SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park,
Shenzhen, Guangdong, China 518057

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FCC REPORT

Application No:	SZEM1605003915CR
Applicant:	AG ACQUISITION CORP.
Manufacturer:	AG ACQUISITION CORP.
Product Name:	A50 Wireless
Model No.(EUT):	A50G03
Trade Mark:	ASTRO GAMING
FCC ID:	YQ6-A50G03
Standards:	47 CFR Part 15, Subpart E (2015)
Date of Receipt:	2016-05-27
Date of Test:	2016-06-23
Date of Issue:	2016-07-12
Test Result:	**PASS ***

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

Authorized Signature:

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2016-07-12		Original

Authorized for issue by:				
Tested By		Benson Wang **(Benson Wang) /Project Engineer**		2016-06-24 **Date**
Prepared By		Iris Zhou **(Iris Zhou) /Clerk**		2016-07-12 **Date**
Checked By		Eric Fu **(Eric Fu) /Reviewer**		2016-07-12 **Date**

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3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Section 15.203	ANSI C63.10: 2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Section 15.407(b)	ANSI C63.10: 2013	PASS
Duty Cycle	FCC KDB 789033 D02 General UNIT Test Procedures New Rules v01	ANSI C63.10: 2013	PASS
Conducted Output Power	47 CFR Part 15 Section 15.407(a)	ANSI C63.10: 2013	PASS
Equivalent Isotropic Radiated Power (e.i.r.p.)	47 CFR Part 15 Section 15.407(a)	ANSI C63.10: 2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15 Section 15.407(e)	ANSI C63.10: 2013	PASS
26 dB Emission Bandwidth & 99% Occupied Bandwidth	47 CFR Part 15 Section 15.407(a)	ANSI C63.10: 2013	PASS
Power Spectral Density	47 CFR Part 15 Section 15.407(a)	ANSI C63.10: 2013	PASS
Radiated Spurious Emissions	47 CFR Part 15 Section 15.407(b)	ANSI C63.10: 2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15 Section 15.407(b)	ANSI C63.10: 2013	PASS

Remark:

Model No.: A50G03

There were two styles of samples in this report, only the model A50G03 with green was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for the above samples, with only different on color.

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5 General Information

5.1 Client Information

Applicant:	AG ACQUISITION CORP.
Address of Applicant:	1441 UTE BLVD., SUITE 250, PARK CITY, UT 84098, United States
Manufacturer:	AG ACQUISITION CORP.
Address of Manufacturer:	1441 UTE BLVD., SUITE 250, PARK CITY, UT 84098,United States

5.2 General Description of EUT

Product Name:	A50 Wireless
Model No.:	A50G03
Trade Mark:	ASTRO GAMING
Operation Frequency:	5.725-5.850GHz.
Channel Numbers:	5G WiFi, 802.11a(VHT20)
Modulation Type	For 802.11a: OFDM(8PSK/QPSK/16QAM/64QAM)
Sample Type:	Portable
Antenna Type:	PCB Printed dipole
Antenna Gain:	Antenna 1: 2.12dBi, Antenna 2: 4.23dBi
Power Supply:	AC120V/60Hz

Note:

In FCC 15.31 , for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table, and the selected channel to perform the test as below:

Frequency Range of Operation Operating Frequency Range (in each Band)	Number of Measurement Frequencies Required	Location of Measurement Frequency in Band of Operation
1 MHz or less	1	centre
1 MHz to 10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near centre

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For 802.11a(HT20)

Mode	Channel	Frequency(MHz)
IEEE 802.11a 20MHz	The Lowest channel	5745
	The Middle channel	5785
	The Highest channel	5825

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5.3 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1005 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

5.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	T430u	REF. No.SEA1800
USB cable(108cm shielded)	Skullcandy	N/A	N/A
Base station	Skullcandy	TXDX01	N/A

5.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch,
No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.
Tel: +86 755 2601 2053 Fax: +86 755 2671 0594
No tests were sub-contracted.

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5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

• **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

• **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

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5.10 Equipment List

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. date (yyyy-mm-dd)**	**Cal.Due date (yyyy-mm-dd)**
1	Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2016-05-13	2017-05-13
2	LISN	Rohde & Schwarz	ENV216	SEM007-01	2015-10-09	2016-10-09
3	LISN	ETS-LINDGREN	3816/2	SEM007-02	2016-04-25	2017-04-25
4	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	EMC0120	2015-08-30	2016-08-30
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	EMC0121	2015-08-30	2016-08-30
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2015-08-30	2016-08-30
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2016-04-25	2017-04-25
8	DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2015-10-09	2016-10-09

RE in Chamber						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. date (yyyy-mm-dd)**	**Cal.Due date (yyyy-mm-dd)**
1	10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2015-08-01	2016-08-01
2	EMI Test Receiver (9k-3GHz)	Rohde & Schwarz	ESCI	SEM004-01	2016-04-25	2017-04-25
3	Trilog-Broadband Antenna(30M-1GHz)	Schwarzbeck	VULB9168	SEM003-17	2016-01-26	2017-01-26
4	Pre-amplifier	Sonoma Instrument Co	310N	SEM005-03	2016-04-25	2017-04-25
5	Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2016-08-14

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RE in Chamber						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. date (yyyy-mm-dd)**	**Cal.Due date (yyyy-mm-dd)**
1	3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2016-05-13	2017-05-13
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEM004-04	2016-04-25	2017-04-25
3	BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2014-11-15	2017-11-15
4	Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2015-10-09	2016-10-09
5	Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
6	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEM003-12	2014-11-24	2017-11-24
7	Low Noise Amplifier	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2015-10-09	2016-10-09
8	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A

RF connected test						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. date (yyyy-mm-dd)**	**Cal.Due date (yyyy-mm-dd)**
1	DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2015-10-09	2016-10-09
2	Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2015-10-17	2016-10-17
3	Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
4	Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2015-10-09	2016-10-09

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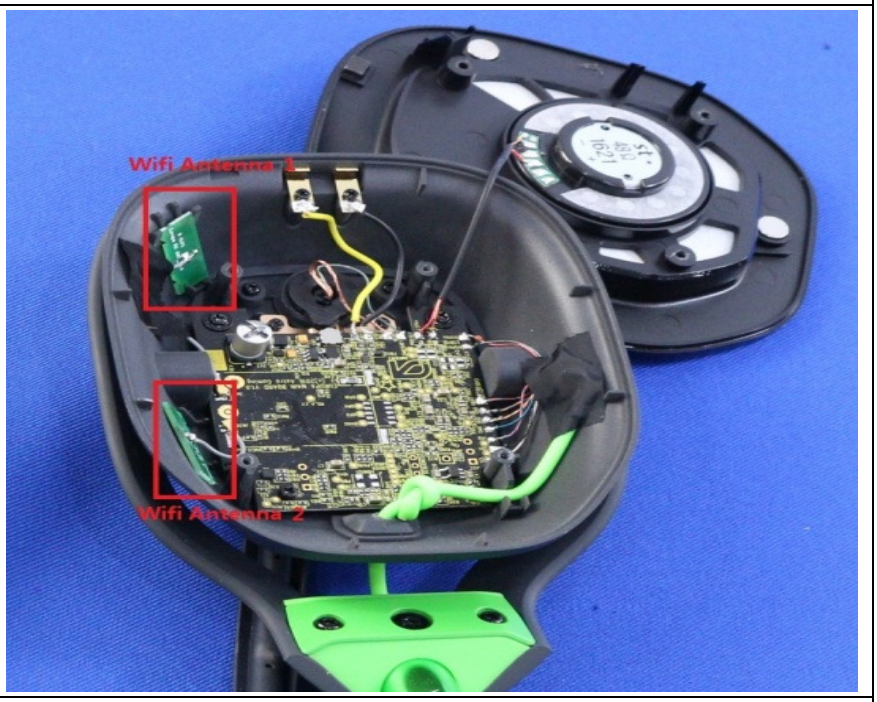
6 Test results and Measurement Data

6.1 Antenna Requirement

Test Requirement:	47 CFR Part 15 Section 15.203 & RSS-Gen Issue 4
EUT Antenna:	
The antenna is integrated antenna and no consideration of replacement. The best case gain of the antenna is 2.12dBi, antenna 2 is 4.23dBi.	

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6.2 Conducted Emissions

Test Requirement:	47 CFR Part 15 Section 15.407(b)
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	150kHz to 30MHz
Limit:	

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test Procedure:

1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.

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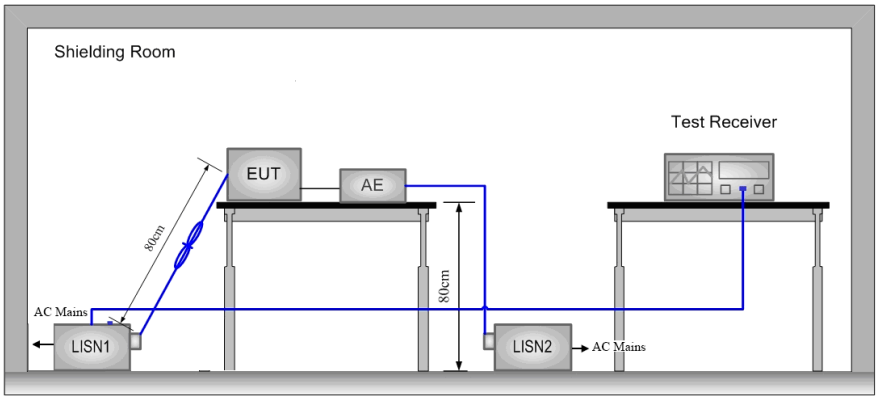
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate of 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

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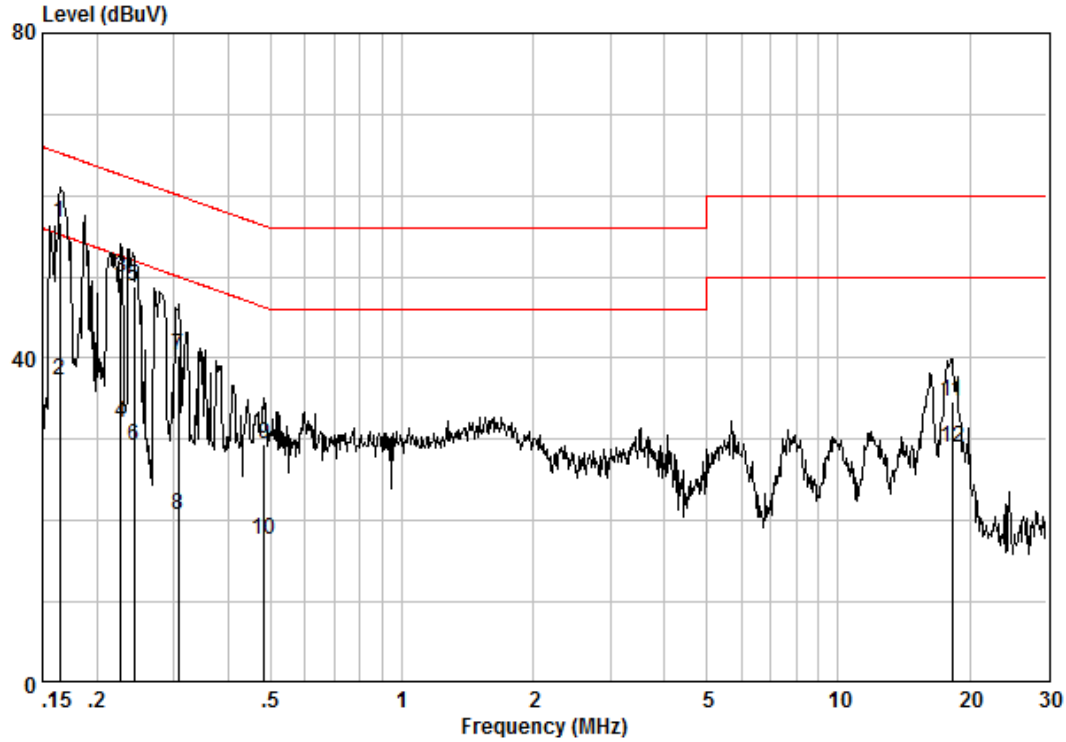
Live Line:



Site : Shielding Room
Condition : CE LINE
Job No. : 3915CR
Test Mode : TX +charge

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.16414	0.02	9.60	47.11	56.73	65.25	-8.52	QP
2	0.16414	0.02	9.60	27.56	37.18	55.25	-18.07	AVERAGE
3	0.22676	0.02	9.60	40.26	49.88	62.57	-12.69	QP
4	0.22676	0.02	9.60	22.35	31.97	52.57	-20.60	AVERAGE
5	0.24293	0.02	9.60	39.31	48.93	62.00	-13.06	QP
6	0.24293	0.02	9.60	19.53	29.15	52.00	-22.85	AVERAGE
7	0.30671	0.02	9.59	30.70	40.31	60.06	-19.75	QP
8	0.30671	0.02	9.59	11.20	20.81	50.06	-29.25	AVERAGE
9	0.48375	0.02	9.59	19.80	29.41	56.27	-26.86	QP
10	0.48375	0.02	9.59	8.13	17.74	46.27	-28.53	AVERAGE
11	18.232	0.17	9.77	24.64	34.58	60.00	-25.42	QP
12	18.232	0.17	9.77	18.98	28.92	50.00	-21.08	AVERAGE

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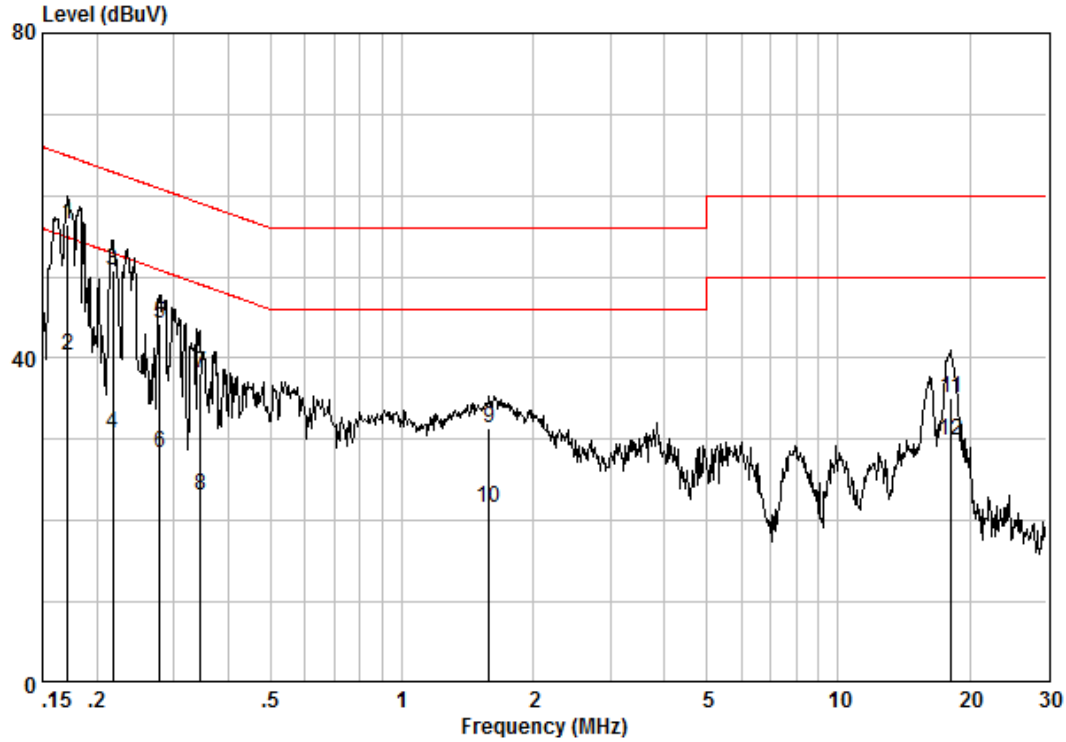
Neutral Line:



Site : Shielding Room
Condition : CE NEUTRAL
Job No. : 3915CR
Test Mode : TX +charge

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 @	0.17124	0.02	9.60	46.85	56.47	64.90	-8.43	QP
2	0.17124	0.02	9.60	30.70	40.32	54.90	-14.58	AVERAGE
3	0.21735	0.02	9.62	41.24	50.88	62.92	-12.04	QP
4	0.21735	0.02	9.62	21.18	30.81	52.92	-22.11	AVERAGE
5	0.27881	0.02	9.62	34.62	44.25	60.85	-16.60	QP
6	0.27881	0.02	9.62	18.71	28.35	50.85	-22.51	AVERAGE
7	0.34463	0.02	9.62	28.53	38.17	59.09	-20.92	QP
8	0.34463	0.02	9.62	13.38	23.02	49.09	-26.07	AVERAGE
9	1.585	0.03	9.64	21.73	31.40	56.00	-24.60	QP
10	1.585	0.03	9.64	11.96	21.64	46.00	-24.36	AVERAGE
11	18.135	0.17	9.96	25.03	35.15	60.00	-24.85	QP
12	18.135	0.17	9.96	19.69	29.81	50.00	-20.19	AVERAGE

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

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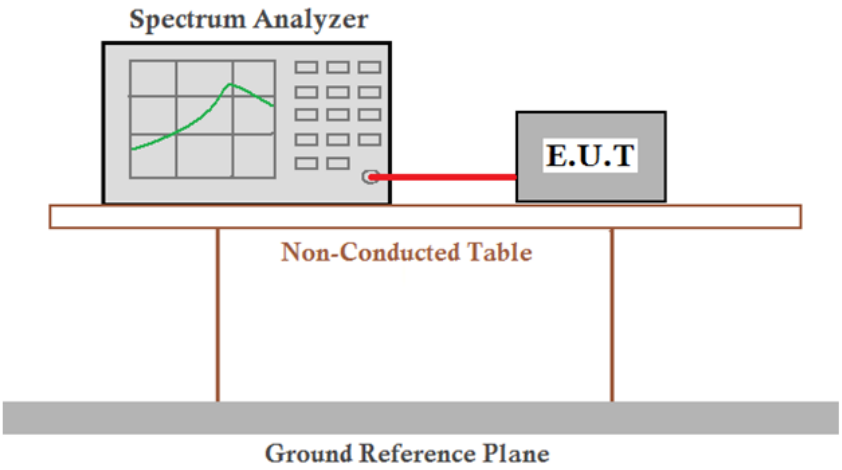
6.3 Duty Cycle

Test Requirement:	47 CFR Part 15C 15.407 and 789033 D02 General UNII Test Procedures New Rules v01, Section (B)
Test Method:	ANSI C63.10: 2013
Test Setup:	
Limit:	N/A
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a; MCSO of rate is the worst case of 802.11n(HT20);
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

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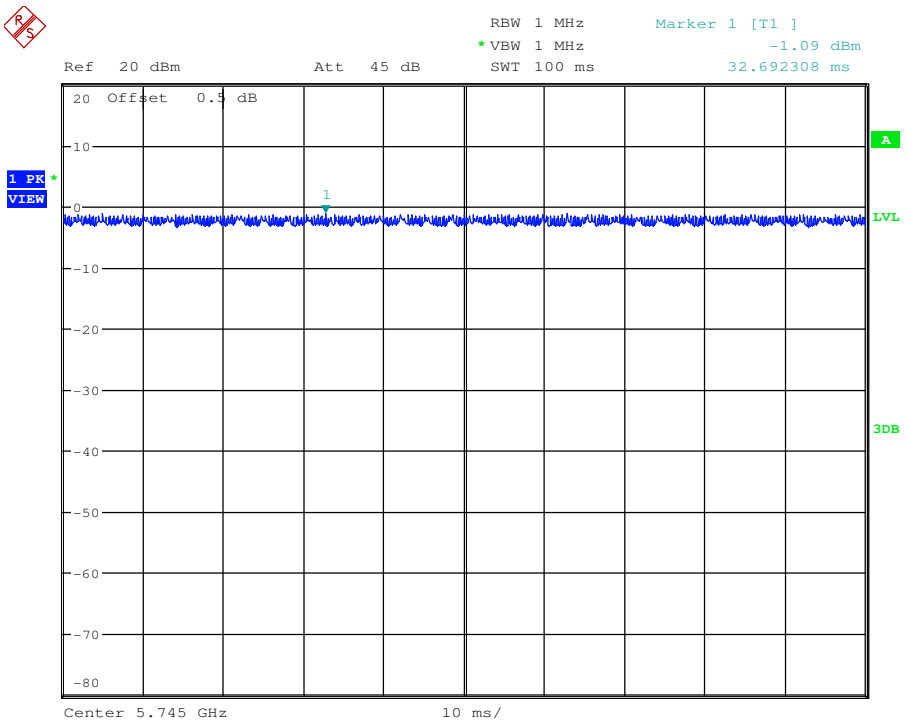
Measurement Data

802.11a mode			
Test channel	On time	Period	Duty Cycle
149	100	100	1

Test mode:	802.11a



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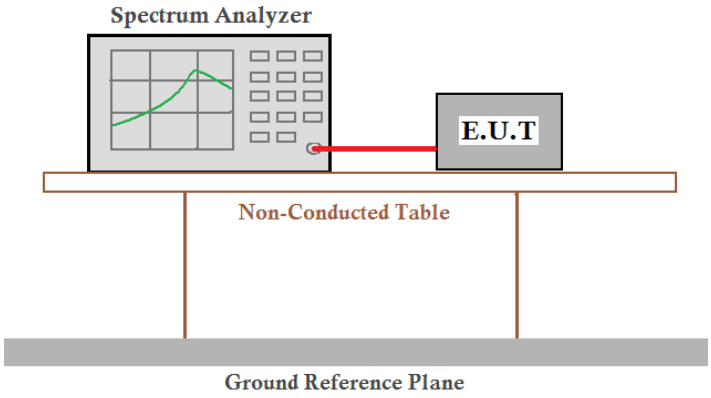
6.4 Conducted Output Power

Test Requirement:	47 CFR Part 15 Section 15.407(a)
Test Method:	ANSI C63.10: 2013
Test Setup:	 *Remark:* *Offset the High-Frequency cable loss 0.5dB in the spectrum analyzer.*
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a; Only the worst case is recorded in the report.
Limit:	The maximum conducted output power shall not exceed 1 W.
Test Results:	Pass

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Measurement Data:

802.11a mode				
Test channel	Conducted Output Power (dBm)		Limit (dBm)	Result
	Ant.1	Ant.2		
149	2.23	4.35	30.00	Pass
157	2.11	4.20	30.00	Pass
165	2.00	3.94	30.00	Pass

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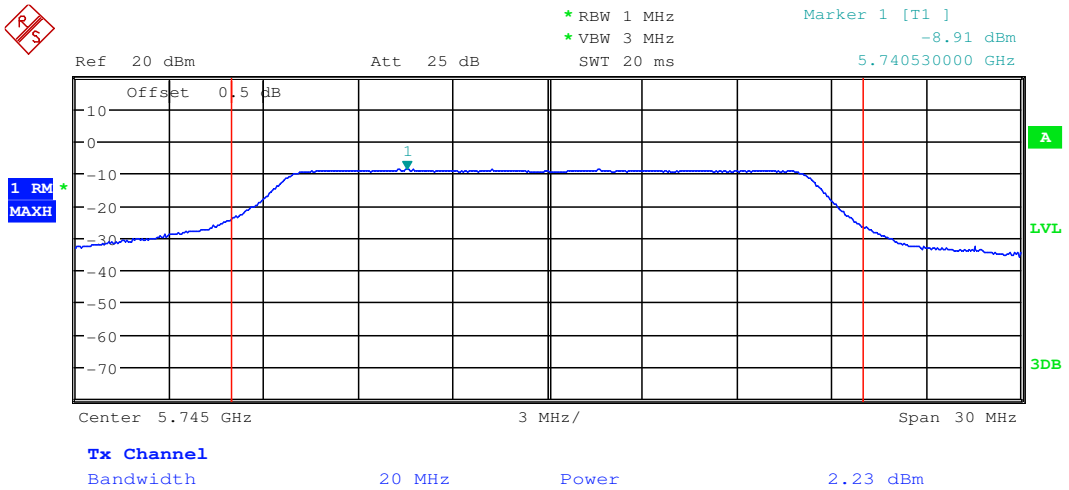
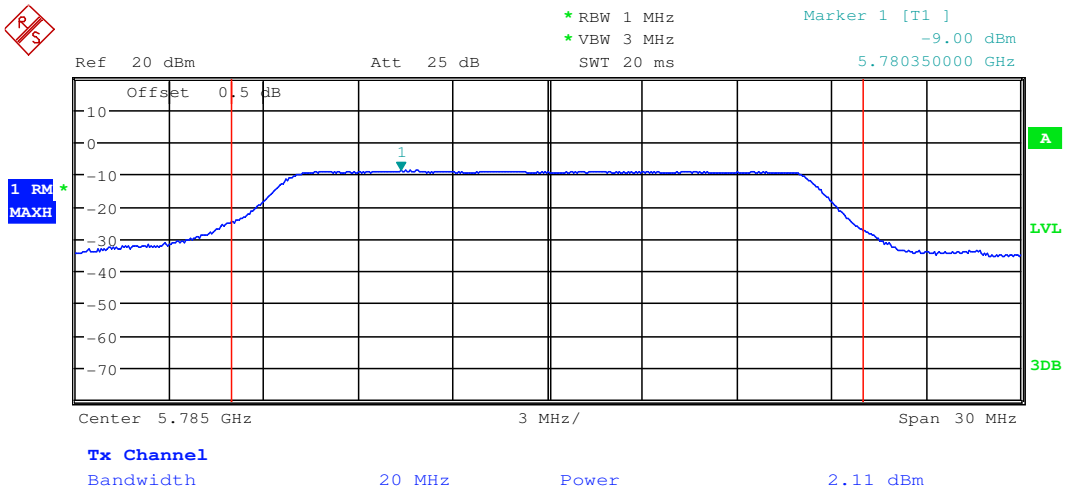
Test plot as follows:

Antenna 1:

Test mode:	802.11a	Test channel:	149



Test mode:	802.11a	Test channel:	157



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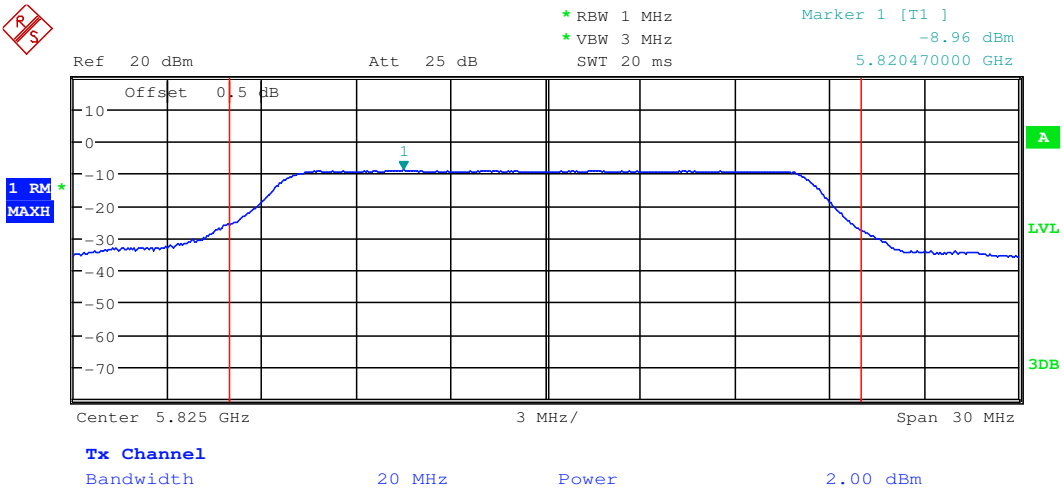
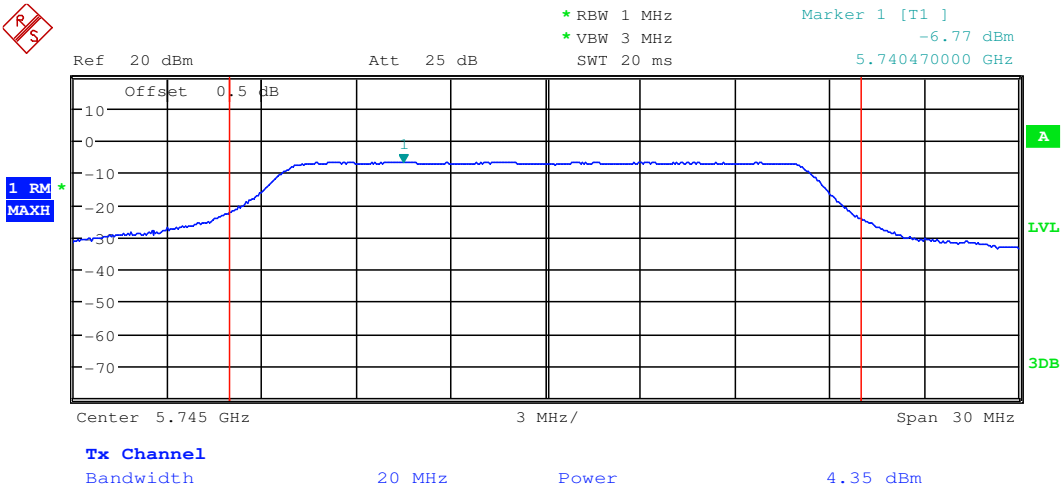
Test mode:	802.11a	Test channel:	165



Antenna 2:

Test mode:	802.11a	Test channel:	149



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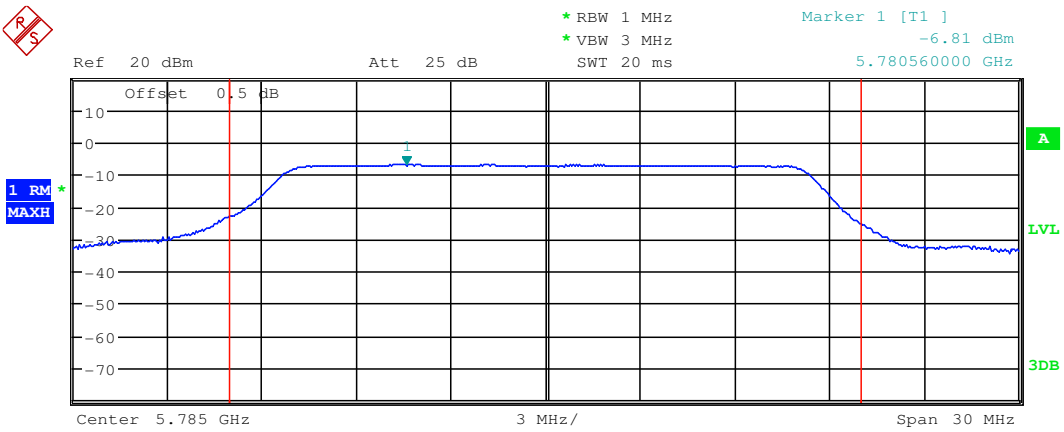
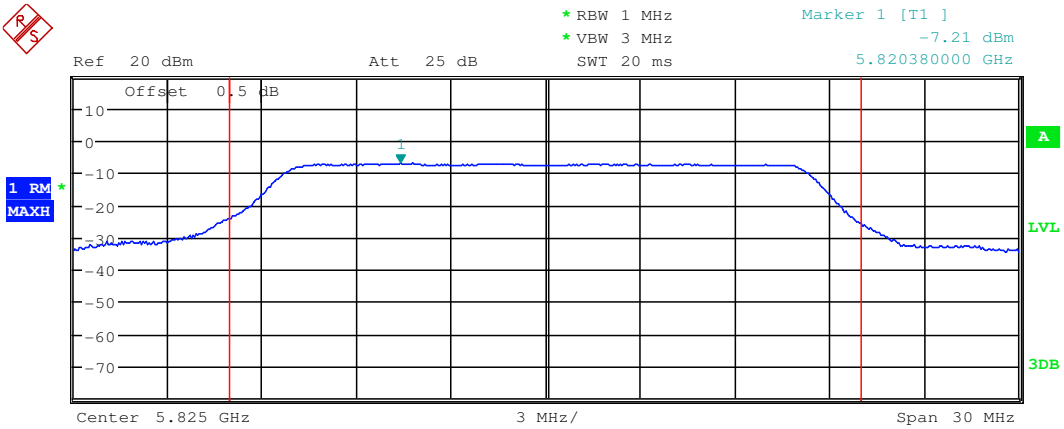
Test mode:	802.11a	Test channel:	157



Tx Channel
Bandwidth 20 MHz Power 4.20 dBm

Test mode:	802.11a	Test channel:	165



Tx Channel
Bandwidth 20 MHz Power 3.94 dBm

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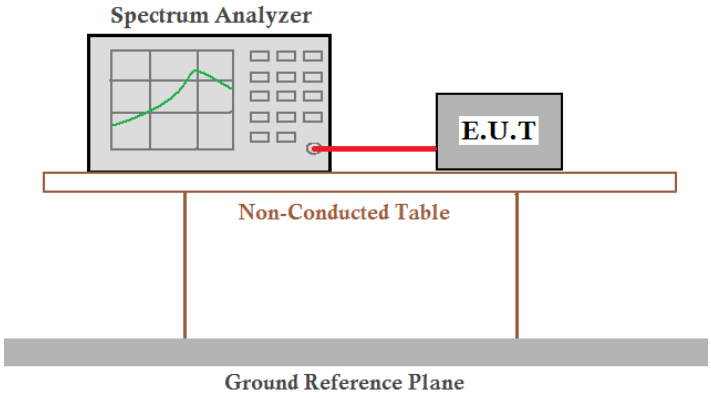
6.5 Equivalent Isotropic Radiated Power (e.i.r.p.)

Test Requirement:	47 CFR Part 15 Section 15.407(a)
Test Method:	ANSI C63.10: 2013
Test Setup:	 *Remark:* *Offset the High-Frequency cable loss 0.5dB in the spectrum analyzer.*
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a; Only the worst case is recorded in the report.
Limit:	*The limit =the maximum output conducted power limit+ actual antenna gain
Test Results:	Pass

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Measurement Data:

802.11a mode				
Test channel	EIRP (dBm)		Limit (dBm)	Result
	Ant.1	Ant.2		
149	4.35	8.58	30.00	Pass
157	4.23	8.43	30.00	Pass
165	4.12	8.17	30.00	Pass

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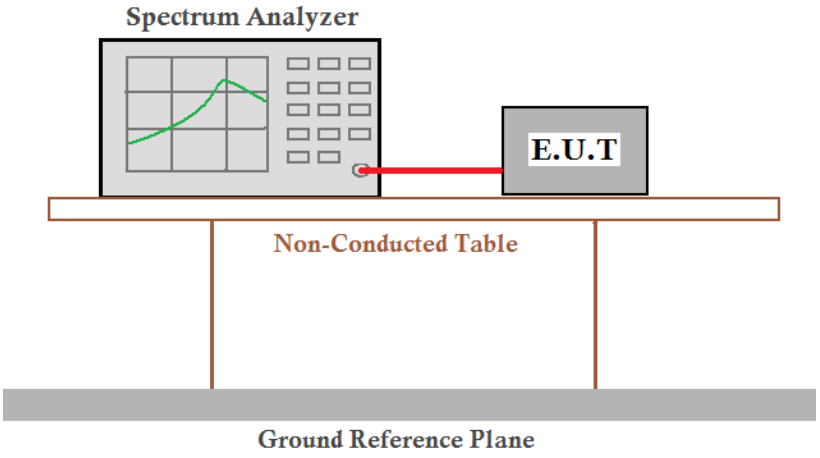
6.6 26dB Emission Bandwidth and 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(a)
Test Method:	ANSI C63.10: 2013
Test Setup:	
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a; Only the worst case is recorded in the report.
Limit:	No restriction limits
Test Results:	Pass

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Measurement Data:

802.11a mode		
Frequency (MHz)	26dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5745	36.680	18.450
5785	35.187	17.760
5825	35.428	17.580

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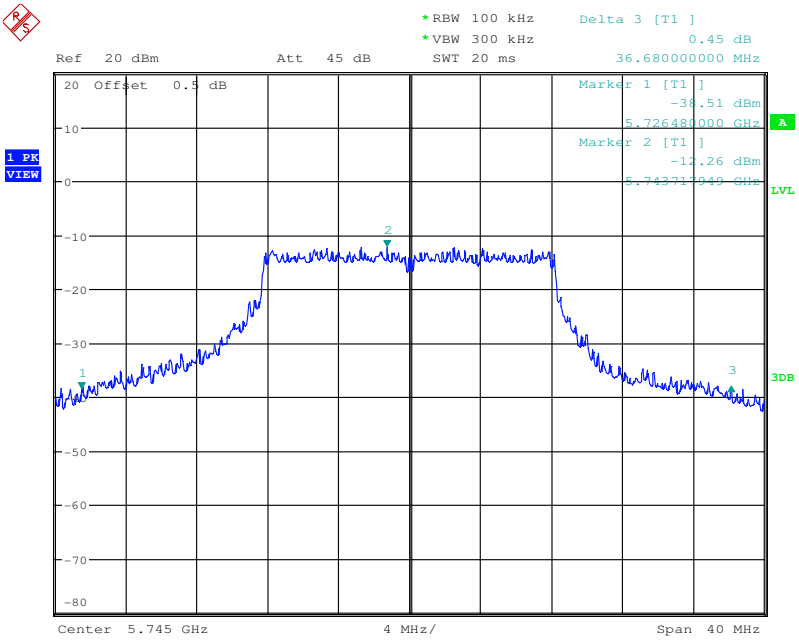
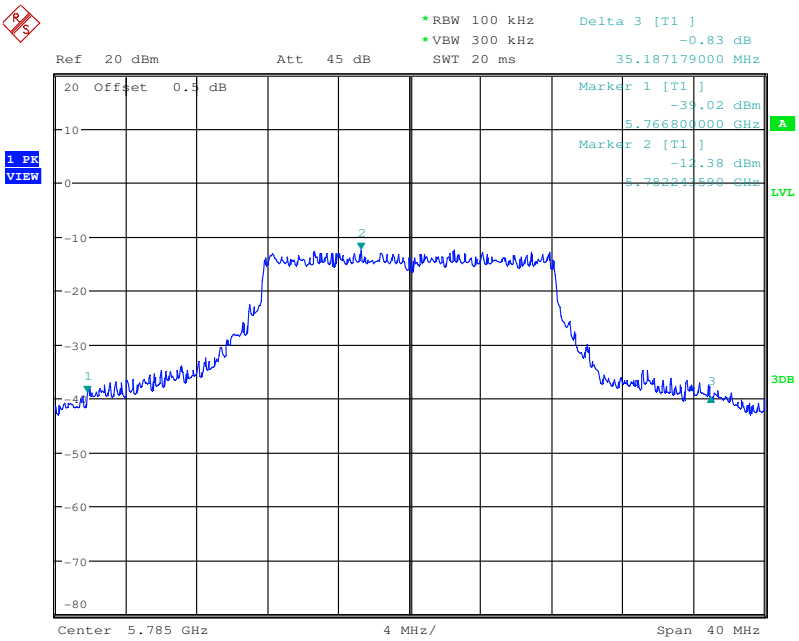
26dB Emission Bandwidth

Test plot as follows:

Test mode:	802.11a	Test channel:	149



Test mode:	802.11a	Test channel:	157



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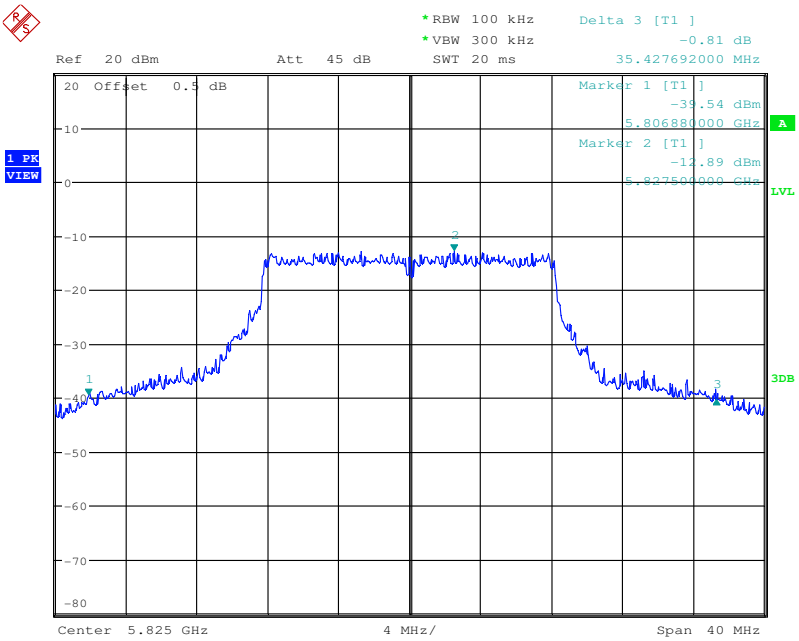
Test mode:	802.11a	Test channel:	165



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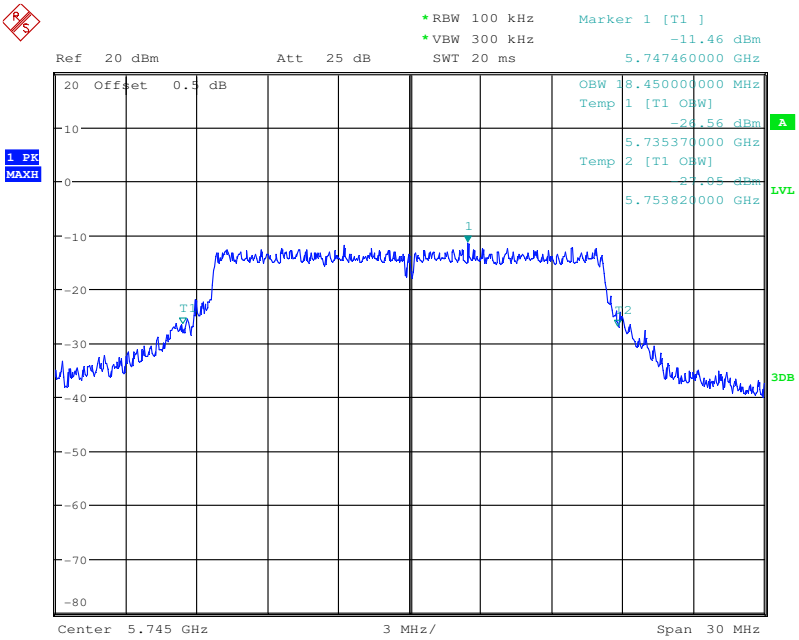
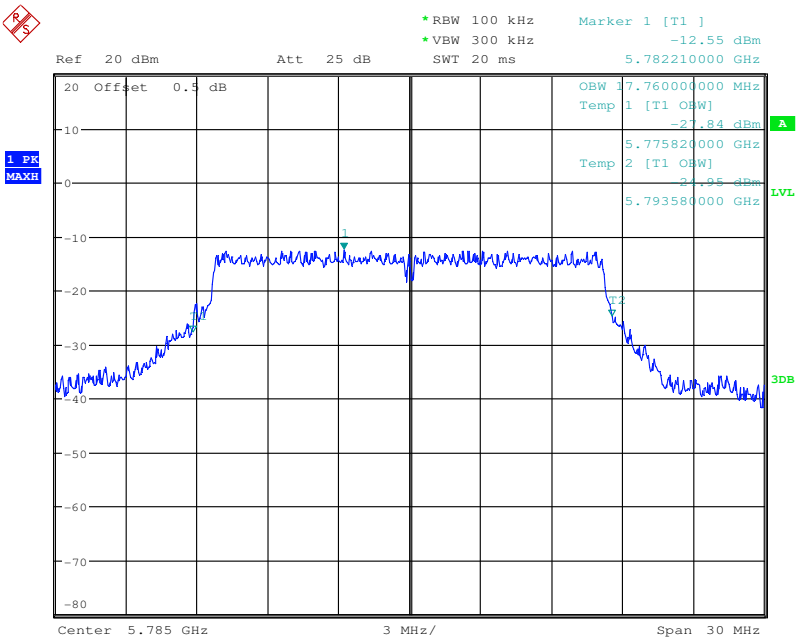
99% Occupied Bandwidth

Test plot as follows:

Test mode:	802.11a	Test channel:	149



Test mode:	802.11a	Test channel:	157



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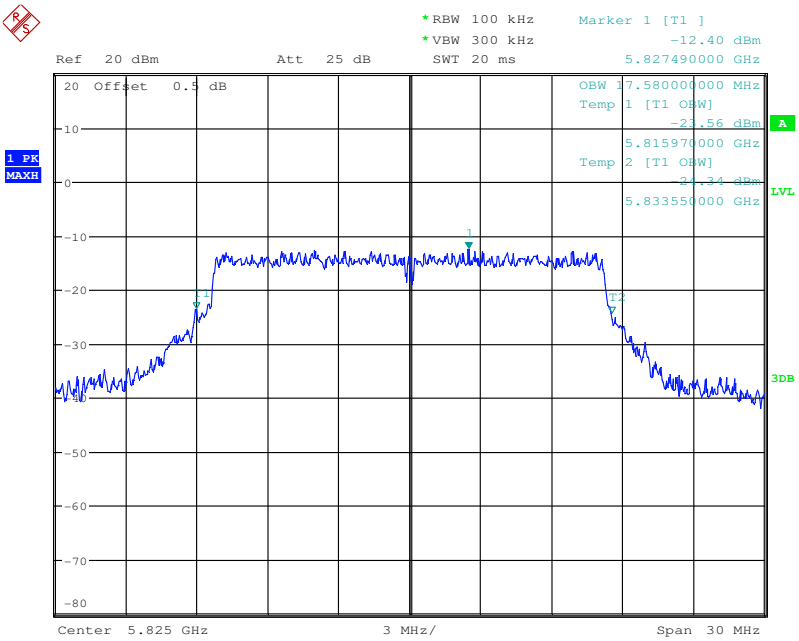
Test mode:	802.11a	Test channel:	165



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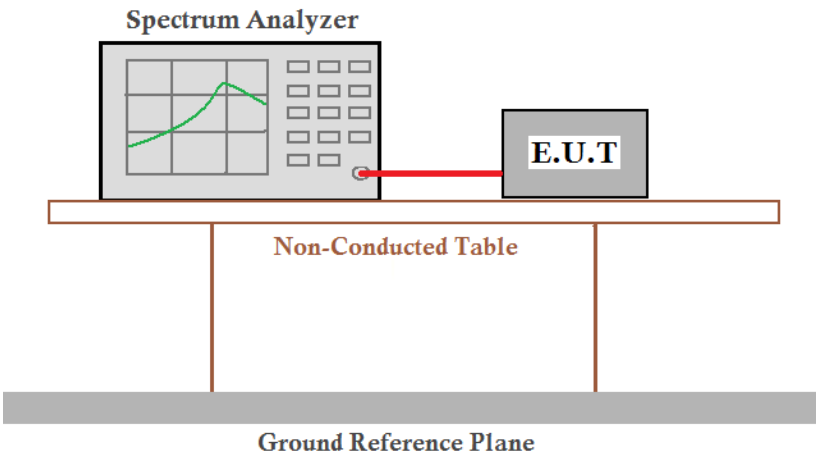
6.7 6dB Emission Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(e)
Test Method:	ANSI C63.10: 2013
Test Setup:	
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a; Only the worst case is recorded in the report.
Limit:	≥ 500 kHz
Test Results:	Pass

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Measurement Data:

802.11a mode			
Frequency (MHz)	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
5745	16.650	≥500	Pass
5785	16.650	≥500	Pass
5825	16.650	≥500	Pass

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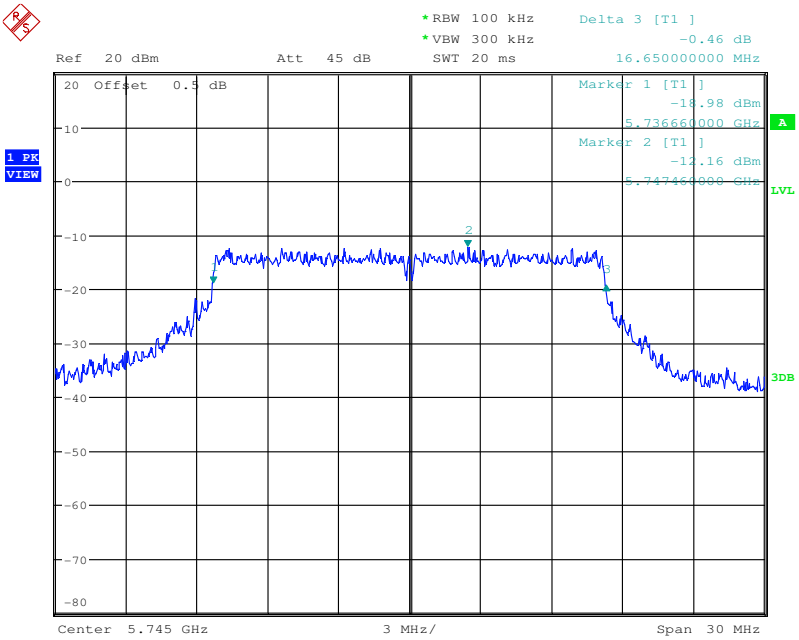
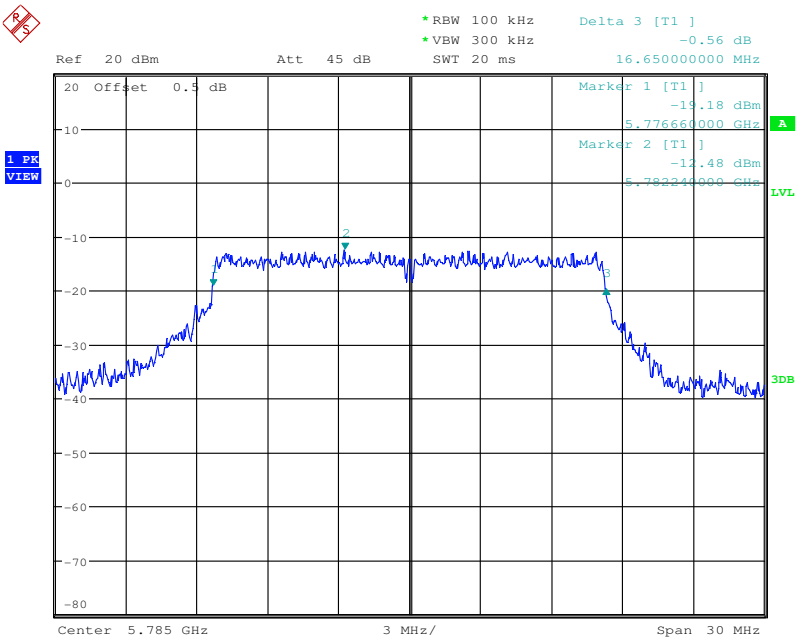
Test plot as follows:

Test mode:	802.11a	Test channel:	149



Test mode:	802.11a	Test channel:	157



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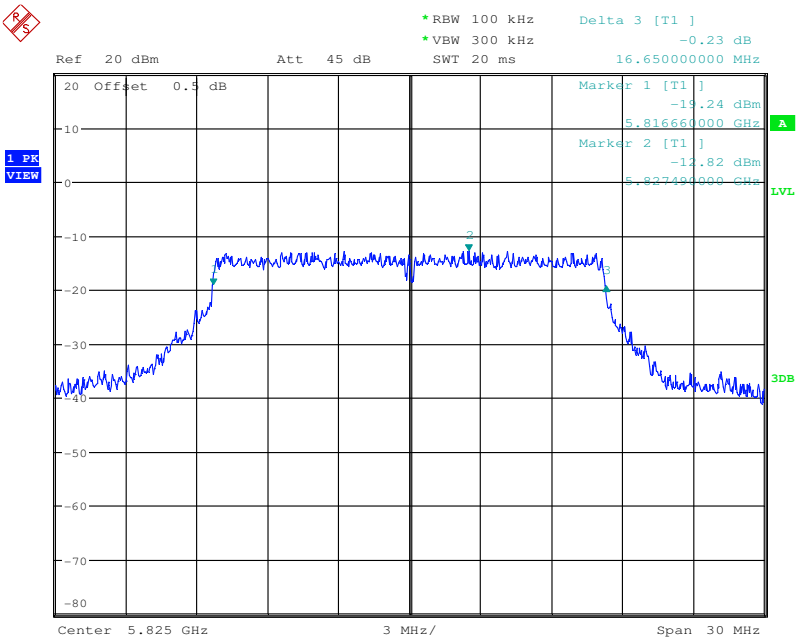
Test mode:	802.11a	Test channel:	165



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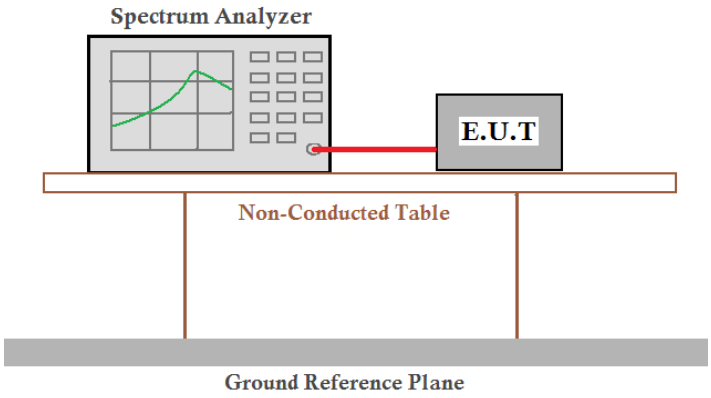
6.8 Power Spectral Density

Test Requirement:	47 CFR Part 15 Section 15.407(a)
Test Method:	ANSI C63.10: 2013
Test Setup:	 *Remark:* *Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.*
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a; Only the worst case is recorded in the report.
Limit:	≤30dBm/500KHz
Test Results:	Pass

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Measurement Data:

802.11a mode				
Test channel	Power Spectral Density (dBm/500kHz)		Limit (dBm/500kHz)	Result
	Ant.1	Ant.2		
149	-11.68	-9.41	≤30dBm/500kHz	Pass
157	-11.78	-9.61	≤30dBm/500kHz	Pass
165	-12.02	-9.88	≤30dBm/500kHz	Pass

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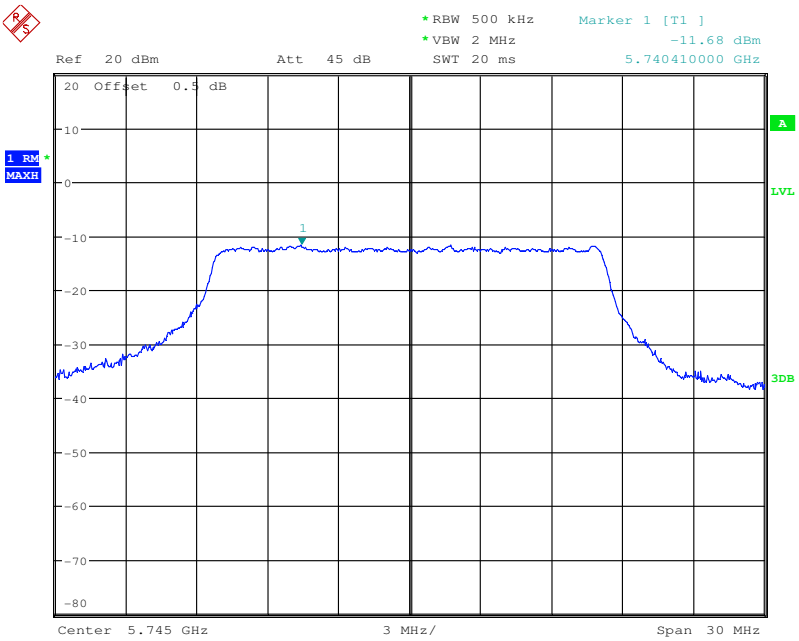
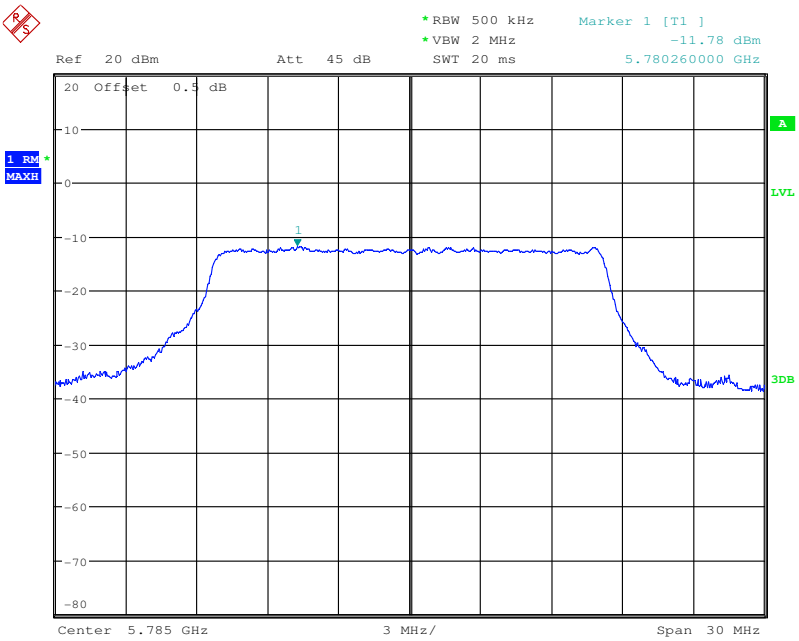
Test plot as follows:

Antenna 1:

Test mode:	802.11a	Test channel:	149



Test mode:	802.11a	Test channel:	157



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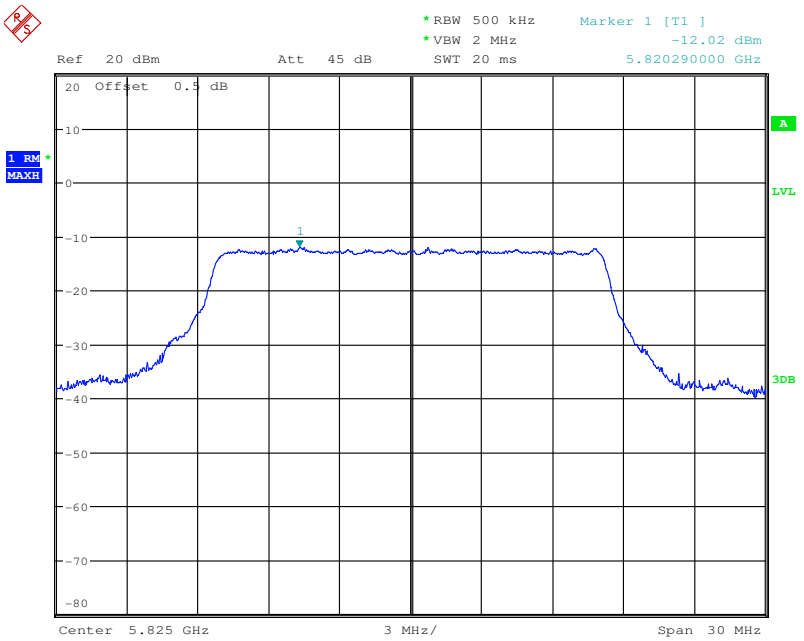
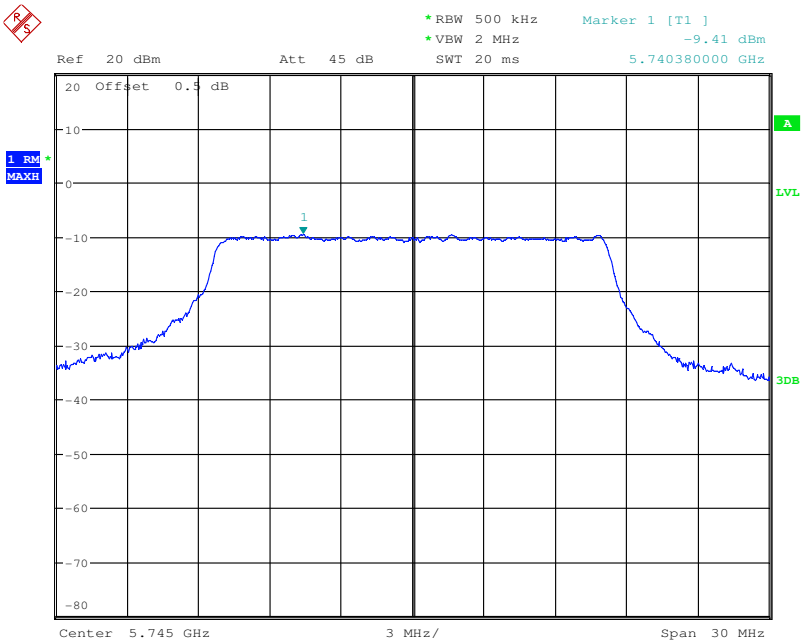
Test mode:	802.11a	Test channel:	165



Antenna 2:

Test mode:	802.11a	Test channel:	149



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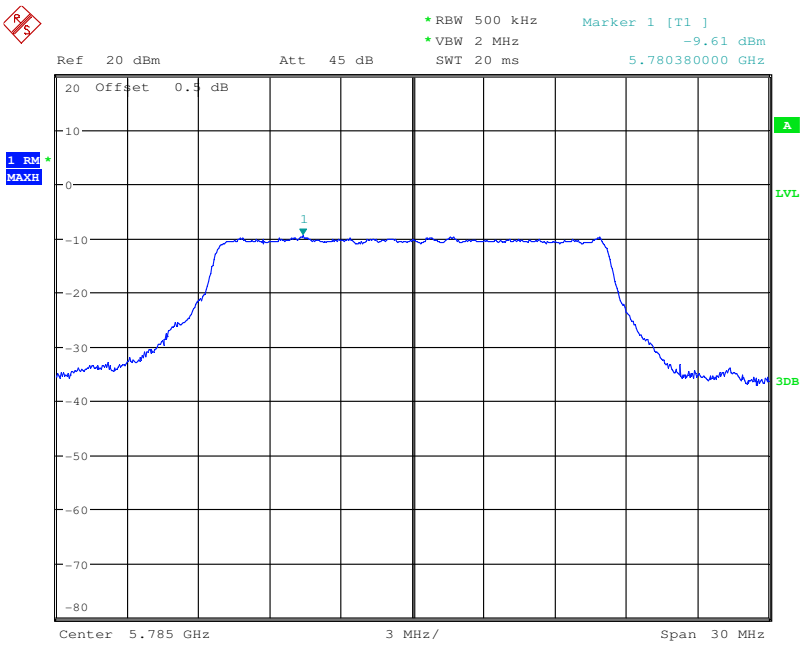
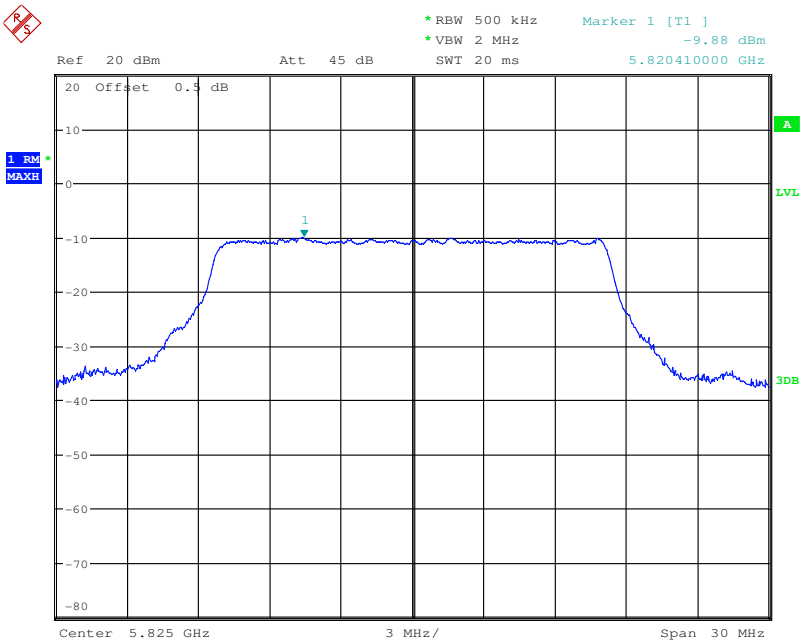
Test mode:	802.11a	Test channel:	157



Test mode:	802.11a	Test channel:	165



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6.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15 Section 15.407(b)
Test Method:	ANSI C63.10: 2013
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber) Measurement Distance: 10m (Semi-Anechoic Chamber)
Test Setup:	

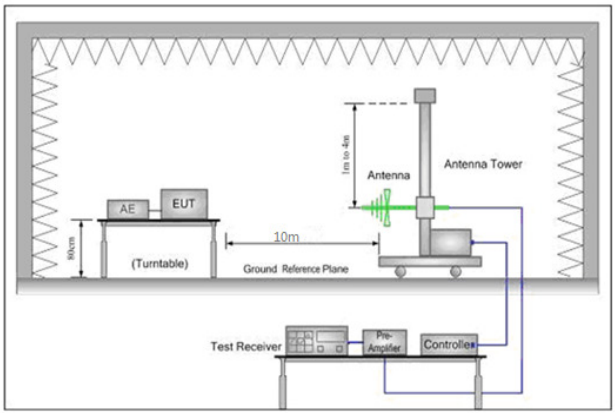

Figure 1. 30MHz to 1GHz

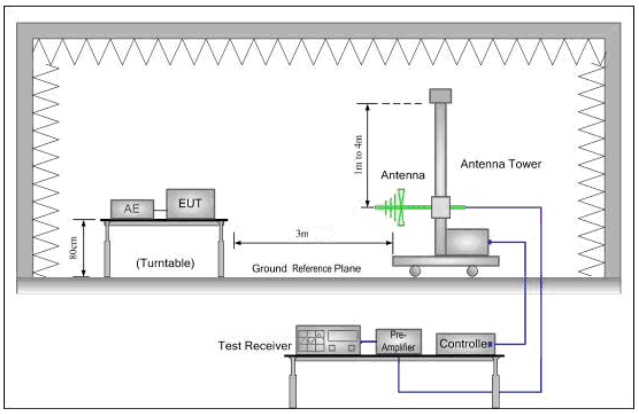

Figure 2. Above 1 GHz

Test Procedure:	a. For below 1GHz test, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 and 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. b. For above 1GHz test, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. g. Test the EUT in the outermost channels. h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case. i. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.

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Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a; For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

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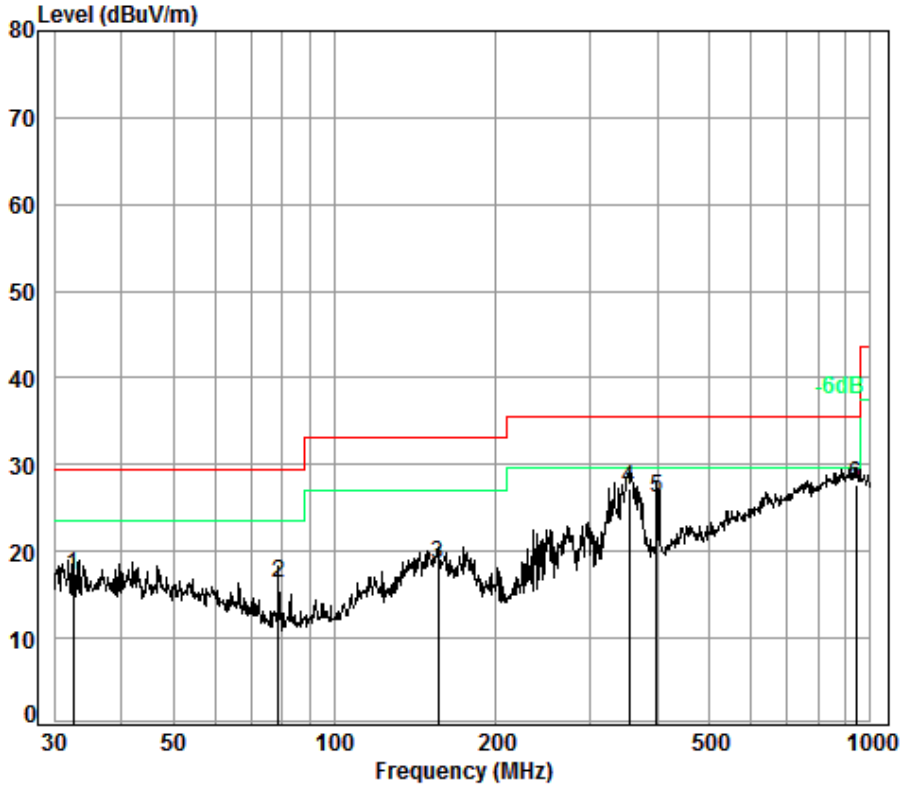
6.9.1 Radiated emission below 1GHz

30MHz~1GHz（QP）		
Test mode:	Transmitting mode	Vertical



Condition: 10m Vertical
Job No. : 3915CR
Test Mode: TX +charge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	32.63	6.70	12.56	32.30	30.17	17.13	29.50	-12.37
2	78.69	7.08	8.73	32.30	32.80	16.31	29.50	-13.19
3	155.91	7.48	13.40	32.30	29.89	18.47	33.10	-14.63
4	354.18	8.27	13.93	32.18	37.23	27.25	35.60	-8.35
5	399.03	8.30	14.84	32.10	35.05	26.09	35.60	-9.51
6 pp	938.83	9.55	22.65	32.34	27.73	27.59	35.60	-8.01

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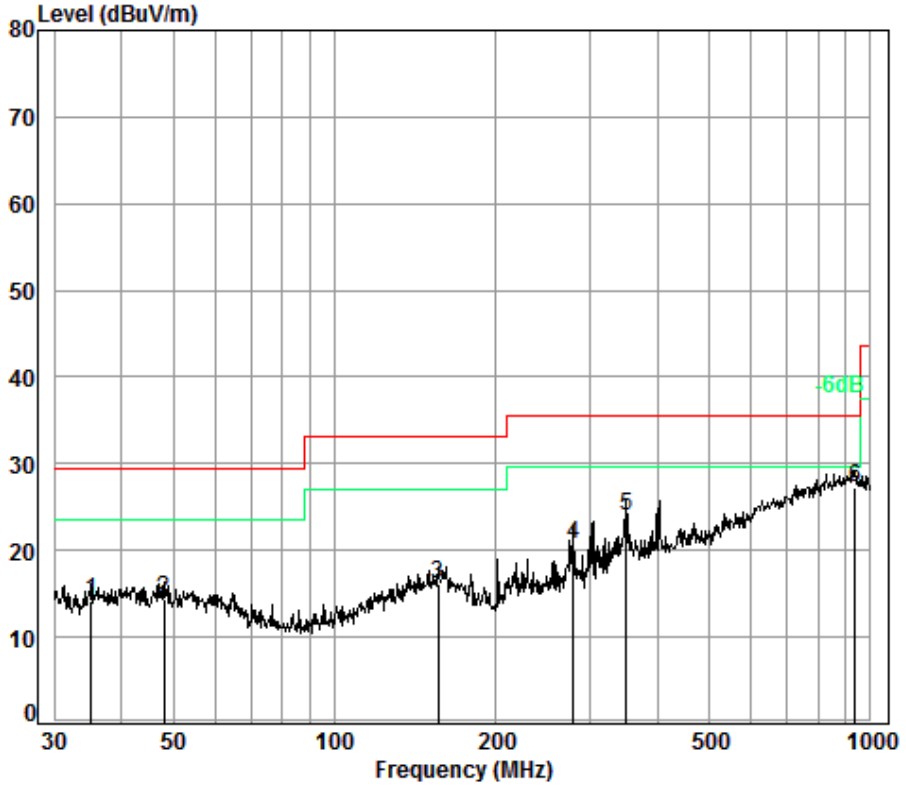
Test mode:	Transmitting mode	Horizontal



Condition: 10m Horizontal
Job No. : 3915CR
Test Mode: TX +charge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	35.25	6.71	12.68	32.30	27.00	14.09	29.50	-15.41
2	48.16	6.86	12.82	32.30	27.06	14.44	29.50	-15.06
3	155.91	7.48	13.40	32.30	27.55	16.13	33.10	-16.97
4	279.04	8.00	12.13	32.30	32.97	20.80	35.60	-14.80
5	350.48	8.25	13.85	32.19	34.10	24.01	35.60	-11.59
6 pp	935.55	9.54	22.63	32.32	27.29	27.14	35.60	-8.46

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6.9.2Transmitter emission above 1GHz

Test plot as follows:

Test mode:	802.11a	Frequency(MHz):	5745	Remark:	Peak

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
7678.832	36.04	10.89	37.44	42.58	52.07	74.00	-21.93	Vertical
9659.786	37.10	12.53	36.28	39.15	52.50	74.00	-21.50	Vertical
11490.000	37.45	14.01	36.68	35.16	49.94	74.00	-24.06	Vertical
13192.440	38.29	15.60	38.42	37.39	52.86	74.00	-21.14	Vertical
15185.920	40.69	16.72	39.49	34.44	52.36	74.00	-21.64	Vertical
17235.000	43.05	19.50	37.03	27.86	53.38	74.00	-20.62	Vertical
7039.780	35.44	10.62	37.71	43.20	51.55	74.00	-22.45	Horizontal
7678.832	36.04	10.89	37.44	42.22	51.71	74.00	-22.29	Horizontal
9007.715	37.00	11.80	37.18	38.13	49.75	74.00	-24.25	Horizontal
11490.000	37.45	14.01	36.68	34.53	49.31	74.00	-24.69	Horizontal
14512.850	40.01	16.40	39.72	36.45	53.14	74.00	-20.86	Horizontal
17235.000	43.05	19.50	37.03	28.14	53.66	74.00	-20.34	Horizontal

Test mode:	802.11a	Frequency(MHz):	5785	Remark:	Peak

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
7678.832	36.04	10.89	37.44	41.79	51.28	74.00	-22.72	Vertical
9007.715	37.00	11.80	37.18	39.60	51.22	74.00	-22.78	Vertical
10616.590	37.11	13.17	36.05	37.26	51.49	74.00	-22.51	Vertical
11570.000	37.49	14.09	36.75	34.51	49.34	74.00	-24.66	Vertical
14485.460	39.99	16.39	39.72	36.07	52.73	74.00	-21.27	Vertical
17355.000	43.23	19.92	37.01	27.05	53.19	74.00	-20.81	Vertical
7678.832	36.04	10.89	37.44	41.23	50.72	74.00	-23.28	Horizontal
9659.786	37.10	12.53	36.28	40.20	53.55	74.00	-20.45	Horizontal
11570.000	37.49	14.09	36.75	36.18	51.01	74.00	-22.99	Horizontal
13217.380	38.32	15.61	38.46	35.82	51.29	74.00	-22.71	Horizontal
15800.410	41.20	17.31	38.51	32.88	52.88	74.00	-21.12	Horizontal
17355.000	43.23	19.92	37.01	27.79	53.93	74.00	-20.07	Horizontal

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Test mode:	802.11a		Frequency(MHz):		5825	Remark:		Peak
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
7160.481	35.56	10.66	37.66	40.39	48.95	74.00	-25.05	Vertical
9007.715	37.00	11.80	37.18	40.23	51.85	74.00	-22.15	Vertical
11650.000	37.50	14.18	36.83	33.72	48.57	74.00	-25.43	Vertical
13192.440	38.29	15.60	38.42	37.34	52.81	74.00	-21.19	Vertical
15417.140	40.82	16.95	39.11	34.80	53.46	74.00	-20.54	Vertical
17475.000	43.45	20.33	36.99	26.54	53.33	74.00	-20.67	Vertical
7678.832	36.04	10.89	37.44	43.27	52.76	74.00	-21.24	Horizontal
9007.715	37.00	11.80	37.18	39.46	51.08	74.00	-22.92	Horizontal
11650.000	37.50	14.18	36.83	34.22	49.07	74.00	-24.93	Horizontal
13217.380	38.32	15.61	38.46	36.75	52.22	74.00	-21.78	Horizontal
16040.990	41.38	17.51	38.15	32.15	52.89	74.00	-21.11	Horizontal
17475.000	43.45	20.33	36.99	27.20	53.99	74.00	-20.01	Horizontal

Remark:
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
2) Scan from 9kHz to 25GHz,The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .
3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

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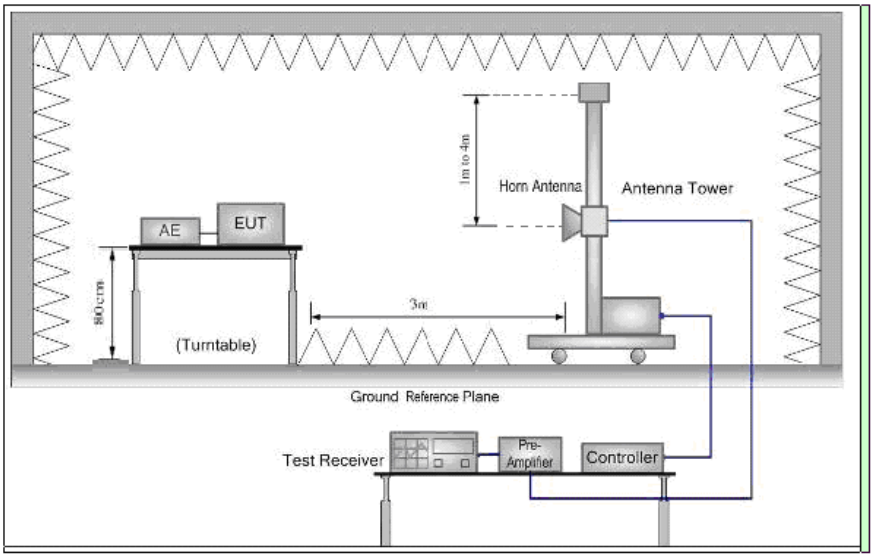
6.10 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15 Section 15.407(b)
Test Method:	ANSI C63.10: 2013
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test Setup:



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Test Procedure:	a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel g. Test the EUT in the outermost channels. h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case. i. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a; Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

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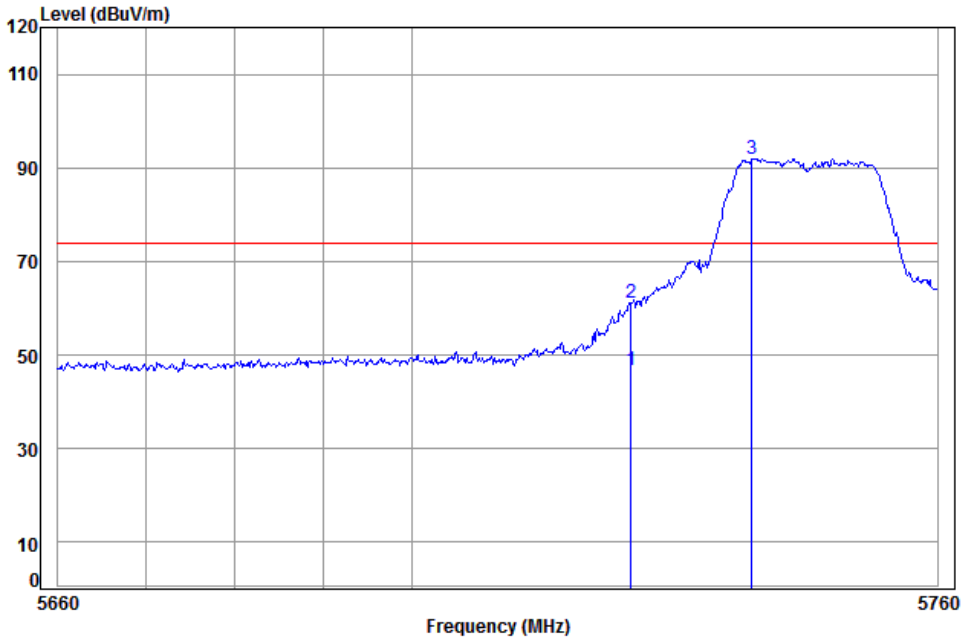
Test plot as follows:

Test mode:	802.11a	Frequency(MHz):	5745	Remark:	Peak	Vertical



Condition: 3m Vertical
Job No: : 3914CR
Mode: : 5745 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 av	5725.000	8.48	34.24	38.92	43.00	46.80	54.00	-7.20	Average
2	5725.000	8.48	34.24	38.92	57.37	61.17	74.00	-12.83	Peak
3 pp	5738.754	8.49	34.23	38.92	88.20	92.00	74.00	18.00	Peak

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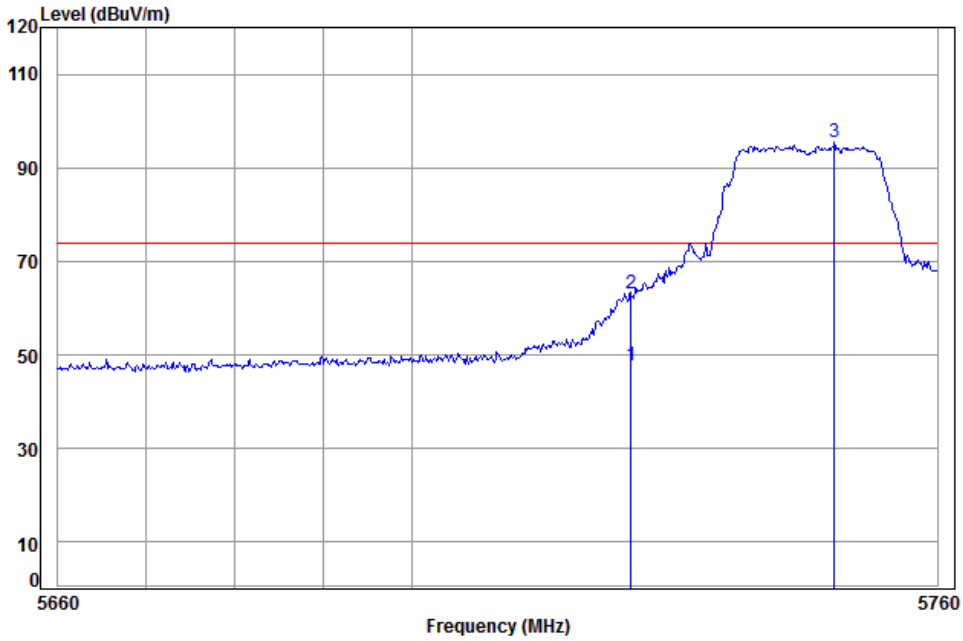
Test mode:	802.11a	Frequency(MHz):	5745	Remark:	Peak	Horizontal



Condition: 3m Horizontal
Job No: : 3914CR
Mode: : 5745 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 av	5725.000	8.48	34.24	38.92	44.00	47.80	54.00	-6.20	Average
2	5725.000	8.48	34.24	38.92	59.18	62.98	74.00	-11.02	Peak
3 pp	5748.209	8.50	34.23	38.92	91.58	95.39	74.00	21.39	Peak

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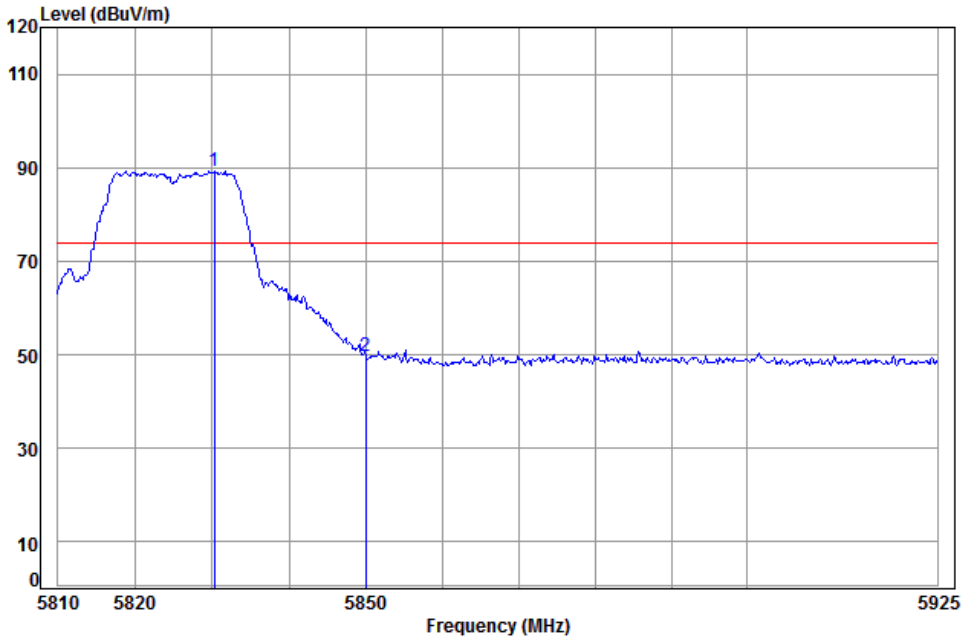
Test mode:	802.11a	Frequency(MHz):	5825	Remark:	Peak	Vertical



Condition: 3m Vertical
Job No: : 3914CR
Mode: : 5825 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	5830.306	8.59	34.28	38.93	85.22	89.16	74.00	15.16	Peak
2	5850.000	8.60	34.33	38.94	45.75	49.74	74.00	-24.26	Peak

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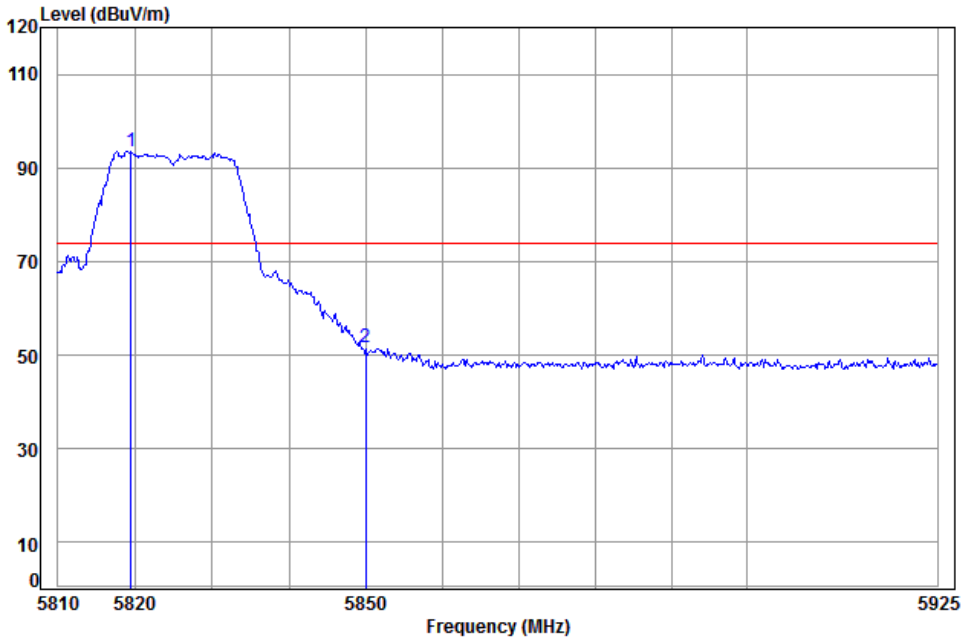
Test mode:	802.11a	Frequency(MHz):	5825	Remark:	Peak	Horizontal



Condition: 3m Horizontal
Job No: : 3914CR
Mode: : 5825 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	5819.459	8.57	34.25	38.93	89.72	93.61	74.00	19.61	Peak
2	5850.000	8.60	34.33	38.94	47.58	51.57	74.00	-22.43	Peak

Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

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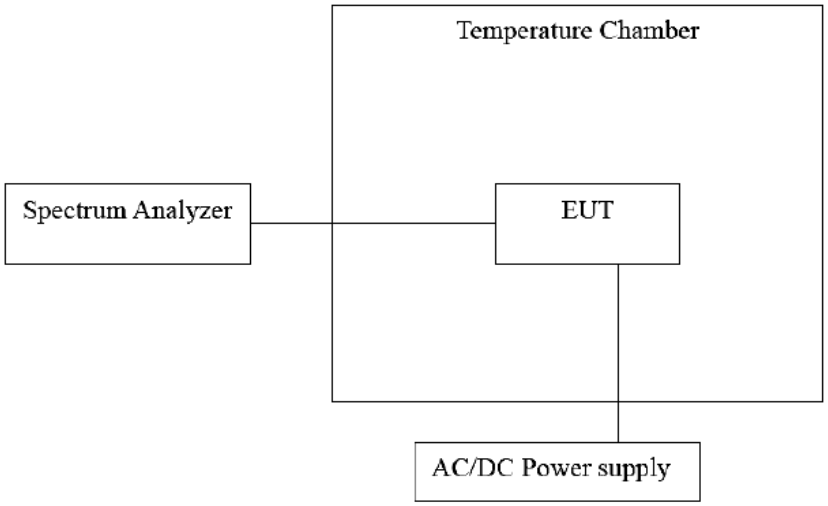
6.11 Frequency Stability

Test Requirement:	47 CFR Part 15 Section 15.407(g)
Test Method:	ANSI C63.10: 2013
Test Setup:	
Limit:	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.
Test Procedure:	a. The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a; Only the worst case is recorded in the report.

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Test mode:	802.11a	Frequency(MHz):	5745

Temperature (℃)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	120	5745.0078	7800	Pass
35		5745.0065	6500	Pass
25		5745.0049	4900	Pass
15		5745.0053	5300	Pass
5		5744.9960	-4000	Pass
-5		5744.9974	-2600	Pass
25	138	5745.0089	8900	Pass
	120	5745.0090	9000	Pass
	102	5745.0065	6500	Pass

Test mode:	802.11a	Frequency(MHz):	5785

Temperature (℃)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	120	5785.0063	6300	Pass
35		5785.0053	5300	Pass
25		5785.0040	4000	Pass
15		5785.0038	3800	Pass
5		5785.0027	2700	Pass
-5		5785.0021	2100	Pass
25	138	5785.0059	5900	Pass
	120	5785.0074	7400	Pass
	102	5784.9960	-4000	Pass

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Test mode:	802.11a	Frequency(MHz):	5825

Temperature (℃)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	120	5825.0073	7300	Pass
35		5825.0066	6600	Pass
25		5825.0053	5300	Pass
15		5824.9950	-5000	Pass
5		5824.9919	-8100	Pass
-5		5824.9924	-7600	Pass
25	138	5825.0093	9300	Pass
	120	5825.0059	5900	Pass
	102	5825.0042	4200	Pass

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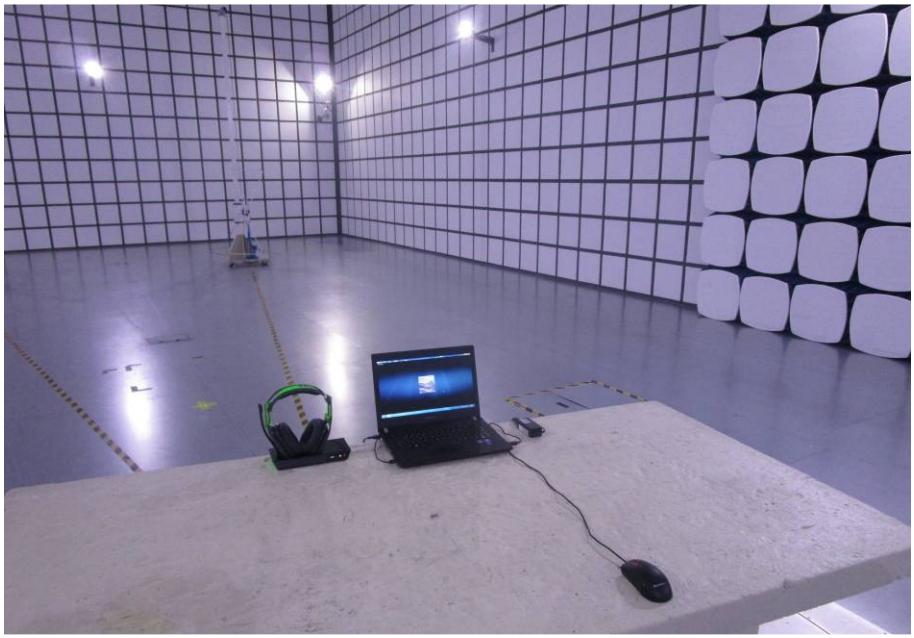
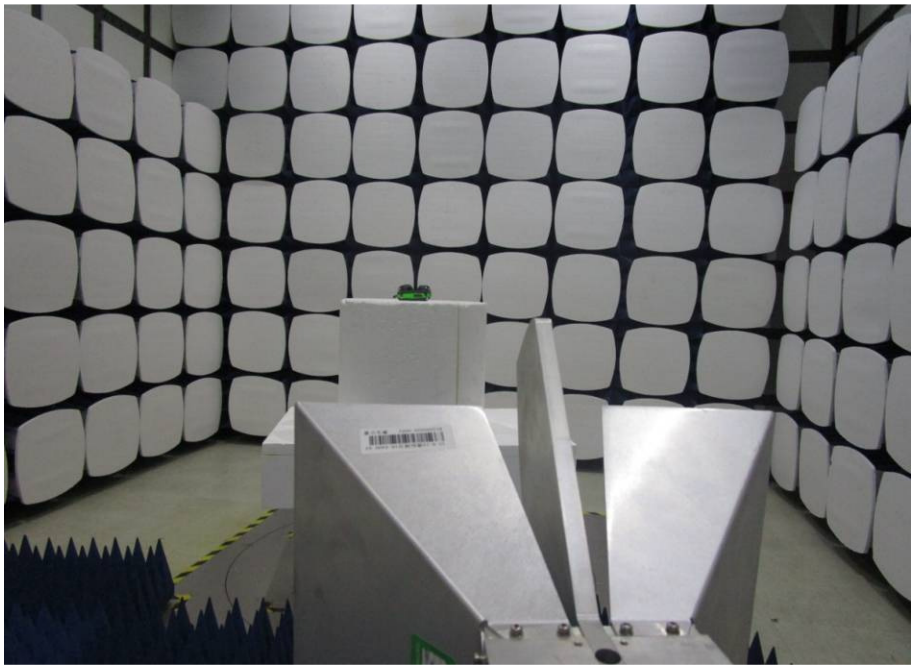
7 Photographs - EUT Test Setup

Test model No.: A50G03

7.1 Radiated Spurious Emission





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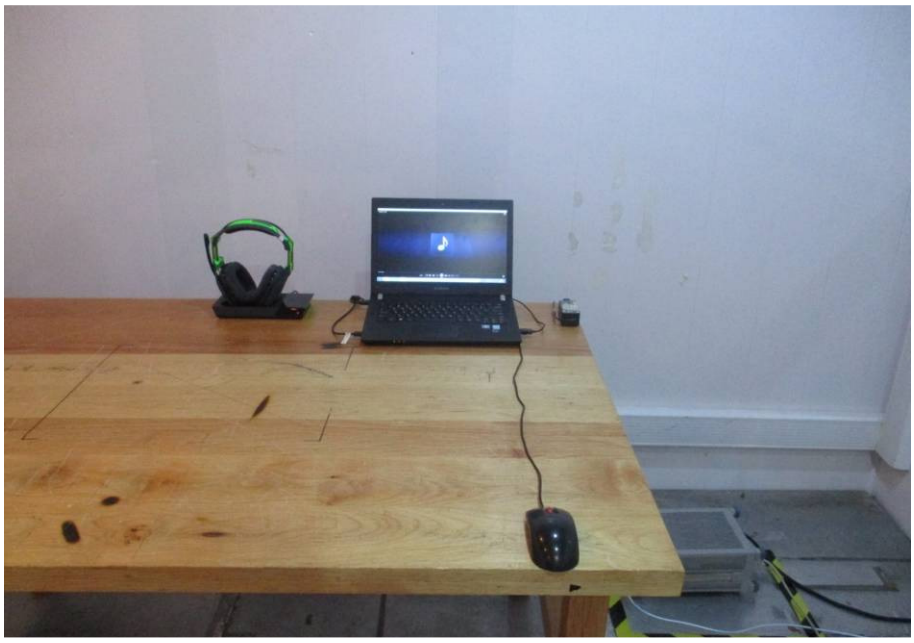
7.2 Conducted Emission



8 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1605003915CR.

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