SPORTON International Inc.
No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
Ph: 886-3-656-9065 / FAX: 886-3-656-9085 / www.sporton.com.tw

FCC RADIO TEST REPORT

Applicant's company	**Motorola Solutions, Inc.**
Applicant Address	One Motorola Plaza Holtsville, NY 11742 USA
FCC ID	**UZ7AP0622**
Manufacturer's company	**Joy Technology (ShenZhen) Corporation**
Manufacturer Address	HengKeng Ind., Shangpai, Shangwu,Aiqun Rd., Shiyan Town,Shenzhen 518108 China

Product Name	Wireless Dual Band AP
Brand Name	MOTOROLA
Model Name	AP-0622
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250MHz
Received Date	Sep. 22, 2011
Final Test Date	Feb. 13, 2012
Submission Type	Original Equipment

Statement

Test result included is for the IEEE 802.11n and IEEE 802.11a (5150 ~ 5250MHz) of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2009** and **47 CFR FCC Part 15 Subpart E**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR192220AB	Rev. 01	Initial issue of report	Mar. 07, 2012

Certificate No.: CB10101169

1. CERTIFICATE OF COMPLIANCE

Product Name	:	**Wireless Dual Band AP**
Brand Name	:	**MOTOROLA**
Model Name	:	**AP-0622**
Applicant	:	**Motorola Solutions, Inc.**
Test Rule Part(s)	:	**47 CFR FCC Part 15 Subpart E § 15.407**

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Sep. 22, 2011 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Jordan Hsiao

Jordan Hsiao

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	11.54 dB
4.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	0.01 dB
4.4	15.407(a)	Power Spectral Density	Complies	0.83 dB
4.5	15.407(a)	Peak Excursion	Complies	0.15 dB
4.6	15.407(b)	Radiated Emissions	Complies	4.25 dB
4.7	15.407(b)	Band Edge Emissions	Complies	1.08 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.5dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
Peak Excursion	±0.5dB	Confidence levels of 95%
26dB Spectrum Bandwidth / Frequency Stability	$\pm 8.5\times10^{-8}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n

Items	Description
Product Type	Please refer to section 3.3
Radio Type	Intentional Transceiver
Power Type	From Power Adapter or POE
Modulation	see the below table for IEEE 802.11n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n
Frequency Range	5150 ~ 5250MHz
Channel Number	19 for 20MHz bandwidth ; 9 for 40MHz bandwidth
Channel Band Width (99%)	**For Embedded (120G00000002A/ 120G00000003A) antenna:** Mode 3 (2TX, 2RX):MCS0 (20MHz): 18.88 MHz ; MCS0 (40MHz): 34.24 MHz **For Dipole (ML-5299-FHPA10-01R) antenna:** Mode 6 (1TX, 2RX):MCS0 (20MHz): 18.56 MHz ; MCS0 (40MHz): 36.80 MHz (2TX, 2RX):MCS0 (20MHz): 19.04 MHz ; MCS0 (40MHz): 34.88 MHz (2TX, 2RX):MCS8 (20MHz): 18.24 MHz ; MCS8 (40MHz): 36.80 MHz **For Patch (ML-5299-PTA1-01R) antenna:** Mode 9 (2TX, 2RX):MCS0 (20MHz): 19.04 MHz ; MCS0 (40MHz): 37.12 MHz **For Panel (ML-5299-WPNA1-01R) antenna:** Mode 12 (1TX, 2RX):MCS0 (20MHz): 18.40 MHz ; MCS0 (40MHz): 36.80 MHz **For Yagil (ML-5299-BYGA15-012) antenna:** Mode 15 (1TX, 2RX):MCS0 (20MHz): 18.40 MHz ; MCS0 (40MHz): 36.80 MHz
Conducted Output Power	**For Embedded (120G00000002A/ 120G00000003A) antenna:** <Mode 3> (2TX, 2RX) Band 1: MCS0 (20MHz): 12.57 dBm ; MCS0 (40MHz): 12.57 dBm **For Dipole (ML-5299-FHPA10-01R) antenna:** <Mode 6> (1TX, 2RX) Band 1: MCS0 (20MHz): 13.99 dBm ; MCS0 (40MHz): 13.88 dBm (2TX, 2RX) Band 1: MCS0 (20MHz): 10.88 dBm ; MCS0 (40MHz): 10.88 dBm (2TX, 2RX) Band 1: MCS8 (20MHz): 13.70 dBm ; MCS8 (40MHz): 13.82 dBm **For Patch (ML-5299-PTA1-01R) antenna:** <Mode 9> (2TX, 2RX)

	Band 1: MCS0 (20MHz): 15.34 dBm ; MCS0 (40MHz): 15.25 dBm **For Panel (ML-5299-WPNA1-01R) antenna:** <Mode 12> (1TX, 2RX) Band 1: MCS0 (20MHz): 10.43 dBm ; MCS0 (40MHz): 10.29 dBm **For Yagi (ML-5299-BYGA15-012) antenna:** <Mode 15> (1TX, 2RX) Band 1: MCS0 (20MHz): 11.87 dBm ; MCS0 (40MHz): 11.72 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3
TPC Function	This device does not exceed 27dBm eirp, so no transmit power control is implemented.

IEEE 802.11a

Items	Description
Product Type	Please refer to section 3.3
Radio Type	Intentional Transceiver
Power Type	From Power Adapter or POE
Modulation	OFDM for IEEE 802.11a
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	OFDM (6/9/12/18/24/36/48/54)
Frequency Range	5150 ~ 5250MHz
Channel Number	19
Channel Band Width (99%)	**For Embedded (120G00000002A/ 120G00000003A) antenna:** Mode 3 (2TX. 2RX):11a: 17.76 MHz **For Dipole (ML-5299-FHPA10-01R) antenna:** Mode 6 (1TX. 2RX):11a: 17.44 MHz (2TX. 2RX):11a: 17.60 MHz **For Patch (ML-5299-PTA1-01R) antenna:** Mode 9 (2TX. 2RX):11a: 17.44 MHz **For Panel (ML-5299-WPNA1-01R) antenna:** Mode 12 (1TX. 2RX):11a: 17.44 MHz **For Yagi (ML-5299-BYGA15-012) antenna:** Mode 15 (1TX. 2RX):11a: 17.60 MHz
Conducted Output Power	**For Embedded (120G00000002A/ 120G00000003A) antenna:** Mode 3 (2TX, 2RX): Band 1: 12.36 dBm **For Dipole (ML-5299-FHPA10-01R) antenna:** Mode 6 (1TX, 2RX): Band 1: 13.98 dBm (2TX, 2RX): Band 1: 10.62 dBm **For Patch (ML-5299-PTA1-01R) antenna:** Mode 9 (2TX, 2RX): Band 1: 14.97 dBm **For Panel (ML-5299-WPNA1-01R) antenna:** Mode 12 (1TX, 2RX): Band 1: 10.49 dBm **For Yagi (ML-5299-BYGA15-012) antenna:** Mode 15 (1TX, 2RX): Band 1: 11.70 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3
TPC Function	This device does not exceed 27dBm eirp, so no transmit power control is implemented.

IEEE 802.11n spec

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Datarate(Mbps)			
									800nsGI		400nsGI	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150
8	2	BPSK	1/2	1	104	216	52	108	13.0	27.0	14.444	30
9	2	QPSK	1/2	2	208	432	104	216	26.0	54.0	28.889	60
10	2	QPSK	3/4	2	208	432	156	324	39.0	81.0	43.333	90
11	2	16-QAM	1/2	4	416	864	208	432	52.0	108.0	57.778	120
12	2	16-QAM	3/4	4	416	864	312	648	78.0	162.0	86.667	180
13	2	64-QAM	2/3	6	624	1296	416	864	104.0	216.0	115.556	240
14	2	64-QAM	3/4	6	624	1296	468	972	117.0	243.0	130.000	270
15	2	64-QAM	5/6	6	624	1296	520	1080	130.0	270.0	144.444	300

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	guard interval

3.2. Accessories

Power	Brand	Model	Rating
Adapter	HIPRO	HP-A0502R3D	Input: 100-240VAC, 50-60Hz, 2.4A Output: 12VDC, 4.16A
Remark: The EUT has POE Function, test with IEEE 802.3 af / at compliance PoE device.			

3.3. Table for Filed Antenna

Ant.	Model Name	Antenna Type	Chip/Radio	Gain (dBi)	
				2.4GHz	5GHz
1	120G00000000A	Embedded	Radio1-CH1	3.92	-
	120G00000001A	Embedded	Radio1-CH2	3.77	-
2	120G00000002A	Embedded	Radio2-CH1	4.08	7.5
	120G00000003A	Embedded	Radio2-CH2	4.44	5.52
3	ML-2499-FHPA9-01R	Dipole	Radio1/2-CH1/2	8.5	-
4	ML-2499-SD3-01R	Patch	Radio1/2-CH1/2	3.5	-
5	ML-2499-BPNA3-01R	Panel	Radio1/2-CH1/2	10.9	-
6	ML-2499-BYGA2-01R	Yagi	Radio1/2-CH1/2	11.1	-
7	ML-5299-FHPA10-01R	Dipole	Radio1/2-CH1/2	-	9
8	ML-5299-PTA1-01R	Patch	Radio1/2-CH1/2	-	4.6
9	ML-5299-WPNA1-01R	Panel	Radio1/2-CH1/2	-	12.5
10	ML-5299-BYGA15-012	Yagi	Radio1/2-CH1/2	-	11
11	ML-2499-5PNL-72-N	Panel	Radio1/2-CH1/2	5	-
12	ML-2499-APA2-01	Dipole	Radio1/2-CH1/2	2	-
13	ML-2499-HPA3-01R	Dipole	Radio1/2-CH1/2	4.7	-
14	ML-5299-APA1-01R	Dipole	Radio1/2-CH1/2	-	2
15	ML-5299-HPA1-01R	Dipole	Radio1/2-CH1/2	-	5
16	ML-2452-APA2-01	Dipole	Radio1/2-CH1/2	3	5
17	ML-2452-PNA5-01R	Panel	Radio1/2-CH1/2	4.5	5
18	ML-2452-PNA7-01R	Panel	Radio1/2-CH1/2	7	9
19	ML-2452-HPA5-036	Dipole	Radio1/2-CH1/2	3	5

Antenna	Antenna Gain		Cable loss		Test Antenna Gain	
	2.4GHz	5GHz	2.4GHz	5GHz	2.4GHz	5GHz
1	3.92	-	0.0	-	3.92	-
	3.77	-	0.0		3.77	
2	4.08	7.5	0.0	0.0	4.08	7.5
	4.44	5.52	0.0	0.0	4.44	5.52
3	9	-	0.5	-	8.5	-
4	3.5	-	0.0	-	3.5	-
5	10.9	-	0.0	-	10.9	-
6	11.1	-	0.0	-	11.1	-
7	-	10	-	1	-	9
8	-	4.6	-	-	-	4.6
9	-	12.5	-	-	-	12.5
10	-	12	-	1	-	11
11	5	-	0.0		5	-
12	2	-	0.0		2	-
13	4.7	-	0.0		4.7	-
14	-	2	-	0.0	-	2
15	-	5	-	0.0	-	5
16	3	5	0.0	0.0	3	5
17	4.5	5	0.0	0.0	4.5	5
18	7	9	0.0	0.0	7	9
19	3	5	0.0	0.0	3	5

Note:

1. There are two chips, Radio 1 and Radio 2 respectively. Radio 1 support Chain 2.4GHz function and Radio 2 support Chain 2.4GHz+5GHz function. Radio 1 is hardware configured as 2.4GHz only and Radio 2 is software restricted to 5GHz only.

   There are 19 antennas in the antenna table list, antenna 1 to 10 are the highest gain antennas. They were selected to perform the test and recorded in this report.
2. Rx function is always 2Rx for 2Tx, but may be either 1Rx or 2Rx for 1Tx.

Table of TX/RX Function in each antenna:

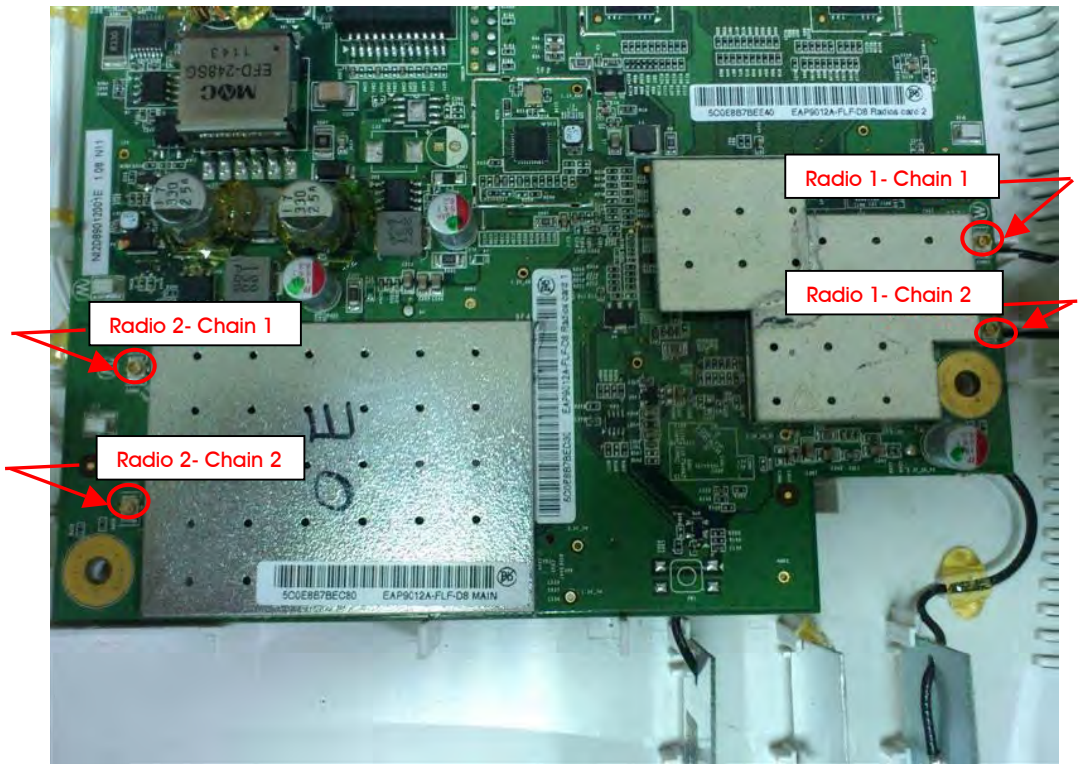
Item			Radio 1				Radio 2			
			Chain 1		Chain 2		Chain 1		Chain 2	
			TX	RX	TX	RX	TX	RX	TX	RX
Ant. 1	2.4GHz	*11b	-	V	V	V	-	-	-	-
		11g	V	V	V	V	-	-	-	-
		11n	V	V	V	V	-	-	-	-
Ant. 2	2.4GHz	*11b	-	-	-	-	V	V	-	V
		11g	-	-	-	-	V	V	V	V
		11n	-	-	-	-	V	V	V	V
	5GHz	11a	-	-	-	-	V	V	V	V
		11n	-	-	-	-	V	V	V	V
Ant. 3	2.4GHz	*11b	-	V	V	V	V	V	-	V
		*11g	-	-	-	-	V	V	-	V
		11g	V	V	V	V	V	V	V	V
		*11n	-	-	-	-	V	V	-	V
		11n	V	V	V	V	V	V	V	V
Ant. 4	2.4GHz	*11b	-	V	V	V	V	V	-	V
		*11g	-	V	V	V	V	V	-	V
		11g	V	V	V	V	V	V	V	V
		*11n	-	V	V	V	V	V	-	V
		11n	V	V	V	V	V	V	V	V
Ant. 5	2.4GHz	*11b	-	V	V	V	V	V	-	V
		*11g	-	V	V	V	V	V	-	V
		*11n	-	V	V	V	V	V	-	V
Ant. 6	2.4GHz	*11b	-	V	V	V	V	V	-	V
		*11g	-	V	V	V	V	V	-	V
		*11n	-	V	-	V	V	V	-	V
Ant. 7	5GHz	*11a	-	V	V	V	V	V	-	V
		11a	V	V	V	V	V	V	V	V
		*11n	-	V	V	V	V	V	-	V
		11n	V	V	V	V	V	V	V	V
Ant. 8	5GHz	11a	V	V	V	V	V	V	V	V
		11n	V	V	V	V	V	V	V	V
Ant. 9	5GHz	*11a	-	V	V	V	V	V	-	V
		*11n	-	V	V	V	V	V	-	V
Ant. 10	5GHz	*11a	-	V	V	V	V	V	-	V
		*11n	-	V	V	V	V	V	-	V

Note: Marked "-" on behalf of no function.

Marked "*" Rx function may be either 1Rx or 2Rx for 1Tx.

Radio 1 support Chain 2 and Radio 2 support Chain 1 when perform the 1TX function.

Chip/Radio	Required 1TX Port
Radio 1-2.4G	Chain 2
Radio 2-2.4G	Chain 1
Radio 2-5G	Chain 1



3.4. Table for Carrier Frequencies

For IEEE 802.11a, use Channel 36, 40, 44, 48.

There are two bandwidth systems for IEEE 802.11n.

For both 20MHz bandwidth systems, use Channel 36, 40, 44, 48.

For both 40MHz bandwidth systems, use Channel 38, 46.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz

3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode		Data Rate	Channel	Chain
AC Power Conducted Emission	Normal Link		Auto	-	-
Max. Conducted Output Power Power Spectral Density	MCS0/20MHz	Band 1	6.5Mbps	36/40/48	1/2/1+2
	MCS0/40MHz	Band 1	13.5Mbps	38/46	1/2/1+2
	MCS8/20MHz	Band 1	13Mbps	36/40/48	1/2/1+2
	MCS8/40MHz	Band 1	27Mbps	38/46	1/2/1+2
	11a/BPSK	Band 1	6Mbps	36/40/48	1/2/1+2
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Peak Excursion	MCS0/20MHz	Band 1	6.5Mbps	36/40/48	1+2
	MCS0/40MHz	Band 1	13.5Mbps	38/46	1+2
	MCS8/20MHz	Band 1	13Mbps	36/40/48	1/2/1+2
	MCS8/40MHz	Band 1	27Mbps	38/46	1/2/1+2
	11a/BPSK	Band 1	6Mbps	36/40/48	1+2
Radiated Emission Below 1GHz	Normal Link		Auto	-	-
Radiated Emission Above 1GHz	MCS0/20MHz	Band 1	6.5Mbps	36/40/48	1+2
	MCS0/40MHz	Band 1	13.5Mbps	38/46	1+2
	MCS8/20MHz	Band 1	13Mbps	36/40/48	1/2/1+2
	MCS8/40MHz	Band 1	27Mbps	38/46	1/2/1+2
	11a/BPSK	Band 1	6Mbps	36/40/48/	1/2/1+2
Band Edge Emission	MCS0/20MHz	Band 1	6.5Mbps	36/40/48	1+2
	MCS0/40MHz	Band 1	13.5Mbps	38/46	1+2
	MCS8/20MHz	Band 1	13Mbps	36/40/48	1/2/1+2
	MCS8/40MHz	Band 1	27Mbps	38/46	1/2/1+2
	11a/BPSK	Band 1	6Mbps	36/40/48	1/2/1+2
Frequency Stability	Un-modulation		-	40	N/A

Note: The CPU of the product is operated at either 560MHz or 600MHz and it does not affect the test result of emissions.

The following test modes were performed for all tests:

<Conducted Emissions test>

Mode 1. EUT (Plastic case) + Adapter

Mode 2. EUT (Iron case) + Adapter

<Radiated emissions test>

For radiated emission 30MHz~ 1GHz:

Mode 1. EUT 1 (Iron case) + Dipole antenna <Ant. 3 (2.4GHz antenna) / Ant. 7 (5GHz antenna)> + POE

Mode 2. EUT 1 (Iron case) + Panel antenna <Ant. 5 (2.4GHz antenna) / Ant. 9 (5GHz antenna)> + POE

Mode 3. EUT 1 (Iron case) + Patch antenna <Ant. 4 (2.4GHz antenna) / Ant. 8 (5GHz antenna)> + POE

Mode 4. EUT 1 (Iron case) + Yagi antenna <Ant. 6 (2.4GHz antenna) / Ant. 10 (5GHz antenna)> + POE

Mode 3 generated the worst test result when this device operates among mode 1 ~ mode 4, thus measurement under mode 5 base on this setting with adapter mode.

Mode 5. EUT 1 (Iron case) + Patch antenna <Ant. 4 (2.4GHz antenna) / Ant. 8 (5GHz antenna)> + Adapter

Mode 6. EUT 2 (Plastic case) + Embedded antenna (Ant. 1/2) + POE

Mode 7. EUT 2 (Plastic case) + Embedded antenna (Ant. 1/2) + Adapter

Due to Mode 3 and Mode 6 generated the worst test results, both of them were recorded in the report.

For radiated emission above 1GHz:

Antenna/Radio Mode		11b 1TX	11a/g 1TX	11a/g 2TX	HT20 1TX (MCS0)	H20 2TX (MCS0)	HT40 1TX (MCS0)	H40 2TX (MCS0)	HT20 2TX (MCS8)	H40 2TX (MCS8)
Mode 1	Internal-R1-2G, Antenna 1	v	-	v	-	v	-	v	-	-
Mode 2	Internal-R2-2G, Antenna 2	v	-	v	-	v	-	v	-	-
Mode 3	Internal-R2-5G, Antenna 2	-	-	v	-	v	-	v	-	-
Mode 4	Dipole-R1-2G, Antenna 3	v	-	v	-	v	-	v	v	v
Mode 5	Dipole-R2-2G, Antenna 3	v	v	v	v	v	v	v	v	v
Mode 6	Dipole-R2-5G, Antenna 7		v	v	v	v	v	v	v	v
Mode 7	Patch-R1-2.4G, Antenna 4	v	v	v	v	v	v	v	-	-
Mode 8	Patch-R2-2.4G, Antenna 4	v	v	v	v	v	v	v	-	-
Mode 9	Patch-R2-5G, Antenna 8		-	v	-	v		v	-	-

Mode 10	Panel-R1-2.4G, Antenna 5	v	v	-	v	-	v	-	-	-
Mode 11	Panel-R2-2.4G, Antenna 5	v	v	-	v	-	v	-	-	-
Mode 12	Panel-R2-5G, Antenna 9	-	v	-	v	-	v	-	-	-
Mode 13	Yagi-R1-2.4G, Antenna 6	v	v	-	v	-	v	-	-	-
Mode 14	Yagi-R2-2.4G, Antenna 6	v	v	-	v	-	v	-	-	-
Mode 15	Yagi-R2-5G, Antenna 10	-	v	-	v	-	v	-	-	-

Note:

1. For HT20/40 2TX, MCS8 (2-stream) limit are higher than MCS0 (1-stream) limits due to no array gain reduction on conducted limits. MCS8 signals on 2TX are completely uncorrelated when the direct mapping is configured. If antenna gain is greater than 5 dBi, this mode should be included to realize higher conducted testing limits.
2. EUT has two modules, R1 is regard to Radio 1 module (2.4GHz), R2 is regard to Radio 2 module (2.4GHz + 5GHz).

<For MPE and Co-location Test>:

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Maximum Permissible Exposure (Please refer to Appendix B and Co-location (please refer to Appendix C) tests are added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D	-
CO01-CB	Conduction	Hsin Chu	262045	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

Please refer section 6 for Test Site Address.

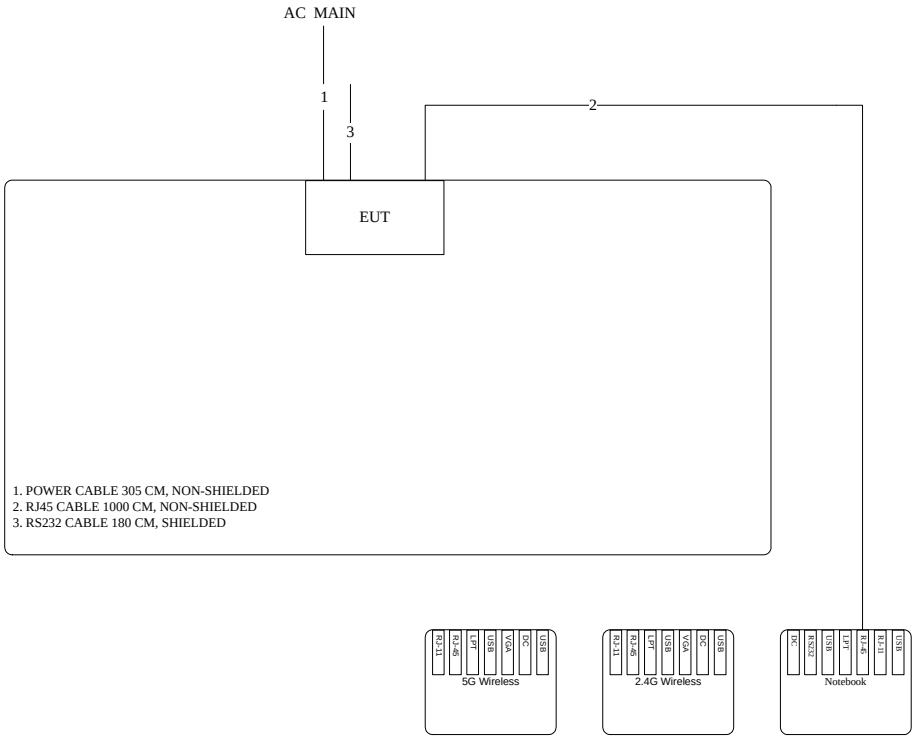
3.7. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D400	E2K24GBRL

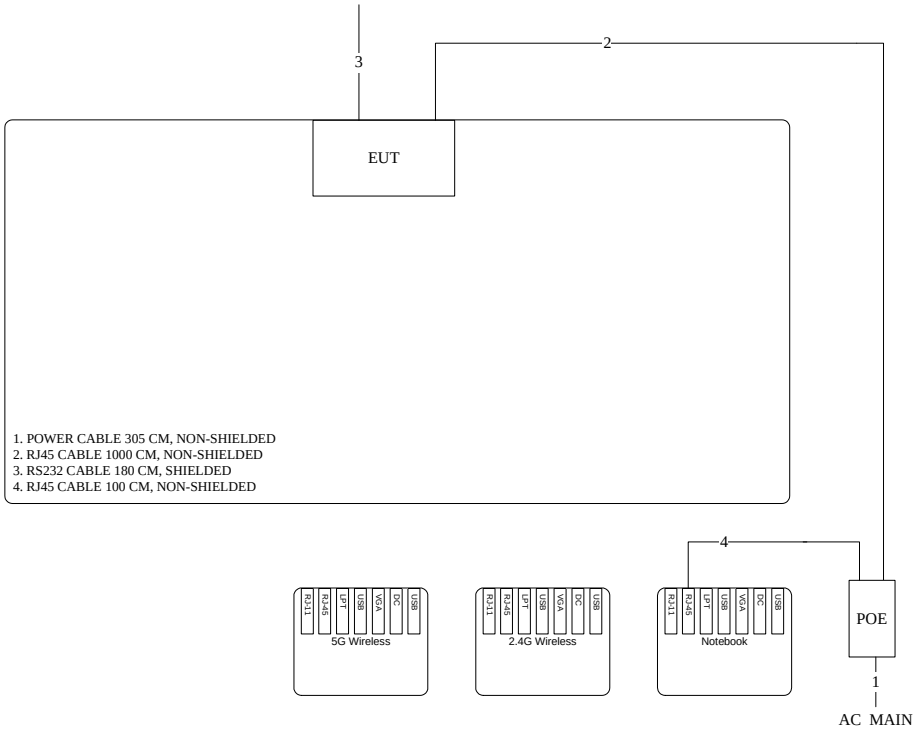
3.8. Test Configurations

3.8.1. Radiation Emissions Test Configuration

Power from Adapter

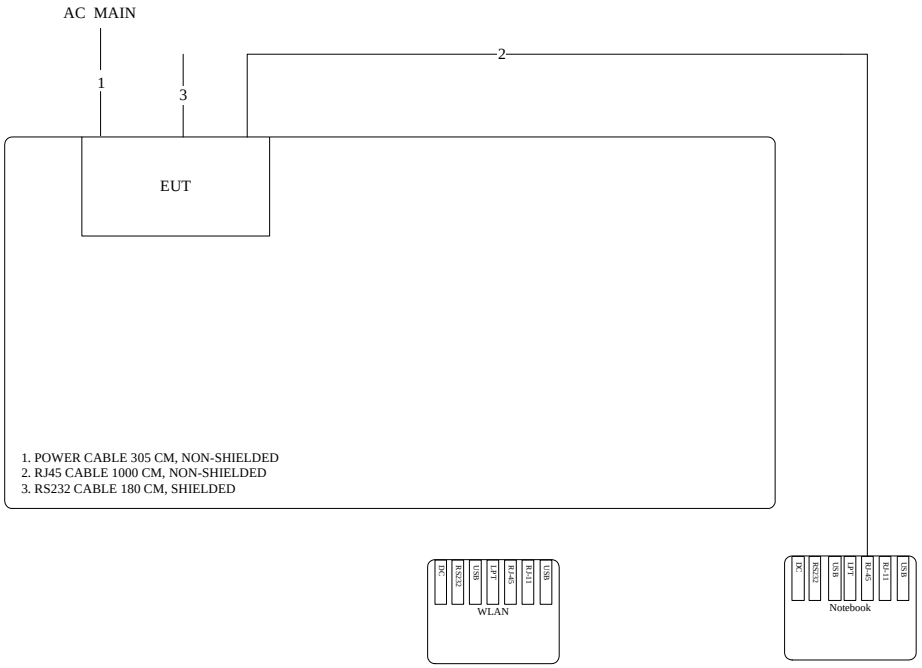


Power from POE:

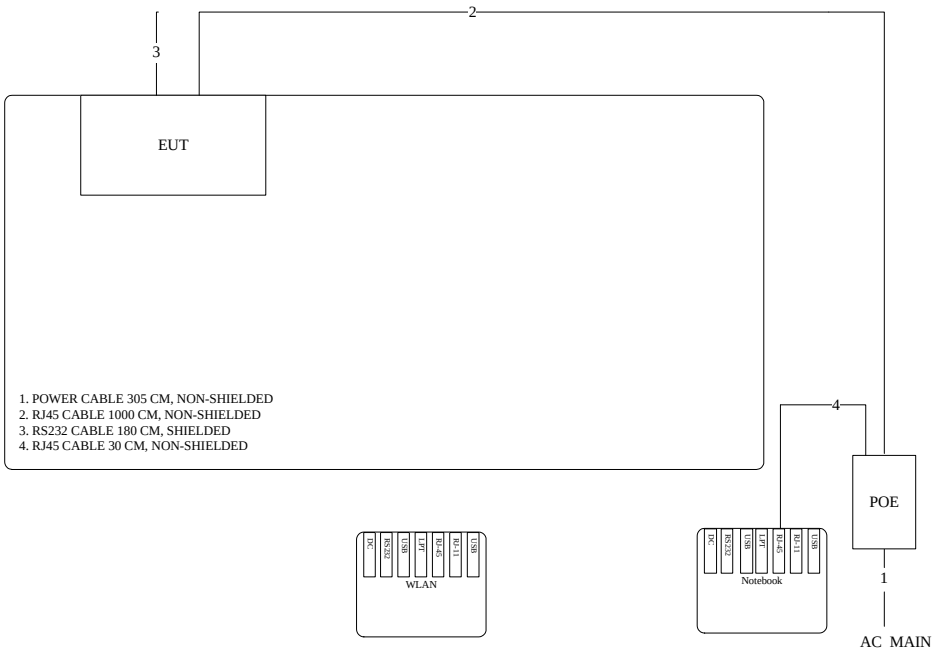


3.8.2. AC Power Line Conduction Emissions Test Configuration

Power from Adapter:



Power from POE:



4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product that is designed to connect to the 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 below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

4.1.2. Measuring Instruments and Setting

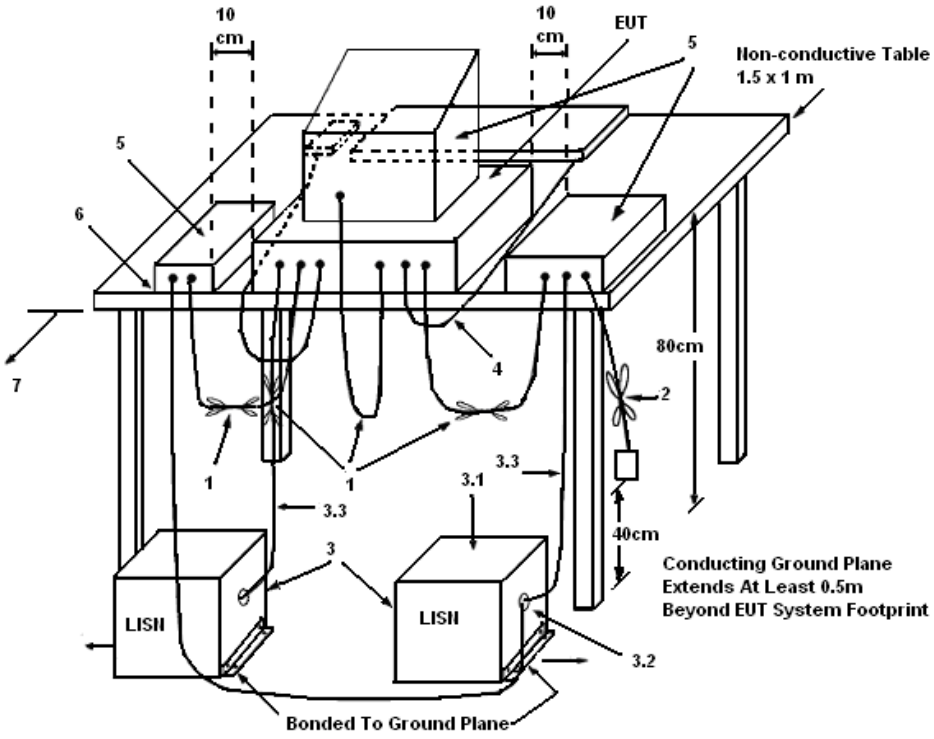
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. Test Setup Layout



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

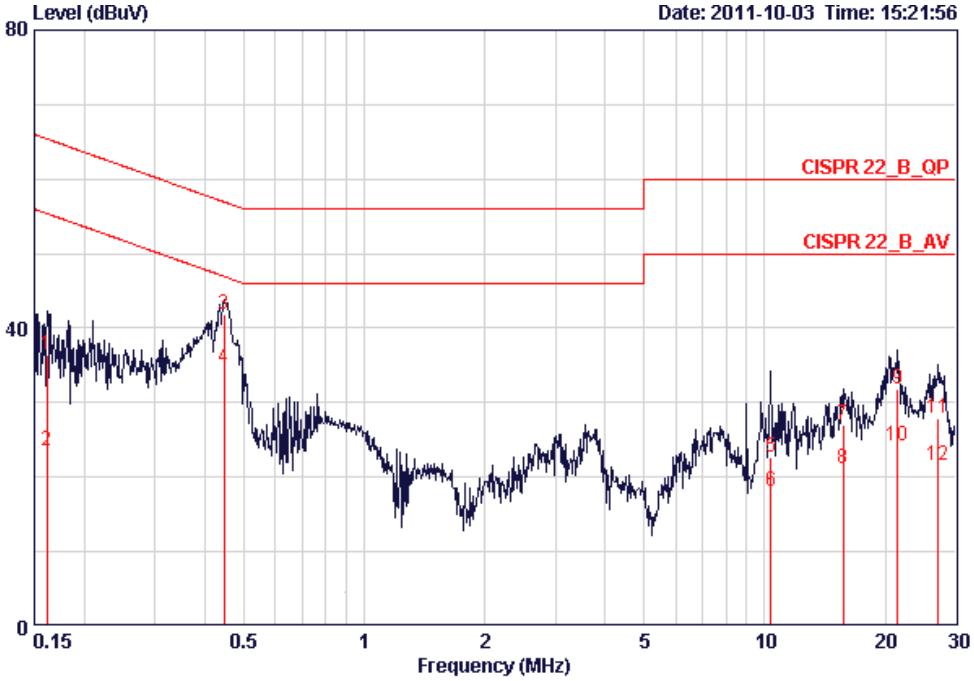
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

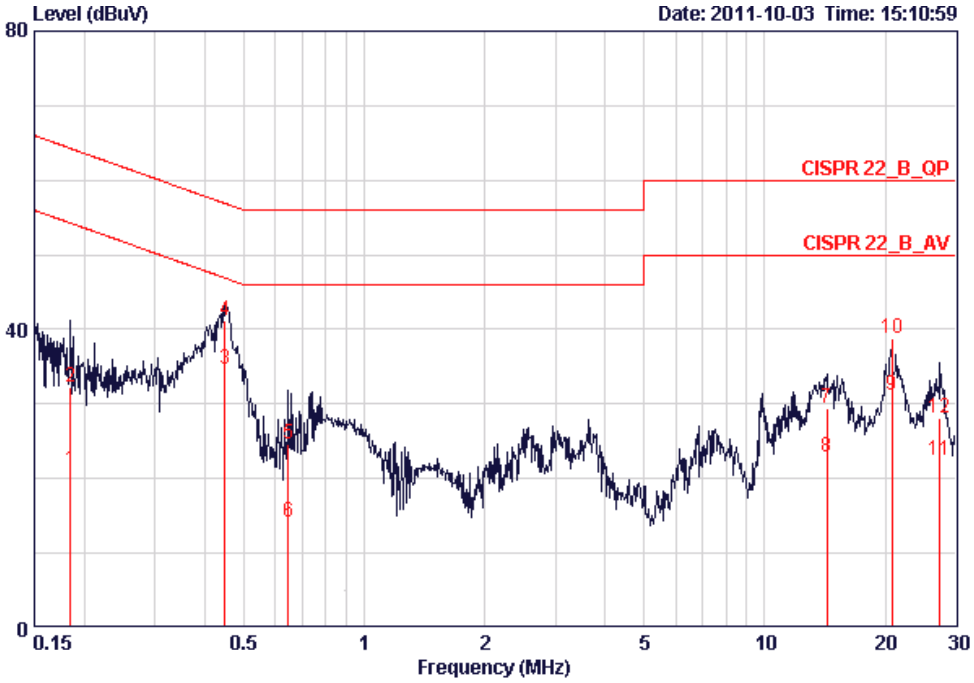
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	21°C	Humidity	59%
Test Engineer	Simon Yang	Phase	Line
Configuration	Normal Link / Mode 1		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.16155	36.39	-29.00	65.38	36.12	0.07	0.20	QP
2	0.16155	23.50	-31.89	55.38	23.23	0.07	0.20	AVERAGE
3	0.44679	41.78	-15.15	56.93	41.55	0.03	0.20	QP
4 @	0.44679	34.65	-12.28	46.93	34.42	0.03	0.20	AVERAGE
5	10.342	22.66	-37.34	60.00	21.93	0.37	0.37	QP
6	10.342	18.15	-31.85	50.00	17.42	0.37	0.37	AVERAGE
7	15.718	26.94	-33.07	60.00	25.94	0.60	0.40	QP
8	15.718	21.21	-28.80	50.00	20.21	0.60	0.40	AVERAGE
9	21.486	31.78	-28.22	60.00	30.36	0.92	0.50	QP
10	21.486	24.28	-25.72	50.00	22.86	0.92	0.50	AVERAGE
11	27.127	27.79	-32.21	60.00	25.93	1.26	0.60	QP
12	27.127	21.65	-28.35	50.00	19.79	1.26	0.60	AVERAGE

Temperature	21°C	Humidity	59%
Test Engineer	Simon Yang	Phase	Neutral
Configuration	Normal Link / Mode 1		

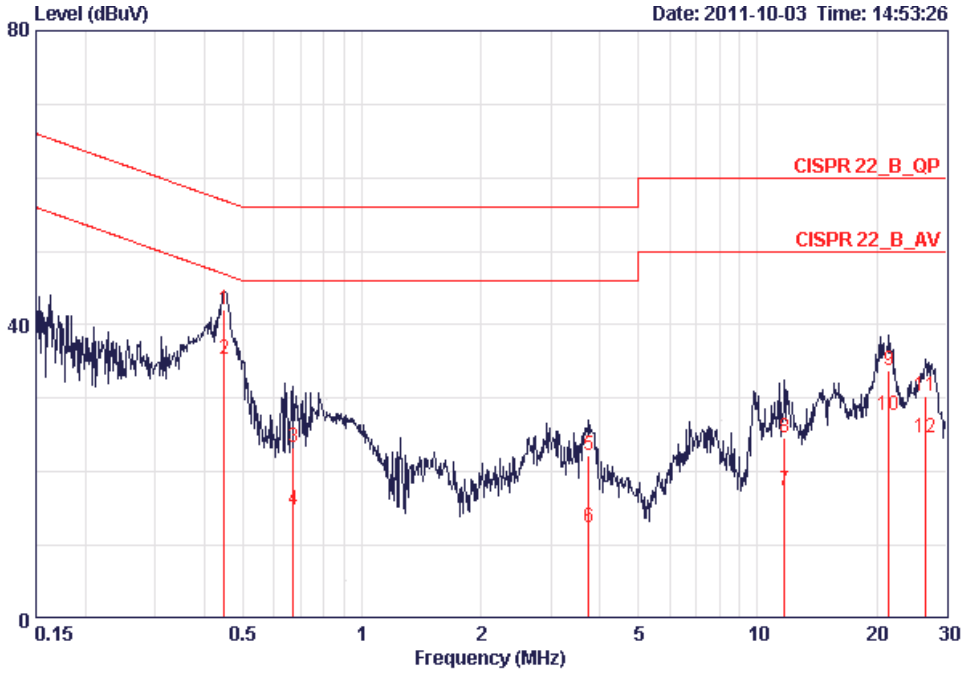


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.18443	21.17	-33.12	54.28	20.88	0.09	0.20	AVERAGE
2	0.18443	32.32	-31.97	64.28	32.03	0.09	0.20	QP
3 @	0.44966	34.65	-12.23	46.88	34.38	0.07	0.20	AVERAGE
4	0.44966	41.28	-15.60	56.88	41.01	0.07	0.20	QP
5	0.64740	24.69	-31.31	56.00	24.42	0.07	0.20	QP
6	0.64740	14.18	-31.82	46.00	13.91	0.07	0.20	AVERAGE
7	14.288	29.48	-30.52	60.00	28.53	0.55	0.40	QP
8	14.288	22.91	-27.09	50.00	21.96	0.55	0.40	AVERAGE
9	20.814	31.10	-18.90	50.00	29.73	0.87	0.50	AVERAGE
10	20.814	38.78	-21.22	60.00	37.41	0.87	0.50	QP
11	27.416	22.43	-27.57	50.00	20.50	1.33	0.60	AVERAGE
12	27.416	28.05	-31.95	60.00	26.12	1.33	0.60	QP

Note:

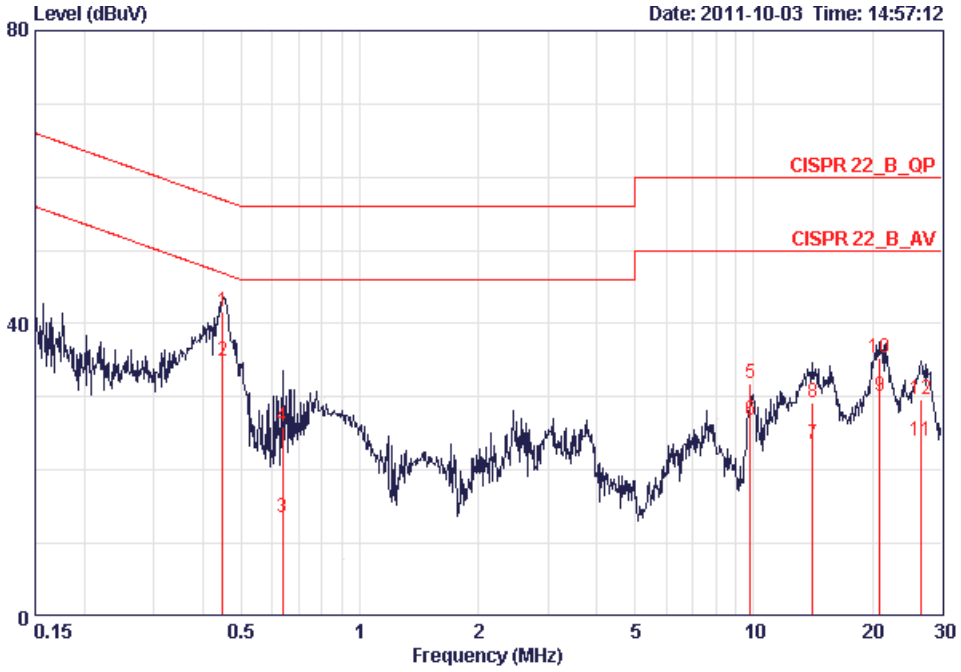
Level = Read Level + LISN Factor + Cable Loss.

Temperature	21°C	Humidity	59%
Test Engineer	Simon Yang	Phase	Line
Configuration	Normal Link / Mode 2		



	Freq	Level	Limit	t Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.44916	42.08	-14.81	56.89	41.85	0.03	0.20	QP
2 @	0.44916	35.35	-11.54	46.89	35.12	0.03	0.20	AVERAGE
3	0.67187	23.31	-32.69	56.00	23.08	0.03	0.20	QP
4	0.67187	14.84	-31.16	46.00	14.61	0.03	0.20	AVERAGE
5	3.740	22.33	-33.67	56.00	21.93	0.10	0.30	QP
6	3.740	12.39	-33.61	46.00	11.99	0.10	0.30	AVERAGE
7	11.683	17.53	-32.47	50.00	16.70	0.43	0.40	AVERAGE
8	11.683	24.72	-35.28	60.00	23.89	0.43	0.40	QP
9	21.486	33.76	-26.24	60.00	32.34	0.92	0.50	QP
10	21.486	27.66	-22.34	50.00	26.24	0.92	0.50	AVERAGE
11	26.558	30.33	-29.67	60.00	28.59	1.24	0.50	QP
12	26.558	24.70	-25.30	50.00	22.96	1.24	0.50	AVERAGE

Temperature	21°C	Humidity	59%
Test Engineer	Simon Yang	Phase	Neutral
Configuration	Normal Link / Mode 2		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.44916	41.58	-15.31	56.89	41.31	0.07	0.20	QP
2 @	0.44916	34.98	-11.91	46.89	34.71	0.07	0.20	AVERAGE
3	0.63798	13.54	-32.46	46.00	13.27	0.07	0.20	AVERAGE
4	0.63798	26.01	-29.99	56.00	25.74	0.07	0.20	QP
5	9.809	31.82	-28.18	60.00	31.14	0.38	0.30	QP
6	9.809	26.76	-23.24	50.00	26.08	0.38	0.30	AVERAGE
7	14.138	23.45	-26.55	50.00	22.51	0.54	0.40	AVERAGE
8	14.138	29.22	-30.78	60.00	28.28	0.54	0.40	QP
9	20.924	30.11	-19.89	50.00	28.73	0.88	0.50	AVERAGE
10	20.924	35.42	-24.58	60.00	34.04	0.88	0.50	QP
11	26.558	23.99	-26.01	50.00	22.21	1.28	0.50	AVERAGE
12	26.558	29.64	-30.36	60.00	27.86	1.28	0.50	QP

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits. But resolution bandwidth within band edge measurement is 1% of the 99% occupied bandwidth.

4.2.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RB	300 kHz
VB	1MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 300 kHz and the video bandwidth of 1000 kHz were used.
3. Measured the spectrum width with power higher than 26dB below carrier.

4.2.4. Test Setup Layout

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of 99% Occupied Bandwidth

Temperature	25°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n / Mode 3

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	21.12	15.68
40	5200 MHz	24.16	18.88
48	5240 MHz	24.64	19.04

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 (2TX, 2RX)

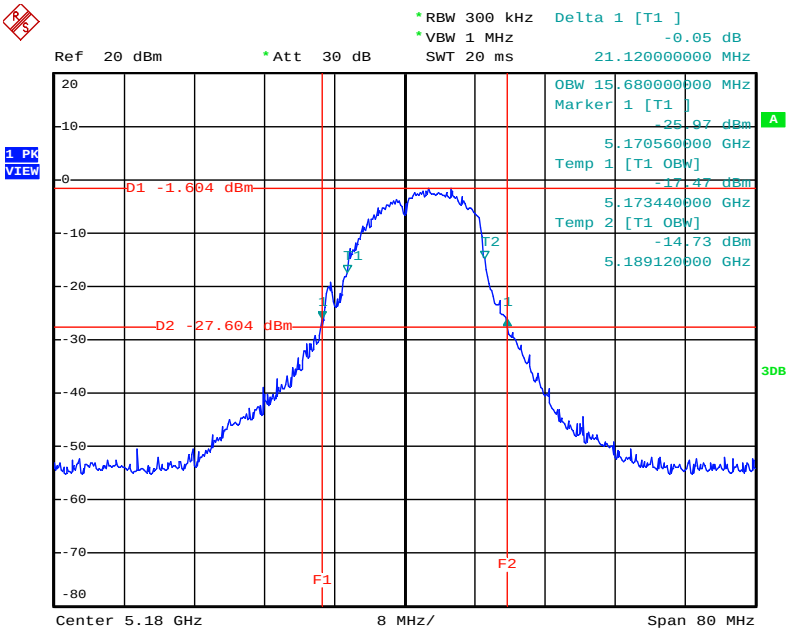
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	42.56	34.24
46	5230 MHz	43.52	34.24

Temperature	25°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a / Mode 3

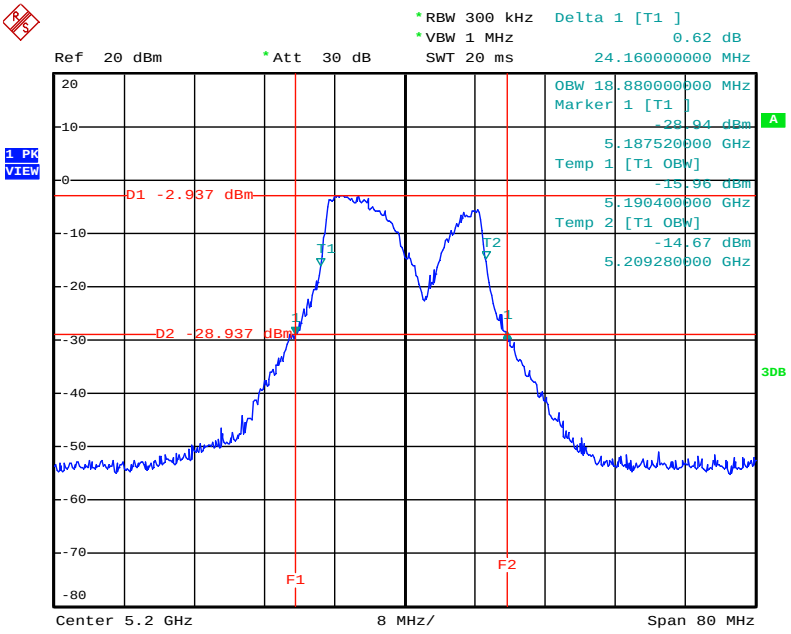
Configuration IEEE 802.11a / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.32	17.60
40	5200 MHz	22.56	16.48
48	5240 MHz	24.00	17.76

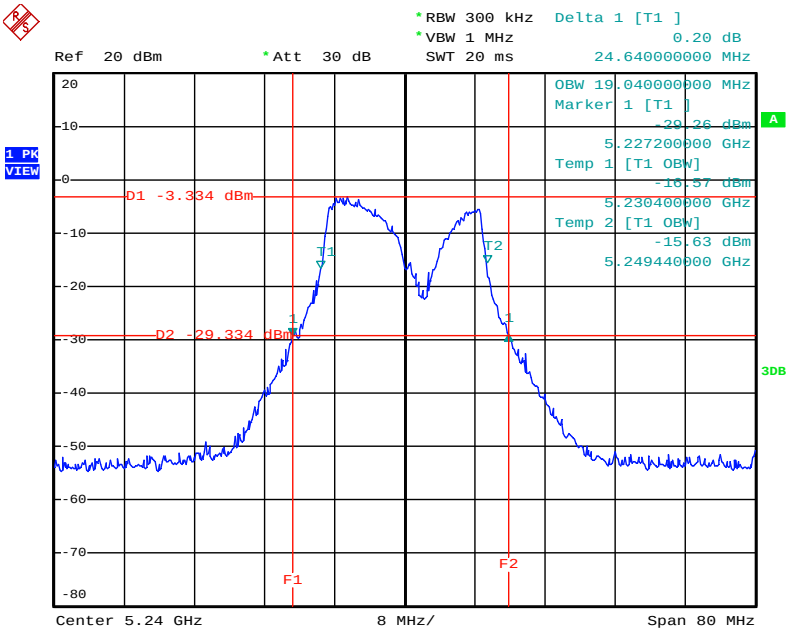
26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 / 5180 MHz / Mode 3 (2TX, 2RX)



26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 / 5200 MHz / Mode 3 (2TX, 2RX)

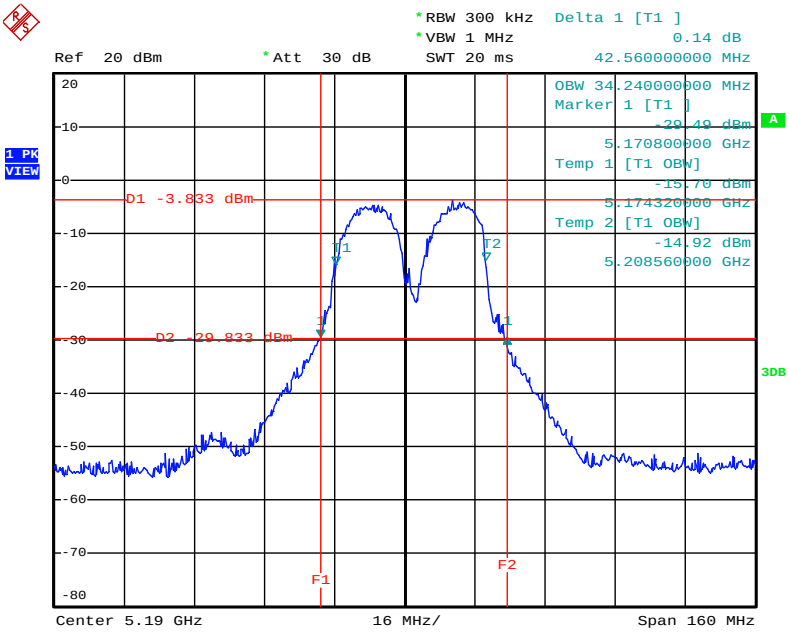


26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 / 5240 MHz / Mode 3 (2TX, 2RX)



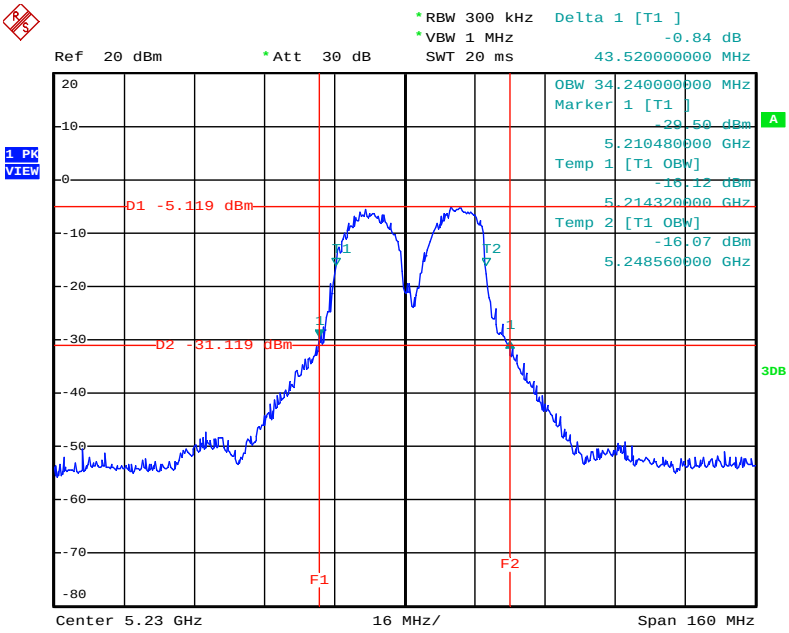
Date: 18.JAN.2012 12:01:59

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 / 5190 MHz



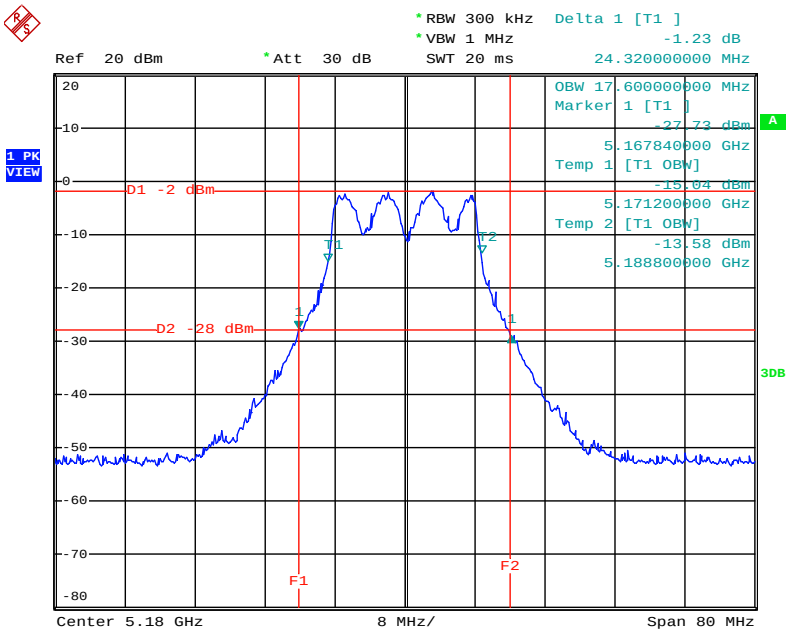
Date: 18.JAN.2012 12:05:28

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 / 5230 MHz / Mode 3 (2TX, 2RX)



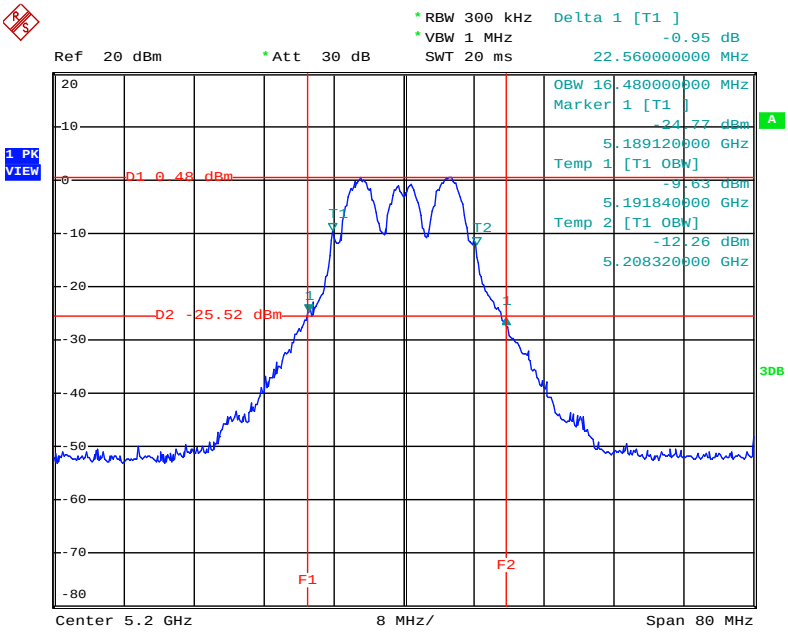
Date: 18.JAN.2012 12:06:02

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5180 MHz / Mode 3 (2TX, 2RX)



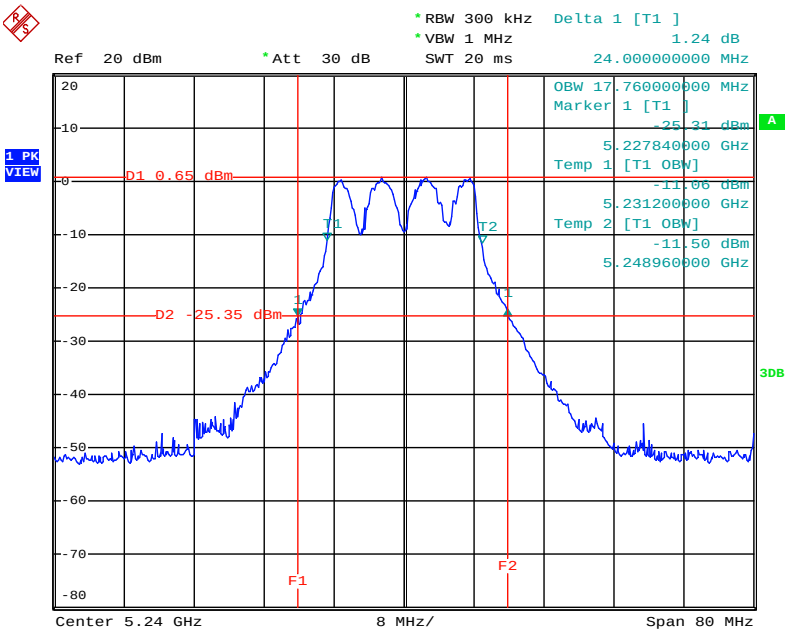
Date: 10.JAN.2012 12:11:09

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5200 MHz / Mode 3 (2TX, 2RX)



Date: 10.JAN.2012 12:14:26

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5240 MHz / Mode 3 (2TX, 2RX)



Date: 10.JAN.2012 12:16:16

Temperature	25°C	Humidity	56%
Test Engineer	Satoshi Yang	Configurations	IEEE 802.11n / Mode 6

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	25.44	18.40
40	5200 MHz	25.76	18.56
48	5240 MHz	25.28	18.40

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	48.64	36.80
46	5230 MHz	46.72	36.80

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.00	19.04
40	5200 MHz	24.96	19.04
48	5240 MHz	24.80	19.04

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	41.92	34.88
46	5230 MHz	43.20	34.56

Configuration IEEE 802.11n MCS8 20MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.48	18.08
40	5200 MHz	24.64	18.24
48	5240 MHz	24.48	18.24

Configuration IEEE 802.11n MCS8 40MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	47.04	36.80
46	5230 MHz	44.48	36.80

Temperature	25°C	Humidity	56%
Test Engineer	Satoshi Yang	Configurations	IEEE 802.11a / Mode 6

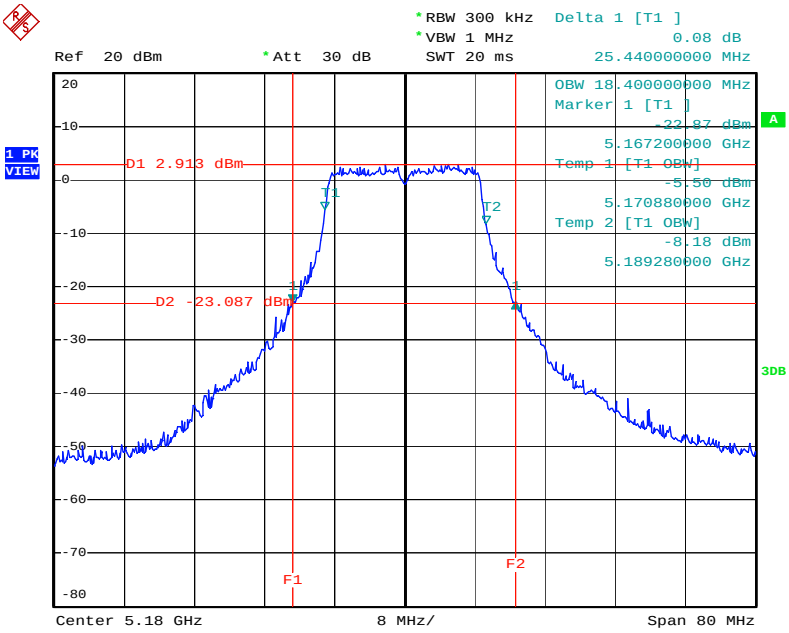
Configuration IEEE 802.11a / Chain 1 (1TX, 2RX)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	25.44	17.44
40	5200 MHz	25.44	17.44
48	5240 MHz	26.08	17.44

Configuration IEEE 802.11a / Chain 1+ Chain 2 (2TX, 2RX)

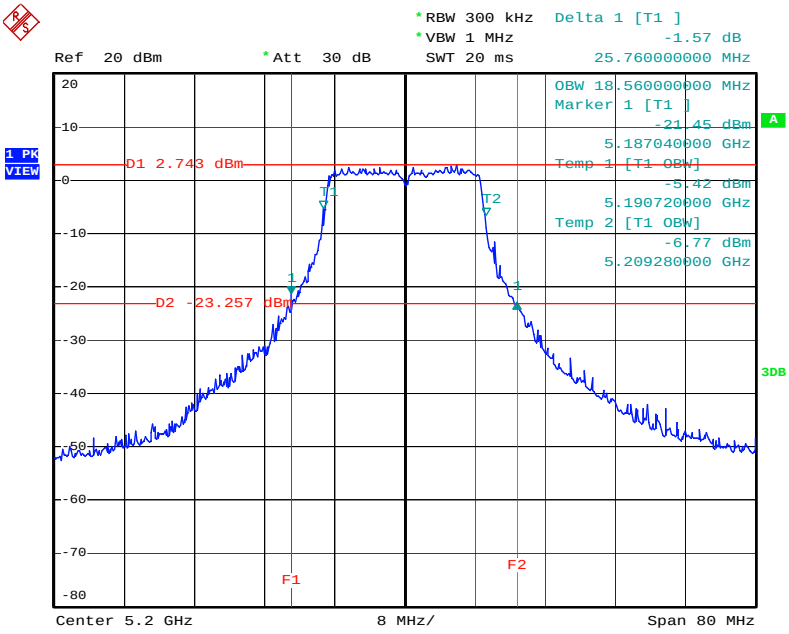
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	23.68	17.60
40	5200 MHz	23.68	17.60
48	5240 MHz	21.76	16.32

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5180 MHz / Mode 6 1TX, 2RX)



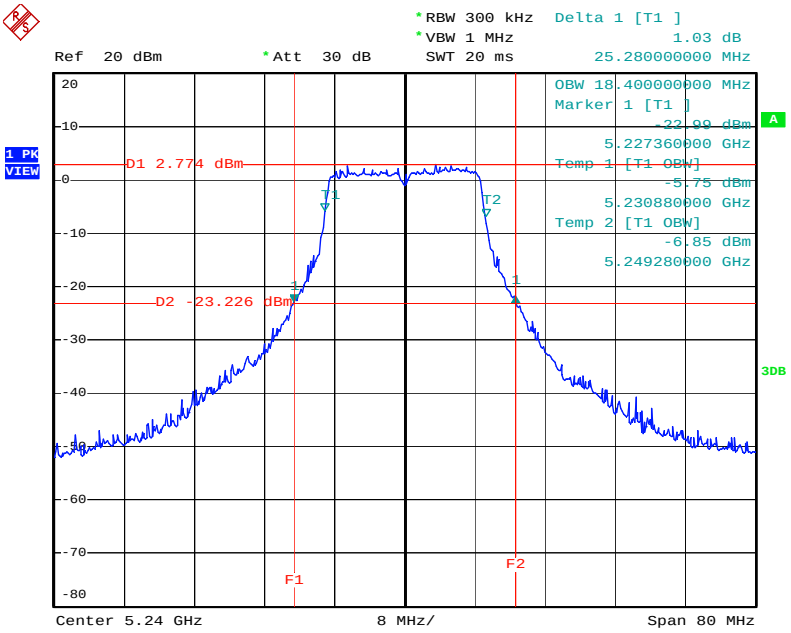
Date: 15.DEC.2011 17:50:42

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5200 MHz / Mode 6 (1TX, 2RX)



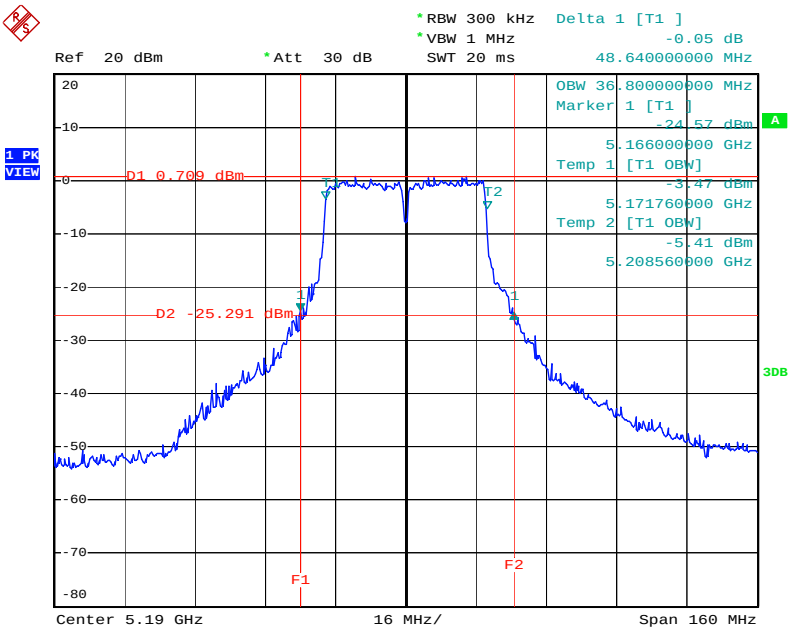
Date: 15.DEC.2011 17:50:19

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5240 MHz / Mode 6 (1TX, 2RX)



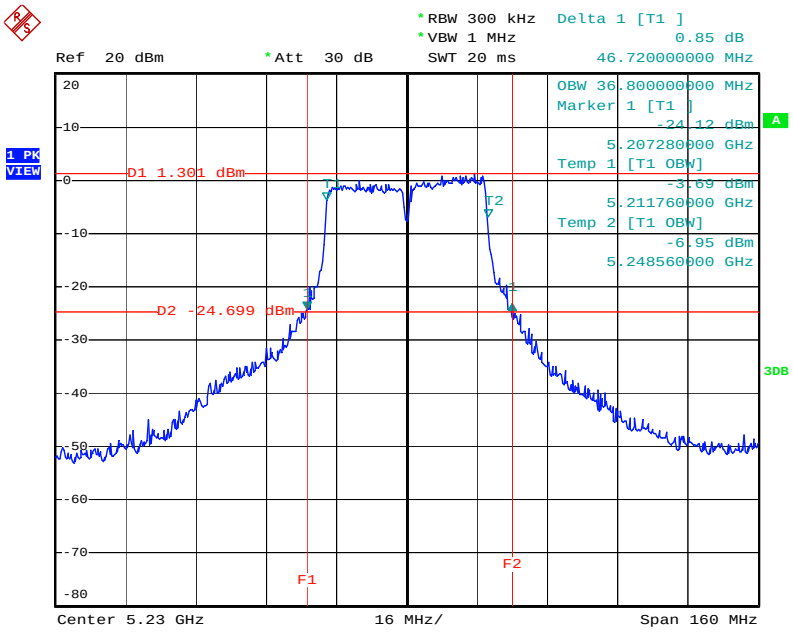
Date: 15.DEC.2011 17:49:53

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 / 5190 MHz / Mode 6 (1TX, 2RX)



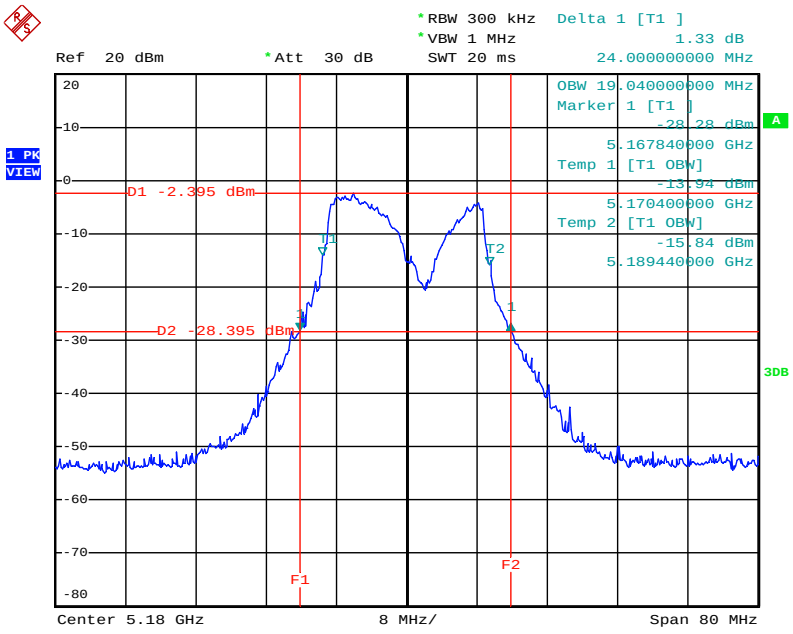
Date: 15.DEC.2011 17:42:45

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 / 5230 MHz / Mode 6 (1TX, 2RX)



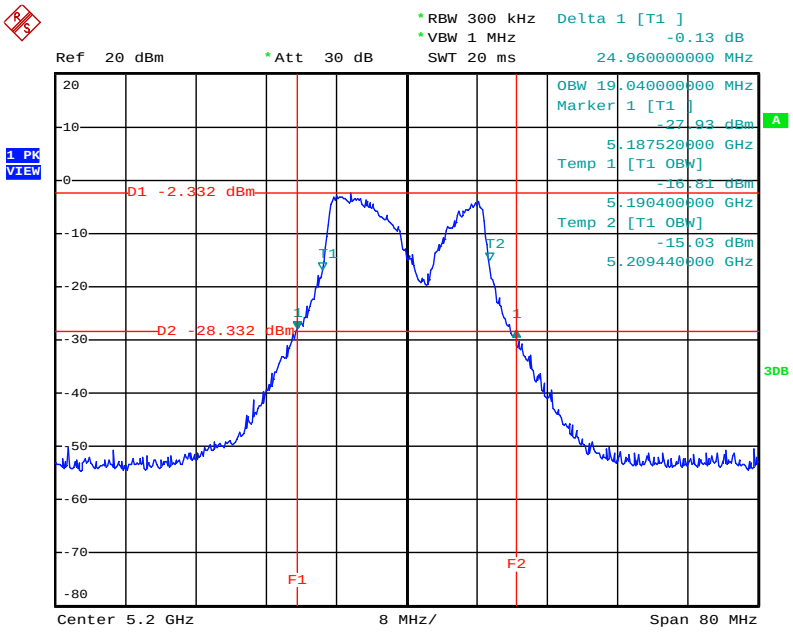
Date: 15.DEC.2011 17:43:23

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 / 5180 MHz / Mode 6 (2TX, 2RX)



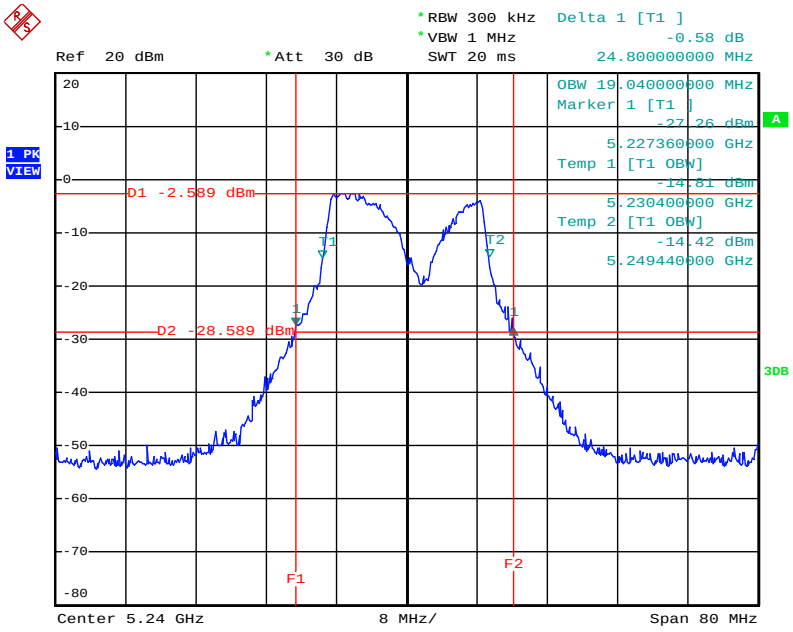
Date: 1.FEB.2012 16:43:21

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 / 5200 MHz / Mode 6 (2TX, 2RX)



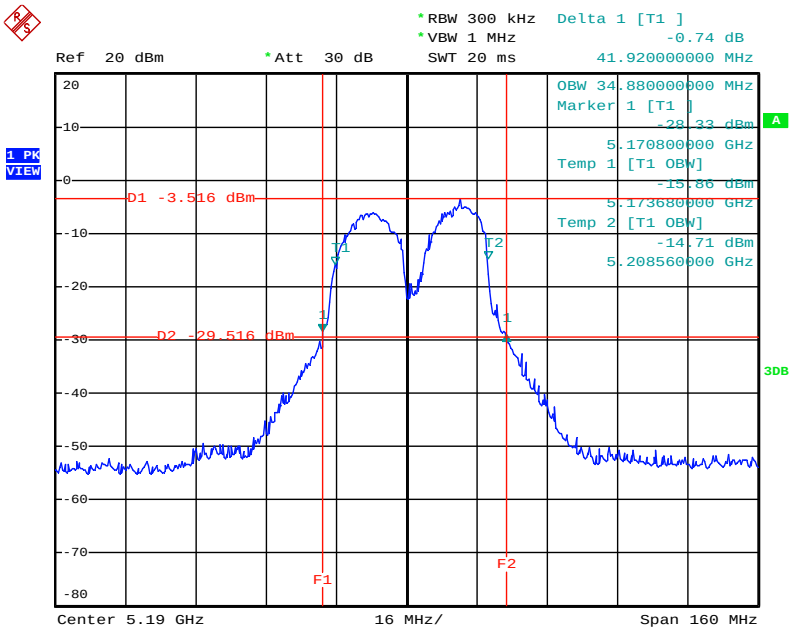
Date: 1.FEB.2012 16:43:50

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 / 5240 MHz / Mode 6 (2TX, 2RX)



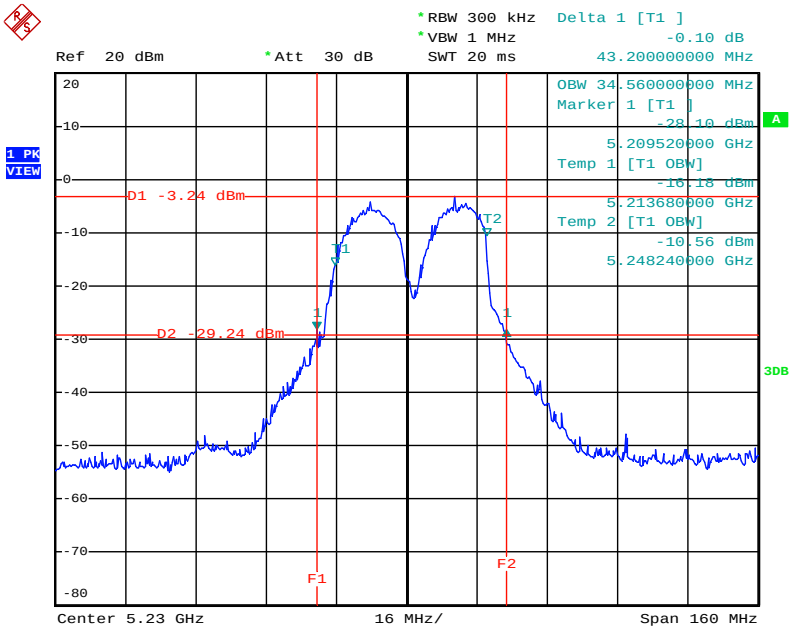
Date: 1.FEB.2012 16:44:22

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 / 5190 MHz / Mode 6 (2TX, 2RX)



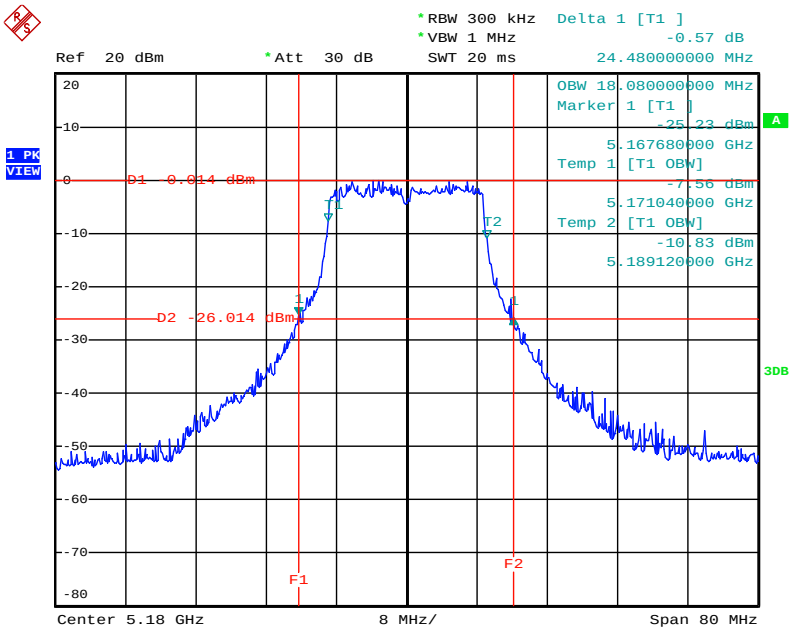
Date: 1.FEB.2012 16:49:32

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 / 5230 MHz / Mode 6 (2TX, 2RX)



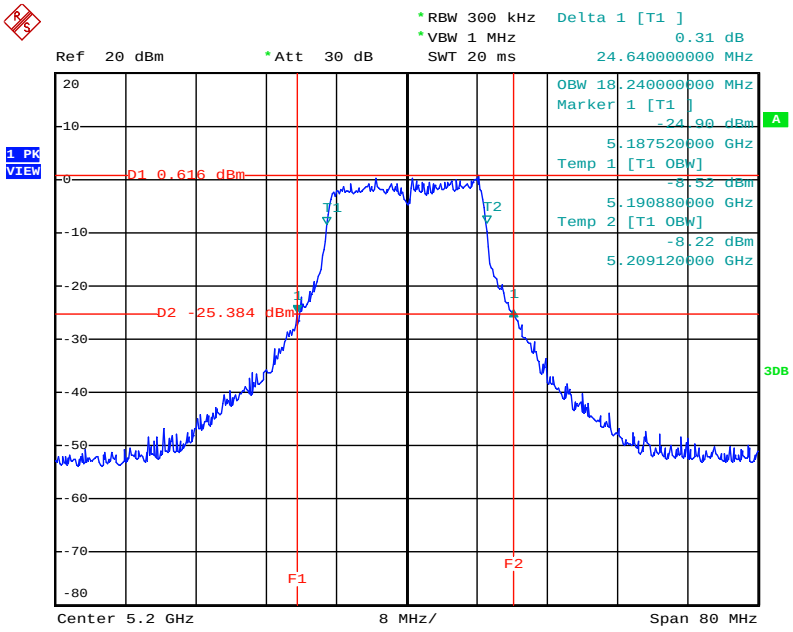
Date: 1.FEB.2012 16:50:00

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz / Chain 1 + Chain 2 / 5180 MHz / Mode 6 (2TX, 2RX)



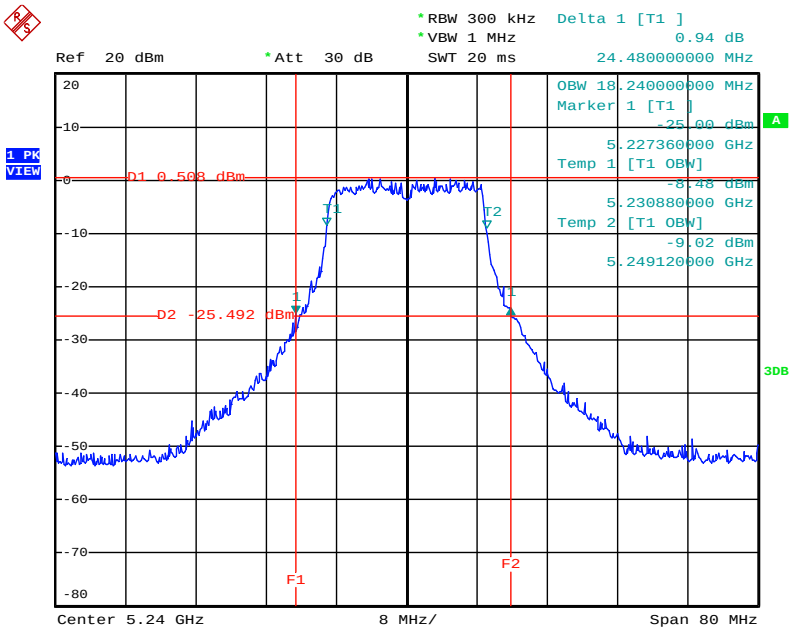
Date: 11.JAN.2012 16:22:35

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz / Chain 1 + Chain 2 / 5200 MHz / Mode 6 (2TX, 2RX)



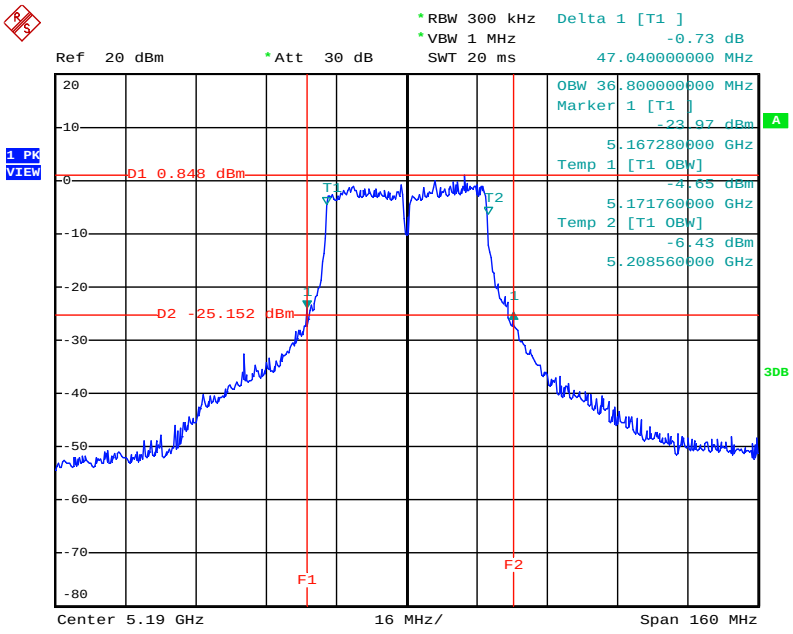
Date: 11.JAN.2012 16:23:12

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz / Chain 1 + Chain 2 / 5240 MHz / Mode 6 (2TX, 2RX)



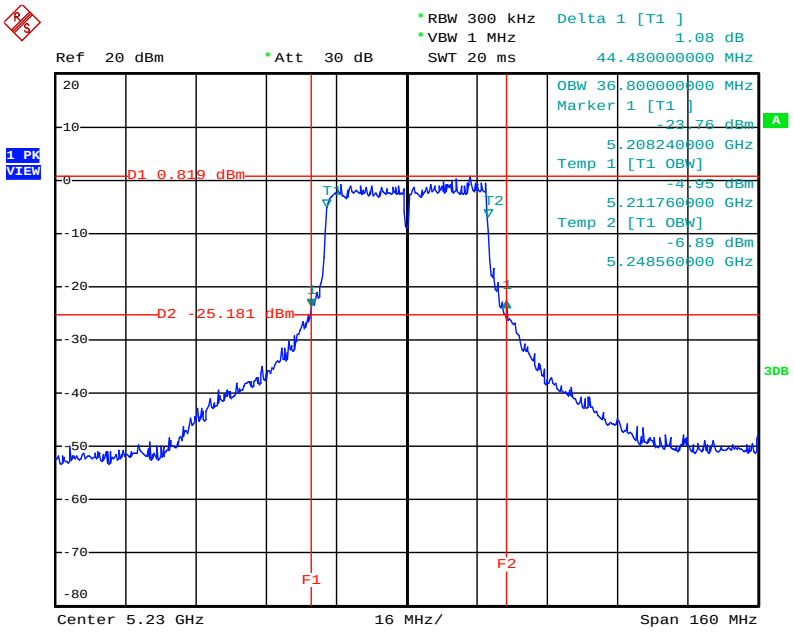
Date: 11.JAN.2012 16:23:37

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz / Chain 1 + Chain 2 / 5190 MHz / Mode 6 (2TX, 2RX)



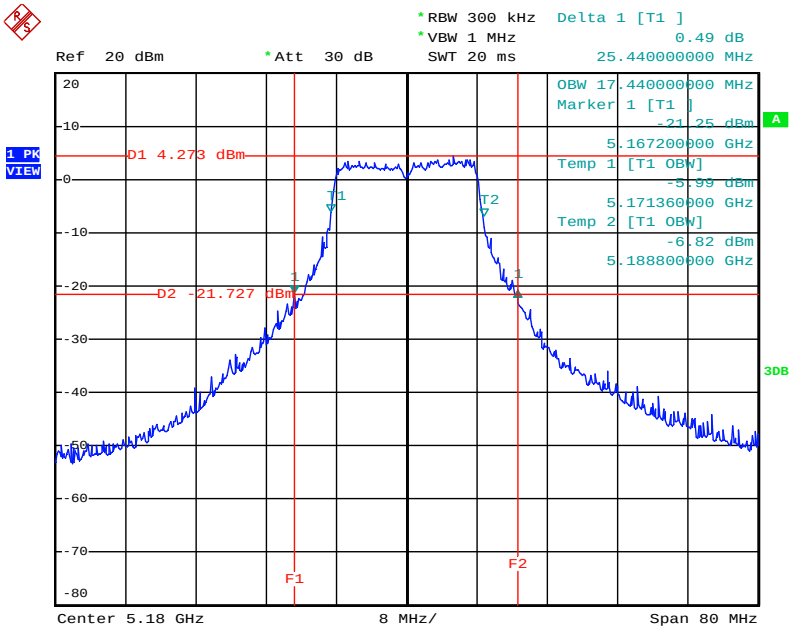
Date: 11.JAN.2012 16:44:48

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz / Chain 1 + Chain 2 / 5230 MHz / Mode 6 (2TX, 2RX)



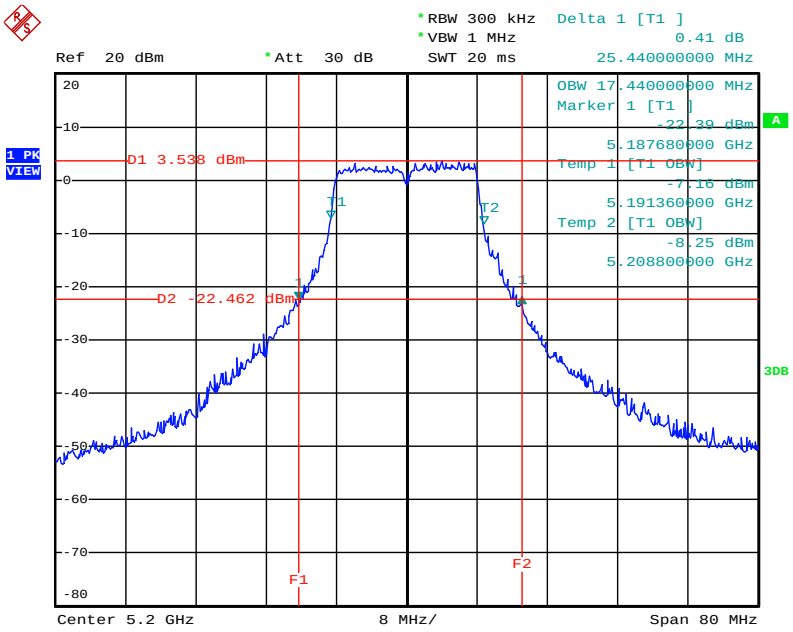
Date: 11.JAN.2012 16:45:17

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5180 MHz / Mode 6 (1TX, 2RX)



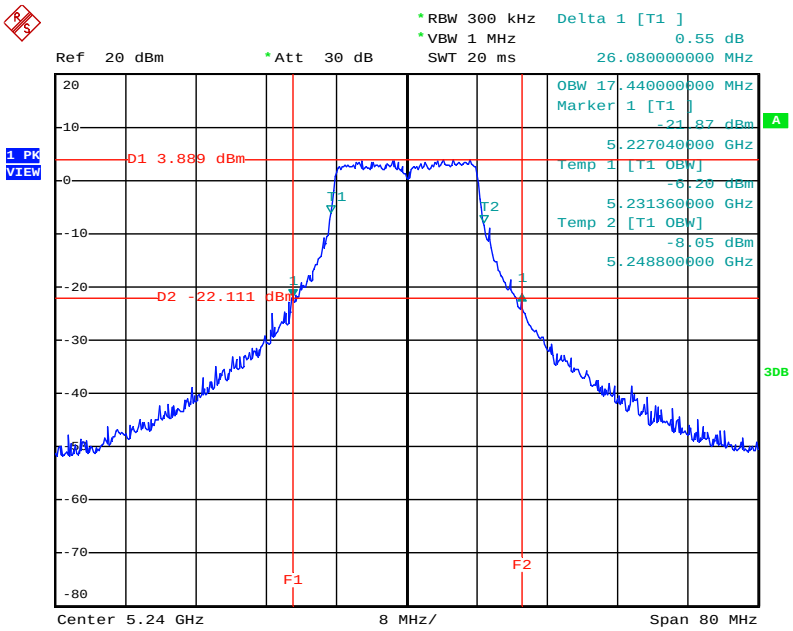
Date: 16.DEC.2011 15:27:11

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5200 MHz / Mode 6 (1TX, 2RX)



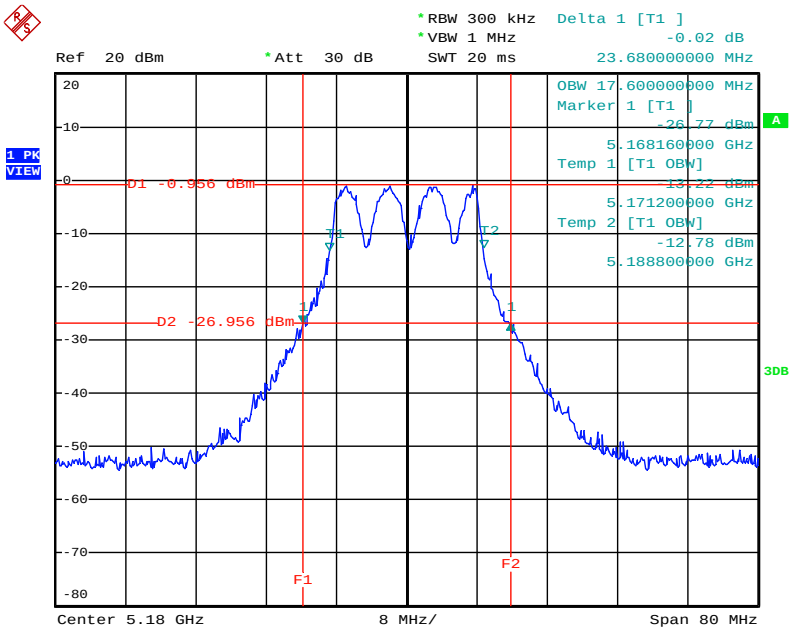
Date: 16.DEC.2011 15:28:58

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5240 MHz / Mode 6 (1TX, 2RX)



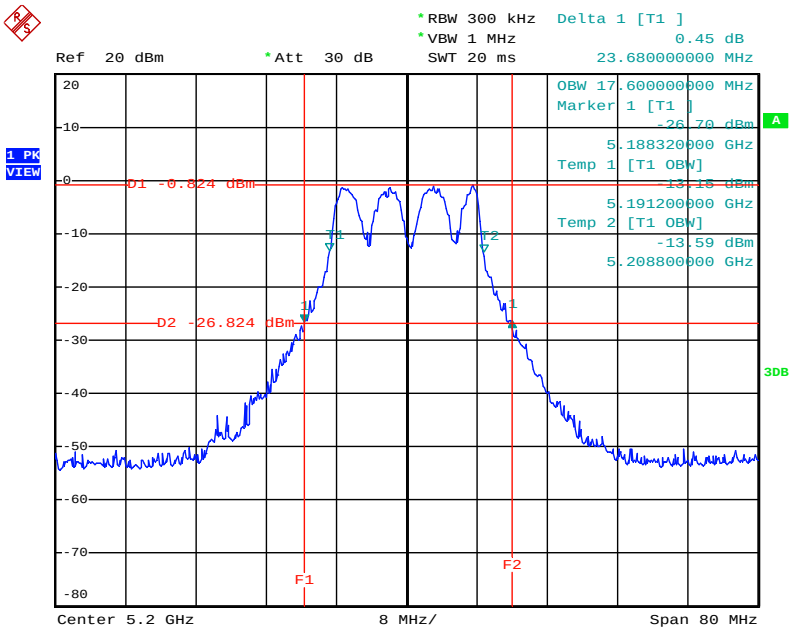
Date: 16.DEC.2011 15:29:38

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5180 MHz / Mode 6 (2TX, 2RX)



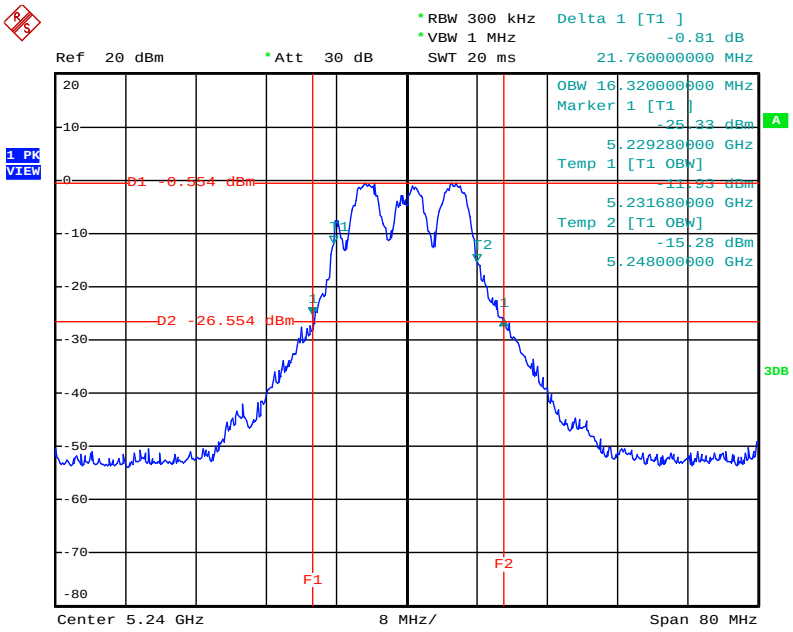
Date: 11.JAN.2012 16:48:21

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5200 MHz / Mode 6 (2TX, 2RX)



Date: 11.JAN.2012 16:48:42

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5240 MHz / Mode 6 (2TX, 2RX)



Date: 11.JAN.2012 16:49:04

Temperature	25°C	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n / Mode 9

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.64	19.04
40	5200 MHz	24.32	19.04
48	5240 MHz	24.80	18.88

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 (2TX, 2RX)

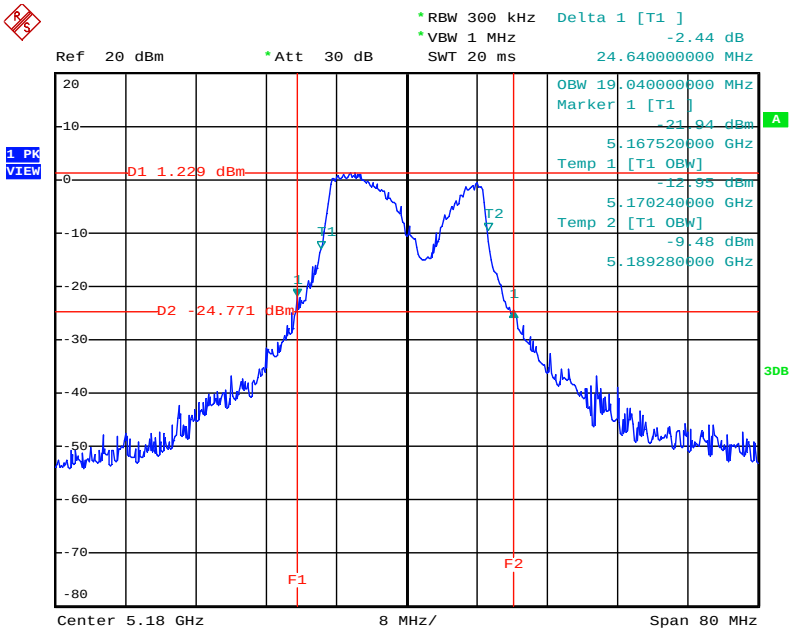
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	46.40	37.12
46	5230 MHz	43.84	34.56

Temperature	25°C	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a / Mode 9

Configuration IEEE 802.11a / Chain 1 + Chain 2 (2TX, 2RX)

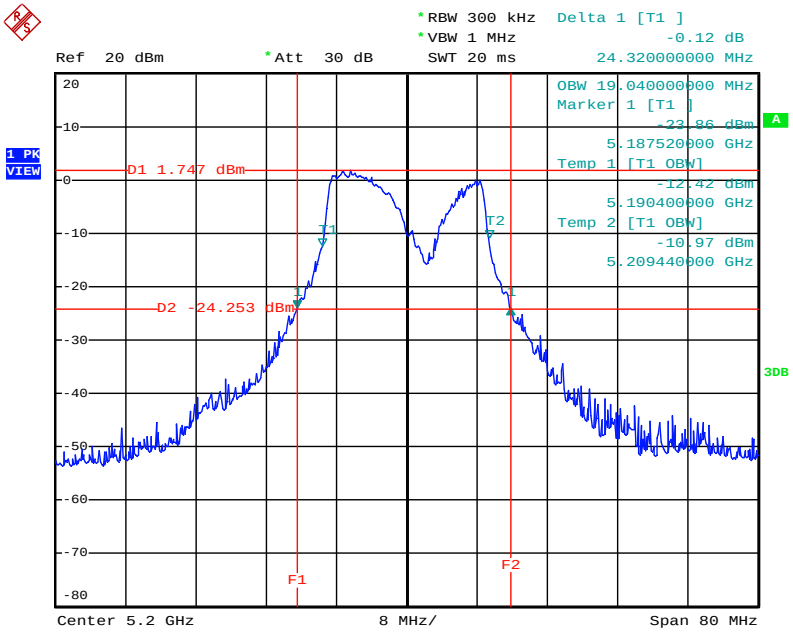
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	23.84	17.44
40	5200 MHz	23.84	17.44
48	5240 MHz	21.76	16.32

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 / 5180 MHz / Mode 9 (2TX, 2RX)



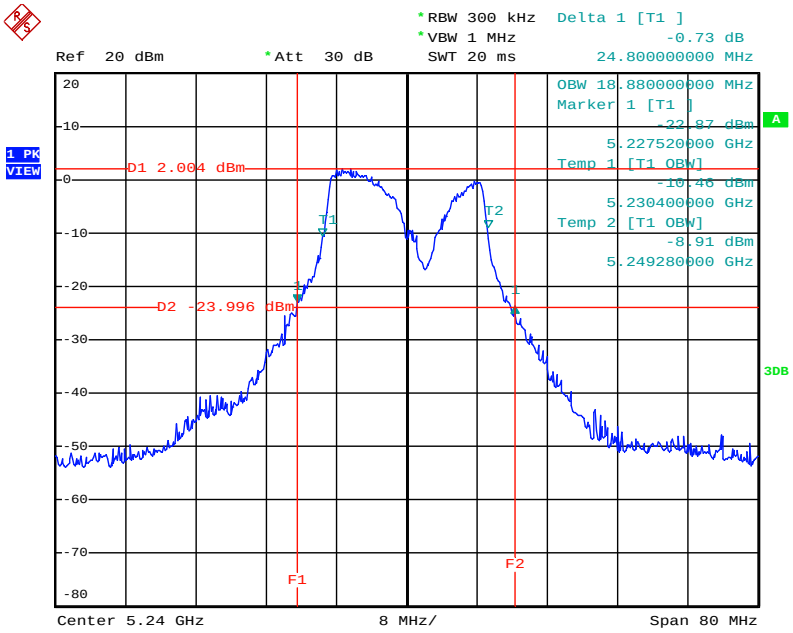
Date: 2.FEB.2012 11:55:33

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 / 5200 MHz / Mode 9 (2TX, 2RX)



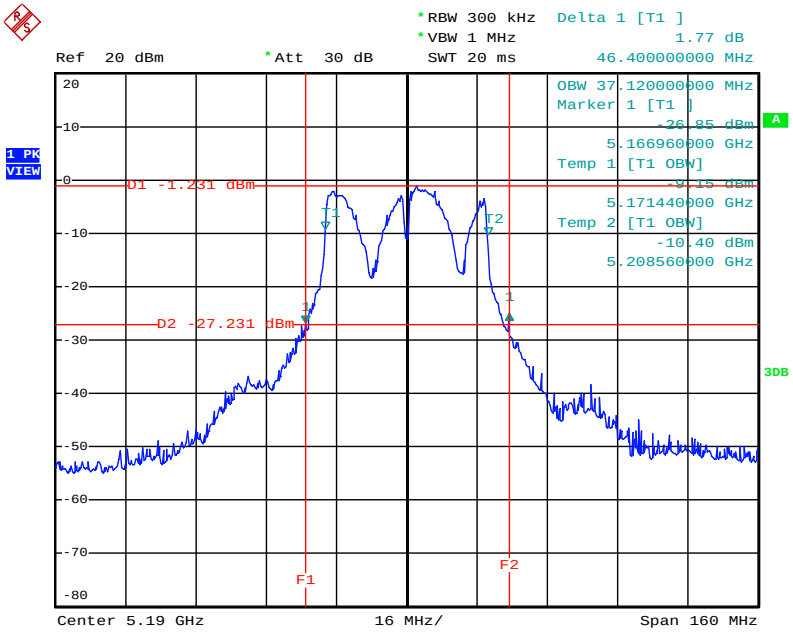
Date: 2.FEB.2012 11:54:39

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 / 5240 MHz / Mode 9 (2TX, 2RX)



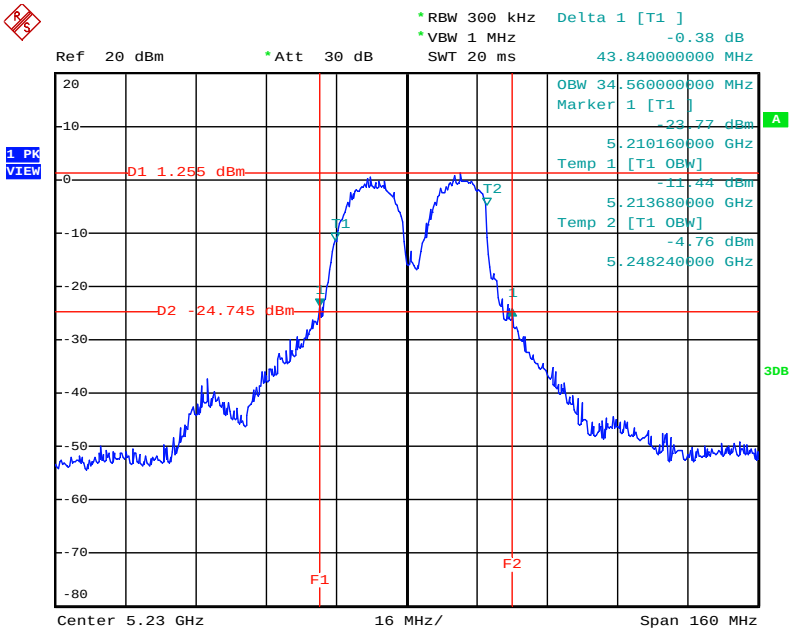
Date: 2.FEB.2012 11:52:47

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 / 5190 MHz / Mode 9 (2TX, 2RX)



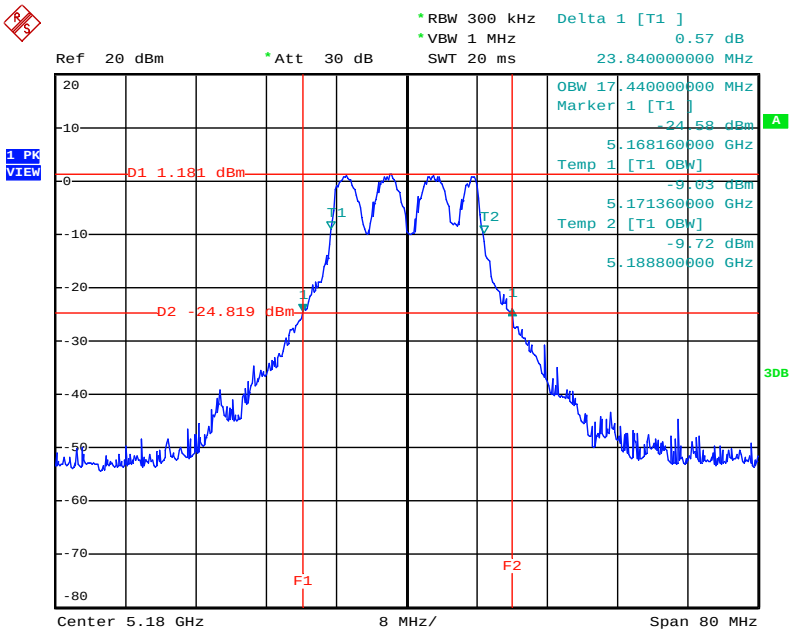
Date: 2.FEB.2012 11:56:35

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 / 5230 MHz / Mode 9 (2TX, 2RX)



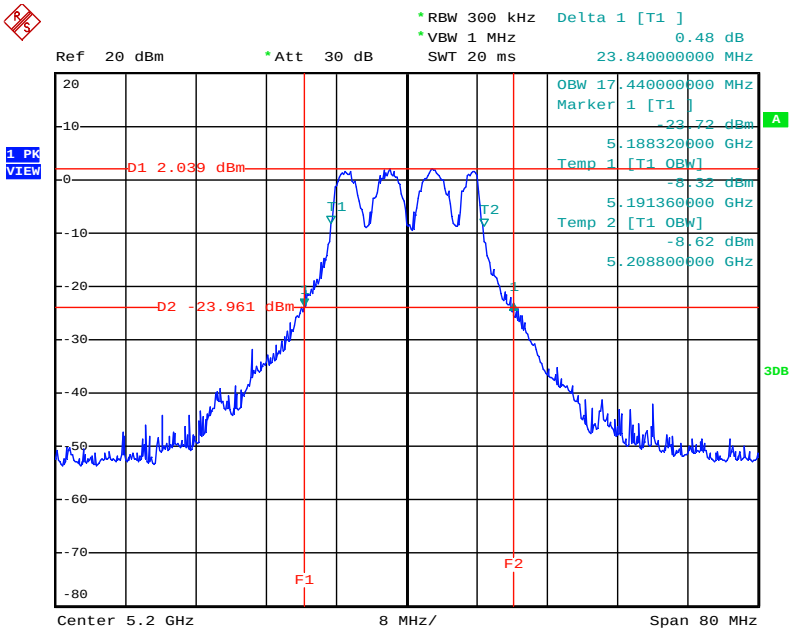
Date: 2.FEB.2012 11:57:09

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5180 MHz / Mode 9 (2TX, 2RX)



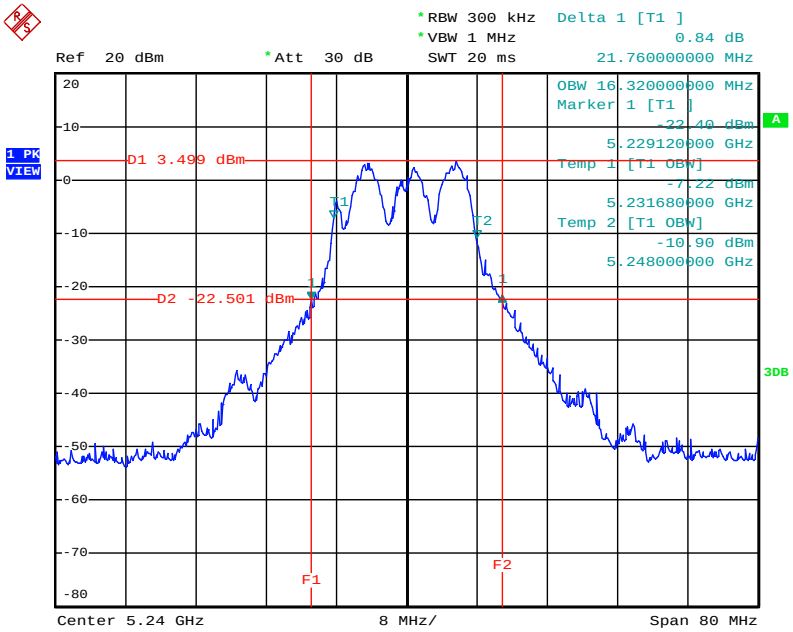
Date: 11.JAN.2012 17:00:33

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5200 MHz / Mode 9 (2TX, 2RX)



Date: 11.JAN.2012 17:00:15

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5240 MHz / Mode 9 (2TX, 2RX)



Date: 11.JAN.2012 16:59:55

Temperature	25°C	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n / Mode 12

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 (2TX, 2RX)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	25.28	18.40
40	5200 MHz	25.44	18.40
48	5240 MHz	25.28	18.40

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 (2TX, 2RX)

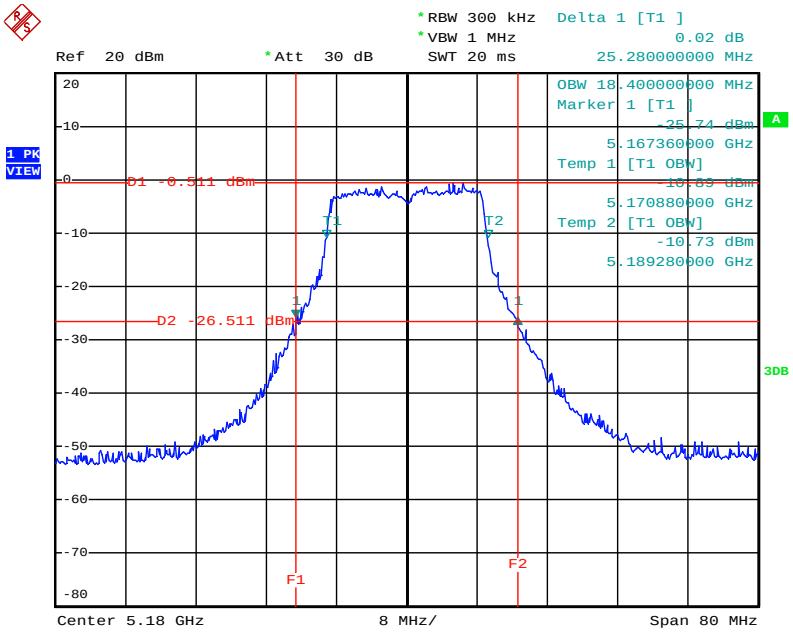
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	47.36	36.80
46	5230 MHz	49.28	36.80

Temperature	25°C	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a / Mode 12

Configuration IEEE 802.11a / Chain 1 (2TX, 2RX)

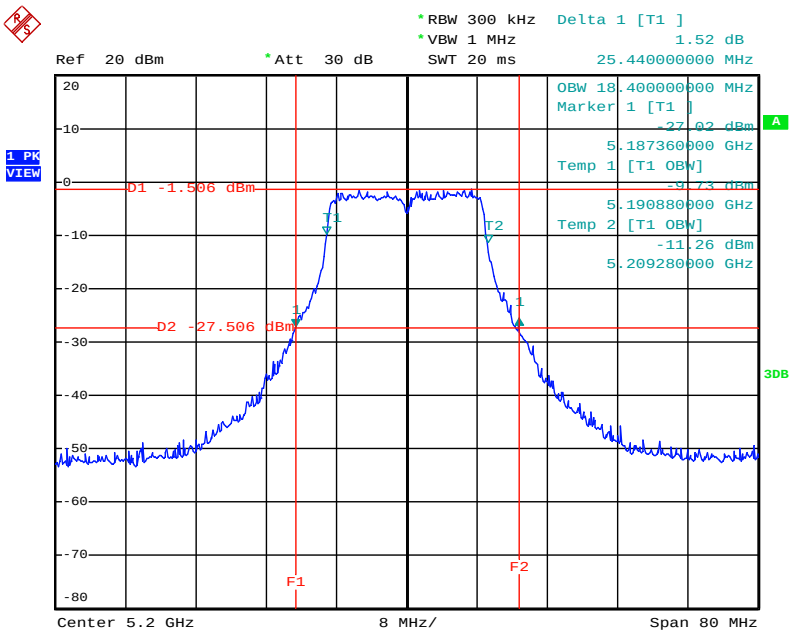
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.64	17.44
40	5200 MHz	25.12	17.28
48	5240 MHz	24.48	17.44

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5180 MHz / Mode 12 (1TX, 2RX)



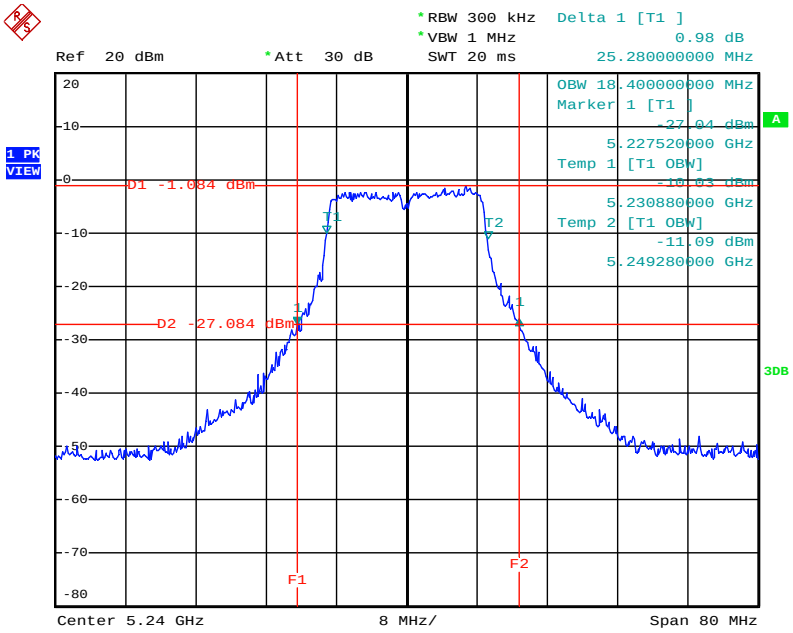
Date: 8.FEB.2012 22:24:01

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5200 MHz / Mode 12 (1TX, 2RX)



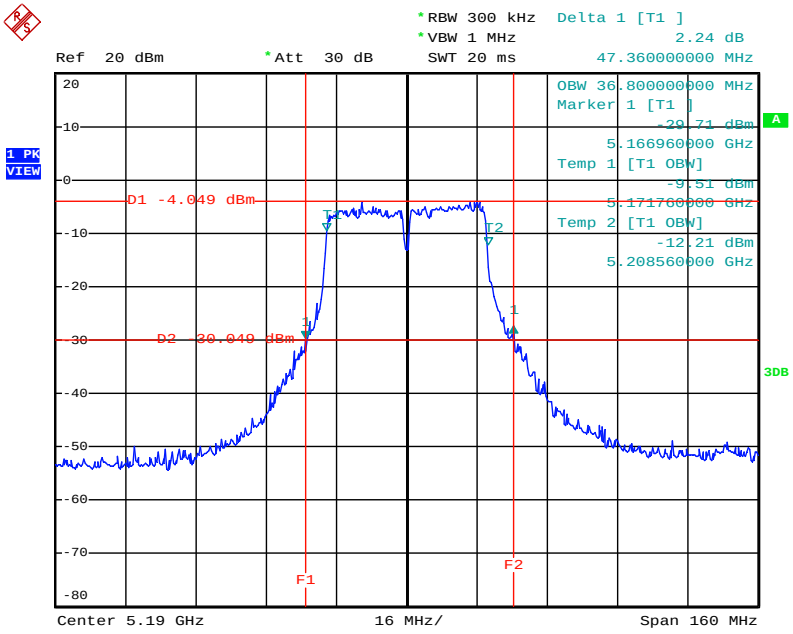
Date: 8.FEB.2012 22:24:32

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5240 MHz / Mode 12 (1TX, 2RX)



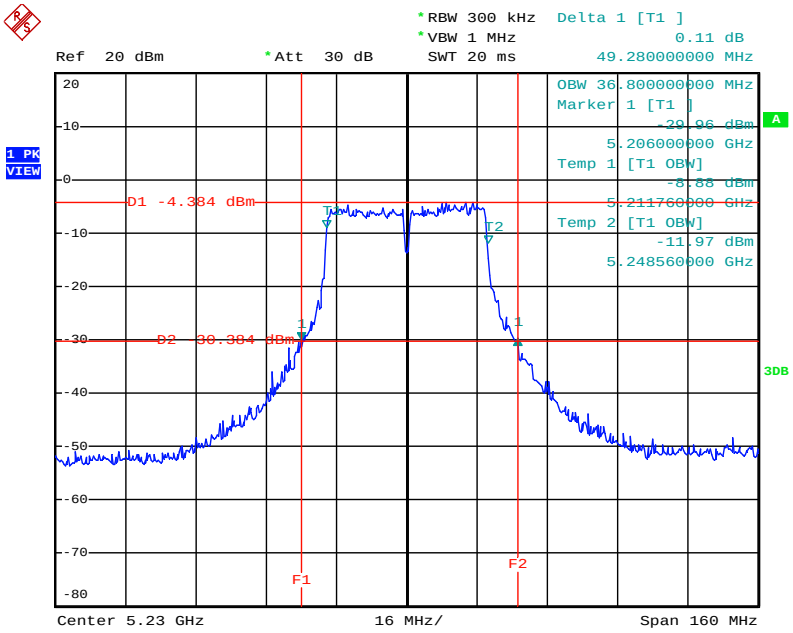
Date: 8.FEB.2012 22:25:04

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 / 5190 MHz / Mode 12 (1TX, 2RX)



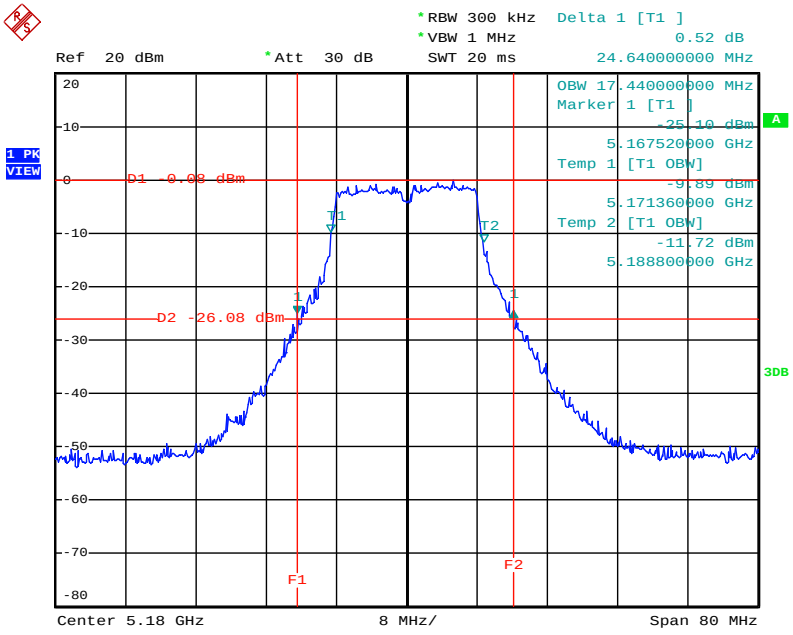
Date: 8.FEB.2012 22:22:46

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1/ 5230 MHz / Mode 12 (1TX, 2RX)



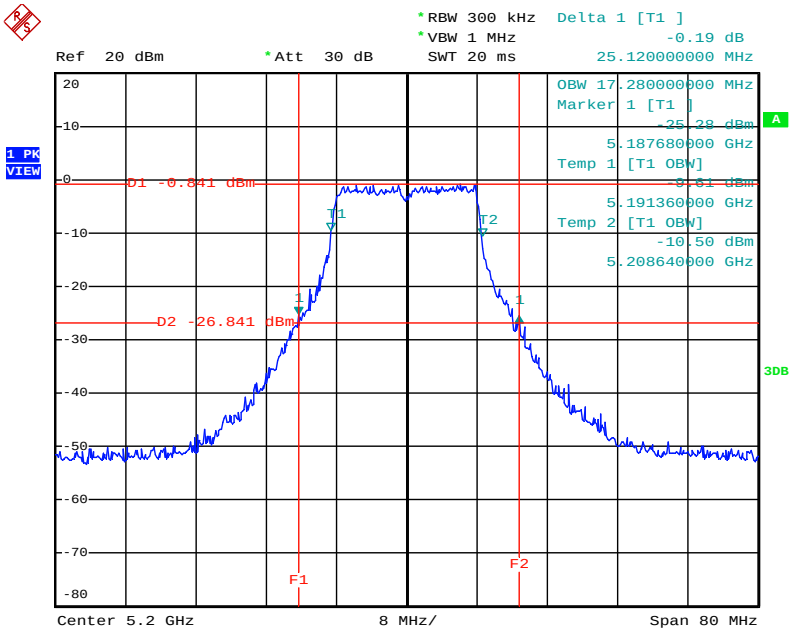
Date: 8.FEB.2012 22:21:57

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1/ 5180 MHz / Mode 12 (1TX, 2RX)



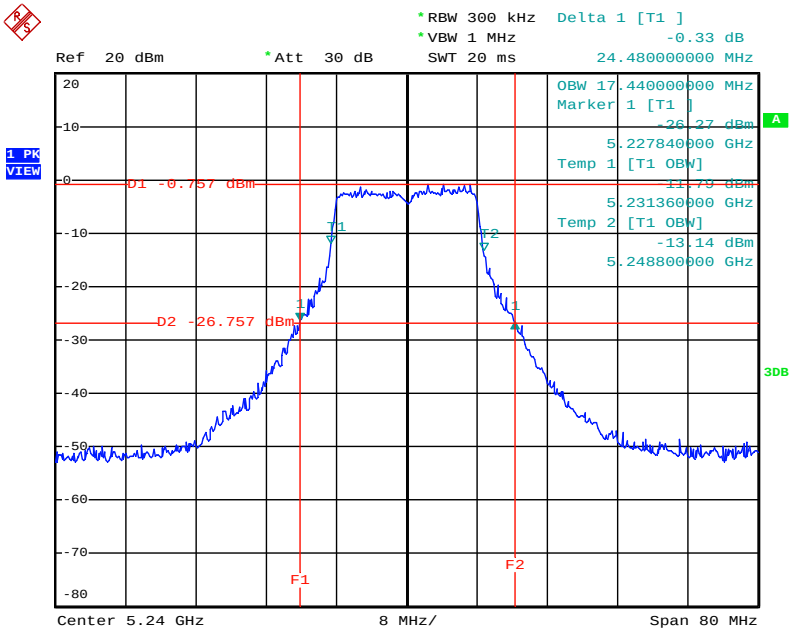
Date: 8.FEB.2012 22:26:48

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5200 MHz / Mode 12 (1TX, 2RX)



Date: 8.FEB.2012 22:26:19

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5240 MHz / Mode 12 (1TX, 2RX)



Date: 8.FEB.2012 22:25:52

Temperature	25°C	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n / Mode 15

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	25.60	18.40
40	5200 MHz	25.76	18.40
48	5240 MHz	25.76	18.40

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 (1TX, 2RX)

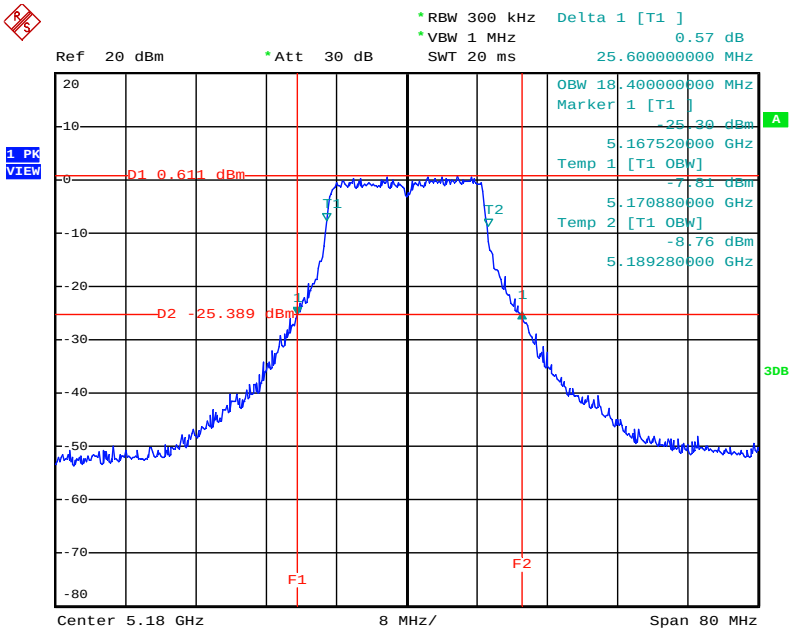
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	48.32	36.80
46	5230 MHz	48.96	36.80

Temperature	25°C	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a / Mode 15

Configuration IEEE 802.11a / Chain 1 (1TX, 2RX)

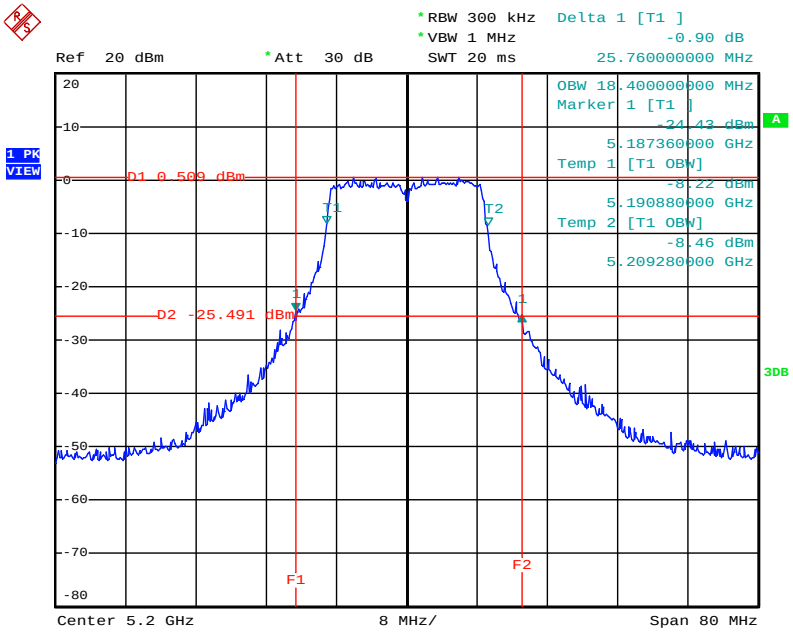
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.32	17.44
40	5200 MHz	25.12	17.60
48	5240 MHz	23.84	17.44

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5180 MHz / Mode 15 (1TX, 2RX)



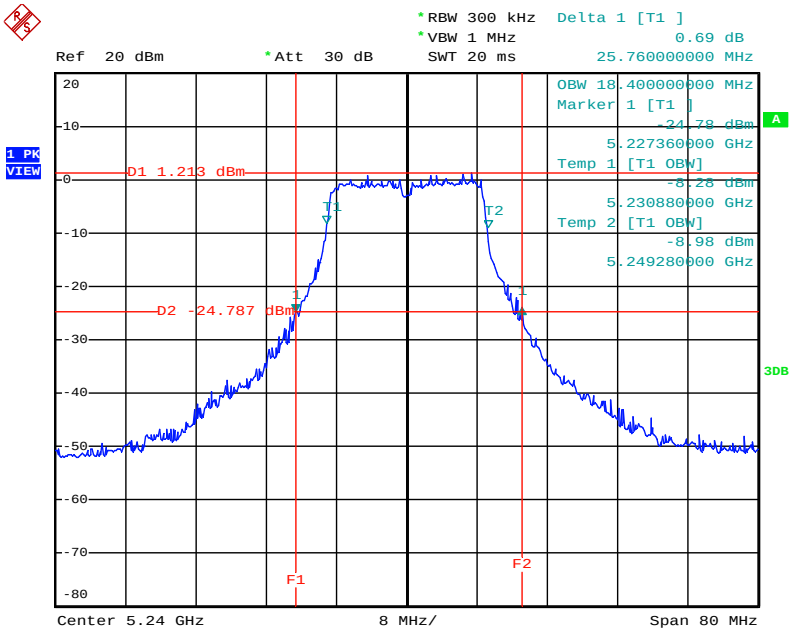
Date: 8.FEB.2012 22:14:53

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5200 MHz / Mode 15 (1TX, 2RX)



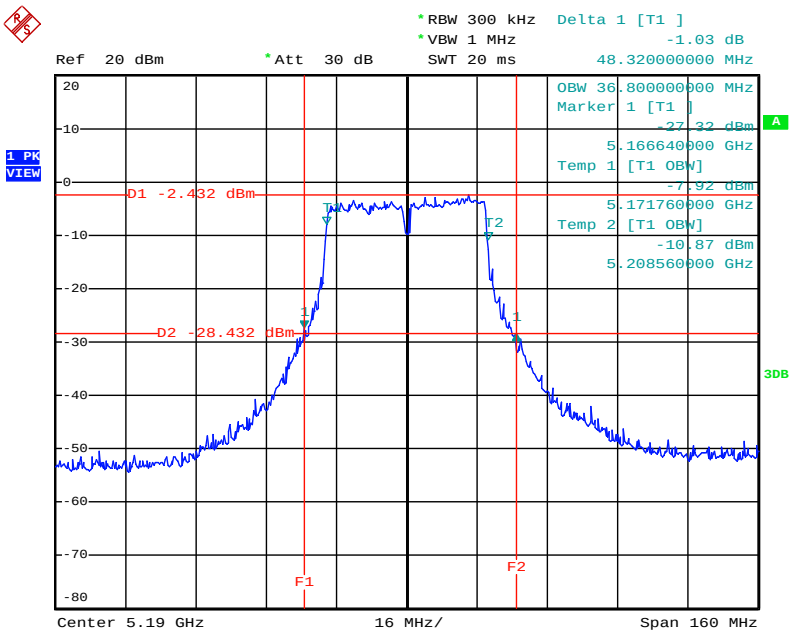
Date: 8.FEB.2012 22:15:30

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5240 MHz / Mode 15 (1TX, 2RX)



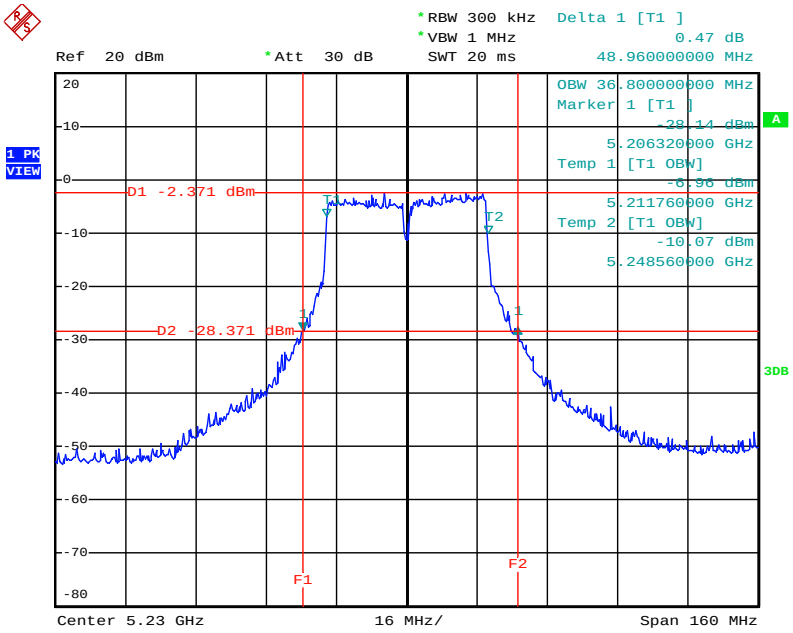
Date: 8.FEB.2012 22:16:10

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 / 5190 MHz / Mode 15 (1TX, 2RX)



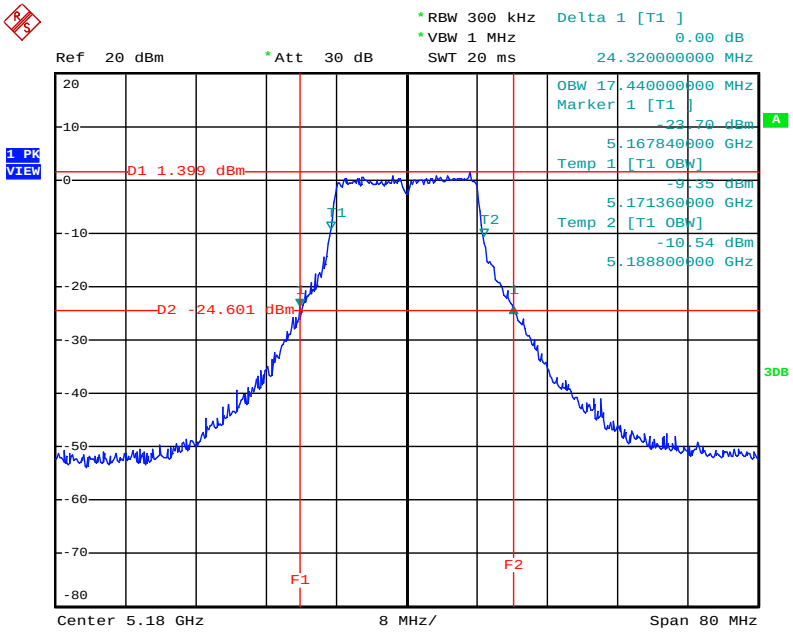
Date: 8.FEB.2012 22:17:15

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1/ 5230 MHz / Mode 15 (1TX, 2RX)



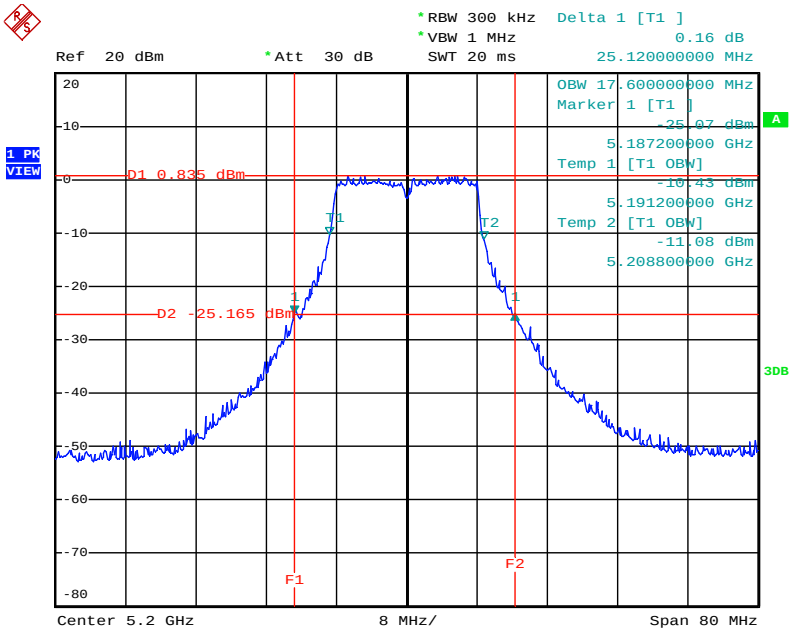
Date: 8.FEB.2012 22:17:59

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1/ 5180 MHz / Mode 15 (1TX, 2RX)



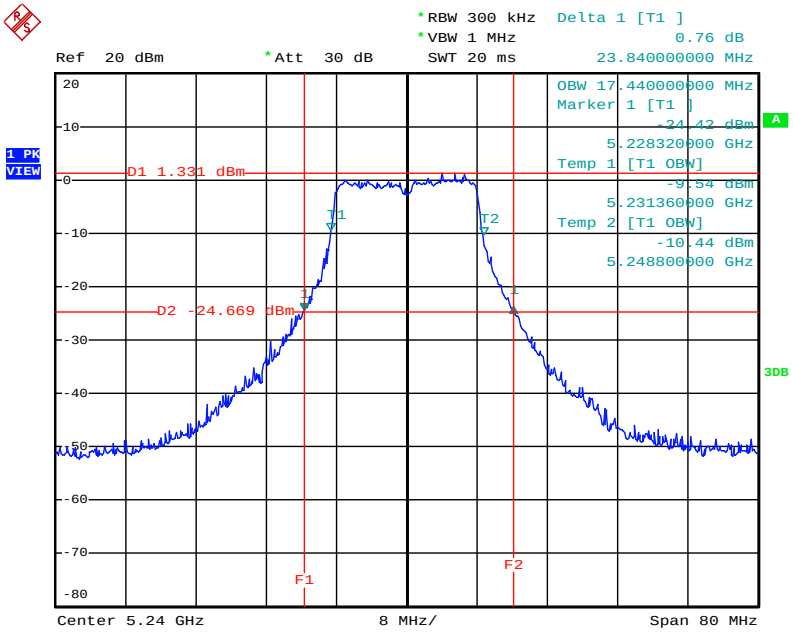
Date: 8.FEB.2012 22:12:16

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5200 MHz / Mode 15 (1TX, 2RX)



Date: 8.FEB.2012 22:12:51

26 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5240 MHz / Mode 15 (1TX, 2RX)



Date: 8.FEB.2012 22:13:45

4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

For the band 5.15~5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B, where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.470-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725~5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or 17 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 17 dBm in any 1ŕMHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power or peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required.

4.3.2. Measuring Instruments and Setting

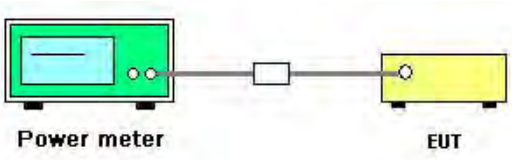
The following table is the setting of the Average.

Power Meter Parameter	Setting
Bandwidth	50MHz bandwidth is greater than the EUT emission bandwidth
Detector	AVERAGE

4.3.3. Test Procedures

Spectrum Parameter	Setting
RF Output Power Method	☒ ANSI C63.10 clause 6.10.2.1 (a) power meter method
RF Output Power Method	☐ ANSI C63.10 clause 6.10.2.1 (b) channel integration method
RF Output Power Method	☐ ANSI C63.10 clause 6.10.3.1 Method 1 - spectral trace averaging
RF Output Power Method	☐ ANSI C63.10 clause 6.10.3.2 Method 2 - zero-span mode with trace averaging

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Maximum Conducted Output Power

Temperature	25°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n
Test Date	Jan 17, 2012	Test Mode	Mode 3

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Conducted Power (dBm)		Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
36	5180 MHz	9.65	9.46	12.57	13.42	Complies
40	5200 MHz	9.51	9.36	12.45	13.42	Complies
48	5240 MHz	9.32	9.20	12.27	13.42	Complies

NOTE: Directional gain $=10\log(10^{7.60/20} + 10^{5.62/20})^2/2$=9.58dBi > 6dBi , so the conducted power limit =17-(9.58-6)=13.42dBm.

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Conducted Power (dBm)		Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
38	5190 MHz	9.57	9.30	12.45	13.42	Complies
46	5230 MHz	9.58	9.54	12.57	13.42	Complies

NOTE: Directional gain $=10\log(10^{7.60/20} + 10^{5.62/20})^2/2$=9.58dBi > 6dBi , so the conducted power limit =17-(9.58-6)=13.42dBm.

Temperature	25°C	Humidity	57%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a
Test Date	Jan 17, 2012	Test Mode	Mode 3

Configuration IEEE 802.11a / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Conducted Power (dBm)		Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
36	5180 MHz	9.61	9.08	12.36	13.42	Complies
40	5200 MHz	9.30	9.38	12.35	13.42	Complies
48	5240 MHz	9.22	9.25	12.25	13.42	Complies

NOTE: Directional gain $=10\log(10^{7.60/20} + 10^{5.62/20})^2/2$=9.58dBi > 6dBi , so the conducted power limit =17-(9.58-6)=13.42dBm.

Temperature	25°C	Humidity	56%
Test Engineer	Satoshi Yang	Configurations	IEEE 802.11n
Test Date	Feb. 09, 2012	Test Mode	Mode 6

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	Conducted Output Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.99	14.00	Complies
40	5200 MHz	13.82	14.00	Complies
48	5240 MHz	13.60	14.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	13.88	14.00	Complies
46	5230 MHz	13.59	14.00	Complies

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Conducted Power (dBm)		Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
36	5180 MHz	7.11	8.52	10.88	10.99	Complies
40	5200 MHz	6.89	8.31	10.67	10.99	Complies
48	5240 MHz	7.12	8.23	10.72	10.99	Complies

NOTE: Directional gain =9 dBi + 10log(2)=12.01dBi > 6dBi, so the conducted power limit =(17 or 4+10log B)-Directional gain-6 = 17-(12.01-6)=10.99

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Conducted Power (dBm)		Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
38	5190 MHz	6.78	8.27	10.60	10.99	Complies
46	5230 MHz	7.19	8.45	10.88	10.99	Complies

NOTE: Directional gain =9 dBi + 10log(2)=12.01dBi > 6dBi, so the conducted power limit =(17 or 4+10log B)-Directional gain-6 = 17-(12.01-6)=10.99

Configuration IEEE 802.11n MCS8 20MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Conducted Power (dBm)		Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
36	5180 MHz	9.64	11.27	13.54	14.00	Complies
40	5200 MHz	9.86	11.38	13.70	14.00	Complies
48	5240 MHz	10.08	10.76	13.44	14.00	Complies

Configuration IEEE 802.11n MCS8 40MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Conducted Power (dBm)		Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
38	5190 MHz	9.95	11.52	13.82	14.00	Complies
46	5230 MHz	10.44	11.12	13.80	14.00	Complies

Temperature	25°C	Humidity	57%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a
Test Date	Jan 17, 2012	Test Mode	Mode 6

Configuration IEEE 802.11a / Chain 1 (1TX, 2RX)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.90	14.00	Complies
40	5200 MHz	13.86	14.00	Complies
48	5240 MHz	13.98	14.00	Complies

Configuration IEEE 802.11a / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Conducted Power (dBm)		Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
36	5180 MHz	6.76	8.22	10.56	10.99	Complies
40	5200 MHz	6.84	8.24	10.61	10.99	Complies
48	5240 MHz	7.13	8.05	10.62	10.99	Complies

NOTE: Directional gain =9 dBi + 10log(2)=12.01dBi > 6dBi, so the conducted power limit =(17 or 4+10log B)-Directional gain-6 = 17-(12.01-6)=10.99

Temperature	25°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n
Test Date	Jan 17, 2012	Test Mode	Mode 9

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Conducted Power (dBm)		Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
36	5180 MHz	11.49	12.91	15.27	15.39	Complies
40	5200 MHz	11.58	12.97	15.34	15.39	Complies
48	5240 MHz	11.75	12.78	15.31	15.39	Complies

NOTE: Directional gain =4.6dBi + 10log(2)=7.61dBi > 6dBi, so the conducted power limit =(17 or 4+10log B)-Directional gain-6=17-(7.61-6)=15.39dBm.

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Conducted Power (dBm)		Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
38	5190 MHz	10.62	12.09	14.43	15.39	Complies
46	5230 MHz	11.63	12.78	15.25	15.39	Complies

NOTE: Directional gain =4.6dBi + 10log(2)=7.61dBi > 6dBi, so the conducted power limit =(17 or 4+10log B)-Directional gain-6=17-(7.61-6)=15.39dBm.

Temperature	25°C	Humidity	57%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a
Test Date	Jan 17, 2012	Test Mode	Mode 9

Configuration IEEE 802.11a / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Conducted Power (dBm)		Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
36	5180 MHz	10.89	12.40	14.72	15.39	Complies
40	5200 MHz	11.06	12.70	14.97	15.39	Complies
48	5240 MHz	11.40	12.35	14.91	15.39	Complies

NOTE: Directional gain =4.6dBi + 10log(2)=7.61dBi > 6dBi, so the conducted power limit =(17 or 4+10log B)-Directional gain-6=17-(7.61-6)=15.39dBm.

Temperature	25°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n
Test Date	Jan 17, 2012	Test Mode	Mode 12

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	10.43	10.50	Complies
40	5200 MHz	10.40	10.50	Complies
48	5240 MHz	10.32	10.50	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	10.29	10.50	Complies
46	5230 MHz	10.25	10.50	Complies

Temperature	25°C	Humidity	57%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a
Test Date	Jan 17, 2012	Test Mode	Mode 12

Configuration IEEE 802.11a / Chain 1 (1TX, 2RX)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	10.49	10.50	Complies
40	5200 MHz	10.22	10.50	Complies
48	5240 MHz	10.10	10.50	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n
Test Date	Jan 17, 2012	Test Mode	Mode 15

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.87	12.00	Complies
40	5200 MHz	11.76	12.00	Complies
48	5240 MHz	11.61	12.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	11.67	12.00	Complies
46	5230 MHz	11.72	12.00	Complies

Temperature	25°C	Humidity	57%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a
Test Date	Jan 17, 2012	Test Mode	Mode 15

Configuration IEEE 802.11a / Chain 1 (1TX, 2RX)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.70	12.00	Complies
40	5200 MHz	11.61	12.00	Complies
48	5240 MHz	11.62	12.00	Complies

4.4. Power Spectral Density Measurement

4.4.1. Limit

The power spectral density is defined as the highest level of power in dBm per MHz generated by the transmitter within the power envelope. The following table is power spectral density limits and decrease power density limit rule refer to section 4.3.1.

Frequency Range	Power Spectral Density limit (dBm/MHz)
5.15~5.25 GHz	4
5.25-5.35 GHz	11
5470-5725	11

4.4.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1MHz
VB	3MHz
Detector	RMS
Trace	AVERAGE
Sweep Time	Auto
Trace Average	100 times

4.4.3. Test Procedures

1. The test procedure is the same as section 4.6.3.
2. Trace A, Set RBW =1MHz, VBW = 3MHz, Span >26dB bandwidth, Max. hold.
3. Delta Mark trace A Maximum frequency and trace B same frequency.
4. Repeat the above procedure until measurements for all frequencies were complete.

4.4.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.6.4.

4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Power Spectral Density

Temperature	25°C	Humidity	57%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n / Mode 3

Configuration IEEE 802.11n MCS0 20MHz (2TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)		Total Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
		Chain 1	Chain 2			
36	5180 MHz	-5.32	-4.97	-2.13	0.42	Complies
40	5200 MHz	-6.35	-5.87	-3.09	0.42	Complies
48	5240 MHz	-6.05	-5.09	-2.53	0.42	Complies

NOTE: Directional gain =7.5 dBi + 10log(2)=9.58dBi > 6dBi, so the Power Spectral Density limit =4-(9.58-6)=0.42dBm.

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Configuration IEEE 802.11n MCS0 40MHz (2TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)		Total Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
		Chain 1	Chain 2			
38	5190 MHz	-8.22	-8.80	-5.49	0.42	Complies
46	5230 MHz	-7.95	-8.00	-4.96	0.42	Complies

NOTE: Directional gain =7.5 dBi + 10log(2)=9.58dBi > 6dBi, so the Power Spectral Density limit =4-(9.58-6)=0.42dBm.

Temperature	25°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a / Mode 3

Configuration IEEE 802.11a / Chain 1 + Chain 2 (2TX, 2RX)

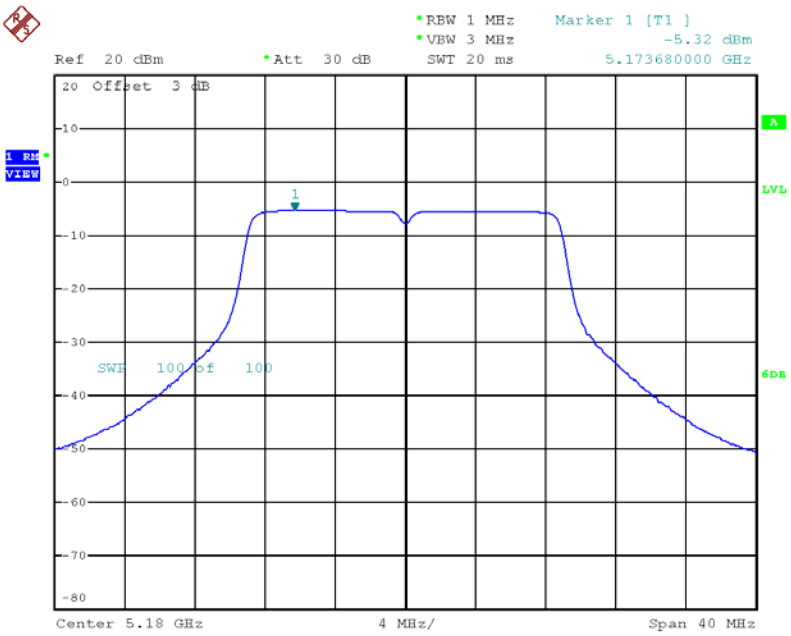
Channel	Frequency	Power Density (dBm/1MHz)		Total Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
		Chain 1	Chain 2			
36	5180 MHz	-6.38	-6.18	-3.27	0.42	Complies
40	5200 MHz	-5.25	-5.54	-2.38	0.42	Complies
48	5240 MHz	-5.06	-5.04	-2.04	0.42	Complies

NOTE 1: Directional gain =7.5 dBi + 10log(2)=9.58dBi > 6dBi, so the Power Spectral Density limit =4-(9.58-6)=0.42dBm.

NOTE 2: All the test values were listed in the report.

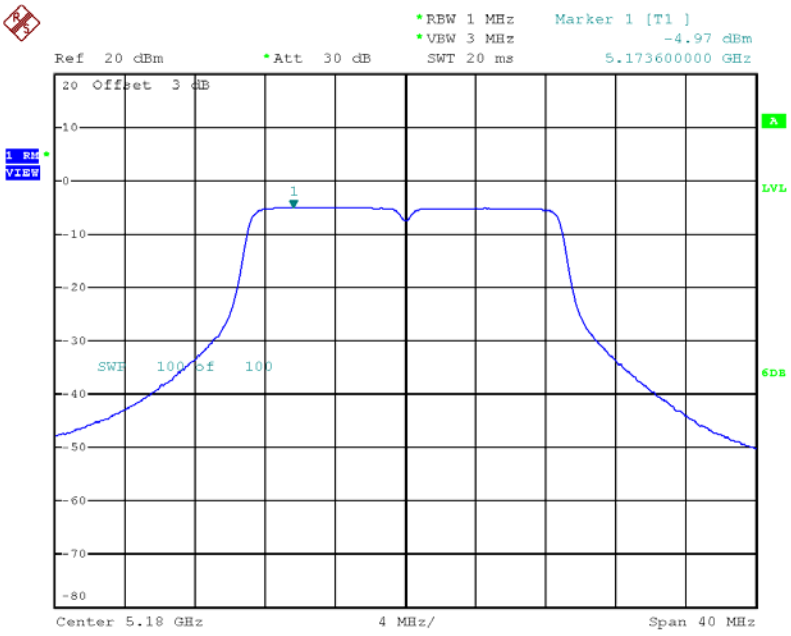
For plots, only the channel with maximum results was shown.

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5180 MHz / Mode 3 (2TX, 2RX)



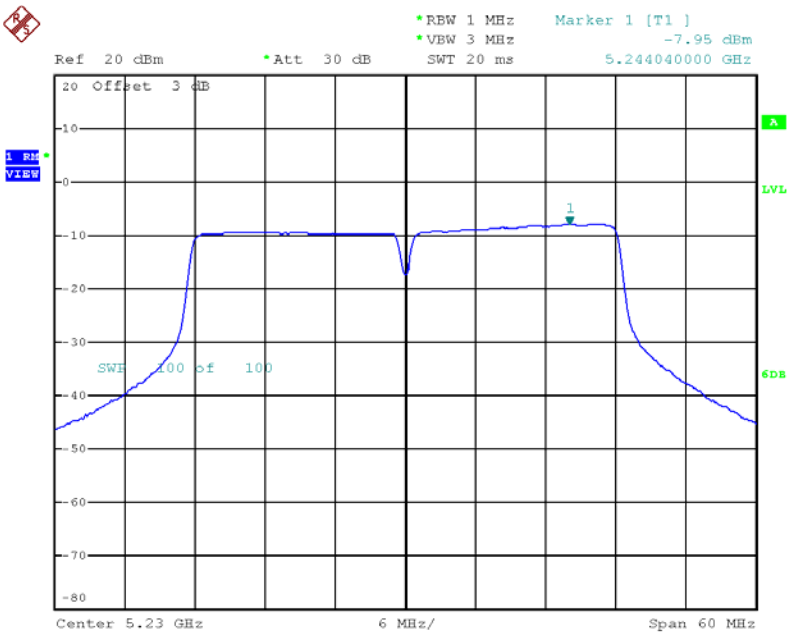
Date: 18.JAN.2012 11:19:26

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 2 / 5180 MHz/ Mode 3 (2TX, 2RX)



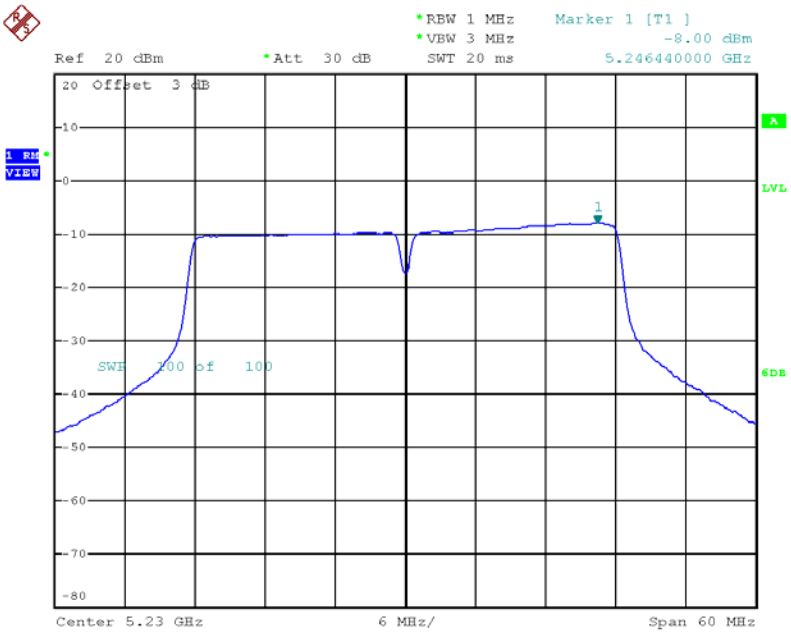
Date: 18.JAN.2012 11:13:03

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 / 5230 MHz / Mode 3 (2TX, 2RX)



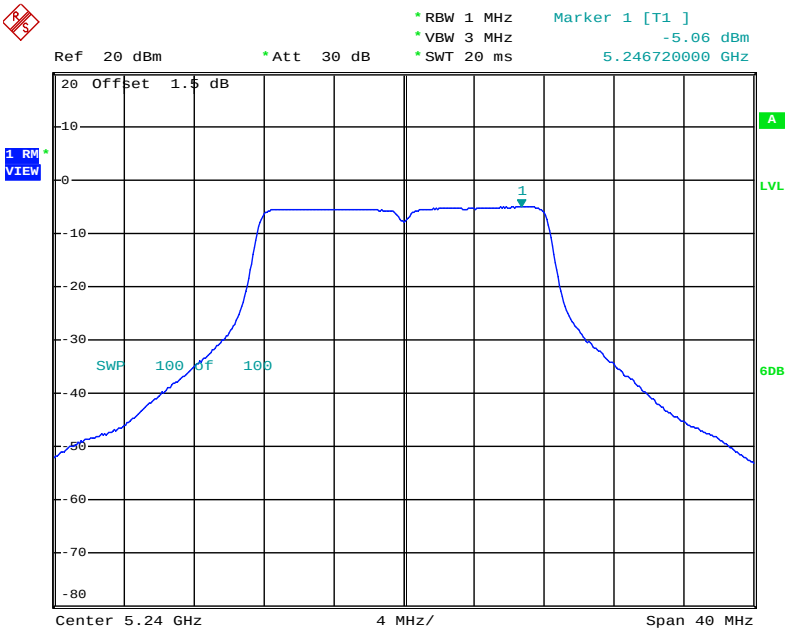
Date: 18.JAN.2012 11:06:16

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 2 / 5230 MHz / Mode 3 (2TX, 2RX)



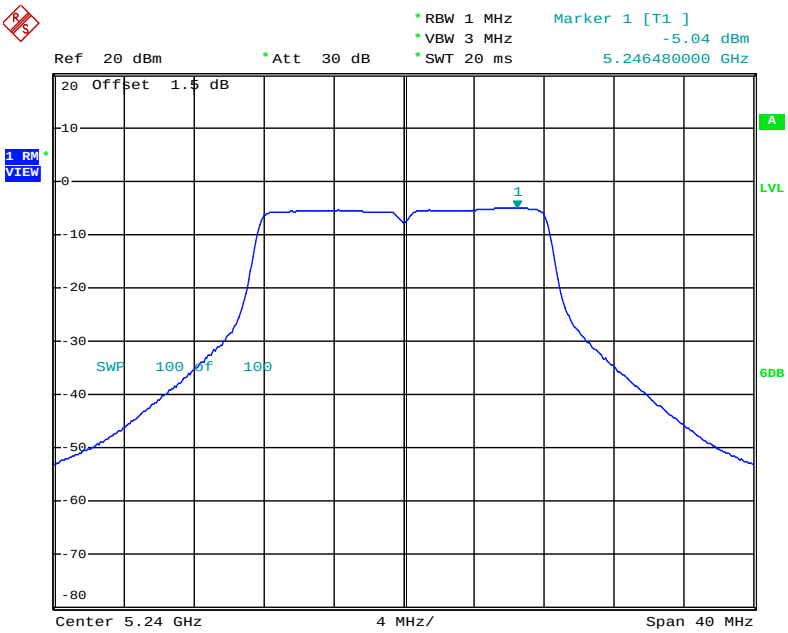
Date: 18.JAN.2012 11:11:51

Power Density Plot on Configuration IEEE 802.11a / Chain 1 / 5240 MHz / Mode 3 (2TX, 2RX)



Date: 10.JAN.2012 15:45:13

Power Density Plot on Configuration IEEE 802.11a / Chain 2 / 5240 MHz / Mode 3 (2TX, 2RX)



Date: 10.JAN.2012 15:46:23

	25°C	**Humidity**	57%
Test Engineer	Satoshi Yang	**Configurations**	IEEE 802.11n / Mode 6

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
36	5180 MHz	-1.24	1.00	Complies
40	5200 MHz	-1.31	1.00	Complies
48	5240 MHz	-0.98	1.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
38	5190 MHz	-3.56	1.00	Complies
46	5230 MHz	-3.59	1.00	Complies

Configuration IEEE 802.11n MCS0 20MHz (2TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)		Total Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
		Chain 1	Chain 2			
36	5180 MHz	-7.86	-6.28	-3.99	-2.01	Complies
40	5200 MHz	-8.23	-6.67	-4.37	-2.01	Complies
48	5240 MHz	-7.54	-6.31	-3.87	-2.01	Complies

NOTE: Directional gain =9dBi + 10log(2)=12.01dBi > 6dBi, so the Power Spectral Density limit =4-(12.01-6)=-2.01dBm.

Configuration IEEE 802.11n MCS0 40MHz (2TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)		Total Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
		Chain 1	Chain 2			
38	5190 MHz	-10.58	-9.08	-6.76	-2.01	Complies
46	5230 MHz	-9.71	-8.63	-6.13	-2.01	Complies

NOTE: Directional gain =9dBi + 10log(2)=12.01dBi > 6dBi , so the Power Spectral Density limit =4-(12.01-6)=-2.01dBm.

Configuration IEEE 802.11n MCS8 20MHz (2TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)		Total Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
		Chain 1	Chain 2			
36	5180 MHz	-4.58	-3.87	-1.20	1.00	Complies
40	5200 MHz	-4.37	-3.59	-0.95	1.00	Complies
48	5240 MHz	-4.50	-4.49	-1.48	1.00	Complies

Configuration IEEE 802.11n MCS8 40MHz (2TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)		Total Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
		Chain 1	Chain 2			
38	5190 MHz	-7.04	-5.57	-3.23	1.00	Complies
46	5230 MHz	-7.46	-5.94	-3.62	1.00	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Satoshi Yang	Configurations	IEEE 802.11a / Mode 6

Configuration IEEE 802.11a / Chain 1 (1TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
36	5180 MHz	-0.40	1.00	Complies
40	5200 MHz	-0.23	1.00	Complies
48	5240 MHz	0.17	1.00	Complies

Configuration IEEE 802.11a / Chain 1 (2TX, 2RX)

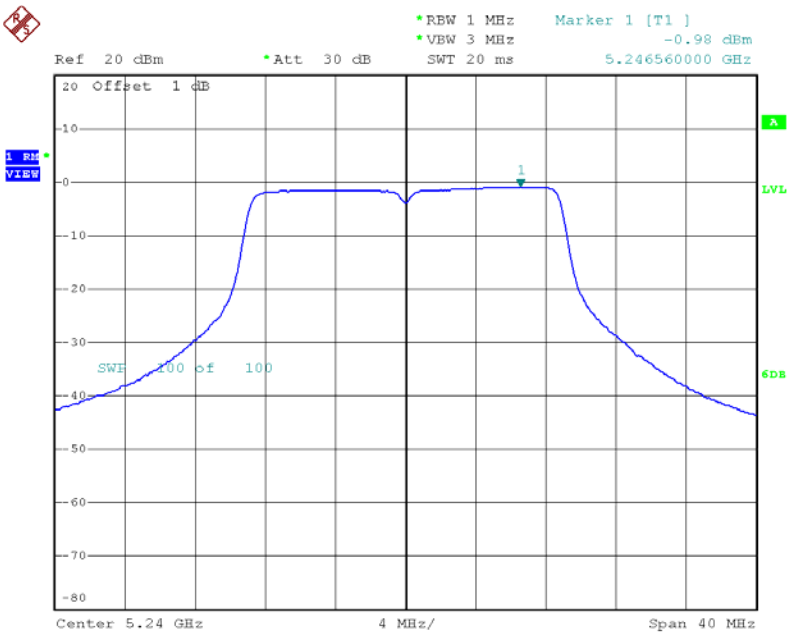
Channel	Frequency	Power Density (dBm/1MHz)		Total Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
		Chain 1	Chain 2			
36	5180 MHz	-7.09	-5.68	-3.32	-2.01	Complies
40	5200 MHz	-7.00	-5.33	-3.07	-2.01	Complies
48	5240 MHz	-6.88	-5.70	-3.24	-2.01	Complies

NOTE 1: Directional gain =9dBi + 10log(2)=12.01dBi > 6dBi, so the Power Spectral Density limit =4-(12.01-6)=-2.01dBm.

NOTE 2: All the test values were listed in the report.

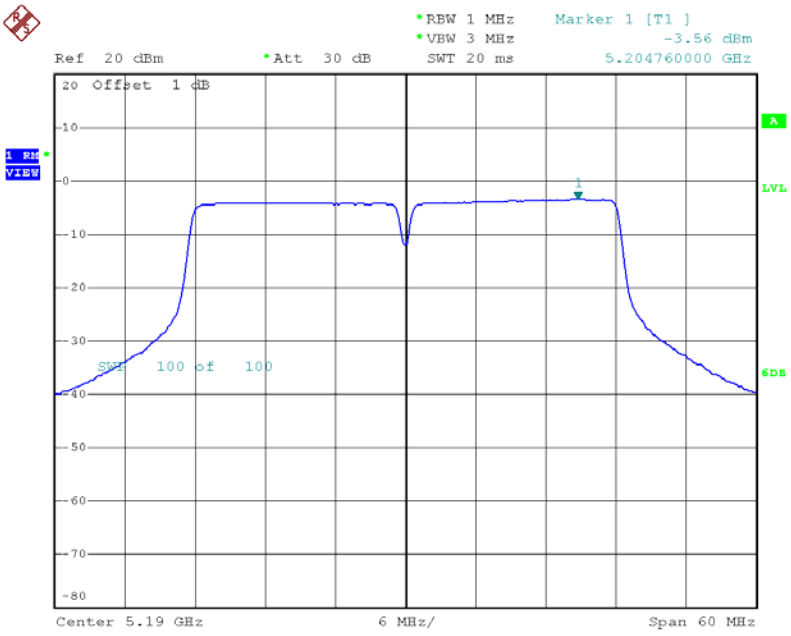
For plots, only the channel with maximum results was shown.

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5240 MHz / Mode 6 / (1TX, 2RX)



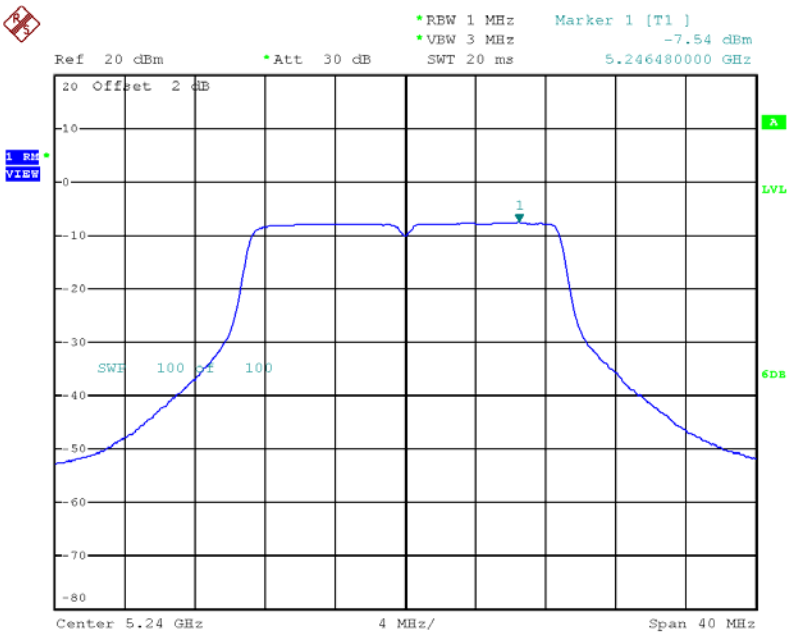
Date: 15.DEC.2011 17:54:39

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 / 5190 MHz / Mode 6 / (1TX, 2RX)



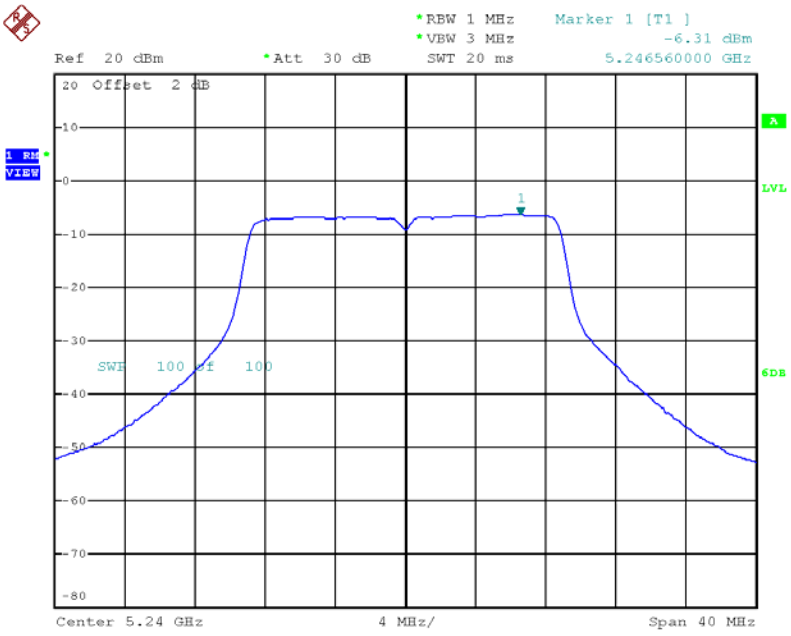
Date: 15.DEC.2011 18:00:30

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5240 MHz / Mode 6 / (2TX, 2RX)



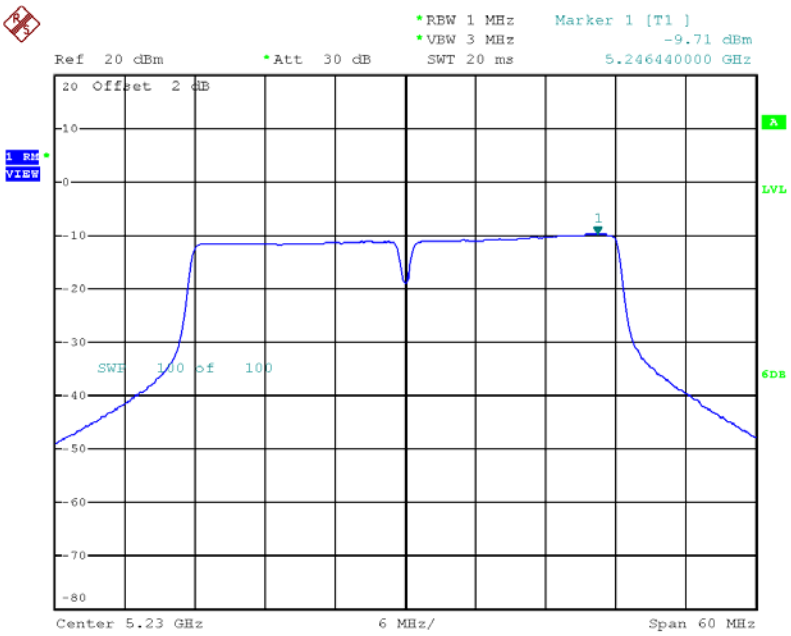
Date: 1.FEB.2012 16:05:18

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 2 / 5240 MHz / Mode 6 / (2TX, 2RX)



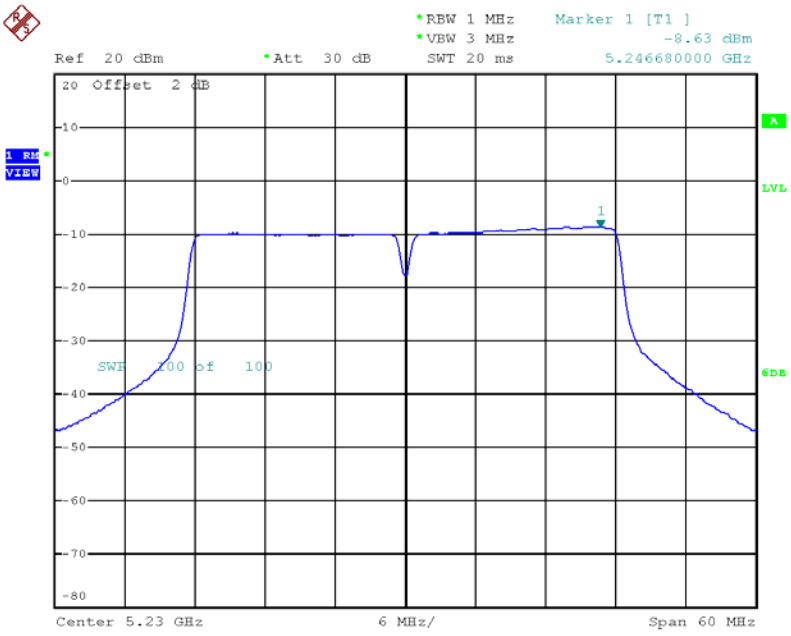
Date: 1.FEB.2012 16:05:44

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 / 5230 MHz / Mode 6 / (2TX, 2RX)



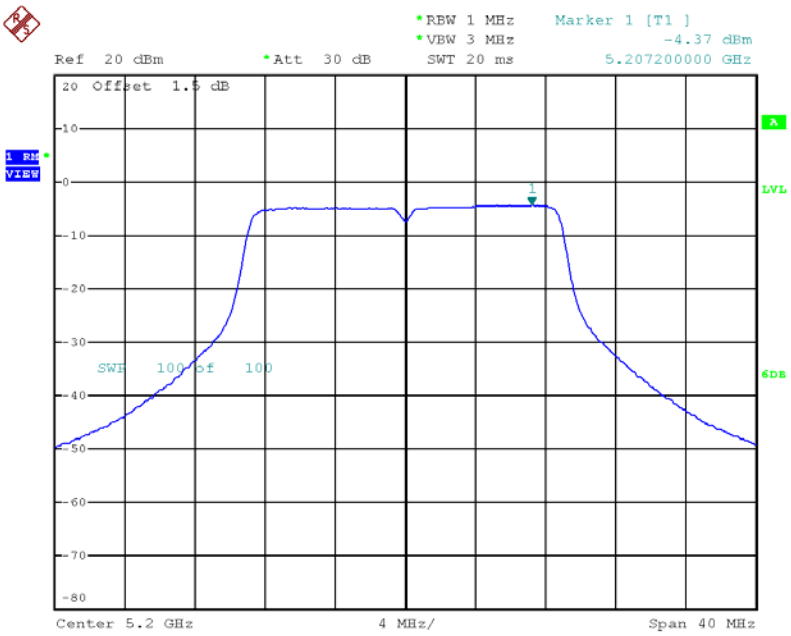
Date: 1.FEB.2012 16:20:24

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 2 / 5230 MHz / Mode 6 / (2TX, 2RX)



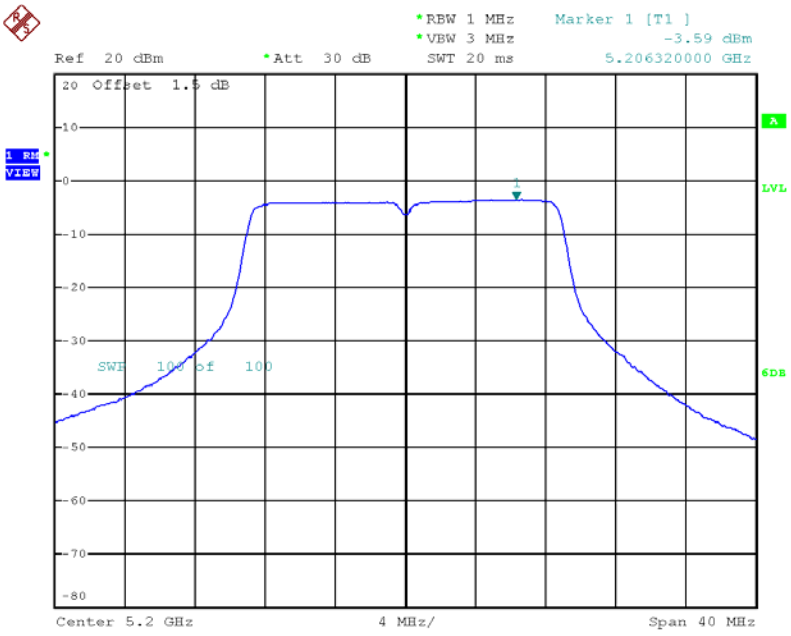
Date: 1.FEB.2012 16:19:49

Power Density Plot on Configuration IEEE 802.11n MCS8 20MHz / Chain 1 / 5200 MHz / Mode 6 / (2TX, 2RX)



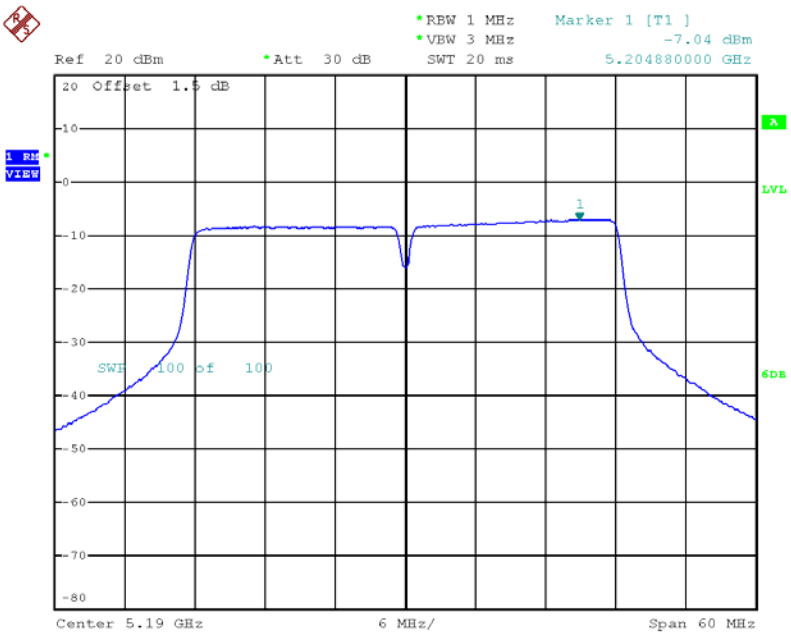
Date: 11.JAN.2012 16:06:36

Power Density Plot on Configuration IEEE 802.11n MCS8 20MHz / Chain 2 / 5200 MHz / Mode 6 / (2TX, 2RX)



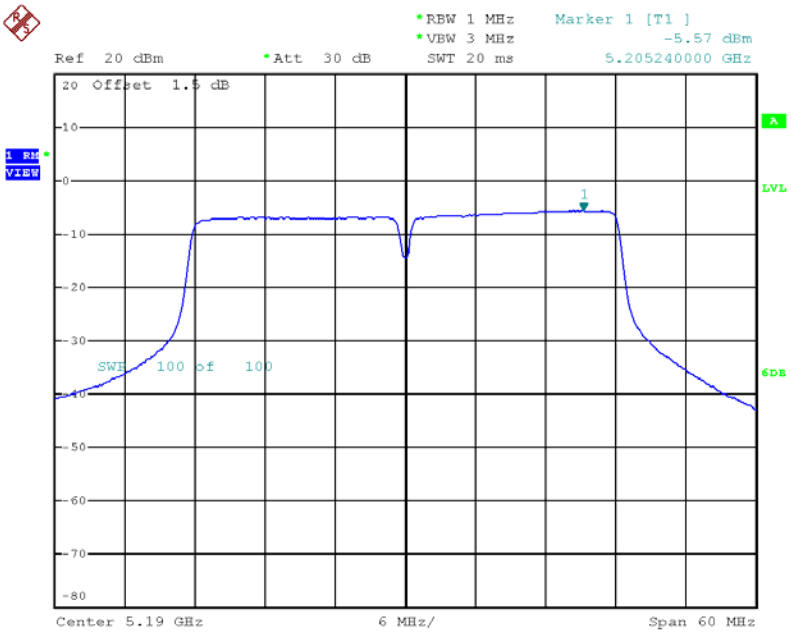
Date: 11.JAN.2012 16:14:50

Power Density Plot on Configuration IEEE 802.11n MCS8 40MHz / Chain 1 / 5190 MHz / Mode 6 / (2TX, 2RX)



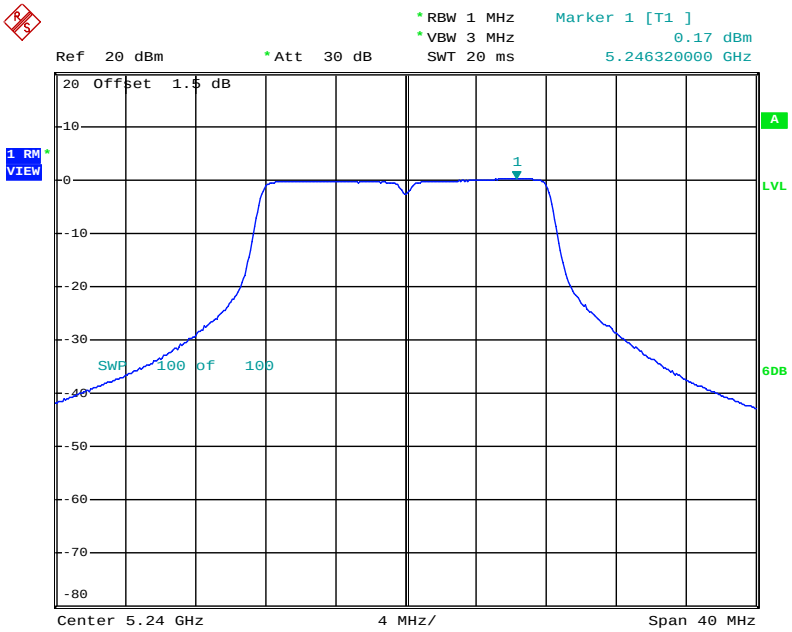
Date: 11.JAN.2012 16:05:29

Power Density Plot on Configuration IEEE 802.11n MCS8 40MHz / Chain 2 / 5190 MHz / Mode 6 / (2TX, 2RX)



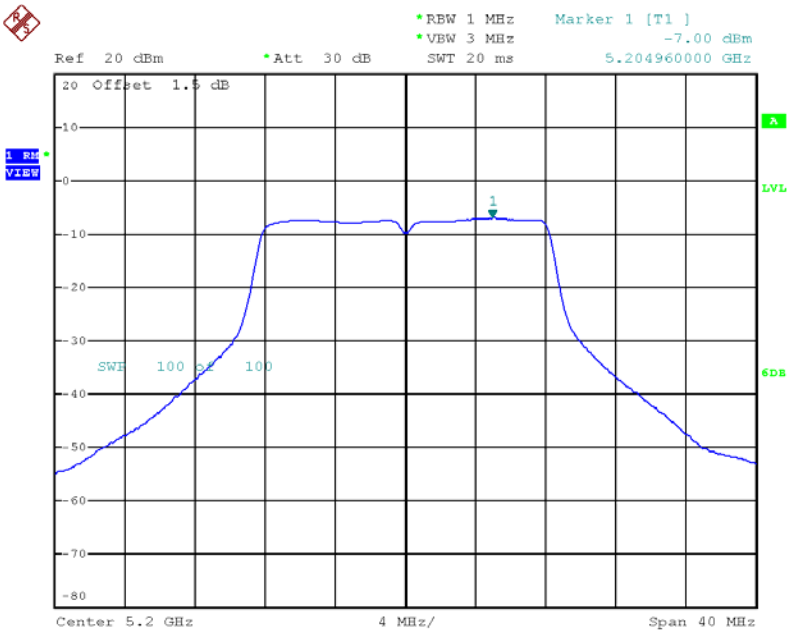
Date: 11.JAN.2012 15:52:14

Power Density Plot on Configuration IEEE 802.11a / Chain 1 / 5240 MHz / Mode 6 / (1TX, 2RX)



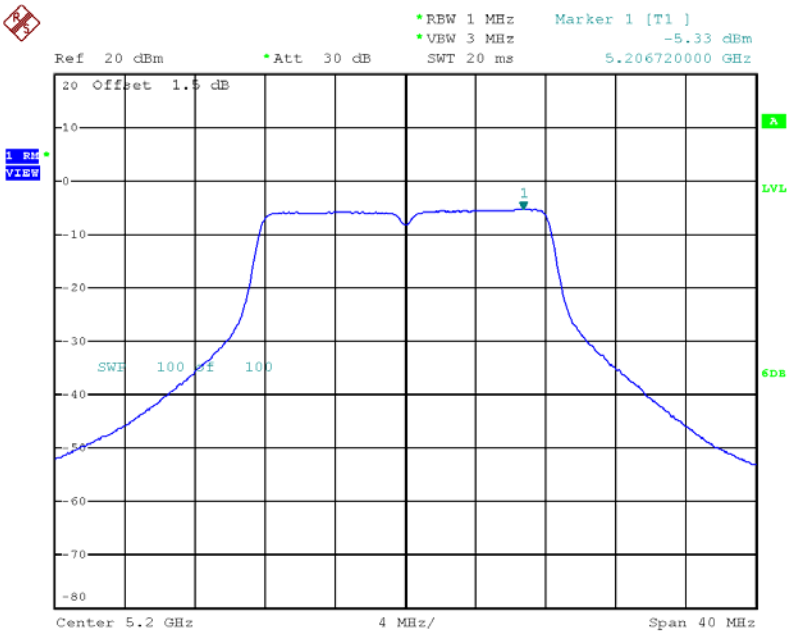
Date: 16.DEC.2011 16:17:30

Power Density Plot on Configuration IEEE 802.11a / Chain 1 / 5200 MHz / Mode 6 / (2TX, 2RX)



Date: 11.JAN.2012 15:33:05

Power Density Plot on Configuration IEEE 802.11a / Chain 2 / 5200 MHz / Mode 6 / (2TX, 2RX)



Date: 11.JAN.2012 15:35:55

Temperature	25℃	Humidity	57%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n / Mode 9

Configuration IEEE 802.11n MCS0 20MHz (2TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)		Total Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
		Chain 1	Chain 2			
36	5180 MHz	-3.37	-2.08	0.33	2.39	Complies
40	5200 MHz	-3.29	-1.89	0.48	2.39	Complies
48	5240 MHz	-2.57	-1.67	0.91	2.39	Complies

NOTE: Directional gain =4.6dBi + 10log(2)=7.61dBi > 6dBi , so the Power Spectral Density limit =4-(7.61-6)=2.39dBm.

Configuration IEEE 802.11n MCS0 40MHz (2TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)		Total Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
		Chain 1	Chain 2			
38	5190 MHz	-7.16	-5.56	-3.28	2.39	Complies
46	5230 MHz	-5.90	-4.93	-2.38	2.39	Complies

NOTE: Directional gain =4.6dBi + 10log(2)=7.61dBi > 6dBi, so the Power Spectral Density limit =4-(7.61-6)=2.39dBm.

Temperature	25°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a / Mode 9

Configuration IEEE 802.11a / Chain 1 + Chain 2 (2TX, 2RX)

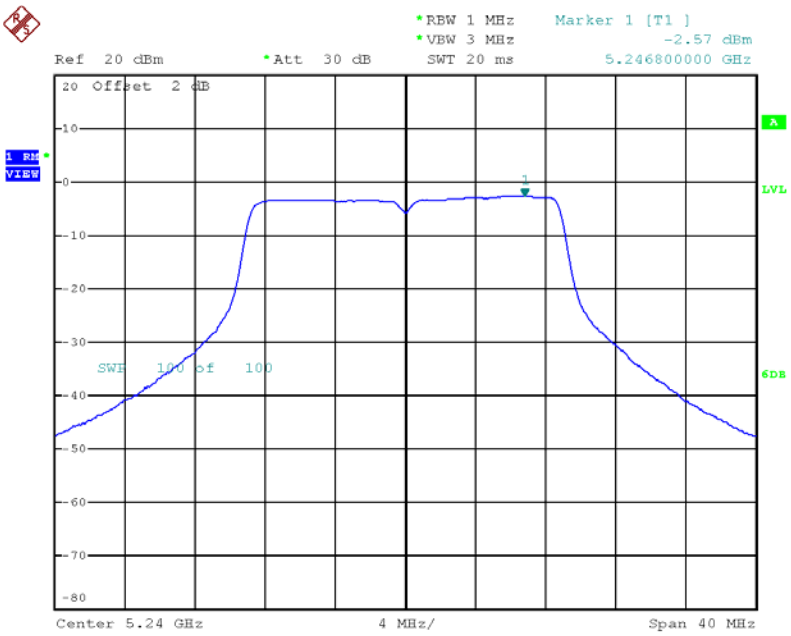
Channel	Frequency	Power Density (dBm/1MHz)		Total Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
		Chain 1	Chain 2			
36	5180 MHz	-2.22	-3.71	0.11	2.39	Complies
40	5200 MHz	-1.84	-2.95	0.65	2.39	Complies
48	5240 MHz	-1.56	-3.41	0.62	2.39	Complies

NOTE 1: Directional gain =4.6dBi + 10log(2)=7.61dBi > 6dBi, so the Power Spectral Density limit =4-(7.61-6)=2.39dBm.

NOTE 2: All the test values were listed in the report.

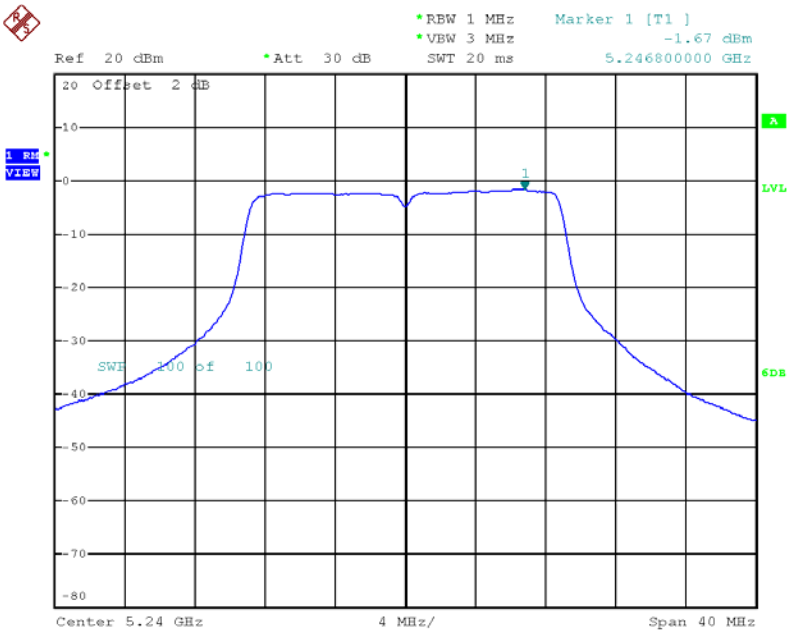
For plots, only the channel with maximum results was shown.

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5240 MHz / Mode 9 (2TX, 2RX)



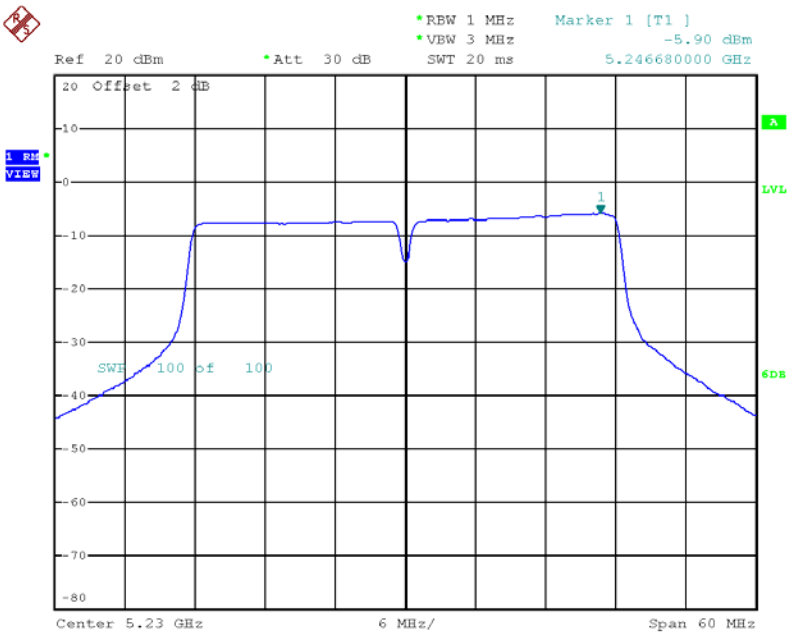
Date: 2.FEB.2012 11:38:31

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 2 / 5240 MHz/ Mode 9 (2TX, 2RX)



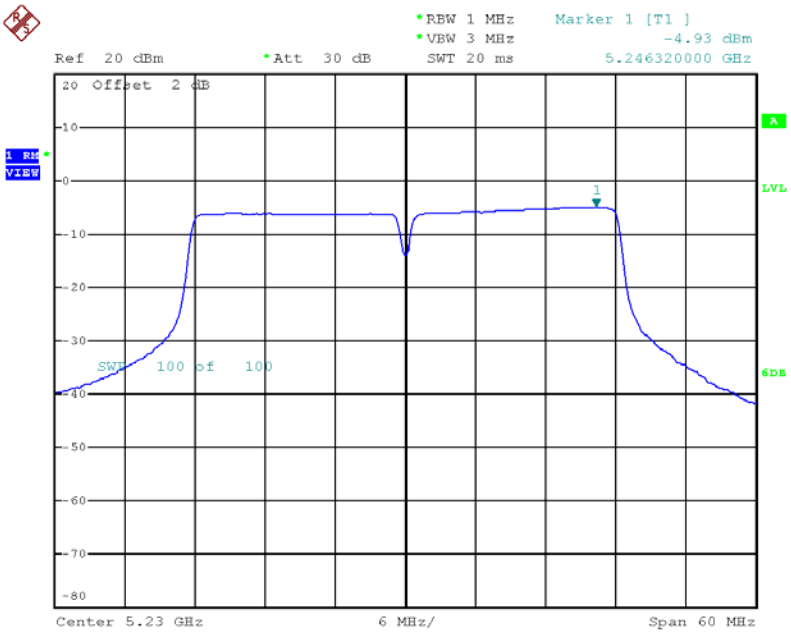
Date: 2.FEB.2012 11:38:46

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 / 5230 MHz / Mode 9 (2TX, 2RX)



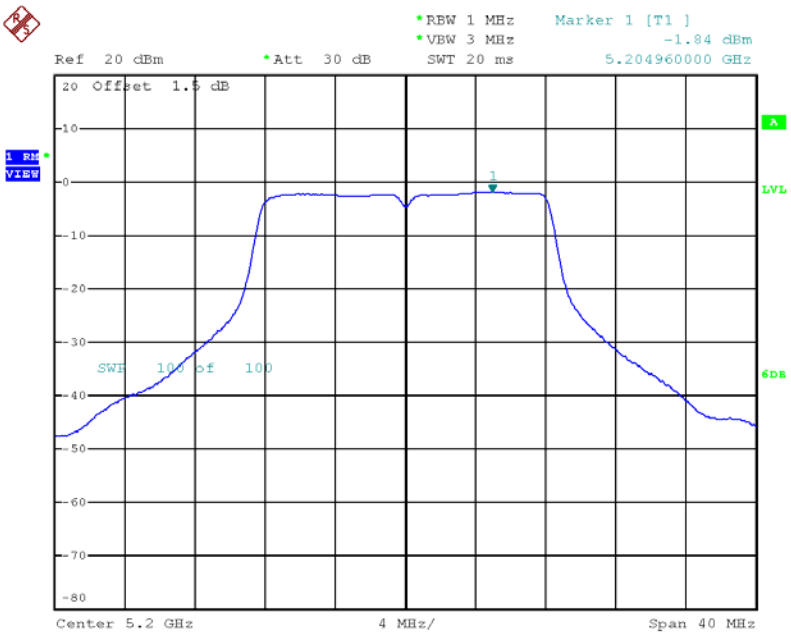
Date: 2.FEB.2012 11:34:15

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 2 / 5230 MHz / Mode 9 (2TX, 2RX)



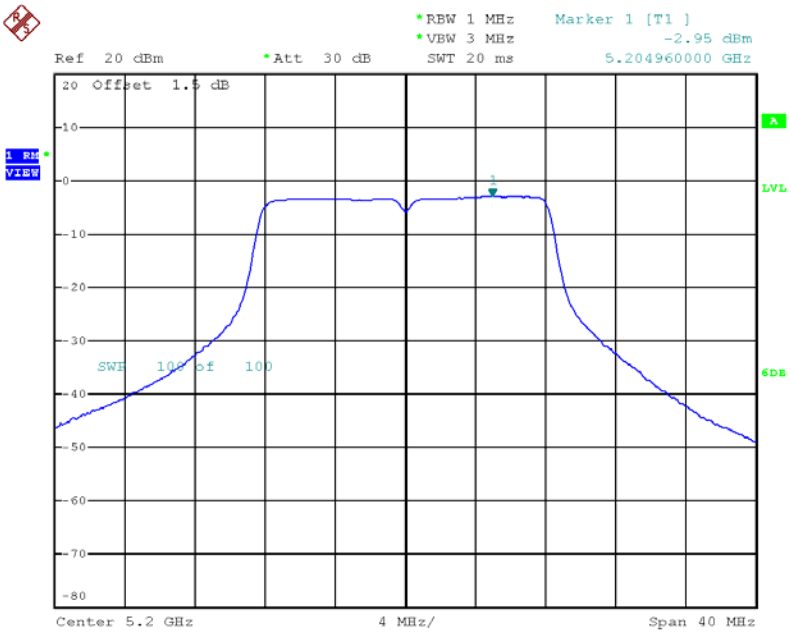
Date: 2.FEB.2012 11:34:57

Power Density Plot on Configuration IEEE 802.11a / Chain 1 / 5200 MHz / Mode 9 (2TX, 2RX)



Date: 11.JAN.2012 14:50:53

Power Density Plot on Configuration IEEE 802.11a / Chain 2 / 5200 MHz / Mode 9 (2TX, 2RX)



Date: 11.JAN.2012 15:03:25

Temperature	25°C	Humidity	57%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n / Mode 12

Configuration IEEE 802.11n MCS0 20MHz (1TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
36	5180 MHz	-5.42	-2.50	Complies
40	5200 MHz	-5.70	-2.50	Complies
48	5240 MHz	-5.69	-2.50	Complies

Configuration IEEE 802.11n MCS0 40MHz (1TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
38	5190 MHz	-8.10	-2.50	Complies
46	5230 MHz	-8.20	-2.50	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a / Mode 12

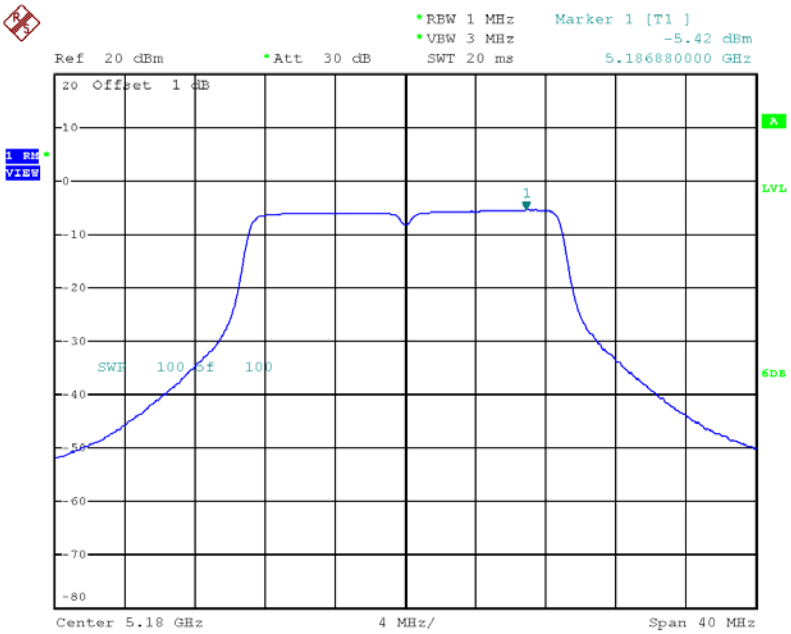
Configuration IEEE 802.11a / Chain 1 (1TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
36	5180 MHz	-4.62	-2.50	Complies
40	5200 MHz	-4.97	-2.50	Complies
48	5240 MHz	-5.41	-2.50	Complies

NOTE: All the test values were listed in the report.

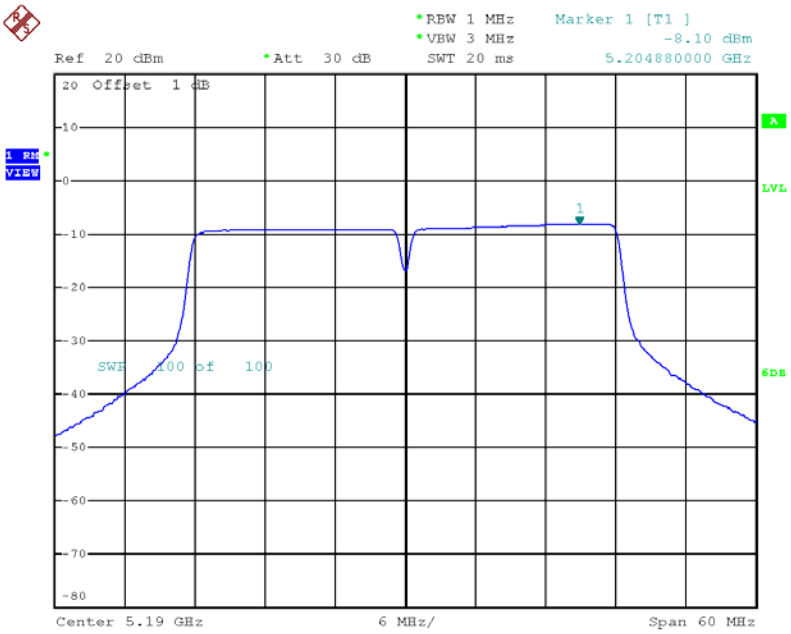
For plots, only the channel with maximum results was shown.

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5180 MHz / Mode 12 (1TX, 2RX)



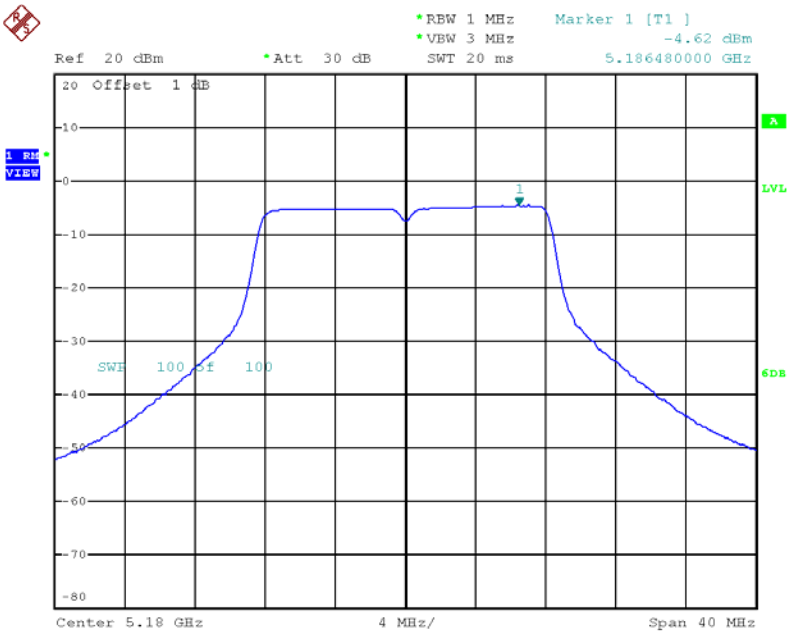
Date: 8.FEB.2012 22:49:54

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 / 5190 MHz / Mode 12 (1TX, 2RX)



Date: 8.FEB.2012 22:52:44

Power Density Plot on Configuration IEEE 802.11a / Chain 1 / 5180 MHz / Mode 12 (1TX, 2RX)



Date: 8.FEB.2012 22:48:57

Temperature	25°C	Humidity	57%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n / Mode 15

Configuration IEEE 802.11n MCS0 20MHz (1TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
36	5180 MHz	-3.44	-1.00	Complies
40	5200 MHz	-3.87	-1.00	Complies
48	5240 MHz	-3.69	-1.00	Complies

Configuration IEEE 802.11n MCS0 40MHz (1TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
38	5190 MHz	-6.66	-1.00	Complies
46	5230 MHz	-6.69	-1.00	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a / Mode 15

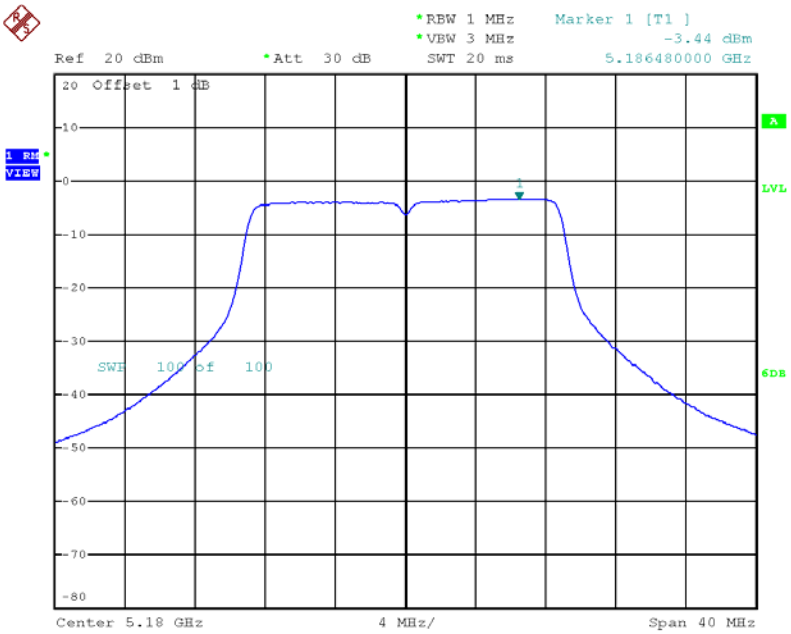
Configuration IEEE 802.11a / Chain 1 (1TX, 2RX)

Channel	Frequency	Power Density (dBm/1MHz)	Max. Limit (dBm/1MHz)	Result
36	5180 MHz	-3.13	-1.00	Complies
40	5200 MHz	-3.54	-1.00	Complies
48	5240 MHz	-3.48	-1.00	Complies

NOTE: All the test values were listed in the report.

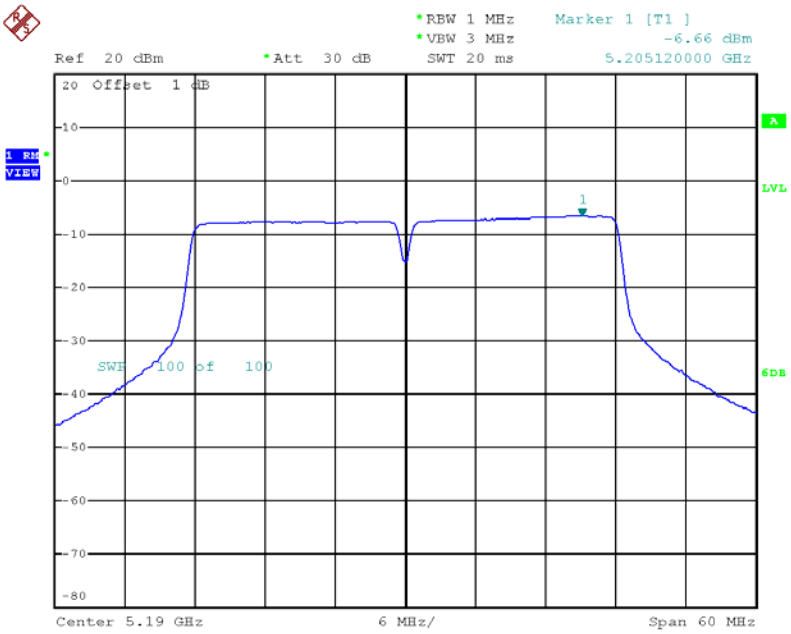
For plots, only the channel with maximum results was shown.

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 / 5180 MHz / Mode 15 (1TX, 2RX)



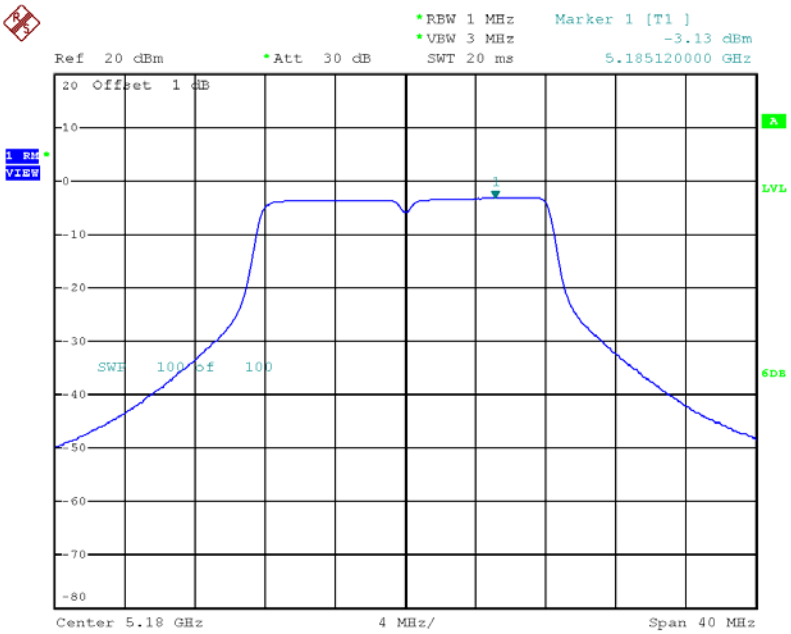
Date: 8.FEB.2012 22:41:36

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 / 5190 MHz / Mode 15 (1TX, 2RX)



Date: 8.FEB.2012 22:44:40

Power Density Plot on Configuration IEEE 802.11a / Chain 1 / 5180 MHz / Mode 15 (1TX, 2RX)



Date: 8.FEB.2012 22:45:36

4.5. Peak Excursion Measurement

4.5.1. Limit

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 emissions bandwidth whichever is less.

4.5.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1MHz (Peak Trace) / 1MHz (Average Trace)
VB	3MHz (Peak Trace) / 300 kHz (Average Trace)
Detector	Peak (Peak Trace) / Sample (Average Trace)
Trace	Max Hold
Sweep Time	AUTO

4.5.3. Test Procedures

1. The test procedure is the same as section 4.6.3.
2. Trace A, Set RBW =1MHz, VBW = 3MHz, Span >26dB bandwidth, Max. hold.
3. Delta Mark trace A Maximum frequency and trace B same frequency.
4. Repeat the above procedure until measurements for all frequencies were complete.

4.5.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.6.4.

4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Peak Excursion

Temperature	25°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n / Mode 3

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.07	13	Complies
40	5200 MHz	5.42	13	Complies
48	5240 MHz	5.51	13	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
38	5190 MHz	5.71	13	Complies
46	5230 MHz	5.26	13	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a / Mode 3

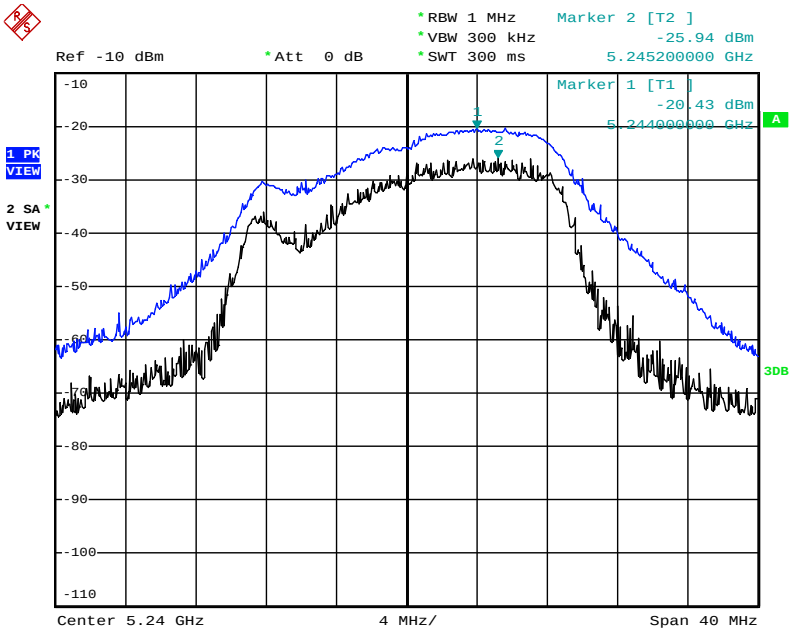
Configuration IEEE 802.11a / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	4.98	13	Complies
40	5200 MHz	5.23	13	Complies
48	5240 MHz	5.56	13	Complies

Note: All the test values were listed in the report.

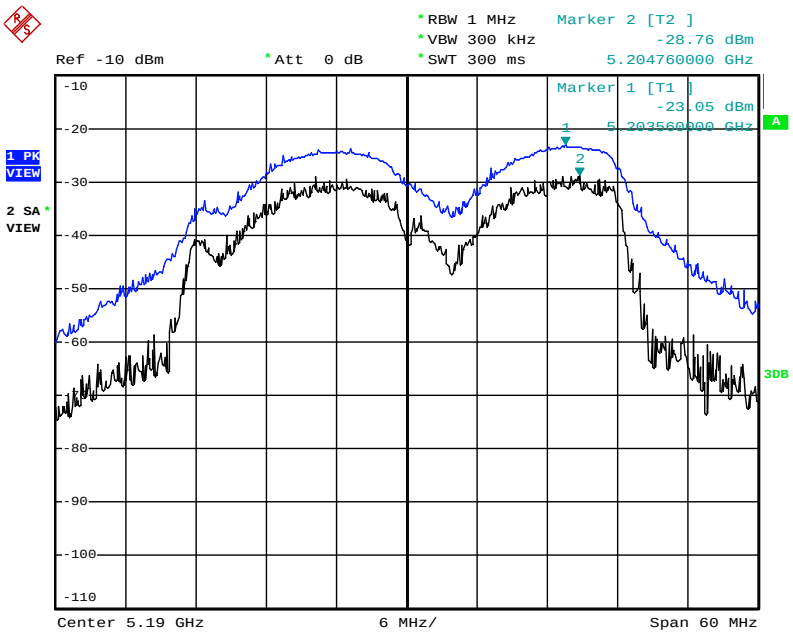
For plots, only the channel with maximum results was shown.

Peak Excursion Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 / 5240 MHz / Mode 3 (2TX, 2RX)



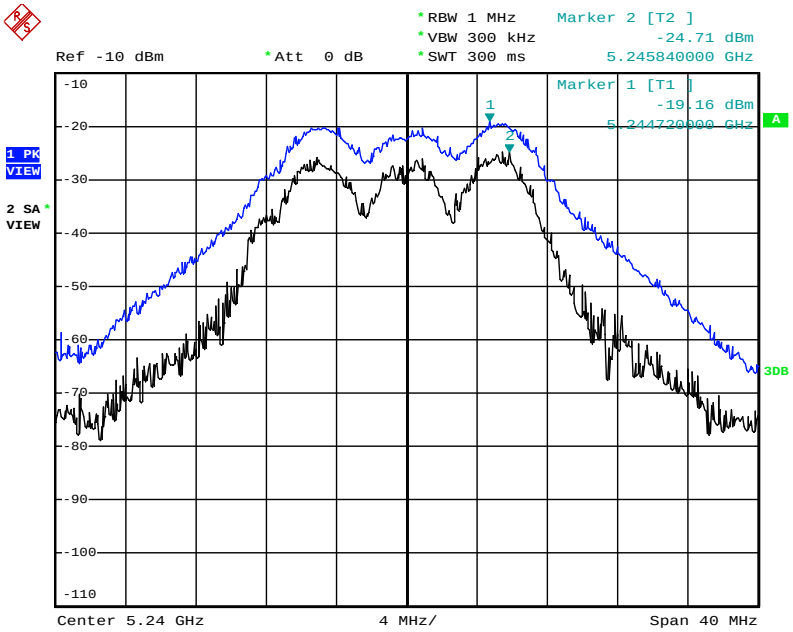
Date: 18.JAN.2012 15:34:57

Peak Excursion Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 / 5190 MHz / Mode 3 (2TX, 2RX)



Date: 18.JAN.2012 15:39:45

Peak Excursion Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5240 MHz / Mode 3 (2TX, 2RX)



Date: 10.JAN.2012 16:40:29

Temperature	25°C	Humidity	56%
Test Engineer	Satoshi Yang	Configurations	IEEE 802.11n / Mode 6

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.51	13	Complies
40	5200 MHz	5.31	13	Complies
48	5240 MHz	5.53	13	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 (1TX, 2RX)

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
38	5190 MHz	5.11	13	Complies
46	5230 MHz	5.25	13	Complies

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.33	13	Complies
40	5200 MHz	5.36	13	Complies
48	5240 MHz	5.51	13	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
38	5190 MHz	6.61	13	Complies
46	5230 MHz	5.46	13	Complies

Configuration IEEE 802.11n MCS8 20MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.33	13	Complies
40	5200 MHz	5.36	13	Complies
48	5240 MHz	5.51	13	Complies

Configuration IEEE 802.11n MCS8 40MHz / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
38	5190 MHz	6.61	13	Complies
46	5230 MHz	5.46	13	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Satoshi Yang	Configurations	IEEE 802.11a / Mode 6

Configuration IEEE 802.11a / Chain 1 (1TX, 2RX)

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	6.63	13	Complies
40	5200 MHz	5.94	13	Complies
48	5240 MHz	6.81	13	Complies

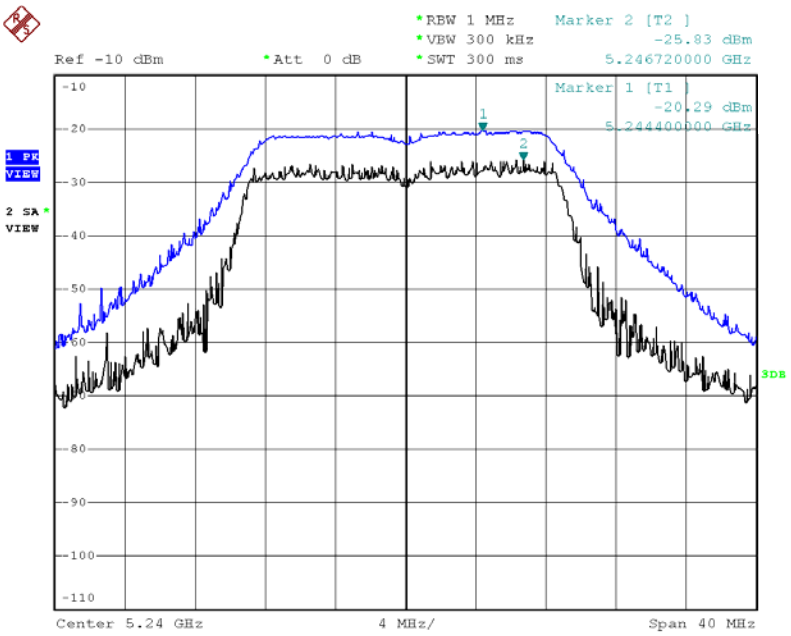
Configuration IEEE 802.11a / Chain 1 + Chain 2 (2TX, 2RX)

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	4.99	13	Complies
40	5200 MHz	3.98	13	Complies
48	5240 MHz	4.87	13	Complies

Note: All the test values were listed in the report.

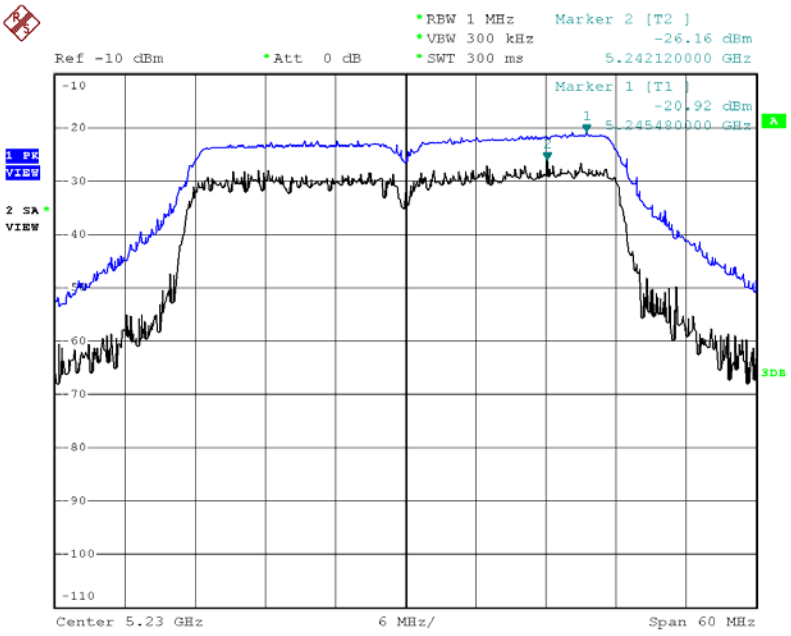
For plots, only the channel with maximum results was shown.

Peak Excursion Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1/ 5240 MHz / Mode 6 (1TX, 2RX)



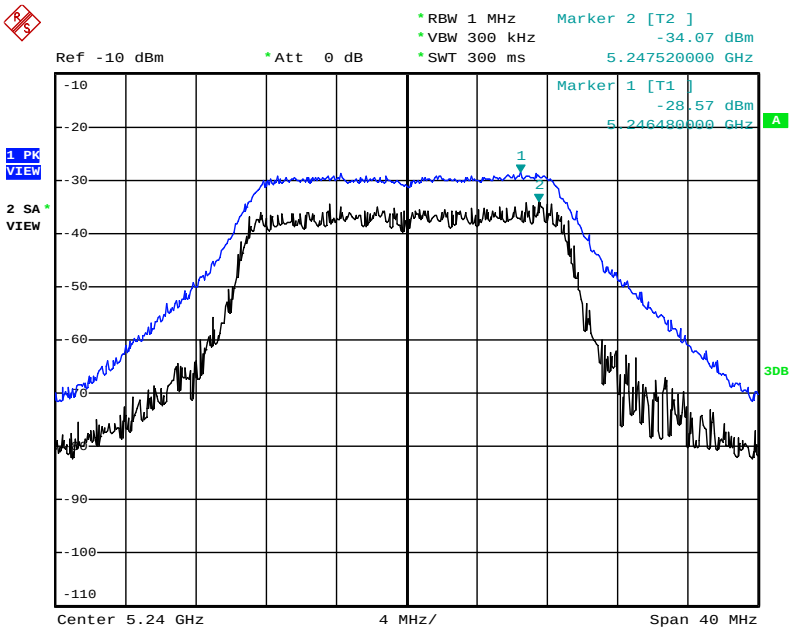
Date: 15.DEC.2011 18:11:22

Peak Excursion Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 / 5230 MHz / Mode 6 (1TX, 2RX)



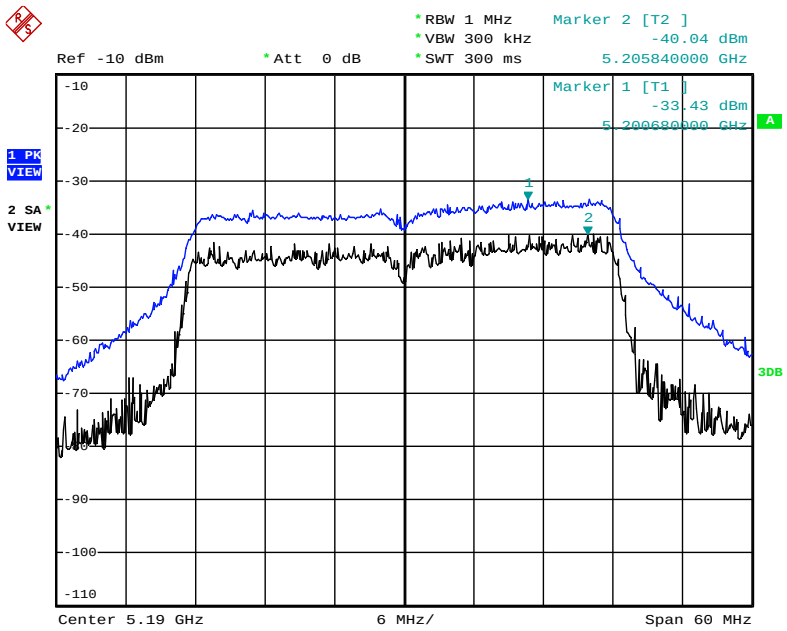
Date: 15.DEC.2011 18:02:58

Peak Excursion Plot on Configuration IEEE 802.11n MCS0 20MHz / Chain 1+ Chain 2 / 5240 MHz / Mode 6 (2TX, 2RX)



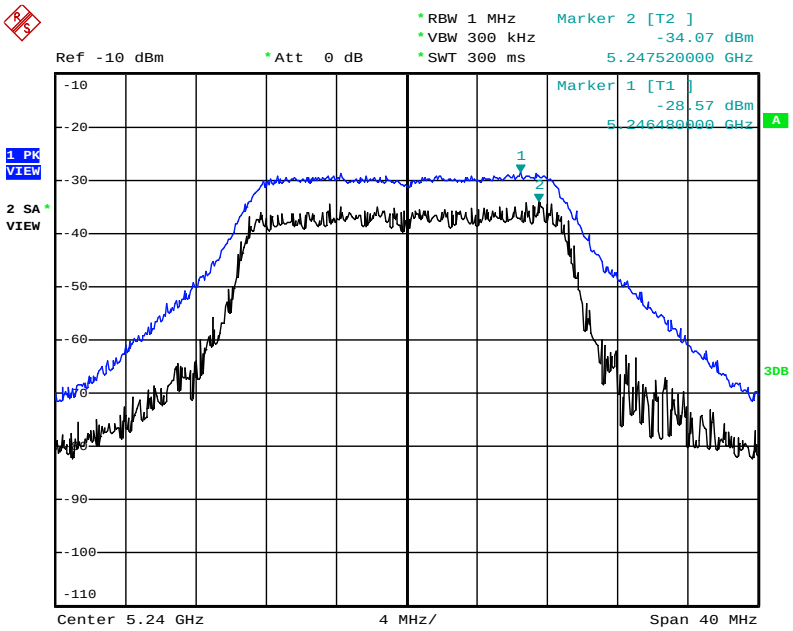
Date: 16.DEC.2011 16:52:14

Peak Excursion Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1+Chain 2 / 5190 MHz / Mode 6 (2TX, 2RX)



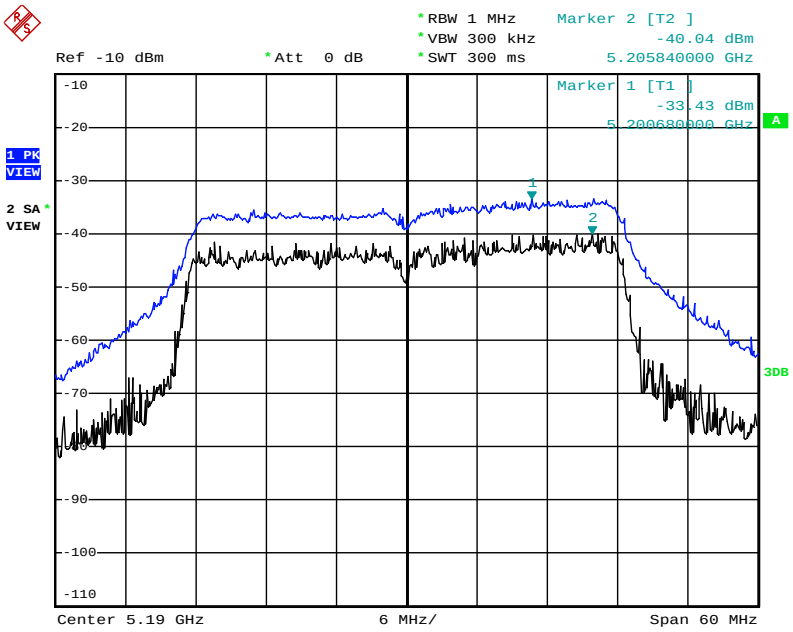
Date: 16.DEC.2011 16:57:26

Peak Excursion Plot on Configuration IEEE 802.11n MCS8 20MHz / Chain 1+Chain 2 / 5240 MHz / Mode 6 (2TX, 2RX)



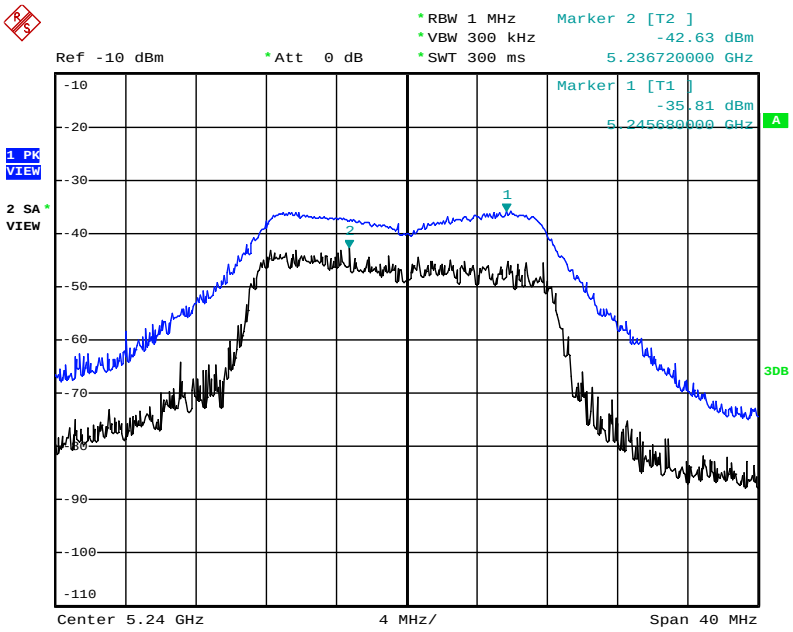
Date: 16.DEC.2011 16:52:14

Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz / Chain 1+Chain 2 / 5190 MHz / Mode 6 (2TX, 2RX)



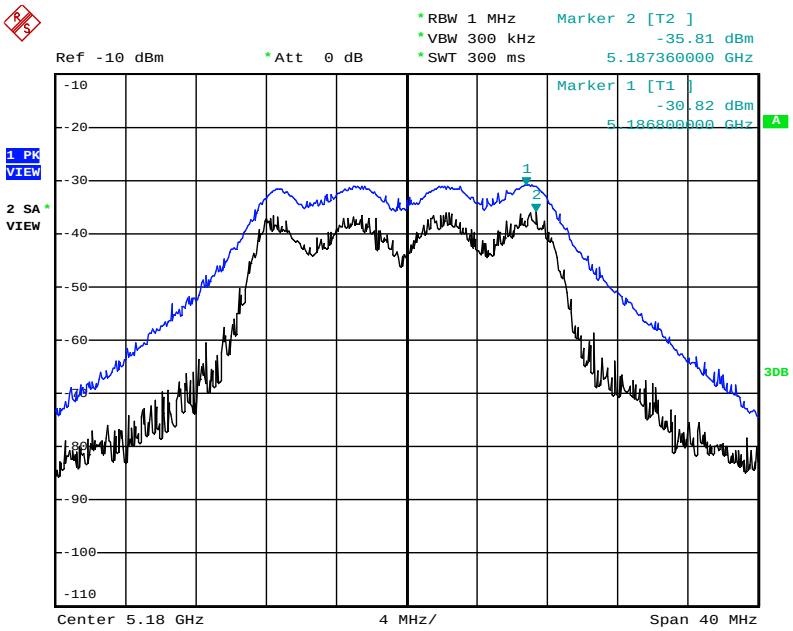
Date: 16.DEC.2011 16:57:26

Peak Excursion Plot on Configuration IEEE 802.11a / Chain 1 / 5240 MHz / Mode 6 (1TX, 2RX)



Date: 16.DEC.2011 16:37:53

Peak Excursion Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5180 MHz / Mode 6 (2TX, 2RX)



Date: 11.JAN.2012 17:55:36