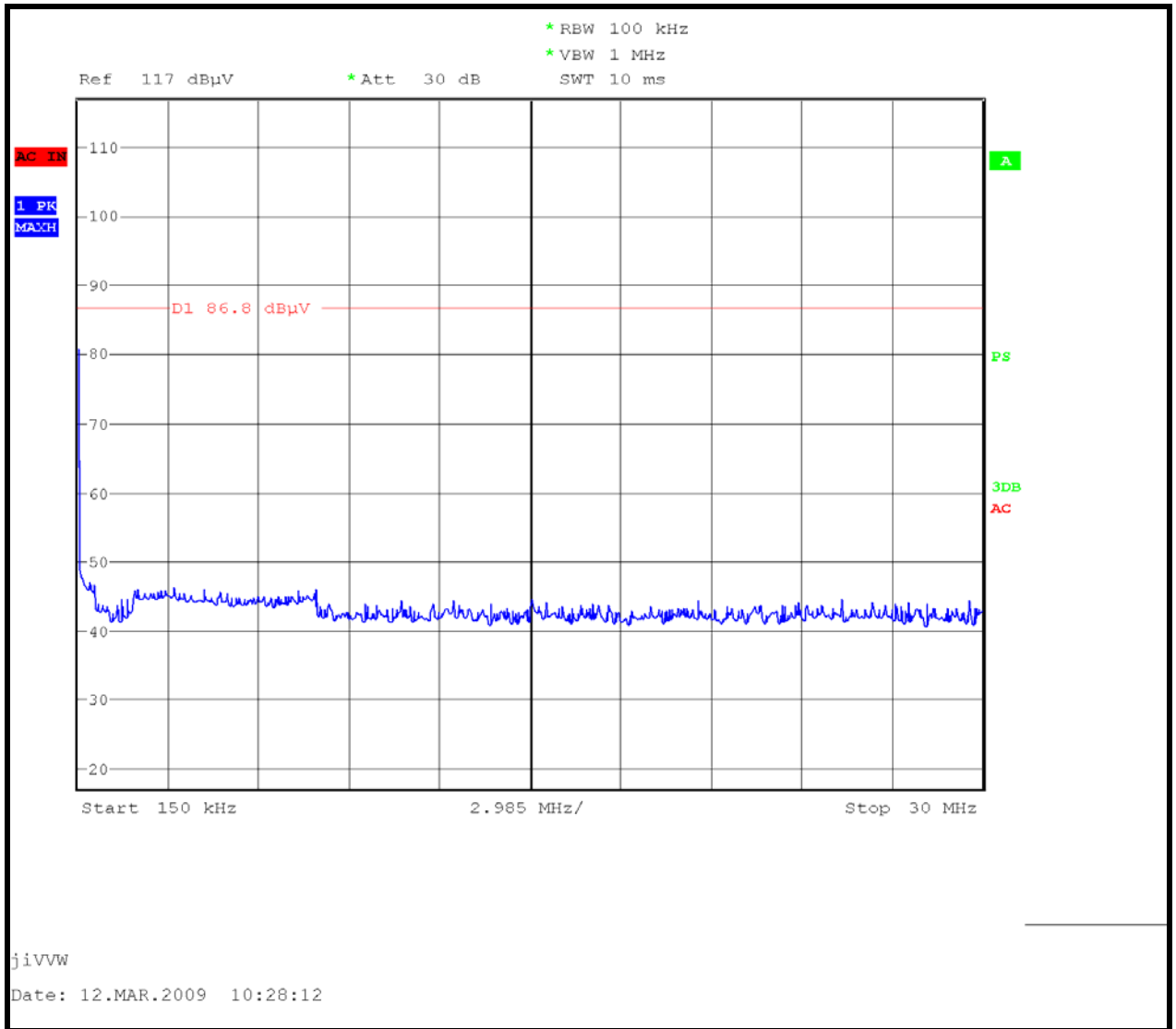
Conducted Spurious emissions 5 GHz to 18 GHz– 2480MHz 1Mb/s



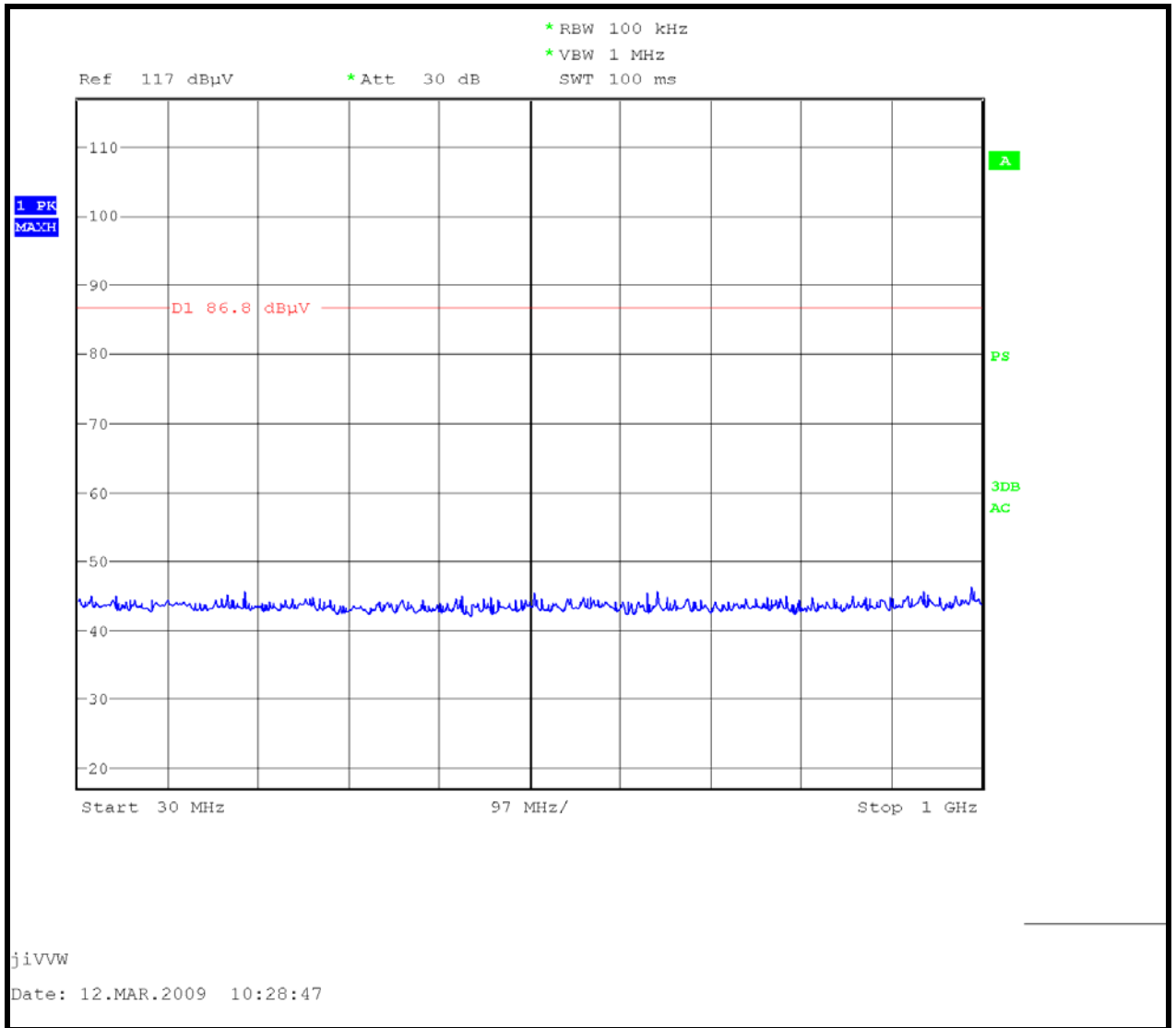
Conducted Spurious emissions 18 GHz to 25 GHz– 2480MHz 1Mb/s



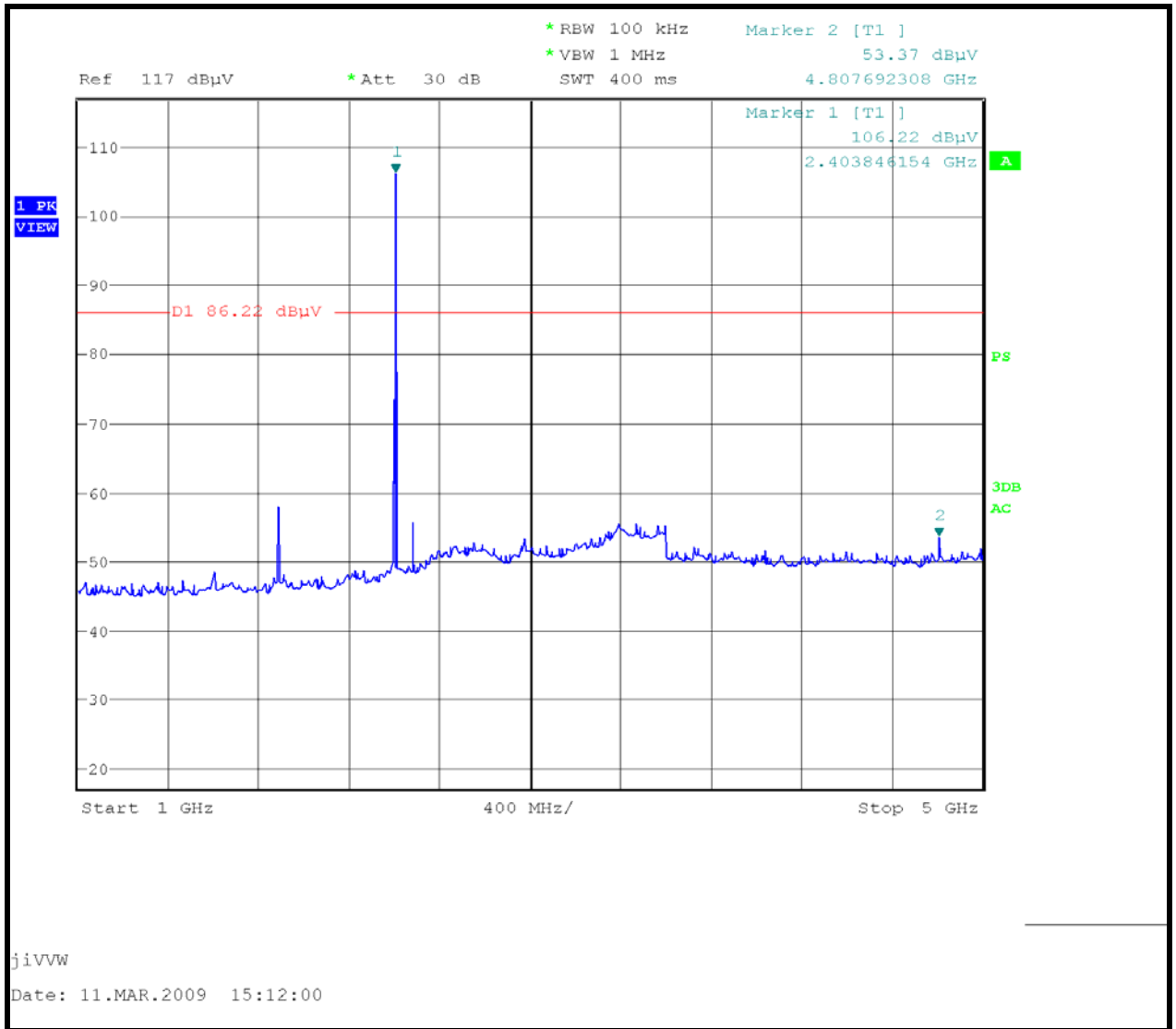
Conducted Spurious emissions 9 kHz to 150 kHz– 2402MHz 2Mb/s



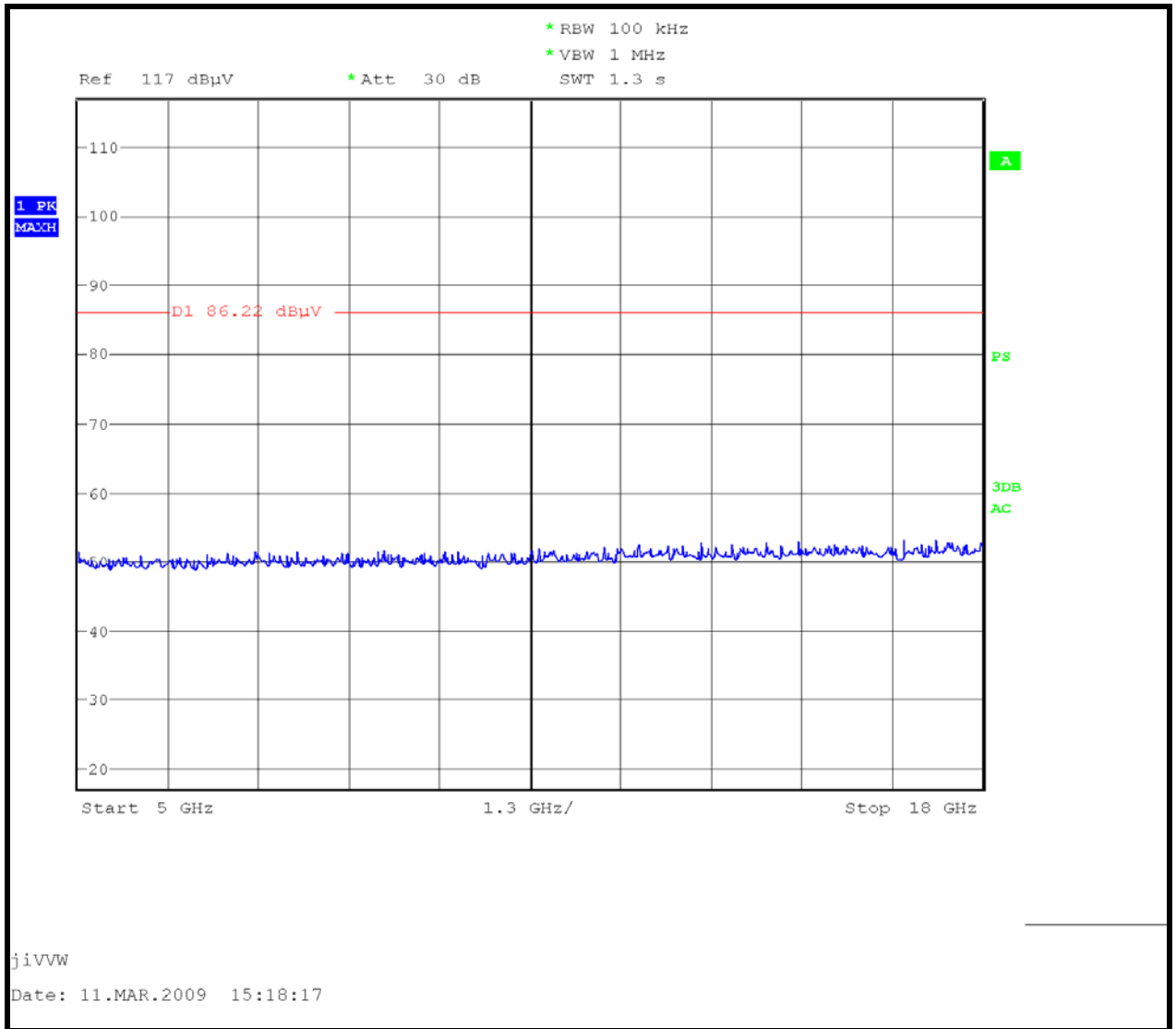
Conducted Spurious emissions 150 kHz to 30 MHz– 2402MHz 2Mb/s



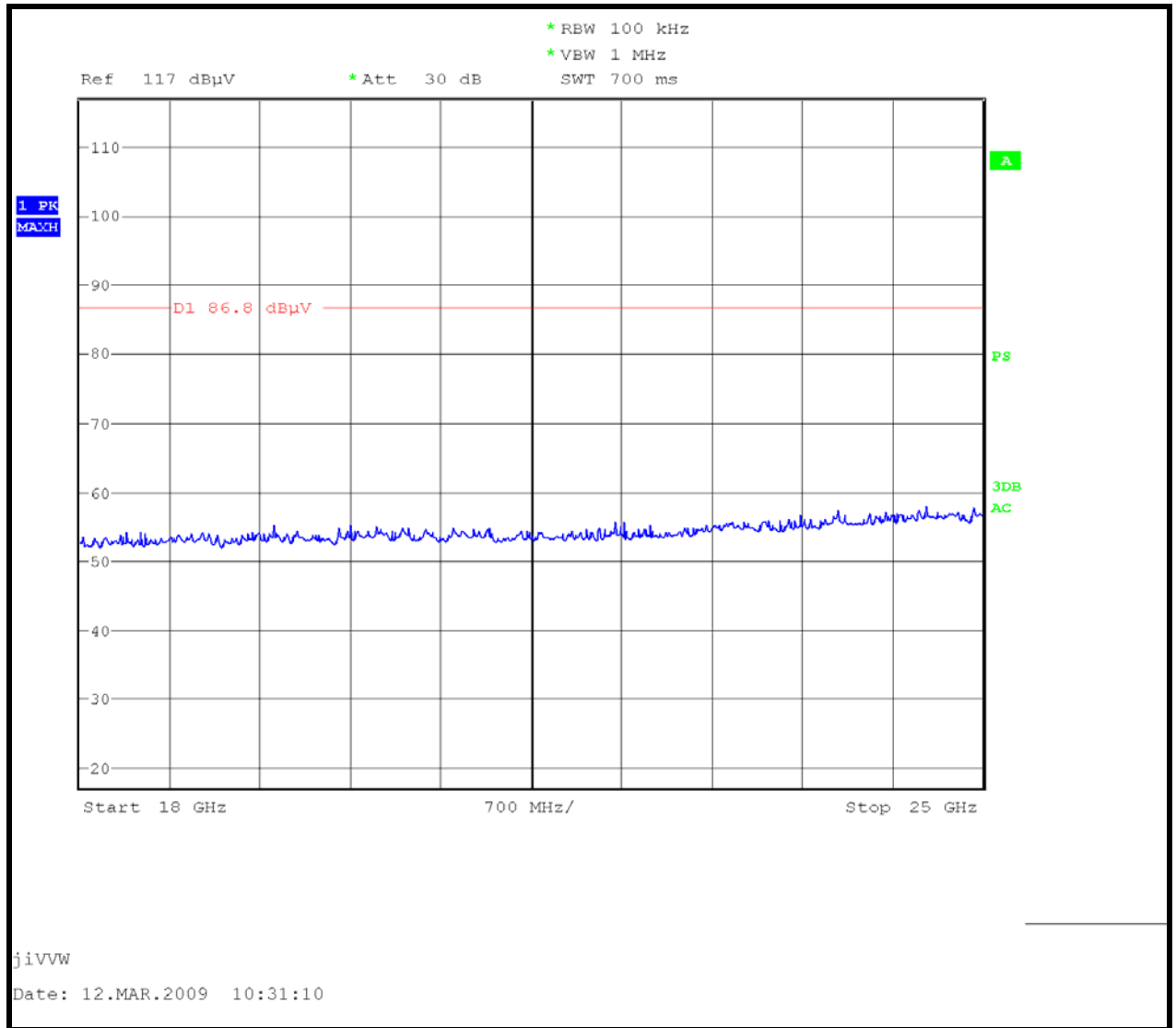
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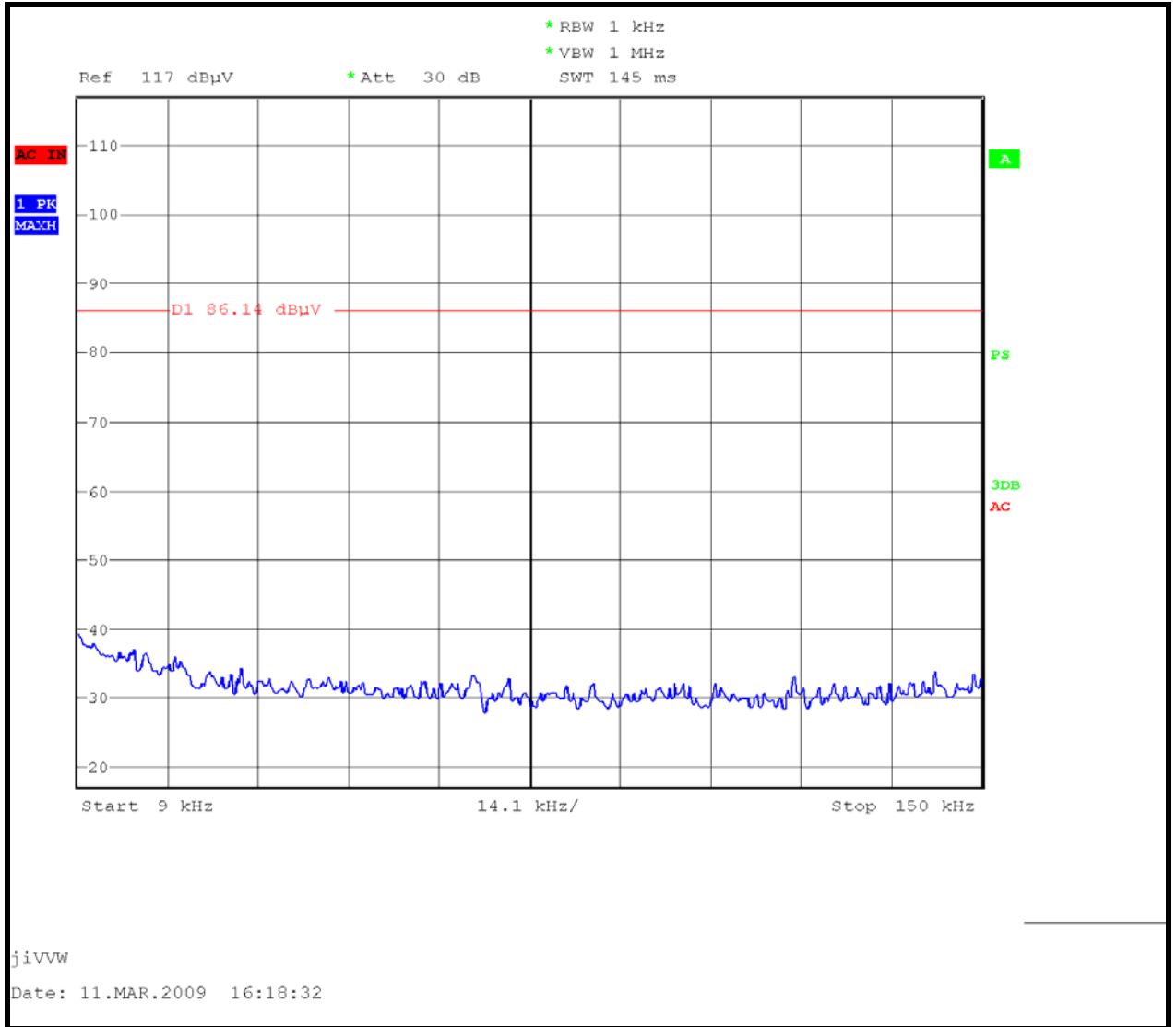
Conducted Spurious emissions 1 GHz to 5 GHz– 2402MHz 2Mb/s



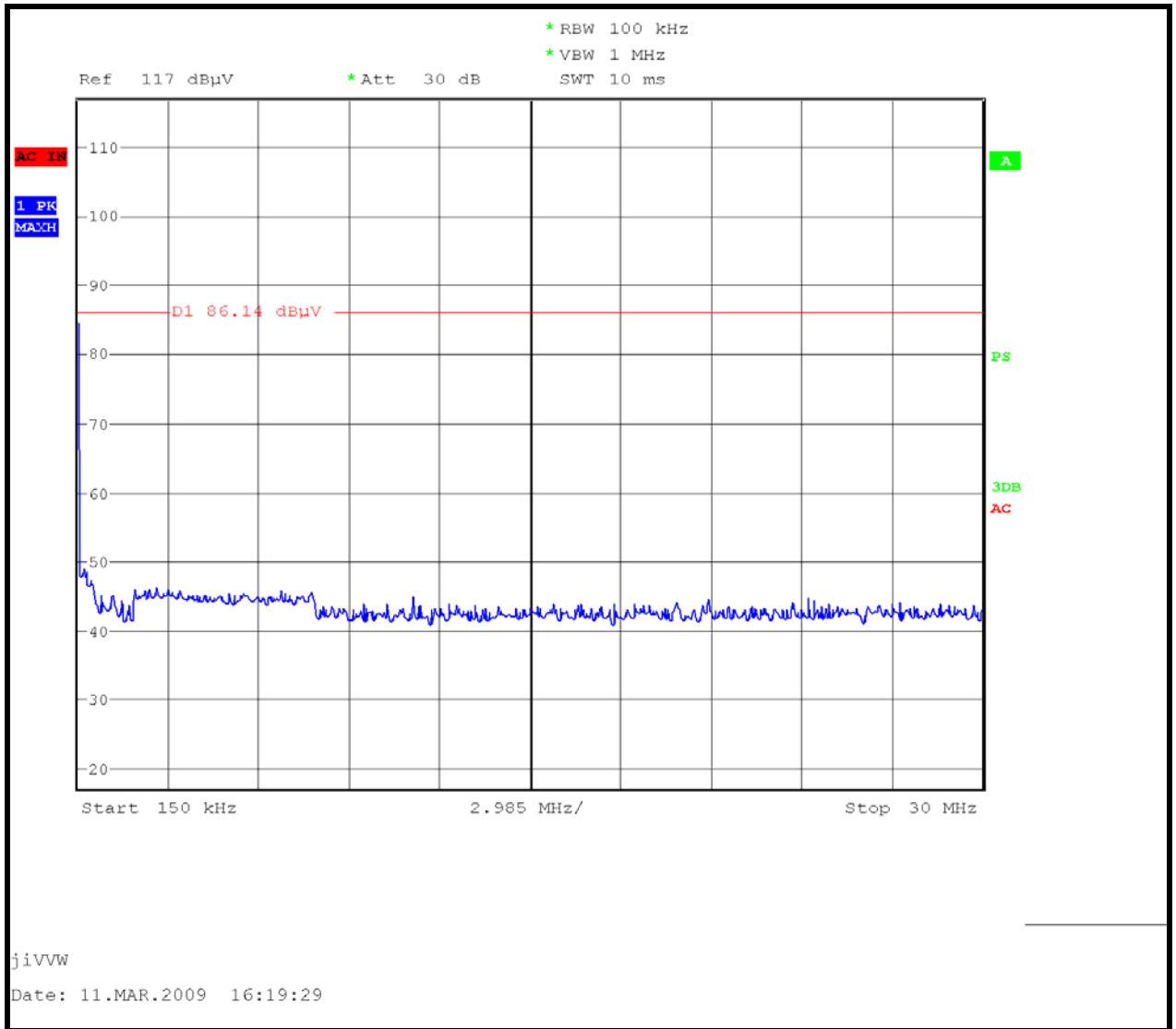
Conducted Spurious emissions 5 GHz to 18 GHz– 2402MHz 2Mb/s



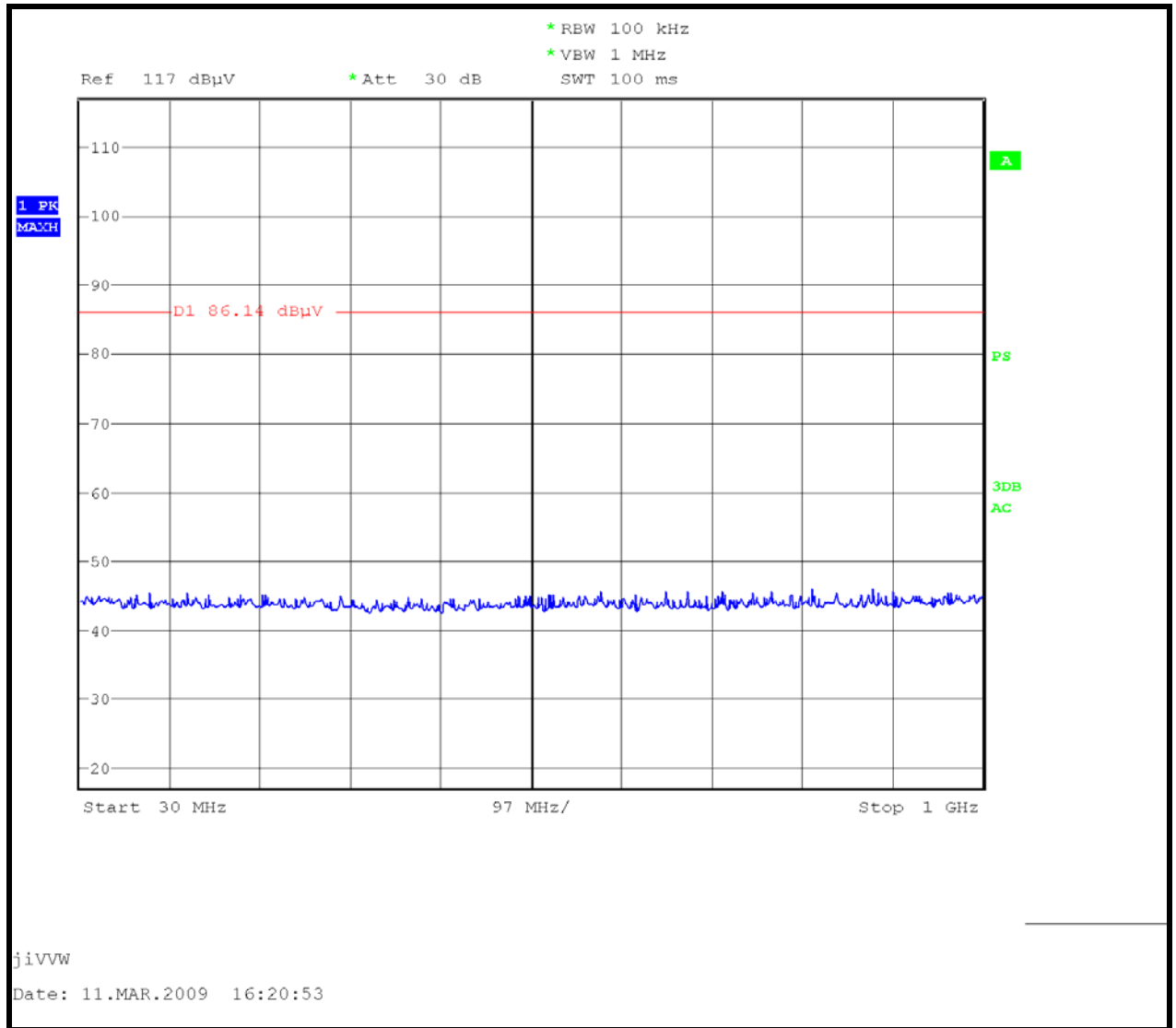
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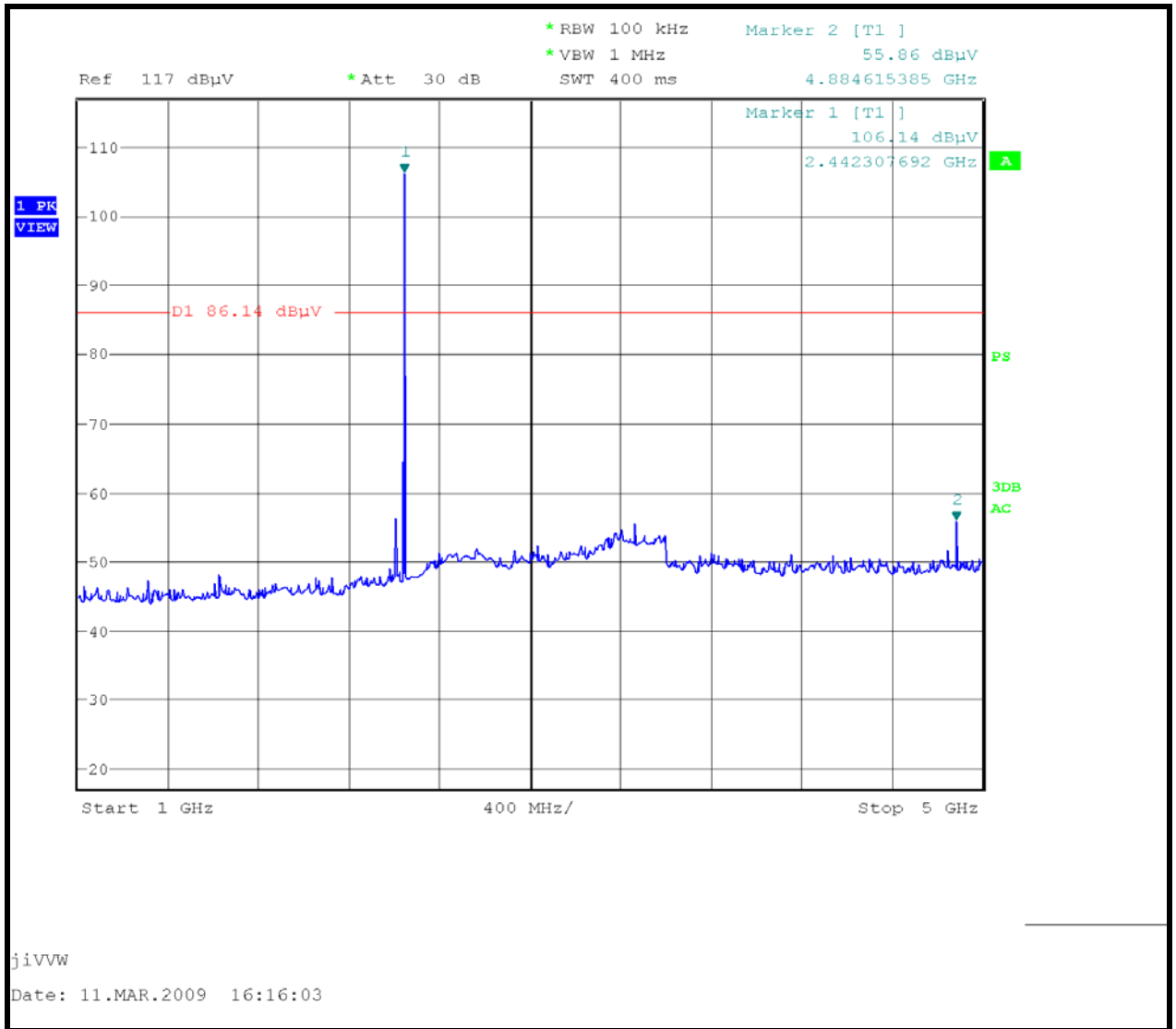
Conducted Spurious emissions 9 kHz to 150 kHz– 2441MHz 2Mb/s



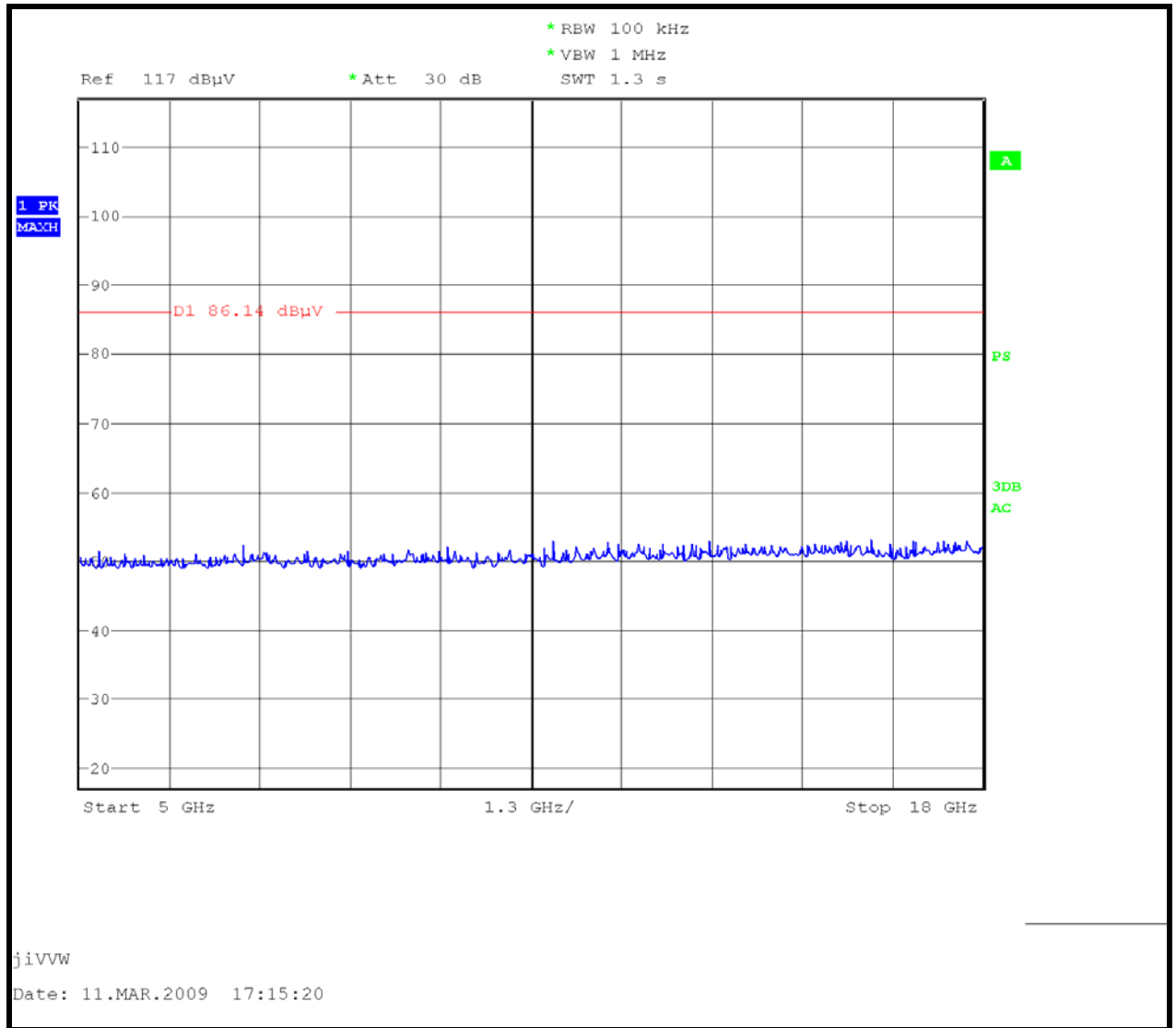
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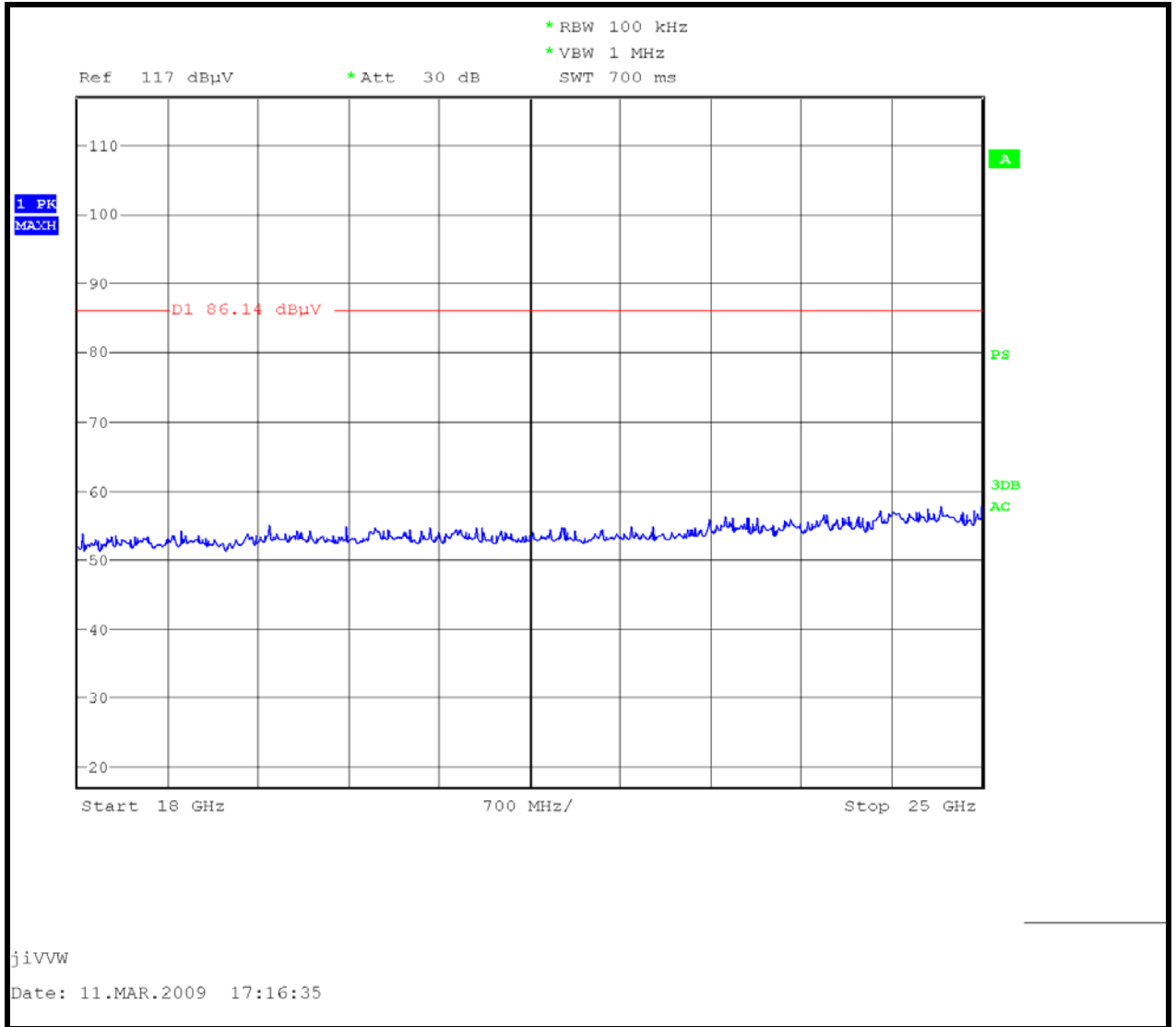
Conducted Spurious emissions 30 MHz to 1 GHz– 2441MHz 2Mb/s



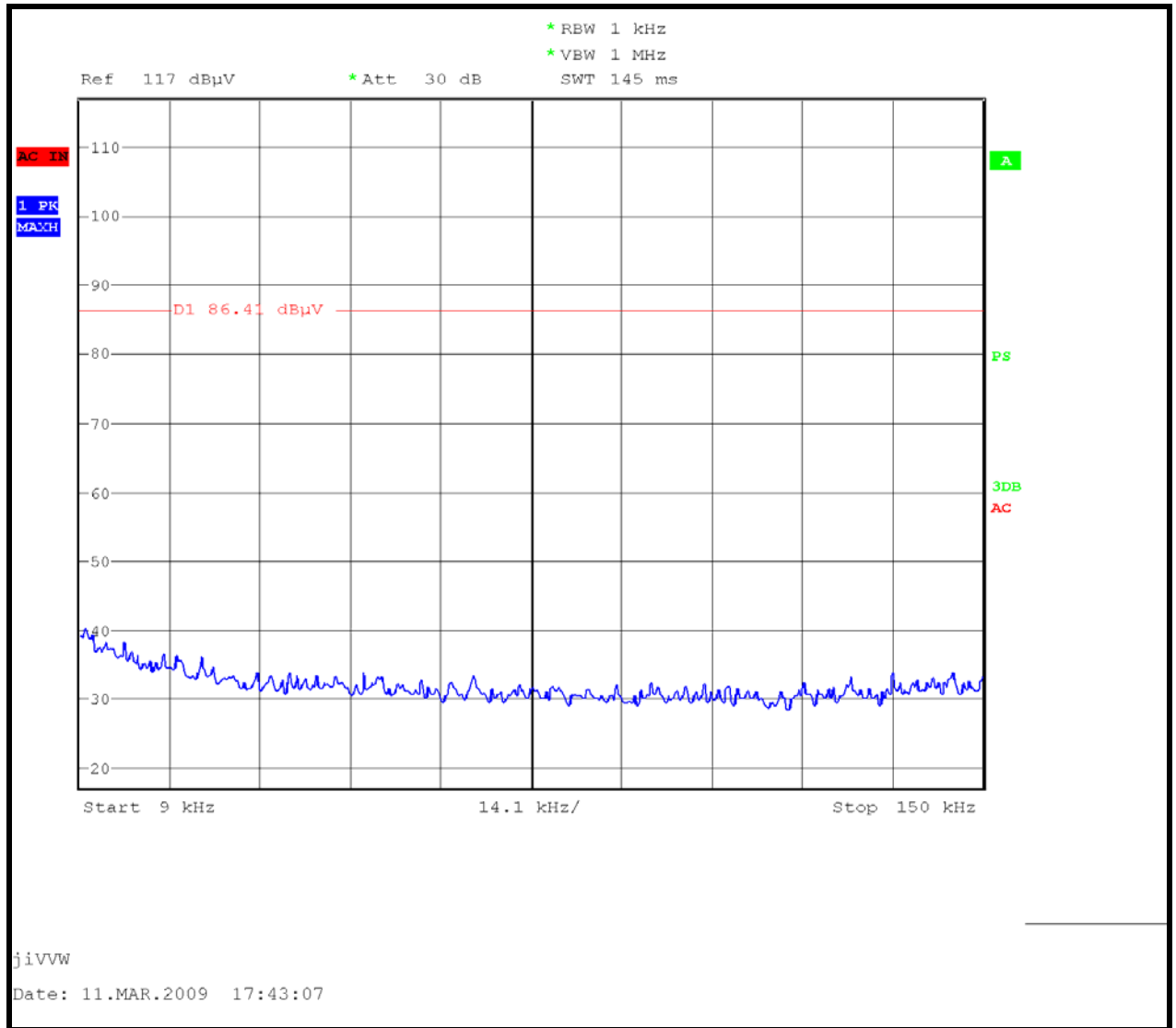
Conducted Spurious emissions 1 GHz to 5 GHz– 2441MHz 2Mb/s



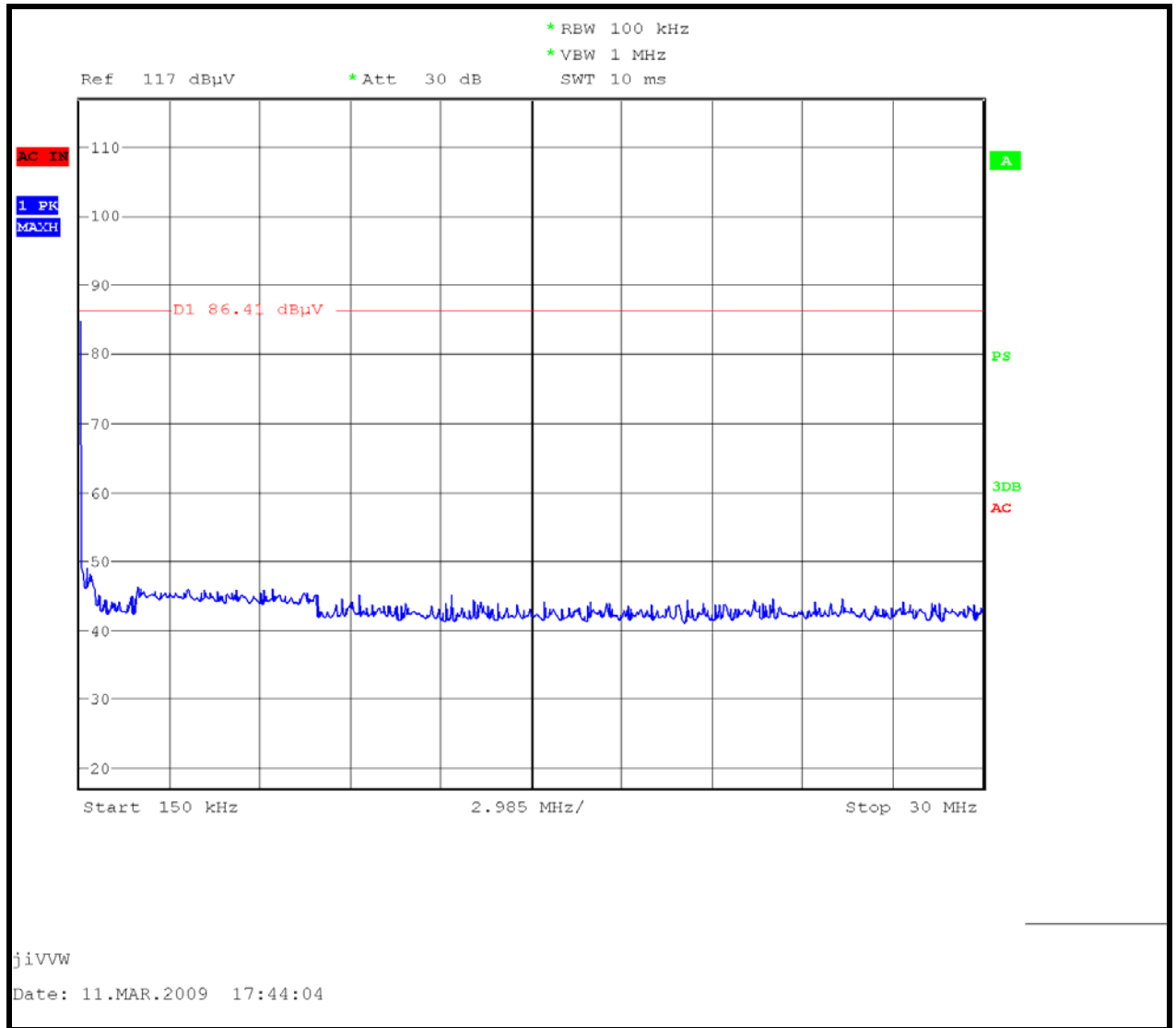
Conducted Spurious emissions 5 GHz to 18 GHz– 2441MHz 2Mb/s



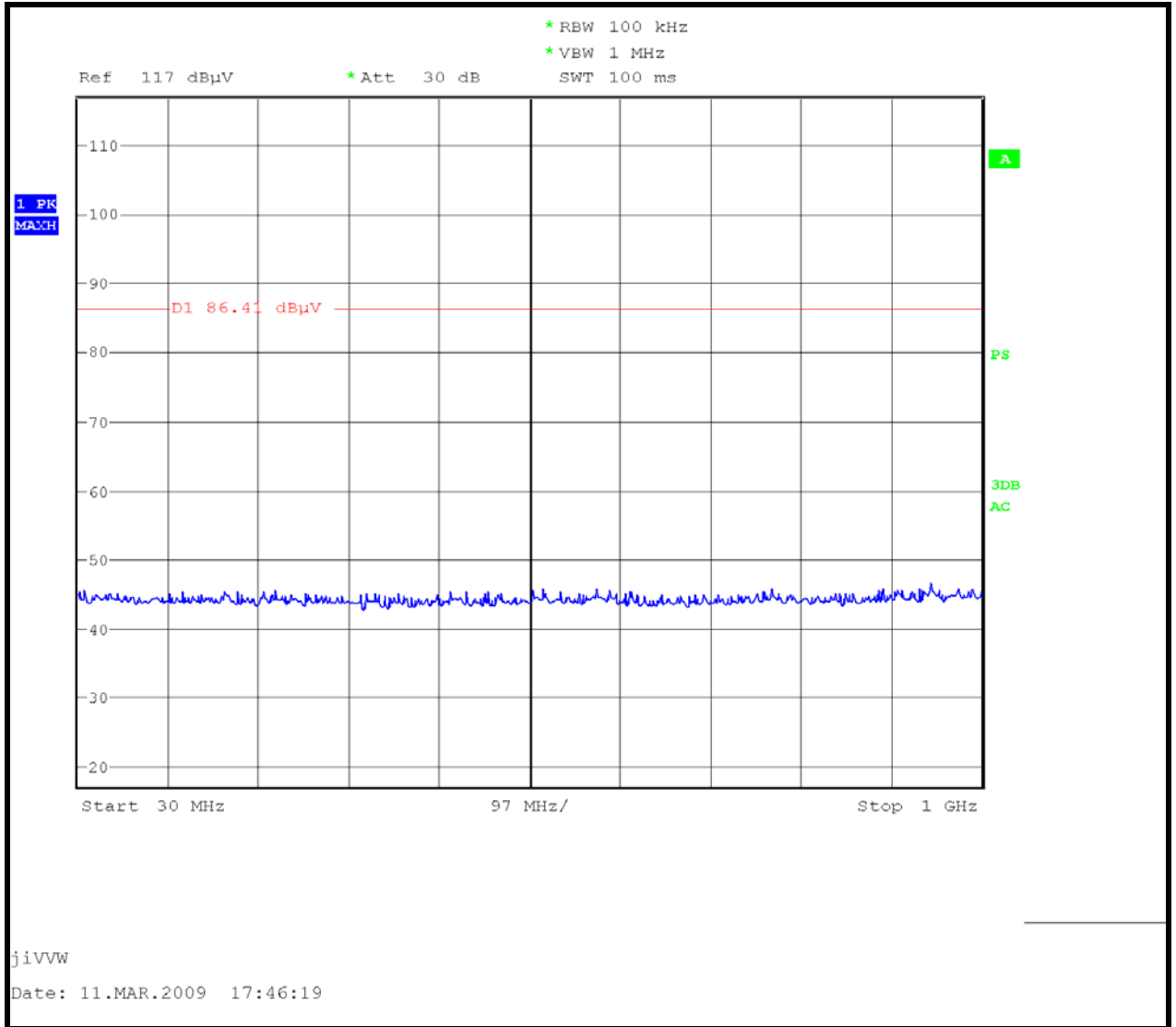
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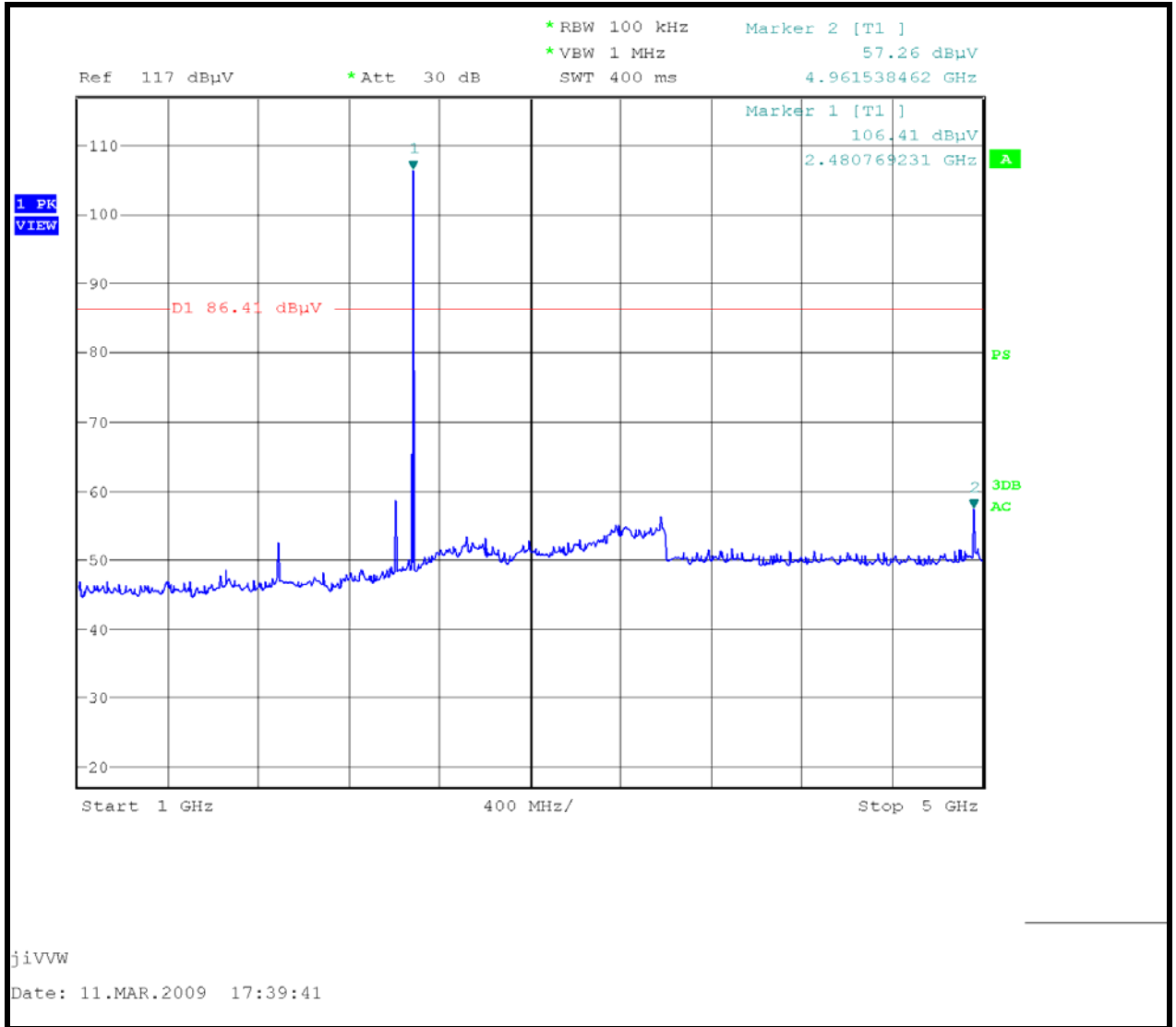
Conducted Spurious emissions 9 kHz to 150 kHz– 2480MHz 2Mb/s



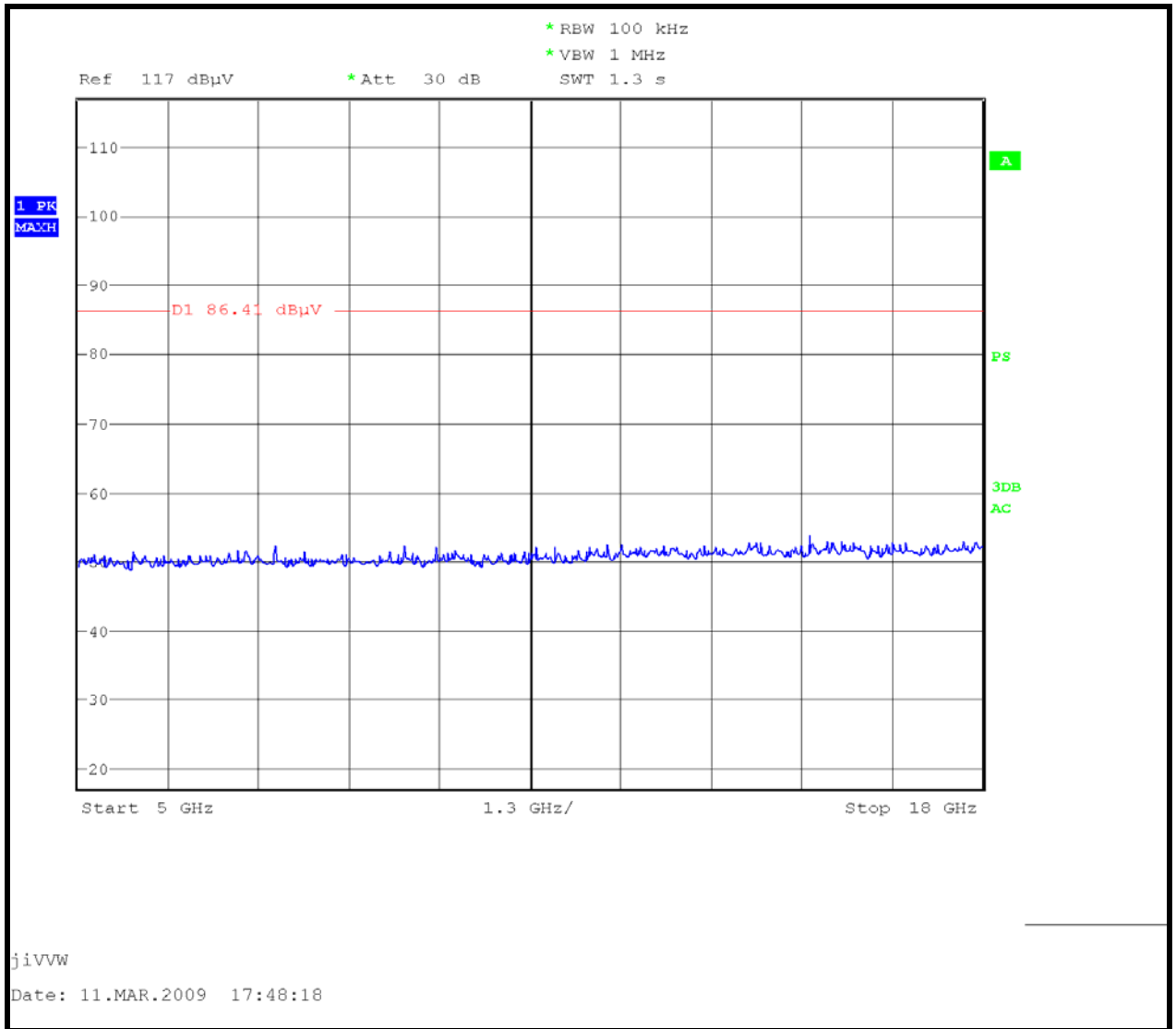
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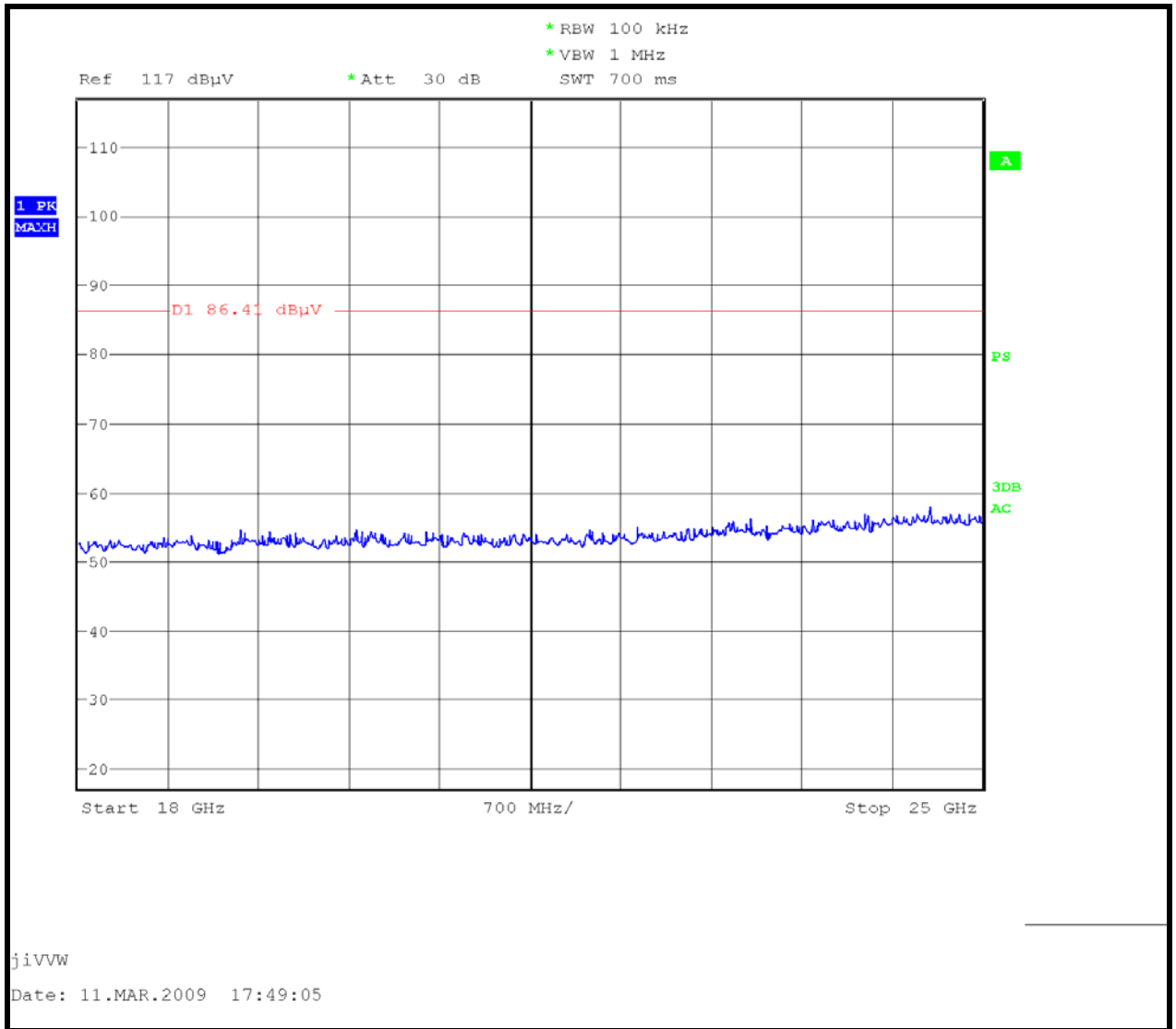
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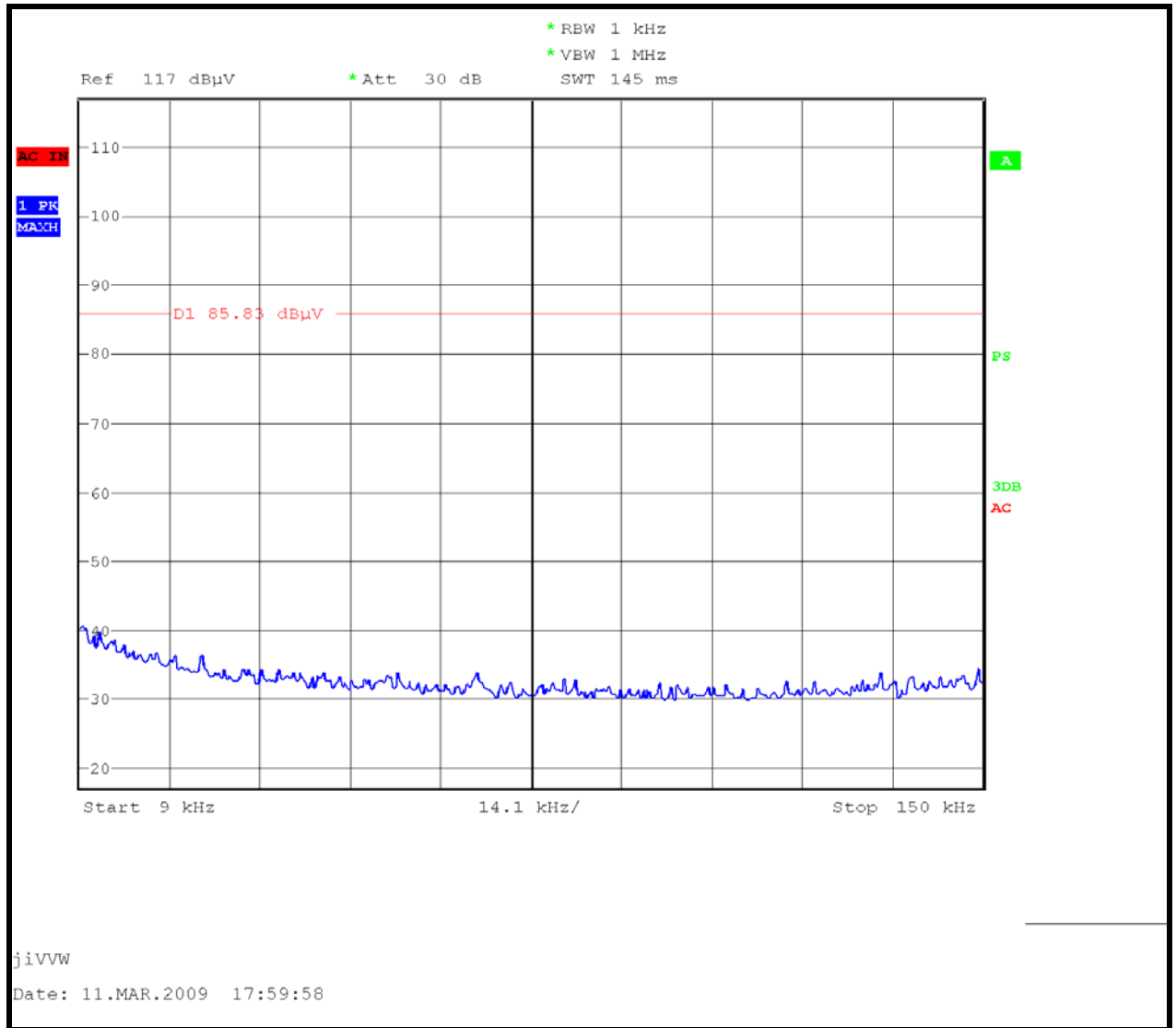
Conducted Spurious emissions 1 GHz to 5 GHz– 2480MHz 2Mb/s



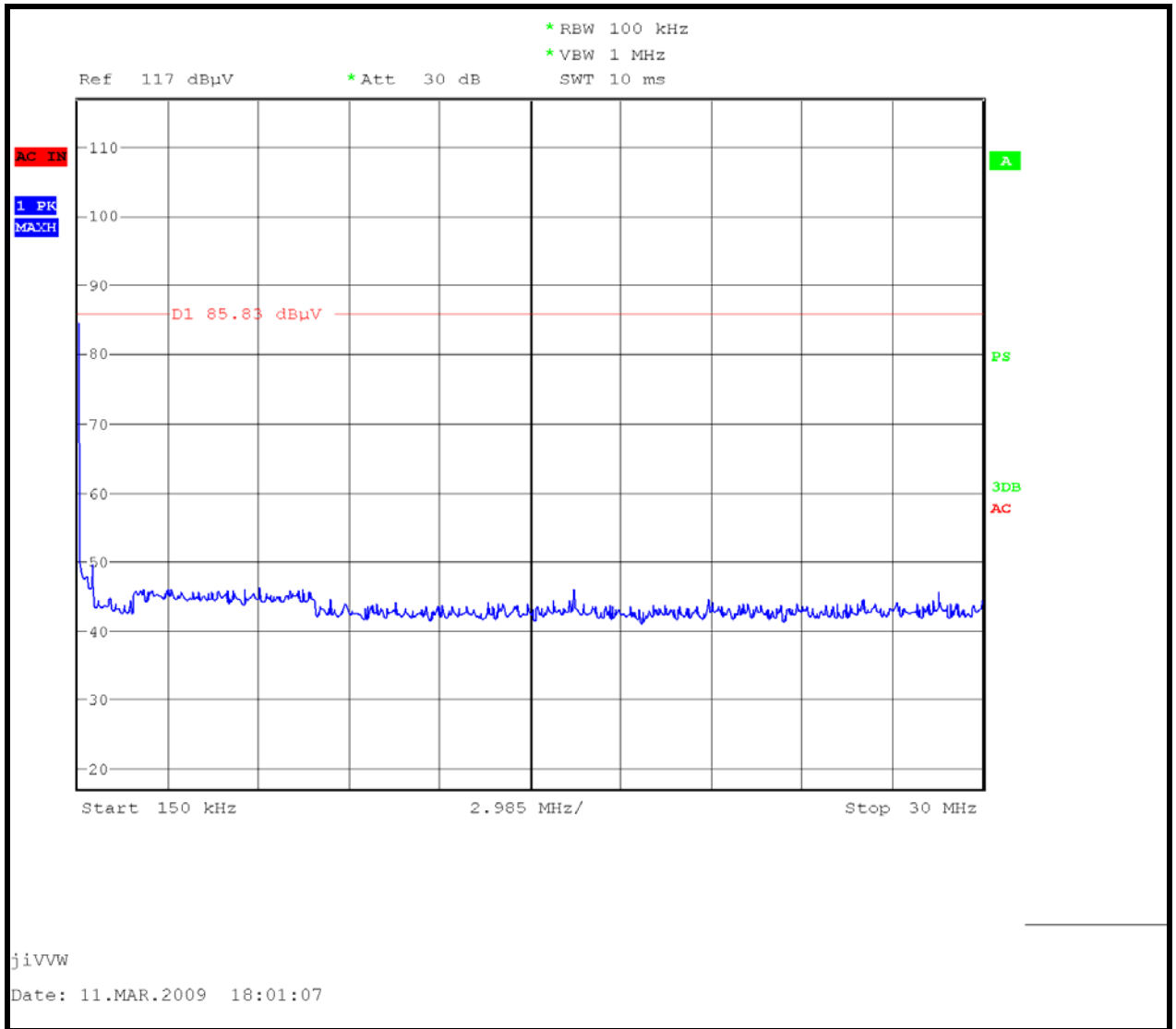
Conducted Spurious emissions 5 GHz to 18 GHz– 2480MHz 2Mb/s



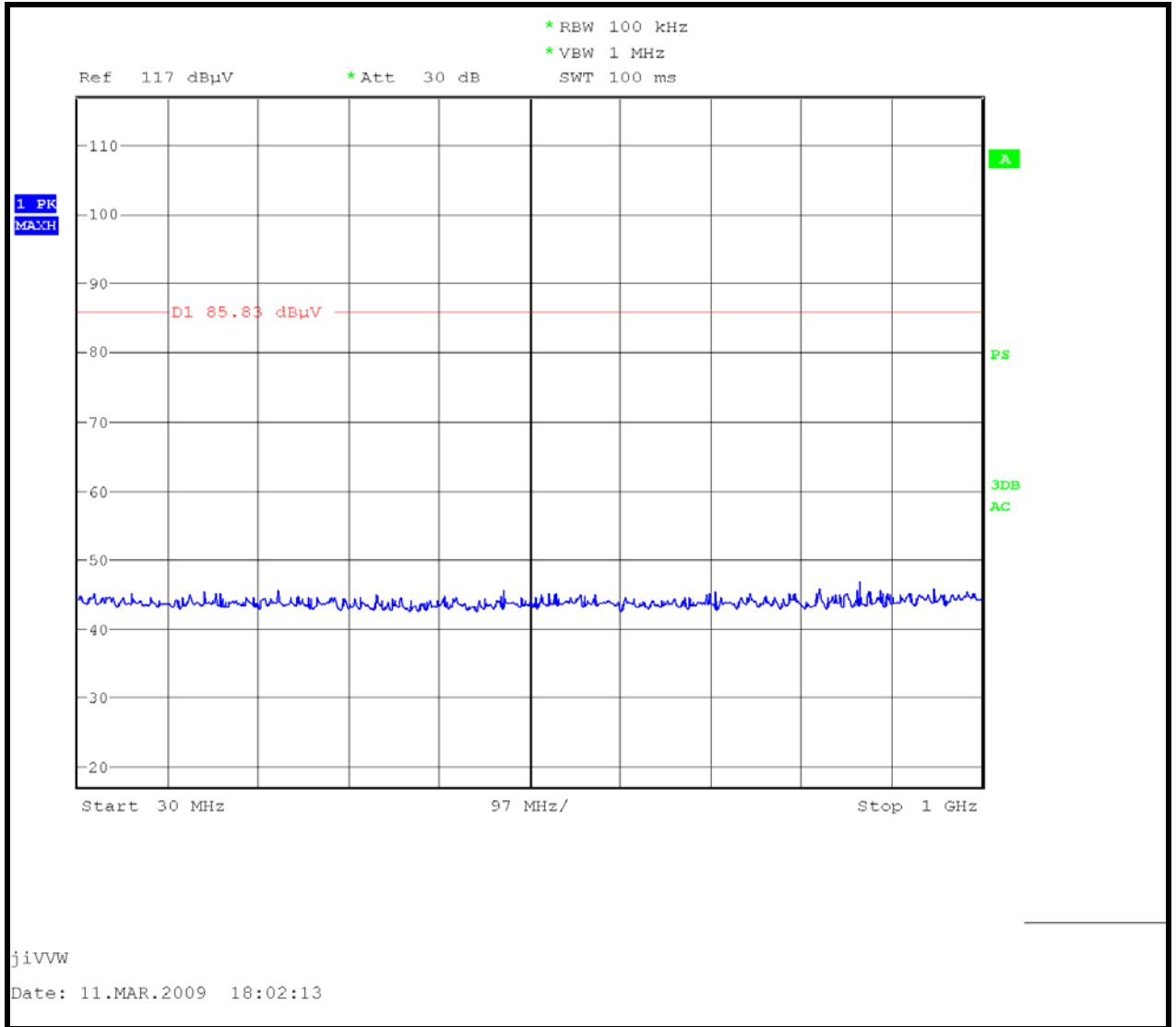
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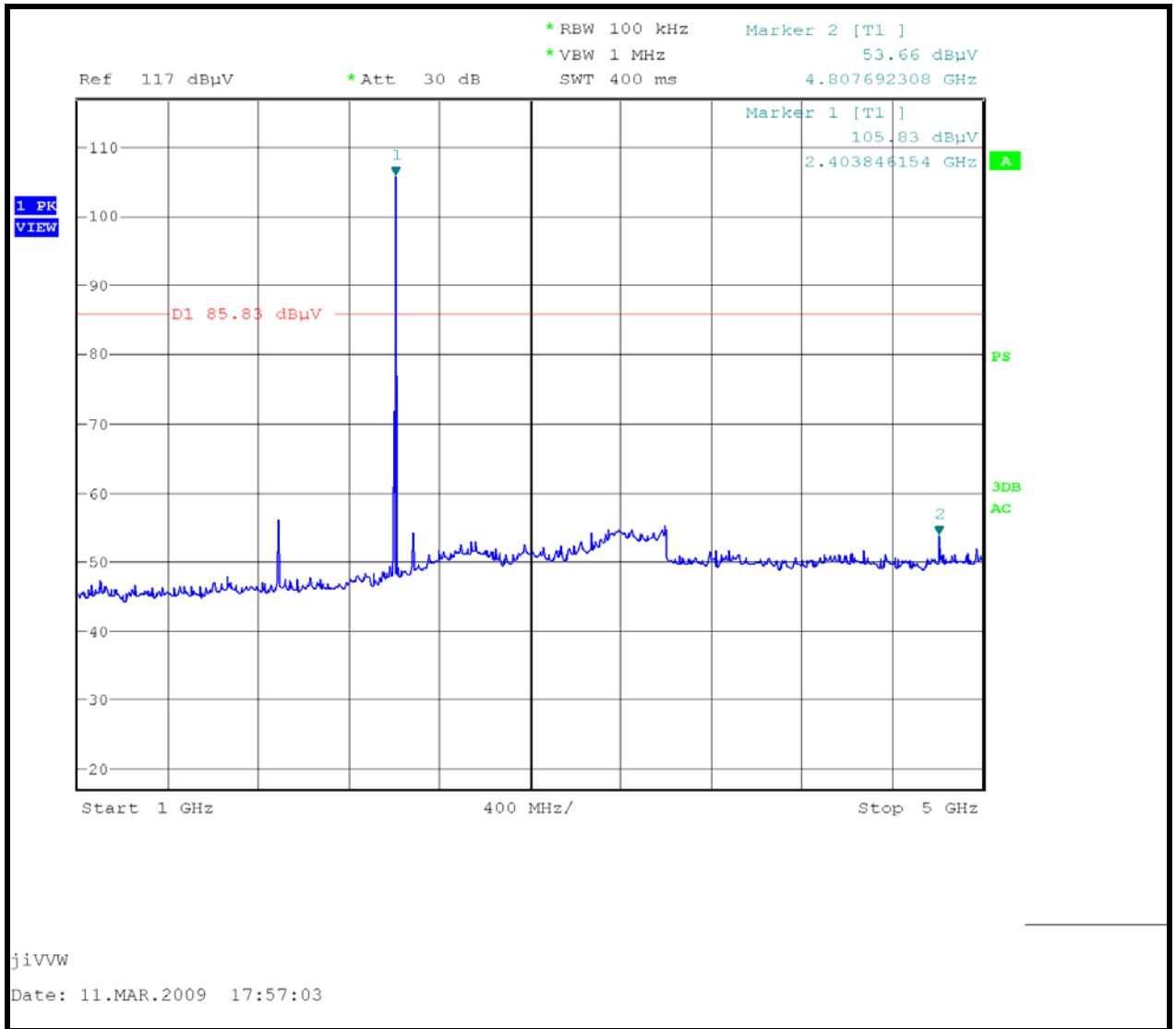
Conducted Spurious emissions 9 kHz to 150 kHz– 2402MHz 3Mb/s



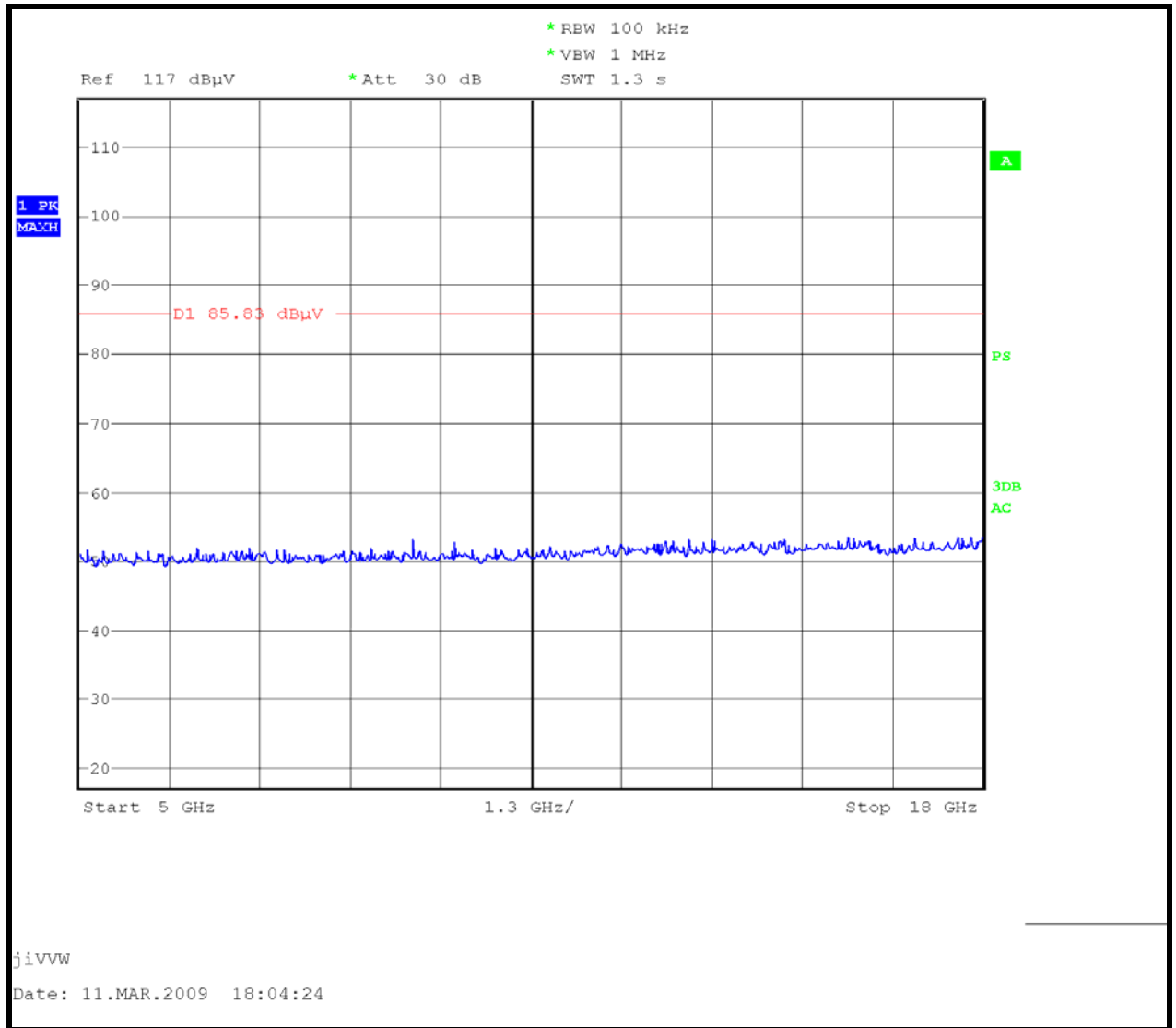
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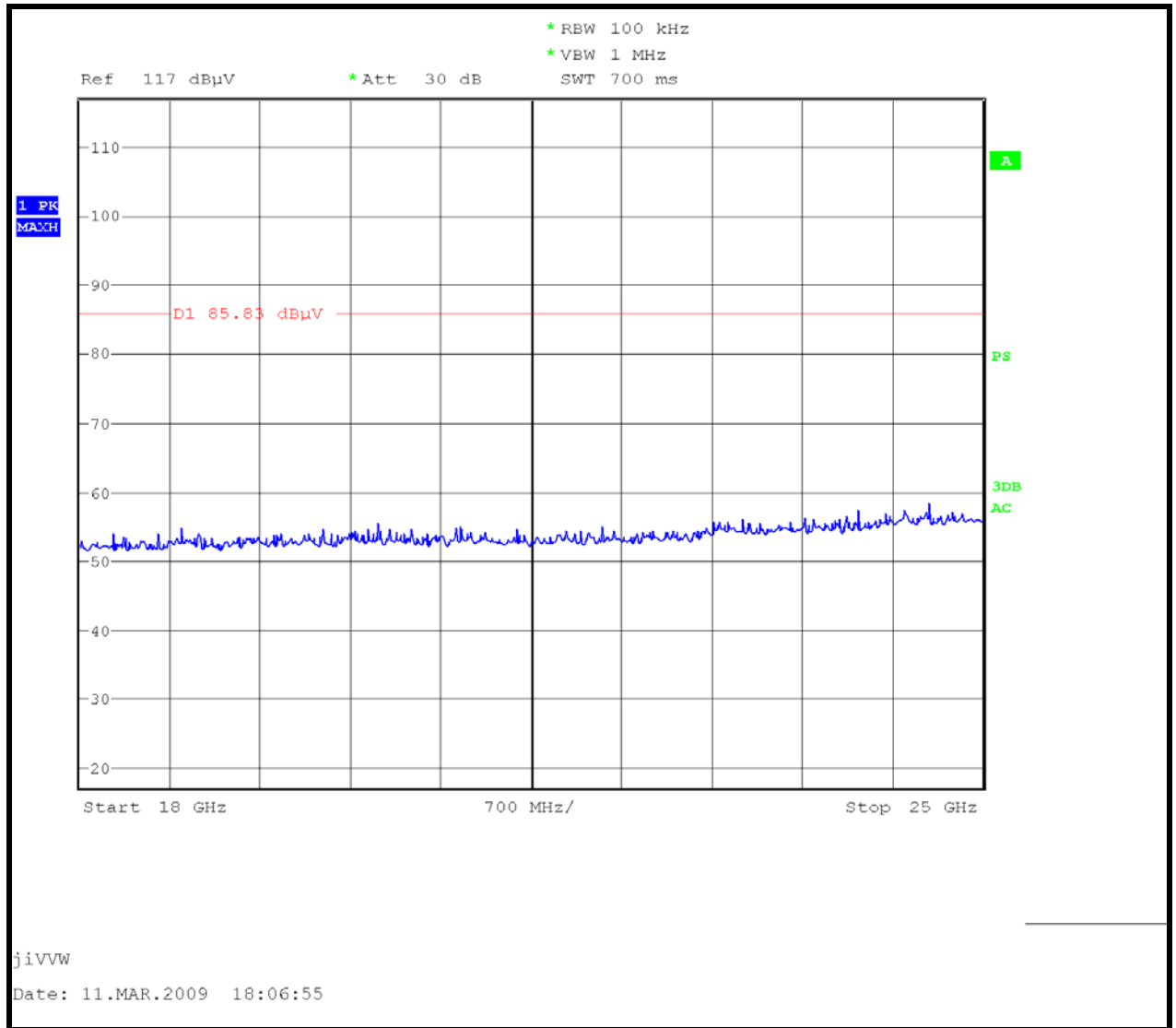
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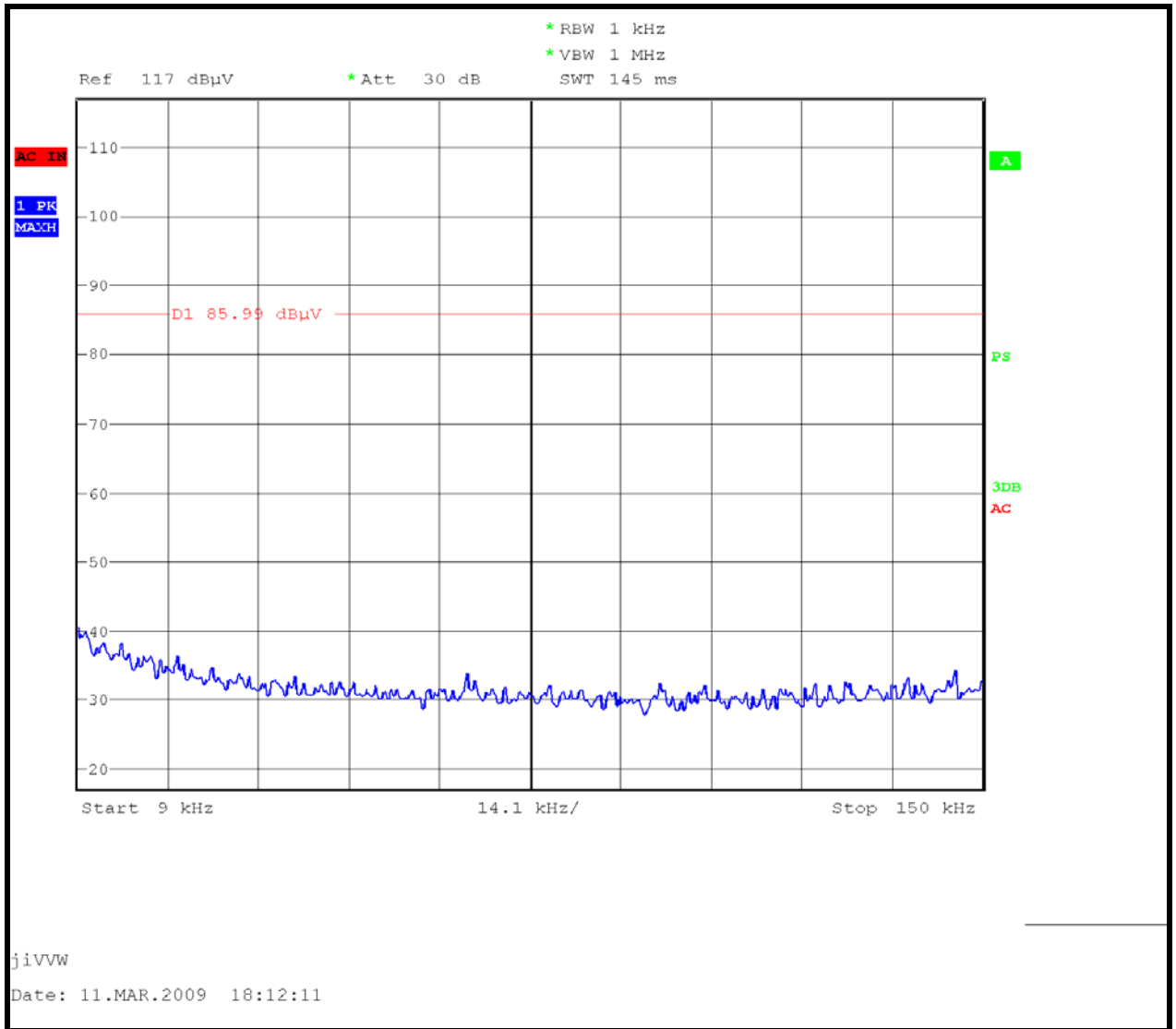
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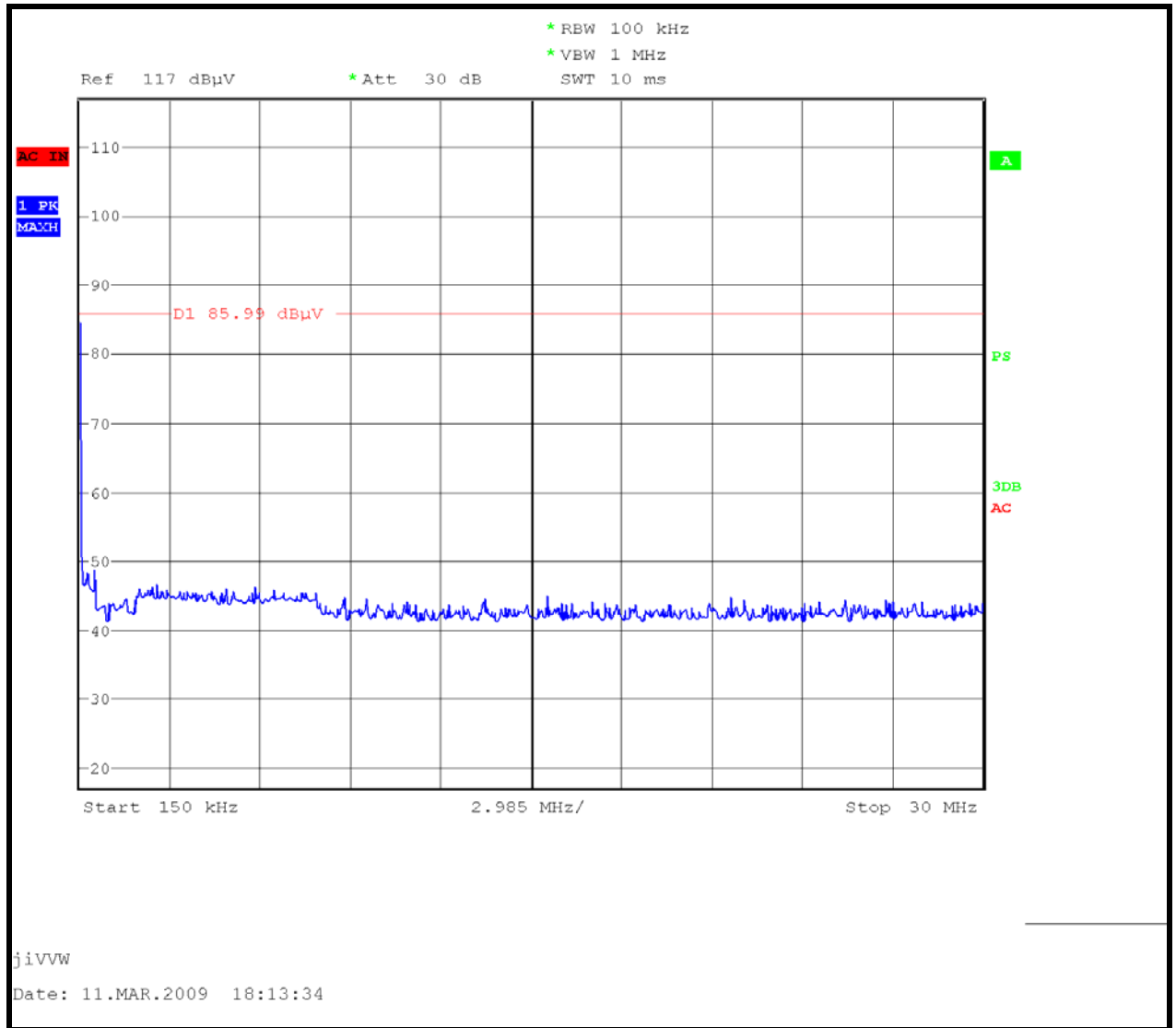
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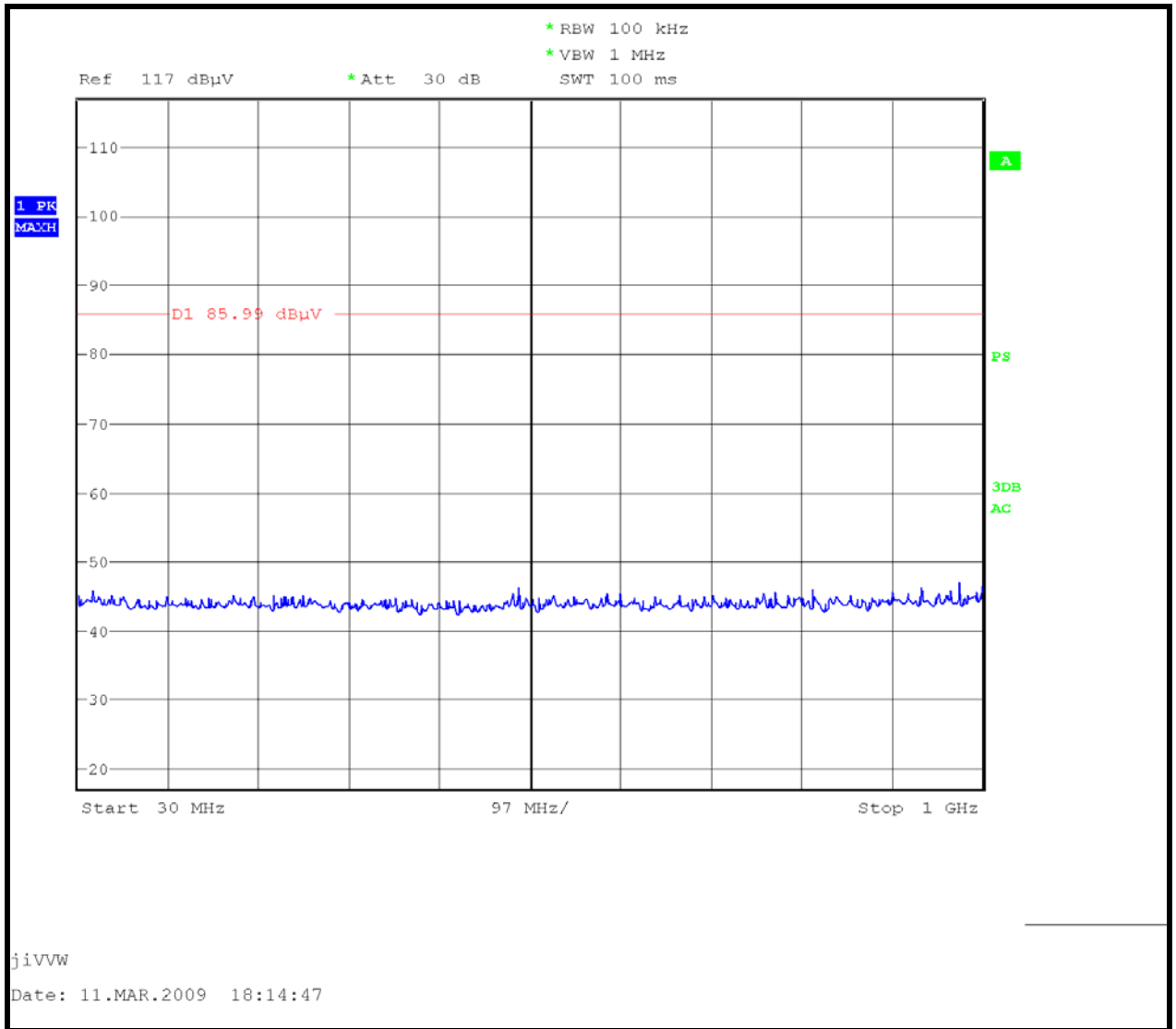
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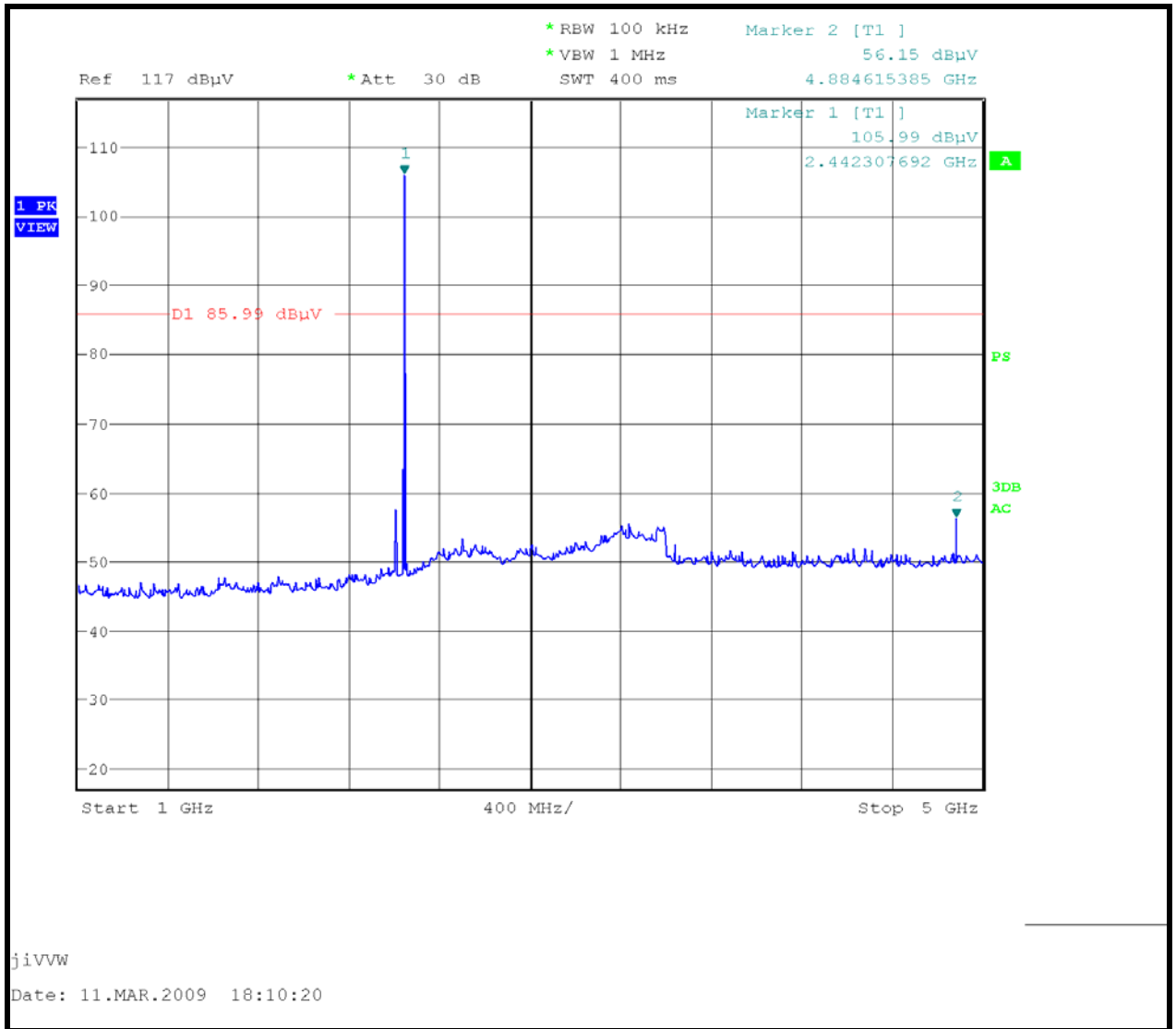
Conducted Spurious emissions 9 kHz to 150 kHz– 2441MHz 3Mb/s



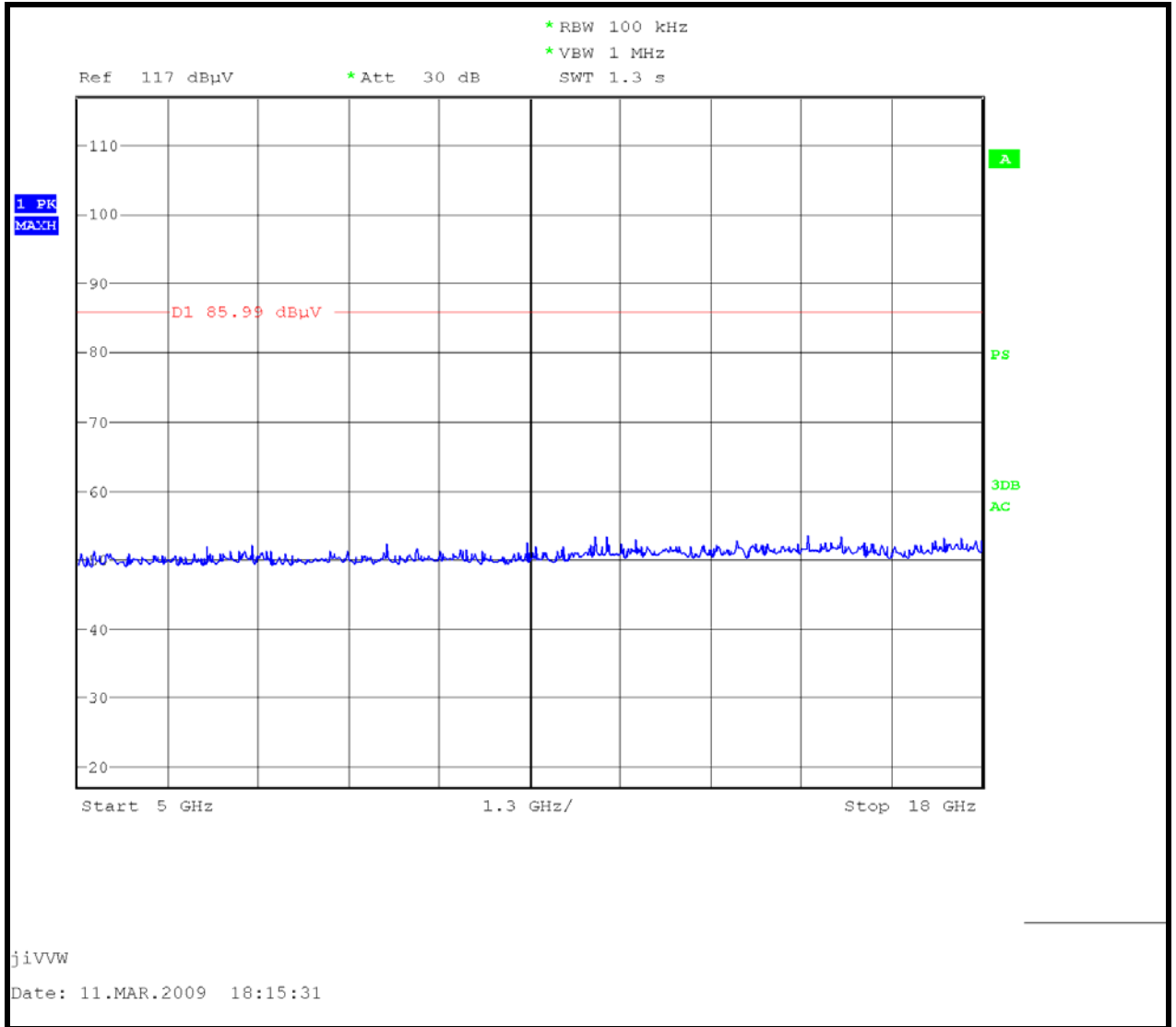
Conducted Spurious emissions 150 kHz to 30 MHz– 2441MHz 3Mb/s



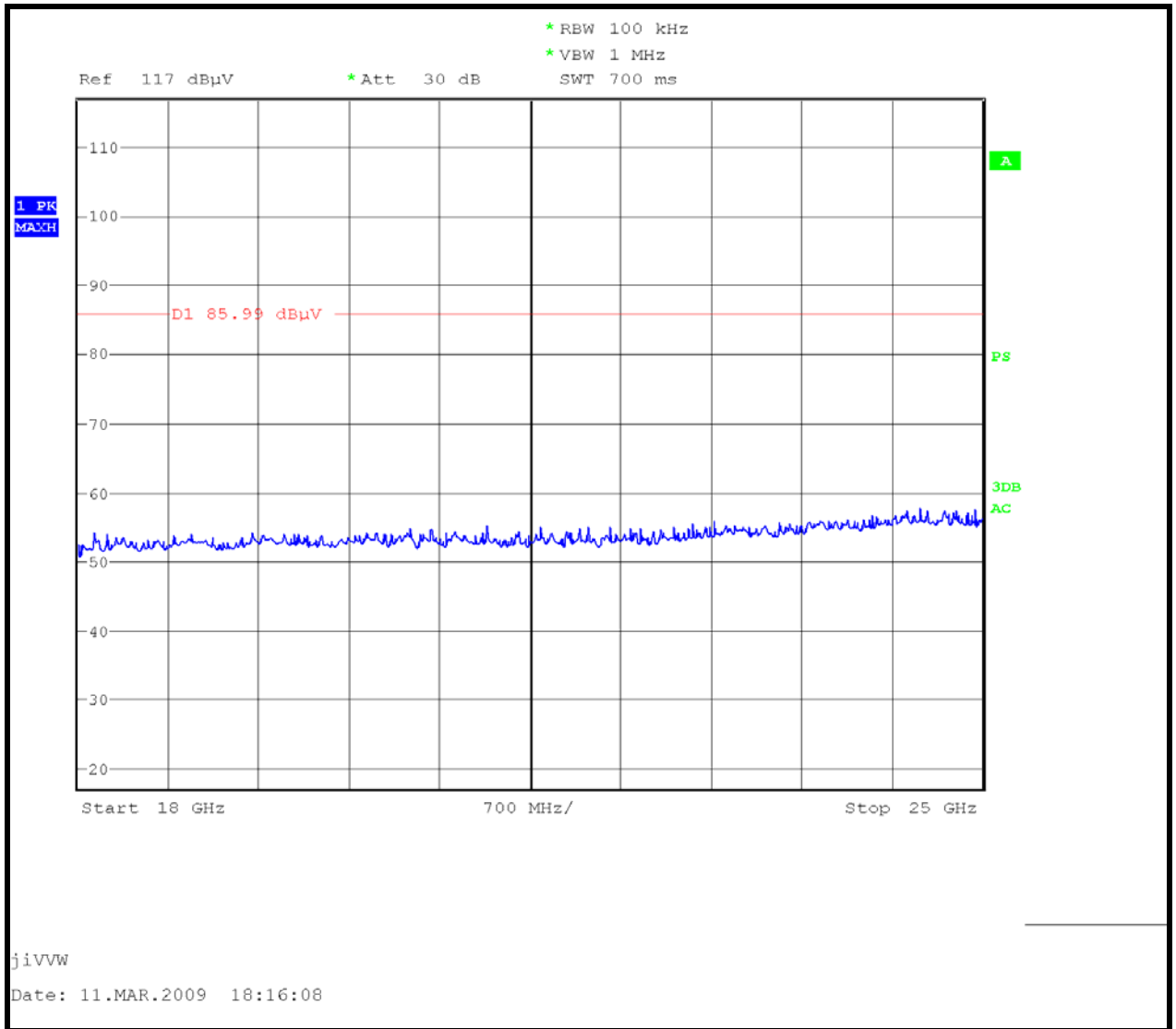
Conducted Spurious emissions 30 MHz to 1 GHz– 2441MHz 3Mb/s



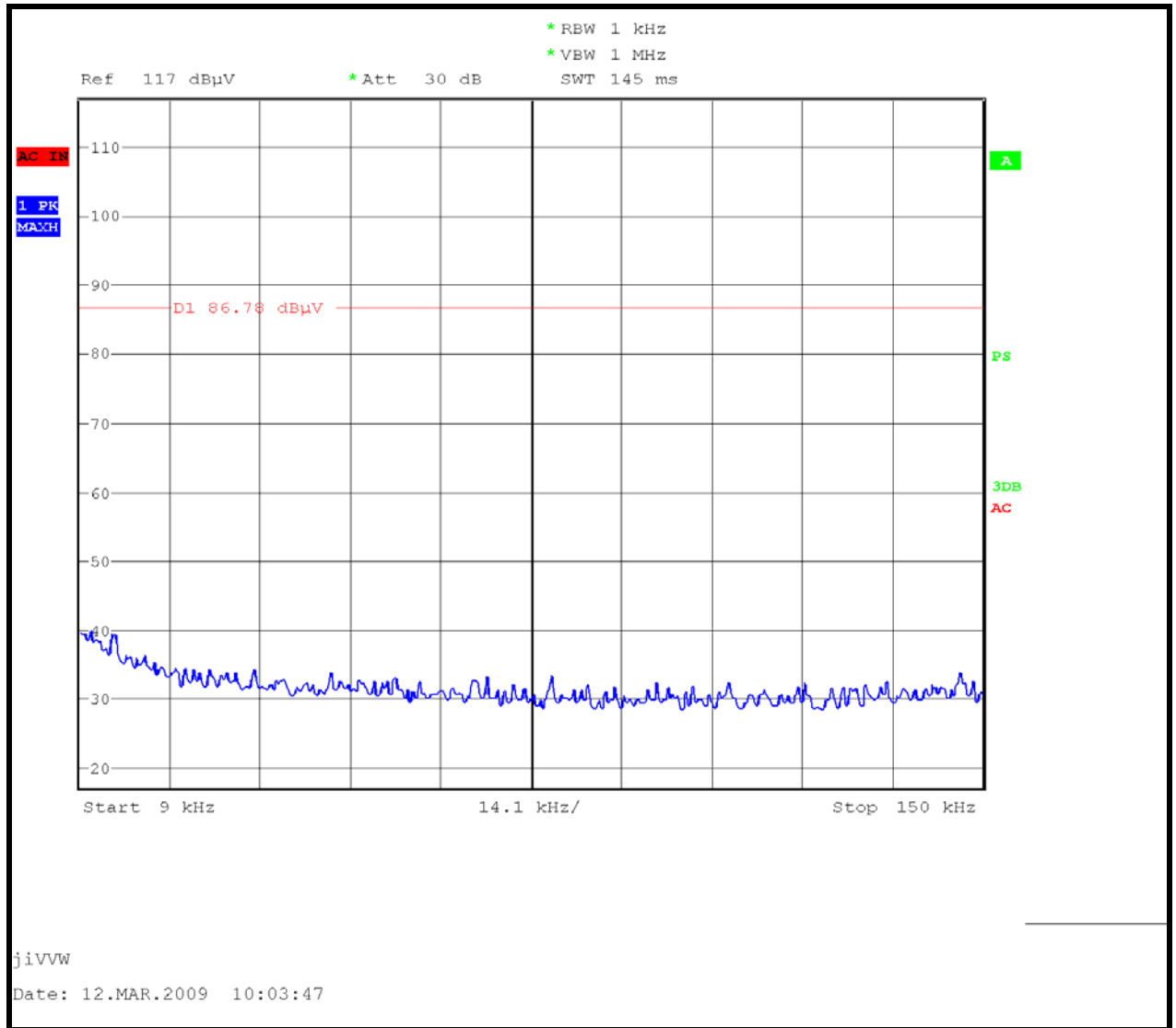
Conducted Spurious emissions 1 GHz to 5 GHz– 2441MHz 3Mb/s



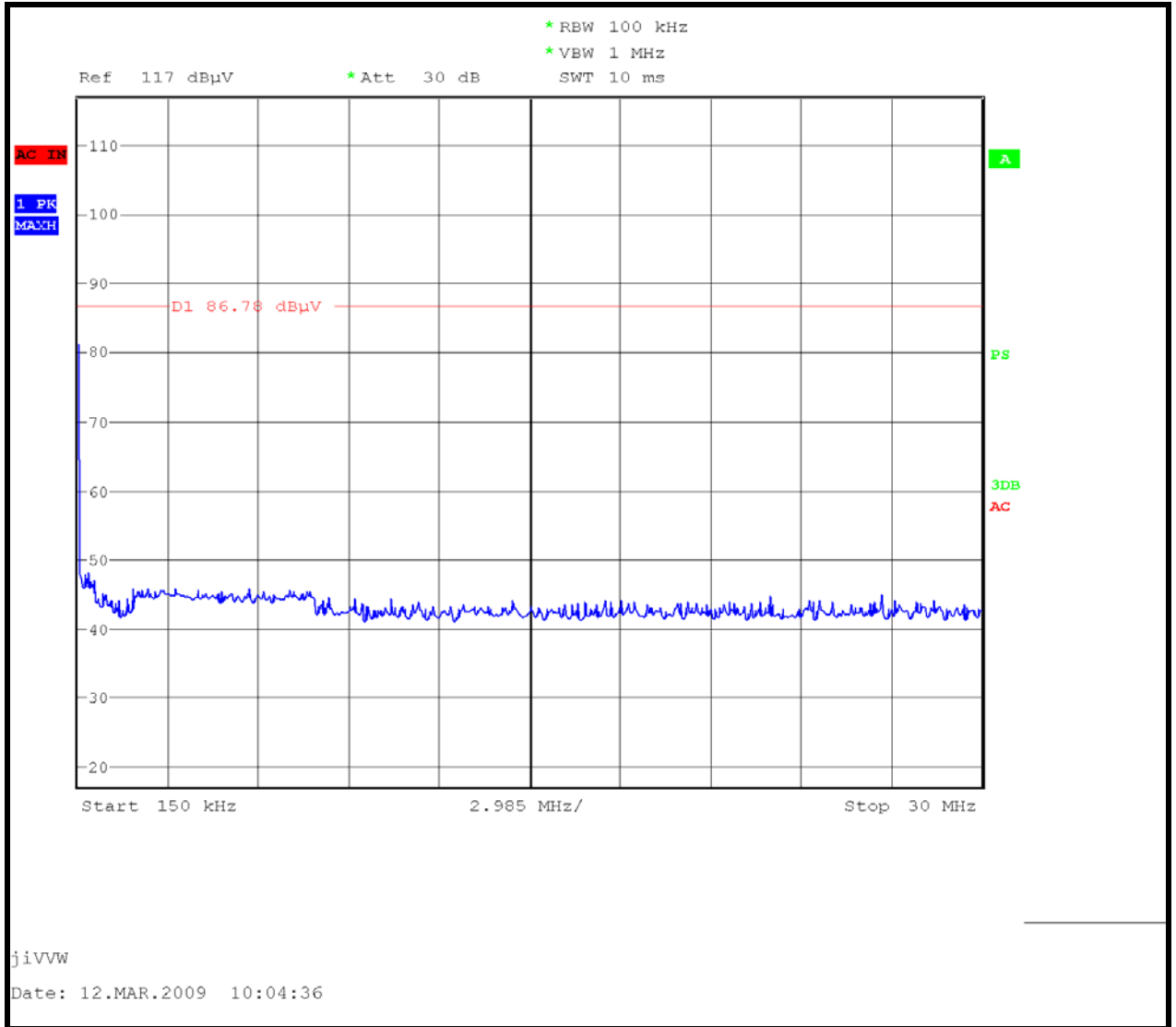
Conducted Spurious emissions 5 GHz to 18 GHz– 2441MHz 3Mb/s



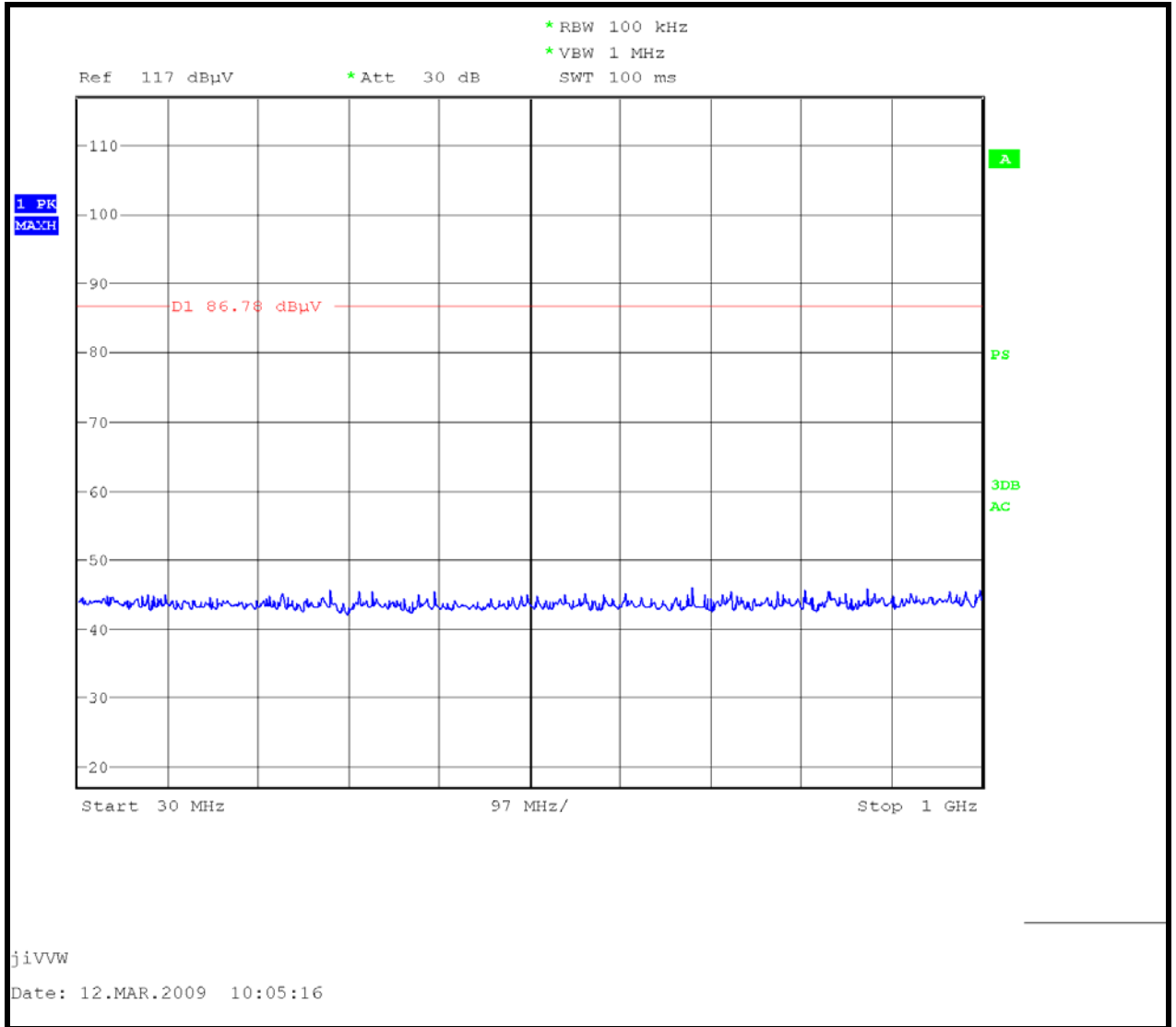
Conducted Spurious emissions 18 GHz to 25 GHz– 2441MHz 3Mb/s



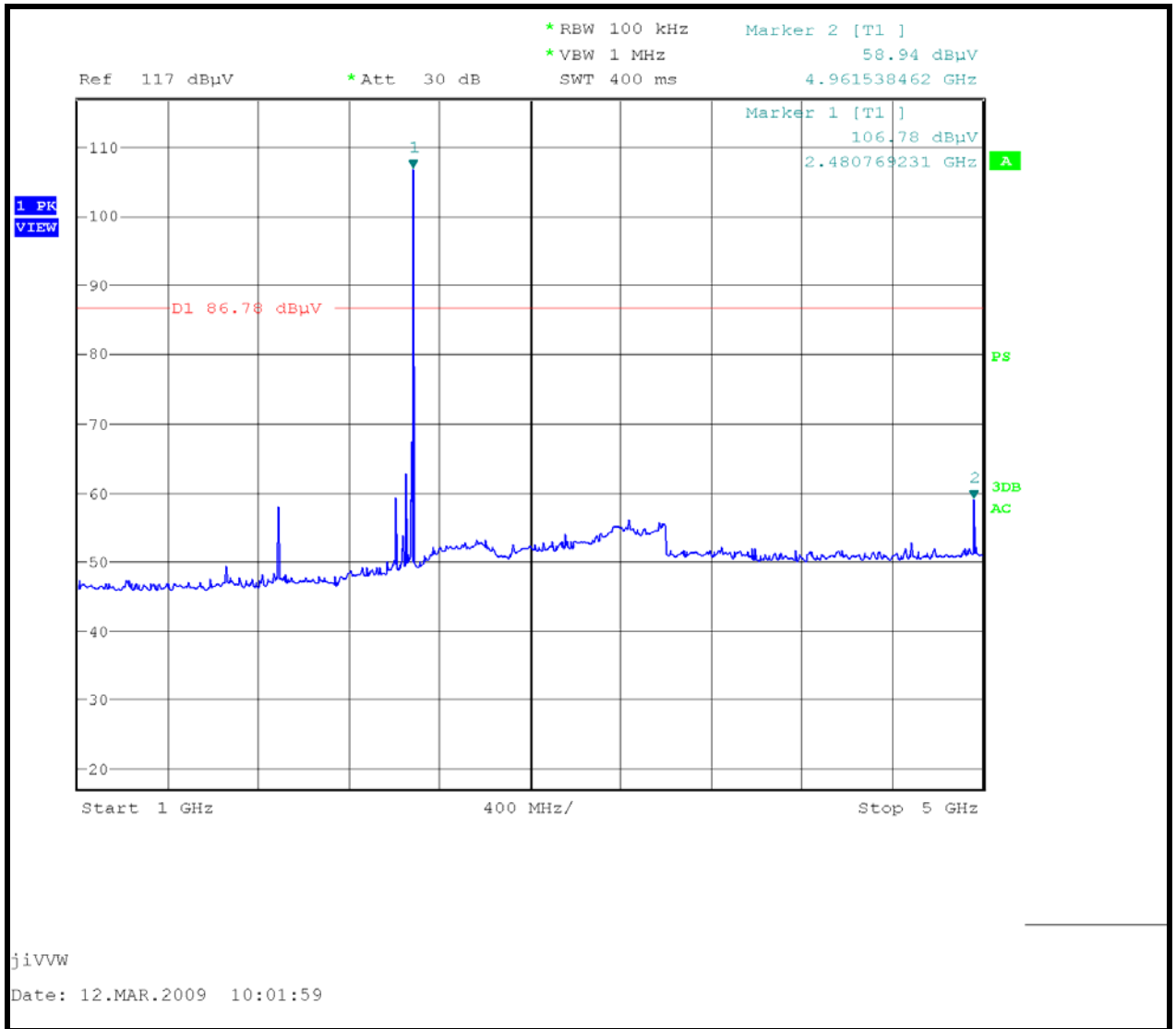
Conducted Spurious emissions 9 kHz to 150 kHz– 2480MHz 3Mb/s



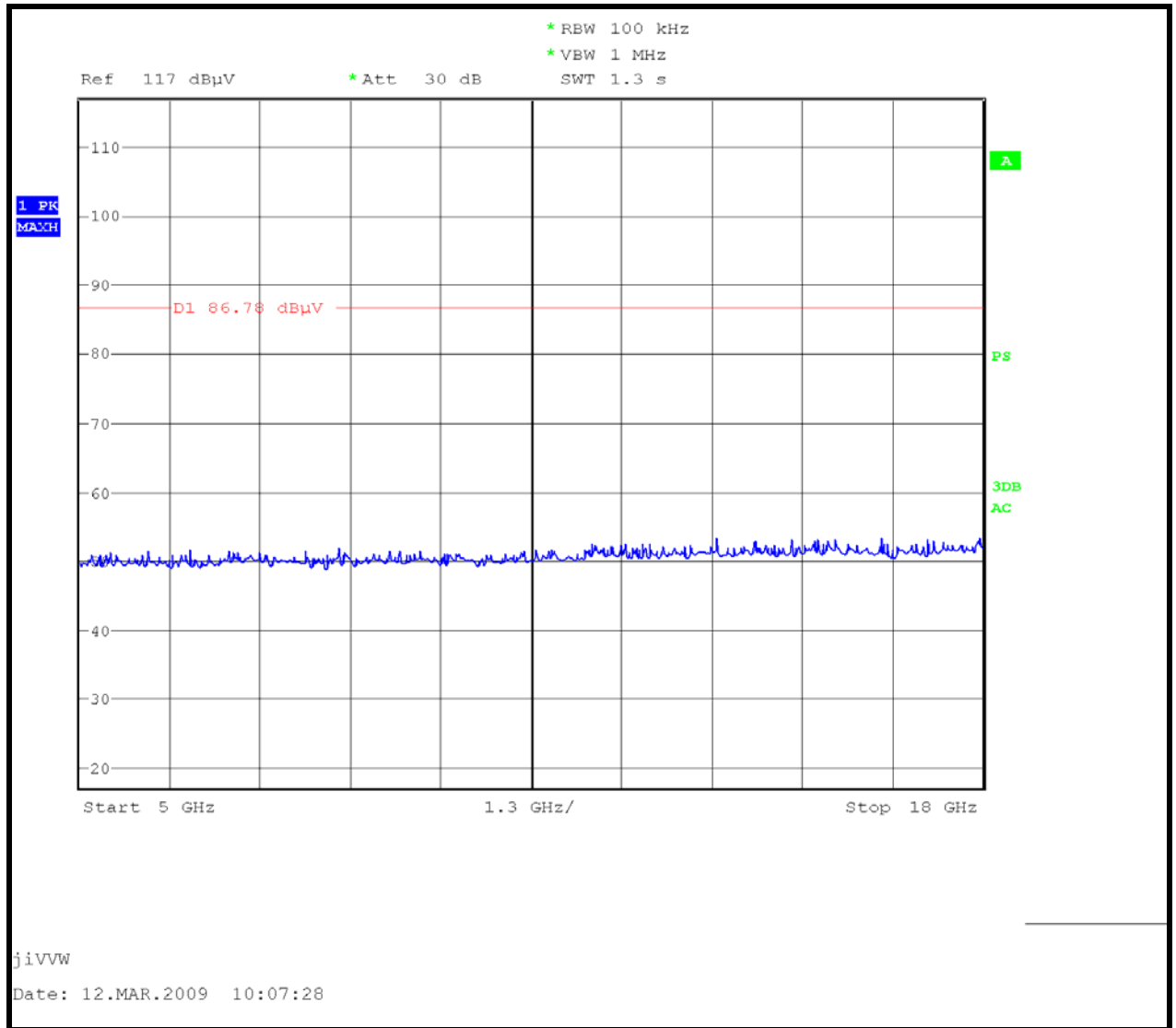
Conducted Spurious emissions 150 kHz to 30 MHz– 2480MHz 3Mb/s



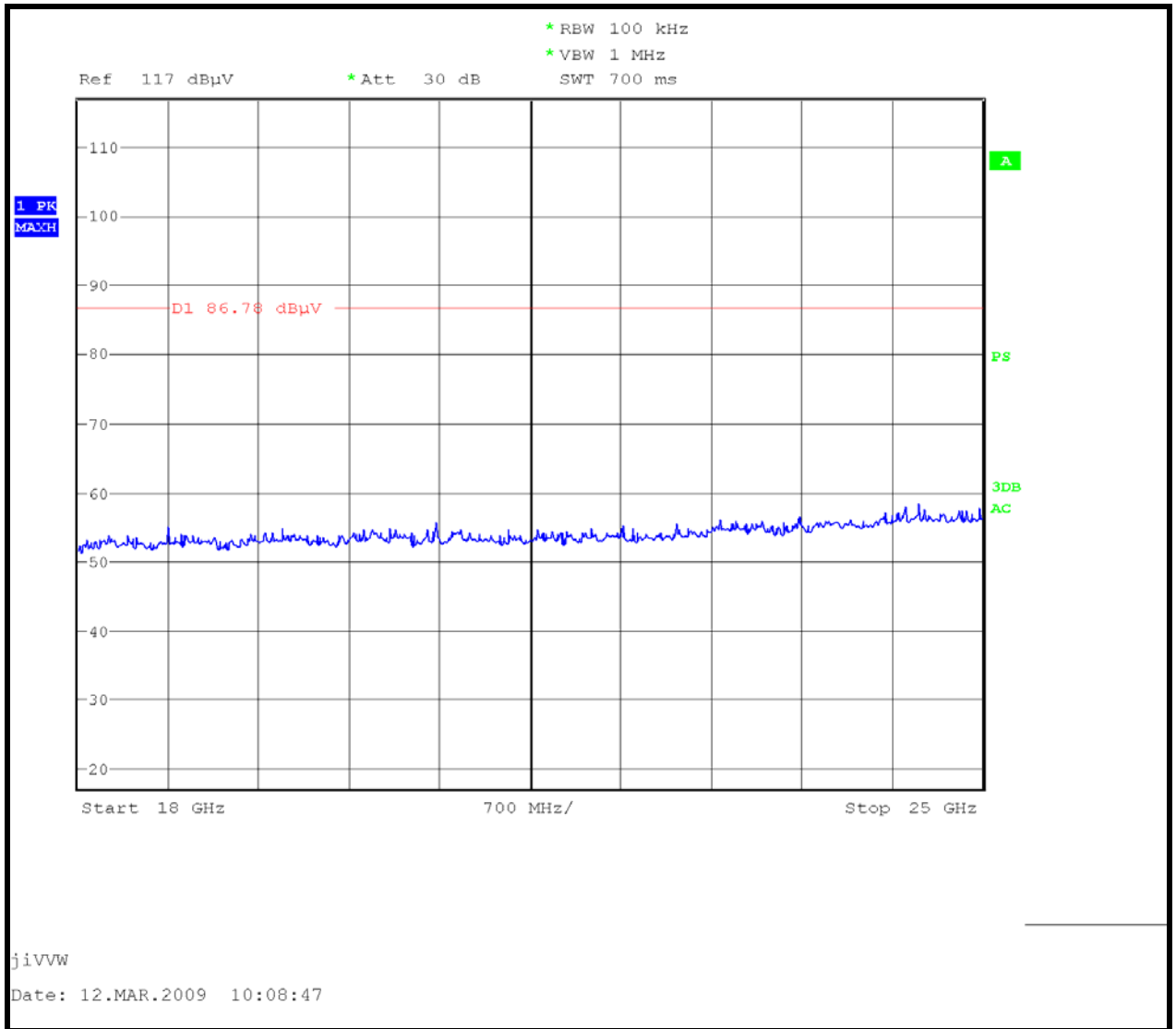
Conducted Spurious emissions 30 MHz to 1 GHz– 2480MHz 3Mb/s



Conducted Spurious emissions 1 GHz to 5 GHz– 2480MHz 3Mb/s



Conducted Spurious emissions 5 GHz to 18 GHz– 2480MHz 3Mb/s



Conducted Spurious emissions 18 GHz to 25 GHz– 2480MHz 3Mb/s

Appendix C:**Additional Test and Sample Details**

This appendix contains details of:

1. The samples submitted for testing.
2. Details of EUT operating mode(s)
3. Details of EUT configuration(s) (see below).
4. EUT arrangement (see below).

Throughout testing, the following numbering system is used to identify the sample and it's modification state:

Sample No: Sxx Mod w

where:

xx	= sample number	eg. S01
w	= modification number	eg. Mod 2

The following terminology is used throughout the test report:

Support Equipment (SE) is any additional equipment required to exercise the EUT in the applicable operating mode. Where relevant SE is divided into two categories:

SE in test environment: The SE is positioned in the test environment and is not isolated from the EUT (e.g. on the table top during REFE testing).

SE isolated from the EUT: The SE is isolated via filtering from the EUT. (e.g. equipment placed externally to the ALSR during REFE testing).

EUT configuration refers to the internal set-up of the EUT. It may include for example:

- Positioning of cards in a chassis.
- Setting of any internal switches.
- Circuit board jumper settings.
- Alternative internal power supplies.

Where no change in EUT configuration is **possible**, the configuration is described as "single possible configuration".

EUT arrangement refers to the termination of EUT ports / connection of support equipment, and where relevant, the relative positioning of samples (EUT and SE) in the test environment.

For further details of the test procedures and general test set ups used during testing please refer to the related document "EMC Test Methods - An Overview", which can be supplied by TRaC Telecoms & Radio upon request.

C1) Test samples

The following samples of the apparatus were submitted by the client for testing :

Sample No.	Description	Identification
S02	Jabra PRO 9470 Base Station (Radiated Sample)	None
S32	SSA-5W-09 US 075065F SIL switching adapter	None
S40	SSA-5W-09 US 075065F SIL switching adapter	None
S41	Jabra PRO 9470 Base Station (Conducted Sample)	None

The following samples of apparatus were supplied by TRaC Telecoms & Radio as support or drive equipment (auxiliary equipment):

TRaC Identification	Description
REF838	Agilent N4010A Bluetooth Test Set
REF1270	VARIAC

C2) EUT Operating Mode During Testing.

During testing, the EUT was exercised as described in the following tables :

<i>Test</i>	<i>Description of Operating Mode</i>
All tests detailed in this report	EUT transmitting on maximum power using FHSS over 79 channels with 1 MHz channel spacing using DH5 packets with the following modulations: 1 Mb/s GFSK 2Mb/s $\pi/4$ -DQPSK 3Mb/s 8DPSK

In addition

Test	Description of Operating Mode:
Spurious emissions (radiated and conducted)	EUT active but non-transmitting.

C3) EUT Configuration Information.

The EUT was submitted for testing in one single possible configuration.

C4) List of EUT Ports

The table below describes the termination of EUT ports:

Sample : S02 (Radiated Sample)
Tests : All

Port	Description of Cable Attached	Cable length	Equipment Connected
dc Power	2 core Unscreened	1m	S40

Sample : S41 (Conducted Sample)
Tests : All

Port	Description of Cable Attached	Cable length	Equipment Connected
dc Power	2 core Unscreened	1m	S32
RF	Coaxial	1m	REF838

Sample : S32/S40
Tests : All

Port	Description of Cable Attached	Cable length	Equipment Connected
dc Power	2 core Unscreened	1m	S02/S41
ac Power	None	N/A	ac Power Supply

C5 Details of Equipment Used

For Radiated Electric Field Emissions 30MHz to 1GHz:15.109, 15.209 and 15.205 (Restricted band)

RFG No	Type	Description	Manufacturer	Date Calibrated.
274	ATS	Ferrite Lined Chamber	TRaC	29/02/08
231	CBL6111	Blue Bilog Antenna (0.03 - 1GHz)	Chase	12/08/08
214	ESAI	Spec Analyser/Test Rxer (LF/HF)	R & S	11/03/09
REF847	ESU	EMI Test Receiver (Spectrum analyser)	R&S	08/05/09
007	8447F	Dual Pre-Amp	HP	02/01/08
267	N-type	RF coaxial cable (Lab 10)	TRaC	28/01/08
270	N-type	RF coaxial cable (Lab 10)	TRaC	28/01/08
278	N-type	RF coaxial cable (Lab 10)	TRaC	28/01/08

For Radiated Electric Field Emissions 1GHz to 18GHz 15.109, 15.209 and 15.205 (Restricted band)

RFG No	Type	Description	Manufacturer	Date Calibrated
274	ATS	Ferrite Lined Chamber	TRaC	29/02/08
129	3115	Horn Antenna	EMCO	29/07/98
307	HP8449B	Microwave Pre-Amp (1-26.5GHz)	HP	18/02/08
650	N-106	Sucoflex uW Cable 3m	Suhner	14/07/08
651	N-106	Sucoflex uW Cable 7m	Suhner	14/07/08
643	ST18/Nm/N m/48	48 inch Sucoflex cable	Suhner	18/07/08
REF847	ESU	EMI Test Receiver (Spectrum analyser)	R&S	08/05/09

For Radiated Electric Field Emissions 18GHz to 26GHz 15.109, 15.209 and 15.205 (Restricted band)

RFG No	Type	Description	Manufacturer	Date Calibrated
274	Lab 10	Large anechoic chamber	TRaC	29/02/08
630	QSH20S20 S	Horn antenna	Q-par	02/11/06
307	8449B	Microwave Pre-Amp	HP	18/02/08
REF847	ESU	EMI Test Receiver (Spectrum analyser)	R&S	08/05/09
REF831		5m K-Type M-M	Teledyne Reynolds	22/04/09
REF832		2m K-Type M-M	Teledyne Reynolds	22/04/09
476	60637	3m HF cable (SMA to SMA)	Semflex	22/04/09
RFG422	34401A	Multi-meter	HP	19/12/08
RFG389	30V-2A	dc power supply	Thurlby	CAL date N/A

For Conducted Tests

RFG No	Type	Description	Manufacturer	Date Calibrated
404	E4407B	Spectrum Analyser	Agilent	07/04/08
127	HP8563E	Spectrum Analyser	HP	17/03/08
REF847	ESU	EMI Test Receiver (Spectrum analyser)	R&S	08/05/09
REF837	PSA E4440A	Spectrum Analyser	Agilent	21/02/08
244	4478	Bandstop Filter	BSC	N/A (Cal during use)

Details of Equipment Used Continued:

For Power Line Conducted Emissions

RFG No	Type	Description	Manufacturer	Date Calibrated
274	Lab 10	Ferrite Lined Chamber	TRaC	11/01/08
n/a	Lab 11	Small Screened Chamber	TRaC	-
n/a	Lab 14	Small Screened Chamber	TRaC	-
030	ESH3-Z5	Single-phase LISN	R & S	23/04/08
189	ESH3-Z5	Single-phase LISN	R & S	14/05/08
190	ESH3-Z2	Pulse Limiter	R & S	24/04/08
232	ESH3-Z2	Pulse Limiter	R & S	07/02/08
214	ESAI	Spec Analyser/Test Rxer (LF/HF)	R & S	22/01/08
012	ESH3	Test Receiver (LF)	R & S	05/02/08
125	ESHS 10	Test Receiver (LF)	R & S	22/11/07
127	HP8563E	Spectrum Analyser	HP	17/03/08
404	E4407B	Spectrum Analyser	Agilent	07/04/08
REF847	ESU	EMI Test Receiver (Spectrum analyser)	R&S	29/02/08
REF837	PSA E4440A	Spectrum Analyser	Agilent	21/02/08
267	N-type	RF coaxial cable (Lab 10)	TRaC	28/01/08
269	N-type	RF coaxial cable (Lab 10)	TRaC	28/01/08
293	BNC	RF coaxial cable (Lab 10)	TRaC	28/01/08
297	BNC	RF coaxial cable (Lab 11)	TRaC	28/01/08
298	BNC	RF coaxial cable (Lab 11)	TRaC	28/01/08
092	BNC	RF coaxial cable (Lab 14)	TRaC	28/01/08
295	BNC	RF coaxial cable (Lab 14)	TRaC	28/01/08

Appendix D:

Additional Information

No additional information is contained within this report.

Appendix E:

Photographs and Figures

The following photographs were taken of the test samples:

1. Power line conducted emissions arrangement.



Photograph 1

Appendix G:

MPE Calculation

OET Bulletin No. 65, Supplement C 01-01

47 CFR §§1.1307 and 2.1091

2.1091 Radio frequency radiation exposure evaluation: mobile devices.

For purposes of these requirements mobile devices are defined by the FCC as transmitters designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimetres is normally maintained between radiating structures and the body of the user or nearby persons. These devices are normally evaluated for exposure potential with relation to the MPE limits. As the 20cm separation specified under FCC rules may not be achievable under normal operation of the EUT, an RF exposure calculation is needed to show the minimum distance required to be less than 1mW/cm² power density limit, as required under FCC rules.

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2} \text{ re - arranged} \quad R = \sqrt{\frac{PG}{S4\pi}}$$

where:

S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the centre of radiation of the antenna

Maximum peak output power at the antenna terminal:	0.2	dBm
Maximum peak output power at the antenna terminal:	1	mW
Power density	1.0	mW/cm ²
Antenna gain (typical):	-1.3	dBi
Maximum antenna gain:	0.7	numeric
Prediction frequency:	2402	MHz

Result

Prediction Frequency (MHz)	Maximum allowable antenna gain: (dBi)	Power density limit (S) (mW/cm ²)	Distance (R) cm required to be less than 1mW/cm ²
2402	-1.3	1.000000	0.23

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