FCC Part 15E
Measurement and Test Report

For

ATID CO., LTD

#1211 Byuksan/Kyungin Digitalvalley II, 184, Gasan digital 2-ro,

Geumcheon-gu, Seoul, Korea

FCC ID: VUJAT870A

FCC Rule(s):	FCC Part 15E
Product Description:	Industrial PDA
Tested Model:	AT870A
Report No.:	STR17068505I-1
Sample Receipt Date:	2017-06-30
Tested Date:	2017-06-31 to 2018-03-08
Issued Date:	2018-03-12
Tested By:	Jason Su / Engineer
Reviewed By:	Silin Chen / EMC Manager
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Prepared By:	

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	ATID CO., LTD
Address of applicant:	#1211 Byuksan/Kyungin Digitalvalley II, 184, Gasan digital 2-ro, Geumcheon-gu, Seoul, Korea
Manufacturer:	ATID CO., LTD
Address of manufacturer:	#1211 Byuksan/Kyungin Digitalvalley II, 184, Gasan digital 2-ro, Geumcheon-gu, Seoul, Korea

General Description of EUT	
Product Name:	Industrial PDA
Brand Name:	Atid
Model No.:	AT870A
Adding Model(s):	/
Rated Voltage:	Battery DC 3.7V
Internal Battery:	Rechargeable Li-Ion(2970mAh)
Trigger Battery:	Rechargeable Li-Ion(5200mAh)
Adapter Model:	BPI020S05N03 Input: AC100-240V 50/60Hz 0.5A; Output: DC5V 3.0A
Software Version:	STD870AP70MNGCSZ
Hardware Version:	Rev 1.1
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT	
Support Standards:	802.11a, 802.11n(HT20)
Frequency Range:	5150-5250MHz, 5725-5850MHz
RF Output Power:	8.88dBm (Conducted)
Type of Modulation:	QPSK, 16QAM, 64QAM
Data Rate:	6-54Mbps, up to 150Mbps
Channel Separation:	20MHz
Type of Antenna:	Integral
Antenna Gain:	0dBi
Lowest Internal Frequency	32.768kHz

1.2 Test Standards

The following report is prepared on behalf of the ATID CO., LTD in accordance with FCC Part 15, Subpart C&E, and section 15.203, 15.205, 15.207, 15.209 and 15.407 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C&E, and section 15.203, 15.205, 15.207, 15.209 and 15.407 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The measurement guide KDB 789033 D02 v02r01 for Unlicensed National Information Infrastructure (U-NII) Devices shall be performed also.

1.4 Table for parameters of Test Software setting

The test utility software used during testing was "RFTestTool" in the menu. During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Mode	Test Frequency (MHz)												
	NCB: 20MHz												
	5180	5200	5240	5260	5300	5320	5500	5580	5700	5720	5745	5785	5825
802.11a 6Mbps	19	19	19	/	/	/	/	/	/	/	15	15	15
802.11n-HT20 MCS0	19	19	19	/	/	/	/	/	/	/	15	15	15

Mode	NCB: 40MHz									
	5190	5230	5270	5310	5510	5550	5670	5710	5755	5795
802.11n-HT40 MCS0	19	19	/	/	/	/	/	/	15	15

Mode	NCB: 80MHz					
	5210	5290	5530	5610	5690	5775
802.11ac-HT80 MCS0/Nss2	19	/	/	/	/	15

1.5 EUT Operating during test

EUT was programmed to be in continuously transmitting mode. During the test, EUT operation to normal function and programs under Android were executed.

1.6 Test Facility

FCC – Registration No.: 125990

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.7 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11a	5180MHz,5200MHz,5240MHz,5745MHz, 5785MHz,5825MHz
TM2	802.11n-HT20	5180MHz,5200MHz,5240MHz,5745MHz, 5785MHz,5825MHz
Note: All test modes (different data rate and different modulation) are performed, but only the worst case is recorded in this report.		

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Core
USB Cable	1.0	Shielded	Without Core
AC Cable	1.8	Unshielded	Without Core
DC Cable	1.5	Unshielded	Without Core

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Earphone	1.2	Unshielded	Without Core

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

1.8 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Power Spectral Density	Conducted	±1.8dB
Conducted Spurious Emission	Conducted	±2.17dB
Conducted Emissions	Conducted	9-150kHz ±3.74dB
		0.15-30MHz ±3.34dB
Transmitter Spurious Emissions	Radiated	30-200MHz ±4.52dB
		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-18GHz ±3.92dB

1.9 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2017-06-12	2018-06-11
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2017-06-12	2018-06-11
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2017-06-12	2018-06-11
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2017-06-12	2018-06-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2017-06-12	2018-06-11
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-08	2018-06-07
SEMT-1042	Horn Antenna	ETS	3117	00086197	2017-06-08	2018-06-07
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2017-06-08	2018-06-07
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-08	2018-06-07
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2017-06-12	2018-06-11
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2017-06-12	2018-06-11
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2017-06-12	2018-06-11
SEMT-1168	Pre-amplifier	Direction Systems Inc.	PAP-0126	14141-12838	2017-08-15	2018-08-14
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2017-08-15	2018-08-14
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2017-06-12	2018-06-11
SEMT-1170	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2017-03-09	2018-03-08

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.203; § 15.405	Antenna Requirement	Compliant
§ 15.207; § 15.407(b)(6)	Conducted Emission	Compliant
§ 15.407(a)(1),(2)	Power Spectral Density	Compliant
§ 15.407(e)	Emission Bandwidth and Occupied Bandwidth	Compliant
§ 15.407(a)(1),(2)	Maximum Conducted Output Power	Compliant
§ 15.407(b)(1),(2),(3)	Conducted Spurious Emission	Compliant
§ 15.205; § 15.407(b)(1),(2),(3)	Radiated Emission	Compliant
§ 15.407(g)	Frequency Stability	Compliant
§ 15.407(h)	Dynamic Frequency Selection (DFS)	N/A

N/A: not applicable

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the SAR Report.

4. Antenna Requirement

4.1 Standard Applicable

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

4.2 Evaluation Information

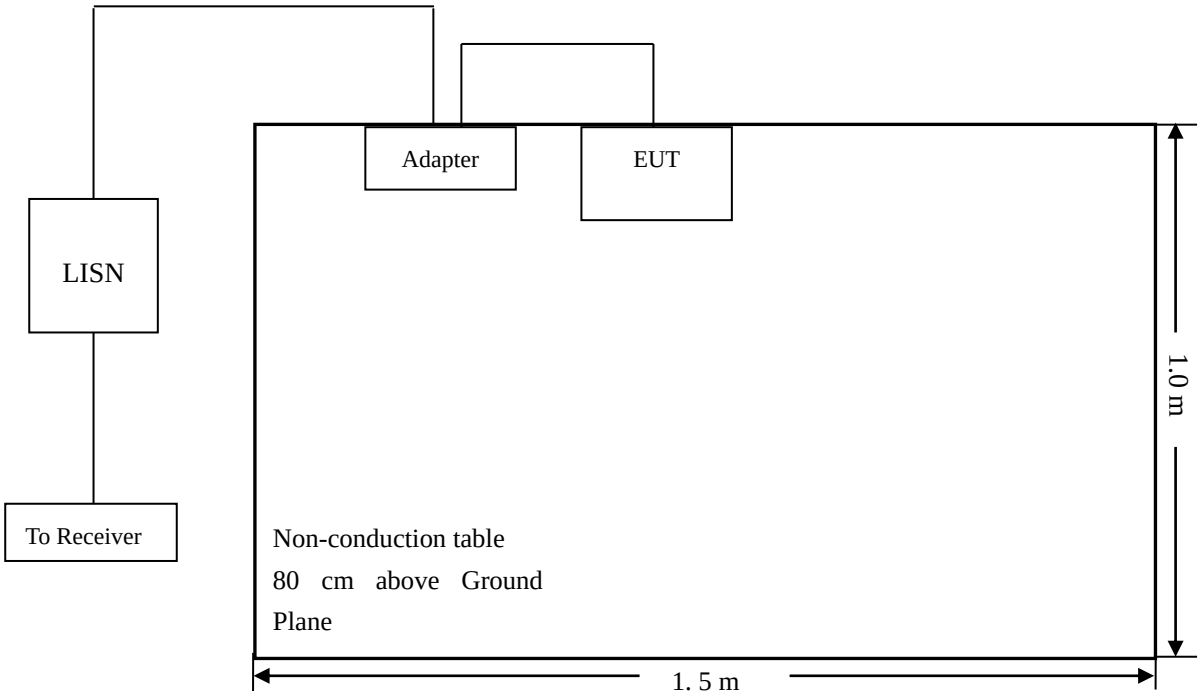
This product has an integral antenna, fulfill the requirement of this section.

5. Conducted Emissions

5.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.

5.3 Basic Test Setup Block Diagram



5.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

5.5 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency ..... 150 kHz
Stop Frequency ..... 30 MHz
Sweep Speed ..... Auto
IF Bandwidth..... 10 kHz
Quasi-Peak Adapter Bandwidth ..... 9 kHz
Quasi-Peak Adapter Mode ..... Normal

5.6 Summary of Test Results/Plots

According to the data in section 5.7, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

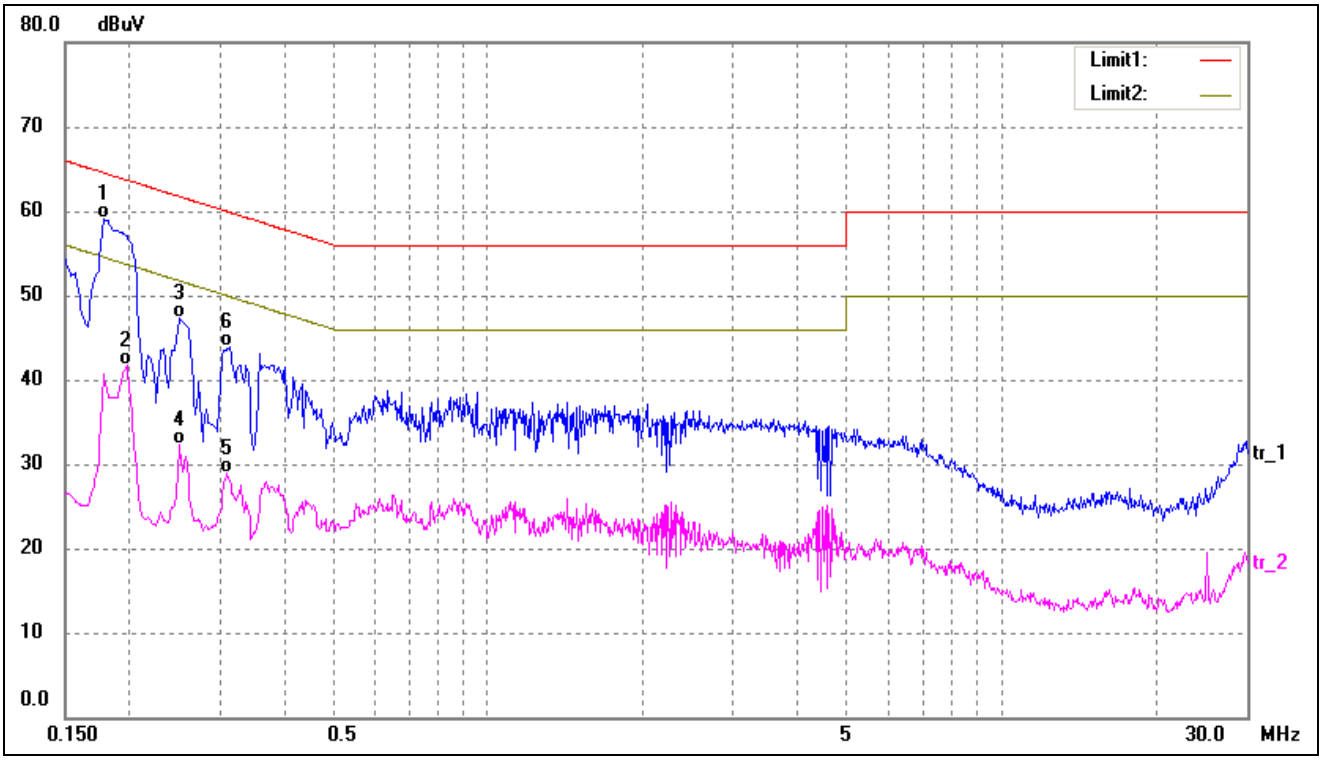
-5.45 dB at **0.1780 MHz** in the **Neutral**, **QP** detector, 0.15-30MHz

5.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

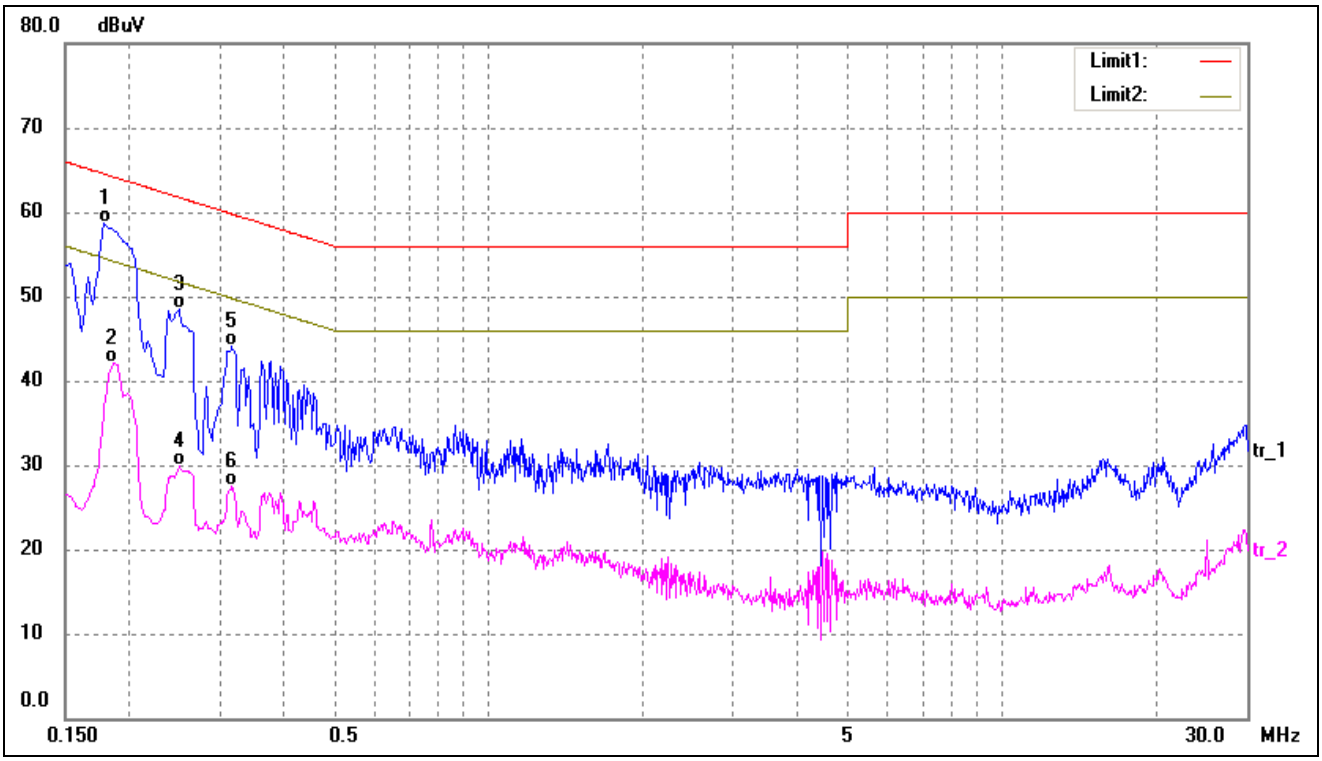
EUT: *Industrial PDA*
Tested Model: *AT870A*
Operating Condition: *Transmitting*
Comment: *AC 120V/60Hz*

Test Specification: *Neutral*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.1780	49.31	9.82	59.13	64.58	-5.45	QP
2	0.1980	31.88	9.80	41.68	53.69	-12.01	AVG
3	0.2500	37.42	9.80	47.22	61.76	-14.54	QP
4	0.2500	22.55	9.80	32.35	51.76	-19.41	AVG
5	0.3100	19.14	9.80	28.94	49.97	-21.03	AVG
6	0.3140	34.10	9.80	43.90	59.86	-15.96	QP

Test Specification: *Line*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.1780	48.87	9.82	58.69	64.58	-5.89	QP
2	0.1860	32.36	9.81	42.17	54.21	-12.04	AVG
3	0.2500	38.67	9.80	48.47	61.76	-13.29	QP
4	0.2500	20.19	9.80	29.99	51.76	-21.77	AVG
5	0.3180	34.23	9.80	44.03	59.76	-15.73	QP
6	0.3180	17.69	9.80	27.49	49.76	-22.27	AVG

6. Power Spectral Density

6.1 Standard Applicable

Section 15.407(a) Power limits:

(1) For the band 5.15-5.25 GHz.
(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 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi 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 dBi.

(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 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi 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 dBi.

(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 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi 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 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi 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.

6.2 Test Procedure

According to 789033 D02 General UNII Test Procedures New Rules v02r01, the following is the measurement procedure.
For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/T, where T is defined in section II.B.l.a).
b) Set VBW ≥ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

6.3 Environmental Conditions

Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

6.4 Summary of Test Results/Plots

5150-5250MHz

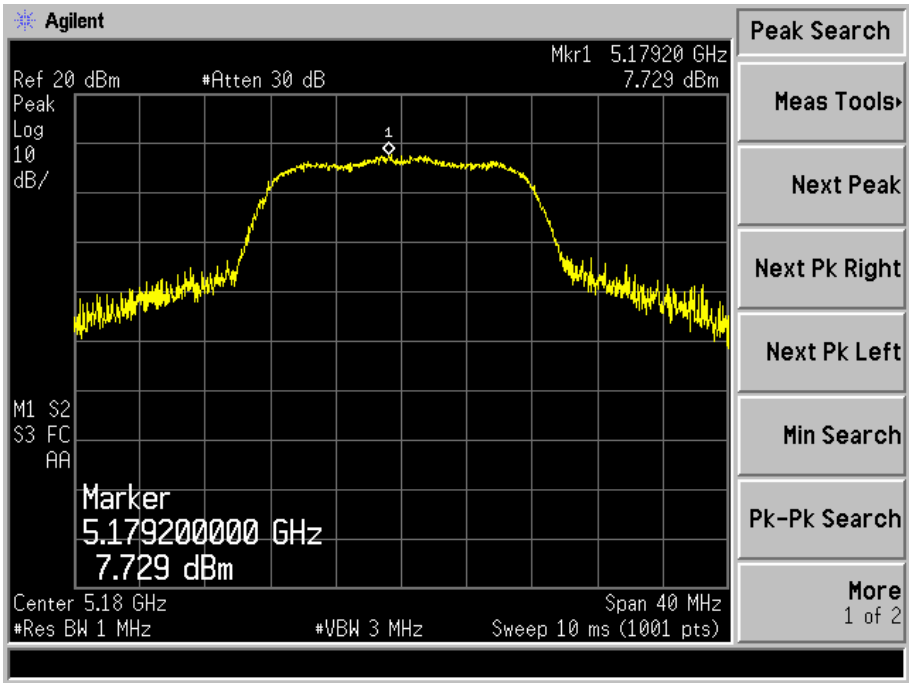
Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5180	7.729	11
	5200	7.745	11
	5240	8.212	11
802.11n-HT20	5180	6.401	11
	5200	7.242	11
	5240	6.128	11

5725-5850MHz

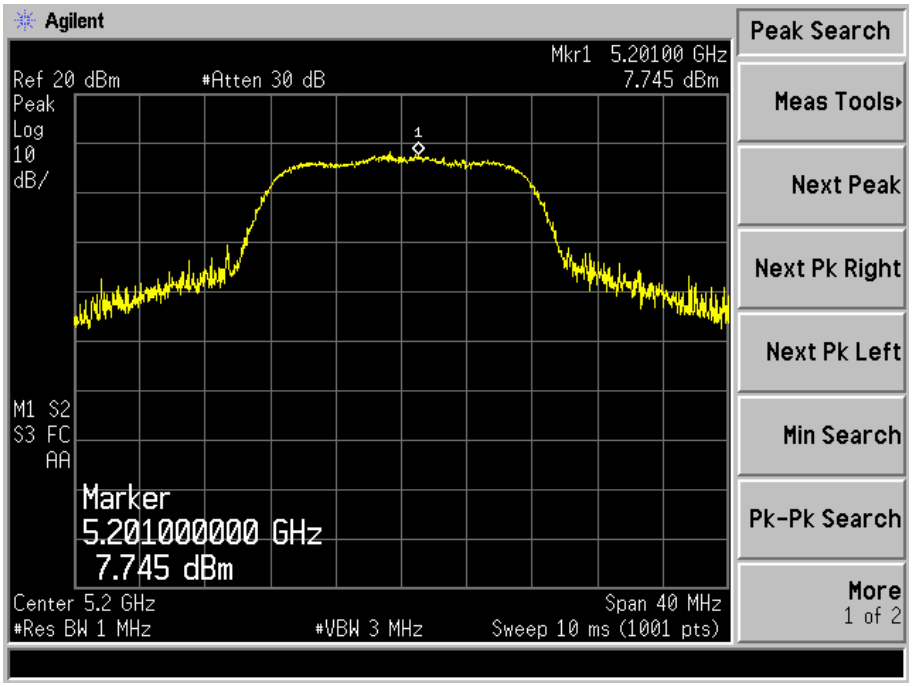
Operating mode	Test Channel	Power Spectral Density dBm/510kHz	Power Spectral Density* dBm/500kHz	Limit dBm/500kHz
802.11a	5745	5.525	8.525	30
	5785	4.846	7.846	30
	5805	4.714	7.714	30
802.11n-HT20	5745	5.319	8.319	30
	5785	4.868	7.868	30
	5805	4.918	7.918	30
*Note: Maximum PSD=PSD(dBm/510kHz)+10log(1MHz/510kHz)=3				

Test Mode: 802.11a

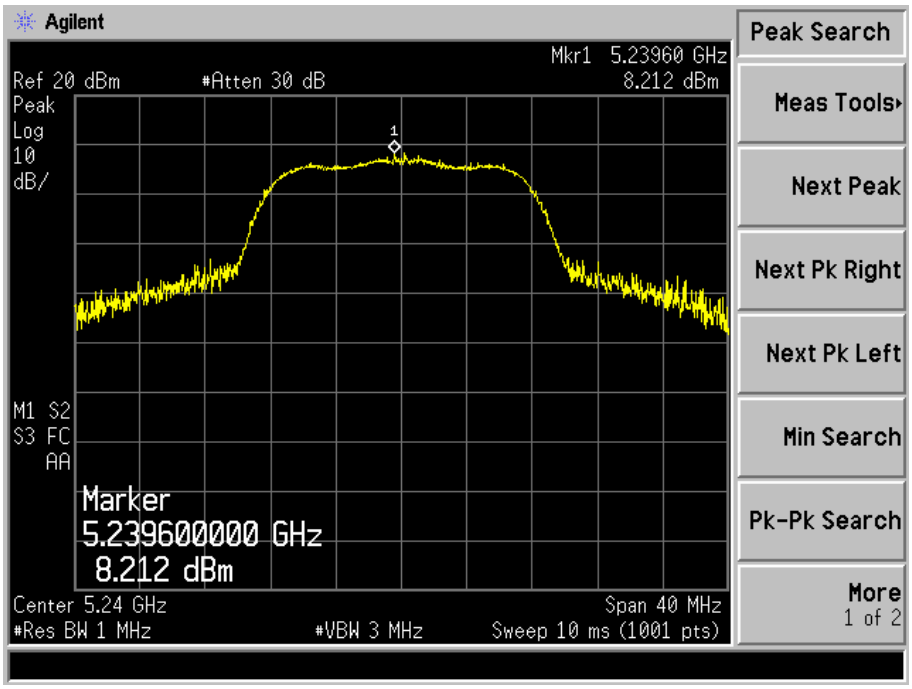
5180MHz



5200MHz



5240MHz



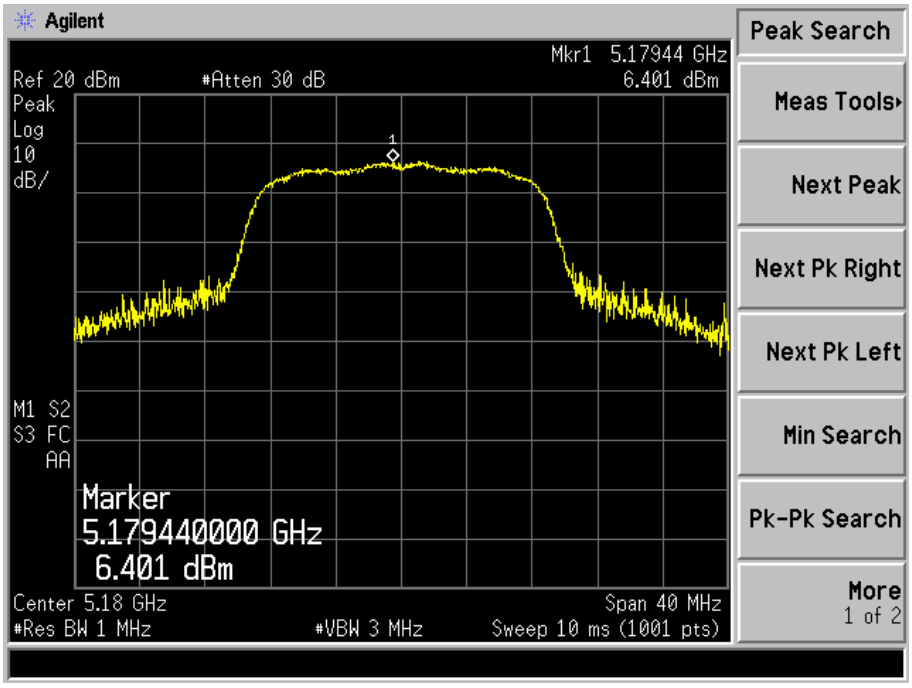
5745MHz

5785MHz

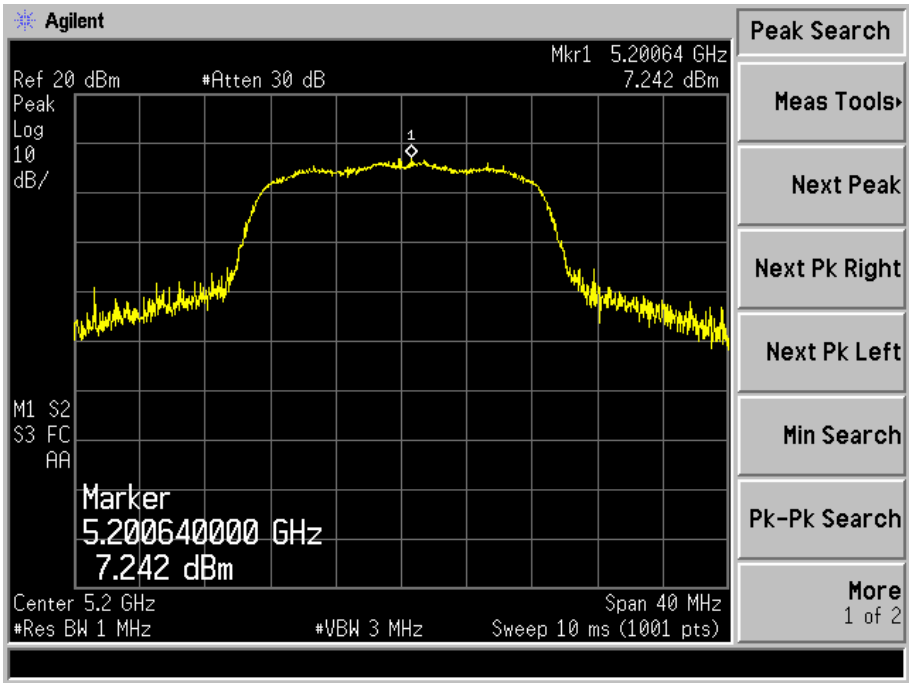
5805MHz

Test Mode: 802.11n-HT20

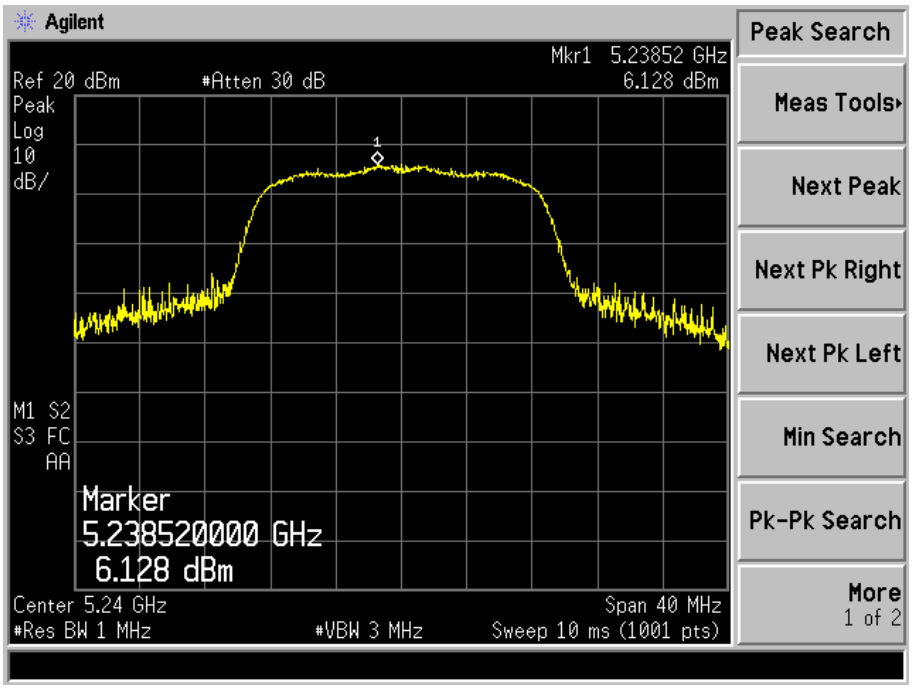
5180MHz



5200MHz



5240MHz



5745MHz

5785MHz

5805MHz

7. Emission Bandwidth and Occupied Bandwidth

7.1 Standard Applicable

According to 15.407 (a) and (e)

(1) For the band 5.15-5.25 GHz.
(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 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi 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 dBi.

(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 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi 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 dBi.

(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 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi 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 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi 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.

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

7.2 Test Procedure

According to 789033 D02 v02r0r section C&D, the following is the measurement procedure.

1. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum 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%.

2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz

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:

a) Set RBW = 100 kHz.

b) Set the video bandwidth (VBW) ≥ 3 × RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

f) Allow the trace to stabilize.

g) 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.

D. 99 Percent Occupied Bandwidth

The 99-percent occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99-percent occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in section II.G.3.d). Measurements of 99-percent occupied bandwidth may also optionally be used in lieu of the EBW to 789033 D02 v02r01 General UNII Test Procedures New Rules v01 define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in section II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.

2. Set span = 1.5 times to 5.0 times the OBW.

3. Set RBW = 1 % to 5 % of the OBW

4. Set VBW ≥ 3 • RBW

5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

6. Use the 99 % power bandwidth function of the instrument (if available).

7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

7.3 Environmental Conditions

Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

7.4 Summary of Test Results/Plots

5150-5250MHz

Test Mode	Test Channel MHz	26 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5180	26.394	16.6832	Pass
	5200	24.992	16.6842	Pass
	5240	25.360	16.6591	Pass
802.11n-HT20	5180	21.107	17.5385	Pass
	5200	23.888	17.5518	Pass
	5240	20.849	17.5419	Pass

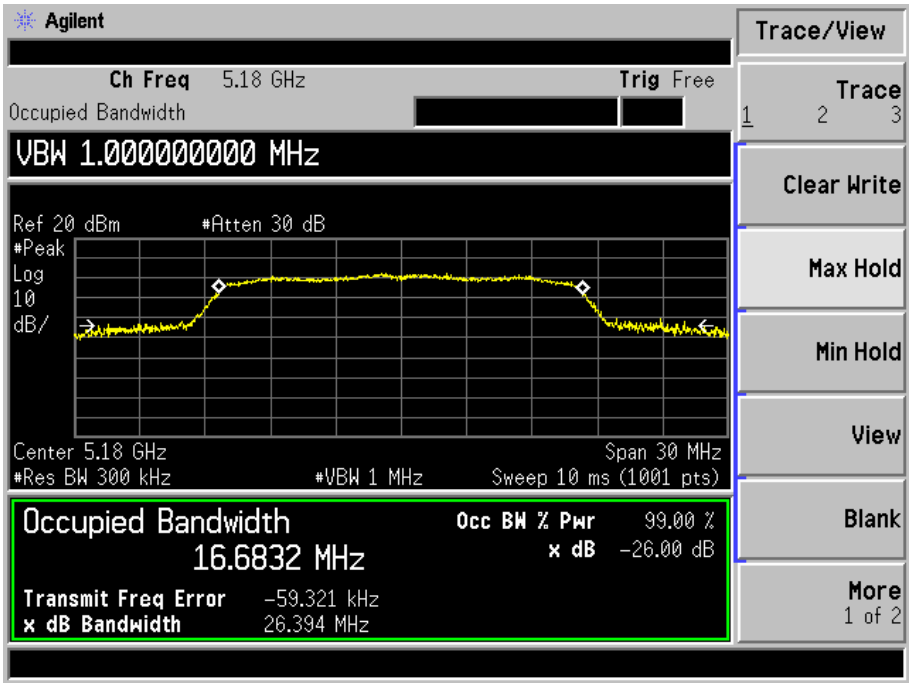
5725-5850MHz

Test Mode	Test Channel MHz	6 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5745	16.351	16.4362	≥500
	5785	16.350	16.3794	≥500
	5805	17.575	17.5990	≥500
802.11n-HT20	5745	16.354	16.4793	≥500
	5785	17.597	17.5511	≥500
	5805	17.598	17.5993	≥500

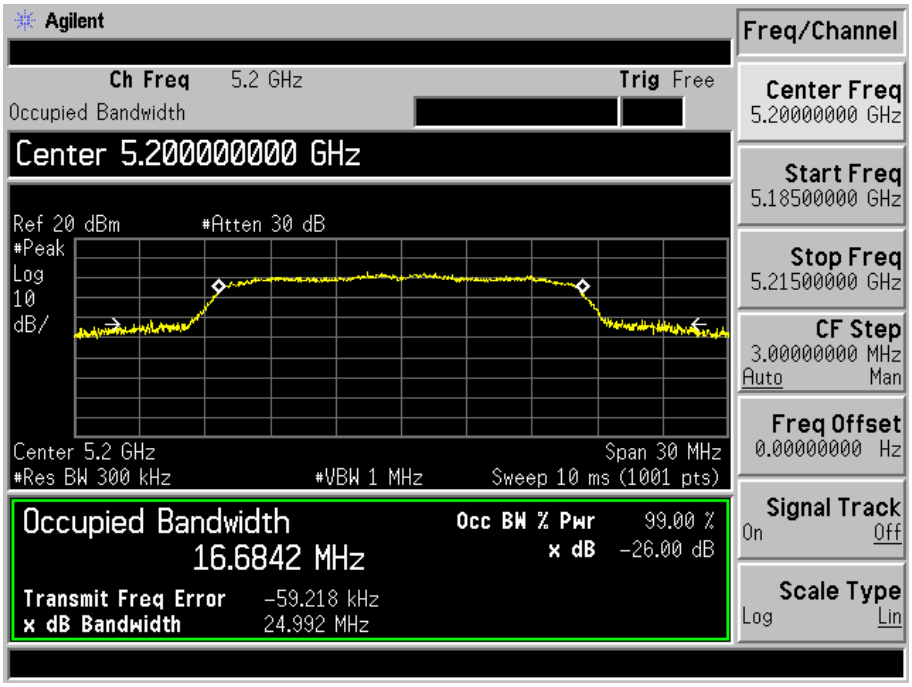
5150-5250MHz

Test mode：802.11a

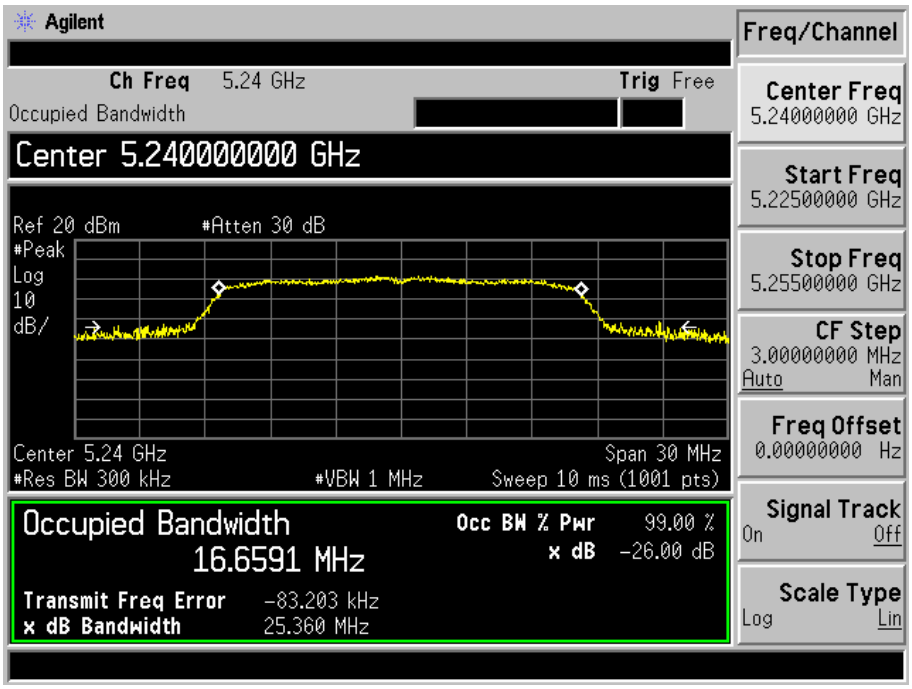
5180MHz



5200MHz

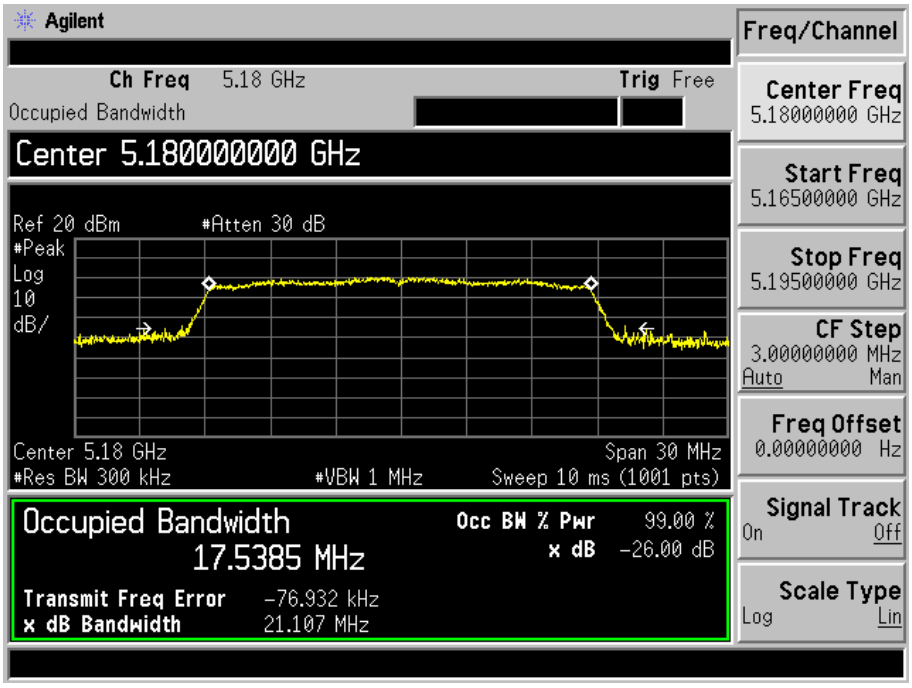


5240MHz

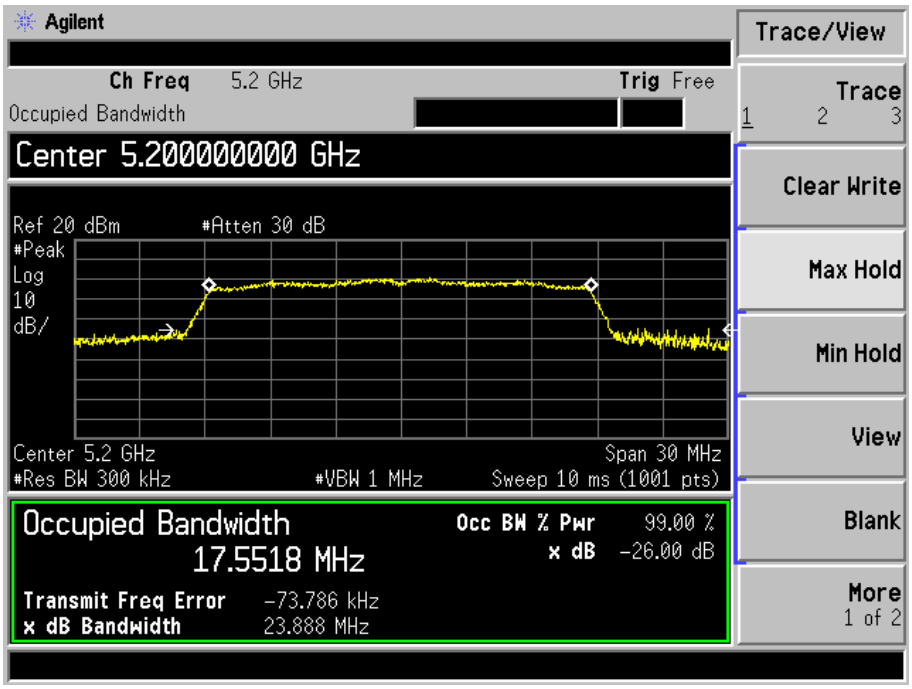


Test mode：802.11n-HT20

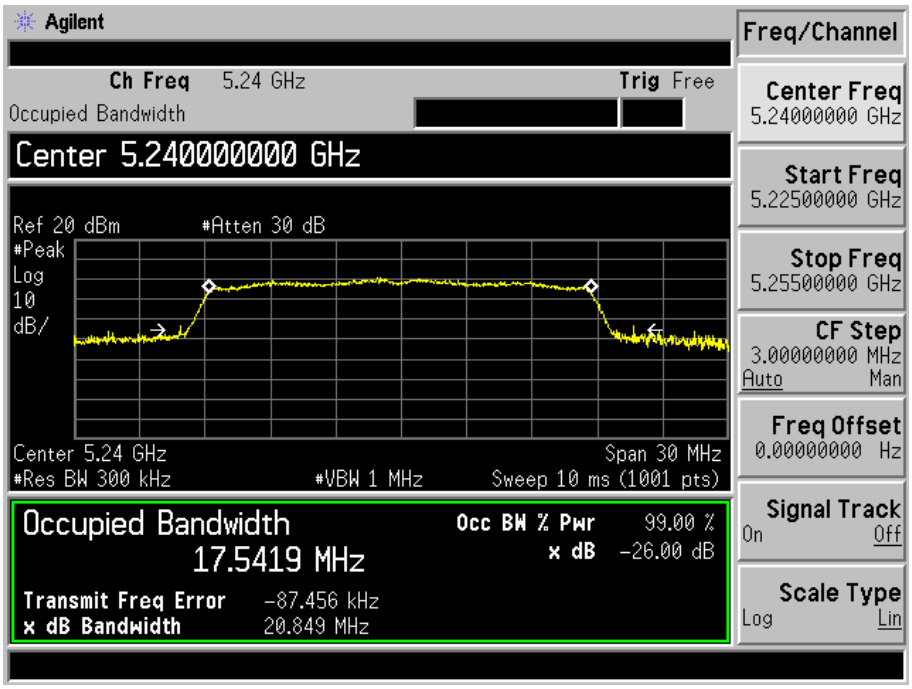
5180MHz



5200MHz



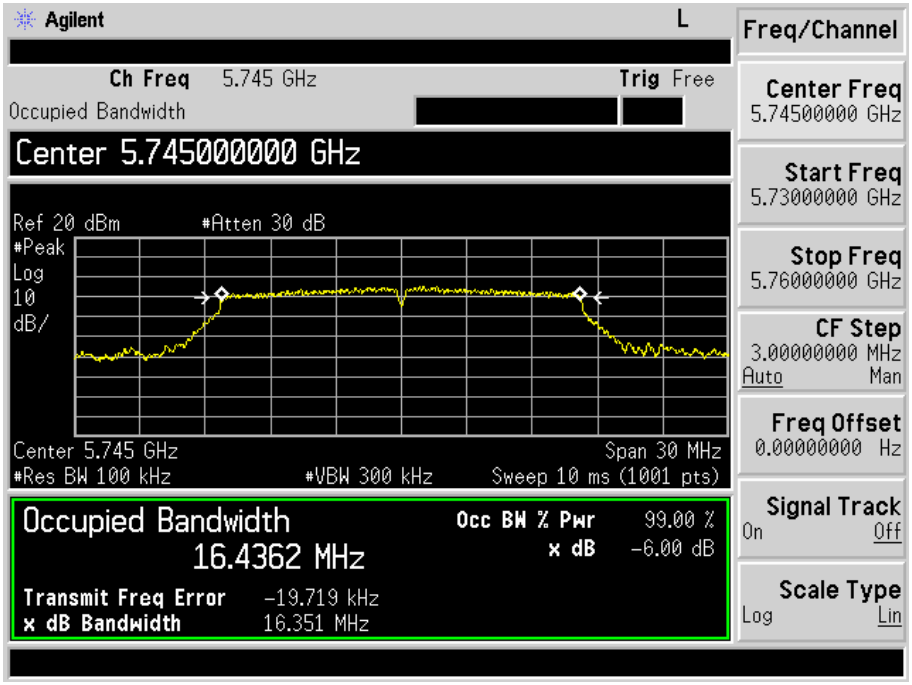
5240MHz



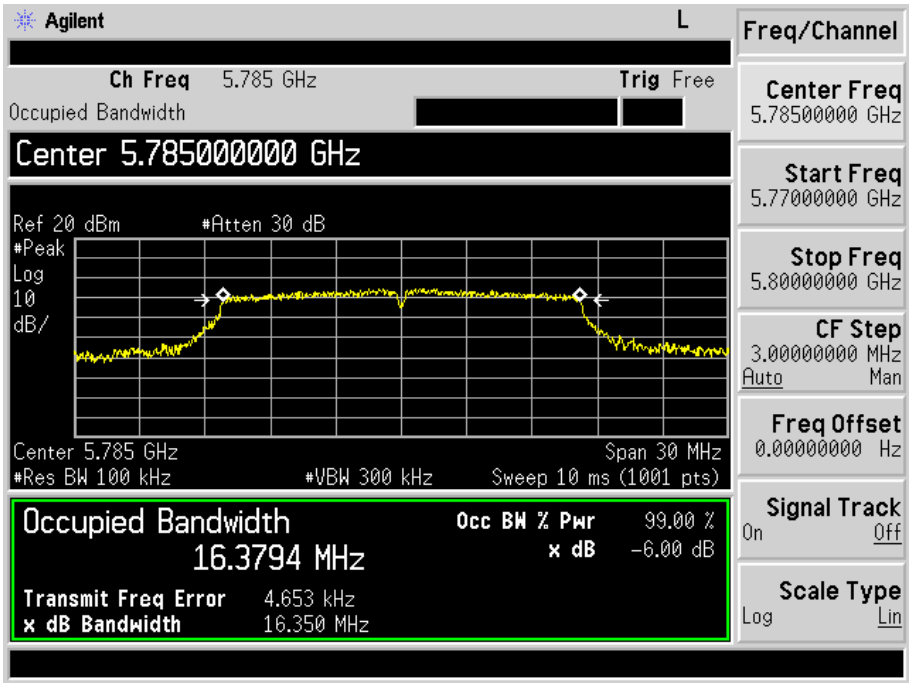
5725-5850MHz

Test mode：802.11a

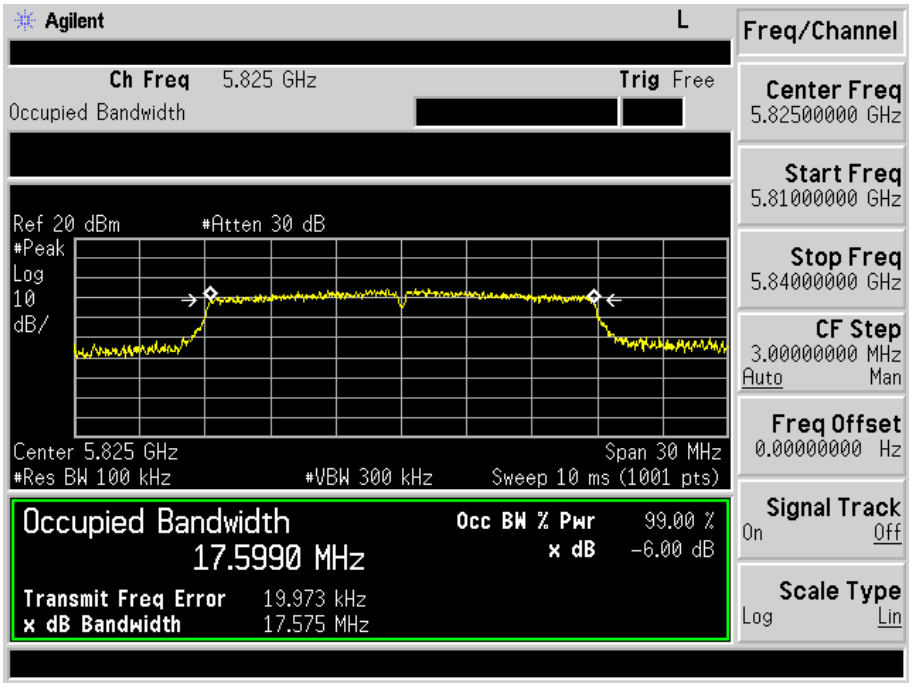
5745MHz



5785MHz

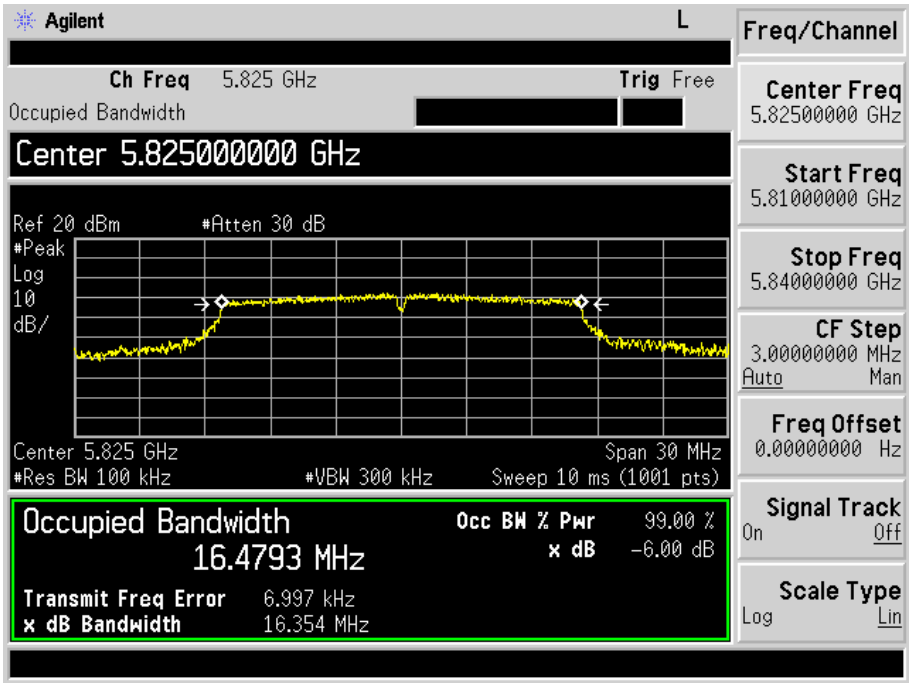


5805MHz

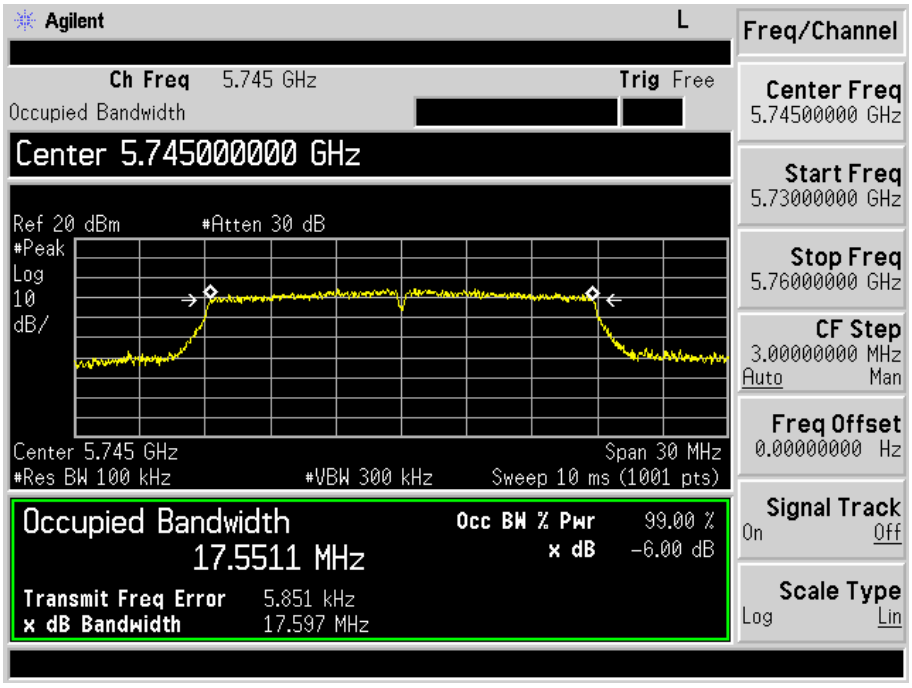


Test mode：802.11-HT20

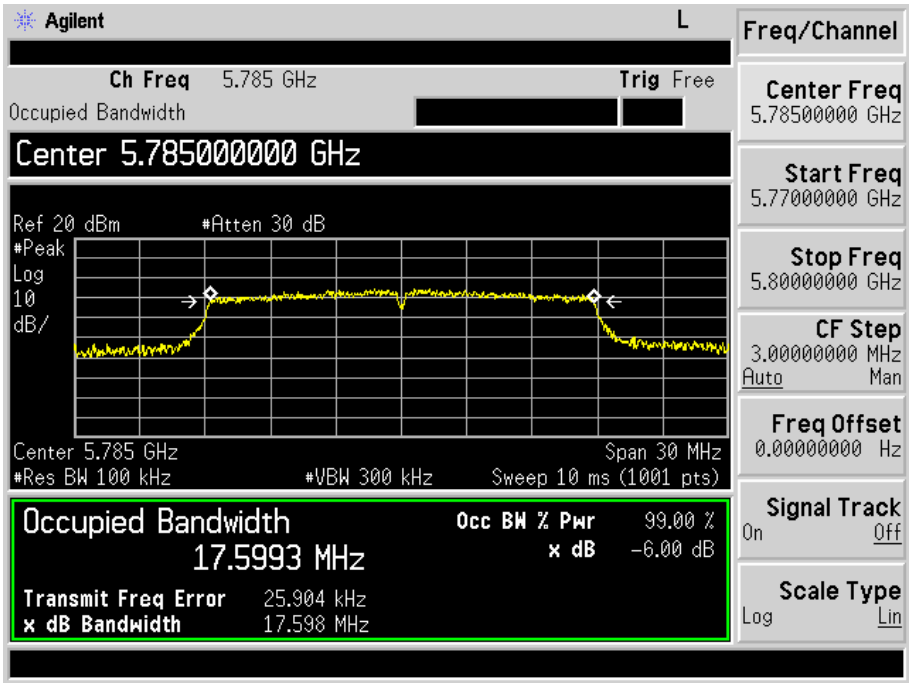
5745MHz



5785MHz



5805MHz



8. Maximum Conducted Output Power

8.1 Standard Applicable

Section 15.407(a) Power limits:

(1) For the band 5.15-5.25 GHz.
(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 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi 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 dBi.

(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 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi 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 dBi.

(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 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi 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 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi 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.

8.2 Test Procedure

According to KDB789033 D02 v02r01 section E, the following is the measurement procedure.

(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(ii) Set RBW = 1 MHz.
(iii) Set VBW ≥ 3 MHz.
(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".

(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

8.3 Environmental Conditions

Temperature:	26° C
Relative Humidity:	65%
ATM Pressure:	1011 mbar

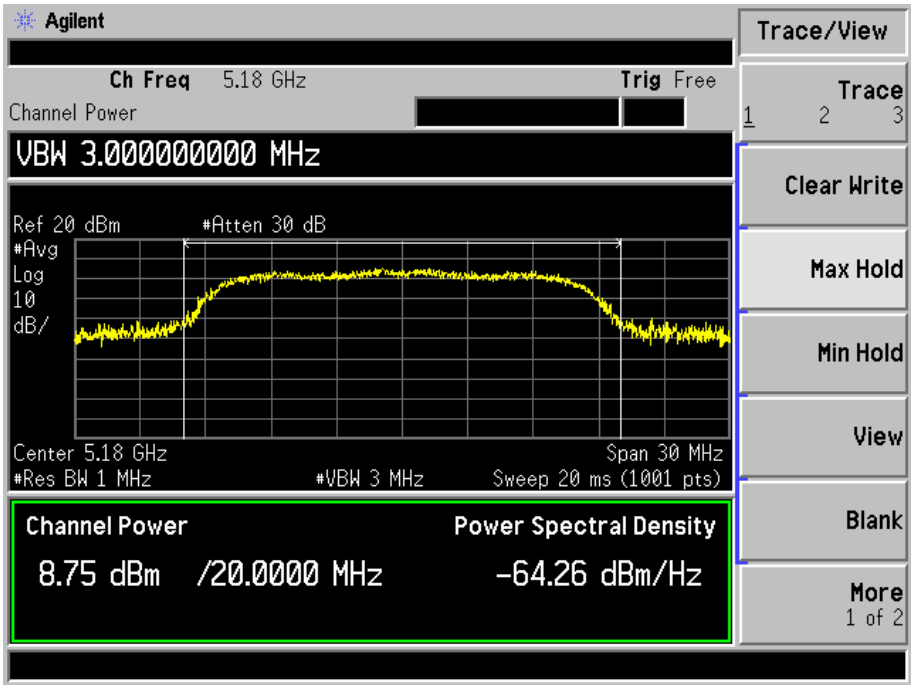
8.4 Summary of Test Results/Plots

For the frequency band 5.15-5.25GHz, 5725-5850GHz

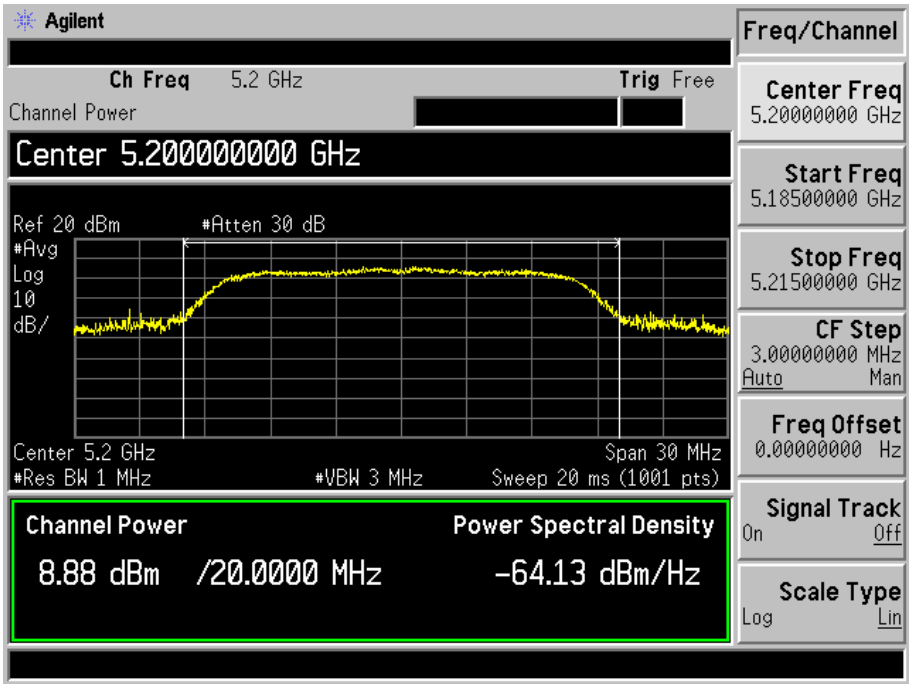
Test mode	Frequency MHz	Output Power dBm	Output Power mW	Limit mW
802.11a	5180	8.75	7.499	250
	5200	8.88	7.727	250
	5240	8.31	6.776	250
	5745	7.29	5.358	1000
	5785	6.98	4.989	1000
	5805	6.85	4.842	1000
802.11n-HT20	5180	8.00	6.310	250
	5200	7.96	6.252	250
	5240	7.19	5.236	250
	5745	6.40	4.365	1000
	5785	5.91	3.899	1000
	5805	6.06	4.036	1000

Test Mode: 802.11a

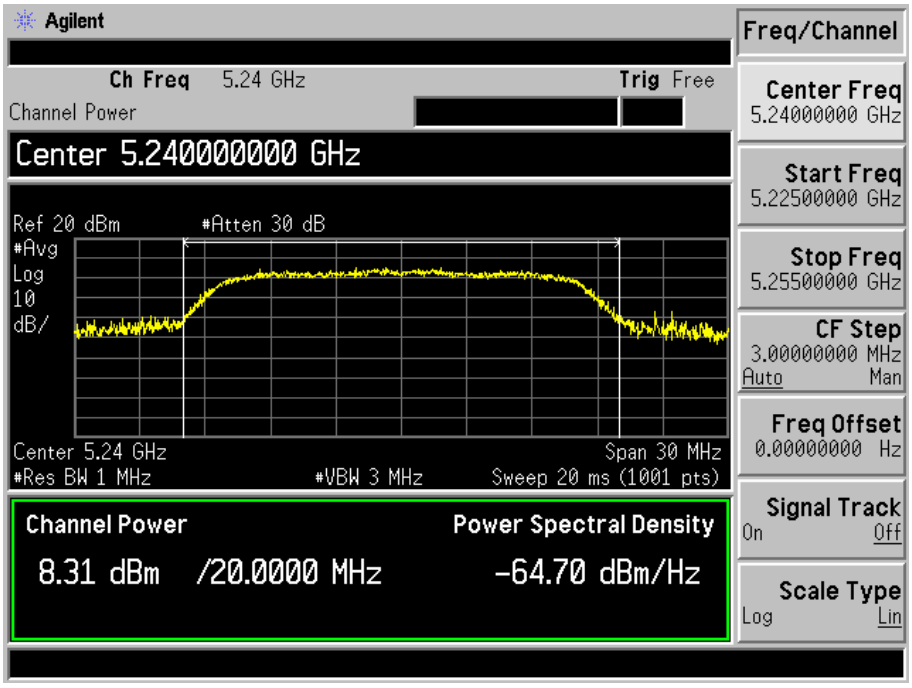
5180MHz



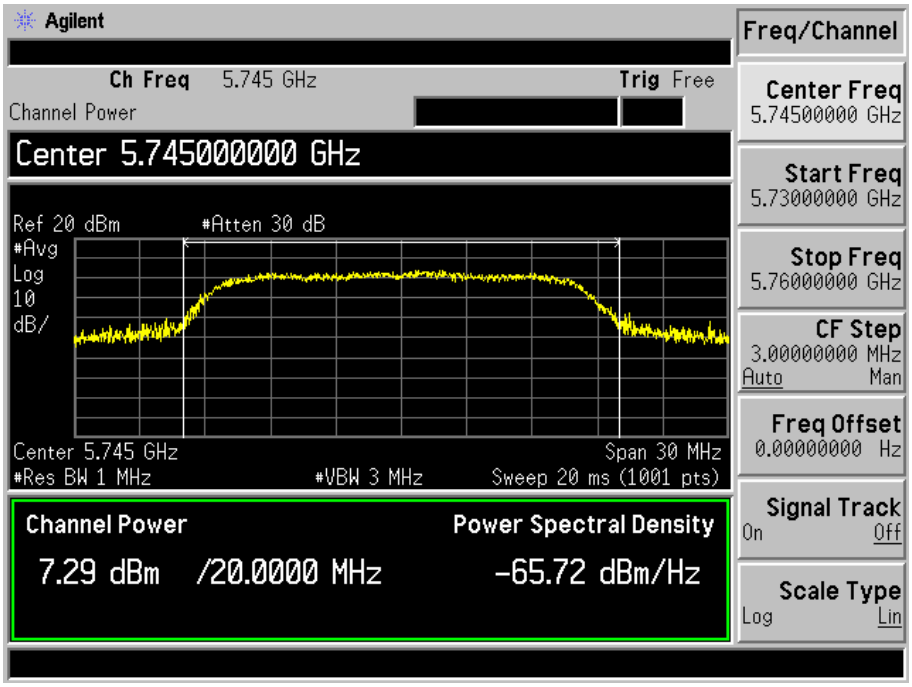
5200MHz



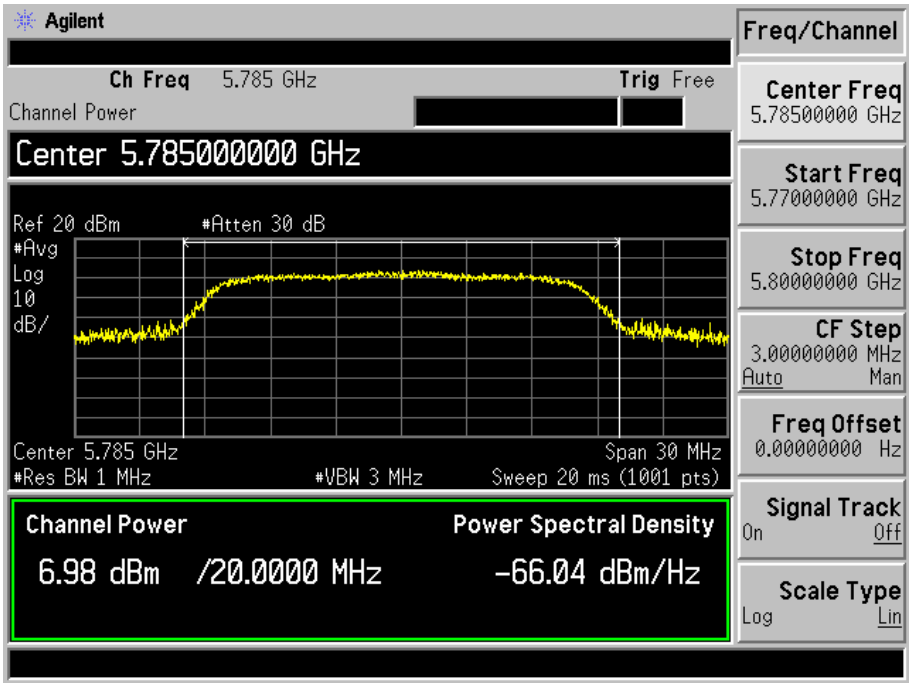
5240MHz



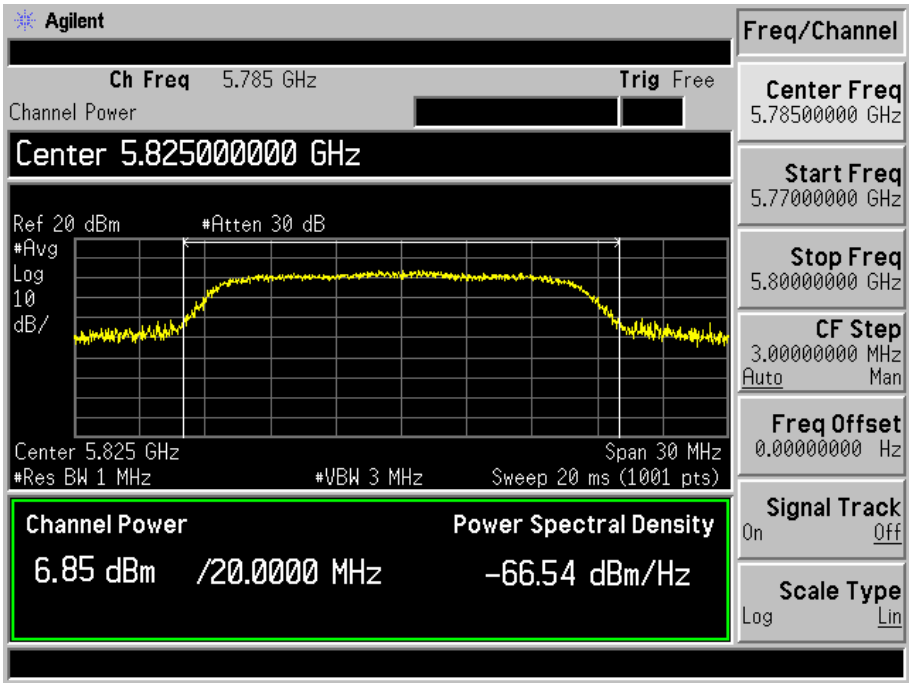
5745MHz



5785MHz

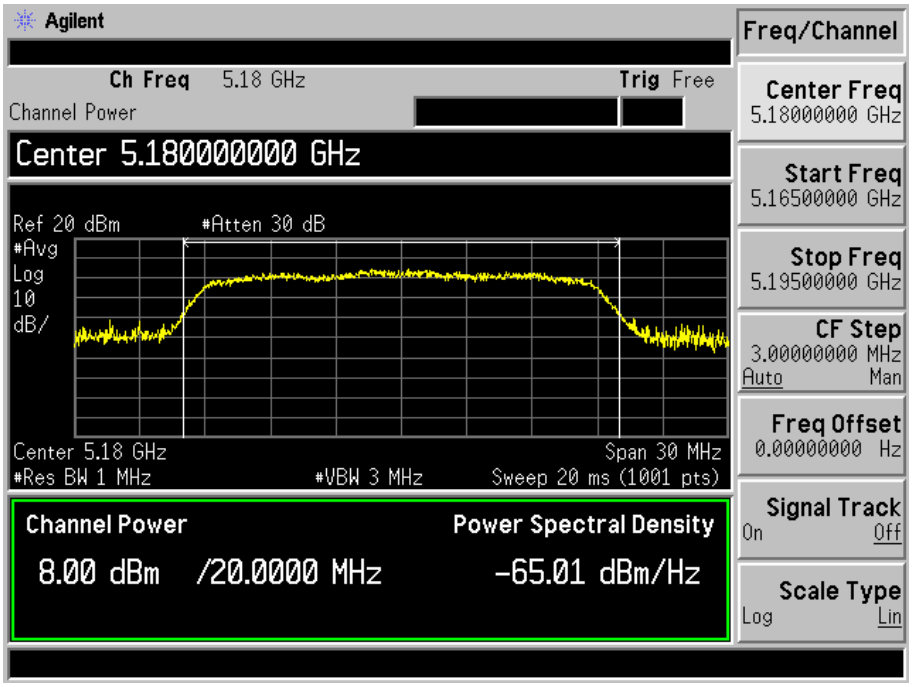


5805MHz

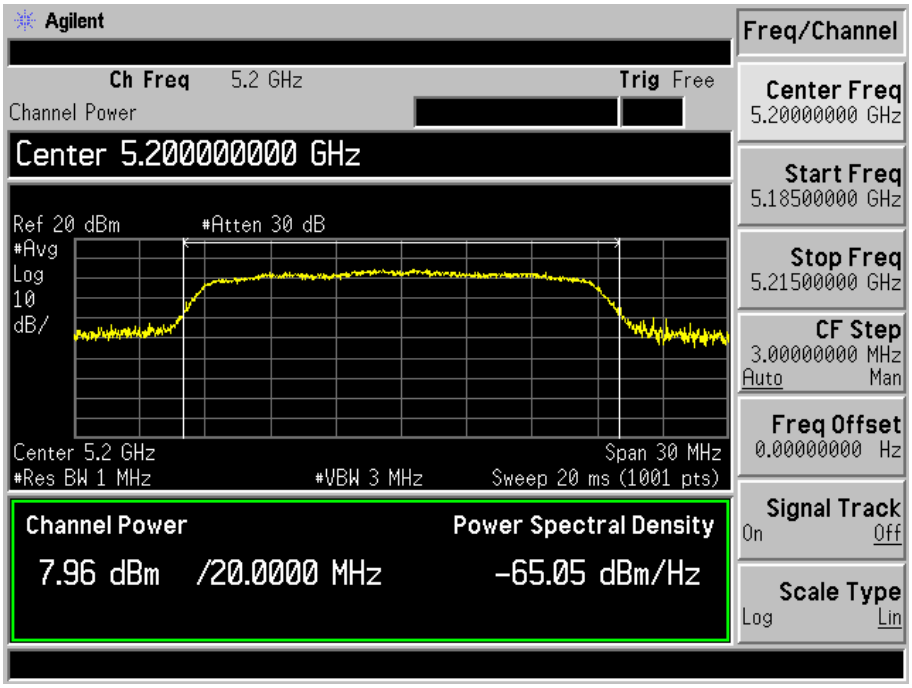


Test Mode: 802.11n-HT20

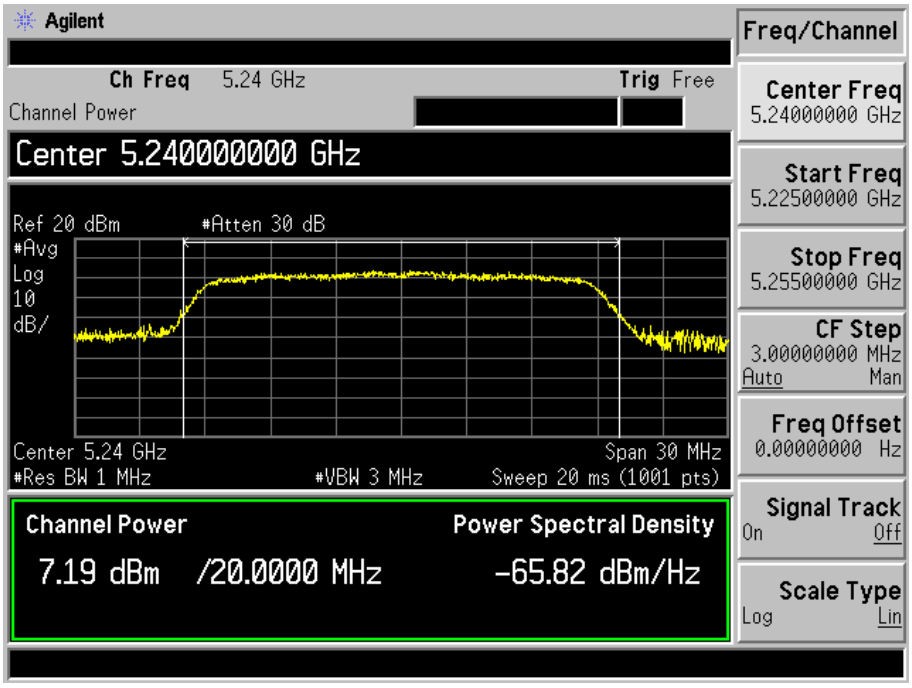
5180MHz



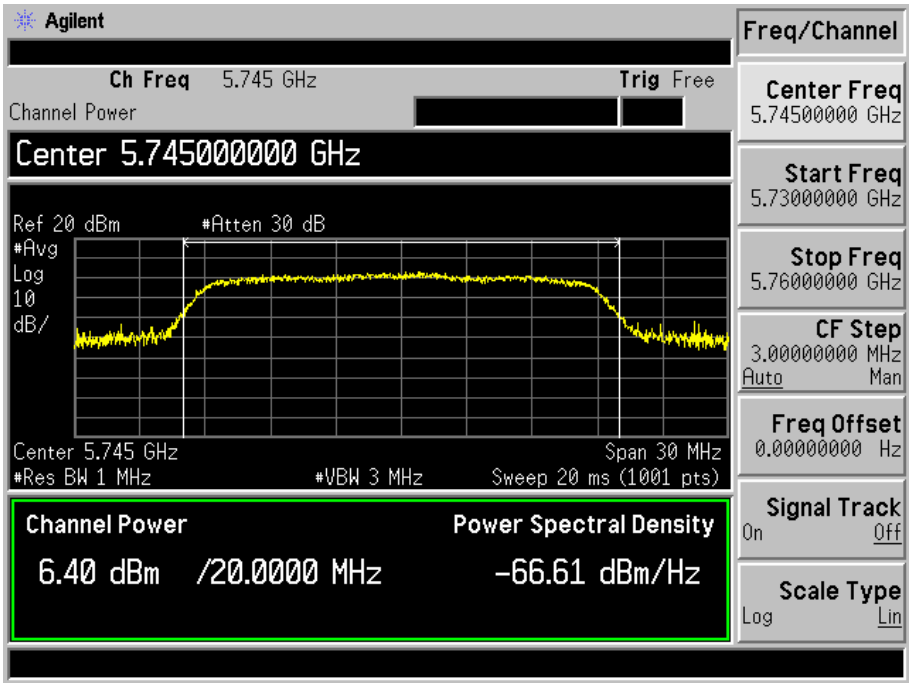
5200MHz



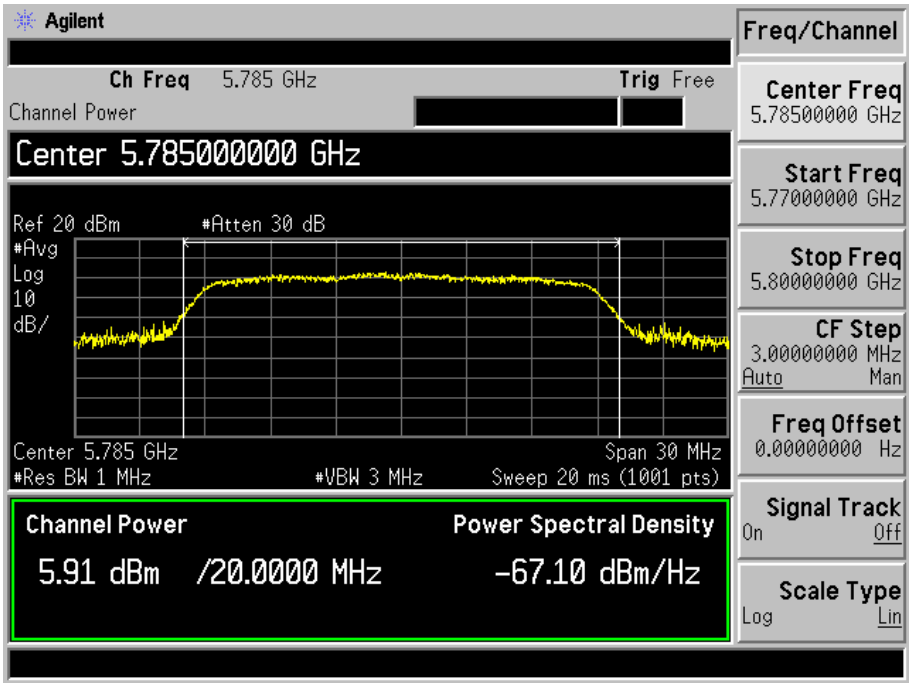
5240MHz



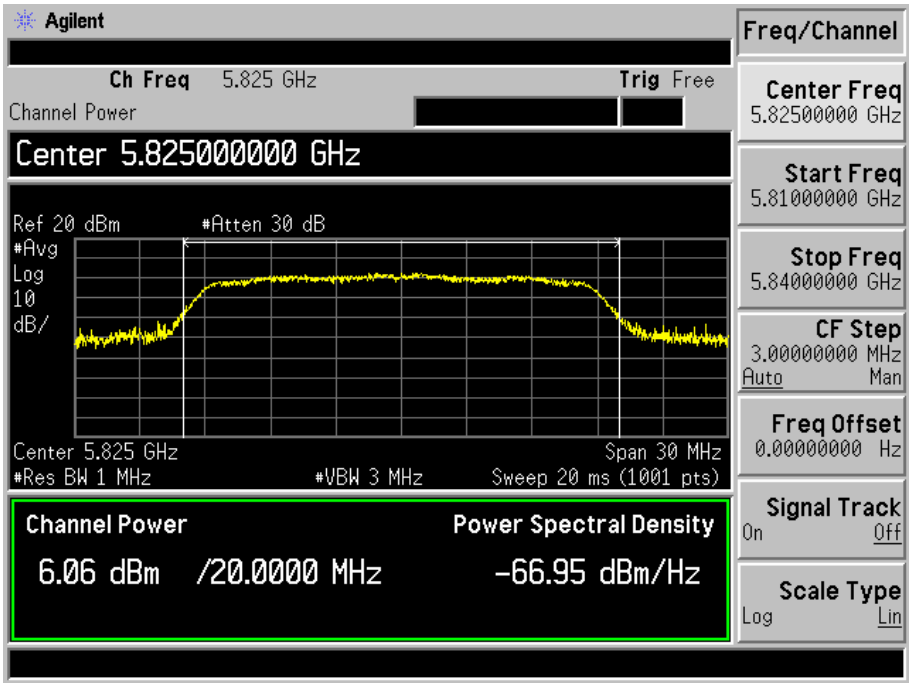
5745MHz



5785MHz



5825MHz



9. Radiated Spurious Emissions

9.1 Standard Applicable

According to §15.407(b)(6), Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209.

According to §15.407(b)(7),The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

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If radiated measurements are performed, field strength is then converted to EIRP as follows:

EIRP = ((E*d)^2) / 30

where:

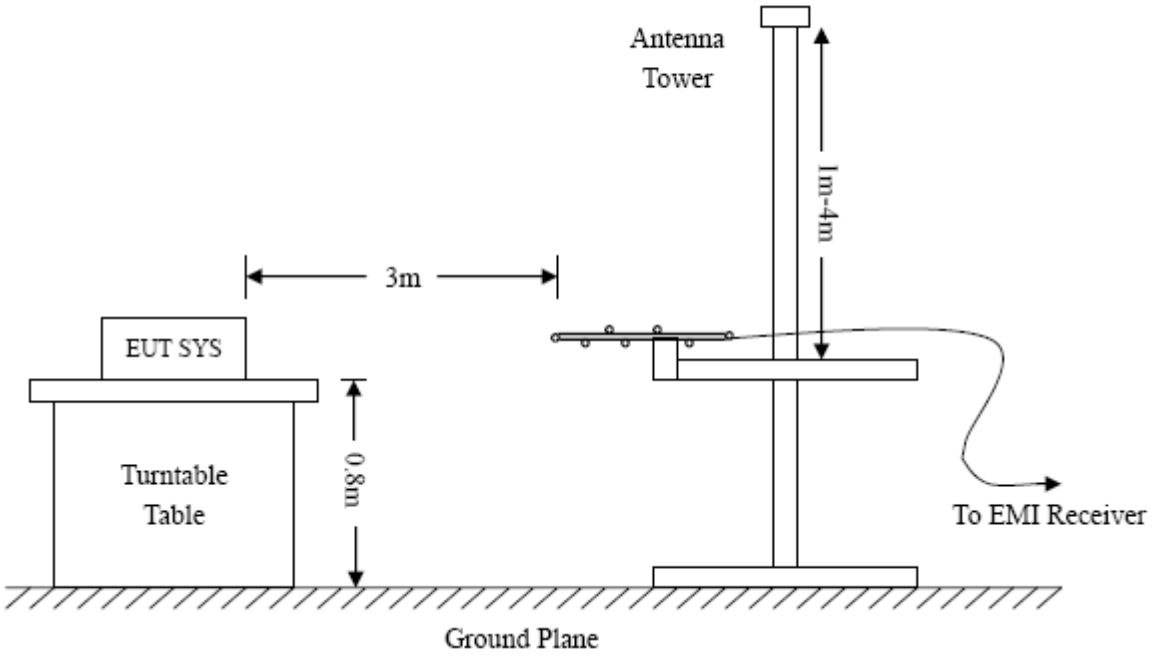
- E is the field strength in V/m;
- d is the measurement distance in meters;
- EIRP is the equivalent isotropically radiated power in watts.

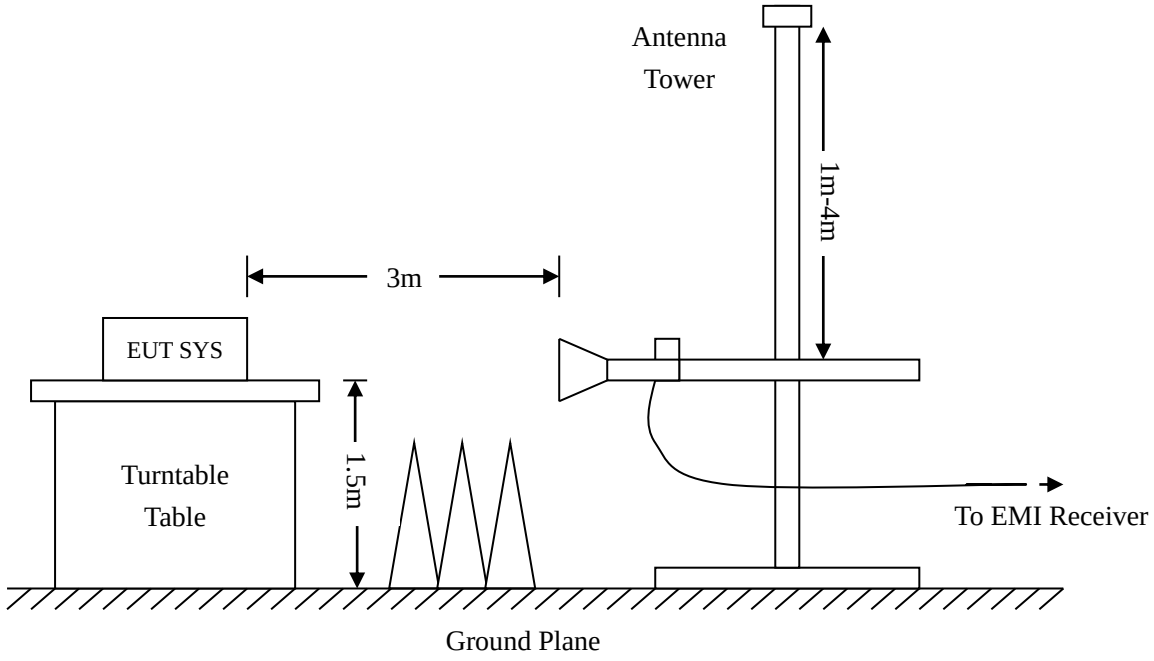
9.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.407(b)(6) and FCC Part 15.209 Limit..

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.





9.3 Test Receiver Setup

During the radiated emission test for above 1GHz, the test receiver was set with the following configurations:

For peak detector:
RBW = 1000kHz, VBW = 3000kHz, Sweep Time = Auto

For average detector:
RBW = 1000kHz, VBW = 10Hz, Sweep Time = Auto

9.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15 Limit

9.5 Environmental Conditions

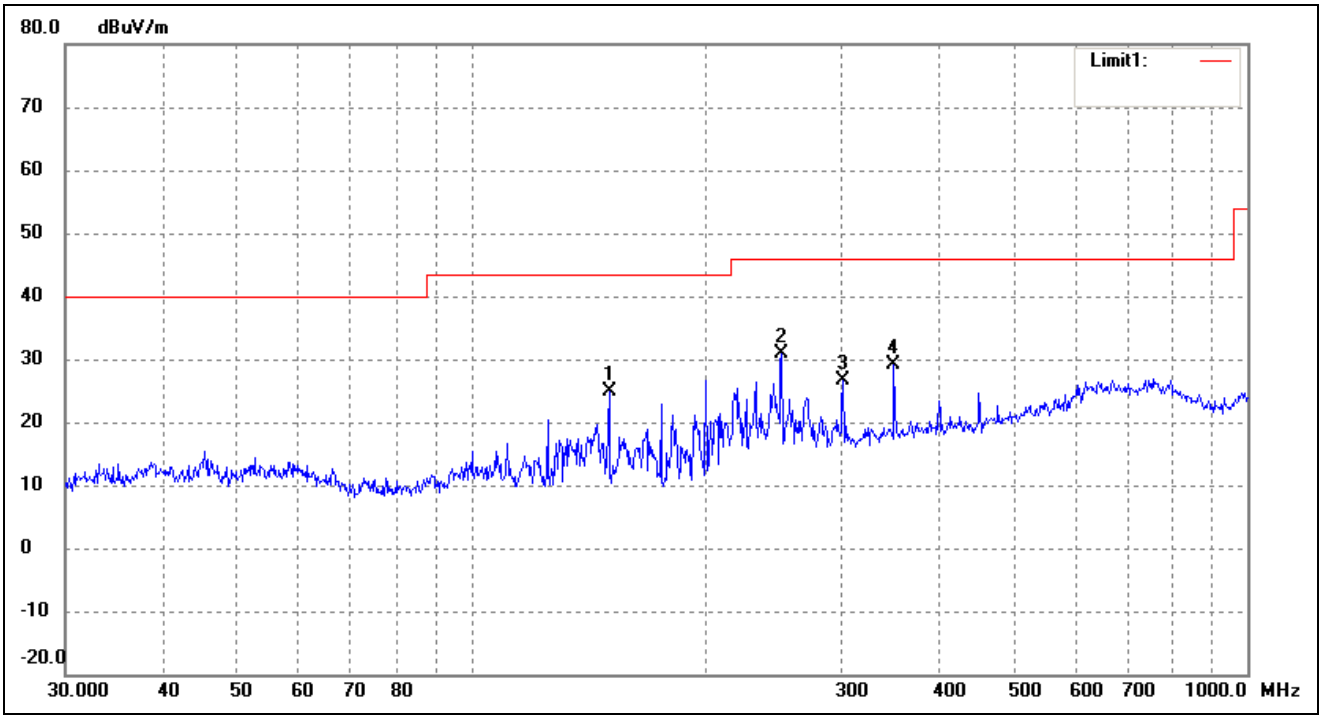
Temperature:	22° C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

9.6 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.407(b)(6) standards, and had the worst margin of:

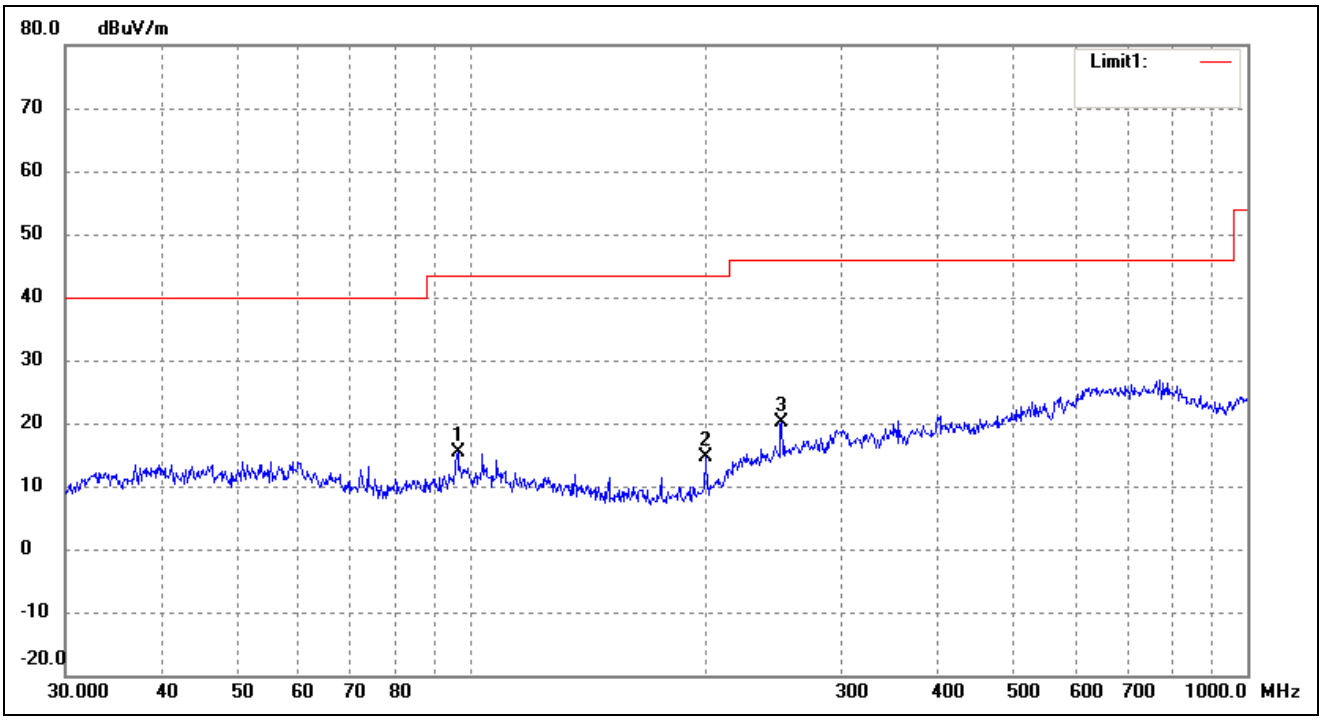
Note: *this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

For 802.11a (worst case)
Spurious Emission From 30 MHz to 1 GHz
Test mode: Transmitting Channel 5180MHz
Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	150.5378	43.63	-18.74	24.89	43.50	-18.61	309	100	peak
2	251.1804	43.03	-12.09	30.94	46.00	-15.06	97	100	peak
3	301.4224	36.15	-9.59	26.56	46.00	-19.44	251	100	peak
4	350.4768	38.37	-9.26	29.11	46.00	-16.89	95	100	peak

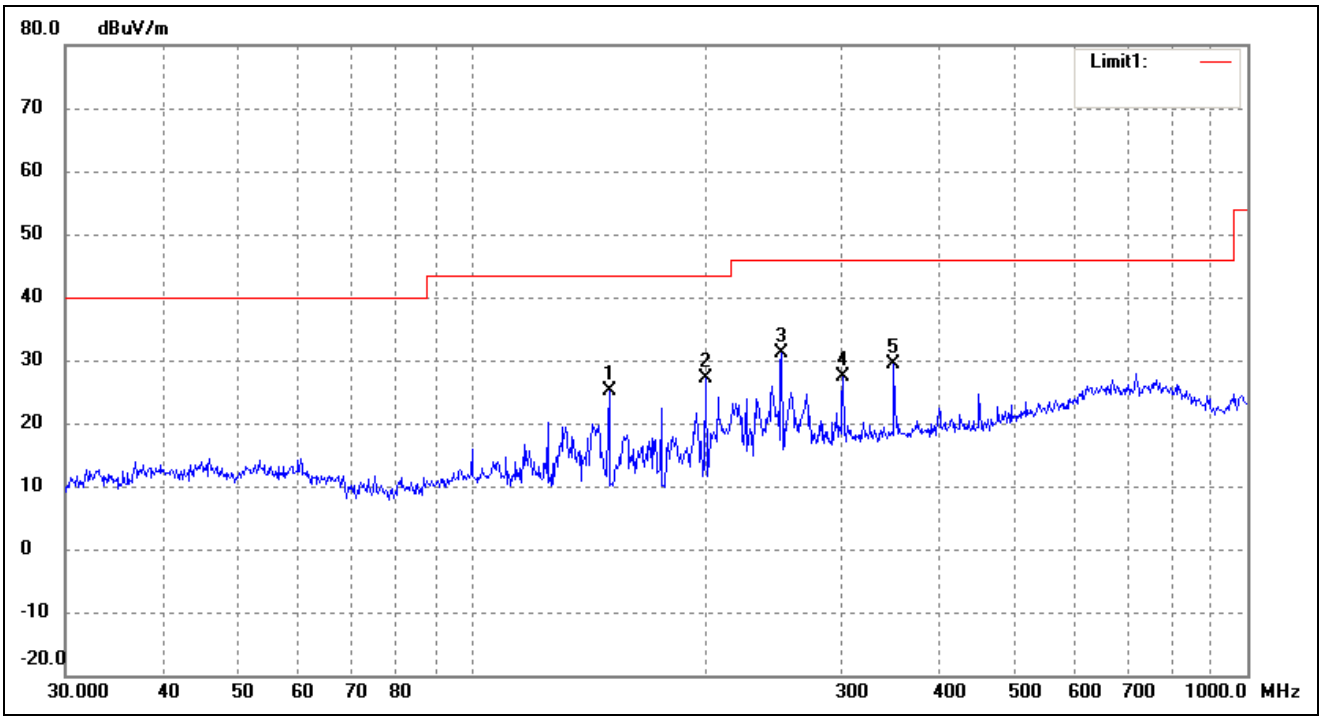
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	96.0986	32.55	-17.14	15.41	43.50	-28.09	336	100	peak
2	200.6881	32.66	-18.05	14.61	43.50	-28.89	97	100	peak
3	251.1804	32.15	-12.09	20.06	46.00	-25.94	140	100	peak

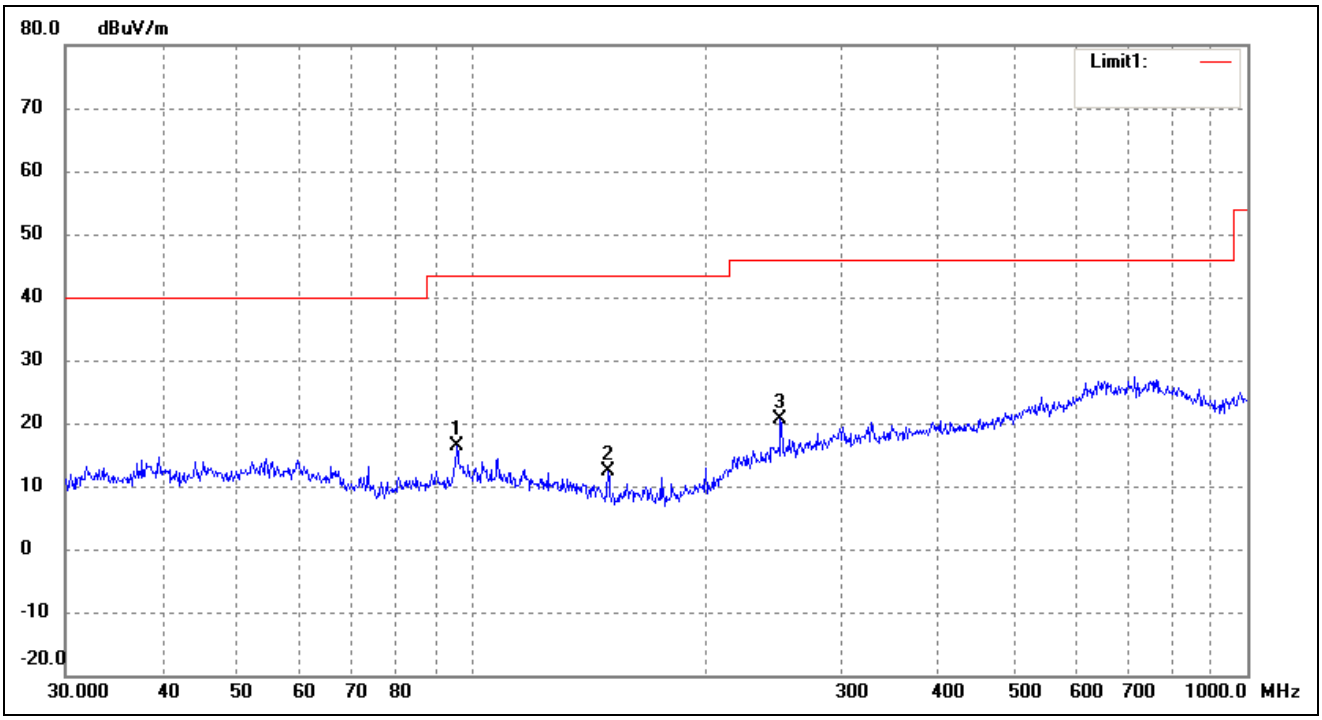
Test mode: Transmitting Channel 5200MHz

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	150.5378	43.95	-18.74	25.21	43.50	-18.29	121	100	peak
2	200.6881	45.28	-18.05	27.23	43.50	-16.27	111	100	peak
3	251.1804	43.14	-12.09	31.05	46.00	-14.95	72	100	peak
4	301.4224	36.95	-9.59	27.36	46.00	-18.64	95	100	peak
5	350.4768	38.70	-9.26	29.44	46.00	-16.56	64	100	peak

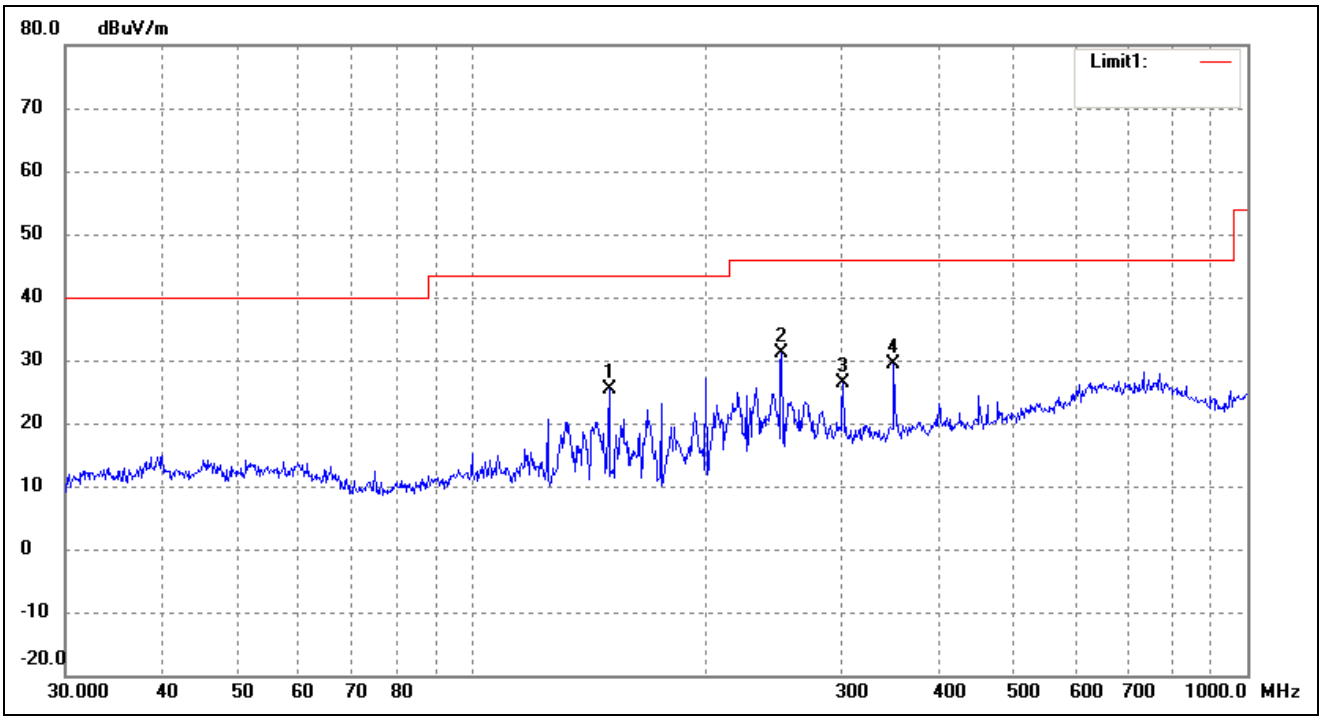
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	95.7622	33.51	-17.19	16.32	43.50	-27.18	70	100	peak
2	150.0108	31.00	-18.73	12.27	43.50	-31.23	150	100	peak
3	250.3012	32.72	-12.13	20.59	46.00	-25.41	75	100	peak

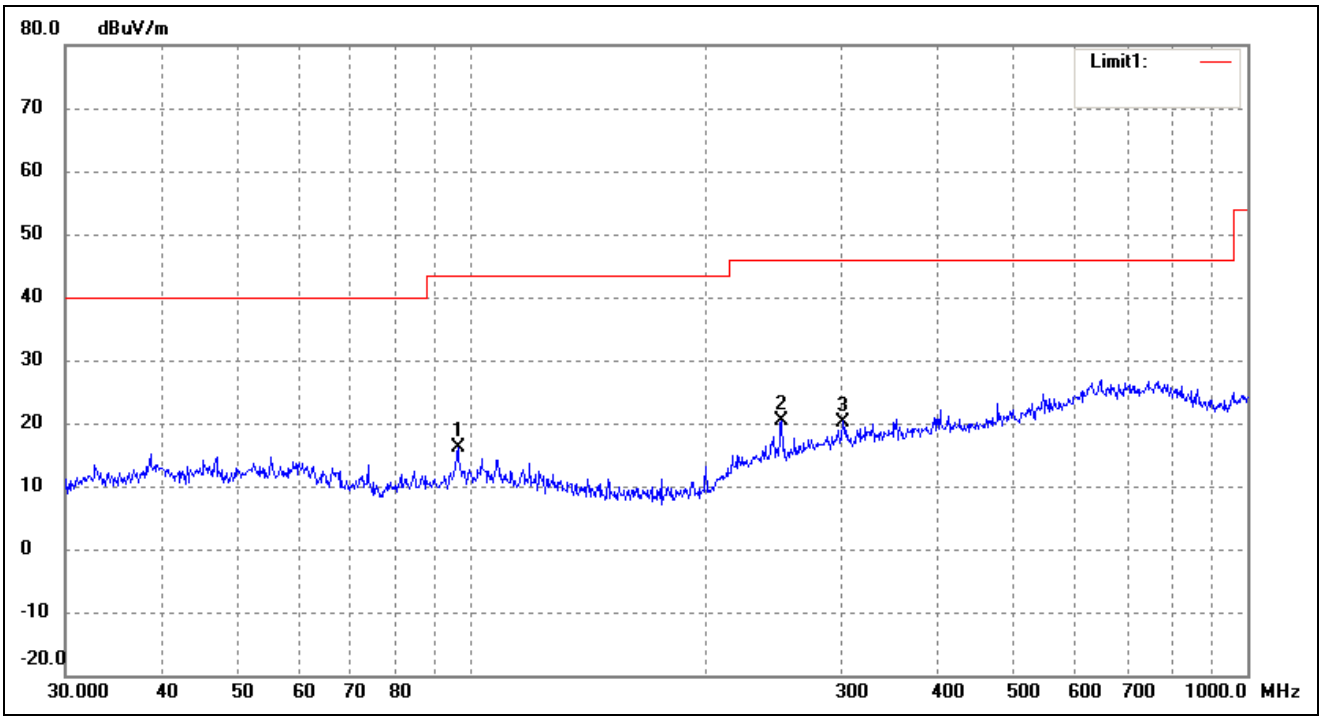
Test mode: Transmitting Channel 5240MHz

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	150.5378	44.03	-18.74	25.29	43.50	-18.21	263	100	peak
2	251.1804	43.34	-12.09	31.25	46.00	-14.75	99	100	peak
3	301.4224	35.96	-9.59	26.37	46.00	-19.63	280	100	peak
4	350.4768	38.72	-9.26	29.46	46.00	-16.54	108	100	peak

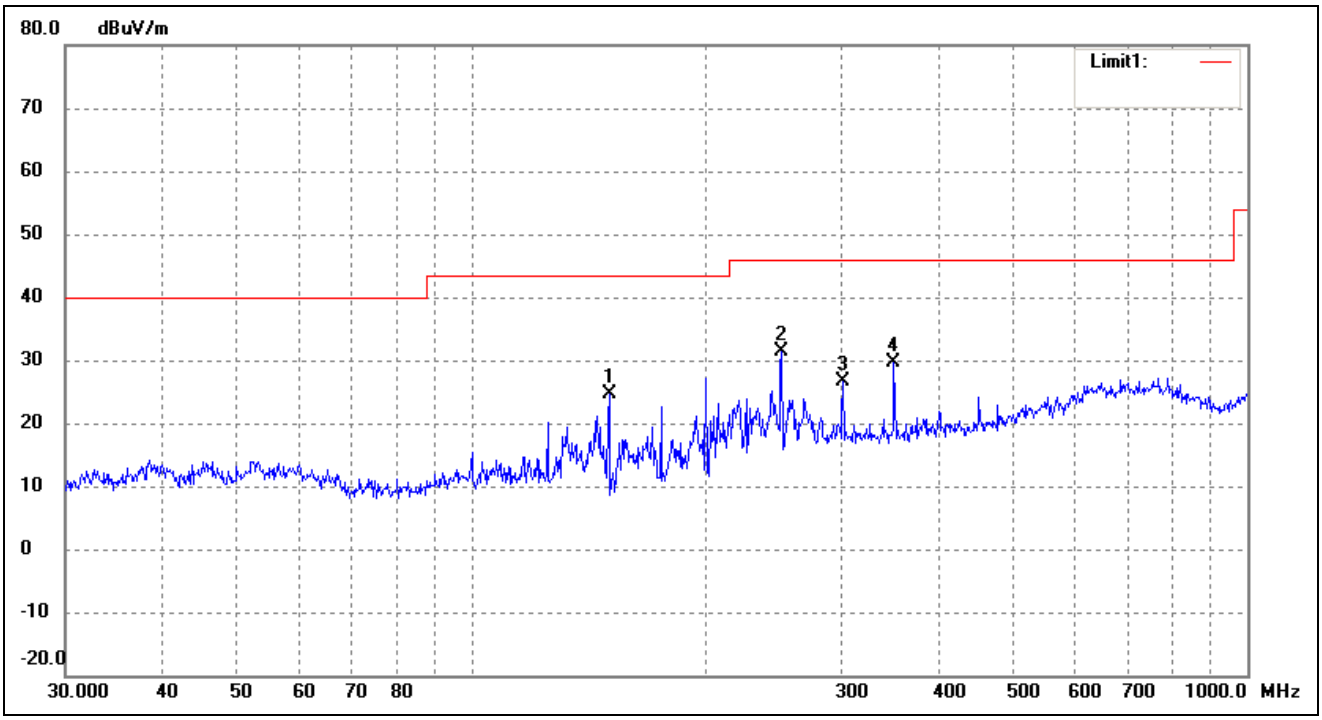
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	96.0986	33.39	-17.14	16.25	43.50	-27.25	332	100	peak
2	251.1804	32.54	-12.09	20.45	46.00	-25.55	262	100	peak
3	301.4224	29.84	-9.59	20.25	46.00	-25.75	52	100	peak

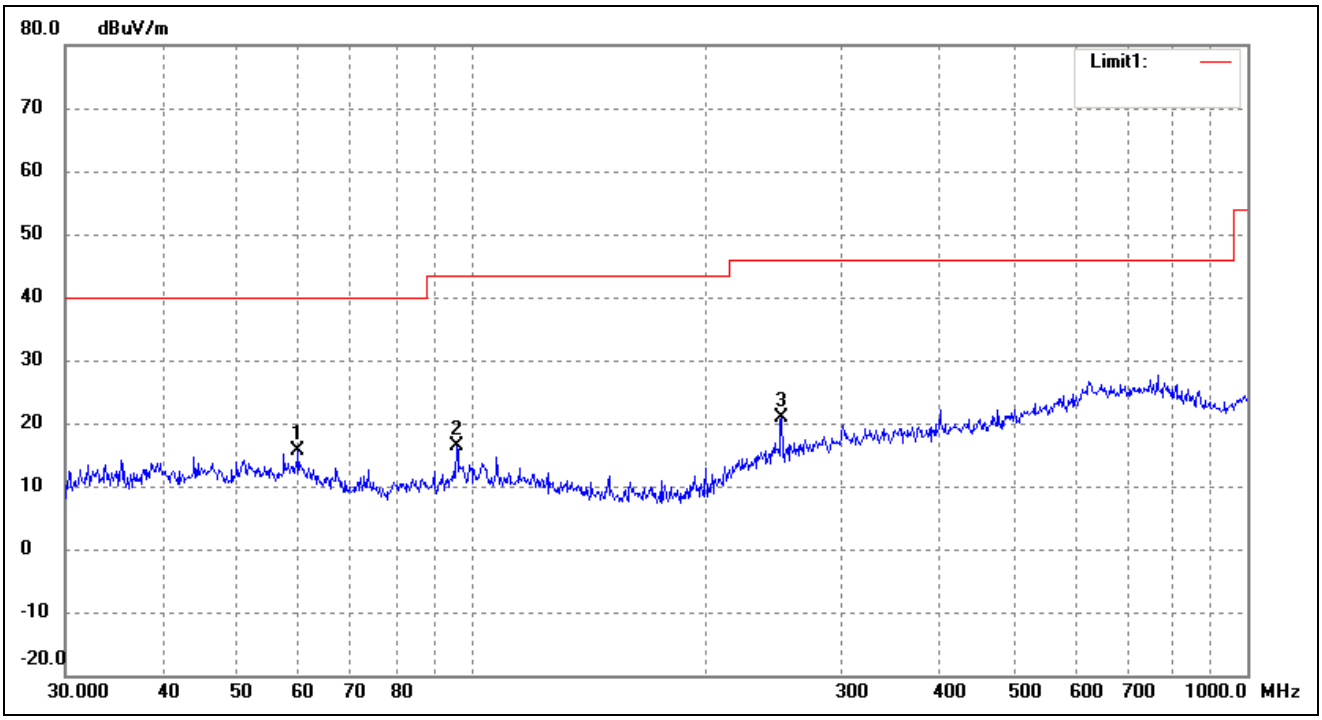
Test mode: Transmitting Channel 5745MHz

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	150.5378	43.28	-18.74	24.54	43.50	-18.96	89	100	peak
2	251.1804	43.50	-12.09	31.41	46.00	-14.59	179	100	peak
3	301.4224	36.31	-9.59	26.72	46.00	-19.28	68	100	peak
4	350.4768	38.78	-9.26	29.52	46.00	-16.48	90	100	peak

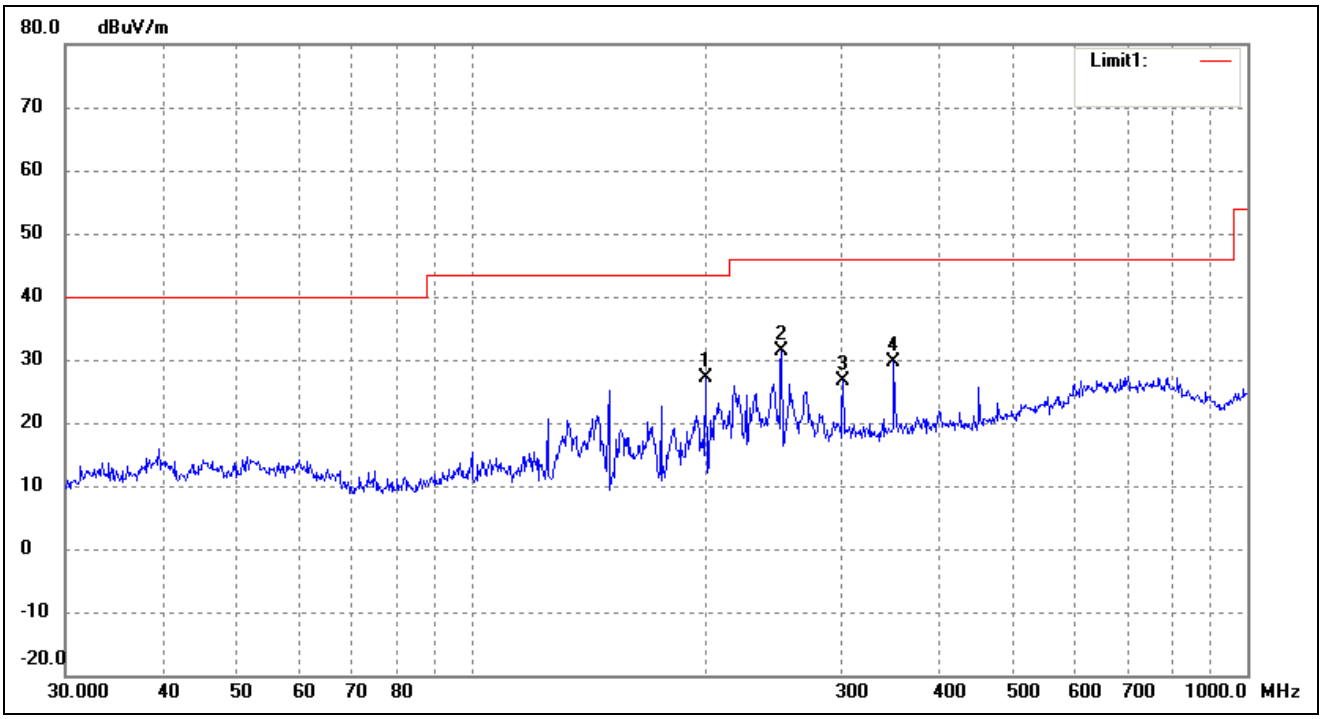
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	59.8588	32.24	-16.51	15.73	40.00	-24.27	226	100	peak
2	95.7622	33.69	-17.19	16.50	43.50	-27.00	92	100	peak
3	251.1804	32.89	-12.09	20.80	46.00	-25.20	92	100	peak

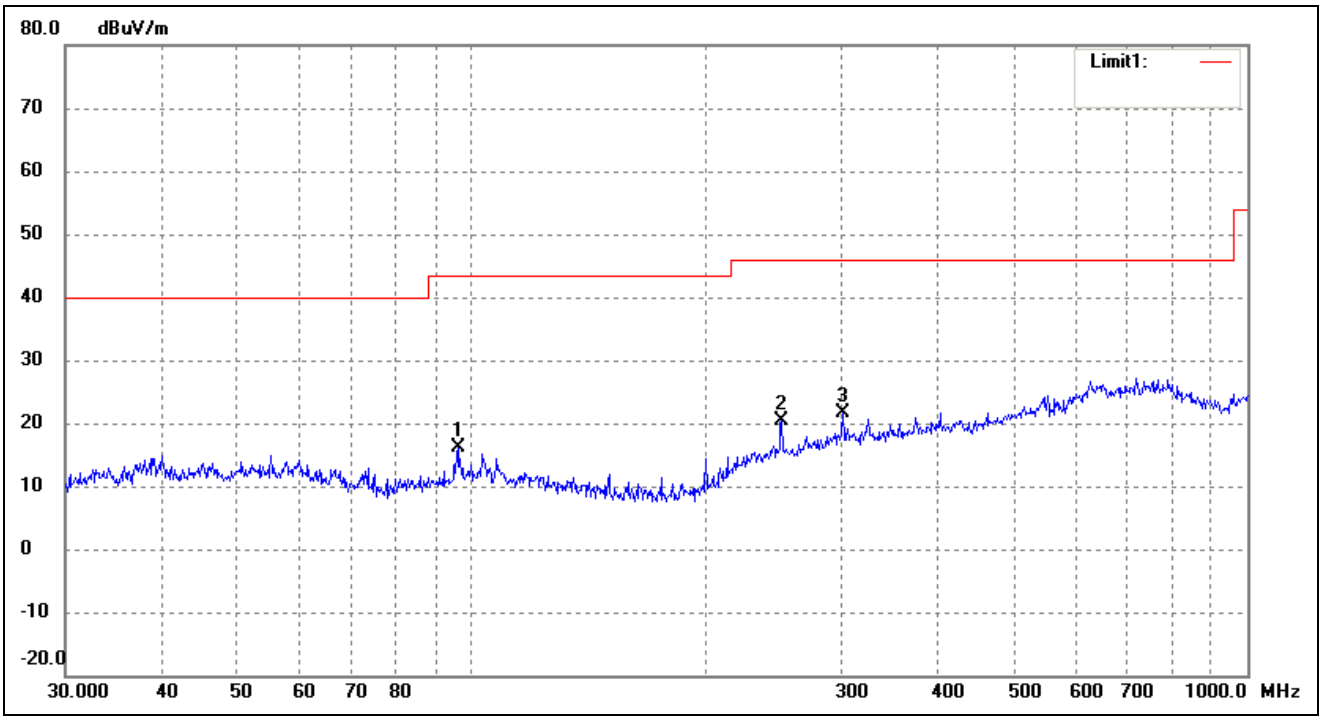
Test mode: Transmitting Channel 5785MHz

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	200.6881	45.18	-18.05	27.13	43.50	-16.37	275	100	peak
2	251.1804	43.50	-12.09	31.41	46.00	-14.59	118	100	peak
3	301.4224	36.31	-9.59	26.72	46.00	-19.28	67	100	peak
4	350.4768	38.78	-9.26	29.52	46.00	-16.48	271	100	peak

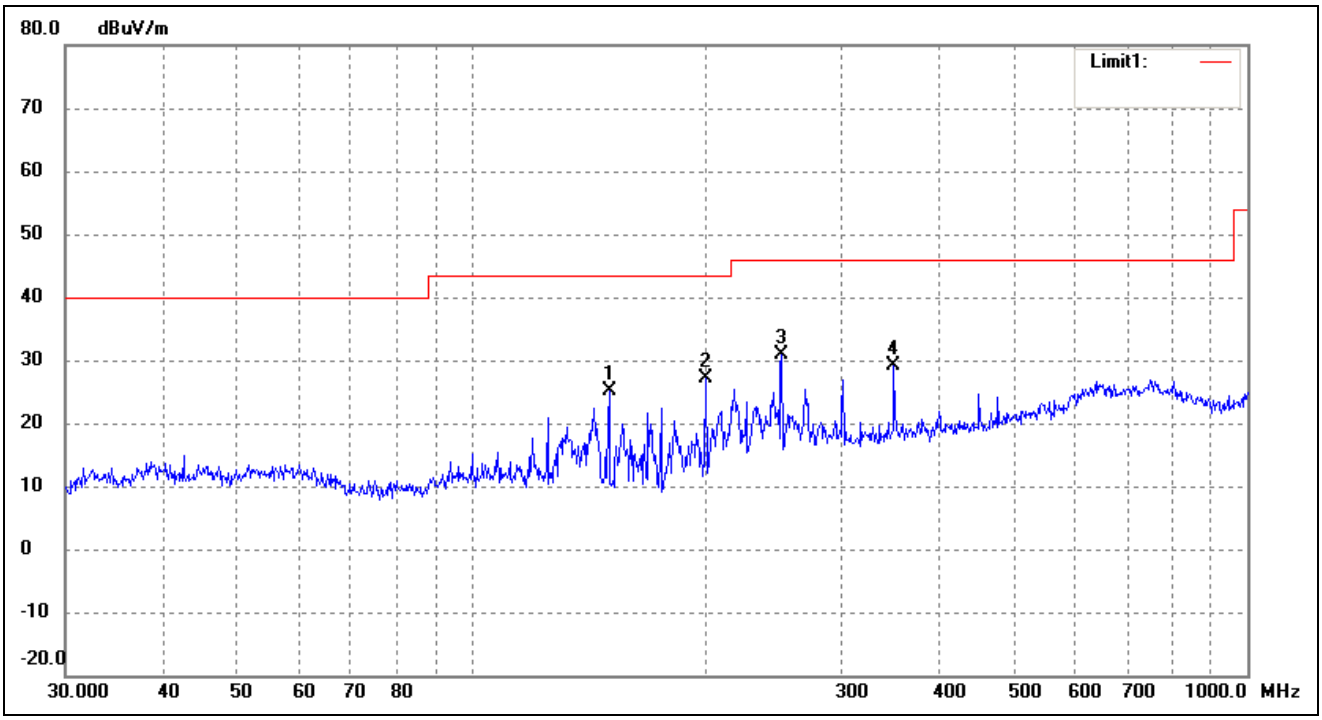
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	96.0986	33.16	-17.14	16.02	43.50	-27.48	119	100	peak
2	251.1804	32.47	-12.09	20.38	46.00	-25.62	180	100	peak
3	301.4224	31.16	-9.59	21.57	46.00	-24.43	90	100	peak

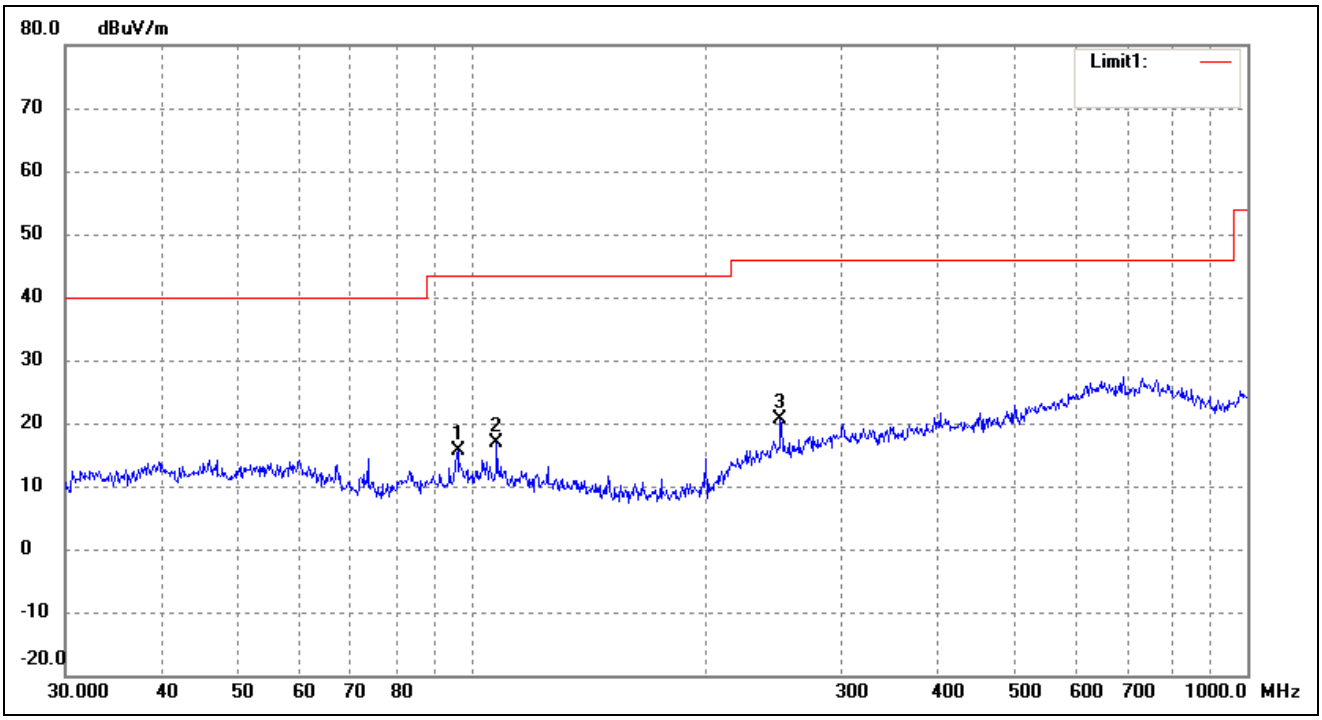
Test mode: Transmitting Channel 5825MHz

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	150.5378	43.90	-18.74	25.16	43.50	-18.34	215	100	peak
2	200.6881	45.24	-18.05	27.19	43.50	-16.31	95	100	peak
3	251.1804	42.91	-12.09	30.82	46.00	-15.18	117	100	peak
4	350.4768	38.34	-9.26	29.08	46.00	-16.92	92	100	peak

Test Specification: *Vertical*



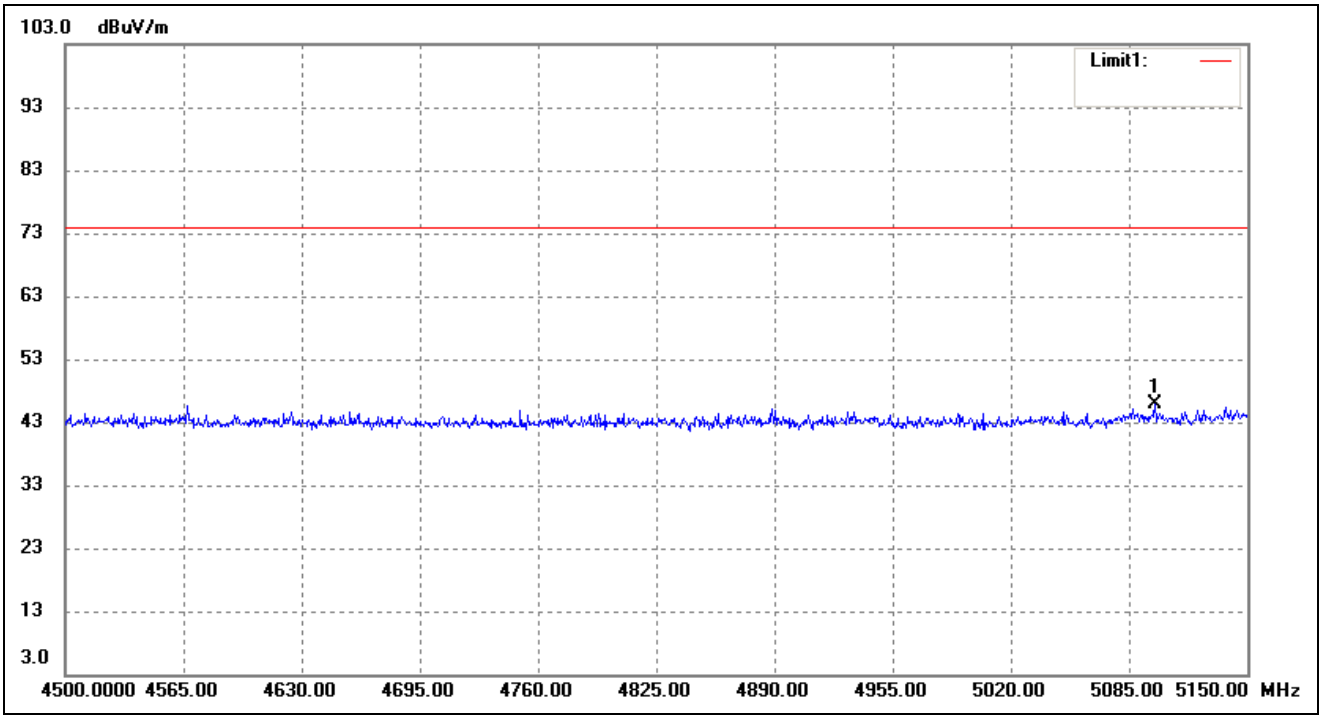
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	96.0986	32.72	-17.14	15.58	43.50	-27.92	171	100	peak
2	107.8877	33.45	-16.61	16.84	43.50	-26.66	179	100	peak
3	250.3012	32.73	-12.13	20.60	46.00	-25.40	91	100	peak

For 802.11a

Spurious Emission above 1GHz

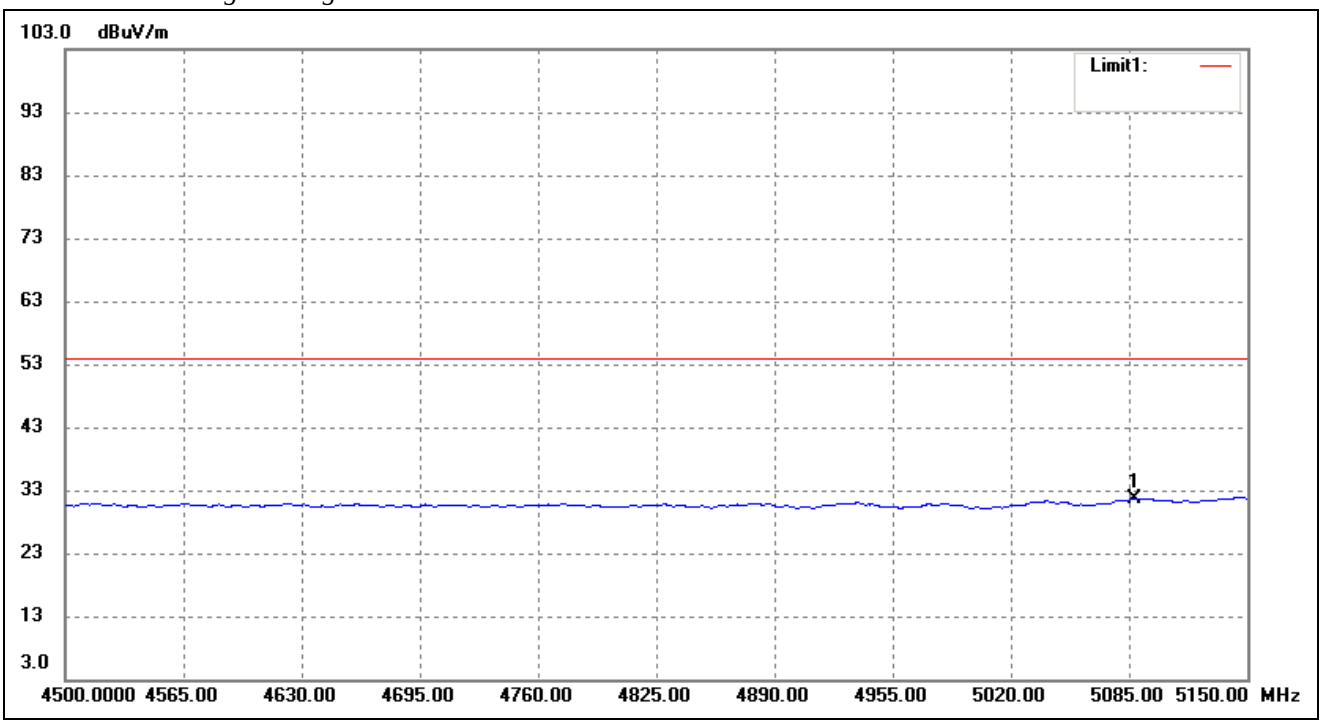
For the frequency band 5.15-5.25GHz(802.11a)

Restricted Bandedge Peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	5099.311	51.19	-5.33	45.86	74.00	-28.14	110	100	peak

Restricted Bandedge Average



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	5088.11	37.03	-5.37	31.66	54.00	-22.34	205	100	Ave

Note: this EUT was tested in the low, high channel and the worst case position data was reported.

Hormonics And Spurious Emissions

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (5180MHz)										
15540	PK	50.32	165	V	40.7	10.9	39.6	62.32	74	-11.68
15540	PK	49.65	23	H	40.7	10.9	39.6	61.65	74	-12.35
15540	AV	35.54	165	V	40.7	10.9	39.6	47.54	54	-6.46
15540	AV	35.15	23	H	40.7	10.9	39.6	47.15	54	-6.85
High Channel (5240MHz)										
15720	PK	48.98	265	V	40.7	10.9	39.6	60.98	74	-13.02
15720	PK	47.15	147	H	40.7	10.9	39.6	59.15	74	-14.85
15720	AV	36.35	265	V	40.7	10.9	39.6	48.35	54	-5.65
15720	AV	34.14	147	H	40.7	10.9	39.6	46.14	54	-7.86

Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5150	-43.65	-27
Highest	Above 5350	-41.02	-27
Note: the data just list the worst cases			

For the frequency band 5.725-5.850GHz (802.11a)

Harmonics And Spurious Emissions

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (5745MHz)										
11490	PK	48.85	314	V	38.9	9.8	40.1	57.45	74	-16.55
11490	PK	47.26	21	H	38.9	9.8	40.1	55.86	74	-18.14
11490	AV	37.26	314	V	38.9	9.8	40.1	45.86	54	-8.14
11490	AV	35.23	21	H	38.9	9.8	40.1	43.83	54	-10.17
High Channel (5825MHz)										
11610	PK	49.26	264	V	38.9	9.8	40.1	57.86	74	-16.14
11610	PK	47.15	87	H	38.9	9.8	40.1	55.75	74	-18.25
11610	AV	37.56	264	V	38.9	9.8	40.1	46.16	54	-7.84
11610	AV	35.26	87	H	38.9	9.8	40.1	43.86	54	-10.14

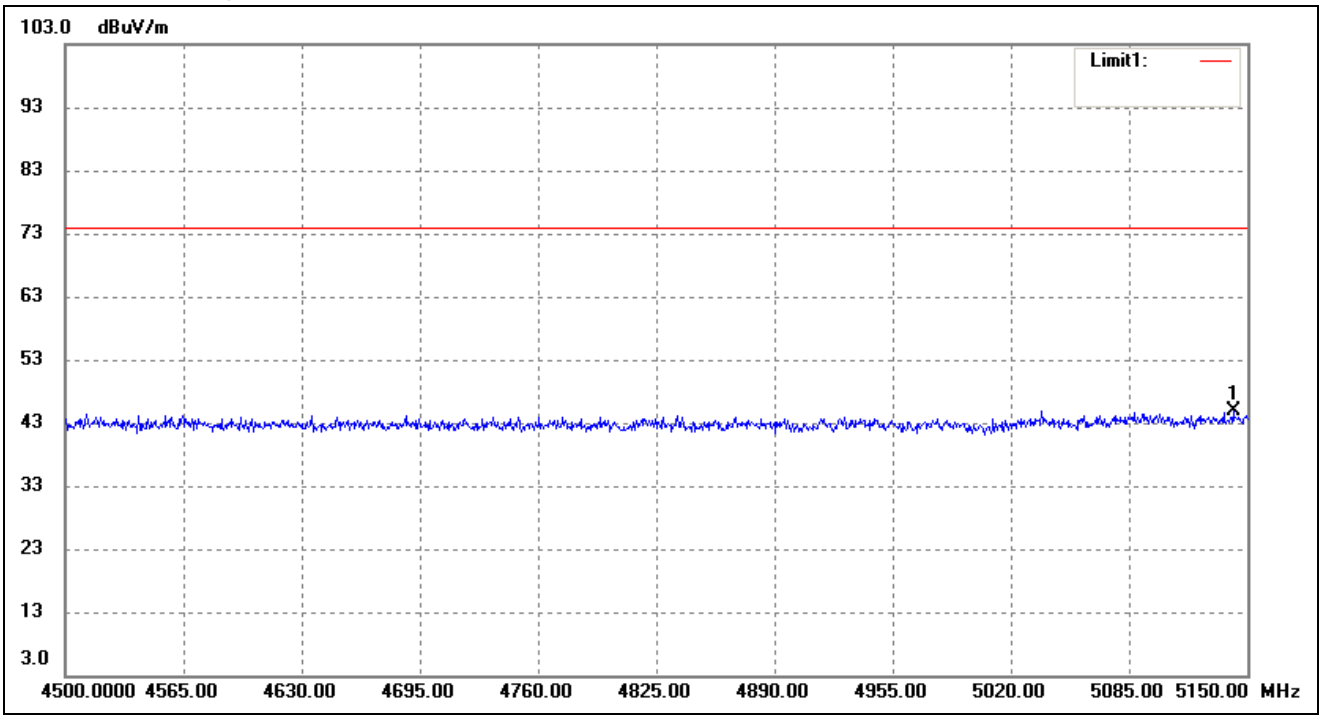
Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5715	-45.32	-27
	5715 to 5725	-41.61	-17
Highest	5850 to 5860	-42.75	-17
	Above 5860	-43.17	-27
Note: the data just list the worst cases			

802.11n HT20

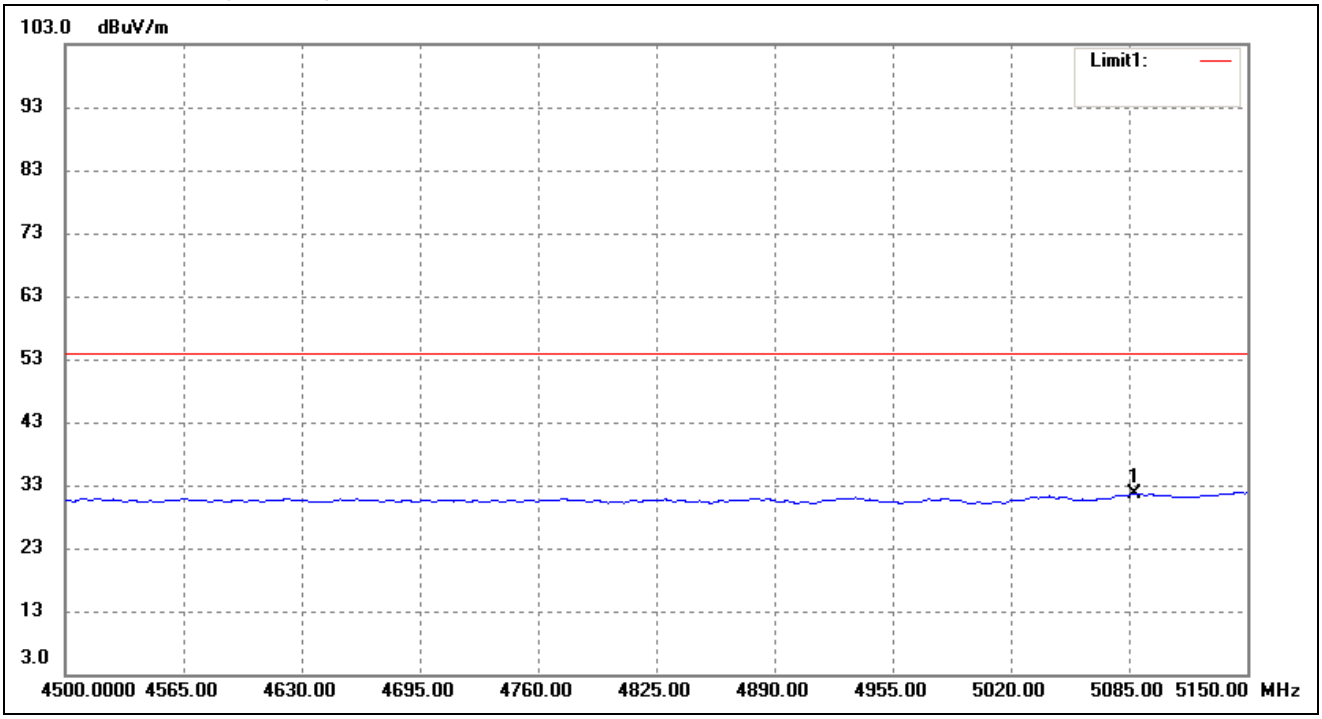
For the frequency band 5.15-5.25GHz(802.11n HT20)

Restricted Bandedge Peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	5142.209	50.01	-5.22	44.79	74.00	-29.21	308	100	peak

Restricted Bandedge Average



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	5088.252	37.01	-5.37	31.64	54.00	-22.36	295	100	Ave

Note: this EUT was tested in the low, high channel and the worst case position data was reported.

Hormonics And Spurious Emissions

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (5180MHz)										
15540	PK	48.65	174	V	40.7	10.9	39.6	60.65	74	-13.35
15540	PK	45.55	301	H	40.7	10.9	39.6	57.55	74	-16.45
15540	AV	35.98	147	V	40.7	10.9	39.6	47.98	54	-6.02
15540	AV	33.15	301	H	40.7	10.9	39.6	45.15	54	-8.85
High Channel (5240MHz)										
15720	PK	48.65	26	V	40.7	10.9	39.6	60.65	74	-13.35
15720	PK	45.54	58	H	40.7	10.9	39.6	57.54	74	-16.46
15720	AV	35.21	26	V	40.7	10.9	39.6	47.21	54	-6.79
15720	AV	34.65	58	H	40.7	10.9	39.6	46.65	54	-7.35

Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5150	-41.65	-27
Highest	Above 5350	-39.36	-27
Note: the data just list the worst cases			

For the frequency band 5.725-5.850GHz (802.11n HT20)

Harmonics And Spurious Emissions

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (5725MHz)										
11490	PK	46.74	136	V	38.9	9.8	40.1	58.74	74	-15.26
11490	PK	45.65	298	H	38.9	9.8	40.1	57.65	74	-16.35
11490	AV	36.14	136	V	38.9	9.8	40.1	48.14	54	-5.86
11490	AV	35.21	298	H	38.9	9.8	40.1	47.21	54	-6.79
High Channel (5825MHz)										
11610	PK	49.01	241	V	38.9	9.8	40.1	61.01	74	-12.99
11610	PK	46.32	129	H	38.9	9.8	40.1	58.32	74	-15.68
11610	AV	36.01	241	V	38.9	9.8	40.1	48.01	54	-5.99
11610	AV	34.54	129	H	38.9	9.8	40.1	46.54	54	-7.46

Out of Band edge

Test CH.	**Test Segment**	**Result**	**Limit**
	MHz	**dBm/MHz**	**dBm/MHz**
Lowest	Below 5715	-38.65	-27
	5715 to 5725	-37.32	-17
Highest	5850 to 5860	-39.65	-17
	Above 5860	-40.25	-27
Note: the data just list the worst cases			

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

10. Frequency Stability

10.1 Standard Applicable

According to §15.407(g), Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

10.2 Test Procedure

According to §2.1055, the following test procedure was performed.
The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

Temperature:	Supply Voltage
20°C	DC 3.5-4.2V
-30°C to +50°C	Normal

10.3 Environmental Conditions

Temperature:	20°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

10.4 Summary of Test Results/Plots

5150-5250MHz

802.11a

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	65	0.0125
40	3.7	125	0.0240
30	3.7	111	0.0213
20	3.7	105	0.0202
10	3.7	114	0.0219
0	3.7	155	0.0298
-10	3.7	165	0.0317
-20	3.7	132	0.0254
-30	3.7	136	0.0262

802.11n_HT20

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	132	0.0254
40	3.7	125	0.0240
30	3.7	103	0.0198
20	3.7	121	0.0233
10	3.7	151	0.0290
0	3.7	129	0.0248
-10	3.7	148	0.0285
-20	3.7	136	0.0262
-30	3.7	102	0.0196

5725-5850MHz

802.11a

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	136	0.0235
40	3.7	65	0.0112
30	3.7	98	0.0169
20	3.7	124	0.0214
10	3.7	152	0.0263
0	3.7	168	0.0290
-10	3.7	97	0.0168
-20	3.7	126	0.0218
-30	3.7	99	0.0171

802.11n_HT20

Reference Frequency(Middle Channel): 5785MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	131	0.0226
40	3.7	105	0.0182
30	3.7	98	0.0169
20	3.7	78	0.0135
10	3.7	121	0.0209
0	3.7	126	0.0218
-10	3.7	113	0.0195
-20	3.7	119	0.0206
-30	3.7	106	0.0183

So, Frequency Stability Versus Input Voltage is:

5150-5250MHz

802.11a

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (℃)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.5	121	0.0233
	3.7	105	0.0202
	4.2	110	0.0212

802.11n_HT20

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (℃)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.5	108	0.0208
	3.7	121	0.0233
	4.2	125	0.0240

5725-5850MHz

802.11a

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (℃)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.5	132	0.0228
	3.7	124	0.0214
	4.2	120	0.0207

802.11n_HT20

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (℃)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.5	81	0.0140
	3.7	78	0.0135
	4.2	87	0.0150

******* END OF REPORT *******