

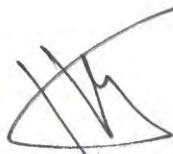
REPORT

FCC Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.**Address:**
129, Samsung-ro, Yeongtong-gu Suwon-si, Gyeonggi-do, 443-742 Rep. of Korea**Date of Issue:**
January 26, 2015**Test Site/Location:**
HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea.**Report No.:** HCT-R-1501-055**HCT FRN:** 0005866421**FCC ID : A3LSMA700F****APPLICANT : SAMSUNG Electronics Co., Ltd.****FCC Model(s):** SM-A700F**EUT Type:** Mobile Phone**Max. RF Output Power:** Wi-Fi 802.11b (23.14 dBm) / Wi-Fi 802.11g (24.41 dBm) / Wi-Fi 802.11n (2.4 GHz) (20.85dBm)
/ Wi-Fi 802.11a (5.8 GHz) (18.89 dBm) / Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (18.53 dBm)
/ Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (17.99 dBm)**Frequency Range:** 2412 MHz - 2462 MHz (2.4 GHz Band)
5745 MHz - 5825 MHz (5.8 GHz Band)_20 MHz BW, 5755 MHz - 5795 MHz (5.8 GHz Band)_40 MHz BW**Modulation type** CCK/DSSS/OFDM**FCC Classification:** Digital Transmission System(DTS)**FCC Rule Part(s):** Part 15.247**Engineering Statement:**

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S. C.853(a)

**Report prepared by**
: Kyung Soo Kang
Test engineer of RF Team**Approved by**
: Sang Jun Lee
Manager of RF Team

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1501-F055	January 26, 2015	- First Approval Report

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1. GENERAL INFORMATION

Applicant: SAMSUNG Electronics Co., Ltd.
Address: 129, Samsung-ro, Yeongtong-gu Suwon-si, Gyeonggi-do, 443-742 Rep. of Korea
FCC ID: A3LSMA700F
EUT Type: Mobile Phone
Model name(s): SM-A700F
Date(s) of Tests: January 09, 2015 ~ January 22, 2015
Place of Tests: HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea
(IC Recognition No. : 5944A-3)

2. EUT DESCRIPTION

EUT Type	Mobile Phone	
FCC Model Name	SM-A700F	
Power Supply	DC 3.8 V	
Battery type	Li-ion Battery(Standard)	
Frequency Range	TX	: 2412 MHz~2462 MHz, 5745 MHz~5825 MHz_20 MHz, 5755 MHz~5795 MHz_40 MHz
	RX	: 2412 MHz~2462 MHz, 5745 MHz~5825 MHz_20 MHz, 5755 MHz~5795 MHz_40 MHz
Max. RF Output Power	Peak	Wi-Fi 802.11b (23.14 dBm) / Wi-Fi 802.11g (24.41 dBm)/ Wi-Fi 802.11n (2.4 GHz) (20.85dBm) / Wi-Fi 802.11a (5.8 GHz) (18.89 dBm)/ Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (18.53 dBm) / Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (17.99 dBm)
	Average	Wi-Fi 802.11b (17.48 dBm) / Wi-Fi 802.11g (16.49 dBm)/ Wi-Fi 802.11n (2.4 GHz) (12.98 dBm) / Wi-Fi 802.11a (5.8 GHz) (11.50 dBm)/ Wi-Fi 802.11n_20 MHz BW (5.8 GHz) (11.41 dBm) / Wi-Fi 802.11n_40 MHz BW (5.8 GHz) (10.73 dBm)
Modulation Type	DSSS/CCK(802.11b), OFDM(802.11a, 802.11g, 802.11n)	
Antenna Specification	Manufacturer: TE Connectivity Antenna type: Internal Antenna Peak Gain : -0.97 dBi (2.4 GHz Band), -0.96 Bi (5.8 GHz Band)	

3. TEST METHODOLOGY

FCC KDB 558074 D01 DTS Meas Guidance v03r02 dated June 05, 2014 entitled “Guidance for Performing Compliance Measurements on Digital Transmission Systems(DTS) and the measurement procedure described in the American National Standard for Testing Unlicensed Wireless Devices(ANSI C63.4-2003) Operating Under §15.247” were used in the measurement.

3.1 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.

3.2 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.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version :2003) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

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 max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version: 2003)

Conducted Antenna Terminal

See Section from 9.1 to 9.2.(KDB 558074)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

4. 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.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated June 21, 2011 (Registration Number: 90661)

5.2 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 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."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

"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 antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203

7. SUMMARY TEST OF RESULTS

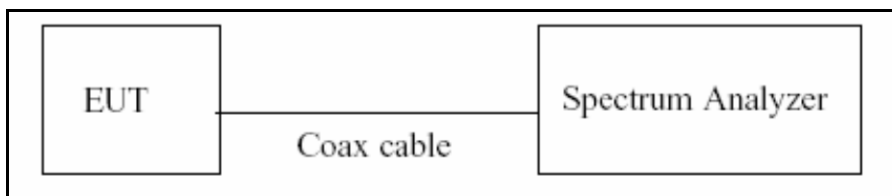
Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz	CONDUCTED	PASS
Conducted Maximum Peak Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	§15.247(d)	Conducted > 20 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 8.6		PASS
Radiated Spurious Emissions	§15.205, 15.209	cf. Section 8.5.1	RADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 8.5.2		PASS

8. TEST RESULT

8.1 DUTY CYCLE(802.11a/b/g/n)

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, 6.0)b) in KDB 558074(issued 06/05/2014)

The largest available value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if $T \leq 6.25$ microseconds. ($50/6.25 = 8$)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are $> 50/T$.

RBW = 8 MHz (the largest available value)

1. VBW = 8 MHz ($\geq$ RBW)
2. SPAN = 0 Hz
3. Detector = Peak
4. Number of points in sweep > 100
5. Trace mode = Clear write
6. Measure T_{total} and T_{on}
7. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10 \cdot \log(1/\text{Duty Cycle})$

Duty Cycle Factor

Mode	Data Rate	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
2.4 GHz Band 802.11b	1	8.560	8.700	0.98390805	0.070
	2	4.280	4.400	0.97272727	0.120
	5.5	1.620	1.725	0.93913043	0.273
	11	0.855	0.960	0.89062500	0.503
2.4 GHz Band 802.11g and 5.8 GHz Band 802.11a	6	1.420	1.525	0.93114754	0.310
	9	0.955	1.060	0.90094340	0.453
	12	0.722	0.822	0.87834550	0.563
	18	0.490	0.592	0.82770270	0.821
	24	0.372	0.472	0.78813559	1.034
	36	0.255	0.355	0.71830986	1.437
	48	0.195	0.296	0.65878378	1.813
	54	0.178	0.280	0.63571429	1.967
2.4 GHz Band 802.11n_20 MHz BW and 5.8 GHz Band 802.11n_20 MHz BW	6.5	1.332	1.437	0.92693111	0.330
	13	0.684	0.789	0.86692015	0.620
	19.5	0.469	0.572	0.81993007	0.862
	26	0.362	0.465	0.77849462	1.087
	39	0.255	0.355	0.71830986	1.437
	52	0.199	0.300	0.66333333	1.783
	58.5	0.183	0.284	0.64436620	1.909
	65	0.167	0.267	0.62546816	2.038
5.8 GHz Band 802.11n_40 MHz BW	13.5	0.662	0.762	0.86876640	0.611
	27	0.349	0.449	0.77728285	1.094
	40.5	0.247	0.345	0.71594203	1.451
	54	0.194	0.293	0.66211604	1.791
	81	0.142	0.241	0.58921162	2.297
	108	0.115	0.213	0.53990610	2.677
	121.5	0.107	0.206	0.51941748	2.845
	135	0.099	0.198	0.50000000	3.010

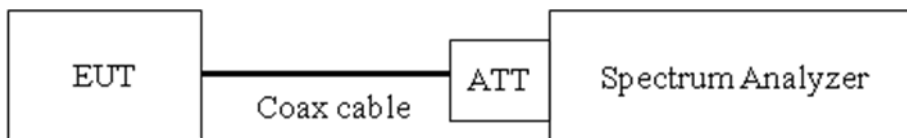
8.2 6dB BANDWIDTH (802.11a/b/g/n)

Test Requirements and limit, §15.247(a)(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



■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (Page 5 in KDB 558074, issued 06/05/2014)

RBW = 100 kHz

VBW $\geq 3 \times$ RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

Note : We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

■ TEST RESULTS

2.4 GHz Band

Conducted 6dB Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	8.13	0.500	Pass
2437	6	8.59	0.500	Pass
2462	11	8.12	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	15.11	0.500	Pass
2437	6	15.04	0.500	Pass
2462	11	15.12	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	15.13	0.500	Pass
2437	6	15.12	0.500	Pass
2462	11	15.14	0.500	Pass

5.8 GHz Band

Conducted 6 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.73	0.500	Pass
5785	157	14.47	0.500	Pass
5825	165	15.05	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.15	0.500	Pass
5785	157	14.21	0.500	Pass
5825	165	15.85	0.500	Pass

Conducted 6 dB Bandwidth Measurements for 802.11n_40 MHz BW

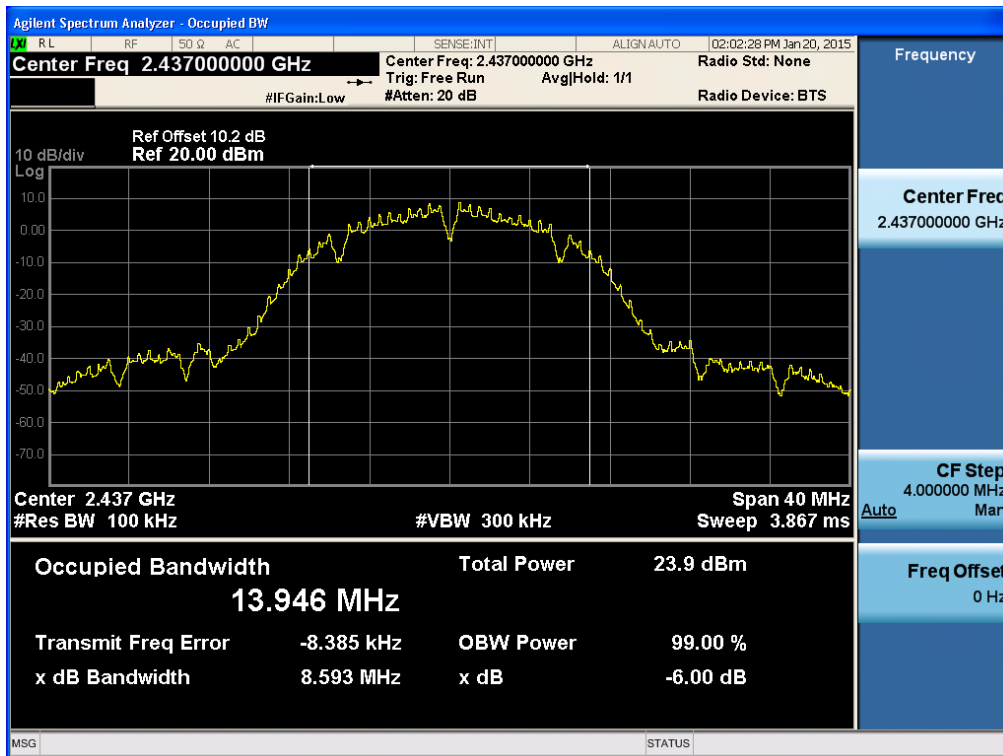
802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.07	0.500	Pass
5795	159	35.14	0.500	Pass

Note : In order to simplify the report, attached plots were only the most wide 6 dB BW channel.

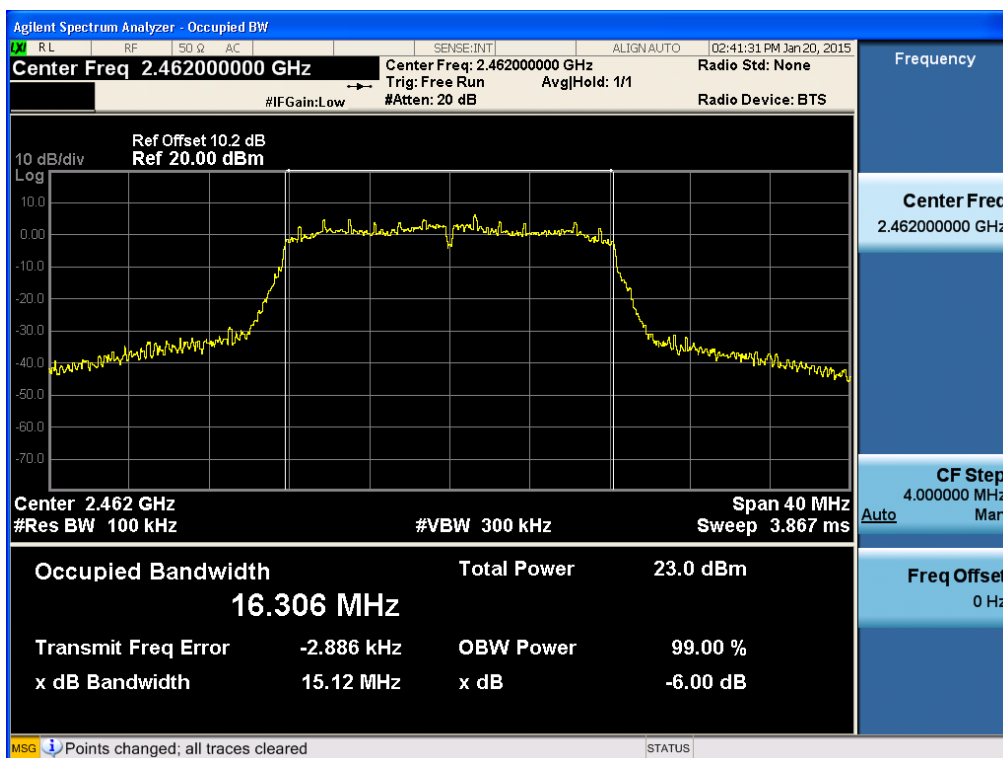
RESULT PLOTS

2.4 GHz Band

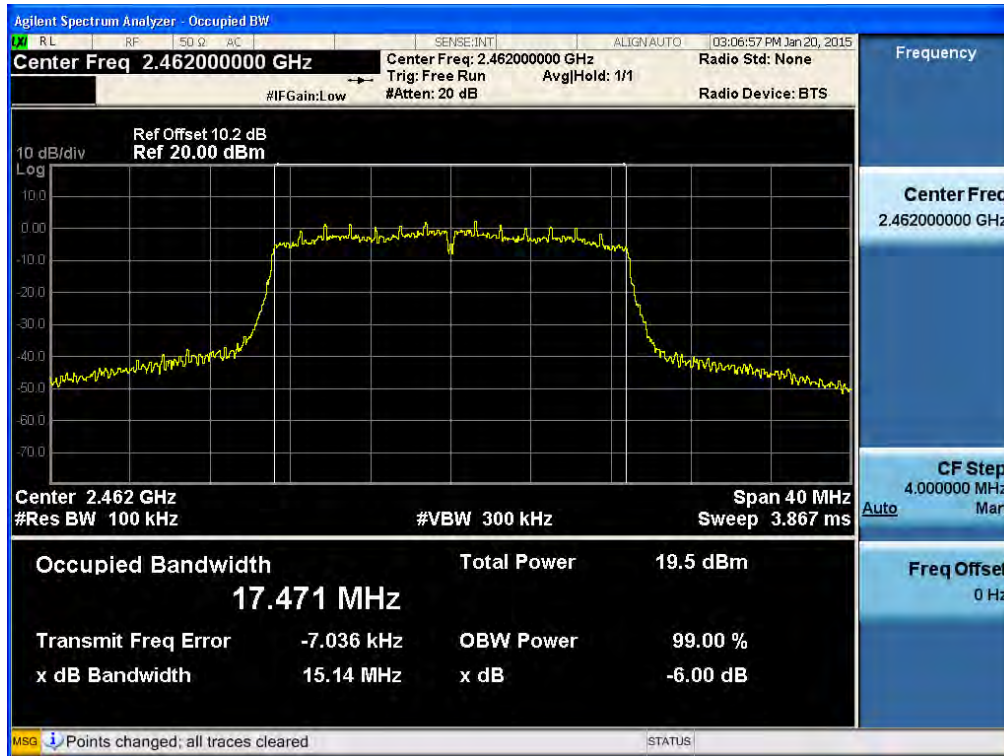
6dB Bandwidth plot (802.11b-CH 6)



6dB Bandwidth plot (802.11g-CH 11)

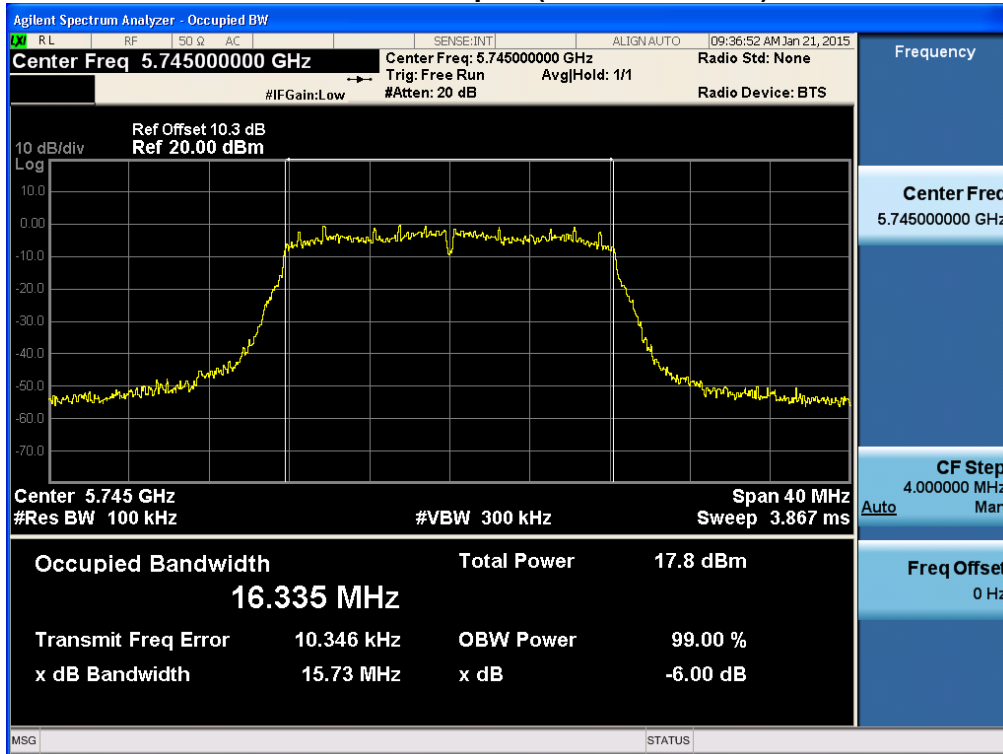


6dB Bandwidth plot (802.11n-CH 11)

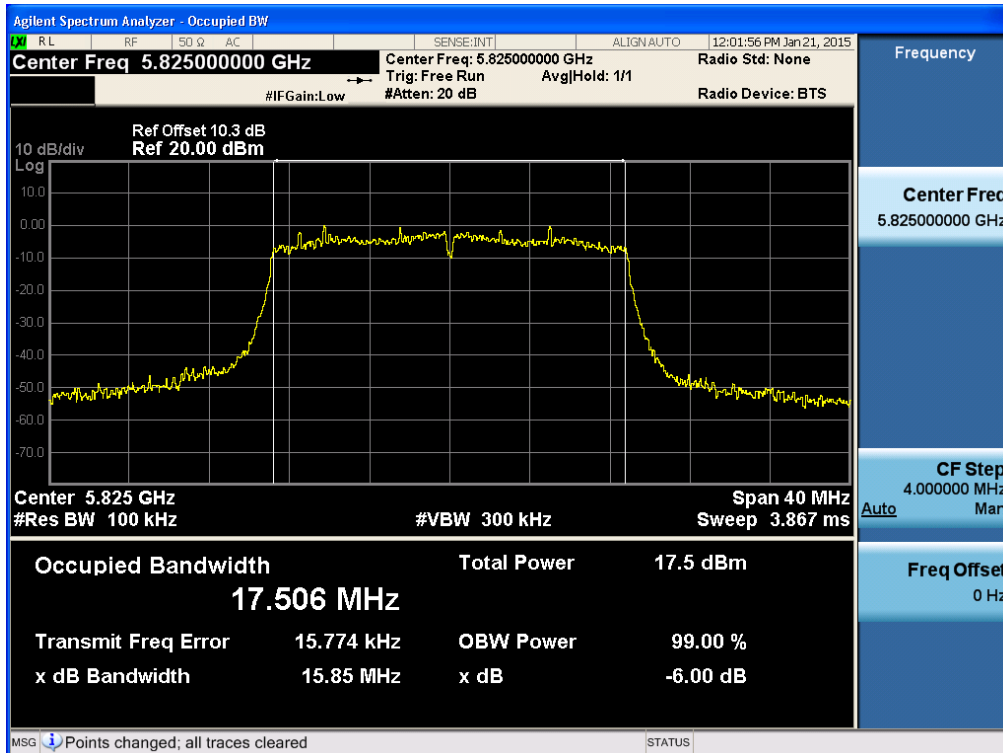


5.8 GHz Band

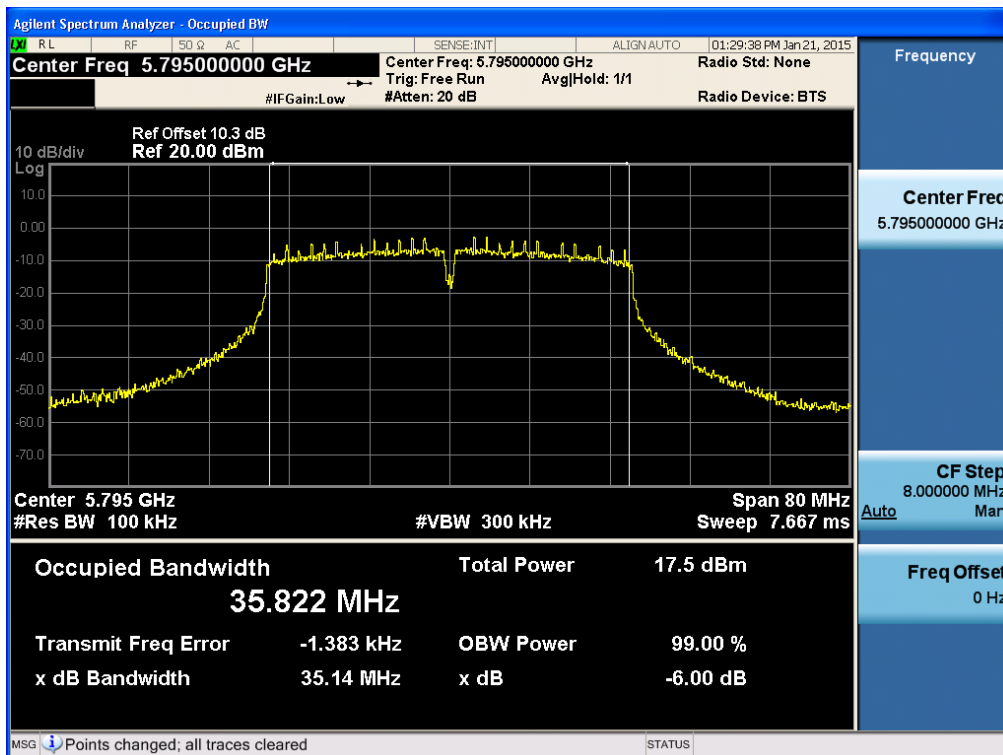
6dB Bandwidth plot (802.11a-CH 149)



6dB Bandwidth plot (802.11n_20 MHz BW-CH 165)



6dB Bandwidth plot (802.11n_40 MHz BW-CH 159)



8.3 OUTPUT POWER (802.11a/b/g/n)

Test Requirements and limit, §15.247(b)(3)

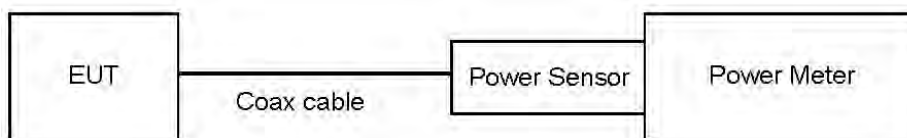
The transmitter output is connected to the input of an RF power sensor. Measurement is made using a broadband power meter capable of making peak and average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

In case of 40 MHz bandwidth, as an alternative to a peak power measurement, compliance with the 1 Watt limit can be based on a measurement of the maximum conducted output power.

So, we are performed the maximum conducted output power for compliance with the 1 Watt limit.

The maximum permissible conducted output power is 1 Watt.

■ TEST CONFIGURATION(20 MHz BW)



■ TEST PROCEDURE(20 MHz BW)

Peak Power (Procedure 9.1.2 in KDB 558074, issued 06/05/2014)

1. Measure the peak power of the transmitter.

▪ Average Power (Procedure 9.2.3.1 in KDB 558074, issued 06/05/2014)

1. Measure the duty cycle.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Note :

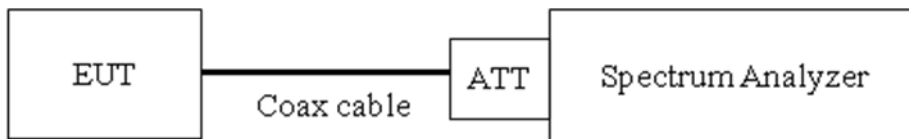
1. We apply to the offset in the 2.4 GHz and 5.8 GHz range that was rounded off to the closest tenth dB. So, 20.2 dB is offset for 2.4 GHz Band and 20.3 dB is offset for 5.8 GHz Band.

Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	20.21
	2437	20.24
	2462	20.24
5.8 GHz	5745	20.31
	5755	20.30
	5785	20.29
	5795	20.26
	5825	20.28

(Actual value of loss for the attenuator and cable combination)

■ TEST CONFIGURATION(40 MHz BW)



■ TEST PROCEDURE(40 MHz BW)

Power sensor(N9121A) is supported only implemented a VBW of 30 MHz. So in case of 40 MHz power measurement, we used the integrated band power method.

The transmitter output is connected to the Spectrum Analyzer. We use the spectrum analyzer's integrated band power measurement function.

The Spectrum Analyzer is set to

- Peak Power (Integrated Band Power Method)

RBW = 1 MHz

VBW $\geq 3 \times$ RBW

SPAN $\geq 1.5 \times$ DTS bandwidth

Detector Mode = Peak

Sweep = auto couple

Trace Mode = max hold

Allow trace to fully stabilize.

Use the instrument's band/channel power measurement function with the band limits set equal to the

DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector).

- Average Power (Procedure 9.2.2.4 in KDB 558074, issued 06/05/2014)

Measure the duty cycle

Set span to at least 1.5 times the OBW

RBW = 1-5 % of the OBW, not to exceed 1 MHz.

VBW $\geq 3 \times$ RBW.

Number of points in sweep $\geq 2 \times$ span / RBW. (This gives bin-to-bin spacing $\leq$ RBW/2, so that narrowband signals are not lost between frequency bins.)

Sweep time = auto.

Detector = RMS(i.e., power averaging)

Do not use sweep triggering. Allow the sweep to “free run”.

Trace average at least 100 traces in power averaging(RMS) mode.

Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.

Add $10 \log (1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

■ Sample Calculation

Output Power = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor

Output Power = 10 dBm + 20 dB + 0.8 dB + 0.2 dB = 31.0 dBm

Note :

1. Spectrum reading values are not plot data. The power results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 2.4 GHz and 5.8 GHz range that was rounded off to the closest tenth dB. So, 10.2 dB is offset for 2.4 GHz and 5.8 GHz Band and
Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	20.21
	2437	20.24
	2462	20.24
5.8 GHz	5745	20.31
	5755	20.30
	5785	20.29
	5795	20.26
	5825	20.28

(Actual value of loss for the attenuator and cable combination)

■ TEST RESULTS-Peak

2.4 GHz Band

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1 Mbps	19.66	30
		2 Mbps	20.04	30
		5.5 Mbps	21.47	30
		11 Mbps	23.14	30
2437	6	1 Mbps	18.84	30
		2 Mbps	19.20	30
		5.5 Mbps	20.67	30
		11 Mbps	22.34	30
2462	11	1 Mbps	19.21	30
		2 Mbps	19.50	30
		5.5 Mbps	20.95	30
		11 Mbps	22.58	30

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	24.19	30
		9 Mbps	24.18	30
		12 Mbps	24.03	30
		18 Mbps	23.92	30
		24 Mbps	24.39	30
		36 Mbps	24.37	30
		48 Mbps	24.41	30
		54 Mbps	24.39	30
2437	6	6 Mbps	23.36	30
		9 Mbps	23.43	30
		12 Mbps	23.19	30
		18 Mbps	23.08	30
		24 Mbps	23.59	30
		36 Mbps	23.55	30
		48 Mbps	23.61	30
		54 Mbps	23.61	30
2462	11	6 Mbps	23.56	30
		9 Mbps	23.59	30
		12 Mbps	23.35	30
		18 Mbps	23.28	30
		24 Mbps	23.77	30
		36 Mbps	23.80	30
		48 Mbps	23.81	30
		54 Mbps	23.88	30

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6.5 Mbps	20.55	30
		13 Mbps	20.39	30
		19.5 Mbps	20.38	30
		26 Mbps	20.85	30
		39 Mbps	20.83	30
		52 Mbps	20.81	30
		58.5 Mbps	20.81	30
		65 Mbps	20.76	30
2437	6	6.5 Mbps	19.76	30
		13 Mbps	19.68	30
		19.5 Mbps	19.68	30
		26 Mbps	20.10	30
		39 Mbps	20.00	30
		52 Mbps	20.08	30
		58.5 Mbps	20.11	30
		65 Mbps	20.01	30
2462	11	6.5 Mbps	19.95	30
		13 Mbps	19.86	30
		19.5 Mbps	19.80	30
		26 Mbps	20.30	30
		39 Mbps	20.31	30
		52 Mbps	20.28	30
		58.5 Mbps	20.30	30
		65 Mbps	20.21	30

5.8 GHz Band

Conducted Output Power Measurements (802.11a Mode: 5745~5825)

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6 Mbps	18.73	30
		9 Mbps	18.71	30
		12 Mbps	18.48	30
		18 Mbps	18.34	30
		24 Mbps	18.70	30
		36 Mbps	18.77	30
		48 Mbps	18.83	30
		54 Mbps	18.89	30
5785	157	6 Mbps	18.40	30
		9 Mbps	18.40	30
		12 Mbps	18.13	30
		18 Mbps	18.07	30
		24 Mbps	18.52	30
		36 Mbps	18.53	30
		48 Mbps	18.50	30
		54 Mbps	18.63	30
5825	165	6 Mbps	18.41	30
		9 Mbps	18.38	30
		12 Mbps	18.16	30
		18 Mbps	18.08	30
		24 Mbps	18.45	30
		36 Mbps	18.48	30
		48 Mbps	18.61	30
		54 Mbps	18.50	30

Conducted Output Power Measurements (802.11n_20 MHz BW Mode: 5745~5825)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5745	149	6.5 Mbps	18.33	30
		13 Mbps	18.08	30
		19.5 Mbps	18.05	30
		26 Mbps	18.53	30
		39 Mbps	18.49	30
		52 Mbps	18.38	30
		58.5 Mbps	18.41	30
		65 Mbps	18.47	30
5785	157	6.5 Mbps	18.10	30
		13 Mbps	17.81	30
		19.5 Mbps	17.90	30
		26 Mbps	18.39	30
		39 Mbps	18.31	30
		52 Mbps	18.14	30
		58.5 Mbps	18.14	30
		65 Mbps	18.16	30
5825	165	6.5 Mbps	18.25	30
		13 Mbps	17.96	30
		19.5 Mbps	17.90	30
		26 Mbps	18.39	30
		39 Mbps	18.35	30
		52 Mbps	18.38	30
		58.5 Mbps	18.34	30
		65 Mbps	18.32	30

■ TEST RESULTS-Average

2.4 GHz Band

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1 Mbps	17.33	0.070	17.40	30
		2 Mbps	17.30	0.120	17.42	30
		5.5 Mbps	17.12	0.273	17.39	30
		11 Mbps	16.98	0.503	17.48	30
2437	6	1 Mbps	16.38	0.070	16.45	30
		2 Mbps	16.42	0.120	16.54	30
		5.5 Mbps	16.22	0.273	16.49	30
		11 Mbps	16.03	0.503	16.53	30
2462	11	1 Mbps	16.77	0.070	16.84	30
		2 Mbps	16.83	0.120	16.95	30
		5.5 Mbps	16.76	0.273	17.03	30
		11 Mbps	16.45	0.503	16.96	30

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6 Mbps	16.17	0.310	16.48	30
		9 Mbps	16.00	0.453	16.45	30
		12 Mbps	15.92	0.563	16.48	30
		18 Mbps	15.67	0.821	16.49	30
		24 Mbps	15.42	1.034	16.45	30
		36 Mbps	15.02	1.437	16.46	30
		48 Mbps	14.66	1.813	16.47	30
		54 Mbps	14.49	1.967	16.46	30
2437	6	6 Mbps	15.49	0.310	15.80	30
		9 Mbps	15.37	0.453	15.82	30
		12 Mbps	15.20	0.563	15.76	30
		18 Mbps	15.03	0.821	15.85	30
		24 Mbps	14.77	1.034	15.80	30
		36 Mbps	14.40	1.437	15.83	30
		48 Mbps	13.99	1.813	15.80	30
		54 Mbps	13.86	1.967	15.83	30
2462	11	6 Mbps	15.63	0.310	15.94	30
		9 Mbps	15.56	0.453	16.01	30
		12 Mbps	15.39	0.563	15.96	30
		18 Mbps	15.24	0.821	16.06	30
		24 Mbps	14.96	1.034	15.99	30
		36 Mbps	14.60	1.437	16.04	30
		48 Mbps	14.18	1.813	15.99	30
		54 Mbps	14.09	1.967	16.05	30

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6.5 Mbps	12.65	0.330	12.98	30
		13 Mbps	12.30	0.620	12.92	30
		19.5 Mbps	12.06	0.862	12.92	30
		26 Mbps	11.81	1.087	12.90	30
		39 Mbps	11.45	1.437	12.89	30
		52 Mbps	11.13	1.783	12.91	30
		58.5 Mbps	11.00	1.909	12.91	30
		65 Mbps	10.87	2.038	12.91	30
2437	6	6.5 Mbps	11.93	0.330	12.26	30
		13 Mbps	11.61	0.620	12.23	30
		19.5 Mbps	11.37	0.862	12.23	30
		26 Mbps	11.15	1.087	12.24	30
		39 Mbps	10.75	1.437	12.18	30
		52 Mbps	10.43	1.783	12.21	30
		58.5 Mbps	10.31	1.909	12.22	30
		65 Mbps	10.14	2.038	12.17	30
2462	11	6.5 Mbps	12.07	0.330	12.40	30
		13 Mbps	11.82	0.620	12.44	30
		19.5 Mbps	11.61	0.862	12.48	30
		26 Mbps	11.36	1.087	12.45	30
		39 Mbps	10.94	1.437	12.38	30
		52 Mbps	10.58	1.783	12.36	30
		58.5 Mbps	10.55	1.909	12.46	30
		65 Mbps	10.27	2.038	12.31	30

5.8 GHz Band

Conducted Output Power Measurements (802.11a Mode: 5745~5825)

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6 Mbps	10.95	0.310	11.26	30
		9 Mbps	10.87	0.453	11.32	30
		12 Mbps	10.78	0.563	11.34	30
		18 Mbps	10.57	0.821	11.39	30
		24 Mbps	10.30	1.034	11.33	30
		36 Mbps	9.90	1.437	11.34	30
		48 Mbps	9.69	1.813	11.50	30
		54 Mbps	9.50	1.967	11.47	30
5785	157	6 Mbps	10.90	0.310	11.21	30
		9 Mbps	10.88	0.453	11.33	30
		12 Mbps	10.65	0.563	11.21	30
		18 Mbps	10.57	0.821	11.39	30
		24 Mbps	10.18	1.034	11.22	30
		36 Mbps	9.93	1.437	11.37	30
		48 Mbps	9.58	1.813	11.40	30
		54 Mbps	9.39	1.967	11.36	30
5825	165	6 Mbps	10.79	0.310	11.10	30
		9 Mbps	10.67	0.453	11.12	30
		12 Mbps	10.56	0.563	11.12	30
		18 Mbps	10.35	0.821	11.17	30
		24 Mbps	10.10	1.034	11.13	30
		36 Mbps	9.83	1.437	11.26	30
		48 Mbps	9.45	1.813	11.26	30
		54 Mbps	9.34	1.967	11.30	30

Conducted Output Power Measurements (802.11n_20 MHz BW Mode: 5745~5825)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5745	149	6.5 Mbps	10.89	0.330	11.22	30
		13 Mbps	10.73	0.620	11.35	30
		19.5 Mbps	10.50	0.862	11.36	30
		26 Mbps	10.25	1.087	11.34	30
		39 Mbps	9.98	1.437	11.41	30
		52 Mbps	9.56	1.783	11.35	30
		58.5 Mbps	9.49	1.909	11.40	30
		65 Mbps	9.35	2.038	11.39	30
5785	157	6.5 Mbps	10.89	0.330	11.22	30
		13 Mbps	10.69	0.620	11.31	30
		19.5 Mbps	10.46	0.862	11.32	30
		26 Mbps	10.29	1.087	11.38	30
		39 Mbps	9.88	1.437	11.31	30
		52 Mbps	9.55	1.783	11.33	30
		58.5 Mbps	9.36	1.909	11.27	30
		65 Mbps	9.28	2.038	11.32	30
5825	165	6.5 Mbps	10.66	0.330	10.99	30
		13 Mbps	10.52	0.620	11.14	30
		19.5 Mbps	10.24	0.862	11.10	30
		26 Mbps	10.09	1.087	11.17	30
		39 Mbps	9.66	1.437	11.10	30
		52 Mbps	9.35	1.783	11.13	30
		58.5 Mbps	9.33	1.909	11.23	30
		65 Mbps	9.16	2.038	11.20	30

Conducted Output Power Measurements (802.11n_40 MHz BW Mode: 5755~5795)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
5755	151	13.5 Mbps	9.88	0.611	10.49	30
		27 Mbps	9.47	1.094	10.56	30
		40.5 Mbps	9.18	1.451	10.64	30
		54 Mbps	8.84	1.791	10.63	30
		81 Mbps	8.43	2.297	10.73	30
		108 Mbps	7.90	2.677	10.58	30
		121.5 Mbps	7.80	2.845	10.65	30
		135 Mbps	7.64	3.010	10.65	30
5795	159	13.5 Mbps	9.81	0.611	10.42	30
		27 Mbps	9.44	1.094	10.53	30
		40.5 Mbps	9.05	1.451	10.51	30
		54 Mbps	8.76	1.791	10.55	30
		81 Mbps	8.26	2.297	10.56	30
		108 Mbps	8.00	2.677	10.67	30
		121.5 Mbps	7.79	2.845	10.64	30
		135 Mbps	7.72	3.010	10.73	30

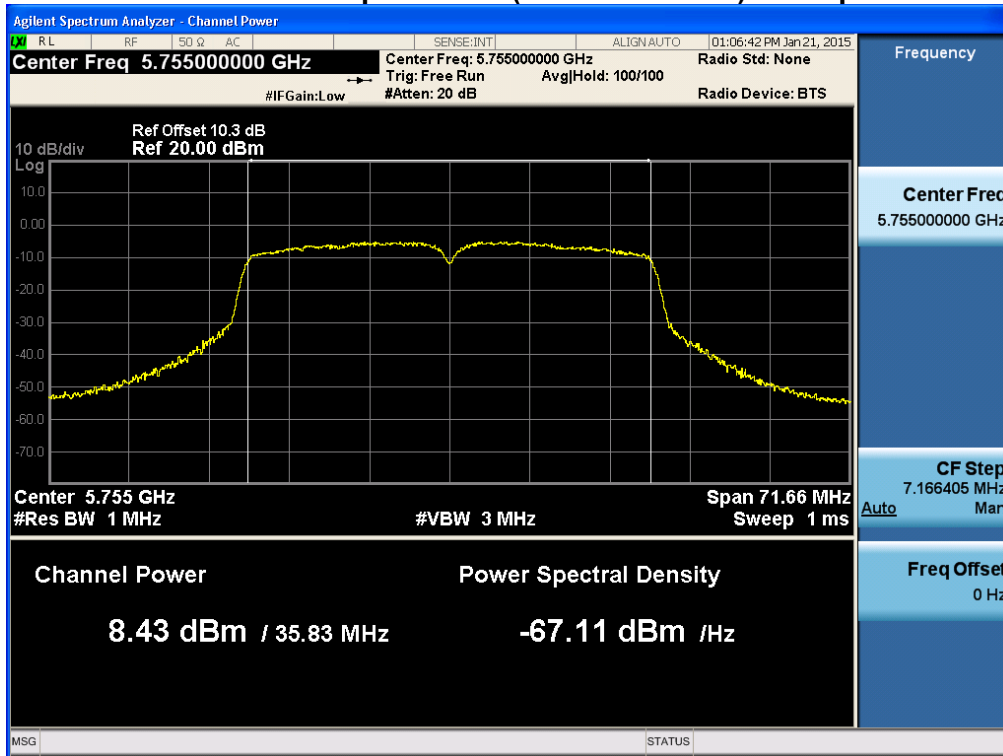
Note : In order to simplify the report, attached plots were only the highest conducted power channel and data rate.

■ **RESULT PLOTS-Average**

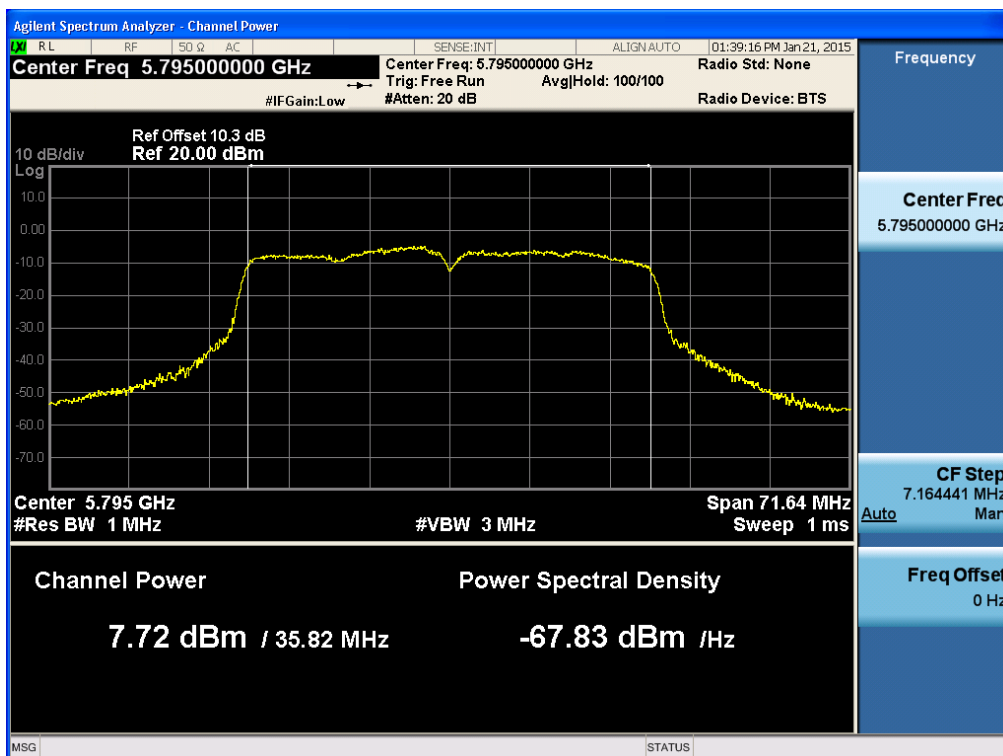
40 MHz BW

(5755 MHz ~5795 MHz)

Conducted Output Power (802.11n-CH 151) 81 Mbps



Conducted Output Power (802.11n-CH 159) 135 Mbps



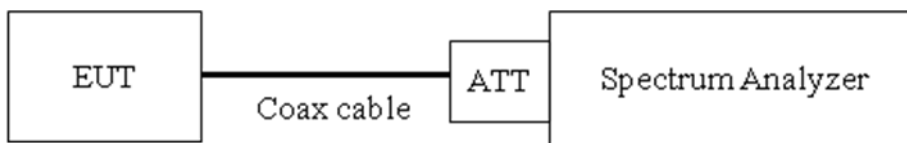
8.4 POWER SPECTRAL DENSITY (802.11a/b/g/n)

Test Requirements and limit, §15.247(e)

The peak power spectral 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 – the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

■ TEST CONFIGURATION



■ TEST PROCEDURE

We tested according to Procedure 10.2 in KDB 558074, issued 06/05/2014

The spectrum analyzer is set to :

Set analyzer center frequency to DTS channel center frequency.

Span = 1.5 times the DTS channel bandwidth.

RBW = 3 kHz ≤ RBW ≤ 100 kHz.

VBW ≥ 3 × RBW.

Sweep = auto couple

Detector = peak

Trace Mode = max hold

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

■ Sample Calculation

$$\begin{aligned} \text{PSD} &= \text{Reading Value} + \text{ATT loss} + \text{Cable loss}(1 \text{ ea}) \\ &= -5 \text{ dBm} + 10 \text{ dB} + 0.8 \text{ dB} = 5.8 \text{ dBm} \end{aligned}$$

Note :

1. Spectrum reading values are not plot data. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 2.4 GHz and 5.8 GHz range that was rounded off to the closest tenth dB. So, 20.2 dB is offset for 2.4 GHz Band and 20.3 dB is offset for 5.8 GHz Band.
Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	20.21
	2437	20.24
	2462	20.24
5.8 GHz	5745	20.31
	5755	20.30
	5785	20.29
	5795	20.26
	5825	20.28

(Actual value of loss for the attenuator and cable combination)

TEST RESULTS

Conducted Power Density Measurements

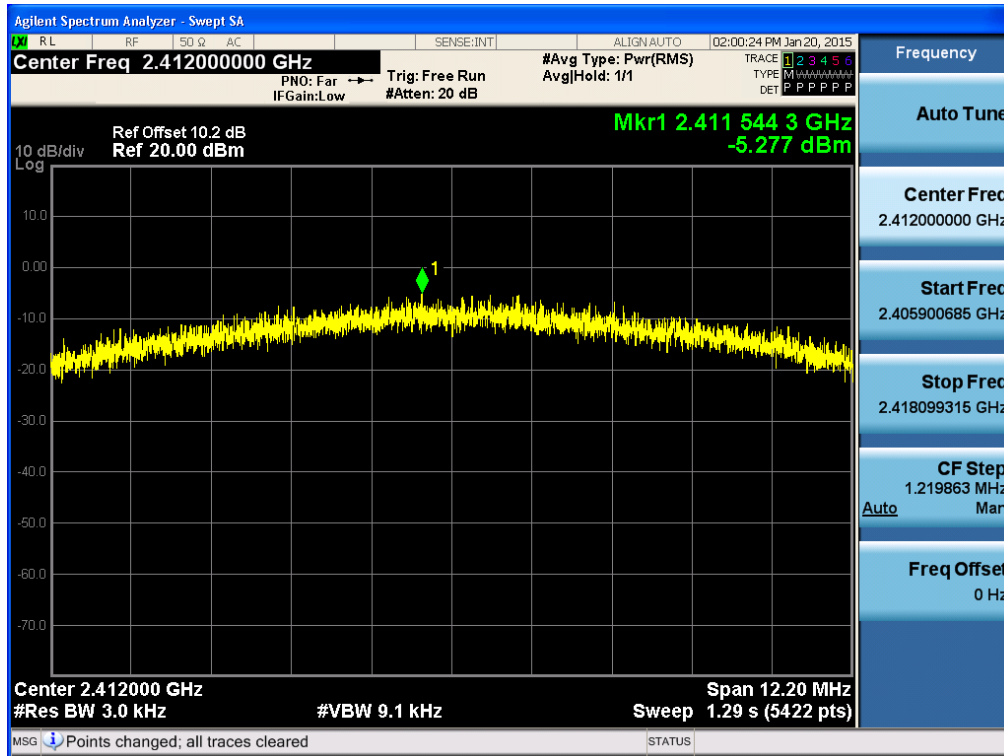
Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11b	-5.277	8	Pass
2437	6		-6.195		Pass
2462	11		-6.061		Pass
2412	1	802.11g	-8.895		Pass
2437	6		-8.960		Pass
2462	11		-9.659		Pass
2412	1	802.11n 2.4 GHz Band	-12.377		Pass
2437	6		-13.377		Pass
2462	11		-12.301		Pass
5745	149	802.11a	-13.178		Pass
5785	157		-14.161		Pass
5825	165		-14.505		Pass
5745	149	802.11n_20 MHz BW 5.8 GHz Band	-13.846		Pass
5785	157		-13.902		Pass
5825	165		-14.801		Pass
5755	151	802.11n_40 MHz BW 5.8 GHz Band	-18.368		Pass
5795	159		-18.291		Pass

Note : In order to simplify the report, attached plots were only the highest PSD channels.

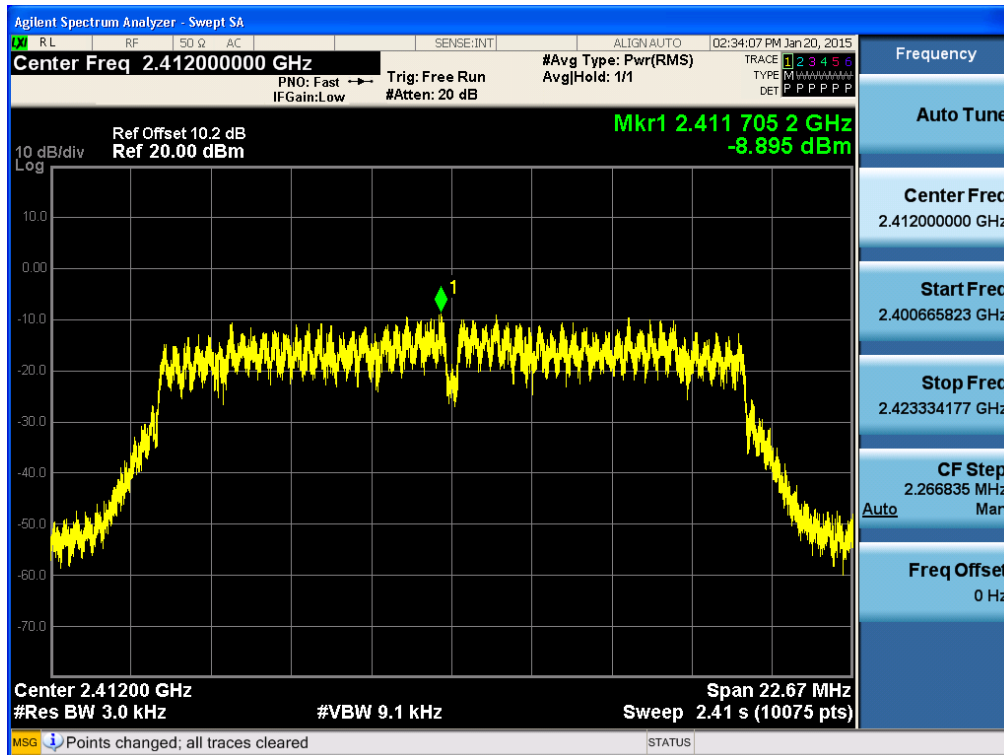
RESULT PLOTS

2.4 GHz Band

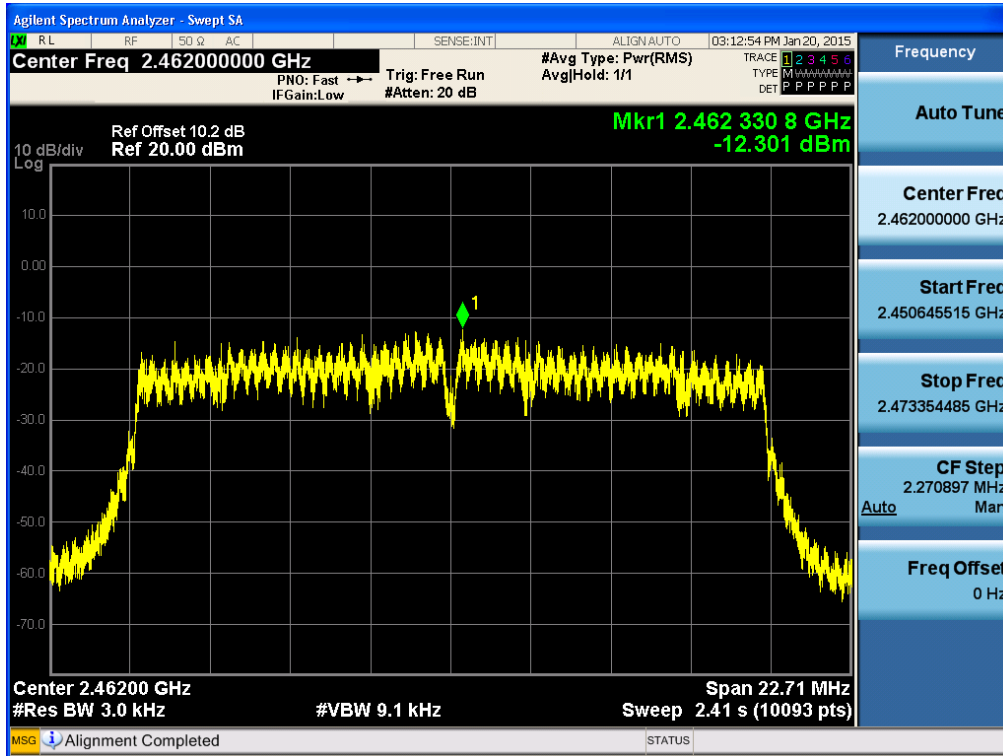
Power Spectral Density (802.11b-CH 1)



Power Spectral Density (802.11g-CH 1)

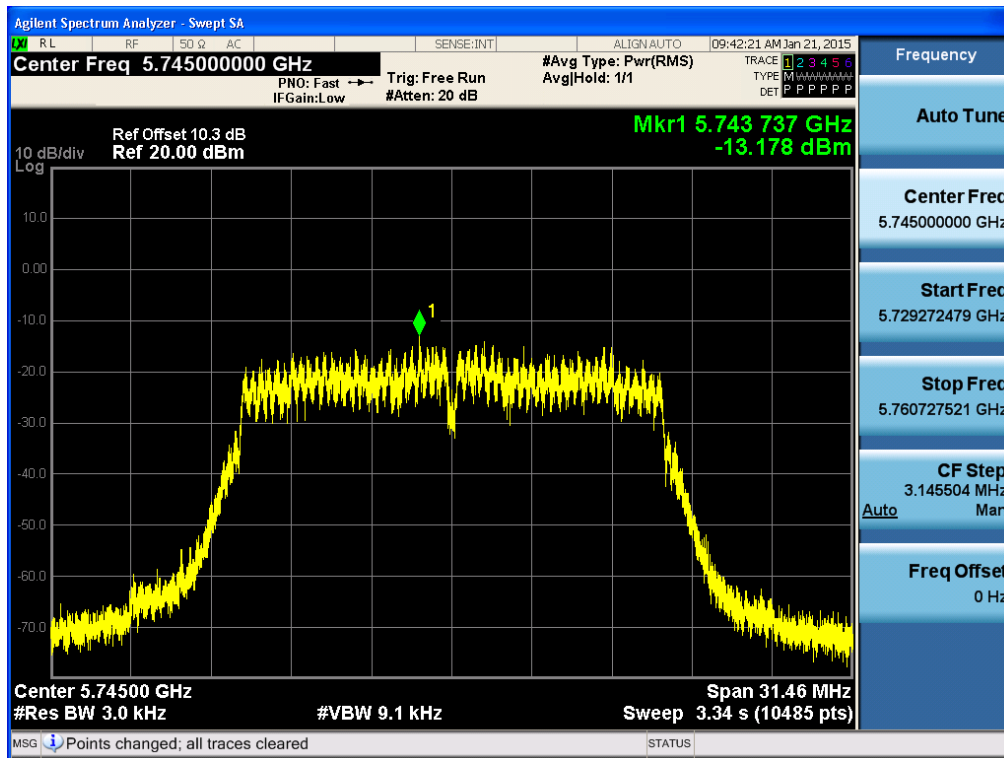


Power Spectral Density (802.11n-CH 11)

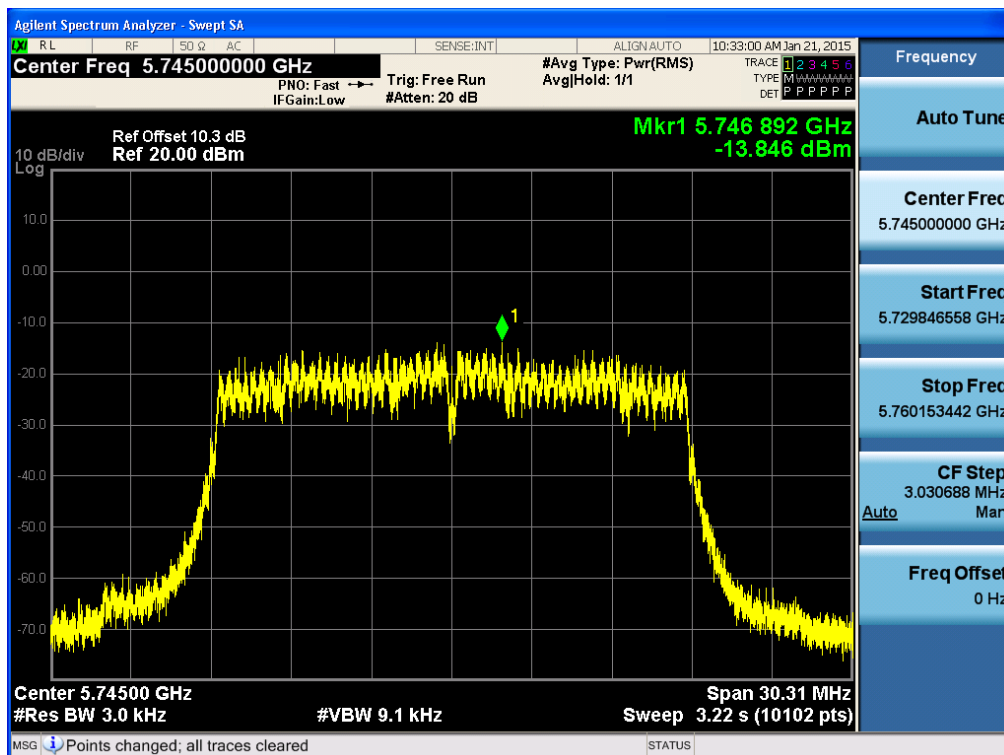


5.8 GHz Band 20 MHz BW

Power Spectral Density (802.11a-CH 149)

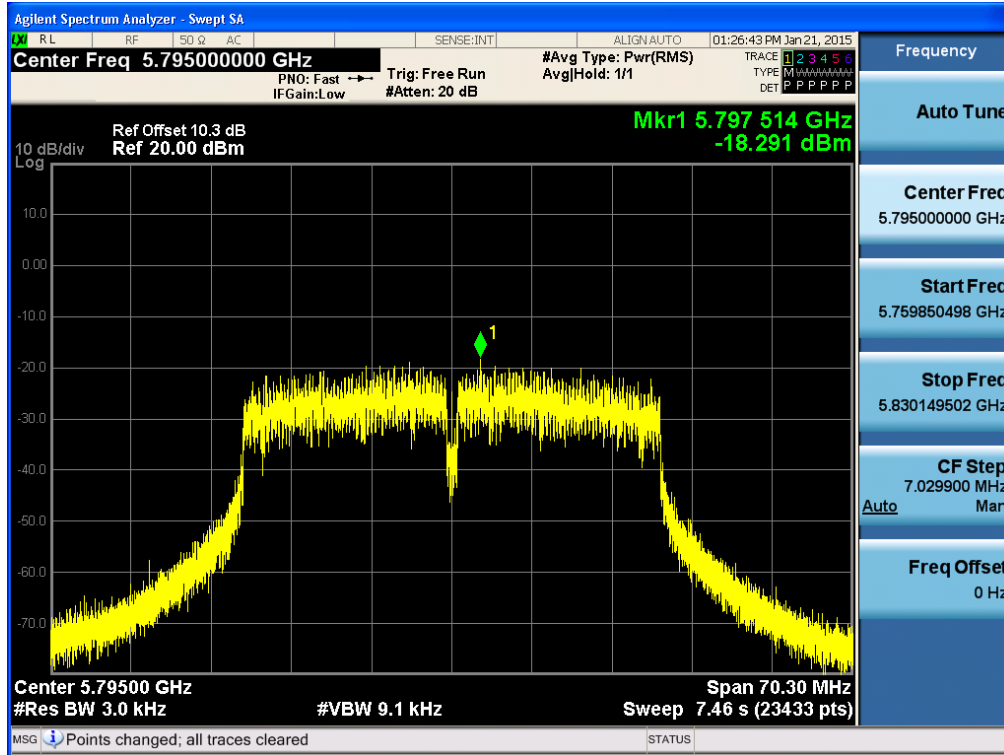


Power Spectral Density (802.11n-CH 149)



40 MHz BW

Power Spectral Density (802.11n-CH 159)



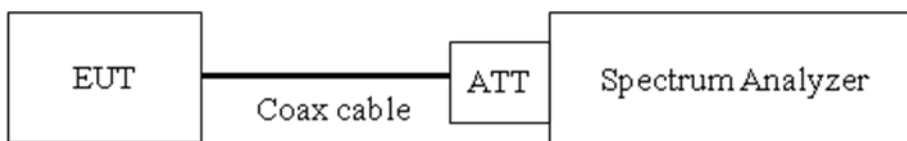
8.5 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Test Requirements and limit, §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit : 20 dBc

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. (Procedure 11.0 in KDB 558074, issued 06/05/2014)

RBW = 100 kHz

VBW $\geq 3 \times$ RBW

Set span to encompass the spectrum to be examined

Detector = Peak

Trace Mode = max hold

Sweep time = auto couple

Ensure that the number of measurement points $\geq$ Span/RBW

Allow trace to fully stabilize.

Use peak marker function to determine the maximum amplitude level.

Measurements are made over the 30 MHz to 10th harmonic range with the transmitter set to the lowest, middle, and highest channels.

Note :

1. The band edge results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss

3. We apply to the offset in the 2.4 GHz and 5.8 GHz range that was rounded off to the closest tenth dB. So, 20.2 dB is offset for 2.4 GHz Band and 20.3 dB is offset for 5.8 GHz Band.

Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	20.21
	2437	20.24
	2462	20.24
5.8 GHz	5745	20.31
	5755	20.30
	5785	20.29
	5795	20.26
	5825	20.28

(Actual value of loss for the attenuator and cable combination)

4. In case of conducted spurious emissions test, please check factors blow table.
5. In order to simplify the report, attached plots were only the worst case channel and data rate.

■ FACTORS FOR FREQUENCY

Freq(MHz)	Factor(dB)
30	19.95
100	20.01
200	20.03
300	20.04
400	20.05
500	20.04
600	20.03
700	20.09
800	20.10
900	20.08
1000	20.11
2000	20.25
2400*	20.19
2500*	20.26
3000	20.27
4000	20.22
5000	20.48
5700*	20.42
5800*	20.48

6000	20.48
7000	20.57
8000	20.45
9000	20.50
10000	20.64
11000	20.69
12000	20.75
13000	20.92
14000	21.90
15000	21.00
16000	21.03
17000	20.93
18000	20.96
19000	20.85
20000	22.11
21000	21.17
22000	20.99
23000	21.12
24000	21.10
25000	21.42
26000	21.28
27000	20.83
28000	21.03
29000	20.99
30000	22.08
31000	20.99
32000	21.32
33000	21.33
34000	22.62
35000	24.85
36000	24.78
37000	25.73
38000	25.81
39000	23.47
40000	24.89

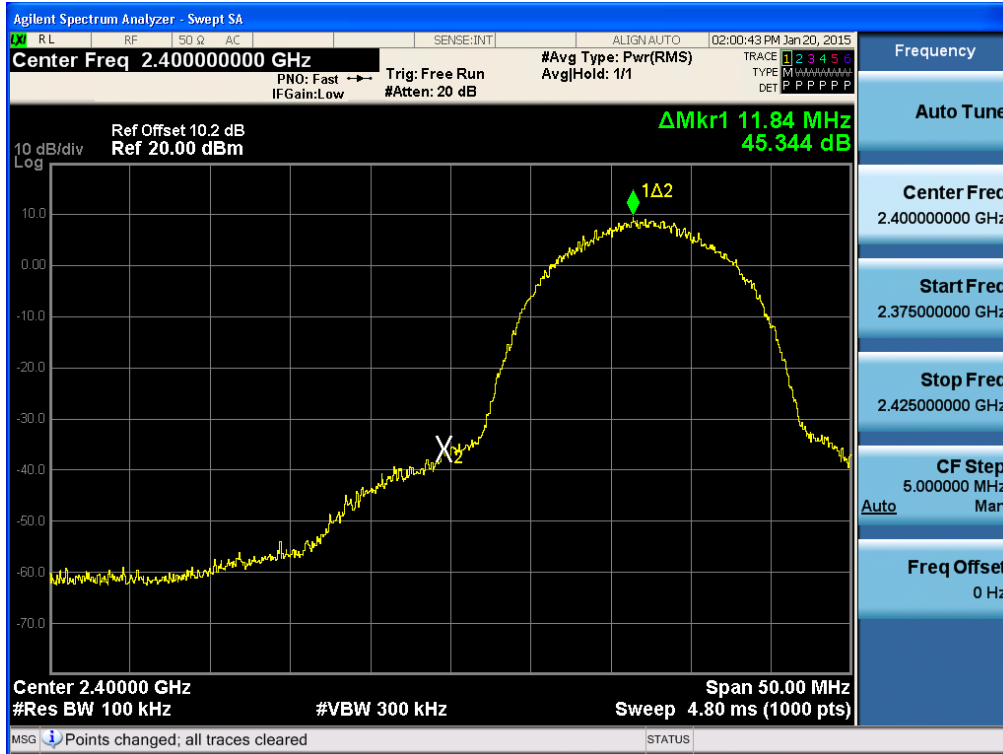
Note : 1. '**' is fundamental frequency range.

2. Factor = Cable loss + Attenuator loss

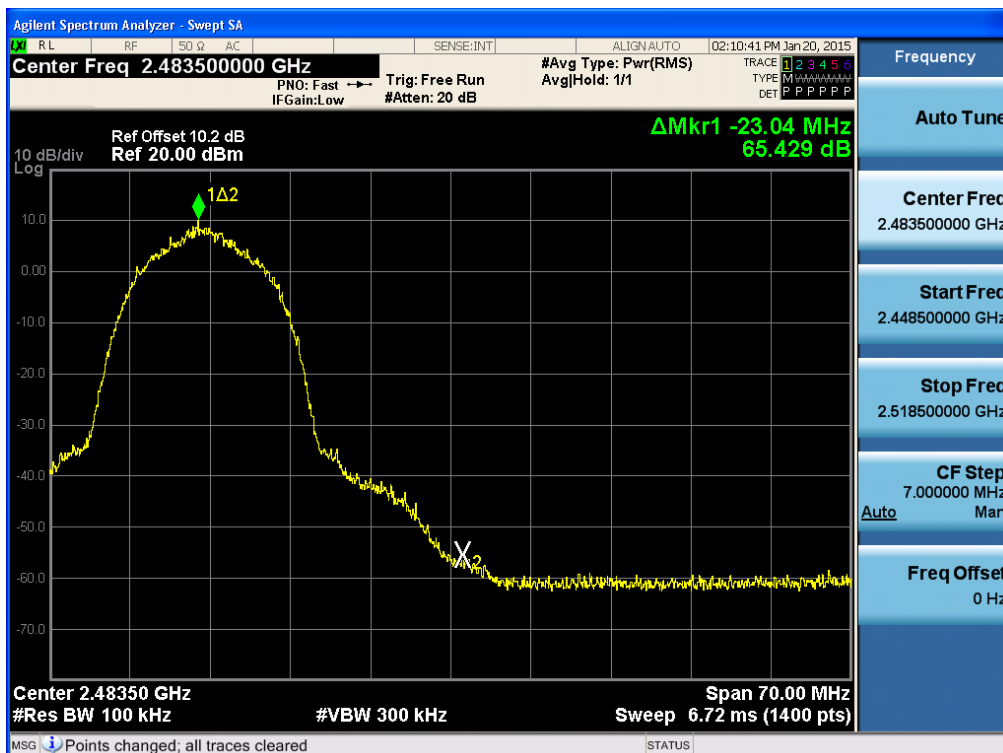
RESULT PLOTS

2.4 GHz Band

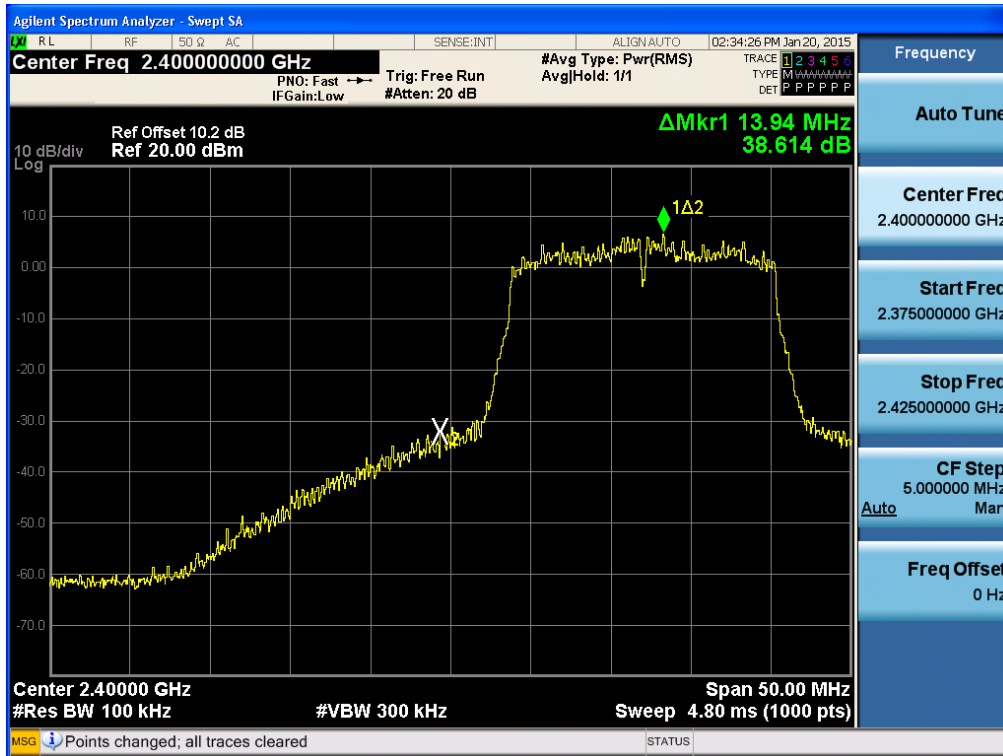
BandEdge (802.11b-CH1)



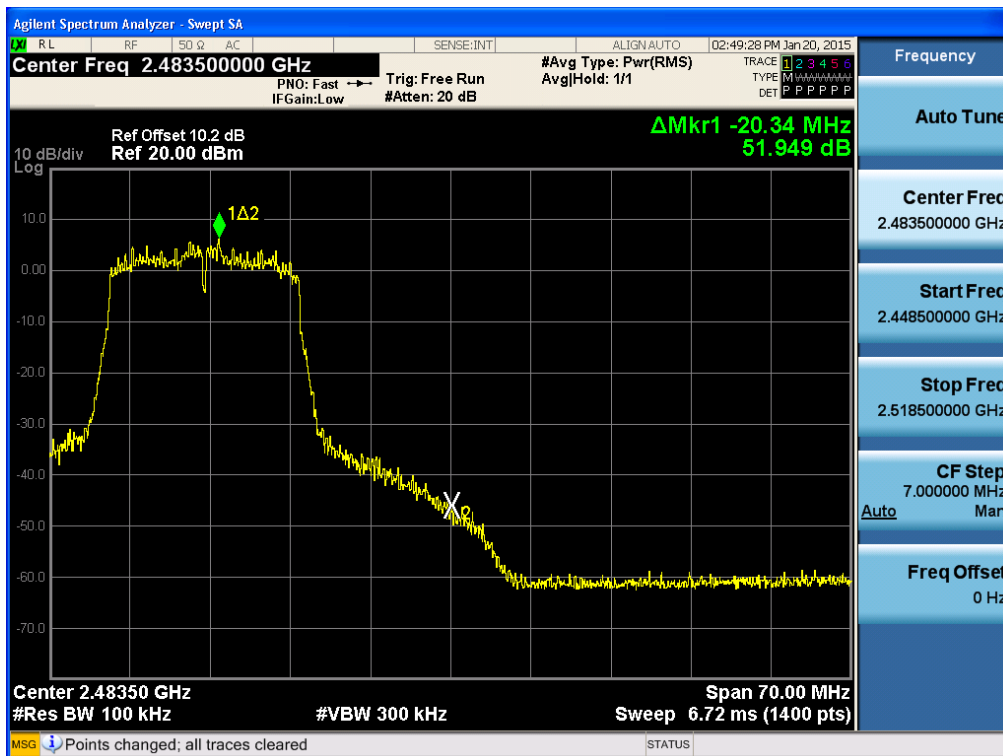
BandEdge (802.11b-CH11)



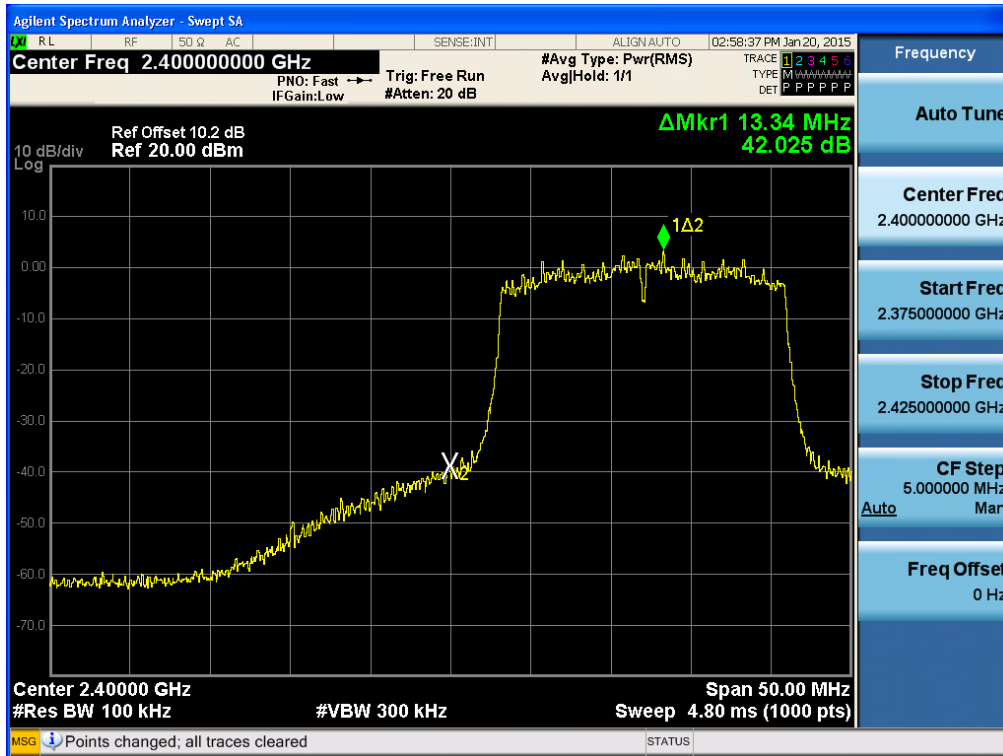
BandEdge (802.11g-CH1)



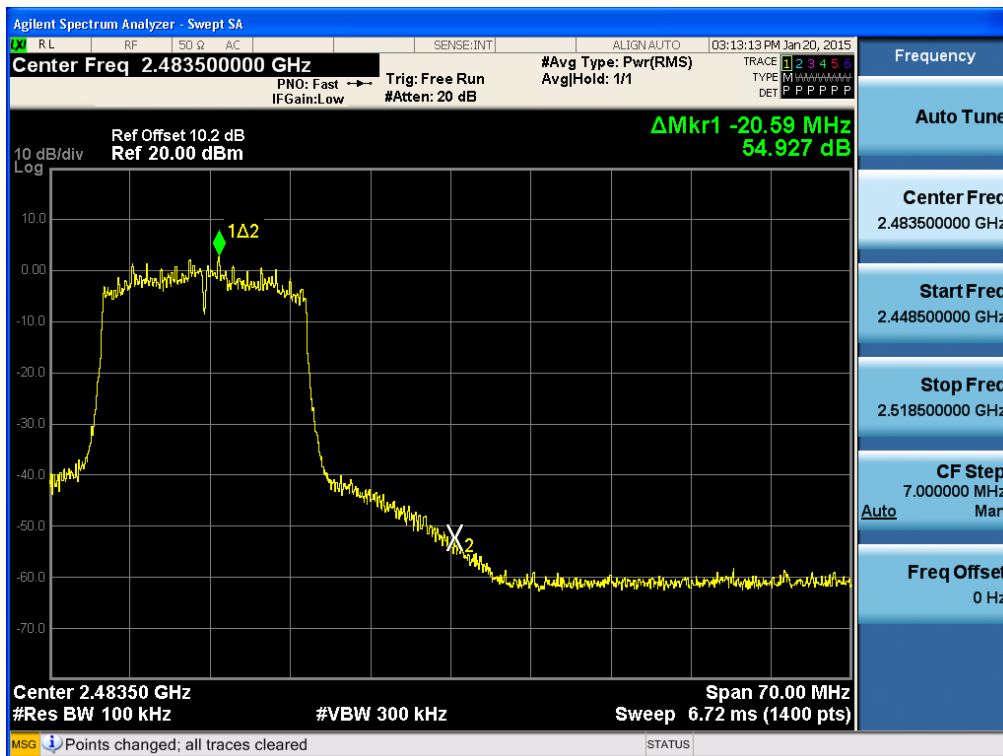
BandEdge (802.11g-CH11)



BandEdge (802.11n-CH1)



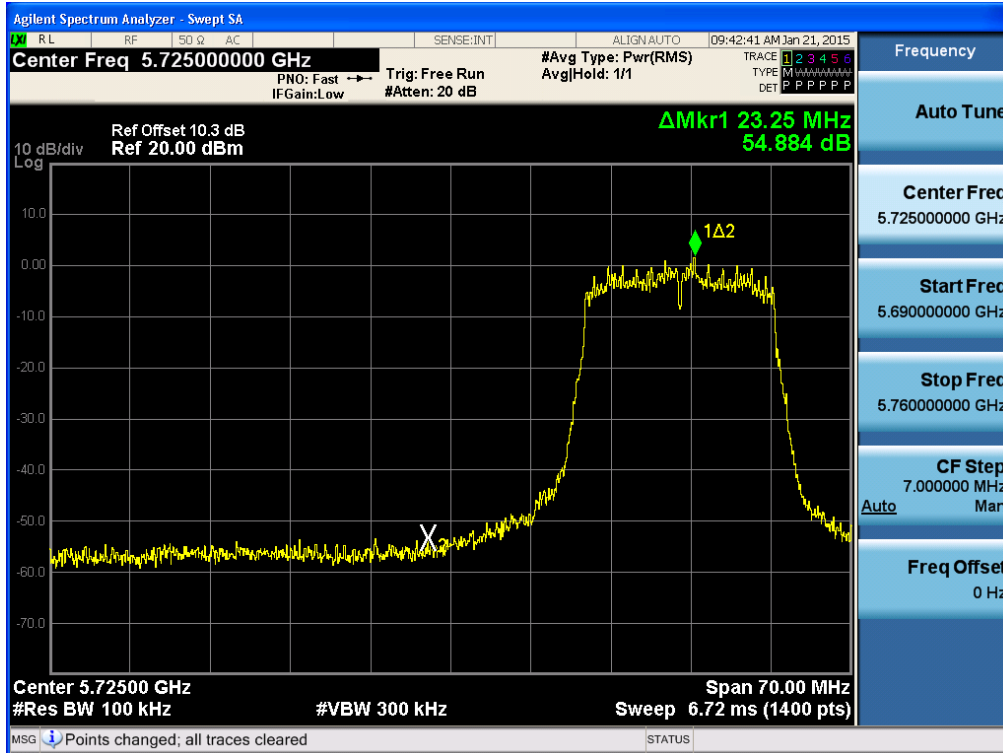
BandEdge (802.11n-CH11)



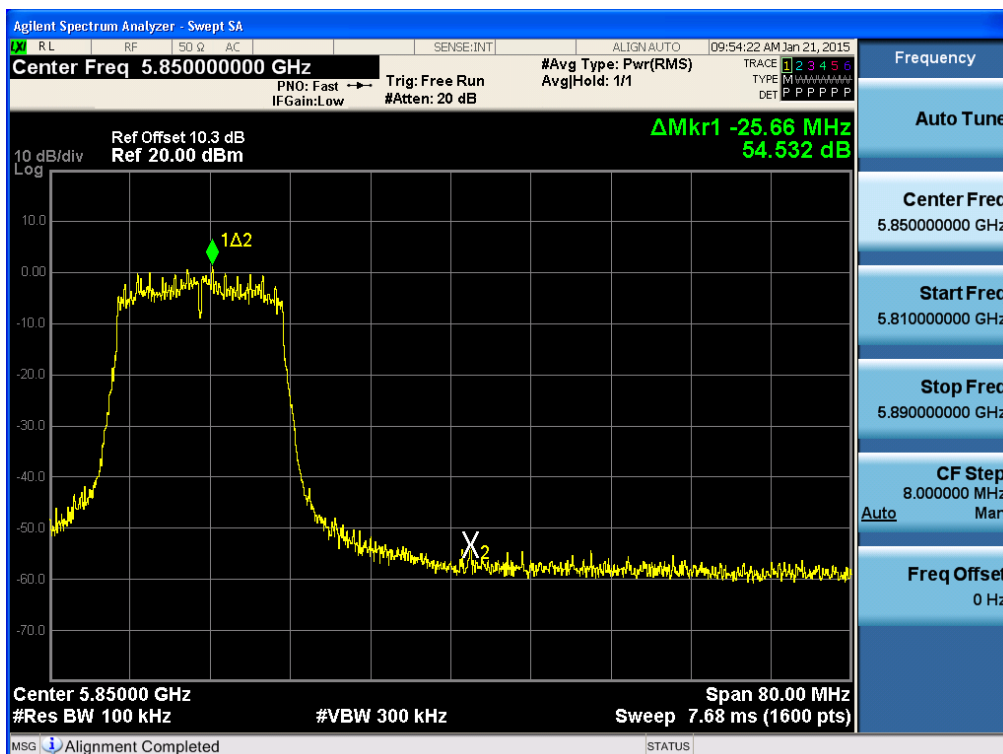
5.8 GHz Band

20 MHz BW

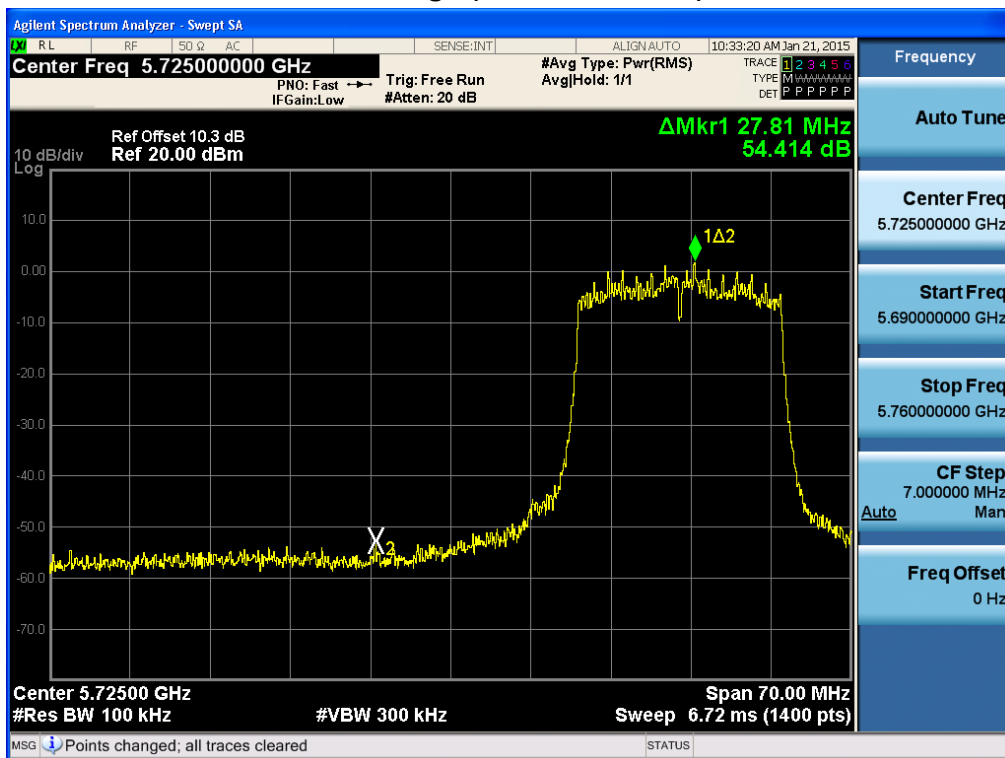
BandEdge (802.11a-CH 149)



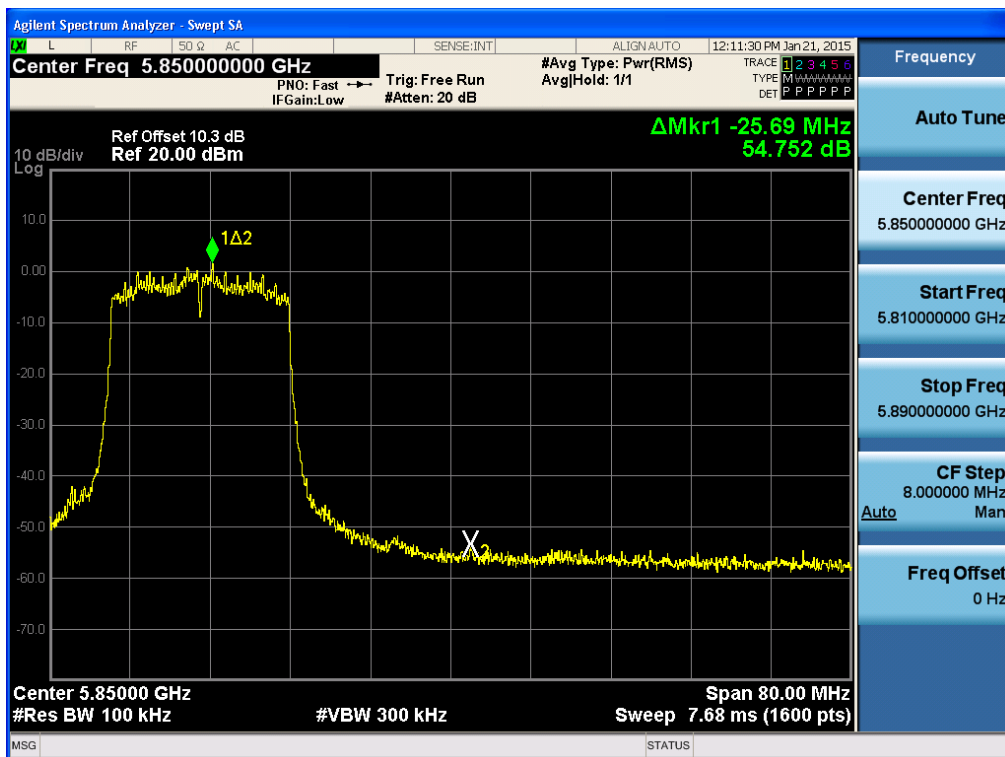
BandEdge (802.11a-CH 165)



BandEdge (802.11n-CH 149)

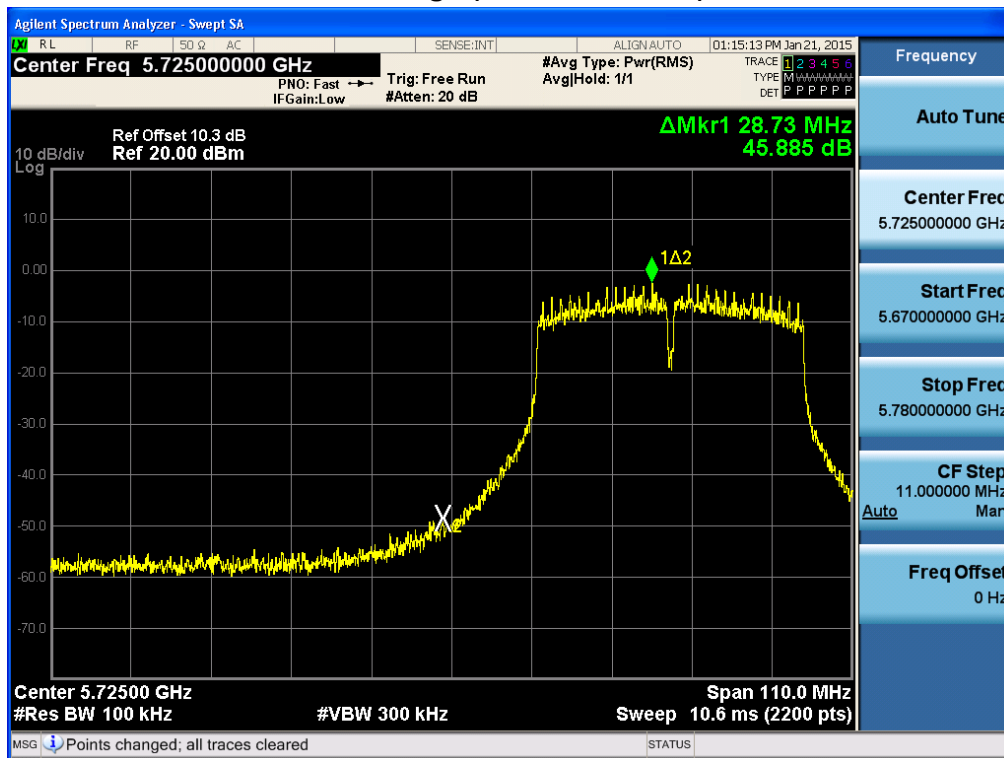


BandEdge (802.11n-CH 165)

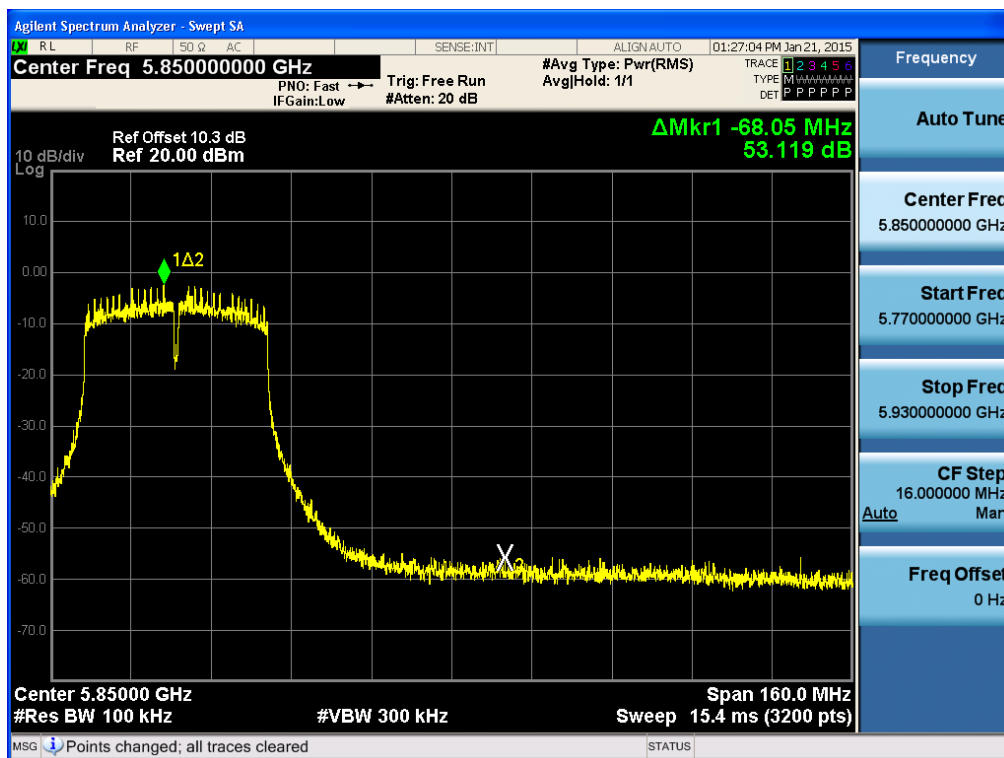


40 MHz BW

BandEdge (802.11n-CH 151)



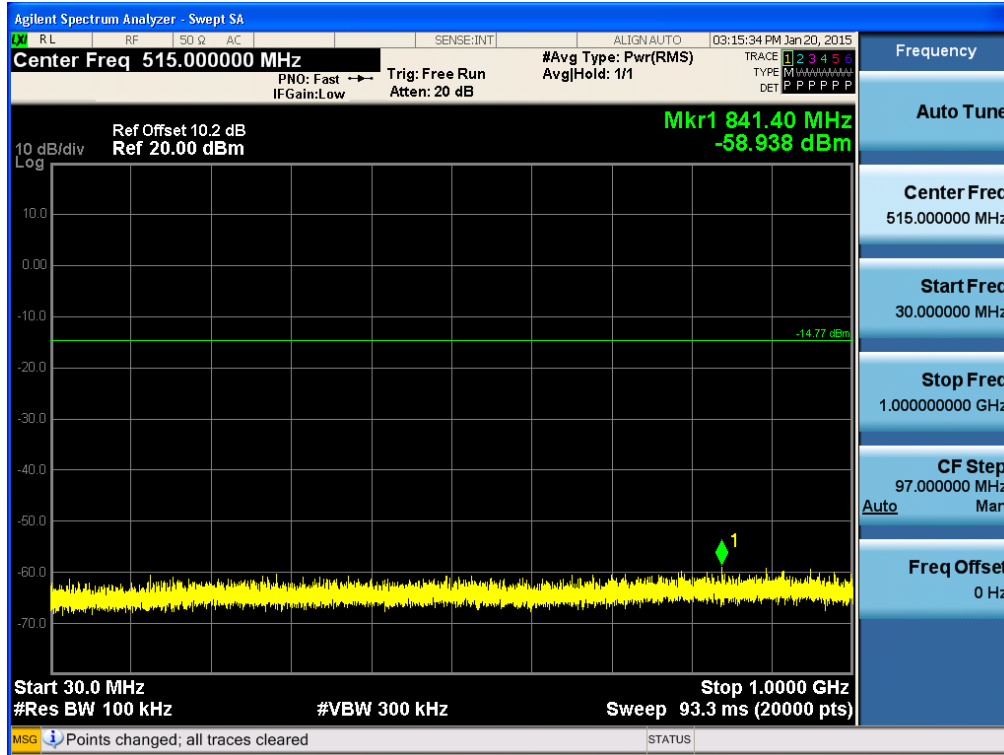
BandEdge (802.11n-CH 159)



2.4 GHz Band

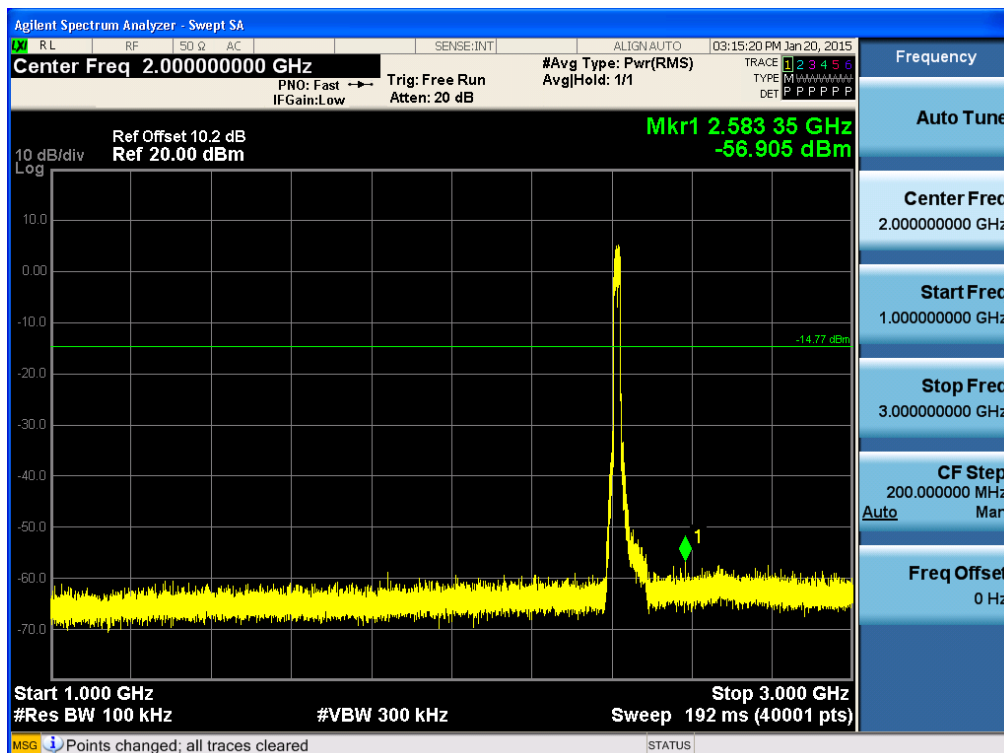
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11g-CH1)



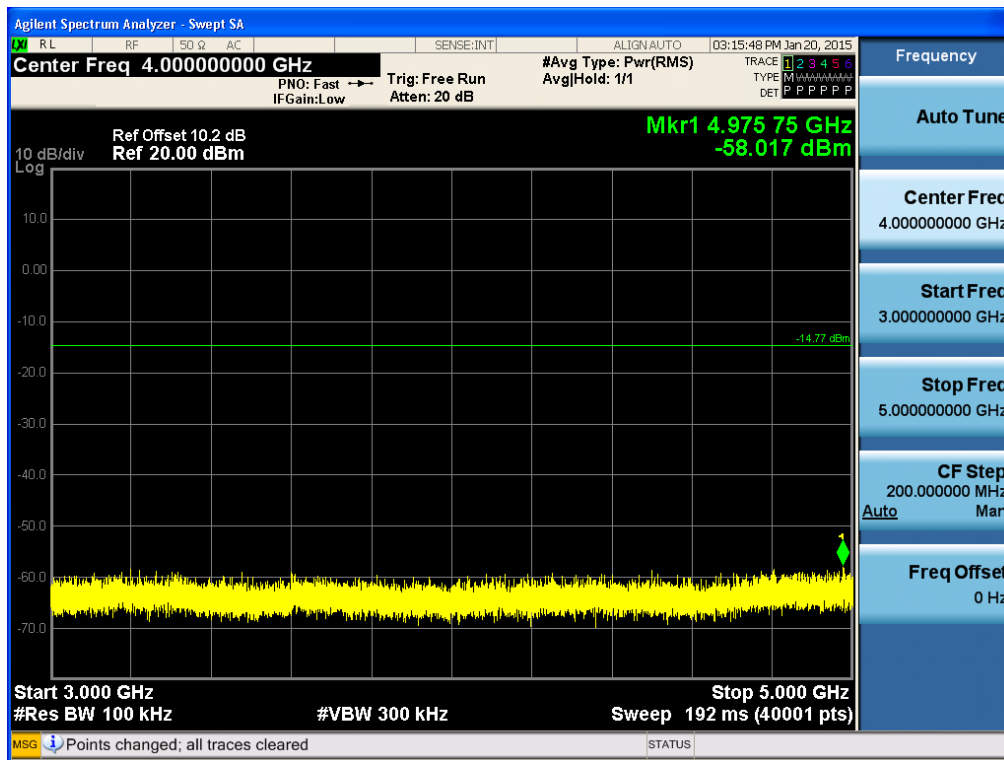
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11g-CH1)



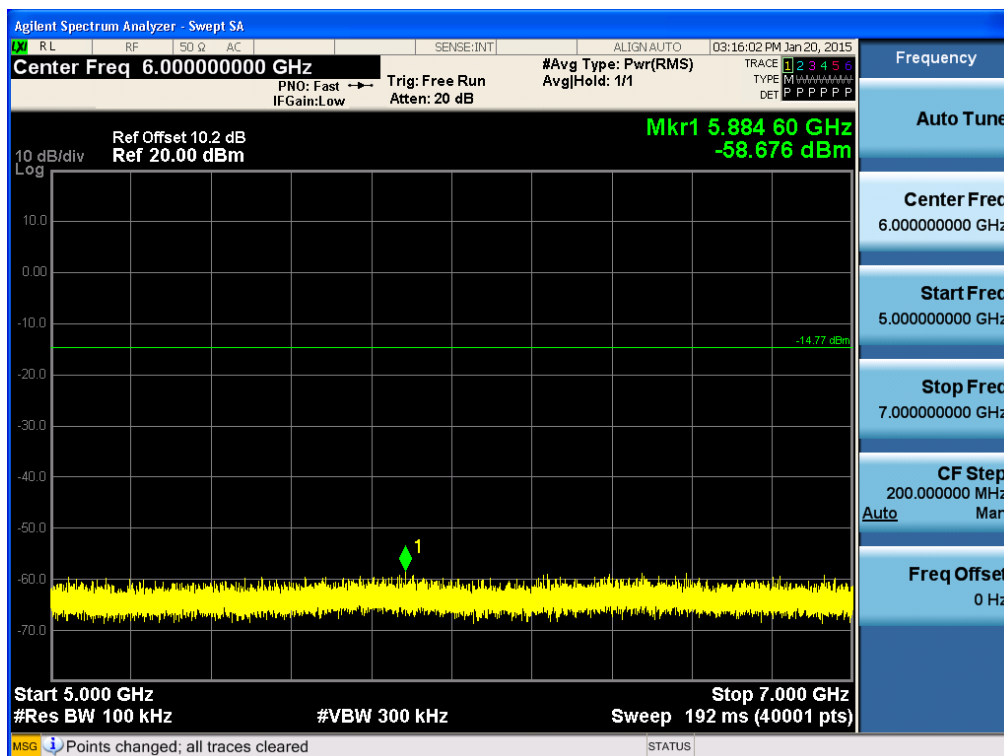
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11g-CH1)



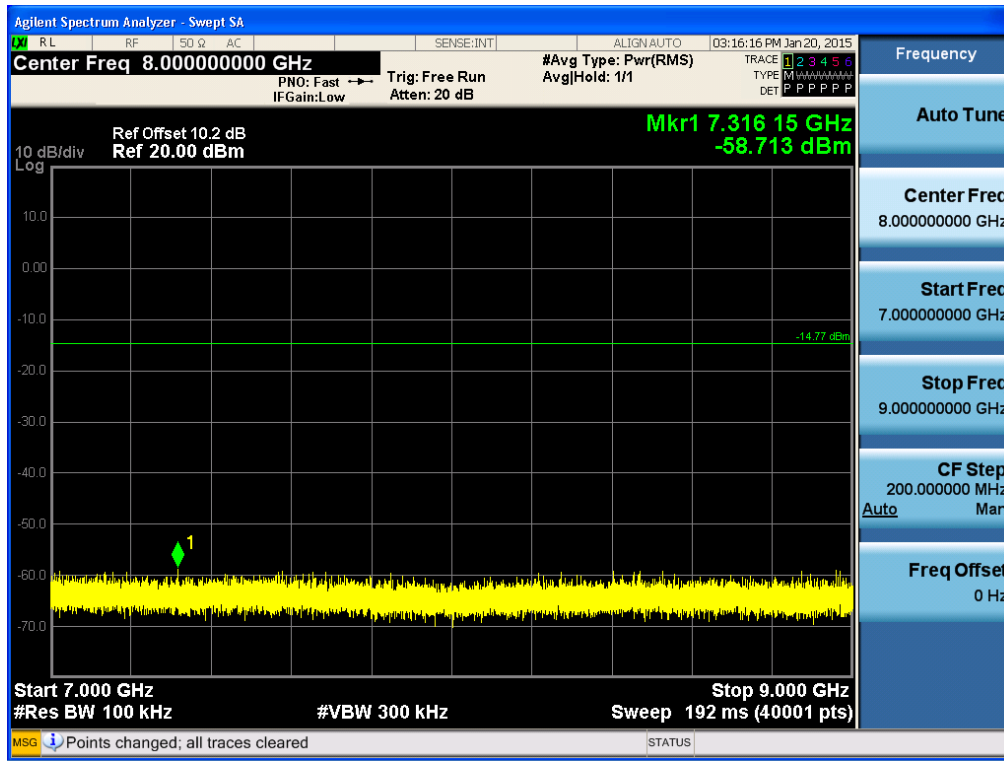
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11g-CH1)



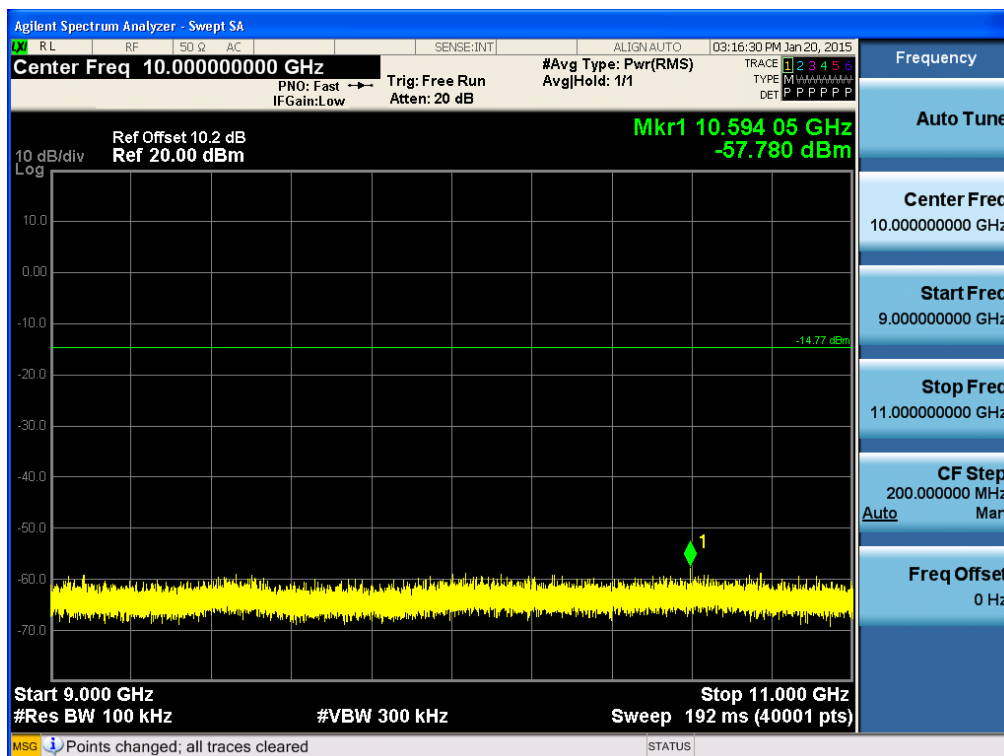
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11g-CH1)



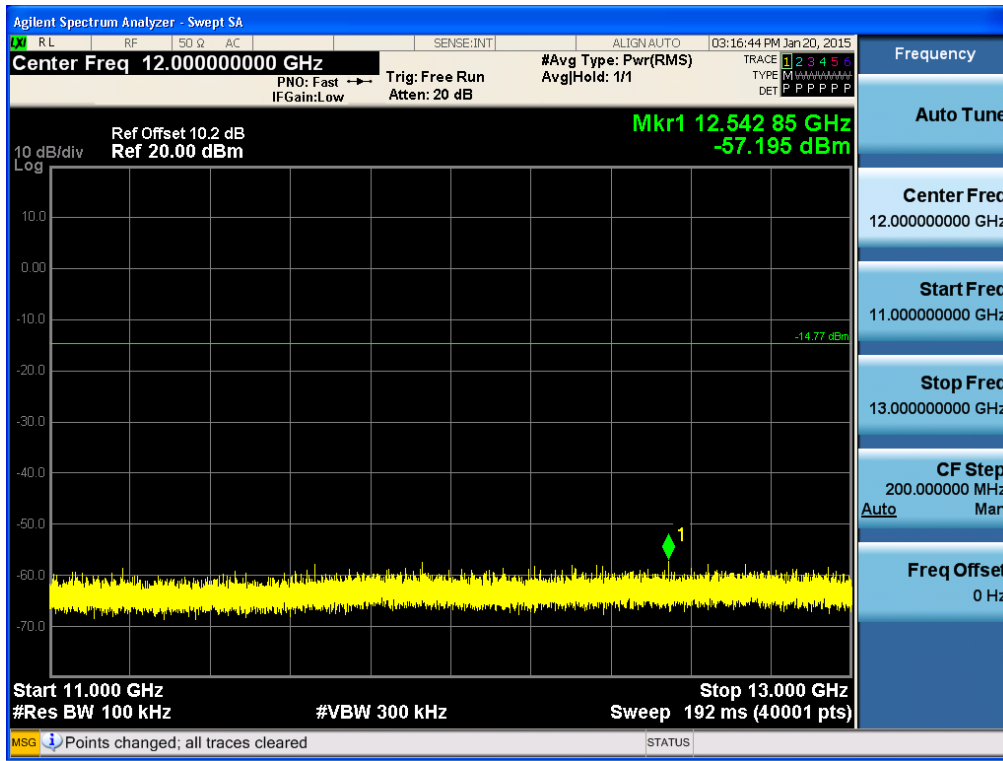
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11g-CH1)



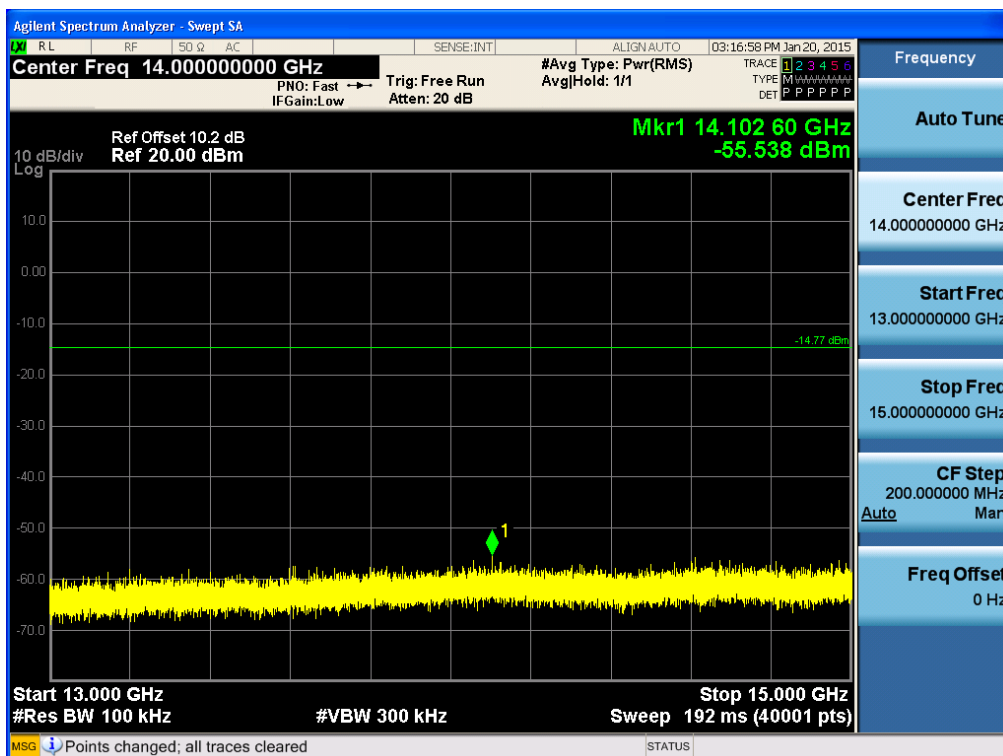
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11g-CH1)



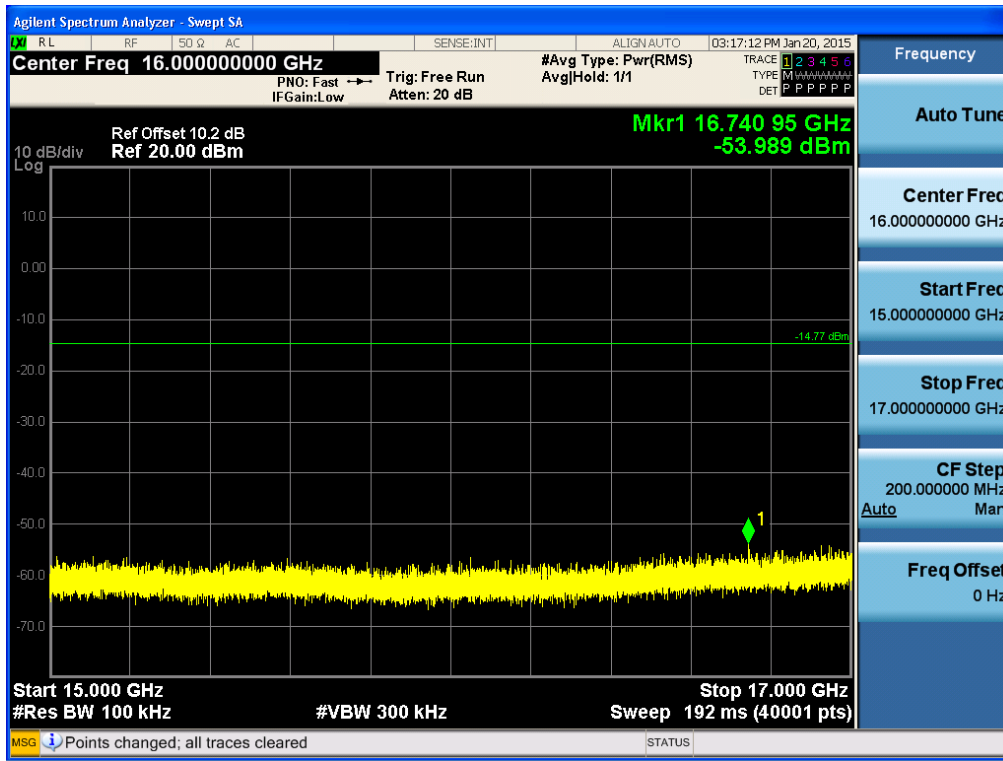
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11g-CH1)



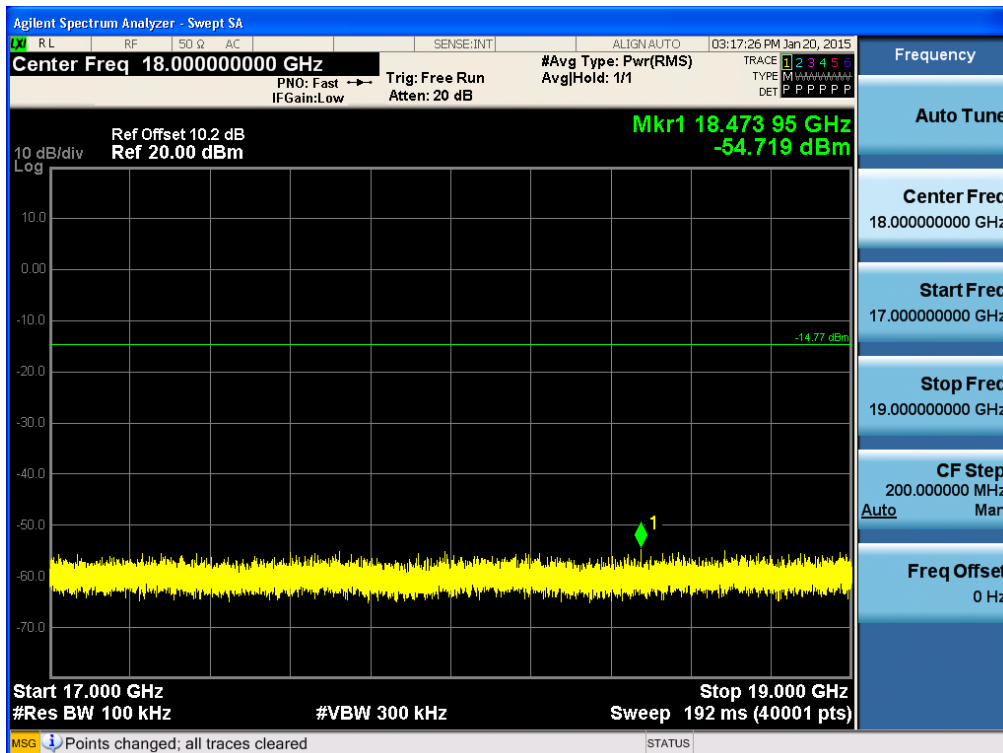
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11g-CH1)



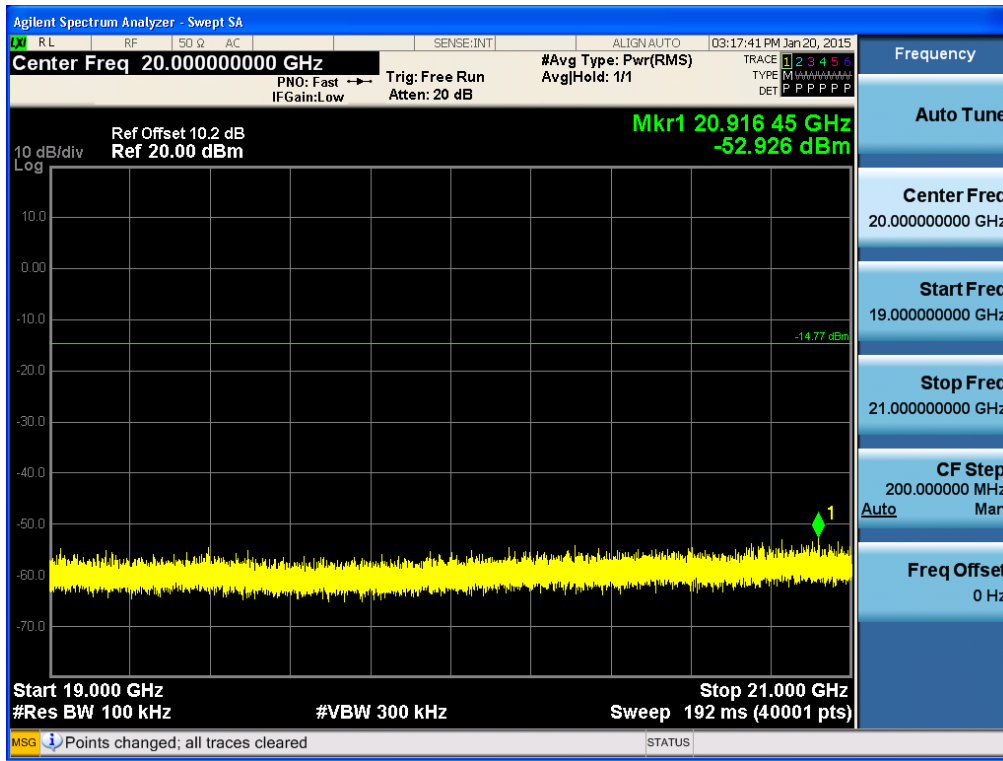
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11g-CH1)



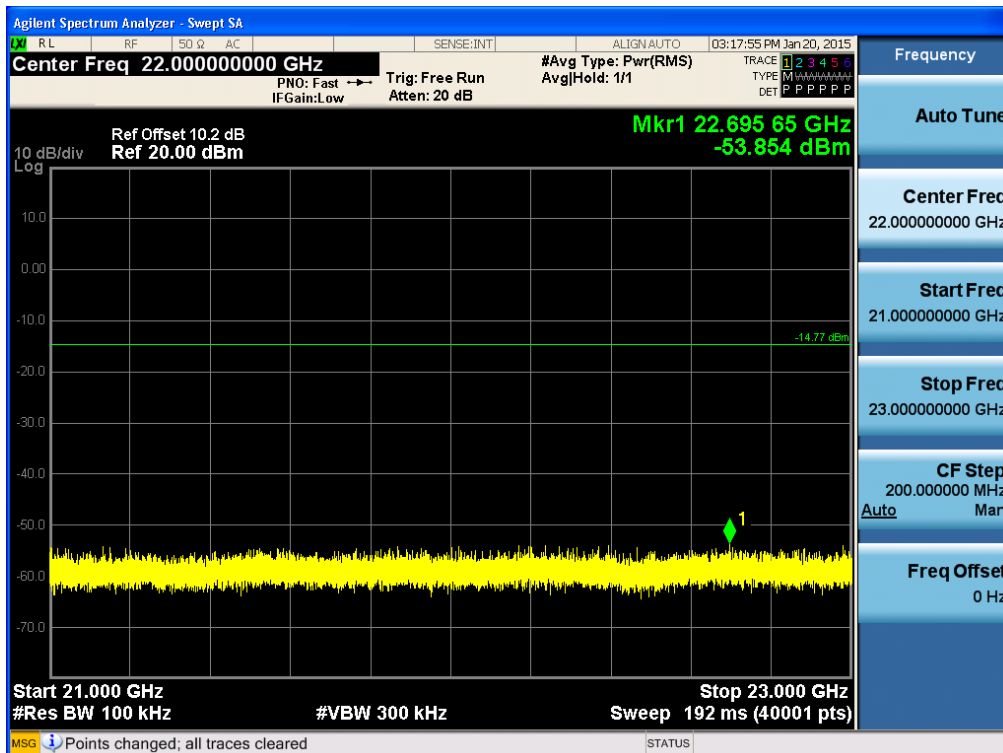
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11g-CH1)



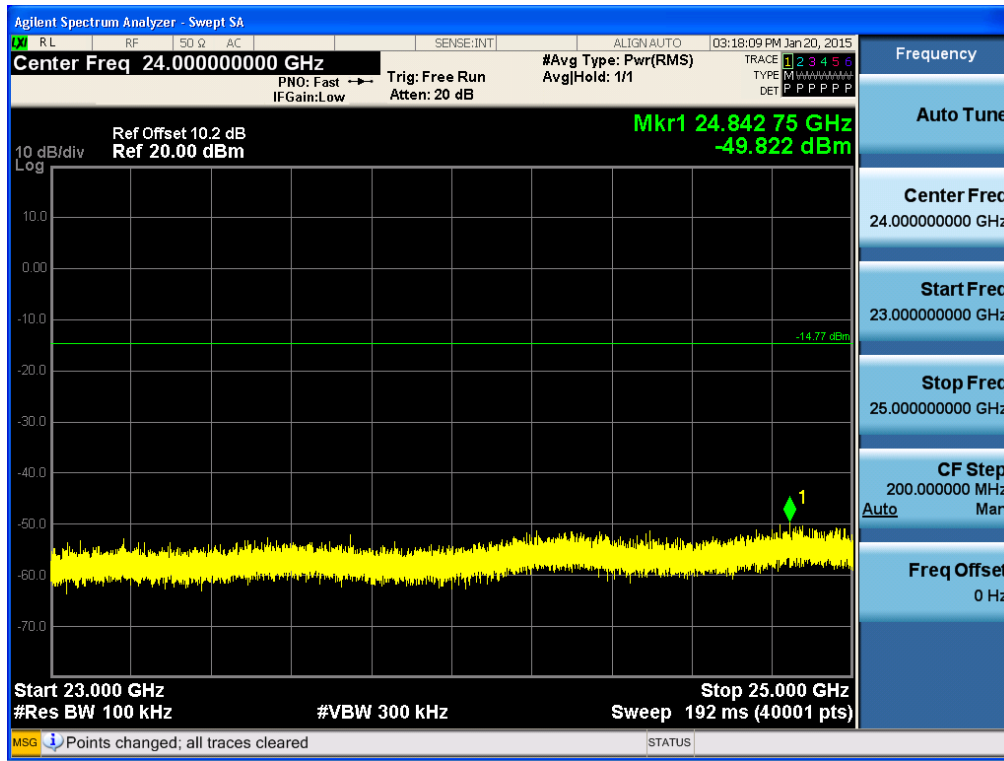
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11g-CH1)



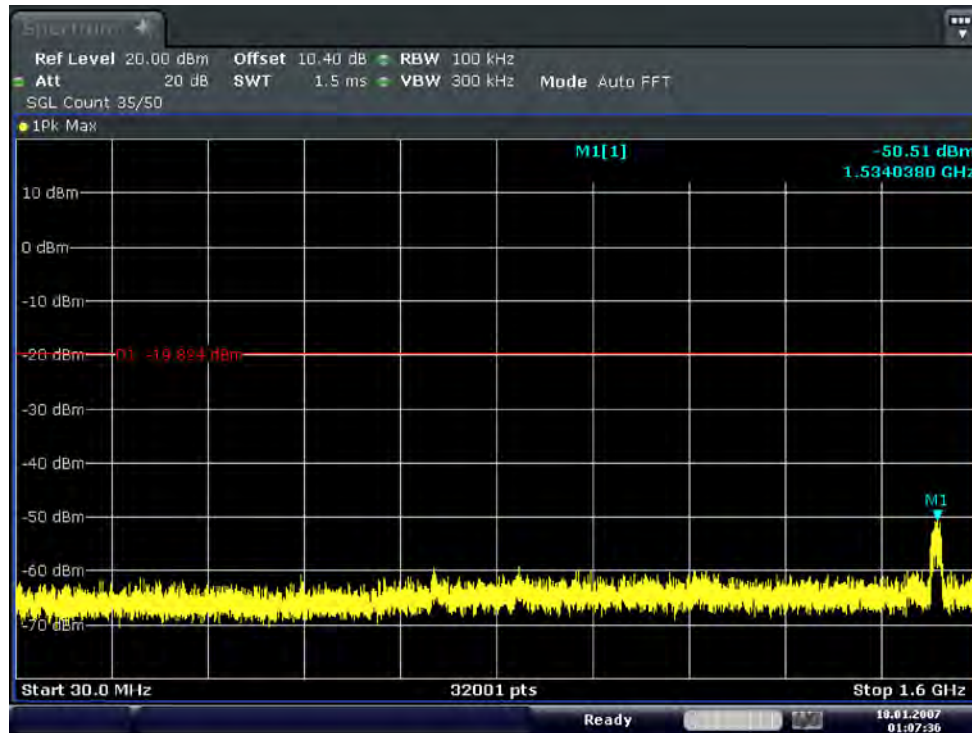
23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11g-CH1)



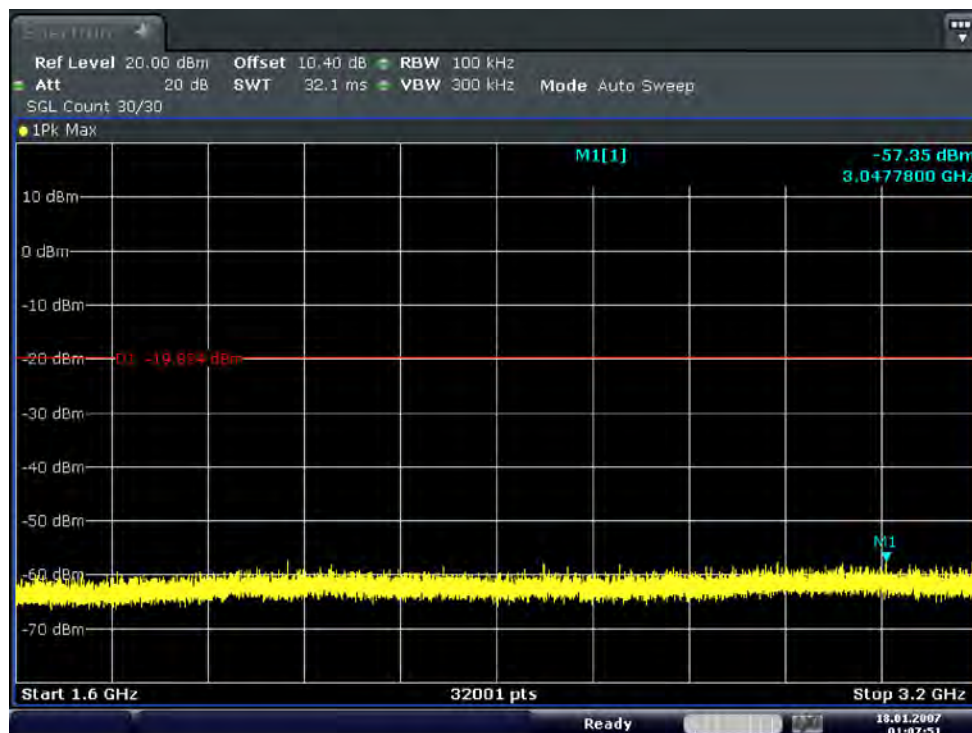
5 GHz Band
30 MHz ~ 1.6 GHz

Conducted Spurious Emission (802.11a-CH149)



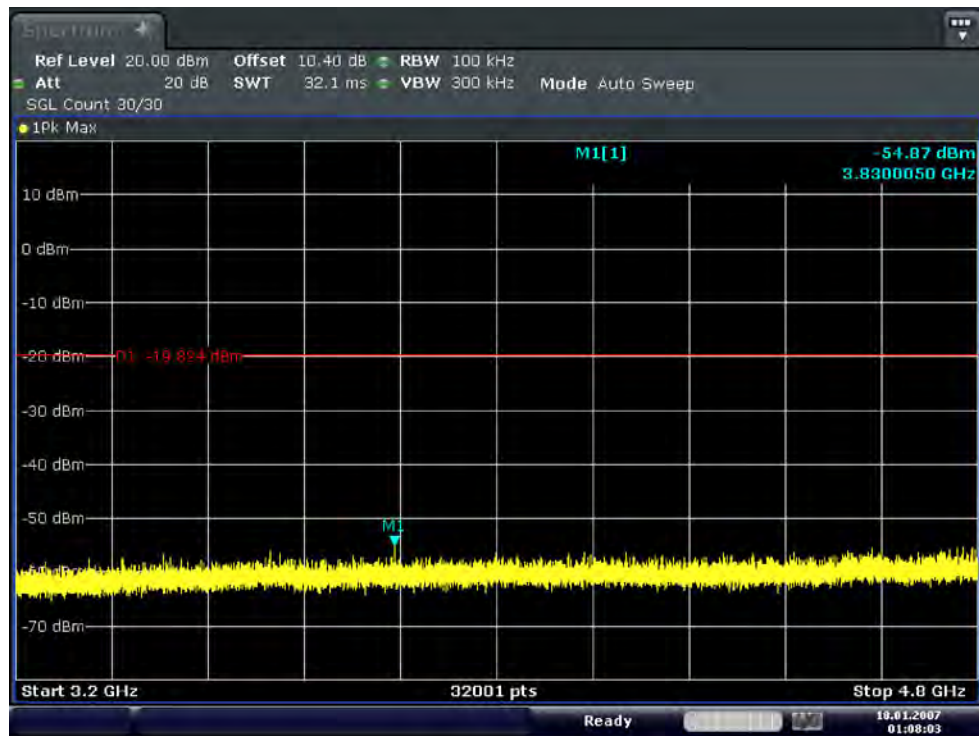
1.6 GHz ~ 3.2 GHz

Conducted Spurious Emission (802.11a-CH149)



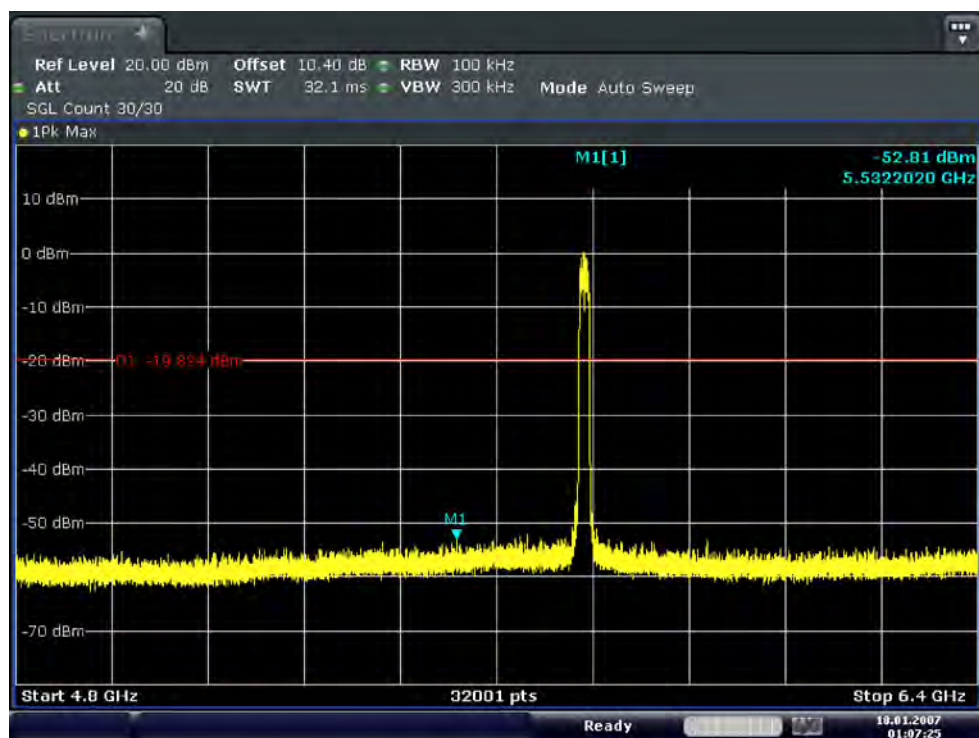
3.2 GHz ~ 4.8 GHz

Conducted Spurious Emission (802.11a-CH149)



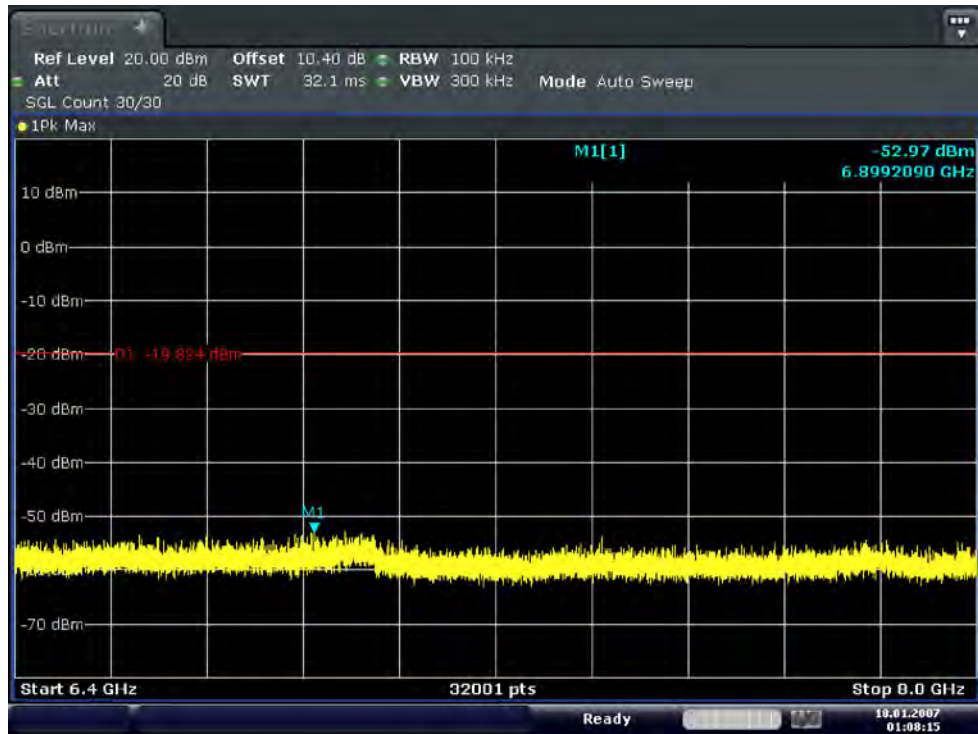
4.8 GHz ~ 6.4 GHz

Conducted Spurious Emission (802.11a-CH149)



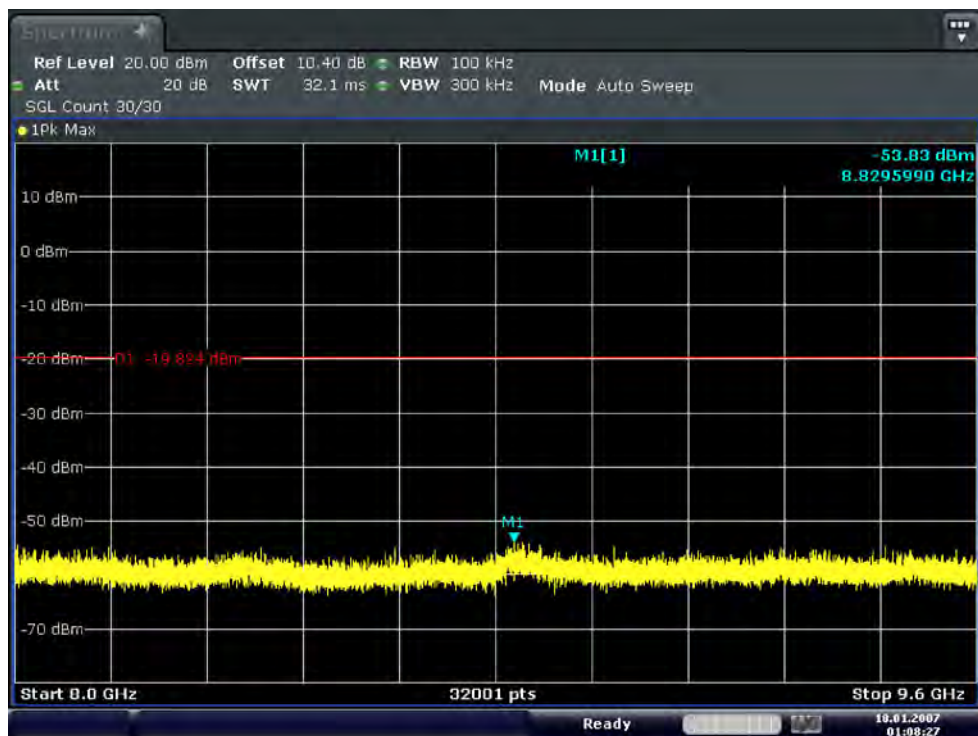
6.4 GHz ~ 8 GHz

Conducted Spurious Emission (802.11a-CH149)



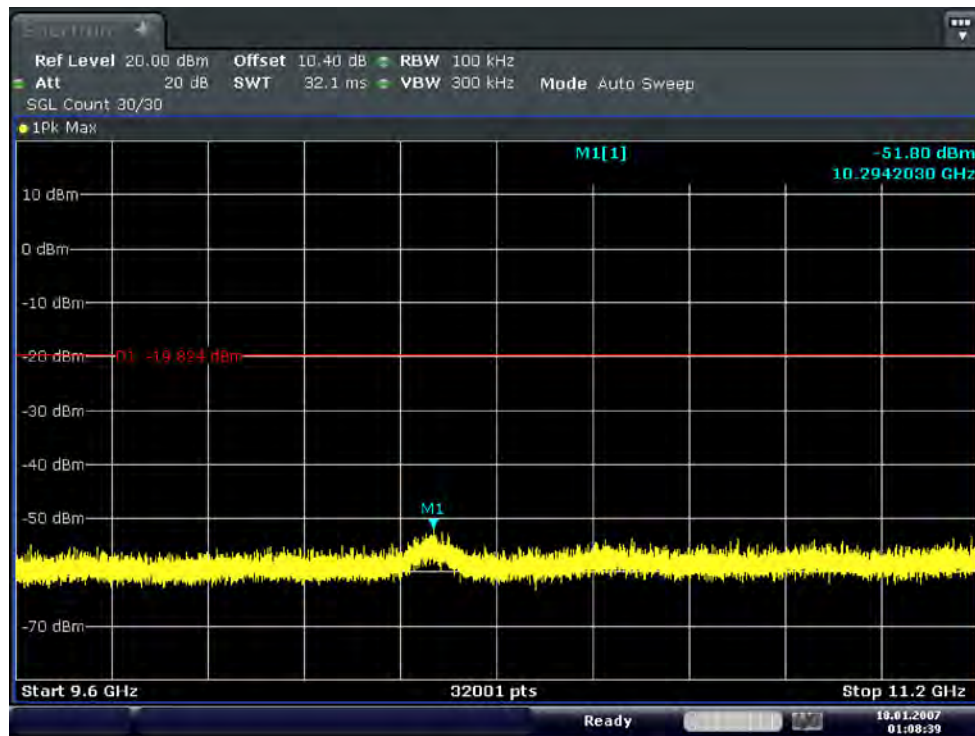
8 GHz ~ 9.6 GHz

Conducted Spurious Emission (802.11a-CH149)



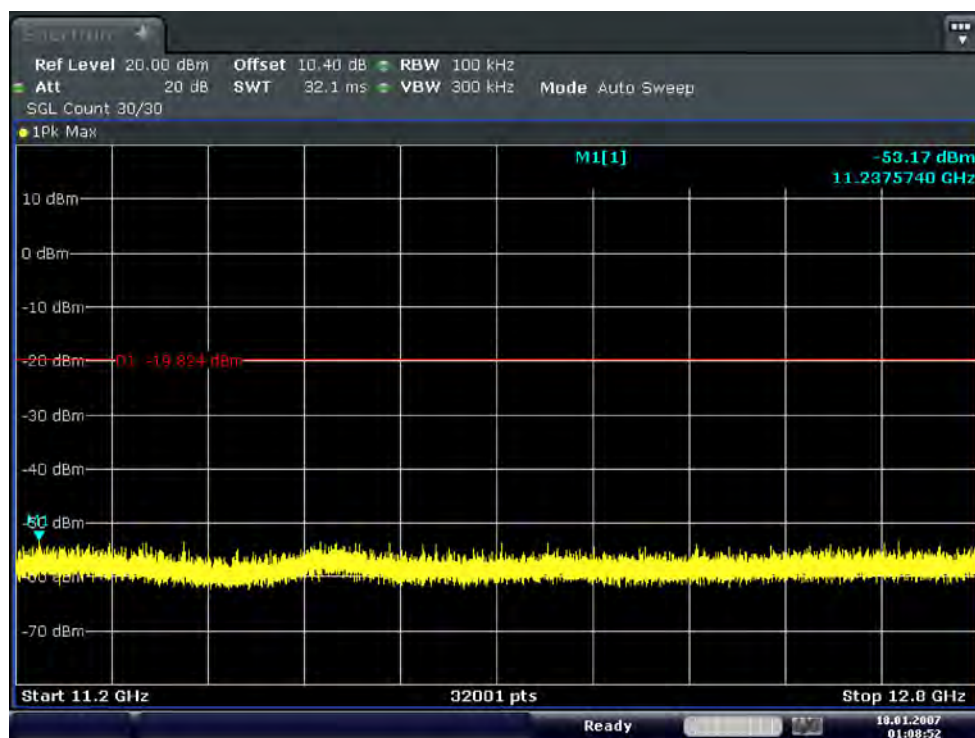
9.6 GHz ~ 11.2 GHz

Conducted Spurious Emission (802.11a-CH149)



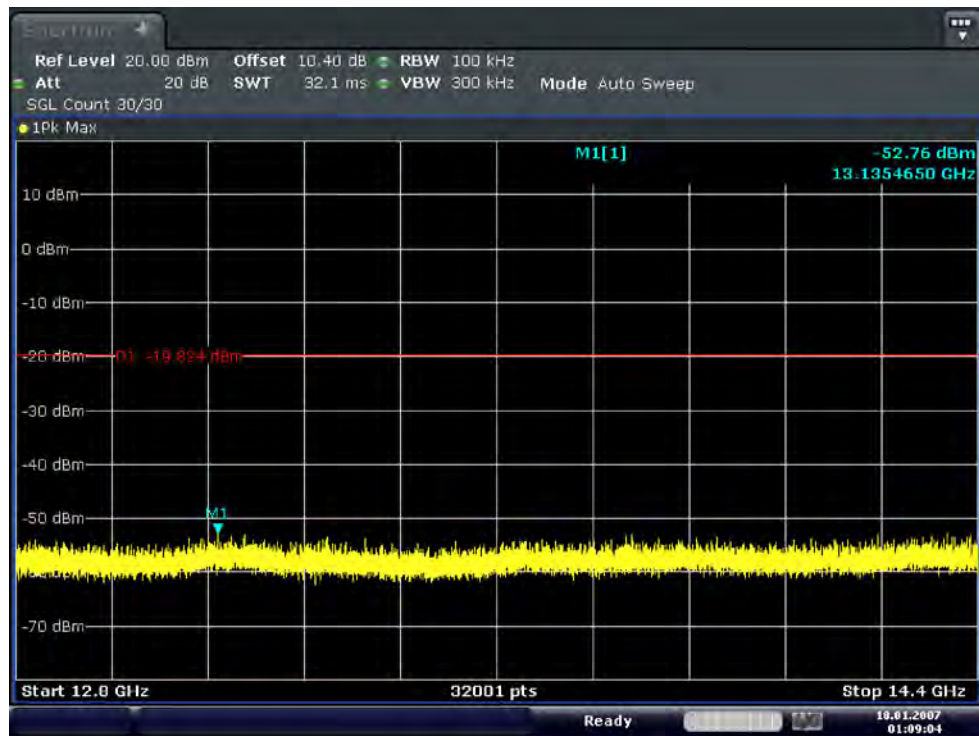
11.2 GHz ~ 12.8 GHz

Conducted Spurious Emission (802.11a-CH149)



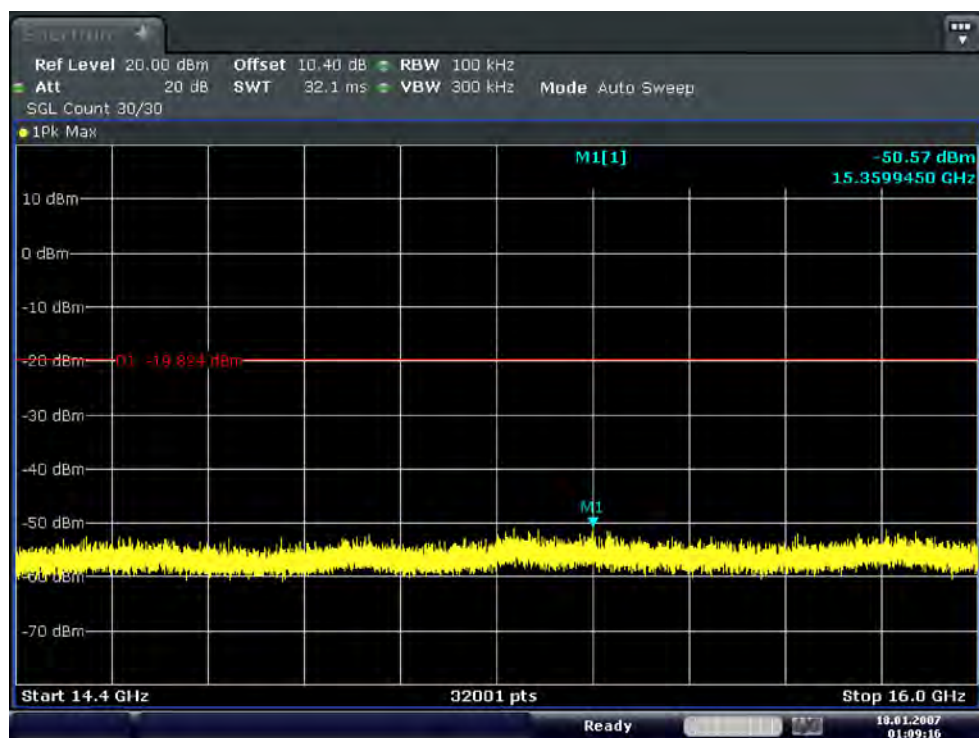
12.8 GHz ~ 14.4 GHz

Conducted Spurious Emission (802.11a-CH149)



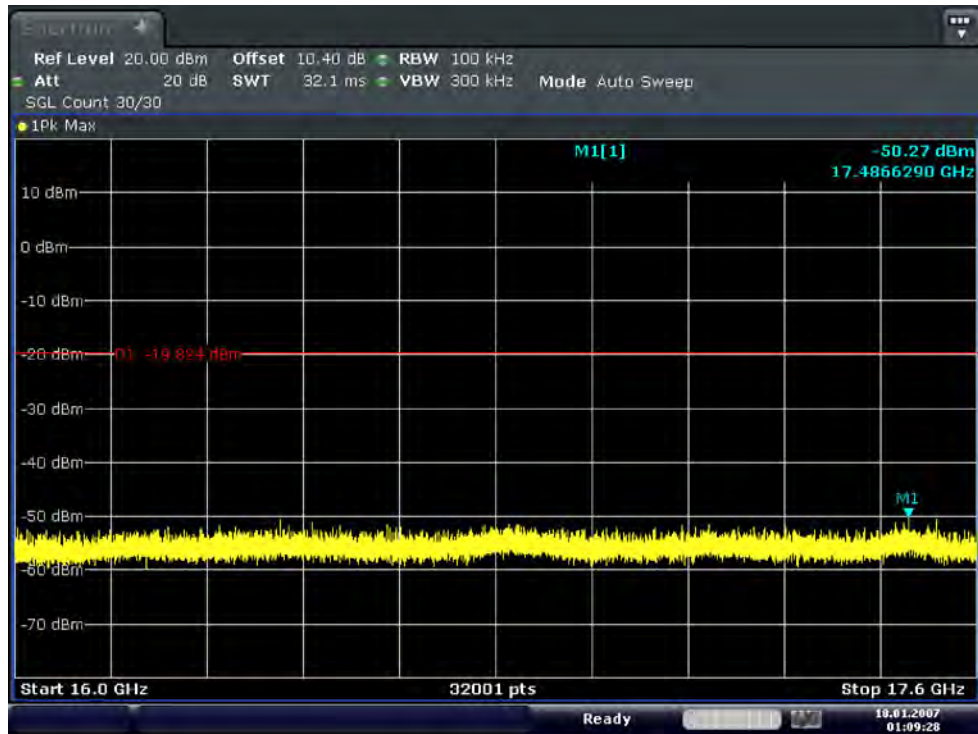
14.4 GHz ~ 16 GHz

Conducted Spurious Emission (802.11a-CH149)



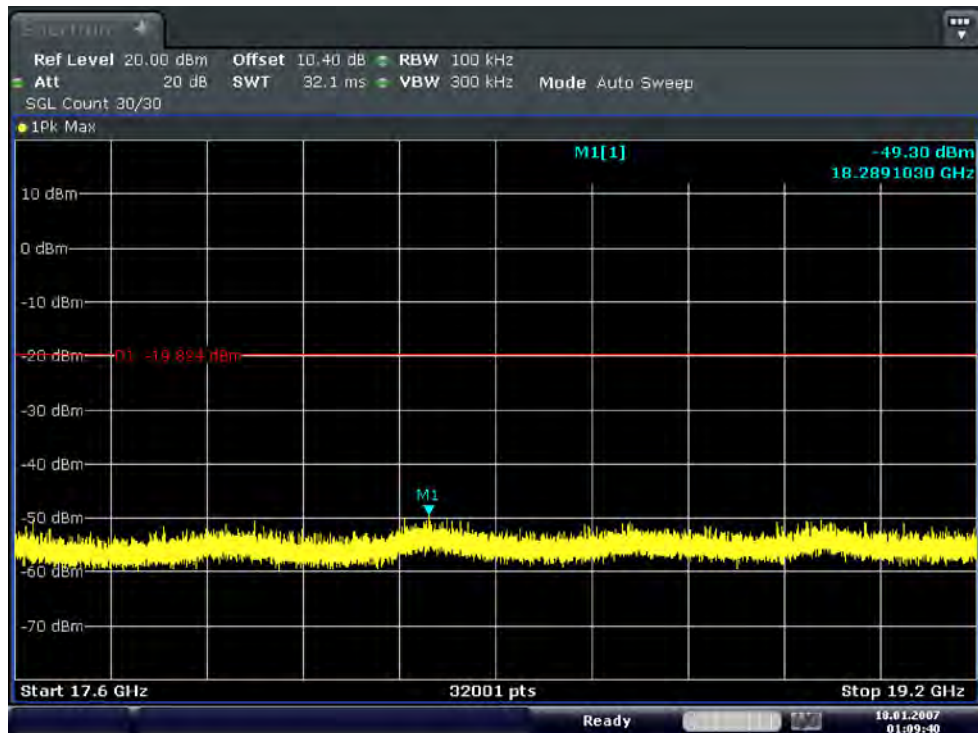
16 GHz ~ 17.6 GHz

Conducted Spurious Emission (802.11a-CH149)



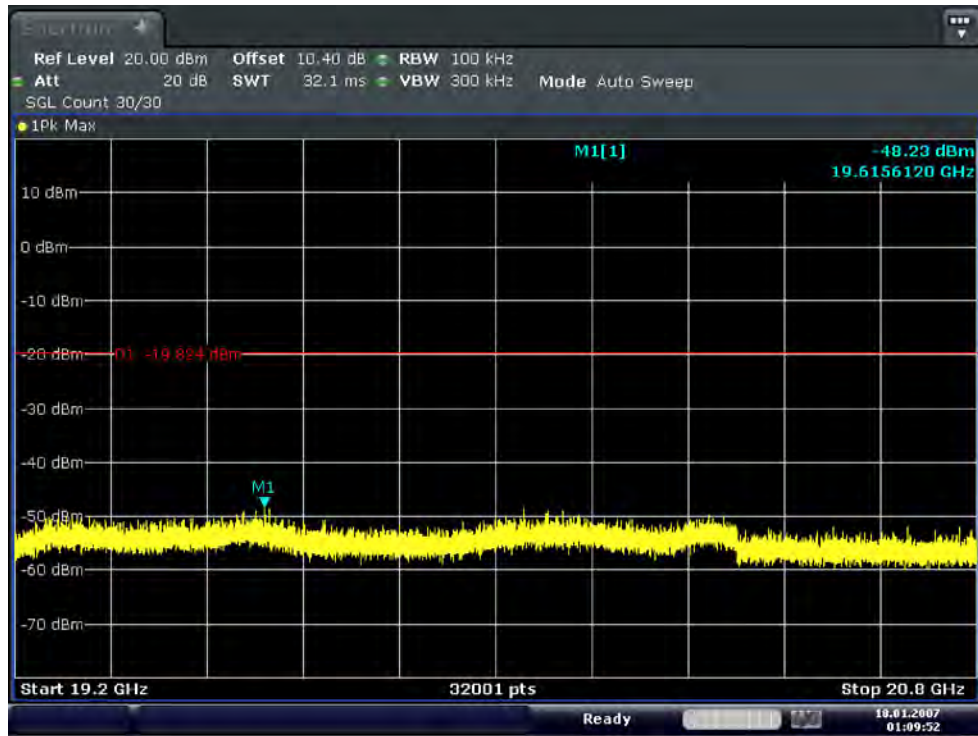
17.6 GHz ~ 19.2 GHz

Conducted Spurious Emission (802.11a-CH149)



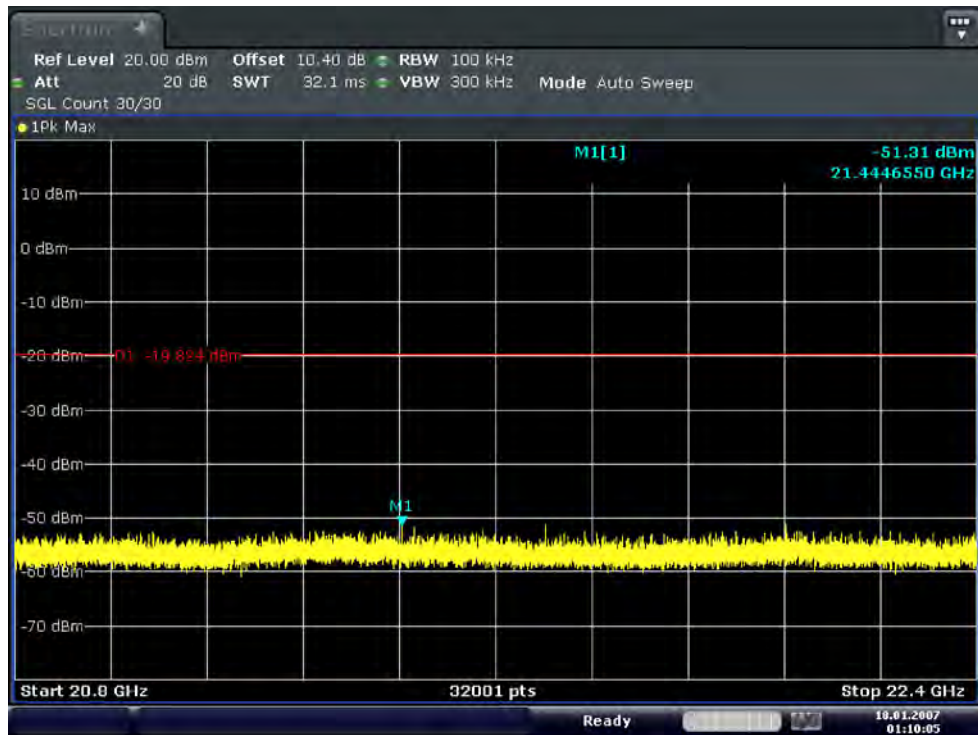
19.2 GHz ~ 20.8 GHz

Conducted Spurious Emission (802.11a-CH149)



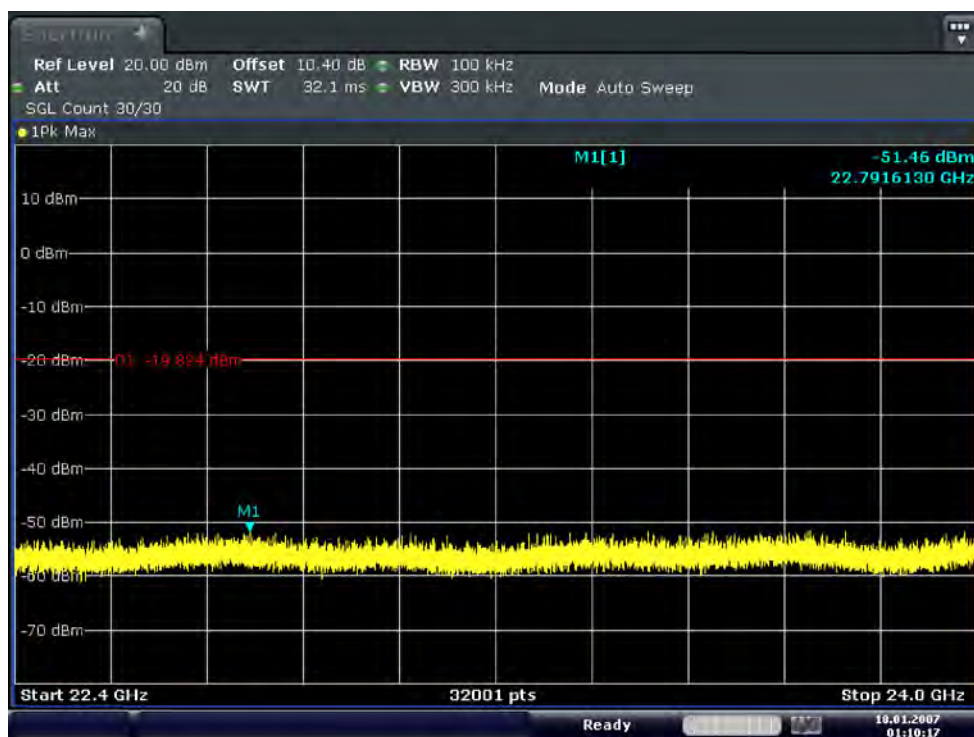
20.8 GHz ~ 22.4 GHz

Conducted Spurious Emission (802.11a-CH149)



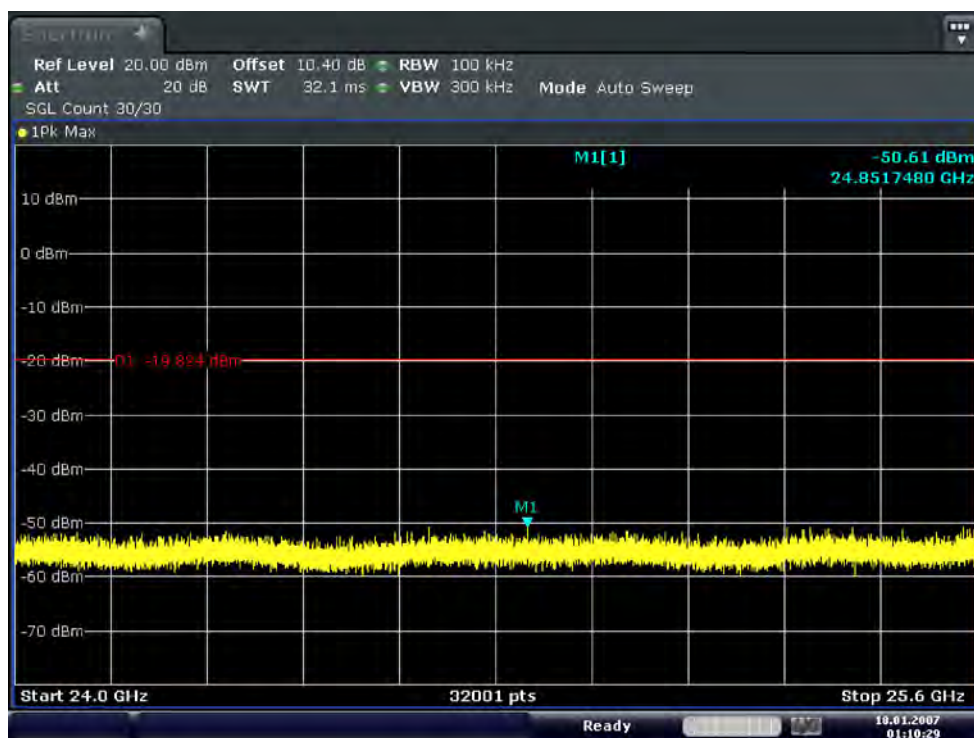
22.4 GHz ~ 24 GHz

Conducted Spurious Emission (802.11a-CH149)



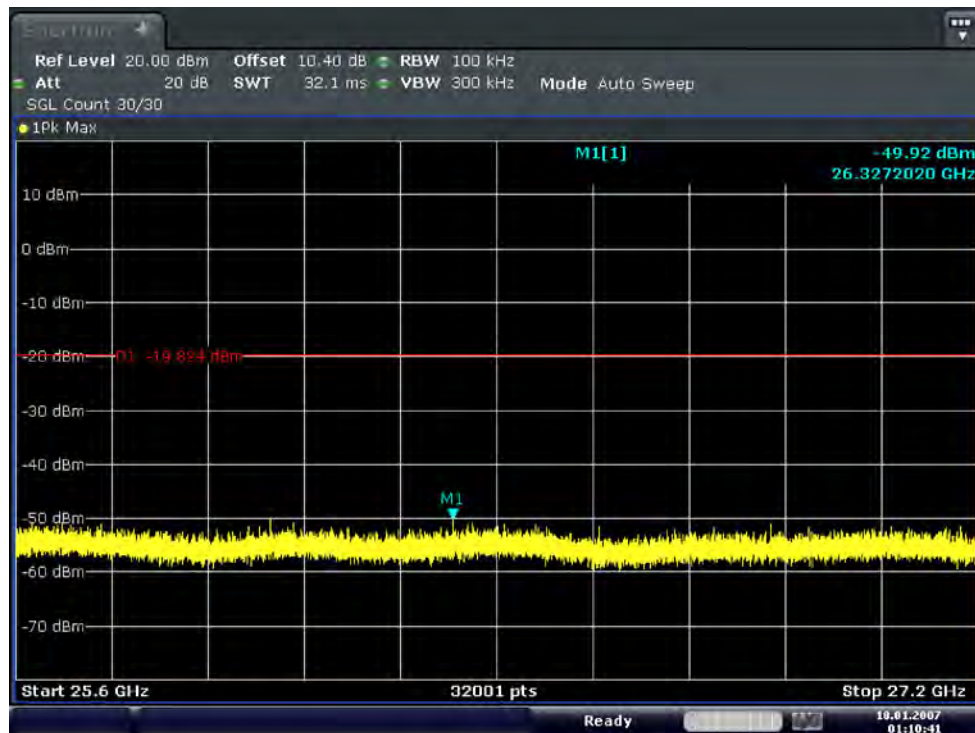
24 GHz ~ 25.6 GHz

Conducted Spurious Emission (802.11a-CH149)



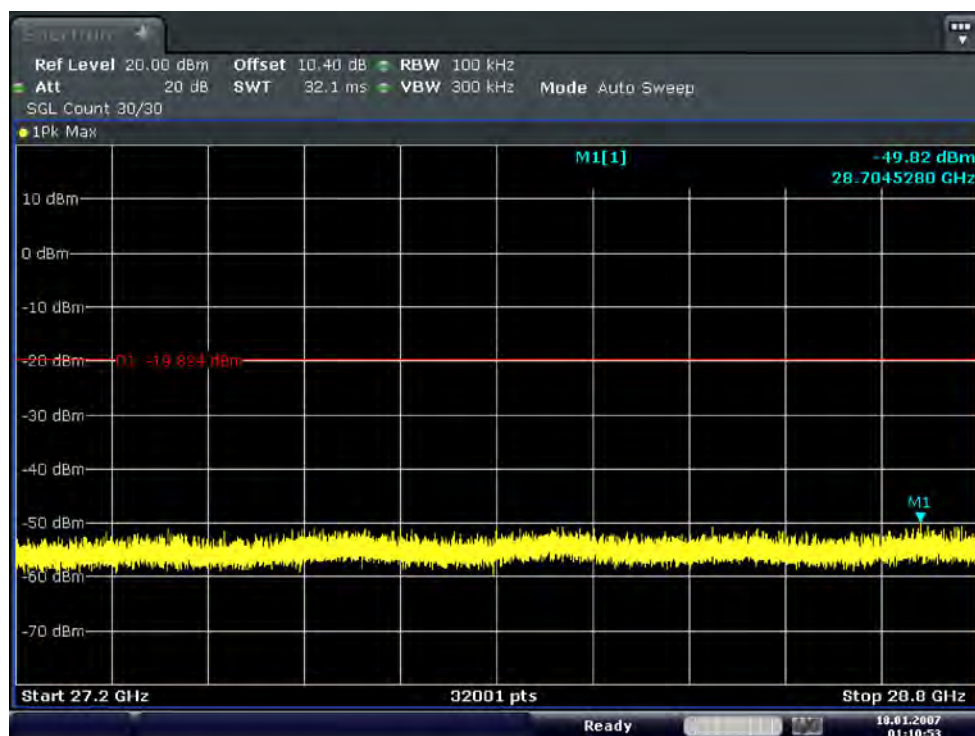
25.6 GHz ~ 27.2 GHz

Conducted Spurious Emission (802.11a-CH149)



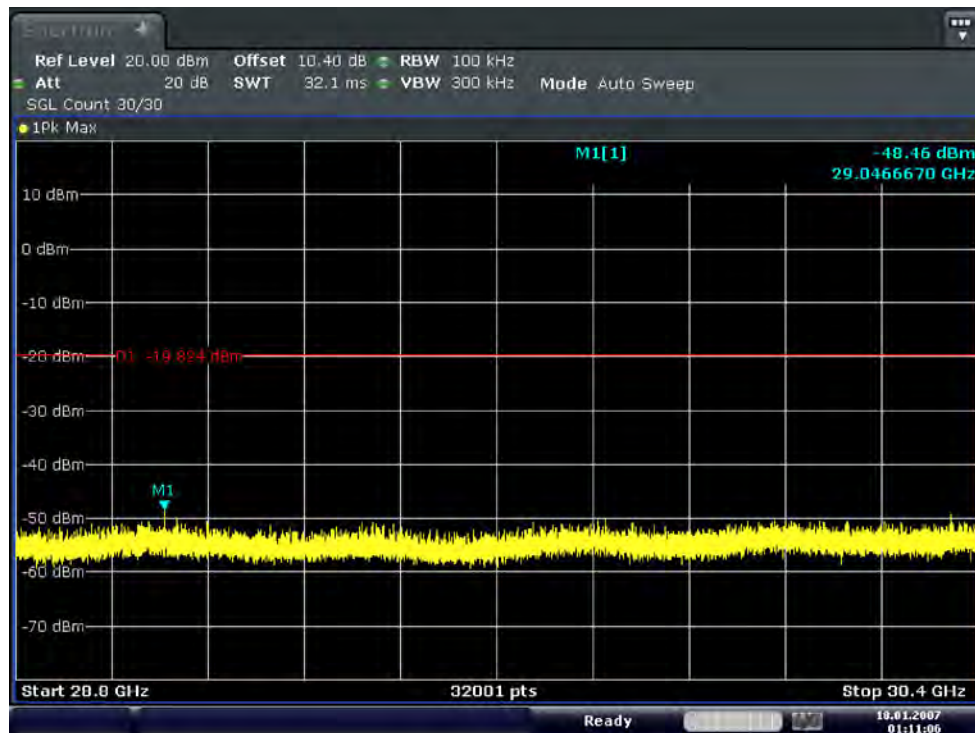
27.2 GHz ~ 28.8 GHz

Conducted Spurious Emission (802.11a-CH149)



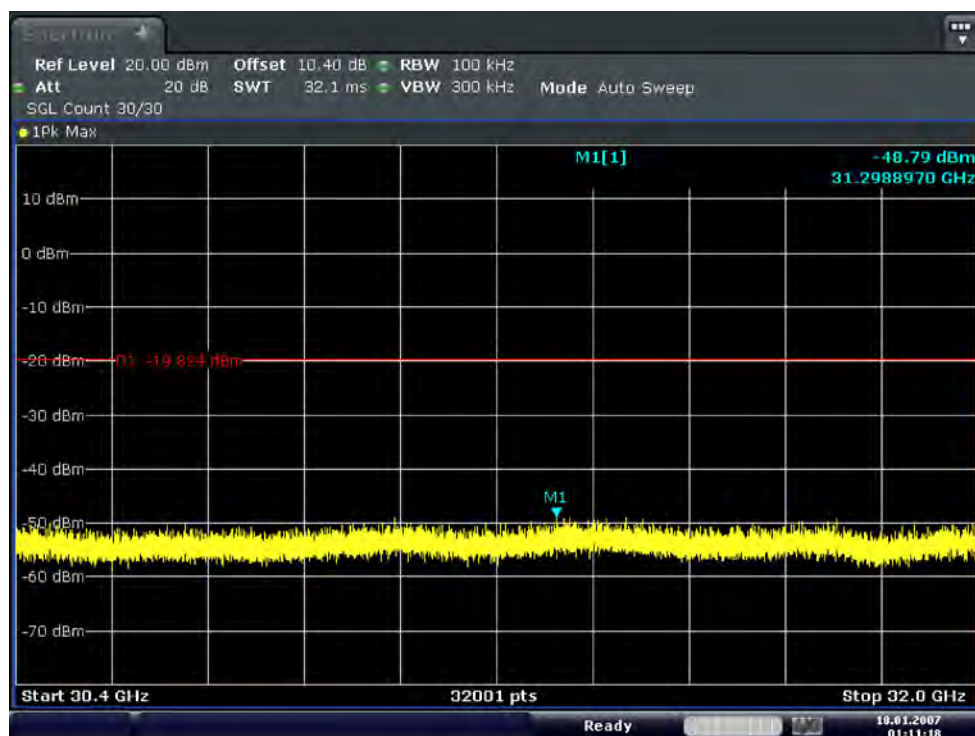
28.8 GHz ~ 30.4 GHz

Conducted Spurious Emission (802.11a-CH149)



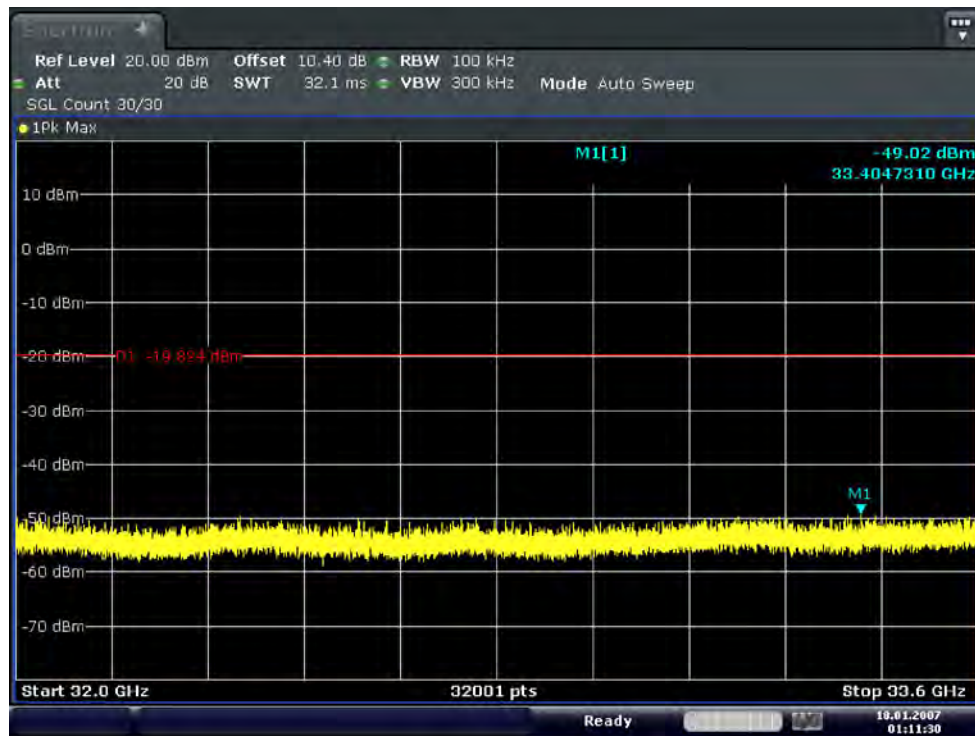
30.4 GHz ~ 32 GHz

Conducted Spurious Emission (802.11a-CH149)



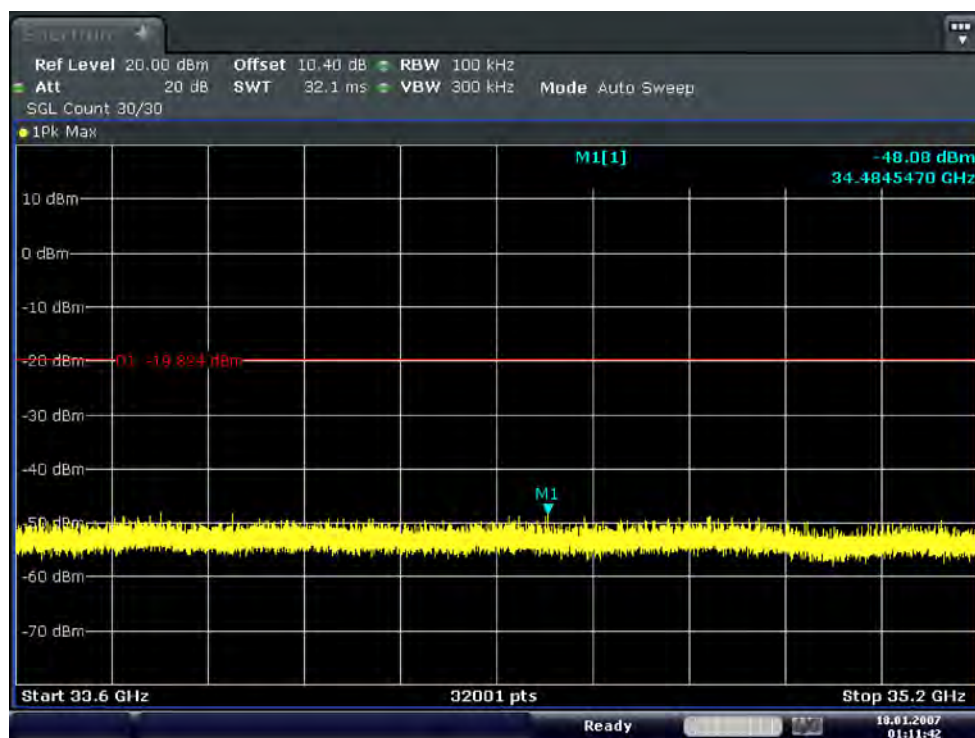
32 GHz ~ 33.6 GHz

Conducted Spurious Emission (802.11a-CH149)



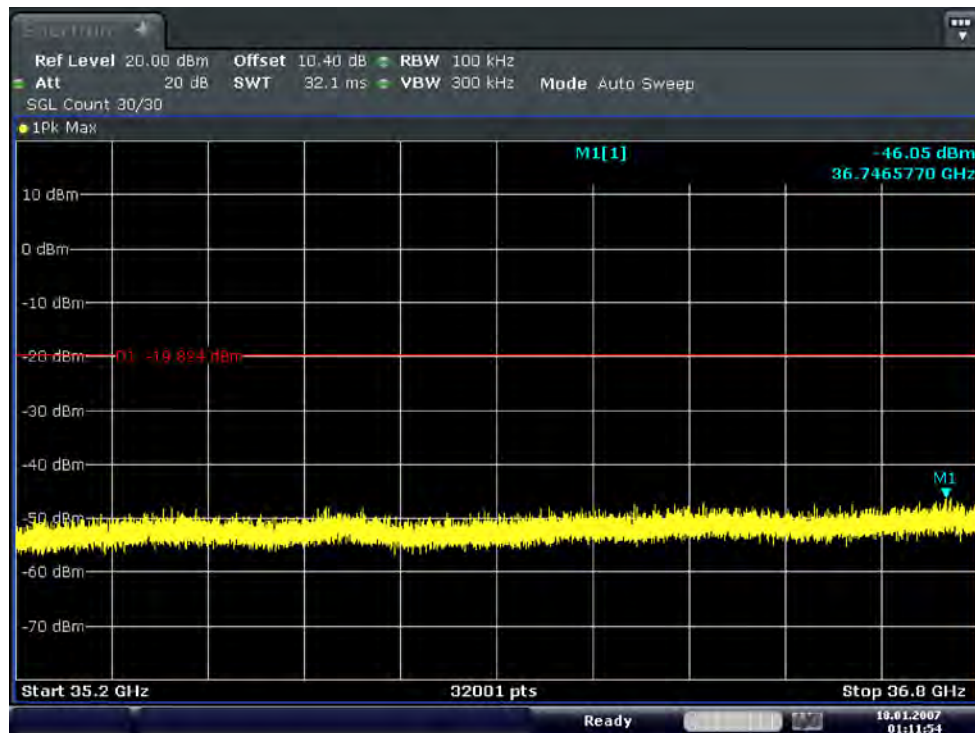
33.6 GHz ~ 35.2 GHz

Conducted Spurious Emission (802.11a-CH149)



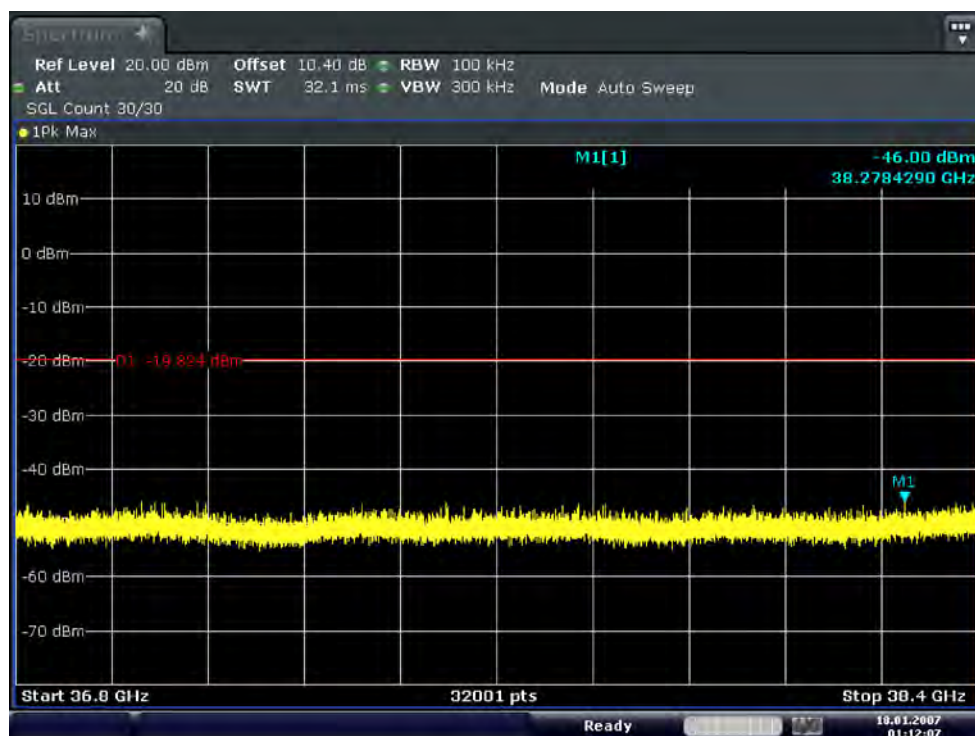
35.2 GHz ~ 36.8 GHz

Conducted Spurious Emission (802.11a-CH149)



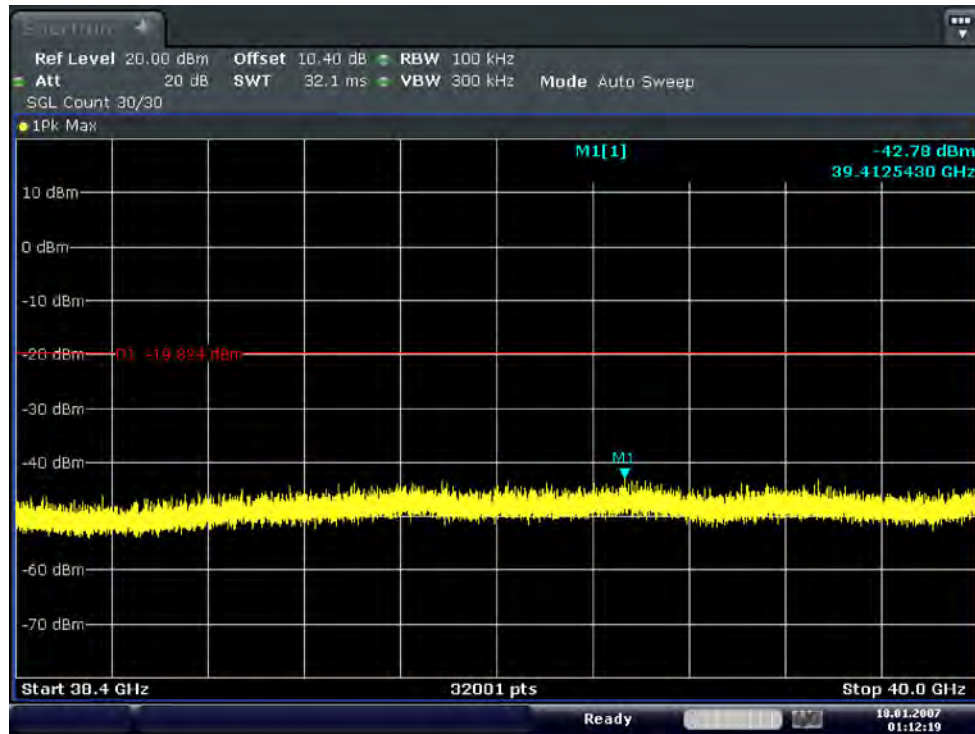
36.8 GHz ~ 38.4 GHz

Conducted Spurious Emission (802.11a-CH149)



38.4 GHz ~ 40 GHz

Conducted Spurious Emission (802.11a-CH149)

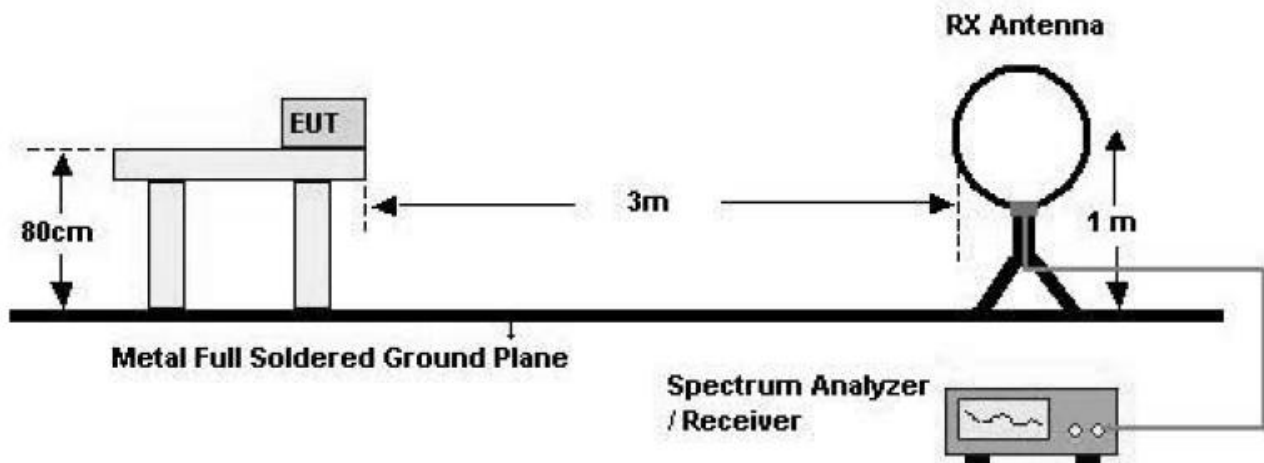


8.6 RADIATED MEASUREMENT.**8.6.1 RADIATED SPURIOUS EMISSIONS.****Test Requirements and limit, §15.205, §15.209**

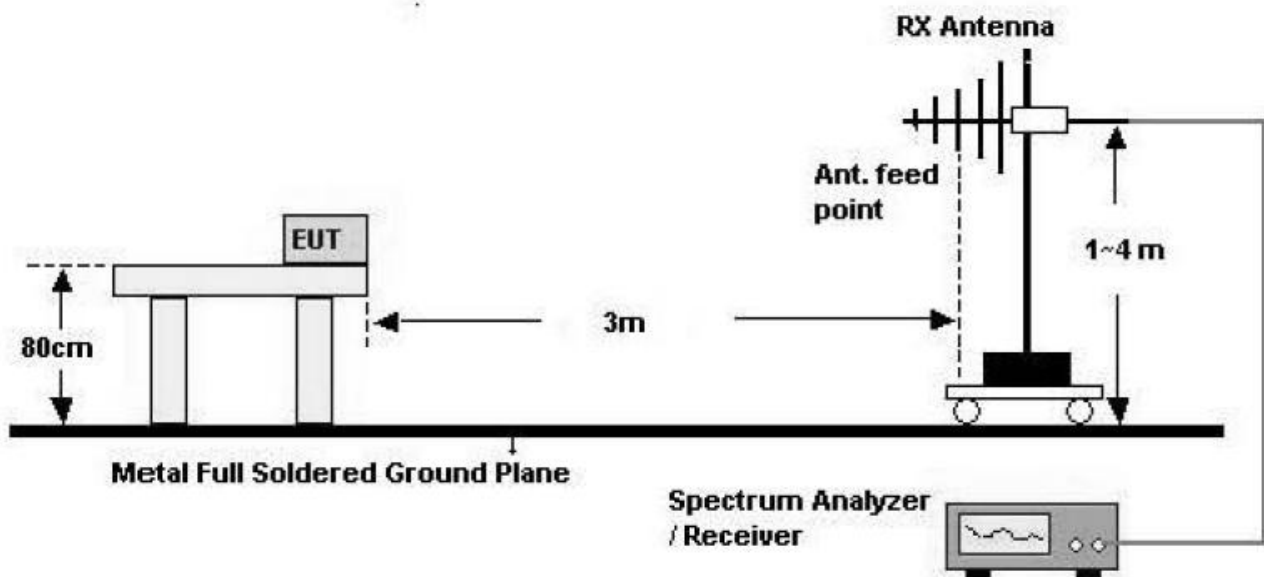
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

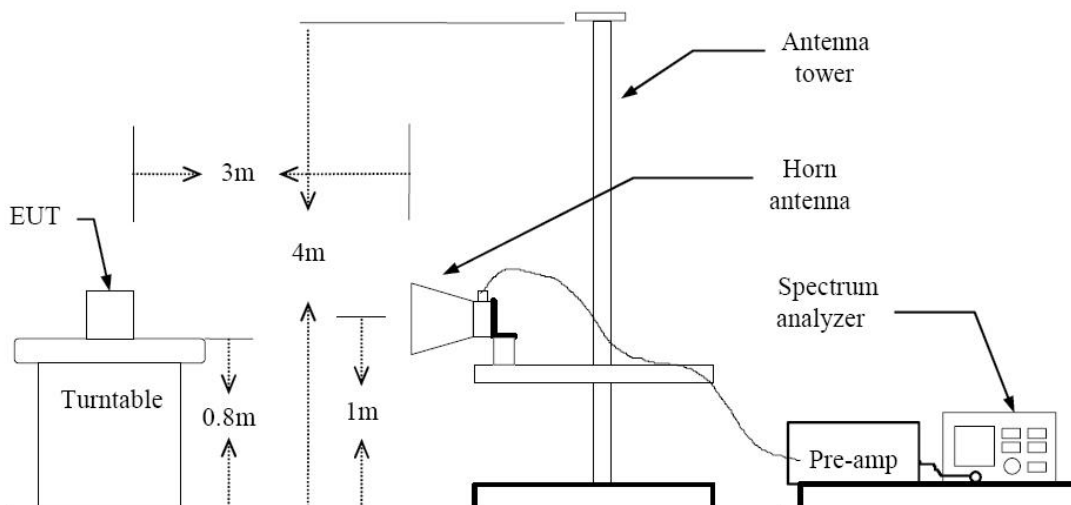
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE USED

Method 12.1 in KDB 558074, issued 06/05/2014)

Spectrum Setting

- Peak

Peak emission levels are measured by setting the instrument as follows:

RBW = cf. Table 1.

VBW $\geq 3 \times$ RBW.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweeps to continue until the trace stabilizes.

(Note that the required measurement time may be longer for low duty cycle applications).

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

- Average

Set RBW = 1 MHz

Set VBW $\geq 1/T$. (at least 100 times less than the resolution bandwidth, but no less than 10 Hz.)

Select spectrum analyzer linear display mode.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Note :

1. We are performed the RSE and radiated band edge using standard radiated method.
2. The actual setting value of VBW for 802.11 b/g/n

Mode	Worst Data rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle (%)	VBW(1/T) (Hz)	The actual setting value of VBW (Hz)
a	6	8.560	8.700	98.39	117	1000
g	6	1.420	1.525	39.11	704	1000
n_20	6.5	1.332	1.437	32.69	751	1000
n_40	13.5	0.662	0.762	86.88	1511	3000

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V/m	dBm /m	dBm	(H/V)	dB μ V/m	dB μ V/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB)
4. Limit line = specific Limits (dB μ V) + Distance extrapolation factor
5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	$\text{dB}_{\mu\text{V}}/\text{m}$	dBm/m	dBm	(H/V)	$\text{dB}_{\mu\text{V}}/\text{m}$	$\text{dB}_{\mu\text{V}}/\text{m}$	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Above 1 GHz

Band :	2.4 GHz
Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2412
Channel No.	01 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	51.24	-1.98	V	49.26	73.98	24.72	PK
4824	42.42	-1.98	V	40.44	53.98	13.54	AV
7236	46.27	7.60	V	53.87	73.98	20.11	PK
7236	32.21	7.60	V	39.81	53.98	14.17	AV
4824	54.52	-1.98	H	52.54	73.98	21.44	PK
4824	48.93	-1.98	H	46.95	53.98	7.03	AV
7236	46.48	7.60	H	54.08	73.98	19.90	PK
7236	32.26	7.60	H	39.86	53.98	14.12	AV

Band :	2.4 GHz
Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2437
Channel No.	06 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	53.19	-1.92	V	51.27	73.98	22.71	PK
4874	43.50	-1.92	V	41.58	53.98	12.40	AV
7311	46.24	7.38	V	53.62	73.98	20.36	PK
7311	32.89	7.38	V	40.27	53.98	13.71	AV
4874	55.79	-1.92	H	53.87	73.98	20.11	PK
4874	49.97	-1.92	H	48.05	53.98	5.93	AV
7311	46.62	7.38	H	54.00	73.98	19.98	PK
7311	32.92	7.38	H	40.30	53.98	13.68	AV

Band :	2.4 GHz
Operation Mode:	802.11 b
Transfer Rate:	1 Mbps
Operating Frequency	2462
Channel No.	11 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	51.39	-1.93	V	49.46	73.98	24.52	PK
4924	42.49	-1.93	V	40.56	53.98	13.42	AV
7386	46.70	7.28	V	53.98	73.98	20.00	PK
7386	32.26	7.28	V	39.54	53.98	14.44	AV
4924	54.17	-1.93	H	52.24	73.98	21.74	PK
4924	48.64	-1.93	H	46.71	53.98	7.27	AV
7386	46.82	7.28	H	54.10	73.98	19.88	PK
7386	32.30	7.28	H	39.58	53.98	14.40	AV

Notes:

11. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done 802.11b mode and all data rate. Worst data rate is the lowest data of each mode.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	2.4 GHz
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Operation Mode: 802.11 g
Transfer Rate: 6 Mbps
Operating Frequency: 2412
Channel No. 01 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	52.95	-1.98	V	50.97	73.98	23.01	PK
4824	35.87	-1.98	V	33.89	53.98	20.09	AV
7236	45.78	7.60	V	53.38	73.98	20.60	PK
7236	32.20	7.60	V	39.80	53.98	14.18	AV
4824	53.82	-1.98	H	51.84	73.98	22.14	PK
4824	38.87	-1.98	H	36.89	53.98	17.09	AV
7236	46.02	7.60	H	53.62	73.98	20.36	PK
7236	32.21	7.60	H	39.81	53.98	14.17	AV

Band : 2.4 GHz
Operation Mode: 802.11 g
Transfer Rate: 6 Mbps
Operating Frequency: 2437
Channel No. 06 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	52.91	-1.92	V	50.99	73.98	22.99	PK
4874	36.75	-1.92	V	34.83	53.98	19.15	AV
7311	46.49	7.38	V	53.87	73.98	20.11	PK
7311	32.82	7.38	V	40.20	53.98	13.78	AV
4874	54.02	-1.92	H	52.10	73.98	21.88	PK
4874	40.15	-1.92	H	38.23	53.98	15.75	AV
7311	46.96	7.38	H	54.34	73.98	19.64	PK
7311	32.87	7.38	H	40.25	53.98	13.73	AV

Band :	2.4 GHz
Operation Mode:	802.11 g
Transfer Rate:	6 Mbps
Operating Frequency	2462
Channel No.	11 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	51.95	-1.93	V	50.02	73.98	23.96	PK
4924	36.45	-1.93	V	34.52	53.98	19.46	AV
7386	47.00	7.28	V	54.28	73.98	19.70	PK
7386	32.32	7.28	V	39.60	53.98	14.38	AV
4924	52.86	-1.93	H	50.93	73.98	23.05	PK
4924	38.57	-1.93	H	36.64	53.98	17.34	AV
7386	47.62	7.28	H	54.90	73.98	19.08	PK
7386	32.36	7.28	H	39.64	53.98	14.34	AV

Notes:

11. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done 802.11g mode and all data rate. Worst data rate is the lowest data of each mode.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	2.4 GHz
Operation Mode:	802.11 n
Transfer Rate:	6.5 Mbps
Operating Frequency	2412
Channel No.	01 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	49.53	-1.98	V	47.55	73.98	26.43	PK
4824	35.94	-1.98	V	33.96	53.98	20.02	AV
7236	46.46	7.60	V	54.06	73.98	19.92	PK
7236	32.22	7.60	V	39.82	53.98	14.16	AV
4824	50.24	-1.98	H	48.26	73.98	25.72	PK
4824	36.46	-1.98	H	34.48	53.98	19.50	AV
7236	46.68	7.60	H	54.28	73.98	19.70	PK
7236	32.26	7.60	H	39.86	53.98	14.12	AV

Band :	2.4 GHz
Operation Mode:	802.11 n
Transfer Rate:	6.5 Mbps
Operating Frequency	2437
Channel No.	06 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	49.93	-1.92	V	48.01	73.98	25.97	PK
4874	36.07	-1.92	V	34.15	53.98	19.83	AV
7311	46.39	7.38	V	53.77	73.98	20.21	PK
7311	32.88	7.38	V	40.26	53.98	13.72	AV
4874	51.82	-1.92	H	49.90	73.98	24.08	PK
4874	37.44	-1.92	H	35.52	53.98	18.46	AV
7311	46.65	7.38	H	54.03	73.98	19.95	PK
7311	32.91	7.38	H	40.29	53.98	13.69	AV

Band :	2.4 GHz
Operation Mode:	802.11 n
Transfer Rate:	6.5 Mbps
Operating Frequency	2462
Channel No.	11 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	49.46	-1.93	V	47.53	73.98	26.45	PK
4924	35.42	-1.93	V	33.49	53.98	20.49	AV
7386	46.78	7.28	V	54.06	73.98	19.92	PK
7386	32.31	7.28	V	39.59	53.98	14.39	AV
4924	50.42	-1.93	H	48.49	73.98	25.49	PK
4924	36.63	-1.93	H	34.70	53.98	19.28	AV
7386	46.91	7.28	H	54.19	73.98	19.79	PK
7386	32.33	7.28	H	39.61	53.98	14.37	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done 802.11n mode and all data rate. Worst data rate is the lowest data of each mode.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	5.8 GHz
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5745 MHz
Channel No.	149 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11490	63.31	-6.10	V	57.21	73.98	16.77	PK
11490	49.55	-6.10	V	43.45	53.98	10.53	AV
11490	63.78	-6.10	H	57.68	73.98	16.30	PK
11490	49.58	-6.10	H	43.48	53.98	10.50	AV

Band :	5.8 GHz
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11570	62.58	-5.57	V	57.01	73.98	16.97	PK
11570	49.18	-5.57	V	43.61	53.98	10.37	AV
11570	63.02	-5.57	H	57.45	73.98	16.53	PK
11570	49.25	-5.57	H	43.68	53.98	10.30	AV

Band :	5.8 GHz
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	63.48	-6.63	V	56.85	73.98	17.13	PK
11650	49.52	-6.63	V	42.89	53.98	11.09	AV
11650	63.81	-6.63	H	57.18	73.98	16.80	PK
11650	49.52	-6.63	H	42.89	53.98	11.09	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done 802.11a mode and all data rate. Worst data rate is the lowest data of each mode
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band :	5.8 GHz
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5745 MHz
Channel No.	149 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11490	63.01	-6.10	V	56.91	73.98	17.07	PK
11490	49.56	-6.10	V	43.46	53.98	10.52	AV
11490	63.40	-6.10	H	57.30	73.98	16.68	PK
11490	49.57	-6.10	H	43.47	53.98	10.51	AV

Band :	5.8 GHz
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11570	62.83	-5.57	V	57.26	73.98	16.72	PK
11570	49.24	-5.57	V	43.67	53.98	10.31	AV
11570	63.23	-5.57	H	57.66	73.98	16.32	PK
11570	49.26	-5.57	H	43.69	53.98	10.29	AV

Band :	5.8 GHz
Operation Mode:	802.11 n_20 MHz BW
Transfer Rate:	6.5 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	63.78	-6.63	V	57.15	73.98	16.83	PK
11650	49.60	-6.63	V	42.97	53.98	11.01	AV
11650	63.84	-6.63	H	57.21	73.98	16.77	PK
11650	49.63	-6.63	H	43.00	53.98	10.98	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done 802.11n_20 MHz BW mode and all data rate. Worst data rate is the lowest data of each mode
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna

Band :	5.8 GHz
Operation Mode:	802.11 n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5755 MHz
Channel No.	151 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11510	46.46	-6.26	V	40.20	73.98	33.78	PK
11510	50.23	-6.26	V	43.97	53.98	10.01	AV
11510	63.79	-6.26	H	57.53	73.98	16.45	PK
11510	50.28	-6.26	H	44.02	53.98	9.96	AV

Band :	5.8 GHz
Operation Mode:	802.11 n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5795 MHz
Channel No.	159 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL-AMP G [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11590	63.11	-5.92	V	57.19	73.98	16.79	PK
11590	50.01	-5.92	V	44.09	53.98	9.89	AV
11590	63.19	-5.92	H	57.27	73.98	16.71	PK
11590	50.03	-5.92	H	44.11	53.98	9.87	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done 802.11n_40 MHz BW mode and all data rate. Worst data rate is the lowest data of each mode
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

8.6.2 RADIATED RESTRICTED BAND EDGES

Test Requirements and limit, §15.247(d) §15.205, §15.209

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c)).

Band :	2.4 GHz
Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	30.96	31.47	H	62.43	73.98	11.55	PK
2390.0	14.19	31.47	H	45.66	53.98	8.32	AV
2390.0	29.51	31.47	V	60.98	73.98	13.00	PK
2390.0	13.72	31.47	V	45.19	53.98	8.79	AV
2483.5	32.70	31.46	H	64.16	73.98	9.82	PK
2483.5	15.83	31.46	H	47.29	53.98	6.69	AV
2483.5	32.02	31.46	V	63.48	73.98	10.50	PK
2483.5	14.40	31.46	V	45.86	53.98	8.12	AV

Band : 2.4 GHz
Operation Mode: 802.11b
Transfer Rate: 1 Mbps
Operating Frequency 2412 MHz, 2462 MHz
Channel No. 01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	26.07	31.47	H	57.54	73.98	16.44	PK
2390.0	12.56	31.47	H	44.03	53.98	9.95	AV
2390.0	25.84	31.47	V	57.31	73.98	16.67	PK
2390.0	12.51	31.47	V	43.98	53.98	10.00	AV
2483.5	26.18	31.46	H	57.64	73.98	16.34	PK
2483.5	12.11	31.46	H	43.57	53.98	10.41	AV
2483.5	25.96	31.46	V	57.42	73.98	16.56	PK
2483.5	12.10	31.46	V	43.56	53.98	10.42	AV

Band : 2.4 GHz
Operation Mode: 802.11n
Transfer Rate: 6.5 Mbps
Operating Frequency 2412 MHz, 2462 MHz
Channel No. 01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV/m]	AN.+CL [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	26.20	31.47	H	57.67	73.98	16.31	PK
2390.0	12.52	31.47	H	43.99	53.98	9.99	AV
2390.0	25.63	31.47	V	57.10	73.98	16.88	PK
2390.0	12.50	31.47	V	43.97	53.98	10.01	AV
2483.5	28.33	31.46	H	59.79	73.98	14.19	PK
2483.5	13.18	31.46	H	44.64	53.98	9.34	AV
2483.5	26.13	31.46	V	57.59	73.98	16.39	PK
2483.5	12.56	31.46	V	44.02	53.98	9.96	AV

Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss
2. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

8.7 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207

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)	Limits (dBµV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

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 attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.
5. We are performed the AC Power Line Conducted Emission test for 48 Mbps, Ch.1 and 802.11g.
Because 802.11g mode is worst case.

RESULT PLOTS

Conducted Emissions (Line 1)

EMI Auto Test(2)

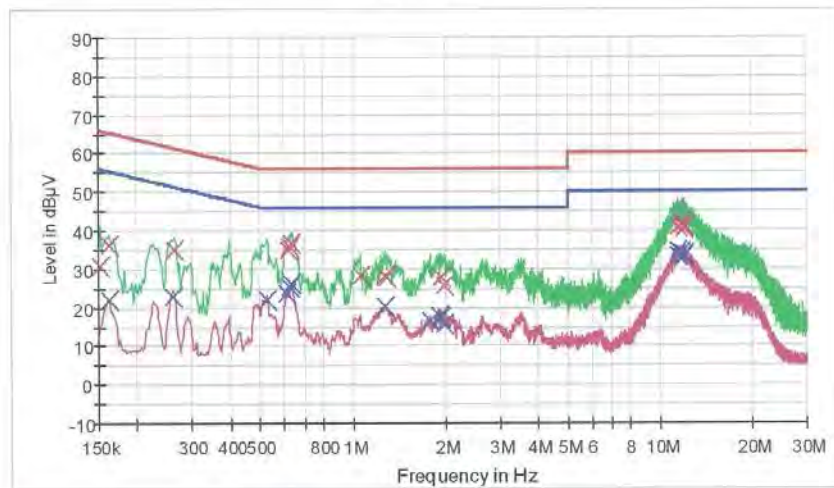
1/2

HCT TEST Report

Common Information

EUT: SM-A700F
Manufacturer: SAMSUNG
Test Site: SHIELD ROOM
Operating Conditions: WLAN MODE(2.4G)
Operator Name: JS LEE

FCC CLASS B



— FCC CLASS B_OP — FCC CLASS B_AV — Preview Result 1-PK+
— Preview Result 2-AVG — Final Result 1-CFK — Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.162000	30.6	9.000	Off	L1	9.6	35.3	65.9
0.162000	36.3	9.000	Off	L1	9.6	29.1	65.4
0.264000	34.8	9.000	Off	L1	9.7	26.5	61.3
0.618000	35.1	9.000	Off	L1	9.6	20.9	56.0
0.624000	35.8	9.000	Off	L1	9.6	20.2	56.0
0.632000	36.8	9.000	Off	L1	9.6	19.2	56.0
1.060000	28.4	9.000	Off	L1	9.7	27.6	56.0
1.272000	28.4	9.000	Off	L1	9.7	27.6	56.0
1.276000	28.3	9.000	Off	L1	9.7	27.7	56.0
1.282000	27.9	9.000	Off	L1	9.7	28.1	56.0
1.936000	27.7	9.000	Off	L1	9.8	28.3	56.0
1.976000	25.8	9.000	Off	L1	9.8	30.2	56.0
11.430000	40.7	9.000	Off	L1	10.1	19.3	60.0
11.826000	41.5	9.000	Off	L1	10.1	18.5	60.0
11.874000	41.8	9.000	Off	L1	10.1	18.2	60.0
11.978000	40.9	9.000	Off	L1	10.1	19.1	60.0

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EMI Auto Test(2)

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Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
11.986000	40.4	9.000	Off	L1	10.1	19.6	60.0
11.992000	40.5	9.000	Off	L1	10.1	19.5	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.162000	21.9	9.000	Off	L1	9.6	33.5	55.4
0.262000	22.8	9.000	Off	L1	9.7	28.6	51.4
0.528000	22.1	9.000	Off	L1	9.7	23.9	46.0
0.814000	23.5	9.000	Off	L1	9.6	22.5	46.0
0.628000	25.1	9.000	Off	L1	9.6	20.9	46.0
0.632000	26.2	9.000	Off	L1	9.6	19.8	46.0
1.272000	20.3	9.000	Off	L1	9.7	25.7	46.0
1.276000	20.4	9.000	Off	L1	9.7	25.6	46.0
1.782000	16.3	9.000	Off	L1	9.8	29.7	46.0
1.926000	17.9	9.000	Off	L1	9.8	28.1	46.0
1.936000	17.1	9.000	Off	L1	9.8	28.9	46.0
1.976000	15.7	9.000	Off	L1	9.8	30.3	46.0
11.430000	33.3	9.000	Off	L1	10.1	16.7	50.0
11.444000	34.5	9.000	Off	L1	10.1	15.5	50.0
11.680000	34.2	9.000	Off	L1	10.1	15.8	50.0
11.694000	33.9	9.000	Off	L1	10.1	16.1	50.0
11.978000	33.9	9.000	Off	L1	10.1	16.1	50.0
11.992000	33.4	9.000	Off	L1	10.1	16.6	50.0

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Conducted Emissions (Line 2)

EMI Auto Test(2)

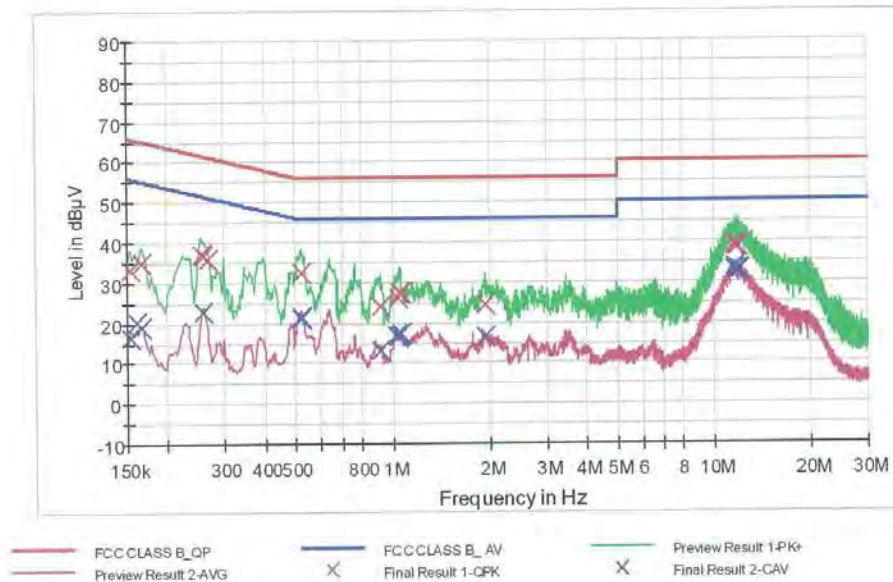
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HCT TEST Report

Common Information

EUT: SM-A700F
Manufacturer: SAMSUNG
Test Site: SHIELD ROOM
Operating Conditions: WLAN MODE(2.4G)
Operator Name: JS LEE

FCC CLASS B



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154000	33.3	9.000	Off	N	9.6	32.5	65.8
0.166000	35.0	9.000	Off	N	9.6	30.2	65.2
0.254000	37.0	9.000	Off	N	9.7	24.6	61.6
0.258000	36.6	9.000	Off	N	9.7	24.9	61.5
0.266000	35.7	9.000	Off	N	9.7	25.5	61.2
0.520000	32.4	9.000	Off	N	9.7	23.6	56.0
0.920000	24.0	9.000	Off	N	9.7	32.0	56.0
1.038000	26.2	9.000	Off	N	9.7	29.8	56.0
1.052000	27.3	9.000	Off	N	9.7	28.7	56.0
1.056000	27.4	9.000	Off	N	9.7	28.6	56.0
1.062000	27.6	9.000	Off	N	9.7	28.4	56.0
1.938000	24.4	9.000	Off	N	9.8	31.6	56.0
11.594000	38.9	9.000	Off	N	10.1	21.1	60.0
11.652000	39.1	9.000	Off	N	10.1	20.9	60.0
11.656000	39.2	9.000	Off	N	10.1	20.8	60.0
11.676000	38.8	9.000	Off	N	10.1	21.2	60.0

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EMI Auto Test(2)

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Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
11.814000	38.6	9.000	Off	N	10.1	21.4	60.0
11.866000	38.9	9.000	Off	N	10.1	21.1	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154000	16.6	9.000	Off	N	9.6	39.2	55.8
0.160000	20.4	9.000	Off	N	9.6	35.1	55.5
0.166000	19.1	9.000	Off	N	9.6	36.1	55.2
0.258000	22.8	9.000	Off	N	9.7	28.7	51.5
0.520000	21.1	9.000	Off	N	9.7	24.9	46.0
0.524000	21.4	9.000	Off	N	9.7	24.6	46.0
0.920000	13.1	9.000	Off	N	9.7	32.9	46.0
1.028000	17.0	9.000	Off	N	9.7	29.0	46.0
1.042000	16.4	9.000	Off	N	9.7	29.6	46.0
1.048000	17.0	9.000	Off	N	9.7	29.0	46.0
1.058000	17.4	9.000	Off	N	9.7	28.6	46.0
1.938000	16.3	9.000	Off	N	9.8	29.7	46.0
11.594000	33.0	9.000	Off	N	10.1	17.0	50.0
11.652000	33.6	9.000	Off	N	10.1	16.4	50.0
11.814000	32.9	9.000	Off	N	10.1	17.1	50.0
11.818000	33.1	9.000	Off	N	10.1	16.9	50.0
11.884000	32.7	9.000	Off	N	10.1	17.3	50.0
11.926000	32.7	9.000	Off	N	10.1	17.3	50.0

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9. LIST OF TEST EQUIPMENT

9.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216/ LISN	01/29/2014	Annual	100073
Agilent	E4440A/ Spectrum Analyzer	04/09/2014	Annual	US45303008
Agilent	N9020A/ SIGNAL ANALYZER	05/23/2014	Annual	MY51110063
Agilent	N1911A/Power Meter	01/24/2014	Annual	MY45100523
Agilent	N1921A /POWER SENSOR	07/09/2014	Annual	MY45241059
Agilent	87300B/Directional Coupler	12/08/2014	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	01/27/2014	Annual	10545
ITECH	IT6720 / DC POWER SUPPLY	11/04/2014	Annual	010002156287001199
TESCOM	TC-3000C / BLUETOOTH TESTER	04/11/2014	Annual	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	05/07/2014	Annual	100422
Agilent	8493C / Attenuator(10 dB)	07/21/2014	Annual	76649

9.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Schwarzbeck	VULB 9160/ TRILOG Antenna	10/10/2014	Biennial	3368
Rohde & Schwarz	ESCI / EMI TEST RECEIVER	01/24/2014	Annual	100584
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Rohde & Schwarz	SCU-18/ Signal Conditioning Unit	09/04/2014	Annual	10094
CERNEX	CBL18265035 / POWER AMP	07/23/2014	Annual	22966
CERNEX	CBL26405040 / POWER AMP	04/04/2014	Annual	19660
Schwarzbeck	BBHA 9120D/ Horn Antenna	07/05/2013	Biennial	1151
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	07/05/2013	Biennial	BBHA9170541
Rohde & Schwarz	FSP / Spectrum Analyzer	01/24/2014	Annual	839117/011
Wainwright Instrument	WHF3.0/18G-10EF / High Pass Filter	02/03/2014	Annual	F6
Wainwright Instrument	WHNX6.0/26.5G-6SS / High Pass Filter	04/09/2014	Annual	1
Wainwright Instrument	WHNX7.0/18G-8SS / High Pass Filter	04/04/2014	Annual	29
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	06/17/2014	Annual	1
TESCOM	TC-3000C / BLUETOOTH TESTER	04/11/2014	Annual	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	05/07/2014	Annual	100422
Rohde & Schwarz	LOOP ANTENNA	09/03/2014	Biennial	1513-175
CERNEX	CBL06185030 / POWER AMP	07/21/2014	Annual	22965
CERNEX	CBLU1183540 / POWER AMP	07/21/2014	Annual	22964