

RF TEST REPORT

Test item : Miracast Dongle
Model No. : RTSD5000, RTSD5000W
Order No. : DEMC1307-02180
Date of receipt : 2013-07-12
Test duration : 2013-08-12 ~ 2013-08-20
Date of issue : 2013-08-26
Use of report : FCC Original Grant

Applicant : TO21 Co.,Ltd.
9F, Nasan Suite, 395-68, Shindaebang-2dong, Dongjak-ku, Seoul, 156-710

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

Test specification : FCC Part 15 Subpart C 247
ANSI C63.10-2009, KDB558074 V03 r01

Test environment : See appended test report

Test result : ☒ Pass ☐ Fail

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DIGITAL EMC CO., LTD.

Tested by:

Witnessed by:

Reviewed by:

A handwritten signature in blue ink, appearing to read "HS" or "H.S.", written over a horizontal line.

Engineer
HyunSu Son

N/A

A handwritten signature in blue ink, appearing to read "HL" or "H.L.", written over a horizontal line.

Deputy General Manager
HongHee Lee

Test Report Version

Test Report No.	Date	Description
DRTFCC1308-0814	Aug. 26, 2013	Initial issue

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1. GENERAL INFORMATION

Applicant : TO21 Co.,Ltd.
Address : 9F, Nasan Suite, 395-68, Shindaebang-2dong, Dongjak-ku, Seoul, 156-710
FCC ID : 2AAUV-RTSD5000
EUT : Miracast Dongle
Model : RTSD5000
Additional Model(s) : RTSD5000W
Data of Test : 2013-08-12 ~ 2013-08-20
Contact person : CHO YOUNG JOO

2. EUT DESCRIPTION

Product	Miracast Dongle
Model Name	RTSD5000, RTSD5000W ※ 2 models are same mechanical, electrical and functional. ※ The only difference is the model name, which are changed for marketing purpose.
Power Supply	DC 5 V
Frequency Range	2.4GHz Band ▪ 802.11n(20MHz): 2412 MHz ~ 2462 MHz 5GHz Band ▪ 802.11n(20MHz): 5745~5825 MHz ▪ 802.11n(40MHz): 5755~5795 MHz
Max. RF Output Power	2.4GHz Band ▪ 802.11n (HT20): 17.66 dBm 5GHz Band ▪ 802.11n (HT20): 20.22dBm ▪ 802.11n (HT40): 21.74dBm
Modulation Type	802.11n: OFDM
Antenna Specification	Wire type antenna (1TX 1RX) ▪ 2.4GHz Band Max. peak gain : 3.658 dBi ▪ 5GHz Band Max. peak gain : 3.542 dBi

3. SUMMARY OF TESTS

FCC Part Section(s)	RSS Section(s)	Parameter	Limit	Test Condition	Status Note 1
I. Transmitter Mode (TX)					
15.247(a)	RSS-210 [A8.2]	6 dB Bandwidth	> 500 kHz	Conducted	C
15.247(b)	RSS-210 [A8.4]	Transmitter Output Power	< 1Watt		C
15.247(d)	RSS-210 [A8.5]	Out of Band Emissions / Band Edge	20dBc in any 100kHz BW		C
15.247(e)	RSS-210 [A8.2]	Transmitter Power Spectral Density	< 8dBm / 3kHz		C
-	RSS Gen [4.6.1]	Occupied Bandwidth (99%)	RSS-Gen(4.6.1)		NA
15.205 15.209	RSS-210 [A8.5]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	< FCC 15.209 limits	Radiated	C ^{Note2}
15.207	RSS-Gen [7.2.4]	AC Conducted Emissions	< FCC 15.207 limits	AC Line Conducted	C
15.203	-	Antenna Requirements	FCC 15.203	-	C
<p>Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable</p> <p>Note 2: This test item was performed in each axis and the worst case data was reported.</p>					

4. TEST METHODOLOGY

The measurement procedure described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2009) and KDB558074

4.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

4.3 GENERAL TEST PROCEDURES

Conducted Emissions

According to the requirements in Section 6.2 of ANSI C63.10, the EUT is placed on the turntable, which is 0.8 m above ground plane and the conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and Average detector.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the highest emission, the relative positions of the EUT were rotated through three orthogonal axes according to the requirements in Section 6.3 of ANSI C63.10.

4.4 DESCRIPTION OF TEST MODES

The EUT has been tested with all modes of operating conditions to determine the worst case emission characteristics. A test program is used to control the EUT for staying in continuous transmitting mode.

5. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

6. FACILITIES AND ACCREDITATIONS

6.1 FACILITIES

The open area test site(OATS) or semi anechoic chamber and conducted measurement facility used to collect the radiated and conducted test data are located at the 683-3, Yubang-Dong, Yongin-Si, Gyunggi-Do, 449-080, South Korea. The site is constructed in conformance with the requirements.

- Semi anechoic chamber registration Number : 678747

6.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and peak, quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

7. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203& RSS-Gen [7.1.2]:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 of this section."

The internal antenna of this E.U.T is permanently attached using the soldering.

Therefore this E.U.T Complies with the requirement of §15.203

8. TEST RESULT

8.1 6dB Bandwidth

Test Requirements and limit, §15.247(a) & RSS-210 [A8.2]

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6dB bandwidth is 500 kHz.

■ TEST CONFIGURATION

Refer to the APPENDIX I.

■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer and used following test procedure of KDB558074.

1. Set resolution bandwidth (RBW) = 100 KHz
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
(RBW:100KHz/VBW:300KHz)
3. Detector = **Peak**.
4. Trace mode = **max hold**.
5. Sweep = **auto couple**.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

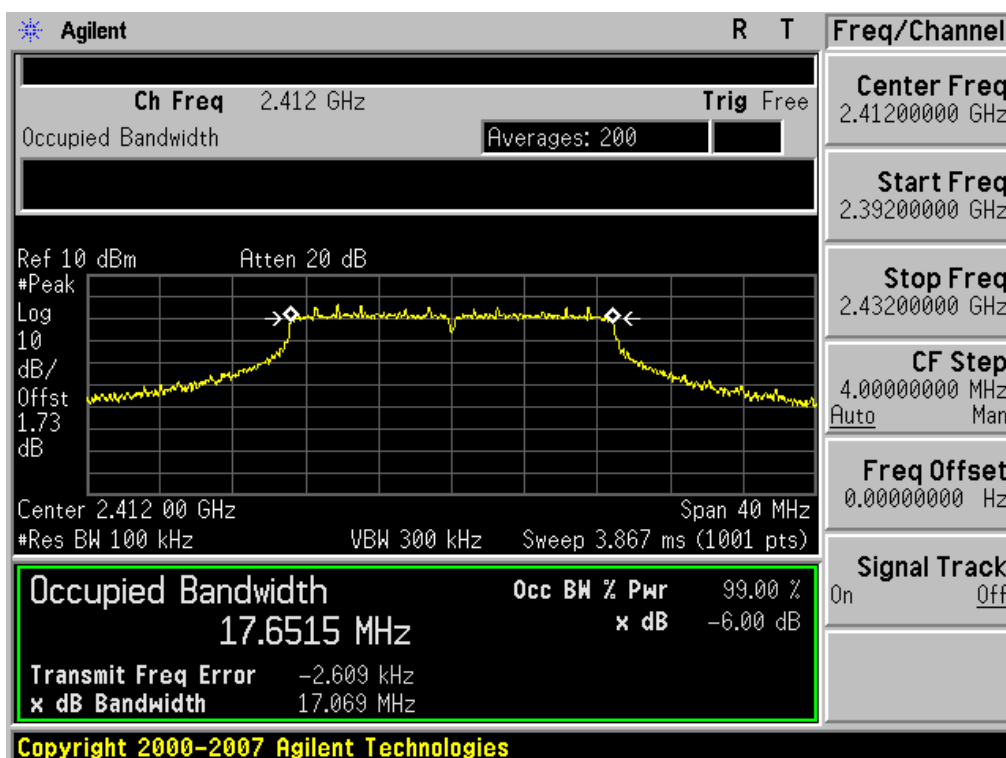
■ TEST RESULTS: **Comply**

Test Mode	Data Rate	Frequency [MHz]	Test Results[MHz]
802.11n (20MHz)	MCS0	2412	17.069
		2437	17.238
		2462	17.257
802.11n (20MHz)	MCS0	5745	16.808
		5785	16.859
		5825	16.936
802.11n (40MHz)	MCS0	5755	34.978
		5795	35.160

RESULT PLOTS

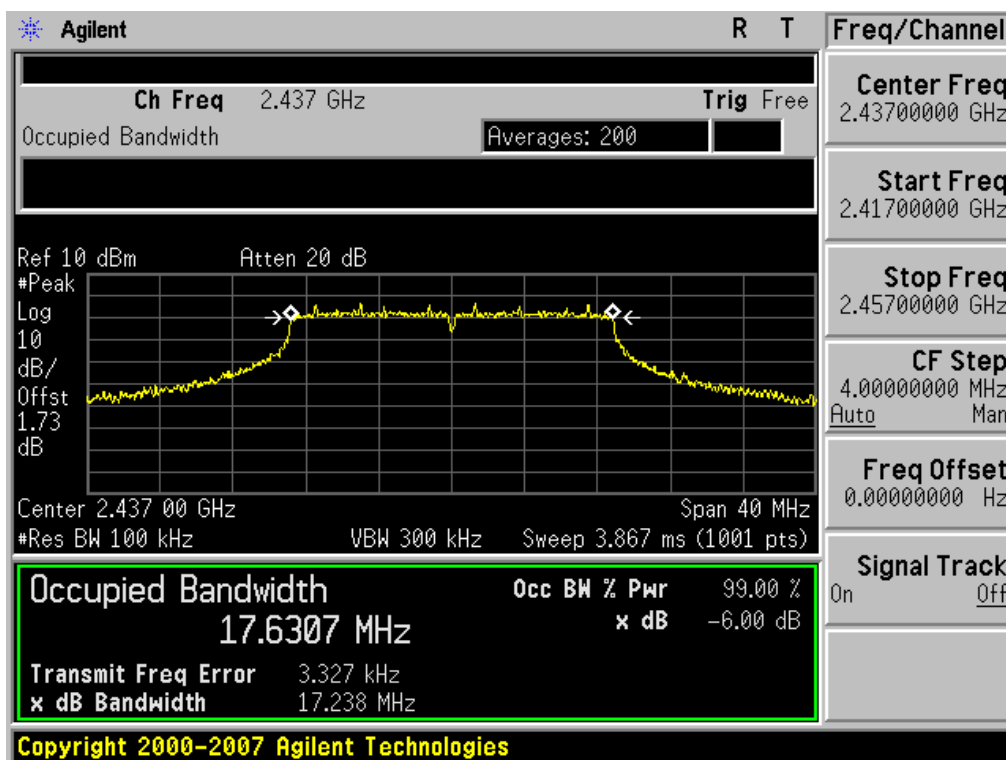
6 dB Bandwidth

Test Mode: 802.11n & MCS0 & 2412 MHz



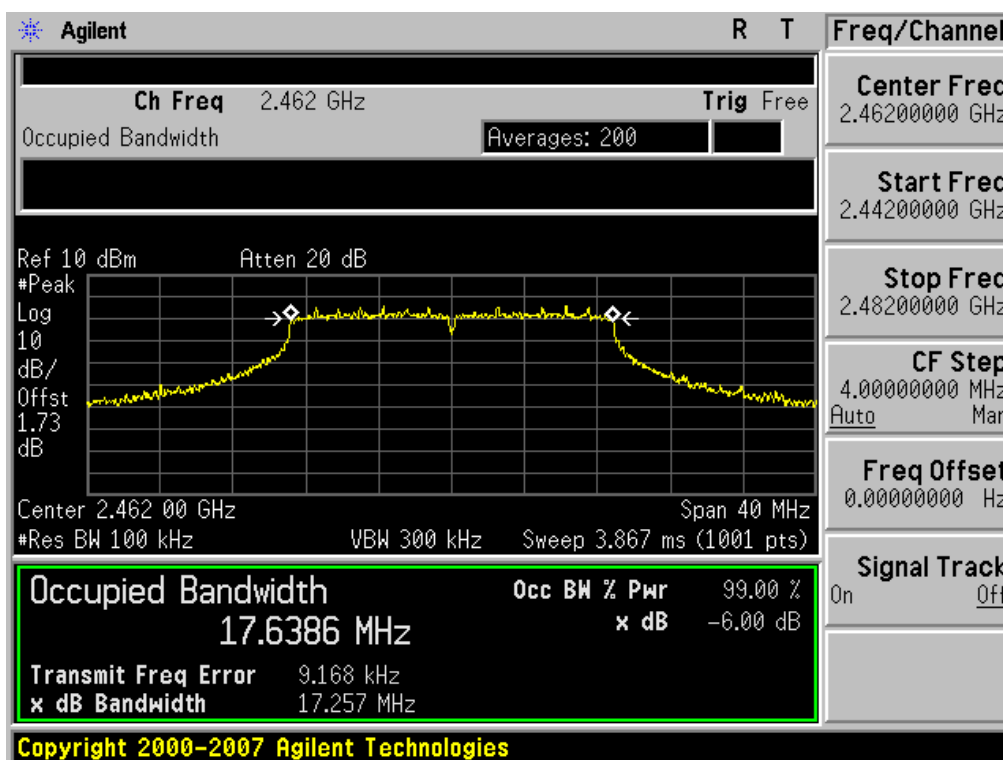
6 dB Bandwidth

Test Mode: 802.11n & MCS0 & 2437 MHz



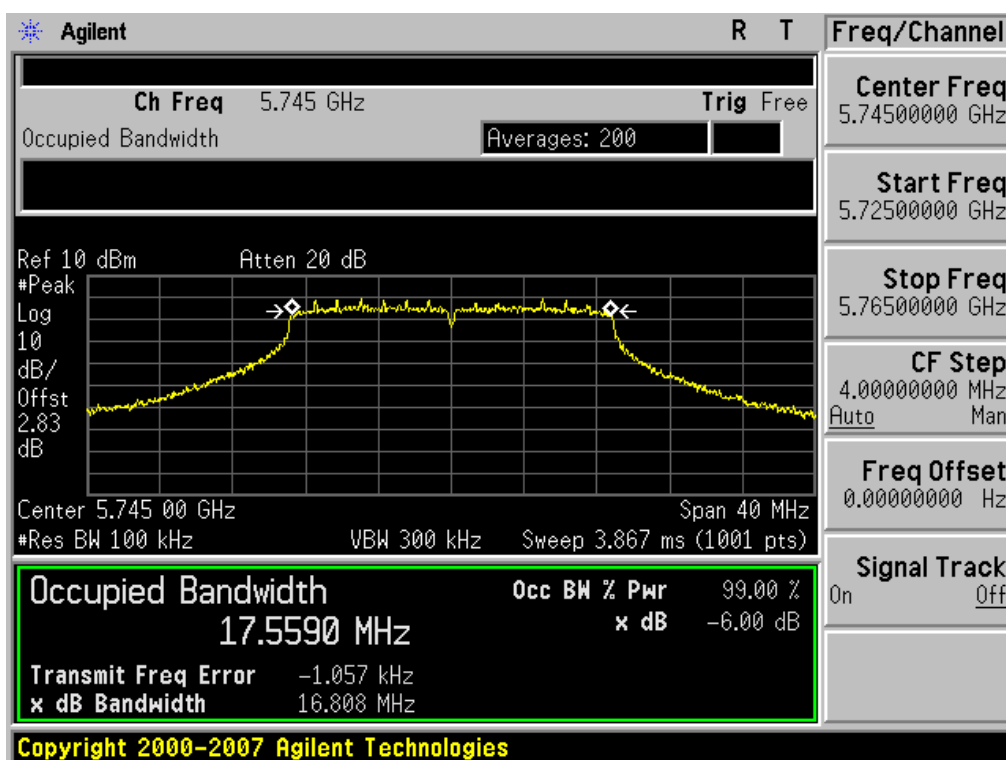
6 dB Bandwidth

Test Mode: 802.11n & MCS0 & 2462 MHz



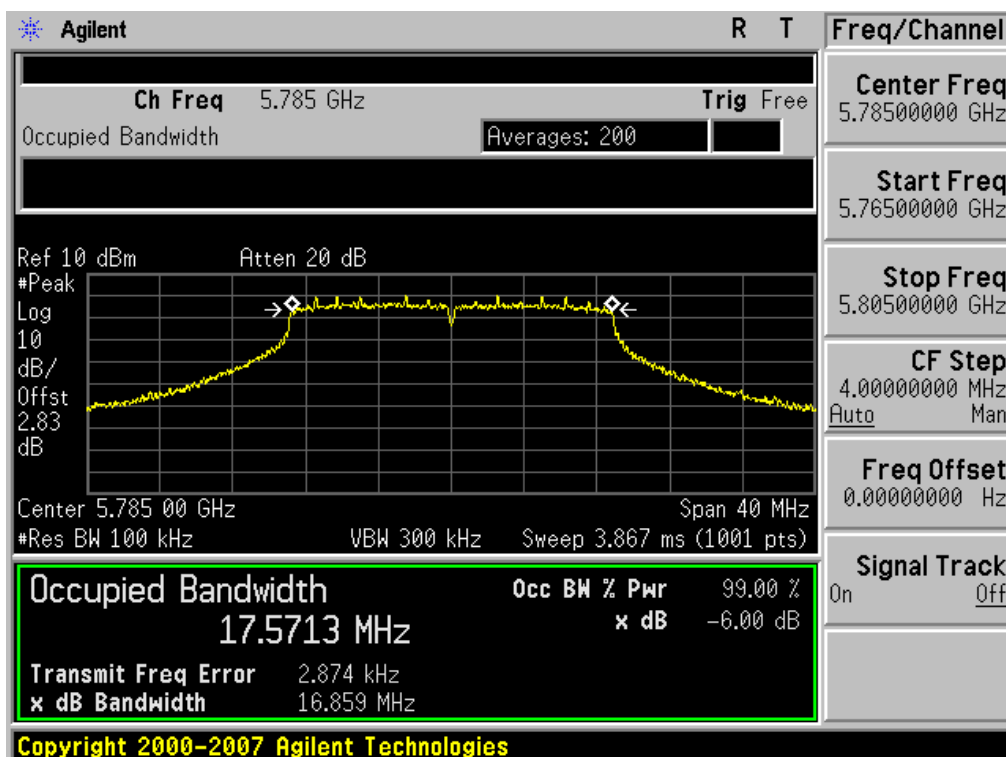
6 dB Bandwidth

Test Mode: 802.11n & MCS0 & 5745 MHz



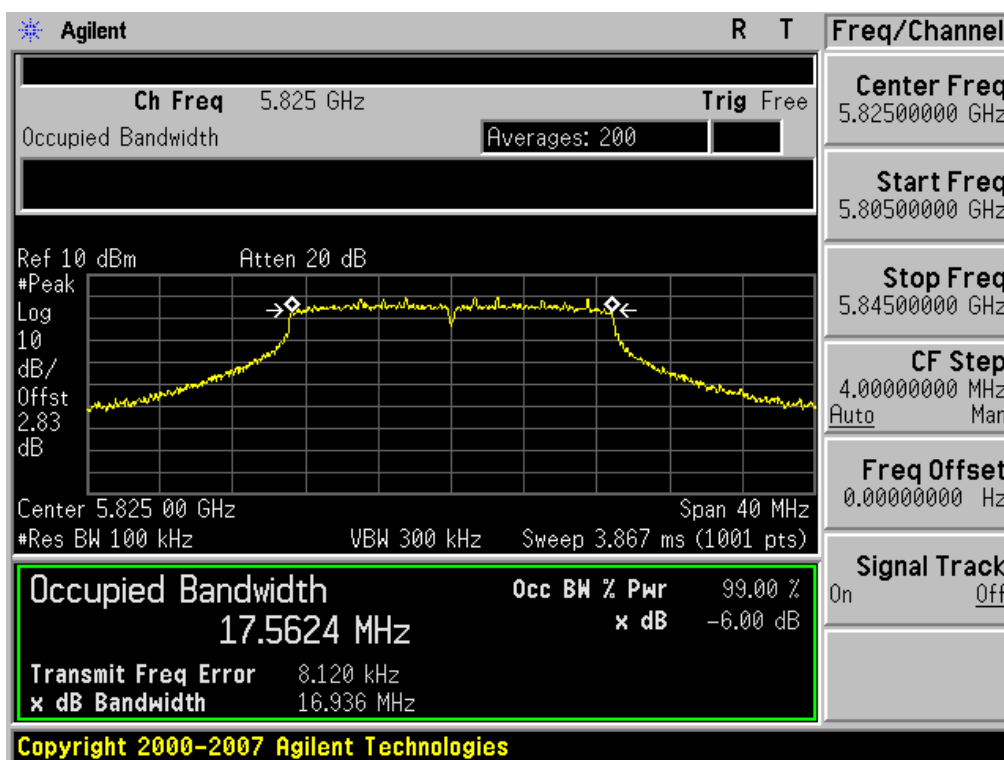
6 dB Bandwidth

Test Mode: 802.11n & MCS0 & 5785 MHz



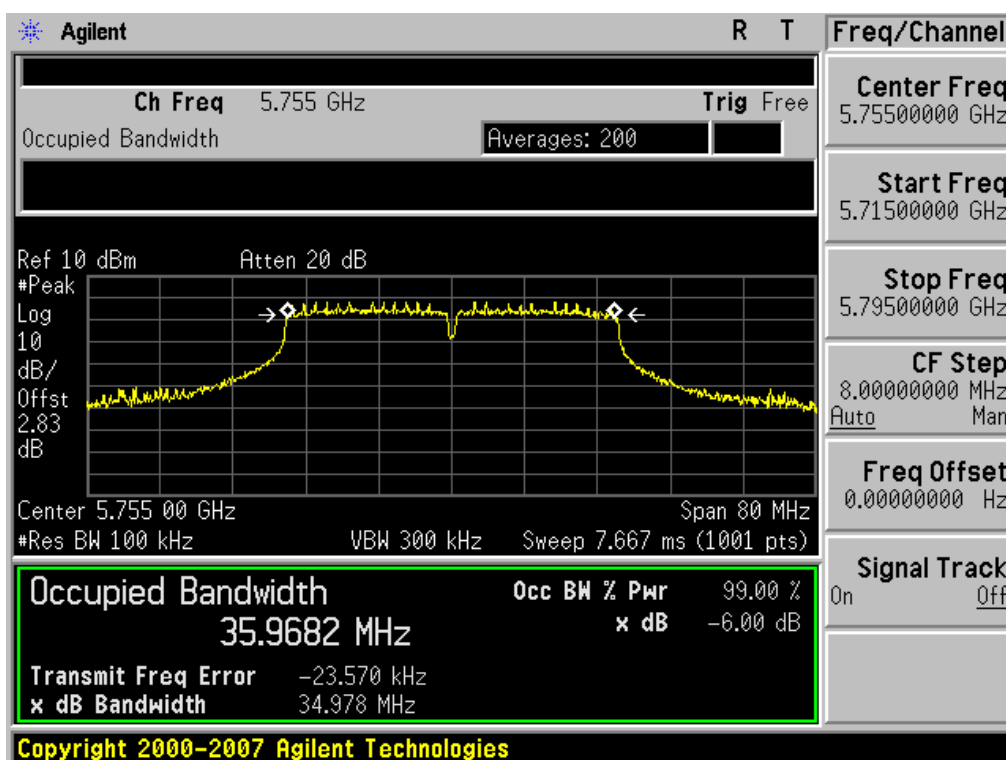
6 dB Bandwidth

Test Mode: 802.11n & MCS0 & 5825 MHz



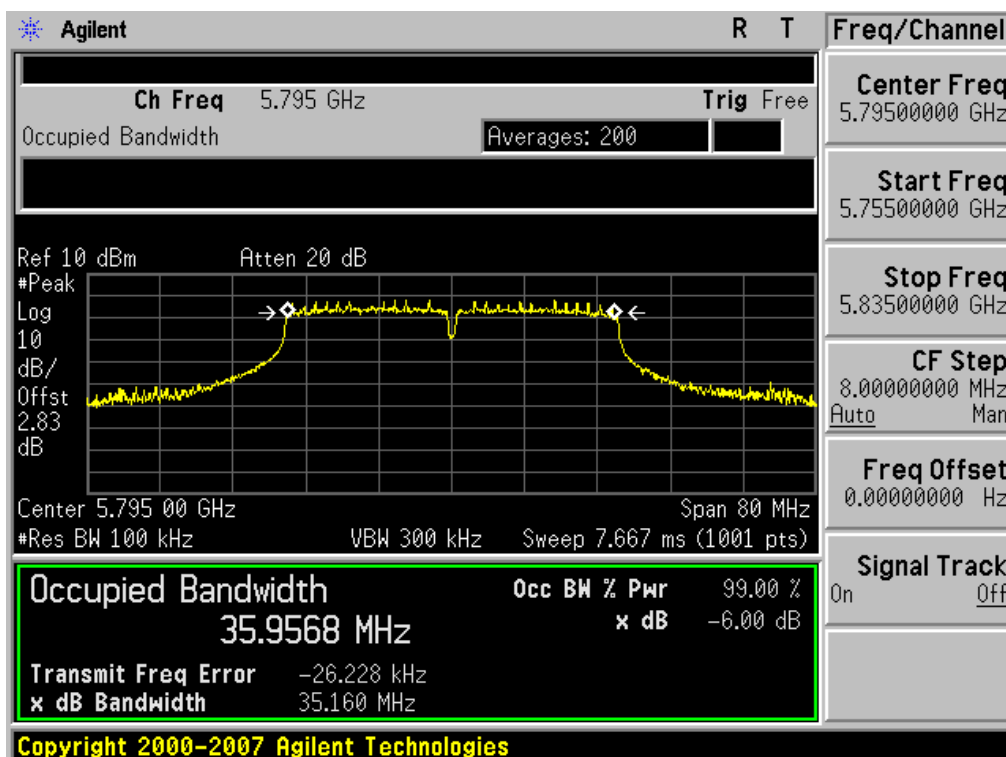
6 dB Bandwidth

Test Mode: 802.11n & MCS0 & 5755 MHz



6 dB Bandwidth

Test Mode: 802.11n & MCS0 & 5795 MHz

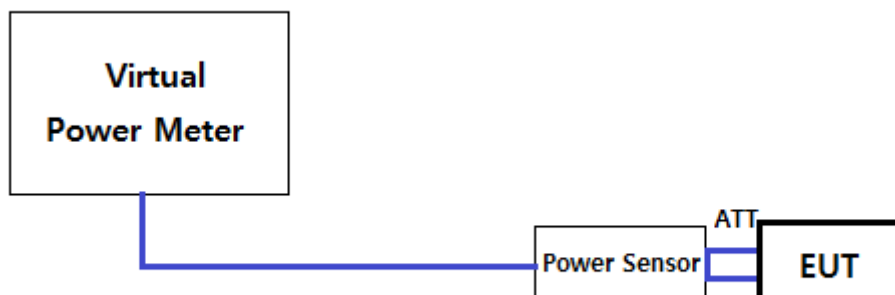


8.2 Maximum Peak Conducted Output Power

Test Requirements and limit, §15.247(b) & RSS-210 [A8.4]

The maximum permissible conducted output power is **1 Watt**.

■ TEST CONFIGURATION



■ TEST PROCEDURE:

A transmitter antenna terminal of EUT is connected to the input of a power sensor using an appropriate attenuator and the total path loss between EUT and a Power Sensor was corrected on the final measurement data using a power meter's internal function.

Measurements are made with a broadband power meter capable of making peak and average measurements while the EUT is operating in transmission mode at the appropriate frequencies.

■ TEST RESULTS: **Comply**

- Measurement Data:

Mode	Channel	Frequency [MHz]	Detector	Test Result [dBm]							
				DATA RATE [Mbps]							
				0	1	2	3	4	5	6	7
802.11n (HT20)	1	2412	PK	17.66	17.26	16.93	17.01	17.02	17.46	17.36	17.11
			AV	7.12	6.91	6.79	6.96	6.77	6.70	6.70	6.64
	6	2437	PK	17.57	17.25	17.24	17.02	16.91	17.15	16.97	17.01
			AV	7.10	7.02	7.05	6.63	6.56	6.44	6.39	6.32
	11	2462	PK	17.55	17.21	17.25	17.07	16.95	17.13	16.90	17.02
			AV	7.17	7.04	7.09	6.72	6.62	6.56	6.56	6.50

Mode	Channel	Frequency [MHz]	Detector	Test Result [dBm]							
				DATA RATE [Mbps]							
				0	1	2	3	4	5	6	7
802.11n (HT20)	149	5745	PK	19.74	19.57	19.27	19.30	19.45	19.66	19.43	19.64
			AV	8.93	8.89	8.83	8.78	8.71	8.61	8.50	8.47
	157	5785	PK	19.95	19.69	19.88	19.75	19.08	19.48	19.32	19.19
			AV	9.44	9.16	9.22	9.16	9.06	9.02	9.01	8.95
	165	5825	PK	20.22	20.20	19.80	19.75	20.04	20.00	20.16	19.97
			AV	9.72	9.63	9.63	9.56	9.45	9.39	9.37	9.30

Mode	Channel	Frequency [MHz]	Detector	Test Result [dBm]							
				DATA RATE [MCS]							
				0	1	2	3	4	5	6	7
802.11n (HT40)	151	5755	PK	21.74	21.33	21.35	21.28	21.03	21.36	21.26	21.10
			AV	10.66	10.62	10.59	9.92	9.68	9.60	9.69	9.53
	159	5795	PK	21.47	20.83	20.70	21.09	20.89	21.00	21.03	20.97
			AV	10.46	10.19	10.02	9.86	9.71	9.56	9.56	9.45

8.3 Maximum Power Spectral Density

Test requirements and limit, §15.247(e) & RSS-210 [A8.2]

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

Minimum Standard –specifies a conducted power spectral density (PSD) limit of 8 dBm in any 3 kHz band segment within the fundamental EBW during any time interval of continuous transmission.

■TEST CONFIGURATION

Refer to the APPENDIX I.

■TEST PROCEDURE:

The Measurement Procedure **Method PKPSD of KDB558074** is used.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to **1.5 times** the DTS bandwidth.
3. Set the RBW to: **3 kHz ≤ RBW ≤ 100 kHz**.
4. Set the VBW **≥ 3 x RBW**.
5. Detector = **peak**.
6. Sweep time = **auto couple**.
7. Trace mode = **max hold**.
8. Allow trace to fully stabilize.
9. Use the **peak marker function** to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

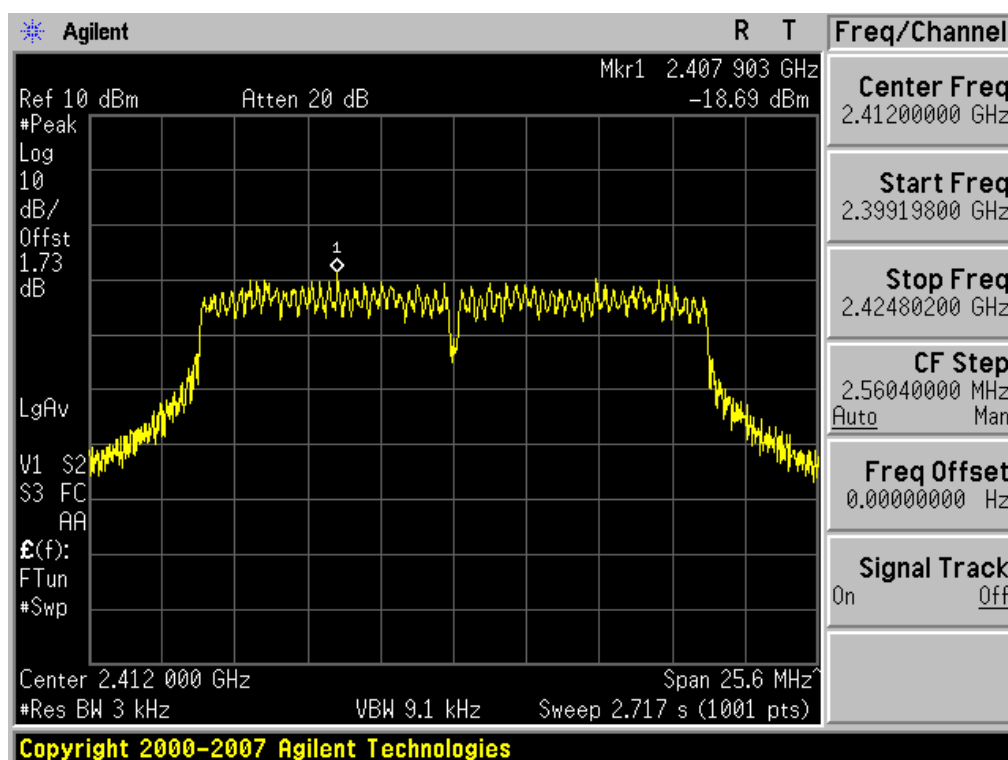
■TEST RESULTS: **Comply**

Test Mode	Data Rate	Frequency [MHz]	RBW	PKPSD [dBm]
802.11n HT20	MCS0	2412	3 kHz	- 18.69
		2437	3 kHz	- 19.31
		2462	3 kHz	- 18.25
802.11n HT20	MCS0	5745	3 kHz	- 16.15
		5785	3 kHz	- 14.65
		5825	3 kHz	- 15.40
802.11n HT40	MCS0	5755	3 kHz	- 15.62
		5795	3 kHz	- 16.21

■ RESULT PLOTS

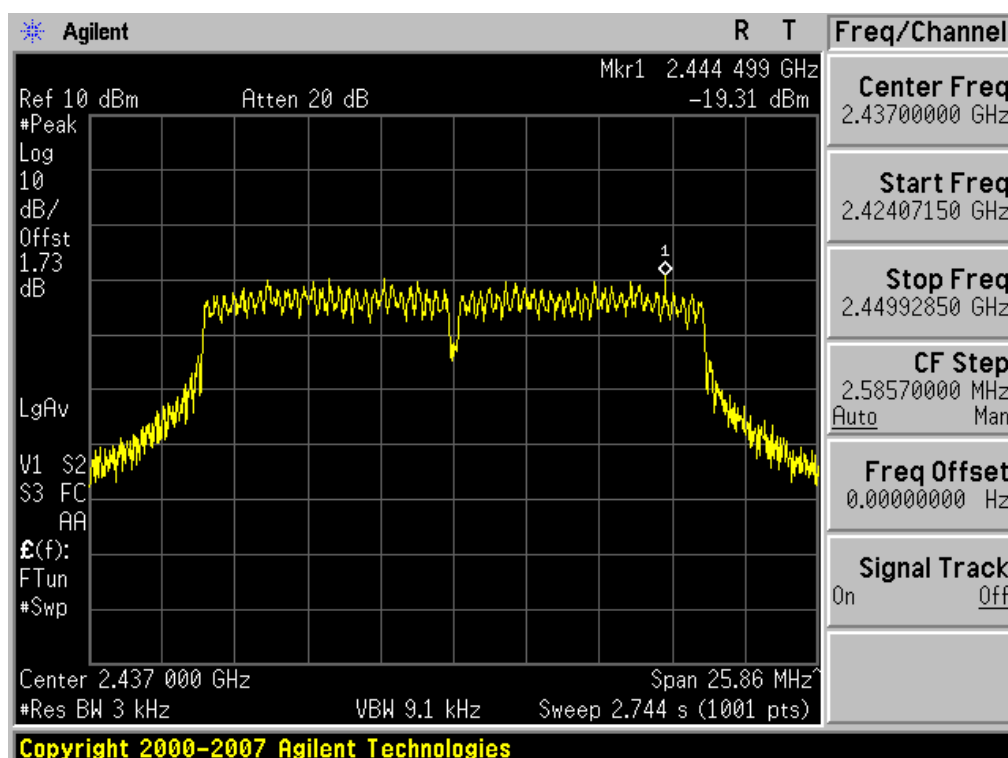
Maximum PKPSD

Test Mode: 802.11n & MCS0 & 2412 MHz



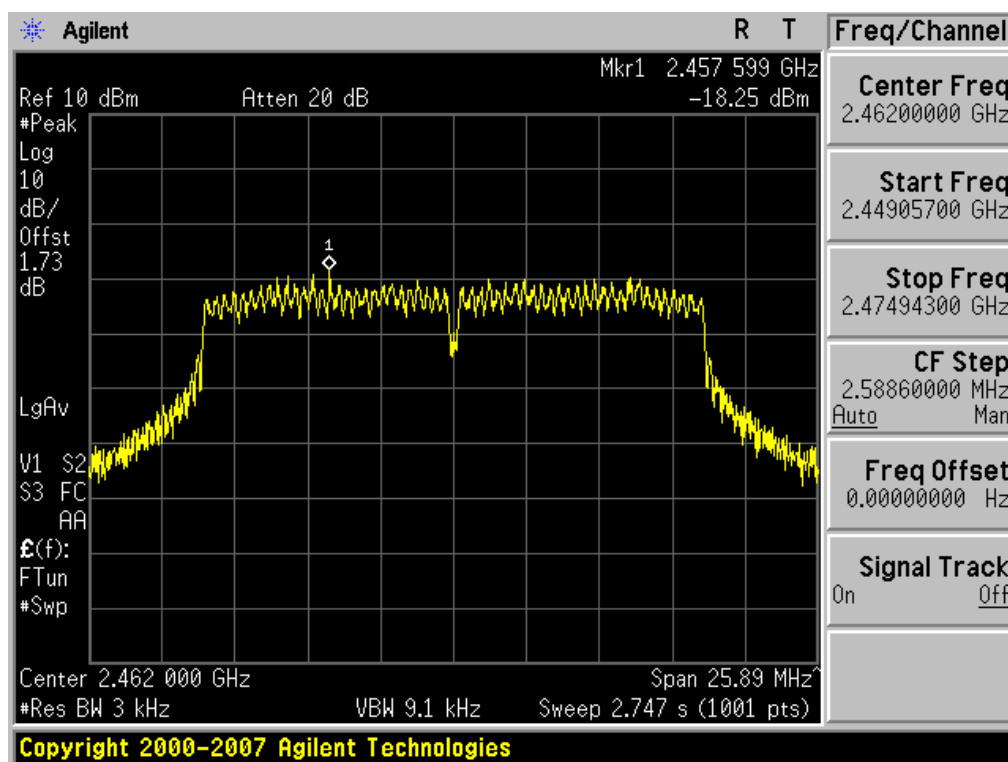
Maximum PKPSD

Test Mode: 802.11n & MCS0 & 2437 MHz



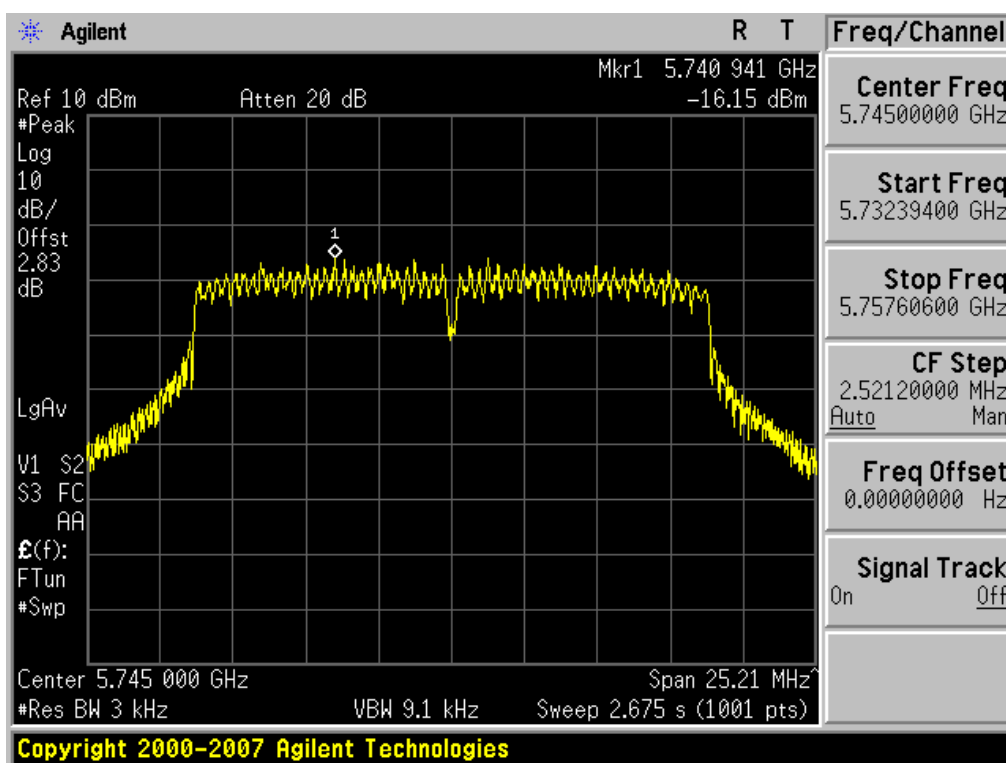
Maximum PKPSD

Test Mode: 802.11n & MCS0 & 2462 MHz



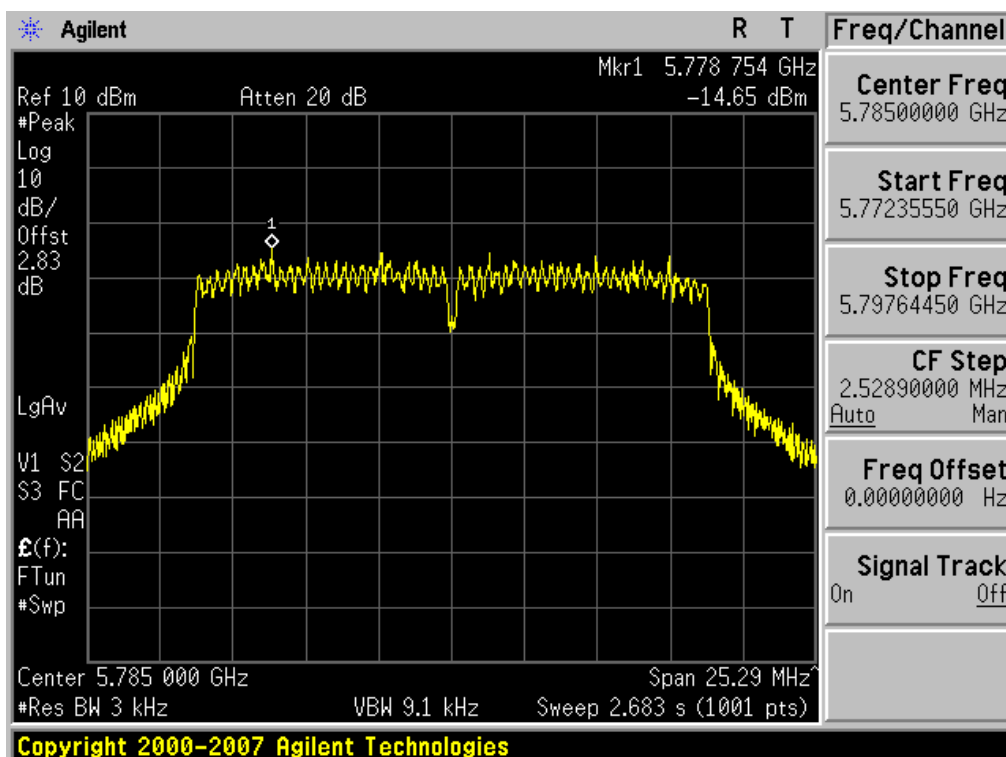
Maximum PKPSD

Test Mode: 802.11n & MCS0 & 5745 MHz



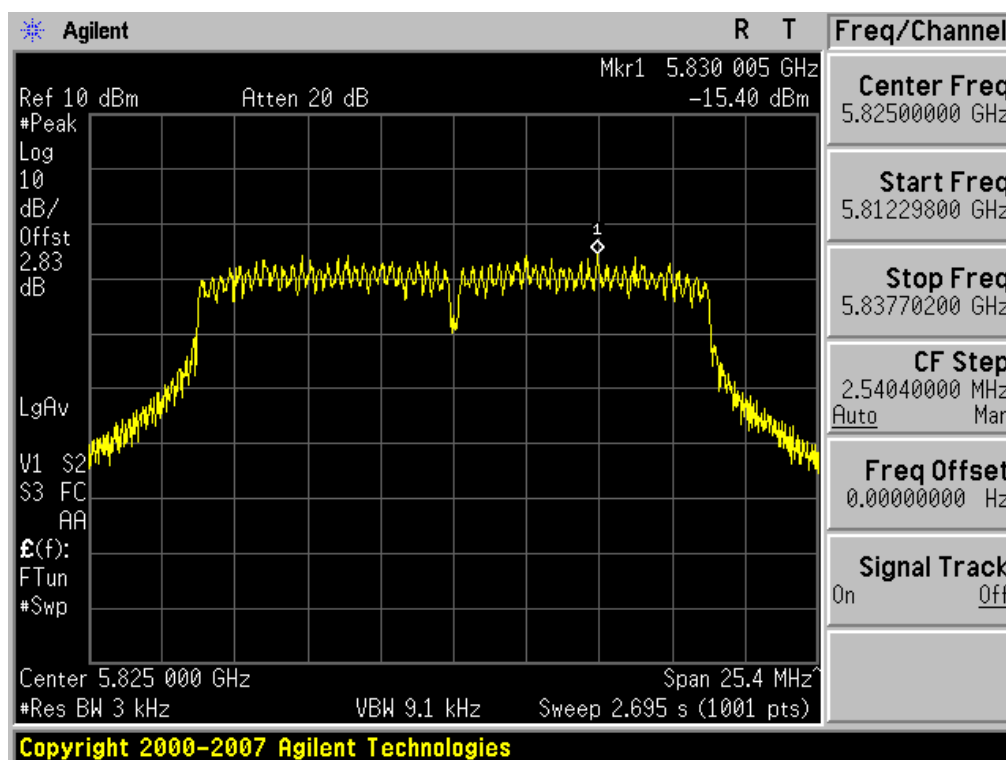
Maximum PKPSD

Test Mode: 802.11n & MCS0 & 5785 MHz



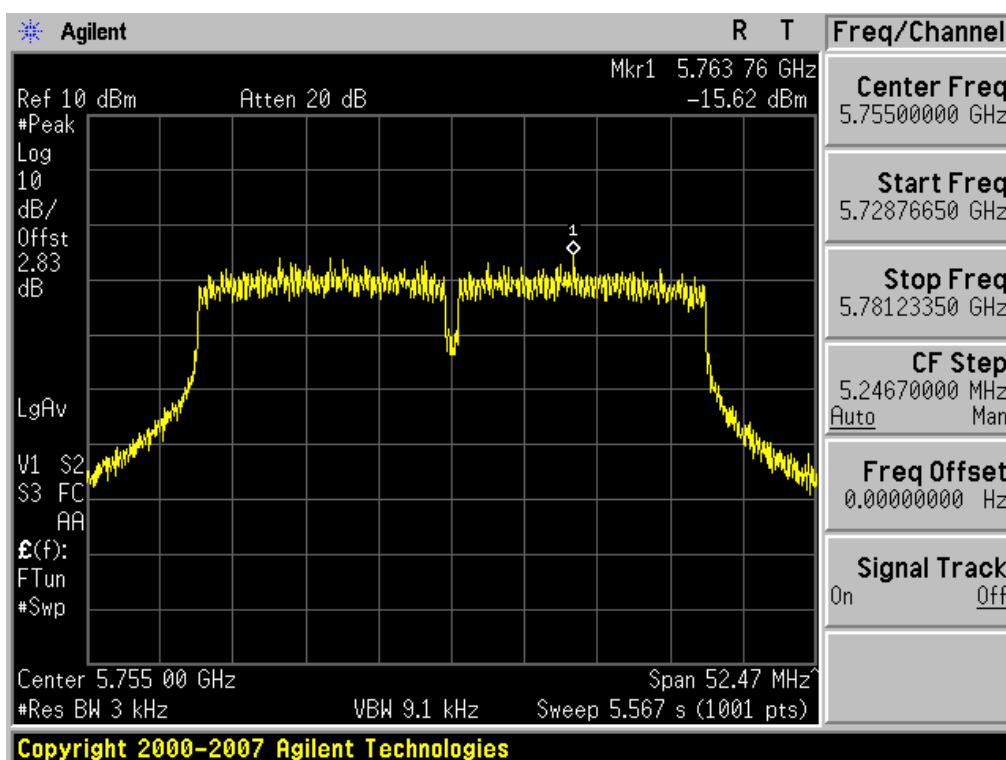
Maximum PKPSD

Test Mode: 802.11n & MCS0 & 5825 MHz



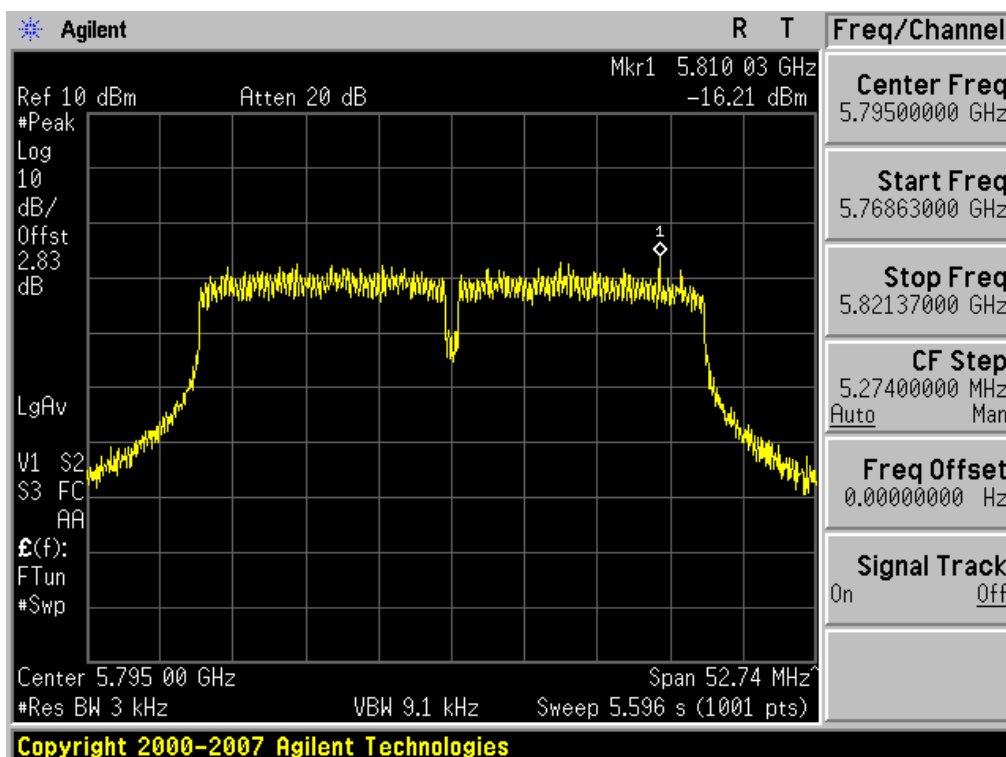
Maximum PKPSD

Test Mode: 802.11n & MCS0 & 5755 MHz



Maximum PKPSD

Test Mode: 802.11n & MCS0 & 5795 MHz



8.4 Out of Band Emissions at the Band Edge / Conducted Spurious Emissions

Test requirements and limit, §15.247(d)

§15.247(d) specifies that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

If the **peak output power procedure** is used to measure the fundamental emission power to demonstrate compliance to **15.247(b)(3)** requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated **by at least 20 dB** relative to the maximum measured in-band peak PSD level.

If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to **15.247(b)(3)** requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in band average PSD level.

In either case, attenuation to levels below the general emission limits specified in **§15.209(a)** is not required.

■ TEST CONFIGURATION

Refer to the APPENDIX I.

■ TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer.

- Measurement Procedure 1 – Reference Level

1. Set instrument center frequency to DTS channel center frequency.
2. Set the span to ≥ 1.5 times the DTS bandwidth.
3. Set the RBW = 100 kHz.
4. Set the VBW $\geq 3 \times$ RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum PSD level

- Measurement Procedure 2 - Unwanted Emissions

1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = **100 kHz.** (Actual 1 MHz, See below note)
3. Set the VBW $\geq 3 \times$ RBW. (Actual 3 MHz, See below note)
4. Detector = **peak.**
5. Ensure that the number of measurement points \geq span/RBW
6. Sweep time = **auto couple.**
7. Trace mode = **max hold.**
8. **Allow the trace to stabilize** (this may take some time, depending on the extent of the span).
9. Use the peak marker function to determine the maximum amplitude level.

Note : The conducted spurious emission was tested each ranges were set as below.

Frequency range: 9KHz ~ 30MHz

RBW= 100 kHz, VBW= 300 kHz, SWEEP TIME = AUTO, DETECTOR = PEAK, TRACE = MAX HOLD, BINS: 30001

Frequency range: 30MHz~26.5GHz (Tested using S/A's measurement function with total 11 sub ranges.)

RBW= 1 MHz, VBW= 3 MHz, SWEEP TIME = AUTO, DETECTOR = PEAK, TRACE = MAX HOLD, SPAN = MAX 3 GHz (Below 10 GHz) and MAX 5 GHz (Above 10 GHz), BINS = at least 2001 (Each 1GHz range)

Frequency range: 26.5~40GHz

RBW= 1MHz, VBW= 3MHz, SWEEP TIME = AUTO, DETECTOR = PEAK, TRACE = MAX HOLD, BINS: 30001

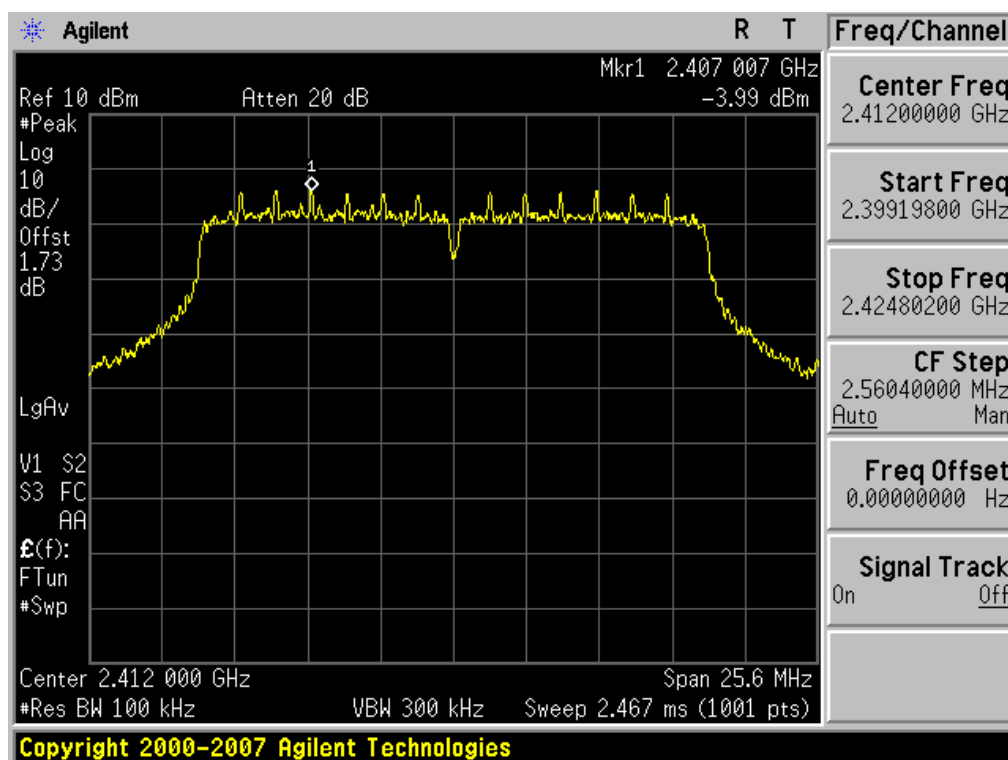
If the emission level with above setting was close to the limit (ie, less than 3 dB margin) then zoom scan is required using RBW = 100 KHz, VBW = 300KHz, SPAN = 100 MHz and BINS = 2001 to get accurate emission level within 100 KHz BW.

Also the path loss for conducted measurement setup was used as described on the Appendix I of this test report.

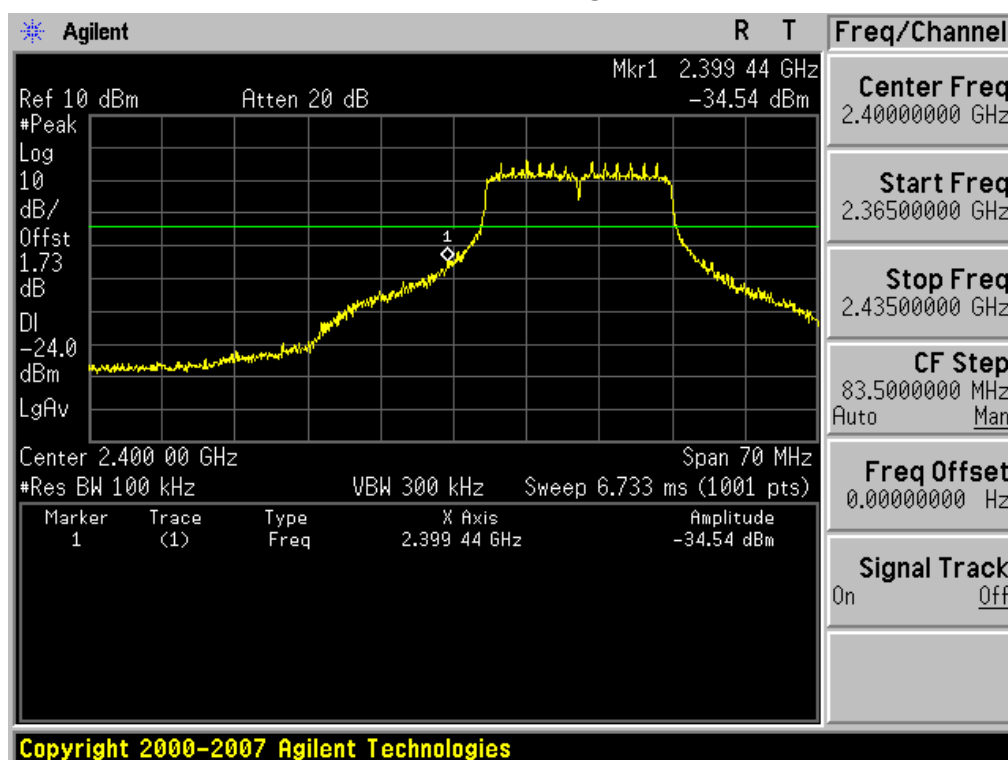
■ RESULT PLOTS

802.11n & MCS0 & 2412 MHz

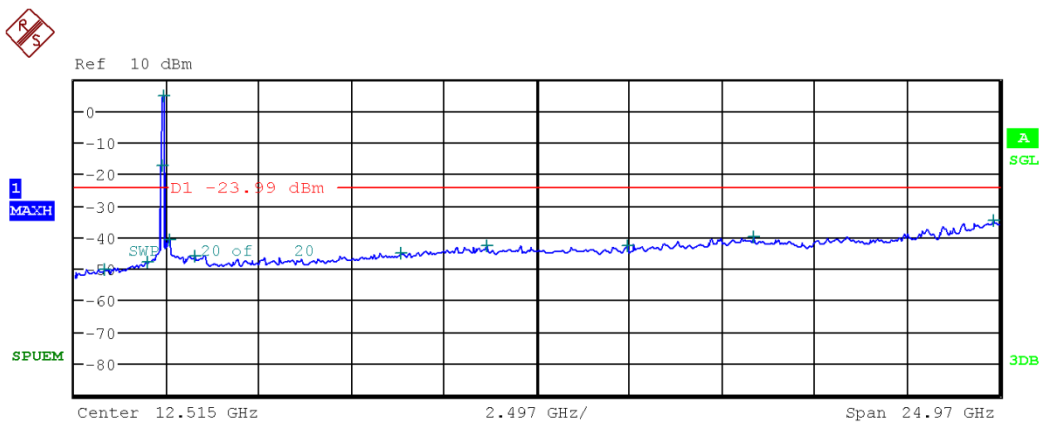
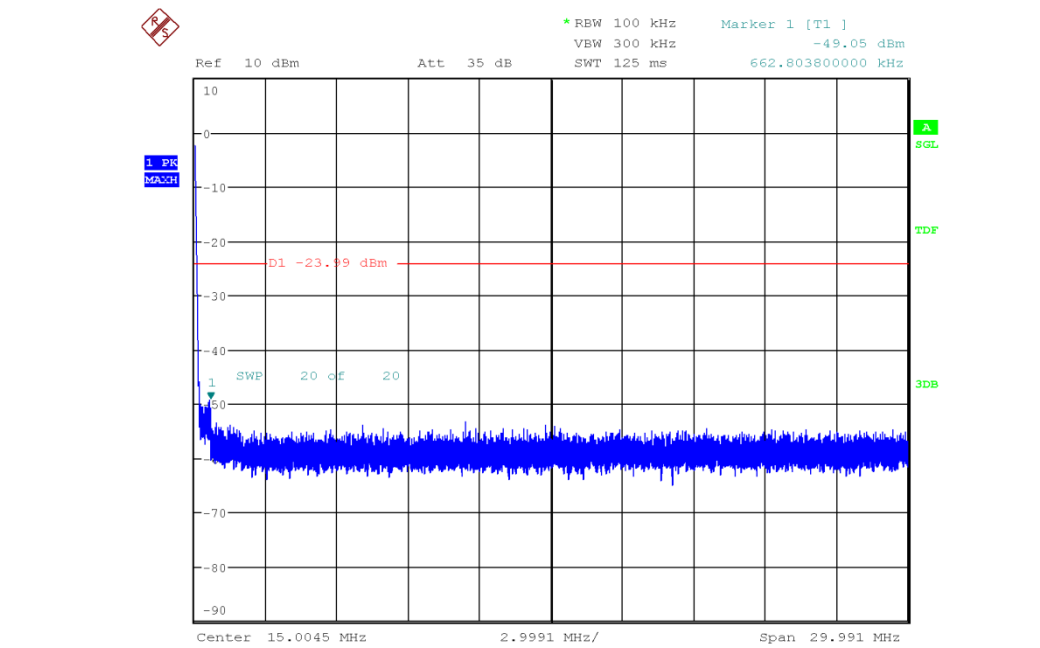
Reference



Low Band-edge



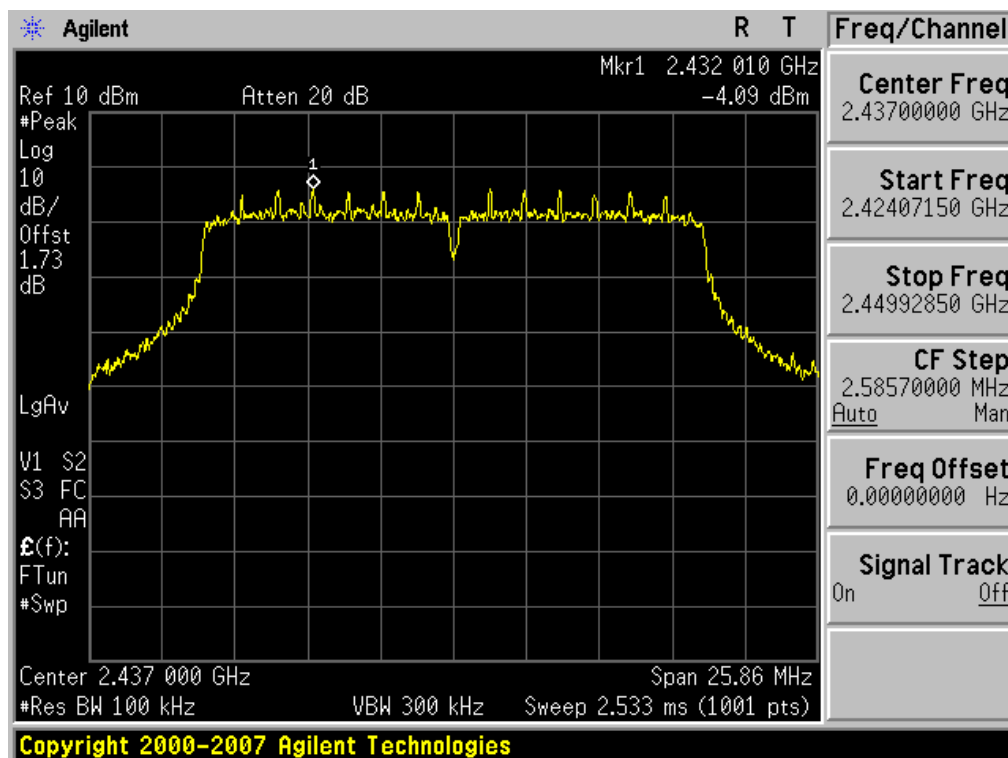
Conducted Spurious Emissions



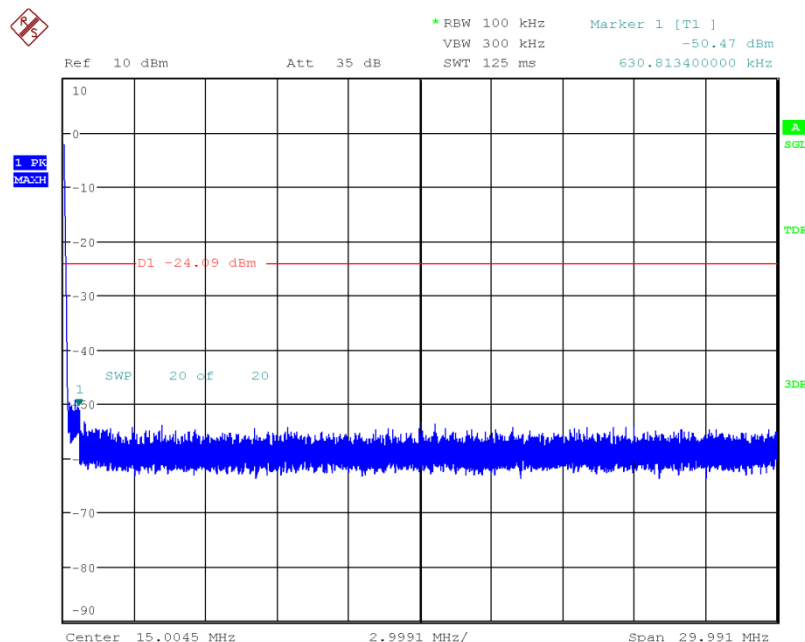
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]
30.000 M	1.000 G	1.00 M	843.830000 M	-50.13
1.000 G	2.000 G	1.00 M	1.987333 G	-47.95
2.000 G	2.400 G	1.00 M	2.400000 G	-17.49
2.400 G	2.483 G	1.00 M	2.415197 G	4.61
2.483 G	3.000 G	1.00 M	2.575644 G	-40.99
3.000 G	6.000 G	1.00 M	3.282333 G	-45.95
6.000 G	9.000 G	1.00 M	8.834333 G	-45.10
9.000 G	12.000 G	1.00 M	11.174000 G	-42.94
12.000 G	15.000 G	1.00 M	14.964000 G	-42.64
15.000 G	20.000 G	1.00 M	18.369500 G	-39.97
20.000 G	25.000 G	1.00 M	24.820000 G	-34.95

802.11n & MCS0 & 2437 MHz

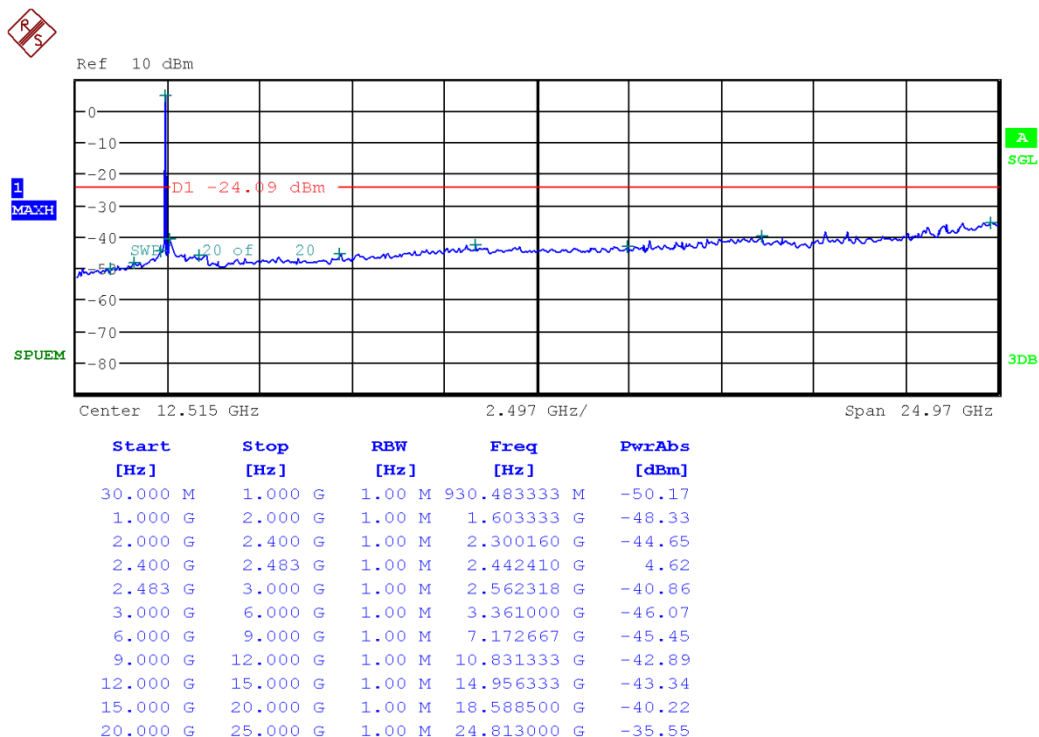
Reference



Conducted Spurious Emissions

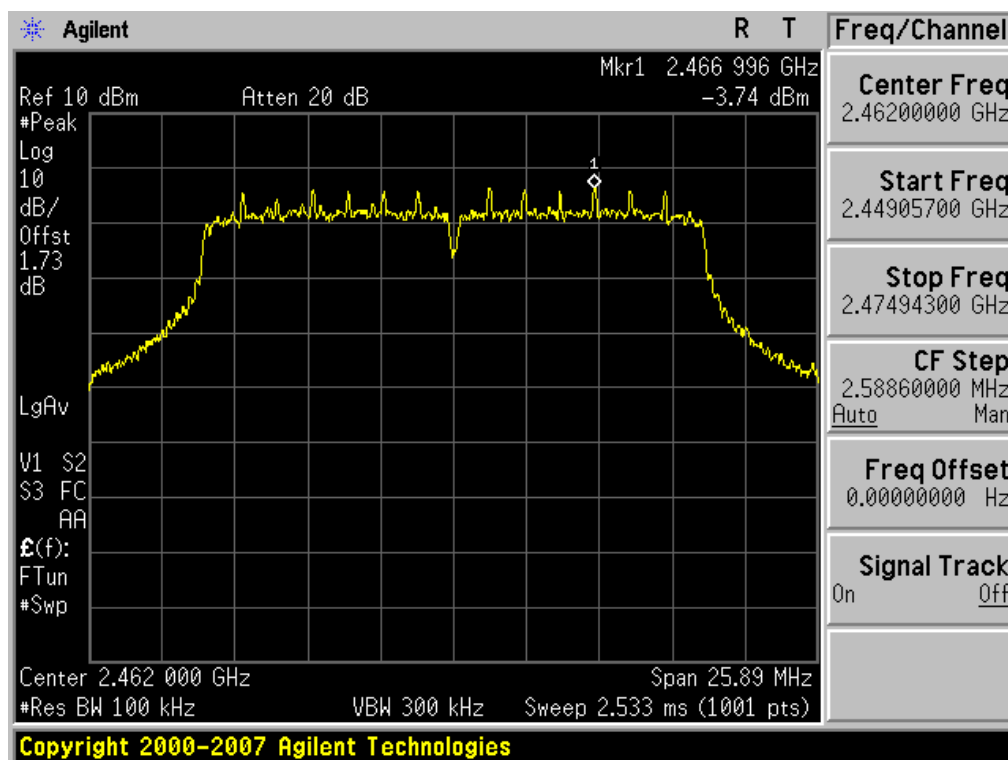


Conducted Spurious Emissions

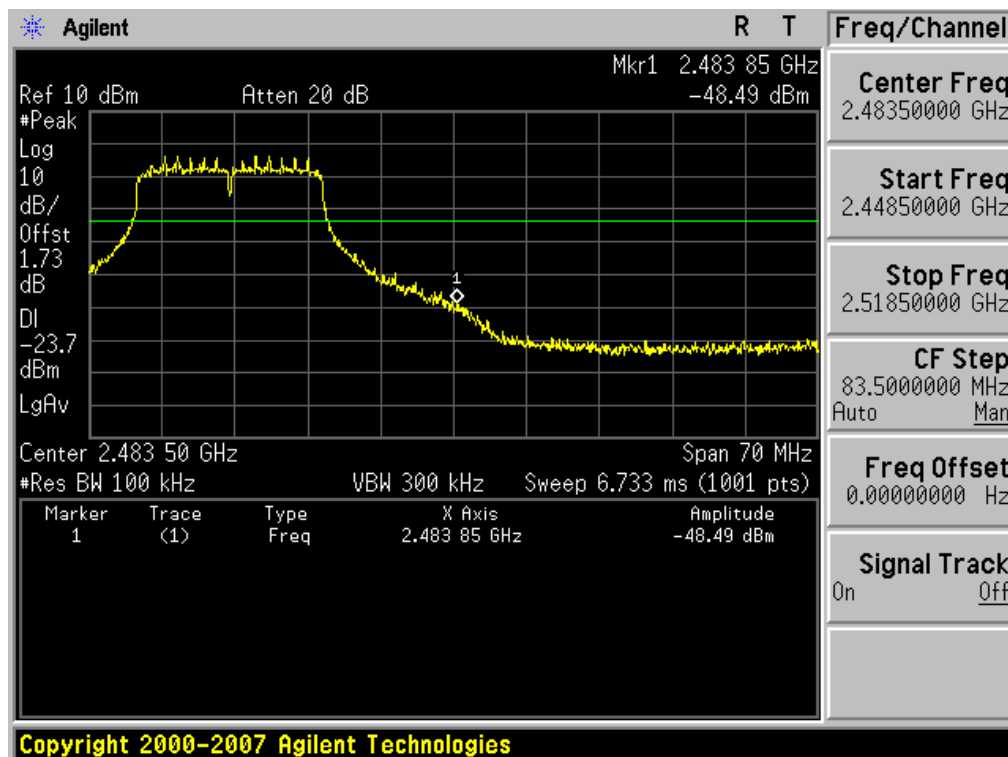


802.11n & MCS0 & 2462 MHz

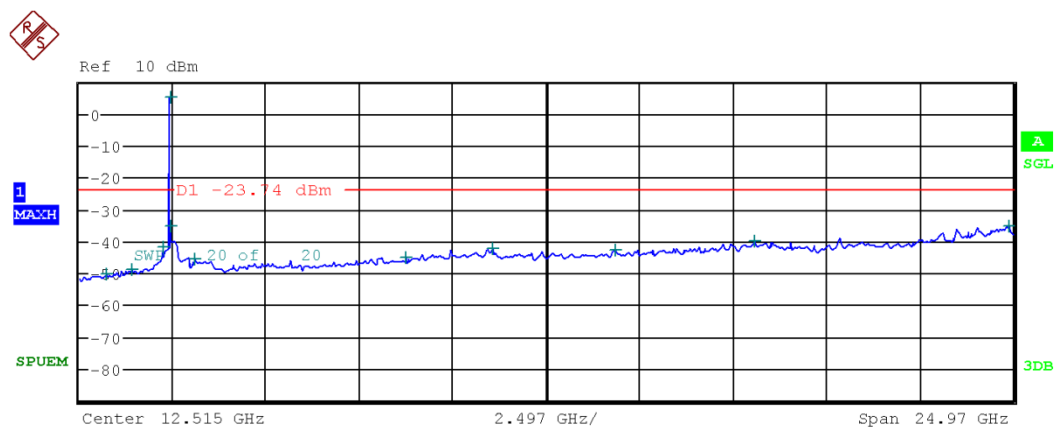
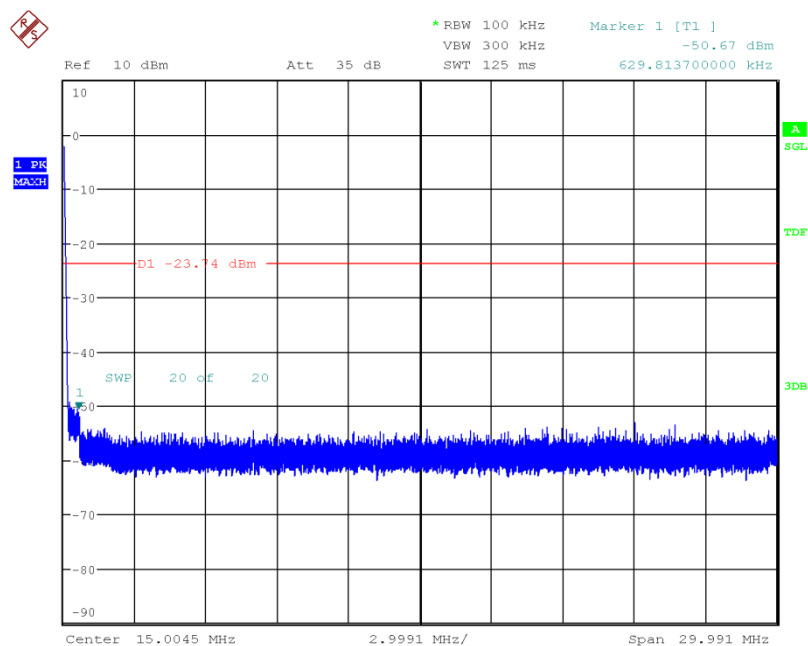
Reference



High Band-edge



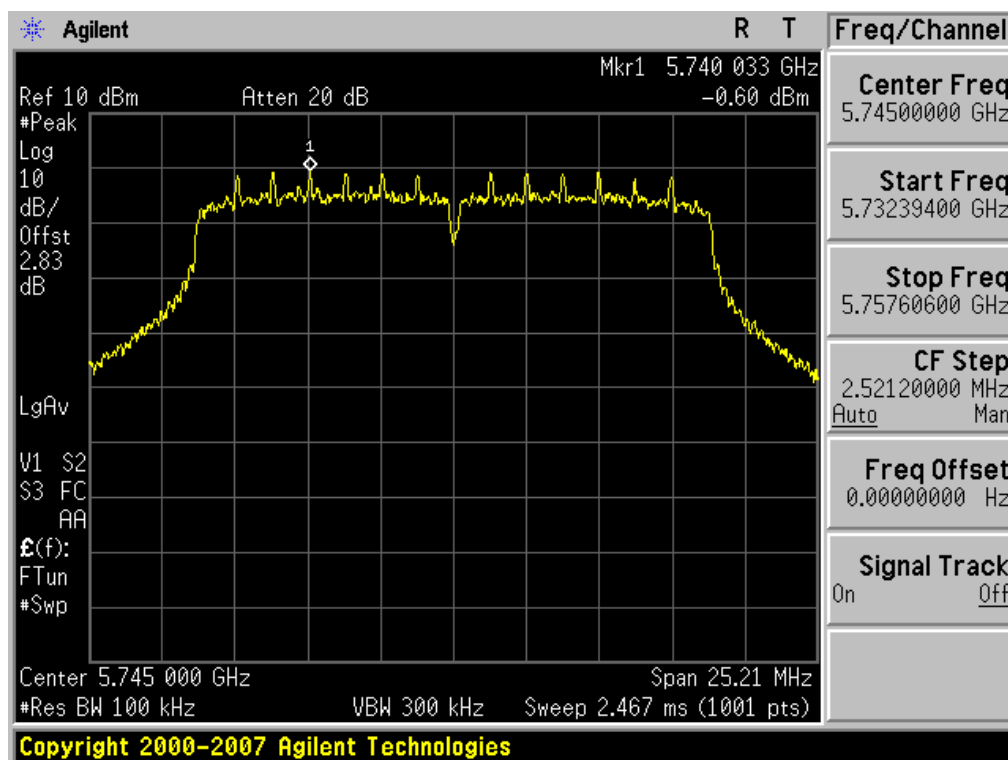
Conducted Spurious Emissions



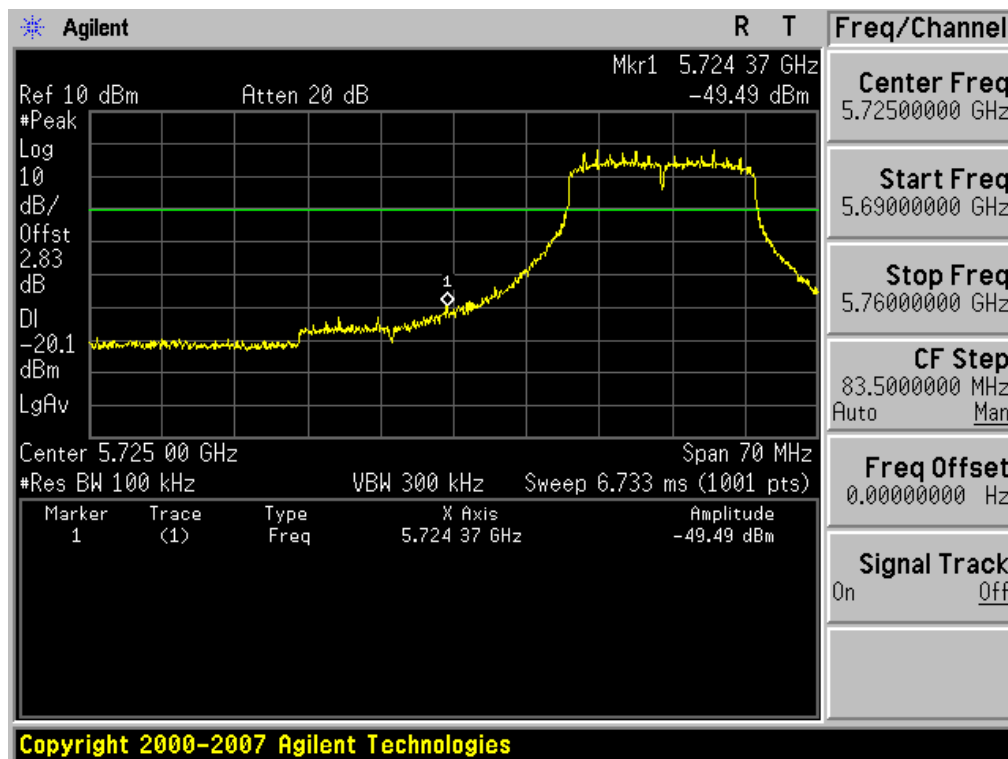
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]
30.000 M	1.000 G	1.00 M	759.763333 M	-50.16
1.000 G	2.000 G	1.00 M	1.438000 G	-48.79
2.000 G	2.400 G	1.00 M	2.280920 G	-42.07
2.400 G	2.483 G	1.00 M	2.458893 G	4.90
2.483 G	3.000 G	1.00 M	2.483913 G	-35.37
3.000 G	6.000 G	1.00 M	3.121667 G	-45.87
6.000 G	9.000 G	1.00 M	8.735000 G	-45.16
9.000 G	12.000 G	1.00 M	11.088667 G	-42.34
12.000 G	15.000 G	1.00 M	14.336333 G	-42.89
15.000 G	20.000 G	1.00 M	18.082000 G	-40.06
20.000 G	25.000 G	1.00 M	24.871000 G	-35.34

802.11n & MCS0 & 5745 MHz

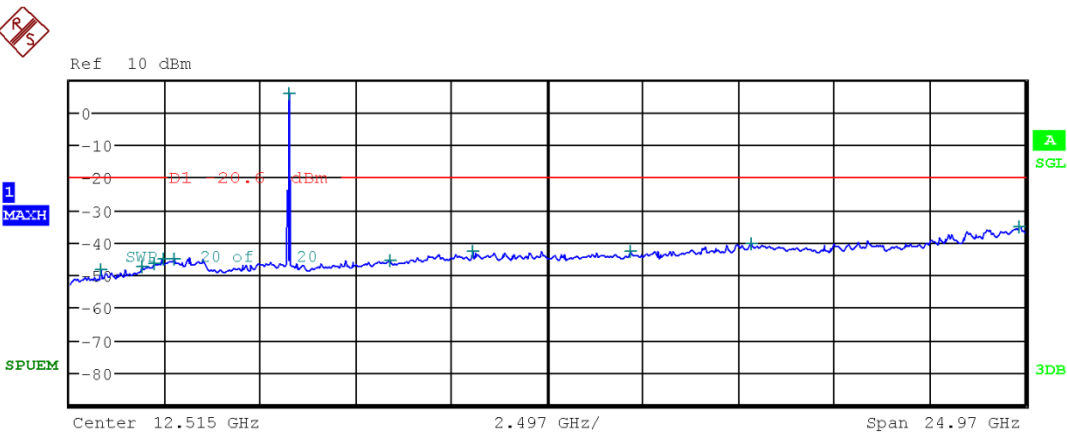
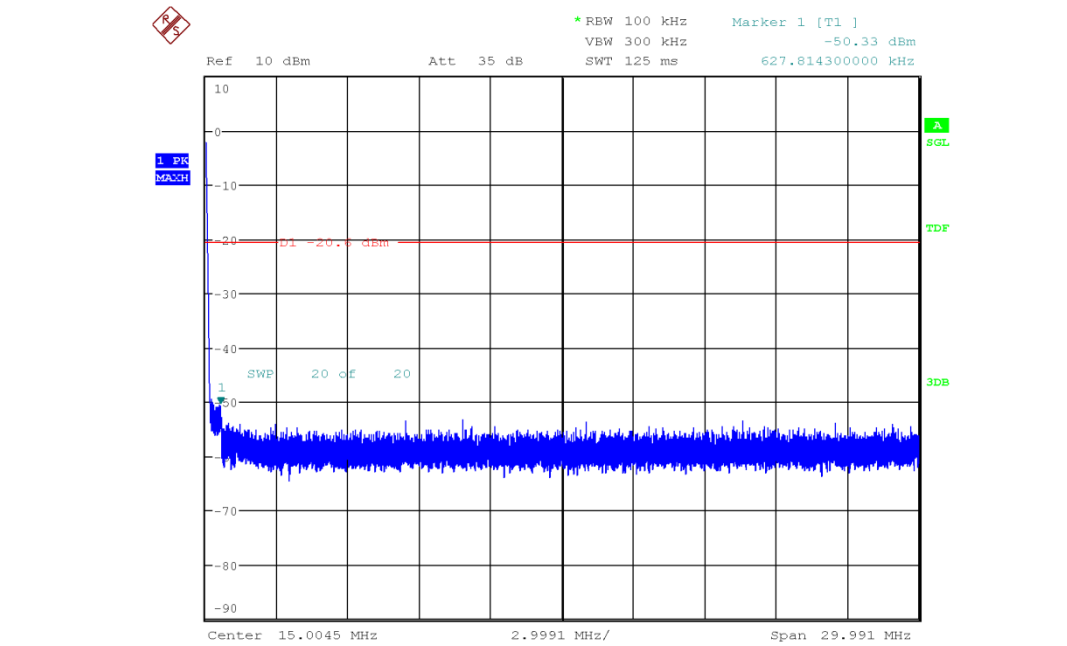
Reference



Low Band-edge

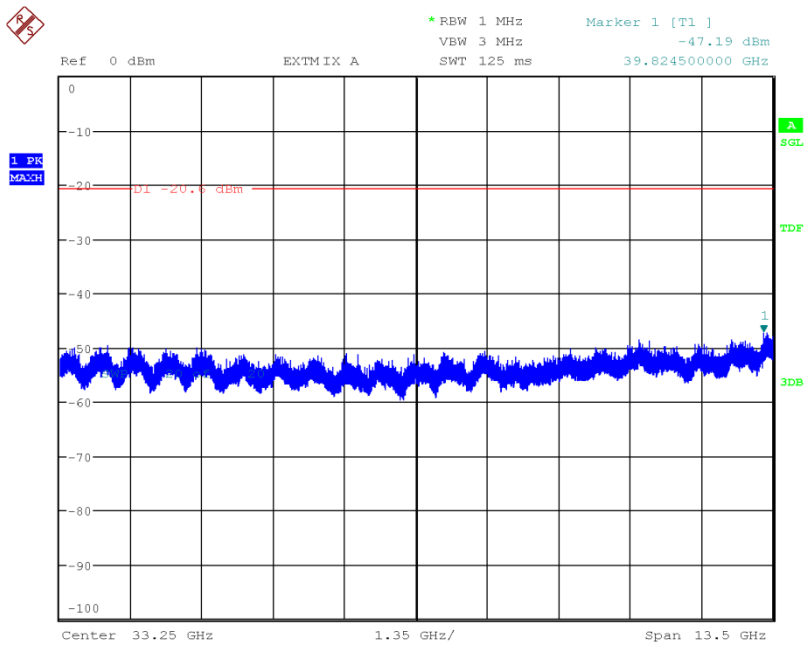


Conducted Spurious Emissions



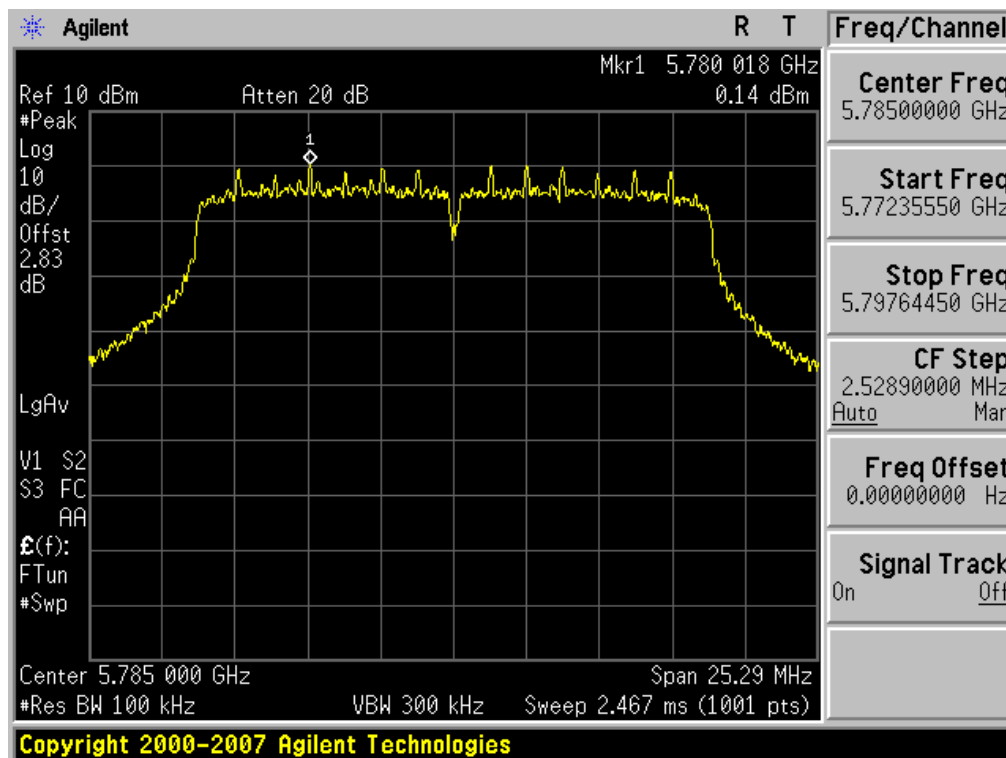
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]
30.000 M	1.000 G	1.00 M	815.700000 M	-48.33
1.000 G	2.000 G	1.00 M	1.904333 G	-47.30
2.000 G	2.400 G	1.00 M	2.221120 G	-46.56
2.400 G	2.483 G	1.00 M	2.471676 G	-45.20
2.483 G	3.000 G	1.00 M	2.739994 G	-45.18
3.000 G	6.000 G	1.00 M	5.748000 G	5.61
6.000 G	9.000 G	1.00 M	8.387333 G	-45.64
9.000 G	12.000 G	1.00 M	10.550000 G	-43.05
12.000 G	15.000 G	1.00 M	14.656333 G	-42.97
15.000 G	20.000 G	1.00 M	17.832000 G	-40.60
20.000 G	25.000 G	1.00 M	24.825000 G	-35.40

Conducted Spurious Emissions

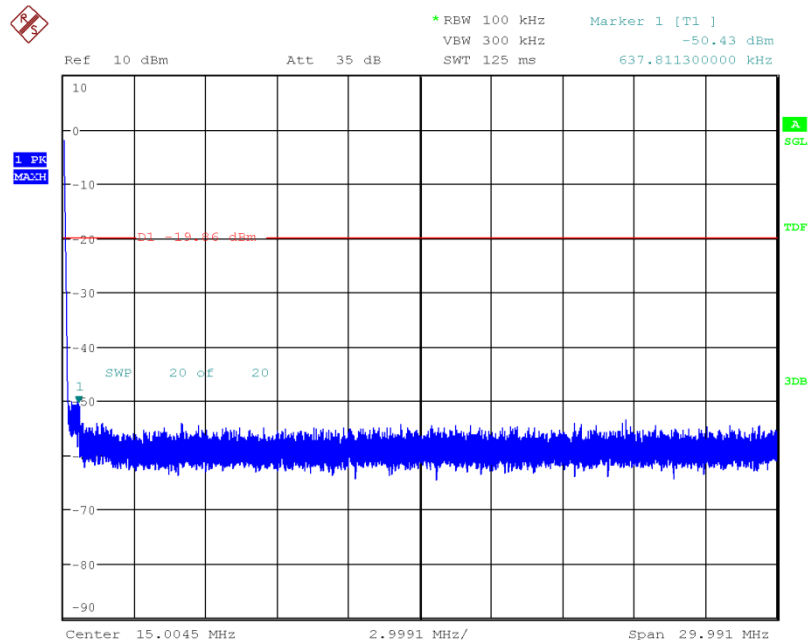


802.11n & MCS0 & 5785 MHz

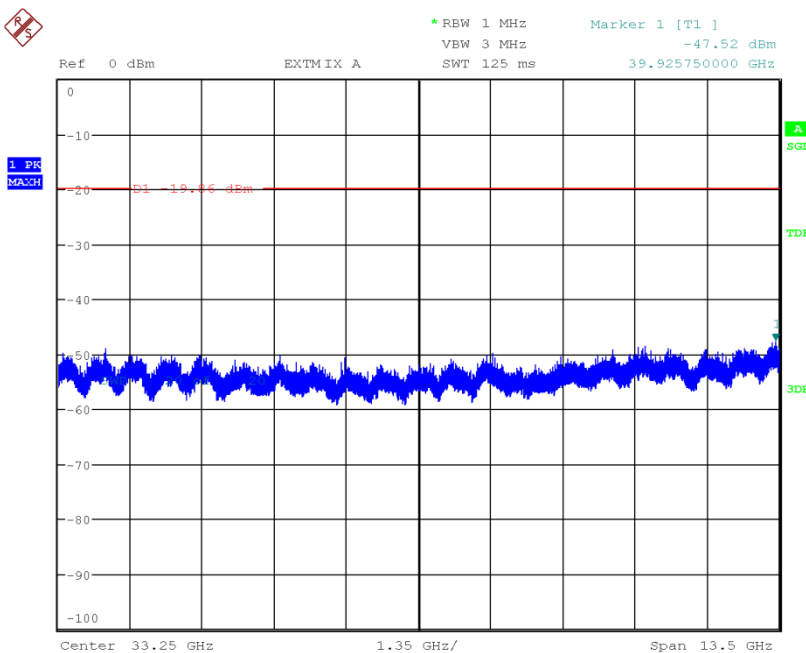
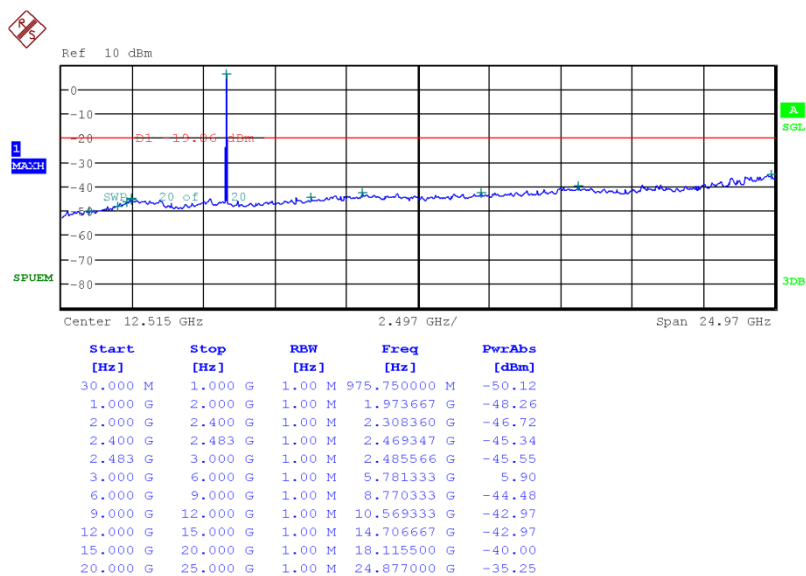
Reference



Conducted Spurious Emissions

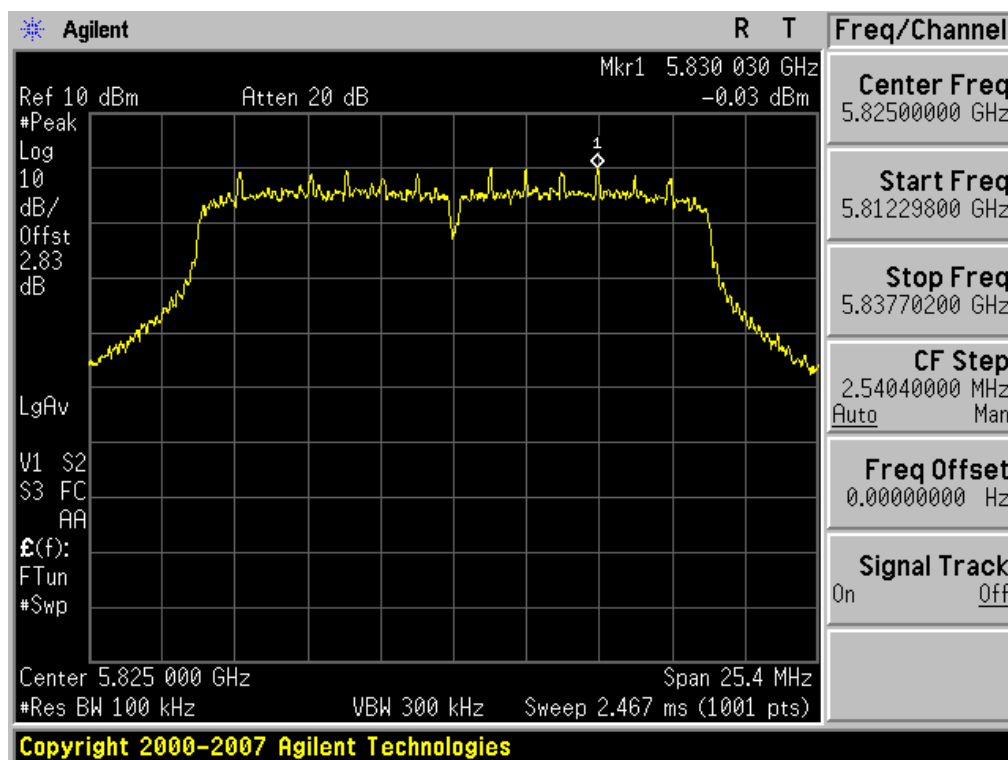


Conducted Spurious Emissions

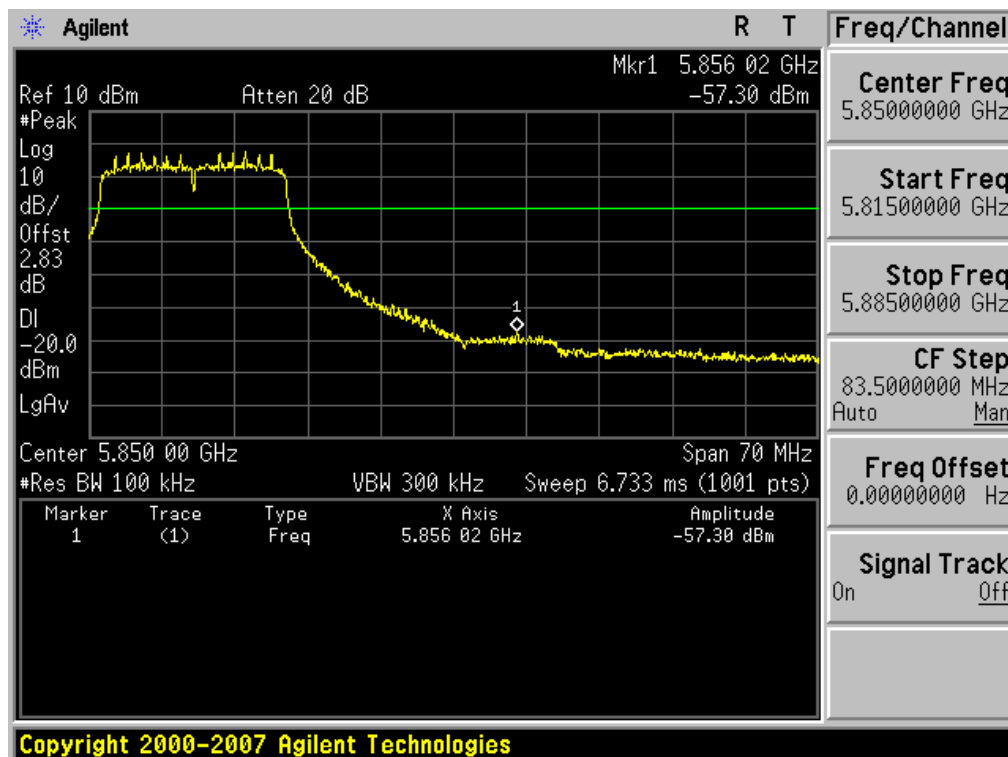


802.11n & MCS0 & 5825 MHz

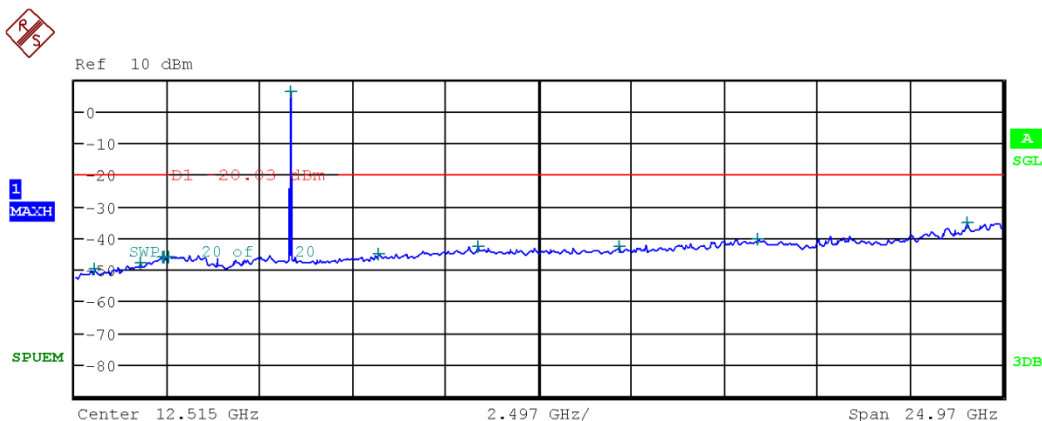
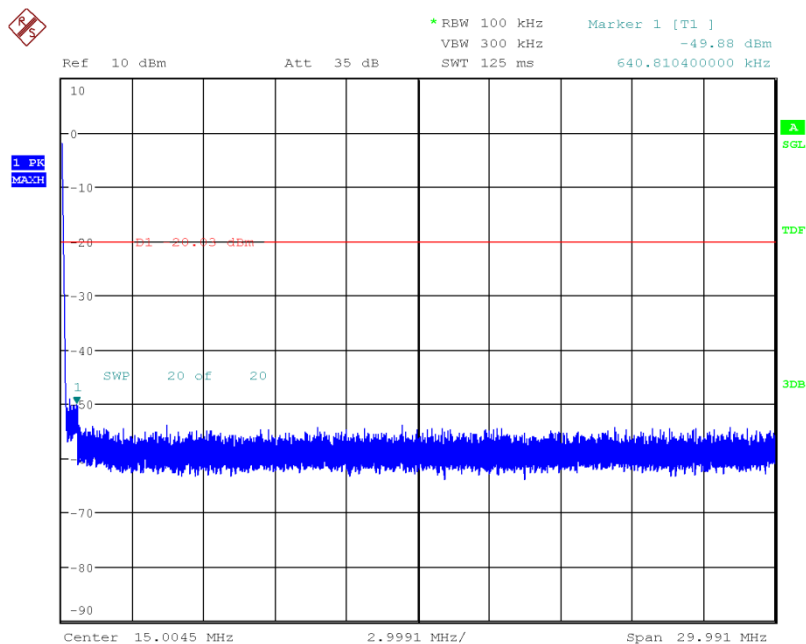
Reference



High Band-edge

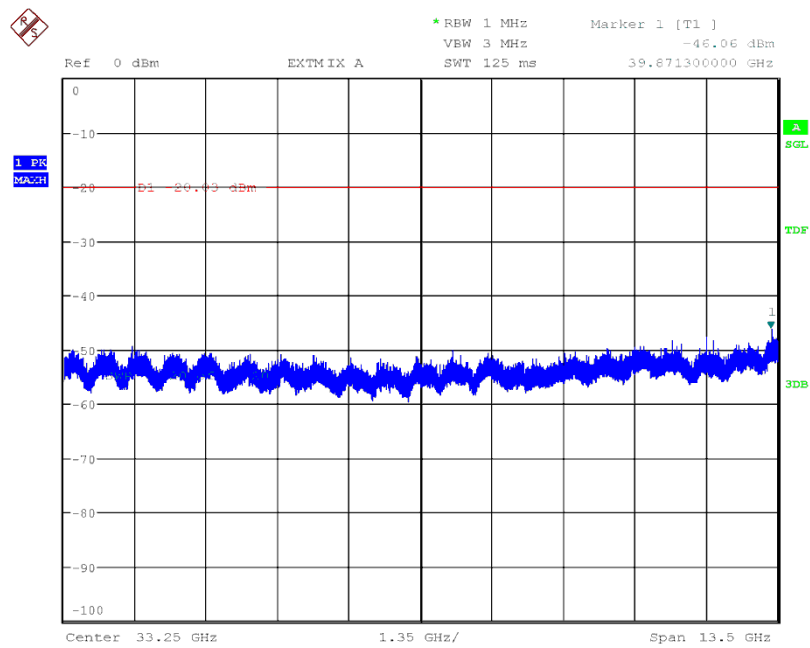


Conducted Spurious Emissions



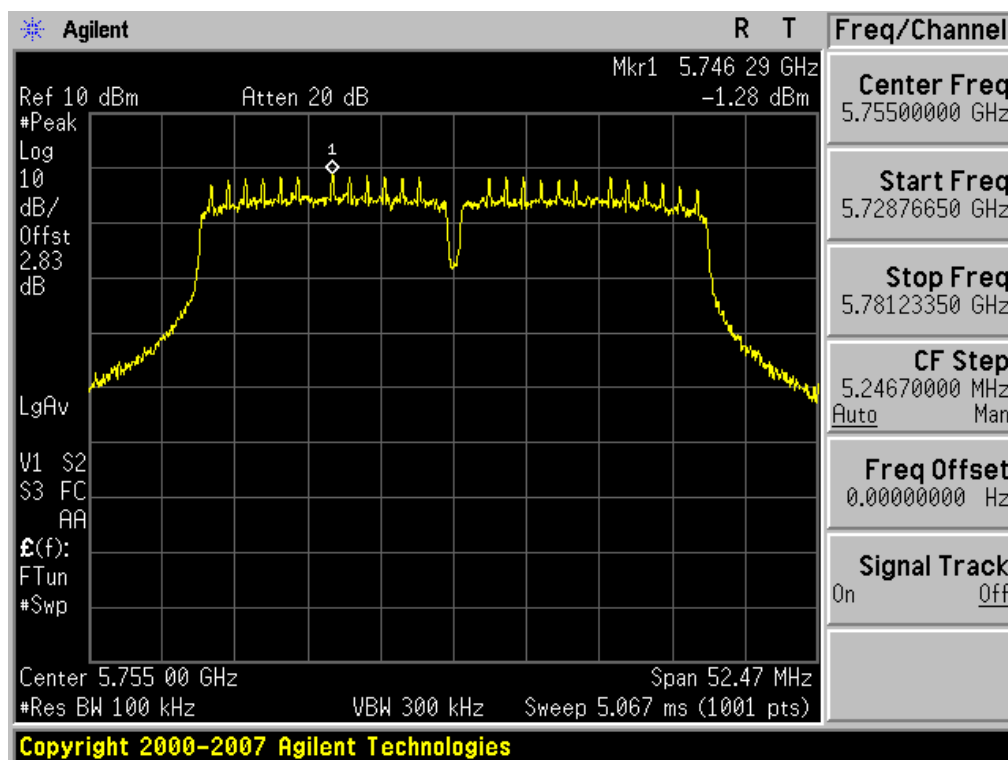
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]
30.000 M	1.000 G	1.00 M	537.956667 M	-50.02
1.000 G	2.000 G	1.00 M	1.800667 G	-47.94
2.000 G	2.400 G	1.00 M	2.377960 G	-46.26
2.400 G	2.483 G	1.00 M	2.439562 G	-45.99
2.483 G	3.000 G	1.00 M	2.561285 G	-45.95
3.000 G	6.000 G	1.00 M	5.828333 G	6.05
6.000 G	9.000 G	1.00 M	8.178000 G	-45.05
9.000 G	12.000 G	1.00 M	10.854667 G	-42.86
12.000 G	15.000 G	1.00 M	14.686667 G	-43.00
15.000 G	20.000 G	1.00 M	18.417000 G	-40.54
20.000 G	25.000 G	1.00 M	24.035500 G	-35.10

Conducted Spurious Emissions

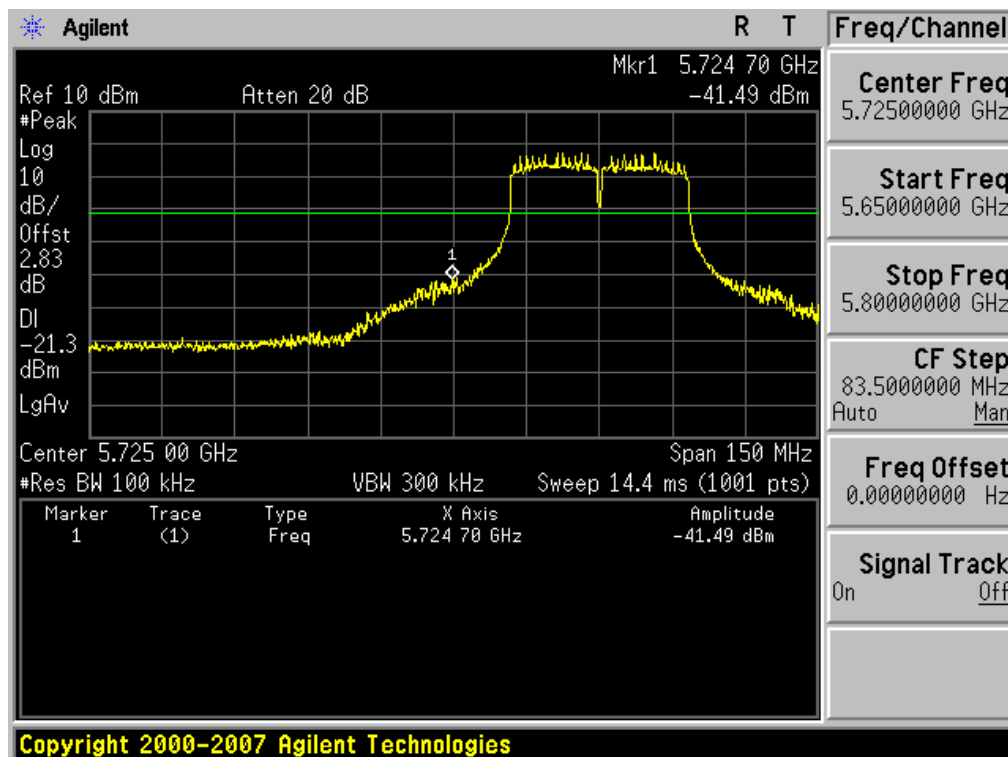


802.11n & MCS0 & 5755 MHz

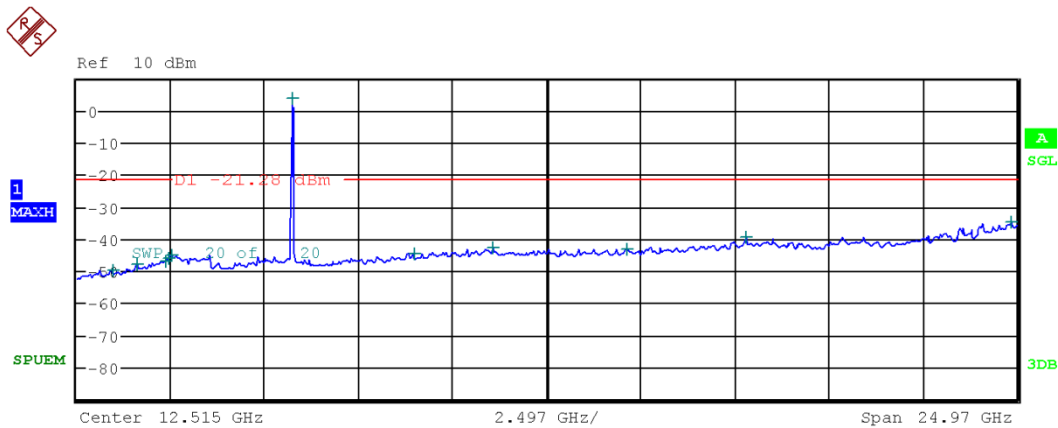
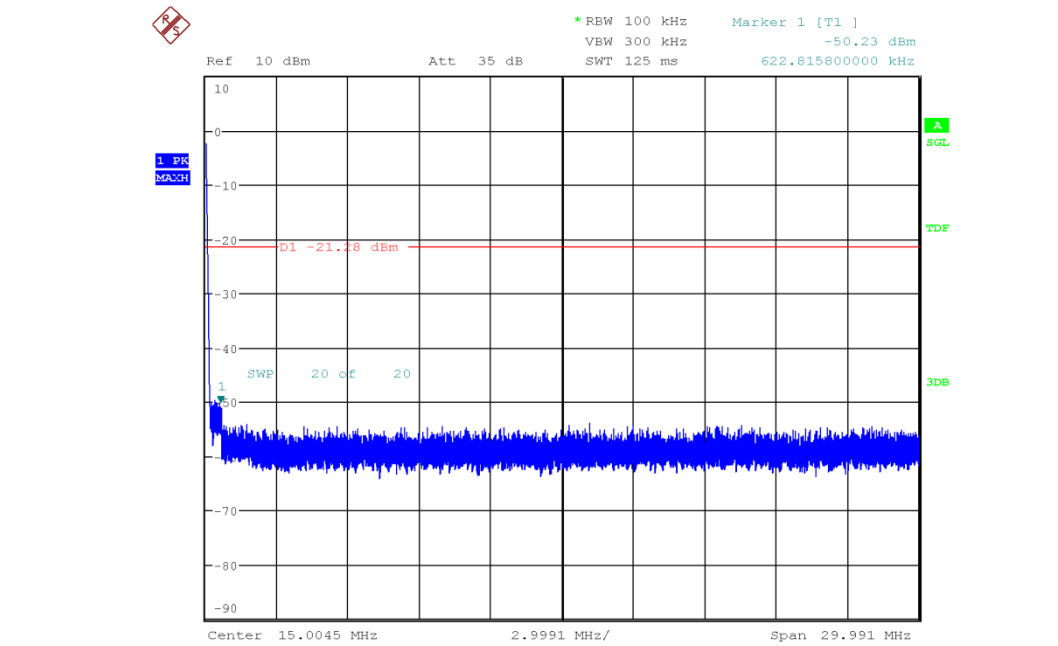
Reference



Low Band-edge

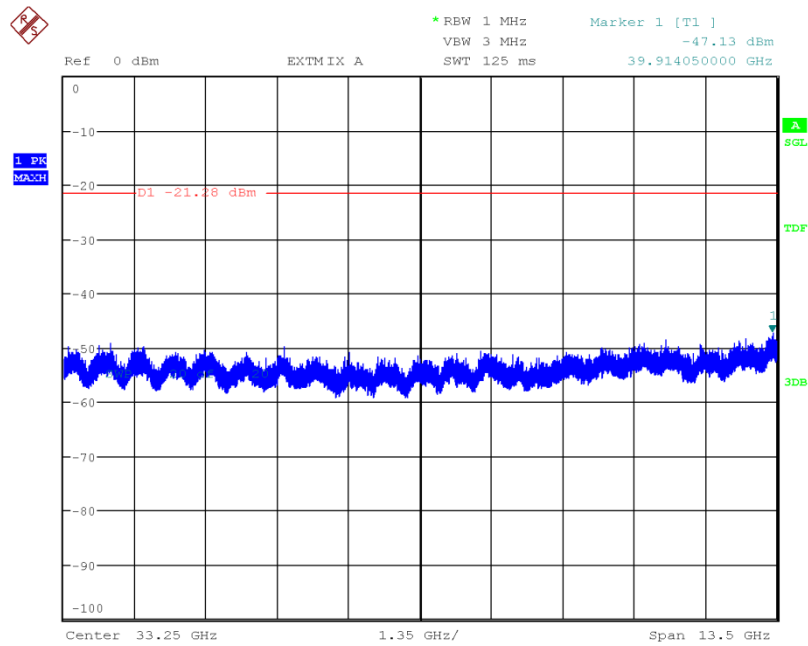


Conducted Spurious Emissions



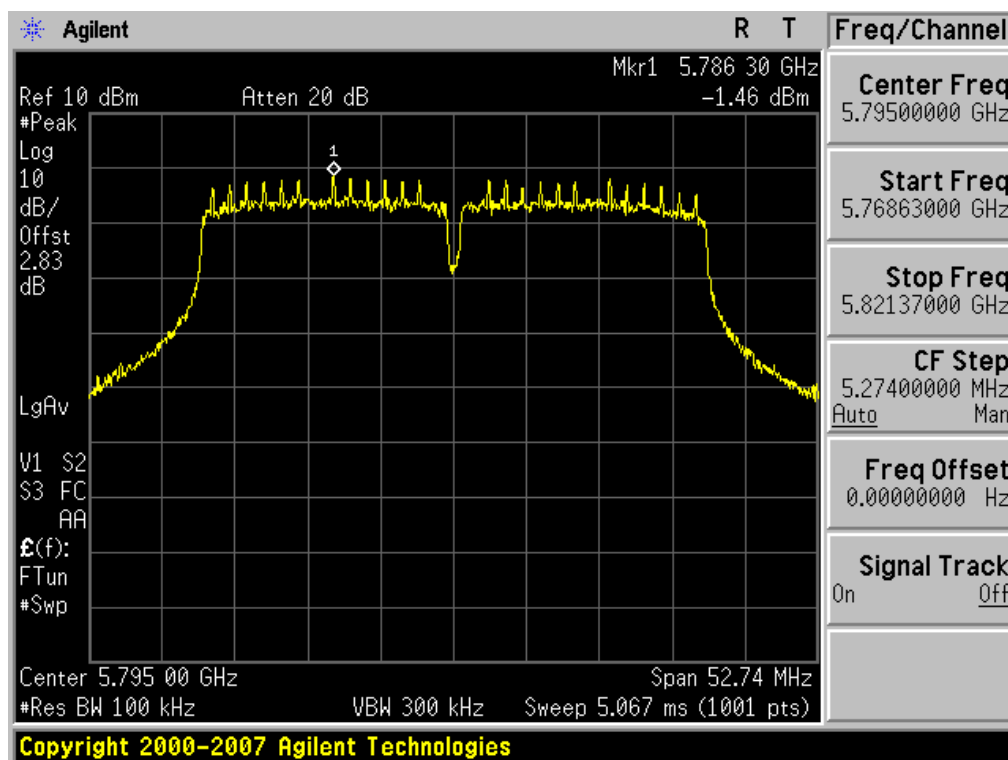
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]
30.000 M	1.000 G	1.00 M	997.090000 M	-49.84
1.000 G	2.000 G	1.00 M	1.633667 G	-47.90
2.000 G	2.400 G	1.00 M	2.397600 G	-46.95
2.400 G	2.483 G	1.00 M	2.461406 G	-46.27
2.483 G	3.000 G	1.00 M	2.534375 G	-45.09
3.000 G	6.000 G	1.00 M	5.751667 G	3.67
6.000 G	9.000 G	1.00 M	8.977000 G	-44.49
9.000 G	12.000 G	1.00 M	11.068000 G	-42.63
12.000 G	15.000 G	1.00 M	14.651667 G	-43.10
15.000 G	20.000 G	1.00 M	17.802000 G	-39.32
20.000 G	25.000 G	1.00 M	24.824000 G	-34.71

Conducted Spurious Emissions

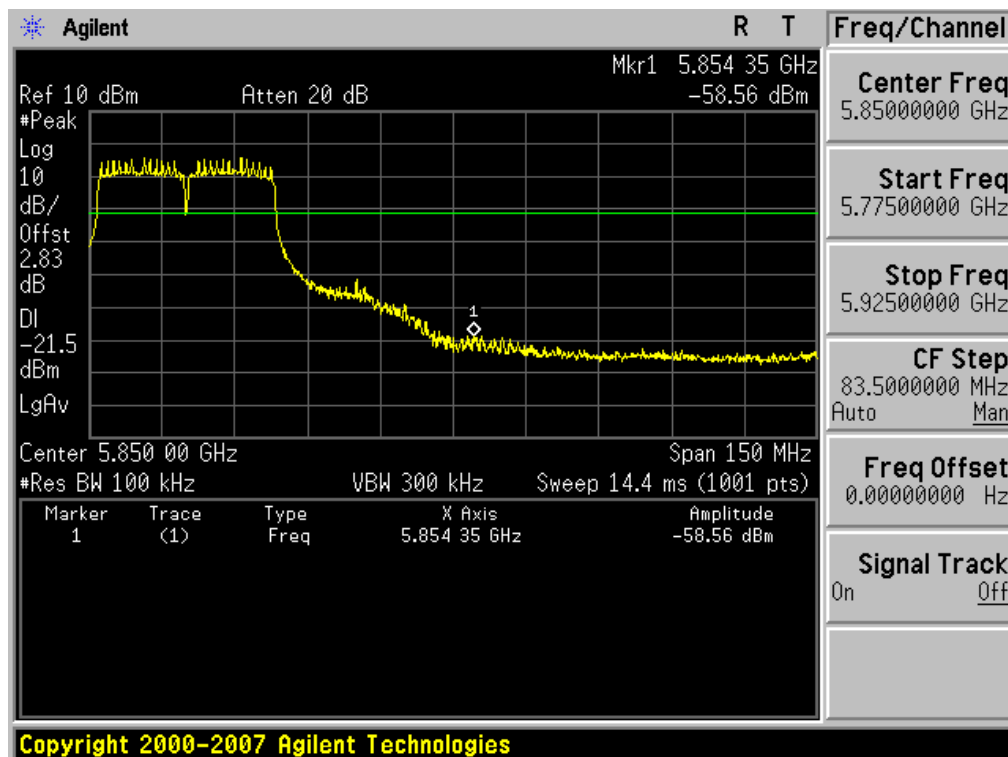


802.11n & MCS0 & 5795 MHz

Reference



Conducted Spurious Emissions



* RBW 100 kHz
 VBW 300 kHz
 SWT 125 ms

Ref 10 dBm
 Att 35 dB

Marker 1 [T1]
 -49.61 dBm
 625.814900000 kHz

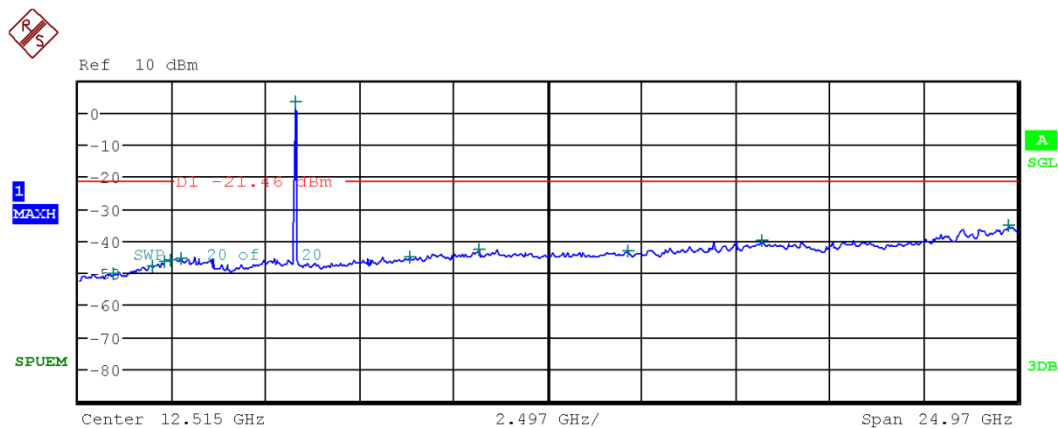
1. PK
 MAG

D1 -21.46 dBm

SWP 20 dB 20

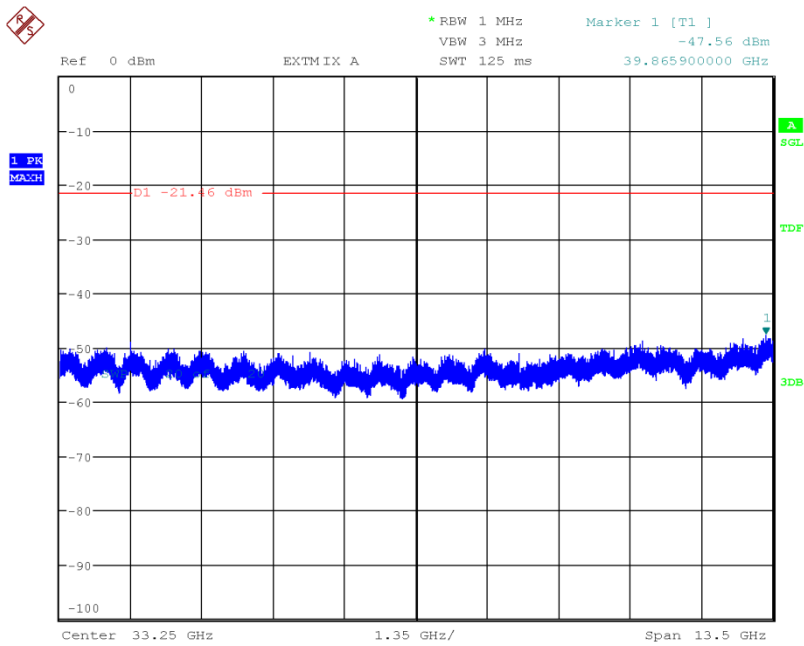
1

Center 15.0045 MHz
 Span 29.991 MHz
 2.9991 MHz/



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]
30.000 M	1.000 G	1.00 M	961.523333 M	-50.36
1.000 G	2.000 G	1.00 M	1.992667 G	-48.08
2.000 G	2.400 G	1.00 M	2.307520 G	-46.44
2.400 G	2.483 G	1.00 M	2.474432 G	-45.92
2.483 G	3.000 G	1.00 M	2.758175 G	-45.84
3.000 G	6.000 G	1.00 M	5.782000 G	3.26
6.000 G	9.000 G	1.00 M	8.823000 G	-45.11
9.000 G	12.000 G	1.00 M	10.684000 G	-42.61
12.000 G	15.000 G	1.00 M	14.628333 G	-43.44
15.000 G	20.000 G	1.00 M	18.197500 G	-40.21
20.000 G	25.000 G	1.00 M	24.767000 G	-35.32

Conducted Spurious Emissions



8.5 Radiated Spurious Emissions

Test Requirements and limit, §15.247(d), §15.205, §15.209 & RSS-210 [A8.5], RSS-Gen [7.2.2]

In any 100kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a) and (b), then the 15.209(a) limit in the table below has to be followed

• FCC Part 15.209(a) and (b)

Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
30 ~ 88	100 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	500	3

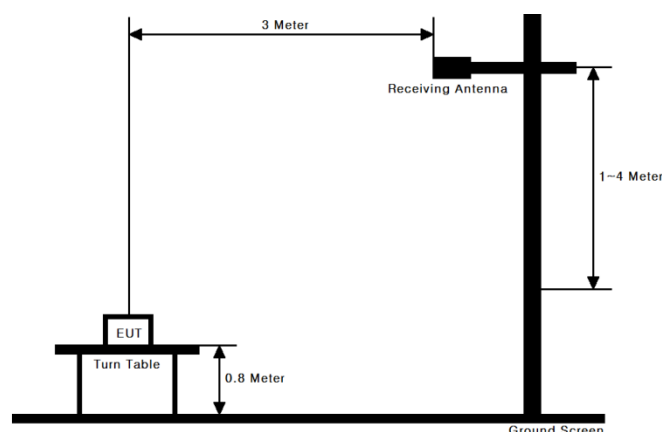
** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part,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

Test Configuration



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

Note : Measurement Instrument Setting for Radiated Emission Measurements.

1. Frequency Range Below 1 GHz

RBW = 100 or 120 KHz, VBW = 3 x RBW , Detector = Peak or Quasi Peak

2. Frequency Range > 1 GHz

Peak Measurement

RBW = 1 MHz , VBW = 3 MHz, Detector = Peak

Average Measurement

1. RBW = 1 MHz (unless otherwise specified).
2. VBW \geq 3 x RBW.
3. Detector = RMS
4. Averaging type = power (i.e., RMS).
5. Sweep time = auto.
6. Perform a trace average of at least 100 traces.
7. A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
 - 1) If **power averaging (RMS) mode** was used in step 4, then the applicable correction factor is $10 \log(1/x)$, where x is the duty cycle.
 - 2) If linear voltage averaging mode was used in step 4, then the applicable correction factor is $20 \log(1/x)$, where x is the duty cycle.
 - 3) If a specific emission is demonstrated to be **continuous (\geq 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction** is required for that emission.

Band	Duty Cycle(%)	T _{on} (ms)	T _{on} + T _{off} (ms)	DCF = 10log(1/Duty) (dB)
2.4GHz 802.11n(HT20)	98	1.920	1.950	-
5.7GHz 802.11n(HT20)	98	1.920	1.950	-
5.7GHz 802.11n(HT40)	96	0.942	0.972	0.18
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

9KHz ~ 25GHz Data(2.4GHz & 802.11n (HT20) & MCS0)

▪ Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2389.92	V	Z	PK	63.86	- 3.38	-	-	60.48	74.00	13.52
2389.62	V	Z	AV	47.67	- 3.38	-	-	44.29	54.00	9.71
4829.70	V	Z	PK	41.50	5.43	-	-	46.93	74.00	27.07
4827.84	V	Z	AV	31.43	5.43	-	-	36.86	54.00	17.14

▪ Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4870.12	V	Z	PK	41.68	5.64	-	-	47.32	74.00	26.68
4872.54	V	Z	AV	31.61	5.64	-	-	37.25	54.00	16.75

▪ Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2483.84	V	Z	PK	58.70	- 2.79	-	-	55.91	74.00	18.09
2483.69	V	Z	AV	44.51	- 2.79	-	-	41.72	54.00	12.28
4923.11	V	Z	PK	41.56	5.99	-	-	47.55	74.00	26.45
4920.40	V	Z	AV	31.80	5.99	-	-	37.79	54.00	16.21

Note.

1. Measurement Distance = 3 m below 10 GHz , Measurement Distance = 1 m above 10 GHz.
2. No other spurious and harmonic emissions were found greater than listed emissions on above table.
3. Above listed point data is the worst case data.
4. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCF + Distance Factor/ T.F = AF + CL – AG
 Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
 DCF = Duty Cycle Correction Factor.

9KHz ~ 25GHz Data(5.7GHz & 802.11n (HT20) & MCS0)

▪ Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11493.250	H	Z	PK	60.95	11.92	-	- 9.54	63.33	74.00	10.67
11490.200	H	Z	AV	49.34	11.92	-	- 9.54	51.72	54.00	2.28

▪ Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11569.800	H	Z	PK	59.30	12.12	-	- 9.54	61.88	74.00	12.12
11569.500	H	Z	AV	47.96	12.12	-	- 9.54	50.54	54.00	3.46

▪ Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11652.450	H	Z	PK	59.38	12.54	-	- 9.54	62.38	74.00	11.62
11650.500	H	Z	AV	47.71	12.54	-	- 9.54	50.71	54.00	3.29

Note.

1. Measurement Distance = 3 m below 10 GHz , Measurement Distance = 1 m above 10 GHz.
So Distance Correction Factor : - 9.54 dB = $20 \cdot \log(1\text{m}/3\text{m})$
2. No other spurious and harmonic emissions were found greater than listed emissions on above table.
3. Above listed point data is the worst case data.
4. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCF + Distance Factor/ T.F = AF + CL – AG
Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
DCF = Duty Cycle Correction Factor.

9KHz ~ 25GHz Data((5.7GHz & 802.11n (HT40) & MCS0)

▪ Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11506.500	H	Z	PK	57.94	11.92	-	- 9.54	60.32	74.00	13.68
11510.300	H	Z	AV	48.02	11.92	0.18	- 9.54	50.58	54.00	3.42

▪ Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11587.400	H	Z	PK	56.14	12.54	-	- 9.54	59.14	74.00	14.86
11589.900	H	Z	AV	46.30	12.54	0.18	- 9.54	49.48	54.00	4.52

Note.

1. Measurement Distance = 3 m below 10 GHz , Measurement Distance = 1 m above 10 GHz.
So Distance Correction Factor : - 9.54 dB = $20 \cdot \log(1\text{m}/3\text{m})$
2. No other spurious and harmonic emissions were found greater than listed emissions on above table.
3. Above listed point data is the worst case data.
4. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} + \text{DCF} + \text{Distance Factor} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

DCF = Duty Cycle Correction Factor.

8.6 Power-line Conducted Emissions

Test Requirements and limit, §15.207& RSS-Gen [7.2.2]

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

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

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs for the actual connections between EUT and support equipment.

Test Mode

The all modes of EUT operation were investigated and the worst case mode was reported.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference groundplane.
2. The EUT is connected via LISN to the test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

■ RESULT PLOTS

AC Line Conducted Emissions (Graph)

Test Mode: 802.11n HT20 (2.4 GHz Band)



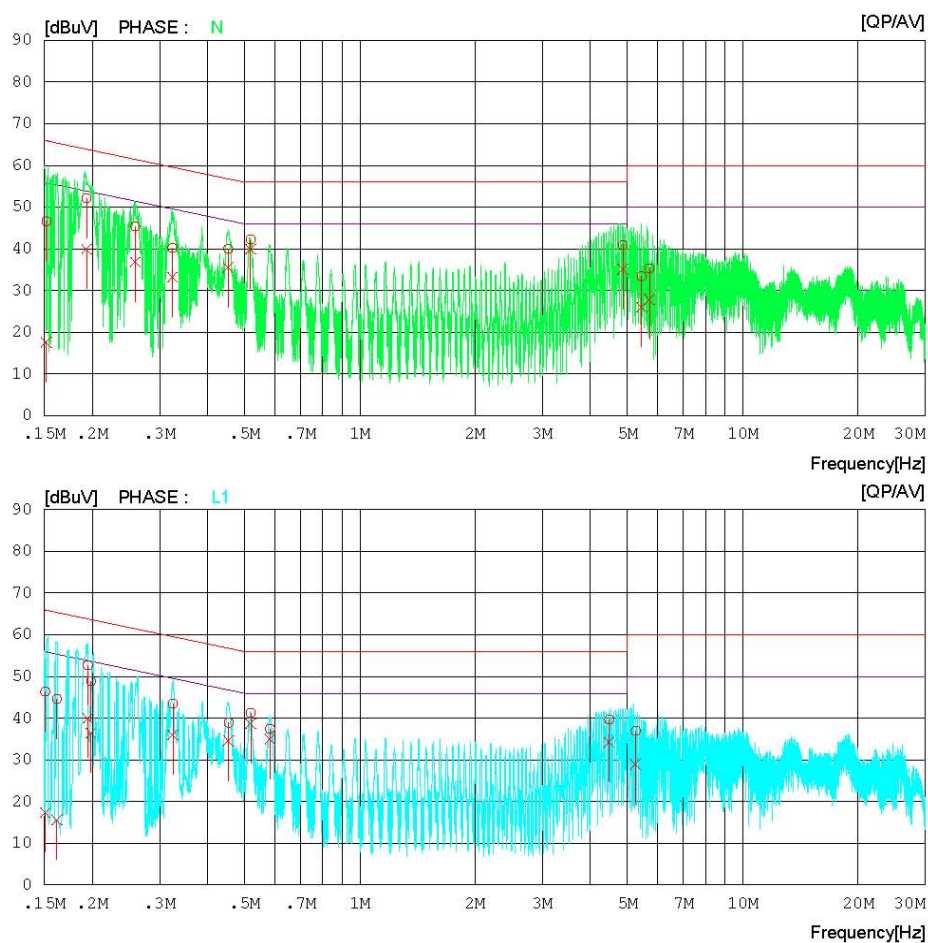
Results of Conducted Emission

Digital EMC
Date : 2013-08-19

Model No. : RTSD5000
Type :
Serial No. : Identical prototype
Test Condition : 2.4GHz

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 24 ' C 44 % R.H.
Operator : H.S.SON

Memo : 802.11n(20)

LIMIT : FCC P15.207 QP
FCC P15.207 AV

AC Line Conducted Emissions (List)

Test Mode: 802.11n HT20 (2.4 GHz Band)

Results of Conducted EmissionDigital EMC
Date : 2013-08-19

Model No.	: RTSD5000	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 24 ' C 44 % R.H.
Test Condition	: 2.4GHz	Operator	: H.S.SON

Memo : 802.11n(20)

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15191	46.5	17.5	0.1	46.6	17.6	65.9	55.9	19.3	38.3	N
2	0.19350	52.0	39.8	0.1	52.1	39.9	63.9	53.9	11.8	14.0	N
3	0.25923	45.3	36.7	0.1	45.4	36.8	61.5	51.5	16.1	14.7	N
4	0.32406	40.1	33.1	0.1	40.2	33.2	59.6	49.6	19.4	16.4	N
5	0.45342	39.9	35.5	0.1	40.0	35.6	56.8	46.8	16.8	11.2	N
6	0.51850	42.2	39.8	0.1	42.3	39.9	56.0	46.0	13.7	6.1	N
7	4.86140	40.5	34.6	0.5	41.0	35.1	56.0	46.0	15.0	10.9	N
8	5.44360	32.9	25.5	0.5	33.4	26.0	60.0	50.0	26.6	24.0	N
9	5.70880	34.9	27.4	0.5	35.4	27.9	60.0	50.0	24.6	22.1	N
10	0.15079	46.3	17.3	0.1	46.4	17.4	66.0	56.0	19.6	38.6	L1
11	0.16171	44.5	15.5	0.1	44.6	15.6	65.4	55.4	20.8	39.8	L1
12	0.19486	52.6	39.9	0.1	52.7	40.0	63.8	53.8	11.1	13.8	L1
13	0.19850	48.8	36.3	0.1	48.9	36.4	63.7	53.7	14.8	17.3	L1
14	0.32484	43.4	35.9	0.1	43.5	36.0	59.6	49.6	16.1	13.6	L1
15	0.45439	38.8	34.5	0.1	38.9	34.6	56.8	46.8	17.9	12.2	L1
16	0.51898	41.1	38.6	0.1	41.2	38.7	56.0	46.0	14.8	7.3	L1
17	0.58326	37.3	34.9	0.1	37.4	35.0	56.0	46.0	18.6	11.0	L1
18	4.47800	39.4	33.9	0.3	39.7	34.2	56.0	46.0	16.3	11.8	L1
19	5.25540	36.5	28.4	0.5	37.0	28.9	60.0	50.0	23.0	21.1	L1

AC Line Conducted Emissions (Graph)

Test Mode: 802.11n HT20 (5.7 GHz Band)

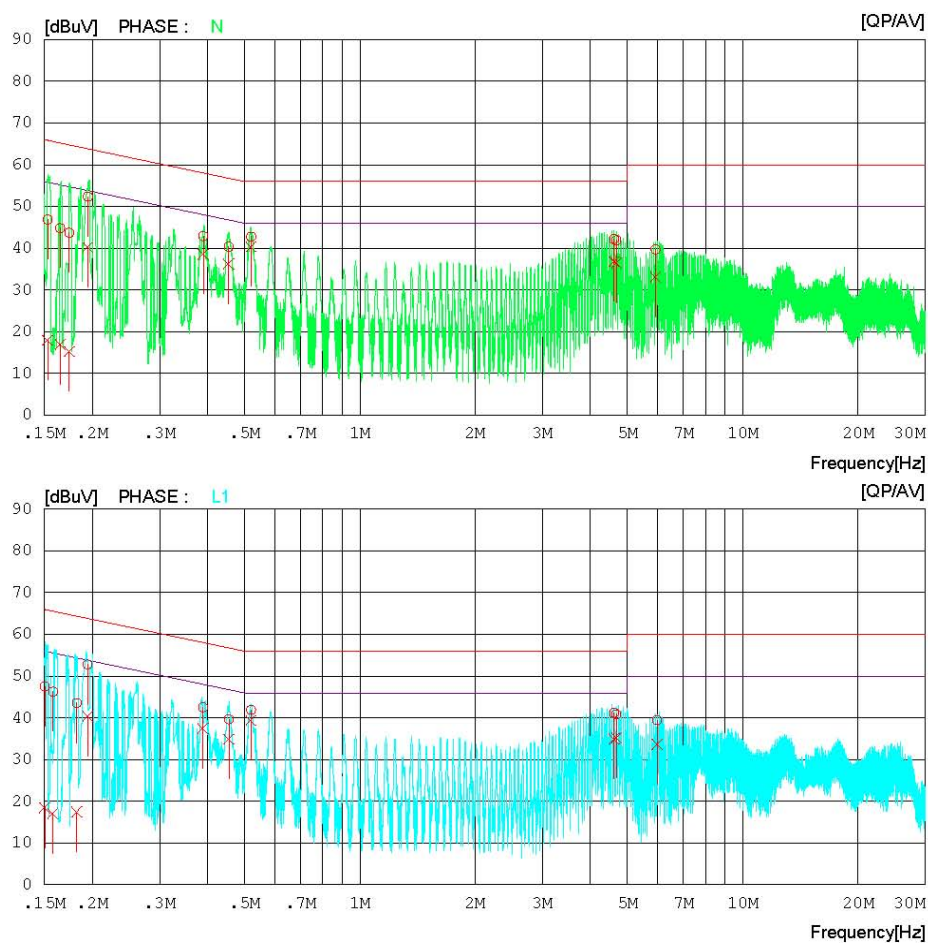
**Results of Conducted Emission**Digital EMC
Date: 2013-08-19

Model No. : RTSD5000
Type :
Serial No. : Identical prototype
Test Condition : 5.7GHz

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 24 ' C 44 % R.H.
Operator : H.S.SON

Memo : 802.11n(20)

LIMIT : FCC P15.207 QP
FCC P15.207 AV



AC Line Conducted Emissions (List)

Test Mode: 802.11n HT20 (5.7 GHz Band)

Results of Conducted EmissionDigital EMC
Date : 2013-08-19

Model No.	: RTSD5000	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 24 ' C 44 % R.H.
Test Condition	: 5.7GHz	Operator	: H.S.SON
Memo	: 802.11n(20)		

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15307	46.7	17.8	0.1	46.8	17.9	65.8	55.8	19.0	37.9	N
2	0.16507	44.7	16.8	0.1	44.8	16.9	65.2	55.2	20.4	38.3	N
3	0.17429	43.6	15.1	0.1	43.7	15.2	64.8	54.8	21.1	39.6	N
4	0.19495	52.2	40.1	0.1	52.3	40.2	63.8	53.8	11.5	13.6	N
5	0.38991	42.8	38.4	0.1	42.9	38.5	58.1	48.1	15.2	9.6	N
6	0.45464	40.3	36.1	0.1	40.4	36.2	56.8	46.8	16.4	10.6	N
7	0.52016	42.6	40.3	0.1	42.7	40.4	56.0	46.0	13.3	5.6	N
8	4.61400	41.7	36.3	0.5	42.2	36.8	56.0	46.0	13.8	9.2	N
9	4.67960	41.4	36.0	0.5	41.9	36.5	56.0	46.0	14.1	9.5	N
10	5.91580	39.2	32.5	0.5	39.7	33.0	60.0	50.0	20.3	17.0	N
11	0.15023	47.5	18.3	0.1	47.6	18.4	66.0	56.0	18.4	37.6	L1
12	0.15797	46.2	17.0	0.1	46.3	17.1	65.6	55.6	19.3	38.5	L1
13	0.18234	43.5	17.3	0.1	43.6	17.4	64.4	54.4	20.8	37.0	L1
14	0.19450	52.7	40.3	0.1	52.8	40.4	63.8	53.8	11.0	13.4	L1
15	0.38944	42.4	37.3	0.1	42.5	37.4	58.1	48.1	15.6	10.7	L1
16	0.45501	39.5	34.8	0.1	39.6	34.9	56.8	46.8	17.2	11.9	L1
17	0.51998	41.8	39.3	0.1	41.9	39.4	56.0	46.0	14.1	6.6	L1
18	4.61560	40.7	34.4	0.5	41.2	34.9	56.0	46.0	14.8	11.1	L1
19	4.67960	40.3	34.7	0.5	40.8	35.2	56.0	46.0	15.2	10.8	L1
20	5.97880	39.0	33.2	0.5	39.5	33.7	60.0	50.0	20.5	16.3	L1

8.7 Occupied Bandwidth

Test Requirements, RSS-Gen [4.6.1]

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

■ TEST CONFIGURATION

Refer to the APPENDIX I.

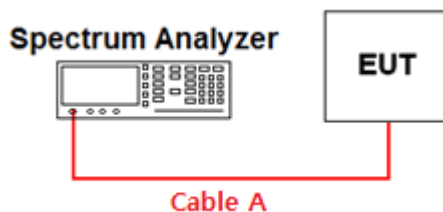
■ TEST PROCEDURE

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual.

■ TEST RESULTS: **N/A**

9. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Horn Antenna (18G)	ETS	3115	13/02/28	15/02/28	00021097
Digital Multimeter	H.P	34401A	13/02/27	14/02/27	3146A13475
Spectrum Analyzer	Rohde Schwarz	FSQ26	13/02/14	14/02/14	200445
HORN ANT	A.H.Systems	SAS-574	13/03/20	15/03/20	154
High-pass filter	Wainwright Instruments	WHNX8.5	12/09/17	13/09/17	1
Thermohygrometer	BODYCOM	BJ5478	13/01/14	14/01/14	090205-4
High-pass filter	Wainwright	WHNX3.0	12/09/17	13/09/17	9
PreAmplifier	Agilent	8449B	13/02/27	14/02/27	3008A00370
Attenuator (3dB)	WEINSCHL	56-3	12/09/17	13/09/17	Y2342
Spectrum Analyzer	Agilent	E4440A	12/10/22	13/10/22	US45303051
LOOP Antenna	Schwarzbeck	FMZB1513	12/09/24	13/09/24	1513-128
DC Power Supply	SM techno	SDP30-5D	13/02/14	14/02/14	305DLJ204
Power Meter Power Sensor	Anritsu	ML2495A MA2411B	13/03/06	14/03/06	1306007 011290
MXA Signal Analyzer	Agilent	N9020A	13/04/10	14/04/10	MY50200816
BILOG ANTENNA	SCHAFFNER	CBL6112B	12/11/06	14/11/06	2737
Amplifier (22dB)	H.P	8447E	13/01/08	14/01/08	2945A02865
EMI TEST RECEIVER	R&S	ESU	13/01/08	14/01/08	100014
EMI TEST RECEIVER	R&S	ESCI	13/02/27	14/02/27	100364
CVCF	KIKUSUI	PCR1000L	12/09/15	13/09/15	14110610
LISN	R&S	ESH2-Z5	12/09/18	13/09/18	828739/006
Harmonic Mixer	OML	M28HWD	13/02/14	14/02/14	Ka100224-1
Signal Generator	Rohde Schwarz	SMF100A	13/07/22	14/07/22	102341

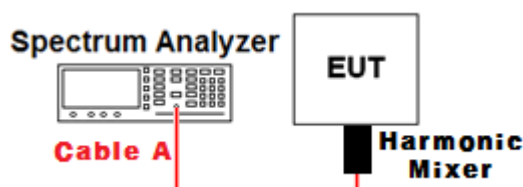
APPENDIX I**Conducted Test set up Diagram & Path loss Information****▪Conducted Measurement(30MHz ~ 25GHz)****Path loss value information**

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
0.03	0.11	10	3.90
1	1.62	15	5.28
2412~2462	1.73	20	5.83
5	2.57	25	6.81
5745~5825	2.83	26.5	7.10

Note. 1: The path loss from EUT to Spectrum analyzer was measured and used for test.

Path loss (=S/A's offset value) = Cable A

Note. 2: For conducted spurious emissions, the path loss values were saved as the transducer factor on the spurious measurement function of the spectrum analyzer and the transducer factor of tested frequency is calculated and corrected automatically by the spectrum analyzer's measurement function.

▪ Conducted Measurement(26.5GHz ~ 40.0GHz)**Path loss value information**

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
26.5	26.02	35.0	27.32
30.0	26.82	40.0	29.26

Note. 1: For conducted spurious emissions between 25.6 GHz and 40 GHz, the external harmonic mixer was used and above correction factors were saved as the transducer factor on the S/A and it was corrected automatically by the S/A's function.