

TEST REPORT

Report Number: 3087319MPK-005B
Project Number: 3087319 & 3090394
January 31, 2006

Testing performed on the
802.11a Wireless Access Point
Model: ORiNOCO AP-700
FCC ID: HZB-AP700
to

FCC Part 15, Subpart E
for
Proxim Corporation



A2LA Certificate Number: 1755-01

Test Performed by:
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Date: January 31, 2006

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1.0 Introduction

The HZB-AP700 product is a 802.11a/b/g access point product. The product was previously approved by FCC under FCC ID: IXMAPAGAT01 for the 2.4 GHz, 5.15-5.35 GHz and 5.725-5.850 GHz band operation. This report records all test results of the same product hardware for the 5.47-5.725 GHz band as per Part 15.407, except for DFS testing.

The FCC application will be a composite one that combines all bands covered under IXMAPAGAT01 the 5.47-5.725 GHz band. The new application will be under FCC ID: HZB-AP700.

1.1 Summary of Tests

FCC ID: HZB-AP700

TEST	REFERENCE	RESULTS
Output power	15.407(a)(2)	Complies
26 dB Bandwidth	15.407(a)(2)	
Peak power spectral density	15.407(a)(2)	Complies
Out-of-band Antenna Conducted Emission	15.407(b)(3)	Complies
Peak excursion	15.407(a)(6)	Complies
Radiated Emission above 1 GHz	15.209, 15.205	Complies
Radiated Emission below 1 GHz	15.209	Complies
AC Line-conducted Emission	15.207	Complies
Frequency stability	15.407(g)	Test was not performed *
Transmit Power Control (TPC) Dynamic Frequency Selection (DFS)	15.407(h)	Test was not performed **
RF Exposure Requirement	2.1091	Complies, see exhibit "RF Exposure"
Antenna Requirement	15.203	Not Applicable; professional installation is required

* Compliance is addressed in Report #RF921107R01 issued by ADT

** Test was not requested by the Applicant

A pre-production version of the EUT was received on December 10, 2005 in good operating condition. As declared by the Applicant, it is identical to the production units.

Date of Test: December 10, 2005 – January 20, 2006

2.0 General Description

2.1 Product Description

The HZB-AP700 product is a 802.11a/b/g Access Point device.

Overview of the FCC ID: HZB-AP700 product

Applicant name & address	Proxim Wireless Corporation 2115 O'Nel Drive San Jose, CA 95131 USA
Manufacturer	Proxim Wireless Corporation
Model	ORiNOCO AP-700
FCC Identifier	HZB-AP700
Use of Product	Wireless Access Point
Date Rate	6 Mbps – 54 Mbps, 12 Mbps – 108 Mbps in turbo mode
Type of Modulation	OFDM
Rated RF Output	24 dBm for maximum antenna gain of 6 dBi
Frequency Range	5470 – 5725 MHz
Number of Channel(s)	11 channels from 5.50 GHz, to 5.70 GHz in regular mode 5 channels from 5.52 GHz to 5.68 GHz in turbo mode
Antenna	See the table below. The EUT requires professional installation when using external antennas with a standard connector.

As declared by the Applicant, the following antennas may be used with the device:

Antenna Type	Manufacturer	Model Number	Mid-band Gain (dBi)	Antenna used for testing
Omni	Proxim	integral antenna	0	X
	SmartAnt	R0320-102	10	X
Sector	Proxim	5054-SA60-17	17	X
Panel	Proxim	1086-PA50-7	7	
	SmartAnt	R0320-091	15	
	SmartAnt	R0209-116	18	
	SmartAnt	R0209-149	23	
1 Foot Flat Panel	Gabriel	DFPD1-52	23.5	
	Andrew	FPA5250D12-N	23.6	
	Mars	MA-WA-58-1X	23	
2 Foot Flat Panel	Gabriel	DFPD2-52	28	X
	Andrew	FPA5250D24-N	28.2	
	RSI	A57A24-U	26.5	
2 Foot Parabolic	Gabriel	SSP2-52B	28.5	
	Gabriel	SSD2-52A	28.4	
	Gabriel	HSSP2-52	28.1	
	Radio Waves	SP2-5.2	28.3	
	Radio Waves	SPD2-5.2	28.1	
	Andrew	P2F-52	29.4	
	Andrew	PX2F-52	29.4	
	RSI	P-57C24	29	
	3 Foot Parabolic	Radio Waves	SP3-5.2	31.4
Radio Waves		SPD3-5.2	31.1	
Andrew		P3F-52	33.4	
Andrew		PX3F-52	33.4	
8 foot Parabolic	Gabriel	SSP8-52	39.8	X

Formula for determining maximum output power setting for 5.47-5.725 GHz operation:

Max Tx (dBm) is the lesser of P_{RF} and $30-G+FL$

where:

G = Antenna Gain

Tx is the output power measured at the antenna input

FL is feeder loss including loss of connectors

P_{RF} is the approved RF power as shown on FCC grant

Note:

All Proxim radios using external antennas require professional installation.

Antennas with gain less than 7 dBi, or greater than 33.4dBi are not allowed

Antennas of other make may be used with the HZB-AP700 device, but must be of the same type, within the range of each type listed

The antennas marked with "X" have been chosen for testing.

2.2 Related Submittal(s) Grants

None.

2.3 Test Methodology

Both conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4. Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Data Sheet**" of this Application. All other measurements were made in accordance with the procedures in parts 2 and 15 of CFR 47.

2.4 Test Facility

The test site and conducted measurement facility used to collect the radiated data is site 1, a 10-meter semi-anechoic chamber. This test facility and site measurement data have been fully placed on file with the FCC and A2LA accredited.

3.0 System Test Configuration

The following frequency and configuration were selected for the tests:

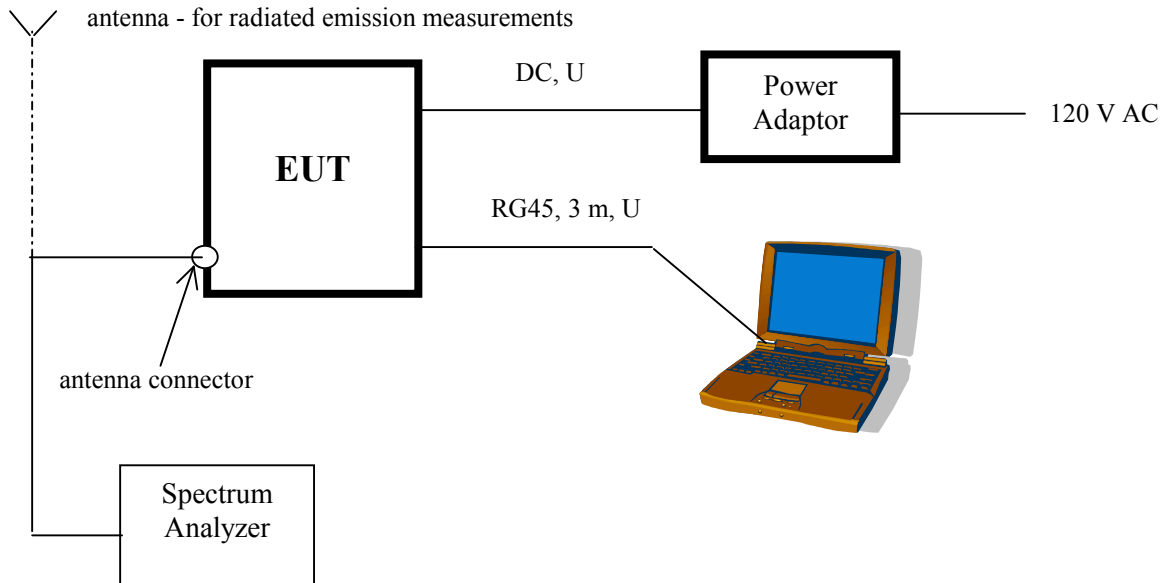
Frequency MHz	Date rate	Mode
5500	6 MBps	regular
5600	6 MBps	regular
5700	6 MBps	regular
5520	72 Mbps	turbo
5600	72 MBps	turbo
5680	72 MBps	turbo

Limited tests were performed for 54 Mbps (regular mode) and 108 Mbps (turbo mode).

3.1 Support Equipment and description

Laptop computer: Dell Latitude.

3.2 Block Diagram of Test Setup



S = Shielded	F = With Ferrite
U = Unshielded	m = Meter

3.3 Justification

For emission testing, the Equipment Under Test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst-case emissions.

For radiated emission measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is wired to transmit full power.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

Care was taken to ensure proper power supply voltages during testing.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology.

3.5 Mode of operation during test

Transmitting modulated signal on low, middle and high channels. As requested by the Applicant, the signal was setup for OFDM with data rate of 6 Mbps (regular mode), and 72 Mbps (turbo mode). Limited tests were performed in 54 Mbps and 108 Mbps.

3.6 Modifications required for Compliance

Intertek installed no modifications during compliance testing in order to bring the product into compliance.

3.7 Additions, deviations and exclusions from standards

No additions, deviations or exclusion have been made from standard.

4.0 Measurement Results

4.1 26-dB Bandwidth

Procedure

The Procedure, described in the FCC Public Notice DA 02-2138, was used.

The antenna port of the EUT was connected to the input of a spectrum analyzer (SA). For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 26 dB lower than PEAK level. The 26-dB bandwidth was determined from where the channel output spectrum intersected the display line.

Test Result

Regular mode

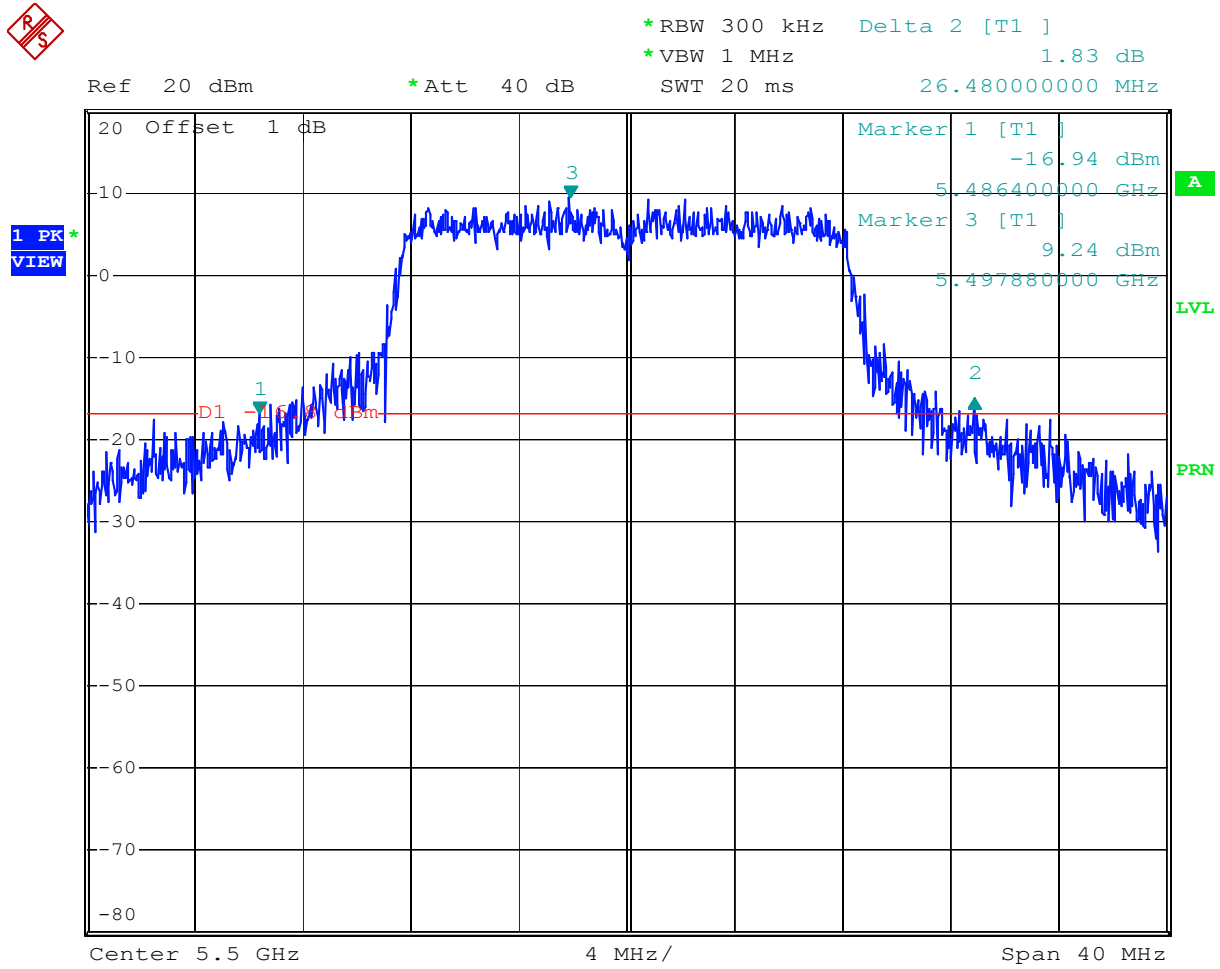
Frequency MHz	Rate, Mbps	26-dB Bandwidth, MHz	Plot #
5500	6	26.5	1.1
5600	6	29.4	1.2
5600	54	24.8	1.3
5700	6	28.3	1.4

Turbo mode

Frequency MHz	Rate, Mbps	26-dB Bandwidth, MHz	Plot #
5520	72	52.0	1.5
5600	72	51.4	1.6
5600	108	46.6	1.7
5680	72	55.2	1.8

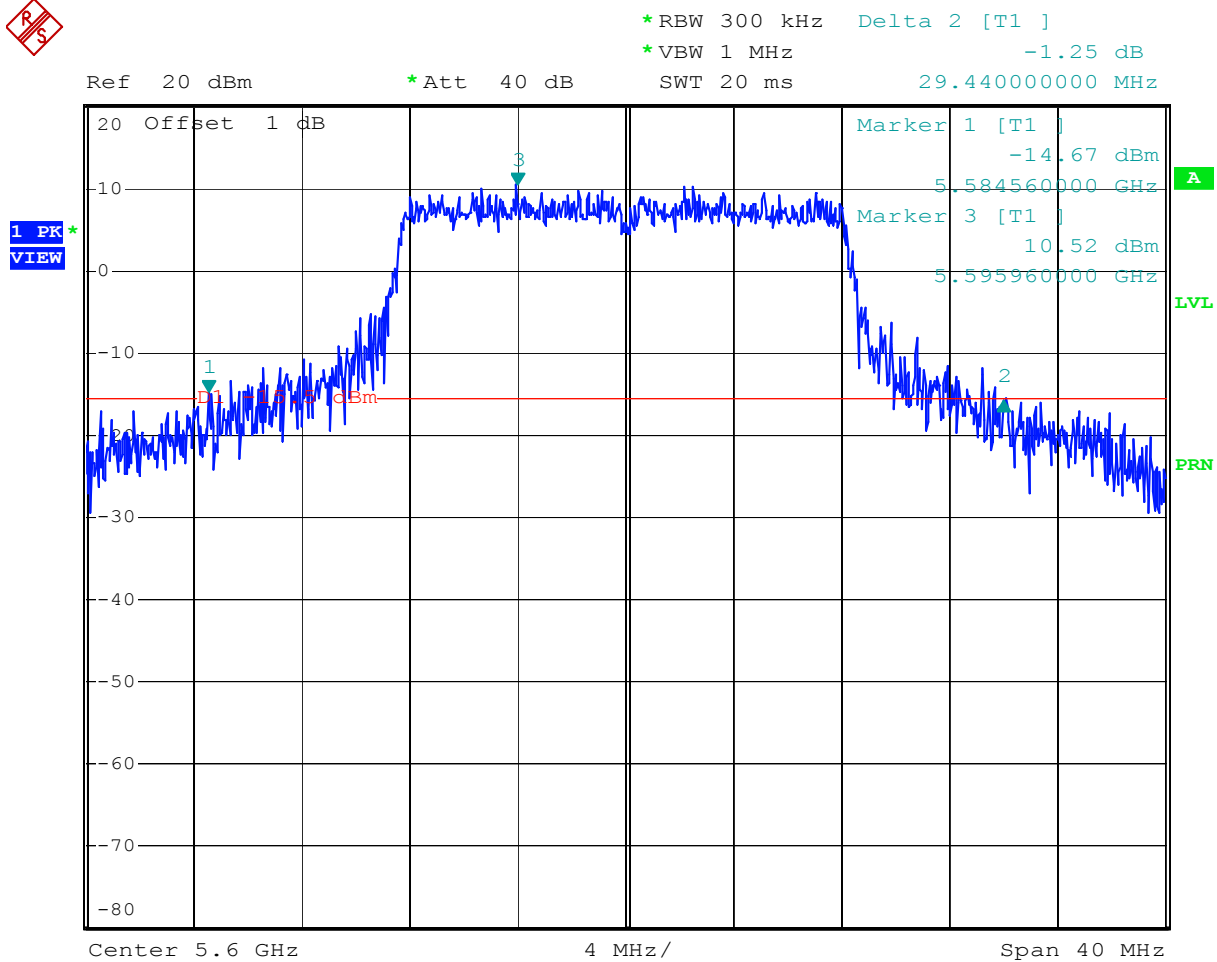
On the plots 1.1 – 1.6 the 26-dB bandwidth is presented.

Plot 1.1



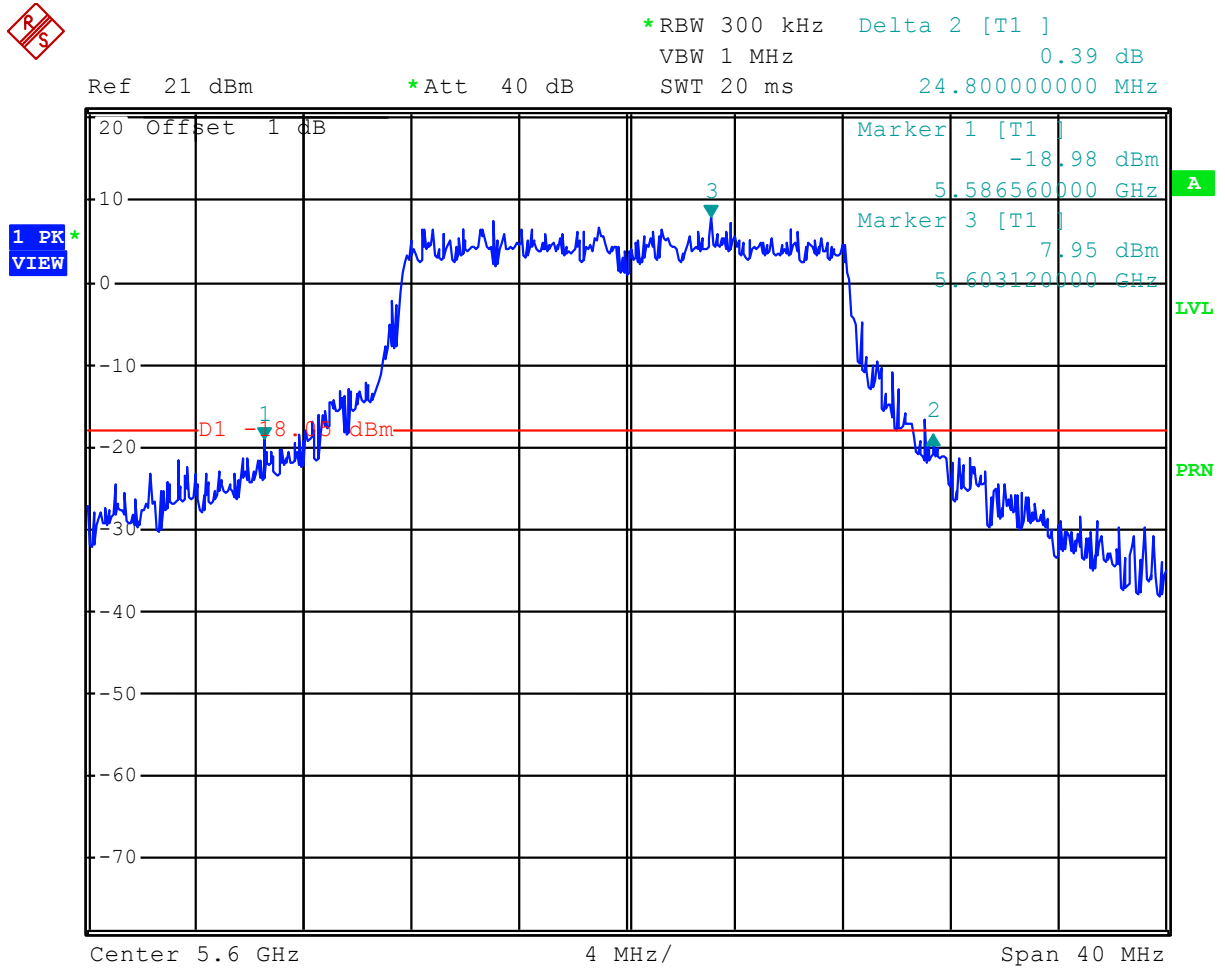
Comment: Bandwidth, 5500 MHz, 6 Mbps
Date: 16.DEC.2005 18:05:42

Plot 1.2



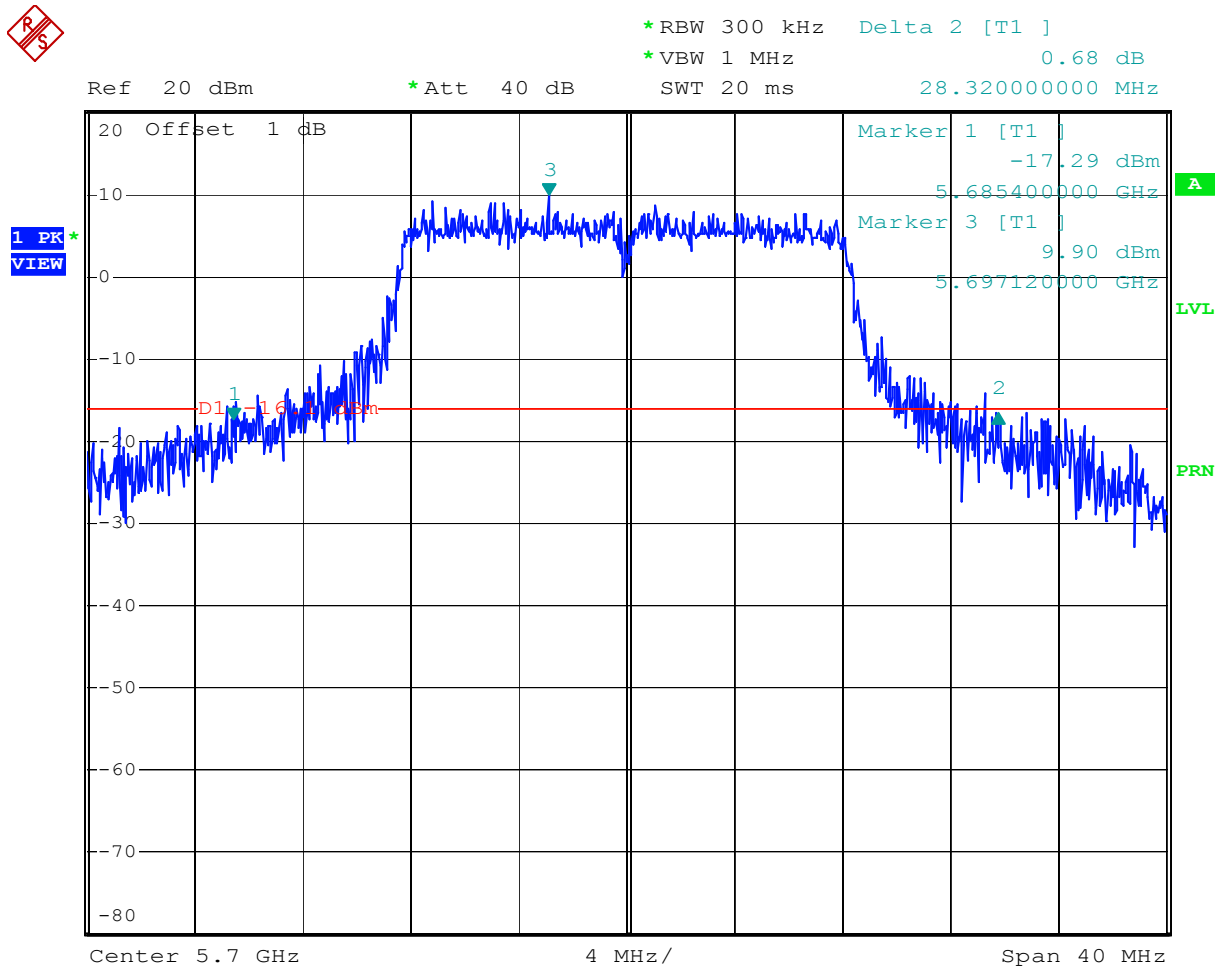
Comment: Bandwidth, 5600 MHz, 6 Mbps
 Date: 16.DEC.2005 18:16:34

Plot 1.3



Comment: 26-dB bandwidth, 5600 MHz, 54 Mbps
 Date: 16.JAN.2006 17:07:14

Plot 1.4



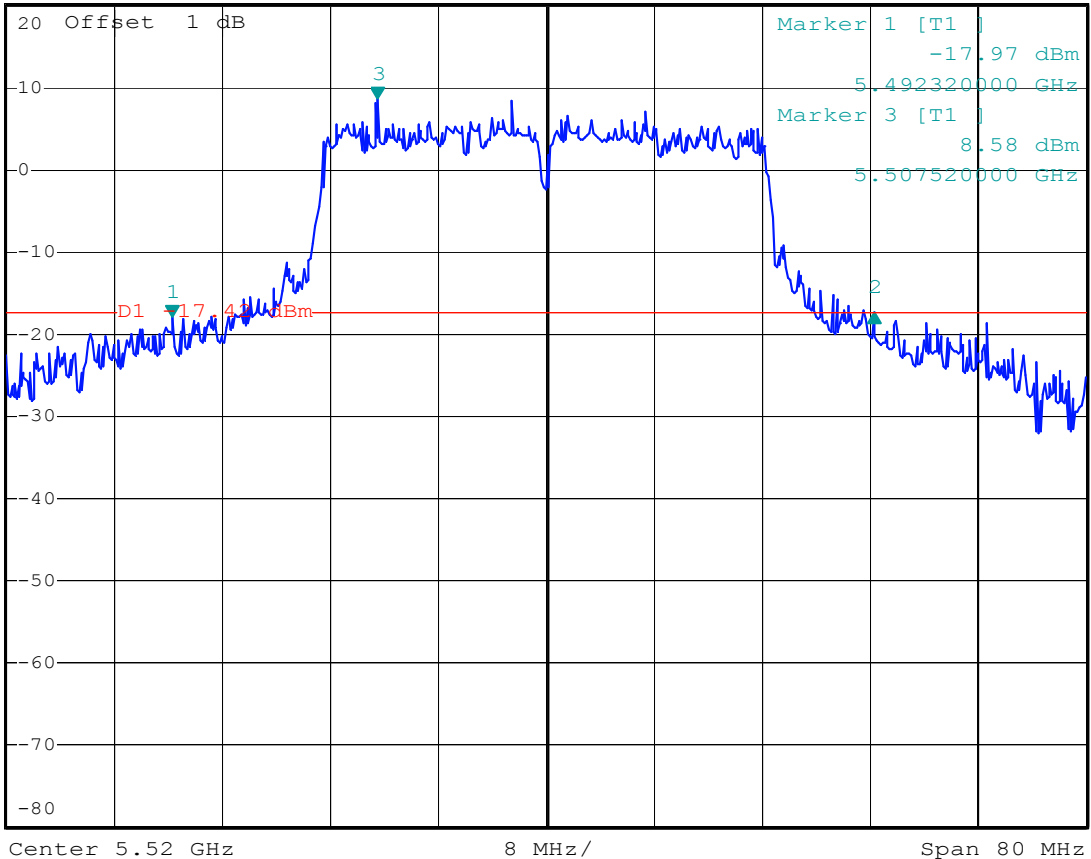
Comment: Bandwidth, 5700 MHz, 6 Mbps
 Date: 16.DEC.2005 18:13:04

Plot 1.5



Ref 20 dBm *Att 40 dB *RBW 300 kHz Delta 2 [T1]
 *VBW 1 MHz 0.53 dB
 SWT 20 ms 52.000000000 MHz

1 PK *
 VIEW



Comment: 26-dB bandwidth, 5520 MHz, turbo mode, 72 Mbps
 Date: 18.JAN.2006 16:47:55

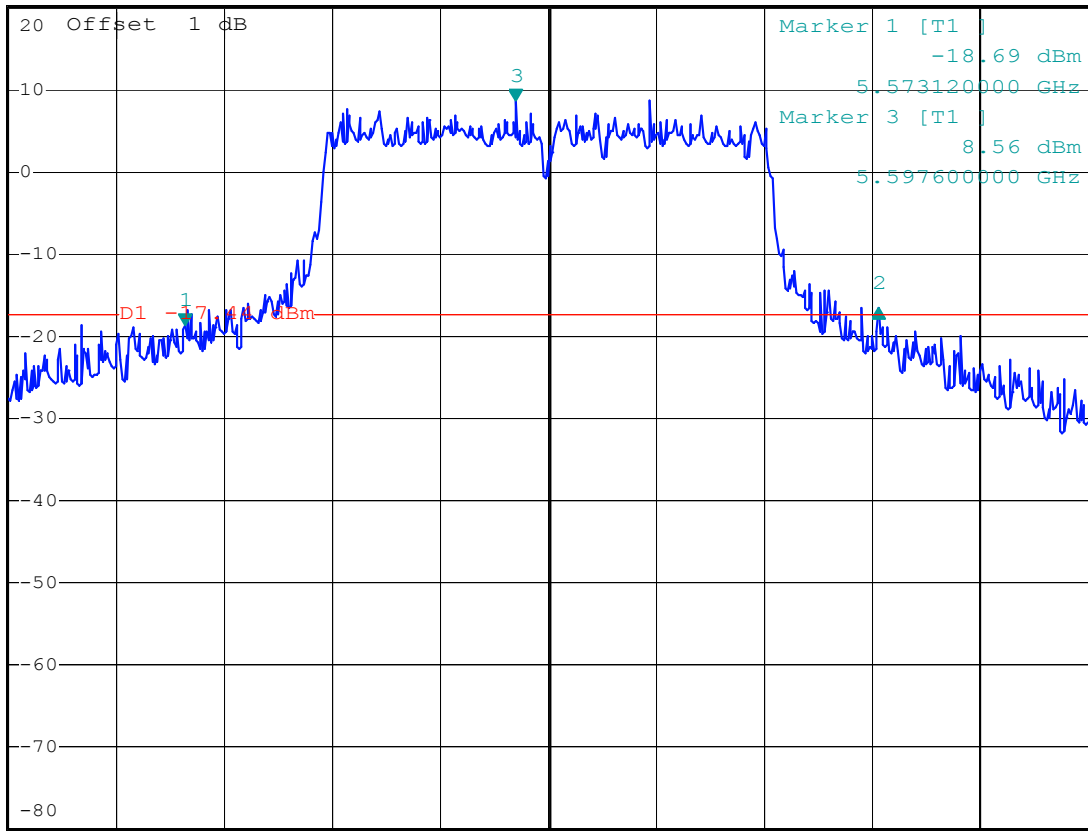
Intertek ETL SEMKO

Plot 1.6



*RBW 300 kHz Delta 2 [T1]
 *VBW 1 MHz 2.09 dB
 SWT 20 ms 51.360000000 MHz

Ref 20 dBm *Att 40 dB



Center 5.6 GHz 8 MHz/ Span 80 MHz

Comment: 26-dB bandwidth, 5600 MHz, turbo mode, 72 Mbps
 Date: 18.JAN.2006 16:45:48

Plot 1.7

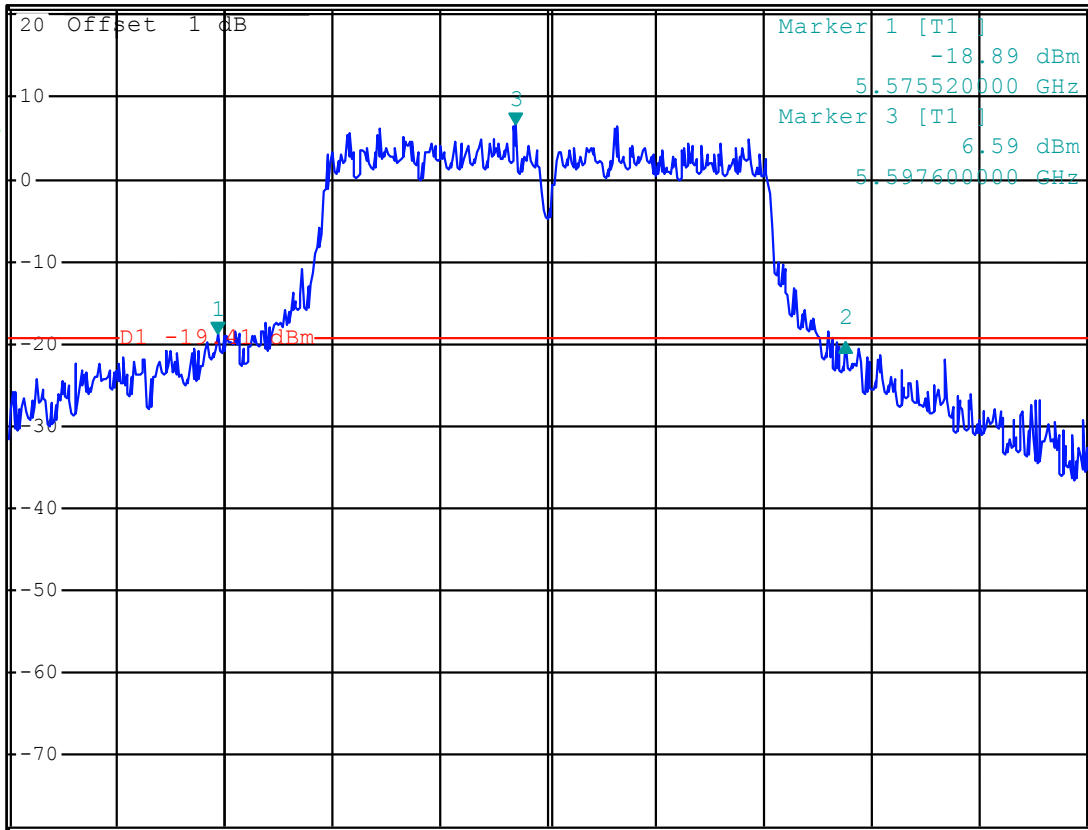


*RBW 300 kHz Delta 2 [T1]
 VBW 1 MHz -0.97 dB
 SWT 20 ms 46.56000000 MHz

Ref 21 dBm

*Att 40 dB

1 PK*
 VIEW



Center 5.6 GHz

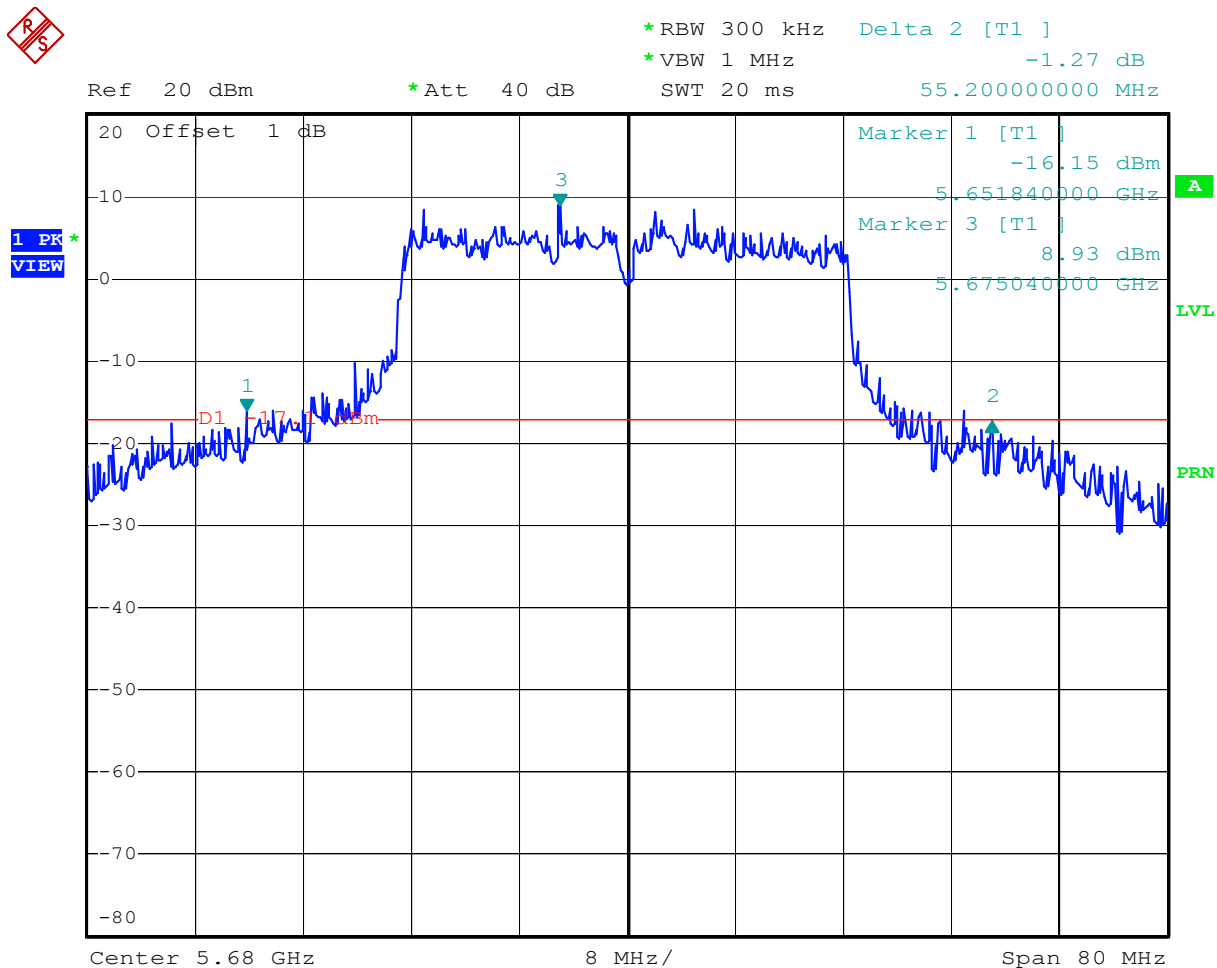
8 MHz/

Span 80 MHz

Comment: 26-dB bandwidth, 5600 MHz, turbo mode, 108 Mbps

Date: 16.JAN.2006 17:10:12

Plot 1.8



Comment: 26-dB bandwidth, 5680 MHz, turbo mode, 72 Mbps
 Date: 18.JAN.2006 16:43:27

4.2 Conducted Output Power
FCC Rule: 15.407(a)(2)

Requirement

The maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or (11 dBm + 10Log B), where B is the 26-dB bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Procedure

The Procedure, described in the FCC Public Notice DA 02-2138, was used.

The Method #3 was selected for the measurement. The antenna port of the EUT was connected to the input of a spectrum analyzer (SA).

Test Results

Frequency MHz	26-dB Bandwidth MHz	Maximum conducted output power mW	Margin to 250 mW limit dB	Plot #
5500	26.5	240.6	0.2	2.1
5600	29.4	246.5	0.1	2.2
5700	28.3	223.3	0.5	2.3

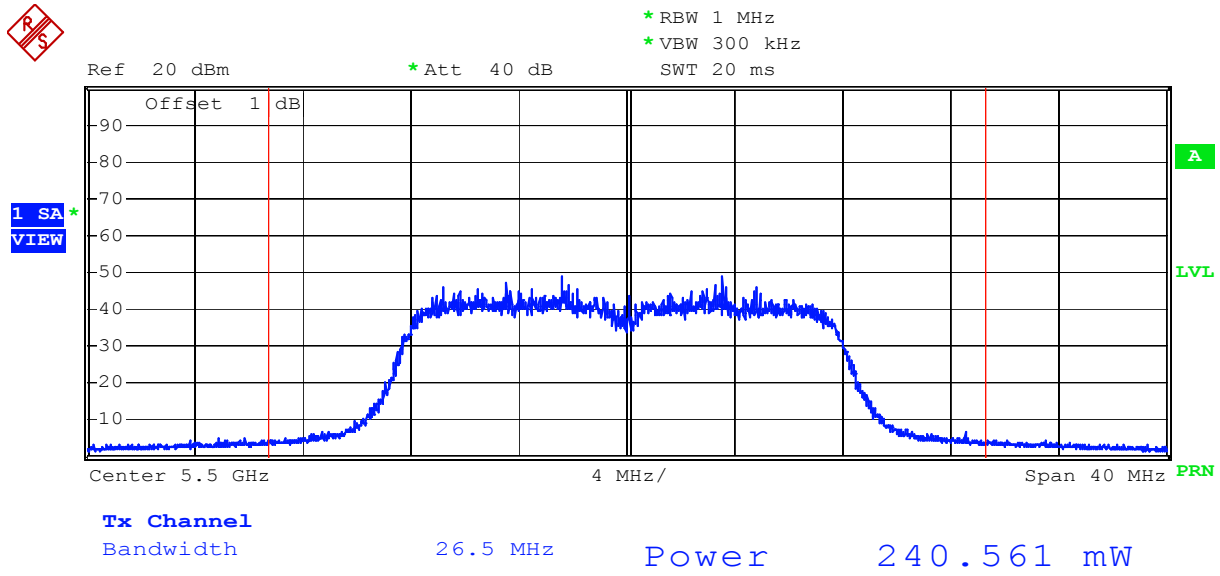
Turbo mode

Frequency MHz	26-dB Bandwidth MHz	Maximum conducted output power mW	Margin to 250 mW limit dB	Plot #
5520	52.0	244.4	0.1	2.4
5600	51.4	248.2	0.1	2.5
5680	55.2	243.4	0.1	2.6

Note: If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

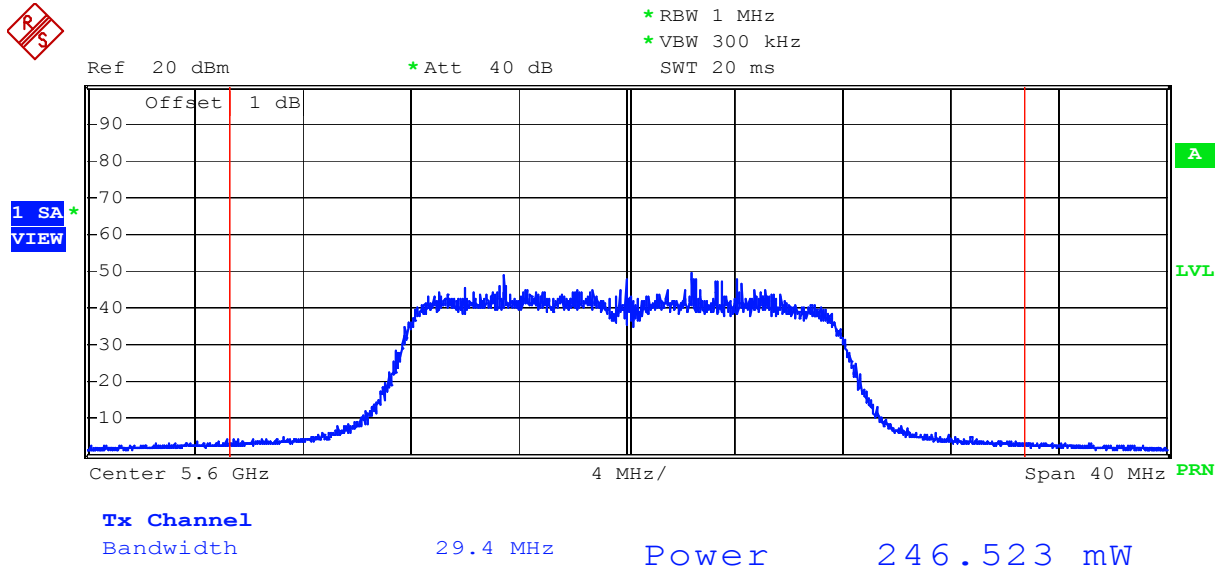
On the plots 2.1 – 2.6 the Maximum conducted output power is presented.

Plot 2.1



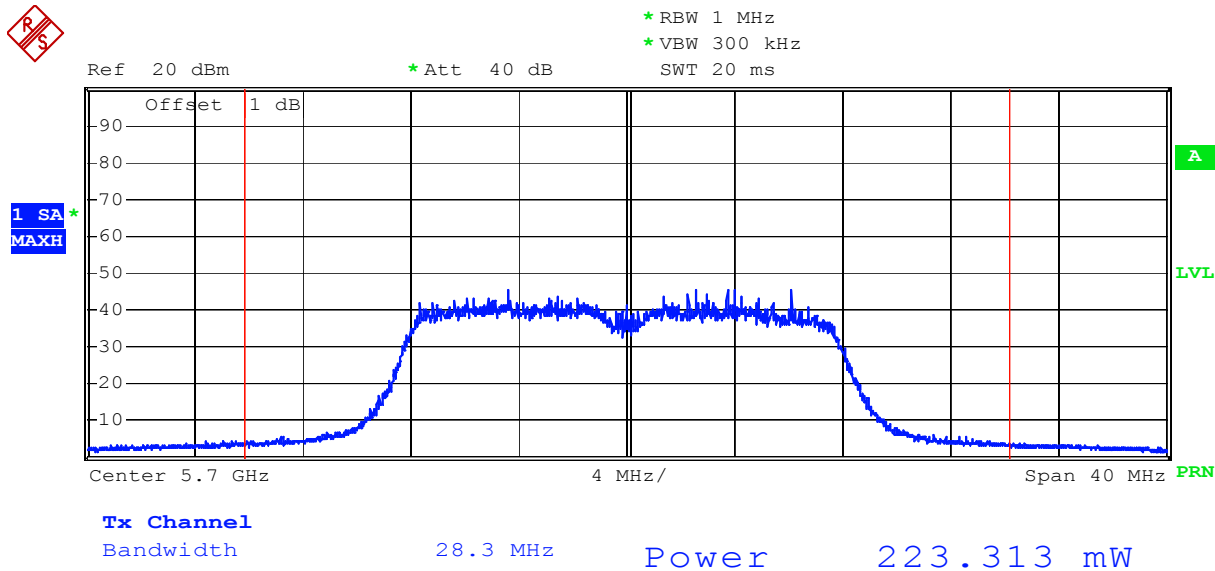
Comment: Peak transmit power, 5500 MHz, 6 Mbps
Date: 16.DEC.2005 18:31:02

Plot 2.2



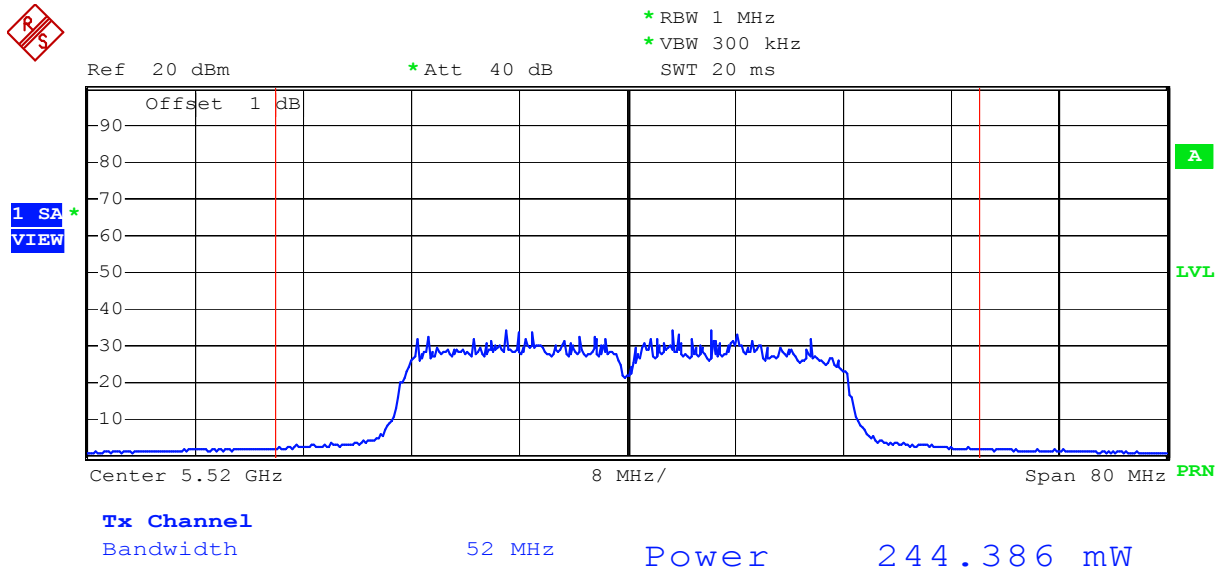
Comment: Peak transmit power, 5600 MHz, 6 Mbps
 Date: 16.DEC.2005 18:23:41

Plot 2.3



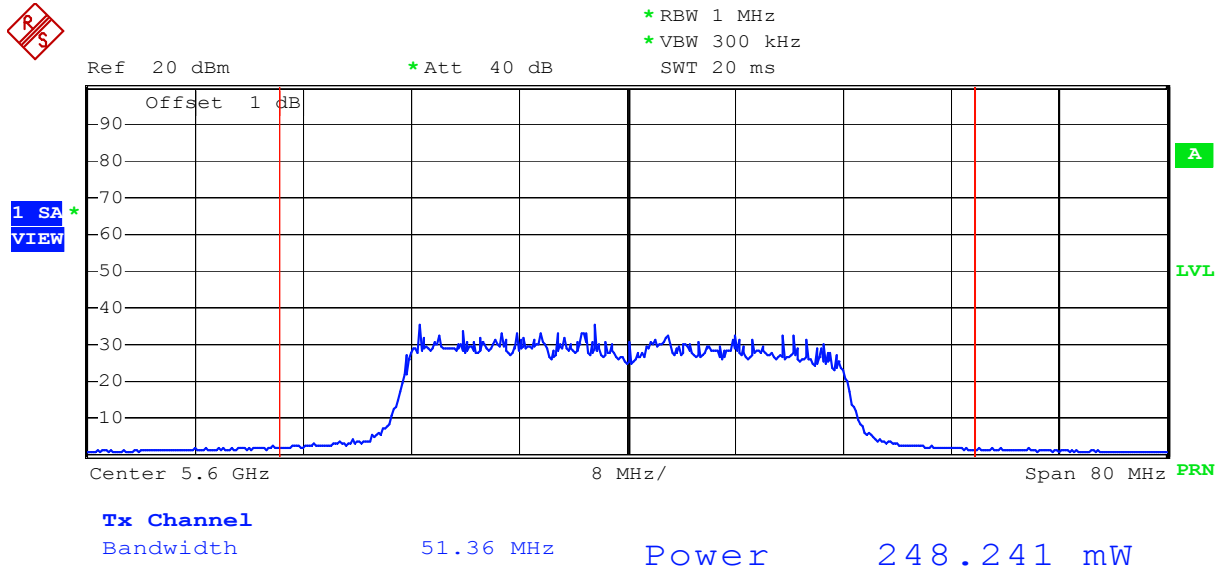
Comment: Peak transmit power, 5700 MHz, 6 Mbps
 Date: 16.DEC.2005 18:37:45

Plot 2.4



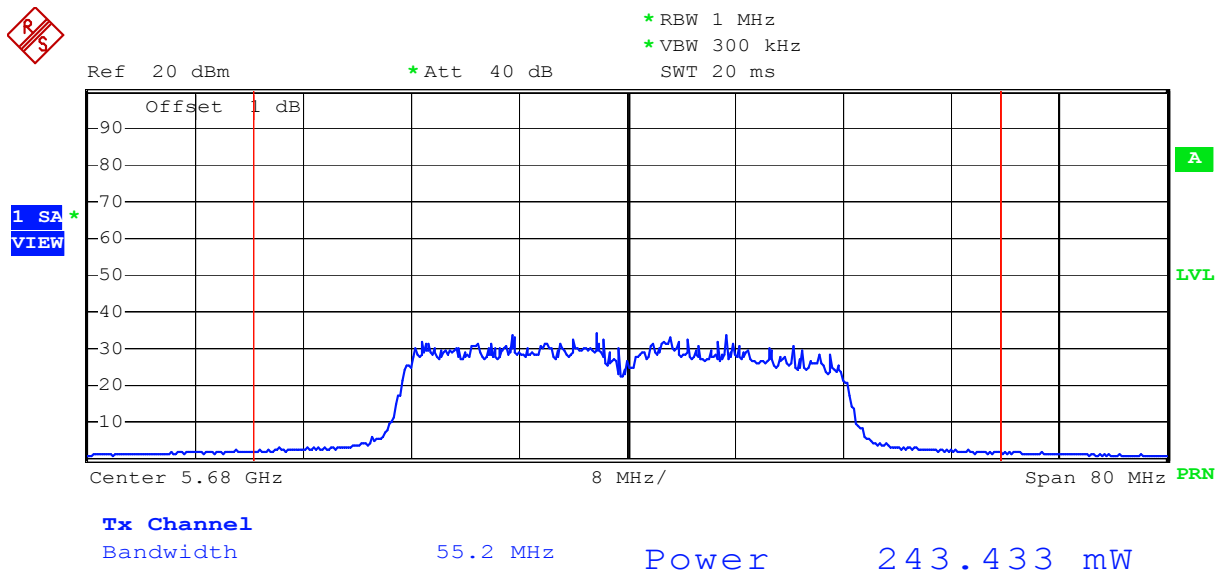
Comment: Peak transmit power, 5520 MHz, turbo mode, 72 Mbps
 Date: 18.JAN.2006 16:54:46

Plot 2.5



Comment: Peak transmit power, 5600 MHz, turbo mode, 72 Mbps
 Date: 18.JAN.2006 16:56:57

Plot 2.6



Comment: Peak transmit power, 5680 MHz, turbo mode, 72 Mbps
 Date: 18.JAN.2006 16:59:59

4.3 Peak Power Spectral Density
FCC Rule: 15.407(a)(2)

Requirement

The peak power spectral density (PPSD) shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Procedure

The Procedure, described in the FCC Public Notice DA 02-2138, was used.
The Method #2 (with the sample detector and averaging over 100 sweeps) was selected for the measurement.
The antenna port of the EUT was connected to the input of a spectrum analyzer (SA).
The spectrum analyzer Resolution Bandwidth was set to 1 MHz.

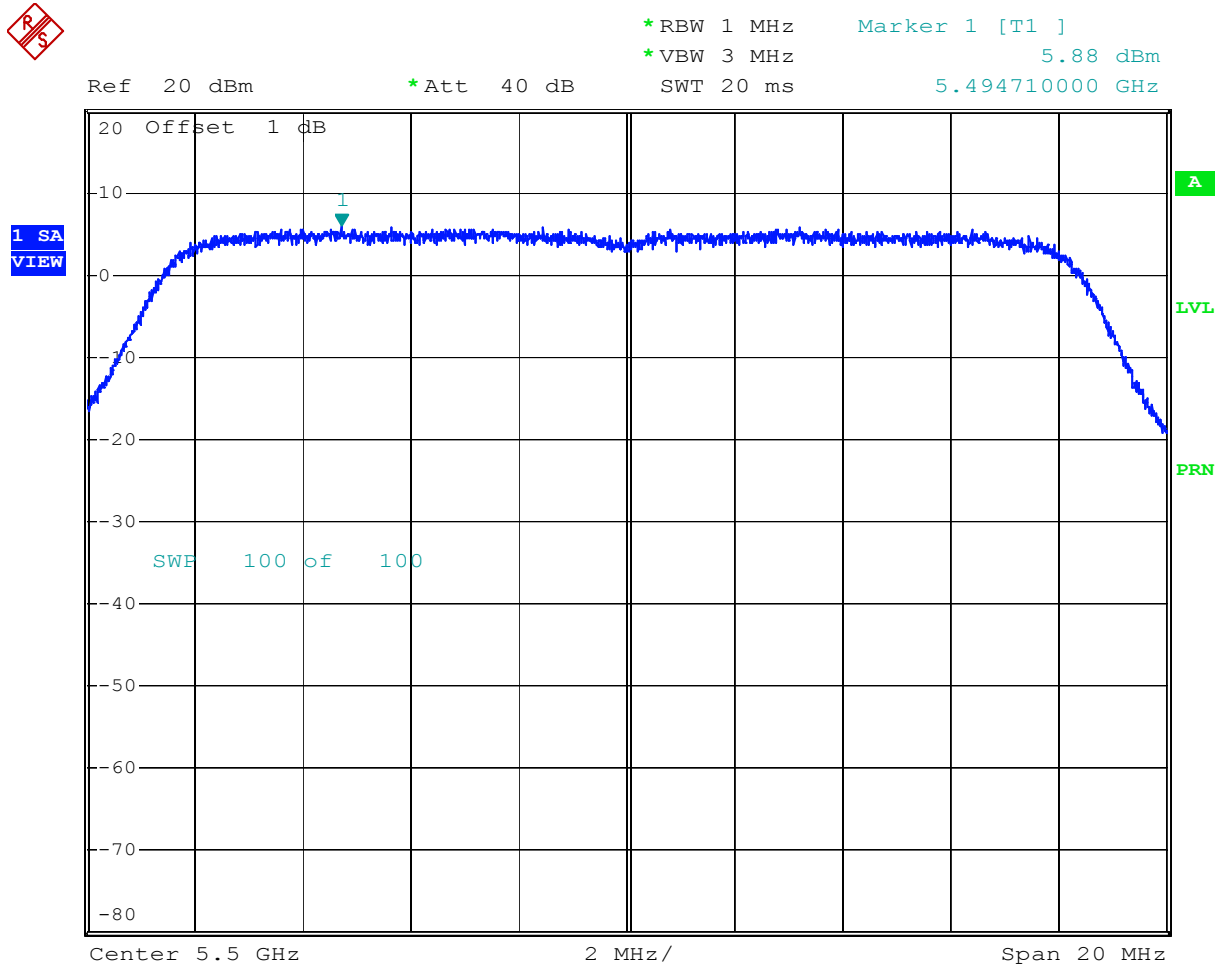
Test Result

Frequency MHz	Mode	Peak Power Spectral Density dBm	Margin to 11 dBm limit dB	Plot #
5500	regular	5.9	5.1	3.1
5600	regular	6.0	5.0	3.2
5600	turbo	3.5	7.5	3.3
5700	regular	5.5	5.5	3.4

On the plots 3.1 – 3.4 the Peak Power Spectral Density is presented.

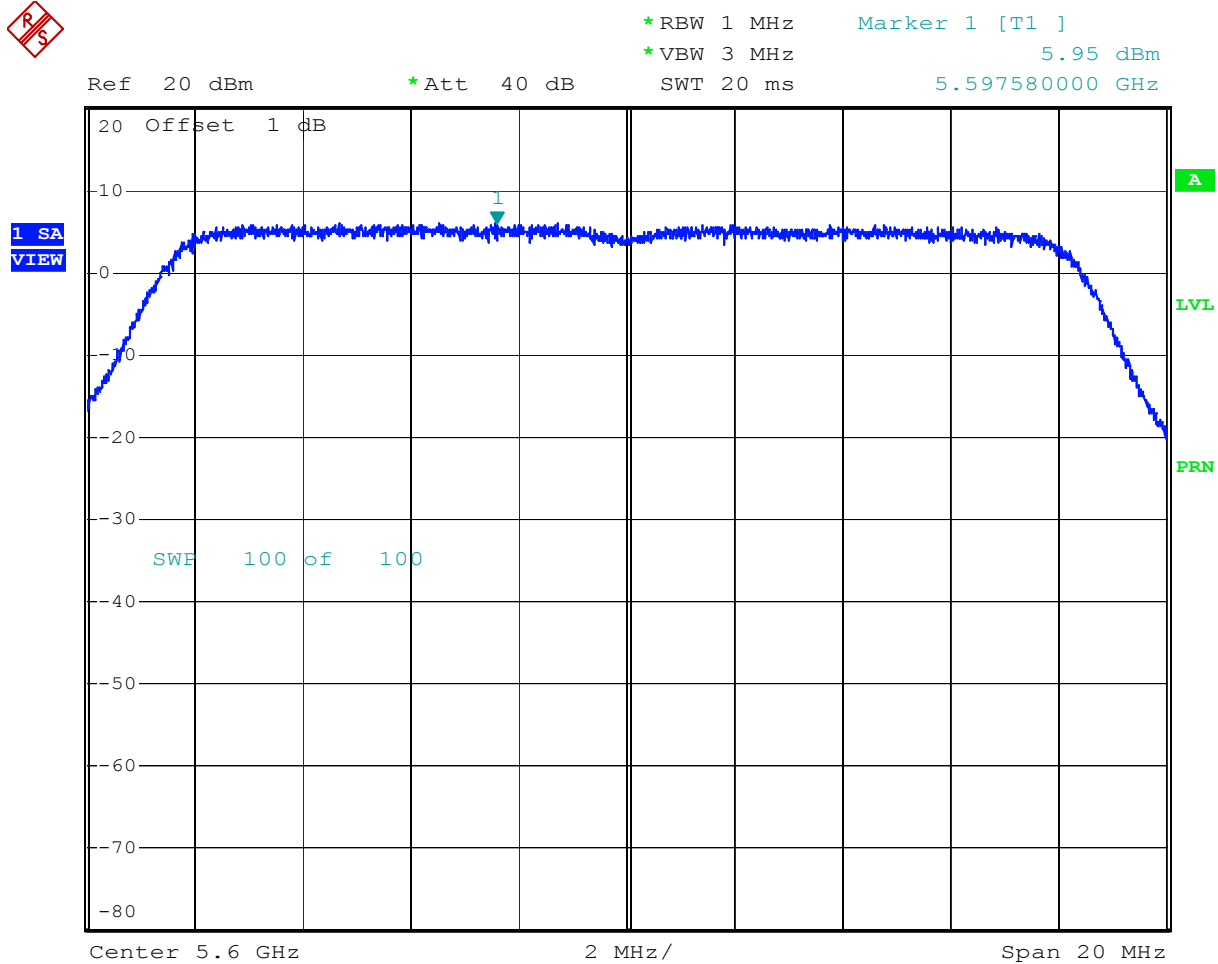
The EUT passed by 5.0 dB.

Plot 3.1



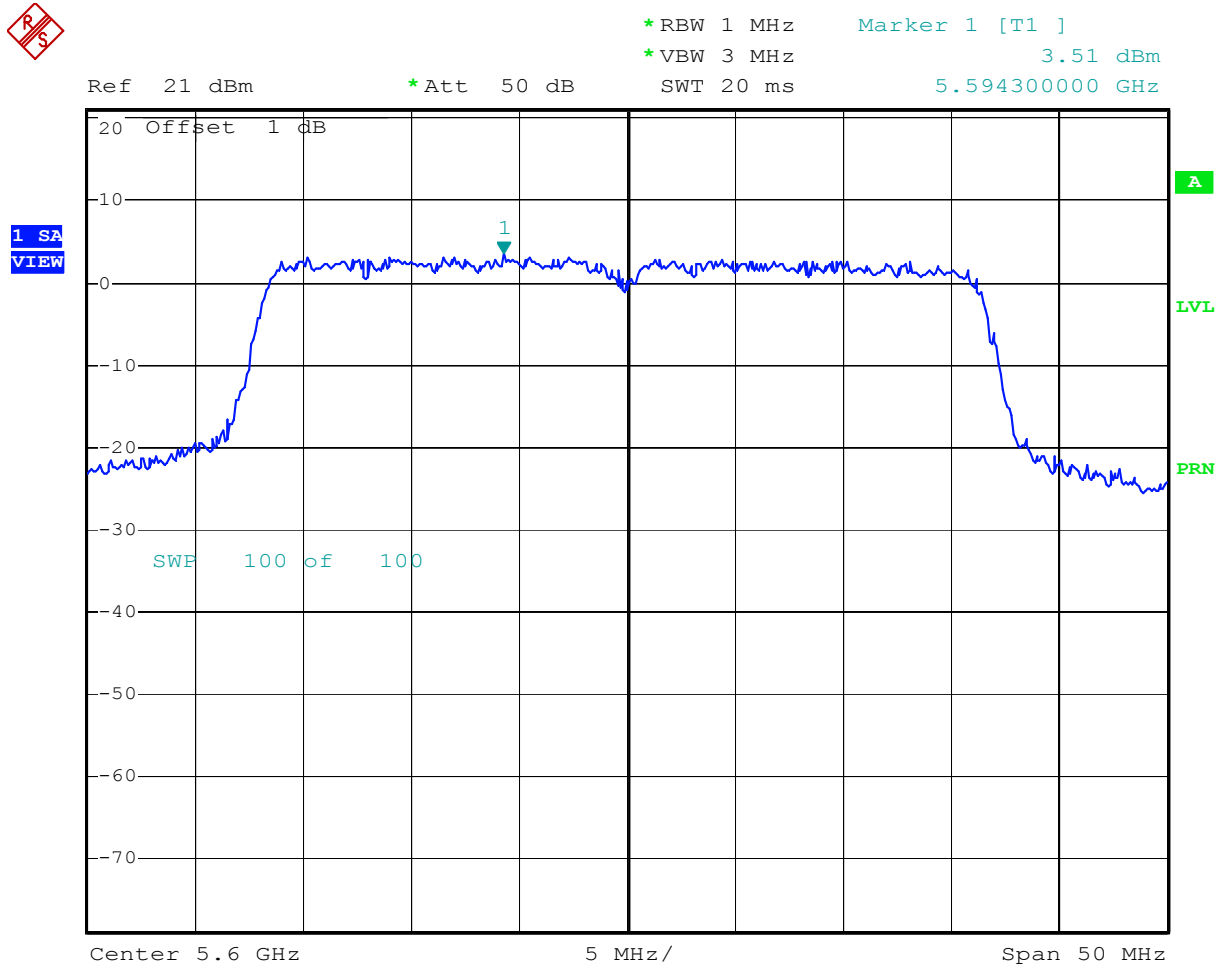
Comment: Peak power spectral density, 5500 MHz, 6 Mbps
 Date: 19.DEC.2005 08:54:17

Plot 3.2



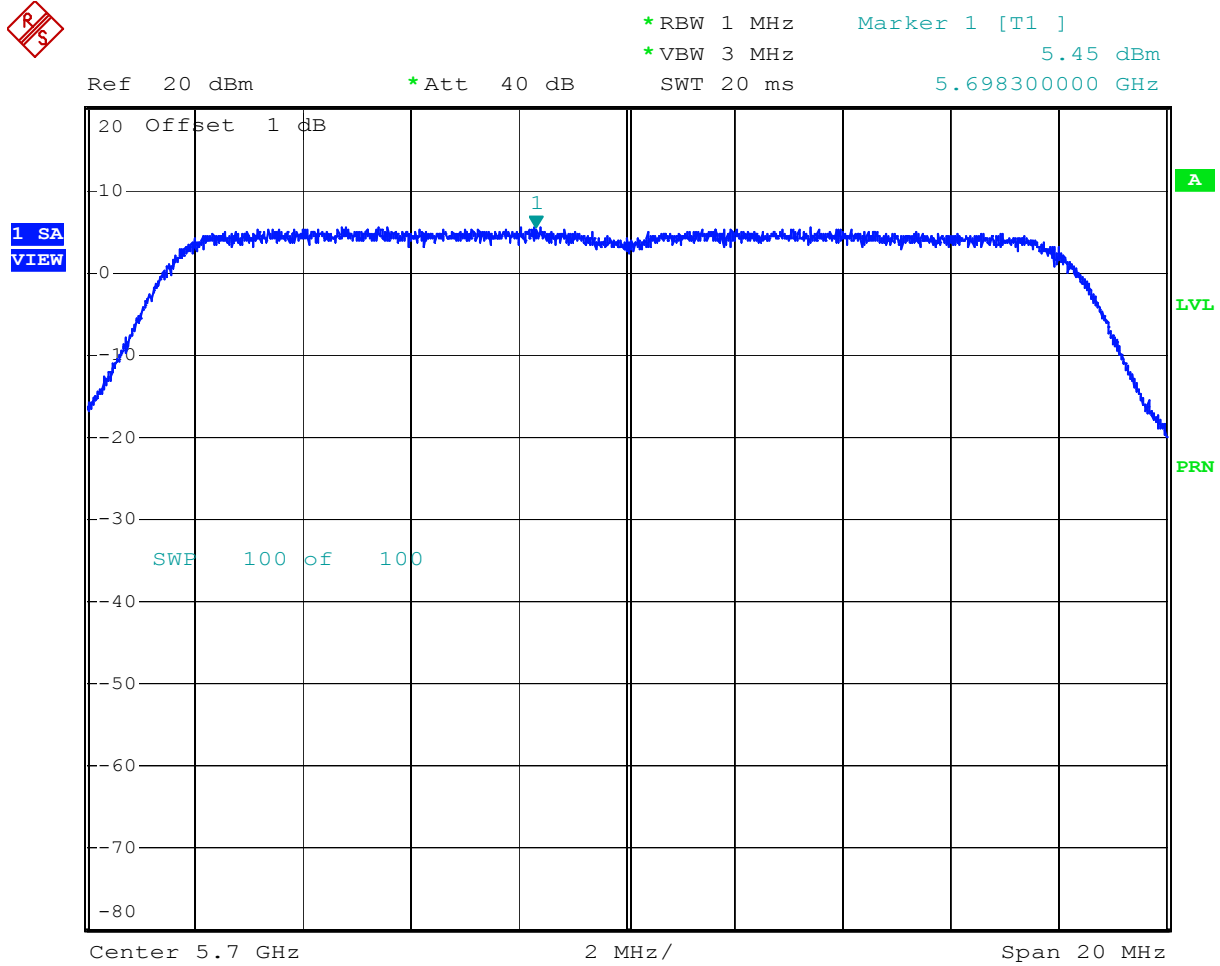
Comment: Peak power spectral density, 5600 MHz, 6 Mbps
 Date: 19.DEC.2005 09:03:42

Plot 3.3



Comment: Peak power spectral density, 5680 MHz, turbo mode, 72 Mbps
 Date: 19.JAN.2006 13:42:08

Plot 3.4



Comment: Peak power spectral density, 5700 MHz, 6 Mbps
Date: 19.DEC.2005 09:04:51

4.4 Ratio of the peak excursion of the modulation envelope
 FCC Rule: 15.407(a)(6)

Requirement

The Ratio of the peak excursion of the modulation envelope to the maximum conducted output power shall not exceed 13 dB across any 1 megahertz bandwidth.

Procedure

The Procedure, described in the FCC Public Notice DA 02-2138, was used.

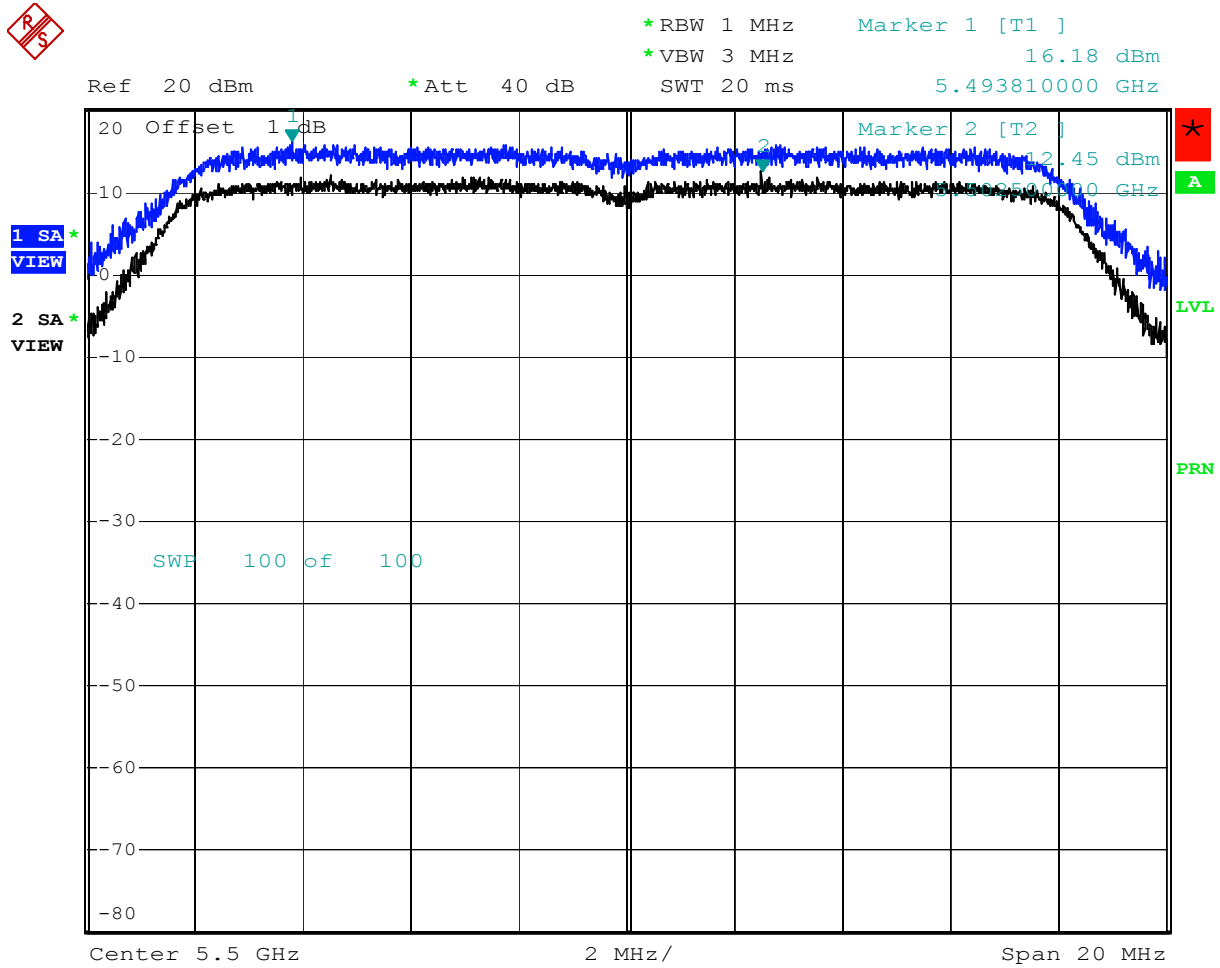
Results

Frequency MHz	Mode	Ratio of the peak excursion dBm	Margin to 13 dBm limit dB	Plot #
5500	regular	3.7	9.3	4.1
5600	regular	4.4	8.6	4.2
5600	turbo	4.8	8.2	4.3
5700	regular	4.7	8.3	4.4

On the plots 4.1 – 4.4 the Ratio of the peak excursion is presented.

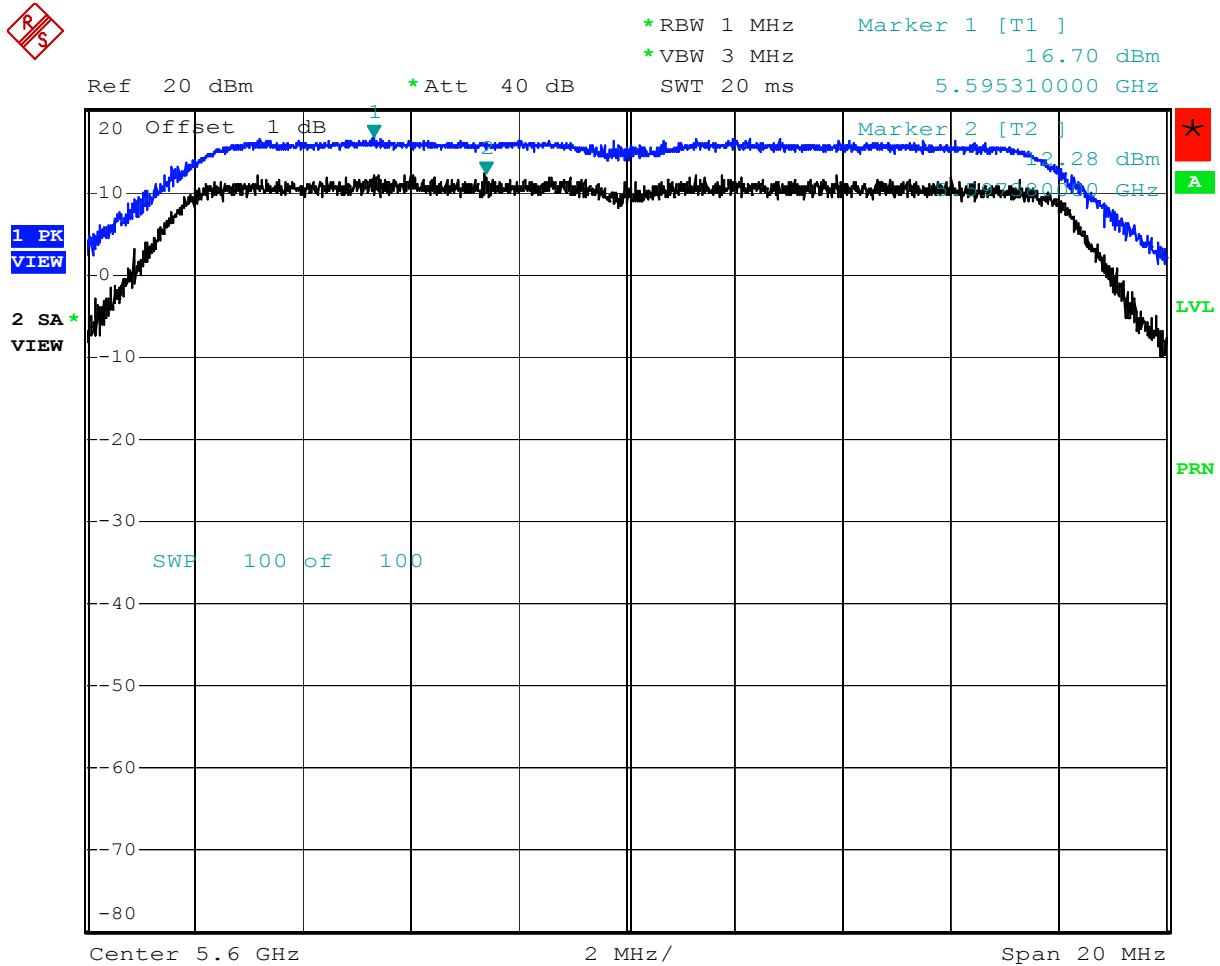
The EUT passed by 8.2 dB.

Plot 4.1



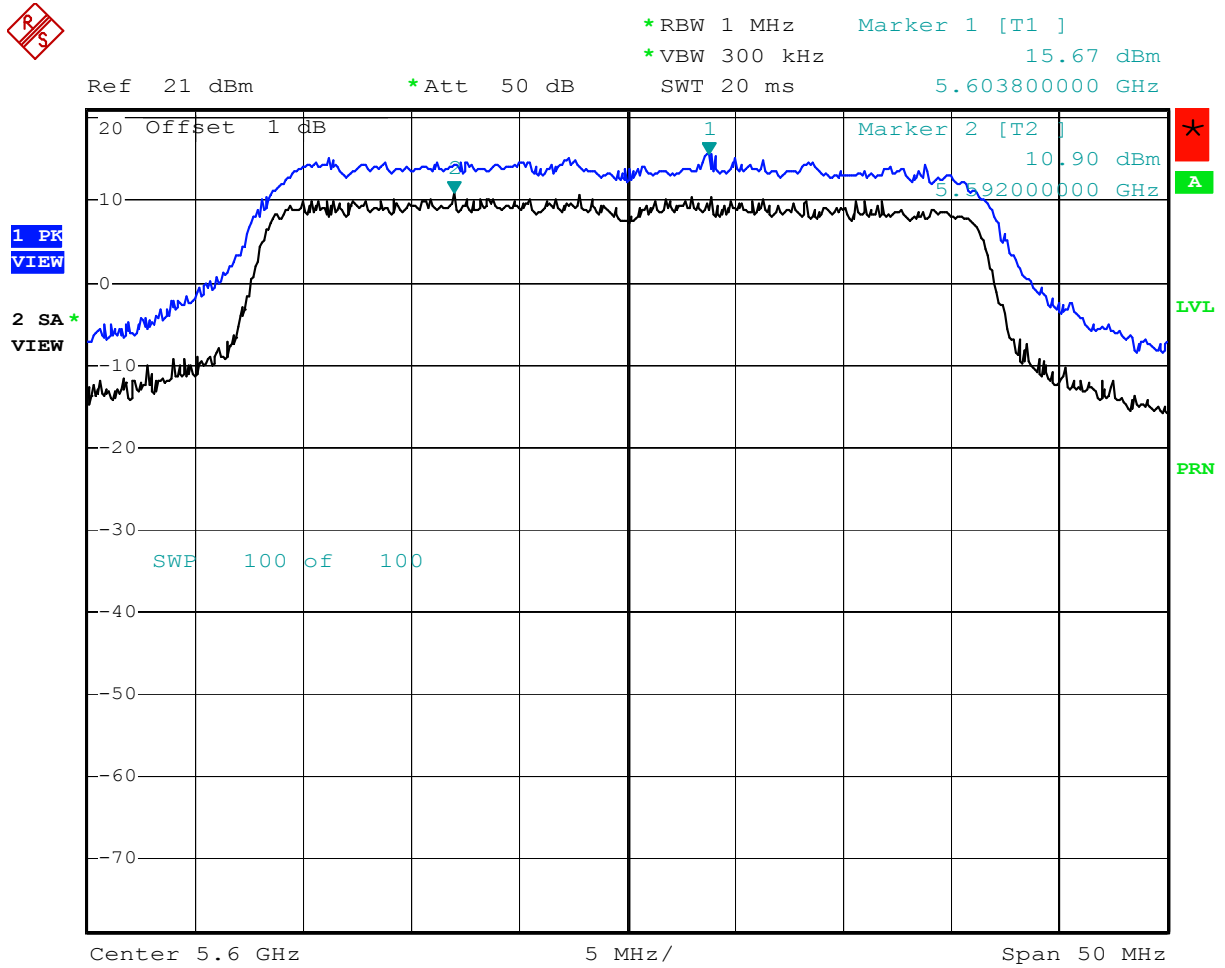
Comment: Peak excursion, 5500 MHz, 6 Mbps
 Date: 19.DEC.2005 09:34:34

Plot 4.2



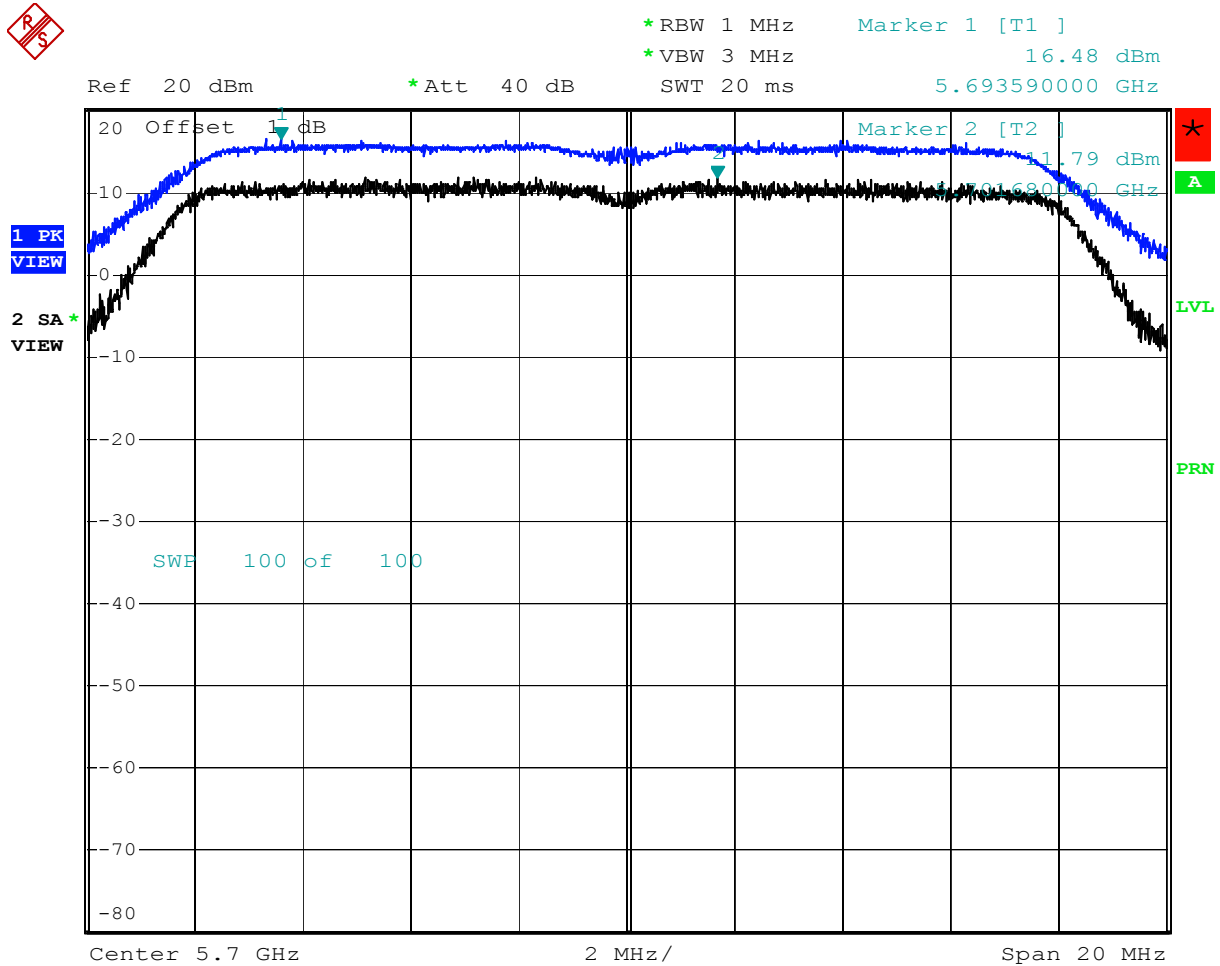
Comment: Peak excursion, 5600 MHz, 6 Mbps
 Date: 19.DEC.2005 10:11:33

Plot 4.3



Comment: Peak excursion, 5680 MHz, turbo mode, 72 Mbps
 Date: 19.JAN.2006 13:54:40

Plot 4.4



Comment: Peak excursion, 5700 MHz, 6 Mbps
Date: 19.DEC.2005 10:14:24

4.5 Out-of-Band Conducted Emissions
FCC Rule: 15.247(c)

Requirements

All emissions outside of the 5.47 – 7.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.

Procedure

A spectrum analyzer was connected to the antenna port of the transmitter. Analyzer Resolution Bandwidth was set to 1 MHz. The out-of-band emissions were measured from 30 MHz to 40 GHz for low, middle and high channel.

Test Result

Refer to the plots below for the test result.

The EUT passed by 4.2 dB.

Regular mode

Frequency MHz	Description	Margin to -27dBm/MHz EIRP limit (antenna gain up to 6 dBi), dB	Plot #
5500	Scan 30 MHz – 1 GHz	> 20	5.1
	Scan 1 GHz – 5.47 GHz	10.8	5.2
	Scan 5.725 GHz – 10 GHz	> 20	5.3
	Scan 10 GHz – 20 GHz	19.8	5.4
	Scan 20 GHz – 40 GHz	> 20	5.5
5600	Scan 30 MHz – 5.47 GHz	19.9	5.6
	Scan 5.725 GHz – 10 GHz	> 20	5.7
	Scan 10 GHz – 20 GHz	19.8	5.8
	Scan 20 GHz – 40 GHz	> 20	5.9
5770	Scan 30 MHz – 5.47 GHz	19.8	5.10
	Scan 5.725 GHz – 10 GHz	15.4	5.11
	Scan 10 GHz – 20 GHz	19.2	5.12
	Scan 20 GHz – 40 GHz	> 20	5.13

Turbo mode

Frequency MHz	Description	Margin to -27dBm/MHz EIRP limit (antenna gain up to 6 dBi), dB	Plot #
5520	Scan 30 MHz – 1 GHz	> 20	5.14
	Scan 1 GHz – 5.47 GHz	7.4	5.15
5600	Scan 30 MHz – 1 GHz	> 20	5.16
	Scan 1 GHz – 5.47 GHz	19.8	5.17
	Scan 5.725 GHz – 10 GHz	> 20	5.18
5680	Scan 5.725 GHz – 6 GHz	13.0	5.19
	Scan 5.725 GHz – 6 GHz (108 Mbps)	> 20	5.20

Minimum Power

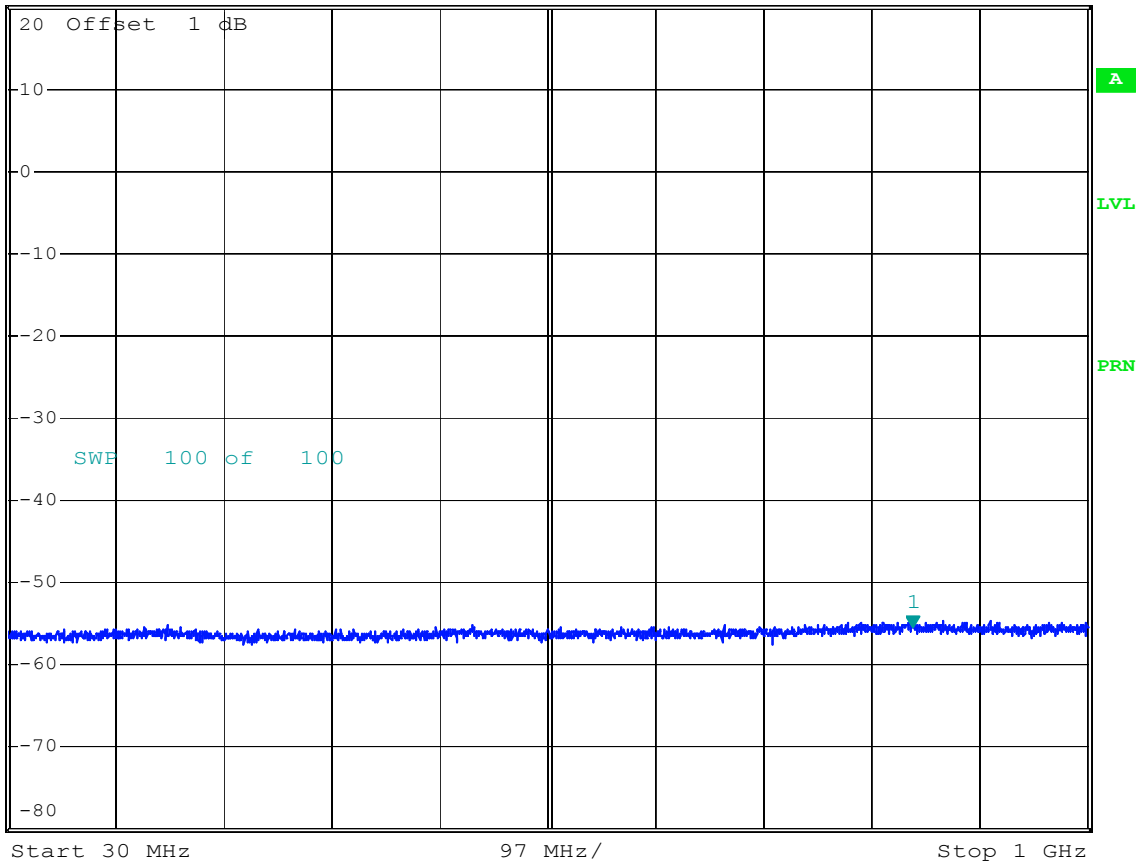
Frequency MHz	Description	Margin to -27dBm/MHz EIRP limit (maximum antenna gain of 33.4 dBi), dB	Plot #
5500	Scan 5.43 GHz – 5.54 GHz	4.6	5.21
5520	Scan 5.43 GHz – 5.54 GHz (turbo)	4.6	5.22
5700	Scan 5.69 GHz – 5.75 GHz	7.0	5.23
5680	Scan 5.65 GHz – 5.75 GHz (turbo)	4.2	5.24

Plot 5.1



*RBW 1 MHz Marker 1 [T1]
 *VBW 3 MHz -55.34 dBm
 Ref 20 dBm *Att 40 dB SWT 10 ms 842.860000000 MHz

1 SA
 AVG



Comment: out-of-band, 5500 MHz, 6 Mbps
 Date: 19.DEC.2005 10:20:15

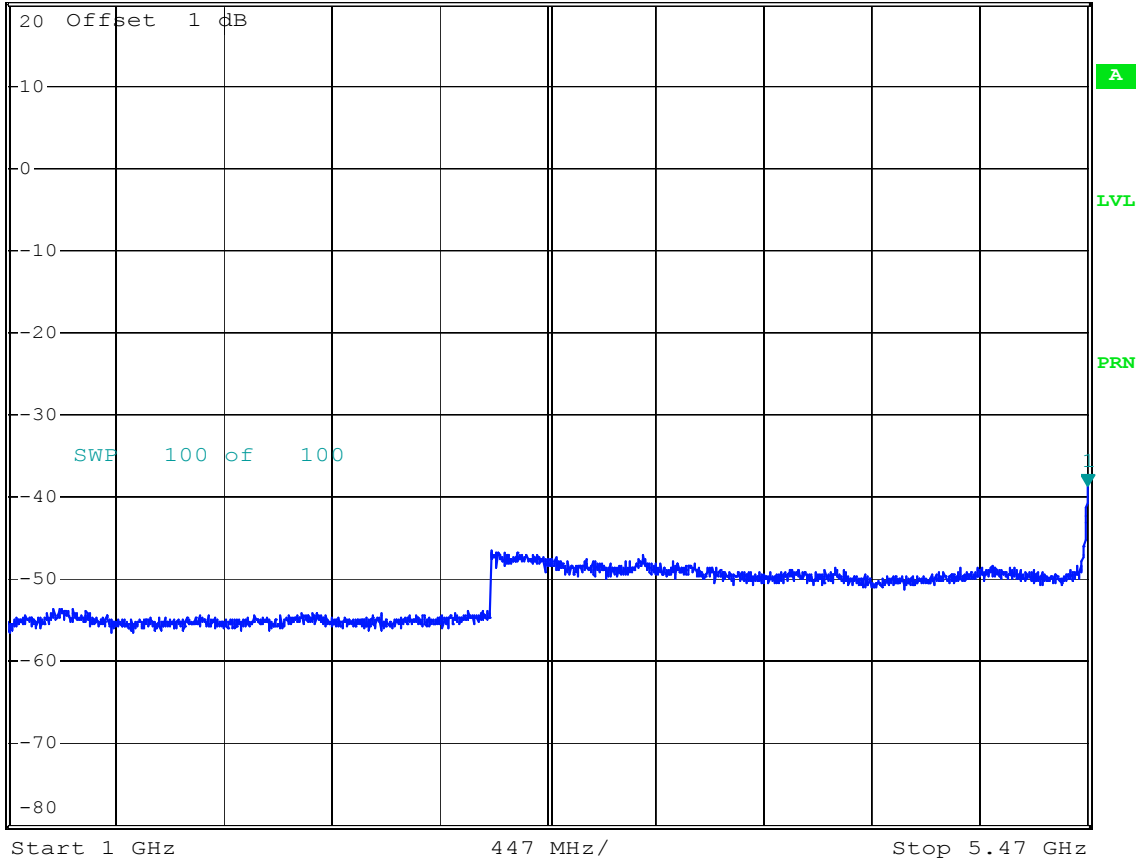
Plot 5.2



*RBW 1 MHz Marker 1 [T1]
 *VBW 1 MHz -38.79 dBm
 SWT 90 ms 5.47000000 GHz

Ref 20 dBm *Att 40 dB

1 SA
 AVG



Comment: out-of-band, 5500 MHz, 6 Mbps
 Date: 19.DEC.2005 10:25:30

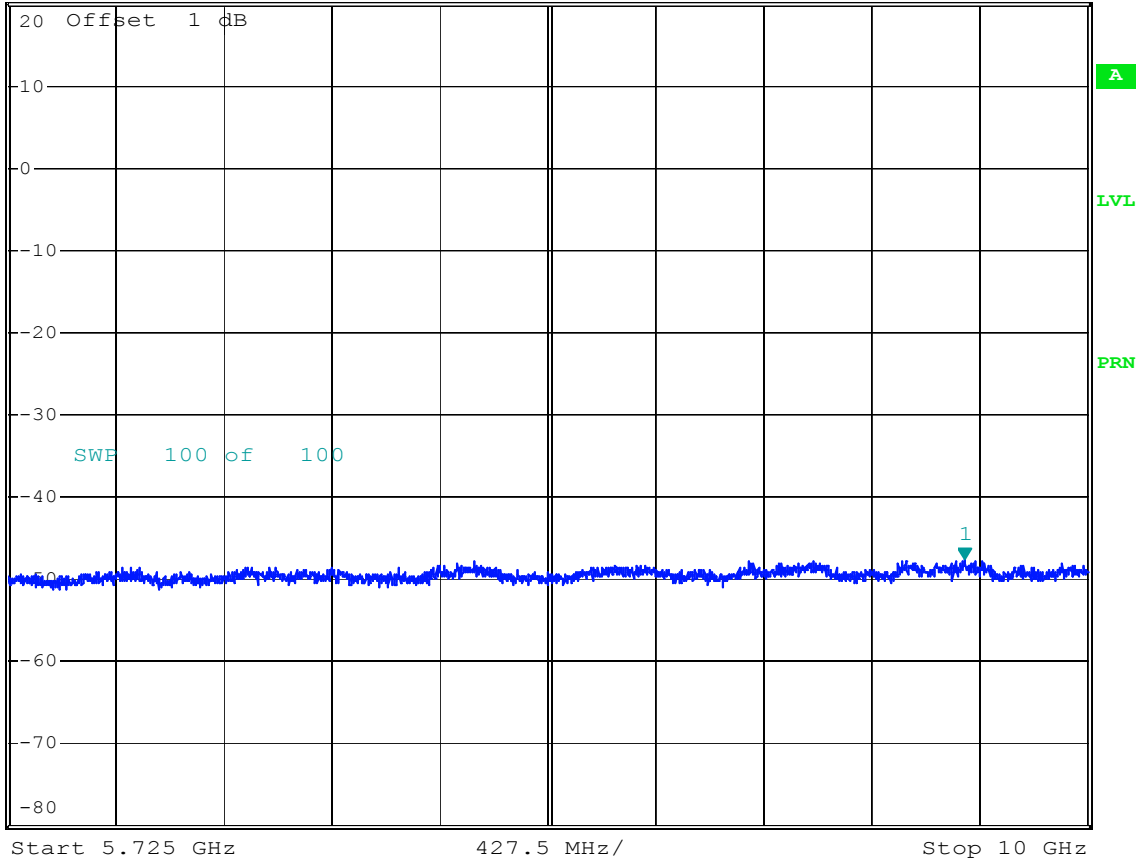
Plot 5.3



*RBW 1 MHz Marker 1 [T1]
 *VBW 1 MHz -47.59 dBm
 SWT 90 ms 9.512650000 GHz

Ref 20 dBm *Att 40 dB

1 SA
 AVG



Comment: out-of-band, 5500 MHz, 6 Mbps
 Date: 19.DEC.2005 10:24:12