RF TEST REPORT

Test item	:	Wi-Fi Module
Model No.	:	TWFM-B005D
Order No.	:	1109-01309
Date of receipt	:	2011-09-28
Test duration	:	2011-10-24 ~ 2011-11-15
Date of issue	:	2011-11-17
Use of report	:	FCC Original Grant

Applicant : LG Innotek Co., Ltd.
#978-1, Jangduk-dong, Gwangsan-gu, Gwangju, 506-731, Korea

Test laboratory : Digital EMC Co., Ltd.
683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Kyunggi-Do, 449-080, Korea

Test specification	:	FCC Part 15.247 Subpart C ANSI C63.4-2003
Test environment	:	See appended test report
Test result	:	☒ Pass ☐ Fail

Tested by:	Witnessed by:	Reviewed by:
Engineer S.K.Ryu	N/A	Manager W.J. Lee

CONTENTS

1. Equipment information

1.1 Equipment description

FCC Equipment Class	Digital Transmission System (DTS)
Equipment type	Wi-Fi Module
Equipment model name	TWFM-B005D
Equipment add model name	TWFM-B015D, TWFM-B025D
Equipment serial no.	Identical prototype
Frequency band	2.4GHz Band ▪ 802.11b/g/n(20MHz): 2412 ~ 2462 MHz ▪ 802.11n(40MHz): 2422~2452 MHz 5GHz Band ▪ 802.11a/n(20MHz): 5745~5825 MHz ▪ 802.11n(40MHz): 5755~5795 MHz
Channel number	2.4GHz Band ▪ 802.11b/g/n(20MHz): 11 ▪ 802.11n(40MHz): 9 5GHz Band ▪ 802.11a/n(20MHz): 5 ▪ 802.11n(40MHz): 2
Modulation type	802.11b: DSSS/CCK 802.11a/g/n: OFDM
Data rate	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n(20MHz): 6.5, 13, 19.5, 26, 39, 52, 58.5, 65 Mbps 802.11n(40MHz): 13.5, 27, 40.5, 54, 81, 108, 121.5, 135 Mbps
Antenna type	PIFA Antenna(2TX 2RX) ▪ 2.4GHz Band Max. peak gain Chain 0 : 2.10dBi, Chain 1 : 1.73dBi ▪ 5GHz Band Max. peak gain Chain 0 : 2.67dBi, Chain 1 : 2.36dBi
Power Supply	DC 5.0 V

1.2 Ancillary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

2. Information about test items

2.1 Test mode

Band	Mode	Single Transmitting		Multiple Transmitting (2 TX / 2 RX)
		Chain 0	Chain 1	
2.4GHz	802.11b	1Mbps	1Mbps	N/A
	802.11g	6Mbps	6Mbps	N/A
	802.11n(20MHz)	N/A	N/A	6.5Mbps
	802.11n(40MHz)	N/A	N/A	13.5Mbps
5GHz	802.11a	6Mbps	6Mbps	N/A
	802.11n(20MHz)	N/A	N/A	6.5Mbps
	802.11n(40MHz)	N/A	N/A	13.5Mbps

For all test items, the low, middle and high channels of the modes were tested respectively by choosing the highest RF out power chain, and transmission rate from preliminary testing.

2.2 Auxiliary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
Notebook	X51RL	85N0AS318314227	ASUSTeK Computer Inc.	-
Mouse	M-UAE96	910-000004	Logitech Inc.	-

2.3 Frequency / Channel information & Antenna configuration

▪ **Frequency / Channel information**

Band	Mode	Channel No.	Freq. [MHz]	Channel No.	Freq. [MHz]	Channel No.	Freq. [MHz]
2.4GHz	802.11b/g/n(20MHz)	1	2412	5	2432	9	2452
		2	2417	6	2437	10	2457
		3	2422	7	2442	11	2462
		4	2427	8	2447	-	-
	802.11n(40MHz)	3	2422	6	2437	9	2452
		4	2427	7	2442	-	-
		5	2432	8	2447	-	-
5GHz	802.11a/n(20MHz)	149	5745	157	5785	165	5825
		153	5765	161	5805	-	-
	802.11n(40MHz)	151	5755	159	5795	-	-

▪ **Supported Antenna Configuration**

Band	Mode	Single Transmitting		Multiple Transmitting (2 TX / 2 RX)
		Chain 0	Chain 1	
2.4GHz	802.11b	Yes	Yes	No
	802.11g	Yes	Yes	No
	802.11n(20MHz)	No	No	Yes
	802.11n(40MHz)	No	No	Yes
5GHz	802.11a	Yes	Yes	No
	802.11n(20MHz)	No	No	Yes
	802.11n(40MHz)	No	No	Yes

2.4 Tested environment

Temperature	:	20 ~ 24 °C
Relative humidity content	:	40 ~ 45 % R.H.
Details of power supply	:	DC 5.0 V

2.5 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing
→ None

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status Note 1
I. Test Items (TX)				
15.247(a)	6 dB Bandwidth	> 500 kHz	Conducted	**C**
15.247(b)	Transmitter Output Power	< 1Watt		**C**
15.247(c)	Out of Band Emissions / Band Edge	20dBc in any 100kHz BW		**C**
15.247(d)	Transmitter Power Spectral Density	< 8dBm / 3kHz		**C**
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	<FCC 15.209 Limits	Radiated	**C** Note.2
15.207	AC Conducted Emissions	EN 55022	AC Line Conducted	**C**
15.203	Antenna Requirements	FCC 15.203	-	**C**

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable

Note 2: This test item was performed in each axis and the worst case data were reported.

The sample was tested according to the following specification:
ANSI C-63.4-2003

3.2 Transmitter requirements

3.2.1 6 dB Bandwidth

- Procedure:

The bandwidth at 6 dB below the highest in-band spectral density was measured with a spectrum analyzer connected to the antenna terminal at the highest, middle and the lowest available channels.
After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level.
The marker-delta reading at this point is the 6 dB bandwidth of the emission.

- Measurement Data: Comply

Mode	Channel	Frequency [MHz]	Test Result [MHz]	
			Chain 0	Chain 1
802.11b	1	2412	***8.130***	8.082
	6	2437	***8.599***	8.125
	11	2462	***8.100***	8.095
802.11g	1	2412	***15.120***	15.100
	6	2437	***15.140***	15.100
	11	2462	***15.160***	15.020
802.11n (20MHz)	1	2412	15.050	***15.150***
	6	2437	***14.440***	14.190
	11	2462	16.070	***16.140***
802.11n (40MHz)	3	2422	36.070	***36.350***
	6	2437	35.360	***35.740***
	9	2452	35.780	***36.340***
802.11a	149	5745	15.190	***15.610***
	157	5785	15.360	***15.380***
	165	5825	15.140	***15.200***
802.11n (20MHz)	149	5745	15.170	***15.220***
	157	5785	***15.190***	15.170
	165	5825	15.090	***15.450***
802.11n (40MHz)	151	5755	35.180	**35.780**
	159	5795	35.490	**35.820**

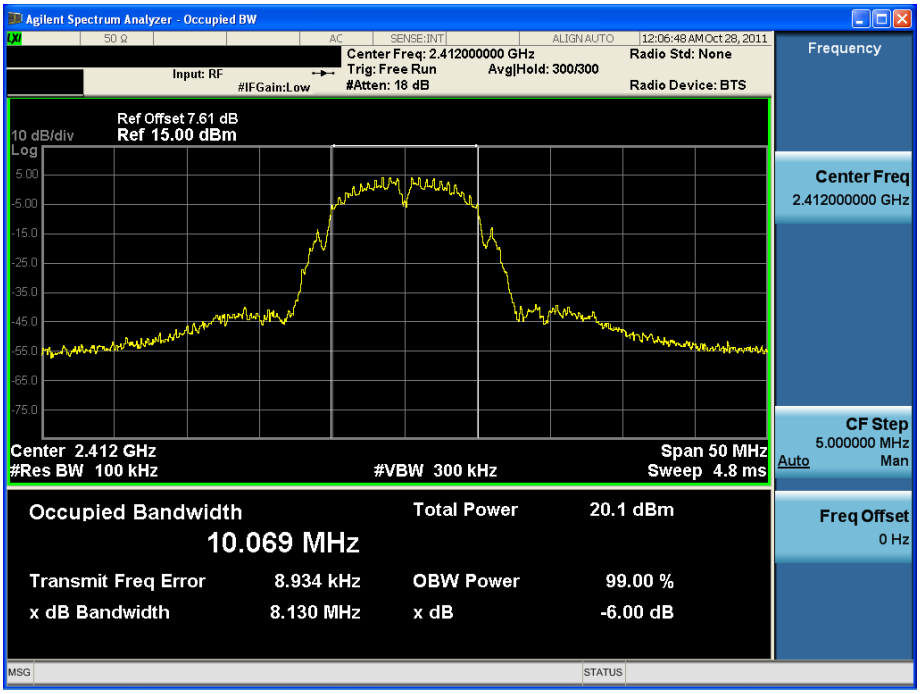
Note 1: The worst case plots in both chains are attached on next page.

- **Minimum Standard:**

The minimum 6 dB bandwidth shall be at least 500 kHz

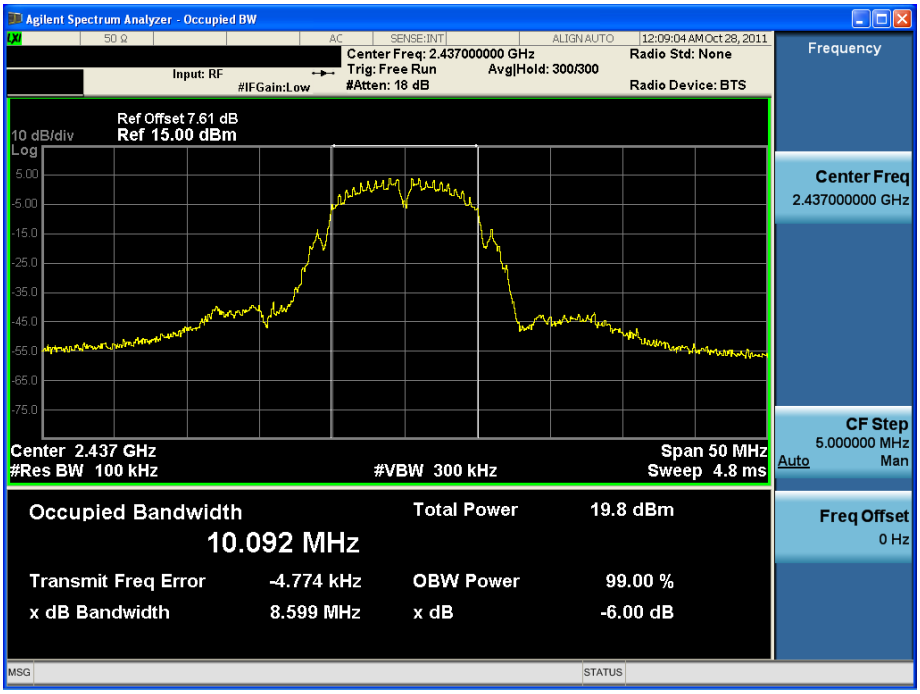
6 dB Bandwidth

Test Mode: 802.11b & Ch.1 & Chain 0



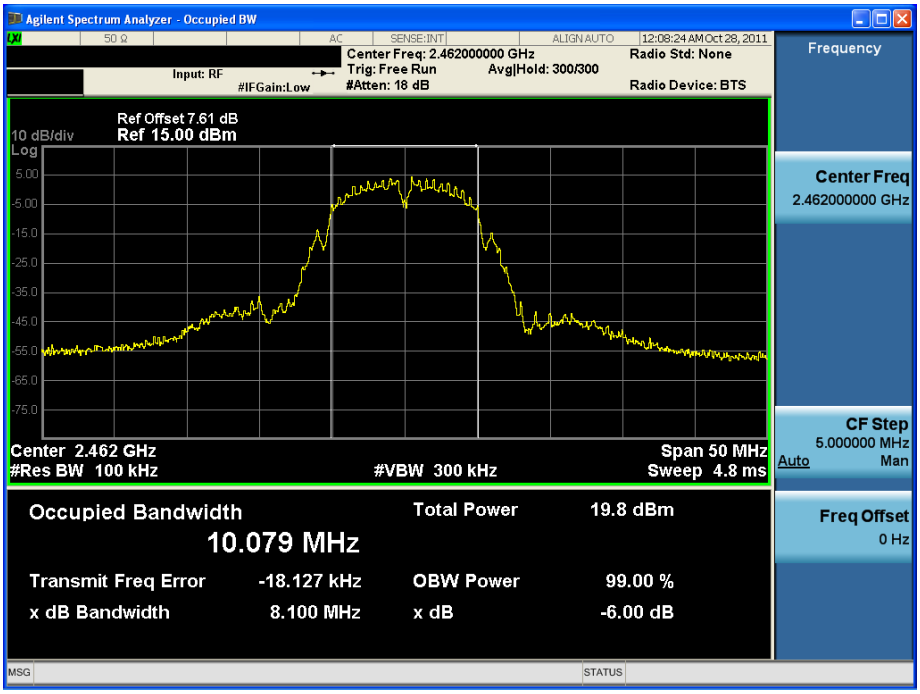
6 dB Bandwidth

Test Mode: 802.11b & Ch.6 & Chain 0



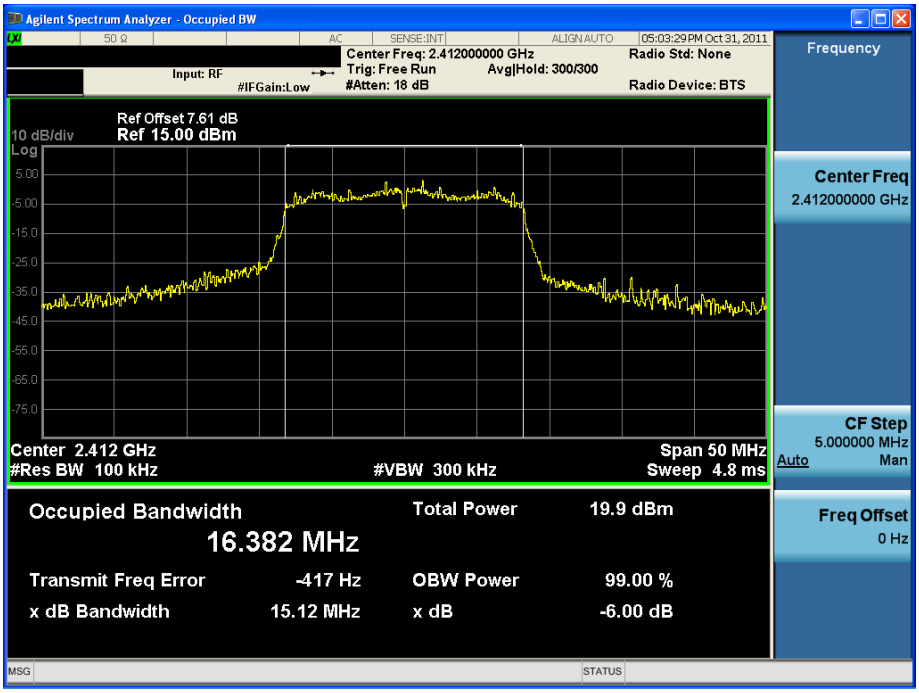
6 dB Bandwidth

Test Mode: 802.11b & Ch.11 & Chain 0



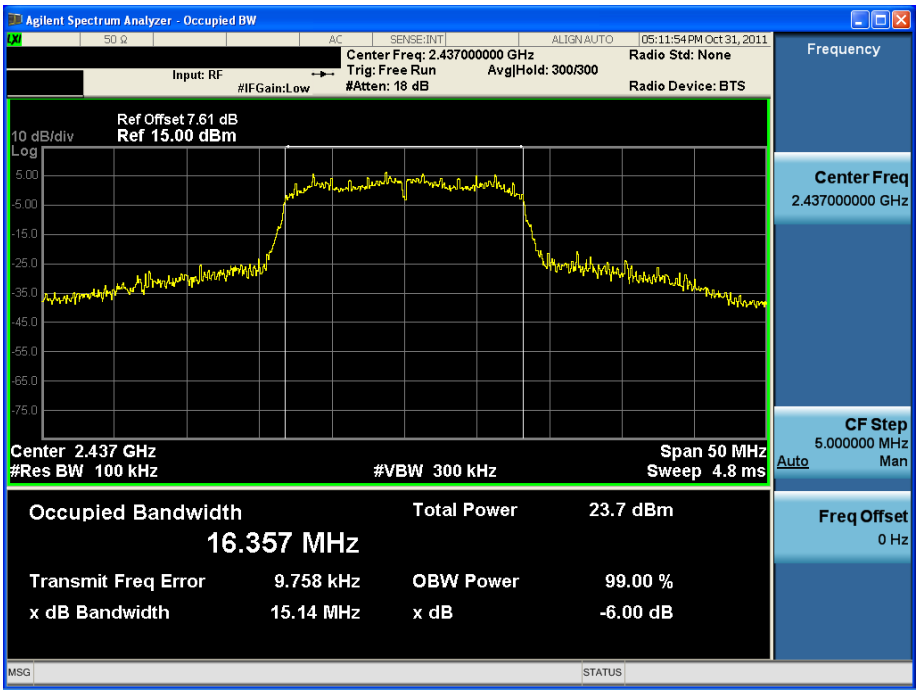
6 dB Bandwidth

Test Mode: 802.11g & Ch.1 & Chain 0



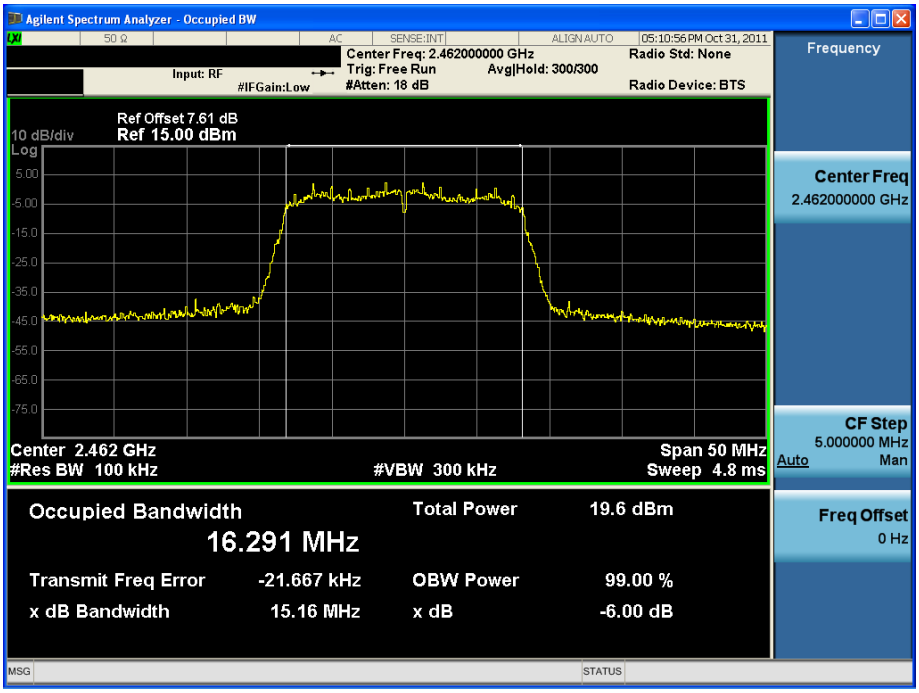
6 dB Bandwidth

Test Mode: 802.11g & Ch.6 & Chain 0



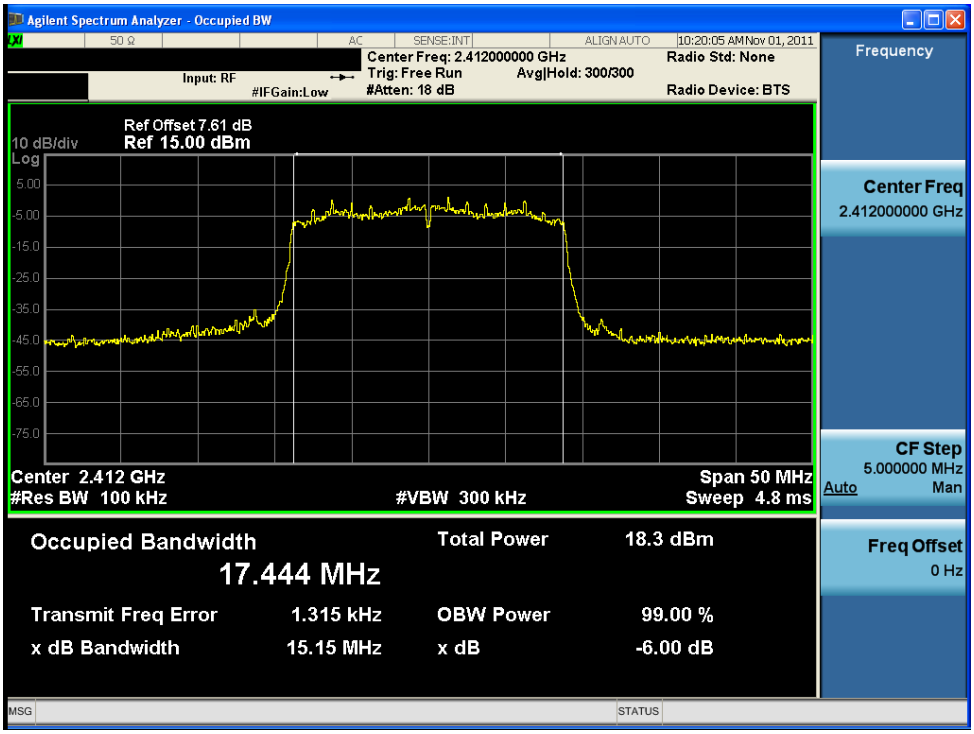
6 dB Bandwidth

Test Mode: 802.11g & Ch.11 & Chain 0



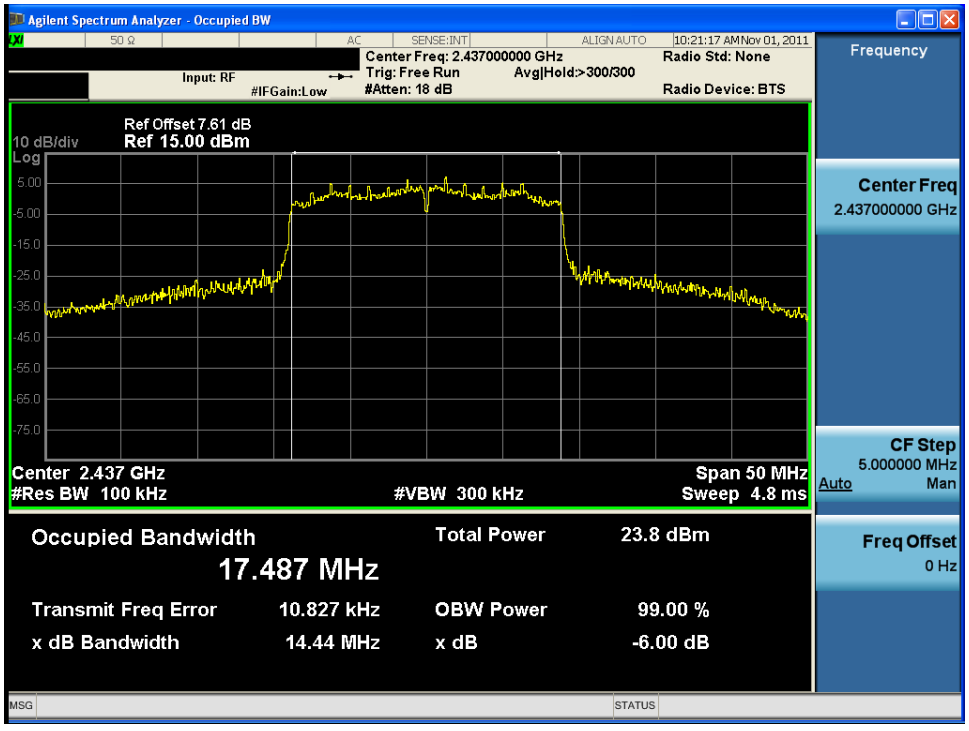
6 dB Bandwidth

Test Mode: 802.11n HT20 & Ch.1 & Chain 1



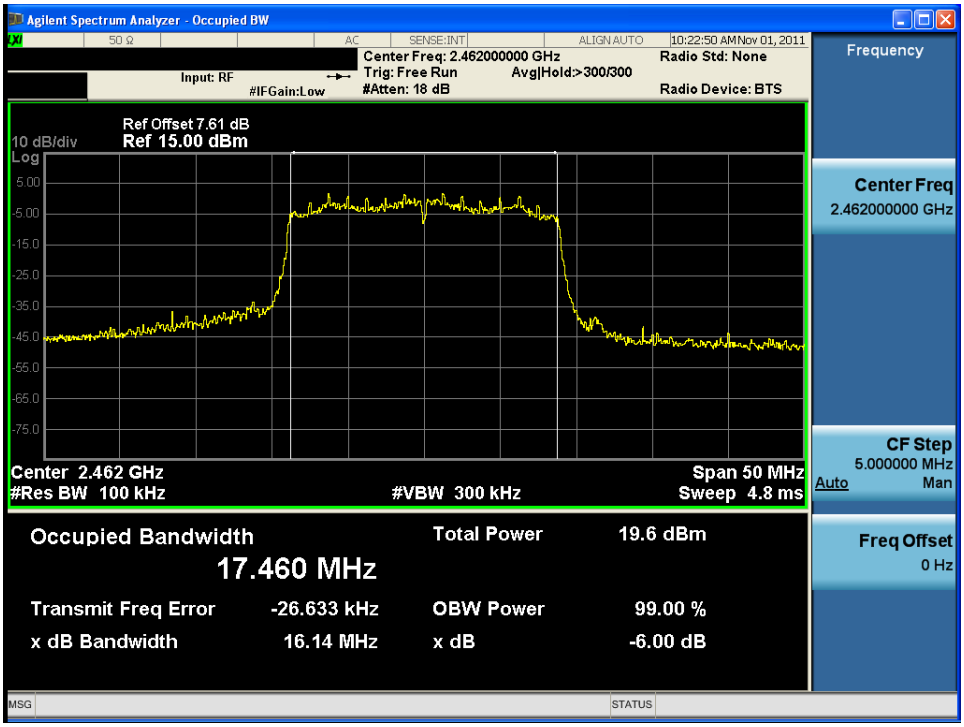
6 dB Bandwidth

Test Mode: 802.11n HT20 & Ch.6 & Chain 0



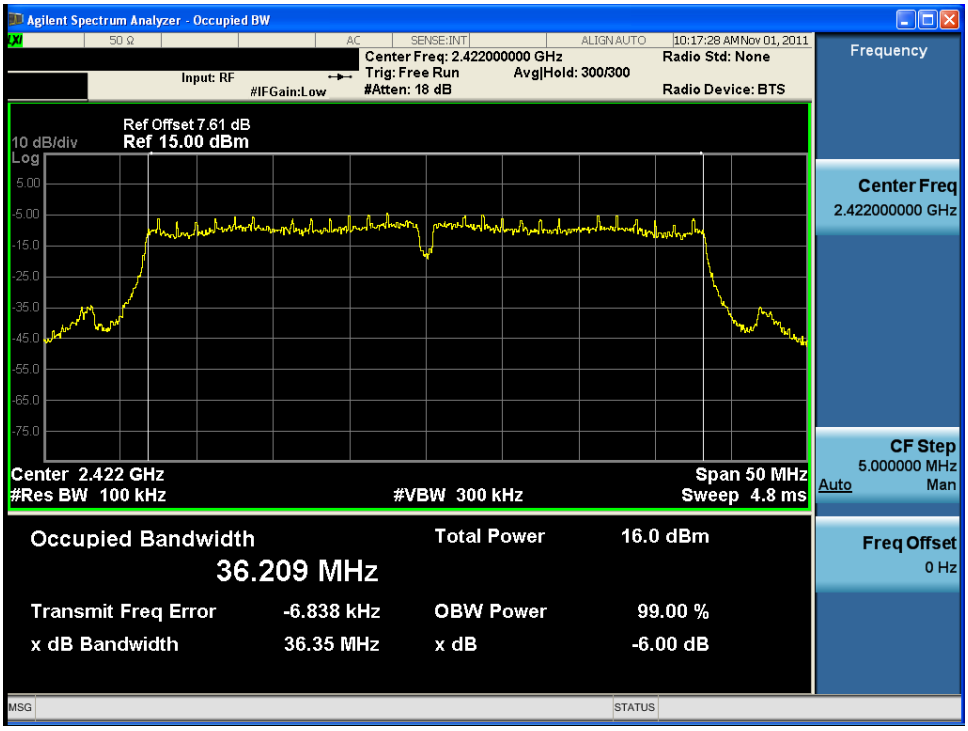
6 dB Bandwidth

Test Mode: 802.11n HT20 & Ch.11 & Chain 1



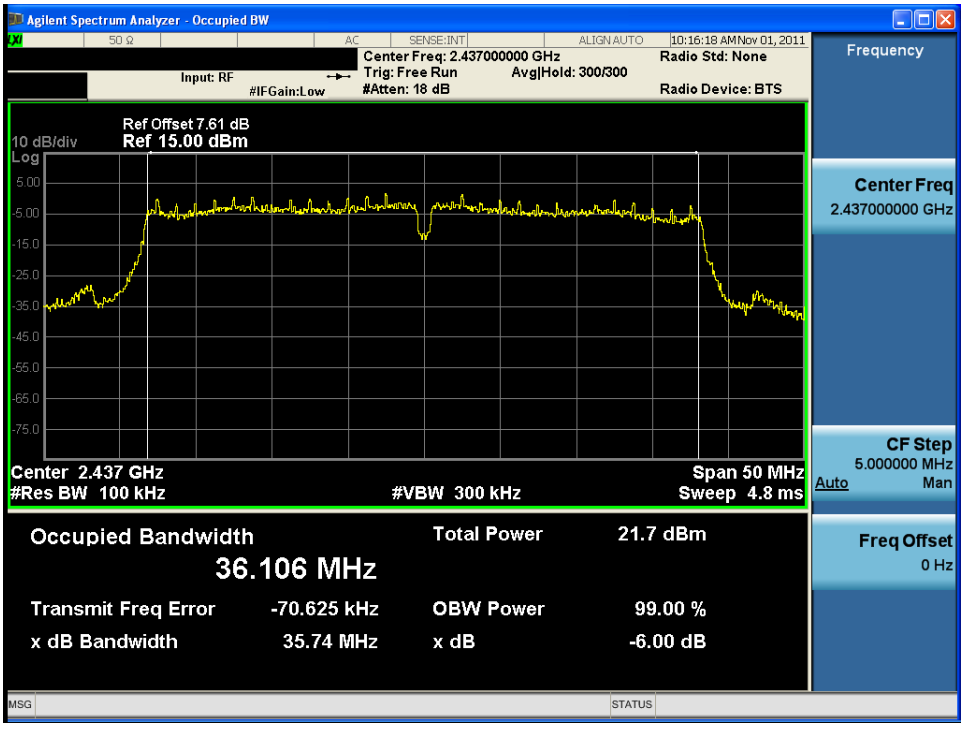
6 dB Bandwidth

Test Mode: 802.11n HT40 & Ch.3 & Chain 1



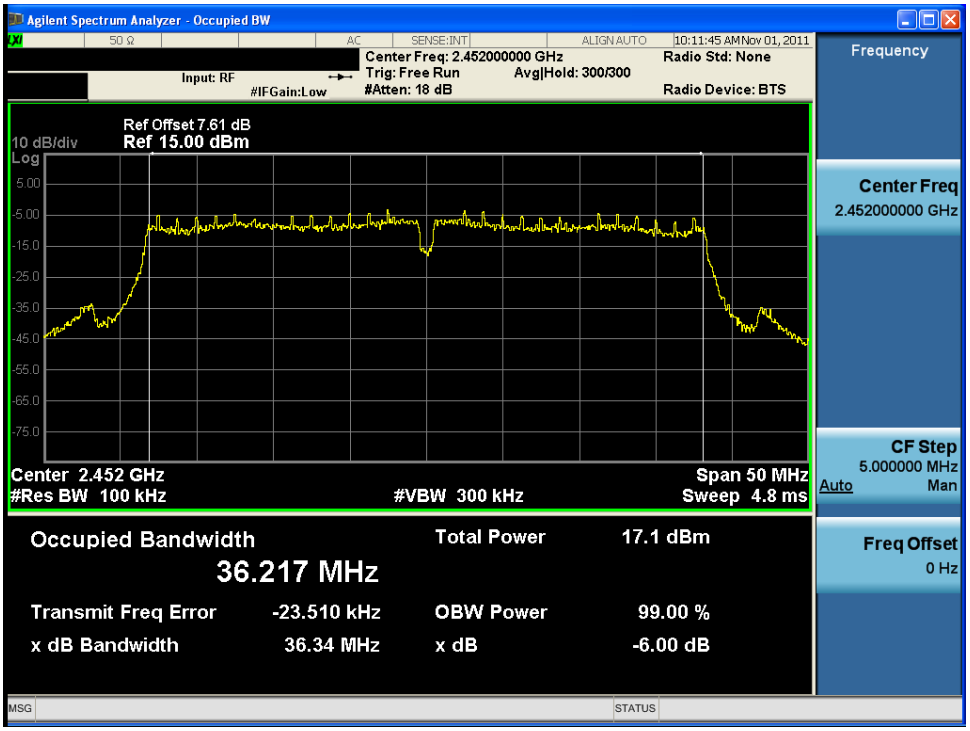
6 dB Bandwidth

Test Mode: 802.11n HT40 & Ch.6 & Chain 1



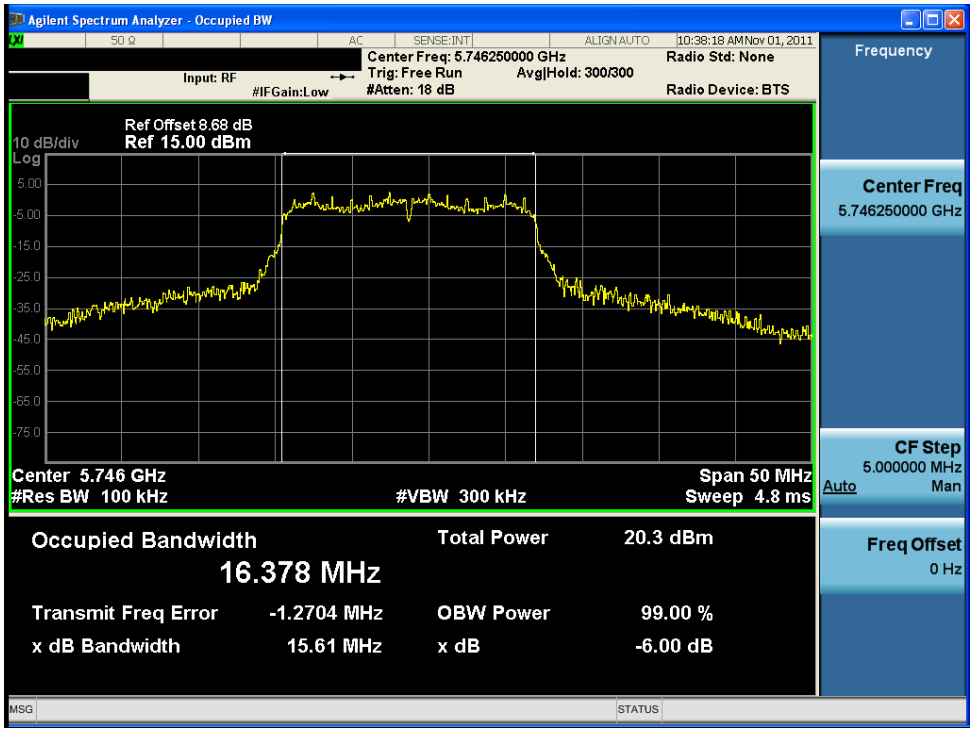
6 dB Bandwidth

Test Mode: 802.11n HT40 & Ch.9 & Chain 1



6 dB Bandwidth

Test Mode: 802.11a & Ch.149 & Chain 1

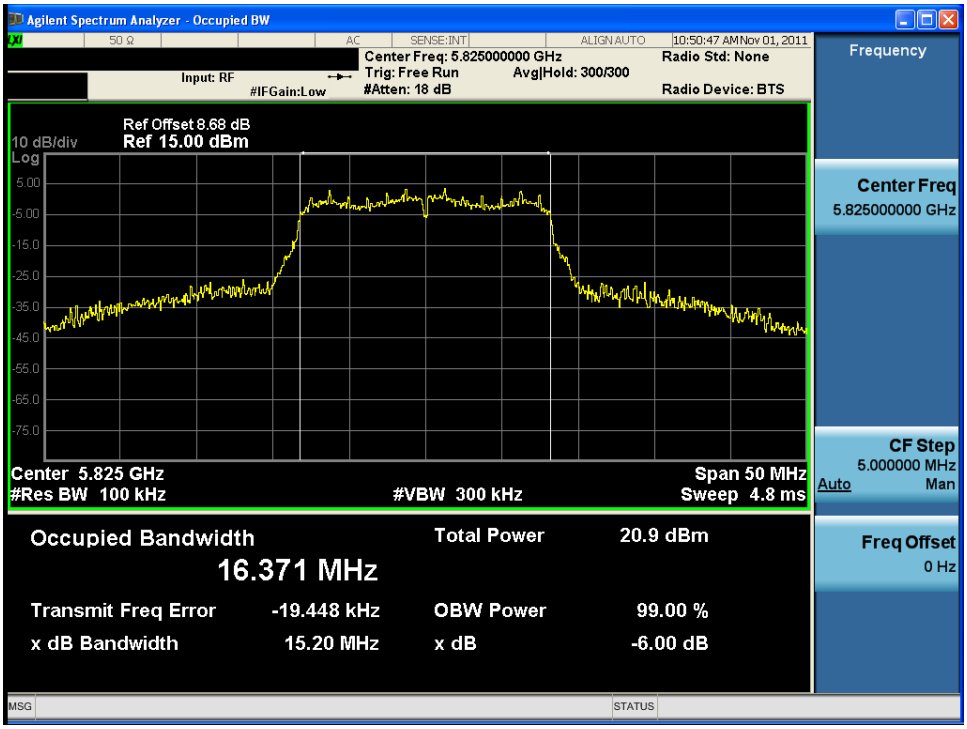


6 dB Bandwidth

Test Mode: 802.11a & Ch.157 & Chain 1

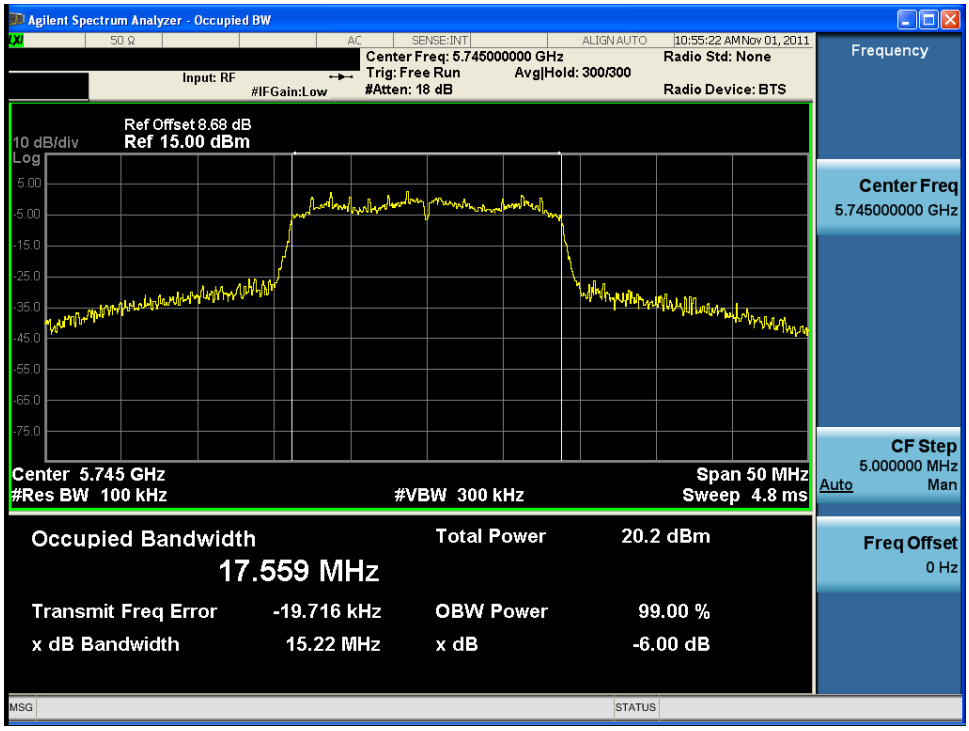
6 dB Bandwidth

Test Mode: 802.11a & Ch.165 & Chain 1



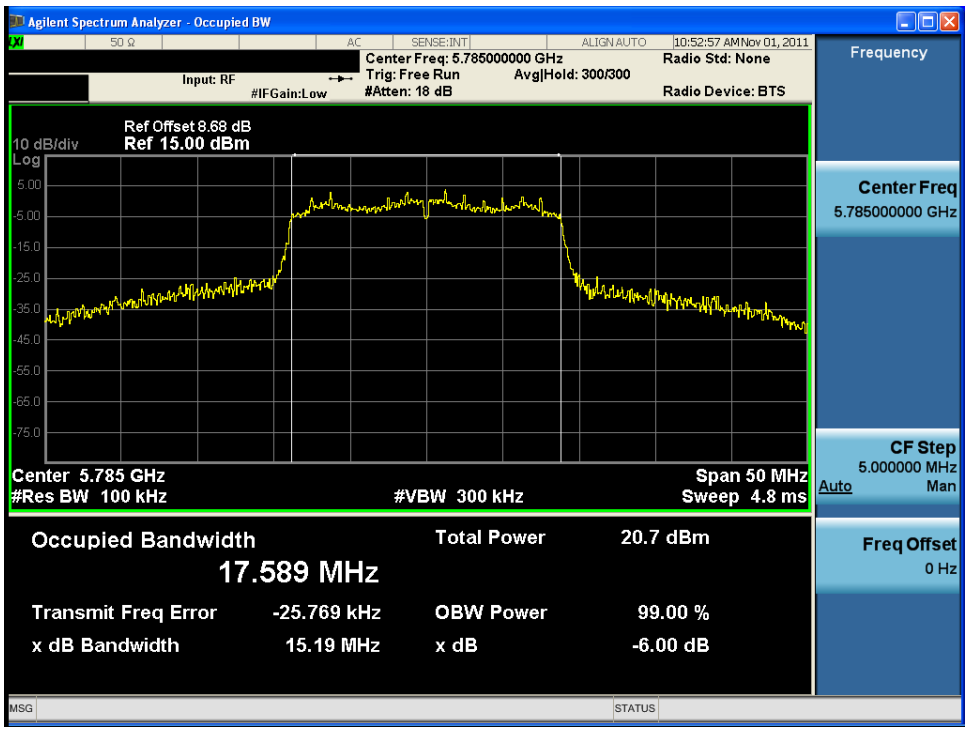
6 dB Bandwidth

Test Mode: 802.11n HT20 & Ch.149 & Chain 1



6 dB Bandwidth

Test Mode: 802.11n HT20 & Ch.157 & Chain 0

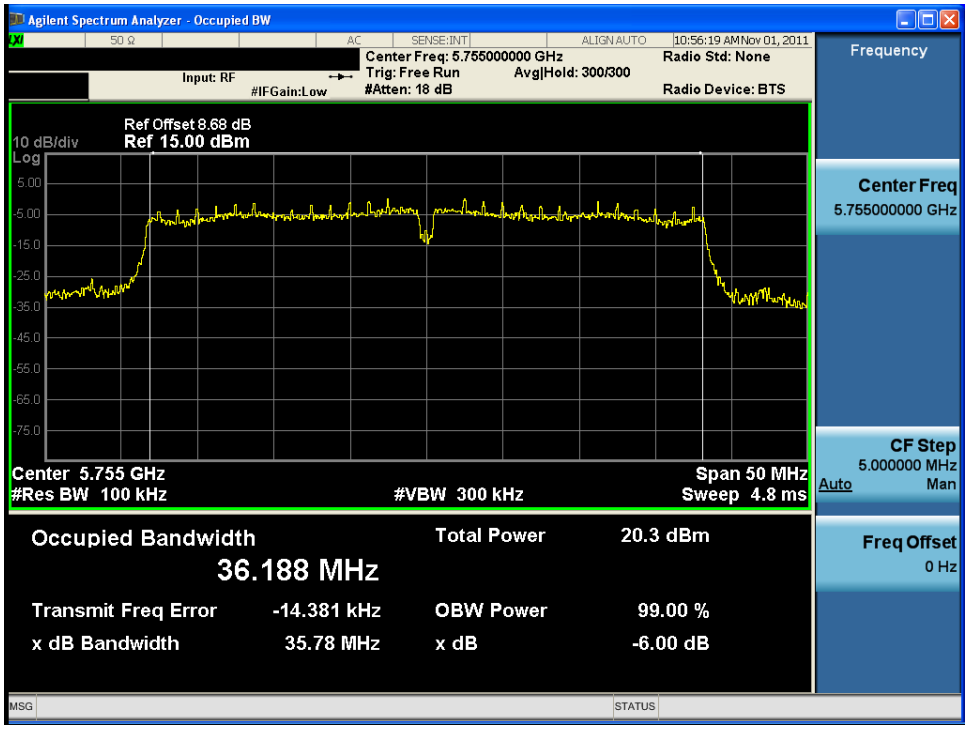


6 dB Bandwidth

Test Mode: 802.11n HT20 & Ch.165 & Chain 1

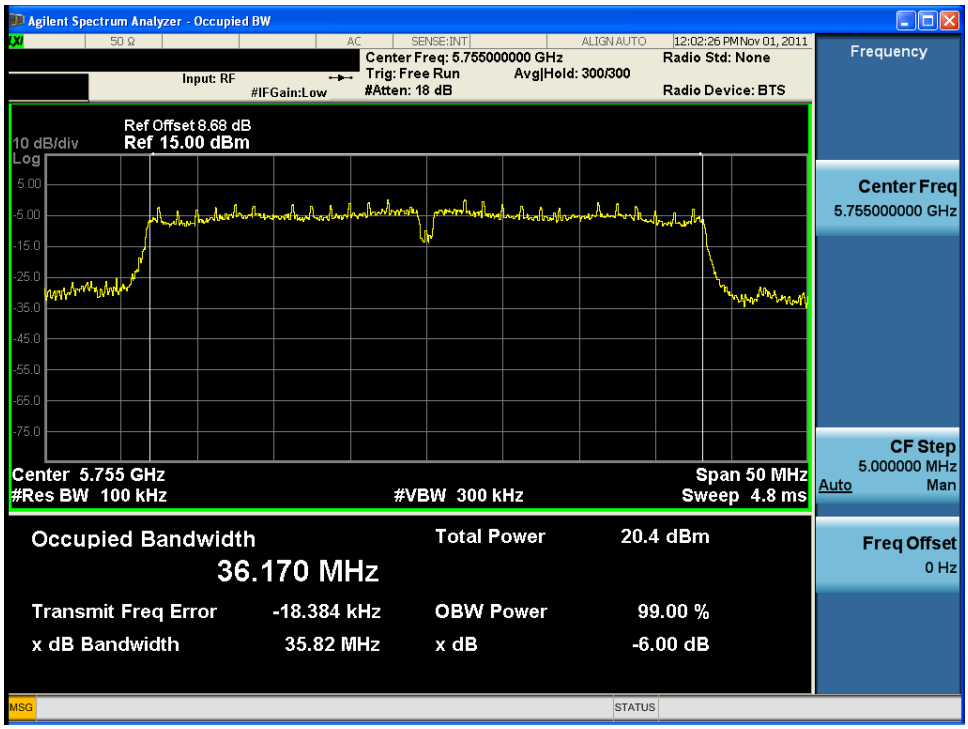
6 dB Bandwidth

Test Mode: 802.11n HT40 & Ch.151 & Chain 1



6 dB Bandwidth

Test Mode: 802.11n HT40 & Ch.159 & Chain 1



3.2.2 Peak Output Power

- Test Procedure:

The peak output power was measured RF power sensor. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.(Power Output Option 1)

- **Measurement Data: Comply**
  - **Single transmitting data**

Mode	Channel	Frequency [MHz]	Test Result			
			Chain 0		Chain 1	
			[dBm]	[W]	[dBm]	[W]
802.11b	1	2412	15.90	0.039	15.38	0.035
	6	2437	16.45	0.044	15.85	0.038
	11	2462	***17.83***	***0.061***	16.97	0.050
802.11g	1	2412	23.28	0.213	23.47	0.222
	6	2437	25.12	0.325	***25.22***	***0.333***
	11	2462	23.64	0.231	23.78	0.239
802.11a	149	5745	24.11	0.258	***24.31***	***0.270***
	157	5785	24.13	0.259	24.16	0.260
	165	5825	23.77	0.238	24.19	0.262

  - **Multiple transmitting data**

Mode	Channel	Frequency [MHz]	Test Result			
			Chain 0 [dBm]	Chain 1 [dBm]	Aggregate Power[Note1]	
					[dBm]	[W]
802.11n HT20	1	2412	23.30	23.52	26.42	0.4387
	6	2437	24.48	25.17	***27.85***	***0.6094***
	11	2462	23.68	23.88	26.79	0.4777
802.11n HT40	3	2422	20.15	20.04	23.11	0.2044
	6	2437	24.07	23.63	***26.87***	***0.4859***
	9	2452	21.91	21.63	24.78	0.3008
802.11n HT20	149	5745	24.21	24.22	***27.23***	***0.5279***
	157	5785	23.93	24.17	27.06	0.5084
	165	5825	23.80	24.23	27.03	0.5047
802.11n HT40	151	5755	23.98	24.06	***27.03***	***0.5047***
	159	5795	23.97	23.98	26.99	0.4995

Note1: Aggregate power = $10\log(10^{(\frac{\text{chain0}}{10})} + 10^{(\frac{\text{chain1}}{10})})$

Minimum Standard:	< 1W

3.2.3 Out of Band Emissions / Band Edge

- Procedure:

Set RBW = 100 kHz, Video bandwidth (VBW) > RBW, scan up through 10th harmonic for 2.4G Band or 40GHz for 5GHz Band.. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.

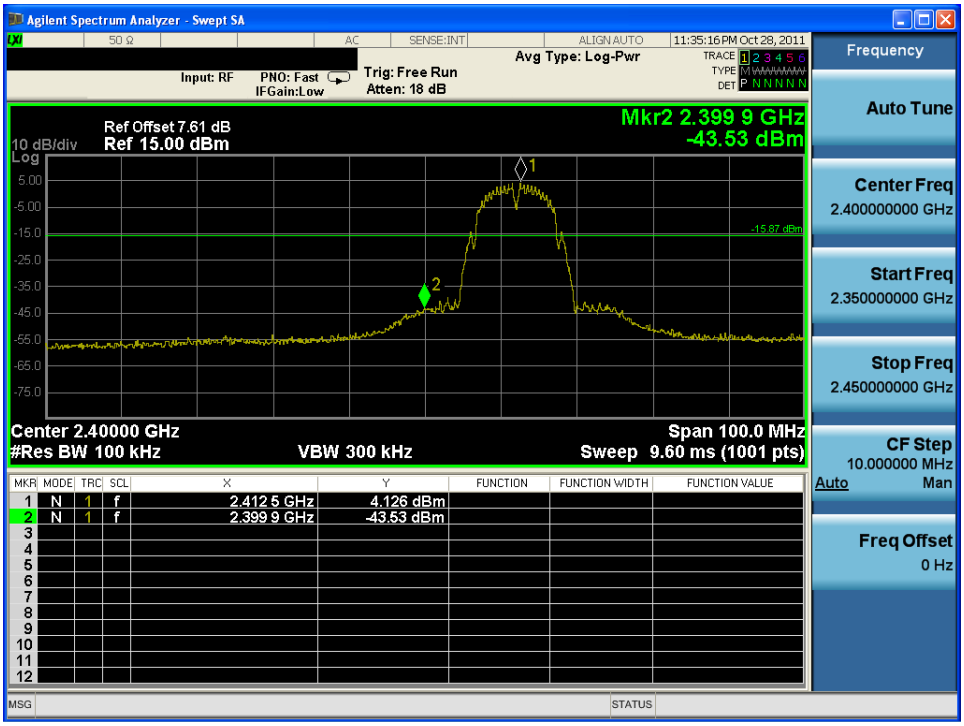
- Measurement Data: Comply

Note 1: The worst case plots in both chains are attached on next page.

Minimum Standard:	Power Output Option 1 > 20 dBc, Power Output Option 2, 3 > 30 dBc,

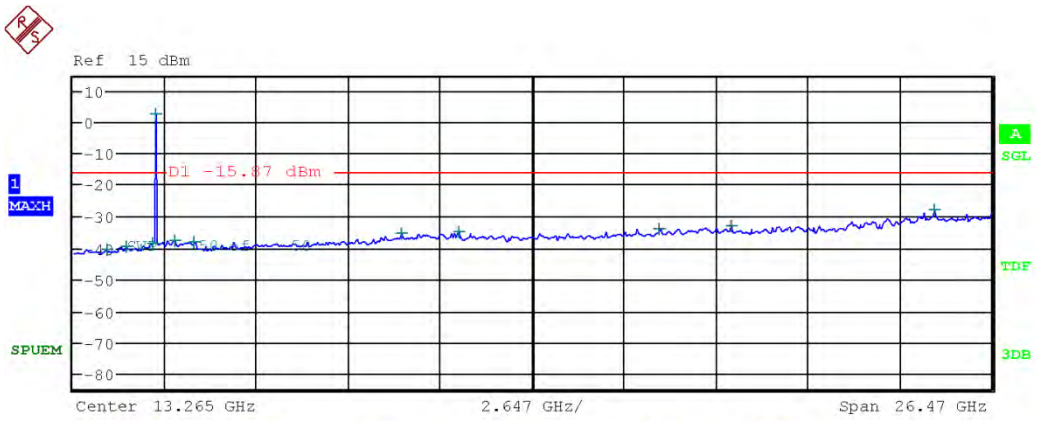
Low Band-edge at 20 dB blow

Test Mode: 802.11b & Ch.1 & Chain 0



Conducted Spurious Emissions

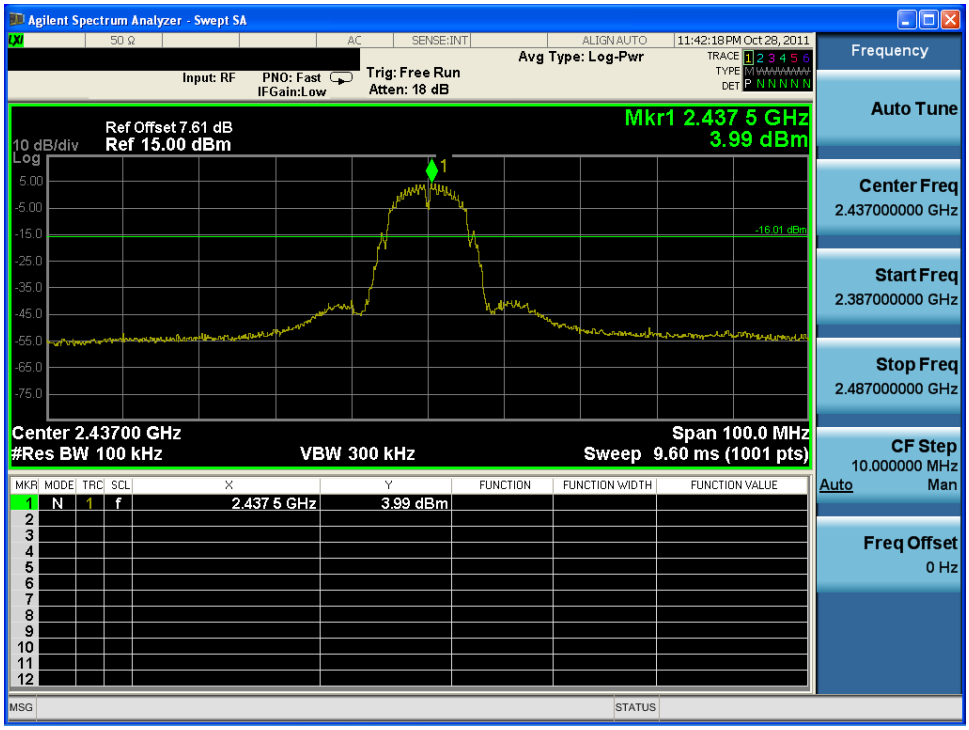
Test Mode: 802.11b & Ch.1 & Chain 0



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	993.210000 M	-40.55	-200.00
1.000 G	2.000 G	100.00 k	1.556000 G	-39.75	-200.00
2.000 G	2.400 G	100.00 k	2.331733 G	-38.68	-200.00
2.400 G	2.483 G	100.00 k	2.413009 G	2.43	-200.00
2.483 G	3.000 G	100.00 k	2.964304 G	-37.81	-200.00
3.000 G	6.000 G	100.00 k	3.495000 G	-38.21	-200.00
6.000 G	10.000 G	100.00 k	9.499500 G	-35.42	-200.00
10.000 G	14.000 G	100.00 k	11.149500 G	-35.17	-200.00
14.000 G	18.000 G	100.00 k	16.934000 G	-34.10	-200.00
18.000 G	22.000 G	100.00 k	19.008000 G	-33.20	-200.00
22.000 G	26.500 G	100.00 k	24.845688 G	-27.89	-200.00

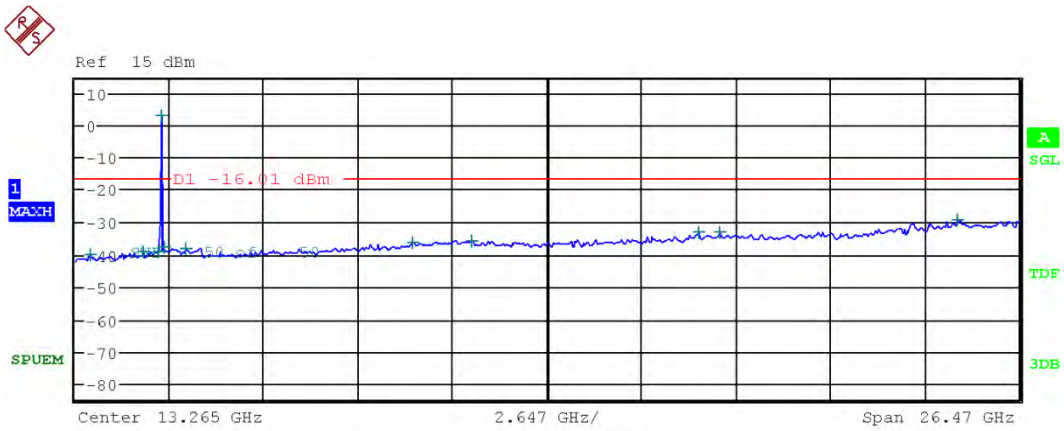
Reference for limit

Test Mode: 802.11b & Ch.6 & Chain 0



Conducted Spurious Emissions

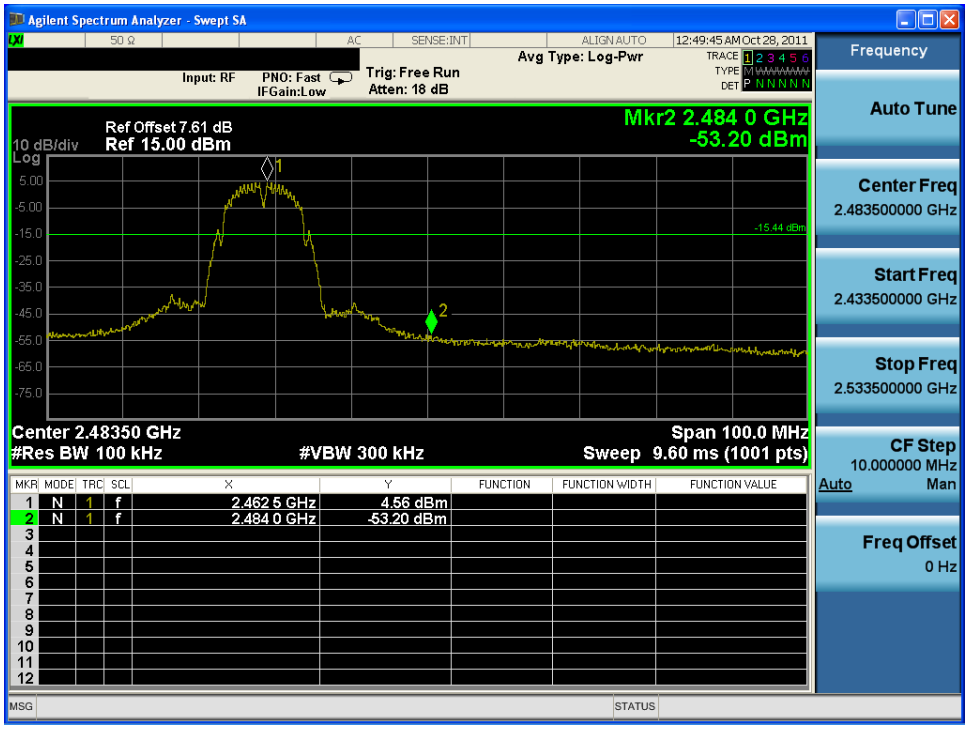
Test Mode: 802.11b & Ch.6 & Chain 0



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	454.472000 M	-40.09	-200.00
1.000 G	2.000 G	100.00 k	1.948400 G	-39.38	-200.00
2.000 G	2.400 G	100.00 k	2.370933 G	-39.11	-200.00
2.400 G	2.483 G	100.00 k	2.436005 G	2.81	-200.00
2.483 G	3.000 G	100.00 k	2.534634 G	-38.01	-200.00
3.000 G	6.000 G	100.00 k	3.106125 G	-38.08	-200.00
6.000 G	10.000 G	100.00 k	9.491500 G	-36.45	-200.00
10.000 G	14.000 G	100.00 k	11.140500 G	-35.75	-200.00
14.000 G	18.000 G	100.00 k	17.492000 G	-33.21	-200.00
18.000 G	22.000 G	100.00 k	18.096000 G	-33.23	-200.00
22.000 G	26.500 G	100.00 k	24.759062 G	-29.27	-200.00

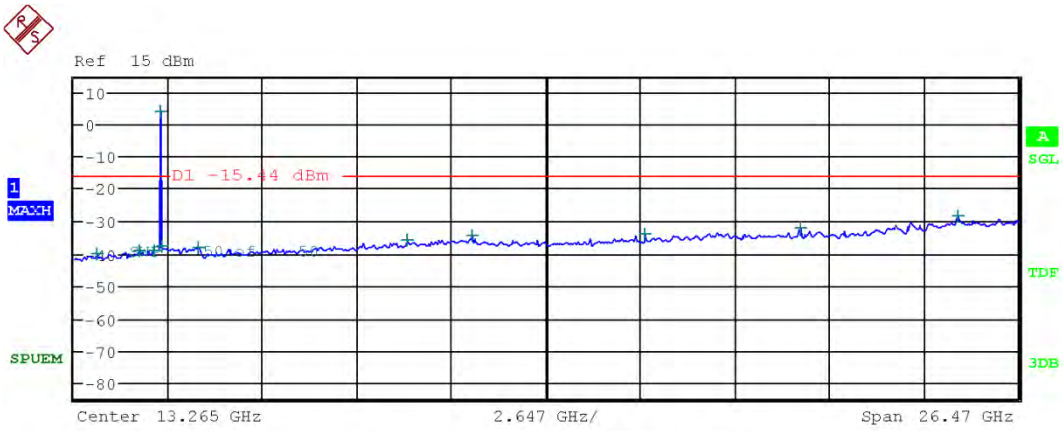
High Band-edge at 20 dB blow

Test Mode: 802.11b & Ch.11 & Chain 0



Conducted Spurious Emissions

Test Mode: 802.11b & Ch.11 & Chain 0



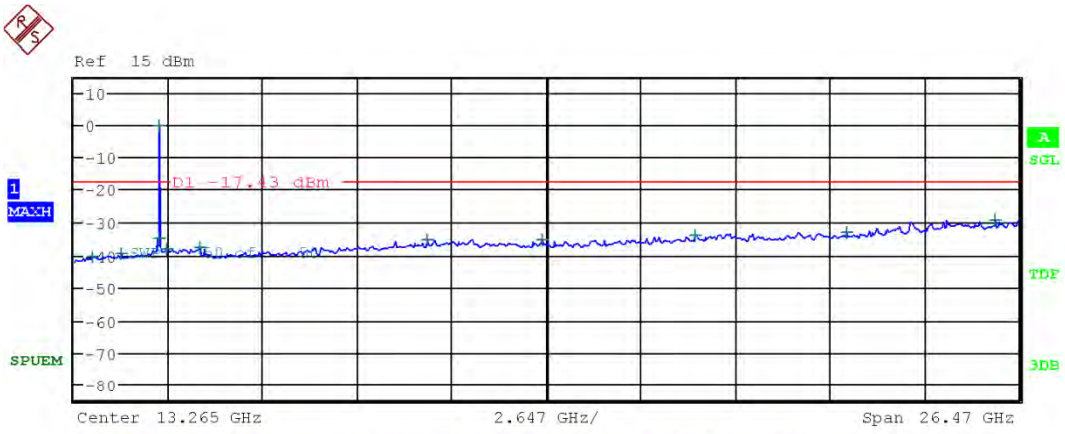
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	650.024000 M	-40.08	-200.00
1.000 G	2.000 G	100.00 k	1.860200 G	-39.21	-200.00
2.000 G	2.400 G	100.00 k	2.287689 G	-39.08	-200.00
2.400 G	2.483 G	100.00 k	2.461489 G	3.93	-200.00
2.483 G	3.000 G	100.00 k	2.488608 G	-37.88	-200.00
3.000 G	6.000 G	100.00 k	3.514500 G	-38.21	-200.00
6.000 G	10.000 G	100.00 k	9.359500 G	-35.81	-200.00
10.000 G	14.000 G	100.00 k	11.196500 G	-34.71	-200.00
14.000 G	18.000 G	100.00 k	16.014000 G	-33.99	-200.00
18.000 G	22.000 G	100.00 k	20.370500 G	-32.16	-200.00
22.000 G	26.500 G	100.00 k	24.783813 G	-28.40	-200.00

Low Band-edge at 20 dB blow

Test Mode: 802.11g & Ch.1 & Chain 1

Conducted Spurious Emissions

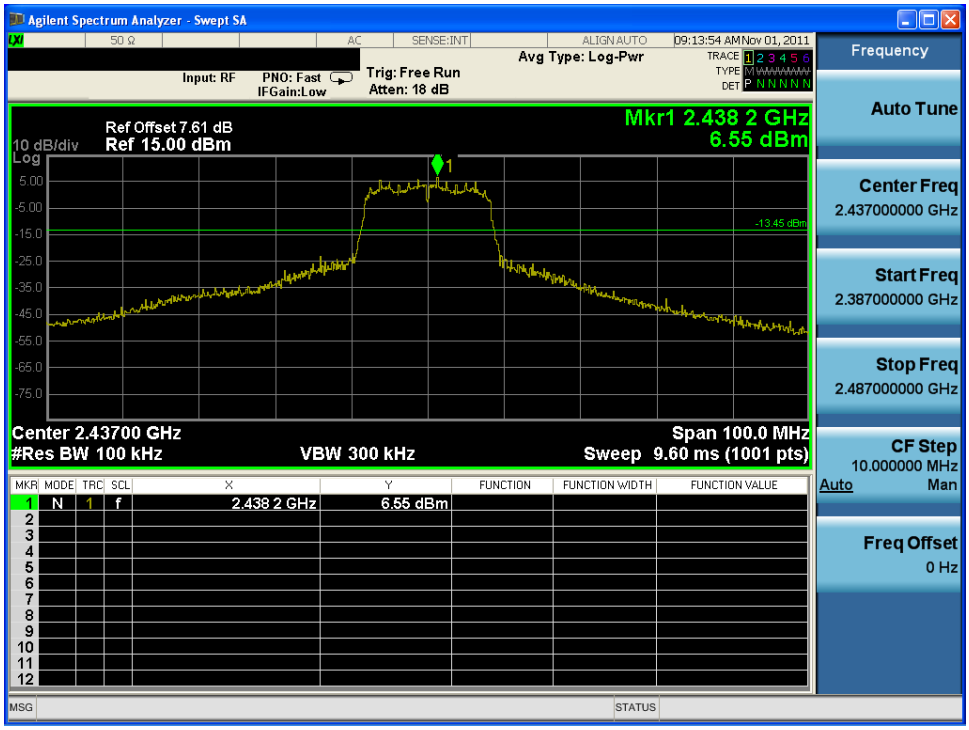
Test Mode: 802.11g & Ch.1 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	100.00 k	537.698000 M	-40.49	-200.00
1.000 G	2.000 G	100.00 k	1.333800 G	-39.88	-200.00
2.000 G	2.400 G	100.00 k	2.398844 G	-34.96	-200.00
2.400 G	2.483 G	100.00 k	2.410688 G	-0.07	-200.00
2.483 G	3.000 G	100.00 k	2.626456 G	-38.35	-200.00
3.000 G	6.000 G	100.00 k	3.538875 G	-37.61	-200.00
6.000 G	10.000 G	100.00 k	9.897500 G	-35.42	-200.00
10.000 G	14.000 G	100.00 k	13.153000 G	-35.30	-200.00
14.000 G	18.000 G	100.00 k	17.410000 G	-33.83	-200.00
18.000 G	22.000 G	100.00 k	21.665500 G	-33.30	-200.00
22.000 G	26.500 G	100.00 k	25.815438 G	-29.25	-200.00

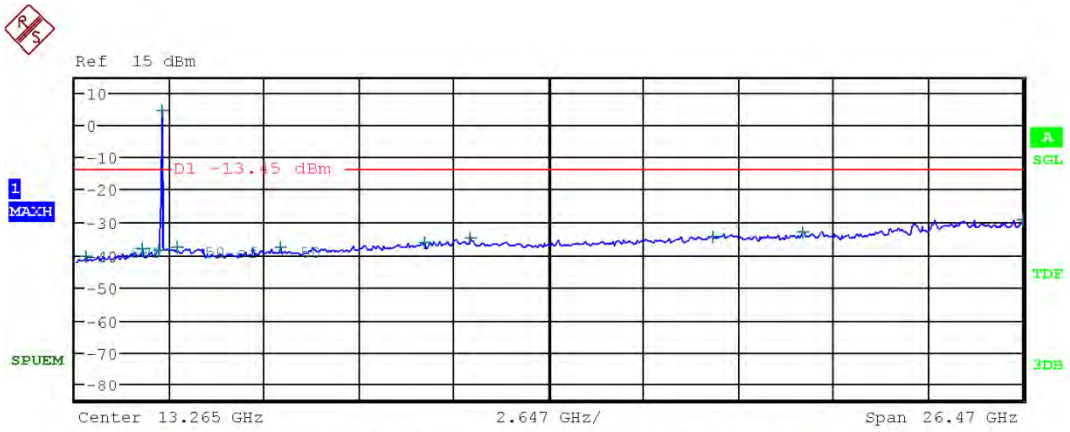
Reference for limit

Test Mode: 802.11g & Ch.6 & Chain 1



Conducted Spurious Emissions

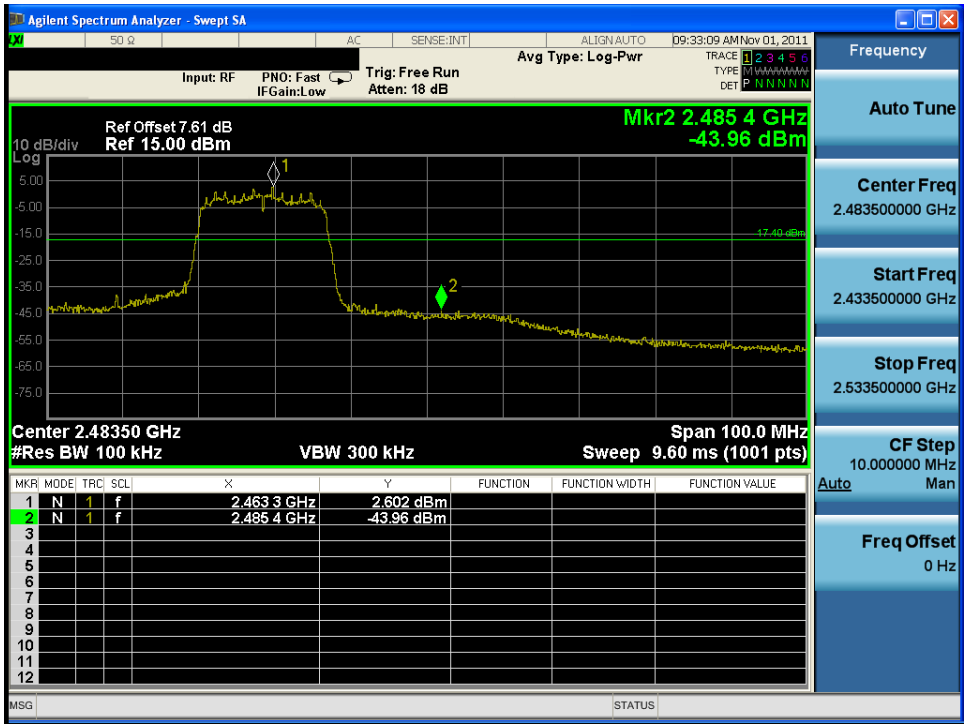
Test Mode: 802.11g & Ch.6 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	333.416000 M	-40.65	-200.00
1.000 G	2.000 G	100.00 k	1.885400 G	-38.15	-200.00
2.000 G	2.400 G	100.00 k	2.363467 G	-38.65	-200.00
2.400 G	2.483 G	100.00 k	2.430711 G	4.39	-200.00
2.483 G	3.000 G	100.00 k	2.863701 G	-37.71	-200.00
3.000 G	6.000 G	100.00 k	5.759250 G	-37.94	-200.00
6.000 G	10.000 G	100.00 k	9.785500 G	-36.18	-200.00
10.000 G	14.000 G	100.00 k	11.072500 G	-35.20	-200.00
14.000 G	18.000 G	100.00 k	17.832000 G	-34.45	-200.00
18.000 G	22.000 G	100.00 k	20.364500 G	-33.13	-200.00
22.000 G	26.500 G	100.00 k	26.491563 G	-29.36	-200.00

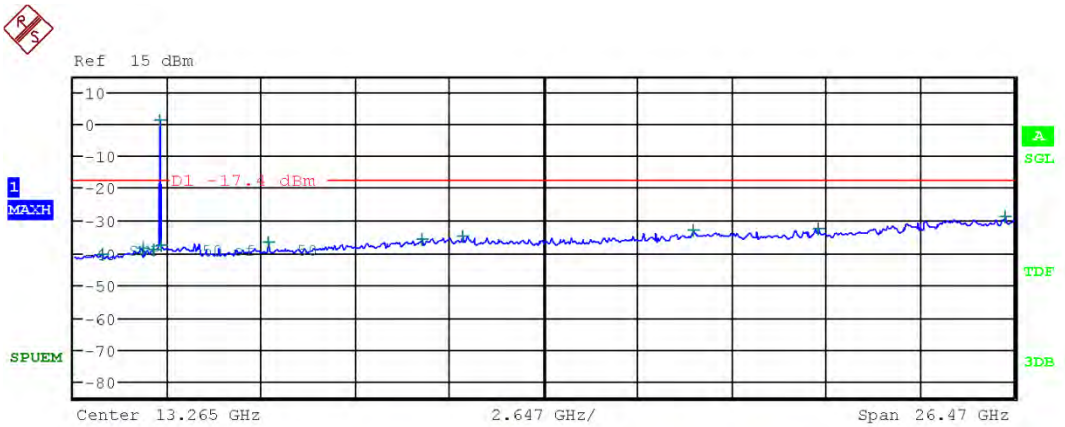
High Band-edge at 20 dB blow

Test Mode: 802.11g & Ch.11 & Chain 1



Conducted Spurious Emissions

Test Mode: 802.11g & Ch.11 & Chain 1



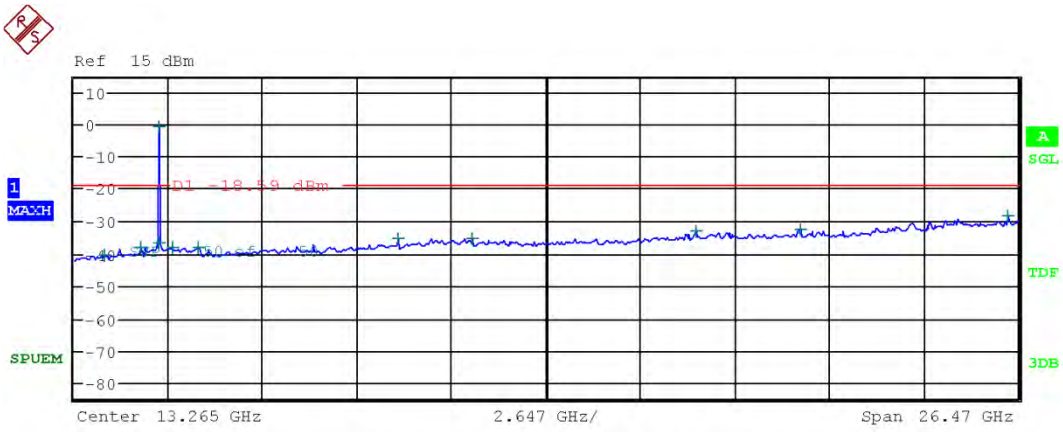
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	854.500000 M	-40.64	-200.00
1.000 G	2.000 G	100.00 k	1.999200 G	-38.79	-200.00
2.000 G	2.400 G	100.00 k	2.285422 G	-39.03	-200.00
2.400 G	2.483 G	100.00 k	2.463260 G	1.32	-200.00
2.483 G	3.000 G	100.00 k	2.489009 G	-37.91	-200.00
3.000 G	6.000 G	100.00 k	5.513625 G	-37.00	-200.00
6.000 G	10.000 G	100.00 k	9.818500 G	-36.17	-200.00
10.000 G	14.000 G	100.00 k	10.959500 G	-34.88	-200.00
14.000 G	18.000 G	100.00 k	17.475000 G	-33.07	-200.00
18.000 G	22.000 G	100.00 k	20.999000 G	-32.82	-200.00
22.000 G	26.500 G	100.00 k	26.261500 G	-28.85	-200.00

Low Band-edge at 20 dB blow

Test Mode: 802.11n HT20 & Ch.1 & Chain 1

Conducted Spurious Emissions

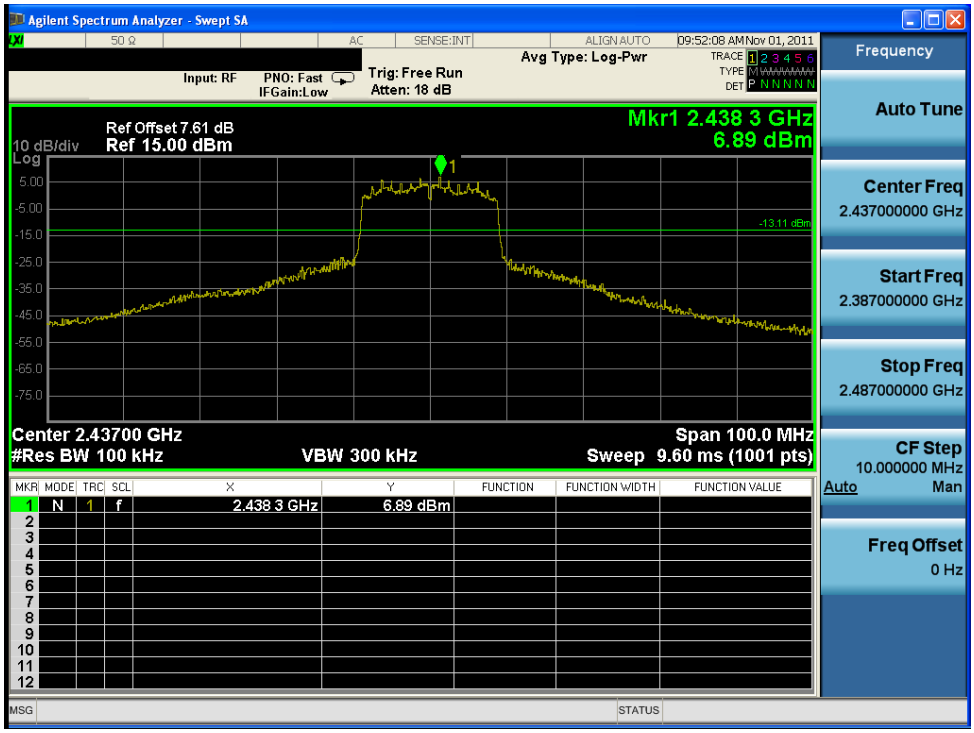
Test Mode: 802.11n HT20 & Ch.1 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	882.630000 M	-40.46	-200.00
1.000 G	2.000 G	100.00 k	1.891800 G	-38.52	-200.00
2.000 G	2.400 G	100.00 k	2.398044 G	-36.91	-200.00
2.400 G	2.483 G	100.00 k	2.418236 G	-0.92	-200.00
2.483 G	3.000 G	100.00 k	2.793687 G	-38.19	-200.00
3.000 G	6.000 G	100.00 k	3.501750 G	-38.40	-200.00
6.000 G	10.000 G	100.00 k	9.107000 G	-35.69	-200.00
10.000 G	14.000 G	100.00 k	11.191000 G	-35.36	-200.00
14.000 G	18.000 G	100.00 k	17.444000 G	-33.33	-200.00
18.000 G	22.000 G	100.00 k	20.372500 G	-32.88	-200.00
22.000 G	26.500 G	100.00 k	26.201313 G	-28.32	-200.00

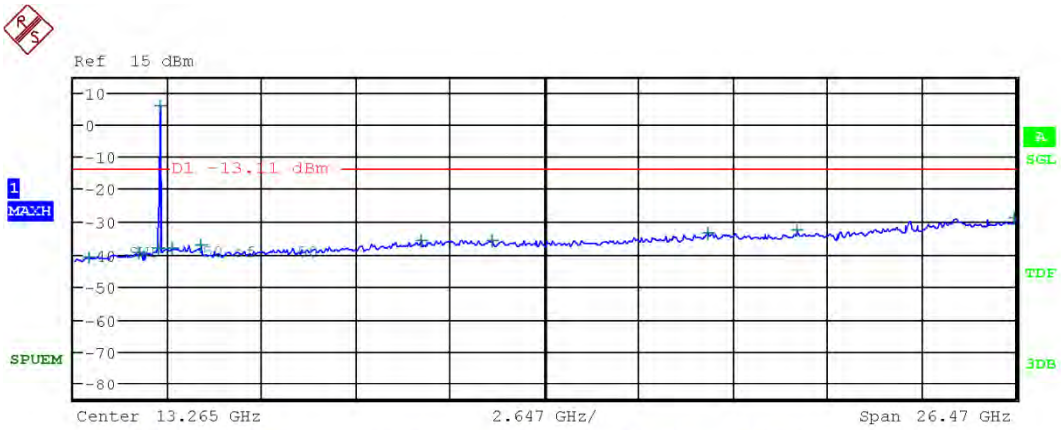
Reference for limit

Test Mode: 802.11n HT20 & Ch.6 & Chain 1



Conducted Spurious missions

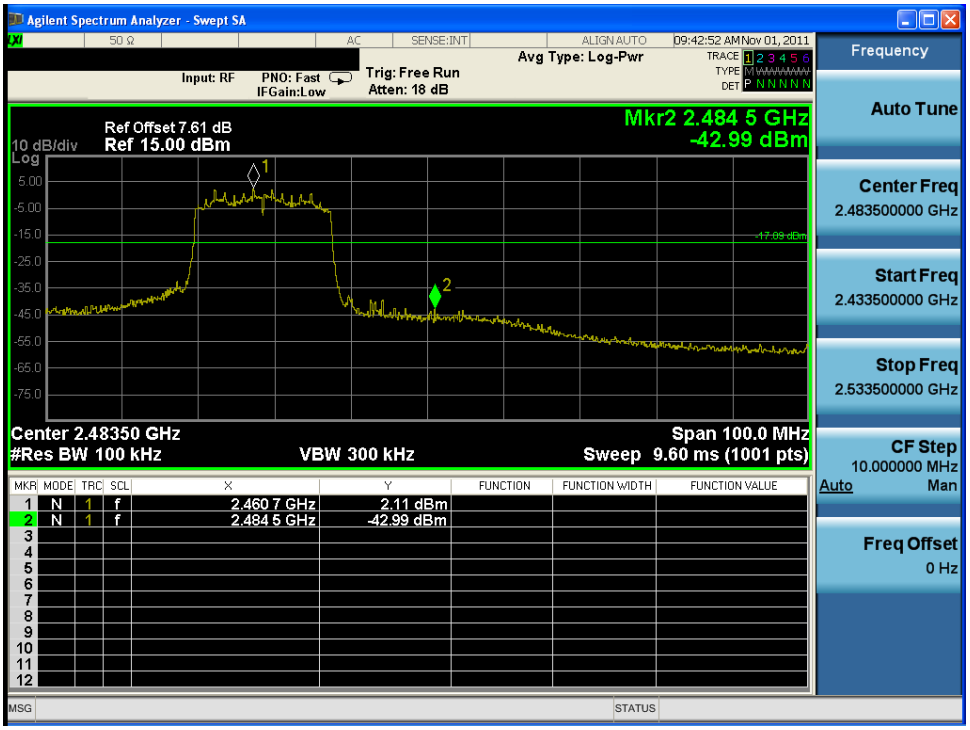
Test Mode: 802.11n HT20 & Ch.6 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	460.680000 M	-40.94	-200.00
1.000 G	2.000 G	100.00 k	1.870000 G	-39.59	-200.00
2.000 G	2.400 G	100.00 k	2.399467 G	-38.36	-200.00
2.400 G	2.483 G	100.00 k	2.435721 G	5.91	-200.00
2.483 G	3.000 G	100.00 k	2.776413 G	-38.28	-200.00
3.000 G	6.000 G	100.00 k	3.591375 G	-37.36	-200.00
6.000 G	10.000 G	100.00 k	9.792500 G	-36.14	-200.00
10.000 G	14.000 G	100.00 k	11.759500 G	-35.77	-200.00
14.000 G	18.000 G	100.00 k	17.828000 G	-33.70	-200.00
18.000 G	22.000 G	100.00 k	20.346500 G	-32.66	-200.00
22.000 G	26.500 G	100.00 k	26.449375 G	-28.94	-200.00

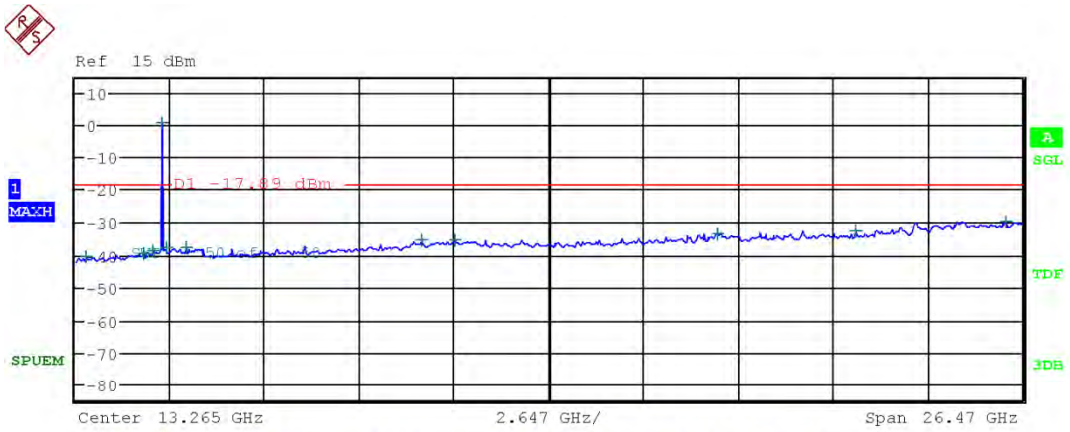
High Band-edge at 20 dB blow

Test Mode: 802.11n HT20 & Ch.11 & Chain 1



Conducted Spurious Emissions

Test Mode: 802.11n HT20 & Ch.11 & Chain 1



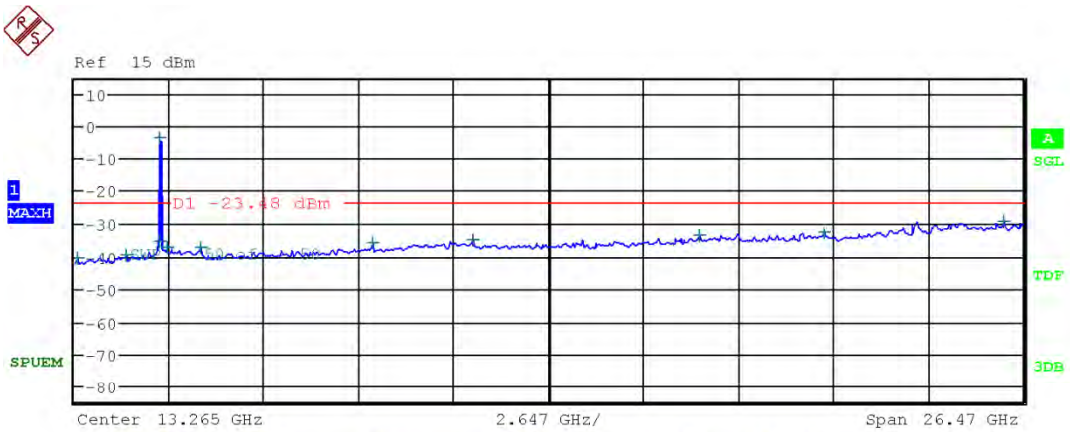
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	310.912000 M	-40.69	-200.00
1.000 G	2.000 G	100.00 k	1.922000 G	-39.63	-200.00
2.000 G	2.400 G	100.00 k	2.175378 G	-38.84	-200.00
2.400 G	2.483 G	100.00 k	2.463293 G	0.87	-200.00
2.483 G	3.000 G	100.00 k	2.574404 G	-37.80	-200.00
3.000 G	6.000 G	100.00 k	3.119250 G	-37.77	-200.00
6.000 G	10.000 G	100.00 k	9.693500 G	-35.55	-200.00
10.000 G	14.000 G	100.00 k	10.633500 G	-35.33	-200.00
14.000 G	18.000 G	100.00 k	17.986000 G	-33.67	-200.00
18.000 G	22.000 G	100.00 k	21.823500 G	-32.70	-200.00
22.000 G	26.500 G	100.00 k	26.012313 G	-29.92	-200.00

Low Band-edge at 20 dB blow

Test Mode: 802.11n HT40 & Ch.3 & Chain 0

Conducted Spurious Emissions

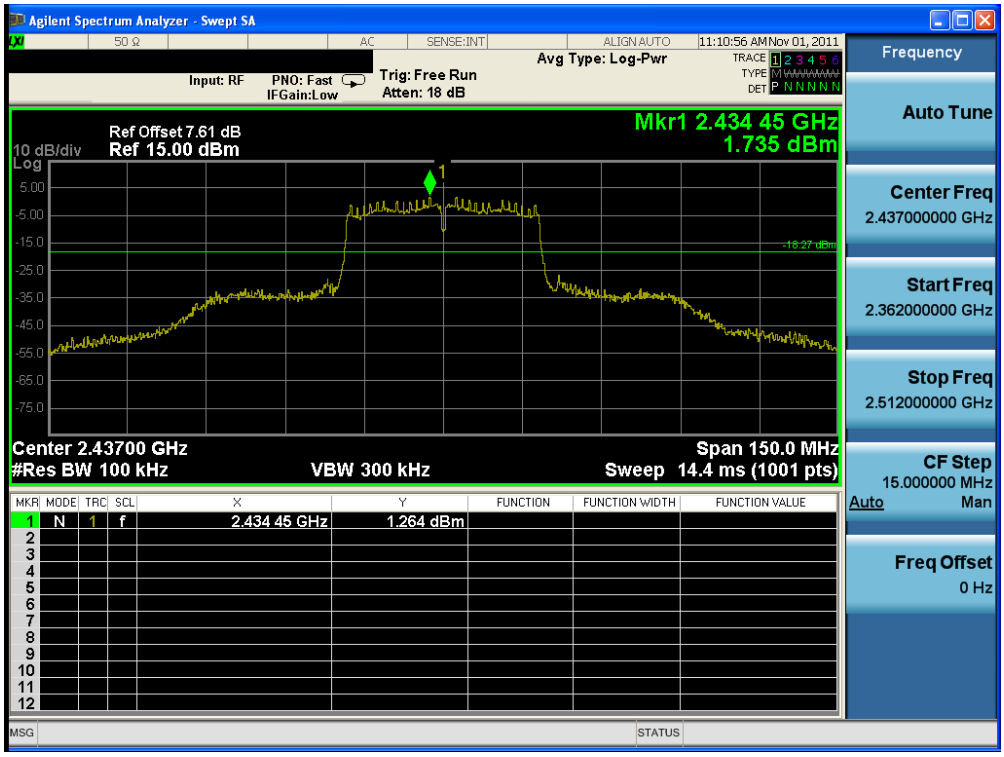
Test Mode: 802.11n HT40 & Ch.3 & Chain 0



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	100.00 k	126.224000 M	-40.58	-200.00
1.000 G	2.000 G	100.00 k	1.465000 G	-39.64	-200.00
2.000 G	2.400 G	100.00 k	2.399867 G	-35.32	-200.00
2.400 G	2.483 G	100.00 k	2.419506 G	-3.71	-200.00
2.483 G	3.000 G	100.00 k	2.623701 G	-37.54	-200.00
3.000 G	6.000 G	100.00 k	3.558750 G	-37.56	-200.00
6.000 G	10.000 G	100.00 k	8.351000 G	-36.14	-200.00
10.000 G	14.000 G	100.00 k	11.159500 G	-34.96	-200.00
14.000 G	18.000 G	100.00 k	17.457500 G	-33.68	-200.00
18.000 G	22.000 G	100.00 k	20.929000 G	-32.77	-200.00
22.000 G	26.500 G	100.00 k	25.962812 G	-29.44	-200.00

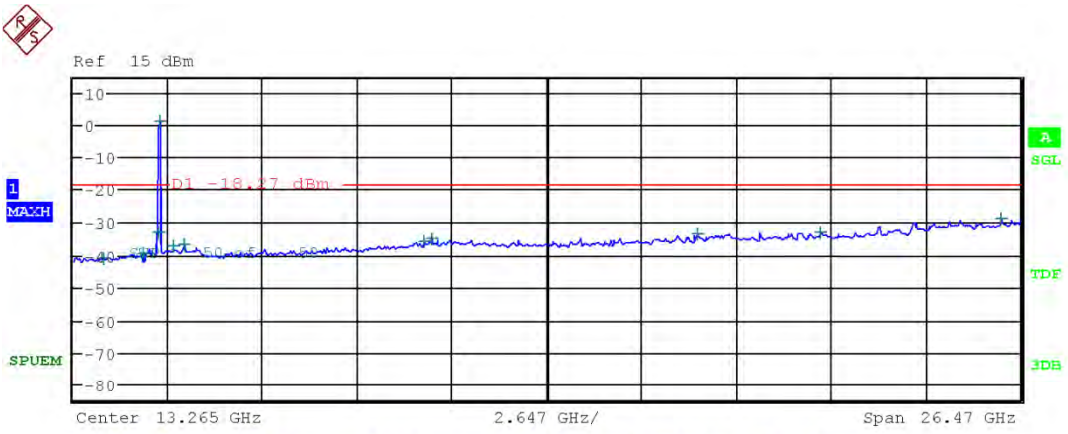
Reference for limit

Test Mode: 802.11n HT40 & Ch.6 & Chain 0



Conducted Spurious Emissions

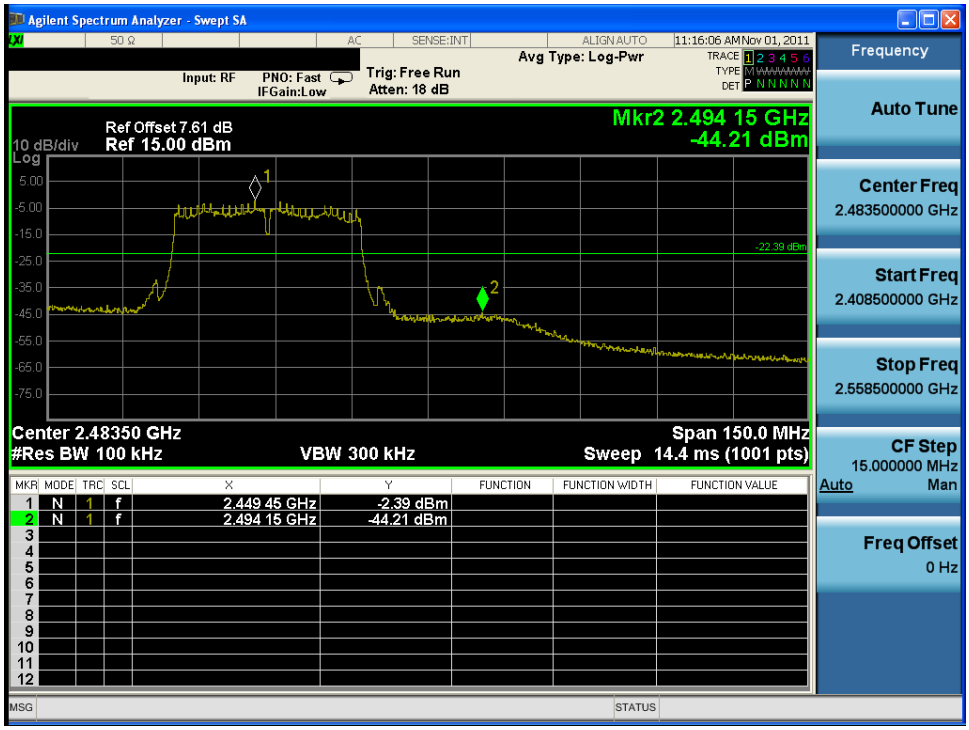
Test Mode: 802.11n HT40 & Ch.6 & Chain 0



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	895.434000 M	-40.97	-200.00
1.000 G	2.000 G	100.00 k	1.970400 G	-39.58	-200.00
2.000 G	2.400 G	100.00 k	2.395156 G	-33.33	-200.00
2.400 G	2.483 G	100.00 k	2.434486 G	1.33	-200.00
2.483 G	3.000 G	100.00 k	2.817733 G	-37.31	-200.00
3.000 G	6.000 G	100.00 k	3.115125 G	-37.08	-200.00
6.000 G	10.000 G	100.00 k	9.835500 G	-36.13	-200.00
10.000 G	14.000 G	100.00 k	10.044500 G	-34.97	-200.00
14.000 G	18.000 G	100.00 k	17.474500 G	-33.80	-200.00
18.000 G	22.000 G	100.00 k	20.903000 G	-32.97	-200.00
22.000 G	26.500 G	100.00 k	25.958313 G	-28.99	-200.00

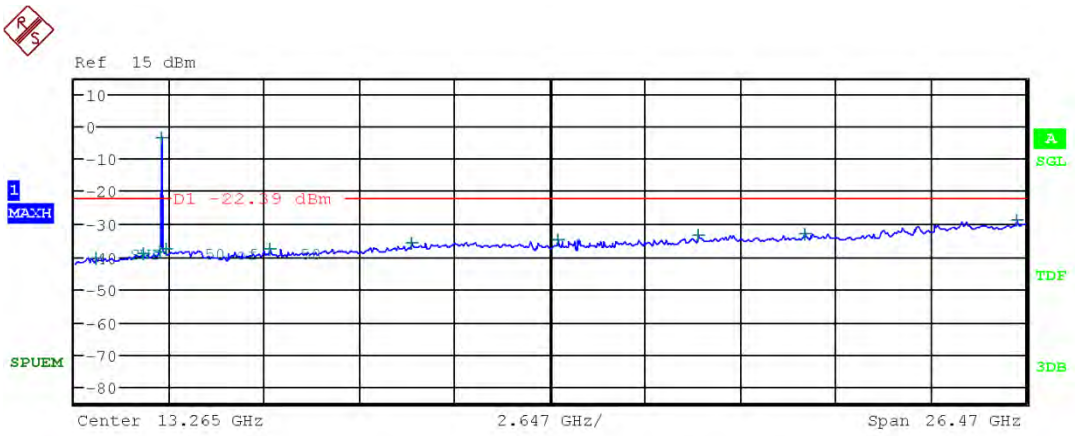
High Band-edge at 20 dB blow

Test Mode: 802.11n HT40 & Ch.9 & Chain 0



Conducted Spurious Emissions

Test Mode: 802.11n HT40 & Ch.9 & Chain 0



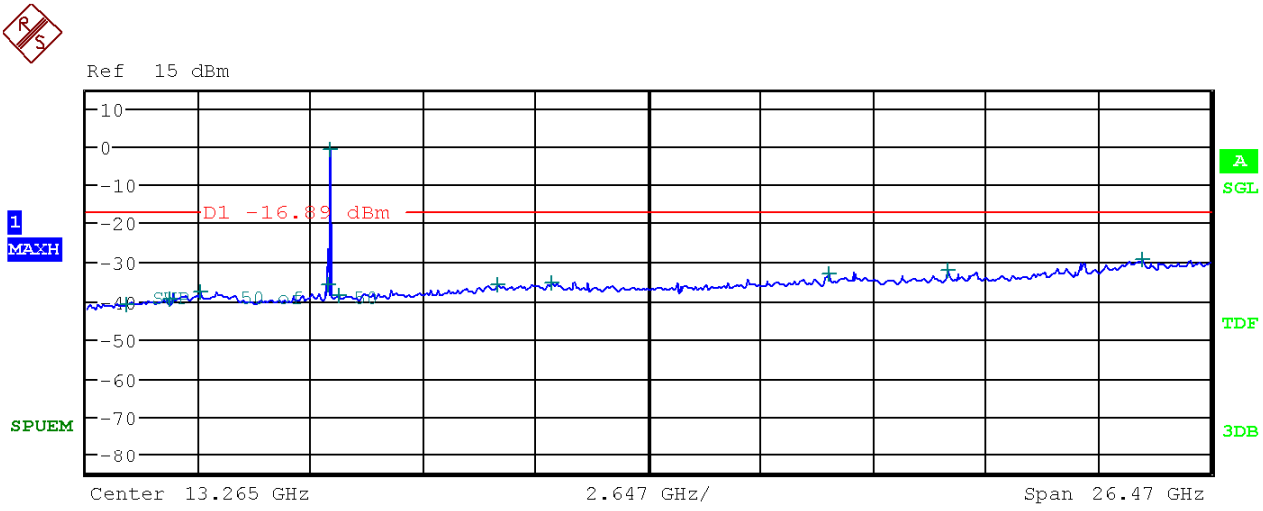
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	642.846000 M	-40.54	-200.00
1.000 G	2.000 G	100.00 k	1.920600 G	-39.46	-200.00
2.000 G	2.400 G	100.00 k	2.399600 G	-38.79	-200.00
2.400 G	2.483 G	100.00 k	2.440731 G	-3.62	-200.00
2.483 G	3.000 G	100.00 k	2.561434 G	-37.82	-200.00
3.000 G	6.000 G	100.00 k	5.479500 G	-37.67	-200.00
6.000 G	10.000 G	100.00 k	9.406500 G	-35.77	-200.00
10.000 G	14.000 G	100.00 k	13.461500 G	-35.20	-200.00
14.000 G	18.000 G	100.00 k	17.377000 G	-33.51	-200.00
18.000 G	22.000 G	100.00 k	20.357500 G	-32.91	-200.00
22.000 G	26.500 G	100.00 k	26.239563 G	-29.07	-200.00

Low Band-edge at 20 dB blow

Test Mode: 802.11a & Ch.149 & Chain 1

Conducted Spurious Emissions

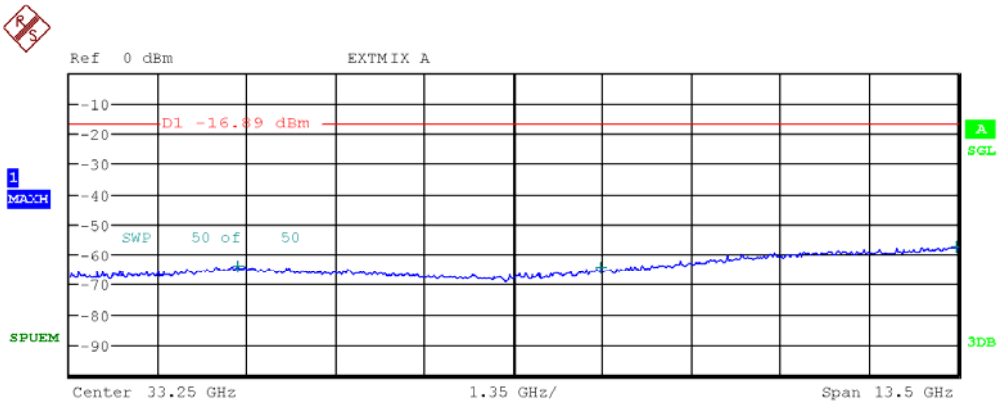
Test Mode: 802.11a & Ch.149 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	944.322000 M	-40.91	-200.00
1.000 G	2.000 G	100.00 k	1.973200 G	-39.92	-200.00
2.000 G	5.000 G	100.00 k	2.712500 G	-37.89	-200.00
5.000 G	5.725 G	100.00 k	5.723147 G	-36.16	-200.00
5.725 G	5.850 G	100.00 k	5.743675 G	-0.87	-200.00
5.850 G	6.500 G	100.00 k	5.964328 G	-38.69	-200.00
6.500 G	10.000 G	100.00 k	9.706000 G	-36.08	-200.00
10.000 G	14.000 G	100.00 k	10.971000 G	-35.31	-200.00
14.000 G	18.000 G	100.00 k	17.501000 G	-33.23	-200.00
18.000 G	22.000 G	100.00 k	20.298000 G	-32.29	-200.00
22.000 G	26.500 G	100.00 k	24.867062 G	-29.54	-200.00

Conducted Spurious Emissions

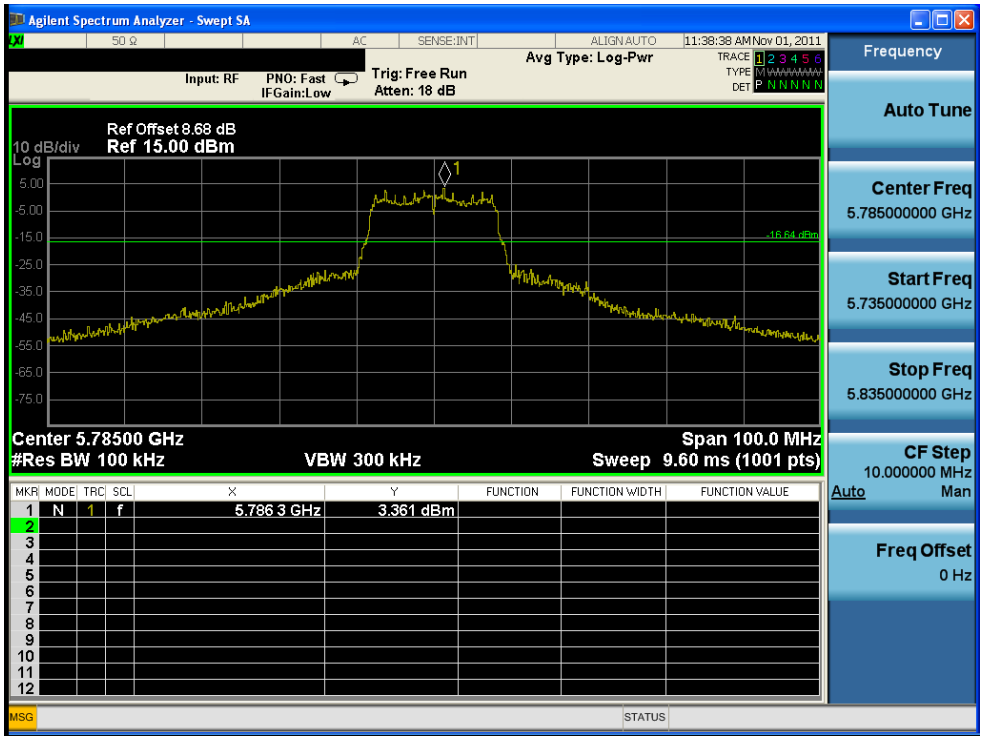
Test Mode: 802.11a & Ch.149 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
26.500 G	30.000 G	100.00 k	29.061300 G	-63.97	-200.00
30.000 G	35.000 G	100.00 k	34.570000 G	-64.34	-200.00
35.000 G	40.000 G	100.00 k	39.968000 G	-57.73	-200.00

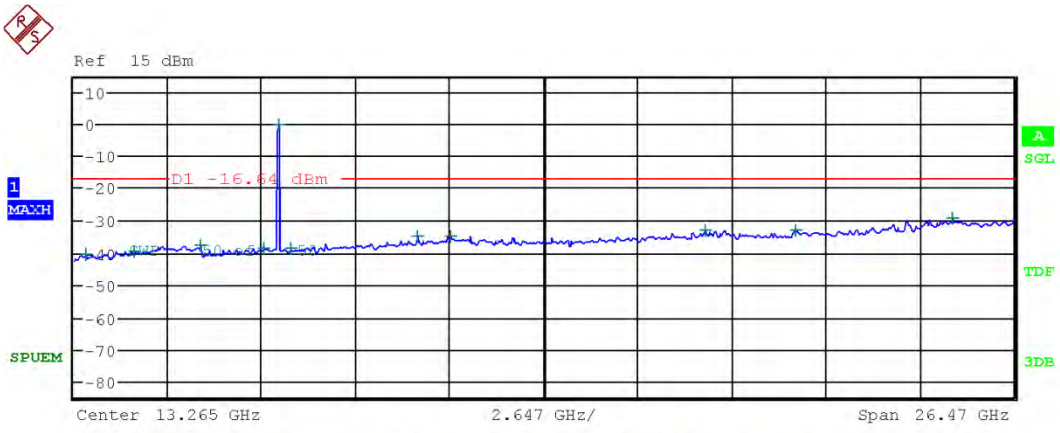
Reference for limit

Test Mode: 802.11a & Ch.157 & Chain 1



Conducted Spurious Emissions

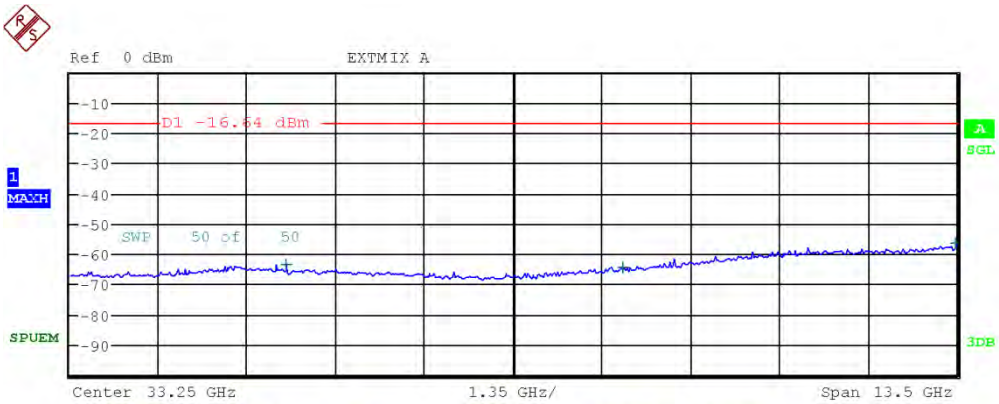
Test Mode: 802.11a & Ch.157 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	359.412000 M	-40.51	-200.00
1.000 G	2.000 G	100.00 k	1.737000 G	-39.58	-200.00
2.000 G	5.000 G	100.00 k	3.595625 G	-37.69	-200.00
5.000 G	5.725 G	100.00 k	5.388600 G	-38.64	-200.00
5.725 G	5.850 G	100.00 k	5.787475 G	-0.33	-200.00
5.850 G	6.500 G	100.00 k	6.137806 G	-38.54	-200.00
6.500 G	10.000 G	100.00 k	9.706000 G	-35.18	-200.00
10.000 G	14.000 G	100.00 k	10.626000 G	-34.92	-200.00
14.000 G	18.000 G	100.00 k	17.818500 G	-33.32	-200.00
18.000 G	22.000 G	100.00 k	20.367500 G	-33.00	-200.00
22.000 G	26.500 G	100.00 k	24.759062 G	-29.26	-200.00

Conducted Spurious Emissions

Test Mode: 802.11a & Ch.157 & Chain 1



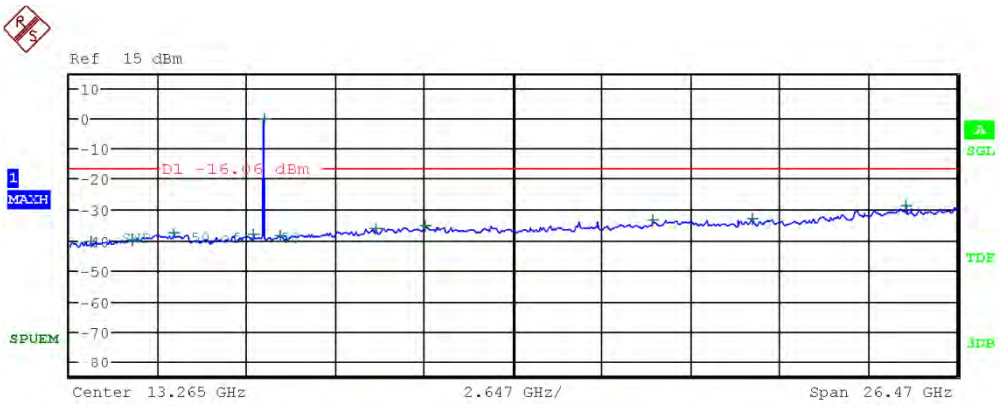
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
26.500 G	30.000 G	100.00 k	29.779500 G	-63.68	-200.00
30.000 G	35.000 G	100.00 k	34.918000 G	-64.50	-200.00
35.000 G	40.000 G	100.00 k	39.989000 G	-56.78	-200.00

High Band-edge at 20 dB blow

Test Mode: 802.11a & Ch.165 & Chain 1

Conducted Spurious Emissions

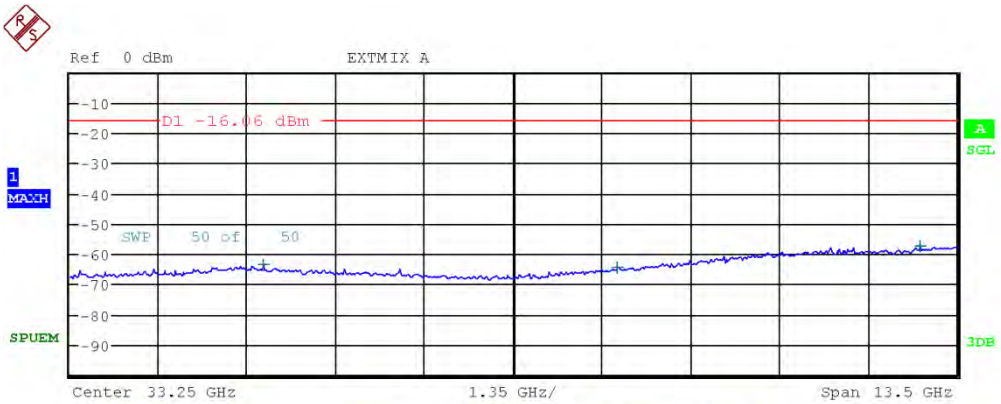
Test Mode: 802.11a & Ch.165 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	100.00 k	668.842000 M	-40.41	-200.00
1.000 G	2.000 G	100.00 k	1.911200 G	-40.04	-200.00
2.000 G	5.000 G	100.00 k	3.116000 G	-38.01	-200.00
5.000 G	5.725 G	100.00 k	5.517892 G	-38.30	-200.00
5.725 G	5.850 G	100.00 k	5.827475 G	-0.45	-200.00
5.850 G	6.500 G	100.00 k	6.297272 G	-38.75	-200.00
6.500 G	10.000 G	100.00 k	9.138563 G	-36.22	-200.00
10.000 G	14.000 G	100.00 k	10.625500 G	-35.58	-200.00
14.000 G	18.000 G	100.00 k	17.433000 G	-33.72	-200.00
18.000 G	22.000 G	100.00 k	20.407000 G	-33.12	-200.00
22.000 G	26.500 G	100.00 k	24.975063 G	-28.87	-200.00

Conducted Spurious Emissions

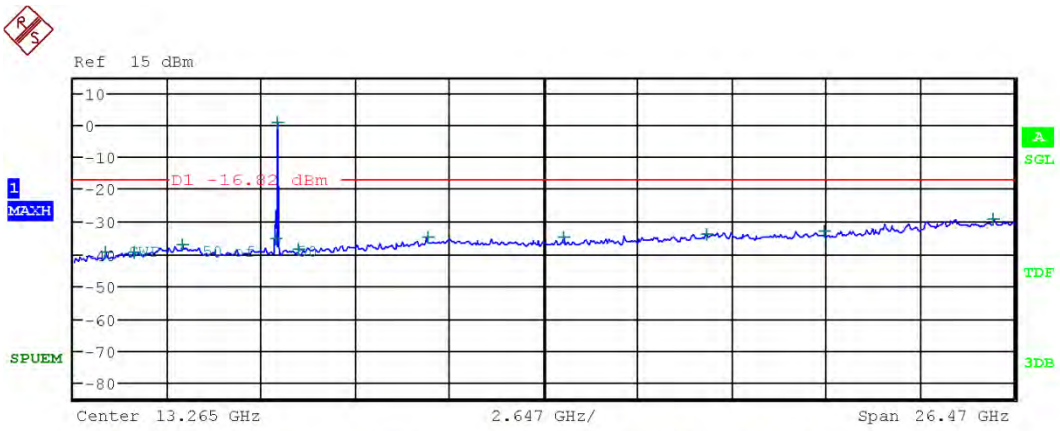
Test Mode: 802.11a & Ch.165 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
26.500 G	30.000 G	100.00 k	29.444200 G	-63.78	-200.00
30.000 G	35.000 G	100.00 k	34.834000 G	-64.61	-200.00
35.000 G	40.000 G	100.00 k	39.443000 G	-57.57	-200.00

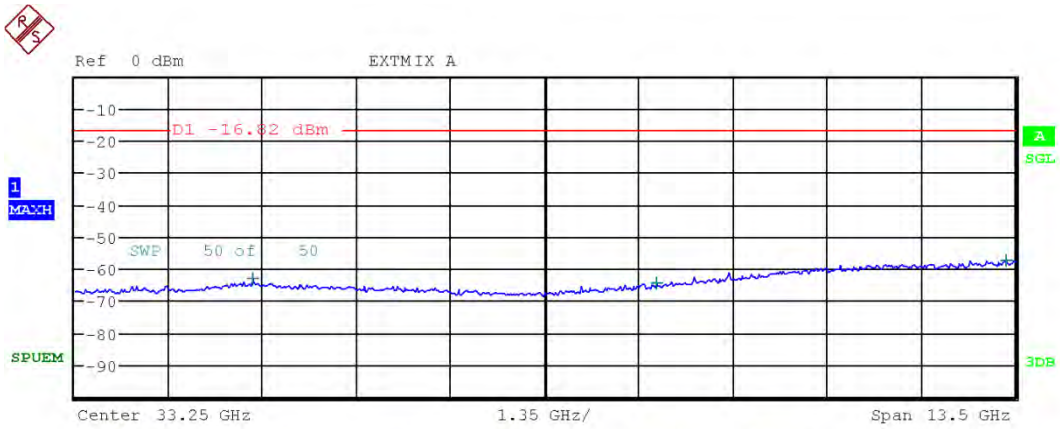
Low Band-edge at 20 dB blow Test Mode: 802.11n HT20 & Ch.149 & Chain 1

Conducted Spurious Emissions Test Mode: 802.11n HT20 & Ch.149 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	916.774000 M	-39.65	-200.00
1.000 G	2.000 G	100.00 k	1.742400 G	-39.90	-200.00
2.000 G	5.000 G	100.00 k	3.065000 G	-37.56	-200.00
5.000 G	5.725 G	100.00 k	5.721858 G	-35.54	-200.00
5.725 G	5.850 G	100.00 k	5.746200 G	0.48	-200.00
5.850 G	6.500 G	100.00 k	6.348694 G	-38.57	-200.00
6.500 G	10.000 G	100.00 k	9.985563 G	-35.07	-200.00
10.000 G	14.000 G	100.00 k	13.836000 G	-34.80	-200.00
14.000 G	18.000 G	100.00 k	17.841500 G	-34.02	-200.00
18.000 G	22.000 G	100.00 k	21.170500 G	-33.15	-200.00
22.000 G	26.500 G	100.00 k	25.922875 G	-29.14	-200.00

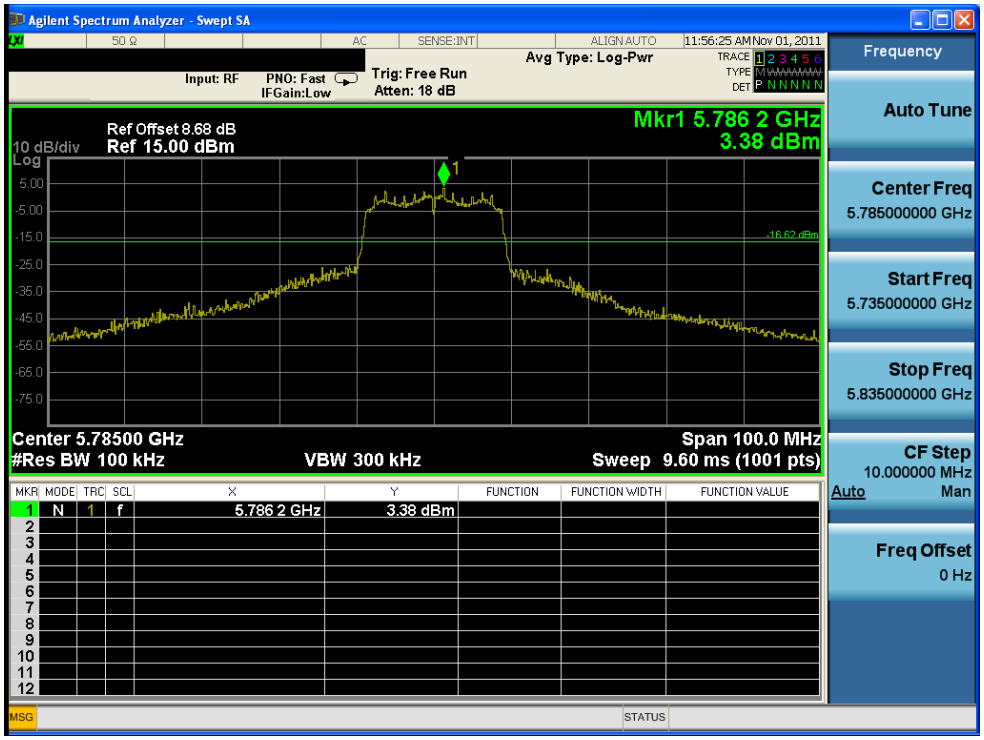
Conducted Spurious Emissions Test Mode: 802.11n HT20 & Ch.149 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
26.500 G	30.000 G	100.00 k	29.043100 G	-63.29	-200.00
30.000 G	35.000 G	100.00 k	34.848000 G	-64.74	-200.00
35.000 G	40.000 G	100.00 k	39.869000 G	-57.48	-200.00

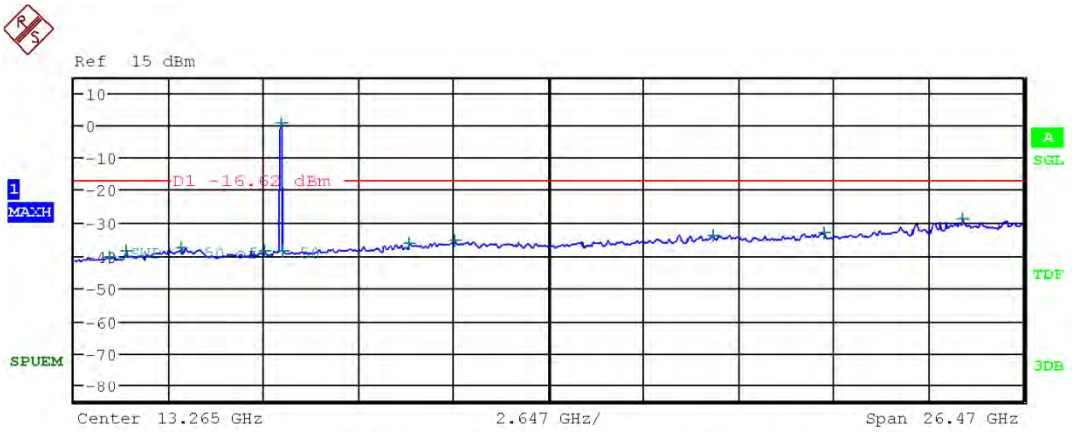
Reference for limit

Test Mode: 802.11n HT20 & Ch.157 & Chain 1



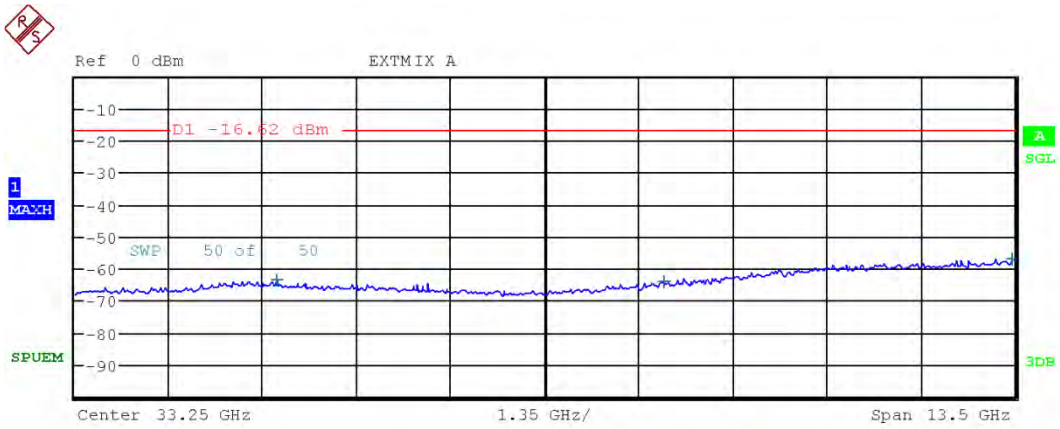
Conducted Spurious Emissions

Test Mode: 802.11n HT20 & Ch.157 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	989.718000 M	-40.62	-200.00
1.000 G	2.000 G	100.00 k	1.472800 G	-38.94	-200.00
2.000 G	5.000 G	100.00 k	2.995250 G	-37.69	-200.00
5.000 G	5.725 G	100.00 k	5.314328 G	-38.54	-200.00
5.725 G	5.850 G	100.00 k	5.778725 G	0.58	-200.00
5.850 G	6.500 G	100.00 k	5.856211 G	-38.87	-200.00
6.500 G	10.000 G	100.00 k	9.359937 G	-36.28	-200.00
10.000 G	14.000 G	100.00 k	10.647500 G	-35.57	-200.00
14.000 G	18.000 G	100.00 k	17.852500 G	-33.97	-200.00
18.000 G	22.000 G	100.00 k	20.945500 G	-33.18	-200.00
22.000 G	26.500 G	100.00 k	24.812500 G	-28.86	-200.00

Conducted Spurious Emissions Test Mode: 802.11n HT20 & Ch.157 & Chain 1



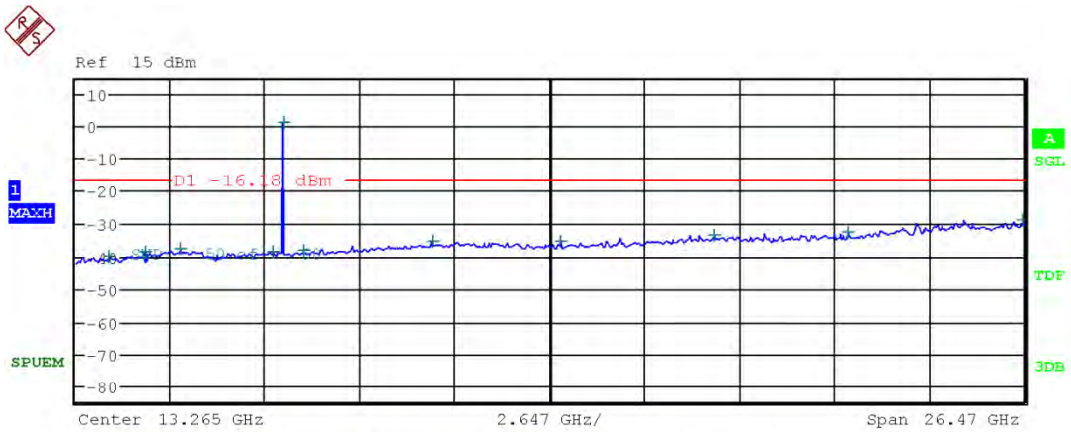
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
26.500 G	30.000 G	100.00 k	29.394500 G	-63.68	-200.00
30.000 G	35.000 G	100.00 k	34.952000 G	-64.16	-200.00
35.000 G	40.000 G	100.00 k	39.958000 G	-56.81	-200.00

High Band-edge at 20 dB blow

Test Mode: 802.11n HT20 & Ch.165 & Chain 1

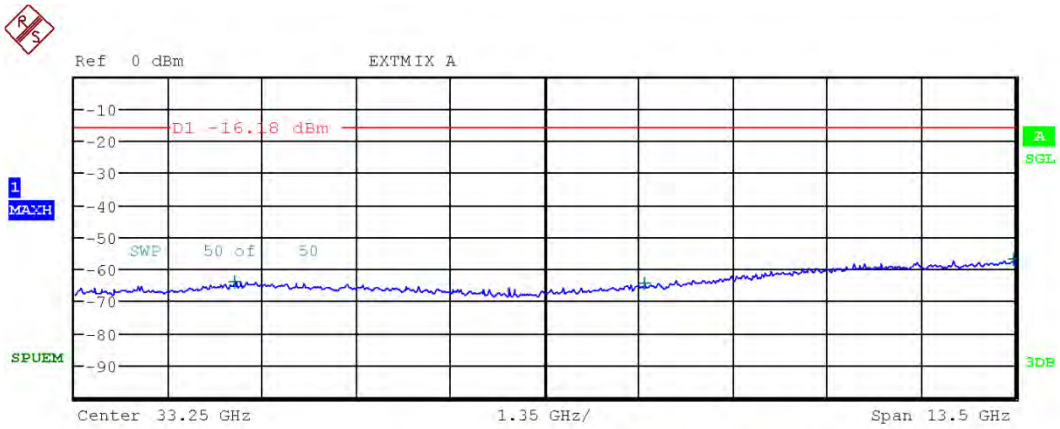
Conducted Spurious Emissions

Test Mode: 802.11n HT20 & Ch.165 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	1.000 G	100.00 k	955.186000 M	-40.21	-200.00
1.000 G	2.000 G	100.00 k	1.963000 G	-38.62	-200.00
2.000 G	5.000 G	100.00 k	2.946500 G	-38.01	-200.00
5.000 G	5.725 G	100.00 k	5.543025 G	-38.61	-200.00
5.725 G	5.850 G	100.00 k	5.826250 G	1.05	-200.00
5.850 G	6.500 G	100.00 k	6.373033 G	-38.28	-200.00
6.500 G	10.000 G	100.00 k	9.994750 G	-35.56	-200.00
10.000 G	14.000 G	100.00 k	13.541500 G	-35.66	-200.00
14.000 G	18.000 G	100.00 k	17.836000 G	-33.51	-200.00
18.000 G	22.000 G	100.00 k	21.572500 G	-32.89	-200.00
22.000 G	26.500 G	100.00 k	26.462312 G	-28.97	-200.00

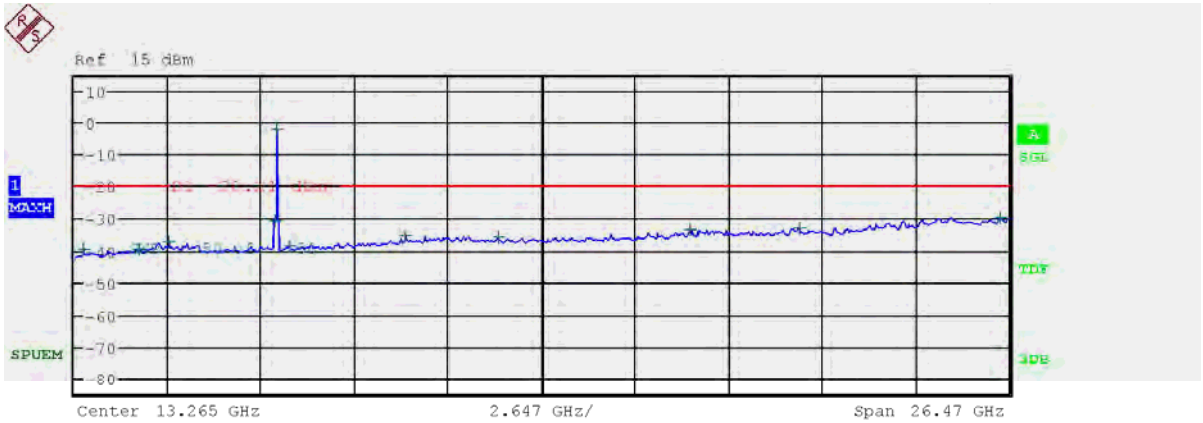
Conducted Spurious Emissions Test Mode: 802.11n HT20 & Ch.165 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
26.500 G	30.000 G	100.00 k	28.800200 G	-64.00	-200.00
30.000 G	35.000 G	100.00 k	34.675000 G	-64.46	-200.00
35.000 G	40.000 G	100.00 k	39.970000 G	-57.08	-200.00

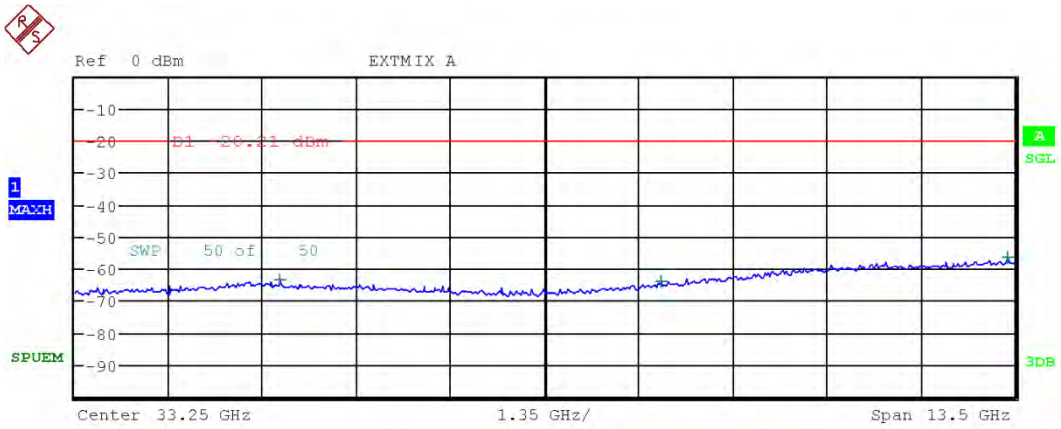
Low Band-edge at 20 dB blow Test Mode: 802.11n HT40 & Ch.151 & Chain 1

Conducted Spurious Emissions Test Mode: 802.11n HT40 & Ch.151 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	266.680000 M	-39.82	-200.00
1.000 G	2.000 G	100.00 k	1.872200 G	-39.58	-200.00
2.000 G	5.000 G	100.00 k	2.706500 G	-37.32	-200.00
5.000 G	5.725 G	100.00 k	5.714367 G	-30.80	-200.00
5.725 G	5.850 G	100.00 k	5.757475 G	-2.15	-200.00
5.850 G	6.500 G	100.00 k	6.146689 G	-38.76	-200.00
6.500 G	10.000 G	100.00 k	9.395812 G	-35.35	-200.00
10.000 G	14.000 G	100.00 k	12.020000 G	-35.75	-200.00
14.000 G	18.000 G	100.00 k	17.485000 G	-33.47	-200.00
18.000 G	22.000 G	100.00 k	20.577000 G	-32.96	-200.00
22.000 G	26.500 G	100.00 k	26.239563 G	-29.78	-200.00

Conducted Spurious Emissions Test Mode: 802.11n HT40 & Ch.151 & Chain 1



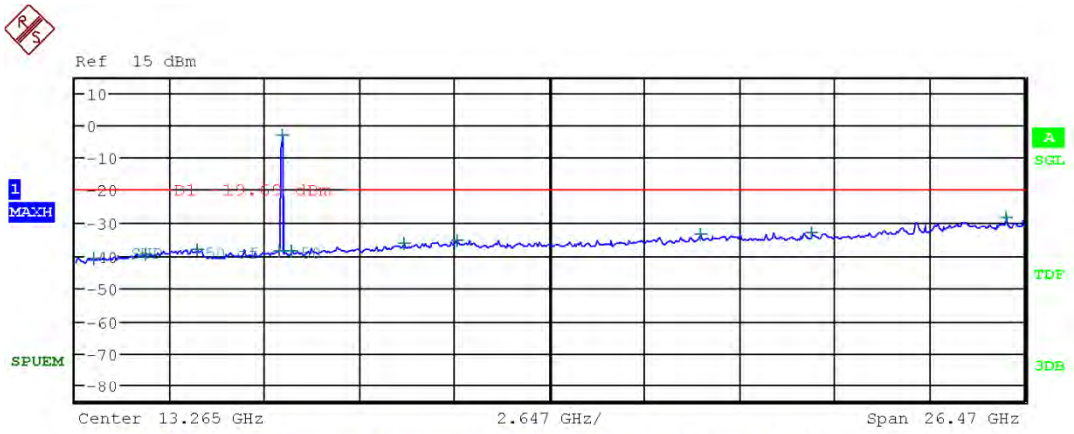
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
26.500 G	30.000 G	100.00 k	29.447000 G	-63.81	-200.00
30.000 G	35.000 G	100.00 k	34.914000 G	-64.28	-200.00
35.000 G	40.000 G	100.00 k	39.895000 G	-56.75	-200.00

High Band-edge at 20 dB blow

Test Mode: 802.11n HT40 & Ch.159 & Chain 1

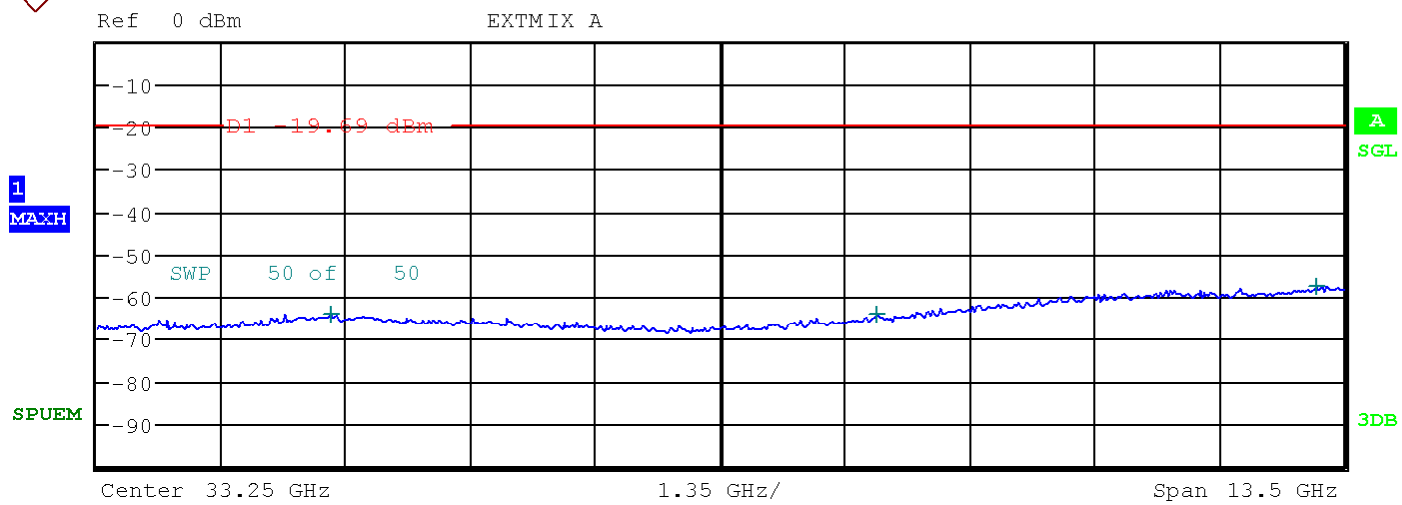
Conducted Spurious Emissions

Test Mode: 802.11n HT40 & Ch.159 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	1.000 G	100.00 k	558.844000 M	-40.89	-200.00
1.000 G	2.000 G	100.00 k	1.965600 G	-39.55	-200.00
2.000 G	5.000 G	100.00 k	3.436625 G	-38.24	-200.00
5.000 G	5.725 G	100.00 k	5.708567 G	-38.98	-200.00
5.725 G	5.850 G	100.00 k	5.792525 G	-2.92	-200.00
5.850 G	6.500 G	100.00 k	6.058217 G	-38.78	-200.00
6.500 G	10.000 G	100.00 k	9.212500 G	-36.48	-200.00
10.000 G	14.000 G	100.00 k	10.665000 G	-35.31	-200.00
14.000 G	18.000 G	100.00 k	17.456500 G	-33.65	-200.00
18.000 G	22.000 G	100.00 k	20.555500 G	-32.94	-200.00
22.000 G	26.500 G	100.00 k	25.975750 G	-28.62	-200.00

Conducted Spurious Emissions Test Mode: 802.11n HT40 & Ch.159 & Chain 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
26.500 G	30.000 G	100.00 k	29.030500 G	-64.02	-200.00
30.000 G	35.000 G	100.00 k	34.944000 G	-64.04	-200.00
35.000 G	40.000 G	100.00 k	39.706000 G	-57.29	-200.00

3.2.4 Out of band Emission – Radiated

- Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:
Frequency Range = 30 MHz ~ 10th harmonic for 2.4G or 40 GHz for 5 G band
RBW and VBW = 1. Frequency range: 30MHz ~ 1GHz
RBW = 120KHz / VBW = ≥ RBW
2. Frequency range: 1GHz ~ 10th harmonics or 40 GHz
Peak mode: RBW = 1MHz / VBW = ≥ RBW
Average mode: RBW = 1MHz / VBW = 10Hz
Detector function = Peak Sweep = auto
Trace = max hold

- Measurement Data: Comply

Note 1: This test item was performed in each axis and the worst case data were reported

- Minimum Standard:

▪ **FCC Part 15.209(a) and (b)**

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

▪ **FCC Part 15.205 (a):** Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	3600 ~ 4400	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	4.5 ~ 5.15	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~	149.9 ~ 150.05	1645.5 ~ 1646.5	5.35 ~ 5.46	17.7 ~ 21.4
4.125 ~ 4.128	12.52025	156.52475 ~	1660 ~ 1710	7.25 ~ 7.75	22.01 ~ 23.12
4.17725 ~ 4.17775	12.57675 ~	156.52525	1718.8 ~ 1722.2	8.025 ~ 8.5	23.6 ~ 24.0
4.20725 ~ 4.20775	12.57725	156.7 ~ 156.9	2200 ~ 2300	9.0 ~ 9.2	31.2 ~ 31.8
6.215 ~ 6.218	13.36 ~ 13.41	162.0125 ~ 167.17	2310 ~ 2390	9.3 ~ 9.5	36.43 ~ 36.5
6.26775 ~ 6.26825	16.42 ~ 16.423	167.72 ~ 173.2	2483.5 ~ 2500	10.6 ~ 12.7	Above 38.6
6.31175 ~ 6.31225	16.69475 ~	240 ~ 285	2655 ~ 2900	13.25 ~ 13.4	
8.291 ~ 8.294	16.69525	322 ~ 335.4	3260 ~ 3267		
8.362 ~ 8.366	16.80425 ~	399.90 ~ 410	3332 ~ 3339		
8.37625 ~ 8.38675	16.80475	608 ~ 614	3345.8 ~ 3358		
	25.5 ~ 25.67	960 ~ 1240			
	37.5 ~ 38.25				
	73 ~ 74.6				
	74.8 ~ 75.2				

▪ **FCC Part 15.205(b):** The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

30MHz ~ 25GHz Radiated Spurious Emissions & 802.11b & Chain 1

▪ Ch.1

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.604	V	X axis	QP	36.70	-5.50	31.20	40.00	8.80
265.356	H	X axis	QP	50.40	-7.90	42.50	46.00	3.50
2387.920	V	Y axis	PK	55.57	-4.03	51.54	74.00	22.46
2389.920	V	Y axis	AV	44.18	-4.03	40.15	54.00	13.85
4824.070	V	Z axis	PK	51.55	6.78	58.33	74.00	15.67
4824.040	V	Z axis	AV	44.77	6.78	51.55	54.00	2.45

▪ Ch.6

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.128	V	X axis	QP	37.50	-5.60	31.90	40.00	8.10
265.340	H	X axis	QP	50.05	-7.90	42.15	46.00	3.85
4873.850	V	Z axis	PK	50.12	6.82	56.94	74.00	17.06
4874.010	V	Z axis	AV	45.25	6.82	52.07	54.00	1.93

▪ Ch.11

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
35.984	V	X	QP	36.40	-5.50	30.90	40.00	9.10
265.361	H	X	QP	48.75	-7.90	40.85	46.00	5.15
2485.230	V	Y	PK	55.87	-3.70	52.17	74.00	21.83
2483.500	V	Y	AV	43.29	-3.70	39.59	54.00	14.41
4924.150	V	Z	PK	51.04	7.15	58.19	74.00	15.81
4924.020	V	Z	AV	43.58	7.15	50.73	54.00	3.27

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. No other spurious and harmonic emissions were reported greater than listed emissions above table.
3. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

30MHz ~ 25GHz Radiated Spurious Emissions & 802.11b & Chain 0

▪ Ch.1

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
34.981	V	X axis	QP	35.30	-5.00	30.30	40.00	9.70
265.353	H	X axis	QP	50.10	-7.90	42.20	46.00	3.80
2387.760	H	Z axis	PK	56.31	-4.03	52.28	74.00	21.72
2389.920	H	Z axis	AV	45.30	-4.03	41.27	54.00	12.73
4824.060	V	Y axis	PK	47.37	6.78	54.15	74.00	19.85
4824.040	V	Y axis	AV	39.47	6.78	46.25	54.00	7.75

▪ Ch.6

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.000	V	X axis	QP	37.70	-5.60	32.10	40.00	7.90
265.360	H	X axis	QP	49.50	-7.90	41.60	46.00	4.40
4873.830	V	Y axis	PK	47.37	6.82	54.19	74.00	19.81
4824.040	V	Y axis	AV	39.47	6.82	46.29	54.00	7.71

▪ Ch.11

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.020	V	X axis	QP	36.80	-5.60	31.20	40.00	8.80
265.358	H	X axis	QP	49.70	-7.90	41.80	46.00	4.20
2484.020	V	Z axis	PK	53.16	-3.70	49.46	74.00	24.54
2483.580	V	Z axis	AV	43.60	-3.70	39.90	54.00	14.10
4923.590	H	Z axis	PK	49.59	7.15	56.74	74.00	17.26
4924.010	H	Z axis	AV	39.53	7.15	46.68	54.00	7.32

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. No other spurious and harmonic emissions were reported greater than listed emissions above table.
3. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain.

30MHz ~ 25GHz Radiated Spurious Emissions & 802.11g & Chain 1

▪ Ch.1

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.384	V	X axis	QP	37.26	-5.60	31.66	40.00	8.34
265.031	H	X axis	QP	48.98	-7.90	41.08	46.00	4.92
2388.560	V	Z axis	PK	74.35	-4.03	70.32	74.00	3.68
2390.000	V	Z axis	AV	55.70	-4.03	51.67	54.00	2.33
4821.280	V	Z axis	PK	44.17	6.78	50.95	74.00	23.05
4824.050	V	Z axis	AV	32.12	6.78	38.90	54.00	15.10

▪ Ch.6

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.286	V	X axis	QP	36.77	-5.60	31.17	40.00	8.83
265.064	H	X axis	QP	49.04	-7.90	41.14	46.00	4.86
4873.850	V	Z axis	PK	54.03	6.82	60.85	74.00	13.15
4873.450	V	Z axis	AV	38.75	6.82	45.57	54.00	8.43

▪ Ch.11

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.038	V	X	QP	38.23	-5.60	32.63	40.00	7.37
265.625	H	X	QP	50.11	-7.90	42.21	46.00	3.79
2483.540	V	Y	PK	74.29	-3.70	70.59	74.00	3.41
2483.500	V	Y	AV	54.47	-3.70	50.77	54.00	3.23
4924.280	H	Z	PK	46.98	7.15	54.13	74.00	19.87
4923.940	H	Z	AV	33.08	7.15	40.23	54.00	13.77

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. No other spurious and harmonic emissions were reported greater than listed emissions above table.
3. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain.

30MHz ~ 25GHz Radiated Spurious Emissions & 802.11g & Chain 0

▪ Ch.1

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.297	V	Y axis	QP	36.38	-5.60	30.78	40.00	9.22
265.065	H	Y axis	QP	49.90	-7.90	42.00	46.00	4.00
2389.600	V	Y axis	PK	72.00	-4.03	67.97	74.00	6.03
2388.320	V	Y axis	AV	54.80	-4.03	50.77	54.00	3.23
4819.160	H	Z axis	PK	45.80	6.78	52.58	74.00	21.42
4824.040	H	Z axis	AV	32.07	6.78	38.85	54.00	15.15

▪ Ch.6

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.271	V	Z axis	QP	35.97	-5.60	30.37	40.00	9.63
265.350	H	Z axis	QP	48.95	-7.90	41.05	46.00	4.95
4873.380	H	Z axis	PK	49.04	6.82	55.86	74.00	18.14
4874.260	H	Z axis	AV	36.45	6.82	43.27	54.00	10.73

▪ Ch.11

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
35.267	V	X axis	QP	37.90	-5.50	32.40	40.00	7.60
265.940	H	X axis	QP	49.27	-7.90	41.37	46.00	4.63
2483.810	H	Y axis	PK	73.88	-3.70	70.18	74.00	3.82
2483.500	H	Y axis	AV	55.53	-3.70	51.83	54.00	2.17
4925.020	H	Z axis	PK	45.58	7.15	52.73	74.00	21.27
4925.020	H	Z axis	AV	32.22	7.15	39.37	54.00	14.63

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. No other spurious and harmonic emissions were reported greater than listed emissions above table.
3. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain.

30MHz ~ 25GHz Radiated Spurious Emissions & 802.11n HT20 & 2TX (Chain 0, 1)

▪ Ch.1

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.028	V	X axis	QP	36.55	-5.60	30.95	40.00	9.05
265.362	V	X axis	QP	49.84	-7.90	41.94	46.00	4.06
2388.960	H	Y axis	PK	75.93	-4.03	71.90	74.00	2.10
2390.000	H	Y axis	AV	56.14	-4.03	52.11	54.00	1.89
2492.910	V	X axis	PK	66.91	-3.65	63.26	74.00	10.74
2492.910	V	X axis	AV	54.16	-3.65	50.51	54.00	3.49
4825.170	V	Z axis	PK	46.13	6.28	52.41	74.00	21.59
4824.030	V	Z axis	AV	32.53	6.58	39.11	54.00	14.89

▪ Ch.6

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
35.694	V	X axis	QP	37.03	-5.50	31.53	40.00	8.47
265.410	H	X axis	QP	49.26	-7.90	41.36	46.00	4.64
2389.840	V	Y axis	PK	67.63	-4.03	63.60	74.00	10.40
2358.800	V	Y axis	AV	53.22	-4.03	49.19	54.00	4.81
4874.180	V	Z axis	PK	51.22	6.82	58.04	74.00	15.96
4874.130	V	Z axis	AV	36.94	6.82	43.76	54.00	10.24

▪ Ch.11

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.326	V	X axis	QP	38.09	-5.00	33.09	40.00	6.91
265.654	H	X axis	QP	48.62	-7.90	40.72	46.00	5.28
2381.280	V	Y axis	PK	65.53	-4.03	61.50	74.00	12.50
2380.960	V	Y axis	AV	51.61	-4.03	47.58	54.00	6.42
2483.850	V	Y axis	PK	75.41	-3.70	71.71	74.00	2.29
2483.500	V	Y axis	AV	55.23	-3.70	51.53	54.00	2.47
4923.210	V	Z axis	PK	44.41	7.15	51.56	74.00	22.44
4924.040	V	Z axis	AV	32.96	7.15	40.11	54.00	13.89

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. No other spurious and harmonic emissions were reported greater than listed emissions above table.
3. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain.

30MHz ~ 25GHz Radiated Spurious Emissions & 802.11n HT40 & 2 TX (Chain 0, 1)

▪ Ch.3

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
35.355	V	X axis	QP	37.06	-5.50	31.56	40.00	8.44
265.388	H	X axis	QP	49.63	-7.90	41.73	46.00	4.28
2385.000	V	Y axis	PK	74.72	-4.03	70.69	74.00	3.31
2390.000	V	Y axis	AV	55.70	-4.03	51.67	54.00	2.33
4844.300	H	Z axis	PK	43.81	6.28	50.09	74.00	23.91
4844.020	H	Z axis	AV	32.89	6.28	39.17	54.00	14.83

▪ Ch.6

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.453	V	X axis	QP	36.91	-5.60	31.31	40.00	8.70
265.362	H	X axis	QP	49.85	-7.90	41.95	46.00	4.05
2390.000	H	X axis	PK	76.06	-4.03	72.03	74.00	1.97
2390.000	H	X axis	AV	55.15	-4.03	51.12	54.00	2.88
4874.100	V	Z axis	PK	46.09	6.82	52.91	74.00	21.09
4874.050	V	Z axis	AV	35.18	6.82	42.00	54.00	12.00

▪ Ch.9

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.337	V	X axis	QP	37.04	-5.00	32.04	40.00	7.96
265.394	H	X axis	QP	50.13	-7.90	42.23	46.00	3.77
2483.870	V	Y axis	PK	72.30	-3.70	68.60	74.00	5.40
2484.140	V	Y axis	AV	53.19	-3.70	49.49	54.00	4.51
4903.700	H	Z axis	PK	44.19	7.15	51.34	74.00	22.66
4904.050	H	Z axis	AV	33.32	7.15	40.47	54.00	13.53

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. No other spurious and harmonic emissions were reported greater than listed emissions above table.
3. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain.

30MHz ~ 40GHz Radiated Spurious Emissions & 802.11a & Chain 1

▪ Ch.149

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.237	V	X axis	QP	36.48	-5.60	30.88	40.00	9.12
265.325	H	X axis	QP	48.50	-7.90	40.60	46.00	5.40
11489.770	H	Y axis	PK	53.58	7.80	61.38	74.00	12.62
11490.230	H	Y axis	AV	40.43	7.80	48.23	54.00	5.77

▪ Ch.157

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.493	V	X axis	QP	37.44	-5.60	31.84	40.00	8.16
265.325	H	X axis	QP	48.87	-7.90	40.97	46.00	5.03
11570.230	H	Y axis	PK	54.76	7.72	62.48	74.00	11.52
11570.350	H	Y axis	AV	39.80	7.72	47.52	54.00	6.48

▪ Ch.165

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.483	V	X axis	QP	37.65	-5.60	32.05	40.00	7.95
265.329	H	X axis	QP	48.57	-7.90	40.67	46.00	5.33
11650.060	H	Y axis	PK	53.35	8.03	61.38	74.00	12.62
11650.020	H	Y axis	AV	38.94	8.03	46.97	54.00	7.03

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. No other spurious and harmonic emissions were reported greater than listed emissions above table.
3. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain.

   Note: The total factor above 10GHz shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1m.
   Distance extrapolation factor = 20 log (3m/1m) dB
   Above 10GHz T.F = AF + CL – AG – 9.54dB

30MHz ~ 40GHz Radiated Spurious Emissions & 802.11a & Chain 0

▪ Ch.149

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
34.575	V	X axis	QP	37.65	-5.50	32.15	40.00	7.85
265.338	H	X axis	QP	49.75	-7.90	41.85	46.00	4.16
11487.840	H	Y axis	PK	51.77	7.80	59.57	74.00	14.43
11489.690	H	Y axis	AV	37.36	7.80	45.16	54.00	8.84

▪ Ch.157

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.470	V	X axis	QP	37.95	-5.60	32.35	40.00	7.65
265.325	H	X axis	QP	49.48	-7.90	41.58	46.00	4.42
11571.360	V	Z axis	PK	51.09	7.72	58.81	74.00	15.19
11570.190	V	Z axis	AV	33.89	7.72	41.61	54.00	12.39

▪ Ch.165

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.325	V	X axis	QP	36.43	-5.60	30.83	40.00	9.17
265.325	H	X axis	QP	49.28	-7.90	41.38	46.00	4.62
11649.600	H	Z axis	PK	53.15	8.03	61.18	74.00	12.82
11650.190	H	Z axis	AV	35.84	8.03	43.87	54.00	10.13

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. No other spurious and harmonic emissions were reported greater than listed emissions above table.
3. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain.

   Note: The total factor above 10GHz shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1m.
   Distance extrapolation factor = 20 log (3m/1m) dB
   Above 10GHz T.F = AF + CL – AG – 9.54dB

30MHz ~ 40GHz Radiated Spurious Emissions & 802.11n HT20 & 2TX (Chain 0, 1)

▪ Ch.149

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
35.498	V	X axis	QP	39.30	-5.50	33.80	40.00	6.20
265.453	H	X axis	QP	49.11	-7.90	41.21	46.00	4.80
11491.200	H	Y axis	PK	53.25	7.80	61.05	74.00	12.95
11490.500	H	Y axis	AV	40.03	7.80	47.83	54.00	6.17

▪ Ch.157

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.382	V	X axis	QP	38.64	-5.60	33.04	40.00	6.96
265.362	H	X axis	QP	48.99	-7.90	41.09	46.00	4.91
11569.100	V	X axis	PK	53.77	7.72	61.49	74.00	12.51
11570.600	V	X axis	AV	37.63	7.72	45.35	54.00	8.65

▪ Ch.165

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.448	V	X axis	QP	39.10	-5.60	33.50	40.00	6.50
265.325	H	X axis	QP	47.68	-7.90	39.78	46.00	6.22
11654.050	H	Z axis	PK	54.19	8.03	62.22	74.00	11.78
11650.300	H	Z axis	AV	38.04	8.03	46.07	54.00	7.93

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. No other spurious and harmonic emissions were reported greater than listed emissions above table.
3. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain.

   Note: The total factor above 10GHz shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1m.
   Distance extrapolation factor = 20 log (3m/1m) dB
   Above 10GHz T.F = AF + CL – AG – 9.54dB

30MHz ~ 40GHz Radiated Spurious Emissions & 802.11n HT40 & 2TX (Chain 0, 1)

▪ Ch.151

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.984	V	X axis	QP	37.69	-5.60	32.09	40.00	7.91
265.435	H	X axis	QP	49.00	-7.90	41.10	46.00	4.91
11508.350	H	Y axis	PK	50.38	7.80	58.18	74.00	15.82
11508.350	H	Y axis	AV	34.84	7.80	42.64	54.00	11.36

▪ Ch.159

Frequency (MHz)	ANT Pol	The worst case EUT Position	Detector Mode	Reading (dBuV)	T.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.217	V	X axis	QP	38.10	-5.60	32.50	40.00	7.50
265.423	H	X axis	QP	48.66	-7.90	40.76	46.00	5.24
11590.800	H	Y axis	PK	50.20	7.72	57.92	74.00	16.08
11589.350	H	Y axis	AV	34.52	7.72	42.24	54.00	11.76

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. No other spurious and harmonic emissions were reported greater than listed emissions above table.
3. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain.

   Note: The total factor above 10GHz shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1m.
   Distance extrapolation factor = 20 log (3m/1m) dB
   Above 10GHz T.F = AF + CL – AG – 9.54dB

3.2.5 Transmitter Power Spectral Density

- Procedure:

The transmitter output is connected to a spectrum analyzer. Locate and zoom in on emission peak within the pass band. The maximum level in a 3 kHz bandwidth is measured with the spectrum analyzer using RBW = 3 kHz and VBW > RBW, sweep time= (Span/3 kHz). The peak level measured must be no greater than + 8 dBm.

The spectrum analyzer is set to:
Center frequency = the highest, middle and the lowest Frequencies
Span = 900 kHz
RBW = 3 kHz
VBW = ≥ RBW
Trace = max hold
Detector function = peak
Sweep = 300 S

- Measurement Data: Comply

▪ **Single transmitting data**

Mode	Channel	Frequency [MHz]	Test Result [dBm]	
			Chain 0	Chain 1
802.11b	1	2412	***-8.01***	-8.61
	6	2437	***-8.12***	-8.79
	11	2462	***-7.15***	-7.68
802.11g	1	2412	***-10.66***	-10.73
	6	2437	***-6.58***	-6.78
	11	2462	***-10.73***	-10.90
802.11a	149	5745	***-7.73***	-8.51
	157	5785	***-7.27***	-8.32
	165	5825	***-7.35***	-7.88

▪ **Multiple transmitting data**

Mode	Channel	Frequency [MHz]	Chain 0 [dBm]	Chain 1 [dBm]	Aggregate PPSD[Note1] [dBm]
802.11n HT20	1	2412	-11.11	-12.33	***-8.67***
	6	2437	-6.76	-5.74	***-3.21***
	11	2462	-10.94	-11.08	***-8.00***
802.11n HT40	3	2422	-17.54	-18.30	***-14.89***
	6	2437	-12.16	-12.41	***-9.27***
	9	2452	-16.31	-17.37	***-13.80***
802.11n HT20	149	5745	-8.23	-8.90	***-5.54***
	157	5785	-7.75	-8.65	***-5.17***
	165	5825	-7.27	-8.28	***-4.74***
802.11n HT40	151	5755	-11.59	-12.08	***-8.82***
	159	5795	-11.62	-12.08	***-8.83***

Note 1: Aggregate PPSD $=10\log\left(10^{\left(\frac{\text{chain0}}{10}\right)}+10^{\left(\frac{\text{chain1}}{10}\right)}\right)$

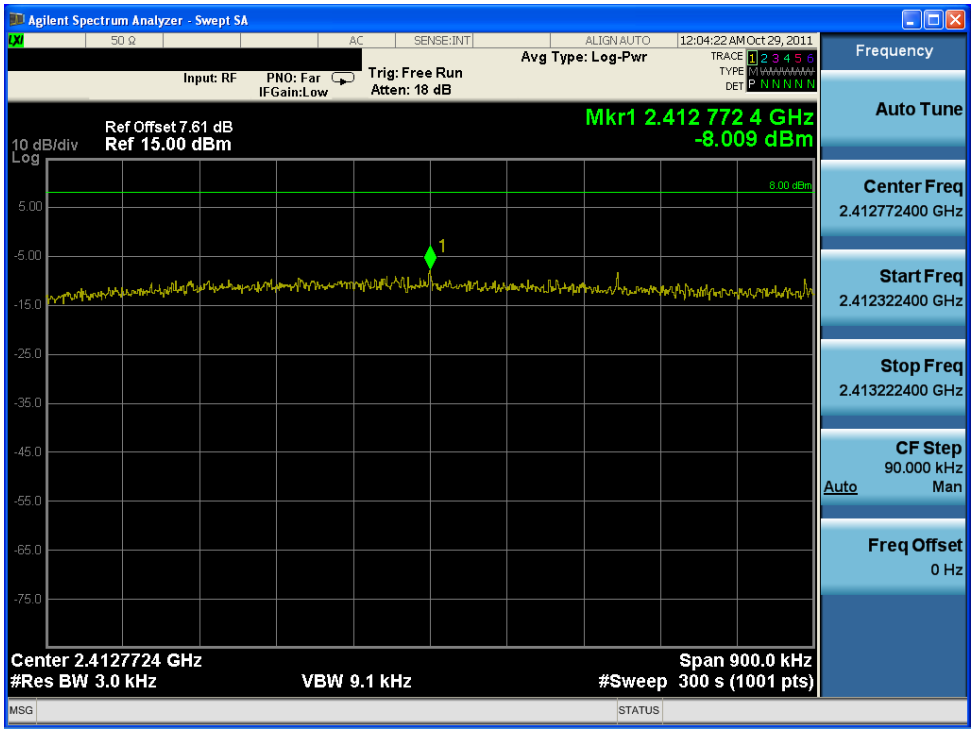
Note 2: The worst case plots in both chains are attached on next page.

- Minimum Standard:

The transmitter power density average over 1-second interval shall not be greater than 8 dBm in any 3kHz BW.

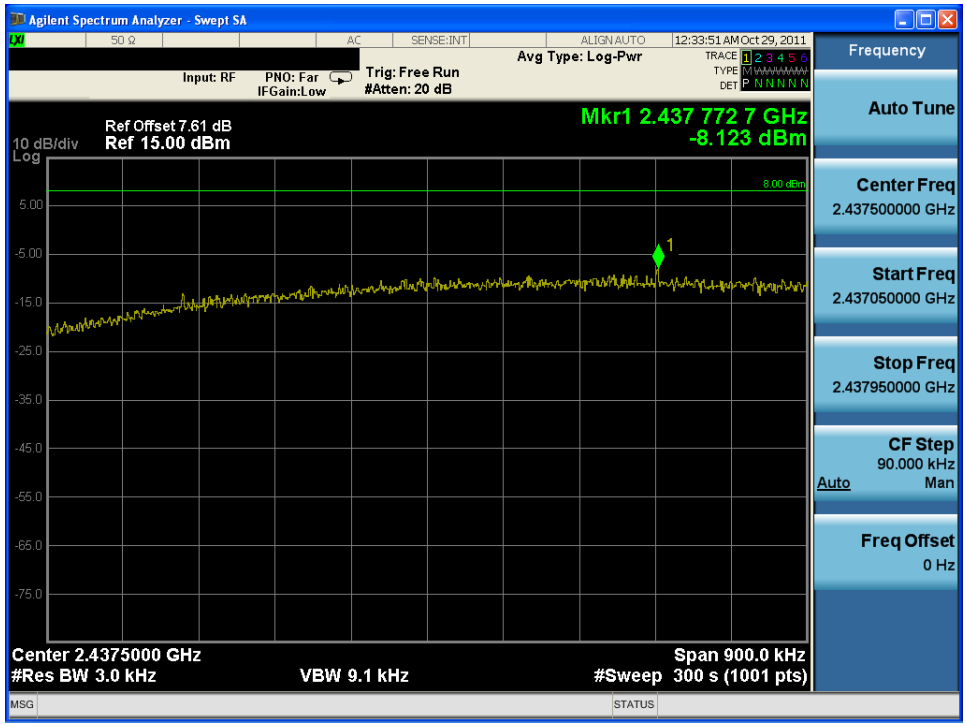
Transmitter Power Spectral Density

Test Mode: 802.11b & Ch.1 & Chain 0



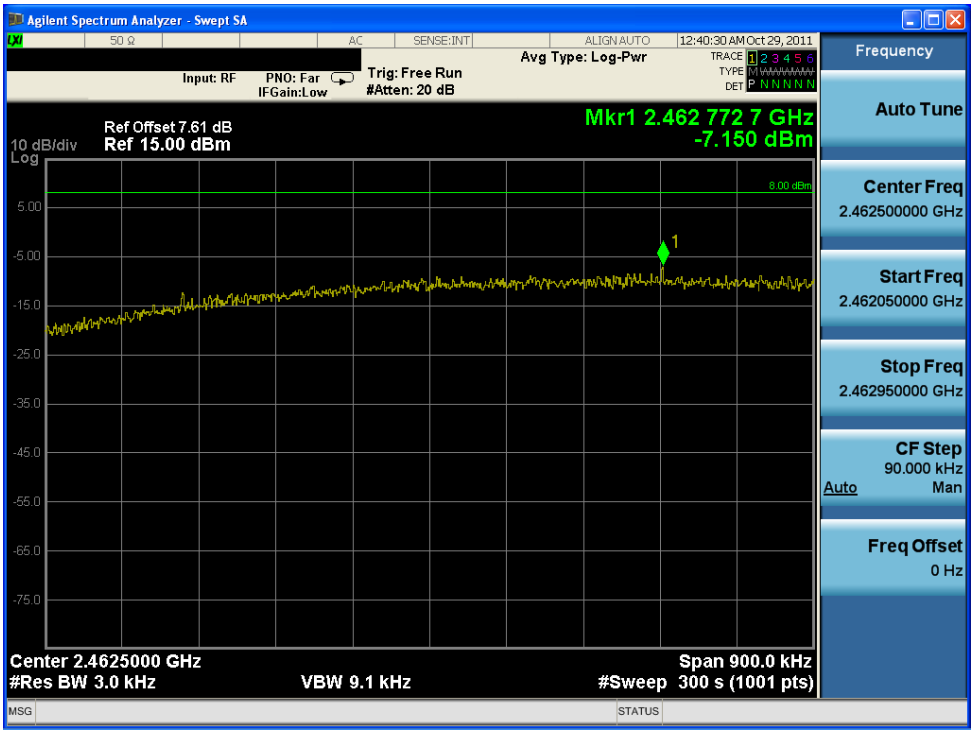
Transmitter Power Spectral Density

Test Mode: 802.11b & Ch.6 & Chain 0



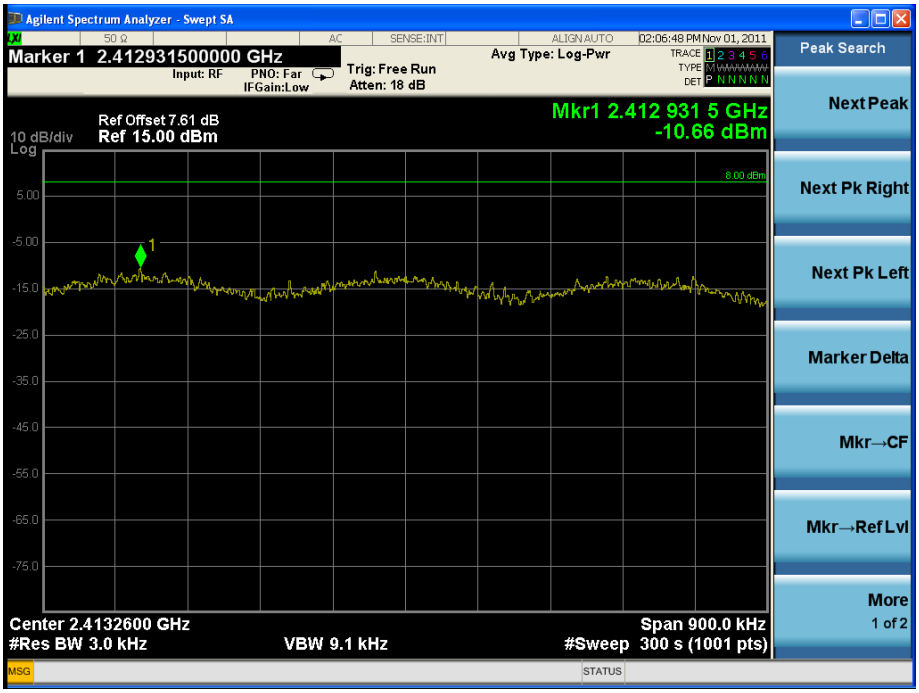
Transmitter Power Spectral Density

Test Mode: 802.11b & Ch.11 & Chain 0



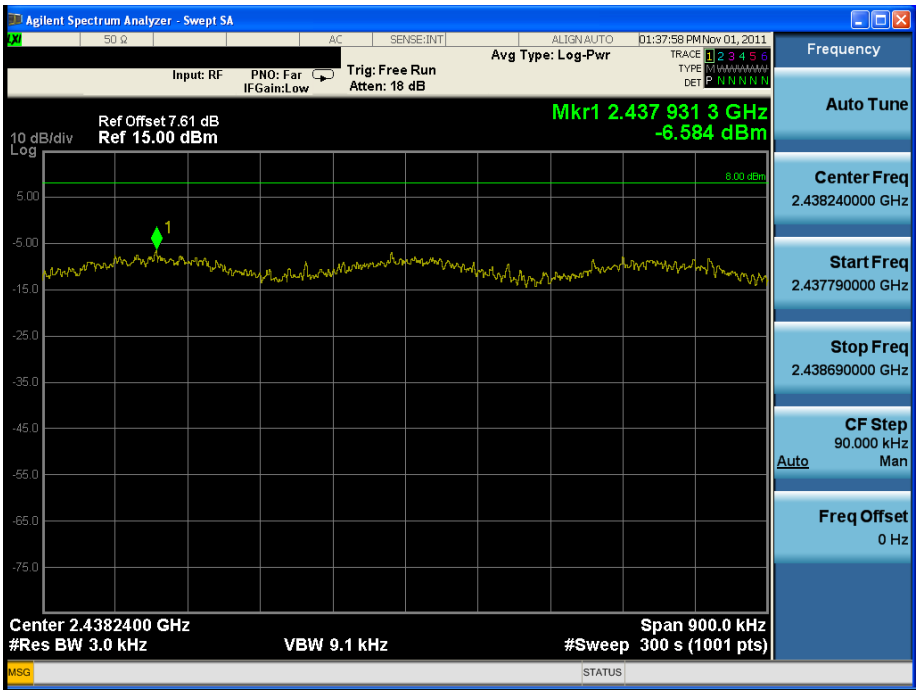
Transmitter Power Spectral Density

Test Mode: 802.11g & Ch.1 & Chain 0



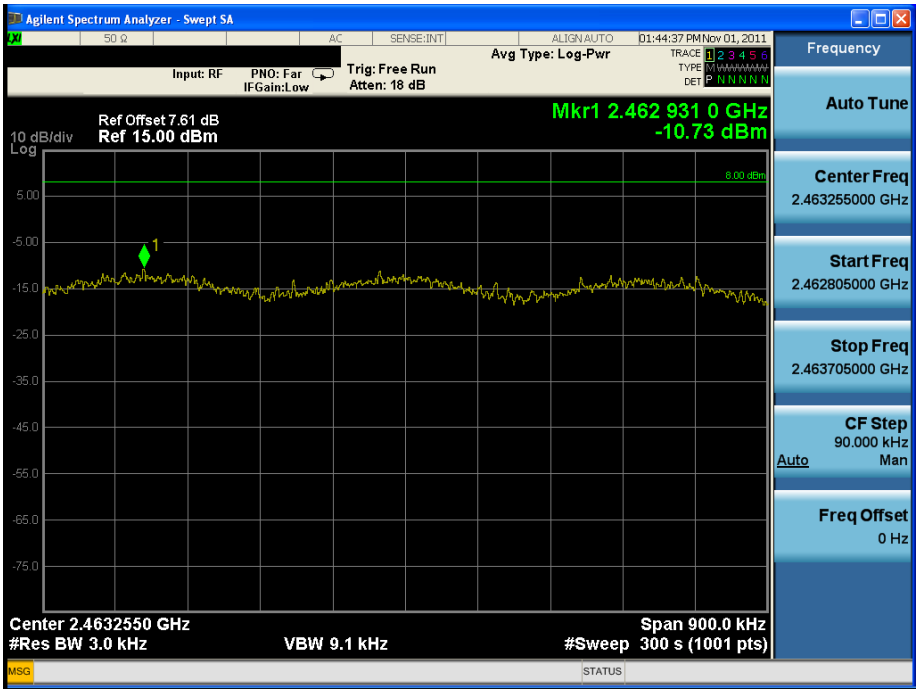
Transmitter Power Spectral Density

Test Mode: 802.11g & Ch.6 & Chain 0



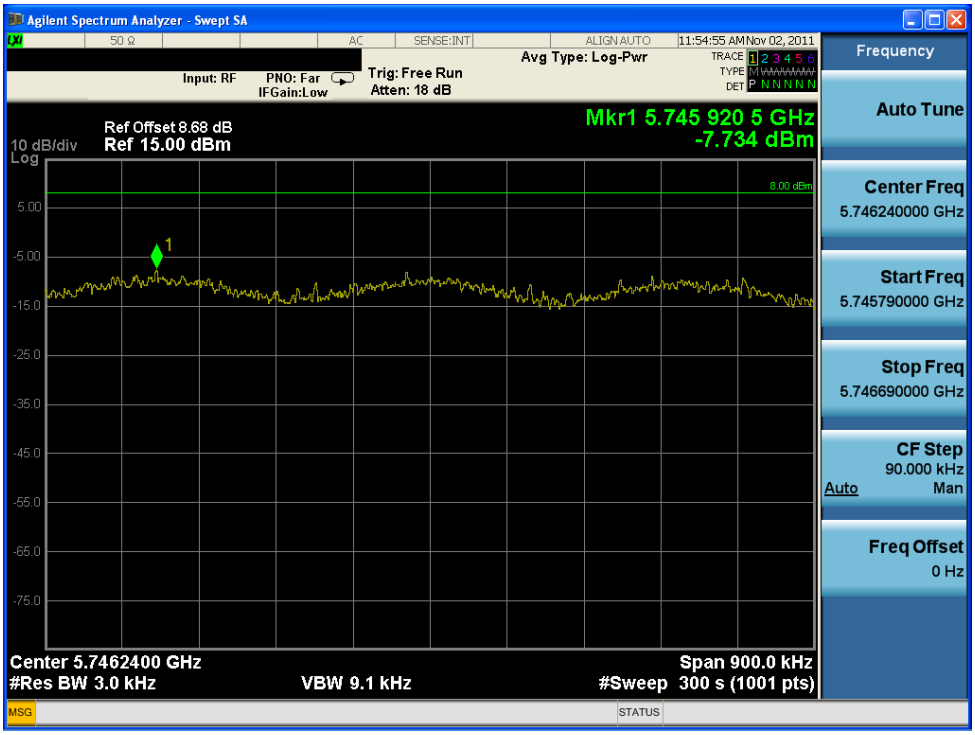
Transmitter Power Spectral Density

Test Mode: 802.11g & Ch.11 & Chain 0



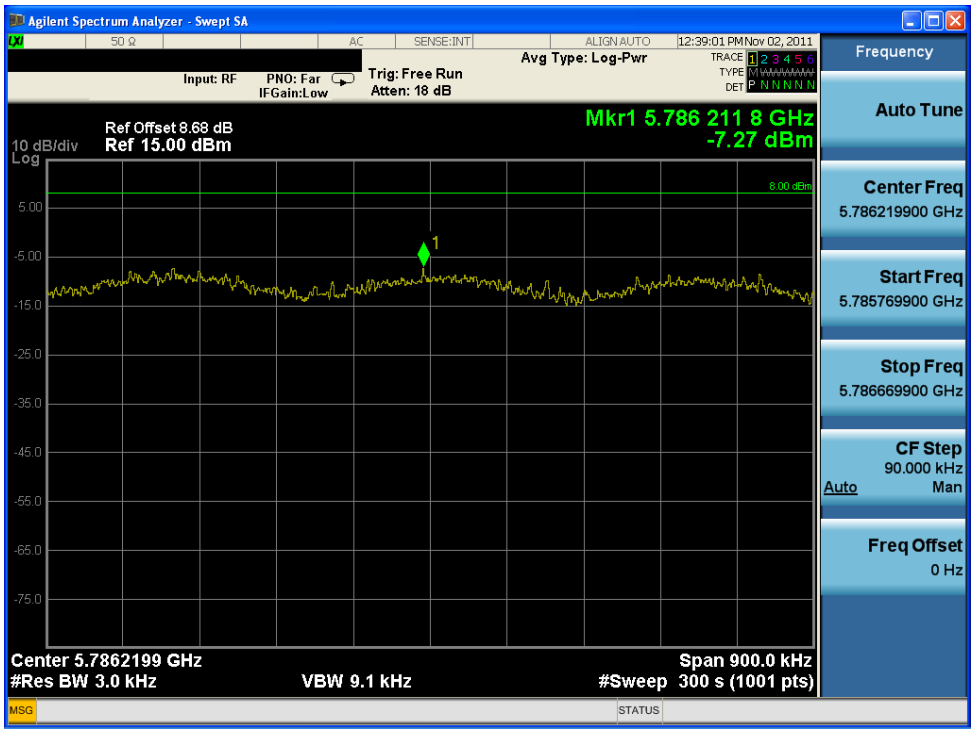
Transmitter Power Spectral Density

Test Mode: 802.11a & Ch.149 & Chain 0



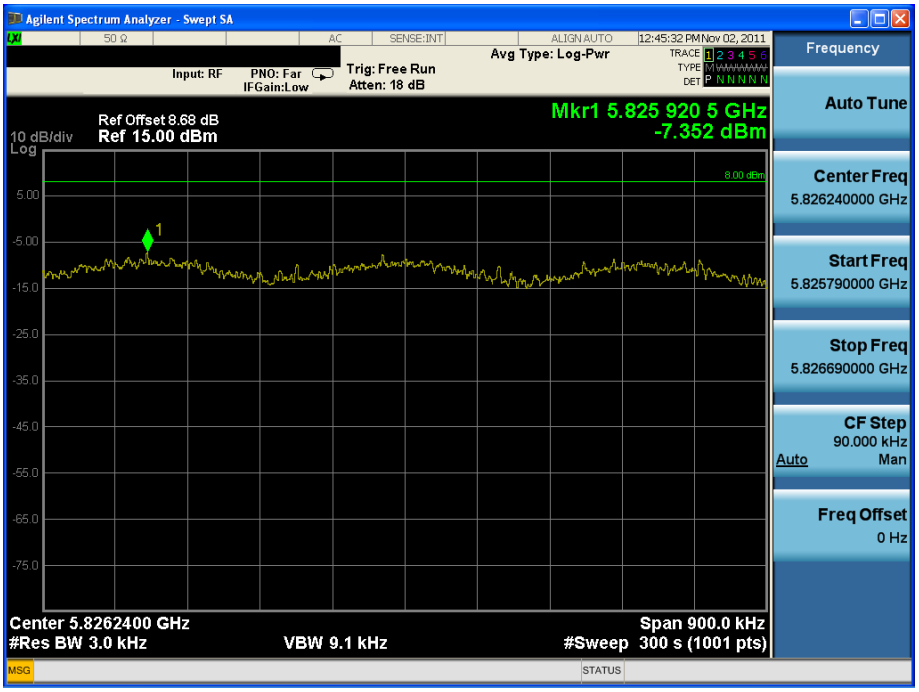
Transmitter Power Spectral Density

Test Mode: 802.11a & Ch.157 & Chain 0



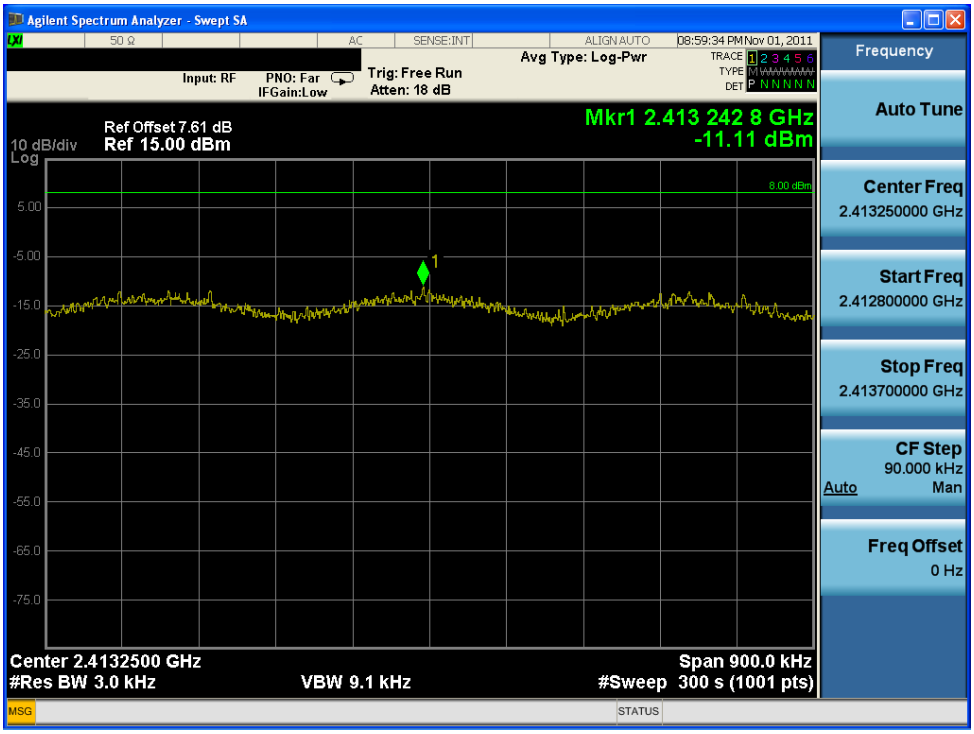
Transmitter Power Spectral Density

Test Mode: 802.11a & Ch.165 & Chain 0



Transmitter Power Spectral Density

Test Mode: 802.11n HT20 & Ch.1 & Chain 0

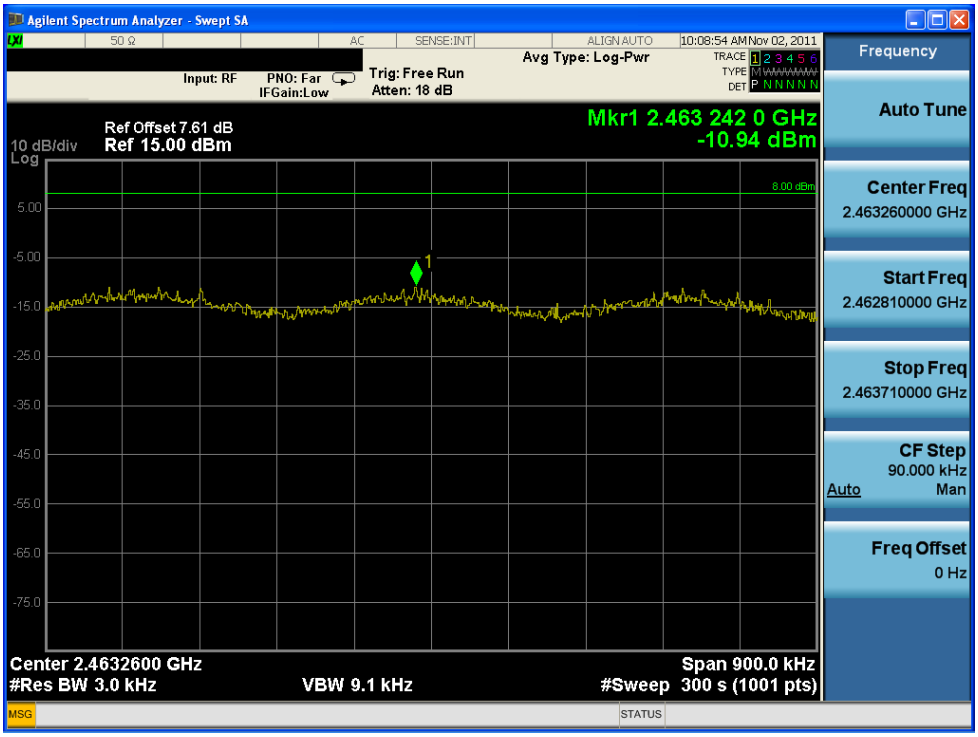


Transmitter Power Spectral Density

Test Mode: 802.11n HT20 & Ch.6 & Chain 0

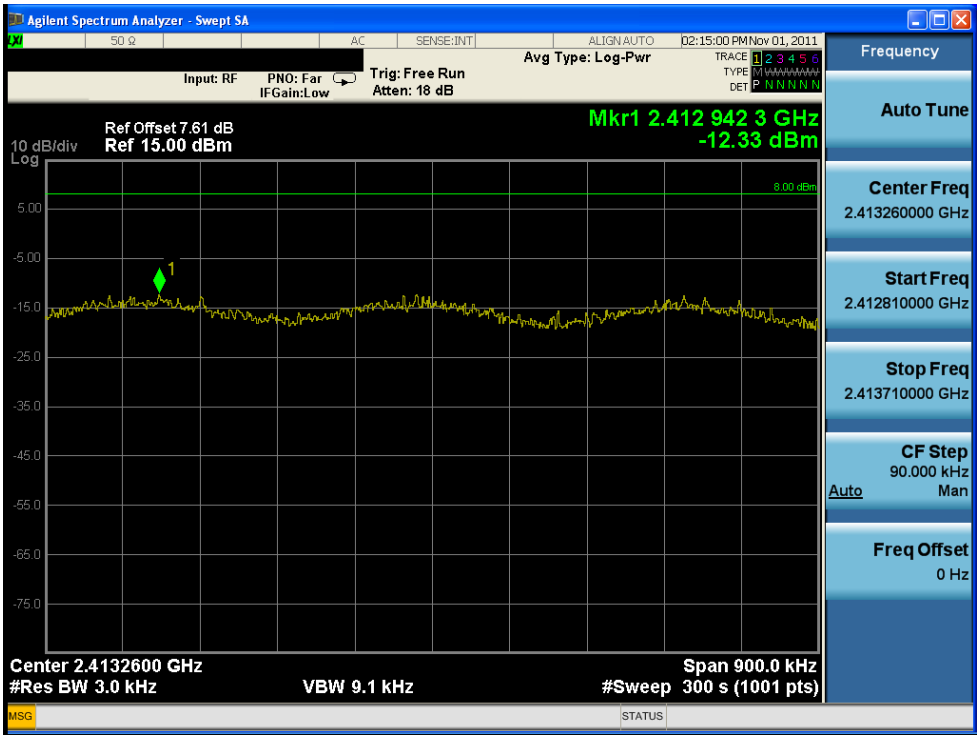
Transmitter Power Spectral Density

Test Mode: 802.11n HT20 & Ch.11 & Chain 0



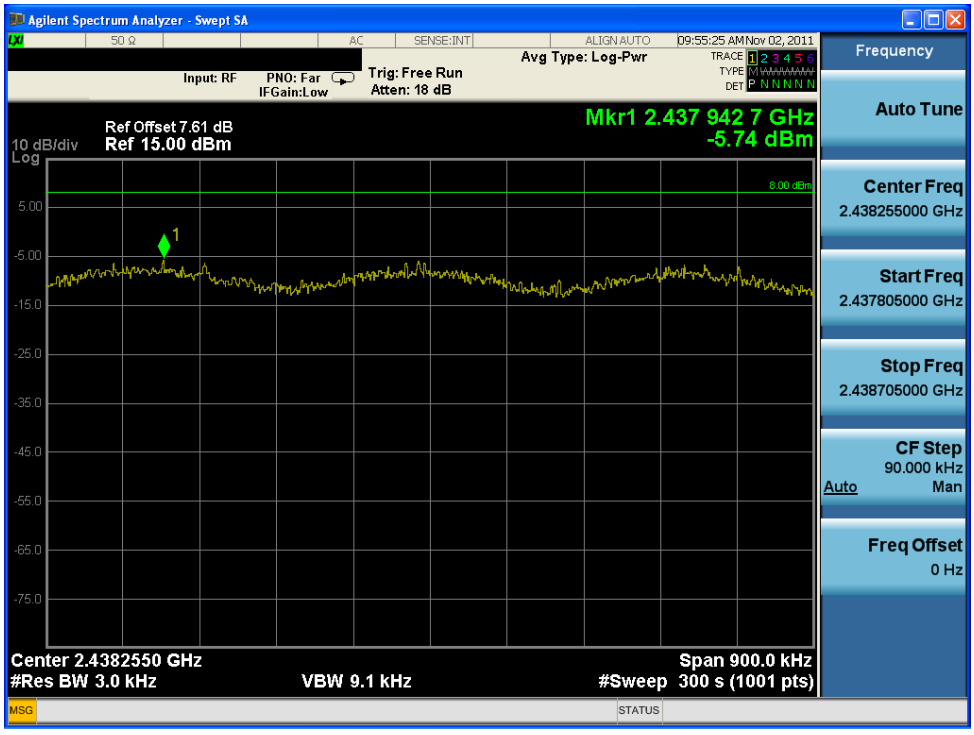
Transmitter Power Spectral Density

Test Mode: 802.11n HT20 & Ch.1 & Chain 1



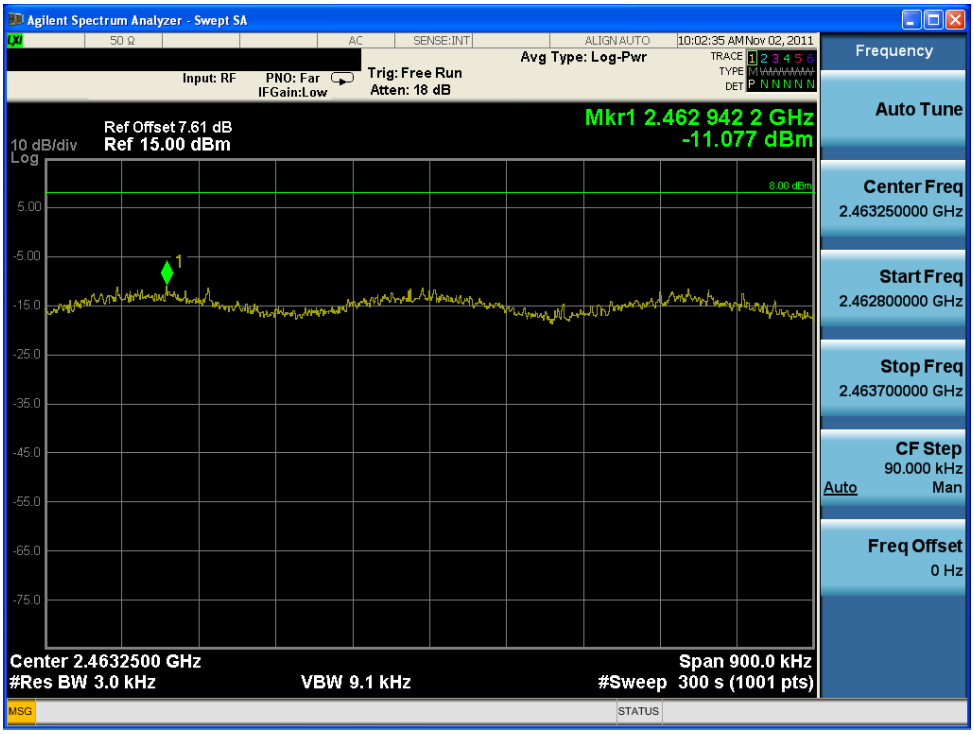
Transmitter Power Spectral Density

Test Mode: 802.11n HT20 & Ch.6 & Chain 1



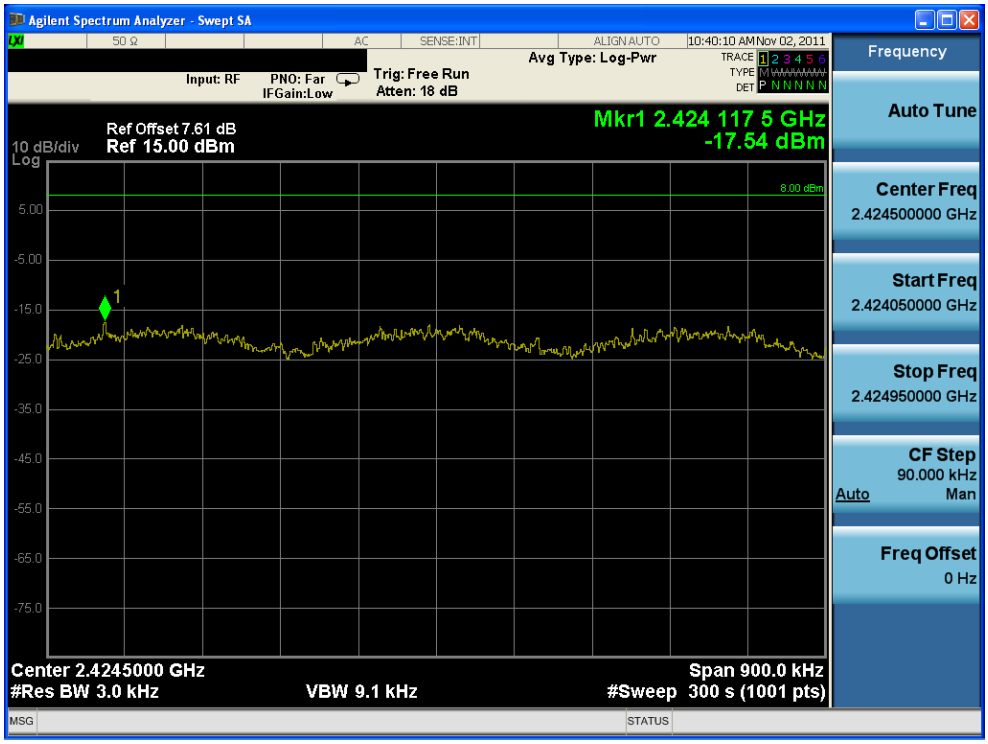
Transmitter Power Spectral Density

Test Mode: 802.11n HT20 & Ch.11 & Chain 1



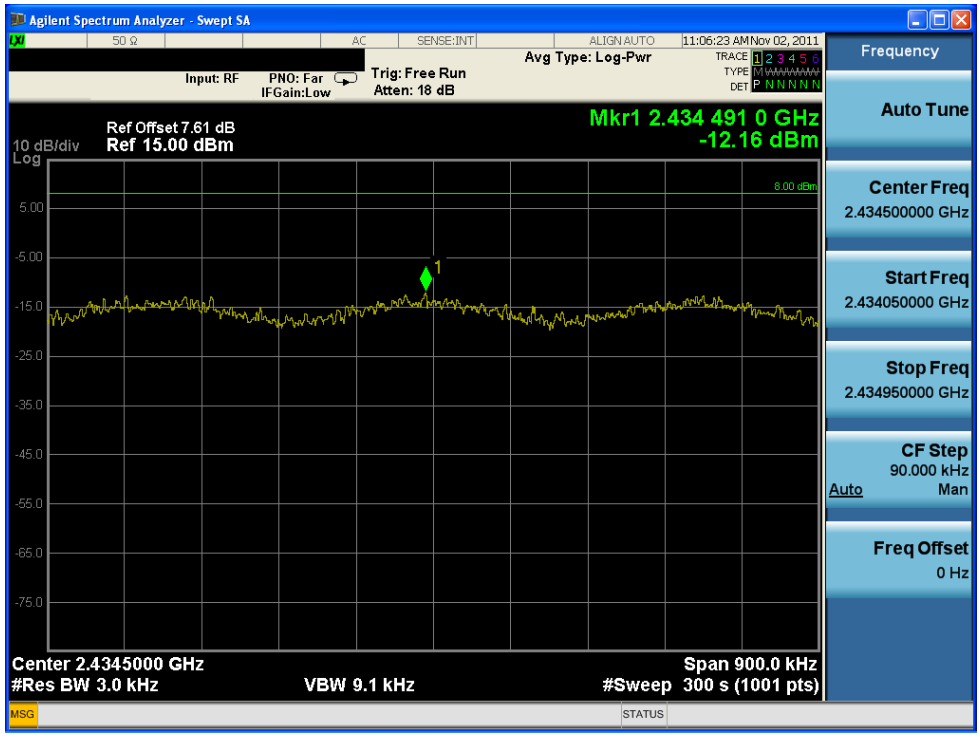
Transmitter Power Spectral Density

Test Mode: 802.11n HT40 & Ch.3 & Chain 0



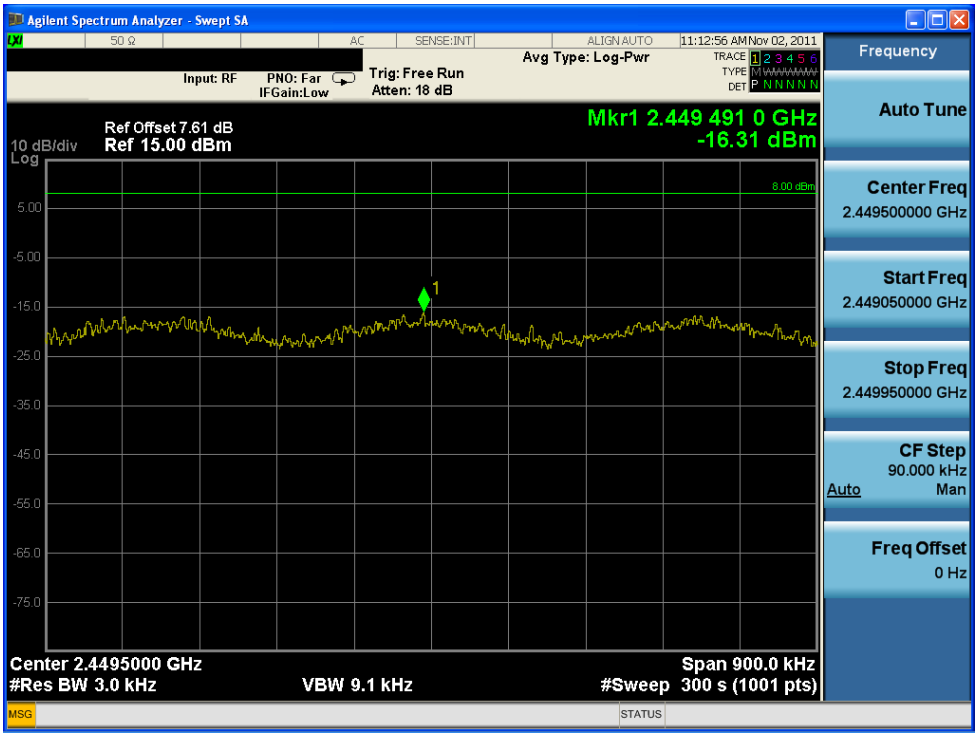
Transmitter Power Spectral Density

Test Mode: 802.11n HT40 & Ch.6 & Chain 0



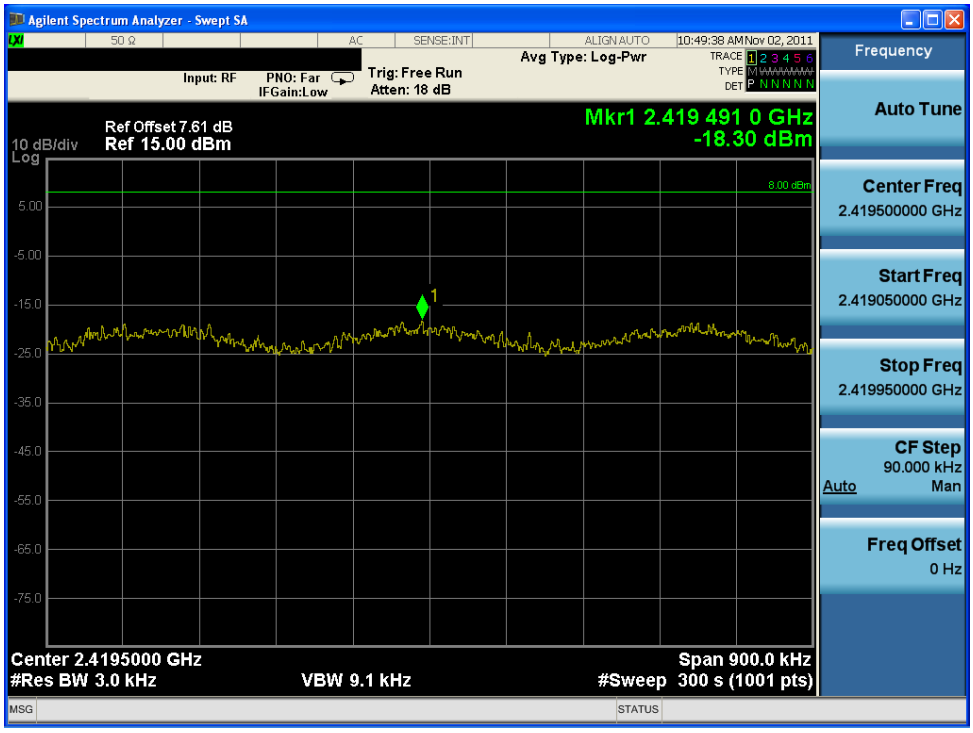
Transmitter Power Spectral Density

Test Mode: 802.11n HT40 & Ch.9 & Chain 0



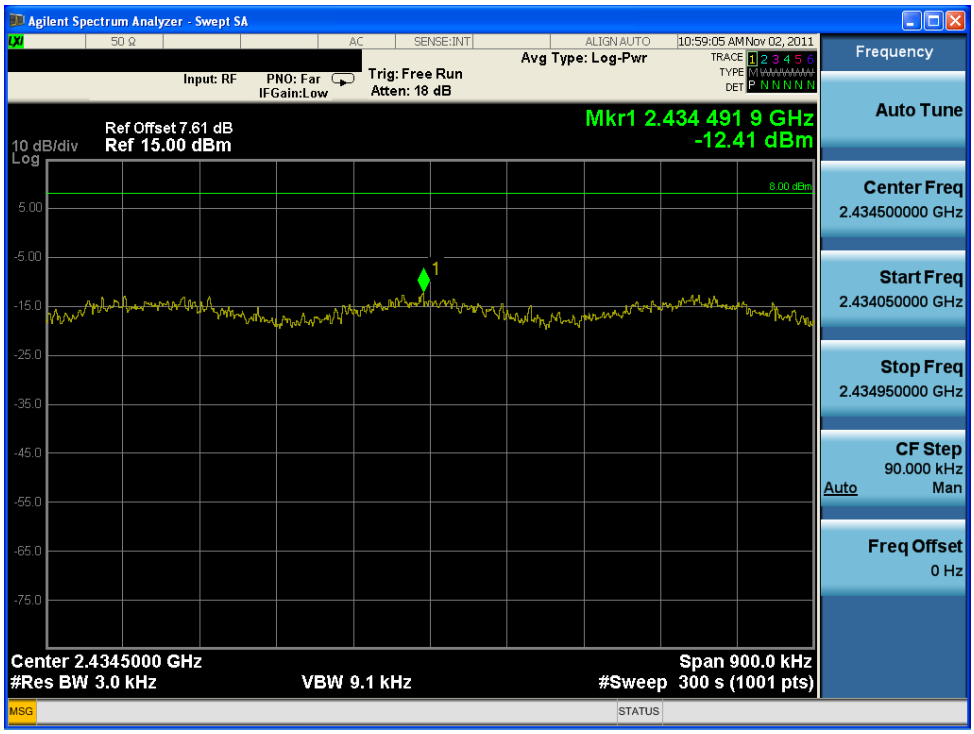
Transmitter Power Spectral Density

Test Mode: 802.11n HT40 & Ch.3 & Chain 1



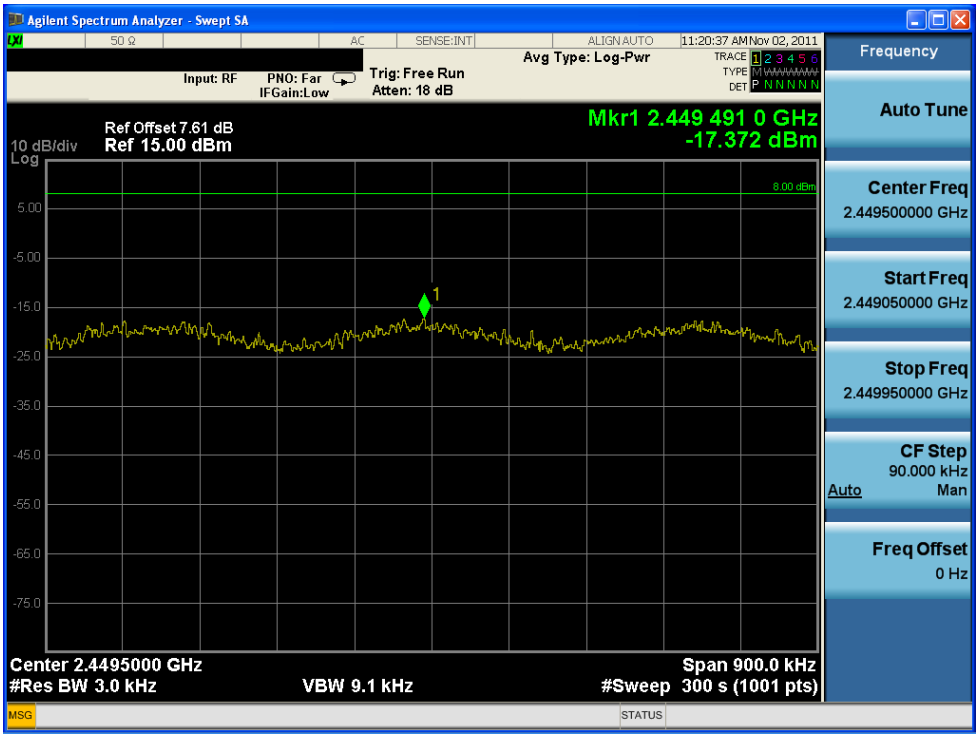
Transmitter Power Spectral Density

Test Mode: 802.11n HT40 & Ch.6 & Chain 1



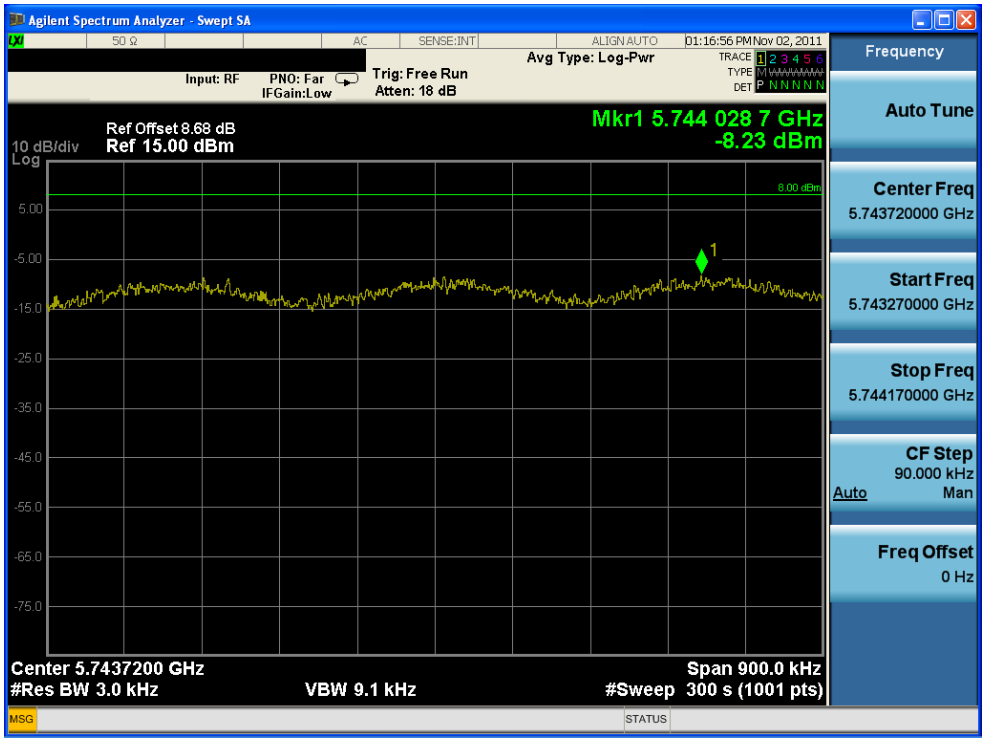
Transmitter Power Spectral Density

Test Mode: 802.11n HT40 & Ch.9 & Chain 1



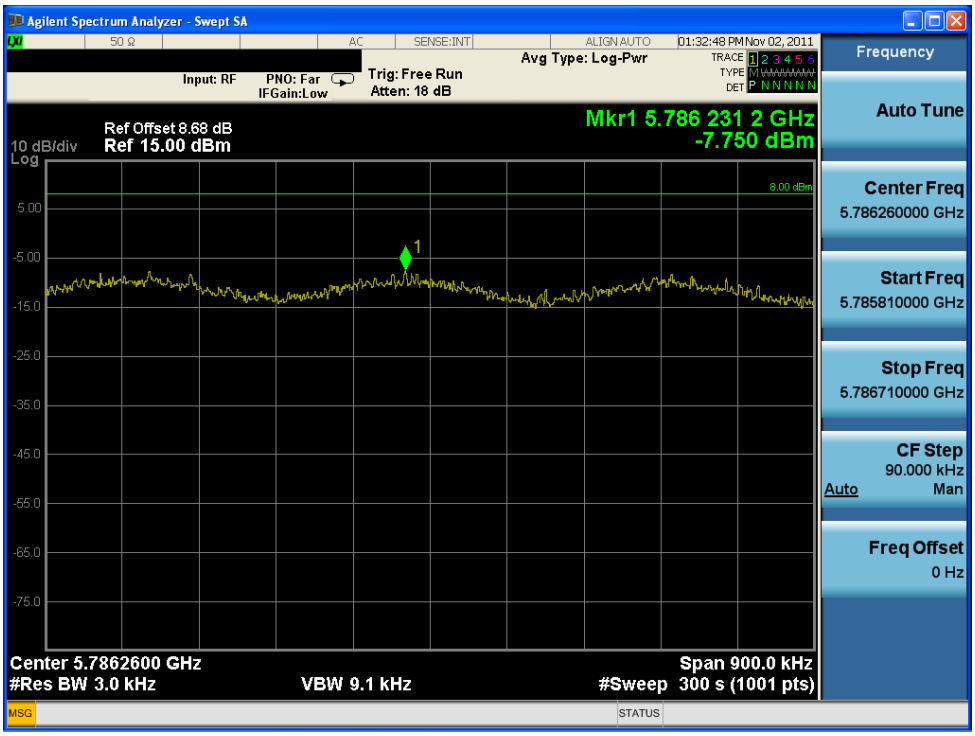
Transmitter Power Spectral Density

Test Mode: 802.11n HT20 & Ch.149 & Chain 0



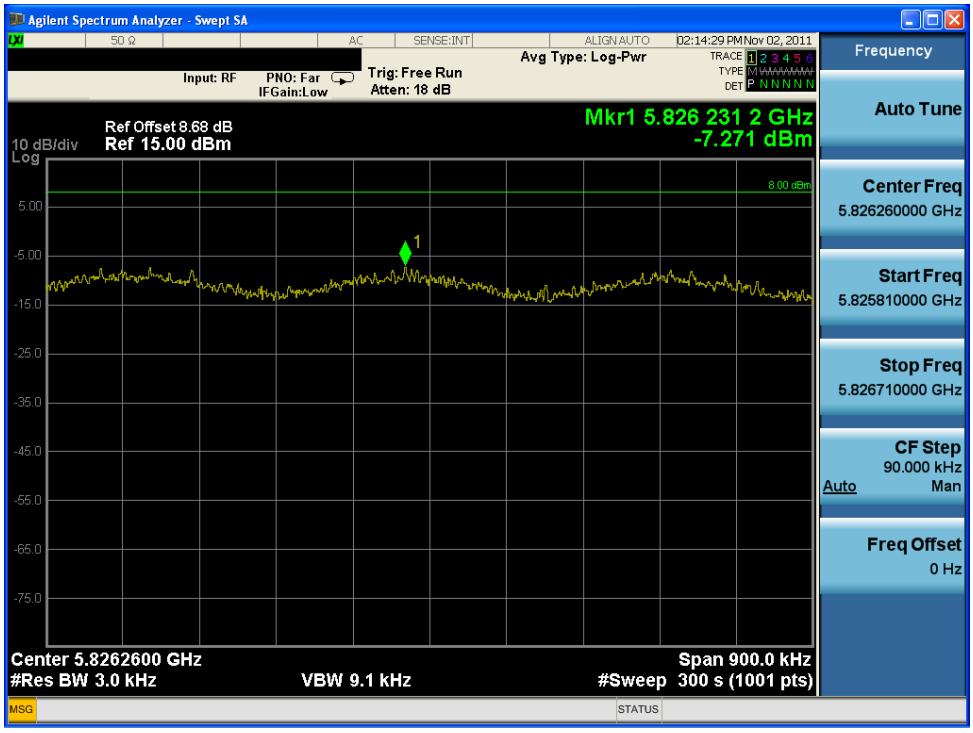
Transmitter Power Spectral Density

Test Mode: 802.11n HT20 & Ch.157 & Chain 0



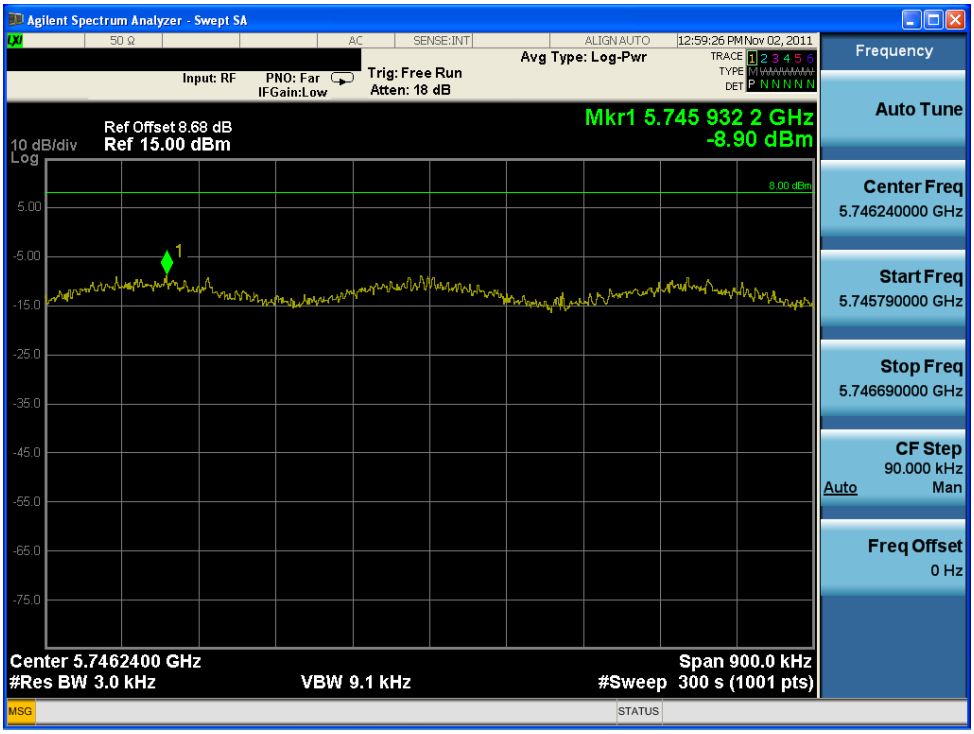
Transmitter Power Spectral Density

Test Mode: 802.11n HT20 & Ch.165 & Chain 0



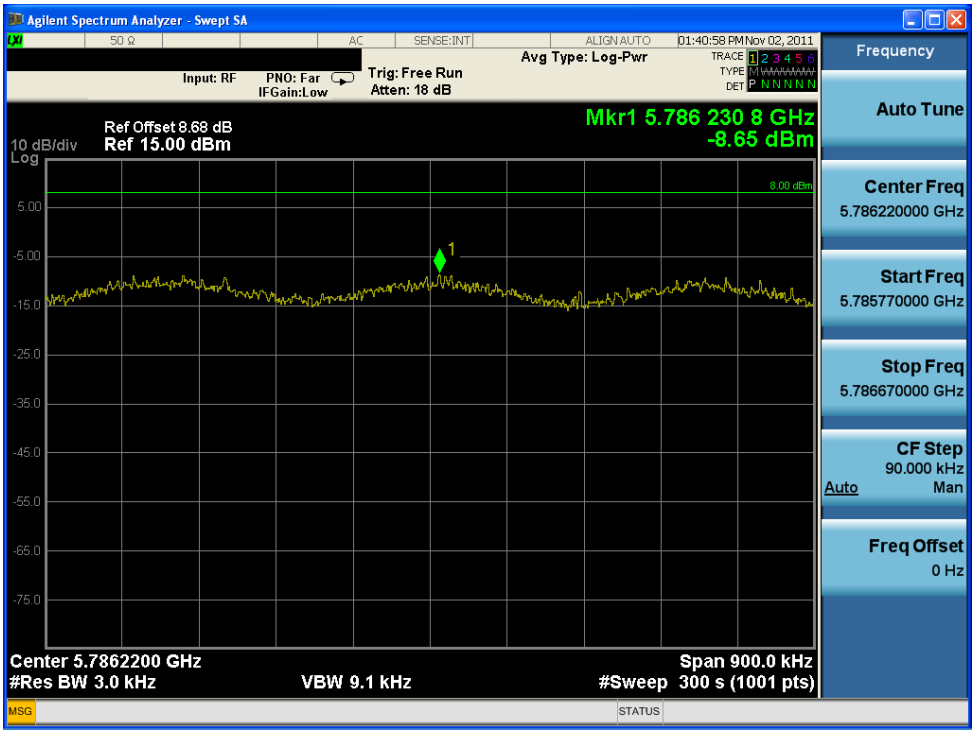
Transmitter Power Spectral Density

Test Mode: 802.11n HT20 & Ch.149 & Chain 1



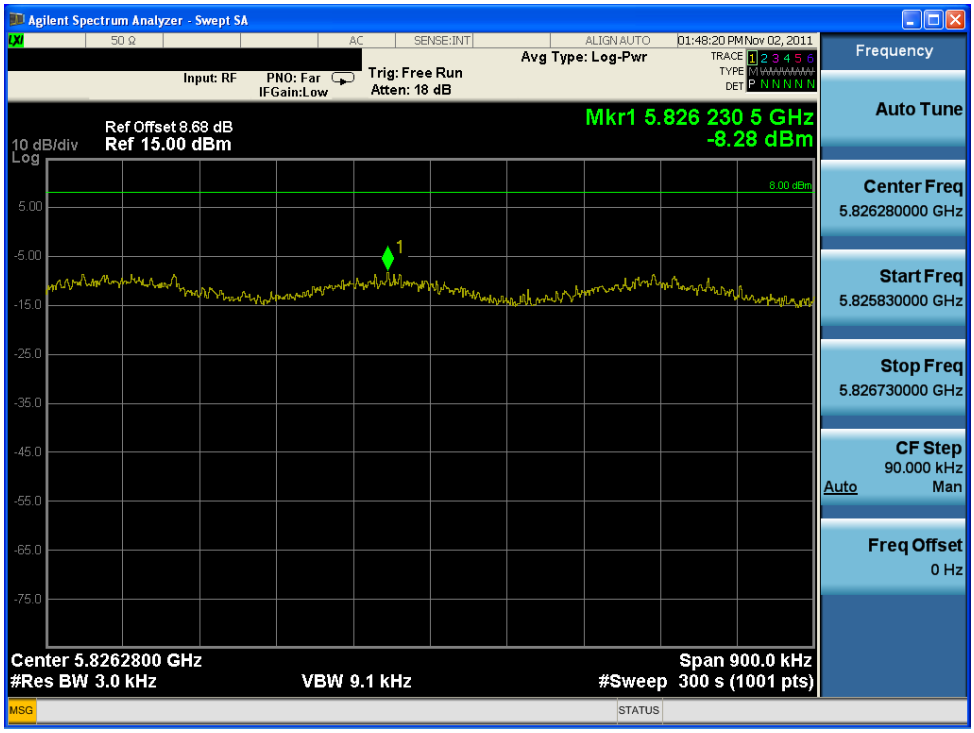
Transmitter Power Spectral Density

Test Mode: 802.11n HT20 & Ch.157 & Chain 1



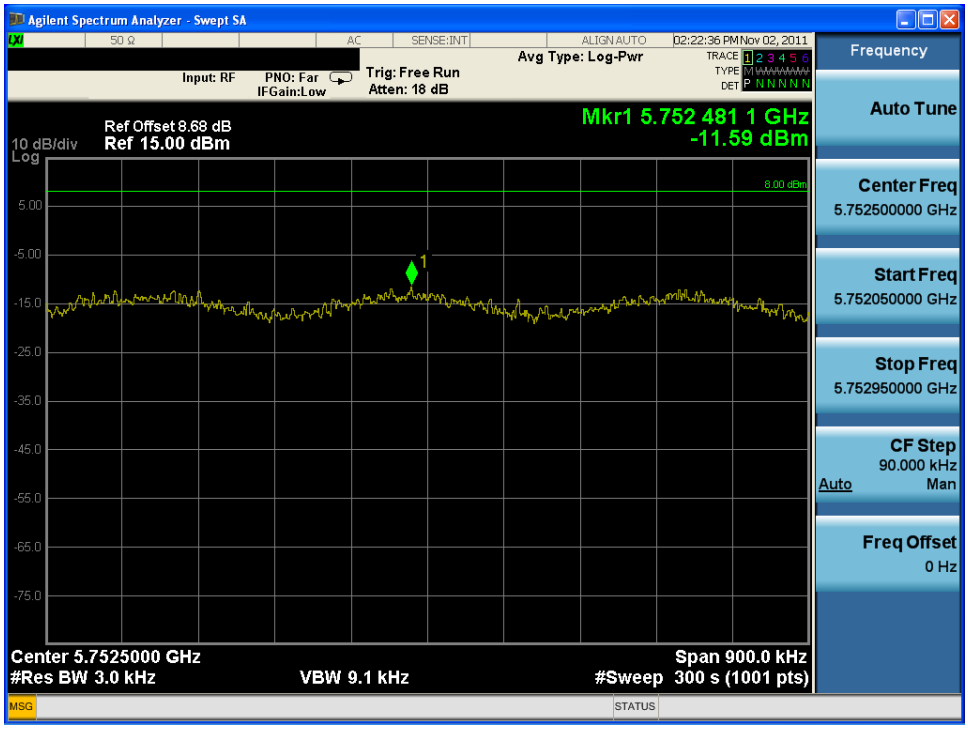
Transmitter Power Spectral Density

Test Mode: 802.11n HT20 & Ch.165 & Chain 1



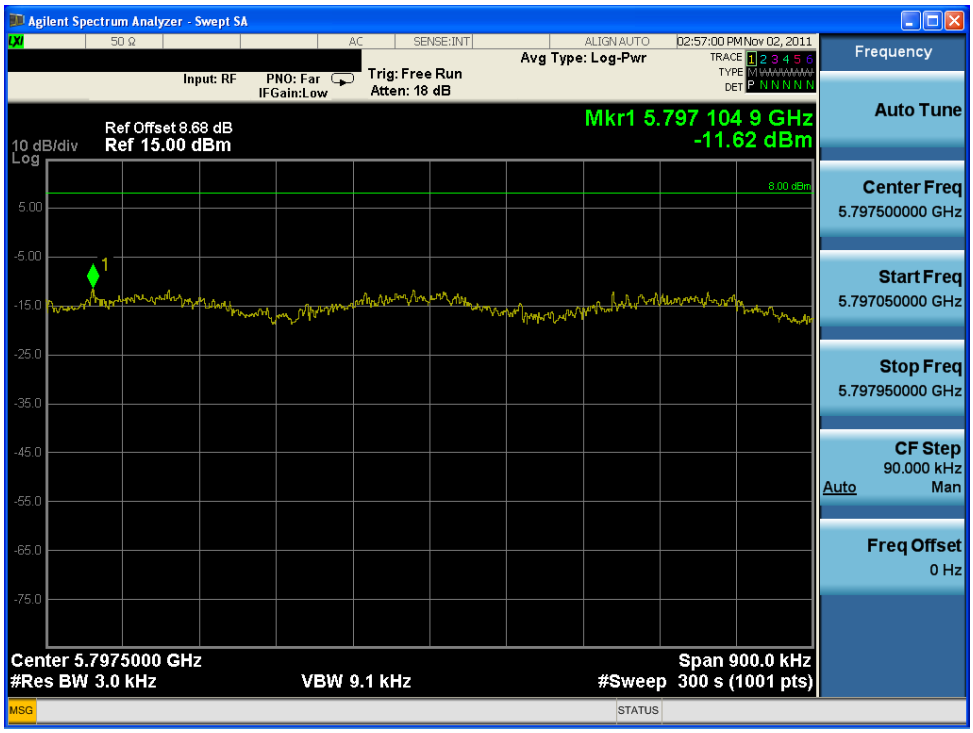
Transmitter Power Spectral Density

Test Mode: 802.11n HT40 & Ch.151 & Chain 0



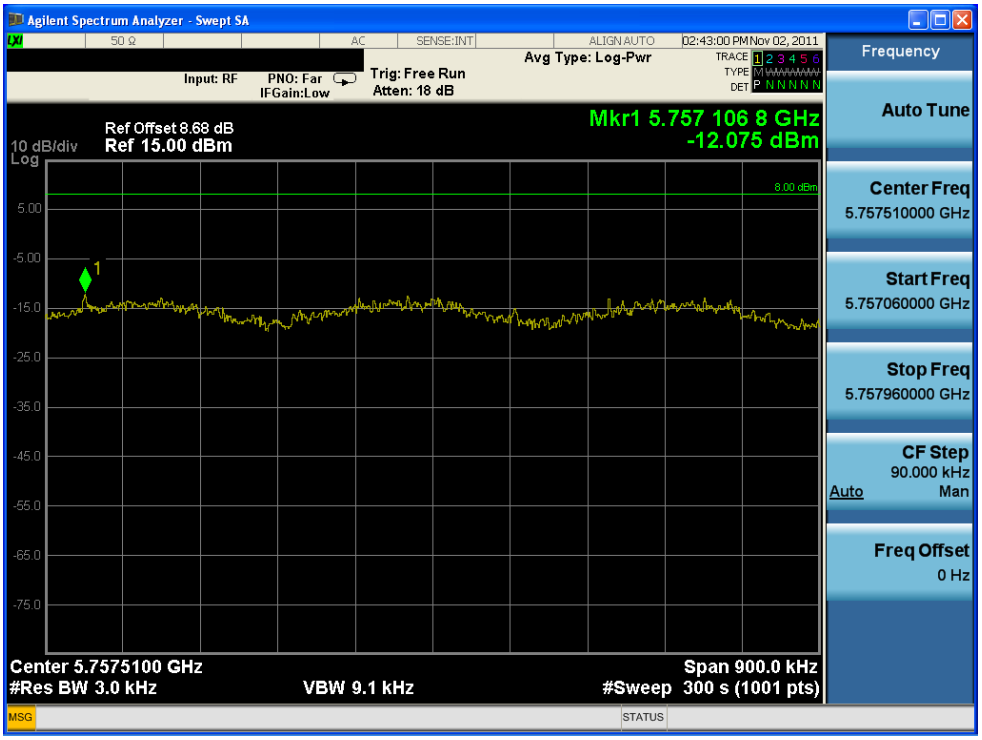
Transmitter Power Spectral Density

Test Mode: 802.11n HT40 & Ch.159 & Chain 0



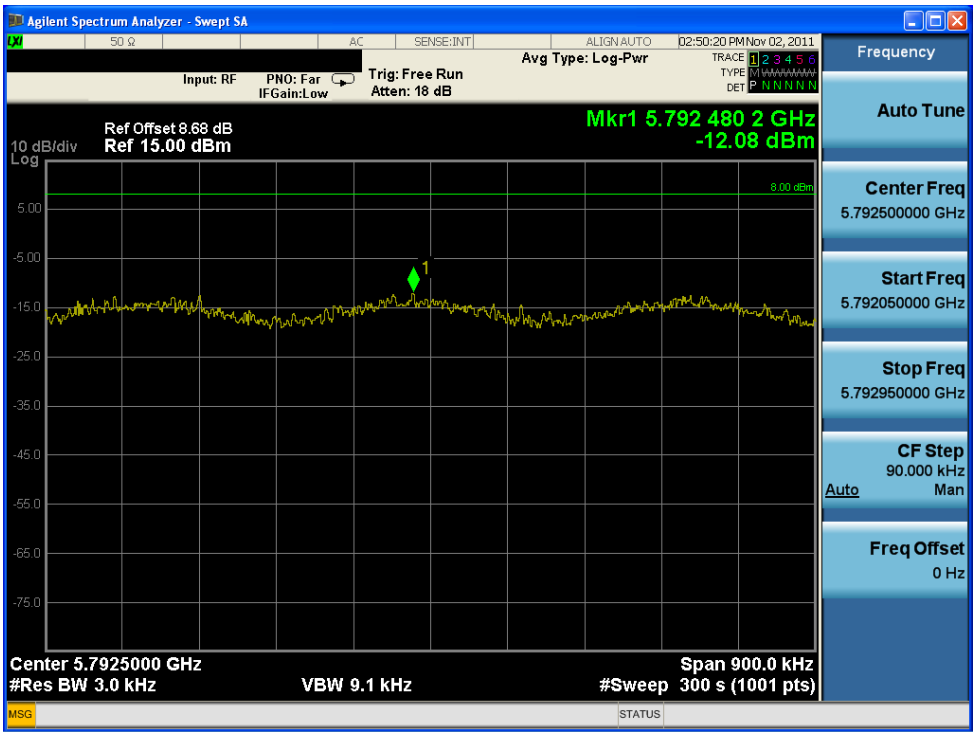
Transmitter Power Spectral Density

Test Mode: 802.11n HT40 & Ch.151 & Chain 1



Transmitter Power Spectral Density

Test Mode: 802.11n HT40 & Ch.159 & Chain 1



3.2.6 AC Conducted Emissions

- Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. Emissions closest to the limit are measured in the quasi-peak mode (QP) and average mode (AV) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

- Measurement Data: Comply

Note 1: See next pages for actual measured spectrum plots and data.

- Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

AC Line Conducted Emissions (Graph)

Test Mode: 802.11b

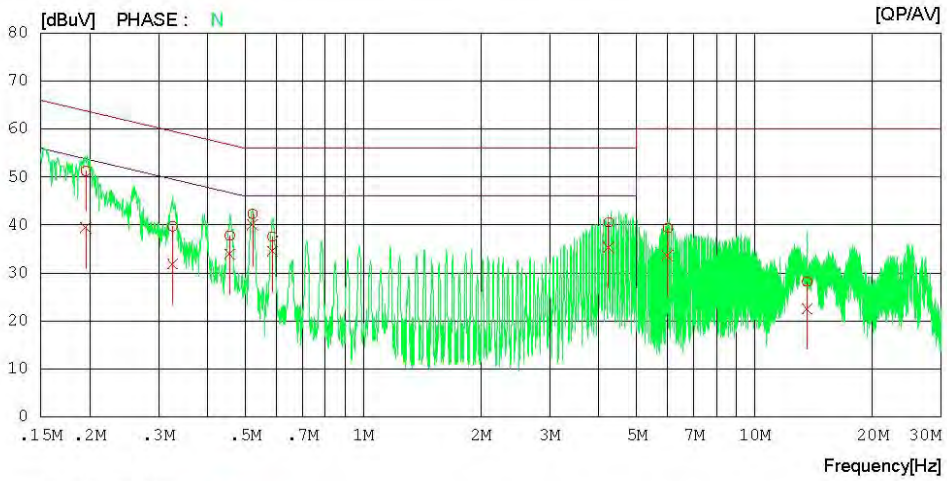
Digital EMC

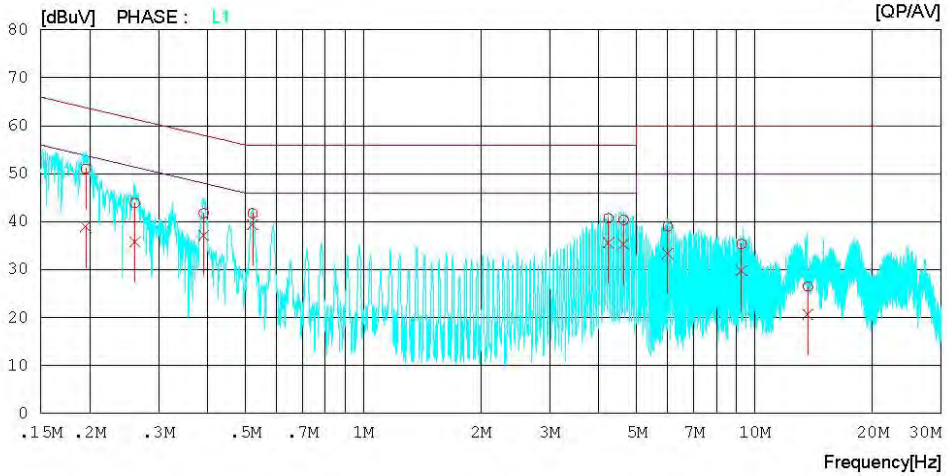
Results of Conducted Emission

Digital EMC
Date : 2011-10-25

Model No.	:	TWFM-B005D	Referrence No.	:	
Type	:		Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	24 'C 40 % R.H.
Test Condition	:	TX	Operator	:	S.K.RYU
Memo	:	2.4GHz / 802.11b			

LIMIT : CISPR22_B QP
CISPR22_B AV





AC Line Conducted Emissions (Data List)

Test Mode: 802.11b

Digital EMC

Results of Conducted Emission

Digital EMC
Date : 2011-10-25

Model No.	:	TWFM-B005D	Referrence No.	:	
Type	:		Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	24 'C 40 % R.H.
Test Condition	:	TX	Operator	:	S.K.RYU

Memo : 2.4GHz / 802.11b

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.19543	51.2	39.3	0.1	51.3	39.4	63.8	53.8	12.5	14.4	N
2	0.32594	39.6	31.8	0.1	39.7	31.9	59.6	49.6	19.9	17.7	N
3	0.45624	37.7	33.8	0.1	37.8	33.9	56.8	46.8	19.0	12.9	N
4	0.52164	42.2	39.9	0.1	42.3	40.0	56.0	46.0	13.7	6.0	N
5	0.58619	37.5	34.5	0.1	37.6	34.6	56.0	46.0	18.4	11.4	N
6	4.23650	40.2	34.8	0.4	40.6	35.2	56.0	46.0	15.4	10.8	N
7	5.99750	39.0	33.2	0.4	39.4	33.6	60.0	50.0	20.6	16.4	N
8	13.63000	27.4	21.7	0.8	28.2	22.5	60.0	50.0	31.8	27.5	N
9	0.19544	51.0	38.8	0.1	51.1	38.9	63.8	53.8	12.7	14.9	L1
10	0.26099	43.8	35.7	0.1	43.9	35.8	61.4	51.4	17.5	15.6	L1
11	0.39144	41.7	37.1	0.1	41.8	37.2	58.0	48.0	16.2	10.8	L1
12	0.52183	41.6	39.3	0.1	41.7	39.4	56.0	46.0	14.3	6.6	L1
13	4.23850	40.3	35.2	0.4	40.7	35.6	56.0	46.0	15.3	10.4	L1
14	4.63000	40.0	34.9	0.4	40.4	35.3	56.0	46.0	15.6	10.7	L1
15	5.99750	38.6	33.0	0.4	39.0	33.4	60.0	50.0	21.0	16.6	L1
16	9.26000	34.8	29.2	0.6	35.4	29.8	60.0	50.0	24.6	20.2	L1
17	13.69500	25.7	19.8	0.8	26.5	20.6	60.0	50.0	33.5	29.4	L1

AC Line Conducted Emissions (Graph)

Test Mode: 802.11g

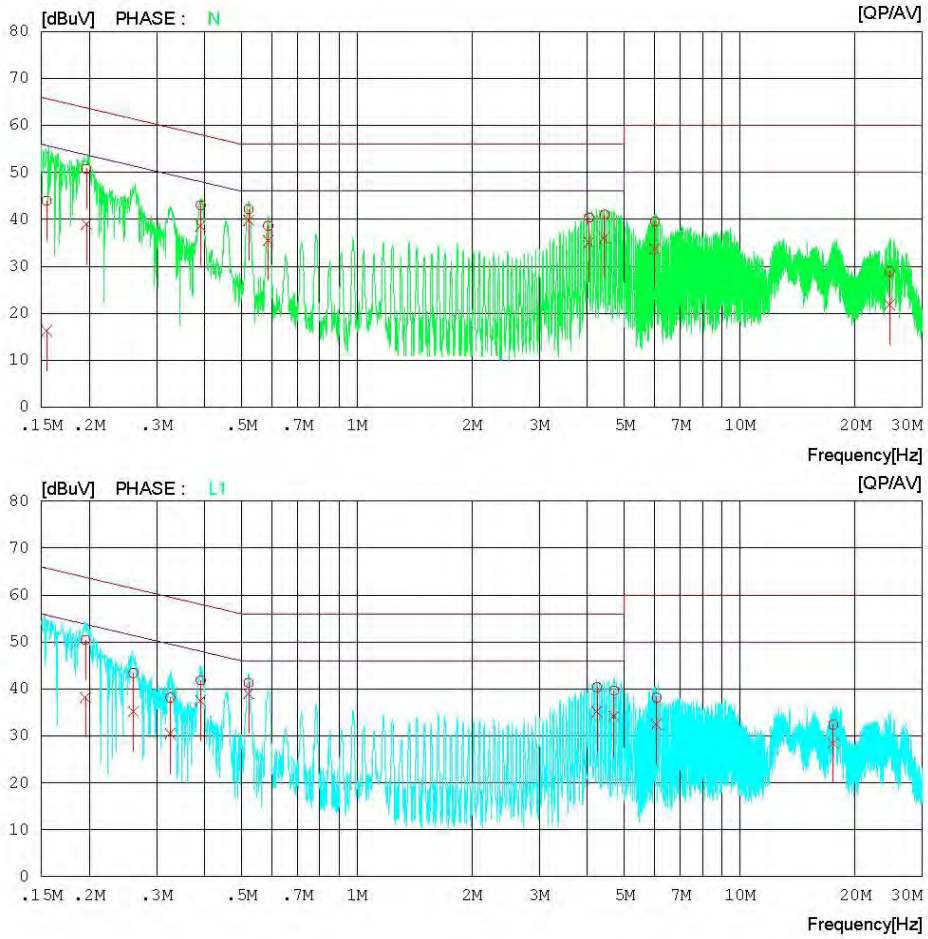
Digital EMC

Results of Conducted Emission

Digital EMC
Date : 2011-10-25

Model No.	:	TWFM-B005D	Referrence No.	:	
Type	:		Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	24 'C 40 % R.H.
Test Condition	:	TX	Operator	:	S.K.RYU
Memo	:	2.4GHz / 802.11g			

LIMIT : CISPR22_B QP
CISPR22_B AV



AC Line Conducted Emissions (Data List)

Test Mode: 802.11g

Digital EMC

Results of Conducted Emission

Digital EMC
Date : 2011-10-25

Model No.	:	TWFM-B005D	Referrence No.	:	
Type	:		Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	24 'C 40 % R.H.
Test Condition	:	TX	Operator	:	S.K.RYU

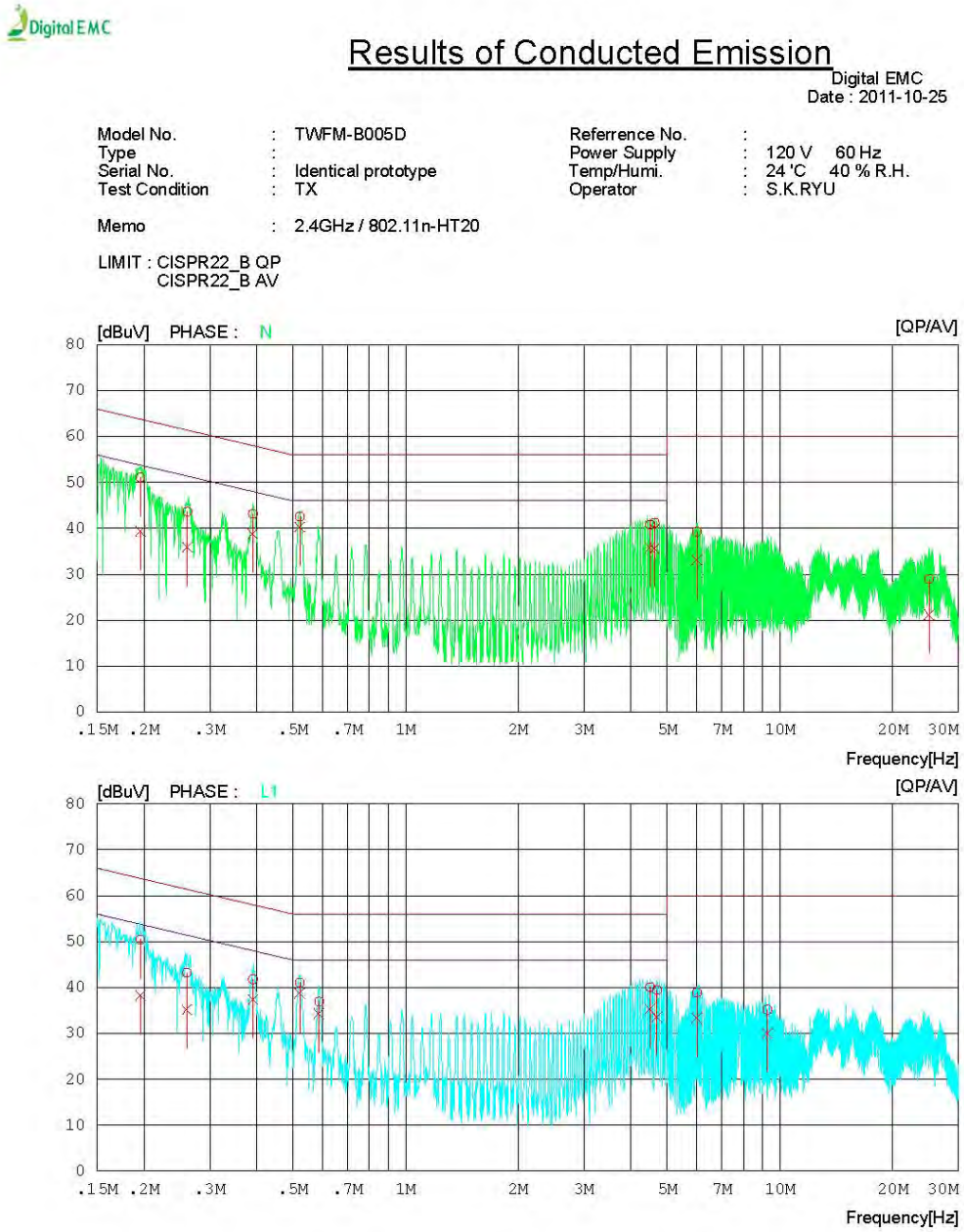
Memo : 2.4GHz / 802.11g

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15491	43.9	16.2	0.1	44.0	16.3	65.7	55.7	21.7	39.4	N
2	0.19666	50.6	38.9	0.1	50.7	39.0	63.8	53.8	13.1	14.8	N
3	0.39135	42.9	38.5	0.1	43.0	38.6	58.0	48.0	15.0	9.4	N
4	0.52204	42.0	39.7	0.1	42.1	39.8	56.0	46.0	13.9	6.2	N
5	0.58651	38.5	35.4	0.1	38.6	35.5	56.0	46.0	17.4	10.5	N
6	4.04300	40.0	34.7	0.4	40.4	35.1	56.0	46.0	15.6	10.9	N
7	4.43500	40.6	35.6	0.4	41.0	36.0	56.0	46.0	15.0	10.0	N
8	6.00000	39.2	33.3	0.4	39.6	33.7	60.0	50.0	20.4	16.3	N
9	24.64650	27.9	20.8	1.0	28.9	21.8	60.0	50.0	31.1	28.2	N
10	0.19556	50.3	38.1	0.1	50.4	38.2	63.8	53.8	13.4	15.6	L1
11	0.26098	43.3	35.1	0.1	43.4	35.2	61.4	51.4	18.0	16.2	L1
12	0.32591	38.1	30.4	0.1	38.2	30.5	59.6	49.6	21.4	19.1	L1
13	0.39145	41.7	37.4	0.1	41.8	37.5	58.0	48.0	16.2	10.5	L1
14	0.52186	41.2	38.9	0.1	41.3	39.0	56.0	46.0	14.7	7.0	L1
15	4.24000	40.0	34.7	0.4	40.4	35.1	56.0	46.0	15.6	10.9	L1
16	4.69750	39.2	33.7	0.4	39.6	34.1	56.0	46.0	16.4	11.9	L1
17	6.06600	37.7	32.1	0.4	38.1	32.5	60.0	50.0	21.9	17.5	L1
18	17.54300	31.5	27.5	0.9	32.4	28.4	60.0	50.0	27.6	21.6	L1

AC Line Conducted Emissions (Graph)

Test Mode: 802.11n HT20 (2.4GHz Band)



AC Line Conducted Emissions (Data List)

Test Mode: 802.11n HT20 (2.4GHz Band)

Digital EMC

Results of Conducted Emission

Digital EMC
Date : 2011-10-25

Model No.	:	TWFM-B005D	Referrence No.	:	
Type	:		Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	24 'C 40 % R.H.
Test Condition	:	TX	Operator	:	S.K.RYU

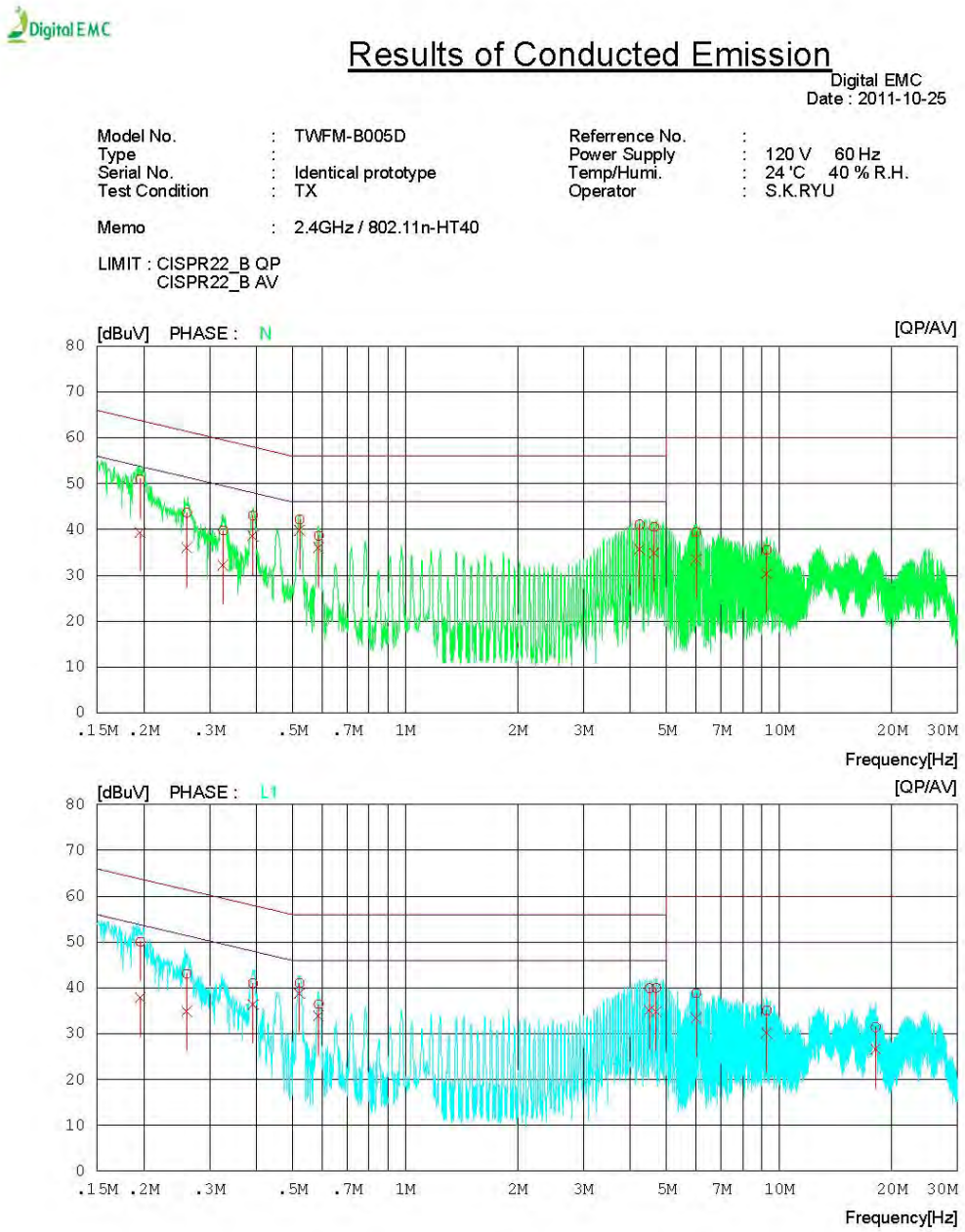
Memo : 2.4GHz / 802.11n-HT20

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.19568	51.0	39.2	0.1	51.1	39.3	63.8	53.8	12.7	14.5	N
2	0.26150	43.5	35.8	0.1	43.6	35.9	61.4	51.4	17.8	15.5	N
3	0.39129	43.0	38.7	0.1	43.1	38.8	58.0	48.0	14.9	9.2	N
4	0.52186	42.5	40.2	0.1	42.6	40.3	56.0	46.0	13.4	5.7	N
5	4.50150	40.4	35.3	0.4	40.8	35.7	56.0	46.0	15.2	10.3	N
6	4.63050	40.8	35.3	0.4	41.2	35.7	56.0	46.0	14.8	10.3	N
7	6.00150	38.9	32.7	0.4	39.3	33.1	60.0	50.0	20.7	16.9	N
8	25.03950	27.8	20.1	1.1	28.9	21.2	60.0	50.0	31.1	28.8	N
9	0.19575	50.3	38.2	0.1	50.4	38.3	63.8	53.8	13.4	15.5	L1
10	0.26050	43.2	35.1	0.1	43.3	35.2	61.4	51.4	18.1	16.2	L1
11	0.39150	41.7	37.3	0.1	41.8	37.4	58.0	48.0	16.2	10.6	L1
12	0.52188	41.0	38.6	0.1	41.1	38.7	56.0	46.0	14.9	7.3	L1
13	0.58735	36.9	34.2	0.1	37.0	34.3	56.0	46.0	19.0	11.7	L1
14	4.50150	39.7	34.9	0.4	40.1	35.3	56.0	46.0	15.9	10.7	L1
15	4.69850	39.0	33.2	0.4	39.4	33.6	56.0	46.0	16.6	12.4	L1
16	6.00100	38.5	32.9	0.4	38.9	33.3	60.0	50.0	21.1	16.7	L1
17	9.26100	34.6	29.4	0.6	35.2	30.0	60.0	50.0	24.8	20.0	L1

AC Line Conducted Emissions (Graph)

Test Mode: 802.11n HT40 (2.4GHz Band)



AC Line Conducted Emissions (Data List)

Test Mode: 802.11n HT40 (2.4GHz Band)

Digital EMC

Results of Conducted Emission

Digital EMC
Date : 2011-10-25

Model No.	:	TWFM-B005D	Referrence No.	:	
Type	:		Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	24 'C 40 % R.H.
Test Condition	:	TX	Operator	:	S.K.RYU

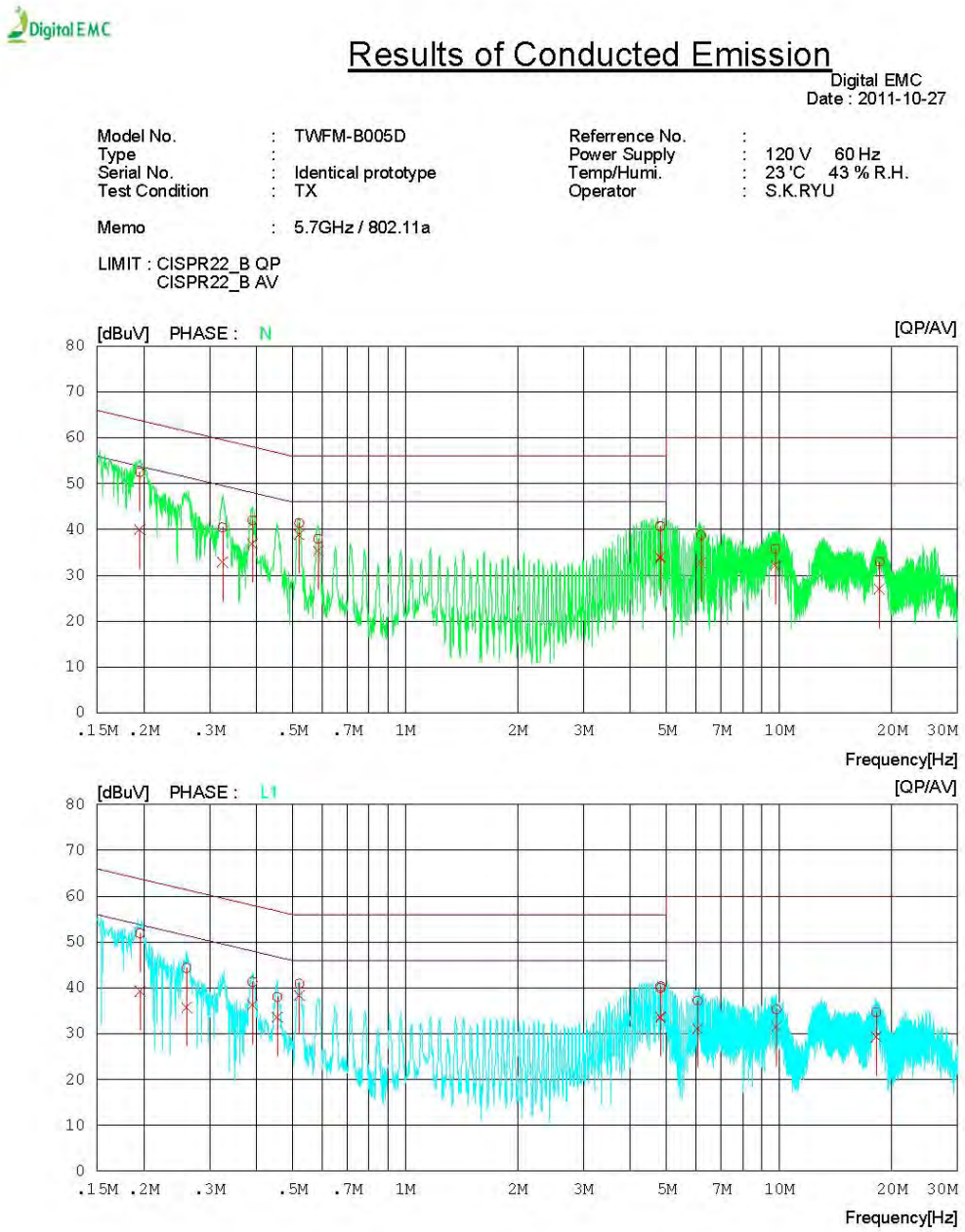
Memo : 2.4GHz / 802.11n-HT40

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.19550	50.9	39.2	0.1	51.0	39.3	63.8	53.8	12.8	14.5	N
2	0.26090	43.6	35.9	0.1	43.7	36.0	61.4	51.4	17.7	15.4	N
3	0.32628	39.7	32.1	0.1	39.8	32.2	59.5	49.5	19.7	17.3	N
4	0.39166	42.9	38.5	0.1	43.0	38.6	58.0	48.0	15.0	9.4	N
5	0.52208	42.1	39.7	0.1	42.2	39.8	56.0	46.0	13.8	6.2	N
6	0.58721	38.5	35.9	0.1	38.6	36.0	56.0	46.0	17.4	10.0	N
7	4.23900	40.7	35.3	0.4	41.1	35.7	56.0	46.0	14.9	10.3	N
8	4.63300	40.1	34.5	0.4	40.5	34.9	56.0	46.0	15.5	11.1	N
9	6.00250	39.0	33.0	0.4	39.4	33.4	60.0	50.0	20.6	16.6	N
10	9.26100	35.0	29.7	0.6	35.6	30.3	60.0	50.0	24.4	19.7	N
11	0.19591	50.0	37.8	0.1	50.1	37.9	63.8	53.8	13.7	15.9	L1
12	0.26044	43.0	34.8	0.1	43.1	34.9	61.4	51.4	18.3	16.5	L1
13	0.39188	40.9	36.3	0.1	41.0	36.4	58.0	48.0	17.0	11.6	L1
14	0.52139	41.0	38.7	0.1	41.1	38.8	56.0	46.0	14.9	7.2	L1
15	0.58704	36.4	33.8	0.1	36.5	33.9	56.0	46.0	19.5	12.1	L1
16	4.50200	39.5	34.7	0.4	39.9	35.1	56.0	46.0	16.1	10.9	L1
17	4.69750	39.6	34.4	0.4	40.0	34.8	56.0	46.0	16.0	11.2	L1
18	6.00100	38.5	33.1	0.4	38.9	33.5	60.0	50.0	21.1	16.5	L1
19	9.26450	34.5	29.6	0.6	35.1	30.2	60.0	50.0	24.9	19.8	L1
20	18.13300	30.5	25.8	0.9	31.4	26.7	60.0	50.0	28.6	23.3	L1

AC Line Conducted Emissions (Graph)

Test Mode: 802.11a



AC Line Conducted Emissions (Data List)

Test Mode: 802.11a

Digital EMC

Results of Conducted Emission

Digital EMC
Date : 2011-10-27

Model No.	:	TWFM-B005D	Referrence No.	:	
Type	:		Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	23 'C 43 % R.H.
Test Condition	:	TX	Operator	:	S.K.RYU

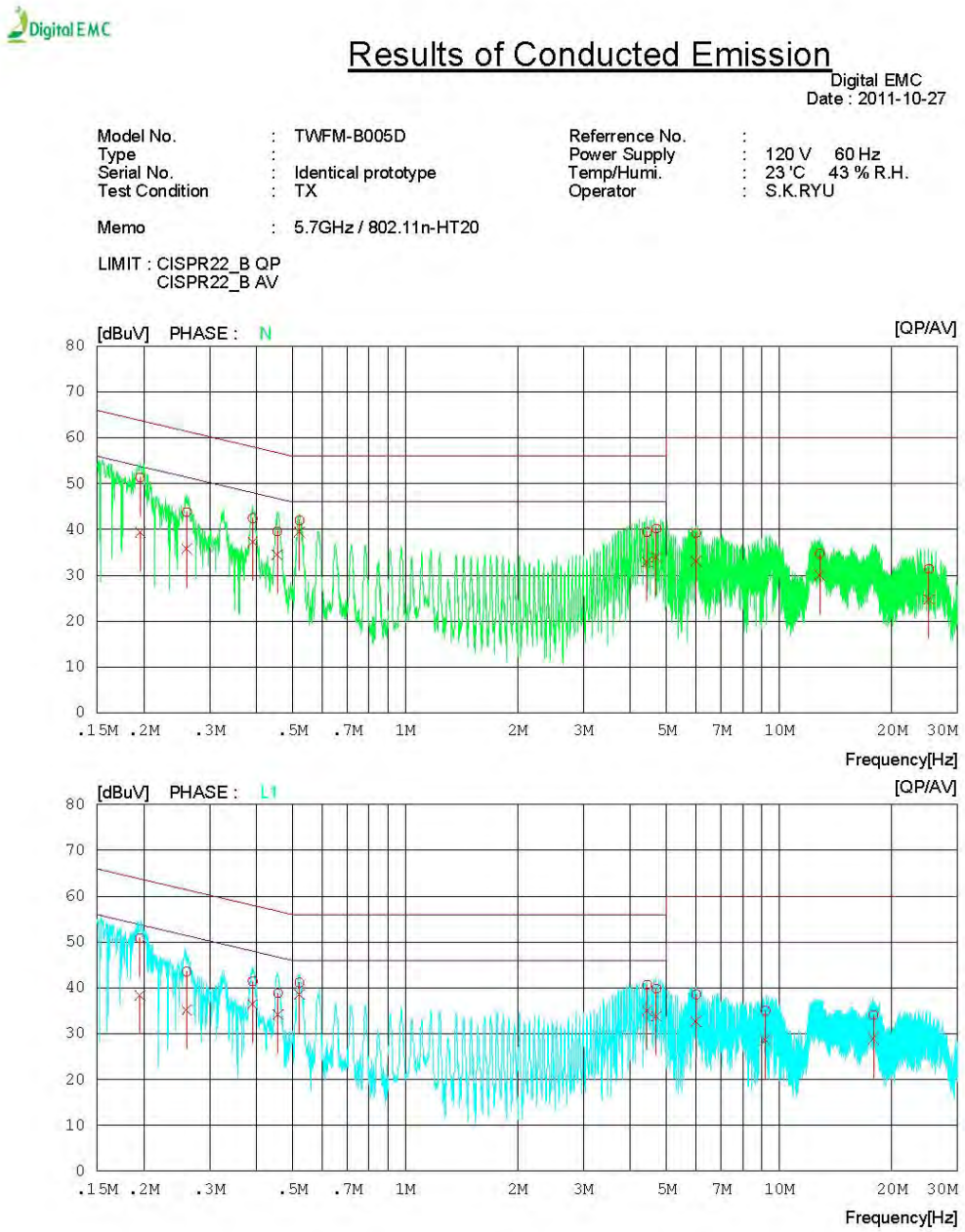
Memo : 5.7GHz / 802.11a

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.19536	52.4	39.9	0.1	52.5	40.0	63.8	53.8	11.3	13.8	N
2	0.32501	40.3	32.7	0.1	40.4	32.8	59.6	49.6	19.2	16.8	N
3	0.39045	41.9	36.8	0.1	42.0	36.9	58.1	48.1	16.1	11.2	N
4	0.52069	41.3	38.8	0.1	41.4	38.9	56.0	46.0	14.6	7.1	N
5	0.58609	37.8	35.2	0.1	37.9	35.3	56.0	46.0	18.1	10.7	N
6	4.81650	40.3	33.6	0.4	40.7	34.0	56.0	46.0	15.3	12.0	N
7	4.81700	40.3	33.5	0.4	40.7	33.9	56.0	46.0	15.3	12.1	N
8	6.18400	38.3	32.2	0.5	38.8	32.7	60.0	50.0	21.2	17.3	N
9	9.76450	35.2	31.5	0.6	35.8	32.1	60.0	50.0	24.2	17.9	N
10	18.55450	32.0	26.1	0.9	32.9	27.0	60.0	50.0	27.1	23.0	N
11	0.19550	51.8	39.2	0.1	51.9	39.3	63.8	53.8	11.9	14.5	L1
12	0.26048	44.3	35.6	0.1	44.4	35.7	61.4	51.4	17.0	15.7	L1
13	0.39066	41.2	36.1	0.1	41.3	36.2	58.0	48.0	16.7	11.8	L1
14	0.45513	37.9	33.5	0.1	38.0	33.6	56.8	46.8	18.8	13.2	L1
15	0.52110	40.8	38.2	0.1	40.9	38.3	56.0	46.0	15.1	7.7	L1
16	4.82000	39.9	33.3	0.4	40.3	33.7	56.0	46.0	15.7	12.3	L1
17	4.81850	39.6	33.2	0.4	40.0	33.6	56.0	46.0	16.0	12.4	L1
18	6.05600	36.8	30.8	0.4	37.2	31.2	60.0	50.0	22.8	18.8	L1
19	9.83550	34.8	30.9	0.6	35.4	31.5	60.0	50.0	24.6	18.5	L1
20	18.17500	33.8	28.4	0.9	34.7	29.3	60.0	50.0	25.3	20.7	L1

AC Line Conducted Emissions (Graph)

Test Mode: 802.11n HT20 (5.7GHz Band)



AC Line Conducted Emissions (Data List)

Test Mode: 802.11n HT20 (5.7GHz Band)

Digital EMC

Results of Conducted Emission

Digital EMC
Date : 2011-10-27

Model No.	:	TWFM-B005D	Referrence No.	:	
Type	:		Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	23 'C 43 % R.H.
Test Condition	:	TX	Operator	:	S.K.RYU

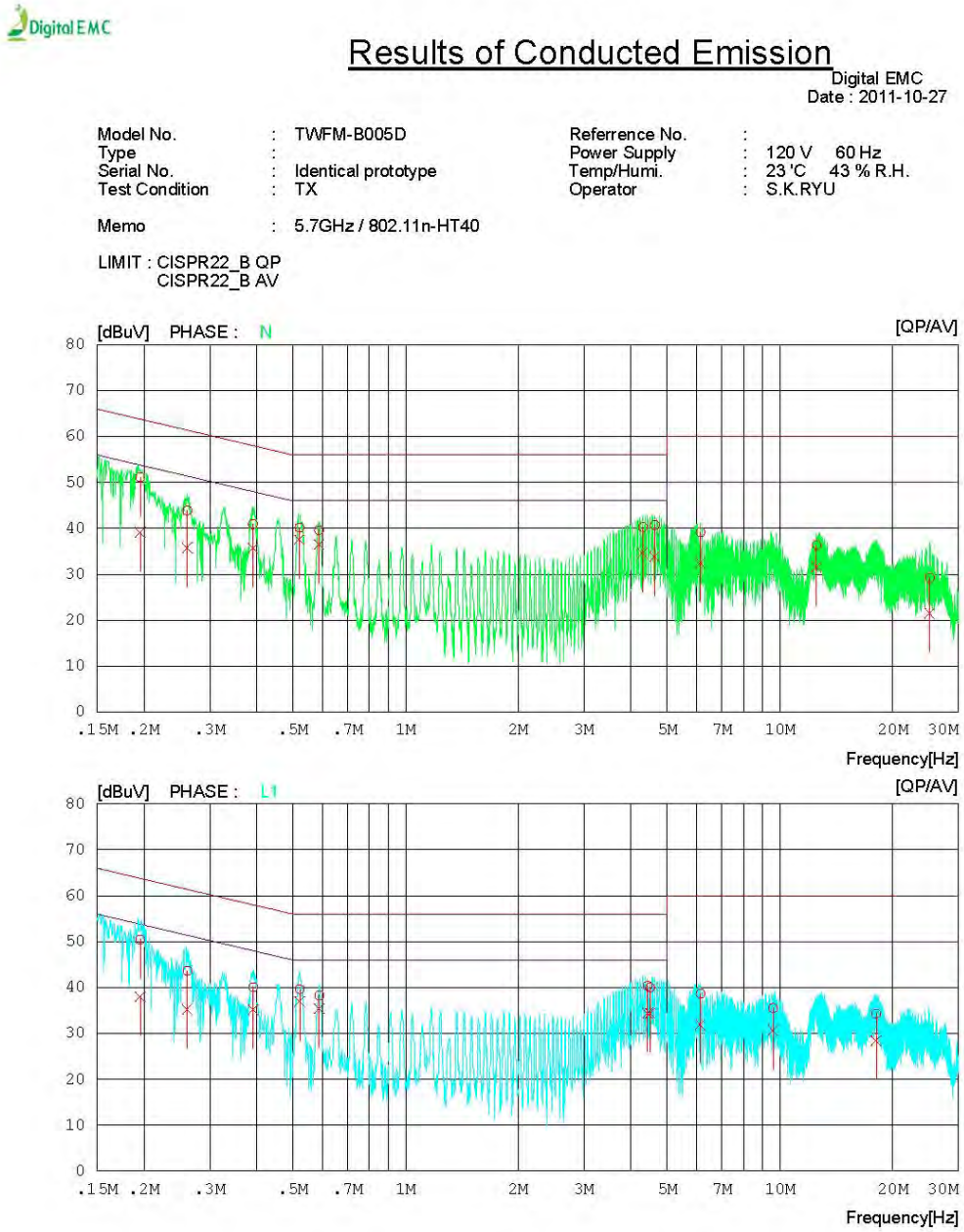
Memo : 5.7GHz / 802.11n-HT20

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.19588	51.2	39.2	0.1	51.3	39.3	63.8	53.8	12.5	14.5	N
2	0.26071	43.7	35.7	0.1	43.8	35.8	61.4	51.4	17.6	15.6	N
3	0.39141	42.3	37.2	0.1	42.4	37.3	58.0	48.0	15.6	10.7	N
4	0.45535	39.5	34.4	0.1	39.6	34.5	56.8	46.8	17.2	12.3	N
5	0.52146	41.9	39.3	0.1	42.0	39.4	56.0	46.0	14.0	6.6	N
6	4.43500	39.0	32.5	0.4	39.4	32.9	56.0	46.0	16.6	13.1	N
7	4.69450	39.8	33.5	0.4	40.2	33.9	56.0	46.0	15.8	12.1	N
8	5.99700	38.8	32.7	0.4	39.2	33.1	60.0	50.0	20.8	16.9	N
9	12.83900	33.9	29.2	0.8	34.7	30.0	60.0	50.0	25.3	20.0	N
10	25.16200	30.3	23.6	1.1	31.4	24.7	60.0	50.0	28.6	25.3	N
11	0.19536	50.8	38.3	0.1	50.9	38.4	63.8	53.8	12.9	15.4	L1
12	0.26044	43.4	35.1	0.1	43.5	35.2	61.4	51.4	17.9	16.2	L1
13	0.39111	41.3	36.3	0.1	41.4	36.4	58.0	48.0	16.6	11.6	L1
14	0.45686	38.8	34.2	0.1	38.9	34.3	56.7	46.7	17.8	12.4	L1
15	0.52150	41.1	38.5	0.1	41.2	38.6	56.0	46.0	14.8	7.4	L1
16	4.43350	40.2	34.6	0.4	40.6	35.0	56.0	46.0	15.4	11.0	L1
17	4.69550	39.4	33.4	0.4	39.8	33.8	56.0	46.0	16.2	12.2	L1
18	5.99800	38.2	32.3	0.4	38.6	32.7	60.0	50.0	21.4	17.3	L1
19	9.19600	34.4	28.1	0.6	35.0	28.7	60.0	50.0	25.0	21.3	L1
20	17.86300	33.2	28.0	0.9	34.1	28.9	60.0	50.0	25.9	21.1	L1

AC Line Conducted Emissions (Graph)

Test Mode: 802.11n HT40 (5.7GHz Band)



AC Line Conducted Emissions (Data List)

Test Mode: 802.11n HT40 (5.7GHz Band)

Digital EMC

Results of Conducted Emission

Digital EMC
Date : 2011-10-27

Model No.	:	TWFM-B005D	Referrence No.	:	
Type	:		Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	23 'C 43 % R.H.
Test Condition	:	TX	Operator	:	S.K.RYU

Memo : 5.7GHz / 802.11n-HT40

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.19544	51.0	39.0	0.1	51.1	39.1	63.8	53.8	12.7	14.7	N
2	0.26129	43.8	35.7	0.1	43.9	35.8	61.4	51.4	17.5	15.6	N
3	0.39140	40.8	35.6	0.1	40.9	35.7	58.0	48.0	17.1	12.3	N
4	0.52045	40.1	37.4	0.1	40.2	37.5	56.0	46.0	15.8	8.5	N
5	0.58719	39.5	36.4	0.1	39.6	36.5	56.0	46.0	16.4	9.5	N
6	4.30700	39.9	34.2	0.4	40.3	34.6	56.0	46.0	15.7	11.4	N
7	4.63350	40.3	33.4	0.4	40.7	33.8	56.0	46.0	15.3	12.2	N
8	6.13250	38.7	32.0	0.5	39.2	32.5	60.0	50.0	20.8	17.5	N
9	12.52700	35.5	30.7	0.8	36.3	31.5	60.0	50.0	23.7	18.5	N
10	25.12350	28.1	20.4	1.1	29.2	21.5	60.0	50.0	30.8	28.5	N
11	0.19545	50.4	37.9	0.1	50.5	38.0	63.8	53.8	13.3	15.8	L1
12	0.26115	43.5	35.1	0.1	43.6	35.2	61.4	51.4	17.8	16.2	L1
13	0.39195	40.0	35.1	0.1	40.1	35.2	58.0	48.0	17.9	12.8	L1
14	0.52170	39.5	36.8	0.1	39.6	36.9	56.0	46.0	16.4	9.1	L1
15	0.58780	38.2	35.3	0.1	38.3	35.4	56.0	46.0	17.7	10.6	L1
16	4.43750	40.0	34.0	0.4	40.4	34.4	56.0	46.0	15.6	11.6	L1
17	4.50300	39.6	34.0	0.4	40.0	34.4	56.0	46.0	16.0	11.6	L1
18	6.13300	38.1	31.5	0.5	38.6	32.0	60.0	50.0	21.4	18.0	L1
19	9.59150	34.9	30.1	0.6	35.5	30.7	60.0	50.0	24.5	19.3	L1
20	18.07400	33.4	27.5	0.9	34.3	28.4	60.0	50.0	25.7	21.6	L1

3.2.7 Antenna Requirements

- Procedure:

Describe how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.

- Conclusion: Comply

The antenna is permanently attached by soldering. (Refer to Internal Photo file.)

- Minimum Standard:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions.

APPENDIX

TEST EQUIPMENT FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment.

	Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
☐	Spectrum Analyzer	Agilent	E4440A	11/09/30	12/09/30	MY45304199
☒	Spectrum Analyzer	Rohde Schwarz	FSQ26	11/01/11	12/01/11	200445
☐	Spectrum analyzer	Agilent	E4404B	11/03/08	12/03/08	US41061134
☐	Spectrum Analyzer(RE)	H.P	8563E	11/10/04	12/10/04	3551A04634
☒	MXA Signal Analyzer	Agilent Technologies, Inc	N9020A	11/01/07	12/01/07	MY49100833
☐	Power Meter	H.P	EPM-442A	11/07/01	12/07/01	GB37170413
☐	Power Sensor	H.P	8481A	11/07/01	12/07/01	3318A96332
☒	Wideband Power Sensor	Rohde Schwarz	NRP-Z81	11/06/04/	12/06/04	1137.9009.02-101001
☐	Power Divider	Agilent	11636B	11/09/30	12/09/30	56471
☐	4-Way Power Divider	ET Industries	D-0526-4	10/12/24	11/12/24	210195001
☐	Power Splitter	Anritsu	K241B	11/09/30	12/09/30	020611
☐	Power Splitter	Anritsu	K241B	11/07/01	12/07/01	017060
☐	Power Splitters & Dividers	Aeroflex/Weinschel	1594	11/02/21	12/02/21	1177
☐	Frequency Counter	H.P	5342A	11/07/01	12/07/01	2119A04450
☐	TEMP & HUMIDITY Chamber	JISCO	KR-100/J-RHC2	11/09/30	12/09/30	30604493/021031
☒	Digital Multimeter	H.P	34401A	11/03/07	12/03/07	3146A13475, US36122178
☐	Multifunction Synthesizer	HP	8904A	11/10/06	12/10/06	3633A08404
☒	Signal Generator	Rohde Schwarz	SMR20	11/03/08	12/03/08	101251
☐	Signal Generator	H.P	ESG-3000A	11/07/01	12/07/01	US37230529
☐	Vector Signal Generator	Rohde Schwarz	SMJ100A	11/01/11	12/01/11	100148
☐	Vector Signal Generator	Rohde Schwarz	SMBV100A	11/01/11	12/01/11	255571
☐	Audio Analyzer	H.P	8903B	11/07/02	12/07/02	3011A09448
☐	Modulation Analyzer	H.P	8901B	11/07/01	12/07/01	3028A03029
☐	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	11/03/07	12/03/07	GB43461134
☐	Universal Radio communication Tester	Rohde Schwarz	CMU200	11/03/07	12/03/07	106760
☐	Bluetooth Tester	TESCOM	TC-3000B	11/07/01	12/07/01	3000B000268
☐	Thermo hygrometer	BODYCOM	BJ5478	11/01/13	12/01/13	090205-3
☒	Thermo hygrometer	BODYCOM	BJ5478	11/01/13	12/01/13	090205-2
☐	Thermo hygrometer	BODYCOM	BJ5478	11/01/13	12/01/13	090205-4
☐	AC Power supply	DAEKWANG	5KVA	11/03/08	12/03/08	20060321-1
☒	DC Power Supply	HP	6622A	11/03/07	12/03/07	3448A03760
☐	DC Power Supply	HP	6633A	11/03/07	12/03/07	3524A06634
☐	DC Power Supply	Protek	PWS-3010D	11/09/30	12/09/30	4072702
☐	DC Power Supply	SM techno	SDP30-5D	11/05/20	12/05/20	305DKA013
☐	BAND Reject Filter	Microwave Circuits	N0308372	11/09/30	12/09/30	3125-01DC0352
☐	BAND Reject Filter	Wainwright	WRCG1750	11/09/30	12/09/30	2
☐	High-Pass Filter	ANRITSU	MP526D	11/09/30	12/09/30	M27756

	Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
☐	High-pass filter	Wainwright	WHNX2.1	11/09/30	12/09/30	1
☒	High-pass filter	Wainwright	WHNX3.0	11/09/30	12/09/30	9
☐	High-pass filter	Wainwright	WHNX5.0	11/09/19	12/09/19	8
☒	High-Pass Filter	Wainwright	WHKX8.5	11/09/19	12/09/19	1
☐	High-Pass Filter	Wainwright	WHKX1.0	11/09/30	12/09/30	9
☐	Tunable Notch Filter	Wainwright	WRCT800.0 /960.0-0.2/40-8SSK	N/A	N/A	32
☐	Tunable Notch Filter	Wainwright	WRCD1700.0 /2000.0-0.2/40-10SSK	N/A	N/A	53
☐	Tunable Notch Filter	Wainwright	WRCT1900.0/ 2200.0-5/40-10SSK	N/A	N/A	30
☒	HORN ANT	ETS	3115	11/09/06	12/09/06	21097
☐	HORN ANT	ETS	3115	11/03/22	12/03/22	6419
☒	HORN ANT	A.H.Systems	SAS-574	11/03/25	13/03/25	154
☐	HORN ANT	A.H.Systems	SAS-574	11/03/25	13/03/25	155
☒	HORN ANT	SCHWARZBECK	BBHA9120A	10/04/13	12/04/13	322
☐	Dipole Antenna	Schwarzbeck	VHA9103	10/11/29	11/11/29	2116
☐	Dipole Antenna	Schwarzbeck	VHA9103	10/11/29	11/11/29	2117
☐	Dipole Antenna	Schwarzbeck	UHA9105	10/11/29	11/11/29	2261
☐	Dipole Antenna	Schwarzbeck	UHA9105	10/11/29	11/11/29	2262
☐	LOOP Antenna	ETS	6502	10/10/29	12/10/29	3471
☐	Coaxial Fixed Attenuators	Agilent	8491B	11/07/02	12/07/02	MY39260700
☒	Attenuator (3dB)	WEINSCHEL	56-3	11/09/30	12/09/30	Y2342
☐	Attenuator (3dB)	WEINSCHEL	56-3	11/09/30	12/09/30	Y2370
☐	Attenuator (10dB)	WEINSCHEL	23-10-34	11/09/30	12/09/30	BP4386
☐	Attenuator (10dB)	WEINSCHEL	23-10-34	11/01/11	12/01/11	BP4387
☐	Attenuator (10dB)	WEINSCHEL	86-10-11	11/09/30	12/09/30	446
☐	Attenuator (10dB)	WEINSCHEL	86-10-11	11/09/30	12/09/30	408
☐	Attenuator (20dB)	WEINSCHEL	86-20-11	11/09/30	12/09/30	432
☐	Attenuator (30dB)	JFW	50FH-030-300	11/03/07	12/03/07	060320-1
☐	Attenuator (40dB)	WEINSCHEL	57-40-33	11/09/30	12/09/30	NN837
☐	Termination	H.P	HP-909D	11/07/02	12/07/02	02750
☐	Termination	H.P	HP-909D	11/07/02	12/07/02	02702
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0088CAN	11/07/01	12/07/01	788
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0185CAN	11/07/01	12/07/01	790
☐	Amplifier (30dB)	Agilent	8449B	11/03/07	12/03/07	3008A01590
☒	Amplifier (30dB)	H.P	8449B	11/03/07	12/03/07	3008A00370
☐	Amplifier	EMPOWER	BBS3Q7ELU	11/09/30	12/09/30	1020
☐	RF Power Amplifier	OPHIRRF	5069F	11/07/01	12/07/01	1006
☒	EMI TEST RECEIVER	R&S	ESU	11/01/20	12/01/20	100014

	Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
☒	BILOG ANTENNA	SCHAFFNER	CBL6112B	10/07/14	12/07/14	2737
☒	Amplifier (22dB)	H.P	8447E	11/01/11	12/01/11	2945A02865
☐	EMI TEST RECEIVER	R&S	ESCI	11/03/08	12/03/08	100364
☐	BICONICAL ANT.	Schwarzbeck	VHA 9103	10/11/29	11/11/29	91032789
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A1	10/11/29	12/11/29	1098
☐	BICONICAL ANT.	Schwarzbeck	VHA 9103	10/12/21	12/12/21	91031946
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A1	10/07/07	12/07/07	0590
☒	Low Noise Pre Amplifier	TSJ	MLA-100K01-B01-2	11/03/07	12/03/07	1252741
☐	Low Noise Pre Amplifier	TSJ	MLA-00108-B02-36	11/01/11	12/01/11	1518831
☐	Amplifier (25dB)	Agilent	8447D	11/03/07	12/03/07	2944A10144
☐	Amplifier (25dB)	Agilent	8447D	11/07/01	12/07/01	2648A04922
☒	Spectrum Analyzer(CE)	H.P	8591E	11/03/07	12/03/07	3649A05889
☒	LISN	Kyoritsu	KNW-407	11/01/11	12/01/11	8-317-8
☒	LISN	Kyoritsu	KNW-242	11/07/02	12/07/02	8-654-15
☒	CVCF	NF Electronic	4420	11/03/08	12/03/08	304935/337980
☒	50 ohm Terminator	HME	CT-01	11/01/11	12/01/11	N/A
☒	RFI/FIELD Intensity Meter	Kyoritsu	KNM-2402	11/07/02	12/07/02	4N-170-3
☐	Wideband Radio Communication Tester	R&S	CMW500	11/09/30	12/09/30	100989