Recognized by the
Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: 3463 (IC)
TCB ID: DE 0001

Accredited by the
German Accreditation Council
DAR–Registration Number
TTI–P–G 081/94-D0

Independent ETSI
compliance test house

Accredited Bluetooth™ Test Facility (BQTF)

Test report no.: 2-3770-01-01b/04

FCC Part 15.407
FCC ID: RPD-SA5252MPCI-01

SA5252 mPCI Rev1

CETECOM – ICT Services GmbH
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1. Administrative data

1.1. Administrative data of the test facility

1.1.1 Identification of the testing laboratory

Company name: Address:	Cetecom ICT Services GmbH Untertürkheimerstr. 6-10 D-66117 Saarbruecken Germany
Laboratory accreditation:	DAR-Registration No. TTI-P-G081/94-D0 Bluetooth Qualification Test Facility (BQTF)
Responsible for testing laboratory:	Harro Ames, Michael Berg Phone: +49 681 598 0 Fax: +49 681 598 9075 email: info@ict.cetecom.de

..... / .....
Responsible for testing laboratory
(Harro Ames, Michael Berg)

1.1.2 Organizational items

Reference No.:	2-3770-01-01b/04
Order No.:	
Responsible for test report and project leader:	Harro Ames, Michael Berg
Receipt of EUT:	2004-10-12
Date(s) of test:	2004-10-12 to 2004-10-14
Date of report:	2004-12-22
Number of report pages:	123
Number of diagram pages (annex):	
Version of template:1.2	

..... / .....
Responsible for test report
(Harro Ames, Michael Berg)

Note:
The test results of this test report relate exclusively to the item tested as specified in this report. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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During the test no hardware and software changes are allowed to be performed at the EUT.

1.1.3 Applicant´s details

Applicant´s name:	Philips Semiconductors Dresden AG
Address:	Am Waldschlösschen 1 D-01099 Dresden Germany
Contact person:	Mr. Jens Bretschneider Phone: 0049 351 80 800 519 Fax: 0049 351 80 800 39 email: jens.bretschneider@philips.com

1.2 Administrative data of manufacturer / member

Manufacturer´s name:	- applicant -
Address:	

1.3 Description of the Equipment under test (EUT)

1.3.1 EUT: Type, S/N etc.

Product name	Product ID	Description	S/N serial number	HW hardware status	SW software status
SA5252 mPCI Rev1	SA5252	802.11/b/g mini PCI WLAN card	–	Rev1	–
Frequency Band [GHz]	**Type of Modulation**	**Number of channels**	**Antenna-connectors**	**Power Supply**	**Temperature Range**
5.15 – 5.25 5.25 – 5.35 5.725 – 5.825	OFDM	4 / 4 /4	2 on PCB board	3.3V via PCI-slot	–

FCC ID: RPD-SA5252MPCI-01

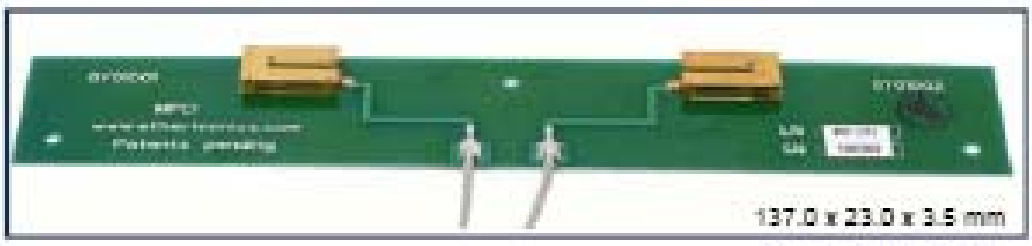
1.3.2 If RF component testing only, description of additional used HW/SW

	Product name	Product ID	Description	S/N serial number	HW hardware status	SW software status
1						
2						

1.3.3 Additional EUT information

The test sample is a dual band mini-PCI WLAN card . It supports all three type of connectivity, the modes a,b and g.

The used antenna is a typical build-in notebook antenna from Ethertronics.



MPCI (mini-PCI) Internal Antenna Module

1.3.4 EUT operating modes

EUT operating mode no.*)	Description of operating modes	Additional information
Op. 0	Normal mode	Normal temperature and power source conditions

*) EUT operating mode no. is used to simplify the test report.

1.3.5 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature / humidity	T_{nom}	°C / %	22°C / 33%
Low Temperature	T_{low}	°C	
High Temperature	T_{high}	°C	
Nominal Power Source	V_{nom}	V	3.3
Low Power Source	V_{low}	V	
High Power Source	V_{high}		

Type of powersource: 3.3V DC via PCI adapter

2 Test standard & summary list of all performed test cases

TC identifier	Description	verdict	date	Remark
RF-Testing	FCC Part 15 §15.407 - CANADA RSS-210			

Test Specification Clause	Test Case	Pass	Fail	Not applicable	Not performed
None	Antenna Gain	Yes			
Range:	5.725 to 5.825 GHz				
§15.407a(3)+(4)	Peak transmit power	Yes			
§15.407a(5)	Peak power spectral density conducted	Yes			
§ 15.407a (6)	Ratio of peak excursion	Yes			
§ 15.407b (3)	Undesirable emissions conducted	Yes			
§ 15.209	Spurious Emission -radiated (TX)	Yes			
§ 15.209	Spurious Emission -radiated (RX)	Yes			
§ 15.107/207	Conducted Emissions <30 MHz	Yes			
Range:	5.25 to 5.35 GHz				
§15.407a(2)+(4)	Peak transmit power	Yes			
§15.407a(5)	Peak power spectral density conducted	Yes			
§ 15.407a (6)	Ratio of peak excursion	Yes			
§ 15.407b (2)	Undesirable emissions conducted	Yes			
§ 15.209	Spurious Emission -radiated (TX)	Yes			
§ 15.209	Spurious Emission -radiated (RX)	Yes			
§ 15.107/207	Conducted Emissions <30 MHz	Yes			

Test Specification Clause	Test Case	Pass	Fail	Not applicable	Not performed
None	Antenna Gain	Yes			
Range:	5.15 to 5.25 GHz				
§15.407a(1)+(4)	Peak transmit power	Yes			
§15.407a(5)	Peak power spectral density conducted	Yes			
§ 15.407a (6)	Ratio of peak excursion	Yes			
§ 15.407b (1)	Undesirable emissions conducted	Yes			
§ 15.209	Spurious Emission -radiated (TX)	Yes			
§ 15.209	Spurious Emission -radiated (RX)	Yes			
§ 15.107/207	Conducted Emissions <30 MHz	Yes			

3 RF measurement testing

3.1 Description of test set-up

3.1.1 Radiated measurements

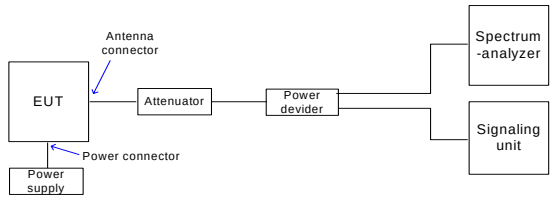
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63-4-2003 clause 4.2.

Antennas are conform with ANSI C63.2-1996 item 15.
150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.
30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna
200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna
>1GHz: Average, RBW 1MHz, VBW 10 MHz, waveguide horn with lownoise preamp

For the mini-PCI card we used a special shielded pc and a passive extender card. (see pictures test site)

3.1.2 Conducted measurements

The EUT´s RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is connected to the spectrum analyzer. The specific losses for signal pathsis first checked within a calibration. The measuerment readings on the spectrum analyzer is corrected by the specific test set-up loss. The attenuator, power divider, signaling unit and the spectrum analyzer are impedance matched on 50 Ohm.



3.1.3 AC-conducted measurements

The AC-conducted measurements were performed with a customer laptop and special software to set the samples in test mode.

3.2 Referenced Documents

none

3.3 Additional comments

Hardware / software changes during testing

none

3.4 Antenna gain

Frequency range: **5725 to 5825 MHz**

Conducted power: 5745 MHz / 19.5 dBm peak
5785 MHz / 19.5 dBm peak
5805 MHz / 19.4 dBm peak

Radiated power: 5745 MHz / 18.5 dBm peak => **Antenna gain = -1.0 dBi**
5785 MHz / 18.3 dBm peak => **Antenna gain = -1.2 dBi**
5805 MHz / 17.9 dBm peak => **Antenna gain = -1.5 dBi**

Frequency range: **5250 to 5350 MHz**

Conducted power: 5280 MHz / 17.8 dBm peak
5320 MHz / 16.2 dBm peak

Radiated power: 5280 MHz / 15.9 dBm peak => **Antenna gain = -1.9 dBi**
5320 MHz / 14.7 dBm peak => **Antenna gain = -1.5 dBi**

Frequency range: **5150 to 5250 MHz**

Conducted power: 5180 MHz / 16.3 dBm peak
5240 MHz / 16.0 dBm peak

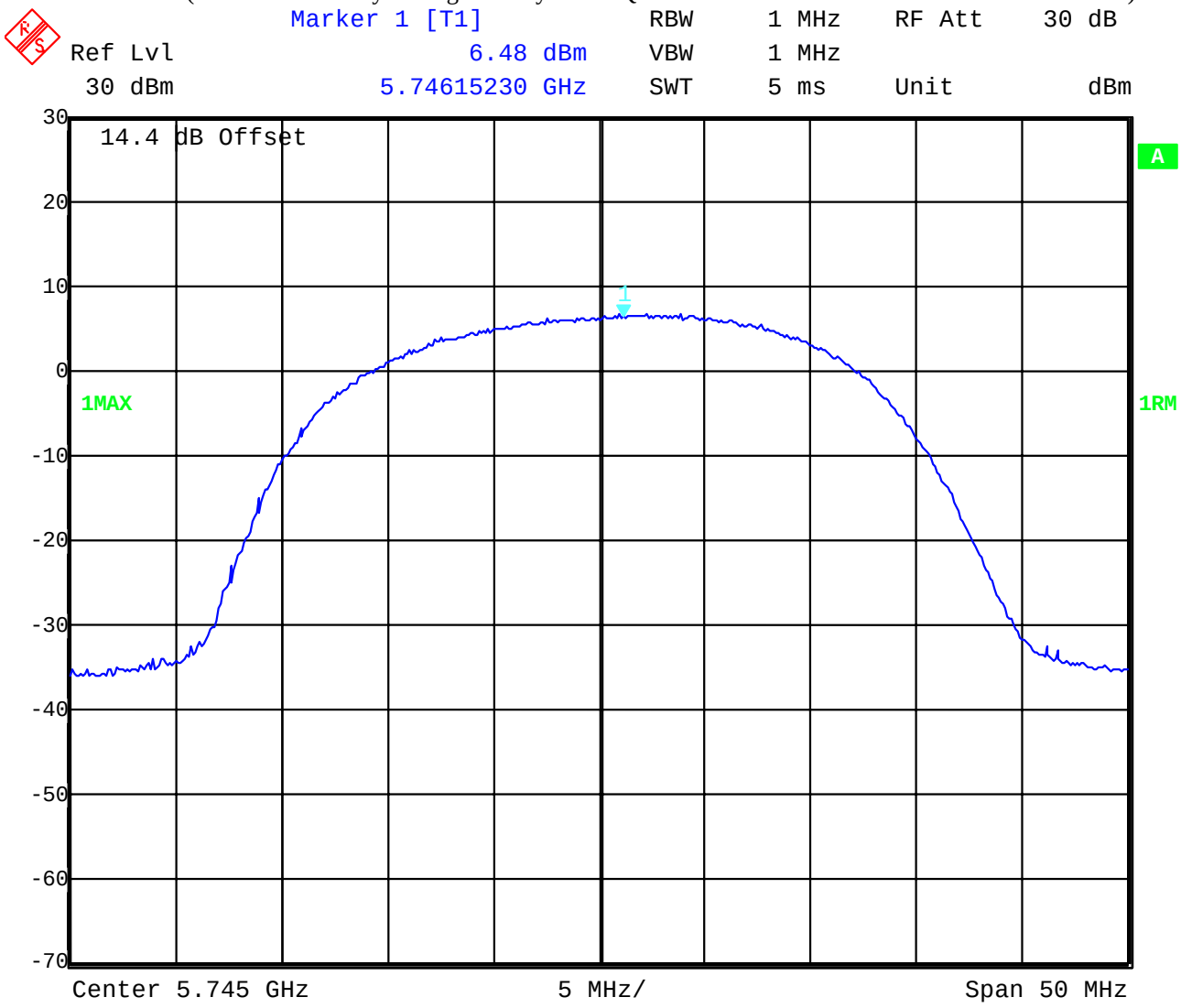
Radiated power: 5180 MHz / 15.7 dBm peak => **Antenna gain = -0.6 dBi**
5240 MHz / 15.1 dBm peak => **Antenna gain = -0.9 dBi**

Frequency range of the sample : 5725 to 5825 MHz

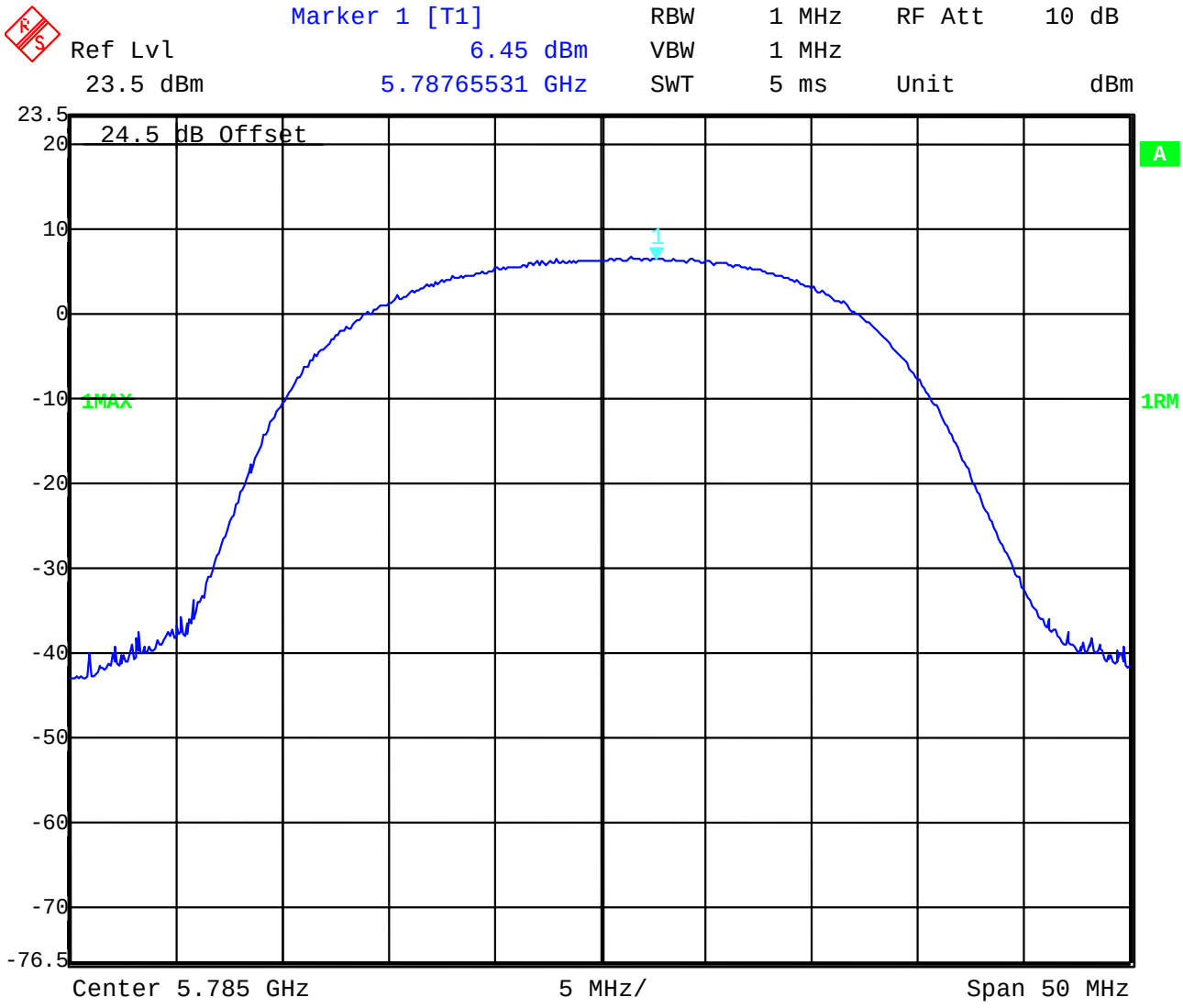
3.5 Peak Transmit Power §15.407a(3)+(4)

True RMS

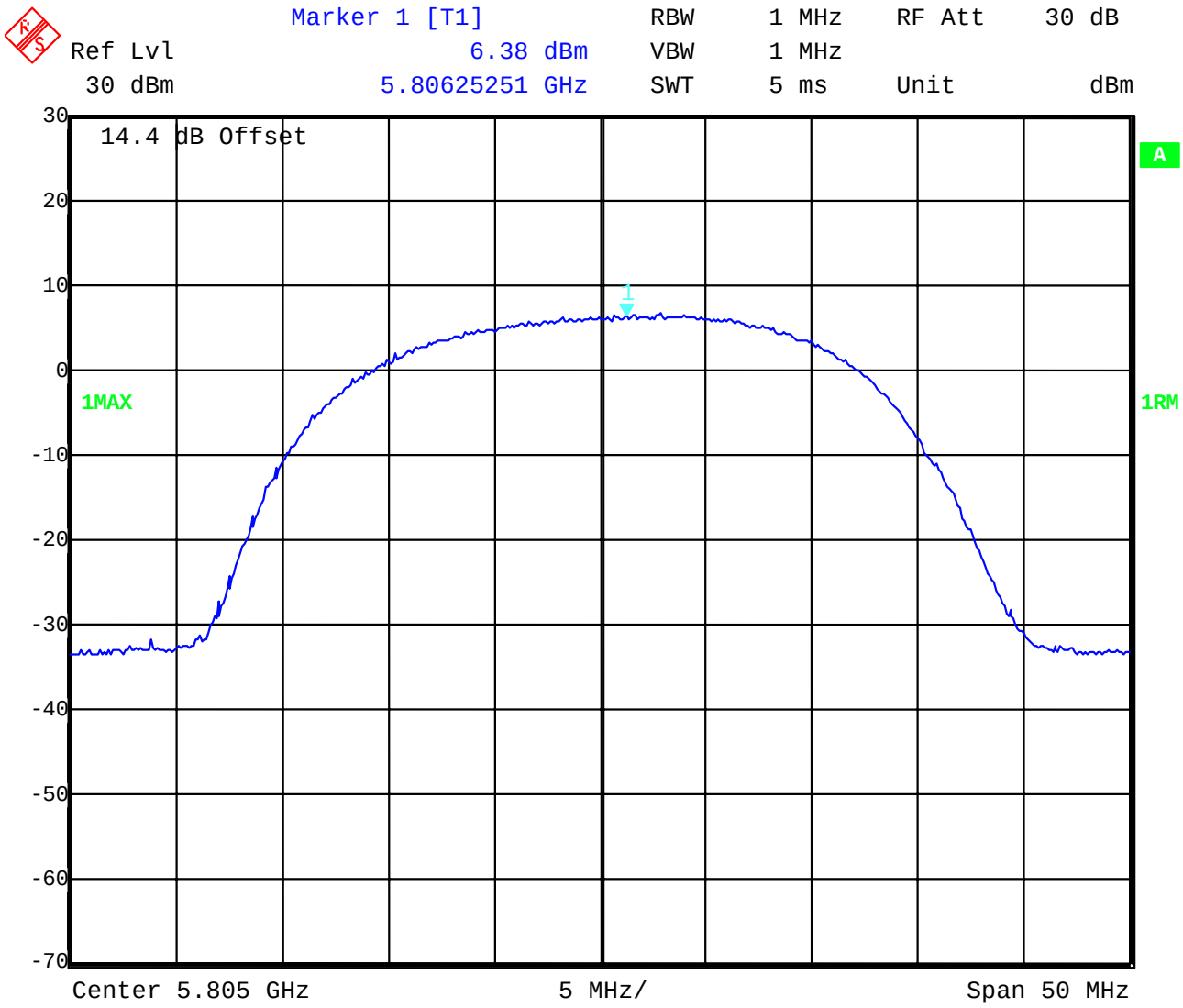
Plot 1: 5745 MHz (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz with a true RMS filter)



Plot 2: 5785 MHz (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz with a true RMS filter)



Plot 3: 5805 Mhz (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz with a true RMS filter)



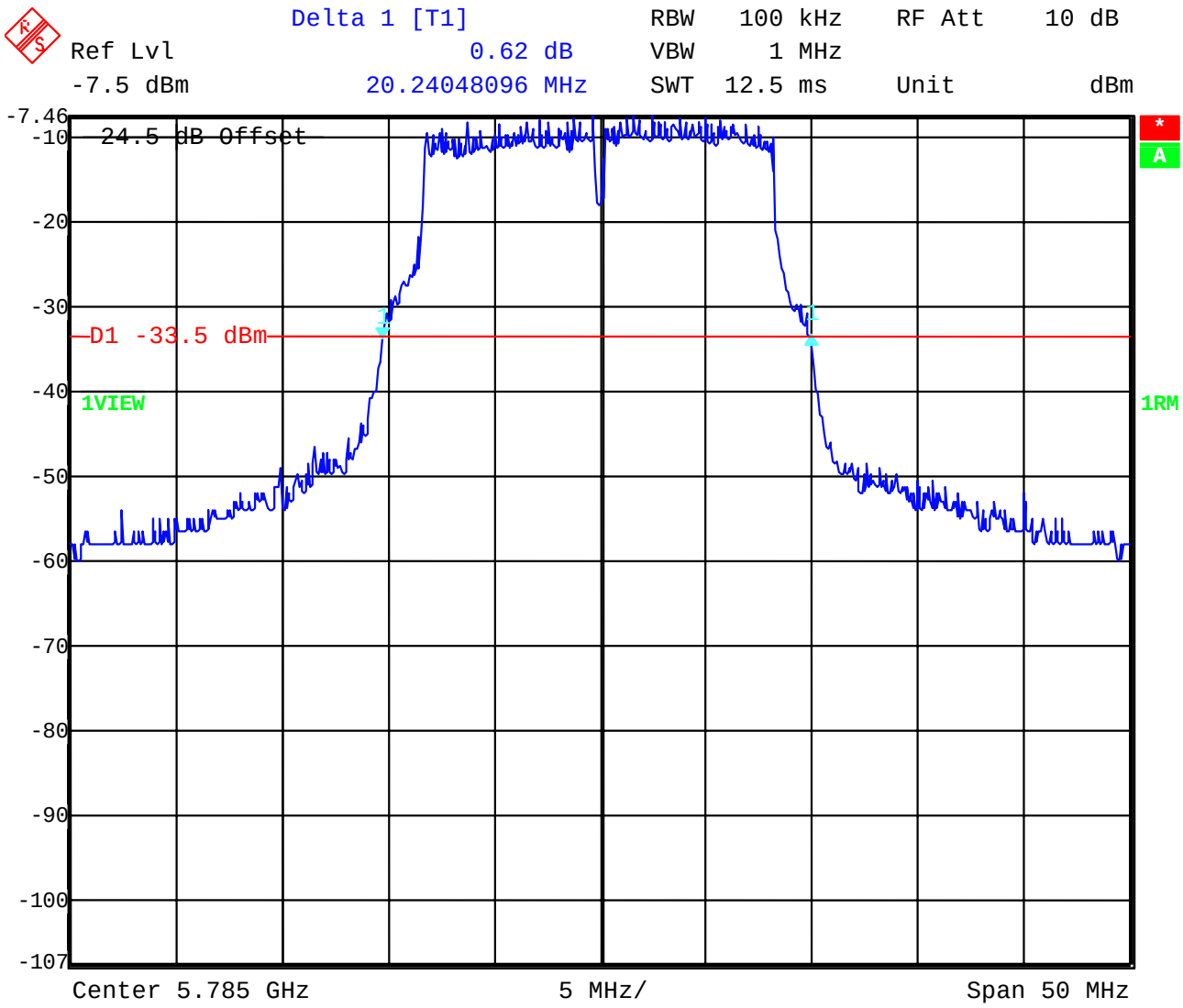
As the OBW of the signal is ~20 MHz and the used measuring BW is 10 MHz we have a correction factor of 3 dB. (see plot next side)

Results: **Plot 1: Peak tx power with true RMS filter : 6.48 dBm + 13dB = 19.48 dBm**
Plot 2: Peak tx power with true RMS filter : 6.45 dBm + 13dB = 19.45dBm
Plot 3: Peak tx power with true RMS filter : 6.38 dBm + 13dB = 19.38dBm

Limit: **30 dBm or 17 dBm + 10log B (26-dB emission BW)**

This plot shows the 26 dB BW of the OFDM signal. It is about 20 MHz.

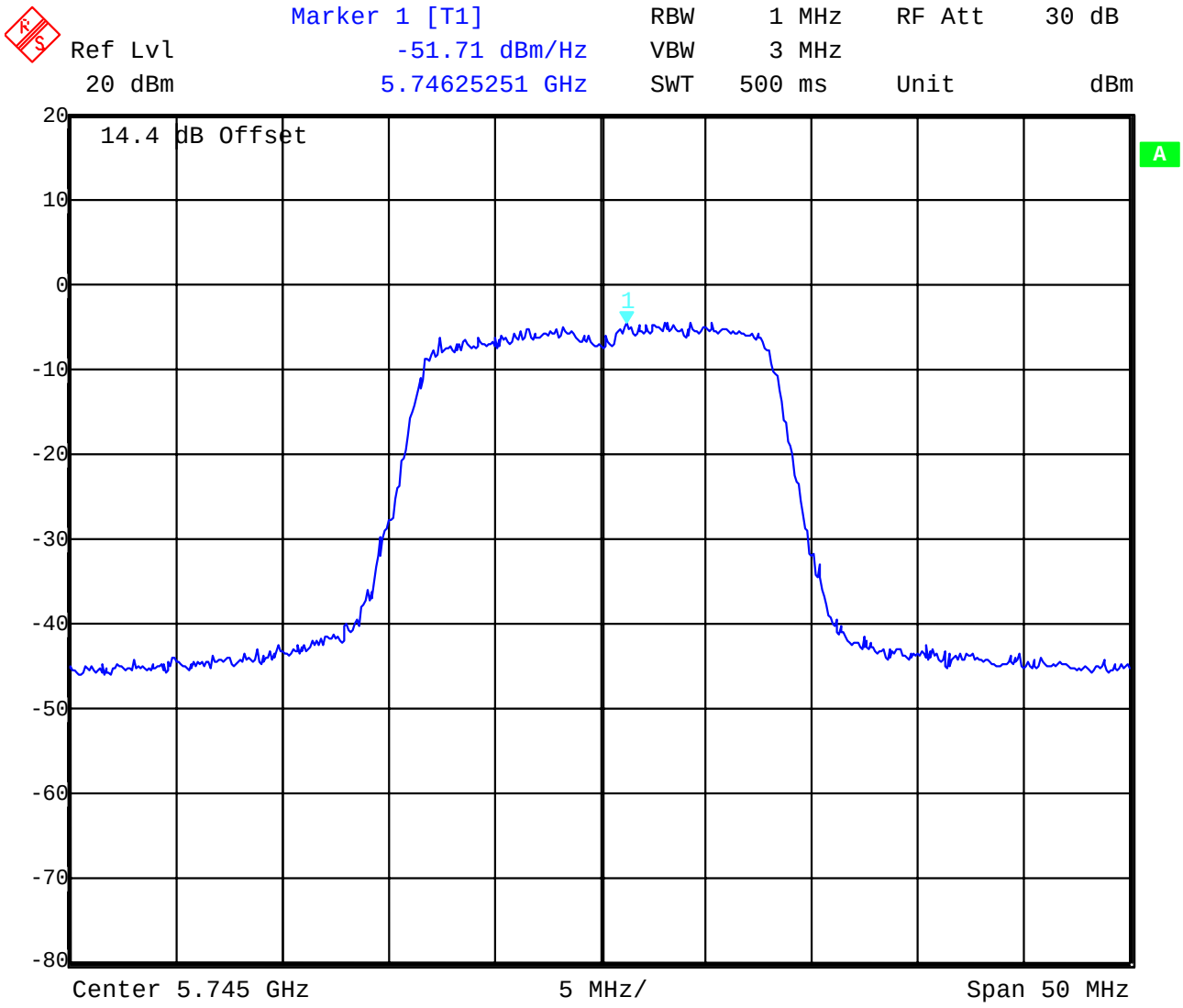
Correction factor is 13 dB according to 1 Mhz RBW/VBW of the analyzer or 3 dB if 10 MHz RBW/VBW is used



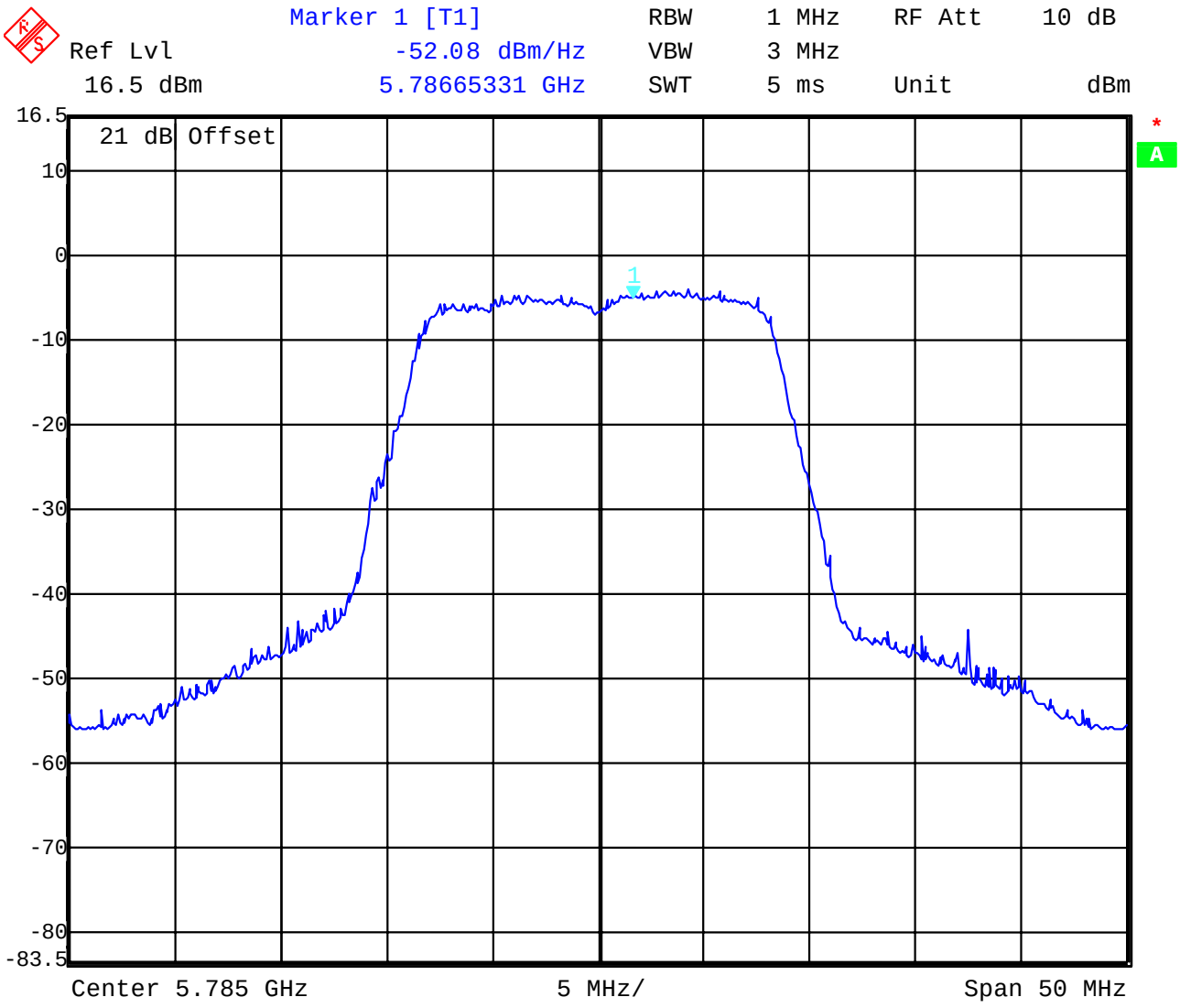
3.6 Peak Spectral Density Conducted §15.407(a5)

Plot 1 : 5745 MHz

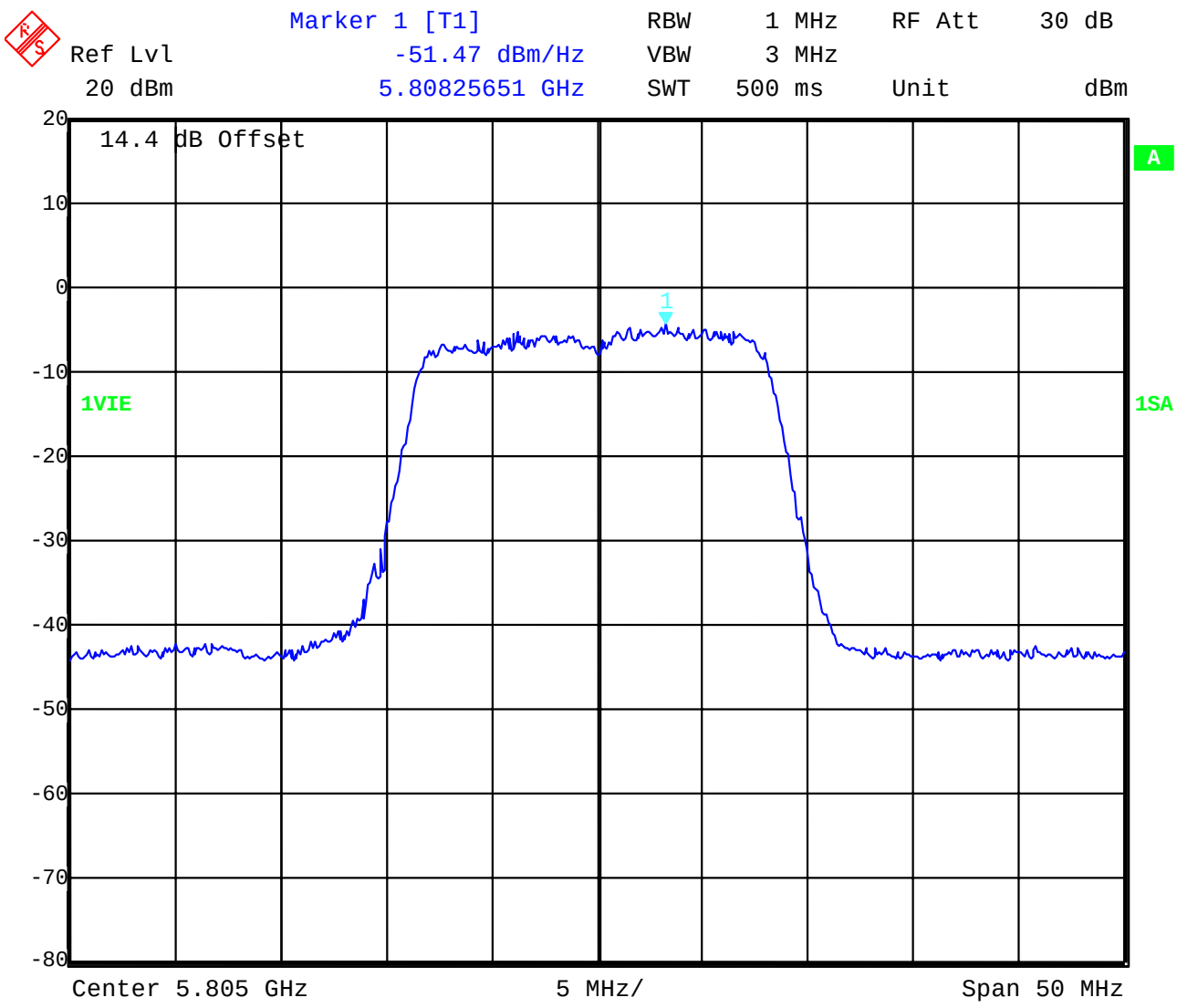
Result is calculated to 1 Hz with the power density function of the analyzer FSIQ26. The get the result related to 1 MHz according to FCC you have to add 60 dB.



Plot 2: 5785 MHz



Plot 3: 5805 MHz



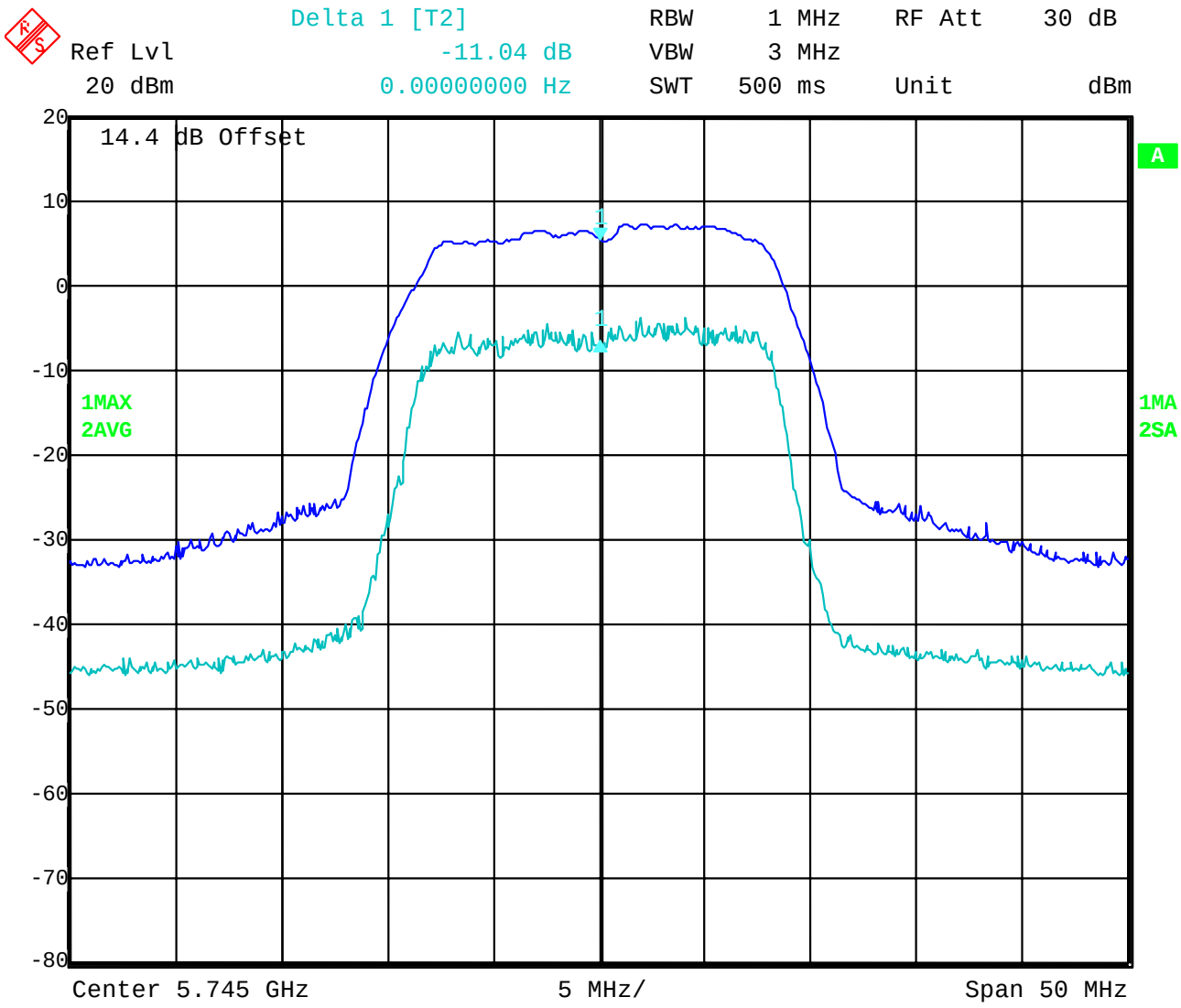
Test conditions		Spectral density		
Frequency [MHz]		+60 dB corr.	Limit	
5745 MHz	-51.71 dBm/Hz	8.29 dBm/MHz	17 dBm	Pass
5785 MHz	-52.08 dBm/Hz	7.92 dBm/MHz	17 dBm	Pass
5805 MHz	-51.47 dBm/Hz	8.53 dBm/MHz	17 dBm	Pass
Measurement uncertainity		±1dB		

3.7 Ratio of Peak Excursion §15.407(a6)

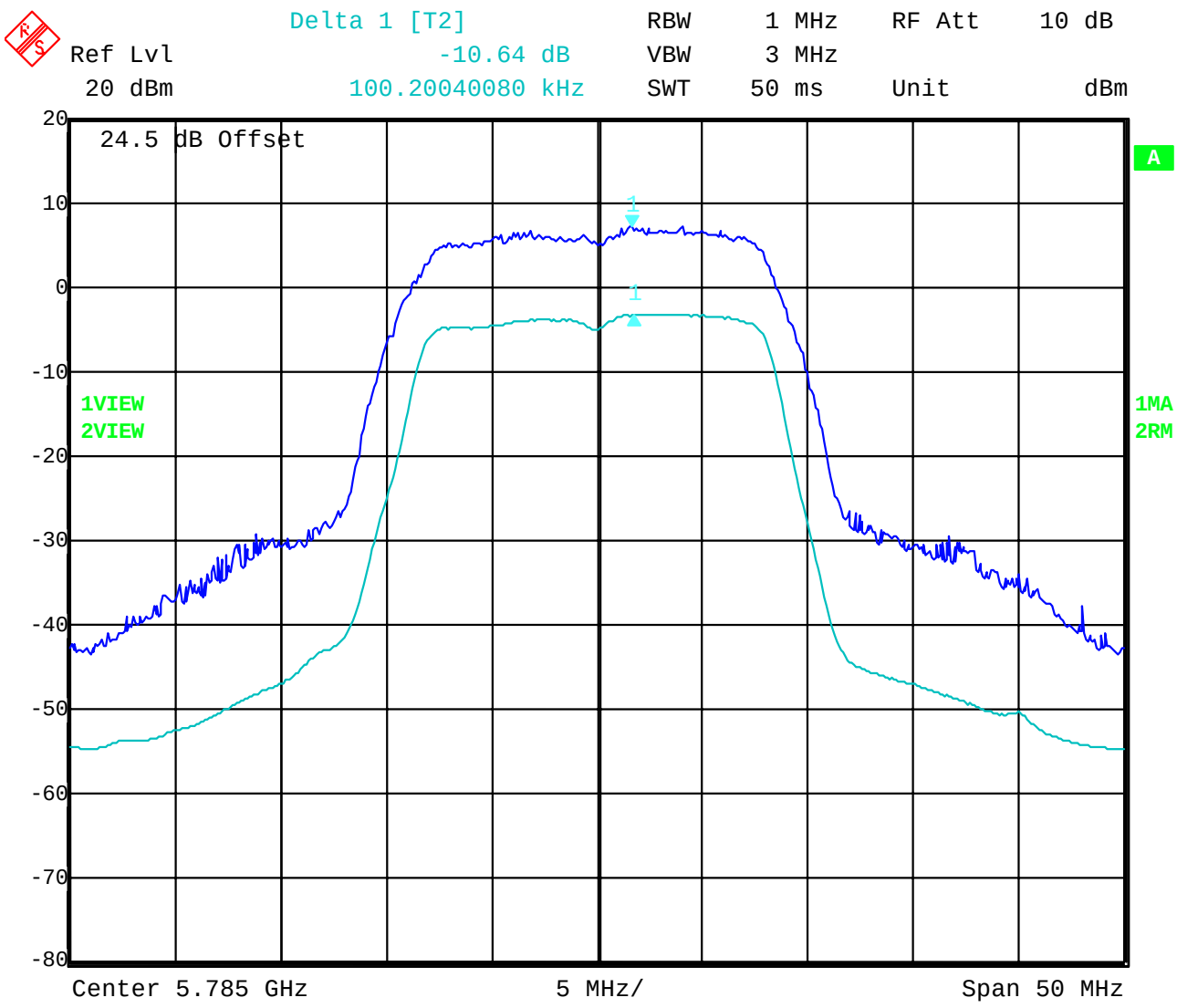
Plot 1 : 5745 MHz

The plot shows the ratio between peak and average.

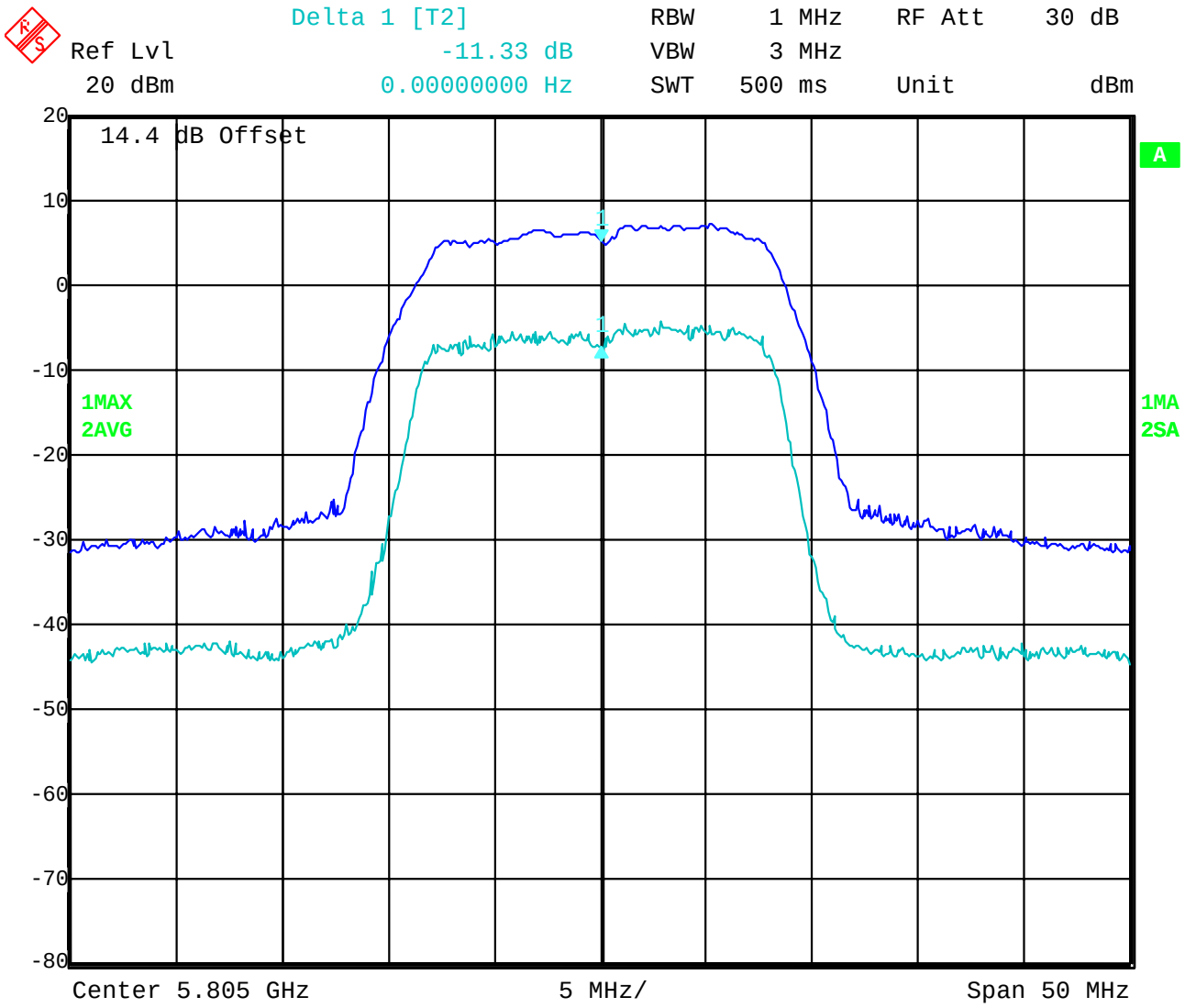
Upper curve: peak envelope (1 MHz / 3MHz) max peak
Lower curve: peak transmit power with 1 MHz filter



Plot 2: 5785 MHz



Plot 3: 5805 MHz

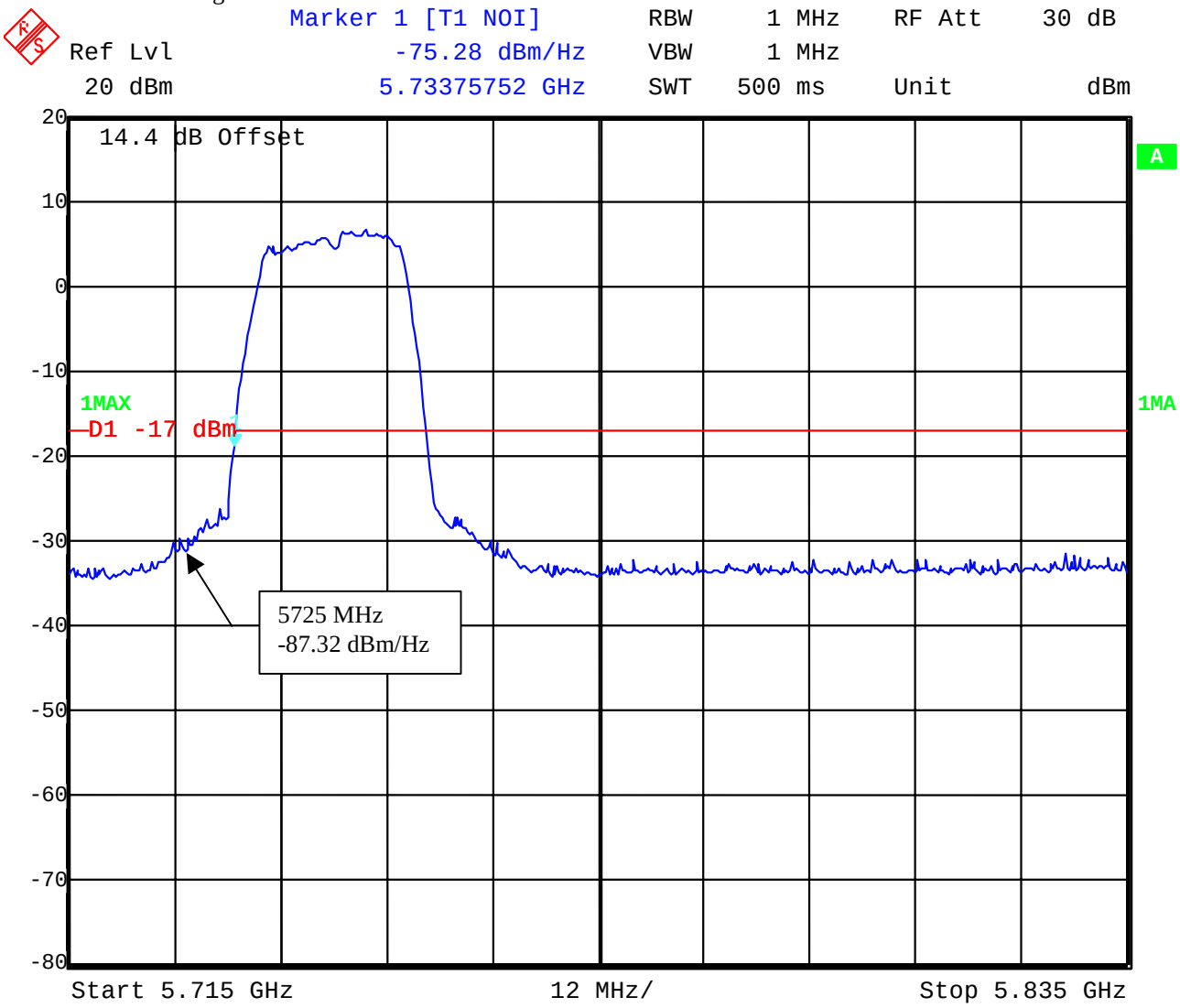


Results

Test conditions		Ratio of peak excursion of the modulation envelope		
		Ratio	Limit	Result
5745 MHz		11.04 dB	13 dB	Pass
5785 MHz		10.64 dB	13 dB	Pass
5805 MHz		11.33 dB	13 dB	Pass
Measurement uncertainity		±1dB		

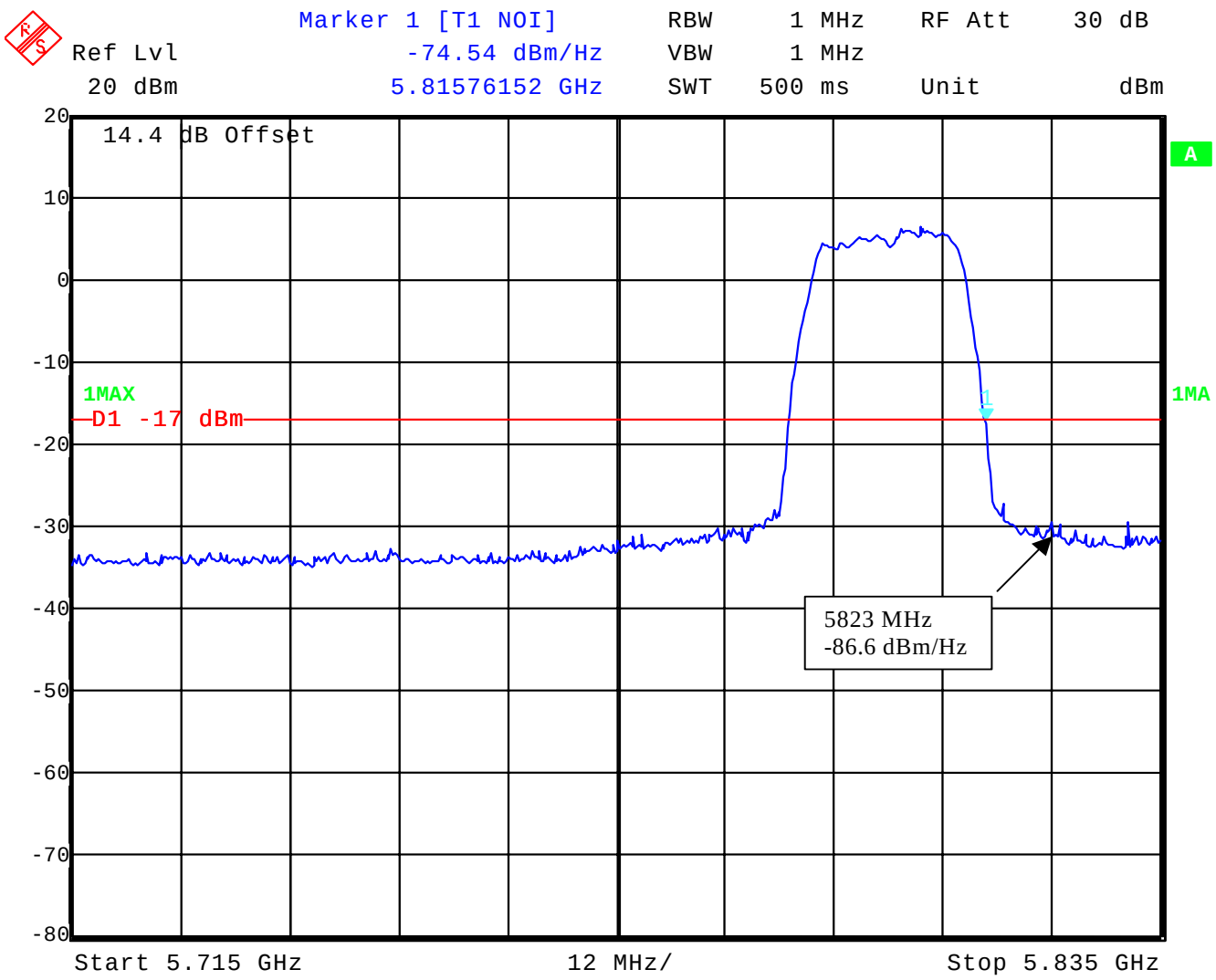
3.8 Undesirable emission limits at band edges 15.407 (b3)

Plot 1: lower band edge



RBW / VBW : 1 MHz

Plot 2: upper band edge



RBW / VBW : 1 MHz

Limits: - ± 10 Mhz above band edge -17 dBm/MHz

- more than 10 MHz above or below -27 dBm/MHz

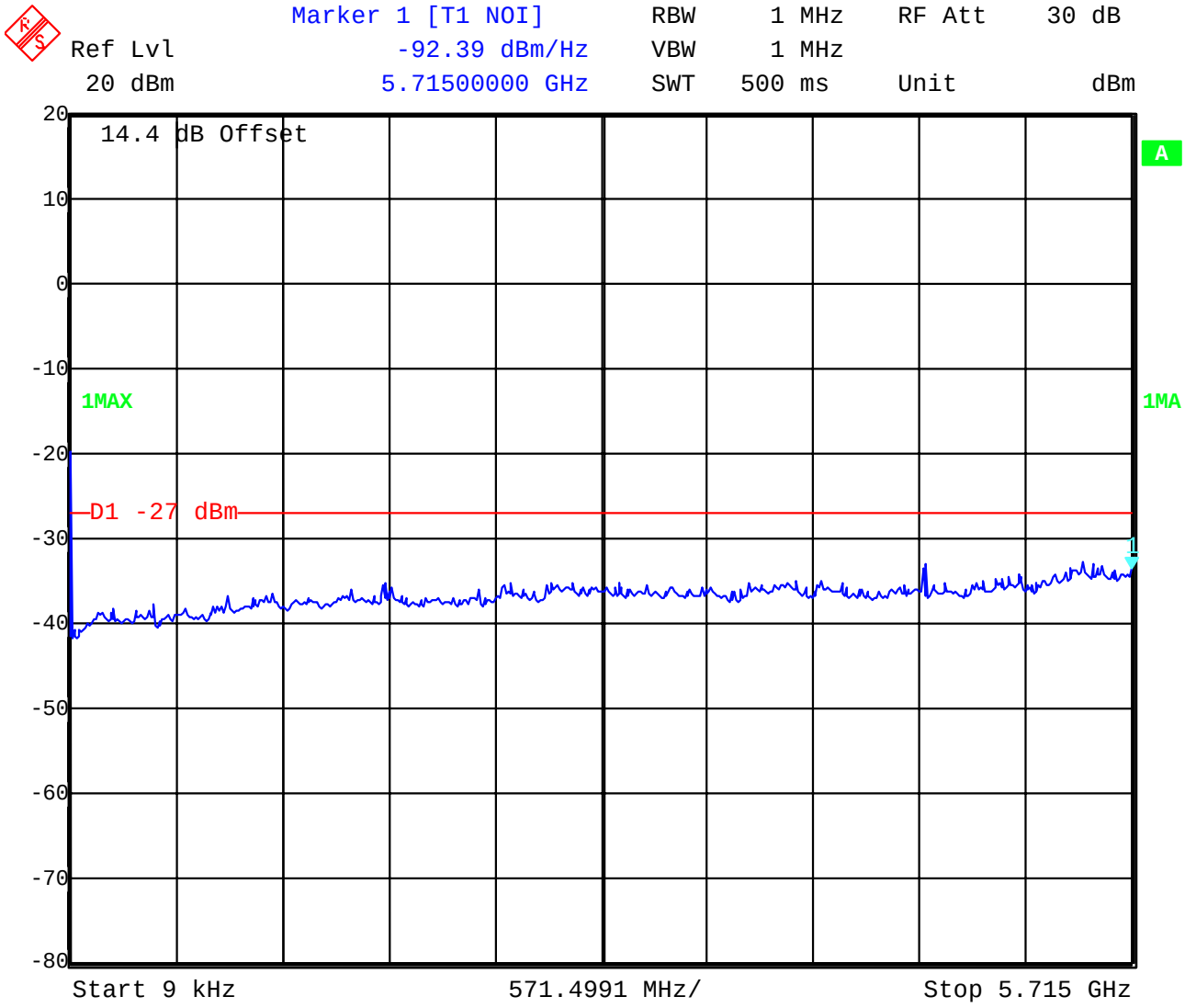
Result: - lower band edge - 10 MHz: -87.3 dBm/Hz + 60 dB = -27.3 dBm/MHz => pass
- upper band edge + 10 MHz: -86.6 dBm/Hz + 60 dB = -26.6 dBm/MHz => pass

-all frequencies more than 10 MHz above or below band edge < -30 dBm/MHz => pass

3.9 Spurious (conducted) 15.407 (b3)

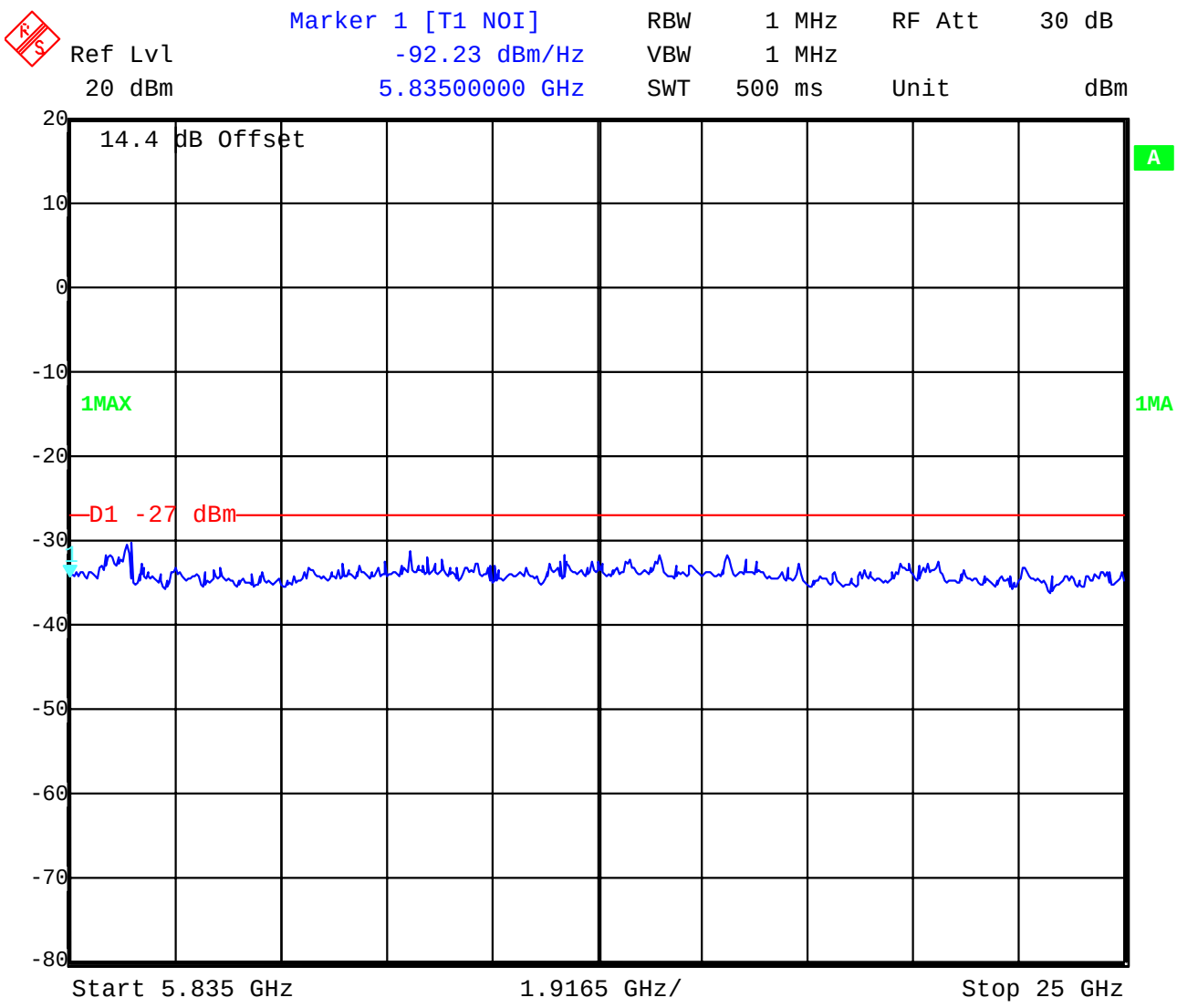
The measurement was performed at the lowest and highest frequency up to 60 GHz with external mixers. There were no peaks found.

Plot 1: 5745 MHz



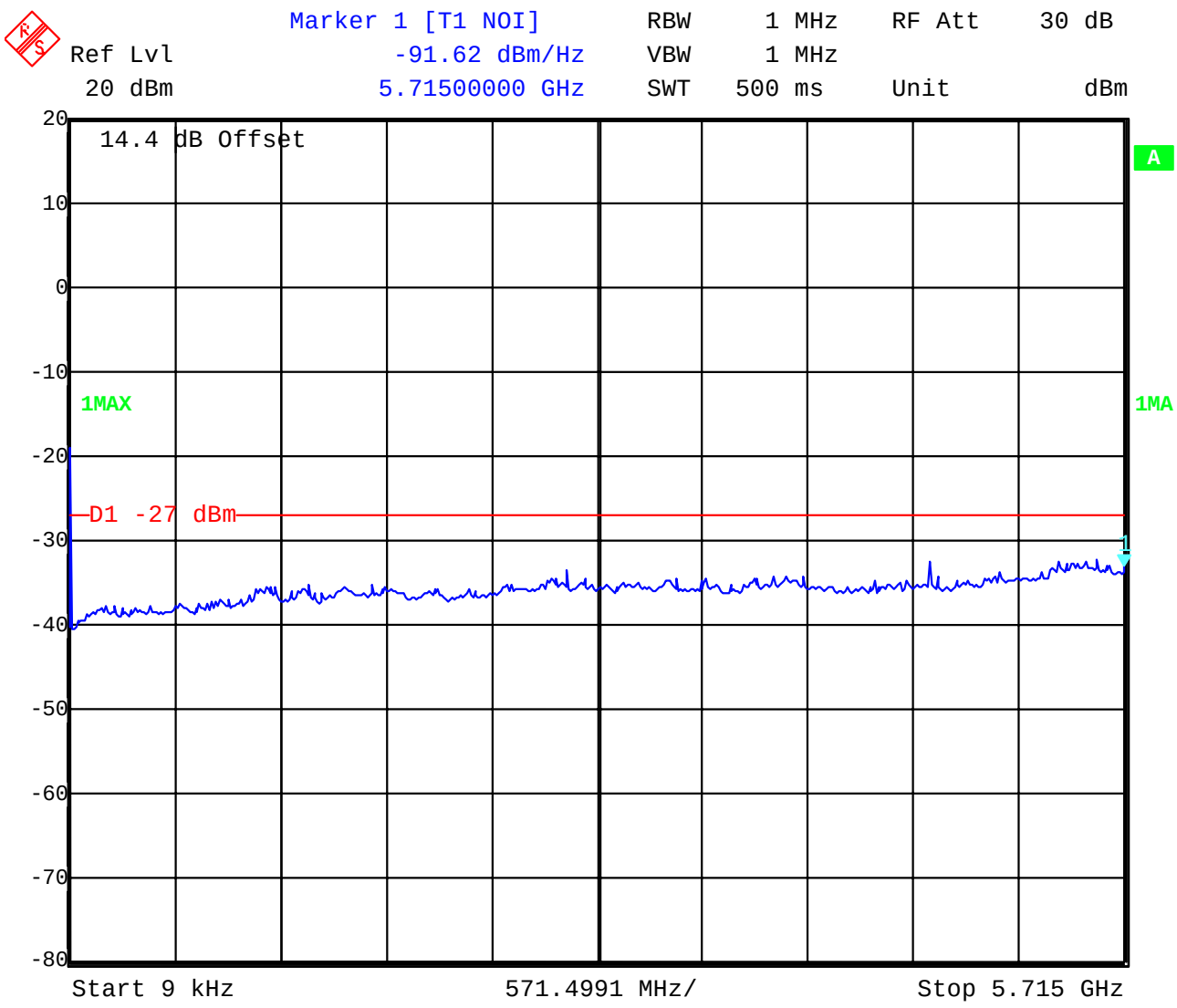
RBW / VBW : 1 MHz

Plot 2: 5745 MHz



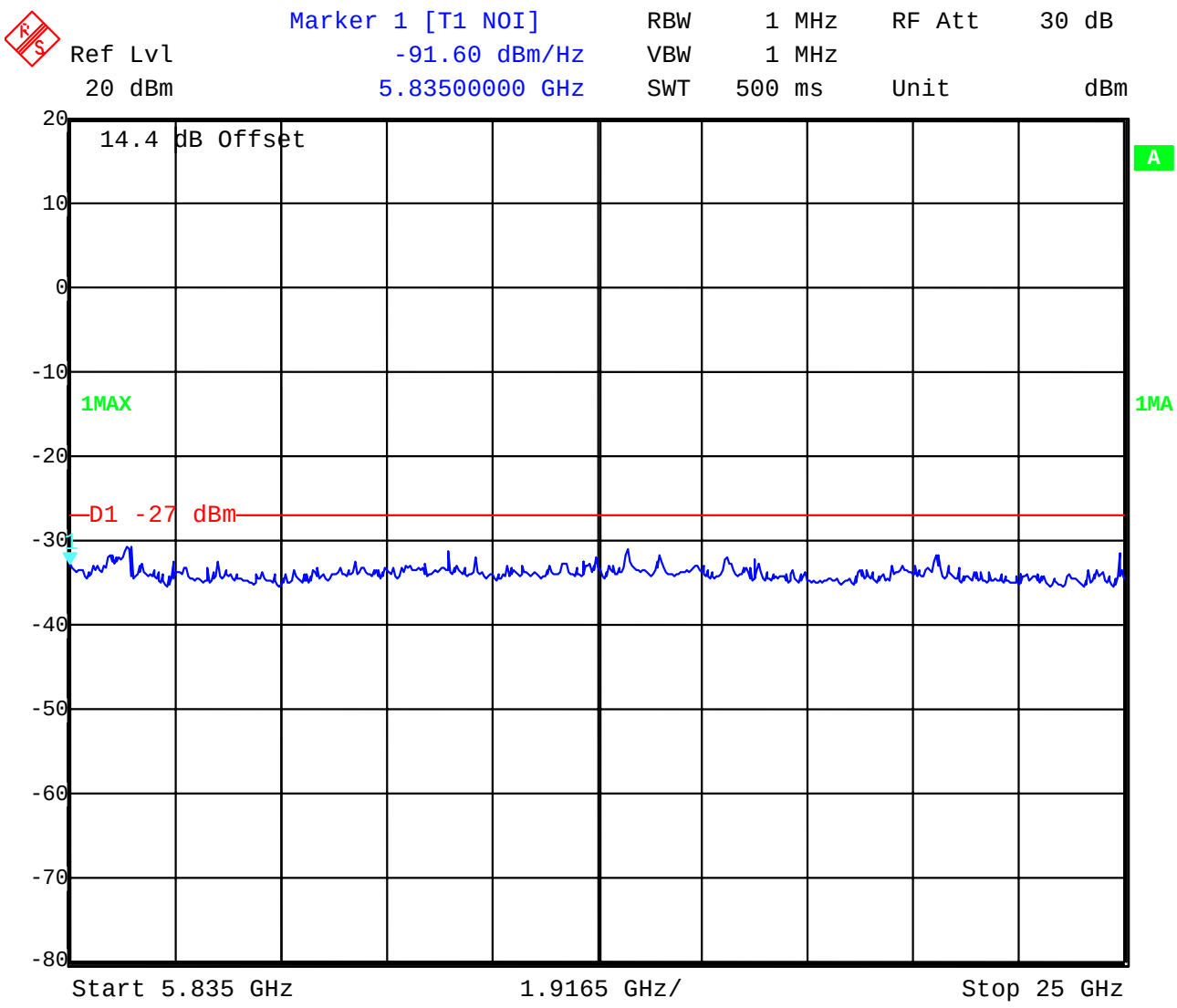
RBW / VBW : 1 MHz

Plot 3: 5805 MHz



RBW / VBW : 1 MHz

Plot 4: 5805 MHz



RBW / VBW : 1 MHz

The measurements were performed up to 60 GHz. There were no peaks found.

3.10 Spurious emissions conducted

Result & Limits

Emission Limitations					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emmision power	actual attenuation below frequency of operation [dB]	results
5745			30 dBm	-	Operating frequency
no	peaks	found		< 20 dB below	limit
5785			30 dBm	-	Operating frequency
no	peaks	found		< 20 dB below	limit
5805			30 dBm	-	Operating frequency
no	peaks	found		< 20 dB below	limit
Measurement uncertainty		± 3dB			

RBW : 1 MHz VBW: 1 MHz

Note: For emissions that fall into restricted bands you find the radiated emissions later in the report.

3.11 Max. peak transmit power §15.407 (a) (3)

Results:

Test conditions **radiated**		Max. power [dBm]		
Frequency [MHz]		5745 MHz	5785 MHz	5805 MHz
T_{nom}	V_{nom}	18.5	18.3	17.9
Measurement uncertainty		±3dB		

Test conditions **conducted**		Max. power [dBm]		
Frequency [MHz]		5745 MHz	5785 MHz	5805 MHz
T_{nom}	V_{nom}	19.5	19.5	19.4
Measurement uncertainty		±3dB		

Limits:

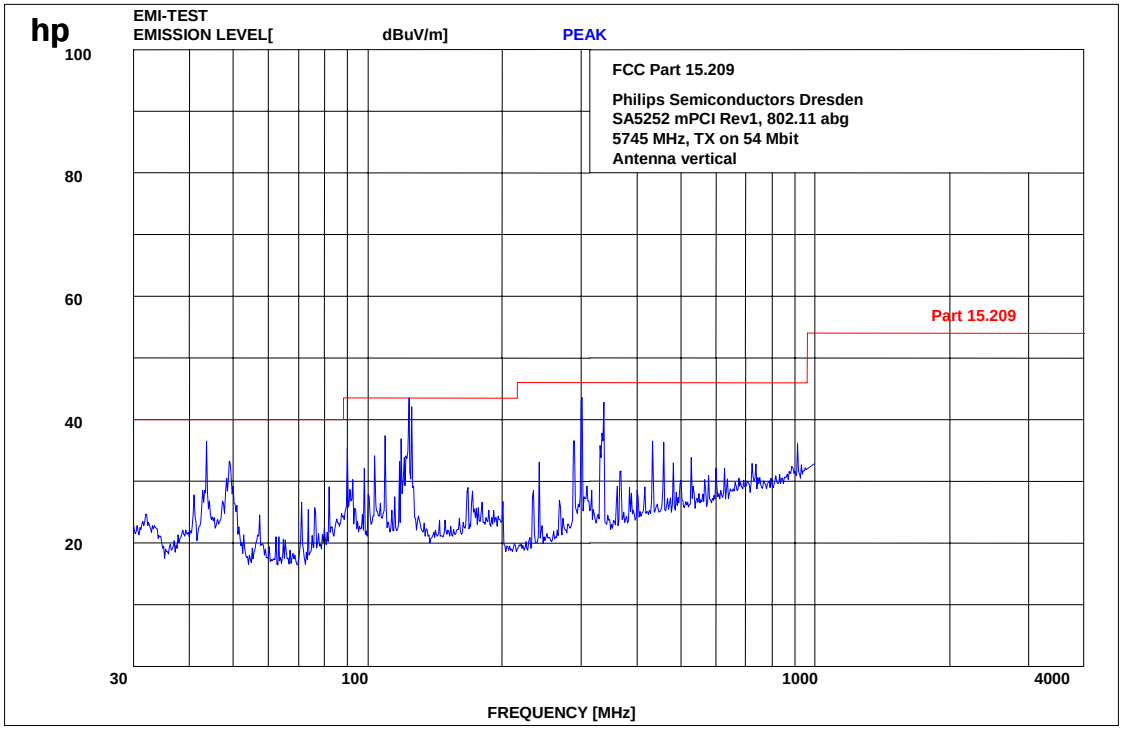
Under normal test conditions	Max. 1.0 Watt / 30 dBm
For point to point	If the antenna gain < 23 dBi No changes to output power necessary

3.12 Spurious Emissions - radiated (Transmitter) §15.209

We measured up to 60 GHz.We found no spurious in any channel up to this range.

The spurious below 1 GHz are radiated from the test pc.

Plot 1: 0.03 - 1 GHz vertical (lowest channel) (worst case)

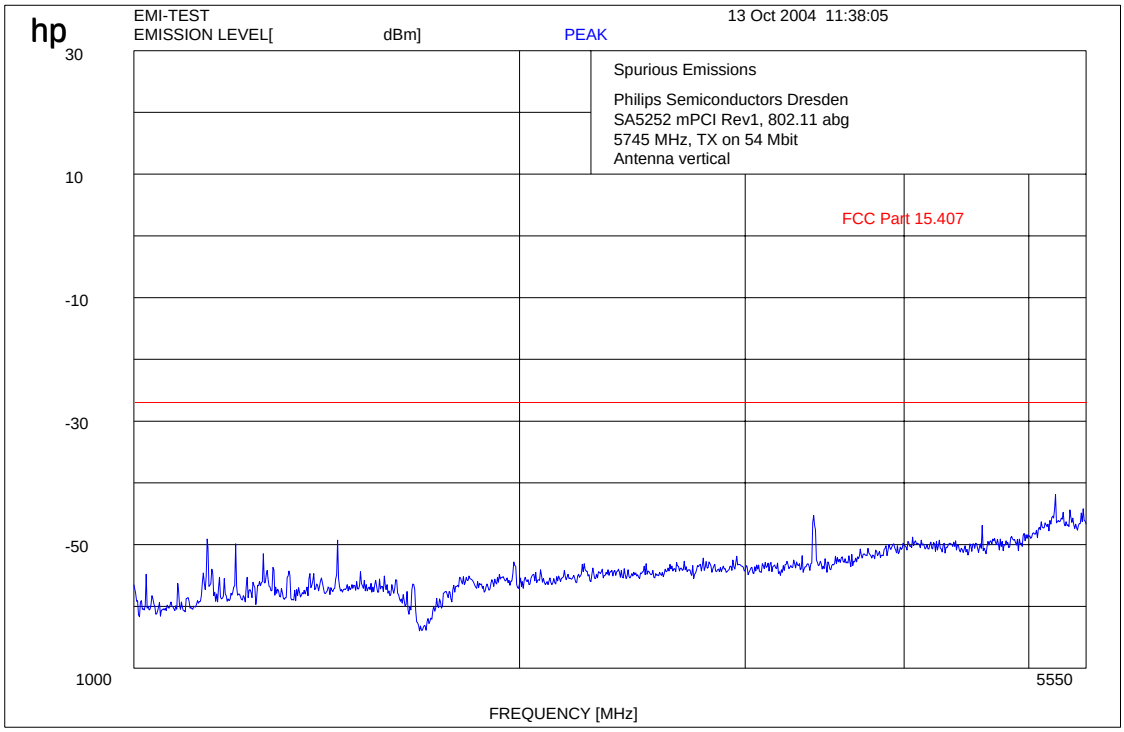


All peaks below 1 GHz were caused by the test-pc, not by the test sample

The peak at 123 MHz was 42.7 dBµV/m peak, the average value was 38.6 dBµV/m at 3m.

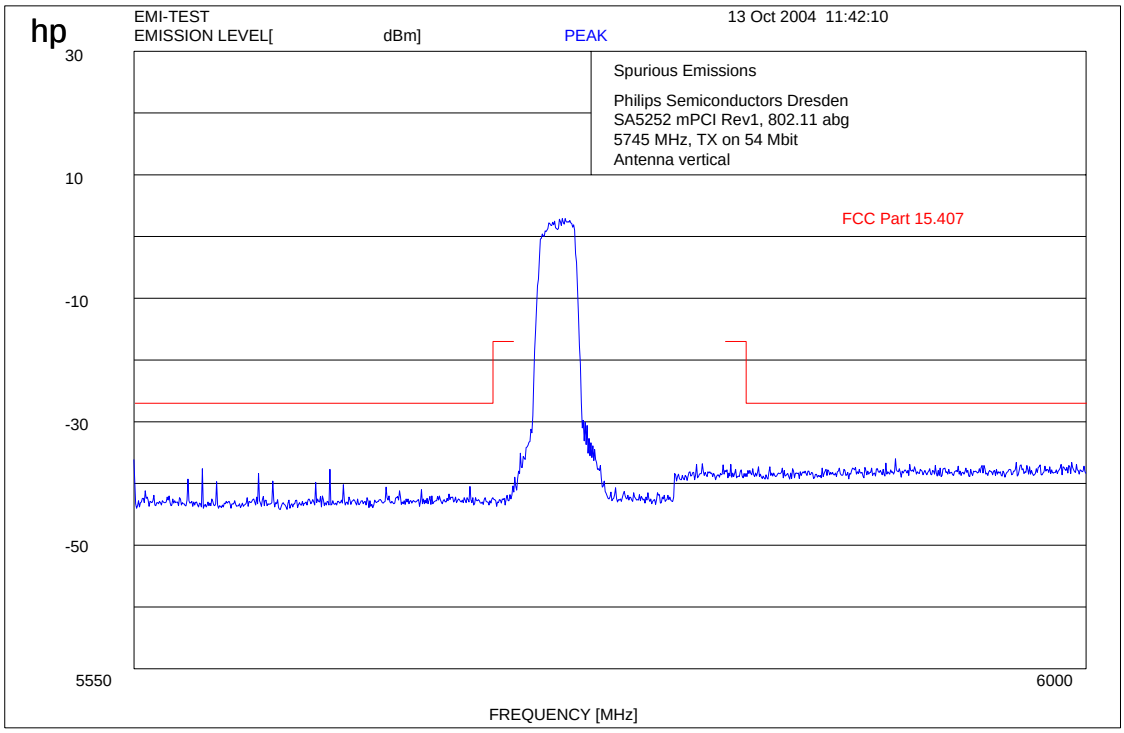
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 2: 1 GHz – 5.55 GHz vertical (lowest channel) (worst case)



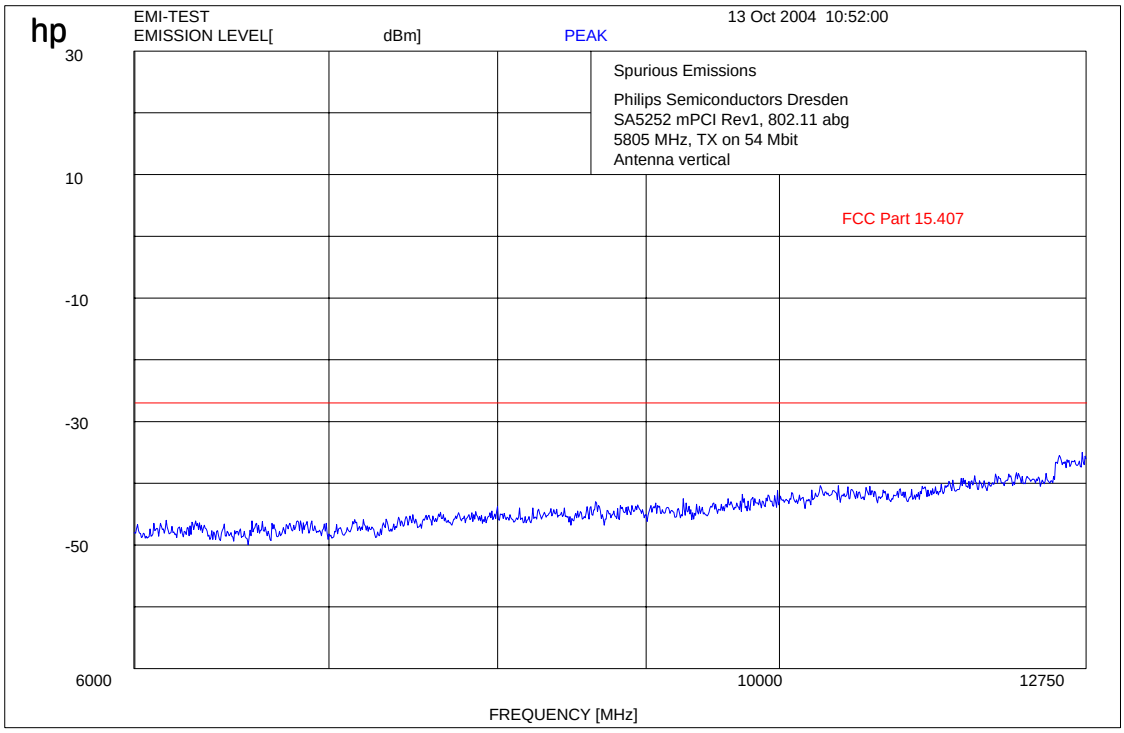
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 3: 5.55 GHz - 6 GHz vertical (lowest channel) (worst case)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

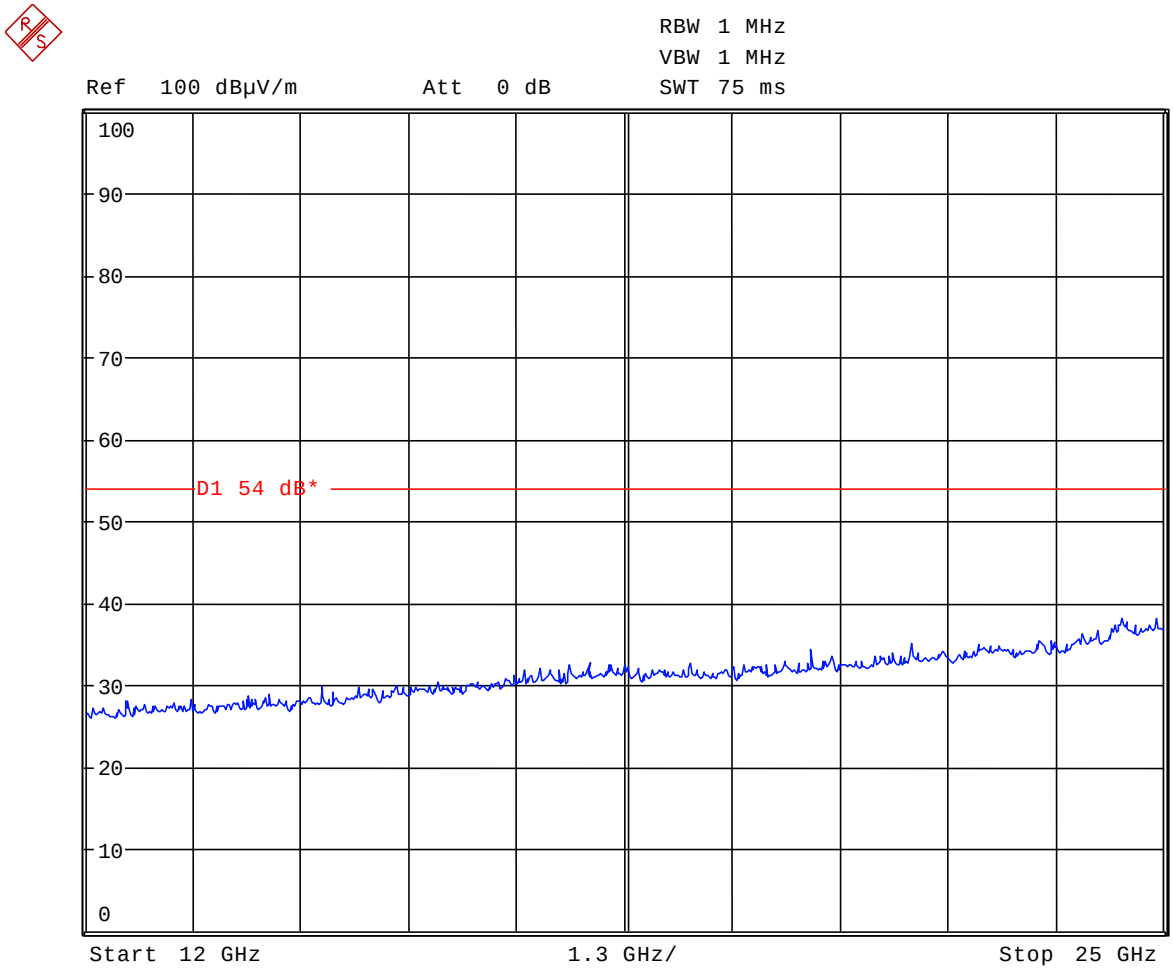
Plot 4: 6 GHz - 12.75 GHz vertical (lowest channel) (worst case)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 5: -25 GHz vertical (lowest channel) (worst case)

Valid for all three measured channels.

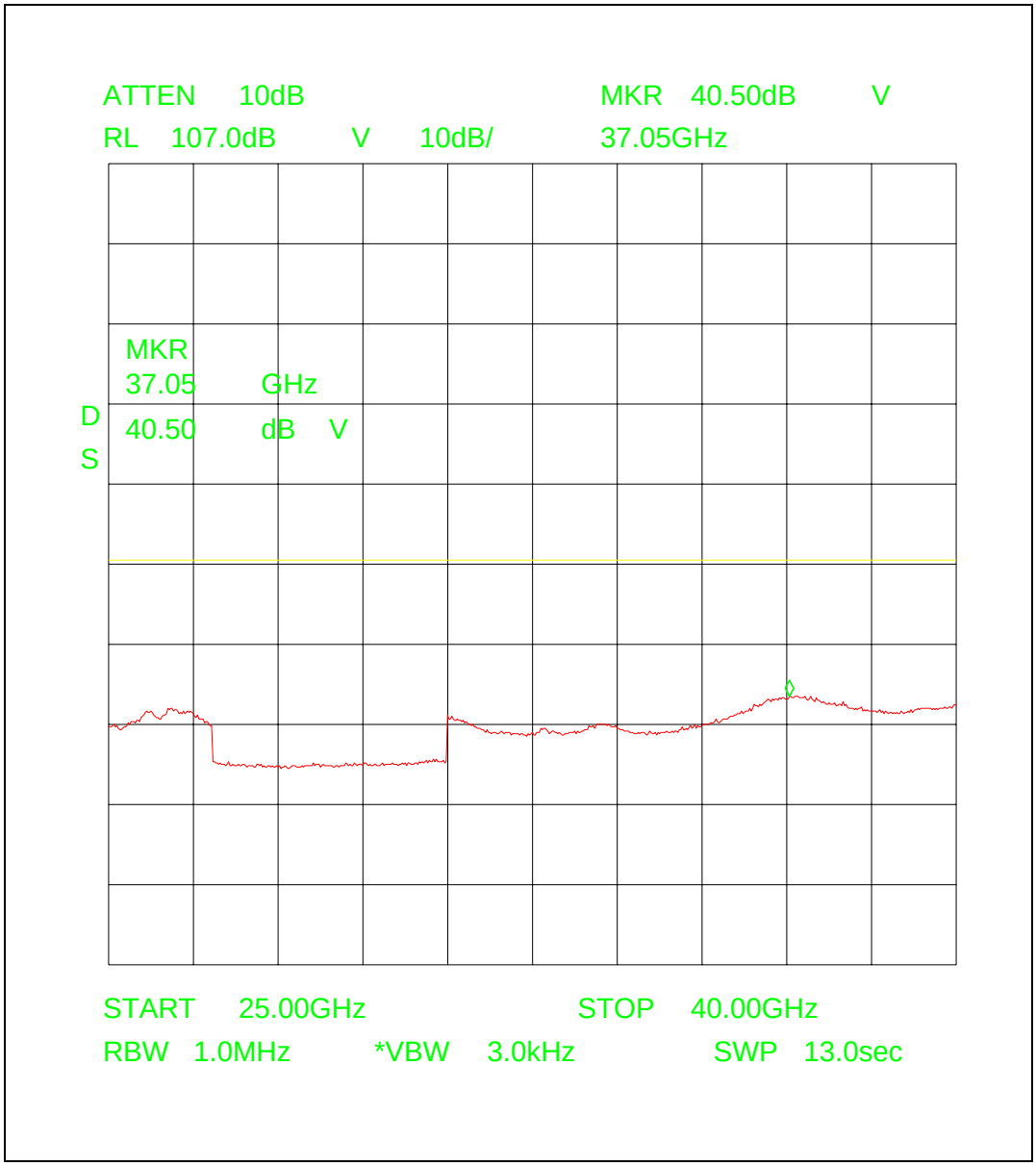


f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

We also measured with external mixers up to 60 GHz.

The plots are valid for all three channels. There were no peaks found.

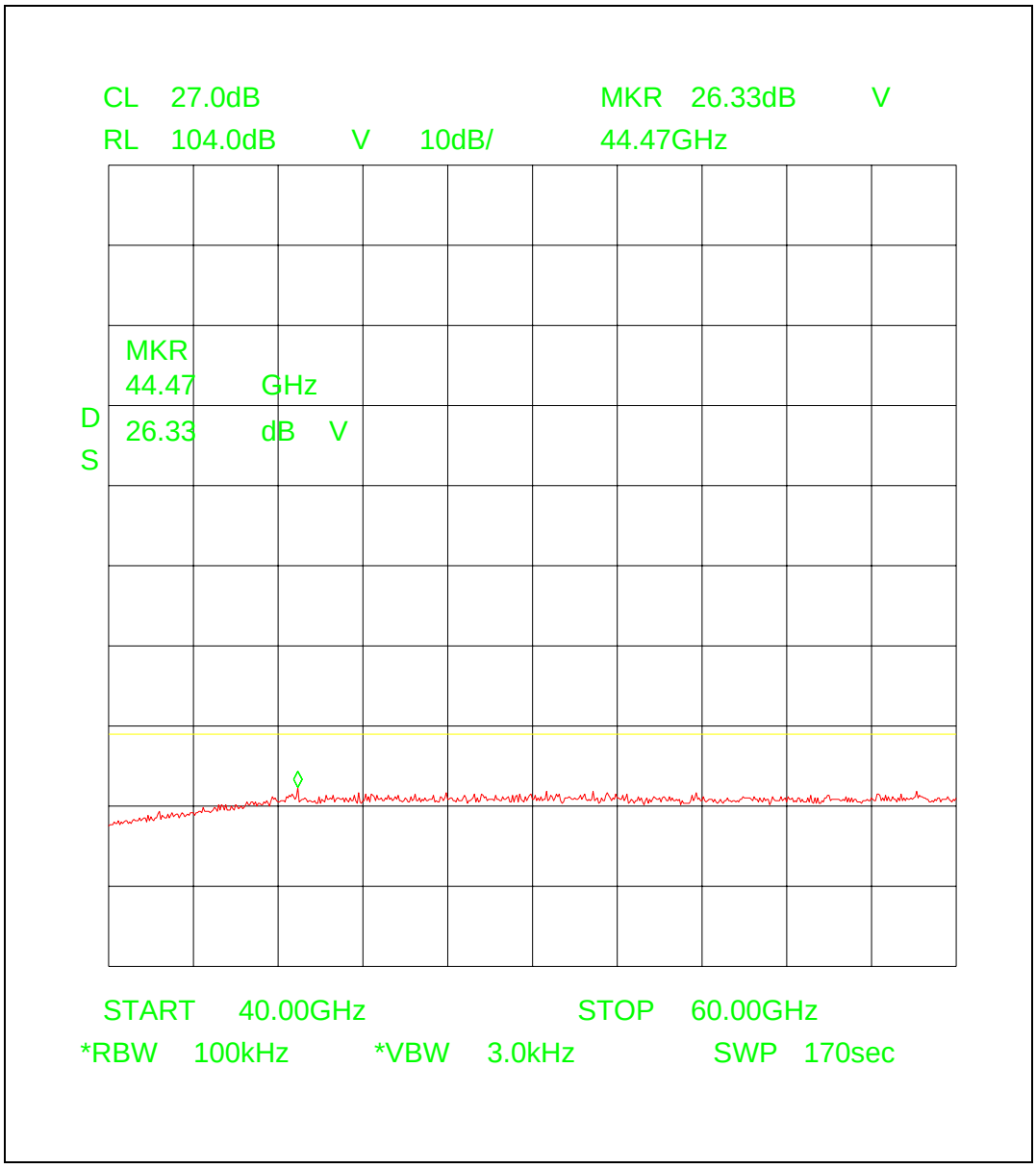
Plot 6: 25 – 40 GHz



Measured under following conditions.

Distance 0.5 Meter - 15.56 dB,
Antenna k-factor 37.5 dB (1/m),
Amplifier 30 dB,
Cabel loss 3.5 dB

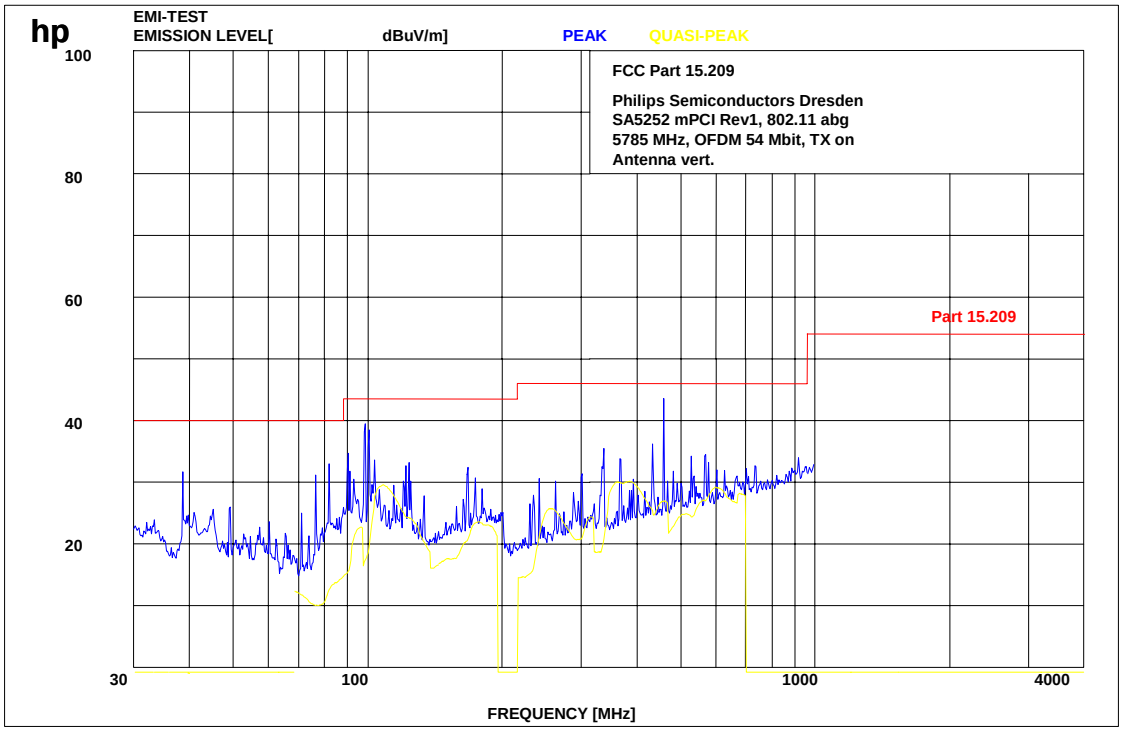
Plot 7: 40 to 60 GHz



Measured under the following conditions.

Distance 0.25 Meter - 21.58 dB,
Antenna k-factor 43.9 dB (1/m),

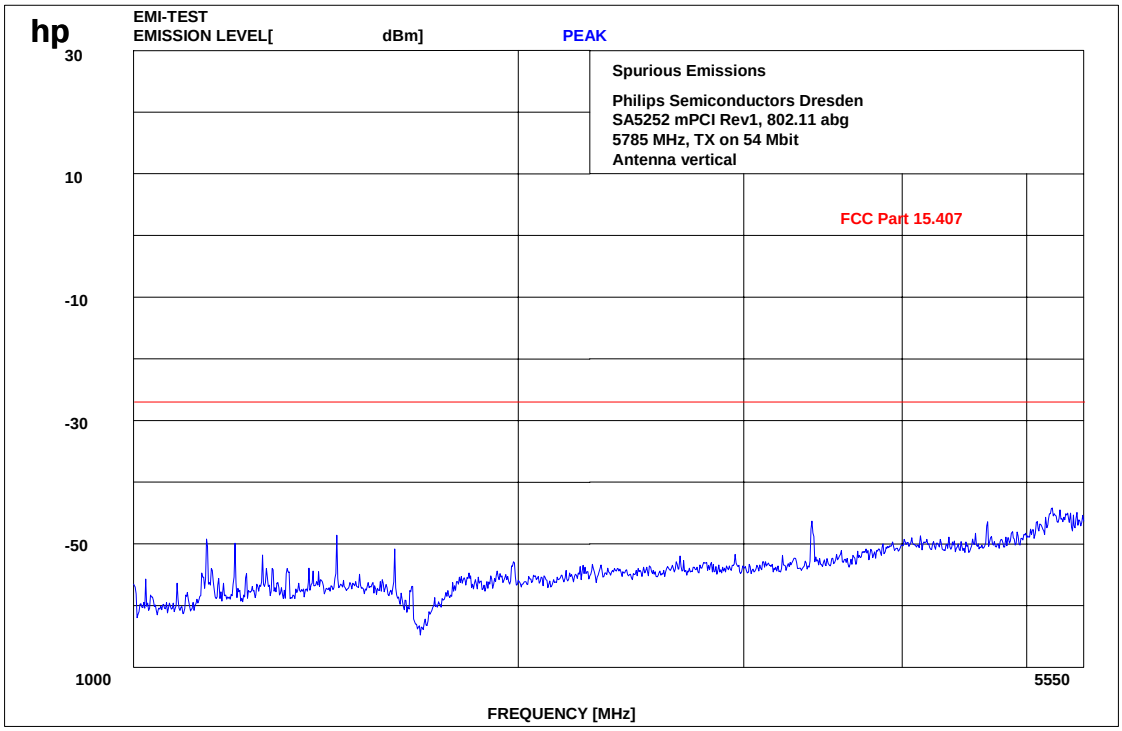
Plot 8: 30 MHz to 1 GHz (middle channel)



The yellow line shows the QP values. They are in all cases > 6 dB below limit.

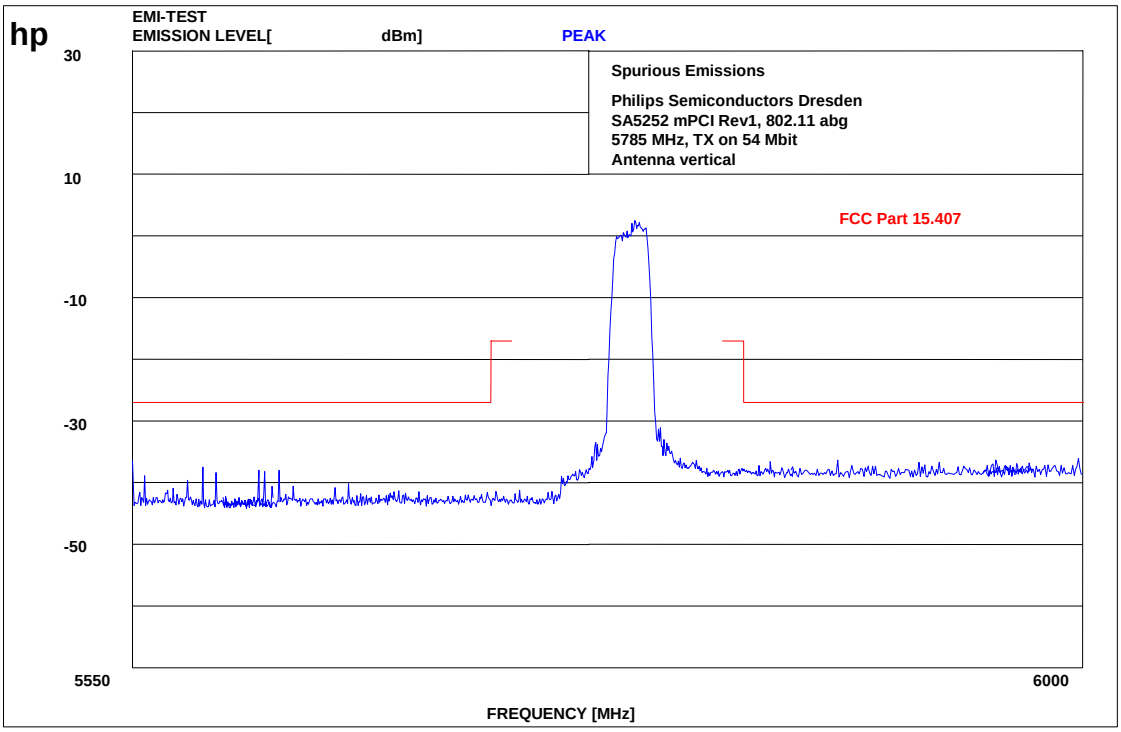
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 9: 1 GHz to 5.55 GHz (middle channel)



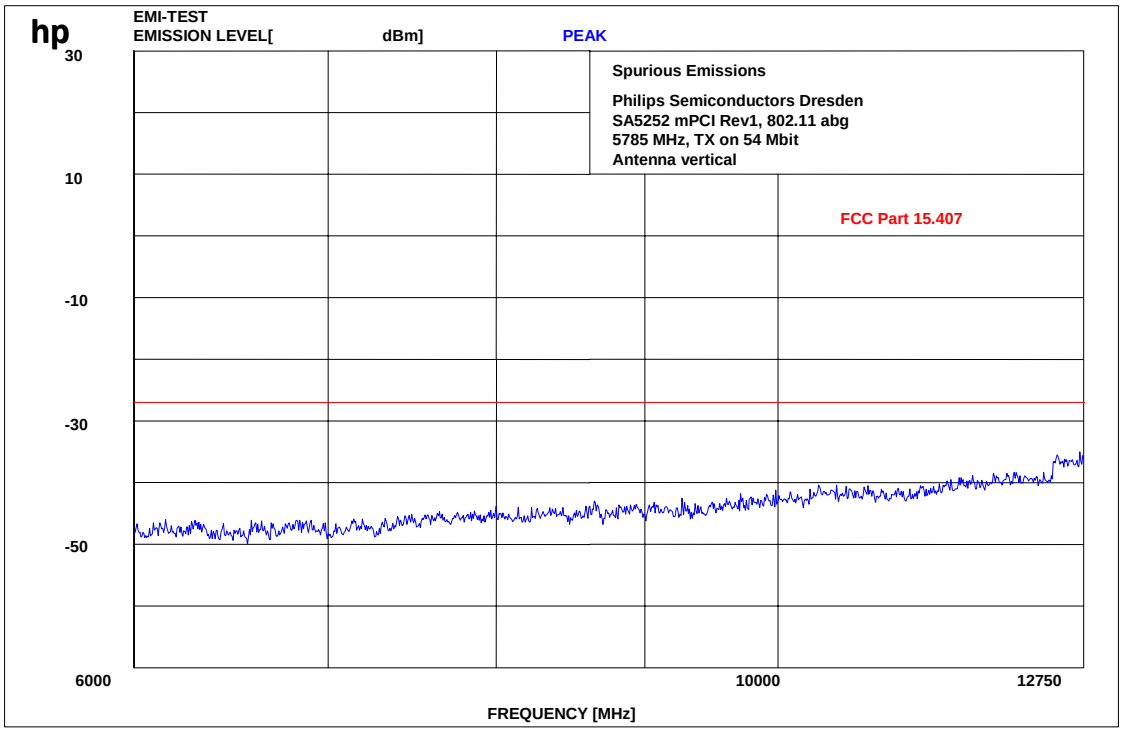
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 10: 5.55 GHz to 6GHz (middle channel)



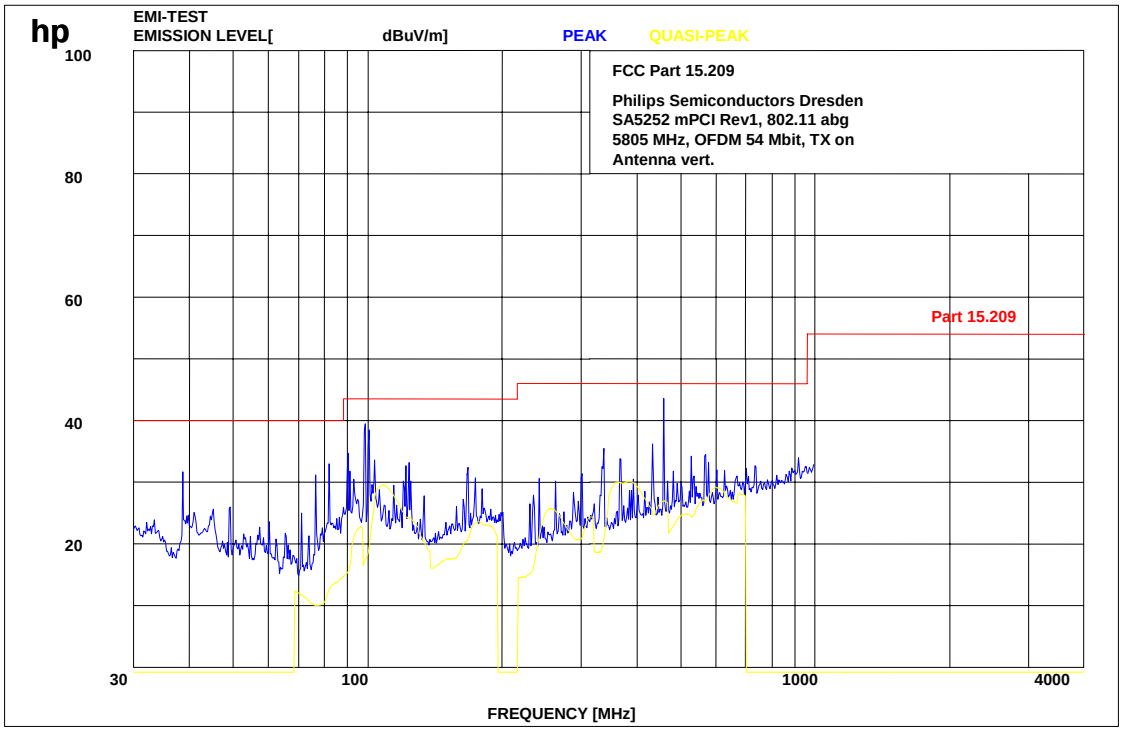
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 11: 6- 12.75 GHz (middlechannel)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

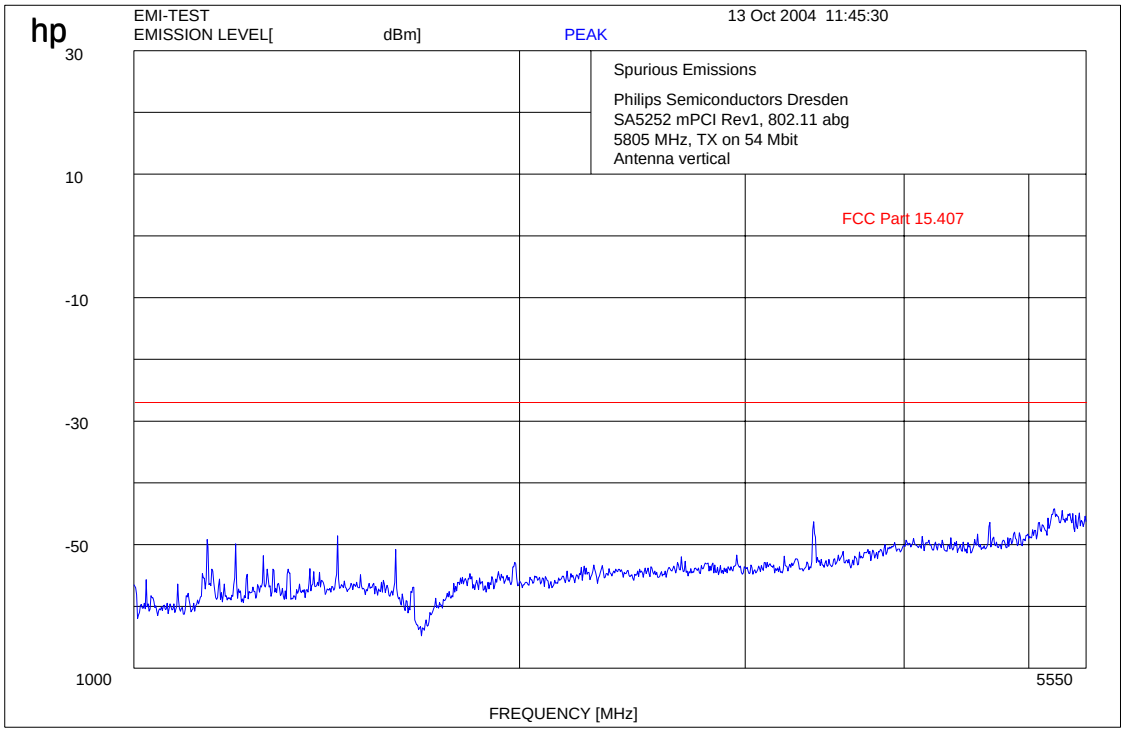
Plot 8: 30 MHz to 1 GHz (high channel)



The yellow line shows the QP values. They are in all cases > 6 dB below limit.

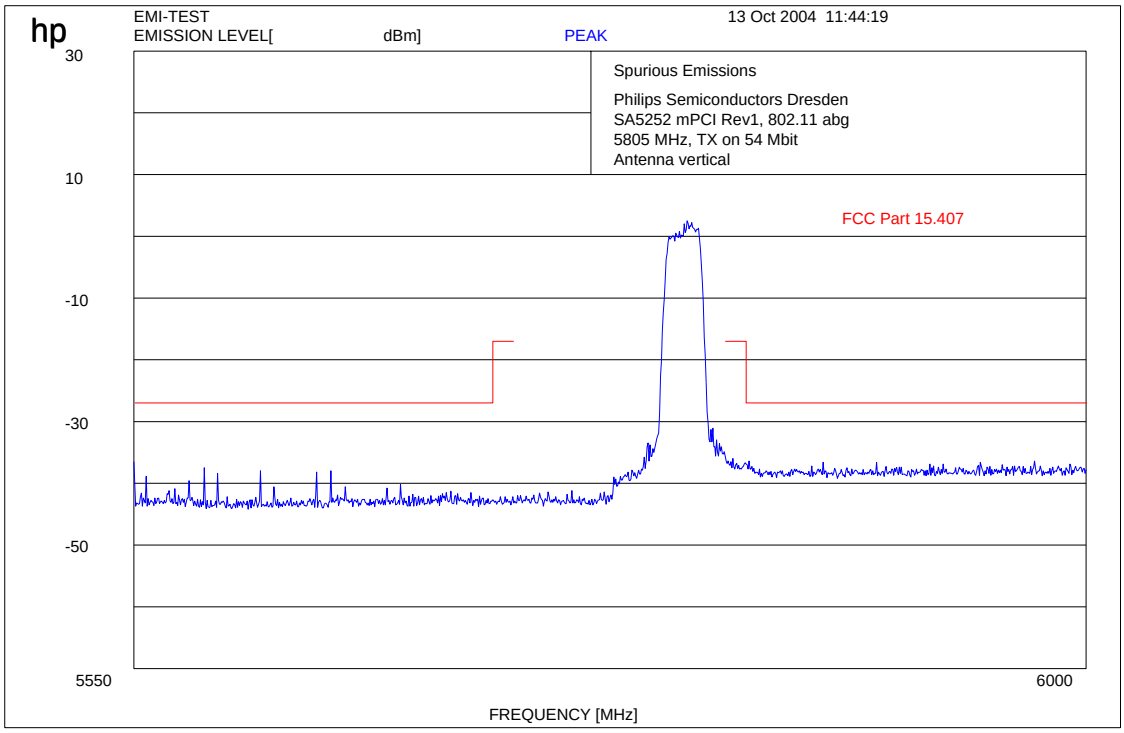
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 9: 1 GHz to 5.55 GHz (high channel)



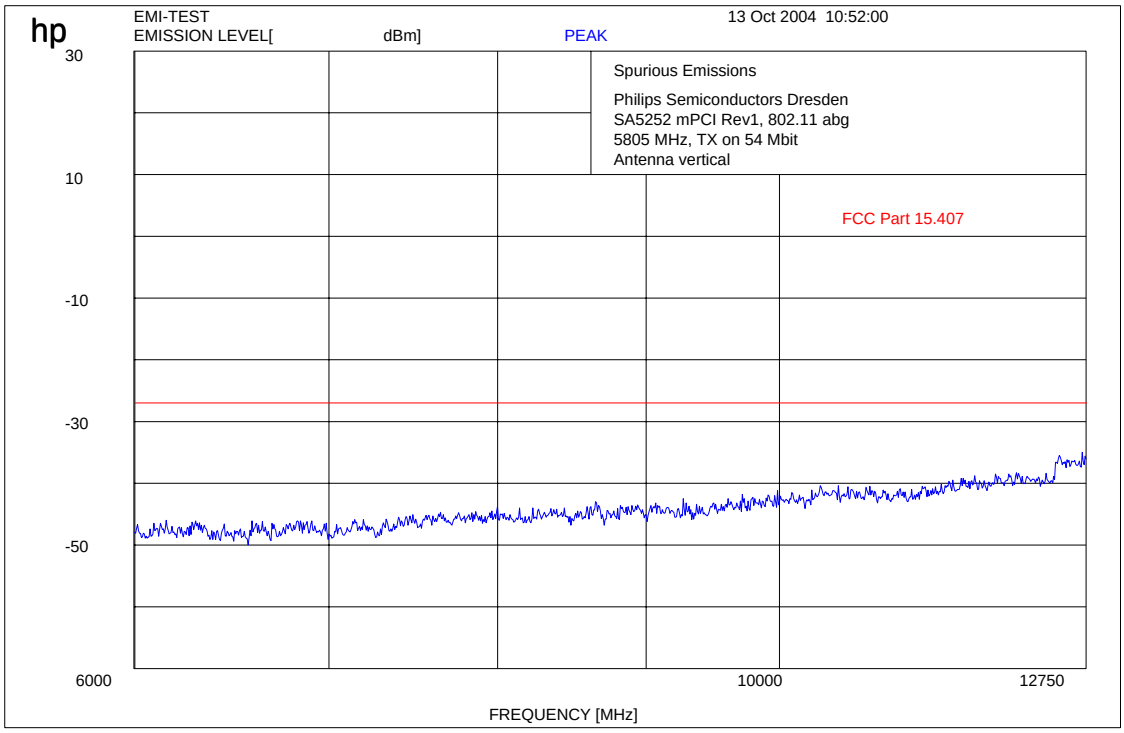
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 10: 5.55 GHz to 6GHz (high channel)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

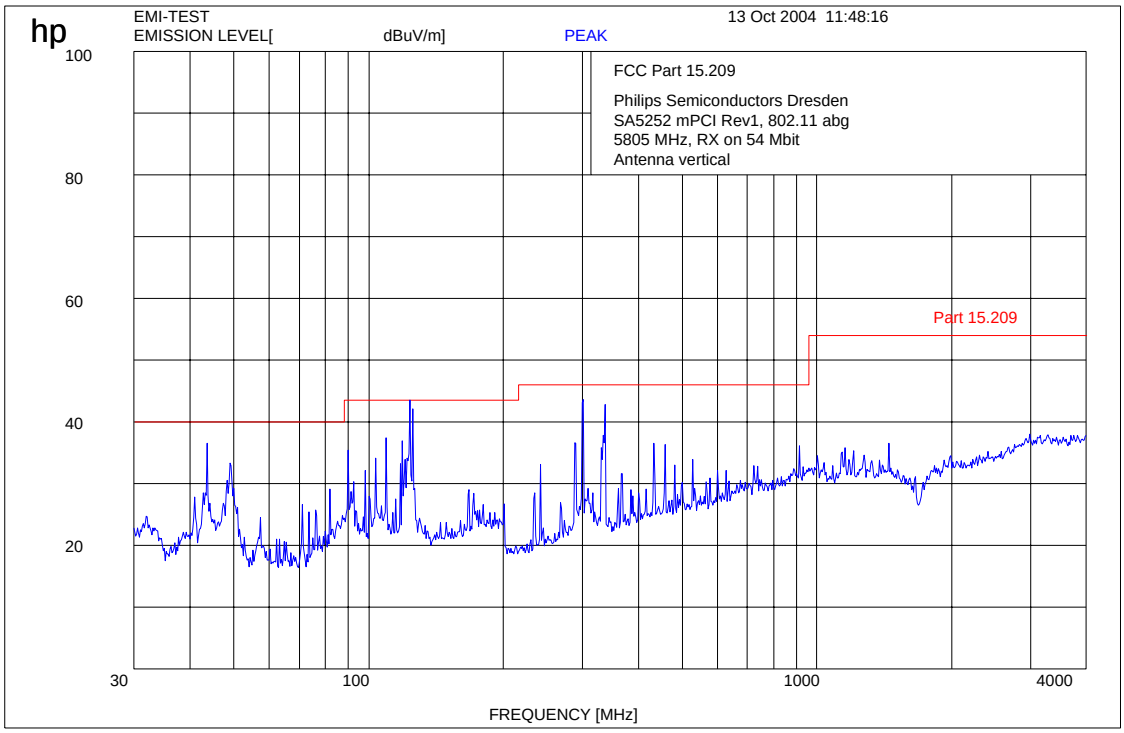
Plot 11: 6- 12.75 GHz (high channel)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

3.13 Spurious emissions radiated (RX) §15.209

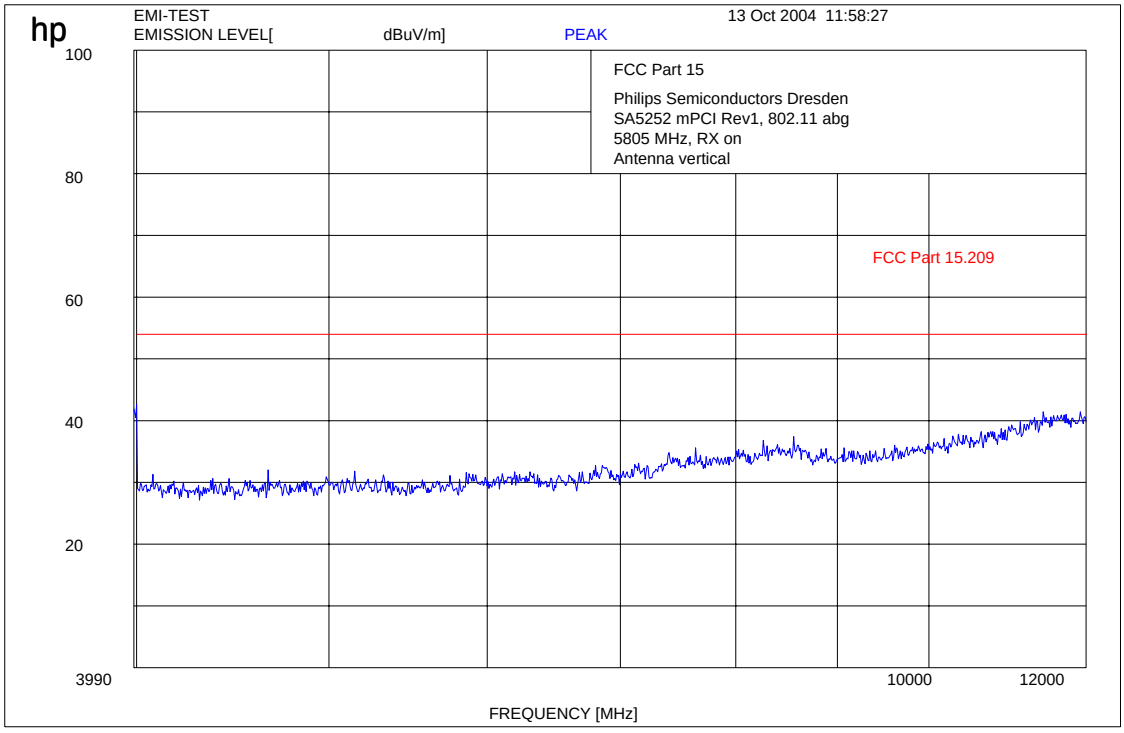
Plot 1: 30 to 4000 MHz



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

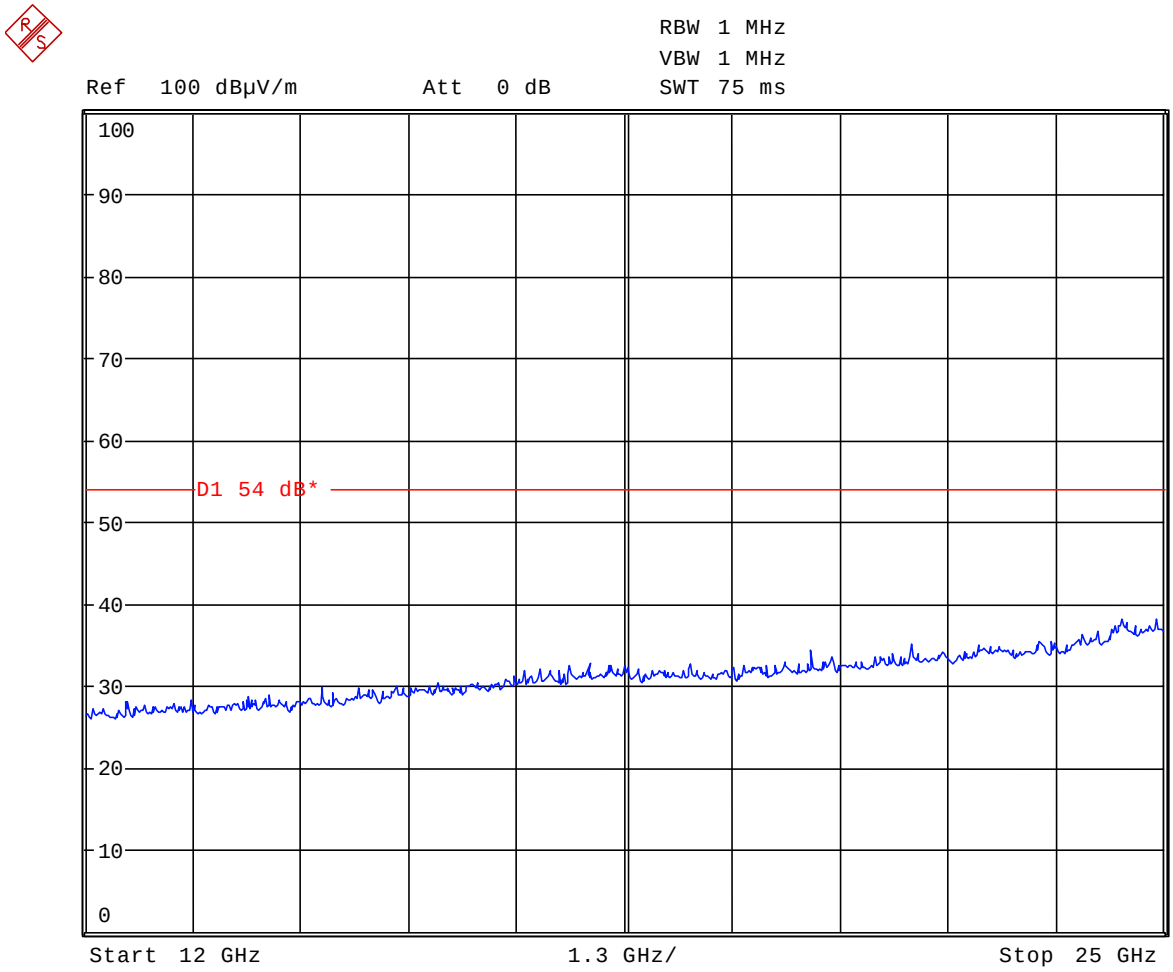
The peak at 123 MHz was 42.7 dBµV/m peak, the average value was 38.6 dBµV/m at 3m.
The peak at 336 MHz was 42.0 dBµV/m peak, the average value was 33.5 dBµV/m at 3m.

Plot 2: 4 GHz to 12 GHz



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 3: - 25 GHz



The measurements were performed up to 60 GHz. There were no peaks found.

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Limits: § 15.209

Frequency [MHz]	Field strength [µV/m]	Measurement distance (m)
30 - 88	100 (40 dBµV/m)	3
88 - 216	150 (43.5 dBµV/m)	3
216 - 960	200 (46 dBµV/m)	3
above 960	500 (54 dBµV/m)	3

Results:

Spurious Emissisons level [µV/m]								
CH 1 / 2 / 3								
f[MHz]	Detector	Level [µV/m]	f[MHz]	Detector	Level [µV/m]	f[MHz]	Detector	Level [µV/m]
123	AV	38.6						
336	AV	33.5						
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz
see above plots

Measurement distance see table

Limits : § 15.109 / 209

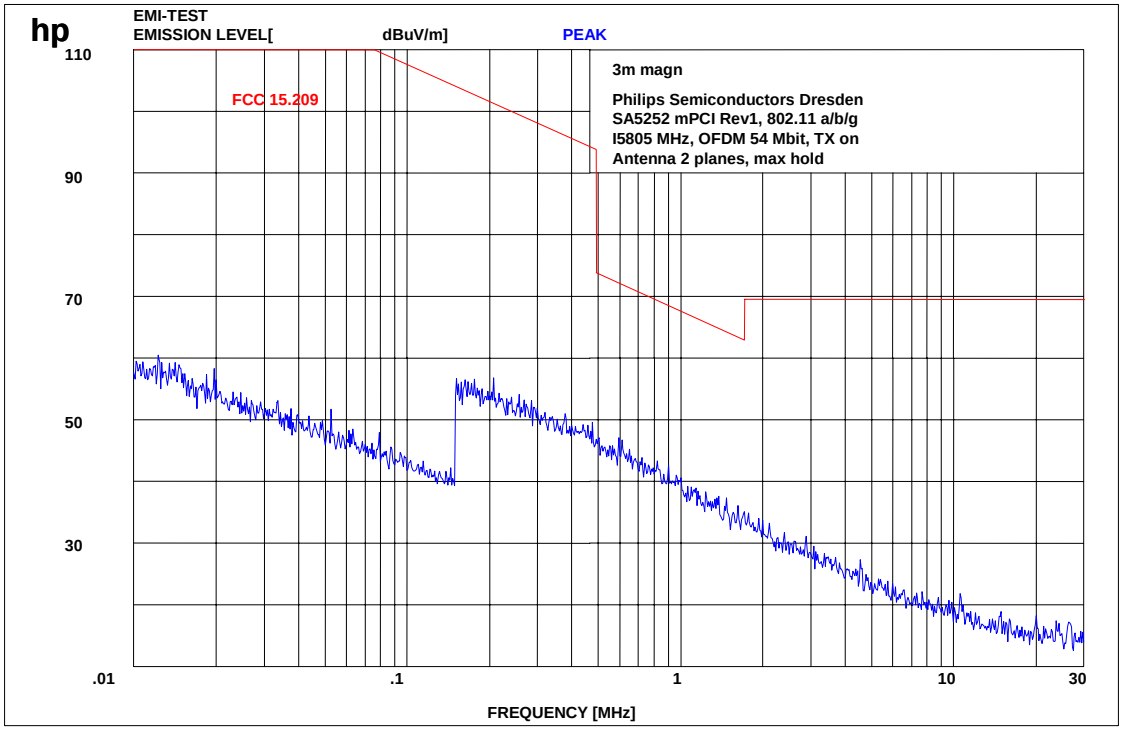
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
30 - 88	100 (40 dBµV/m)	3
88 - 216	150 (43.5 dBµV/m)	3
216 - 960	200 (46 dBµV/m)	3
above 960	500 (54 dBµV/m)	3

3.14 Spurious Emissions - radiated <30 MHz §15.109

(measured with a special shielded pc with the build-in test sample)

Measured at 3 m distance.
Values recalculated with 40 dB/decade according to FCC rules.

Plot 1:



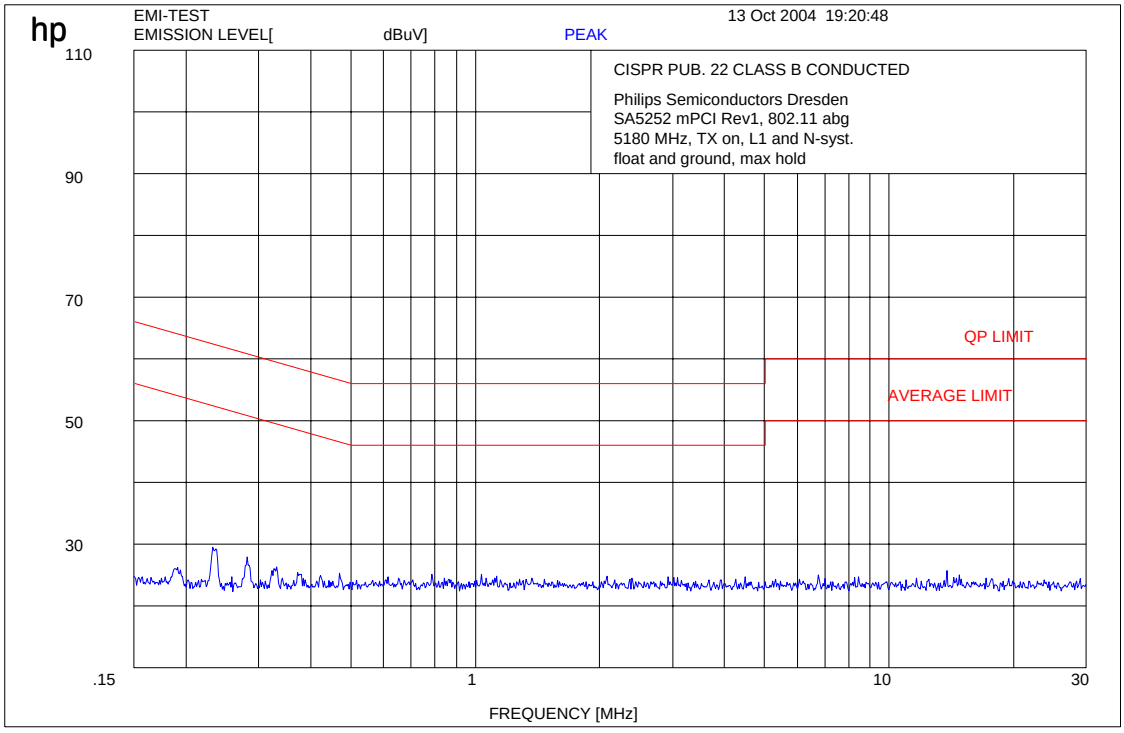
Limits:

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30 / 29.5 dBµV/m	30
30 - 88	100 / 40 dBµV/m	3
88 - 216	150 / 43.5 dBµV/m	3
216 - 960	200 / 46 dBµV/m	3
above 960	54 dBµV/m	3

3.15 Conducted Emissions <30 MHz §15.107/207

(measured with 110V Ac at a customer laptop with build-in test sample.)

Plot 1: CISPR 22



We measured in TX and RX mode, L1 and N floating and grounded, max value was hold.

Limits :

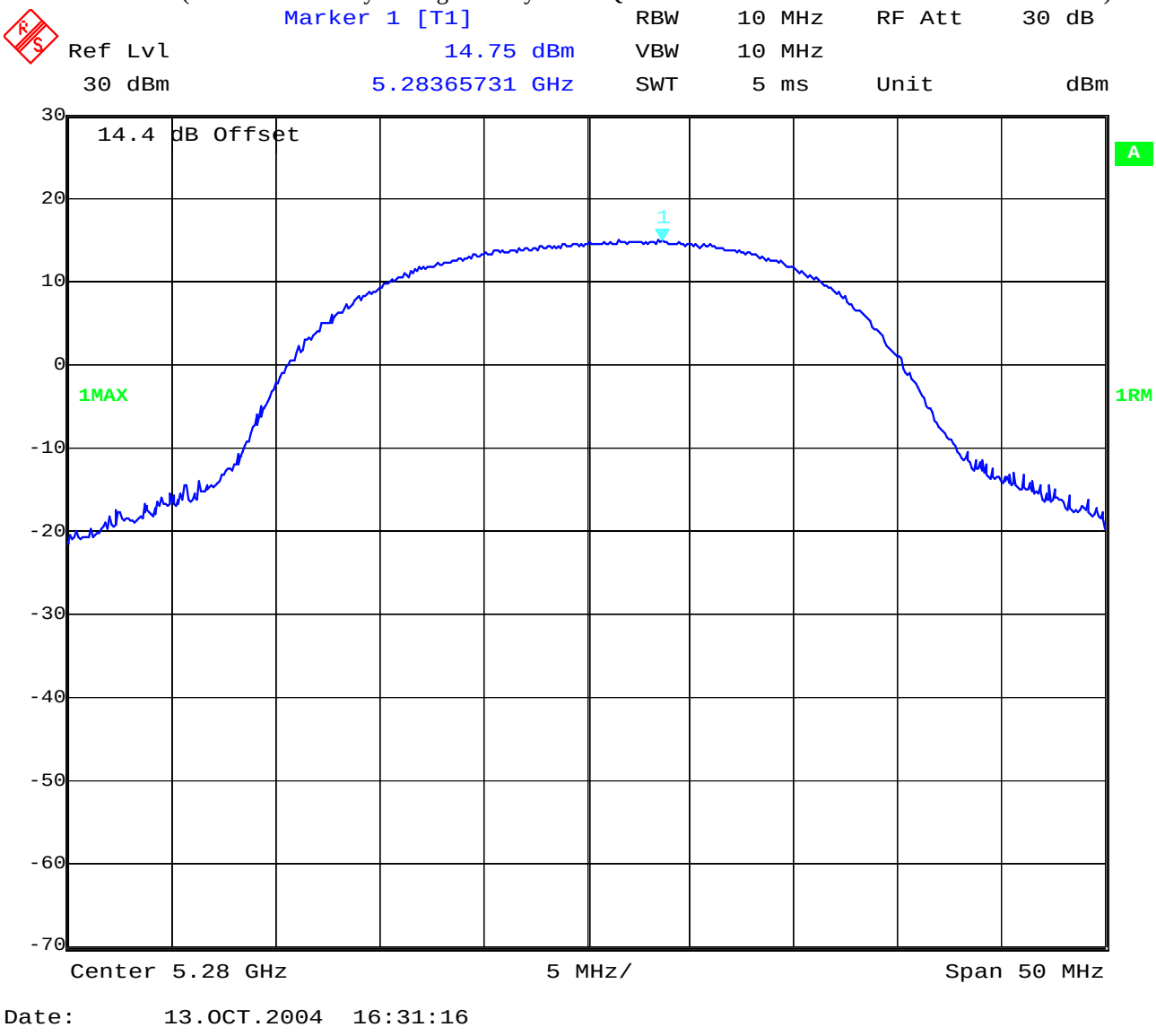
Under normal test conditions only	See plots

Frequency range of the sample : 5250 to 5350 MHz

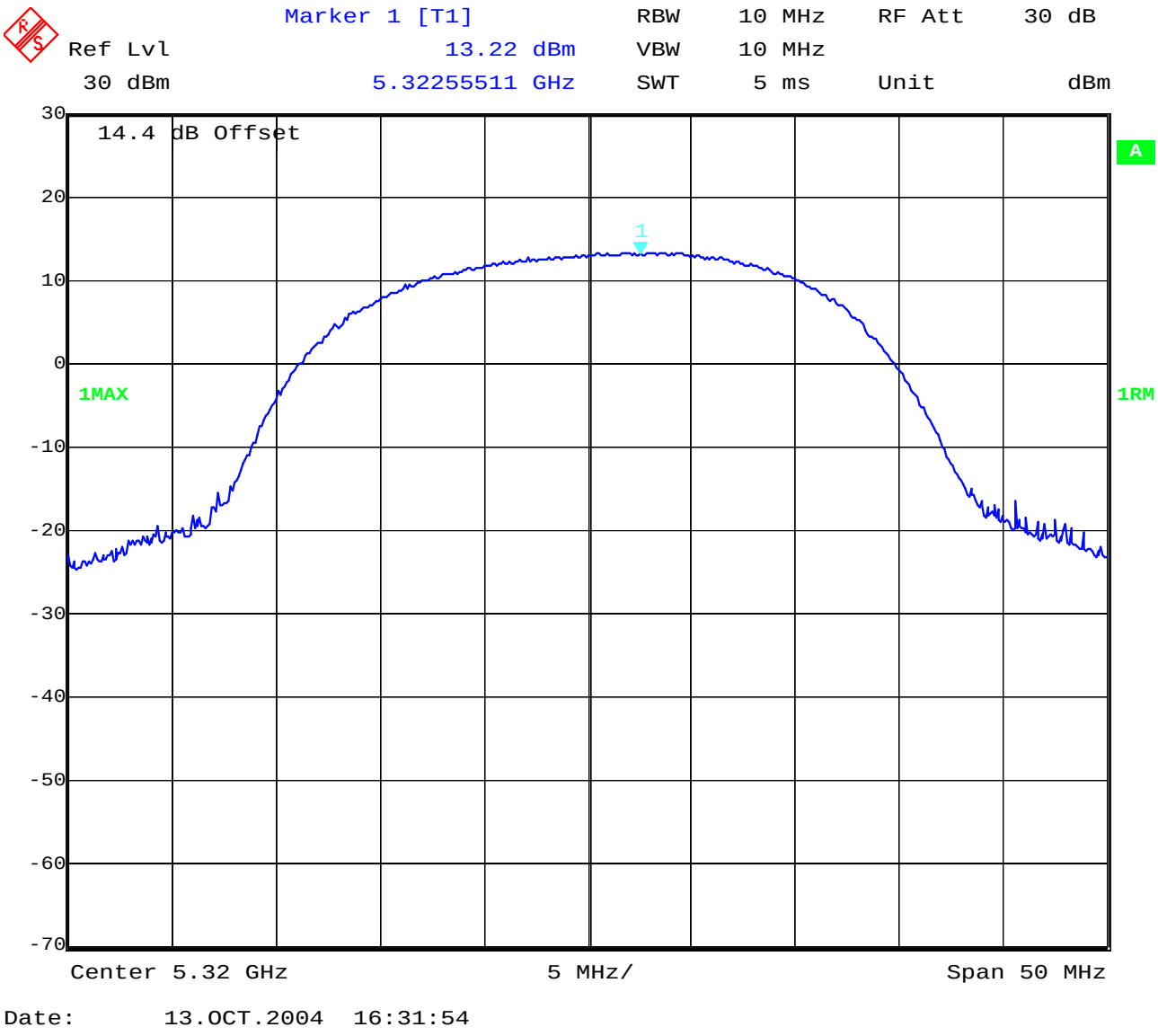
3.16 Peak Transmit Power §15.407a(2)+(4)

True RMS

Plot 1: 5280 MHz (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz with a true RMS filter)



Plot 2: 5320 Mhz (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



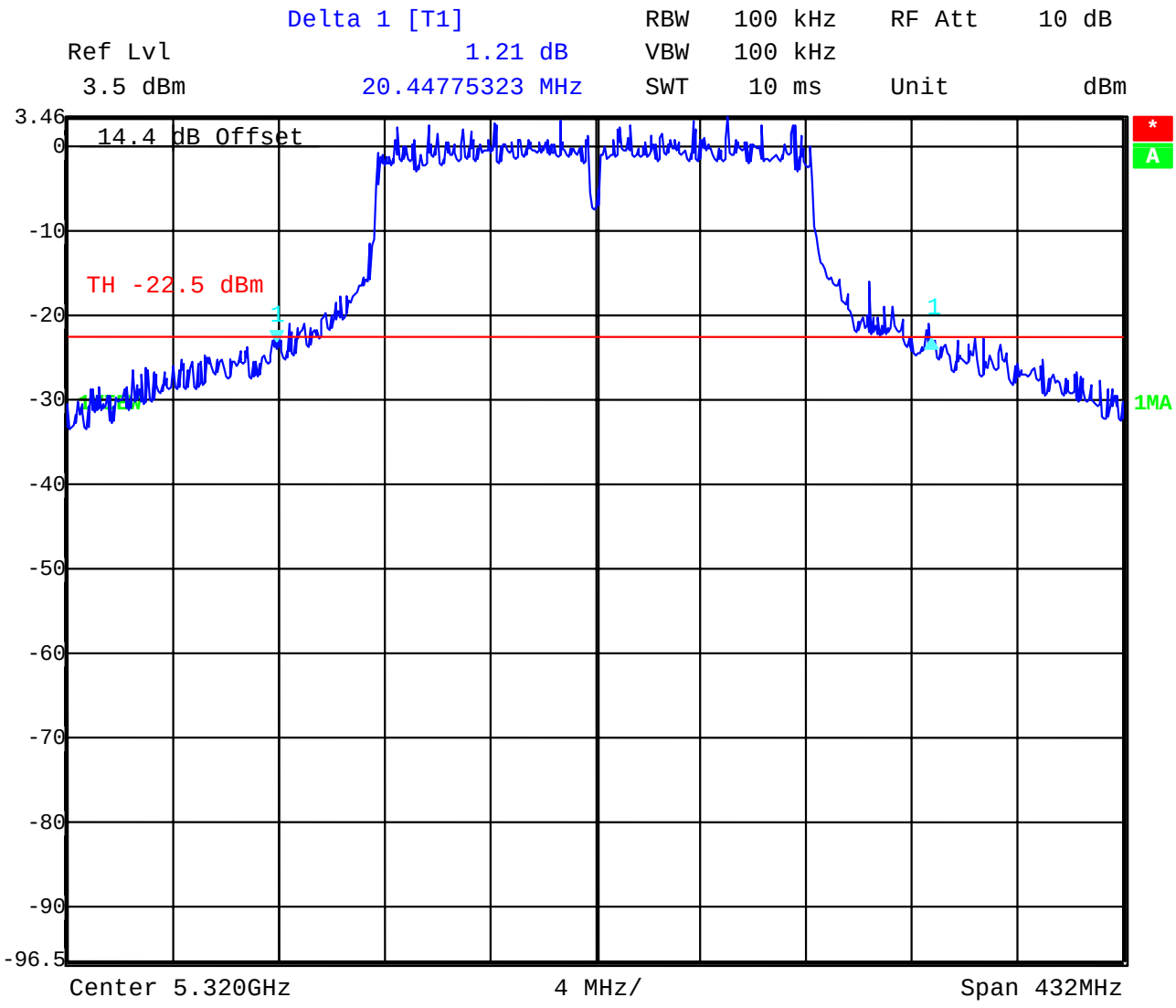
As the OBW of the signal is ~20 MHz and the used measuring BW is 10 MHz we have a correction factor of 3 dB.

Results: **Plot 1: Peak transmit power with true RMS filter : 14.8 dBm + 3dB = 17.8 dBm**
Plot 2: Peak transmit power with true RMS filter : 13.2 dBm + 3dB = 16.2 dBm

Limit: **24 dBm or 11 dBm + 10log B (26-dB emission BW)**

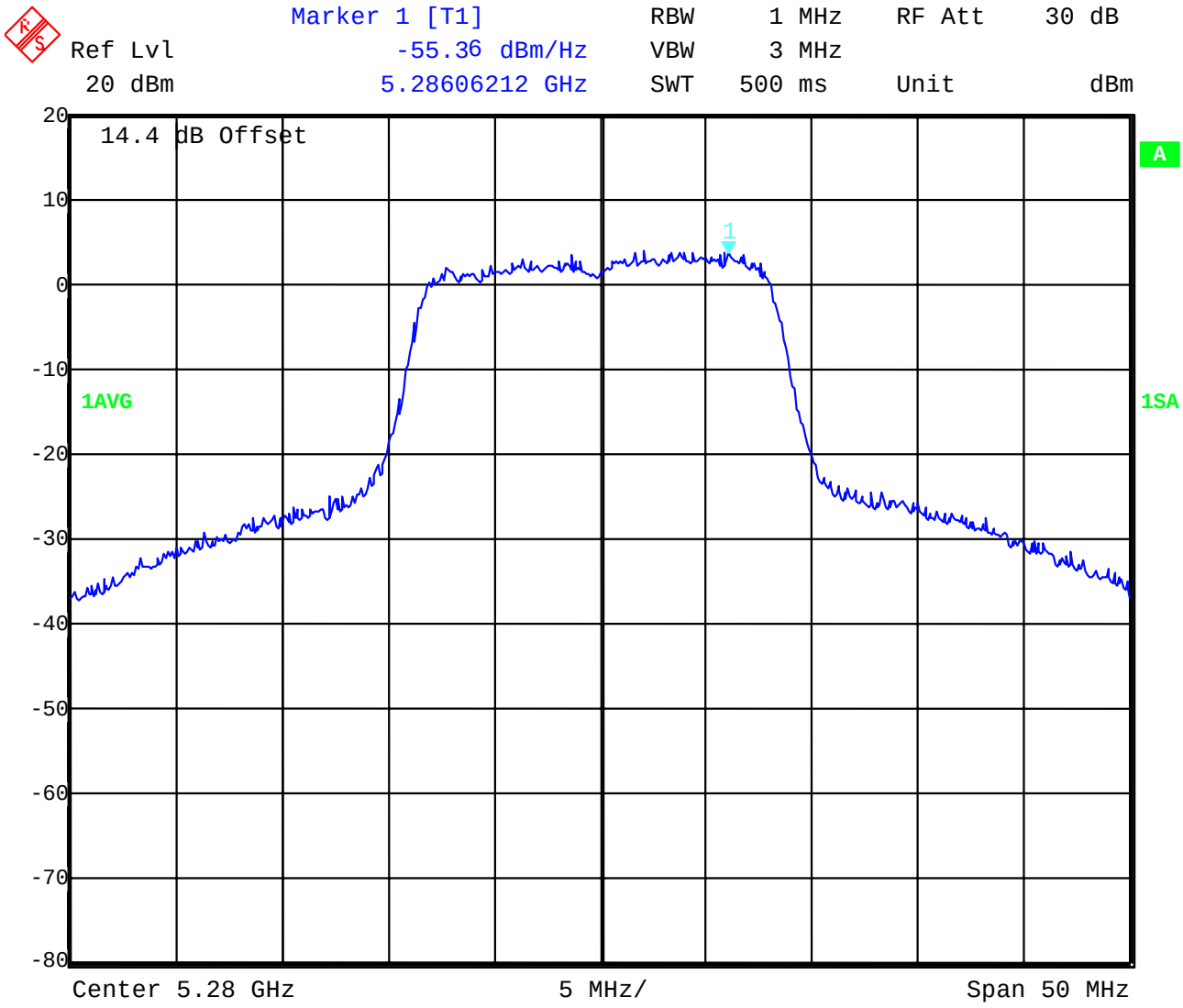
This plot shows the 26 dB BW of the OFDM signal. It is also about 20 MHz.

Correction factor is 3 dB according to 10 Mhz RBW/VBW of the analyzer

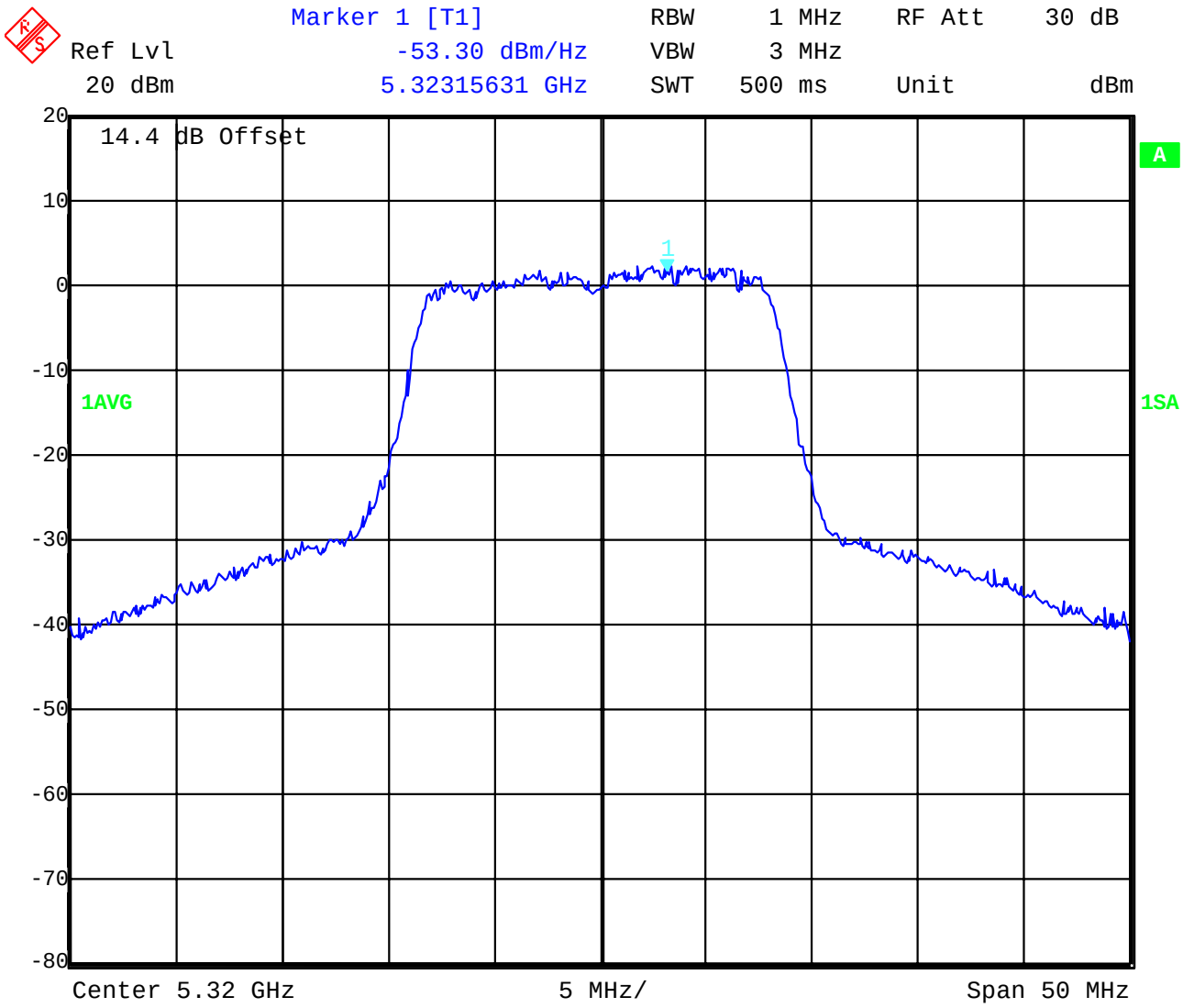


3.17 Spectral Density Conducted §15.407(a5)

Plot 1 : 5280 MHz



Plot 2: 5320 MHz

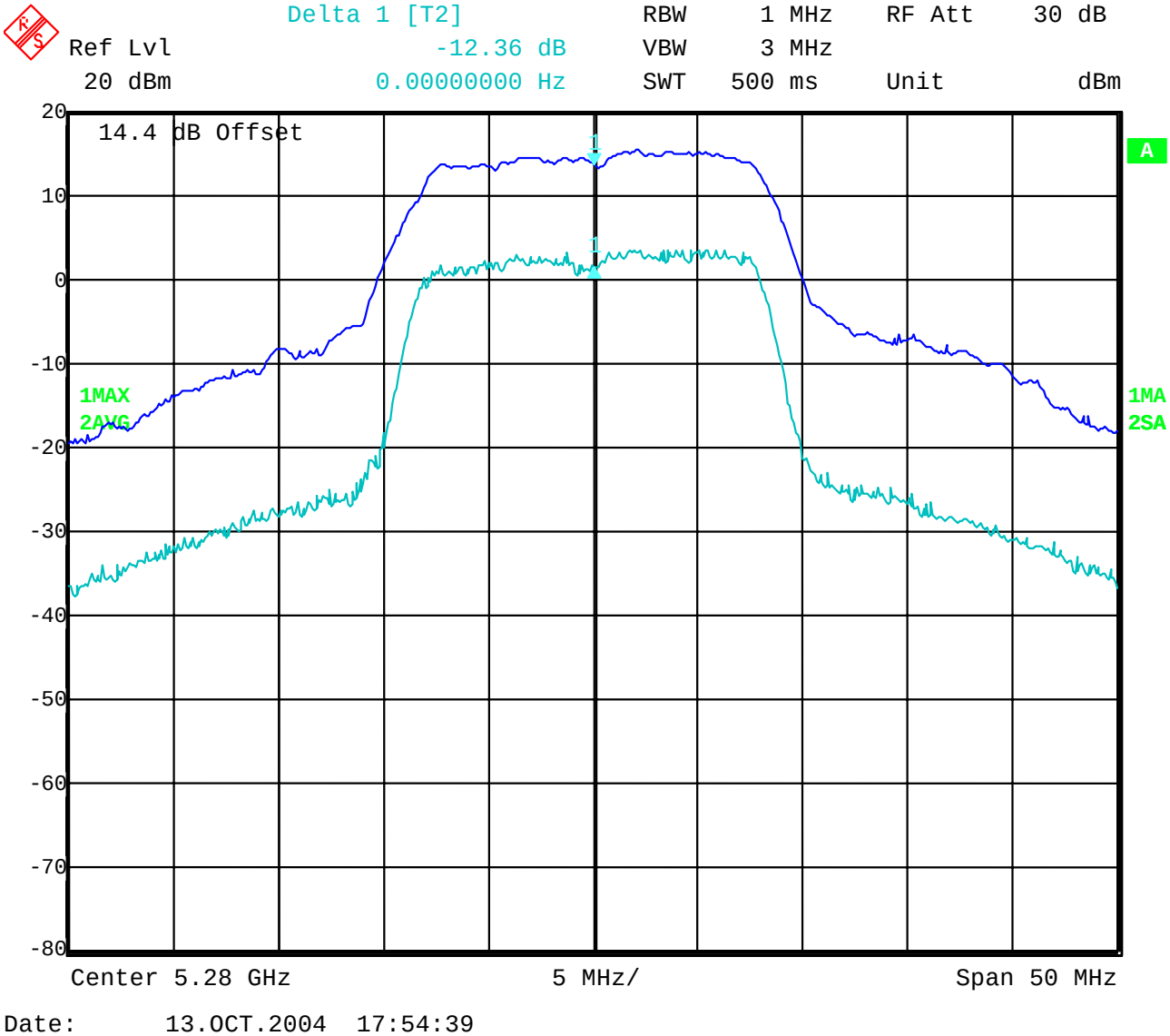


Test conditions		Spectral density		
Frequency [MHz]		60 dB corr.	Limit	
5280 MHz	-55.36 dBm/Hz	4.64dBm/MHz	11 dBm/MHz	Pass
5320 MHz	-53.30 dBm/Hz	6.70 dBm/MHz	11 dBm/MHz	Pass
Measurement uncertainity		±1dB		

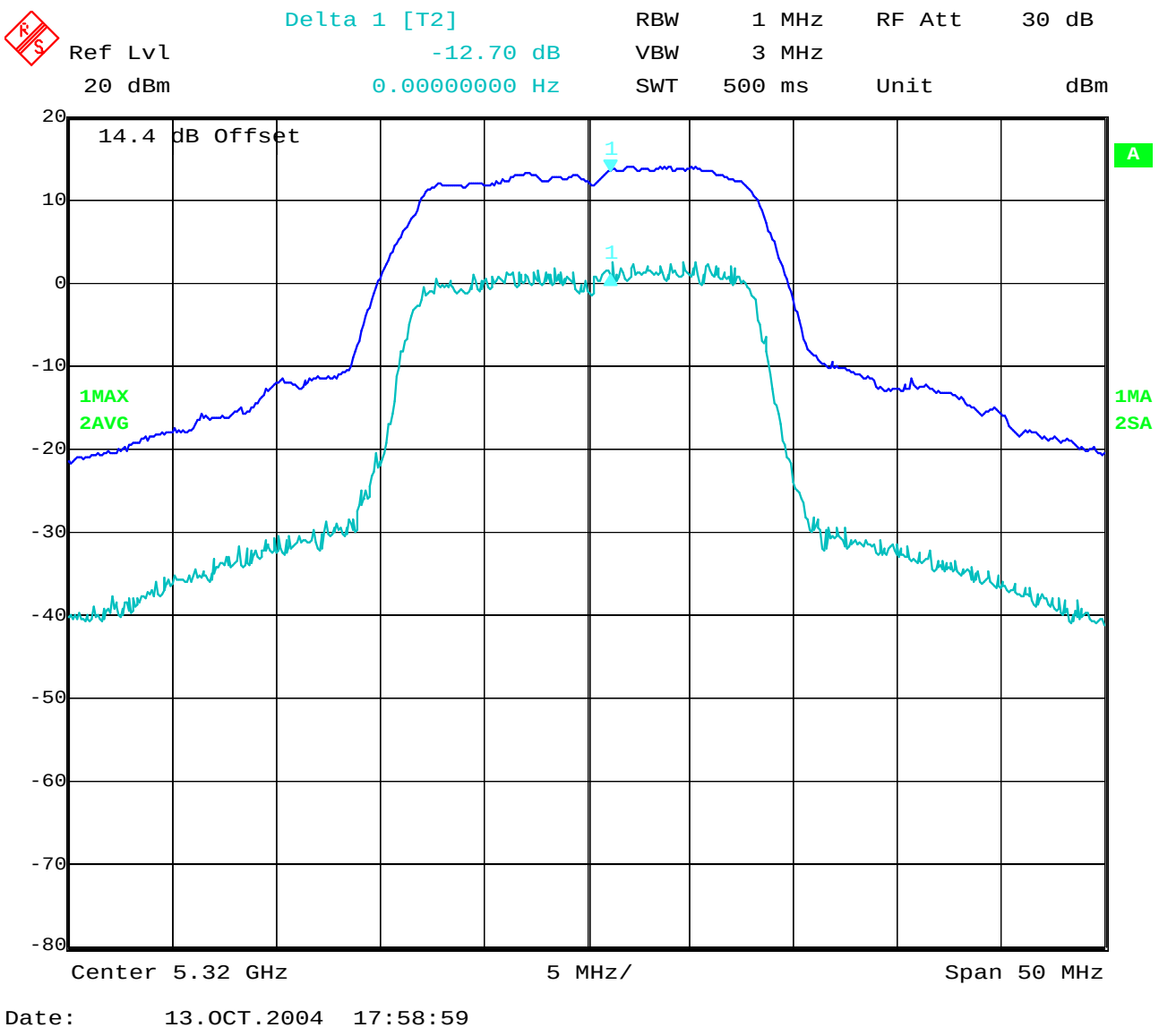
3.18 Ratio of Peak Excursion §15.407(a6)

Plot 1 : 5280 MHz

The plot shows directly the ratio between peak and average.



Plot 2: 5320 MHz

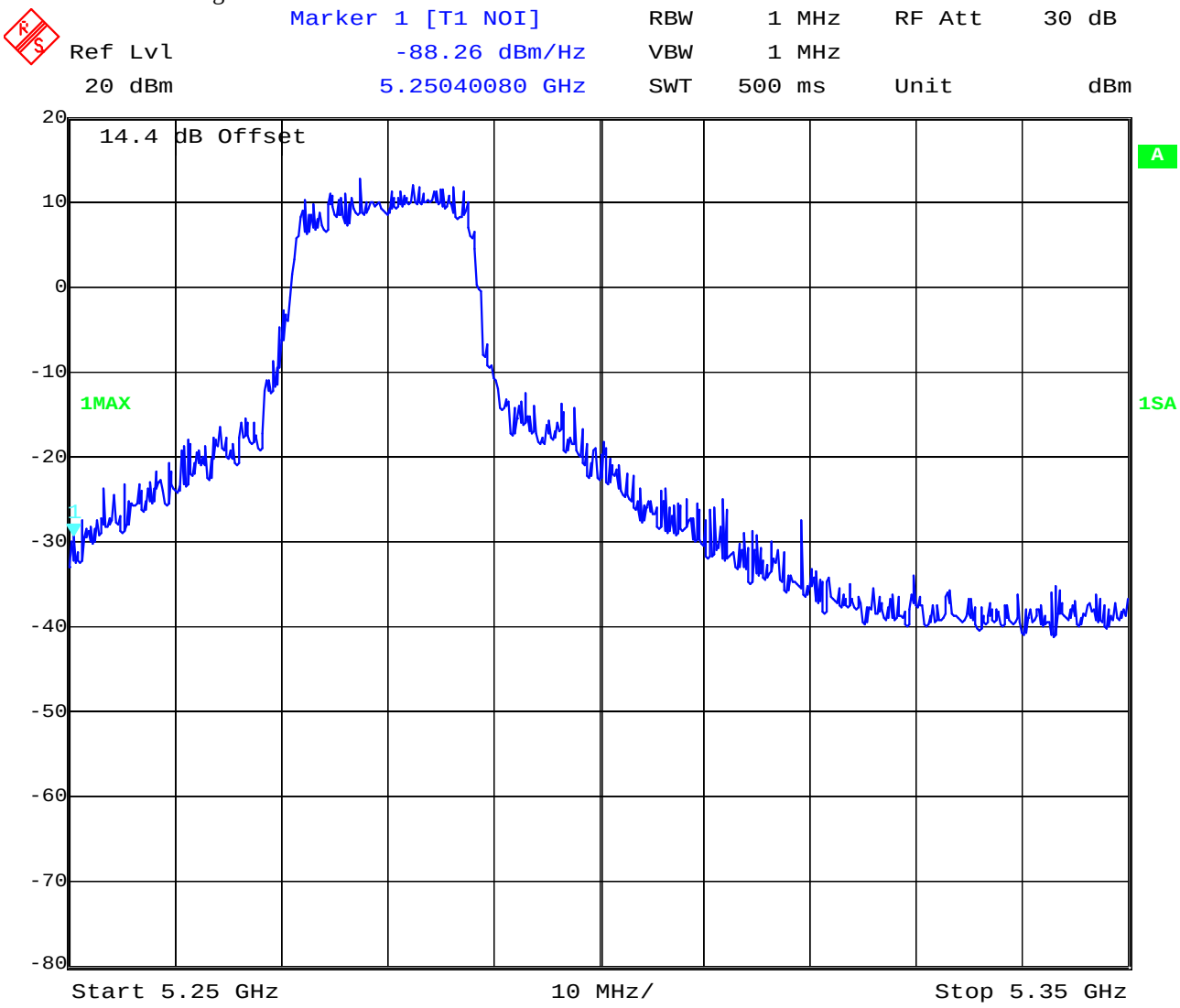


Results:

Test conditions		Ratio of peak excursion of the modulation envelope		
		result	Limit	
5280 MHz		12.4	13 dB	pass
5320 MHz		12.7	13 dB	pass
Measurement uncertainity		±1dB		

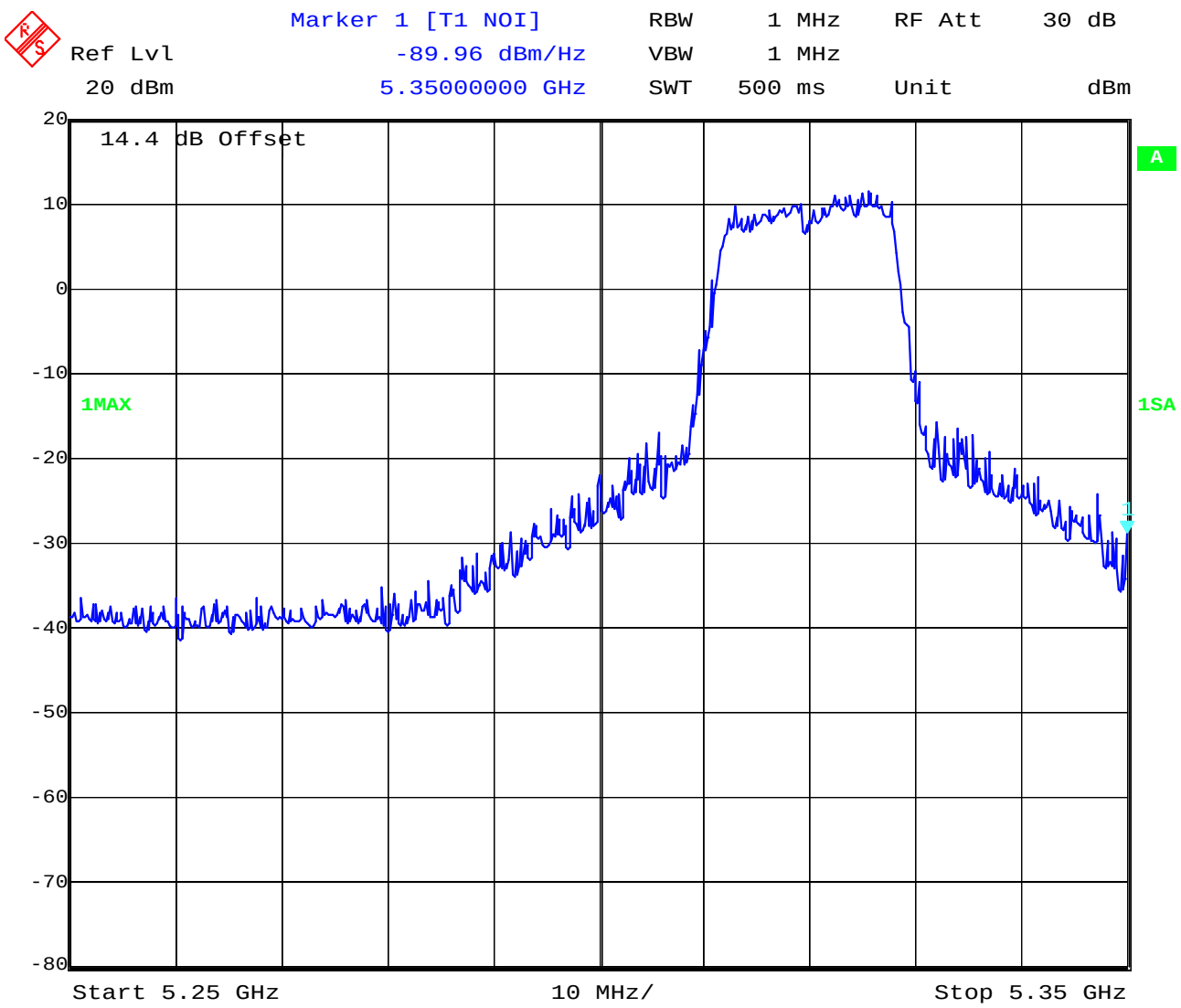
3.19 Undesirable emission limits at band edges 15.407 (b3)

Plot 1: lower band edge



Date: 13.OCT.2004 18:48:04
RBW / VBW : 1 MHz

Plot 2: upper band edge



Date: 13.OCT.2004 18:50:20
RBW / VBW : 10 MHz

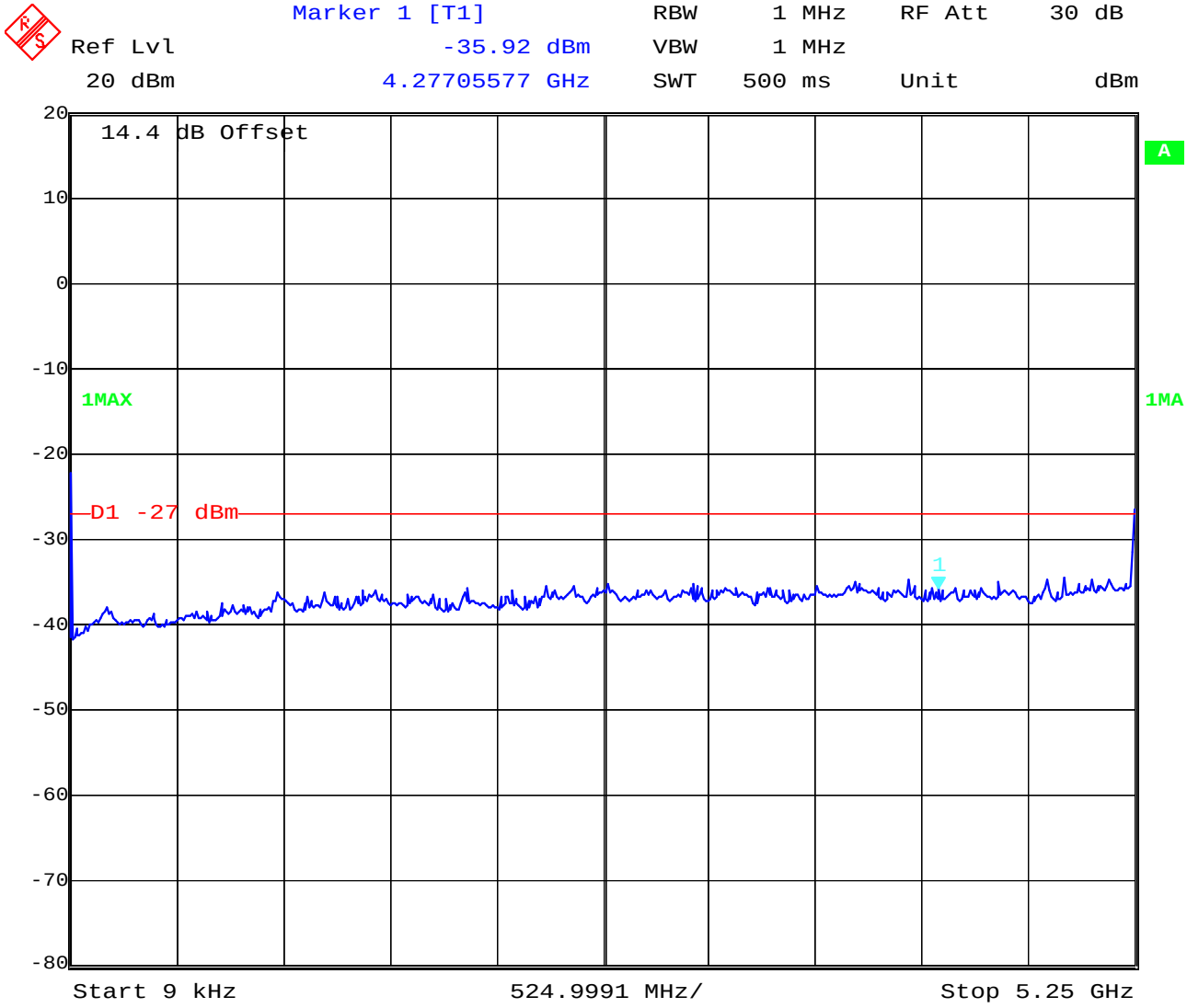
Limits: - outside of 5.15 – 5.35 GHz band -27 dBm/MHz

Result: - lower band edge -88.3 dBm/Hz + 60 dB = -28.3 dBm/MHz => pass
- upper band edge -90.0 dBm/Hz + 60 dB = -30.0 dBm/MHz => pass

-all frequencies more than 10 MHz above or below band edge < -27 dBm/MHz => pass

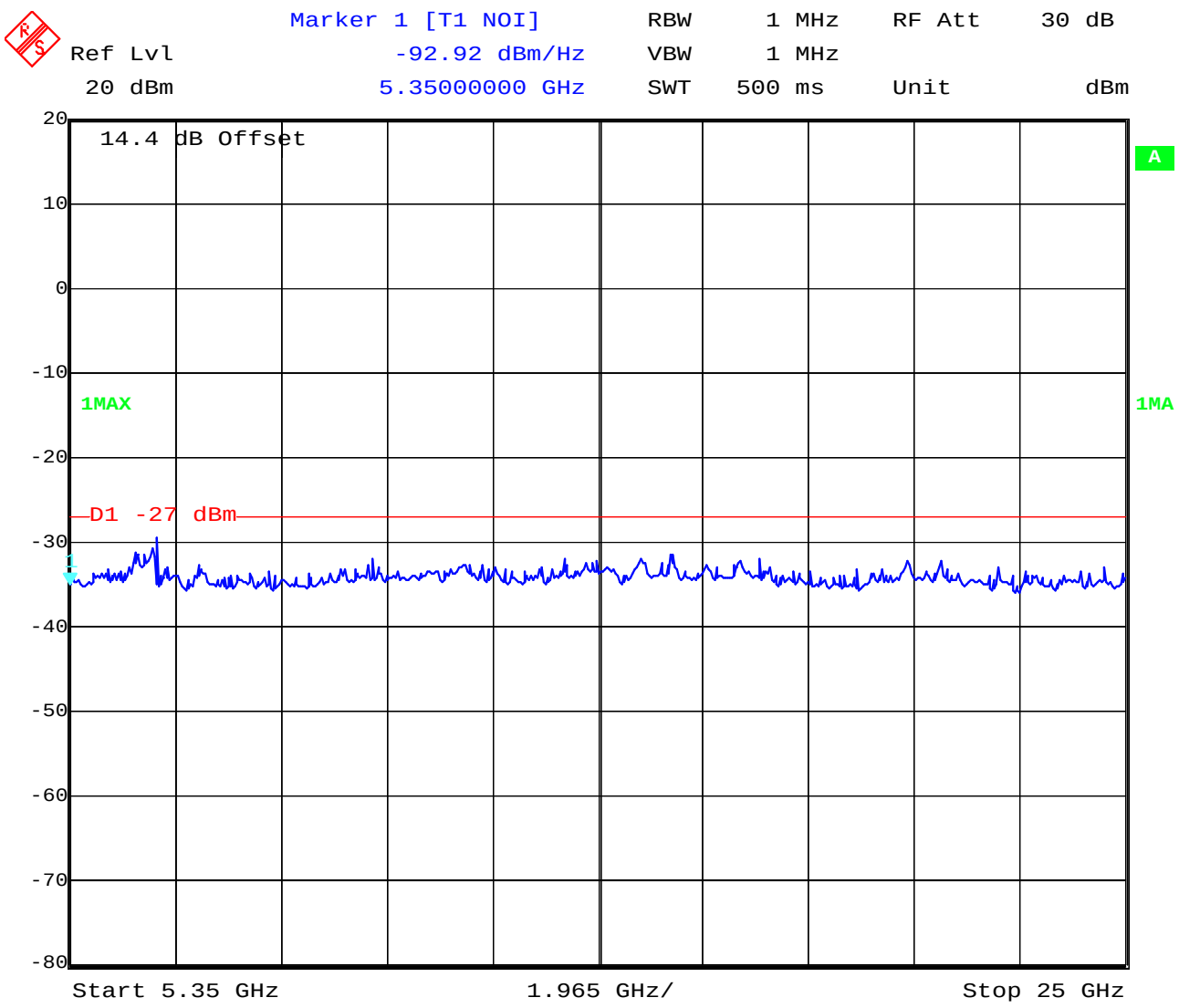
3.20 Spurious (conducted) 15.407 (b3)

Plot 1: 5280 MHz



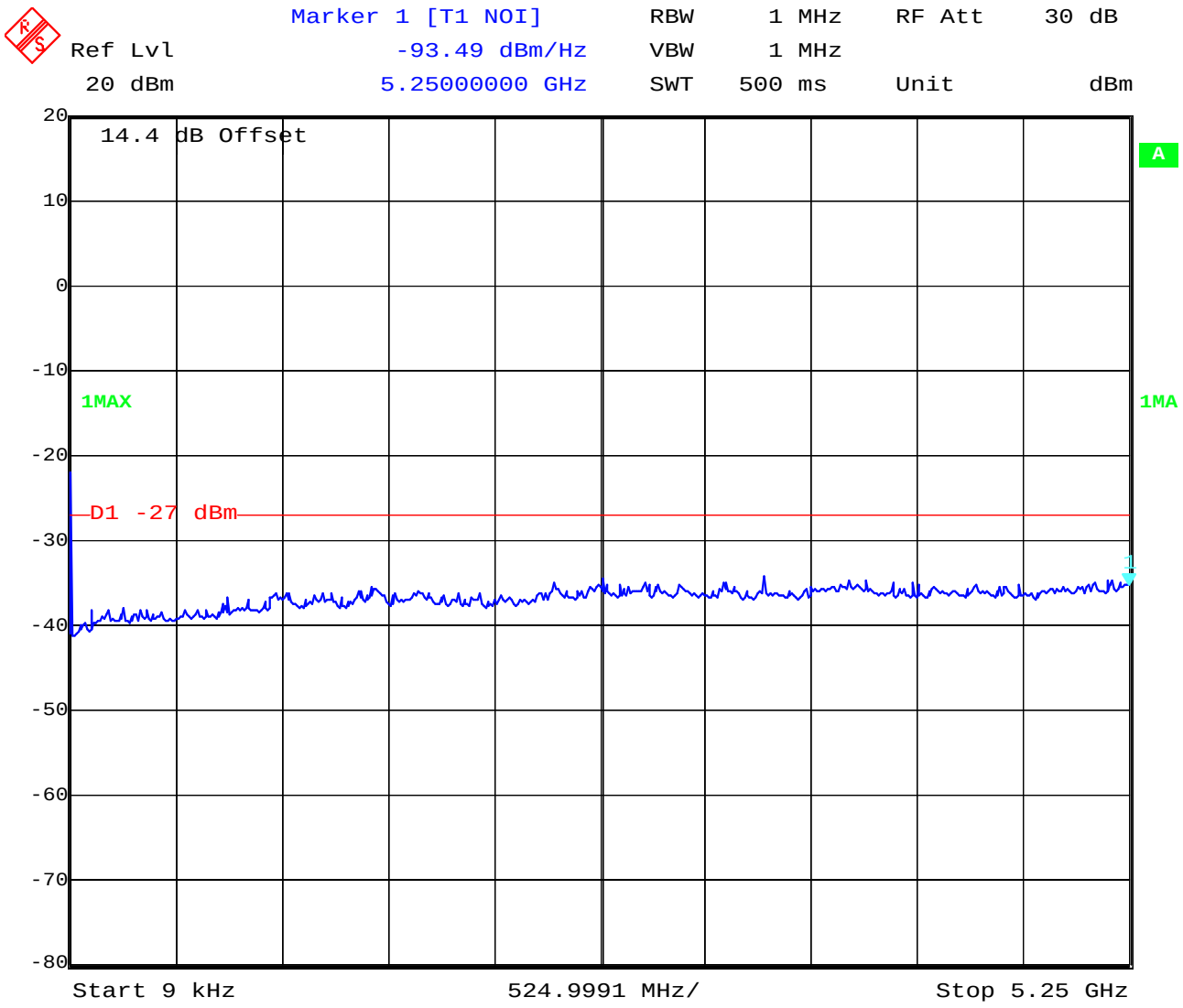
Date: 13.OCT.2004 18:46:35
RBW / VBW : 1 MHz

Plot 2: 5280 MHz



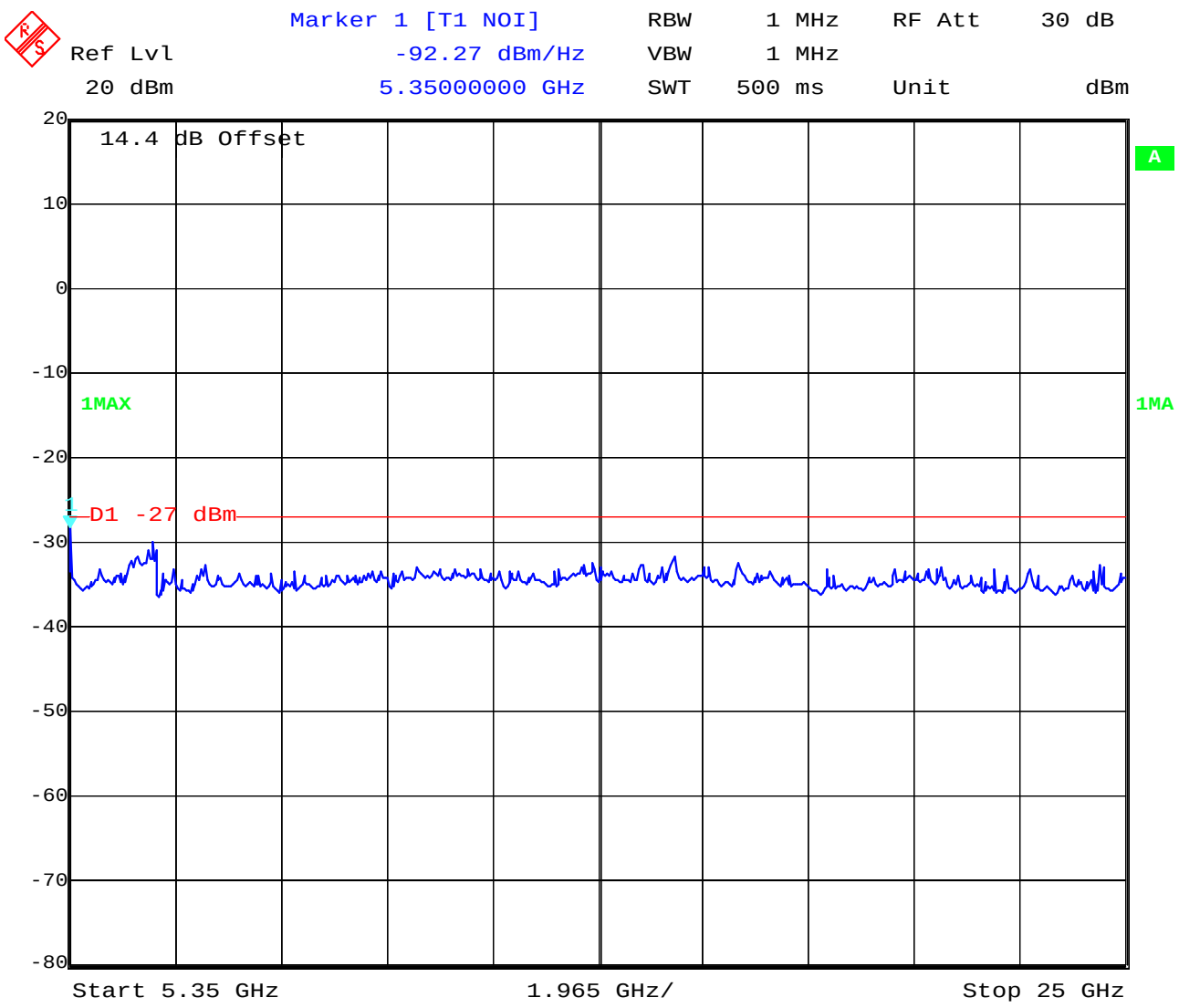
Date: 13.OCT.2004 18:29:36
RBW / VBW : 1 MHz

Plot 3: 5320 MHz



Date: 13.OCT.2004 18:51:20
RBW / VBW : 1 MHz

Plot 4: 5320 MHz



Date: 13.OCT.2004 18:29:56
RBW / VBW : 1 MHz

The measurements were performed up to 60 GHz. There were no peaks found.

Spurious emissions conducted

Result & Limits

Emission Limitations					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emmision power	actual attenuation below frequency of operation [dB]	results
5280			30 dBm	-	Operating frequency
no	peaks	found		< 20 dB below	limit
5320			30 dBm	-	Operating frequency
no	peaks	found		< 20 dB below	limit
Measurement uncertainty		± 3dB			

RBW : 1 MHz VBW: 1 MHz

Under normal test conditions only	In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Note: For emissions that fall into restricted bands you find the radiated emissions later in the report.

3.21 Max. peak output power (radiated) §15.407 (a) (2)

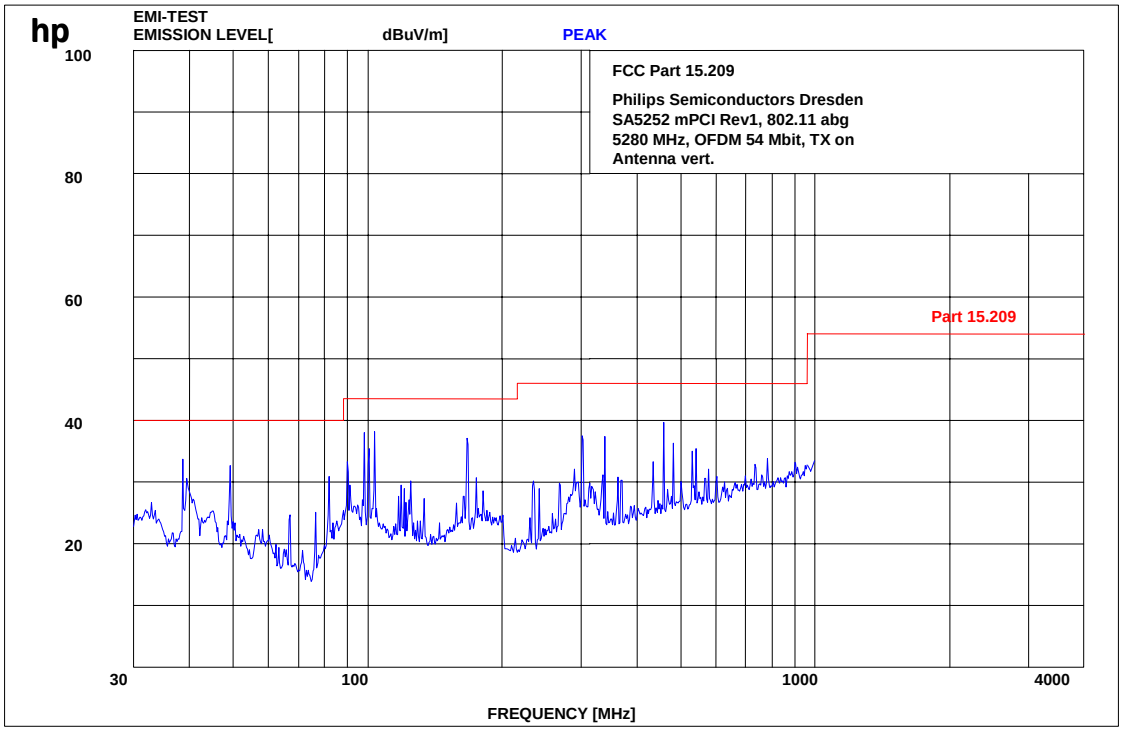
Results:

Test conditions **radiated** Frequency [MHz]		Max. peak output power EIRP [dBm]		
		5280 MHz		5320 MHz
T_{nom}	V_{nom}	15.9		14.7
Measurement uncertainty		±3dB		

Test conditions **conducted** Frequency [MHz]		Max. peak output power EIRP [dBm]		
		5280 MHz		5320 MHz
T_{nom}	V_{nom}	17.8		16.2
Measurement uncertainty		±3dB		

3.22 Spurious Emissions - radiated (Transmitter) §15.209

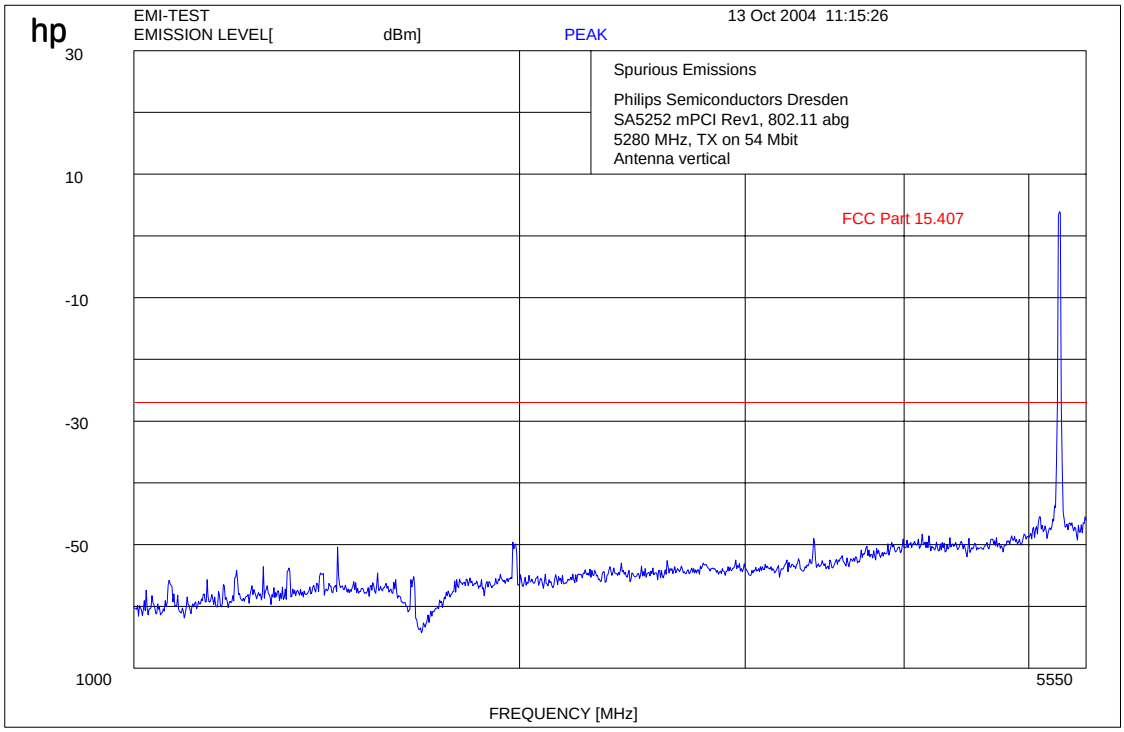
Plot 1: 0.03 – 1 GHz vertical (lowest channel) (worst case)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

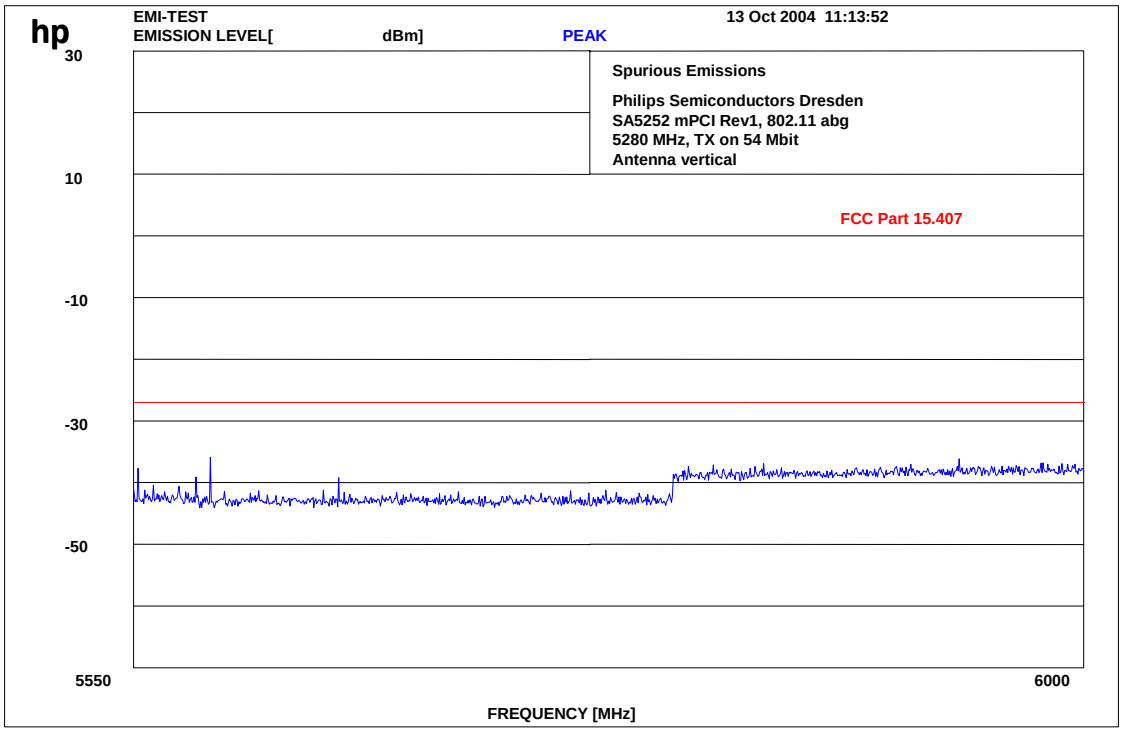
We remeasured all peaks below 1 GHz with average filters. All values were > 15 dB below limit.

Plot 2: 1 GHz – 5.55 GHz (lowest channel) (worst case)



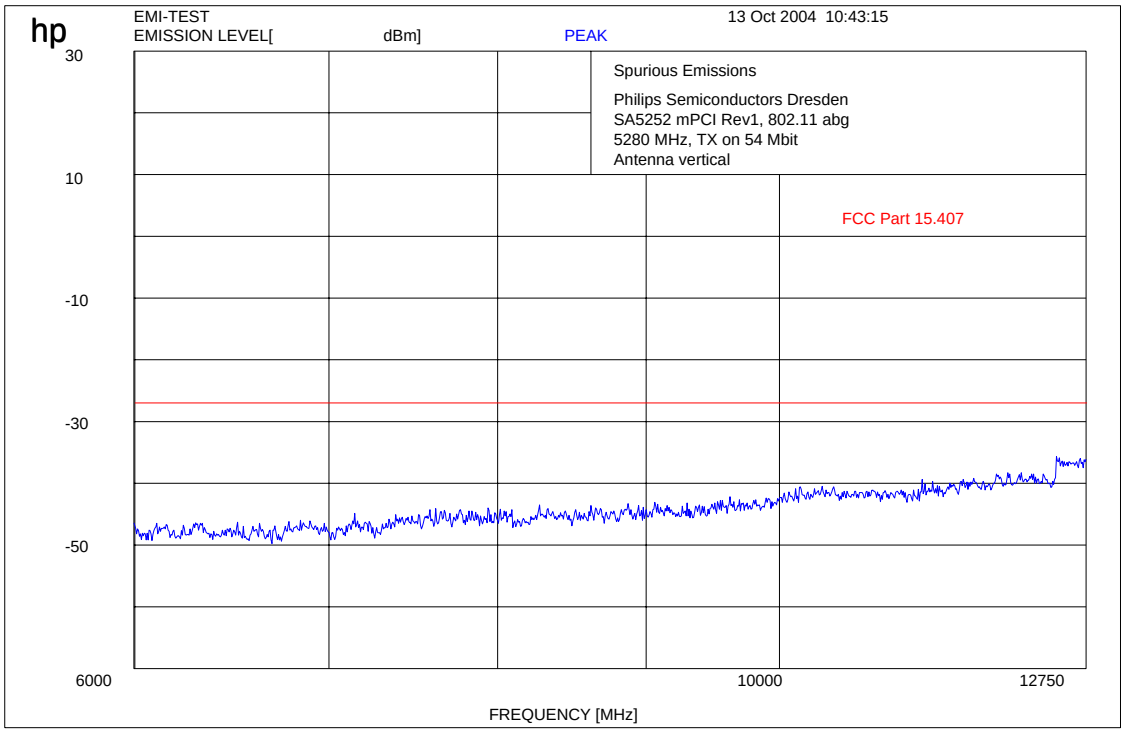
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 3: 5.55 GHz – 6 GHz (lowest channel) (worst case)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

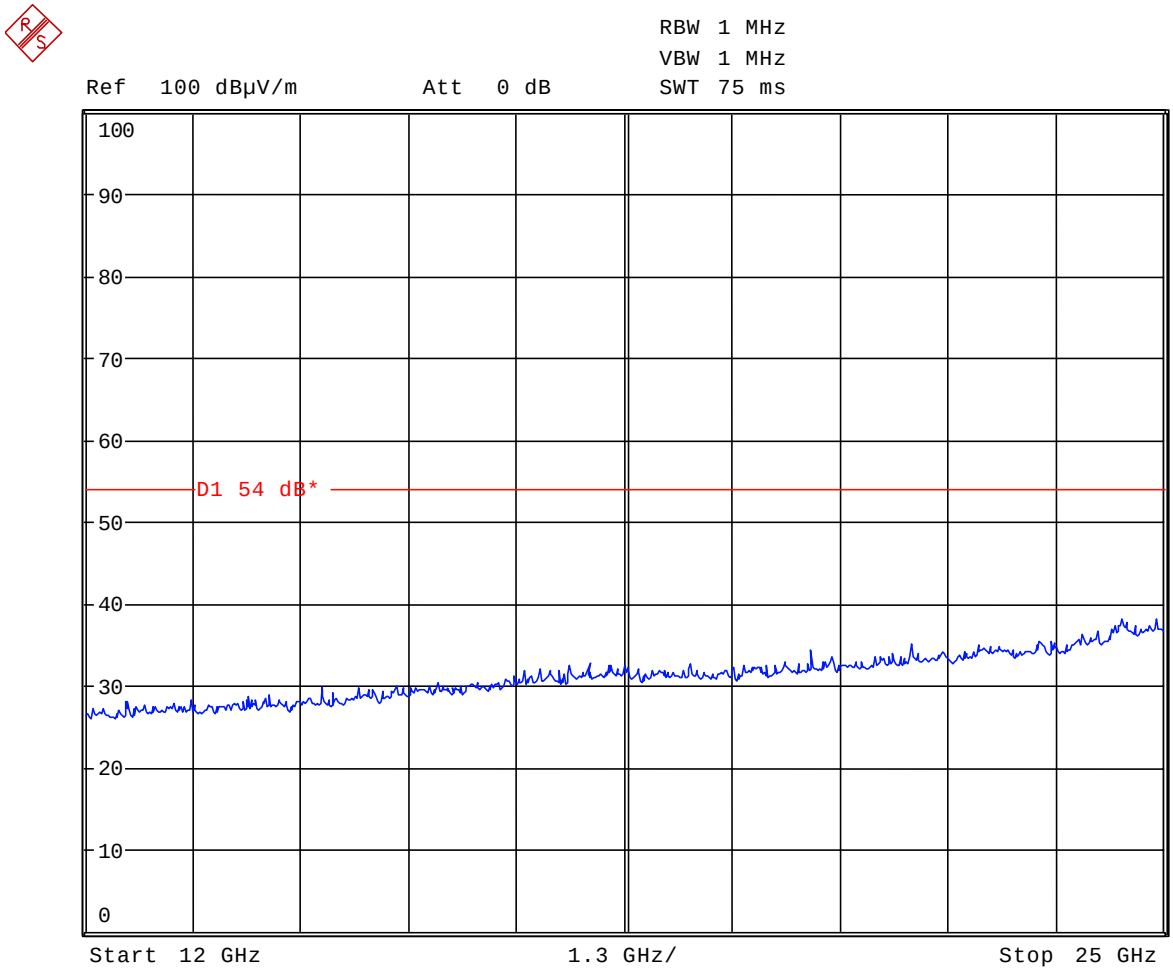
Plot 4: 6 GHz – 12 GHz (lowest channel) (worst case)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 5: -25 GHz vertical (lowest channel) (worst case)

Valid for all measured channels.

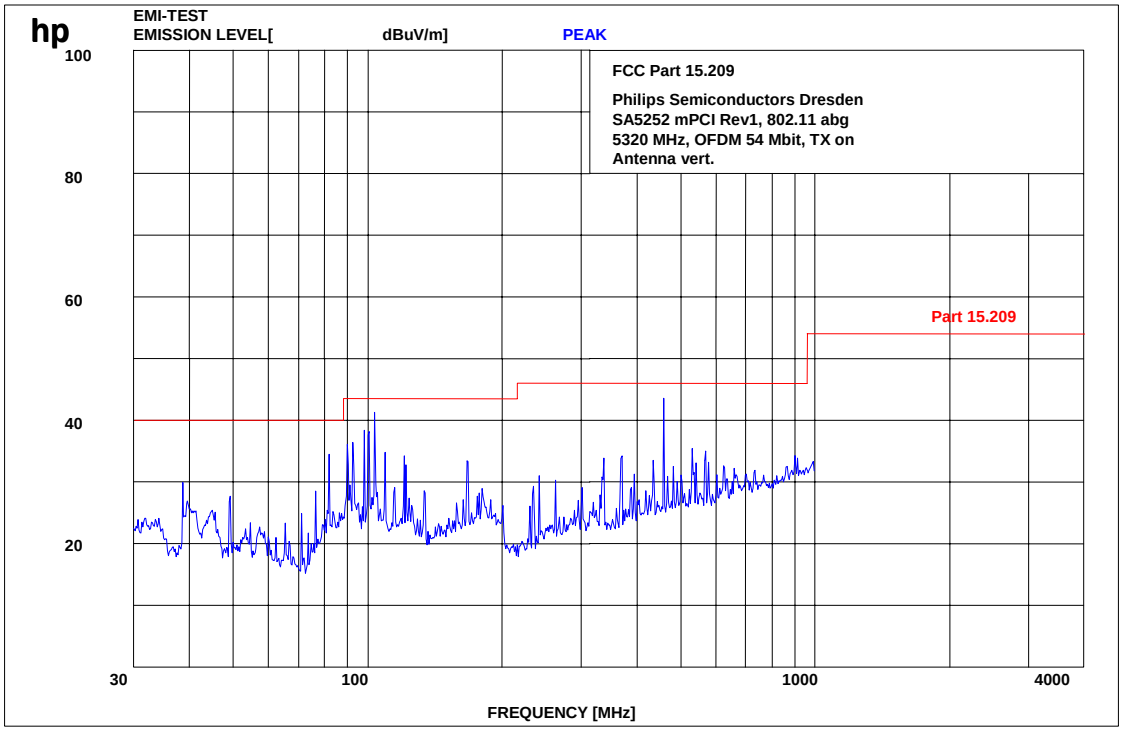


f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

We also measured with external mixers up to 60 GHz.

There were no peaks found.

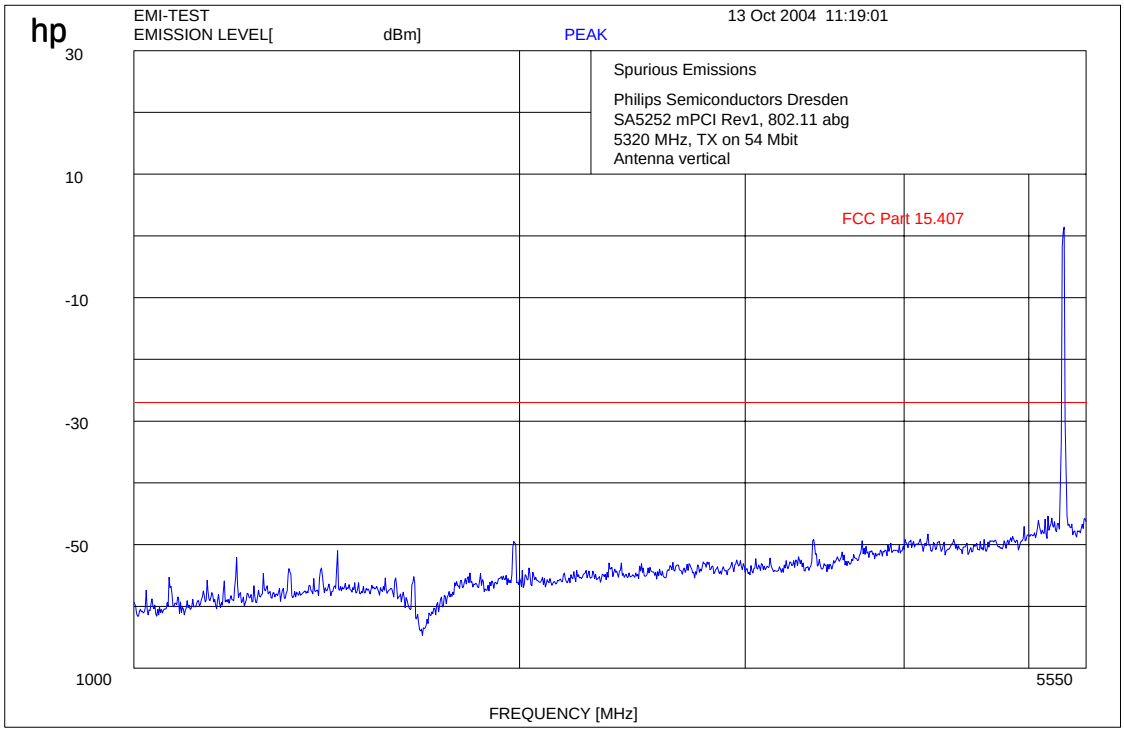
Plot 6: 30 MHz to 1 GHz (highest channel)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

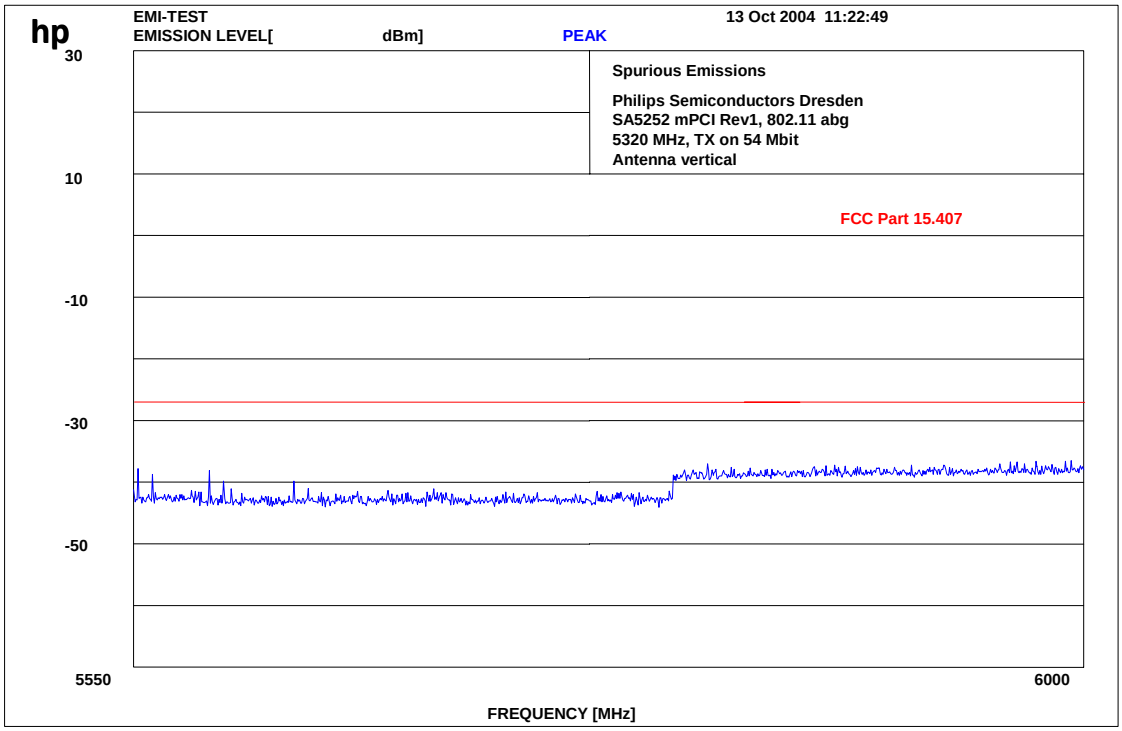
We remeasured all peaks below 1 GHz with average filters. All values were > 15 dB below limit.

Plot 7: 1 GHz to 5.55 GHz (highest channel)



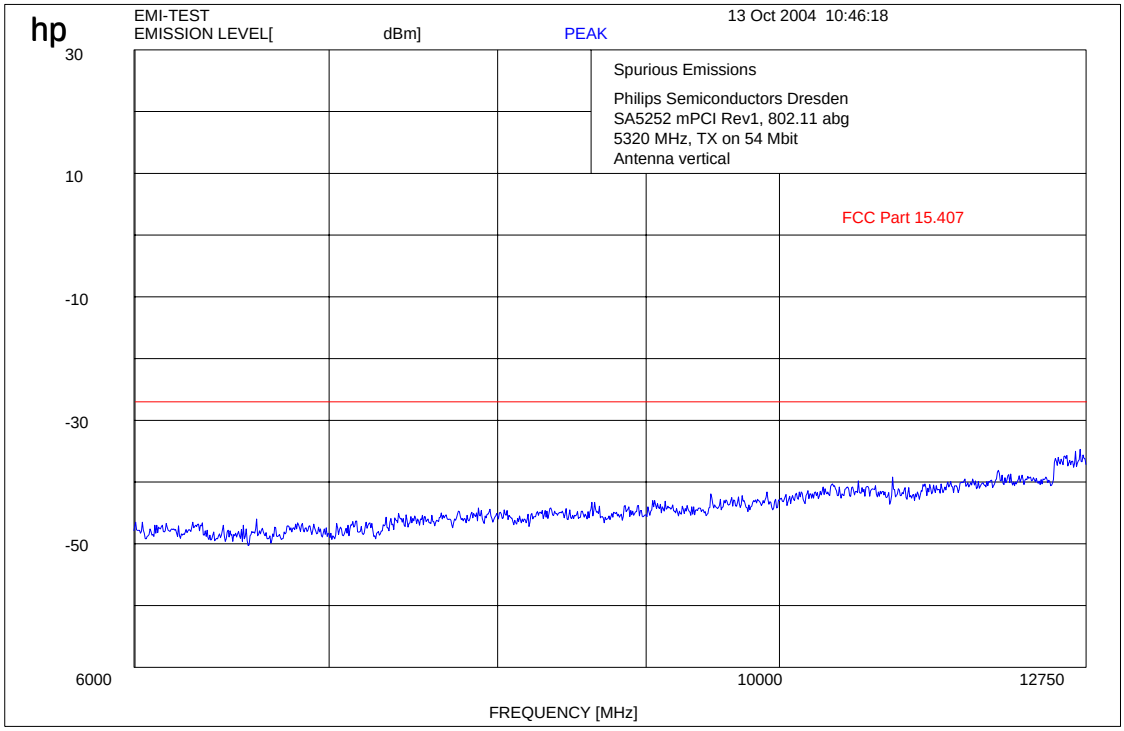
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 8: 5.55 GHz to 6 GHz (highest channel)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

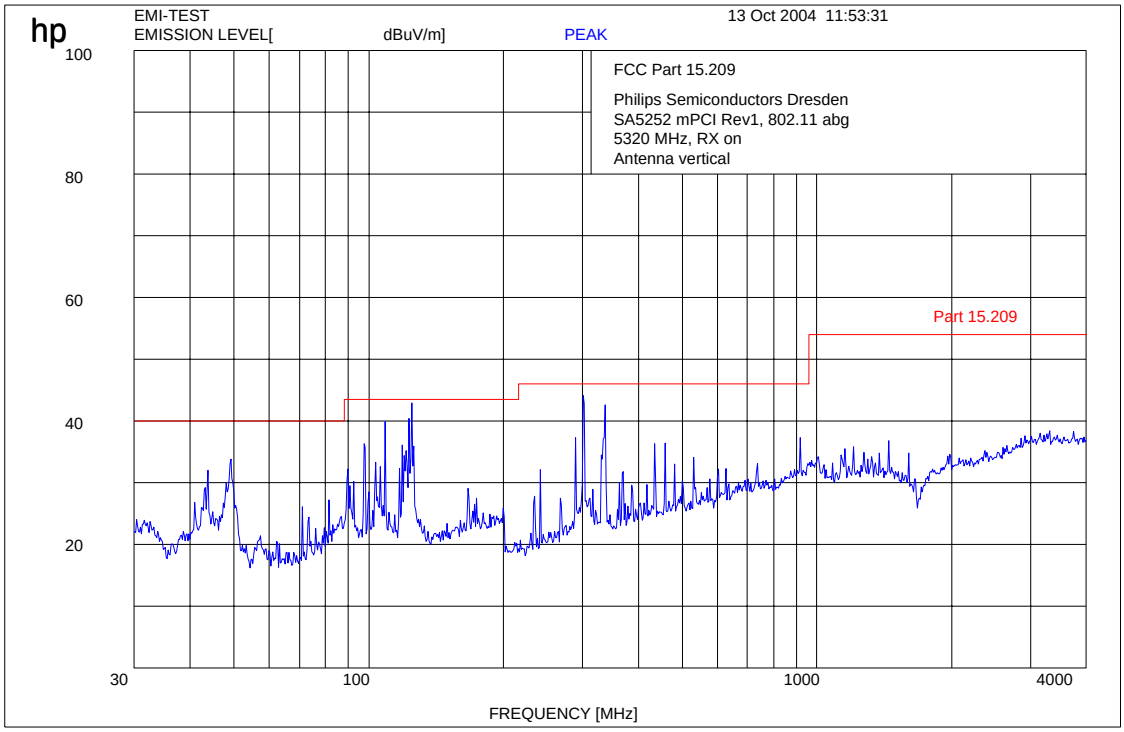
Plot 9: 6 GHz to 12 GHz (highest channel)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

3.23 Spurious emissions radiated (RX) 15.209

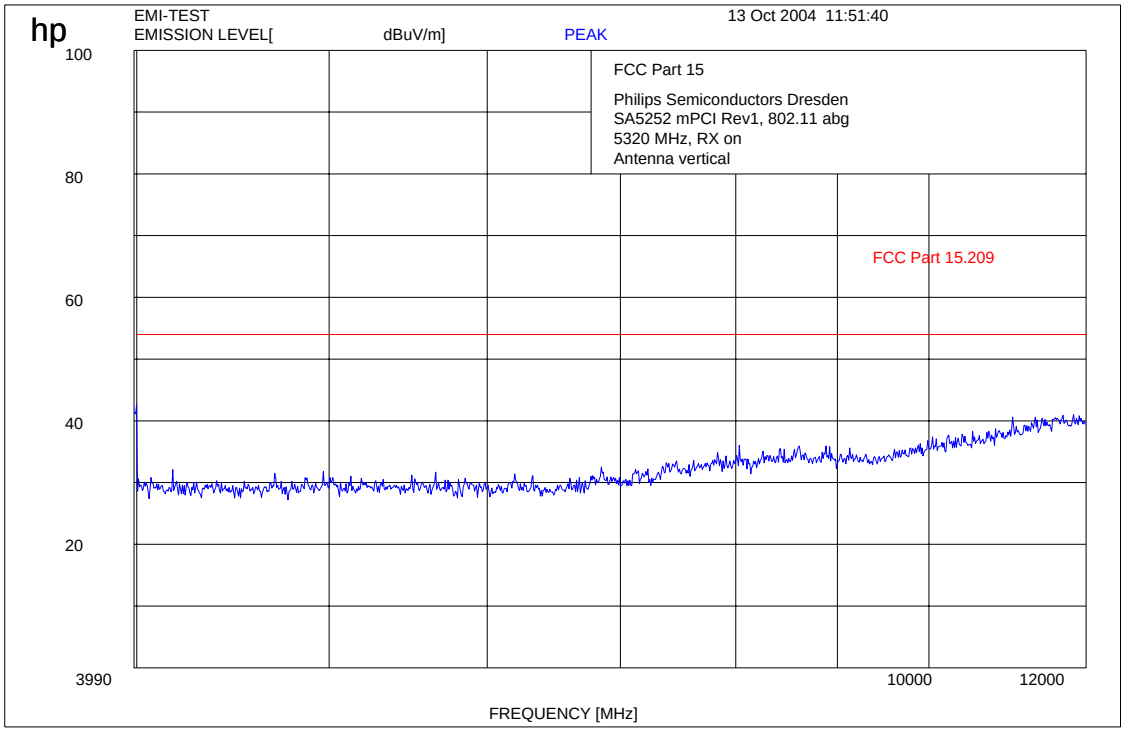
Plot 1: 30 to 4000 MHz



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

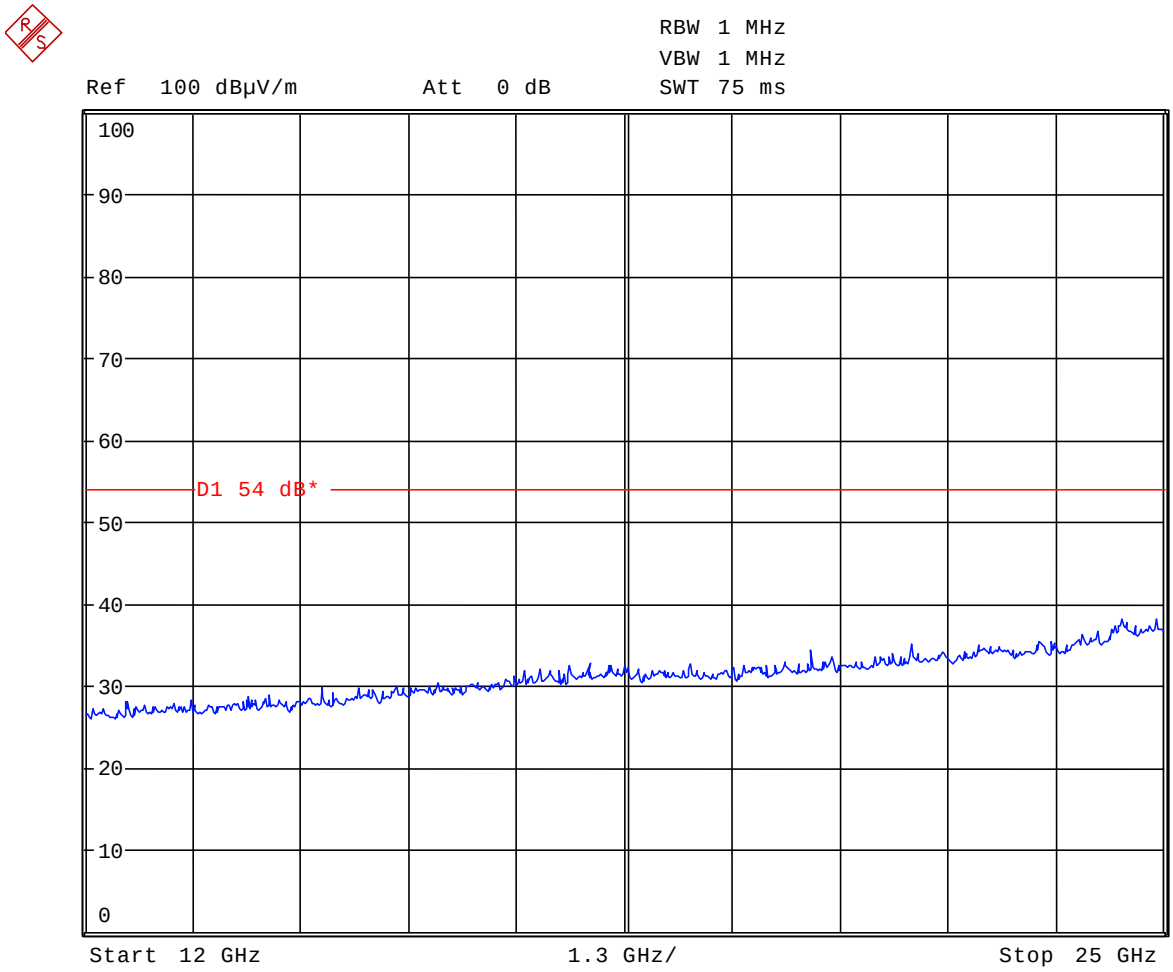
The peak at 123 MHz was 42.7 dBµV/m peak, the average value was 38.6 dBµV/m at 3m.
The peak at 336 MHz was 42.0 dBµV/m peak, the average value was 33.5 dBµV/m at 3m.
All other peaks were averaged > 15 dB below limit.

Plot 2: 4 GHz to 12 GHz



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 3: - 25 GHz



The measurements were performed up to 60 GHz. There were no peaks found.

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Limits: § 15.209

Frequency [MHz]	Field strength [µV/m]	Measurement distance (m)
30 - 88	100 (40 dBµV/m)	3
88 - 216	150 (43.5 dBµV/m)	3
216 - 960	200 (46 dBµV/m)	3
above 960	500 (54 dBµV/m)	3

Results:

Spurious Emissisons level [µV/m]								
CH 1 / 2 / 3								
f[MHz]	Detector	Level [µV/m]	f[MHz]	Detector	Level [µV/m]	f[MHz]	Detector	Level [µV/m]
123	AV	38.6						
336	AV	33.5						
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz
see above plots

Measurement distance see table

Limits : § 15.109 / 209

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
30 - 88	100 (40 dBµV/m)	3
88 - 216	150 (43.5 dBµV/m)	3
216 - 960	200 (46 dBµV/m)	3
above 960	500 (54 dBµV/m)	3

3.24 Spurious Emissions - radiated <30 MHz §15.109

See page 49.

Limits:

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30 / 29.5 dBµV/m	30
30 - 88	100 / 40 dBµV/m	3
88 - 216	150 / 43.5 dBµV/m	3
216 - 960	200 / 46 dBµV/m	3
above 960	54 dBµV/m	3

3.25 Conducted Emissions <30 MHz §15.107/207

See page 50:

Limits :

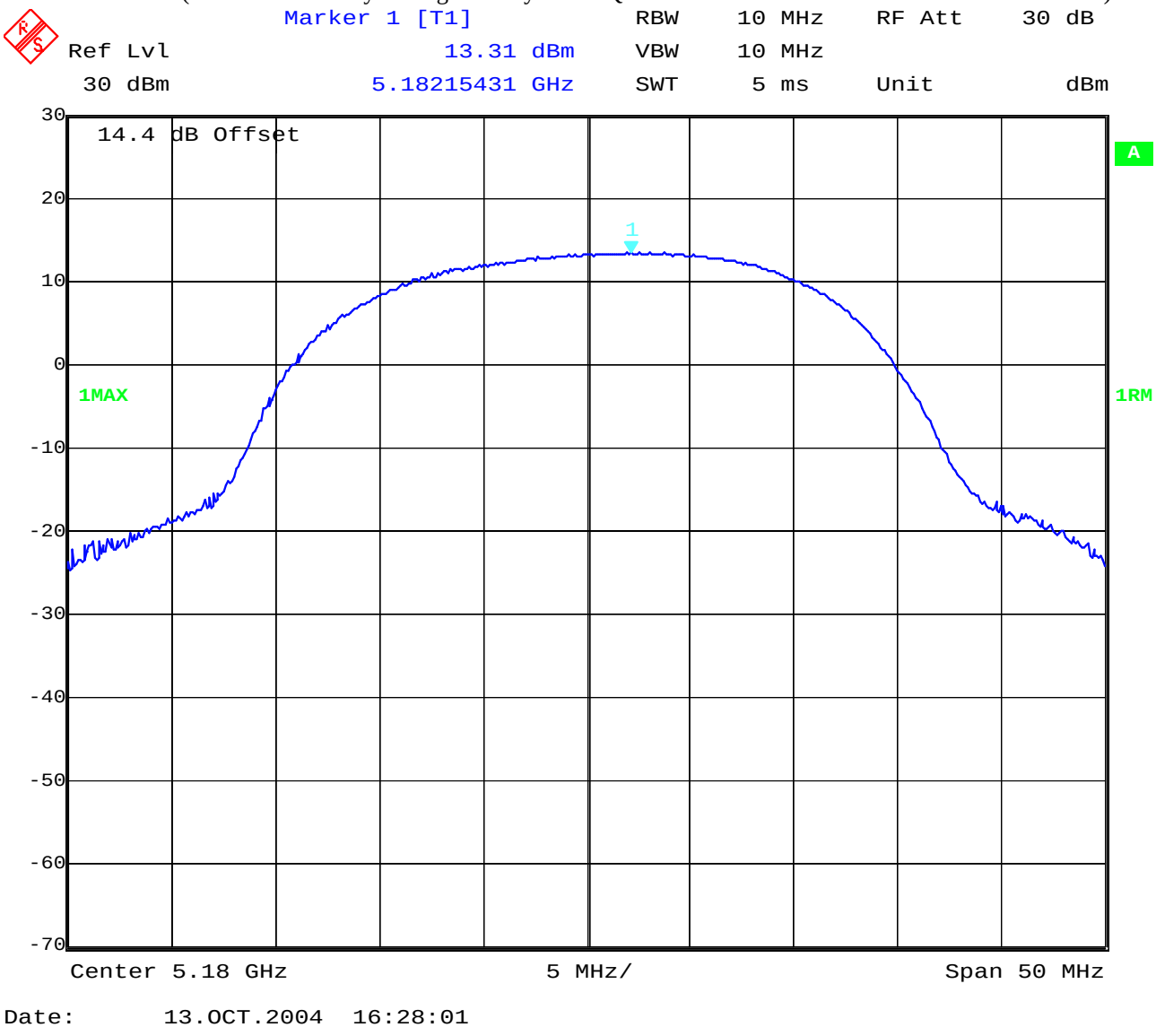
Under normal test conditions only	See plots

Frequency range of the sample : 5150 to 5250 MHz

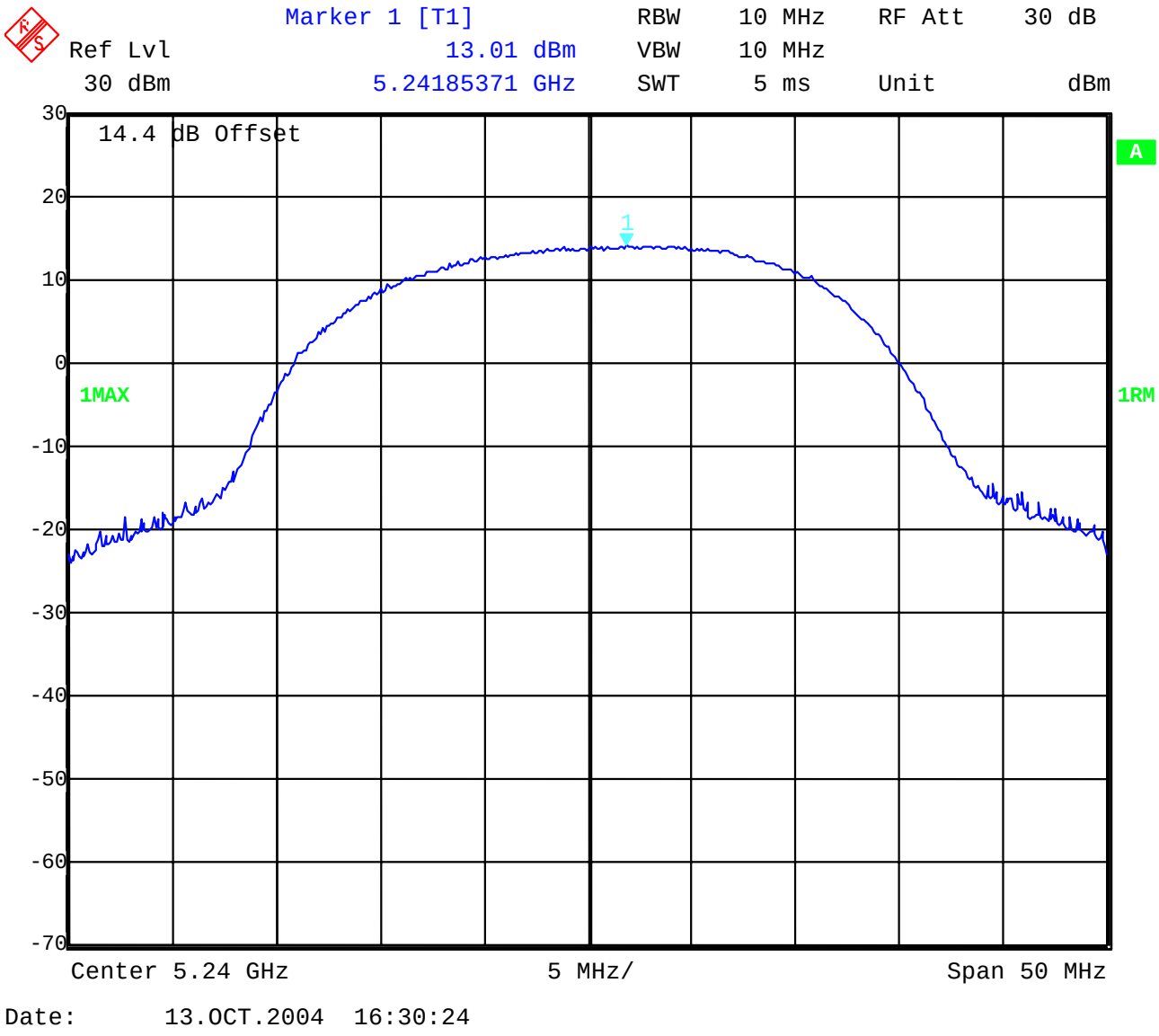
3.26 Peak Transmit Power §15.407a(1)+(4)

True RMS

Plot 1: 5180 MHz (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz with a true RMS filter)



Plot 2: 5240 Mhz (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



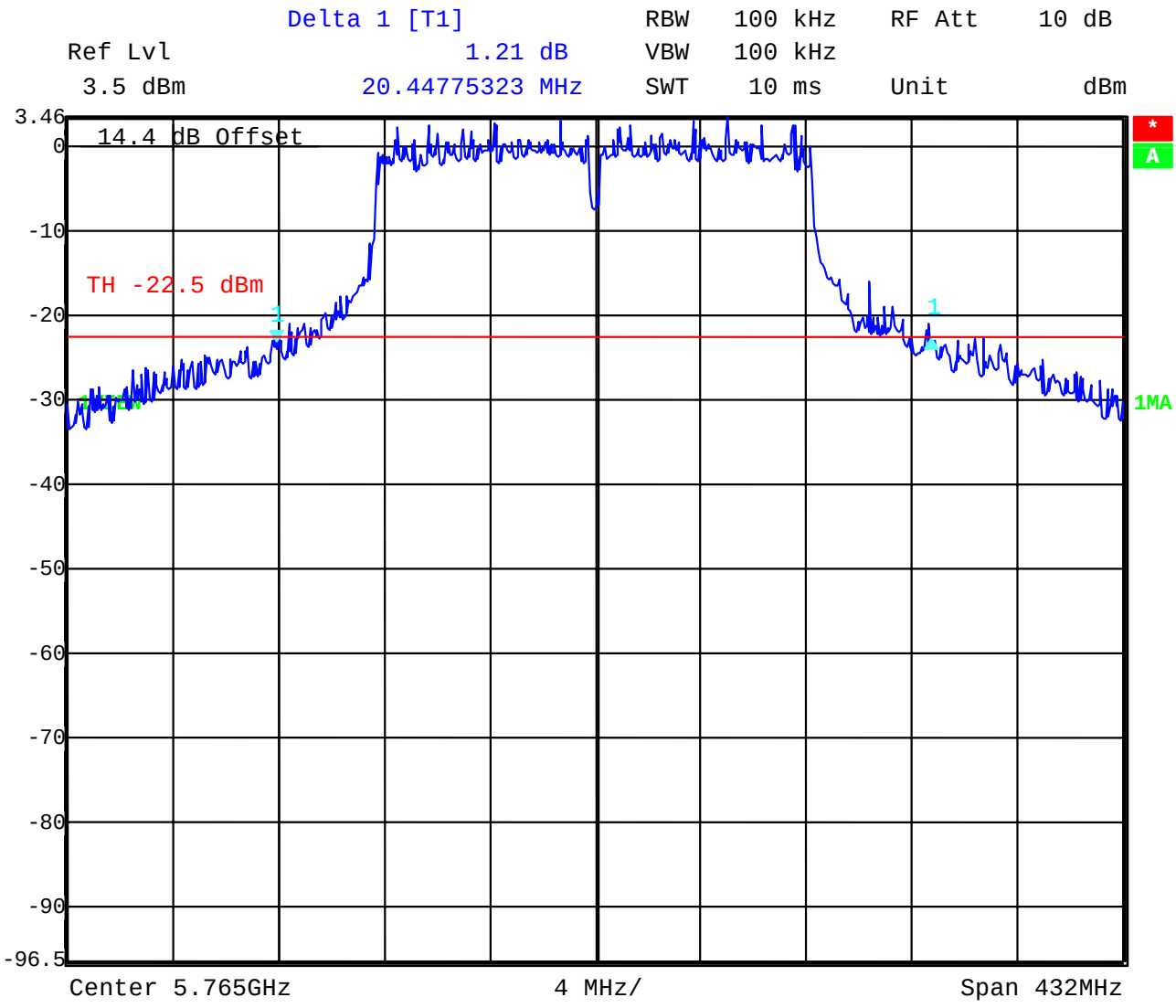
As the OBW of the signal is ~20 MHz and the used measuring BW is 10 MHz we have a correction factor of 3 dB.

Results: **Plot 1: Peak transmit power with true RMS filter : 13.3 dBm + 3dB = 16.3 dBm**
Plot 2: Peak transmit power with true RMS filter : 13.1 dBm + 3dB = 16.1 dBm

Limit: **17 dBm or 4 dBm + 10log B (26-dB emission BW)**

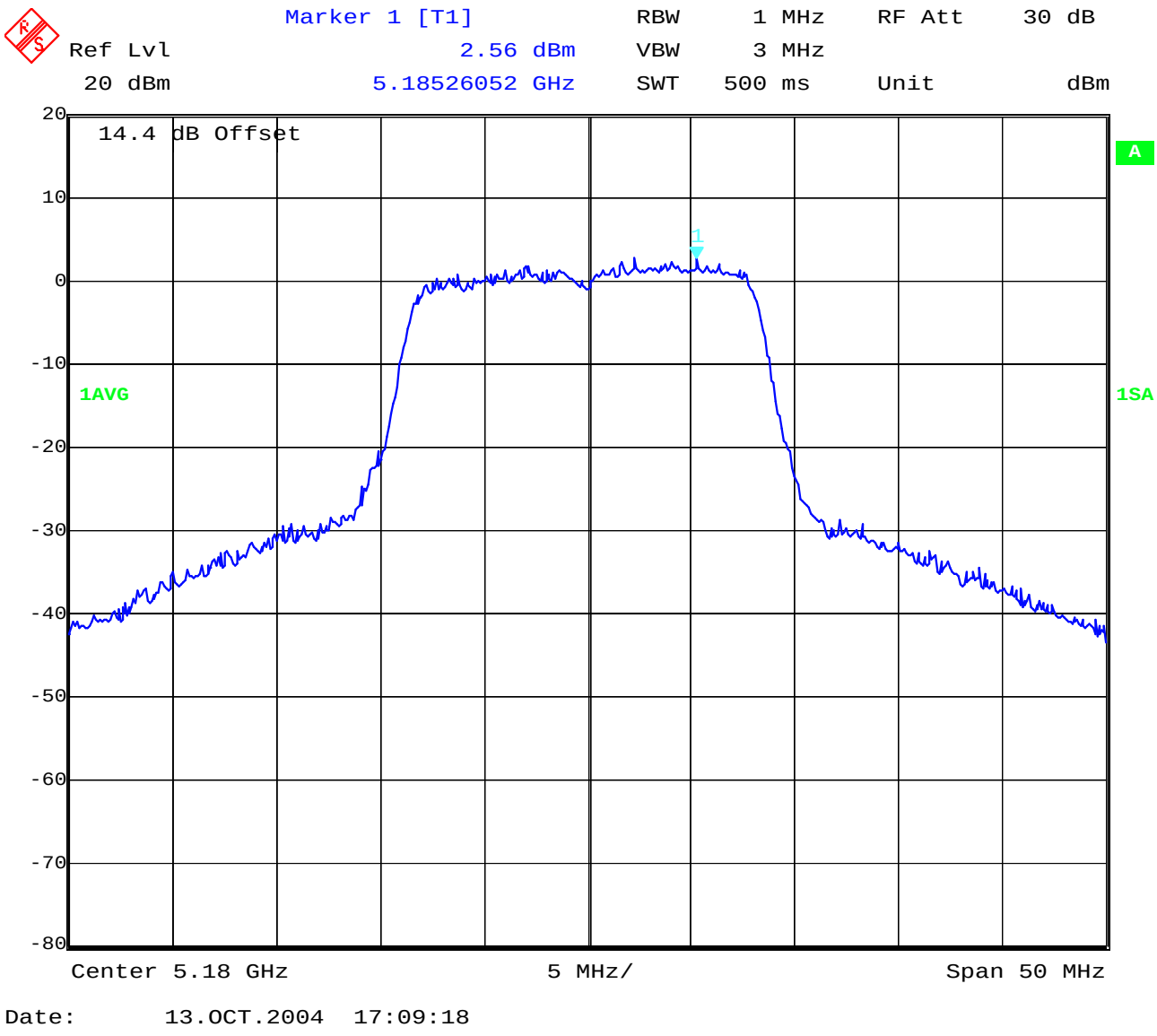
This plot shows the 26 dB BW of the OFDM signal. It is also about 20 MHz.

Correction factor is 3 dB according to 10 Mhz RBW/VBW of the analyzer

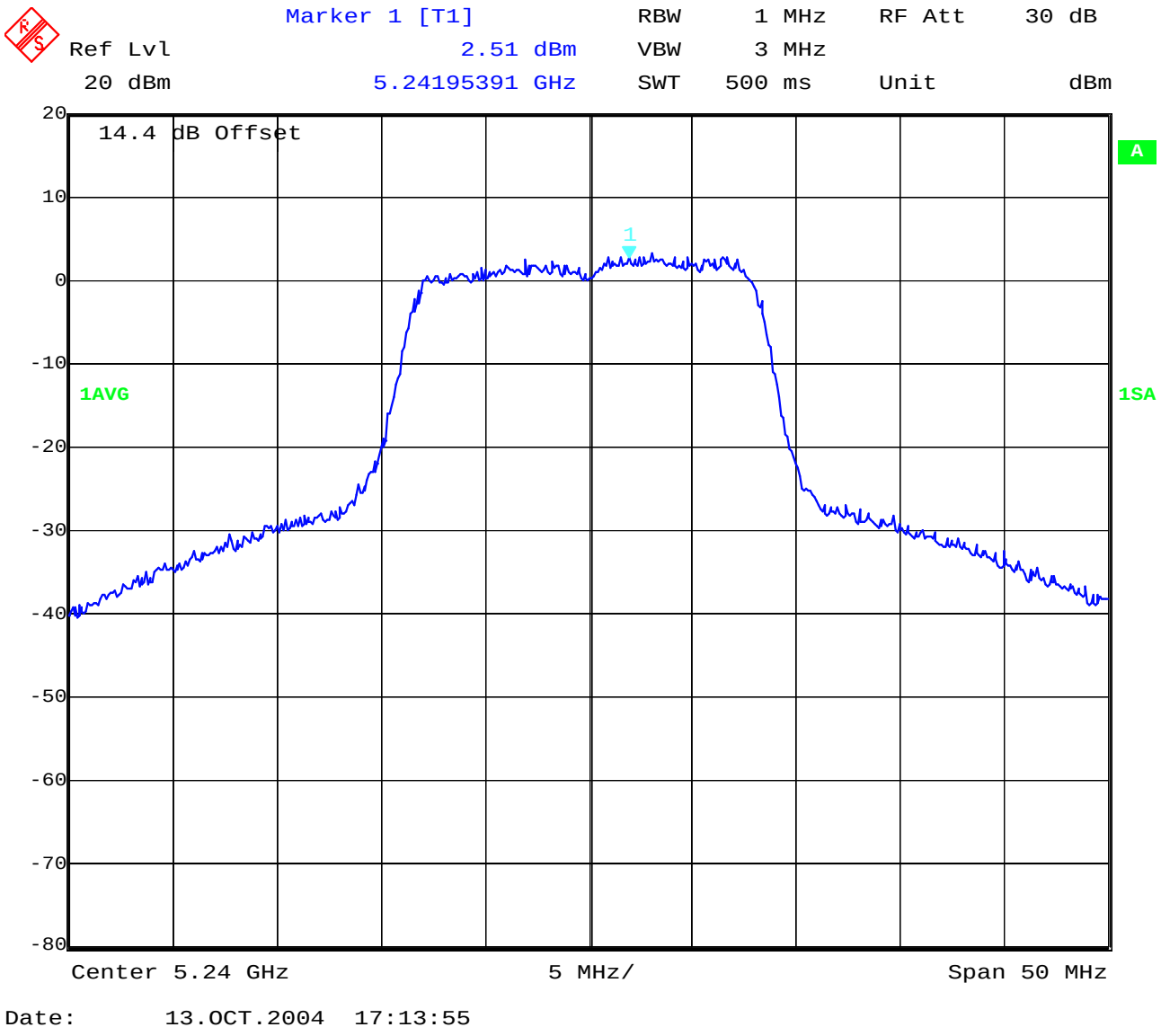


3.27 Spectral Density Conducted §15.407(a5)

Plot 1 : 5180 MHz



Plot 2: 5240 MHz

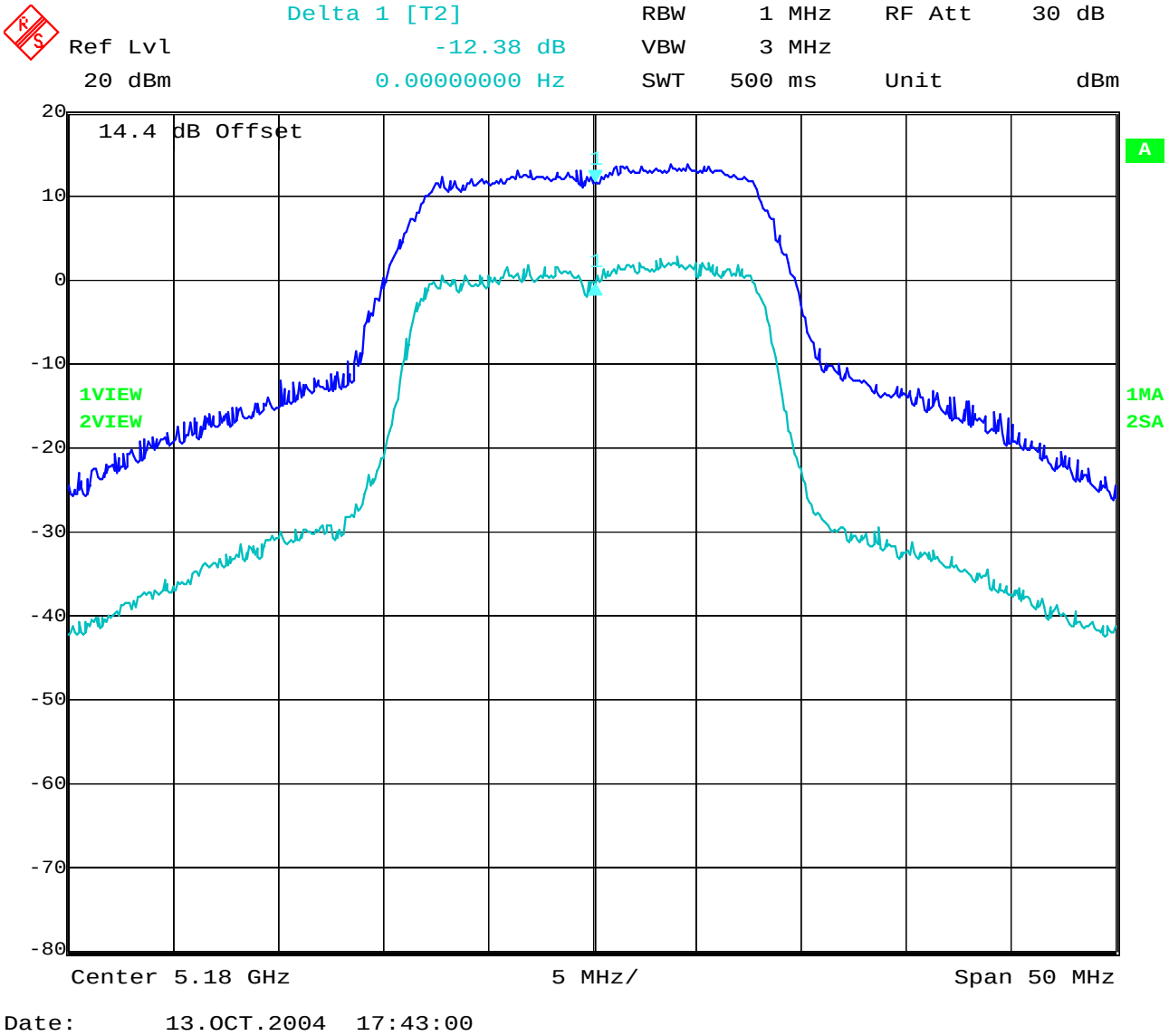


Test conditions		Spectral density		
Frequency [MHz]			Limit	
	5180 MHz	2.56 dBm	4 dBm	Pass
	5240 MHz	2.51 dBm	4 dBm	Pass
Measurement uncertainity		±1dB		

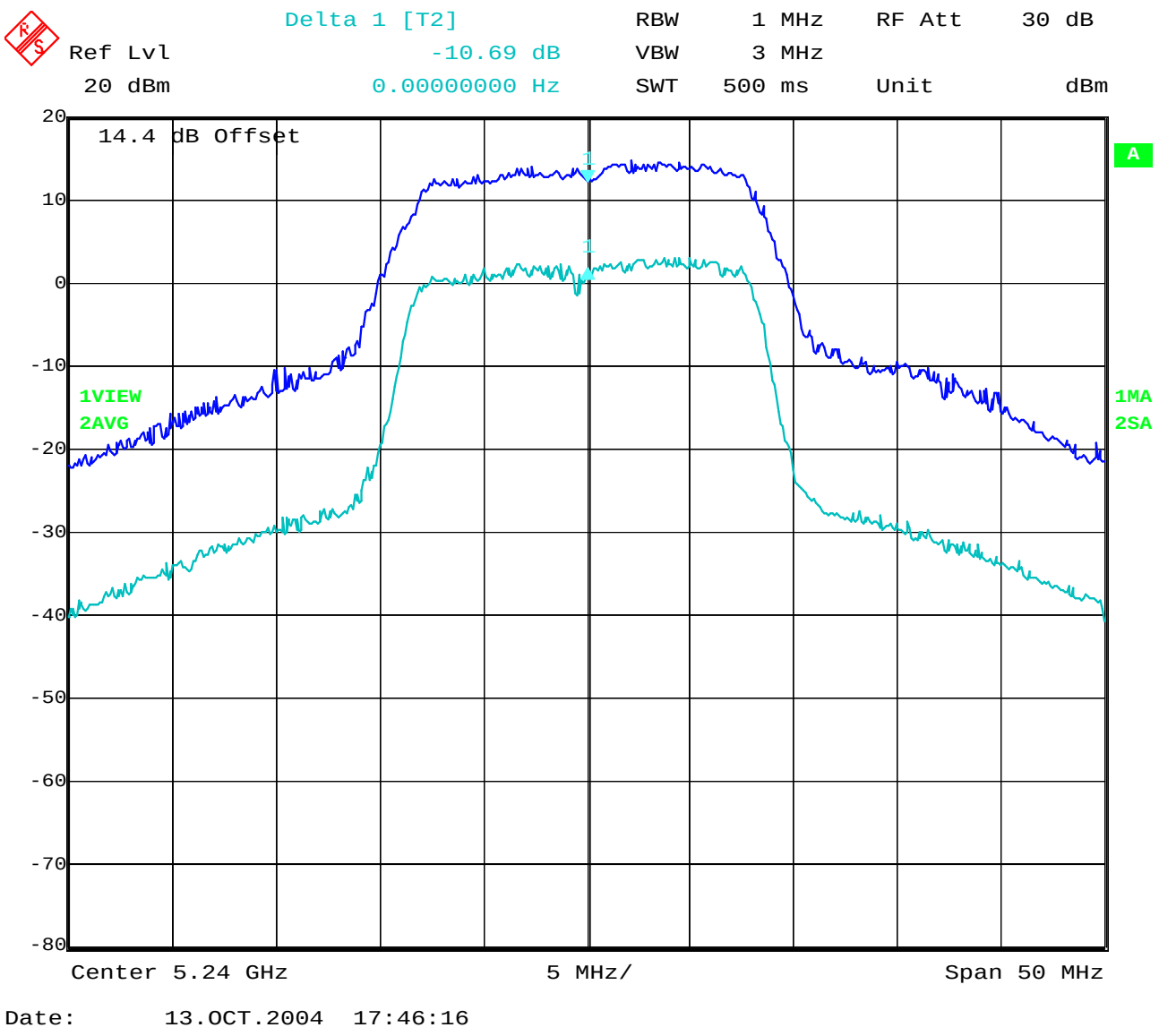
3.28 Ratio of Peak Excursion §15.407(a6)

Plot 1 : 5180 MHz

The plot shows directly the ratio between peak and average.



Plot 2: 5240 MHz

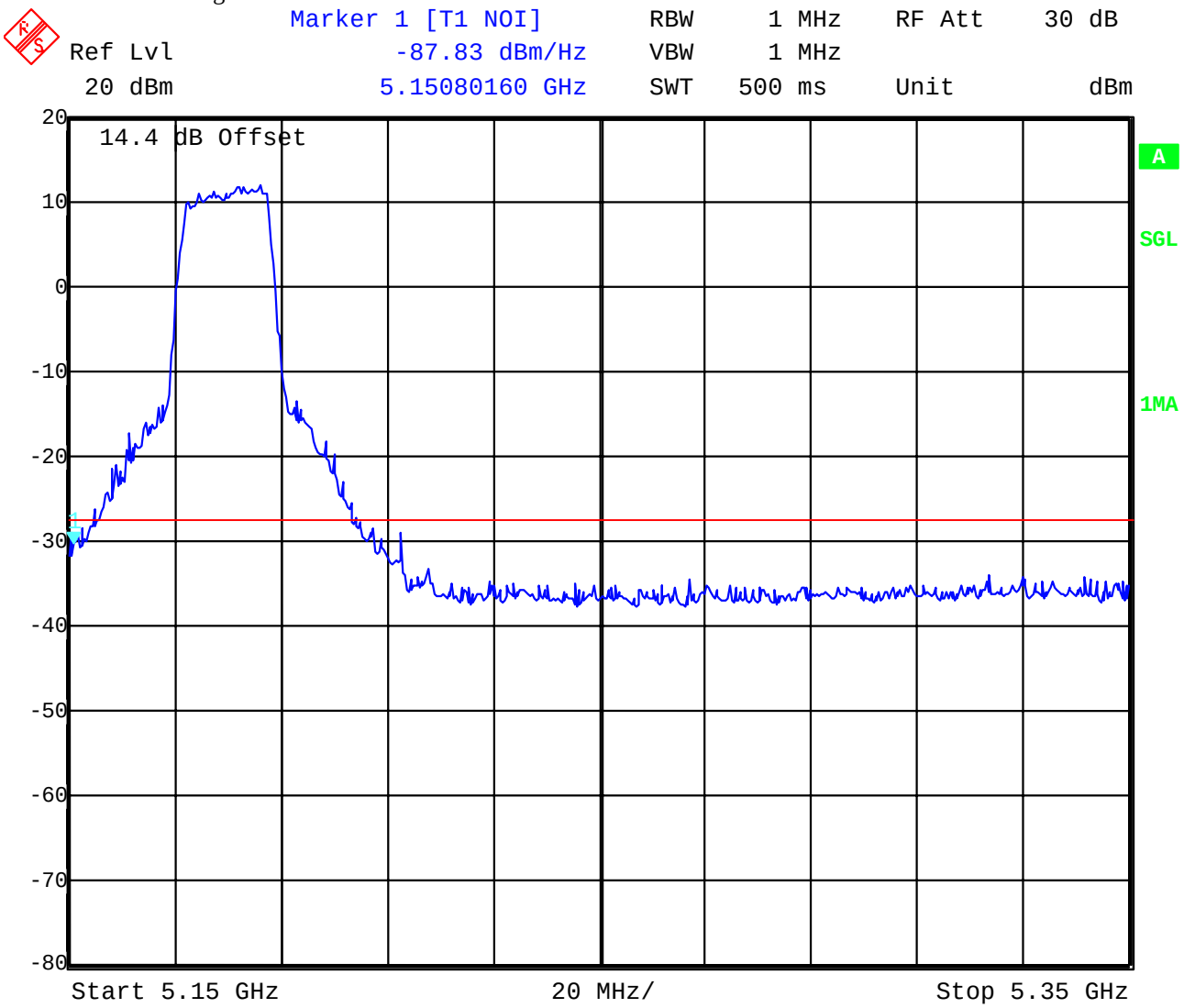


Results

Test conditions		Ratio of peak excursion of the modulation envelope		
		result	Limit	
5180 MHz		12.4	13 dB	pass
5240 MHz		10.7	13 dB	pass
Measurement uncertainity		±1dB		

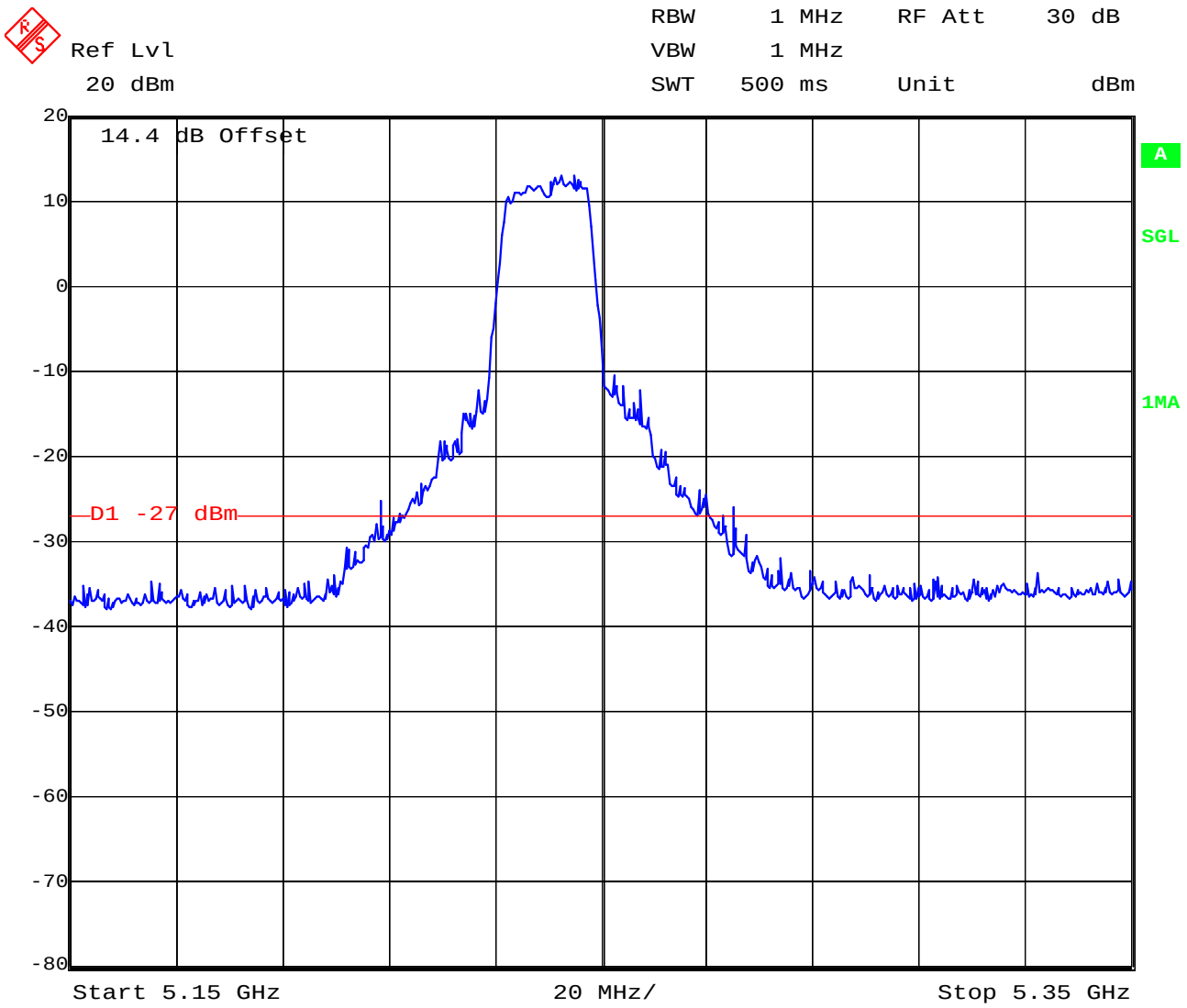
3.29 Undesirable emission limits at band edges 15.407 (b3)

Plot 1: lower band edge



Date: 13.OCT.2004 18:44:12
RBW / VBW : 1 MHz

Plot 2: upper band edge



Date: 13.OCT.2004 18:45:23
RBW / VBW : 10 MHz

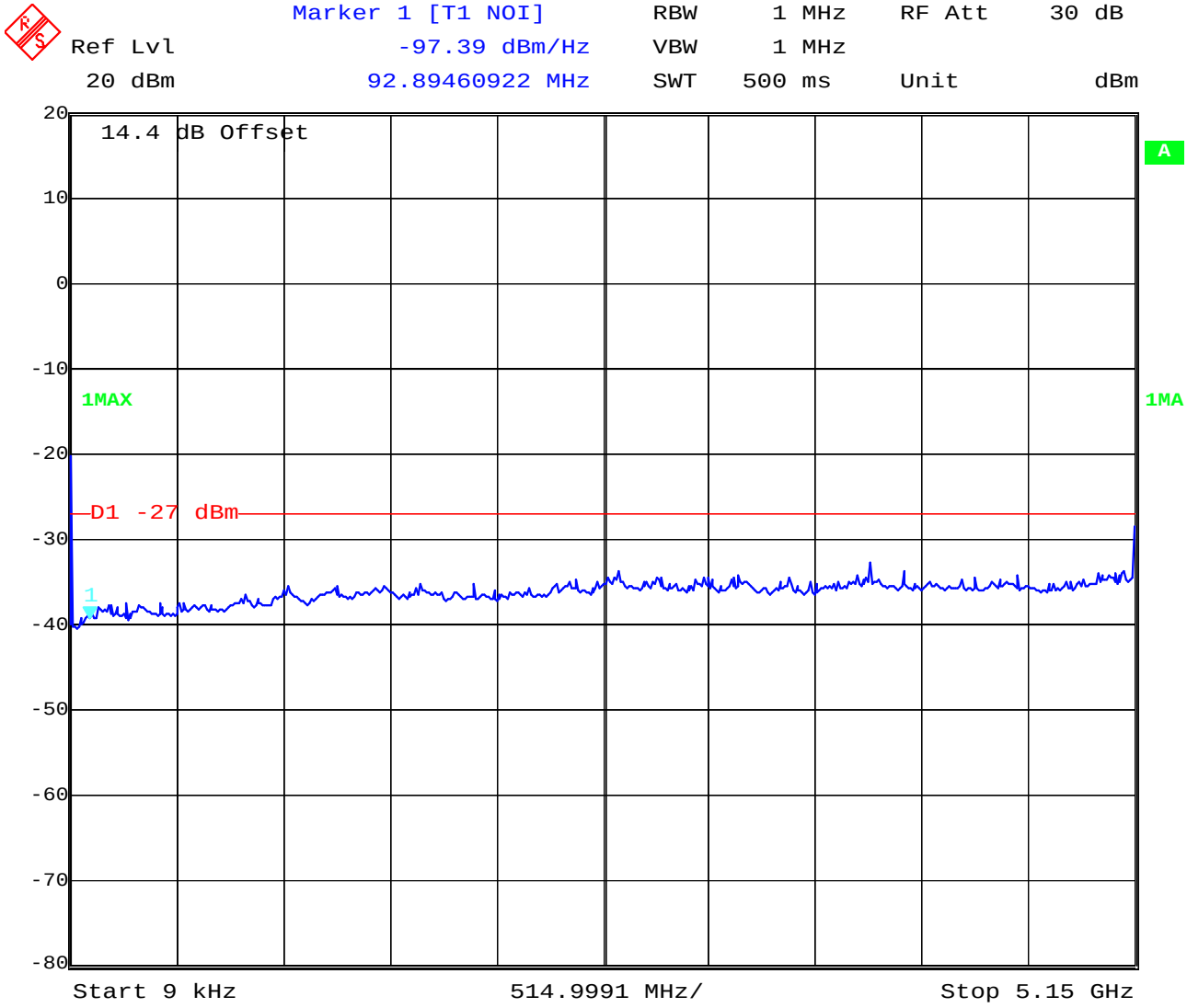
Limits: - outside of 5.15 – 5.35 GHz band -27 dBm/MHz

Result: - lower band edge -87.8 dBm/Hz + 60 dB = -27.8 dBm/MHz => pass
- upper band edge -94.7 dBm/Hz + 60 dB = -34.7 dBm/MHz => pass

-all frequencies more than 10 MHz above or below band edge < -27 dBm/MHz => pass

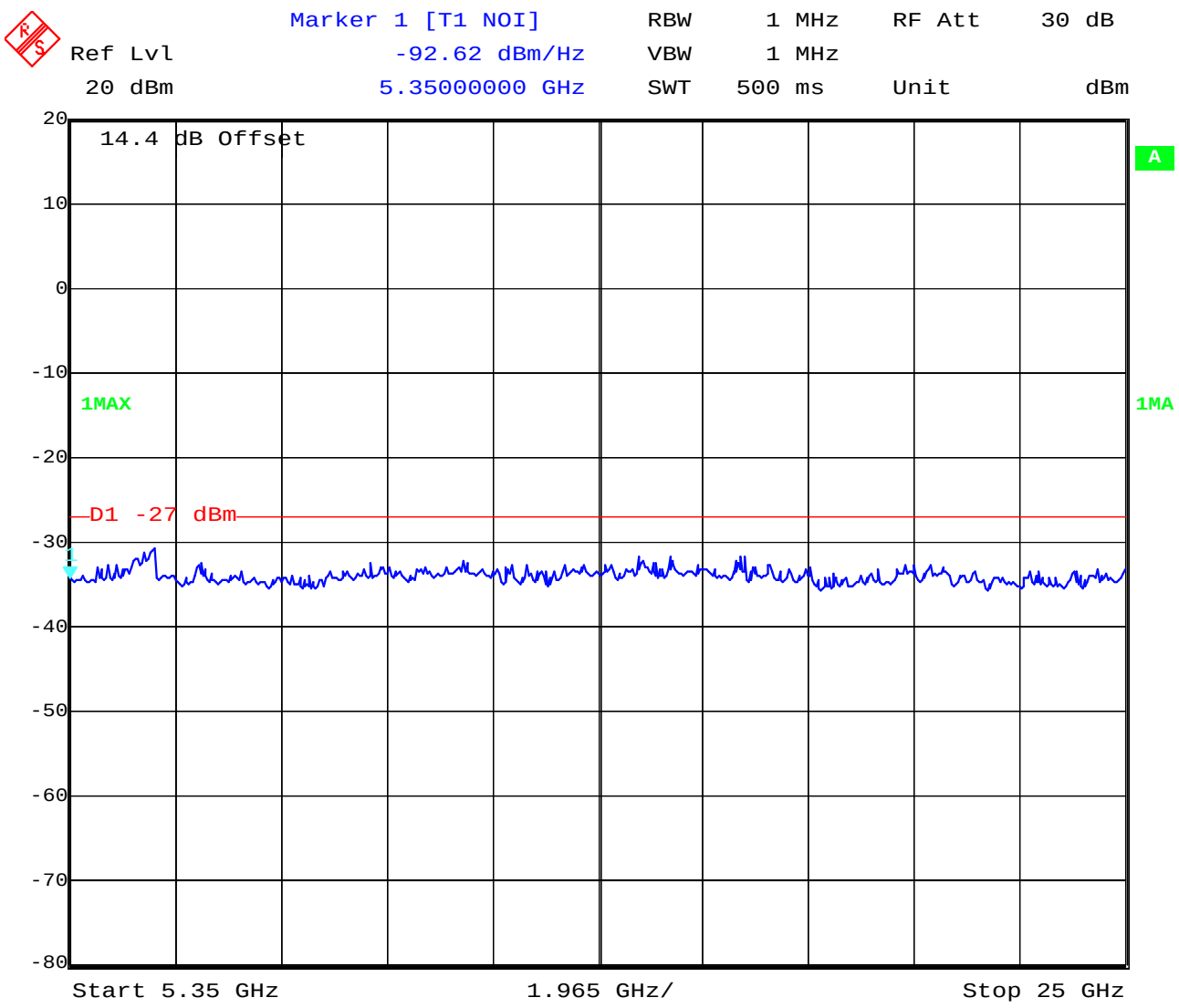
3.30 Spurious (conducted) 15.407 (b3)

Plot 1: 5180 MHz



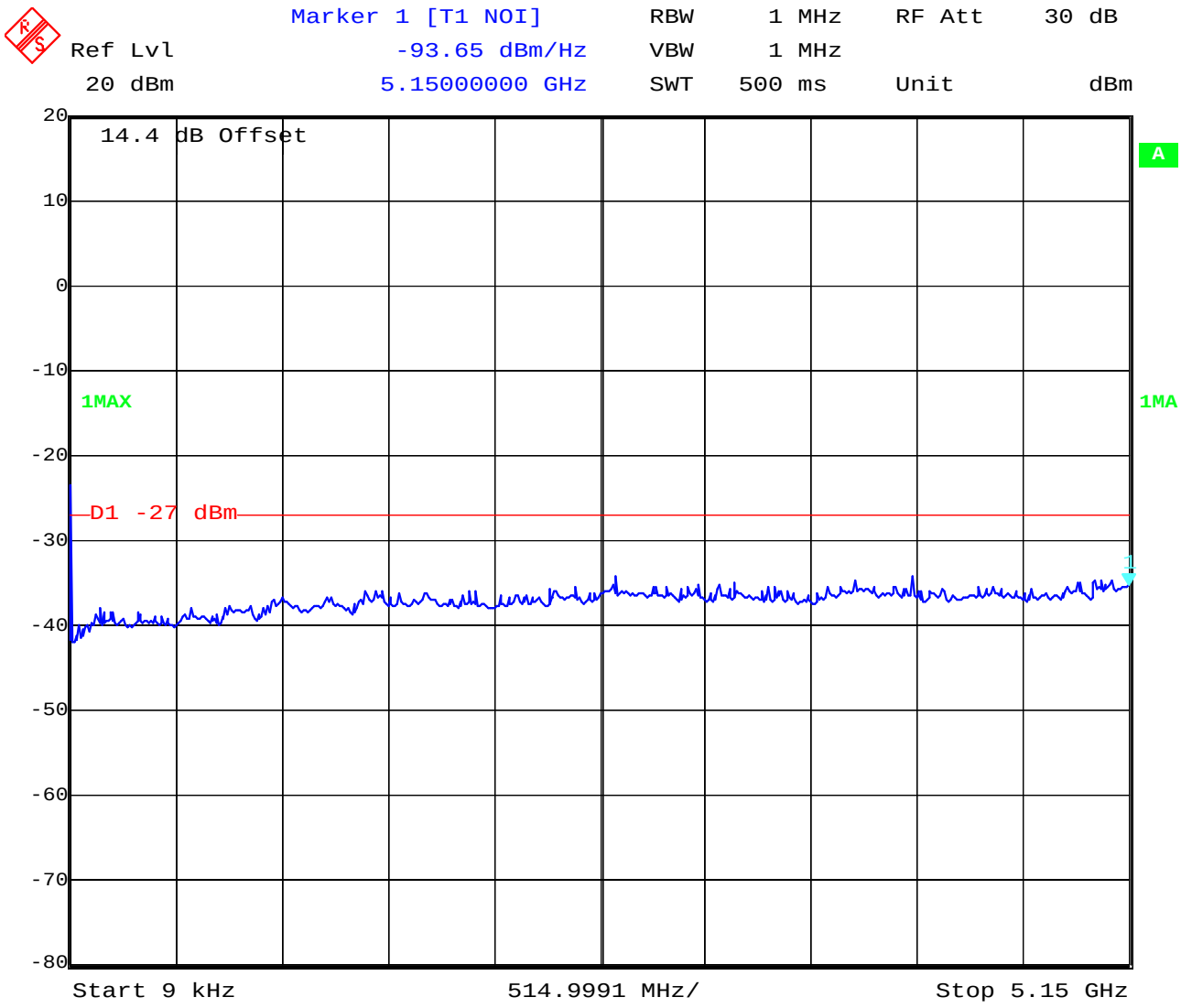
Date: 13.OCT.2004 18:22:42
RBW / VBW : 1 MHz

Plot 2: 5180 MHz



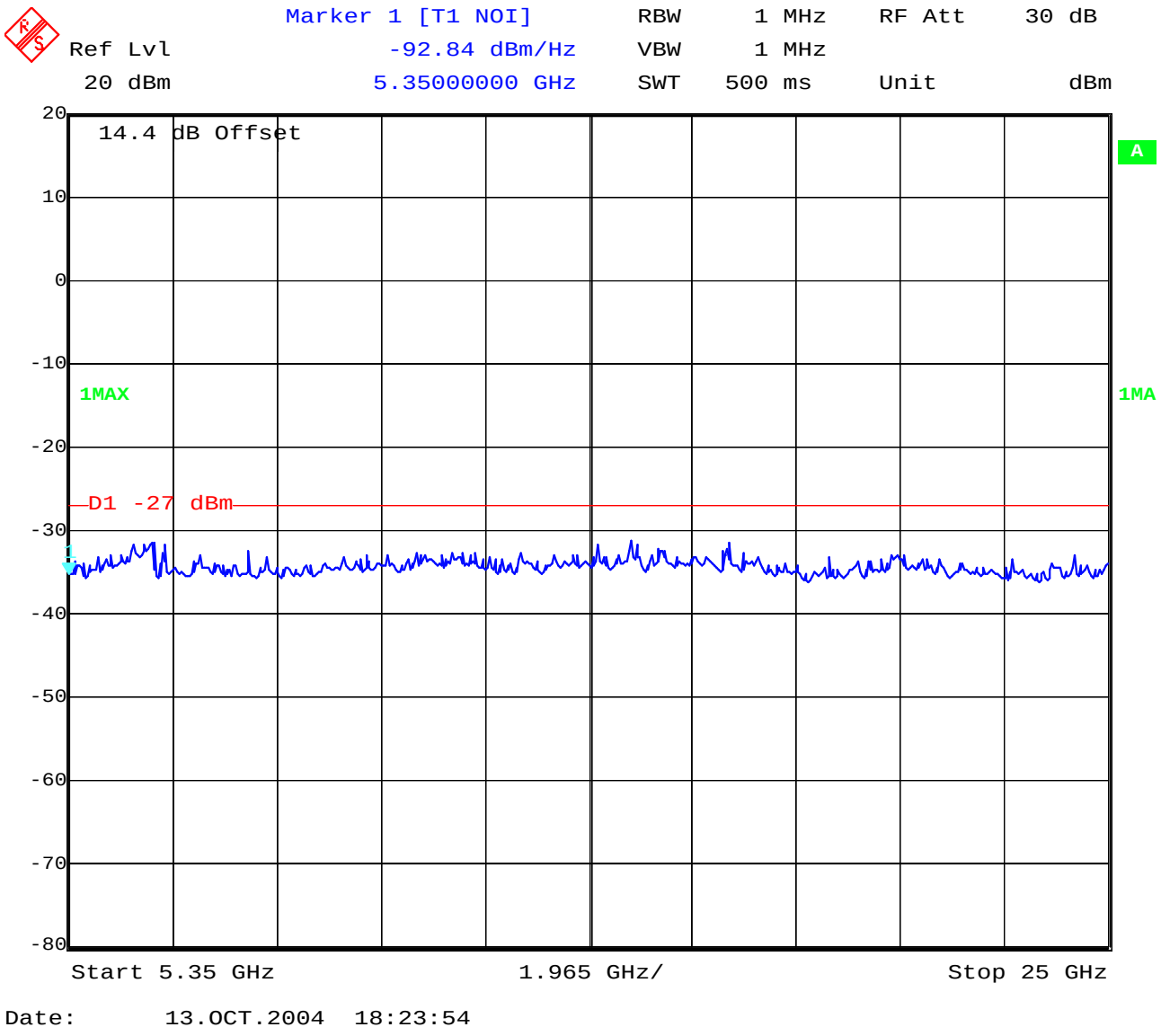
Date: 13.OCT.2004 18:23:33
RBW / VBW : 1 MHz

Plot 3: 5240 MHz



Date: 13.OCT.2004 18:26:50
RBW / VBW : 1 MHz

Plot 4: 5240 MHz



RBW / VBW : 1 MHz

The measurements were performed up to 60 GHz. There were no peaks found.

Spurious emissions conducted

Result & Limits

Emission Limitations					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emmision power	actual attenuation below frequency of operation [dB]	results
5180			30 dBm	-	Operating frequency
no	peaks	found		< 20 dB below	limit
5240			30 dBm	-	Operating frequency
no	peaks	found		< 20 dB below	limit
Measurement uncertainty		± 3dB			

RBW : 1 MHz VBW: 1 MHz

Under normal test conditions only	In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Note: For emissions that fall into restricted bands you find the radiated emissions later in the report.

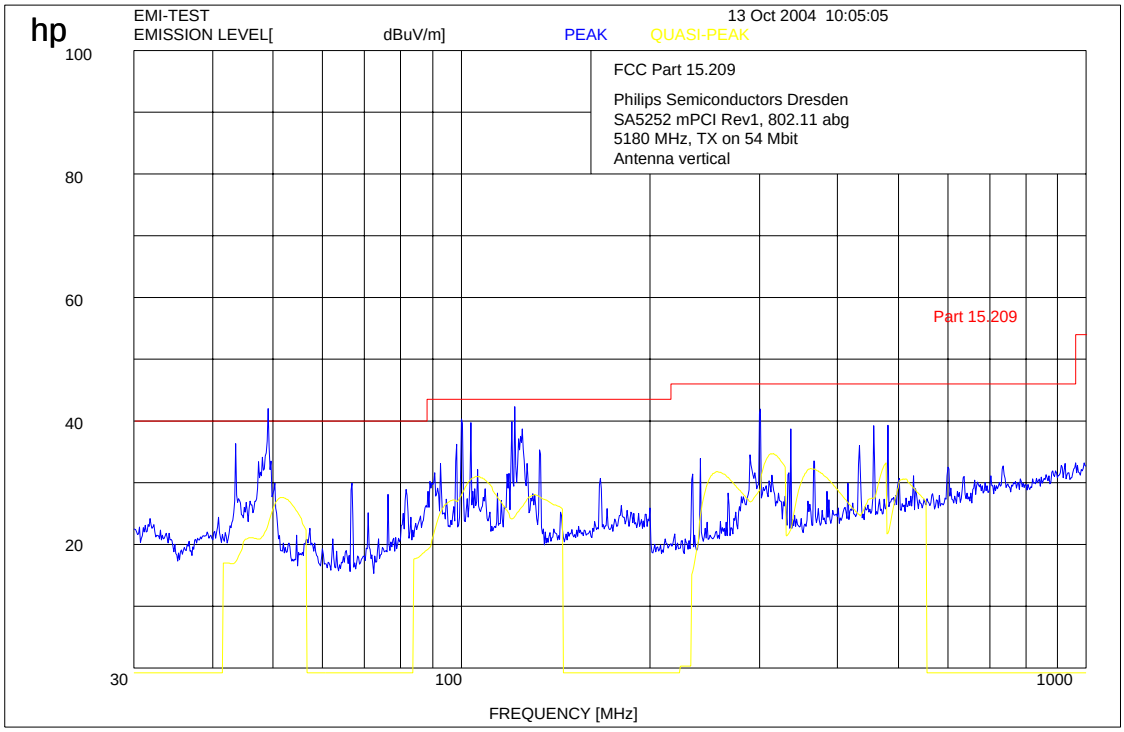
3.31 Max. peak output power (radiated) §15.407 (a) (1)

Results:

Test conditions		Max. peak output power EIRP [dBm] Including antenna gain		
Frequency [MHz]		5180 MHz		5240 MHz
T_{nom}	V_{nom}	15.7		15.1
Measurement uncertainty		±3dB		

3.32 Spurious Emissions - radiated (Transmitter) §15.209

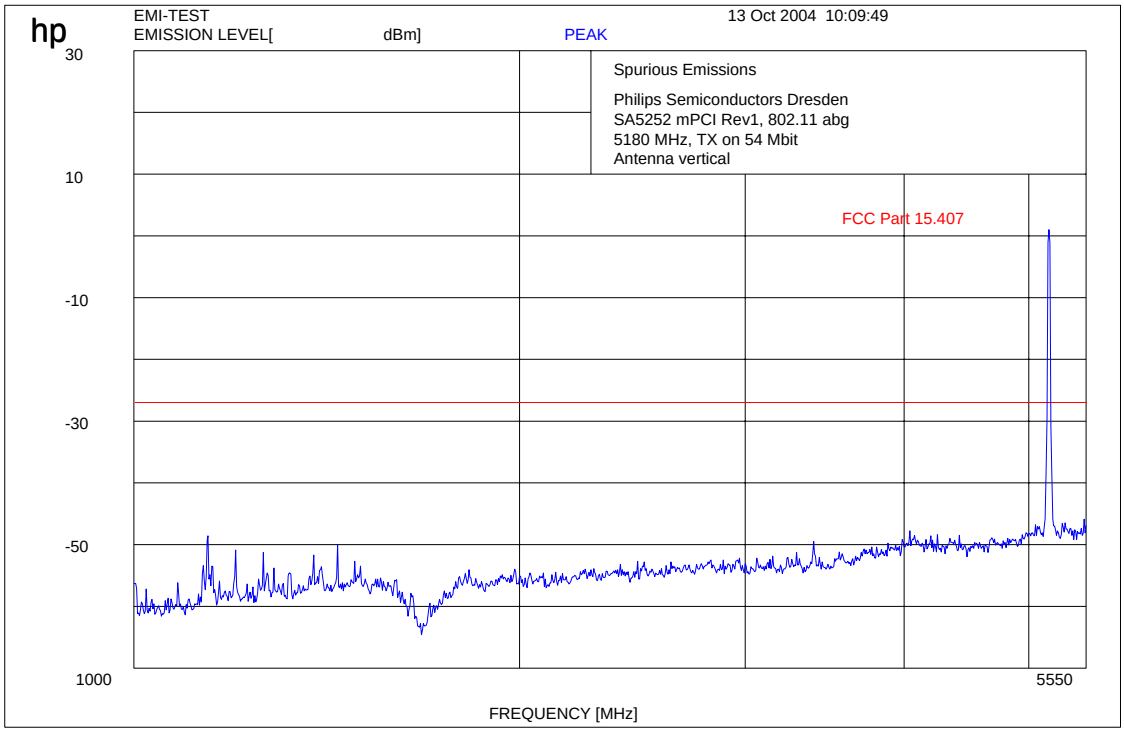
Plot 1: 0.03 – 1 GHz vertical (lowest channel) (worst case)



The yellow line shows the QP values. There is no peak < 6dB below limit.

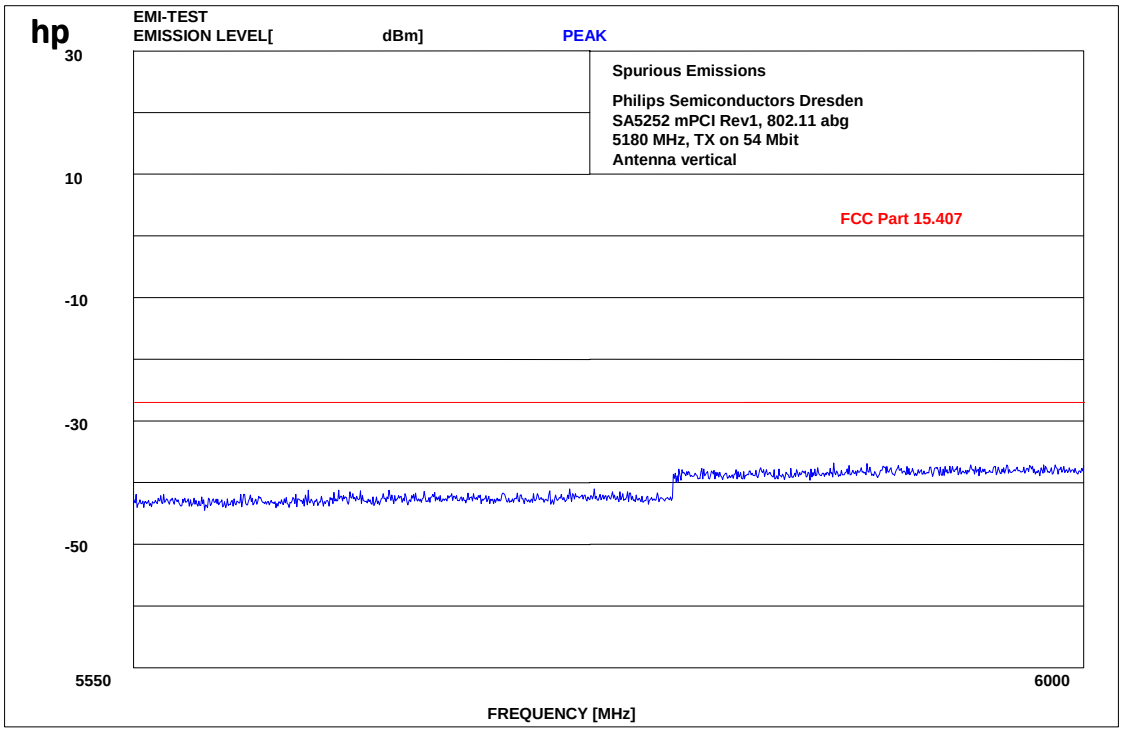
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 2: 1 GHz – 5.55 GHz (lowest channel) (worst case)



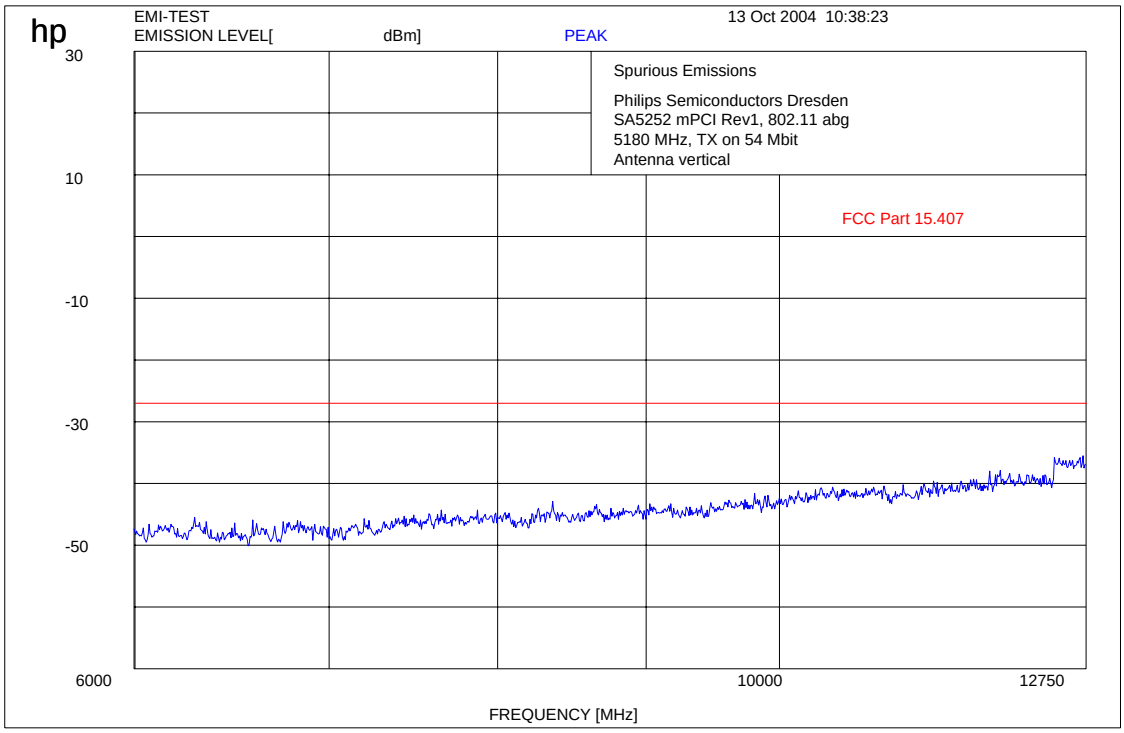
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 3: 5.55 GHz – 6 GHz (lowest channel) (worst case)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

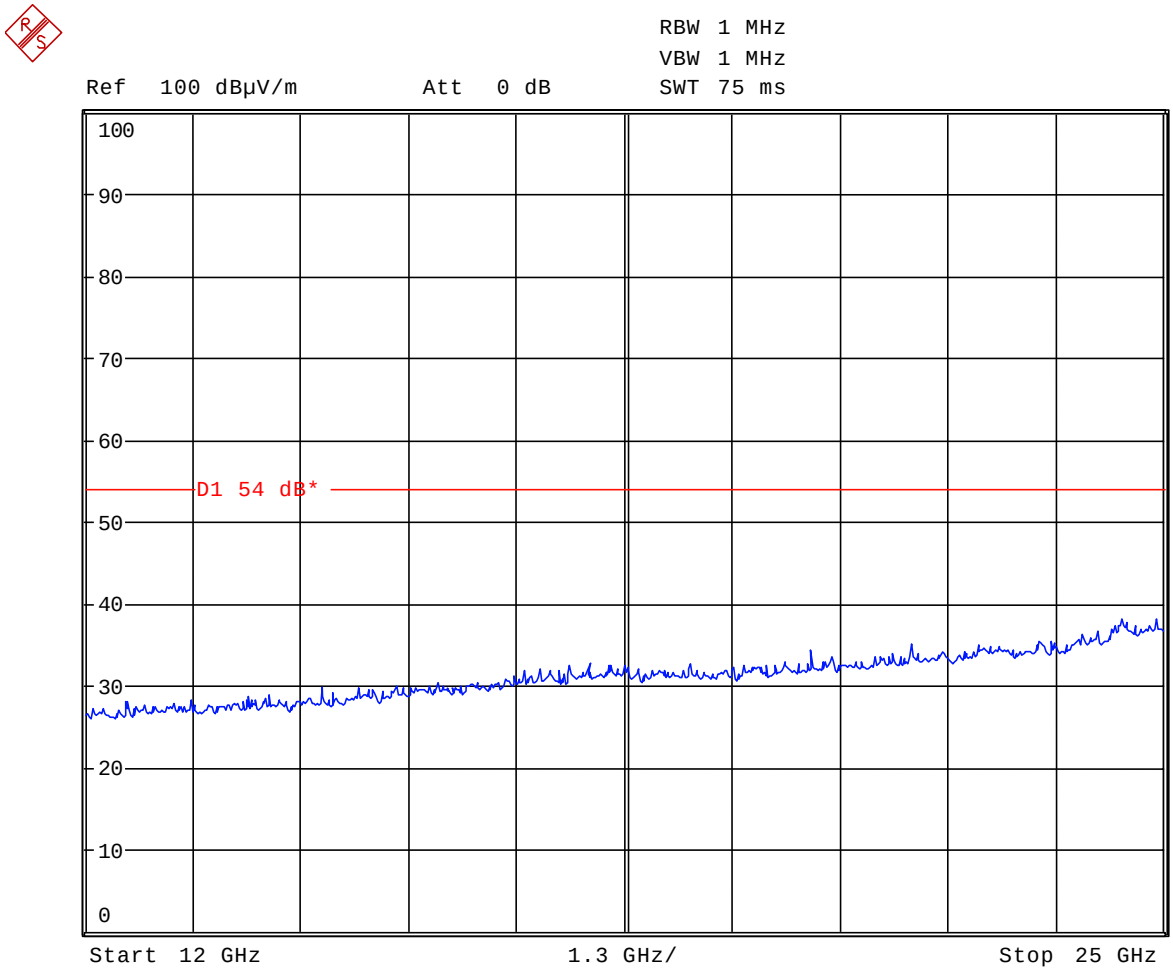
Plot 4: 6 GHz – 12 GHz (lowest channel) (worst case)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 5: -25 GHz vertical (lowest channel) (worst case)

Valid for all measured channels.

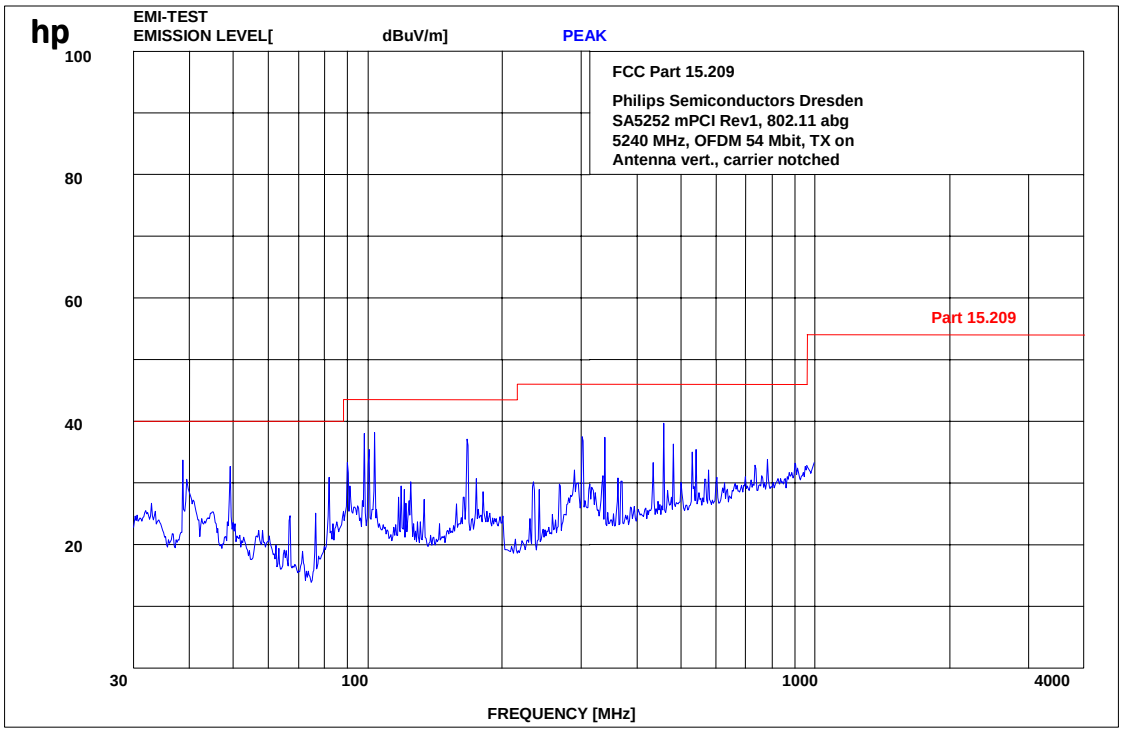


f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

We also measured with external mixers up to 60 GHz.

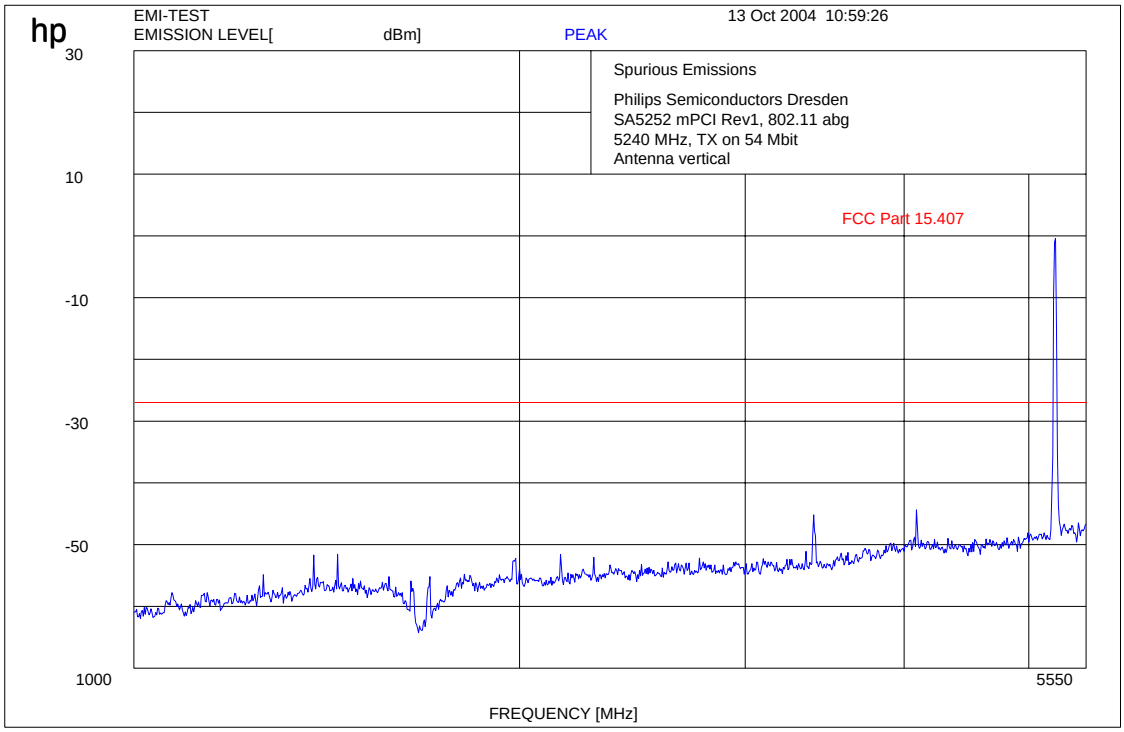
There were no peaks found.

Plot 6: 30 MHz to 1 GHz (highest channel)



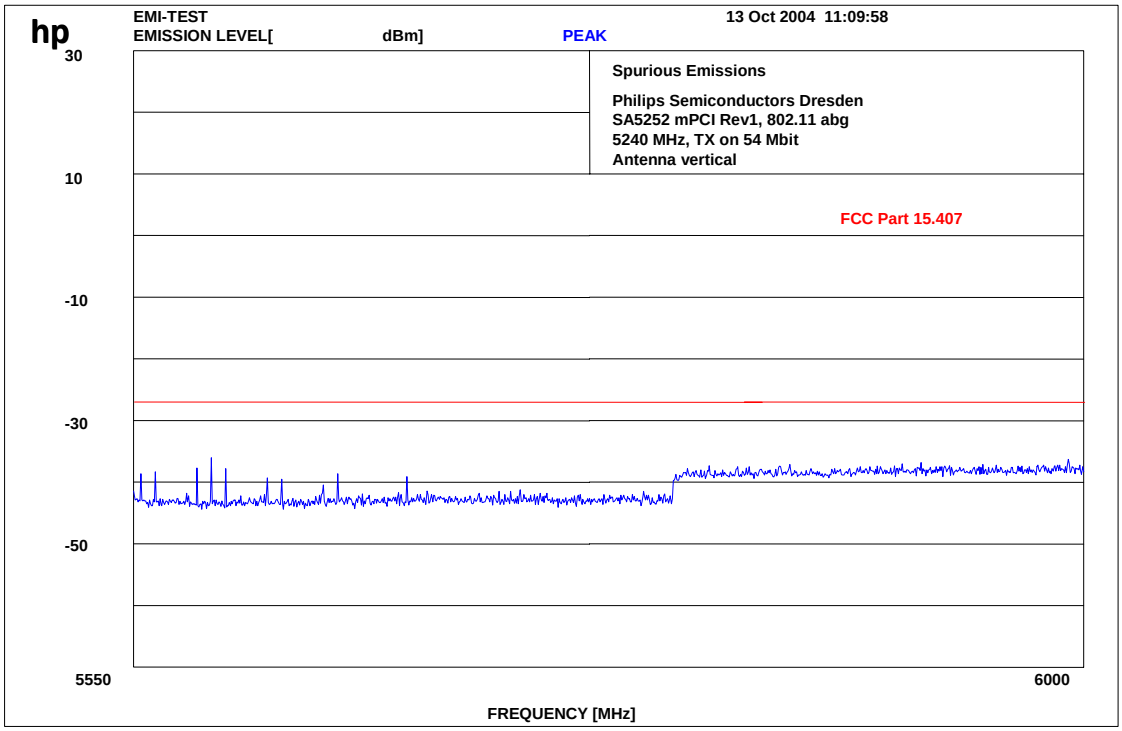
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 7: 1 GHz to 5.55 GHz (highest channel)



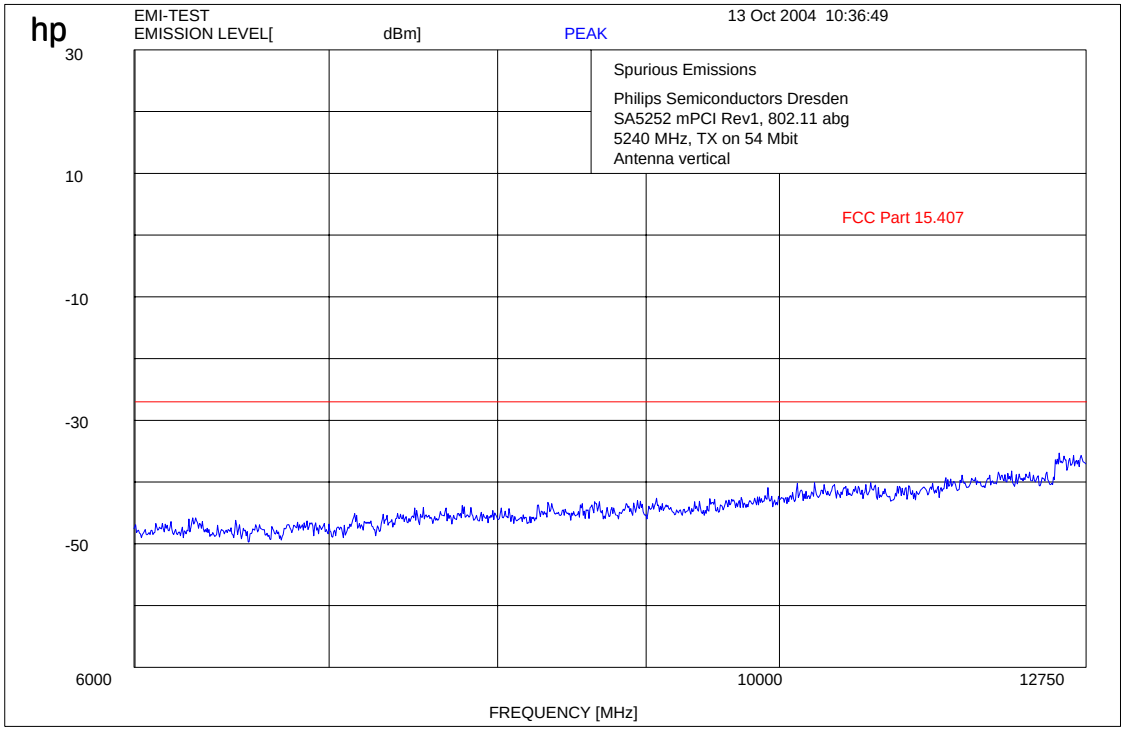
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 8: 5.55 GHz to 6 GHz (highest channel)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

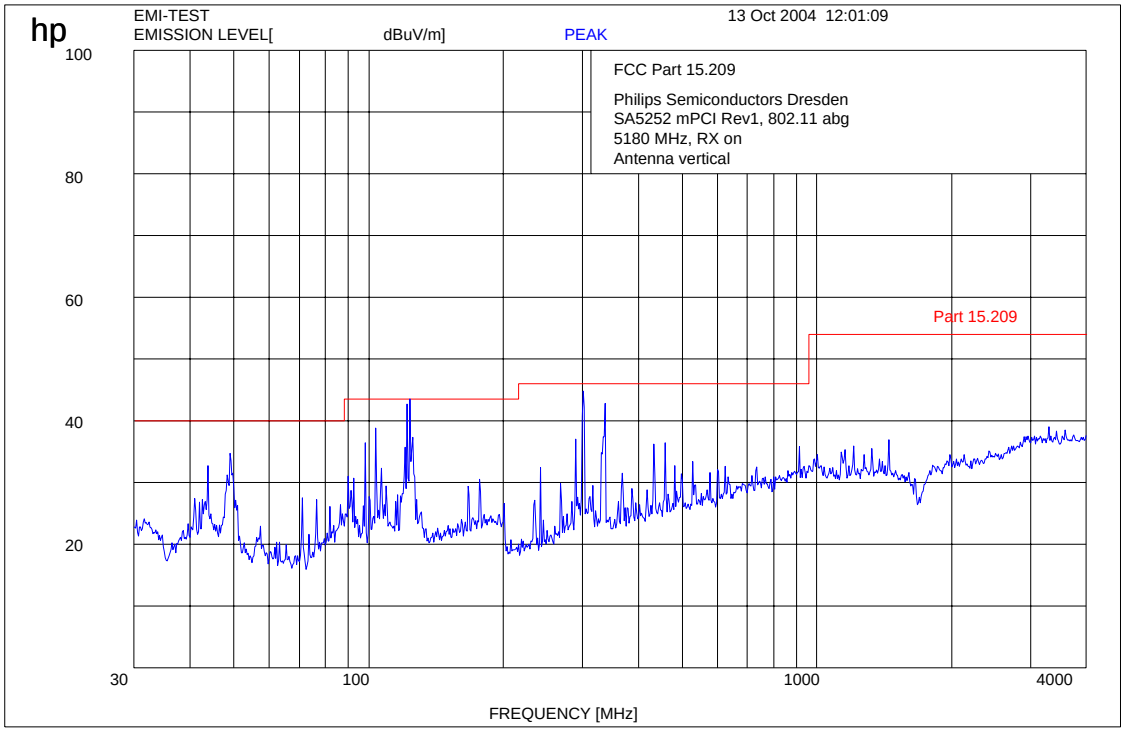
Plot 9: 6 GHz to 12 GHz (highest channel)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

3.33 Spurious emissions radiated (RX) 15.209

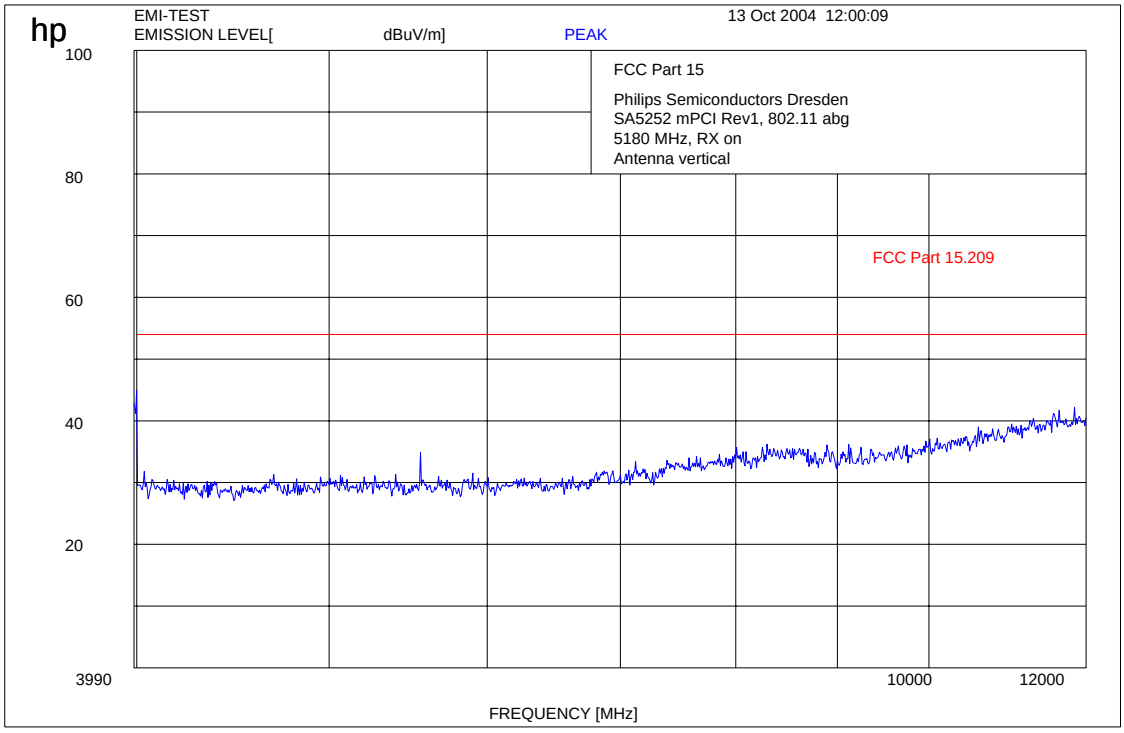
Plot 1: 30 to 4000 MHz



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

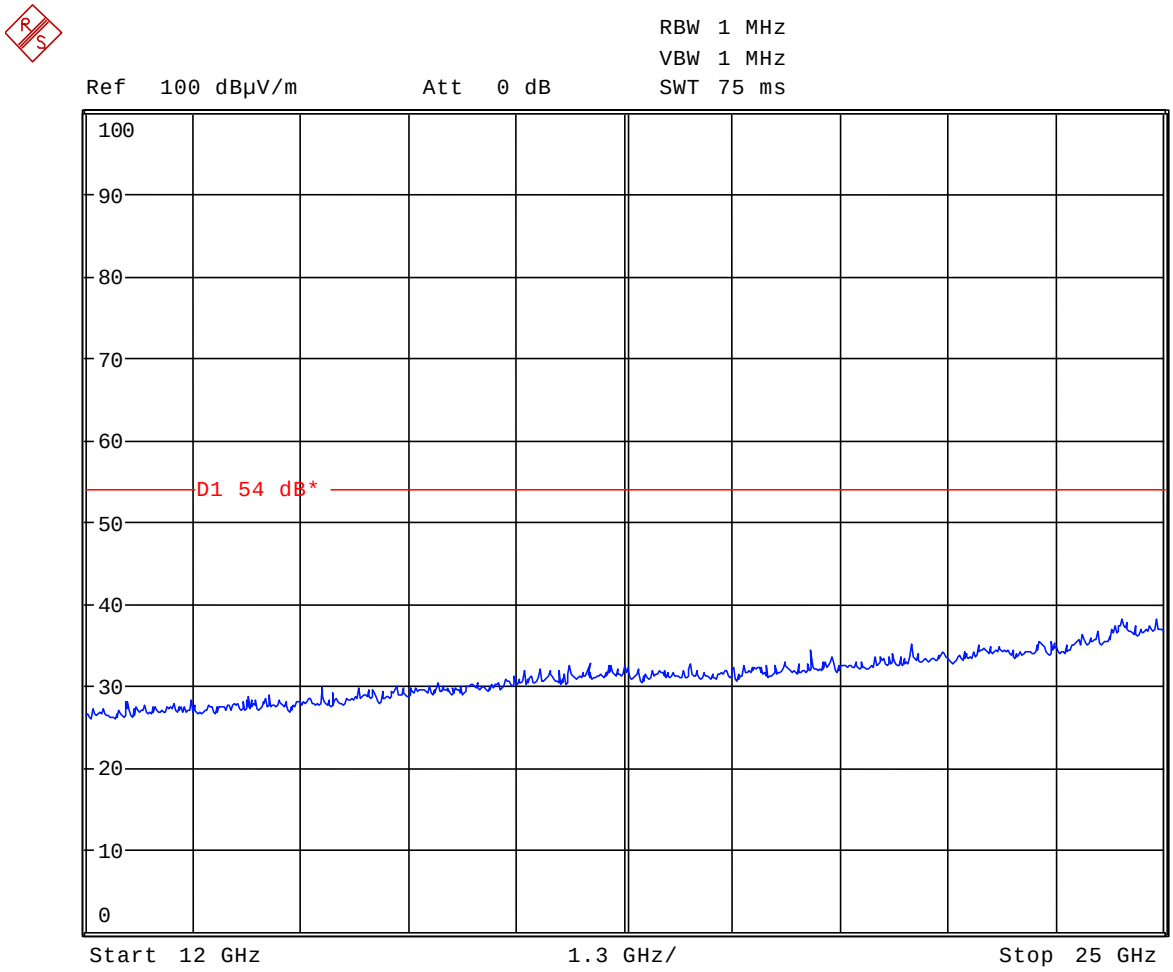
All peaks were caused by the test-pc, not by the sample.

Plot 2: 4 GHz to 12 GHz



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Plot 3: - 25 GHz



The measurements were performed up to 60 GHz. There were no peaks found.

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Limits: § 15.209

Frequency [MHz]	Field strength [µV/m]	Measurement distance (m)
30 - 88	100 (40 dBµV/m)	3
88 - 216	150 (43.5 dBµV/m)	3
216 - 960	200 (46 dBµV/m)	3
above 960	500 (54 dBµV/m)	3

Results:

Spurious Emissisons level [µV/m]								
CH 1 / 2 / 3								
f[MHz]	Detector	Level [µV/m]	f[MHz]	Detector	Level [µV/m]	f[MHz]	Detector	Level [µV/m]
no	peaks	found	< 15 dB	below	limit			
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz
see above plots

Measurement distance see table

Limits : § 15.109 / 209

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
30 - 88	100 (40 dBµV/m)	3
88 - 216	150 (43.5 dBµV/m)	3
216 - 960	200 (46 dBµV/m)	3
above 960	500 (54 dBµV/m)	3

3.34 Spurious Emissions - radiated <30 MHz §15.109

See page 49.

Limits:

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30 / 29.5 dBµV/m	30
30 - 88	100 / 40 dBµV/m	3
88 - 216	150 / 43.5 dBµV/m	3
216 - 960	200 / 46 dBµV/m	3
above 960	54 dBµV/m	3

3.35 Conducted Emissions <30 MHz §15.107/207

See page 50:

Limits :

Under normal test conditions only	See plots

3.36 Used Testequipment

Anechoic chamber C:

Device	Manufacturer	Type	S/N Number	Inv. No. Cetecom
Spectrum Analyzer	HP	8566B	2747A05306	300001000
Spectrum Analyzer Display	HP	85662A	2816A16541	300002297
Quasi-Peak-Adapter	HP	85650A	2811A01131	300000999
Power Supply	HP	6032A	2818A03450	300001040
Power Attenuator	Byrd	8325	1530	300001595
Biconical Antenna	EMCO	3104	3758	300001602
Log. Period. Antenna	EMCO	3146	2130	300001603
Double Ridged Antenna	EMCO	HP 3115P	3088	300001032
Active Loop Antenna	EMCO	6502	2210	300001015
Antenna VDE/FCC		HP11965B		300002298
SRM-Drive	HP	9144A	2823e46556	300001044
Software	HP	EMI		300000983
Busisolator	Kontron			300001056
Absorberhalle	MWB		87400/02	300000996
Salzsäule	Kontron			300001055
Antenna	R&S	HMO20	832211/003	300002243
Indukt.Tast Antenna	R&S	HFH 2 Z4	881468/026	300001464
System-Rack	HP I.V.	85900	*	300000222
Spectrum Analyzer	HP	8566B	2747A05275	300000219
Quasi-Peak-Adapter	HP	85650A	2811A01135	300000216
RF-Preselector	HP	85685A	2837A00779	300000218
Rahmen Antenne	R&S	HFH2-Z2	891847-35	300001169
Leitungsteiler	HP	11850C		300000997
Breitband-Hornantenne EMI	HP	35155P		300002300
PC	HP	Vectra VL		300001688
VHF Meßantenne	Schwarzbeck	VHA 9103		300001778
Spectrum Analyzer Display	HP	85662A	2816A16497	300001690
VHF Meßantenna	Schwarzbeck	VHA 9103		300001780
Biconical Antenna	EMCO	3104 C	9909-4868	300002590

SRD Laboratory:

Device	300001207	Type	S/N Number	Inv. No. Cetecom
Spectrum Analyzer	300001208	494AP	B010241	300000863
Spectrum Analyzer	HP	71210A (70000)	2731A02347	300000321
Spectrum Analyzer Display	HP	70206A	2840A01553	300002017
Reference Frequency	HP	70310A	2736A00707	300002018
Local Oscillator	HP	70900A	2842A02221	300002019
ZF-Modul 10Hz-300 kHz	HP	70902A	2840A02145	300002020
ZF-Modul 100 kHz-3 MHz	HP	70903A	2835A01069	300002021
HF-Teil für 71210A 100Hz- 22GHz	HP	70908A		300002022
Spectrum Analyzer 2	HP	85660B	3138A07614	
Spectrum Analyzer Display 2	HP	85662A	3144A20627	

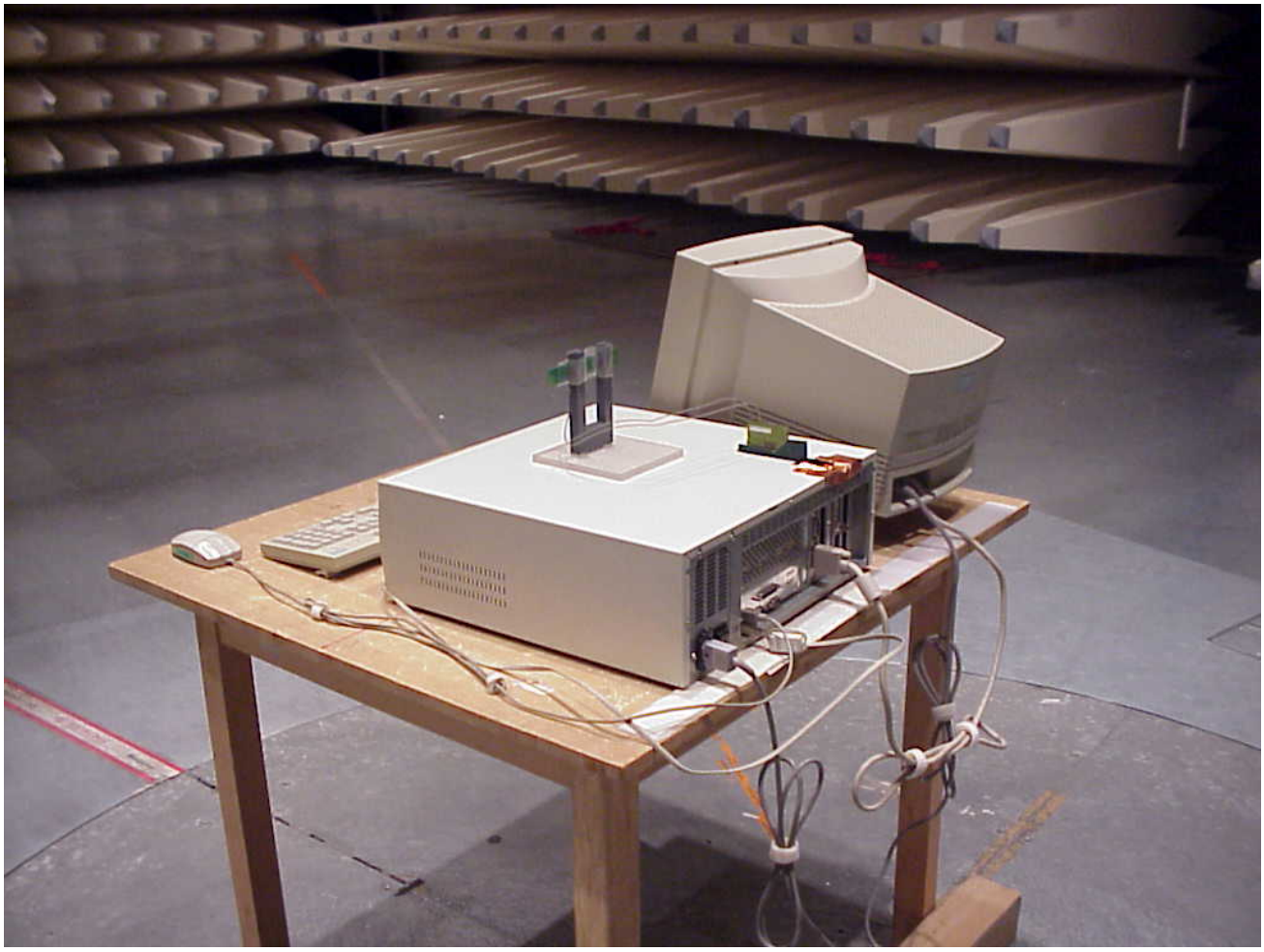
Signal Generator DC-600 KHz	HP	8904A	2822A01213	300001157
Signal Generator DC-600 KHz	HP	8904A	2822A01214	300001158
Powersupply	HP	6038A	3122A11097	300001204
Netznachbildung	R&S	ESH3-Z5	828576/020	300001210
Amplituden Controller	R&S	SMDU-Z2	871829/051	300002309
Trenntrafo	Erfi	913501		300001205
Trenntrafo	Grundig	RT5A	9242	300001627
Relais Matrix	HP	3488A	2719A15013	300001156
Multimeter	Siemens	Multizet		300001102
Peak Power Calibrator	HP	8900B		300001084
Schallgeber	Schomandl	SG 1	10159	300001209
Schallgeber	Schomandl	SG 2	10176	300002473
Filter	FSY Microwave			300001206
Attenuatorer	Pro Nova			300002476
Klimaschrank	Heraeus Voetsch	VUK04/500		300001012
Spectrum Analyzer 3	HP	8566A	1925A00257	300001098
Spectrum Analyzer Display 3	HP	85662	1925A00860	300002306
Oszilloscope	Tektronix	2432	110261	300001165
Radiocom. Analyzer	R&S	CMTA 54	894043/010	300001175
Powersupply	HP	6038A	2848A07027	300001174
Signal Generator 0.01-1280 MHz	HP	8662A	2224A01012	300001110
Signal Generator (Funktions)	R&S	AFGU	862490/032	300001201
Trenntrafo	Erfi	MPL	91350	300001155
Relais Matrix	R&S	PSU	893285/020	300001173
Power Meter	HP	436A	2101A12378	300001136
Powersensor	HP	8484A	2237A10156	300001140
Powersensor	HP	8482A	2237A06016	300001139
Relais Matrix	R&S	PSU	282628/004	300001214
Powersupply	Zentro		2007	300001109
Oszilloscope	Tektronix	7633		300001111
Klimaschrank	Heraeus Voetsch	VUK04/500	32926	300001500
Quasi-Peak Adapter	HP	85650A	2811A01204	300002308
Radiocom. Analyzer	R&S	CMTA 84	894199/012	300001176
Oszilloscope	HP	54510A	3022A02062	300001202
Funkmeßplatz	Schomandl	FD1000	34982	300001115
Signal Generator	R&S	SMPC	882416/019	300001162
Frequency counter	HP	5340A	2116A08138	300001104
Power Meter	HP	436A	2031U01461	300001105
Powersensor	HP	8482A		300001106
Powersensor	HP	8484A		300001107
Powersensor	HP	8485A		300001108
Powersupply	HP	6038A	2752A04866	300001161
Reflectionsmeter	R&S	NAP	879191	300001132
Signal Generator NF	R&S	SPN	880139/068	300001142
Trenntrafo	Erfi	MPL	91350	300001151
Attenuator	JFW	30 db	1350h/104	300001703
Attenuator	JFW	10 db	1350h/103	300001704
Attenuator	JFW	20 db	1350h/106	300001705
Attenuator	JFW	20 db	1350h/105	300001766
Filter	Spinner	153755		300001791

Powersensor	HP	8484A	2237A10494	300001666
Powersupply	HP	6038A	3122A11097	300001204
Netznachbildung	R&S	ESH3-Z5	828576/020	300001210
Amplituden Controller	R&S	SMDU-Z2	871829/051	300002309
Trenntrafo	Erfi	913501		300001205
Trenntrafo	Grundig	RT5A	9242	300001627
Relais Matrix	HP	3488A	2719A15013	300001156
Multimeter	Siemens	Multizet		300001102
Peak Power Calibrator	HP	8900B		300001084
Schallgeber	Schomandl	SG 1	10159	300001209
Schallgeber	Schomandl	SG 2	10176	300002473
Filter	FSY Microwave			300001206
Attenuatorer	Pro Nova			300002476
Klimaschrank	Heraeus Voetsch	VUK04/500		300001012
Spectrum Analyzer 3	HP	8566A	1925A00257	300001098
Spectrum Analyzer Display 3	HP	85662	1925A00860	300002306
Oszilloscope	Tektronix	2432	110261	300001165
Radiocom. Analyzer	R&S	CMTA 54	894043/010	300001175
Powersupply	HP	6038A	2848A07027	300001174
Signal Generator 0.01-1280 MHz	HP	8662A	2224A01012	300001110
Signal Generator (Funktions)	R&S	AFGU	862490/032	300001201
Trenntrafo	Erfi	MPL	91350	300001155
Relais Matrix	R&S	PSU	893285/020	300001173
Power Meter	HP	436A	2101A12378	300001136
Powersensor	HP	8484A	2237A10156	300001140
Powersensor	HP	8482A	2237A06016	300001139
Relais Matrix	R&S	PSU	282628/004	300001214
Powersupply	Zentro		2007	300001109
Oszilloscope	Tektronix	7633		300001111
Klimaschrank	Heraeus Voetsch	VUK04/500	32926	300001500
Quasi-Peak Adapter	HP	85650A	2811A01204	300002308
Radiocom. Analyzer	R&S	CMTA 84	894199/012	300001176
Oszilloscope	HP	54510A	3022A02062	300001202
Funkmeßplatz	Schomandl	FD1000	34982	300001115
Signal Generator	R&S	SMPC	882416/019	300001162
Frequency counter	HP	5340A	2116A08138	300001104
Power Meter	HP	436A	2031U01461	300001105
Powersensor	HP	8482A		300001106
Powersensor	HP	8484A		300001107
Powersensor	HP	8485A		300001108
Powersupply	HP	6038A	2752A04866	300001161
Reflectionsmeter	R&S	NAP	879191	300001132
Signal Generator NF	R&S	SPN	880139/068	300001142
Trenntrafo	Erfi	MPL	91350	300001151
Attenuator	JFW	30 db	1350h/104	300001703
Attenuator	JFW	10 db	1350h/103	300001704
Attenuator	JFW	20 db	1350h/106	300001705
Attenuator	JFW	20 db	1350h/105	300001766
Filter	Spinner	153755		300001791
Powersensor	HP	8484A	2237A10494	300001666

Powersensor	HP	8485A	2238A00849	300001668
Bandfilter	Telonic	TTF7255EE	20293-11	300001300
Bandfilter	Telonic	TTF12555EE	20292-6	300001302
Bandfilter	Telonic	TTF25055EE	20291-8	300001304
Bandfilter	Telonic	TTF50055EE	20290-7	300001305
Bandfilter	Telonic	TTF100055EE	20289-7	300001307
Bandfilter	Telonic	TTA300055EESN	20370-2	300001312
Bandstop	Telonic	TTR3753EE1	30013-1	300001314
Bandstop	Telonic	TTR723EE	20417-2	300001316
Bandstop	Telonic	TTR95-3EE	20372-4	300001318
Bandstop	Telonic	TTR1903EE	30036-4	300001320
Bandstop	Telonic	TTR3753EE	20369-5	300001321
Bandstop	Telonic	TTR750-3EE1	90177-1	300002387
Highpass	Pro Nova	HDP120-6GG	ohne	300001348
Highpass	Pro Nova	HMC500-6AA	HJ67-01?	300001350
Highpass	Narda	NHP 9000	0004	300001362
Highpass	Narda	HDP16-6GH	JV70-01	300001364
Highpass	RSD	HDP50-6GH, HDP200-6GG		300001371
Highpass	RSD	2099-02-01		300000370
Signal Generator 0.1-2060 MHz	HP	8657A	2838U00736	300001009
Radio Code Analyzer	Schlumberger	SL4922		300001038
Signal Analyzer	B&K	2033		300001047
Frequency counter	HP	5386A	2704A01243	300000998
Laufzeitelement	WR-Elektronik			300001036
Powersupply Stromversorgung	Systron	M5P 40/15A	828233	300001291
Powersupply	Heiden	1108-32	1701	300001392
Powersupply	Heiden	1108-32	1802	300001383
Powersupply	Heiden	1108-32	003202	300001187
Powersupply	Zentro	LA 2x30/5GB1	2011	300001276
Powersupply	Zentro	LA 2x30/5GB2	2012	300001275
Powersupply	Zentro	LA 30/5GA	2041,2042	300001287
Trenntrafo	Grundig	RT5A	8781	300001277
Trenntrafo	Grundig	RT5A	9242	300001263
Multimeter	Goerz Elektro	Unigor 6e P	911 355	300001625
Multimeter	Goerz Elektro	Unigor 6e P	911 391	300001281
Climatic Box	Heraeus Voetsch	VUK04/500	32679	300000299
Powersensor + Att.	HP	8482B	2703A02586	300001492
Attenuator 30 dB	HP	8498A	1801A02445	300001475
Signal Generator NF	HP		2822A01203	300001004
Attenuator	Spinner	BN 534171 D	51881	300001516
Attenuator coaxial	Bird	8325	2429	300001513
Impulsbegrenzer	R&S	ESH 3 Z2		300001460
4Port Box	R&S	4Port Box	860457/005	300001472
Signal Generator 0.1-4200 MHz	HP	8665A	2833A0011	300002299
NF-Spektrumanalyzer	B&K	2033A		300002301
Swissphone Freifeld-Messbox	Swissphone Schweiz			300002302
Trenntrafo regelbar	Grundig	RT5H	9242	300001628
Signal Generator	HP	8111A	2215G00867	300001117

4 Photographs

Test site:



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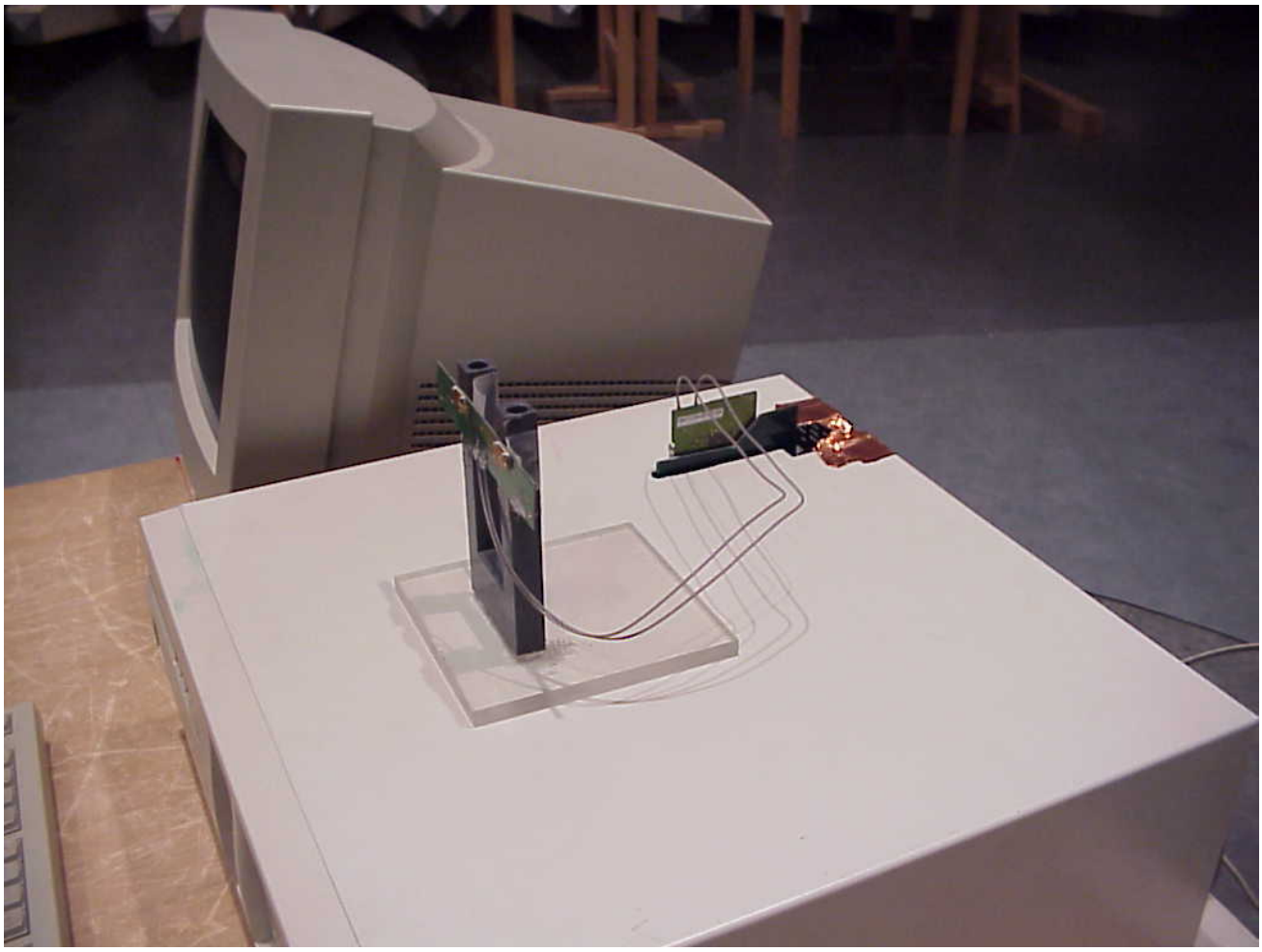

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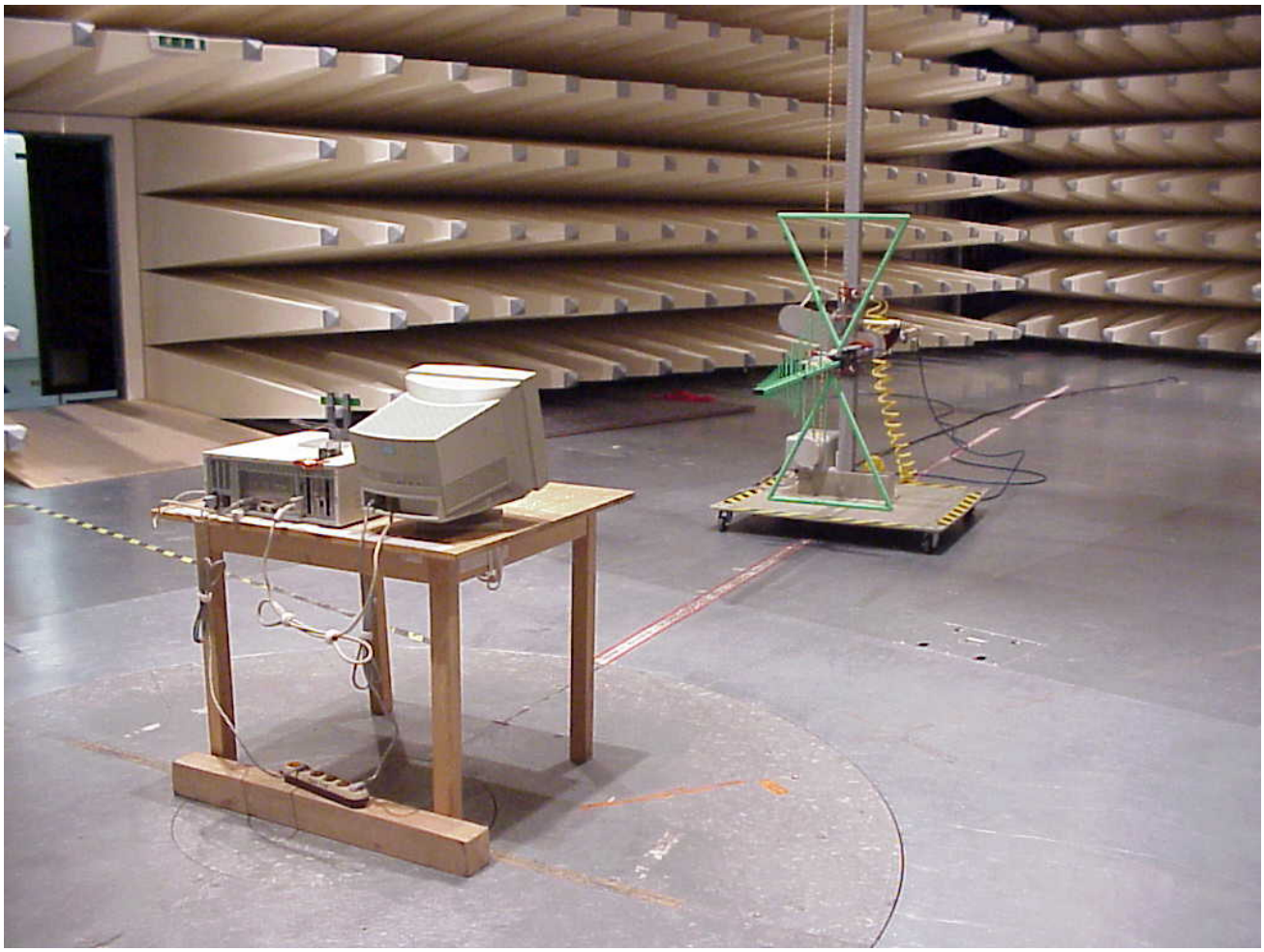
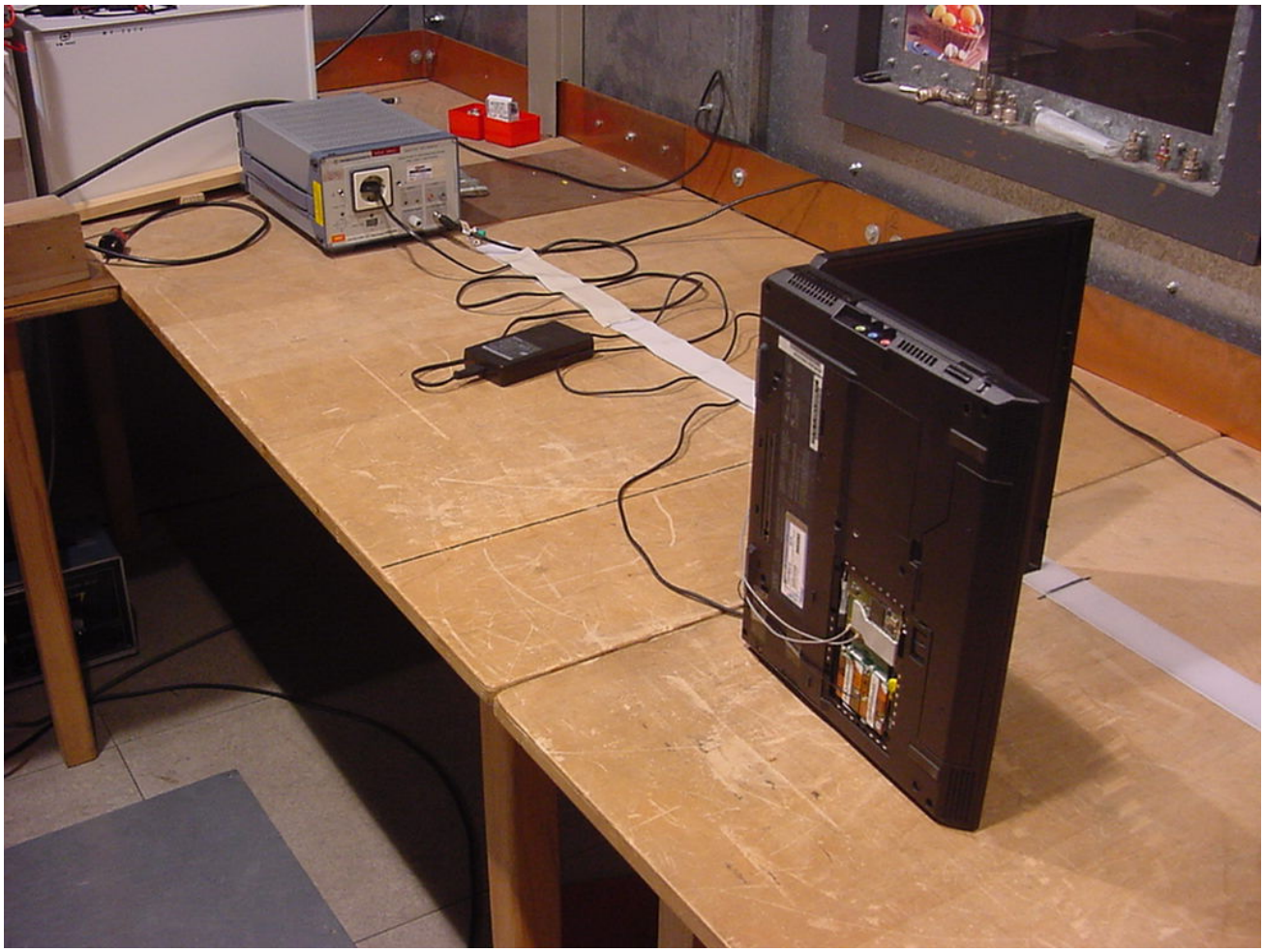
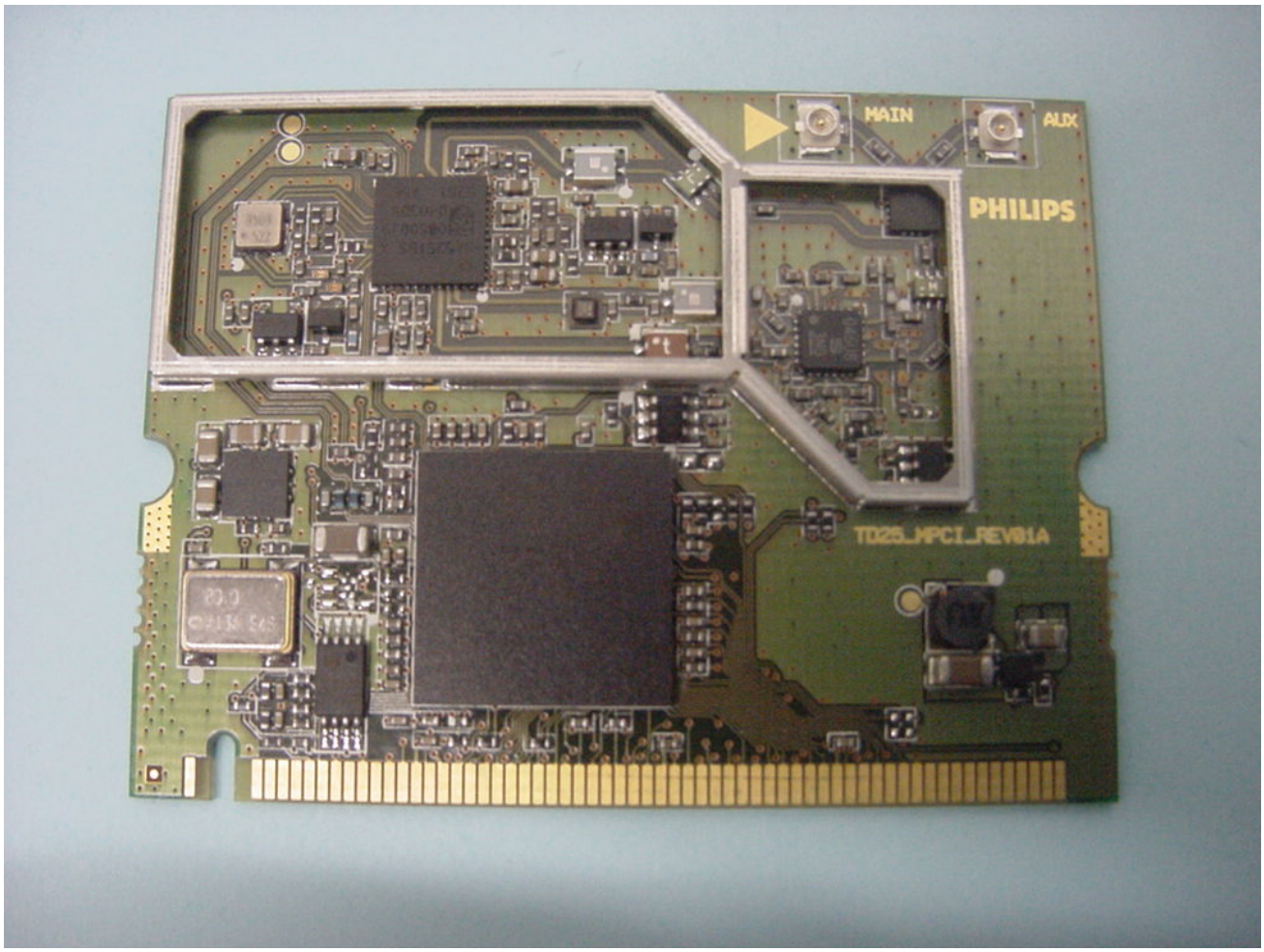


AC-conducted:

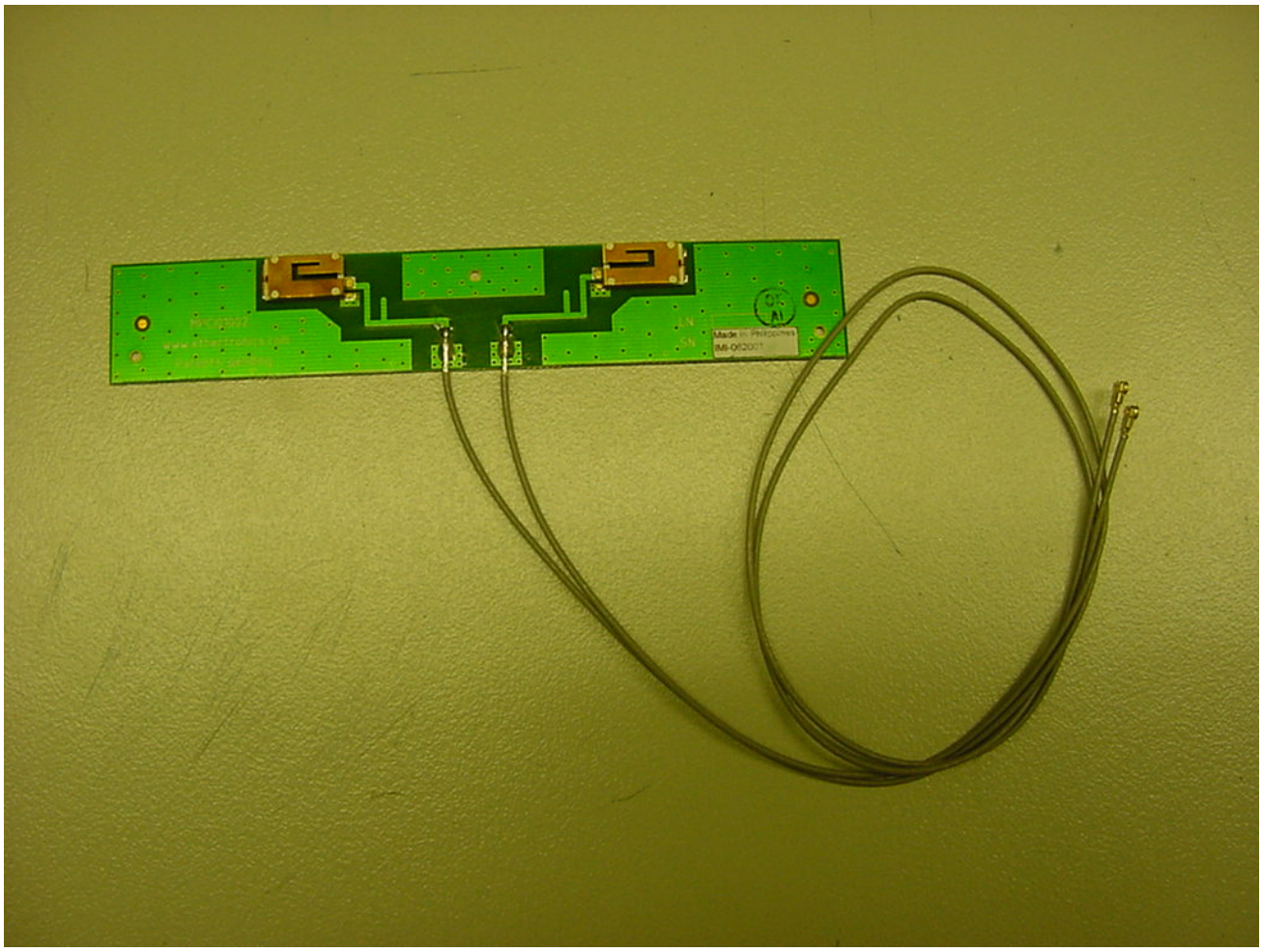


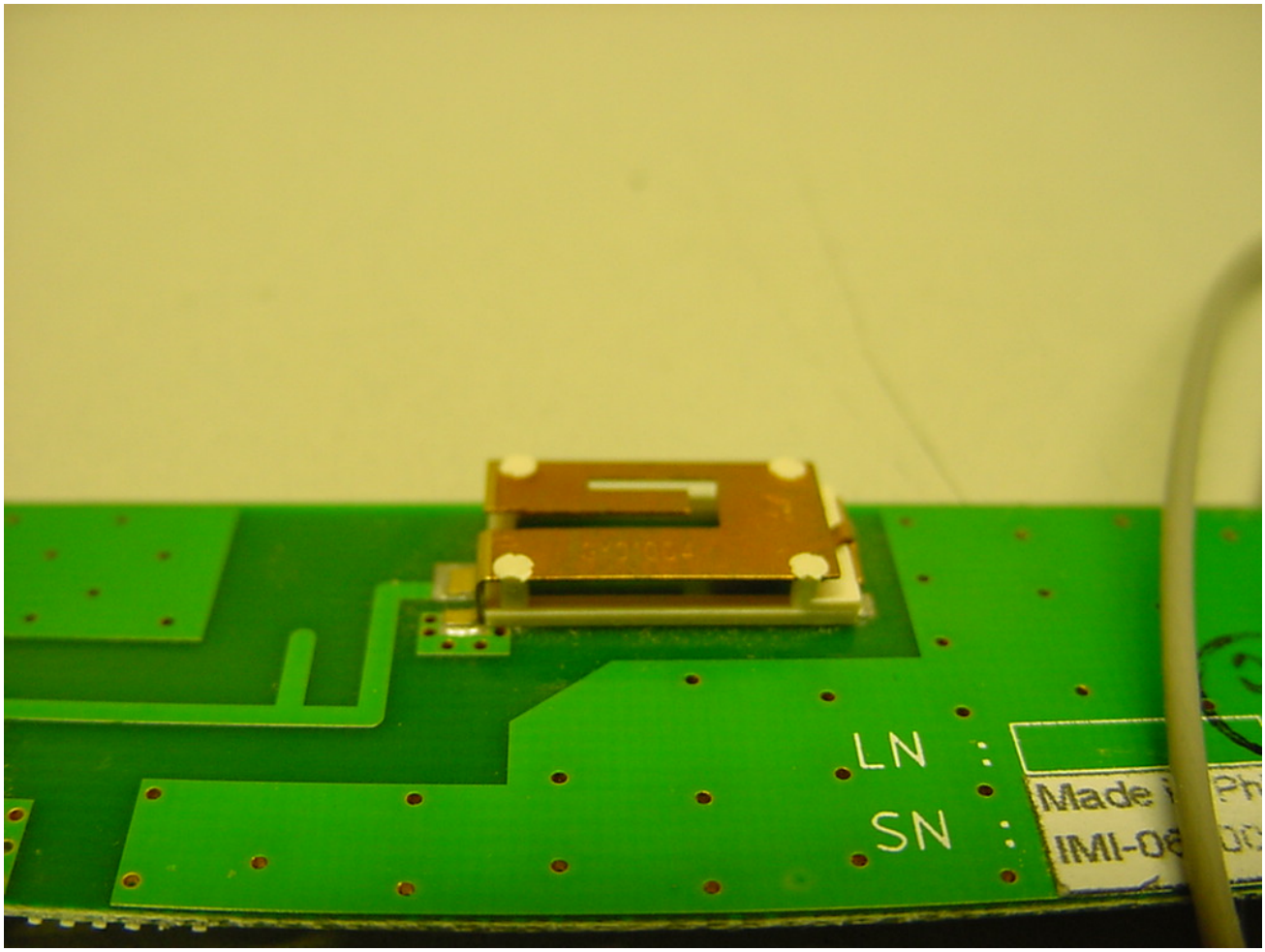
Test sample:


AT&S FU M
94V-0
3304
06-11-04-4F-27-89


MAIN
AUX
PHILIPS
TD25_MPCI_REV01A

Antenna Ethertronics




LN
SN