

TEST REPORT

of

FCC Part 15 Subpart B&C §15.247 / RSS-210 Issue 8, RSS-Gen Issue 3

FCC ID/IC Certification: A3LWIDT20R / 649E-WIDT20R

Equipment Under Test : Wi-Fi Module
Model Name : WIDT20R
Serial No. : N/A
Applicant : SAMSUNG ELECTRONICS CO., LTD.
Manufacturer : SAMSUNG ELECTRONICS CO., LTD.
Date of Test(s) : 2011.11.08 ~ 2011.12.21
Date of Issue : 2011.12.22

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Date

2011.12.22

Duke Ko

Approved By:



Date

2011.12.22

Feel Jeong

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1. General information

1.1. Testing laboratory

SGS Korea Co., Ltd.(Gunpo Laboratory)

- 705, Dongchun-Dong Sooji-Gu, Yongin-Shi, Kyungki-Do, South Korea.
- Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040

www.kr.sgs.com/ee

Phone No. : +82 +31 428 5700

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1.2 Details of applicant

Applicant : SAMSUNG ELECTRONICS CO., LTD.

Address : 416, Maetan3-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea

Contact Person : Lee, Jay Woo

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SGS Korea Co., Ltd. (Gunpo Laboratory) 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea, 435-040

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1.3 Description of EUT

Kind of Product	Wi-Fi Module
Model Name	WIDT20R
Serial Number	N/A
Power Supply	DC 5 V
Frequency Range	2 412 MHz ~ 2 462 MHz (11b/g/n_HT20) 2 422 MHz ~ 2 452 MHz (11b/g/n_HT40) 5 745 MHz ~ 5 825 MHz (11a/n_HT20) 5 755 MHz ~ 5 795 MHz (11a/n_HT40) 5 180 MHz ~ 5 240 MHz (11a/n_HT20 – Non DFS) 5 190 MHz ~ 5 230 MHz (11a/n_HT40 – Non DFS) 5 260 MHz ~ 5 320 MHz (11a/n_HT20 – DFS) 5 270 MHz ~ 5 310 MHz (11a/n_HT40 – DFS) 5 500 MHz ~ 5 700 MHz (11a/n_HT20 – DFS) 5 510 MHz ~ 5 670 MHz (11a/n_HT40 – DFS)
Modulation Technique	DSSS, OFDM
Number of Channels	11 channel(11b/g/n_HT20), 7 channel(11b/g/n_HT40), 5 channel(11a/n_HT20), 2 channel(11a/n_HT40), 4 channel(11a/n_HT20 – Non DFS), 2 channel(11a/n_HT40 – Non DFS), 15 channel (11a/n_HT20 - DFS), 7 channel (11a/n_HT40 - DFS)
Antenna Type	Fixed type (2 Tx / 2 Rx)
Antenna Gain	ANT0 2.19 dB i(11b/g/n), 2.48 dB i(11a/n), 0.56 dB i(11a/n – Non DFS), 1.47 dB i(11a/n -DFS) ANT1 2.92 dB i(11b/g/n), 1.21 dB i(11a/n), 2.13 dB i(11a/n – Non DFS), 2.37 dB i(11a/n -DFS)

1.4. Declaration by the manufacturer

- EUT uses Cyclic Delay Diversity (CDD) modes and the signals are correlated.

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1.5. Test equipment list

Equipment	Manufacturer	Model	S/N	Cal Due.
Signal Generator	R & S	SMR40	100272	Jul. 15, 2012
PXA Spectrum Analyzer	Agilent	N9030A	US51350132	Oct. 28, 2012
Attenuator	AEROFLEX	26A-10dB	2	Apr. 06, 2012
Attenuator	AEROFLEX	26A-10dB	3	Apr. 13, 2012
Attenuator	AEROFLEX	18N-20dB	3	Apr. 26, 2012
High Pass Filter	Wainwright	WHK3.0/18G-10SS	344	Jul. 07, 2012
DC power Supply	Agilent	U8002A	MY49030063	Jan. 05, 2012
Preamplifier	H.P.	8447F	2944A03909	Jul. 04, 2012
Preamplifier	R & S	SCU 18	10117	Mar. 23, 2012
Test Receiver	R & S	ESU26	100109	Feb. 21, 2012
Bilog Antenna	SCHWARZBECK MESSELEKTRONIK	VULB9163	396	Apr. 27, 2013
Horn Antenna	R & S	HF 906	100229	May. 04. 2012
Horn Antenna	SCHWARZBECK MESSELEKTRONIK	BBHA9170	BBHA9170223	Jun. 30, 2012
Antenna Master	EMCO	1050	N.C.R.	N.C.R.
Turn Table	Daeil EMC	DI-1500	N.C.R.	N.C.R.
Anechoic Chamber	SY Corporation	L x W x H (9.6 m x 6.4 m x 6.6 m)	N.C.R.	N.C.R.

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1.6. Summary of test result

The EUT has been tested according to the following specifications:

APPLIED STANDARD:FCC Part15 subpart B&C, RSS-210, RSS-Gen			
Standard section		Test Item	Result
15.205(a) 15.209 15.247(d)	A8.5	Transmitter Radiated Spurious Emissions Conducted Spurious Emission	Complied
15.109(a)	RSS-Gen 6	Receiver Radiated Spurious Emission	Complied
15.247(a)(2)	A8.2(a)	6 dB Bandwidth and 99% BW	Complied
15.247(b)(3)	A8.4(4)	Maximum Peak Output Power	Complied
15.247(e)	A8.3(2)	Power Spectral Density	Complied

1.7. Description of test mode

802.11 b mode:

We found out the test mode with the highest power level after we analyze all the data rates. 11 Mbps data rate is chose worst case as a representative.

802.11a/g mode:

We found out the test mode with the highest power level after we analyze all the data rates. 54 Mbps data rate is chose (worst case) as a representative.

802.11n mode:

We found out the test mode with the highest power level after we analyze all the data rates. MCS32 data rate is chose (worst case) as a representative.

1.8. Test report revision

Revision	Report number	Description
0	F690501/RF-RTL005204	Initial

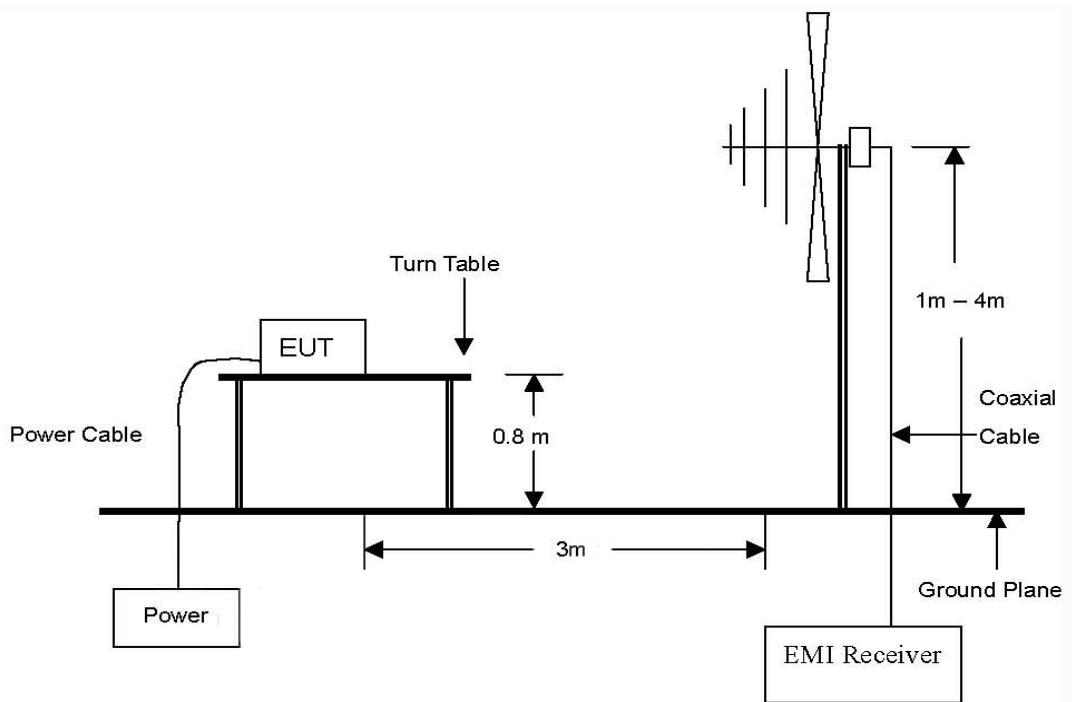
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2. Transmitter radiated spurious emissions and conducted spurious emission

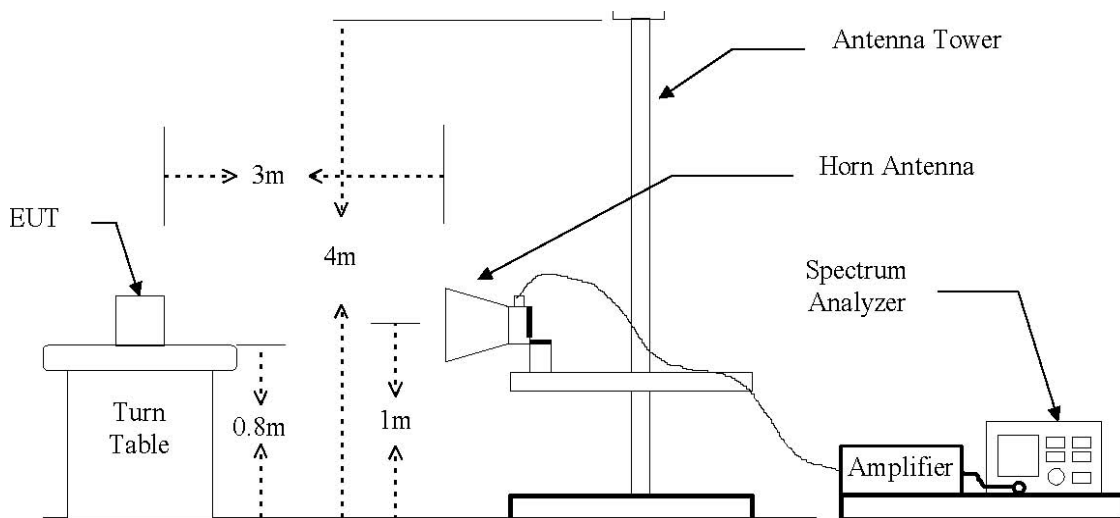
2.1. Test setup

2.1.1. Transmitter radiated spurious emissions

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 40 GHz Emissions.



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2.1.2. Conducted spurious emissions



2.2. Limit

According to §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 section §15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section §15.205(a), must also comply the radiated emission limits specified in section §15.209(a) (see section §15.205(c))

According to § 15.109(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values :

Frequency (MHz)	Distance (Meters)	Radiated (dB µV/m)	Radiated (µV/m)
30 - 88	3	40.0	100
88 – 216	3	43.5	150
216 – 960	3	46.0	200
Above 960	3	54.0	500

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2.3. Test procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

2.3.1. Test procedures for radiated spurious emissions

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

▣ Note

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Peak detection (PK) or Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1 GHz.

2.3.2. Test procedures for conducted spurious emissions

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW=100 kHz, VBW=100 kHz.

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2.4. Test result

Ambient temperature : (24 ± 2) °C
 Relative humidity : 49 % R.H.

2.4.1. Spurious radiated emission (Worst case configuration_11b mode)

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions are not reported much lower than the prescribed limits.

Radiated emissions			Ant	Correction factors		Total	Limit	
Frequency (MHz)	Reading (dB _{μV})	Detect Mode	Pol.	AF (dB/m)	Amp gain+CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
457.69	39.2	Peak	V	15.0	-24.5	29.7	46.0	16.3
565.12	43.4	Peak	V	17.0	-24.4	36.0	46.0	10.0
798.40	41.1	Peak	V	20.9	-23.9	38.1	46.0	7.9
Above 800.00	Not detected	-	-	-	-	-	-	-

■ Remark:

1. All spurious emission at channels are almost the same below 1 GHz, so that the channel was chosen at representative in final test.
2. Actual = Reading + AF + AMP + CL
3. To get a maximum emission level from the EUT, the EUT was moved throughout the X, Y and Z planes. The worst case is Y.

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2.4.2. Spurious radiated emission for above 1 GHz

The frequency spectrum above 1000 MHz was investigated. Emission levels are not reported much lower than the limits by over 30 dB.

ANT0

DSSS : 802.11b

Low Channel (2 412 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 390.00	27.86	Peak	V	28.47	5.23	61.56	74.00	12.44
*2 390.00	14.44	Average	V	28.47	5.23	48.14	54.00	5.86

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 824.07	46.14	Peak	V	32.86	-36.68	42.32	74.00	31.68
Above 4 900.00	Not detected	-	-	-	-	-	-	-

Middle Channel (2 437 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 874.12	46.55	Peak	V	33.00	-36.70	42.85	74.00	31.15
Above 4 900.00	Not detected	-	-	-	-	-	-	-

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High Channel (2 462 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 483.50	26.93	Peak	V	28.71	5.37	61.01	74.00	12.99
*2 483.50	13.15	Average	V	28.71	5.37	47.23	54.00	6.77

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 924.08	47.12	Peak	V	33.14	-36.41	43.85	74.00	30.15
Above 5 000.00	Not detected	-	-	-	-	-	-	-

OFDM : 802.11g

Low Channel (2 412 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 390.00	27.03	Peak		28.47	5.23	60.73	74.00	13.27
*2 390.00	15.19	Average		28.47	5.23	48.89	54.00	5.11

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 824.00	42.15	Peak	V	32.86	-36.68	38.33	74.00	35.67
Above 4 900.00	Not detected	-	-	-	-	-	-	-

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Middle Channel (2 437 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 874.00	41.23	Peak	V	33.00	-36.70	37.53	74.00	36.47
Above 4 900.00	Not detected	-	-	-	-	-	-	-

High Channel (2 462 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 483.50	27.20	Peak	V	28.71	5.37	61.28	74.00	12.72
*2 483.50	14.22	Average	V	28.71	5.37	48.30	54.00	5.70

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 924.00	38.27	Peak	V	33.14	-36.41	35.00	74.00	39.00
Above 5 000.00	Not detected	-	-	-	-	-	-	-

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ANT1
DSSS : 802.11b

Low Channel (2 412 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 390.00	26.90	Peak	V	28.47	5.23	60.60	74.00	13.40
*2 390.00	14.41	Average	V	28.47	5.23	48.11	54.00	5.89

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 823.92	50.47	Peak	V	32.86	-36.68	46.65	74.00	27.35
Above 4 900.00	Not detected	-	-	-	-	-	-	-

Middle Channel (2 437 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 874.15	46.40	Peak	V	33.00	-36.70	42.70	74.00	31.30
Above 4 900.00	Not detected	-	-	-	-	-	-	-

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High Channel (2 462 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 483.50	26.47	Peak	V	28.71	5.37	60.55	74.00	13.45
*2 483.50	13.29	Average	V	28.71	5.37	47.37	54.00	6.63

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 924.22	48.52	Peak	V	33.14	-36.41	45.25	74.00	28.75
Above 5 000.00	Not detected	-	-	-	-	-	-	-

OFDM : 802.11g

Low Channel (2 412 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 390.00	28.54	Peak	V	28.47	5.23	62.24	74.00	11.76
*2 390.00	15.36	Average	V	28.47	5.23	49.06	54.00	4.94

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 826.32	44.65	Peak	V	32.87	-36.69	40.83	74.00	33.17
Above 4 900.00	Not detected	-	-	-	-	-	-	-

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Middle Channel (2 437 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 876.17	41.40	Peak	V	33.01	-36.69	37.72	74.00	36.28
Above 4 900.00	Not detected	-	-	-	-	-	-	-

High Channel (2 462 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 483.50	26.69	Peak	V	28.71	5.37	60.77	74.00	13.23
*2 483.50	14.53	Average	V	28.71	5.37	48.61	54.00	5.39

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 920.24	40.65	Peak	V	33.13	-36.42	37.36	74.00	36.64
Above 5 000.00	Not detected	-	-	-	-	-	-	-

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OFDM : 802.11n_HT20 ANT0+ANT1

Low Channel (2 412 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 390.00	28.12	Peak	V	28.47	5.23	61.82	74.00	12.18
*2 390.00	15.04	Average	V	28.47	5.23	48.74	54.00	5.26

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 824.32	42.55	Peak	V	32.86	-36.68	38.73	74.00	35.27
Above 4 900.00	Not detected	-	-	-	-	-	-	-

Middle Channel (2 437 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 881.81	40.26	Peak	V	33.02	-36.65	36.63	74.00	37.37
Above 4 900.00	Not detected	-	-	-	-	-	-	-

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High Channel (2 462 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 483.50	26.22	Peak	V	28.71	5.37	60.30	74.00	13.70
*2 483.50	13.60	Average	V	28.71	5.37	47.68	54.00	6.32

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 930.37	42.08	Peak	V	33.16	-36.37	38.87	74.00	35.13
Above 5 000.00	Not detected	-	-	-	-	-	-	-

OFDM : 802.11n_HT40 ANT0+ANT1

Low Channel (2 422 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 390.00	28.68	Peak	V	28.47	5.23	62.38	74.00	11.62
*2 390.00	15.56	Average	V	28.47	5.23	49.26	54.00	4.74

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 855.92	38.96	Peak	V	32.95	-36.82	35.09	74.00	38.91
Above 4 900.00	Not detected	-	-	-	-	-	-	-

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Middle Channel (2 437 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4853.45	38.35	Peak	V	32.94	-36.84	34.45	74.00	39.55
Above 4 900.00	Not detected	-	-	-	-	-	-	-

High Channel (2 452 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 483.50	27.67	Peak	V	28.71	5.37	61.75	74.00	12.25
*2 483.50	14.59	Average	V	28.71	5.37	48.67	54.00	5.33

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 891.37	39.16	Peak	V	33.05	-36.59	35.62	74.00	38.38
Above 4 900.00	Not detected	-	-	-	-	-	-	-

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802.11a – ANT0
A. Low Channel (5 745 MHz)

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
5 745.00	49.81	Peak	V	34.41	8.49	92.71	-	-
5 745.00	40.02	Average	V	34.41	8.49	82.92	-	-
5 745.00	51.99	Peak	H	34.41	8.49	94.89	-	-
5 745.00	41.99	Average	H	34.41	8.49	84.89	-	-

Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain +CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
*11 491.74	33.82	Peak	H	38.22	-32.67	39.37	74.00	34.63
Above 11 500.00	Not detected	-	-	-	-	-	-	-

B. Middle Channel (5 785 MHz)

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
5 785.00	48.93	Peak	V	34.47	8.49	91.89	-	-
5 785.00	38.59	Average	V	34.47	8.49	81.55	-	-
5 785.00	52.22	Peak	H	34.47	8.49	95.18	-	-
5 785.00	42.22	Average	H	34.47	8.49	85.18	-	-

Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain +CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
*11 584.47	34.13	Peak	H	38.20	-32.30	40.03	74.00	33.97
Above 11 600.00	Not detected	-	-	-	-	-	-	-

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C. High Channel (5 825 MHz)

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
5 825.00	48.16	Peak	V	34.52	8.58	91.26	-	-
5 825.00	38.11	Average	V	34.52	8.58	81.21	-	-
5 825.00	51.91	Peak	H	34.52	8.58	95.01	-	-
5 825.00	41.76	Average	H	34.52	8.58	84.86	-	-

Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain +CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
*11 635.41	33.94	Peak	H	38.20	-32.32	39.82	74.00	34.18
Above 11 700.00	Not detected	-	-	-	-	-	-	-

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802.11a – ANT1
A. Low Channel (5 745 MHz)

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
5 745.00	50.92	Peak	V	34.41	8.49	93.82	-	-
5 745.00	40.51	Average	V	34.41	8.49	83.41	-	-
5 745.00	52.63	Peak	H	34.41	8.49	95.53	-	-
5 745.00	42.17	Average	H	34.41	8.49	85.07	-	-

Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain +CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
*11 497.81	34.18	Peak	H	38.22	-32.69	39.71	74.00	34.29
Above 11 500.00	Not detected	-	-	-	-	-	-	-

B. Middle Channel (5 785 MHz)

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
5 785.00	50.05	Peak	V	34.47	8.49	93.01	-	-
5 785.00	39.50	Average	V	34.47	8.49	82.46	-	-
5 785.00	52.59	Peak	H	34.47	8.49	95.55	-	-
5 785.00	42.63	Average	H	34.47	8.49	85.59	-	-

Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain +CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
*11 582.45	33.74	Peak	H	38.21	-32.32	39.63	74.00	34.37
Above 11 600.00	Not detected	-	-	-	-	-	-	-

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C. High Channel (5 825 MHz)

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
5 825.00	48.53	Peak	V	34.52	8.58	91.63	-	-
5 825.00	38.07	Average	V	34.52	8.58	81.17	-	-
5 825.00	53.24	Peak	H	34.52	8.58	96.34	-	-
5 825.00	43.10	Average	H	34.52	8.58	86.20	-	-

Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain +CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
*11 671.36	33.14	Peak	H	38.19	-32.61	38.72	74.00	35.28
Above 11 700.00	Not detected	-	-	-	-	-	-	-

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802.11n-HT20 – ANT0 + ANT1
A. Low Channel (5 745 MHz)

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
5 745.00	48.89	Peak	V	34.41	8.49	91.79	-	-
5 745.00	38.68	Average	V	34.41	8.49	81.58	-	-
5 745.00	54.27	Peak	H	34.41	8.49	97.17	-	-
5 745.00	43.37	Average	H	34.41	8.49	86.27	-	-

Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain +CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
*11 500.13	34.24	Peak	H	38.22	-32.69	39.77	74.00	34.23
Above 11 600.00	Not detected	-	-	-	-	-	-	-

B. Middle Channel (5 785 MHz)

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
5 785.00	49.36	Peak	V	34.47	8.49	92.32	-	-
5 785.00	38.37	Average	V	34.47	8.49	81.33	-	-
5 785.00	55.52	Peak	H	34.47	8.49	98.48	-	-
5 785.00	45.13	Average	H	34.47	8.49	88.09	-	-

Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain +CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
*11 550.09	33.20	Peak	H	38.21	-32.45	38.96	74.00	35.04
Above 11 600.00	Not detected	-	-	-	-	-	-	-

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C. High Channel (5 825 MHz)

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
5 825.00	49.04	Peak	V	34.52	8.58	92.14	-	-
5 825.00	38.13	Average	V	34.52	8.58	81.23	-	-
5 825.00	54.82	Peak	H	34.52	8.58	97.92	-	-
5 825.00	44.47	Average	H	34.52	8.58	87.57	-	-

Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain +CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
*11 667.60	33.56	Peak	H	38.19	-32.57	39.18	74.00	34.82
Above 11 700.00	Not detected	-	-	-	-	-	-	-

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802.11n_HT40
A. Low Channel (5 755 MHz)

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
5 755.00	45.37	Peak	V	34.42	8.42	88.21	-	-
5 755.00	33.70	Average	V	34.42	8.42	76.54	-	-
5 755.00	50.00	Peak	H	34.42	8.42	92.84	-	-
5 755.00	40.02	Average	H	34.42	8.42	82.86	-	-

Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain +CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
*11 538.08	33.10	Peak	H	38.21	-32.51	38.80	74.00	35.20
Above 11 600.00	Not detected	-	-	-	-	-	-	-

B. High Channel (5 795 MHz)

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
5 795.00	45.02	Peak	V	34.48	8.52	88.02	-	-
5 795.00	35.53	Average	V	34.48	8.52	78.53	-	-
5 795.00	49.55	Peak	H	34.48	8.52	92.55	-	-
5 795.00	38.66	Average	H	34.48	8.52	81.66	-	-

Frequency (MHz)	Reading (dB uV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain +CL (dB)	Actual (dB uV/m)	Limit (dB uV/m)	Margin (dB)
*11 573.21	33.09	Peak	H	38.21	-32.35	38.95	74.00	35.05
Above 11 600.00	Not detected	-	-	-	-	-	-	-

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■ Remarks

1. “*” means the restricted band.
2. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental Frequency.
3. Radiated emissions measured in frequency above 1 000 MHz were made with an instrument using peak/average detector mode.
4. Average test would be performed if the peak result were greater than the average limit.
5. Actual = Reading + AF + AMP + CL+Dis
6. To get a maximum emission level from the EUT, the EUT was moved throughout the x-axis, y-axis and z-axis. The worst case is y-axis.

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2.4.3. Spurious RF Conducted Emissions: Plot of Spurious RF Conducted Emission

ANT0
2.4GHz

802.11b
Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 390	-53.87	-50.86	-13.16
2 398	-33.63	-30.62	
3 216	-50.23	-47.22	

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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Middle Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
3 243	-50.97	-47.96	-13.98

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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High Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 484	-53.00	-49.99	-13.52
3 269	-52.70	-49.69	

It has 2 outputs and $10\log(2)$ is $10\log(2) = 3.01$ dB

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802.11g

Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 390	-48.80	-45.79	-17.82
2 400	-35.43	-32.42	

It has 2 outputs and 10log(2) is $10\log(2) = 3.01$ dB

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Middle Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
3 251	-55.33	-52.32	-18.60

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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High Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 484	-38.77	-35.76	-18.08
3 277	-54.92	-51.91	

It has 2 outputs and $10\log(2)$ is $10\log(2) = 3.01$ dB

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802.11n_HT20

Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 390	-47.31	-44.30	-19.34
2 400	-36.40	-33.39	
3 224	-59.21	-56.20	

It has 2 outputs and 10log (2) is $10\log(2) = 3.01 \text{ dB}$

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Middle Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
3 251	-56.40	-53.39	-20.19

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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High Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 484	-37.32	-34.31	-19.51
3 277	-56.89	-53.88	

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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802.11n_HT40

Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 390	-38.89	-35.88	-23.35
2 400	-35.25	-32.24	
3 224	-57.15	-54.14	

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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Middle Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 390	-52.50	-49.49	-22.15
2 400	-46.74	-43.73	
2484	-43.40	-40.39	
3 251	-56.27	-53.26	

It has 2 outputs and $10\log(2)$ is $10\log(2) = 3.01$ dB

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High Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 484	-28.03	-25.02	-23.59
3 216	-57.01	-54.00	

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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5.8 GHz

802.11a

Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
5 725	-40.17	-37.16	-20.29

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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Middle Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
3 870	-54.35	-51.34	-20.91

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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High Channel



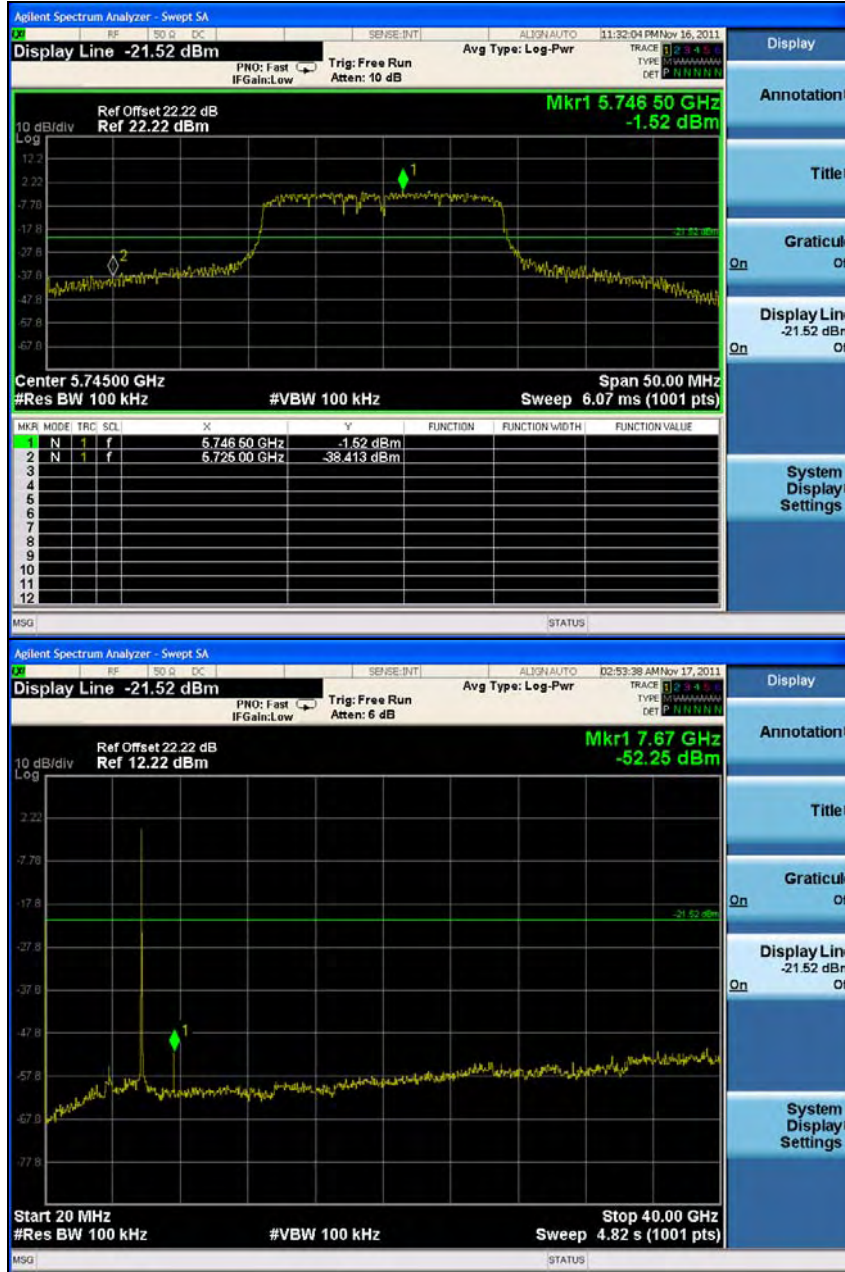
Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
3 910	-53.11	-50.10	-20.32

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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802.11n_HT20

Low Channel

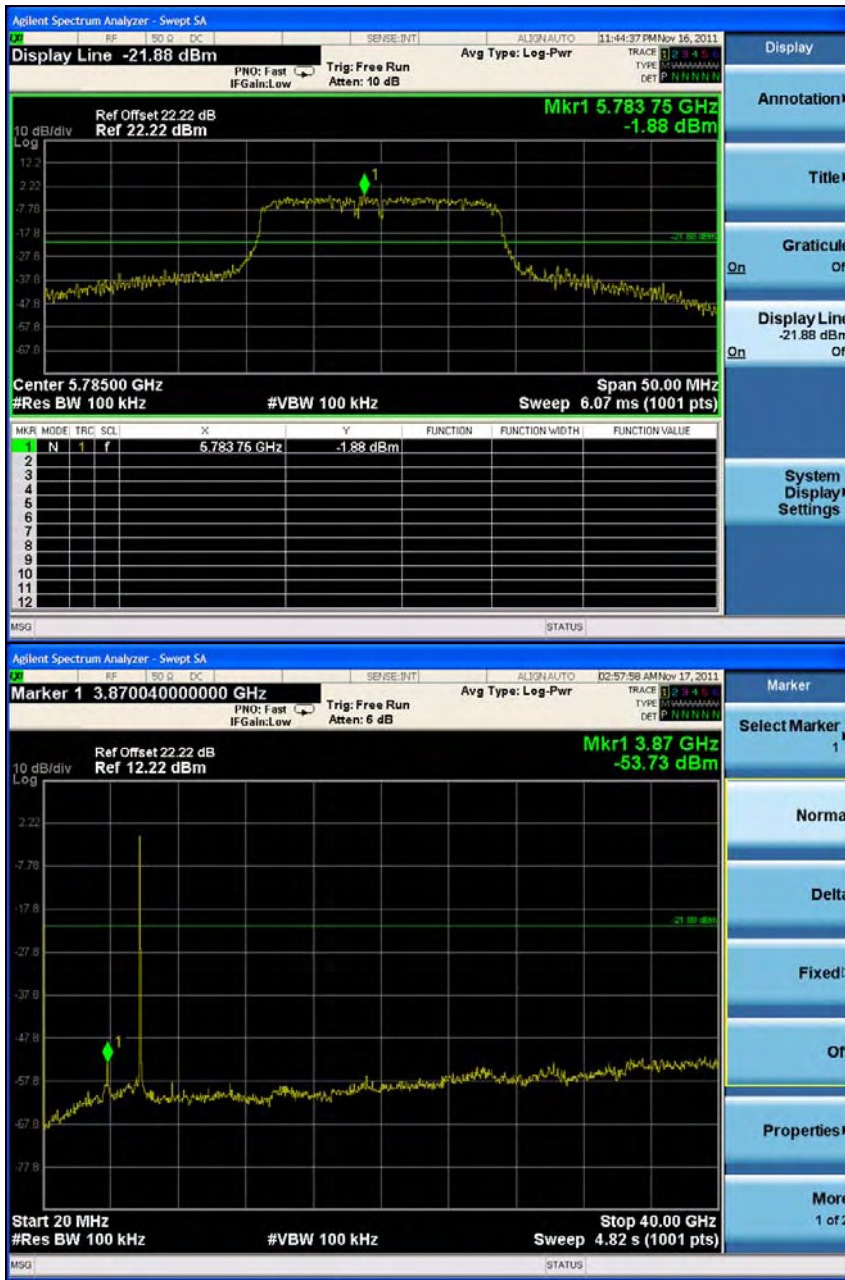


Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
5 725	-38.41	-35.40	-21.52
7 670	-52.25	-49.24	

It has 2 outputs and 10log(2) is $10\log(2) = 3.01$ dB

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Middle Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
3 870	-53.73	-50.72	-13.16

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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High Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
3 900	-54.22	-51.21	-22.66

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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802.11n_HT40

Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
5 725	-39.06	-36.05	-26.44
7 660	-53.47	-50.46	

It has 2 outputs and 10log(2) is $10\log(2) = 3.01 \text{ dB}$

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High Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
5 850	-52.36	-49.35	-26.73
3 860	-53.22	-50.21	

It has 2 outputs and $10\log(2)$ is $10\log(2) = 3.01$ dB

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ANT1
2.4GHz
802.11b
 Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 390	-54.30	-51.29	-14.07
2 398	-37.02	-34.01	
3 224	-54.43	-51.42	

It has 2 outputs and 10log (2) is $10\log(2) = 3.01 \text{ dB}$

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Middle Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
3 251	-51.02	-48.01	-14.23

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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High Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 484	-54.98	-51.97	-13.91
3 277	-49.45	-46.44	

It has 2 outputs and $10\log(2)$ is $10\log(2) = 3.01$ dB

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802.11g

Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 390	-51.20	-48.19	-19.34
2 400	-37.60	-34.59	
3 224	-56.91	-53.90	

It has 2 outputs and 10log (2) is $10\log(2) = 3.01 \text{ dB}$

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Middle Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
3 251	-54.24	-51.23	-19.03

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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High Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 484	-48.05	-45.04	-19.06
3 277	-55.14	-52.13	

It has 2 outputs and $10\log(2)$ is $10\log(2) = 3.01$ dB

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802.11n_HT20

Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 390	-49.49	-46.48	-20.76
2 400	-38.26	-35.25	
3 224	-56.55	-53.54	

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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Middle Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
3 251	-55.27	-52.26	-20.93

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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High Channel



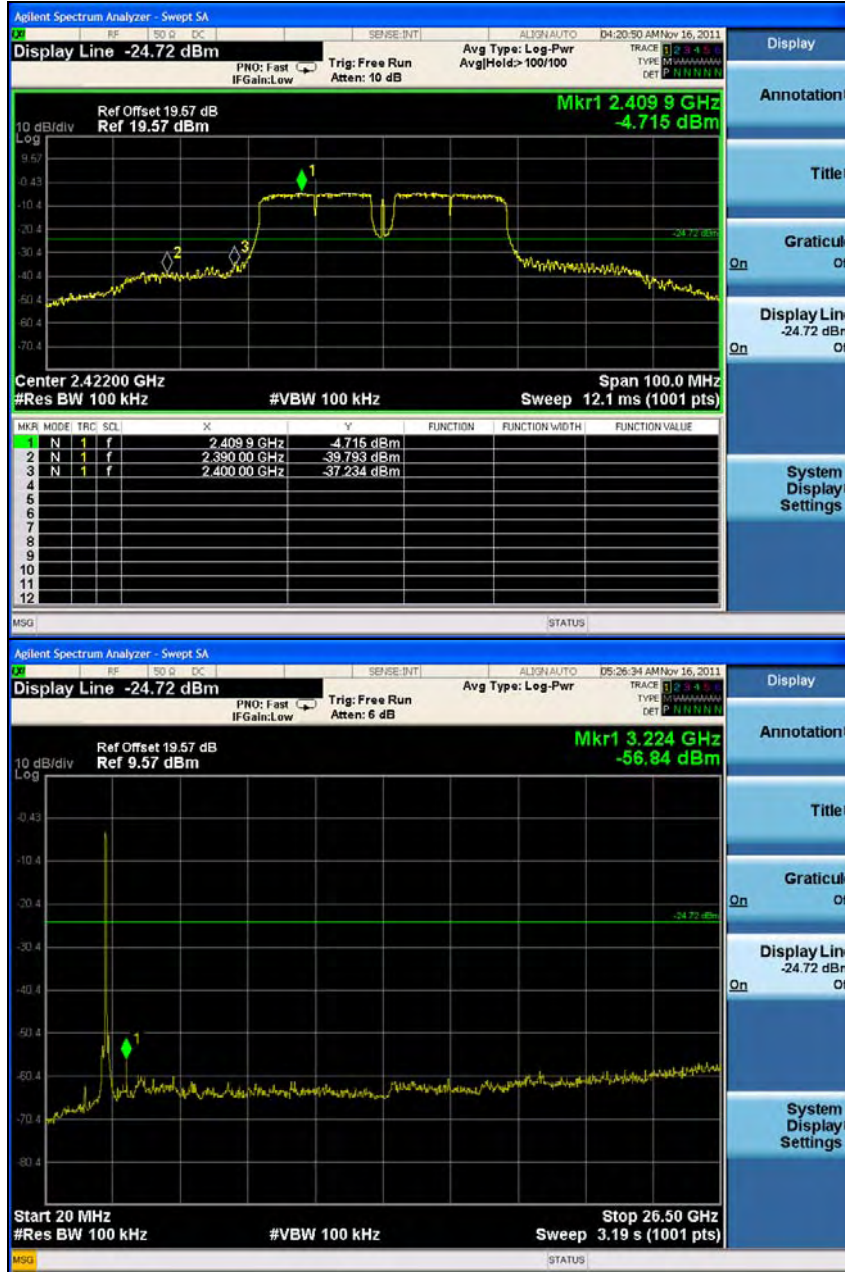
Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 484	-44.74	-41.73	-20.55
3 277	-53.32	-50.31	

It has 2 outputs and $10\log(2)$ is $10\log(2) = 3.01$ dB

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802.11n_HT40

Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 390	-39.79	-36.78	-24.72
2 398	-37.23	-34.22	
3 224	-56.84	-53.83	

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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Middle Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 390	-52.06	-49.05	-23.15
2 400	-47.56	-44.55	
2 484	-49.39	-46.38	
3 251	-55.05	-52.04	

It has 2 outputs and $10\log(2)$ is $10\log(2) = 3.01$ dB

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High Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
2 484	-35.43	-32.42	-24.68
3 269	-54.19	-51.18	

It has 2 outputs and $10\log(2)$ is $10\log(2) = 3.01$ dB

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5.8 GHz

802.11a

Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
5 725	-40.12	-37.11	-19.39
7 670	-52.80	-49.79	

It has 2 outputs and 10log(2) is 10log(2) = 3.01 dB

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Middle Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
7 710	-53.52	-50.51	-21.59

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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High Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
7 790	-53.84	-50.83	-21.85

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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802.11n_HT20

Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
5 725	-42.02	-39.01	-21.91
7 670	-50.90	-47.89	

It has 2 outputs and $10\log(2)$ is $10\log(2) = 3.01$ dB

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Middle Channel

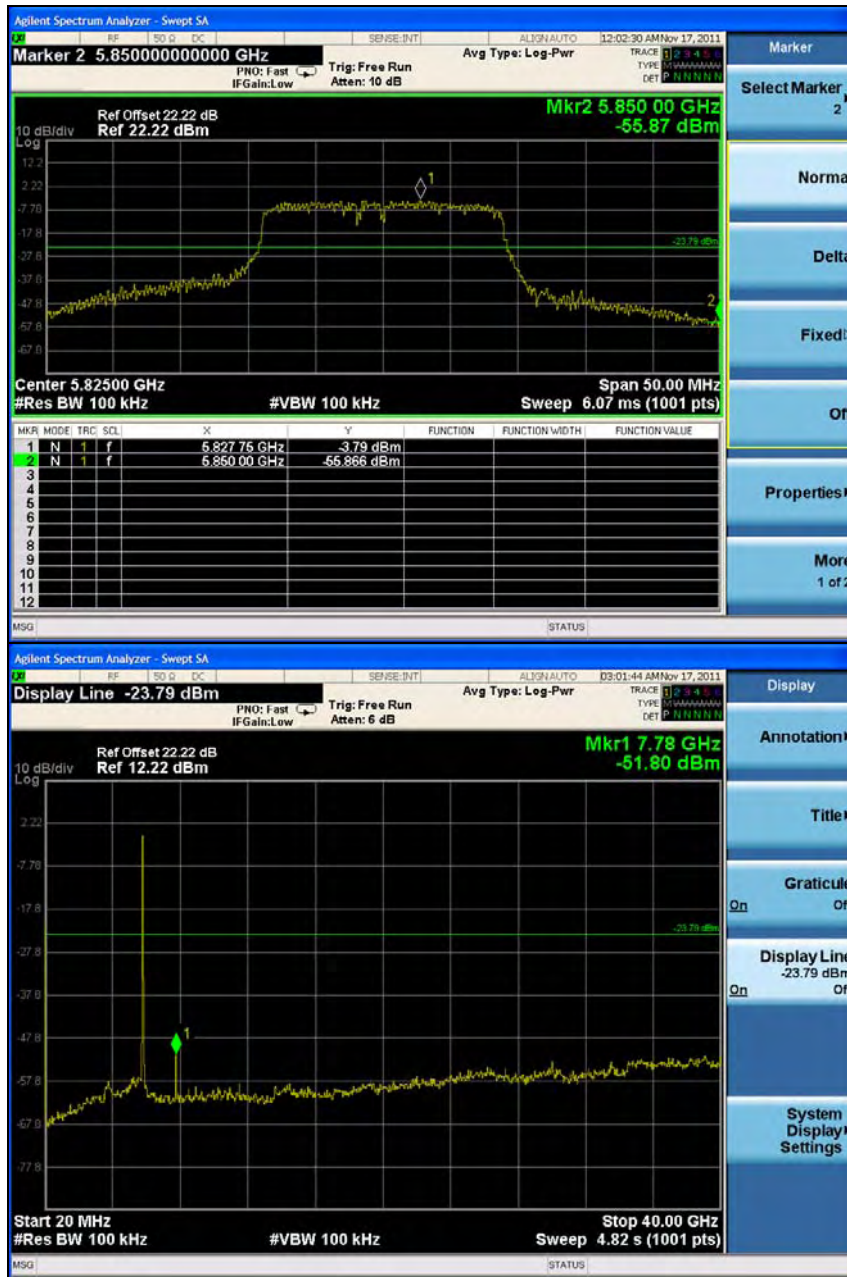


Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
7 710	-50.51	-47.50	-23.19

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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High Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
7 780	-51.80	-48.79	-23.79

It has 2 outputs and 10log (2) is $10\log(2) = 3.01$ dB

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802.11n_HT40

Low Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
5 725	-38.79	-35.78	-26.77
7 660	-51.04	-48.03	

It has 2 outputs and $10\log(2)$ is $10\log(2) = 3.01$ dB

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High Channel



Frequency (MHz)	Measured (dB m)	Add 10log(2) (dB m)	Limit (dB m)
5 850	-54.46	-51.45	-27.23
7 740	-52.36	-49.35	

It has 2 outputs and $10\log(2) = 3.01 \text{ dB}$

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3. Receiver Radiated spurious emissions

3.1. Test setup - Same as clause 2.1.

3.1.1. Receiver Radiated Spurious Emissions - Same as clause 2.1.1.

3.2. Limit

According to §15.109(a), Except for Class A digital devices, the field strength of radiated emission from unintentional radiator at a distance of 3 m shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
30 - 88	3	40.0	100
88 – 216	3	43.5	150
216 – 960	3	46.0	200
Above 960	3	54.0	500

3.3. Test Procedures - Same as clause 2.3.

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

3.3.1. Test Procedures for Radiated Spurious Emissions- Same as clause 2.3.1.

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3.4. Test Results

Ambient temperature : (24 ± 2) °C
 Relative humidity : 47 % R.H.

3.4.1. Spurious Radiated Emission (Worst case configuration_11b mode)

The frequency spectrum from 30 MHz to 26.5 GHz was investigated. Emission levels are not reported much lower than the limits by over 30 dB. All reading values are peak values.

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
531.81	40.2	Peak	V	16.5	-24.6	32.1	46.0	13.9
565.44	42.3	Peak	V	17.0	-24.4	34.9	46.0	11.1
631.00	40.6	Peak	V	18.2	-24.4	34.4	46.0	11.6
797.80	40.8	Peak	V	20.9	-23.9	37.8	46.0	8.2
Above 800.00	Not detected	-	-	-	-	-	-	-

Remark:

1. All spurious emission at channels are almost the same from 30 MHz to 26.5 GHz, so that the middle channel was chosen at representative in final test.
2. Actual = Reading + AF + AMP + CL

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4. 6 dB Bandwidth and 99% Bandwidth measurement

4.1. Test setup



4.2. Limit

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 ~928 MHz , 2 400 ~ 2 483.5 MHz, and 5 725 ~ 5 825 MHz bands. The minimum of 6 dB Bandwidth shall be at least 500 kHz

4.3. Test procedure

4.3.1. 6 dB bandwidth

1. The 6 dB band width was measured with a spectrum analyzer connected to RF antenna connector(conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency, using the analyzer. Display Line and Marker Delta functions, the 6 dB band width of the emission was determined.
2. The bandwidth of the fundamental frequency was measured with the spectrum analyzer
 - 2 GHz: RBW = 100 kHz, VBW = 100 kHz, Span = 50 MHz, Sweep = auto.
 - 5 GHz: RBW = 1 MHz, VBW = 3 MHz, Span = 100 MHz, Sweep = auto.

4.3.2. 99% bandwidth

1. Set the spectrum analyzer as SPAN = 2 or 3 times necessary bandwidth, RBW = approximately 1 % of the SPAN, VBW is set to 3 times RBW, Detector = sampling, Trace mode = max hold.
2. Measure lowest and highest frequencies are placed in a running sum until 0.5 % and 99.5 % of the total is reached.
3. Record the SPAN between the lowest and the highest frequencies for the 99 % occupied bandwidth.
4. Repeat until all the test channels are investigated.

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4.4. Test result

Ambient temperature : (24 ± 2) °C
 Relative humidity : 49 % R.H.

ANT0

Operation Mode	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Bandwidth (MHz)
DSSS 802.11b	2 412	11.25	14.44
	2 437	11.30	14.55
	2 462	11.30	14.47
OFDM 802.11g	2 412	16.50	16.84
	2 437	16.50	16.89
	2 462	16.50	16.92
OFDM 802.11n_HT20	2 412	17.60	17.71
	2 437	17.60	17.77
	2 462	17.60	17.78
OFDM 802.11n_HT40	2 422	36.5	36.98
	2 437	36.5	38.61
	2 452	36.5	38.59
OFDM 802.11a	5 745	16.50	16.58
	5 785	16.55	16.63
	5 825	16.50	16.60
OFDM 802.11n_HT20	5 745	17.60	17.63
	5 785	17.60	17.57
	5 825	17.60	17.60
OFDM 802.11n_HT40	5 755	36.4	36.41
	5 795	36.5	36.38

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ANT1

Operation Mode	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Bandwidth (MHz)
DSSS 802.11b	2 412	11.55	14.43
	2 437	11.30	14.44
	2 462	11.30	14.45
OFDM 802.11g	2 412	16.50	16.75
	2 437	16.50	16.75
	2 462	16.50	16.79
OFDM 802.11n_HT20	2 412	17.60	17.70
	2 437	17.60	17.78
	2 462	17.60	17.89
OFDM 802.11n_HT40	2 422	36.5	36.44
	2 437	36.5	36.50
	2 452	36.5	36.57
OFDM 802.11a	5 745	16.50	16.68
	5 785	16.55	16.70
	5 825	16.50	16.56
OFDM 802.11n_HT20	5 745	17.60	17.56
	5 785	17.60	17.60
	5 825	17.65	17.54
OFDM 802.11n_HT40	5 755	36.5	36.26
	5 795	36.5	36.38

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6 dB Bandwidth

ANT0

2.4 GHz

802.11b

Low channel



Middle channel



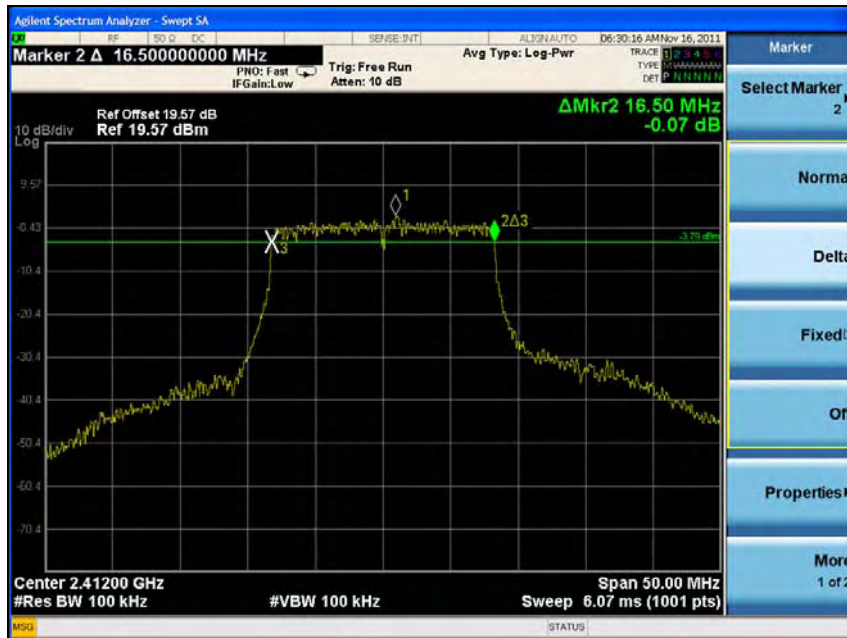
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High channel



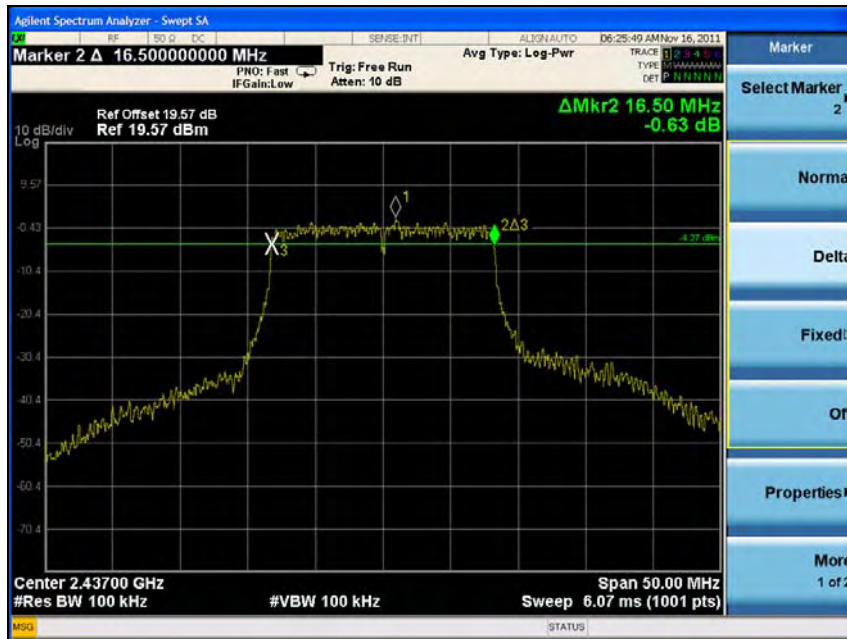
802.11g

Low channel

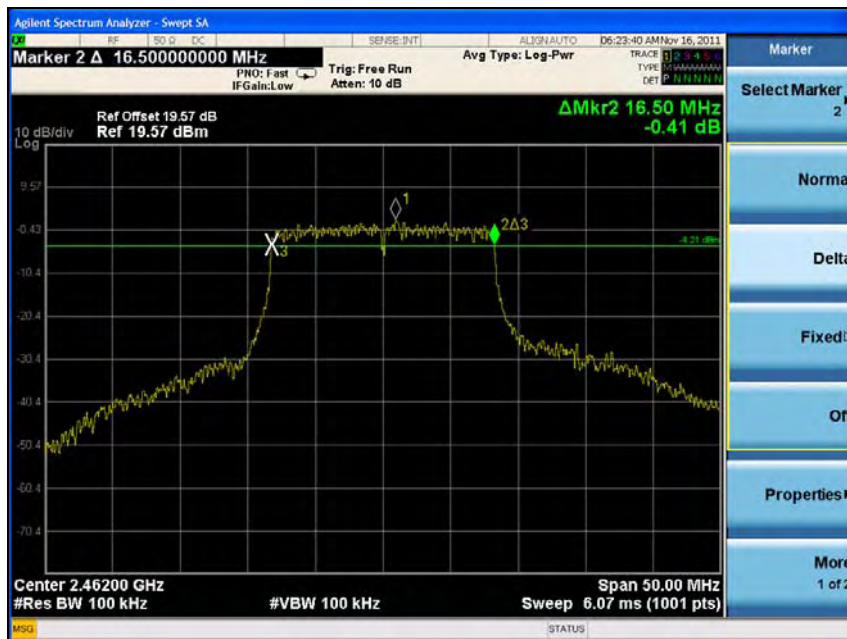


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Middle channel



High channel



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