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TCB ID: DE0001



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German Accreditation Council
DAR-Registration Number
DAT-P-176/94-D1



Accredited Bluetooth® Test Facility (BQTF)

Test report No.: 1-0778-01-03/08-A2
Applicant: Gigaset Communications GmbH
Type: Gigaset SX685 WIMAX 2.6 GHz
Standard: FCC CFR 47 Part 27
FCC ID: TVU-SX685

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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.

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.

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Test Laboratory Manager:

2008-11-06 _____ Karsten Geraldly _____
Date Name Signature



Technical responsibility for area of testing:

2008-11-06 _____ Nicolas Stamber _____
Date Name Signature



1.2 Testing laboratory

CETECOM ICT Services GmbH
Untertuerkheimer Strasse 6-10
66117 Saarbruecken
Germany

Phone : + 49 (0) 681 598-0
Fax : + 49 (0) 681 598-9075

State of accreditation:

The test laboratory is accredited according to DIN EN ISO/IEC 17025.
DAR-registration number: DAT-P-176/94-D1

Testing location, if different from CETECOM ICT Services GmbH: not applicable

1.3 Details of applicant

Name : Gigaset Communications GmbH
Street : Frankenstr. 2
Town : 46395 Bocholt
Country : Germany
Phone : +49 (0) 2871 91-0
Fax : +49 (0) 2871 91-24 95

Contact person

Name : Mr. Uwe Alt
Phone : +49 (0) 2871 91-28 57
Fax : +49 (0) 2871 91 62 857
E-Mail : uwe.alt@siemens.com

1.4 Application details

Date of receipt of application : 2008-10-16
Date of receipt of test item : 2008-10-13
Date of test : 2008-10-13 - 2008-10-20
Representations of applicant : Mr. Jürgen Voigt
Test report version : 2

Test item (EUT)

Description : Point to multipoint, Digital Microwave Fixed Link
Type designation : Gigaset SX685 WIMAX 2.6 GHz
Manufacturer : Gigaset Communications GmbH
Frankenstr. 2
46395 Bocholt
Germany

Technical data (5 MHz channel spacing)

Tx Frequency range EUT : 2.504750 – 2.687250 GHz
Frequency EUT : 2.504750, 2.593000, 2.687250 GHz
Channel spacing : 5.0 MHz
Modulation : OFDM (with QPSK, 16QAM, 64QAM)
Radio Output Power (Average) : +24 dBm
Power supply U_{AC} (Nominal) : 115.0 V
Power supply U_{AC} (Minimum) : 97.7 V
Power supply U_{AC} (Maximum) : 132.3 V

Technical data (10 MHz channel spacing)

Tx Frequency range EUT : 2.507500 – 2.684500 GHz
Frequency EUT : 2.507500, 2.596000, 2.684500 GHz
Channel spacing : 10.0 MHz
Modulation : OFDM (with QPSK, 16QAM, 64QAM)
Radio Output Power (Average) : +24 dBm
Power supply U_{AC} (Nominal) : 115.0 V
Power supply U_{AC} (Minimum) : 97.7 V
Power supply U_{AC} (Maximum) : 132.3 V

1.4.1 Operation conditions

Operation: FCC CFR 47 Part 27: Uninterrupted operation for TX

1.4.2 Equipment under test

Indoor unit

Gigaset SX685 WIMAX 2.6 GHz		
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All measurements were performed with the Gigaset SX685 WIMAX 2.6 GHz with the external antenna S25015P. This combination represents the worst case.

Antenna

Name:	Product Code	Antenna gain [dBi]	cable length / attenuation
external antenna 2.5 - 2.7 GHz	S25015P	15	1 m + 2 m / 3 dB
external antenna 2.5 - 2.7 GHz	S2509P39NM	9	1 m / 1 dB

The Antenna S25015P comes with a fixed 1 m cable plus an additional 2 m piece.

1.5 Test standards

FEDERAL COMMUNICATIONS COMMISSION

CFR 47 Part 27 2007-10-01 Subpart C – Technical standards

1.6 Technical test

1.6.1 Summary of test results:

Remarks on the RF tests carried out during the assessment:

Complete RF tests for all mandatory Tx parameters.

The test report:

- describes the first test
- describes an additional test
- is a verification of documents
- is only valid with the test report no.:

1.6.2 Test environment

The environmental conditions are documented especially for each test.

Normal conditions:	Temperature	+22.0 °C
	Humidity	50.0 %

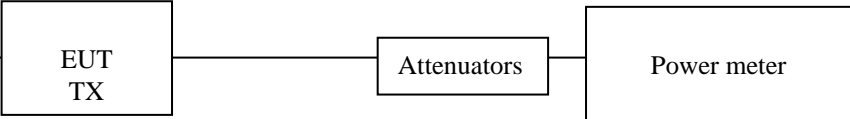
1.6.3 Measurement and test set-up

The measurement and test set-up is defined in the technical specification FCC.

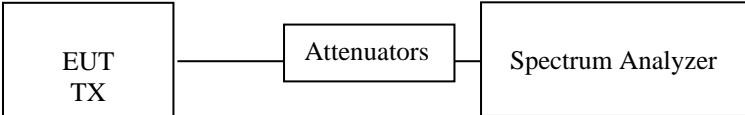
Measurement uncertainties:	Power	± 0.4 dB
	Frequency	± 0.01 ppm
	Spectrum masks	± 0.4 dB; ± 0.01 ppm
	Spurious emissions	± 1.4 dB; ± 0.01 ppm

Test set-up

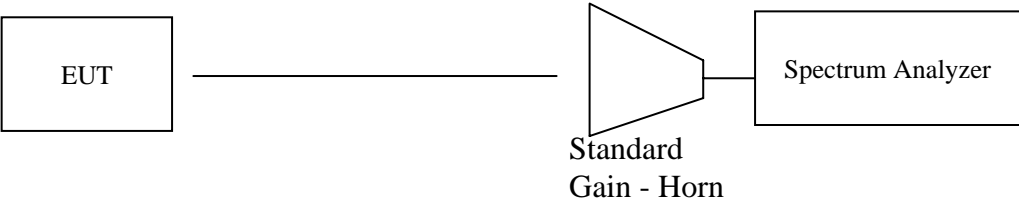
No. 1



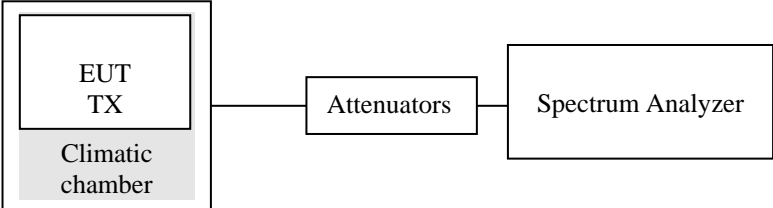
No. 2



No. 3



No. 4



1.6.4 Test equipment utilized

Test equipment	Manufacturer	Type	CETECOM Ref. No.
Spectrum analyser	Agilent	E4440A	300003812
Power meter	Hewlett Packard	E4419B	300002627
Power sensor	Hewlett Packard	R8485A	300001668
Climatic test chambers	Vötsch	VUK 04/500	300000297
Spectrum analyser	HP	HP 85660B	300000999
Analyser display	HP	HP 85662A	300002297
Quasi peak adapter	HP	HP 85650A	30000999a
RF-preselector	HP	HP 85685A	300001000
Biconical antenna	Emco	3104	300001603a
Log.-per.-antenna	Emco	3146	300001603b
Double ridge horn	Emco	3115	300001603c
Amplifier	Tron-Tech	P42-GA29	300001040
Amplifier	Hewlett Packard	83017A	300002268
Standard Gain Horn	Narda	639	300000786
Standard Gain Horn	Narda	638	300000785
Power supply	Hewlett Packard	6038A	300001174
Power supply	Zentro Elektrik	6032A	300000501
Power supply	Zentro Elektrik	6032A	300000505
Power controller	Fluke	45	300001532
RF-cable	Hewlett Packard	5061-5359	300002033
RF-cable	Insulated Wire Inc.	2-PS1401-788-2PS	300002855

1.7 Test results

1.7.1 Test result overview

This test was performed:

in addition to the test report no.:

Verification of EUT:

- EUT is in accordance with the technical description
- EUT is not in accordance with the technical description

1.7.2 Test details

- Transmitter characteristics 5 MHz..... 11
 - Conducted Output Power..... 11
- Transmitter characteristics 10 MHz..... 12
 - Conducted Output Power..... 12
- Occupied bandwidth..... 13
- Spurious emissions at antenna terminals..... 17
 - 5 MHz channel spacing..... 17
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- Field strength of spurious radiation..... 37
 - 5 MHz channel spacing..... 37
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 - 5 MHz channel spacing..... 51
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- RF Exposure /Safety..... 63

CFR 47 Part 2.1046 Measurements required: RF power output
 CFR 47 Part 27.50 Power and antenna height limits, subpart (h)

Transmitter characteristics: 5 MHz channel spacing

Conducted output power

Measurement conditions:

Frequency	f_{min}	= 2.504750 GHz
Frequency	f_{nom}	= 2.593000 GHz
Frequency	f_{max}	= 2.687250 GHz
Channel spacing	CS	= 5.0 MHz
Modulation	D	= QPSK, 16QAM, 64QAM
Temperature	t	= see table
Power supply	U_{AC}	= see table
Measurement at	C'	

Test set-up: see page 8 / no. 1

Limit: 2 Watt / 33 dBm

Test measurement:

U_{Aa}	T	Modulation	Frequency	RF power
[V]	[°C]	[°C]	[GHz]	[dBm]
115.0	+22.0	QPSK	2.504750	23.7
115.0	+22.0	QPSK	2.593000	23.6
115.0	+22.0	QPSK	2.687250	23.3
115.0	+22.0	16QAM	2.504750	23.5
115.0	+22.0	16QAM	2.593000	23.4
115.0	+22.0	16QAM	2.687250	23.1
115.0	+22.0	64QAM	2.504750	23.5
115.0	+22.0	64QAM	2.593000	23.2
115.0	+22.0	64QAM	2.687250	22.9

Test result: Passed: Failed:

CFR 47 Part 2.1046 Measurements required: RF power output
 CFR 47 Part 27.50 Power and antenna height limits, subpart (h)

Transmitter characteristics: 10 MHz channel spacing

Conducted output power

Measurement conditions:

Frequency	f_{\min}	= 2.507500 GHz
Frequency	f_{nom}	= 2.596000 GHz
Frequency	f_{\max}	= 2.684500 GHz
Channel spacing	CS	= 10.0 MHz
Modulation	D	= QPSK, 16QAM, 64QAM
Temperature	t	= see table
Power supply	U_{AC}	= see table
Measurement at	C'	

Test set-up: see page 8 / no. 1

Limit: 2 Watt / 33 dBm

Test measurement:

U_{AC}	T	Modulation	Frequency	RF power
[V]	[°C]	[°C]	[GHz]	[dBm]
115.0	+22.0	QPSK	2.507500	23.6
115.0	+22.0	QPSK	2.596000	23.3
115.0	+22.0	QPSK	2.684500	22.8
115.0	+22.0	16QAM	2.507500	23.4
115.0	+22.0	16QAM	2.596000	22.8
115.0	+22.0	16QAM	2.684500	22.6
115.0	+22.0	64QAM	2.507500	23.2
115.0	+22.0	64QAM	2.596000	22.9
115.0	+22.0	64QAM	2.684500	22.4

Test result:

Passed:

Failed:

CFR 47 Part 2.1049 Measurements required: Occupied bandwidth
 CFR 47 Part 27.53 Emission limits, subpart (l) (6)

Transmitter characteristics: 5 / 10 MHz channel spacing

Measurement conditions:

Frequency	f_{nom}	= 2.593 GHz / 2.596 GHz
Channel spacing	CS	= 5.0 MHz / 10.0 MHz
Modulation	D	= QPSK, 16QAM, 64QAM
Temperature	t	= see table
Power supply	U_{AC}	= see table
Measurement at	C'	

Test set-up: see page 8 / no. 2

Limit: see plots

Test measurement:

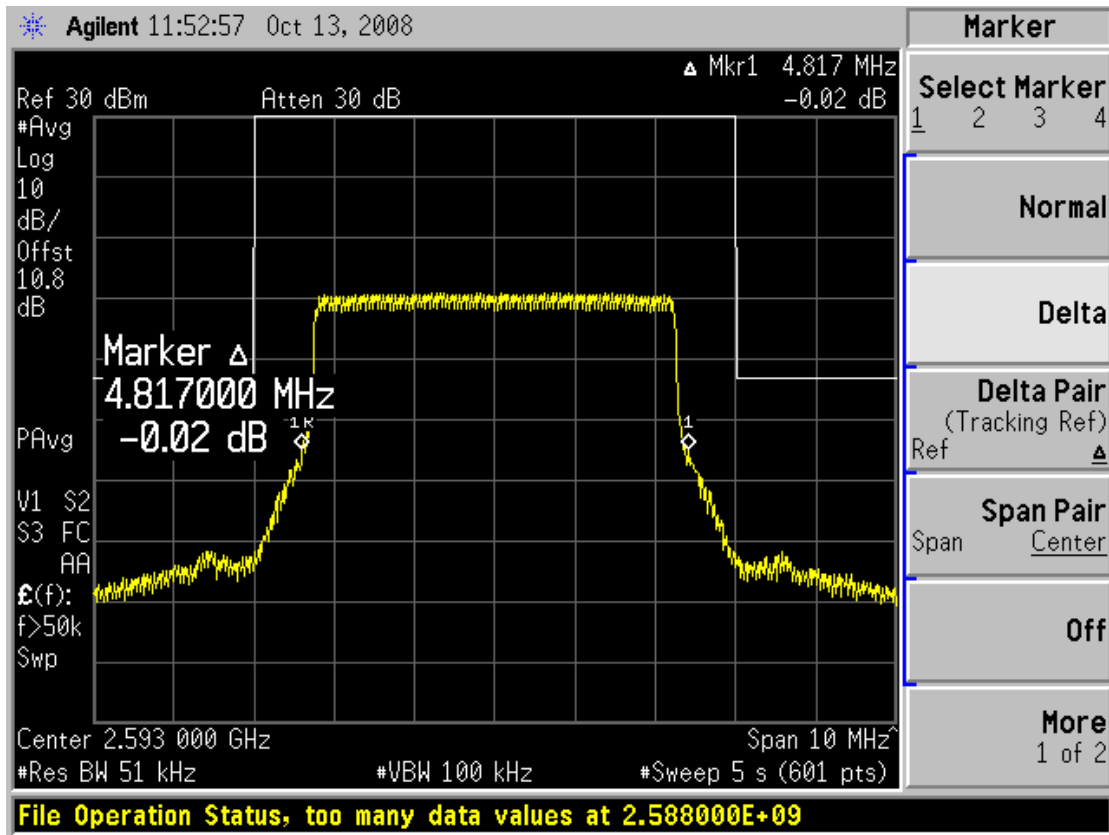
U_{AC}	T	Channel spacing	Modulation	Frequency	Occupied bandwidth	Plot
[V]	[°C]	[MHz]	[°C]	[GHz]	[MHz]	
115.0	+22.0	5	QPSK	2.593000	4.817	1
115.0	+22.0	5	16QAM	2.593000	4.783	2
115.0	+22.0	5	64QAM	2.593000	4.767	3
115.0	+22.0	10	QPSK	2.596000	9.700	4
115.0	+22.0	10	16QAM	2.596000	9.600	5
115.0	+22.0	10	64QAM	2.596000	9.570	6

Test result:

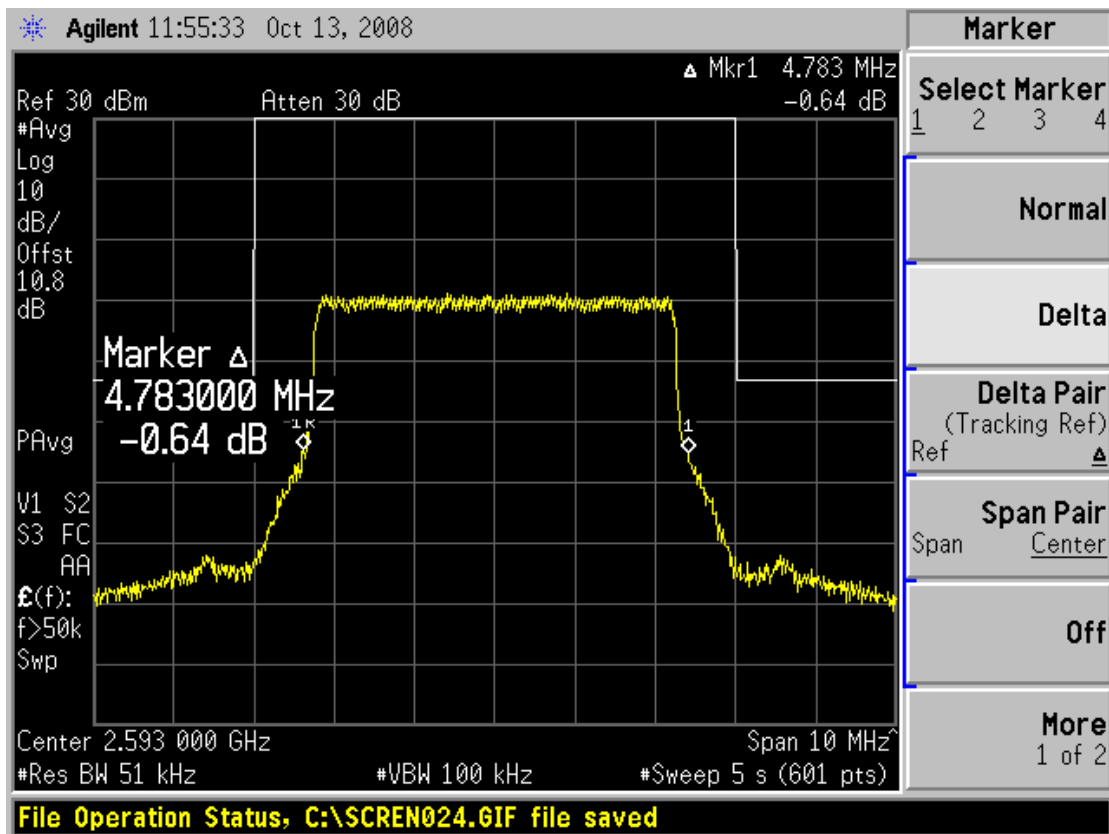
Passed:

Failed:

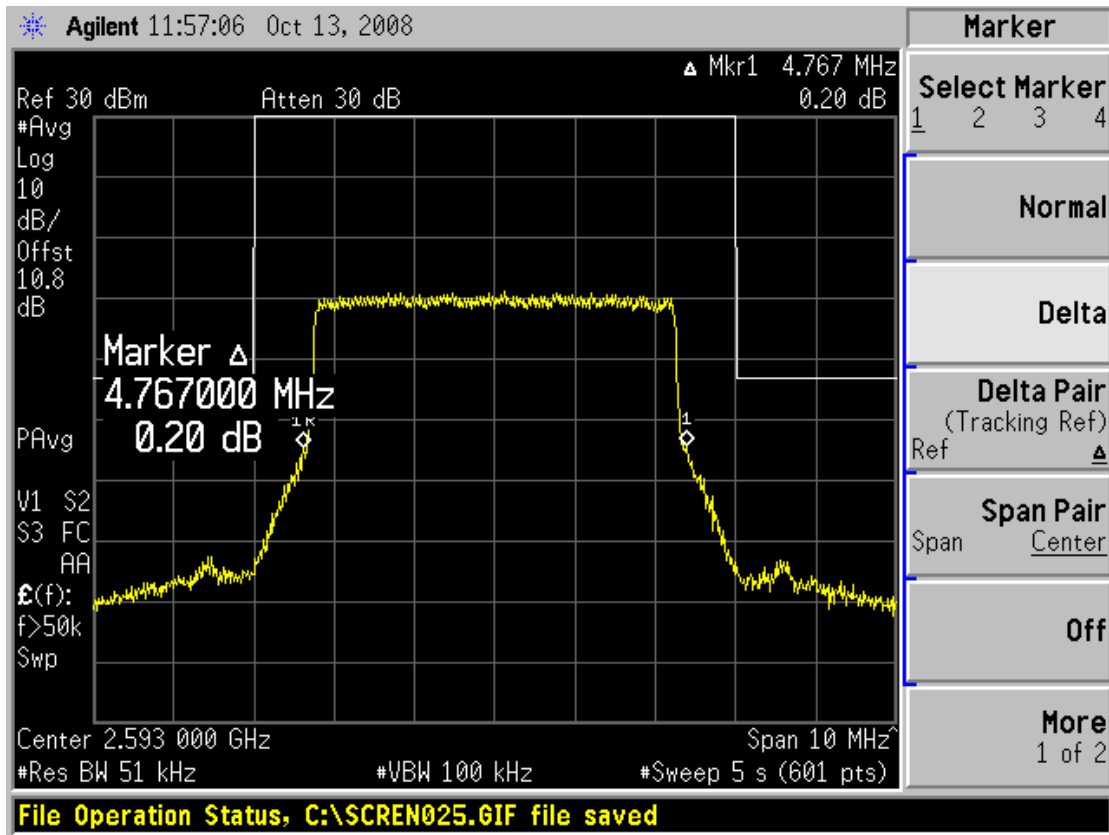
Plot 1:



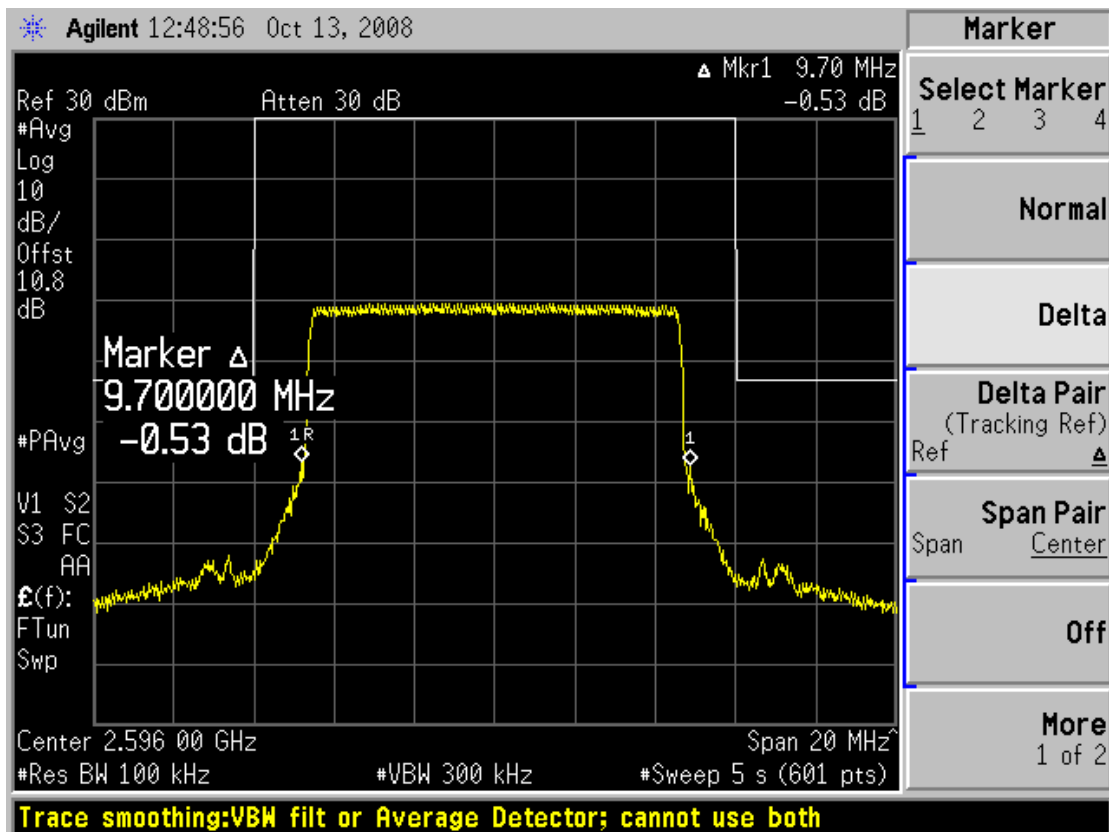
Plot 2:



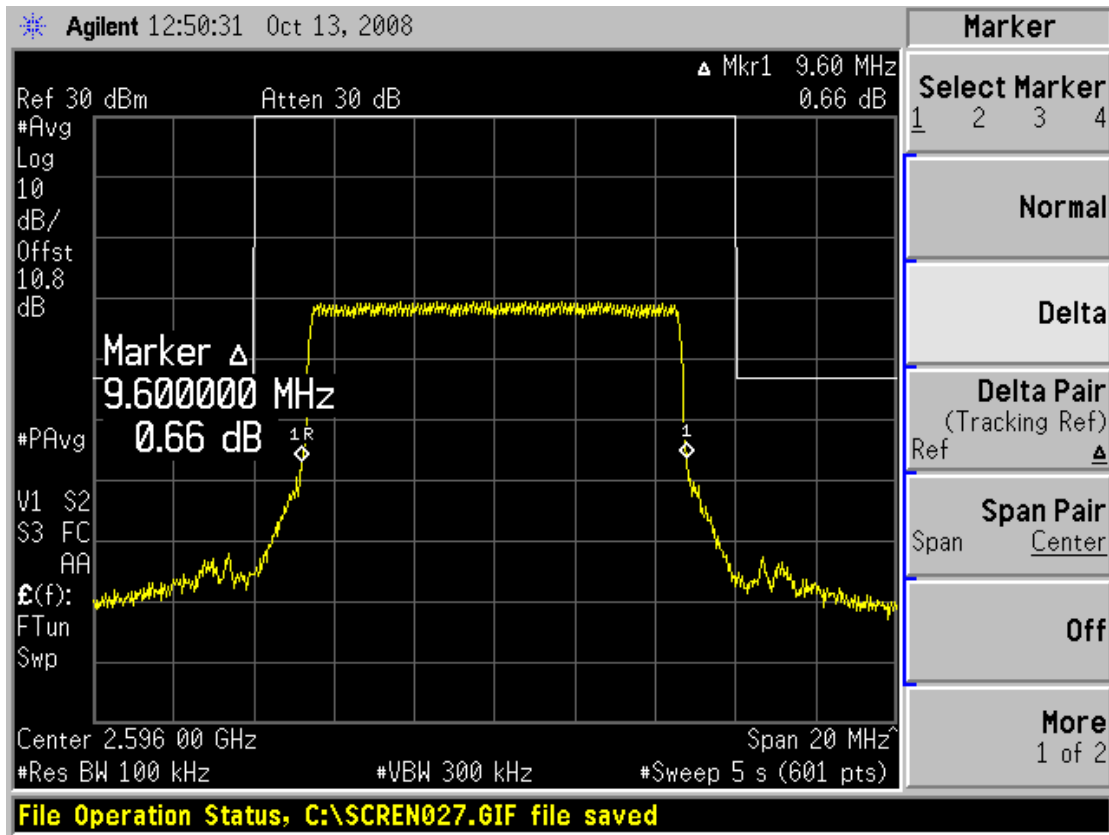
Plot 3:



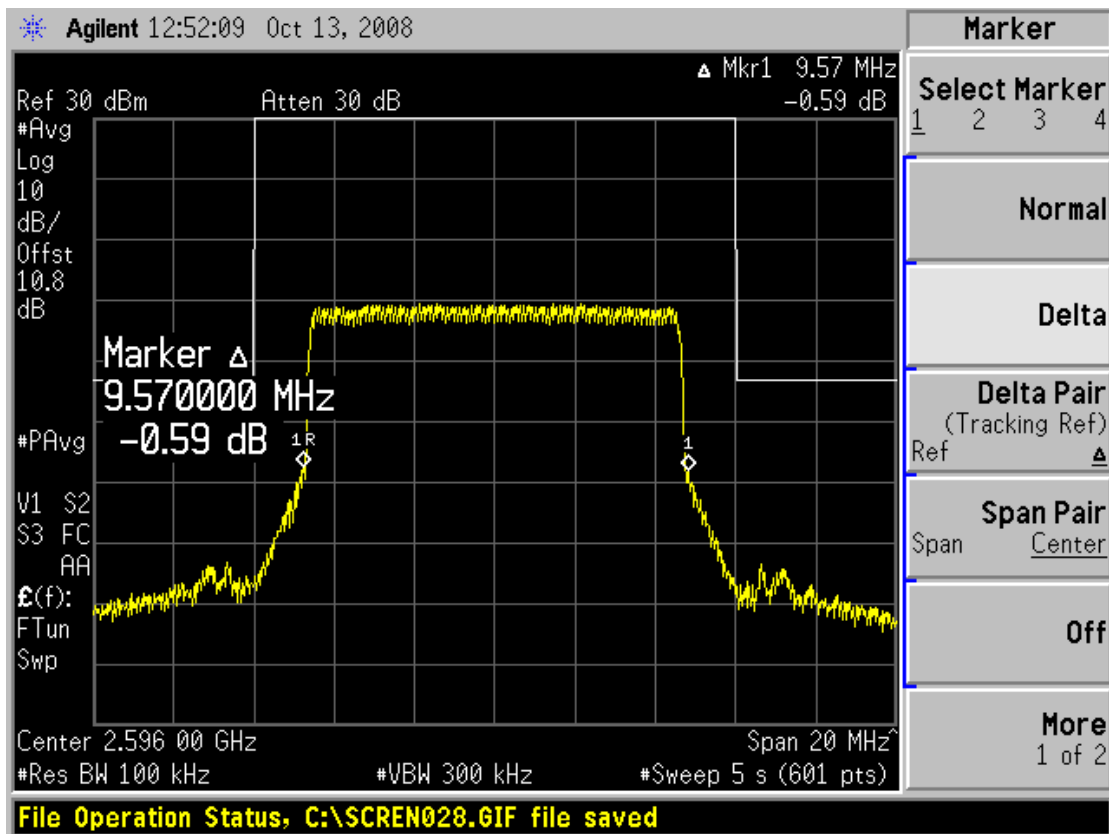
Plot 4:



Plot 5:



Plot 6:



CFR 47 Part 2.1051 Measurements required: Spurious emissions at antenna terminals
 CFR 47 Part 27.53 Emission limits, subpart (1) (2)

Transmitter characteristics: 5 MHz channel spacing

Measurement conditions:

Frequency	f_{\min}	= 2.504750 GHz
Frequency	f_{nom}	= 2.593000 GHz
Frequency	f_{\max}	= 2.687250 GHz
Channel spacing	CS	= 5.0 MHz
Modulation	D	= QPSK, 16QAM, 64QAM
Temperature	t	= +22.0 °C
Nominal power supply	U_{AC}	= 115.0 V
Measurement at	C'	

Test set-up: see page 8 / no. 2

Limit: see table

Test measurement:

Frequency Range	f_{carrier}	Modulation	Limit	Res. BW	Spurious Frequency	Emissions P	see plot no.
[GHz]	[GHz]		[dBm]	[MHz]	[GHz]	[dBm]	
0.030 – 27.000	2.504750	QPSK	-13.0	1.0	n.f.	< limit	7 / 8
0.030 – 27.000	2.593000	QPSK	-13.0	1.0	n.f.	< limit	9 / 10
0.030 – 27.000	2.687250	QPSK	-13.0	1.0	n.f.	< limit	11 / 12
0.030 – 27.000	2.504750	16QAM	-13.0	1.0	n.f.	< limit	13 / 14
0.030 – 27.000	2.593000	16QAM	-13.0	1.0	n.f.	< limit	15 / 16
0.030 – 27.000	2.687250	16QAM	-13.0	1.0	n.f.	< limit	17 / 18
0.030 – 27.000	2.504750	64QAM	-13.0	1.0	n.f.	< limit	19 / 20
0.030 – 27.000	2.593000	64QAM	-13.0	1.0	n.f.	< limit	21 / 22
0.030 – 27.000	2.687250	64QAM	-13.0	1.0	n.f.	< limit	23 / 24

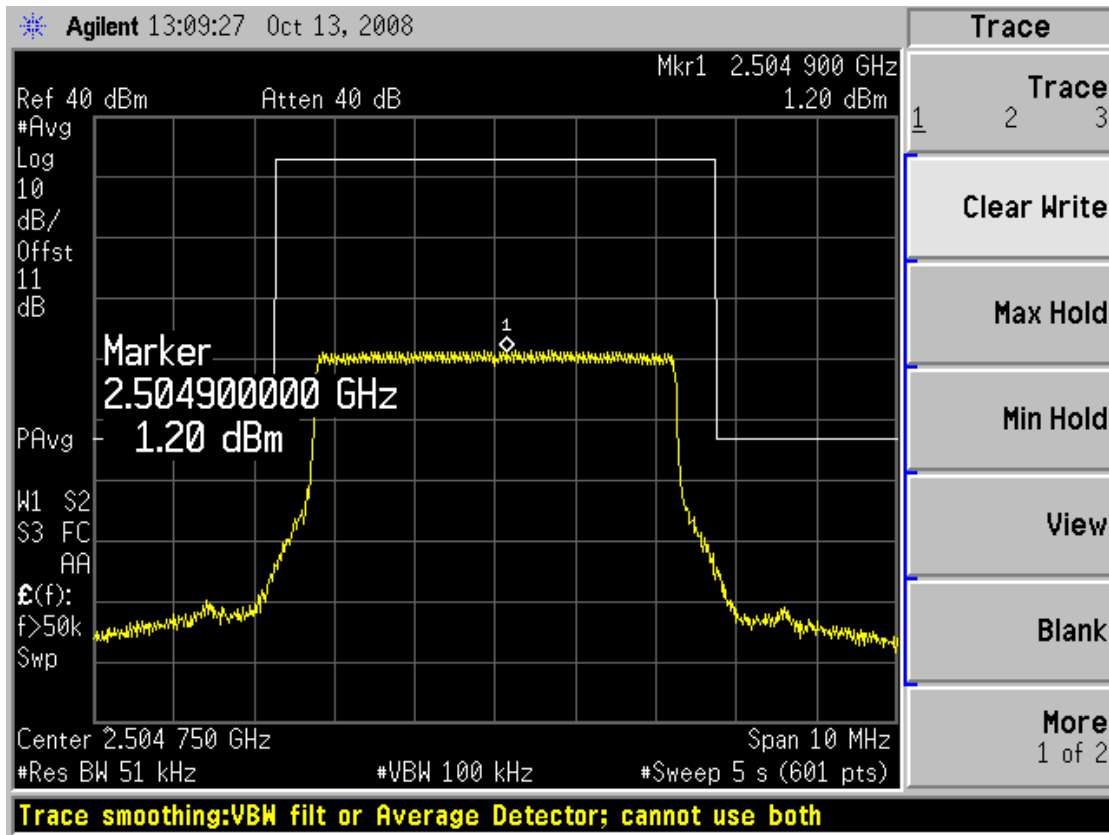
n.f. = nothing found

Test result:

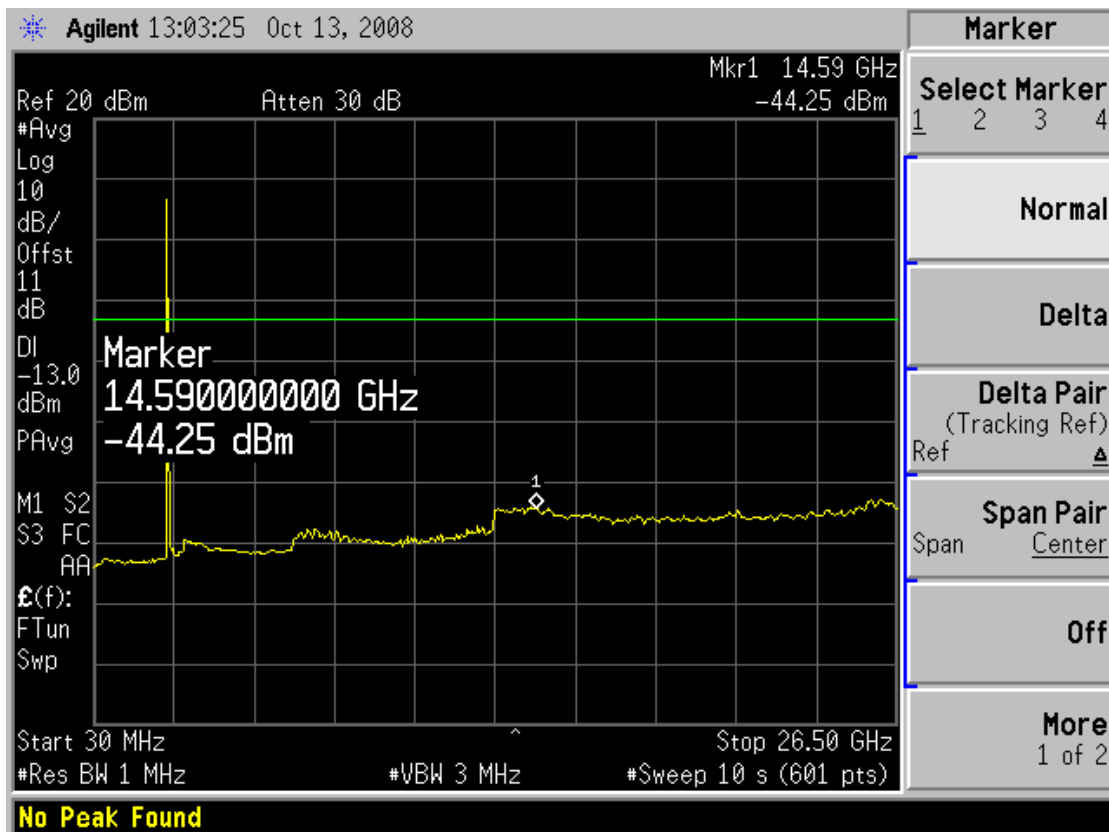
Passed:

Failed:

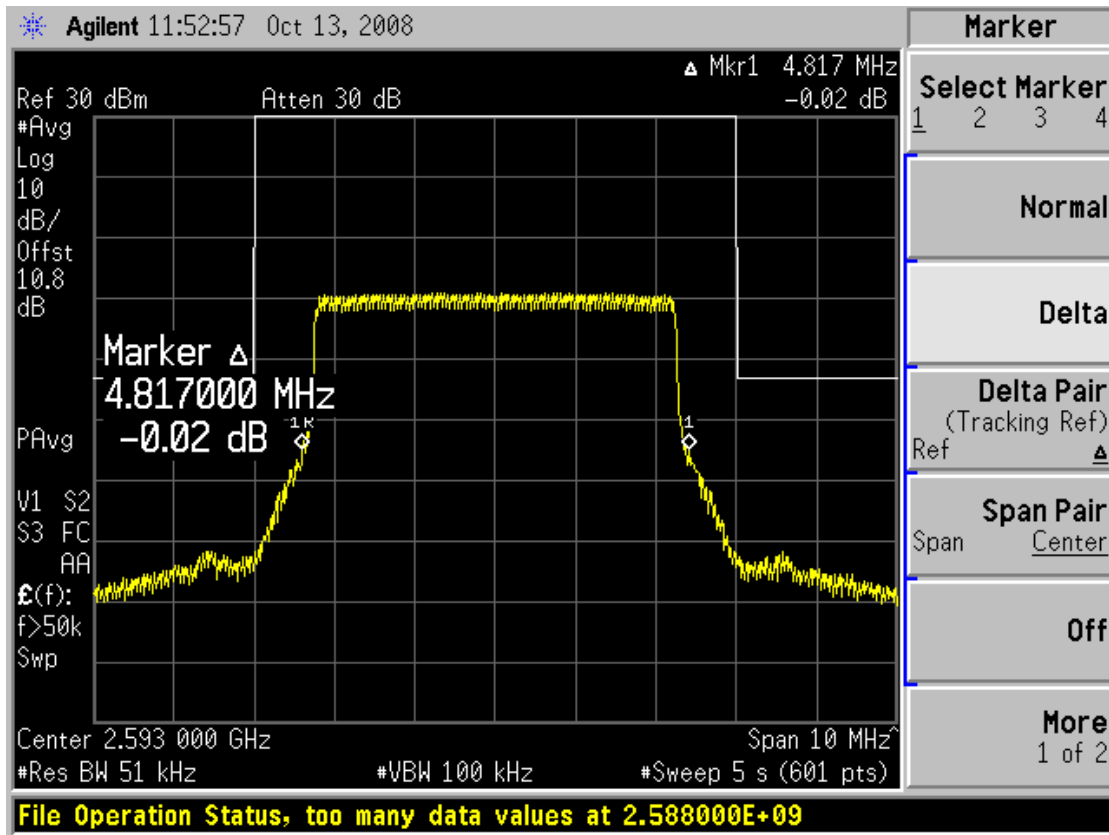
Plot 7:



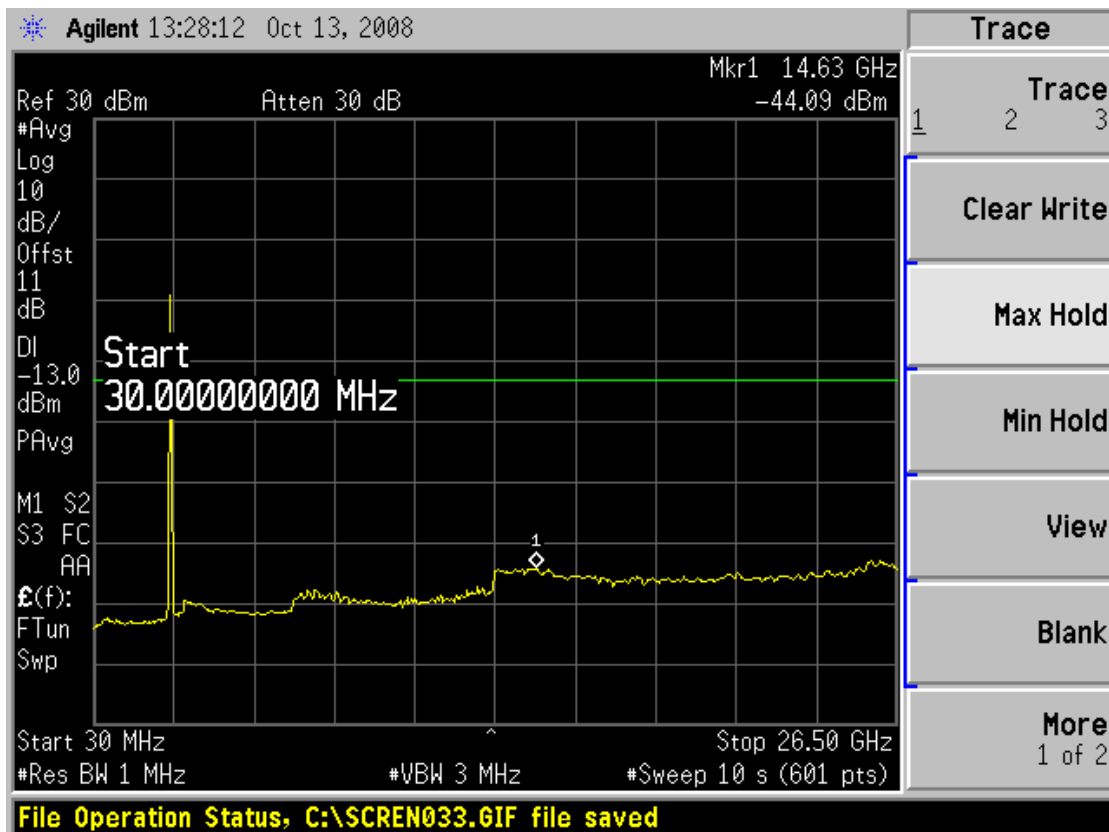
Plot 8:



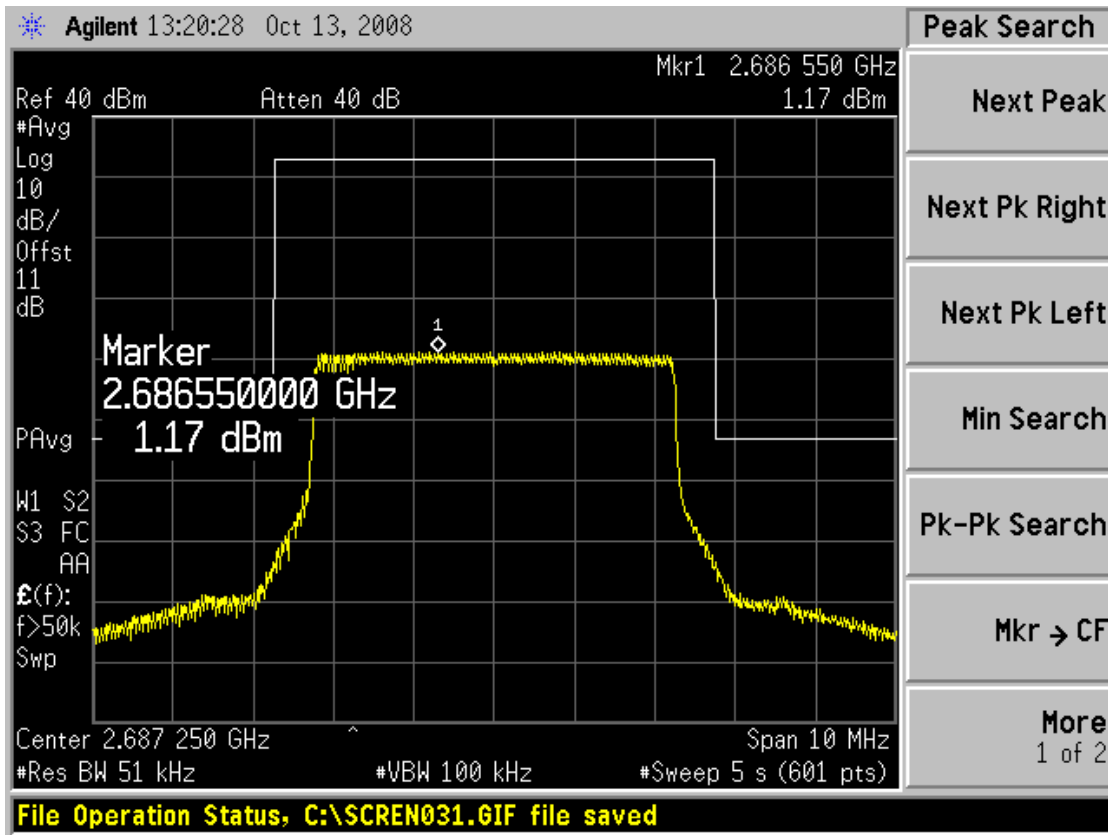
Plot 9:



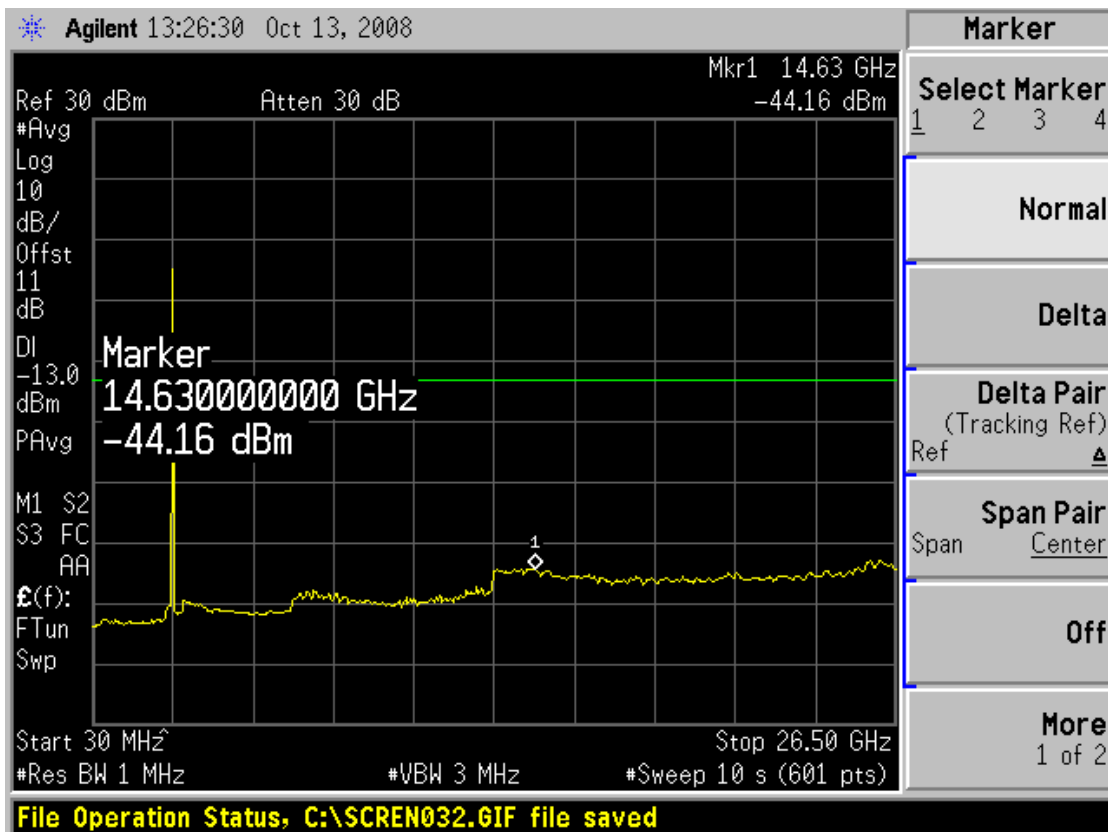
Plot 10:



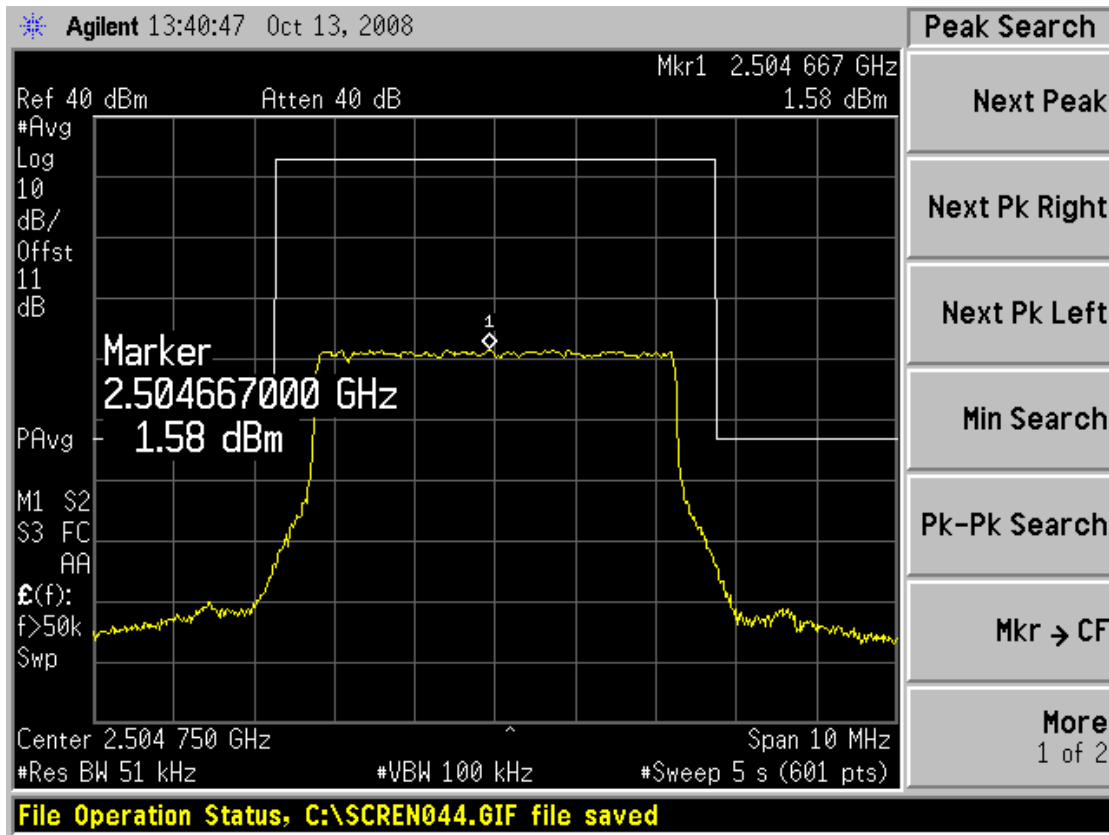
Plot 11:



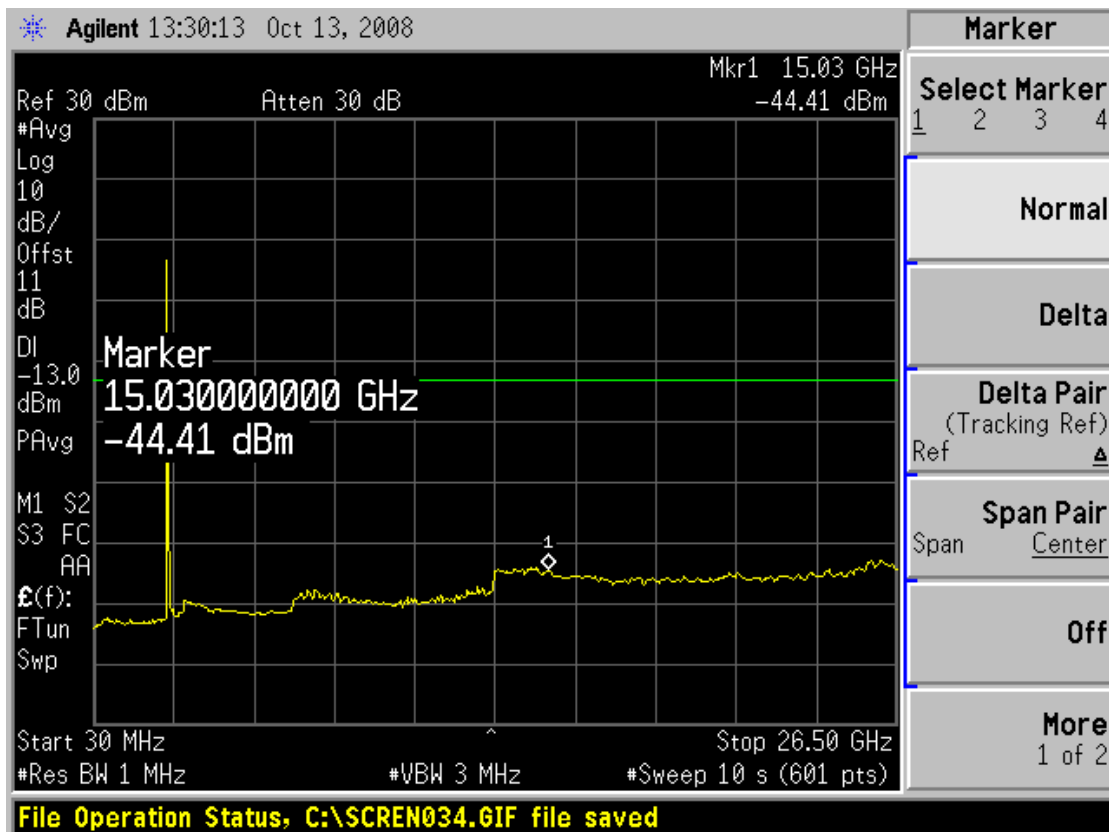
Plot 12:



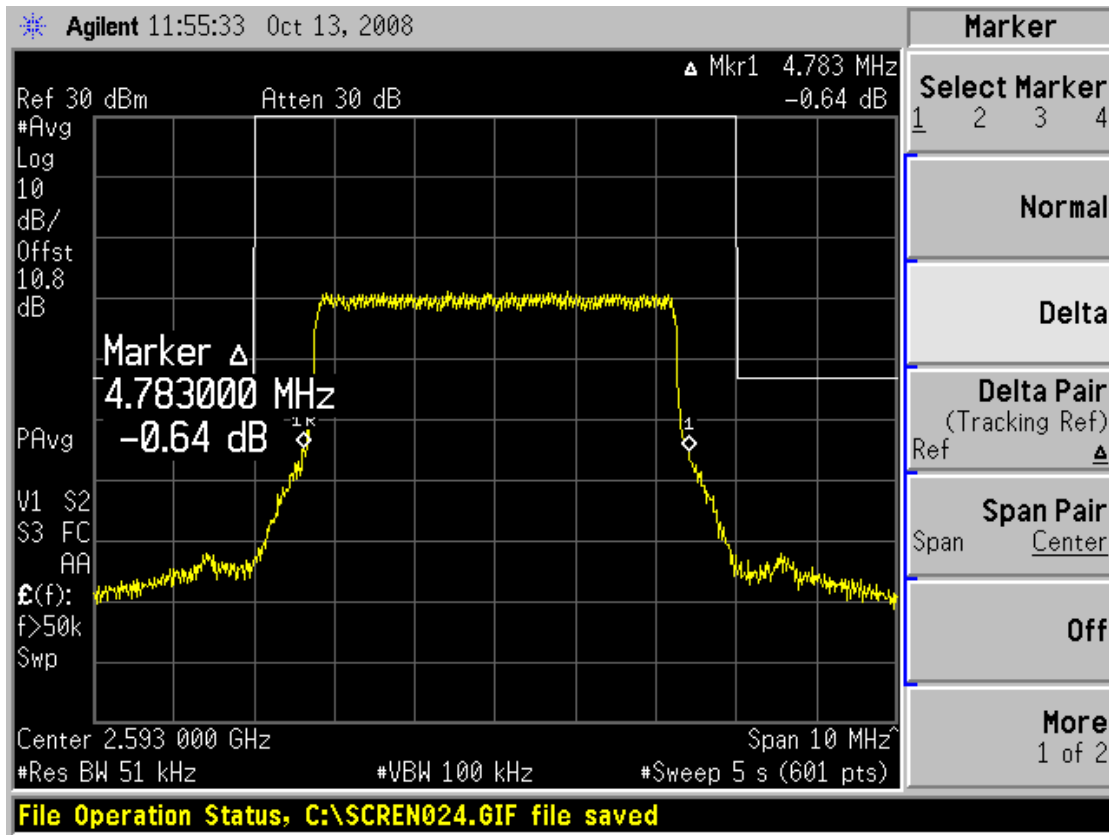
Plot 13:



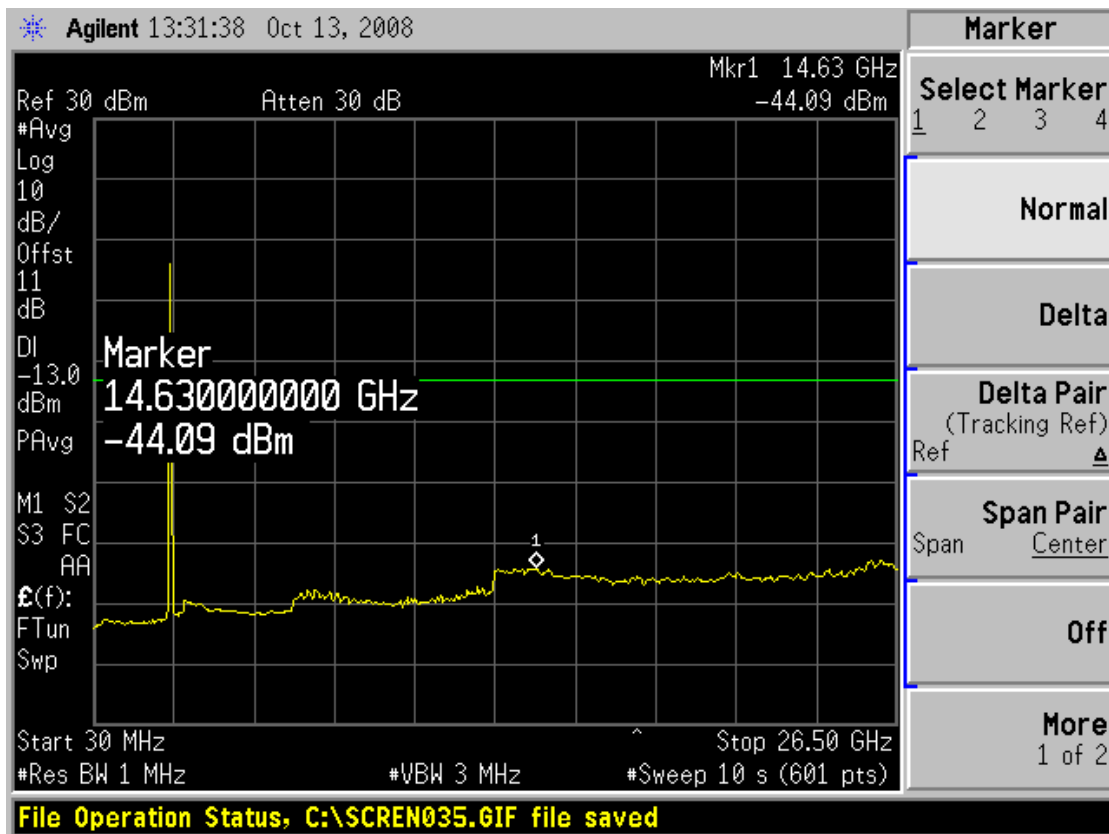
Plot 14:



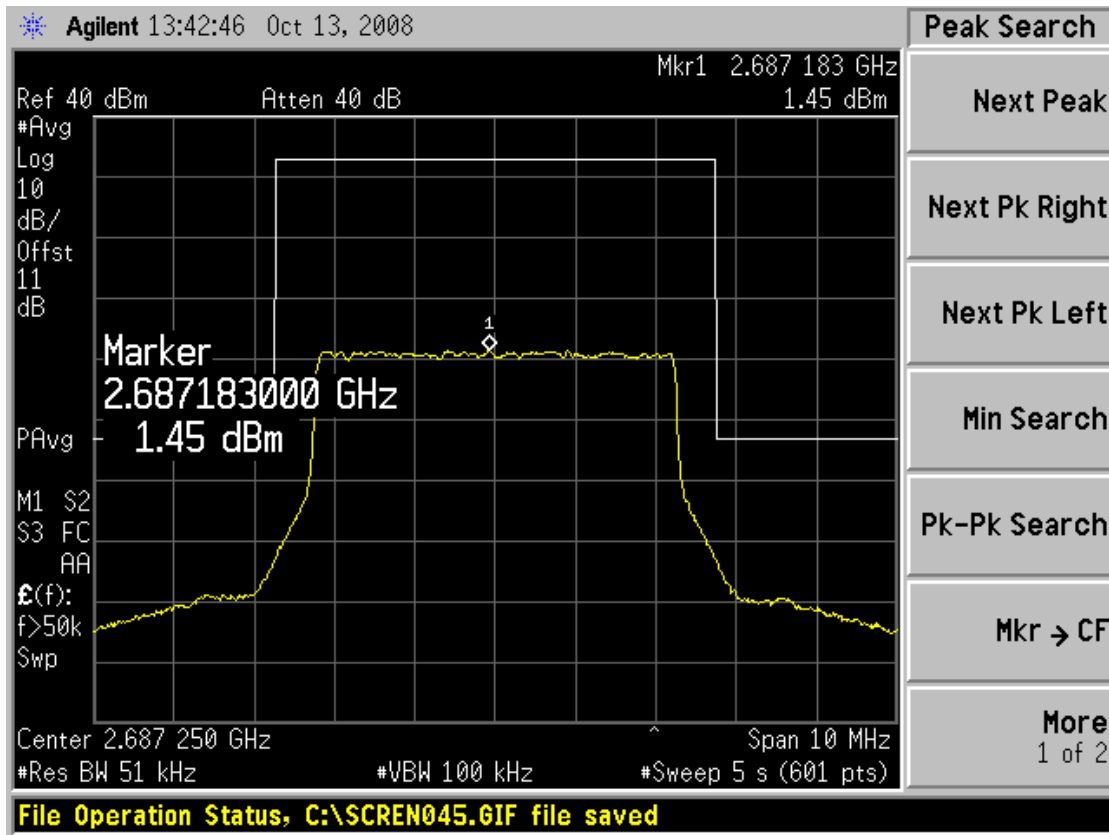
Plot 15:



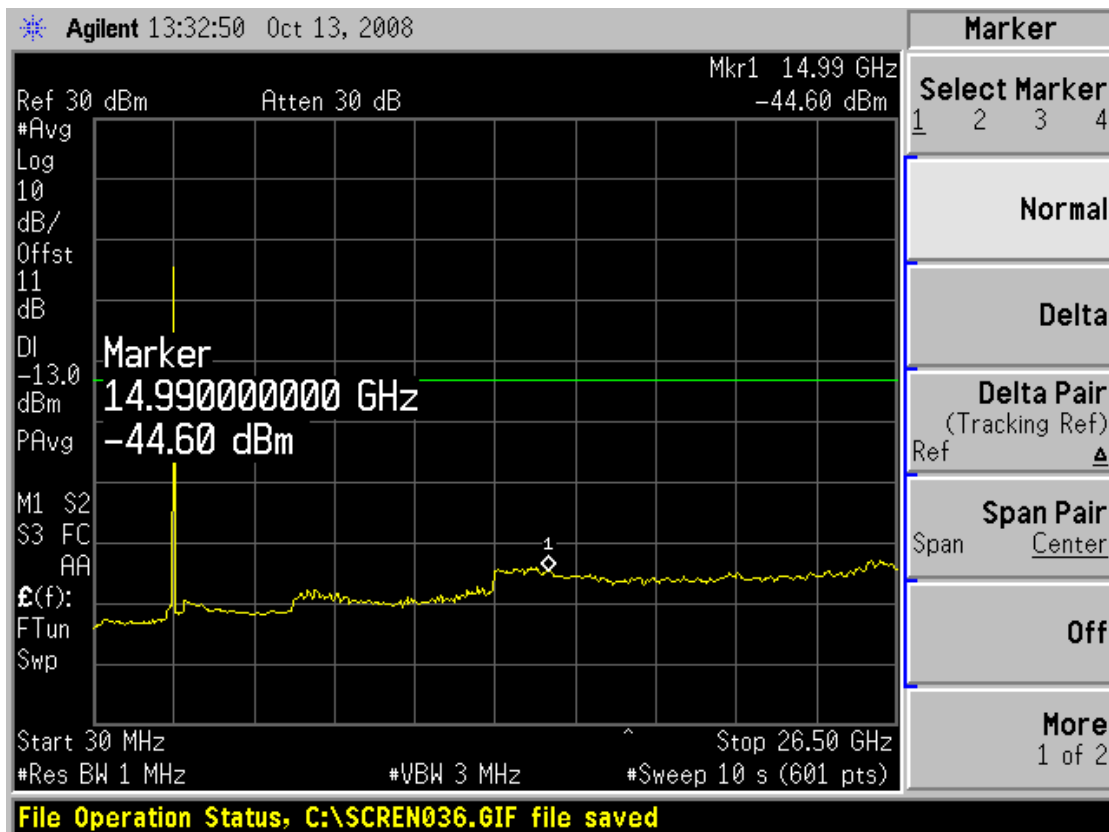
Plot 16:



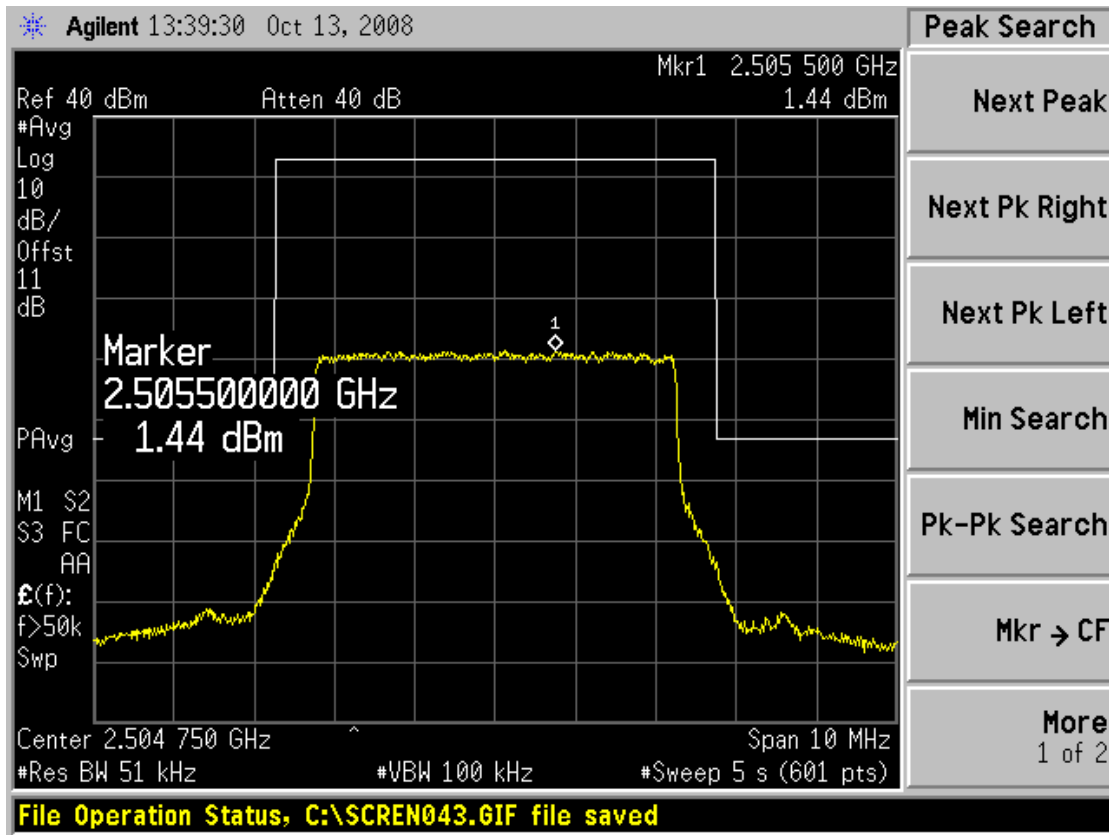
Plot 17:



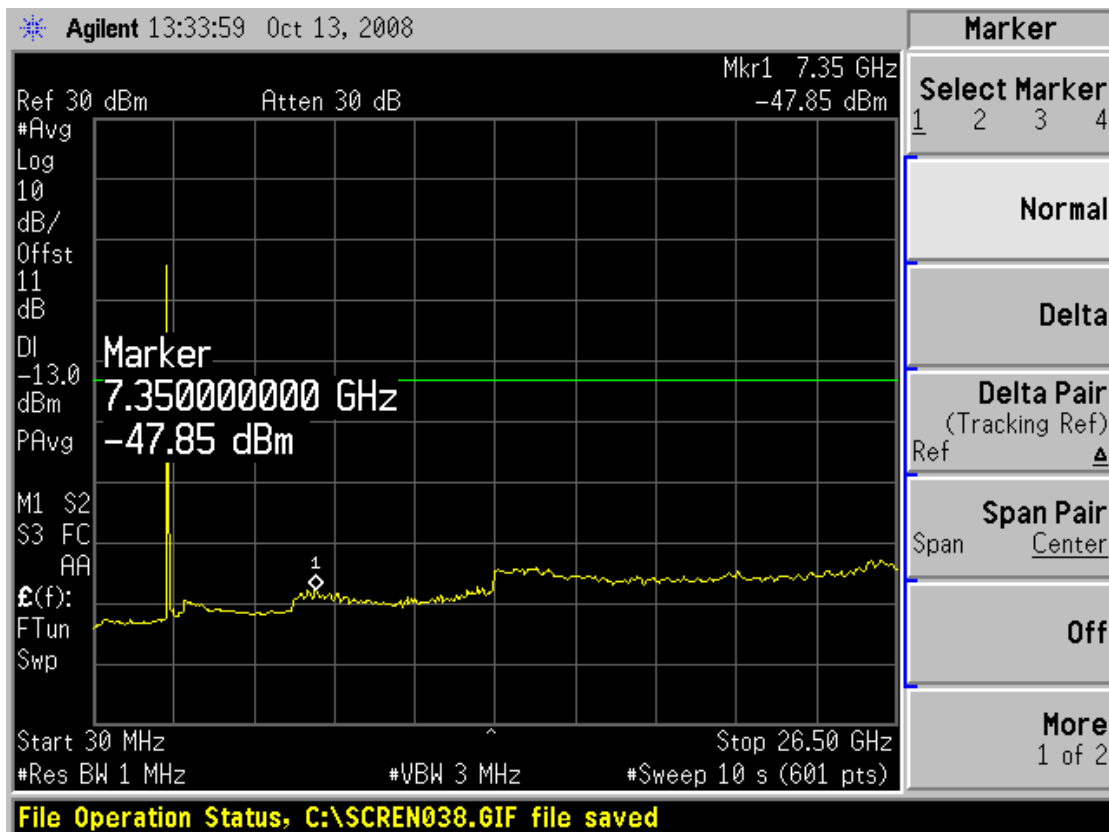
Plot 18:



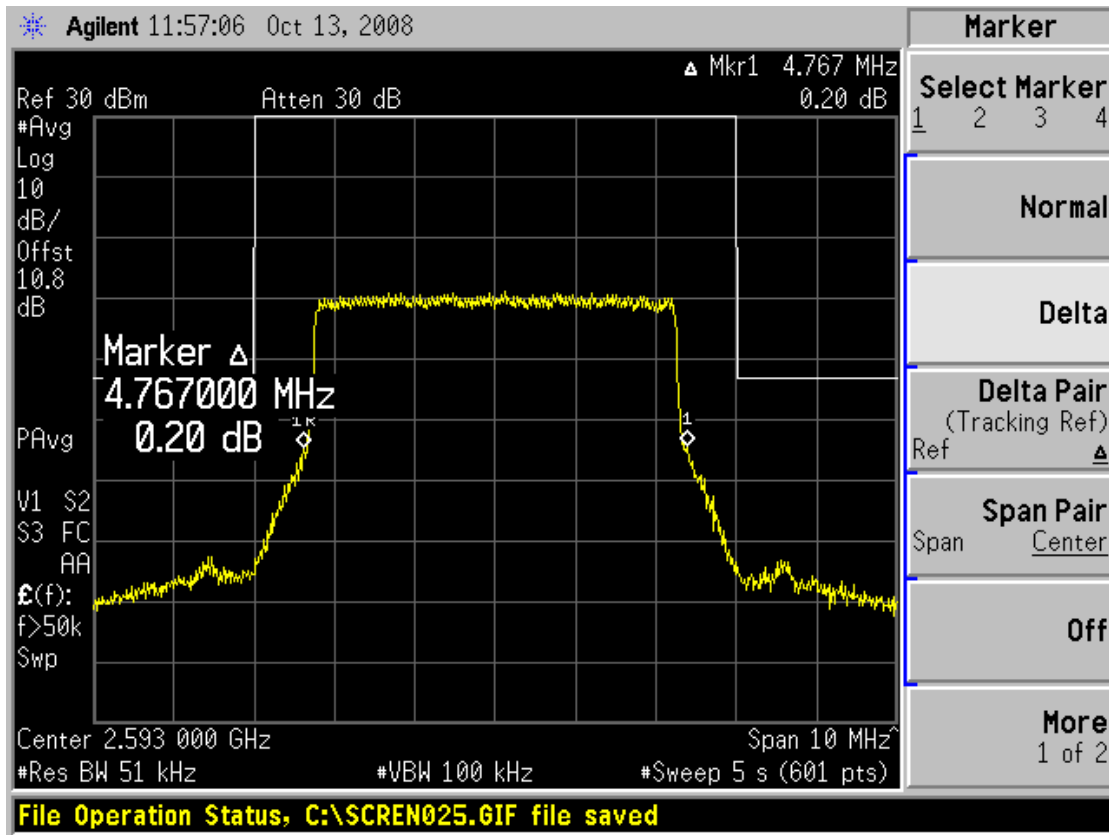
Plot 19:



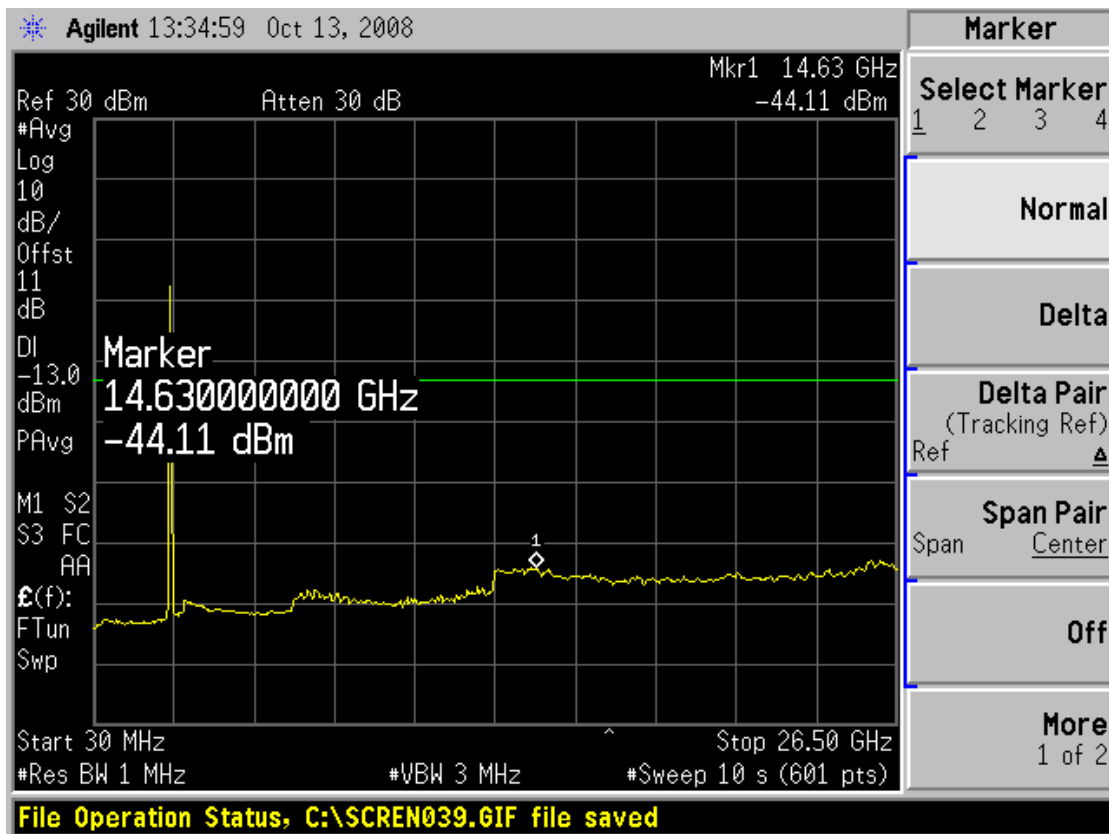
Plot 20:



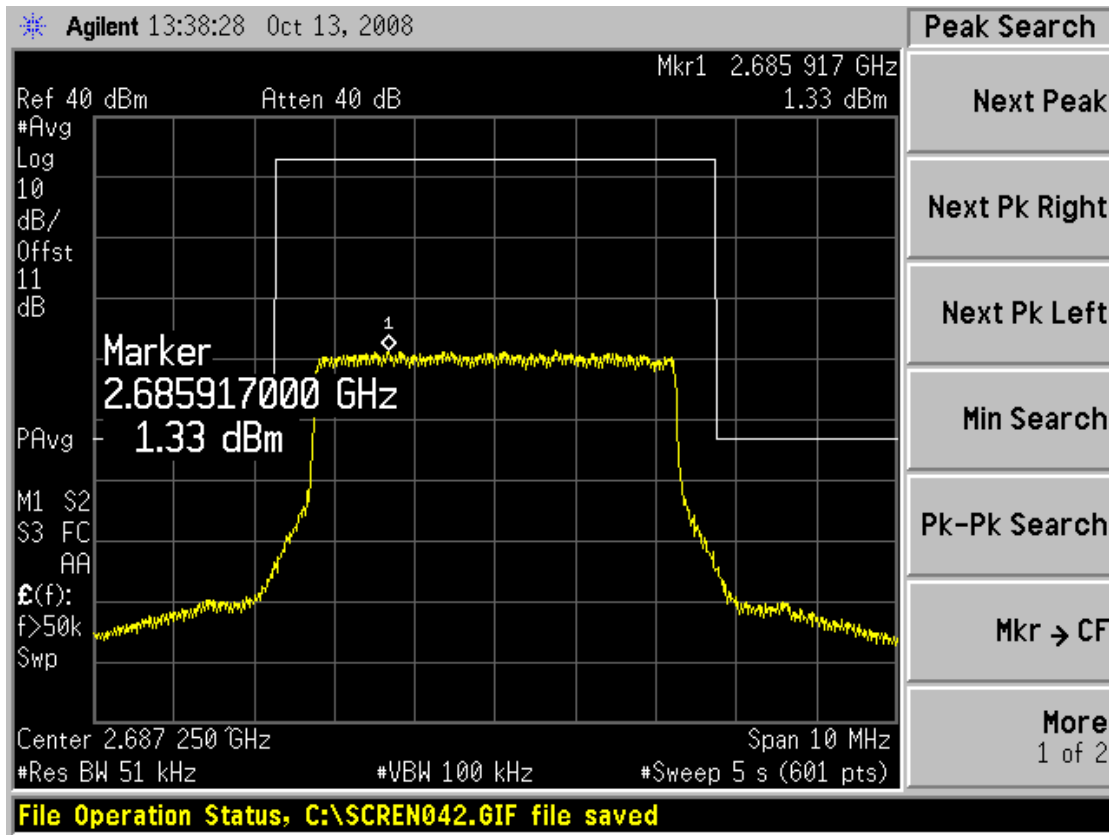
Plot 21:



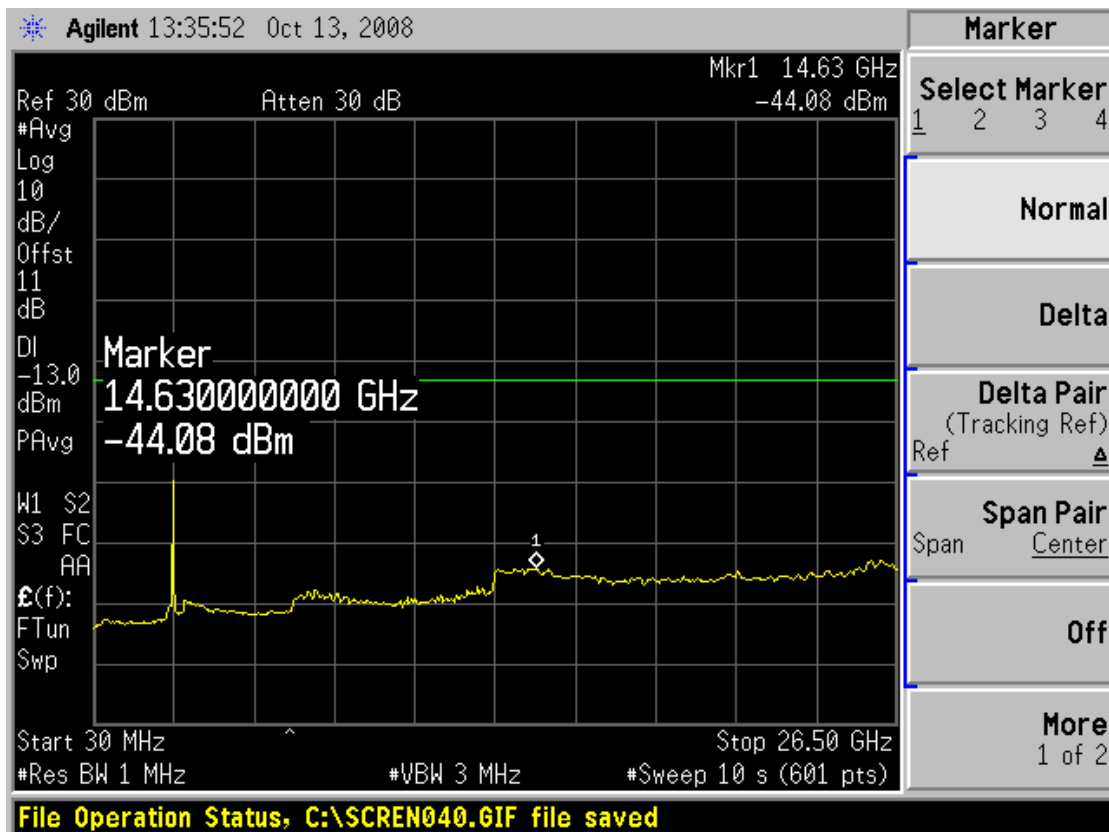
Plot 22:



Plot 23:



Plot 24:



CFR 47 Part 2.1051 Measurements required: Spurious emissions at antenna terminals
 CFR 47 Part 27.53 Emission limits, subpart (1) (2)

Transmitter characteristics: 10 MHz channel spacing

Measurement conditions:

Frequency	f_{\min}	= 2.507500 GHz
Frequency	f_{nom}	= 2.596000 GHz
Frequency	f_{\max}	= 2.684500 GHz
Channel spacing	CS	= 10.0 MHz
Modulation	D	= QPSK, 16QAM, 64QAM
Temperature	t	= +22.0 °C
Nominal power supply	U_{AC}	= 115.0 V
Measurement at	C'	

Test set-up: see page 8 / no. 2

Limit: see table

Test measurement:

Frequency Range	f_{carrier}	Modulation	Limit	Res. BW	Spurious Frequency	Emissions	see plot no.
[GHz]	[GHz]		[dBm]	[MHz]	[GHz]	[dBm]	
0.030 – 27.000	2.507500	QPSK	-13.0	1.0	n.f.	< limit	25 / 26
0.030 – 27.000	2.596000	QPSK	-13.0	1.0	n.f.	< limit	27 / 28
0.030 – 27.000	2.684500	QPSK	-13.0	1.0	n.f.	< limit	29 / 30
0.030 – 27.000	2.507500	16QAM	-13.0	1.0	n.f.	< limit	31 / 32
0.030 – 27.000	2.596000	16QAM	-13.0	1.0	n.f.	< limit	33 / 34
0.030 – 27.000	2.684500	16QAM	-13.0	1.0	n.f.	< limit	35 / 36
0.030 – 27.000	2.507500	64QAM	-13.0	1.0	n.f.	< limit	37 / 38
0.030 – 27.000	2.596000	64QAM	-13.0	1.0	n.f.	< limit	39 / 40
0.030 – 27.000	2.684500	64QAM	-13.0	1.0	n.f.	< limit	41 / 42

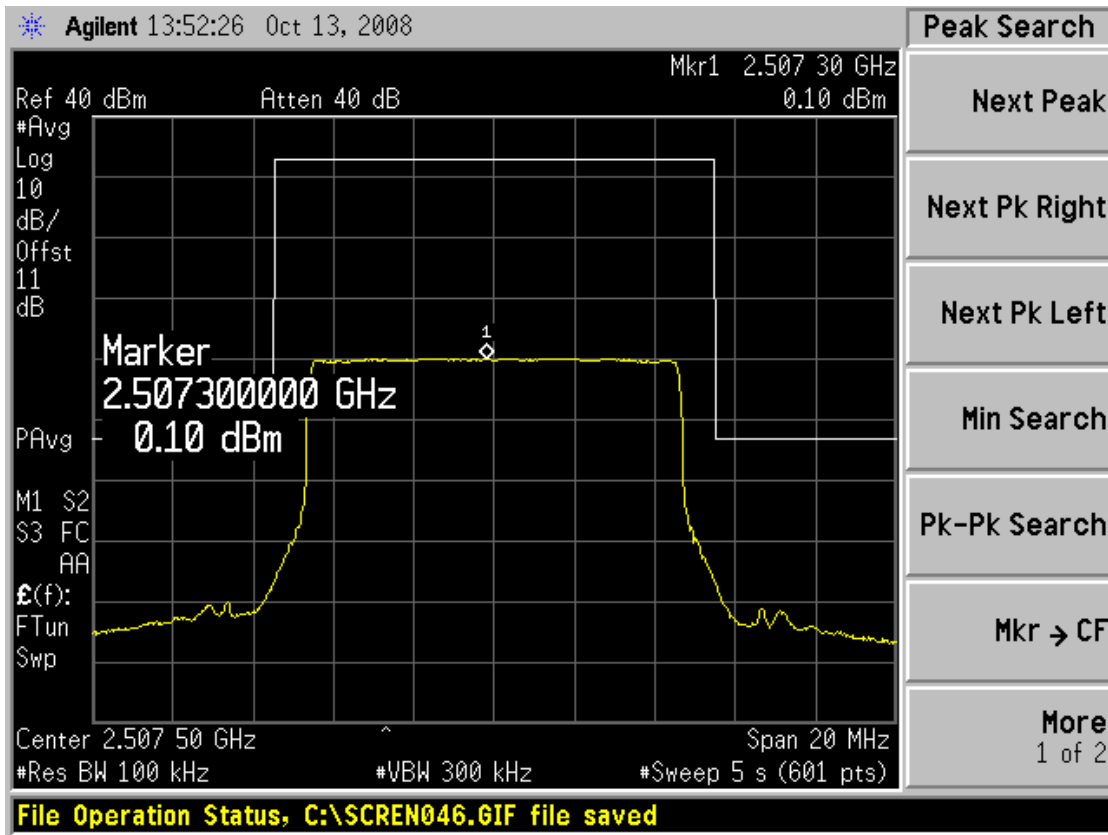
n.f. = nothing found

Test result:

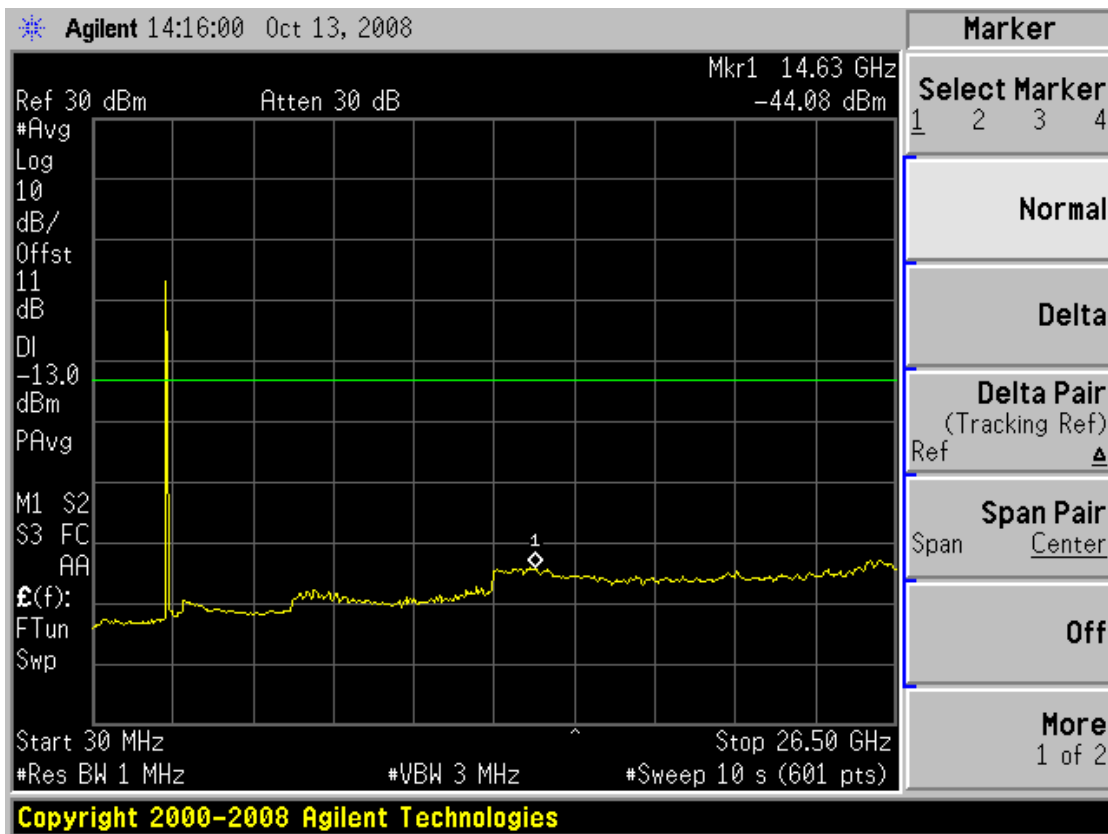
Passed:

Failed:

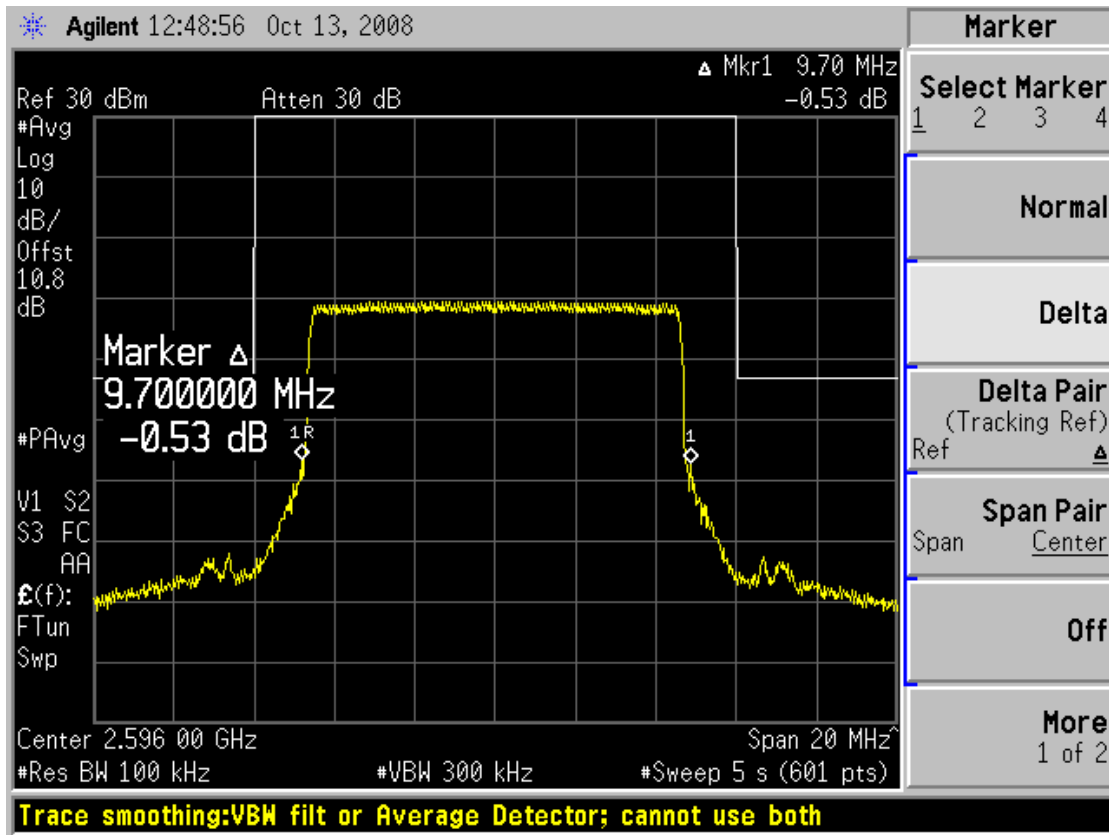
Plot 25:



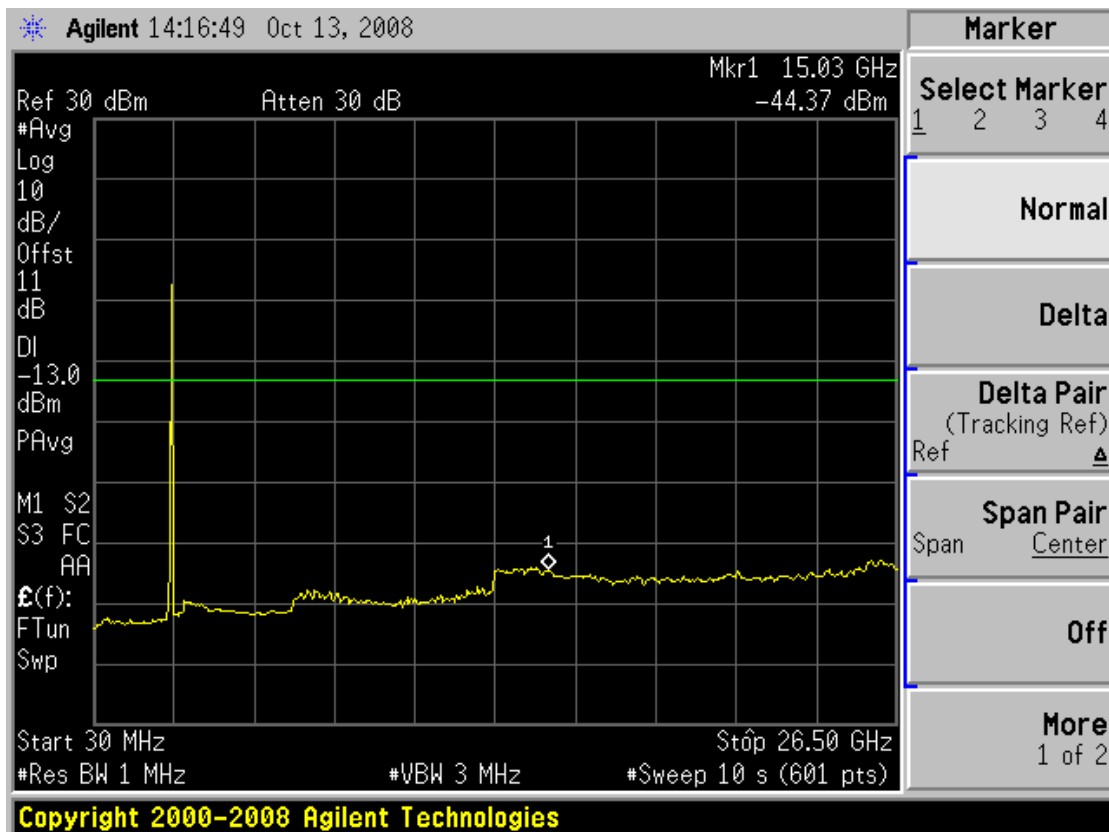
Plot 26:



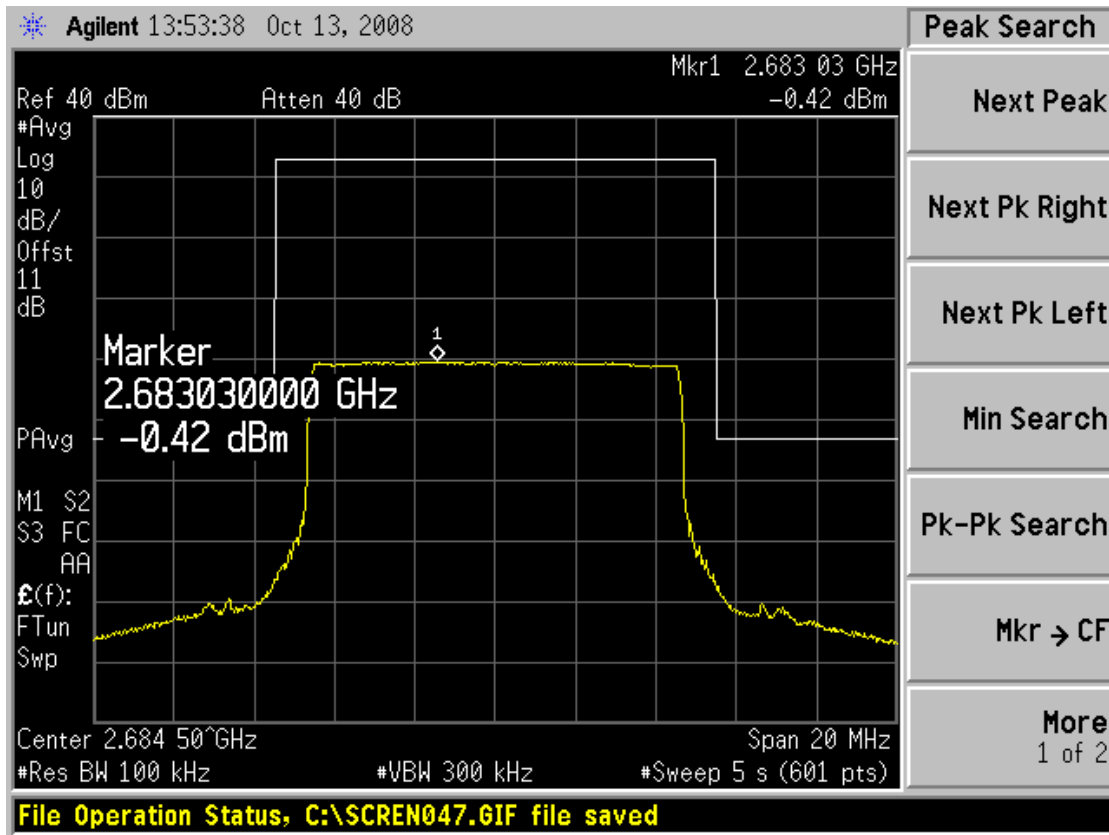
Plot 27:



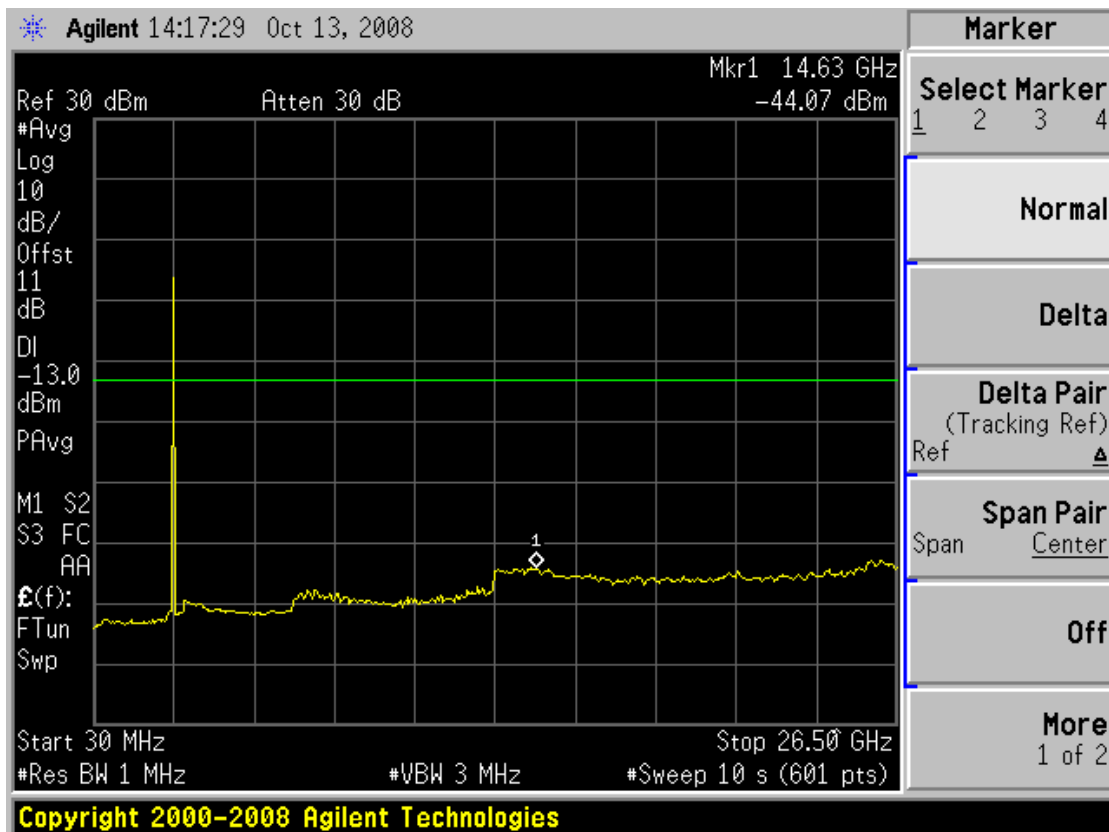
Plot 28:



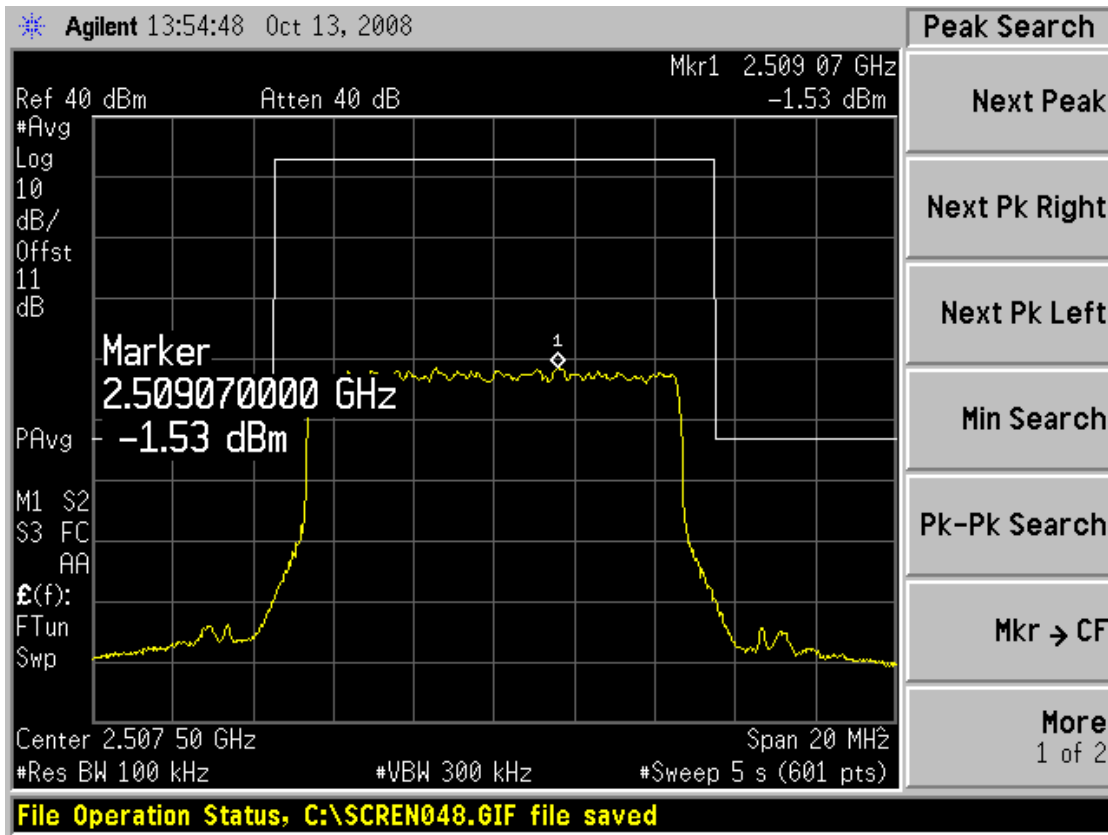
Plot 29:



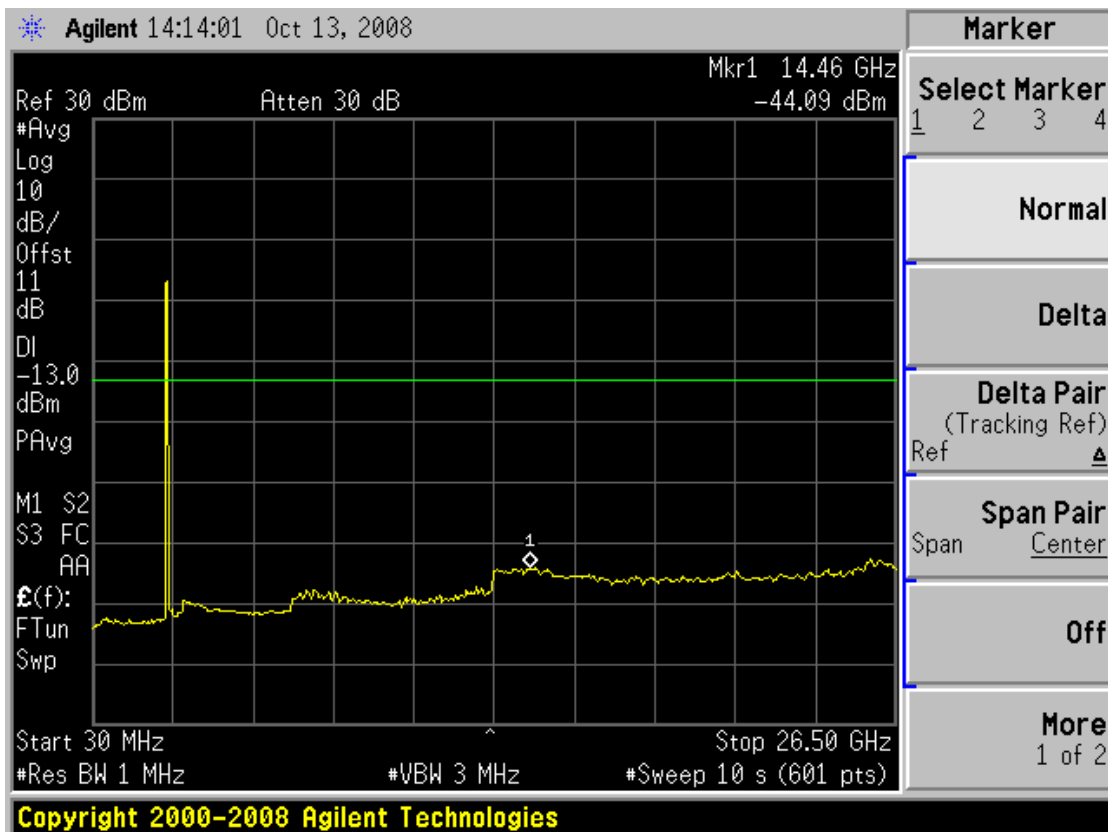
Plot 30:



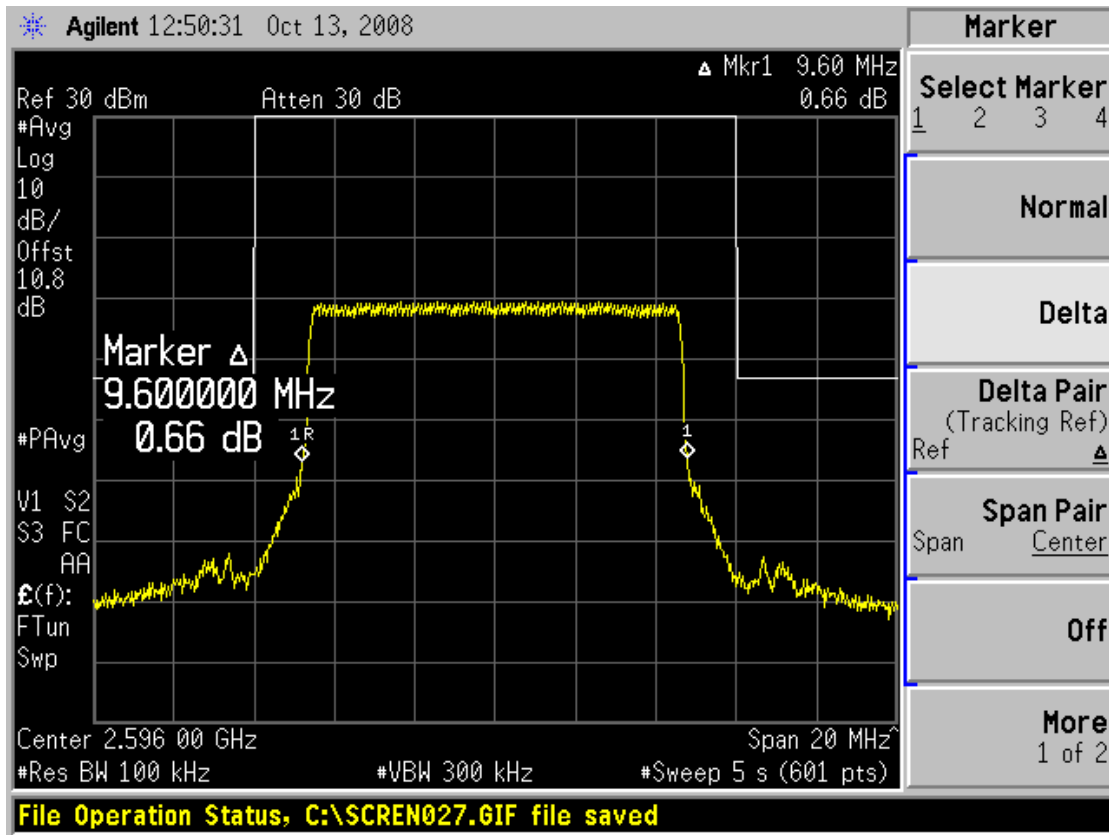
Plot 31:



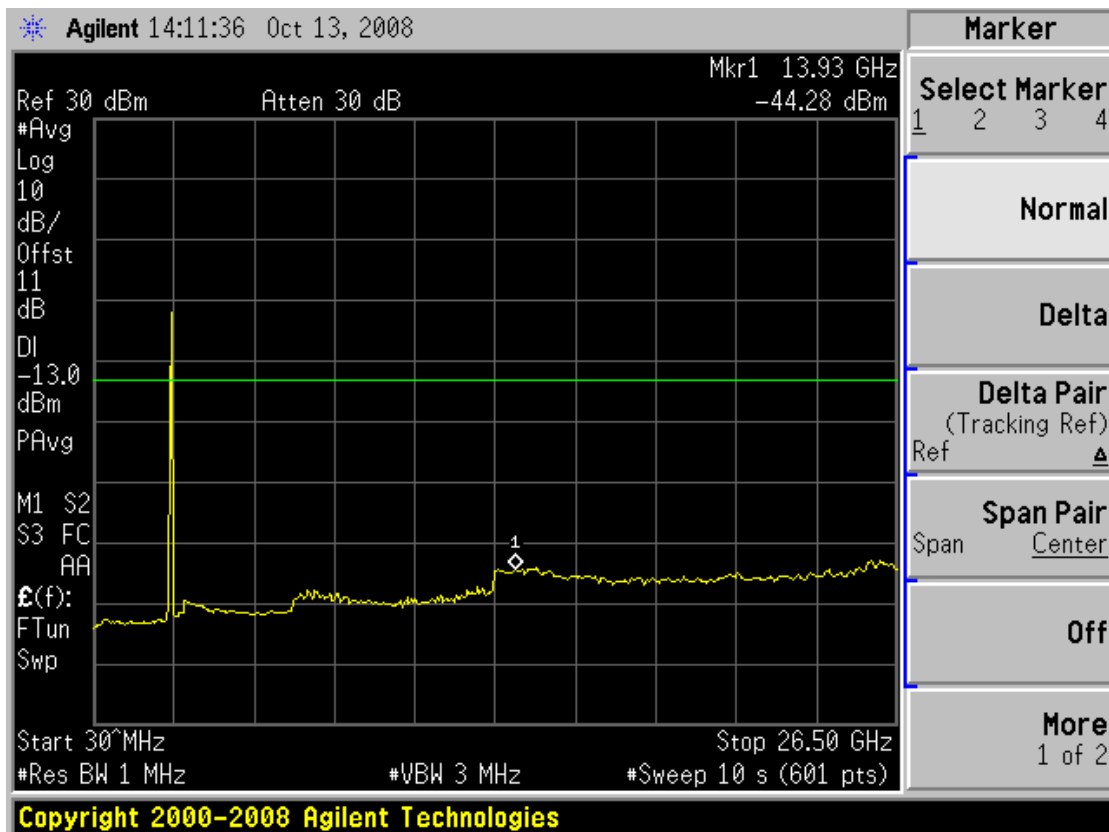
Plot 32:



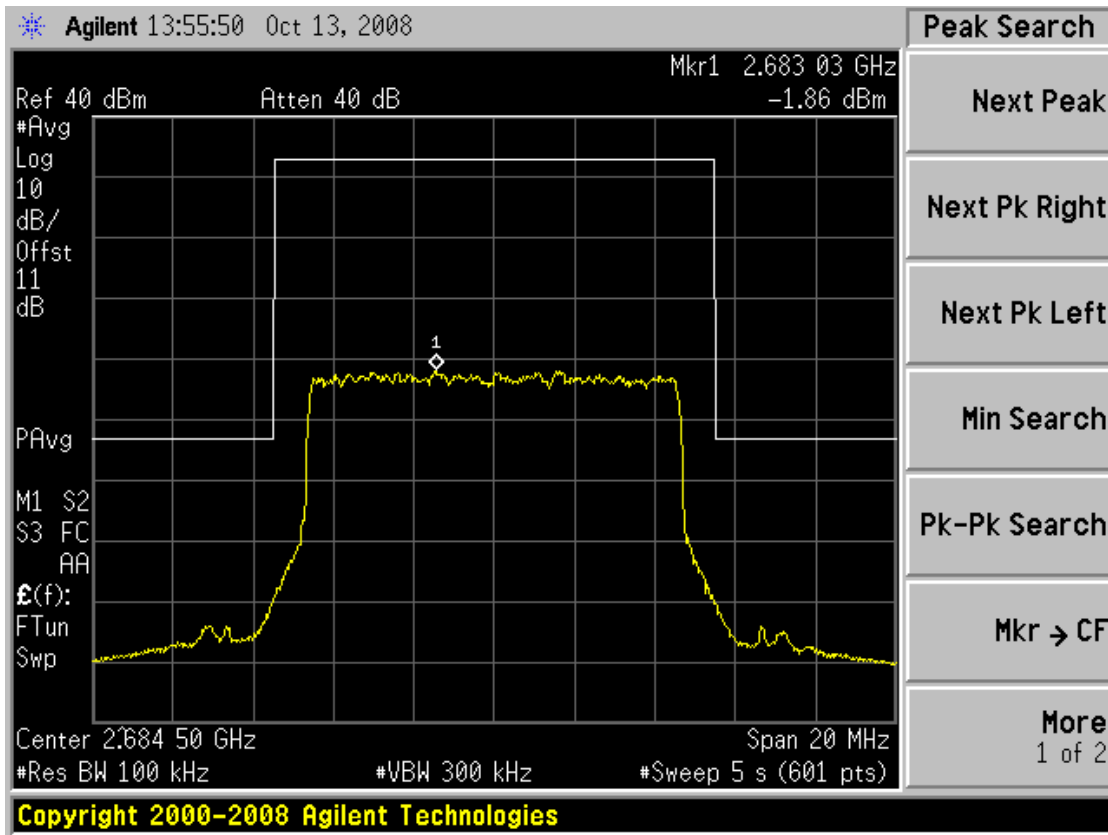
Plot 33:



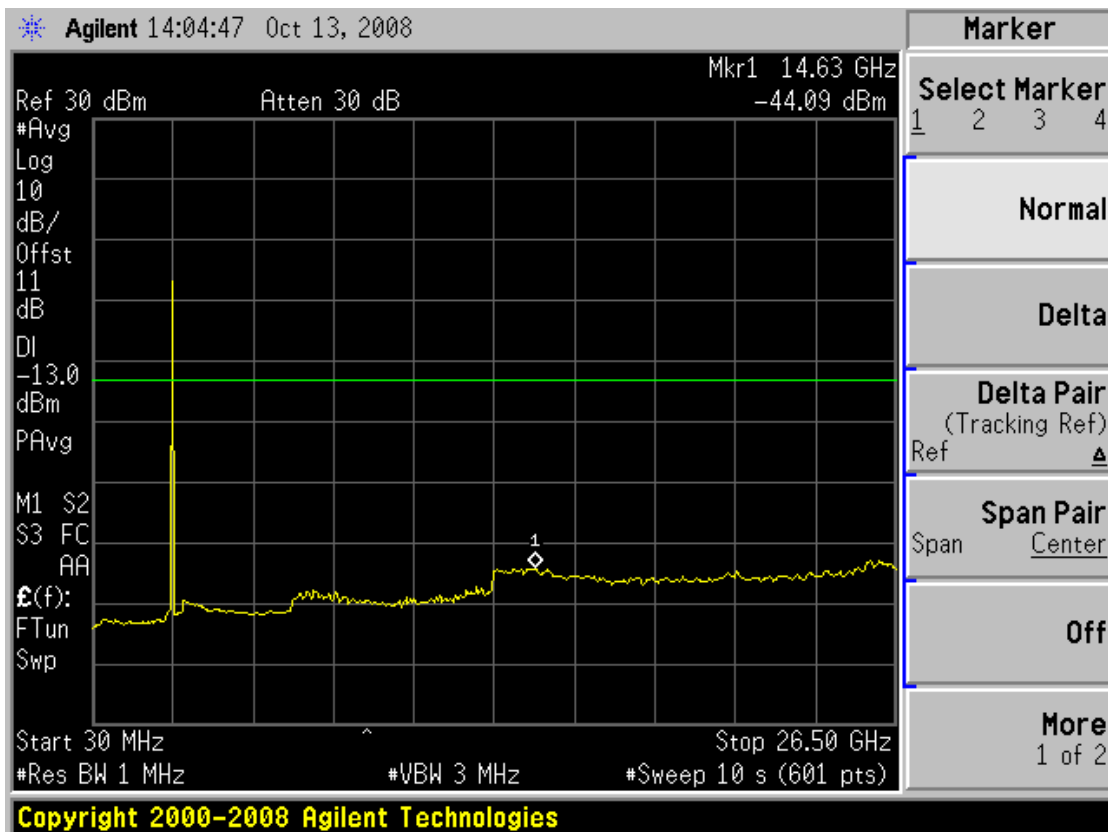
Plot 34:



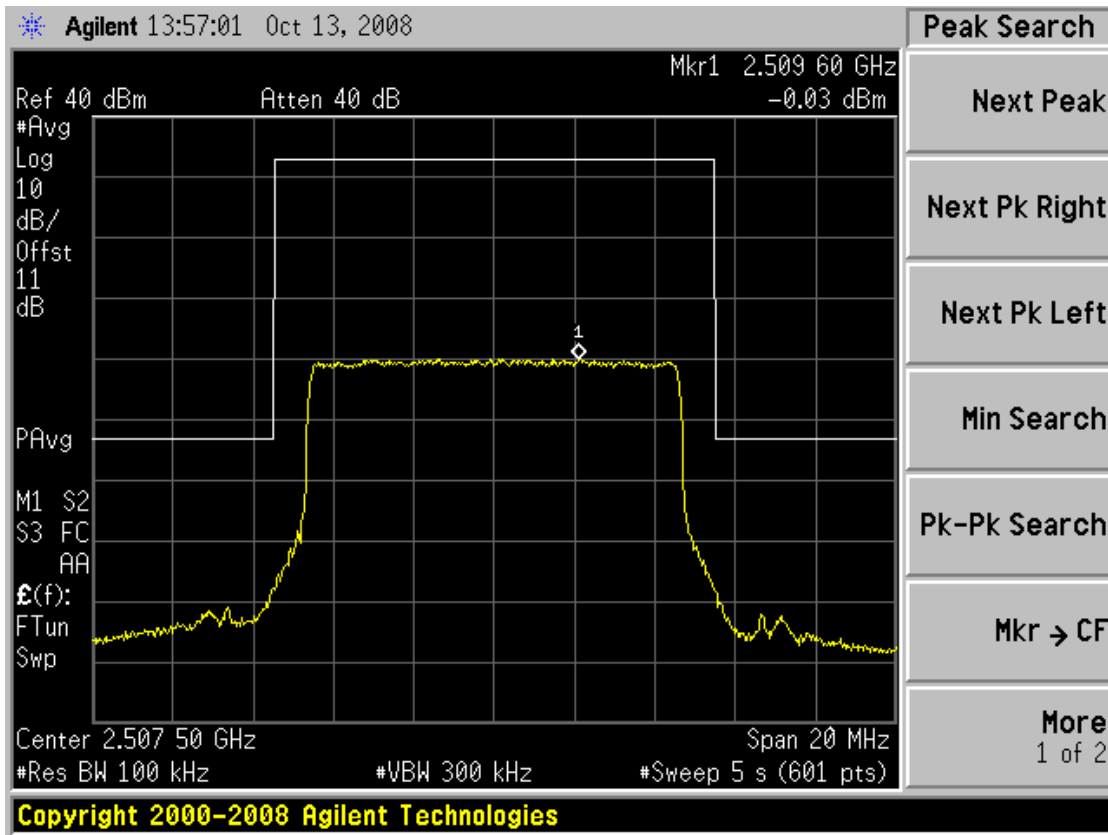
Plot 35:



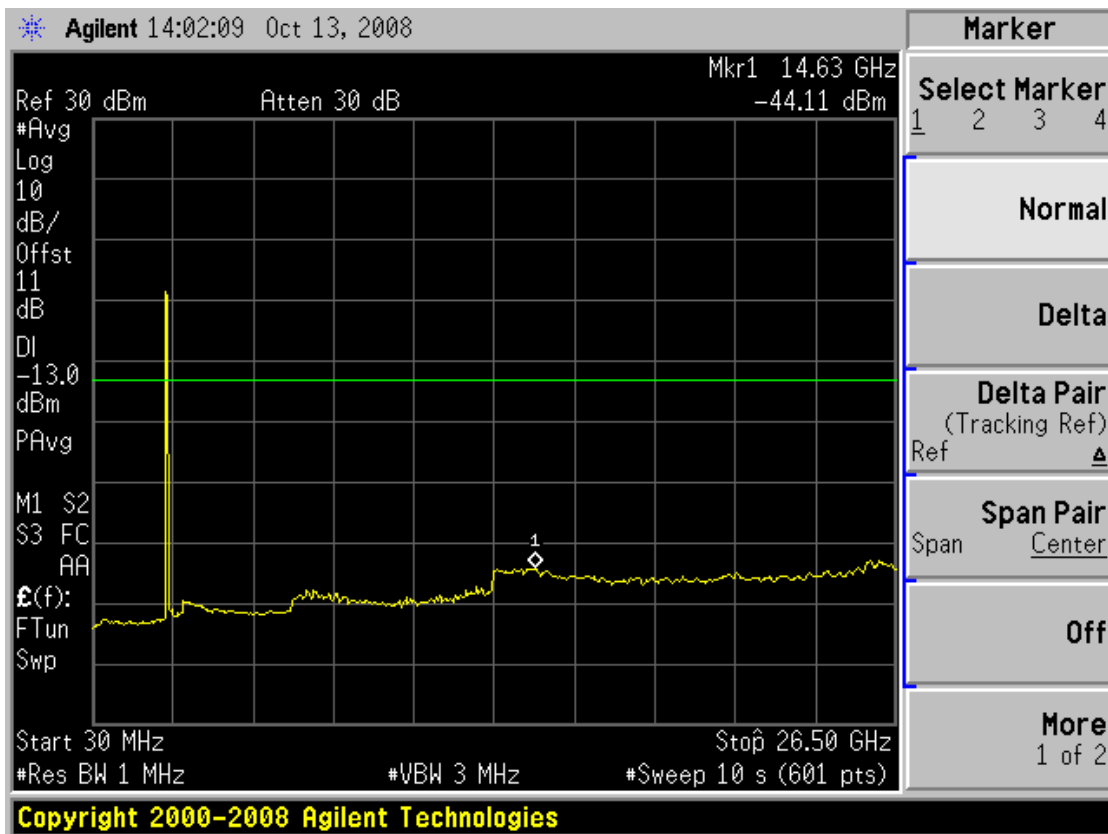
Plot 36:



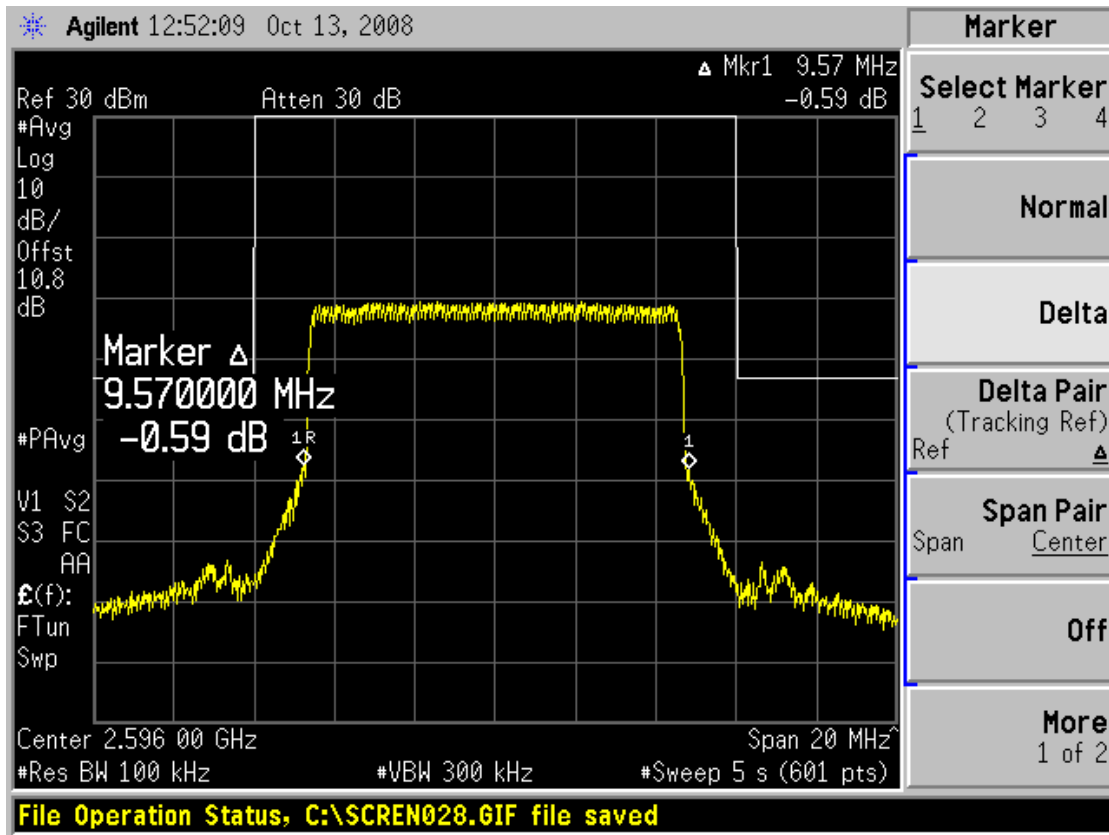
Plot 37:



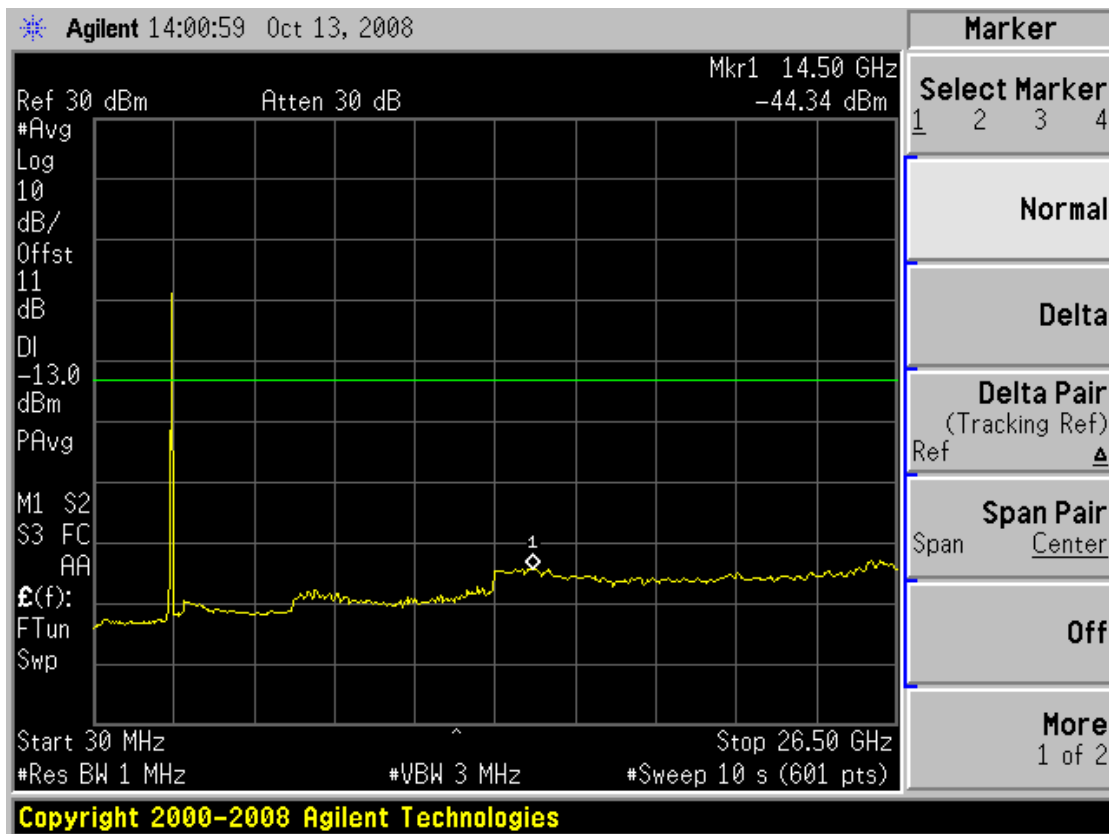
Plot 38:



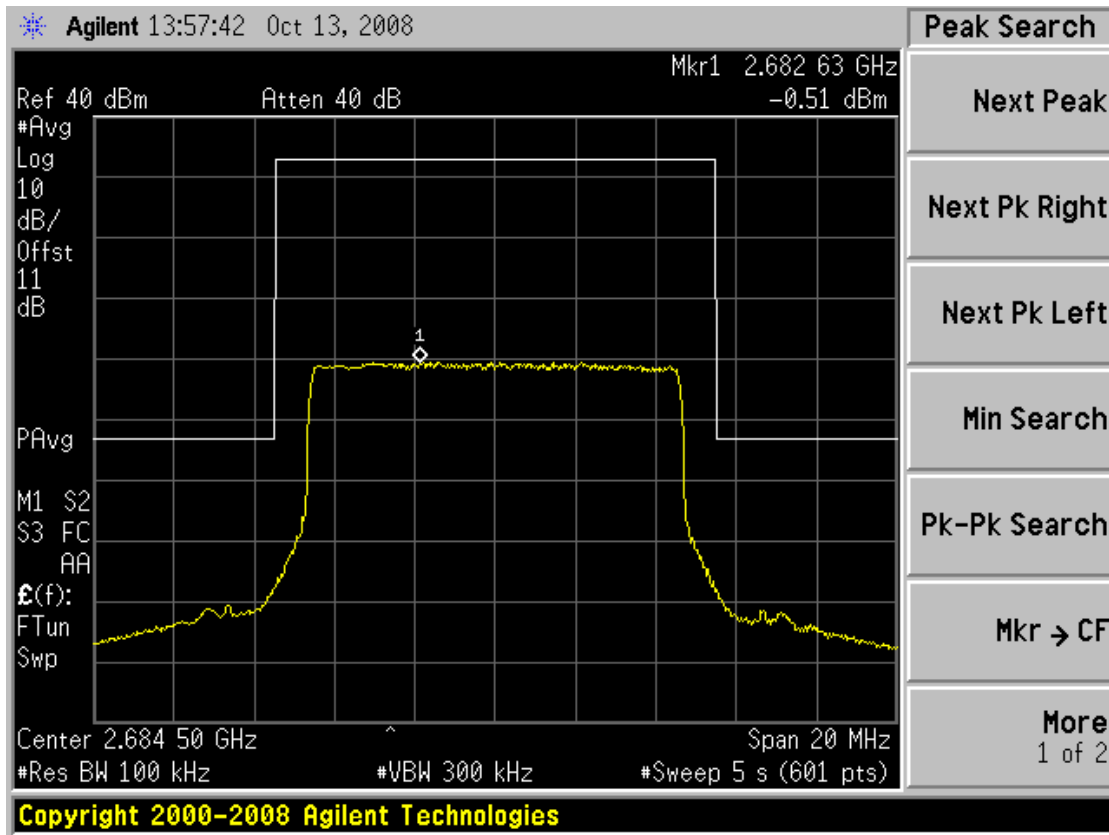
Plot 39:



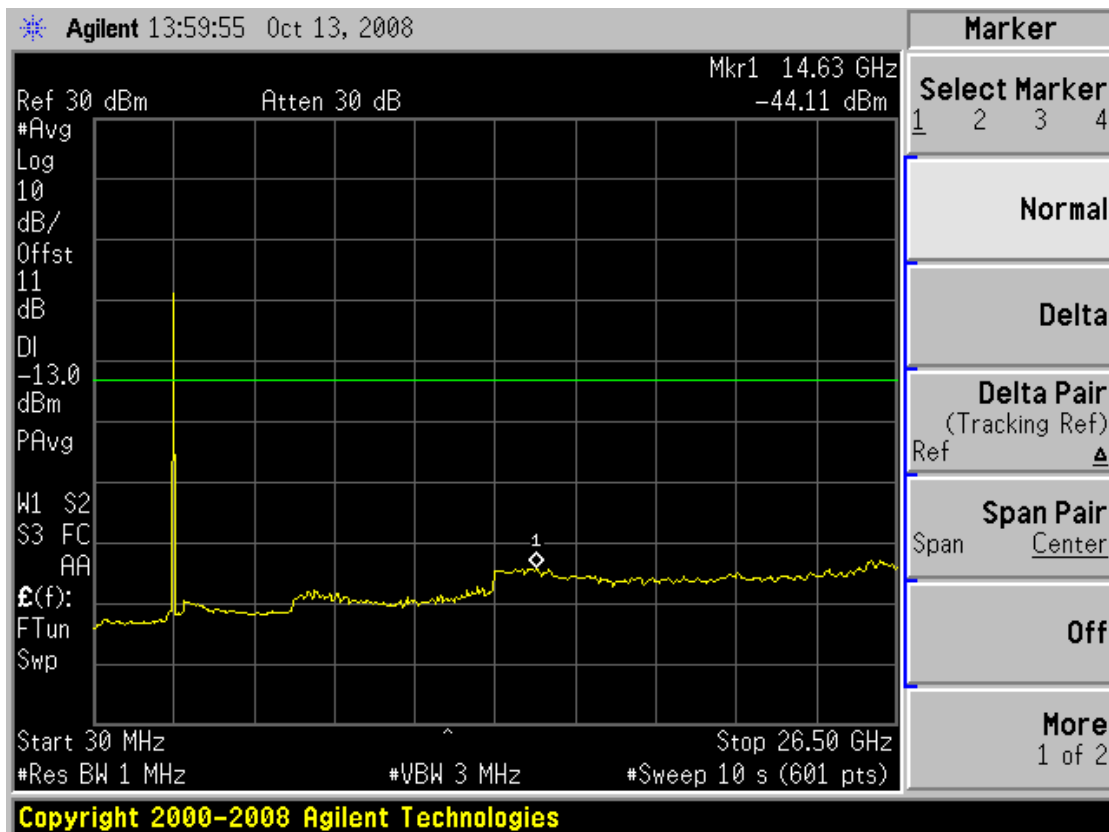
Plot 40:



Plot 41:



Plot 42:



CFR 47 Part 2.1053 Measurements required: Field strength of spurious radiation
 CFR 47 Part 27.53 Emission limits, subpart (1) (2)

Transmitter characteristics: 5 MHz channel spacing

Measurement conditions:

Frequency	f_{\min}	= 2.504750 GHz
Frequency	f_{nom}	= 2.593000 GHz
Frequency	f_{\max}	= 2.687250 GHz
Channel spacing	CS	= 5.0 MHz
Modulation	D	= 64QAM
Temperature	t	= +22.0 °C
Nominal power supply	U_{AC}	= 115.0 V
Measurement at	C'	

Test set-up: see page 8 / no. 3

Limit: see table

Test measurement:

Frequency Range	f_{carrier}	Modulation	Limit	Res. BW	Spurious Frequency	Emissions	see plot no.
[GHz]	[GHz]		[dBm]	[MHz]	[GHz]	[dBm]	
0.030 – 4.000	2.504750	64QAM	-13.0	1.0	n.f.	< limit	43
4.000 – 12.000	2.504750	64QAM	-13.0	1.0	n.f.	< limit	44
12.000 – 18.000	2.504750	64QAM	-13.0	1.0	n.f.	< limit	45
18.000 – 27.000	2.504750	64QAM	-13.0	1.0	n.f.	< limit	46
0.030 – 4.000	2.593000	64QAM	-13.0	1.0	n.f.	< limit	47
4.000 – 12.000	2.593000	64QAM	-13.0	1.0	n.f.	< limit	48
12.000 – 18.000	2.593000	64QAM	-13.0	1.0	n.f.	< limit	49
18.000 – 27.000	2.593000	64QAM	-13.0	1.0	n.f.	< limit	50
0.030 – 4.000	2.687250	64QAM	-13.0	1.0	n.f.	< limit	51
4.000 – 12.000	2.687250	64QAM	-13.0	1.0	n.f.	< limit	52
12.000 – 18.000	2.687250	64QAM	-13.0	1.0	n.f.	< limit	53
18.000 – 27.000	2.687250	64QAM	-13.0	1.0	n.f.	< limit	54

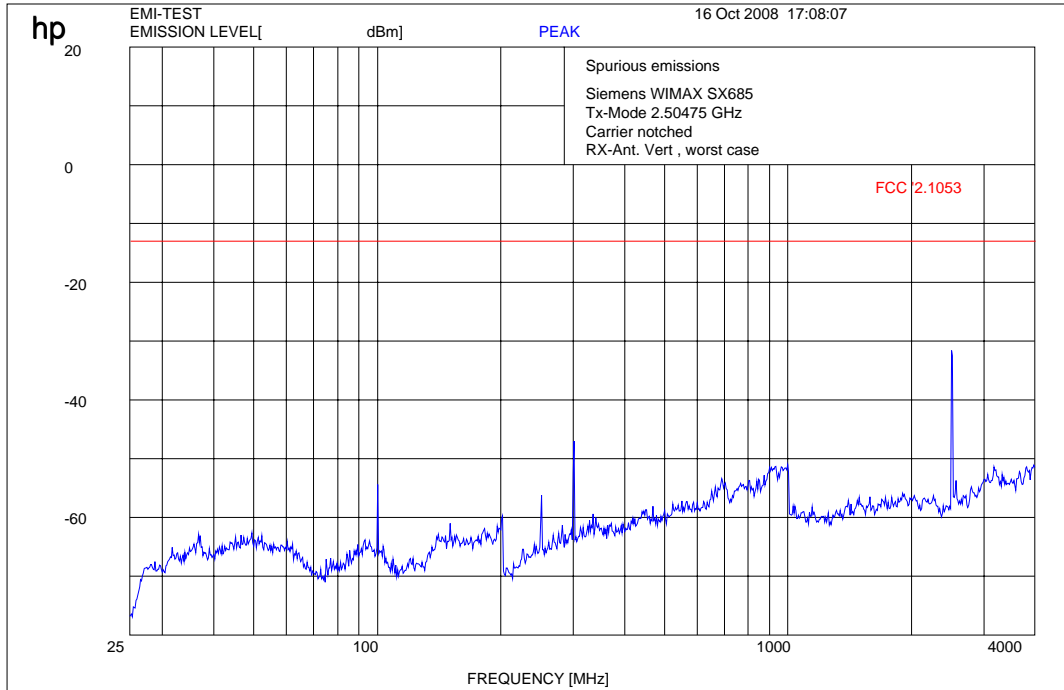
n.f. = nothing found

Test result:

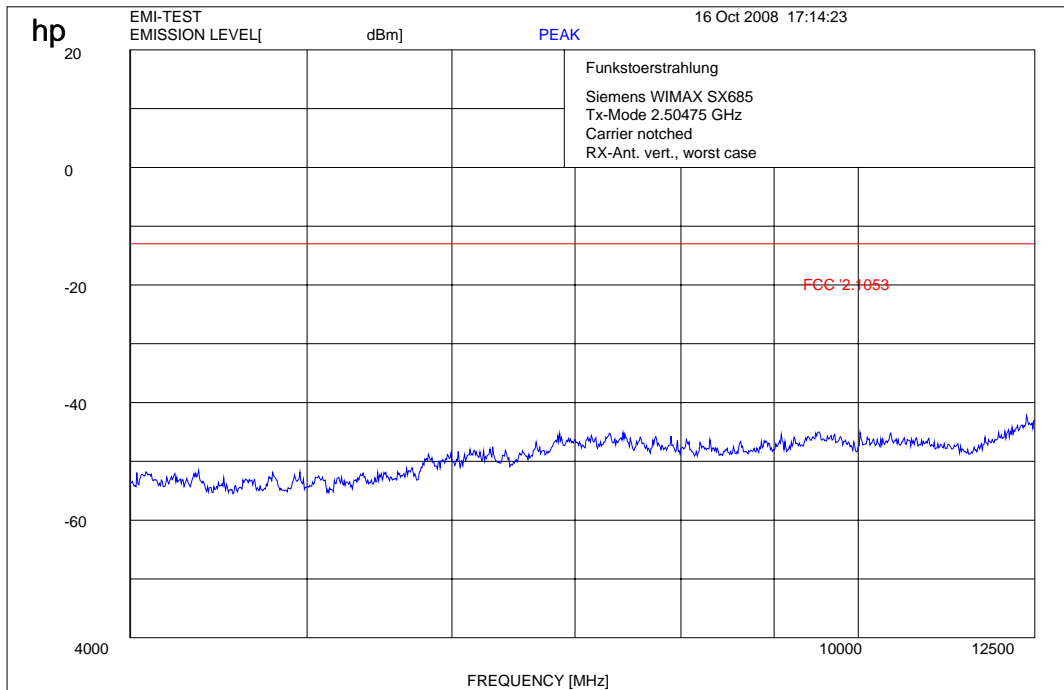
Passed:

Failed:

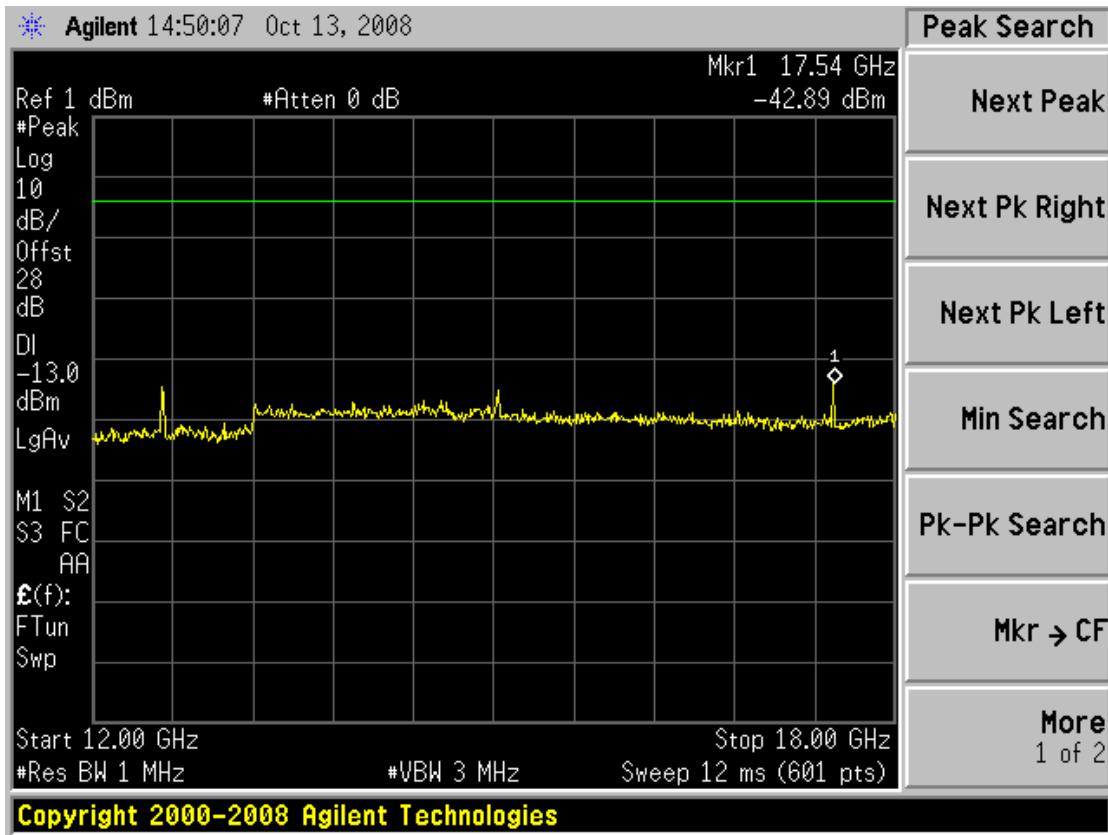
Plot 43:



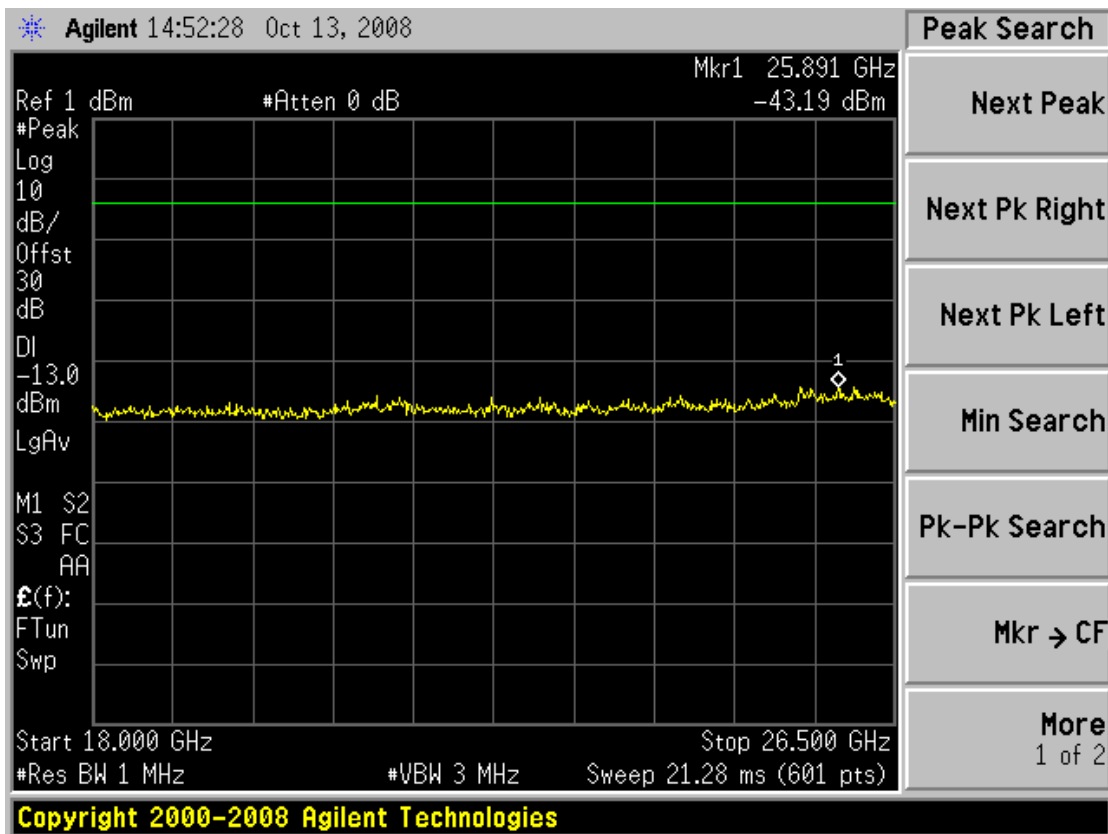
Plot 44:



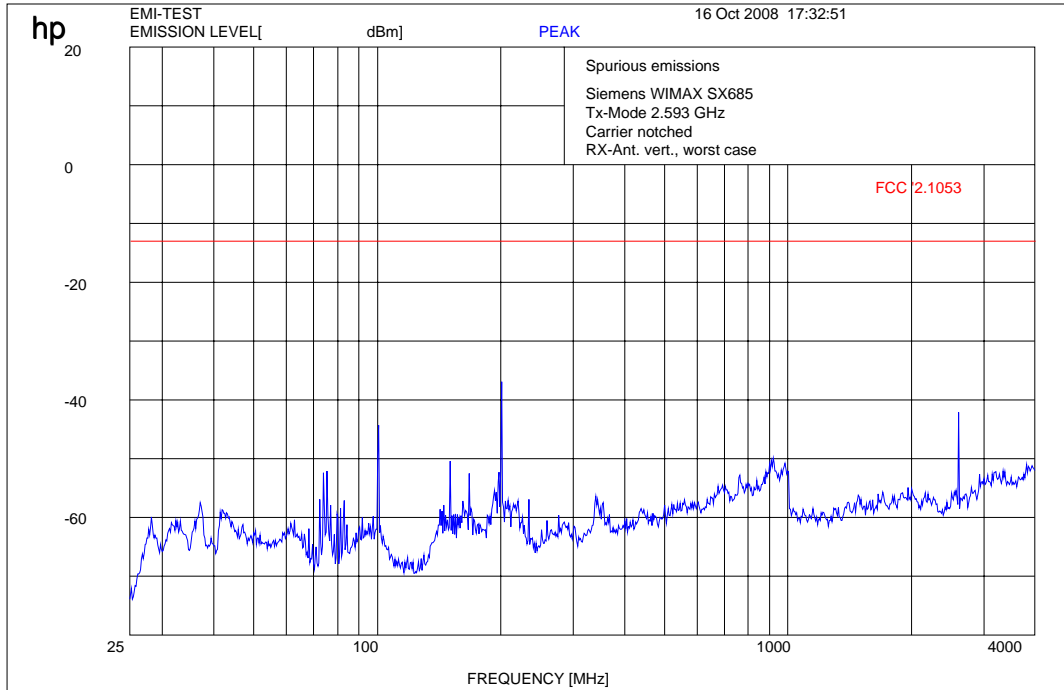
Plot 45:



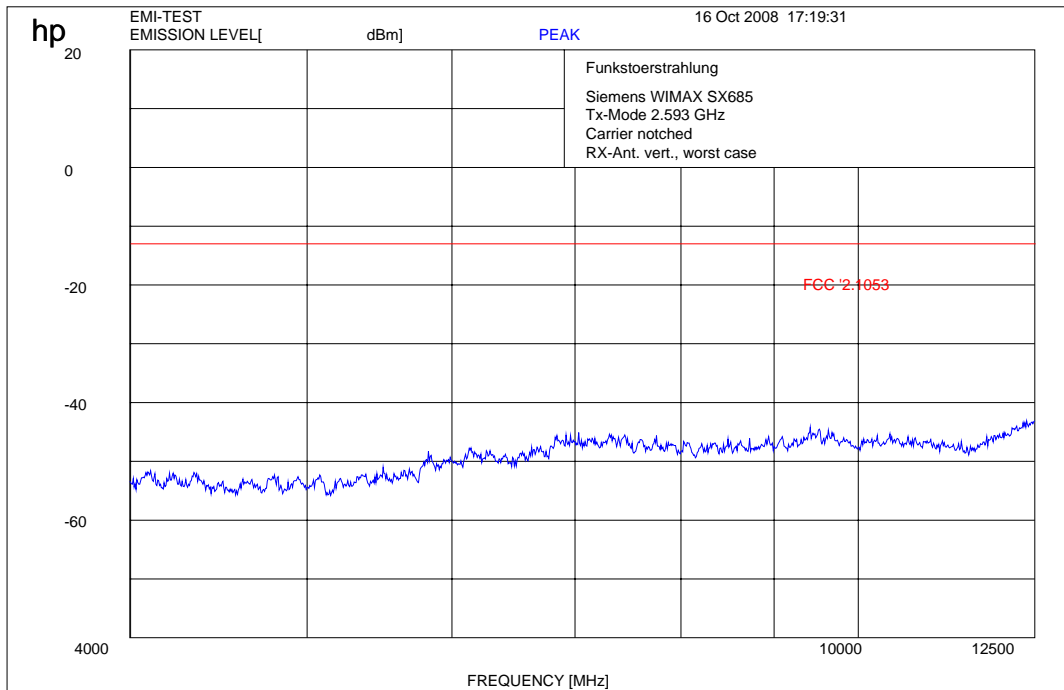
Plot 46:



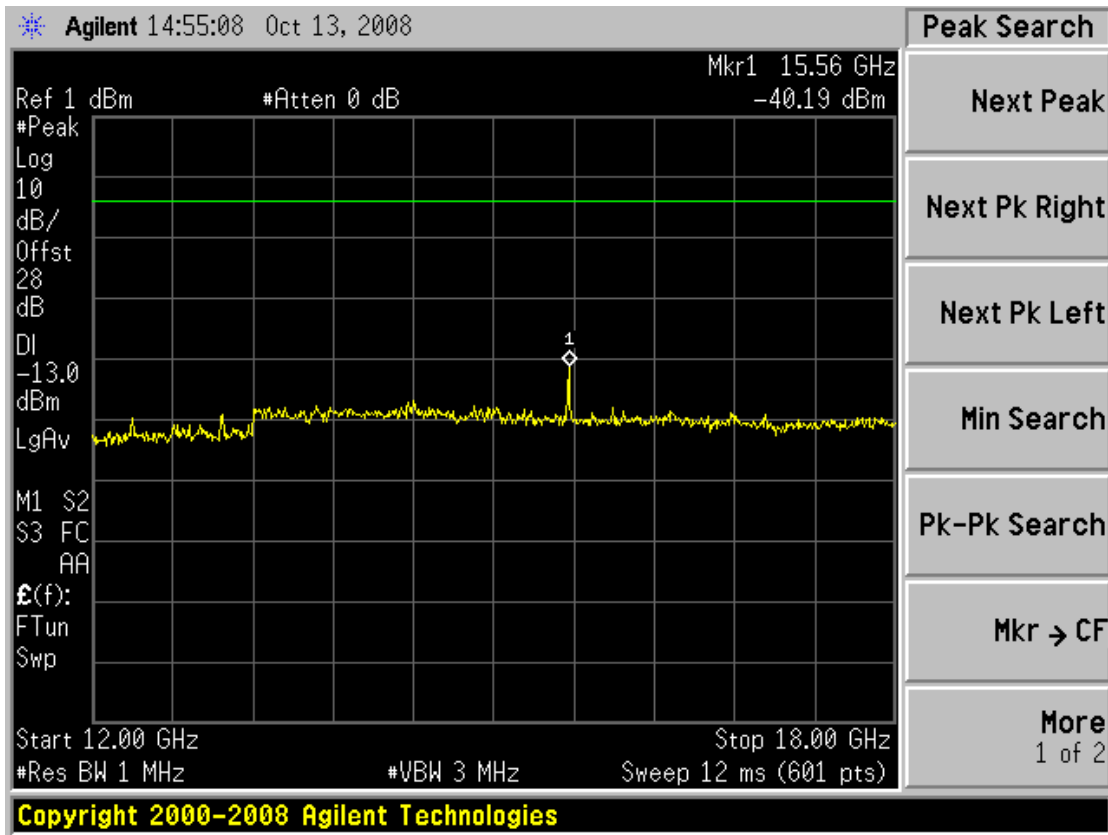
Plot 47:



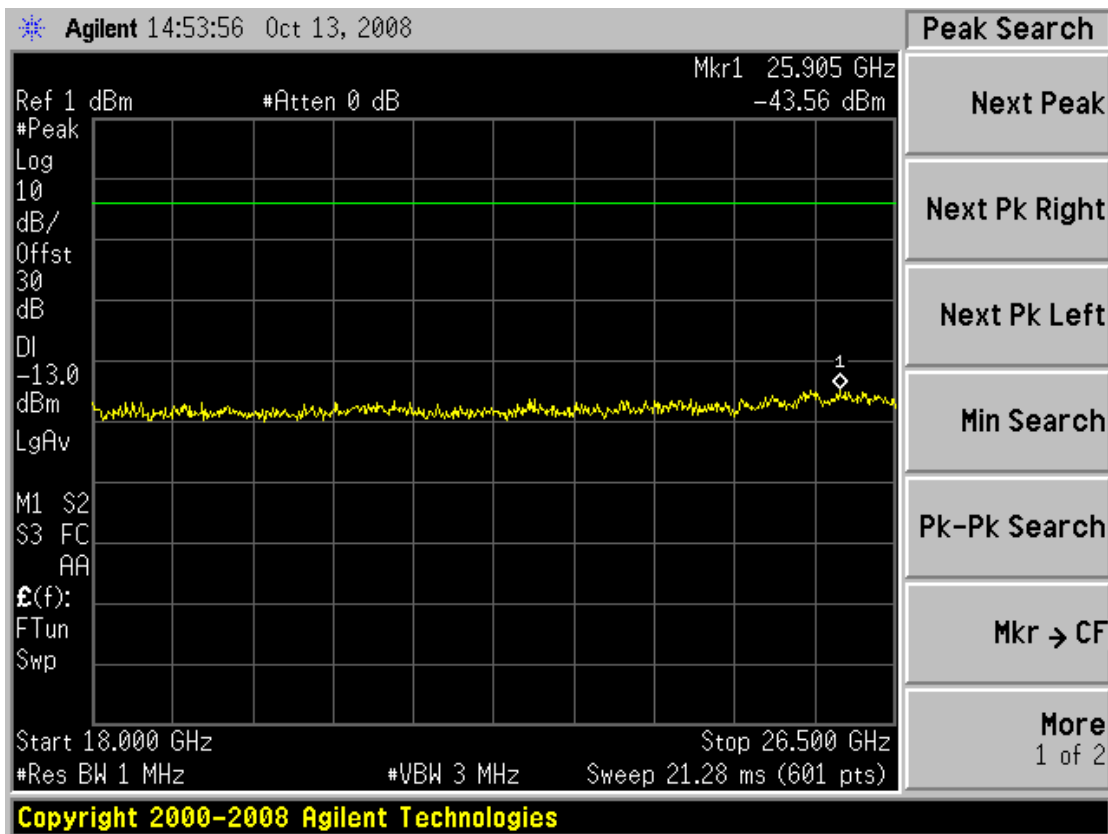
Plot 48:



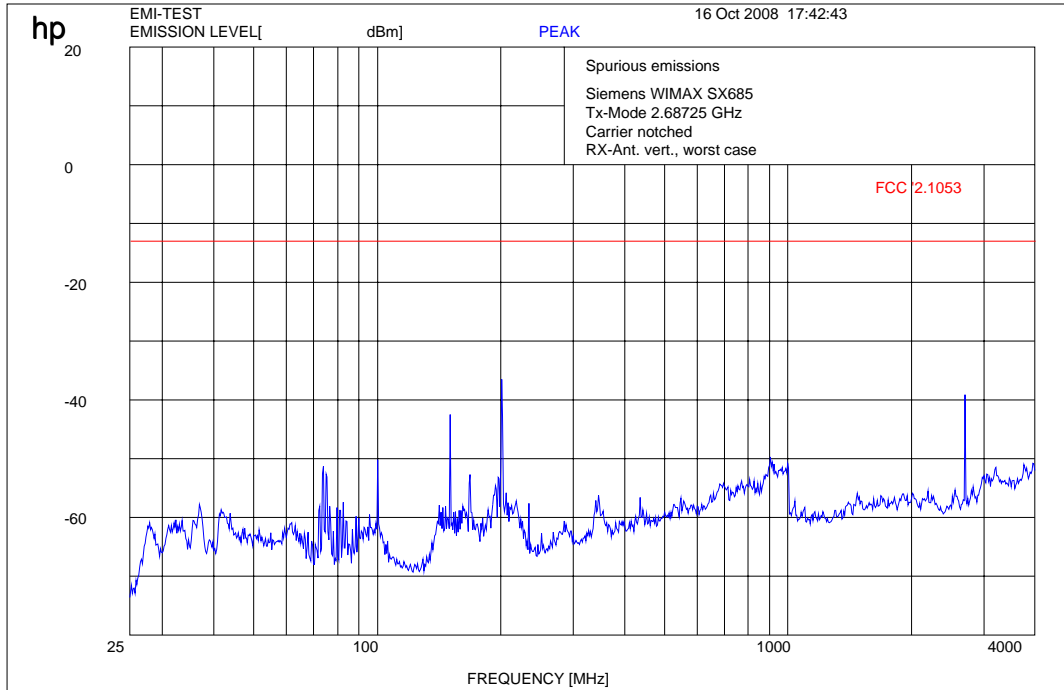
Plot 49:



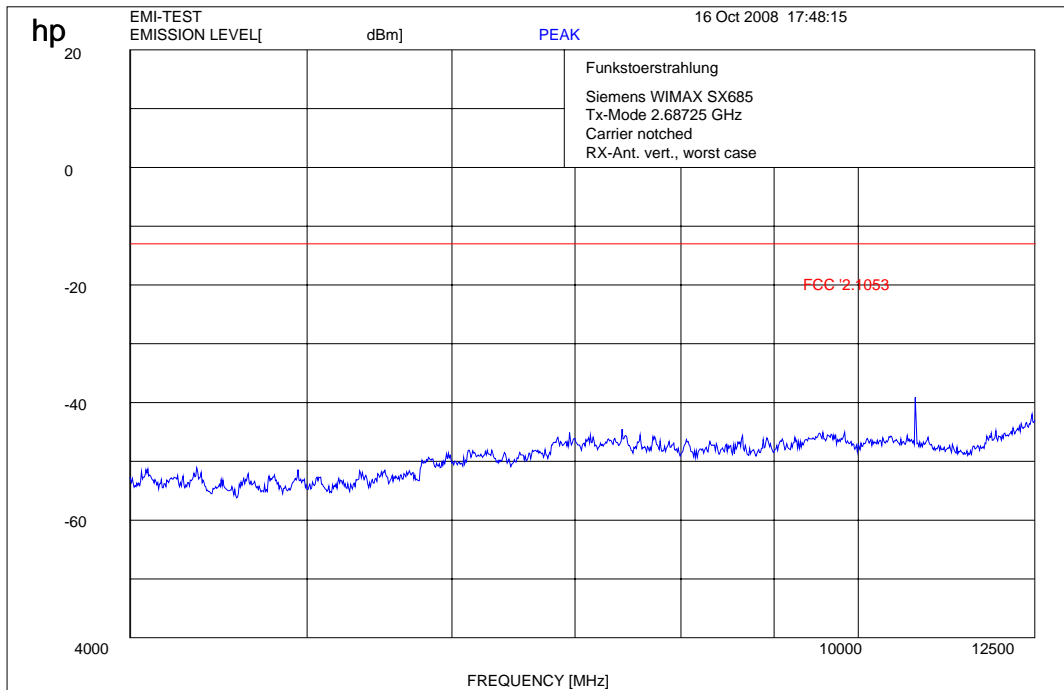
Plot 50:



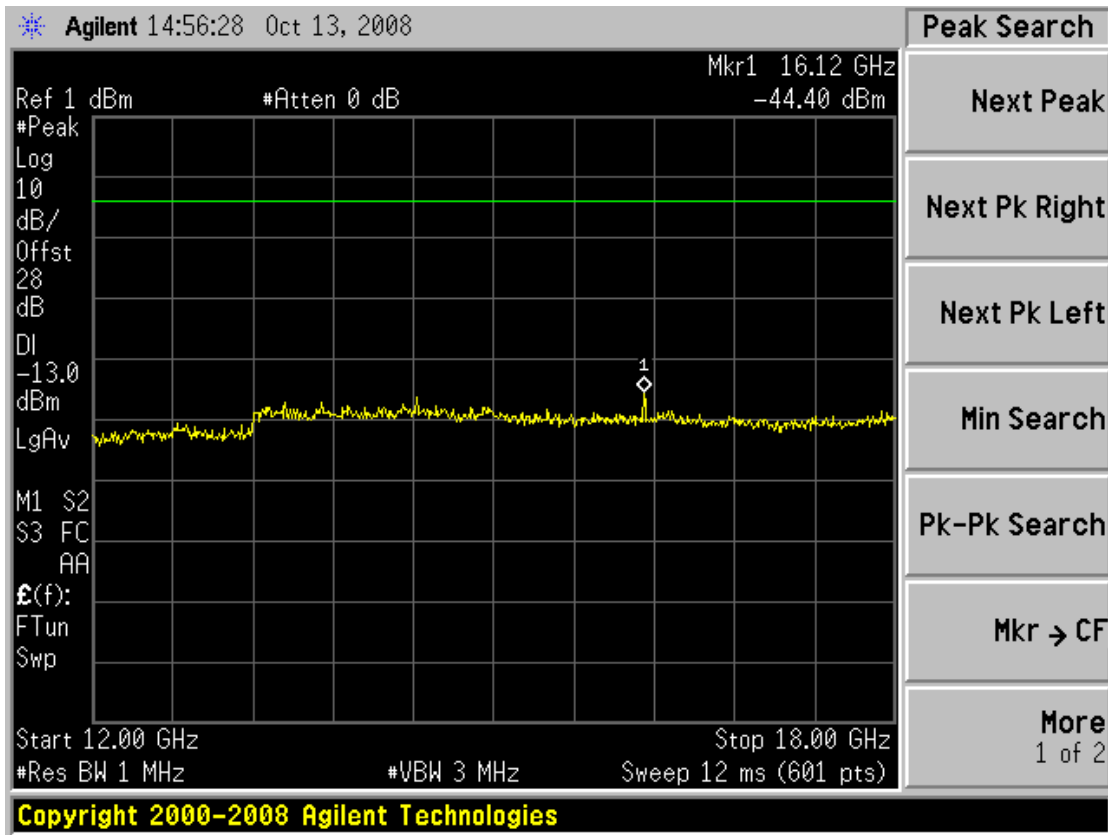
Plot 51:



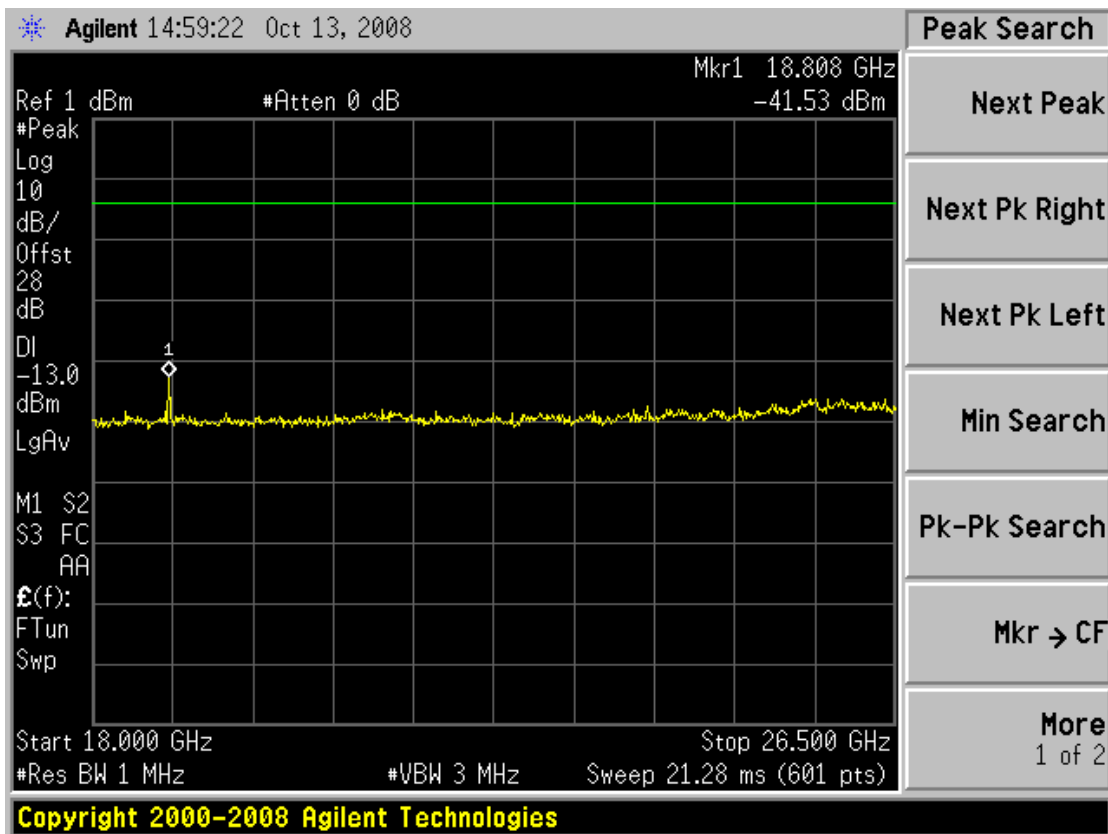
Plot 52:



Plot 53:



Plot 54:



CFR 47 Part 2.1053 Measurements required: Field strength of spurious radiation
 CFR 47 Part 27.53 Emission limits, subpart (1) (2)

Transmitter characteristics: 10 MHz channel spacing

Measurement conditions:

Frequency	f_{\min}	= 2.507500 GHz
Frequency	f_{nom}	= 2.596000 GHz
Frequency	f_{\max}	= 2.684500 GHz
Channel spacing	CS	= 10.0 MHz
Modulation	D	= 64QAM
Temperature	t	= +22.0 °C
Nominal power supply	U_{AC}	= 115.0 V
Measurement at	C'	

Test set-up: see page 8 / no. 3

Limit: see table

Test measurement:

Frequency Range	f_{carrier}	Modulation	Limit	Res. BW	Spurious Frequency	Emissions	see plot no.
[GHz]	[GHz]		[dBm]	[MHz]	[GHz]	[dBm]	
0.030 – 4.000	2.507500	64QAM	-13.0	1.0	n.f.	< limit	55
4.000 – 12.000	2.507500	64QAM	-13.0	1.0	n.f.	< limit	56
12.000 – 18.000	2.507500	64QAM	-13.0	1.0	n.f.	< limit	57
18.000 – 27.000	2.507500	64QAM	-13.0	1.0	n.f.	< limit	58
0.030 – 4.000	2.596000	64QAM	-13.0	1.0	n.f.	< limit	59
4.000 – 12.000	2.596000	64QAM	-13.0	1.0	n.f.	< limit	60
12.000 – 18.000	2.596000	64QAM	-13.0	1.0	n.f.	< limit	61
18.000 – 27.000	2.596000	64QAM	-13.0	1.0	n.f.	< limit	62
0.030 – 4.000	2.684500	64QAM	-13.0	1.0	n.f.	< limit	63
4.000 – 12.000	2.684500	64QAM	-13.0	1.0	n.f.	< limit	64
12.000 – 18.000	2.684500	64QAM	-13.0	1.0	n.f.	< limit	65
18.000 – 27.000	2.684500	64QAM	-13.0	1.0	n.f.	< limit	66

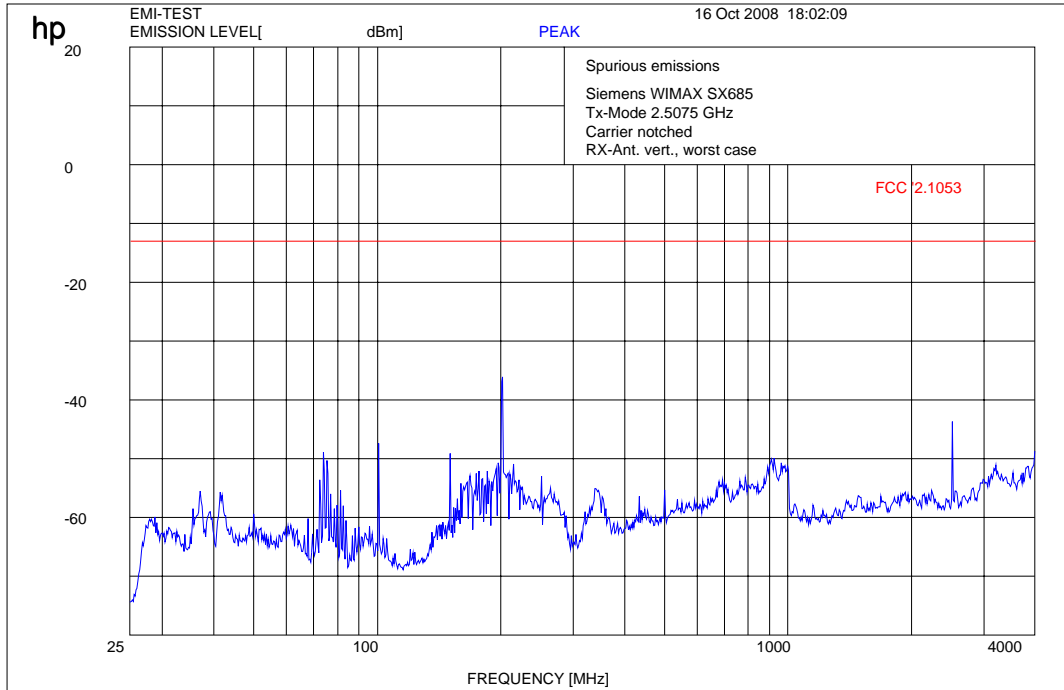
n.f. = nothing found

Test result:

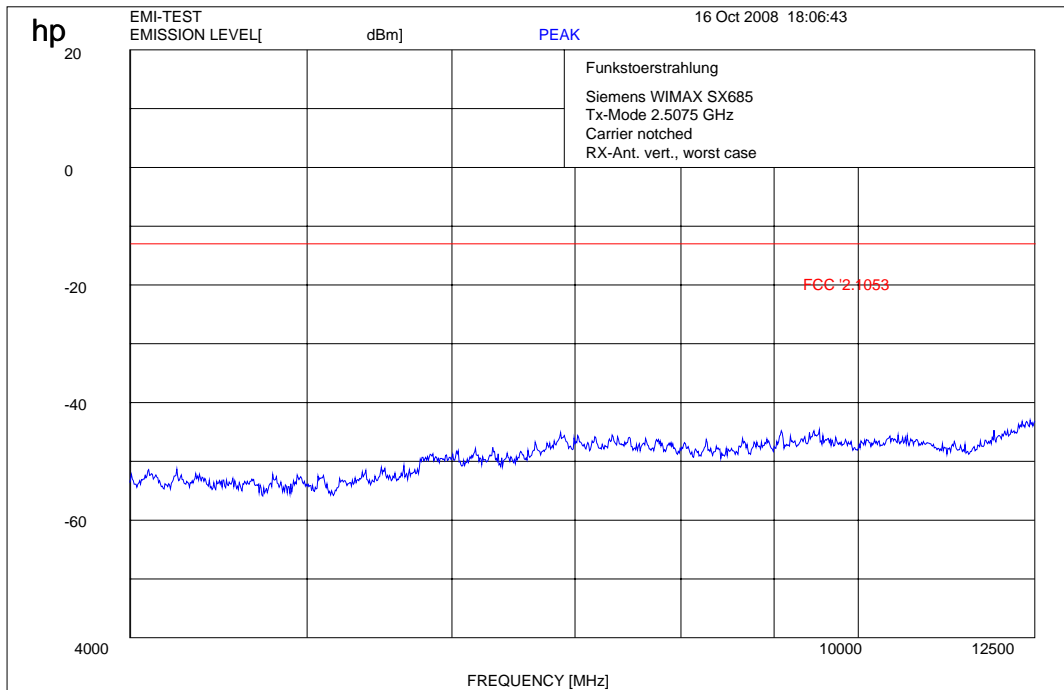
Passed:

Failed:

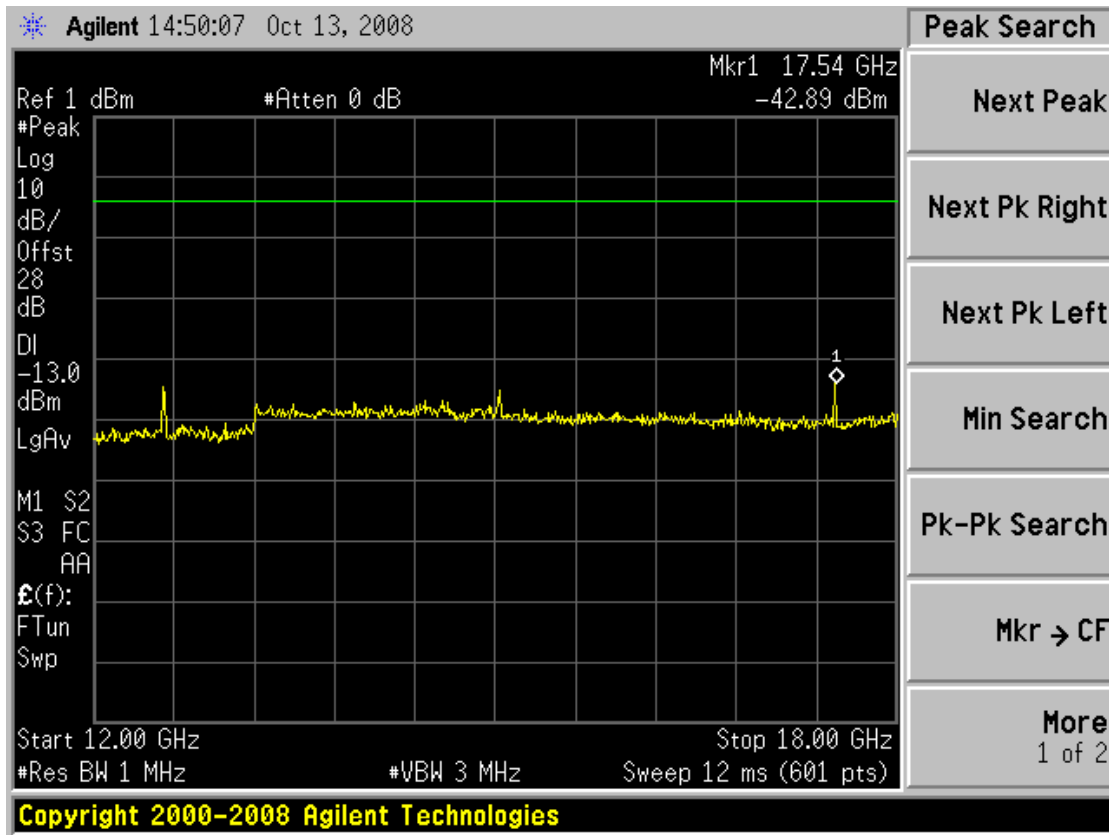
Plot 55:



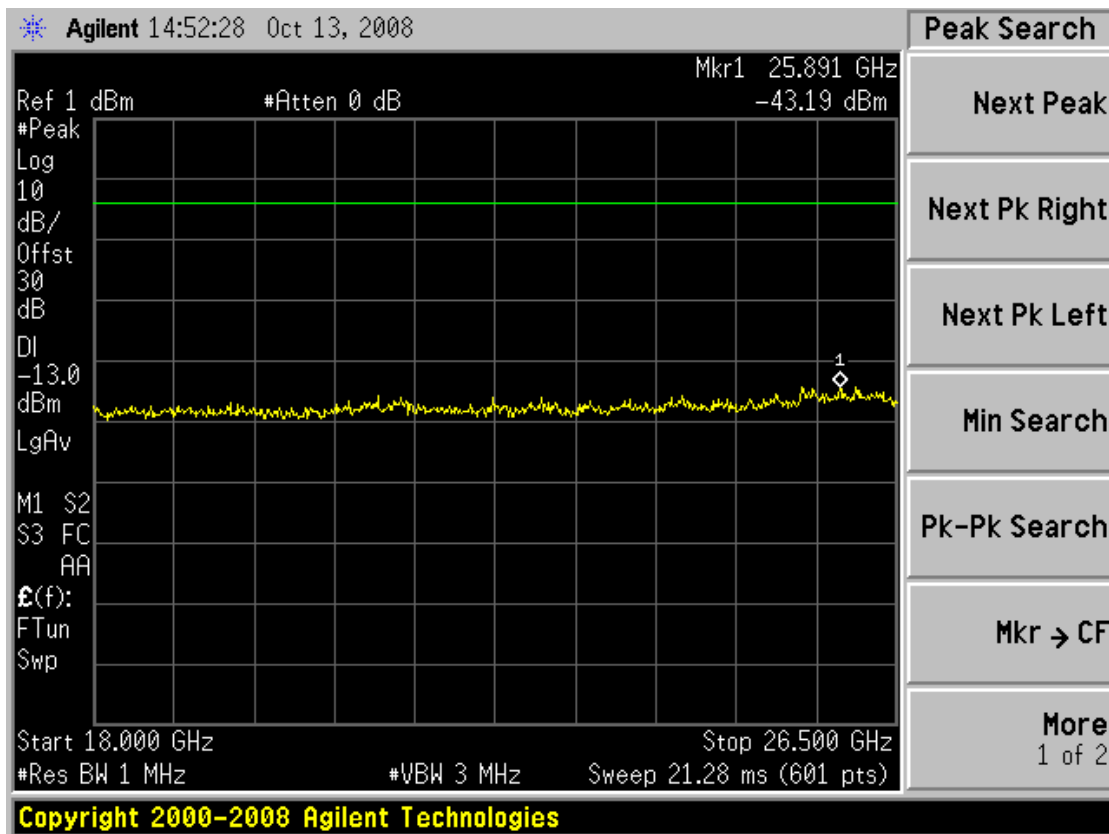
Plot 56:



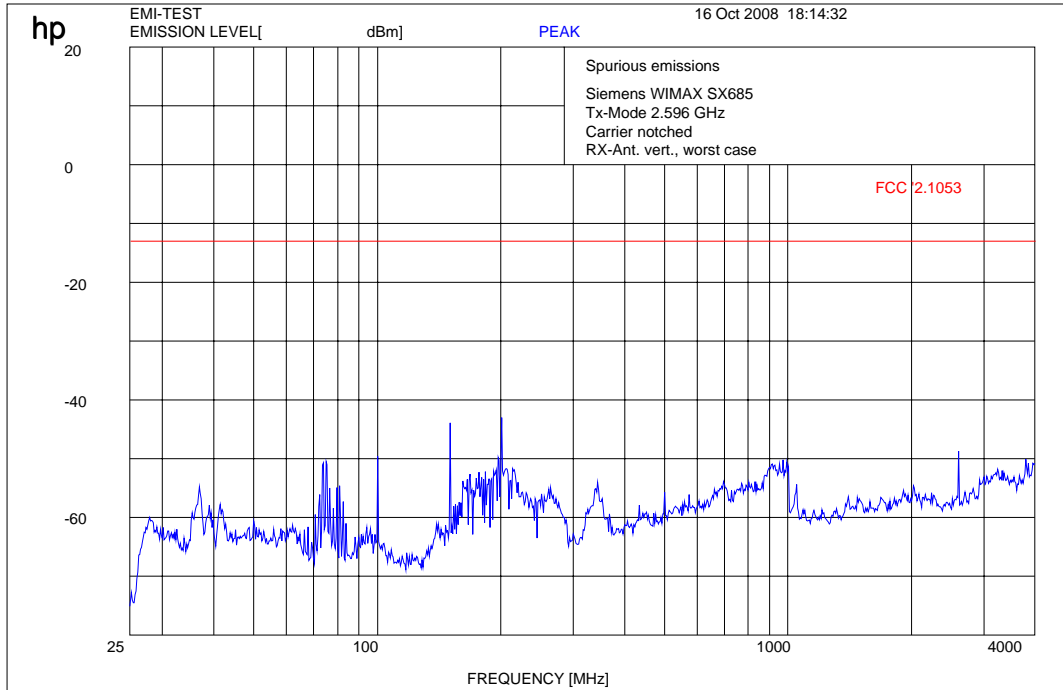
Plot 57:



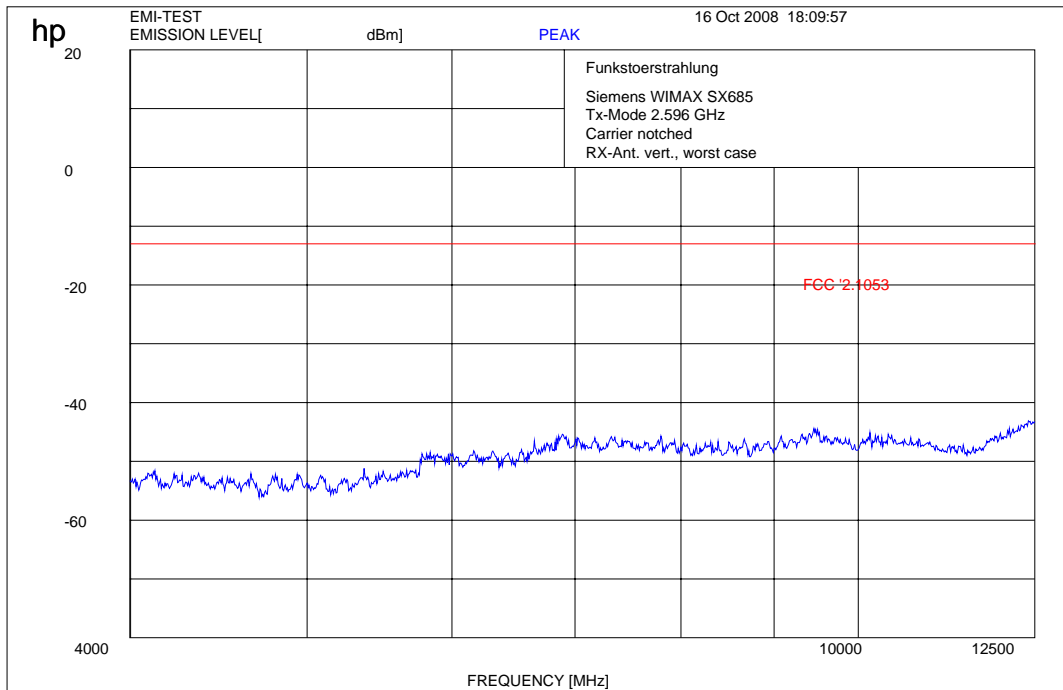
Plot 58:



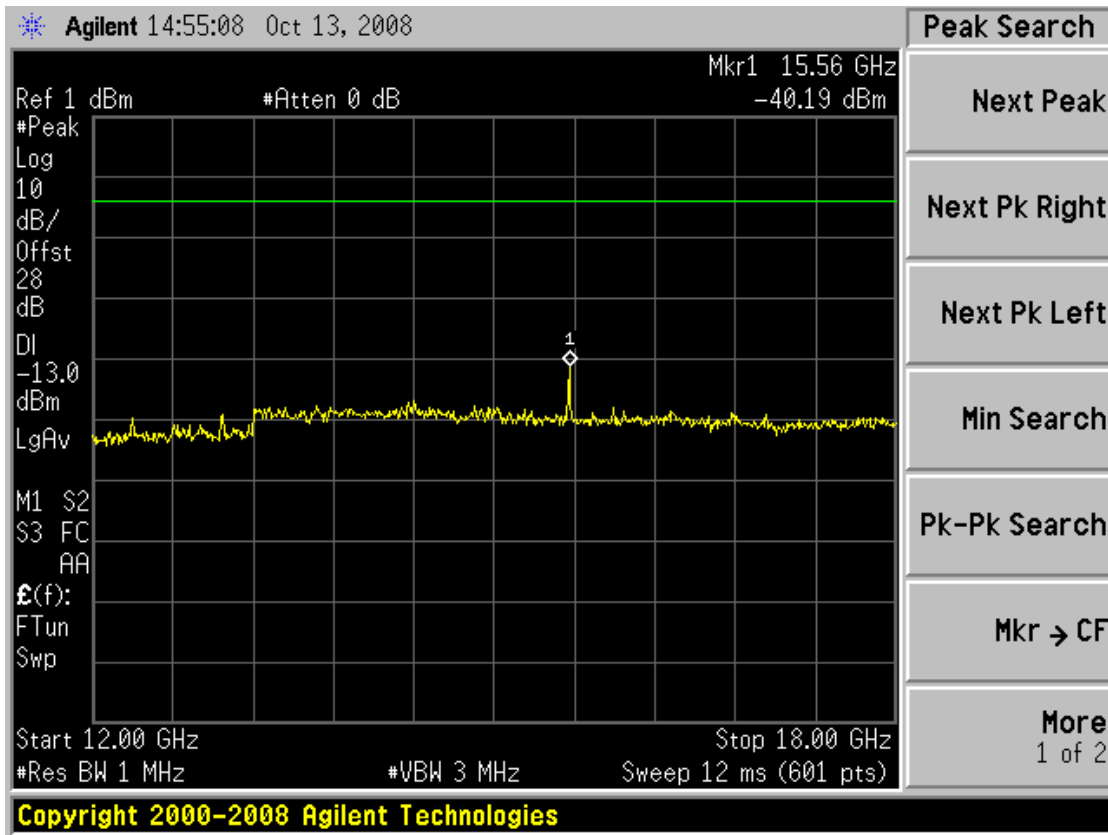
Plot 59:



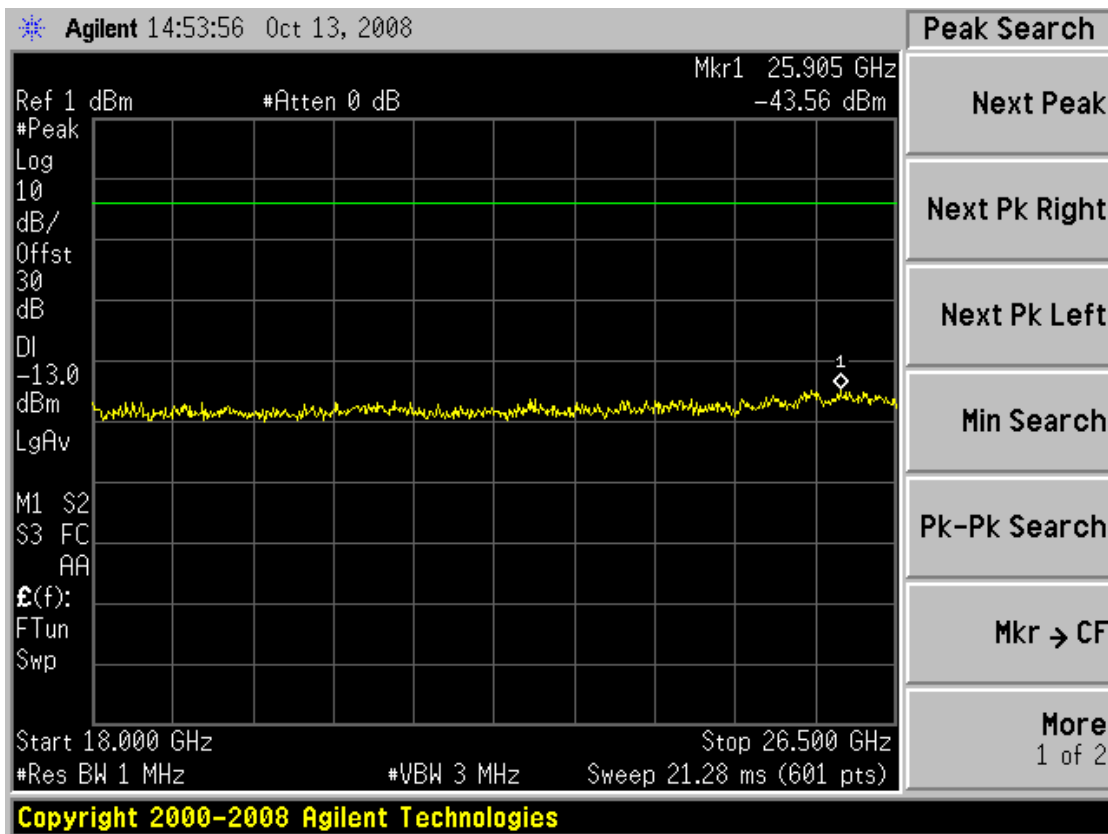
Plot 60:



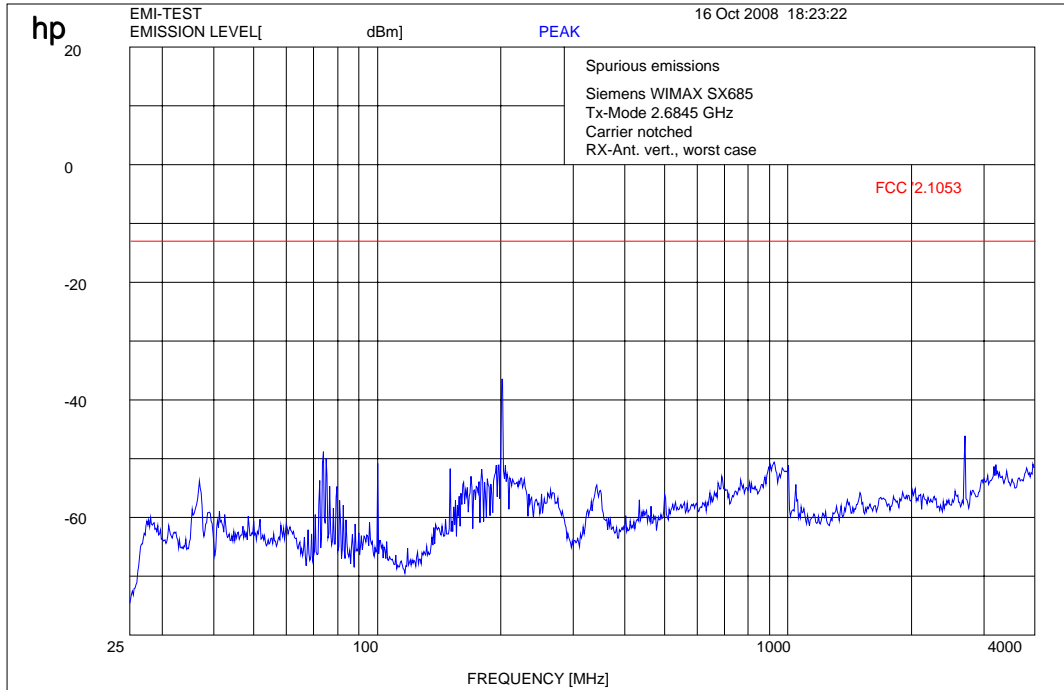
Plot 61:



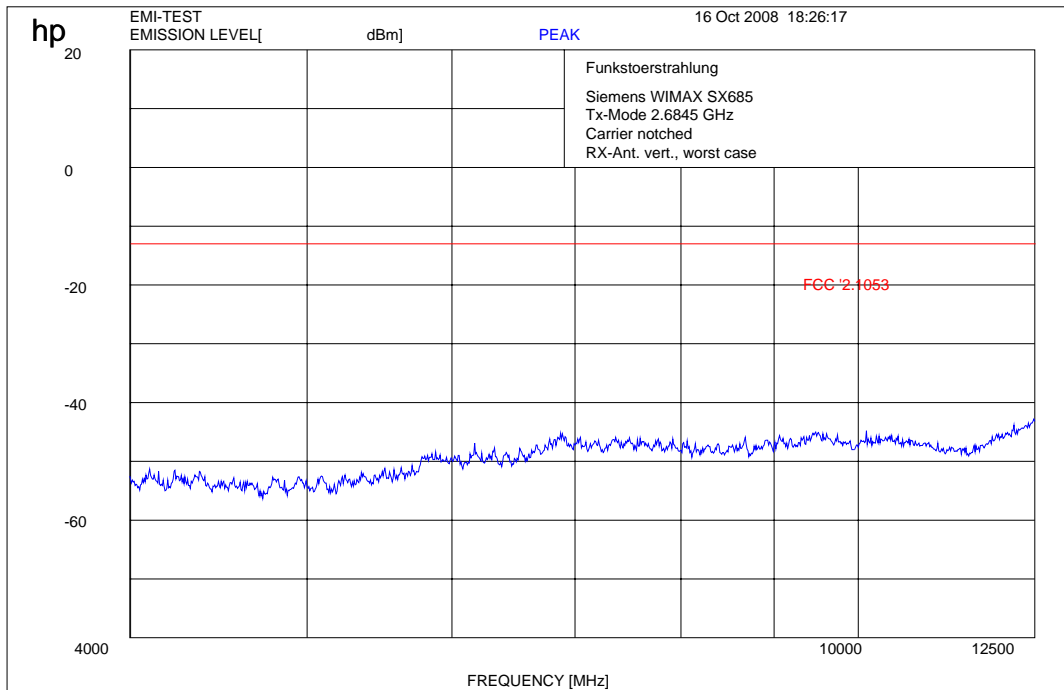
Plot 62:



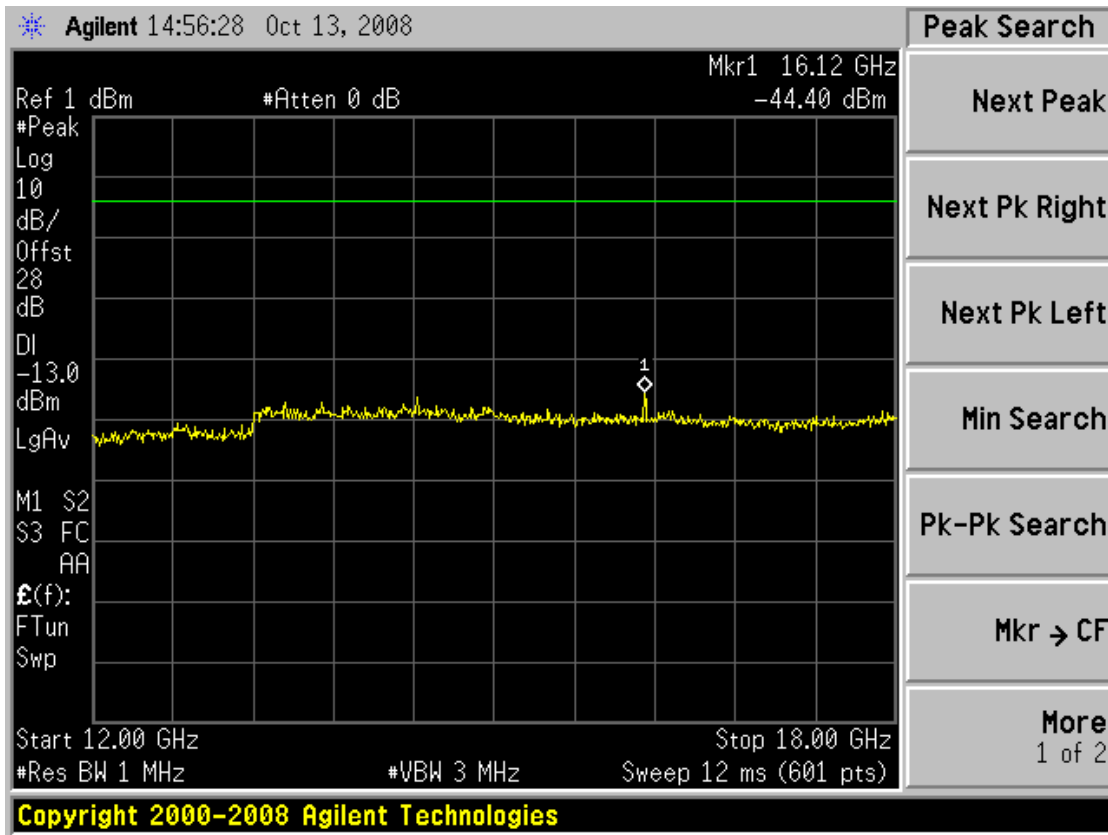
Plot 63:



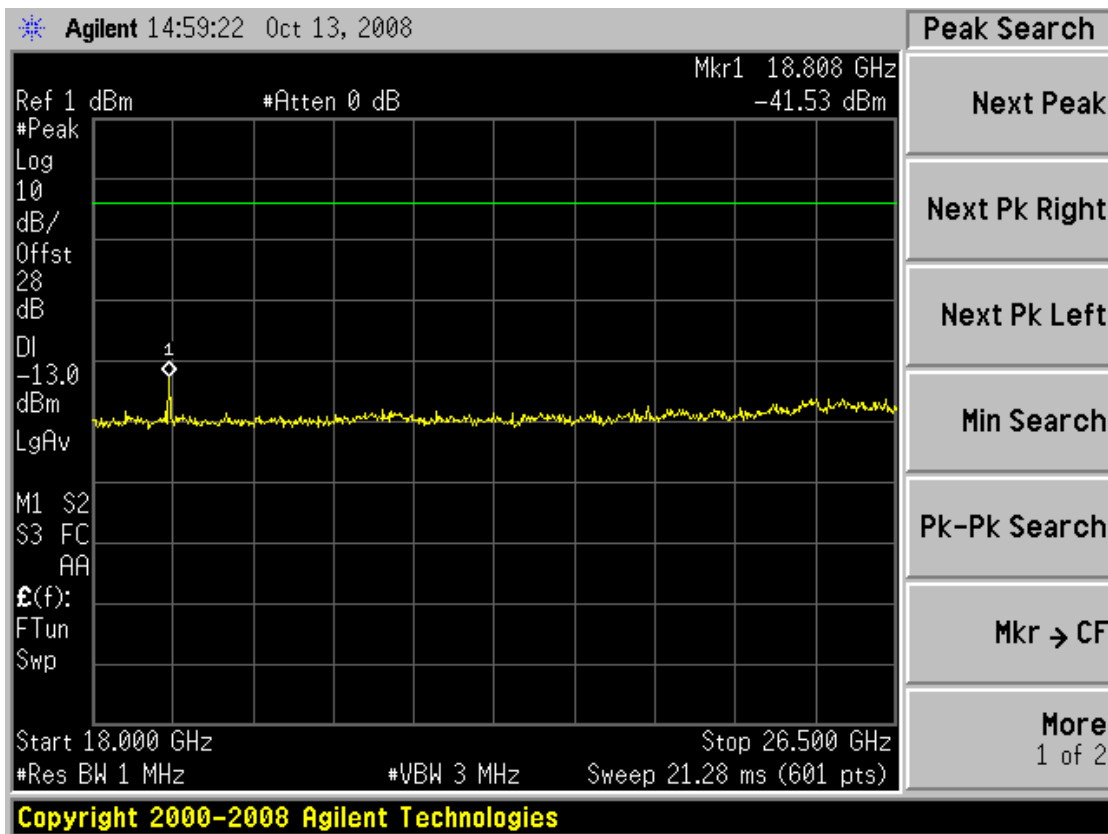
Plot 64:



Plot 65:



Plot 66:



CFR 47 Part 2.1055 Measurements required: Frequency stability
 CFR 47 Part 27.54 Frequency stability

Transmitter characteristics: 5 MHz channel spacing

Measurement conditions:

Frequency	f_{nom}	= 2.593000 GHz
Channel spacing	CS	= 5.0 MHz
Modulation	D	= 64QAM
Temperature	t	= see table
Power supply	U_{AC}	= see table
Measurement at	C'	

Test set-up: see page 8 / no. 4

Limit: see plots

Test measurement:

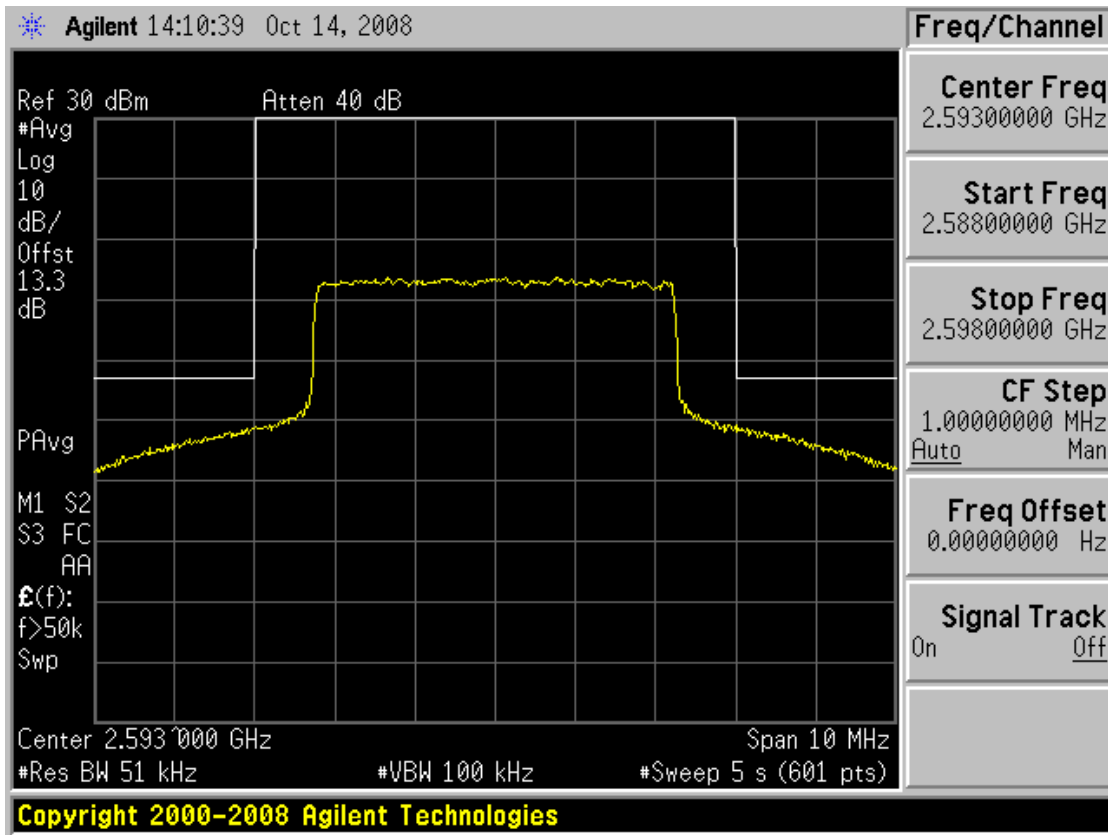
U_{AC}	T	Channel spacing	Modulation	Frequency	Frequency Error	Plot
[V]	[°C]	[MHz]		[GHz]		
97 / 115 / 133	-30.0	5	64QAM	2.593000	12.18 kHz / 4.7 ppm	67
97 / 115 / 133	-20.0	5	64QAM	2.593000	10.94 kHz / 4.2 ppm	68
97 / 115 / 133	-10.0	5	64QAM	2.593000	9.12 kHz / 3.5 ppm	69
97 / 115 / 133	0.0	5	64QAM	2.593000	7.59 kHz / 2.9 ppm	70
97 / 115 / 133	10.0	5	64QAM	2.593000	5.61 kHz / 2.1 ppm	71
97 / 115 / 133	20.0	5	64QAM	2.593000	3.87 kHz / 1.5 ppm	72
97 / 115 / 133	30.0	5	64QAM	2.593000	1.14 kHz / 0.4 ppm	73
97 / 115 / 133	40.0	5	64QAM	2.593000	-0.73 kHz / -0.3 ppm	74
97 / 115 / 133	50.0	5	64QAM	2.593000	-2.23 kHz / -0.9 ppm	75

Note:

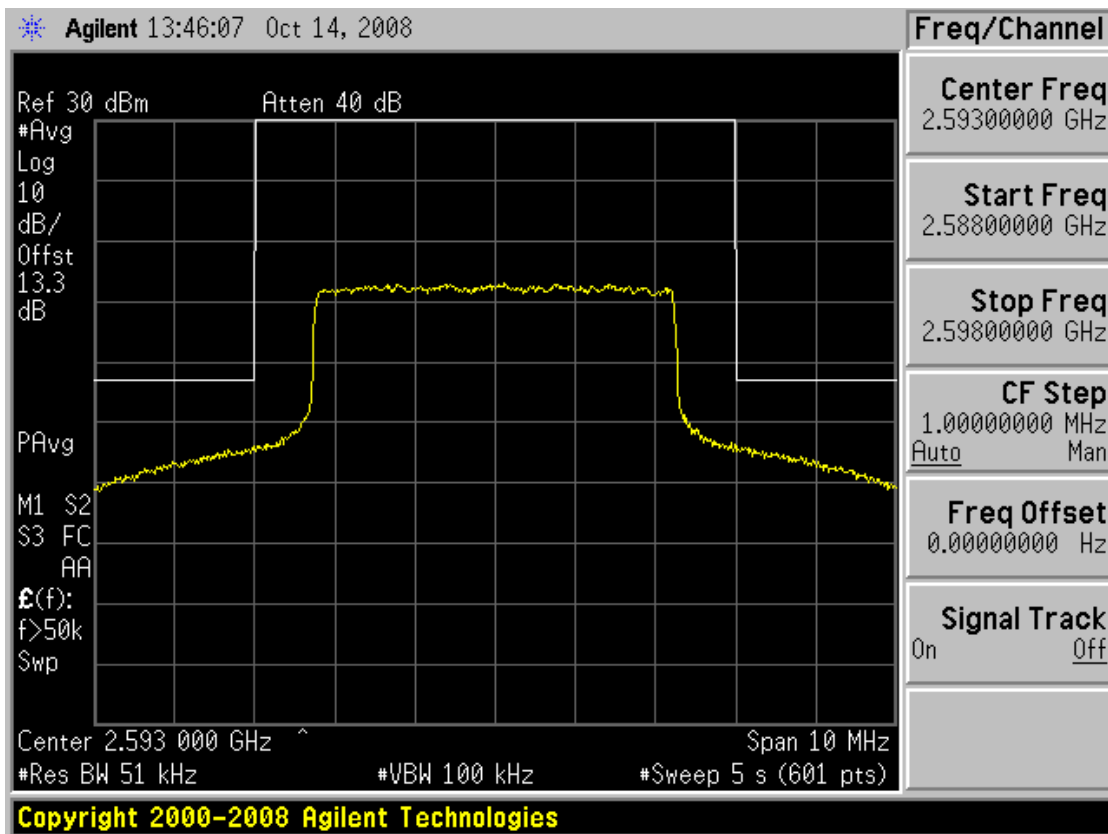
The manufacturer declared a maximum frequency deviation of 160 Hz (0.06 ppm) when locked to the base station.

Test result: Passed: Failed:

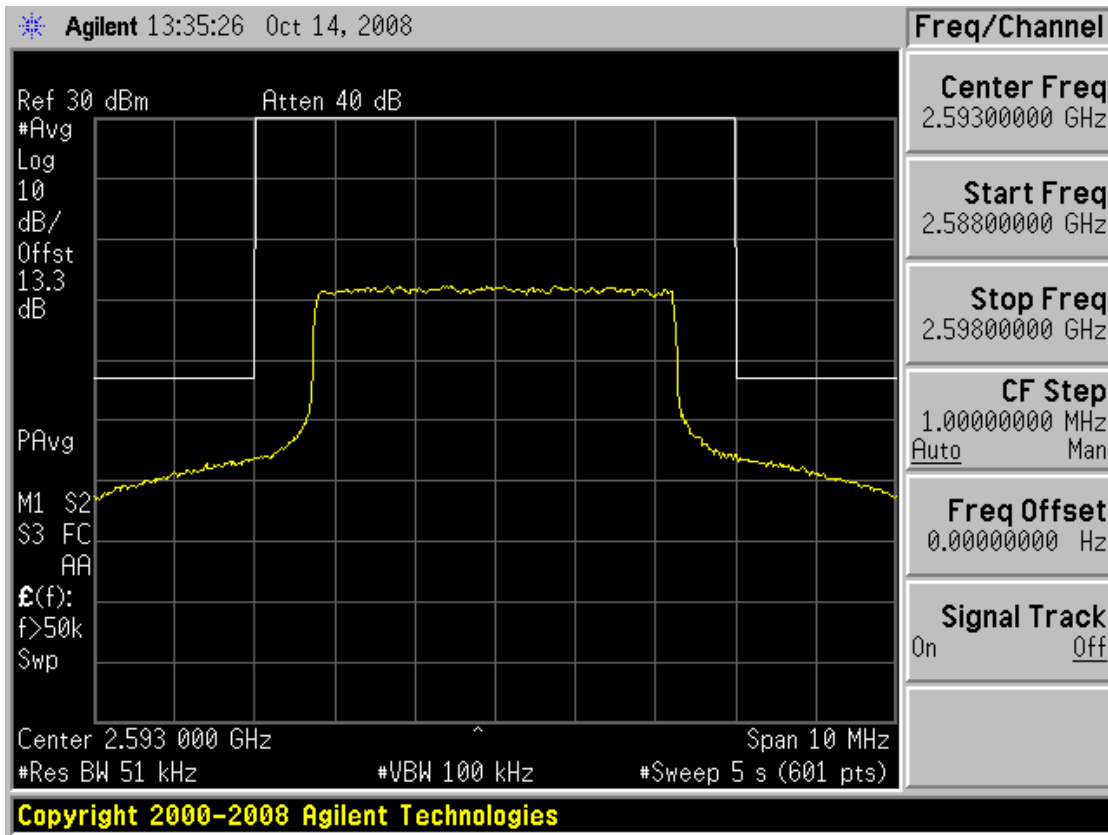
Plot 67:



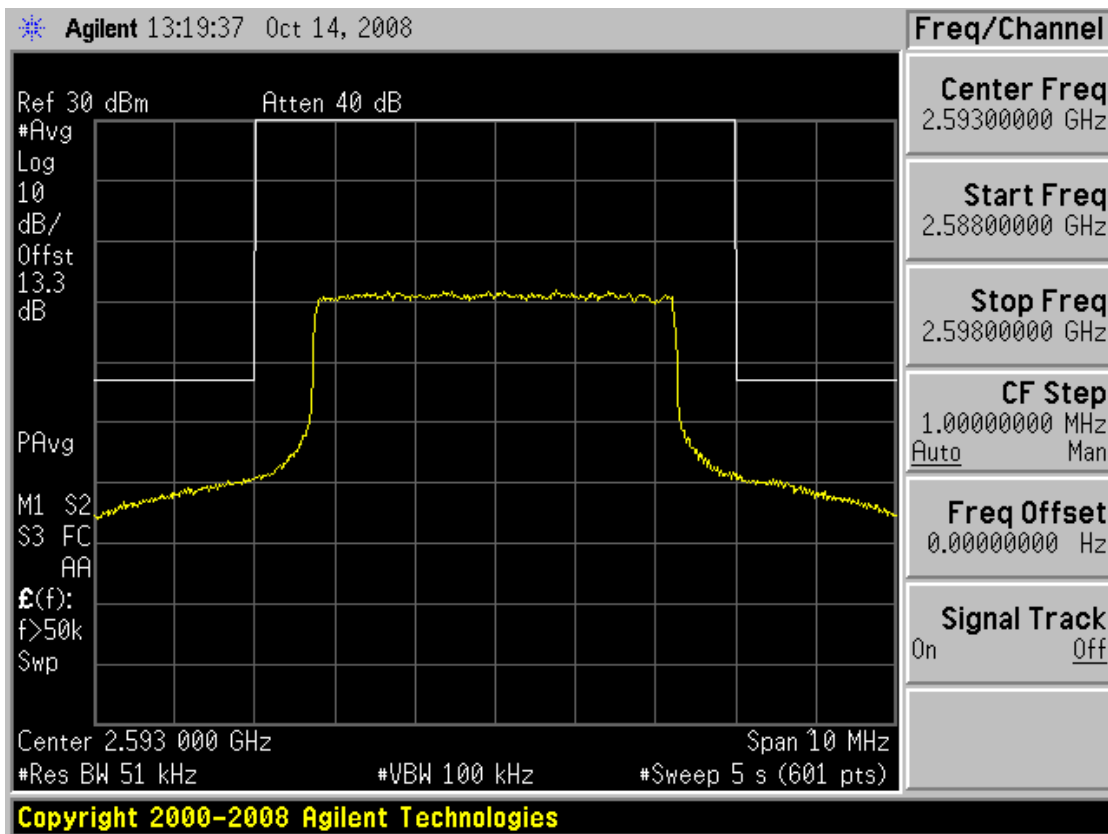
Plot 68:



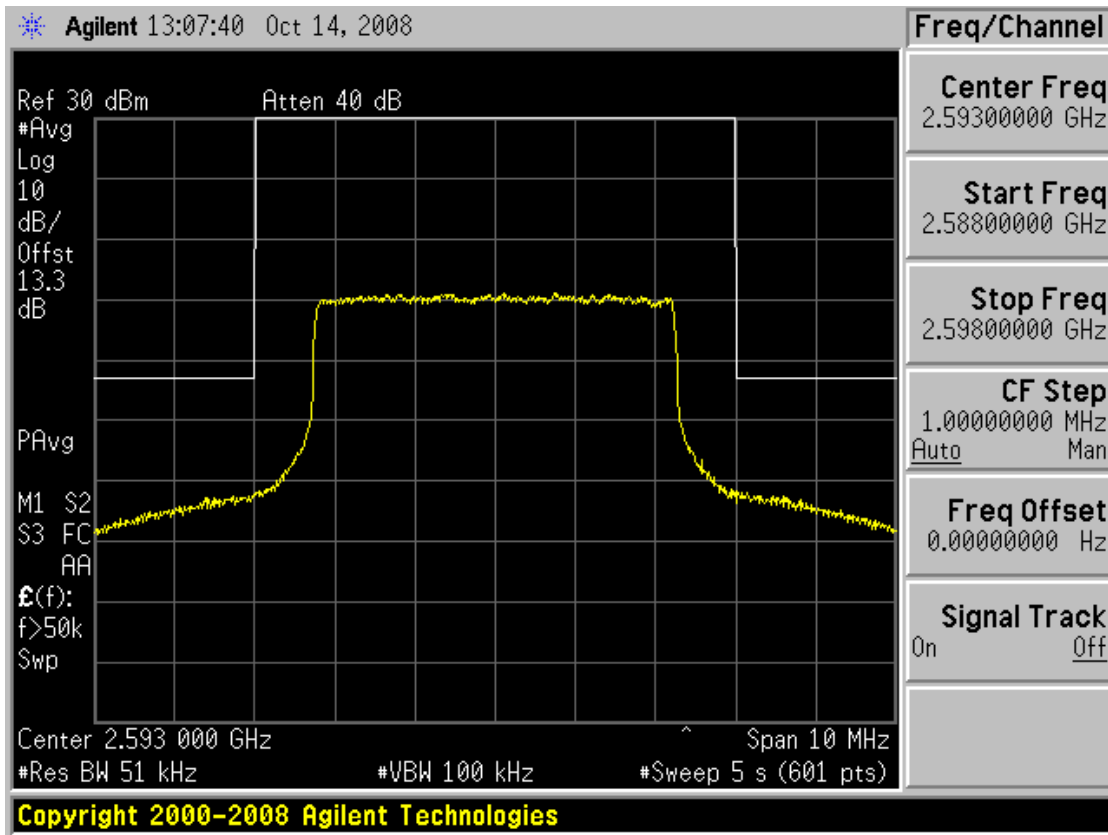
Plot 69:



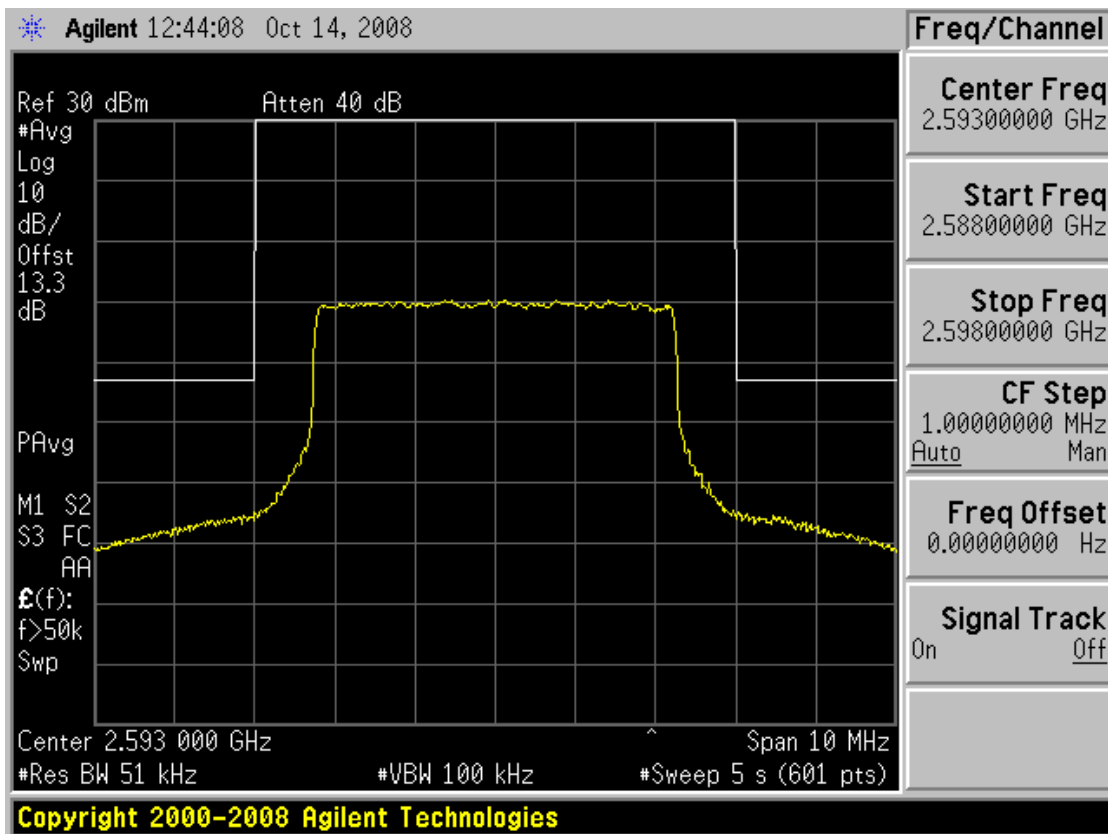
Plot 70:



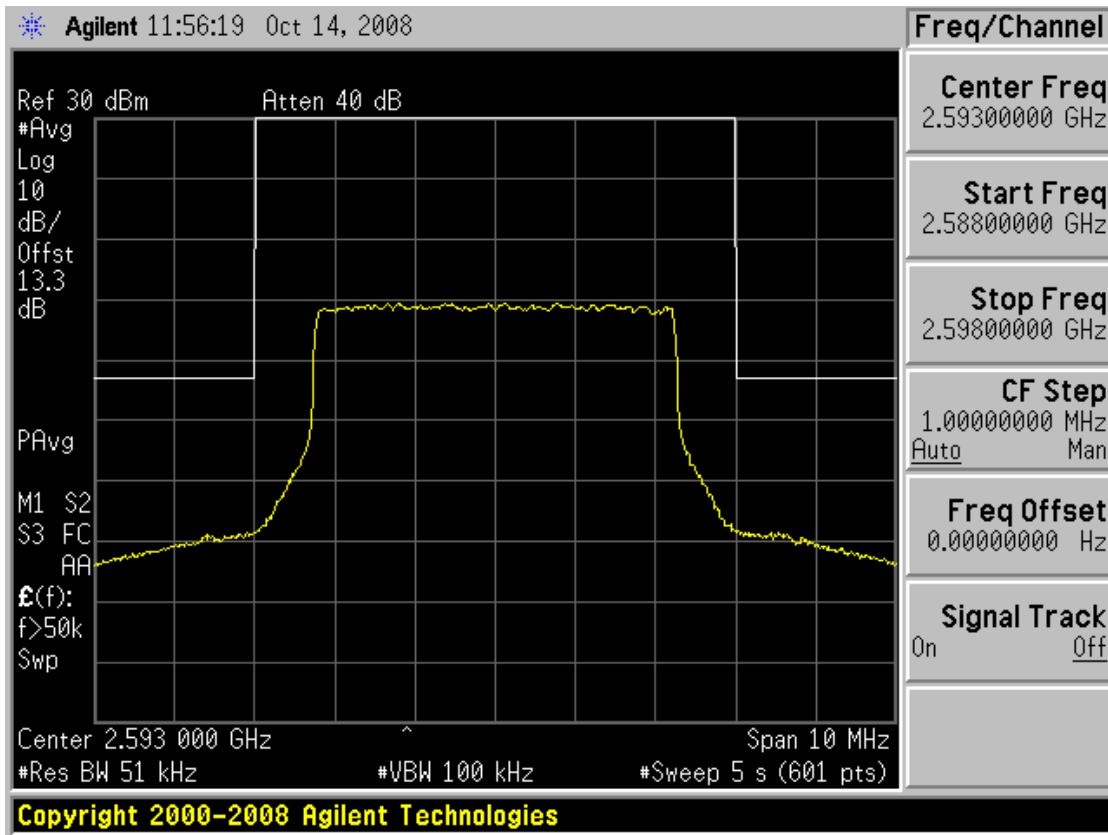
Plot 71:



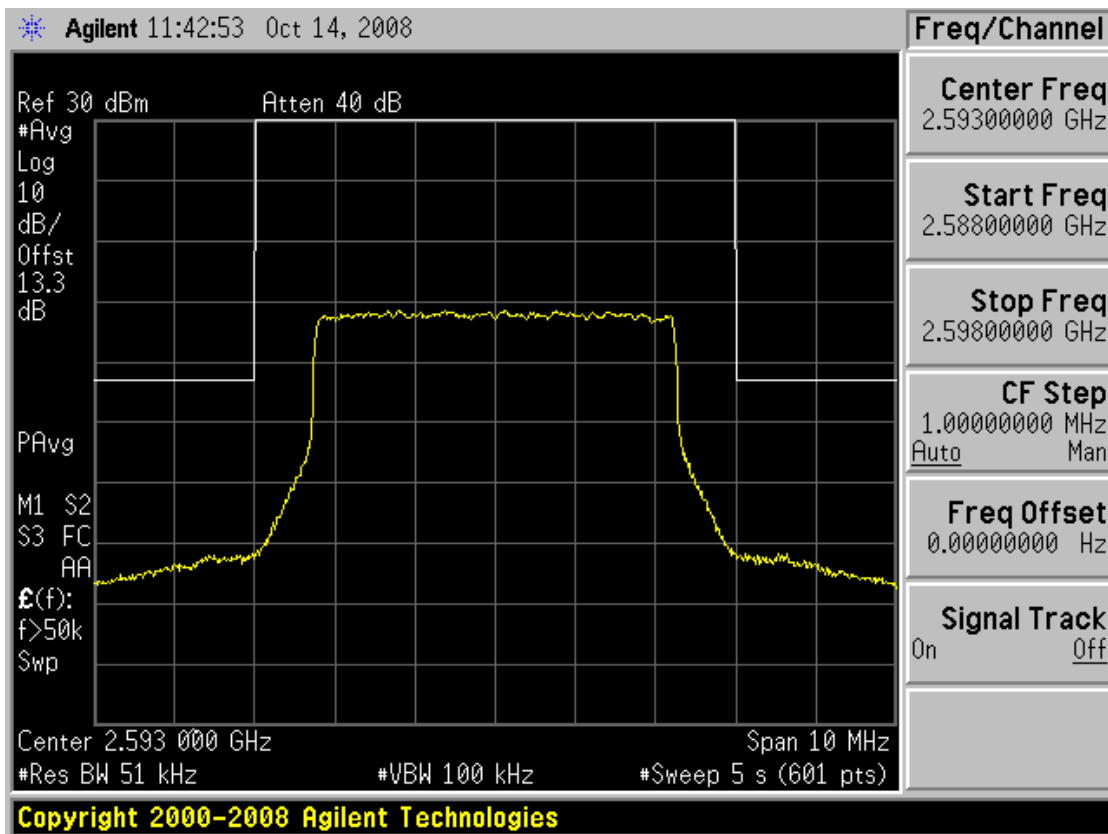
Plot 72:



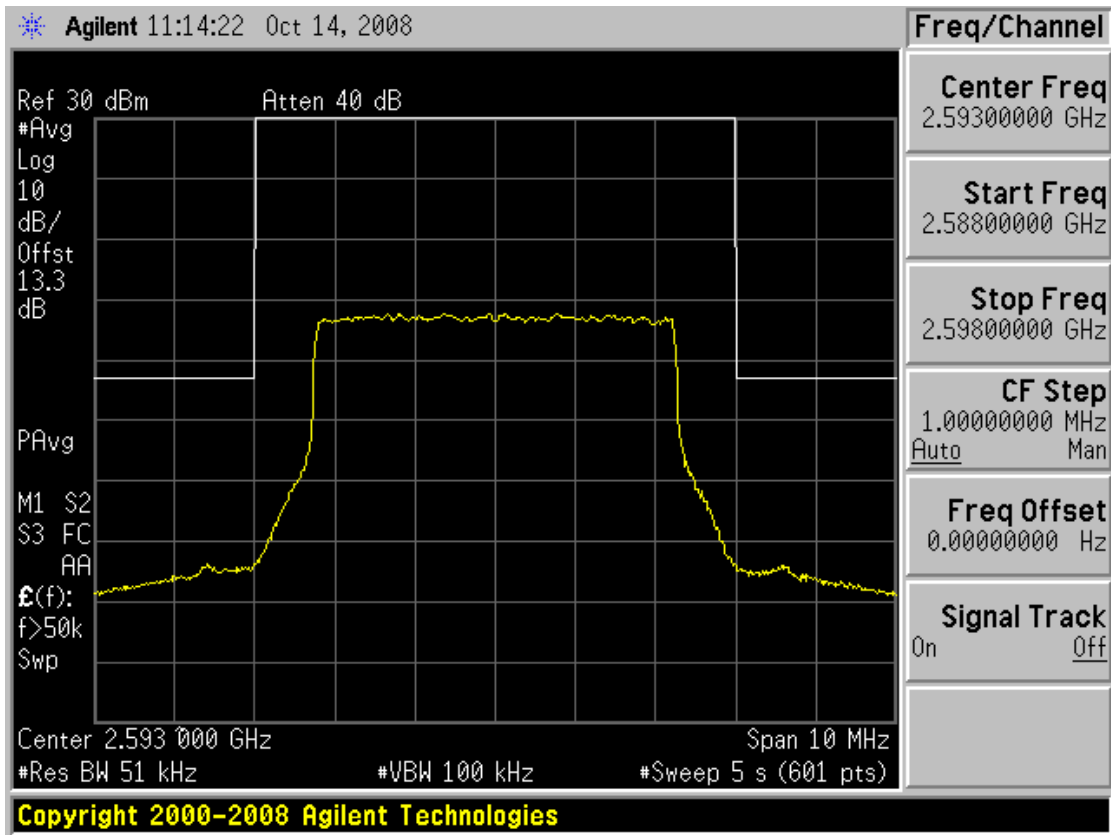
Plot 73:



Plot 74:



Plot 75:



CFR 47 Part 2.1055 Measurements required: Frequency stability
 CFR 47 Part 27.54 Frequency stability

Transmitter characteristics: 10 MHz channel spacing

Measurement conditions:

Frequency	f_{nom}	= 2.596000 GHz
Channel spacing	CS	= 10.0 MHz
Modulation	D	= 64QAM
Temperature	t	= see table
Power supply	U_{AC}	= see table
Measurement at	C'	

Test set-up: see page 8 / no. 4

Limit: see plot

Test measurement:

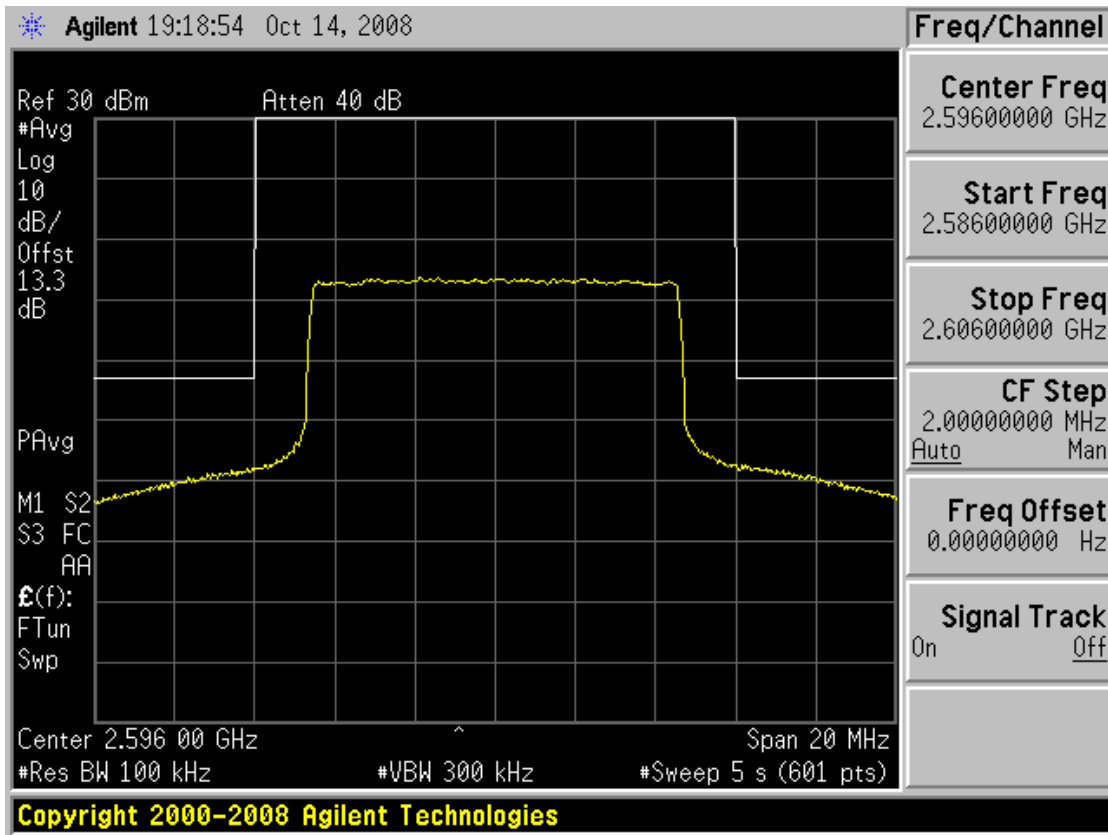
U_{AC}	T	Channel spacing	Modulation	Frequency	Frequency Error	Plot
[V]	[°C]	[MHz]		[GHz]		
97 / 115 / 133	-30.0	10	64QAM	2.596000	12.23 kHz / 4.7 ppm	76
97 / 115 / 133	-20.0	10	64QAM	2.596000	11.07 kHz / 4.3 ppm	77
97 / 115 / 133	-10.0	10	64QAM	2.596000	9.27 kHz / 3.6 ppm	78
97 / 115 / 133	0.0	10	64QAM	2.596000	7.81 kHz / 3.0 ppm	79
97 / 115 / 133	10.0	10	64QAM	2.596000	5.73 kHz / 2.2 ppm	80
97 / 115 / 133	20.0	10	64QAM	2.596000	3.96 kHz / 1.5 ppm	81
97 / 115 / 133	30.0	10	64QAM	2.596000	1.52 kHz / 0.6 ppm	82
97 / 115 / 133	40.0	10	64QAM	2.596000	-0.51 kHz / -0.2 ppm	83
97 / 115 / 133	50.0	10	64QAM	2.596000	-1.97 kHz / -0.8 ppm	84

Note:

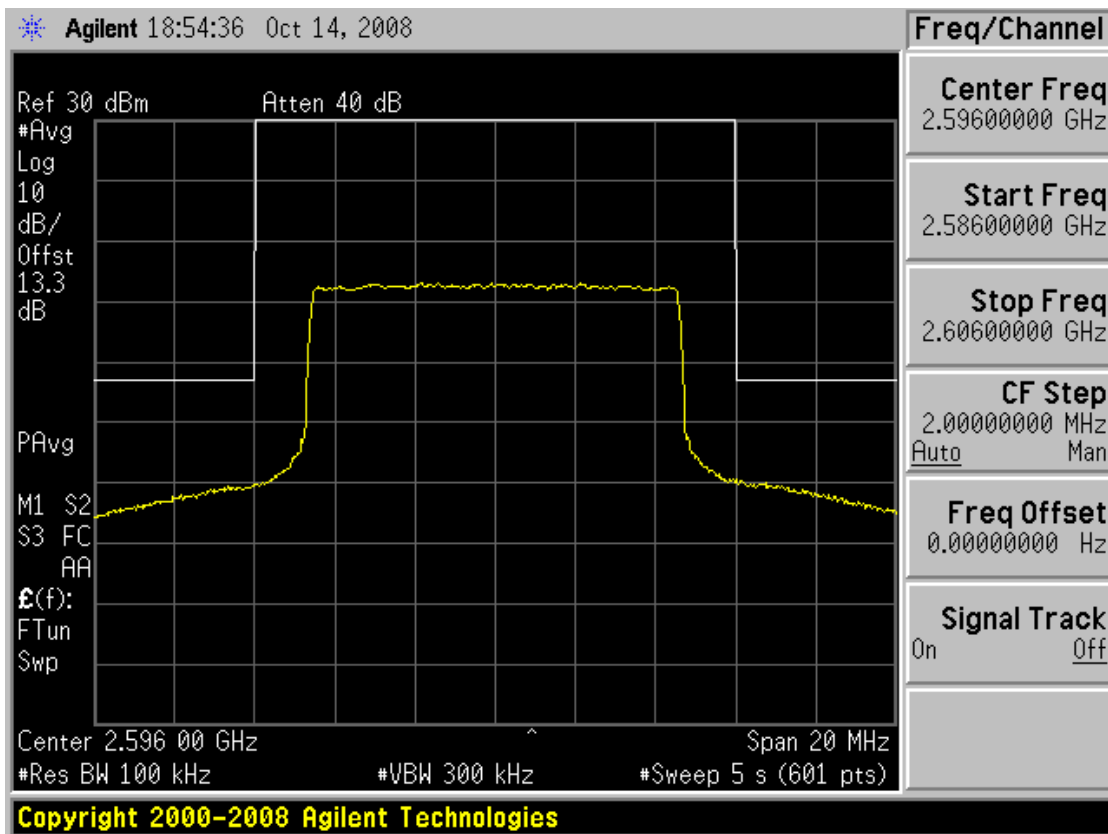
The manufacturer declared a maximum frequency deviation of 160 Hz (0.06 ppm) when the DUT is locked to the base station.

Test result: Passed: Failed:

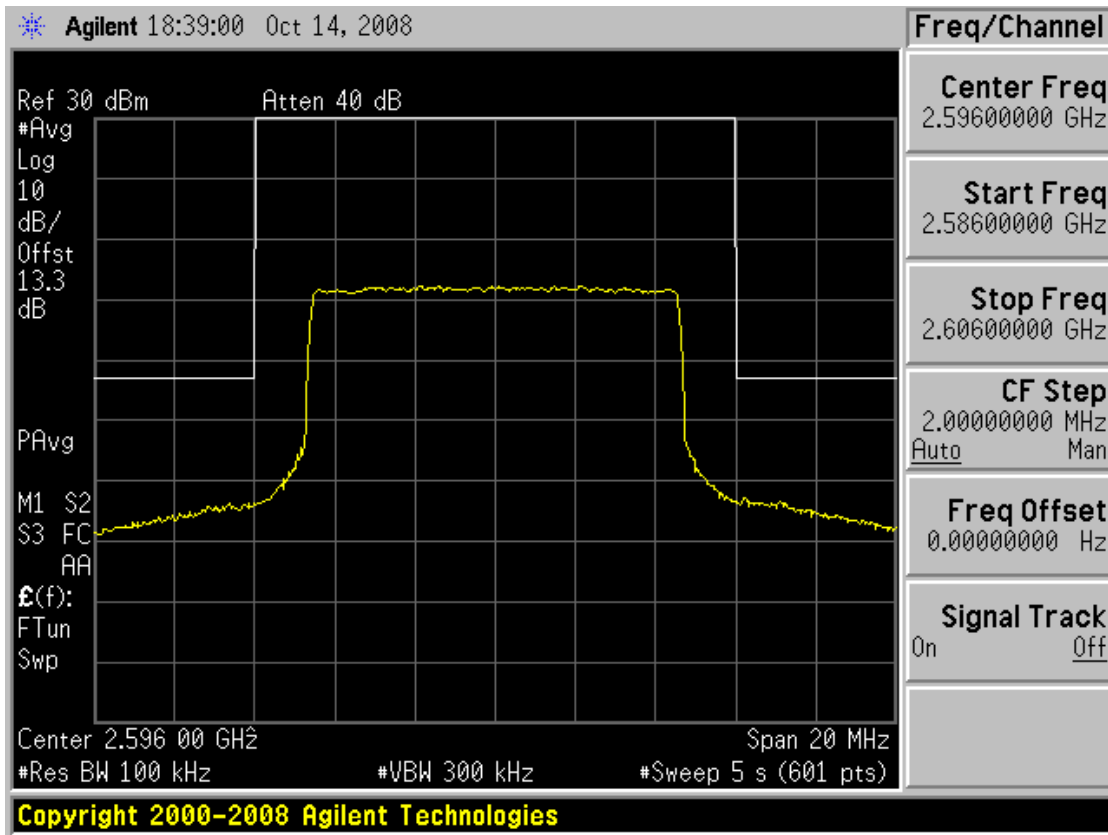
Plot 76:



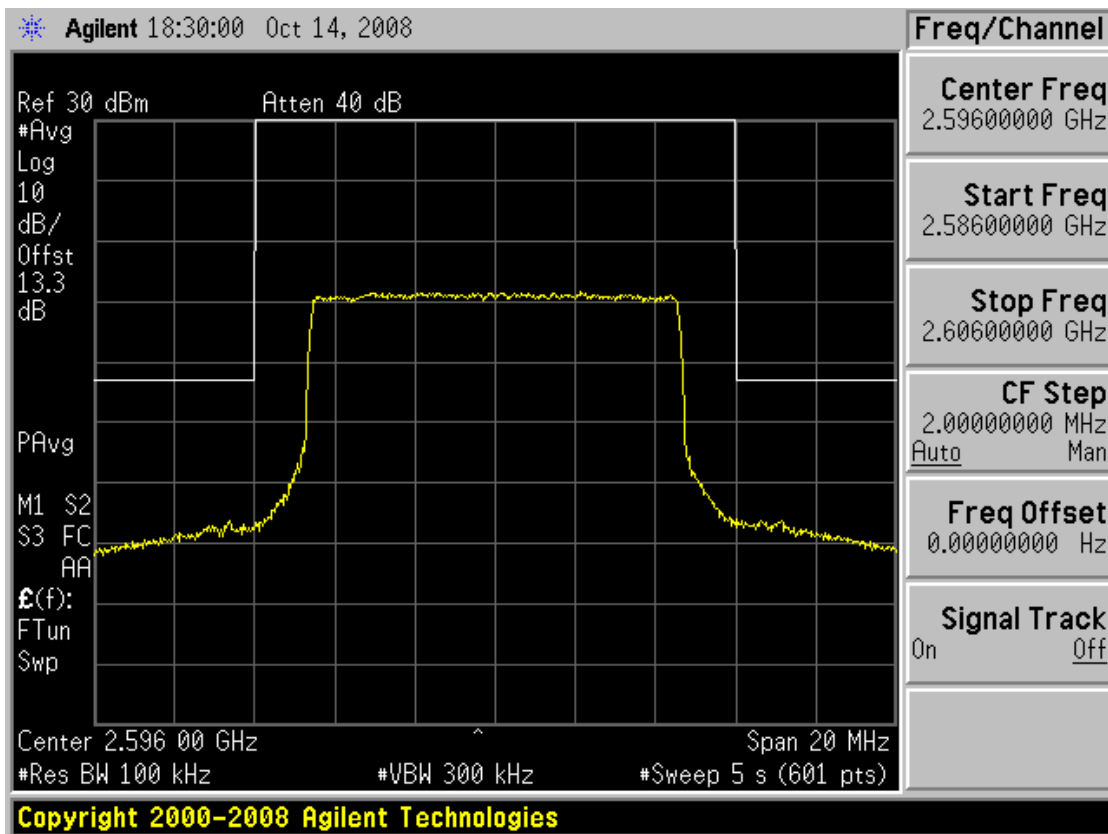
Plot 77:



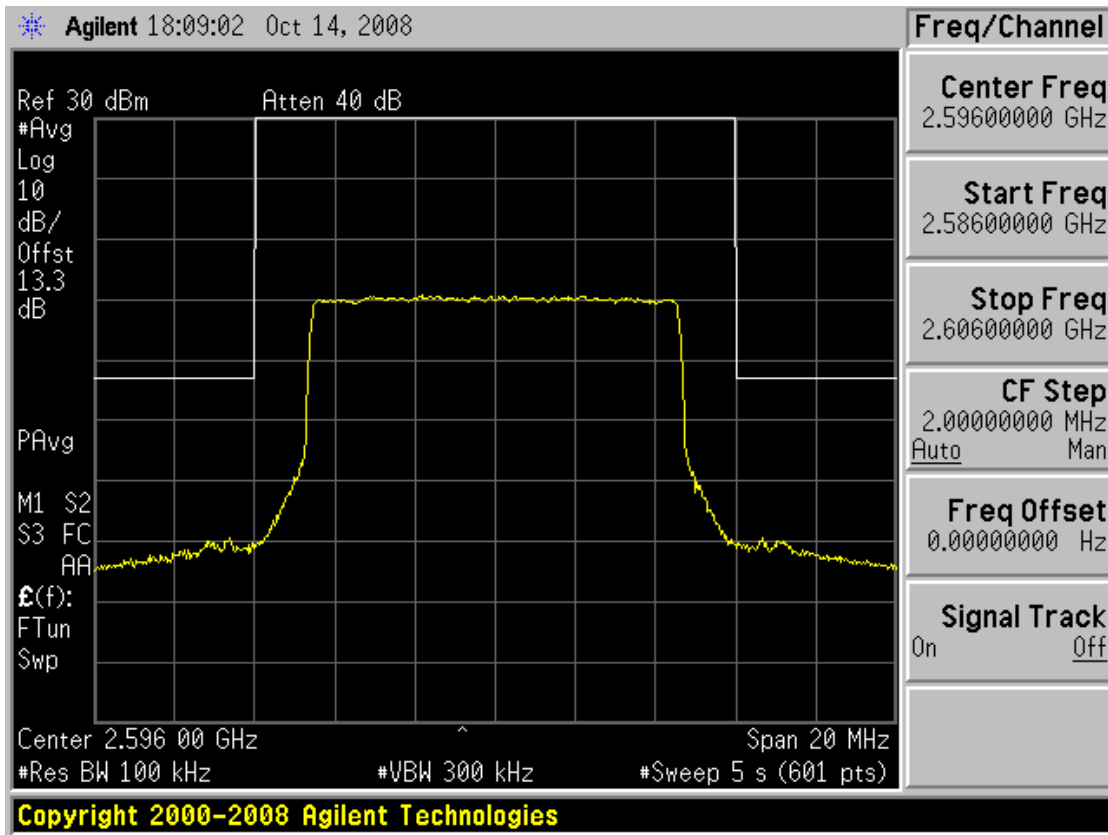
Plot 78:



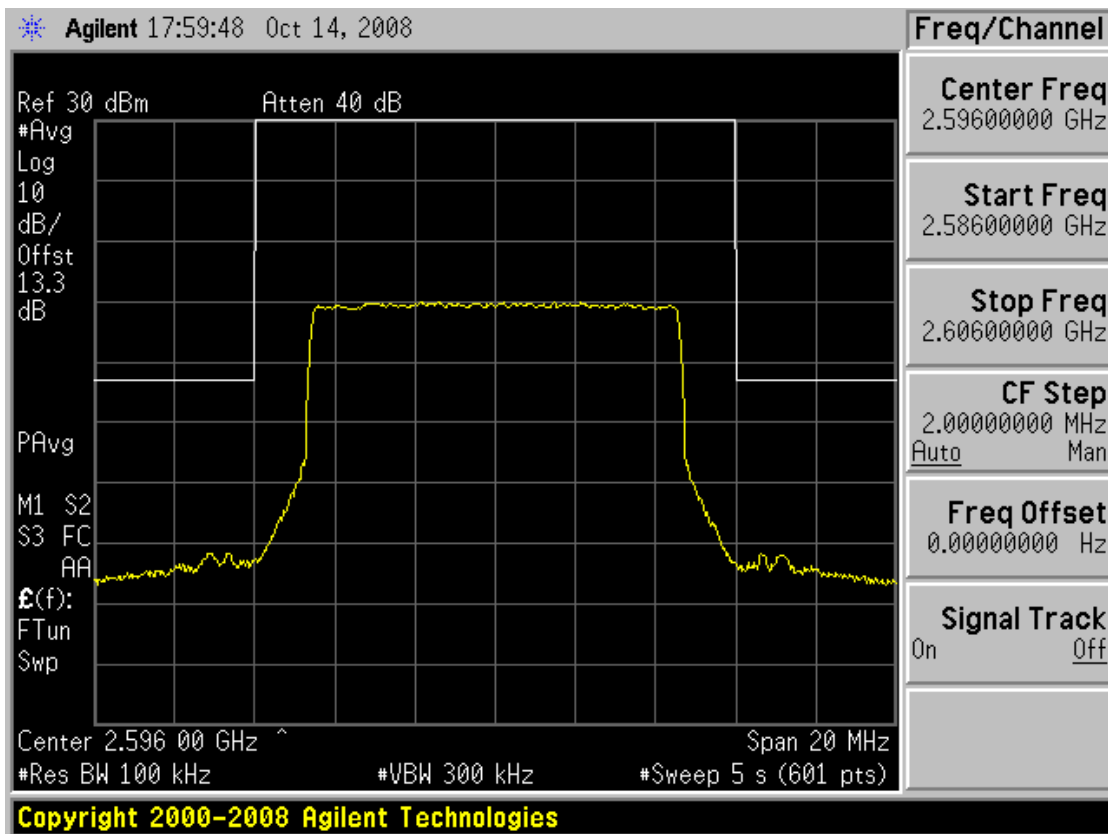
Plot 79:



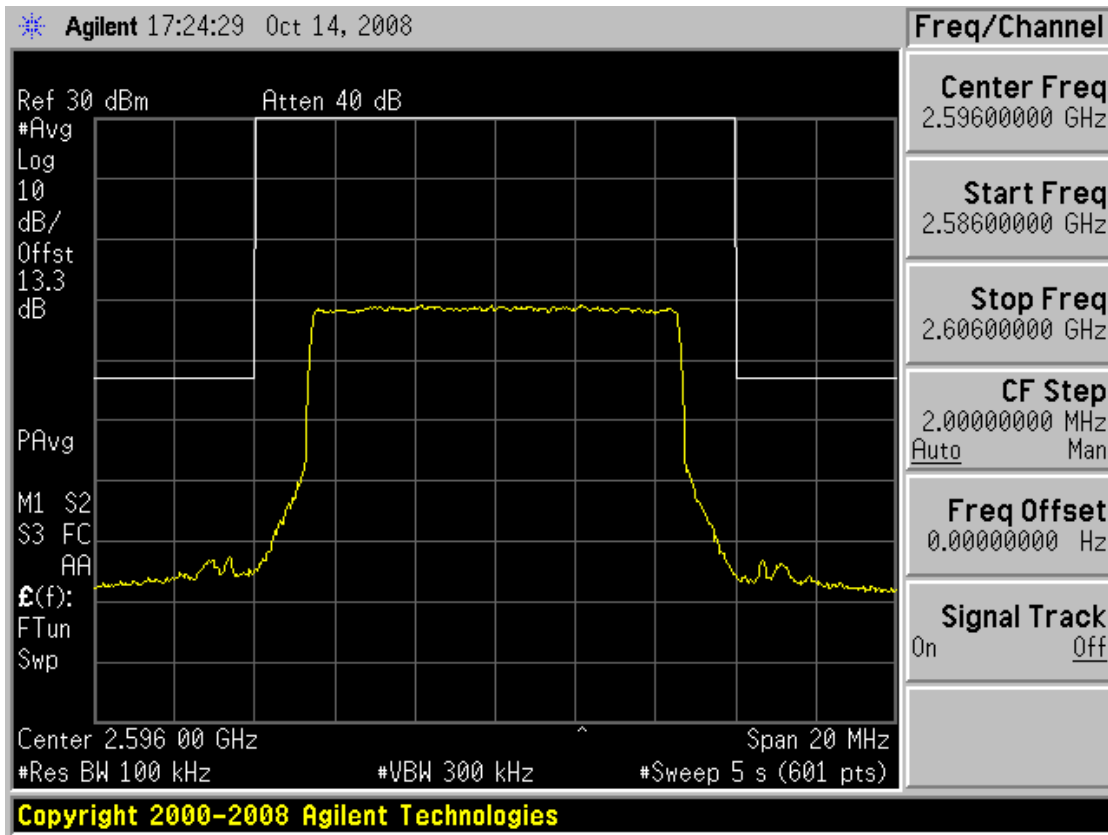
Plot 80:



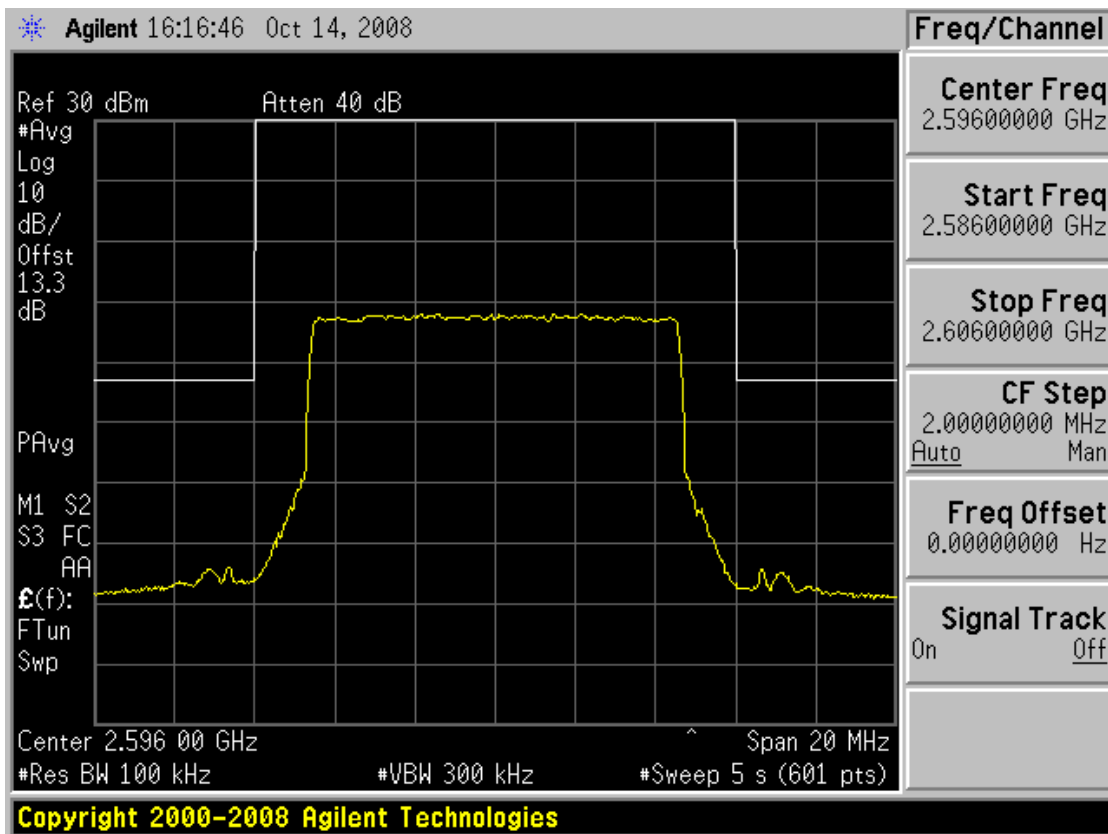
Plot 81:



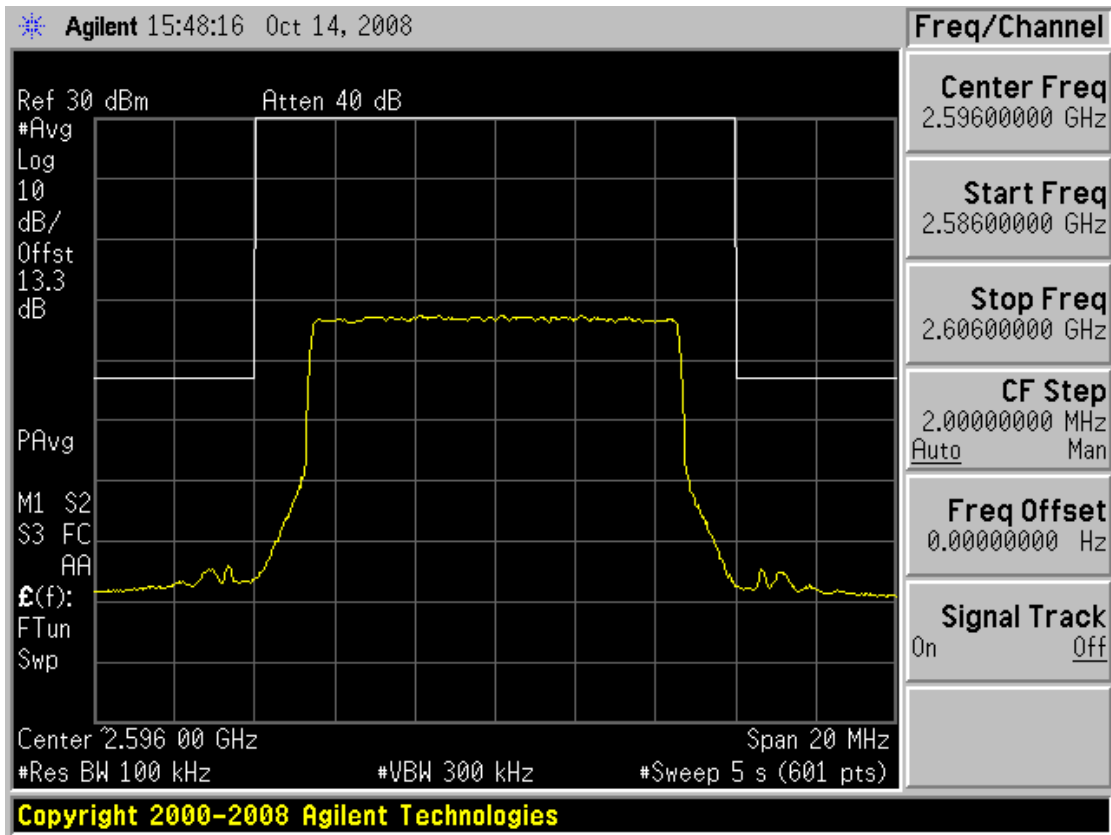
Plot 82:



Plot 83:



Plot 84:



RF Exposure / Safety

Calculation of Maximum Permissible Exposure (MPE)
based on Section 1.1307(b) Requirements

- a) FCC limit is: 1mW/cm²
- b) The Wimax CPE can be configured in one of three different setups:
 - Setup 1: CPE with 9dBi internal antenna
 - Setup 2: CPE with 9dBi external desktop antenna
 - Setup 3: CPE with 15dBi external outdoor antenna

c) The power density produced by the EUT is:

$$S_{peak} = \frac{P_t \cdot G_t}{4\pi R^2}$$

$$S_{average} = \frac{P_t \cdot G_t \cdot dc}{4\pi R^2 \cdot 100}$$

- P_t – Transmitted power 251mW (rms peak) (24dBm)
- G_t – Antenna gain dependant on setup
- R – Distance from transmitter
- Dc – duty cycle

d) The power density is:

	Setup 1	Setup 2	Setup 3
P _t - Power output (rms peak) 24dBm	24dBm 251mW	24dBm 251mW	24dBm 251mW
G _t – Antenna gain	9dBi 8	9dBi - 1dB cable loss 6.3	15dBi - 1dB cable loss 25.1
Duty cycle (worst case)	100%	100%	100%
R – Distance from antenna (cm)	20	20	50
S _{peak} – peak power density (mW/cm ²)	0.40	0.31	0.2

e) S_{peak} < 1mW/cm²

2 Photographs of the Test Setup

Photo 1

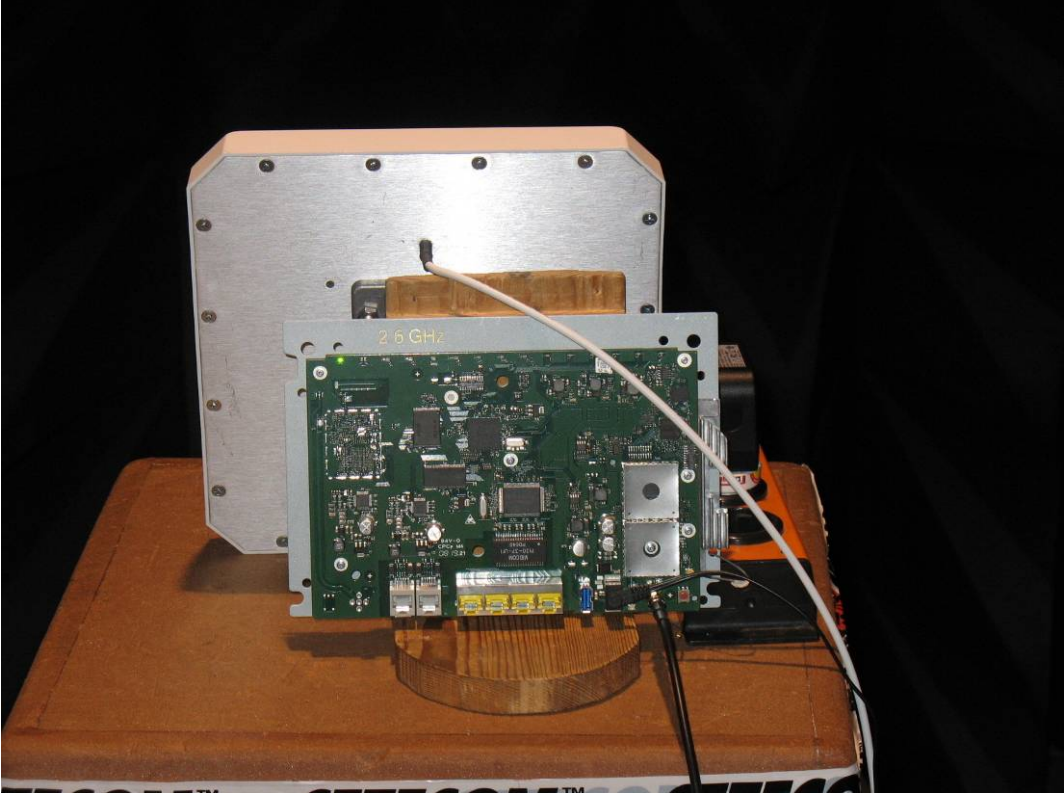


Photo 2



Photo 3



Radiated spurious emissions from 1 - 12 GHz in test chamber

3 External Photographs of the DUT

Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12



Photo 13

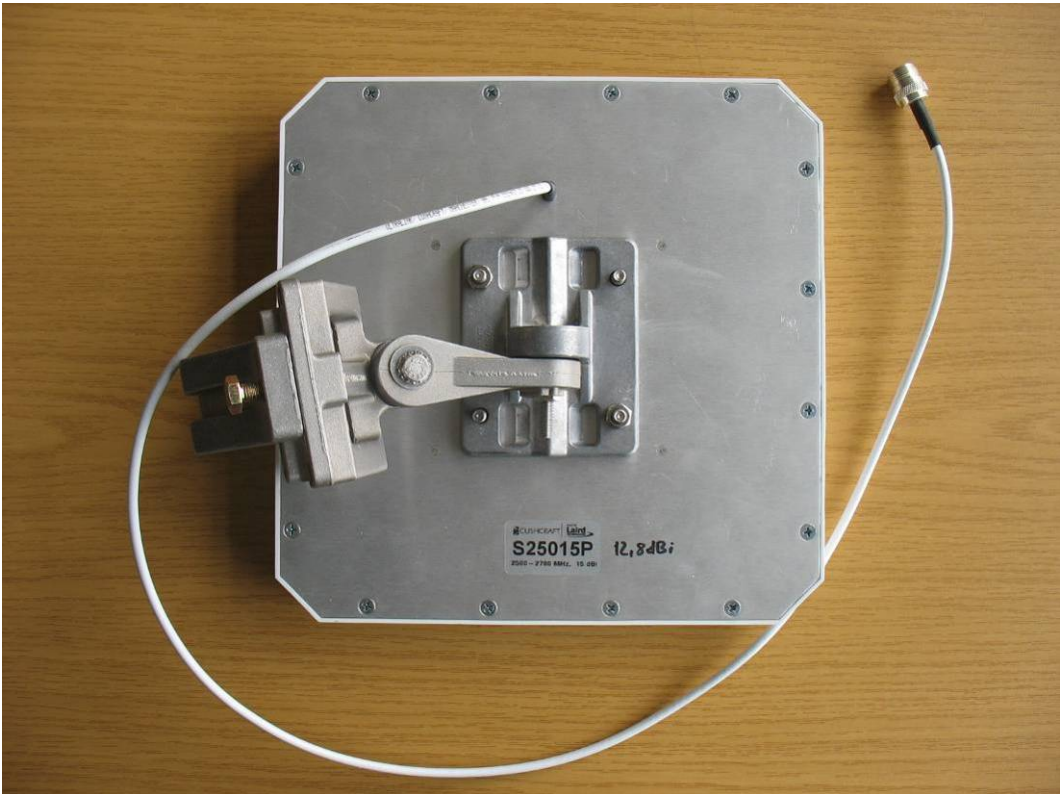


Photo 14



Photo 15

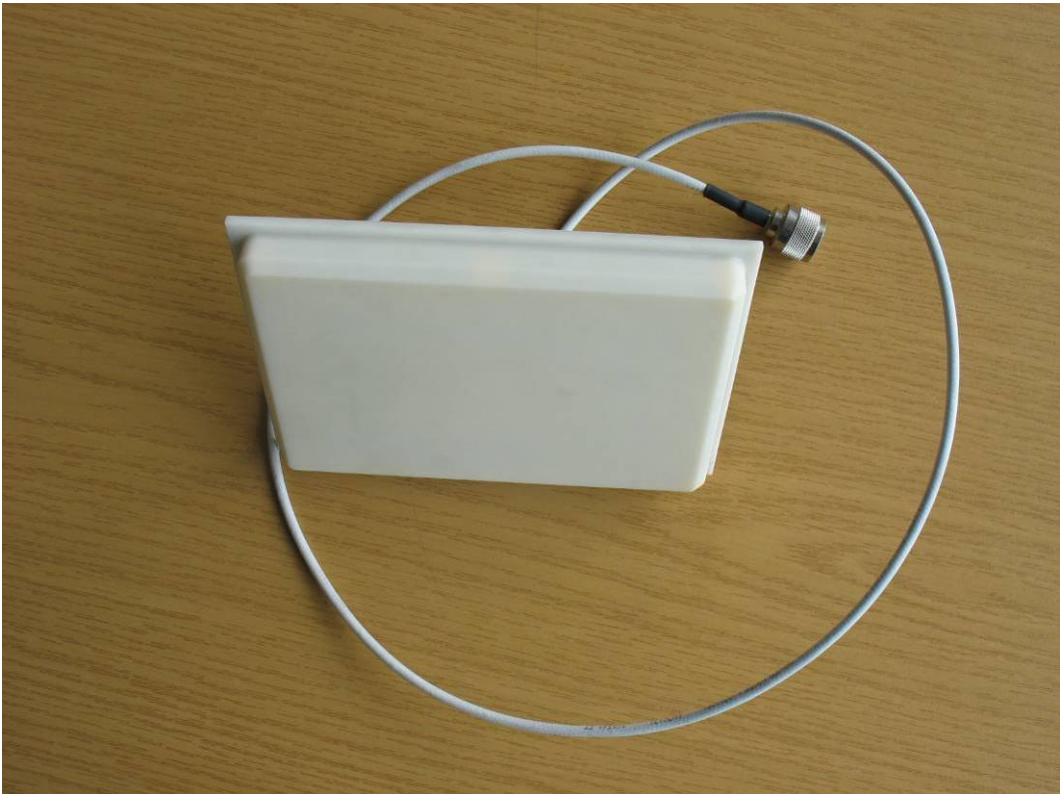
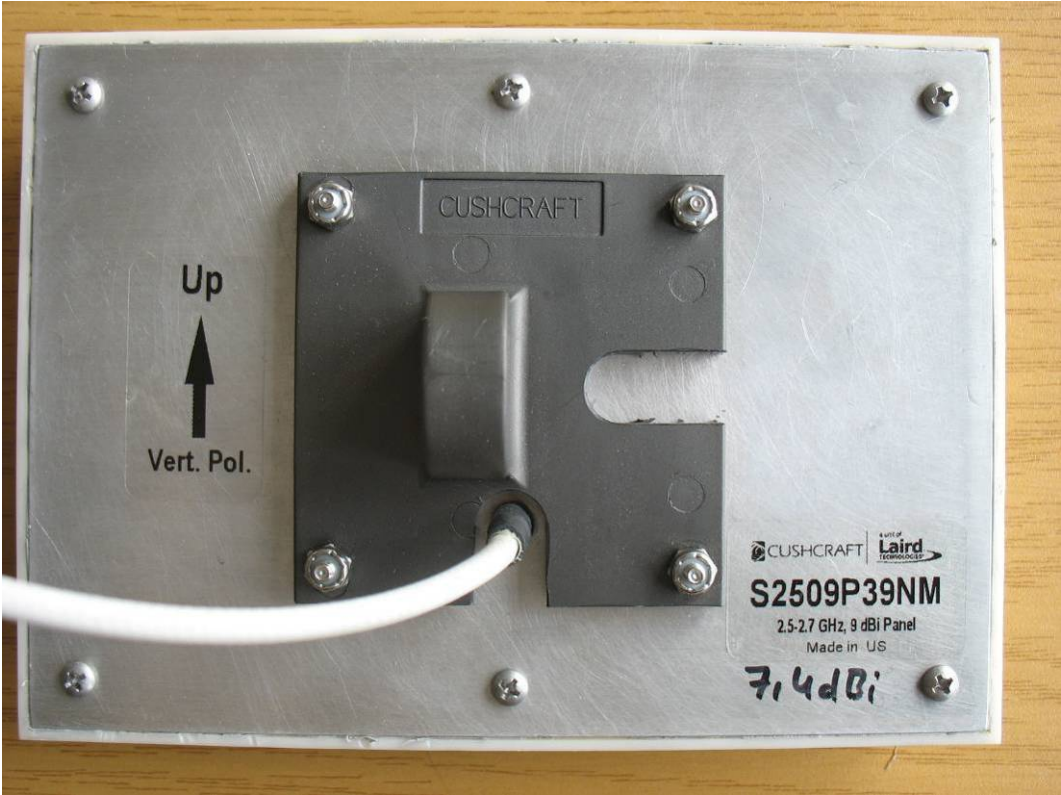


Photo 16



4 Internal Photographs of the DUT

Photo 17

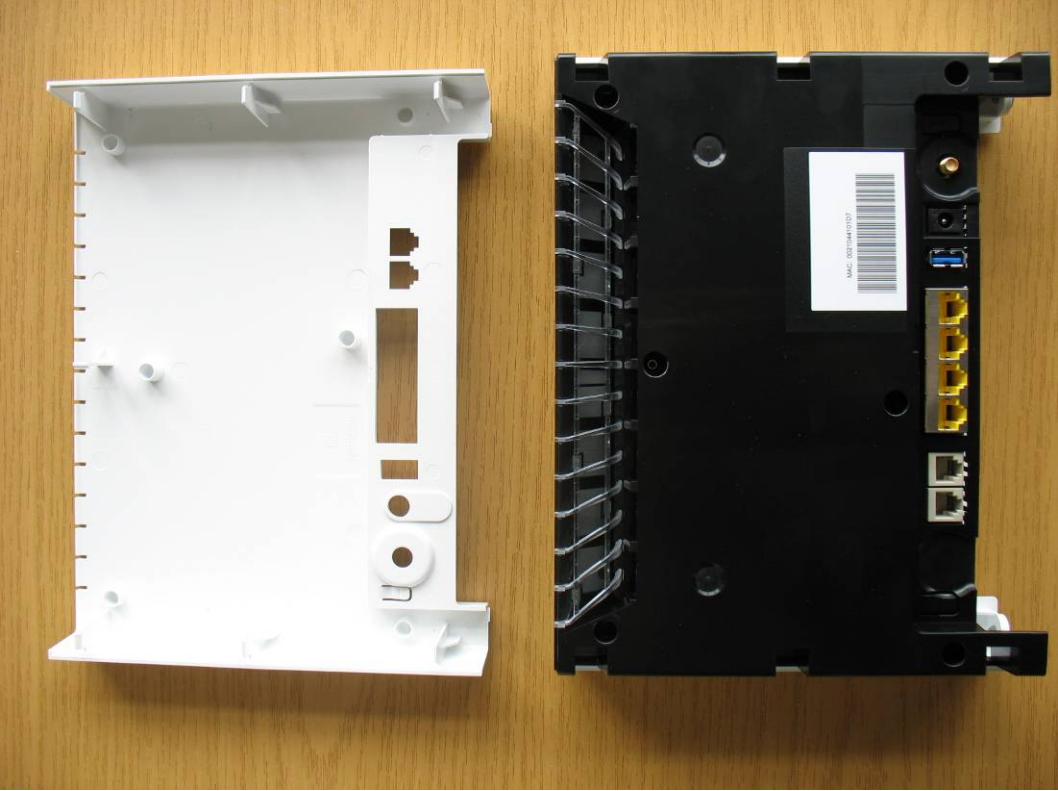


Photo 18

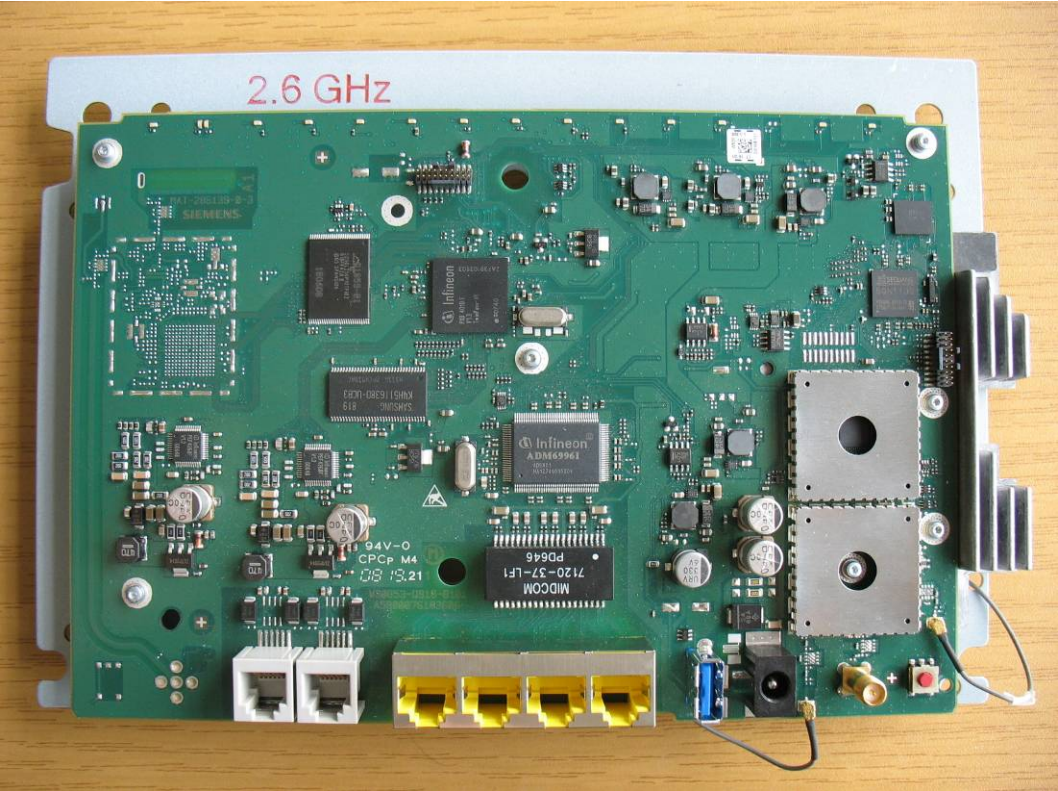


Photo 19

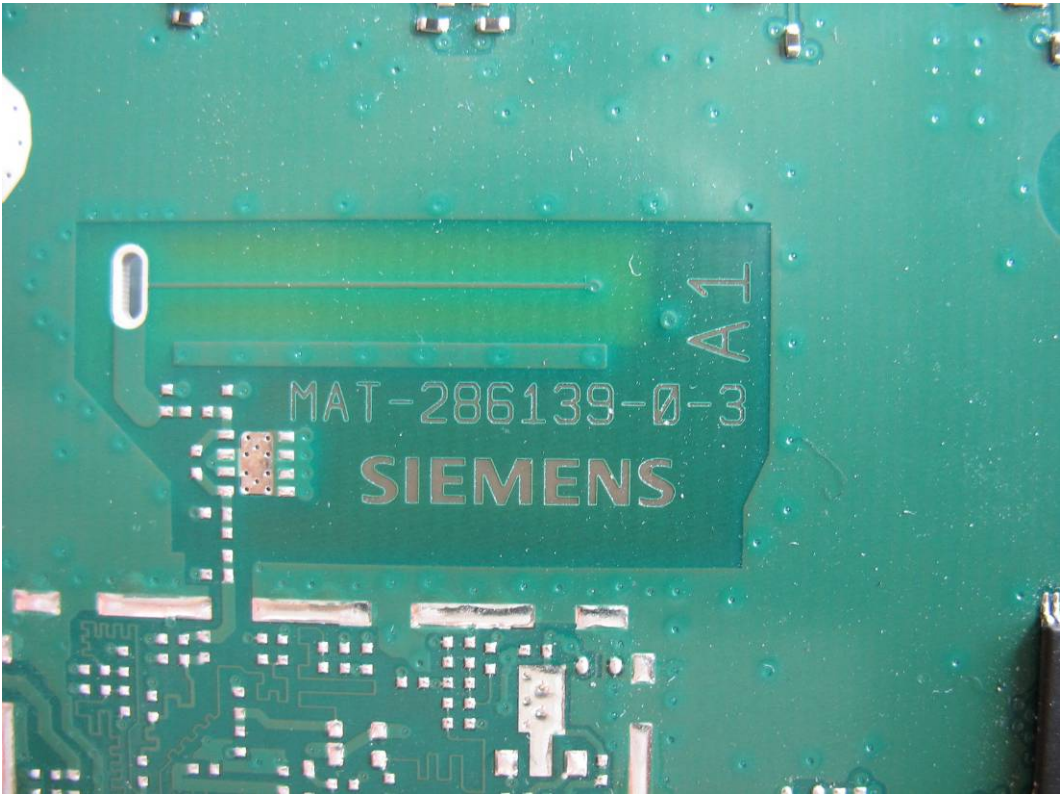


Photo 20

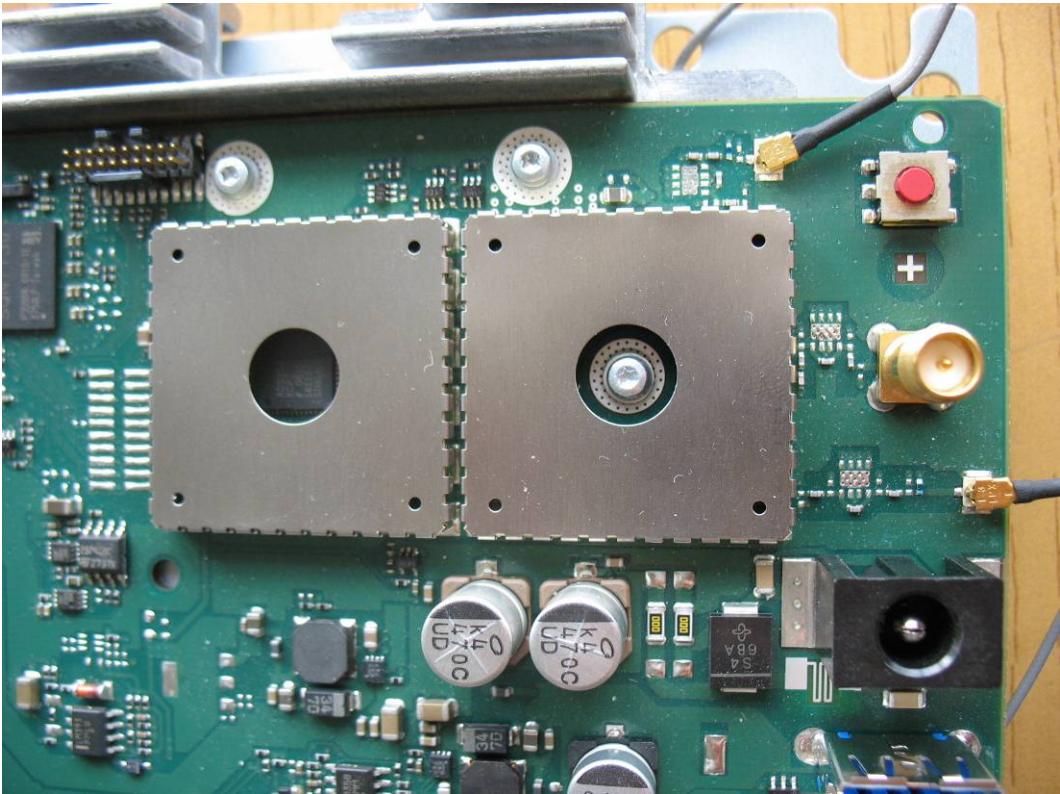


Photo 21

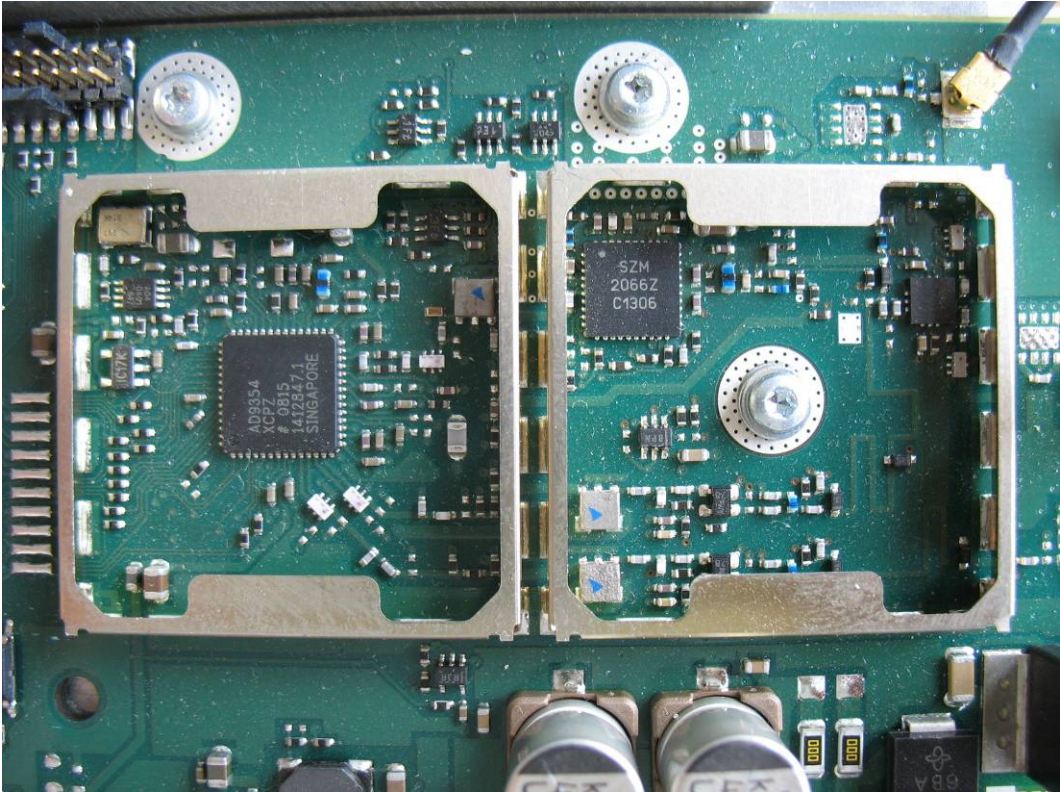


Photo 22

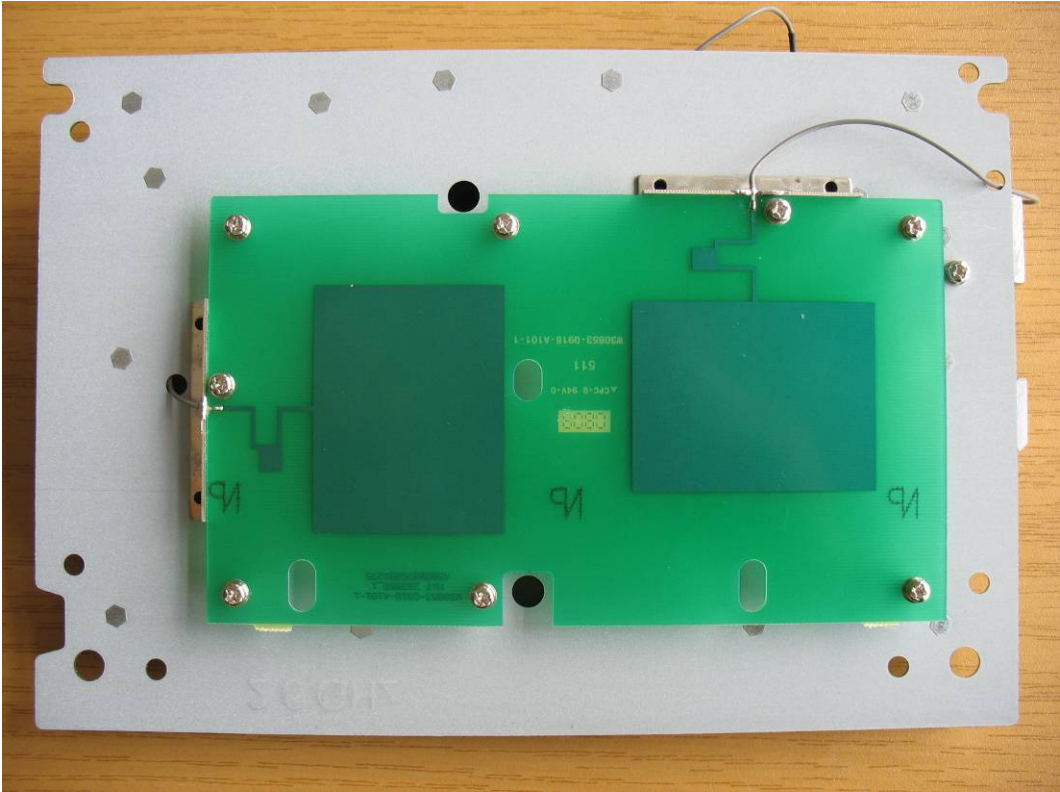


Photo 23

