

FCC 47 CFR PART15 SUBPART E**Test Report****For****Product Name: ClickShare Button****Brand Name: Barco****Model No.: R9861500D01****Series Model.: N/A****FCC ID: 2AAED- R9861500D01****IC: 9393B- R9861500D01****Test Report Number:****C150805R02-RPB****Issued for****Barco NV****President Kennedypark 35, 8500 Kortrijk, Belgium****Issued by****Compliance Certification Services Inc.****Kun shan Laboratory****No.10 Weiye Rd., Innovation park, Eco&Tec,
Development Zone, Kunshan City, Jiangsu, China****TEL: 86-512-57355888****FAX: 86-512-57370818**

TESTING CERT #2541.01

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1 TEST RESULT CERTIFICATION

Product Name:	ClickShare Button
Trade Name:	Barco
Model Name.:	R9861500D01
Series Model:	N/A
Applicant Discrepancy:	Initial
Device Category:	Mobile device
Date of Test:	July 31, 2015 ~ September 14, 2015
Applicant:	Barco NV President Kennedypark 35, 8500 Kortrijk, Belgium
Manufacturer:	Barco NV President Kennedypark 35, 8500 Kortrijk, Belgium
Application Type:	Certification


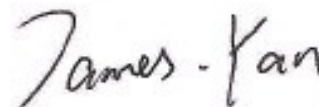
APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart E	No non-compliance noted
Canada RSS-247 Issue 1	No non-compliance noted
Canada RSS-Gen Issue 4	No non-compliance noted

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.407 and KDB 789033.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

Tested by:

Jeff.Fang
RF Manager
Compliance Certification Service Inc.

James.Yan
Test Engineer
Compliance Certification Service Inc.

2 EUT DESCRIPTION

Product Name:	ClickShare Button
Brand Name:	Barco
Model Name:	R9861500D01
Series Model:	N/A
Model Discrepancy:	N/A
Power Adapter Power Rating :	DC 5V
Frequency Range :	5725MHz-5850MHz
Transmit Power :	Chain 0: 802.11a mode: 5.25 dBm 802.11an HT20 mode: 4.70 dBm Chain 1: 802.11a mode: 5.14 dBm 802.11an HT20 mode: 4.46 dBm
Modulation Technique :	802.11a mode: OFDM (6,9,12,18,24,36,48 and 54 Mbps) 802.11an HT20 mode:OFDM (MCS0~MCS7)
Number of Channels :	IEEE 802.11a mode: 5 Channels IEEE 802.11an HT20de: 5 Channels
Antenna Specification:	chip antenna1 for 5GHz Gain 4.9dBi chip antenna2 for 5GHz Gain 4.9dBi
DDR:	Mode1: SAMSUNG / K4T1G164QG-BCE7 Mode2:MICRON / MT47H64M16NF-25EM
Software Version:	

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for **FCC ID: 2AAED- R9861500D01** filing to comply with FCC Part 15, Subpart E Rules.
3. This submittal(s) (test report) is intended for **IC: 9393B- R9861500D01** filing to comply with Canada RSS-247 Issue 1 and Canada RSS-Gen Issue 3 Rules.

3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10:2013 and FCC CFR 47 15.207, 15.209 and 15.407,RSS-247.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed for RF field strength measurement to meet the Commissions requirement, and is operated in a manner intended to generate the maximum emission in a continuous normal application.

3.2 EUT EXERCISE

The EUT is operated in the engineering mode to fix the Tx frequency for the purposes of measurement.

According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is positioned at 0.8 m above the ground plane. According to the requirements in Section 13.3 of ANSI C63.10:2013, the conducted emission from the EUT is measured in the frequency range between 0.15 MHz and 30MHz, using the CISPR Quasi-Peak detector mode.

Radiated Emissions

Under 1GHz

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10:2013.

Above 1GHz

The EUT is placed on a turn table, which is 1.5 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10:2013.

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.50 - 5.15
0.495 - 0.505 ⁽¹⁾	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960.0 - 1240	7.25 - 7.75
4.125 - 4.128	25.50 - 25.67	1300 - 1427	8.025 - 8.500
4.17725 - 4.17775	37.50 - 38.25	1435.0 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73.00 - 74.60	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.80 - 75.20	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108.00 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.90 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500.0	17.7 - 21.4
8.37625 - 8.38675	156.70 - 156.90	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.1700	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.20	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358.0	36.43 - 36.5 ⁽²⁾
12.57675 - 12.57725	322.0 - 335.4	3600 - 4400	
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5 DESCRIPTION OF TEST MODES

Description	Modulation Technology	Modulation Type
6dB Bandwidth and 99% Bandwidth	OFDM	BPSK
Maximum conducted output power	OFDM	BPSK
Band edges measurement	OFDM	BPSK
Peak Power Spectral Density	OFDM	BPSK
Radiated undesirable emission	OFDM	BPSK
Conducted undesirable emission	OFDM	BPSK
Powerline conducted emission	OFDM	BPSK

The EUT transmitting and receiving with two antennas working at a/an mode, Both chain0 and chain1 could be used as transmit/receiving antenna, but only one of them could transmit/receive at the same time. so 2x2 configuration was used for all testing in this report.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes with DDR mode 1 as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

IEEE 802.11a mode:

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 54Mbps data rate were chosen for full testing.

IEEE 802.11an HT20 mode:

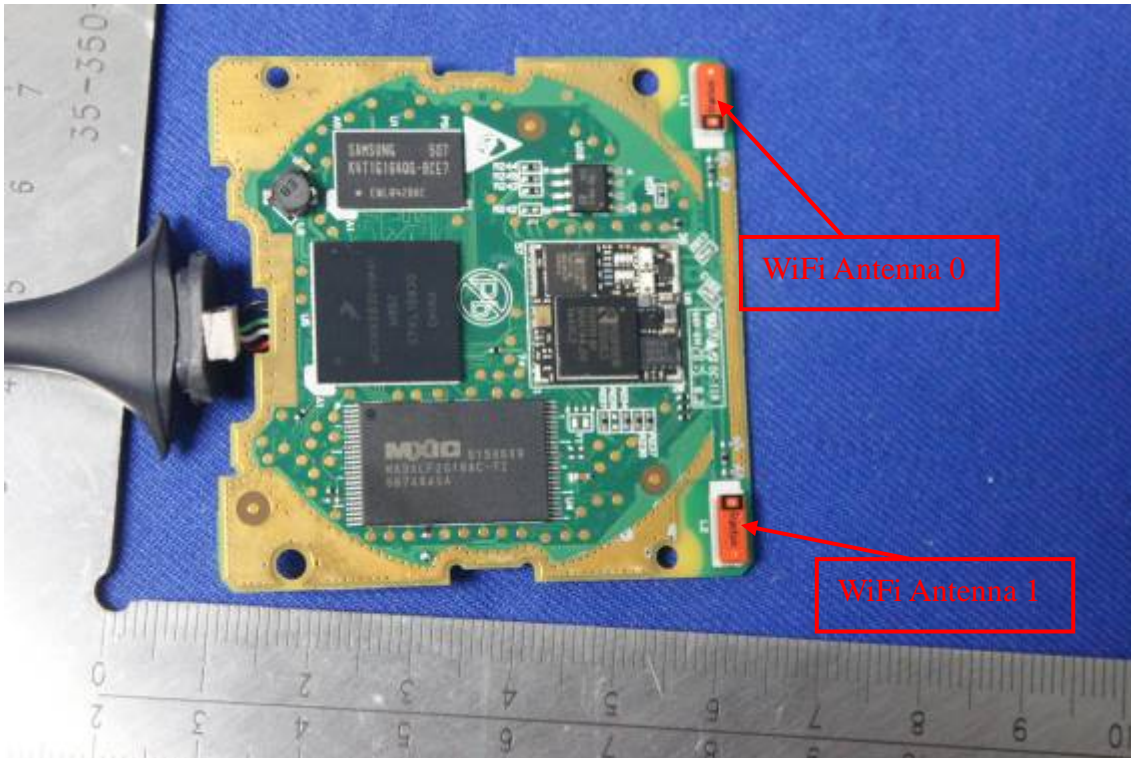
Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 65Mbps data rate were chosen for full testing.

3.6 ANTENNA DESCRIPTION

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

* the antenna of this EUT is a unique(chip Antenna for 5G WiFi).

* the EUT complies with the requirement of 15.203.



4 INSTRUMENT CALIBRATION

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

4.1 MEASUREMENT EQUIPMENT USED

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	2015-4-9	2016-4-8
DETECTOR NEGATIVE	Agilent	8473B	MY42240176	2015-5-11	2016-5-10
OSCILLOSCOPE	Agilent	DSO6104A	MY44002585	2015-3-16	2016-3-15
Power Sensor	Anritsu	MA2411A	0917072	2015-4-24	2016-4-23
Power Meter	Agilent	U2021XA	MY53120005	2015-4-24	2016-4-23
Power SPLITTER	Mini-Circuits	ZN2PD-9G	SF078500430	N.C.R	N.C.R
DC Power Supply	AGILENT	E3632A	MY50340053	N.C.R	N.C.R
Temp. / Humidity Chamber	TERCHY	MHK-120AK	X30109	2015-1-22	2016-1-21
Power SPLITTER	Mini-Circuits	ZN2PD-9G	SF078500430	N.C.R	N.C.R
DC POWER SUPPLY	GW instek	GPS-3303C	E903131	N.C.R	N.C.R
Temp. / Humidity Chamber	Kingson	THS-M1	242	2015-1-22	2016-1-21

977 Chamber					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	2015-4-9	2016-4-8
EMI Test Receiver	R&S	ESCI	101378	2015-1-22	2016-1-21
Pre-Amplifier	MINI	ZFL-1000VH2	d041703	2015-1-22	2016-1-21
Pre-Amplifier	Miteq	JS41-00101800-32-10P	1675713	2015-1-22	2016-1-21
Bilog Antenna	Sunol	JB1	A062604	2015-3-6	2016-3-5
Horn-antenna	SCHWARZBECK	BBHA9120D	D:266	2015-3-7	2016-3-6
Turn Table	CT	CT123	4165	N.C.R	N.C.R
Antenna Tower	CT	CTERG23	3256	N.C.R	N.C.R
Controller	CT	CT100	95637	N.C.R	N.C.R
Test Software			EZ-EMC		

Conducted Emission					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI TEST RECEIVER	R&S	ESCI	100781	2015-3-16	2016-3-15
V (V-LISN)	SCHWARZBECK	NNLK 8129	8129-143	N.C.R	N.C.R
LISN (EUT)	FCC	FCC-LISN-50/250-50-2-02	05012	2015-3-16	2016-3-15
Pulse LIMITER	R&S	ESH3-Z2	100524	2015-9-24	2016-9-23
Test Software	EZ-EMC				

Remark: Each piece of equipment is scheduled for calibration once a year.

4.2 MEASUREMENT UNCERTAINTY

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR 100 028-1 [2] and shall correspond to an expansion factor (coverage factor) $k = 1,96$ or $k = 2$ (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Table 6 is based on such expansion factors.

Table 6: Maximum measurement uncertainty

Parameter	<u>UNCERTAINTY</u>
Radio frequency	$\pm 0.8 \times 10^{-7}$
RF power, conducted	0.2054
Maximum frequency deviation:	
-within 300 Hz and 6 kHz of audio frequency	1.3%
-within 6 kHz and 25 kHz of audio frequency	0.65 dB
Adjacent channel power	0.2054
Conducted spurious emission of transmitter, valid up to 6 GHz	0.2892
Conducted emission of receivers	+1.2/-1.1 dB
Radiated emission of transmitter, valid up to 6 GHz	± 3.94 dB
Radiated emission of receiver, valid up to 6 GHz	± 3.94 dB
RF level uncertainty for a given BER	± 0.3 dB
Temperature	0.1979
Humidity	± 1 %

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.10Weiye Rd., Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

The sites are constructed in conformance with the requirements of ANSI C63.10:2013 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.



Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

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

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 200581-0 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, 2324E-1 for 10m chamber 10m, 2324E-2 for 10m chamber 3m; the test facilities are listed with USA, Certification and Engineering Bureau, 424105 for 10m chamber 10m, 238958 for 10m chamber 3m.

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	47 CFR FCC Part 15/18 (using ANSI C63.10 :2013); VCCI V3; CNS 13438; CNS 13439; CNS 13803; CISPR 11; EN 55011; CISPR 13; EN 55013; CISPR 22:2005; CISPR 22:1997 +A1 :2000+A2 :2002; EN 55022:2006; EN55022 :1998 +A1 :2001+A2 :2003; EN 61000-6-3 (excluding discontinuous interference); EN 61000-6-4; AS/NZS CISPR 22; CAN/CSA-CEI/IEC CISPR 22; EN 61000-3-2; EN 61000-3-3; EN550024; EN 61000-4-2; EN 61000-4-3; EN61000-4-4; EN 61000-4-5; EN 61000-4-6; IEC 61000-4-8; EN 61000-4-11; IEC61000-3-2; IEC61000-3-3; IEC 61000-4-2; IEC 61000-4-3; IEC 61000-4-4; IEC 61000-4-5; IEC 61000-4-6; IEC 61000-4-8; IEC 61000-4-11; EN 300 220-3; EN 300 328; EN 300 330-2; EN 300 440-1; EN 300-440-2; EN 300 893; EN 301 489-01; EN 301 489-3; EN 301 489-07; EN 301 489-17; 47 CFR FCC Part 15, 22, 24	
USA	FCC	3/10 meter Sites to perform FCC Part 15/18 measurements	 93105, 90471
Japan	VCCI	3/10 meter Sites and conducted test sites to perform radiated/conducted measurements	VCCI R-1600 C-1707 G-216

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*

6 SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

No.	Equipment	Model No.	Serial No.
1	Notebook	dell	E5430

Remark:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

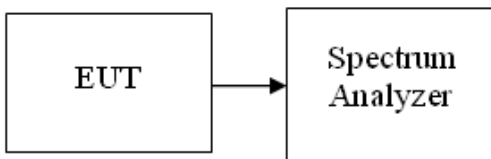
7 FCC PART 15 REQUIREMENTS

7.1 6 DB BANDWIDTH MEASUREMENT

LIMIT

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low-loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW =100KHz, VBW \geq 3RBW, Detector = Peak. Trace mode = max hold.
4. Measure the maximum width of the emission that is 6 dB down from the peak of the emission..
5. Measure and record the results in the test report

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11a mode/chain 0

5725~5850MHz

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	16.577	0.5
Mid	5785	16.562	0.5
High	5825	16.538	0.5

Test mode: IEEE 802.11a mode/chain 1

5725~5850MHz

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	16.607	0.5
Mid	5785	16.591	0.5
High	5825	16.548	0.5

Test mode: IEEE 802.11n HT20 mode/chain 0

5725~5850MHz

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	17.773	0.5
Mid	5785	17.809	0.5
High	5825	17.761	0.5

Test mode: IEEE 802.11n HT20 mode/chain 1

5725~5850MHz

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	17.789	0.5
Mid	5785	17.705	0.5
High	5825	17.764	0.5

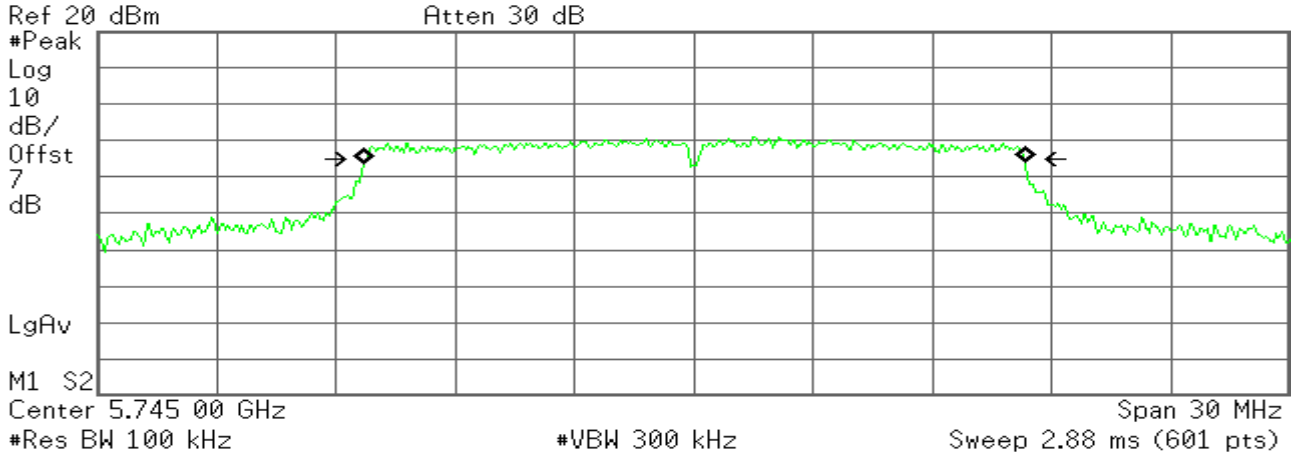
Test Plot

IEEE 802.11a mode/chain 0

6dB Bandwidth (CH Low)

Agilent

R T



Occupied Bandwidth
16.5990 MHz

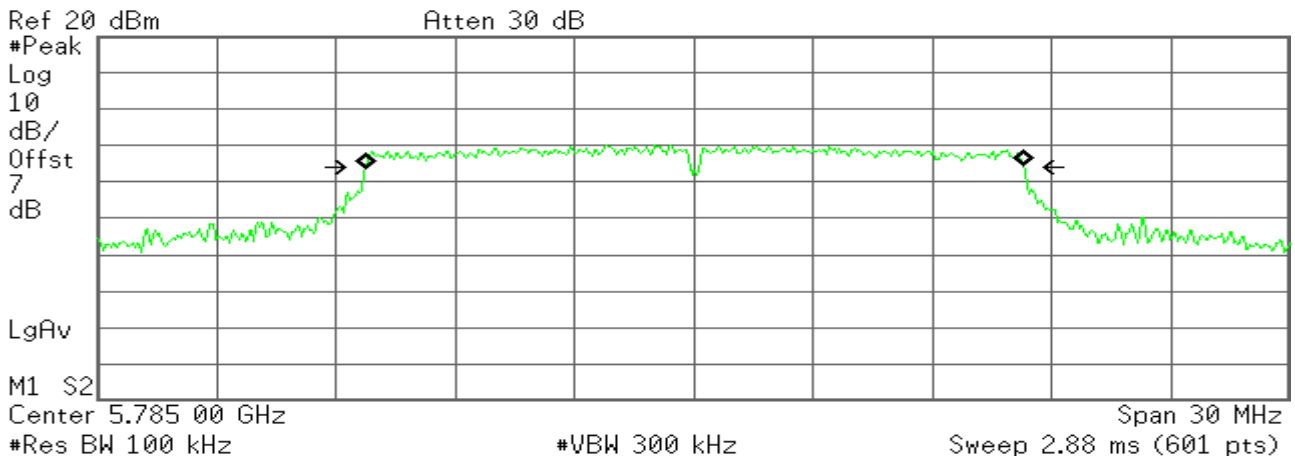
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 24.732 kHz
x dB Bandwidth 16.577 MHz

6dB Bandwidth (CH Mid)

Agilent

R T



Occupied Bandwidth
16.5587 MHz

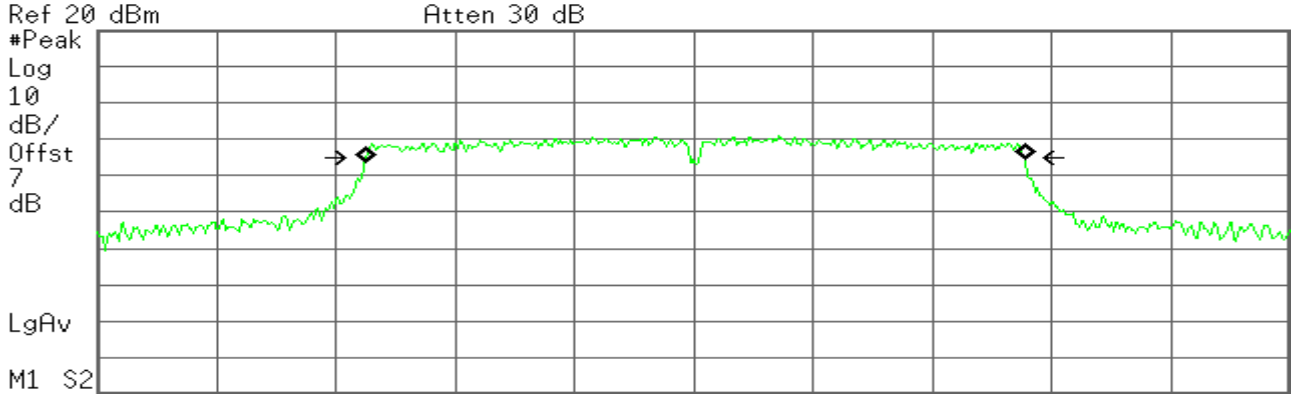
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 26.356 kHz
x dB Bandwidth 16.562 MHz

6dB Bandwidth (CH High)

Agilent

R T



Center 5.825 00 GHz Span 30 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 2.88 ms (601 pts)

Occupied Bandwidth
16.5714 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

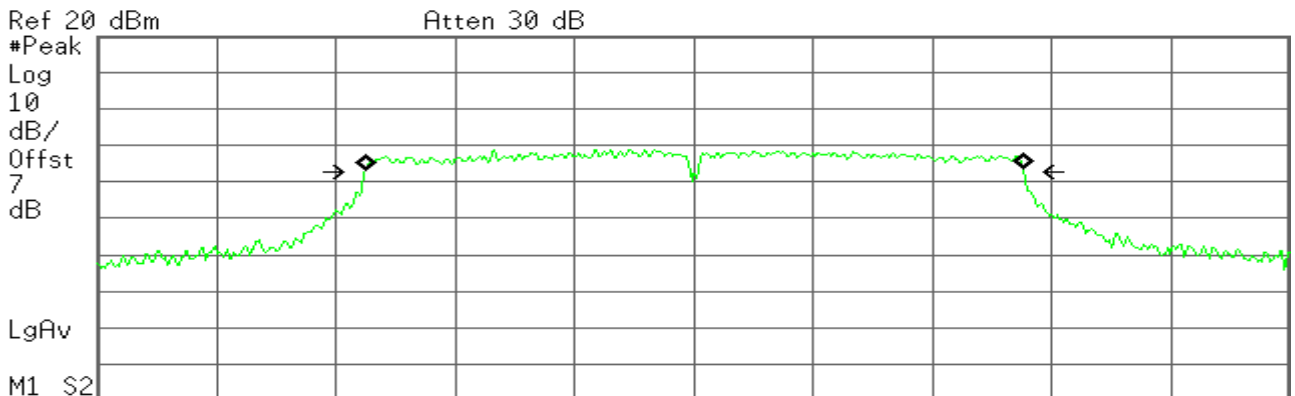
Transmit Freq Error 27.832 kHz
x dB Bandwidth 16.538 MHz

IEEE 802.11a mode/chain 1

6dB Bandwidth (CH Low)

Agilent

R T



Center 5.745 00 GHz Span 30 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 2.88 ms (601 pts)

Occupied Bandwidth
16.5568 MHz

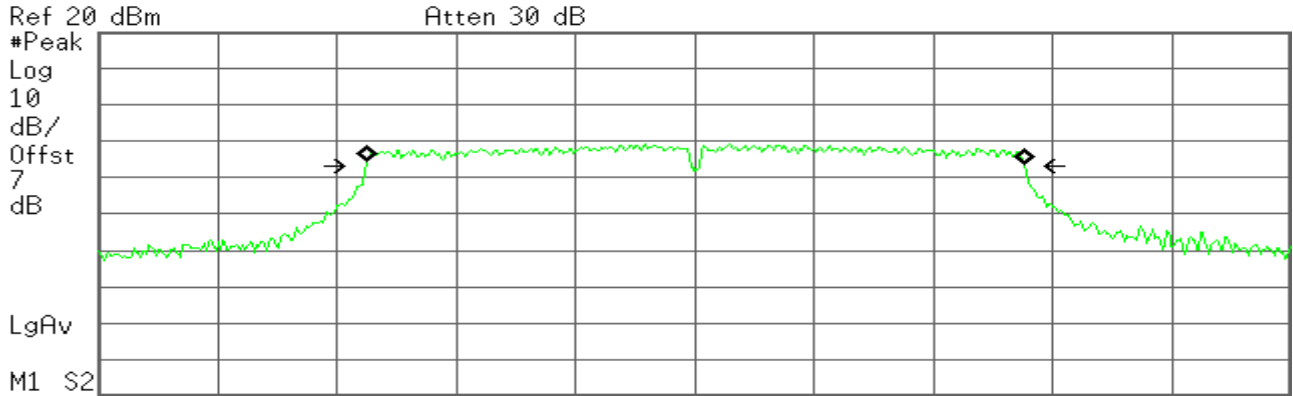
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 22.526 kHz
x dB Bandwidth 16.607 MHz

6dB Bandwidth (CH Mid)

Agilent

R T



Ref 20 dBm Atten 30 dB
 #Peak
 Log
 10
 dB/
 Offst
 7
 dB
 LgAv
 M1 S2
 Center 5.785 00 GHz Span 30 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 2.88 ms (601 pts)

Occupied Bandwidth
16.5556 MHz

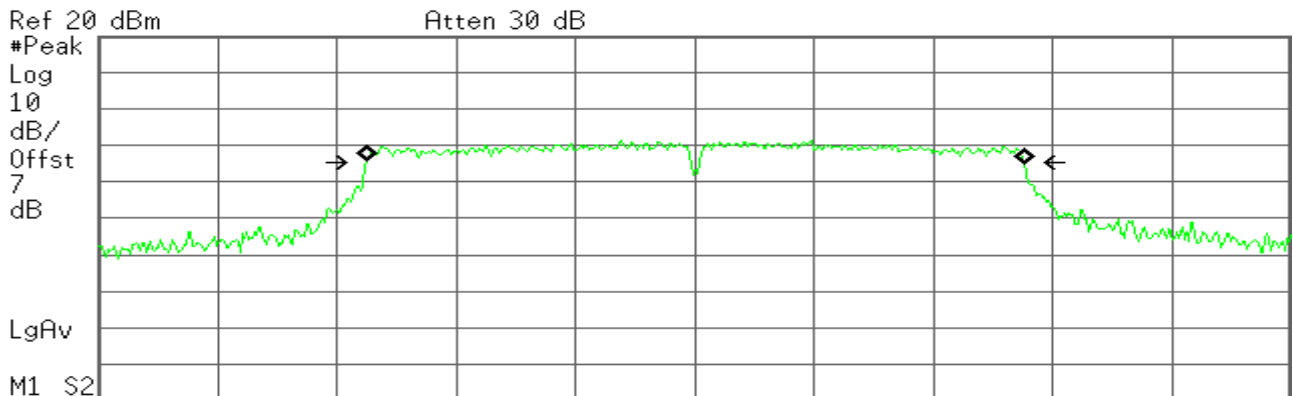
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 27.238 kHz
x dB Bandwidth 16.591 MHz

6dB Bandwidth (CH High)

Agilent

R T



Ref 20 dBm Atten 30 dB
 #Peak
 Log
 10
 dB/
 Offst
 7
 dB
 LgAv
 M1 S2
 Center 5.825 00 GHz Span 30 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 2.88 ms (601 pts)

Occupied Bandwidth
16.5311 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

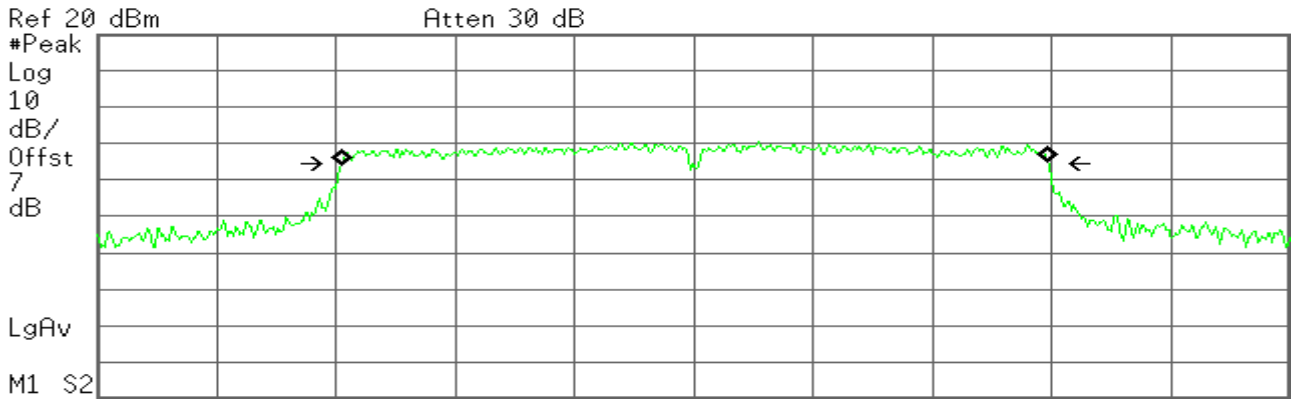
Transmit Freq Error 31.821 kHz
x dB Bandwidth 16.548 MHz

IEEE 802.11n HT20 mode/chain 0

6dB Bandwidth (CH Low)

Agilent

R T



Ref 20 dBm Atten 30 dB
 #Peak Log 10 dB/ Offst 7 dB
 LgAv
 M1 S2
 Center 5.745 00 GHz Span 30 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 2.88 ms (601 pts)

Occupied Bandwidth
17.7539 MHz

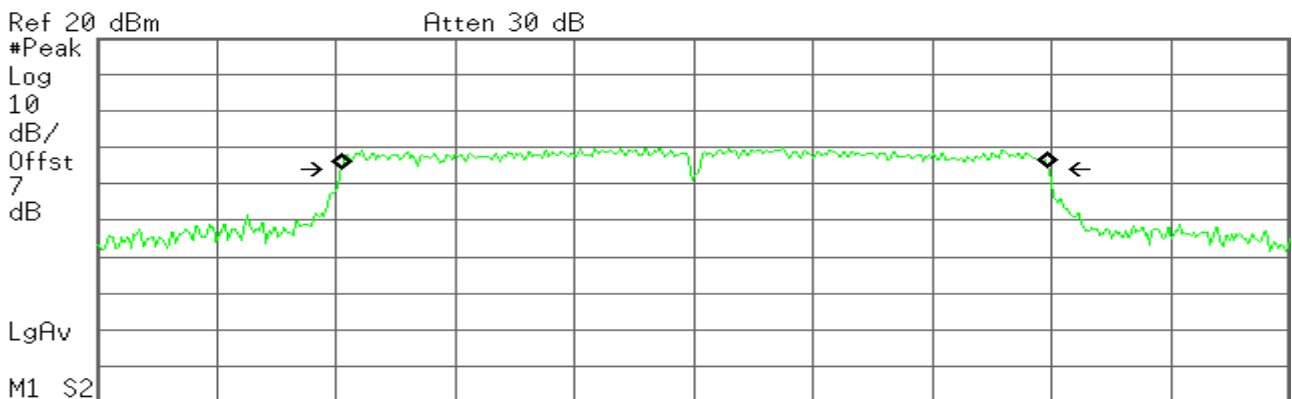
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 31.764 kHz
x dB Bandwidth 17.773 MHz

6dB Bandwidth (CH Mid)

Agilent

R T



Ref 20 dBm Atten 30 dB
 #Peak Log 10 dB/ Offst 7 dB
 LgAv
 M1 S2
 Center 5.785 00 GHz Span 30 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 2.88 ms (601 pts)

Occupied Bandwidth
17.7558 MHz

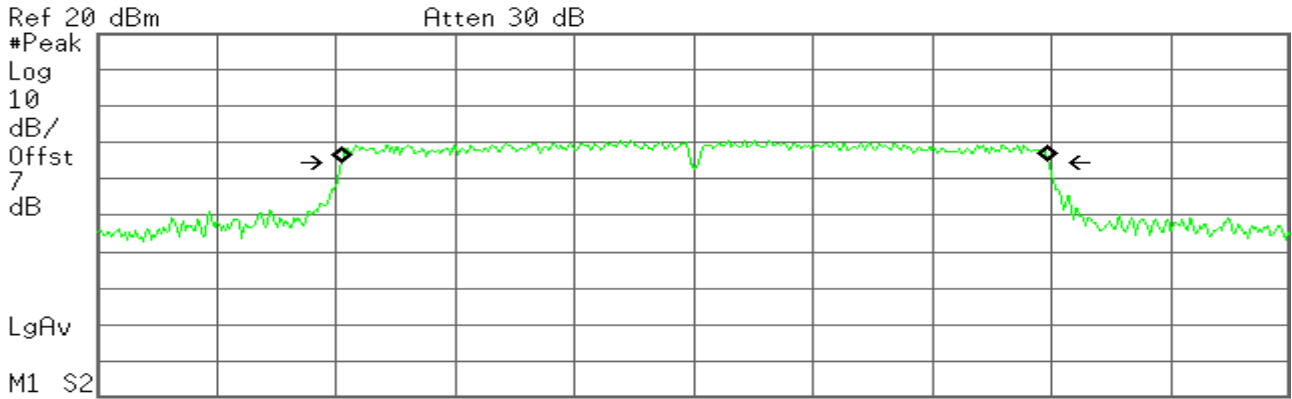
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 23.681 kHz
x dB Bandwidth 17.809 MHz

6dB Bandwidth (CH High)

Agilent

R T



Center 5.825 00 GHz

Span 30 MHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 2.88 ms (601 pts)

Occupied Bandwidth
17.7498 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

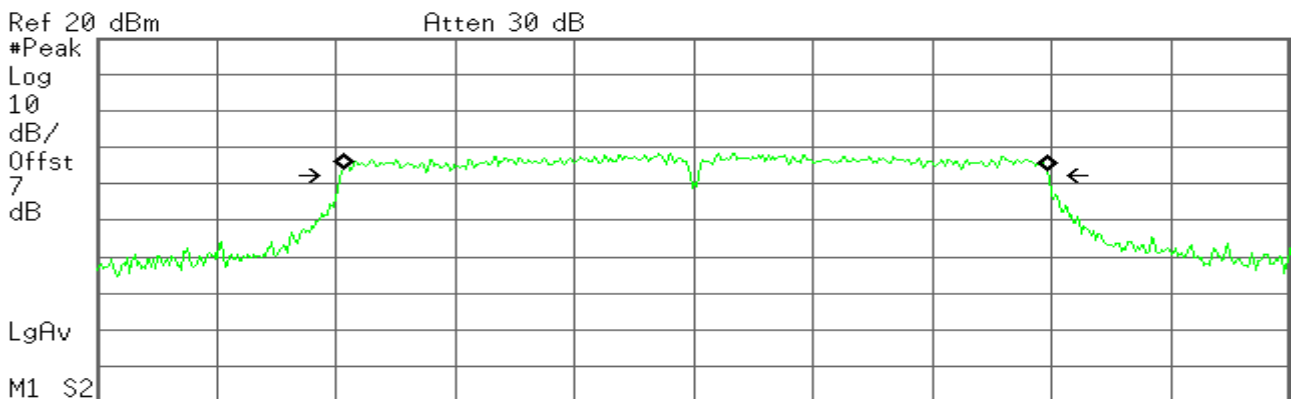
Transmit Freq Error 38.840 kHz
x dB Bandwidth 17.761 MHz

IEEE 802.11n HT20 mode/chain 1

6dB Bandwidth (CH Low)

Agilent

R T



Center 5.745 00 GHz

Span 30 MHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 2.88 ms (601 pts)

Occupied Bandwidth
17.6892 MHz

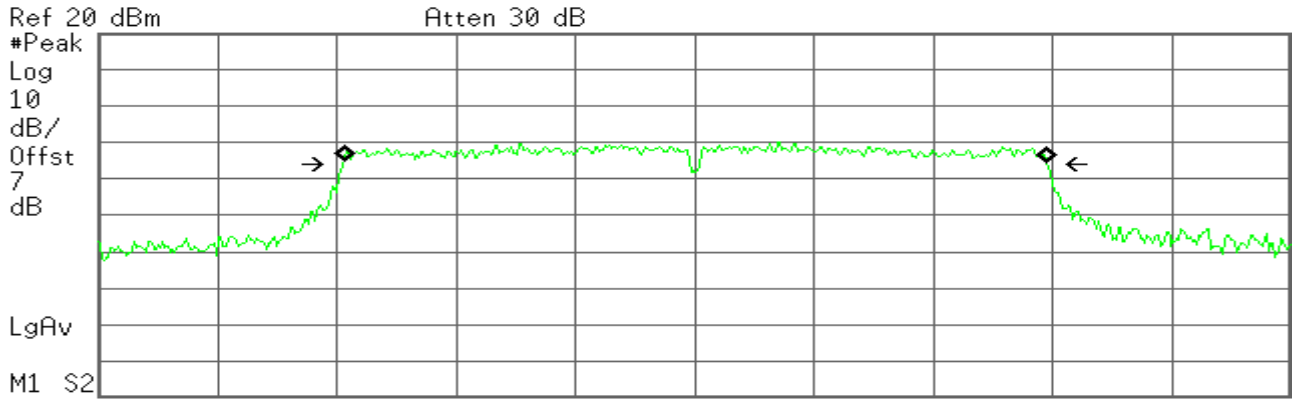
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 25.544 kHz
x dB Bandwidth 17.789 MHz

6dB Bandwidth (CH Mid)

Agilent

R T



Center 5.785 00 GHz Span 30 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 2.88 ms (601 pts)

Occupied Bandwidth
17.6691 MHz

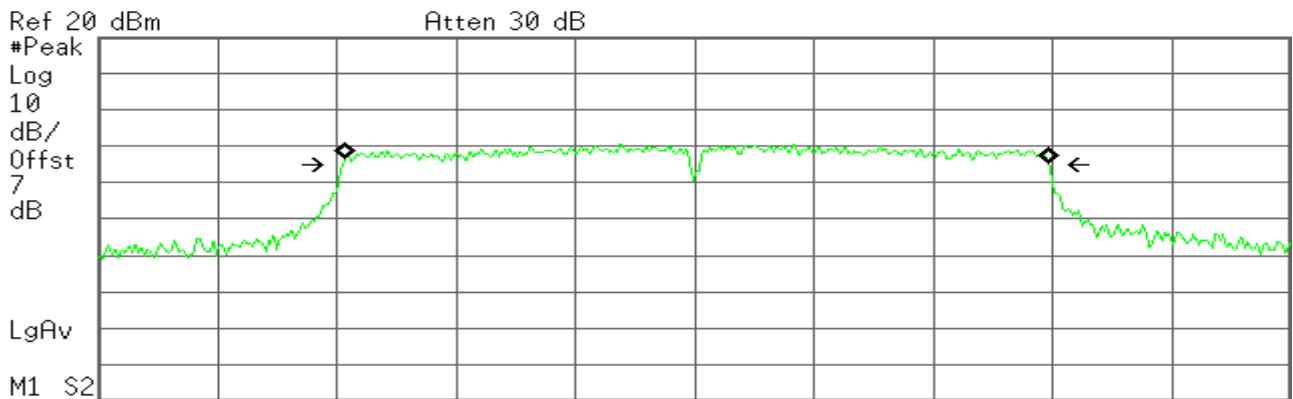
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 18.243 kHz
x dB Bandwidth 17.705 MHz

6dB Bandwidth (CH High)

Agilent

R T



Center 5.825 00 GHz Span 30 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 2.88 ms (601 pts)

Occupied Bandwidth
17.6746 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

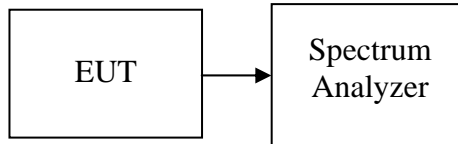
Transmit Freq Error 35.745 kHz
x dB Bandwidth 17.764 MHz

7.2 99% BANDWIDTH MEASUREMENT

LIMIT

None; for reporting purposes only
RSS-Gen 4.6.1

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to close to 1% of the selected span as is possible without being below 1%. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

TEST RESULTS

No non-compliance noted

Test Data

IEEE 802.11a mode / Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)	Result
Low	5745	16.8771	PASS
Mid	5785	16.9762	PASS
High	5825	16.9937	PASS

IEEE 802.11a mode / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Result
Low	5745	16.7546	PASS
Mid	5785	16.8285	PASS
High	5825	16.8342	PASS

IEEE 802.11n HT20 mode / Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)	Result
Low	5745	17.9553	PASS
Mid	5785	17.9832	PASS
High	5825	18.0744	PASS

IEEE 802.11n HT20 mode / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Result
Low	5745	17.8992	PASS
Mid	5785	17.9264	PASS
High	5825	17.8538	PASS

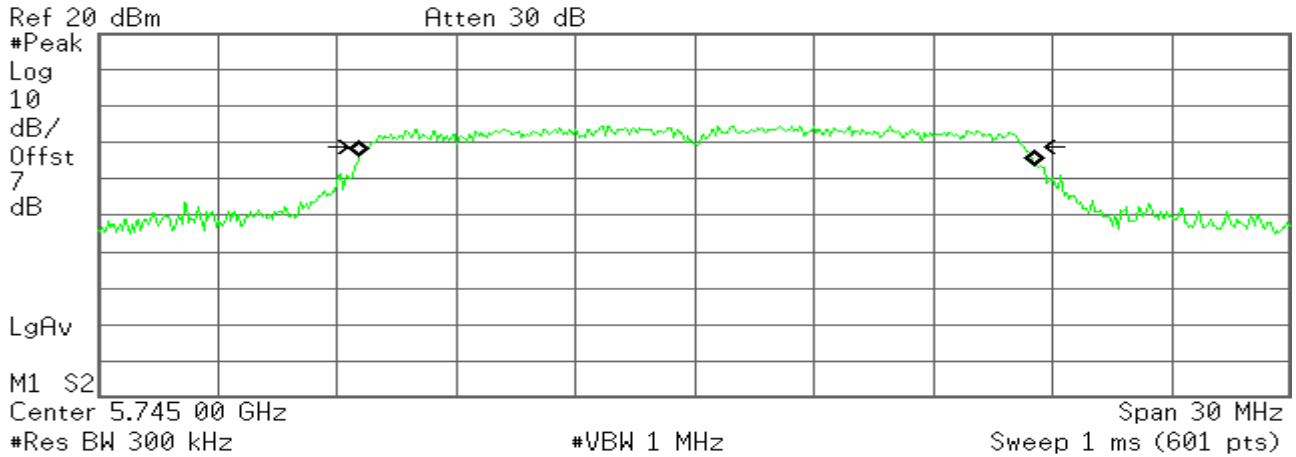
Test Plot

IEEE 802.11n MODE/chain 0

99% Bandwidth (CH Low)

Agilent

R T



Occupied Bandwidth
16.8771 MHz

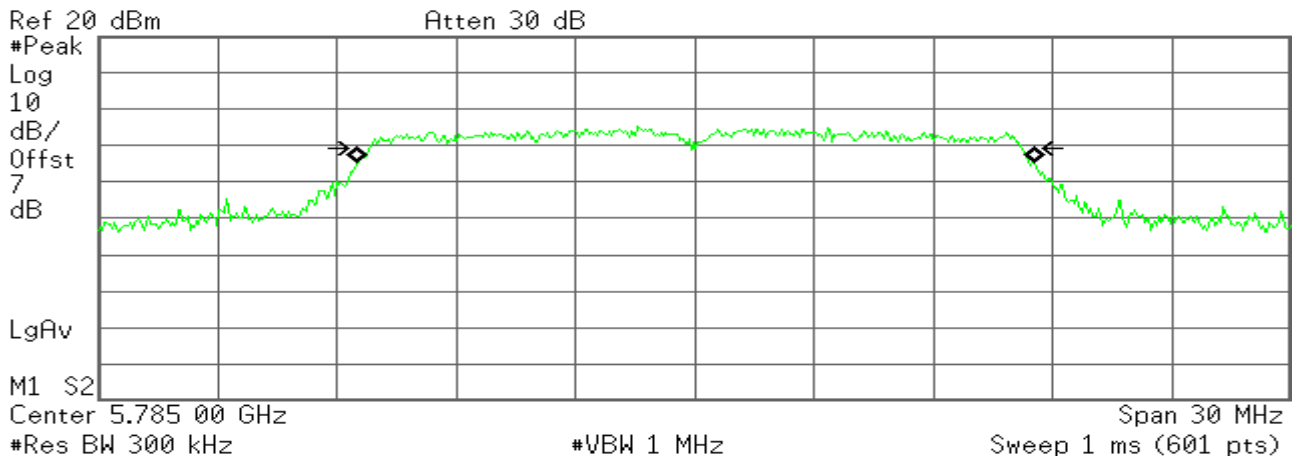
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 26.796 kHz
x dB Bandwidth 16.431 MHz

99% Bandwidth (CH Mid)

Agilent

R T



Occupied Bandwidth
16.9672 MHz

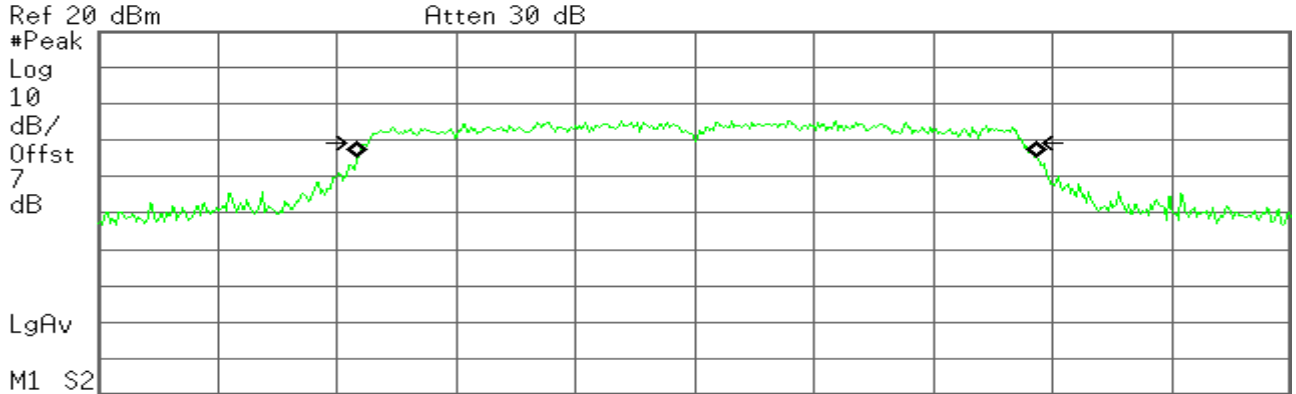
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 36.272 kHz
x dB Bandwidth 16.433 MHz

99% Bandwidth (CH High)

Agilent

R T



Center 5.825 00 GHz

Span 30 MHz

#Res BW 300 kHz

#VBW 1 MHz

Sweep 1 ms (601 pts)

Occupied Bandwidth
16.9937 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

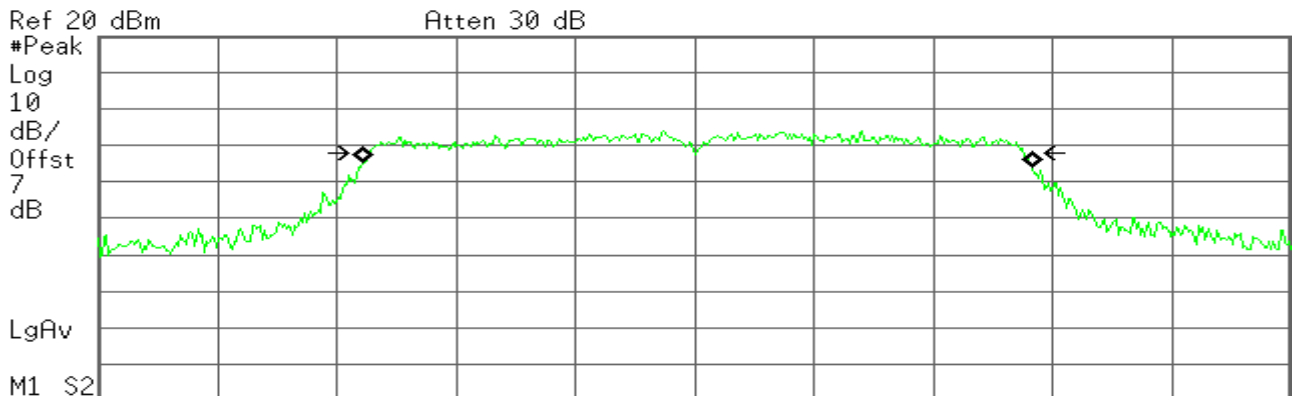
Transmit Freq Error 39.273 kHz
x dB Bandwidth 16.458 MHz

IEEE 802.11n MODE/chain 1

99% Bandwidth (CH Low)

Agilent

R T



Center 5.745 00 GHz

Span 30 MHz

#Res BW 300 kHz

#VBW 1 MHz

Sweep 1 ms (601 pts)

Occupied Bandwidth
16.7546 MHz

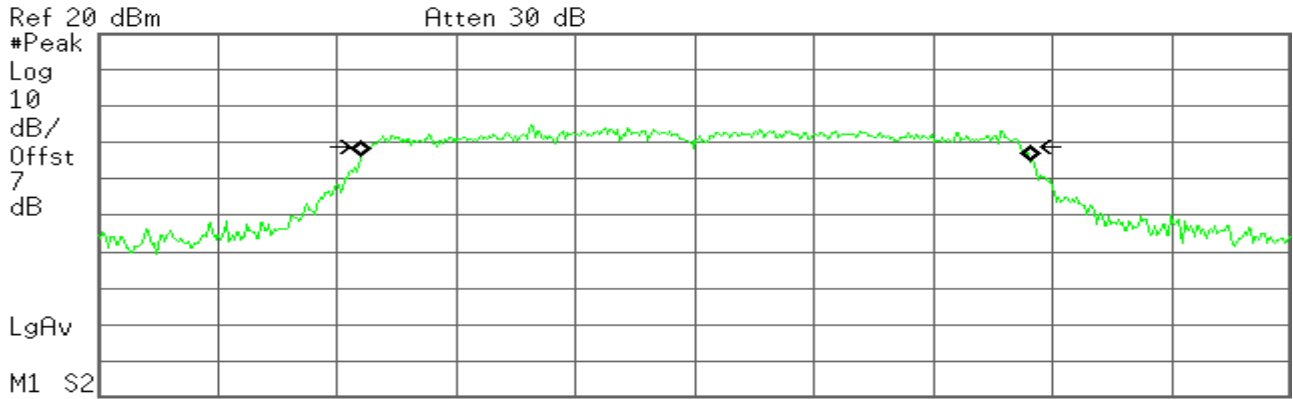
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 53.909 kHz
x dB Bandwidth 16.406 MHz

99% Bandwidth (CH Mid)

Agilent

R T



Ref 20 dBm Atten 30 dB
 #Peak
 Log
 10
 dB/
 Offst
 7
 dB
 LgAv
 M1 S2
 Center 5.785 00 GHz Span 30 MHz
 #Res BW 300 kHz #VBW 1 MHz Sweep 1 ms (601 pts)

Occupied Bandwidth
16.8285 MHz

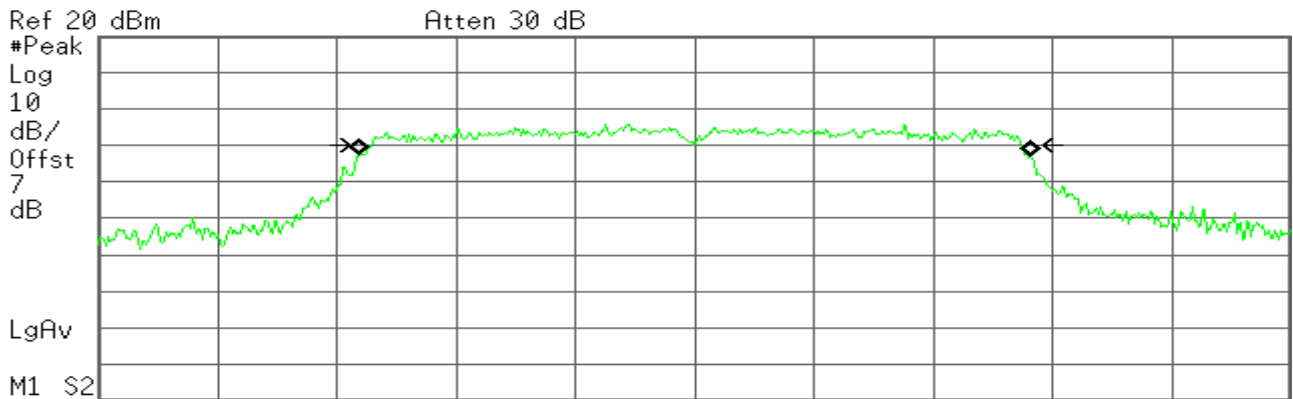
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 24.682 kHz
x dB Bandwidth 16.319 MHz

99% Bandwidth (CH High)

Agilent

R T



Ref 20 dBm Atten 30 dB
 #Peak
 Log
 10
 dB/
 Offst
 7
 dB
 LgAv
 M1 S2
 Center 5.825 00 GHz Span 30 MHz
 #Res BW 300 kHz #VBW 1 MHz Sweep 1 ms (601 pts)

Occupied Bandwidth
16.8342 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

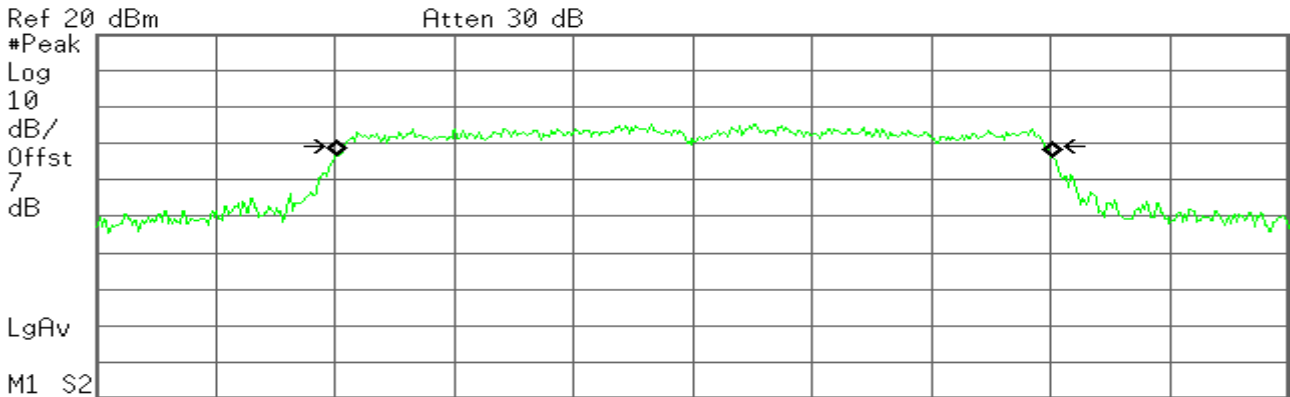
Transmit Freq Error 19.407 kHz
x dB Bandwidth 16.313 MHz

IEEE 802.11n HT20 MODE/chain 0

99% Bandwidth (CH Low)

Agilent

R T



Center 5.745 00 GHz

Span 30 MHz

#Res BW 300 kHz

#VBW 1 MHz

Sweep 1 ms (601 pts)

Occupied Bandwidth
17.9553 MHz

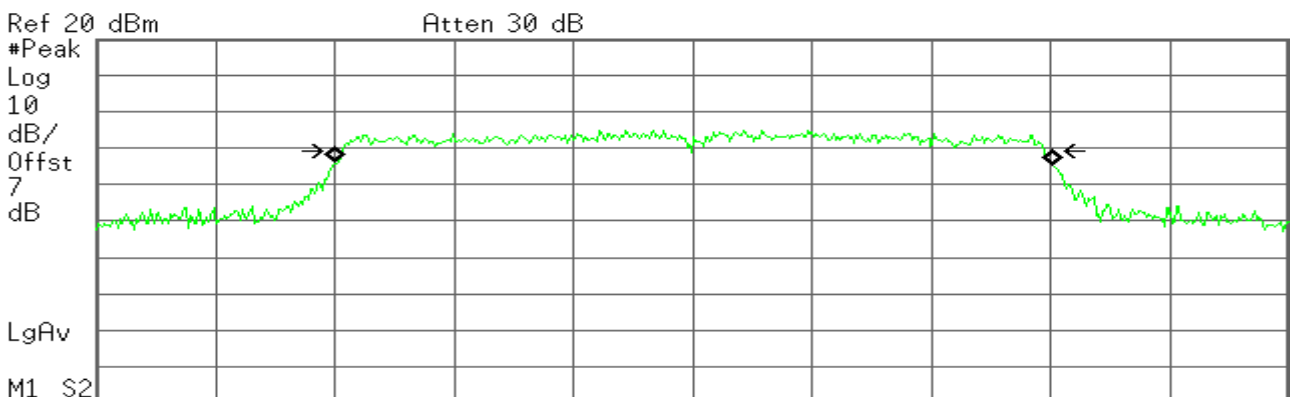
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 46.929 kHz
x dB Bandwidth 17.491 MHz

99% Bandwidth (CH Mid)

Agilent

R T



Center 5.785 00 GHz

Span 30 MHz

#Res BW 300 kHz

#VBW 1 MHz

Sweep 1 ms (601 pts)

Occupied Bandwidth
17.9832 MHz

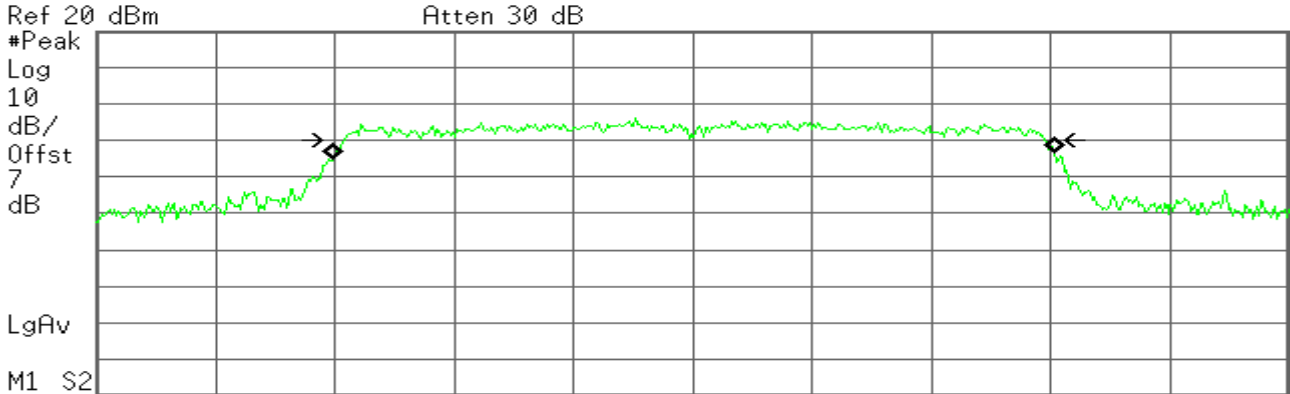
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 44.243 kHz
x dB Bandwidth 17.661 MHz

99% Bandwidth (CH High)

Agilent

R T



Center 5.825 00 GHz

Span 30 MHz

#Res BW 300 kHz

#VBW 1 MHz

Sweep 1 ms (601 pts)

Occupied Bandwidth
18.0744 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

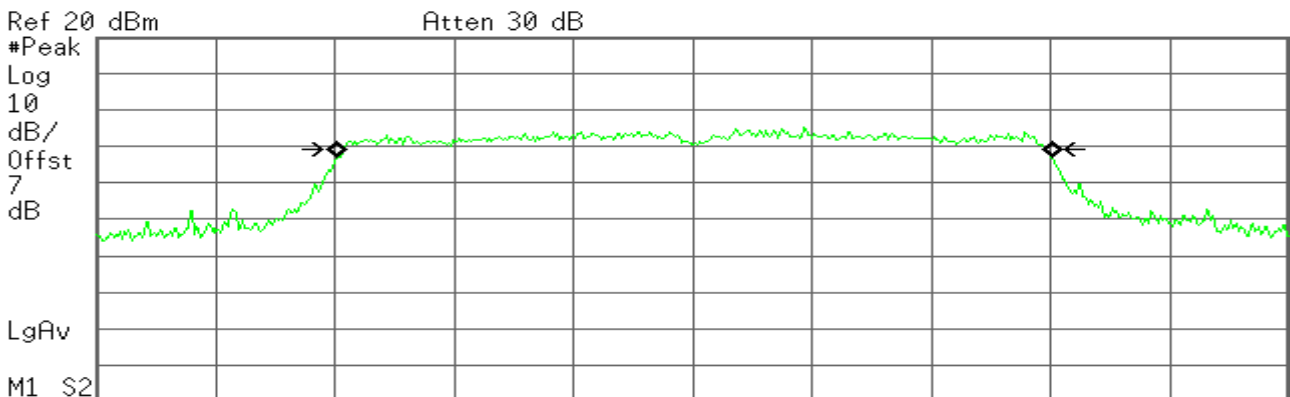
Transmit Freq Error 59.245 kHz
x dB Bandwidth 17.663 MHz

IEEE 802.11n HT20 MODE/chain 1

99% Bandwidth (CH Low)

Agilent

R T



Center 5.745 00 GHz

Span 30 MHz

#Res BW 300 kHz

#VBW 1 MHz

Sweep 1 ms (601 pts)

Occupied Bandwidth
17.8992 MHz

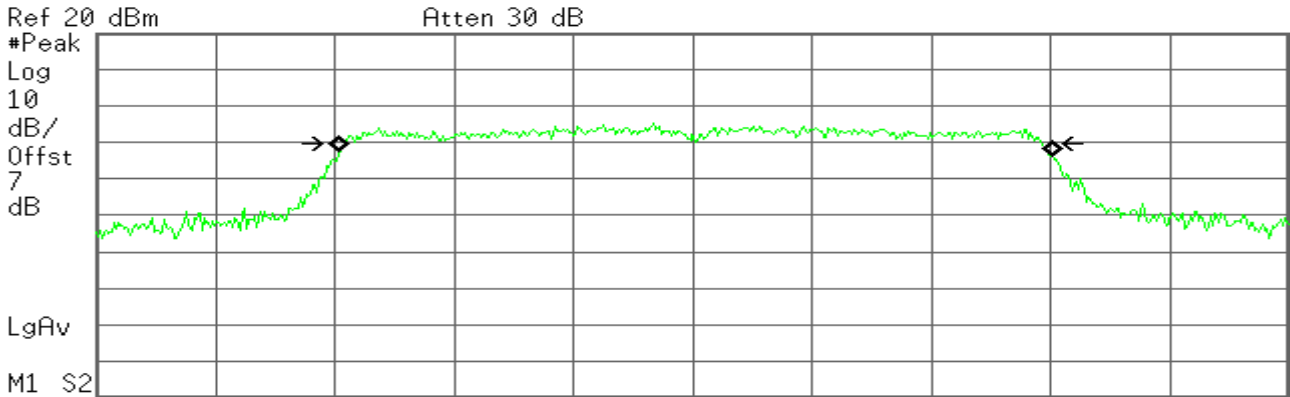
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 54.193 kHz
x dB Bandwidth 17.616 MHz

99% Bandwidth (CH Mid)

Agilent

R T



Ref 20 dBm Atten 30 dB
 #Peak Log 10 dB/Offst 7 dB
 M1 S2 Center 5.785 00 GHz Span 30 MHz
 #Res BW 300 kHz #VBW 1 MHz Sweep 1 ms (601 pts)

Occupied Bandwidth
17.9264 MHz

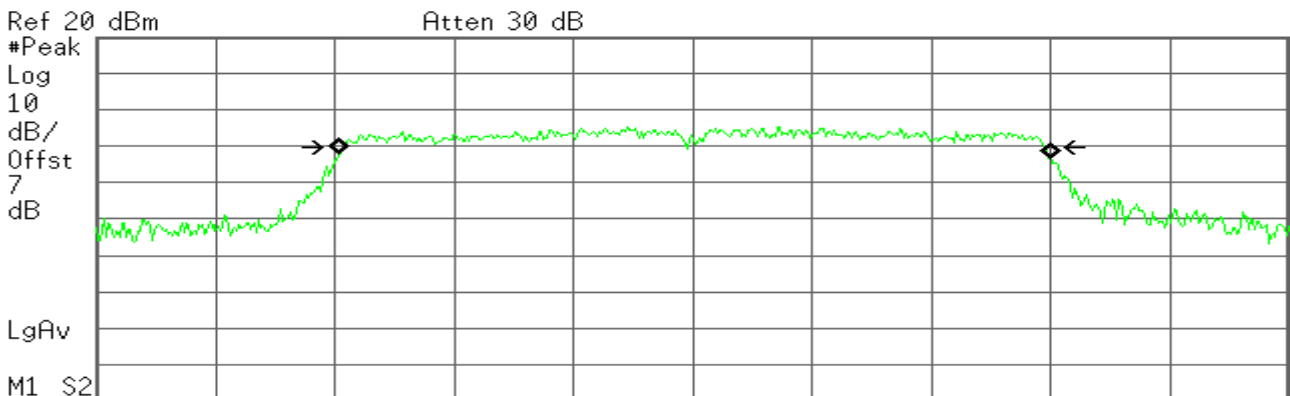
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 61.038 kHz
x dB Bandwidth 17.600 MHz

99% Bandwidth (CH High)

Agilent

R T



Ref 20 dBm Atten 30 dB
 #Peak Log 10 dB/Offst 7 dB
 M1 S2 Center 5.825 00 GHz Span 30 MHz
 #Res BW 300 kHz #VBW 1 MHz Sweep 1 ms (601 pts)

Occupied Bandwidth
17.8538 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 42.189 kHz
x dB Bandwidth 17.671 MHz

7.3 MAXIMUM CONDUCTED OUTPUT POWER

LIMIT

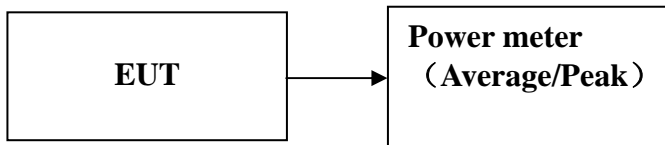
According to §15.407(a),

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

The peak power shall not exceed the limit as follow:

Test Configuration



The EUT was connected to a spectrum analyzer through a 50Ω RF cable.

TEST PROCEDURE

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, $10 \log(1/x)$, where x is the duty cycle.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11a mode

5725~5850MHz

Channel	Frequency (MHz)	Average Conducted Power (dBm)		Limit (dBm)
		Chain 0	Chain 1	
Low	5745	3.46	3.04	30
Mid	5785	4.22	3.93	30
High	5825	5.25	5.14	30

Test mode: IEEE 802.11n HT20 mode

5725~5850MHz

Channel	Frequency (MHz)	Average Conducted Power (dBm)		Limit (dBm)
		Chain 0	Chain 1	
Low	5745	2.92	3.42	30
Mid	5785	3.53	4.27	30
High	5825	4.70	4.46	30

Note:Duty factor has been offsetted with cableloss

7.4 BAND EDGES MEASUREMENT

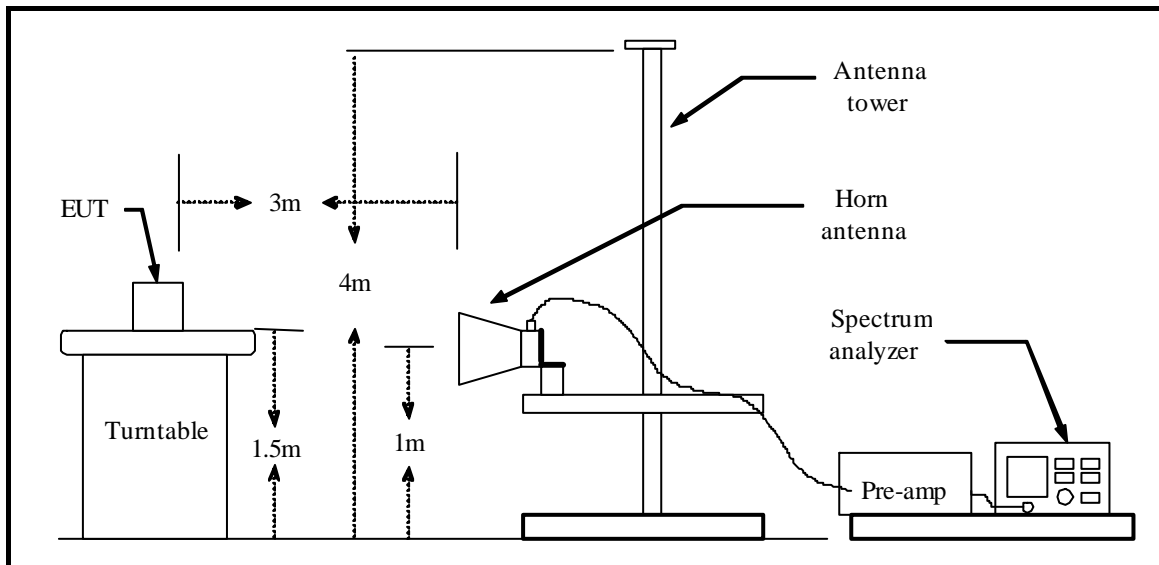
LIMIT

According to §15.407(b),

(1) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

Test Configuration



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

TEST RESULTS

Refer to attach spectrum analyzer data chart.

Operation Mode:	Tx / IEEE 802.11a mode CH/ Low	Test Date:	2015-9-7
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5713.486	52.19	6.35	58.54	68.20	-9.66	100	101	peak
2	5724.856	65.47	6.37	71.84	78.20	-6.36	100	101	peak
3	N/A								

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5711.899	49.95	6.35	56.30	68.20	-11.90	100	76	peak
2	5724.063	60.08	6.37	66.45	78.20	-11.75	100	84	peak
3	N/A								

Operation Mode:	Tx / IEEE 802.11a mode/ CH High	Test Date:	2015-9-7
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5854.423	57.13	6.61	63.74	78.20	-14.46	100	76	peak
2	5860.288	48.38	6.62	55.00	68.20	-13.20	100	77	peak
3	N/A								

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5852.596	55.50	6.60	62.10	78.20	-16.10	100	1	peak
2	5864.327	46.58	6.62	53.20	68.20	-15.00	100	11	peak
3	N/A								

Operation Mode:	Tx / IEEE 802.11n HT20 mode/ CH Low	Test Date:	2015-9-7
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5712.692	54.95	6.35	61.30	68.20	-6.90	100	108	peak
2	5724.327	67.99	6.37	74.36	78.20	-3.84	100	260	peak
3	N/A								

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5712.869	51.22	6.35	57.57	68.20	-10.63	100	319	peak
2	5724.063	66.04	6.37	72.41	78.20	-5.79	100	319	peak
3	N/A								

Operation Mode:	Tx / IEEE 802.11n HT20 mode/ CH High	Test Date:	2015-9-7
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5850.865	60.01	6.60	66.61	78.20	-11.59	100	75	peak
2	5861.346	50.25	6.62	56.87	68.20	-11.33	100	74	peak
3	N/A								

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5850.769	57.34	6.60	63.94	78.20	-14.26	100	12	peak
2	5860.288	50.78	6.62	57.40	68.20	-10.80	100	55	peak
3	N/A								

7.5 POWER SPECTRAL DENSITY

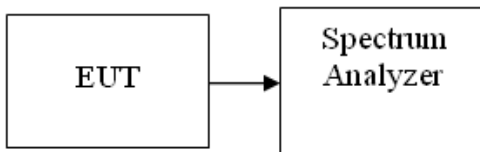
LIMIT

According to §15.407(a),

For the band 5.725–5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

If transmitting antennas of directional gain greater than 6dBi are used, both the maximum transmit power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Test Configuration



TEST PROCEDURE

1. The testing follows Method SA-2 of FCC KDB 789033 D01 General UNII Test Procedures v01r03.
2. Measure the duty cycle, Set span to encompass the entire emission bandwidth (EBW) of the signal. Set RBW = 300 kHz. Set VBW \geq 1 MHz. Number of points in sweep \geq 2 Span / RBW. Sweep time = auto. Detector = RMS, Trace average at least 100 traces in power averaging mode. Add $10 \log(500\text{kHz}/\text{RBW})$ to the test result. Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.
3. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
4. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (1): Measure and sum the spectra across the outputs. The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11a mode

5725~5850MHz

Channel	Frequency (MHz)	Average PSD (dBm/300kHz)		10log (500kHz/ RBW) Factor(dB)	Total Average PSD (dBm/500kHz)		Average PSD Limit (dBm/500kHz)	Result
		Chain 0	Chain 1		Chain 0	Chain 1		
Low	5745	-4.90	-5.18	2.22	-2.68	-2.96	30.00	PASS
Mid	5785	-4.74	-4.77	2.22	-2.52	-2.55	30.00	PASS
High	5825	-4.55	-3.53	2.22	-2.33	-1.31	30.00	PASS

Test mode: IEEE 802.11n HT20 mode

5725~5850MHz

Channel	Frequency (MHz)	Average PSD (dBm/300kHz)		10log (500kHz/ RBW) Factor(dB)	Total Average PSD (dBm/500kHz)		Average PSD Limit (dBm/500kHz)	Result
		Chain 0	Chain 1		Chain 0	Chain 1		
Low	5745	-4.86	-5.99	2.22	-2.64	-3.77	30.00	PASS
Mid	5785	-5.70	-5.09	2.22	-3.48	-2.87	30.00	PASS
High	5825	-4.58	-3.56	2.22	-2.36	-1.34	30.00	PASS

Note:Duty factor has been offsetted with cableloss

Test Plot

IEEE 802.11a mode/chain 0

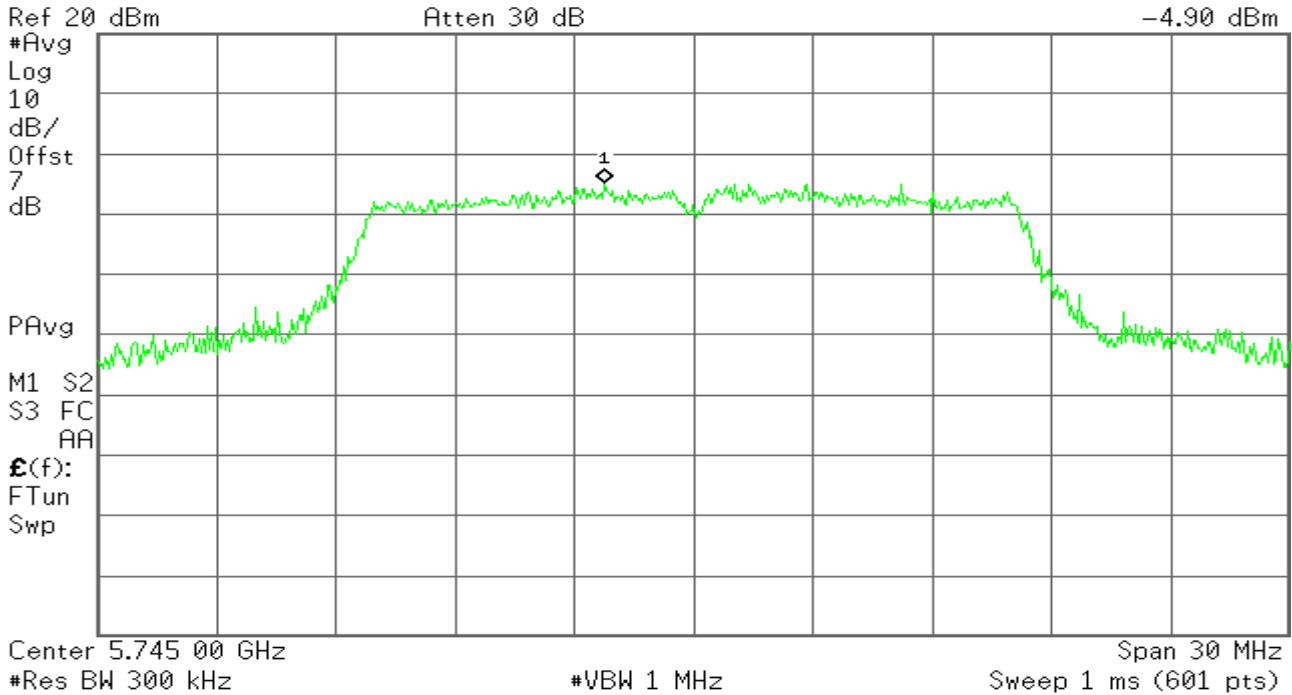
5725~5850MHz

CH Low

Agilent

R T

Mkr1 5.742 75 GHz
-4.90 dBm

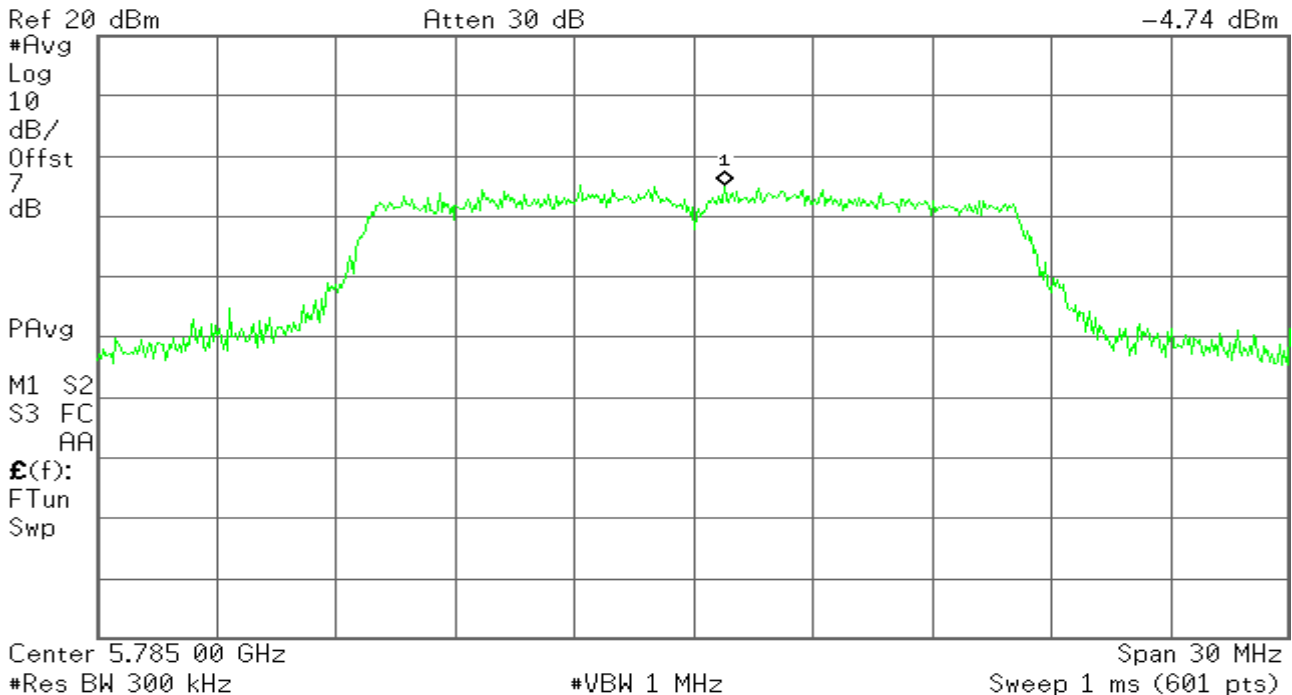


CH Mid

Agilent

R T

Mkr1 5.785 80 GHz
-4.74 dBm

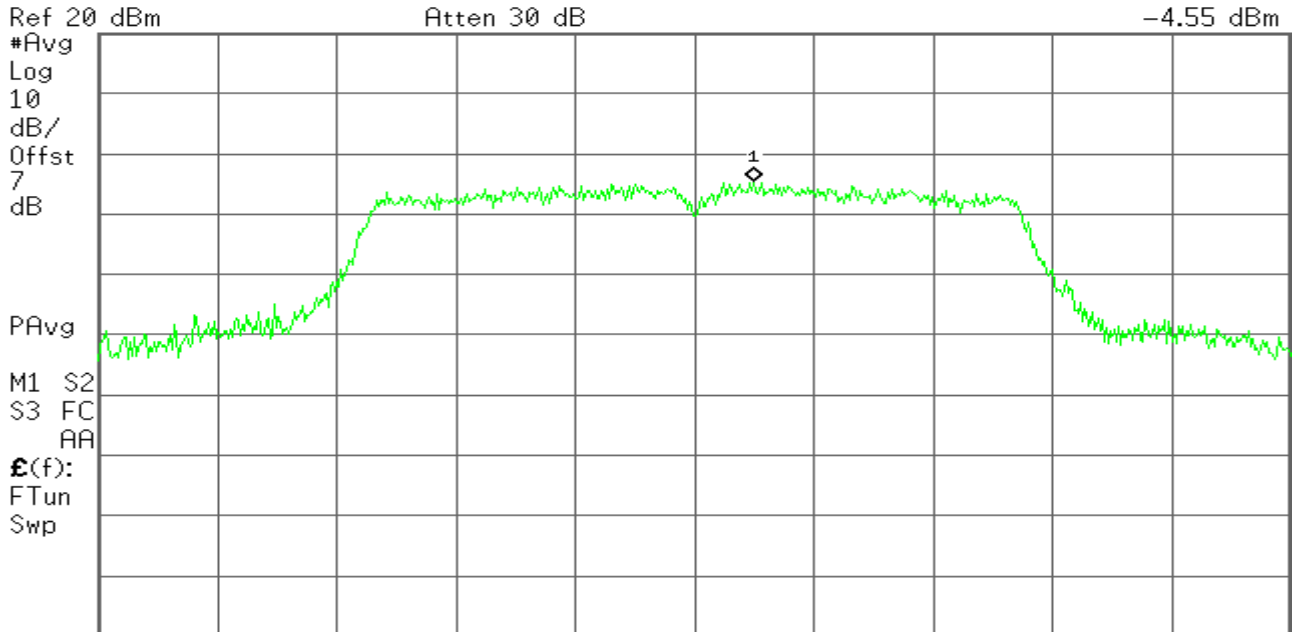


CH High

Agilent

R T

Mkr1 5.826 50 GHz
-4.55 dBm



Center 5.825 00 GHz Span 30 MHz
#Res BW 300 kHz #VBW 1 MHz Sweep 1 ms (601 pts)

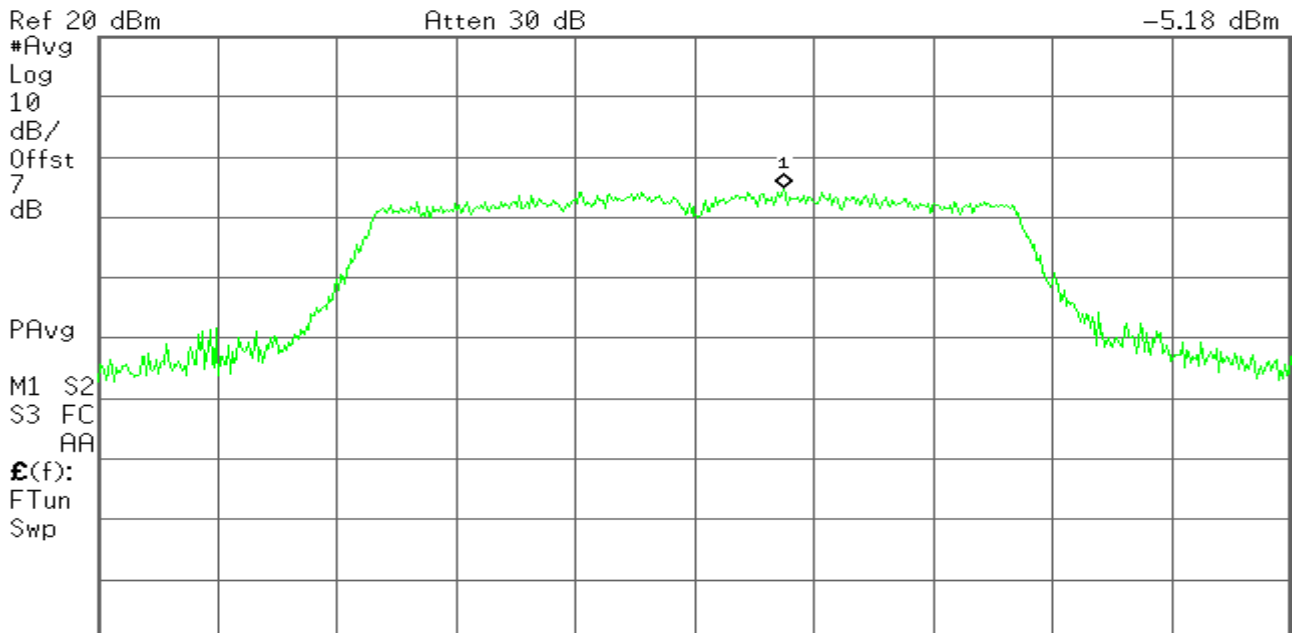
**IEEE 802.11n mode/chain 1
5725~5850MHz**

CH Low

Agilent

R T

Mkr1 5.747 25 GHz
-5.18 dBm



Center 5.745 00 GHz Span 30 MHz
#Res BW 300 kHz #VBW 1 MHz Sweep 1 ms (601 pts)

CH Mid

Agilent

R T

Mkr1 5.783 40 GHz
-4.77 dBm

Ref 20 dBm

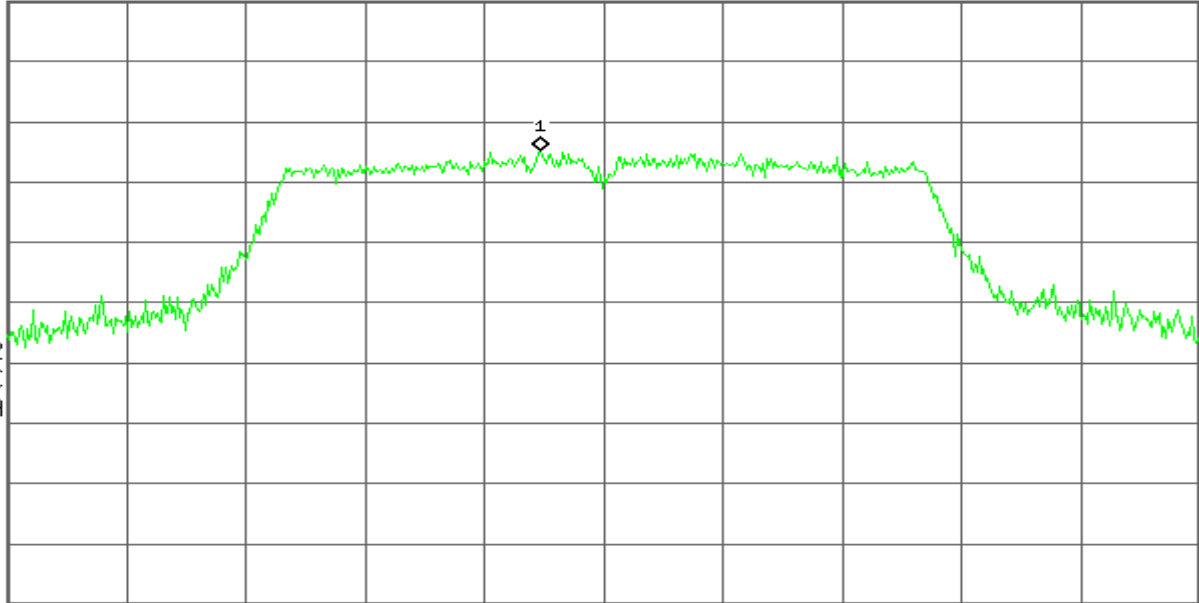
Atten 30 dB

#Avg
Log
10
dB/
Offst
7
dB

PAvg

M1 S2
S3 FC
AA

£(f):
FTun
Swp



Center 5.785 00 GHz

Span 30 MHz

#Res BW 300 kHz

#VBW 1 MHz

Sweep 1 ms (601 pts)

CH High

Agilent

R T

Mkr1 5.826 10 GHz
-3.53 dBm

Ref 20 dBm

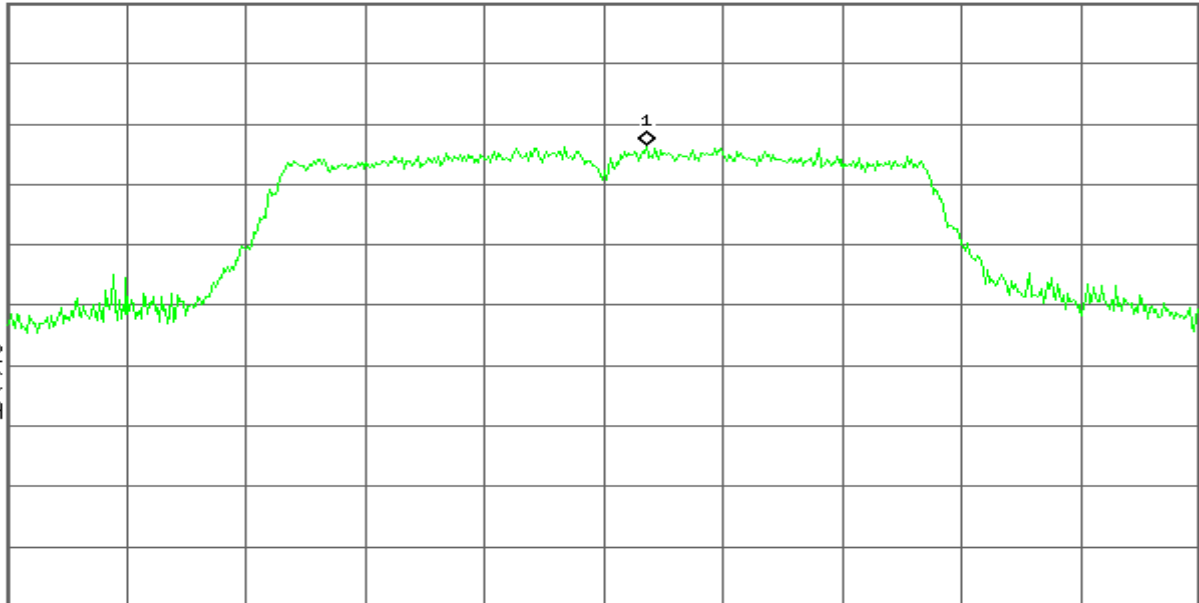
Atten 30 dB

#Avg
Log
10
dB/
Offst
7
dB

PAvg

M1 S2
S3 FC
AA

£(f):
FTun
Swp



Center 5.825 00 GHz

Span 30 MHz

#Res BW 300 kHz

#VBW 1 MHz

Sweep 1 ms (601 pts)

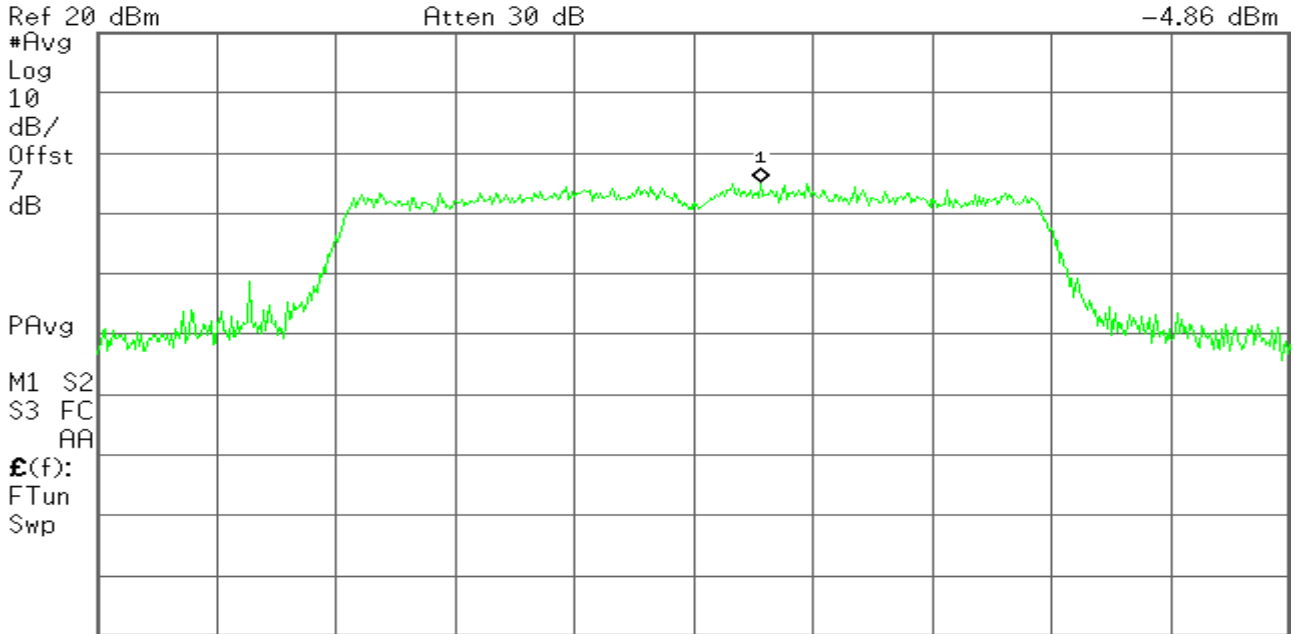
IEEE 802.11n HT20 mode/chain 0
5725~5850MHz

CH Low

Agilent

R T

Mkr1 5.746 70 GHz
-4.86 dBm



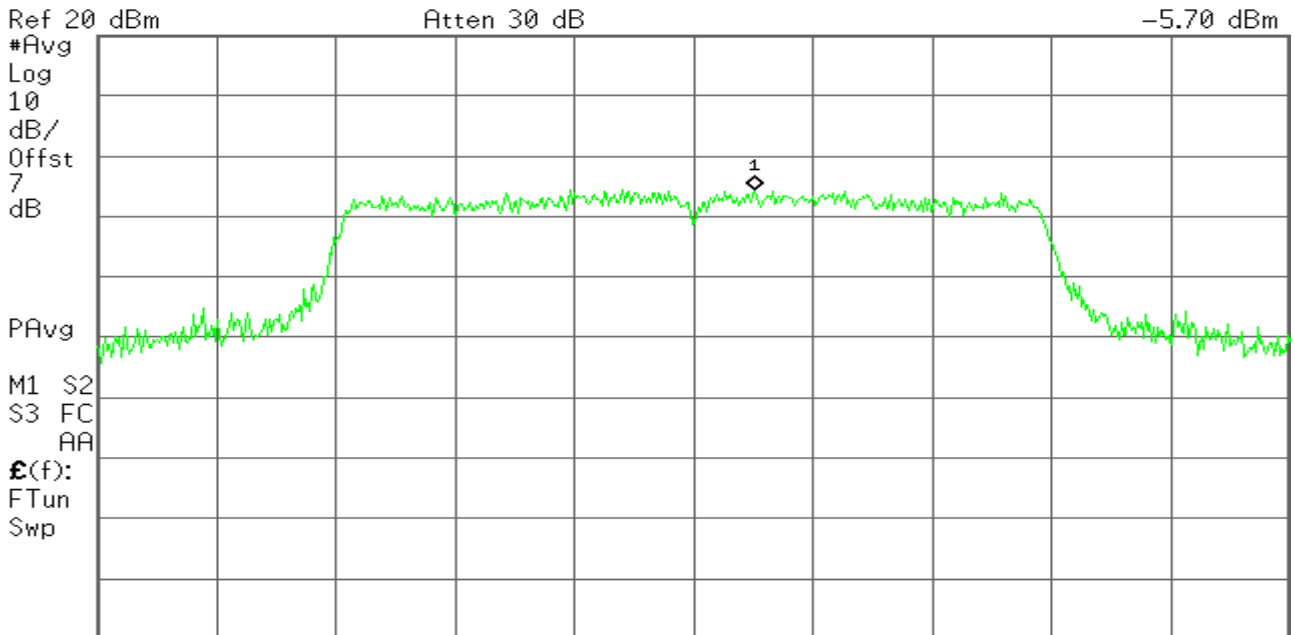
Center 5.745 00 GHz Span 30 MHz
#Res BW 300 kHz #VBW 1 MHz Sweep 1 ms (601 pts)

CH Mid

Agilent

R T

Mkr1 5.786 55 GHz
-5.70 dBm



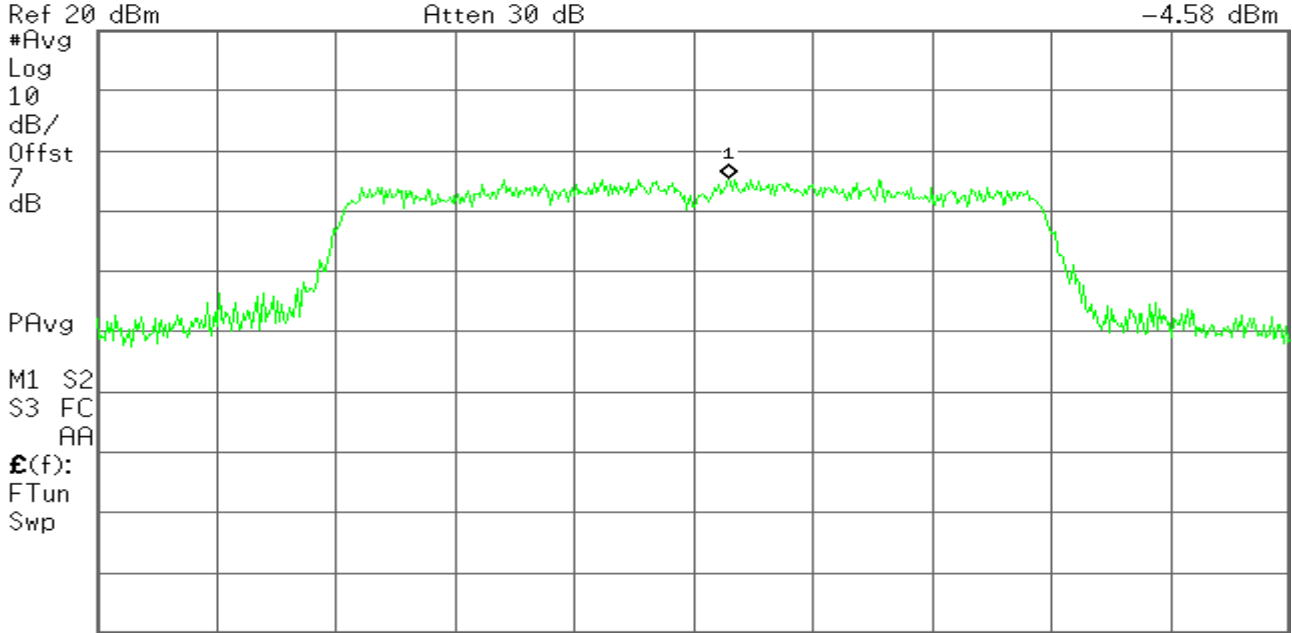
Center 5.785 00 GHz Span 30 MHz
#Res BW 300 kHz #VBW 1 MHz Sweep 1 ms (601 pts)

CH High

Agilent

R T

Mkr1 5.825 90 GHz
-4.58 dBm



Center 5.825 00 GHz
#Res BW 300 kHz

#VBW 1 MHz

Span 30 MHz
Sweep 1 ms (601 pts)

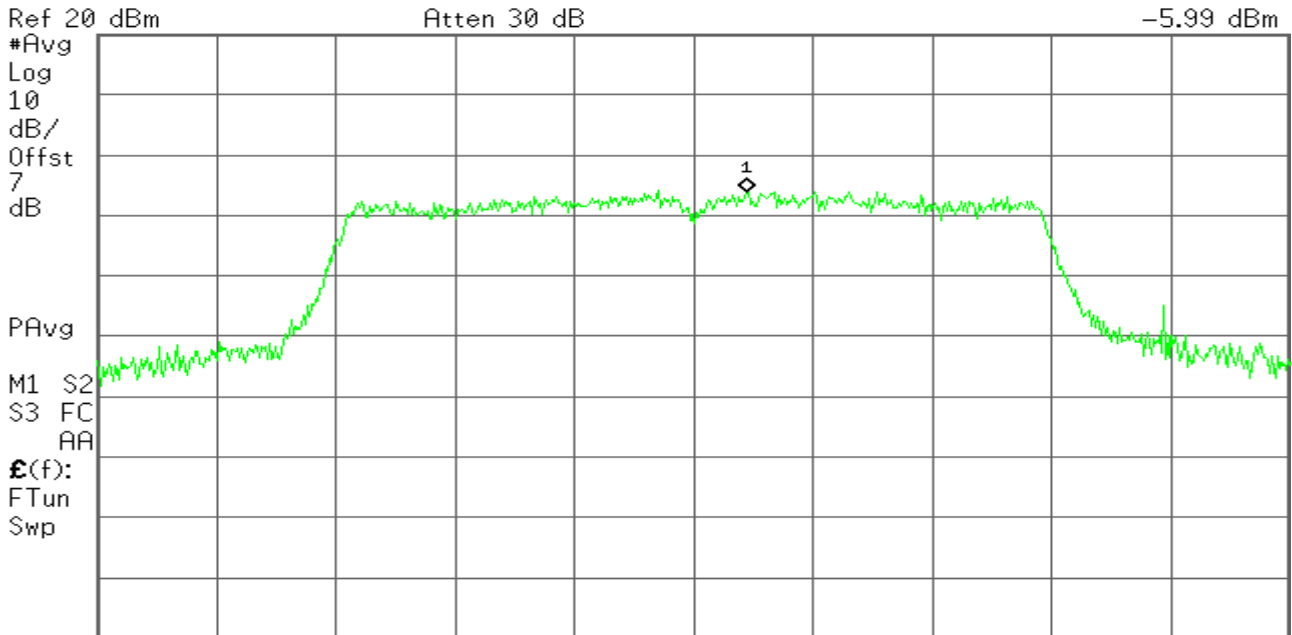
**IEEE 802.11a HT20 mode/chain 1
5725~5850MHz**

CH Low

Agilent

R T

Mkr1 5.746 35 GHz
-5.99 dBm



Center 5.745 00 GHz
#Res BW 300 kHz

#VBW 1 MHz

Span 30 MHz
Sweep 1 ms (601 pts)

CH Mid

Agilent

R T

Mkr1 5.787 35 GHz
-5.09 dBm

Ref 20 dBm

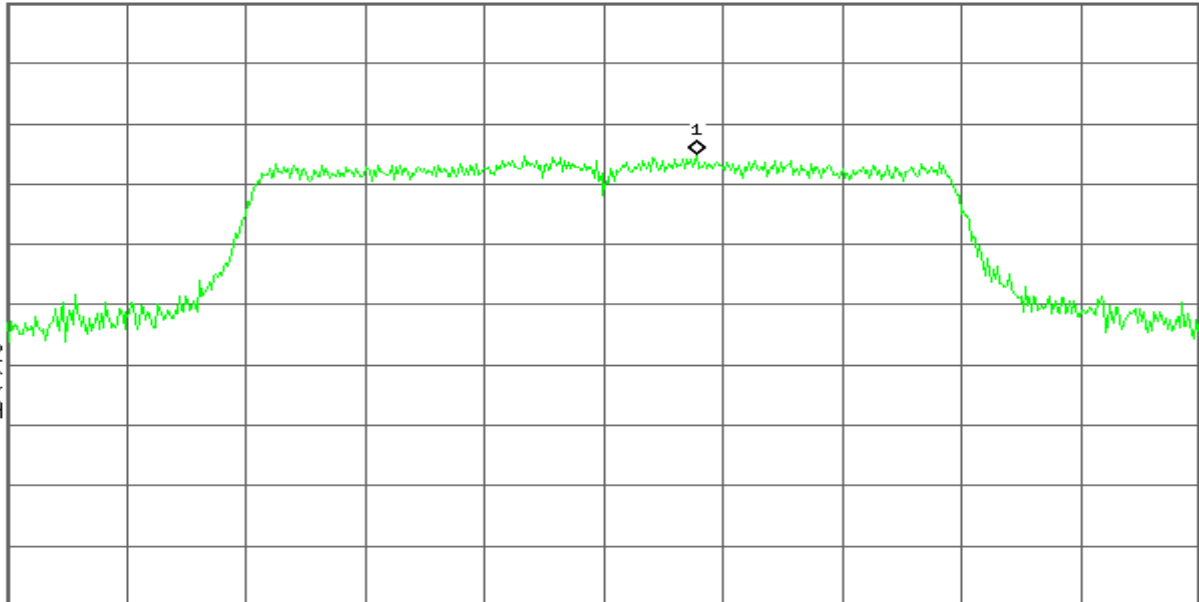
Atten 30 dB

#Avg
Log
10
dB/
Offst
7
dB

PAvg

M1 S2
S3 FC
AA

£(f):
FTun
Swp



Center 5.785 00 GHz

#Res BW 300 kHz

#VBW 1 MHz

Span 30 MHz

Sweep 1 ms (601 pts)

CH High

Agilent

R T

Mkr1 5.826 40 GHz
-3.56 dBm

Ref 20 dBm

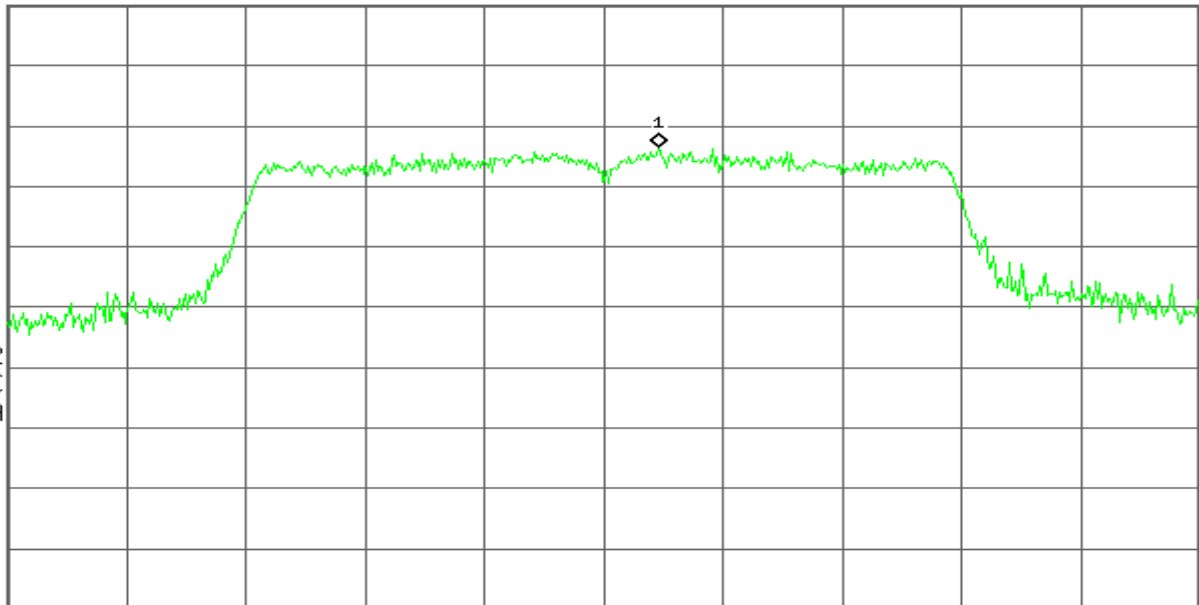
Atten 30 dB

#Avg
Log
10
dB/
Offst
7
dB

PAvg

M1 S2
S3 FC
AA

£(f):
FTun
Swp



Center 5.825 00 GHz

#Res BW 300 kHz

#VBW 1 MHz

Span 30 MHz

Sweep 1 ms (601 pts)

7.6 RADIATED UNDESIRABLE EMISSION

LIMIT

Radiated emissions from 9 kHz to 25 GHz were measured according to the methods defines in ANSI C63.10-2013. The EUT was placed above the ground plane, 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

1. 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:

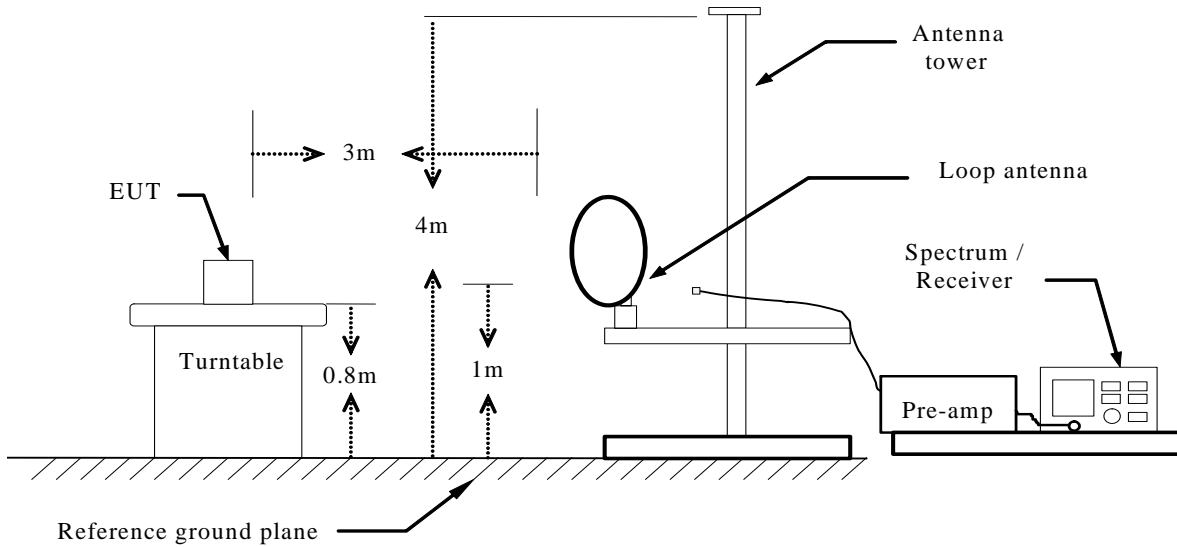
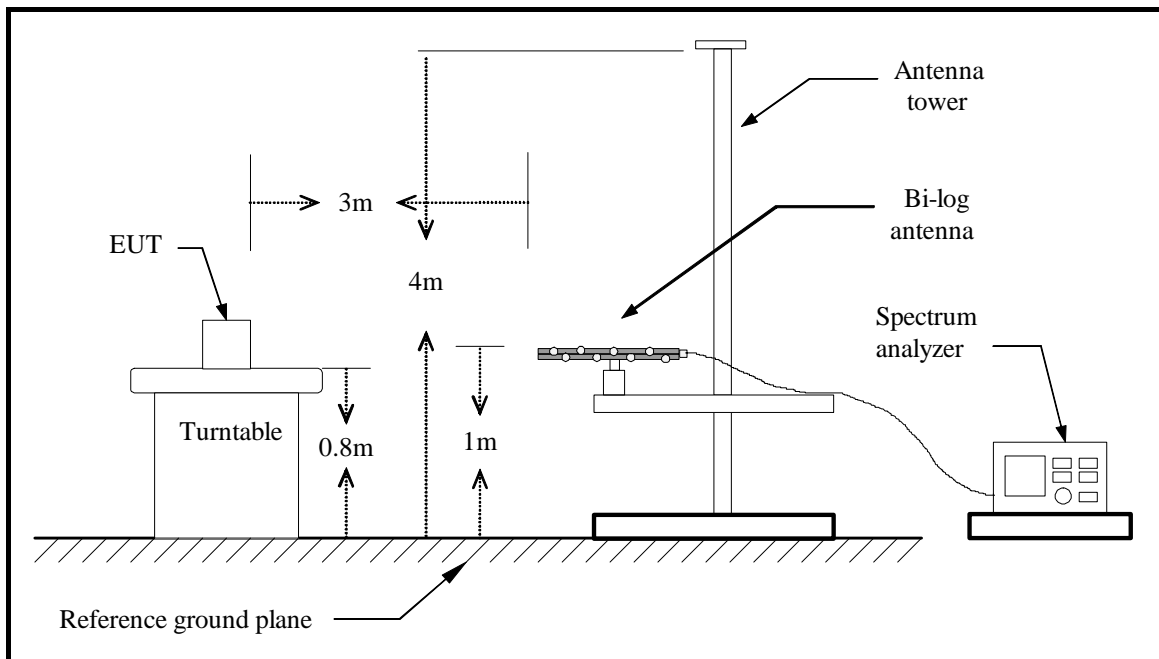
FREQUENCIES(MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE(meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

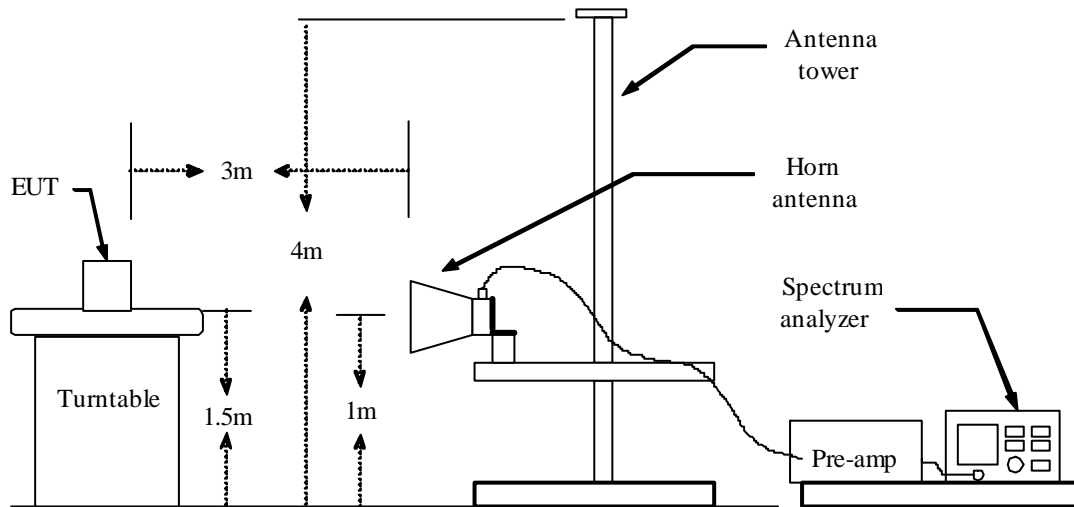
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

2. In the emission table above, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$ at 3-meter)	Field Strength ($\text{dB}\mu\text{V}/\text{m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

Below 30MHz**Below 1 GHz**

Above 1 GHz**TEST PROCEDURE**

1. The EUT is placed on a turntable above ground plane, which is 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.

TEST RESULTS

Below 1 GHz

Operation Mode:	Normal Link	Test Date:	2015-7-31
Temperature:	25°C	Tested by:	James.Yan
Humidity:	48% RH	Polarity:	Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (dBUV)	Correction Factor (dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Remark
34.8500	V	14.85	18.40	33.25	40.00	-6.75	QP
239.5200	V	28.39	12.86	41.25	46.00	-4.75	QP
484.9300	V	15.82	19.51	35.33	46.00	-10.67	QP
720.6400	V	17.80	23.22	41.02	46.00	-4.98	QP
832.1900	V	12.85	24.40	37.25	46.00	-8.75	QP
960.2300	V	19.67	26.58	46.25	54.00	-7.75	QP
30.9700	H	11.88	19.37	31.25	40.00	-8.75	QP
239.5200	H	28.46	12.86	41.32	46.00	-4.68	QP
480.0800	H	23.11	19.52	42.63	46.00	-3.37	QP
554.7700	H	15.44	20.49	35.93	46.00	-10.07	QP
797.2700	H	15.83	24.49	40.32	46.00	-5.68	QP
960.2300	H	17.43	26.58	44.01	54.00	-9.99	QP

Remark:

4. Measuring frequencies from 30 MHz to the 1GHz.(no emission found from the lowest internal used/generated frequency to 30MHz)
5. Radiated emissions measured were made with an instrument using peak/quasi-peak detector mode.
6. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
7. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
8. Margin (dB) = Remark result (dBUV/m) – Quasi-peak limit (dBUV/m).

Above 1 GHz

Operation Mode:	Tx / IEEE 802.11a mode CH Low	Test Date:	2015-9-7
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11951.923	40.87	15.43	56.30	74.00	-17.70	100	100	peak
2	11951.923	21.76	15.43	37.19	54.00	-16.81	100	100	AVG
3	16419.872	39.89	17.23	57.12	74.00	-16.88	100	35	peak
4	16419.872	22.59	17.23	39.82	54.00	-14.18	100	35	AVG
5	N/A								
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11216.346	40.28	14.70	54.98	74.00	-19.02	100	37	peak
2	11216.346	23.77	14.70	38.47	54.00	-15.53	100	37	AVG
3	15793.269	39.66	16.51	56.17	74.00	-17.83	100	243	peak
4	15793.269	23.77	16.51	40.28	54.00	-13.72	100	243	AVG
5	N/A								
6									

Operation Mode:	Tx / IEEE 802.11a mode CH Mid	Test Date:	2015-9-7
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11597.756	41.38	15.38	56.76	74.00	-17.24	100	298	peak
2	11597.756	24.26	15.38	39.64	54.00	-14.36	100	298	AVG
3	15738.782	39.24	16.51	55.75	74.00	-18.25	100	201	peak
4	15738.782	23.68	16.51	40.19	54.00	-13.81	100	201	AVG
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11870.192	39.85	15.42	55.27	74.00	-18.73	100	255	peak
2	11870.192	23.36	15.42	38.78	54.00	-15.22	100	255	AVG
3	15983.974	39.30	16.53	55.83	74.00	-18.17	100	9	peak
4	15983.974	23.55	16.53	40.08	54.00	-13.92	100	9	AVG
5	N/A								
6									

Operation Mode:	Tx / IEEE 802.11a mode CH High	Test Date:	2015-9-7
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11270.833	40.96	14.82	55.78	74.00	-18.22	100	180	peak
2	11270.833	23.67	14.82	38.49	54.00	-15.51	100	180	AVG
3	16637.821	40.15	17.65	57.80	74.00	-16.20	100	184	peak
4	16637.821	22.53	17.65	40.18	54.00	-13.82	100	184	AVG
5	N/A								
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11325.320	40.46	14.95	55.41	74.00	-18.59	100	52	peak
2	11325.320	23.52	14.95	38.47	54.00	-15.53	100	52	AVG
3	14812.500	40.04	16.31	56.35	74.00	-17.65	100	197	peak
4	14812.500	22.92	16.31	39.23	54.00	-14.77	100	197	AVG
5	N/A								
6									

Operation Mode:	TX / IEEE 802.11n HT20 mode /CH Low	Test Date:	2015-9-7
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11243.590	41.61	14.76	56.37	74.00	-17.63	100	284	peak
2	11243.590	23.80	14.76	38.56	54.00	-15.44	100	284	AVG
3	16419.872	39.52	17.23	56.75	74.00	-17.25	100	130	peak
4	16419.872	22.44	17.23	39.67	54.00	-14.33	100	130	AVG
5	N/A								
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11488.782	40.43	15.33	55.76	74.00	-18.24	100	200	peak
2	11488.782	23.26	15.33	38.59	54.00	-15.41	100	200	AVG
3	16447.115	40.20	17.27	57.47	74.00	-16.53	100	53	peak
4	16447.115	22.89	17.27	40.16	54.00	-13.84	100	53	AVG
5	N/A								
6									

Operation Mode:	TX / IEEE 802.11n HT20 mode /CH Mid	Test Date:	2015-9-7
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11216.346	41.68	14.70	56.38	74.00	-17.62	100	0	peak
2	11216.346	24.36	14.70	39.06	54.00	-14.94	100	0	AVG
3	14567.308	41.32	16.25	57.57	74.00	-16.43	100	133	peak
4	14567.308	25.27	16.25	41.52	54.00	-12.48	100	133	AVG
5	N/A								
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11270.833	40.85	14.82	55.67	74.00	-18.33	100	190	peak
2	11270.833	22.99	14.82	37.81	54.00	-16.19	100	190	AVG
3	16419.872	39.37	17.23	56.60	74.00	-17.40	100	152	peak
4	16419.872	22.29	17.23	39.52	54.00	-14.48	100	152	AVG
5	N/A								
6									

Operation Mode:	TX / IEEE 802.11n HT20 mode /CH High	Test Date:	2015-9-7
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11652.244	40.60	15.38	55.98	74.00	-18.02	100	270	peak
2	11652.244	22.58	15.38	37.96	54.00	-16.04	100	270	AVG
3	15248.397	39.68	16.42	56.10	74.00	-17.90	100	250	peak
4	15248.397	22.76	16.42	39.18	54.00	-14.82	100	250	AVG
5	N/A								
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11488.782	40.01	15.33	55.34	74.00	-18.66	100	285	peak
2	11488.782	22.56	15.33	37.89	54.00	-16.11	100	285	AVG
3	14839.744	40.64	16.31	56.95	74.00	-17.05	100	277	peak
4	14839.744	23.67	16.31	39.98	54.00	-14.02	100	277	AVG
5	N/A								
6									

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 3 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

7.7 POWERLINE CONDUCTED EMISSIONS

LIMIT

For equipment 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.

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION

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

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

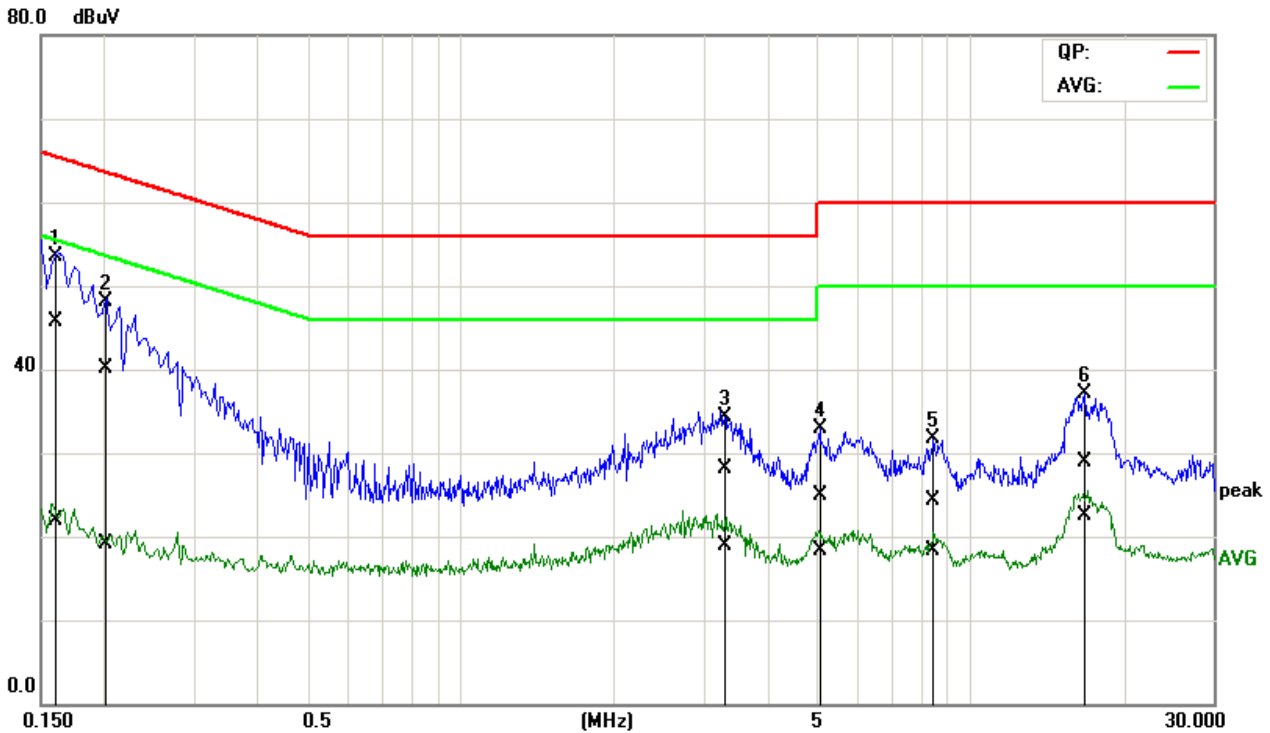
TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data

Job No.:	C150805R02	Date:	2015-8-2
Model No.:	R9861500D01	Time:	PM 01:56:52
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	James.Yan
Line:	L1	Test Voltage:	AC 120V/60Hz
Model:		Description:	

L1

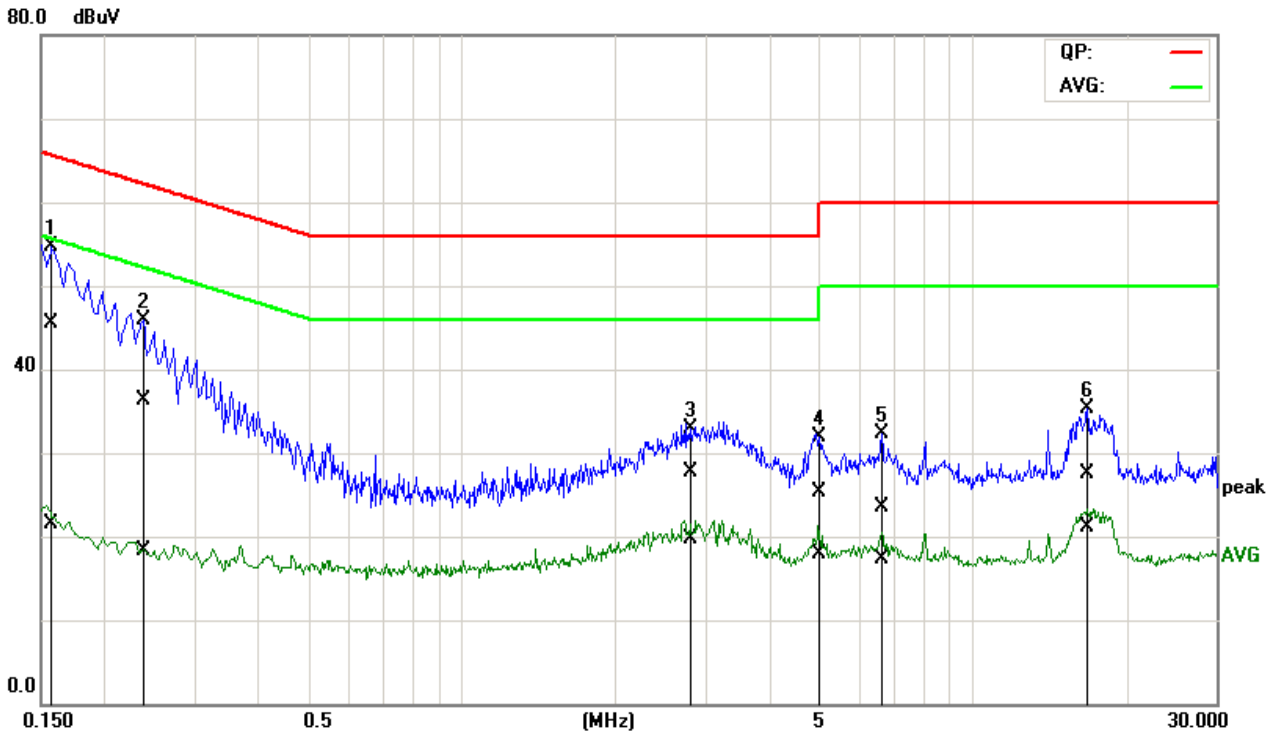


No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1*	0.1571	26.00	2.12	19.78	45.78	21.90	65.62	55.62	-19.84	-33.72	Pass
2	0.1981	20.55	-0.45	19.61	40.16	19.16	63.69	53.69	-23.53	-34.53	Pass
3	3.2778	7.93	-1.27	20.09	28.02	18.82	56.00	46.00	-27.98	-27.18	Pass
4	5.0147	4.59	-1.94	20.30	24.89	18.36	60.00	50.00	-35.11	-31.64	Pass
5	8.5141	3.74	-2.26	20.63	24.37	18.37	60.00	50.00	-35.63	-31.63	Pass
6	16.7603	7.97	1.56	20.94	28.91	22.50	60.00	50.00	-31.09	-27.50	Pass

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Job No.:	C150805R02	Date:	2015-8-2
Model No.:	R9861500D01	Time:	PM 02:02:52
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	James.Yan
Line:	L2	Test Voltage:	AC 120V/60Hz
Model:		Description:	

L2



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1*	0.1581	25.73	1.84	19.72	45.45	21.56	65.56	55.56	-20.11	-34.00	Pass
2	0.2346	16.66	-1.38	19.66	36.32	18.28	62.29	52.29	-25.97	-34.01	Pass
3	2.8010	7.73	-0.26	20.06	27.79	19.80	56.00	46.00	-28.21	-26.20	Pass
4	4.9914	5.00	-2.48	20.30	25.30	17.82	56.00	46.00	-30.70	-28.18	Pass
5	6.6950	2.97	-3.16	20.47	23.44	17.31	60.00	50.00	-36.56	-32.69	Pass
6	16.7440	6.59	0.38	20.82	27.41	21.20	60.00	50.00	-32.59	-28.80	Pass

END OF REPORT