



PRODUCT SAFETY AND COMPLIANCE EMC LABORATORY

EMC TEST REPORT - Addendum

Test Report Number -24402-1 WLAN@5.8 GHz

Report Date -2011-03-09

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

Signature: 

Name: Lei Yang

Title: EMC Project Manager

Test: 2011-03-07 to 2011-03-09

As the responsible test lab manager, I hereby declare that the model tested as specified in this report conforms to the requirements indicated.

Signature: 

Name: Yilin Zhao

Title: Test Lab Manager

Date: 2011-03-10

This report must not be reproduced, except in full, without written approval from this laboratory.

FCC Registration Number: 177885

IC Registration Number: 109AW-1

ADR Testing Service location ADR BJ

ISO/IEC-17025:2005 accredited by UKAS



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Test Report Details

Tests Performed By: Motorola (Beijing) Mobility Technologies Co., Ltd.
Asia Global Compliance Labs
No.1 Wang Jing East Road
Chao Yang District
Beijing, 100102, P. R. China
Phone: +86 10 8473 2610
FCC Registration Number: 177885
IC Registration Number: 109AW-1

Tests Requested By: Motorola Mobility, Inc.
600 North US Hwy 45
Libertyville, IL 60048
United States

Product Type: Cellular Phone with embedded WLAN

Signaling Capability: WCDMA 850 & 1900, GSM 850 & 1900,
EDGE 850 & 1900, Bluetooth, WLAN a/b/g/n

FCC ID: IHDP56LS2

IMEI: 356381040019881

Project number: 24402-1

Testing Complete Date: 2011-05-19

Applicable Standards

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

 X Part 15 Subpart C – Intentional Radiators

Applicable Standards: ANSI 63.4 2003, RSS-210 Issue 8

Summary of Testing

Test	Test Name	Pass/Fail
1	Spectrum Bandwidth	Pass
2	Peak Power	Pass
3	Power Spectral Density	Pass
4	Spurious RF Conducted Emissions	Pass
5	AC Line Conducted Emissions	Pass

Test	Test Name	Results
1	Spectrum Bandwidth	See plots
2	Peak Power	See plots
3	Power Spectral Density	See tables
4	Spurious RF Conducted Emissions	See plots
5	AC Line Conducted Emissions	See Plots

General and Special Conditions

The Cellular Phone hereinafter referred to as the Equipment under Test or EUT was tested using a fully charged battery when applicable. Where a battery could not be used due to the need for a controlled variation of input voltage, an external power supply was utilized.

All testing was done in an indoor controlled environment. The temperature and the relative humidity were maintained within the ANSI C63.4 2003 Standard requirements during the entire duration of testing.

Equipment and Cable Configurations

The EUT was tested in a stand-alone configuration that is representative of typical use.

Measuring Equipment and Calibration Information

Manufacturer	Equipment Type	Model No.	Serial Number	Date of Calibration
Rohde Schwarz	Receiver	FSU26	200353	04/04/10
Rohde Schwarz	Receiver	ESCI	100650	04/09/10
Rohde Schwarz	Receiver	ESU40	100036	12/09/10
Agilent	Attenuator	8491A	MY39263202	NCR
Rohde Schwarz	LISN	ENV216	100055	12/20/2010

All test equipment was within their calibration date during the time of testing. When equipment went out of calibration during testing it was replaced using a similar piece of calibrated equipment. All these equipments are listed in the equipment list. All equipment is on a one-year calibration cycle.

Description of WLAN Transmitter

The EUT offers WLAN, operating in the 2.4GHz and 5GHz bands, as a feature. This report covers operation in the 2.4GHz band only. The WLAN antenna is mounted inside of the EUT. The antenna installation is permanent. For a more thorough description of the functionality please refer to Exhibit 12 of this package.

As a WLAN transmitter, it is designed operate with other WLAN devices as defined by the industrial standard. In this application, the device is battery operated.

De Facto EIRP Limit – Pursuant 47 CFR 15.247(b) (4); RSS-210 Section A8.4.

Criterion: The conducted output power limit of 1-watt is based on the use of antennas with directional gains that do not exceed 6 dB_i. If transmitting antennas of directional gain greater than 6 dB_i are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB_i.

The antenna employed by this transmitter is intended to be omni-directional, and thus will not exhibit directional gain in excess of 6 dB_i. The conducted power is less than the limits set forth (see elsewhere in this report for details).

Measurement Procedures and Data

Spectrum Bandwidth

CFR 47 Part 15.247

Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 20db passive attenuator. A fully charged battery was used for the supply voltage.

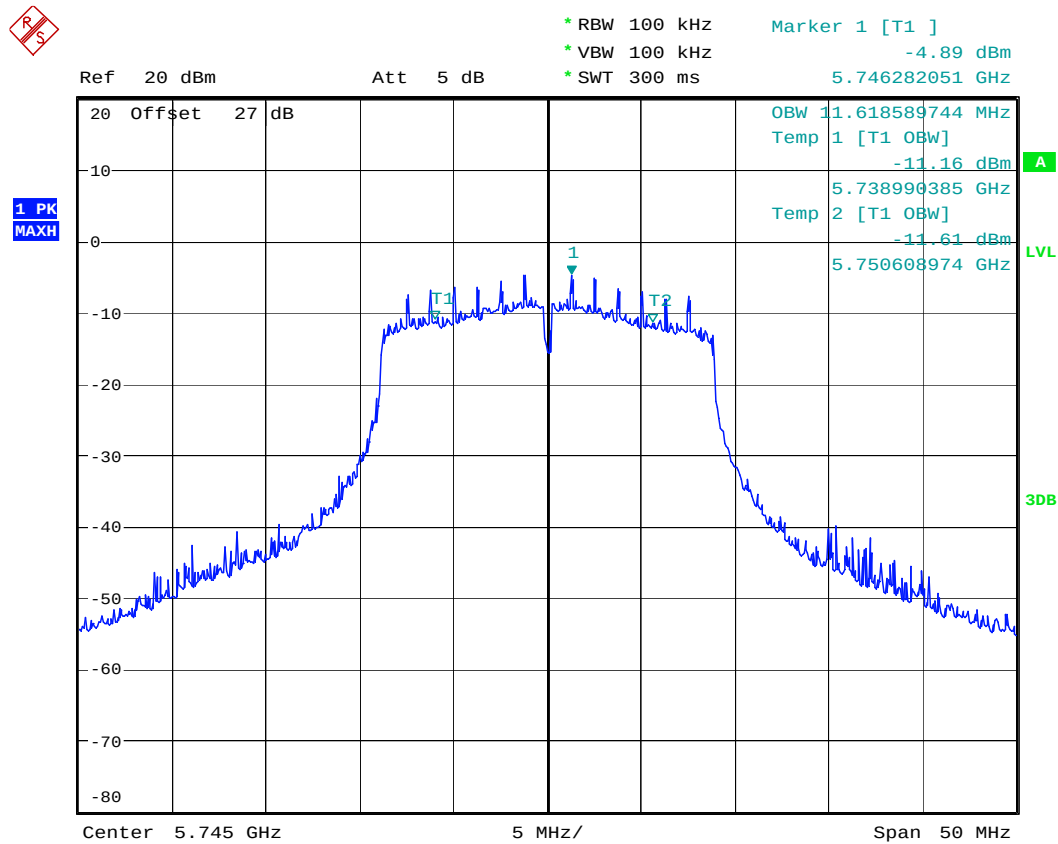
1. $RBW \geq 100 \text{ kHz}$
2. $VBW \geq RBW$
3. Sweep = auto
4. Detector function = peak
5. Trace = max hold

The trace was allowed to stabilize. The marker-to-peak function was used to set the marker to the peak of the emission. The marker-delta function was used to measure 6 dB down one side of the emission. The marker-delta function and marker was moved to the other side of the emission until it was even with the reference marker. The marker-delta reading at this point was the 6 dB bandwidth of the emission. The same procedure was repeated for 20 dB bandwidth.

Measurement Results

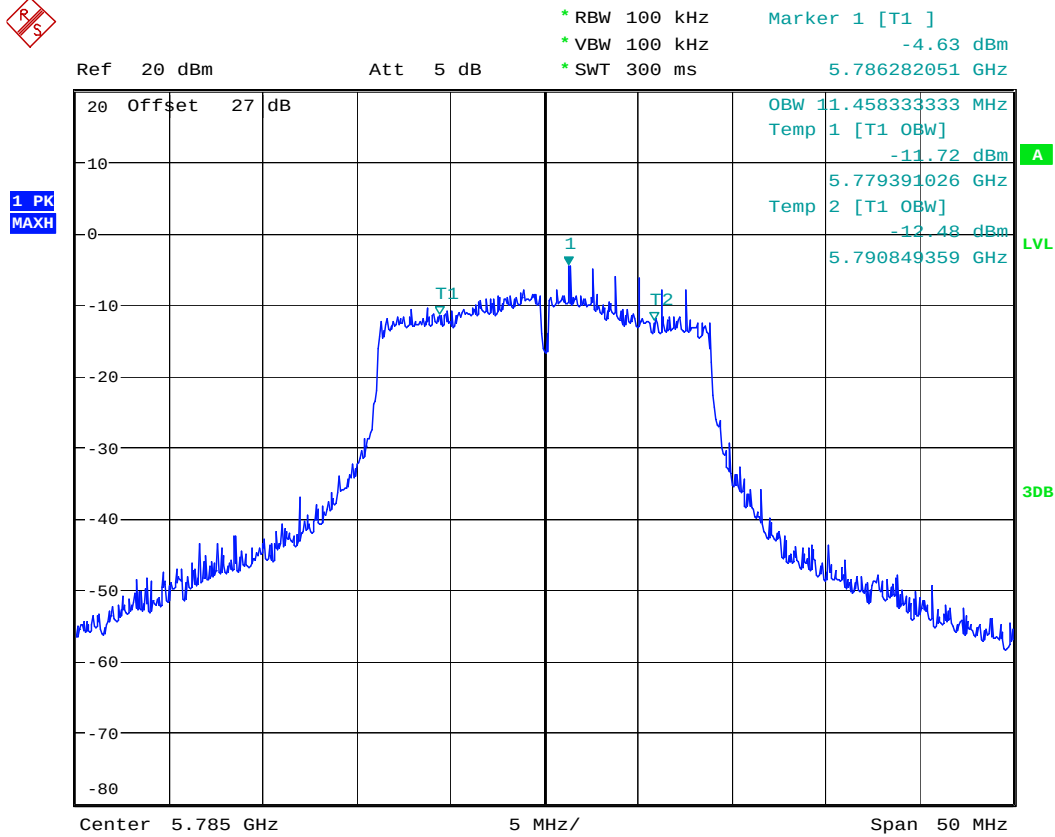
See attached

802.11 n Mode



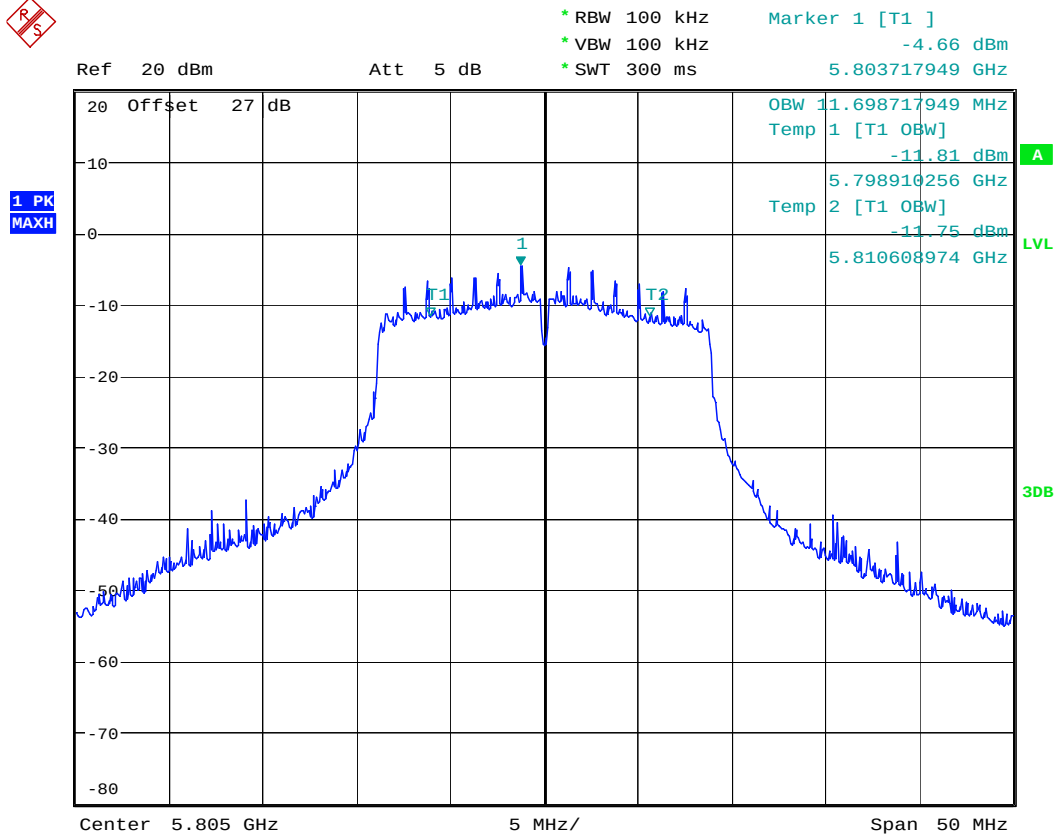
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6dB Bandwidth Channel 149 @ 6.5 Mbps



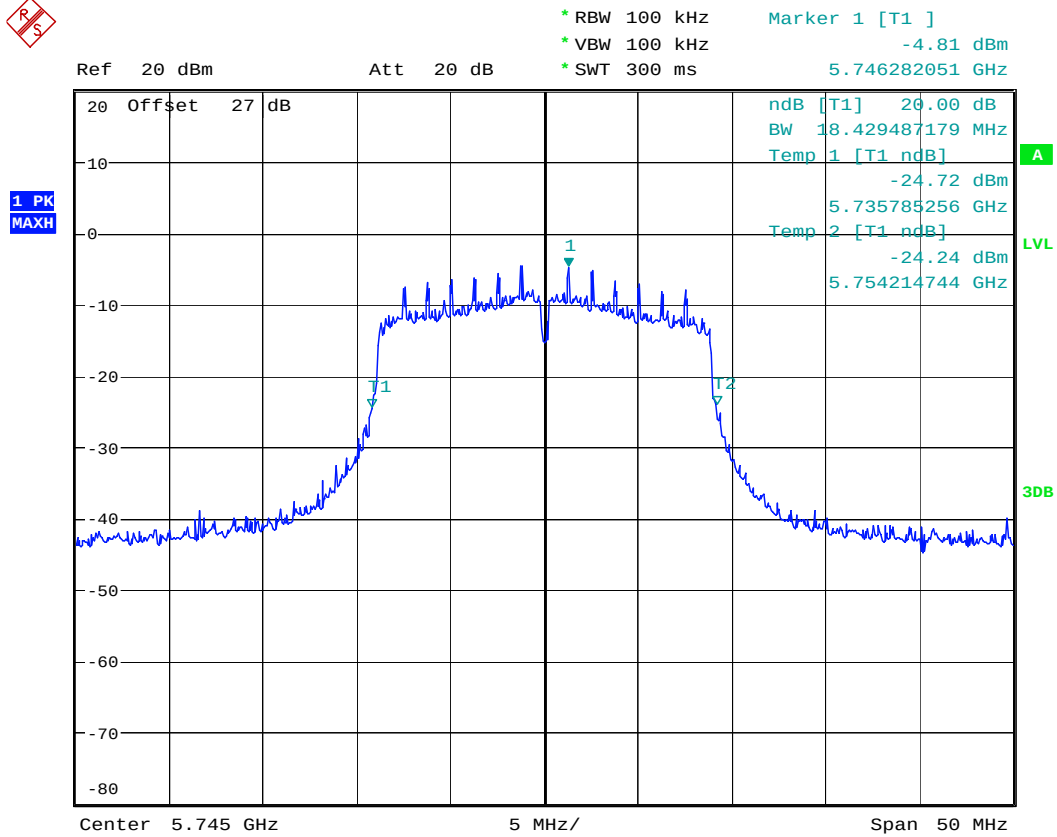
Date: 1.MAR.2011 08:49:43

6dB Bandwidth Channel 157 @ 6.5 Mbps



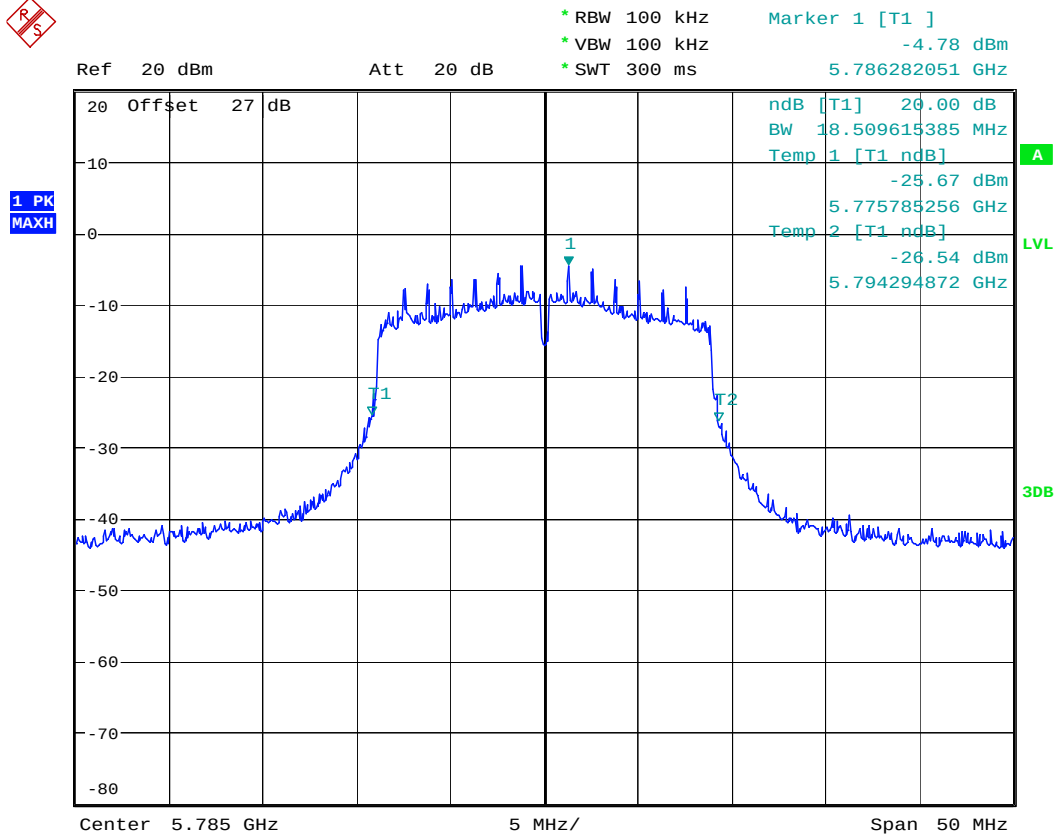
Date: 1.MAR.2011 08:50:25

6dB Bandwidth Channel 161 @ 6.5 Mbps



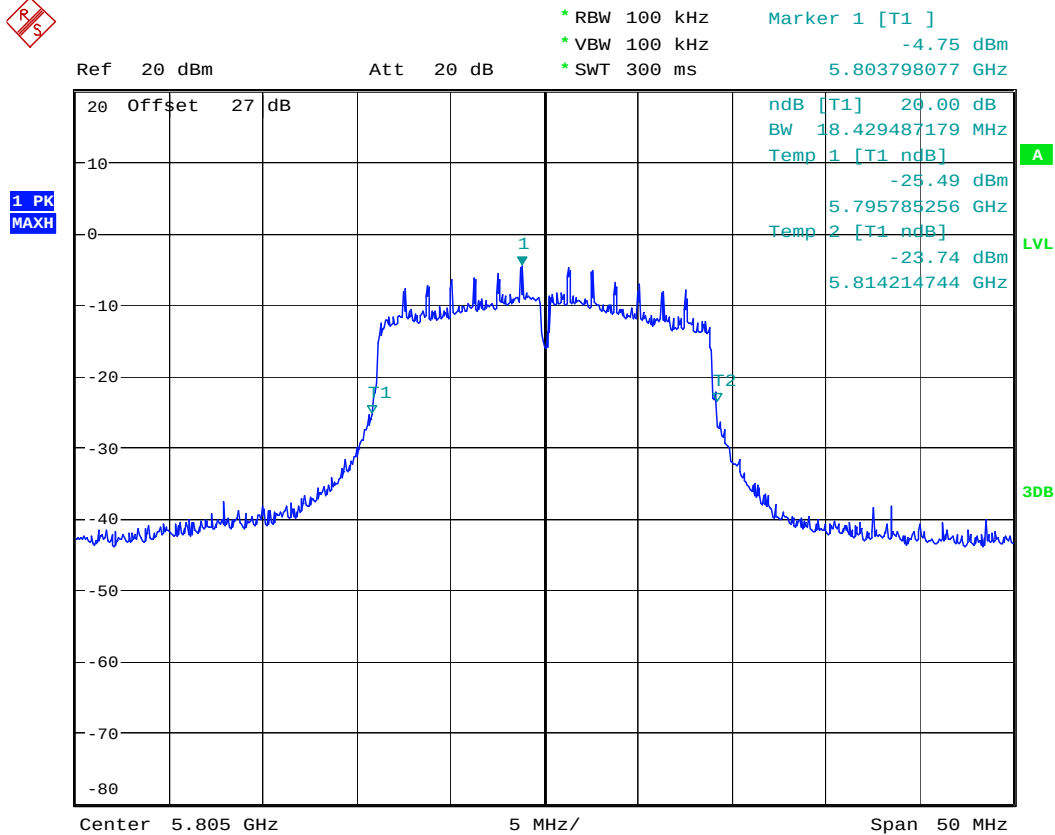
Date: 1.MAR.2011 08:52:15

20dB Bandwidth Channel 149 @ 6.5 Mbps



Date: 1.MAR.2011 08:51:28

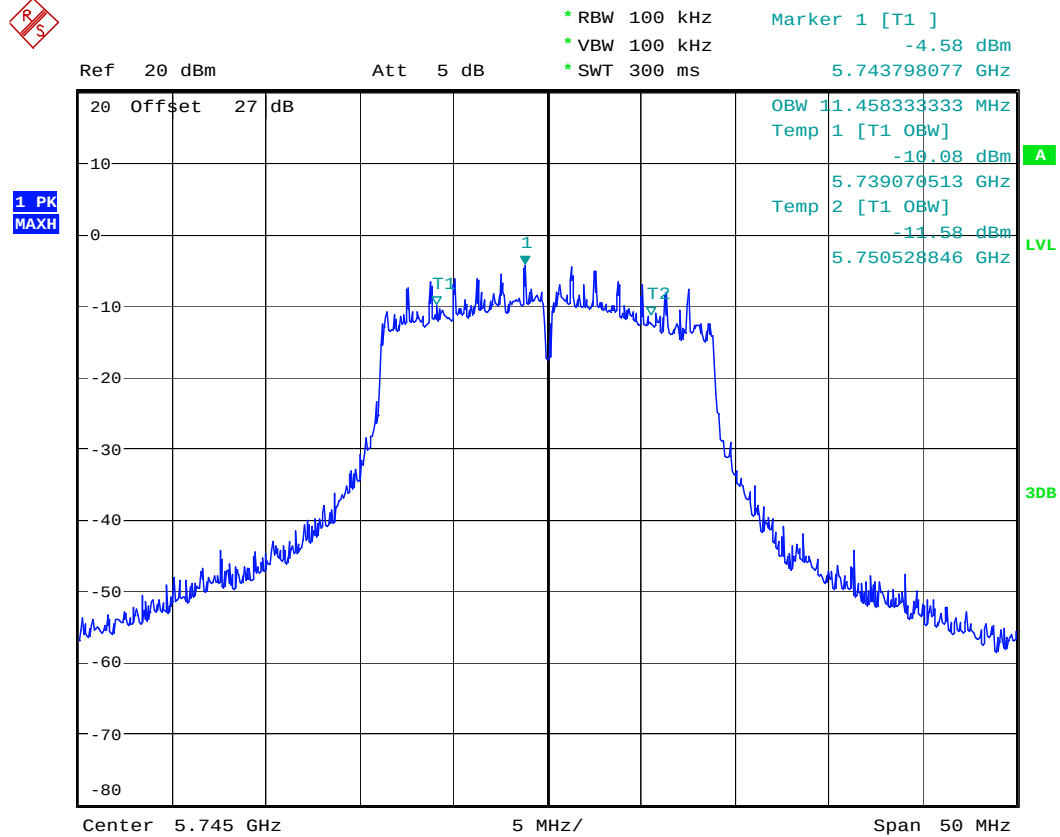
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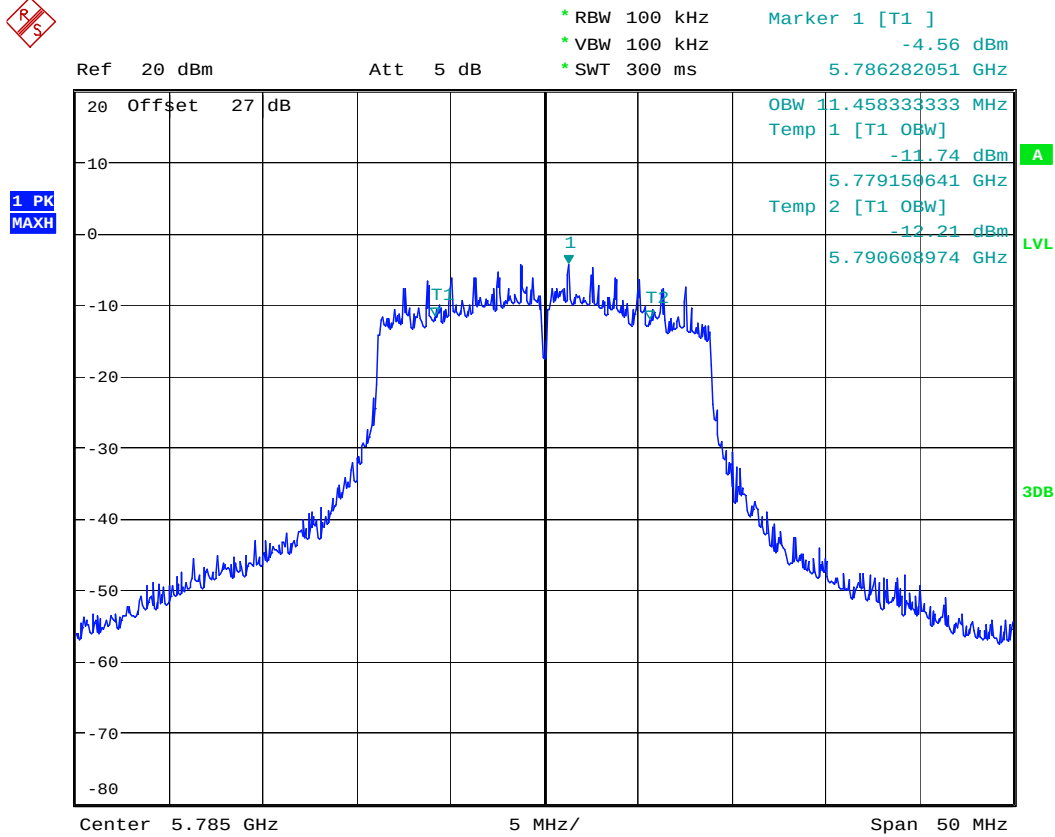
20dB Bandwidth Channel 161 @ 6.5 Mbps

**802.11 n Mode @
57.8Mbps**



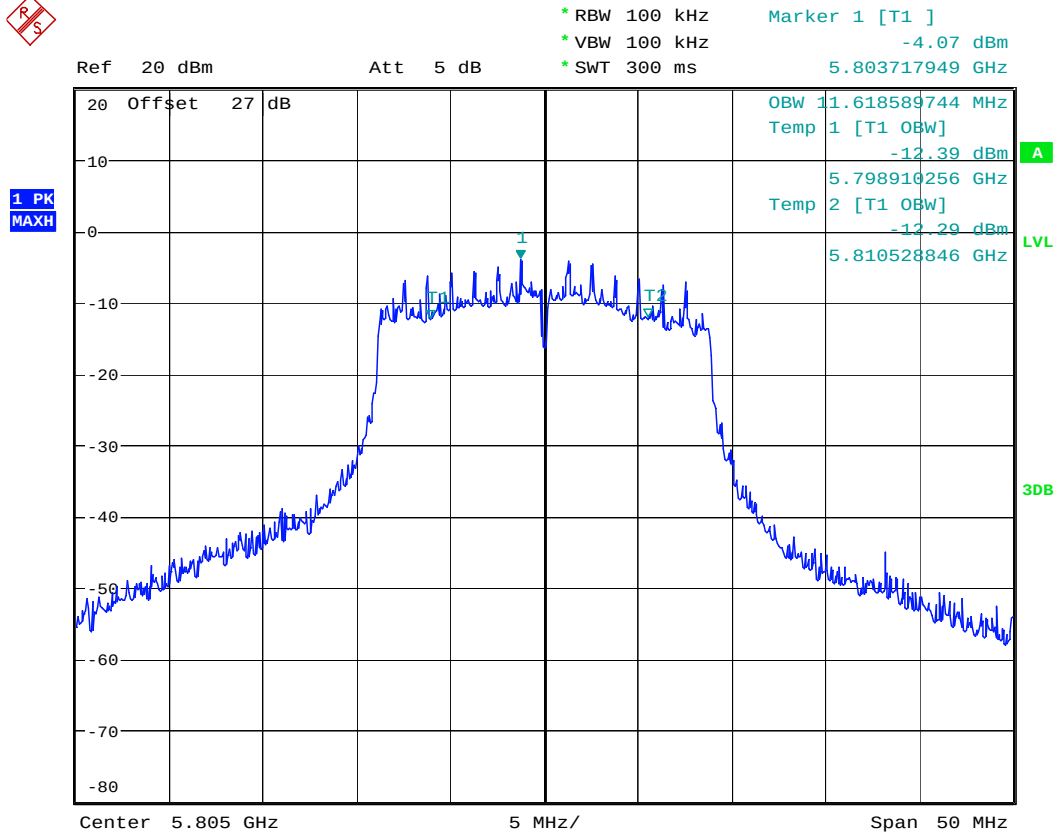
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6dB Bandwidth Channel 149 @57.8 Mbps



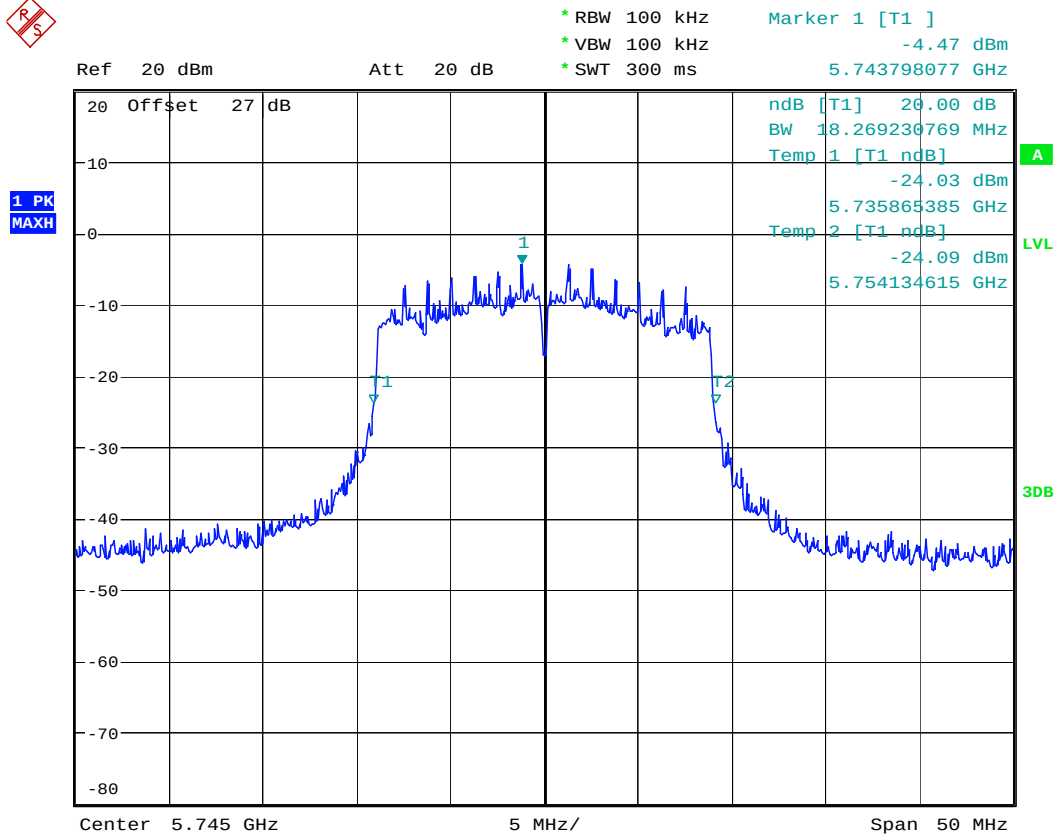
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6dB Bandwidth Channel 157 @ 57.8 Mbps



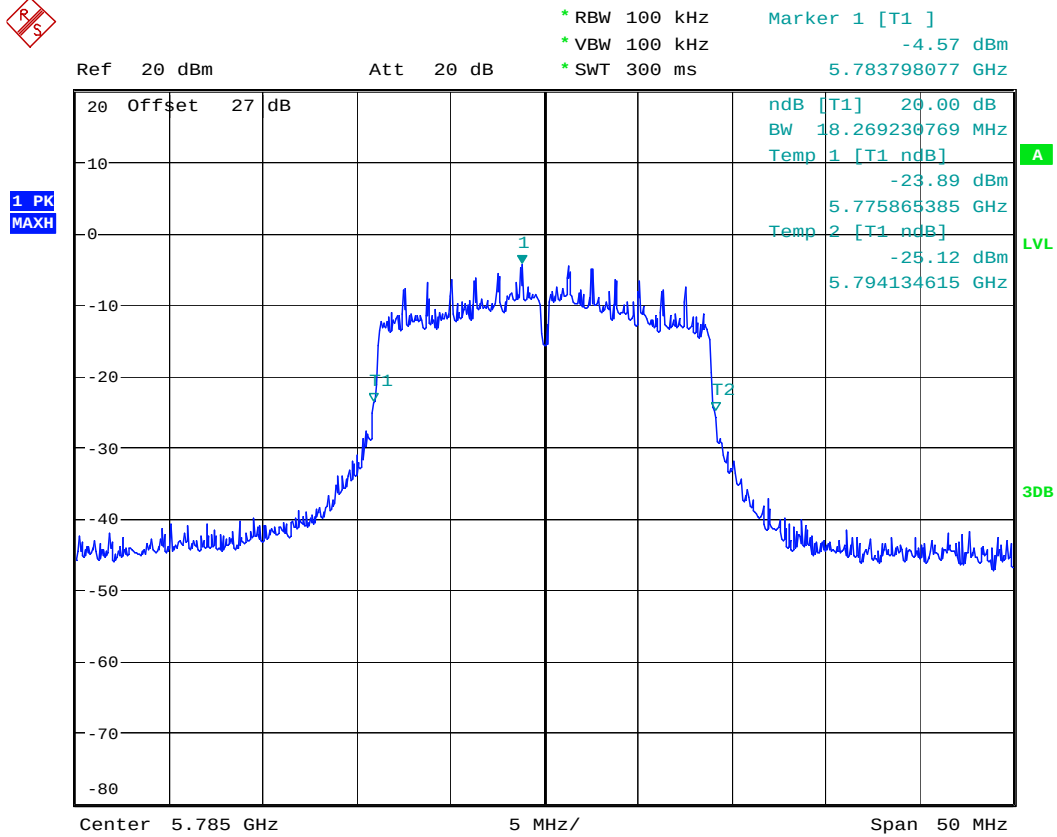
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6dB Bandwidth Channel 161 @ 57.8 Mbps



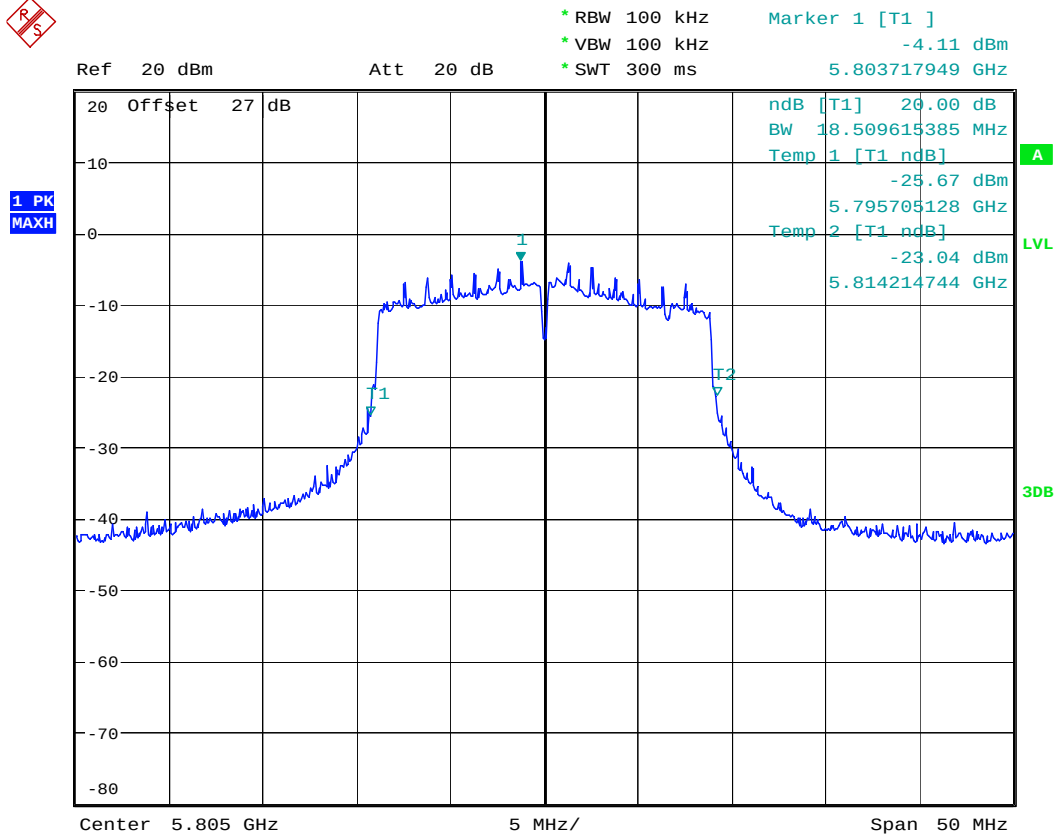
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20dB Bandwidth Channel 149 @ 57.8 Mbps



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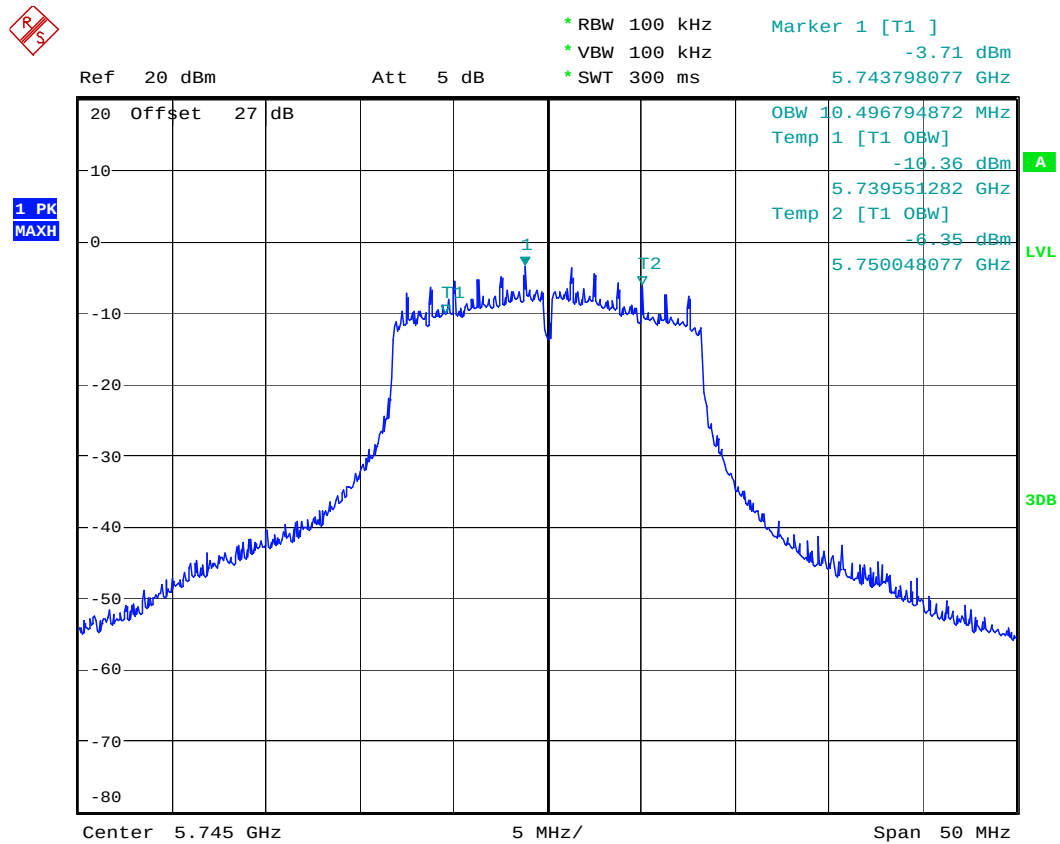
20dB Bandwidth Channel 157 @ 57.8 Mbps



Date: 1.MAR.2011 08:46:53

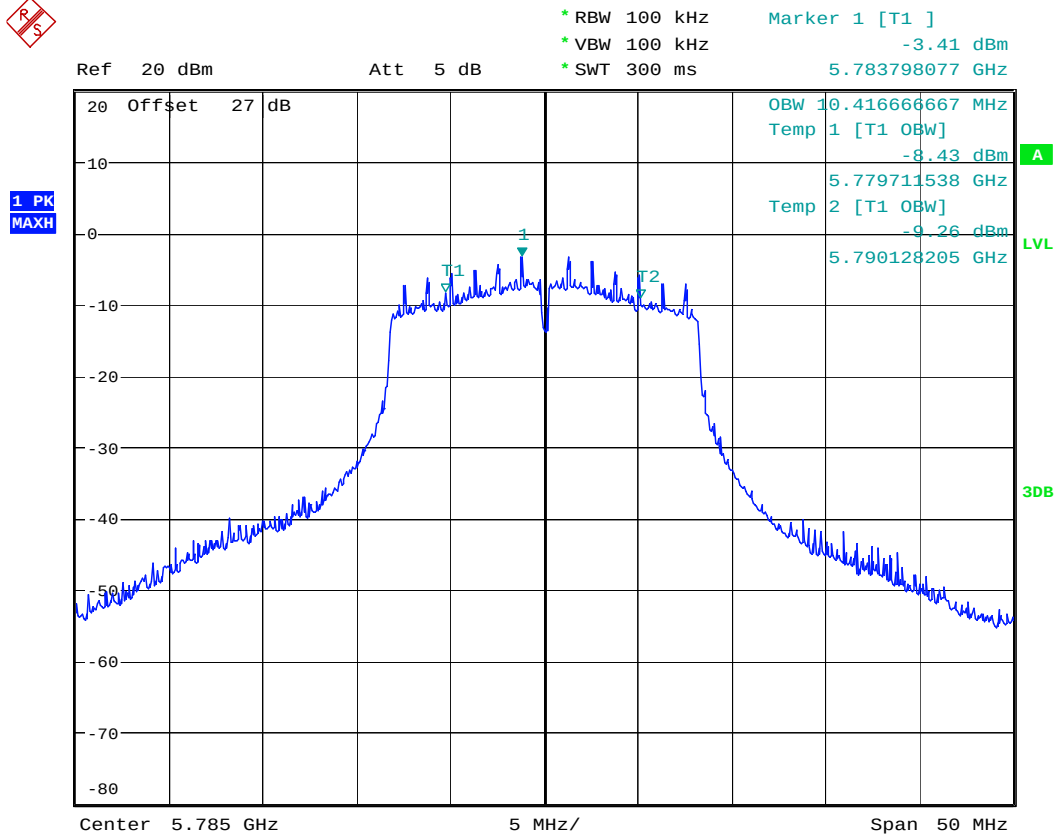
20dB Bandwidth Channel 161 @ 57.8 Mbps

802.11 a Mode@12Mbps



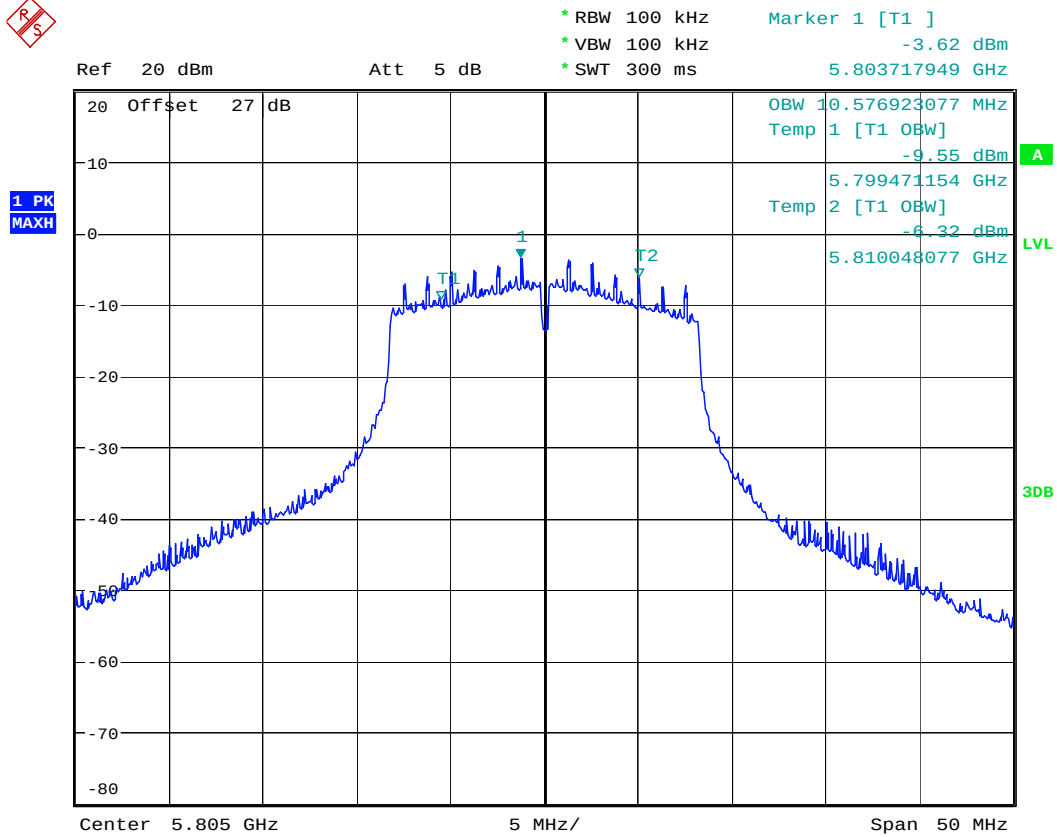
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6dB Bandwidth Channel 149 @ 12 Mbps



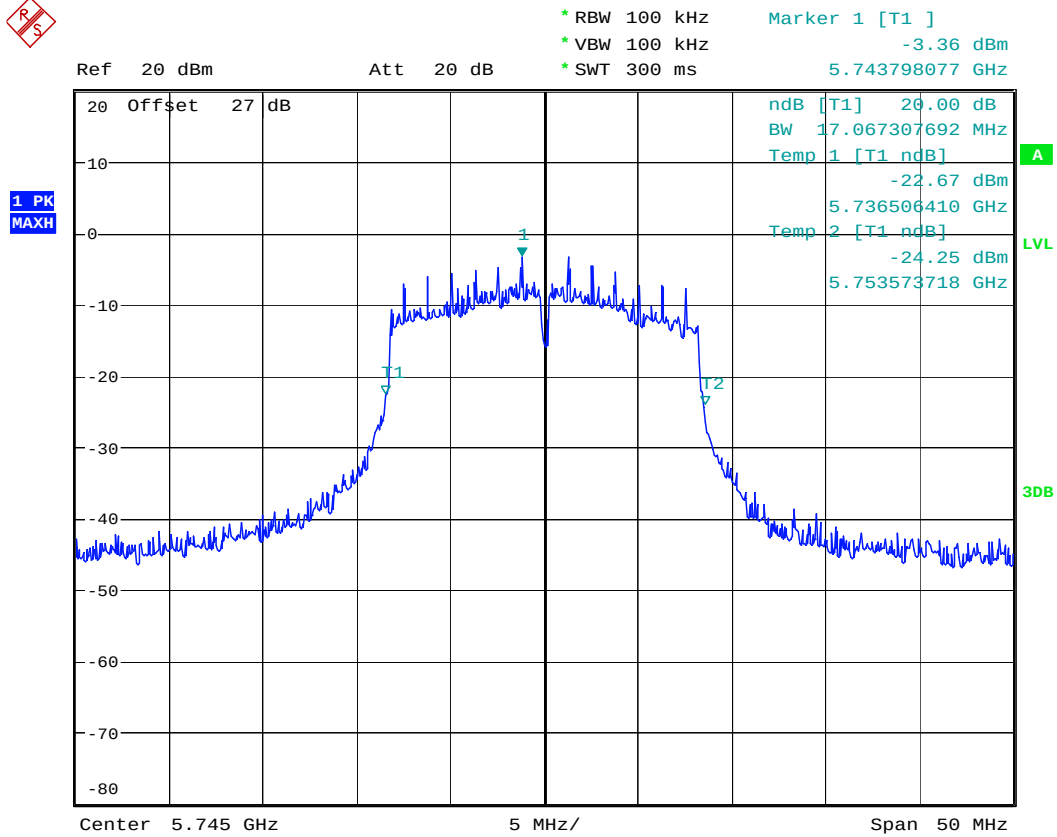
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6dB Bandwidth Channel 157 @ 12 Mbps



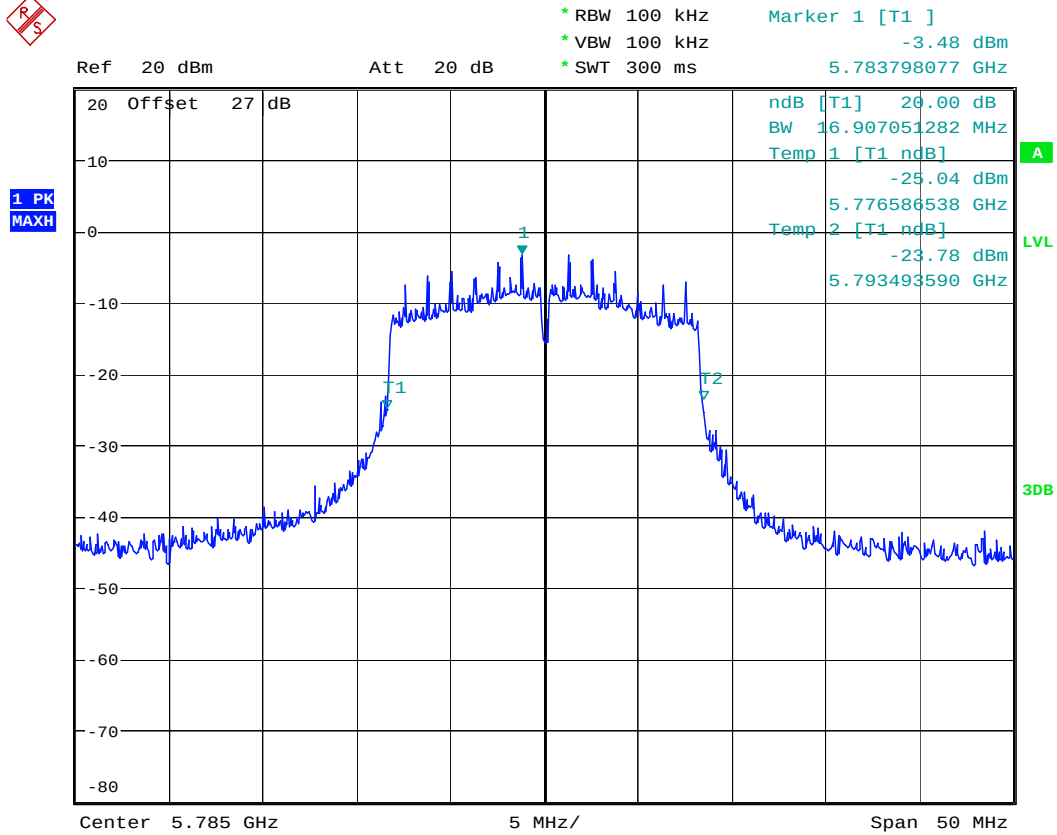
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6dB Bandwidth Channel 161 @ 12 Mbps



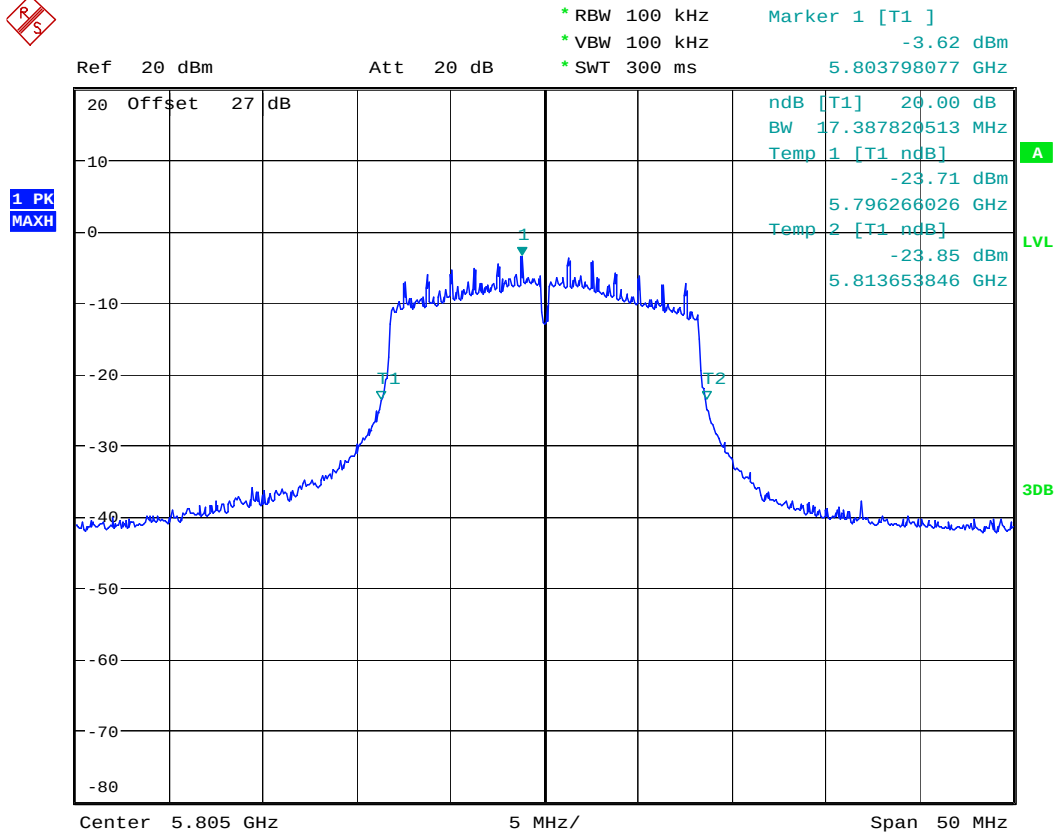
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20dB Bandwidth Channel 149 @ 12 Mbps



Date: 1.MAR.2011 03:22:13

20dB Bandwidth Channel 157 @ 12 Mbps



Date: 1.MAR.2011 03:21:31

20dB Bandwidth Channel 161 @ 12 Mbps

PEAK OUTPUT POWER

CFR 47 Part 15.247

Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the Spectrum analyzer through a specialized RF connector and a 20db passive attenuator. A fully charged battery was used for the supply voltage. Initially, an average detector is used to measure power in the low, middle and high channels for all data rates. The average measurements are used to determine which data rate is to be fully tested for each supported mode. Using a peak detector, the power is then measured for the applicable data rates.

Measurement Results

See Attached

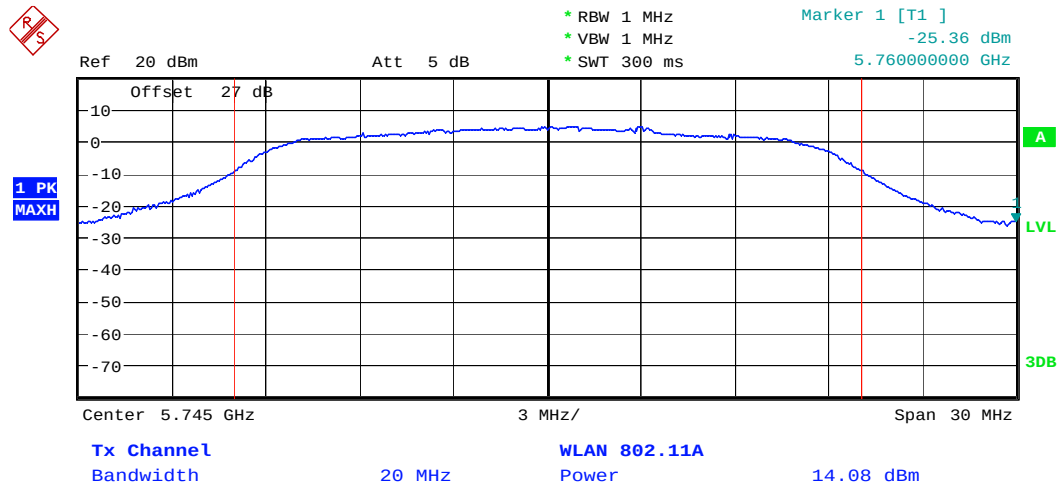
Initial average power measurements in the 5 GHz band

Average power (dBm) for <u>802.11n</u> in 5 GHz																	
Freq	CH	20 MHz BW, 400 ns GI								20 MHz BW, 800 ns GI							
		7.2 Mbps	14.4 Mbps	21.7 Mbps	28.9 Mbps	43.3 Mbps	57.8 Mbps	65 Mbps	72.2 Mbps	6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
5745	149	9.12	8.81	8.88	9.32	9.25	9.39	9.36	7.11	9.64	8.93	8.92	9.03	9.29	9.25	9.35	7.02
5765	153	8.45	8.56	8.81	9.04	9.04	9.15	9.04	6.86	8.9	8.44	8.68	8.8	8.83	9.05	8.86	6.81
5785	157	8.97	8.69	8.8	9.06	9.03	9.1	9	7.01	8.59	8.57	8.64	8.97	9.07	8.92	9.14	6.9
5805	161	9.09	8.79	8.84	9.02	8.98	9.1	9.12	6.84	8.58	8.66	8.67	8.9	8.99	8.95	8.91	6.87

Average power (dBm) for <u>802.11a</u> in 5 GHz									
Freq	CH	20 MHz BW							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
5745	149	10.59	10.7	11.05	10.82	10.78	10.69	10.81	10.61
5765	153	10.68	10.59	10.56	10.7	10.78	10.75	10.75	10.73
5785	157	10.89	10.83	10.77	10.74	10.69	10.95	10.93	10.93
5805	161	10.63	10.84	10.78	10.72	10.69	10.66	10.91	10.89

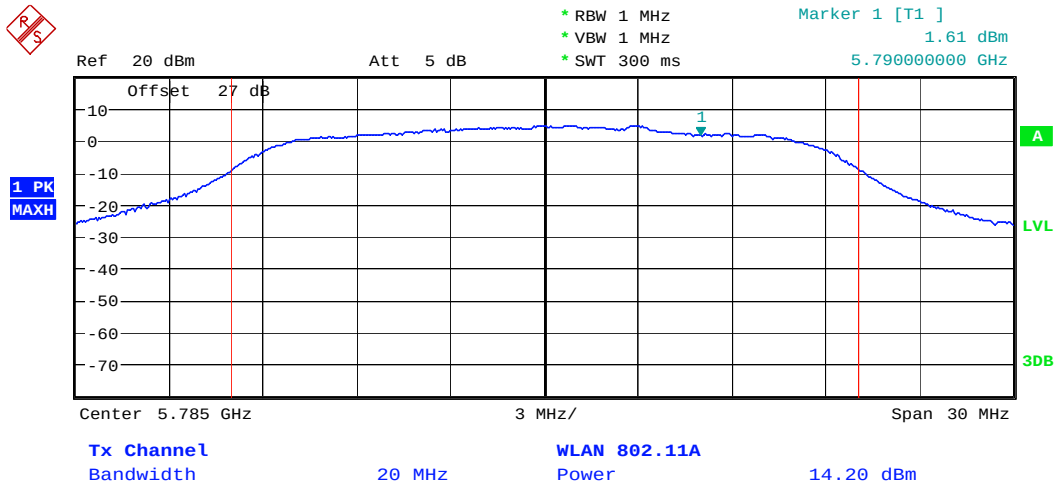
Based on these initial measurements, it was determined that testing will be performed in the 57.8 Mbps data rate for the 802.11n 400ns GI mode and 6.5 Mbps data rate for 802.11n 800ns GI mode and 12 Mbps for the 802.11 a mode. Plots showing the peak power measurements for the applicable data rates follow.

802.11 n @ 6.5 Mbps



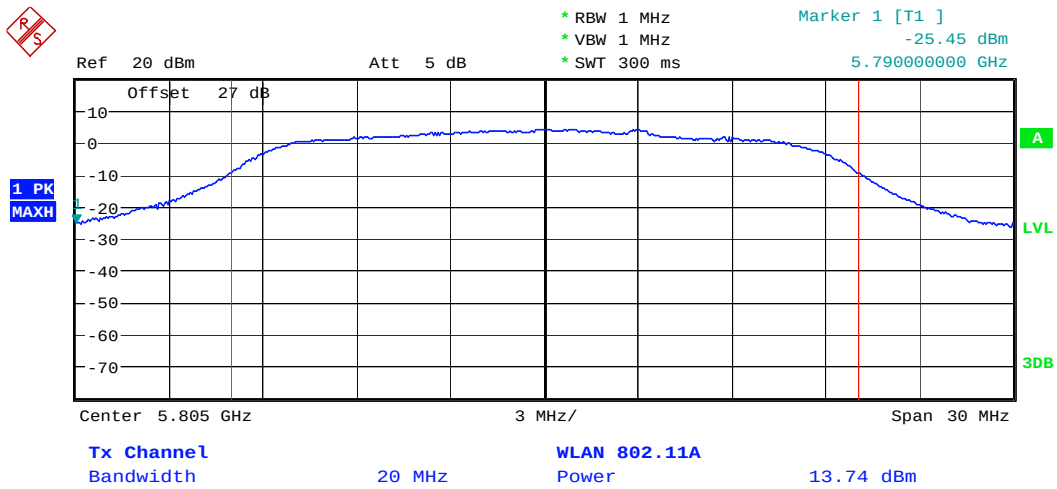
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Max. Power Channel 149 @ 6.5 Mbps



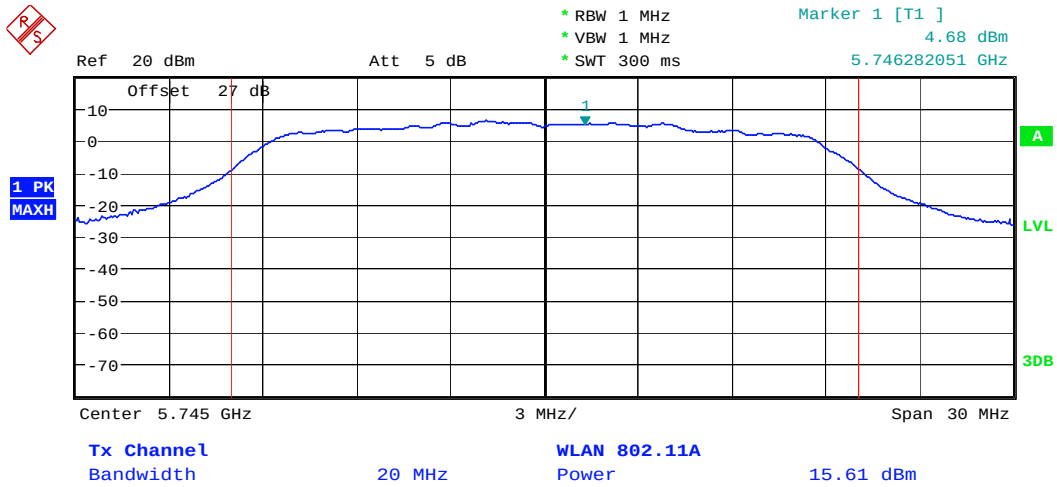
Date: 4.MAR.2011 02:12:16

Max. Power Channel 157 @ 6.5 Mbps



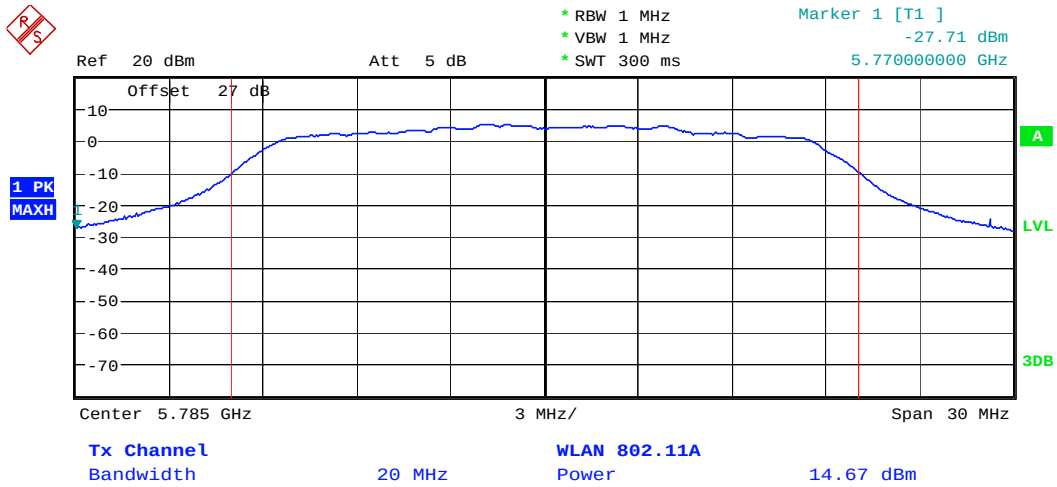
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Max. Power Channel 161 @ 6.5 Mbps
802.11 n @ 57.8 Mbps



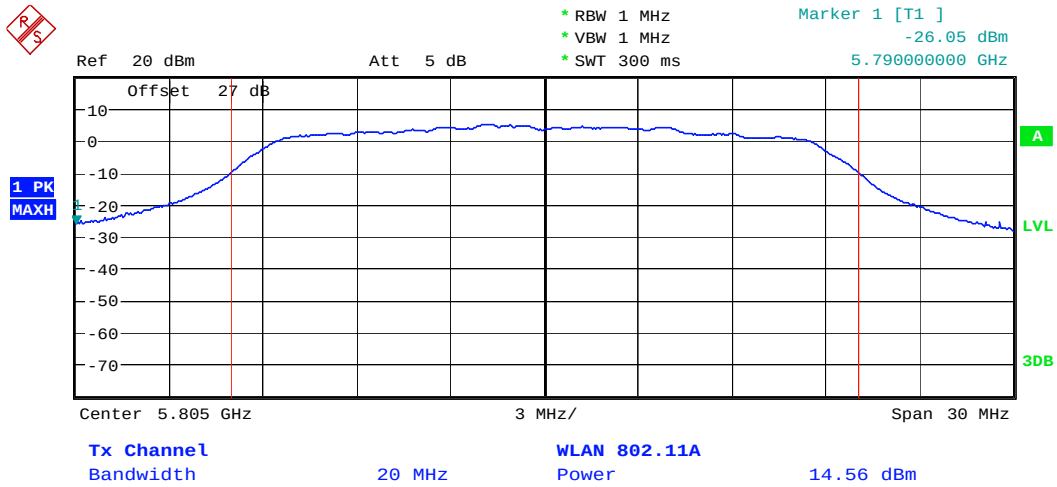
Date: 4.MAR.2011 01:47:11

Max. Power Channel 149 @ 57.8 Mbps



Date: 4.MAR.2011 01:52:48

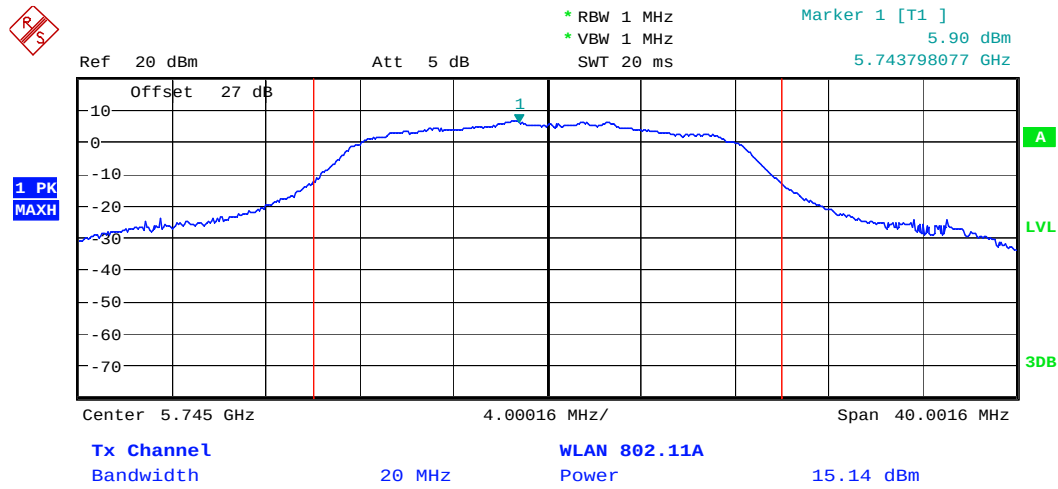
Max. Power Channel 157 @ 57.8 Mbps



Date: 4.MAR.2011 02:04:59

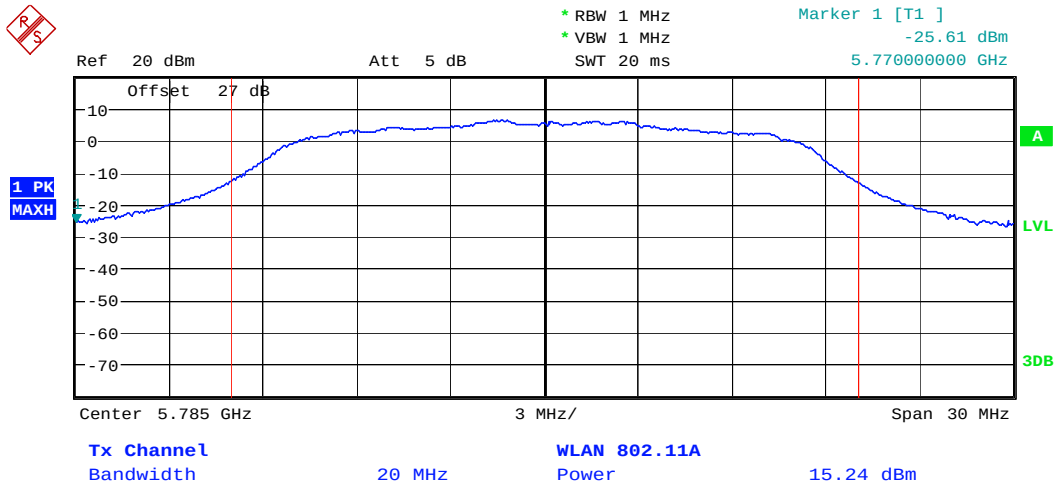
Max. Power Channel 161 @ 57.8 Mbps

802.11 a @ 12 Mbps



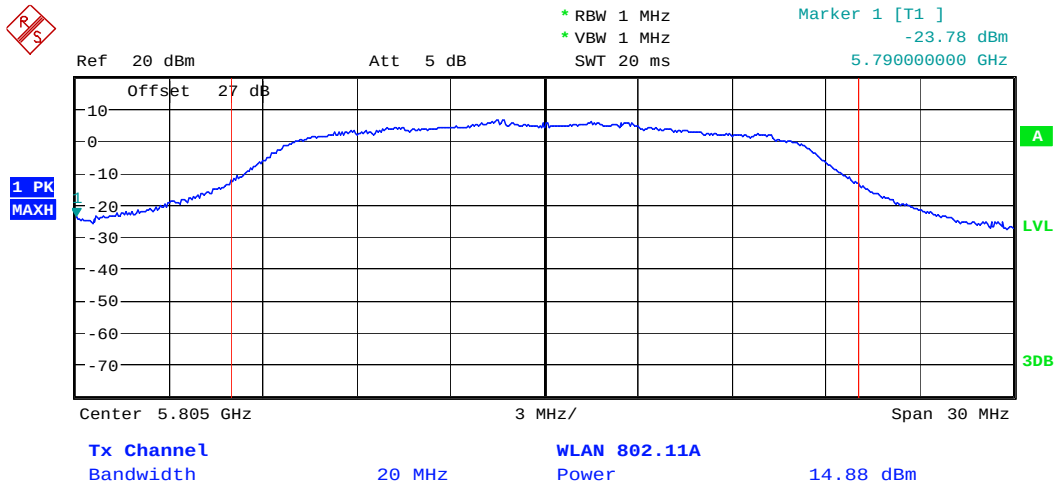
Date: 1.MAR.2011 03:29:16

Max. Power Channel 149 @ 12 Mbps



Date: 1.MAR.2011 03:34:04

Max. Power Channel 157 @ 12 Mbps



Date: 1.MAR.2011 03:35:59

Max. Power Channel 161 @ 12 Mbps

Power Spectral Density

CFR 47 Part 15.247

Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 20db passive attenuator. A fully charged battery was used for the supply voltage.

The WLAN DSSS function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = 300 kHz
2. VBW = 30 kHz
3. RBW = 3 kHz
4. Sweep = 50 ms
5. Detector function = peak
6. Trace = max hold

The trace was allowed to stabilize. The EUT was transmitting at its maximum data rate.

Measurement Results

5745 MHz	5785 MHz	5805 MHz
1.42	0.03	-0.25

802.11 n @ 6.5 Mbps

5745 MHz	5785 MHz	5805 MHz
0.01	0.39	0.23

802.11 n @ 57.8 Mbps

5745 MHz	5785 MHz	5805 MHz
1.65	1.77	1.89

802.11 a @ 12 Mbps

SPURIOUS RF CONDUCTED EMISSIONS

CFR 47 Part 15.247

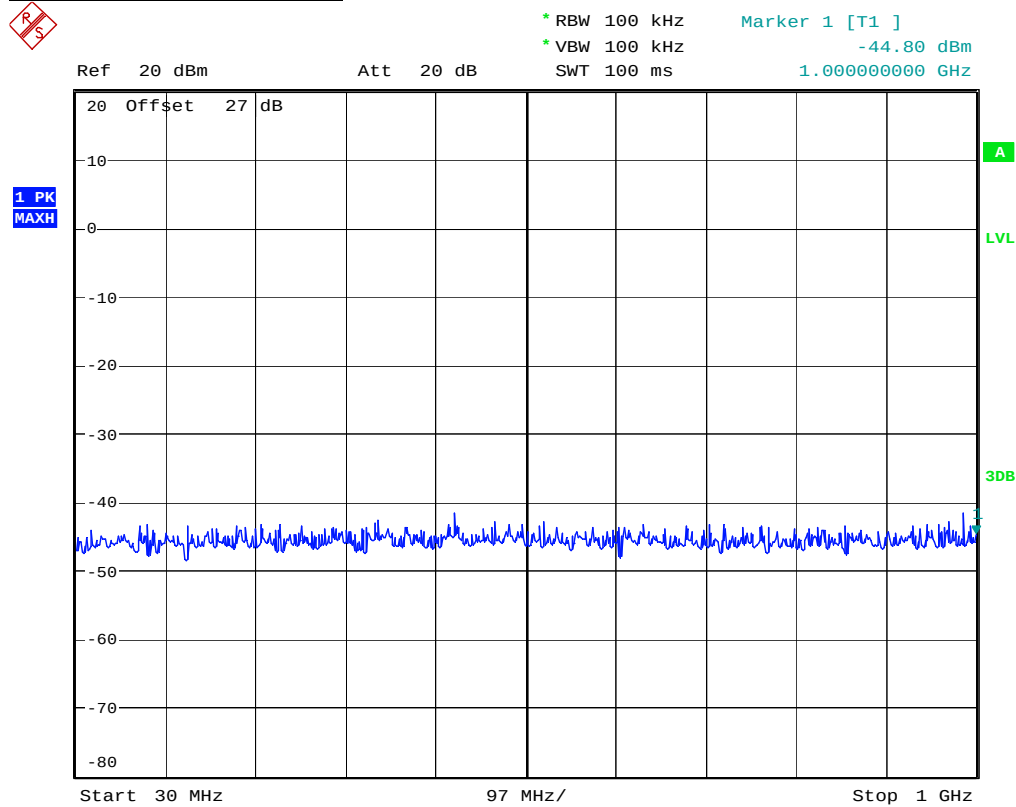
Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 20db passive attenuator. A fully charged battery was used for the supply voltage.

Measurement Results

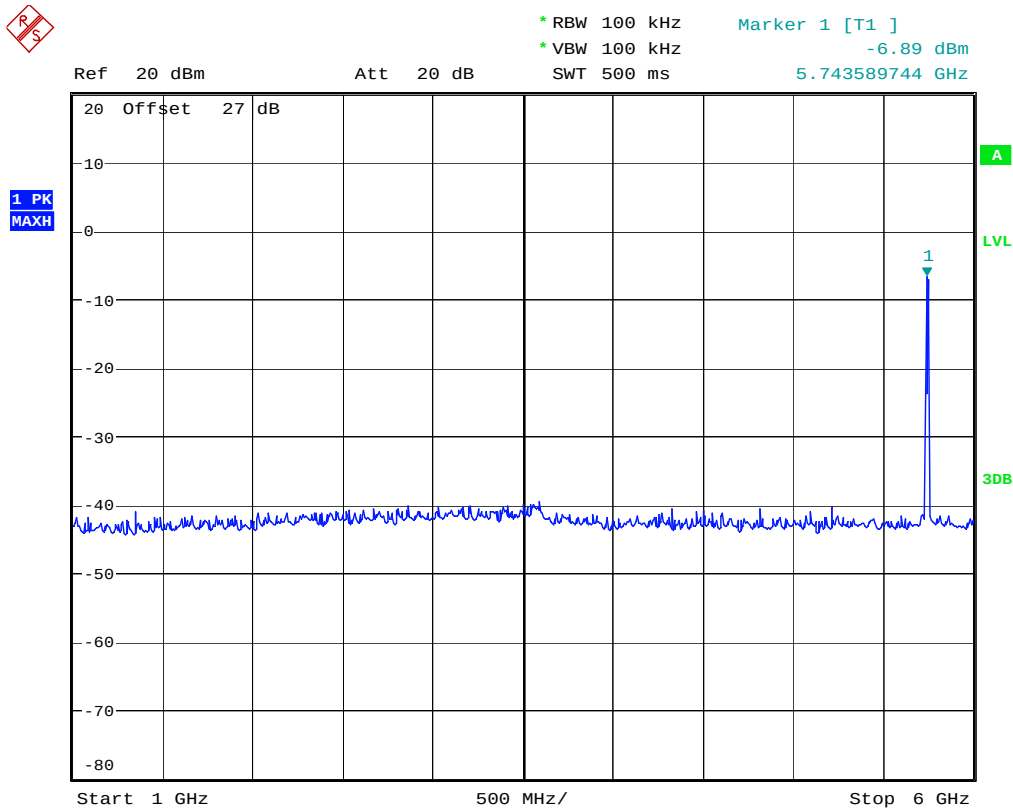
See attached

802.11 n @ 6.5 Mbps



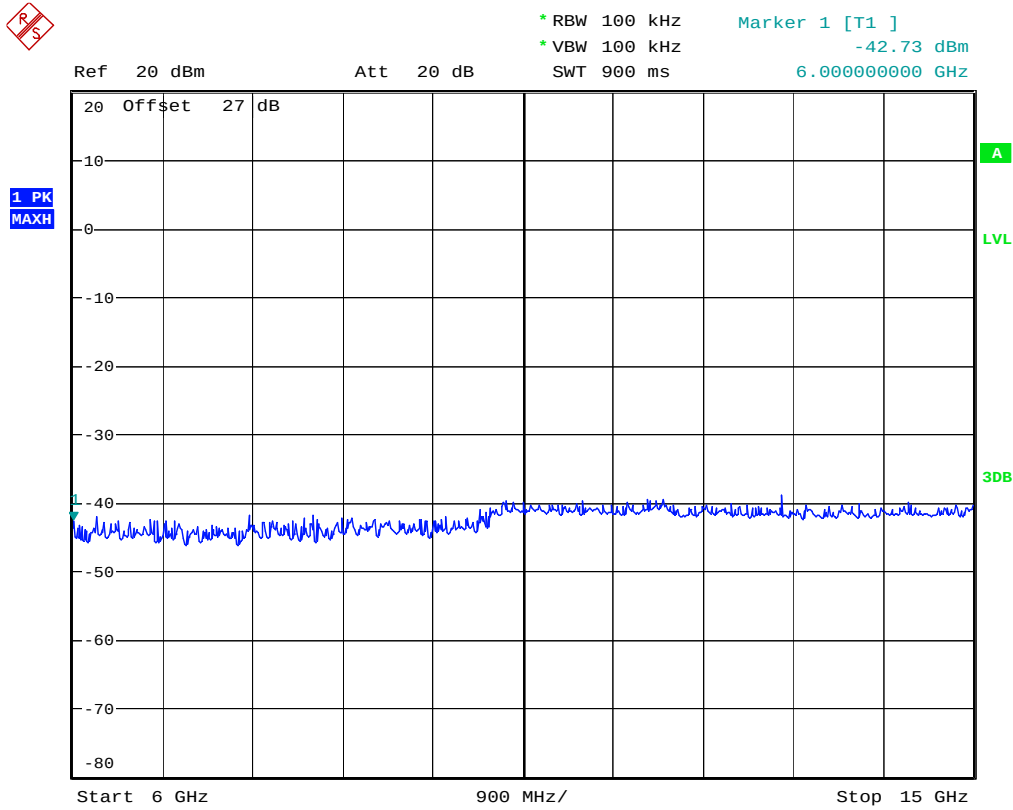
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Conducted Spurious Emissions 30-1000MHz (Ch 149)



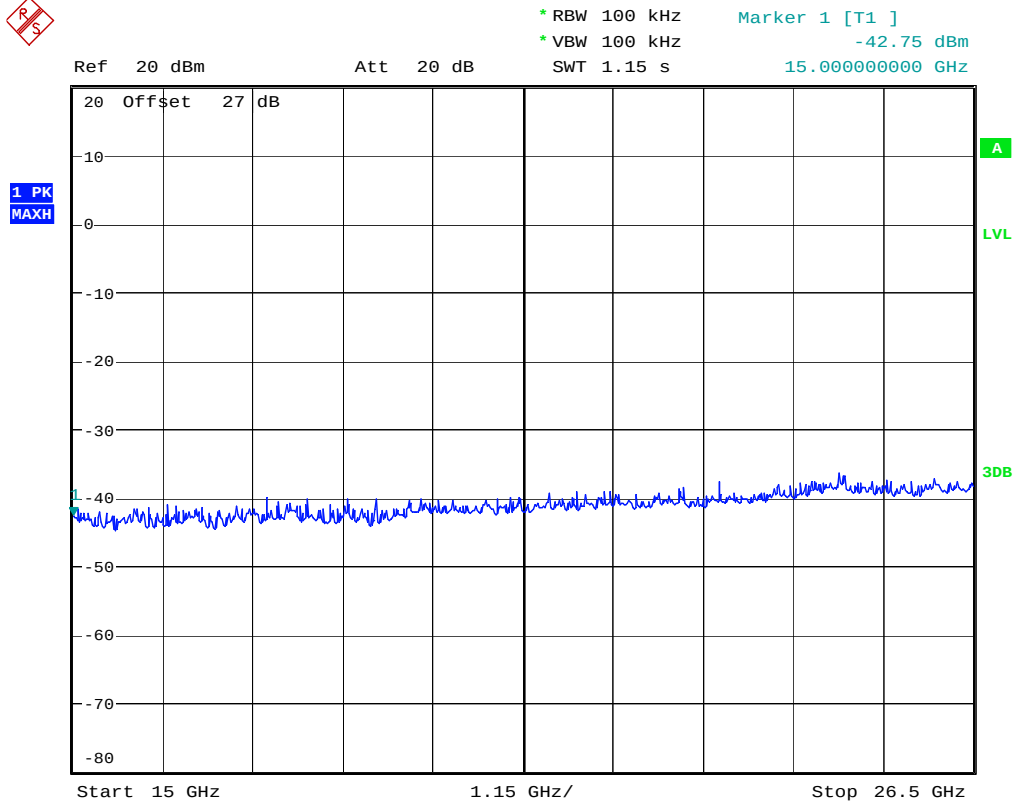
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Conducted Spurious Emissions 1-6GHz (Ch 149)



Date: 4.MAR.2011 03:00:14

Conducted Spurious Emissions 6-15GHz (Ch 149)



Date: 4.MAR.2011 03:00:40

Conducted Spurious Emissions 15-26.5GHz (Ch 149)

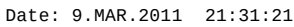
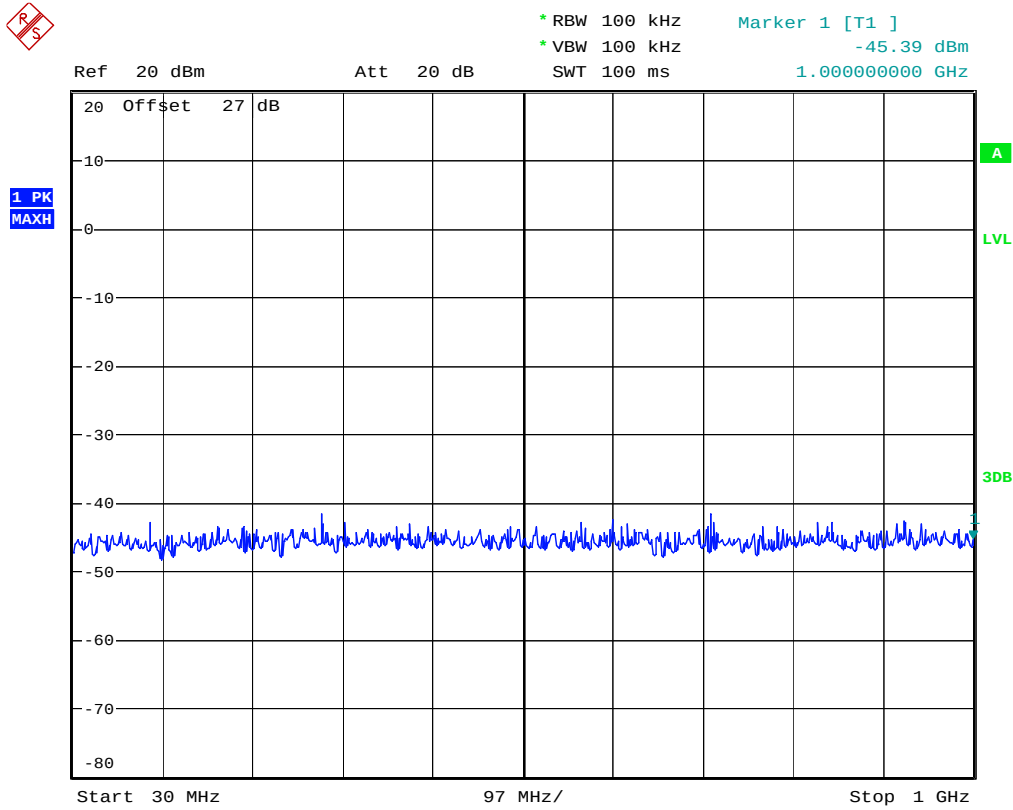
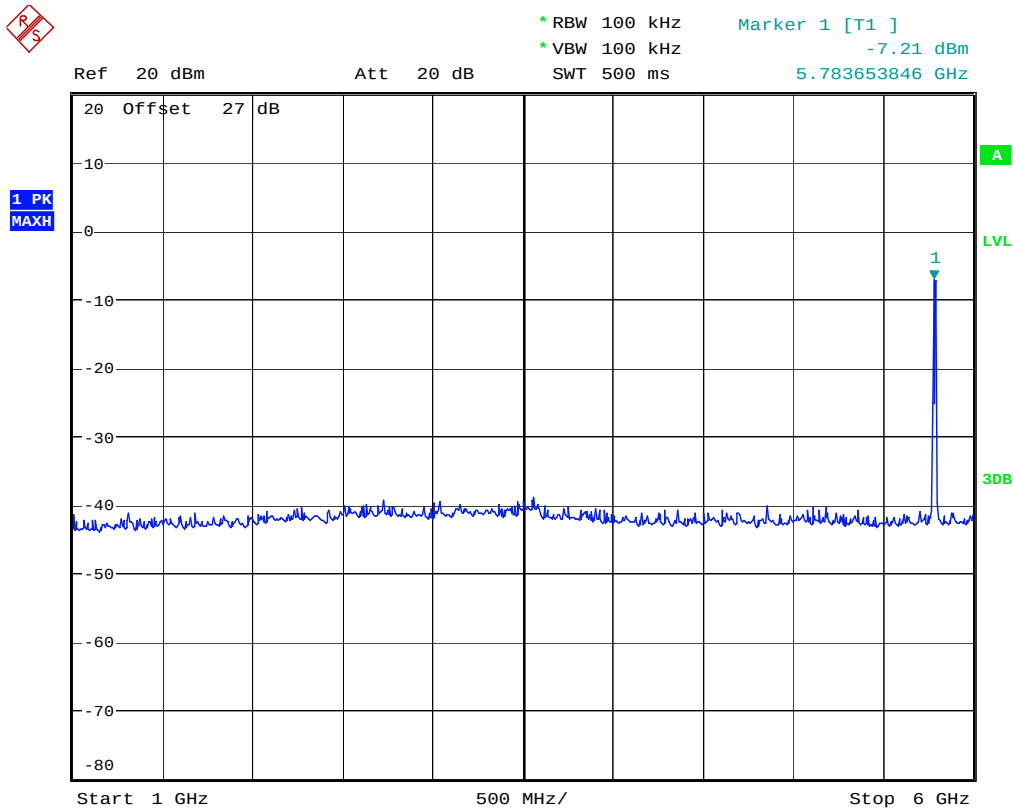


EXHIBIT 6A6



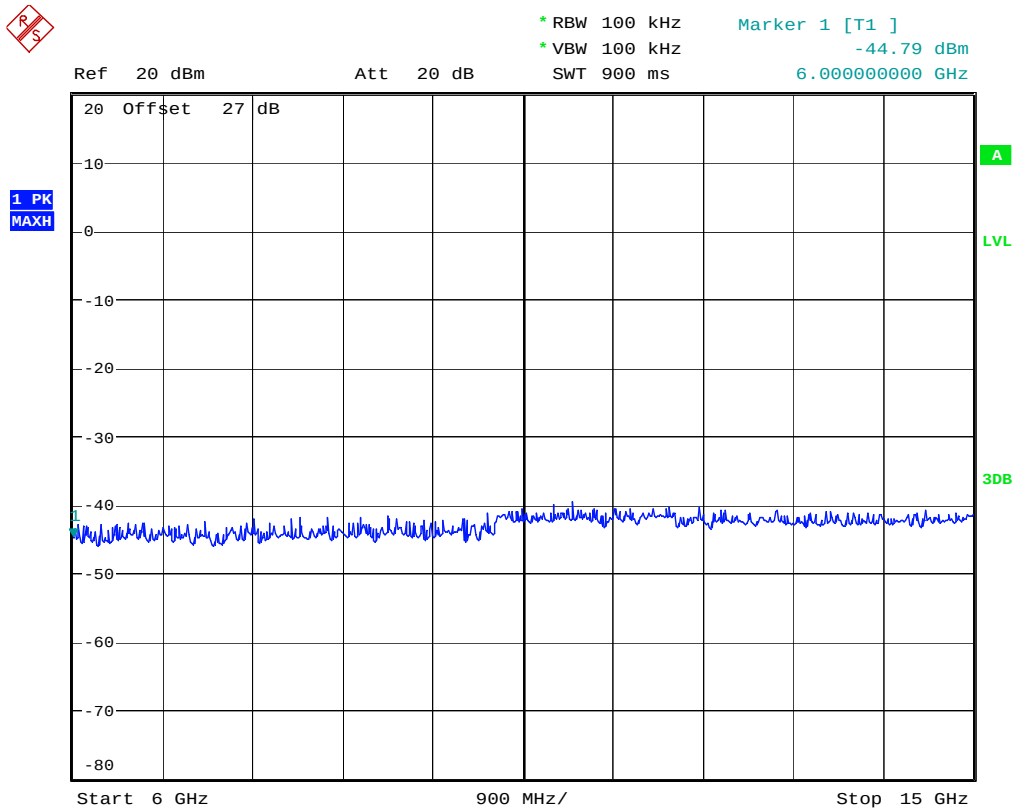
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Conducted Spurious Emissions 30-1000MHz (Ch 157)



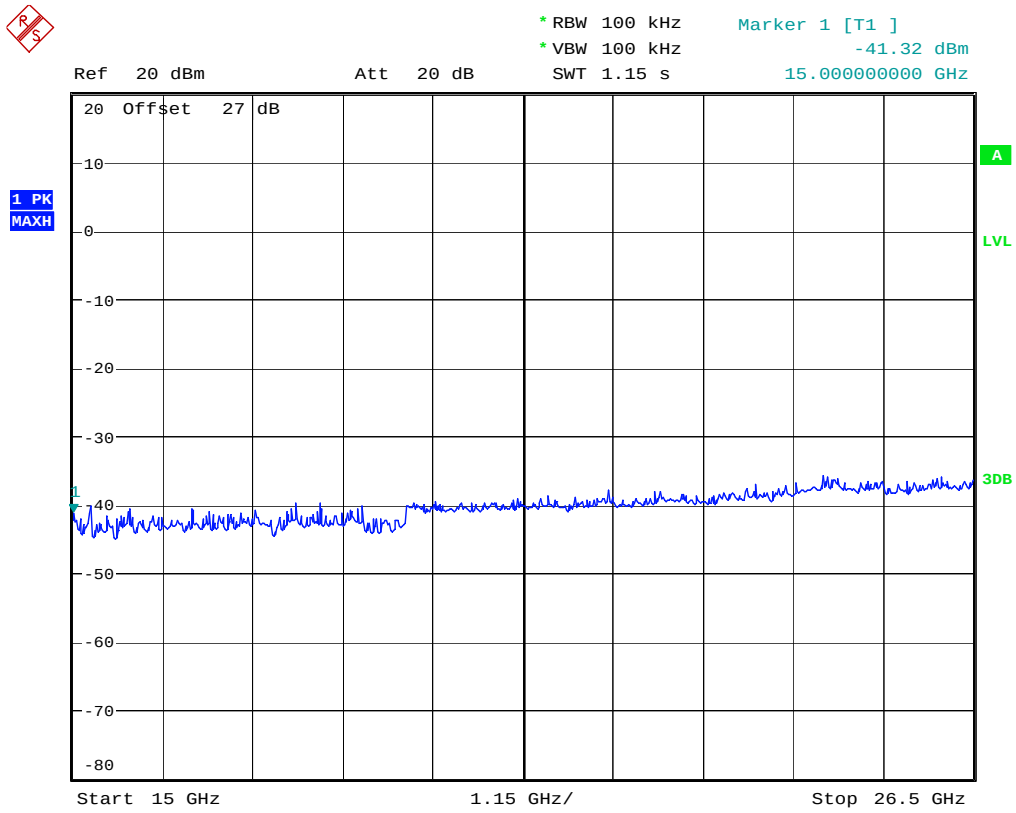
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Conducted Spurious Emissions 1-6GHz (Ch 157)



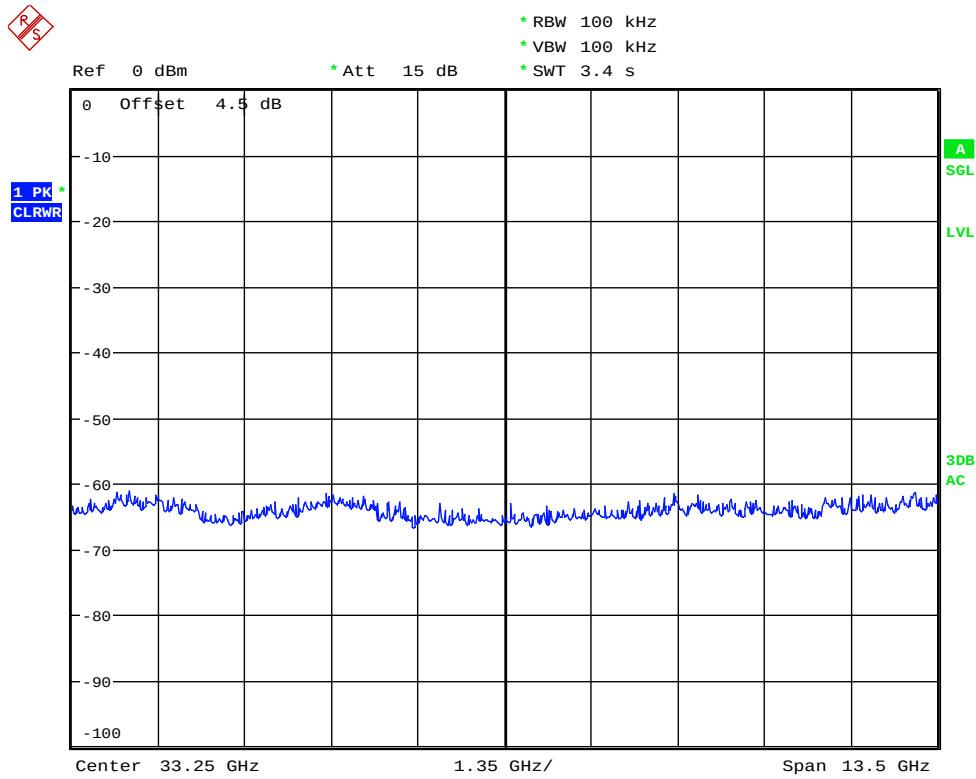
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Conducted Spurious Emissions 6-15GHz (Ch 157)



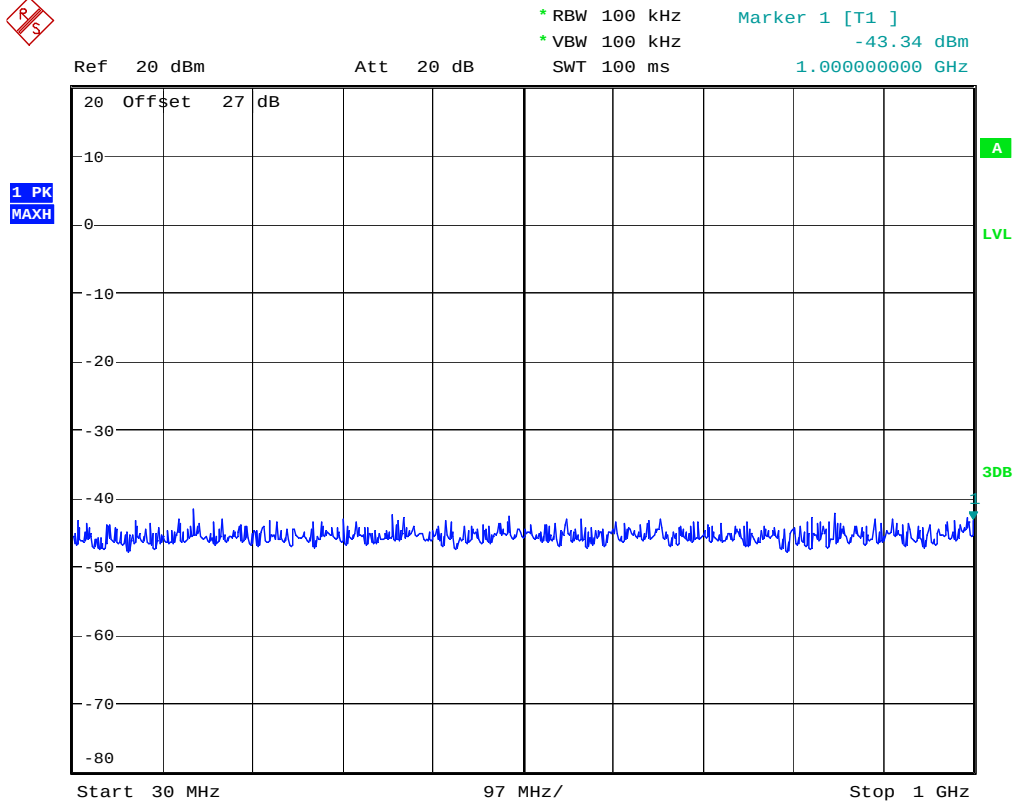
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Conducted Spurious Emissions 15-26.5GHz (Ch 157)



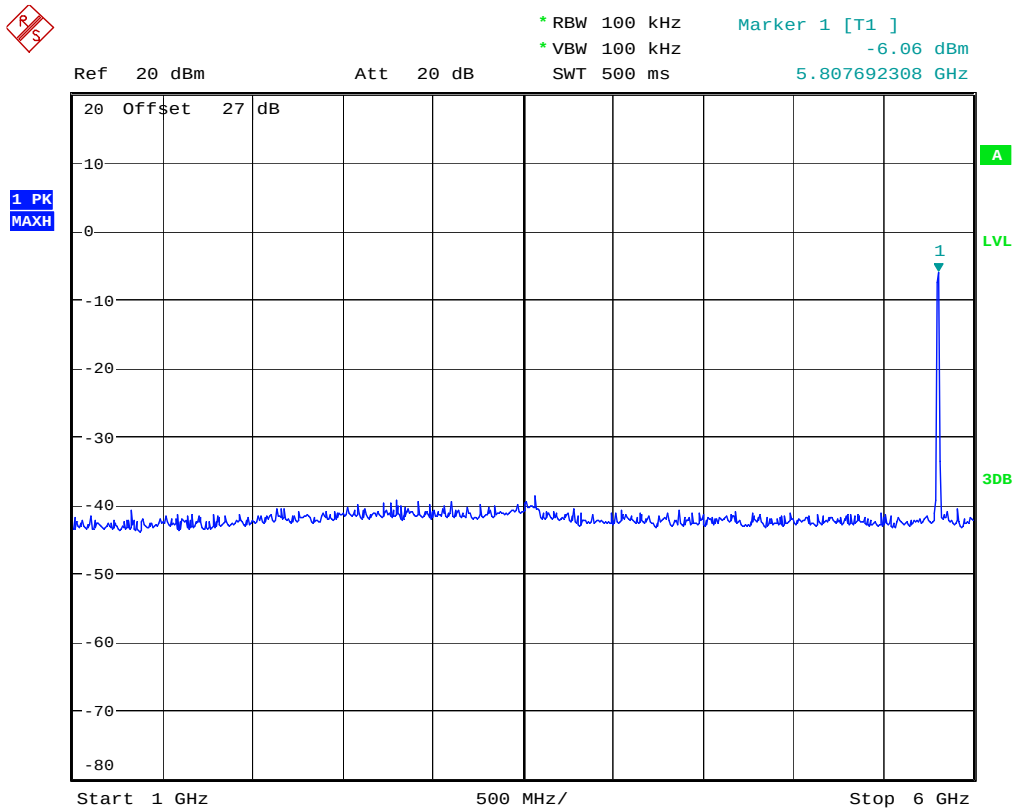
Date: 9.MAR.2011 21:33:35

Conducted Spurious Emissions 26.5-40GHz (Ch 157)



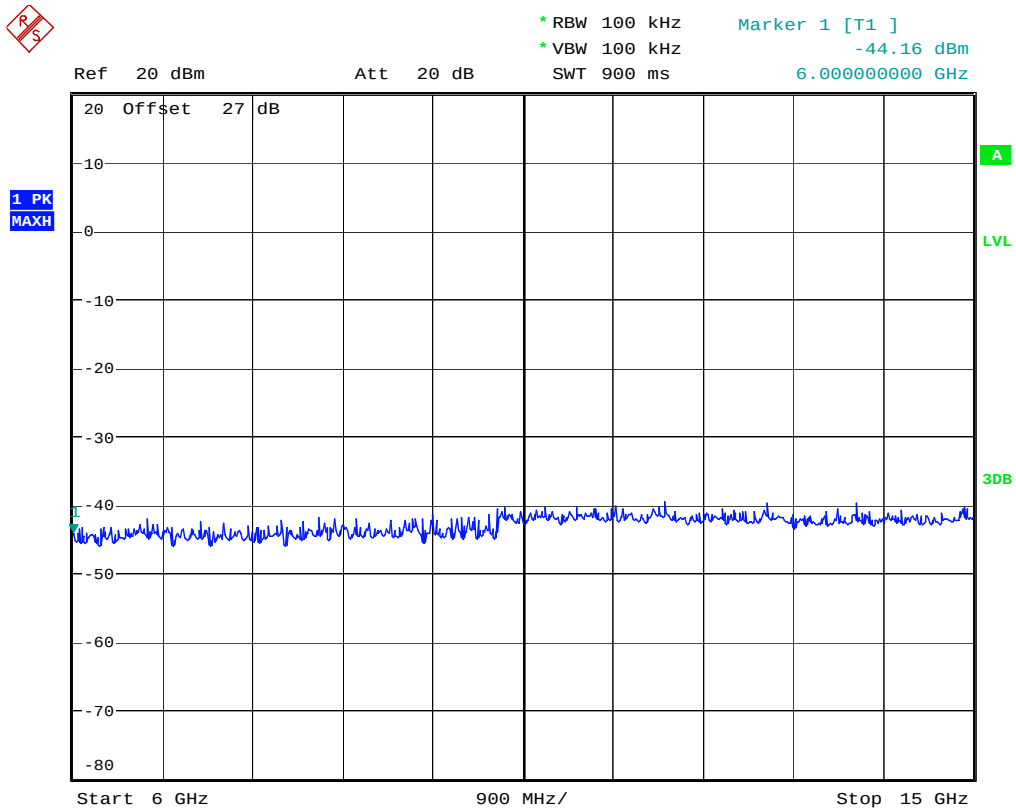
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Conducted Spurious Emissions 30-1000MHz (Ch 161)



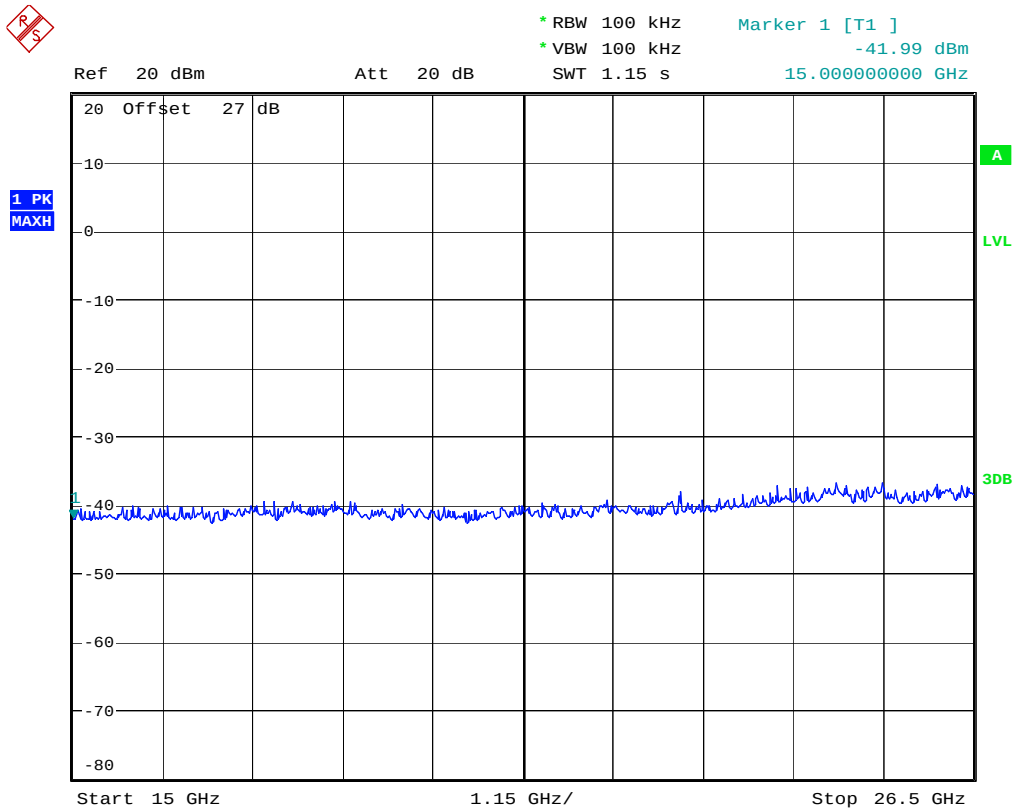
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Conducted Spurious Emissions 1-6 GHz (Ch 161)



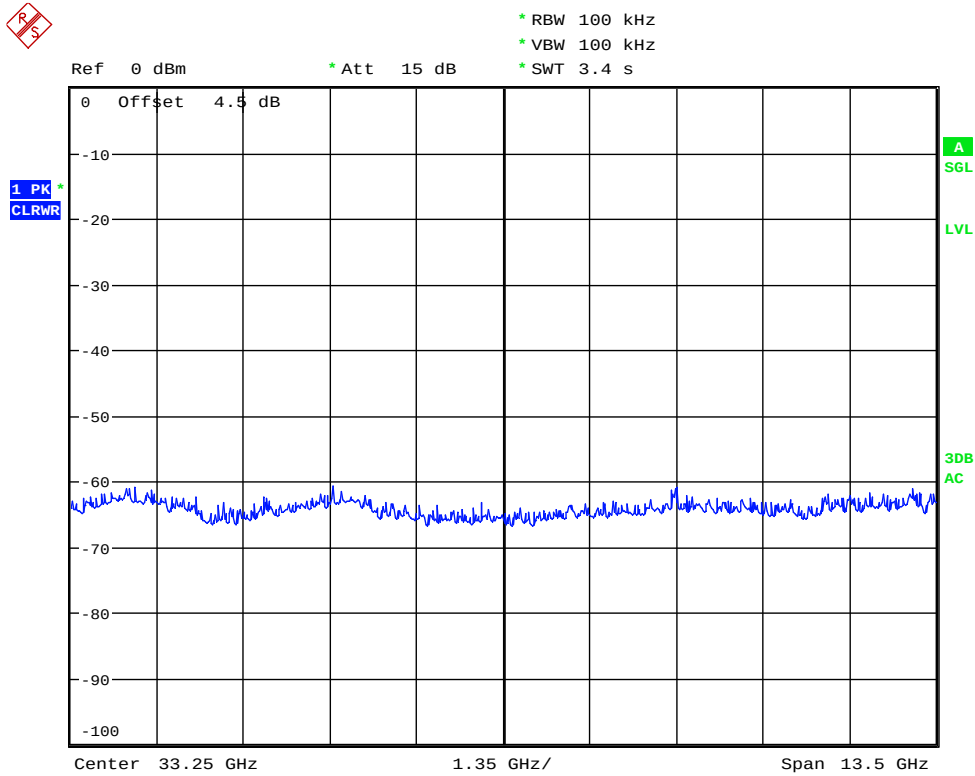
Date: 4.MAR.2011 03:08:43

Conducted Spurious Emissions 6-15GHz (Ch 161)



Date: 4.MAR.2011 03:09:31

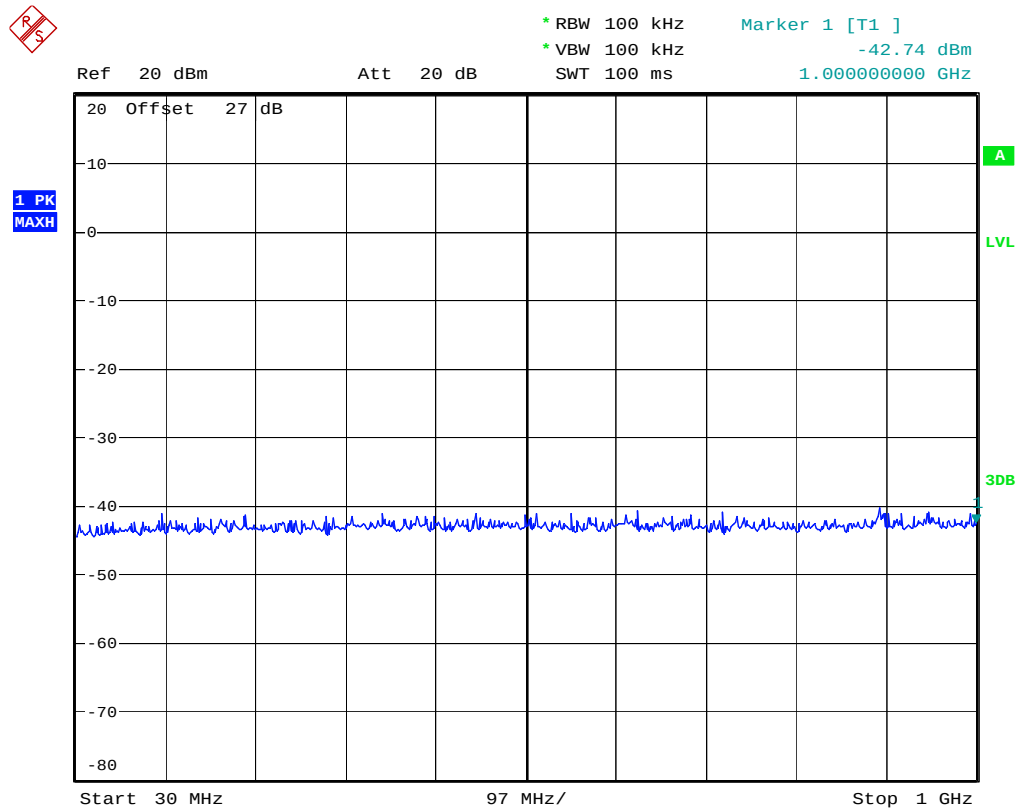
Conducted Spurious Emissions 15-26.5GHz (Ch 161)



Date: 9.MAR.2011 21:36:11

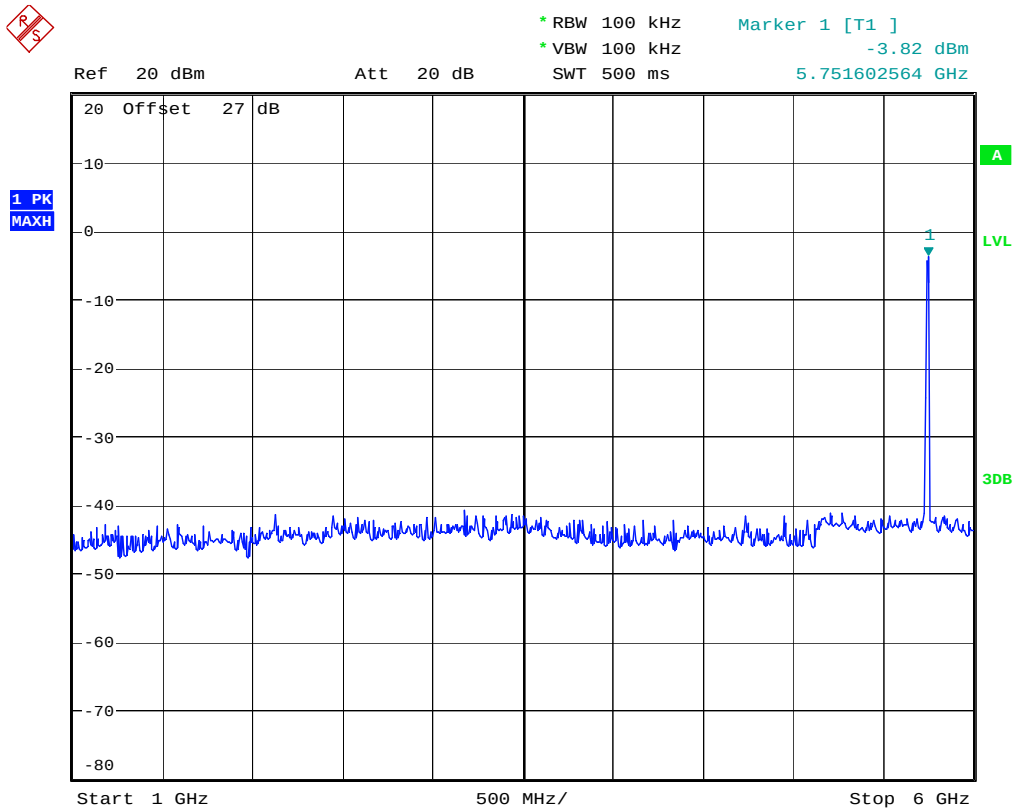
Conducted Spurious Emissions 26.5-40GHz (Ch 161)

802.11 n @ 57.8 Mbps



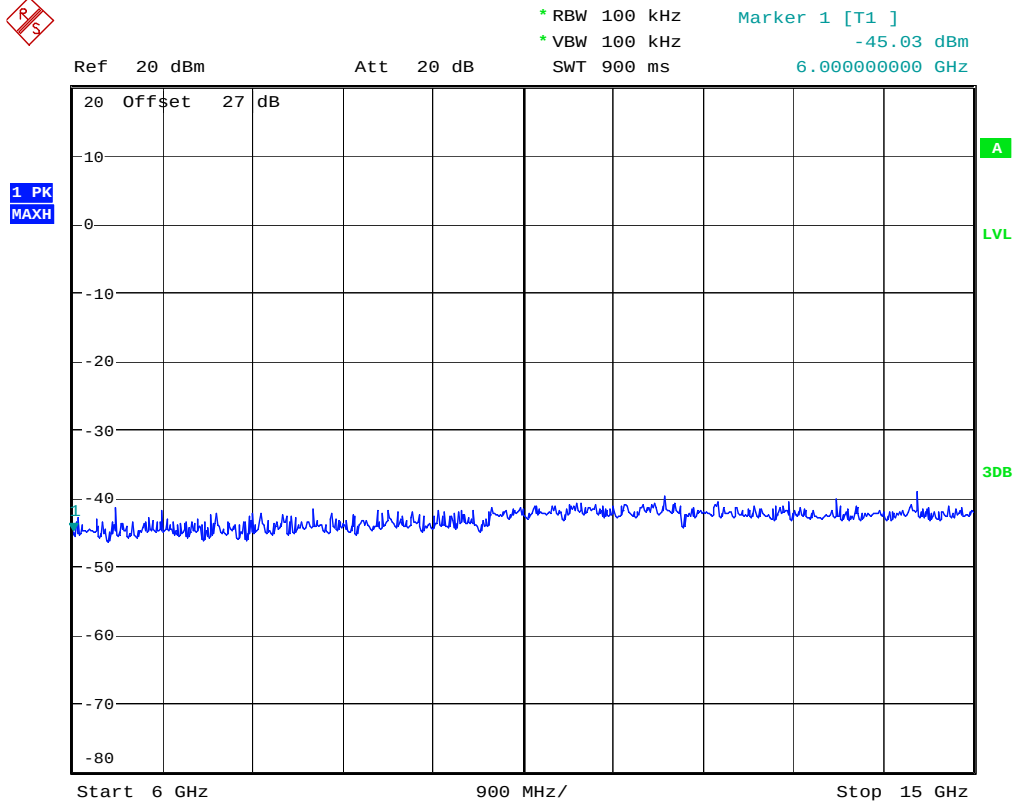
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Conducted Spurious Emissions 30-1000MHz (Ch 149)



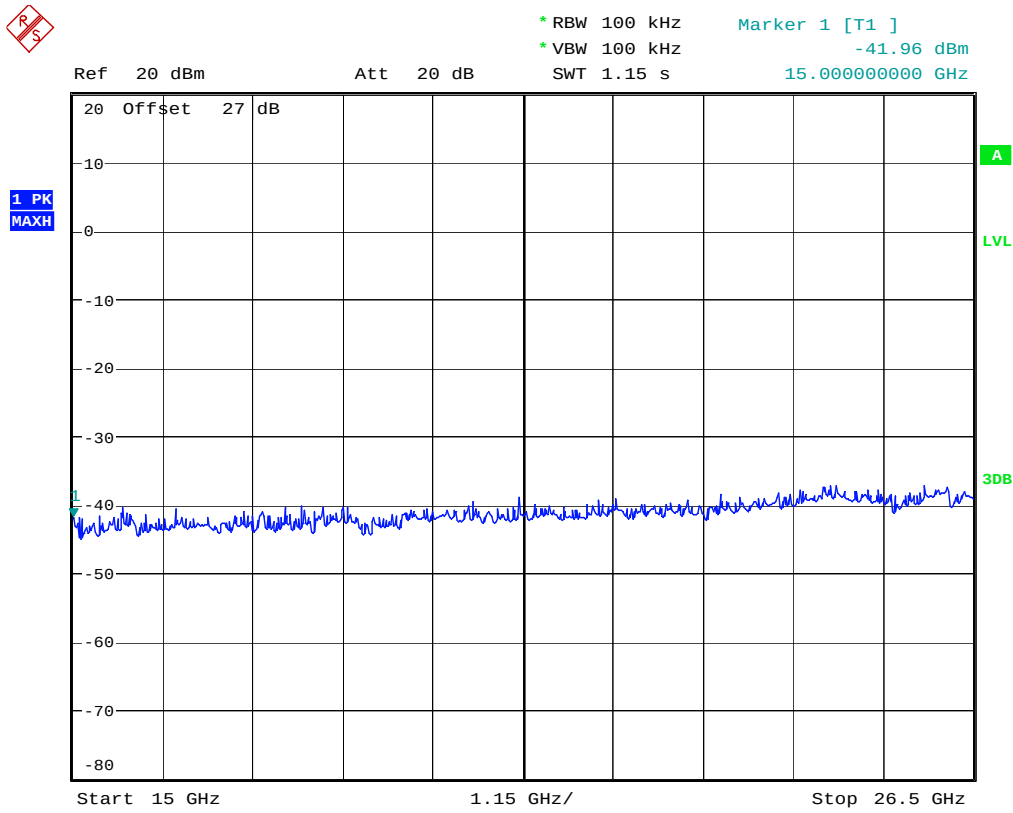
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Conducted Spurious Emissions 1-6 GHz (Ch 149)



Date: 4.MAR.2011 02:51:54

Conducted Spurious Emissions 6-15GHz (Ch 149)



Date: 4.MAR.2011 02:52:17

Conducted Spurious Emissions 15-26.5GHz (Ch 149)

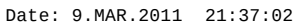
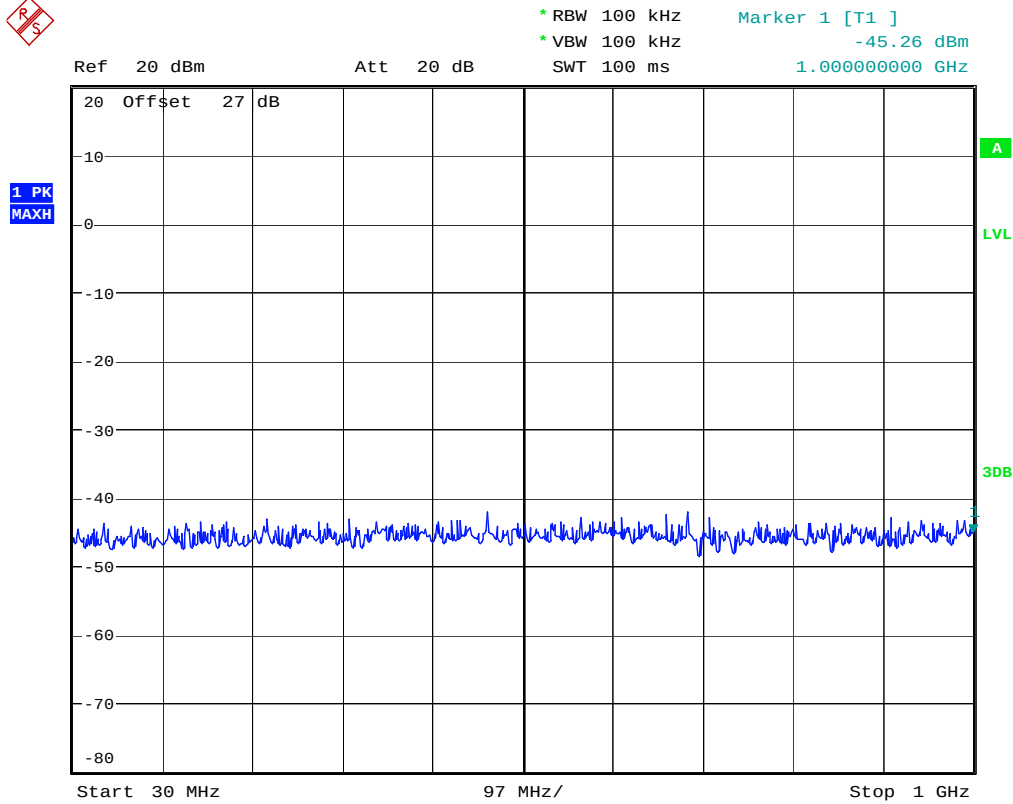
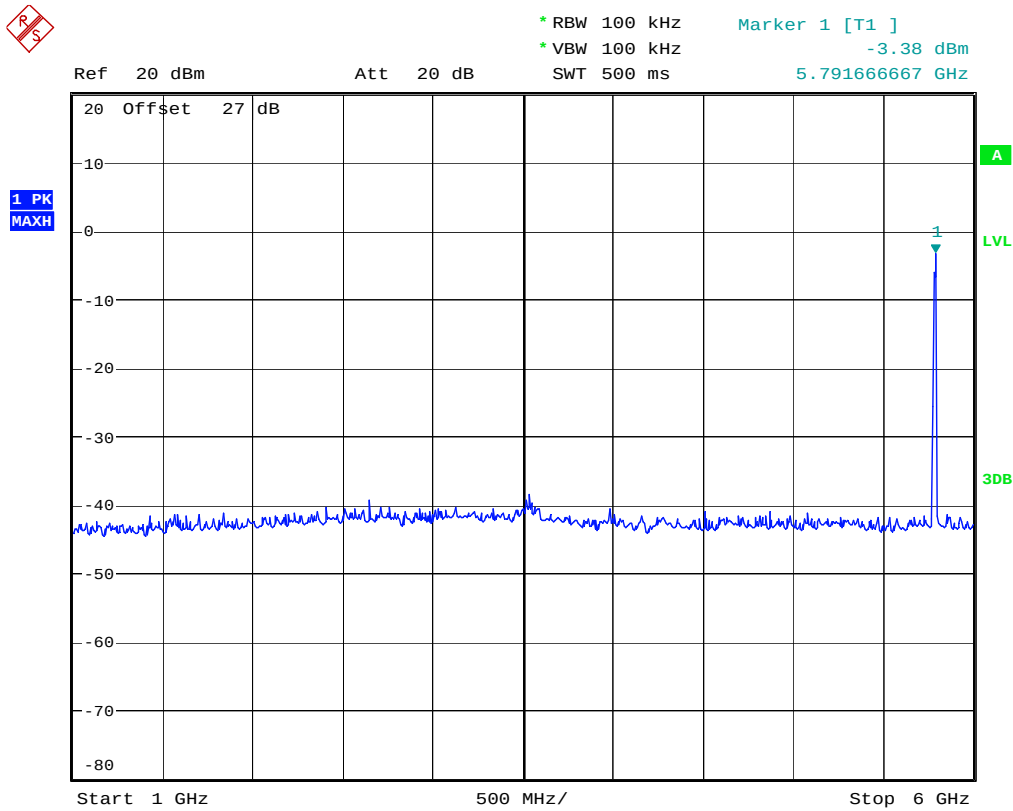


EXHIBIT 6A6



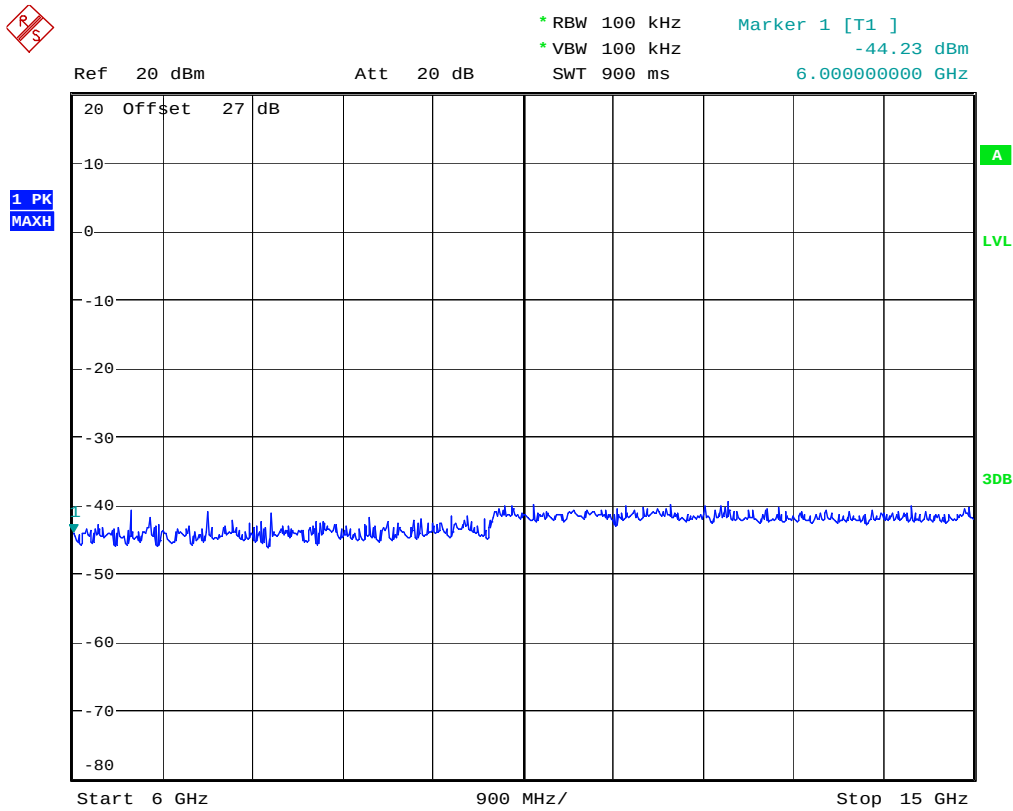
Date: 4.MAR.2011 02:53:02

Conducted Spurious Emissions 30-1000MHz (Ch 157)



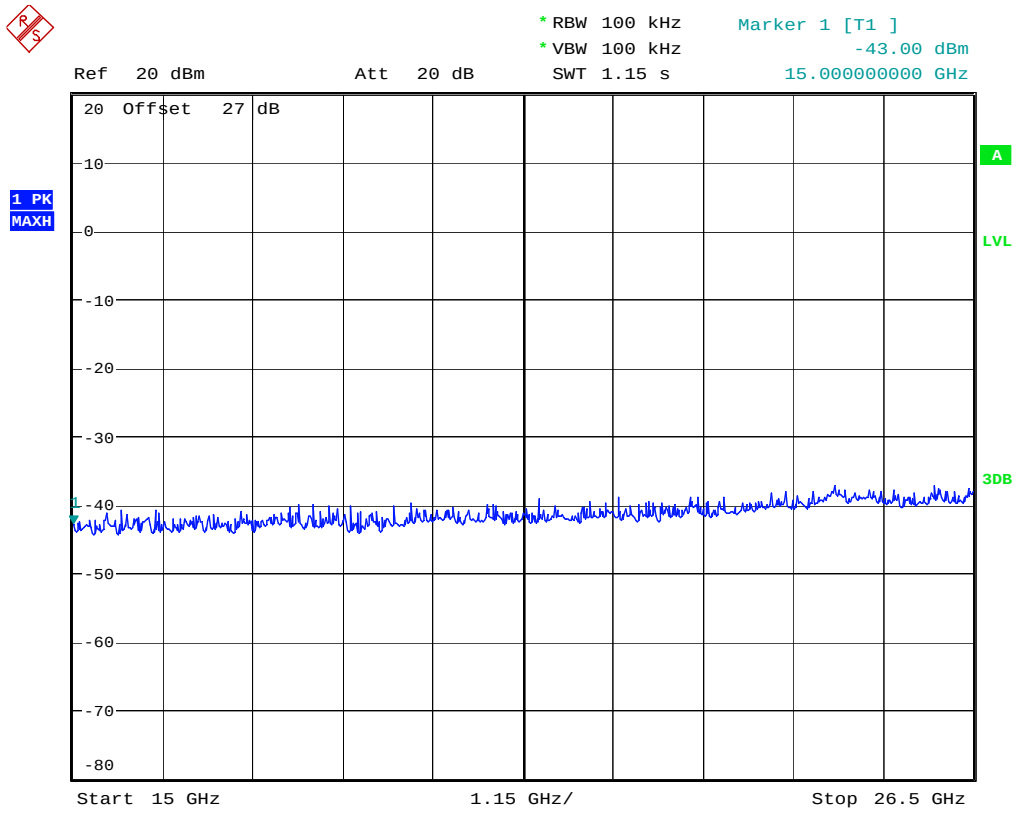
Date: 4.MAR.2011 02:53:45

Conducted Spurious Emissions 1-6GHz (Ch 157)



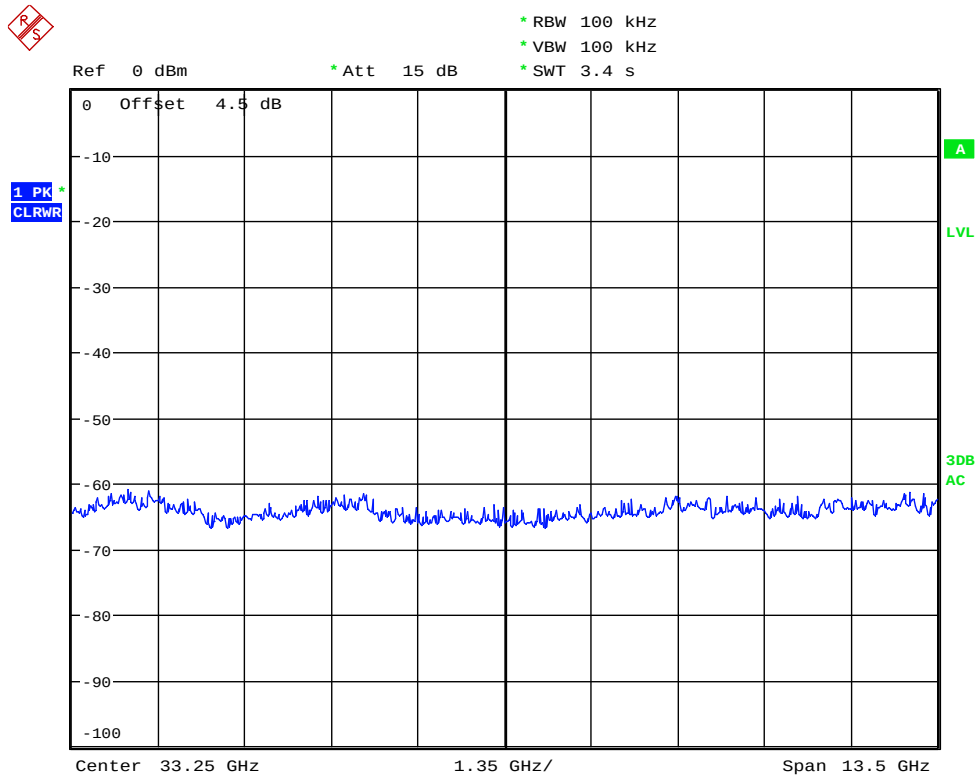
Date: 4.MAR.2011 02:54:26

Conducted Spurious Emissions 6-15GHz (Ch 157)



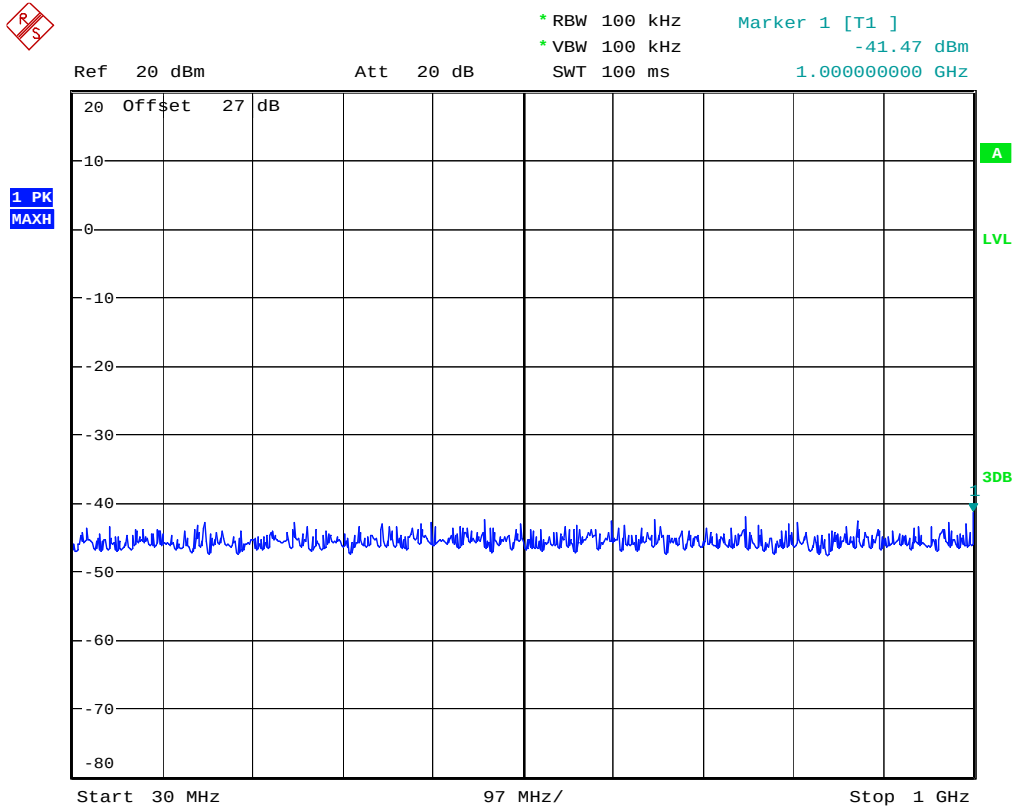
Date: 4.MAR.2011 02:54:45

Conducted Spurious Emissions 15-26.5GHz (Ch 157)



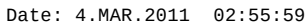
Date: 9.MAR.2011 21:37:35

Conducted Spurious Emissions 26.5-40GHz (Ch 157)

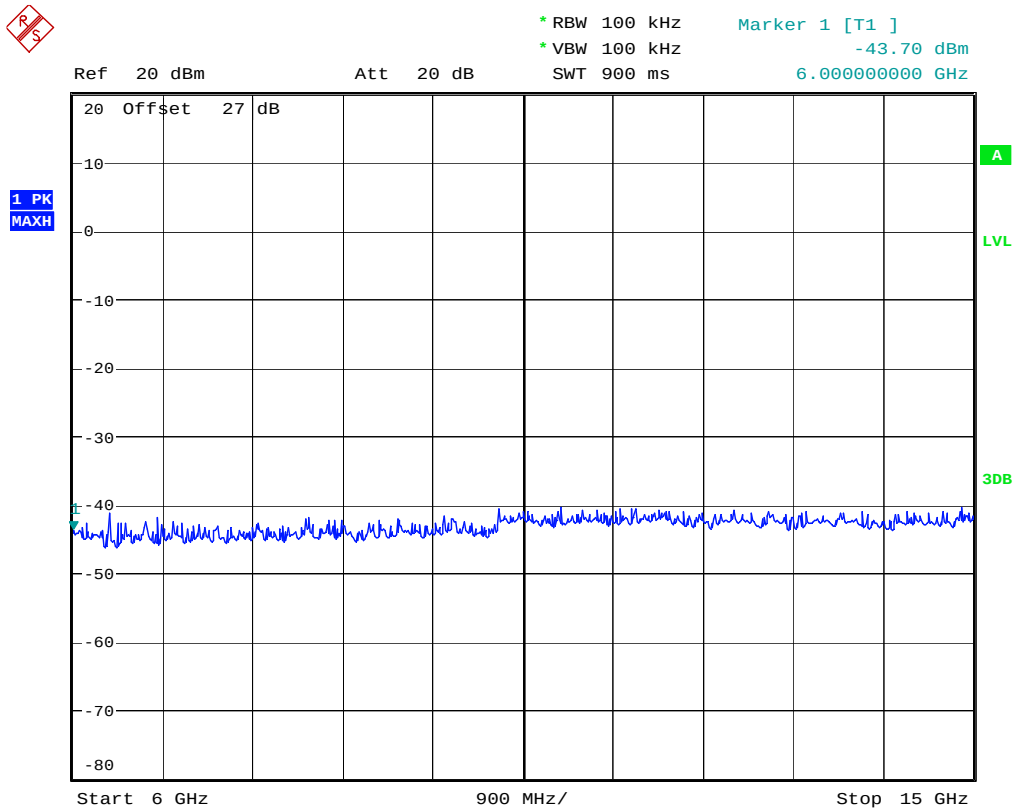


Date: 4.MAR.2011 02:55:34

Conducted Spurious Emissions 30-1000MHz (Ch 161)

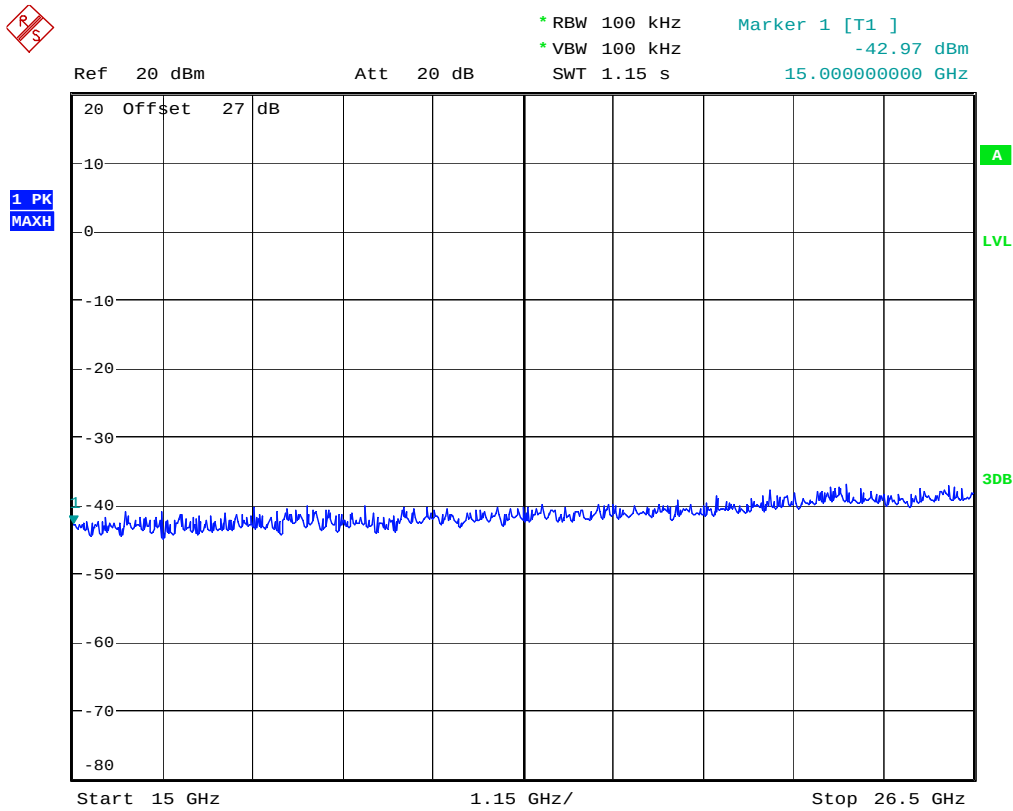


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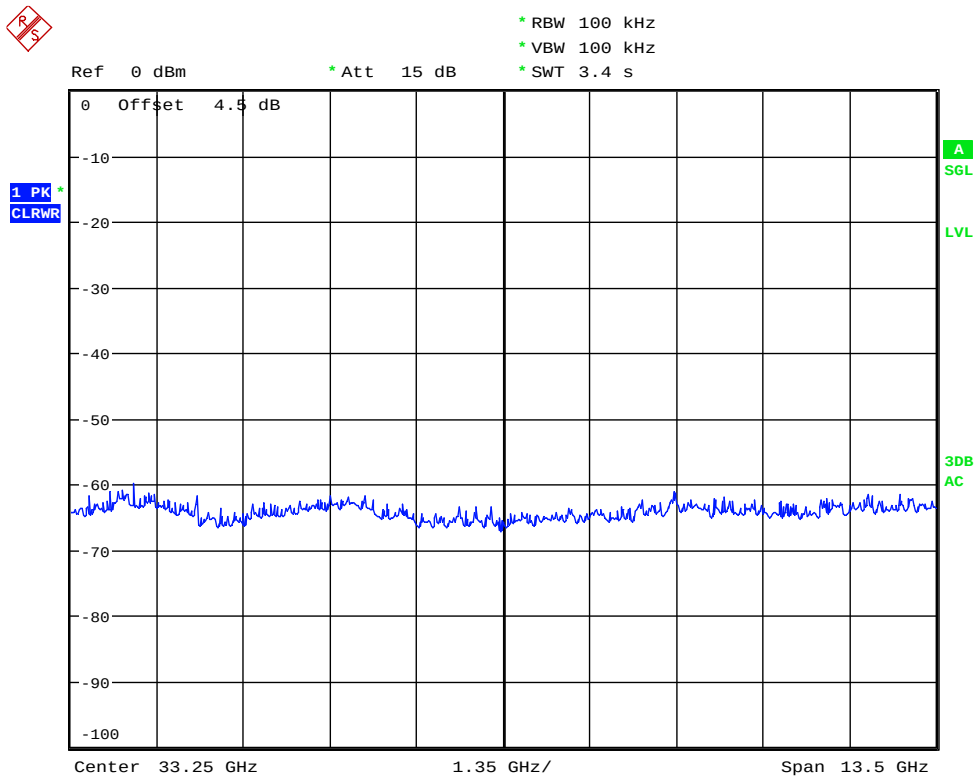
Date: 4.MAR.2011 02:56:24

Conducted Spurious Emissions 6-15GHz (Ch 161)



Date: 4.MAR.2011 02:56:45

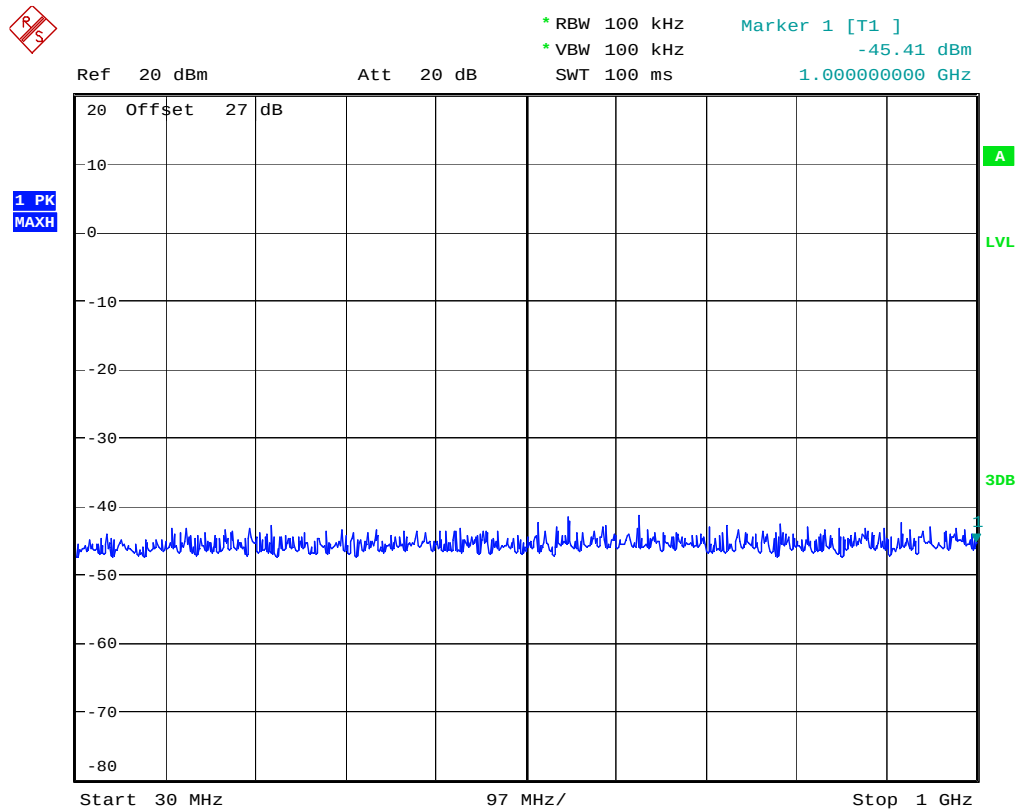
Conducted Spurious Emissions 15-26.5GHz (Ch 161)



Date: 9.MAR.2011 21:34:20

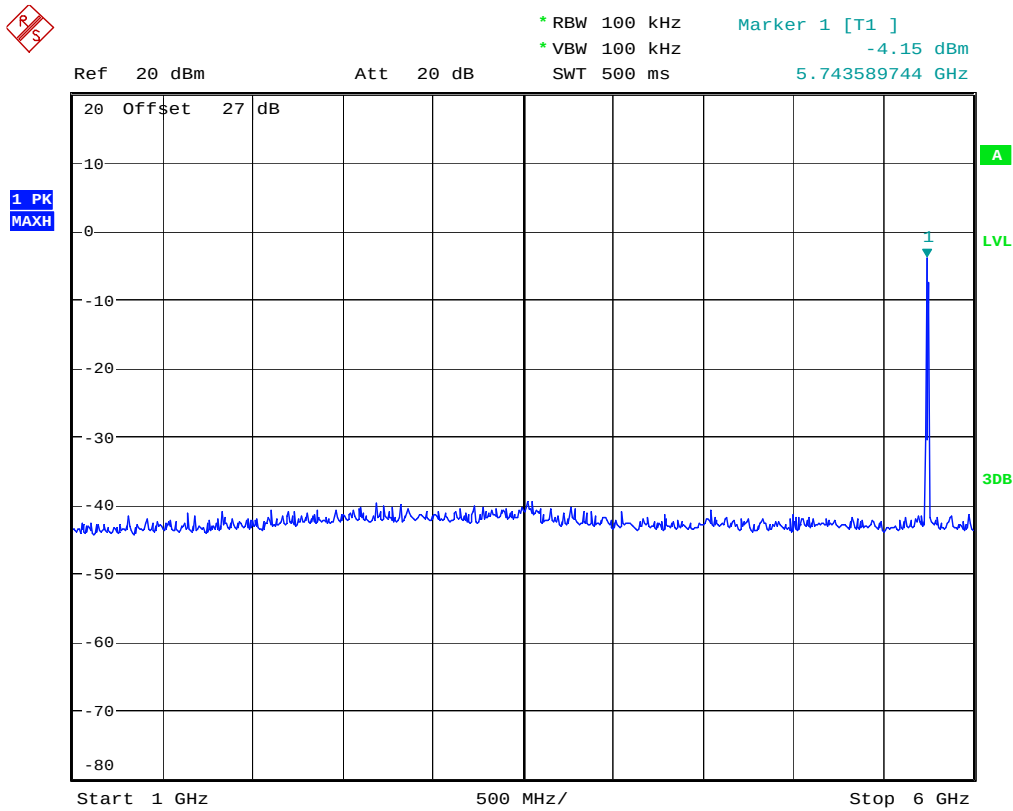
Conducted Spurious Emissions 26.5-40GHz (Ch 161)

802.11 a @ 12 Mbps



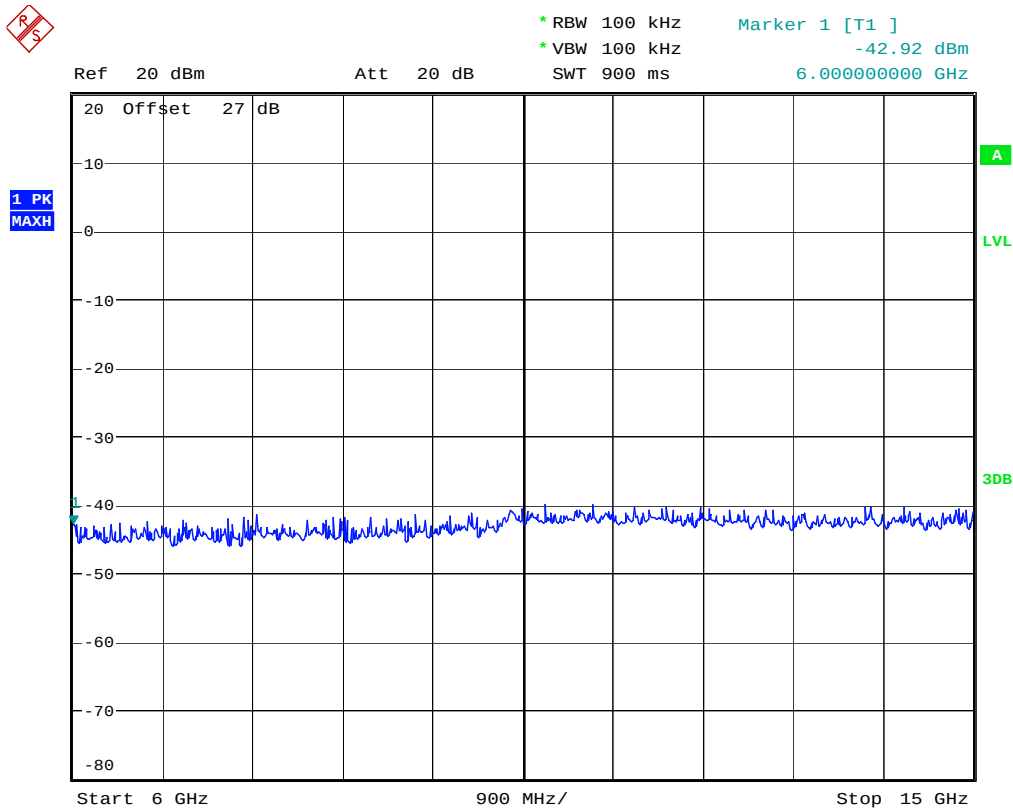
Date: 1.MAR.2011 03:44:15

Conducted Spurious Emissions 30-1000MHz (Ch 149)



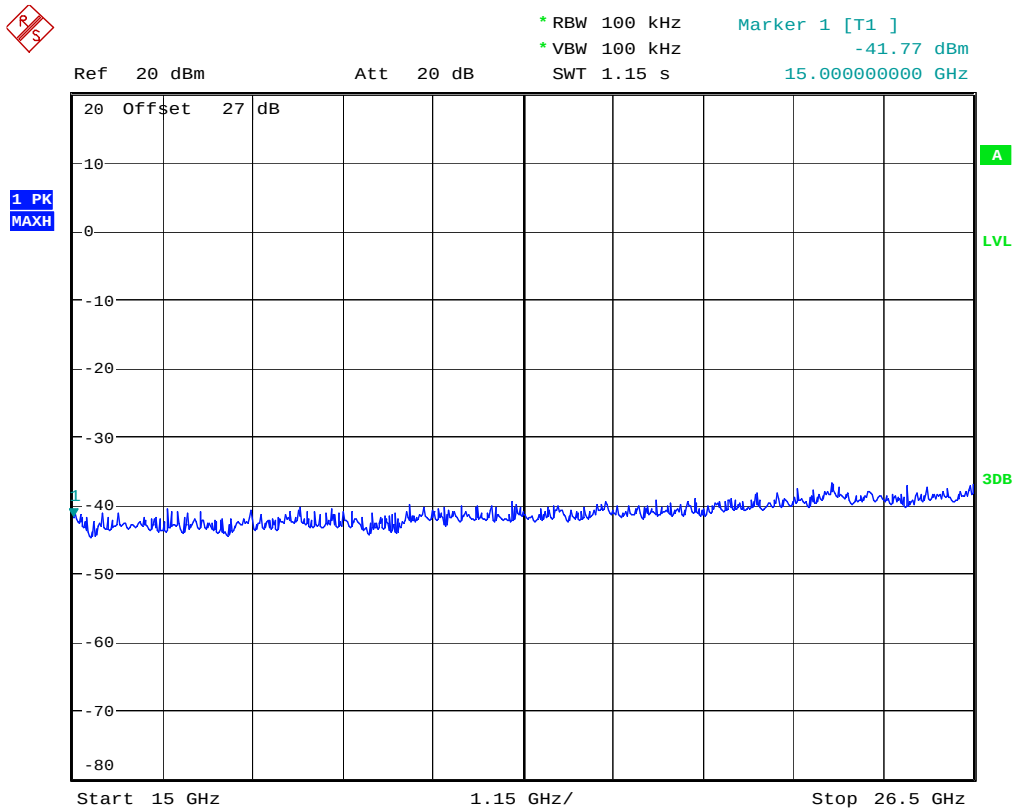
Date: 1.MAR.2011 04:17:40

Conducted Spurious Emissions 1-6 GHz (Ch 149)



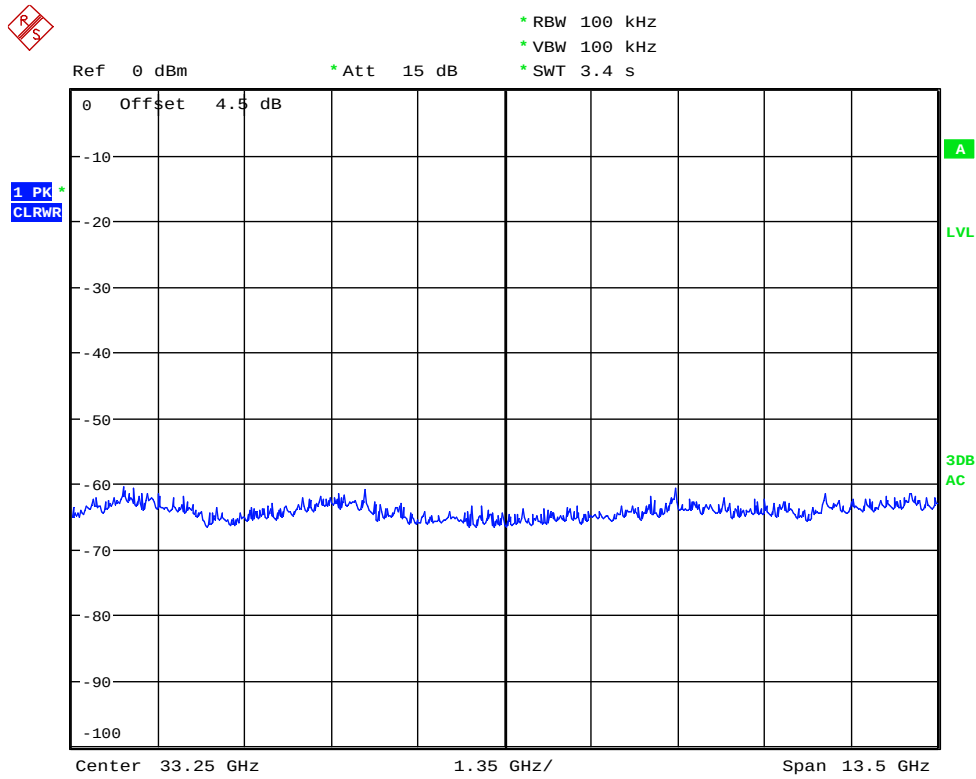
Date: 1.MAR.2011 04:18:03

Conducted Spurious Emissions 6-15GHz (Ch 149)



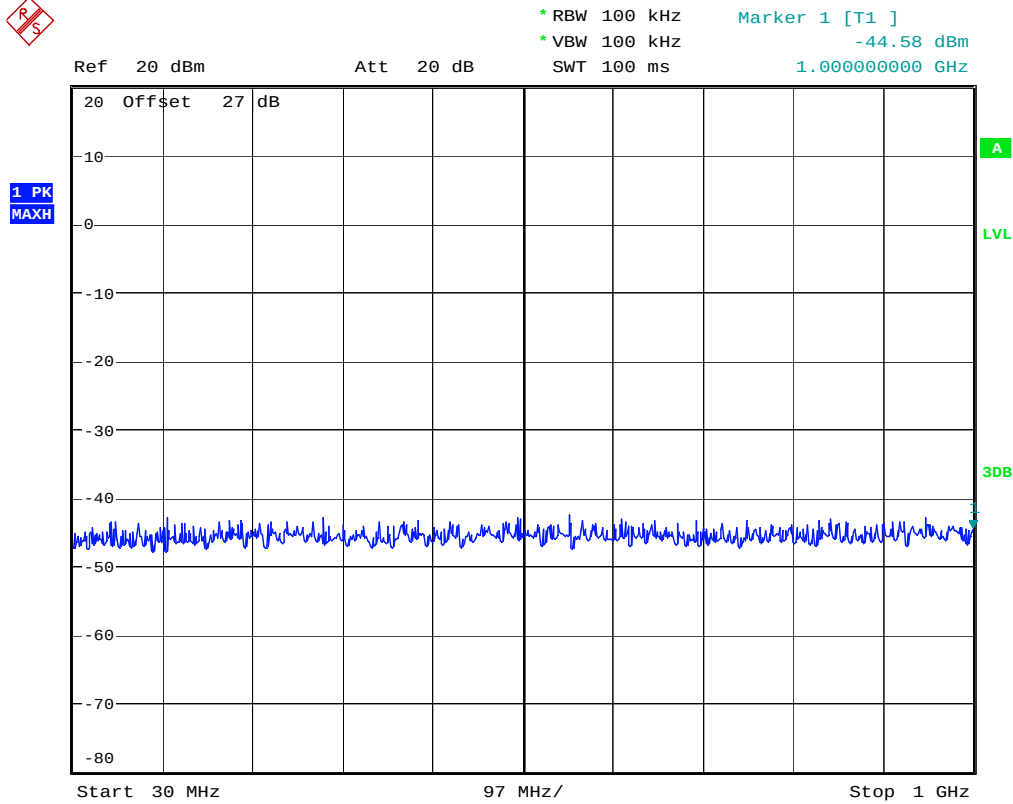
Date: 1.MAR.2011 04:18:24

Conducted Spurious Emissions 15-26.5GHz (Ch 149)



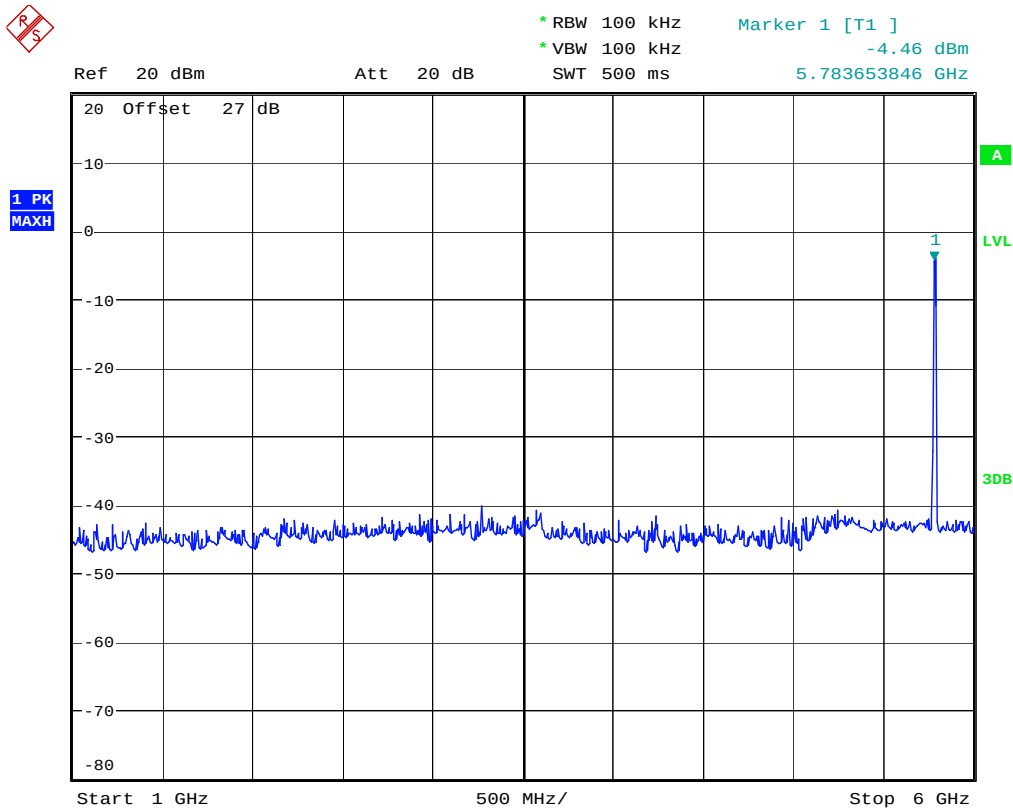
Date: 9.MAR.2011 21:39:52

Conducted Spurious Emissions 26.5-40GHz (Ch 149)



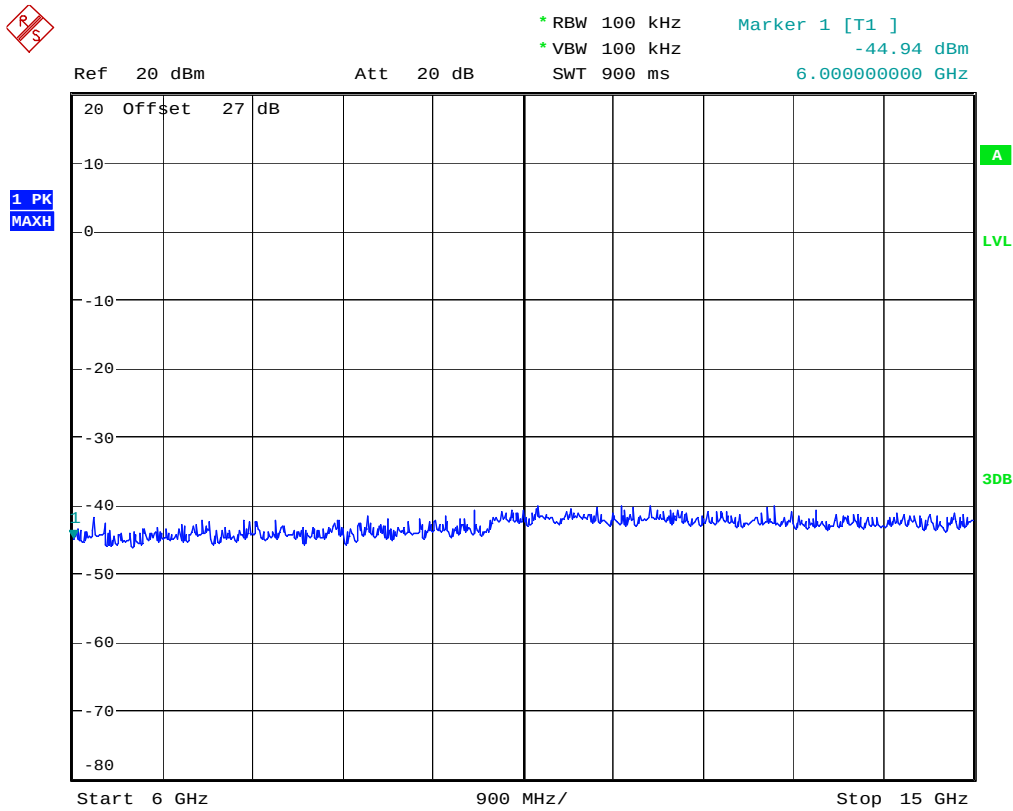
Date: 1.MAR.2011 04:19:04

Conducted Spurious Emissions 30-1000MHz (Ch 157)



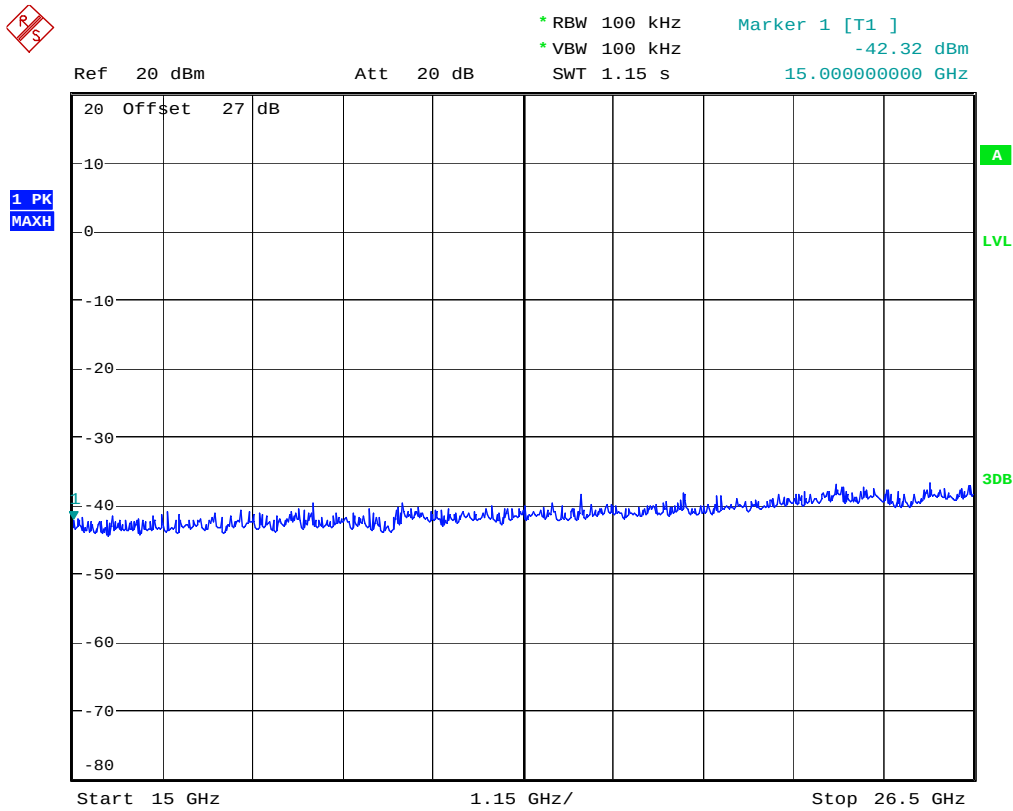
Date: 1.MAR.2011 04:19:25

Conducted Spurious Emissions 1-6GHz (Ch 157)



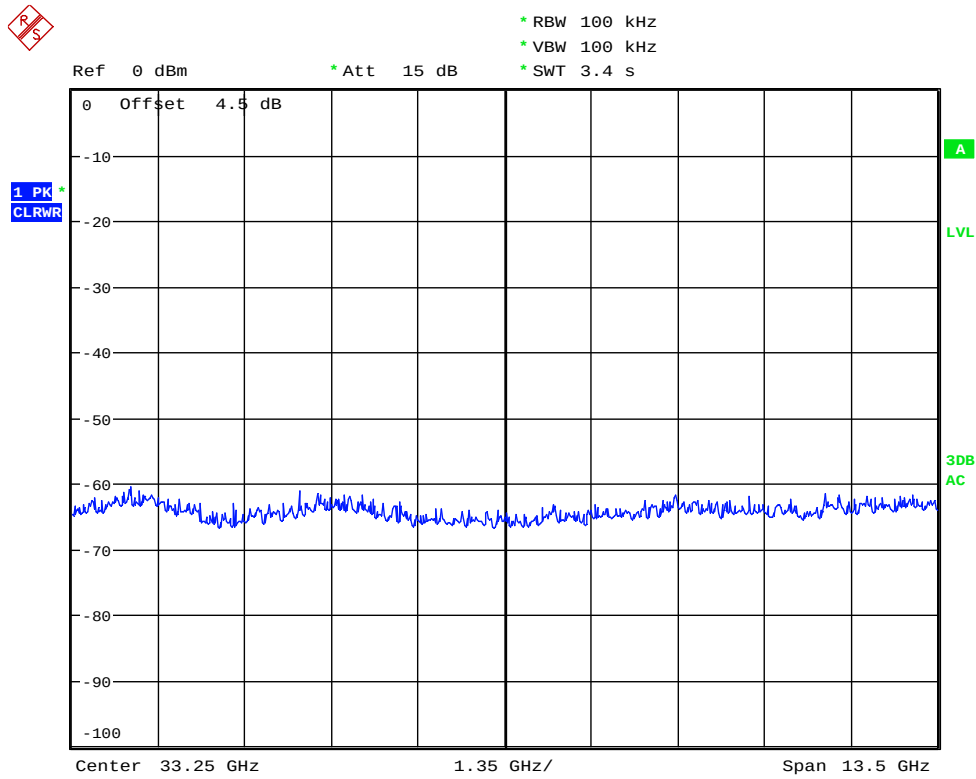
Date: 1.MAR.2011 04:19:47

Conducted Spurious Emissions 6-15GHz (Ch 157)



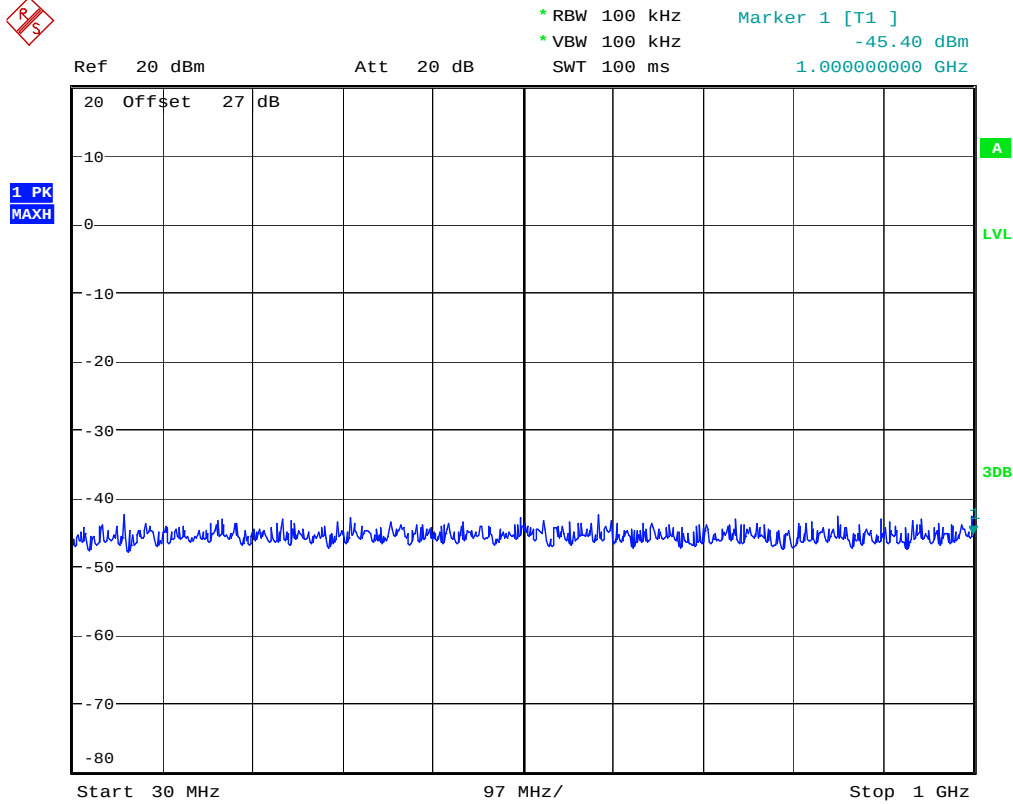
Date: 1.MAR.2011 04:20:12

Conducted Spurious Emissions 15-26.5GHz (Ch 157)



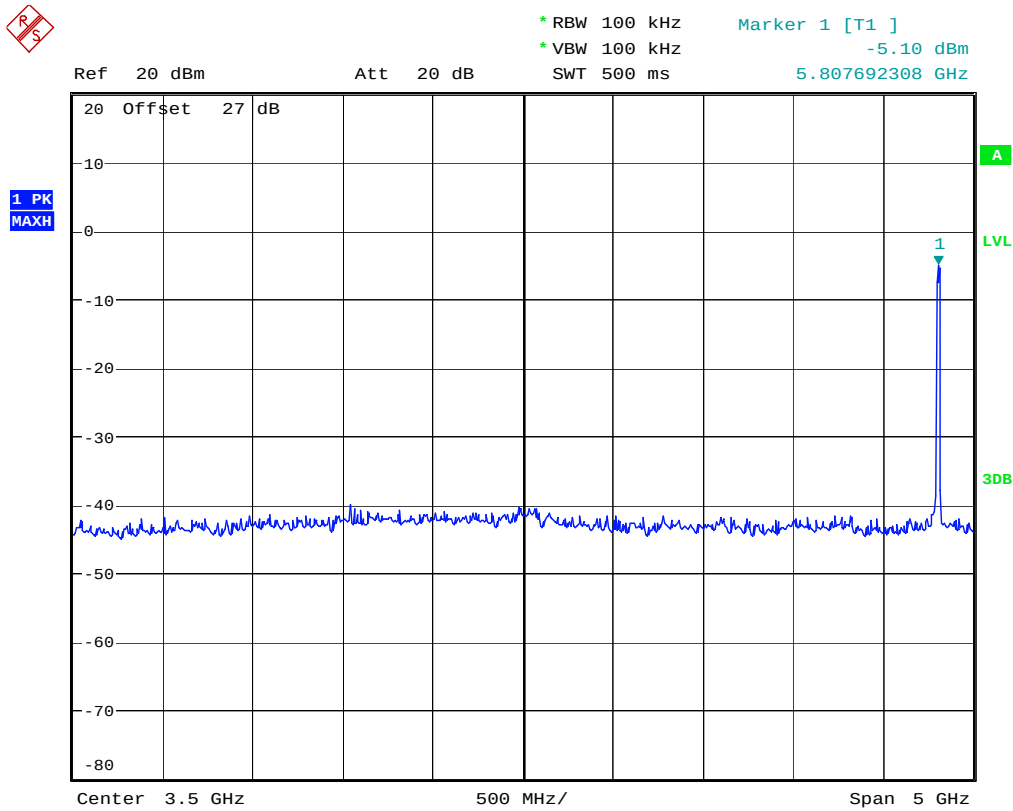
Date: 9.MAR.2011 21:40:25

Conducted Spurious Emissions 26.5-40GHz (Ch 157)



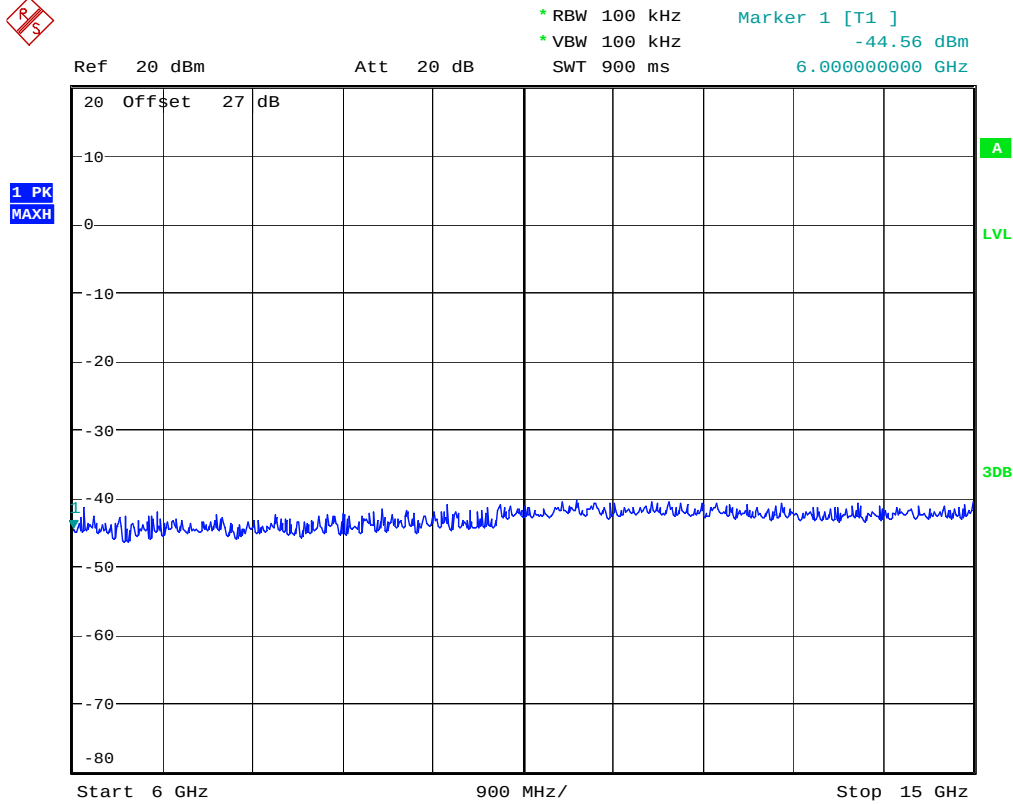
Date: 1.MAR.2011 04:20:46

Conducted Spurious Emissions 30-1000MHz (Ch 161)



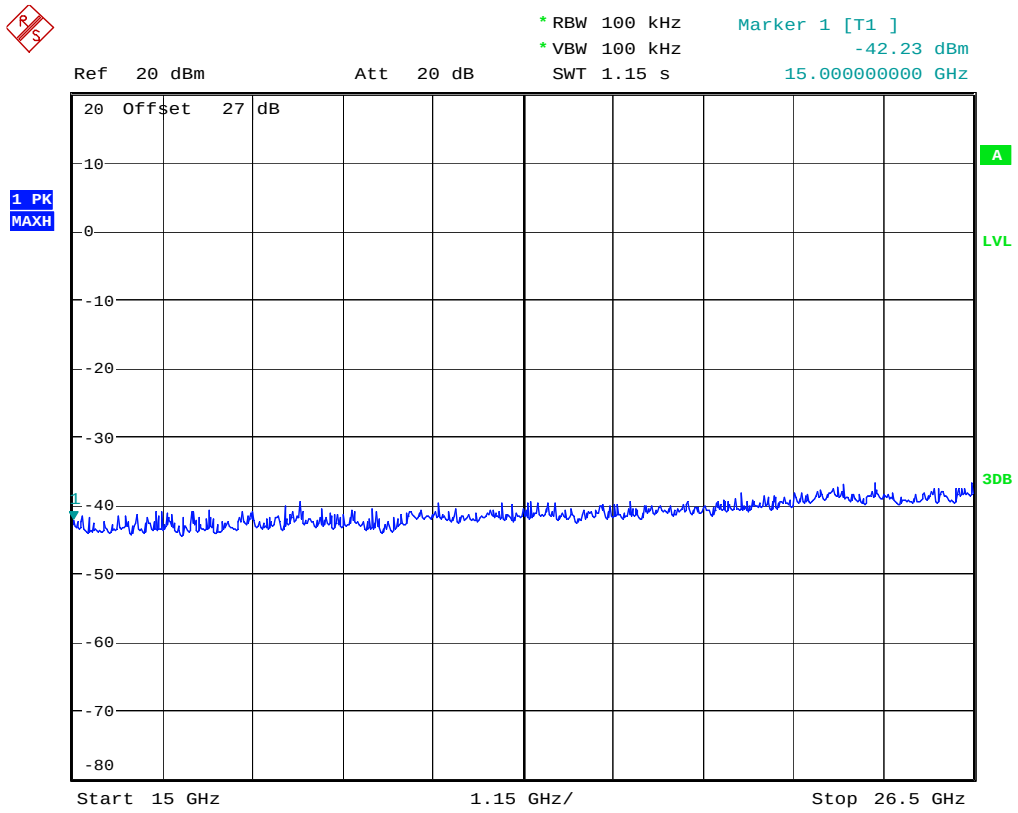
Date: 1.MAR.2011 04:21:18

Conducted Spurious Emissions 1-6GHz (Ch 161)



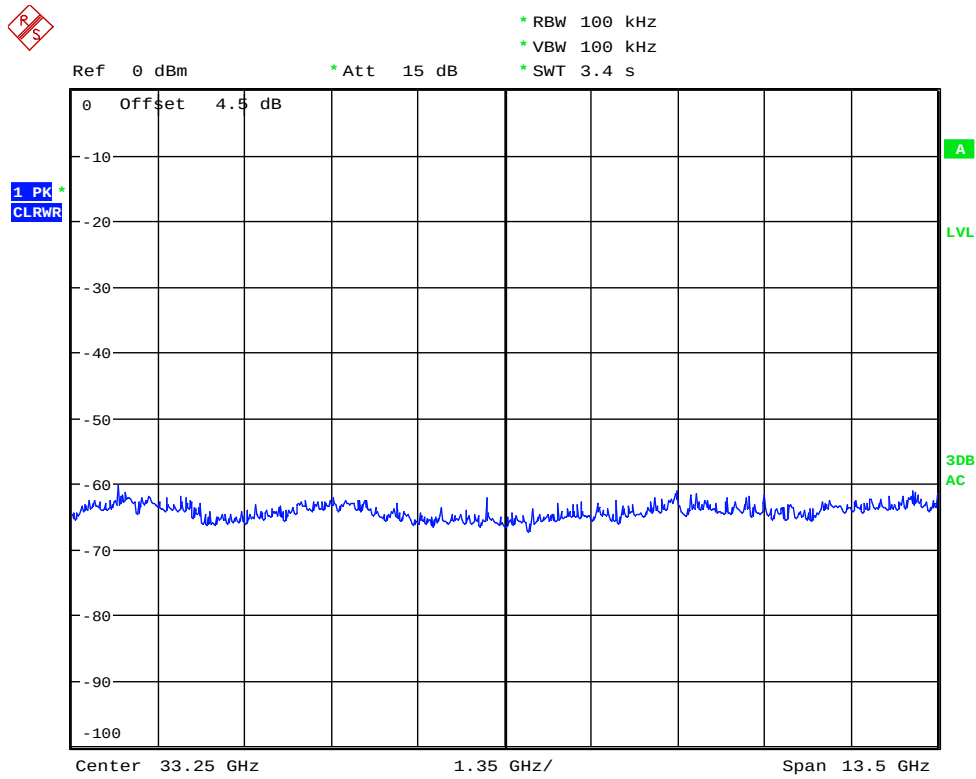
Date: 1.MAR.2011 04:21:51

Conducted Spurious Emissions 6-15GHz (Ch 161)



Date: 1.MAR.2011 04:22:14

Conducted Spurious Emissions 15-26.5GHz (Ch 161)



Date: 9.MAR.2011 21:40:54

Conducted Spurious Emissions 26.5-40GHz (Ch 161)

AC LINE CONDUCTED EMISSIONS

CFR 47 Part 15.207

Measurement Procedure

Measured levels of ac power line conducted emission shall be the radio-noise voltage from the line probe or across the 50 Ω LISN port, where permitted, terminated into a 50 Ω noise meter, or where permitted or required, the radio-noise current on the power line sensed by a current probe.

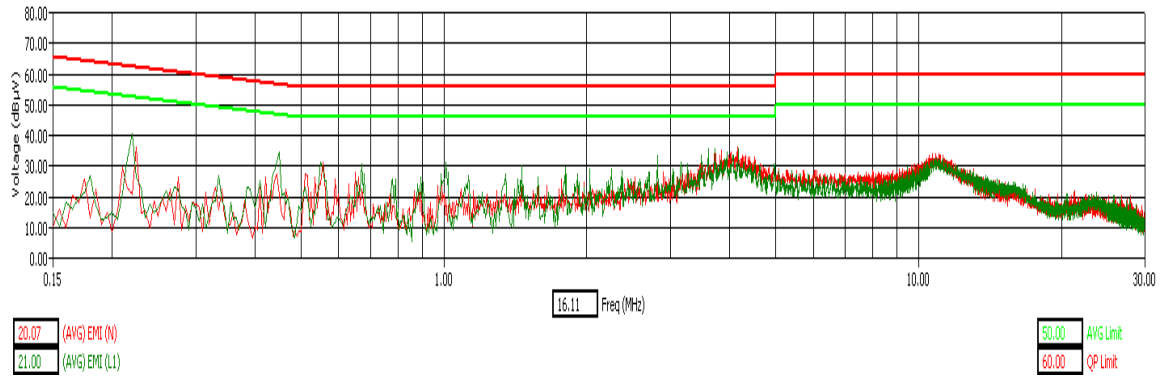
All radio-noise voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord or calibrated extension cord by the use of mating plugs and receptacles on the EUT and LISN. Equipment shall be tested with power cords that are normally supplied using an LISN, the 50 Ω measuring port is terminated by a 50 Ω radio-noise meter or a 50 Ω resistive load. All other ports are terminated in 50 Ω .

Detectors – Peak and Average Detector.

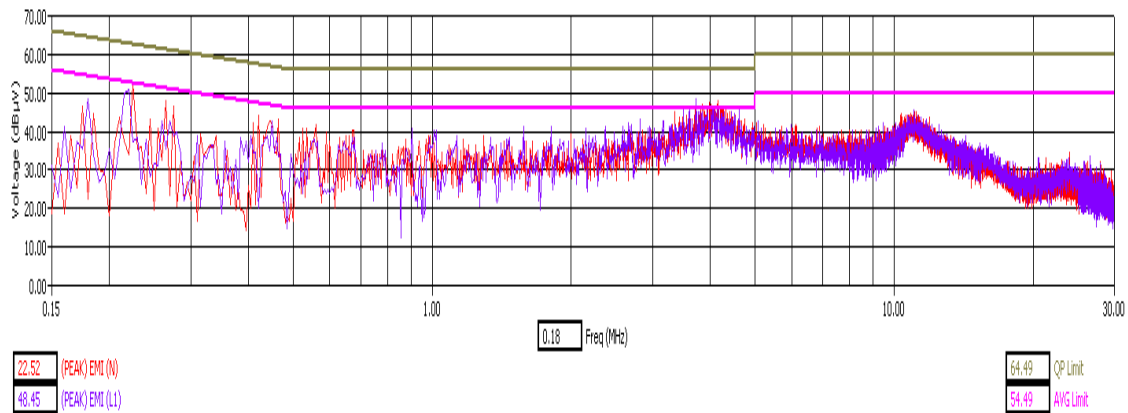
Measurement Results

See attached:

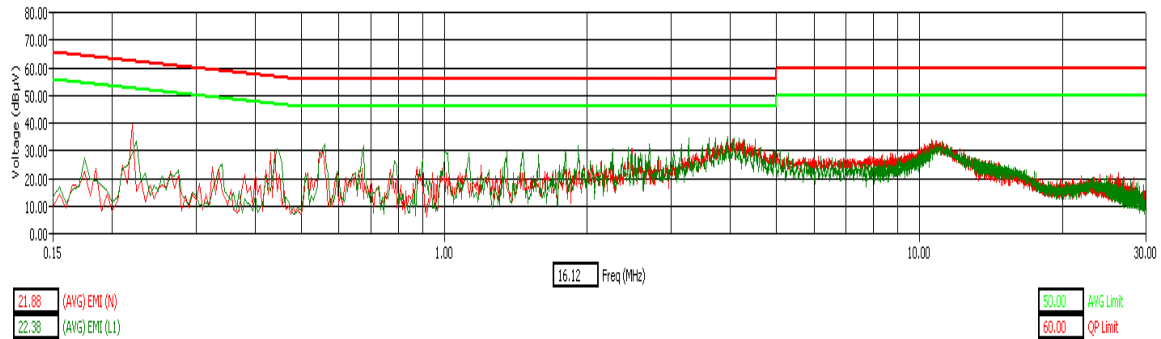
802.11 n @ 6.5 Mbps



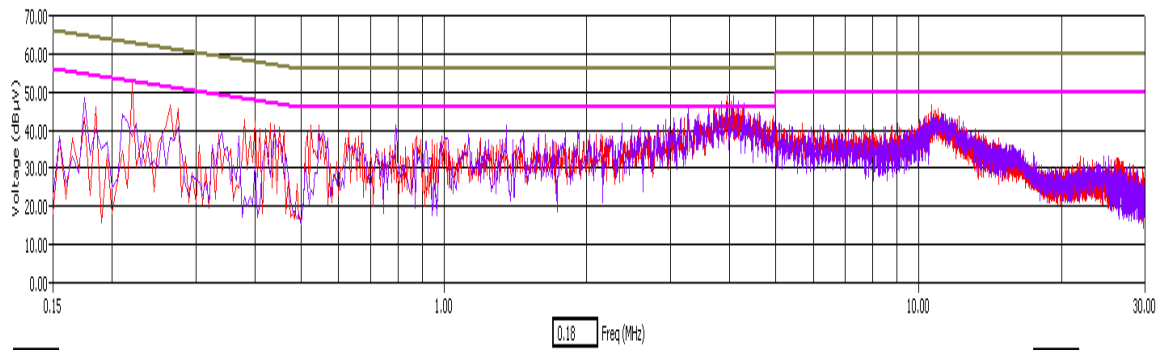
WLAN Channel 149 - Tx Mode - AVG Detector



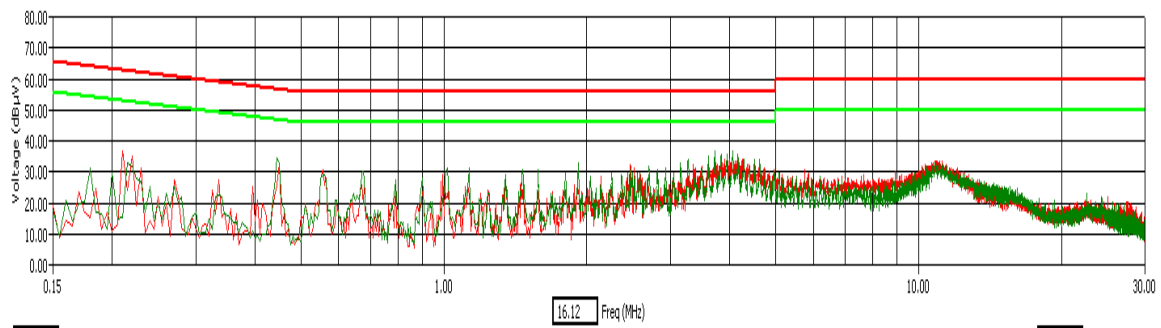
WLAN Channel 149 - Tx Mode -Peak Detector



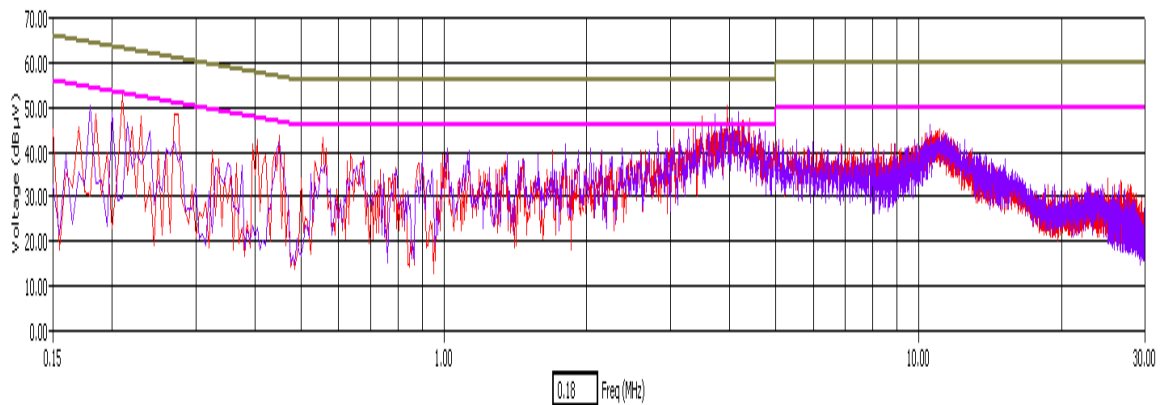
WLAN Channel 157 - Tx Mode - AVG Detector



WLAN Channel 157 - Tx Mode - Peak Detector

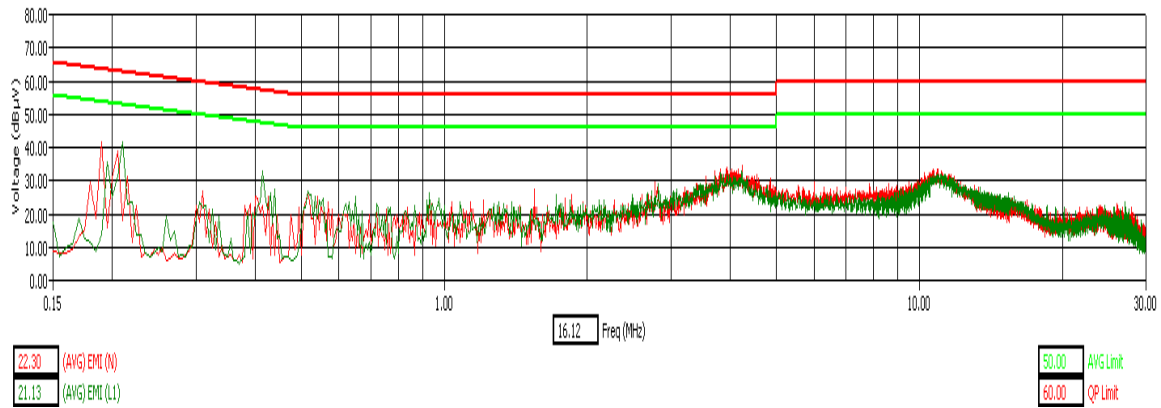


WLAN Channel 161 - Tx Mode - AVG Detector

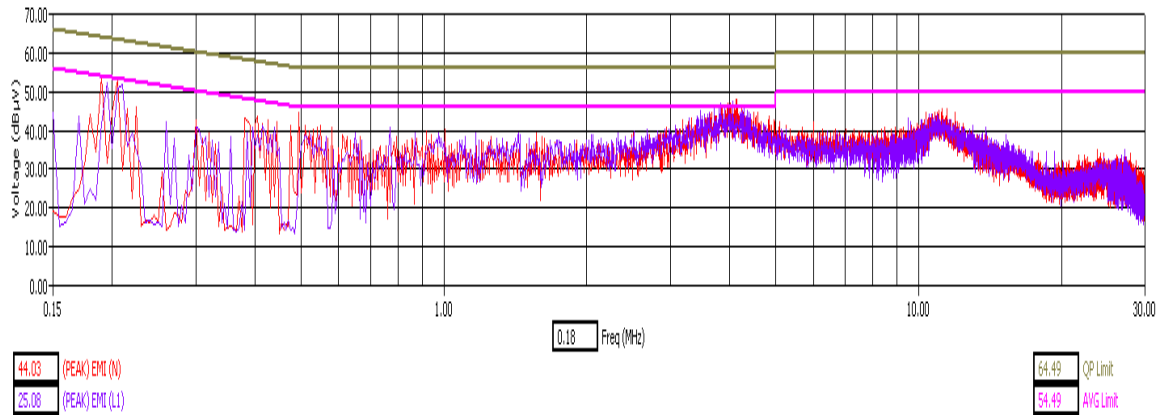


WLAN Channel 161 - Tx Mode - Peak Detector

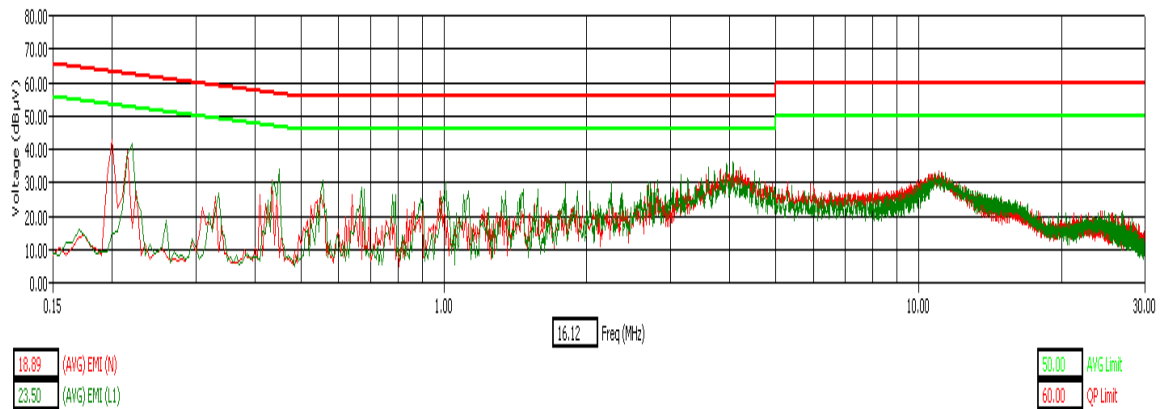
802.11 n @ 57.8 Mbps



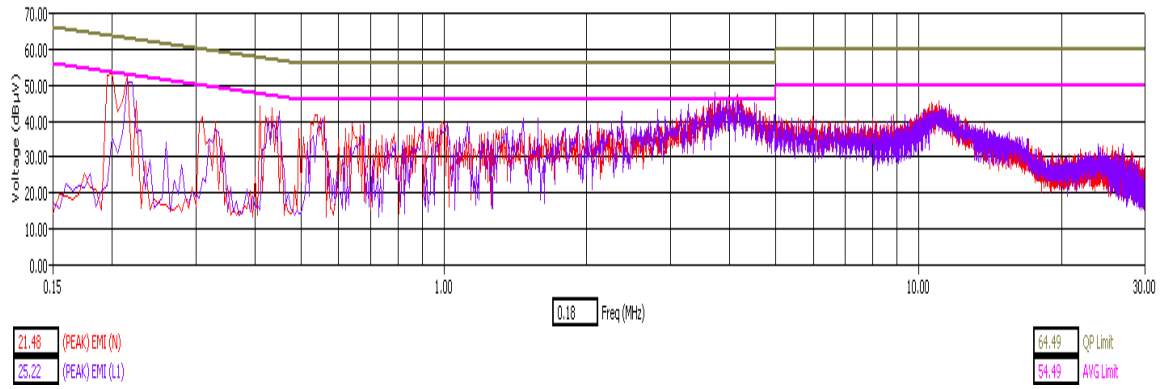
WLAN Channel 149 - Tx Mode - AVG Detector



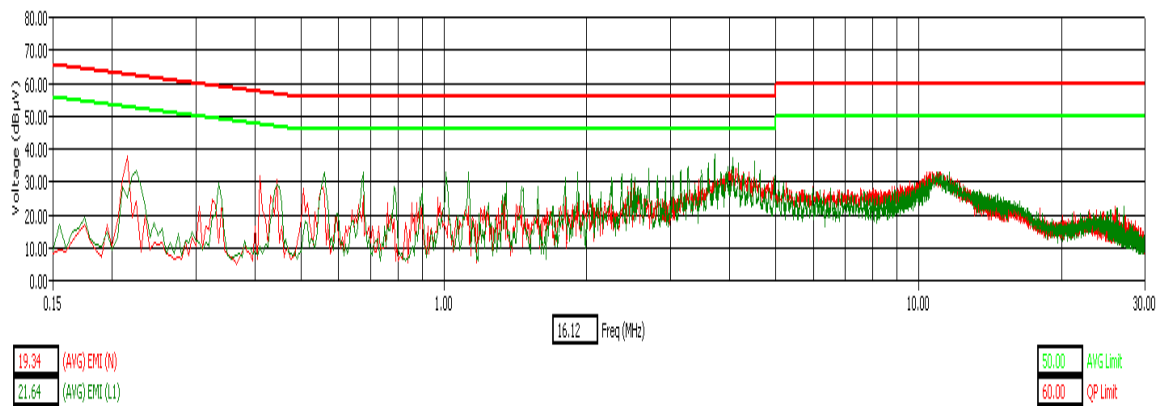
WLAN Channel 149 - Tx Mode -Peak Detector



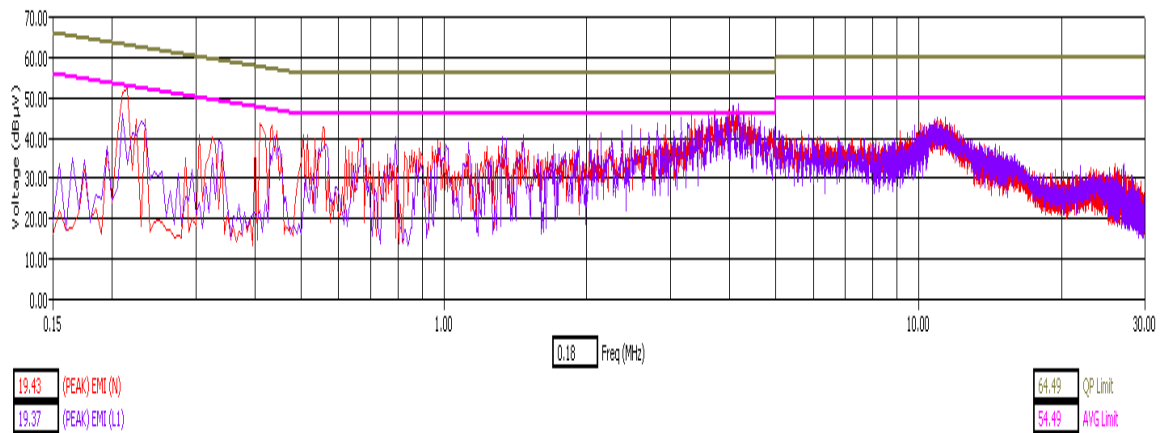
WLAN Channel 157 - Tx Mode - AVG Detector



WLAN Channel 157 - Tx Mode - Peak Detector

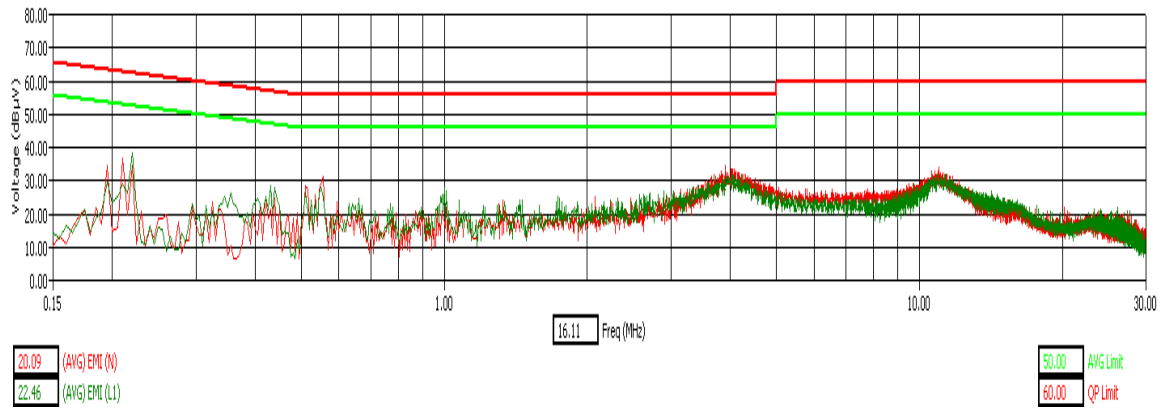


WLAN Channel 161 - Tx Mode - AVG Detector

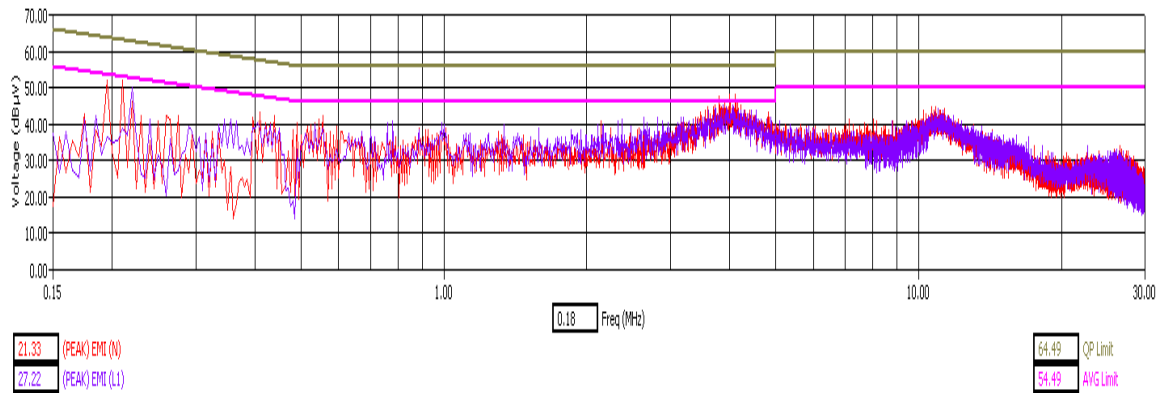


WLAN Channel 161 - Tx Mode - Peak Detector

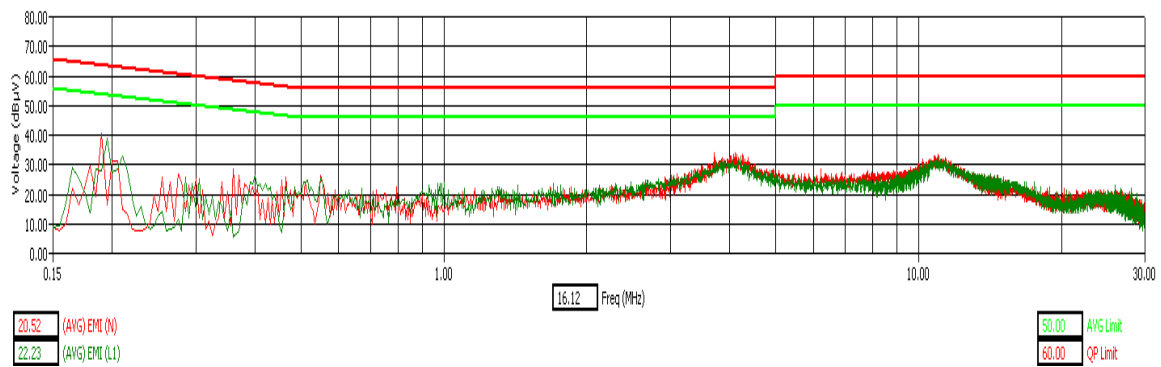
802.11 a @ 12 Mbps



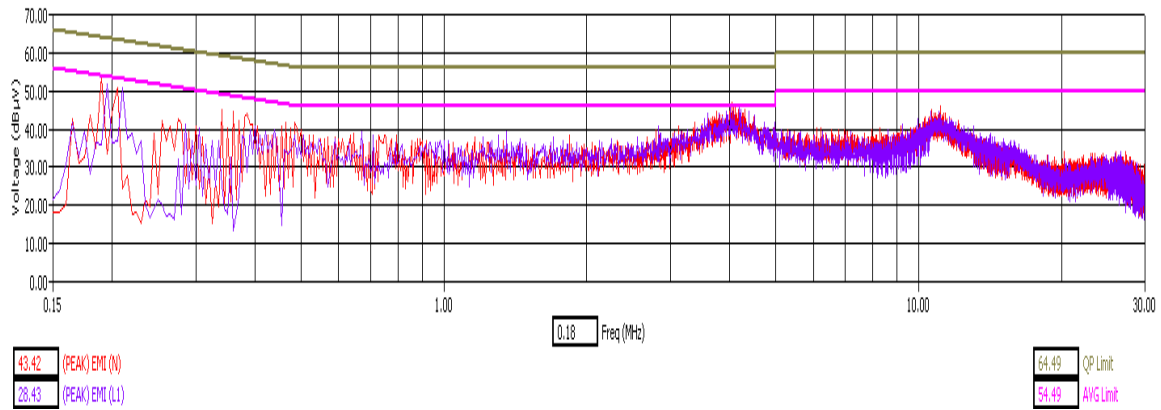
WLAN Channel 149 - Tx Mode - AVG Detector



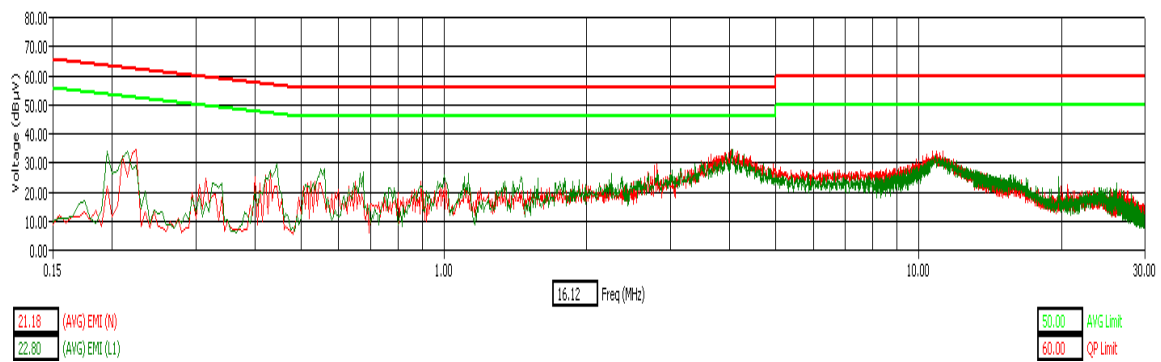
WLAN Channel 149 - Tx Mode -Peak Detector



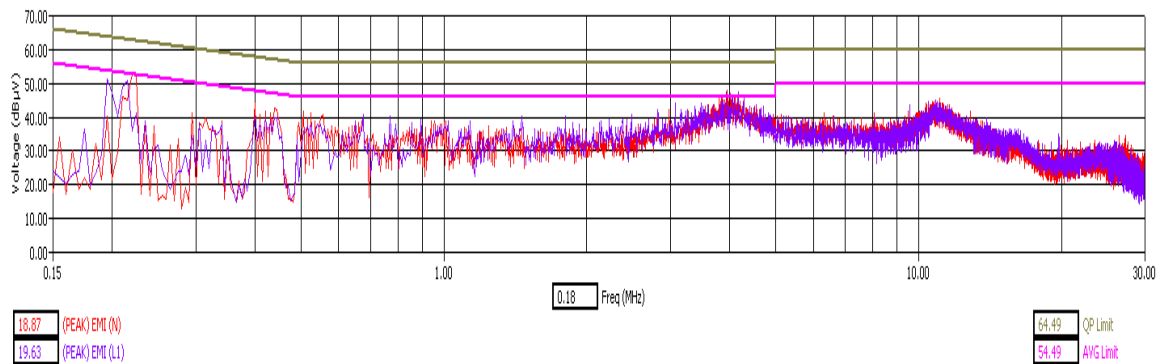
WLAN Channel 157 - Tx Mode - AVG Detector



WLAN Channel 157 - Tx Mode - Peak Detector



WLAN Channel 161 - Tx Mode - AVG Detector



WLAN Channel 161 - Tx Mode - Peak Detector

End of Test Report