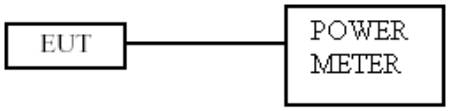
6. Peak Transmit Power

6.1. Test Procedure

The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

6.2. Test Setup Layout



6.3. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2013/03/15	2014/03/14
SERIES POWER METER	ANRITSU	ML2495A	1224005	2013/03/21	2014/03/20
POWER SENSOR	ANRITSU	MA2411B	1207295	2013/03/21	2014/03/20

6.4. Test Result and Data

Test Date: Aug. 28, 2013 Temperature: 26℃

Atmospheric pressure: 1019 hPa Humidity: 45%

Modulation Standard: IEEE 802.11a (54Mbps)

Channel	Frequency (MHz)	Peak Power Output (dBm)			Peak Power Output (mW)	26dB Occupied Bandwidth (MHz)	
		ANT R	ANT L	ANT R+L	ANT R+L	ANT R	ANT L
36	5180	7.57	7.56	10.58	11.42	22.3	22.3
44	5220	7.95	7.57	10.77	11.95	22.0	22.3
48	5240	8.06	7.64	10.87	12.20	22.1	22.0

Modulation Standard: IEEE 802.11an, HT20 (130Mbps)

Channel	Frequency (MHz)	Peak Power Output (dBm)			Peak Power Output (mW)	26dB Occupied Bandwidth (MHz)	
		ANT R	ANT L	ANT R+L	ANT R+L	ANT R	ANT L
36	5180	7.54	7.09	10.33	10.79	22.8	22.8
44	5220	7.88	6.75	10.36	10.87	22.7	22.7
48	5240	8.11	6.82	10.52	11.28	22.8	22.5

Modulation Standard: IEEE 802.11an, HT40 (270Mbps)

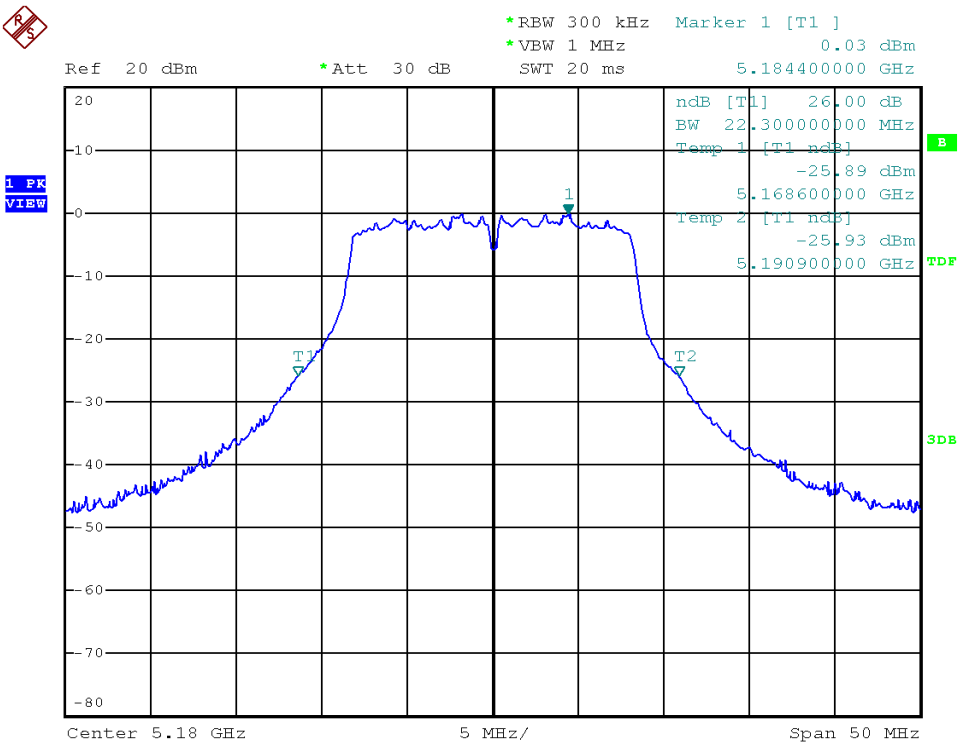
Channel	Frequency (MHz)	Peak Power Output (dBm)			Peak Power Output (mW)	26dB Occupied Bandwidth (MHz)	
		ANT R	ANT L	ANT R+L	ANT R+L	ANT R	ANT L
38	5190	9.09	8.15	11.66	14.64	39.8	39.6
42	5210	8.85	7.99	11.45	13.97	39.8	39.8
46	5230	8.81	7.97	11.42	13.87	39.6	39.8

Limit:

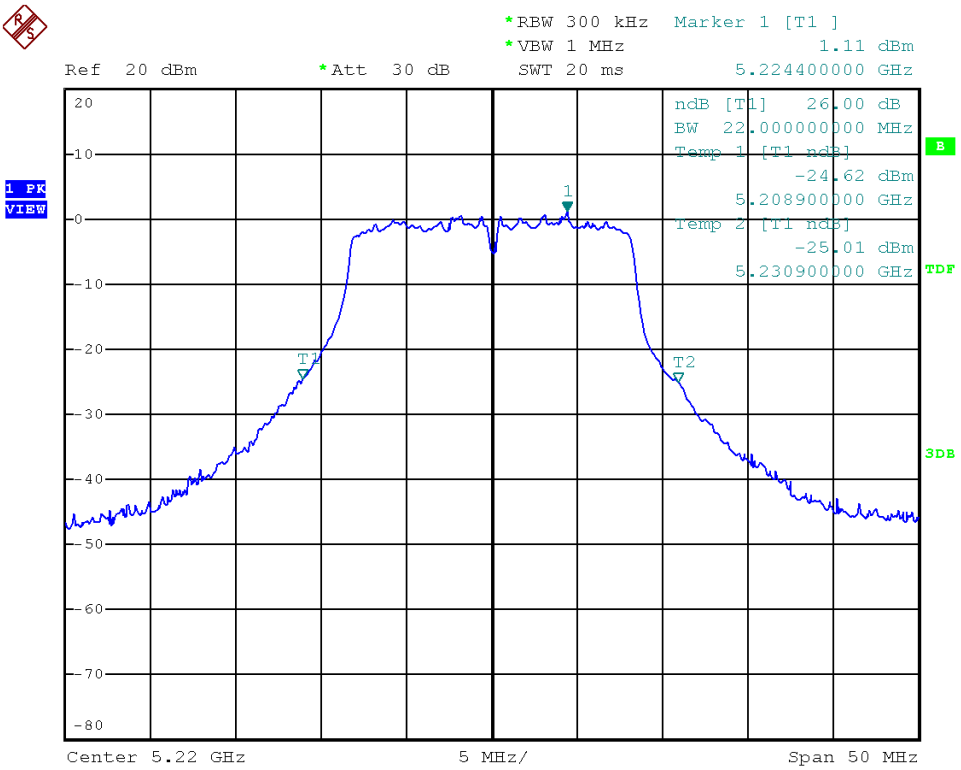
Frequency Band	Limit
5.15 – 5.25 GHz	The lesser of 50mW(17dBm) or 4dBm + 10logB
B is the 26dB emission bandwidth in MHz.	

26dB Occupied Bandwidth

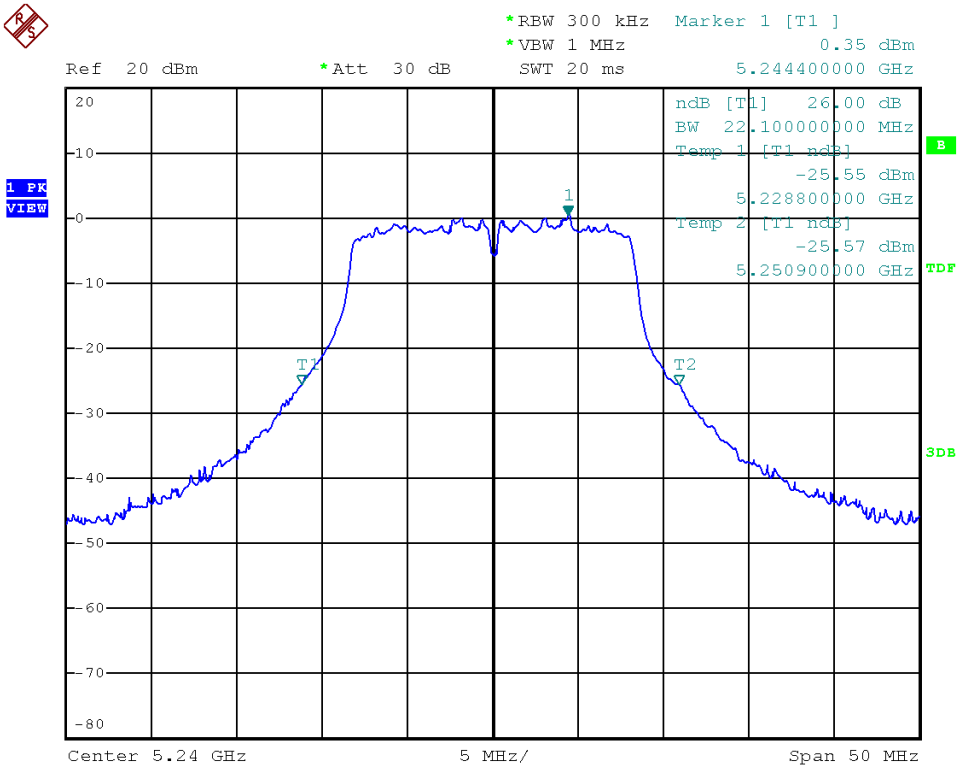
Modulation Standard: 802.11a (54Mbps), ANT R
Channel: 36



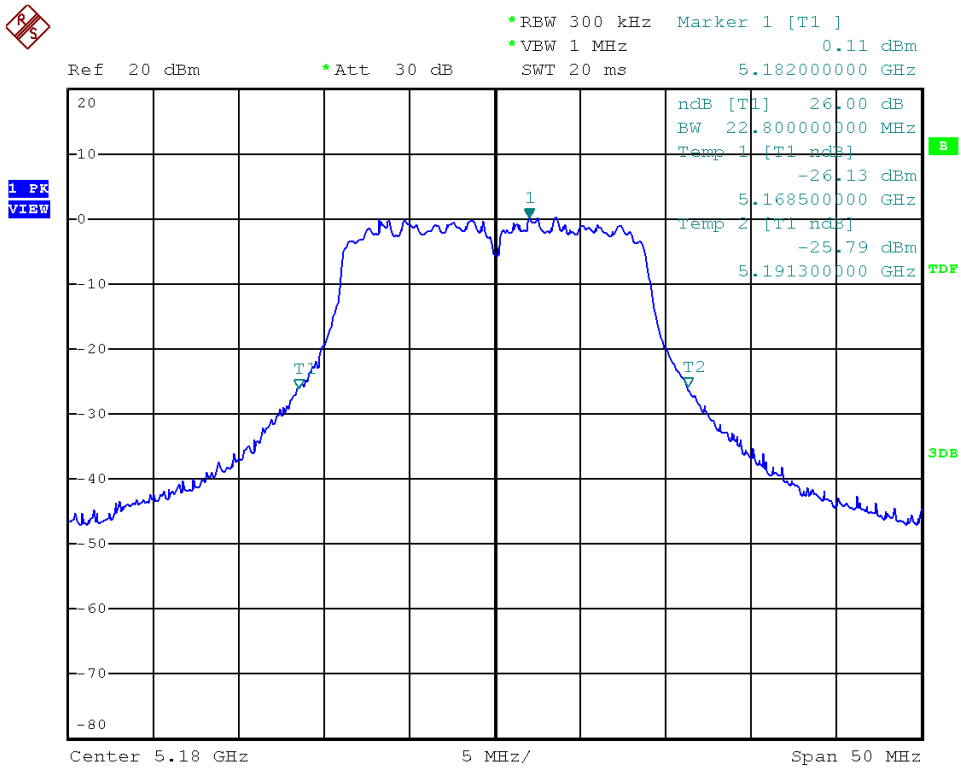
Modulation Standard: 802.11a (54Mbps), ANT R
Channel: 44



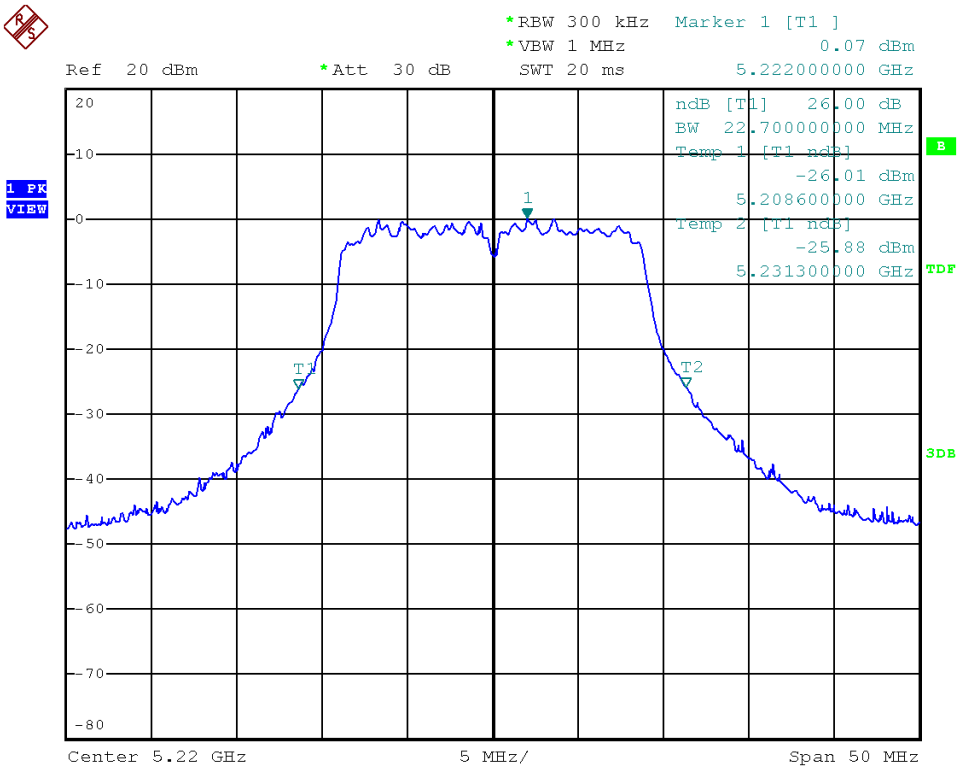
Modulation Standard: 802.11a (54Mbps), ANT R
Channel: 48



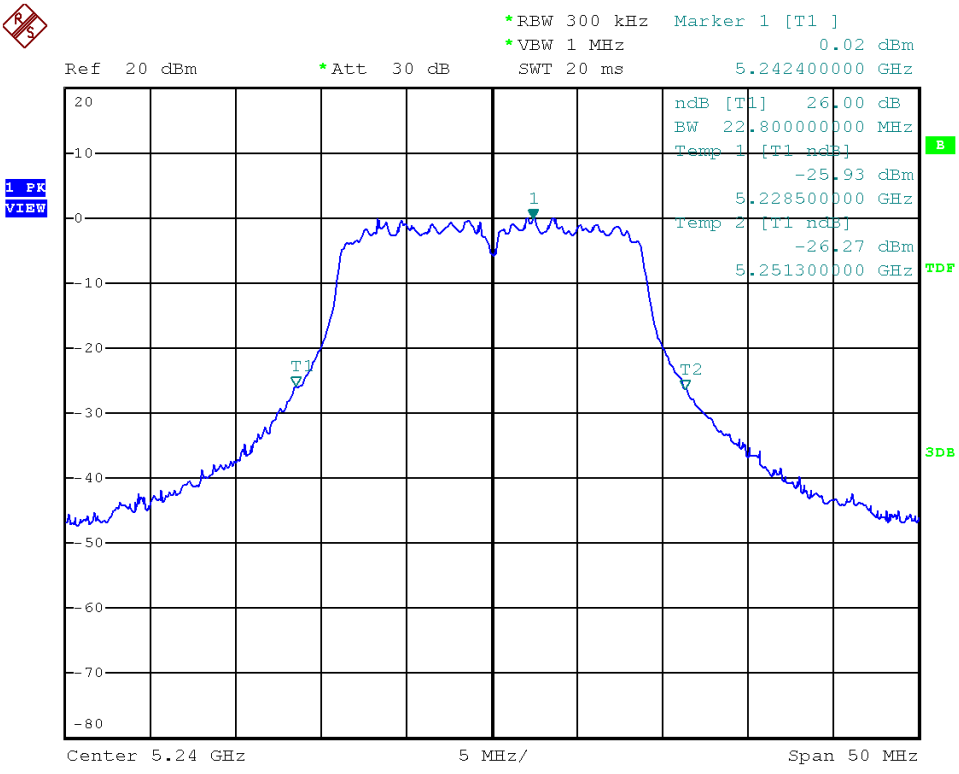
Modulation Standard: 802.11an, HT20 (130Mbps), ANT R
Channel: 36



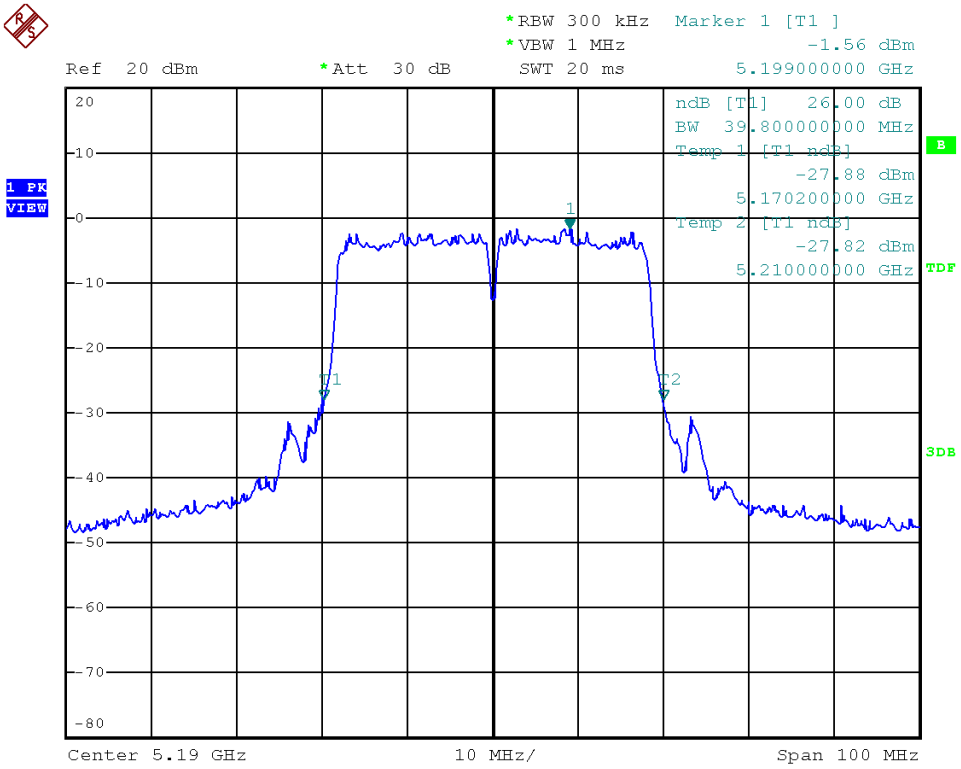
Modulation Standard: 802.11an, HT20 (130Mbps), ANT R
Channel: 44



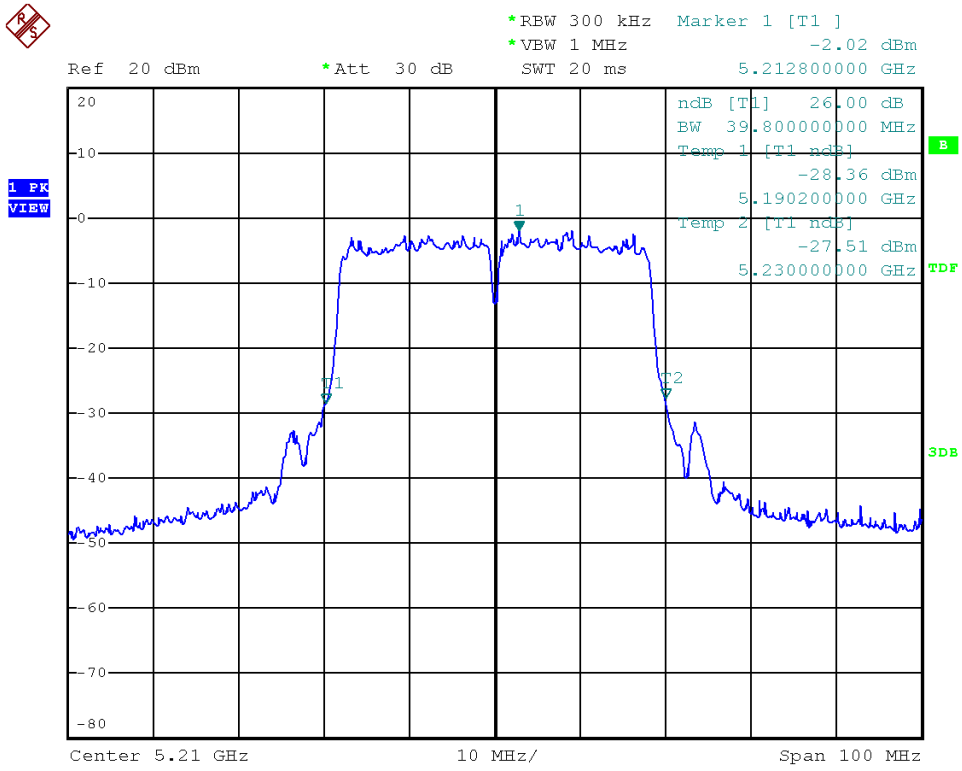
Modulation Standard: 802.11an, HT20 (130Mbps), ANT R
Channel: 48



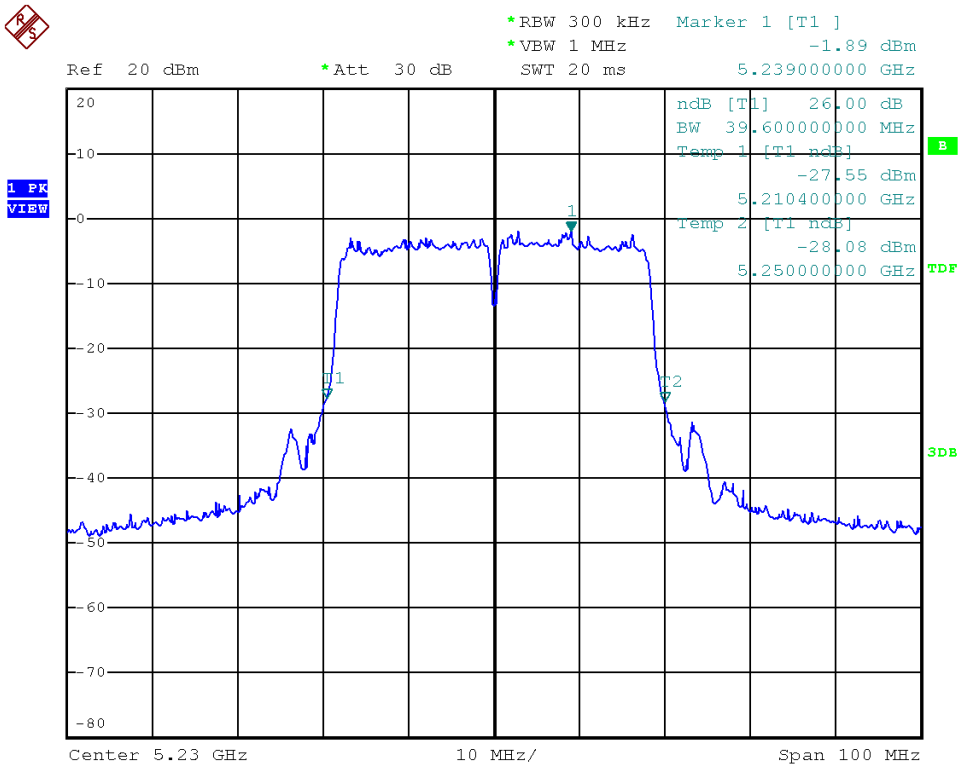
Modulation Standard: 802.11an HT40 (270Mbps), ANT R
Channel: 38



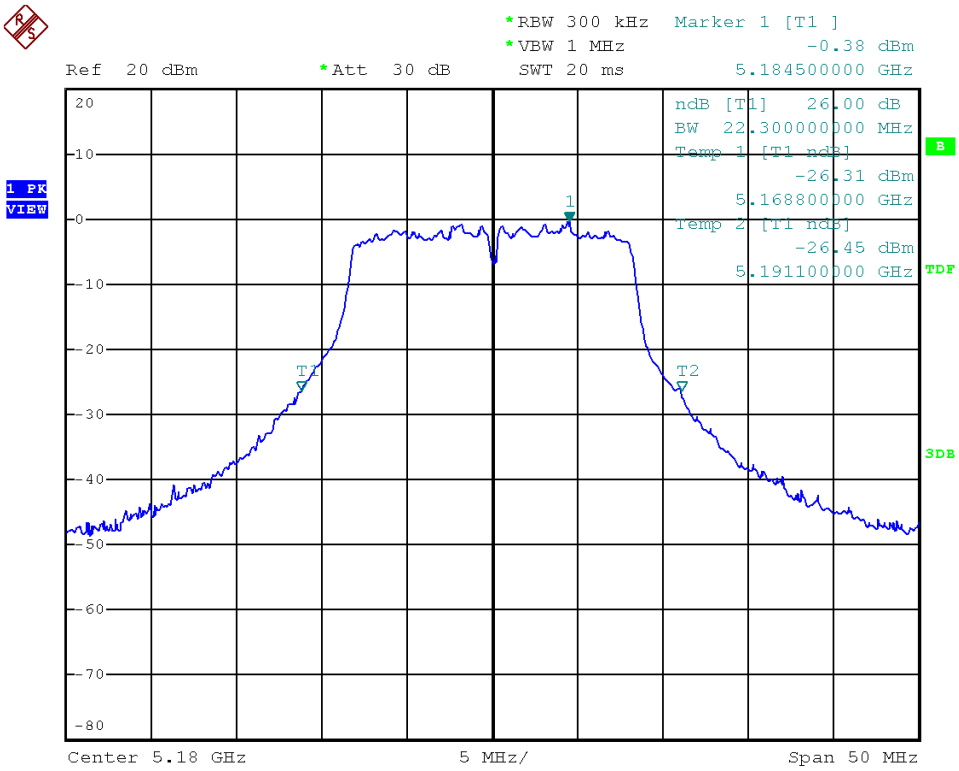
Modulation Standard: 802.11an HT40 (270Mbps), ANT R
Channel: 42



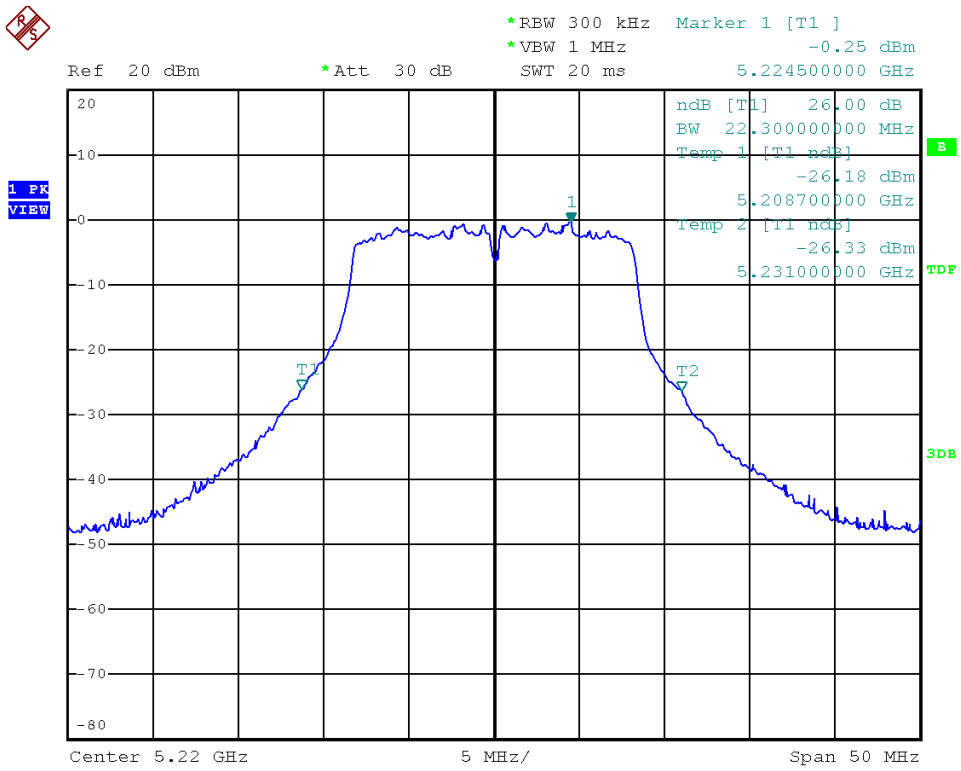
Modulation Standard: 802.11an HT40 (270Mbps), ANT R
Channel: 46



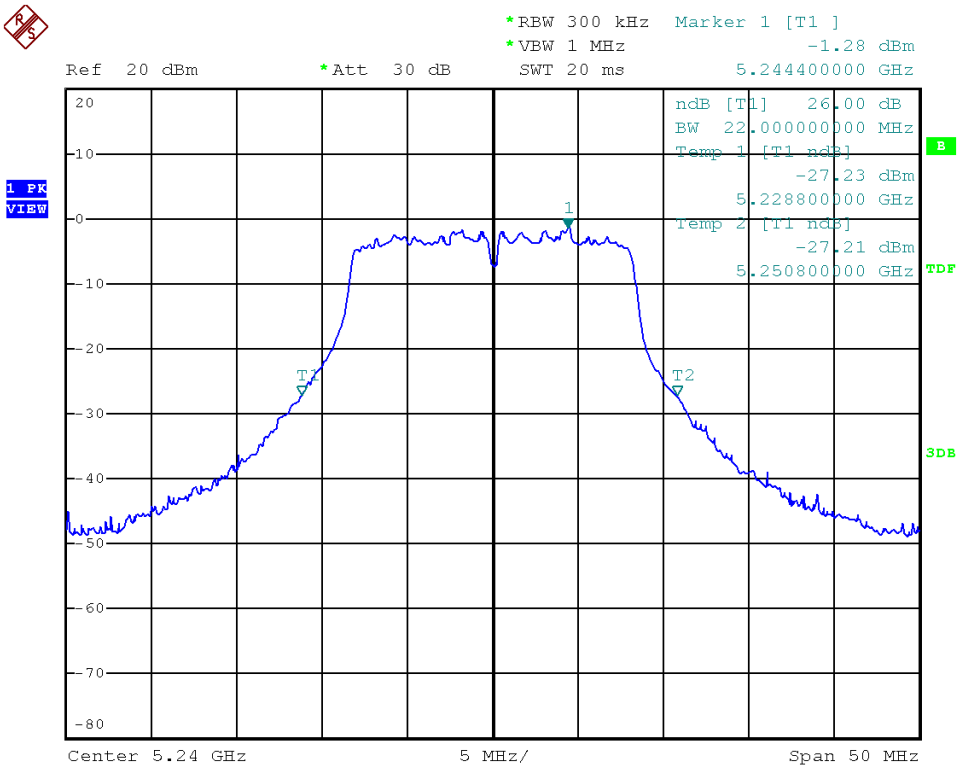
Modulation Standard: 802.11a (54Mbps), ANT L
Channel: 36



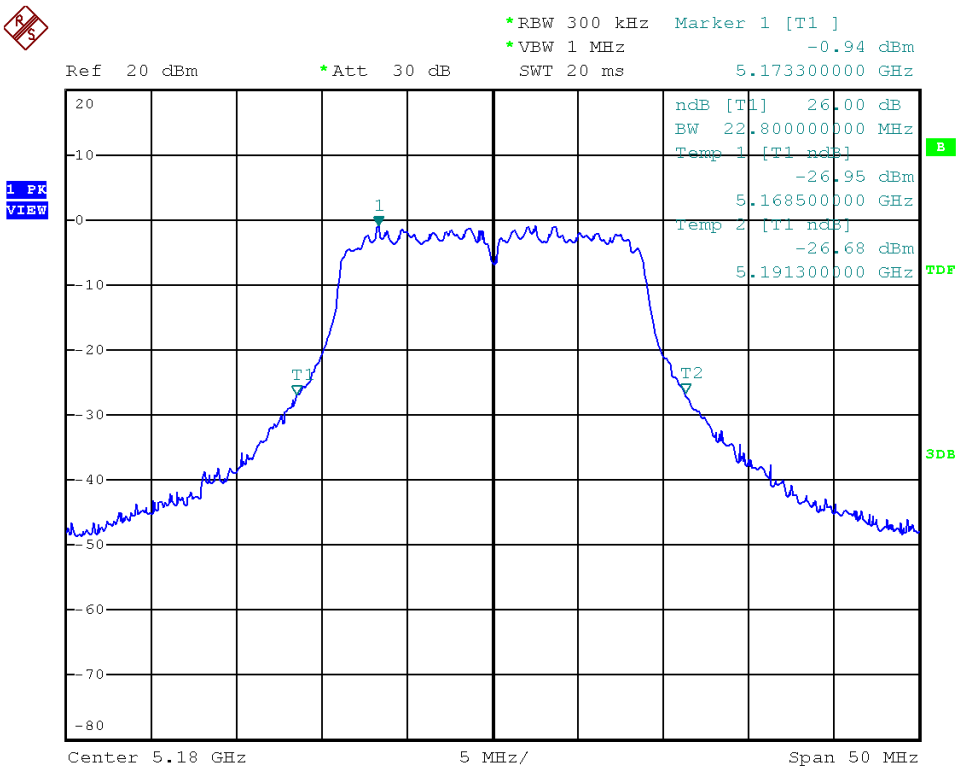
Modulation Standard: 802.11a (54Mbps), ANT L
Channel: 44



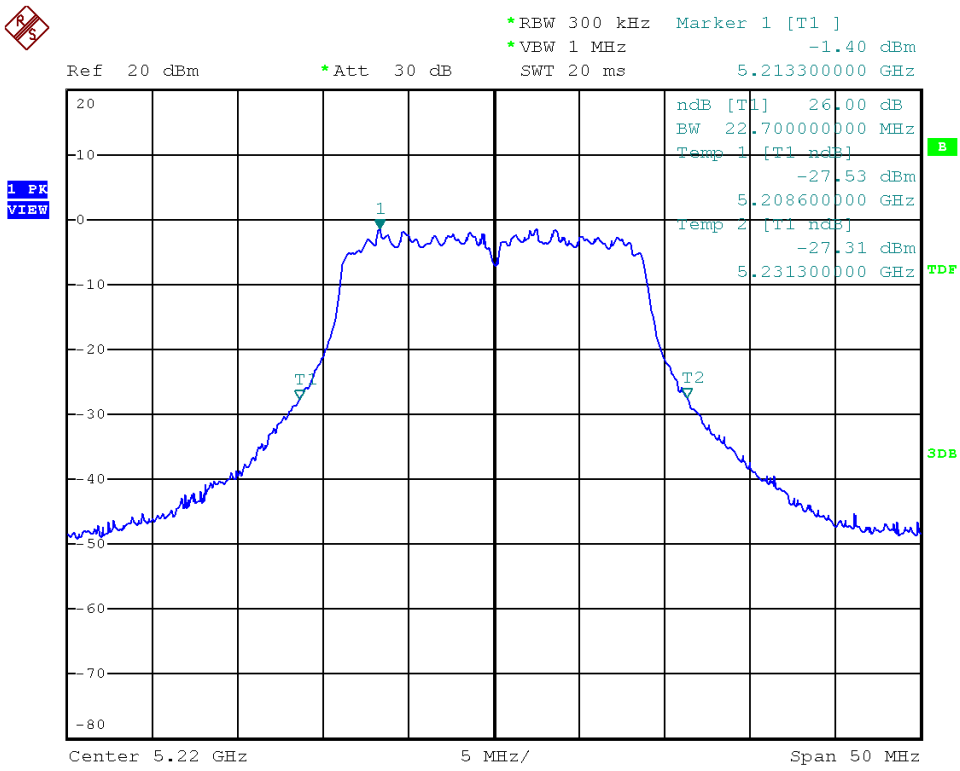
Modulation Standard: 802.11a (54Mbps), ANT L
Channel: 48



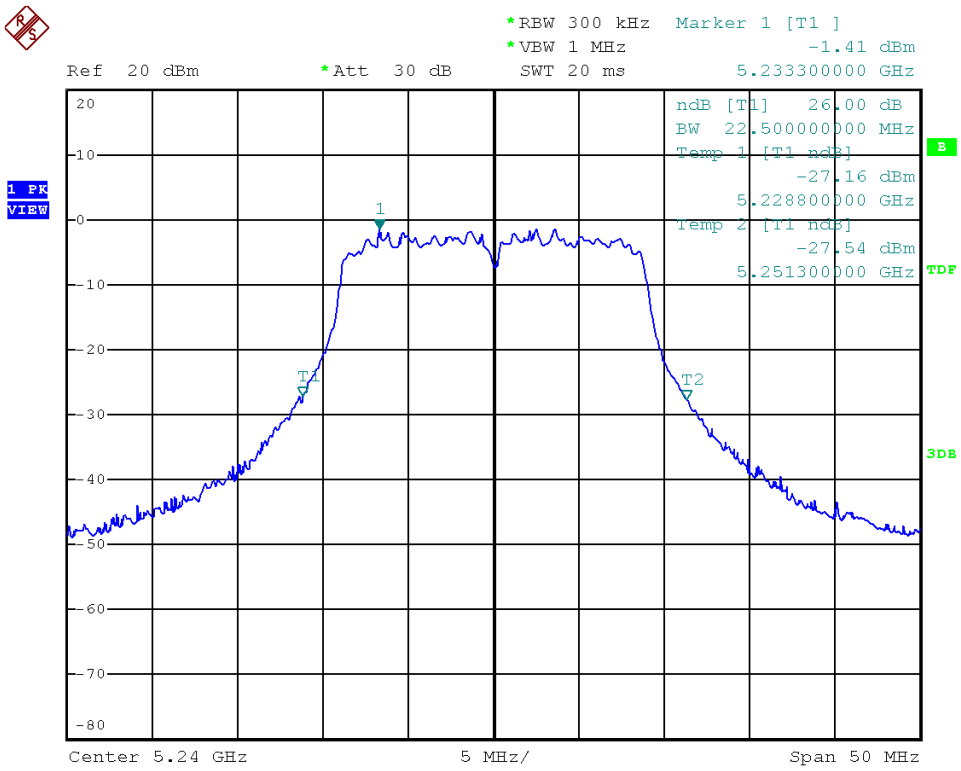
Modulation Standard: 802.11an, HT20 (130Mbps), ANT L
Channel: 36



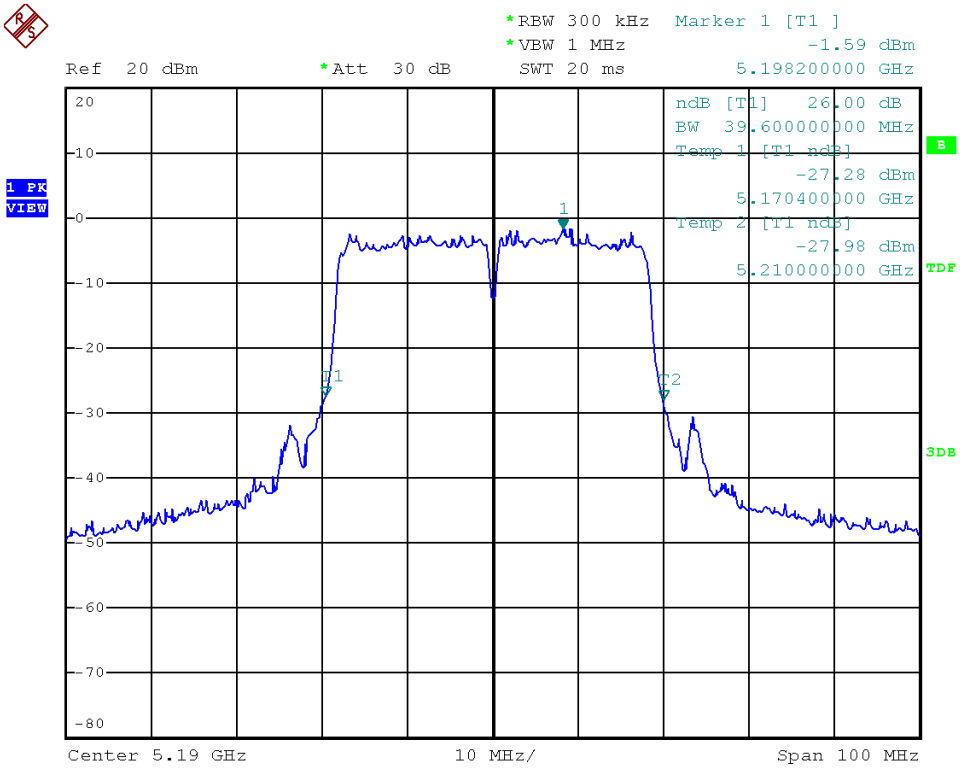
Modulation Standard: 802.11an, HT20 (130Mbps), ANT L
Channel: 44



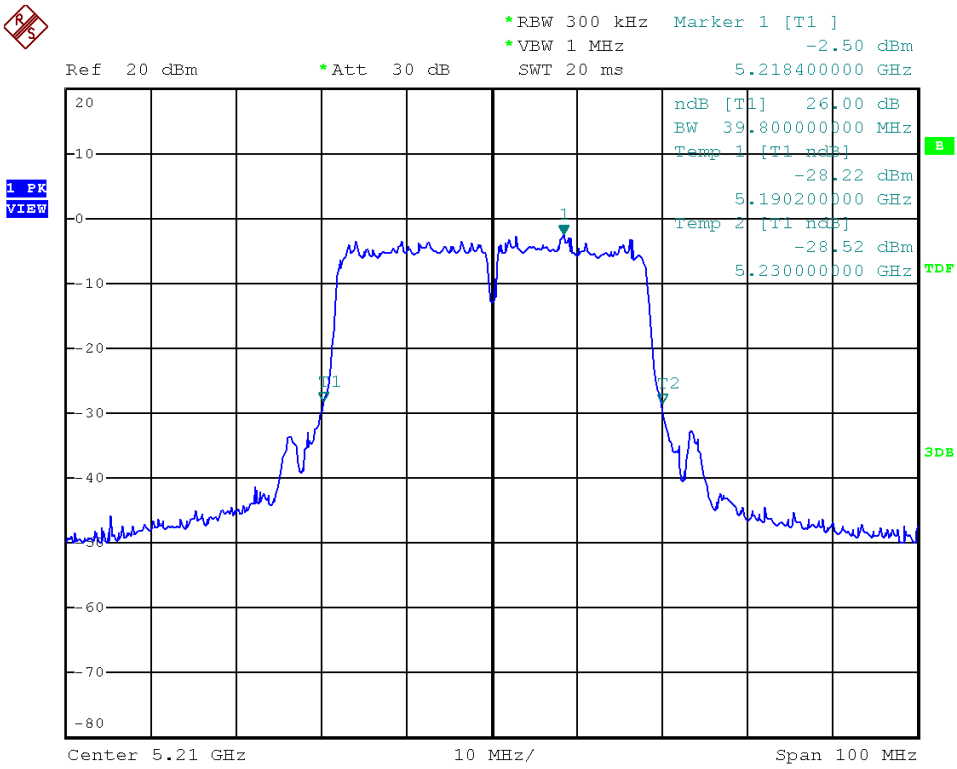
Modulation Standard: 802.11an, HT20 (130Mbps), ANT L
Channel: 48



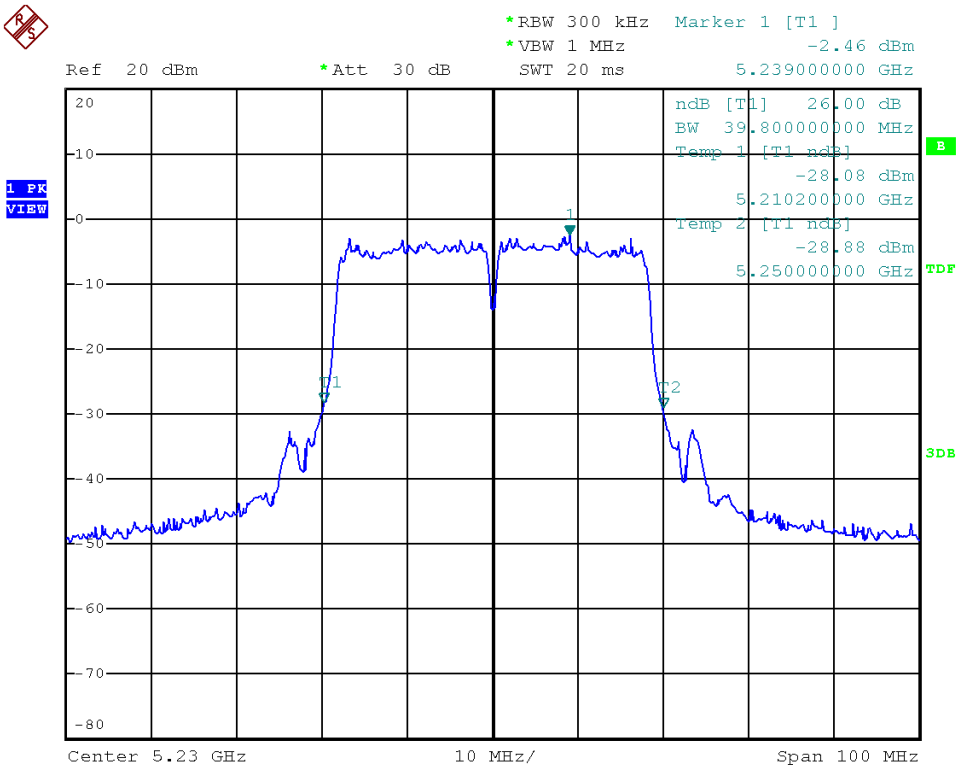
Modulation Standard: 802.11an HT40 (270Mbps), ANT L
Channel: 38



Modulation Standard: 802.11an HT40 (270Mbps), ANT L
Channel: 42



Modulation Standard: 802.11an HT40 (270Mbps), ANT L
Channel: 46

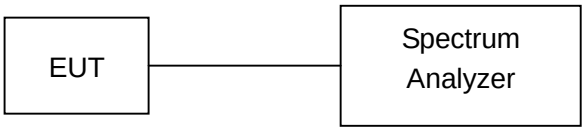


7. Peak Power Excursion

7.1. Test Procedure

1. The transmitter output was connected to the spectrum analyzer
2. Using Peak detector and max-hold function for Trace 1.
3. Set RBW of spectrum analyzer to 1 MHz and VBW to 3 MHz for Trace 1.
4. Set RBW of spectrum analyzer to 1 MHz and VBW to 3 MHz for Trace 2, Set detector mode to RMS, trace average 100 traces in power averaging mode.
5. The largest difference between Trace 1 and Trace 2 in any 1 MHz band on any frequency was recorded.

7.2. Test Setup Layout



7.3. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2013/03/15	2014/03/14

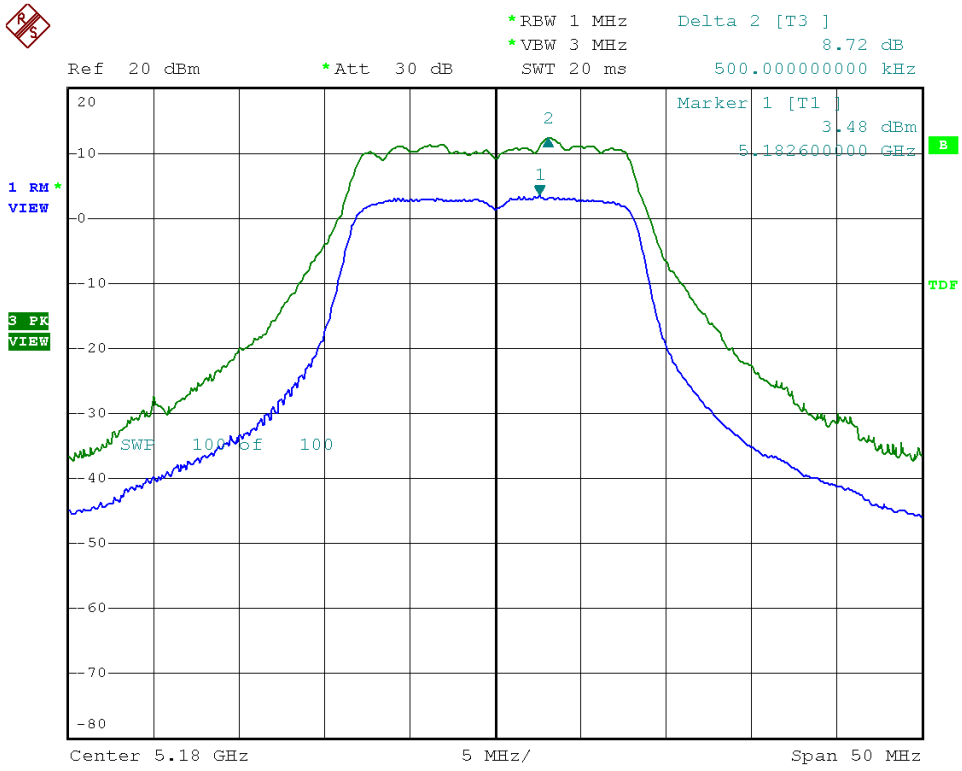
7.4. Test Result and Data

Test Date: Aug. 28, 2013 Temperature: 26℃

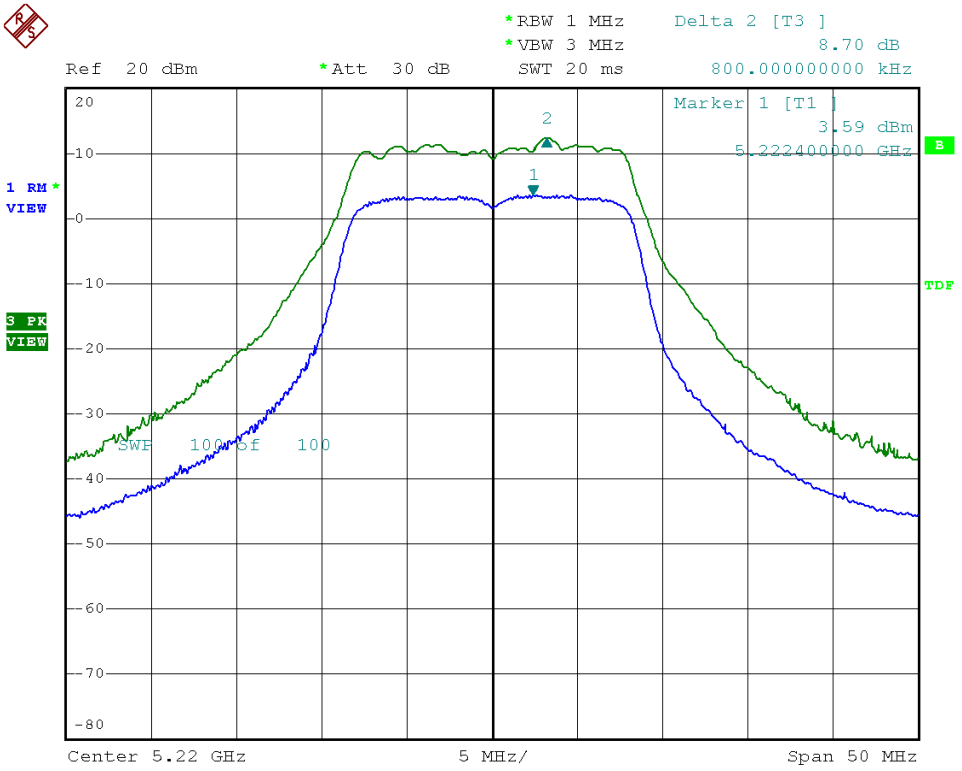
Atmospheric pressure: 1019 hPa Humidity: 45%

Modulation Standard	Channel	Frequency (MHz)	Peak Power Output (dBm)		Limit (dB)
			ANT R	ANT L	
802.11a (54Mbps)	36	5180	8.72	8.58	13
	44	5220	8.70	8.54	13
	48	5240	8.75	8.82	13
802.11an HT20 (130Mbps)	36	5180	8.38	8.28	13
	44	5220	8.20	8.21	13
	48	5240	8.37	7.95	13
802.11an HT40 (270Mbps)	38	5190	8.44	8.11	13
	42	5210	8.00	8.45	13
	46	5230	8.31	8.09	13

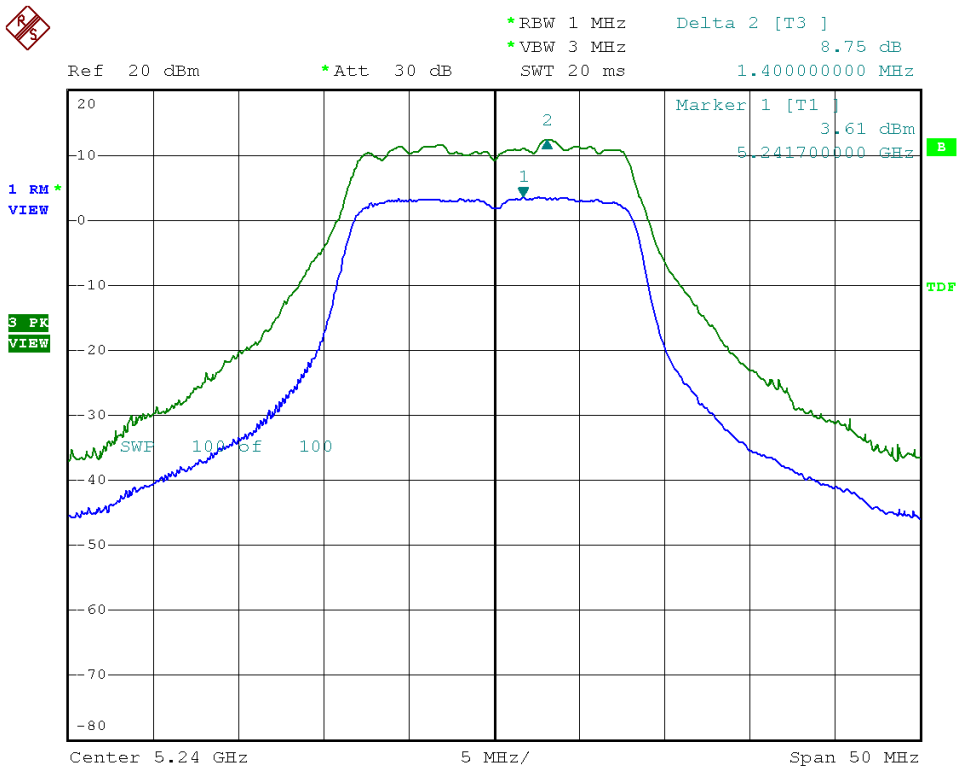
Modulation Standard: 802.11a (54Mbps), ANT R
Channel: 36



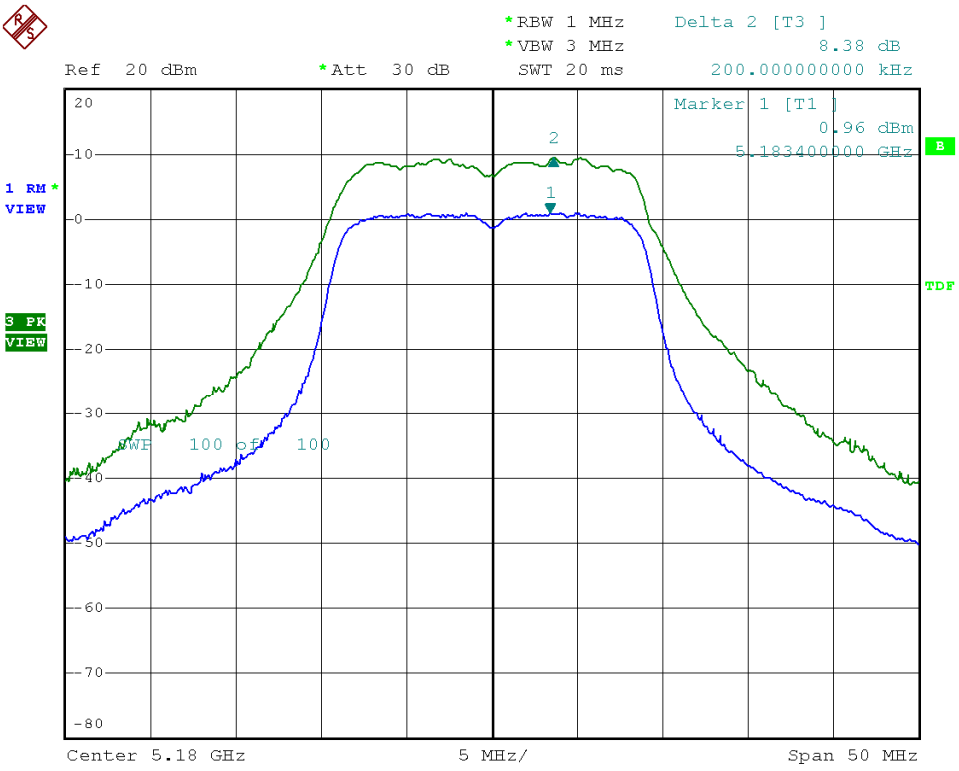
Modulation Standard: 802.11a (54Mbps), ANT R
Channel: 44



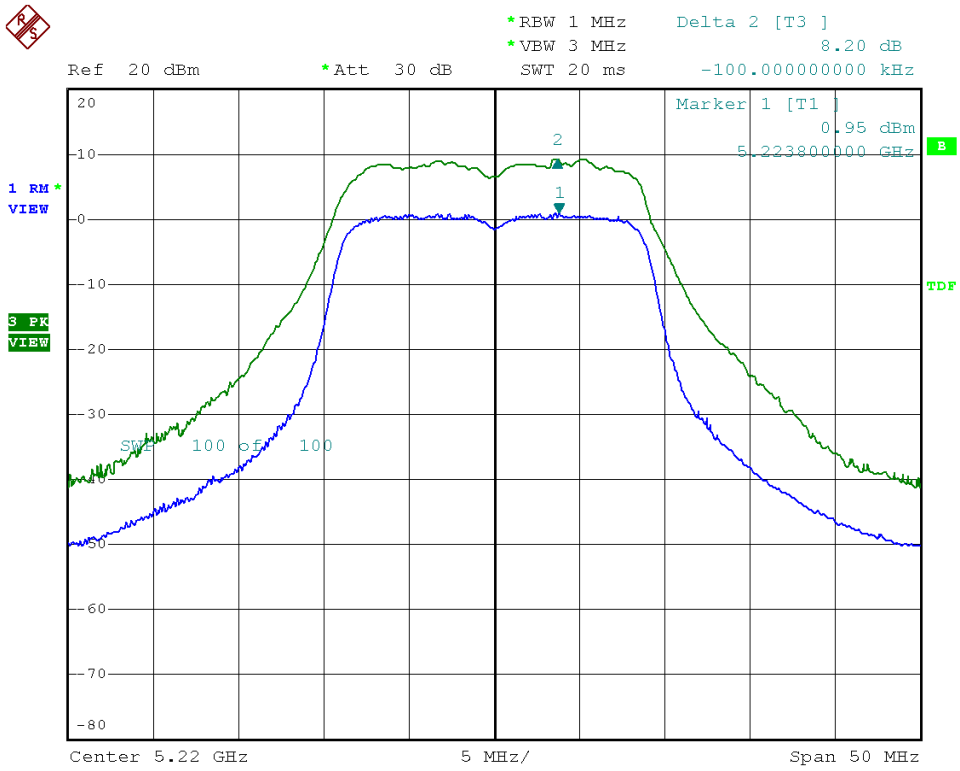
Modulation Standard: 802.11a (54Mbps), ANT R
Channel: 48



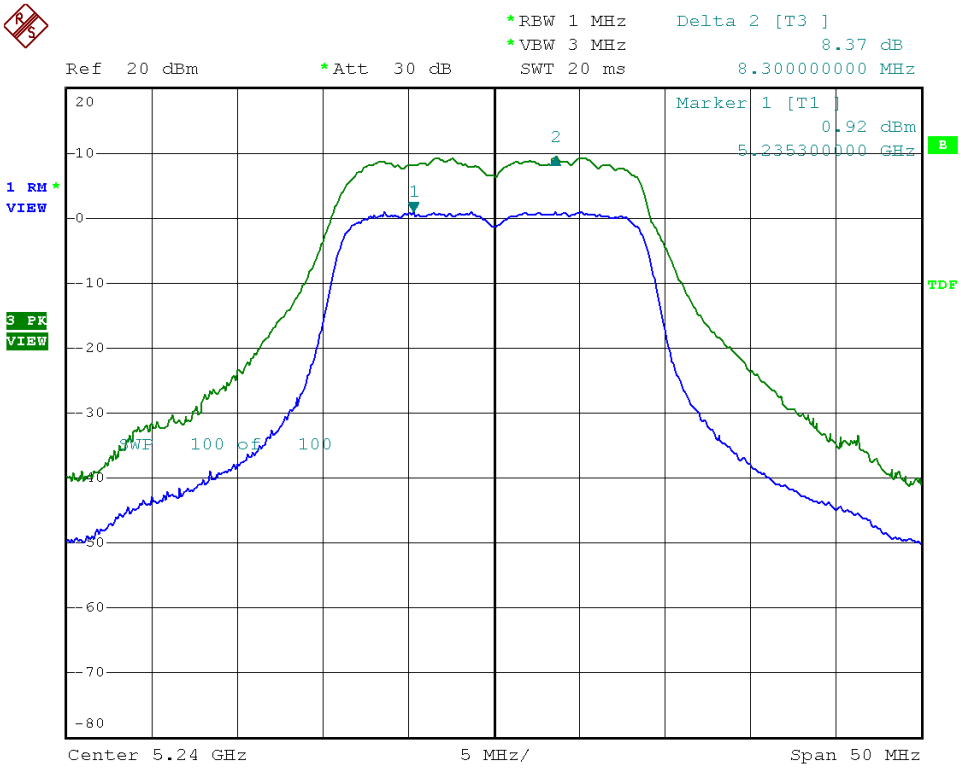
Modulation Standard: 802.11an, HT20 (130Mbps), ANT R
Channel: 36



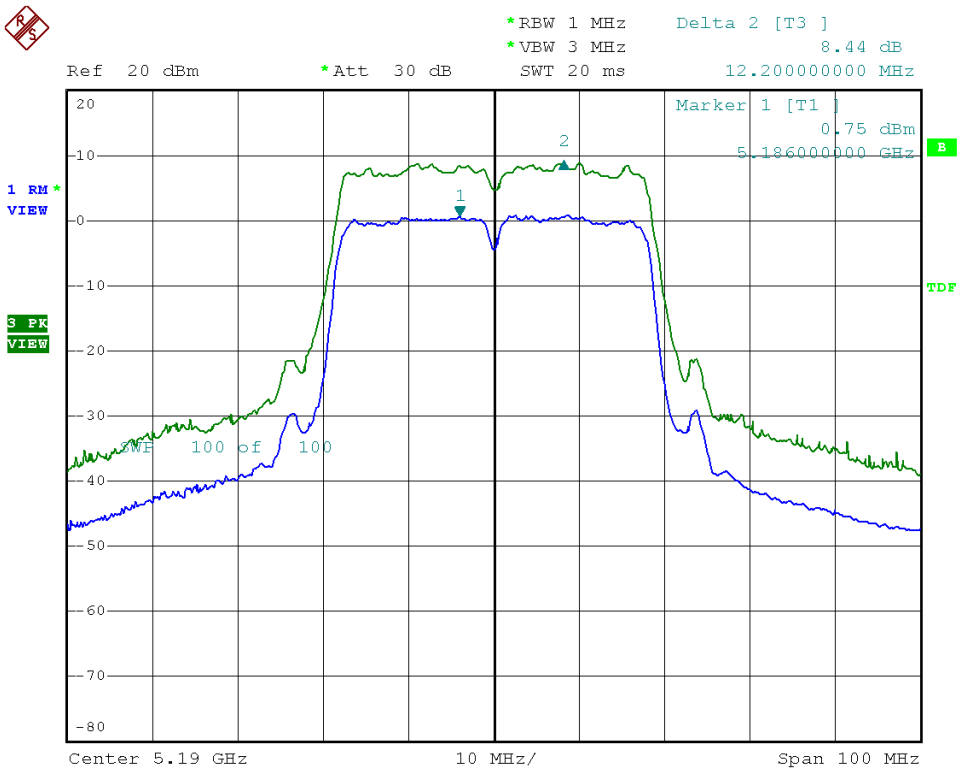
Modulation Standard: 802.11an, HT20 (130Mbps), ANT R
Channel: 44



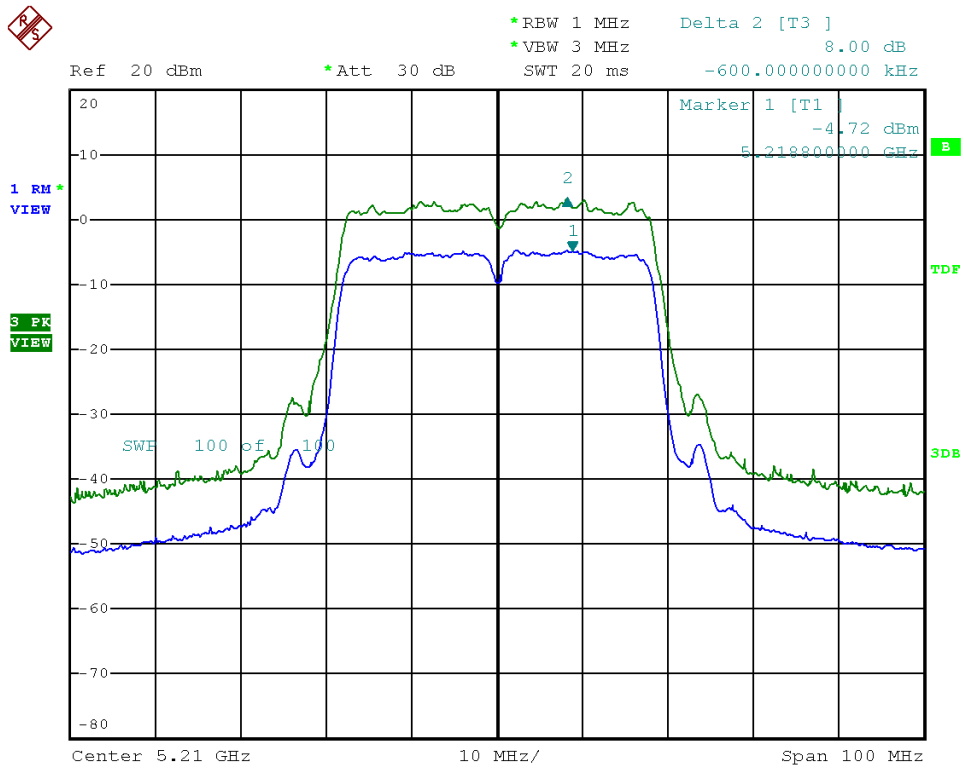
Modulation Standard: 802.11an, HT20 (130Mbps) , ANT R
Channel: 48



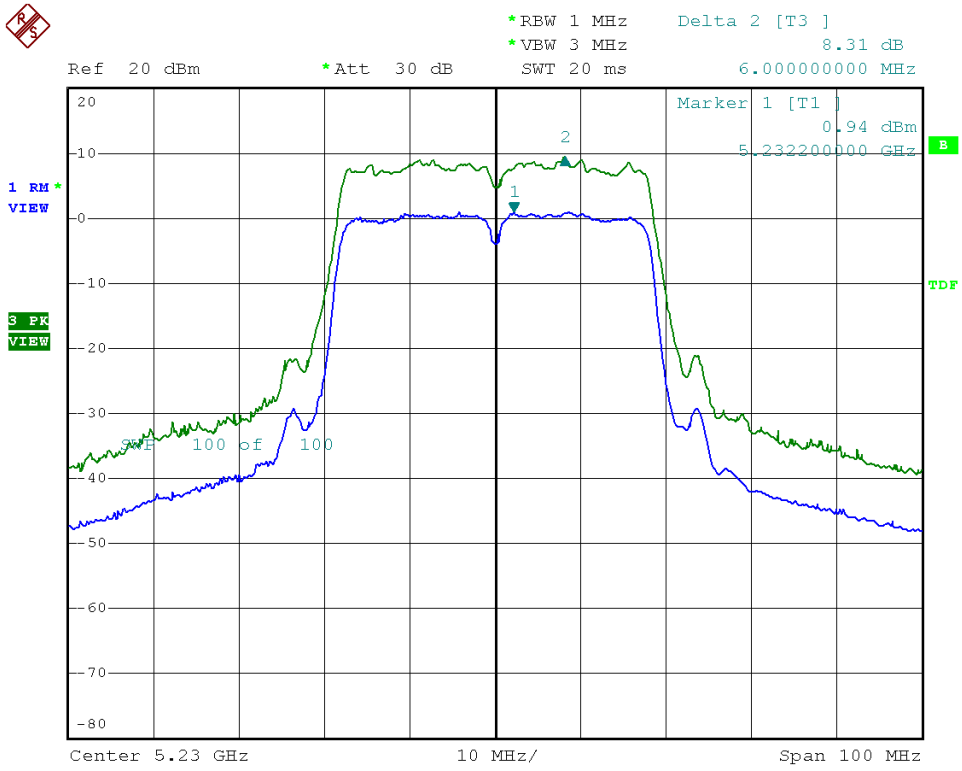
Modulation Standard: 802.11an HT40 (270Mbps), ANT R
Channel: 38



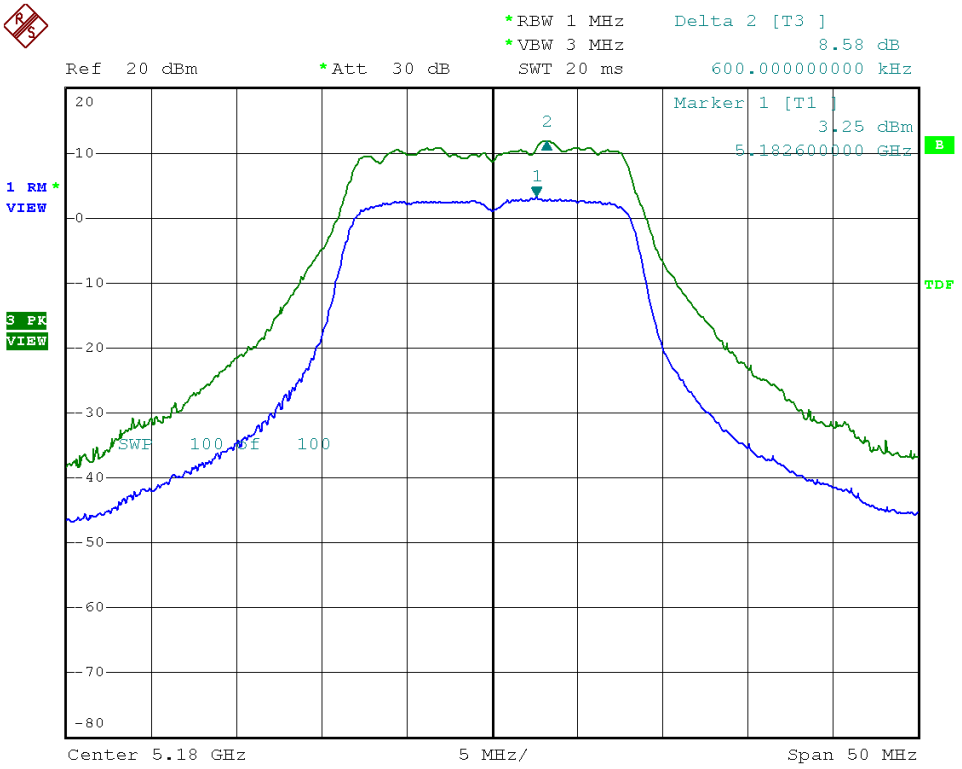
Modulation Standard: 802.11an HT40 (130Mbps), ANT R
Channel: 42



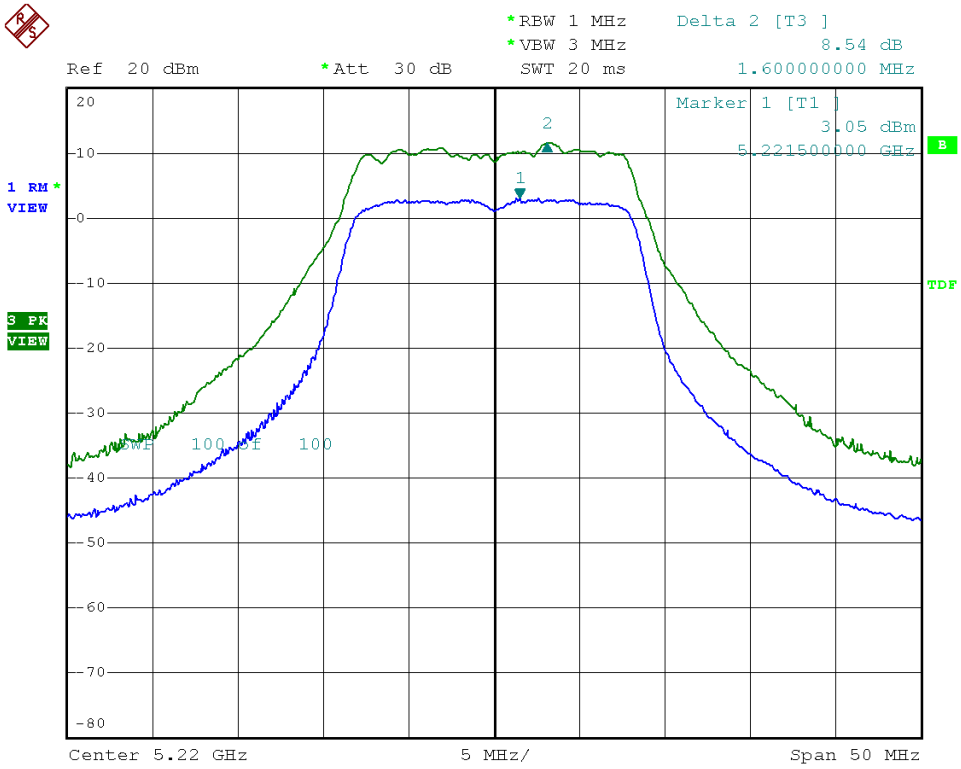
Modulation Standard: 802.11an HT40 (130Mbps), ANT R
Channel: 46



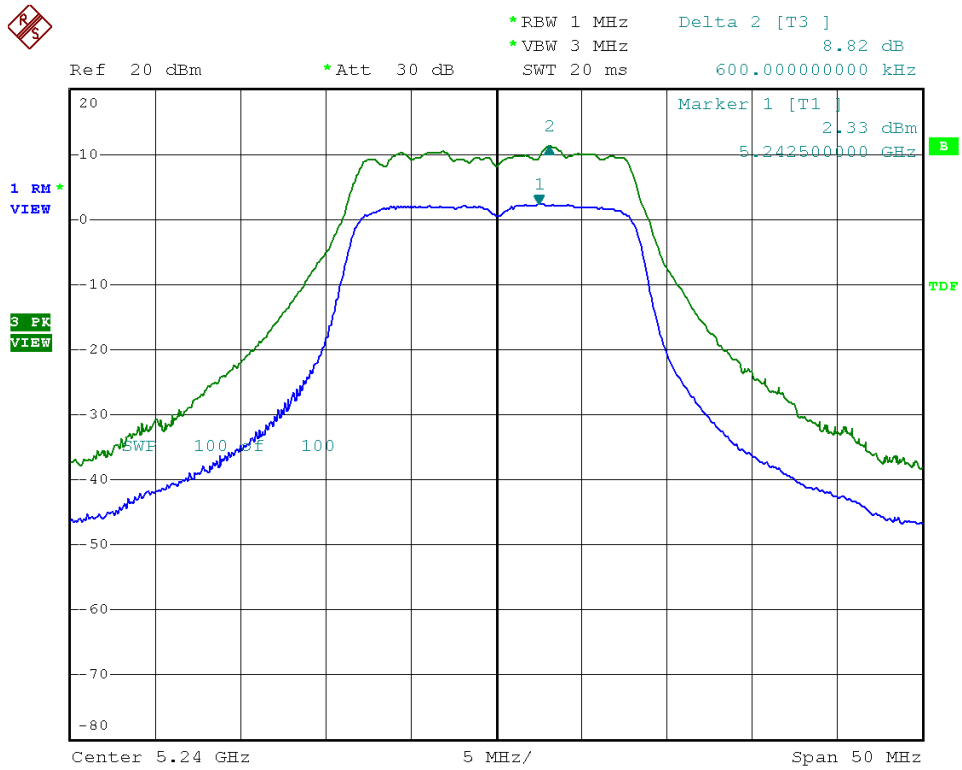
Modulation Standard: 802.11a (54Mbps), ANT L
Channel: 36



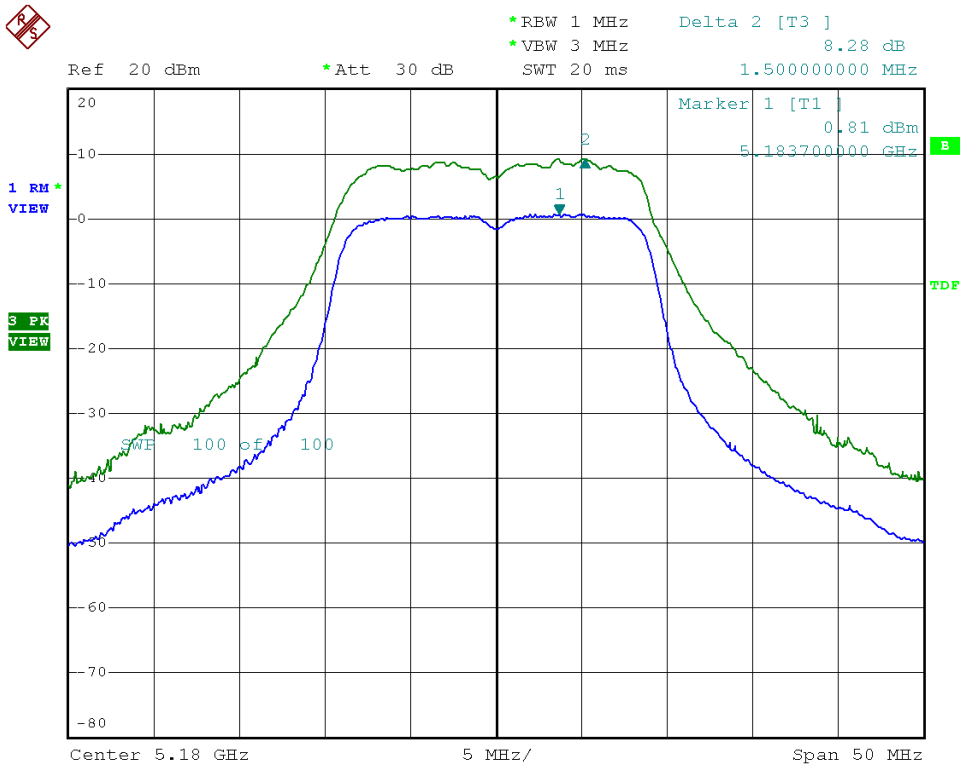
Modulation Standard: 802.11a (54Mbps), ANT L
Channel: 44



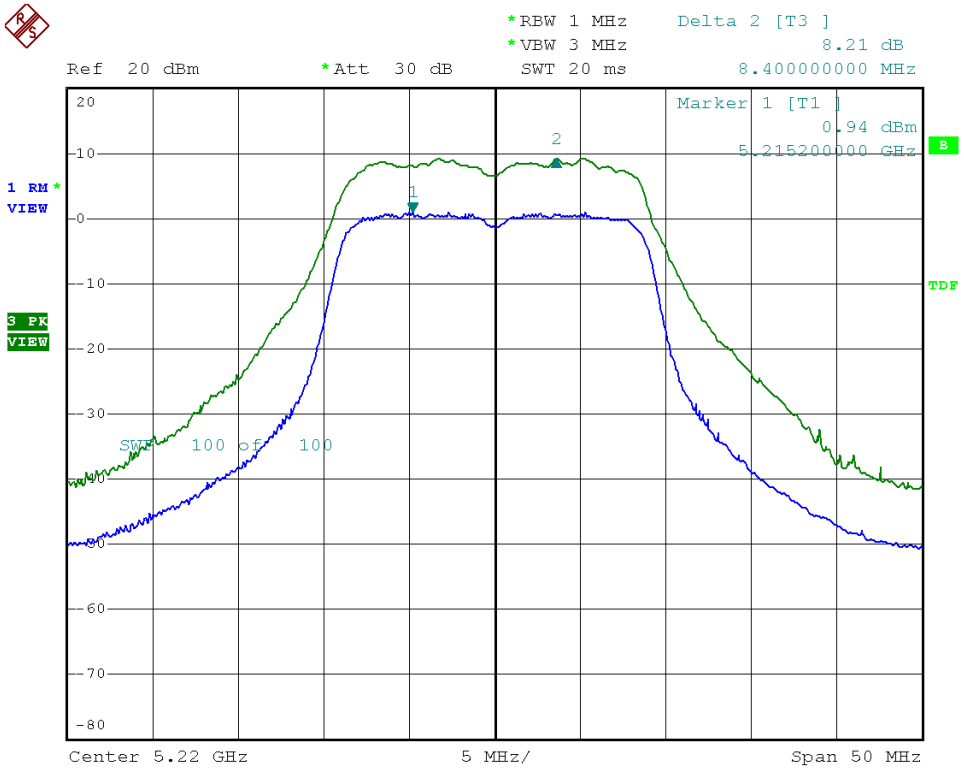
Modulation Standard: 802.11a (54Mbps), ANT L
Channel: 48



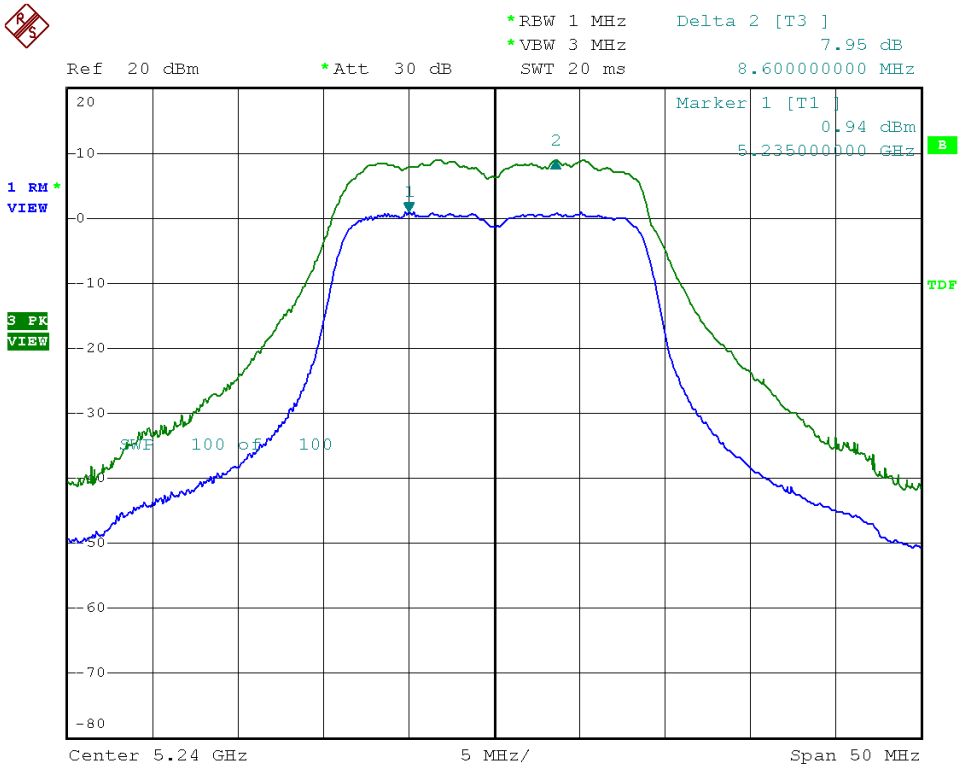
Modulation Standard: 802.11an, HT20 (130Mbps), ANT L
Channel: 36



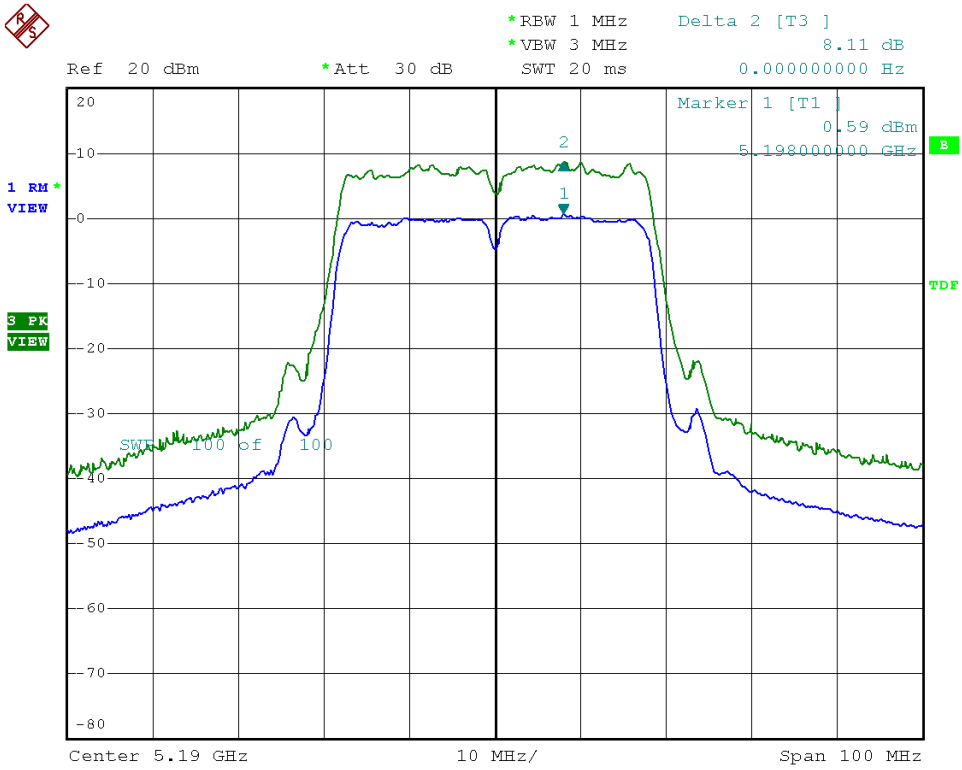
Modulation Standard: 802.11an, HT20 (130Mbps), ANT L
Channel: 44



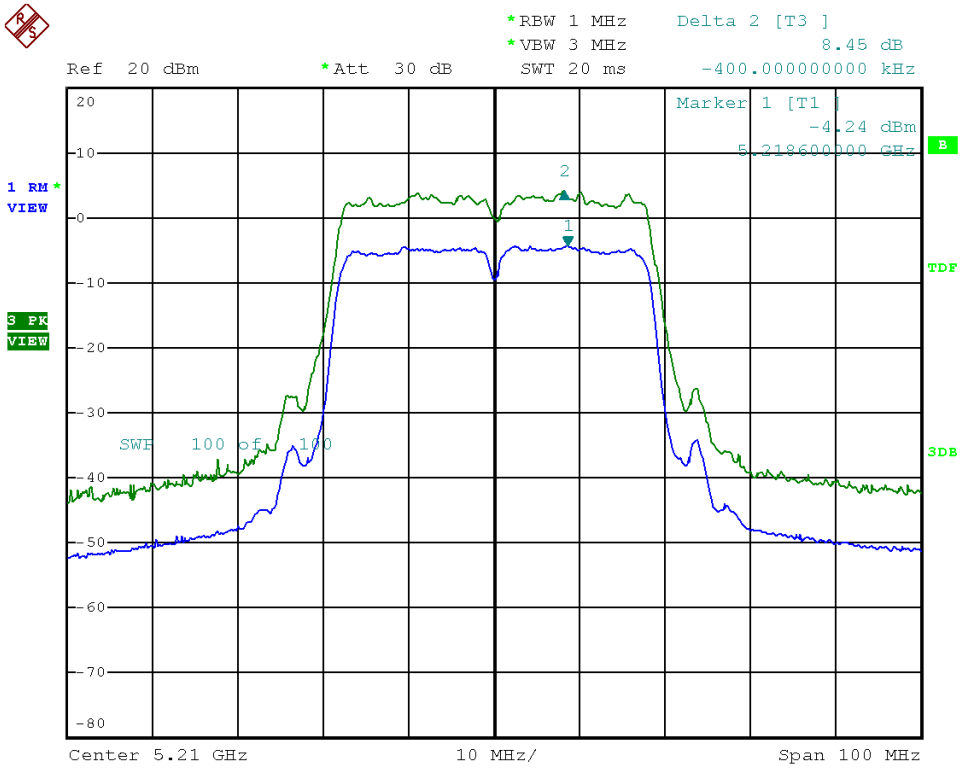
Modulation Standard: 802.11an, HT20 (130Mbps) , ANT L
Channel: 48



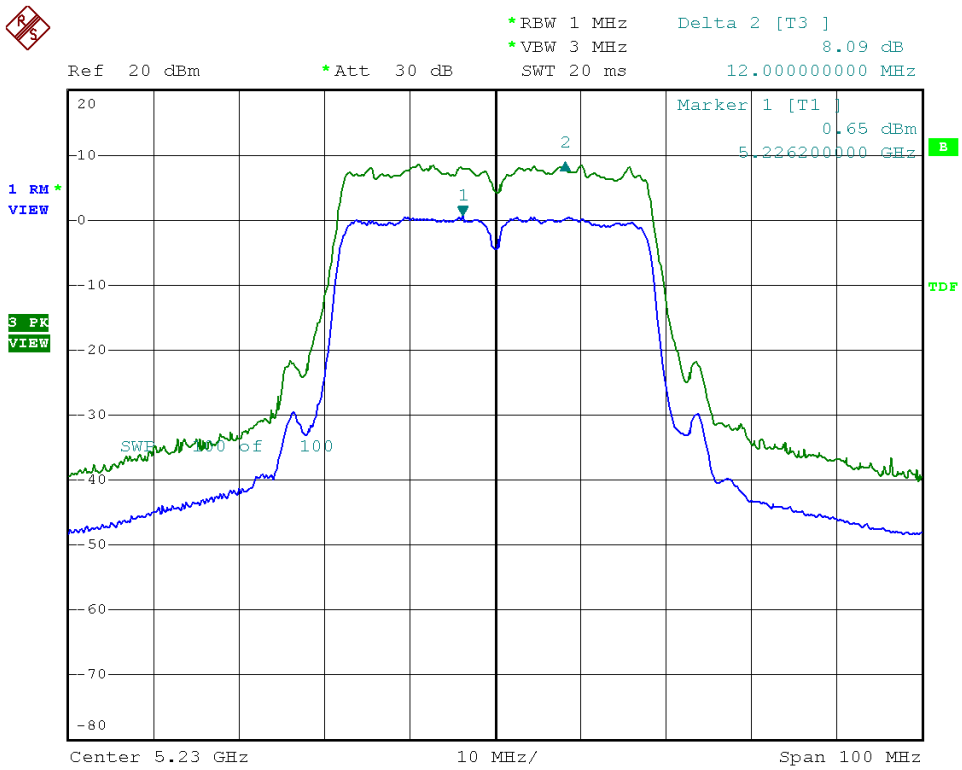
Modulation Standard: 802.11an HT40 (270Mbps), ANT L
Channel: 38



Modulation Standard: 802.11an HT40 (130Mbps), ANT L
Channel: 42



Modulation Standard: 802.11an HT40 (130Mbps), ANT L
Channel: 46

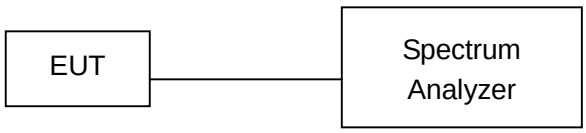


8. Peak Power Spectral Density

8.1. Test Procedure

1. The transmitter output was connected to spectrum analyzer.
2. Set RBW of spectrum analyzer to 1 MHz and VBW to 3 MHz, Set detector mode to RMS, trace average 100 traces in power averaging mode.
3. The Peak Power Spectral Density is the highest level found across the emission in any 1MHz Band

8.2. Test Setup Layout



8.3. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2013/03/15	2014/03/14

8.4. Test Result and Data

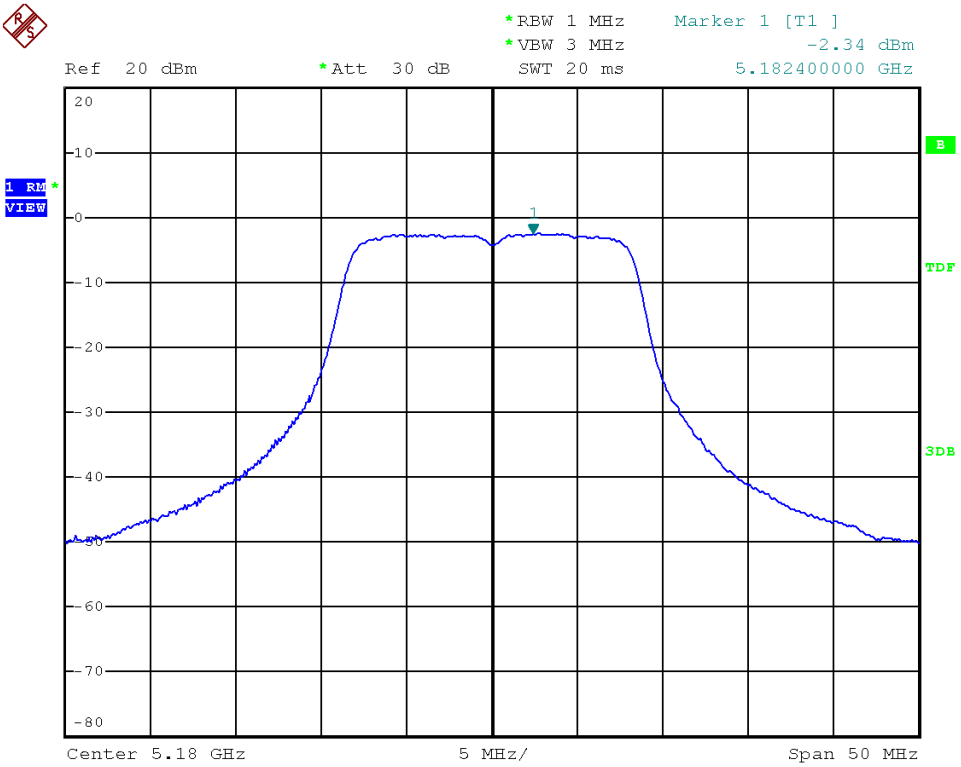
Test Date: Aug. 28, 2013 Temperature: 26℃

Atmospheric pressure: 1019 hPa Humidity: 45%

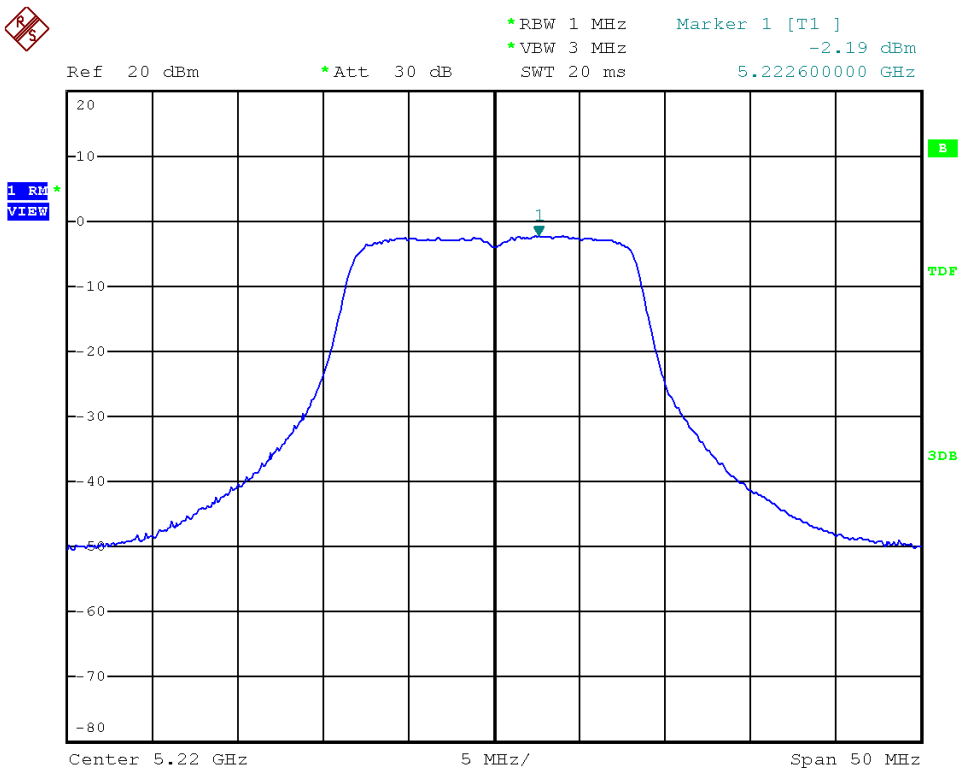
Modulation Standard	Channel	Frequency (MHz)	RF Power Level In 1MHz BW (dBm)			Limit (dB)
			ANT R	ANT L	ANT R+L	
802.11a (54Mbps)	36	5180	-2.34	-2.65	0.52	2.99
	44	5220	-2.19	-2.42	0.71	2.99
	48	5240	-2.14	-2.21	0.84	2.99

Modulation Standard	Channel	Frequency (MHz)	RF Power Level In 1MHz BW (dBm)			Limit (dB)
			ANT R	ANT L	ANT R+L	
802.11an HT20 (130Mbps)	36	5180	-2.56	-2.13	-0.67	2.99
	44	5220	-2.39	-2.15	0.74	2.99
	48	5240	-2.15	-2.43	0.72	2.99
802.11an HT40 (270Mbps)	38	5190	-4.55	-4.85	-1.69	2.99
	42	5210	-4.45	-4.32	-1.37	2.99
	46	5230	-4.32	-4.30	-1.30	2.99

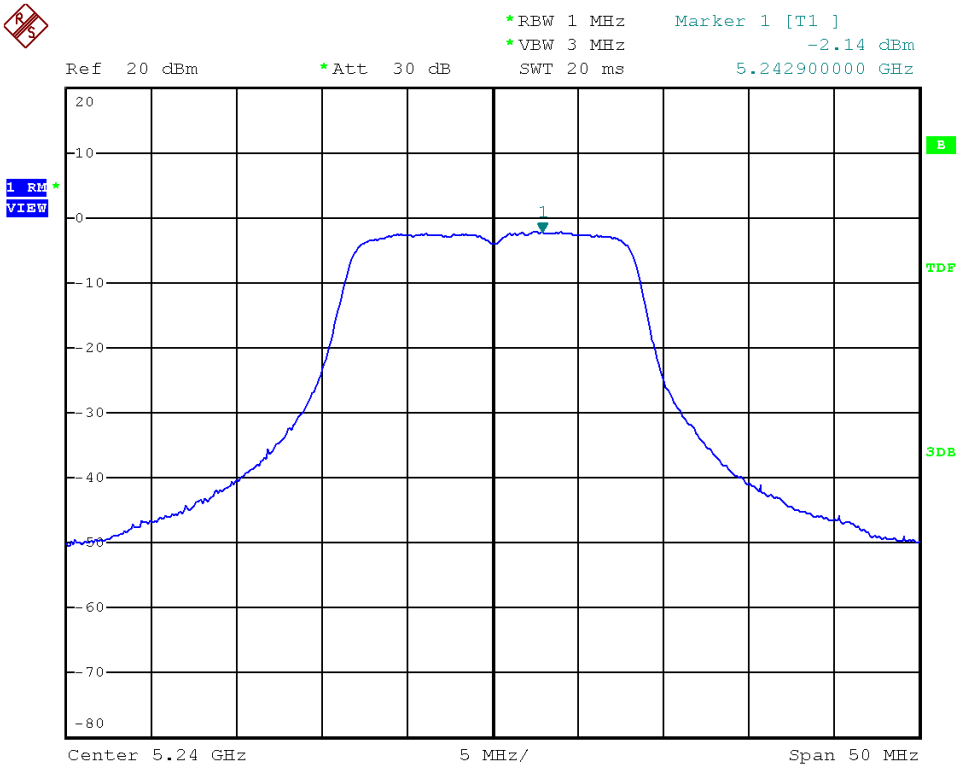
Modulation Standard: 802.11a (54Mbps), ANT R
Channel: 36



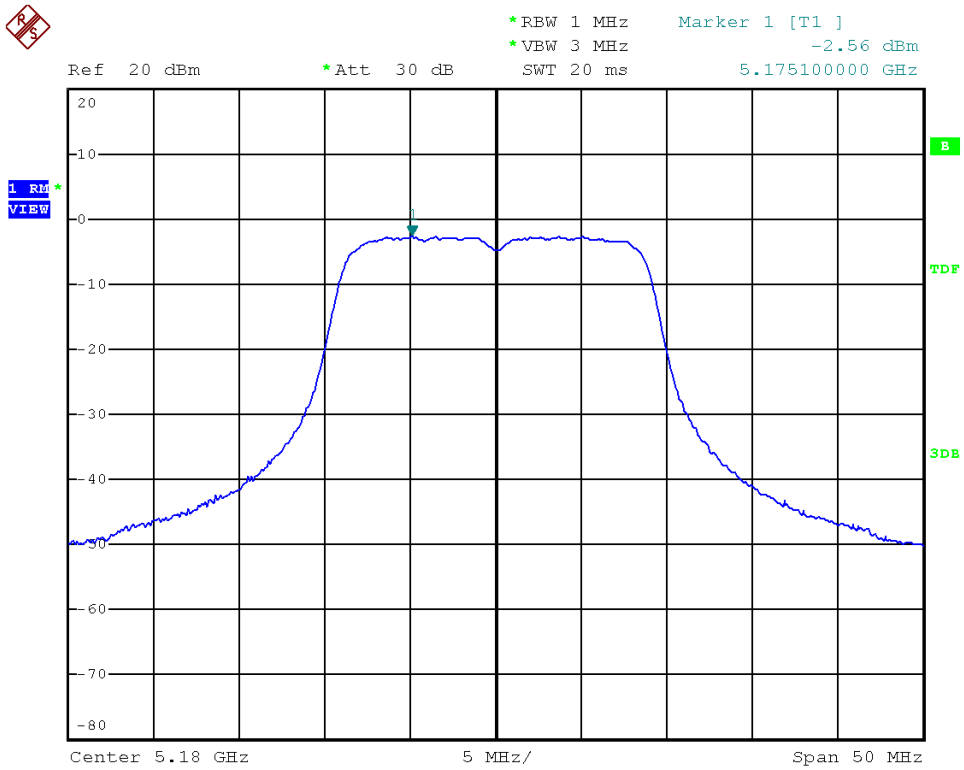
Modulation Standard: 802.11a (54Mbps), ANT R
Channel: 44



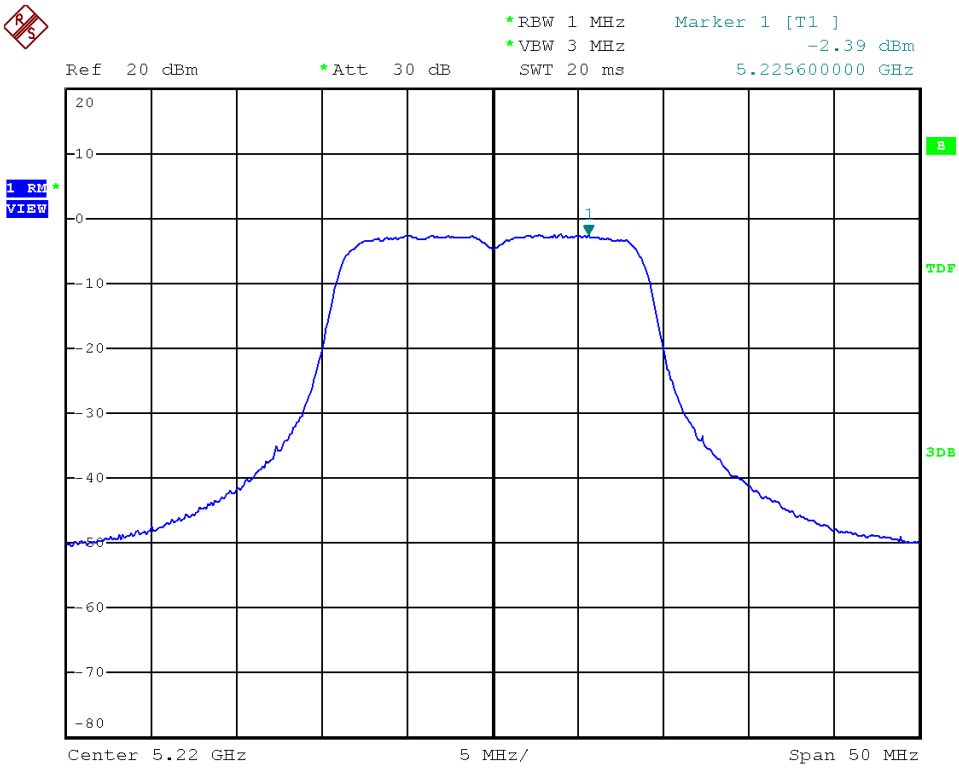
Modulation Standard: 802.11a (54Mbps), ANT R
Channel: 48



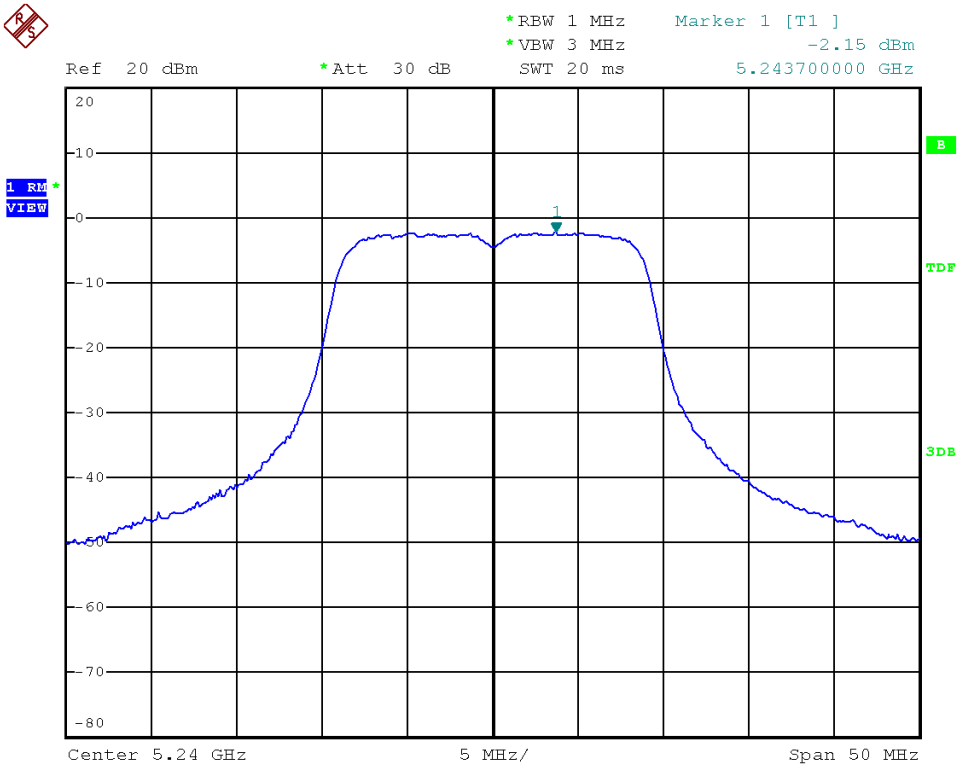
Modulation Standard: 802.11an, HT20 (130Mbps), ANT R
Channel: 36



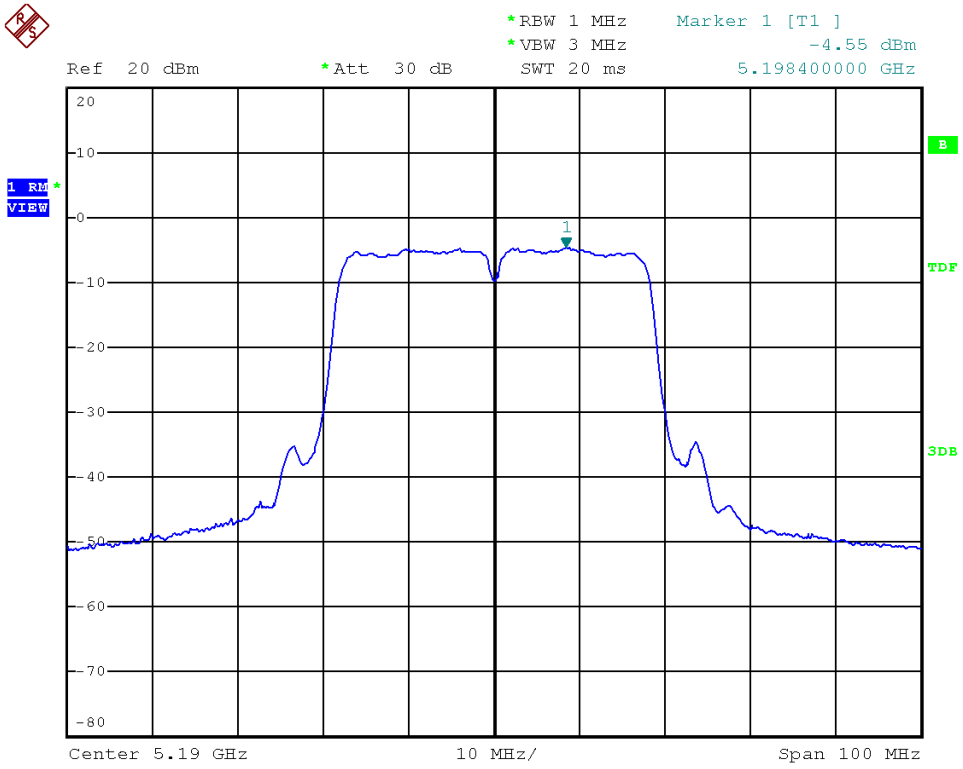
Modulation Standard: 802.11an, HT20 (130Mbps), ANT R
Channel: 44



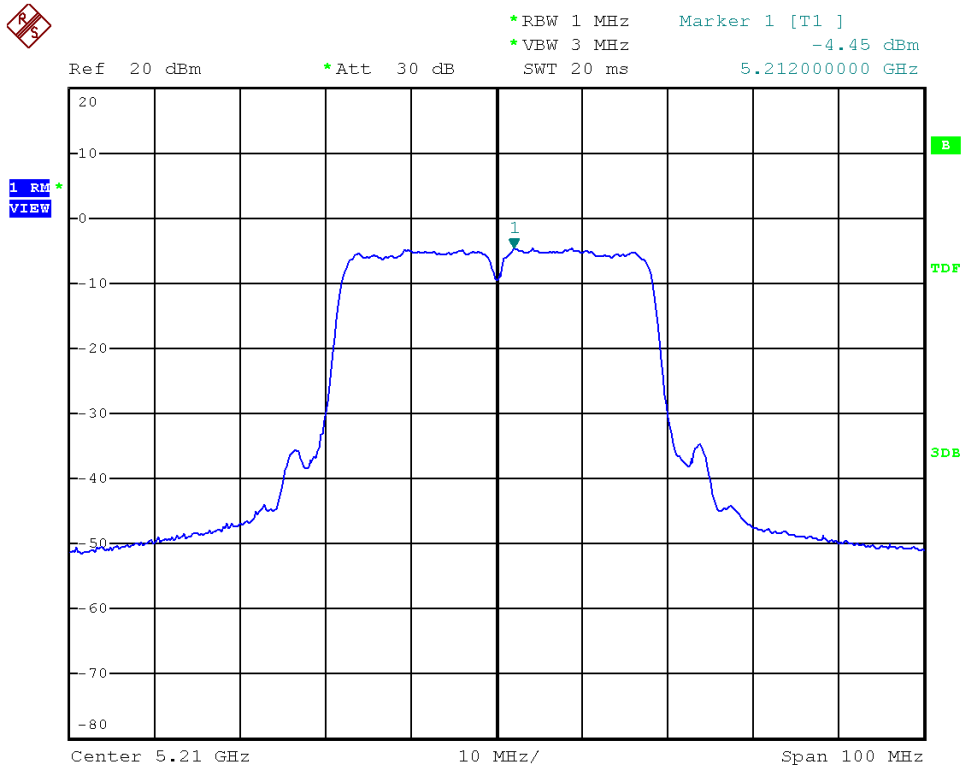
Modulation Standard: 802.11an, HT20 (130Mbps), ANT R
Channel: 48



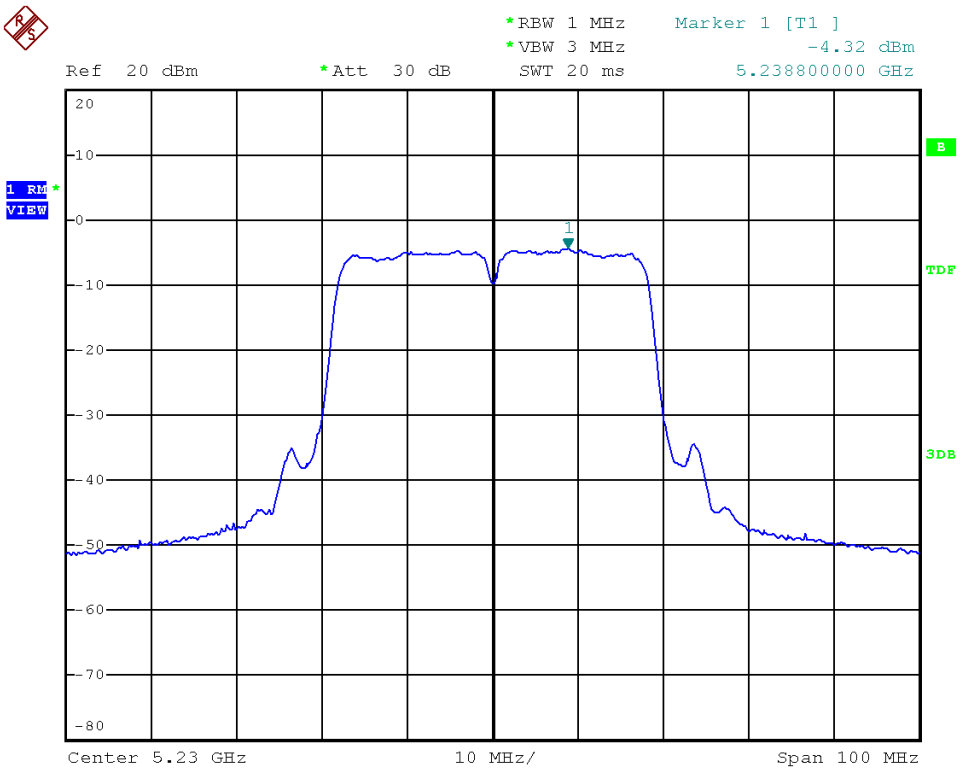
Modulation Standard: 802.11an, HT40 (270Mbps), ANT R
Channel: 38



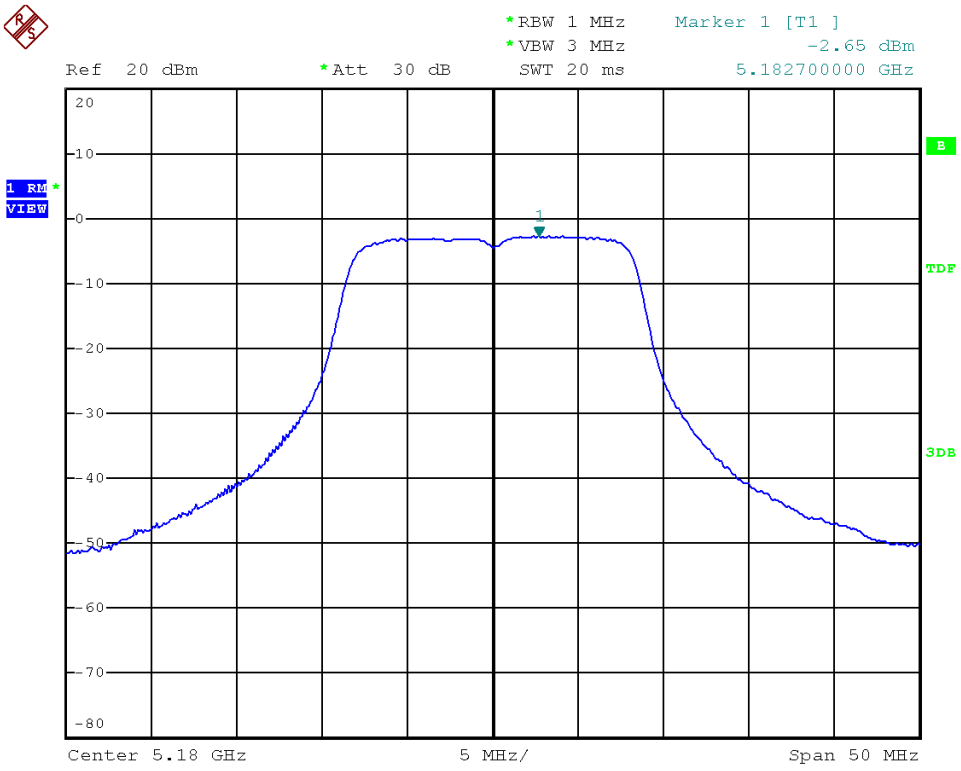
Modulation Standard: 802.11an, HT40 (270Mbps), ANT R
Channel: 42



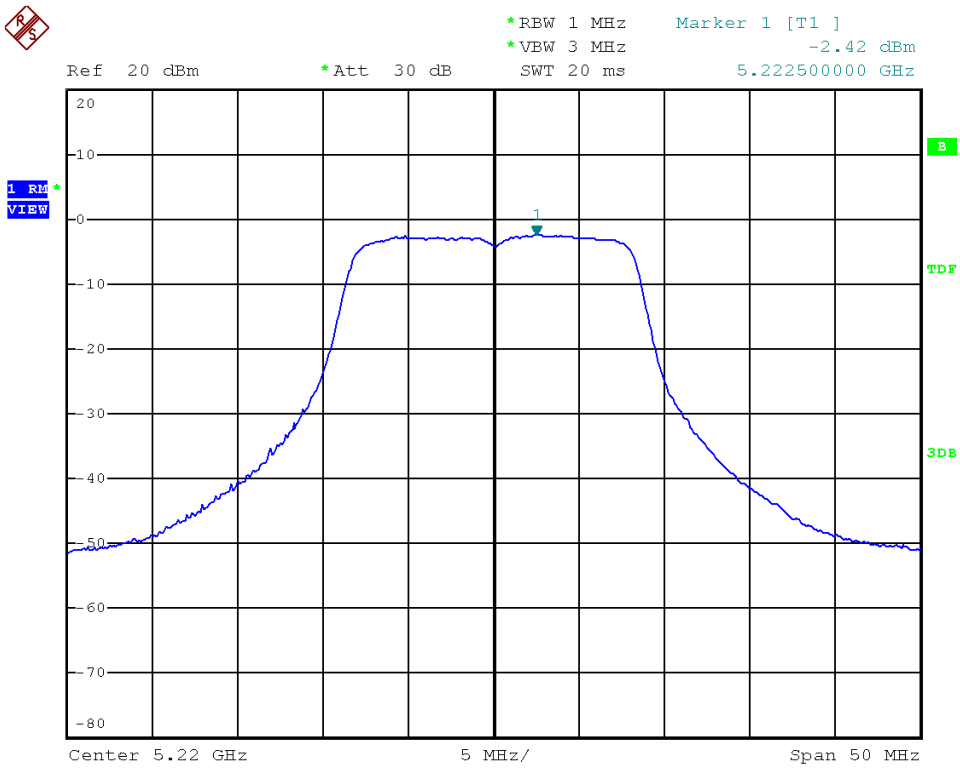
Modulation Standard: 802.11an, HT40 (270Mbps), ANT R
Channel: 46



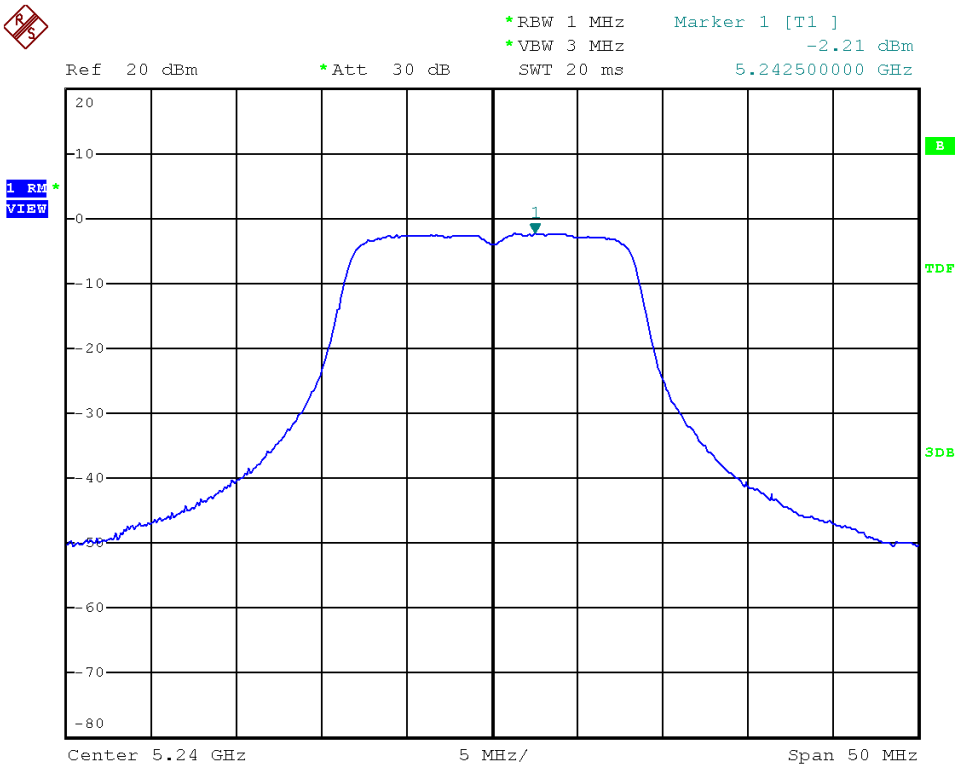
Modulation Standard: 802.11a (54Mbps), ANT L
Channel: 36



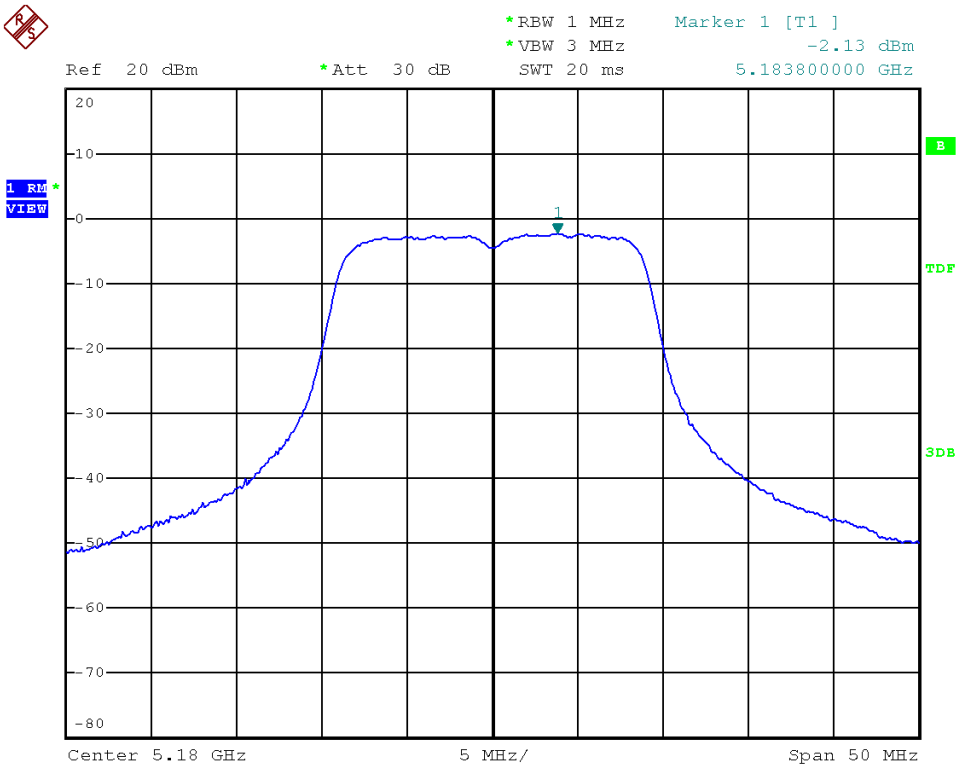
Modulation Standard: 802.11a (54Mbps), ANT L
Channel: 44



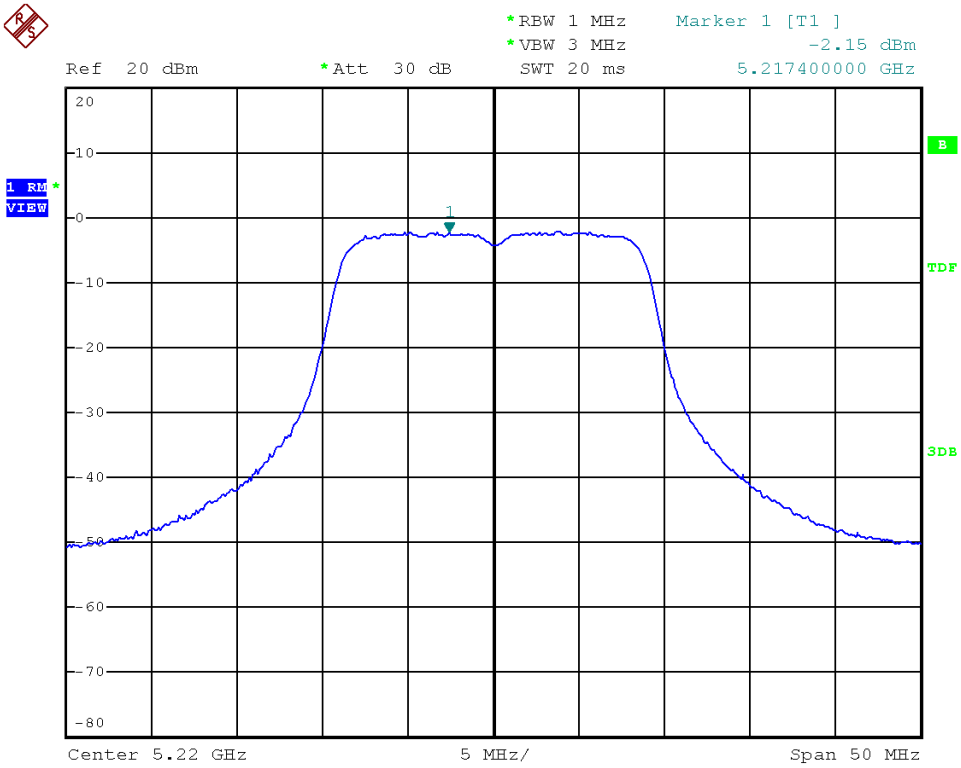
Modulation Standard: 802.11a (54Mbps), ANT L
Channel: 48



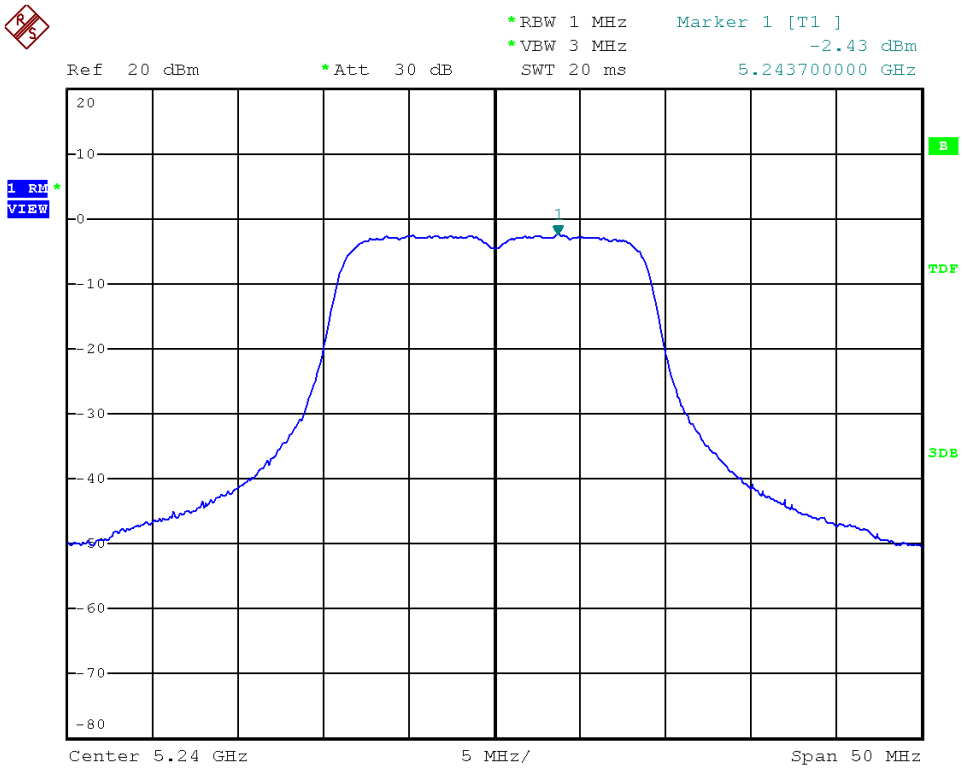
Modulation Standard: 802.11an, HT20 (130Mbps), ANT L
Channel: 36



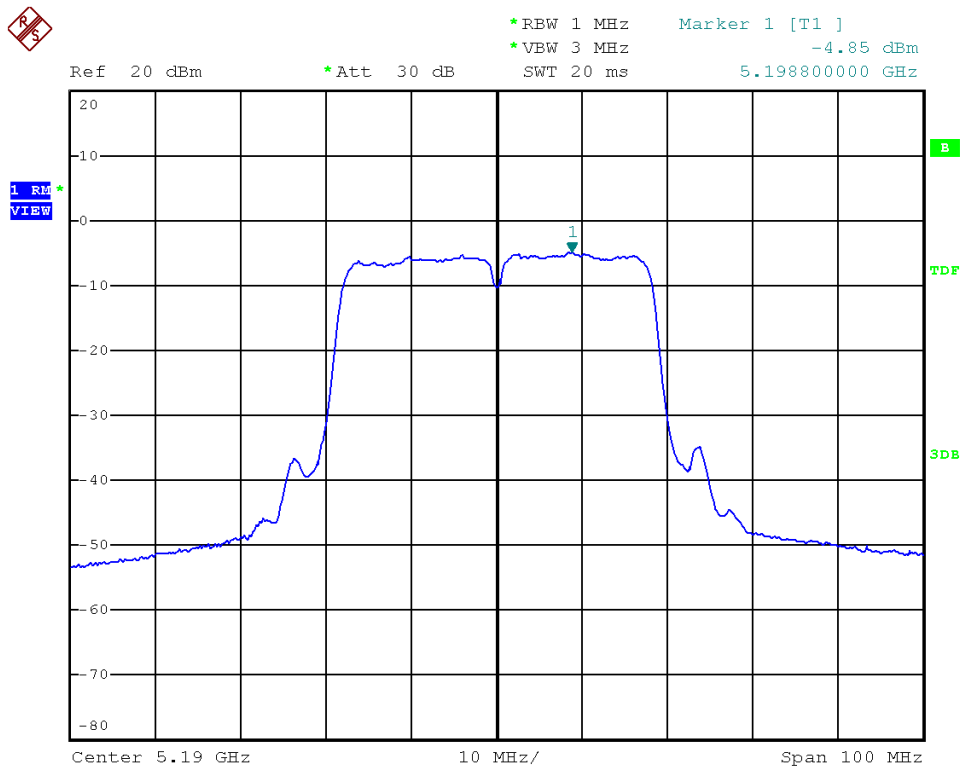
Modulation Standard: 802.11an, HT20 (130Mbps), ANT L
Channel: 44



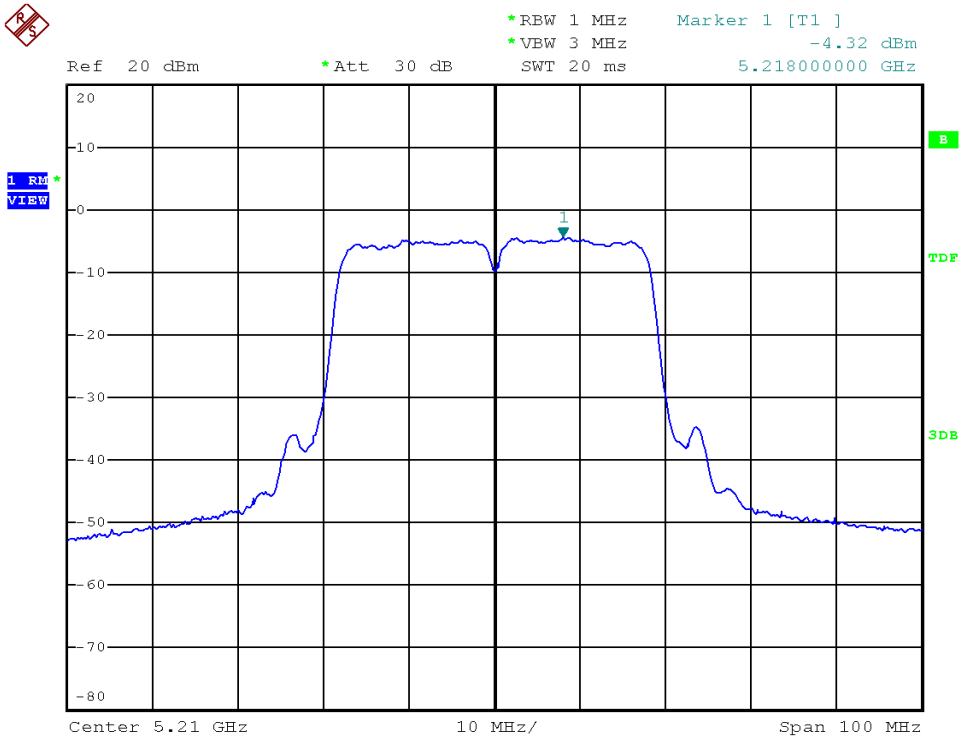
Modulation Standard: 802.11an, HT20 (130Mbps), ANT L
Channel: 48



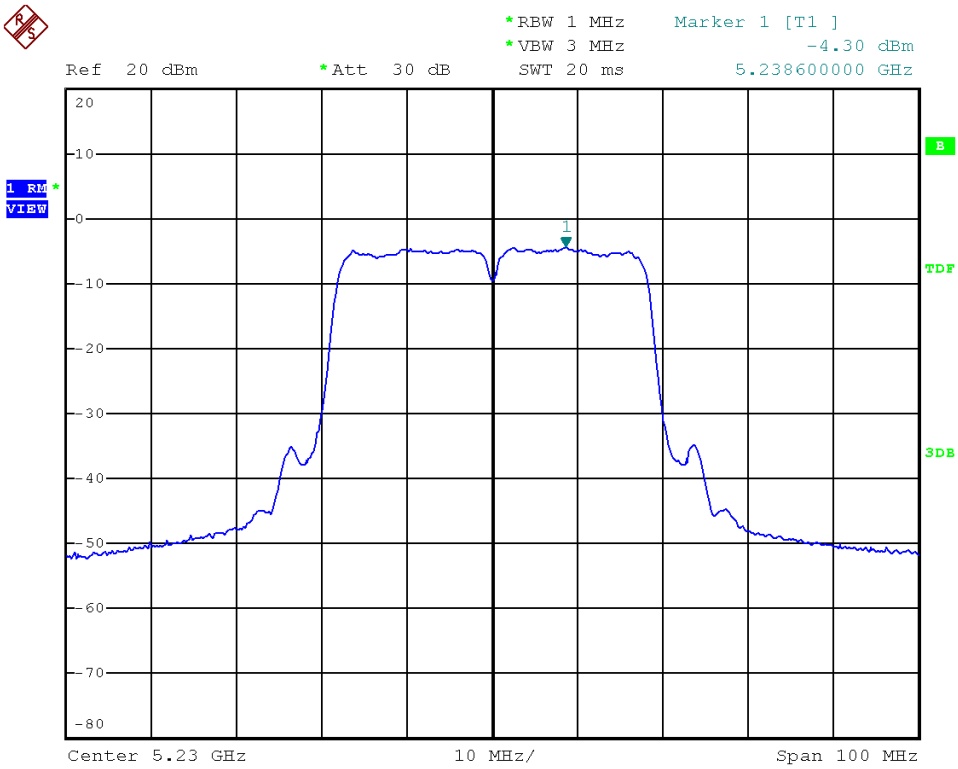
Modulation Standard: 802.11an, HT40 (270Mbps), ANT L
Channel: 38



Modulation Standard: 802.11an, HT40 (270Mbps), ANT L
Channel: 42



Modulation Standard: 802.11an, HT40 (270Mbps), ANT L
Channel: 46

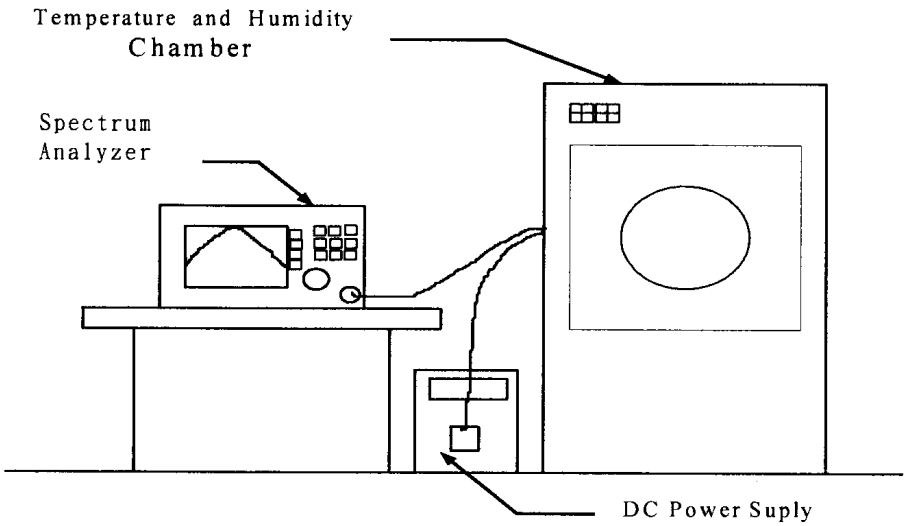


9. Frequency Stability

9.1. Test Procedure

1. The EUT was placed inside the Temperature and Humidity chamber.
2. The transmitter output was connected to spectrum analyzer.
3. Turn the EUT on and couple its output to a spectrum analyzer.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
6. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
7. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

9.2. Test Setup Layout



9.3. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2013/03/15	2014/03/14
TEMPERATURE CHAMBER	T MACHINE	TMJ-9712	T-12-040111	2012/09/21	2013/09/20
DC Power Supply	GPD-3030	GM	7020936	N/A	N/A
AC POWER CONVERTER	AFC-11005	APC	F103120008	N/A	N/A

9.4. Test Result and Data

Test Date: Aug. 28, 2013 Temperature: 26℃

Atmospheric pressure: 1019 hPa Humidity: 45%

Operating frequency: 5230 MHz							
Temp (°C)	Power supply (V)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	102	5229.9824	-0.000337	5229.9808	-0.000367	5229.9802	-0.000379
	120	5229.9888	-0.000214	5229.9850	-0.000287	5229.9826	-0.000333
	138	5229.9892	-0.000207	5229.9902	-0.000187	5229.9882	-0.000226
40	102	5229.9886	-0.000218	5229.9878	-0.000233	5229.9884	-0.000222
	120	5229.9882	-0.000226	5229.9886	-0.000218	5229.9884	-0.000222
	138	5229.9898	-0.000195	5229.9884	-0.000222	5229.9888	-0.000214
30	102	5229.9484	-0.000987	5229.9482	-0.000990	5229.9484	-0.000987
	120	5229.9490	-0.000975	5229.9495	-0.000966	5229.9484	-0.000987
	138	5229.9484	-0.000987	5229.9488	-0.000979	5229.9494	-0.000967
20	102	5229.9384	-0.001178	5229.9392	-0.001163	5229.9388	-0.001170
	120	5229.9392	-0.001163	5229.9386	-0.001174	5229.9394	-0.001159
	138	5229.9388	-0.001170	5229.9388	-0.001170	5229.9396	-0.001155
10	102	5229.9502	-0.000952	5229.9492	-0.000971	5229.9502	-0.000952
	120	5229.9500	-0.000956	5229.9496	-0.000964	5229.9490	-0.000975
	138	5229.9498	-0.000960	5229.9490	-0.000975	5229.9494	-0.000967
0	102	5229.9776	-0.000428	5229.9760	-0.000459	5229.9734	-0.000509
	120	5229.9706	-0.000562	5229.9706	-0.000562	5229.9690	-0.000593
	138	5229.9674	-0.000623	5229.9672	-0.000627	5229.9664	-0.000642
-10	102	5229.9778	-0.000424	5229.9774	-0.000432	5229.9776	-0.000428
	120	5229.9780	-0.000421	5229.9780	-0.000421	5229.9774	-0.000432
	138	5229.9790	-0.000402	5229.9792	-0.000398	5229.9806	-0.000371
-20	102	5229.9828	-0.000329	5229.9820	-0.000344	5229.9822	-0.000340
	120	5229.9826	-0.000333	5229.9812	-0.000359	5229.9808	-0.000367
	138	5229.9838	-0.000310	5229.9240	-0.001453	5229.9838	-0.000310
-30	102	5229.9848	-0.000291	5229.9890	-0.000210	5229.9852	-0.000283
	120	5229.9844	-0.000298	5229.9844	-0.000298	5229.9842	-0.000302
	138	5229.9826	-0.000333	5229.9842	-0.000302	5229.9846	-0.000294

Limit : ±20ppm

10. Band Edges Measurement

10.1. Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz with convenient frequency span including 100 MHz bandwidth from band edge.
3. The band edges was measured and recorded.

10.2. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2013/03/15	2014/03/14

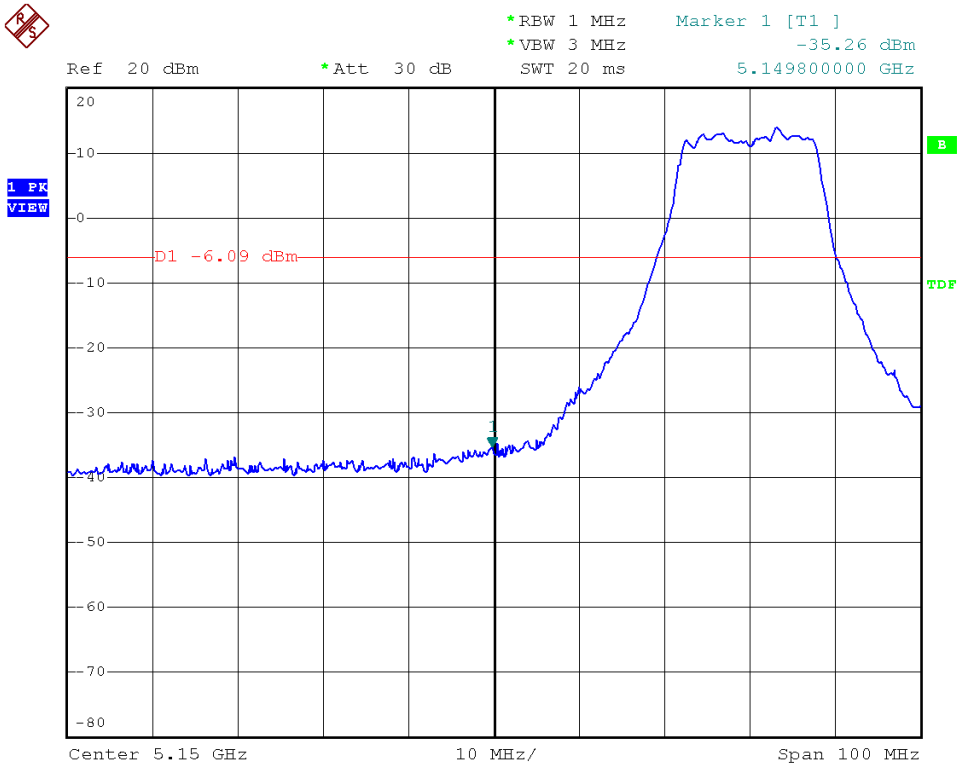
10.3. Test Result and Data

Test Date: Aug. 28, 2013 Temperature: 26℃

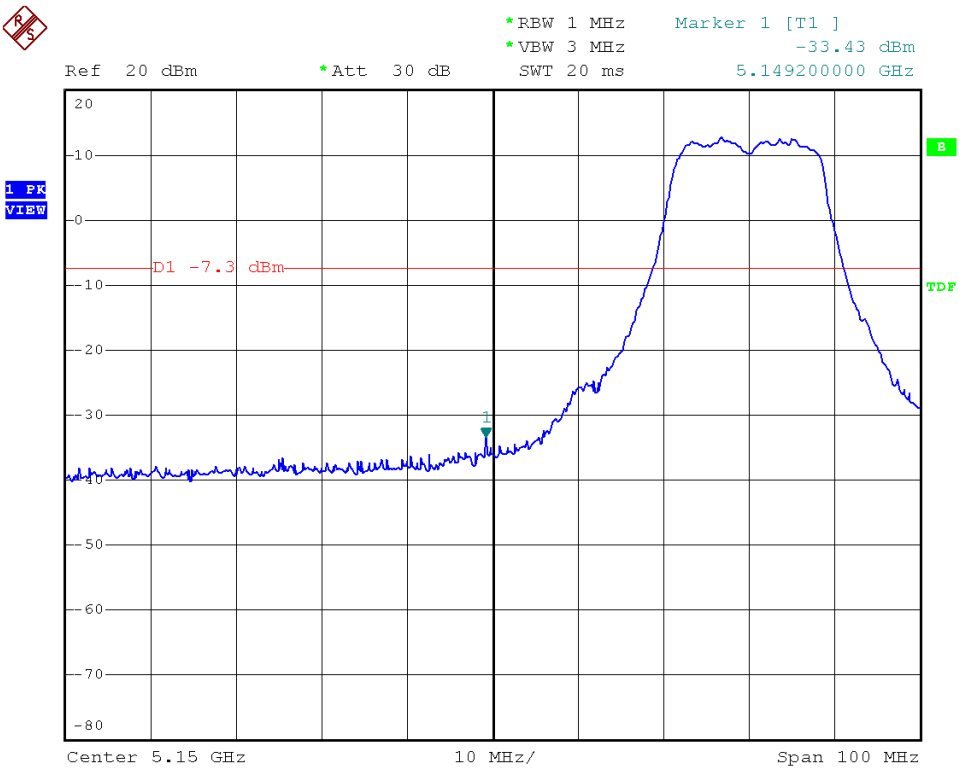
Atmospheric pressure: 1019 hPa Humidity: 45%

Modulation Standard	Channel	Frequency (MHz)	maximum value in frequency (MHz)		maximum value (dBm)	
			ANT R	ANT L	ANT R	ANT L
802.11a (54Mbps)	36	5180	5149.80	5150.00	-35.26	-37.07
802.11an HT20 (130Mbps)	36	5180	5149.20	5150.00	-33.43	-38.46
802.11an HT40 (270Mbps)	38	5190	5150.00	5149.20	-28.01	-35.49

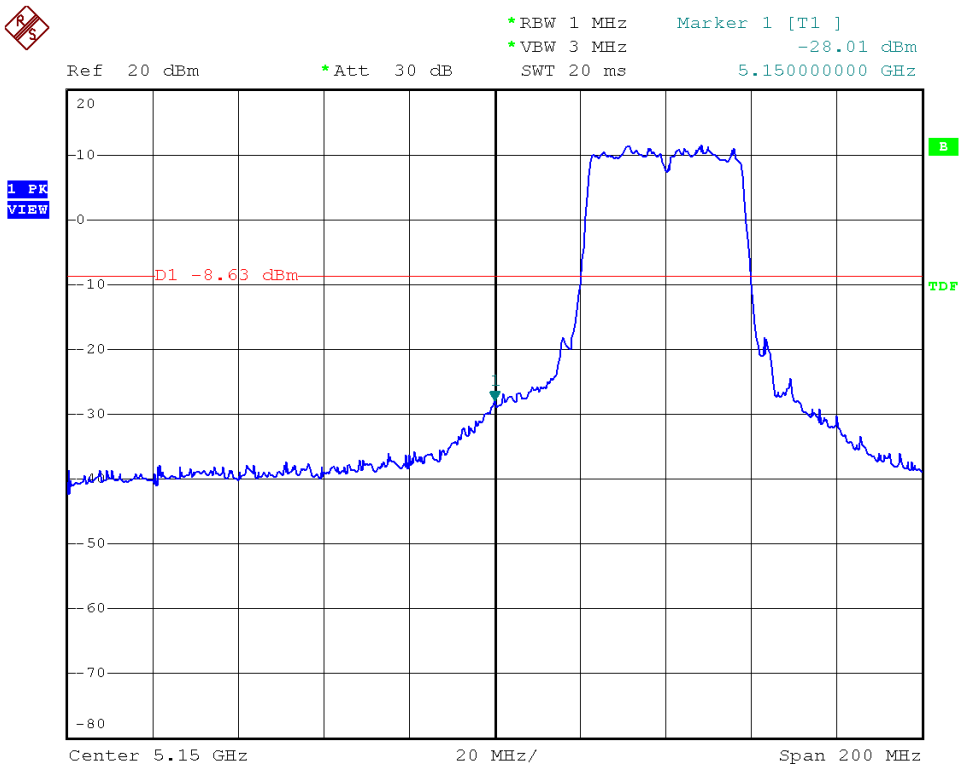
Modulation Standard: 802.11a (54Mbps), ANT R
Channel: 36



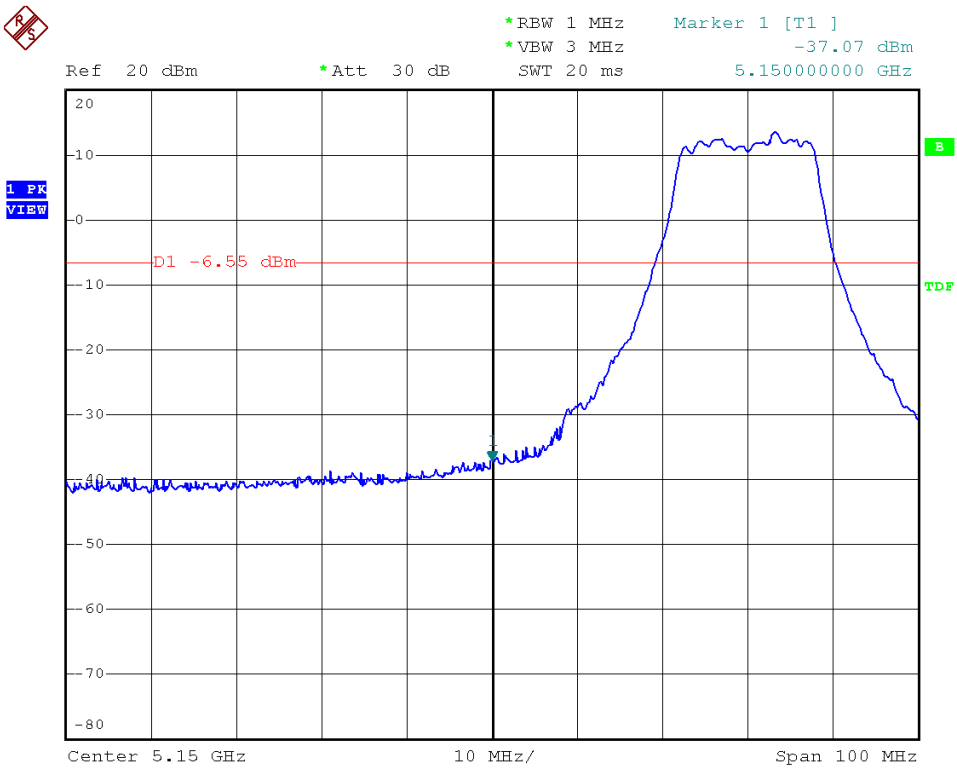
Modulation Standard: 802.11an, HT20 (130Mbps), ANT R
Channel: 36



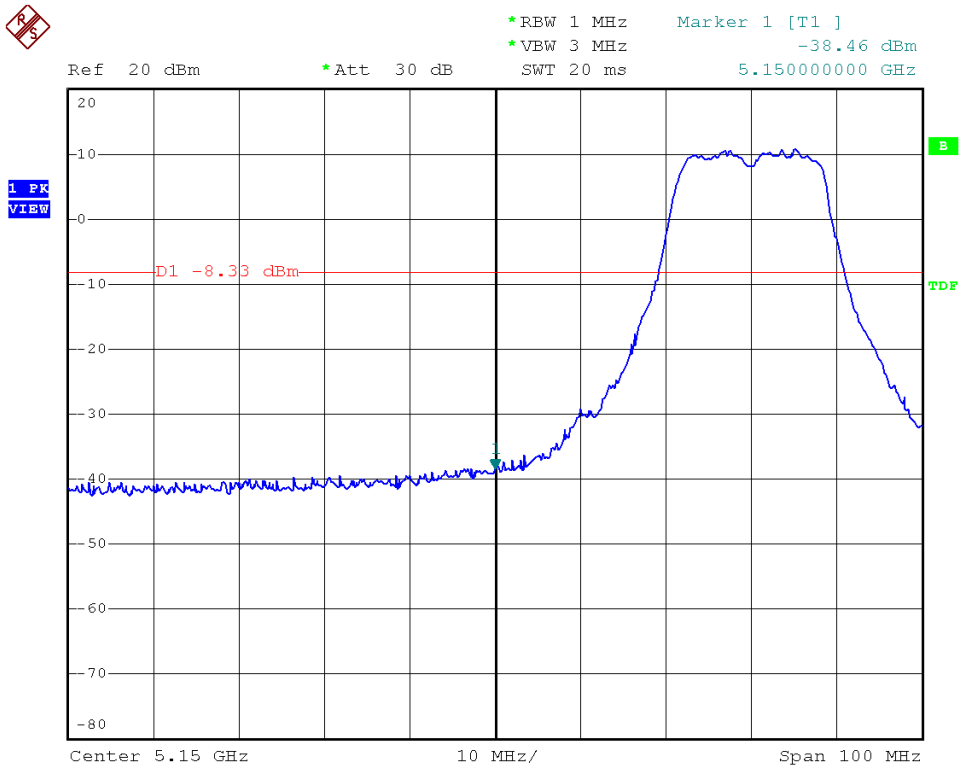
Modulation Standard: 802.11an HT40 (270Mbps), ANT R
Channel: 38



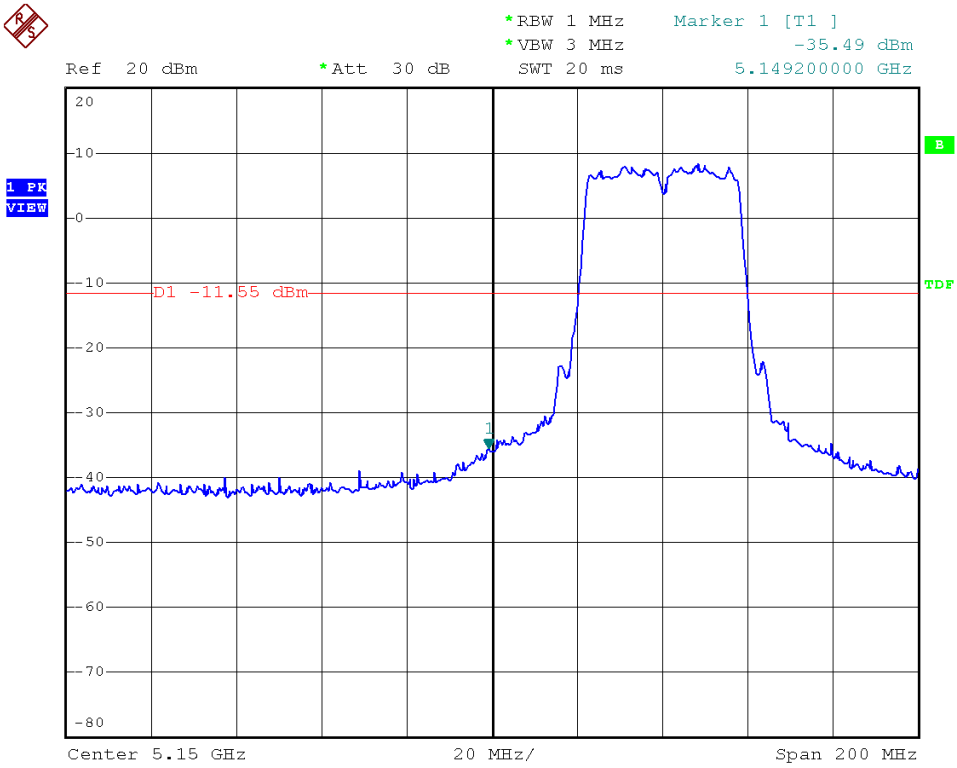
Modulation Standard: 802.11a (54Mbps), ANT L
Channel: 36



Modulation Standard: 802.11an HT20 (130Mbps), ANT L
Channel: 36



Modulation Standard: 802.11an, HT40 (270Mbps), ANT L
Channel: 38



10.4. Restrict Band Emission Measurement Data

Test Date: Aug. 29, 2013 Temperature: 26℃

Atmospheric pressure: 1016 hPa Humidity: 48%

Modulation Standard: IEEE 802.11a (54Mbps)

Channel 36										Fundamental Frequency: 5180 MHz
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
5114.80	H	49.21	7.32	56.53	Peak	74	54	-17.47	214	1.00
5149.75	H	36.98	7.59	44.57	Ave	74	54	-9.43	214	1.00
5101.20	V	49.45	7.93	57.38	Peak	74	54	-16.62	162	1.00
5149.75	V	37.13	7.36	44.49	Ave	74	54	-9.51	162	1.00

Modulation Standard: IEEE 802.11an, HT20 (130Mbps)

Channel 36										Fundamental Frequency: 5180 MHz
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
5119.50	H	48.98	7.36	56.34	Peak	74	54	-17.66	213	1.00
5149.50	H	36.96	7.59	44.55	Ave	74	54	-9.45	213	1.00
5111.80	V	49.29	7.82	57.11	Peak	74	54	-16.89	155	1.00
5149.75	V	37.19	7.36	44.55	Ave	74	54	-9.45	155	1.00

Modulation Standard: IEEE 802.11an, HT40 (270Mbps)

Channel 38										Fundamental Frequency: 5190 MHz
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
5115.50	H	48.84	7.32	56.16	Peak	74	54	-17.84	212	1.00
5148.50	H	37.02	7.59	44.61	Ave	74	54	-9.39	212	1.00
5113.20	V	49.42	7.80	57.22	Peak	74	54	-16.78	150	1.00
5148.50	V	37.25	7.38	44.63	Ave	74	54	-9.37	150	1.00

Notes:

1. Result = Meter Reading + Factor
2. Factor = Antenna Factor + Cable Loss – Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3 MHz (detector peak mode) for Peak detection at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3 MHz (detector sample mode) for Average detection at frequency above 1GHz.

11. Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.150
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

**: Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

11.1. Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.