

TEST REPORT

of

FCC Part 15 Subpart E §15.407

FCC ID: ZNFLGL25

Equipment Under Test : Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA Smart Phone
Model Name : LGL25
Applicant : LG Electronics MobileComm U.S.A., Inc.
Manufacturer : LG Electronics MobileComm U.S.A., Inc.
Date of Test(s) : 2014.09.19 ~ 2014.11.07
Date of Issue : 2014.11.10

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

Tested By:



Date:

2014.11.10

Youngmin Park

Approved By:



Date:

2014.11.10

Hyunchoe You

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1. General information

1.1 Testing laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

-Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-837

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

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1.1. Details of Applicant

Applicant : LG Electronics MobileComm U.S.A., Inc.

Address : 10101 Old Grove Road, San Diego, CA 92131

Contact Person : An, Hee-Ju

Phone No. : +82 2 2033 1103

1.3. Description of EUT

Kind of Product	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA Smart Phone
Model Name	LGL25
Power Supply	DC 3.8 V
Frequency Range	5 180 MHz ~ 5 240 MHz (Band 1 : 11a/n_HT20), 5 190 MHz ~ 5 230 MHz (Band 1 : 11n_HT40), 5 260 MHz ~ 5 320 MHz (Band 2A : 11a/n_HT20), 5 270 MHz ~ 5 310 MHz (Band 2A : 11n_HT40), 5 500 MHz ~ 5 700 MHz (Band 2C : 11a/n_HT20)_except for TDWR(5.6-5.65 GHz) band, 5 510 MHz ~ 5 670 MHz (Band 2C : 11n_HT40)_except for TDWR(5.6-5.65 GHz) band, 5 745 MHz ~ 5 825 MHz (Band 3 : 11a/n_HT20), 5 755 MHz ~ 5 795 MHz (Band 3 : 11n_HT40)
Modulation Technique	DSSS, OFDM
Number of Channels	4 channels (Band 1 : 11a/n_HT20), 2 channels (Band 1 : 11n_HT40), 4 channels (Band 2A : 11a/n_HT20), 2 channels (Band 2A : 11n_HT40), 8 channels (Band 2C : 11a/n_HT20), 3 channels (Band 2C : 11n_HT40), 5 channels (Band 3 : 11a/n_HT20), 2 channels (Band 3 : 11n_HT40)
Antenna Type	Internal type (SISO)
Antenna Gain	5 180 MHz ~ 5 320 MHz : 1.31 dBi, 5 500 MHz ~ 5 700 MHz : 0.65 dBi, 5 745 MHz ~ 5 805 MHz : 1.67 dBi

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1.4. Declaration by the manufacturer

- EUT is SLAVE without Radar Detection and TPC.
- EUT is not supported TDWR(5.6-5.65 GHz) band. There is a detailed information for channel plans in the operational description.

1.5. Test equipment list

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Signal Generator	Agilent	E8257D	MY51501169	Jul. 17, 2014	Annual	Jul. 17, 2015
Spectrum Analyzer	Agilent	N9030A	MY53120526	Jul. 17, 2014	Annual	Jul. 17, 2015
Spectrum Analyzer	R&S	FSV30	100768	Mar. 27, 2014	Annual	Mar. 27, 2015
Attenuator	MCLI	FAS-12-10	1	Jun. 20, 2014	Annual	Jun. 20, 2015
Attenuator	AEROFLEX / INMET	18N-20 dB	2	Mar. 18, 2014	Annual	Mar. 18, 2015
Band Reject Filter	Wainwright	WRCJV5150/5350-5130/ 5370-50/16SS	1	Sep. 24, 2014	Annual	Sep. 24, 2015
Band Reject Filter	Wainwright	WRCJV5470/5725-5450/ 5745-50/20SS	1	Sep. 24, 2014	Annual	Sep. 24, 2015
High Pass Filter	Wainwright	WHK6.0/18G-10SS	11	Jun. 10, 2014	Annual	Jun. 10, 2015
High Pass Filter	Wainwright	WHNX7.5/26.5G-6SS	11	Jun. 10, 2014	Annual	Jun. 10, 2015
Low Pass Filter	Mini circuits	NLP-1200+	V 8979400903-2	Mar. 21, 2014	Annual	Mar. 21, 2015
Power Meter	Anritsu	ML2495A	1223004	Jun. 10, 2014	Annual	Jun. 10, 2015
Power Sensor	Anritsu	MA2411B	1207272	Jun. 10, 2014	Annual	Jun. 10, 2015
DC Power Supply	Agilent	U8002A	MY49030063	Dec. 12, 2013	Annual	Dec. 12, 2014
Preamplifier	H.P.	8447F	2944A03909	Aug. 27, 2014	Annual	Aug. 27, 2015
Preamplifier	R&S	SCU 18	10117	Jan. 14, 2014	Annual	Jan. 14, 2015
Preamplifier	MITEQ Inc.	JS44-18004000-35-8P	1546891	Apr. 28, 2014	Annual	Apr. 28, 2015
Bilog Antenna	SCHWARZBECK MESSELEKTRONIK	VULB9163	396	Jun. 07, 2013	Biennial	Jun. 07, 2015
Loop Antenna	SCHWARZBECK MESSELEKTRONIK	FMZB 1519	1519-039	Jul. 09, 2013	Biennial	Jul. 09, 2015
Horn Antenna	R&S	HF906	100326	Dec. 10, 2013	Biennial	Dec. 10, 2015
Horn Antenna	SCHWARZBECK MESSELEKTRONIK	BBHA9170	BBHA9170431	May 15, 2014	Biennial	May 15, 2016
Test Receiver	R&S	ESU26	100109	Mar. 04, 2014	Annual	Mar. 04, 2015
Antenna Master	INN-CO	MM4000	N/A	N/A	N/A	N.C.R.
Turn Table	INN-CO	DS 1200 S	N/A	N/A	N/A	N.C.R.
Test Receiver	R&S	ESU26	100109	Mar. 04, 2014	Annual	Mar. 04, 2015
Test Receiver	R&S	ESCI 7	100911	Jan. 24, 2014	Annual	Jan. 24, 2015
Two-Line V-Network	R&S	ENV216	100190	Jan. 02, 2014	Annual	Jan. 02, 2015
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N/A	N/A	N.C.R.
Shield Room	SY Corporation	L × W × H (6.5 m × 3.5 m × 3.5 m)	N/A	N.C.R.	N/A	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 C, E		
Section in FCC 15	Test Item	Result
15.205(a) 15.209(a) 15.407(b)(1) 15.407(b)(2) 15.407(b)(3) 15.407(b)(4)	Transmitter radiated spurious emissions	Complied
15.407(e) 15.407(a)	26 dB bandwidth, 6 dB bandwidth	Complied
15.407(a)(1) 15.407(a)(2) 15.407(a)(3)	Output power	Complied
15.407(a)(1) 15.407(a)(2) 15.407(a)(3)	Peak power spectral density	Complied
15.407(a)(6)	Peak excursion	Complied
15.207	Transmitter AC power line Conducted emission	Complied

1.7. Test Procedure(s)

The measurement procedures described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2003), the guidance provided in KDB 789033 D02 New rules v01 and were used in the measurement of the DUT.

The device was tested to the new UNII rules.

1.8. Sample calculation

Where relevant, the following sample calculation is provided:

1.8.1. Conducted test

Offset value (dB) = Attenuator (dB) + Cable loss (dB)

1.8.2. Radiation test

Field strength level (dB μ V/m) = Measured level (dB μ V) + Antenna factor (dB) + Cable loss (dB) - amplifier (dB)

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1.9. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL008132	2014.10.31	Initial
1	F690501/RF-RTL008132-1	2014.11.05	Modified Summary of test result for list 15.407(b) requirements. Added a comment about Support Availability for TDWR(5.6-5.65 GHz) band.
2	F690501/RF-RTL008132-2	2014.11.10	Retested the bandedge within 10 MHz of the UNII band 3 for plot data.

1.10. Duty Cycle of EUT

Regarding to KDB789033 D02 New rules v01, B), the maximum duty cycles of all modes were investigated and set the spectrum analyzer as below

Set RBW $\geq$ EBW 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.

Mode	Data Rate							
11a	6	9	12	18	24	36	48	54
Duty Cycle (%)	95	92	90	86	84	76	73	71
Correction factor (dB)	0.22	0.36	0.46	0.66	0.76	1.19	1.37	1.49
11n_HT20	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Duty Cycle (%)	94	90	86	83	77	72	70	68
Correction factor (dB)	0.27	0.46	0.66	0.81	1.14	1.43	1.55	1.67
11n_HT40	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Duty Cycle (%)	90	82	76	71	64	58	55	55
Correction factor (dB)	0.46	0.86	1.19	1.49	1.94	2.37	2.60	2.60

Remark:

- As measured duty cycles of EUT, all of mode and data rate keep constant period and are converted to log scale (power averaging) to compensate correction factor to result of average test items.
- Duty cycle (%) = (Tx on time / (Tx on + off time)) x 100
- Correction factor (dB) = 10 log (1/duty cycle)

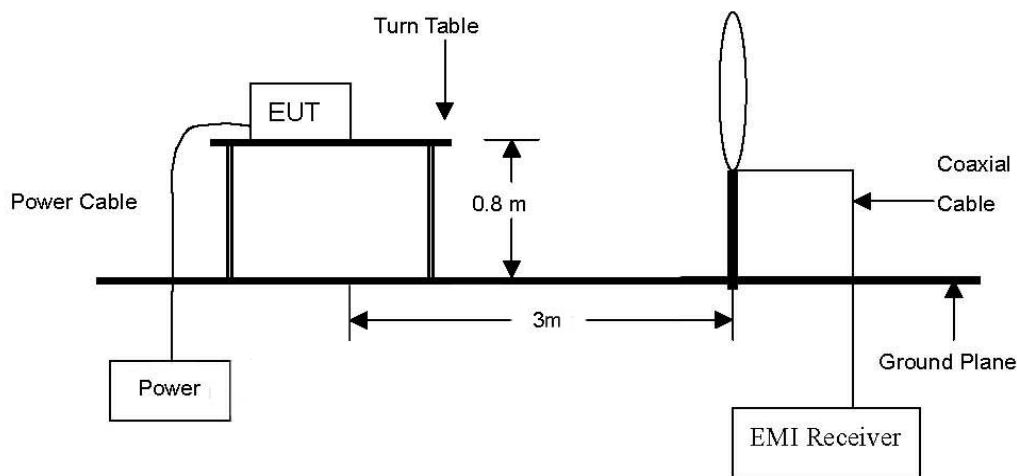
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2. Transmitter radiated spurious emissions

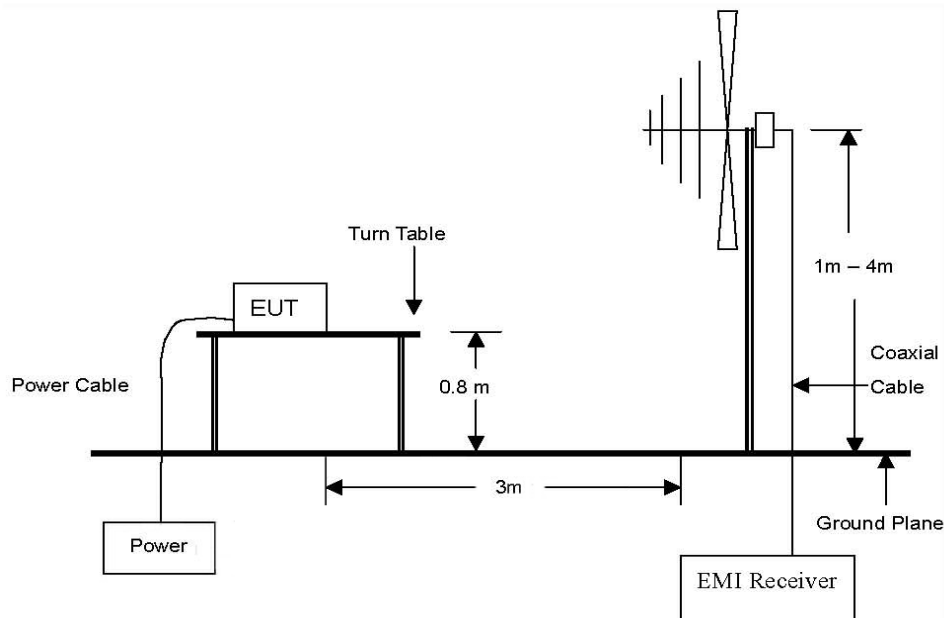
2.1. Test setup

2.1.1. Transmitter Radiated Spurious Emissions

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions.

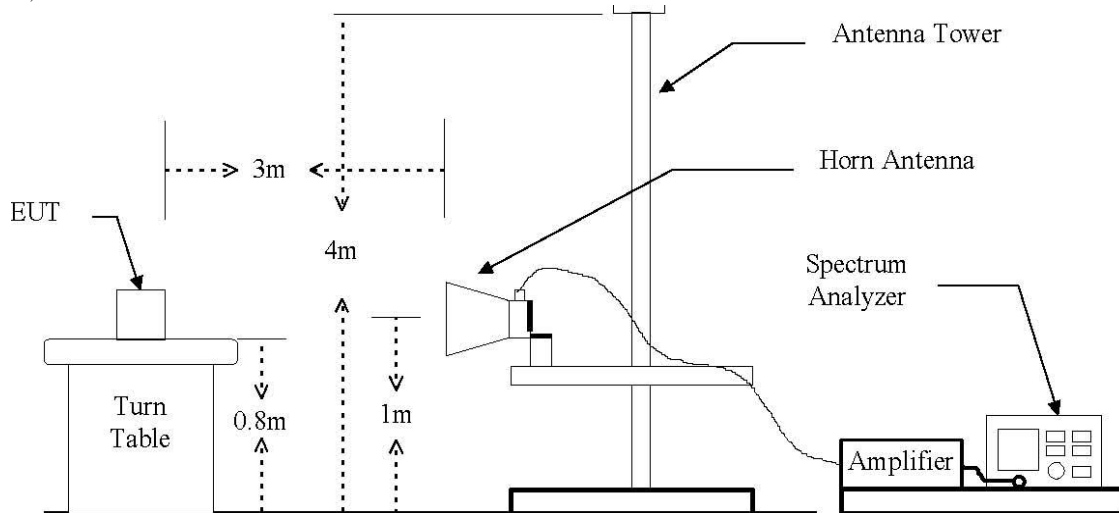


The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



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The diagram below shows the test setup that is utilized to make the measurements for emission. The spurious emissions were investigated from 1 GHz to the 10th harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.



2.1.1.1. Actual equipment used for Transmitter Radiated spurious Emissions

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Spectrum Analyzer	Agilent	N9030A	MY53120526	Jul. 17, 2014	Annual	Jul. 17, 2015
Signal Generator	Agilent	E8257D	MY51501169	Jul. 17, 2014	Annual	Jul. 17, 2015
Test Receiver	R&S	ESU26	100109	Mar. 04, 2014	Annual	Mar. 04, 2015
High Pass Filter	Wainwright	WHK6.0/18G-10SS	11	Jun. 10, 2014	Annual	Jun. 10, 2015
High Pass Filter	Wainwright	WHNX7.5/26.5G-6SS	11	Jun. 10, 2014	Annual	Jun. 10, 2015
Low Pass Filter	Mini circuits	NLP-1200+	V 8979400903-2	Mar. 21, 2014	Annual	Mar. 21, 2015
Preamplifier	H.P.	8447F	2944A03909	Aug. 27, 2014	Annual	Aug. 27, 2015
Preamplifier	R&S	SCU 18	10117	Jan. 14, 2014	Annual	Jan. 14, 2015
Preamplifier	MITEQ Inc.	JS44-18004000-35-8P	1546891	Apr. 28, 2014	Annual	Apr. 28, 2015
Bilog Antenna	TESEQ	VULB9163	396	Jun. 07, 2013	Biennial	Jun. 07, 2015
Loop Antenna	SCHWARZBECK MESSELEKTRONIK	FMZB 1519	1519-039	Jul. 09, 2013	Biennial	Jul. 09, 2015
Horn Antenna	R&S	HF906	100326	Dec. 10, 2013	Biennial	Dec. 10, 2015
Horn Antenna	SCHWARZBECK MESSELEKTRONIK	BBHA9170	BBHA9170431	May 15, 2014	Biennial	May 15, 2016
Antenna Master	INN-CO	MM4000	N/A	N/A	N/A	N.C.R.
Turn Table	INN-CO	DS 1200 S	N/A	N/A	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N/A	N/A	N.C.R.

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2.2. Limit

For transmitters operating in the 5.15 ~ 5.25 GHz band: all emissions outside of the 5.15 ~ 5.35 GHz band shall not exceed an EIRP of -27 dB m/MHz.

For transmitters operating in the 5.25 ~ 5.35 GHz band: all emissions outside of the 5.15 ~ 5.35 GHz band shall not exceed an EIRP of -27 dB m/MHz. Devices operating in the 5.25 ~ 5.35 GHz band that generate emissions in the 5.15 ~ 5.25 GHz band must meet all applicable technical requirements for operation in the 5.15 ~ 5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dB m/MHz in the 5.15 ~ 5.25 GHz band.

For transmitters operating in the 5.47 ~ 5.725 GHz band: all emissions outside of the 5.47 ~ 5.725 GHz band shall not exceed an EIRP of -27 dB m/MHz.

For transmitters operating in the 5.725 ~ 5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dB m/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dB m/MHz.

According to § 15.209(a), Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Distance (Meters)	Field Strength (dBμV/m)	Field Strength (μV/m)
0.009 – 0.490	300	$20 \log (2\,400/F(\text{kHz}))$	$2\,400/F(\text{kHz})$
0.490 – 1.705	30	$20 \log (24\,000/F(\text{kHz}))$	$24\,000/F(\text{kHz})$
1.705 – 30.0	30	29.54	30
30 - 88	3	40.0	100
88 – 216	3	43.5	150
216 – 960	3	46.0	200
Above 960	3	54.0	500

2.3. Test procedures

Radiated spurious emissions from the EUT were measured according to the dictates in section G of KDB 789033 New rules v01 and ANSI C63.4 2003.

All data rates and modes were investigated for conducted spurious emissions. The emissions of the configuration that produced the worst case emissions are reported in this section.

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2.3. Test procedures for radiated spurious emissions

2.3.1. Test Procedures for emission below 30 MHz

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. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum Hold Mode.

2.3.2. Test Procedures for emission from above 30 MHz

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 bi-log antenna, a horn 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;

- The measurements for below 1 GHz refer to section II.G.4.

Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

- The measurements for above 1 GHz refer to section II.G.5.

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

Set to RBW = 1 MHz, VBW ≥ 3 MHz, Detector = Peak, Sweep time = auto, Trace mode= Max hold

- The measurements for above 1 GHz refer to section II.G.6.

Average emission levels are measured by setting the analyzer as follows:

Set to RBW = 1 MHz, VBW ≥ 3 MHz, Detector = RMS, Averaging type = power(i.e., RMS), Sweep time = auto, Trace mode= trace average of at least 100 traces. If the transmission is not continuous, the number of traces shall be increased by a factor of 1/x, where x is the duty cycle.

If duty cycle < 98 percent, a correction factor shall be added to the measurement results.

- Power averaging (RMS) mode was used above the correction factor is 10 log (1/x), where x is the duty cycle.

To get a maximum emission level from the EUT, the EUT is manipulated through three orthogonal planes. Definition of DUT three orthogonal planes were described in the test setup photo.

Worst orthogonal plan of EUT is **Z – axis** during radiation test.

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2.4. Test result

Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

2.4.1. Spurious radiated emission

The frequency spectrum from 9 MHz to 1 000 MHz was investigated. All reading values are applied for peak values per frequency band.

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)
43.98	36.75	Peak	H	12.53	-27.08	22.20	40.00	17.80
48.55	38.45	Peak	V	9.45	-27.00	20.90	40.00	19.10
95.11	35.27	Peak	H	12.82	-26.39	21.70	43.50	21.80
96.85	35.16	Peak	V	11.62	-26.38	20.40	43.50	23.10
845.73	39.16	Peak	V	21.95	-23.51	37.60	46.00	8.40
Above 900.00	Not detected	-	-	-	-	-	-	-

Remark:

1. Spurious emissions for all channels and modes were investigated and almost the same below 1 GHz.
2. Reported spurious emissions are in **11a / 6 Mbps / 36 channels** as worst case among other modes.
3. Radiated spurious emission measurement as below
(Actual = Reading + Antenna Factor + Amp + CL)

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2.4.2. Spurious radiated emission for above 1 GHz

802.11a (Band 1) _6 Mbps

A. Low Channel (5 180 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*4 811.23	12.58	Peak	V	32.27	8.81	-	53.66	74.00	20.34
*4 811.23	4.87	Average	V	32.27	8.81	0.23	46.18	54.00	7.82
*5 150.00	12.43	Peak	V	33.43	9.32	-	55.18	74.00	18.82
*5 150.00	4.81	Average	V	33.43	9.32	0.23	47.79	54.00	6.21

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 359.88	43.44	Peak	V	37.58	-29.99	-	51.03	68.23	17.20
Above 10 400.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 220 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 440.10	43.50	Peak	V	37.67	-30.19	-	50.98	68.23	17.25
Above 10 500.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 240 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 480.17	43.31	Peak	V	37.61	-30.30	-	50.62	68.23	17.61
Above 10 500.00	Not detected	-	-	-	-	-	-	-	-

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802.11a (Band 2A) _6 Mbps

A. Low Channel (5 260 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 519.82	41.51	Peak	V	37.52	-30.38	-	48.65	68.23	19.58
Above 10 600.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 300 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*10 600.02	40.51	Peak	V	37.63	-30.46	-	47.68	74.00	26.32
*10 600.02	37.22	Average	V	37.63	-30.46	0.23	44.62	54.00	9.38
Above 10 700.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 320 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*5 350.00	10.27	Peak	V	33.75	9.32	-	53.34	74.00	20.66
*5 350.00	3.40	Average	V	33.75	9.32	0.23	46.70	54.00	7.30
*5 353.22	10.45	Peak	V	33.76	9.33	-	53.54	74.00	20.46
*5 353.22	3.48	Average	V	33.76	9.33	0.23	46.80	54.00	7.20

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*10 639.97	42.24	Peak	V	37.67	-30.14	-	49.77	74.00	24.23
*10 639.97	38.16	Average	V	37.67	-30.14	0.23	45.92	54.00	8.08
Above 10 700.00	Not detected	-	-	-	-	-	-	-	-

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802.11a (Band 2C) _6 Mbps

A. Low Channel (5 500 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*5 447.81	11.77	Peak	V	34.19	9.08	-	55.04	74.00	18.96
*5 447.81	3.24	Average	V	34.19	9.08	0.23	46.74	54.00	7.26
*5 460.00	11.63	Peak	V	34.29	9.12	-	55.04	74.00	18.96
*5 460.00	3.16	Average	V	34.29	9.12	0.23	46.80	54.00	7.20

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*10 998.20	43.85	Peak	V	38.10	-29.58	-	52.37	74.00	21.63
*10 998.20	41.39	Average	V	38.10	-29.58	0.23	50.14	54.00	3.86
Above 11 000.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 580 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 160.24	43.87	Peak	V	37.94	-29.53	-	52.28	74.00	21.72
*11 160.24	41.86	Average	V	37.94	-29.53	0.23	50.50	54.00	3.50
Above 11 200.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 700 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 401.40	44.16	Peak	V	37.93	-29.11	-	52.98	74.00	21.02
*11 401.40	41.31	Average	V	37.93	-29.11	0.23	50.36	54.00	3.64
Above 11 500.00	Not detected	-	-	-	-	-	-	-	-

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802.11a (Band 3)_6 Mbps

A. Low Channel (5 745 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
5 709.30	14.25	Peak	V	34.10	9.35	-	57.70	68.23	10.53
5 725.00	12.79	Peak	V	34.13	9.45	-	56.37	78.23	21.86
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 491.40	44.46	Peak	V	38.40	-30.49	-	52.37	74.00	21.63
*11 491.40	40.02	Average	V	38.40	-30.49	0.23	48.16	54.00	5.84
Above 11 500.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 785 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 569.90	44.81	Peak	V	38.43	-31.58	-	51.66	74.00	22.34
*11 569.90	39.89	Average	V	38.43	-31.58	0.23	46.97	54.00	7.03
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 μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
5 850.00	12.77	Peak	V	34.14	9.53	-	56.44	78.23	21.79
5 861.30	14.16	Peak	V	34.21	9.69	-	58.06	68.23	10.17
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 654.10	45.10	Peak	V	38.36	-31.78	-	51.68	74.00	22.32
*11 654.10	38.44	Average	V	38.36	-31.78	0.23	45.25	54.00	8.75
Above 11 700.00	Not detected	-	-	-	-		-	-	-

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802.11n_HT20 (Band 1)_MCS0

A. Low Channel (5 180 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*4 863.37	12.82	Peak	V	32.70	9.13	-	54.65	74.00	19.35
*4 863.37	4.43	Average	V	32.70	9.13	0.25	46.51	54.00	7.49
*5 150.00	12.74	Peak	V	33.43	9.32	-	55.49	74.00	18.51
*5 150.00	4.36	Average	V	33.43	9.32	0.25	47.36	54.00	6.64

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 360.15	45.90	Peak	V	37.58	-29.99	-	53.49	68.23	14.74
Above 10 400.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 220 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 439.45	44.93	Peak	V	37.67	-30.19	-	52.41	68.23	15.82
Above 10 500.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 240 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 479.74	45.30	Peak	V	37.61	-30.30	-	52.61	68.23	15.62
Above 10 500.00	Not detected	-	-	-	-	-	-	-	-

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802. 11n_HT20 (Band 2A)_MCS0

A. Low Channel (5 260 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 520.31	43.46	Peak	V	37.52	-30.38	-	50.60	68.23	17.63
Above 10 600.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 300 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 559.96	42.99	Peak	V	37.63	-30.46	-	50.16	68.23	18.07
Above 10 600.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 320 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*5 350.00	11.78	Peak	V	33.75	9.32	-	54.85	74.00	19.15
*5 350.00	3.17	Average	V	33.75	9.32	0.25	46.49	54.00	7.51
*5 357.26	11.92	Peak	V	33.76	9.35	-	55.03	74.00	18.97
*5 357.26	3.45	Average	V	33.76	9.35	0.25	46.81	54.00	7.19

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*10 639.83	43.19	Peak	V	37.67	-30.14	-	50.72	74.00	23.28
*10 639.83	40.33	Average	V	37.67	-30.14	0.25	48.11	54.00	5.89
Above 10 700.00	Not detected	-	-	-	-	-	-	-	-

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802. 11n_HT20 (Band 2C)_MCS0

A. Low Channel (5 500 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5 448.36	11.79	Peak	V	34.20	9.07	-	55.06	74.00	18.94
*5 448.36	3.74	Average	V	34.20	9.07	0.25	47.26	54.00	6.74
*5 460.00	11.58	Peak	V	34.29	9.12	-	54.99	74.00	19.01
*5 460.00	3.53	Average	V	34.29	9.12	0.25	47.19	54.00	6.81

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*10 999.95	43.78	Peak	V	38.09	-29.59	-	52.28	74.00	21.72
*10 999.95	41.00	Average	V	38.09	-29.59	0.25	49.75	54.00	4.25
Above 11 000.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 580 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 160.23	43.31	Peak	V	37.94	-29.53	-	51.72	74.00	22.28
*11 160.23	41.45	Average	V	37.94	-29.53	0.25	50.11	54.00	3.89
Above 11 200.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 700 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 399.91	43.71	Peak	V	37.92	-29.08	-	52.55	74.00	21.45
*11 399.91	41.52	Average	V	37.92	-29.08	0.25	50.61	54.00	3.39
Above 11 400.00	Not detected	-	-	-	-	-	-	-	-

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802.11n_HT20 (Band 3)_MCS0

A. Low Channel (5 745 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
5 712.30	15.10	Peak	V	34.11	9.37	-	58.58	68.23	9.65
5 725.00	12.48	Peak	V	34.13	9.45	-	56.06	78.23	22.17
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 492.20	42.74	Peak	V	38.40	-30.50	-	50.64	74.00	23.36
*11 492.20	38.72	Average	V	38.40	-30.50	0.25	46.87	54.00	7.13
Above 11 500.00	Not detected	-	-	-	-		-	-	-

B. Middle Channel (5 785 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 569.40	42.99	Peak	V	38.43	-31.58	-	49.84	74.00	24.16
*11 569.40	37.84	Average	V	38.43	-31.58	0.25	44.94	54.00	9.06
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 μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
5 850.20	16.08	Peak	V	34.14	9.53	-	59.75	78.23	18.48
5 863.40	15.09	Peak	V	34.21	9.72	-	59.02	68.23	9.21
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 650.10	44.33	Peak	V	38.36	-31.79	-	50.90	74.00	23.10
*11 650.10	37.39	Average	V	38.36	-31.79	0.25	44.21	54.00	9.79
Above 11 700.00	Not detected	-	-	-	-	-	-	-	-

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802.11n_HT40 (Band 1) _MCS0

A. Low Channel (5 190 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*4 862.72	12.54	Peak	V	32.69	9.11	-	54.34	74.00	19.66
*4 862.72	4.66	Average	V	32.69	9.11	0.45	46.91	54.00	7.09
*5 150.00	12.10	Peak	V	33.43	9.32	-	54.85	74.00	19.15
*5 150.00	4.40	Average	V	33.43	9.32	0.45	47.60	54.00	6.40

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 379.92	46.51	Peak	V	37.54	-30.03	-	54.02	68.23	14.21
Above 10 400.00	Not detected	-	-	-	-	-	-	-	-

B. High Channel (5 230 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 459.64	45.24	Peak	V	37.62	-30.25	-	52.61	68.23	15.62
Above 10 500.00	Not detected	-	-	-	-	-	-	-	-

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802. 11n_HT40 (Band 2A)_MCS0

A. Low Channel (5 270 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 540.26	44.43	Peak	V	37.54	-30.40	-	51.57	68.23	16.66
Above 10 600.00	Not detected	-	-	-	-	-	-	-	-

B. High Channel (5 310 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*5 350.00	11.23	Peak	V	33.75	9.32	-	54.30	74.00	19.70
*5 350.00	3.59	Average	V	33.75	9.32	0.45	47.11	54.00	6.89
*5 423.59	11.45	Peak	V	34.11	9.30	-	54.86	74.00	19.14
*5 423.59	3.71	Average	V	34.11	9.30	0.45	47.57	54.00	6.43

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*10 619.50	43.27	Peak	V	37.71	-30.31	-	50.67	74.00	23.33
*10 619.50	39.53	Average	V	37.71	-30.31	0.45	47.38	54.00	6.62
Above 10 700.00	Not detected	-	-	-	-	-	-	-	-

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802. 11n_HT40 (Band 2C)_MCS0

A. Low Channel (5 510 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*5 459.57	13.35	Peak	V	34.29	9.12	-	56.76	74.00	17.24
*5 459.57	3.64	Average	V	34.29	9.12	0.45	47.50	54.00	6.50
*5 460.00	13.15	Peak	V	34.29	9.12	-	56.56	74.00	17.44
*5 460.00	3.24	Average	V	34.29	9.12	0.45	47.10	54.00	6.90

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 020.04	44.09	Peak	V	38.15	-29.56	-	52.68	74.00	21.32
*11 020.04	41.43	Average	V	38.15	-29.56	0.45	50.47	54.00	3.53
Above 11 100.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 550 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 100.03	44.81	Peak	V	38.01	-29.42	-	53.40	74.00	20.60
*11 100.03	41.65	Average	V	38.01	-29.42	0.45	50.69	54.00	3.31
Above 11 200.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 670 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+ CL (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 339.99	44.65	Peak	V	38.11	-29.49	-	53.27	74.00	20.73
*11 339.99	41.72	Average	V	38.11	-29.49	0.45	50.79	54.00	3.21
Above 11 400.00	Not detected	-	-	-	-	-	-	-	-

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802.11n_HT40 (Band 3)_MCS0

A. Low Channel (5 755 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+C L (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
5 709.20	15.40	Peak	V	34.10	9.35	-	58.85	68.23	9.38
5 725.00	13.32	Peak	V	34.13	9.45	-	56.90	78.23	21.33
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+C L (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 515.60	41.68	Peak	V	38.47	-30.84	-	49.31	74.00	24.69
*11 515.60	37.25	Average	V	38.47	-30.84	0.45	45.33	54.00	8.67
Above 11 600.00	Not detected	-	-	-	-		-	-	-

B. High Channel (5 795 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+C L (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
5 850.00	12.91	Peak	V	34.14	9.53	-	56.58	78.23	21.65
5 879.20	15.01	Peak	V	34.21	9.94	-	59.16	68.23	9.07
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+C L (dB)	Duty (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 589.60	40.81	Peak	V	38.40	-31.86	-	47.35	74.00	26.65
*11 589.60	35.49	Average	V	38.40	-31.86	0.45	42.48	54.00	11.52
Above 11 600.00	Not detected	-	-	-	-		-	-	-

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Remark:

1. “*” means the restricted band.
2. Radiated emissions measured in frequency above 1 000 MHz were made with an instrument using Peak / average detector mode if frequency was in restricted band. Otherwise the frequency was out of restricted band, only peak detector should be used.
3. Band edge measurement
(Actual = Reading + Antenna Factor + CL + Duty cycle)
4. Radiated spurious emission measurement
(Actual = Reading + Antenna Factor + Amp + CL + Duty cycle)
5. If frequency was out of restricted band, the calculation method for peak limit is same as below:

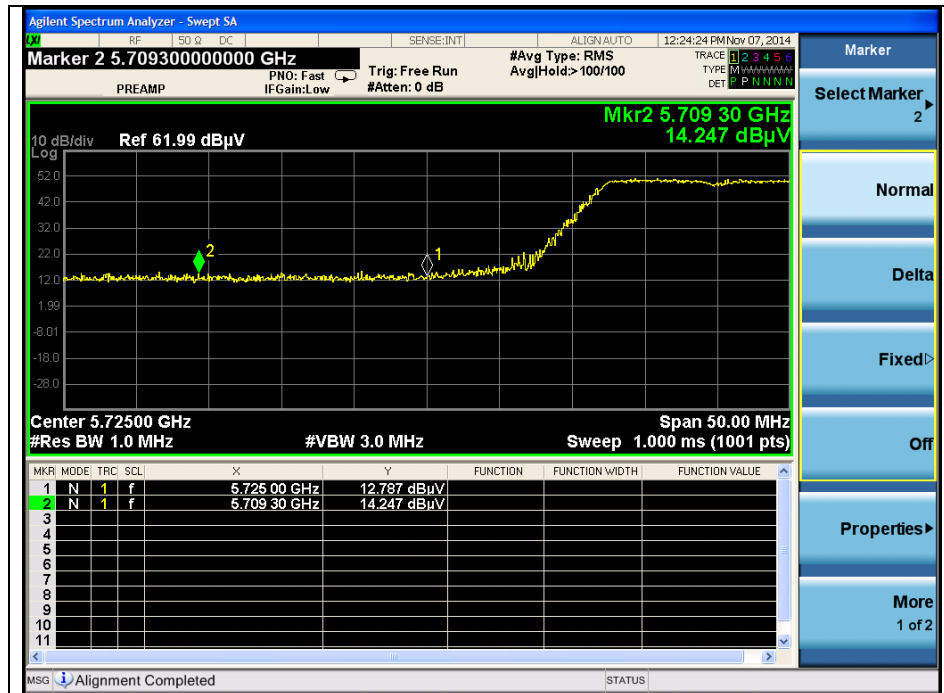
$$68.23 \text{ dB}\mu\text{V/m} = \text{EIRP} - 20 \log(d) + 104.77 = -27 - 20 \log(3) + 104.77$$
 *distance: 3 m, *EIRP: -27 dB m/MHz
6. The band edge data within 10 MHz of the UNII band 3 refer to the following plots.

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The band edge data within 10 MHz of the UNII band 3

802.11a (Band 3)

Low Channel (5 745 MHz)

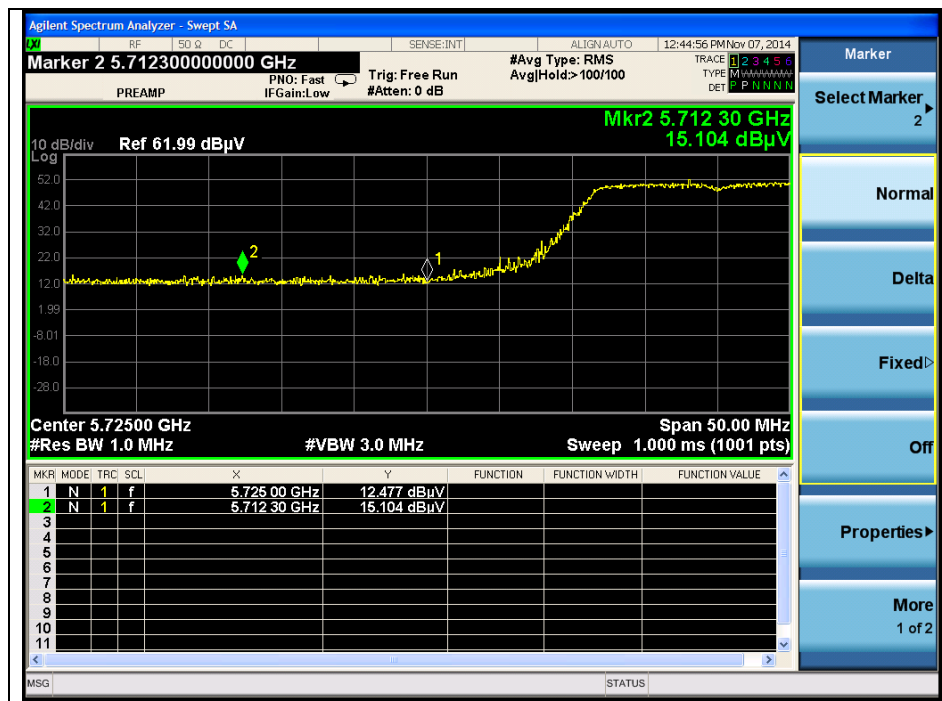


high Channel (5 850 MHz)

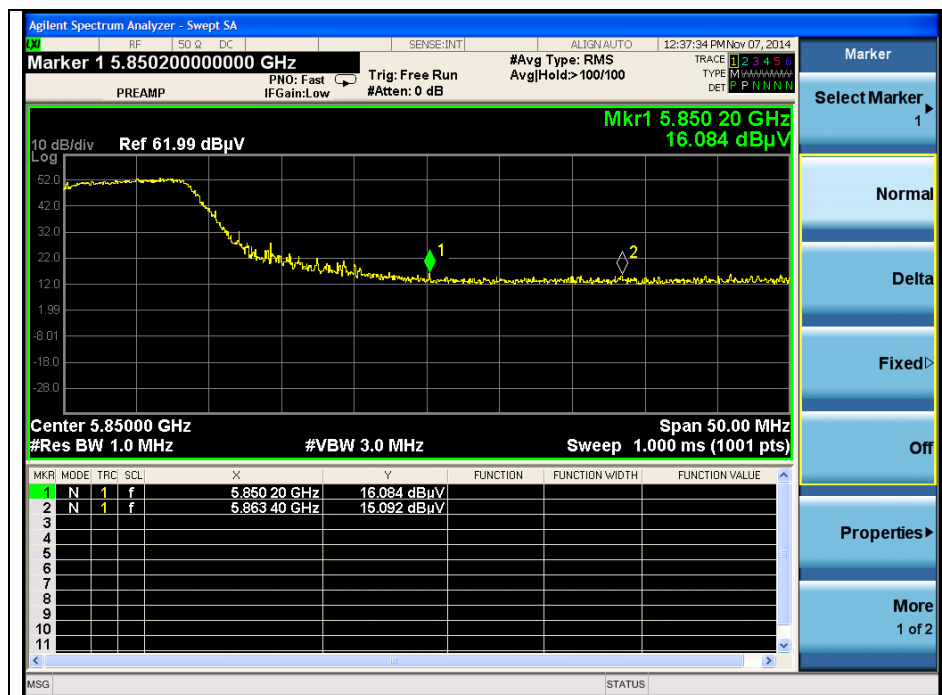


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802.11n_HT20 (Band 3) Low Channel (5 745 MHz)

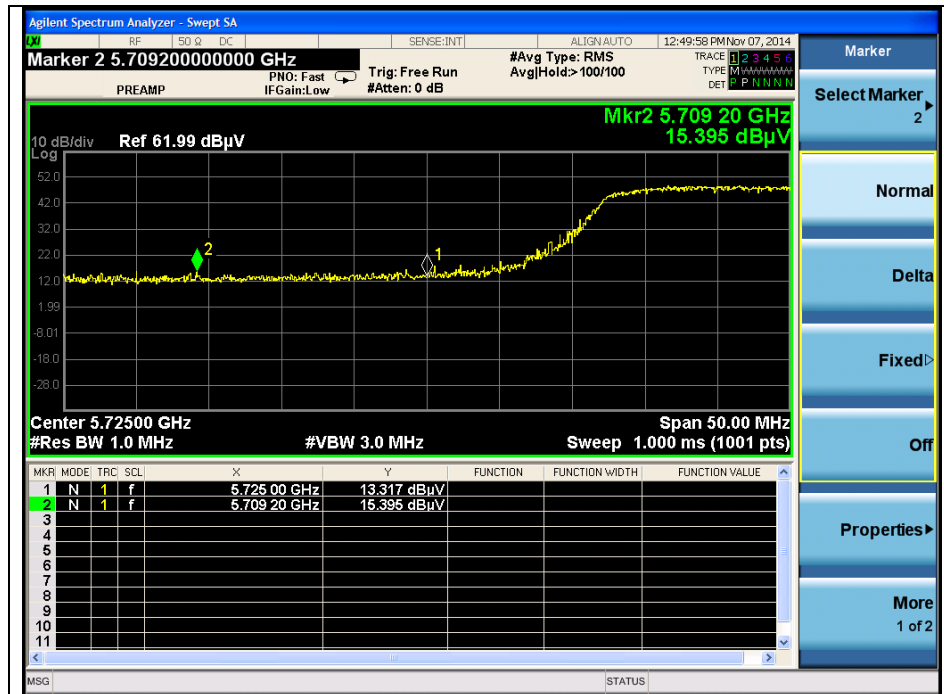


high Channel (5 850 MHz)

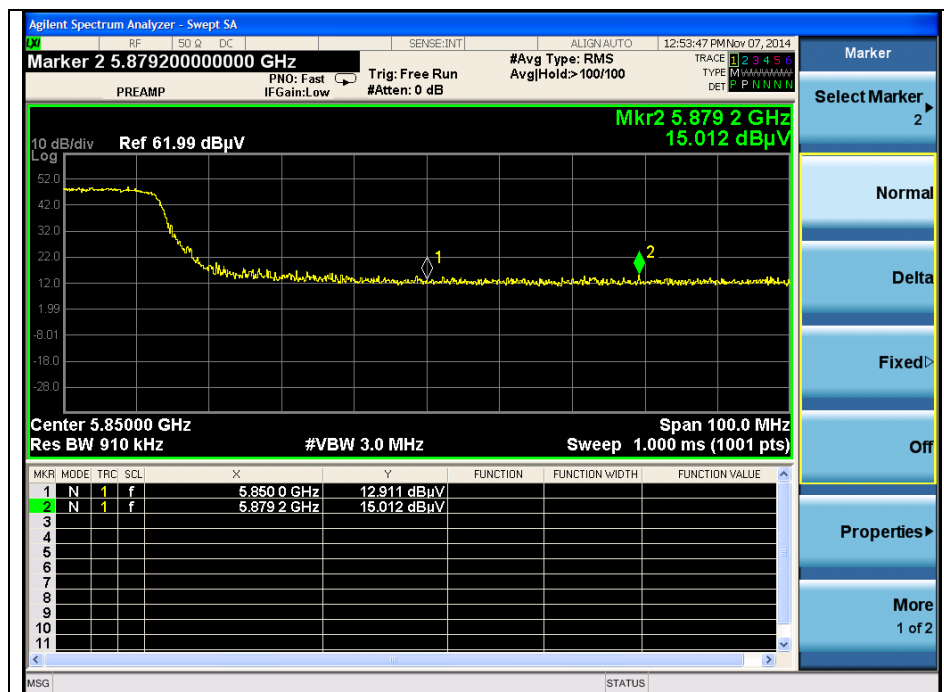


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802.11n_HT40 (Band 3) Low Channel (5 755 MHz)



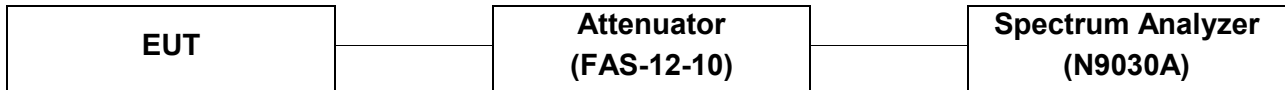
high Channel (5 795 MHz)



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3. 26 dB bandwidth

3.1. Test setup



3.1.1. Actual equipment used for 26 dB Bandwidth Measurement

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Signal Generator	Agilent	E8257D	MY51501169	Jul. 17, 2014	Annual	Jul. 17, 2015
Spectrum Analyzer	Agilent	N9030A	MY53120526	Jul. 17, 2014	Annual	Jul. 17, 2015
Attenuator	MCLI	FAS-12-10	1	Jun. 20, 2014	Annual	Jun. 20, 2015
DC Power Supply	Agilent	U8002A	MY49030063	Dec. 12, 2013	Annual	Dec. 12, 2014

3.3. Test procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

3.3.1. 26 dB Bandwidth

1. This measurement settings are specified in section C) of KDB 789033 D02 New rules v01.
2. Set RBW: approximately 1 % of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

According to KDB 644545 D01 v01r02 and 15.215(c), 20 dB bandwidth measurement were investigated to check whether a single emission is within a particular band or not.

In addition, the 20 dB bandwidth plots were reported at the end of this section.

In the result,

- DFS requirements are not applicable in the 5 150 MHz - 5 250 MHz
- No emission is within the 5 600 MHz - 5 650 MHz TDWR band

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

3.4. Test result

Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

3.4.1. 26 dB Bandwidth

Band	Mode	Frequency (MHz)	Ch.	Data Rate	26 dB Bandwidth (MHz)
U-NII 1	11a	5 180	36	6	22.27
		5 220	44	6	21.66
		5 240	48	6	21.87
	11n_HT20	5 180	36	MCS0	21.97
		5 220	44	MCS0	21.80
		5 240	48	MCS0	22.29
	11n_HT40	5 190	38	MCS0	43.37
		5 230	46	MCS0	43.38
U-NII 2A	11a	5 260	52	6	22.10
		5 300	60	6	21.86
		5 320	64	6	21.85
	11n_HT20	5 260	52	MCS0	22.53
		5 300	60	MCS0	21.94
		5 320	64	MCS0	22.12
	11n_HT40	5 270	54	MCS0	42.69
		5 310	62	MCS0	43.37
U-NII 2C	11a	5 500	100	6	21.54
		5 580	116	6	21.68
		5 700	140	6	21.46
	11n_HT20	5 500	100	MCS0	22.57
		5 580	116	MCS0	22.15
		5 700	140	MCS0	22.04
	11n_HT40	5 510	102	MCS0	43.40
		5 550	110	MCS0	42.97
		5 670	134	MCS0	43.15

3.4.2. 20 dB Bandwidth

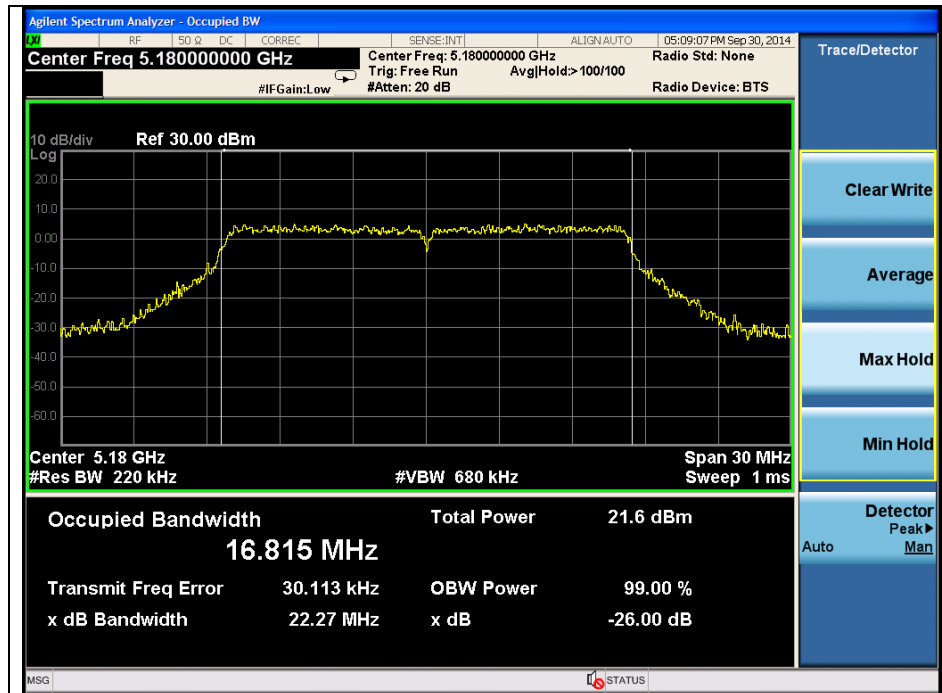
Band	Mode	Frequency (MHz)	Ch.	Data Rate	20 dB Bandwidth (MHz)
U-NII 1	11a	5 240	48	6	19.88
	11n_HT20	5 240	48	MCS0	19.88
	11n_HT40	5 230	46	MCS0	39.19
U-NII 2C	11a	5 580	116	6	19.44
		5 660	132	6	19.27
	11n_HT20	5 580	116	MCS0	19.71
		5 660	132	MCS0	19.95
	11n_HT40	5 550	110	MCS0	39.38
		5 670	134	MCS0	39.51

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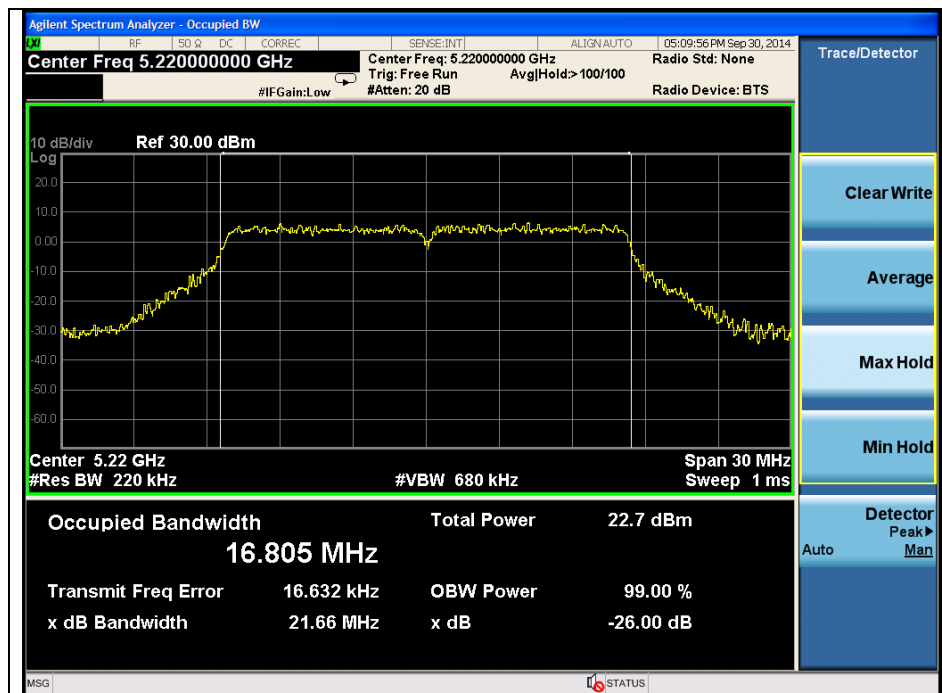
26 dB Bandwidth

802.11a (Band 1)

Low Channel (5 180 MHz)

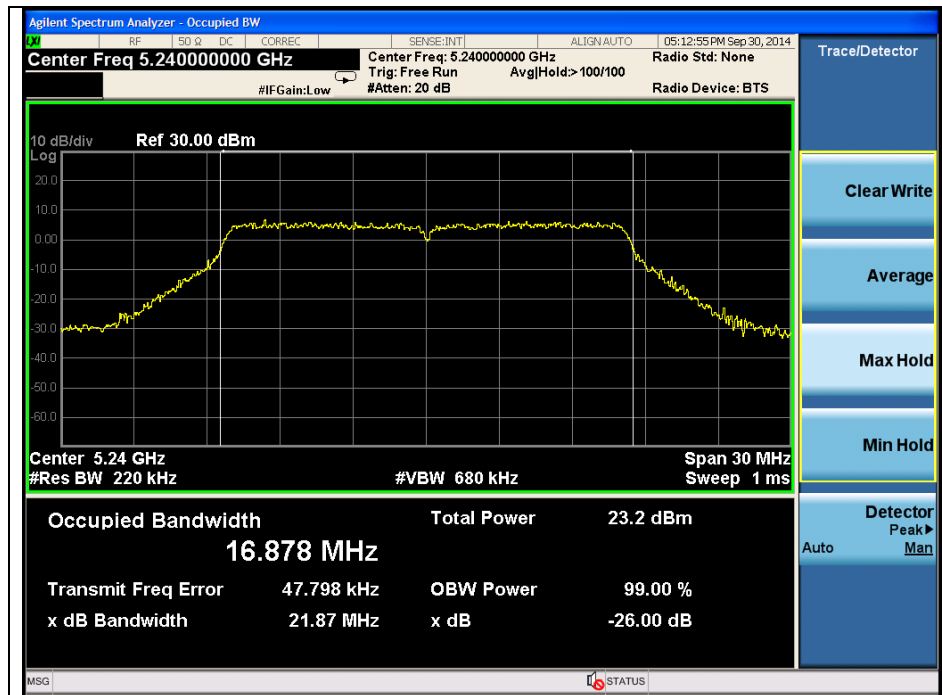


Middle Channel (5 220 MHz)



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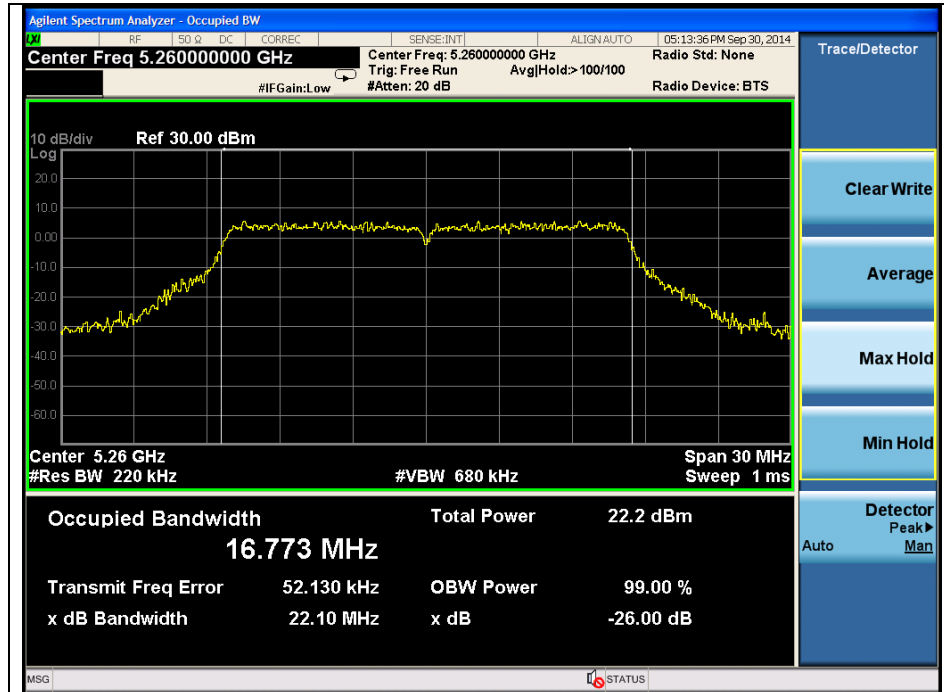
High Channel (5 240 MHz)



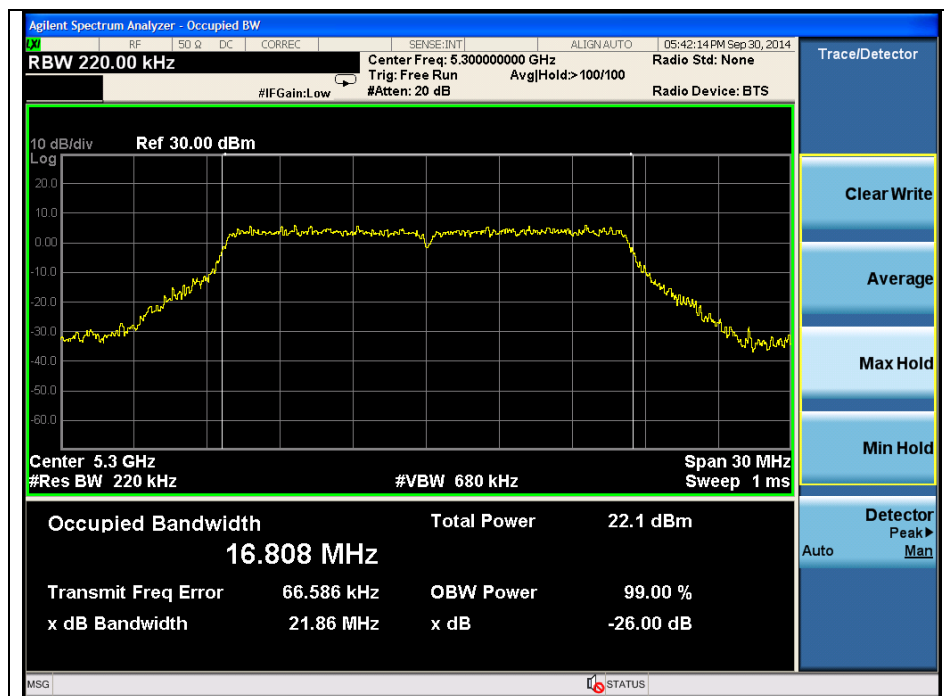
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802.11a (Band 2A)

Low Channel (5 260 MHz)

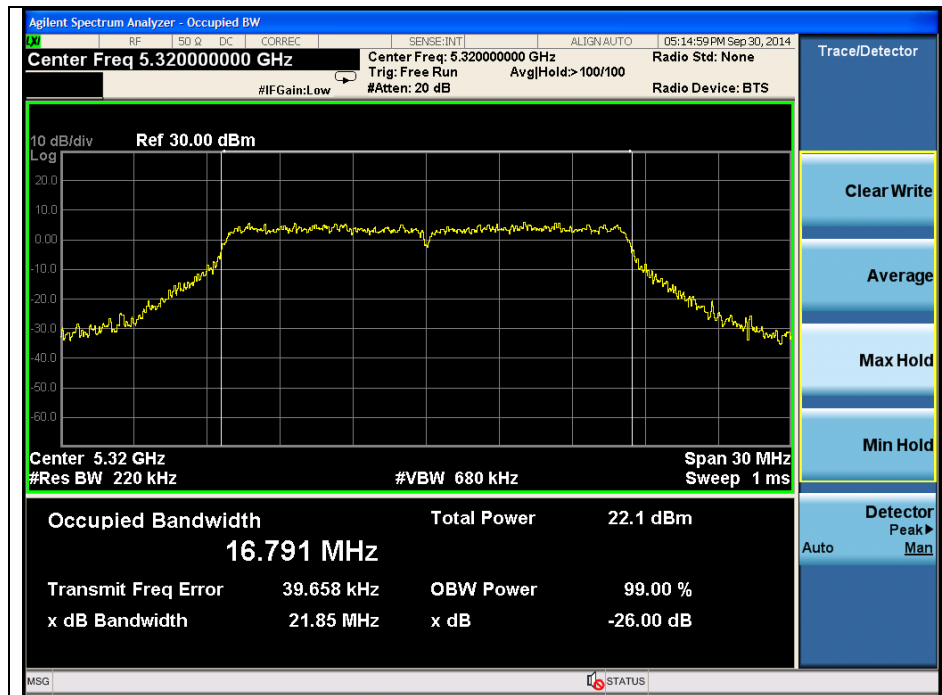


Middle Channel (5 300 MHz)



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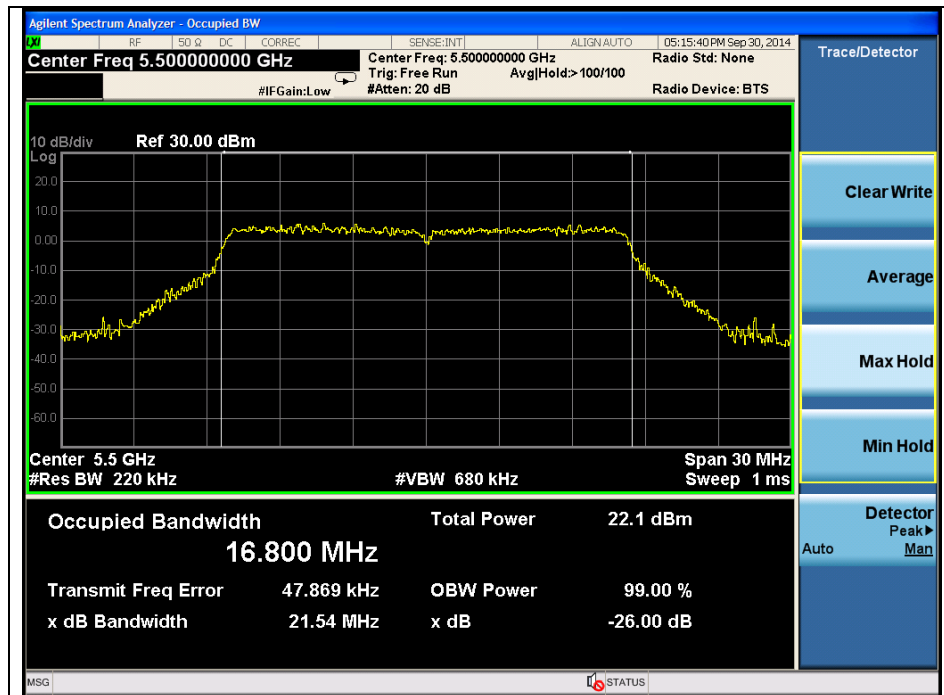
High Channel (5 320 MHz)



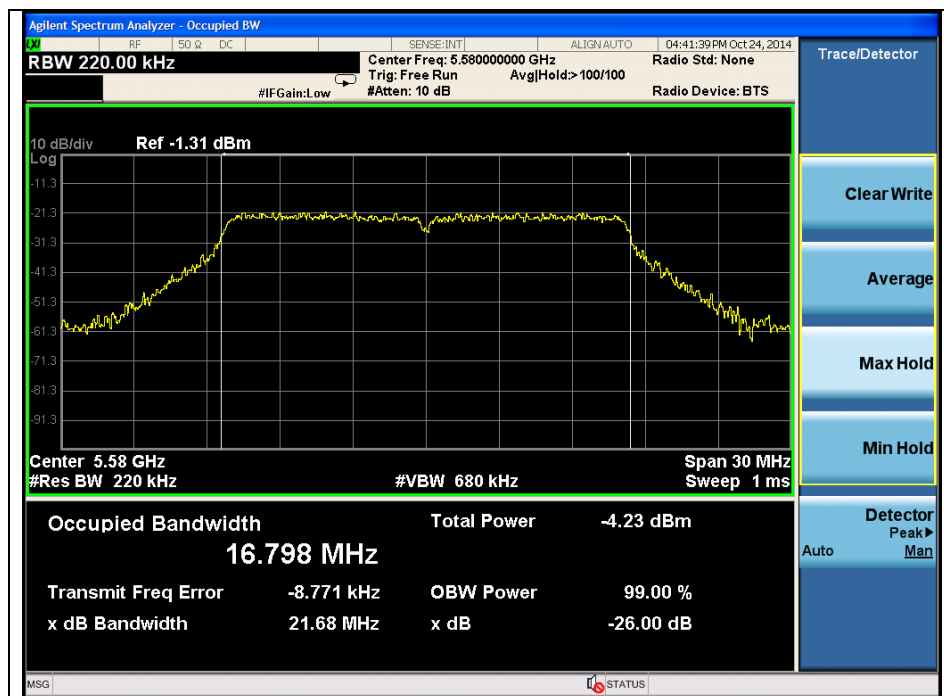
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802.11a (Band 2C)

Low Channel (5 500 MHz)

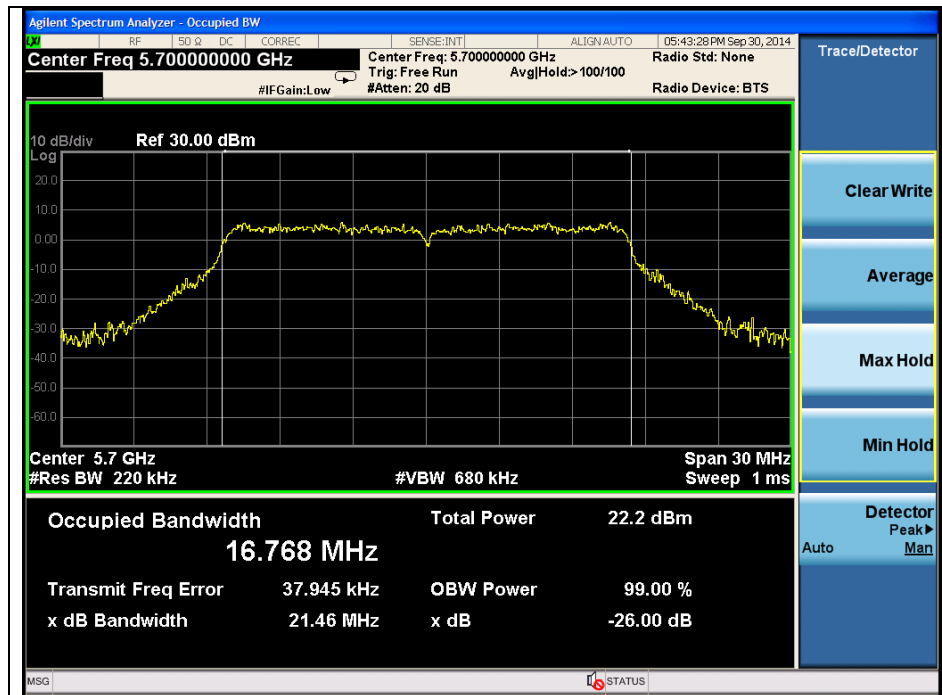


Middle Channel (5 580 MHz)



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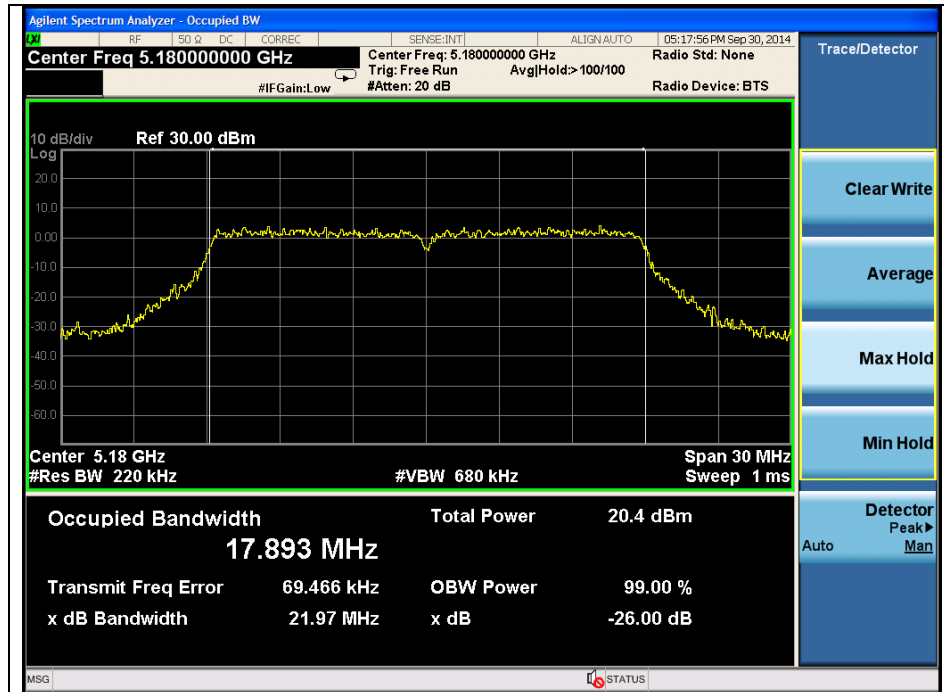
High Channel (5 700 MHz)



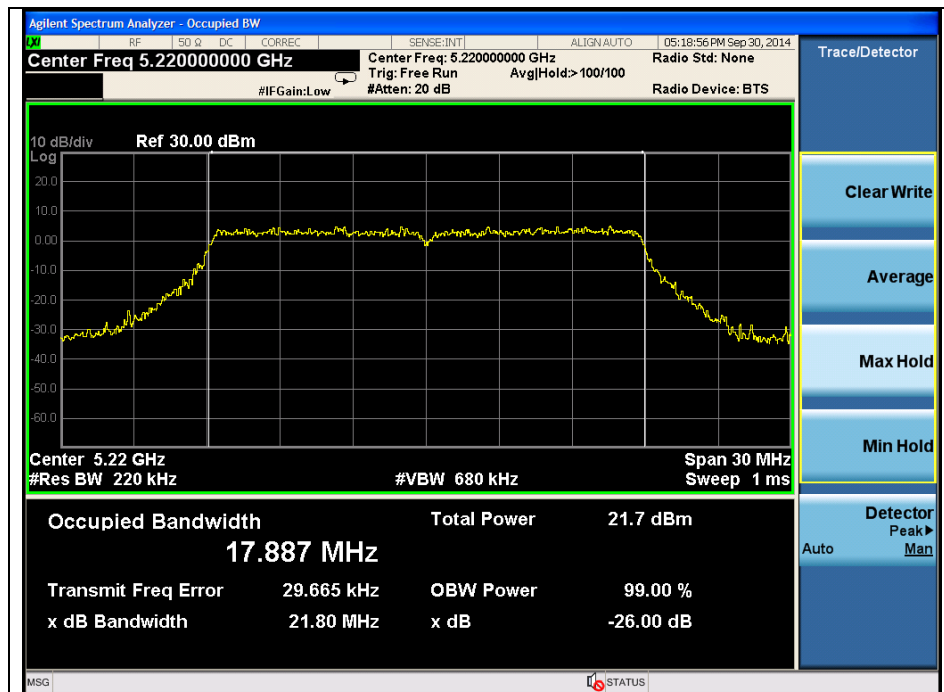
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802.11n_HT20 (Band 1)

Low Channel (5 180 MHz)

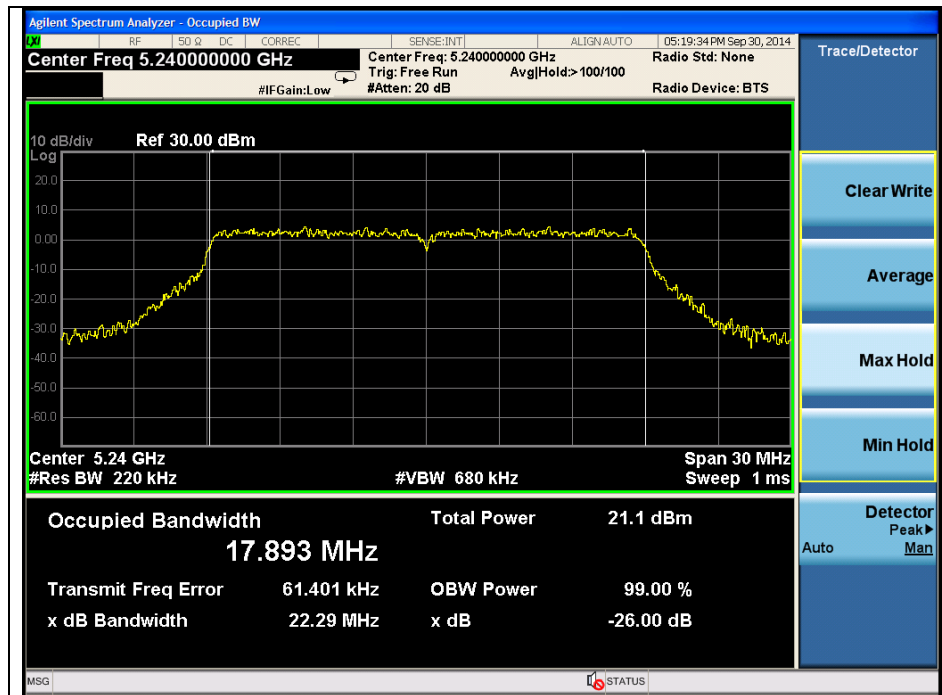


Middle Channel (5 220 MHz)



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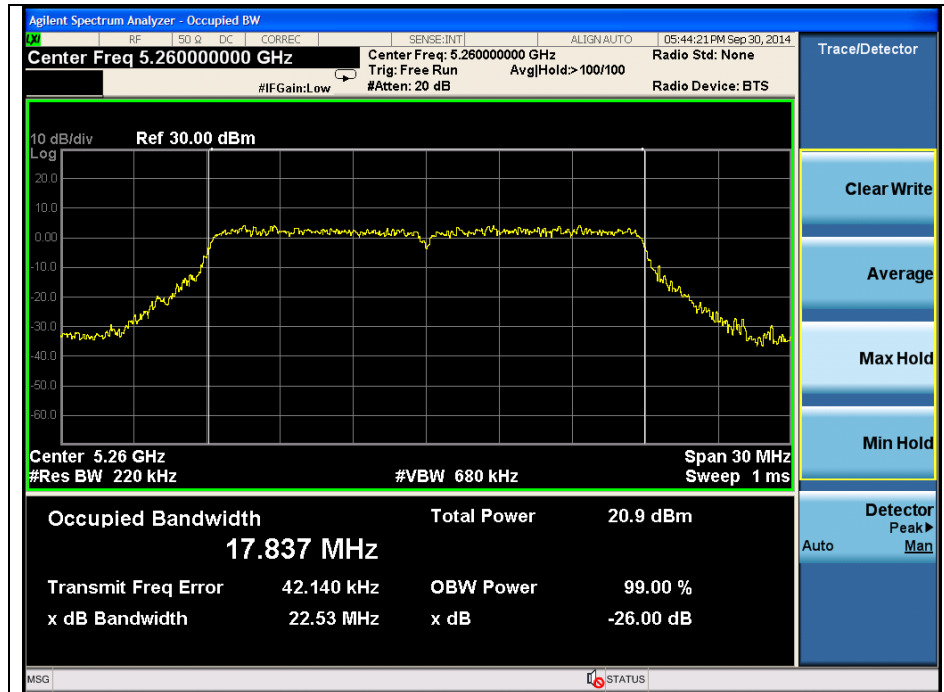
High Channel (5 240 MHz)



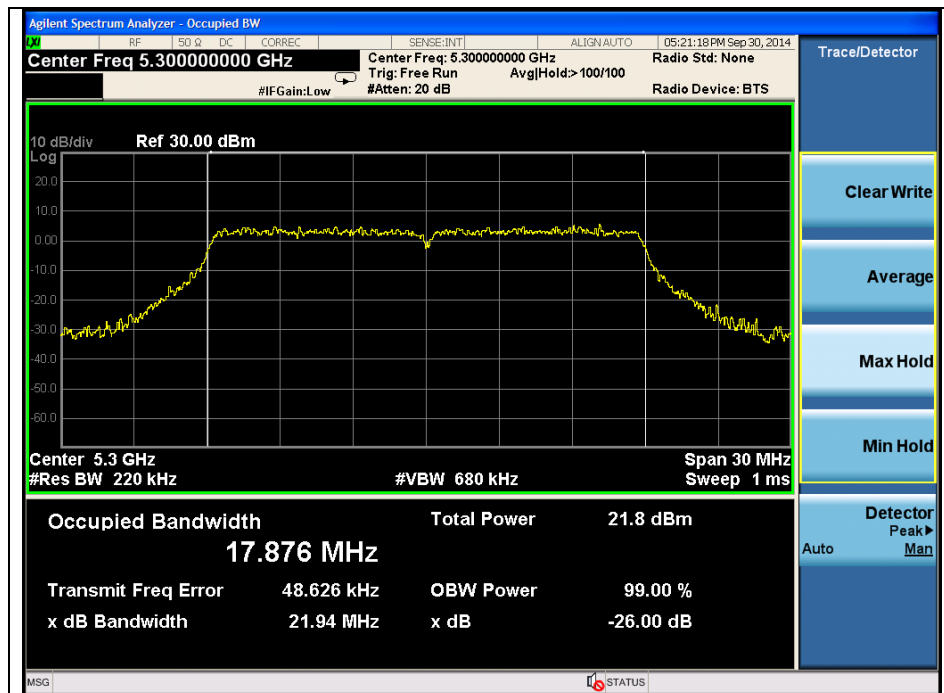
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802.11n_HT20 (Band 2A)

Low Channel (5 260 MHz)

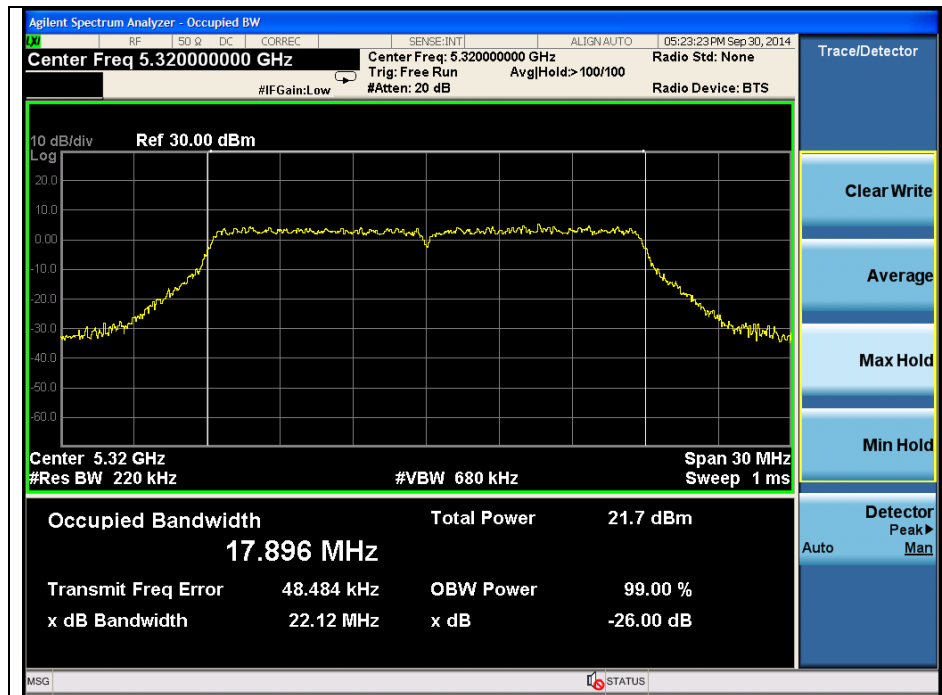


Middle Channel (5 300 MHz)



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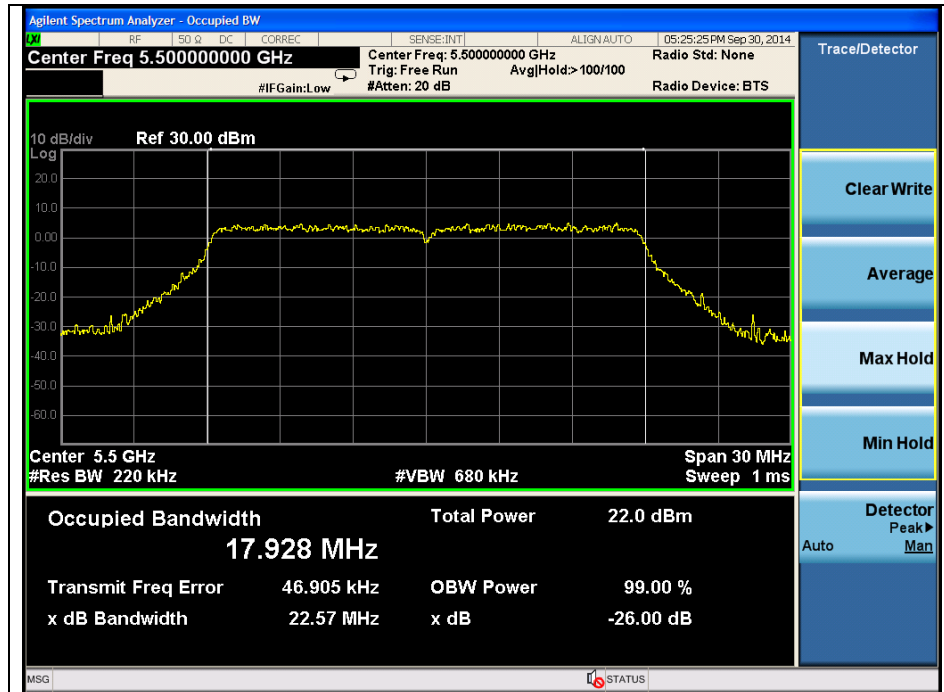
High Channel (5 320 MHz)



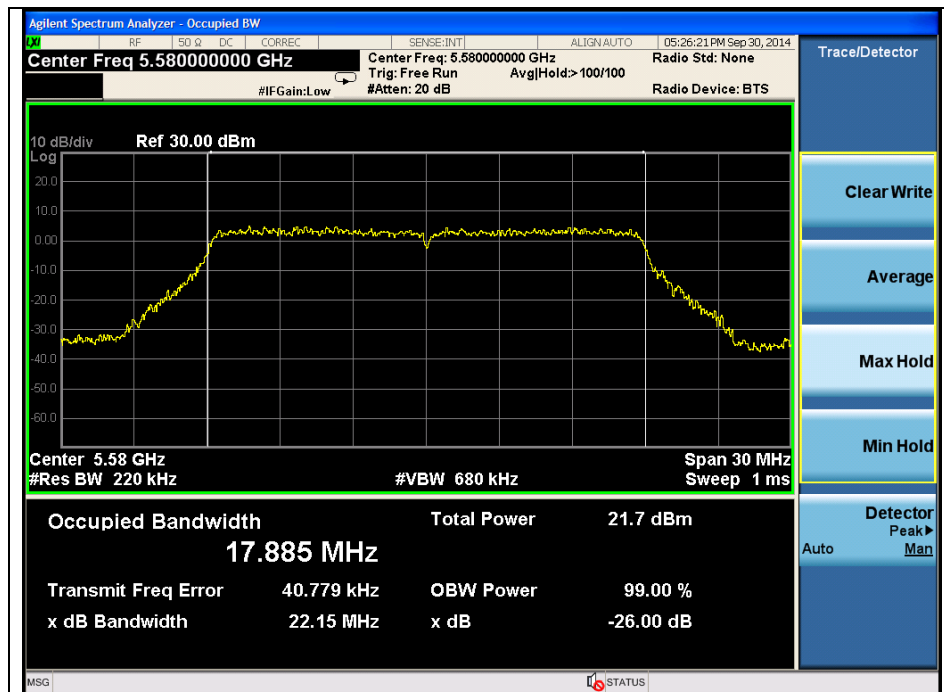
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802.11n_HT20 (Band 2C)

Low Channel (5 500 MHz)

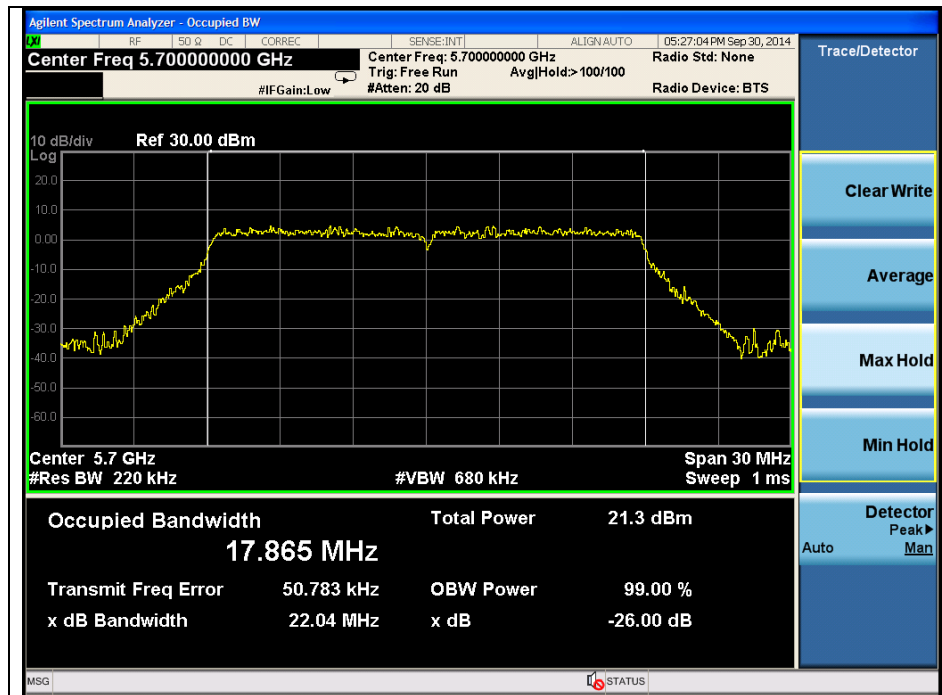


Middle Channel (5 580 MHz)



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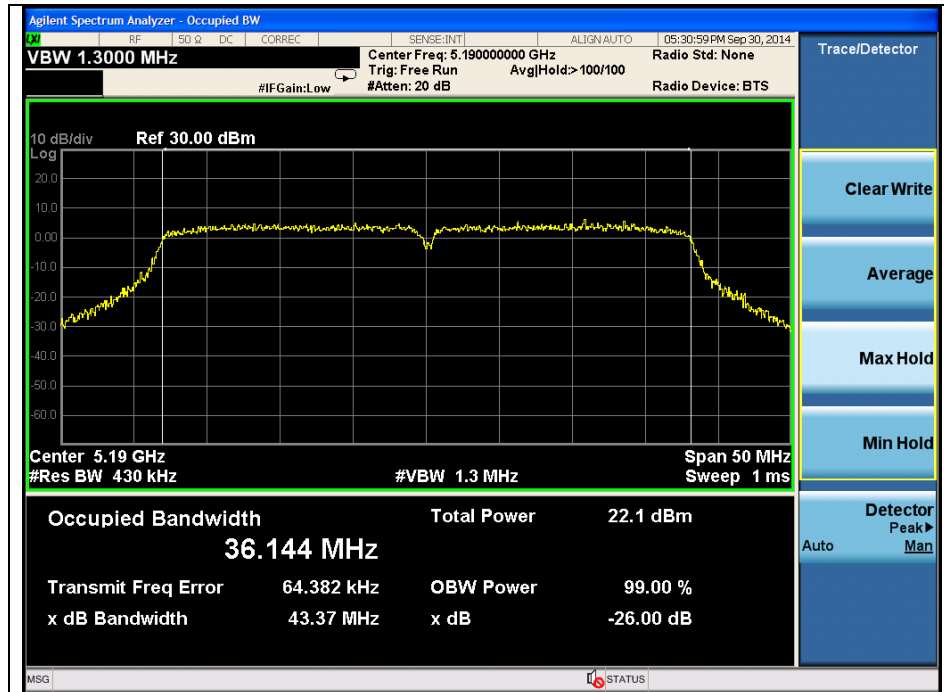
High Channel (5 700 MHz)



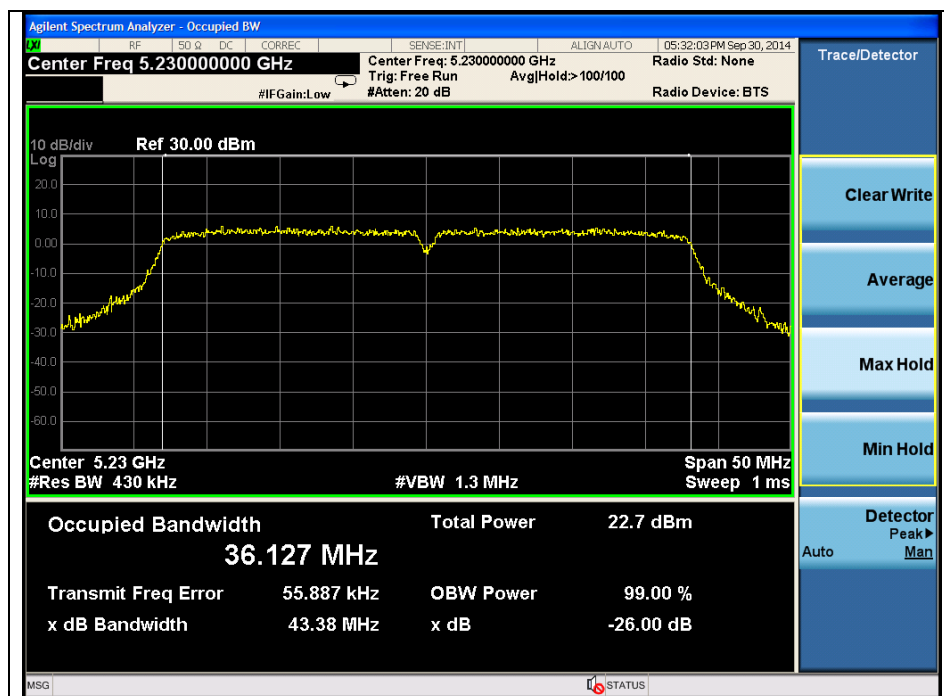
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802.11n_HT40 (Band 1)

Low Channel (5 190 MHz)



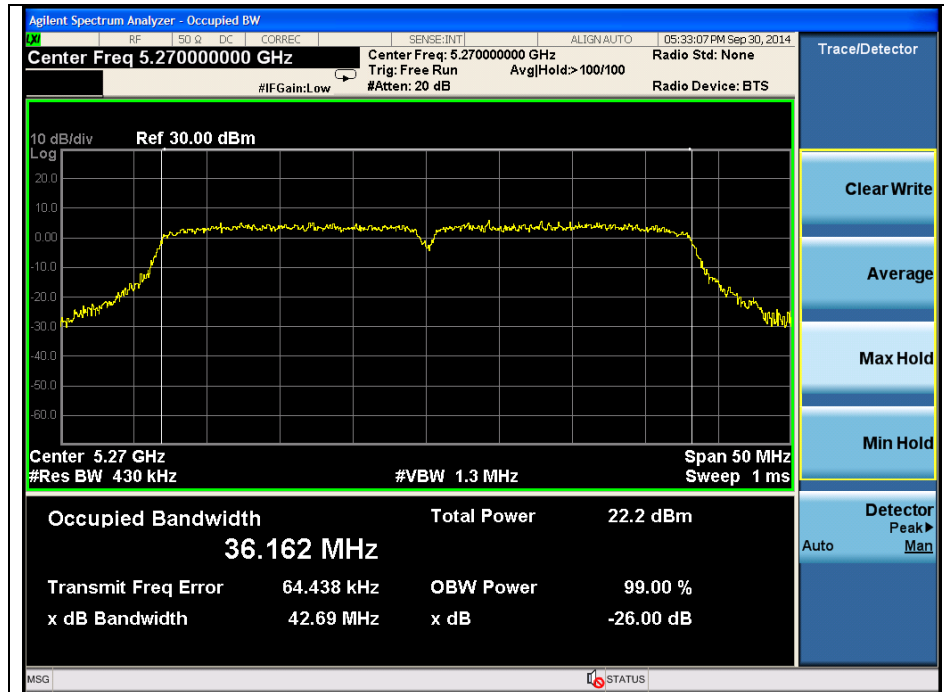
High Channel (5 230 MHz)



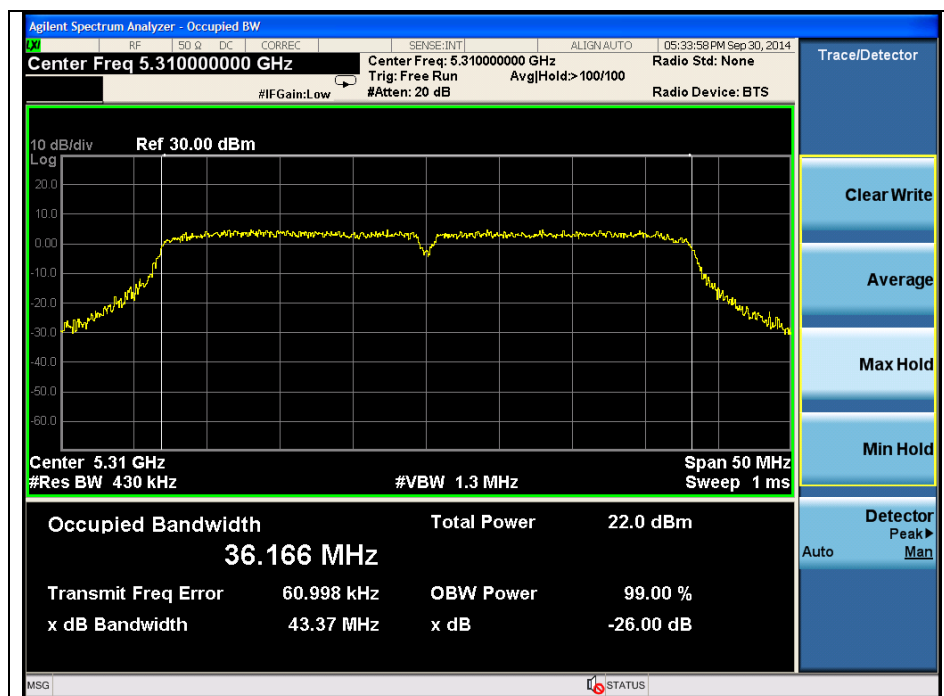
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802.11n_HT40 (Band 2A)

Low Channel (5 270 MHz)



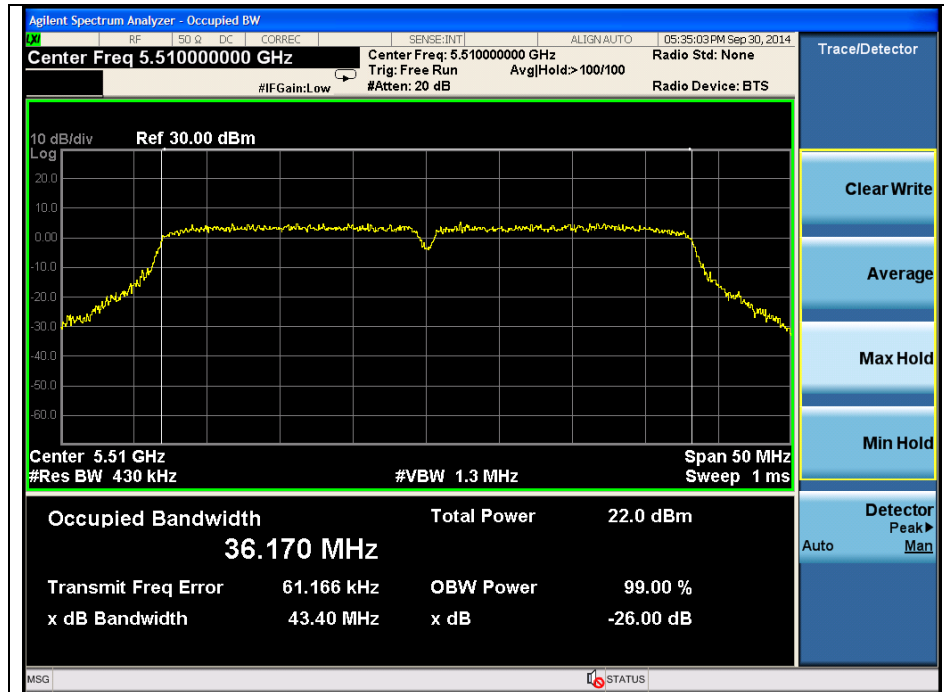
High Channel (5 310 MHz)



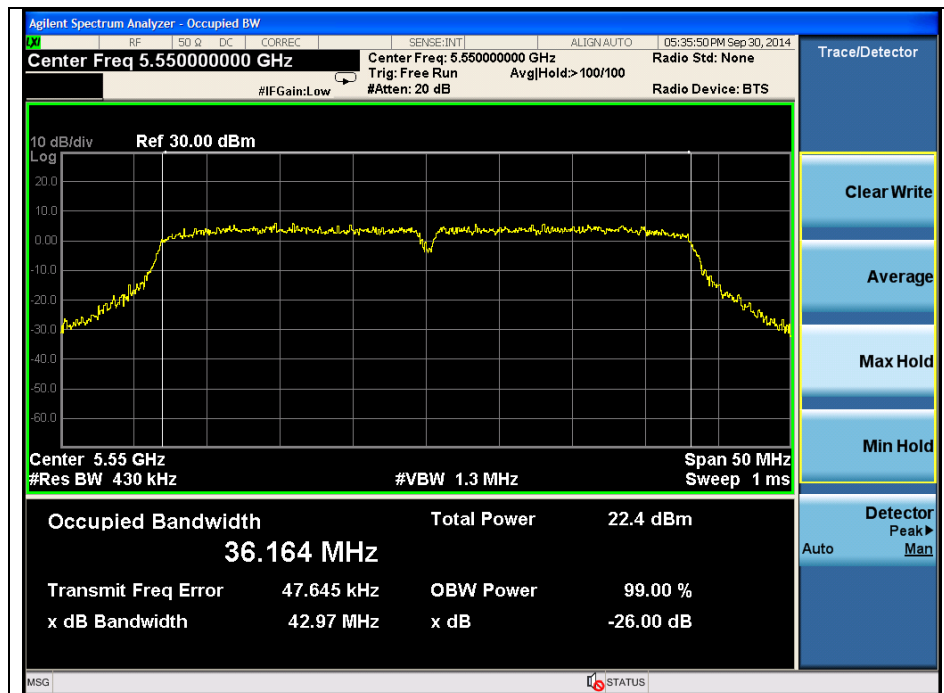
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

802.11n_HT40 (Band 2C)

Low Channel (5 510 MHz)

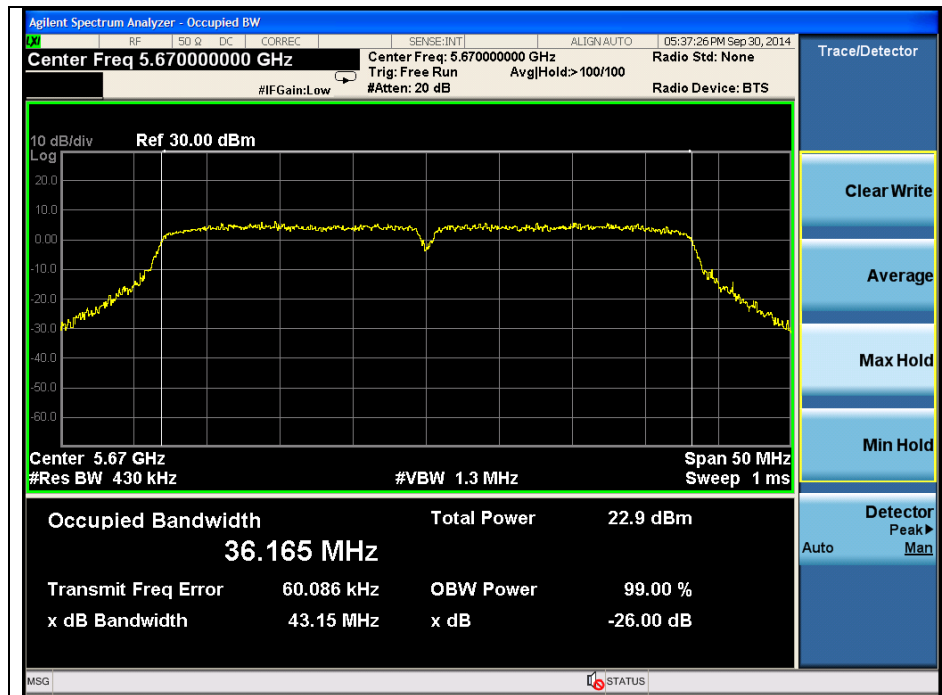


Low Channel (5 550 MHz)



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High Channel (5 670 MHz)

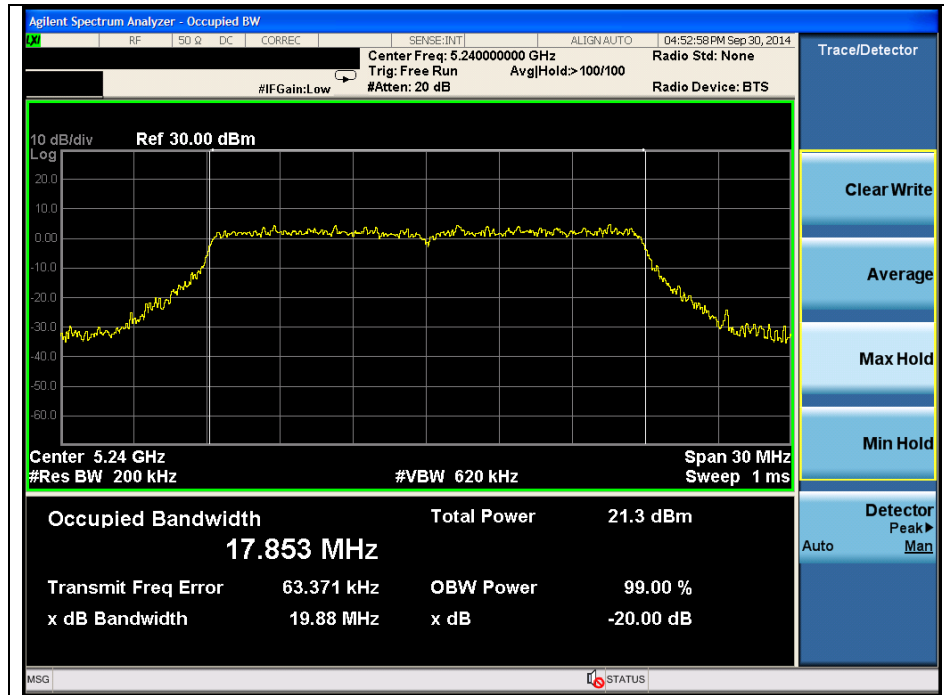


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20 dB Bandwidth

802.11a (Band 1)

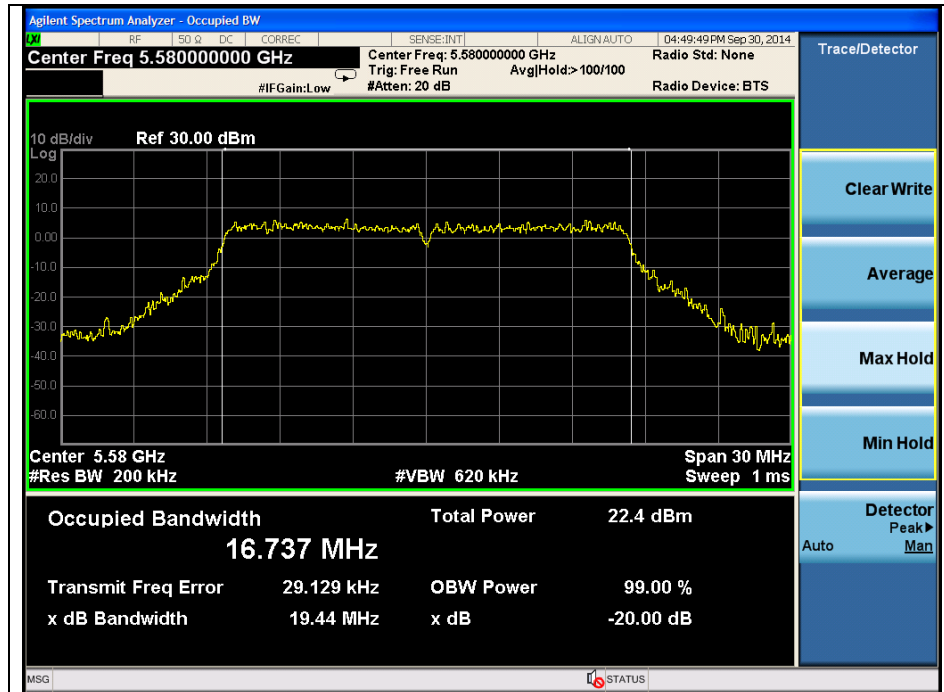
Channel (5 240 MHz)



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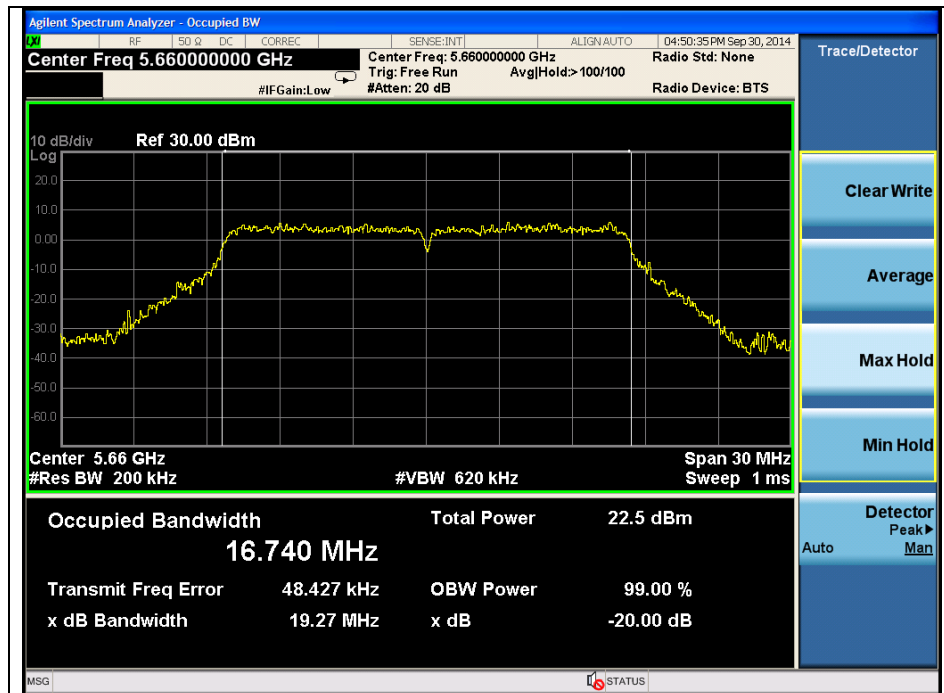
802.11a (Band 2A)

Channel (5 580 MHz)



802.11a (Band 2C)

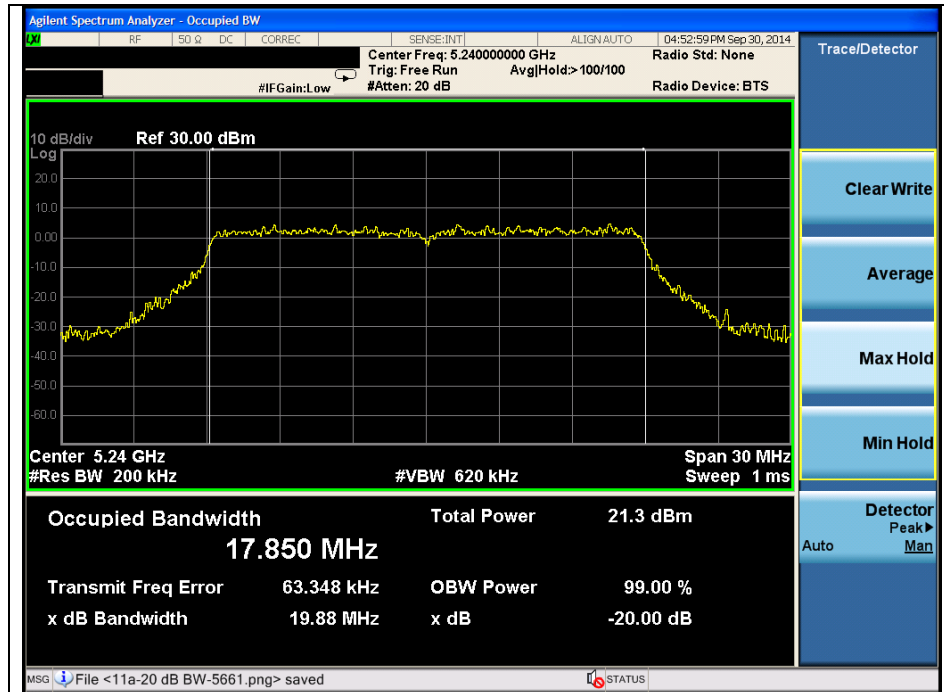
Channel (5 660 MHz)



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802.11n_HT20 (Band 1)

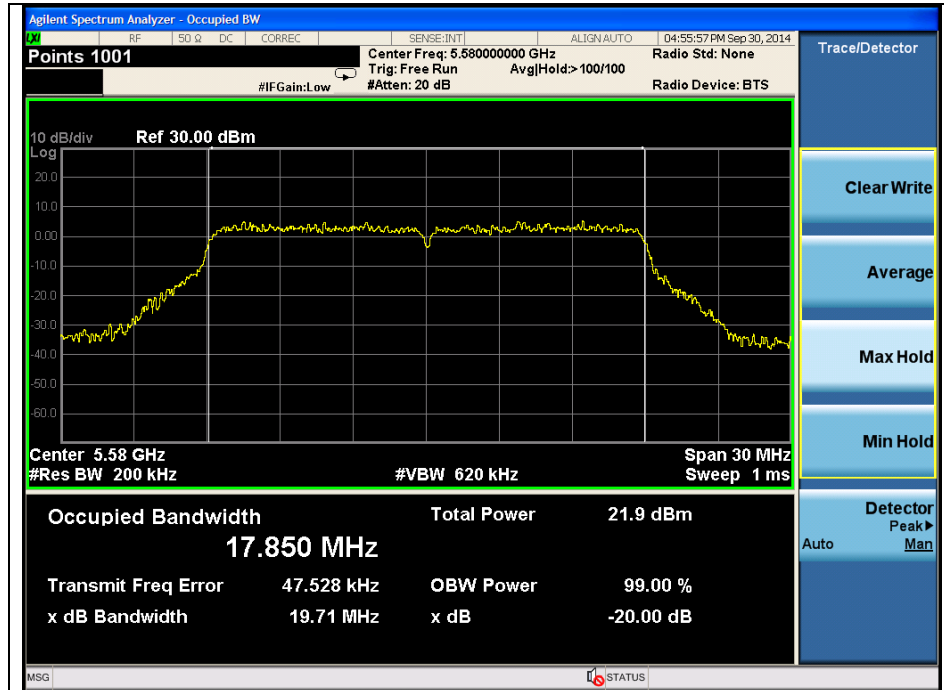
Channel (5 240 MHz)



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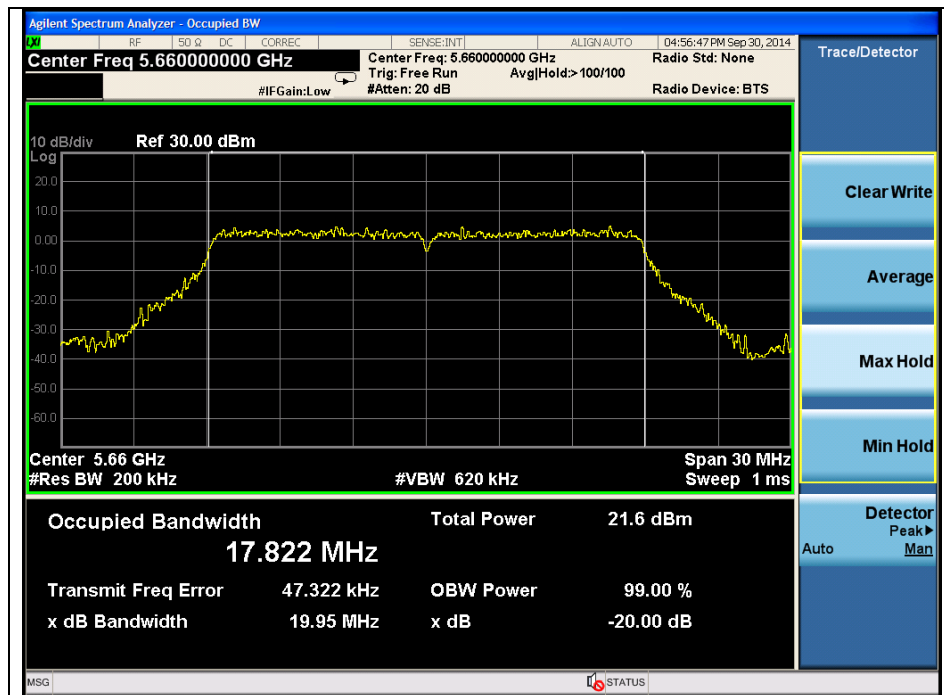
802.11n_HT20 (Band 2A)

Channel (5 580 MHz)



802.11n_HT20 (Band 2C)

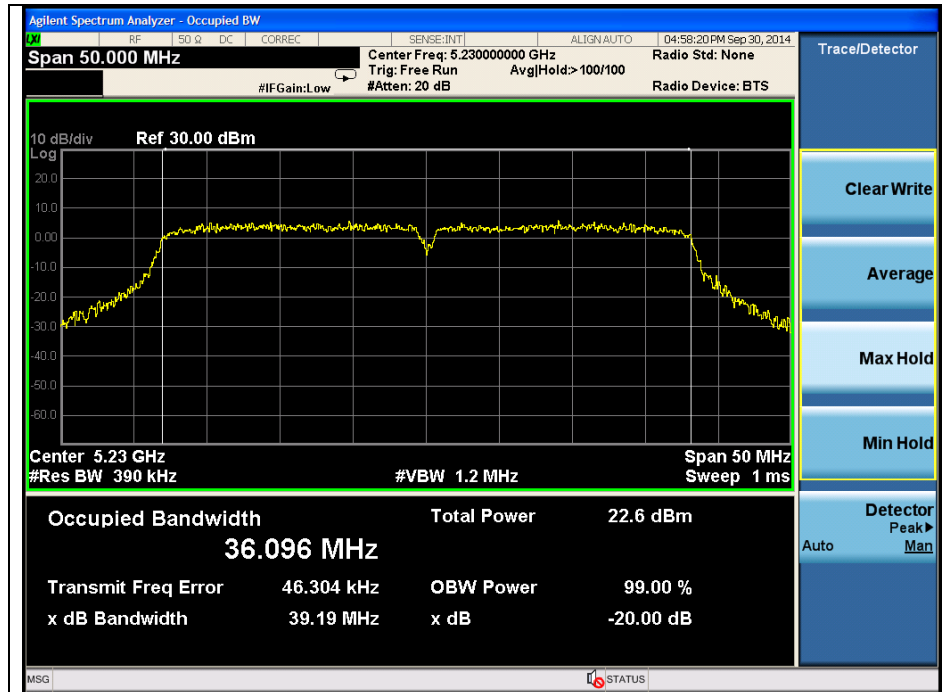
Channel (5 660 MHz)



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802.11n_HT40 (Band 1)

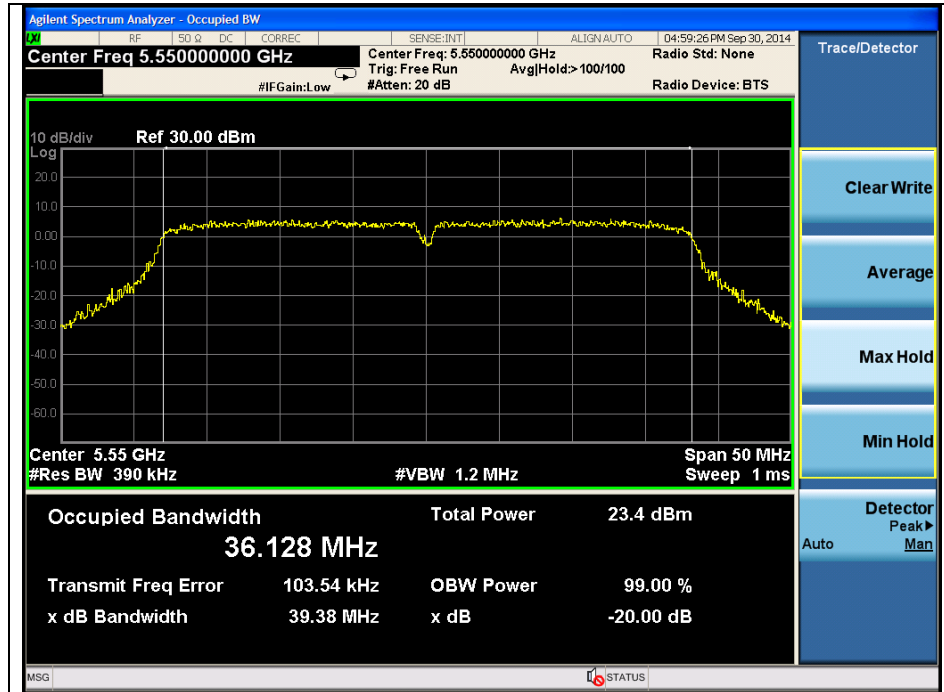
Channel (5 230 MHz)



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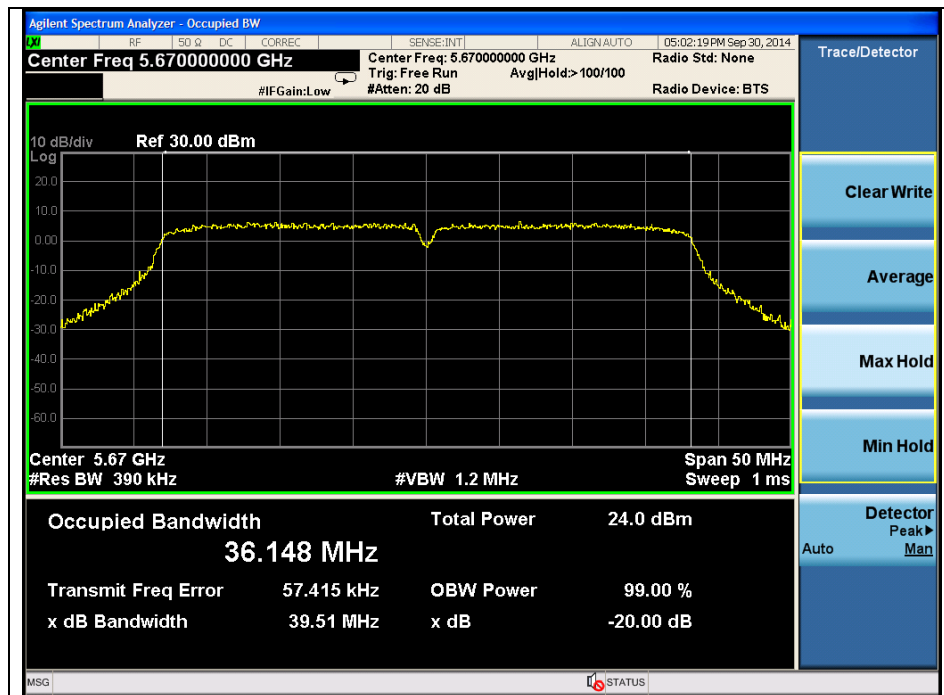
802.11n_HT40 (Band 2A)

Channel (5 550 MHz)



802.11n_HT40 (Band 2C)

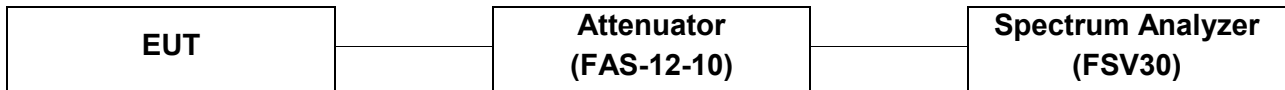
Channel (5 670 MHz)



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4. 6 dB bandwidth

4.1. Test setup



4.1.1. Actual equipment used for 6 dB Bandwidth

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Signal Generator	Agilent	E8257D	MY51501169	Jul. 17, 2014	Annual	Jul. 17, 2015
Spectrum Analyzer	R&S	FSV30	100768	Mar. 27, 2014	Annual	Mar. 27, 2015
Attenuator	MCLI	FAS-12-10	1	Jun. 20, 2014	Annual	Jun. 20, 2015
DC Power Supply	Agilent	U8002A	MY49030063	Dec. 12, 2013	Annual	Dec. 12, 2014

4.2. Limit

Within the 5.725 - 5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

4.3. Test procedure

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 kHz for the band 5.715 - 5.85 GHz. The following procedure shall be used for measuring this bandwidth:

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

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

4.4. Test result

Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

4.4.1. 6 dB Bandwidth

Band	Mode	Frequency (MHz)	Ch.	Data Rate	6 dB Bandwidth (MHz)
U-NII 1	11a	5 745	149	6	16.44
		5 785	157	6	16.44
		5 825	165	6	16.44
	11n_HT20	5 745	149	MCS0	17.66
		5 785	157	MCS0	17.66
		5 825	165	MCS0	17.66
	11n_HT40	5 755	151	MCS0	36.01
		5 795	159	MCS0	35.77

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SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040 <http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

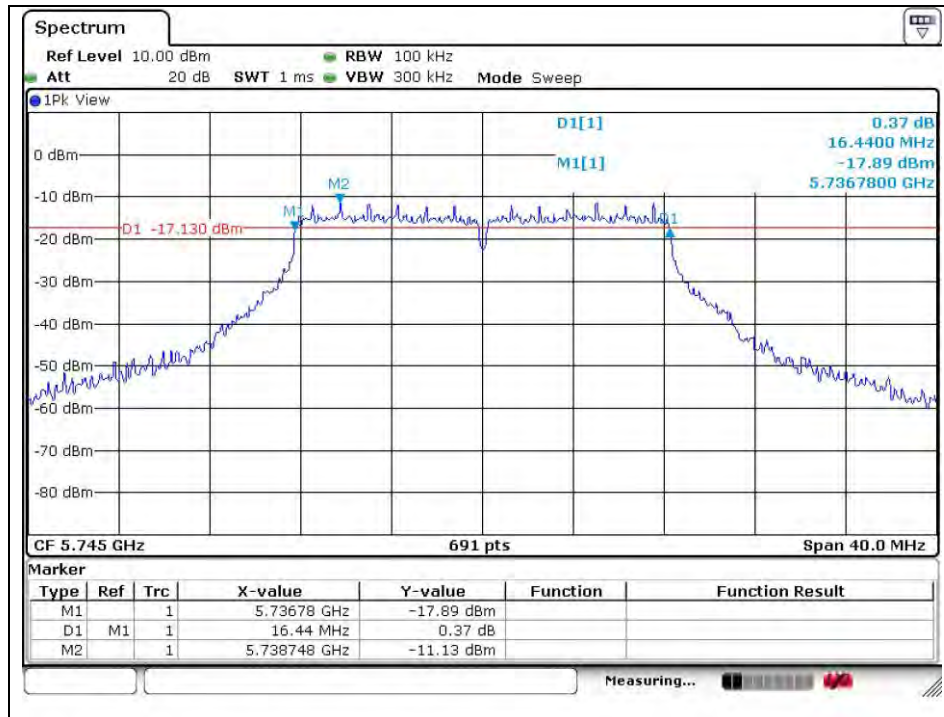
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

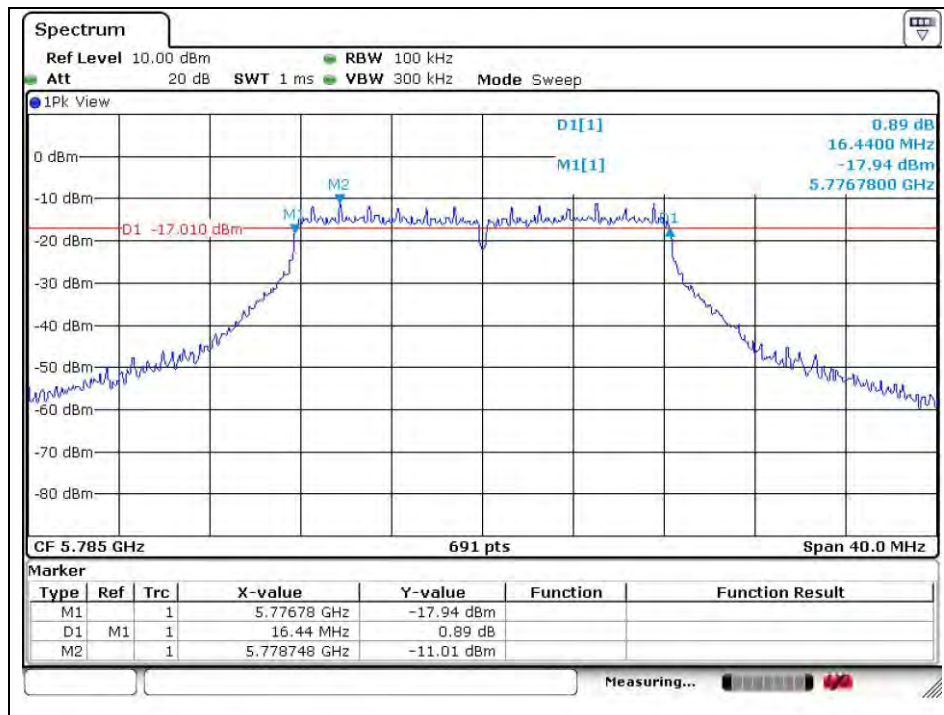
6 dB Bandwidth

802.11a (Band 3)

Low Channel (5 745 MHz)

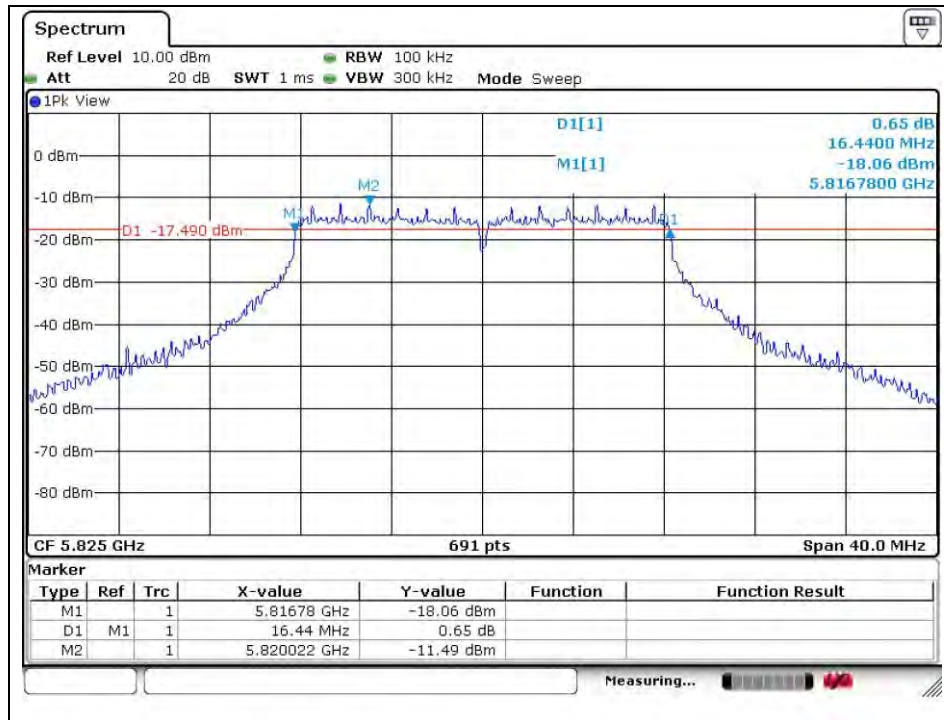


Middle Channel (5 785 MHz)



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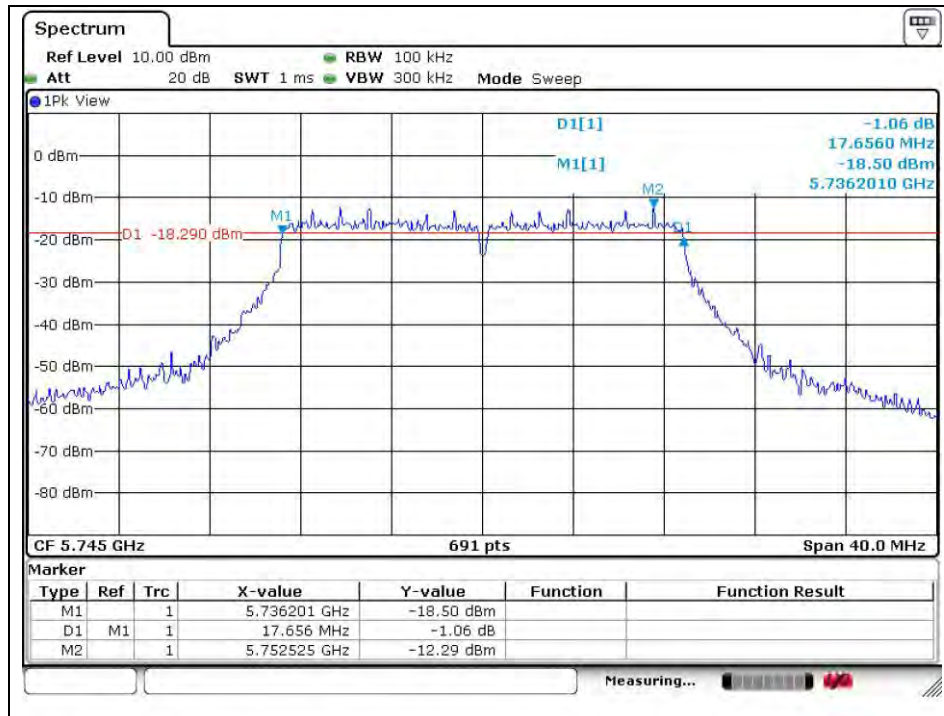
High Channel (5 825 MHz)



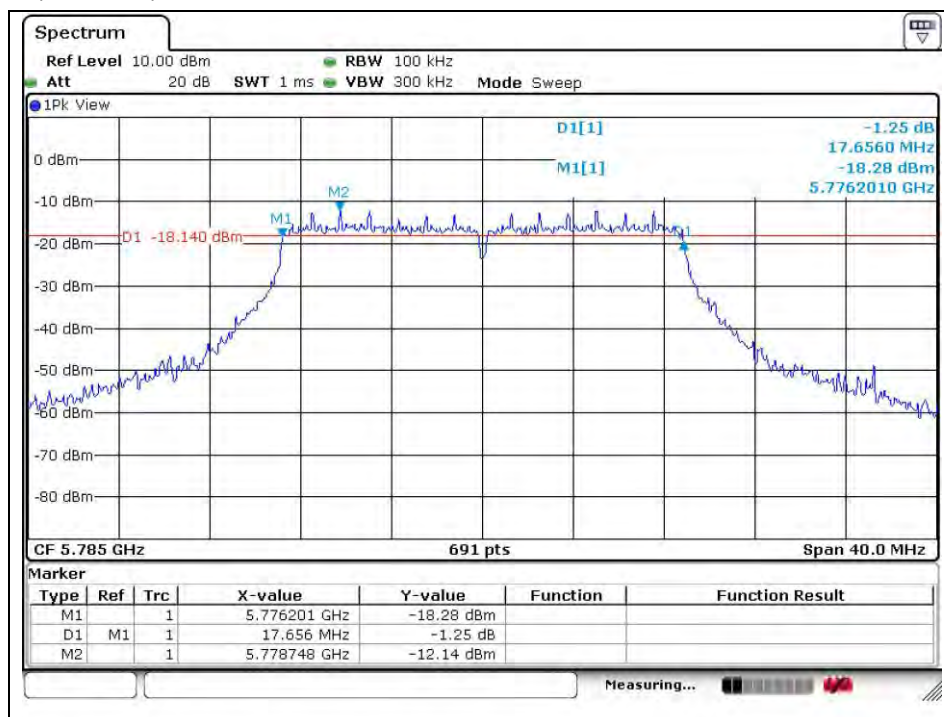
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802.11n_HT20 (Band 3)

Low Channel (5 745 MHz)

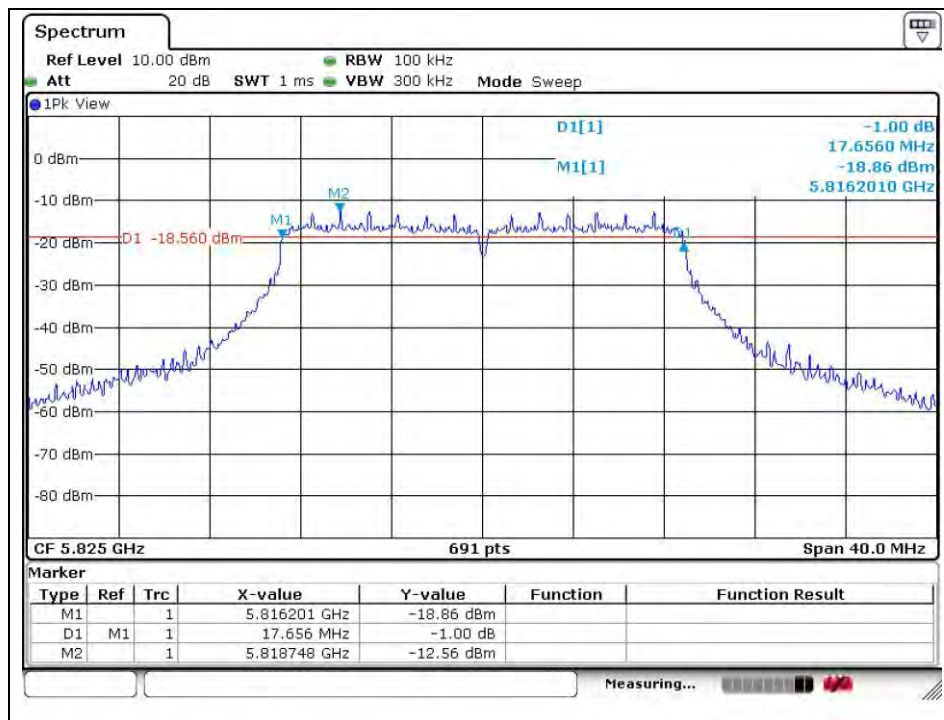


Middle Channel (5 785 MHz)



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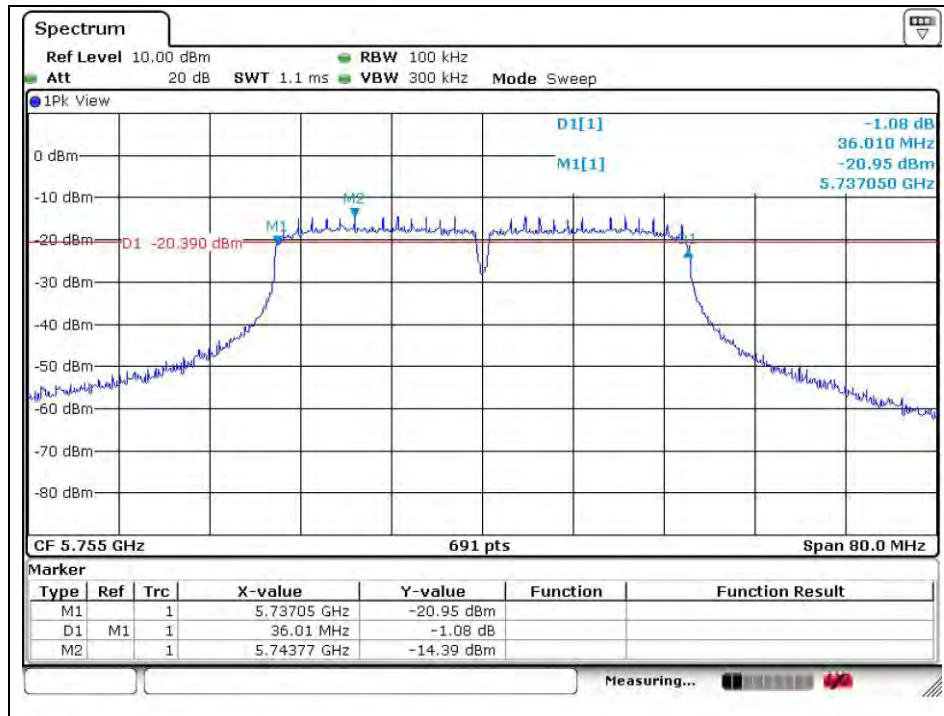
High Channel (5 825 MHz)



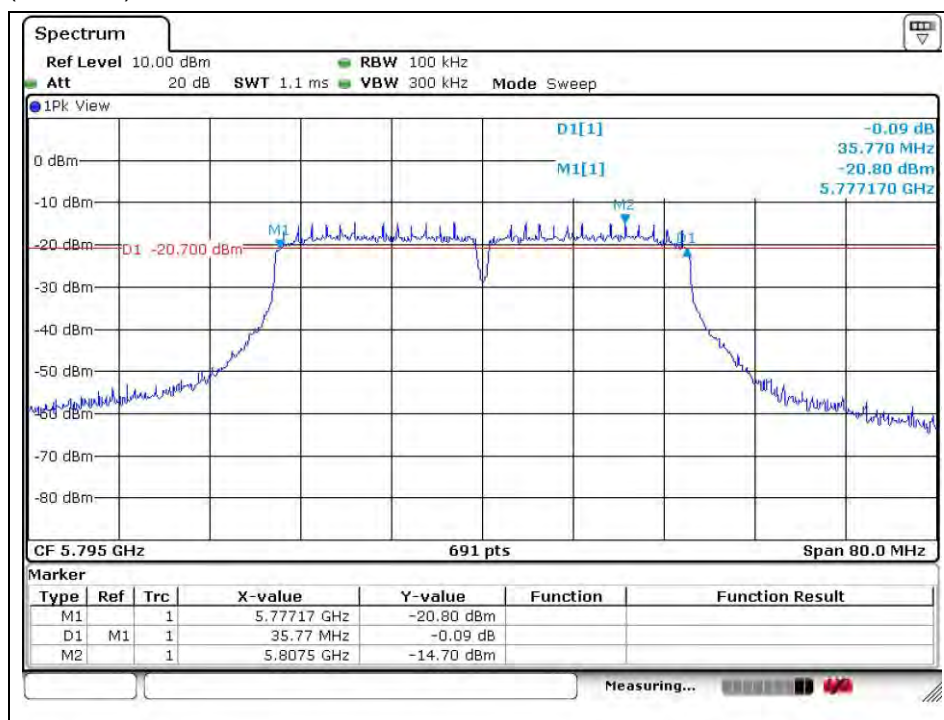
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802.11n_HT40 (Band 3)

Low Channel (5 755 MHz)



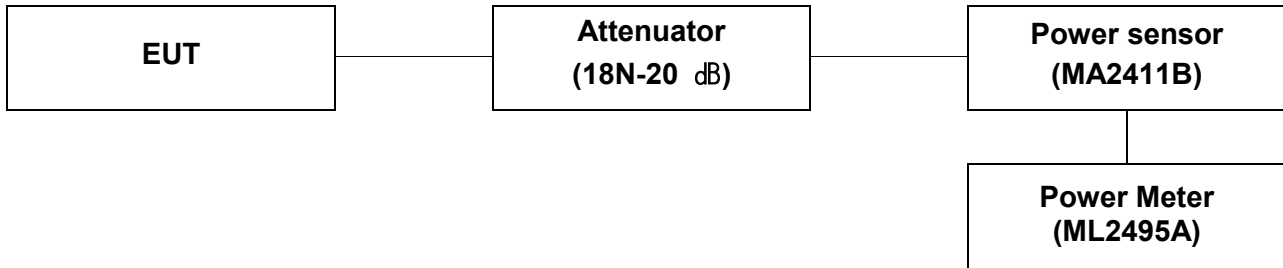
High Channel (5 795 MHz)



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5. Output power

5.1. Test setup



5.1.1. Actual equipment used for Output power

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Signal Generator	Agilent	E8257D	MY51501169	Jul. 17, 2014	Annual	Jul. 17, 2015
Power Meter	Anritsu	ML2495A	1223004	Jun. 10, 2014	Annual	Jun. 10, 2015
Power Sensor	Anritsu	MA2411B	1207272	Jun. 10, 2014	Annual	Jun. 10, 2015
Attenuator	AEROFLEX / INMET	18N-20 dB	2	Mar. 18, 2014	Annual	Mar. 18, 2015
DC Power Supply	Agilent	U8002A	MY49030063	Dec. 12, 2013	Annual	Dec. 12, 2014

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

5.2. Limit

5.2.1. FCC 15.407

(a)(1)(iv)

For mobile and portable client devices in the 5.15 - 5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dB i. In addition, the maximum power spectral density shall not exceed 11 dB m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dB i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB i.

(a)(2)

For the 5.25 - 5.35 GHz and 5.47 - 5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dB m $10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dB m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dB i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB i.

(a)(3)

For the band 5.725 - 5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dB m in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dB i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dB i without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

5.3. Test procedure

1. This measurement settings are specified in clause 3) a) of section E of KDB 789033 D02 New rules v01.
2. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.
 - The EUT is configured to transmit continuously or to transmit with a consistent duty cycle.
 - At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
 - The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
3. If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B).
4. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
5. Adjust the measurement in dB m by adding $10 \log (1/x)$ where x is the duty cycle (e.g., $10 \log (1/0.25)$ if the duty cycle is 25 percent).

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

5.4. Test result

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

- 11a

Band	Power	Frequency (MHz)	Conducted Power (dB m)							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
U-NII 1	Mea. average	5 180	11.85	11.68	11.61	11.28	11.15	10.70	10.50	10.35
	Result		12.07	12.04	12.07	11.94	11.91	11.89	11.87	11.84
	Mea. average	5 220	12.76	12.61	12.49	12.27	12.14	11.66	11.42	11.27
	Result		12.98	12.97	12.95	12.93	12.90	12.85	12.79	12.76
	Mea. average	5 240	11.90	11.74	11.61	11.40	11.25	10.80	10.53	10.39
	Result		12.12	12.10	12.07	12.06	12.01	11.99	11.90	11.88
U-NII 2A	Mea. average	5 260	11.66	11.51	11.39	11.11	11.00	10.55	10.30	10.17
	Result		11.88	11.87	11.85	11.77	11.76	11.74	11.67	11.66
	Mea. average	5 300	12.33	12.18	12.05	11.84	11.72	11.27	11.07	10.94
	Result		12.55	12.54	12.51	12.50	12.48	12.46	12.44	12.43
	Mea. average	5 320	11.48	11.30	11.19	10.96	10.85	10.40	10.17	10.03
	Result		11.70	11.66	11.65	11.62	11.61	11.59	11.54	11.52
U-NII 2C	Mea. average	5 500	11.57	11.42	11.30	11.07	10.94	10.50	10.26	10.10
	Result		11.79	11.78	11.76	11.73	11.70	11.69	11.63	11.59
	Mea. average	5 580	11.16	10.99	10.87	10.64	10.56	10.11	9.92	9.79
	Result		11.38	11.35	11.33	11.30	11.32	11.30	11.29	11.28
	Mea. average	5 700	11.91	11.74	11.64	11.41	11.29	10.85	10.60	10.45
	Result		12.13	12.10	12.10	12.07	12.05	12.04	11.97	11.94
U-NII 3	Mea. average	5 745	11.86	11.71	11.59	11.36	11.21	10.78	10.57	10.45
	Result		12.08	12.07	12.05	12.02	11.97	11.97	11.94	11.94
	Mea. average	5 785	12.11	11.96	11.84	11.62	11.50	11.05	10.82	10.62
	Result		12.33	12.32	12.30	12.28	12.26	12.24	12.19	12.11
	Mea. average	5 825	11.97	11.82	11.70	11.49	11.38	10.94	10.76	10.63
	Result		12.19	12.18	12.16	12.15	12.14	12.13	12.13	12.12

Band	Conducted Power Limit (dB m)					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB)
U-NII 1	5 180	24				
	5 220	24				
	5 240	24				
U-NII 2A	5 260	24	22.10	24.44	-0.32	24
	5 300	24	21.86	24.40	-0.32	24
	5 320	24	21.85	24.39	-0.32	24
U-NII 2C	5 500	24	21.54	24.33	-0.24	24
	5 580	24	21.68	24.36	-0.24	24
	5 700	24	21.46	24.32	-0.24	24
U-NII 3	5 745	30				
	5 785	30				
	5 825	30				

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Mode	Duty cycle							
	Data Rate [Mbps]							
11a	6	9	12	18	24	36	48	54
Duty Cycle (%)	95	92	90	86	84	76	73	71
Correction factor (dB)	0.22	0.36	0.46	0.66	0.76	1.19	1.37	1.49

Remark:

1. Result (dB m) = Average (dB m) + Correction factor (dB)
2. Duty cycle (%) = (Tx on time / (Tx on + off time)) x 100
3. Correction factor (dB) = 10 log (1/duty cycle)

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- 11n_HT20

Band	Power	Frequency (MHz)	Conducted Power (dB m)							
			Data Rate [MCS]							
			0	1	2	3	4	5	6	7
U-NII 1	Mea. average	5 180	10.71	10.50	10.30	10.14	9.79	9.48	9.35	9.22
	Result		10.98	10.96	10.96	10.95	10.93	10.91	10.90	10.89
	Mea. average	5 220	11.63	11.43	11.22	11.05	10.72	10.38	10.23	9.98
	Result		11.90	11.89	11.88	11.86	11.86	11.81	11.78	11.65
	Mea. average	5 240	10.73	10.52	10.31	10.15	9.80	9.44	9.25	9.07
	Result		11.00	10.98	10.97	10.96	10.94	10.87	10.80	10.74
U-NII 2A	Mea. average	5 260	10.67	10.47	10.24	10.08	9.71	9.39	9.22	9.04
	Result		10.94	10.93	10.90	10.89	10.85	10.82	10.77	10.71
	Mea. average	5 300	11.36	11.13	10.91	10.75	10.40	10.04	9.89	9.76
	Result		11.63	11.59	11.57	11.56	11.54	11.47	11.44	11.43
	Mea. average	5 320	10.61	10.39	10.18	10.03	9.69	9.38	9.28	9.05
	Result		10.88	10.85	140.84	10.84	10.83	10.81	10.83	10.72
U-NII 2C	Mea. average	5 500	10.89	10.69	10.47	10.30	9.87	9.54	9.36	9.16
	Result		11.16	11.15	11.13	11.11	11.01	10.97	10.91	10.83
	Mea. average	5 580	10.60	10.39	10.18	10.02	9.67	9.37	9.20	8.97
	Result		10.87	10.85	10.84	10.83	10.81	10.80	10.75	10.64
	Mea. average	5 700	10.95	10.73	10.51	10.35	9.98	9.65	9.45	9.31
	Result		11.22	11.19	11.17	11.16	11.12	11.08	11.00	10.98
U-NII 3	Mea. average	5 745	11.09	10.87	10.65	10.46	10.10	9.77	9.60	9.40
	Result		11.36	11.33	11.31	11.27	11.24	11.20	11.15	11.07
	Mea. average	5 785	10.85	10.65	10.45	10.29	9.96	9.67	9.54	9.42
	Result		11.12	11.11	11.11	11.10	11.10	11.10	11.09	11.09
	Mea. average	5 825	11.16	10.94	10.73	10.58	10.23	9.85	9.70	9.56
	Result		11.43	11.40	11.39	11.39	11.37	11.28	11.25	11.23

Band	Conducted Power Limit (dB m)					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB)
U-NII 1	5 180	24				
	5 220	24				
	5 240	24				
U-NII 2A	5 260	24	22.53	24.53	-0.32	24
	5 300	24	21.94	24.41	-0.32	24
	5 320	24	22.12	24.45	-0.32	24
U-NII 2C	5 500	24	22.57	24.54	-0.24	24
	5 580	24	22.15	24.45	-0.24	24
	5 700	24	22.04	24.43	-0.24	24
U-NII 3	5 745	30				
	5 785	30				
	5 825	30				

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Mode	Duty cycle							
	Data Rate [MCS]							
11an_HT20	0	1	2	3	4	5	6	7
Duty Cycle (%)	94	90	86	83	77	72	70	68
Correction factor (dB)	0.27	0.46	0.66	0.81	1.14	1.43	1.55	1.67

Remark:

1. Result (dB m) = Average (dB m) + Correction factor (dB)
2. Duty cycle (%) = (Tx on time / (Tx on + off time)) x 100
3. Correction factor (dB) = 10 log (1/duty cycle)

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- 11n_HT40

Band	Power	Frequency (MHz)	Conducted Power (dB m)							
			Data Rate [MCS]							
			0	1	2	3	4	5	6	7
U-NII 1	Mea. average	5 190	11.20	10.78	10.44	10.12	9.66	9.22	8.90	8.87
	Result		11.66	11.64	11.63	11.61	11.60	11.59	11.50	11.47
	Mea. average	5 230	11.31	10.89	10.53	10.19	9.71	9.26	9.00	8.93
	Result		11.77	11.75	11.72	11.68	11.65	11.63	11.60	11.53
U-NII 2A	Mea. average	5 270	10.96	10.54	10.19	9.87	9.40	8.96	8.69	8.64
	Result		11.42	11.40	11.38	11.36	11.34	11.33	11.29	11.24
	Mea. average	5 310	11.11	10.68	10.33	10.02	9.51	9.05	8.80	8.78
	Result		11.57	11.54	11.52	11.51	11.45	11.42	11.40	11.38
U-NII 2C	Mea. average	5 510	10.71	10.30	9.95	9.60	9.11	8.60	8.25	8.12
	Result		11.17	11.16	11.14	11.09	11.05	10.97	10.85	10.72
	Mea. average	5 550	11.01	10.59	10.23	9.91	9.44	9.00	8.70	8.65
	Result		11.47	11.45	11.42	11.40	11.38	11.37	11.30	11.25
	Mea. average	5 670	11.10	10.66	10.30	9.98	9.49	9.04	8.77	8.52
	Result		11.56	11.52	11.49	11.47	11.43	11.41	11.37	11.12
U-NII 3	Mea. average	5 755	10.83	10.42	10.07	9.74	9.27	8.82	8.44	8.39
	Result		11.29	11.28	11.26	11.23	11.21	11.19	11.04	10.99
	Mea. average	5 795	11.07	10.65	10.31	9.97	9.52	9.03	8.62	8.50
	Result		11.53	11.51	11.50	11.46	11.46	11.4	11.22	11.10

Band	Conducted Power Limit (dB m)					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB)
U-NII 1	5 190	24				
	5 230	24				
U-NII 2A	5 270	24	42.69	27.30	-0.32	24
	5 310	24	43.37	27.37	-0.32	24
U-NII 2C	5 510	24	43.40	27.37	-0.24	24
	5 550	24	42.97	27.33	-0.24	24
	5 670	24	43.15	27.35	-0.24	24
U-NII 3	5 755	30				
	5 795	30				

Mode	Duty cycle							
	Data Rate [MCS]							
11an_HT40	0	1	2	3	4	5	6	7
Duty Cycle (%)	90	82	76	71	64	58	55	55
Correction factor (dB)	0.46	0.86	1.19	1.49	1.94	2.37	2.60	2.60

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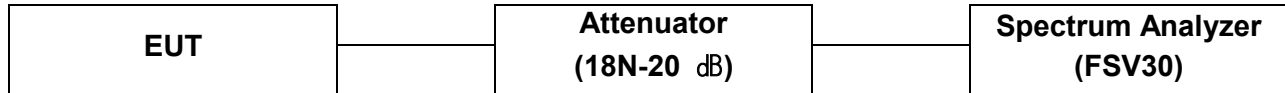
Remark:

1. Result (dB m) = Average (dB m) + Correction factor (dB)
2. Duty cycle (%) = (Tx on time / (Tx on + off time)) x 100
3. Correction factor (dB) = 10 log (1/duty cycle)

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

6. Peak power spectral density

6.1. Test setup



6.1.1. Actual equipment used for Peak power spectral density

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Signal Generator	Agilent	E8257D	MY51501169	Jul. 17, 2014	Annual	Jul. 17, 2015
Spectrum Analyzer	R&S	FSV30	100768	Mar. 27, 2014	Annual	Mar. 27, 2015
Attenuator	AEROFLEX / INMET	18N-20 dB	2	Mar. 18, 2014	Annual	Mar. 18, 2015
DC Power Supply	Agilent	U8002A	MY49030063	Dec. 12, 2013	Annual	Dec. 12, 2014

6.2. Limit

6.2.1. FCC 15.407

(a)(1)(iv)

For mobile and portable client devices in the 5.15 - 5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dB i. In addition, the maximum power spectral density shall not exceed 11 dB m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dB i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB i.

(a)(2)

For the 5.25 - 5.35 GHz and 5.47 - 5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dB m 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dB m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dB i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB i.

(a)(3)

For the band 5.725 - 5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dB m in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dB i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dB i without any

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corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

6.3. Test procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

1. This measurement settings are specified in clause d) Method SA-2 of section E of KDB 789033_New rules v01.
2. Measure the duty cycle, x , of the transmitter output signal as described in section B).
3. Set span to encompass the 26 dB EBW (or, alternatively, the entire 99 % occupied bandwidth) of the signal.
4. Set RBW = 1 MHz
5. Set VBW $\geq$ 3 MHz
6. Number of points in sweep $\geq$ 2 Span / RBW. (This ensures that bin-to-bin spacing is $\leq$ RBW/2, so that narrowband signals are not lost between frequency bins.)
7. Sweep time = auto.
8. Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
9. Do not use sweep triggering. Allow the sweep to "free run".
10. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
11. Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
12. The result is the PPSPD.

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6.4. Test result

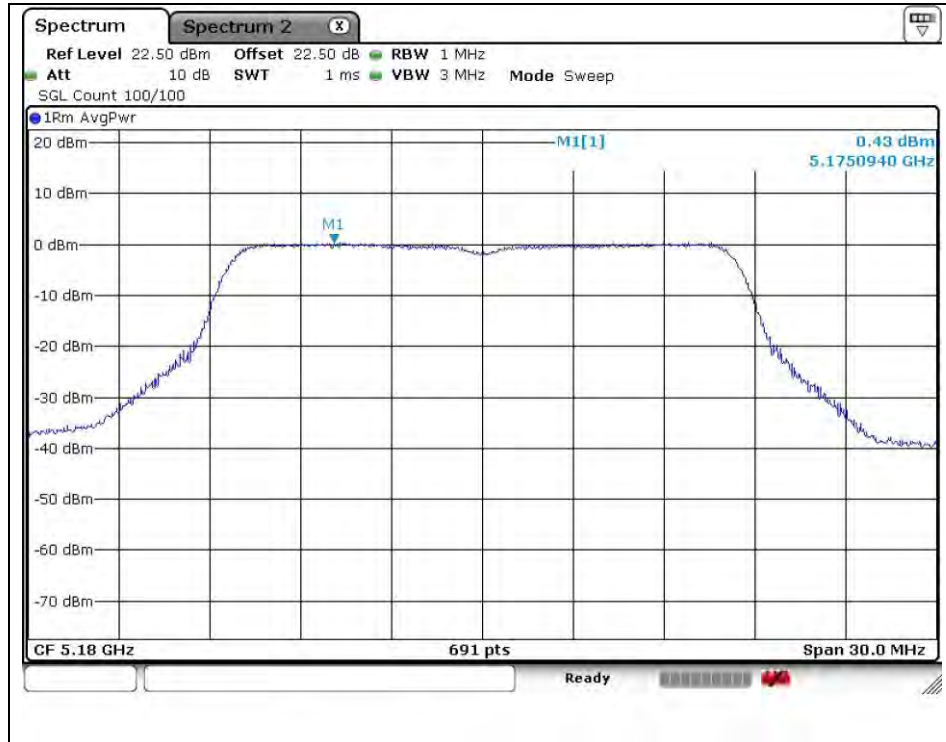
Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

Band	Mode	Frequency (MHz)	Ch.	Data Rate	Measured PPSD (dB m)	Duty Factor (dB)	Final PPSD (dB m)	Limit (dB m/MHz)
U-NII 1	11a	5 180	36	6	0.43	0.22	0.65	4
		5 220	44	6	0.75	0.22	0.97	4
		5 240	48	6	0.60	0.22	0.82	4
	11n_HT20	5 180	36	MCS0	-0.84	0.27	-0.57	4
		5 220	44	MCS0	-0.33	0.27	-0.06	4
		5 240	48	MCS0	-0.73	0.27	-0.46	4
	11n_HT40	5 190	38	MCS0	-3.25	0.46	-2.79	4
		5 230	46	MCS0	-3.03	0.46	-2.57	4
U-NII 2A	11a	5 260	52	6	0.66	0.22	0.88	11
		5 300	60	6	1.05	0.22	1.27	11
		5 320	64	6	0.50	0.22	0.72	11
	11n_HT20	5 260	52	MCS0	-0.77	0.27	-0.50	11
		5 300	60	MCS0	-0.33	0.27	-0.06	11
		5 320	64	MCS0	-0.77	0.27	-0.50	11
	11n_HT40	5 270	54	MCS0	-3.07	0.46	-2.61	11
		5 310	62	MCS0	-3.13	0.46	-2.67	11
U-NII 2C	11a	5 500	100	6	0.31	0.22	0.53	11
		5 580	116	6	-0.04	0.22	0.18	11
		5 700	140	6	0.68	0.22	0.90	11
	11n_HT20	5 500	100	MCS0	-0.50	0.27	-0.23	11
		5 580	116	MCS0	-0.86	0.27	-0.59	11
		5 700	140	MCS0	-0.44	0.27	-0.17	11
	11n_HT40	5 510	102	MCS0	-3.67	0.46	-3.21	11
		5 550	110	MCS0	-3.45	0.46	-2.99	11
U-NII 3	11a	5 670	134	MCS0	-3.02	0.46	-2.56	11
	11a	5 745	149	6	0.72	0.22	0.94	17
		5 785	157	6	0.50	0.22	0.72	17
		5 825	165	6	0.54	0.22	0.76	17
	11n_HT20	5 745	149	MCS0	-0.32	0.27	-0.05	17
		5 785	157	MCS0	-0.84	0.27	-0.57	17
		5 825	165	MCS0	-0.62	0.27	-0.35	17
	11n_HT40	5 755	151	MCS0	-3.07	0.46	-2.61	17
		5 795	159	MCS0	-3.06	0.46	-2.60	17

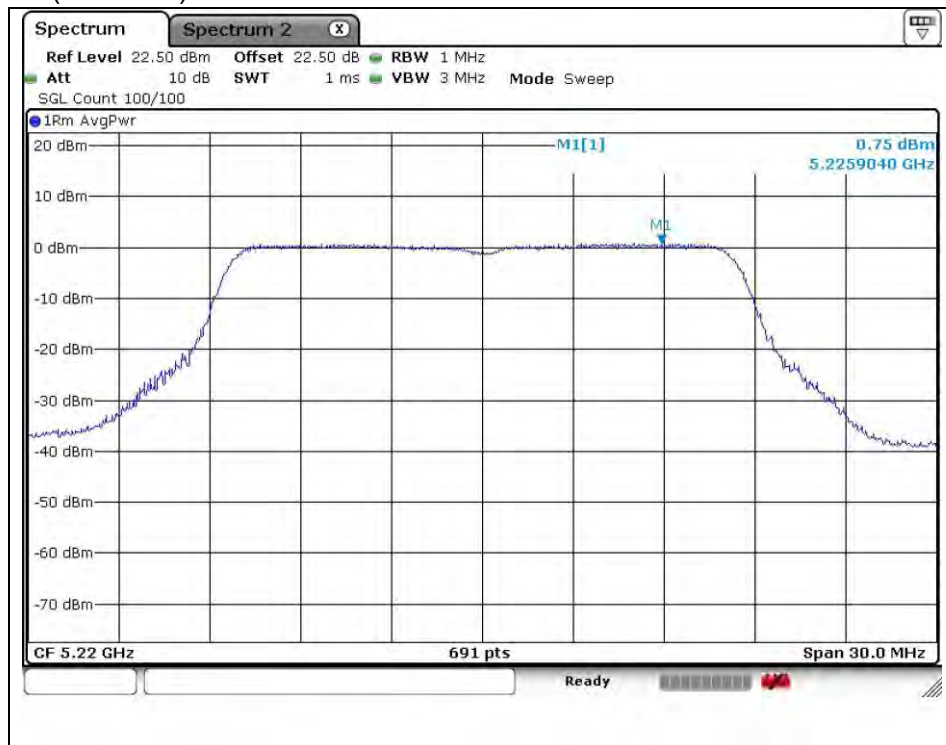
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802.11a (Band 1)

Low Channel (5 180 MHz)

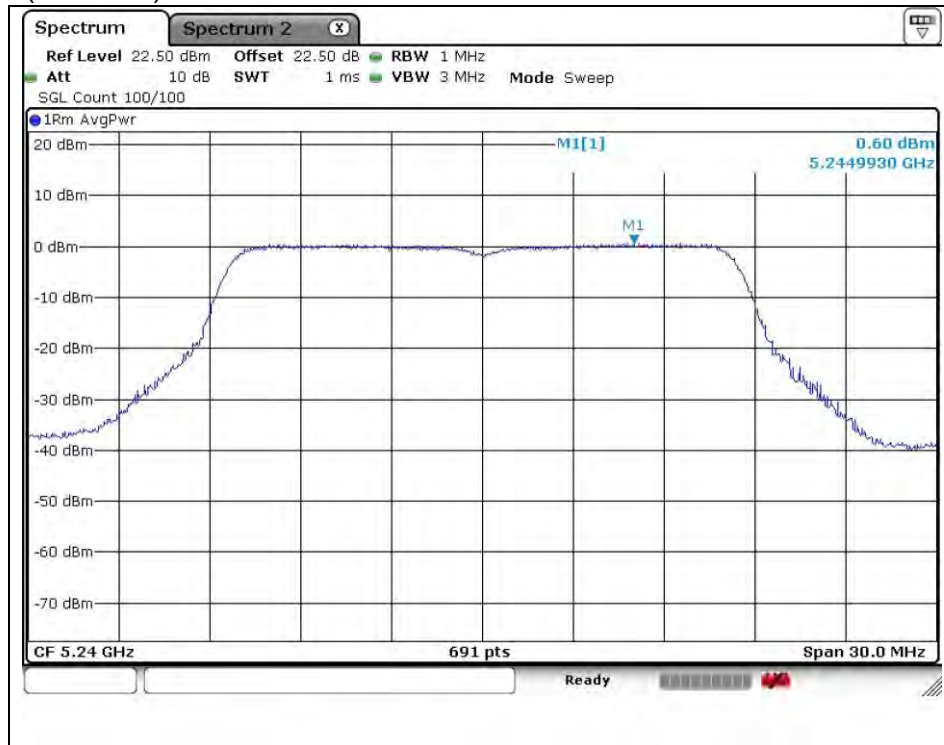


Middle Channel (5 220 MHz)



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High Channel (5 240 MHz)



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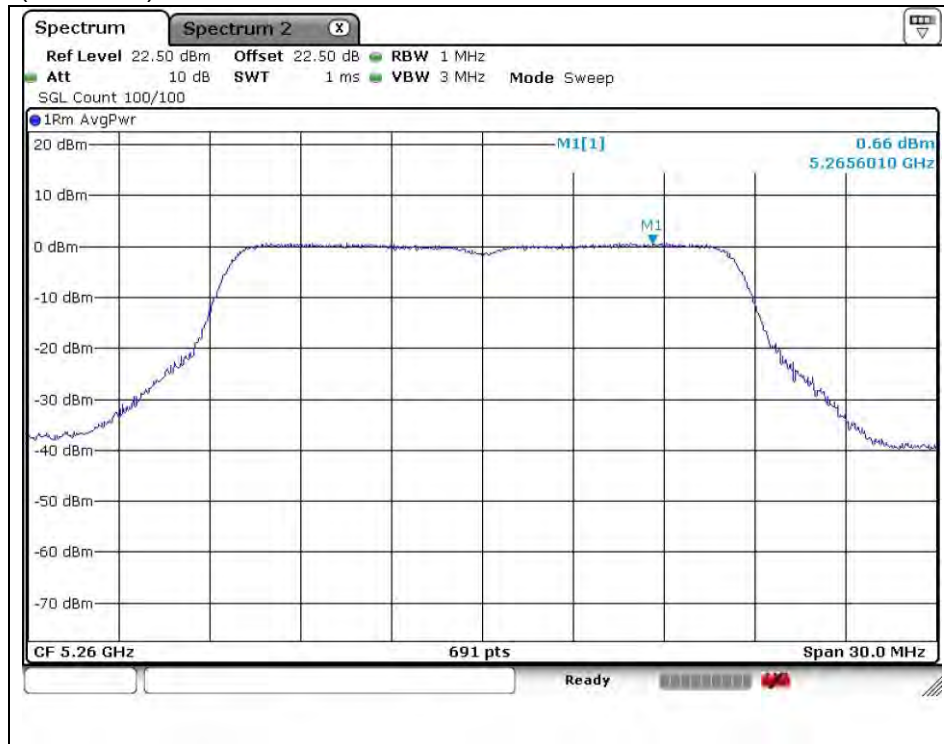
RTT5041-20(2014.01.20)(2)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

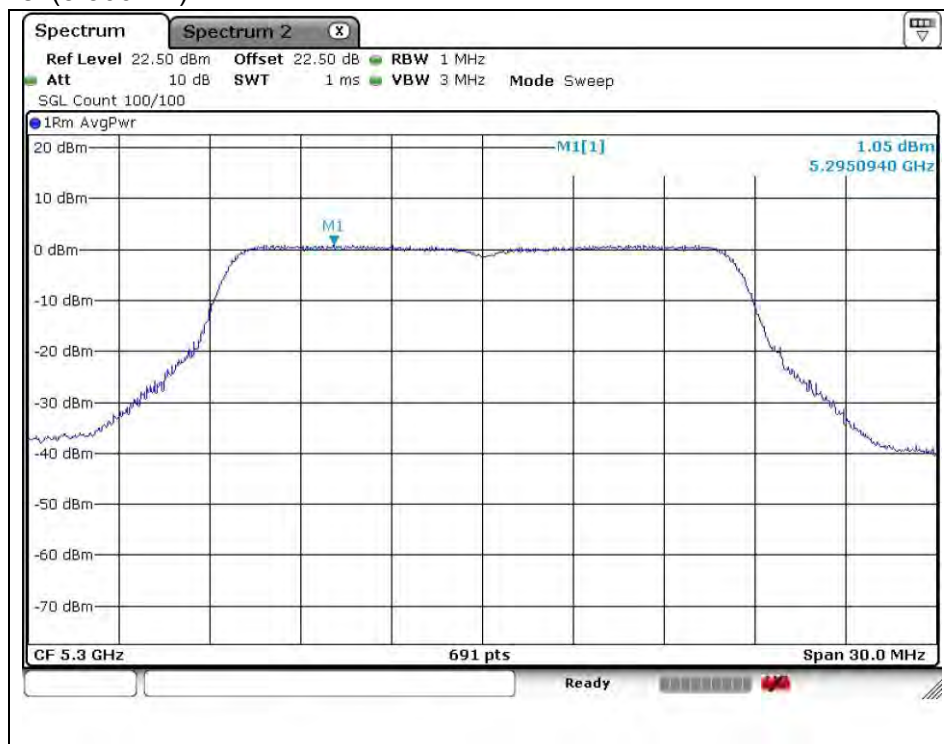
A4(210 mm x 297 mm)

802.11a (Band 2A)

Low Channel (5 260 MHz)

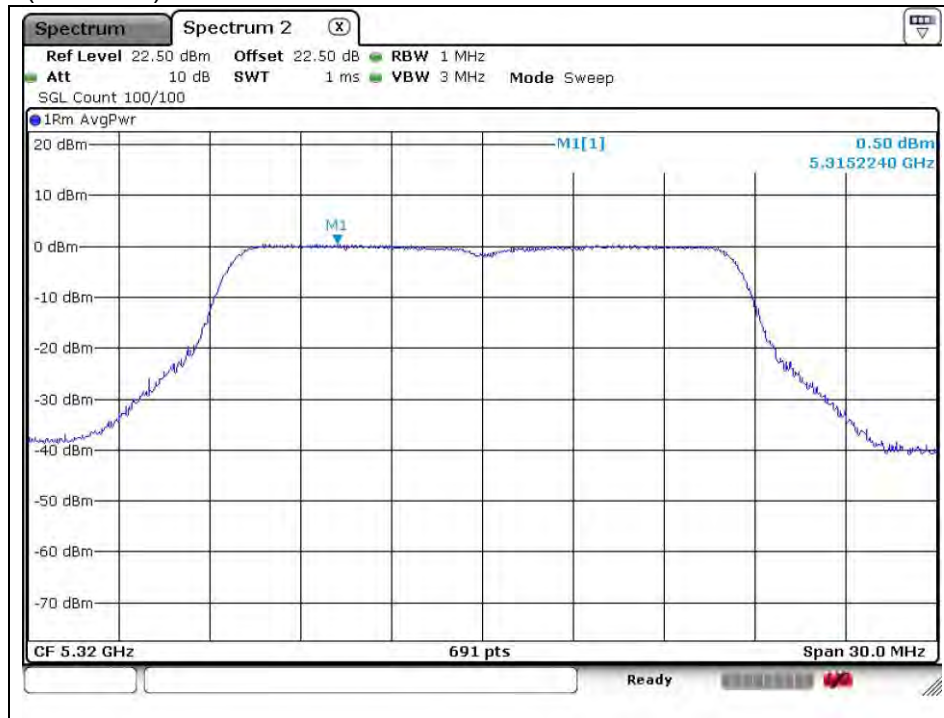


Middle Channel (5 300 MHz)



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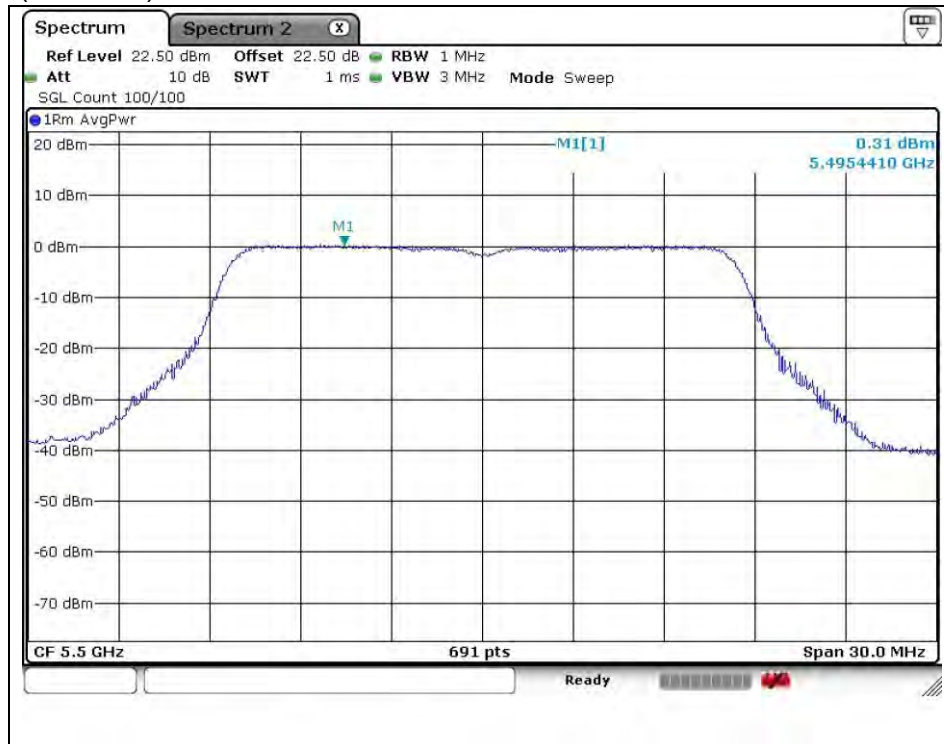
High Channel (5 320 MHz)



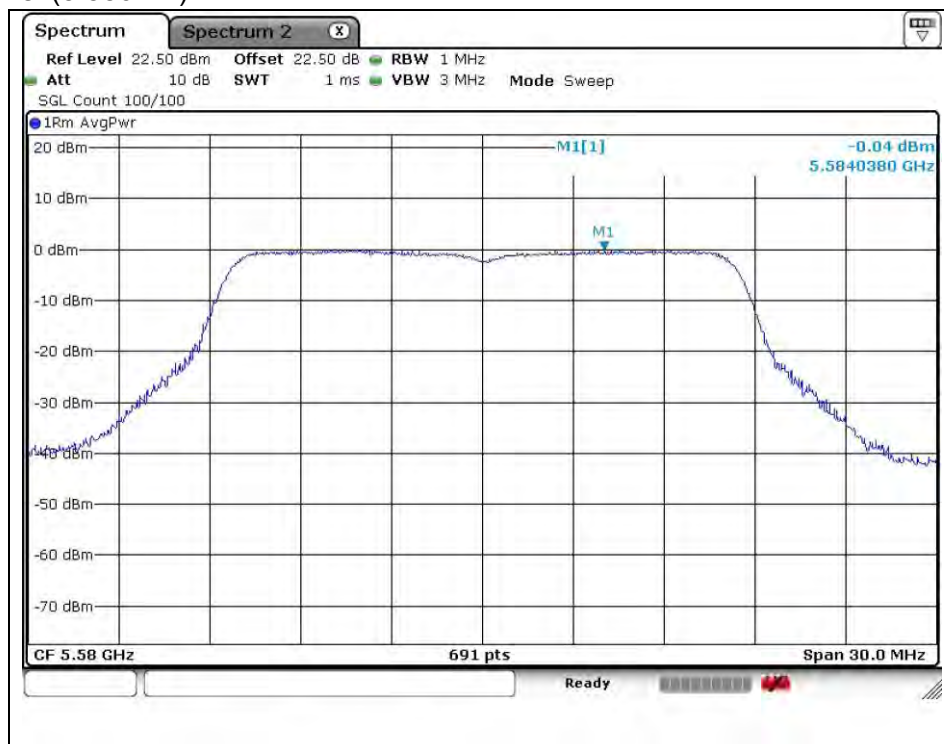
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802.11a (Band 2C)

Low Channel (5 500 MHz)

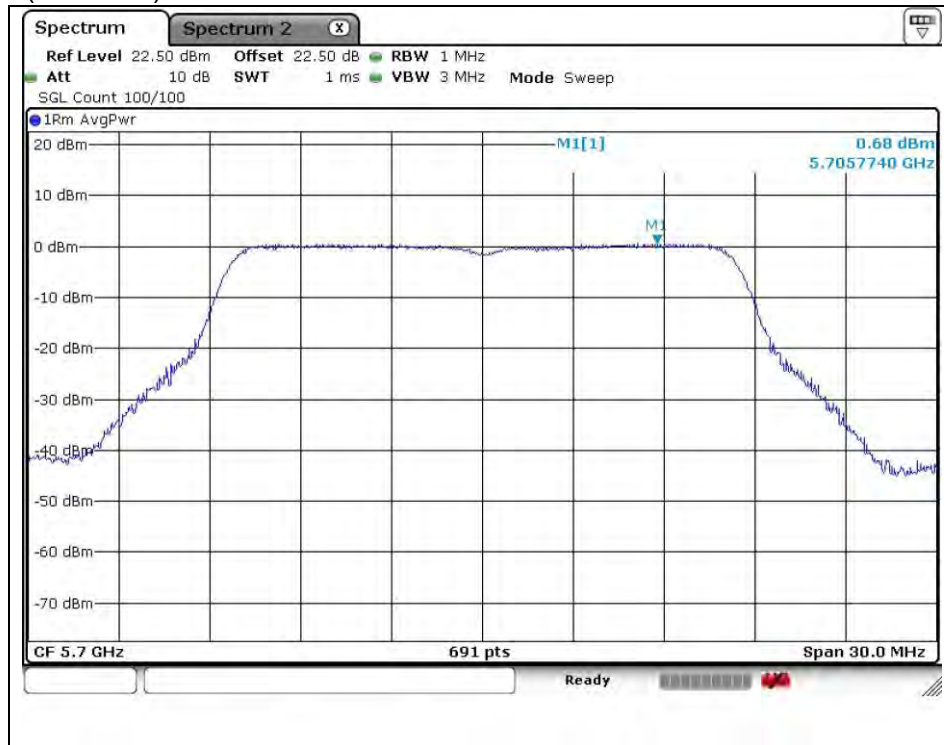


Middle Channel (5 580 MHz)



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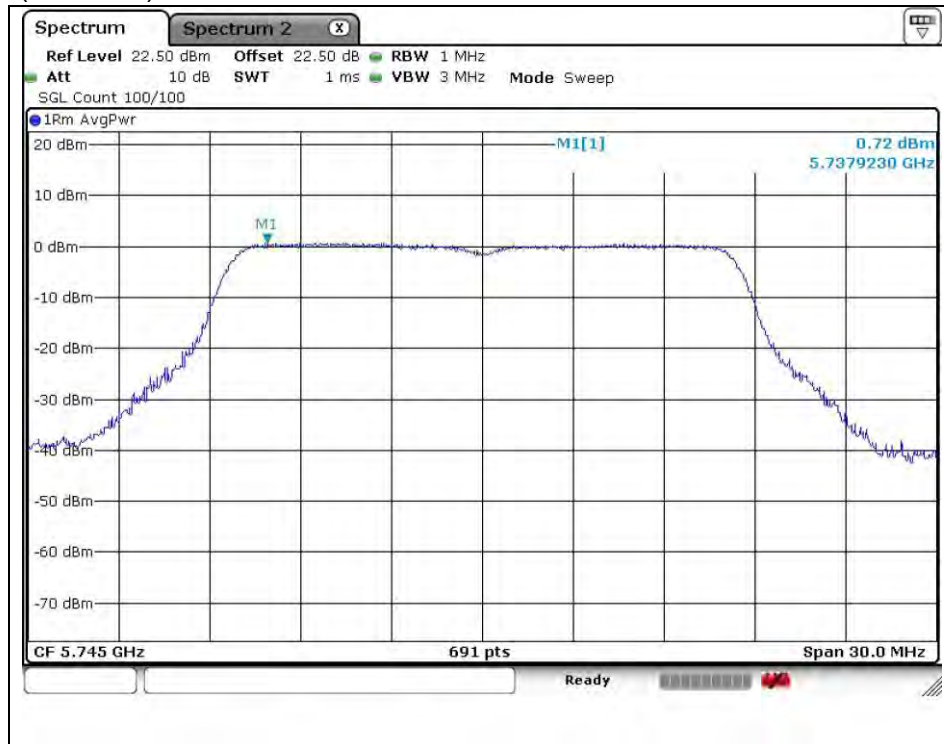
High Channel (5 700 MHz)



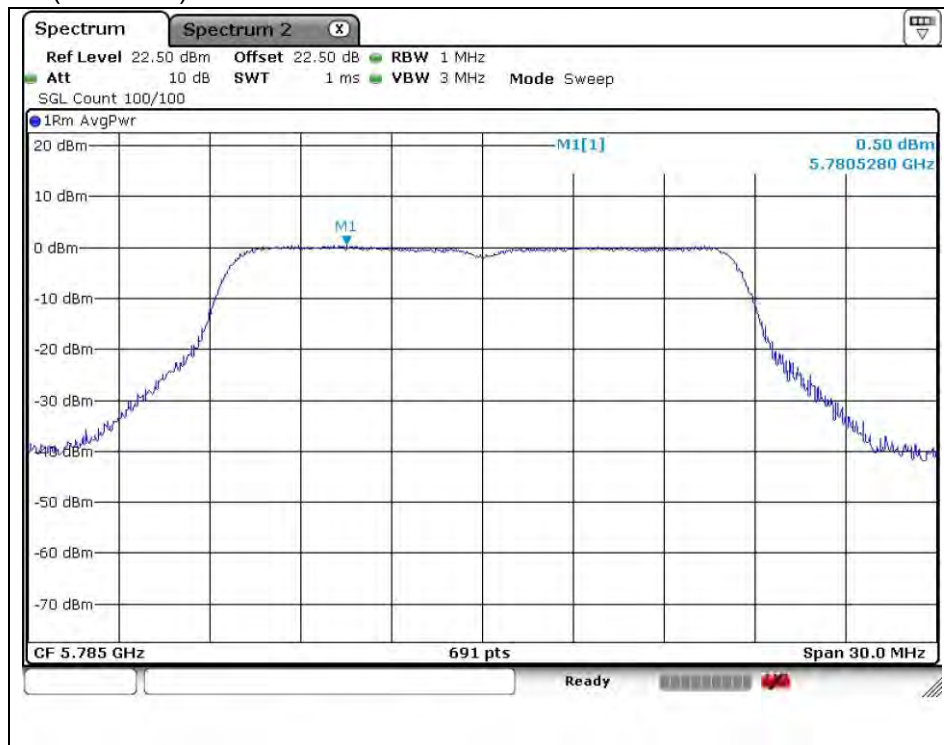
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802.11a (Band 3)

Low Channel (5 745 MHz)

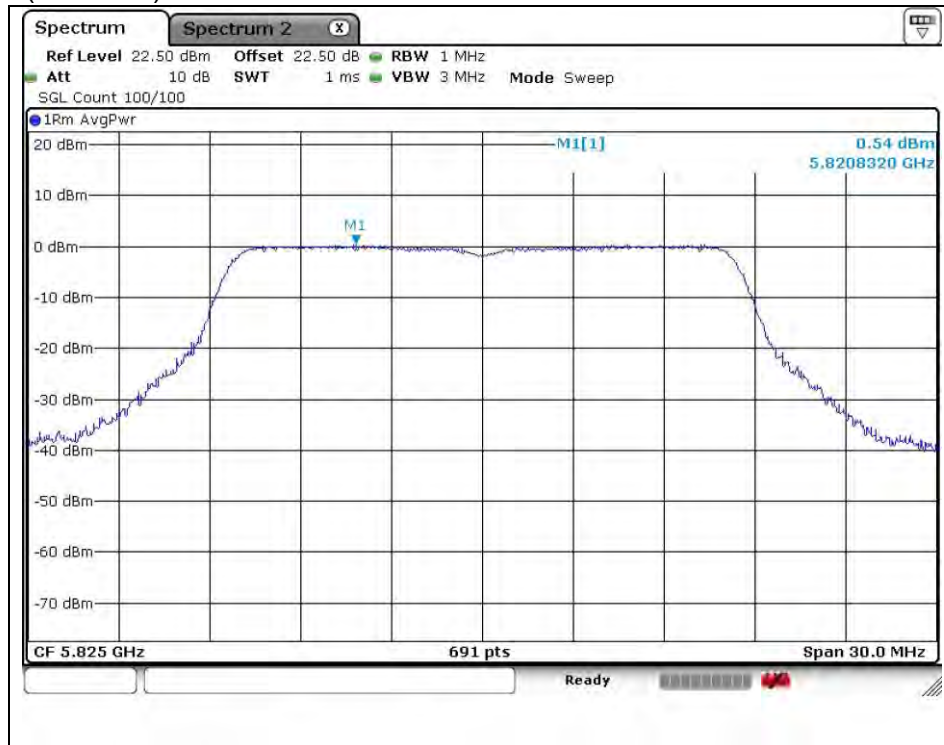


Middle Channel (5 785 MHz)



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High Channel (5 825 MHz)



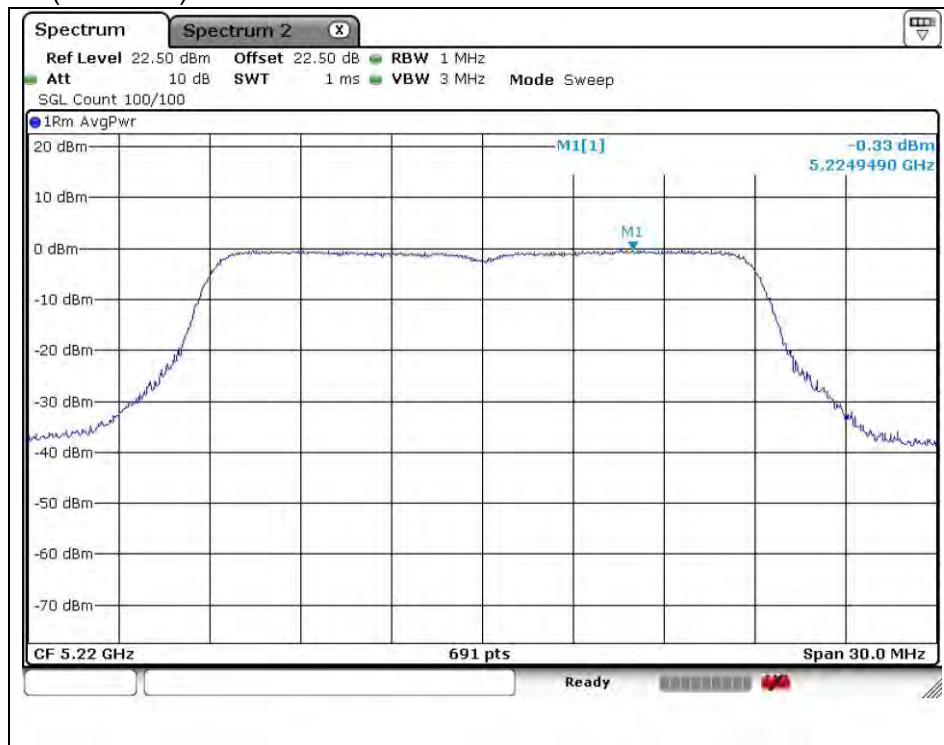
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

802.11n_HT20 (Band 1)

Low Channel (5 180 MHz)

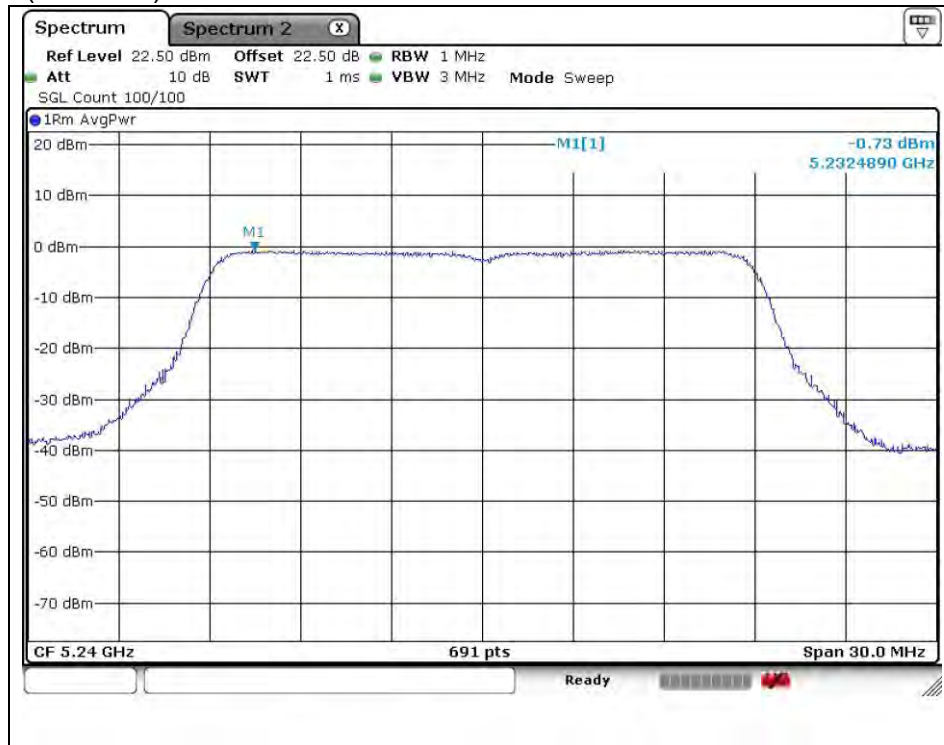


Middle Channel (5 220 MHz)



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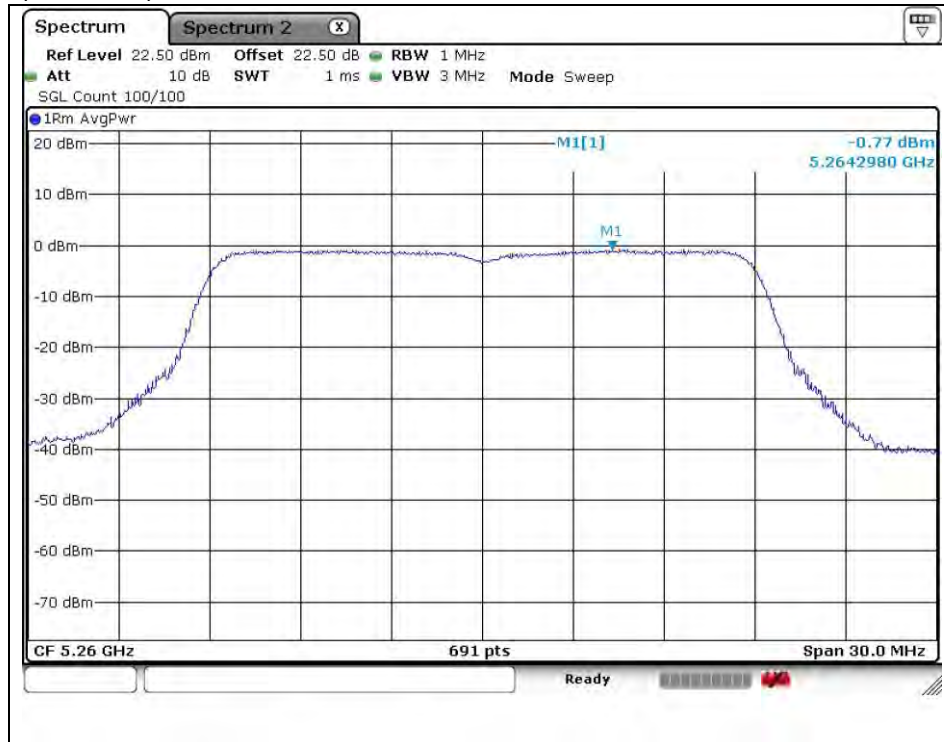
High Channel (5 240 MHz)



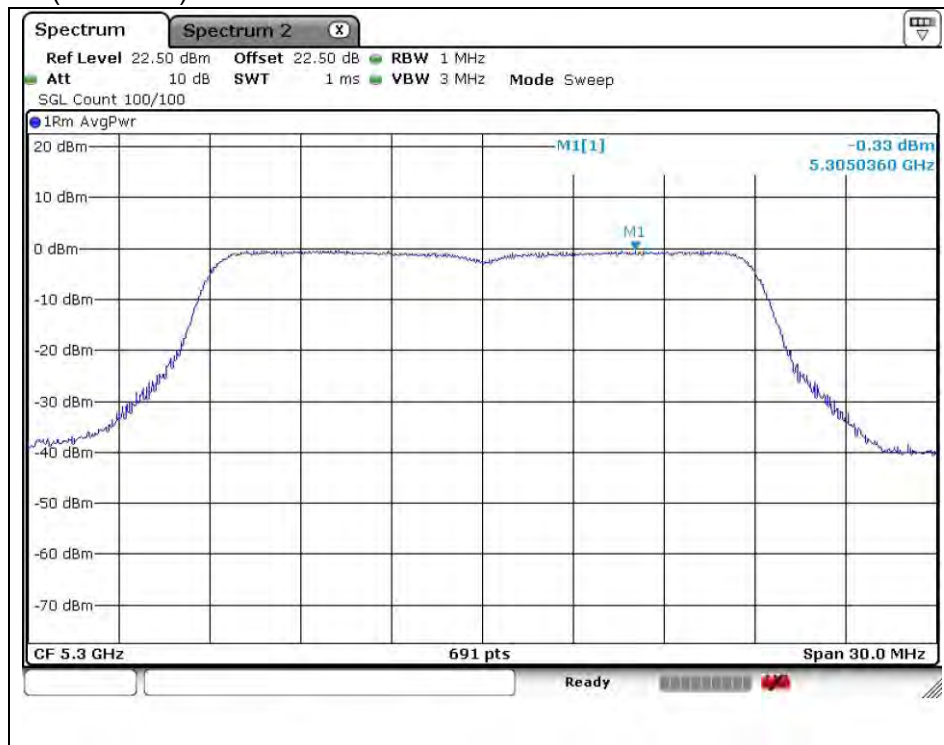
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802.11n_HT20 (Band 2A)

Low Channel (5 260 MHz)



Middle Channel (5 300 MHz)



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High Channel (5 320 MHz)



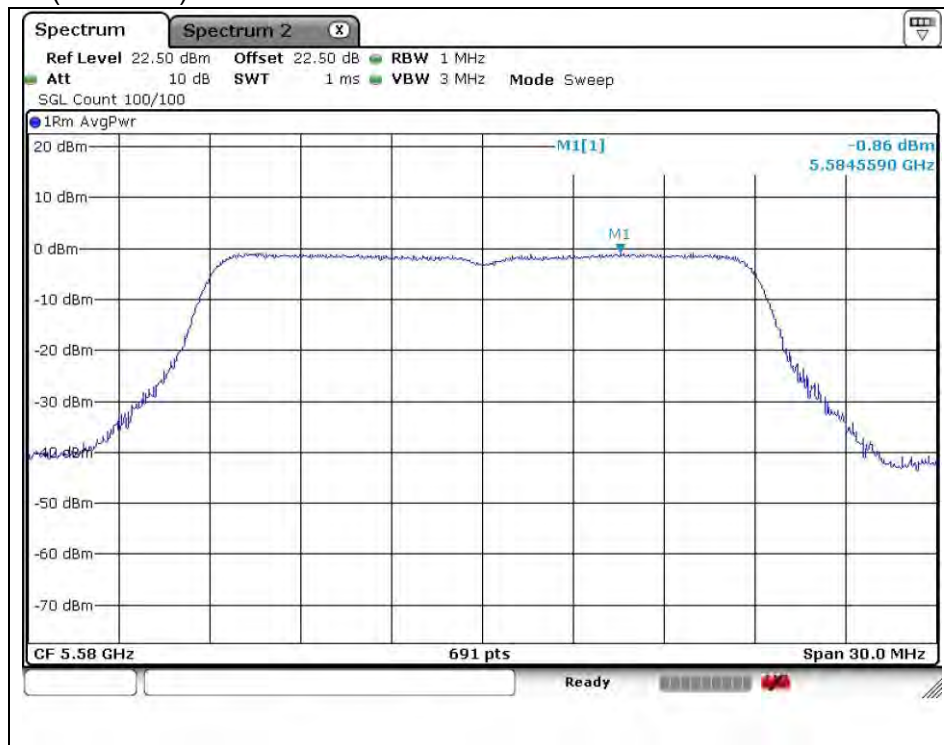
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802.11n_HT20 (Band 2C)

Low Channel (5 500 MHz)

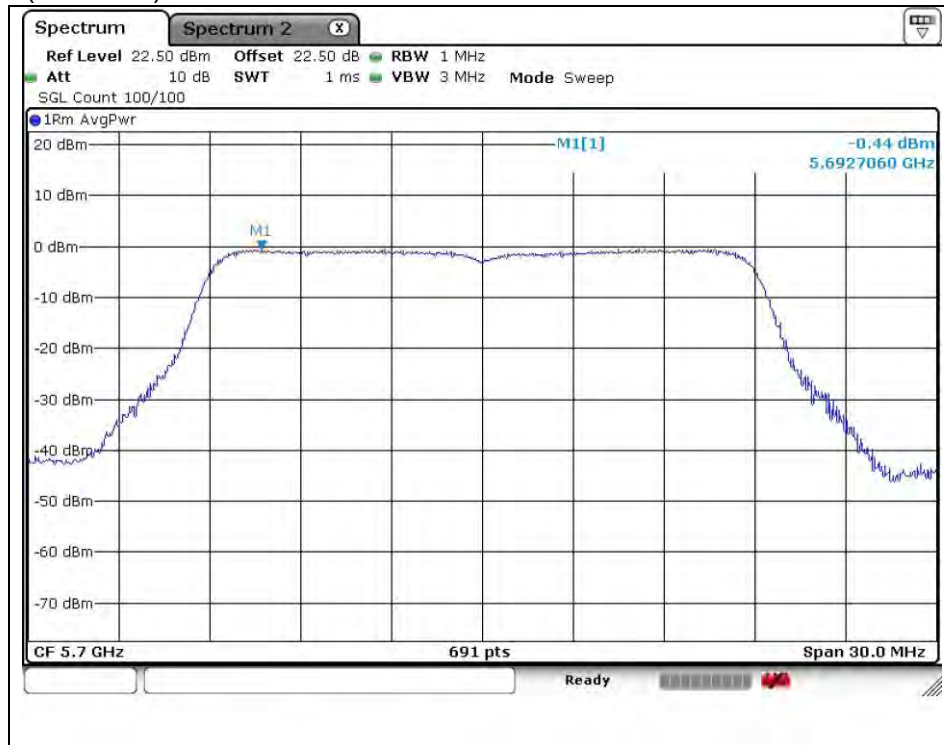


Middle Channel (5 580 MHz)



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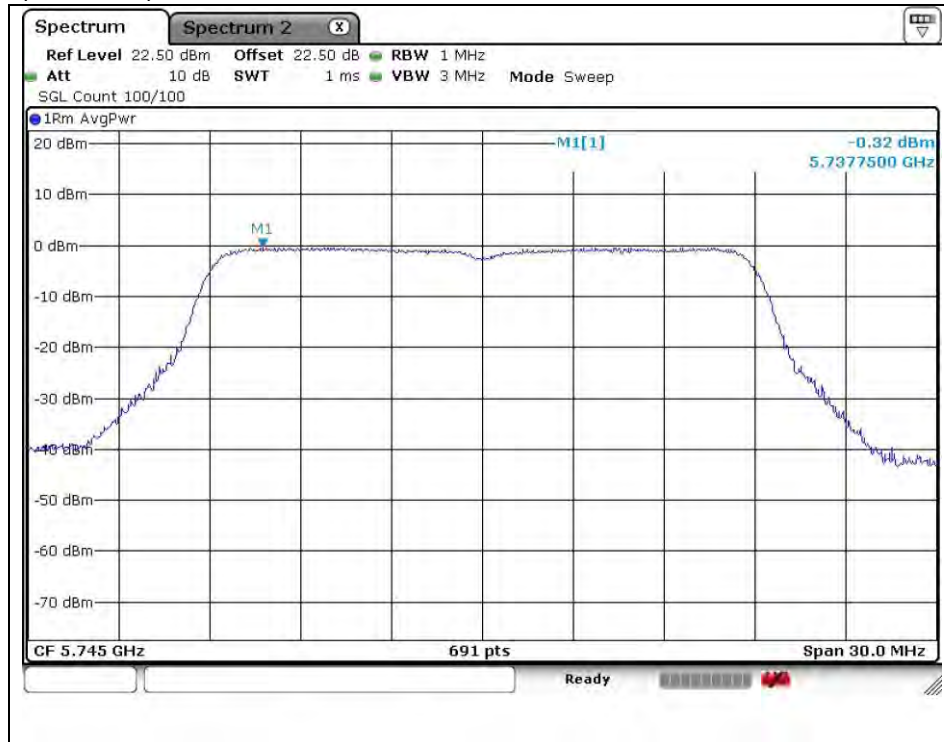
High Channel (5 700 MHz)



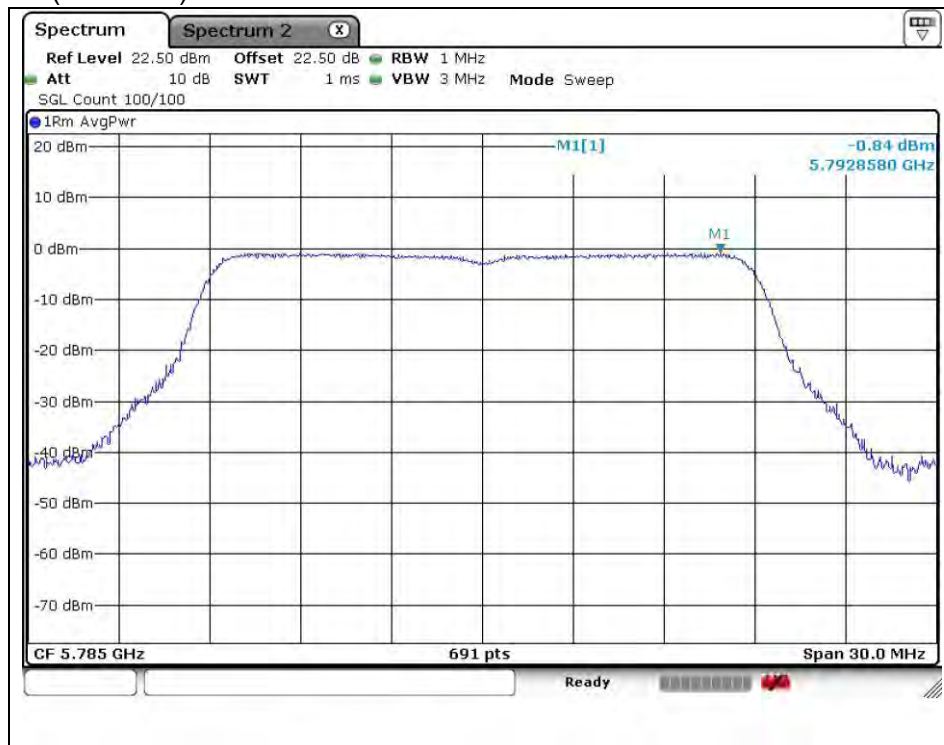
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802.11n_HT20 (Band 3)

Low Channel (5 745 MHz)

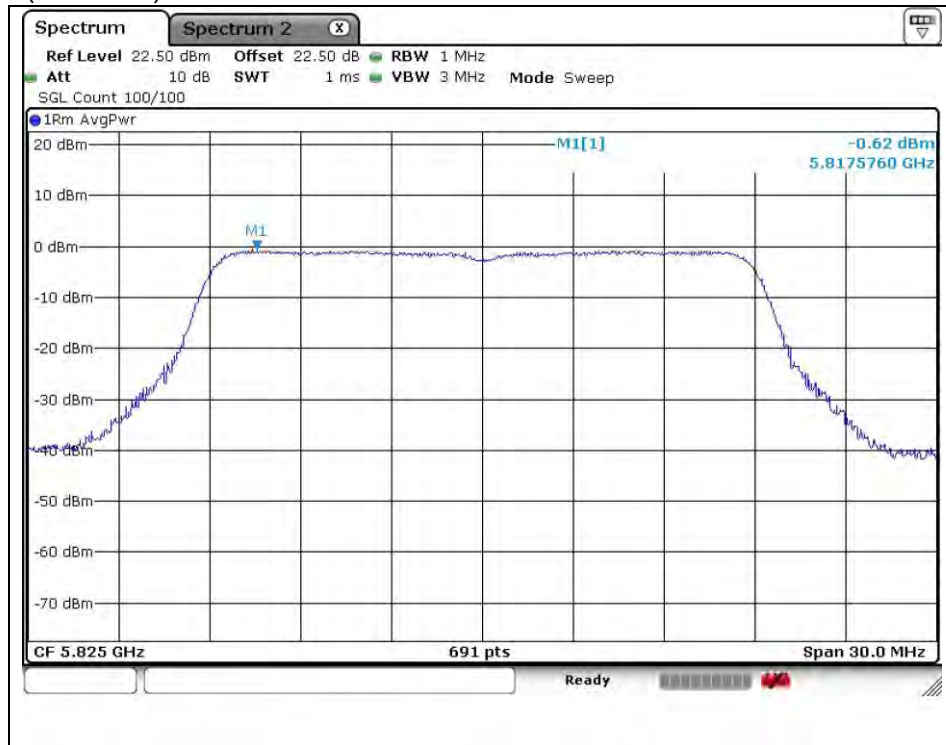


Middle Channel (5 785 MHz)



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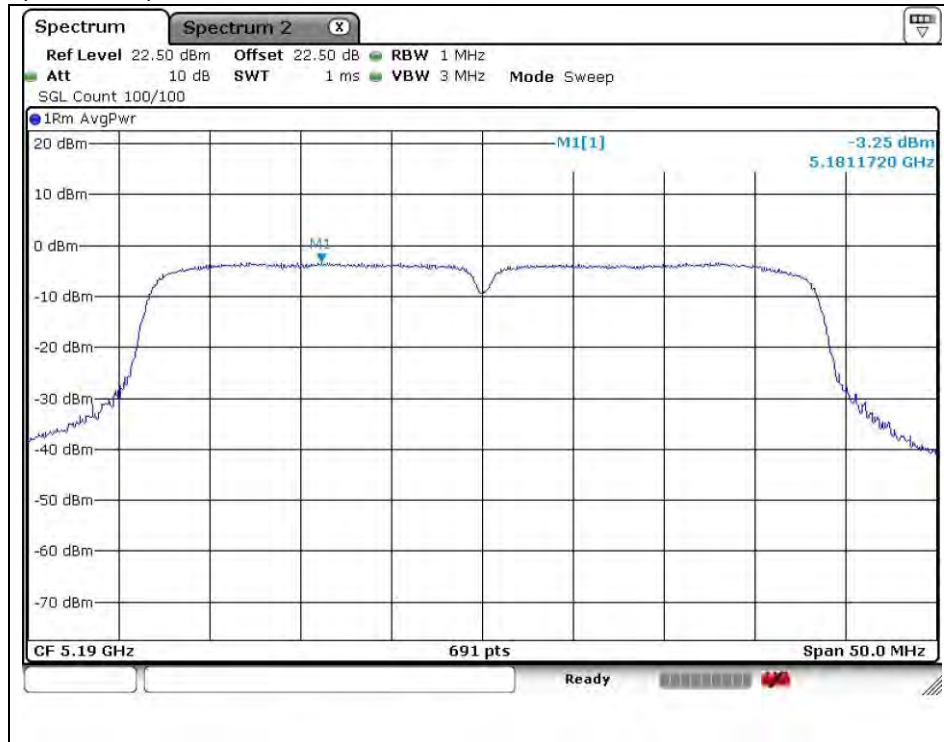
High Channel (5 825 MHz)



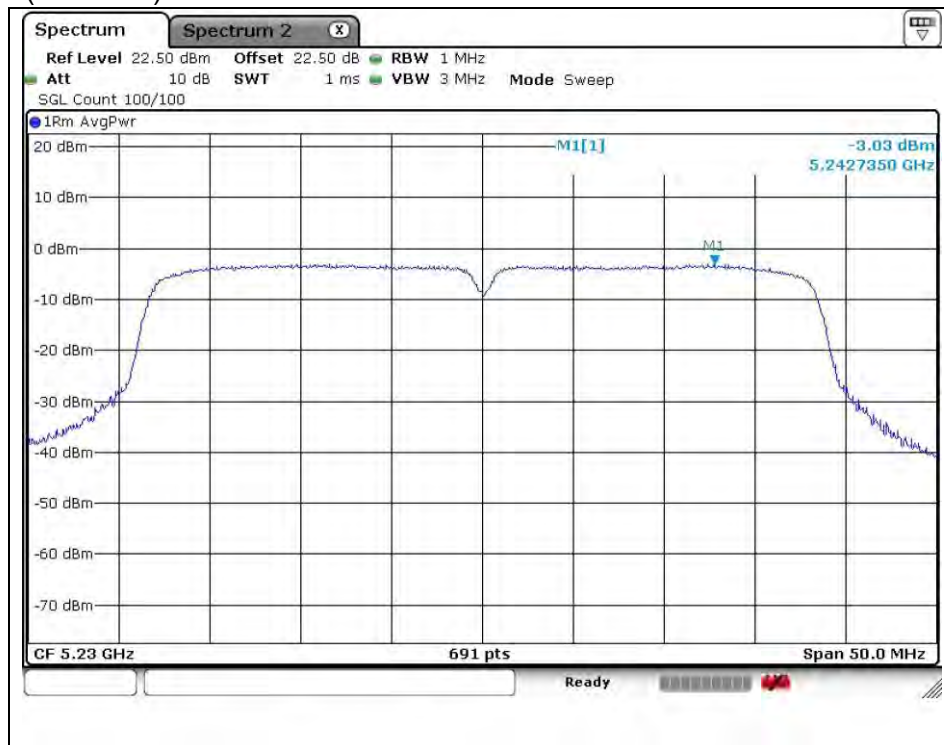
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802.11n_HT40 (Band 1)

Low Channel (5 190 MHz)



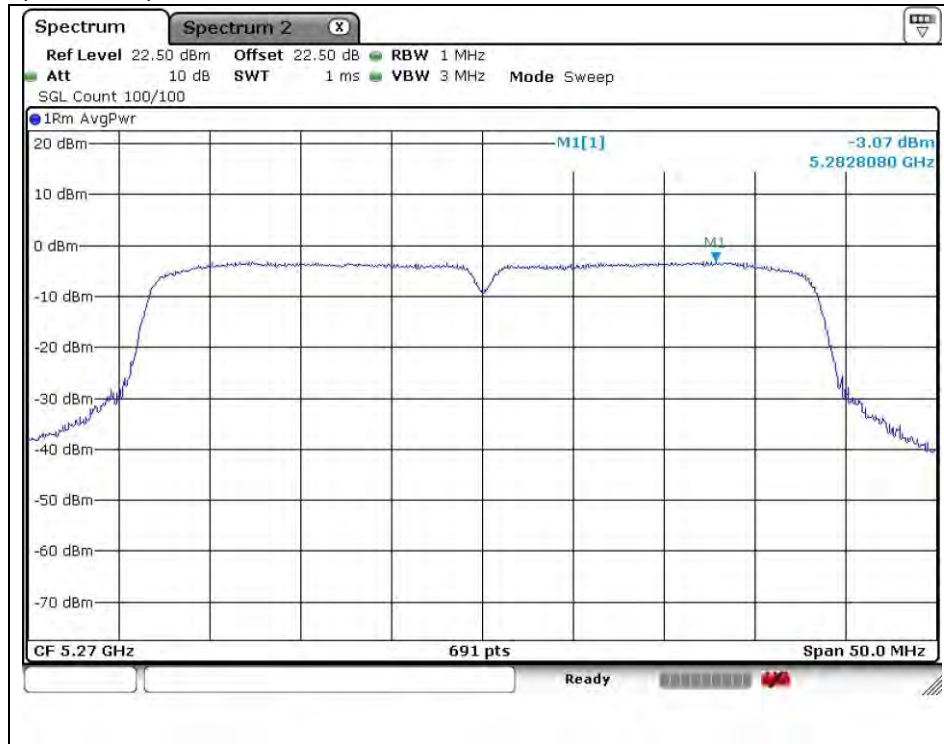
High Channel (5 230 MHz)



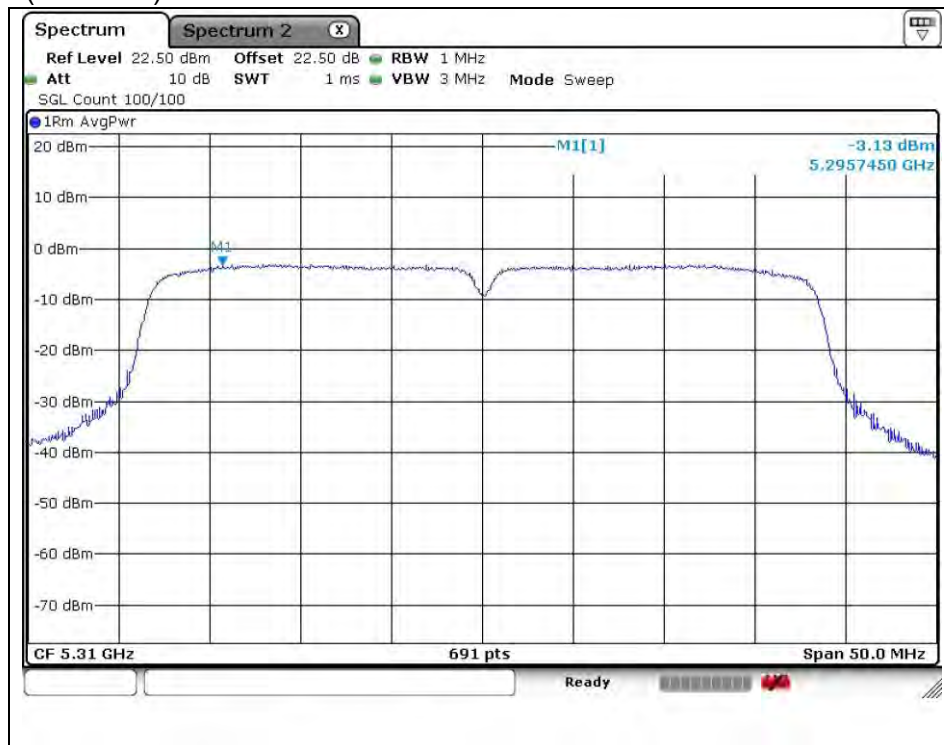
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802.11n_HT40 (Band 2A)

Low Channel (5 270 MHz)



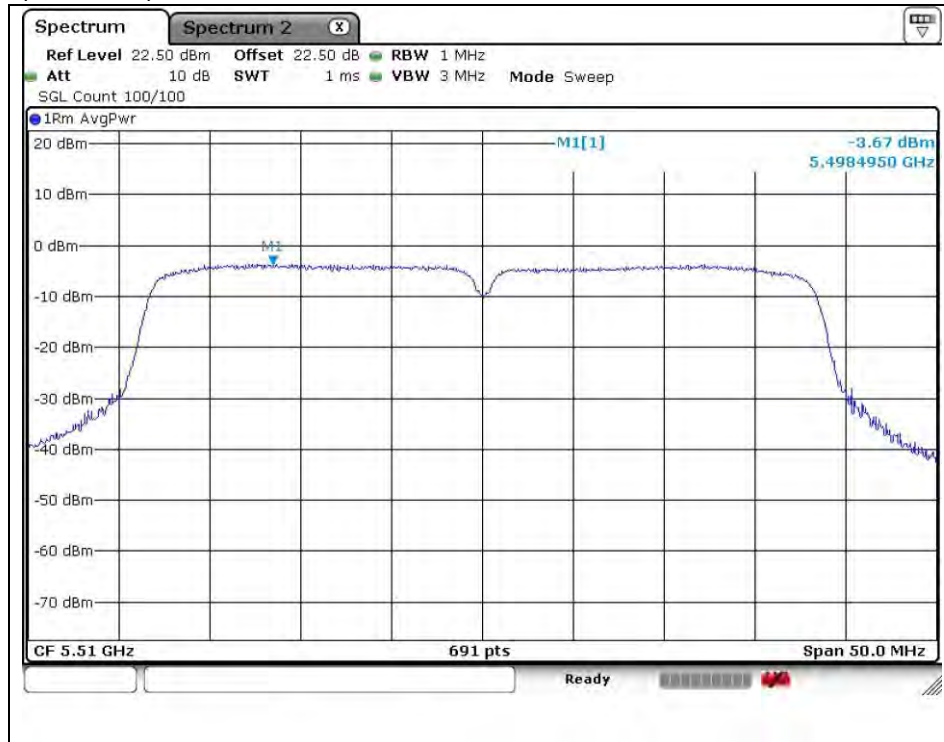
High Channel (5 310 MHz)



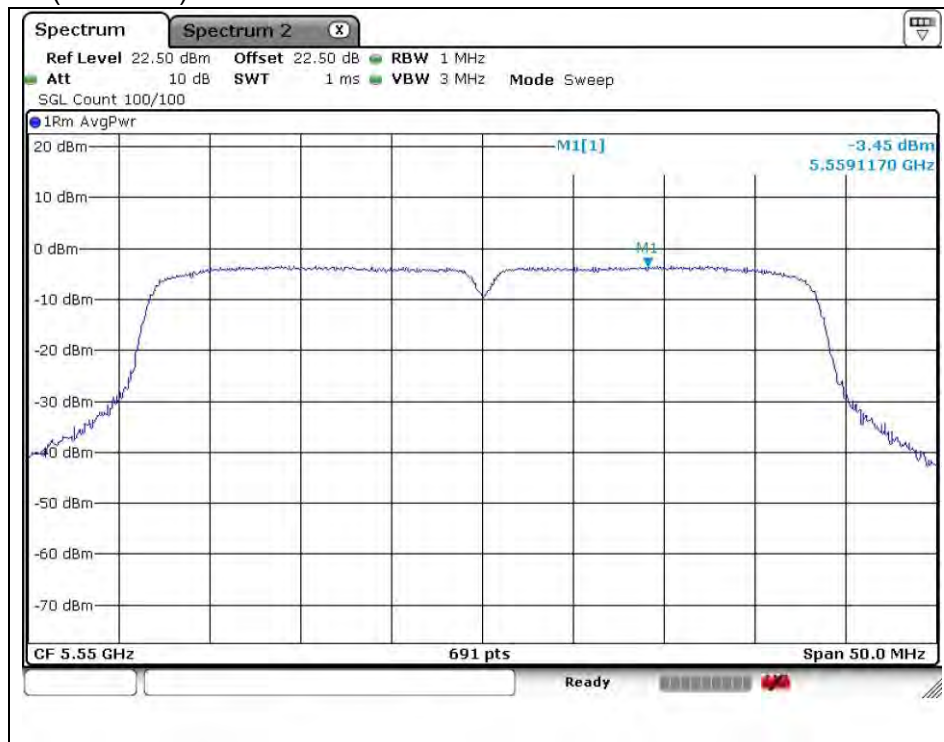
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802.11n_HT40 (Band 2C)

Low Channel (5 510 MHz)

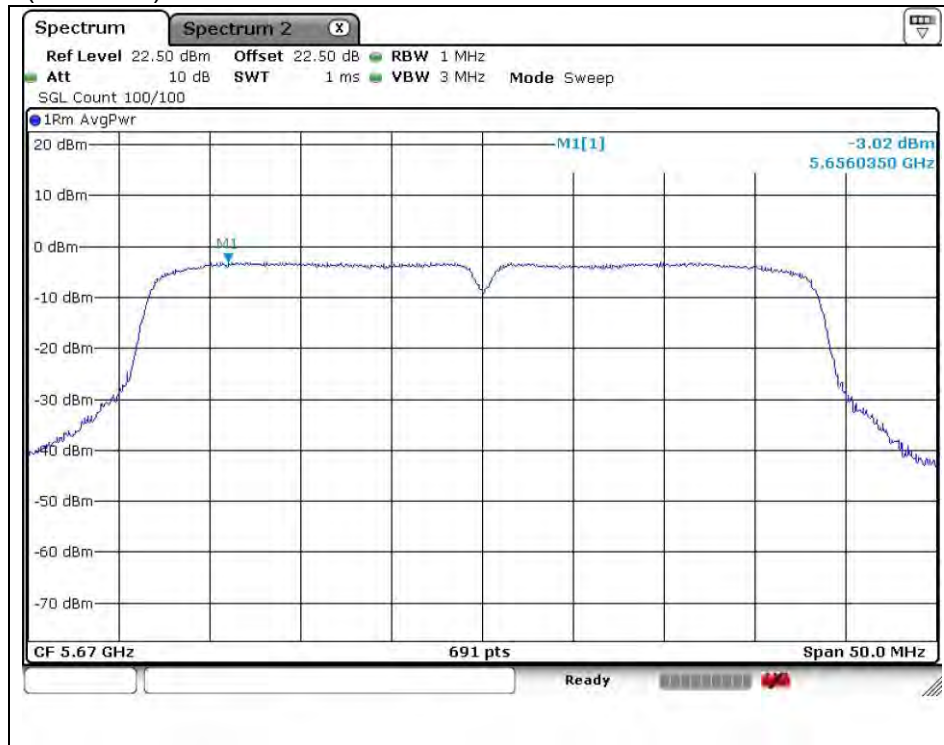


Middle Channel (5 550 MHz)



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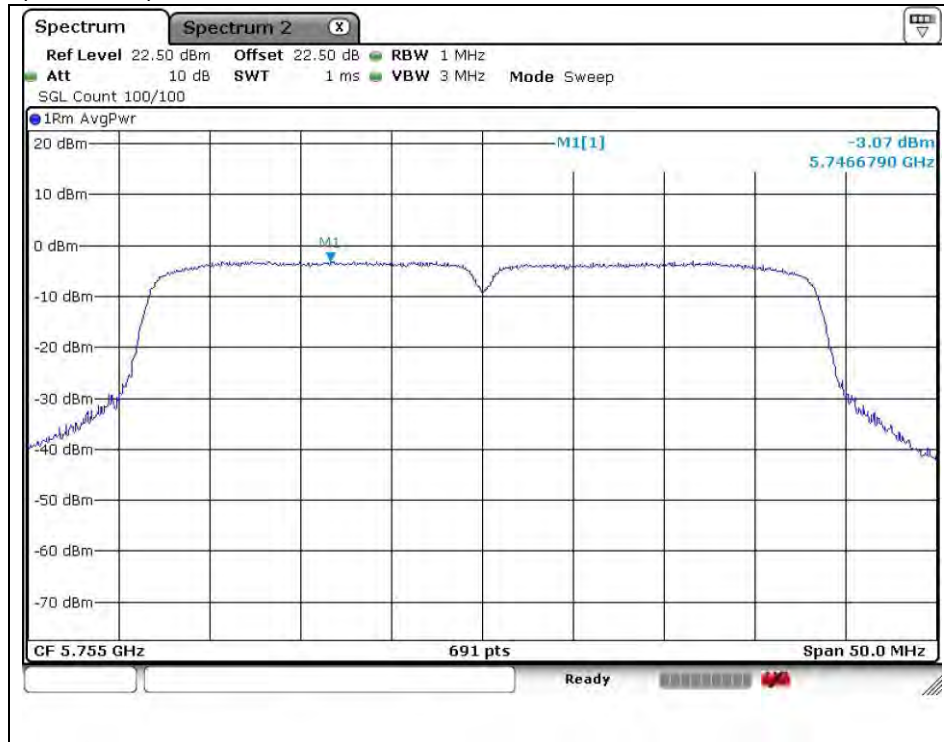
High Channel (5 670 MHz)



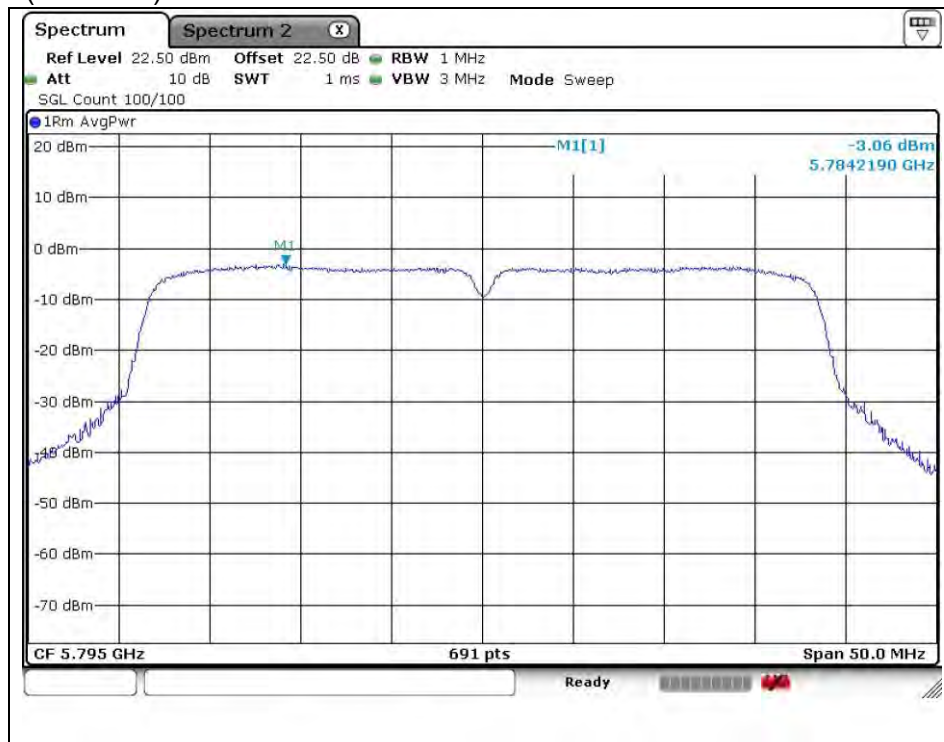
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802.11n_HT40 (Band 3)

Low Channel (5 755 MHz)



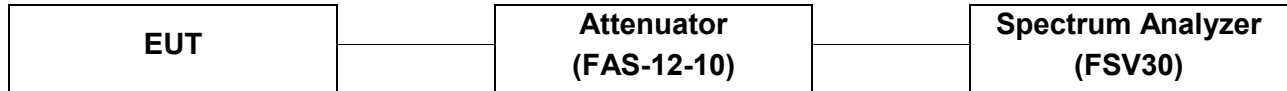
High Channel (5 795 MHz)



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7. Peak excursion

7.1. Test setup



7.1.1. Actual equipment used for Peak excursion

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Signal Generator	Agilent	E8257D	MY51501169	Jul. 17, 2014	Annual	Jul. 17, 2015
Spectrum Analyzer	R&S	FSV30	100768	Mar. 27, 2014	Annual	Mar. 27, 2015
Attenuator	MCLI	FAS-12-10	1	Jun. 20, 2014	Annual	Jun. 20, 2015
DC Power Supply	Agilent	U8002A	MY49030063	Dec. 12, 2013	Annual	Dec. 12, 2014

7.2. Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

7.3. Test procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

1. This measurement settings are specified in section G of KDB 789033_v01r04.
2. Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth.
3. Find the maximum of the peak-max-hold spectrum.
4. Set RBW = 1 MHz.
5. Set VBW $\geq$ 3 MHz.
6. Detector = Peak.
7. Trace mode = max-hold.
8. Allow the sweeps to continue until the trace stabilizes.
9. Use the peak search function to find the peak of the spectrum.
10. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSP.
 - Testing each modulation mode on a single channel in a single operating band is sufficient to demonstrate compliance with the peak excursion requirement.
 - Tests performed all signal types, all modulation types, all bandwidth modes, all variations in signal parameters.

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7.4. Test result

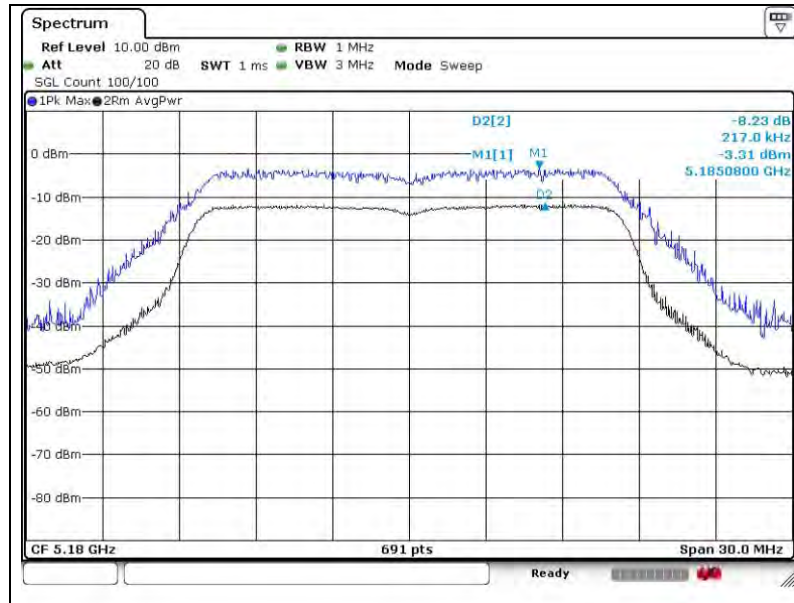
Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

Peak Excursion (dB)										
Mode	Frequency (MHz)	Data Rate (Mbps / MCS)								Limit (dB m/MHz)
11a	5 180	6	9	12	18	24	36	48	54	-
		8.23	8.39	8.51	8.99	9.39	10.23	9.73	9.99	13
11n_HT20	5 180	0	1	2	3	4	5	6	7	-
		8.58	9.02	8.90	9.62	9.80	10.14	10.94	10.20	13
11n_HT40	5 190	0	1	2	3	4	5	6	7	-
		9.02	9.11	9.35	9.70	10.90	10.90	11.57	10.80	13

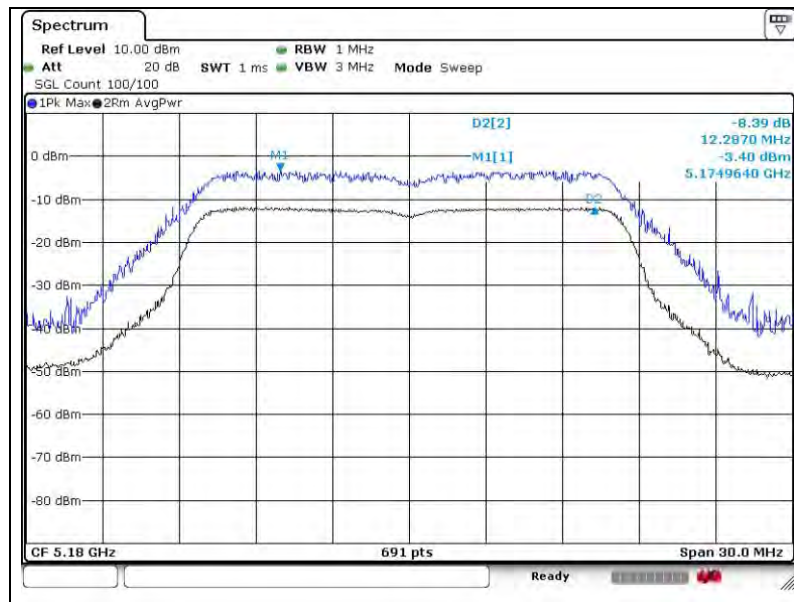
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- 11a

5 180 MHz(6 Mbps)

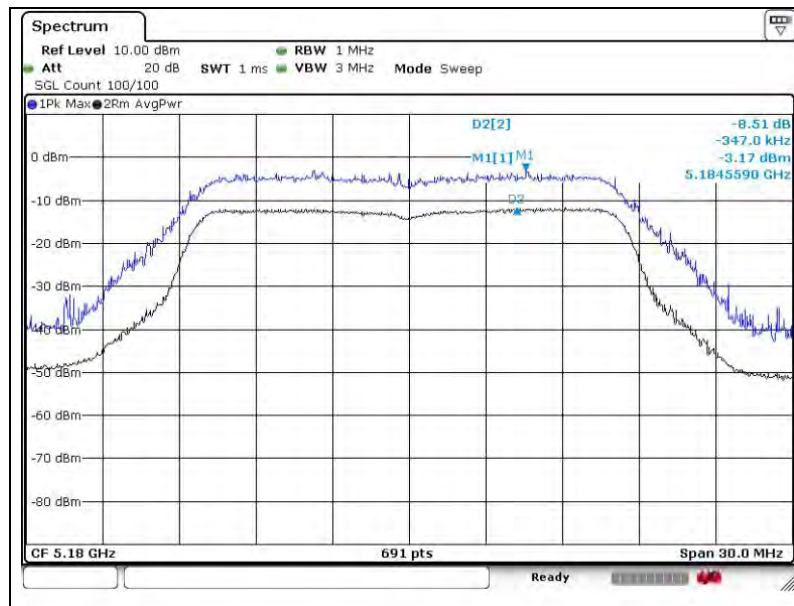


5 180 MHz(9 Mbps)

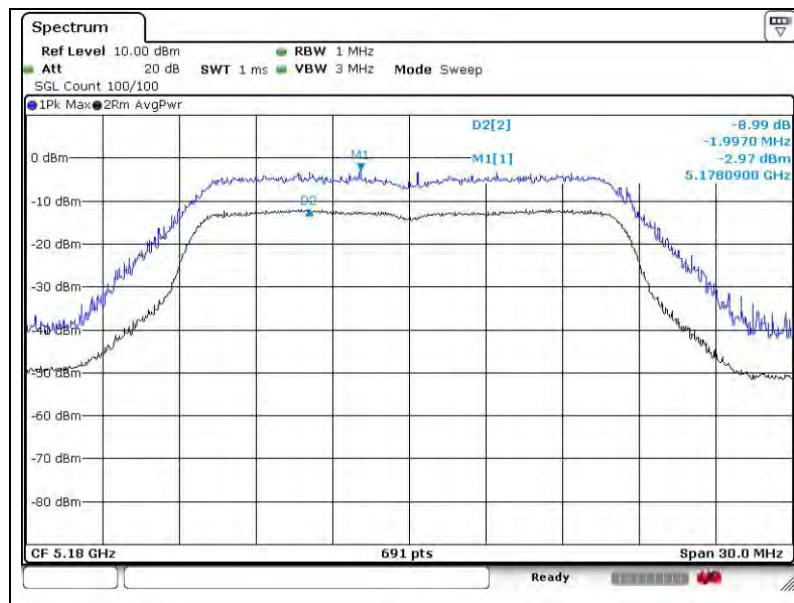


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5 180 MHz(12 Mbps)

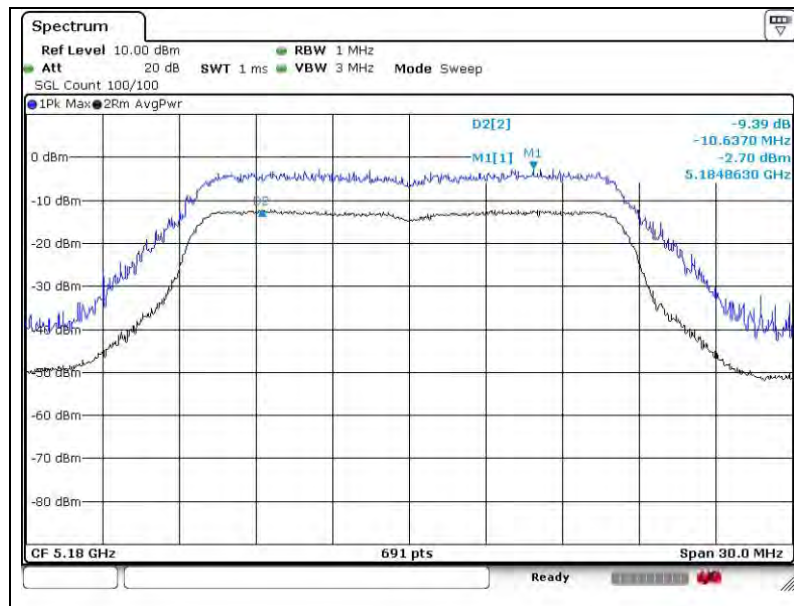


5 180 MHz(18 Mbps)

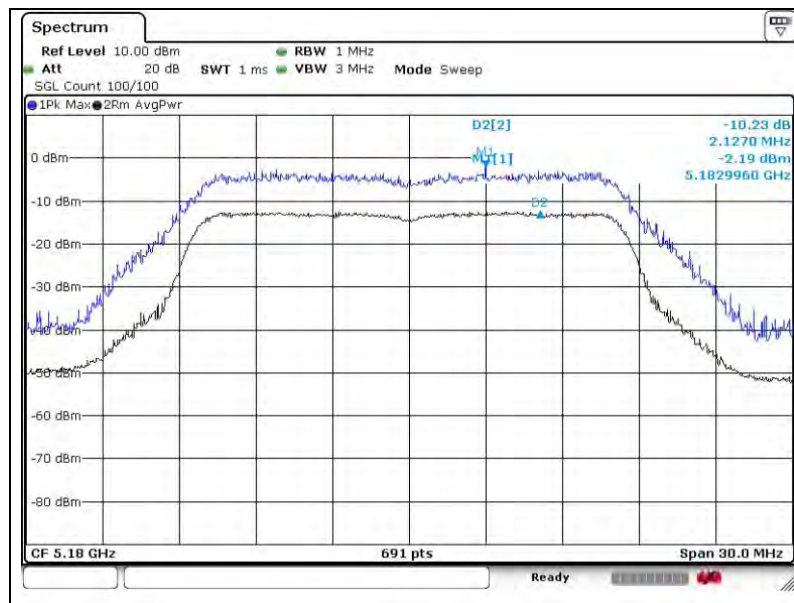


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5 180 MHz(24 Mbps)



5 180 MHz(36 Mbps)

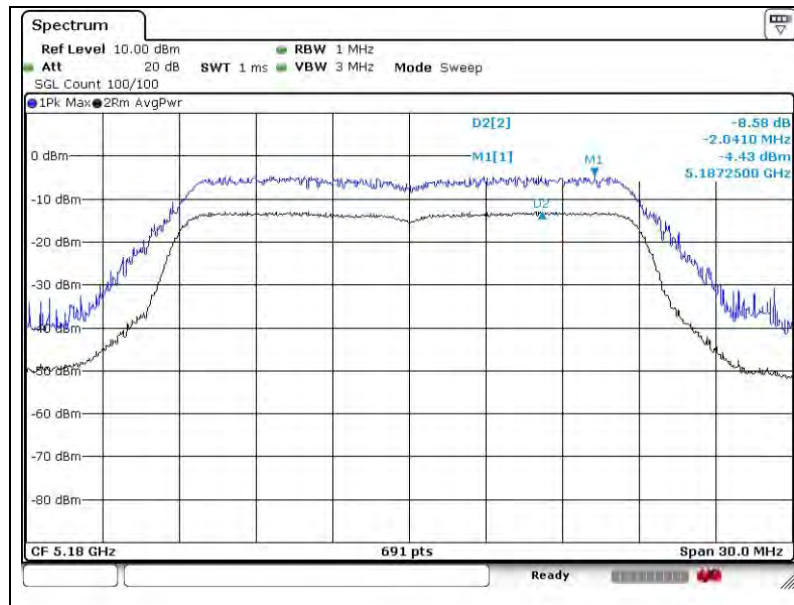


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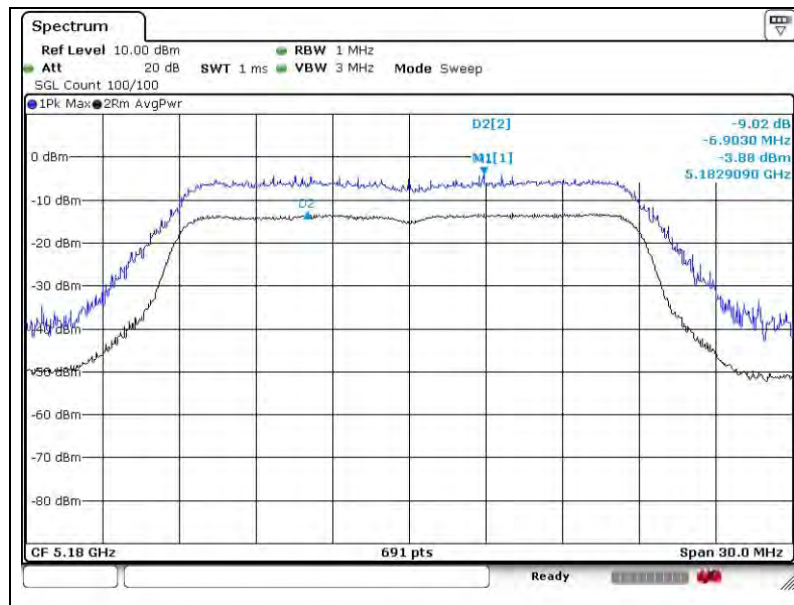
A4(210 mm x 297 mm)

- 11n_HT20

5 180 MHz(MCS0)

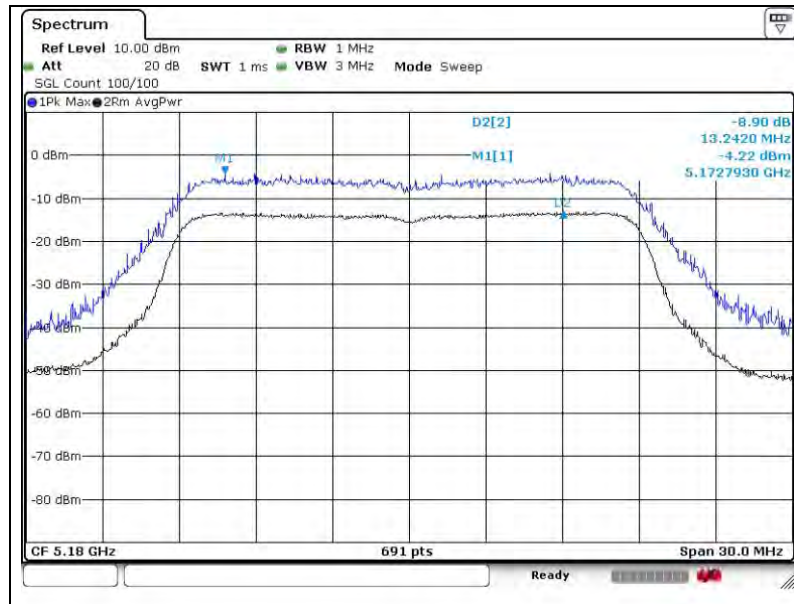


5 180 MHz(MCS1)

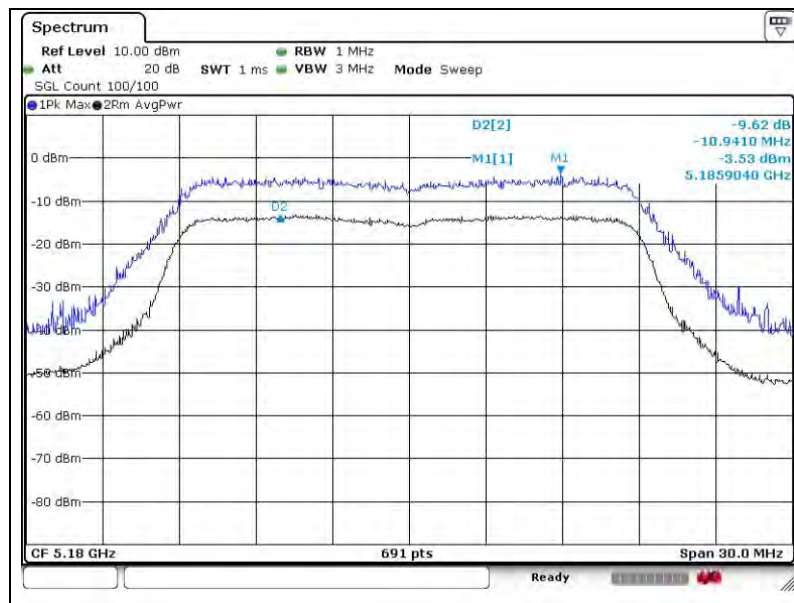


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5 180 MHz(MCS2)

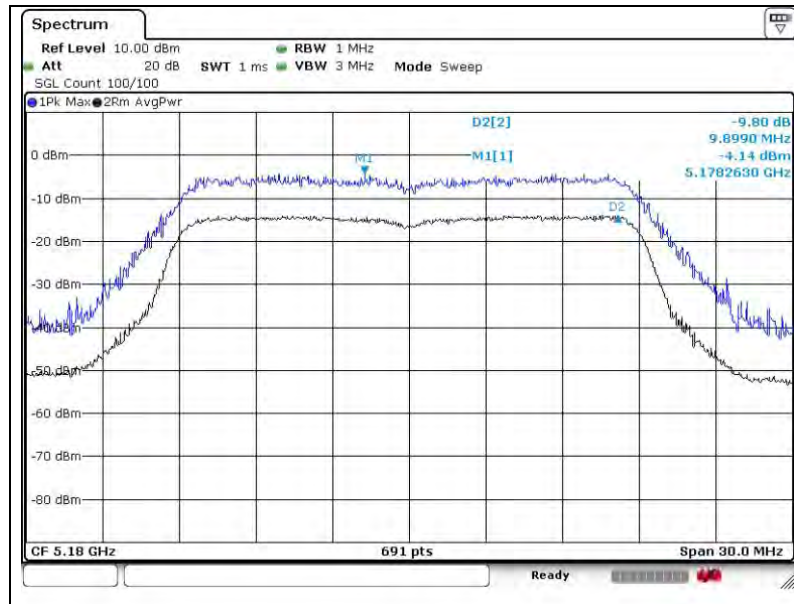


5 180 MHz(MCS3)

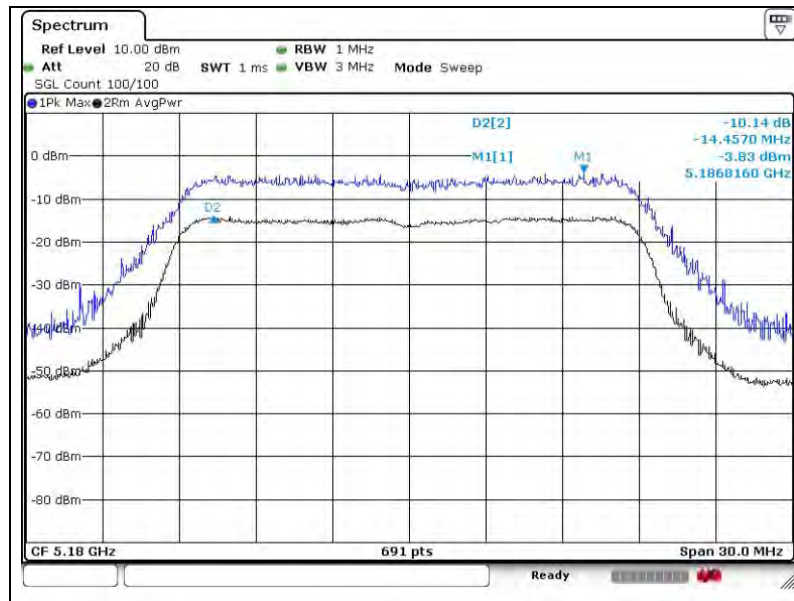


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5 180 MHz(MCS4)

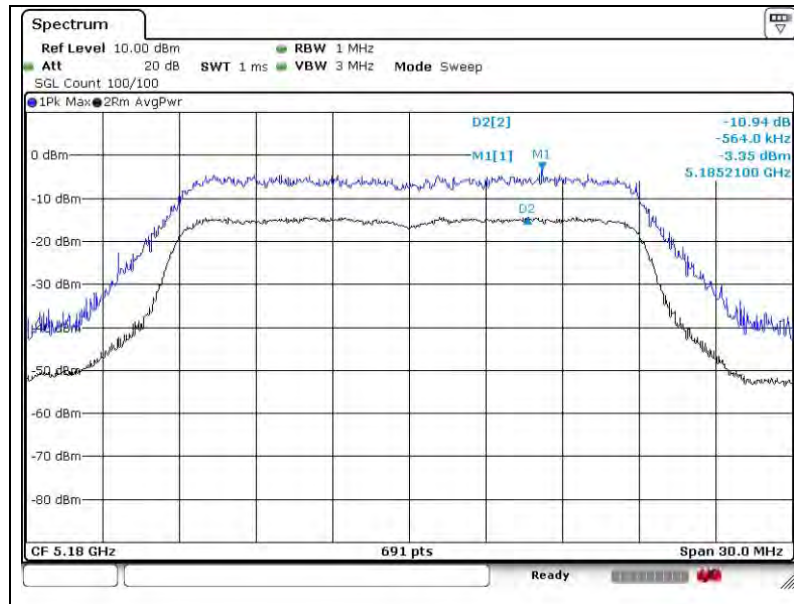


5 180 MHz(MCS5)

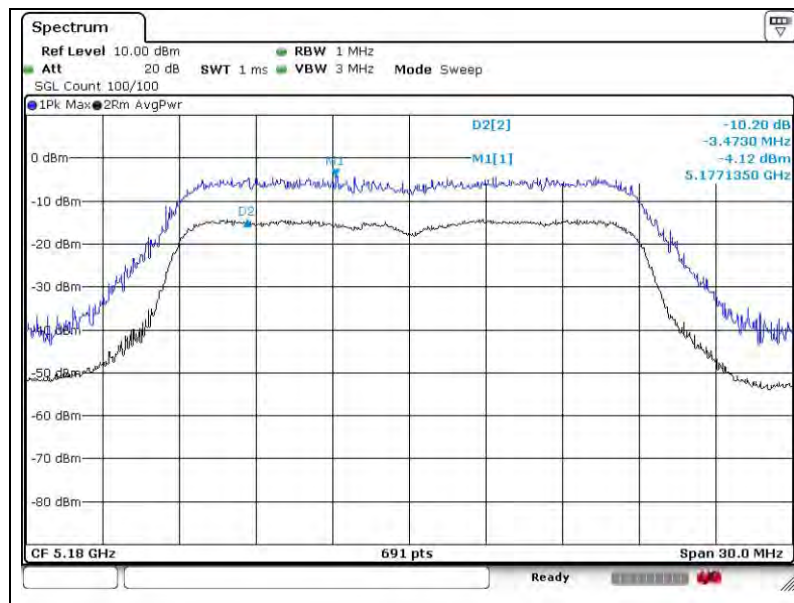


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5 180 MHz(MCS6)



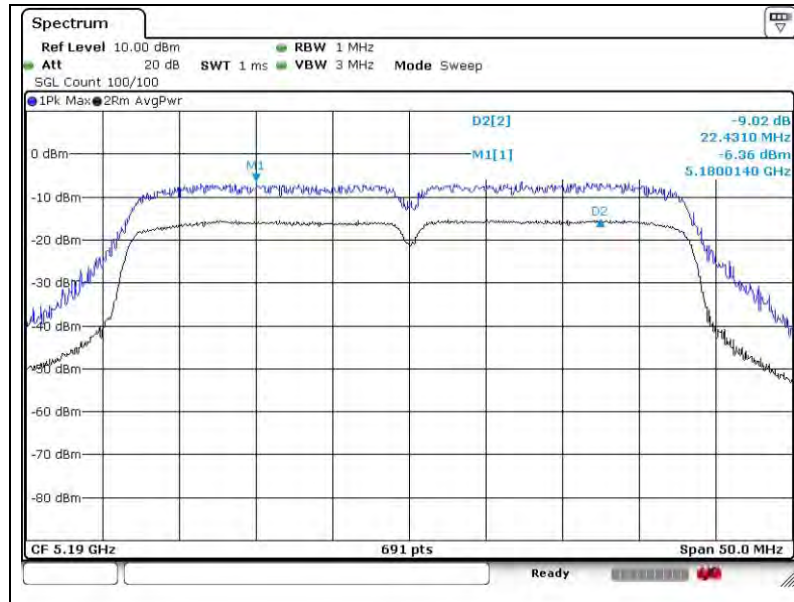
5 180 MHz(MCS7)



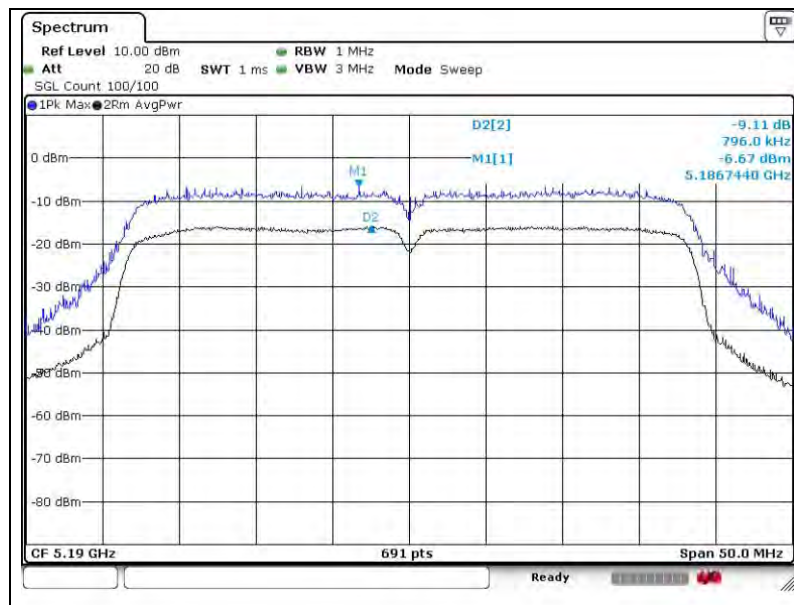
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- 11n_HT40

5 190 MHz(MCS0)



5 190 MHz(MCS1)



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4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 435-040

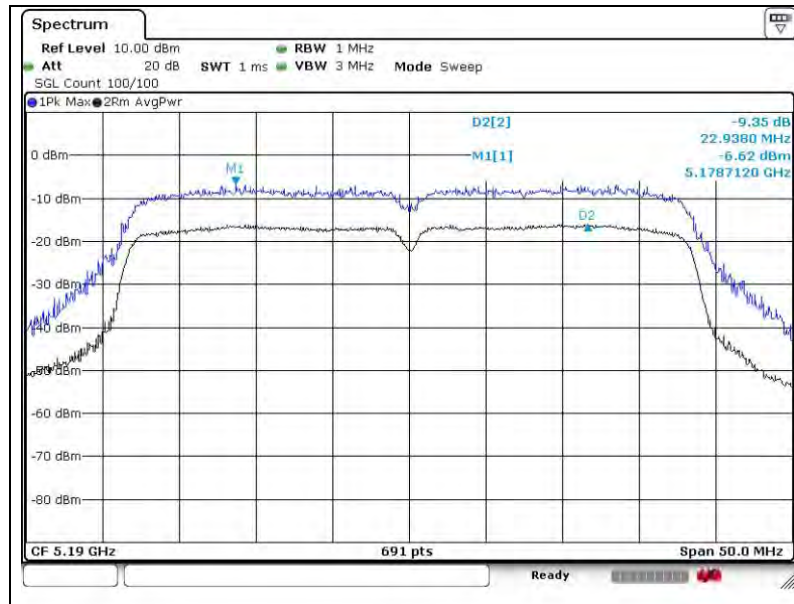
<http://www.sgsgroup.kr>

RTT5041-20(2014.01.20)(2)

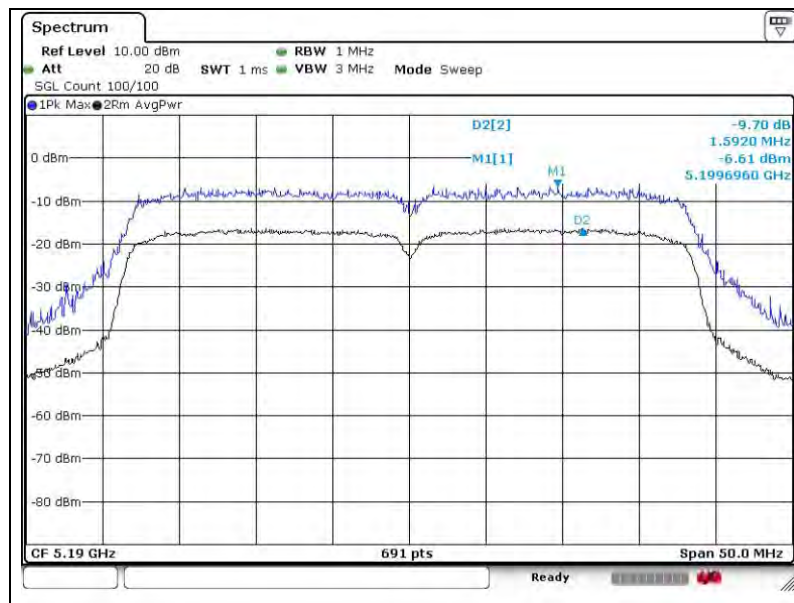
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

5 190 MHz(MCS2)

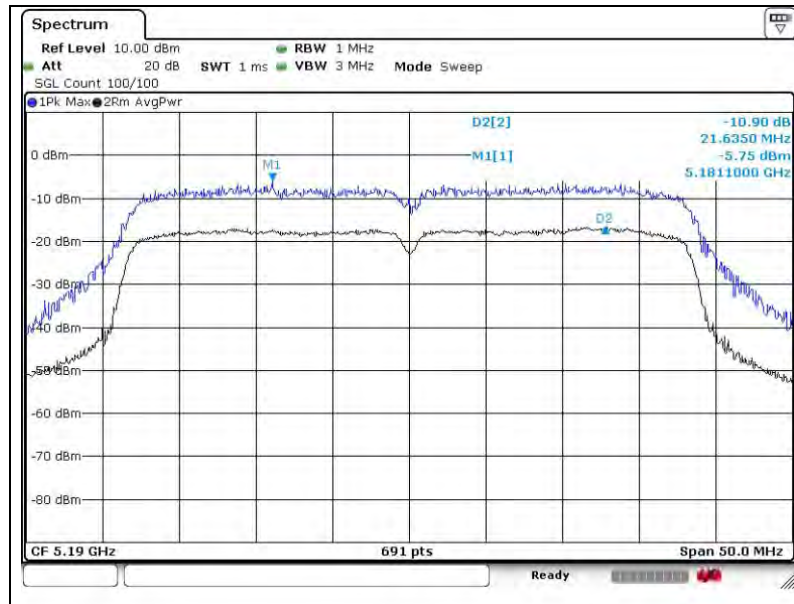


5 190 MHz(MCS3)

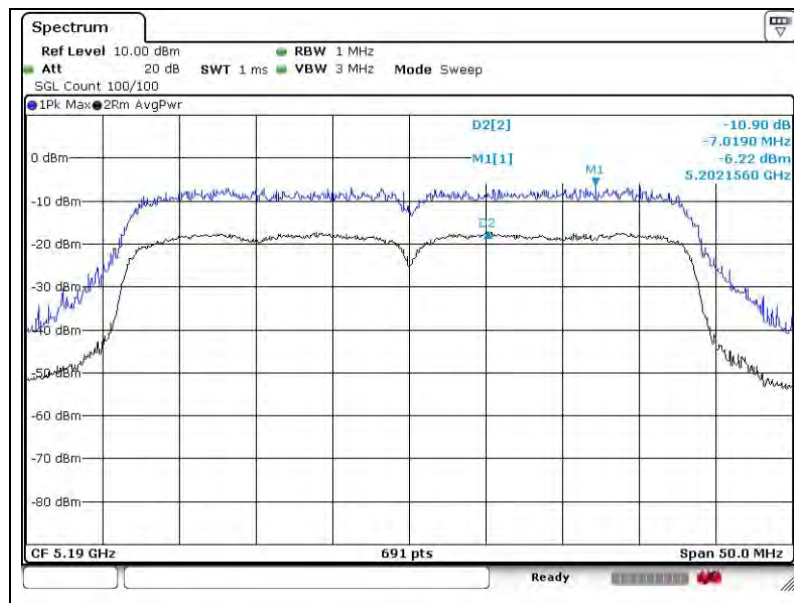


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5 190 MHz(MCS4)

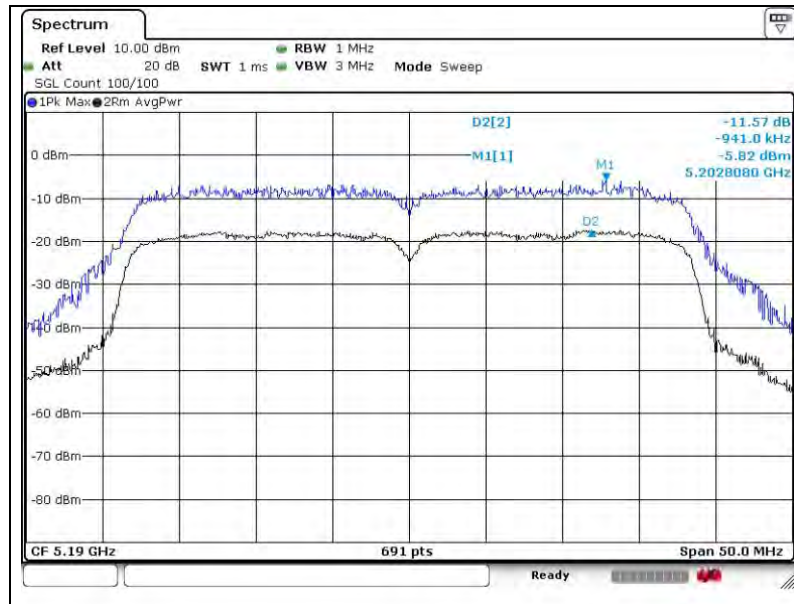


5 190 MHz(MCS5)

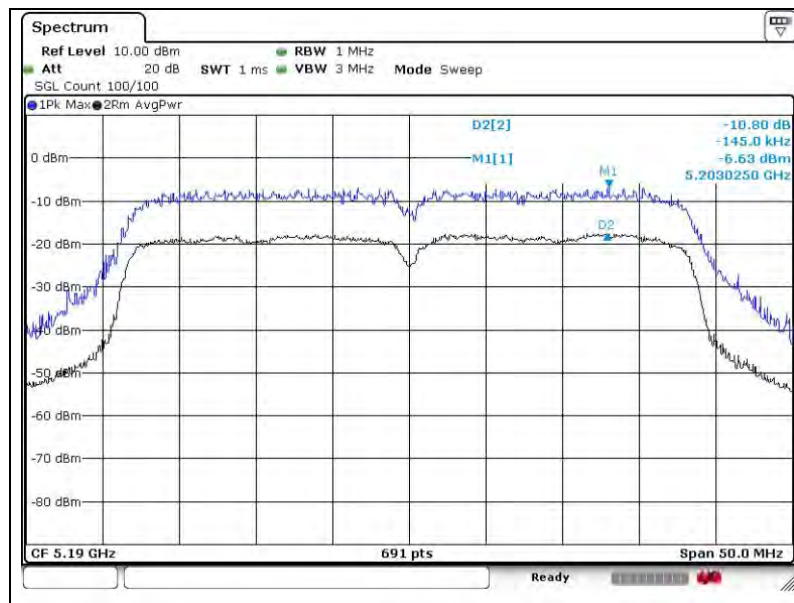


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5 190 MHz(MCS6)



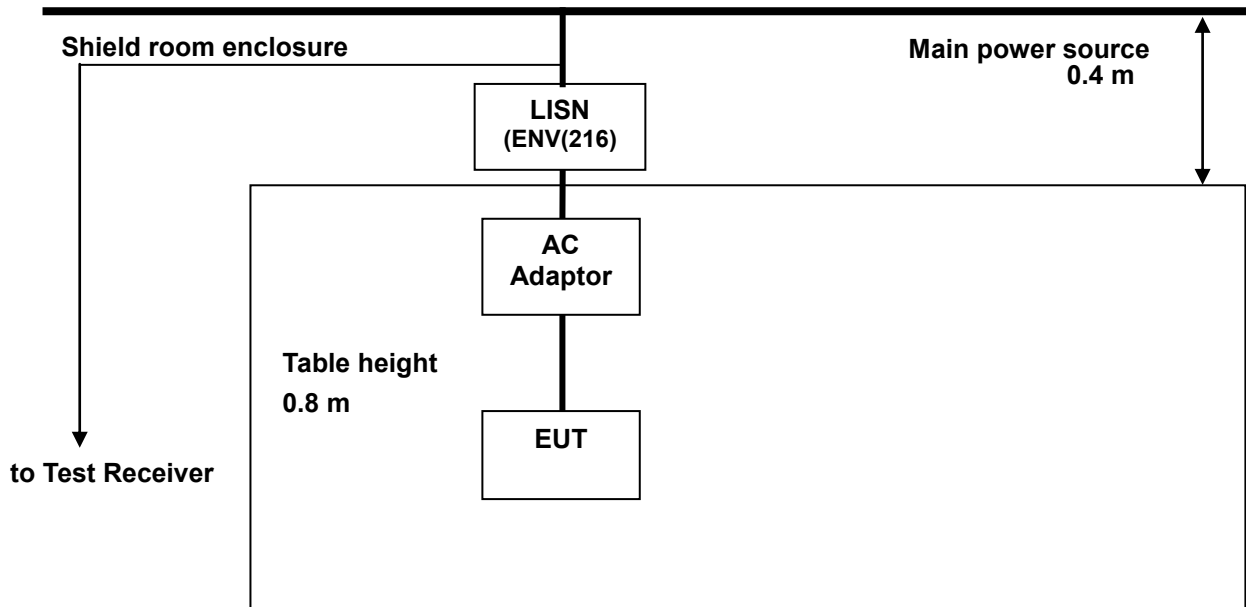
5 190 MHz(MCS7)



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8. Transmitter AC Power Line Conducted Emission

8.1. Test Setup



8.1.1. Actual equipment used for AC Power Line Conducted Emission

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Signal Generator	Agilent	E8257D	MY51501169	Jul. 17, 2014	Annual	Jul. 17, 2015
Test Receiver	R&S	ESCI 7	100911	Jan. 24, 2014	Annual	Jan. 24, 2015
Two-Line V-Network	R&S	ENV216	100190	Jan. 02, 2014	Annual	Jan. 02, 2015
Shield Room	SY Corporation	L × W × H (6.5 m × 3.5 m × 3.5 m)	N/A	N.C.R.	N/A	N.C.R.

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8.2. Limit

According to §15.207(a) for an intentional radiator that 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 the limits in the following table, as measured using a 50 μ H /50 ohm line impedance stabilization network(LISN).

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

* Decreases with the logarithm of the frequency.

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8.3. Test Procedures

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

AC line conducted emissions from the EUT were measured according to the dictates of ANSI C63.4-2003

1. The test procedure is performed in a 6.5 m × 3.6 m × 3.6 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m(W) × 1.5 m(L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. The excess power cable between the EUT and the LISN was bundled. All connecting cables of EUT were moved to find the maximum emission.

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8.4. Test Results

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line

Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

Frequency range : 0.15 MHz – 30 MHz
Measured Bandwidth : 9 kHz

FREQ. (MHz)	LEVEL (dB μ V)		LINE	LIMIT (dB μ V)		MARGIN (dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
1.06	39.10	30.40	H	56.00	46.00	16.90	15.60
2.06	38.40	27.80	H	56.00	46.00	17.60	18.20
3.11	37.70	27.50	H	56.00	46.00	18.30	18.50
7.31	37.10	25.10	H	60.00	50.00	22.90	24.90
11.60	40.10	28.60	H	60.00	50.00	19.90	21.40
18.25	38.50	22.20	H	60.00	50.00	21.50	27.80
1.24	34.10	25.40	N	56.00	46.00	21.90	20.60
2.05	35.30	24.60	N	56.00	46.00	20.70	21.40
3.14	34.40	24.40	N	56.00	46.00	21.60	21.60
5.08	30.60	20.10	N	60.00	50.00	29.40	29.90
6.14	30.70	23.80	N	60.00	50.00	29.30	26.20
17.93	42.70	24.00	N	60.00	50.00	17.30	26.00

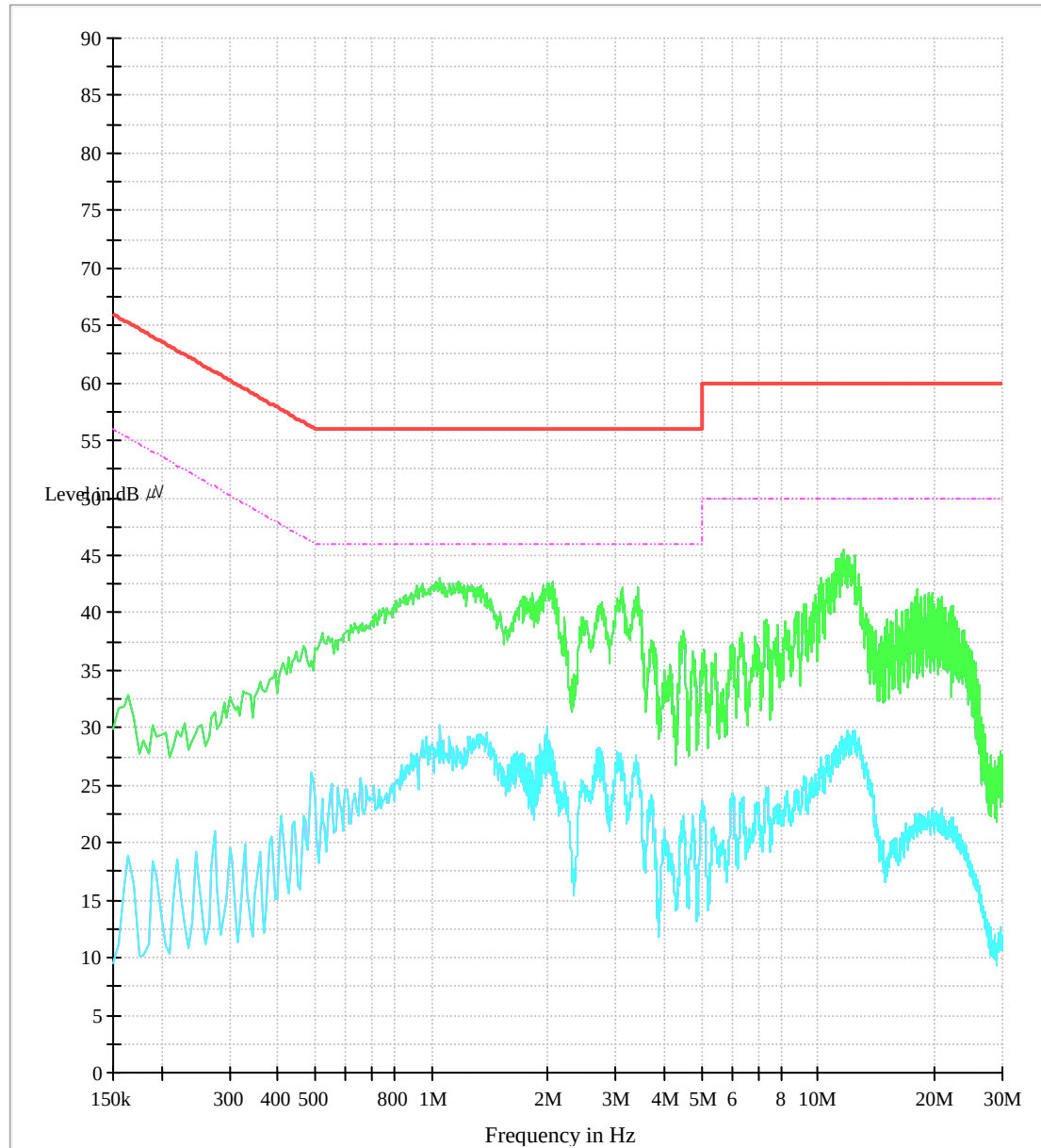
Remark;

- Line (H): Hot, Line (N): Neutral
- All modes of operation were investigated and the worst-case emissions were reported using 11a Mode 6 Mbps, 36 channels
- Traces shown in plot mad using a peak detector and average detector
- The limit for Class B device(s) from 150 kHz to 30 MHz are specified in Section of the Title 47 CFR.
- Deviations to the Specifications: None.

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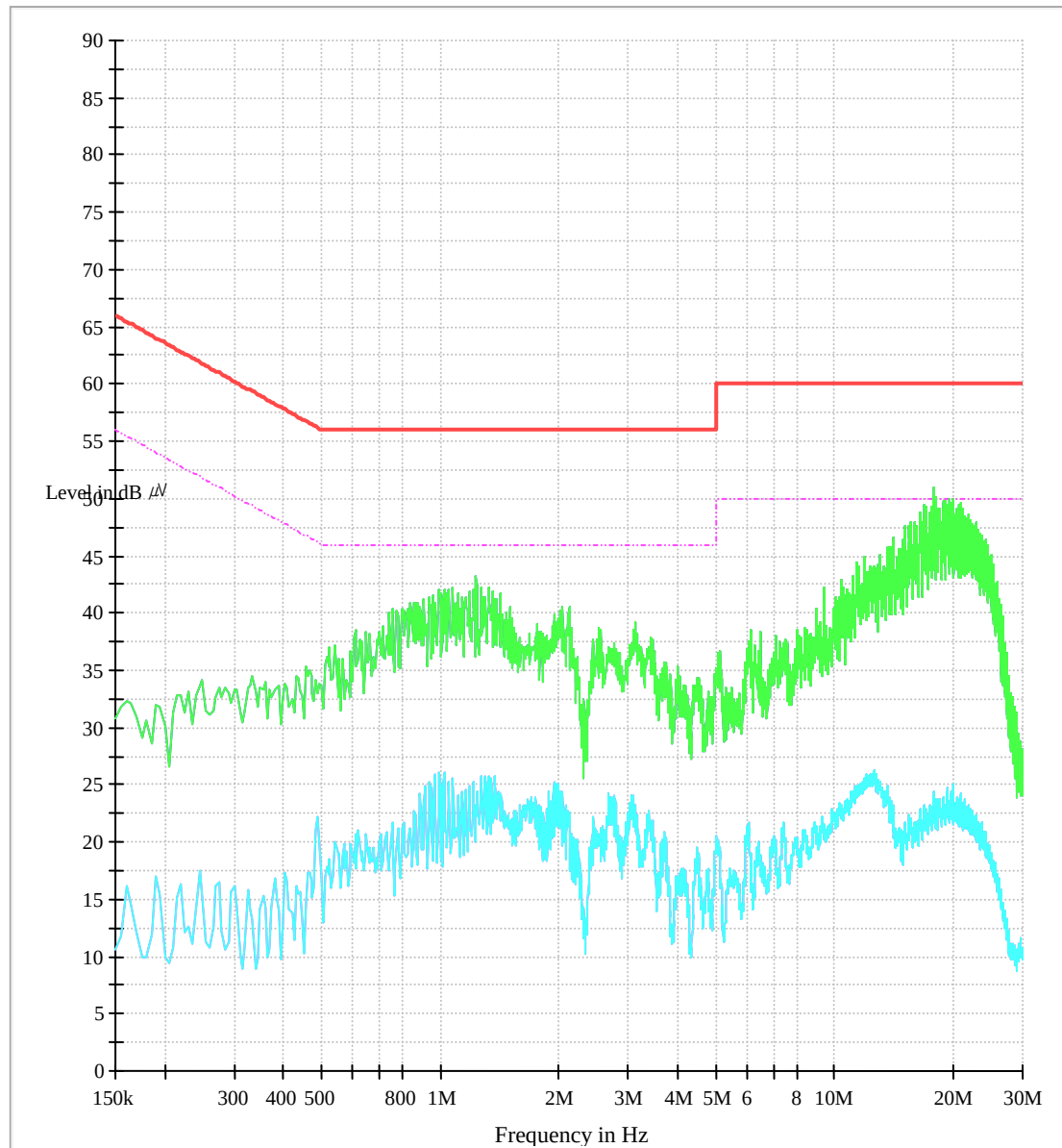
Plots of Conducted Power line

Test mode : (Neutral)



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Test mode : (Hot)



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