FCC/IC Test Report

FOR:

Model Name: A1219
iPad
FCC ID: BCG-E2381A
IC ID: 579C-E2381A

47 CFR Part 15.407

IC RSS-210 Issue 7

TEST REPORT #: EMC_APPLE_055_15.407_81A_Rev3
DATE: 2010-03-11

Bluetooth Qualification Test Facility (BQTF)

FCC listed
A2LA Accredited

IC recognized # 3462B

***CETECOM* Inc.**
411 Dixon Landing Road ◆ Milpitas, CA 95035 ◆ U.S.A.
Phone: + 1 (408) 586 6200 ◆ Fax: + 1 (408) 586 6299 ◆ E-mail: info@cetecomusa.com ◆ http://www.cetecom.com
CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686
Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

TABLE OF CONTENTS

1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Parts 15.407 of Title 47 of the Code of Federal Regulations and Industry Canada Standards RSS 210 Issue 7.

Company	Description	Model #
Apple Inc.	**Tablet Computer**	**A1219**

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2010-03-11	Compliance	Heiko Strehlow (Director)	Digitally signed by Heiko Strehlow Date: 2010.03.11 18:00:28 -08'00'

Responsible for the Report:

Date	Section	Name	Signature
2010-03-11	Compliance	Marc Douat (Test Lab Manager)	

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Responsible Test Lab Manager:	Heiko Strehlow
Responsible Project Leader:	Marc Douat

2.2 Identification of the Client

Applicant's Name:	Apple Inc.
Street Address:	1 Infinite Loop Mail Stop26A
City/Zip Code	Cupertino, California 95014
Country	USA
Contact Person:	Mike Kriege
Phone No.	408-974-0560
Fax:	408-862-5061
e-mail:	kriege@apple.com

2.3 Identification of the Manufacturer

Same as above applicant.

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name:	iPad
Model No:	A1219
Product Type:	Tablet Computer
Hardware Revision :	A
Software Revision :	06.12.50 (7B293)
FCC-ID:	BCG-E2381A
IC-ID :	579C-E2381A
Frequency:	5150-5250MHz, 5250-5350MHz, 5470-5725MHz
Type(s) of Modulation:	OFDM with BPSK, QPSK, 16QAM, 64QAM
Antenna Tx0:	Type: PIFA 5150 – 5250 MHz: 3.8 dBi 5250 – 5350 MHz: 3.7 dBi 5470 – 5725 MHz: 2.9 dBi
Antenna Tx1:	Type: Patch 5150 – 5250 MHz: 6.0 dBi 5250 – 5350 MHz: 5.9 dBi 5470 – 5725 MHz: 4.3 dBi
Equipment Classification:	☐Fixed ☐Vehicular ■Portable ☐Module
Power Supply:	4.2 VDC battery, 110VAC Adapter
Temperature Range:	0ºC to 35ºC

3.2 Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	HW Version	SW Version
1	YM950003DYW	A	06.12.50 (7B293)

3.3 Identification of Accessory equipment

AE #	Type	Manufacturer	Model
1	10W USB Power Adapter	Foxlink Technology, Ltd.	A1357 W010A051

4 Subject Of Investigation

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Part 15.407 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS-210 Issue 7.

This test report is to support a request for new equipment authorization under the FCC ID BCG-E2381A and IC ID 579C-E2381A.
Radiated measurements were performed on the product referred to in Section 3 as EUT, conducted measurements were performed on the radio installed on a test fixture. This test report contains full radiated and conducted testing results as per FCC15.407.

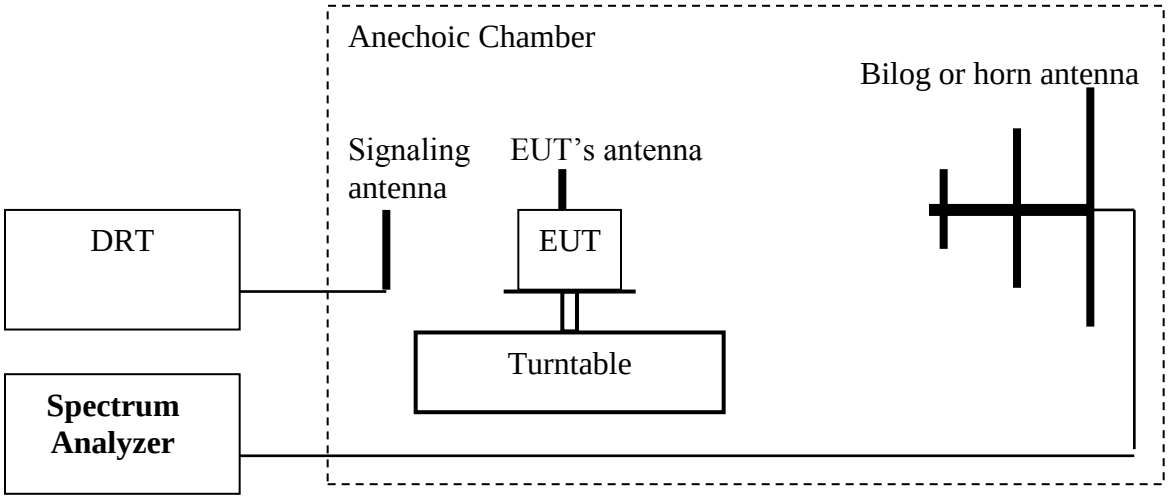
Low, mid and high channels and all modes were tested. All data in this report shows the worst case between horizontal and vertical polarization measurements.

The device has transmit diversity but does not transmit simultaneously on both antennas.

5 Measurements

5.1 Radiated Measurement Procedure

Ref: TIA-603C 2004 -2.2.17.2 Effective Radiated Power (ERP) or Effective Isotropic Radiated Power (EIRP)



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a vertical orientation.
2. Adjust the settings of the Digital RadioCommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4. Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
5. Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the ERP using the following equation:
   ERP (dBm) = **LVL** (dBm) + **LOSS** (dB)
8. Determine the EIRP using the following equation:
   EIRP (dBm) = **ERP** (dBm) + 2.14 (dB)
9. Measurements are to be performed with the EUT set to the low, middle and high channels.

Spectrum analyzer settings: RBW=VBW=10MHz

ANSI C63.4 Section 8.3.1.1: Exploratory radiated emission measurements

Exploratory radiated measurements shall be performed at the measurement distance or at a closer distance than that specified for compliance to determine the emission characteristics of the EUT. At near distances, for EUTs of comparably small size, it is relatively easy to determine the spectrum signature of the EUT and, if applicable, the EUT configuration that produces the maximum level of emissions. A shielded room may be used for exploratory testing, but may have anomalies that can lead to significant errors in amplitude measurements.

Broadband antennas and a spectrum analyzer or a radio-noise meter with a panoramic display are often useful in this type of testing. It is recommended that either a headset or loudspeaker be connected as an aid in detecting ambient signals and finding frequencies of significant emission from the EUT when the exploratory and final testing is performed in an OATS with strong ambient signals. Caution should be taken if either antenna height between 1 and 4 meters or EUT azimuth is not fully explored. Not fully exploring these parameters during exploratory testing may require complete testing at the OATS or semi-anechoic chamber when the final full spectrum testing is conducted.

The EUT should be set up in its typical configuration and arrangement, and operated in its various modes. For tabletop systems, cables or wires should be manipulated within the range of likely arrangements. For floor-standing equipment, the cables or wires should be located in the same manner as the user would install them and no further manipulation is made. For combination EUTs, the tabletop and floor-standing portions of the EUT shall follow the procedures for their respective setups and cable manipulation. If the manner of cable installation is not known, or if it changes with each installation, cables or wires for floor-standing equipment shall be manipulated to the extent possible to produce the maximum level of emissions.

For each mode of operation required to be tested, the frequency spectrum shall be monitored. Variations in antenna height between 1 and 4 m, antenna polarization, EUT azimuth, and cable or wire placement (each variable within bounds specified elsewhere) shall be explored to produce the emission that has the highest amplitude relative to the limit. A step-by-step technique for determining this emission can be found in Annex C.

When measuring emissions above 1 GHz, the frequencies of maximum emission shall be determined by manually positioning the antenna close to the EUT and by moving the antenna over all sides of the EUT while observing a spectral display. It will be advantageous to have prior knowledge of the frequencies of emissions above 1 GHz. If the EUT is a device with dimensions approximately equal to that of the measurement antenna beamwidth, the measurement antenna shall be aligned with the EUT.

ANSI C63.4 Section 8.3.1.2: Final radiated emission measurements

Based on the measurement results in 8.3.1.1, the one EUT, cable and wire arrangement, and mode of operation that produces the emission that has the highest amplitude relative to the limit is selected for the final measurement. The final measurement is then performed on a site meeting the requirements of 5.3, 5.4, or 5.5 as appropriate without variation of the EUT arrangement or EUT mode of operation. If the EUT is relocated from an exploratory test site to a final test site, the highest emission shall be remaximized at the final test location before final radiated emissions measurements are performed. However, antenna height and polarity and EUT azimuth are to be varied. In addition, the full frequency spectrum (for the range to be checked for meeting compliance) shall be investigated.

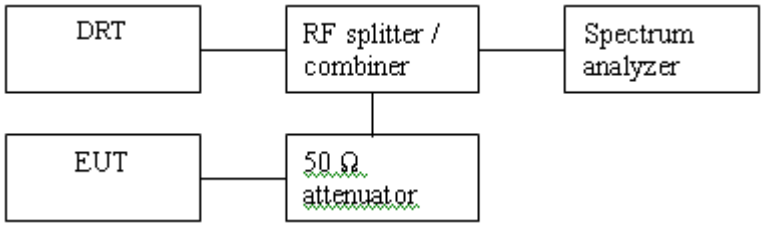
This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. During the full frequency spectrum investigation, particular focus should be made on those frequencies found in exploratory testing that were used to find the final test configuration, mode of operation, and arrangement (associated with achieving the least margin with respect to the limit). This full spectrum test constitutes the compliance measurement.

For measurements above 1 GHz, use the cable, EUT arrangement, and mode of operation determined in the exploratory testing to produce the emission that has the highest amplitude relative to the limit. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the antenna in the "cone of radiation" from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response. The antenna may have to be higher or lower than the EUT, depending on the EUT's size and mounting height, but the antenna should be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. If the transmission line for the measurement antenna restricts its range of height and polarization, the steps needed to ensure the correct measurement of the maximum emissions, shall be described in detail in the report of measurements. Data collected shall satisfy the report requirements of Clause 10.

NOTES

1— Where limits are specified by agencies for both average and peak (or quasi-peak) detection, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.
2—Use of waveguide and flexible waveguide may be necessary at frequencies above 10 GHz to achieve usable signal-to noise ratios at required measurement distances. If so, it may be necessary to restrict the height search of the antenna, and special care should be taken to ensure that maximum emissions are correctly measured.
3—All presently known devices causing emissions above 10 GHz are physically small compared with the beam-widths of typical horn antennas used for EMC measurements. For such EUTs and frequencies, it may be preferable to vary the height and polarization of the EUT instead of the receiving antenna to maximize the measured emissions.

5.2 Conducted Measurement Procedure



1. Connect the equipment as shown in the above diagram.
2. Adjust the settings of the Digital RadioCommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Measurements are to be performed with the EUT set to the low, middle and high channels.

5.3 Maximum Peak Output Power

5.3.1 Limits: §15.407

Conducted Output Power is defined as the following (reduced if directional gain > 6dBi):

Sub-band 1: 5150-5250MHz: 15.407(a)(1): 50mW or 4dBm + 10log(B),
Sub-band 2: 5250-5350MHz: 15.407(a)(2): 250mW or 11dBm + 10log(B)
Sub-band 3: 5470-5725MHz: 15.407(a)(2): 250mW or 11dBm + 10log(B)

B is the 26–dB emission bandwidth in MHz.

EIRP limit = Conducted Limit + 6dB.

5.3.2 Test Conditions:

Tnom: 21°C; Vnom

5.3.3 Test Result:

EIRP = conducted output power + antenna gain

Max Peak Output Power - EIRP (dBm)					
Frequency (MHz)	Channel	Tx0		Tx1	
		a	HT20	a	HT20
5180	36	20.7	20.7	18.7	18.9
5200	40	20.7	20.7	19.1	19.2
5240	48	20.5	20.8	19.5	19.7
5260	52	22.3	21.9	19.2	19
5300	60	22.4	21.8	19.7	19.3
5320	64	20.9	21.8	19.8	19.6
5500	100	21.7	21.9	19.3	19.8
5600	120	22	22.7	19.9	20.1
5700	140	22	22.8	19.8	19.8
Measurement Uncertainty: ±0.5dB					

UNII power method 2 was used

Max Peak Output Power - Conducted (dBm)					
Frequency (MHz)	**Channel**	**Tx0**		**Tx1**	
		a	**HT20**	**a**	**HT20**
5180	**36**	16.9	16.9	12.7	12.9
5200	**40**	16.9	16.9	13.1	13.2
5240	**48**	16.7	17	13.5	13.7
5260	**52**	18.6	18.2	13.3	13.1
5300	**60**	18.7	18.1	13.8	13.4
5320	**64**	17.2	18.1	13.9	13.7
5500	**100**	18.8	19	15	15.5
5600	**120**	19.1	19.8	15.6	15.8
5700	**140**	19.1	19.9	15.5	15.5
Measurement Uncertainty: ±0.5dB					

5.4 Restricted Band Edge Compliance

5.4.1 Limits: §15.205

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

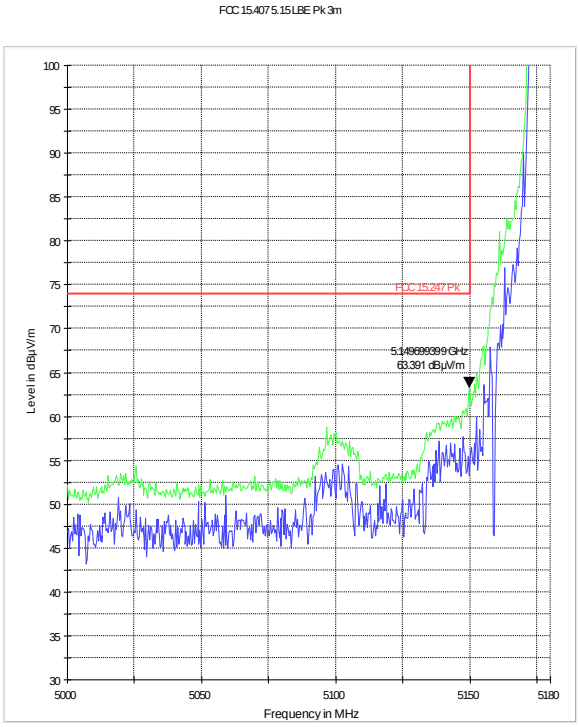
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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)).

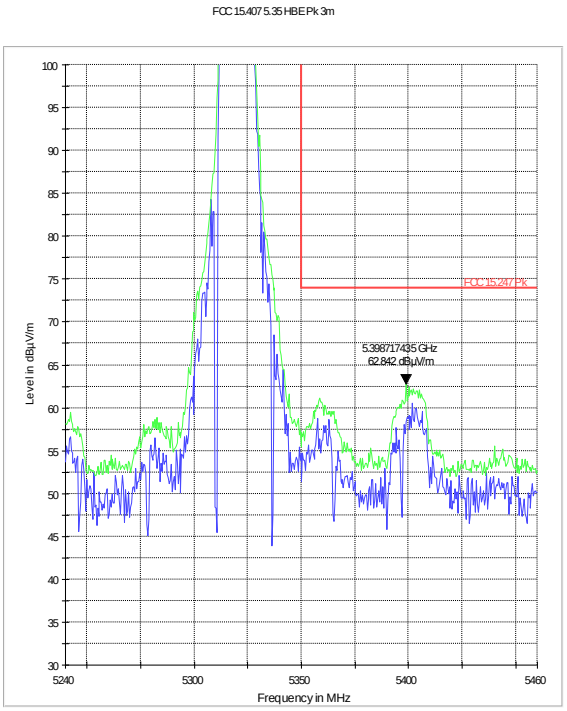
*PEAK LIMIT= 74dBµV/m
*AVG. LIMIT= 54dBµV/m

Bandedge measurements were also performed with Bluetooth transmitting on the same antenna

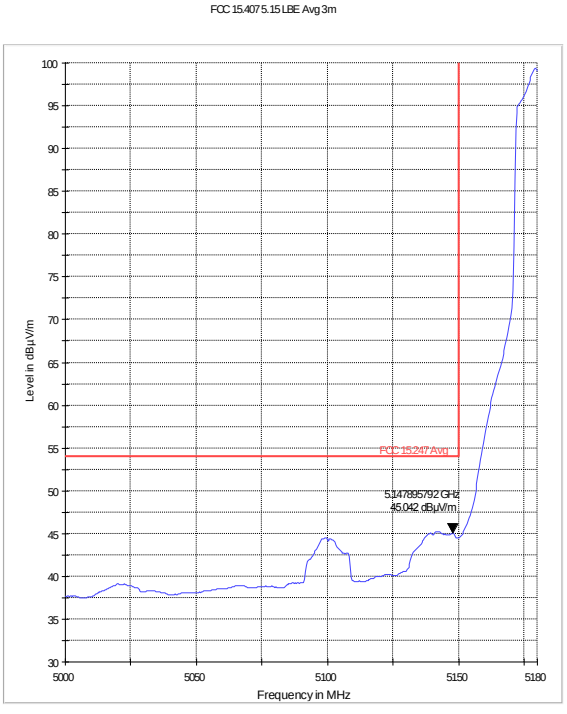
5.4.2 Test Data/plots:

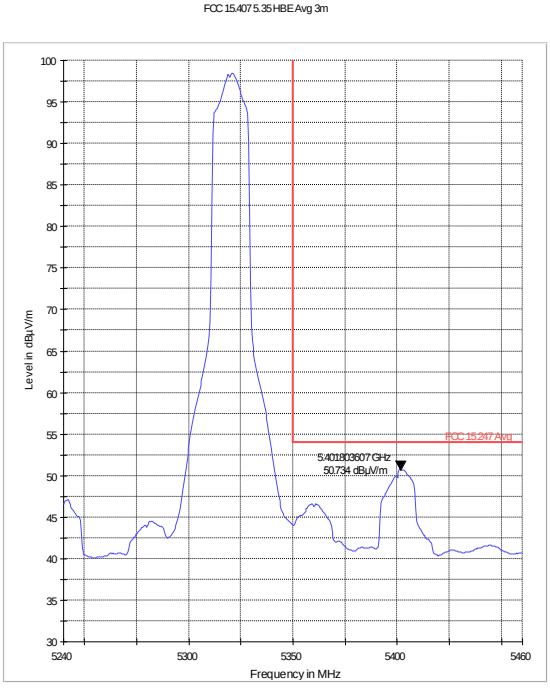
Tx0 802.11a Bandedge Pk



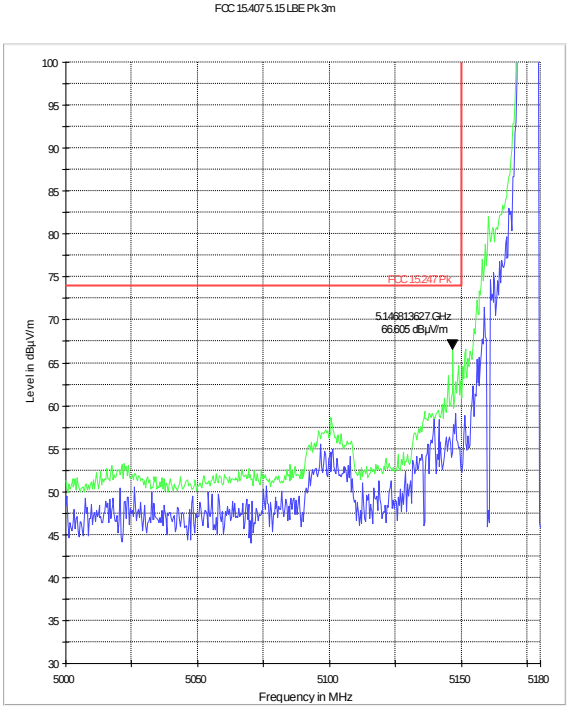


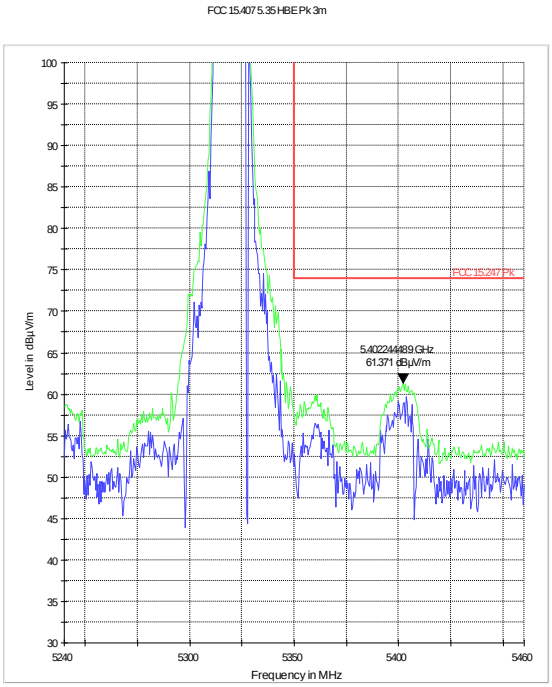
Tx0 802.11a Bandedge Avg



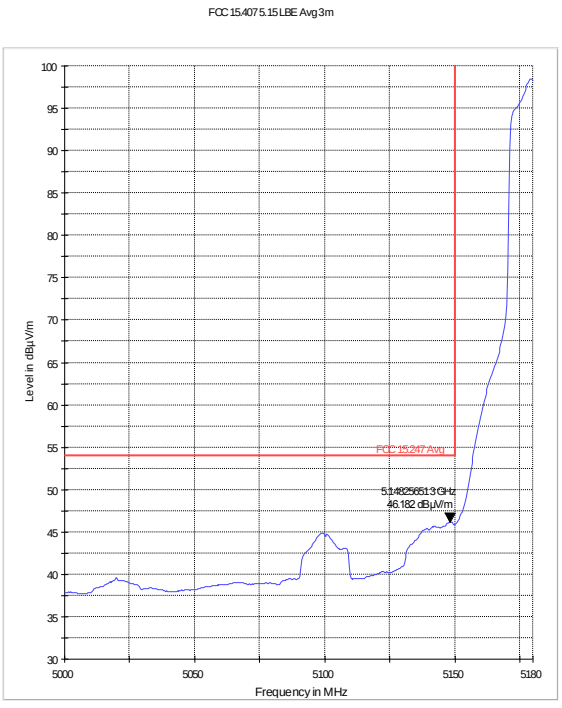


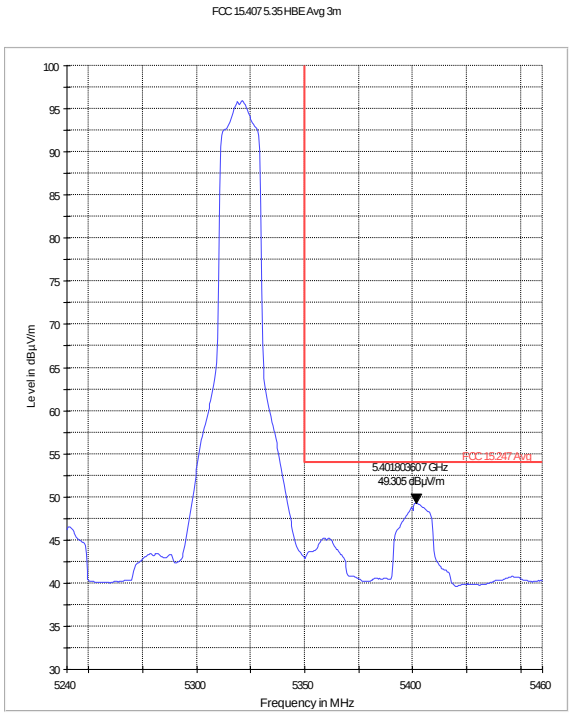
Tx0 802.11 HT20 Bandedge Pk



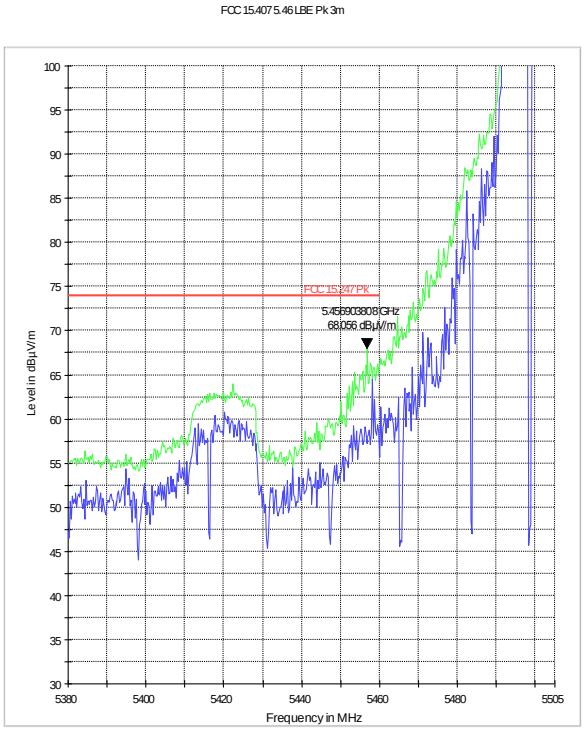


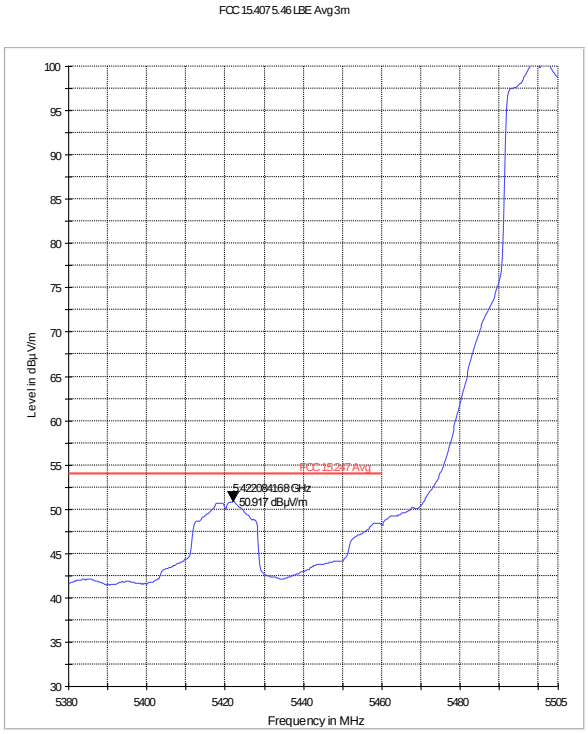
Tx0 802.11 HT20 Bandedge Avg



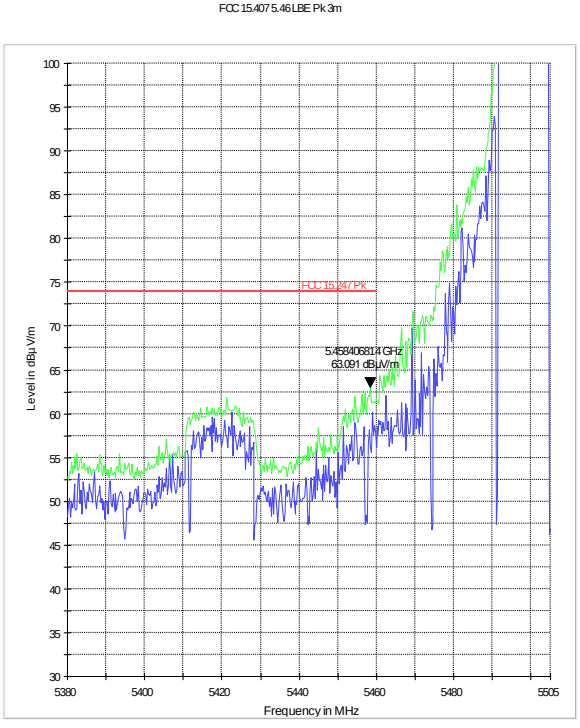


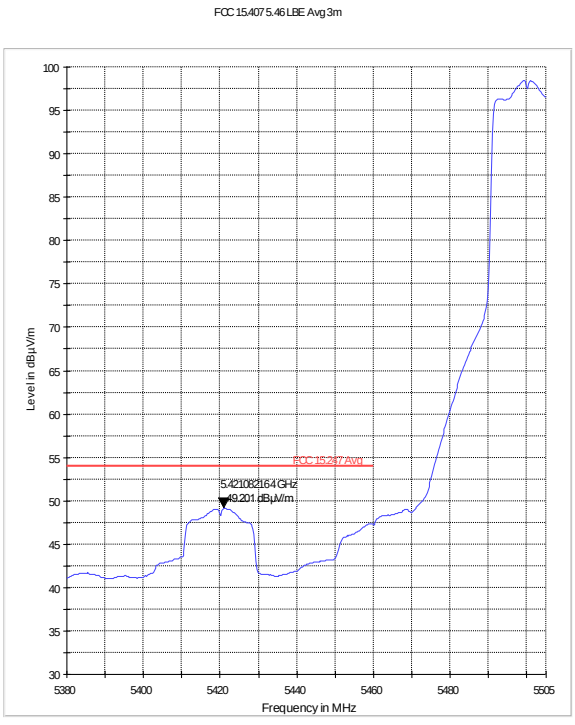
Tx0 802.11a Band 3 Bandedge Pk / Avg



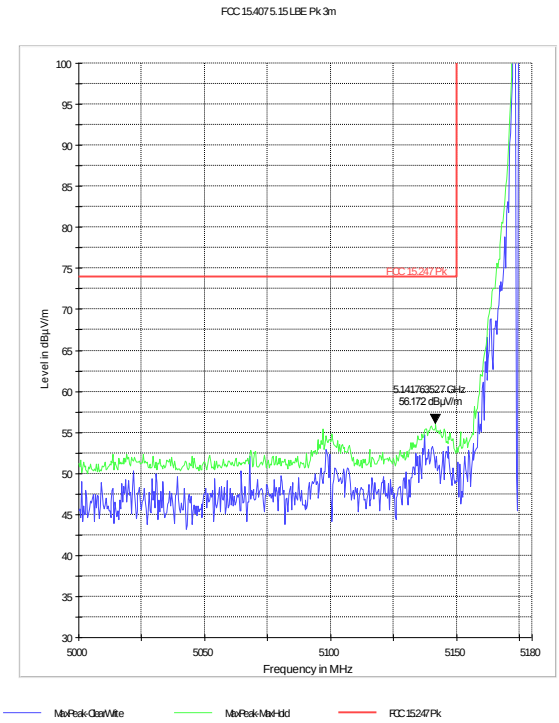


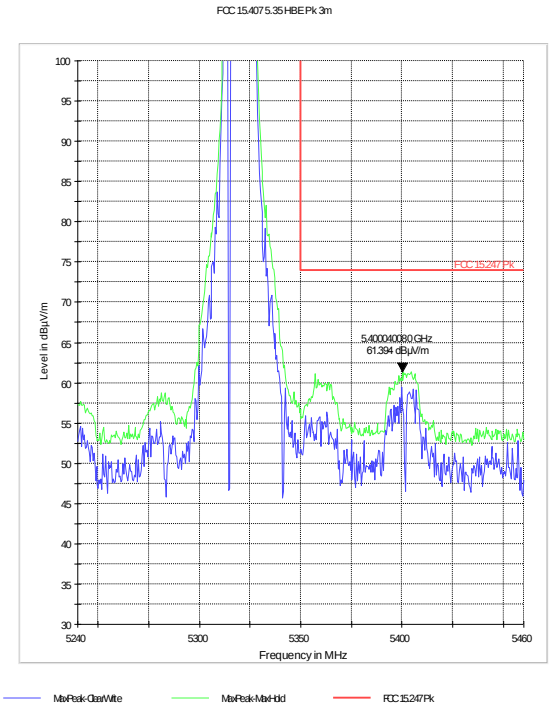
Tx0 802.11 HT20 Band 3 Bandedge Pk / Avg



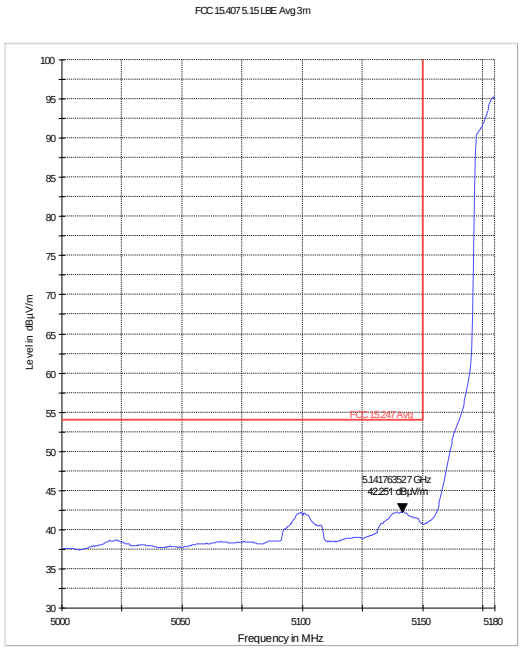


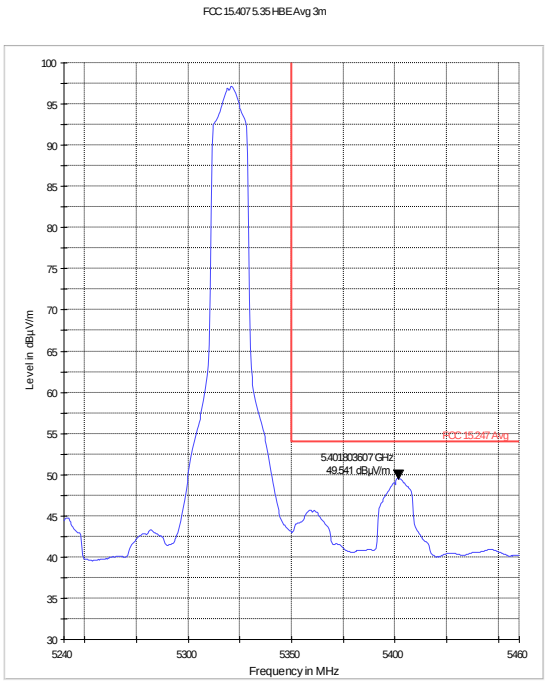
Tx1 802.11a Bandedge Pk



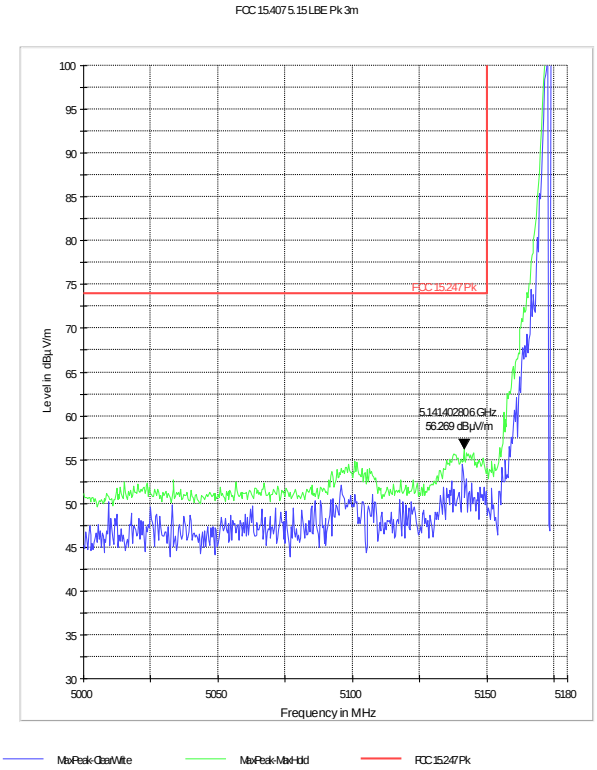


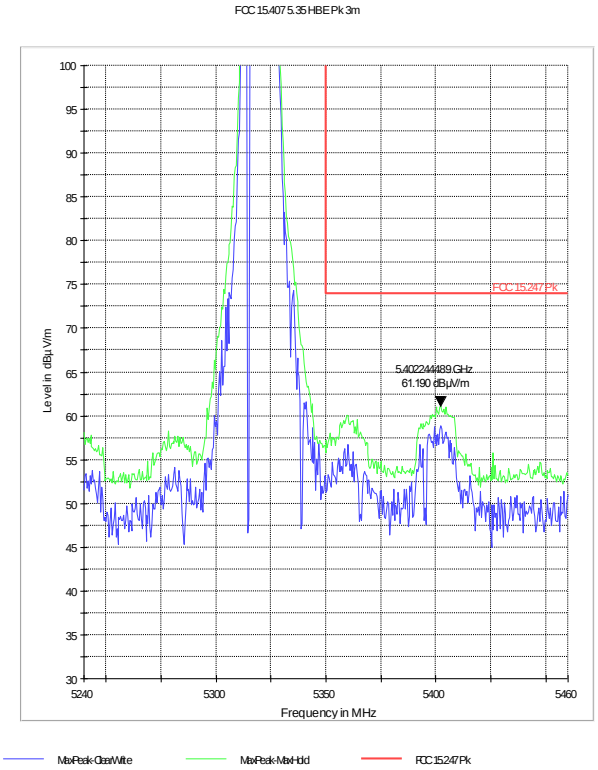
Tx1 802.11a Bandedge Avg



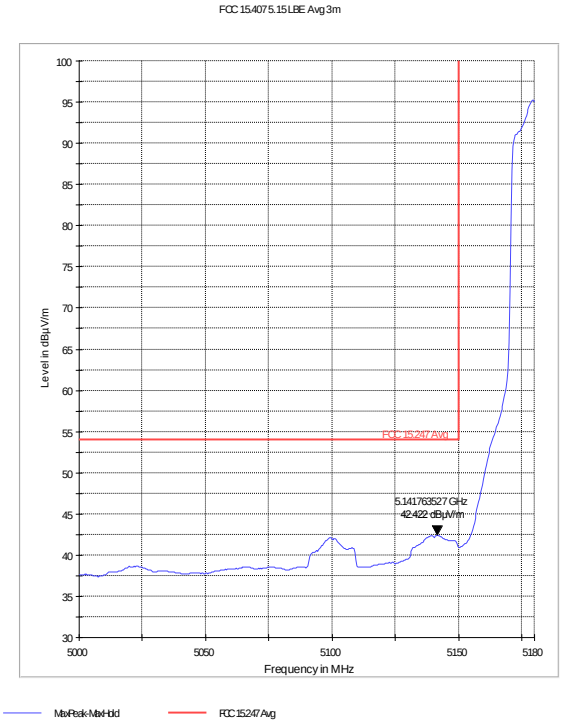


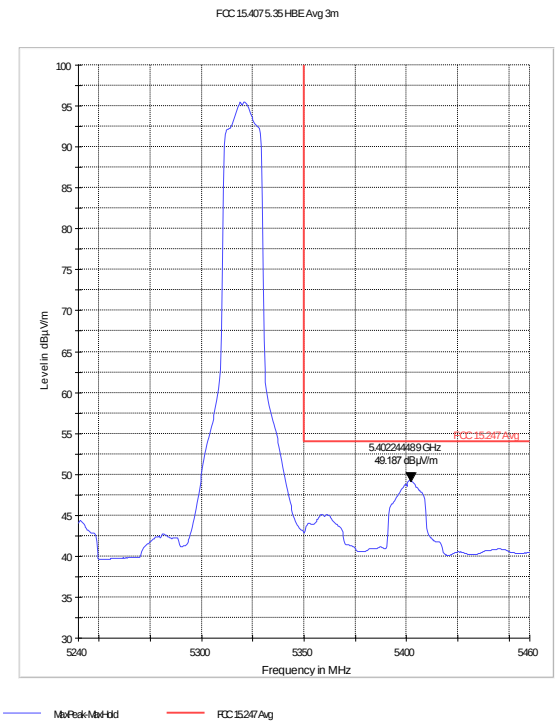
Tx1 802.11 HT20 Bandedge Pk



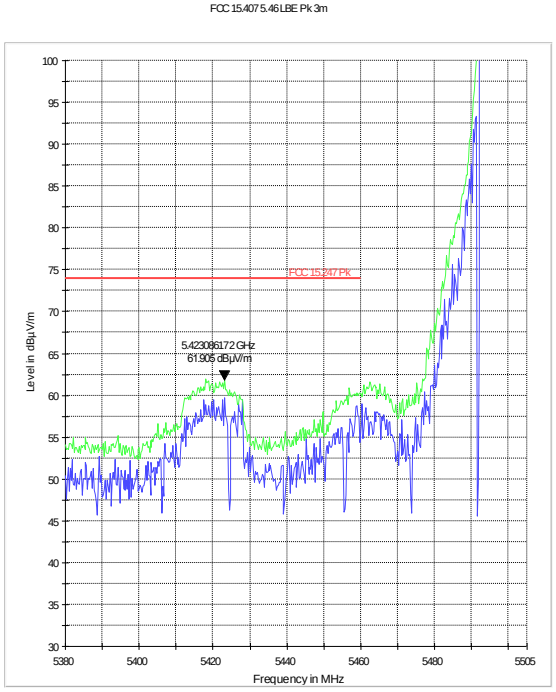


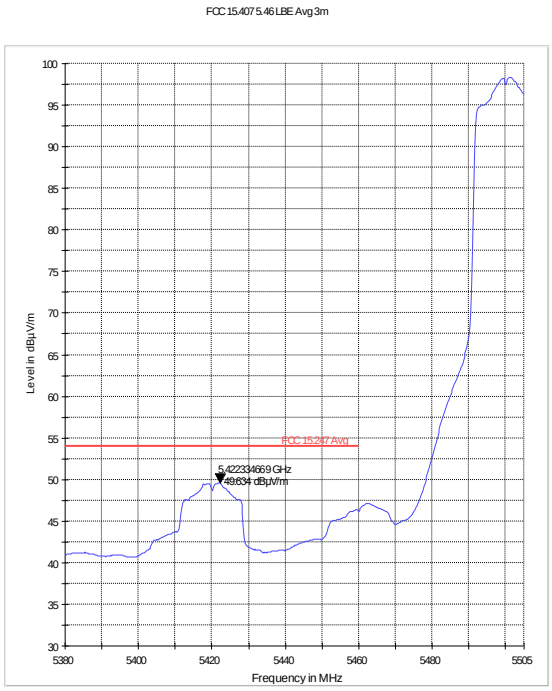
Tx1 802.11 HT20 Bandedge Avg



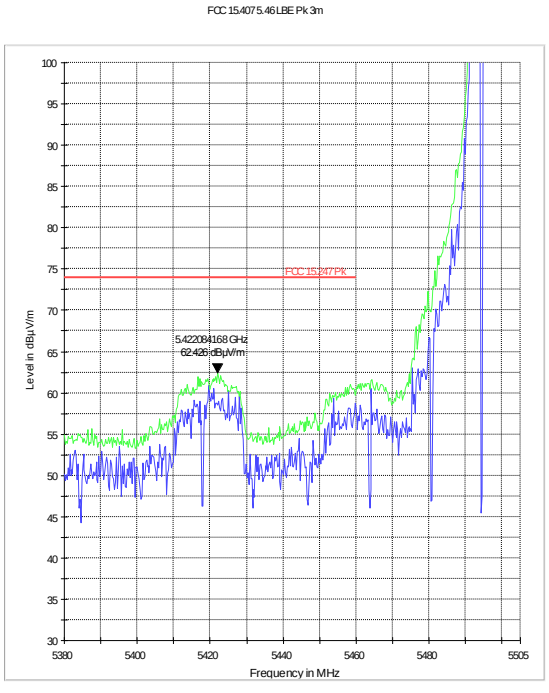


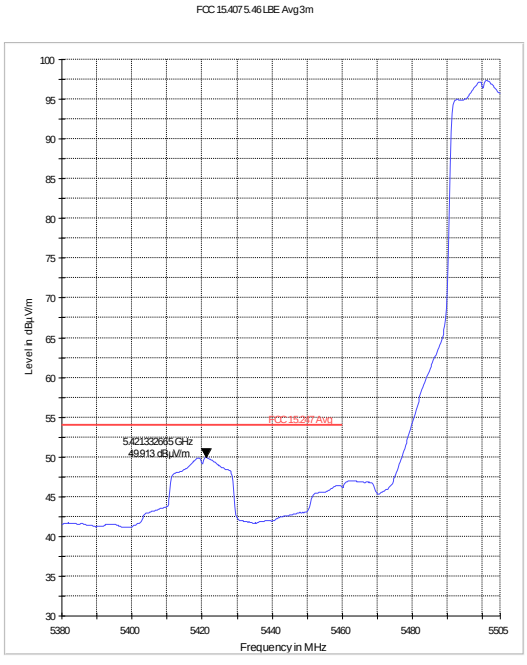
Tx1 802.11a Band 3 Bandedge Pk / Avg



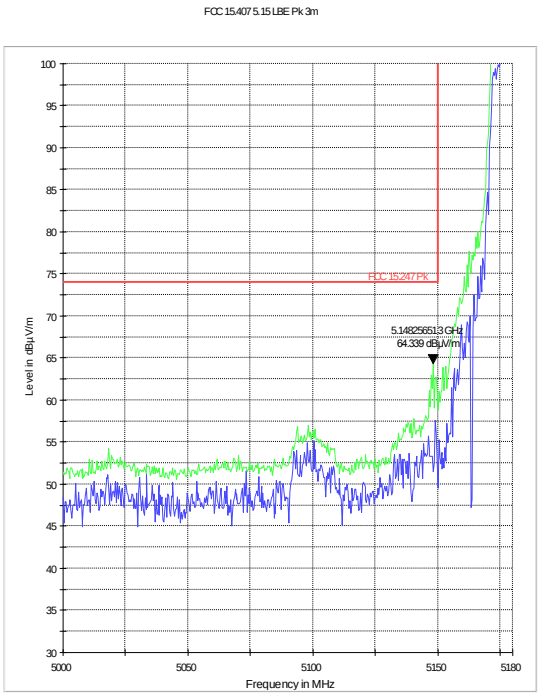


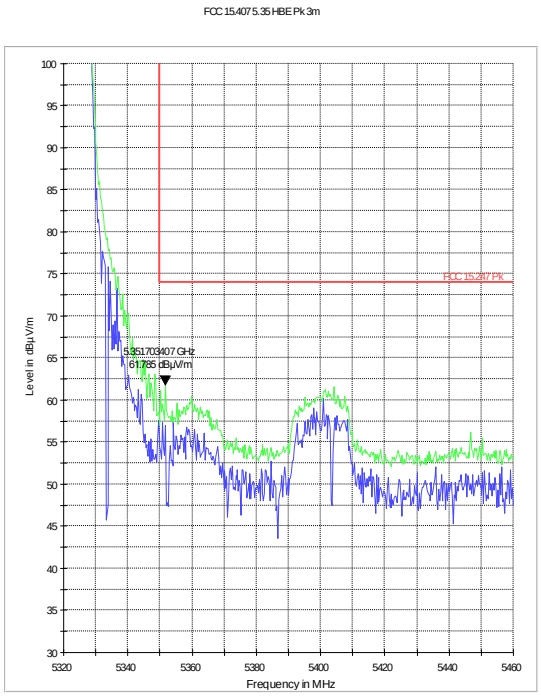
Tx1 802.11 HT20 Band 3 Bandedge Pk / Avg



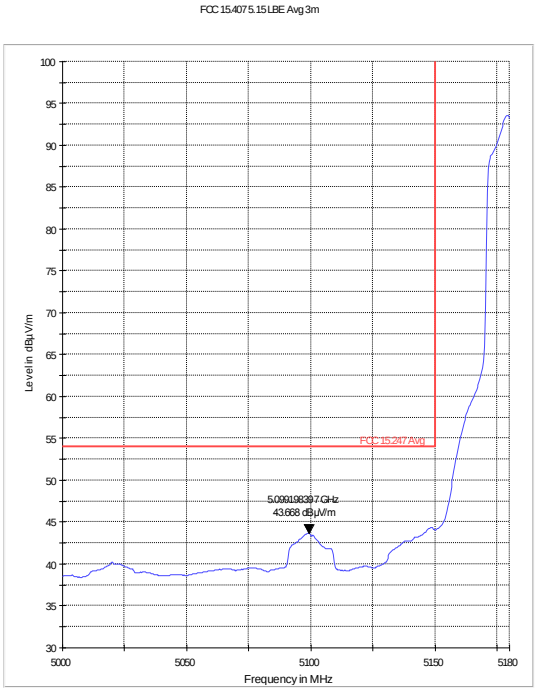


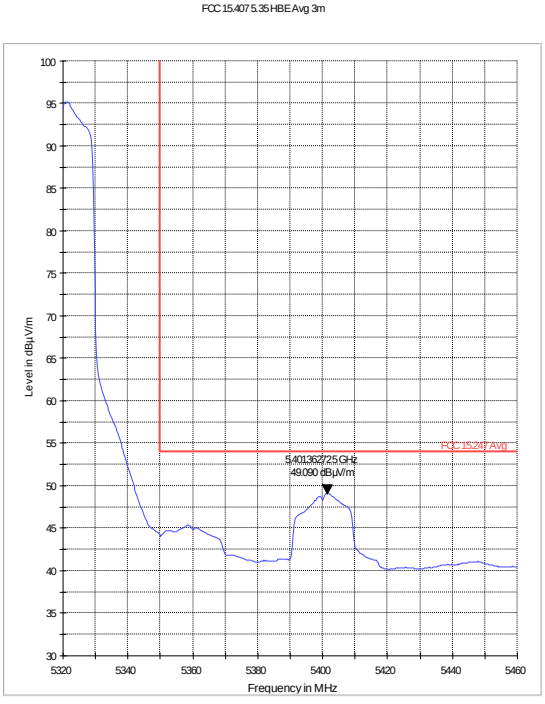
Simultaneous Transmission Tx0 802.11a Bluetooth Ch39 Bandedge Pk





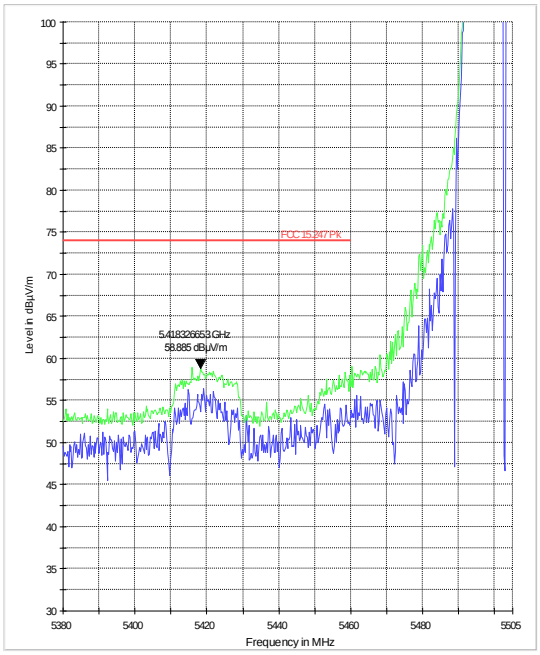
Simultaneous Transmission Tx0 802.11a Bluetooth Ch39 Bandedge Avg



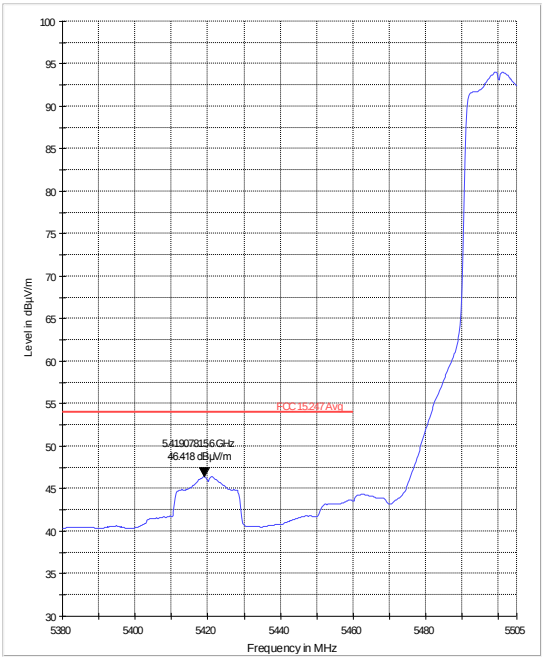


Simultaneous Transmission Tx0 802.11a Bluetooth Ch39 Band 3 Bandedge Pk / Avg

FCC 15.407 5.46 LBE Pk 3m



FCC 15.407 5.46 LBE Avg 3m



5.5 Occupied Bandwidth

5.5.1 Limits:

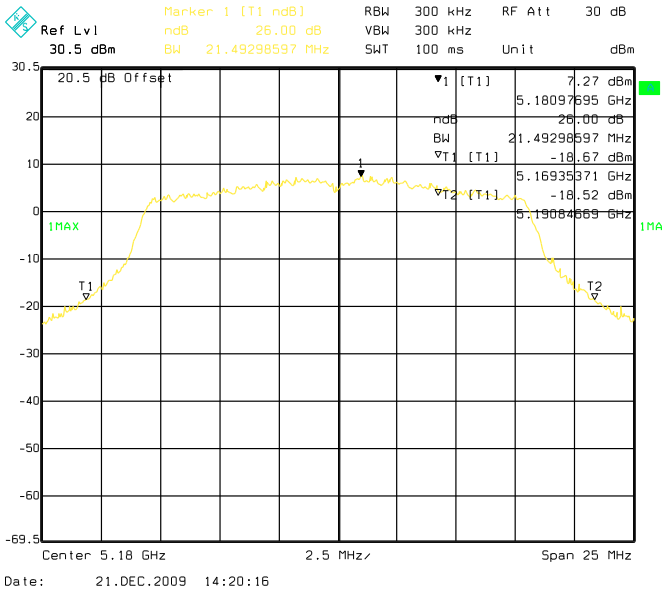
None.

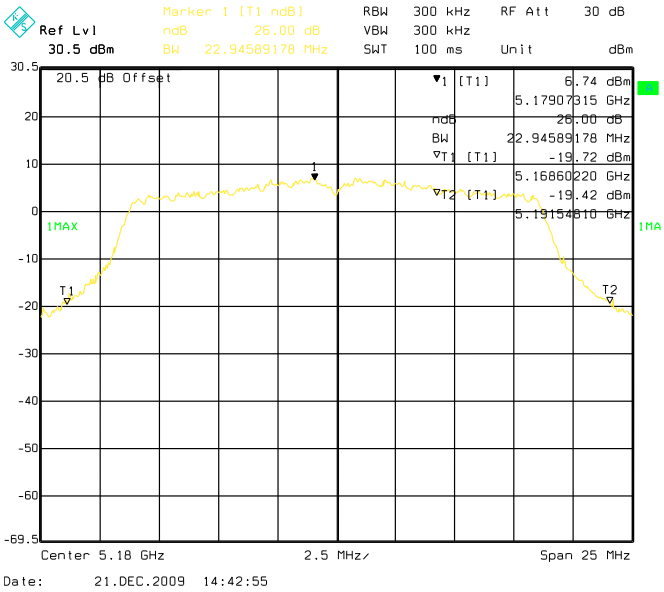
5.5.2 Test Result:

Occupied Bandwidth (MHz)									
Frequency (MHz)	Channel	Tx0				Tx1			
		a		HT20		a		HT20	
		26 dB	99%	26 dB	99%	26 dB	99%	26 dB	99%
5180	36	21.49	16.53	22.95	17.79	21.19	16.58	23.15	17.79
5200	40	21.19	16.53	22.55	17.74	21.54	16.53	22.44	17.74
5240	48	21.49	16.58	22.65	17.79	21.44	16.53	22.8	17.79
5260	52	21.59	16.53	22.9	17.79	21.19	16.58	23.19	17.79
5300	60	21.04	16.53	22.6	17.74	21.04	16.53	22.6	17.79
5320	64	21.29	16.53	22.8	17.74	21.04	16.53	22.85	17.74
5500	100	21.24	16.53	22.49	17.79	21.19	16.53	22.44	17.79
5600	120	21.24	16.53	22.75	17.79	21.69	16.53	22.7	17.79
5700	140	21.39	16.53	22.65	17.79	21.34	16.53	22.34	17.79
Measurement Uncertainty: ±0.01 MHz									

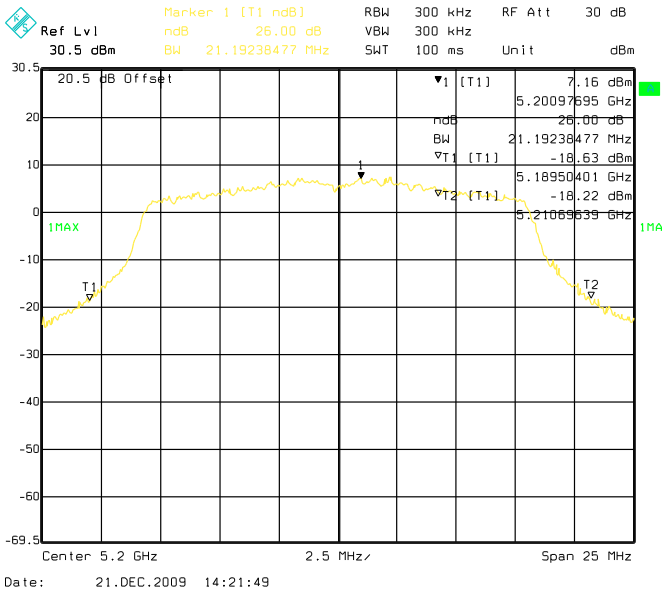
5.5.3 Plots

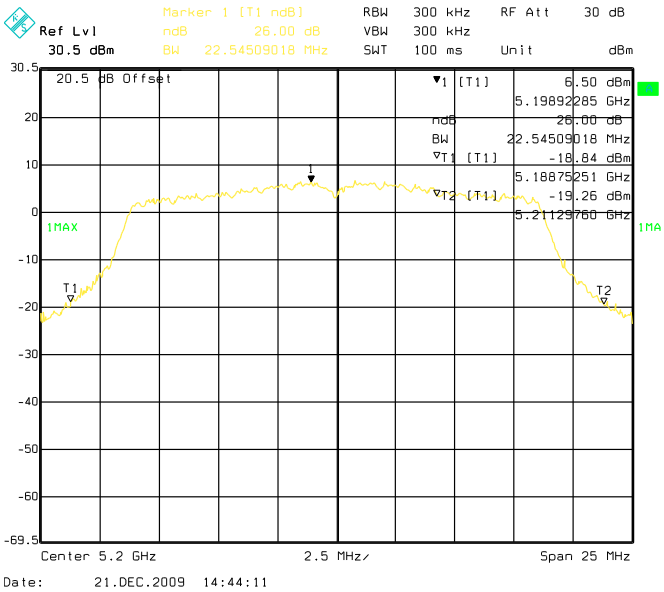
26bw tx0 ch36 a / n



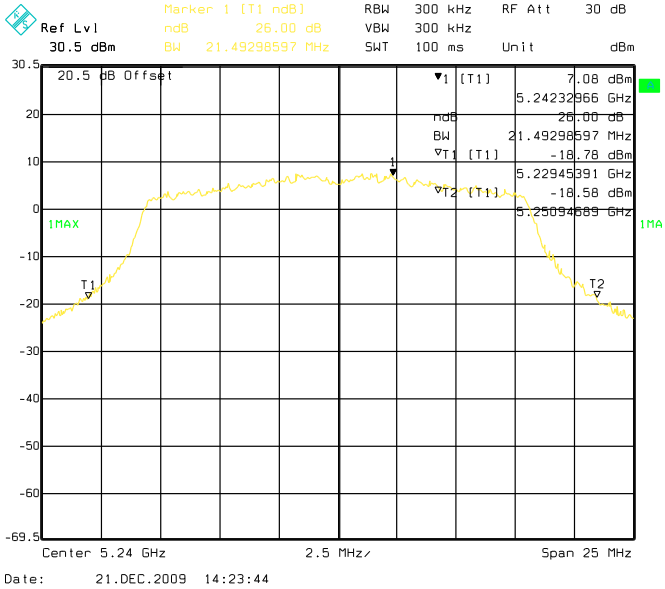


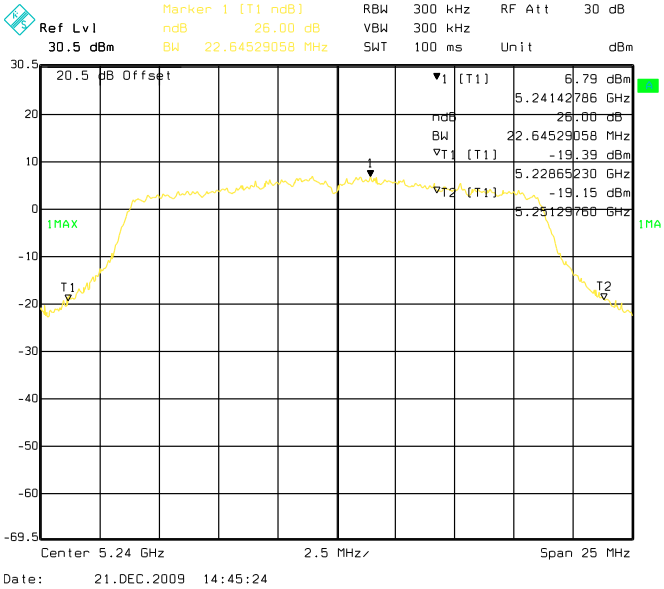
26bw tx0 ch40 a / n



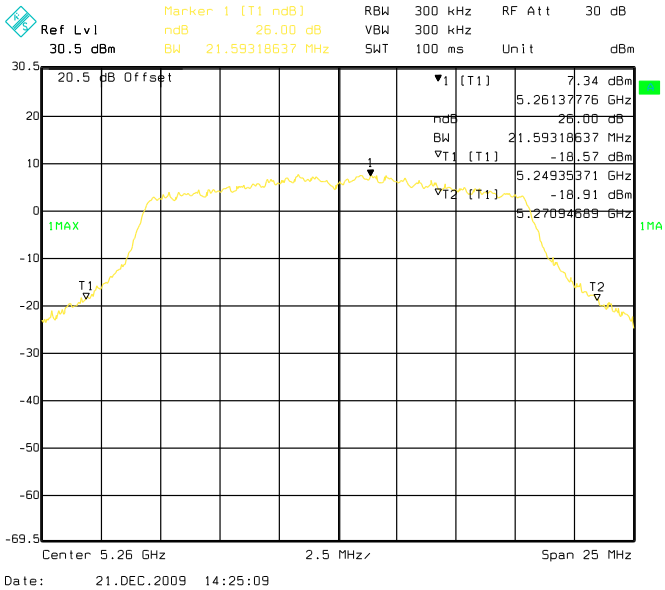


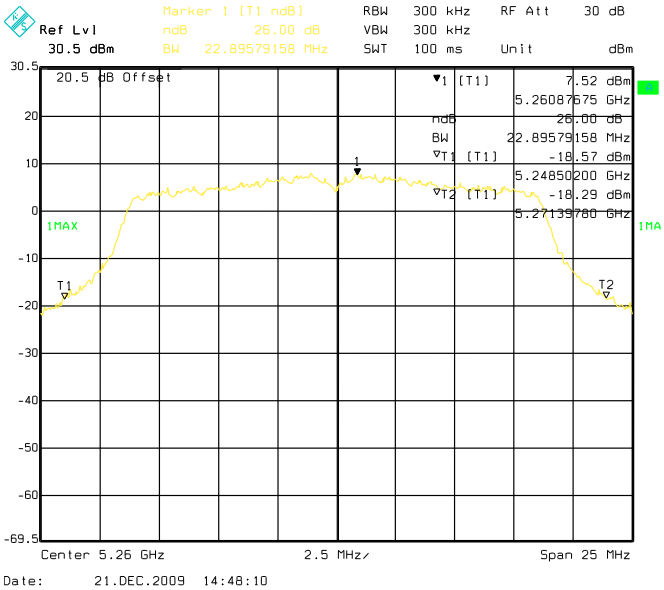
26bw tx0 ch48 a / n



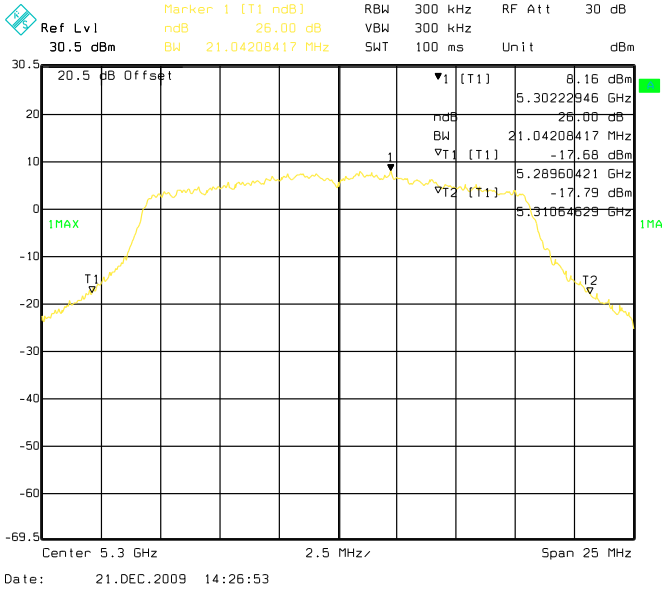


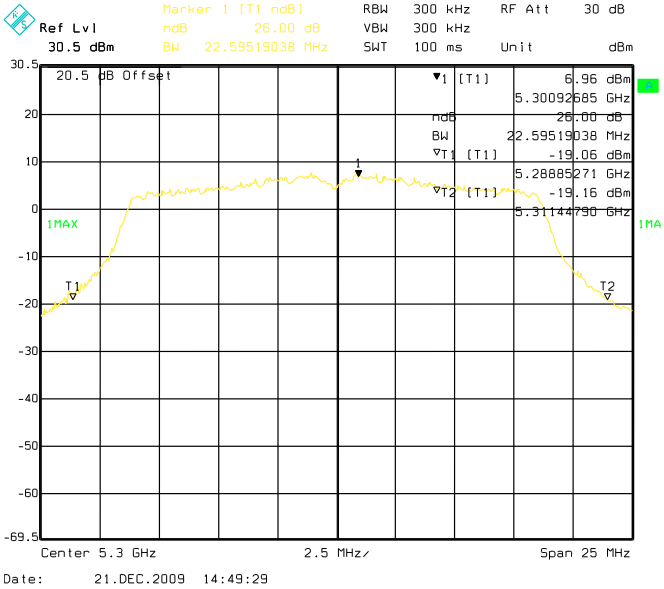
26bw tx0 ch52 a / n



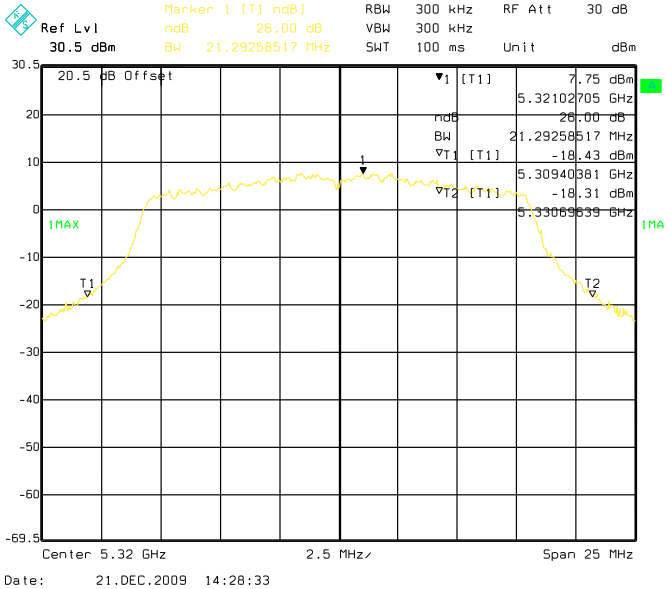


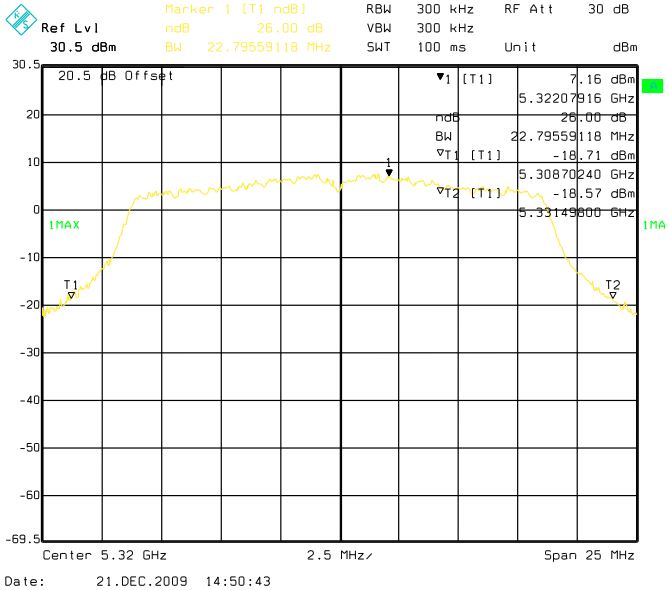
26bw tx0 ch60 a / n



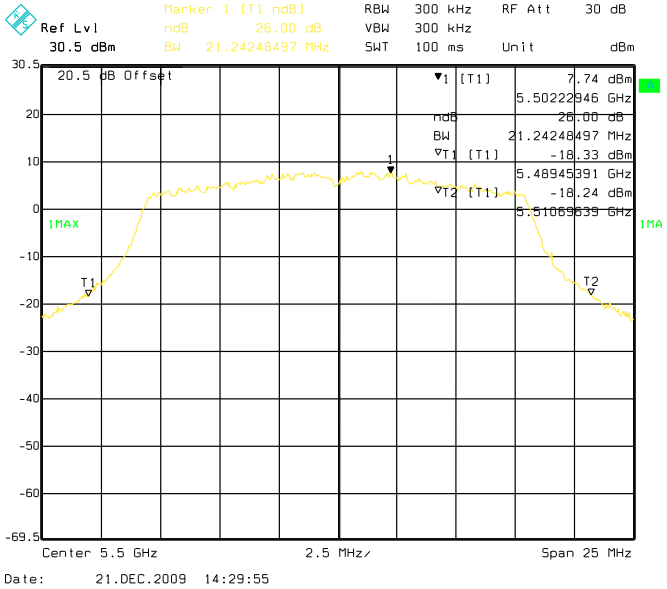


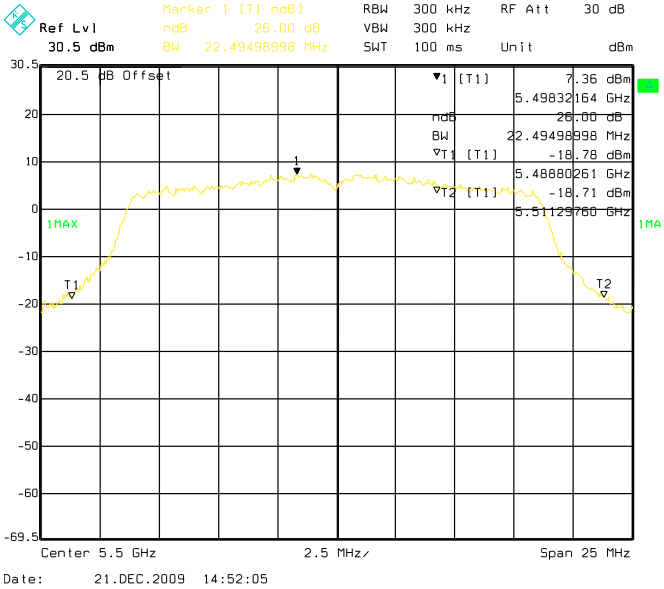
26bw tx0 ch64 a / n



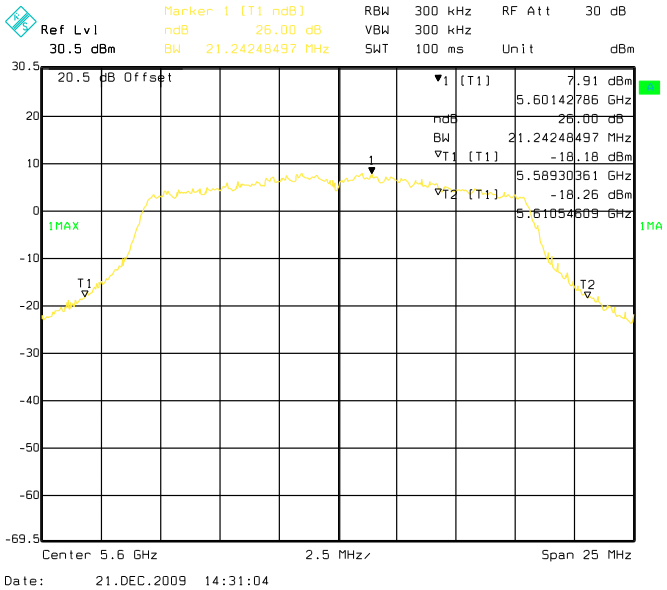


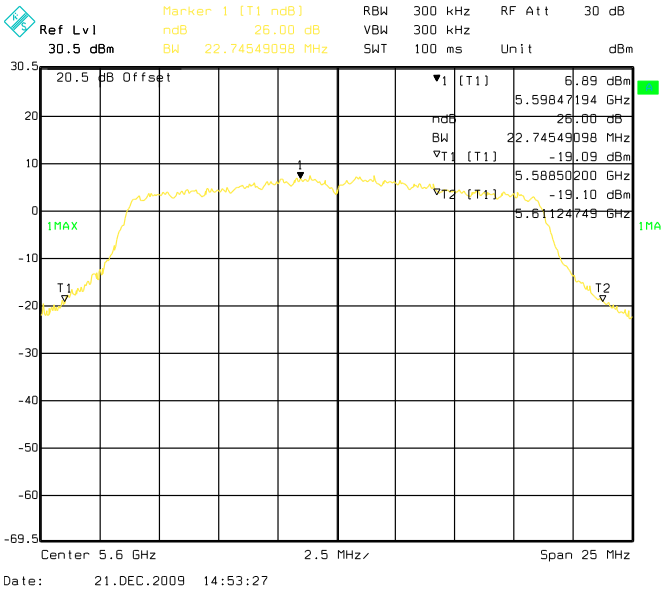
26bw tx0 ch100 a / n



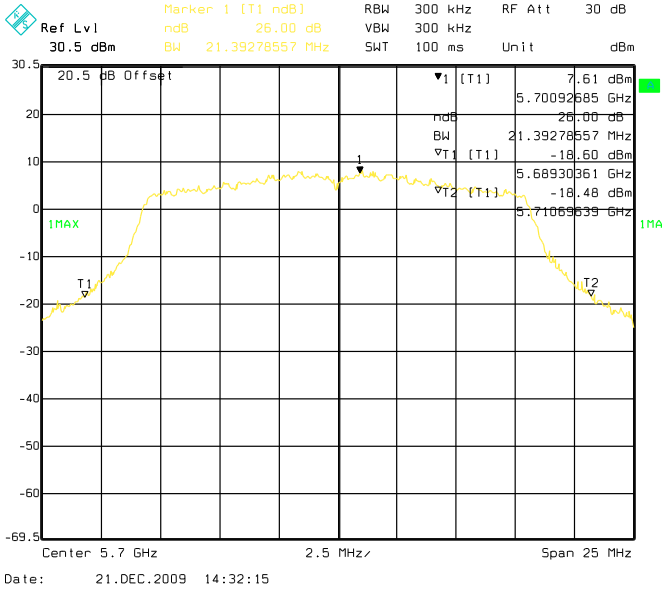


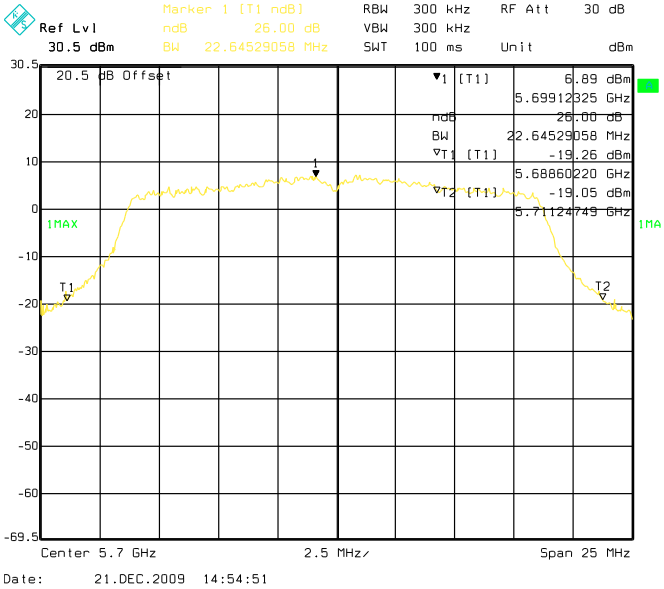
26bw tx0 ch120 a / n



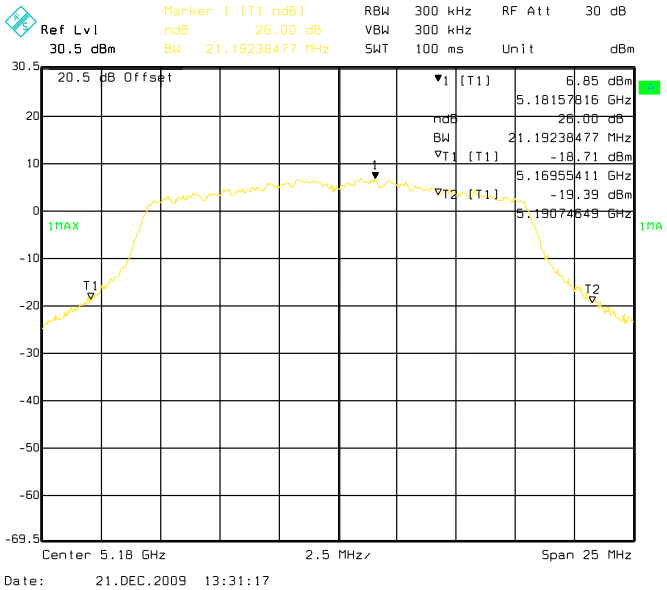


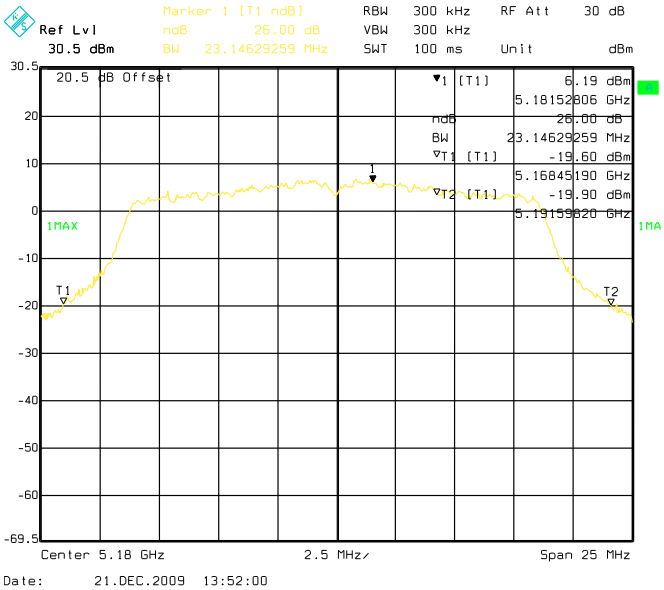
26bw tx0 ch140 a / n



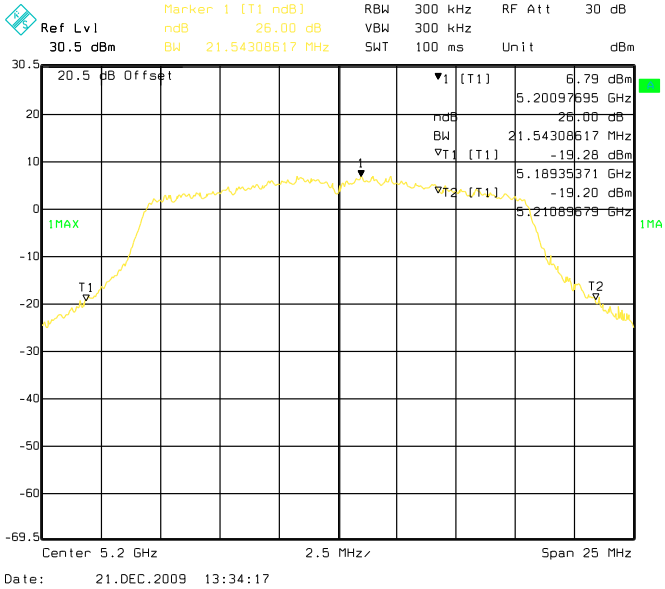


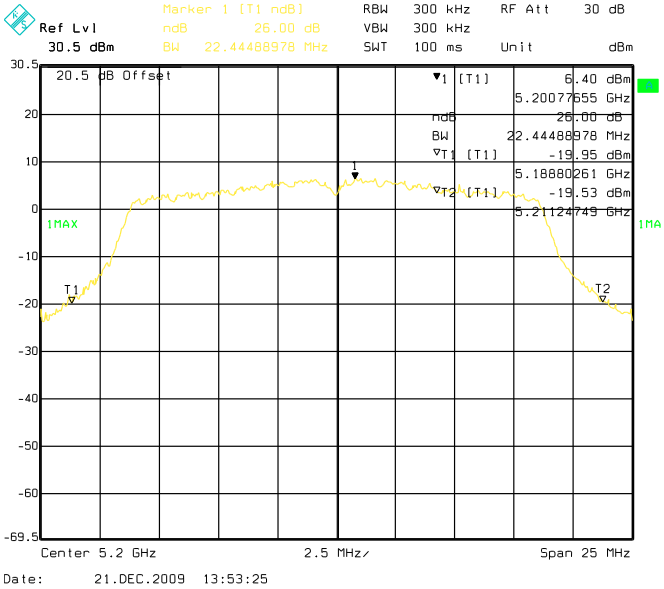
26bw tx1 ch36 a / n



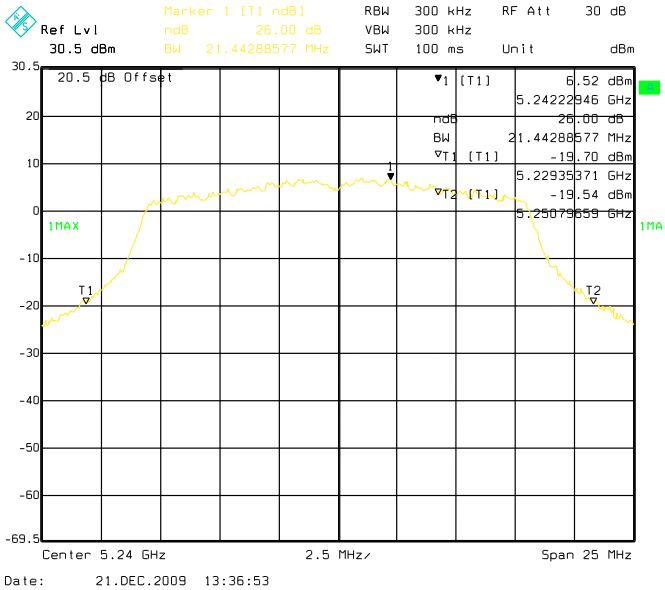


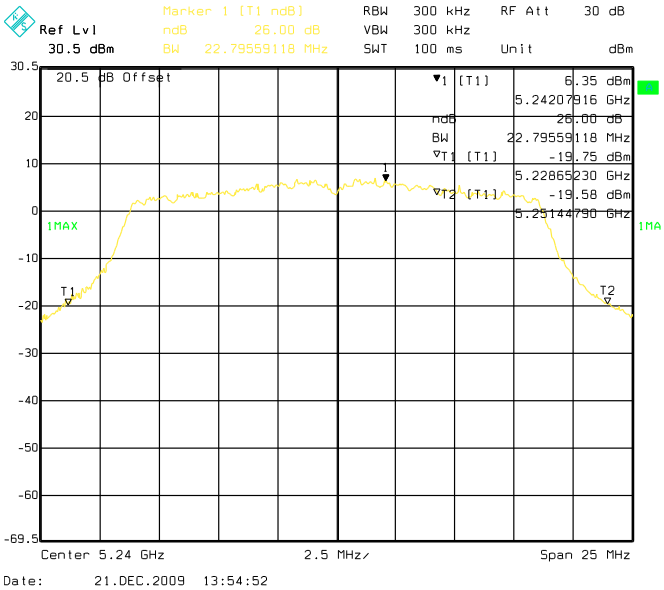
26bw tx1 ch40 a / n



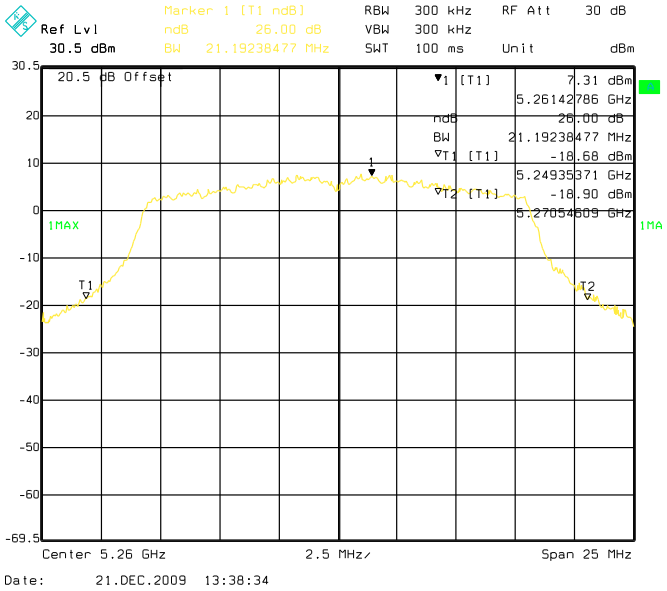


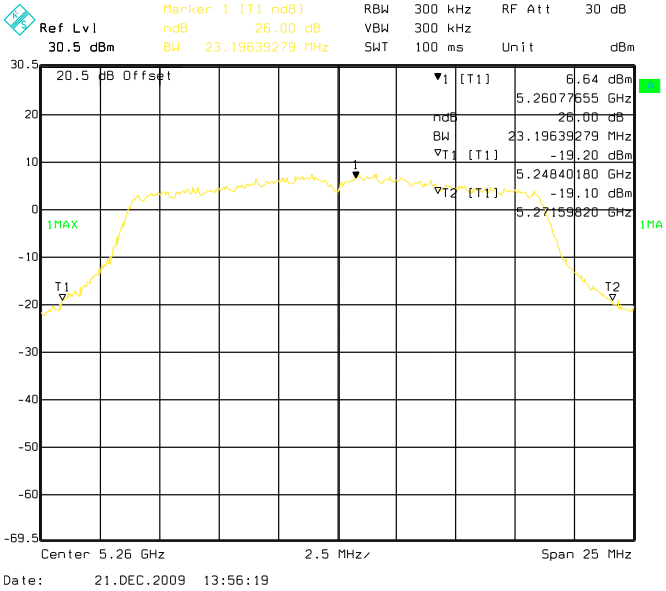
26bw tx1 ch48 a / n



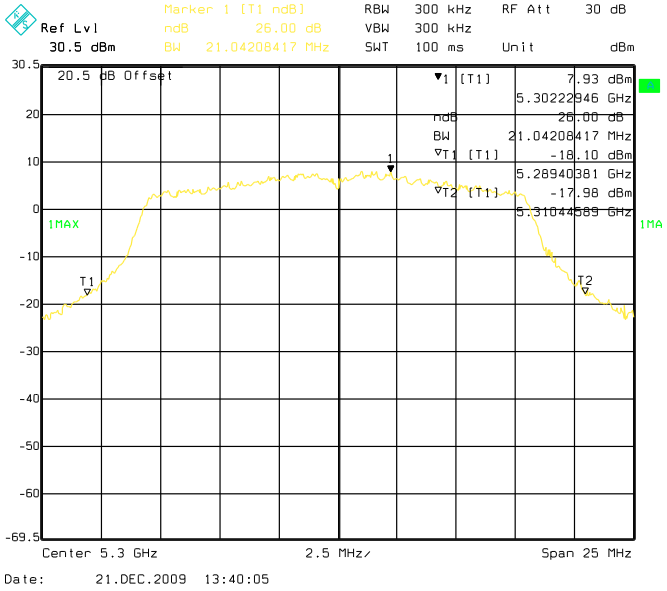


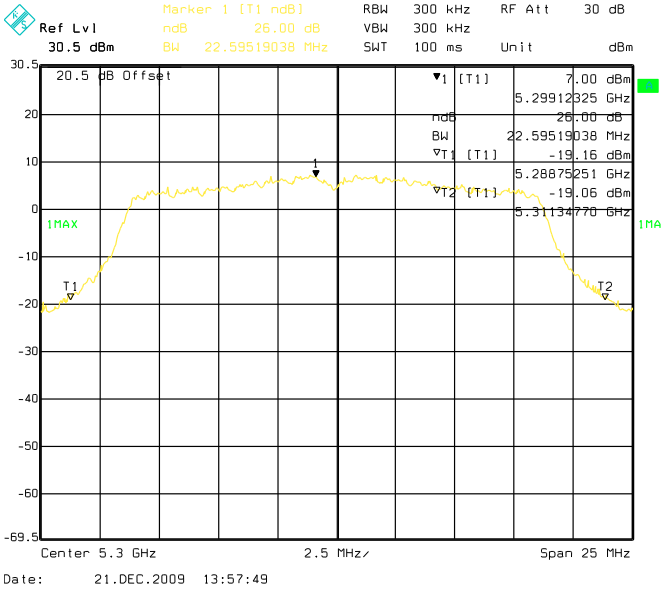
26bw tx1 ch52 a / n



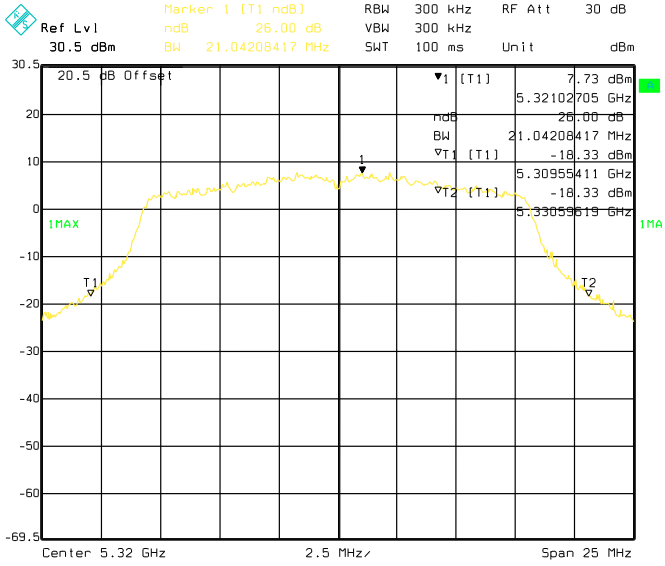


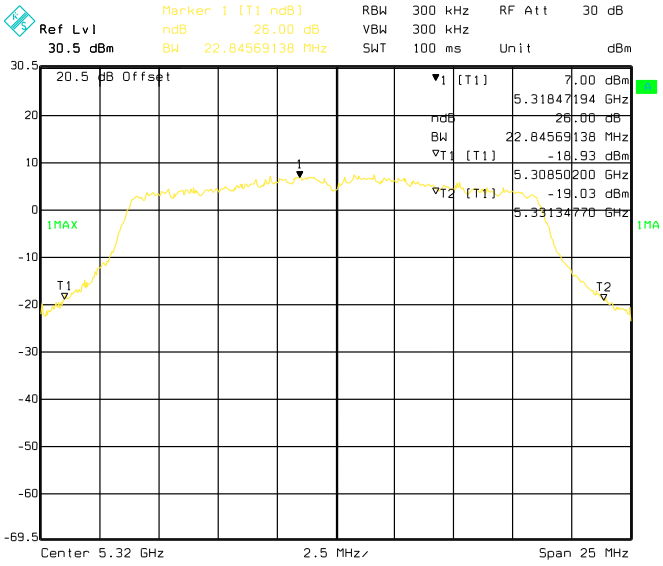
26bw tx1 ch60 a / n



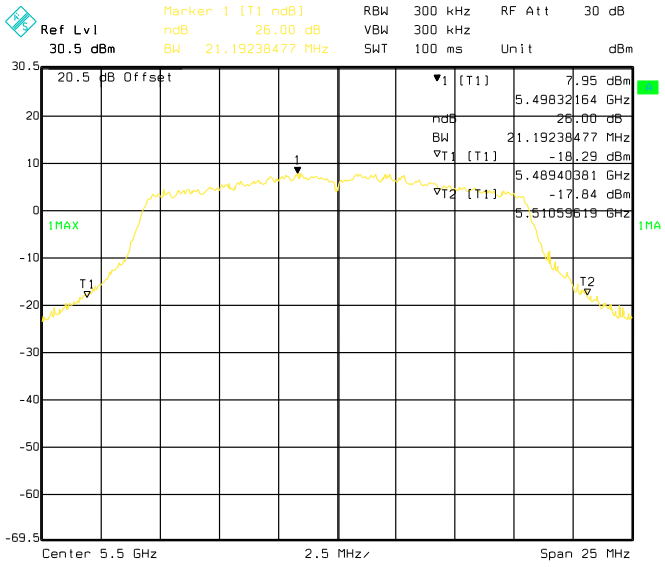


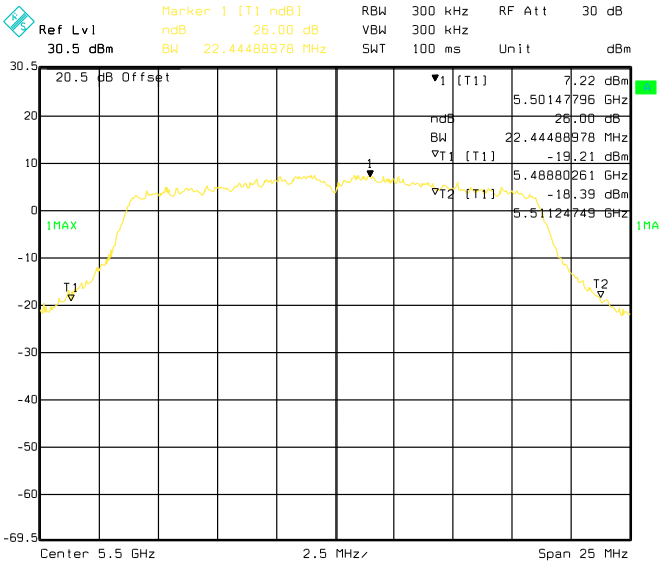
26bw tx1 ch64 a / n



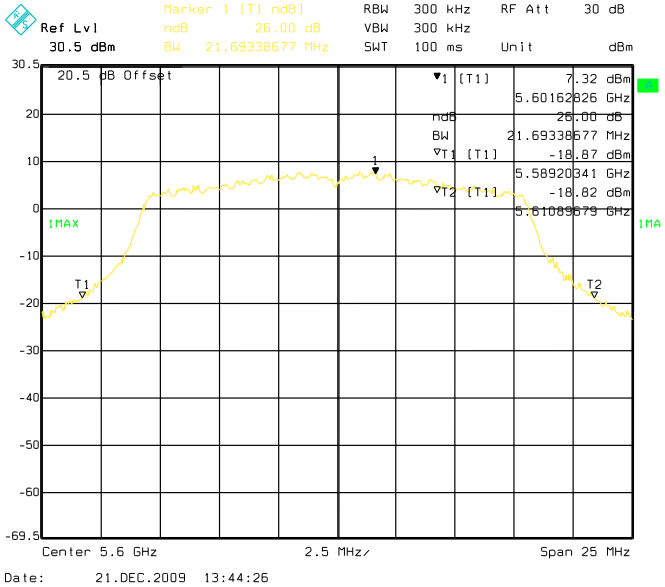


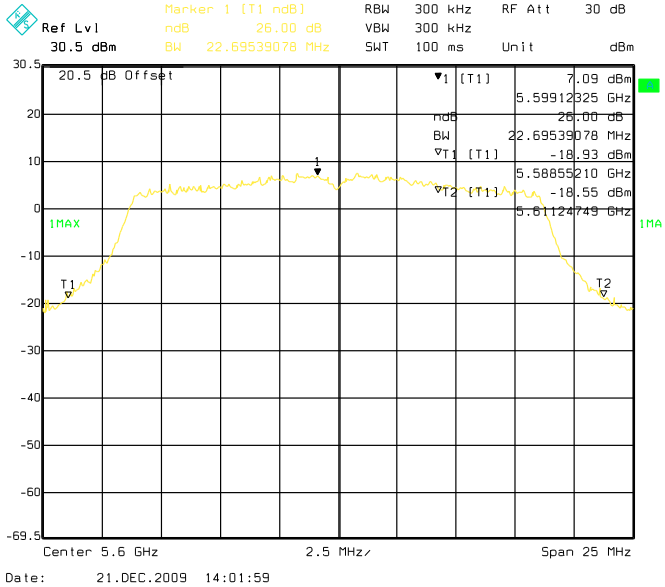
26bw tx1 ch100 a / n



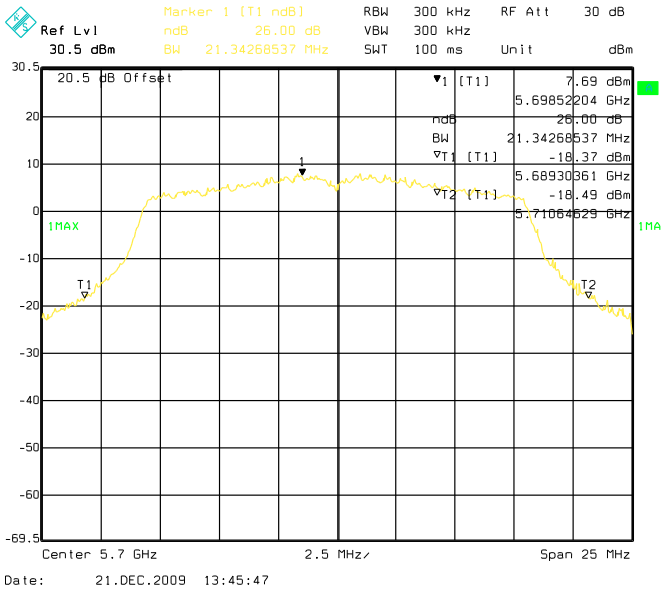


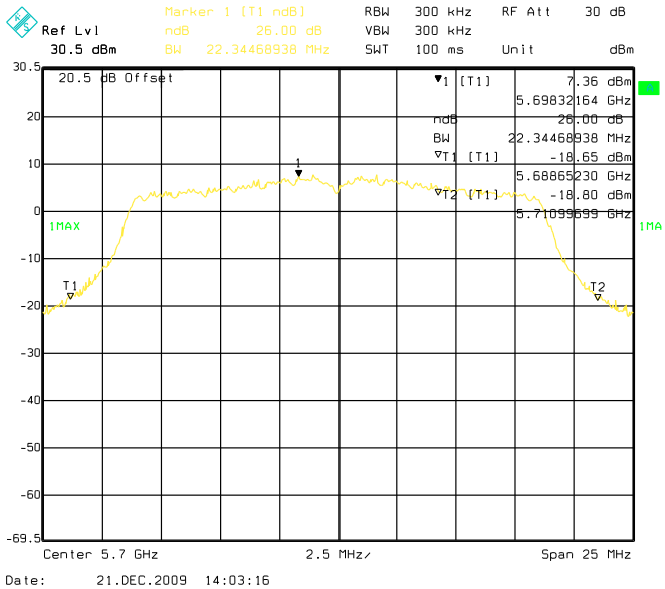
26bw tx1 ch120 a / n



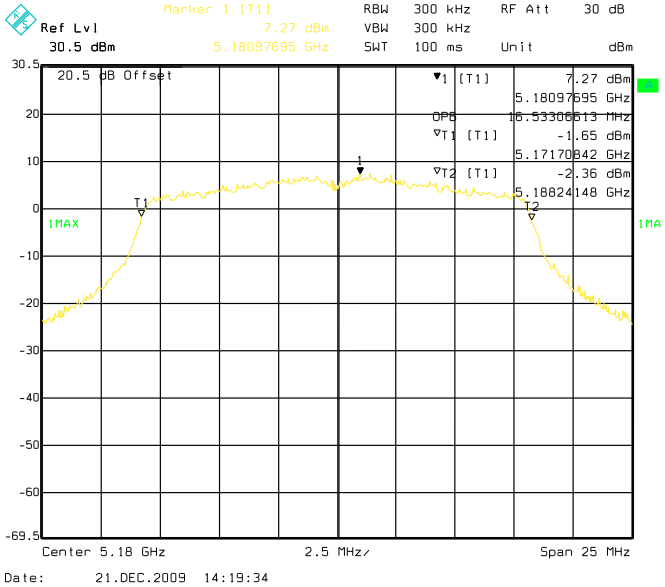


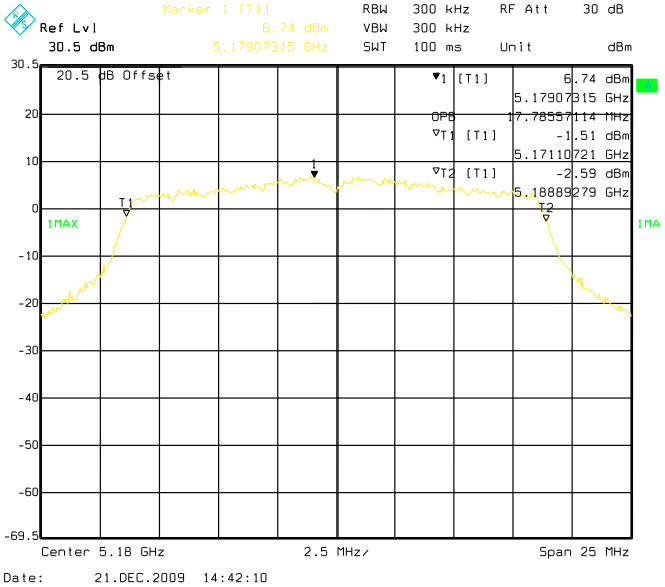
26bw tx1 ch140 a / n



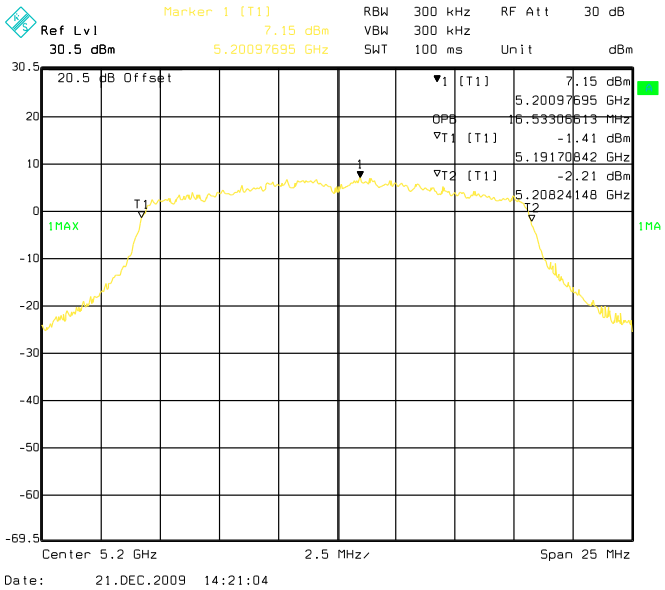


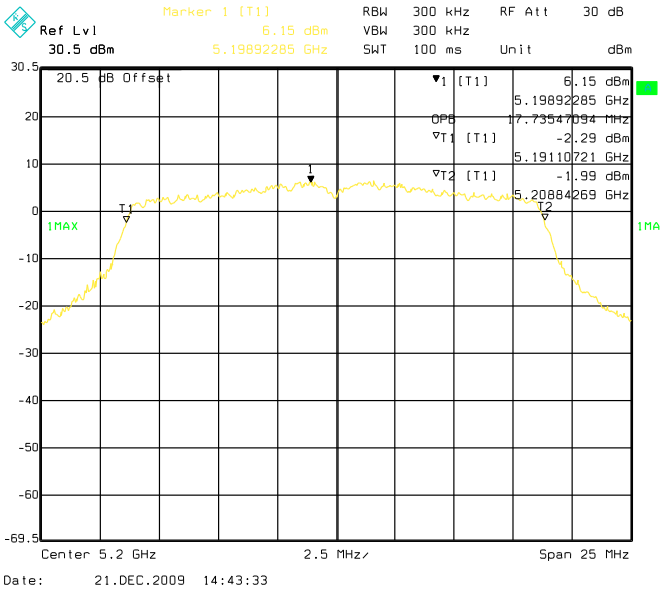
OBW tx0 ch36 a / n



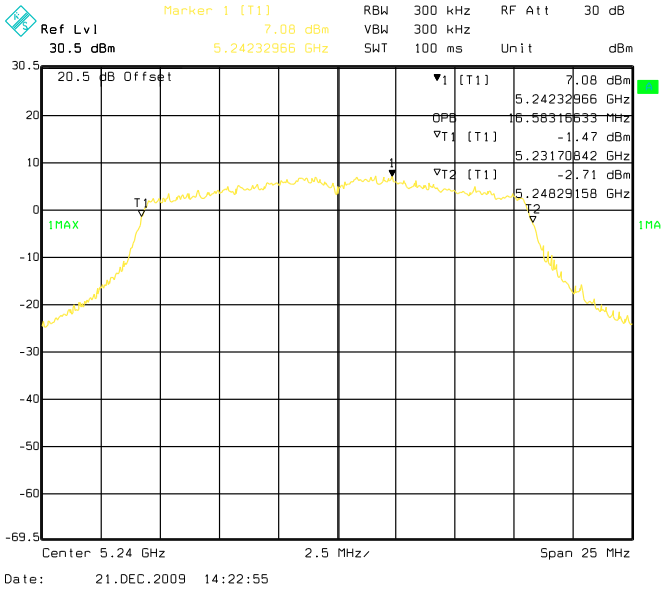


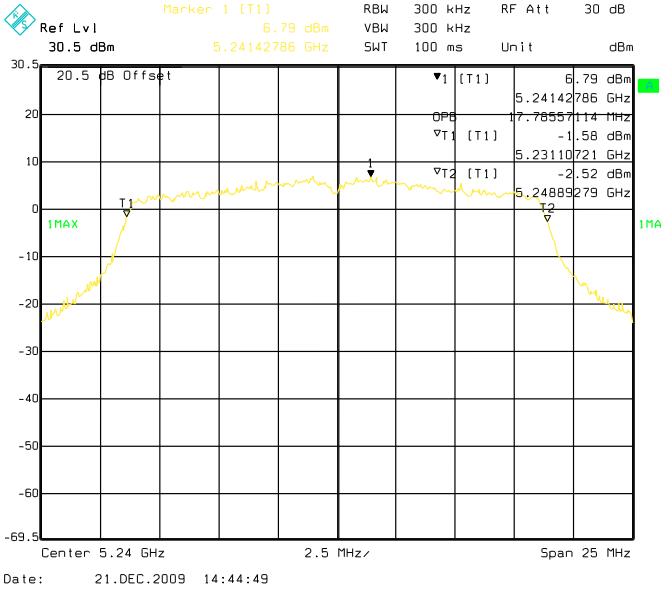
OBW tx0 ch40 a / n



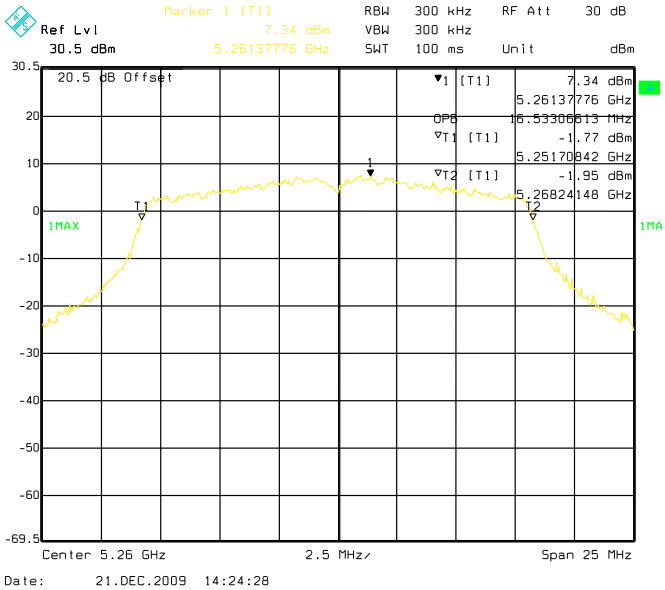


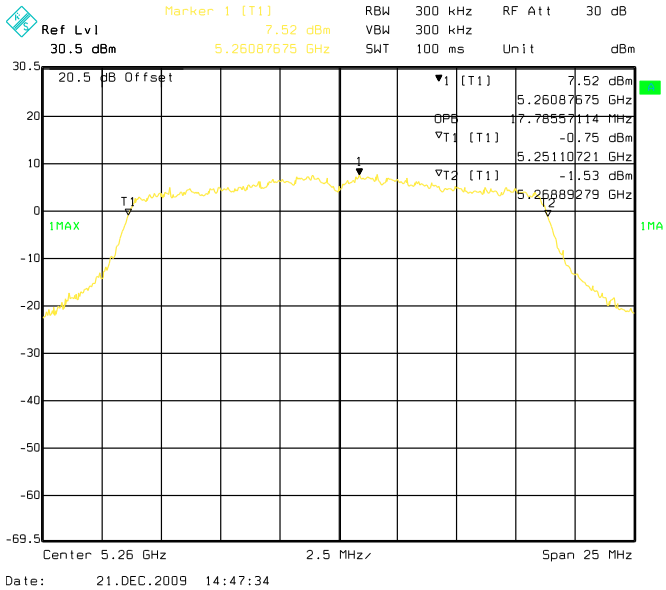
OBW tx0 ch48 a / n



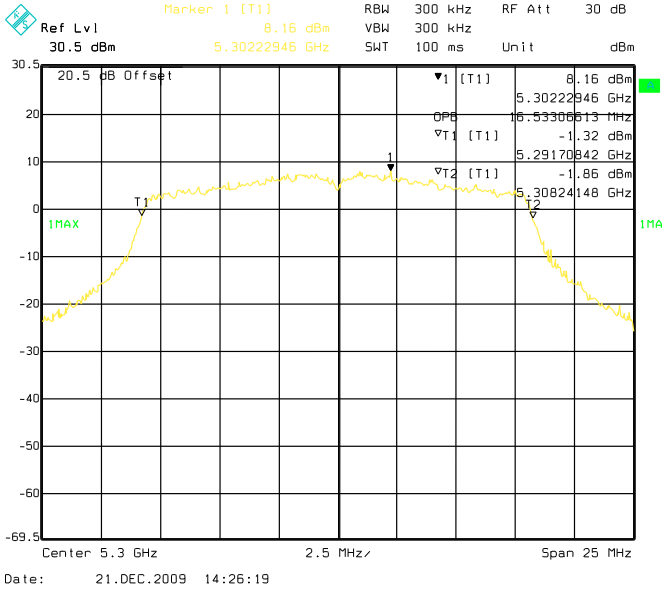


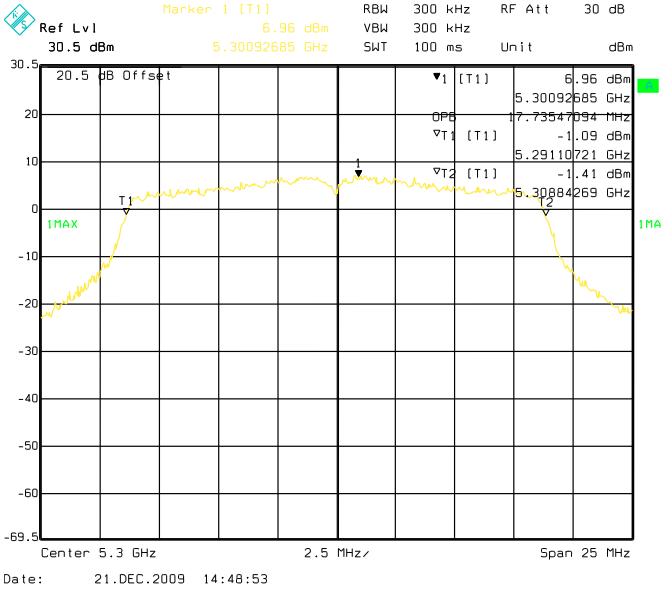
OBW tx0 ch52 a / n



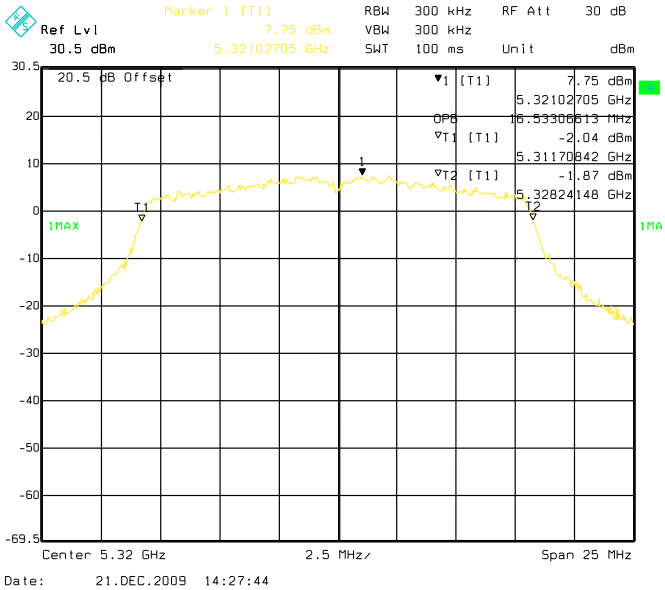


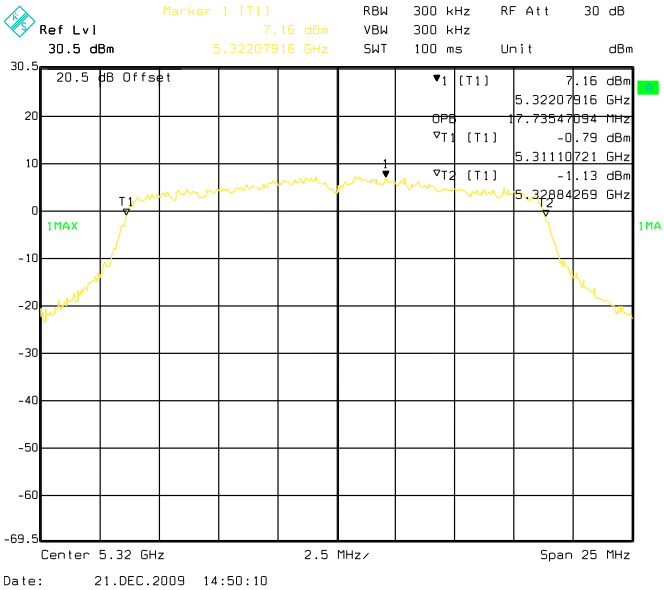
OBW tx0 ch60 a / n



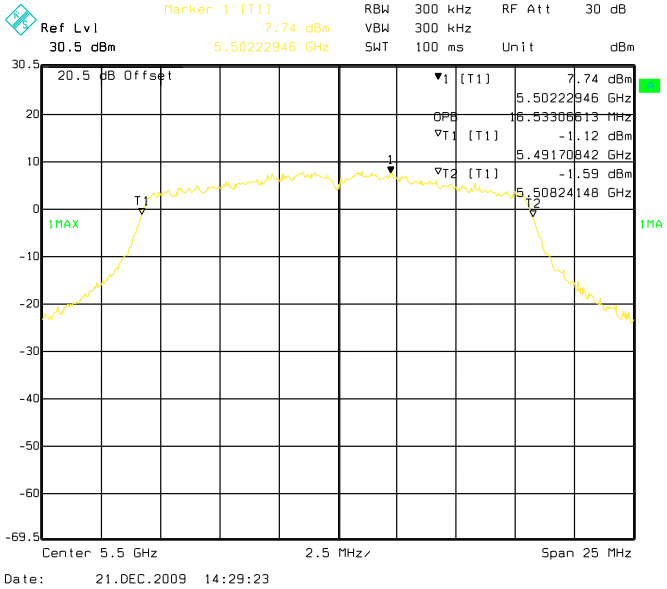


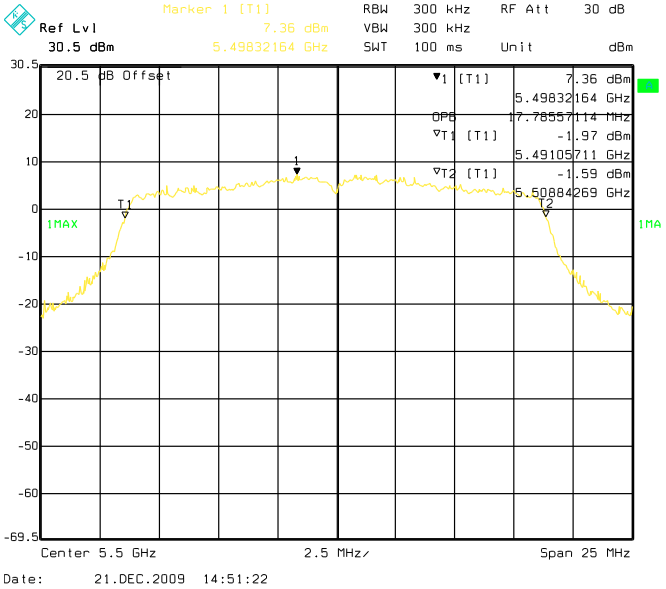
OBW tx0 ch64 a / n



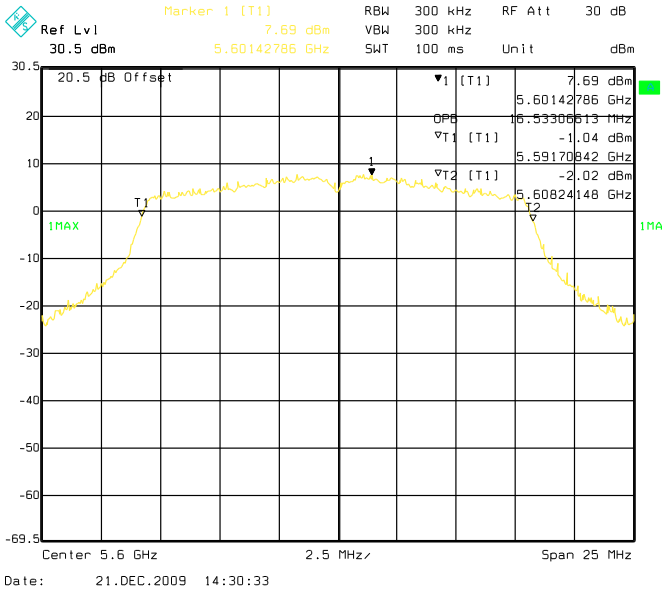


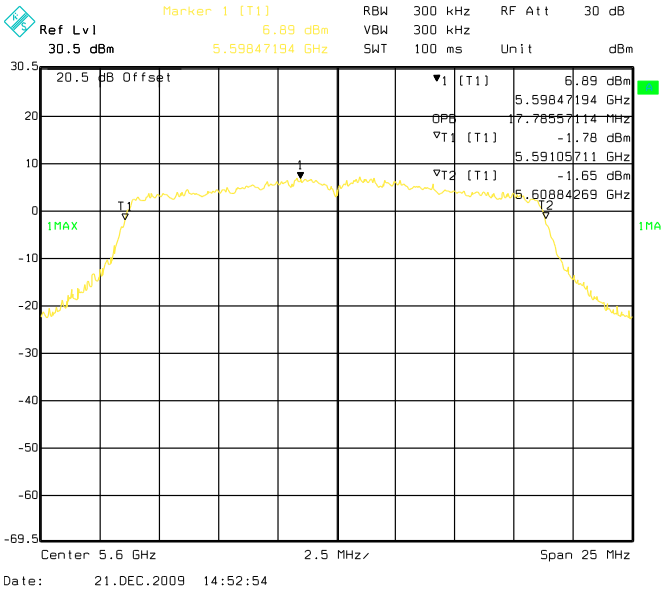
OBW tx0 ch100 a / n



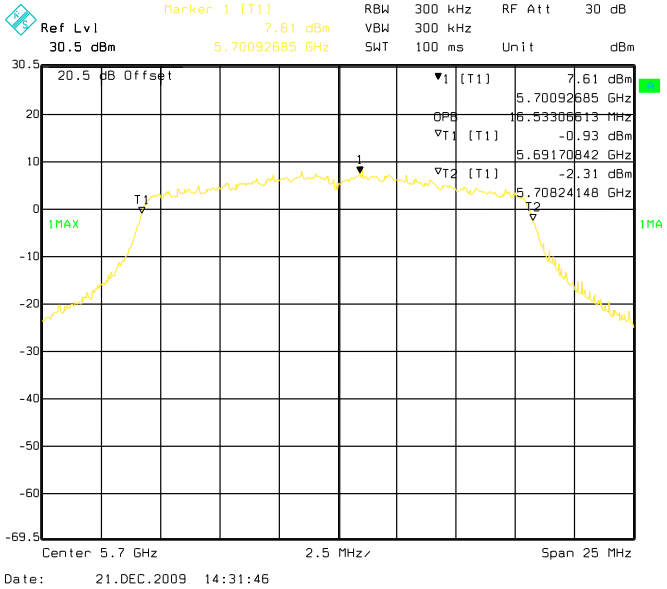


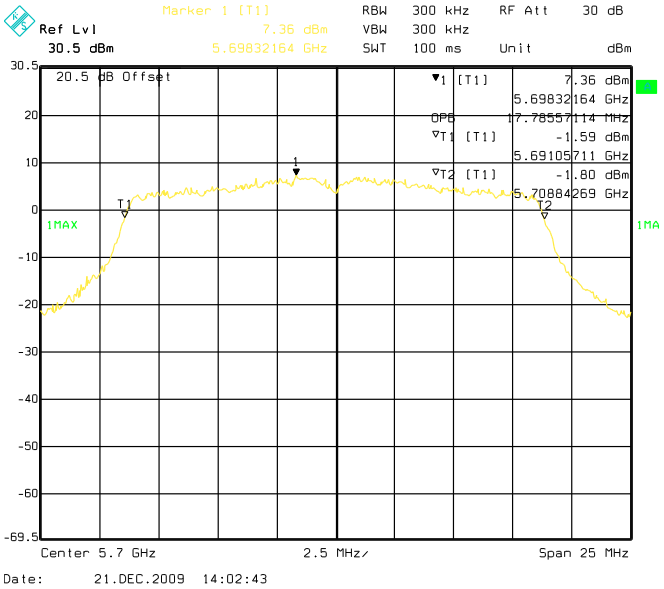
OBW tx0 ch120 a / n



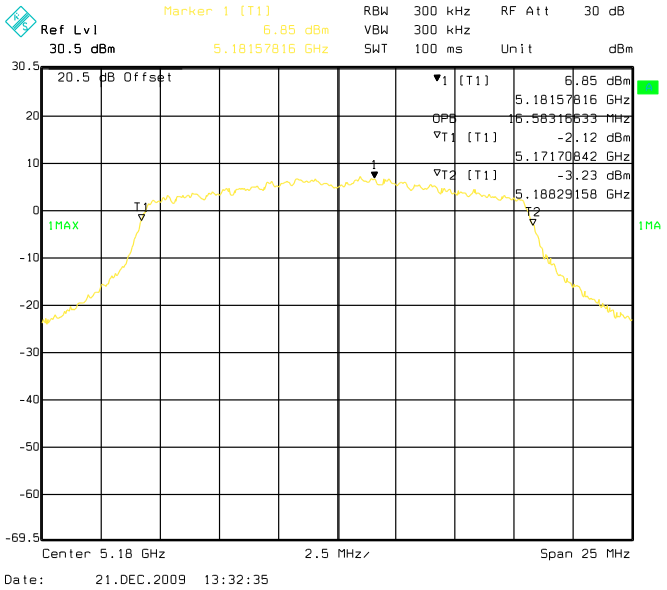


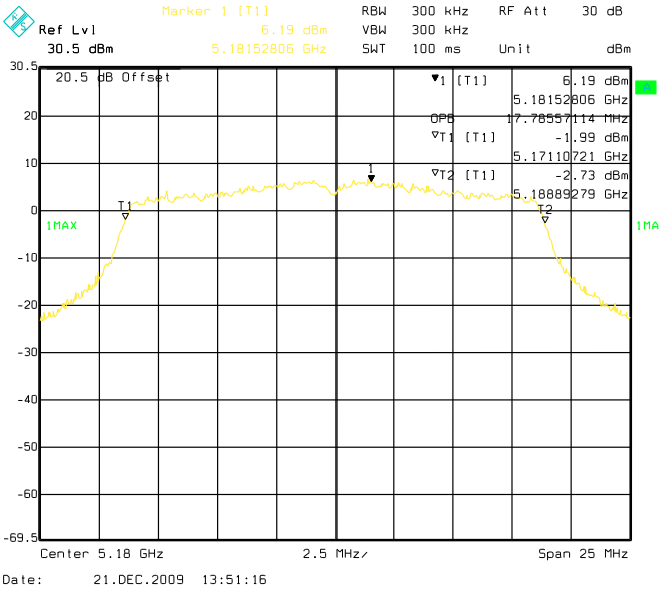
OBW tx0 ch140 a / n



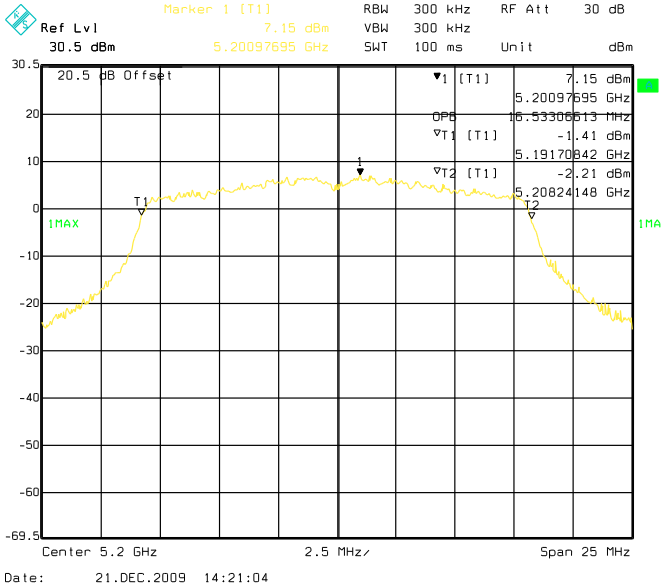


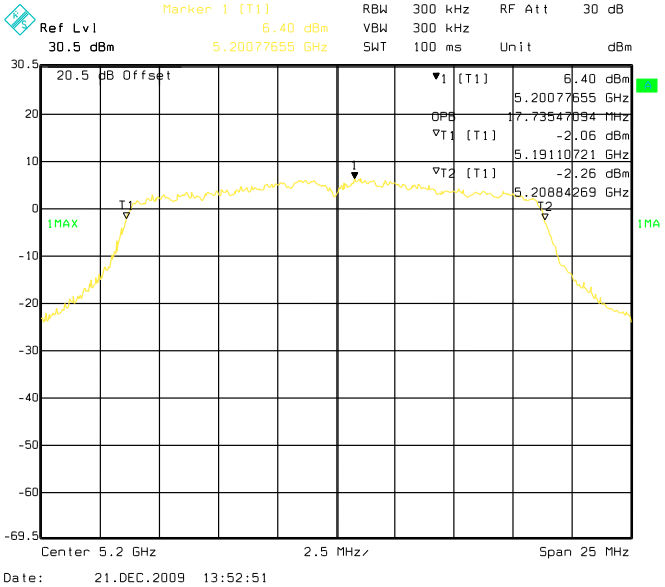
OBW tx1 ch36 a / n



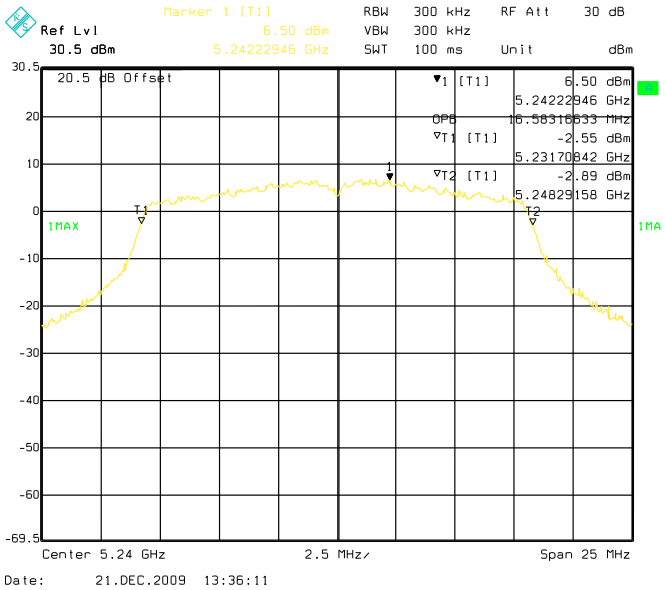


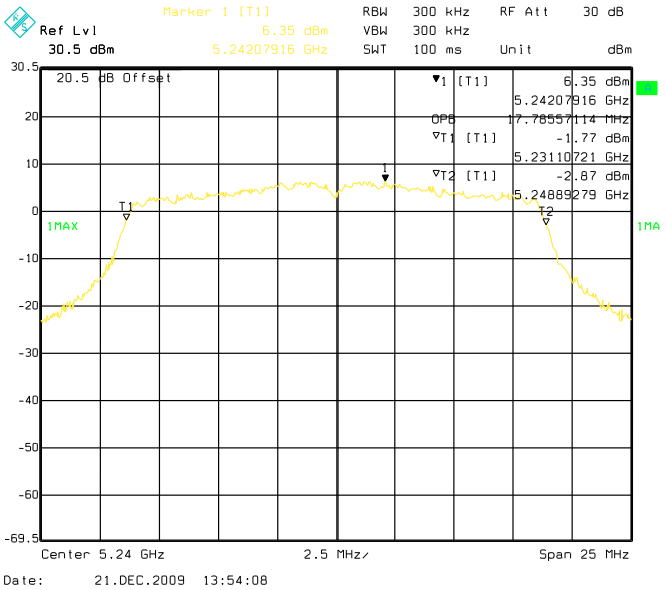
OBW tx1 ch40 a / n



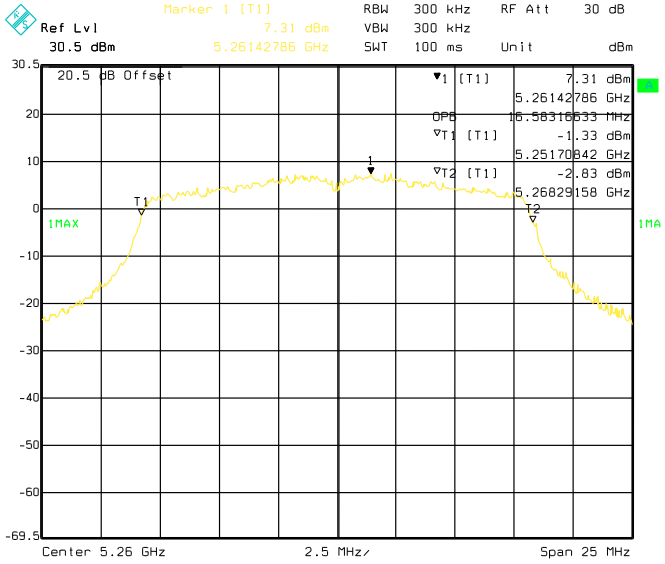


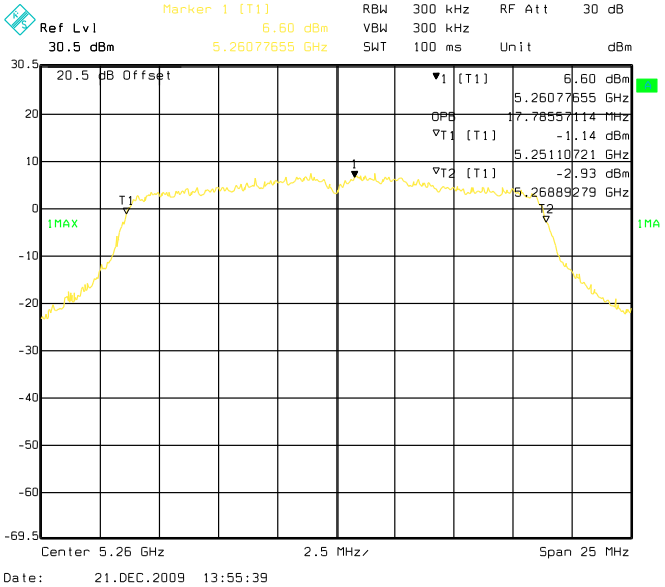
OBW tx1 ch48 a / n



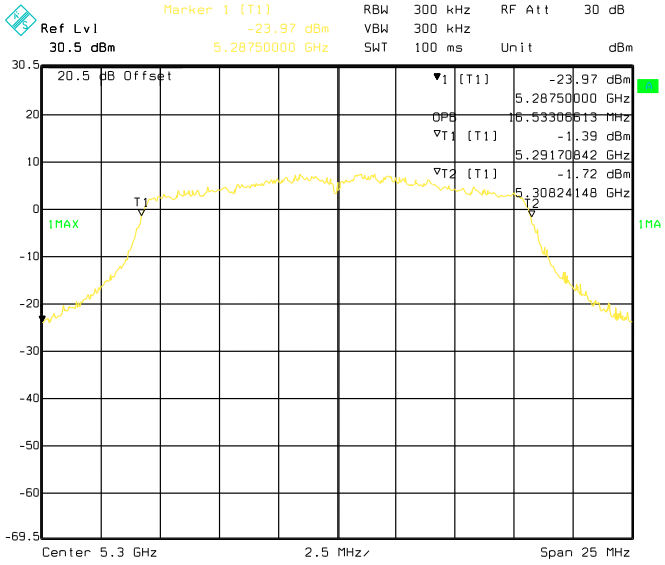


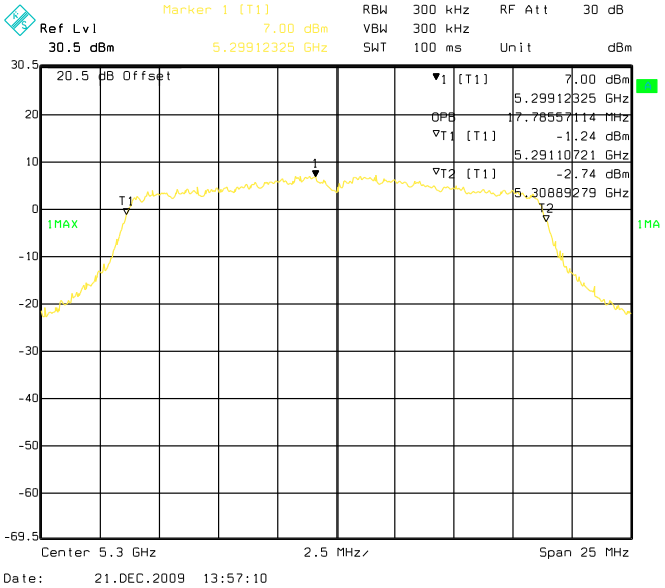
OBW tx1 ch52 a / n



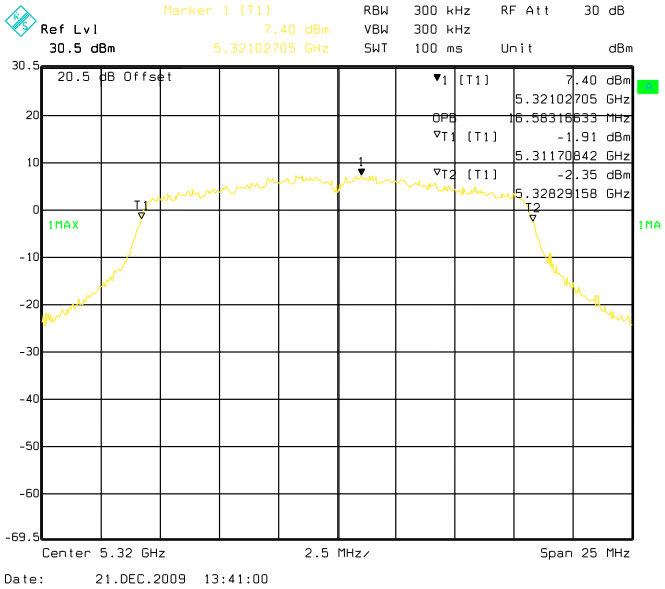


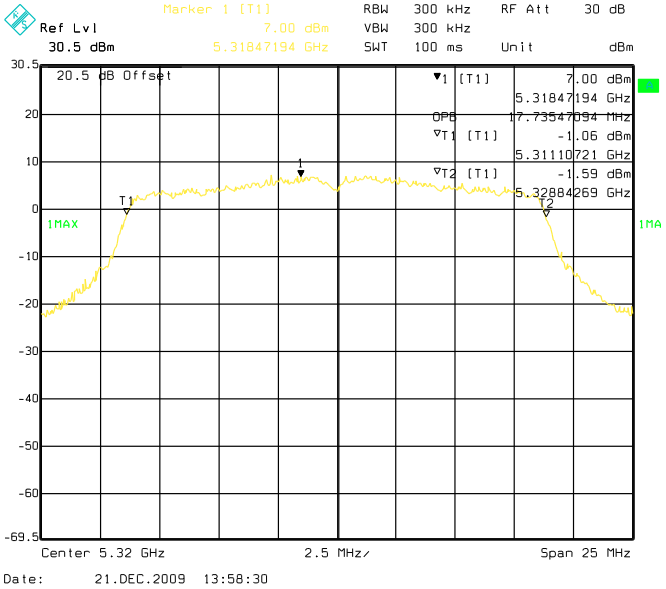
OBW tx1 ch60 a / n



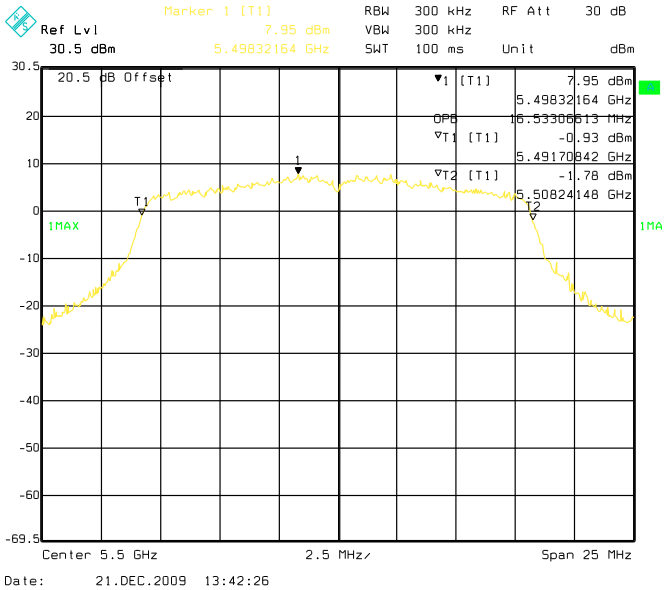


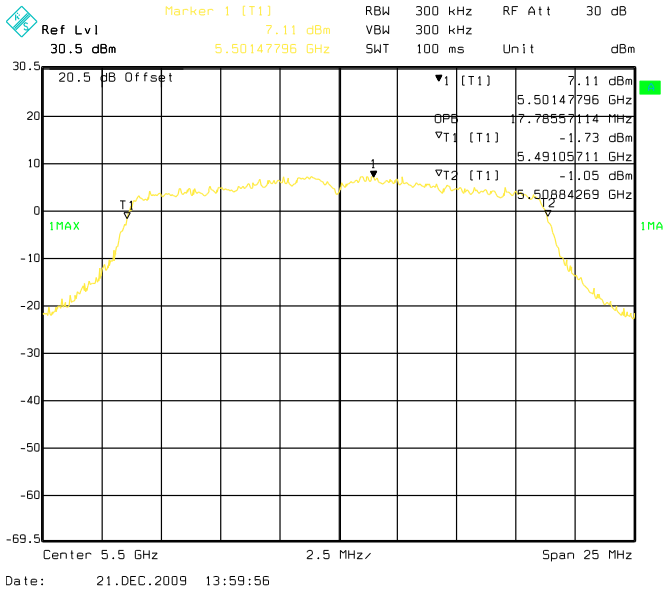
OBW tx1 ch64 a / n



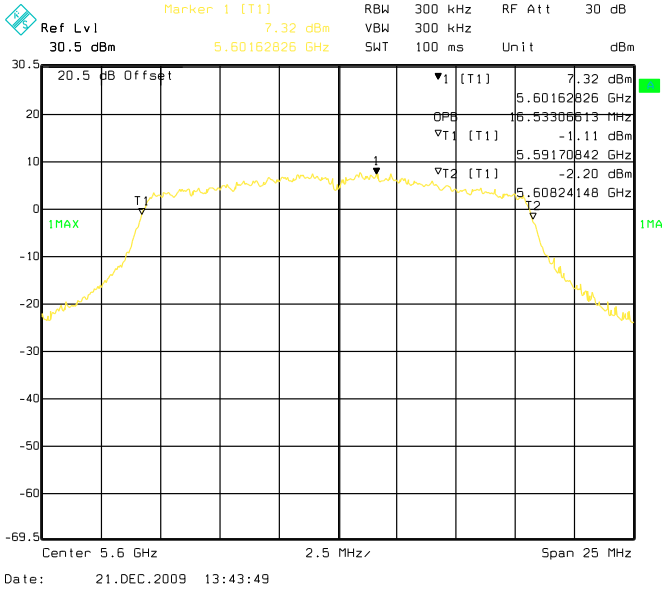


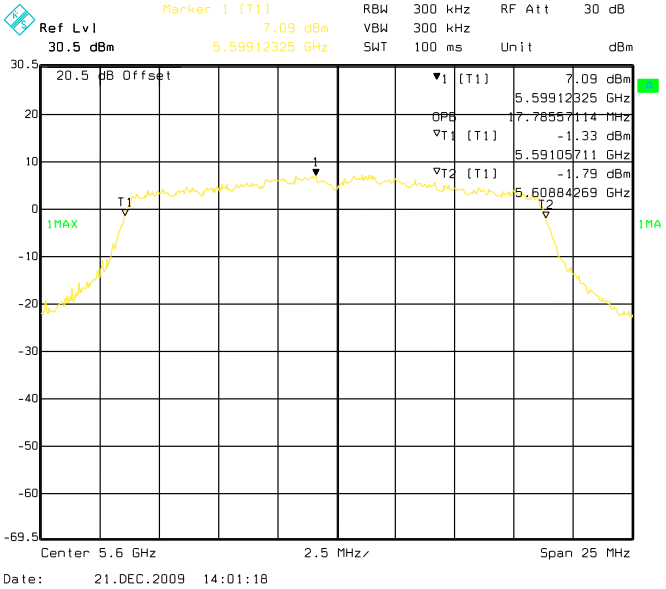
OBW tx1 ch100 a / n



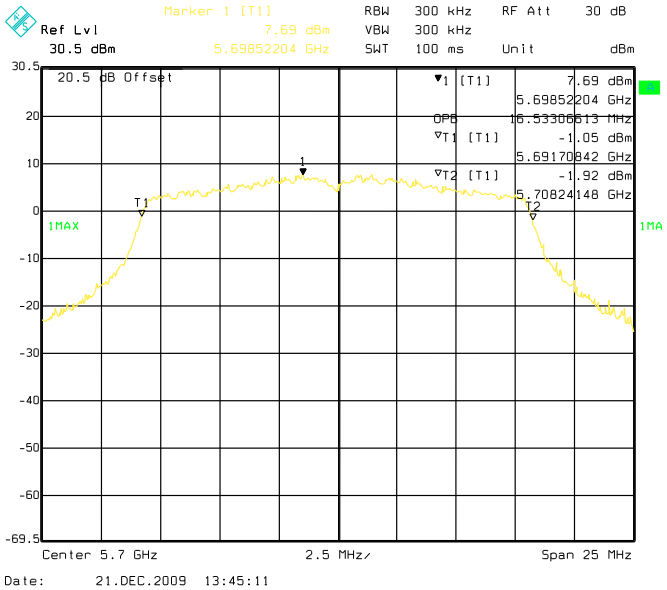


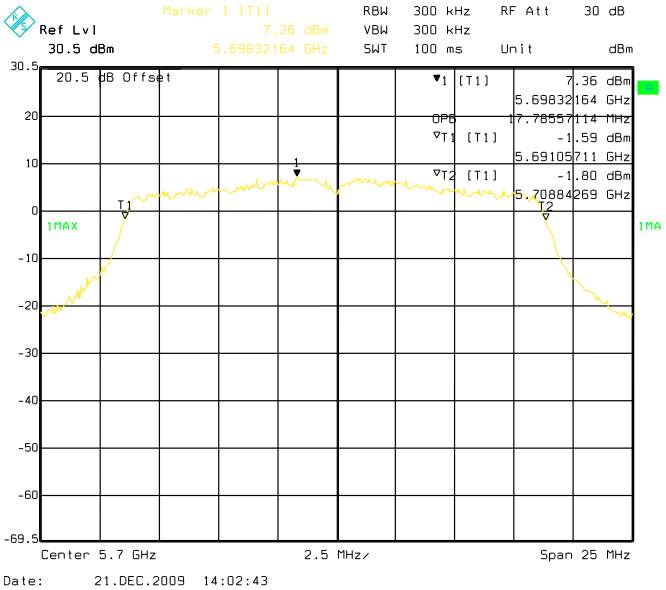
OBW tx1 ch120 a / n





OBW tx1 ch140 a / n





5.6 Peak Power Spectral Density

5.6.1 Limits:

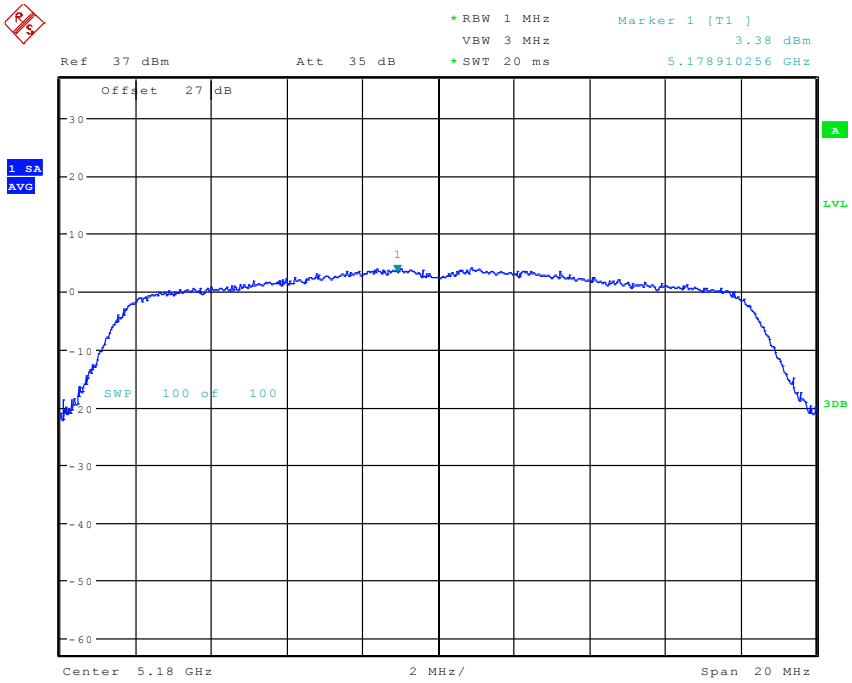
Sub-band 1: 5150-5250MHz 15.407(a) (1): 4dBm in any 1–MHz band
Sub-band 2: 5250-5350MHz 15.407(a) (2): 11dBm in any 1–MHz band
Sub-band 3: 5470-5725MHz 15.407(a) (2): 11dBm in any 1–MHz band

5.6.2 Results

Method 2 specified in FCC public knowledge DA-02-2138A1 was used.

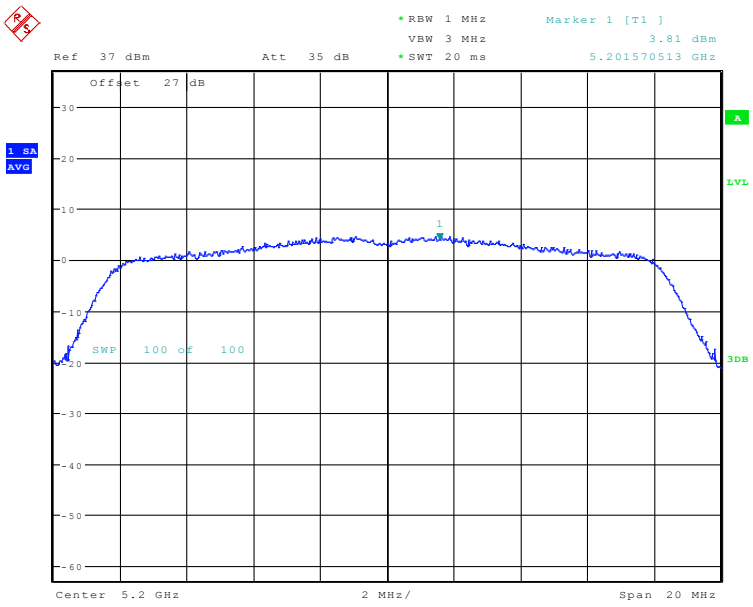
Peak Power Spectral Density (dBm)					
Frequency (MHz)	Channel	Tx0		Tx1	
		a	HT20	a	HT20
5180	36	3.38	3.66	1.06	0.57
5200	40	3.81	3.57	1.49	0.67
5240	48	3.9	3.77	0.69	1.4
5260	52	5.95	5.49	0.77	-0.03
5300	60	5.97	4.73	0.99	0.54
5320	64	5.05	4.85	1.69	0.63
5500	100	6.08	4.68	3.26	3.43
5600	120	7.19	5.68	4.74	3.6
5700	140	7.62	6.34	4.03	3.32

Tx0 802.11a Ch36



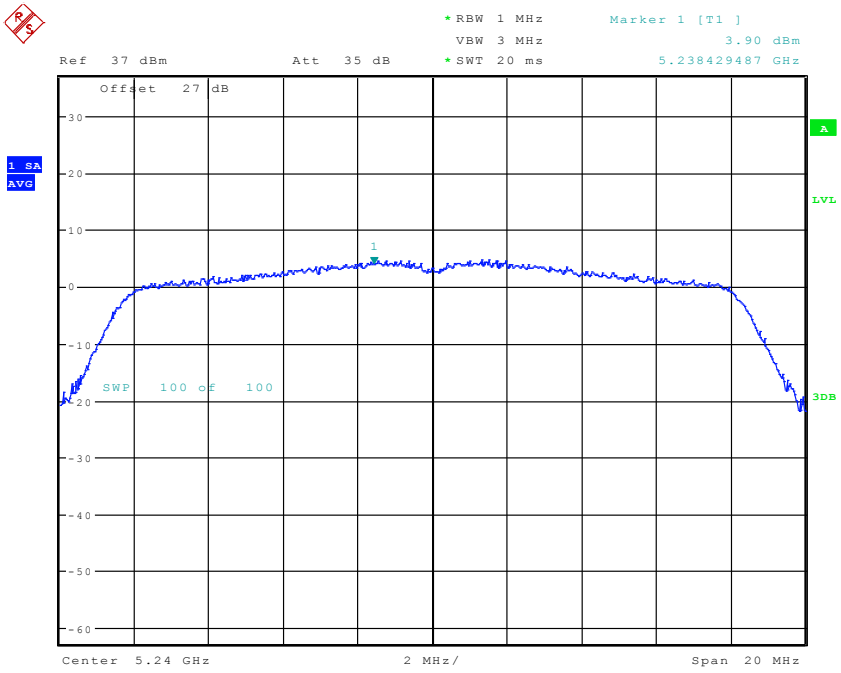
Date: 6.JAN.2010 11:48:12

Tx0 802.11a Ch40



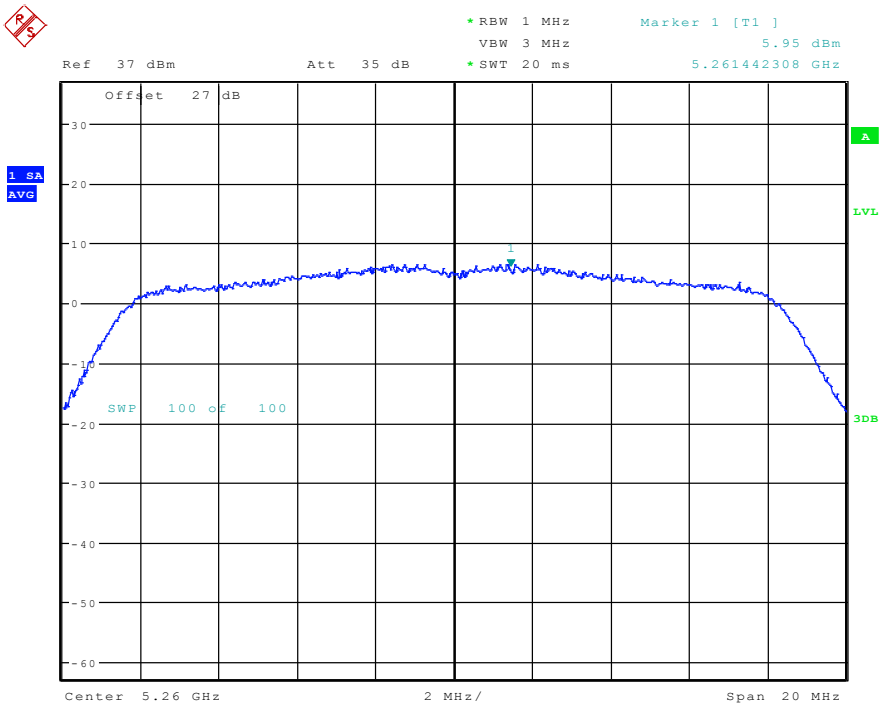
Date: 6.JAN.2010 11:50:01

Tx0 802.11a Ch48



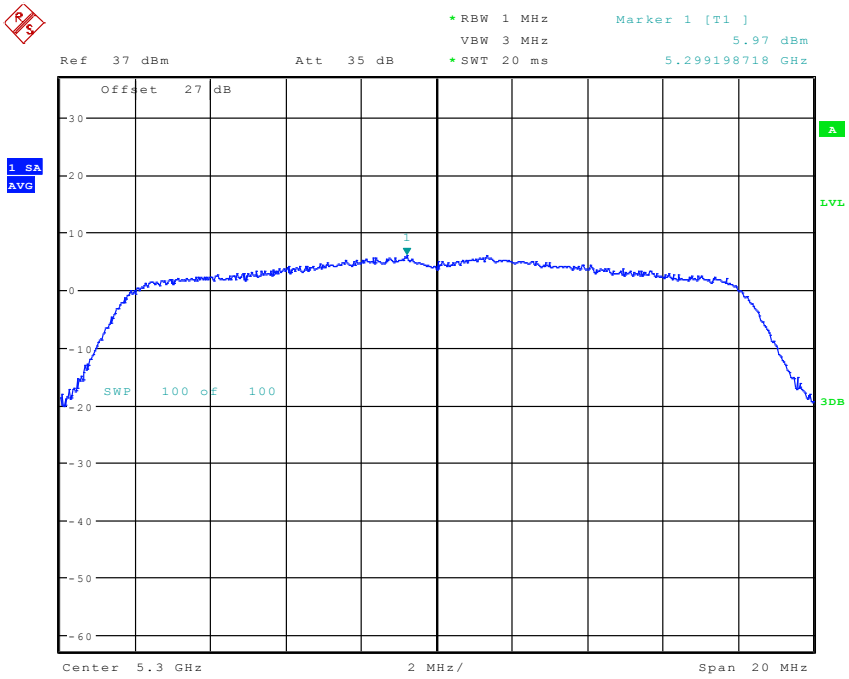
Date: 6.JAN.2010 11:53:41

Tx0 802.11a Ch52



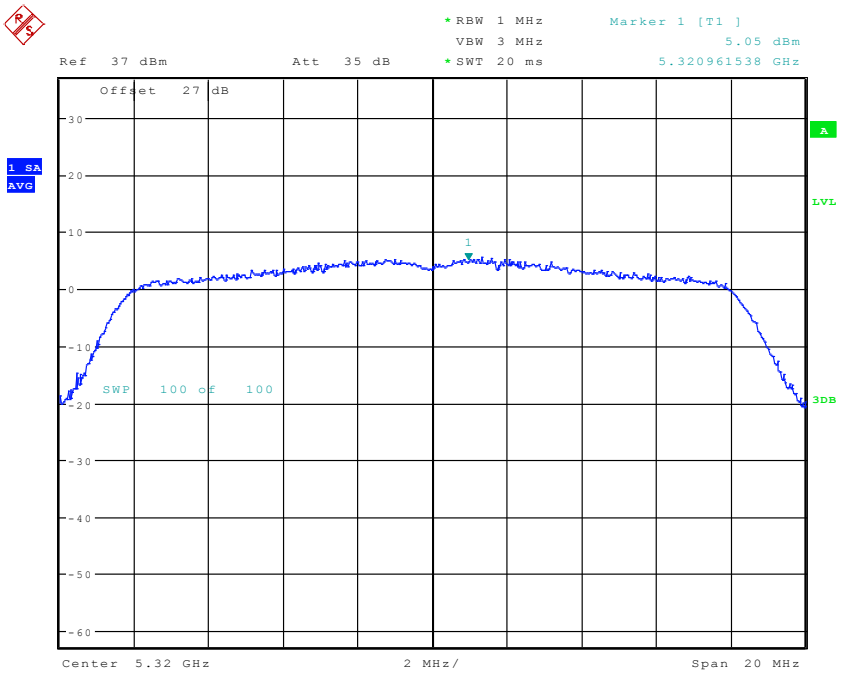
Date: 6.JAN.2010 12:34:49

Tx0 802.11a Ch60



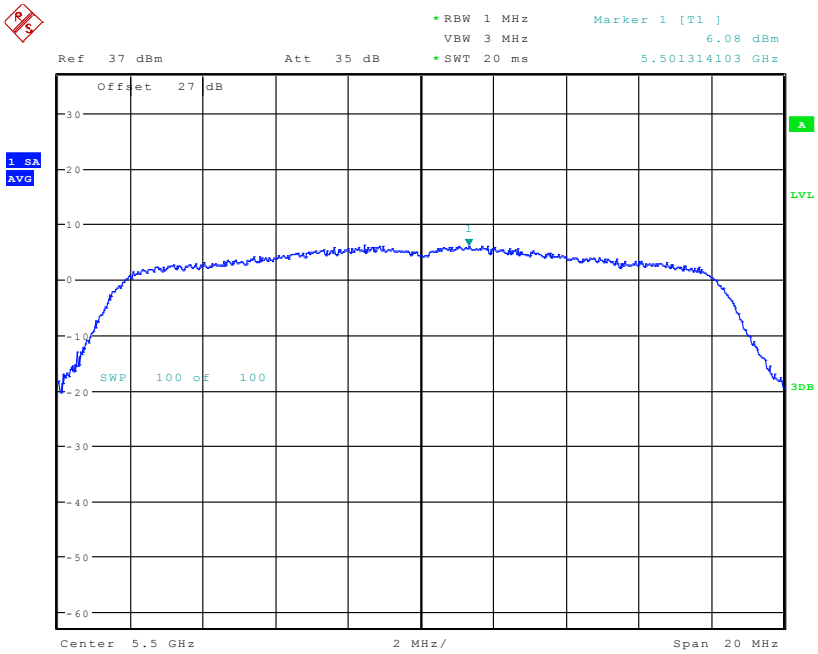
Date: 6.JAN.2010 12:38:57

Tx0 802.11a Ch64



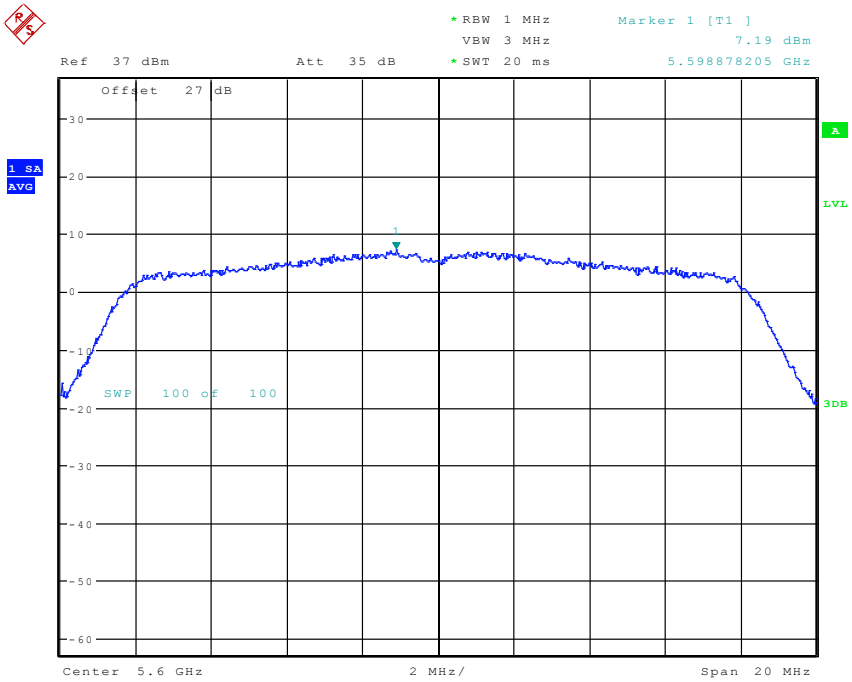
Date: 6.JAN.2010 12:39:58

Tx0 802.11a Ch100



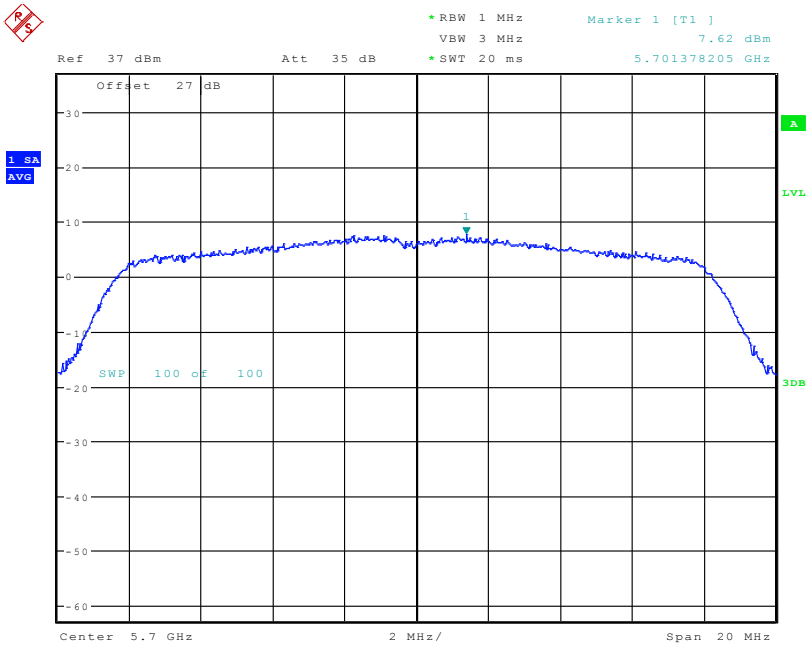
Date: 6.JAN.2010 12:41:44

Tx0 802.11a Ch120



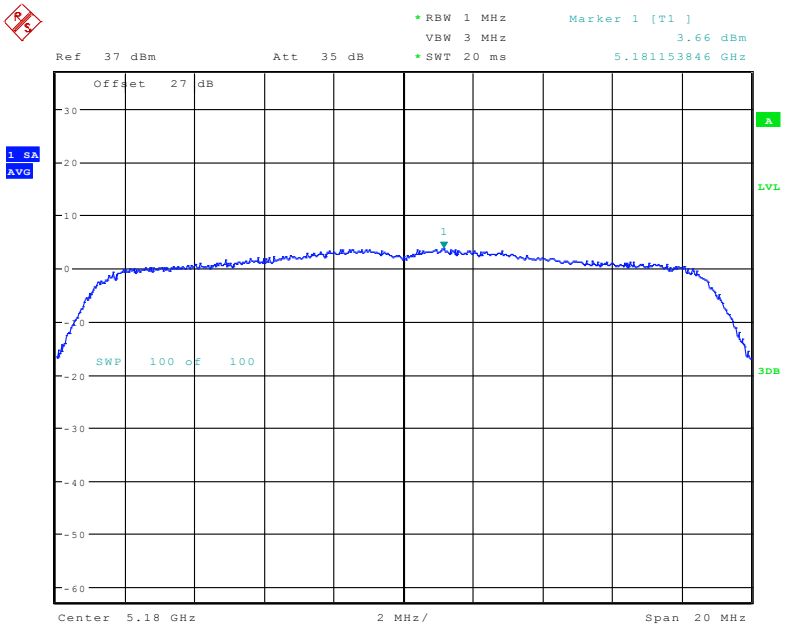
Date: 6.JAN.2010 12:42:55

Tx0 802.11a Ch140



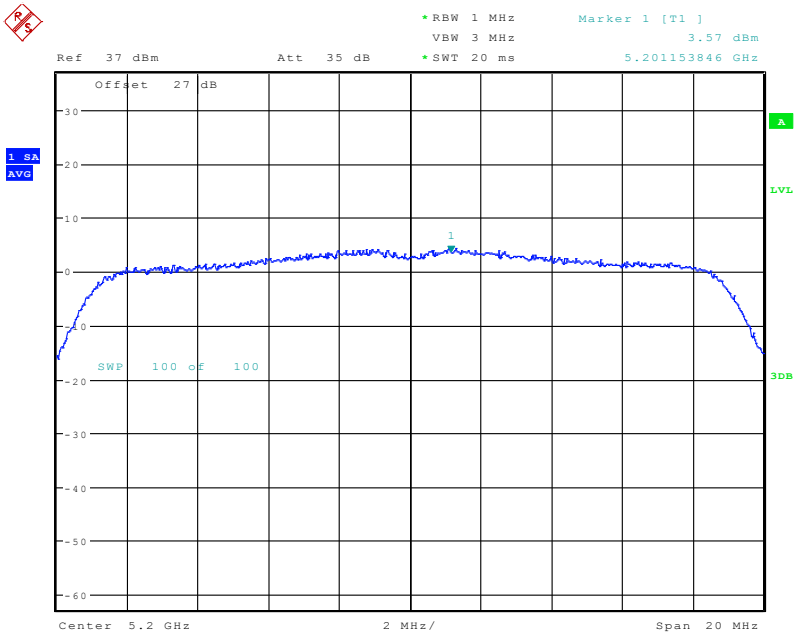
Date: 6.JAN.2010 12:44:38

Tx0 802.11n Ch36



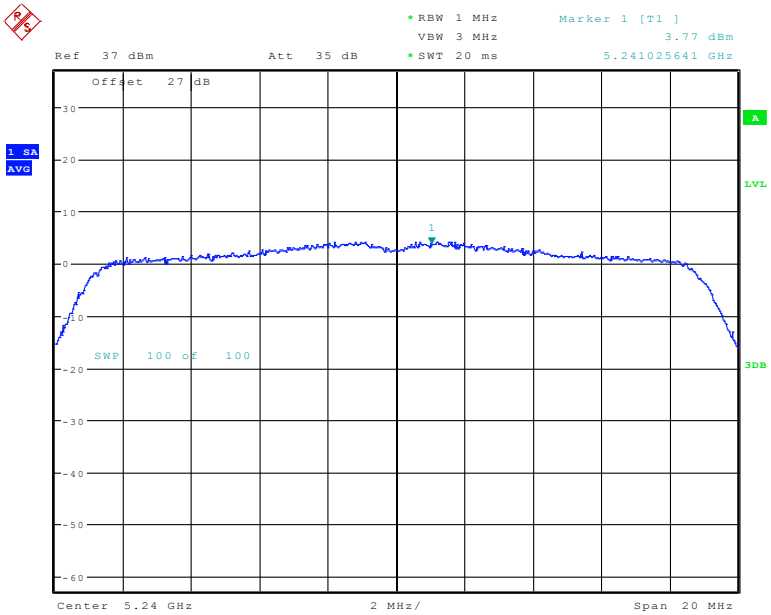
Date: 6.JAN.2010 11:48:58

Tx0 802.11n Ch40



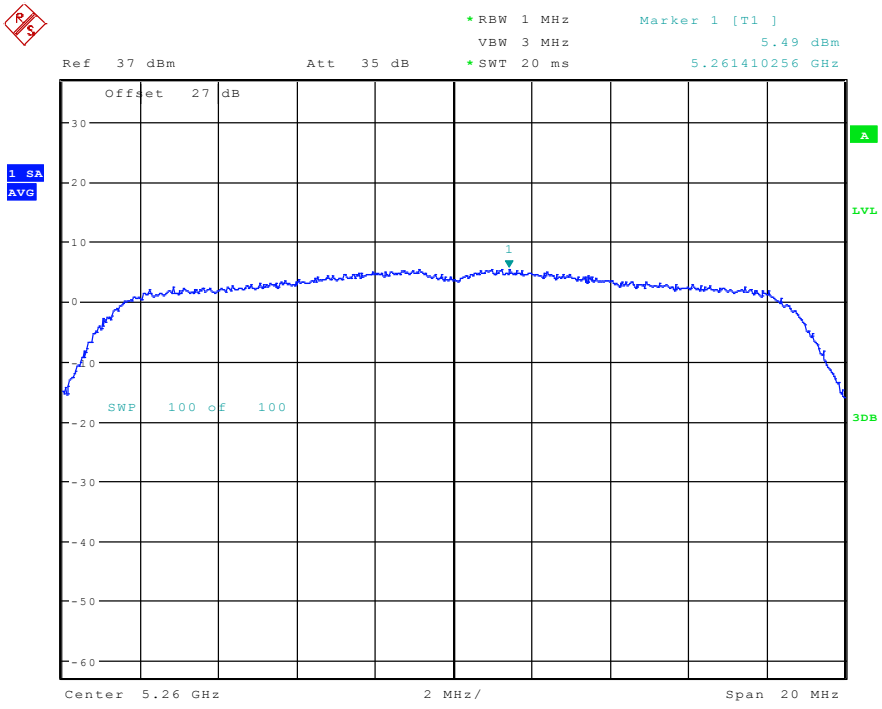
Date: 6.JAN.2010 11:50:40

Tx0 802.11n Ch48



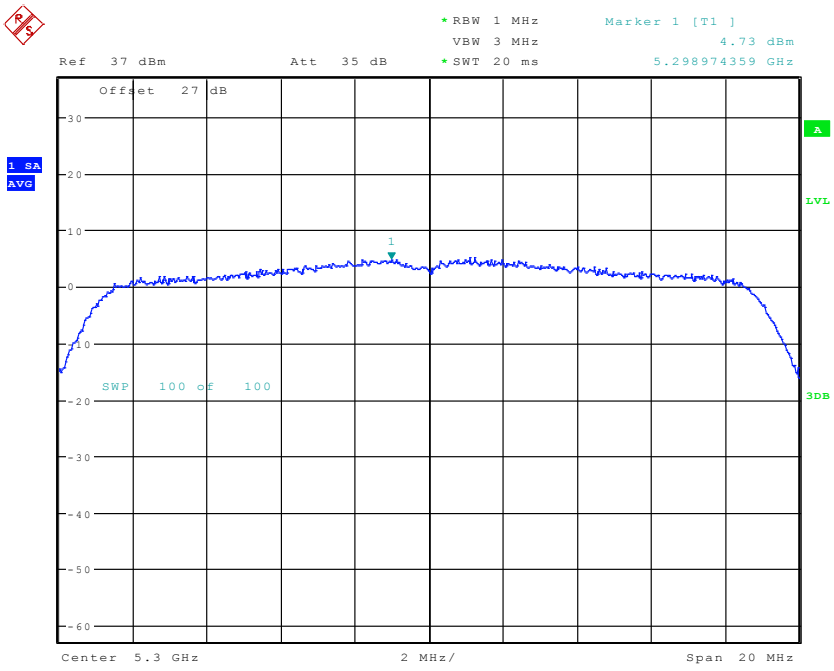
Date: 6.JAN.2010 11:56:43

Tx0 802.11n Ch52



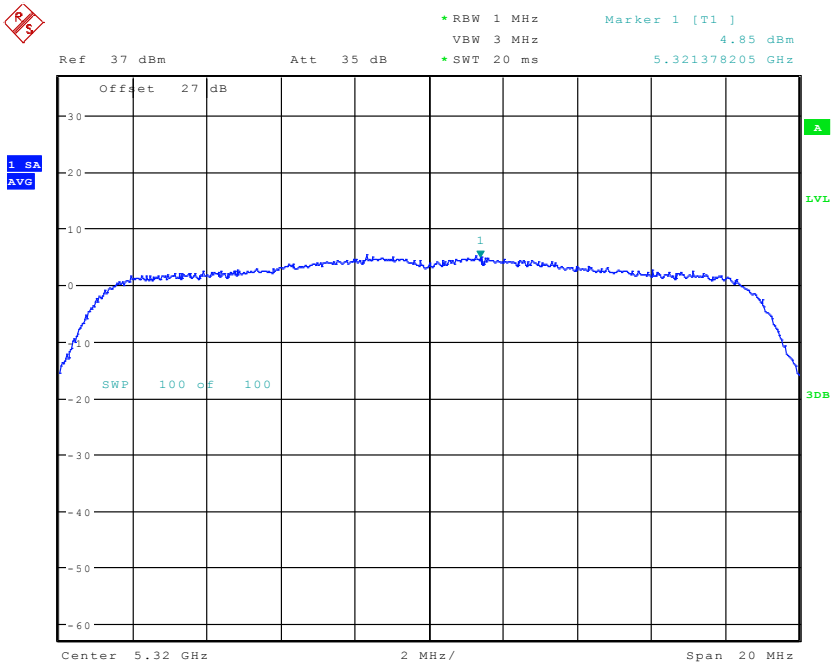
Date: 6.JAN.2010 12:38:09

Tx0 802.11n Ch60



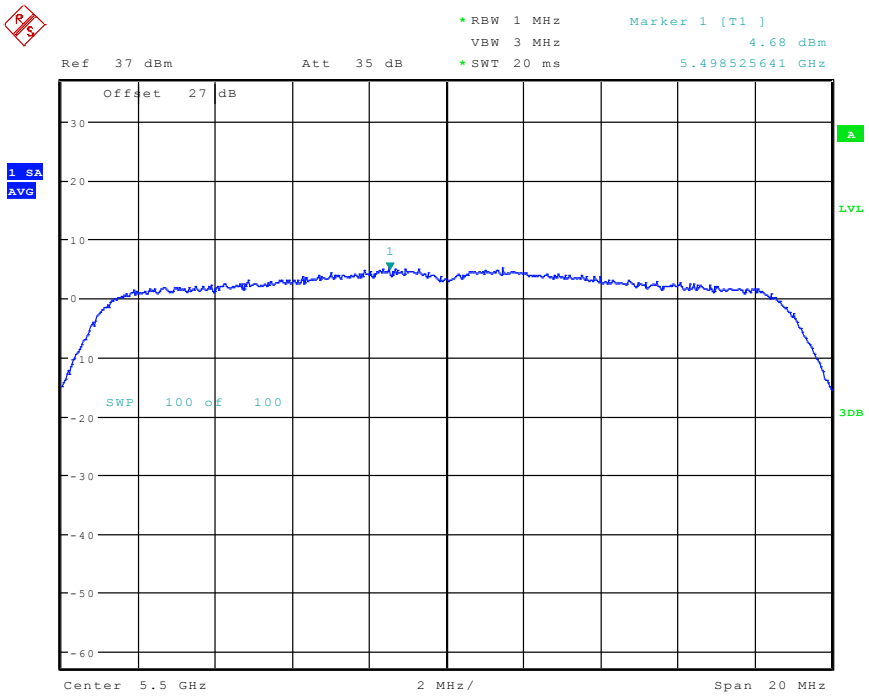
Date: 6.JAN.2010 12:39:24

Tx0 802.11n Ch64



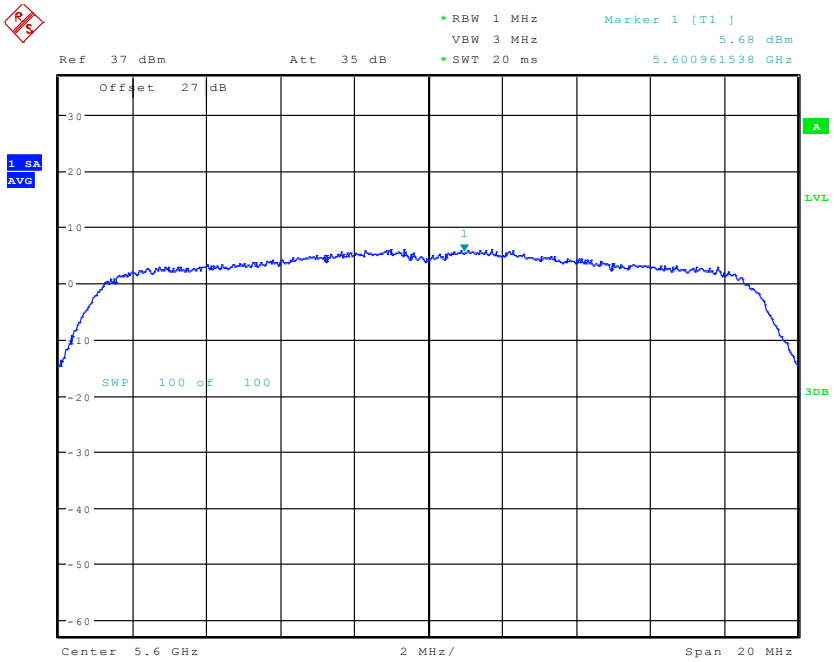
Date: 6.JAN.2010 12:40:47

Tx0 802.11n Ch100



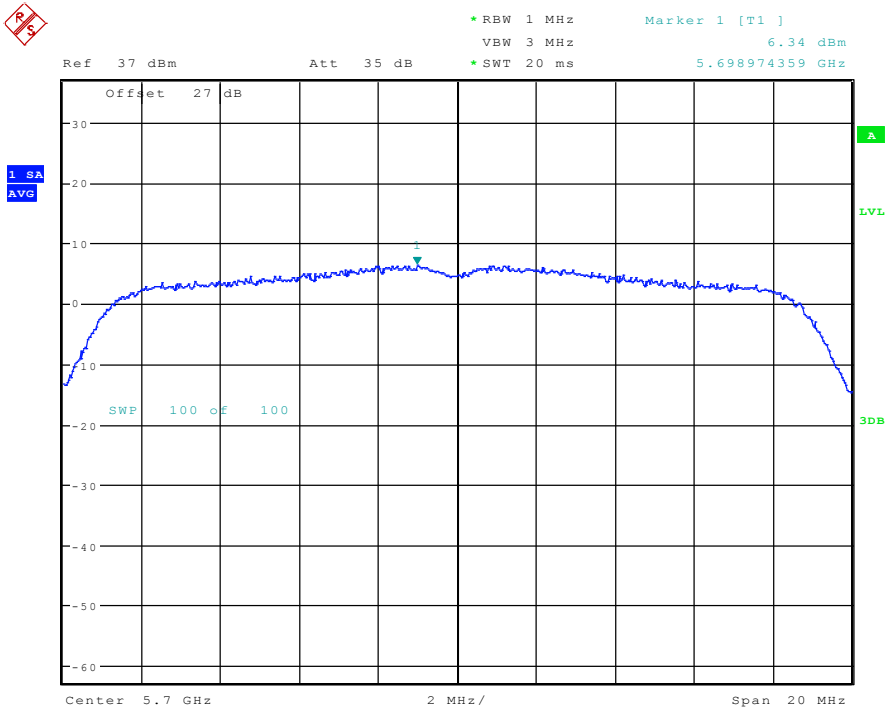
Date: 6.JAN.2010 12:42:18

Tx0 802.11n Ch120



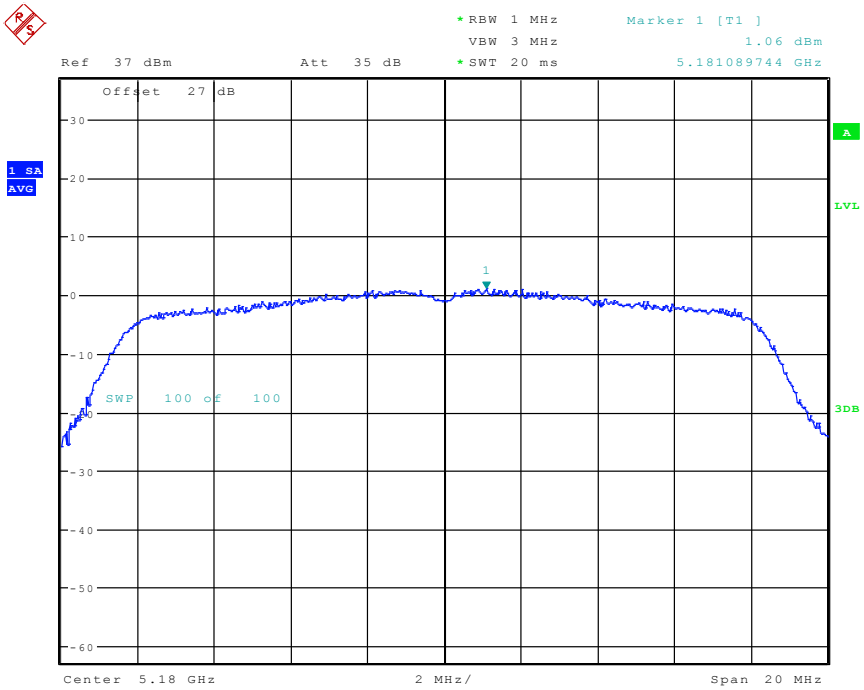
Date: 6.JAN.2010 12:43:40

Tx0 802.11n Ch140



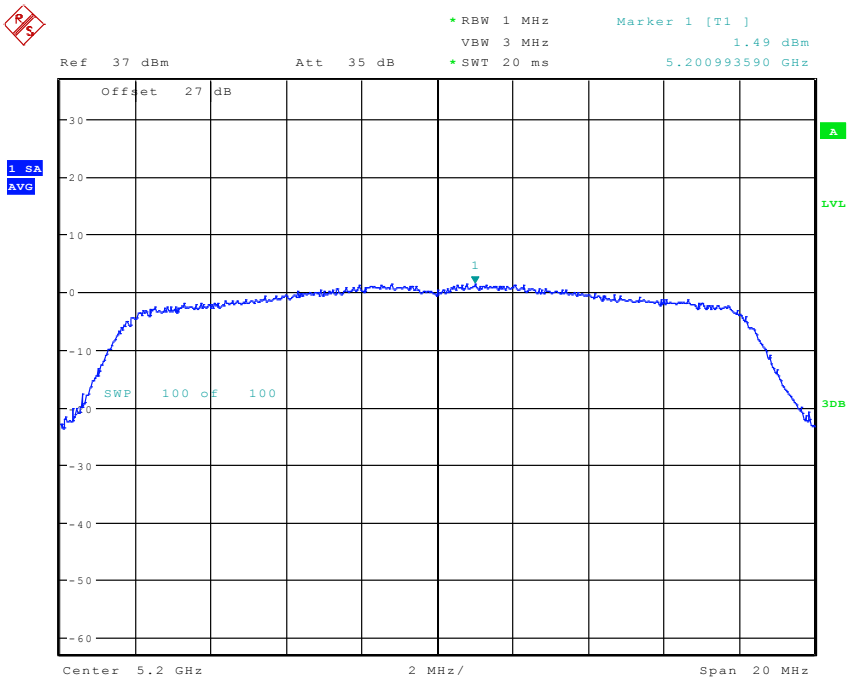
Date: 6.JAN.2010 12:45:06

Tx1 802.11a Ch36



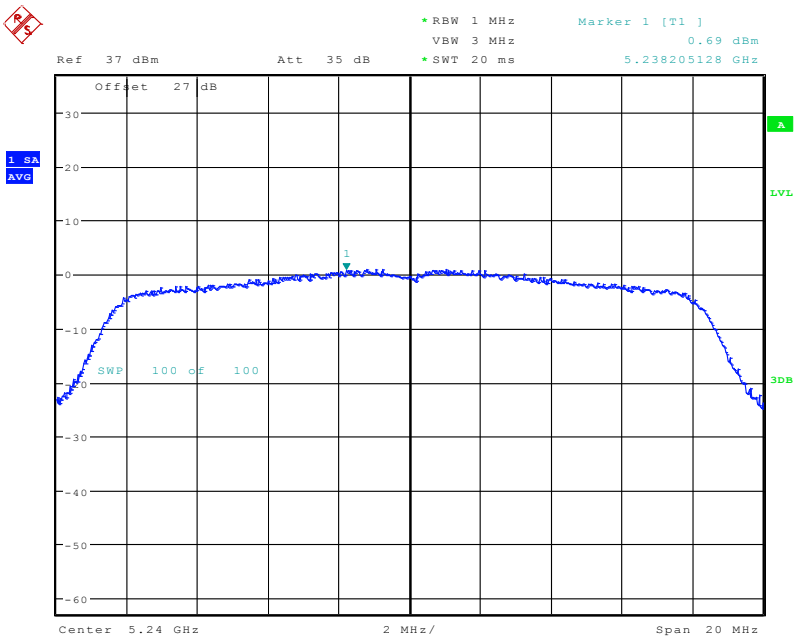
Date: 6.JAN.2010 11:25:31

Tx1 802.11a Ch40



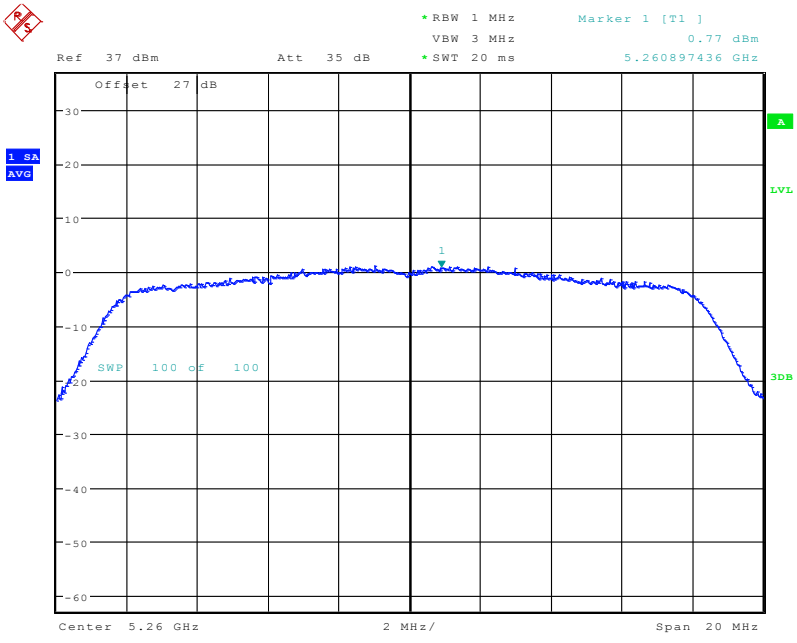
Date: 6.JAN.2010 11:26:53

Tx1 802.11a Ch48



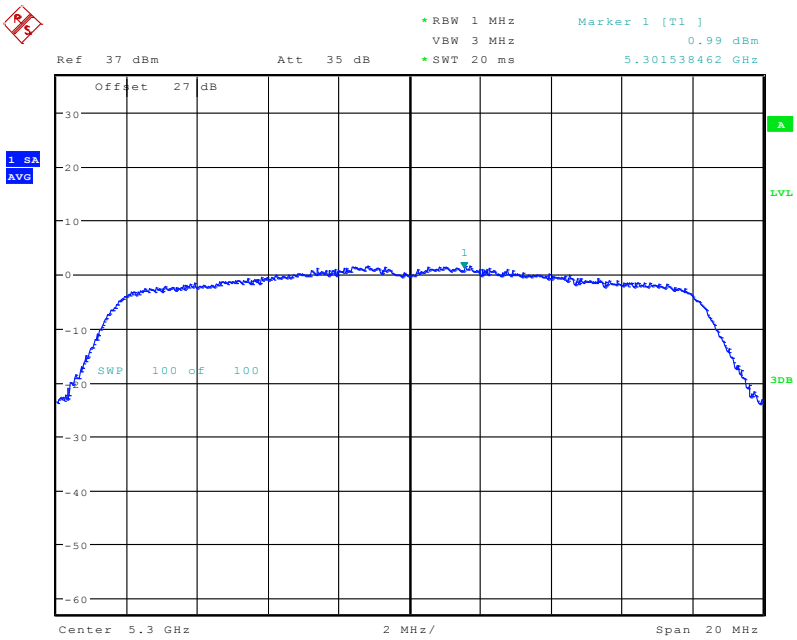
Date: 6.JAN.2010 11:28:23

Tx1 802.11a Ch52



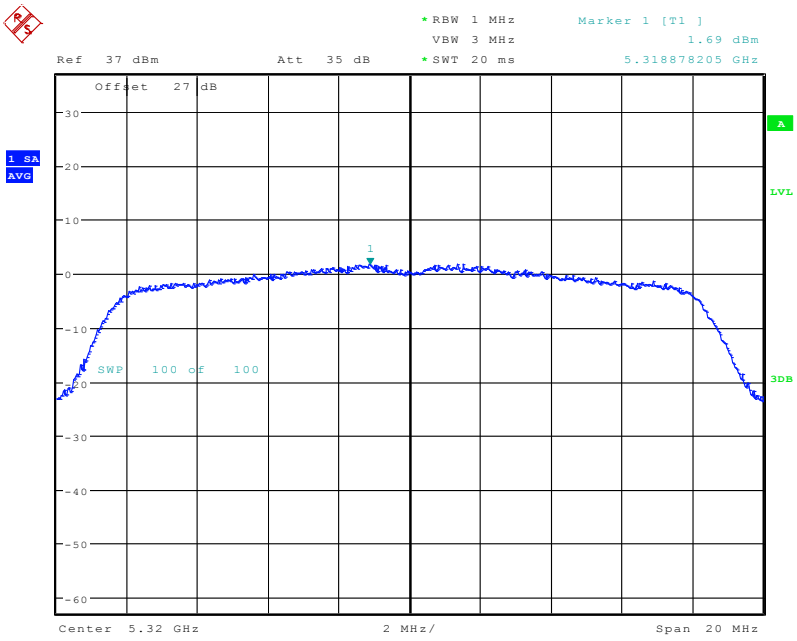
Date: 6.JAN.2010 11:20:41

Tx1 802.11a Ch60



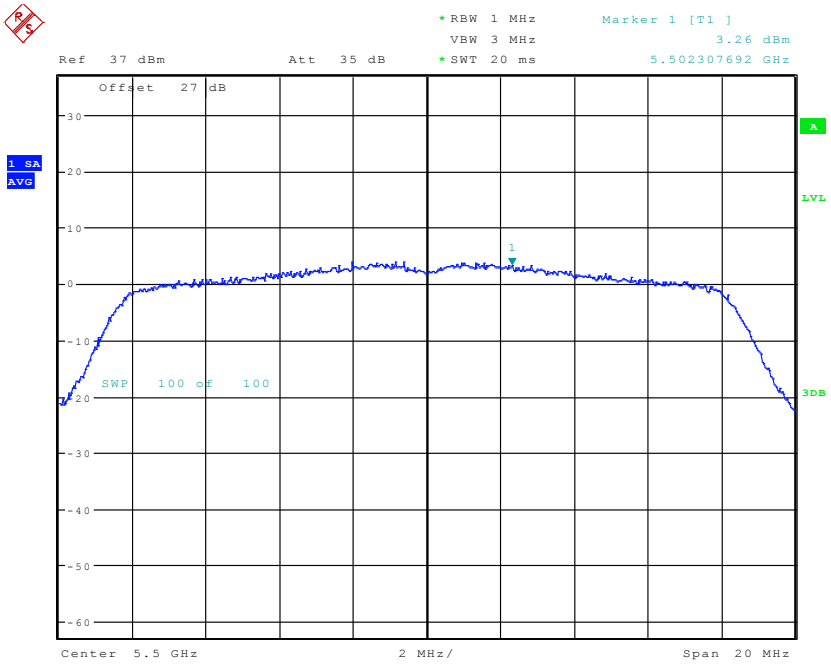
Date: 6.JAN.2010 11:21:45

Tx1 802.11a Ch64



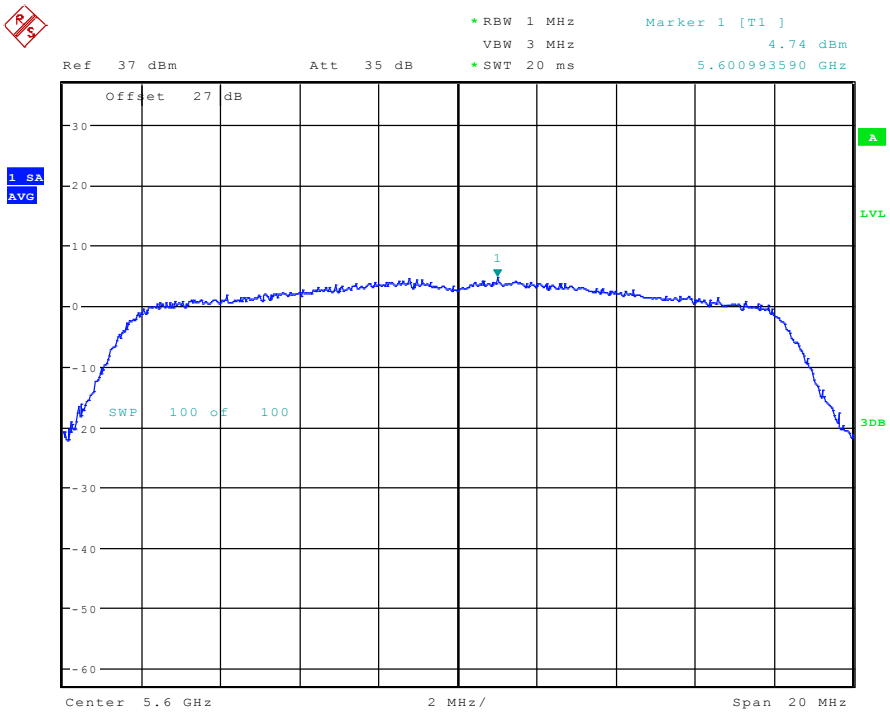
Date: 6.JAN.2010 11:24:37

Tx1 802.11a Ch100



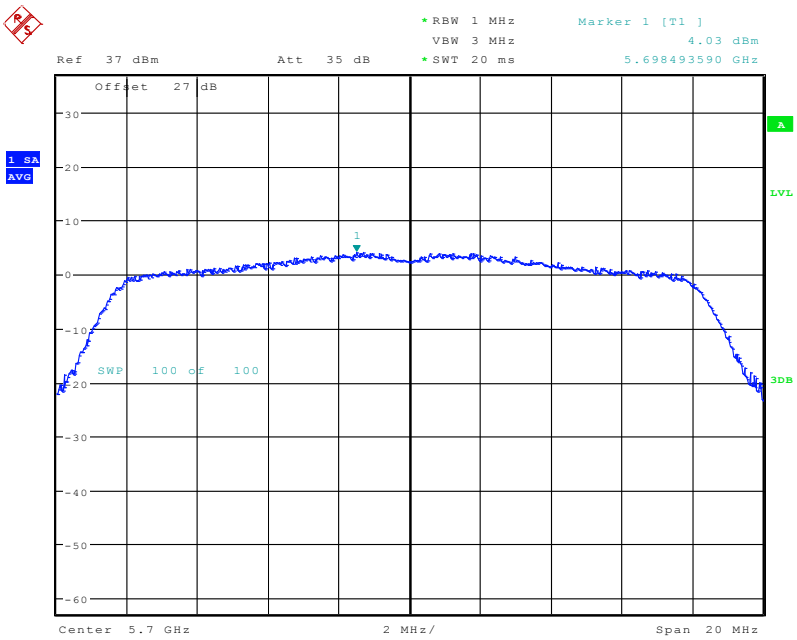
Date: 6.JAN.2010 11:30:18

Tx1 802.11a Ch120



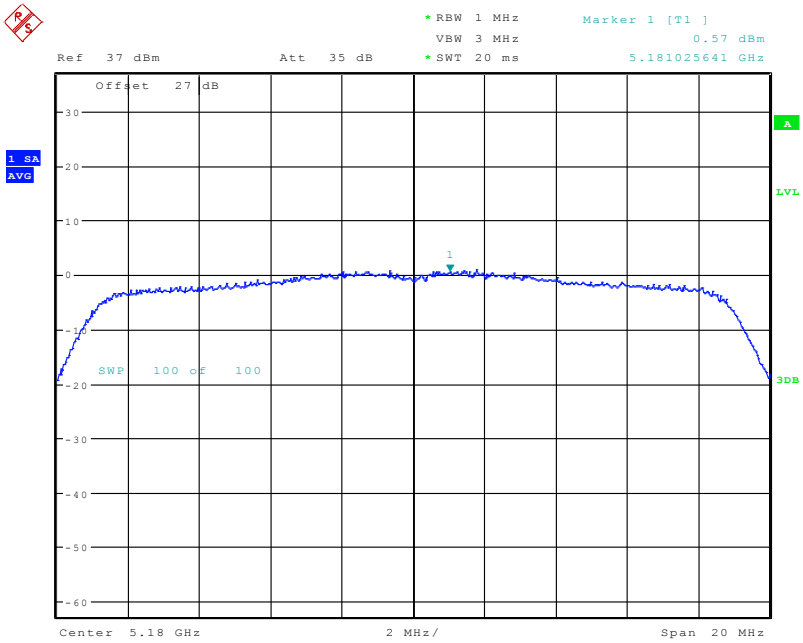
Date: 6.JAN.2010 11:31:41

Tx1 802.11a Ch140



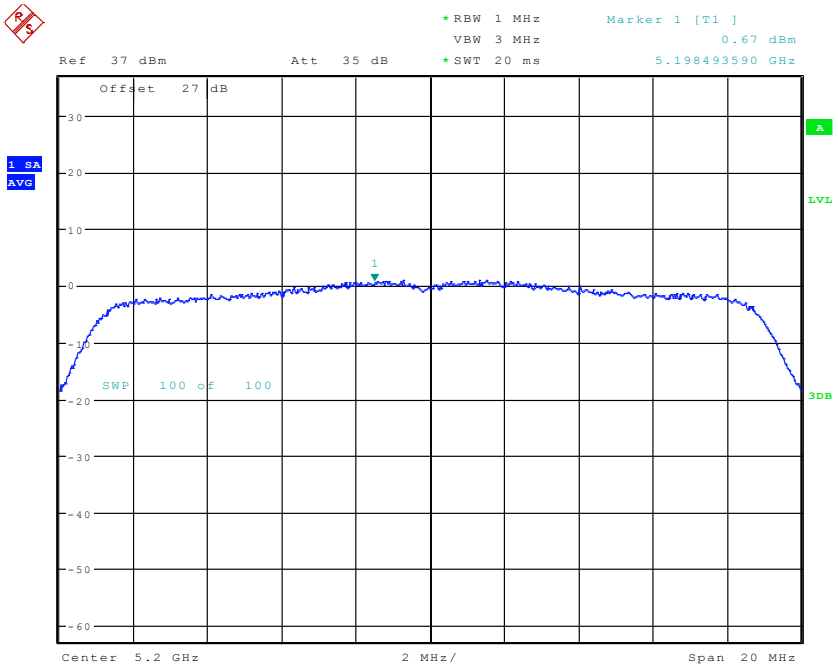
Date: 6.JAN.2010 11:33:18

Tx1 802.11n Ch36



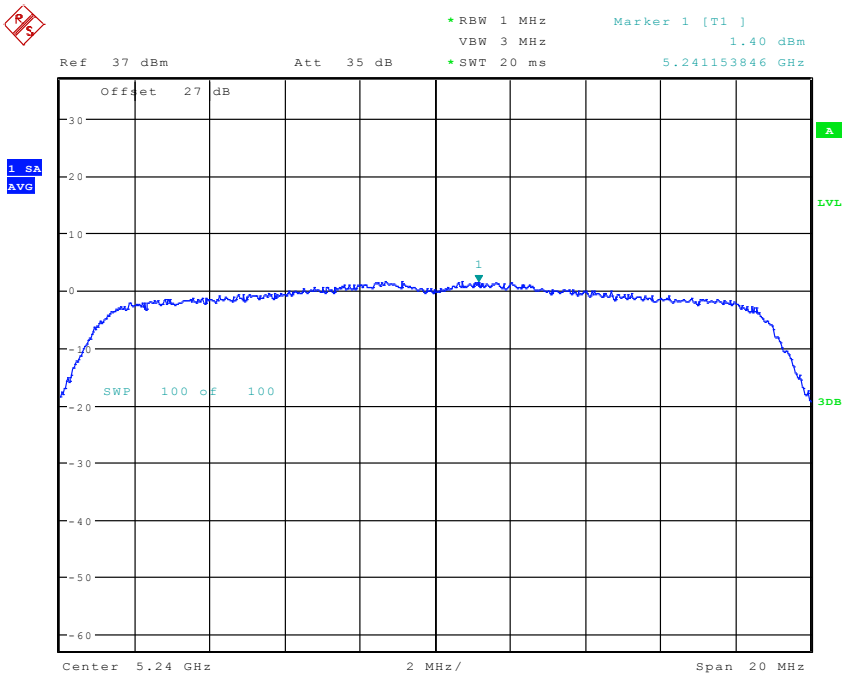
Date: 6.JAN.2010 11:26:00

Tx1 802.11n Ch40



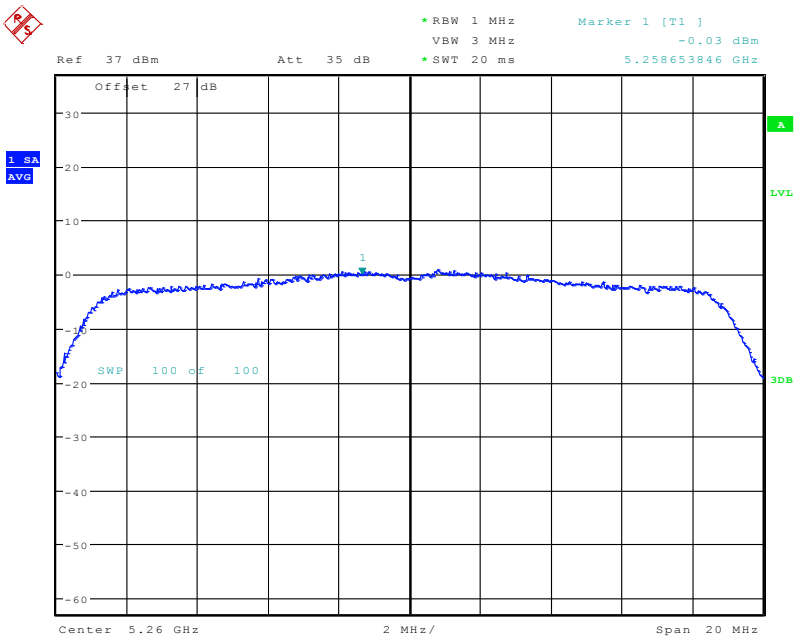
Date: 6.JAN.2010 11:27:26

Tx1 802.11n Ch48



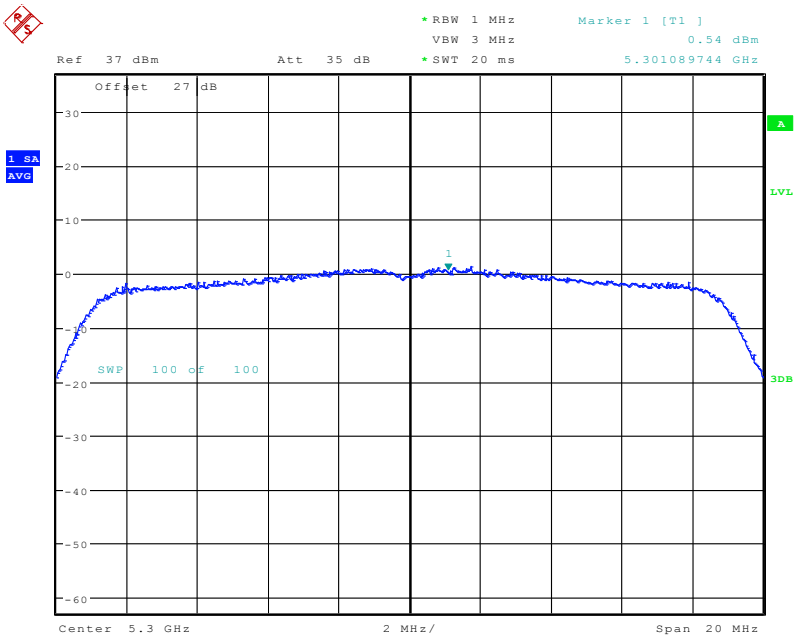
Date: 6.JAN.2010 11:28:59

Tx1 802.11n Ch52



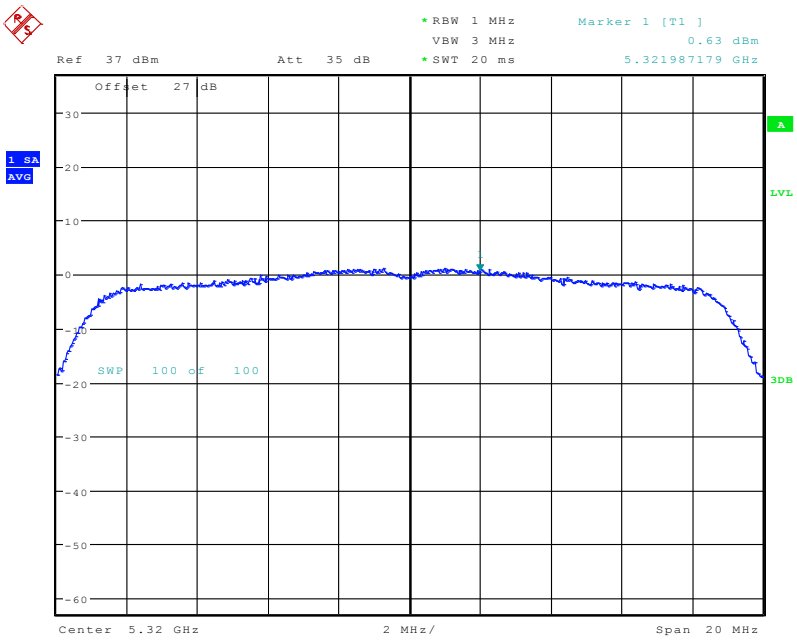
Date: 6.JAN.2010 11:18:41

Tx1 802.11n Ch60



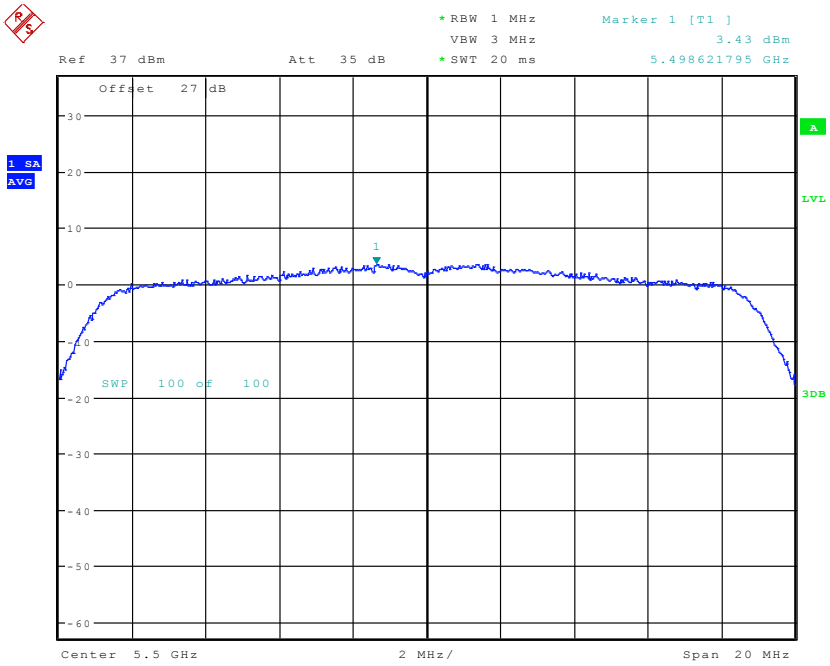
Date: 6.JAN.2010 11:22:17

Tx1 802.11n Ch64



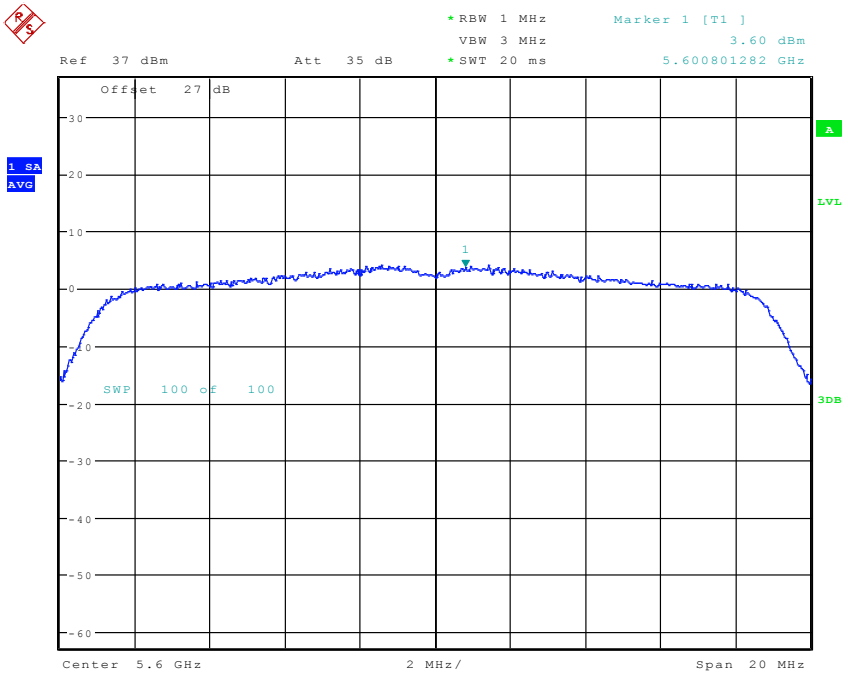
Date: 6.JAN.2010 11:23:18

Tx1 802.11n Ch100



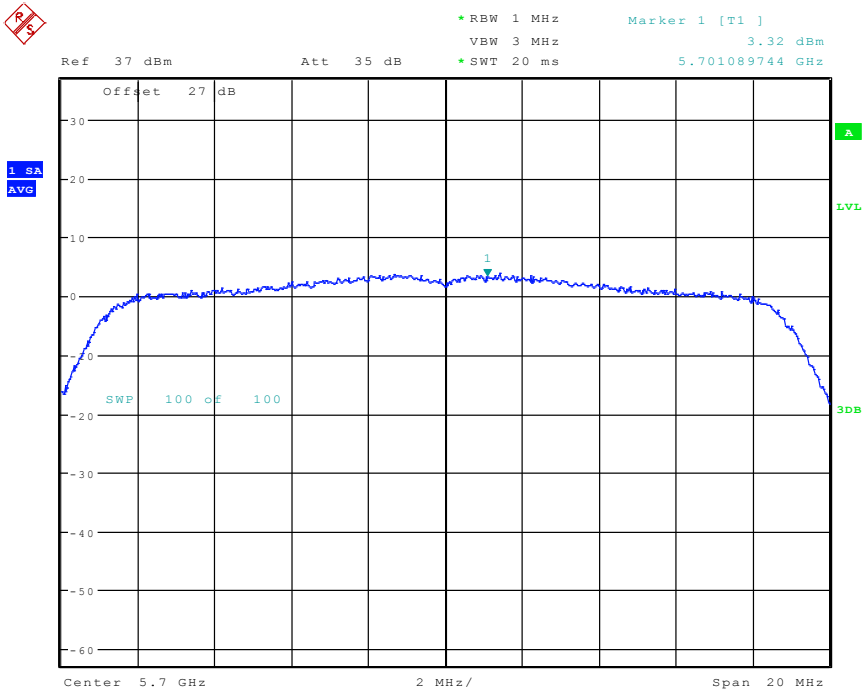
Date: 6.JAN.2010 11:30:51

Tx1 802.11n Ch120



Date: 6.JAN.2010 11:32:18

Tx1 802.11n Ch140



Date: 6.JAN.2010 11:33:48

5.7 Peak Excursion

5.7.1 Limit

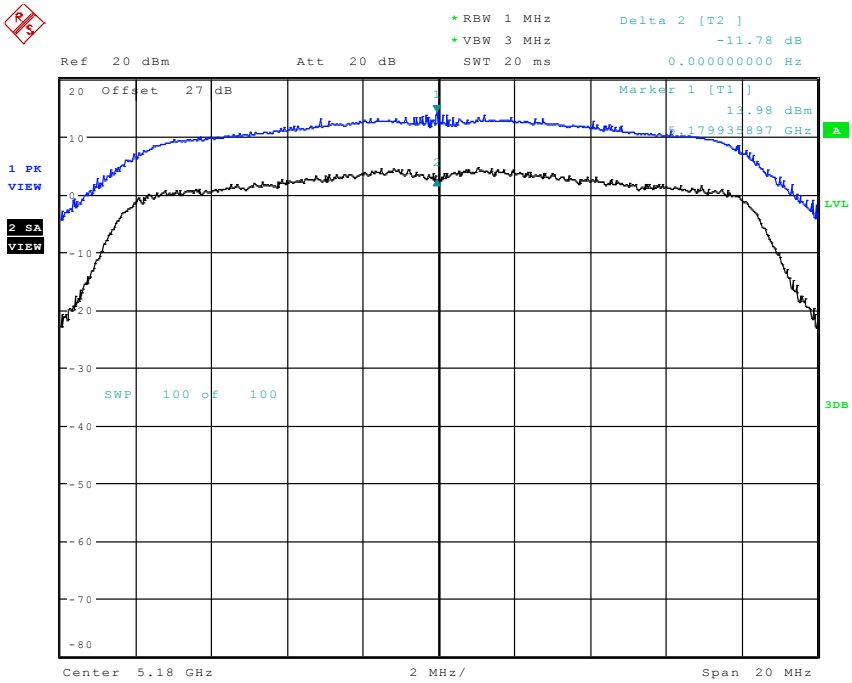
FCC15.407 (A)(6): The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

5.7.2 Results

The peak conducted power is measured with a spectrum analyzer and method 2 specified in FCC public knowledge DA-02-2138A1.

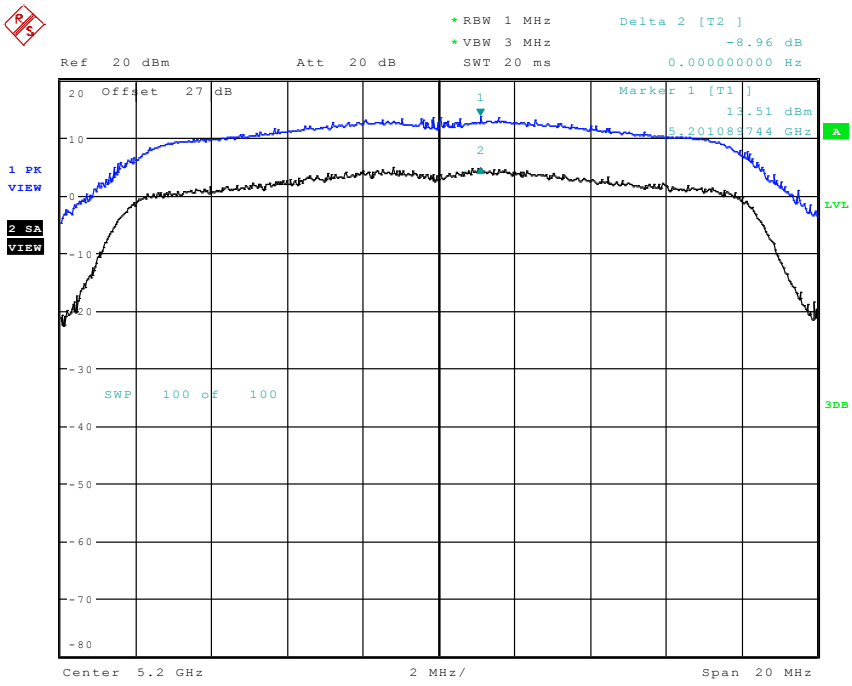
Peak Excursion (dB)					
Frequency (MHz)	Channel	Tx0		Tx1	
		a	HT20	a	HT20
5180	36	11.78	9.75	11.5	9.27
5200	40	8.96	10.48	10.59	10.38
5240	48	10.31	11.27	9.56	10.02
5260	52	9.1	9.9	10.88	10.99
5300	60	10.18	11.14	10.92	10.82
5320	64	9.89	9.94	11.41	10.32
5500	100	10.82	10.3	11.42	10.39
5600	120	10.83	11.19	10.01	10.22
5700	140	10.55	10.41	9.56	9.53

Tx0 802.11a Ch36



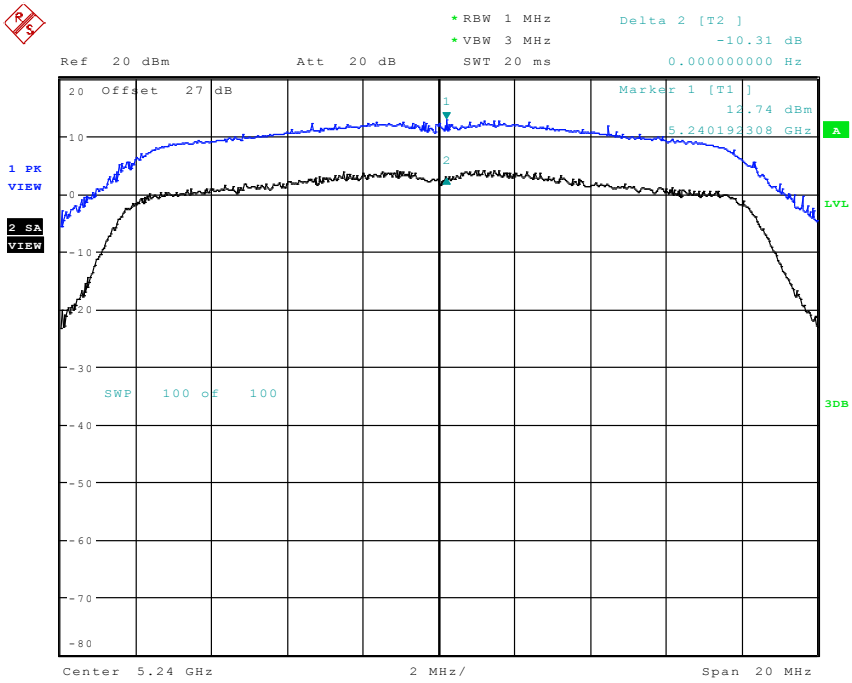
Date: 6.JAN.2010 15:19:53

Tx0 802.11a Ch40



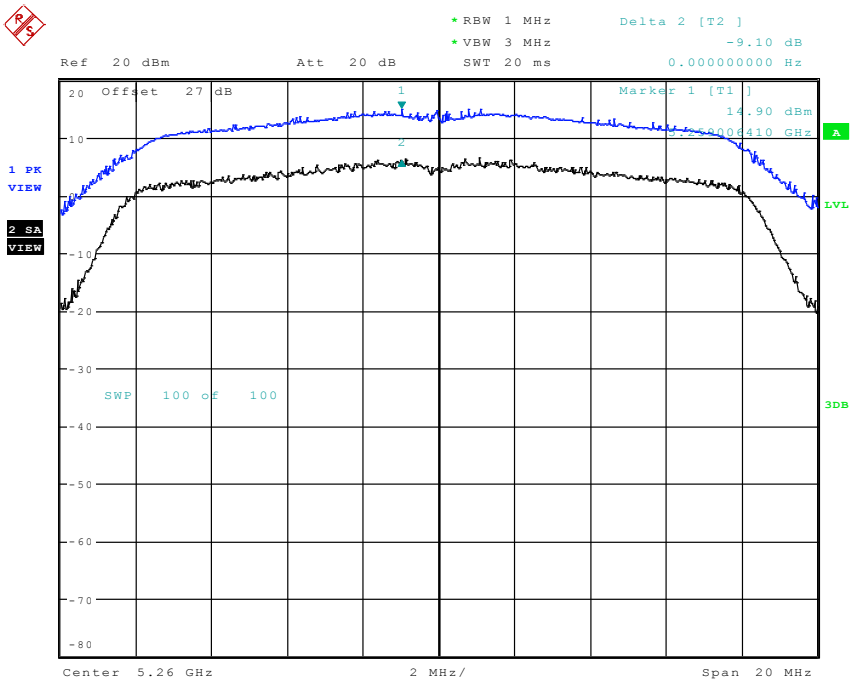
Date: 6.JAN.2010 15:22:22

Tx0 802.11a Ch48



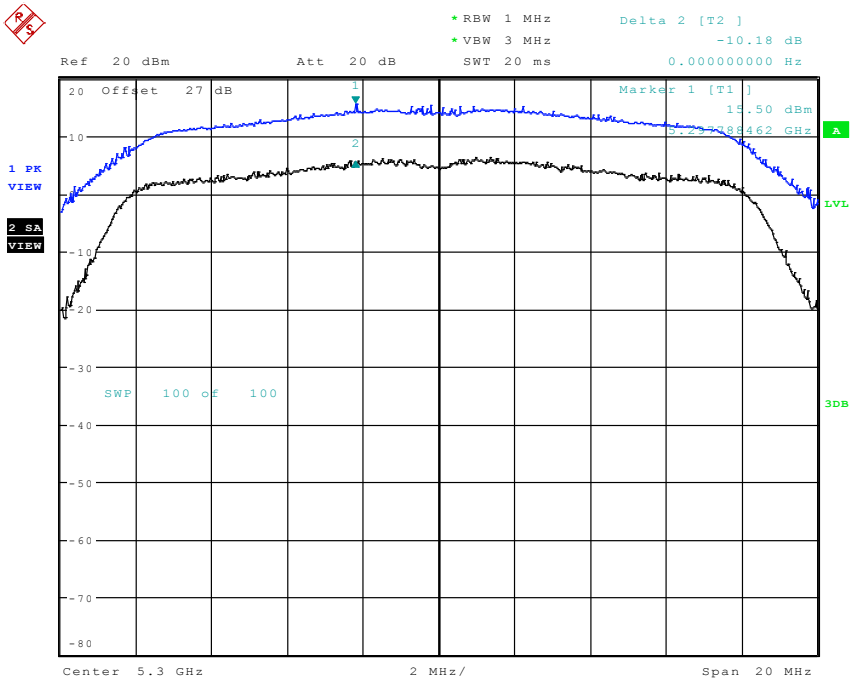
Date: 6.JAN.2010 15:25:03

Tx0 802.11a Ch52



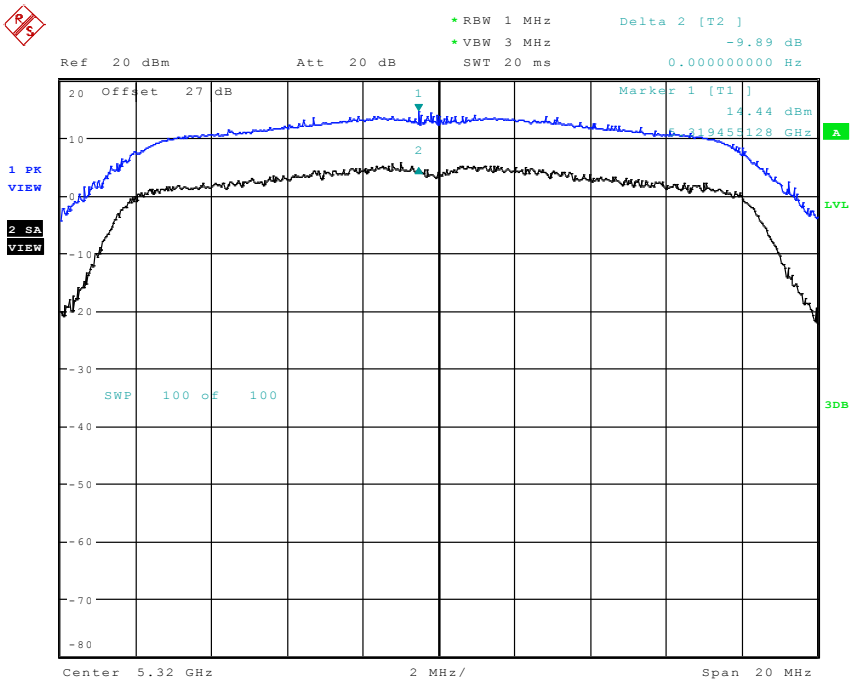
Date: 6.JAN.2010 15:26:56

Tx0 802.11a Ch60



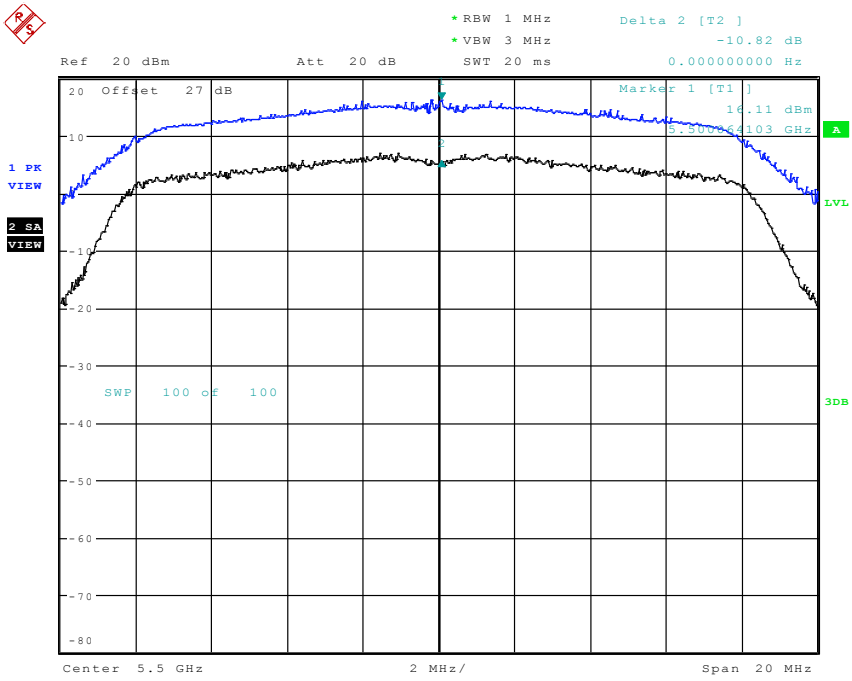
Date: 6.JAN.2010 15:29:07

Tx0 802.11a Ch64



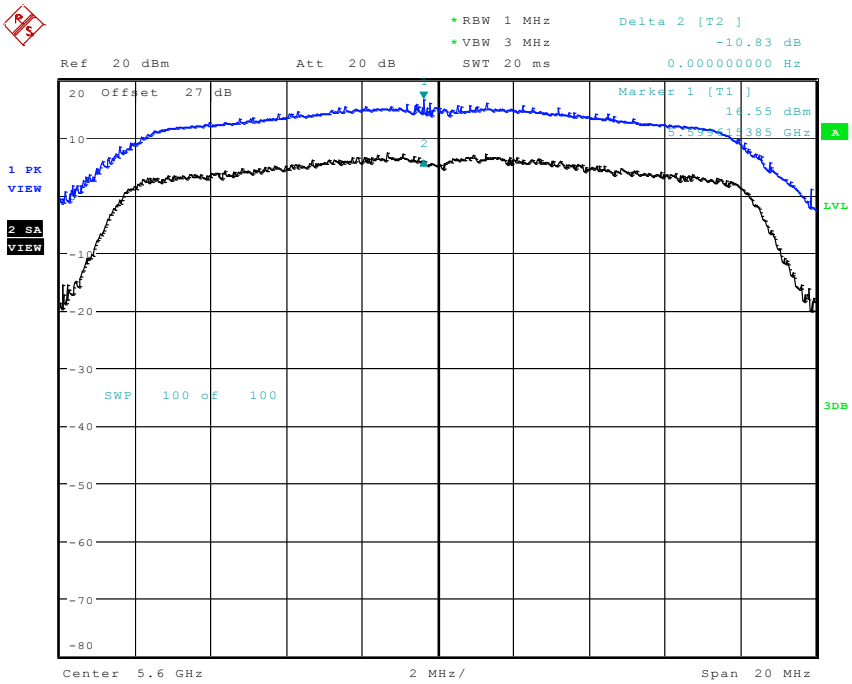
Date: 6.JAN.2010 15:30:43

Tx0 802.11a Ch100



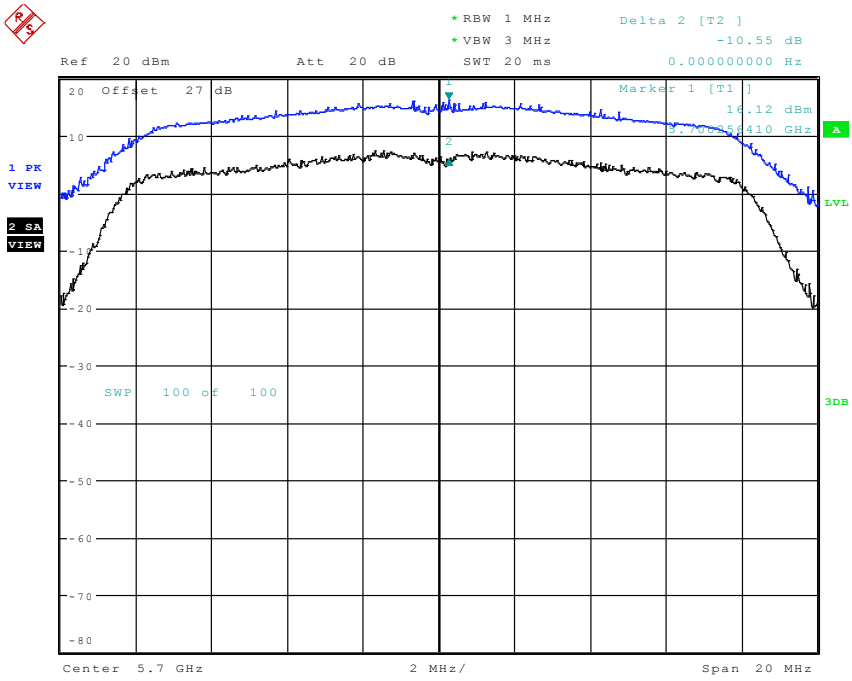
Date: 6.JAN.2010 15:32:32

Tx0 802.11a Ch120



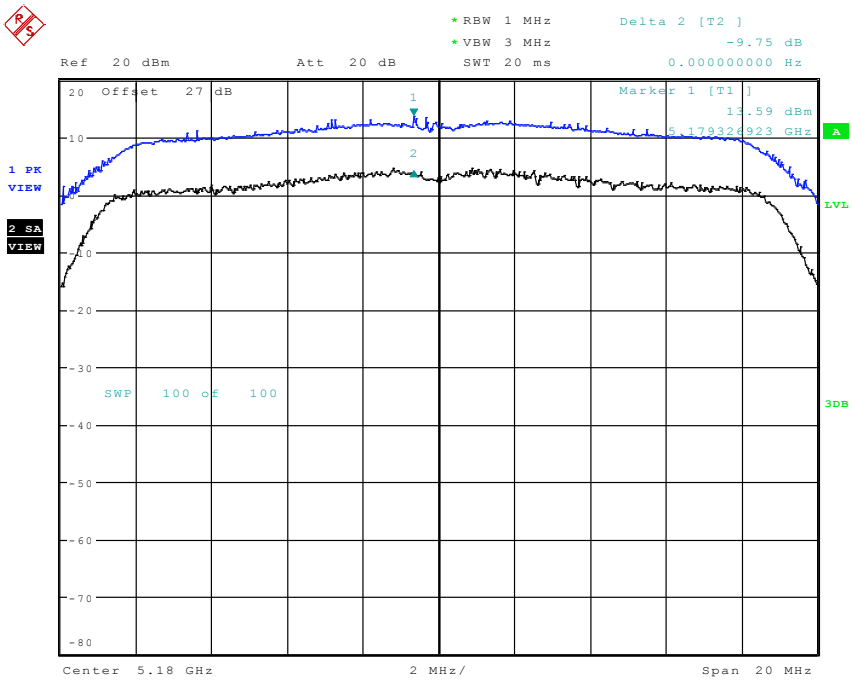
Date: 6.JAN.2010 15:34:17

Tx0 802.11a Ch140



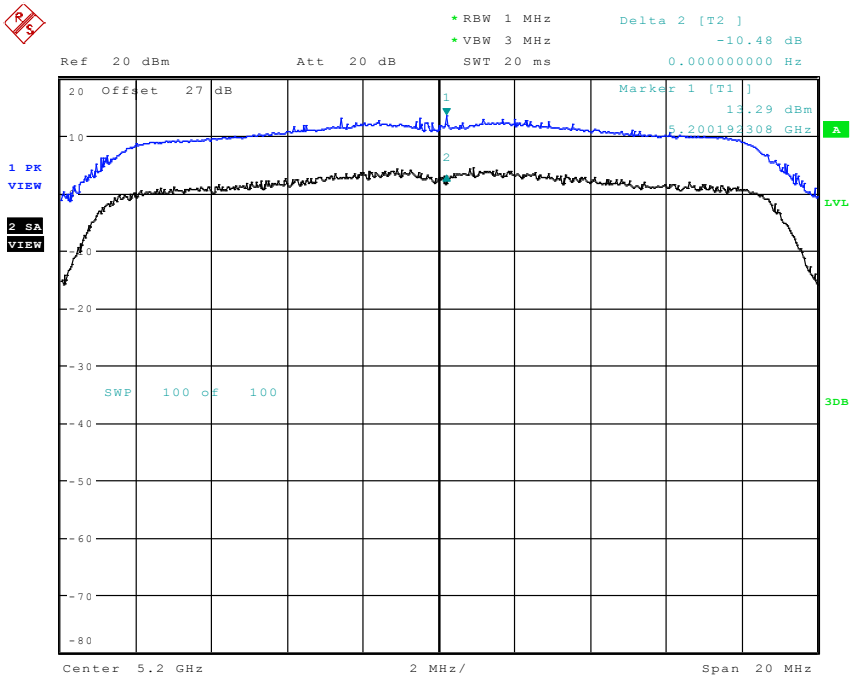
Date: 6.JAN.2010 15:38:15

Tx0 802.11n Ch36



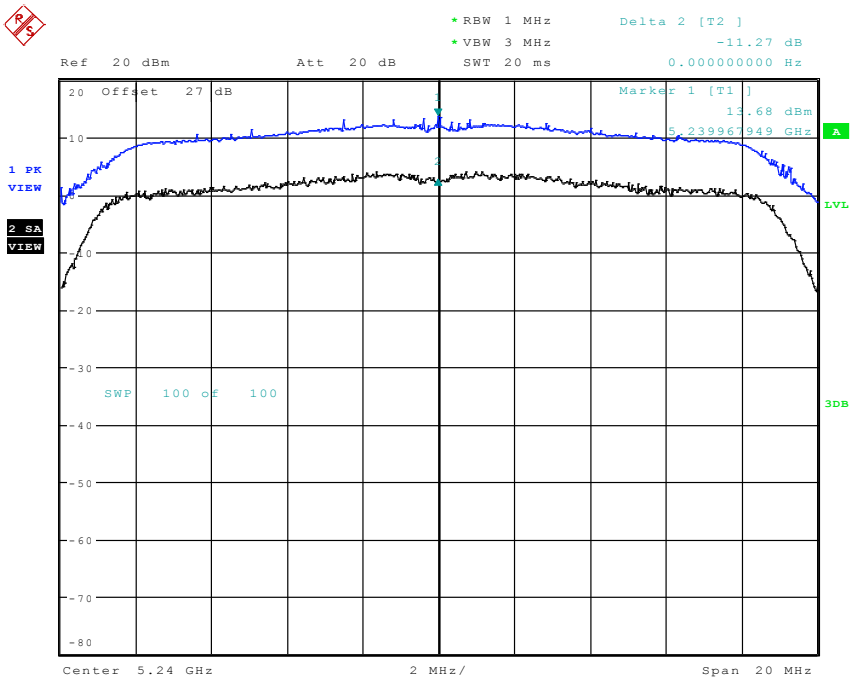
Date: 6.JAN.2010 15:21:00

Tx0 802.11n Ch40



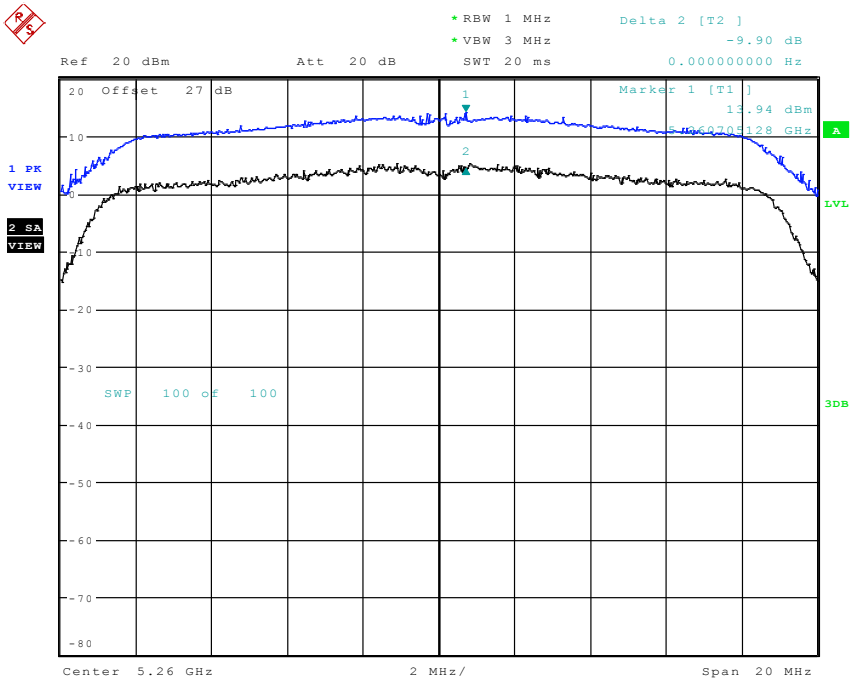
Date: 6.JAN.2010 15:23:17

Tx0 802.11n Ch48



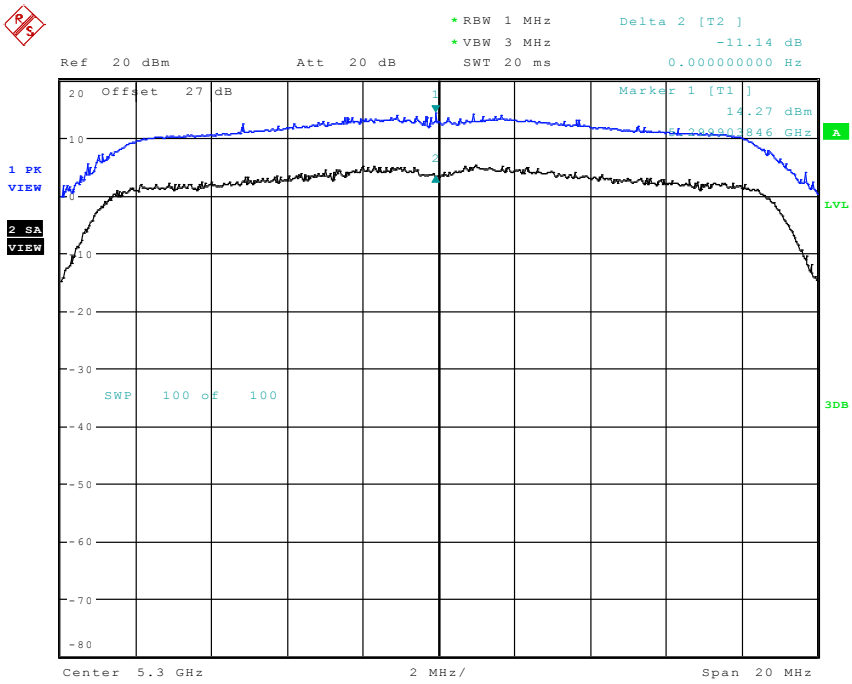
Date: 6.JAN.2010 15:25:53

Tx0 802.11n Ch52



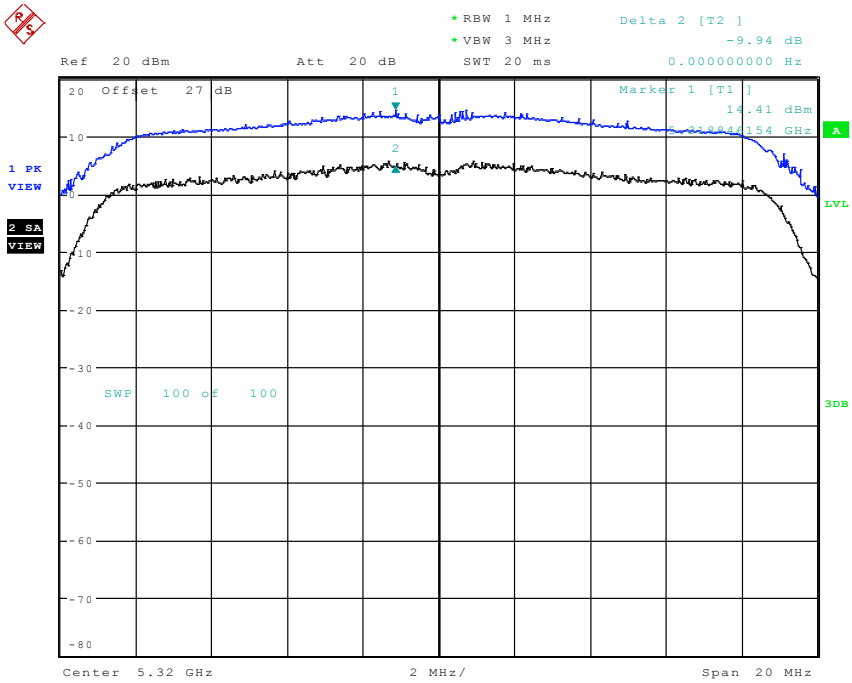
Date: 6.JAN.2010 15:28:07

Tx0 802.11n Ch60



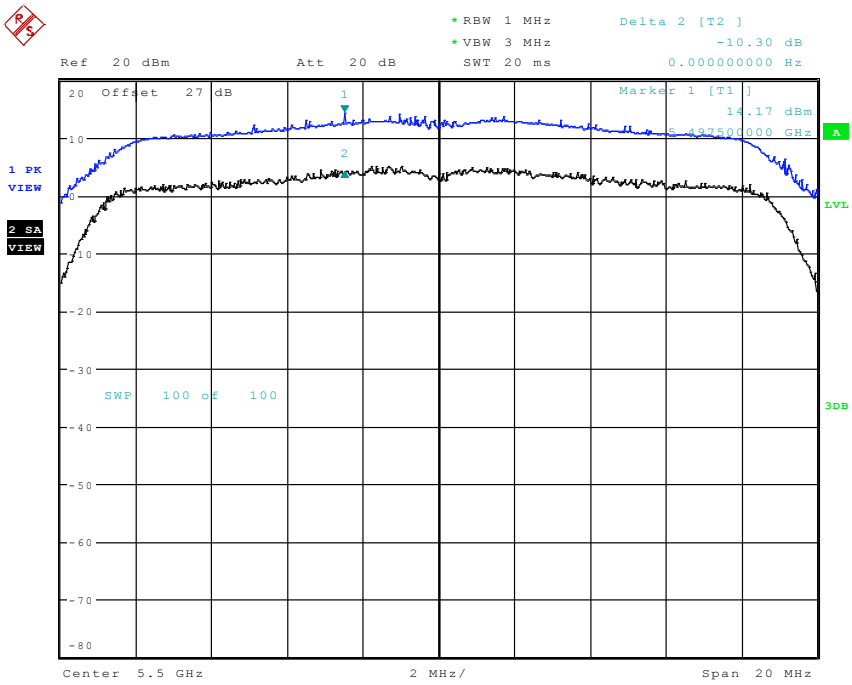
Date: 6.JAN.2010 15:29:57

Tx0 802.11n Ch64



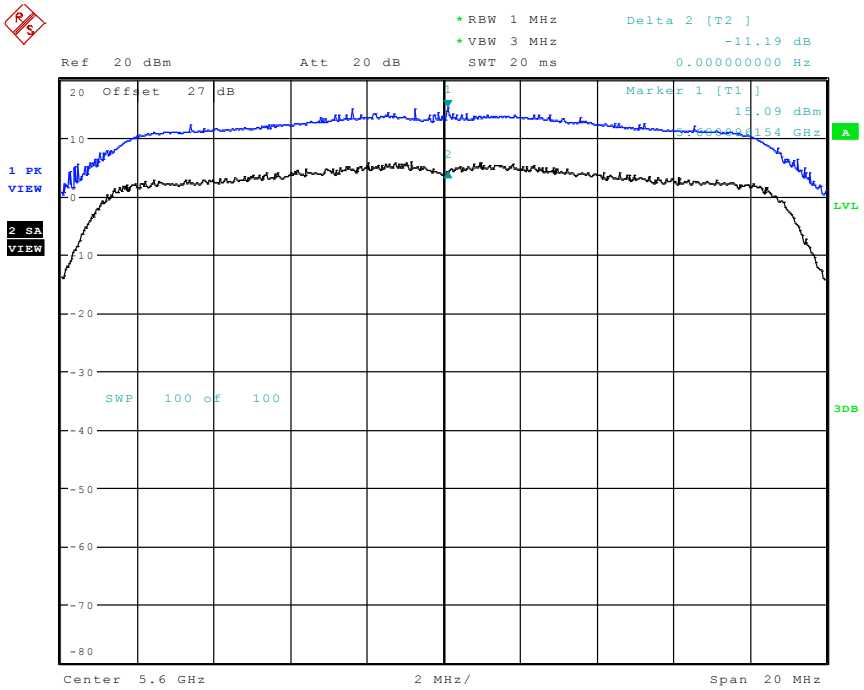
Date: 6.JAN.2010 15:31:31

Tx0 802.11n Ch100



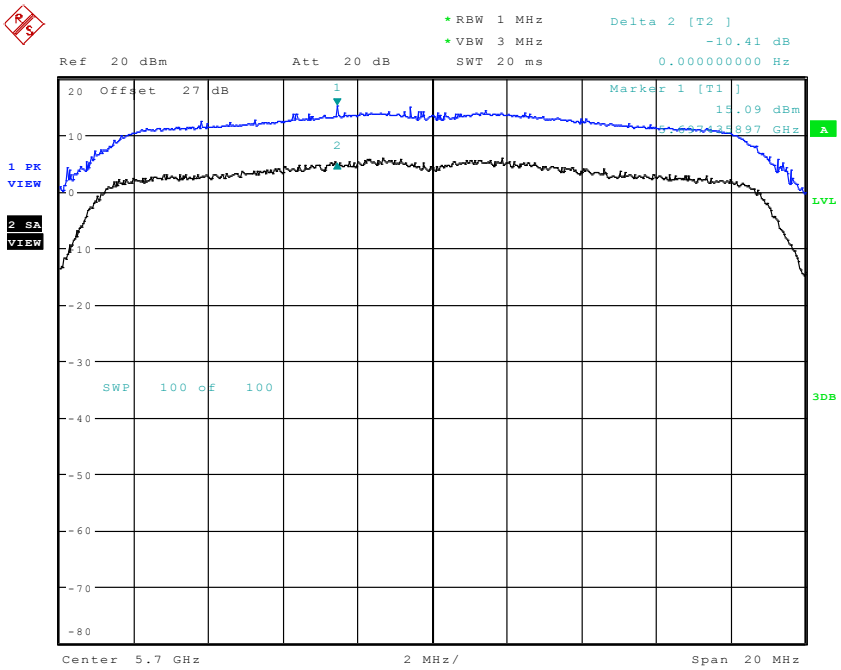
Date: 6.JAN.2010 15:37:20

Tx0 802.11n Ch120



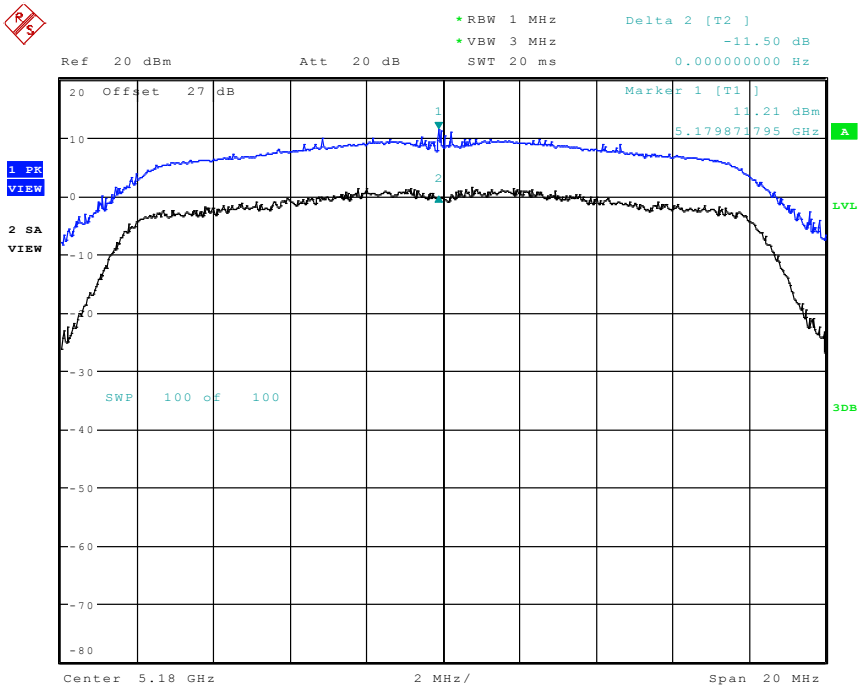
Date: 6.JAN.2010 15:35:27

Tx0 802.11n Ch140



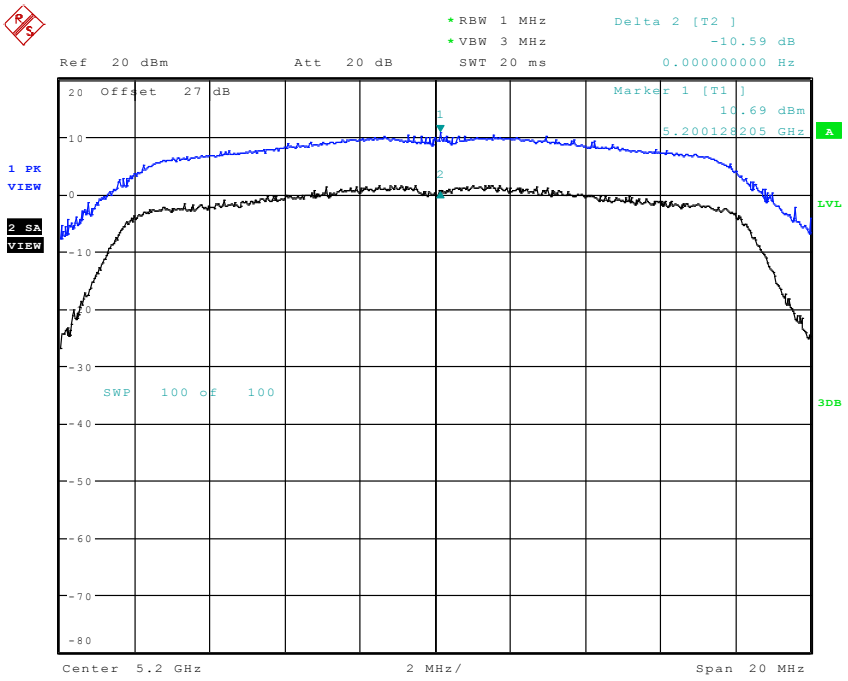
Date: 6.JAN.2010 15:39:15

Tx1 802.11a Ch36



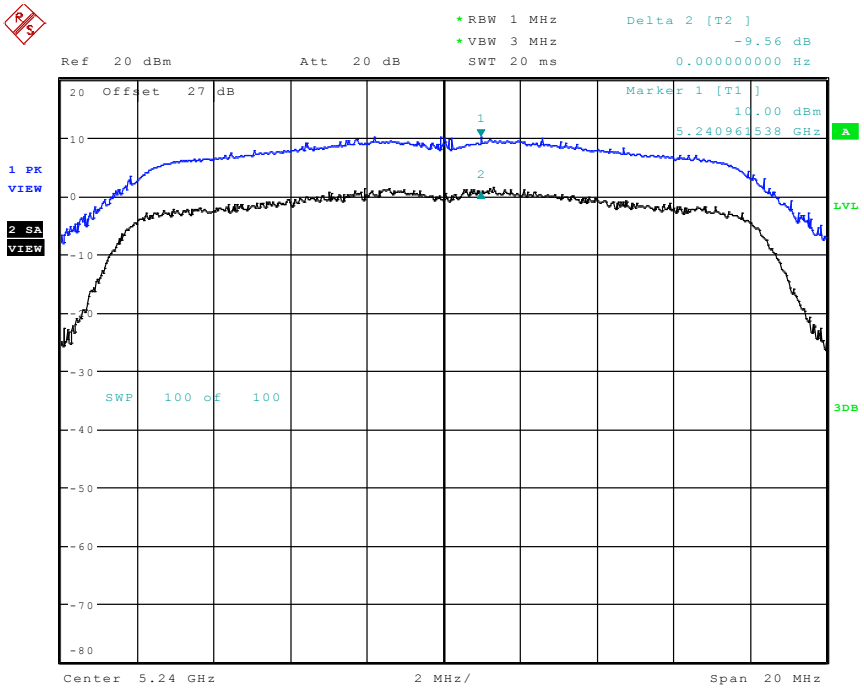
Date: 6.JAN.2010 14:49:37

Tx1 802.11a Ch40



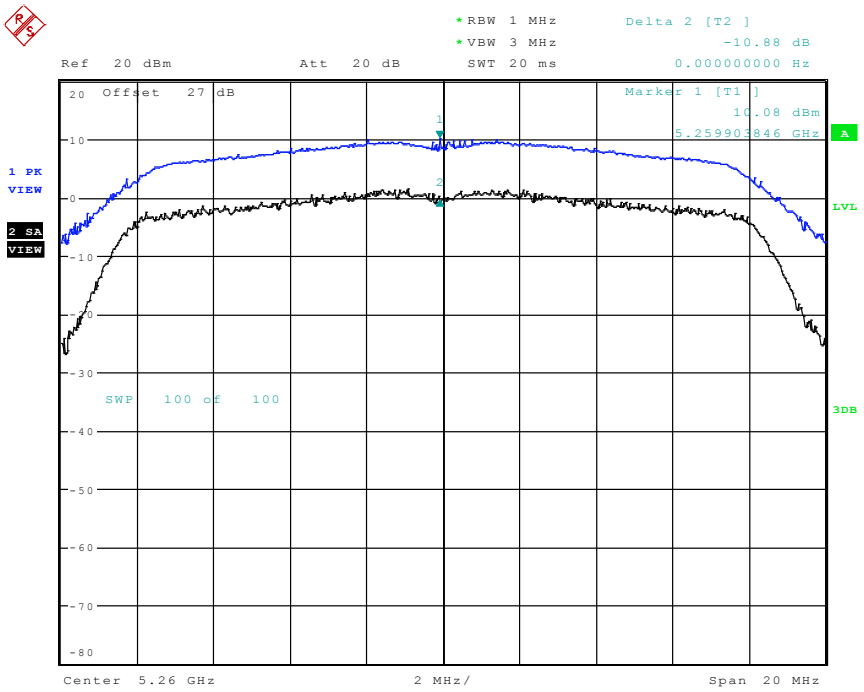
Date: 6.JAN.2010 14:53:39

Tx1 802.11a Ch48



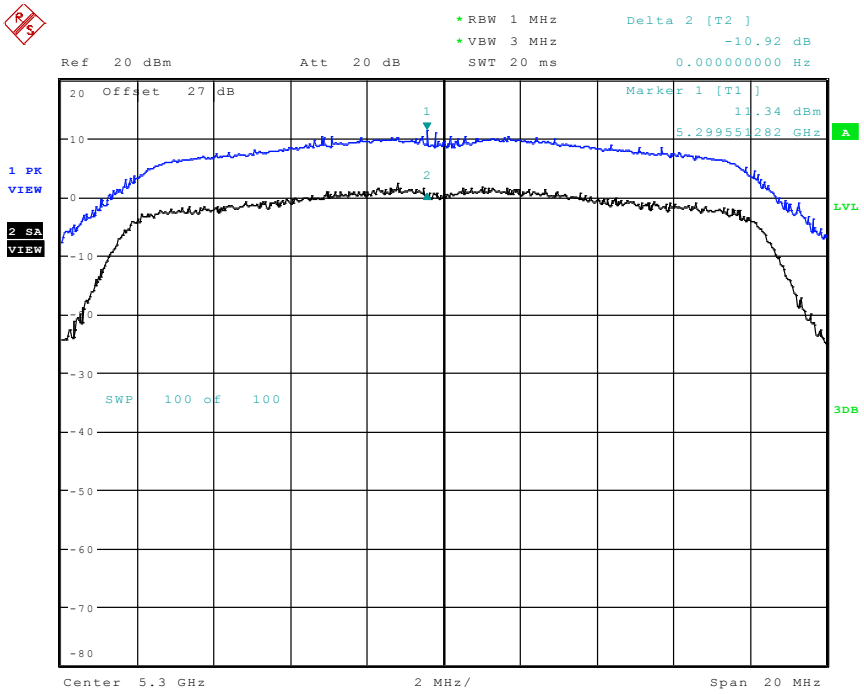
Date: 6.JAN.2010 15:00:35

Tx1 802.11a Ch52



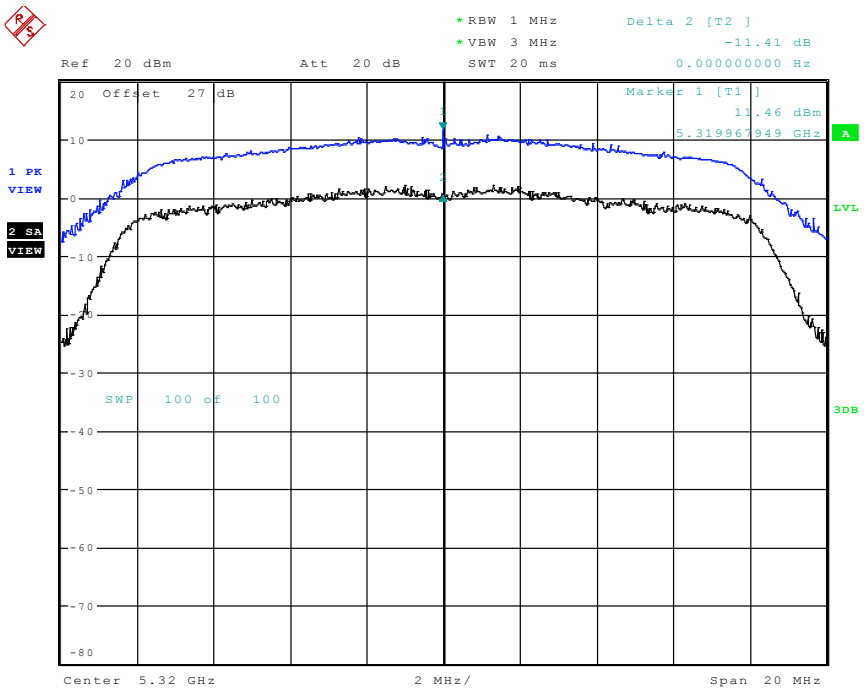
Date: 6.JAN.2010 15:01:59

Tx1 802.11a Ch60



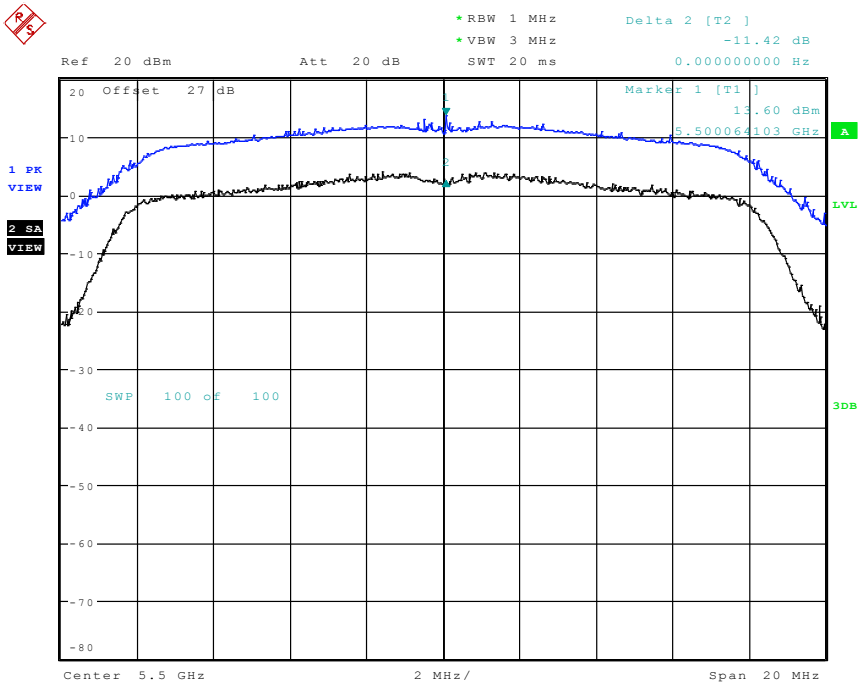
Date: 6.JAN.2010 15:04:19

Tx1 802.11a Ch64



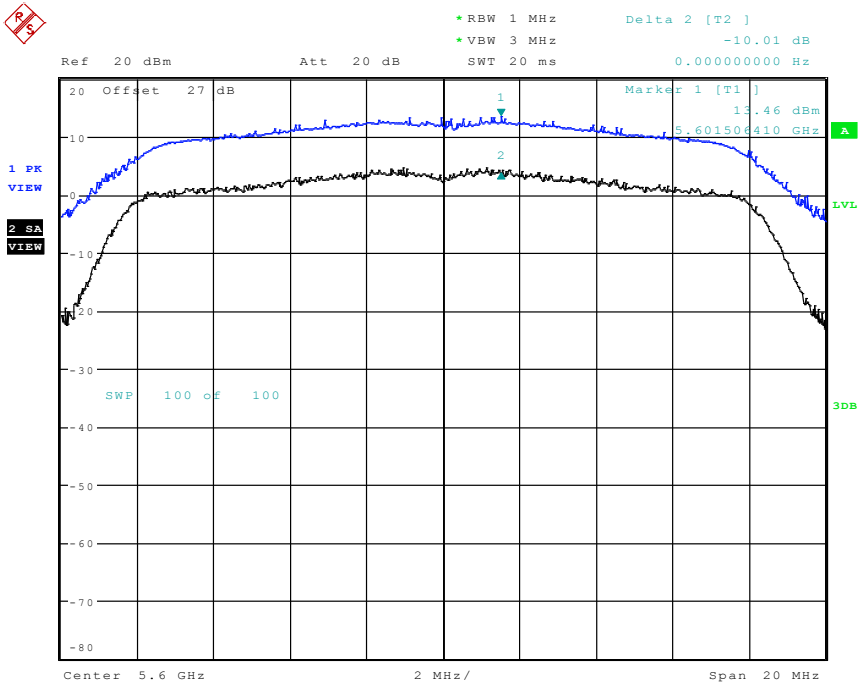
Date: 6.JAN.2010 15:07:31

Tx1 802.11a Ch100



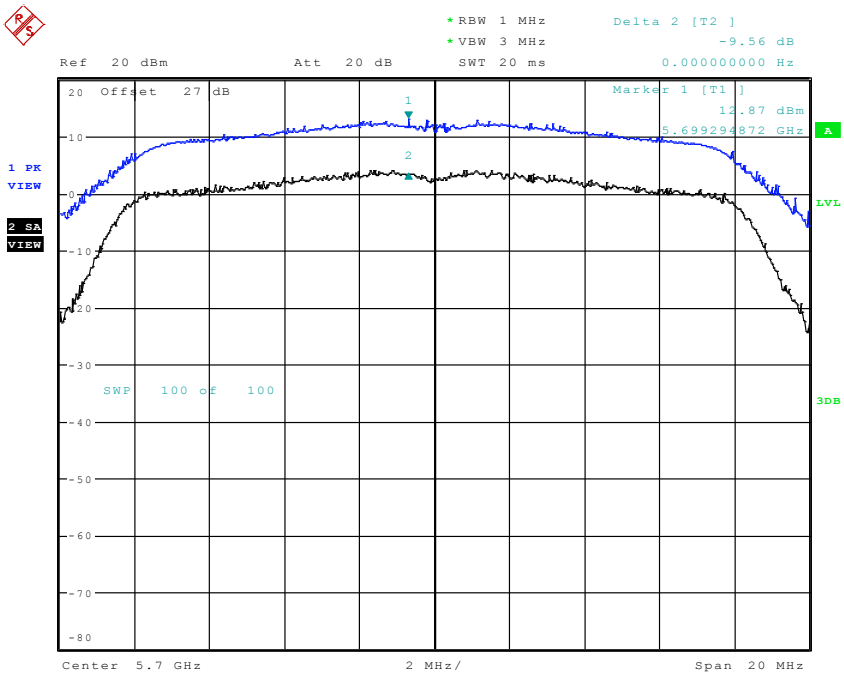
Date: 6.JAN.2010 15:11:18

Tx1 802.11a Ch120



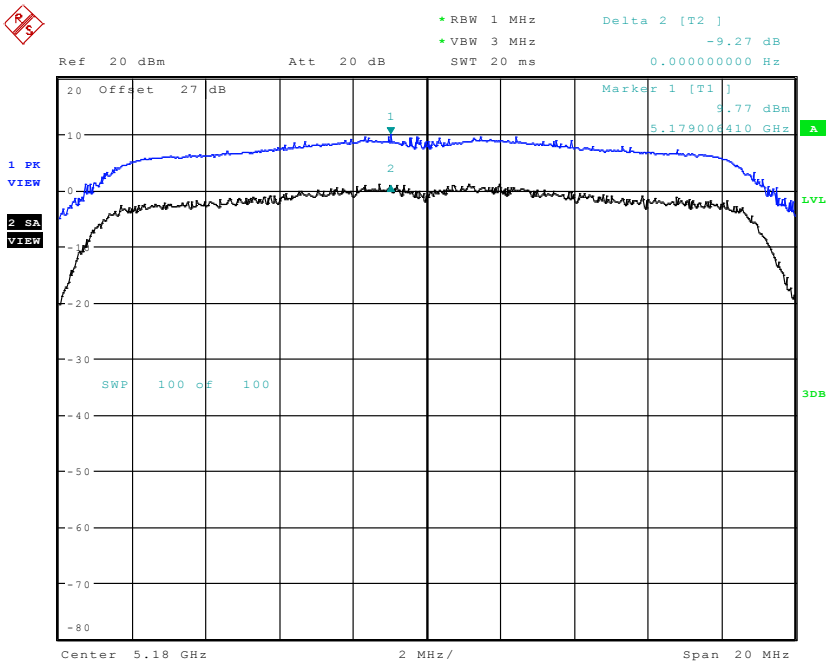
Date: 6.JAN.2010 15:13:01

Tx1 802.11a Ch140



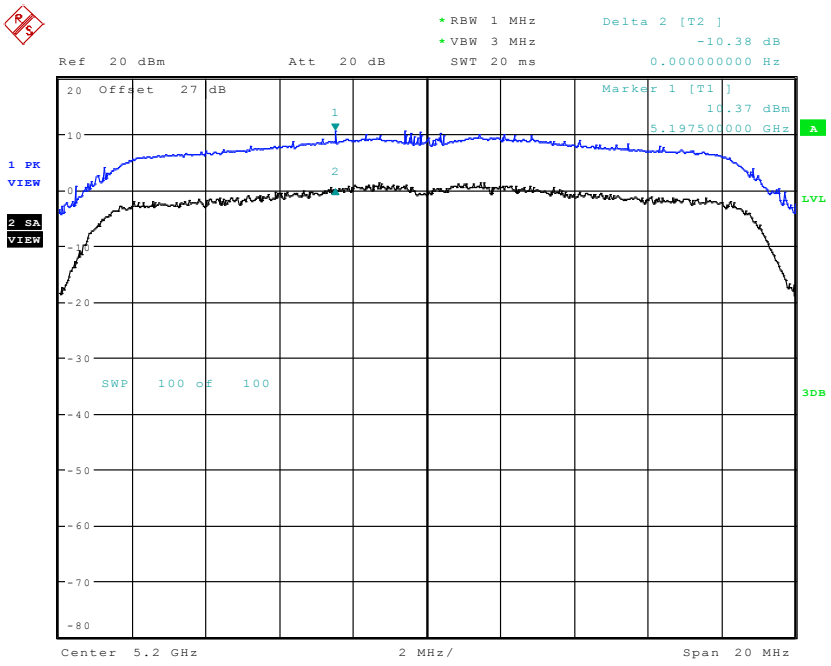
Date: 6.JAN.2010 15:17:12

Tx1 802.11n Ch36



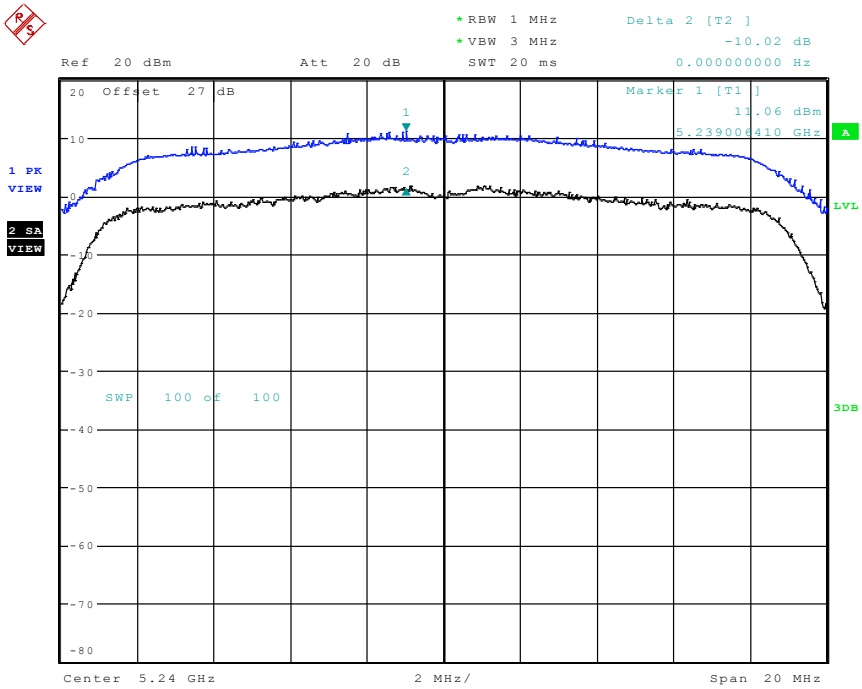
Date: 6.JAN.2010 14:51:47

Tx1 802.11n Ch40



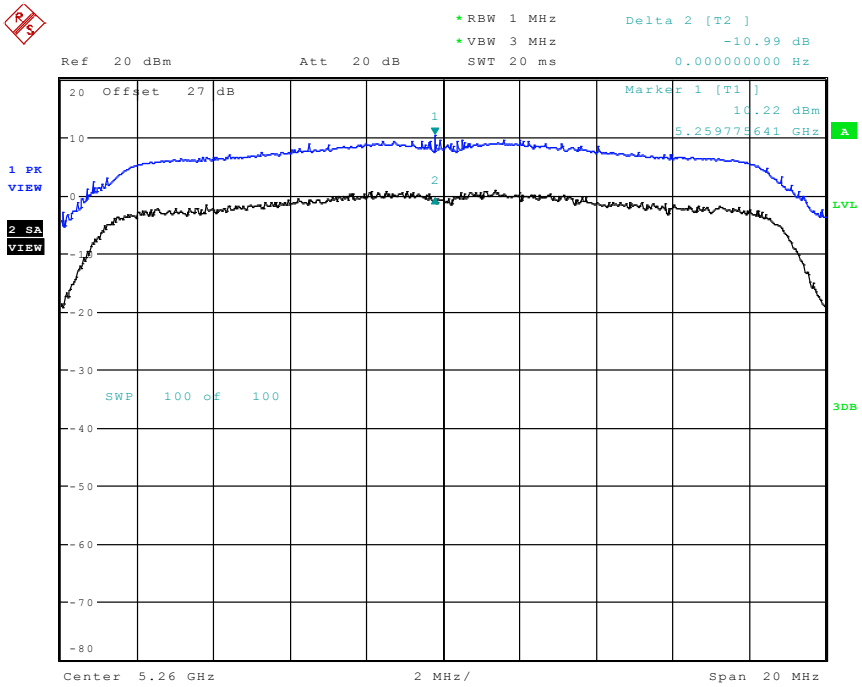
Date: 6.JAN.2010 14:55:05

Tx1 802.11n Ch48



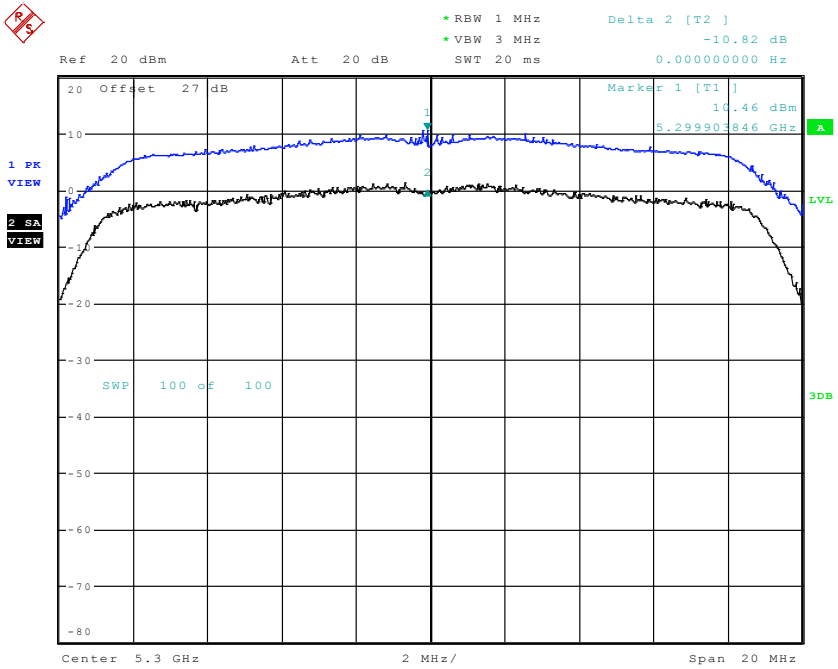
Date: 6.JAN.2010 14:58:43

Tx1 802.11n Ch52



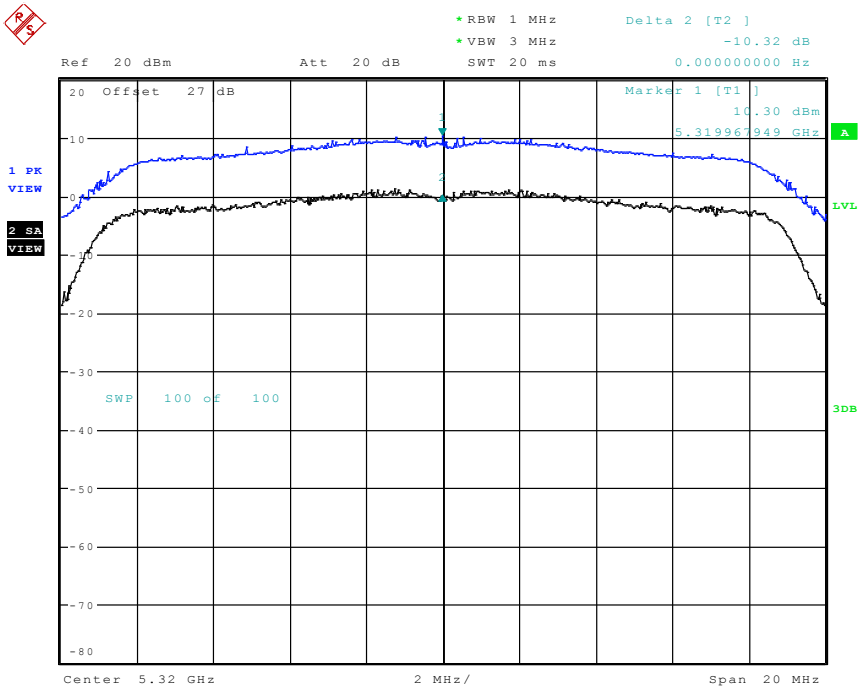
Date: 6.JAN.2010 15:02:58

Tx1 802.11n Ch60



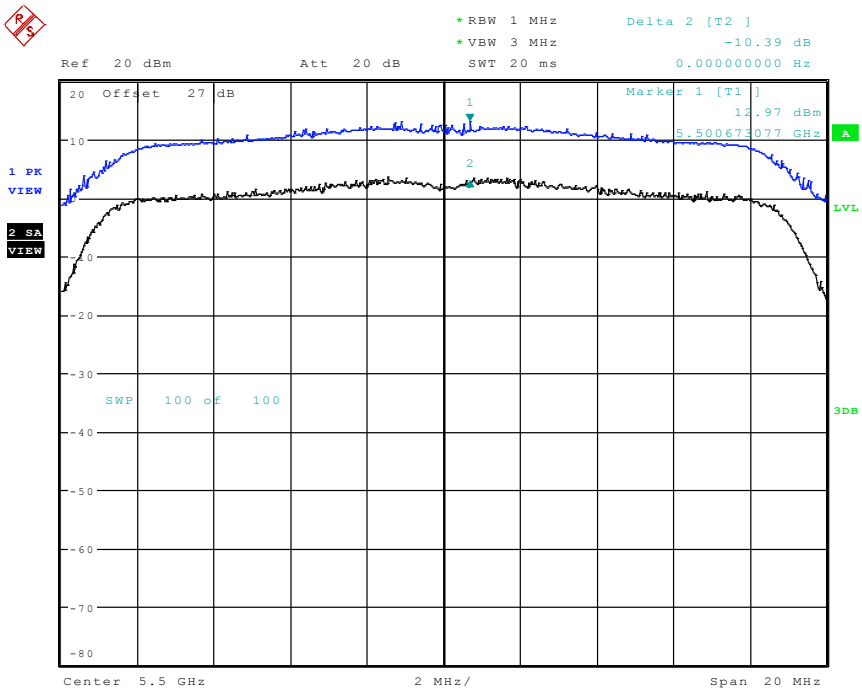
Date: 6.JAN.2010 15:06:10

Tx1 802.11n Ch64



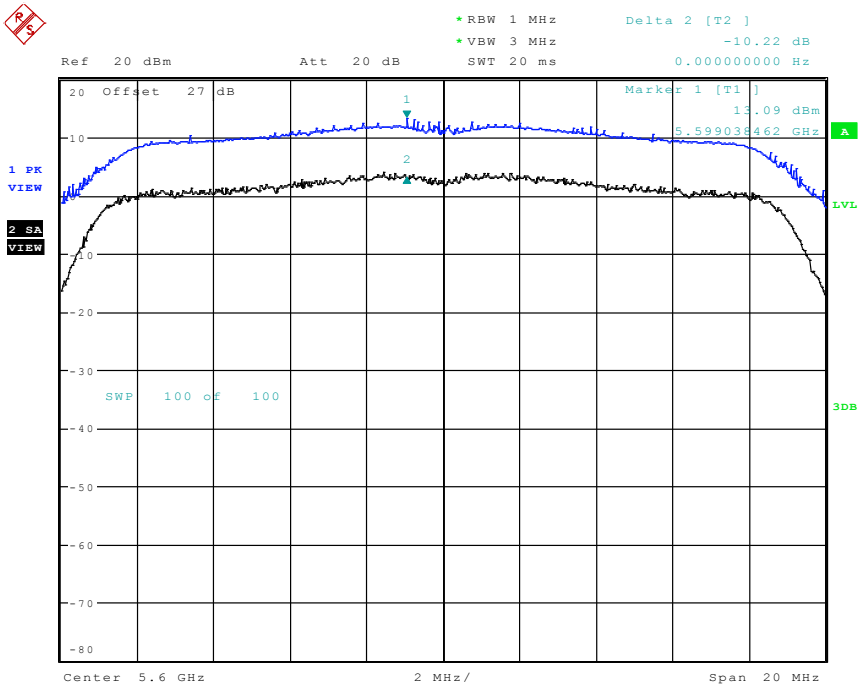
Date: 6.JAN.2010 15:08:33

Tx1 802.11n Ch100



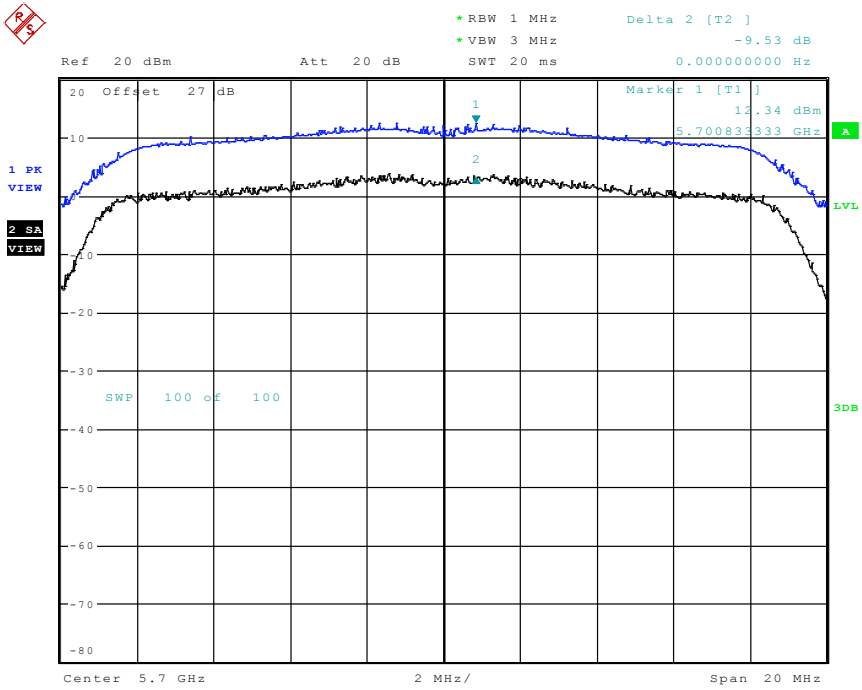
Date: 6.JAN.2010 15:16:15

Tx1 802.11n Ch120



Date: 6.JAN.2010 15:14:23

Tx1 802.11n Ch140



Date: 6.JAN.2010 15:17:56

5.8 Transmitter Spurious Emissions- Conducted

5.8.1 Limits: § 15.407 (b)

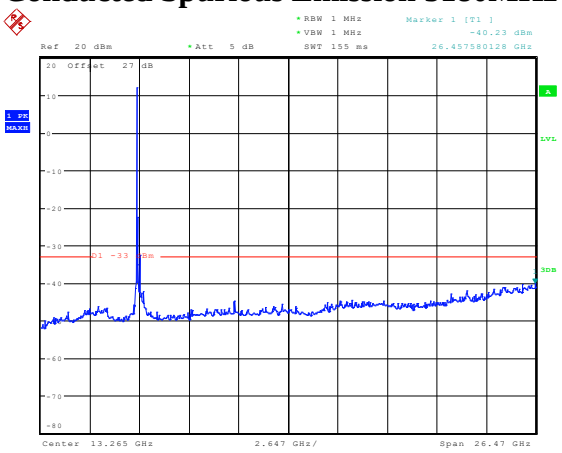
-27 dBm / MHz EIRP

5.8.2 Test data/ plots:

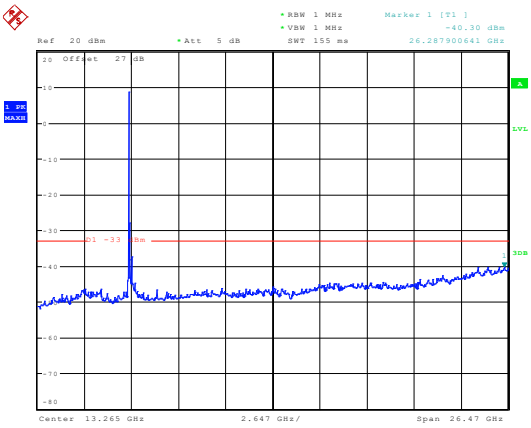
Conducted Spurious Emissions					
Frequency (MHz)	Channel	Tx0		Tx1	
		a	HT20	a	HT20
5180	36	Pass	Pass	Pass	Pass
5200	40	Pass	Pass	Pass	Pass
5240	48	Pass	Pass	Pass	Pass
5260	52	Pass	Pass	Pass	Pass
5300	60	Pass	Pass	Pass	Pass
5320	64	Pass	Pass	Pass	Pass
5500	100	Pass	Pass	Pass	Pass
5600	120	Pass	Pass	Pass	Pass
5700	140	Pass	Pass	Pass	Pass

5.8.3 Test data/ plots:

Conducted Spurious Emission 5180MHz 802.11a Tx0 / Tx1

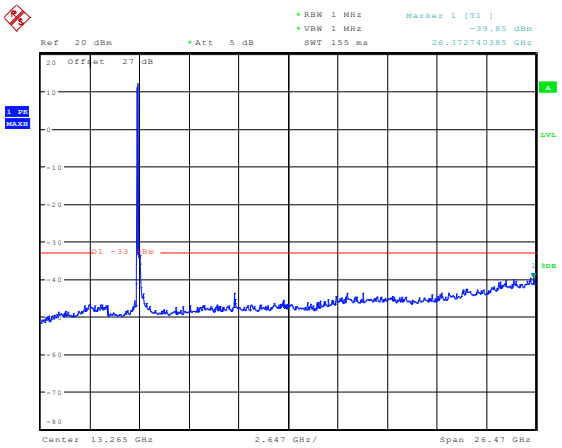


Date: 7.JAN.2010 09:06:52

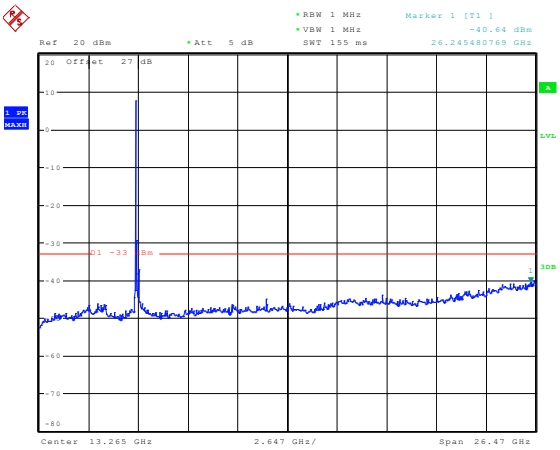


Date: 7.JAN.2010 10:41:32

Conducted Spurious Emission 5180MHz 802.11 HT20 Tx0 / Tx1

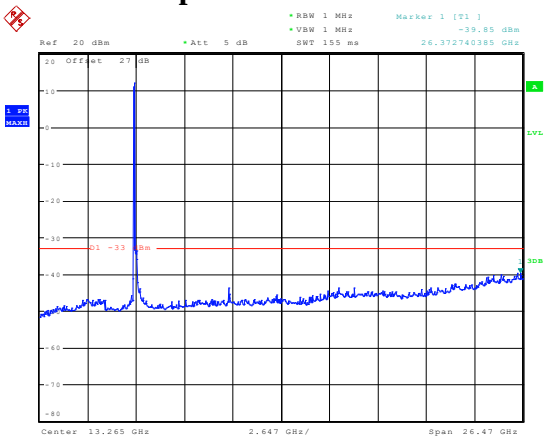


Date: 7.JAN.2010 09:11:30

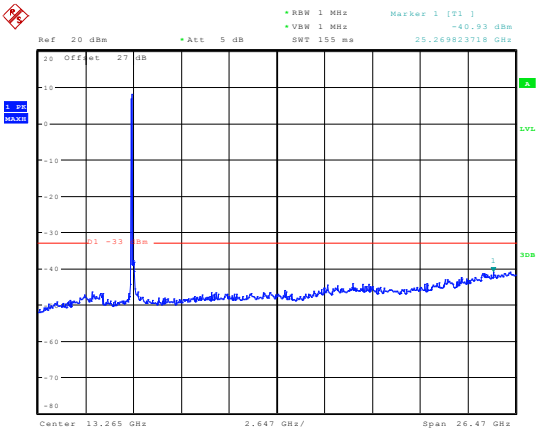


Date: 7.JAN.2010 10:42:27

Conducted Spurious Emission 5200MHz 802.11a Tx0 / Tx1

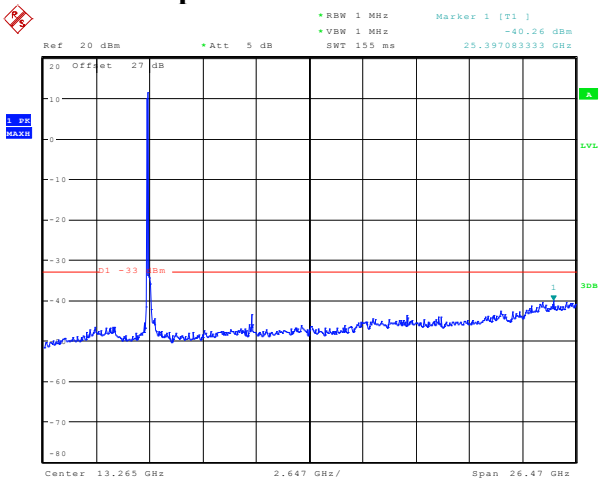


Date: 7.JAN.2010 09:11:30

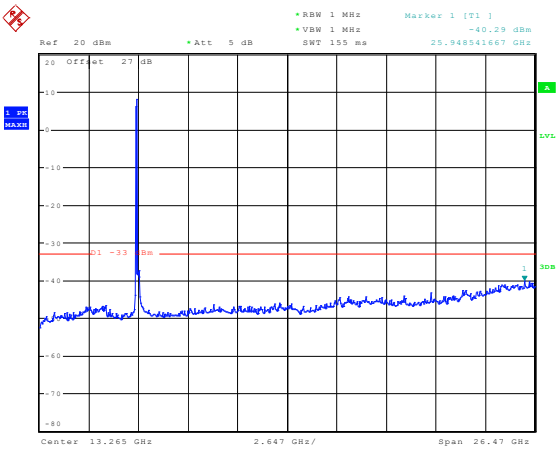


Date: 7.JAN.2010 10:43:09

Conducted Spurious Emission 5200MHz 802.11 HT20 Tx0 / Tx1

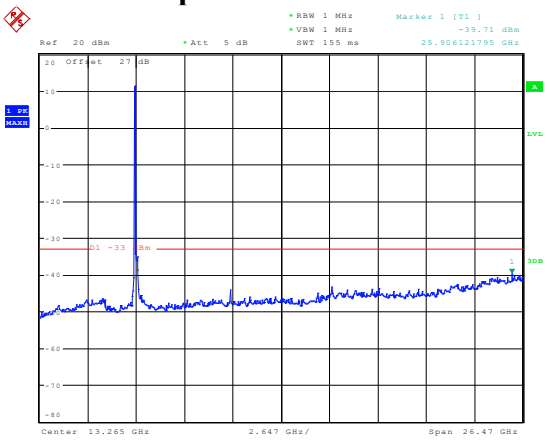


Date: 7.JAN.2010 09:14:22

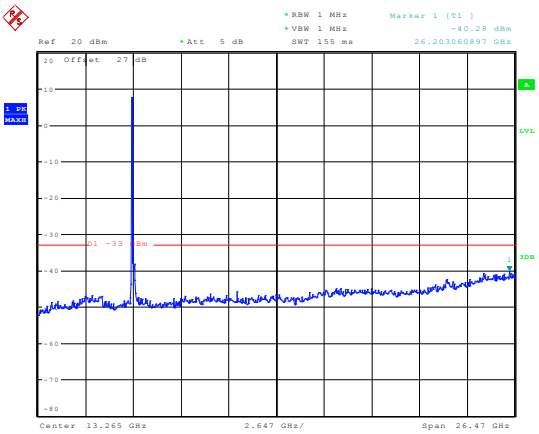


Date: 7.JAN.2010 10:43:55

Conducted Spurious Emission 5240MHz 802.11a Tx0 / Tx1

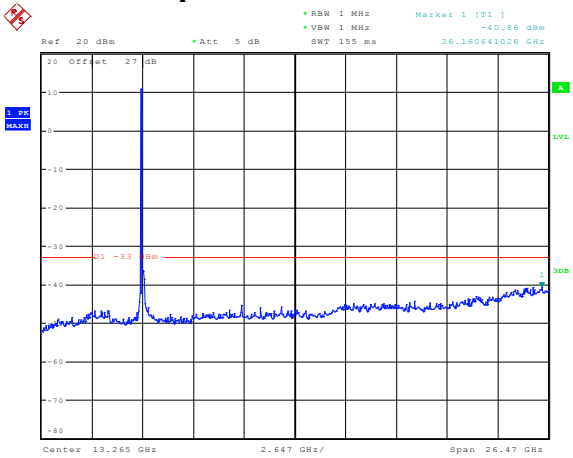


Date: 7.JAN.2010 09:15:56

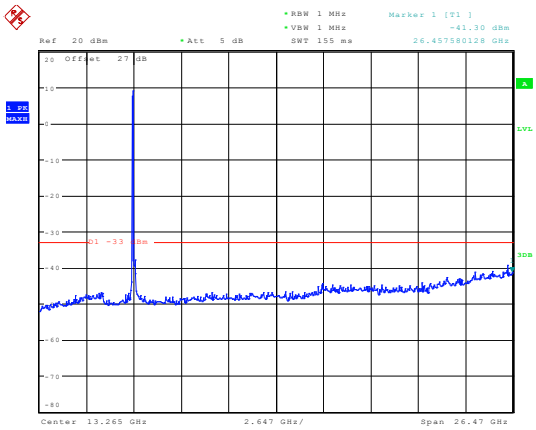


Date: 7.JAN.2010 10:44:37

Conducted Spurious Emission 5240MHz 802.11 HT20 Tx0 / Tx1

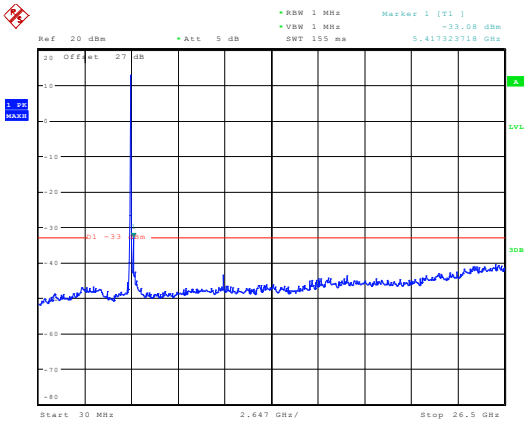


Date: 7.JAN.2010 09:16:41

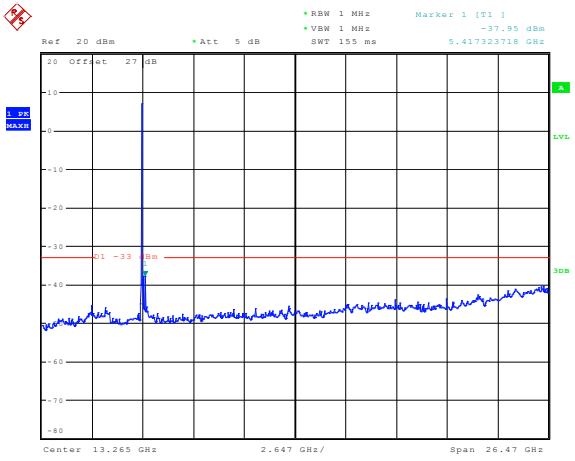


Date: 7.JAN.2010 10:45:09

Conducted Spurious Emission 5260MHz 802.11a Tx0 / Tx1



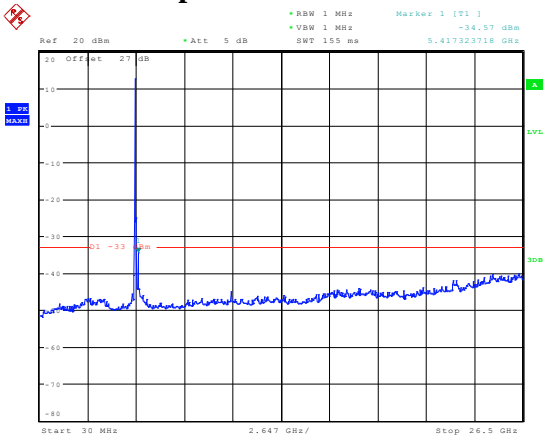
Date: 7.JAN.2010 09:40:46



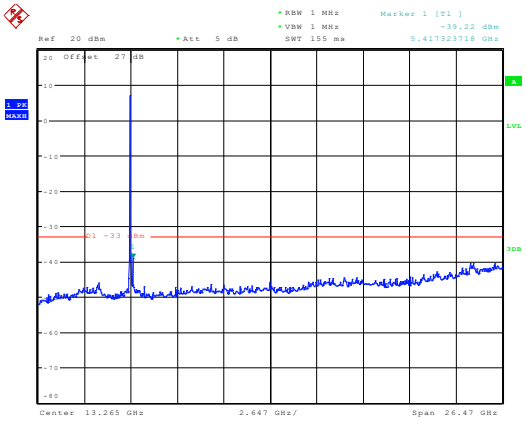
Date: 7.JAN.2010 10:45:45

Note -41.34 dBm avg at 5.417 GHz

Conducted Spurious Emission 5260MHz 802.11 HT20 Tx0 / Tx1

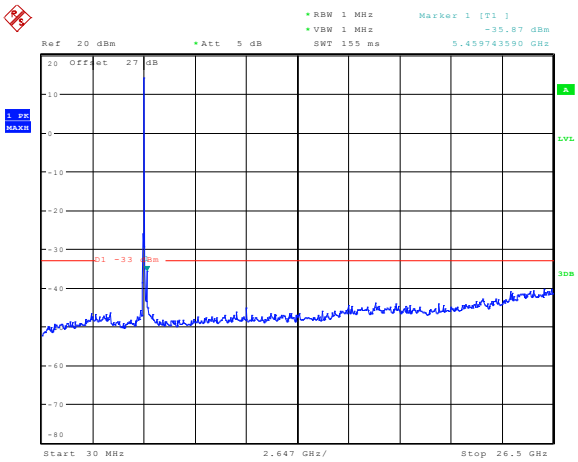


Date: 7.JAN.2010 09:44:32

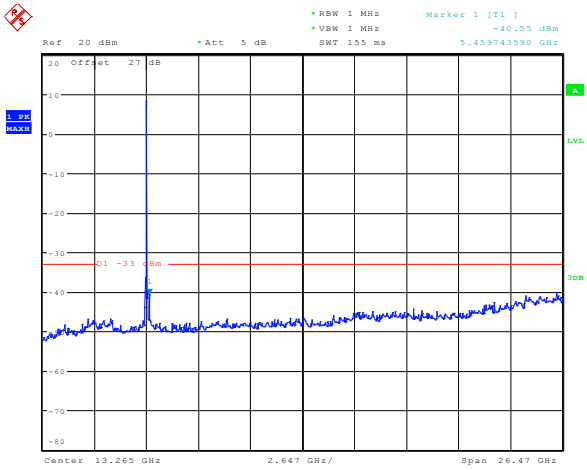


Date: 7.JAN.2010 10:46:14

Conducted Spurious Emission 5300MHz 802.11a Tx0 / Tx1

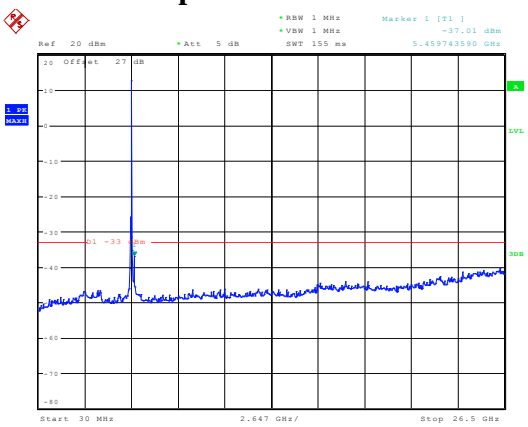


Date: 7.JAN.2010 09:45:29

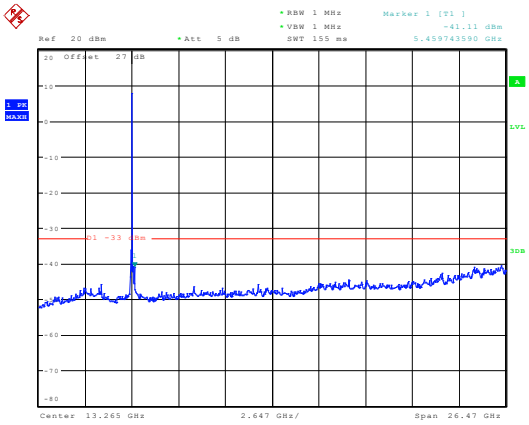


Date: 7.JAN.2010 10:46:52

Conducted Spurious Emission 5300MHz 802.11 HT20 Tx0 / Tx1

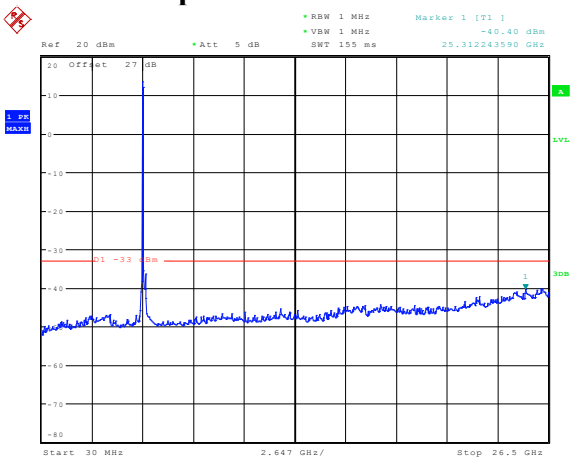


Date: 7.JAN.2010 09:46:25

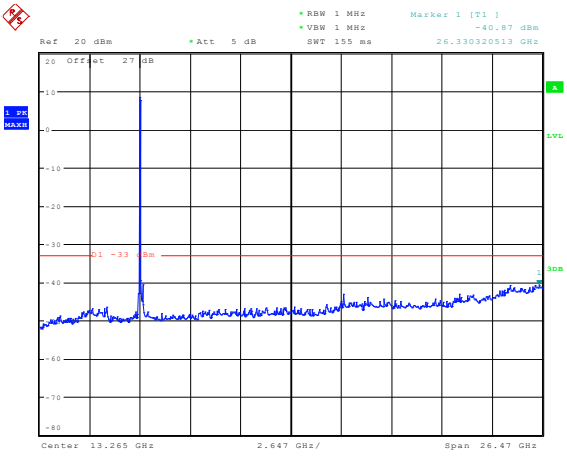


Date: 7.JAN.2010 10:47:17

Conducted Spurious Emission 5320MHz 802.11a Tx0 / Tx1

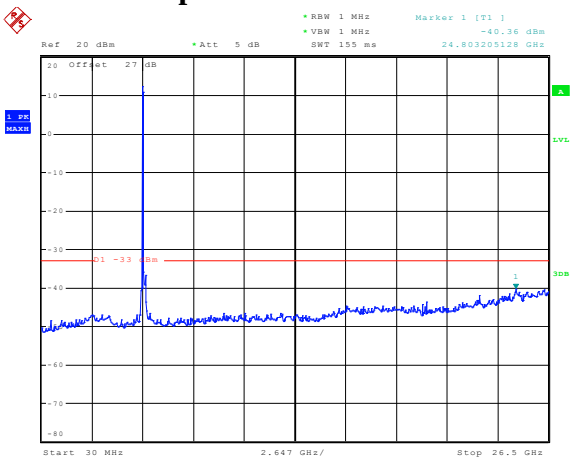


Date: 7.JAN.2010 09:38:45

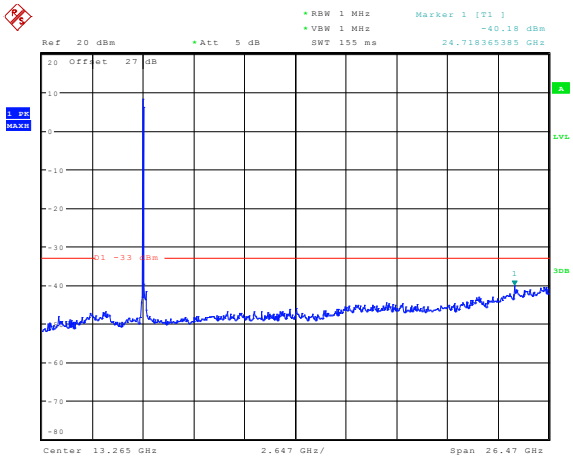


Date: 7.JAN.2010 10:48:02

Conducted Spurious Emission 5320MHz 802.11 HT20 Tx0 / Tx1

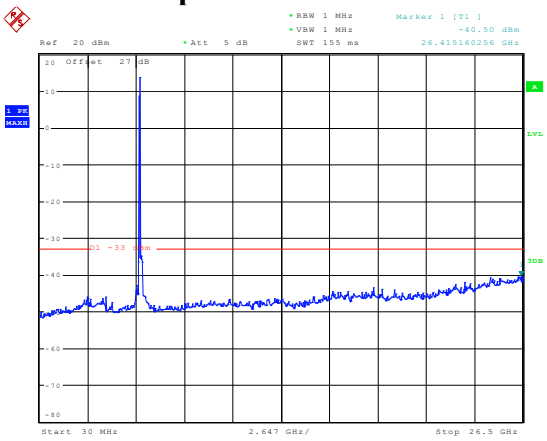


Date: 7.JAN.2010 09:39:56

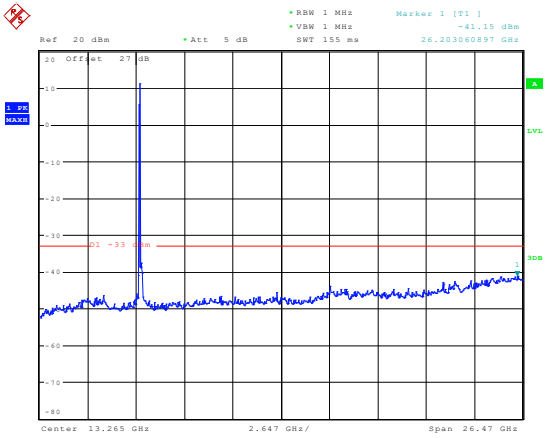


Date: 7.JAN.2010 10:48:29

Conducted Spurious Emission 5500MHz 802.11a Tx0 / Tx1

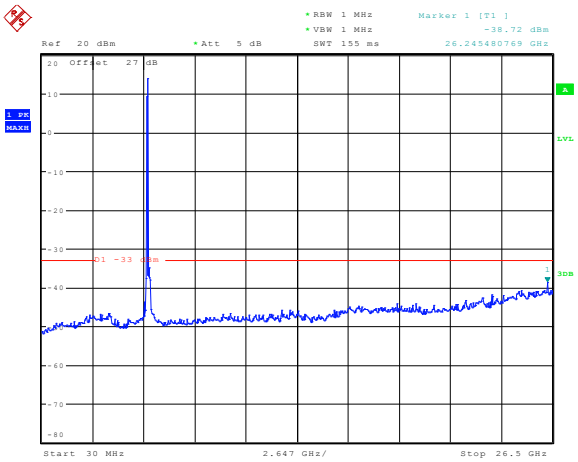


Date: 7.JAN.2010 09:47:47

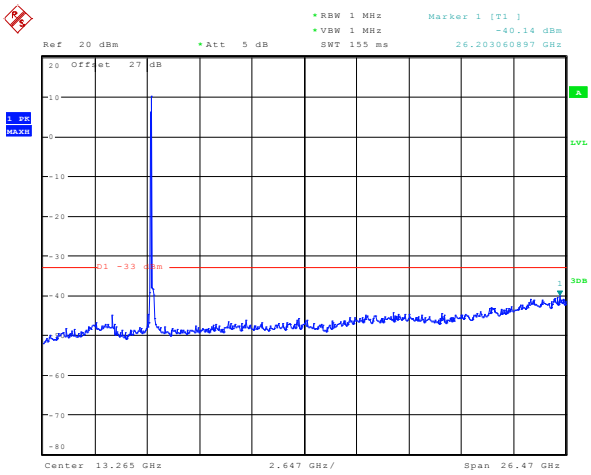


Date: 7.JAN.2010 10:49:30

Conducted Spurious Emission 5500MHz 802.11 HT20 Tx0 / Tx1

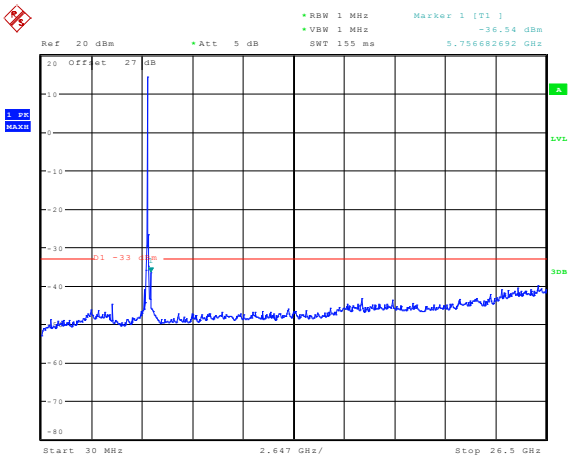


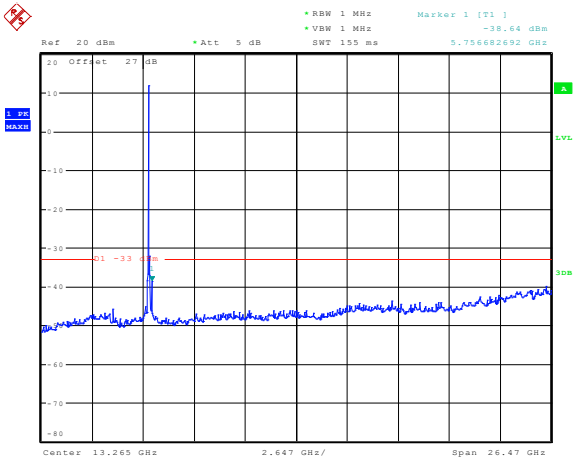
Date: 7.JAN.2010 09:48:34



Date: 7.JAN.2010 10:50:10

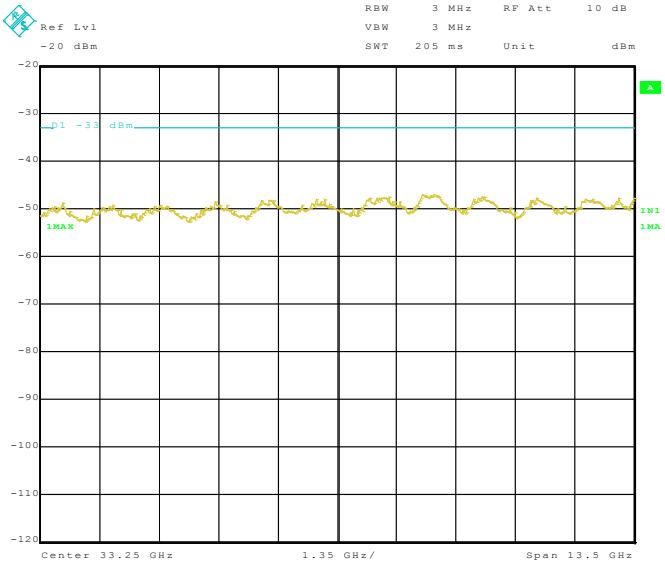
Conducted Spurious Emission 5600MHz 802.11a Tx0 / Tx1

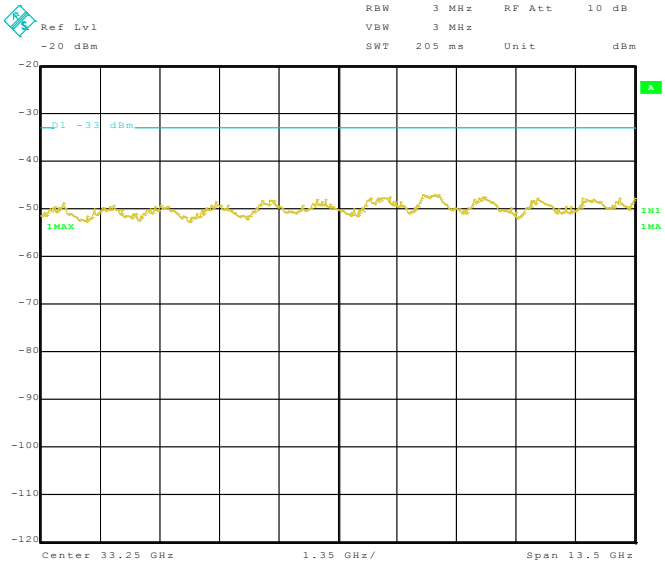




Date: 7.JAN.2010 09:49:37

Date: 7.JAN.2010 10:50:58

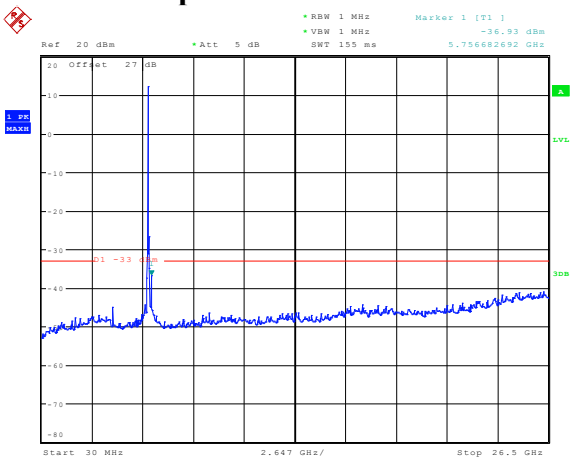




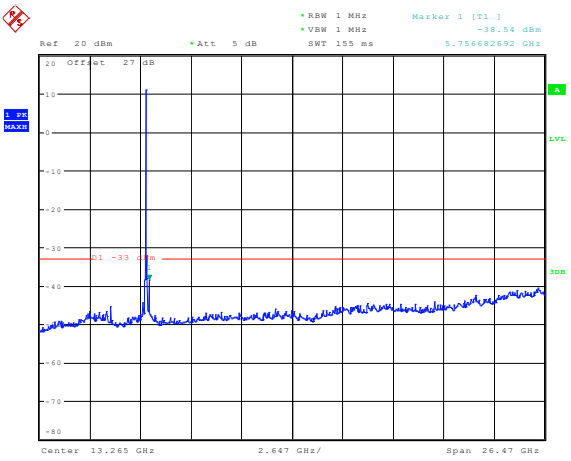
Date: 7.JAN.2010 13:43:29

Date: 7.JAN.2010 13:43:43

Conducted Spurious Emission 5600MHz 802.11 HT20 Tx0 / Tx1

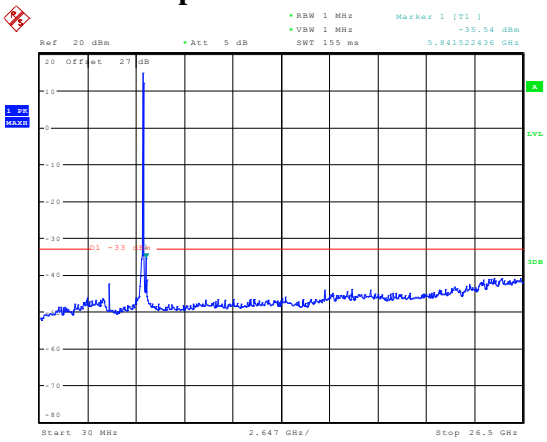


Date: 7.JAN.2010 09:50:11

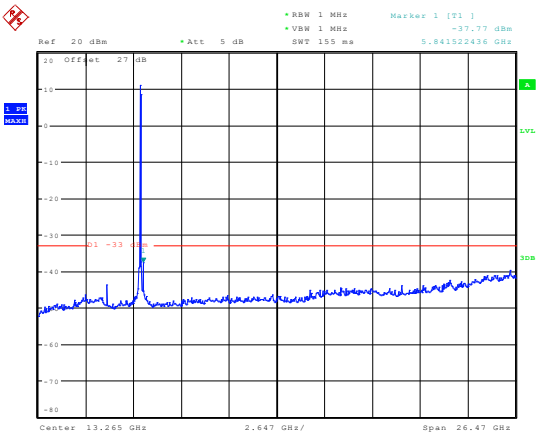


Date: 7.JAN.2010 10:51:24

Conducted Spurious Emission 5700MHz 802.11a Tx0 / Tx1

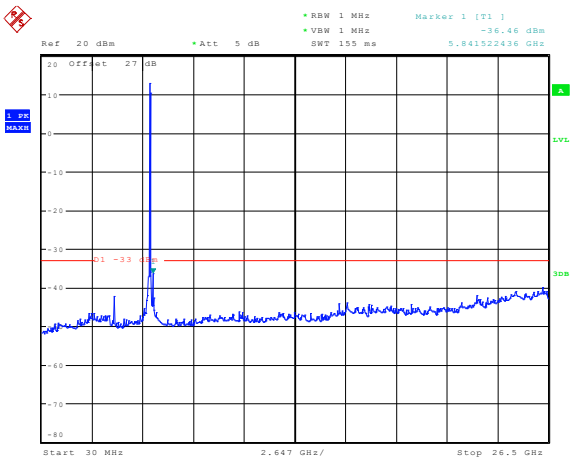


Date: 7.JAN.2010 09:50:57

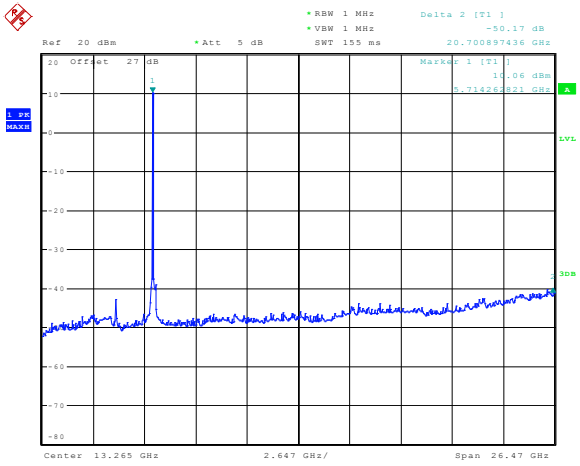


Date: 7.JAN.2010 10:52:03

Conducted Spurious Emission 5700MHz 802.11 HT20 Tx0 / Tx1



Date: 7.JAN.2010 09:51:35



Date: 7.JAN.2010 10:54:04

5.9 Transmitter Spurious Emissions- Radiated

5.9.1 Limits: §15.205

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. 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)).

*PEAK LIMIT= 74dBµV/m

*AVG. LIMIT= 54dBµV/m

5.9.2 Limits: §15.209

(For measurement distance of 3m)

Frequency of emission (MHz)	Field strength (µV/m)
30–88	100 (40dBµV/m)
88–216	150 (43.5 dBµV/m)
216–960	200 (46 dBµV/m)
Above 960	500 (54 dBµV/m)

NOTE:

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in Peak mode using an Average limit, unless specified within the plots.

5.9.3 Limits: §15.209

Frequency of emission (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	30

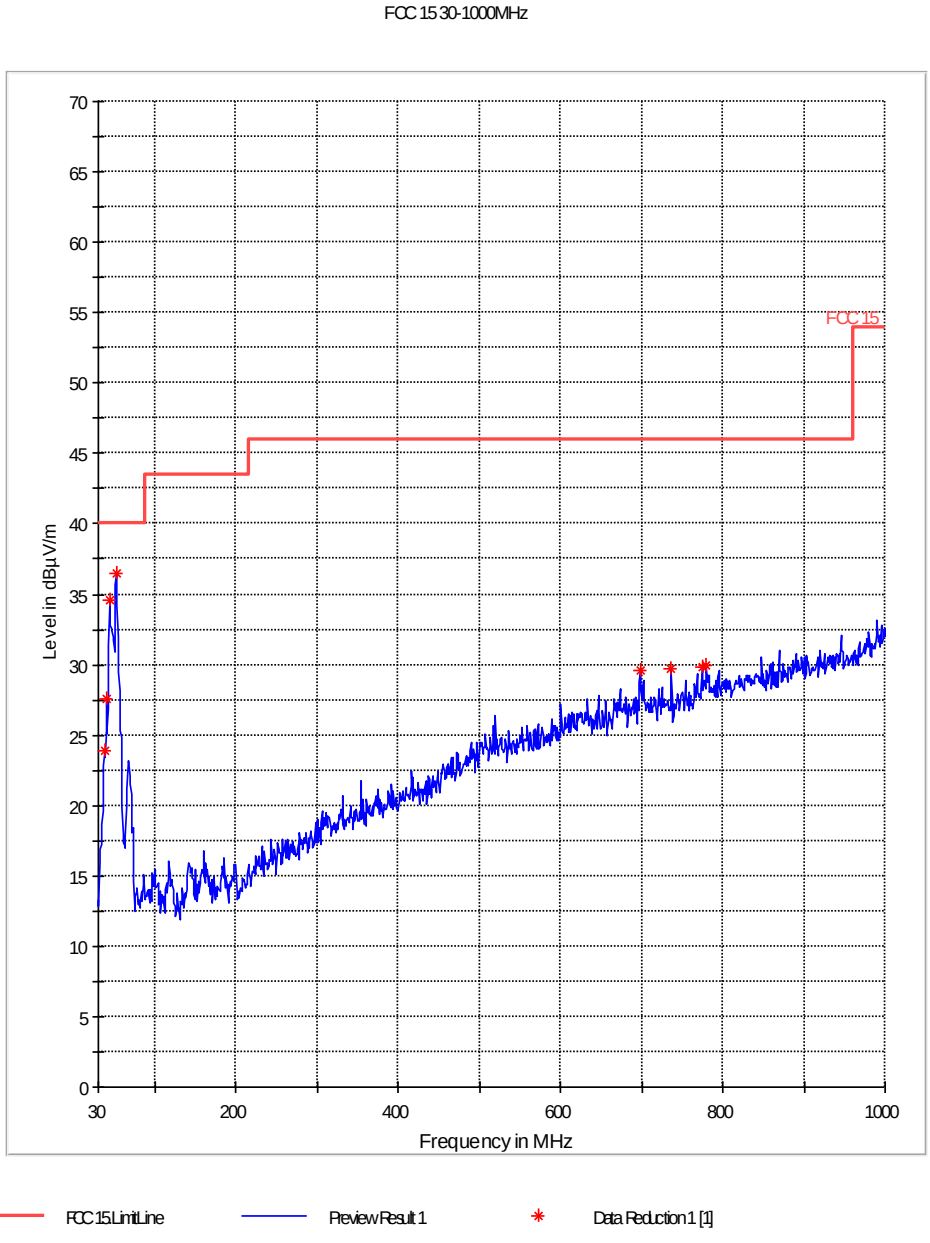
5.9.4 Test Result:

No significant emissions measurable. Plots reported here represent the worse case emissions, and both Horizontal and Vertical polarizations. 802.11a represents worst case.

5.9.5 Test data/ plots:

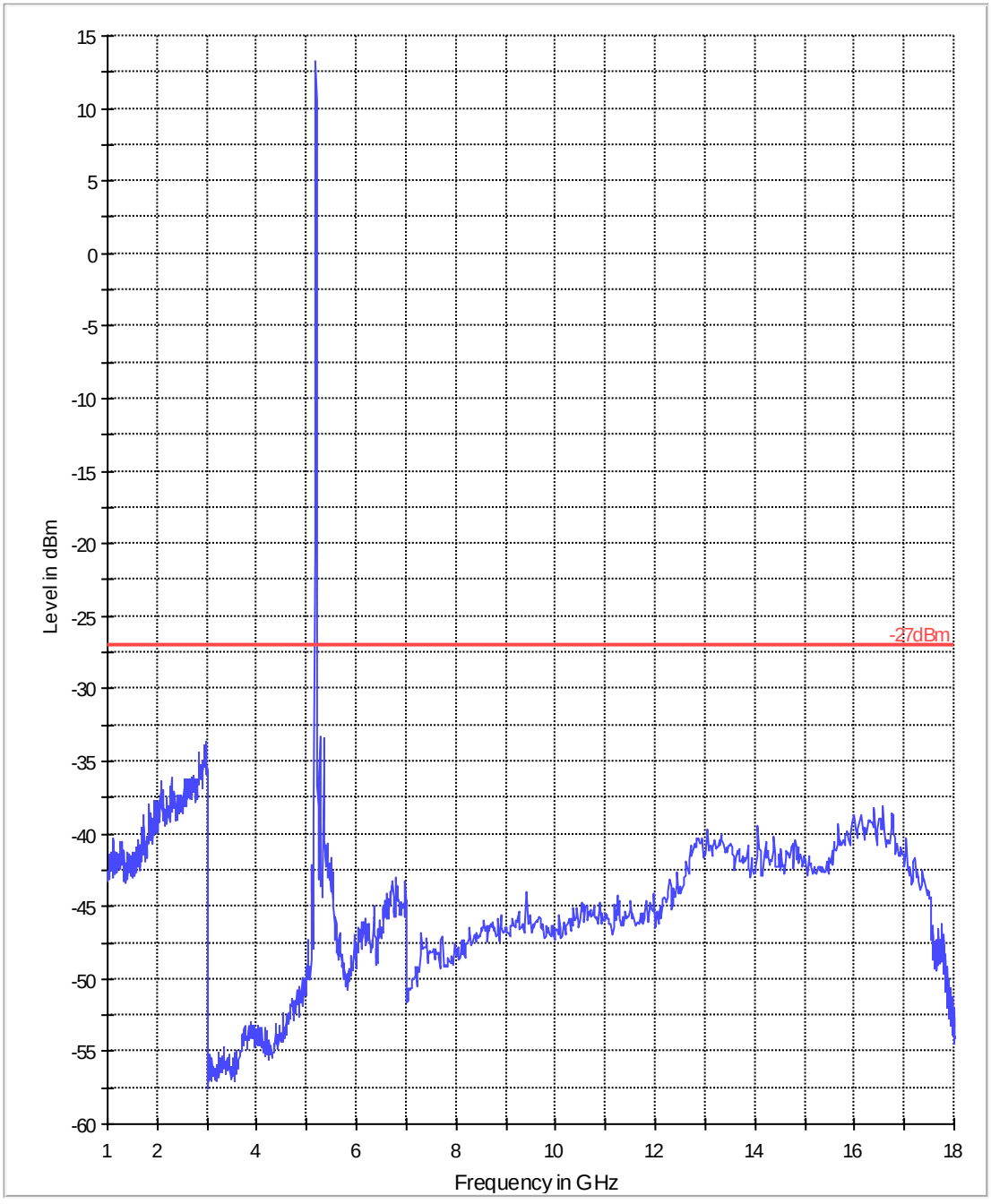
NOTE – Worst case plot for all channels and modes.

a mode_ch 120_tx 0_30-1



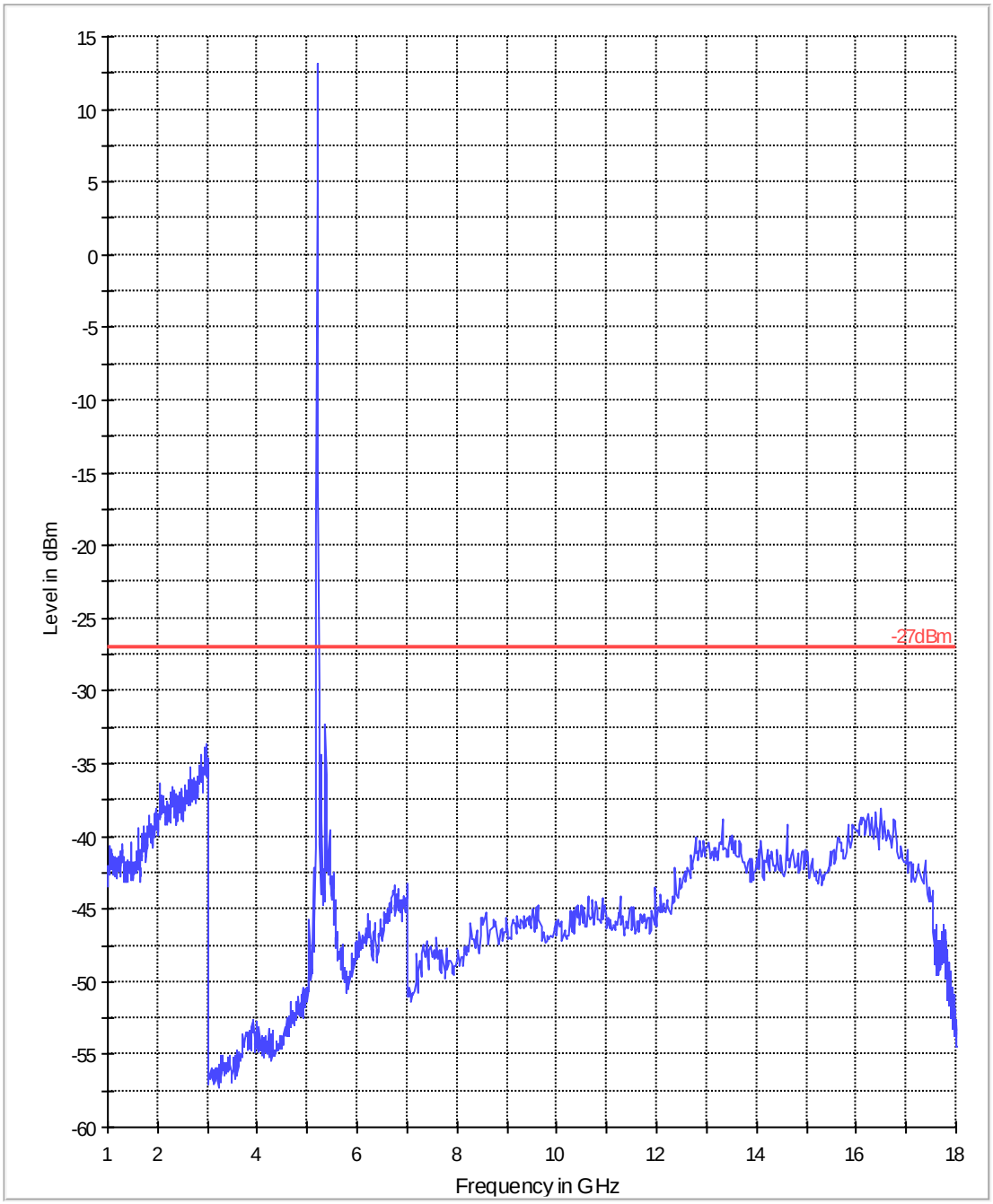
Tx0 1-18 a ch36

FCC 15.407 1-18GHz



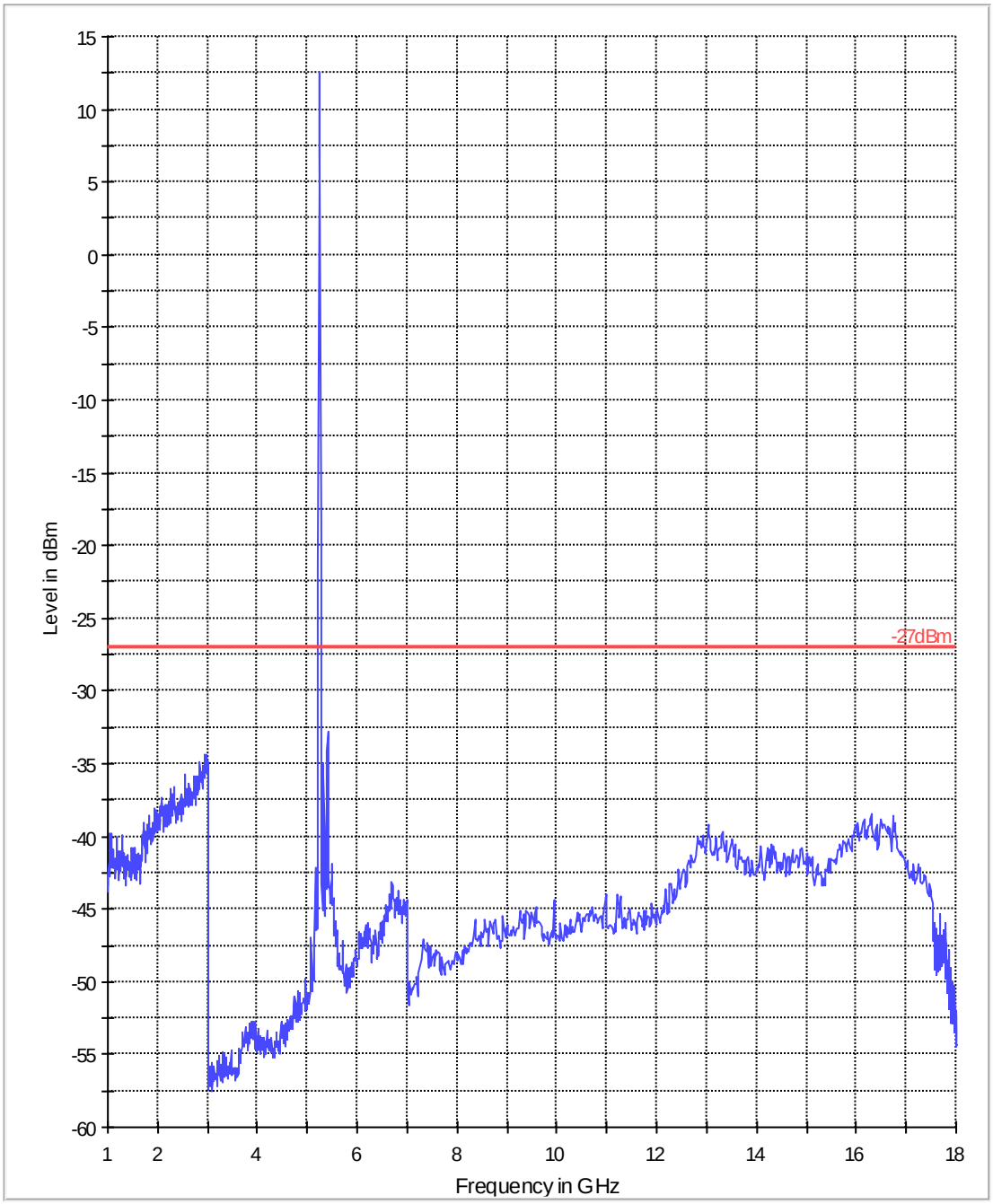
Tx0 1-18 a ch40

FCC 15.407 1-18GHz



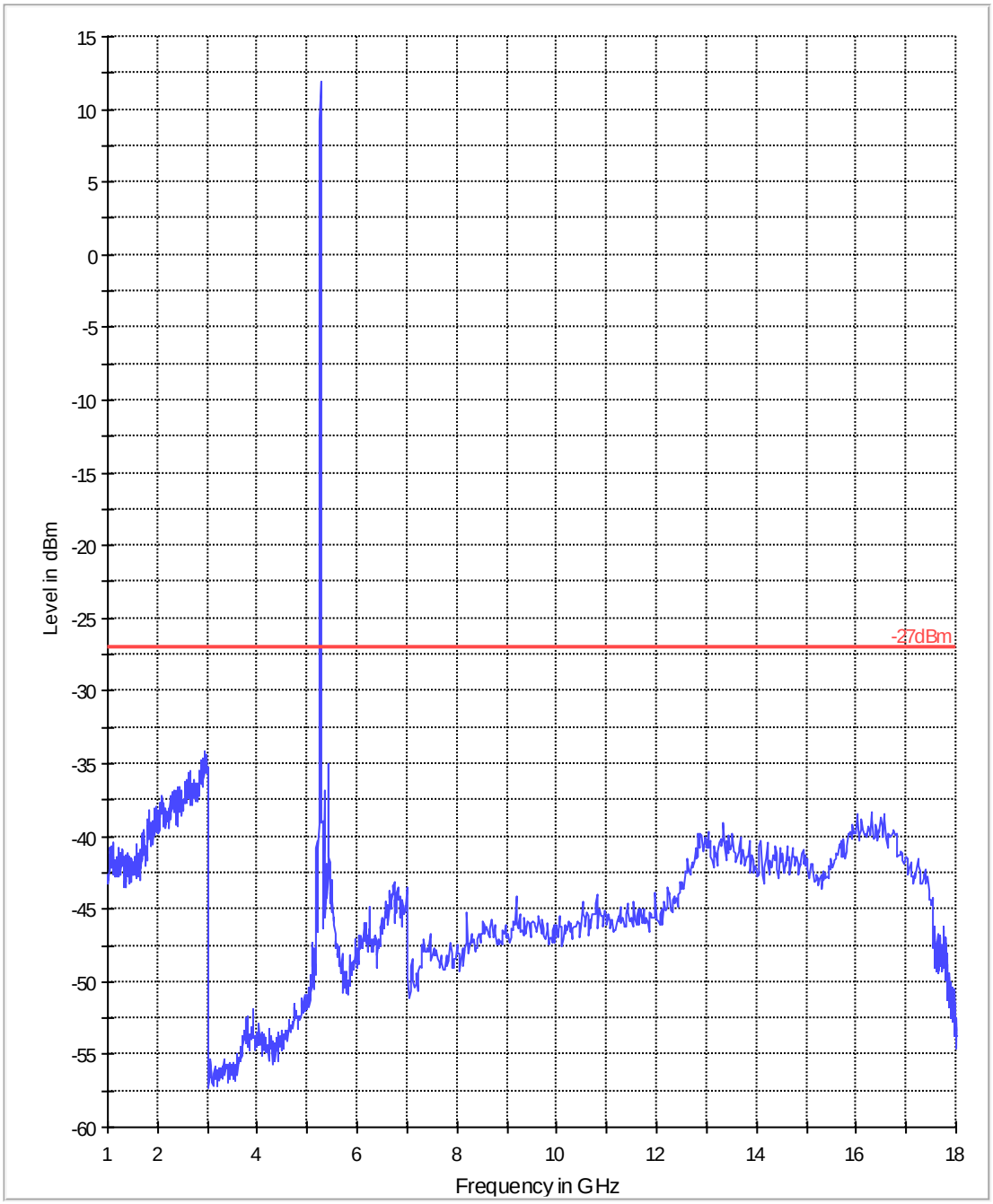
Tx0 1-18 a ch48

FCC 15.407 1-18GHz



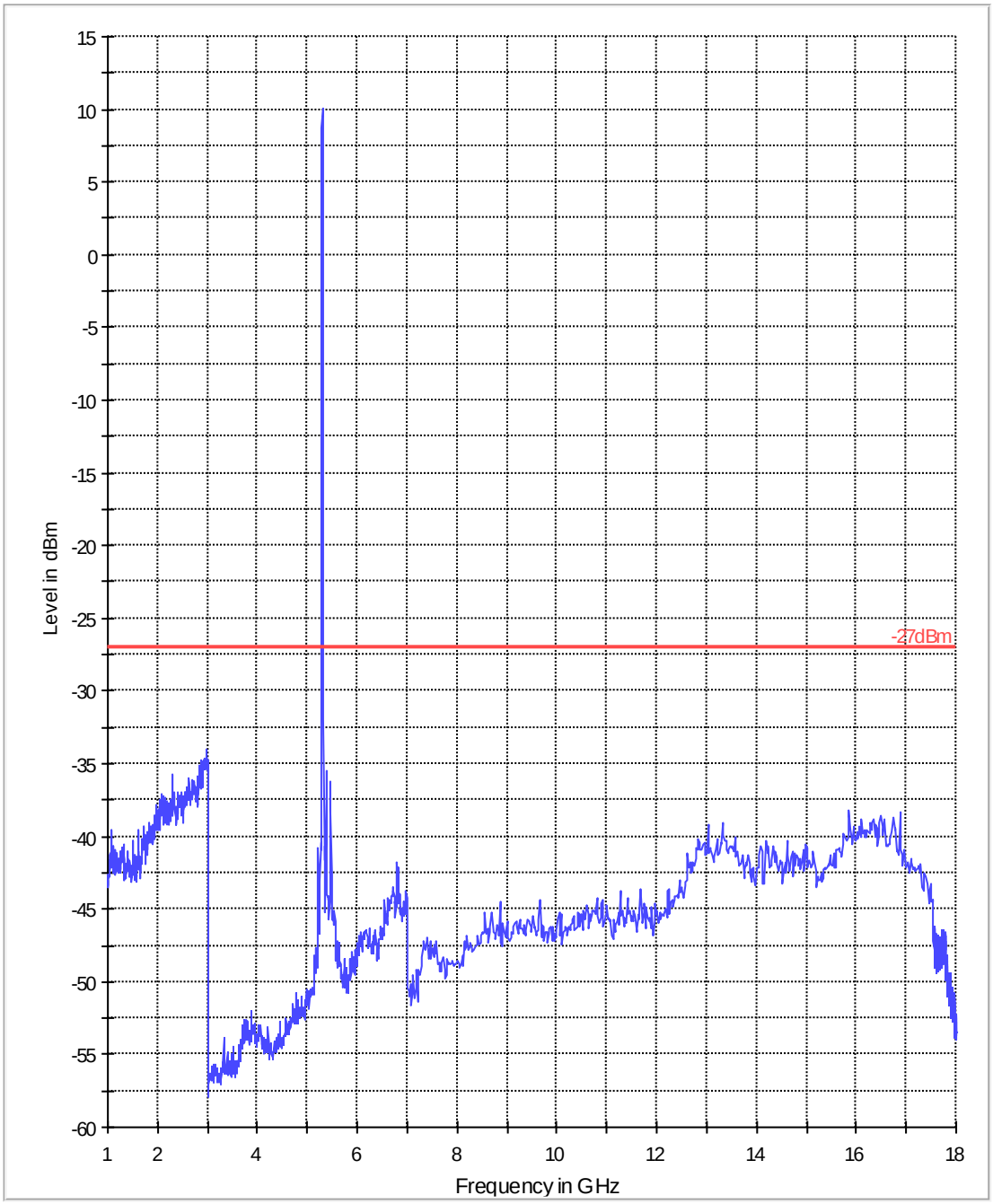
Tx0 1-18 a ch52

FCC 15.407 1-18GHz



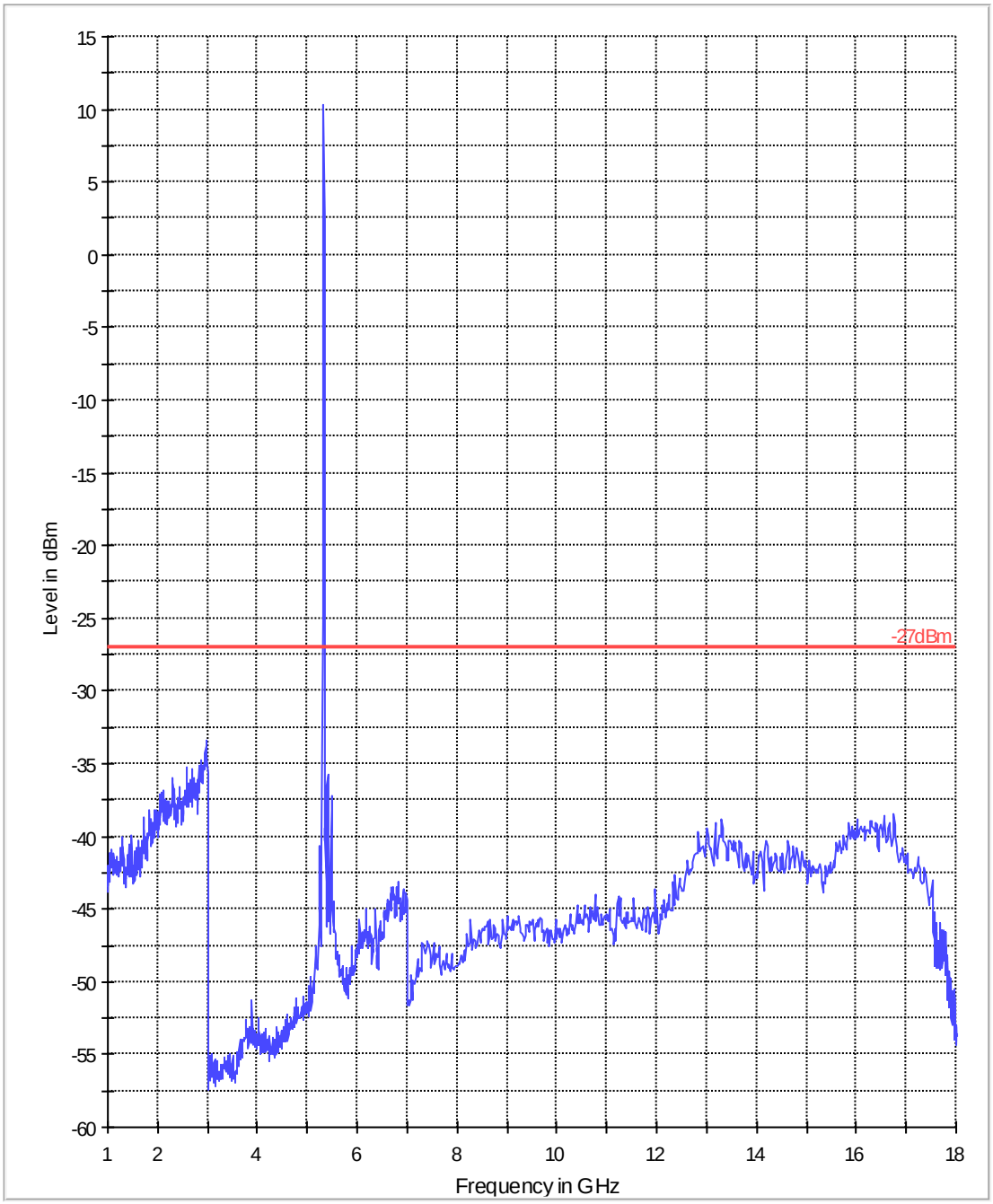
Tx0 1-18 a ch60

FCC 15.407 1-18GHz



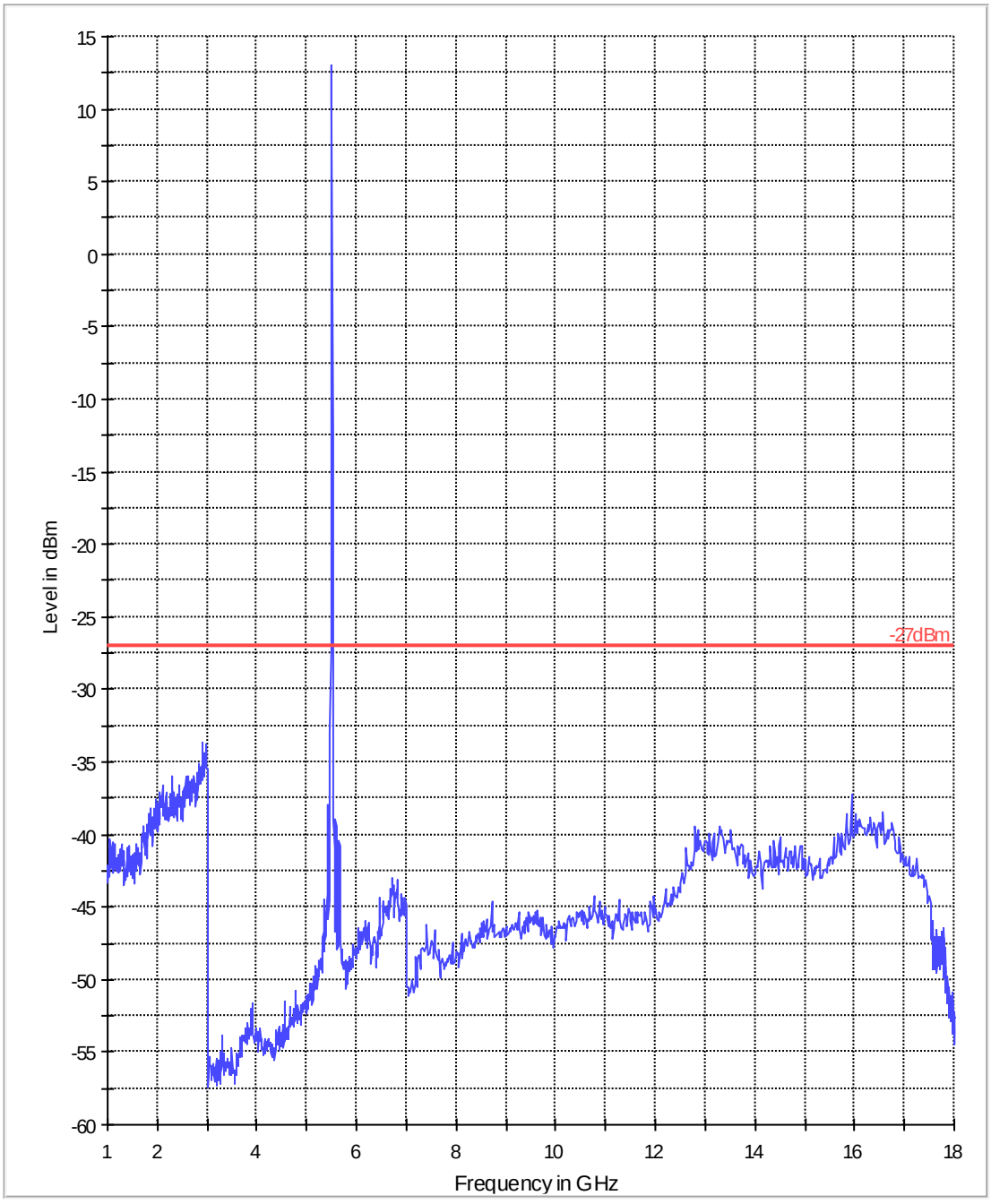
Tx0 1-18 a ch64

FCC 15.407 1-18GHz



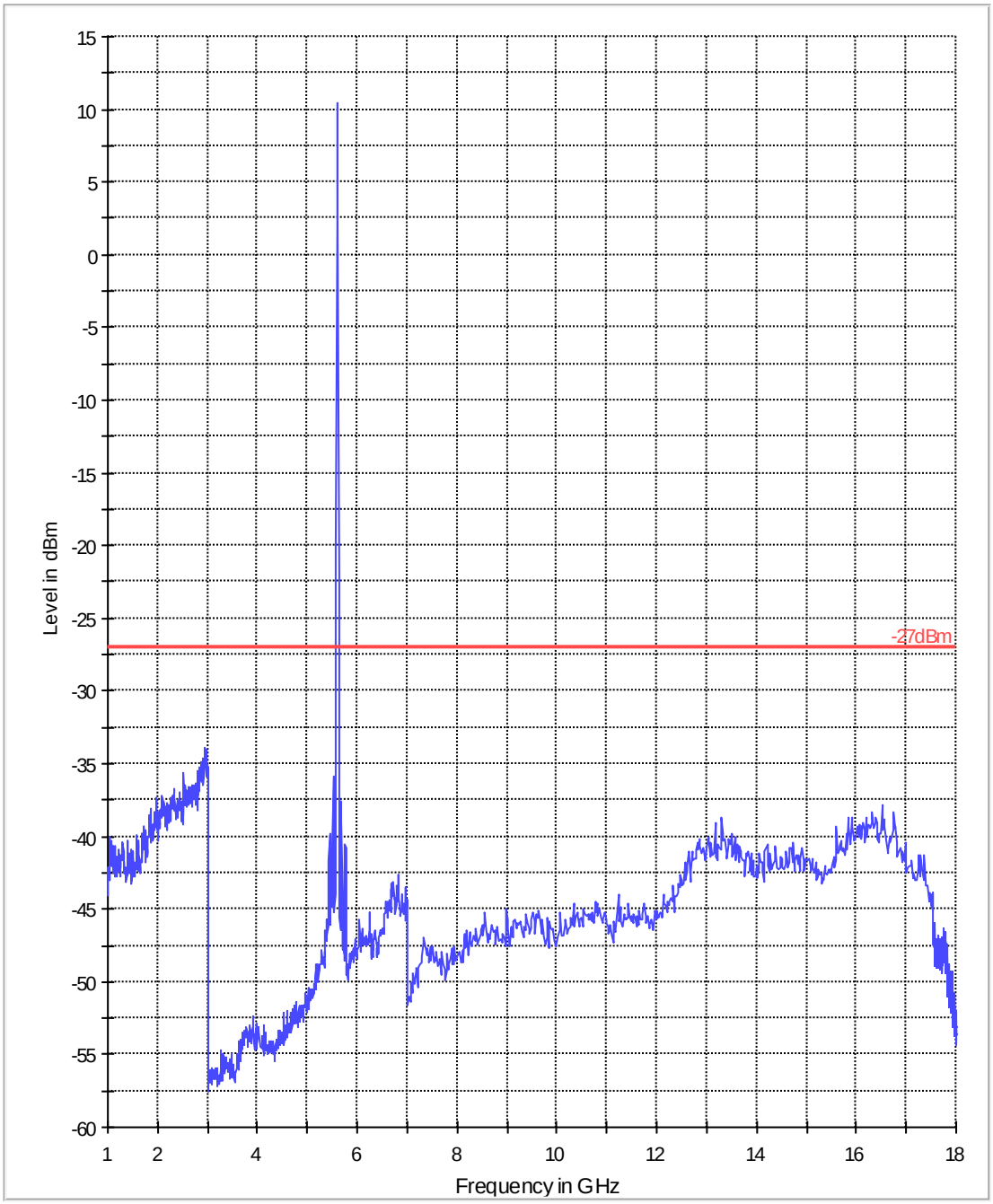
Tx0 1-18 a ch100

FCC 15.407 1-18GHz



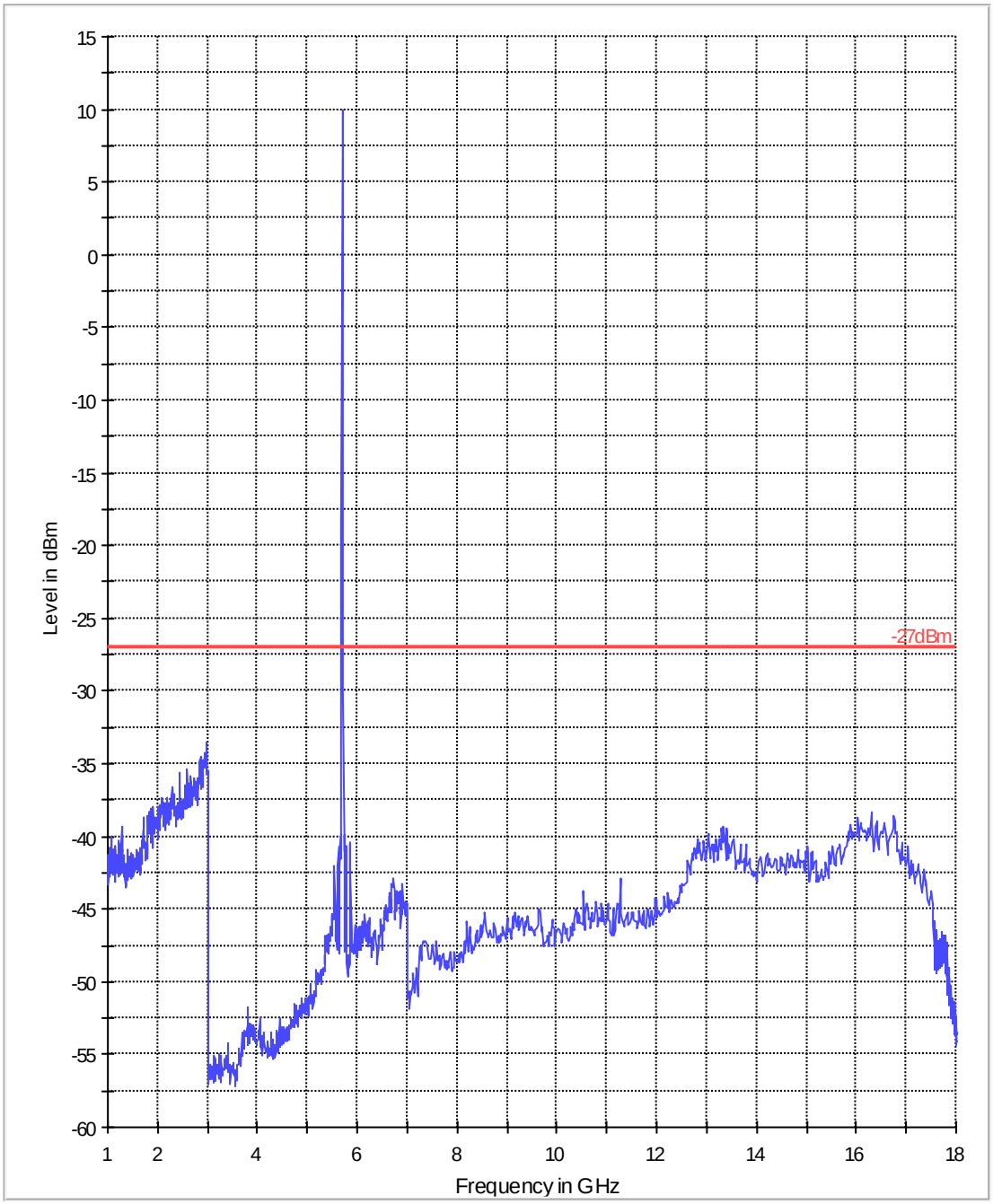
Tx0 1-18 a ch120

FCC 15.407 1-18GHz



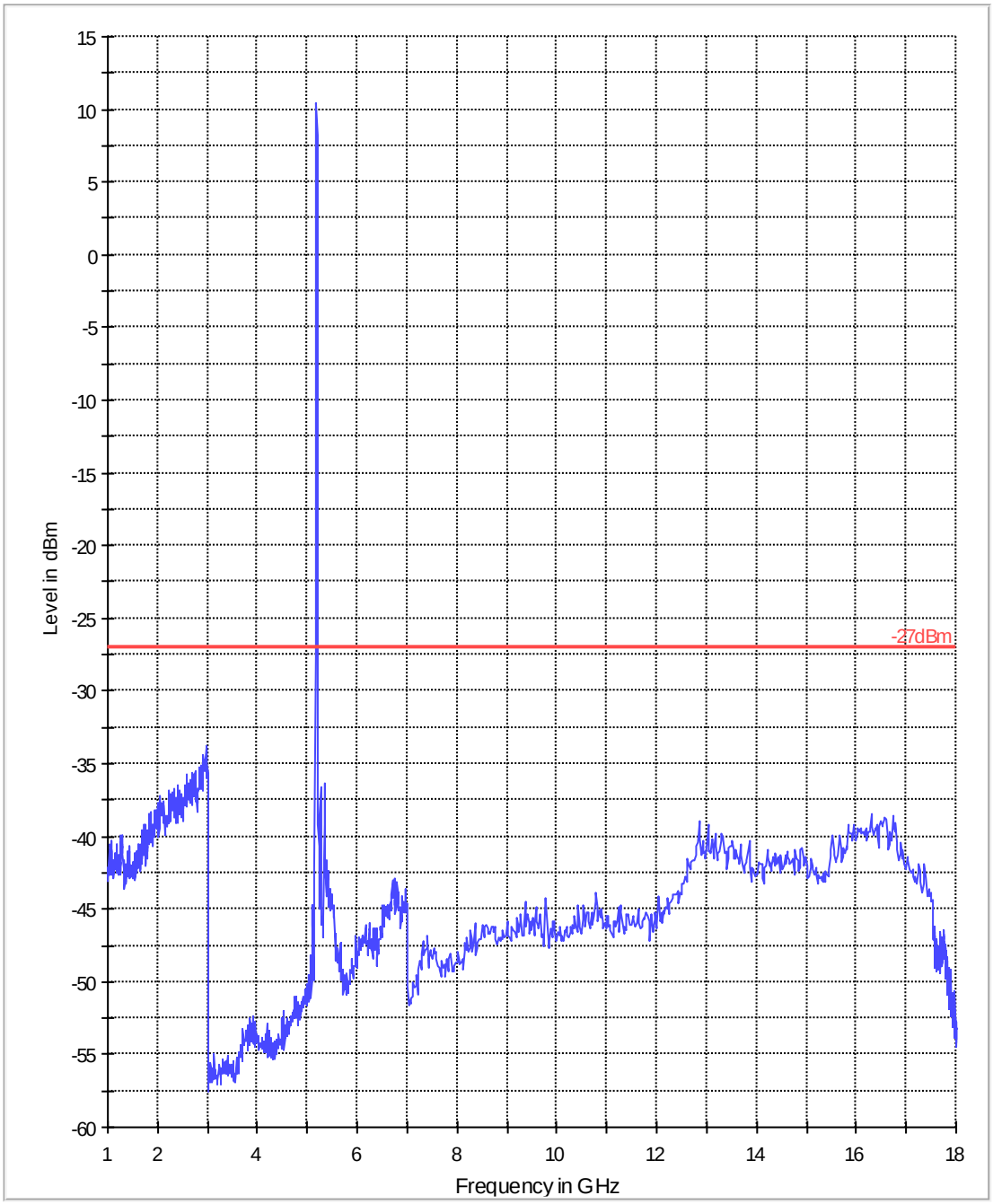
Tx0 1-18 a ch140

FCC 15.407 1-18GHz



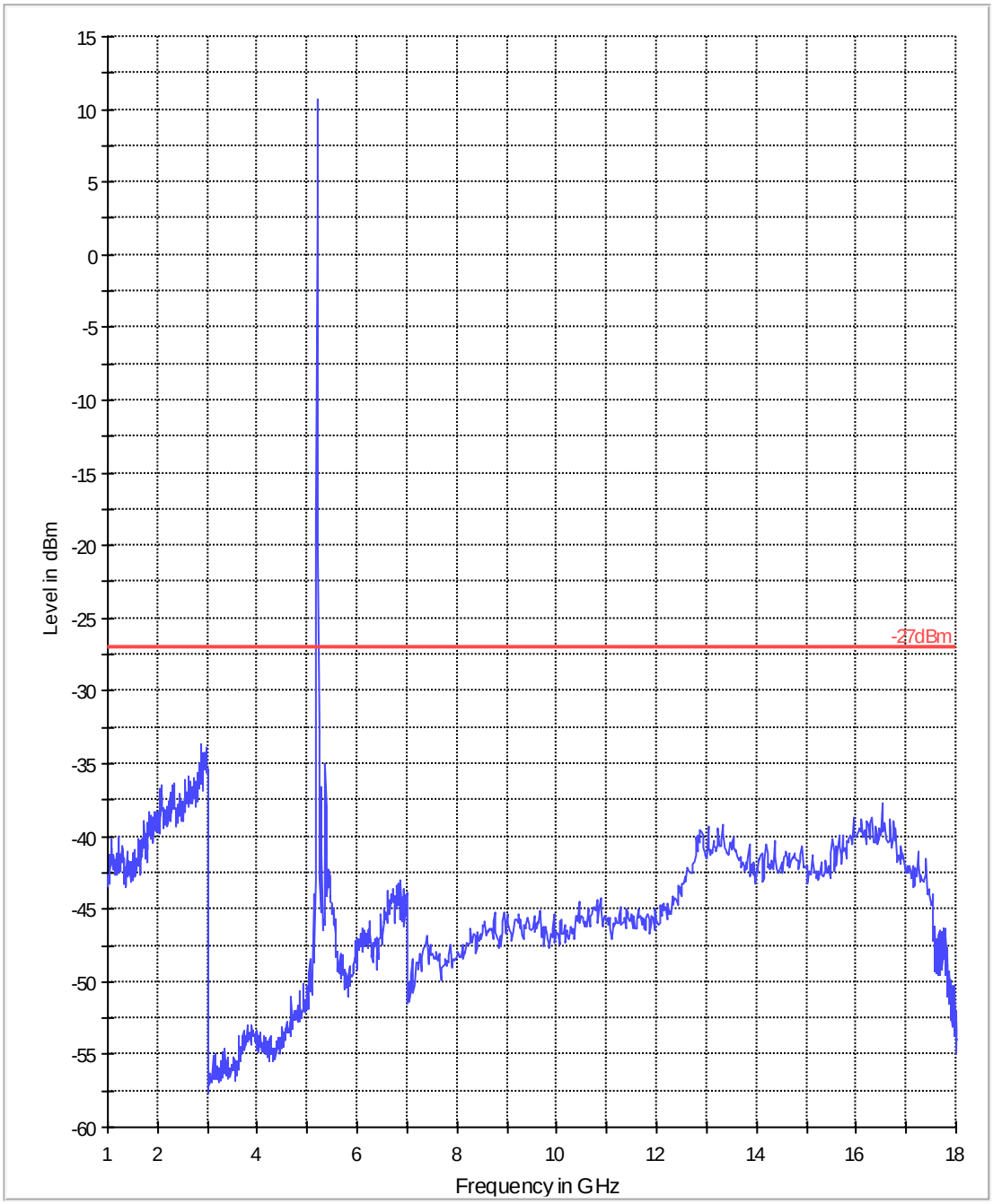
Tx1 1-18 a ch36

FCC 15.407 1-18GHz



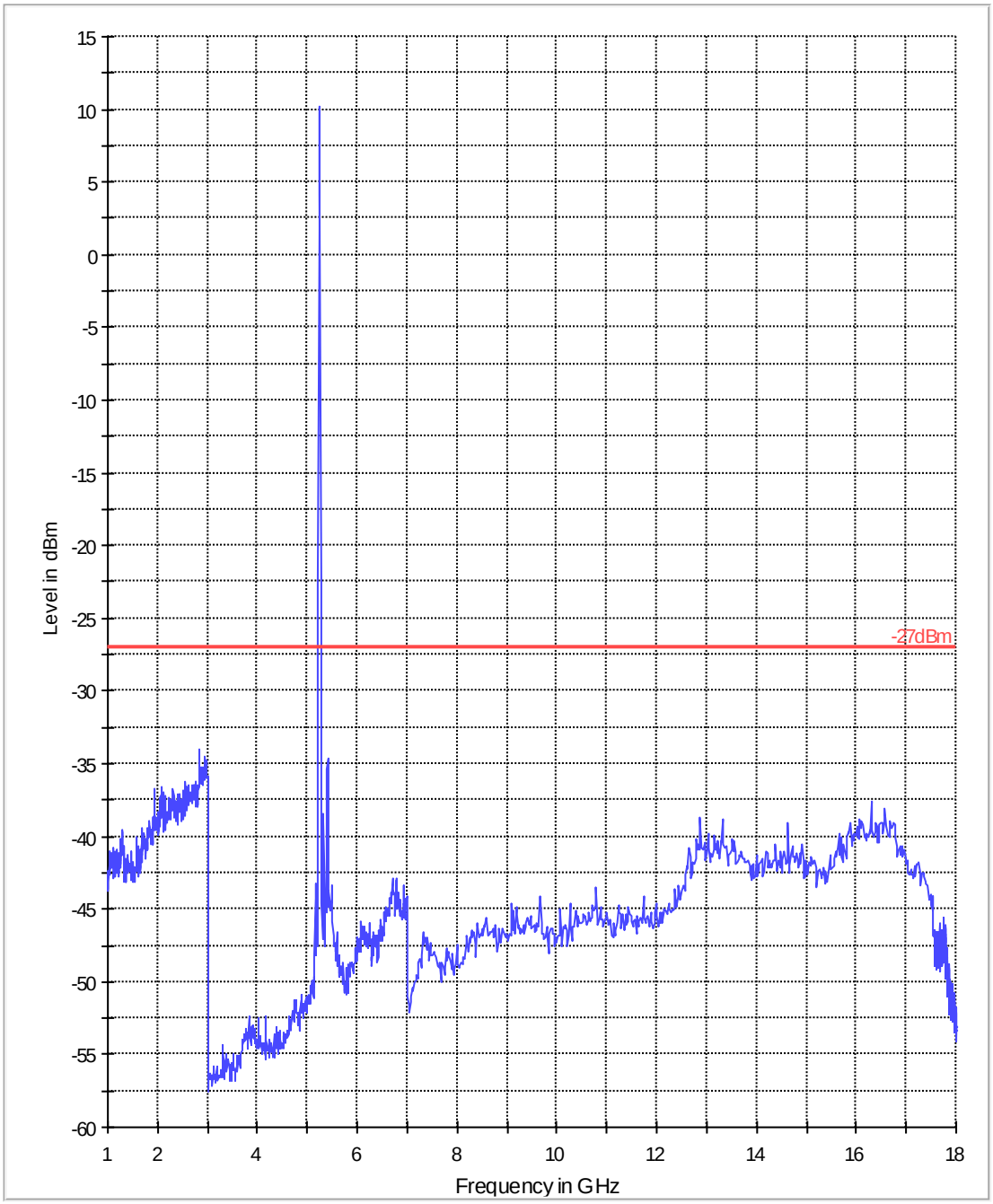
Tx1 1-18 a ch40

FCC 15.407 1-18GHz



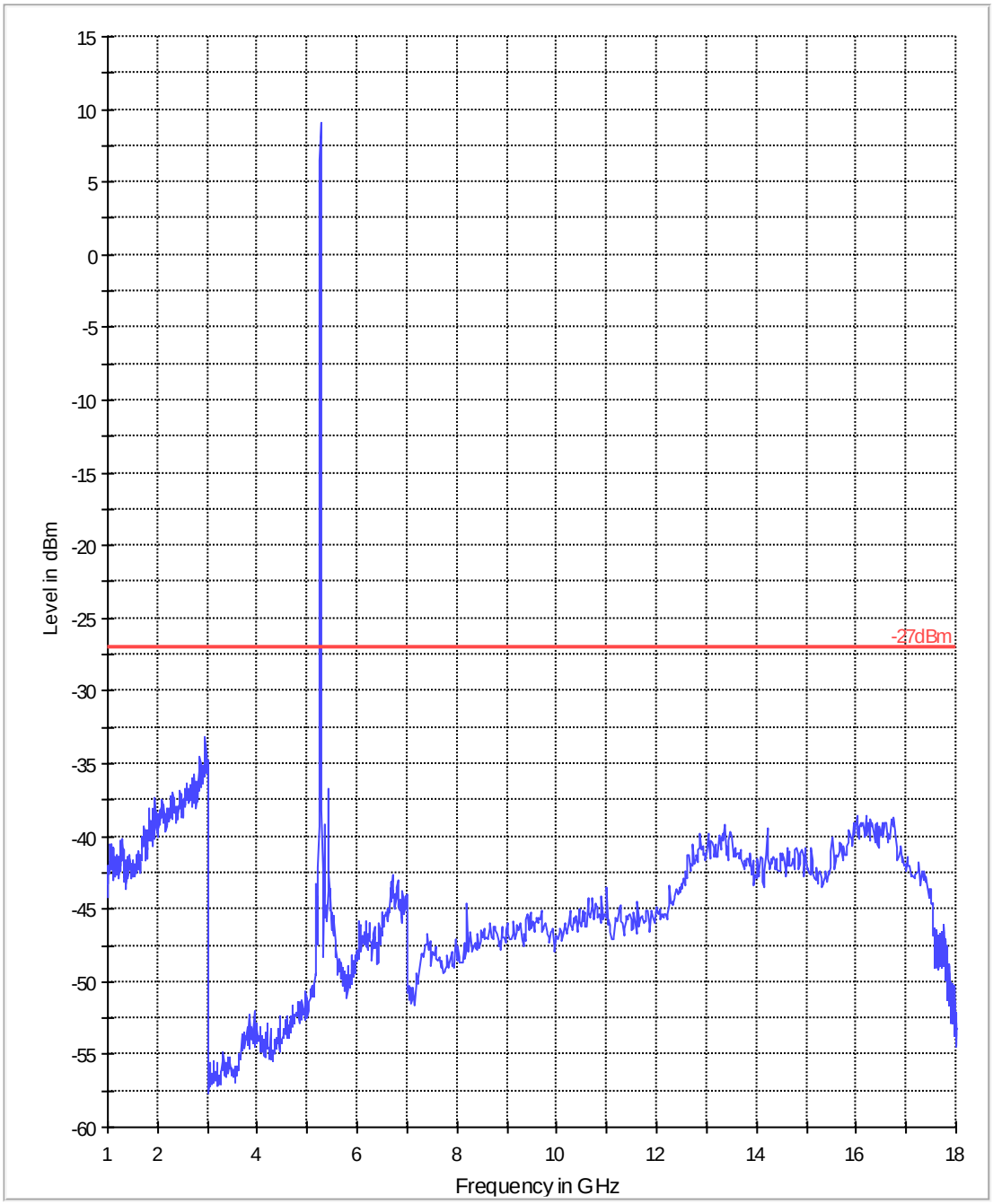
Tx1 1-18 a ch48

FCC 15.407 1-18GHz



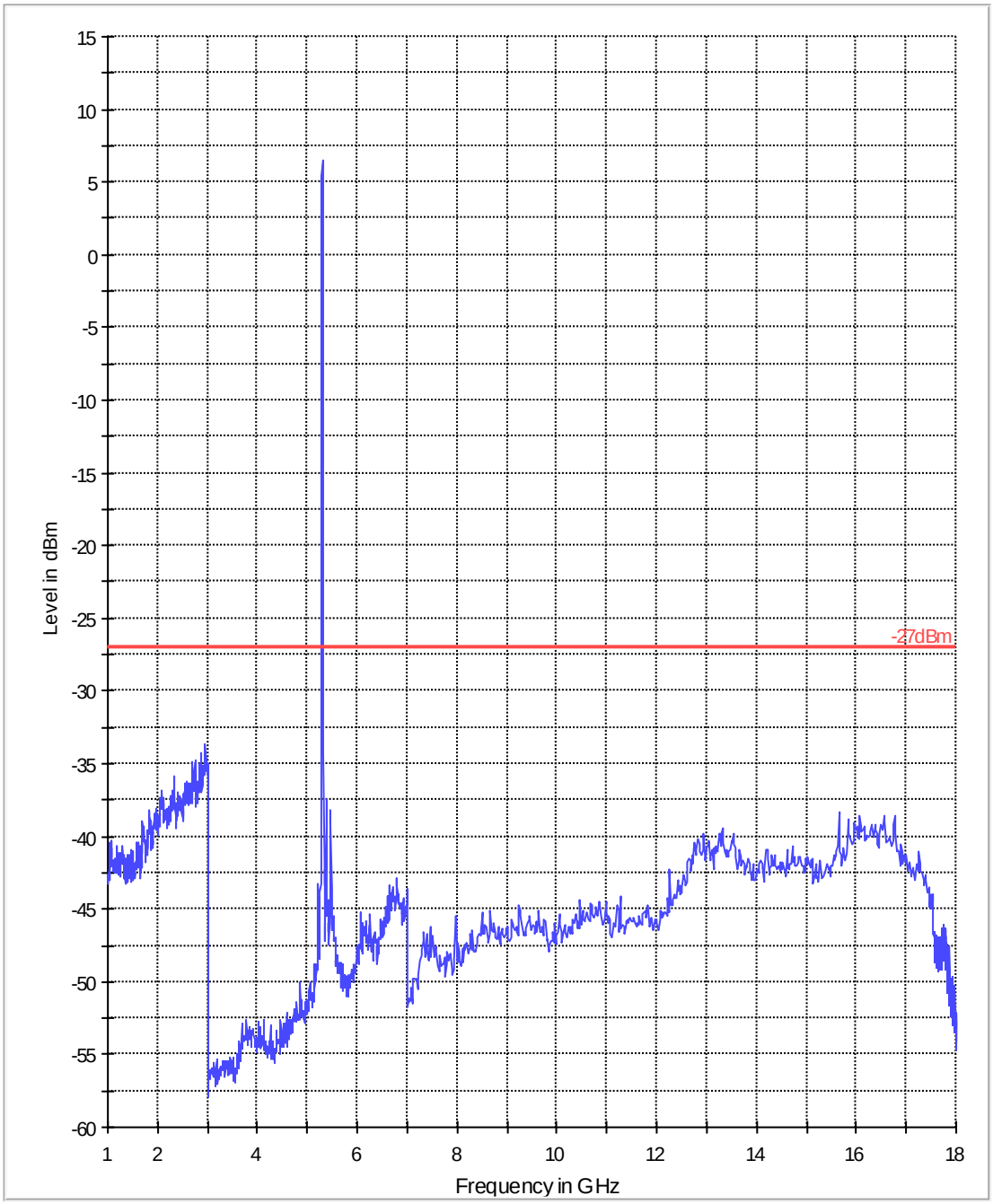
Tx1 1-18 a ch52

FCC 15.407 1-18GHz



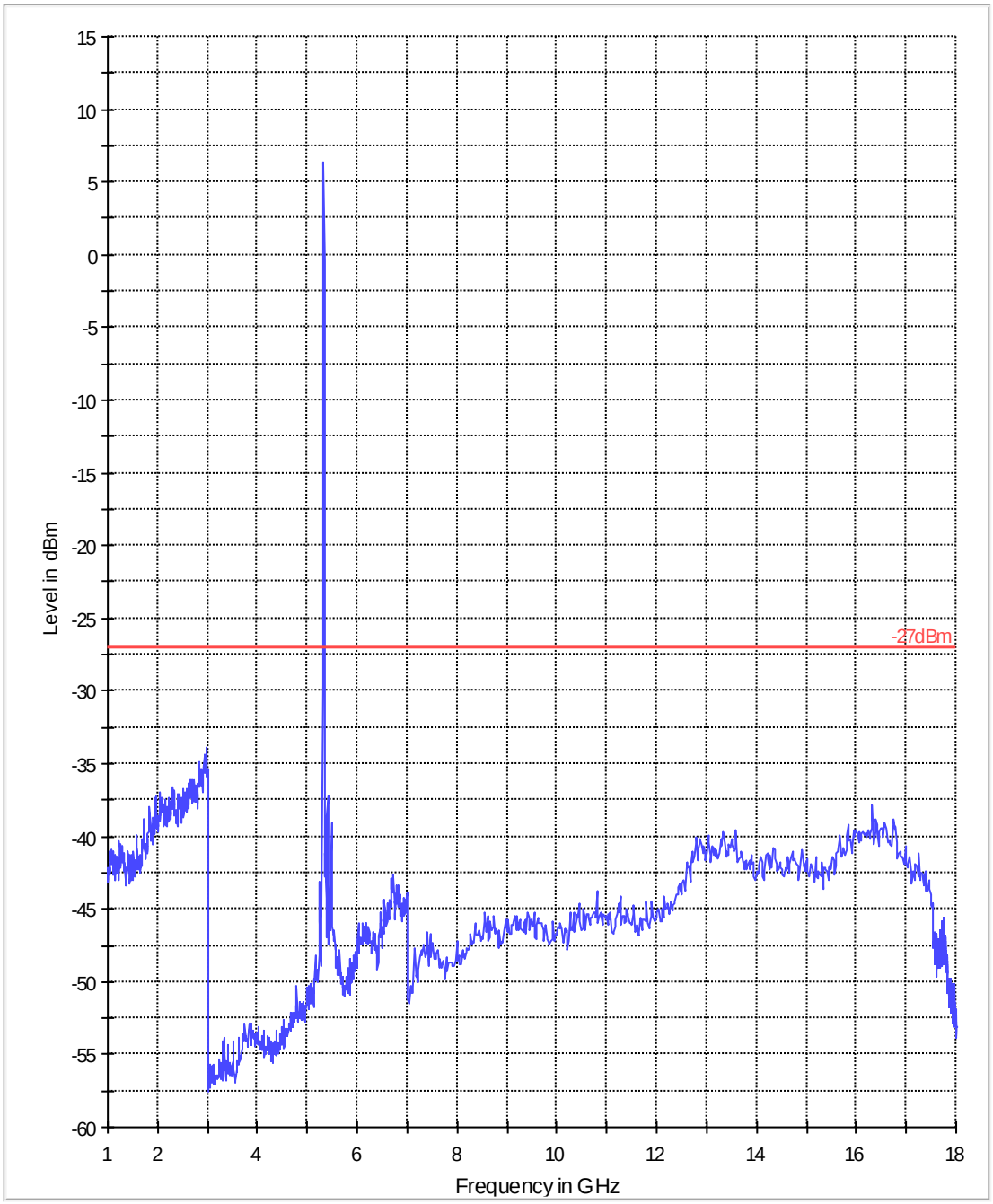
Tx1 1-18 a ch60

FCC 15.407 1-18GHz



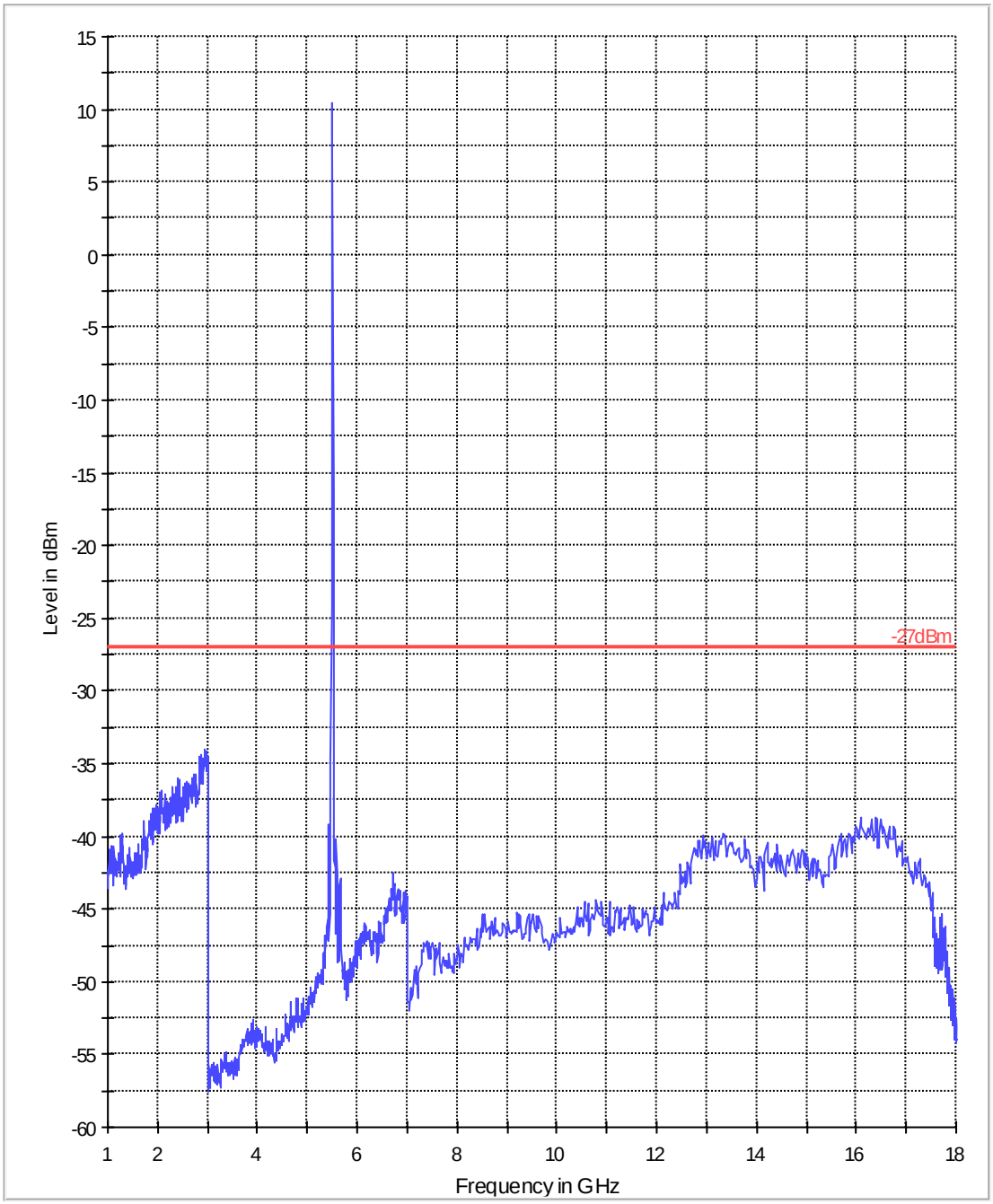
Tx1 1-18 a ch64

FCC 15.407 1-18GHz



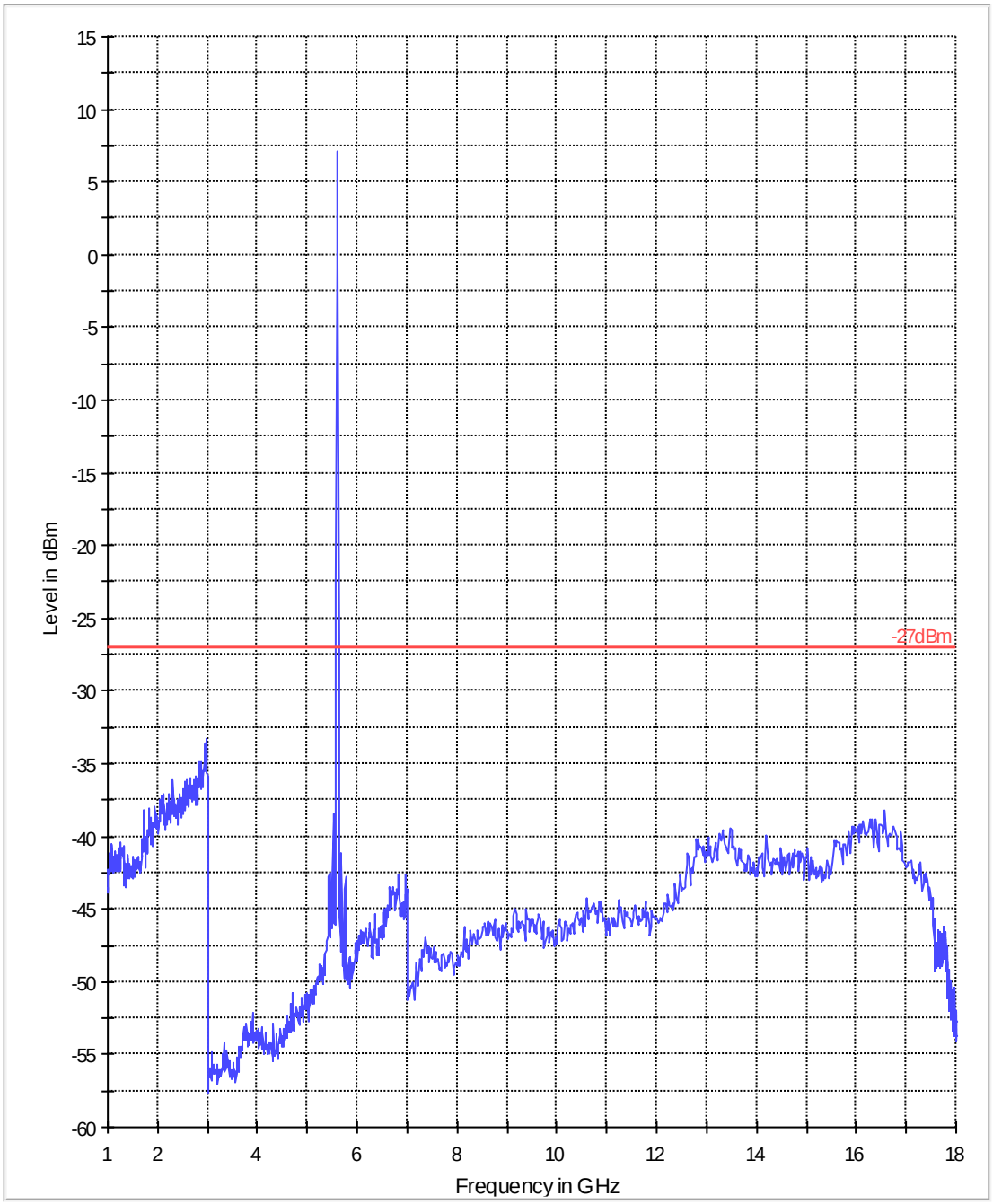
Tx1 1-18 a ch100

FCC 15.407 1-18GHz



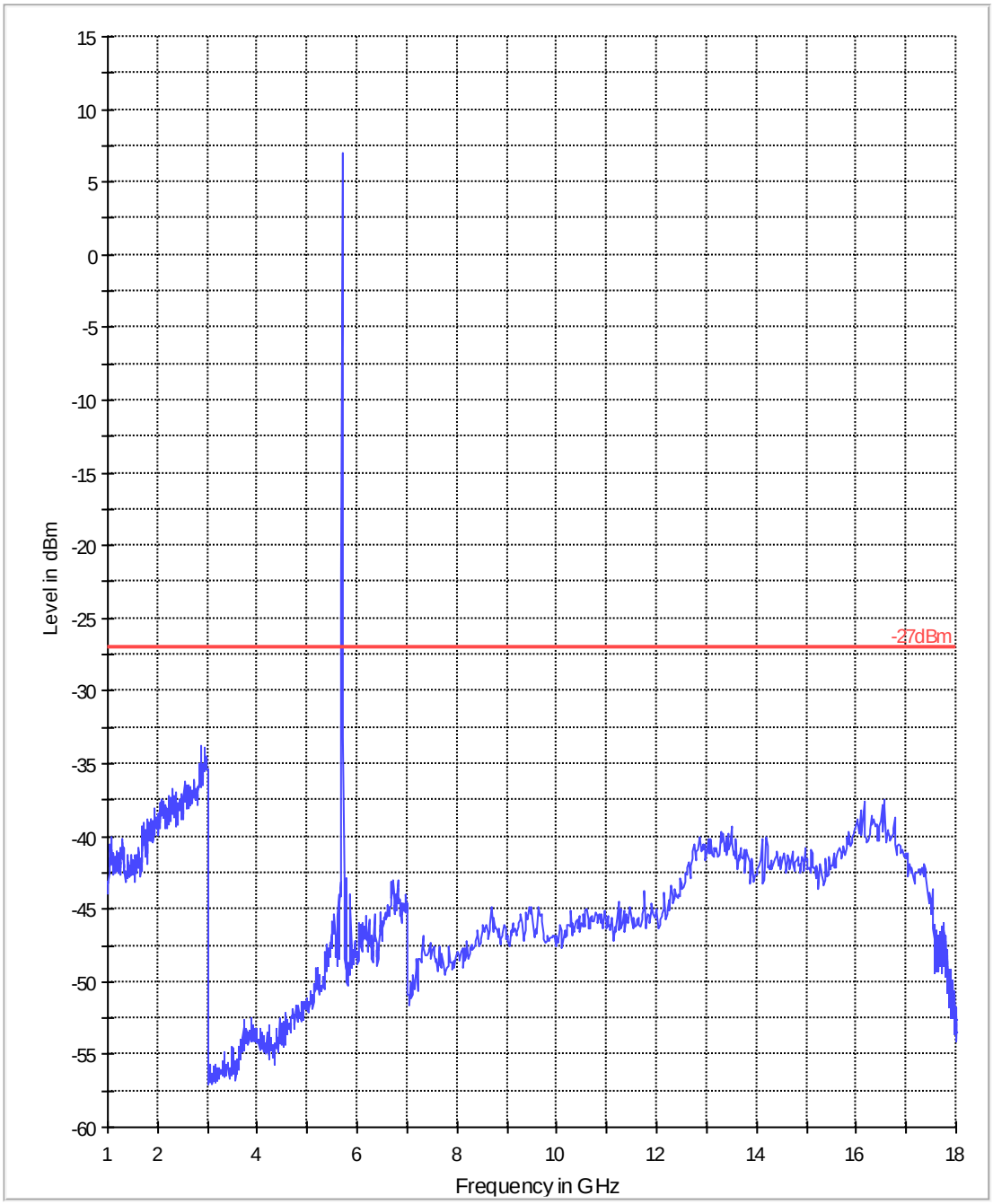
Tx1 1-18 a ch120

FCC 15.407 1-18GHz

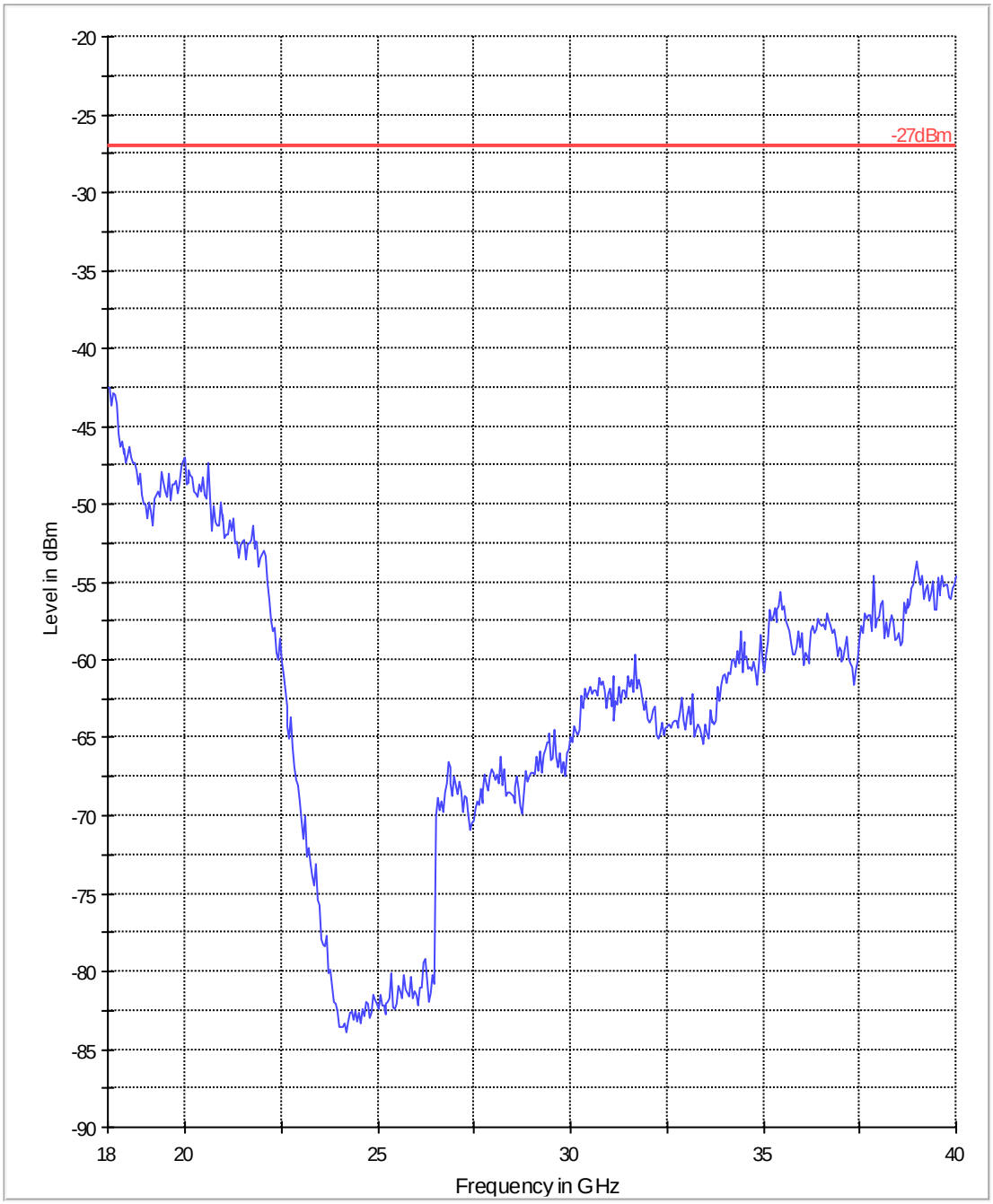


Tx1 1-18 a ch140

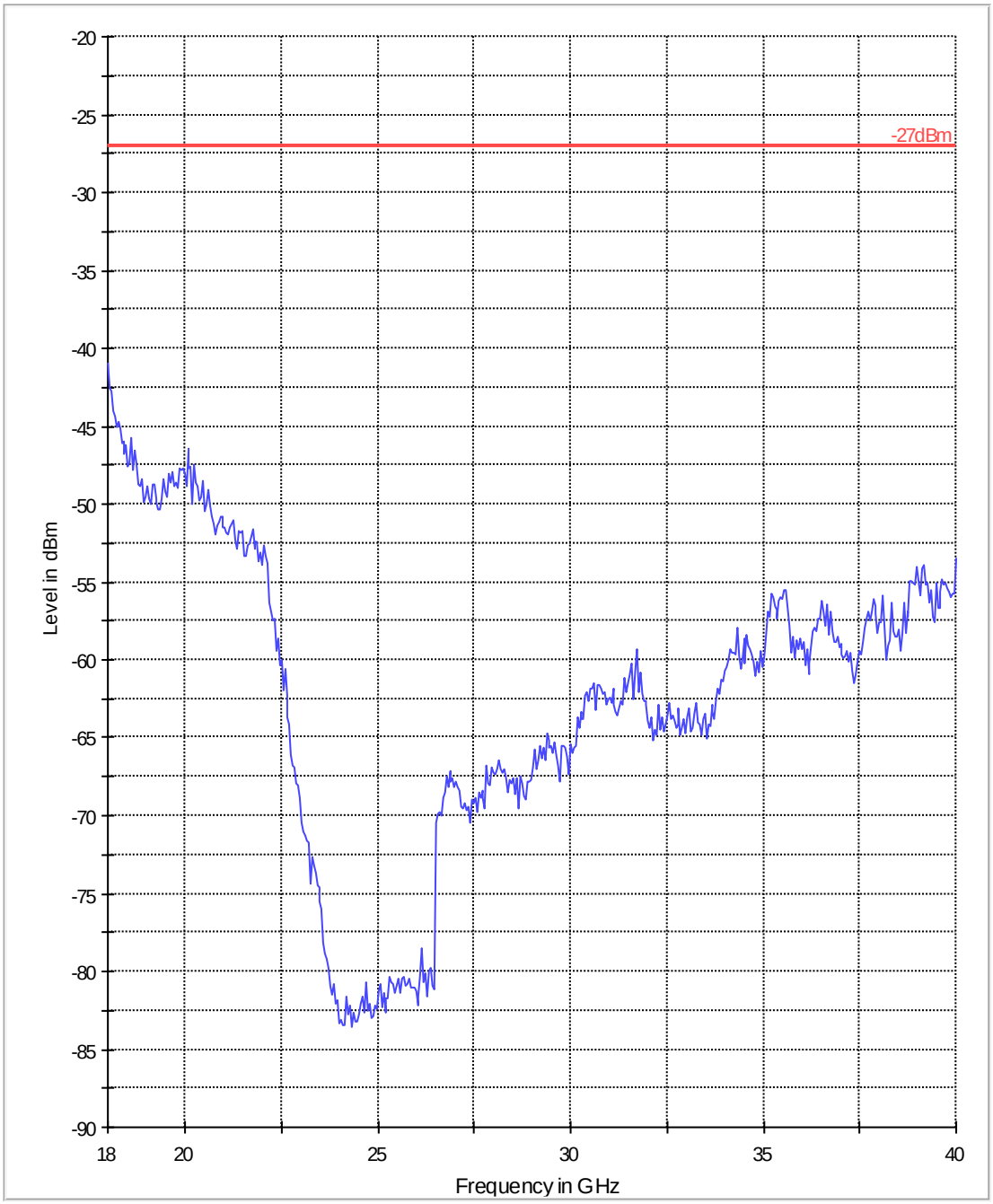
FCC 15.407 1-18GHz



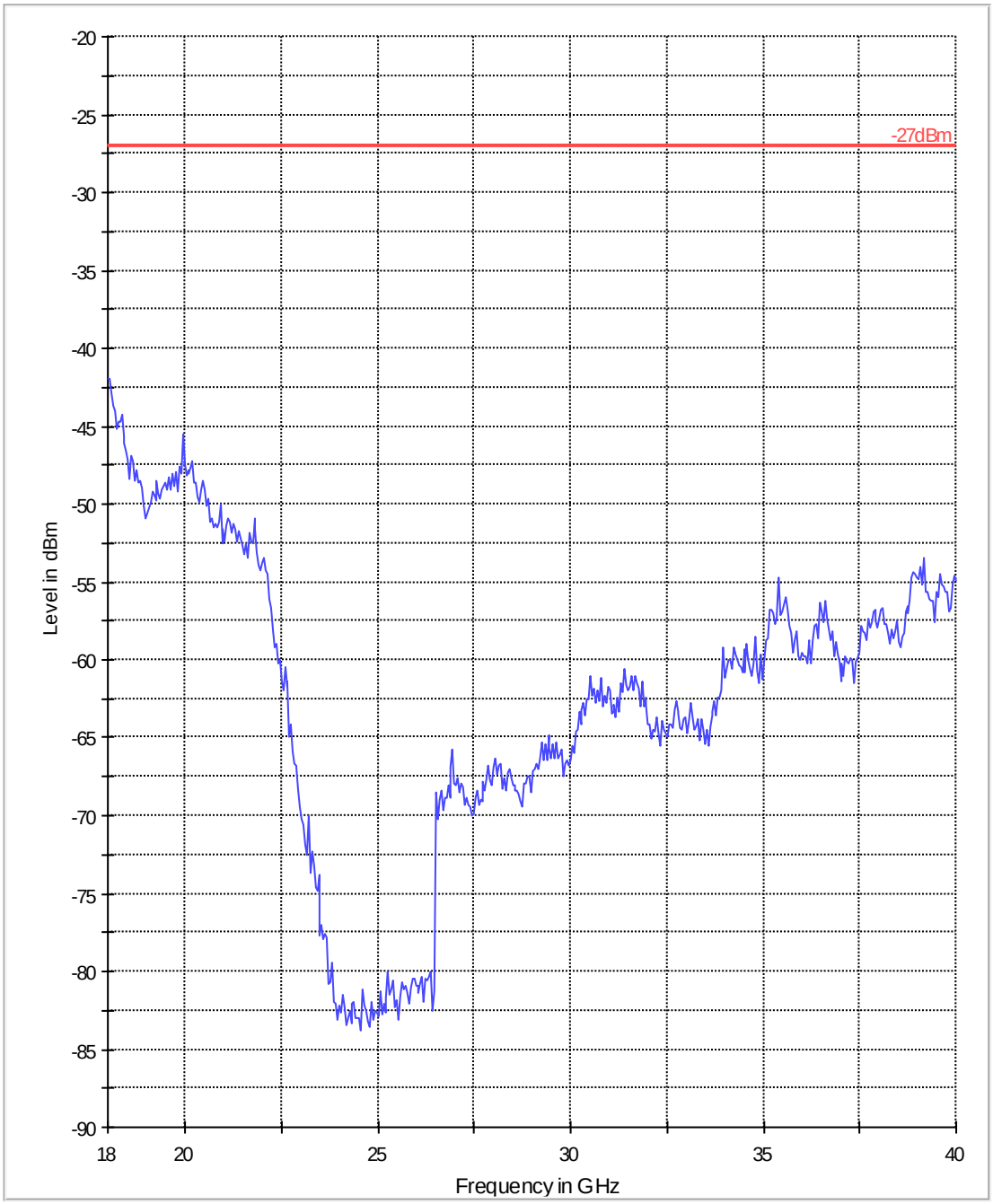
Tx0 18-40 a ch40



Tx0 18-40 a ch60

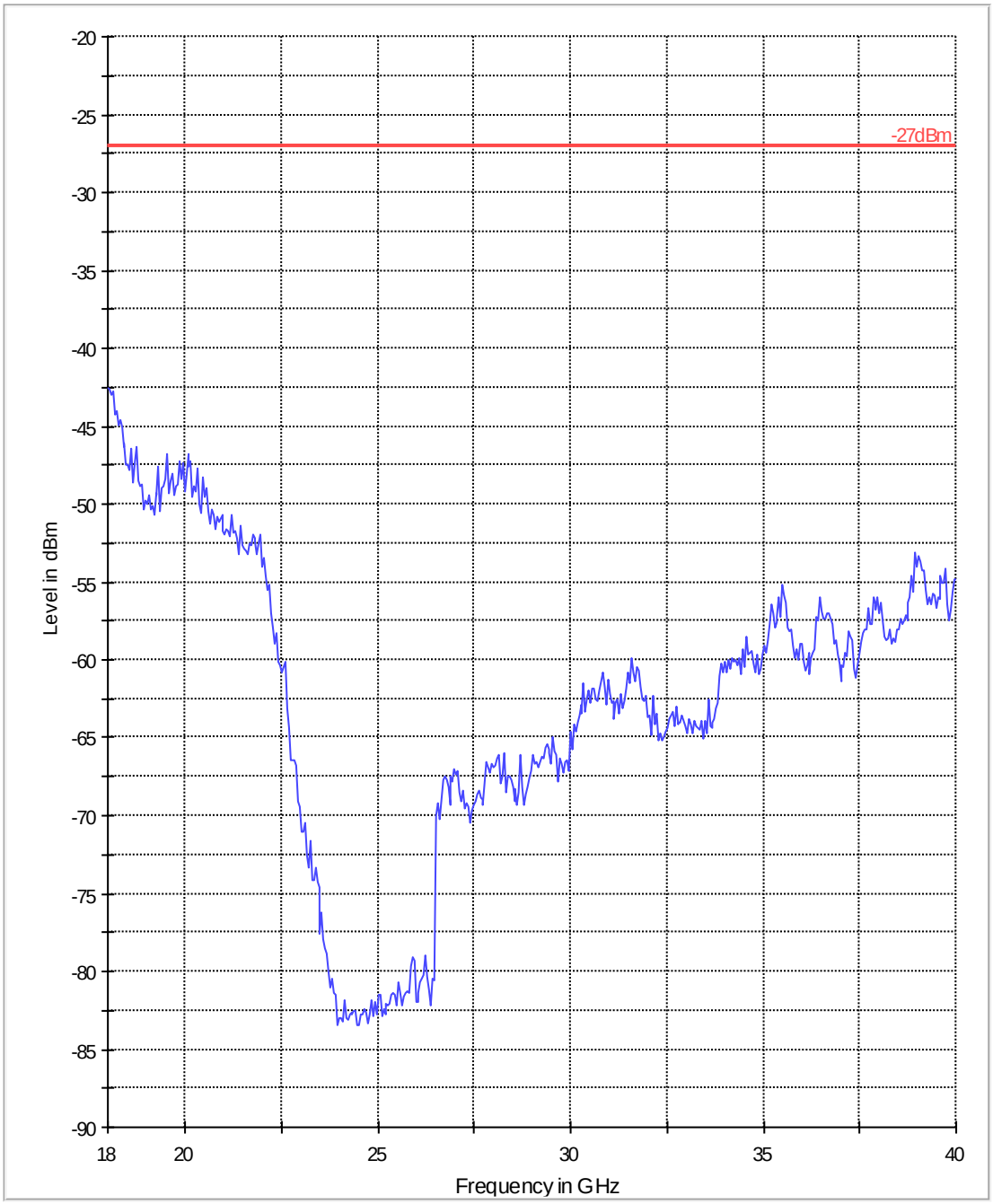


Tx0 18-40 a ch120



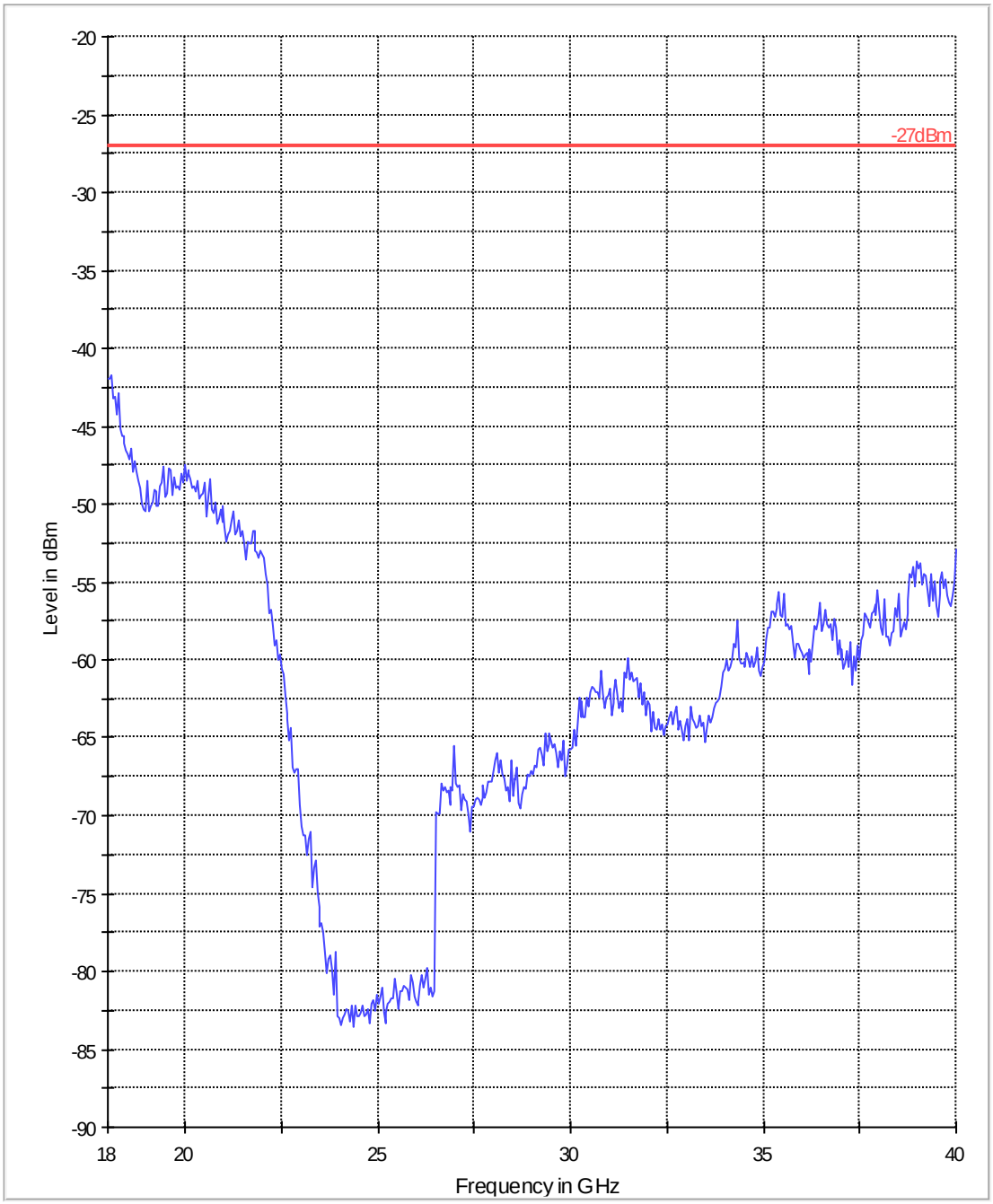
Tx1 18-40 a ch40

FCC 15.407 18-40GHz m



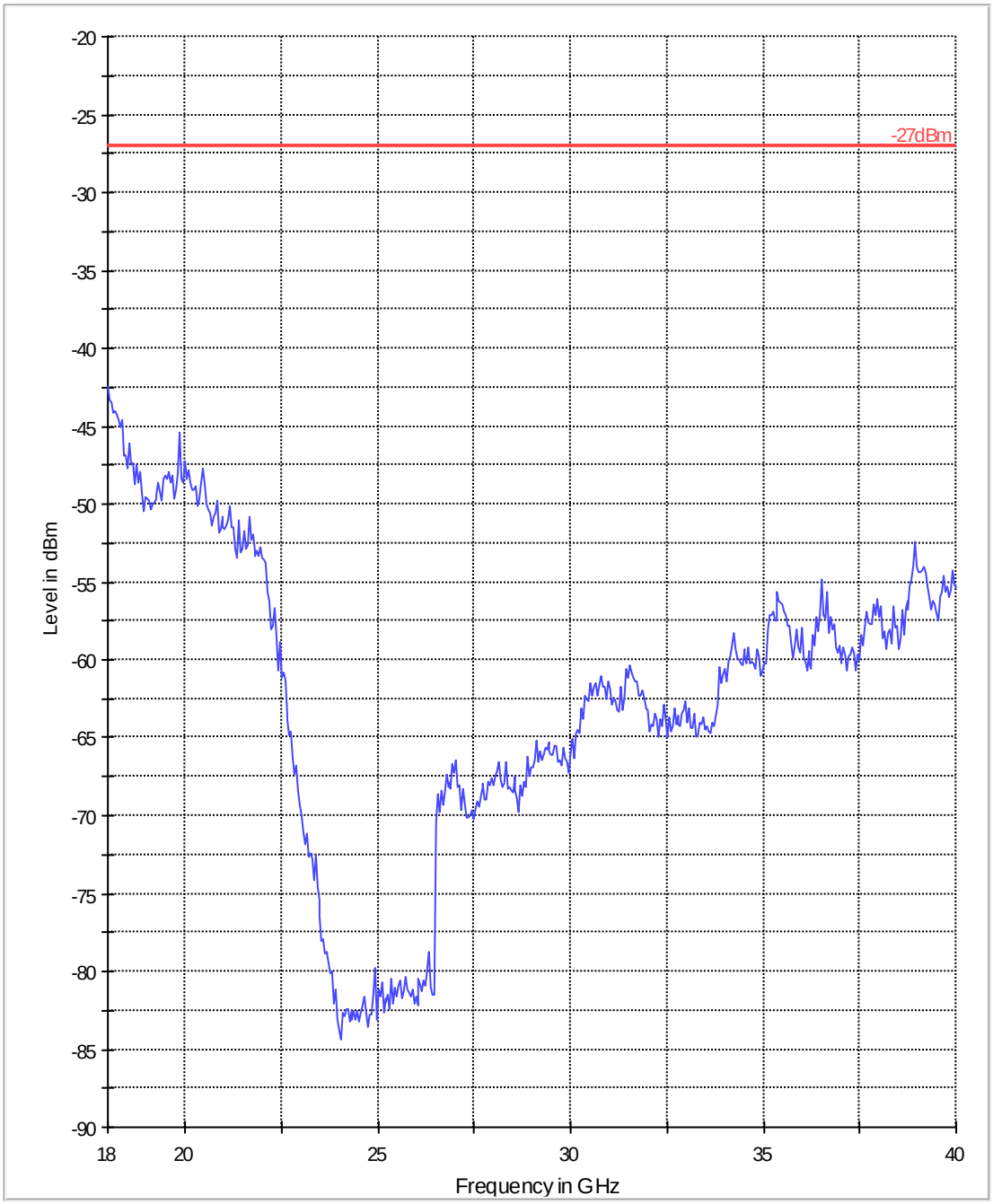
Tx1 18-40 a ch60

FCC 15.407 18-40GHz m



Tx1 18-40 a ch120

FCC 15.407 18-40GHz m



5.10 Receiver Spurious Emissions- Radiated

5.10.1 Limits: §15.109

Frequency of emission (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	30
30–88	100 (40dBµV/m)	3
88–216	150 (43.5 dBµV/m)	3
216–960	200 (46 dBµV/m)	3
Above 960	500 (54 dBµV/m)	3

5.10.2 Test Result:

Plots reported here represent the worse case emissions.

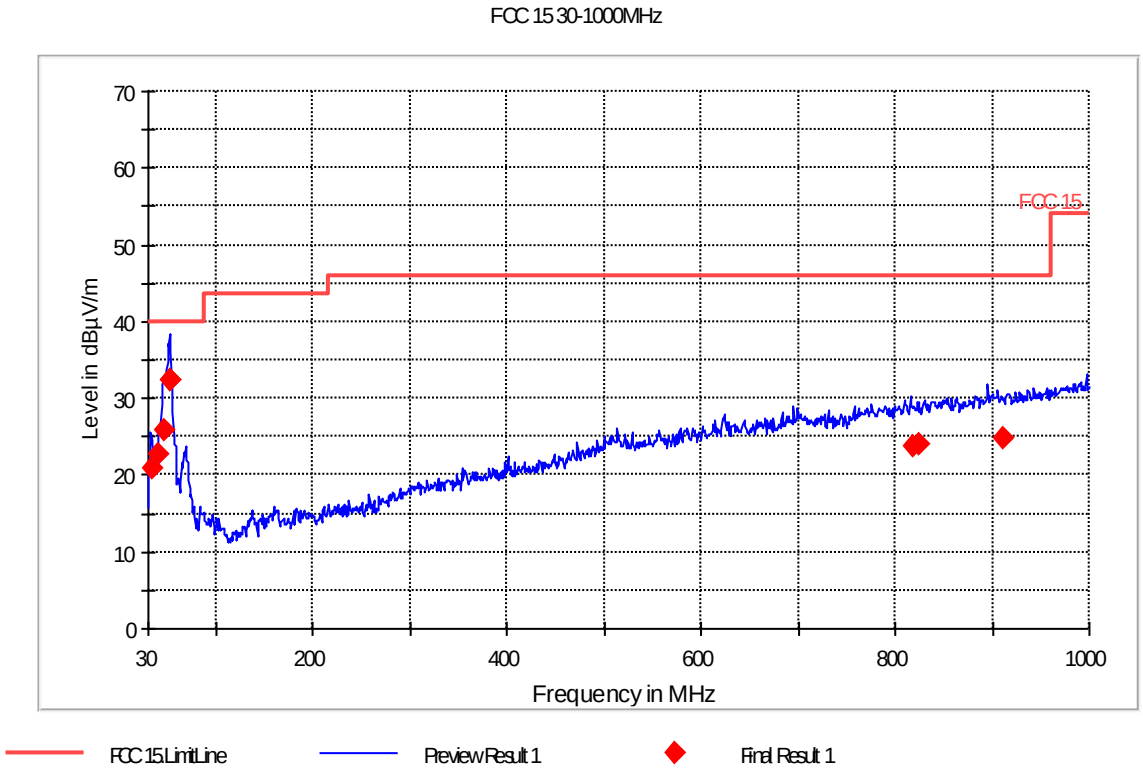
5.10.3 Test data/ plots:

idle 30-1

Final Result 1

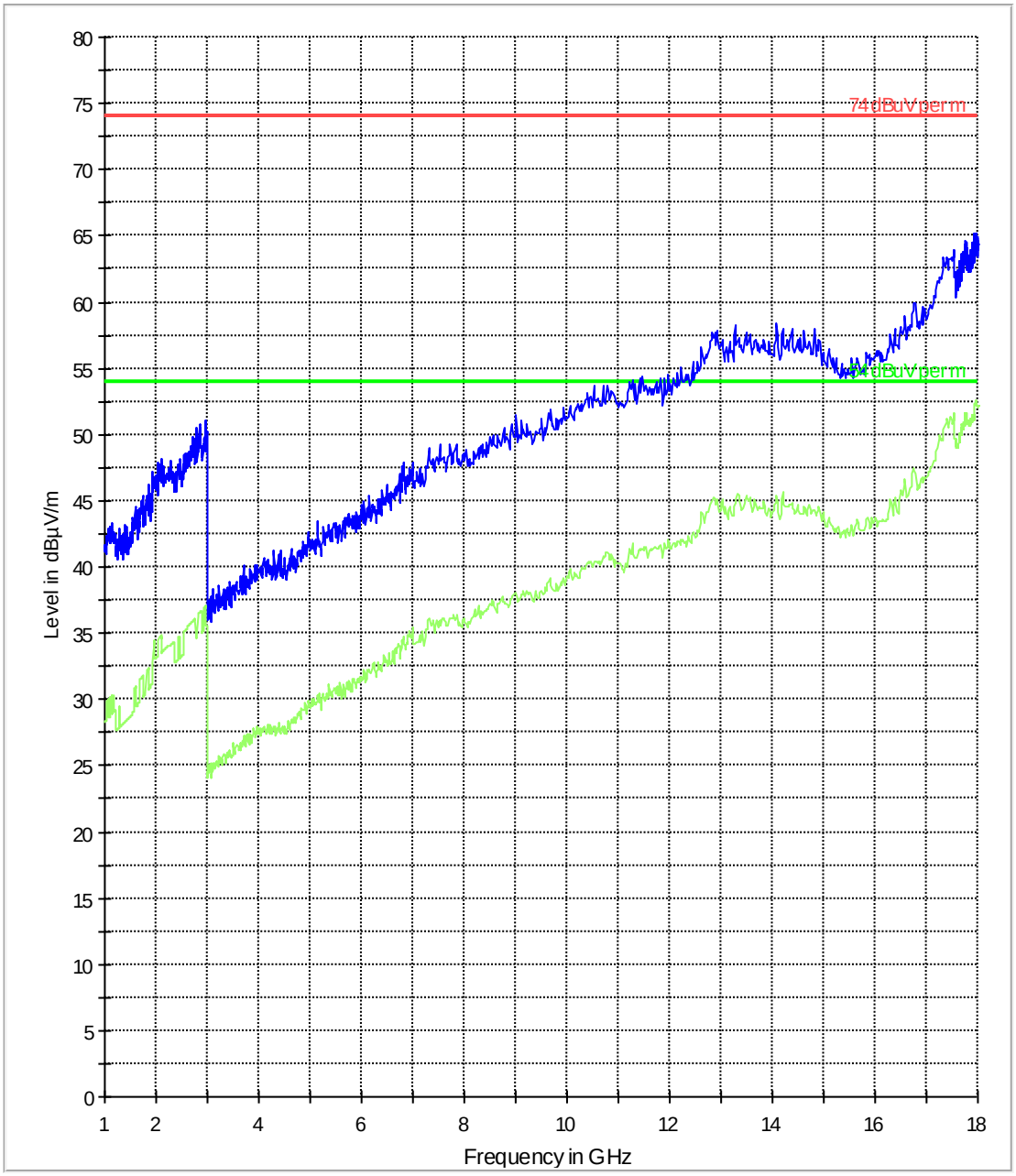
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
33.238367	21.0	20.000	120.000	120.0	V	45.0	6.8	19.0	40.0
41.337368	22.7	20.000	120.000	120.0	V	135.0	5.6	17.3	40.0
46.991909	25.8	20.000	120.000	120.0	V	199.0	6.4	14.2	40.0
51.857307	32.4	20.000	120.000	180.0	V	119.0	6.9	7.6	40.0
53.224499	32.4	20.000	120.000	177.0	V	1.0	7.1	7.6	40.0
818.826841	23.8	20.000	120.000	237.0	H	32.0	25.7	22.2	46.0
823.599690	23.9	20.000	120.000	186.0	H	86.0	25.8	22.1	46.0
911.331354	24.9	20.000	120.000	205.0	H	20.0	26.5	21.1	46.0

(continuation of the "Final Result 1" table from column 10 ...)



idle 1-18

FCC 15 1-18GHz



5.11 AC Power Line Conducted Emissions

5.11.1 Limits: §15.107/15.207

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

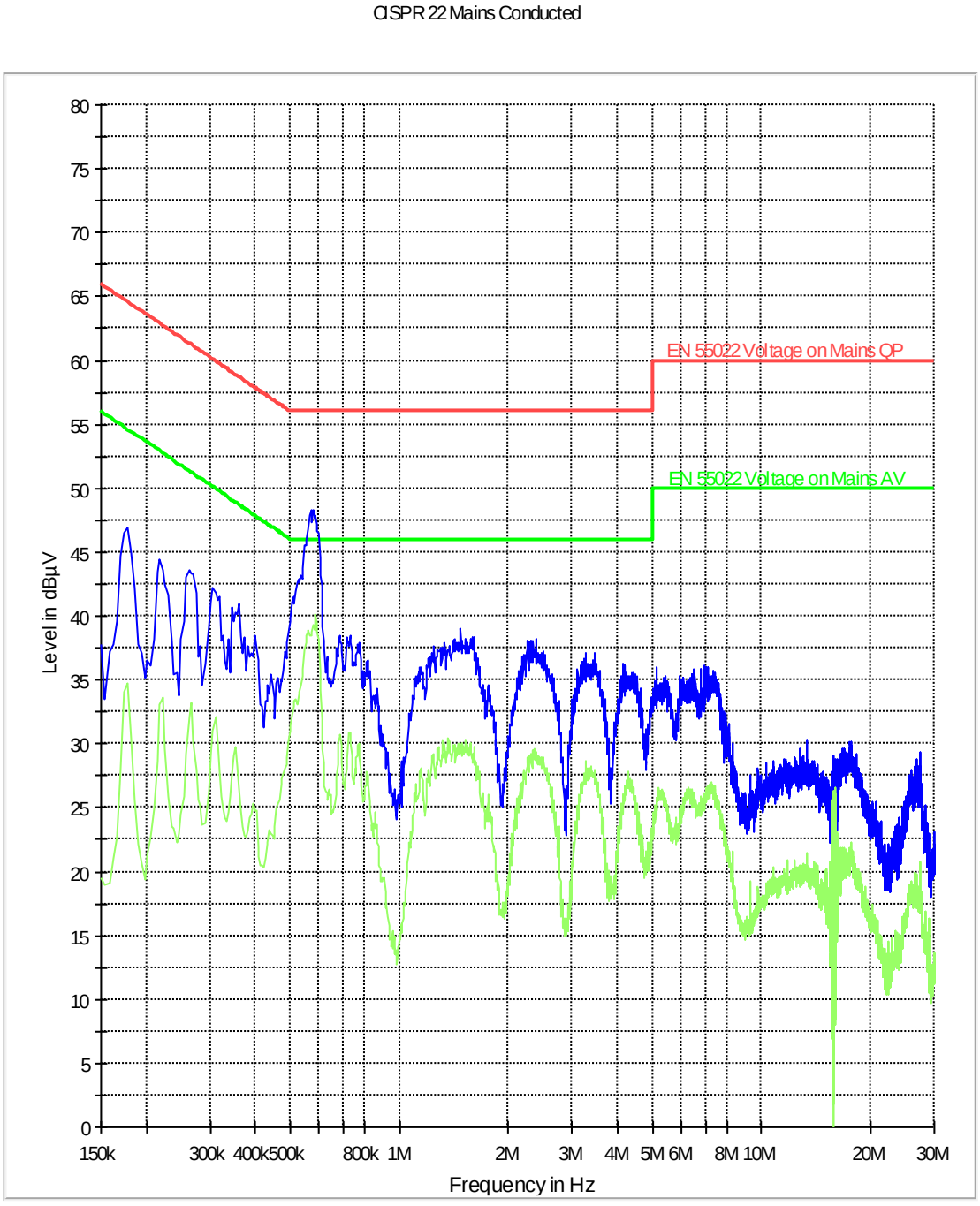
Analyzer Settings: RBW = 10KHz; VBW = 10KHz

5.11.2 Test Result:

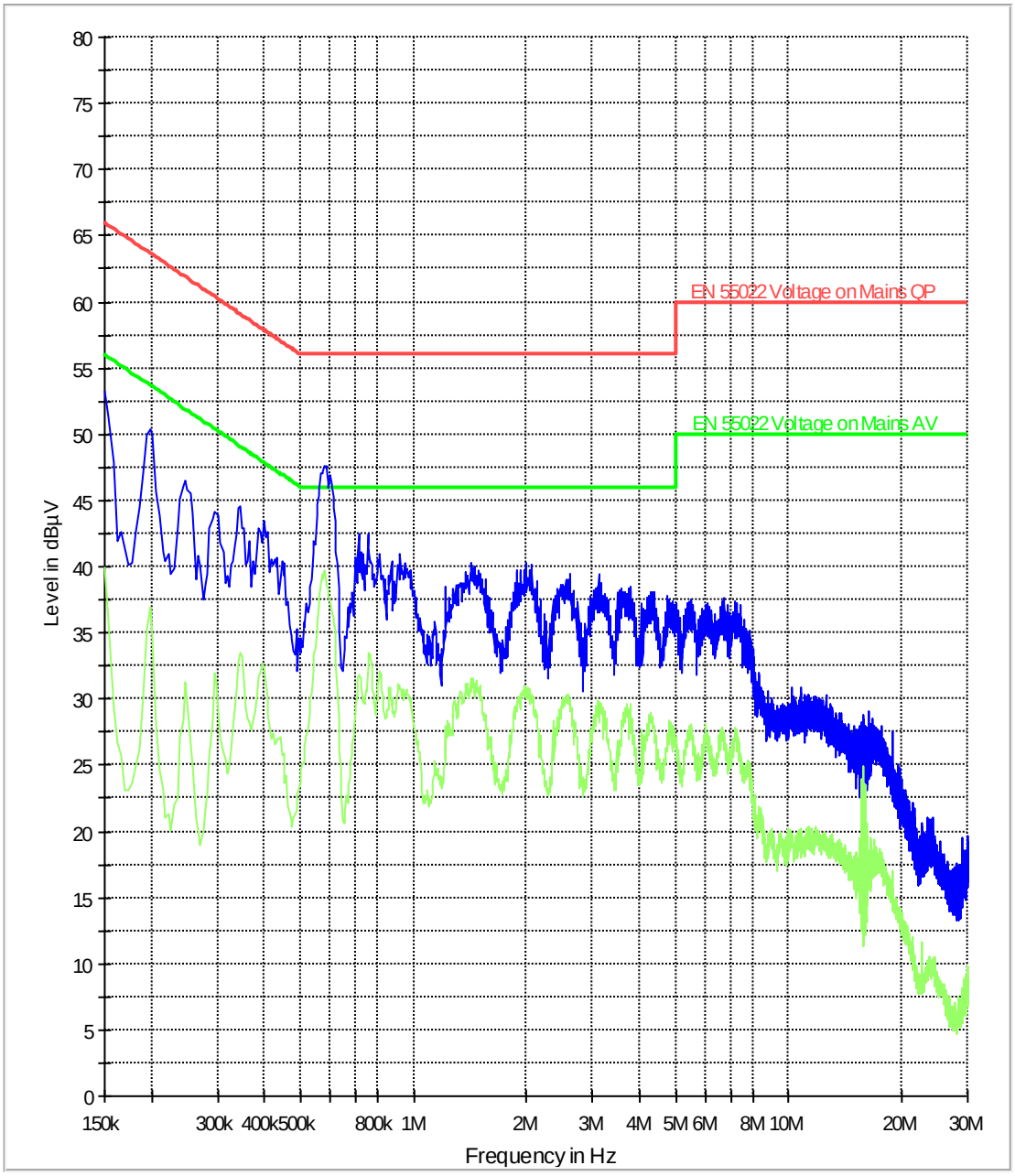
No significant emissions measurable. Plots reported here represent the worse case emissions.

5.11.3 Test data/ plots:

TX Mode- Line & Neutral



RX Mode- Line & Neutral



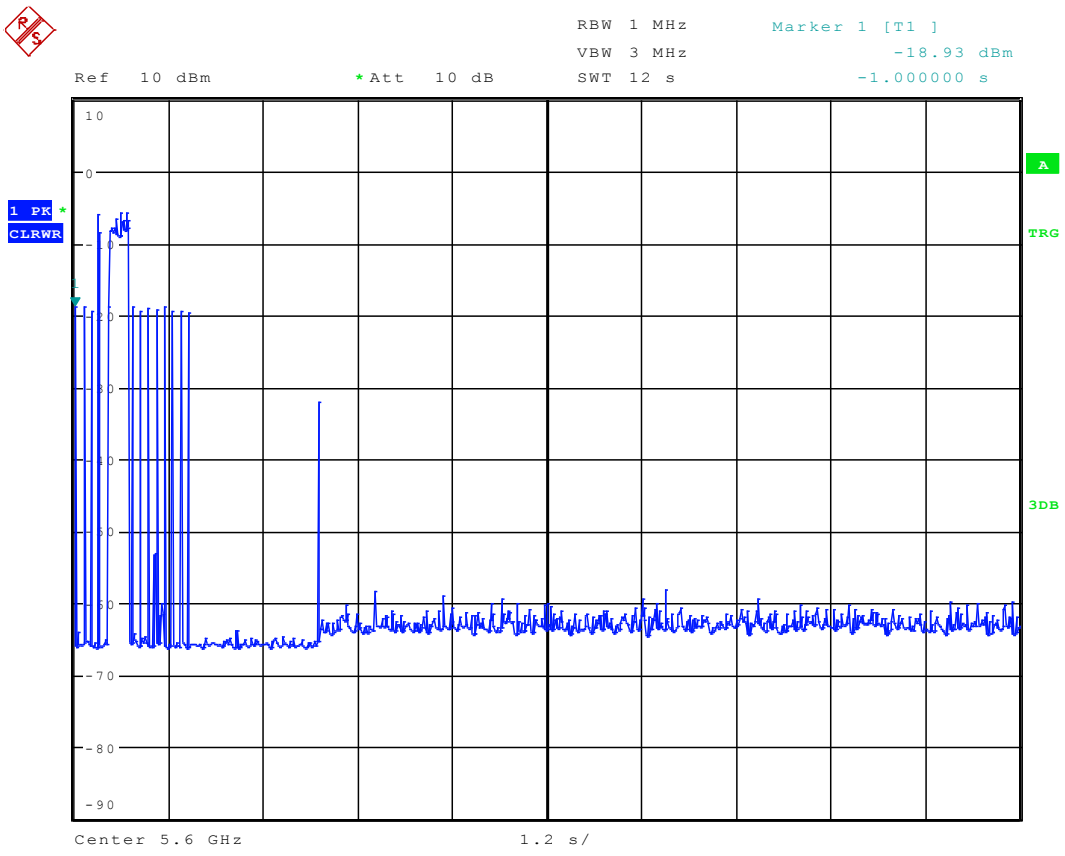
6 Dynamic Frequency Selection

6.1 Channel Move Time

6.1.1 Limits

Channel must move within 10 seconds

6.1.2 Results



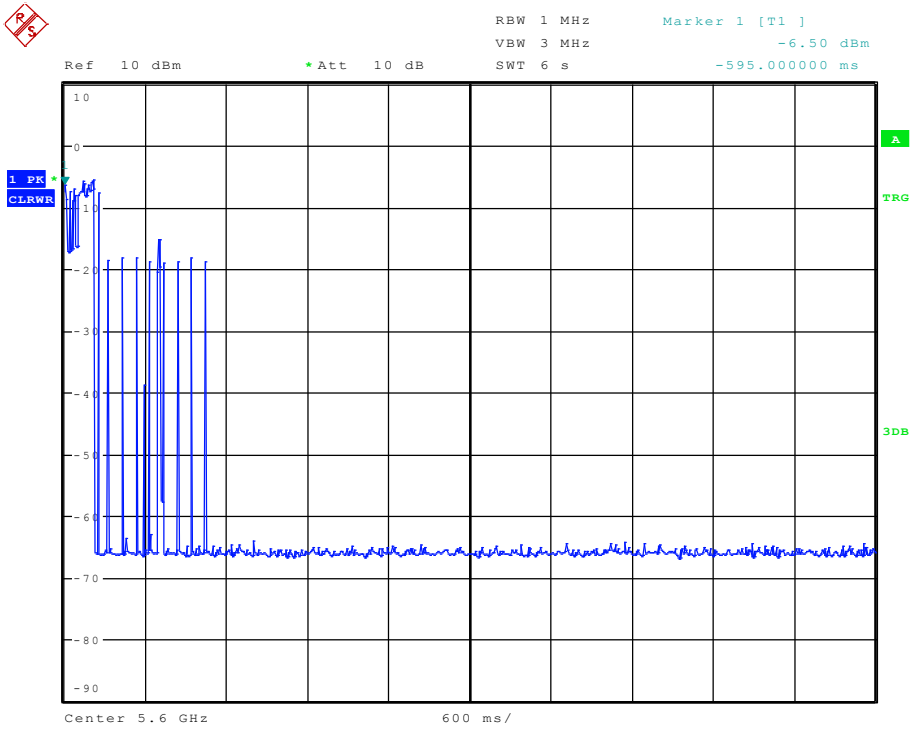
Date: 13.JAN.2010 15:52:29

6.2 Channel Closing Time

6.2.1 Limits

Closing time must be less than 200ms + and aggragate of 60 ms over the remaining 10 second period

6.2.2 Results



Date: 13.JAN.2010 16:17:22

Analyzer Total bins	625
# of Bins	562.50
Analyzer Sweep (s)	6.00
Analyzer (ms)	6,000.0
Transmission Time (seconds)	5.400
Transmission Time (ms)	5,400.0
Dwell time per bin (second)	0.00960
Dwell time per bin (ms)	9.60000
Number of bins with WLAN Tx	3.0
Aggregate (seconds)	0.0288
Aggregate (ms)	28.8

6.3 30 Minute Beacon Test

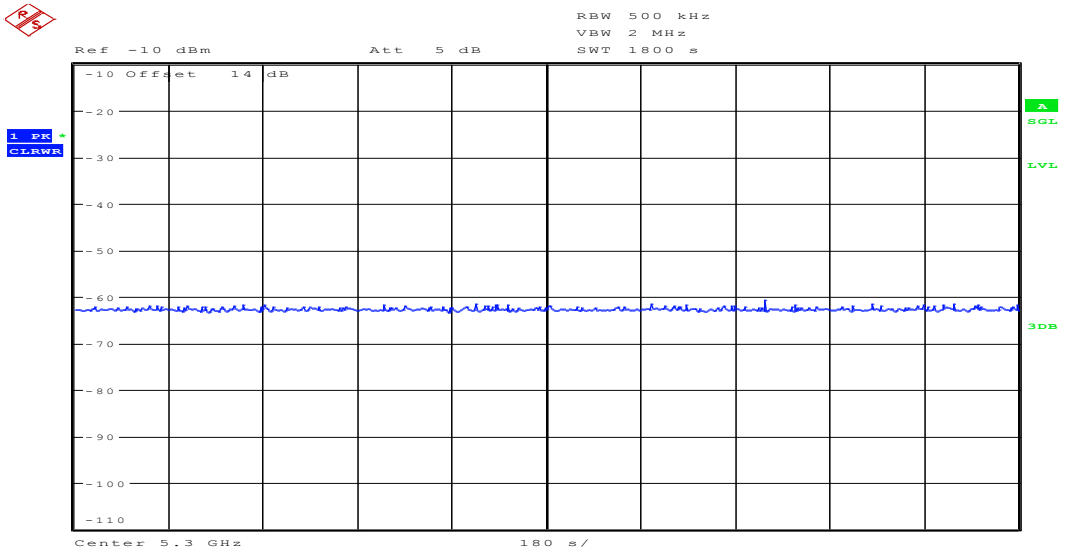
6.3.1 Limits

Client cannot transmit beacons

6.3.2 Results

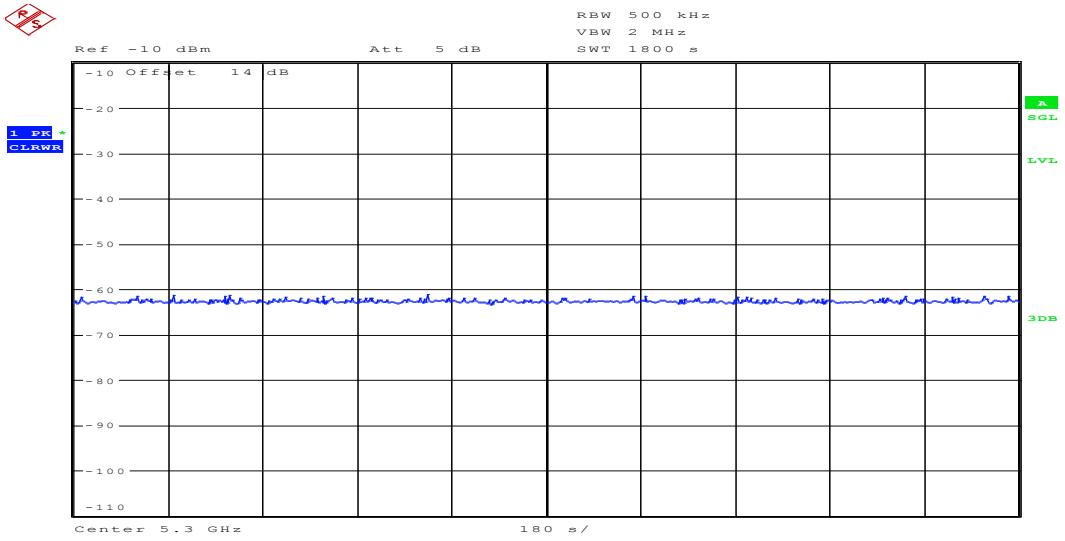
Spectrum Analyzer was set to a sweep time of 30 minutes. During that time no emissions were observed.

Tx0



Date: 26.JAN.2010 13:18:03

Tx1

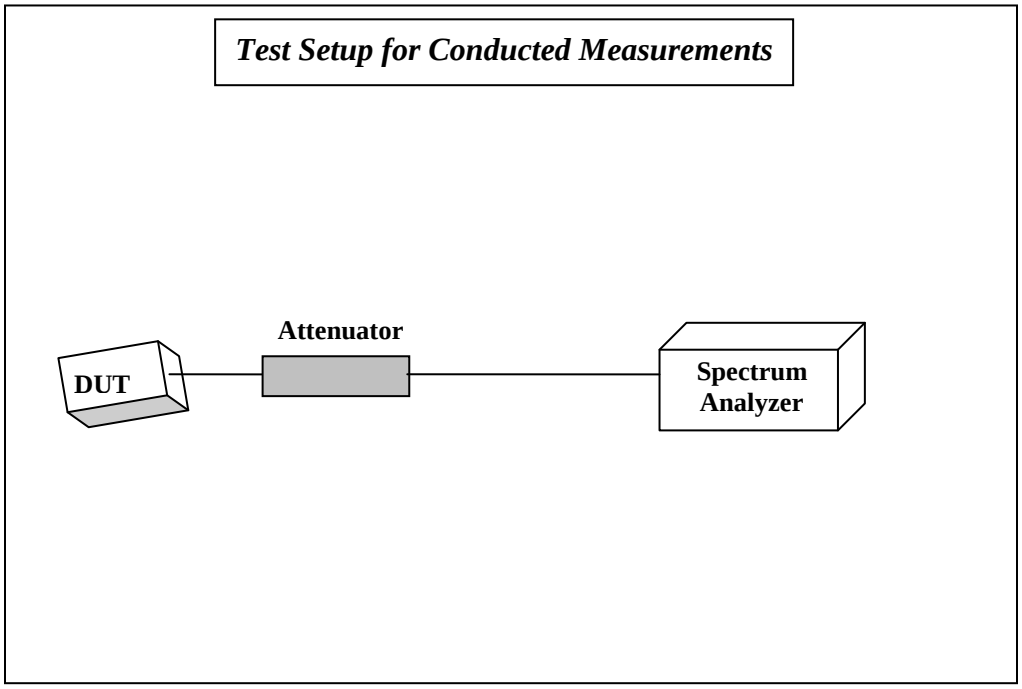


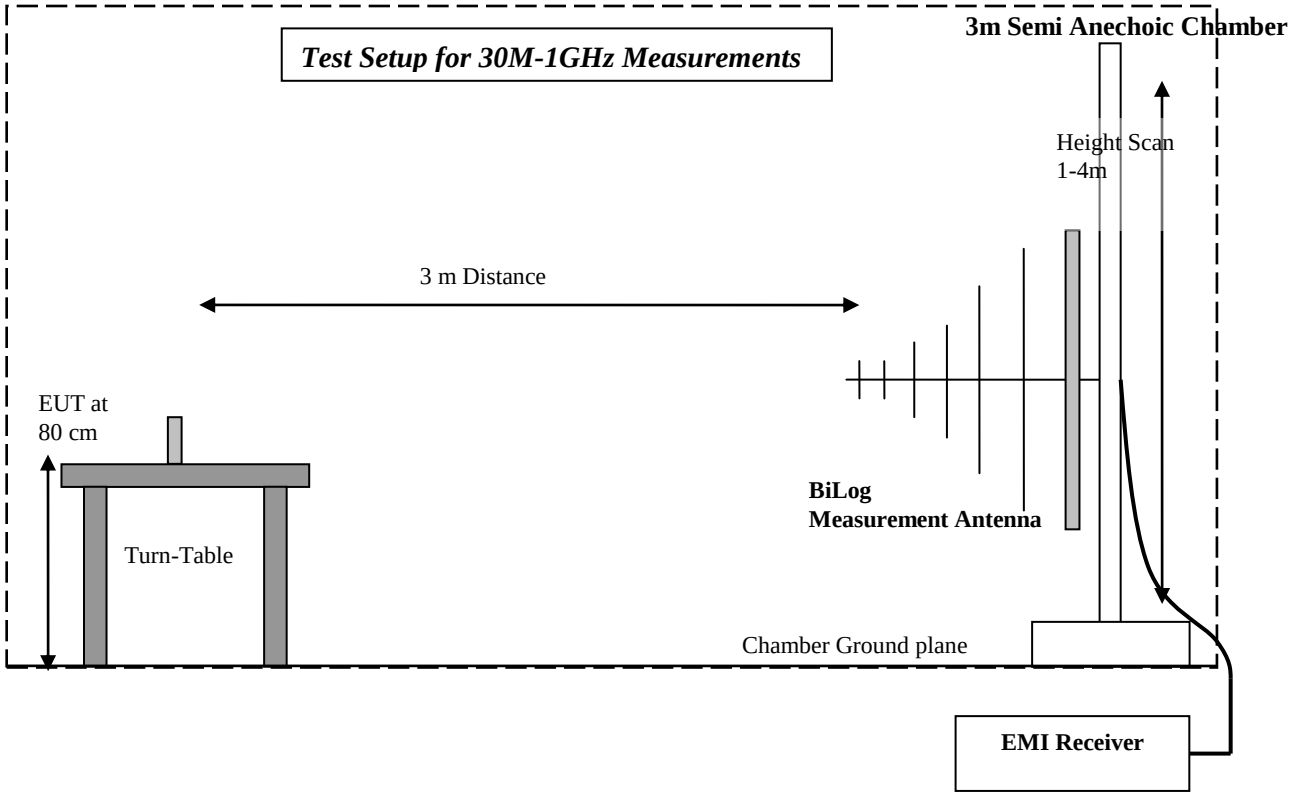
Date: 26.JAN.2010 13:51:16

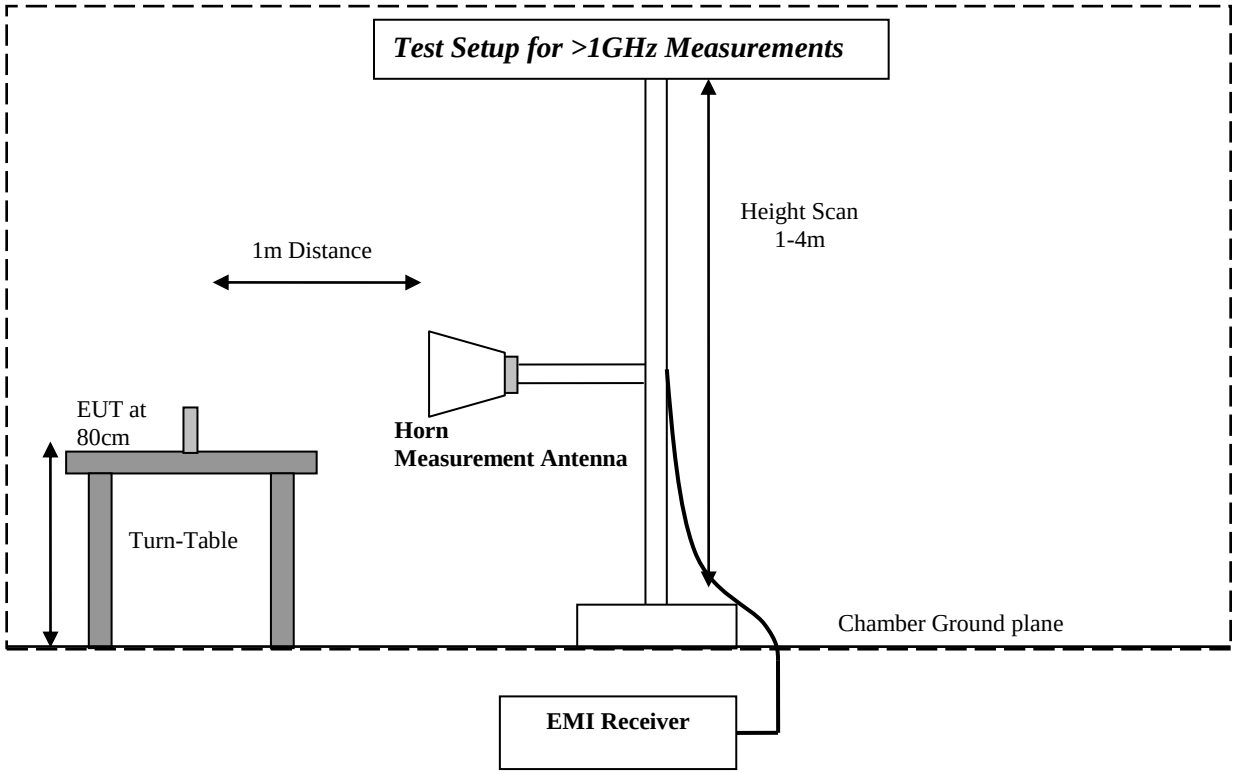
7 Test Equipment and Ancillaries used for tests

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2010	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	May 2010	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2010	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2010	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2010	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2010	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2010	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2010	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2010	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2010	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2010	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2010	1 year
16	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2010	1 year
17	Loop Antenna	6512	EMCO	00049838	July 2010	2 years

8 BLOCK DIAGRAMS






Test Setup for >1GHz Measurements
Height Scan
1-4m
1m Distance
EUT at
80cm
Horn
Measurement Antenna
Turn-Table
Chamber Ground plane
EMI Receiver

9 Revision History

Date	Report Name	Changes to report	Report prepared by
2010-02-17	EMC_ APPLE_055_15.407_81A	Original	Marc
2010-03-05	EMC_ APPLE_055_15.407_81A_Rev1	Updated plots for bandwidth, PPSD and Peak excursion. Added H/V statement. Updated modulation types. Updated RSE plots. Added 40GHz conducted spurious emission. Added simultaneous transmission bandedge plots.	Marc
2010-03-09	EMC_ APPLE_055_15.407_81A_Rev2	Updated table for bandwidths	Marc
2010-03-11	EMC_ APPLE_055_15.407_81A_Rev3	Updated radiated measurement procedure	Marc