CETECOM ICT Services GmbH

Radio Satellite Communication
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Recognized by the
Federal Communications Commission
Anechoic chamber registration no: 90462 (FCC)
Anechoic chamber registration no: 3436 (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.: 2-3958-01-03/05
FCC Part 15.247 / CANADA RSS-210
D1705
FCC ID: HSS-WLAN-D1705

Table of Contents

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(for reference numbers see test equipment listing)
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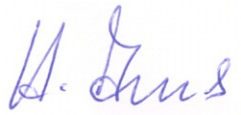
1 General information

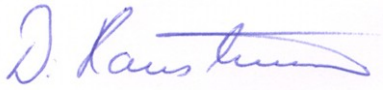
1.1 Notes

The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

Technical responsibility for area of testing :

Date	Section	Name	Signature
2005-07-05	RSC 8414	H. Ames	

Technical responsibility for area of testing :

Date	Section	Name	Signature
2005-07-05	RSC8412	D. Hausknecht	

1.2 Testing laboratory

CETECOM ICT Services GmbH
Untertürkheimer Straße 6 - 10
66117 Saarbrücken
Germany
Telefone : + 49 681 598 - 9100
Telefax : + 49 681 598 - 9075
E-mail : info@ict.cetecom.de
Internet : www.cetecom-ict.de
Accredited testing laboratory
DAR-registration number : TTI-P-G-081/94-D0
Accredited Bluetooth® Test Facility (BQTF)

1.3 Details of applicant

Name	**:**	Fujitsu Siemens Computers GmbH
Street	**:**	Bürgermeister-Ulrich-Str. 100
City	**:**	D-86199 Augsburg
Country	**:**	Germany
Telephone	**:**	+49 (0) 821 8 04-22 33
Telefax	**:**	+49 (0) 821 8 04-26 75
Contact	**:**	Mr. Robert Schauffler
Telephone	**:**	+49 (0) 821 8 04-22 33

1.4 Application details

Date of receipt of application	**:** 2005-05-19
Date of receipt of test item	**:** 2005-05-19
Date of test	**:** 2005-05-19 to 2005-05-20

1.5 Test item

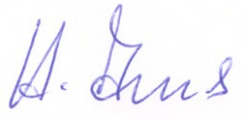
Type of equipment	:	**2.4 GHz WLAN USB card 802.11b/g**
Type designation	:	D1705
Manufacturer	:	**-applicant -**
Street	:	
City	:	
Country	:	
Serial number	:	
FCC ID	:	**HSS-WLAN-D1705**
Hardware	:	
Software	:	
Additional information	**:**	
Frequency	:	2412 – 2462 MHz
Type of modulation	:	16M6P7D (DSSS) / (OFDM) Ch. Sep. : 5 MHz
Number of channels	:	11
Antenna	:	integrated antenna on PCB
Power supply	:	5.0 V via USB port
Output power cond./rad.	:	DSSS System: 16.0 dBm / 17.0 dBm EIRP OFDM System:14.8 dBm / 17.8 dBm EIRP
Type of equipment	:	Class B
Temperature range	:	0°C - +45°C
Field strength peak	:	120.3 dBµV/m in 3m
Occupied bandwidth	:	DSSS: 10371 kHz OFDM: 16533 kHz
Temperature range	:	0°C - +40°C

1.6 Additional EUT information for IC Canada (appendix 2)

Company Number:	
Model Number:	
Product Name:	D1705
Manufacturer:	Fujitsu Siemens Computers GmbH Bürgermeister-Ulrich-Str. 100 D-86199 Augsburg Germany Mr. Robert Schauffler Phone: +49 (0) 821 8 04-22 33 Fax: +49 (0) 821 8 04-26 75 email: robert.schaufler@fujitsu-siemens.com
Tested to Radio Standards Specification (RSS) No.:	RSS-210
Open Area Test Site Industry Canada Number:	3463
Frequency Range (or fixed frequency) [MHz]:	2400 – 2483.5 MHz
Antenna Type:	integrated antenna on PCB
RF: Power [W] (max) DSSS:	Rad. EIRP: 0,050 Conducted : 0,040
RF: Power [W] (max) OFDM:	Rad. EIRP: 0,060 Conducted : 0,030
Occupied Bandwidth (99% BW) [kHz]:	DSSS Mode: 10371 OFDM Mode: 16533
Type of Modulation:	FSK
Emission Designator (TRC-43):	10M6P7D (DSSS) 16M6P7D (OFDM)
Transmitter Spurious (worst case) [µV/m in 3m]:	245.47
Receiver Spurious (worst case) [µV/m in 3m]:	33.49

ATTESTATION:
DECLARATION OF COMPLIANCE: I declare that the testing was performed or supervised by me; that the test
measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

Signature: H. Ames



Date: 2005-05-23

1.7 Test standards:

FCC Part 15 §15.247 / CANADA RSS-210

1.8 Test set-up:

We measured at 11 Mbit/s (DSSS) and 54 Mbit/s (OFDM) where necessary.

The tests were performed with a Laptop PC from the customer.

We used special test software from the customer to set the samples in the required modes.

We made conducted measurement with the test pc to show the influence of the sample to the AC line.

2. Technical test

2.1 Summary of test results

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 analyzers 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.

9 kHz – 150 kHz: Quasi Peak measurement, 200 Hz BW, loop antenna.

150 kHz - 30 MHz: Quasi Peak measurement, 9 kHz BW, 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 Hz, wave-guide horn

All measurement settings are according to FCC 15.35, 15.205, 15.209, 15.247 and the „Measurement guidelines for DSSS systems“.
No deviations from the technical specification(s) were ascertained in the course of the tests performed.

The product fulfills also the requirements for CANADA RSS-210.

FINAL VERDICT : PASS

2.2 Test Results

2.2.1 Antenna Gain § 15.204

The antenna gain of the complete system is calculated by the difference of conducted power of the module and the radiated power in EIRP with OFDM modulation.
Measured in the 5 ¼ inch mounting unit. (D1705A)

DSSS	low channel	mid channel	high channel
Conducted power	15.8 dBm	15.9 dBm	16.0 dBm
Radiated power	14.7 dBm	15.0 dBm	14.7 dBm
Gain	-1.1 dBi	-0.9 dBi	-1.3 dBi

OFDM	low channel	mid channel	high channel
Conducted power	14.7 dBm	14.2 dBm	14.8 dBm
Radiated power	15.7 dBm	13.4 dBm	13.7 dBm
Gain	-1.0 dBi	-0,8 dBi	-1.1 dBi

2.2.2 Spectrum Bandwidth of a DSSS System §15.247(a)

6 dB bandwidth

TEST CONDITIONS		6 dB BANDWIDTH (kHz)		
Frequency (MHz)		2412	2437	2462
T_{nom}(23.0)°C	V_{nom}(5.0)V	10371	10321	10321
Measurement uncertainty		±1kHz		

LIMIT **SUBCLAUSE §15.247(a) (2)**

The minimum 6dB bandwidth shall be at least 500 kHz

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2.2.3 Spectrum Bandwidth of an OFDM System §15.247(a)

6 dB bandwidth

TEST CONDITIONS		6 dB BANDWIDTH (kHz)		
Frequency (MHz)		2412	2437	2462
T_{nom}(23.0)°C	V_{nom}(5.0)V	16533	16533	16433
Measurement uncertainty		±1kHz		

LIMIT **SUBCLAUSE §15.247(a) (2)**

The minimum 6dB bandwidth shall be at least 500 kHz

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
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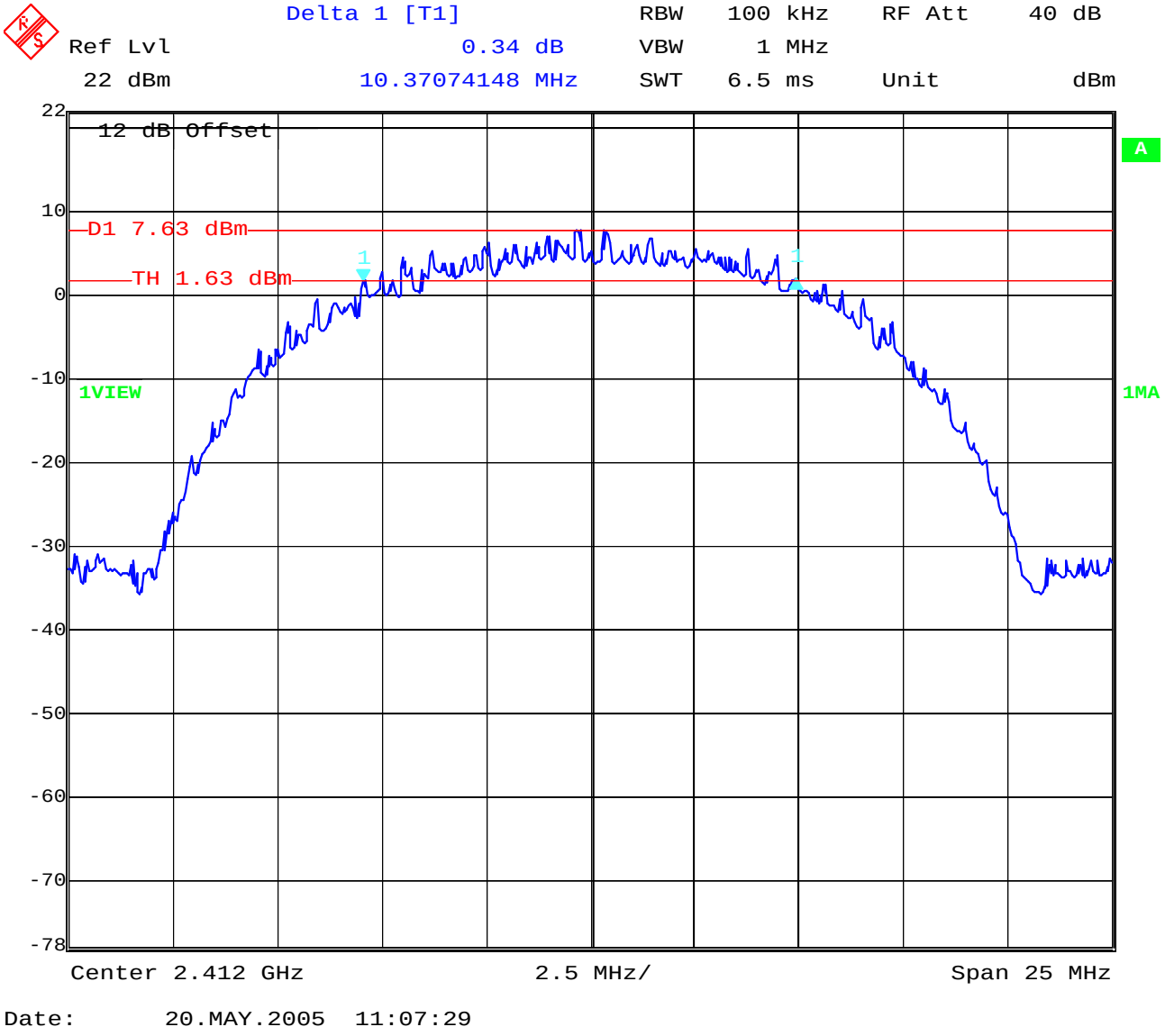
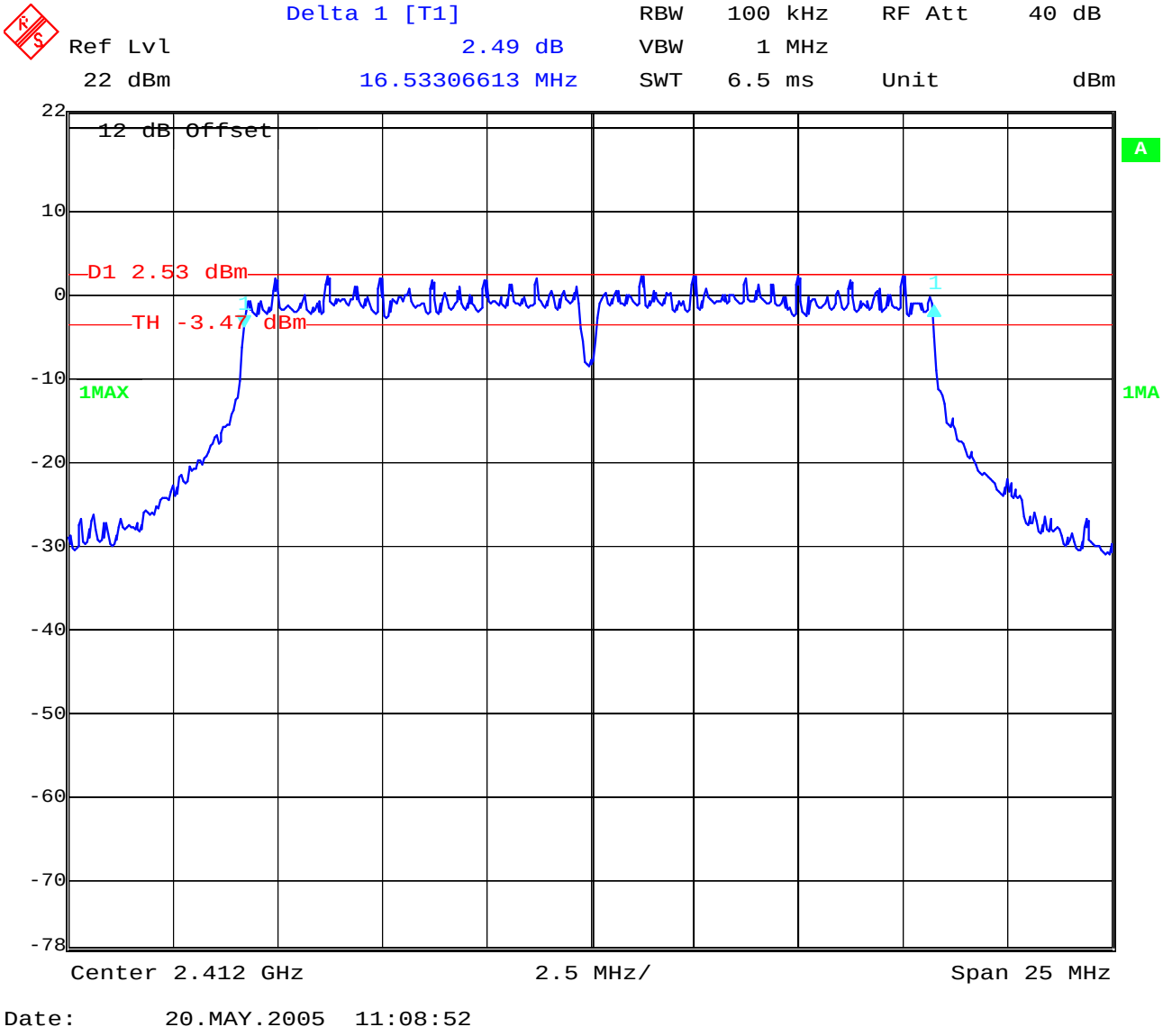
64

Channel 1



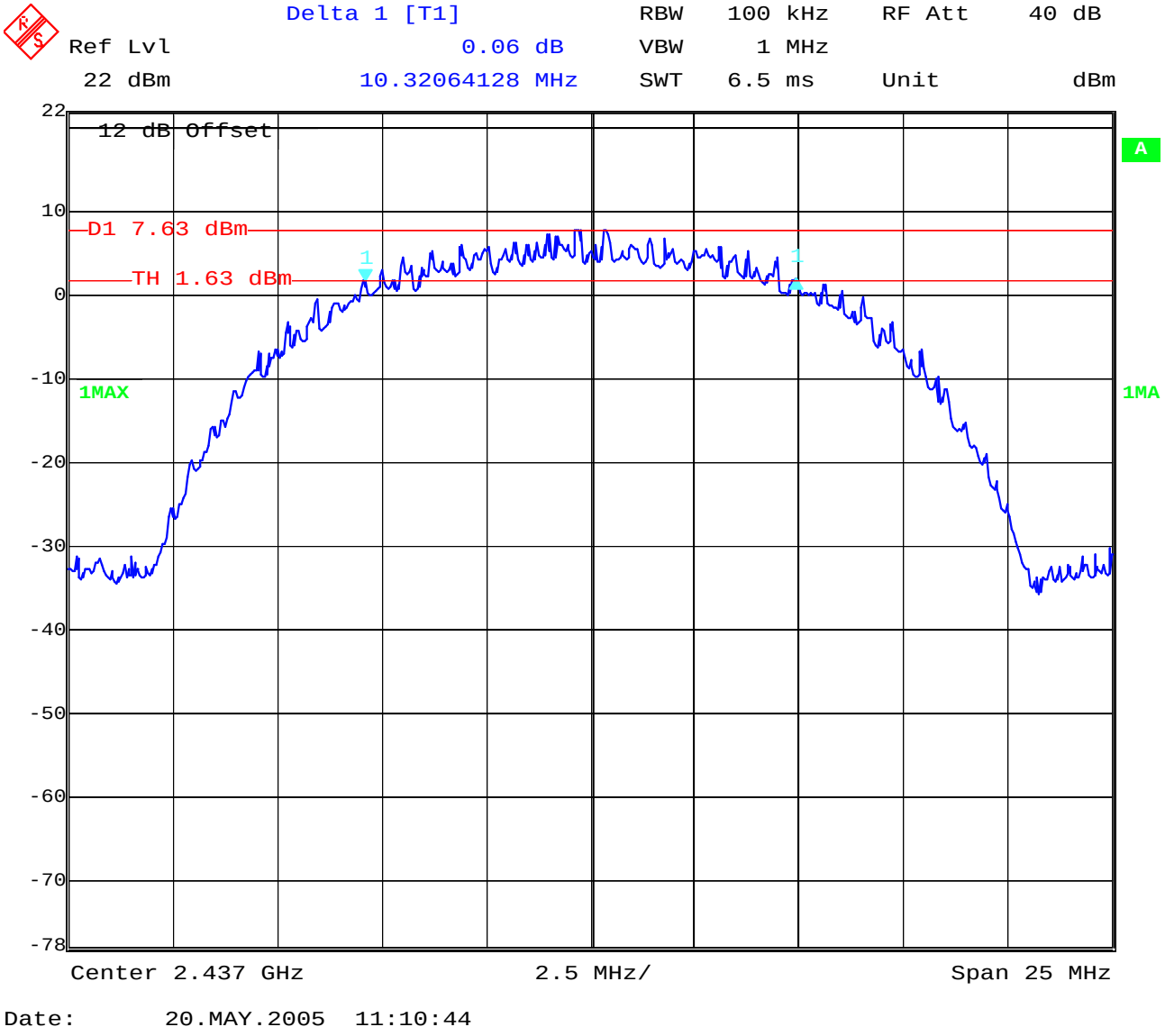
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Channel 1



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Channel 6



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
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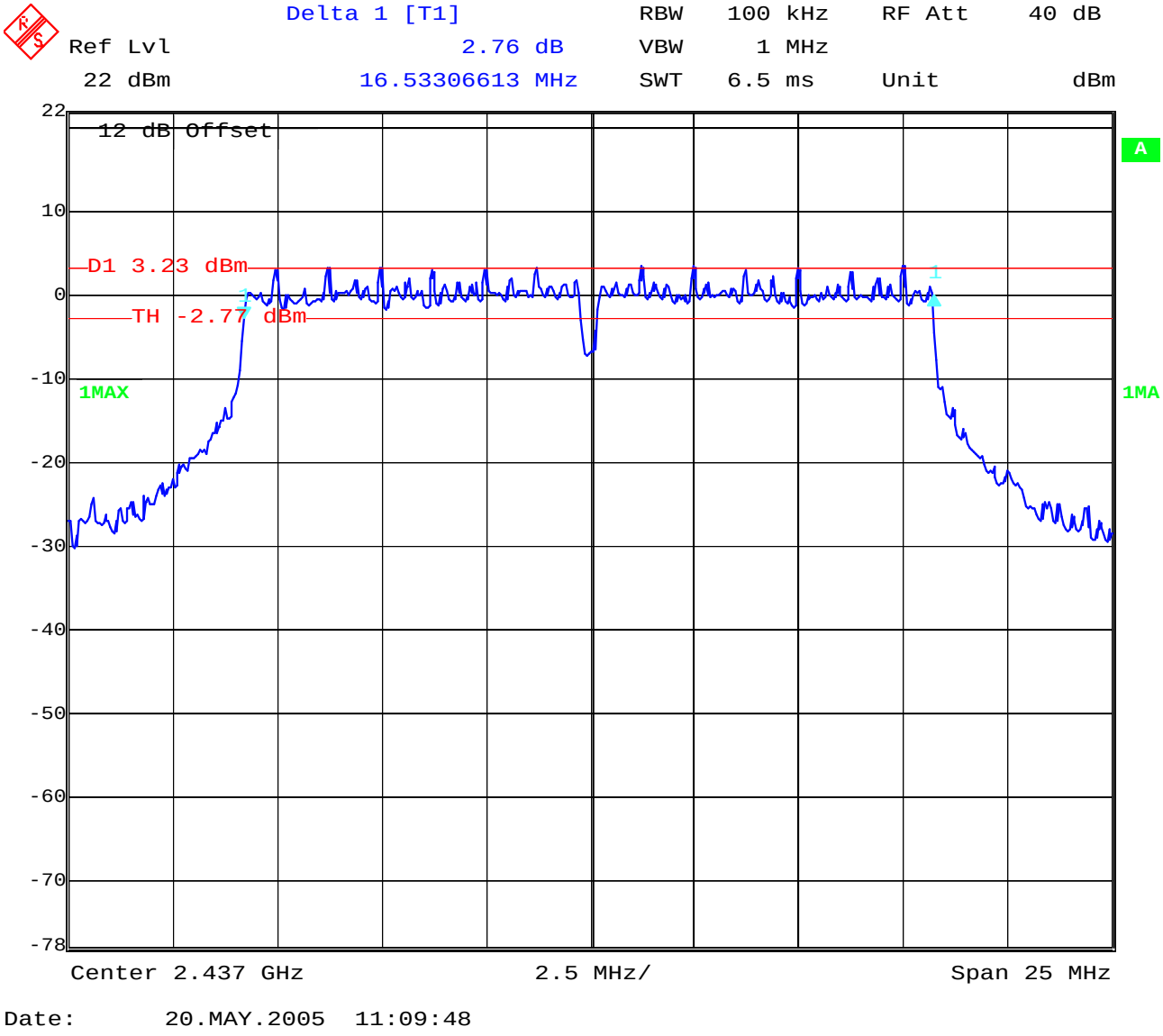
Channel 6



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
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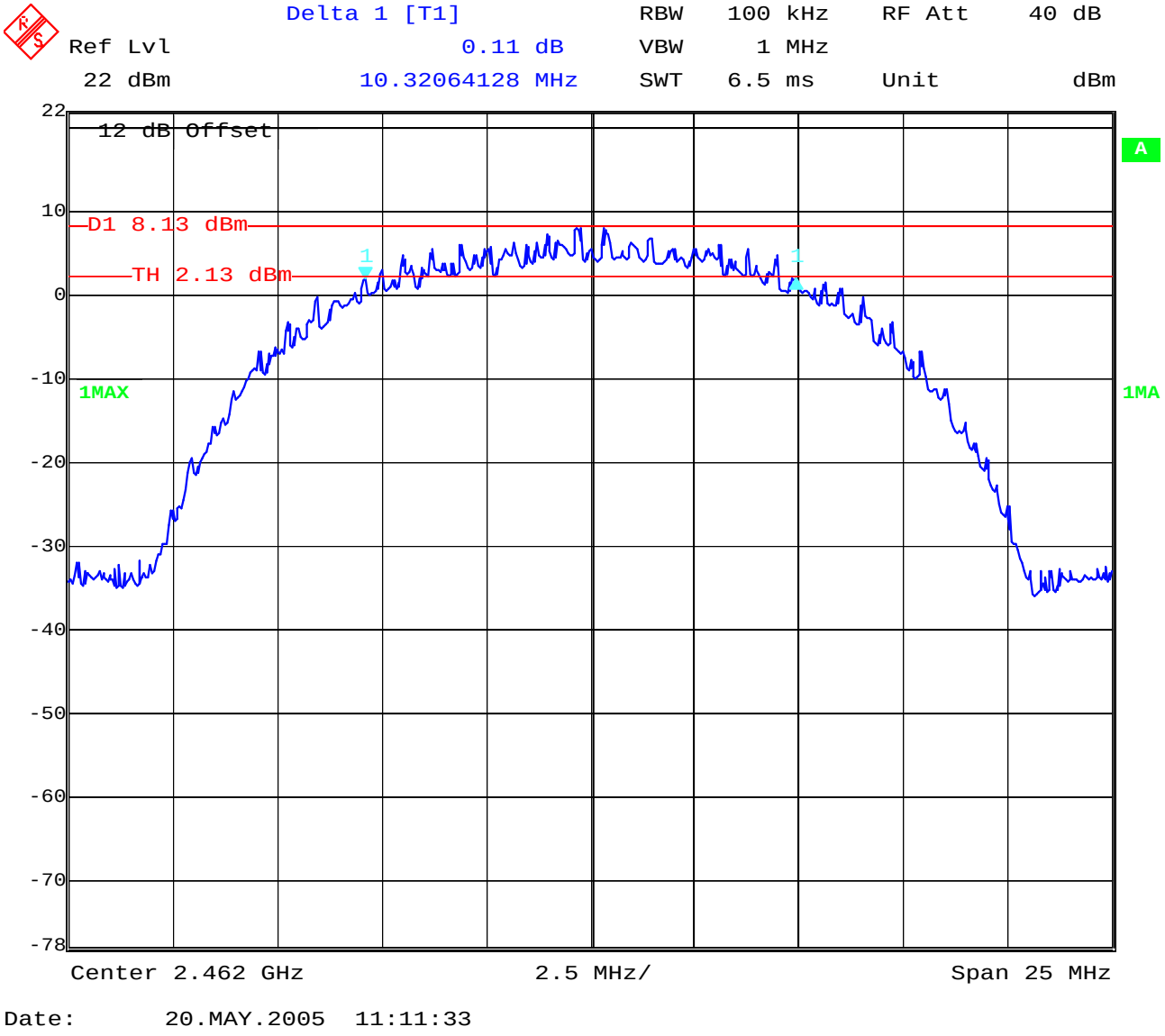
Channel 11:



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
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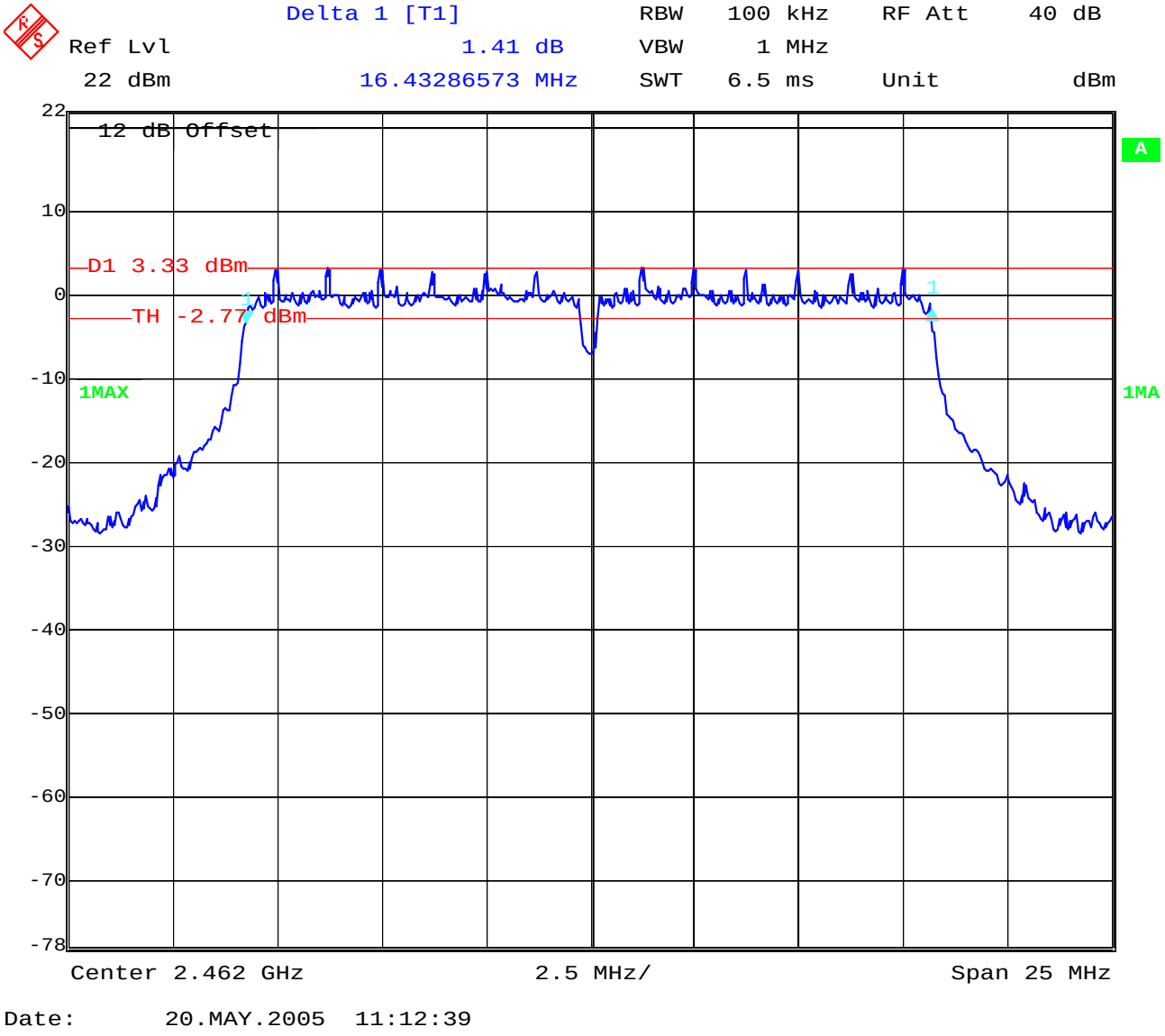
Channel 11:



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
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2.2.4 Maximum Peak Output Power § 15.247 (b) (1) (CONDUCTED)

DSSS System (measured with 10 MHz RBW/VBW)

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2412	2437	2462
T_{nom}(23.0)°C	V_{nom}(5.0)V	Peak :22.2 AV : 15.8	Peak :22.1 AV : 15.9	Peak :22.4 AV : 16.0
Measurement uncertainty		±0.5dB		

OFDM System
(measured with the channel power function of the analyzer with 16.5 MHz ChannelBW)

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2412	2437	2462
T_{nom}(23.0)°C	V_{nom}(5.0)V	Peak :21.2 AV : 14.7	Peak :21.3 AV : 14.2	Peak :22.1 AV : 14.8
Measurement uncertainty		±0.5dB		

RBW/VBW : 1 MHz

The channel power measurement integrates all measured points within the selected channel-BW. This delivers the same results as measured with smaller BW and correction factor.

The average value was measured with the RMS-detector of the analyzer.

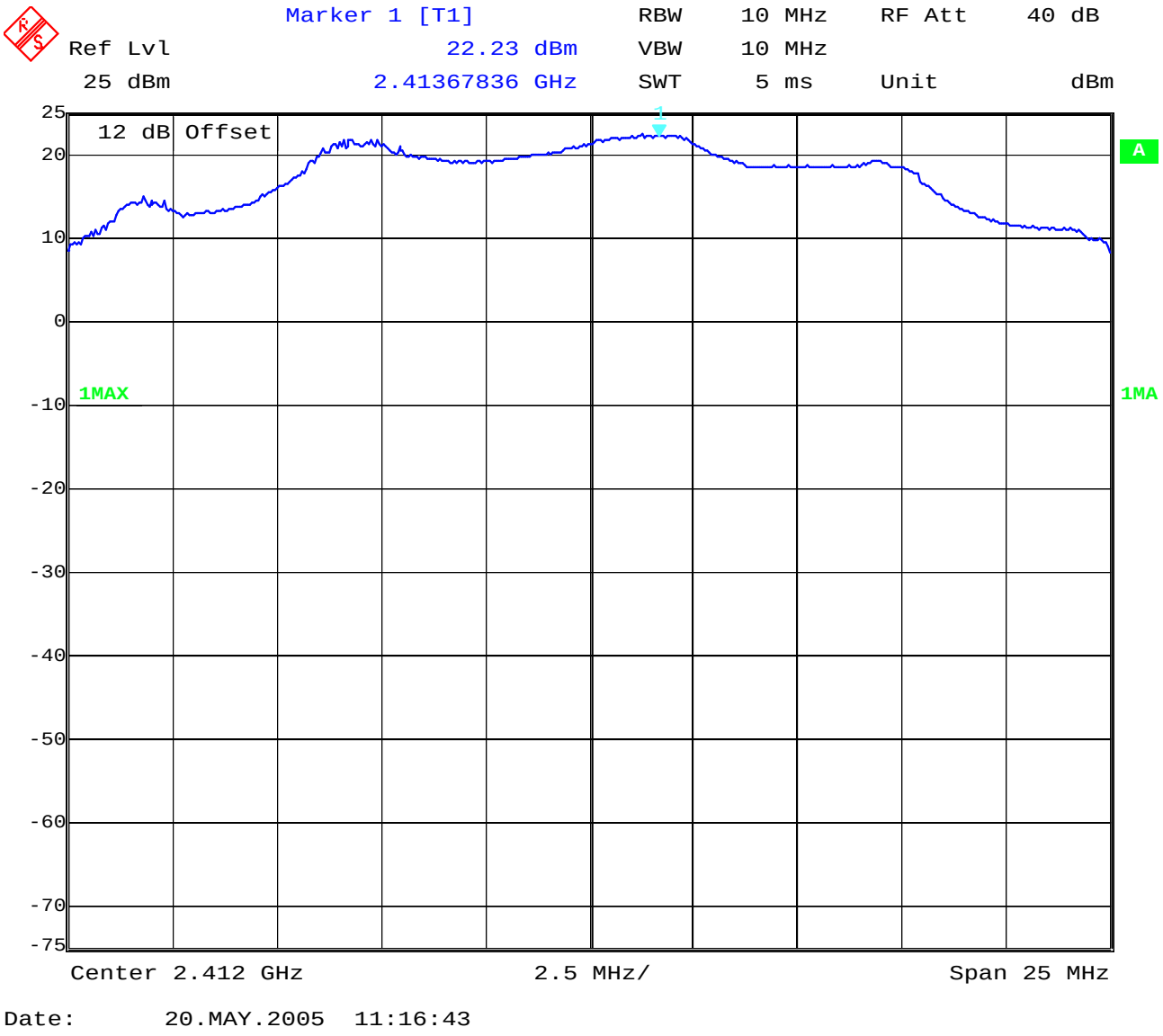
LIMIT **SUBCLAUSE § 15.247 (b) (1)**

Frequency range	RF power output
2400-2483.5 MHz	1.0 Watt/ 30dBm

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

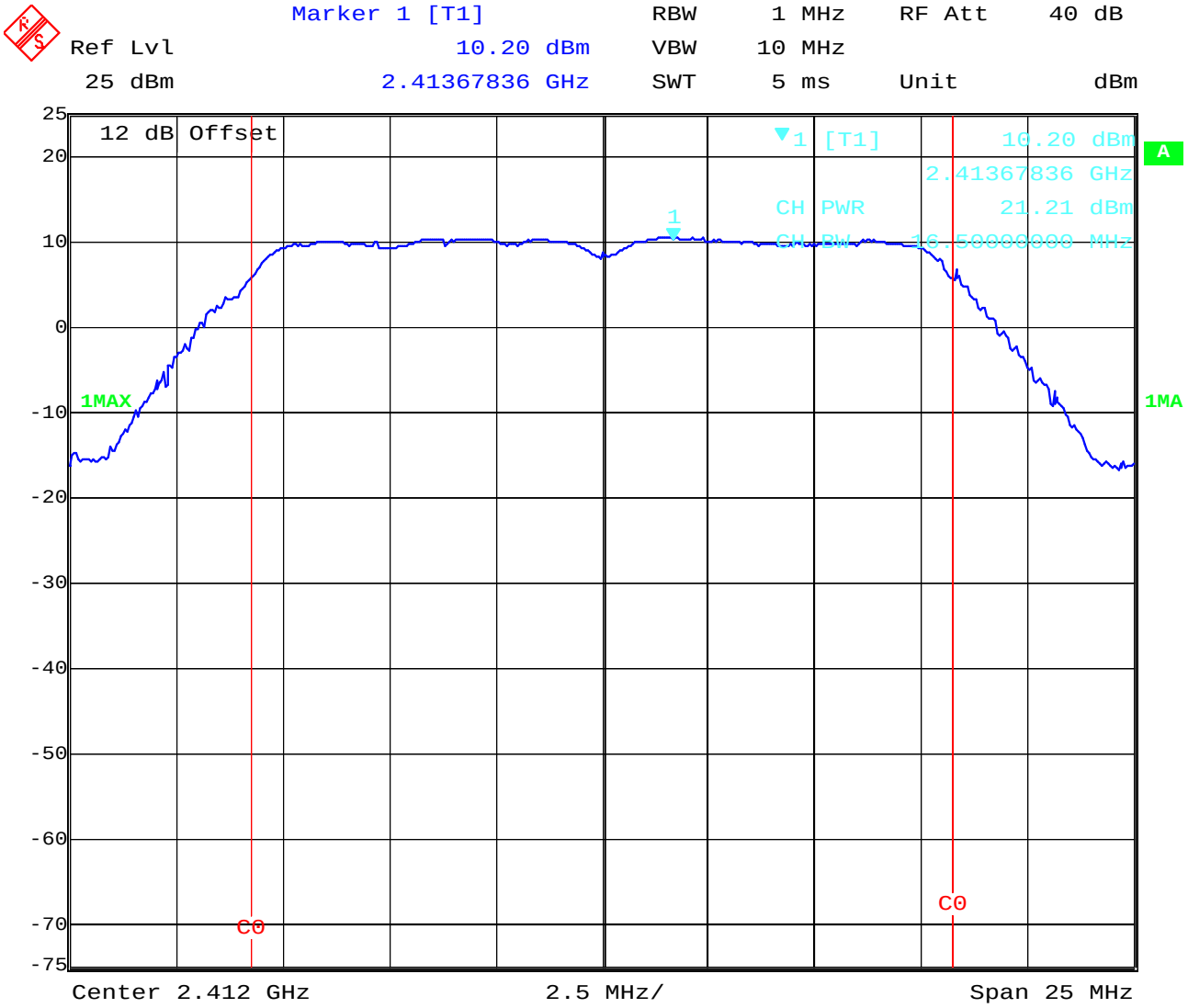
DSSS System (CONDUCTED)

low channel peak



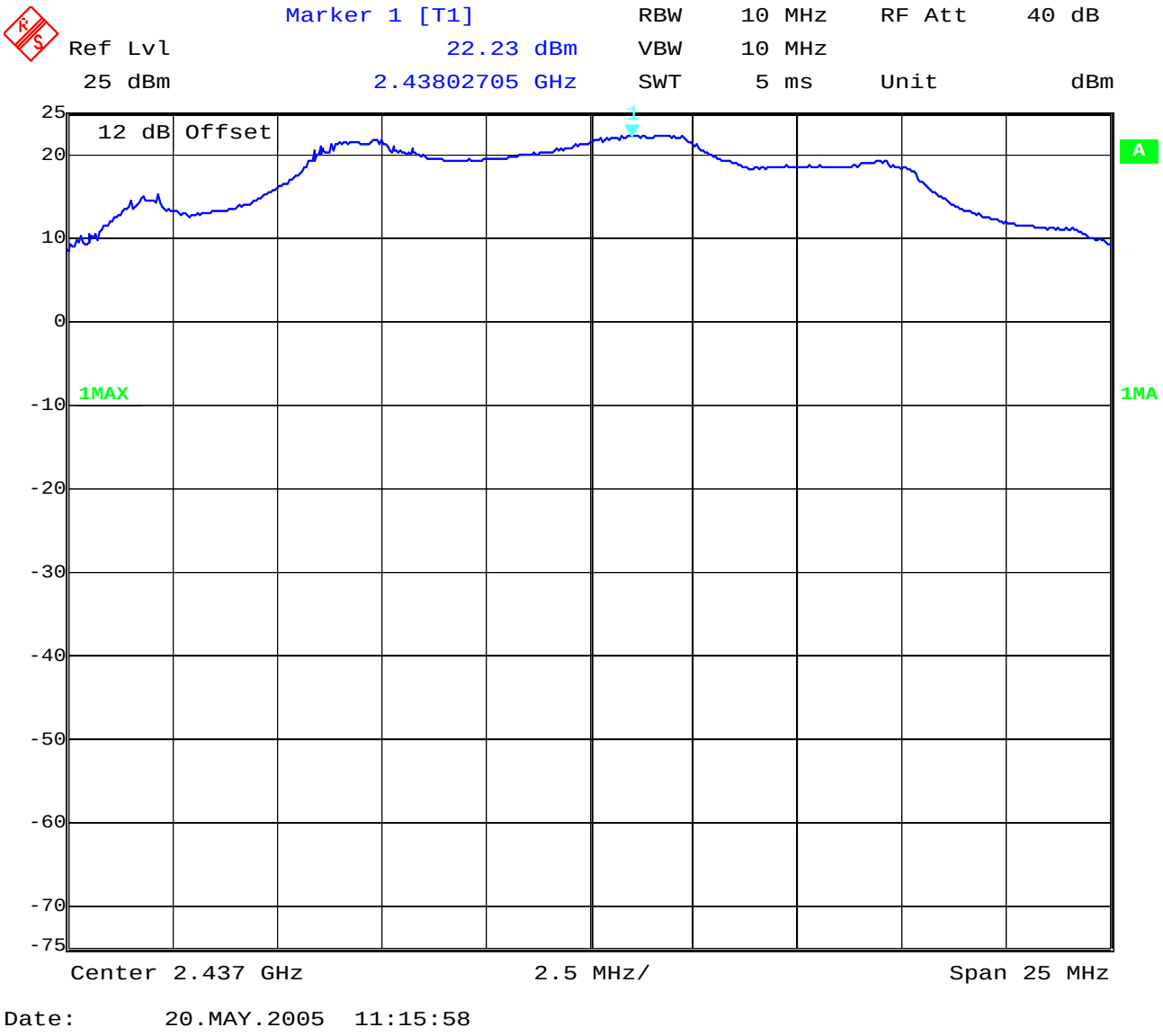
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

OFDM System (CONDUCTED)
low channel peak



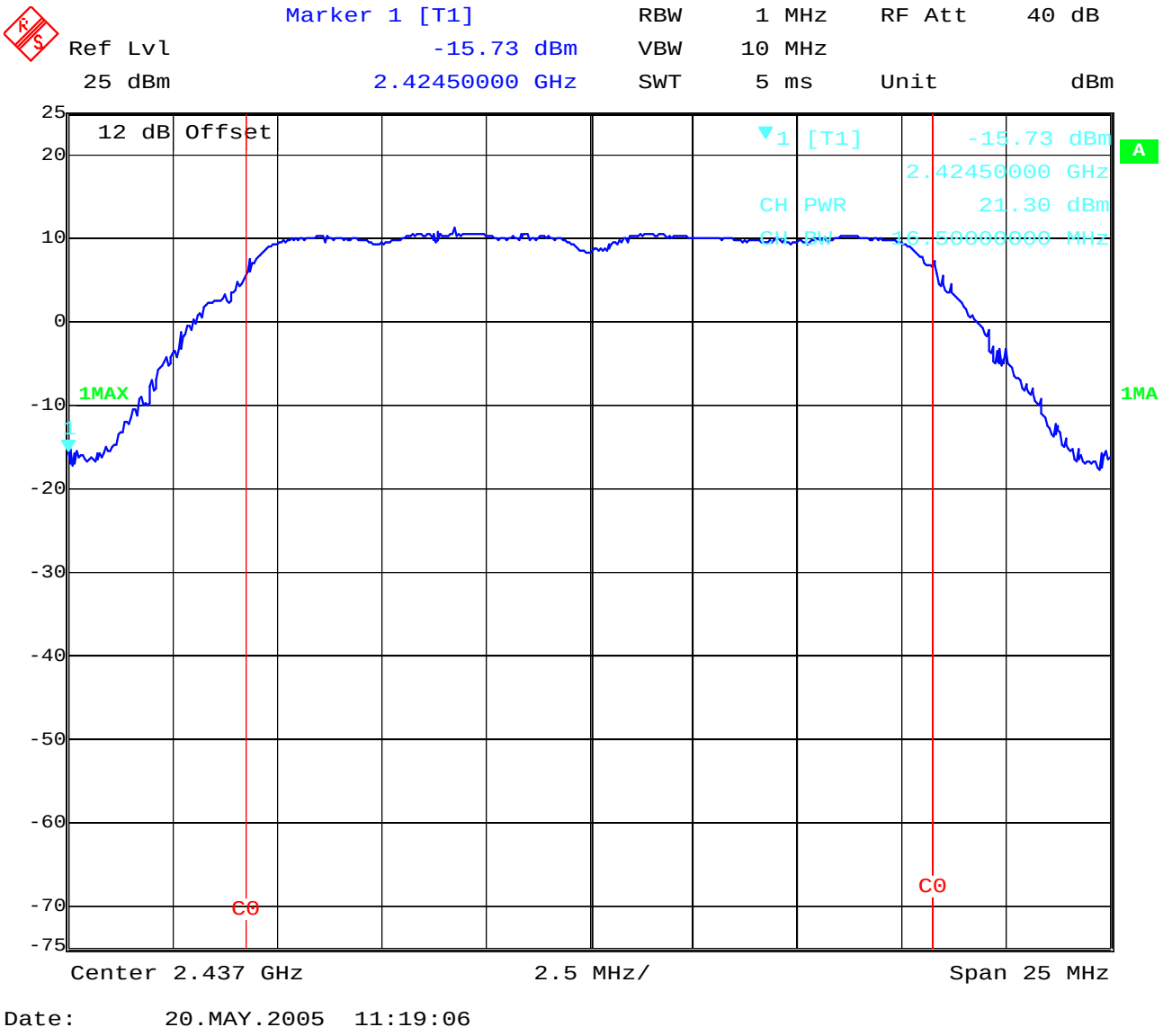
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

DSSS System (CONDUCTED)
mid channel peak



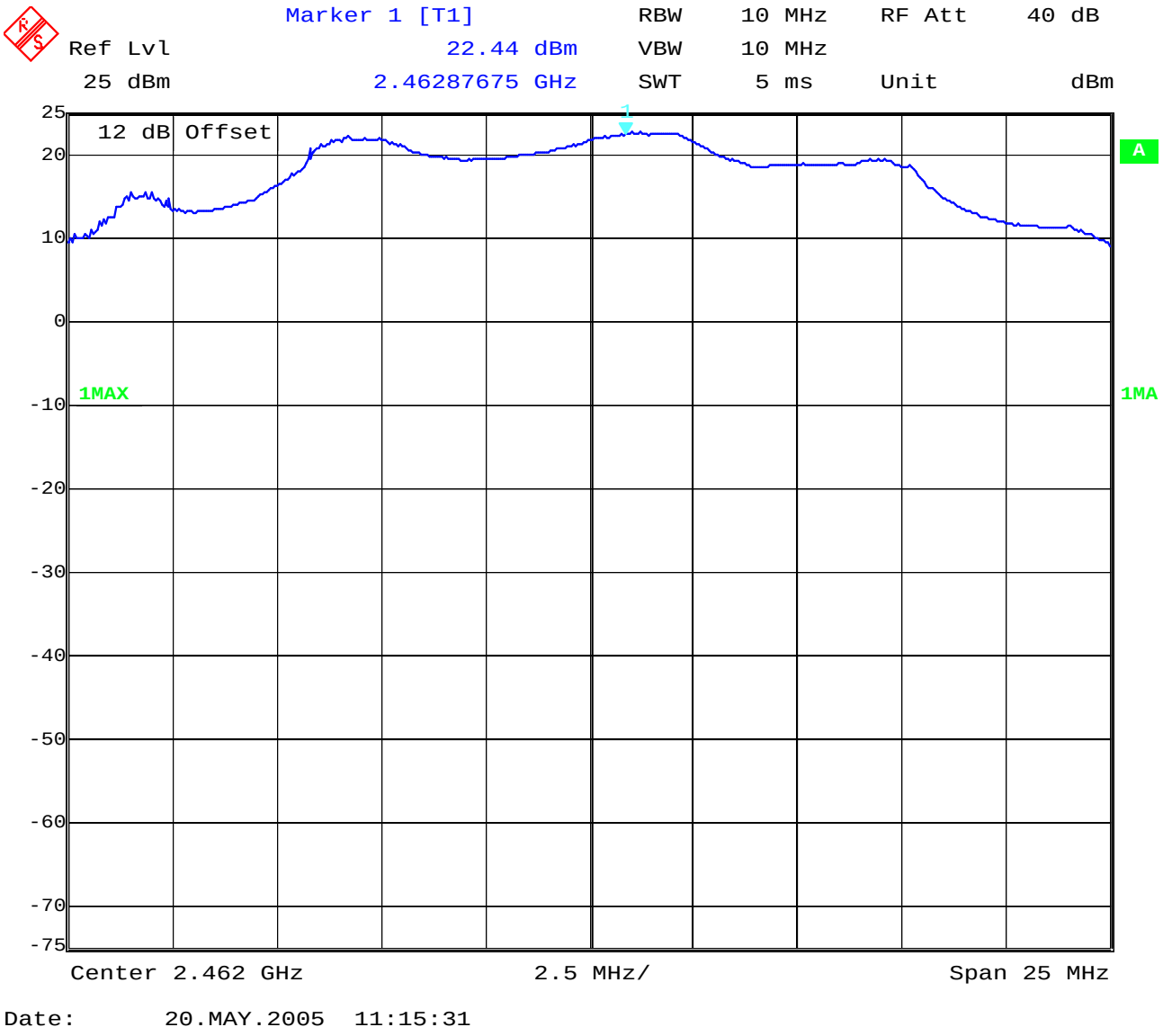
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

OFDM System (CONDUCTED)
mid channel peak



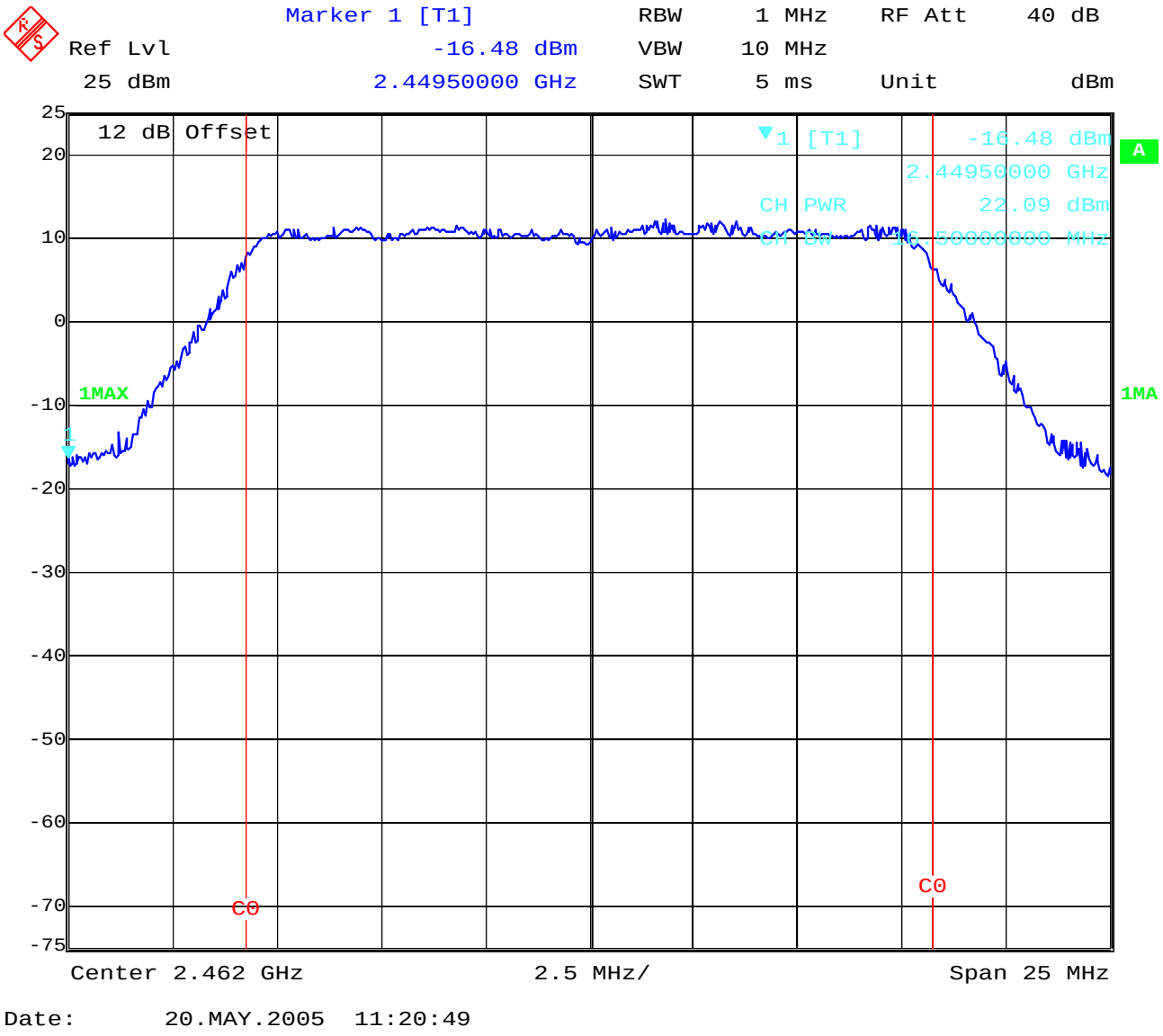
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

DSSS System (CONDUCTED)
high channel peak



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

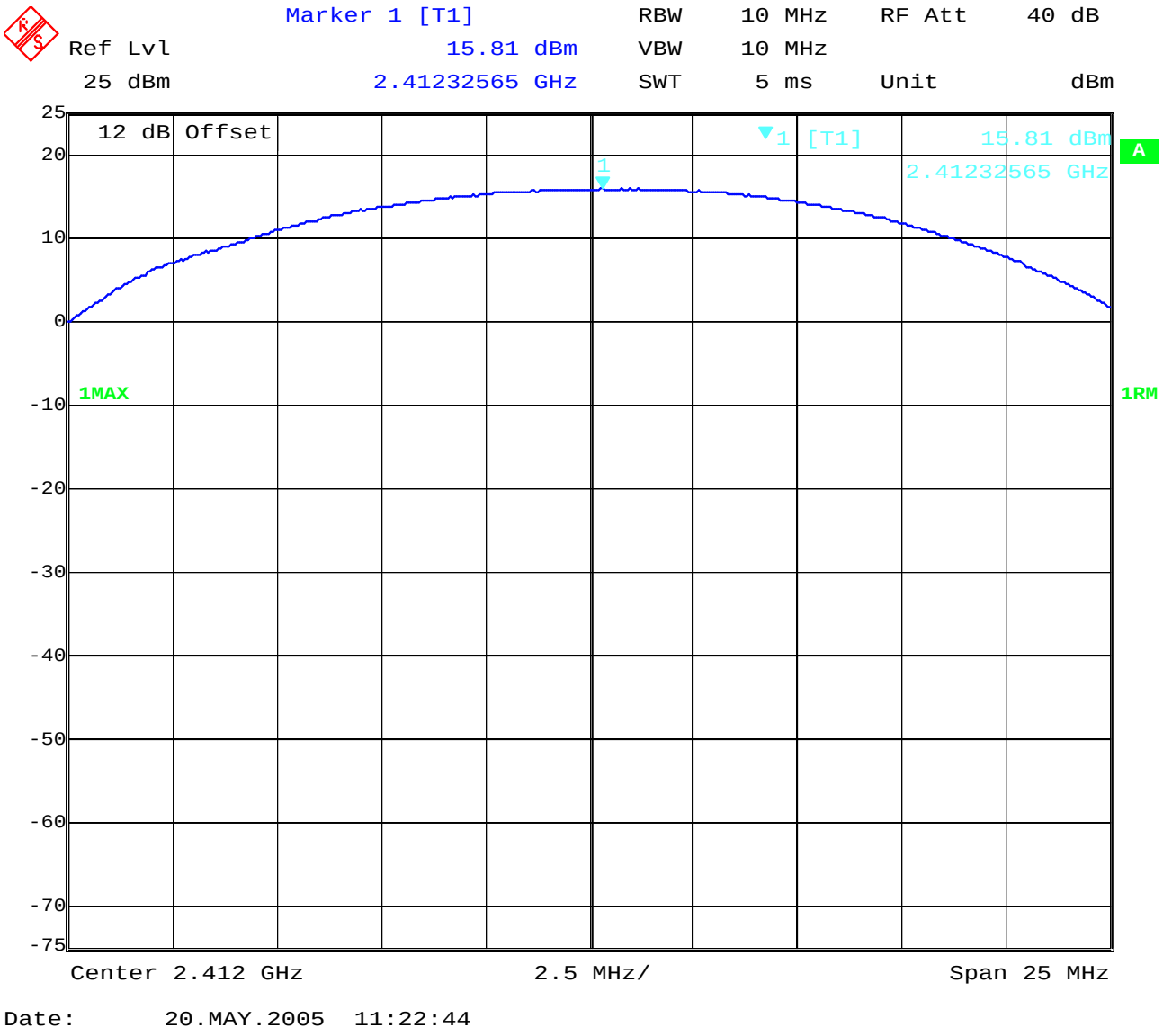
OFDM System (CONDUCTED)
high channel peak



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

DSSS System (CONDUCTED)

low channel AV



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(for reference numbers see test equipment listing)
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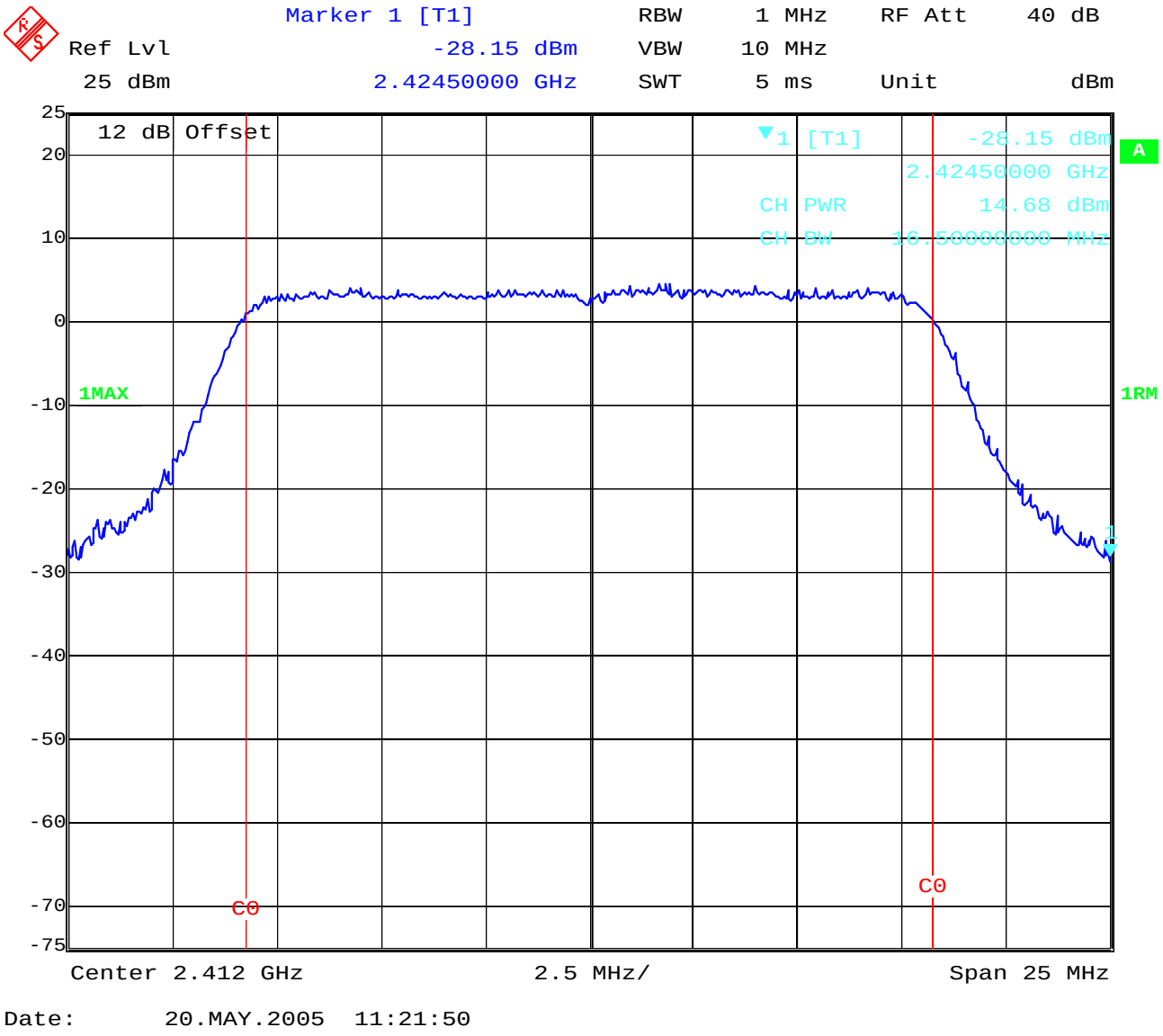
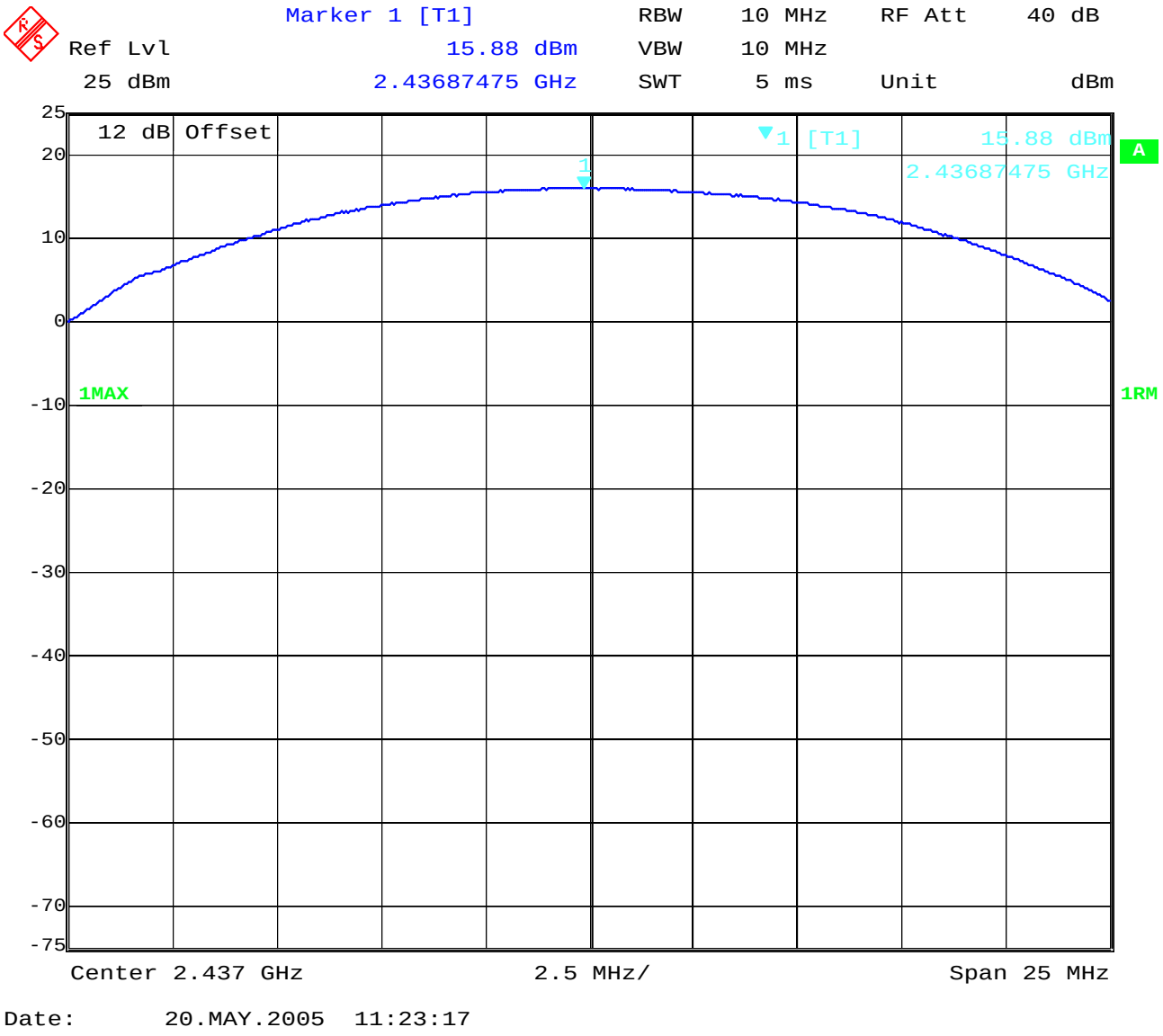
OFDM System (CONDUCTED)
low channel AV



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

DSSS System (CONDUCTED)
mid channel AV



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
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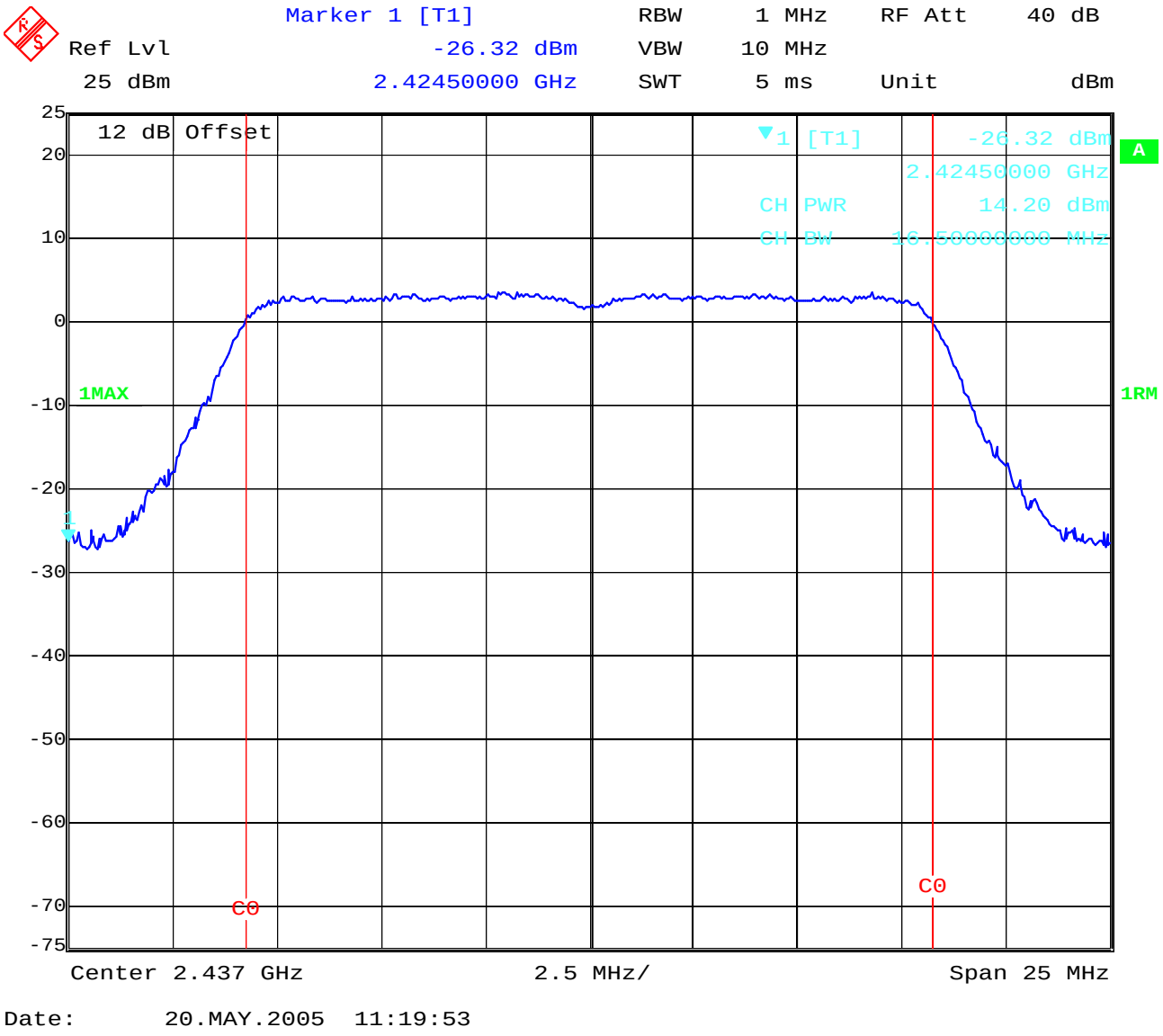
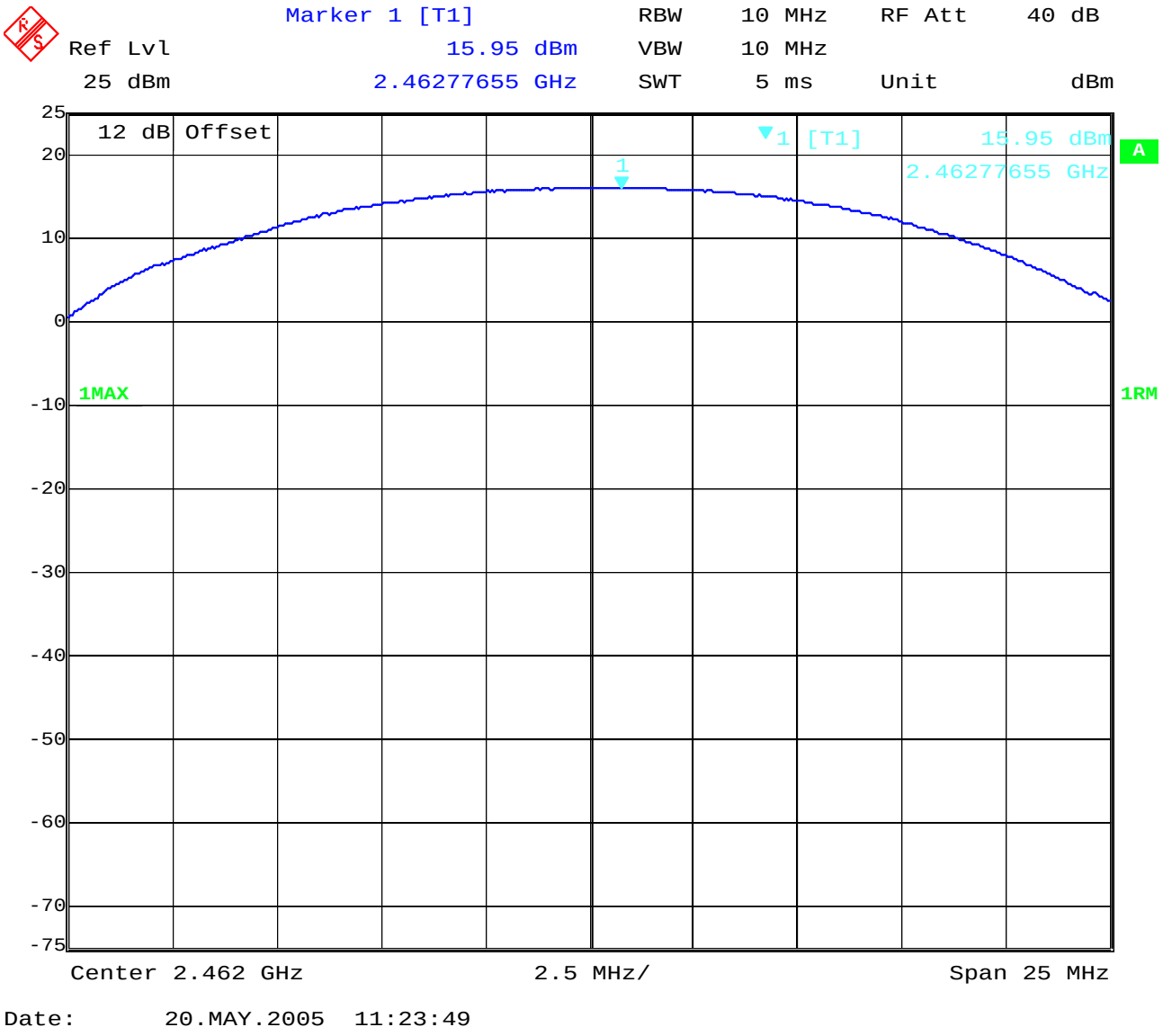
64

OFDM System (CONDUCTED)
mid channel AV



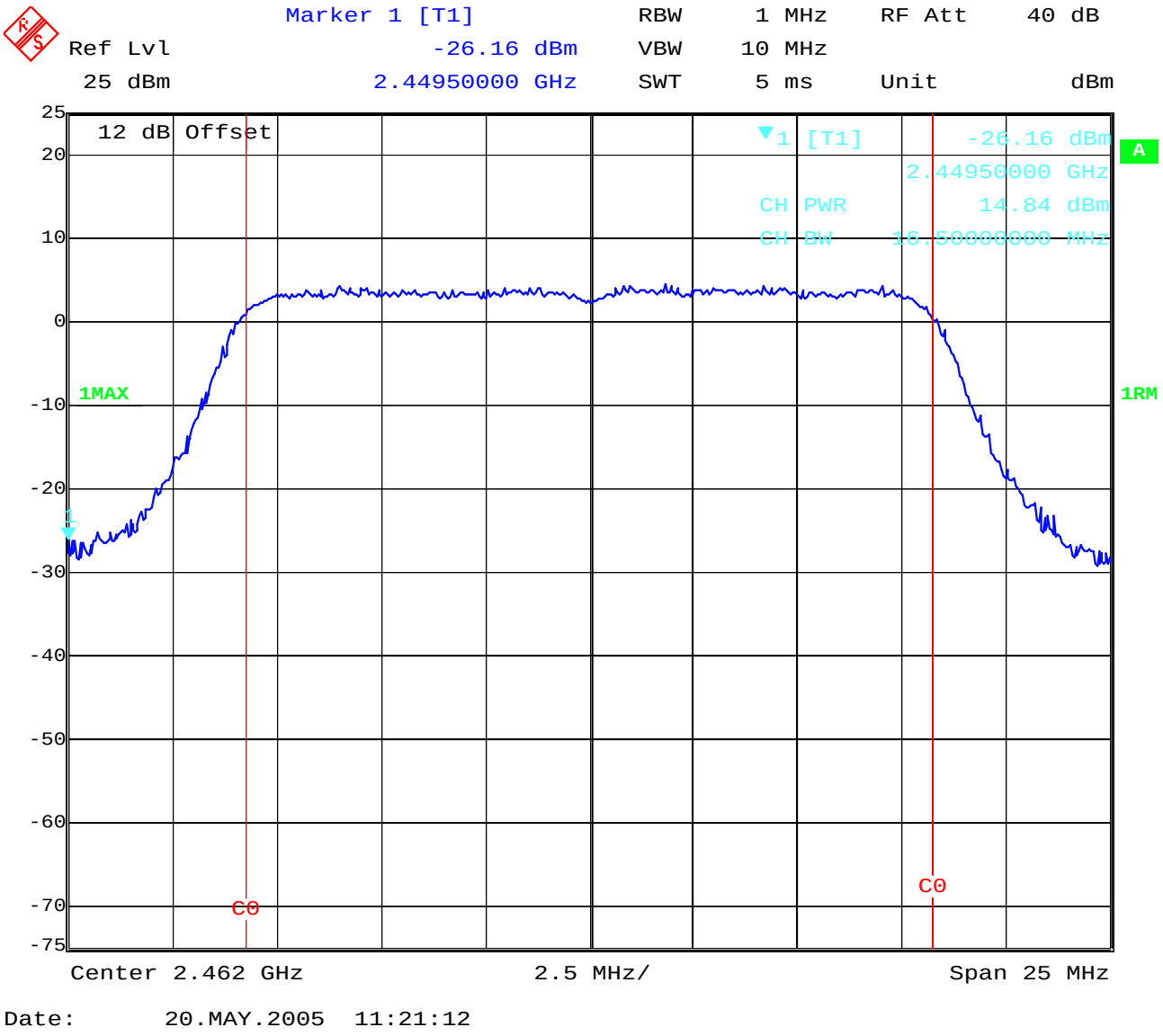
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

DSSS System (CONDUCTED)
high channel AV



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

OFDM System (CONDUCTED)
high channel AV



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Maximum Peak Output Power Radiated **SUBCLAUSE § 15.247 (b) (1)**
measured in a 5 ¼ Inch Housing

DSSS System (measured with 3 MHz RBW/VBW at the analyzer)

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (mW)		
Frequency (MHz)		2412	2437	2462
T_{nom}(23.0)°C	V_{nom}(5.0)V	14.1 mW 11.5 dBm	15.1 mW 11.8 dBm	14.1 mW 11.5 dBm
Correction factor		+5.2 dB		
Final corrected result		46.8 mW 16.7 dBm	50.1 mW 17.0 dBm	46.8 mW 16.7 dBm
Measurement uncertainty		±3dB		

OFDM System (measured with 3 MHz RBW/VBW at the analyzer)

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (mW)		
Frequency (MHz)		2412	2437	2462
T_{nom}(23.0)°C	V_{nom}(5.0)V	8.9 mW 9.5 dBm	8.7 mW 9.4 dBm	7.9 mW 8.9 dBm
Correction factor		+7.3 dB		
Final corrected result		47.9 mW 16.8 dBm	46.7 mW 16.7 dBm	41.7 mW 16.2 dBm
Measurement uncertainty		±3dB		

The correction factor is calculated by 10*log (measured BW / used BW) (dB)
=> 5.2 dB for DSSS (10 MHz OBW) and 7.3 dB for OFDM (16.5 MHz OBW)

Measured at a distance of 3m

LIMIT **SUBCLAUSE § 15.247 (b) (1)**

Frequency range	RF power output
2400-2483.5 MHz	**1.0 Watt / 30 dBm**

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Maximum Peak Output Power Radiated § 15.247 (b) (1)

DSSS System

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (mW)		
Frequency (MHz)		2412	2437	2462
T_{nom}(23.0)°C	V_{nom}(5.0)V	17.8 mW 12.5 dBm	19.1 mW 12.8 dBm	17.8 mW 12.5 dBm
Correction factor		+5.2 dB		
Final corrected result		58.9 mW 17.7 dBm	63.1 mW 18.0 dBm	58.9 mW 17.7 dBm
Measurement uncertainty		±3dB		

OFDM System (measured with 3 MHz RBW/VBW at the analyzer)

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (mW)		
Frequency (MHz)		2412	2437	2462
T_{nom}(23.0)°C	V_{nom}(5.0)V	11.2 mW 10.5 dBm	11.0 mW 10.4 dBm	9.8 mW 9.9 dBm
Correction factor		+7.3 dB		
Final corrected result		60.3 mW 17.8 dBm	58.9 mW 17.7 dBm	52.5 mW 17.2 dBm
Measurement uncertainty		±3dB		

The correction factor is calculated by 10*log (measured BW / used BW) (dB)
=> 5.2 dB for DSSS (10 MHz OBW) and 7.3 dB for OFDM (16.5 MHz OBW)
Measured at a distance of 3m

LIMIT **SUBCLAUSE § 15.247 (b) (1)**

Frequency range	RF power output
2400-2483.5 MHz	**1.0 Watt / 30 dBm**

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
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MPE calculation

These equations are generally accurate in the far field of an antenna but will over predict power density in the near field, where they could be used for making a "worst case" prediction.

$$S = PG/4\pi R^2$$

where S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units e.g. mW)
G = power gain of the antenna in the direction of interest relative to the isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units e.g. cm)

or,

$$S = EIRP/4\pi R^2$$

where EIRP = equivalent isotropically radiated power

Calculation:

(Calculated for max. EIRP)

EIRP: 18.0 dBm (63.1 mW)

calculated at distance of 20 cm

power density = $63.1/4\pi 20^2$

= $\underline{0.013\ mW/\ cm^2}$

Limit:

1mW/ cm^2 is the reference level for general public exposure according to the OET Bulletin 65, Edition 97-01 Table 1.

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2.2.5 Power spectral density §15.247 (d)

DSSS System

TEST CONDITIONS		RF POWER LEVEL IN 3 kHz BW		
Frequency (MHz)		2412	2437	2462
T_{nom}(22.4)°C	V_{nom}(5.0)V	-18.2 dBm	-17.8 dBm	-18.0 dBm
Measurement uncertainty		±3dB		

OFDM System

TEST CONDITIONS		RF POWER LEVEL IN 3 kHz BW		
Frequency (MHz)		2412	2437	2462
T_{nom}(22.4)°C	V_{nom}(5.0)V	-25.5 dBm	-24.3 dBm	-25.2 dBm
Measurement uncertainty		±3dB		

Measured with the marker noise function of the analyzer.

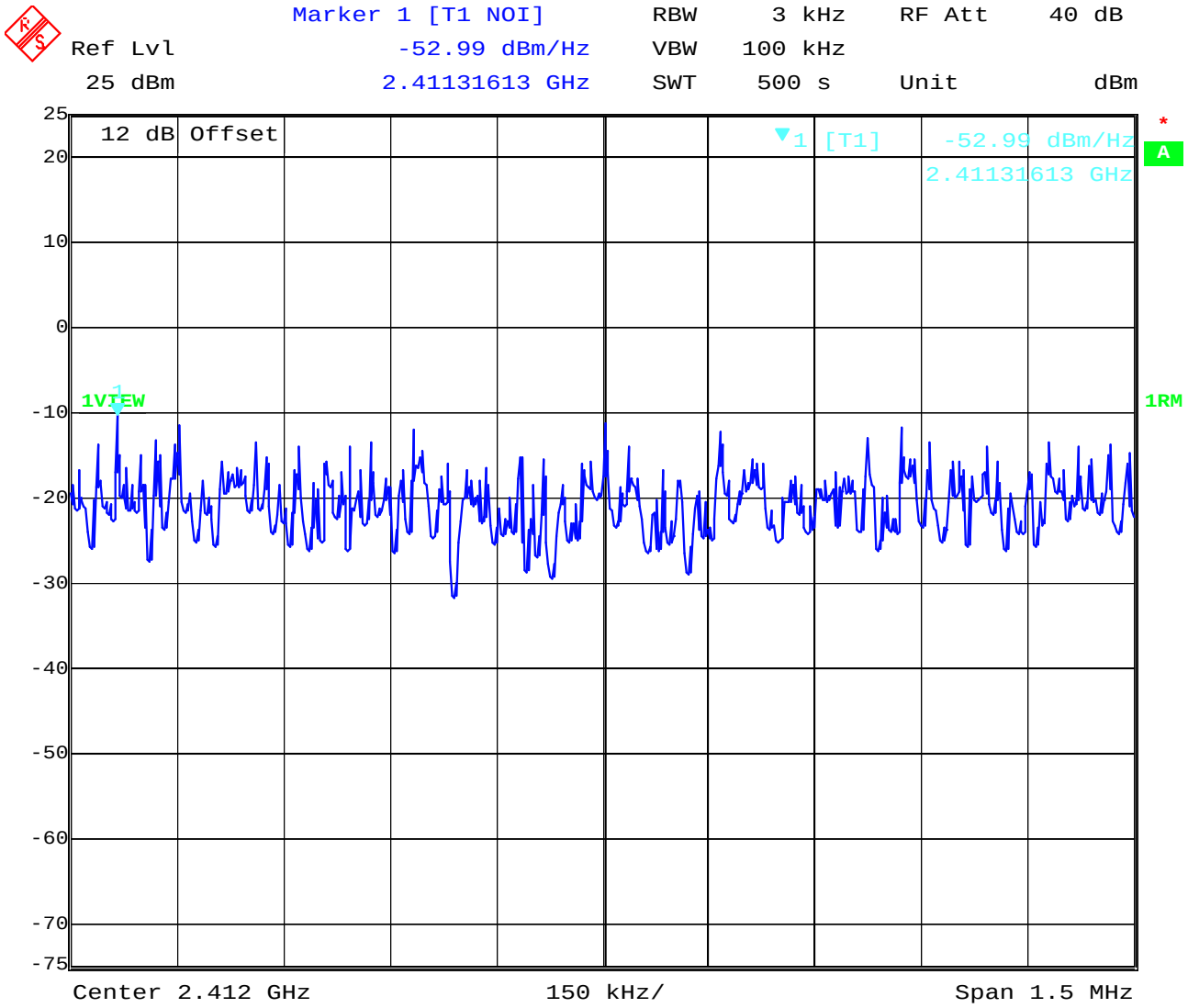
The correction factor from 1 Hz to 3 kHz is +34.8 dB.

LIMIT **SUBCLAUSE §15.247(d)**

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

2412 MHz
DSSS System



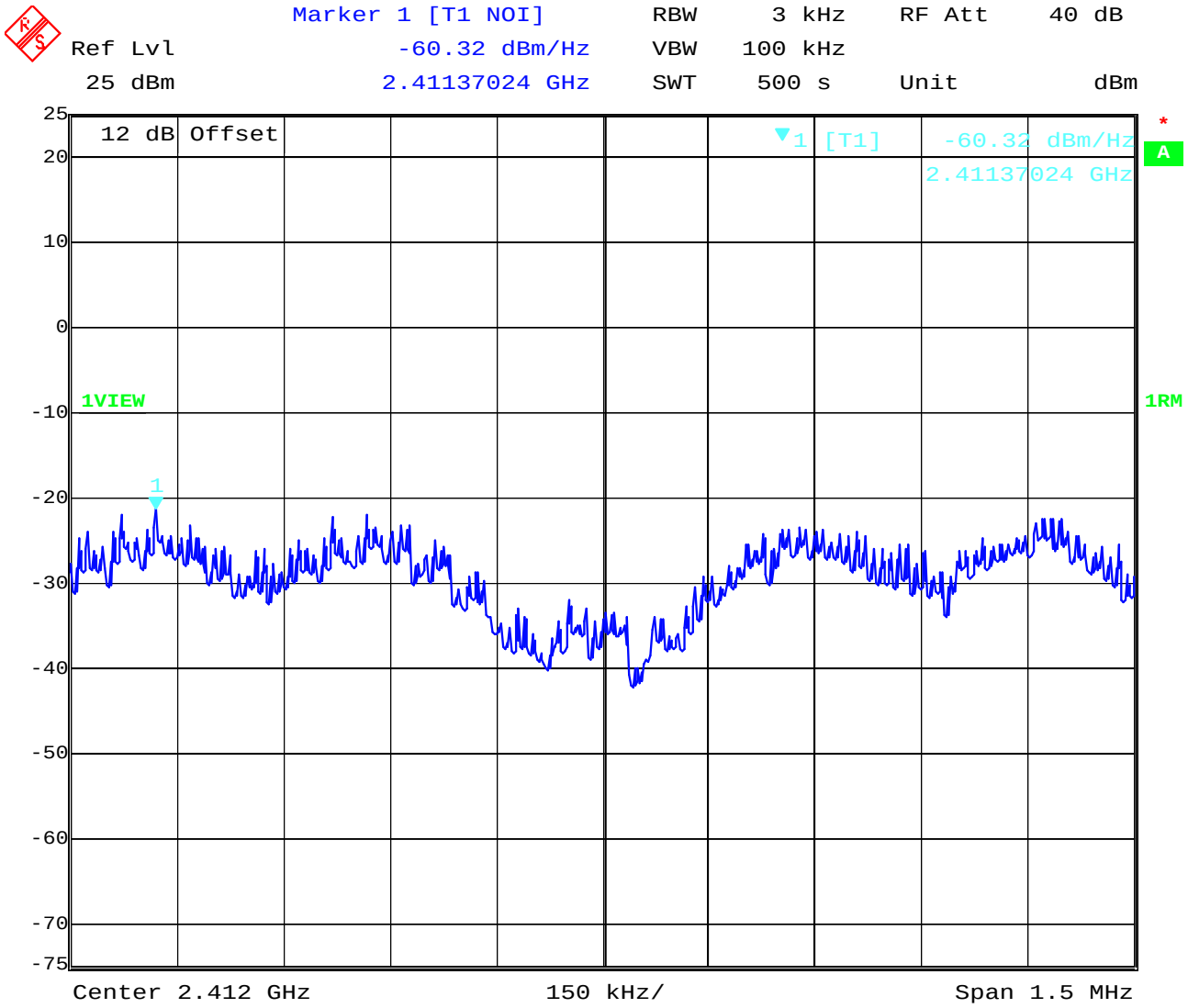
Date: 20.MAY.2005 11:30:47

LIMIT **SUBCLAUSE §15.247(d)**

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

2412 MHz
OFDM System

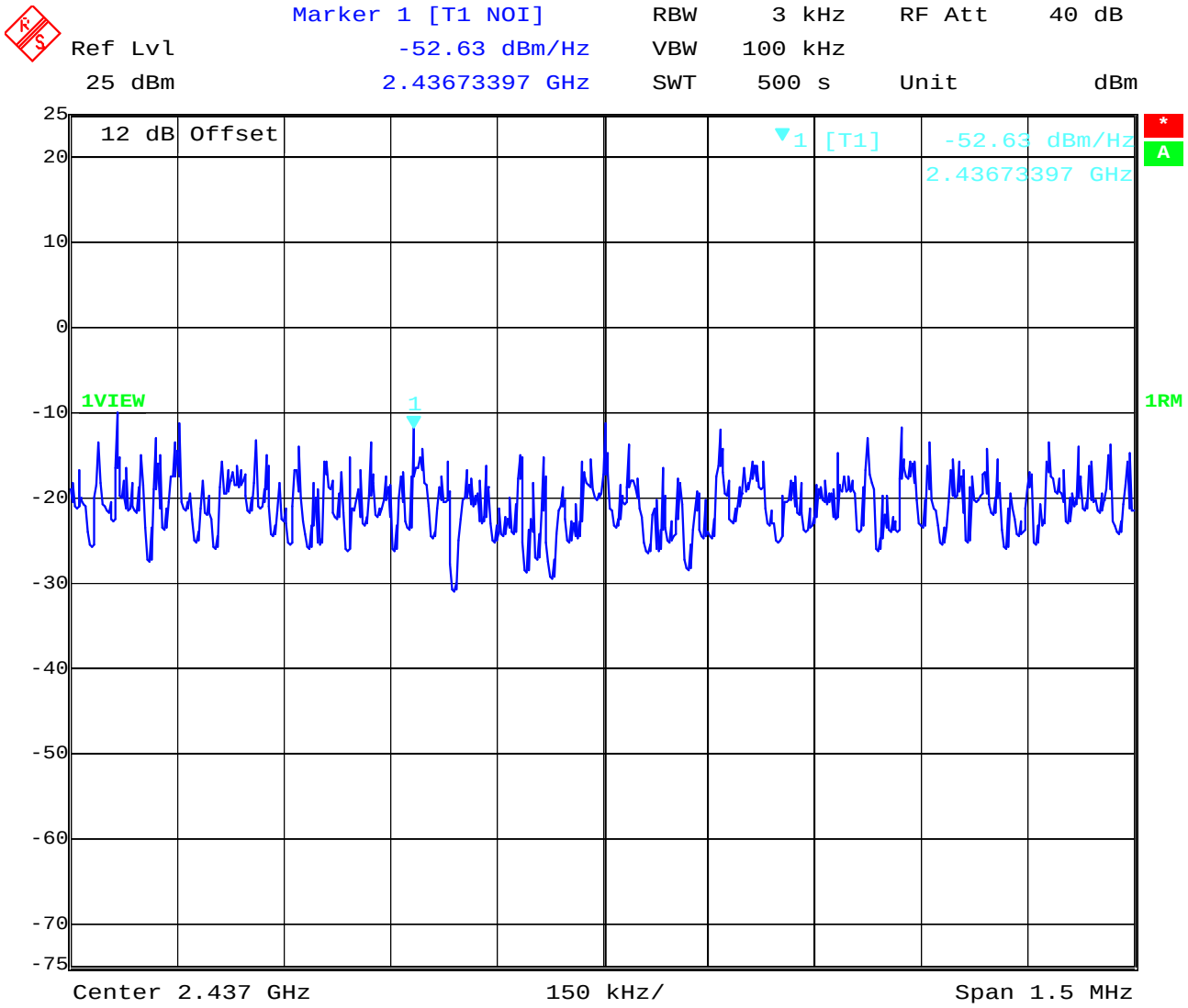


LIMIT **SUBCLAUSE §15.247(d)**

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

2437 MHz
DSSS System

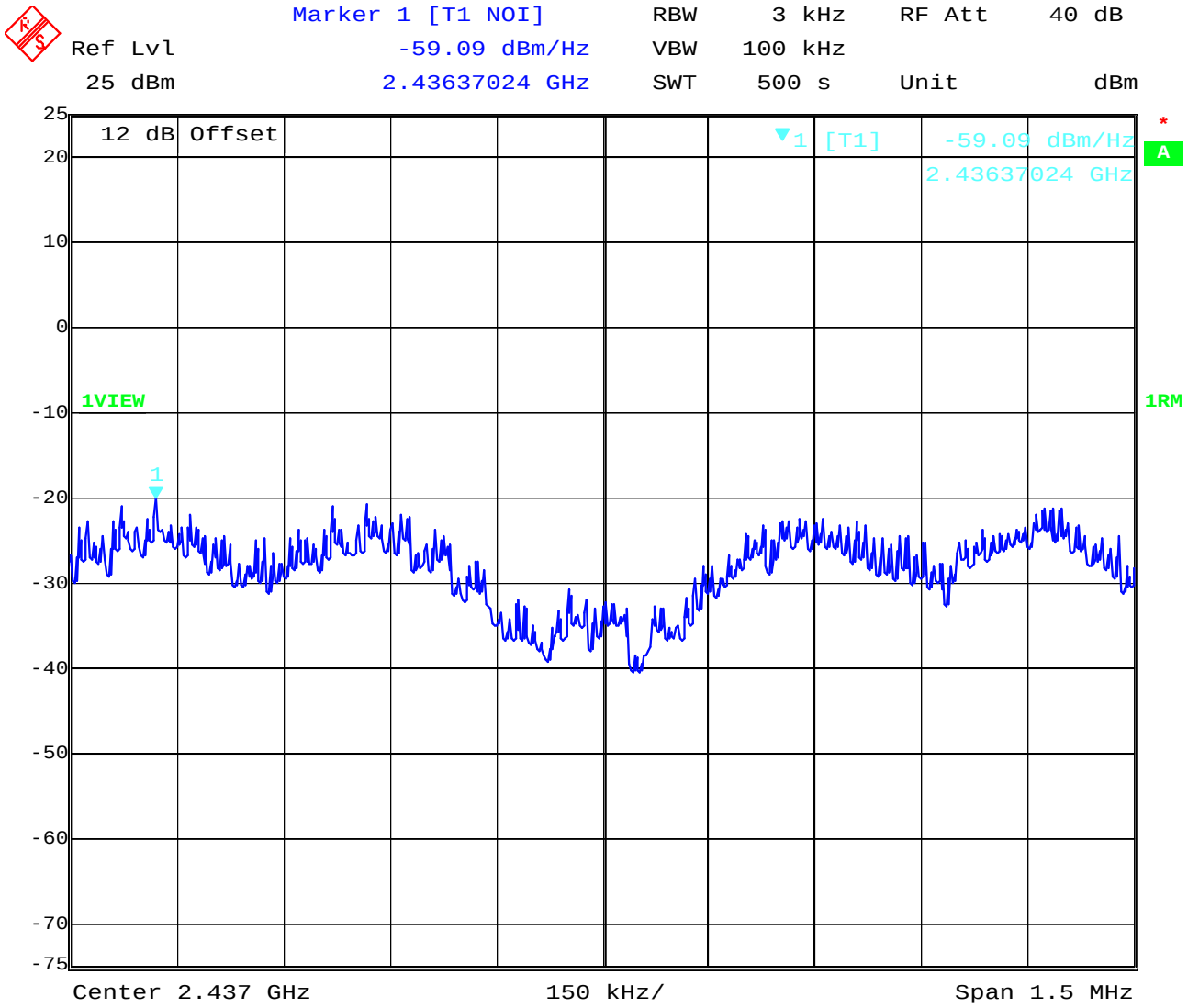


LIMIT **SUBCLAUSE §15.247(d)**

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

2437 MHz
OFDM System

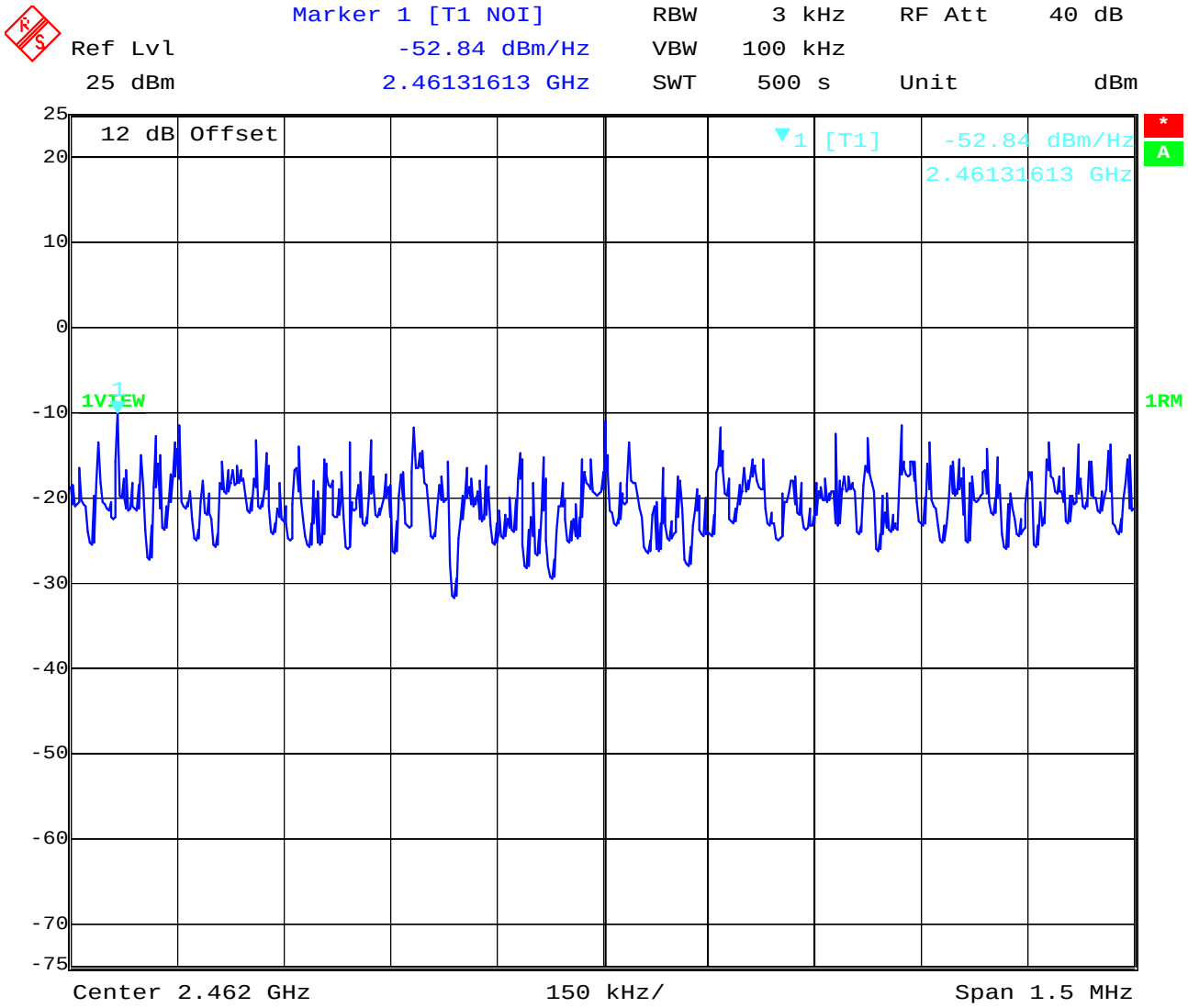


LIMIT **SUBCLAUSE §15.247(d)**

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

2462 MHz
DSSS System

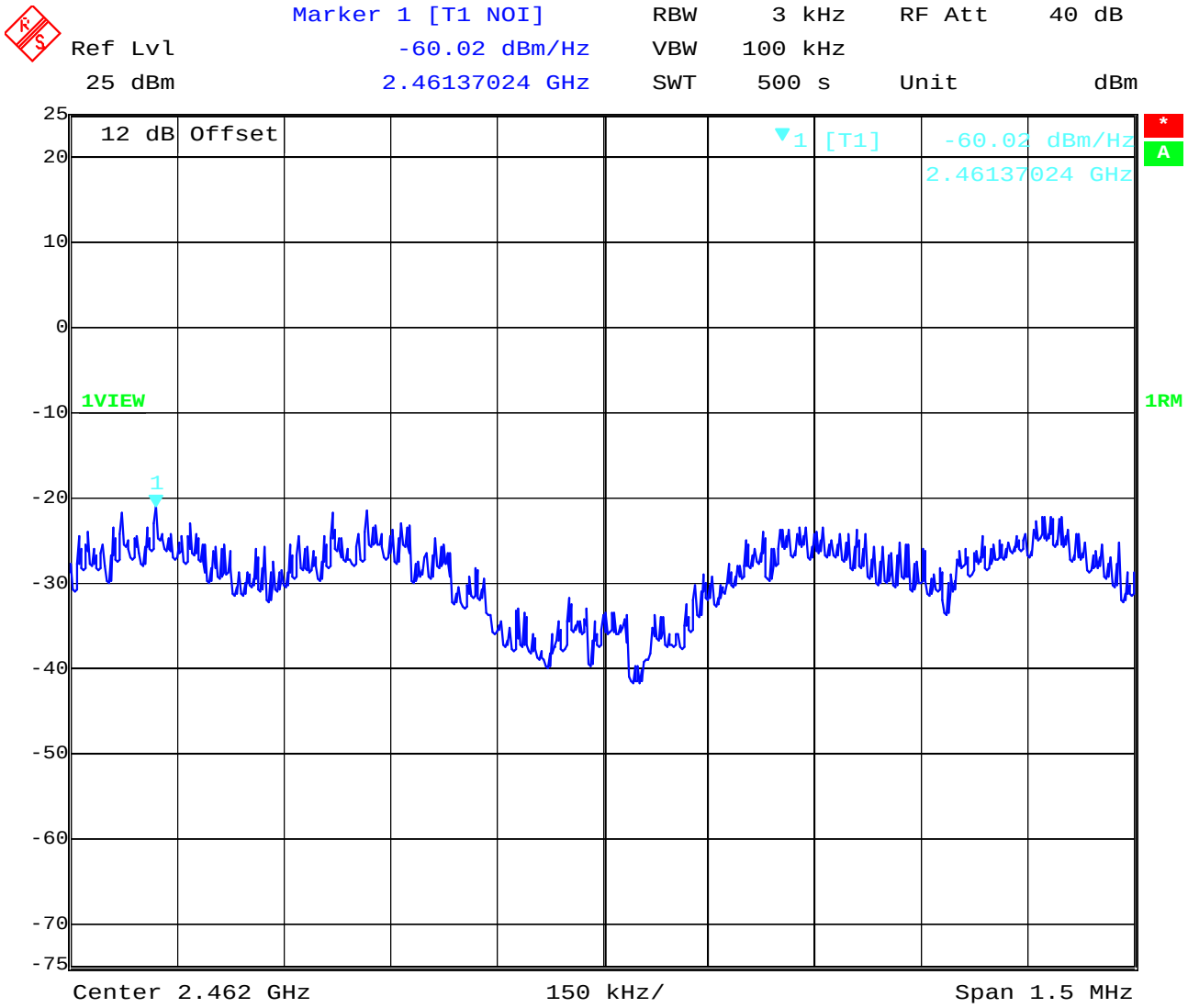


LIMIT **SUBCLAUSE §15.247(d)**

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

2462 MHz
OFDM System



LIMIT **SUBCLAUSE §15.247(d)**

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

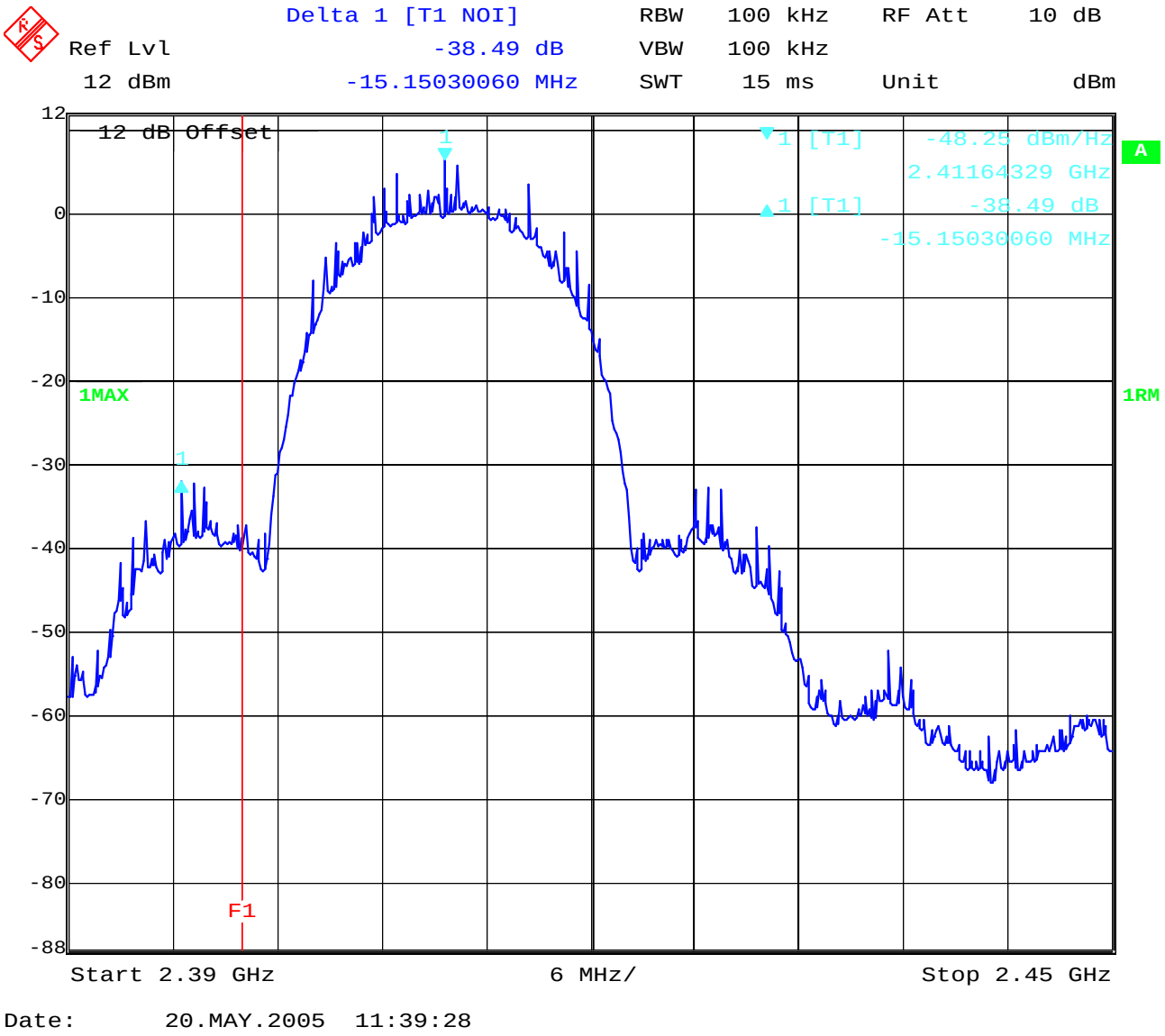
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

2.2.6 Band-edge compliance of conducted emissions §15.247 (c)

Valid for D1705A and D1705B, no differences

Low channel

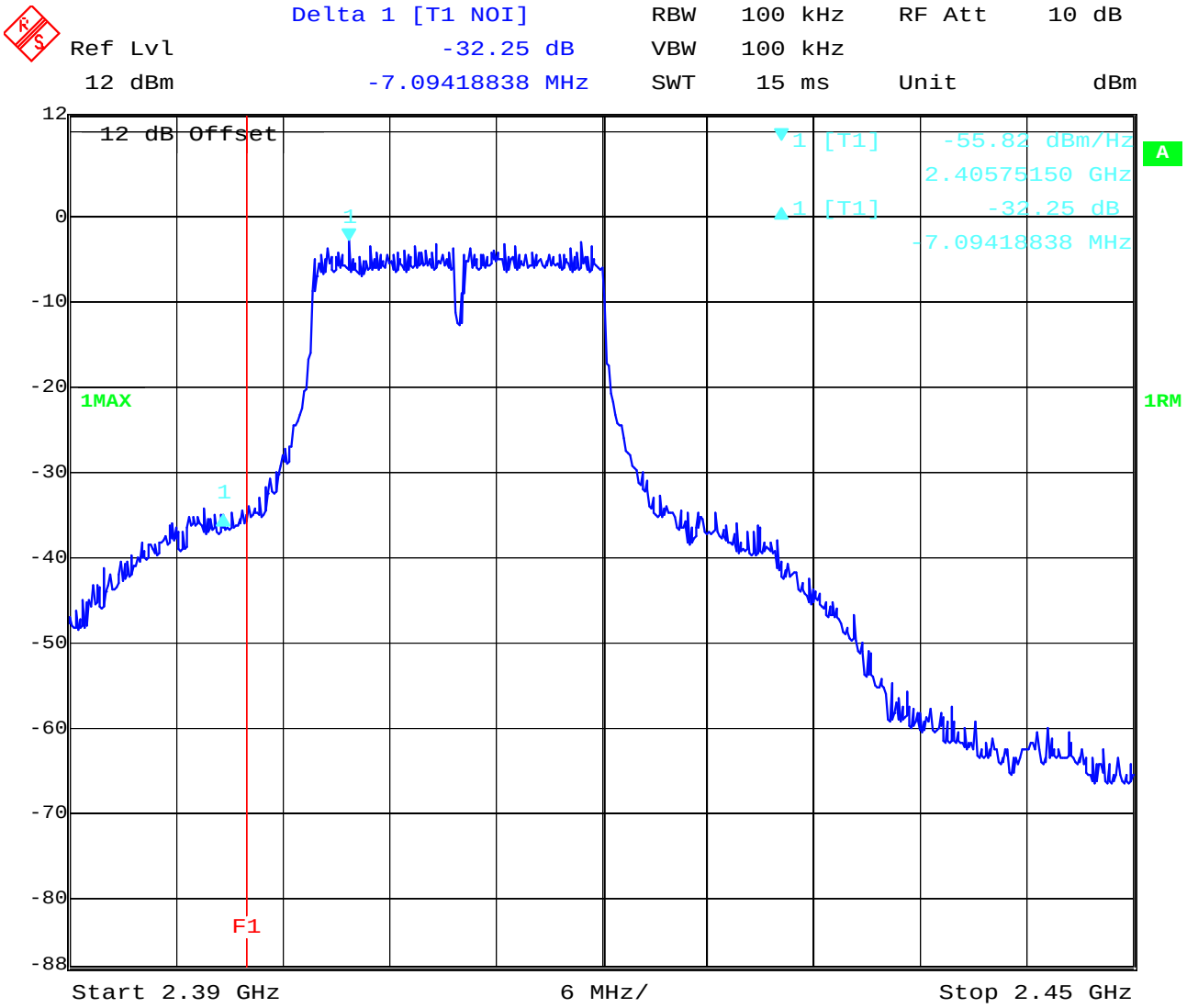
DSSS System



Delta dB = 44.96 dB

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

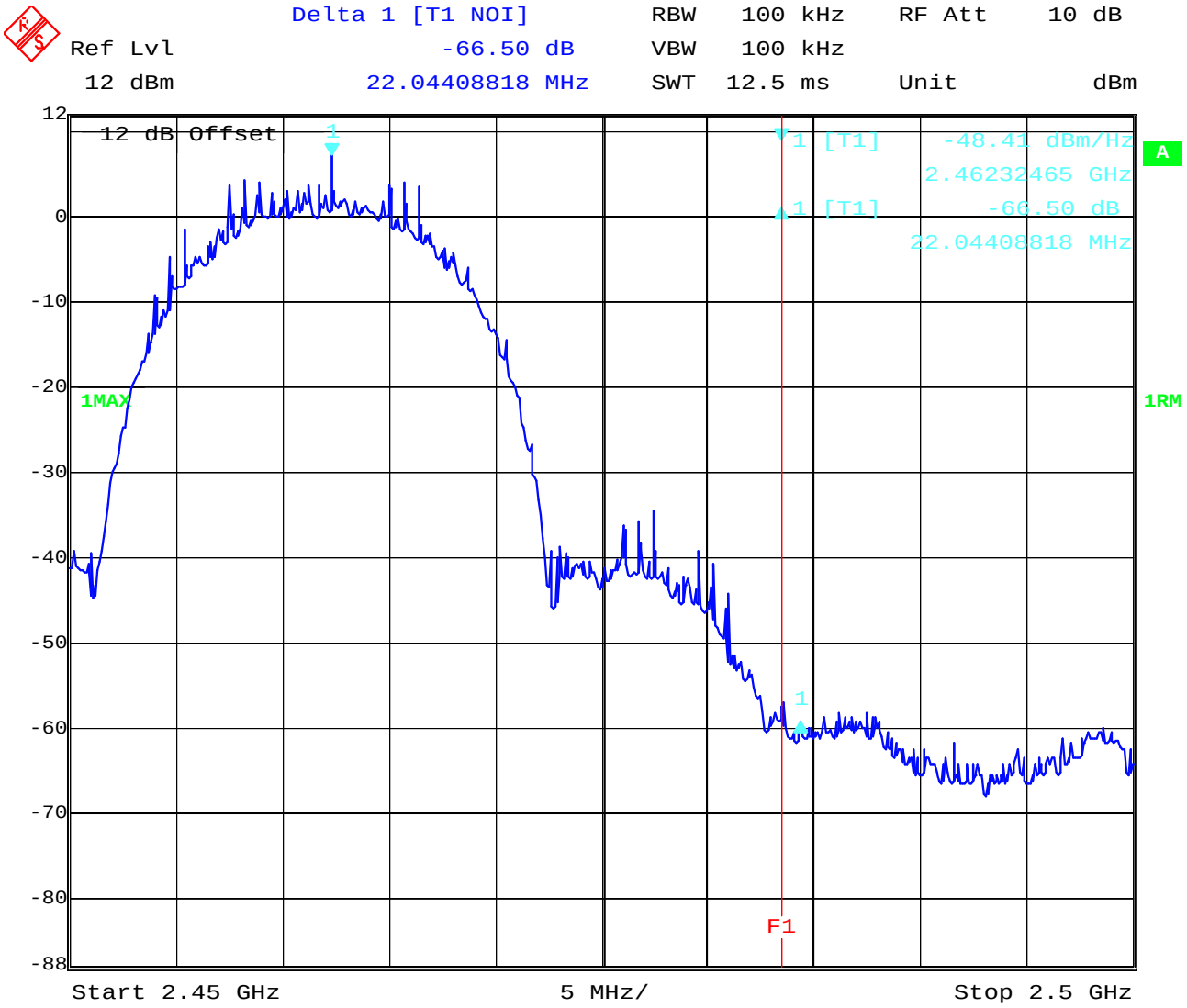
Low channel
OFDM System



Delta dB = 36.07 dB

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

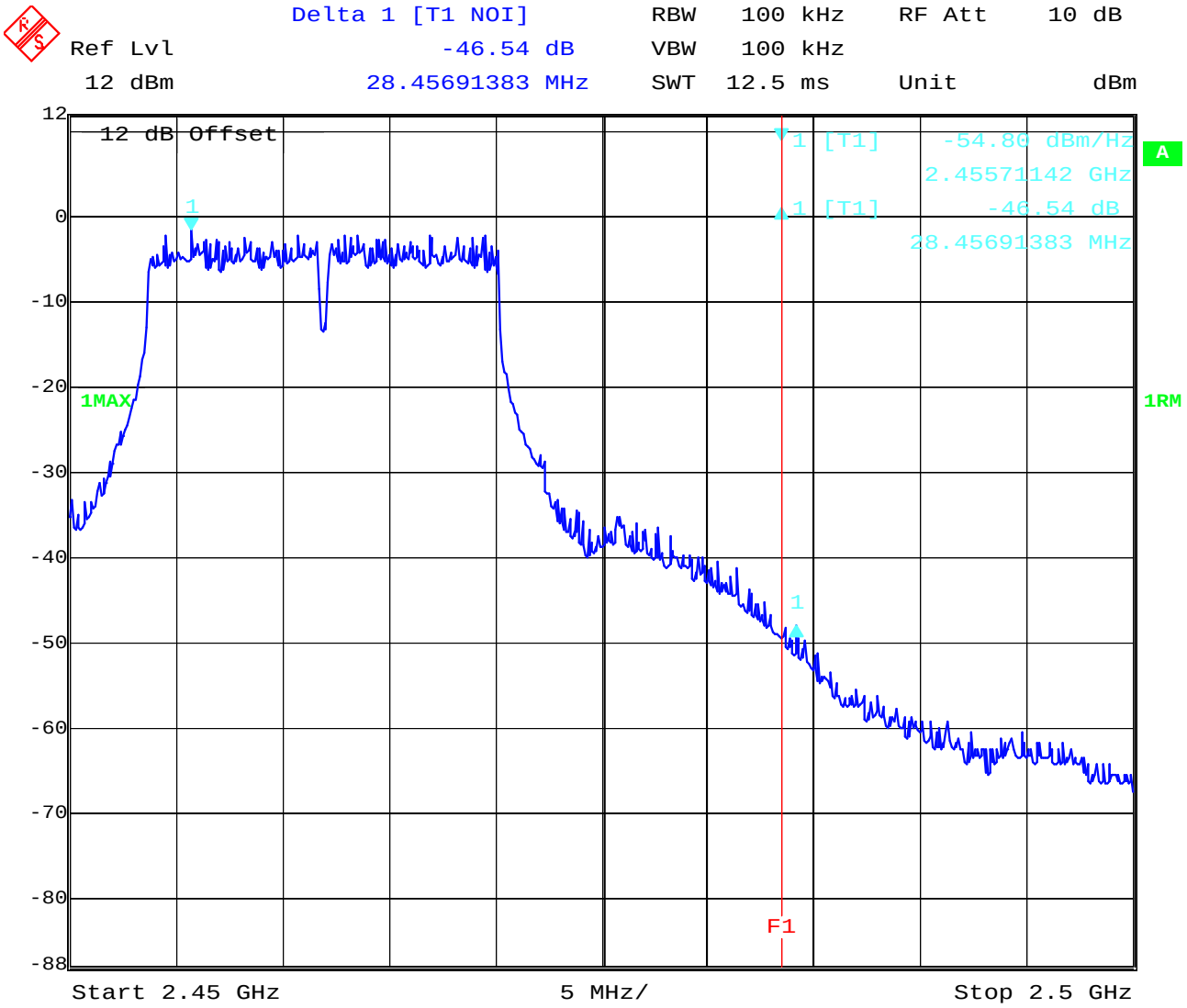
high channel
DSSS System



Delta dB = 57.87 dB

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

high channel
OFDM System



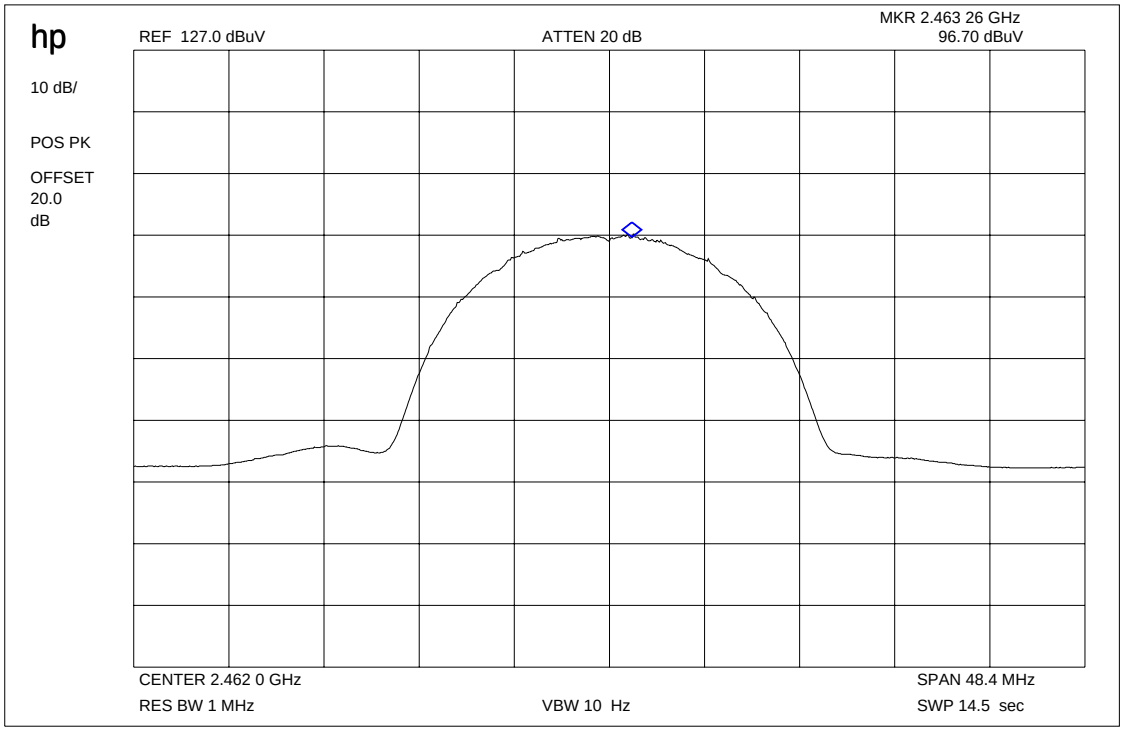
Delta dB = 50.13 dB

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

2.2.7 Band-edge compliance of radiated emissions §15.247 (c)

Valid foe D1705A and D1705B, no differences

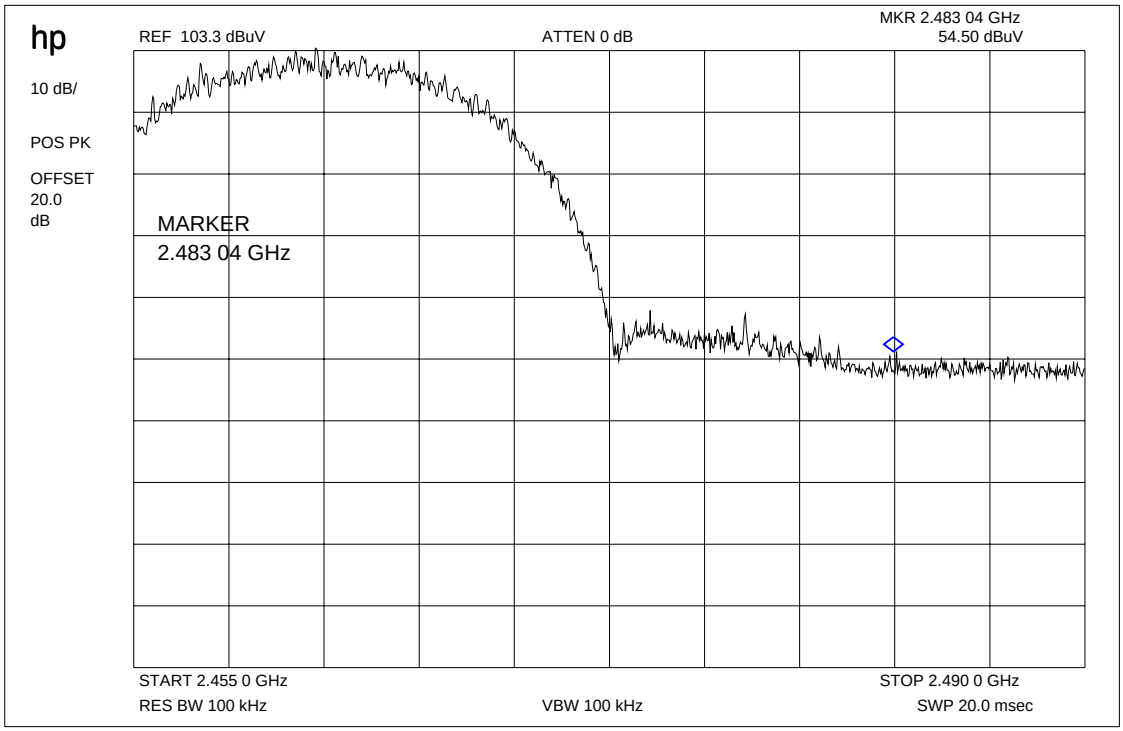
Max. field strength in 3m distance average
DSSS System



Frequency	Meter reading	Cable loss	Antenna factor	Results
2462 MHz	105.66 dBµV	7.25 dB	27 dB – 43.21 dB (Amp gain)	96.70 dBµV/m

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

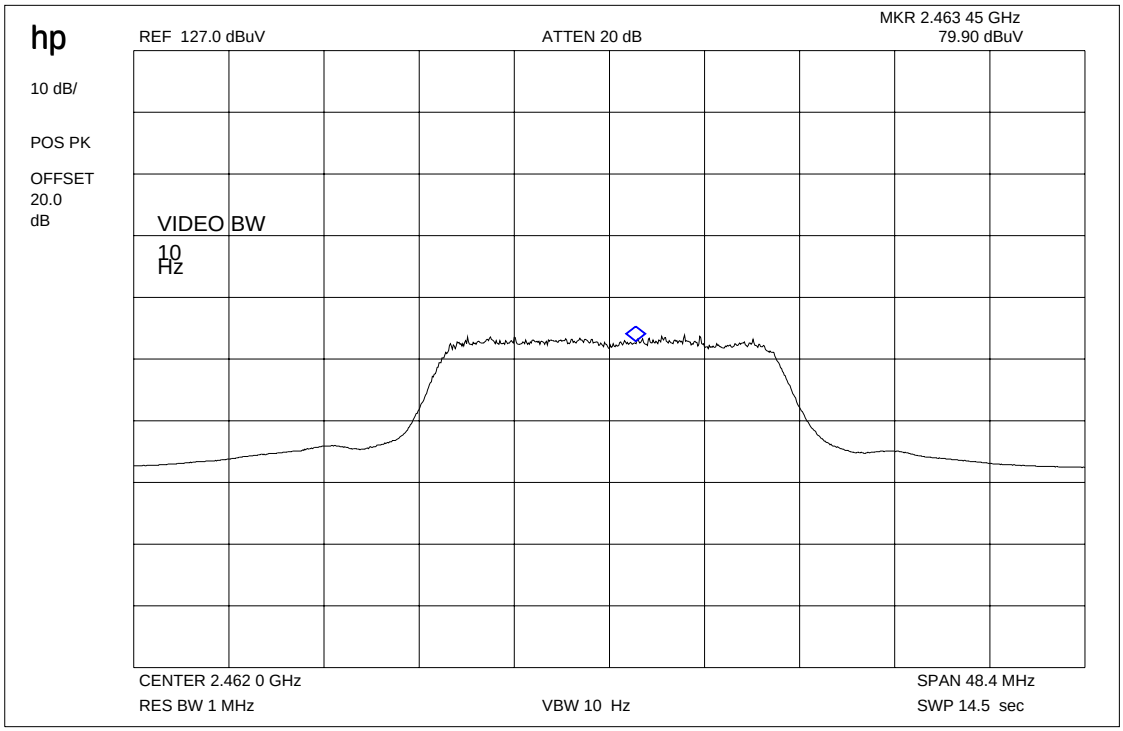
DSSS System



Delta dB = 48.8 dB

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

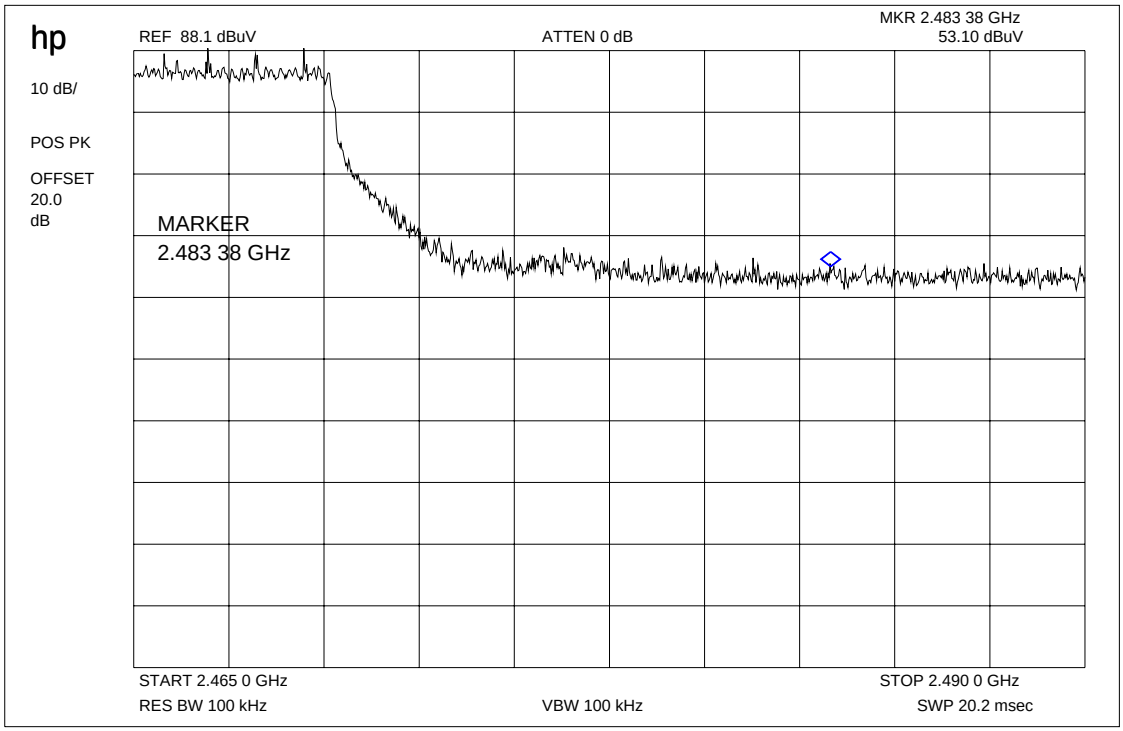
Max. field strength in 3m distance average
OFDM System



Frequency	Meter reading	Cable loss	Antenna factor	Results
2462 MHz	88.86 dBµV	7.25 dB	27 dB – 43.21 dB (Amp gain)	79.90 dBµV/m

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

OFDM System



Delta dB = 35.0 dB

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Radiated field strength

DSSS System

The field strength was measured with an EMI measuring receiver and 1 MHz RBW / VBW for peak and with 1MHz RBW / 10Hz VBW for average at a distance of 3m.

high channel	setup	measured value (3m)	correction factor (3m)	calculated value (3m)
Max. peak value	1 MHz RBW 1 MHz VBW	120.3 dBµV/m	-8.96 dB	111.3 dBµV/m
Max. average value	1 MHz RBW 10 Hz VBW	105.7 dBµV/m	-8.96 dB	96.7 dBµV/m
Delta value	Peak 300 kHz RBW/VBW	48.8 dB	-	-
Value at band edge	limit 54 dBµV/m			47.9 dBµV/m
Statement:				Complies

The product complies with the limit of the restricted bands.

Delta marker plots see above pages

Radiated field strength

OFDM System

The field strength was measured with an EMI measuring receiver and 1 MHz RBW / VBW for peak and with 1MHz RBW / 10Hz VBW for average at a distance of 3m.

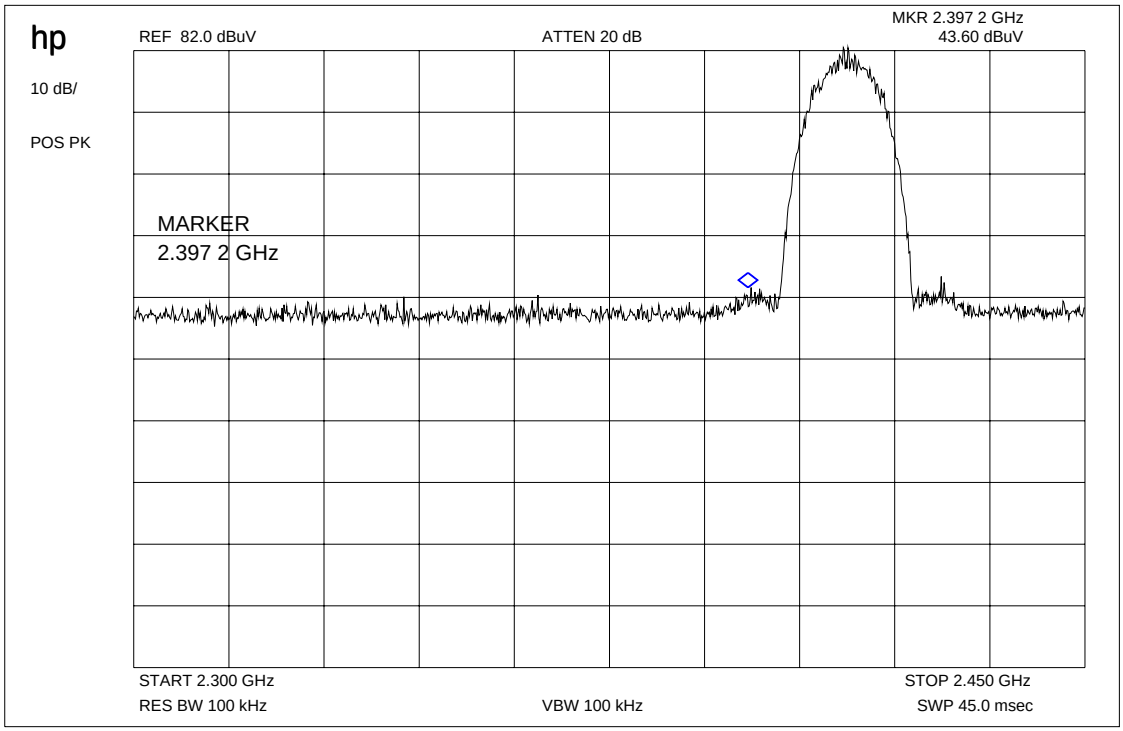
high channel	setup	measured value (3m)	correction factor (3m)	calculated value (3m)
Max. peak value	1 MHz RBW 1 MHz VBW	118.4 dBµV/m	-8.96 dB	109.4 dBµV/m
Max. average value	1 MHz RBW 10 Hz VBW	88.9 dBµV/m	8.96 dB	79.9 dBµV/m
Delta value	Peak 300 kHz RBW/VBW	35.0 dB	-	-
Value at band edge	limit 54 dBµV/m			44.7 dBµV/m
Statement:				Complies

The product complies with the limit of the restricted bands.

Delta marker plots see above pages

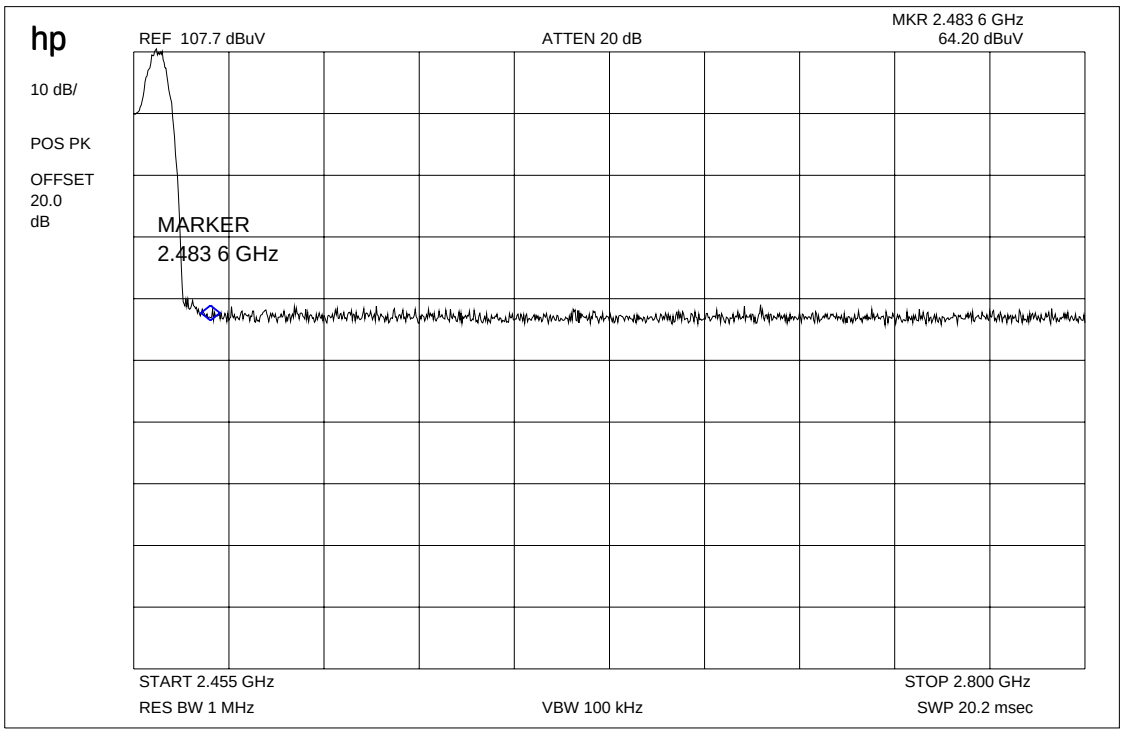
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Band-edge compliance radiated
Restricted band 2310 – 2390 MHz



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Band-edge compliance radiated
Restricted band 2483.5 - 2500 MHz



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

2.2.8 Emission Limitations - Conducted (Transmitter) § 15.247 (c) (1)

Maximal Values at DSSS (11 Mbit/s) System

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dBm)	limit max. allowed emmision power	actual attenuation below frequency of operation (dB)	results
2412		16.8	30 dBm	-	Operating frequency
4824		-62.2	-20 dBc (-3.2 dBm)	79.0	complies
2437		17.0	30 dBm	-	Operating frequency
4874		-56.9	-20 dBc (-3.0 dBm)	73.9	complies
2462		16.7	30 dBm		Operating frequency
4909.8		-59.9	-20 dBc (- 3.3 dBm)	76.6	complies
Measurement uncertainty		± 3dB			

RBW : 100 kHz VBW: 100 kHz

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

LIMITS **SUBCLAUSE § 15.247 (c)**

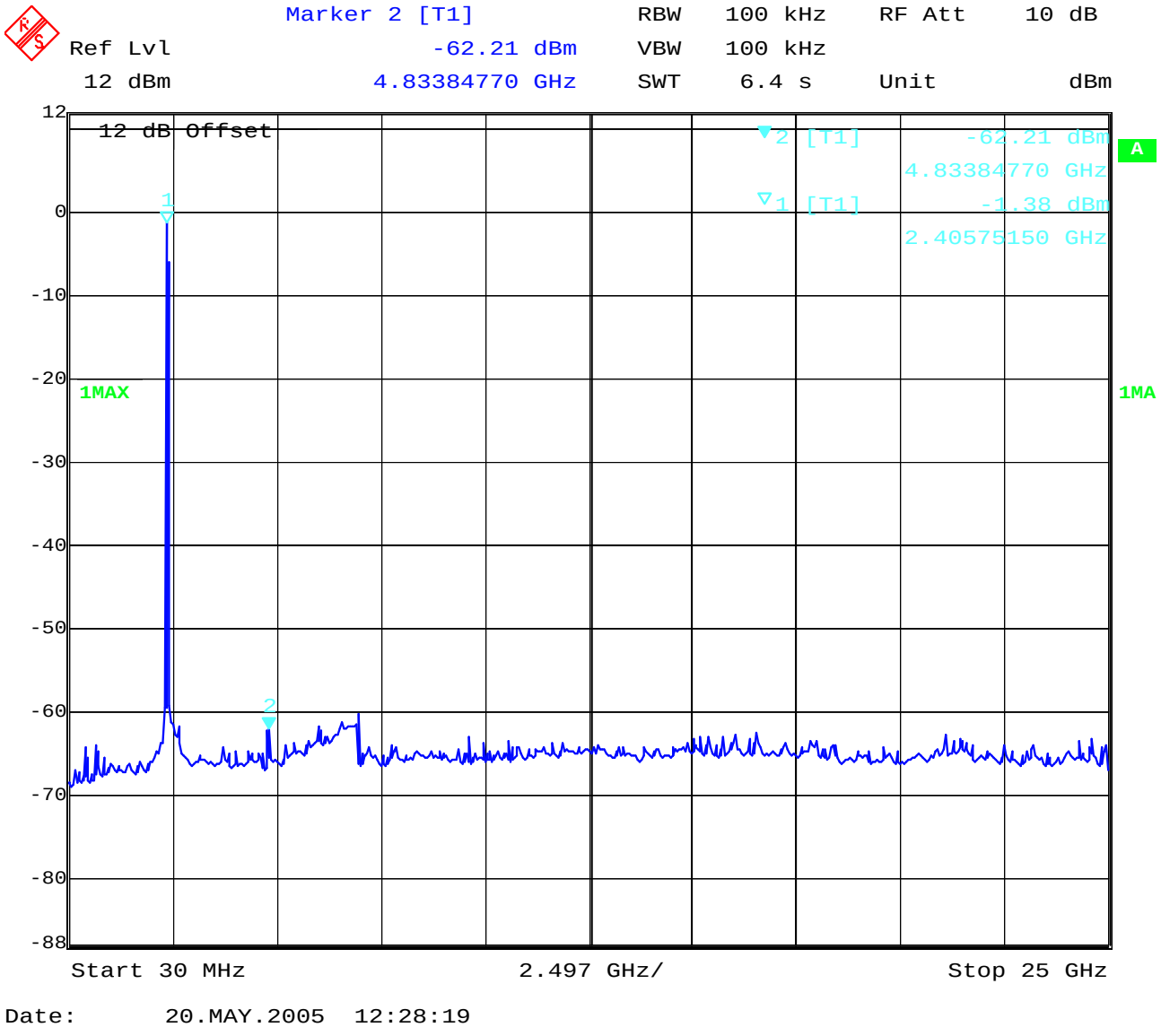
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Valid for DSSS and OFDM

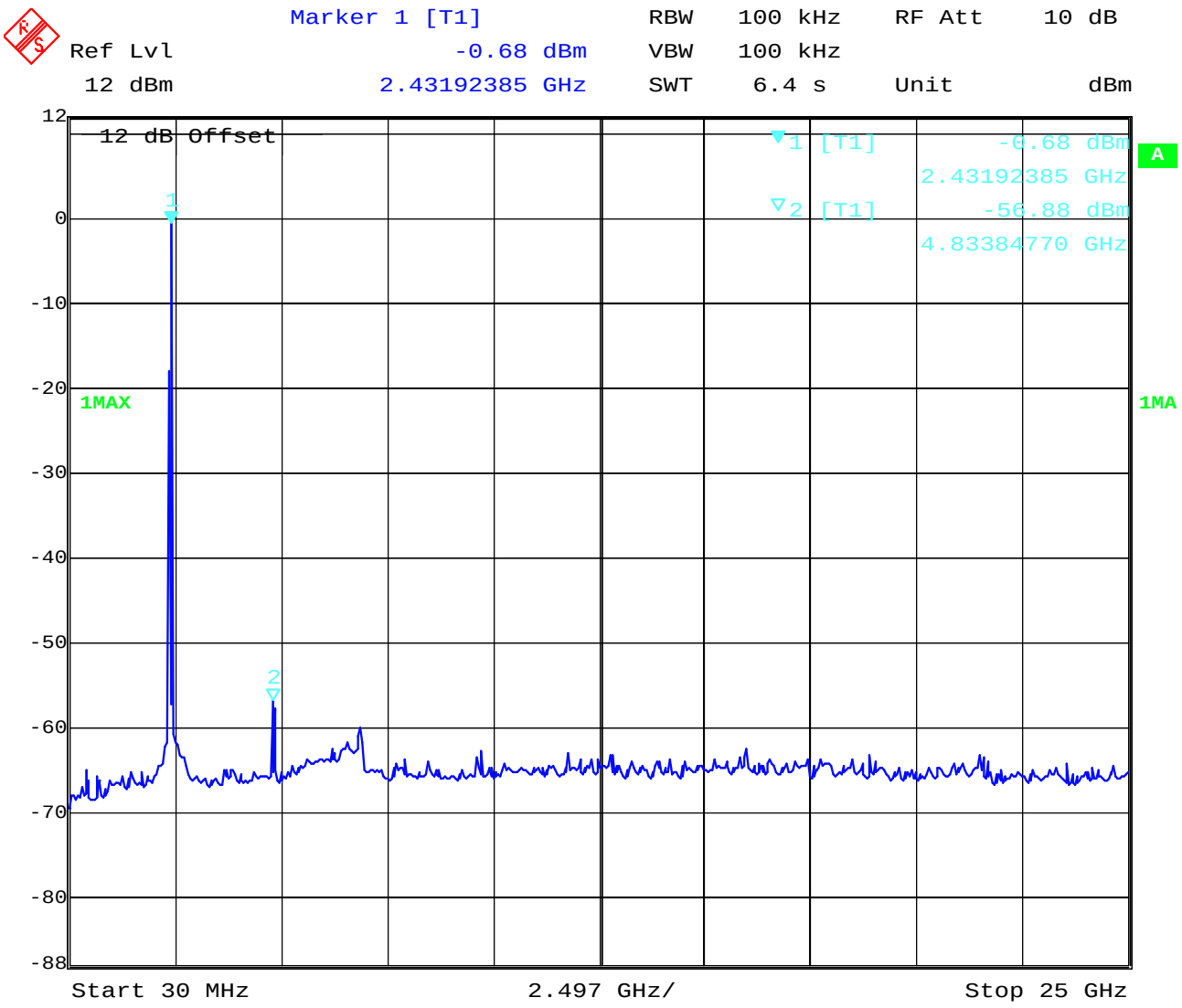
No peak found < 20 dB below limit (20dBc)

Low channel



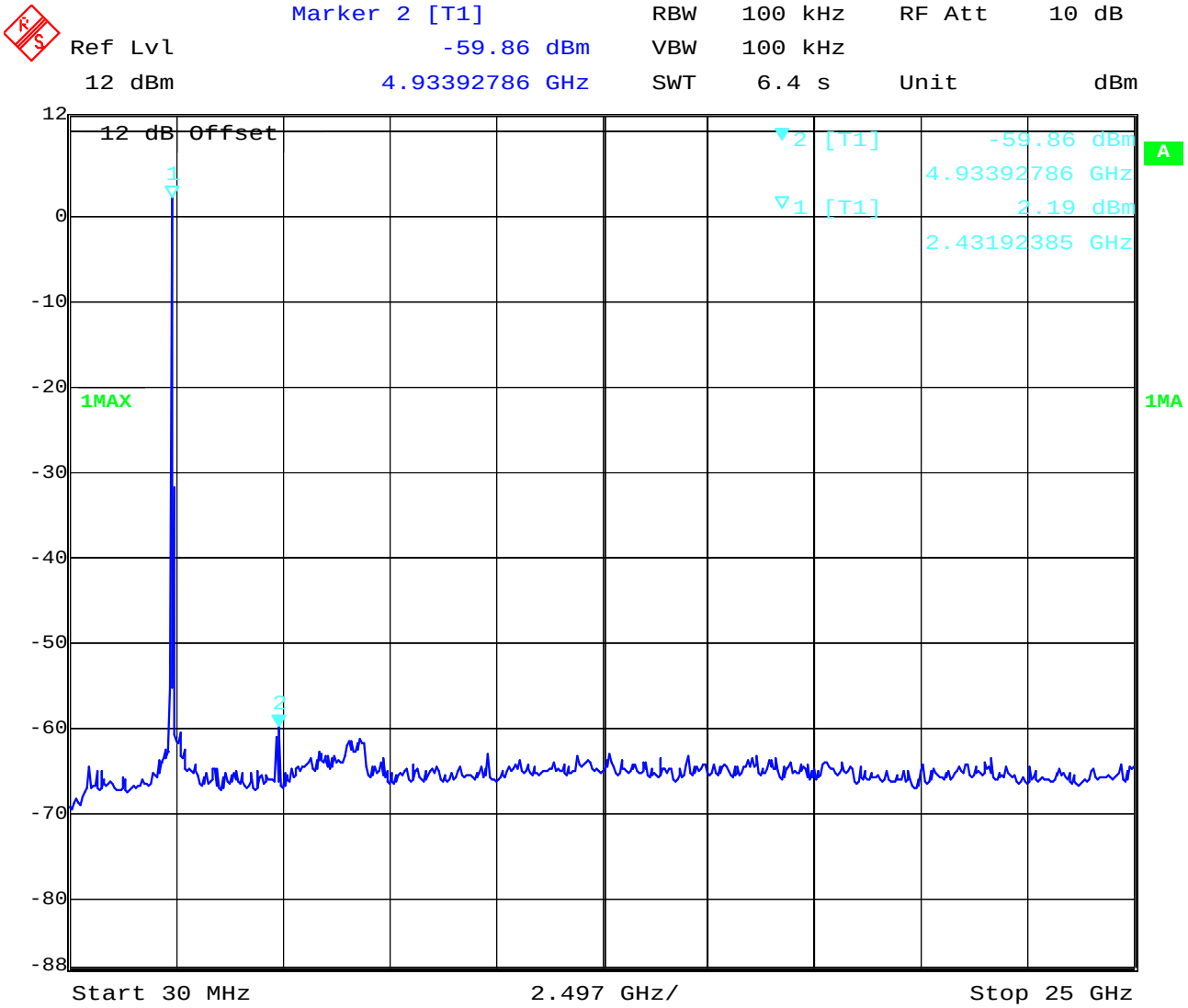
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Mid channel (peak)



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

High channel



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

2.2.9 Spurious Emissions (radiated) § 15.247 (c) (1)

SPURIOUS EMISSIONS LEVEL (dBµV/m)								
2412 MHz			2437 MHz			2462 MHz		
f (MHz)	Detector	Level dBµV/m	f (MHz)	Detector	Level dBµV/m	f (MHz)	Detector	Level dBµV/m
488	QP	30.7	488	QP	30.7	488	QP	30.7
4320	peak	47.4	4320	peak	47.4	4320	peak	47.4
4844	peak	45.9	4874	peak	46.2	4944	peak	47.8
Measurement uncertainty			±3 dB					

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

LIMITS **SUBCLAUSE § 15.247 (c)**

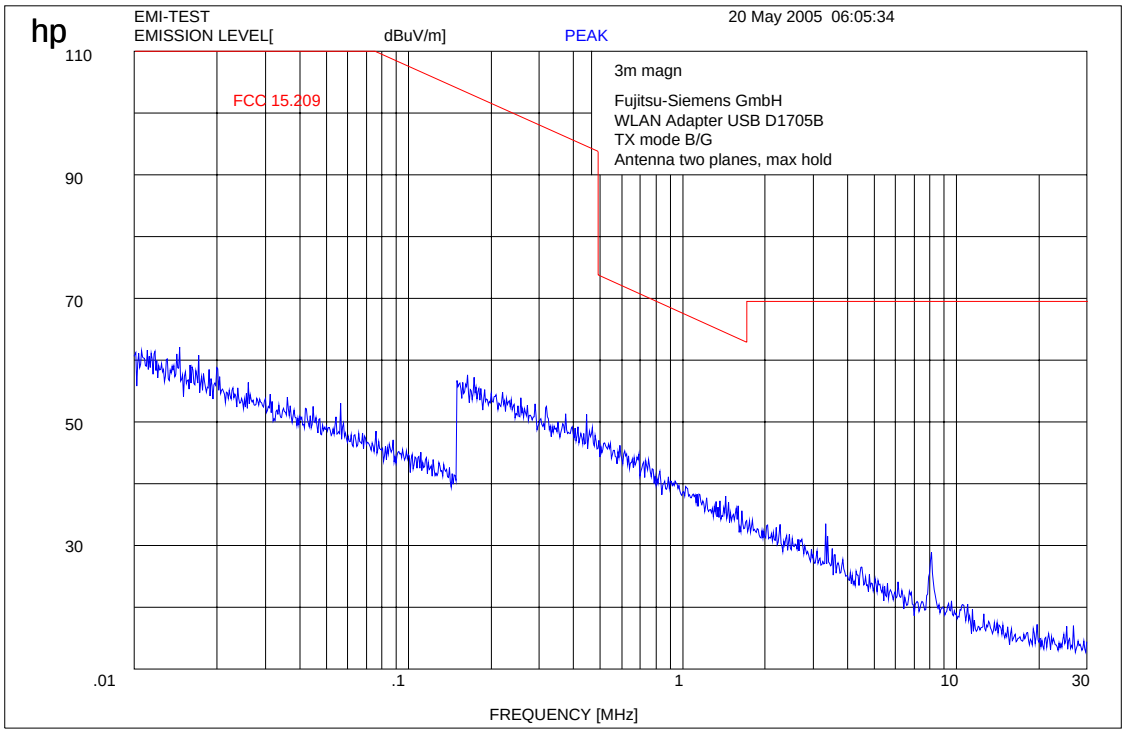
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Limits **SUBCLAUSE § 15.209**

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	500 / 54 dBµV/m	3

EMISSION LIMITATIONS- Radiated **§ 15.247 (c) (1)**

Transmitter up to 30 MHz
this plot is valid for all channels

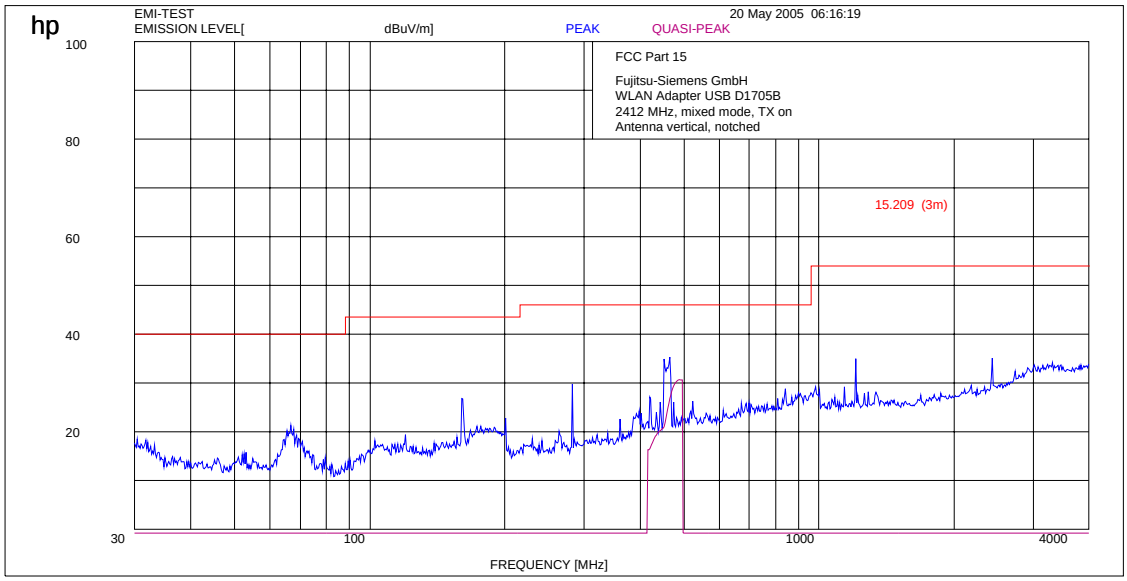


(to convert the measuring distance from 3m to 30m and 3 to 300m a correction factor from 40 dB/decade was used.)

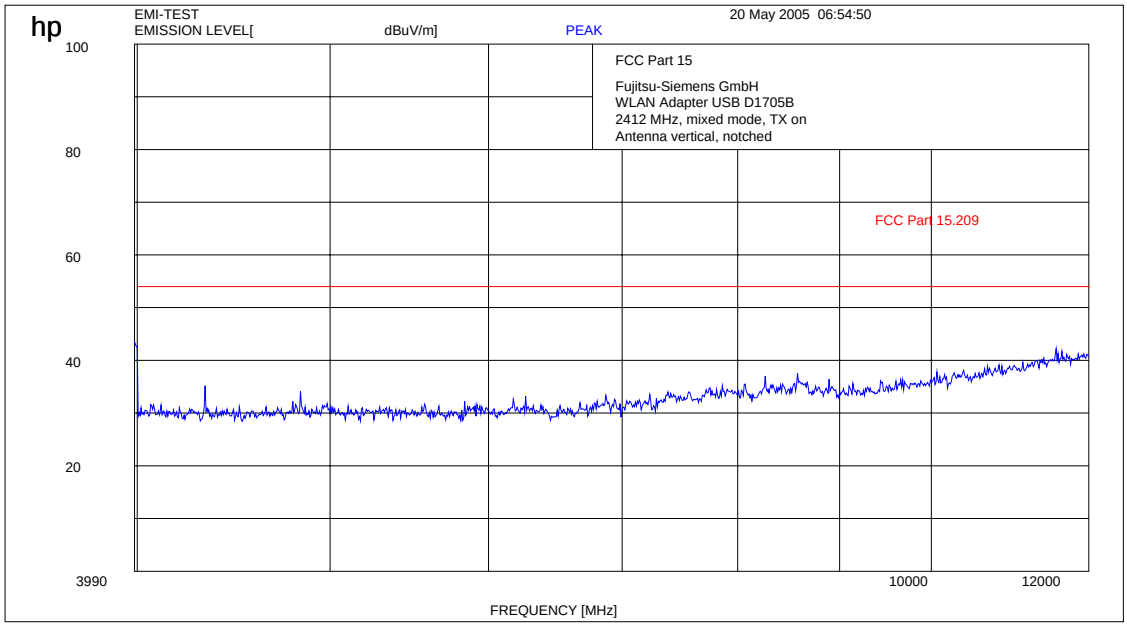
Limits **SUBCLAUSE § 15.209**

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	500 / 54 dBµV/m	3

EMISSION LIMITATIONS- Radiated **§ 15.247 (c) (1)**
low channel up to 12 GHz
Plots are valid for DSSS and OFDM mode

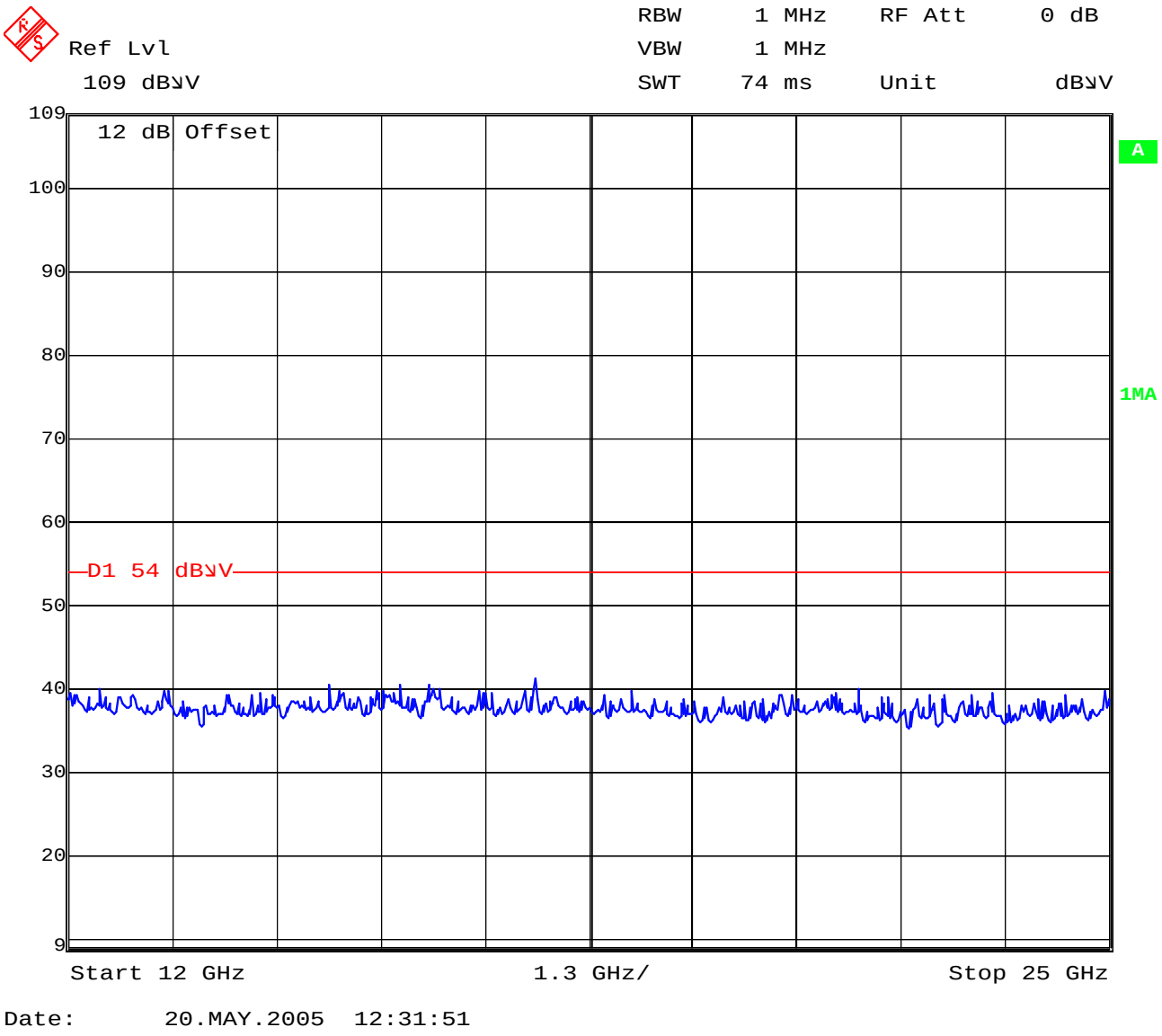


Carrier rejected by a tuneable rejection filter

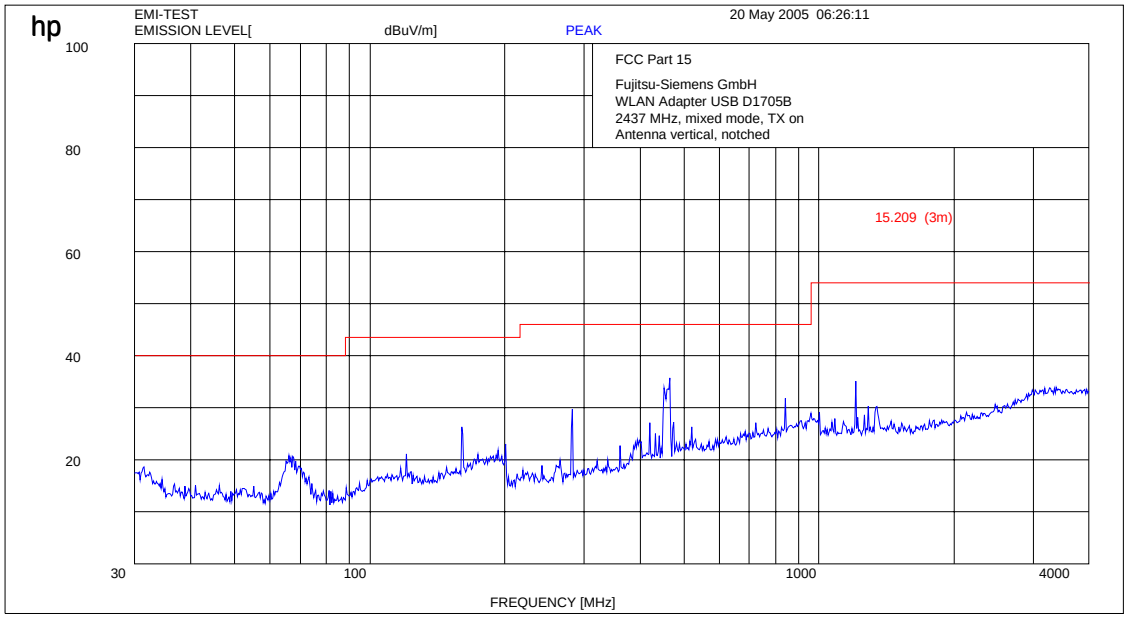


EMISSION LIMITATIONS- Radiated **§ 15.247 (c) (1)**

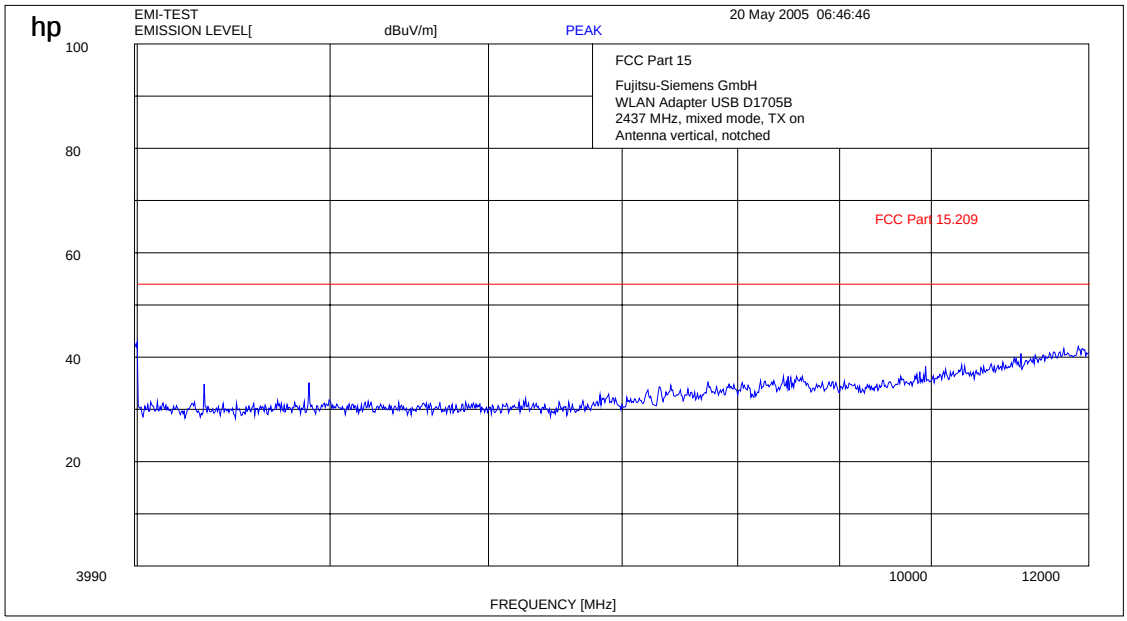
up to 25 GHz (DSSS and OFDM)
this plot is valid for all 3channels



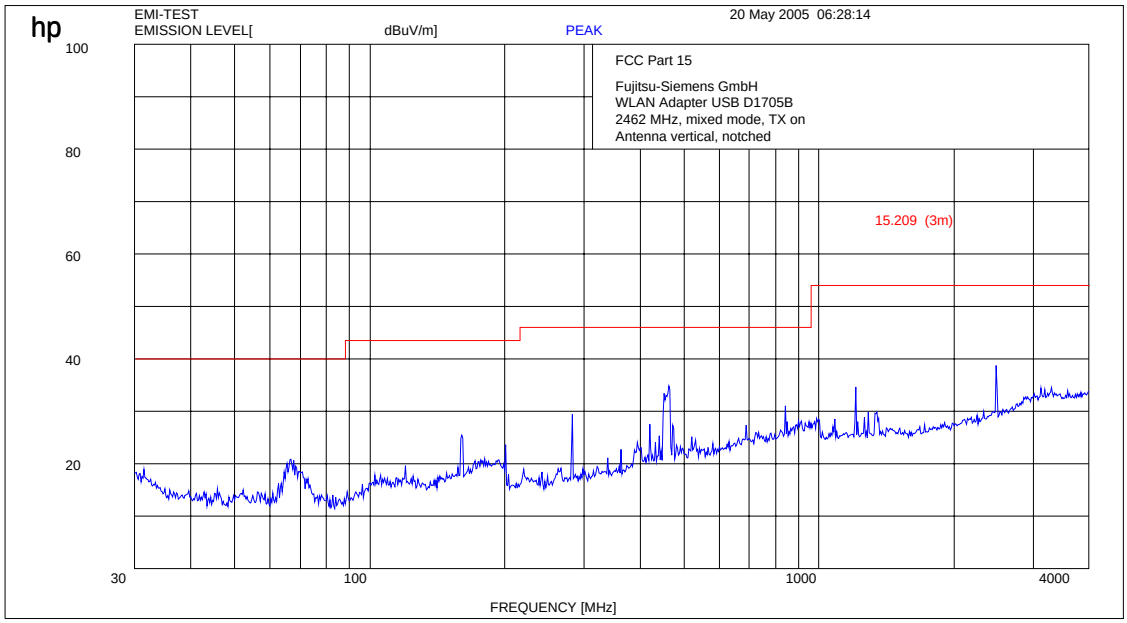
EMISSION LIMITATIONS- Radiated **§ 15.247 (c) (1)**
Mid channel up to 12 GHz
Plots are valid for DSSS and OFDM mode



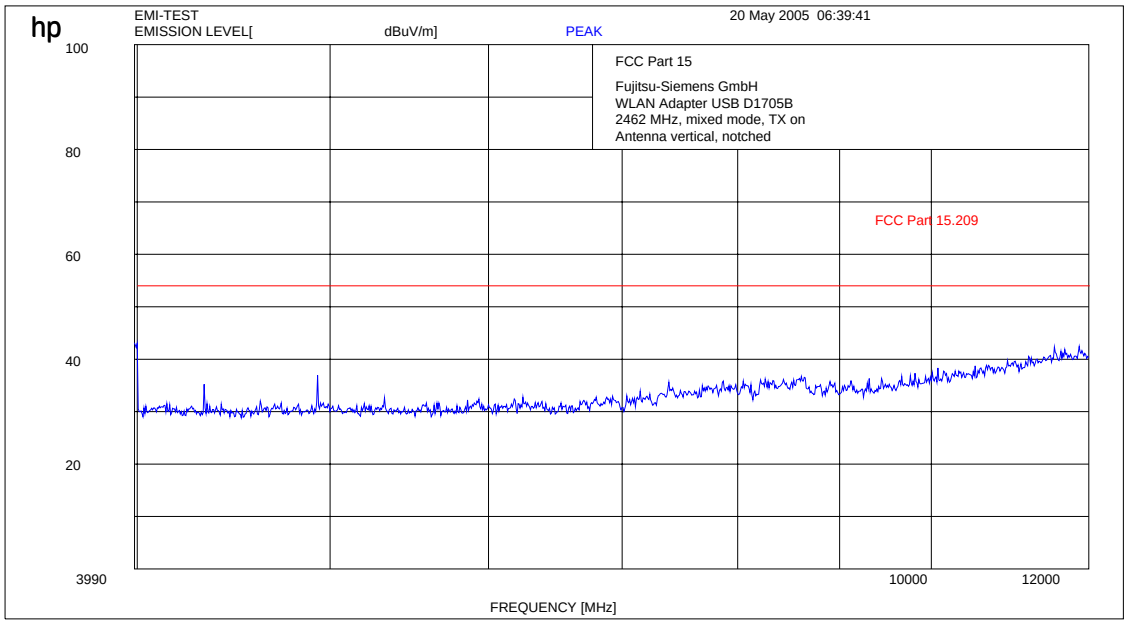
Carrier rejected by a tuneable rejection filter



EMISSION LIMITATIONS- Radiated **§ 15.247 (c) (1)**
high channel up to 12 GHz
Plots are valid for DSSS and OFDM mode



Carrier rejected by a tuneable rejection filter



SPURIOUS EMISSION (radiated) § 15.247 (c) (1)
Additional Test for D1705A in a 5 ¼ Inch housing

SPURIOUS EMISSIONS LEVEL (dBµV/m)								
2412 MHz			2437 MHz			2462 MHz		
f (MHz)	Detector	Level dBµV/m	f (MHz)	Detector	Level dBµV/m	f (MHz)	Detector	Level dBµV/m
240	QP	38.6	240	QP	38.6	240	QP	38.6
						4924	peak	39.6
Measurement uncertainty			±3 dB					

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

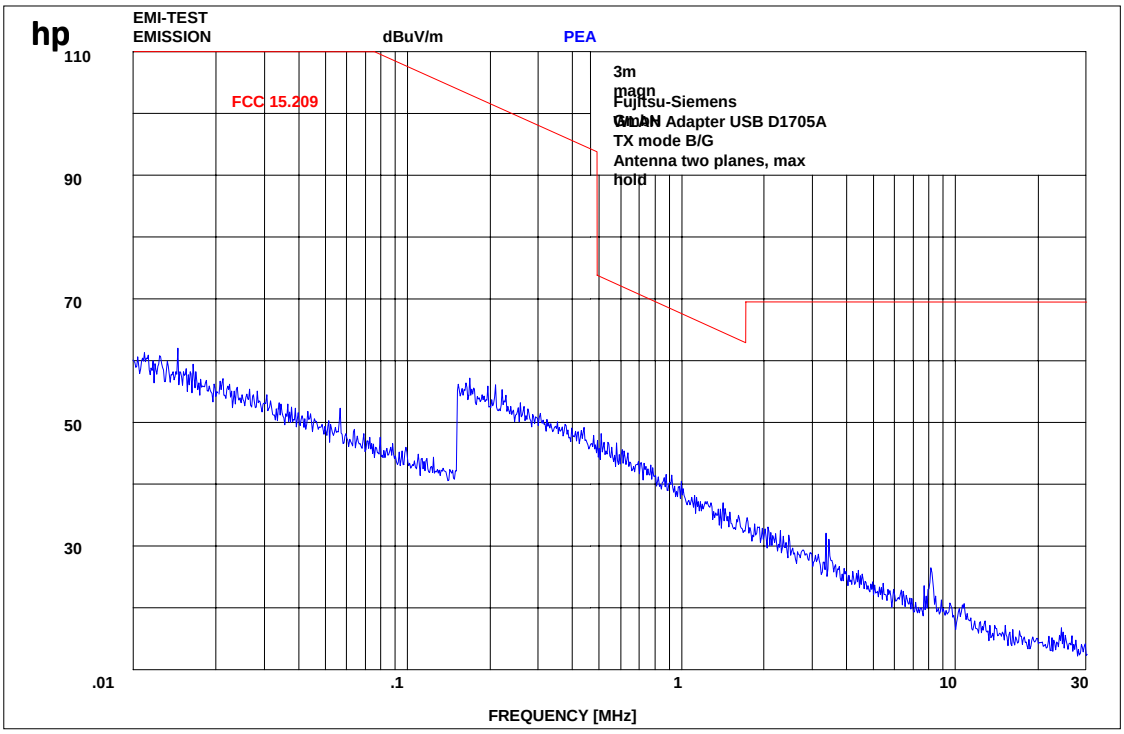
LIMITS **SUBCLAUSE § 15.247 (c)**

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)).

Limits **SUBCLAUSE § 15.209**

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	500 / 54 dBµV/m	3

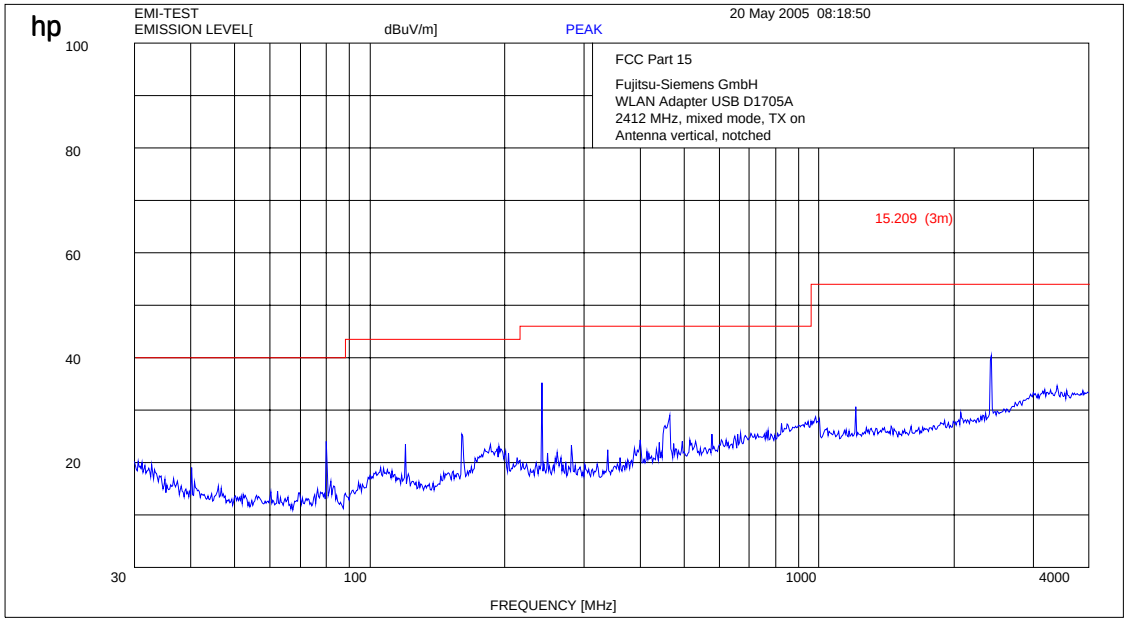
EMISSION LIMITATIONS- Radiated **§ 15.247 (c) (1)**
Additional Test for D1705A in a 5 ¼ Inch housing
Transmitter up to 30 MHz
this plot is valid for all channels



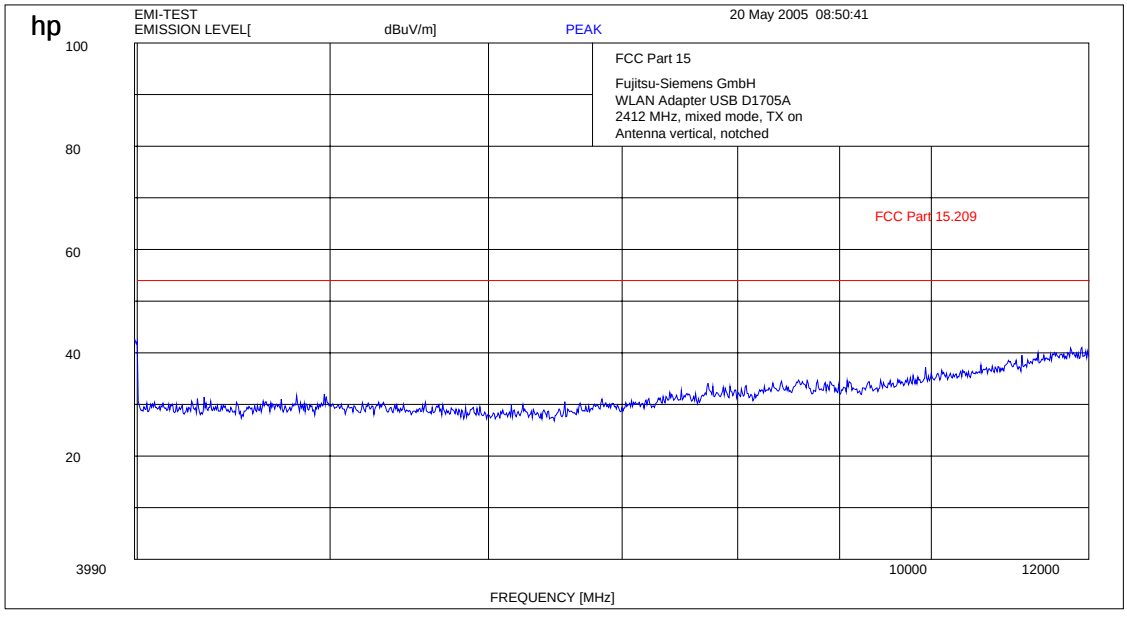
Limits **SUBCLAUSE § 15.109**

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	500 / 54 dBµV/m	3

EMISSION LIMITATIONS- Radiated **§ 15.247 (c) (1)**
low channel up to 12 GHz
Plots are valid for DSSS and OFDM mode
Additional Test for D1705A in a 5 ¼ Inch housing

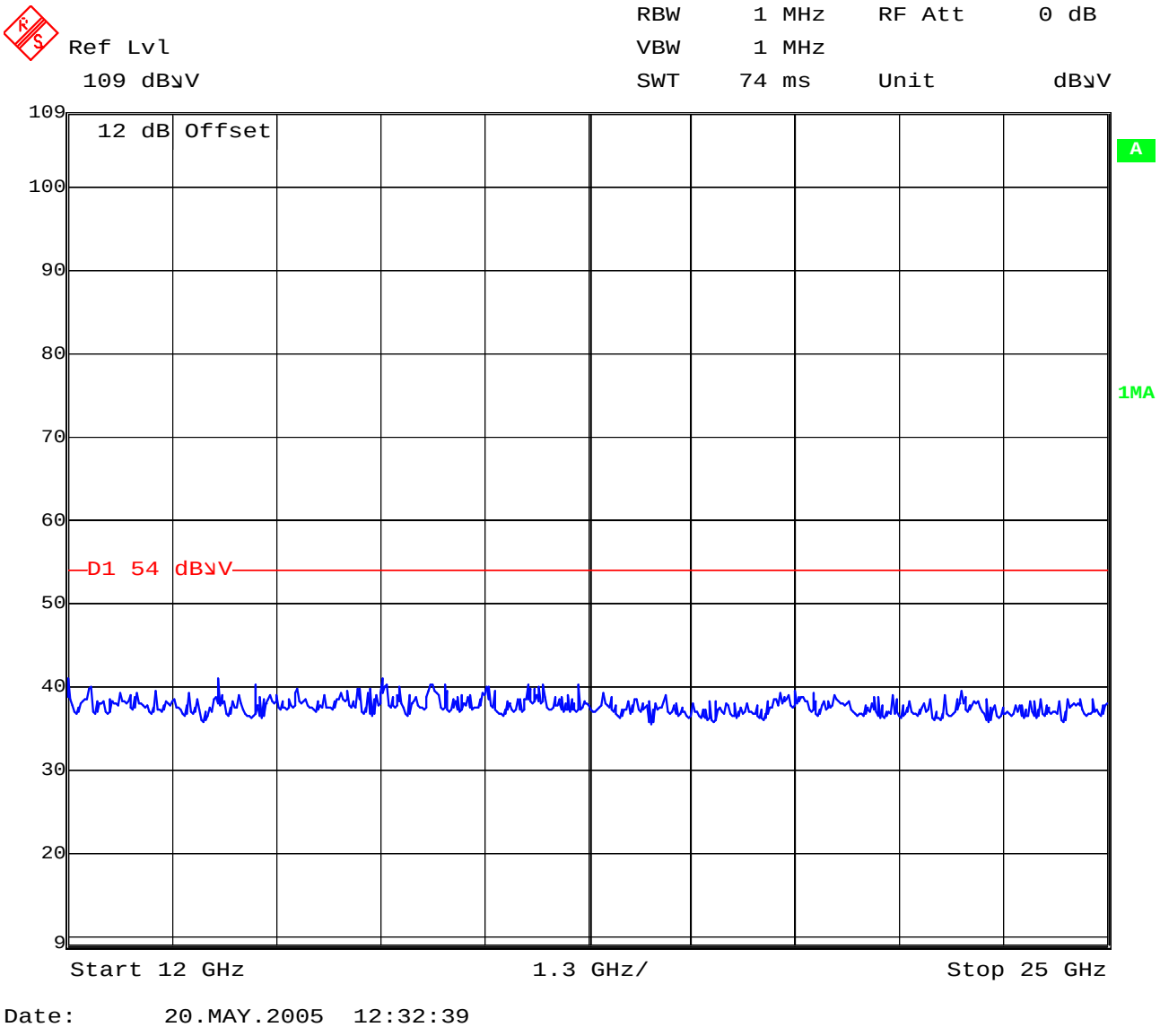


Carrier rejected by a tuneable rejection filter



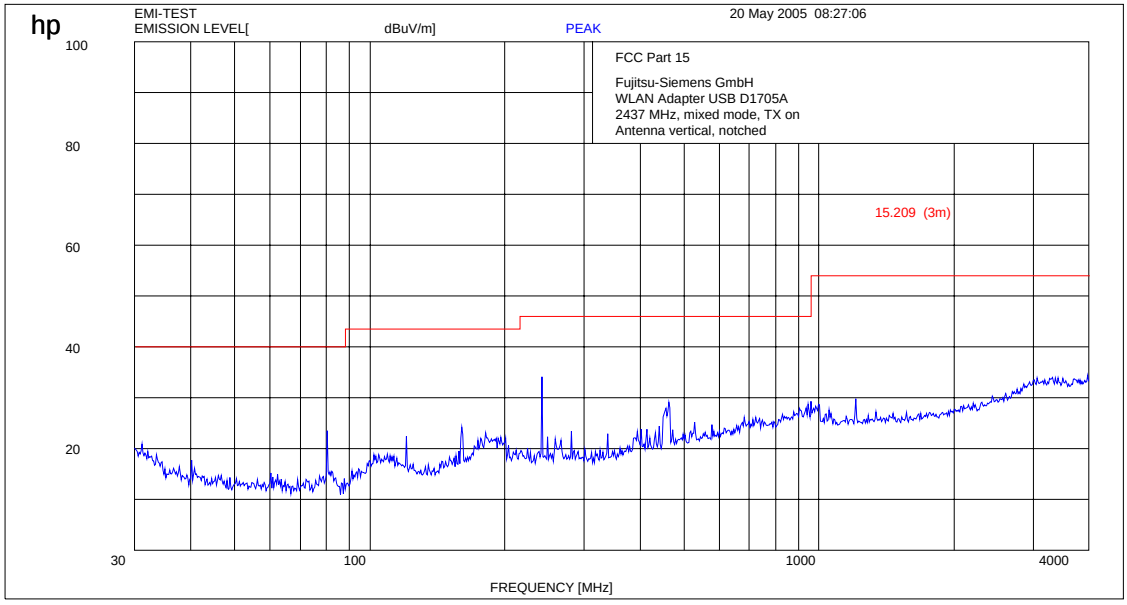
EMISSION LIMITATIONS- Radiated **§ 15.247 (c) (1)**

up to 25 GHz (DSSS and OFDM)
this plot is valid for all 3channels
Additional Test for D1705A in a 5 ¼ Inch housing

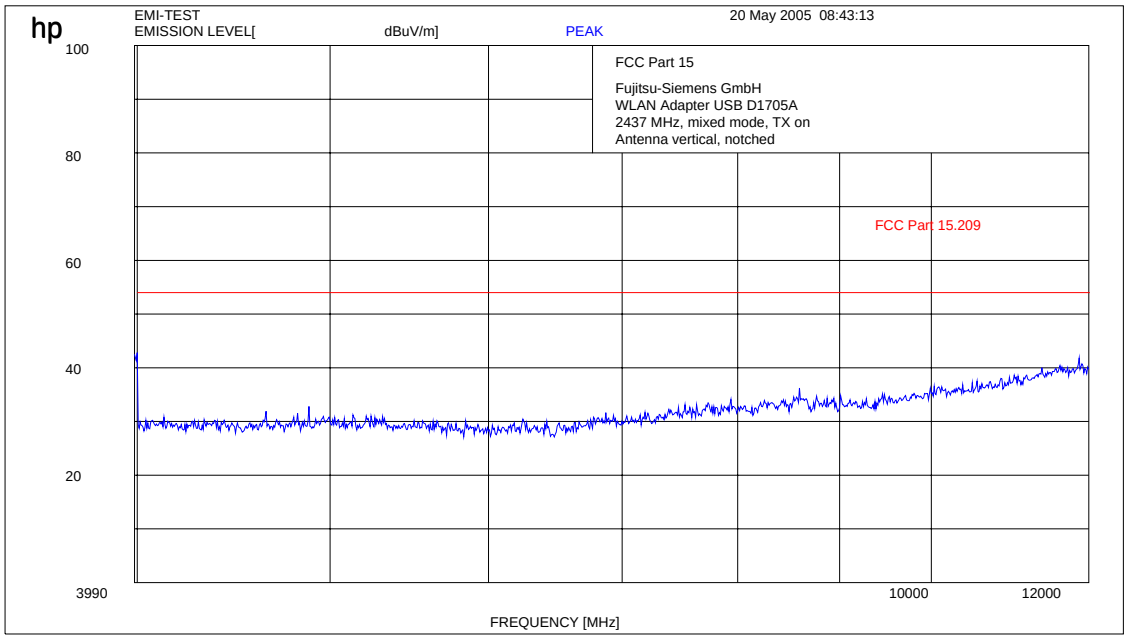


Date: 20.MAY.2005 12:32:39

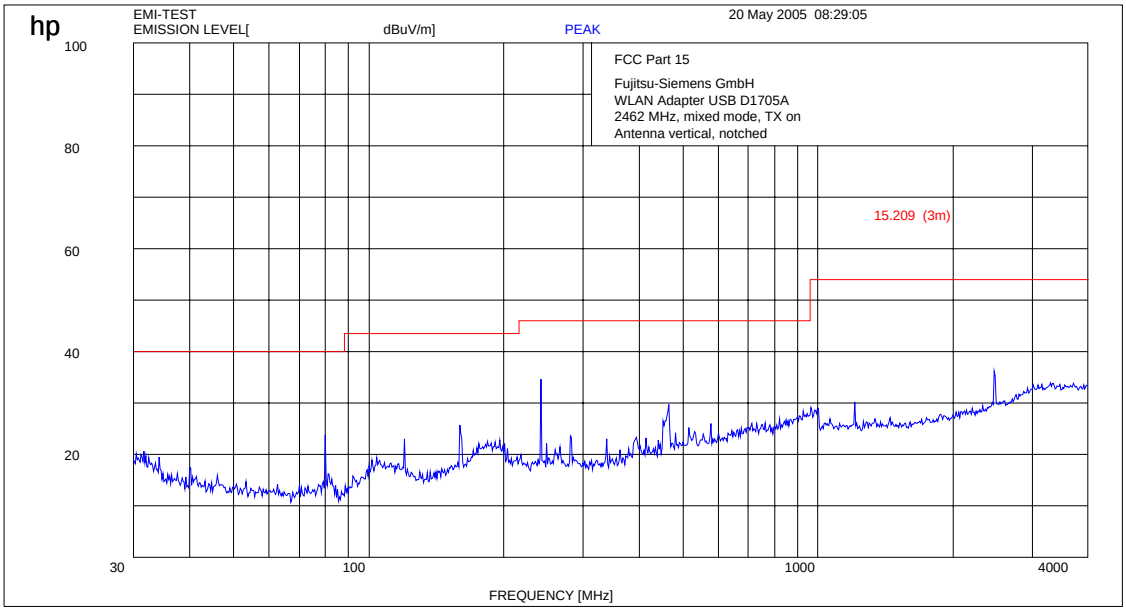
mid channel up to 12 GHz
Plots are valid for DSSS and OFDM mode
Additional Test for D1705A in a 5 ¼ Inch housing



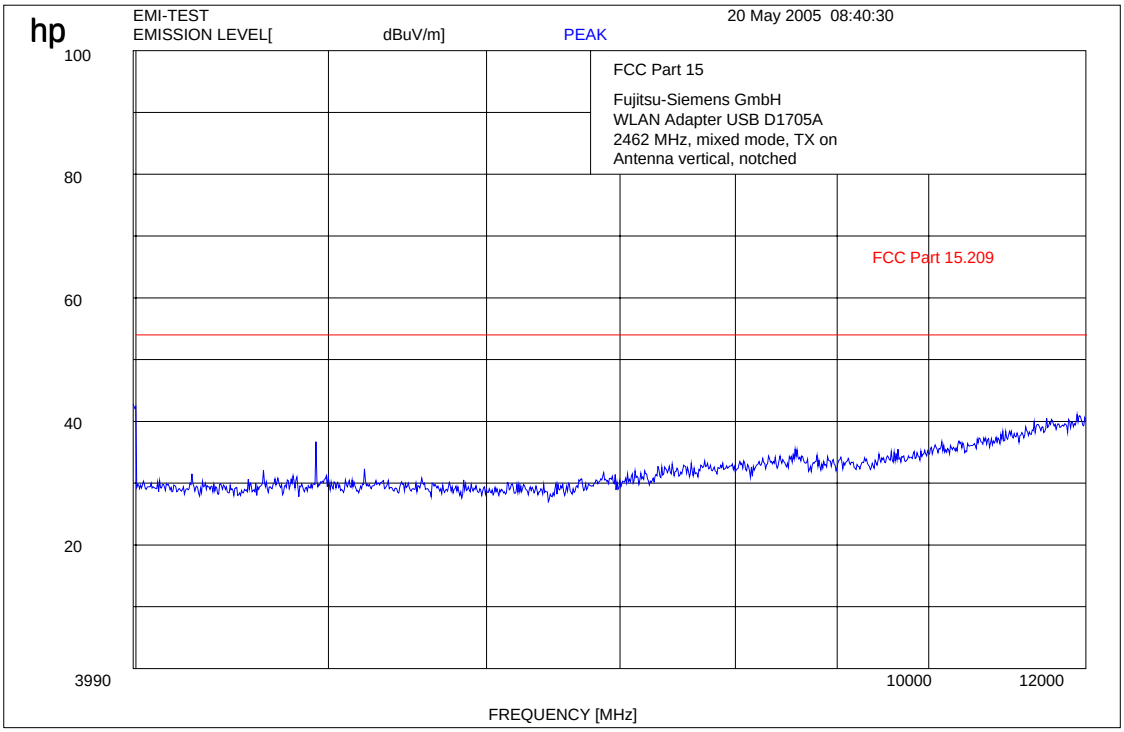
Carrier rejected by a tuneable rejection filter



high channel up to 12 GHz
Plots are valid for DSSS and OFDM mode
Additional Test for D1705A in a 5 ¼ Inch housing



Carrier rejected by a tuneable rejection filter



2.2.10 Emission Limitations – Receiver radiated § 15.209

SPURIOUS EMISSIONS LEVEL (µV/m)								
D1705B			D1705A in 5 ¼ Inch Housing					
f (MHz)	Detector	Level (dBµV/m)	f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)
All peaks > 15 dB below limit								
Measurement uncertainty			±3 dB					

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

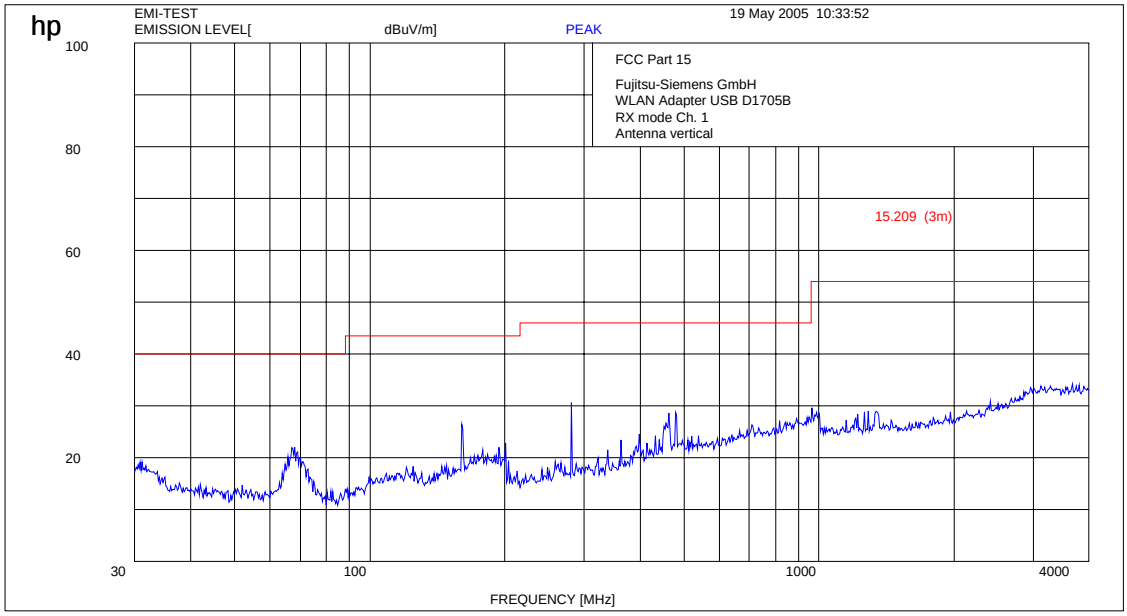
see plots

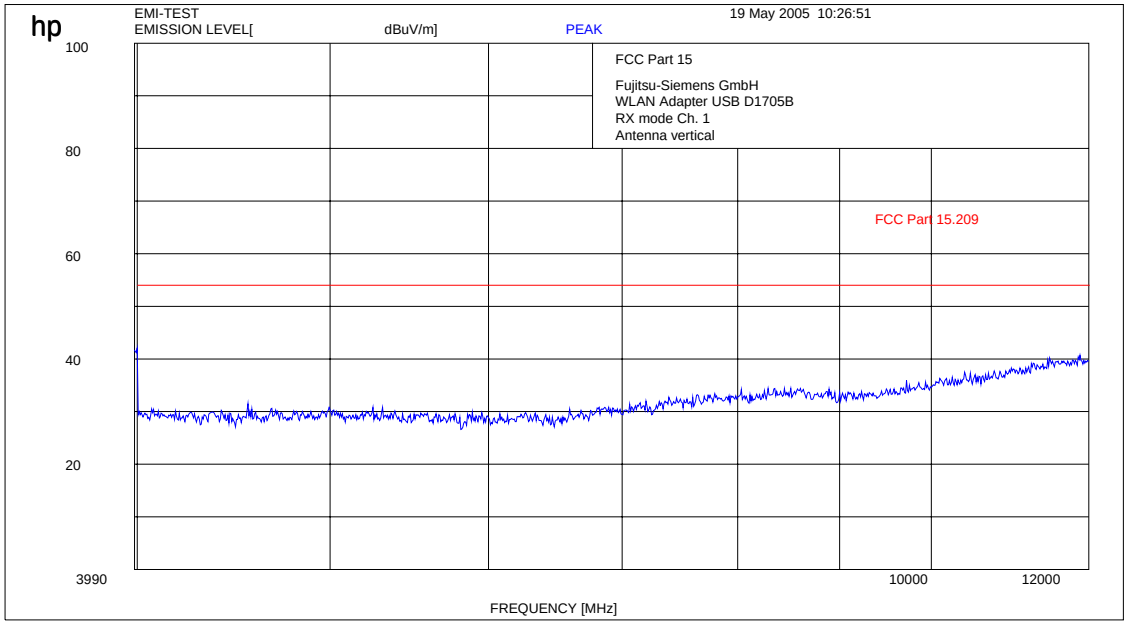
Measurement distance see table

Limits **SUBCLAUSE § 15.109**

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	500 / 54 dBµV/m	3

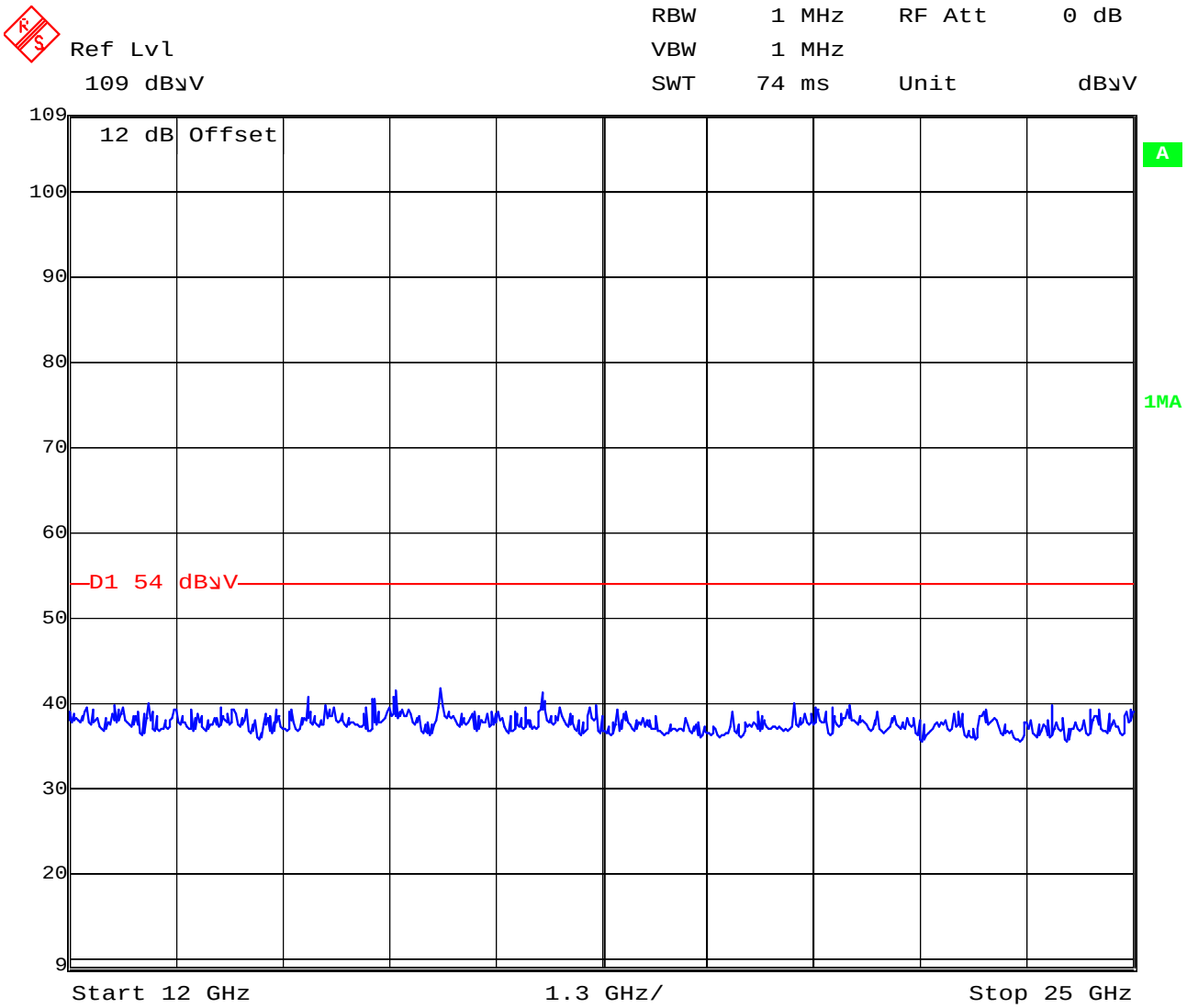
EMISSION LIMITATIONS- Radiated **§ 15.209**
Receiver up to 12 GHz
Low channel





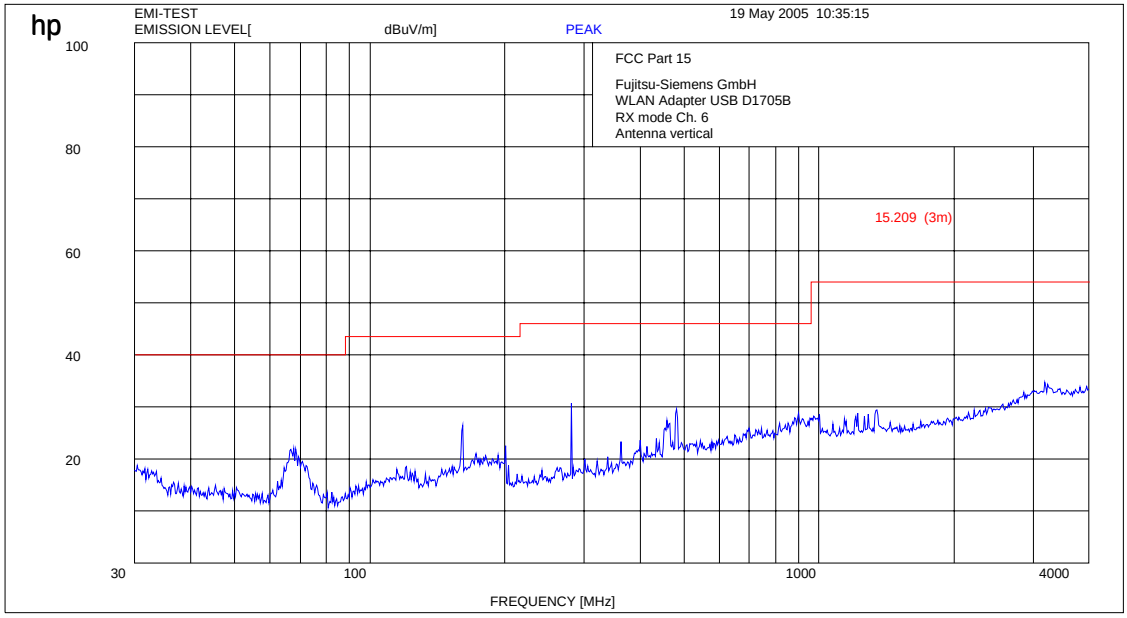
EMISSION LIMITATIONS- Radiated **§ 15.209**

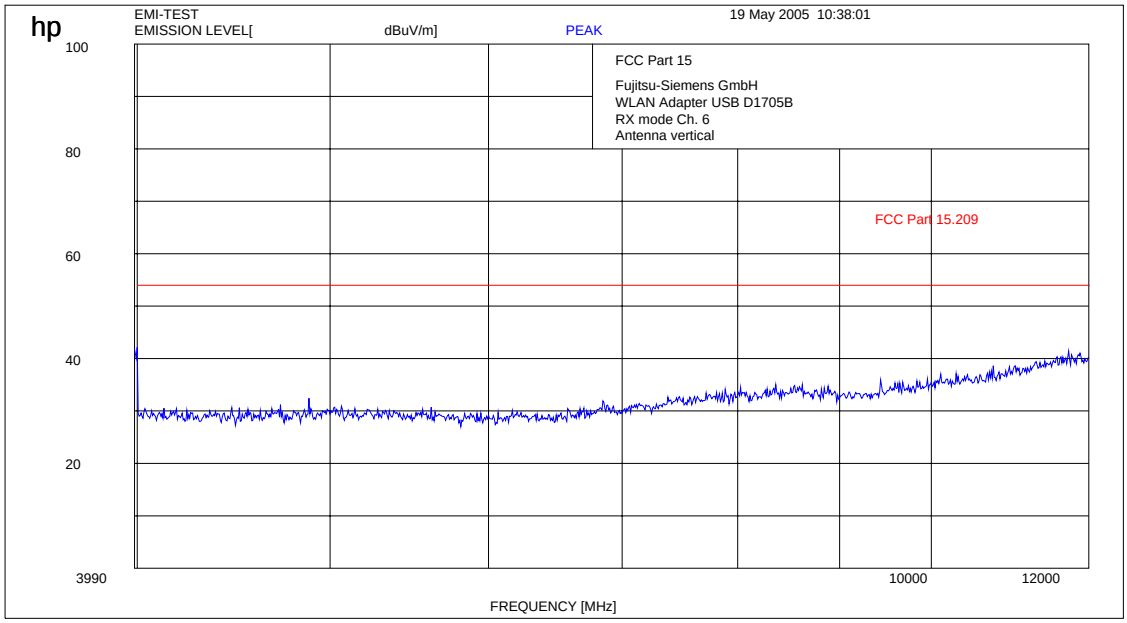
Receiver up to 25 GHz , valid for all three channels



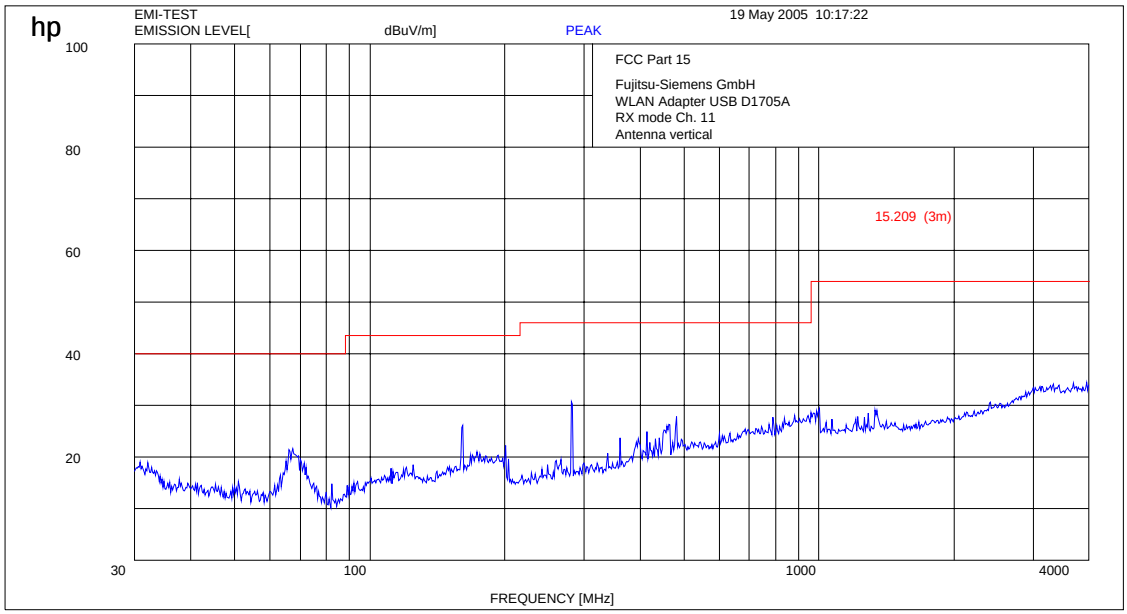
Date: 20.MAY.2005 12:32:01

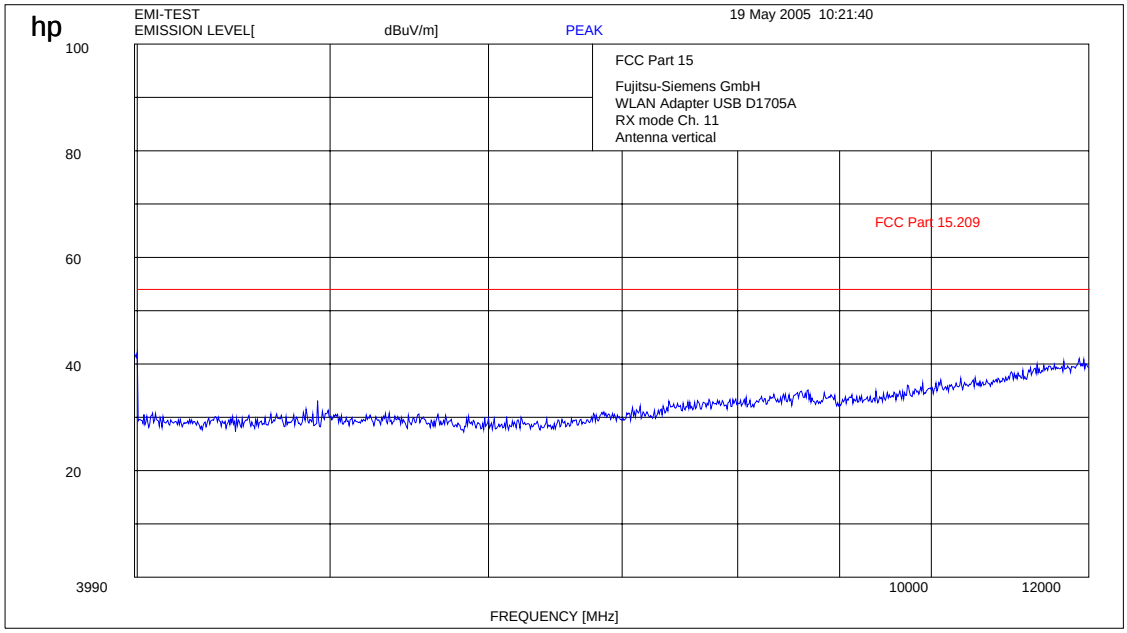
Receiver up to 12 GHz
mid channel



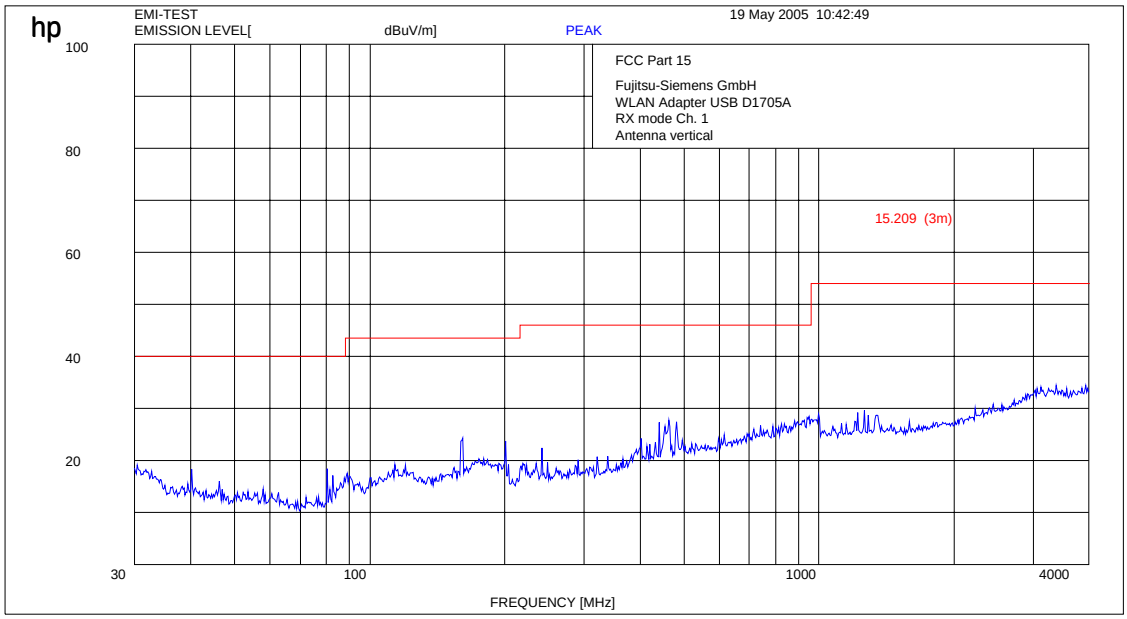


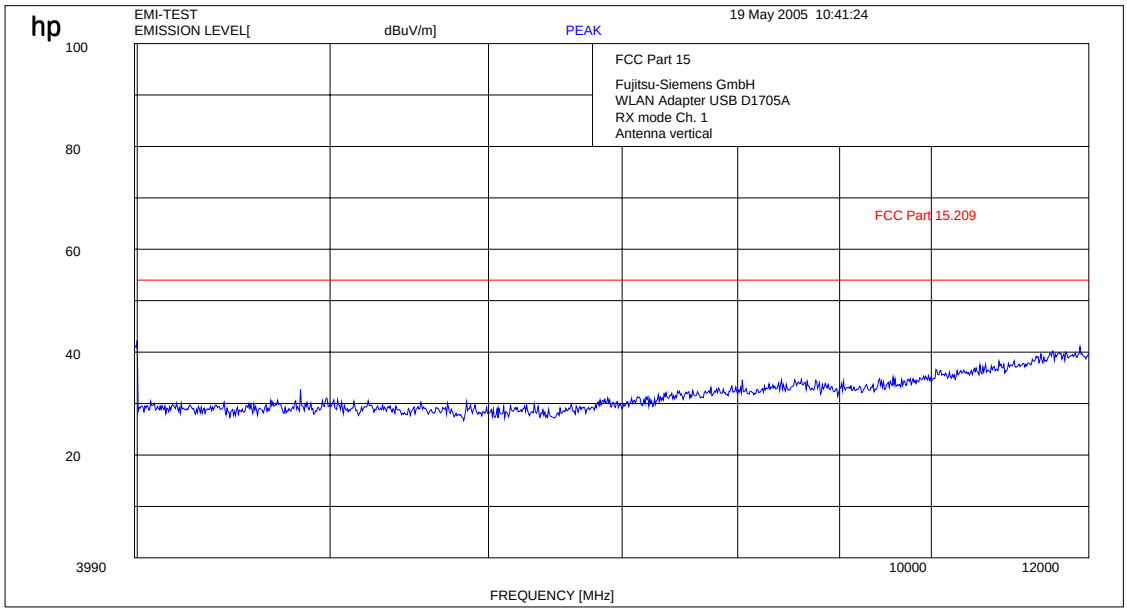
Receiver up to 12 GHz
high channel



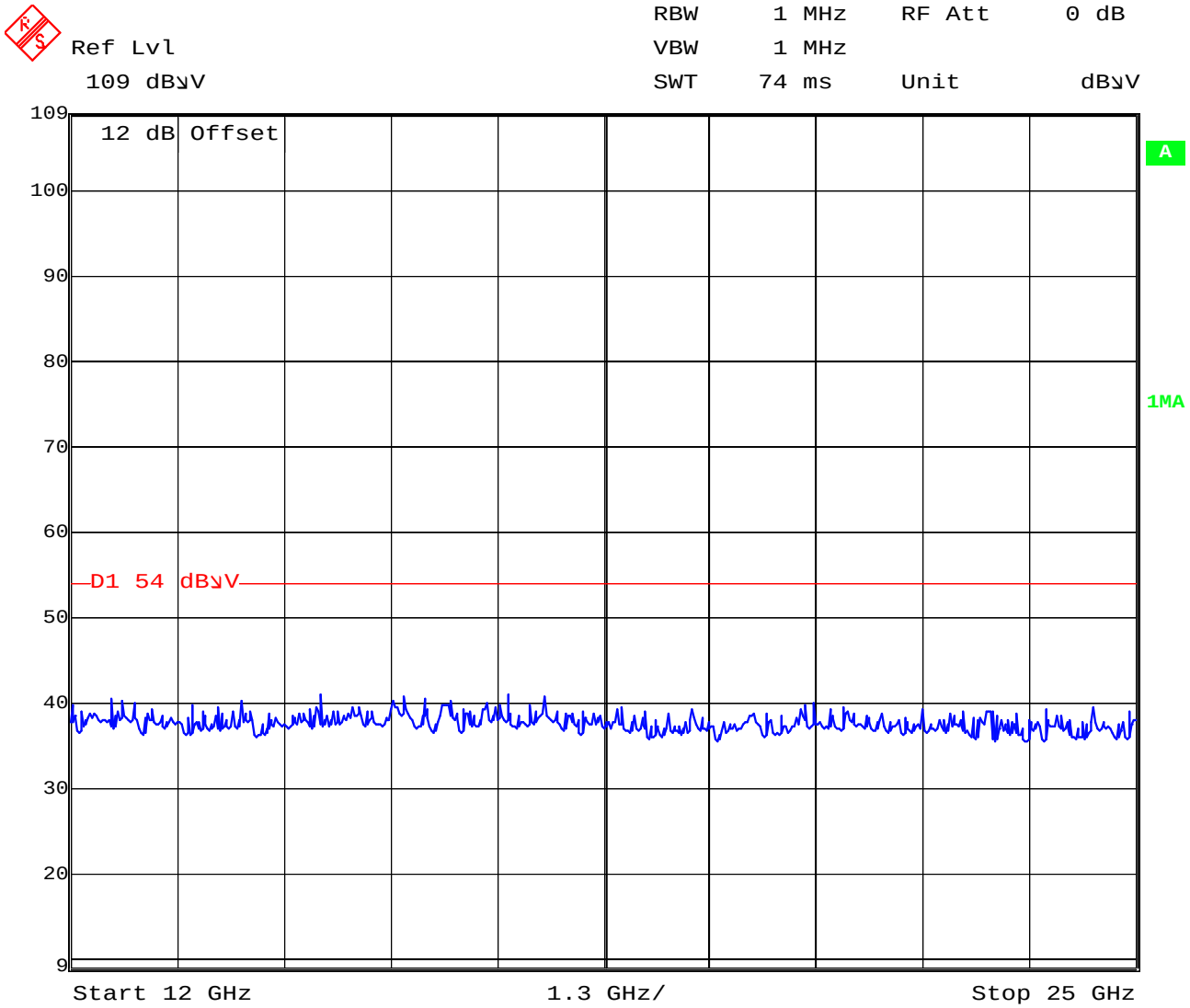


EMISSION LIMITATIONS- Radiated **§ 15.209**
Receiver up to 12 GHz
Low channel
D1705A in 5 ¼ Inch housing

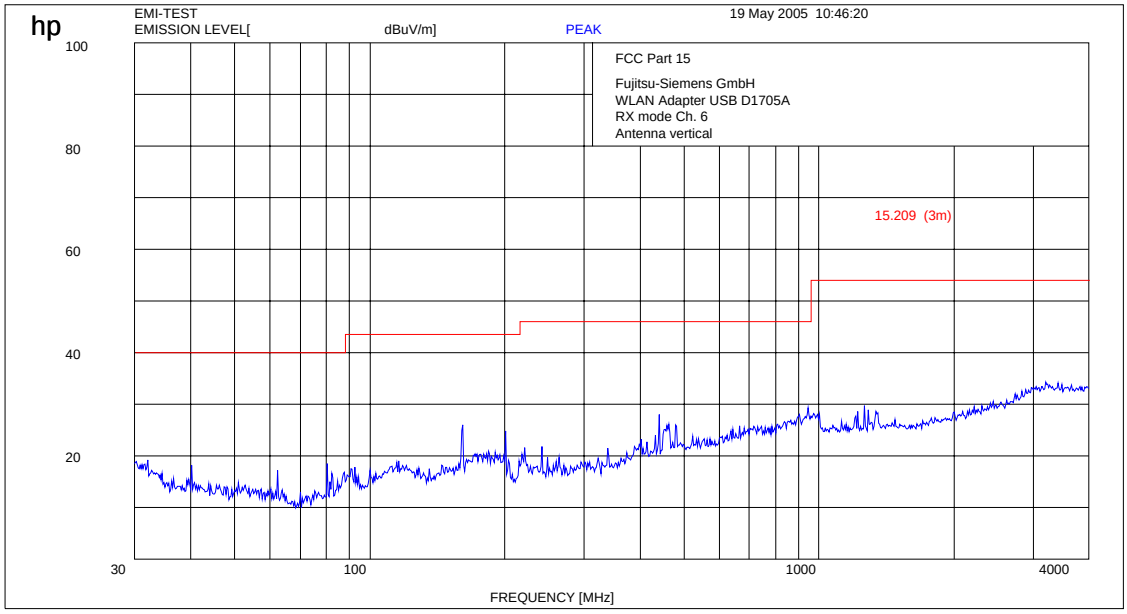


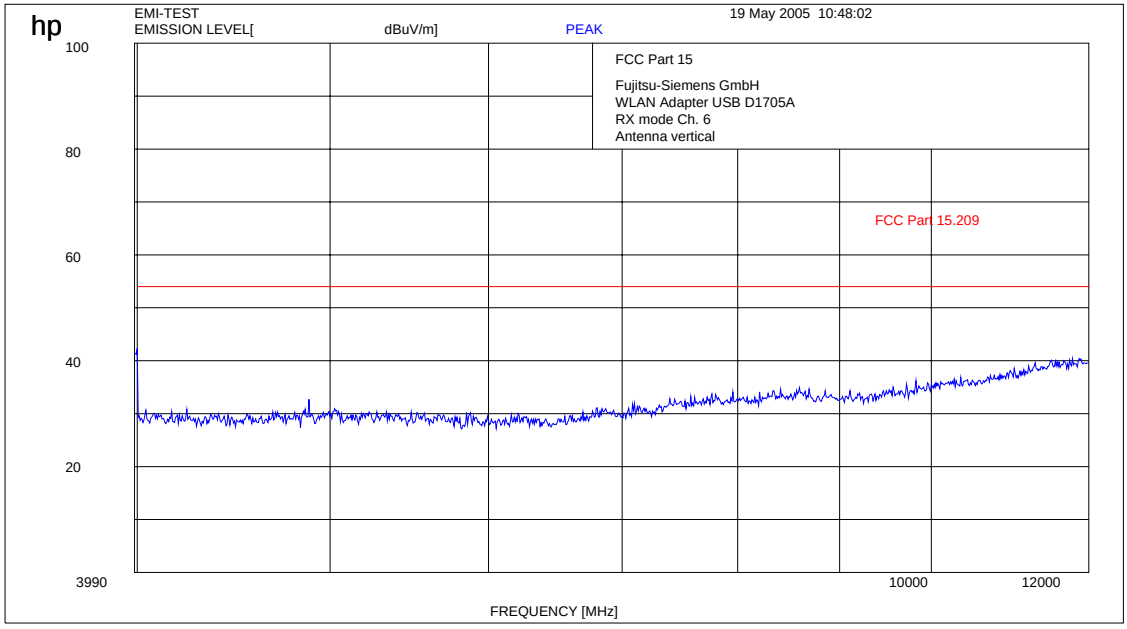


EMISSION LIMITATIONS- Radiated **§ 15.209**
Receiver up to 25 GHz , valid for all three channels
D1705A in 5 ¼ Inch housing

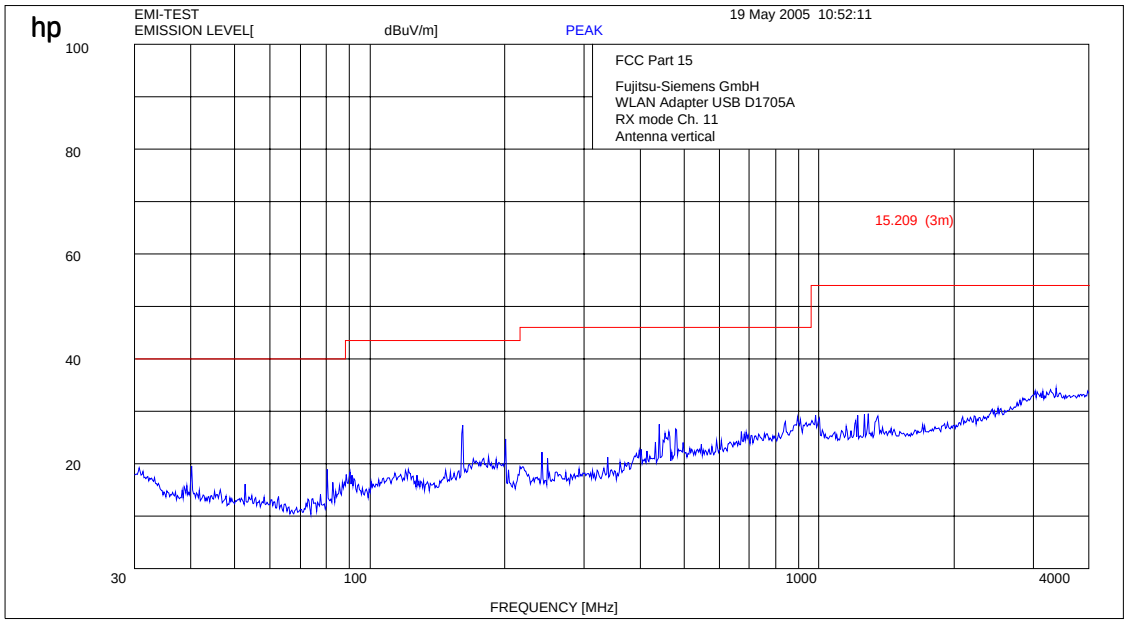


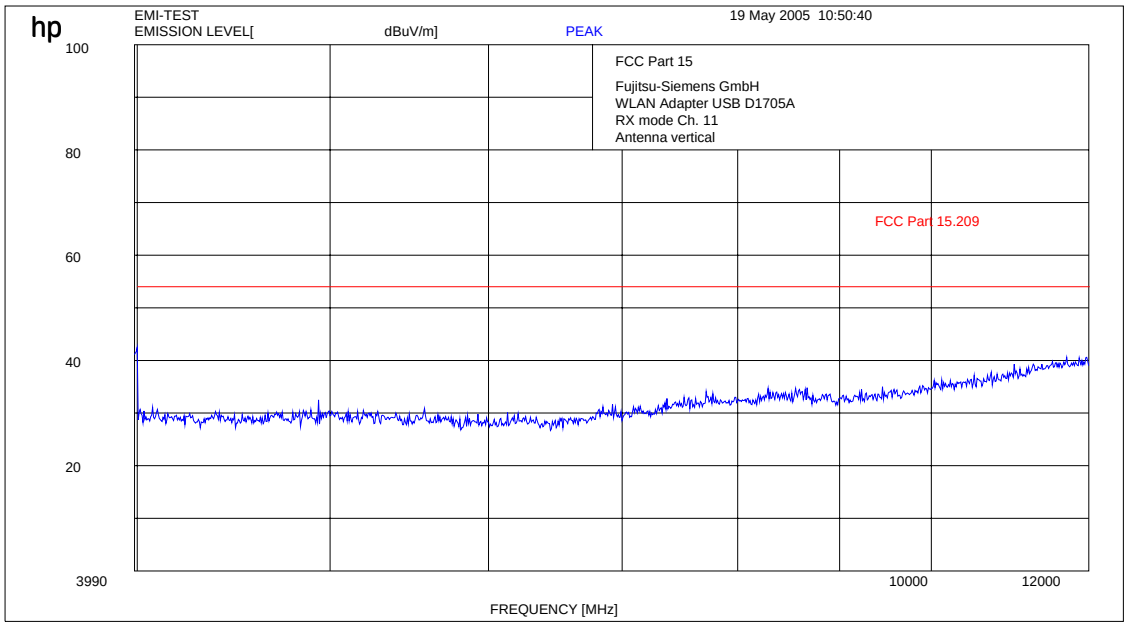
Receiver up to 12 GHz
mid channel
D1705A in 5 ¼ Inch housing





Receiver up to 12 GHz
high channel
D1705A in 5 ¼ Inch housing





3. Test Equipment and Ancillaries used for Tests

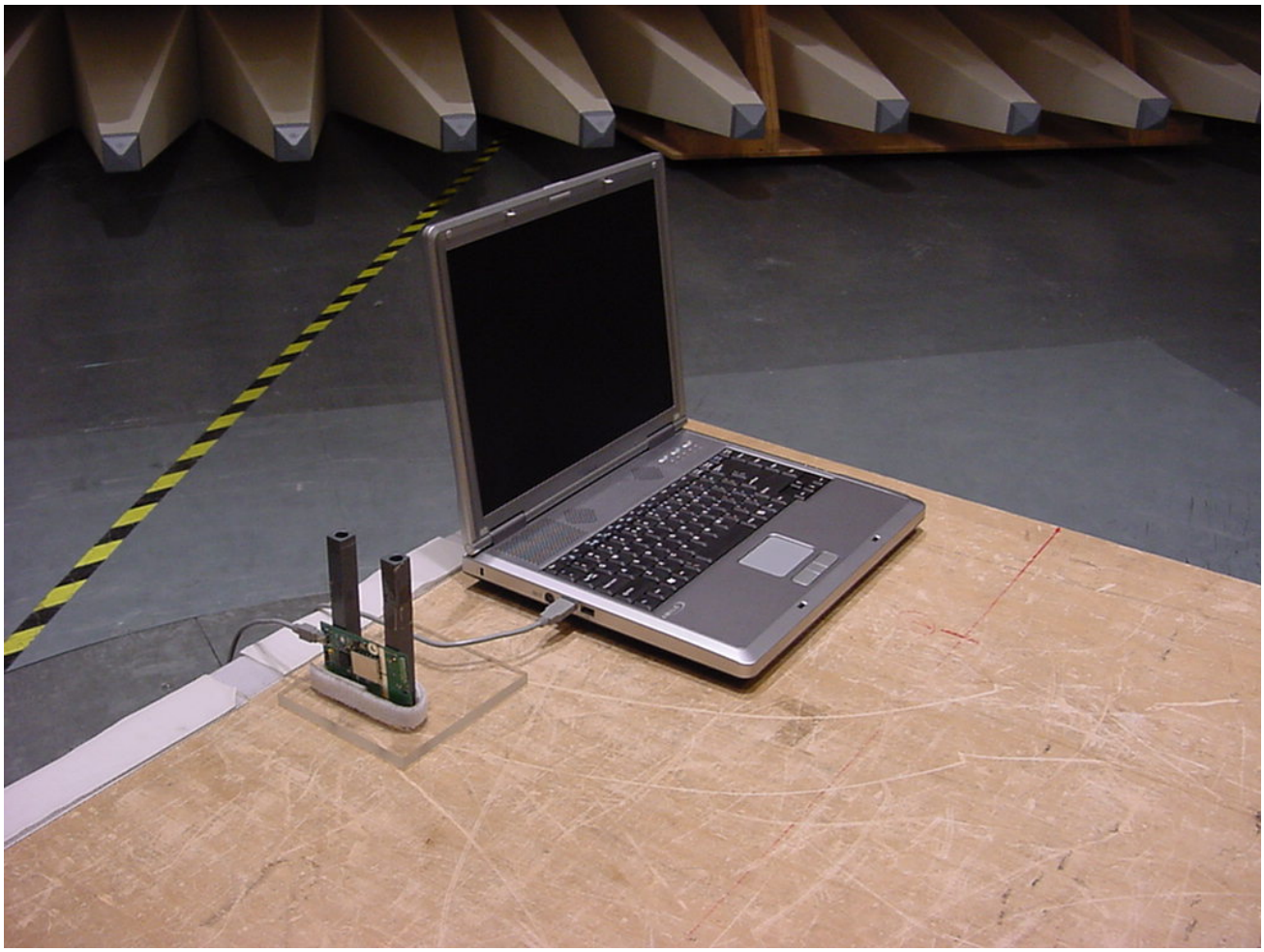
To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

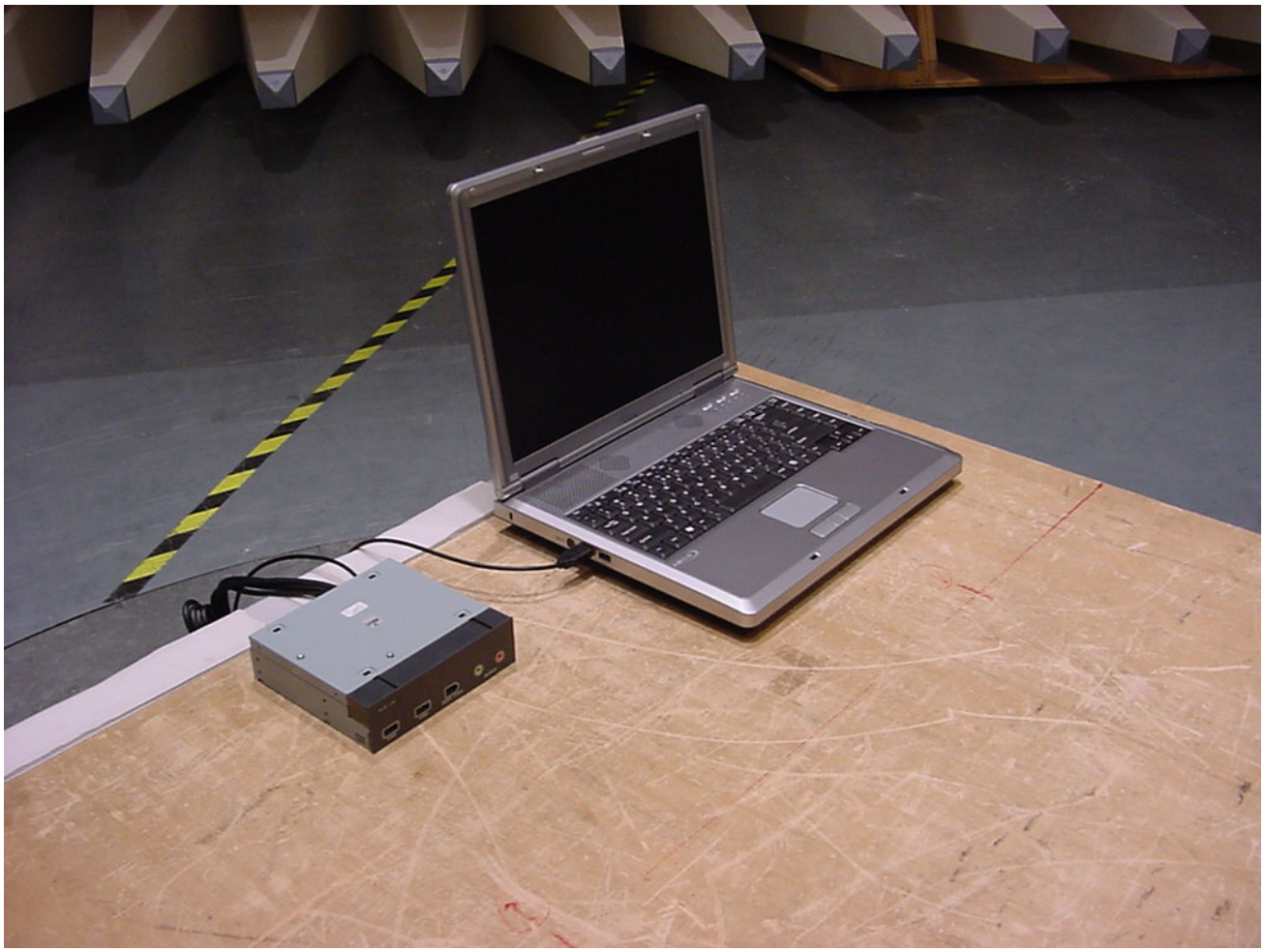
No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Calibrated
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257	Yes
02	Analyzer Display	8566 A	Hewlett-Packard	1925A00860	Yes
03	Oscilloscope	7633	Tektronix	230054	Yes
04	Radio Communication Analyzer	CMTA 54	Rohde & Schwarz	894 043/010	Yes
05	System Power Supply	6038 A	Hewlett-Packard	2848A07027	Yes
06	Signal Generator	8111 A	Hewlett-Packard	2215G00867	Yes
07	Signal Generator	8662 A	Hewlett-Packard	2224A01012	Yes
08	Function Generator	AFGU	Rohde & Schwarz	862 480/032	Yes
09	Regulating Transformer	MPL	Erfi	91350	n.a.
10	LISN	NNLA 8120	Schwarzbeck	8120331	Yes
11	Relay-Matrix	PSU	Rohde & Schwarz	893 285/020	Yes
12	Power-Meter	436 A	Hewlett-Packard	2101A12378	Yes
13	Power-Sensor	8484 A	Hewlett-Packard	2237A10156	Yes
14	Power-Sensor	8482 A	Hewlett-Packard	2237A00616	Yes
15	Modulation Meter	9008	Racal-Dana	2647	Yes
16	Frequency Counter	5340 A	Hewlett-Packard	1532A03899	Yes
17	Anechoic Chamber	---	MWB	87400/002	Yes
18	Spectrum Analyzer	85660 B	Hewlett-Packard	2747A05306	Yes
19	Analyzer Display	85662 A	Hewlett-Packard	2816A16541	Yes
20	Quasi Peak Adapter	85650 A	Hewlett-Packard	2811A01131	Yes
21	RF-Preselector	85685 A	Hewlett-Packard	2833A00768	Yes
22	Biconical Antenna	3104	Emco	3758	Yes
23	Log. Per. Antenna	3146	Emco	2130	Yes
24	Double Ridged Horn	3115	Emco	3088	Yes
25	EMI-Testreceiver	ESAI	Rohde & Schwarz	863 180/013	Yes
26	EMI-Analyzer-Display	ESAI-D	Rohde & Schwarz	862 771/008	Yes
27	Biconical Antenna	HK 116	Rohde & Schwarz	888 945/013	Yes
28	Log. Per. Antenna	HL 223	Rohde & Schwarz	825 584/002	Yes
29	Relay-Switch-Unit	RSU	Rohde & Schwarz	375 339/002	Yes
30	Highpass	HM985955	FSY Microwave	001	n.a.
31	Amplifier	P42-GA29	Tron-Tech	B 23602	Yes
32	Anechoic Chamber		Frankonia		Yes
33	Control Computer	PSM 7	Rohde & Schwarz	834 621/004	Yes
34	EMI Test Receiver	ESMI	Rohde & Schwarz	827 063/010	Yes
35	EMI Test Receiver	Display	Rohde & Schwarz	829 808/010	Yes

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Calibrated
36	Control Computer	HD 100	Deisel	100/322/93	n.a.
37	Relay Matrix	PSN	Rohde & Schwarz	829 065/003	Yes
38	Control Unit	GB 016 A2	Rohde & Schwarz	344 122/008	Yes
39	Relay Switch Unit	RSU	Rohde & Schwarz	316 790/001	Yes
40	Power Supply	6032A	Hewlett Packard	2846A04063	Yes
41	Spectrum Monitor	EZM	Rohde & Schwarz	883 720/006	n.a.
42	Measuring Receiver	ESH 3	Rohde & Schwarz	890 174/002	Yes
43	Measuring Receiver	ESVP	Rohde & Schwarz	891 752/005	Yes
44	Bicon Ant. 20-300MHz	HK 116	Rohde & Schwarz	833 162/011	Yes
45	Logper Ant. 0.3-1 GHz	HL 223	Rohde & Schwarz	832 914/010	Yes
46	Amplifier 0.1-4 GHz	AFS4	Miteq Inc.	206461	Yes
47	Logper Ant. 1-18 GHz	HL 024 A2	Rohde & Schwarz	342 662/002	Yes
48	Polarisation Network	HL 024 Z1	Rohde & Schwarz	341 570/002	Yes
49	Double Ridged Horn Antenna 1-26.5 GHz	3115	EMCO	9107-3696	Yes
50	Microw. Sys. Amplifier 0.5- 26.5 GHz	8317A	Hewlett Packard	3123A00105	Yes
51	Audio Analyzer	UPD	Rohde & Schwarz	1030.7500.04	Yes
52	Controler	PSM 7	Rohde & Schwarz	883 086/026	Yes
53	DC V-Network	ESH3-Z6	Rohde & Schwarz	861 406/005	Yes
54	DC V-Network	ESH3-Z6	Rohde & Schwarz	893 689/012	Yes
55	AC 2 Phase V-Network	ESH3-Z5	Rohde & Schwarz	861 189/014	Yes
56	AC 2 Phase V-Network	ESH3-Z5	Rohde & Schwarz	894 981/019	Yes
57	AC-3 Phase V-Network	ESH2-Z5	Rohde & Schwarz	882 394/007	Yes
58	Power Supply	6032A	Rohde & Schwarz	2933A05441	Yes
59	RF-Test Receiver	ESVP.52	Rohde & Schwarz	881 487/021	Yes
60	Spectrum Monitor	EZM	Rohde & Schwarz	883 086/026	n.a.
61	RF-Test Receiver	ESH3	Rohde & Schwarz	881 515/002	Yes
62	Relay Matrix	PSU	Rohde & Schwarz	882 943/029	Yes
63	Relay Matrix	PSU	Rohde & Schwarz	828 628/007	Yes
64	Spectrum Analyzer	FSIQ 26	Rohde & Schwarz	119.6001.27	Yes
65	Spectrum Analyzer	HP 8565E	Hewlett Packard	3473A00773	Yes
68					

4. Photographs of Test set-up

4.1 Radiated Emissions

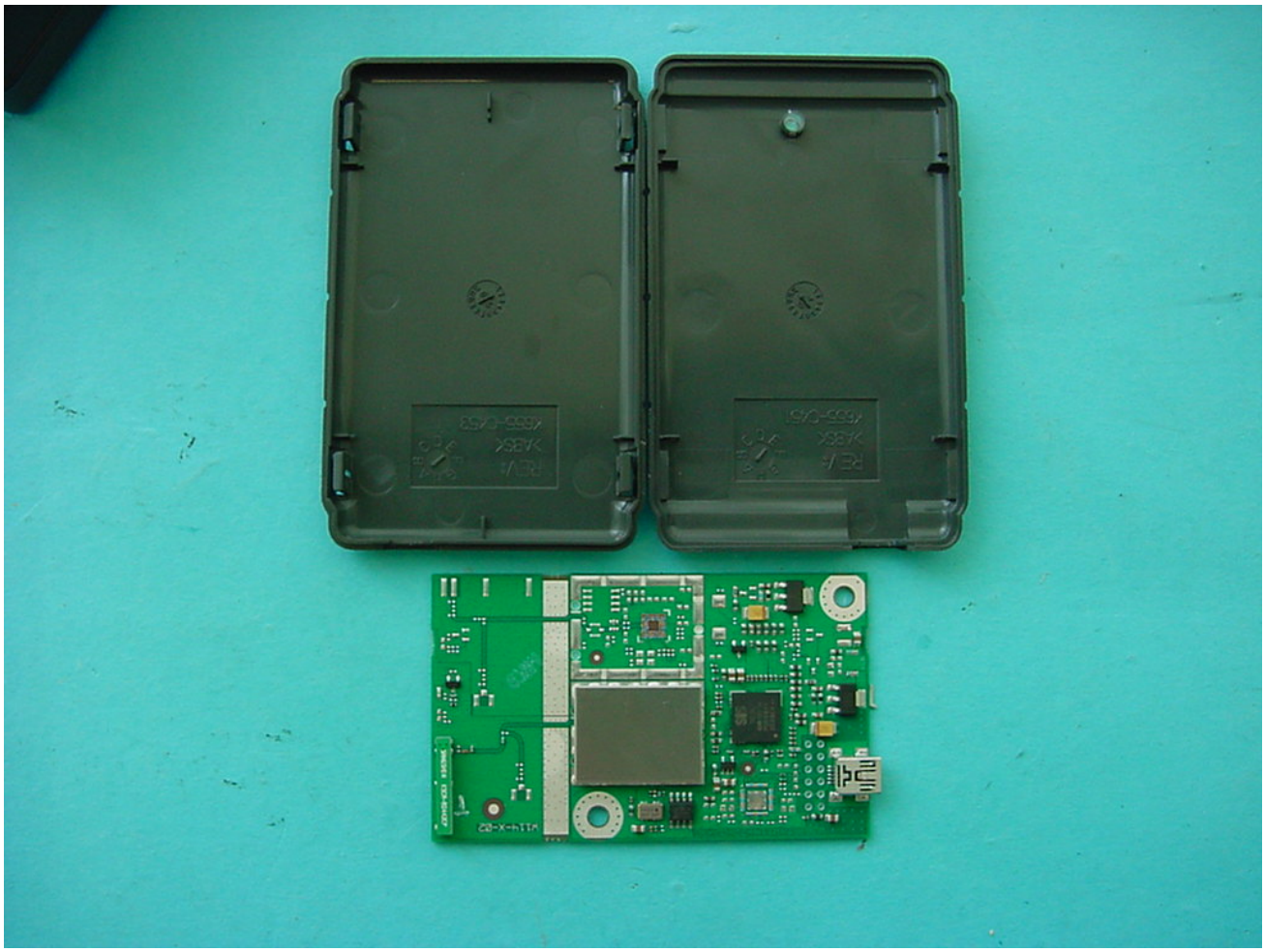


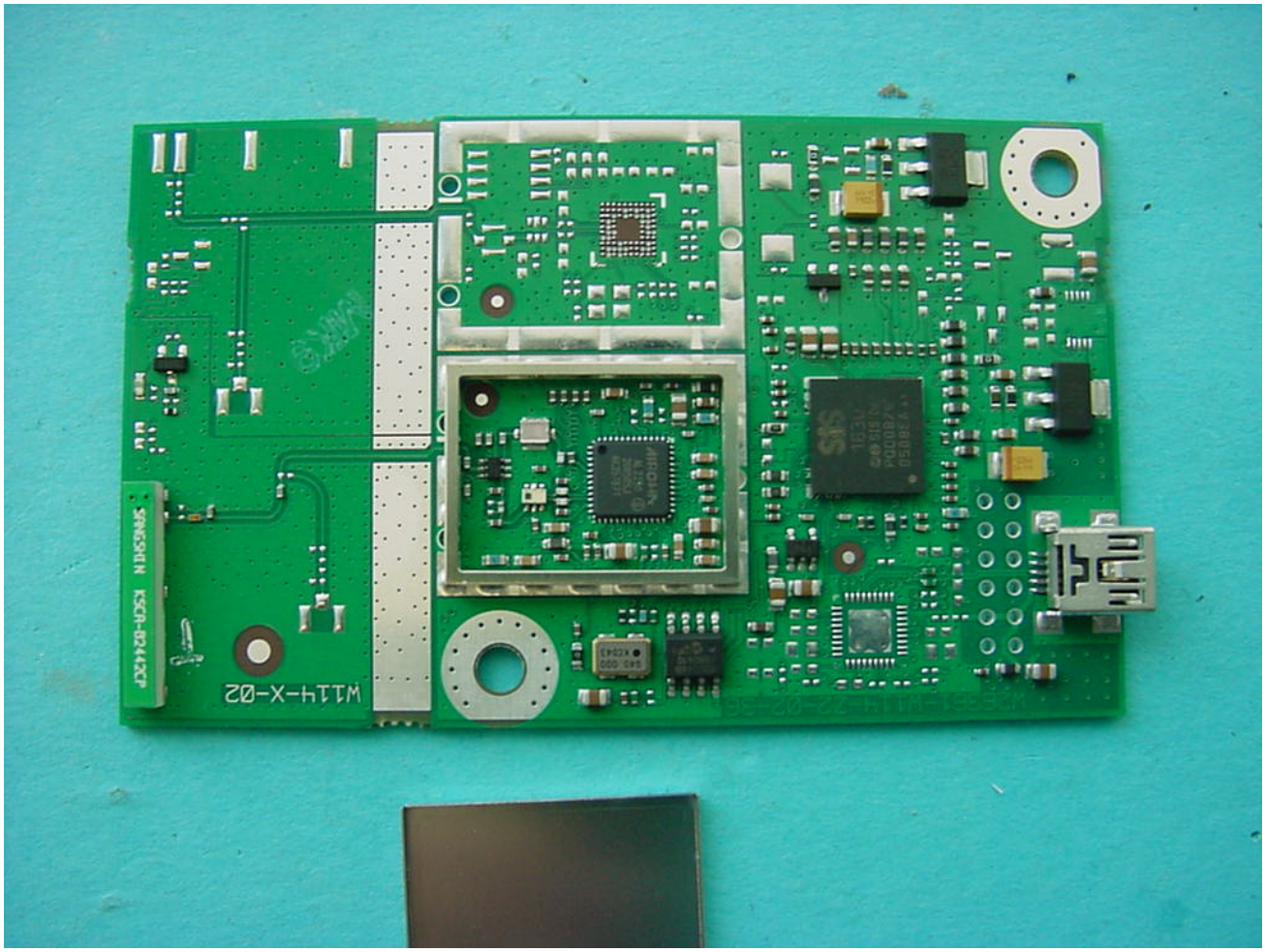


4.2 Conducted measurements

5. Photographs of test equipment


01705
B.

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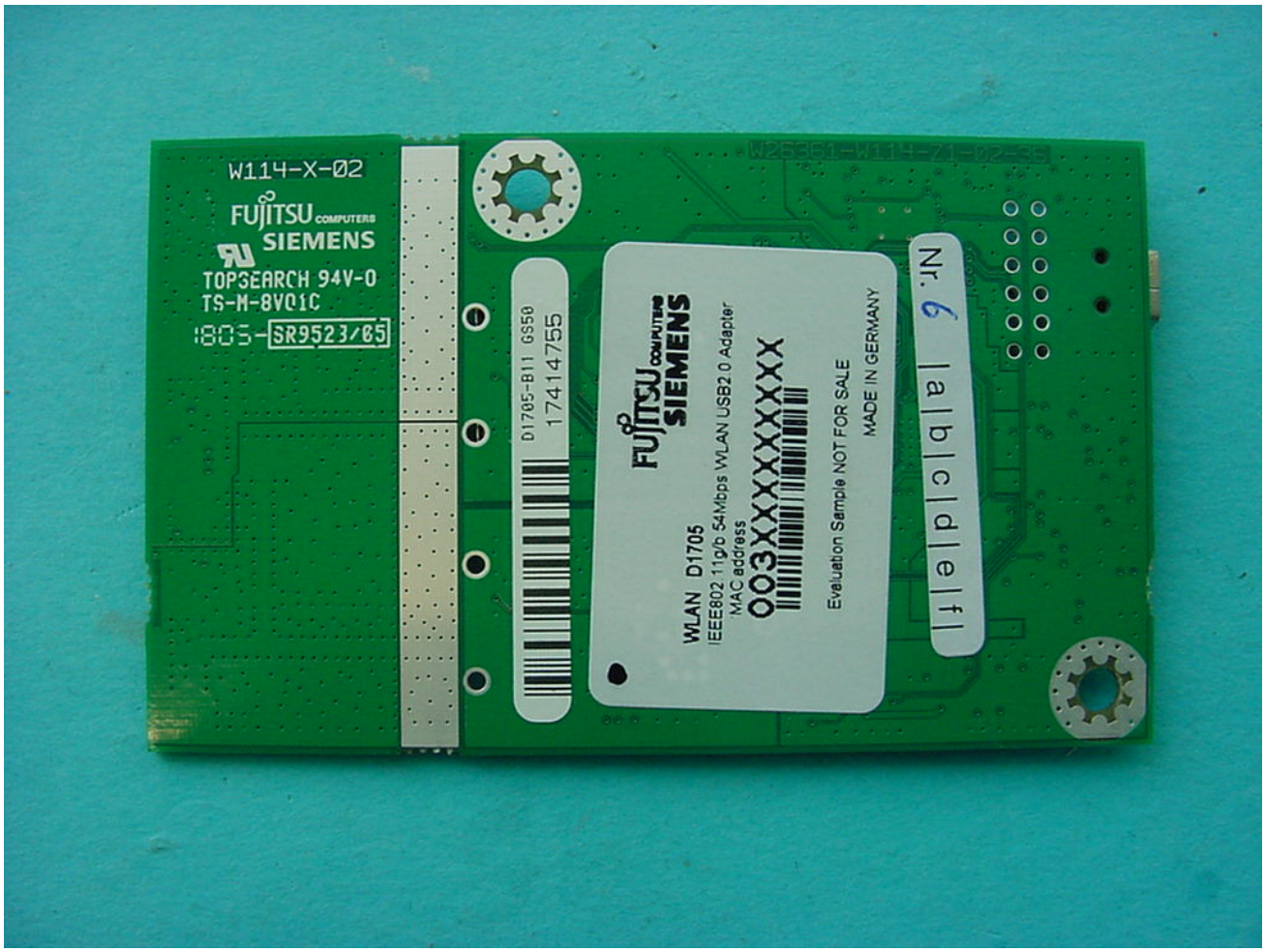
W114-X-02
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:803-SR9523/05
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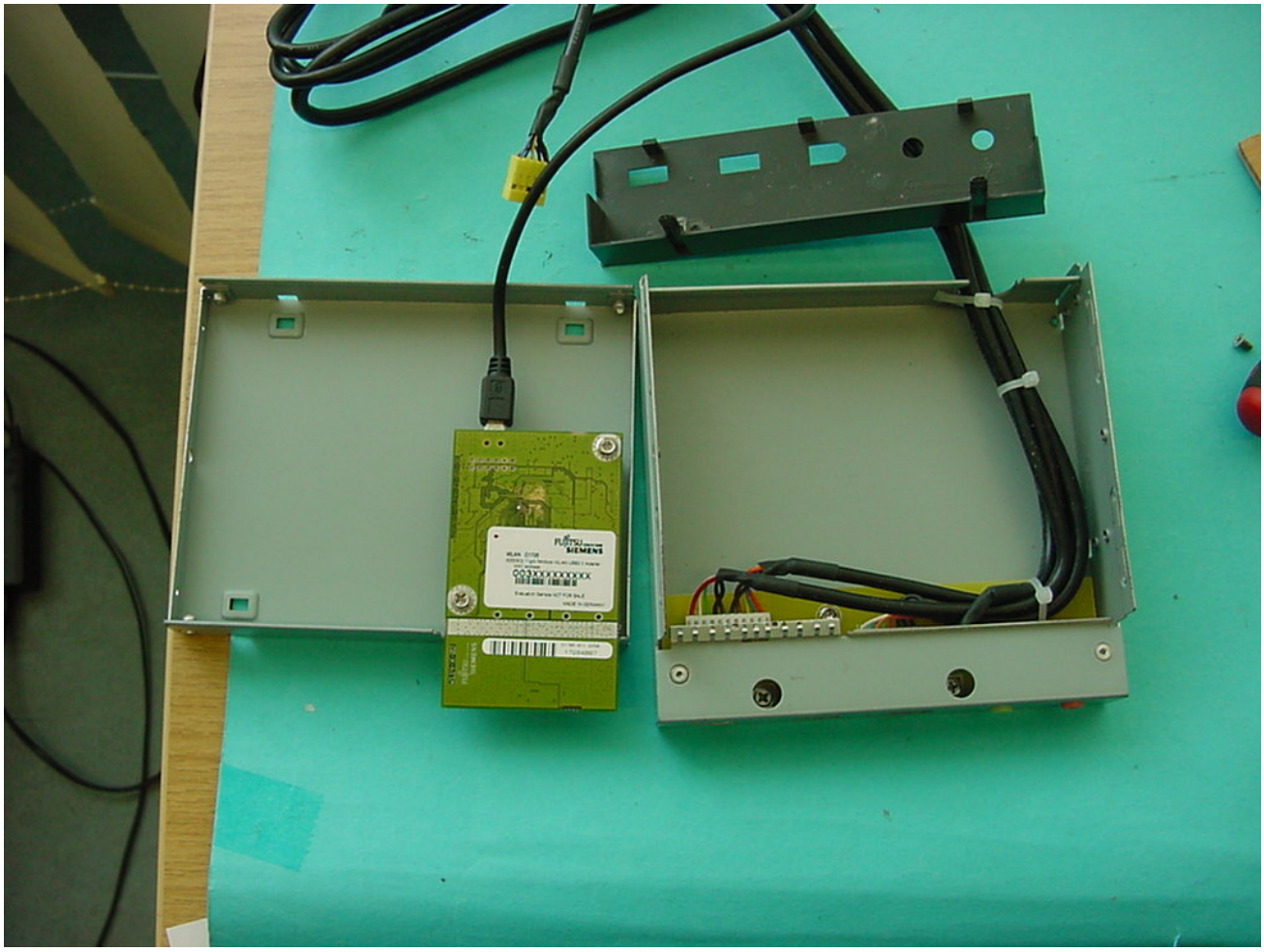
17414755
FUJITSU COMPUTERS
SIEMENS
WLAN D1705
IEEE802 11g/b 54Mbps WLAN USB2.0 Adapter
MAC address
003XXXXXXXXX
Evaluation Sample NOT FOR SALE
MADE IN GERMANY
Nr. 6


D1705
A


WLAN LINK
USB
USB
IEEE 1394
AUDIO


GS109-5.25-2 RE /01
AZALIA


D1705
A




W114-X-02
FUJITSU
SIEMENS
W26361-W114-Z1-02-36
WLAN D1705
IEEE802.11g/b 54Mbps WLAN USB2.0 Adapter
MAC address
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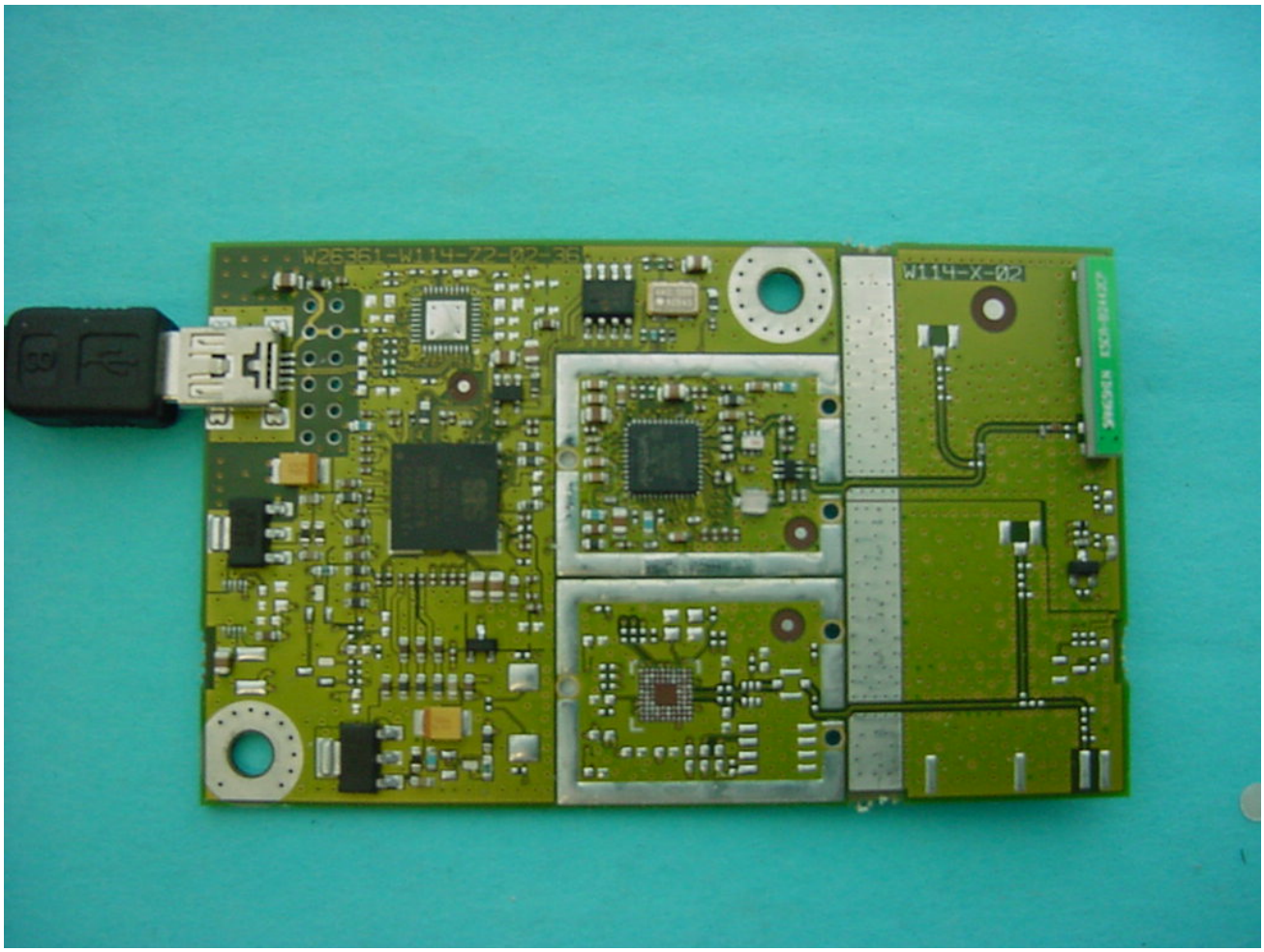
Evaluation Sample NOT FOR SALE
MADE IN GERMANY
D1705-A11 GS50
17284007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