



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

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Report No.: SZEM160300165102
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FCC REPORT

Application No: SZEM1603001651CR
Applicant: Xi'an Skye Intelligence Technology Co., Ltd.
Manufacturer: Xi'an Skye Intelligence Technology Co., Ltd.
Factory: Xi'an Skye Intelligence Technology Co., Ltd.
Product Name: Orbit
Model No.(EUT): ORBTX2

Trade Mark:

 **Skye Intelligence**

FCC ID: 2AHTB-20150215

Standards: 47 CFR Part 15, Subpart E (2015)

Date of Receipt: 2016-05-25

Date of Test: 2016-06-14

Date of Issue: 2016-06-15

Test Result:	PASS *
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. * 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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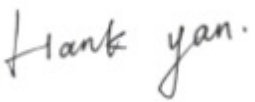


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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2016-06-15		Original

Authorized for issue by:				
Tested By				2016-06-14
				Date
Prepared By				2016-06-15
				Date
Checked By				2016-06-15
				Date
		(Hank Yan) /Project Engineer		
		(Iris Zhou) /Clerk		
		(Eric Fu) /Reviewer		

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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
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
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
Frequency Stability	47 CFR Part 15 Section 15.407(g)	ANSI C63.10: 2013	PASS

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5 General Information

5.1 Client Information

Applicant:	Xi'an Skye Intelligence Technology Co., Ltd.
Address of Applicant:	Room 504 Block E, GLP I-Park, 211 Tiangu #8 Road, High-tech Zone, Xi'an 710077, China
Manufacturer:	Xi'an Skye Intelligence Technology Co., Ltd.
Address of Manufacturer:	Room 504 Block E, GLP I-Park, 211 Tiangu #8 Road, High-tech Zone, Xi'an 710077, China
Factory:	Xi'an Skye Intelligence Technology Co., Ltd.
Address of Factory:	Room 504 Block E, GLP I-Park, 211 Tiangu #8 Road, High-tech Zone, Xi'an 710077, China

5.2 General Description of EUT

Product Name:	Orbit			
Model No.:	ORBTX2			
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII	IEEE 802.11a	5745-5825	5
	Band III	IEEE 802.11n 20MHz	5745-5825	5
Type of Modulation:	IEEE 802.11a: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11n: OFDM(BPSK/QPSK/16QAM/64QAM)			
Channel Numbers:	IEEE 802.11a/n(HT20)@5G: 5 Channels			
Sample Type:	Mobile Device			
EUT Function:	WiFi: 802.11a/n(HT20)			
Antenna Type:	PIFA Antenna			
Antenna Gain:	2dBi			
Power Supply:	DC 11.40V 5100mAh			

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 UNII Band III:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n 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:	50 % RH
Atmospheric Pressure:	1016 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 independent unit.

5.5 Test Location

All tests were performed at:

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



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

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	ETS-Lindgren	N/A	SEM001-01	2016-05-13	2017-05-13
2	Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2016-04-25	2017-04-25
3	BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2014-11-15	2017-11-15
4	Double-ridged horn (1-18GHz)	ETS-Lindgren	3117	SEM003-11	2015-10-17	2018-10-17
5	Horn Antenna (18-26GHz)	ETS-Lindgren	3160	SEM003-12	2014-11-24	2017-11-24
6	Horn Antenna(26GHz-40GHz)	A.H.Systems, inc.	SAS-573	SEM003-13	2015-02-12	2018-02-12
7	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2016-04-25	2017-04-25
8	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-10	2015-10-17	2016-10-17
9	Pre-amplifier(26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2016-02-12	2017-02-12
10	DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2015-10-09	2016-10-09
11	Loop Antenna	Beijing Daze	ZN30401	SEM003-09	2015-05-13	2018-05-13

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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	Low Noise Amplifier	Black Diamond Series	BDLNA- 0118- 352810	SEM005-05	2015-10-09	2016-10-09
7	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A

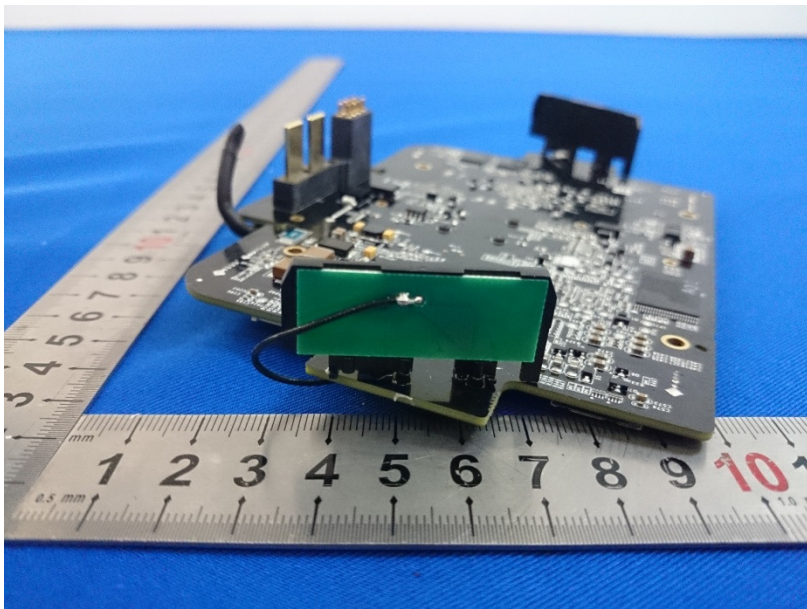
RF connected test						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2015-10-09	2016-10-09
2	Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2015-10-17	2016-10-17
3	Signal Generator	Rohde & Schwarz	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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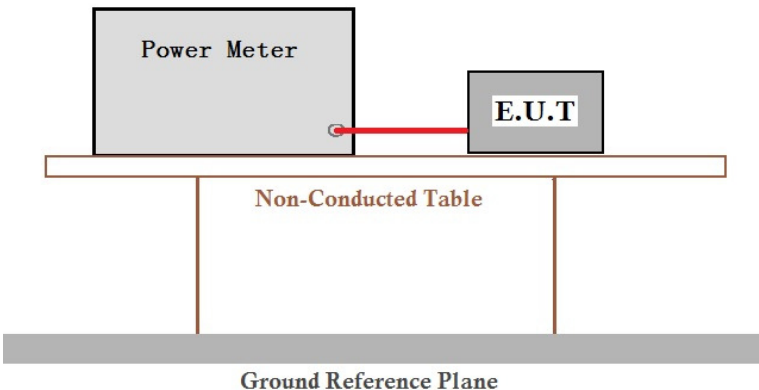
6 Test results and Measurement Data

6.1 Antenna Requirement

Test Requirement:	47 CFR Part 15 Section 15.203
EUT Antenna:	
The antenna is integrated antenna and no consideration of replacement. The best case gain of the antenna is 2dBi.	



6.2 Conducted Output Power

Test Requirement:	47 CFR Part 15 Section 15.407(a)	
Test Method:	ANSI C63.10: 2013	
Test Setup:	 <p><i>Remark:</i> Offset the High-Frequency cable loss 1.5dB in the power meter.</p>	
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; MCS0 of rate is the worst case of 802.11n(HT20); Only the worst case is recorded in the report.	
Limit:	Frequency Band	Limit
	5725-5850MHz	Not exceed 1W(30dBm)
	*Where B is the 26dB emission bandwidth in MHz	
Test Results:	Pass	



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Pre-scan under all rate at lowest channel 1								
Mode	802.11a							
Data Rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
Power (dBm)	17.05	16.99	16.92	16.86	16.82	16.79	16.73	16.66
Mode	802.11n(HT20)							
Data Rate	6.5Mbps	13Mbps	19.5Mbps	26Mbps	39Mbps	52Mbps	58.5Mbps	65Mbps
Power (dBm)	16.86	16.80	16.73	16.66	16.62	16.57	16.55	16.54
Through Pre-scan, 6Mbps of rate is the worst case of 802.11a; 6.5Mbps of rate is the worst case of 802.11n(HT20).								



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Measurement Data:

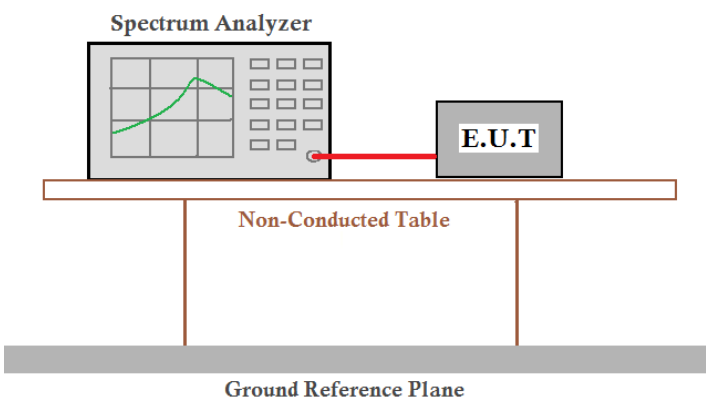
802.11a mode			
Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Result
5745	17.05	30.00	Pass
5785	17.16	30.00	Pass
5825	18.11	30.00	Pass

802.11n(HT20) mode			
Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Result
5745	16.86	30.00	Pass
5785	17.07	30.00	Pass
5825	18.16	30.00	Pass

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6.3 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:	 <p><i>Remark:</i> Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</p>	
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; MCS0 of rate is the worst case of 802.11n(HT20); Only the worst case is recorded in the report.	
Limit:	Frequency Band	Limit
	5725-5850MHz	4W(36dBm) with 6dBi antenna
	*The limit =the maximum output conducted power limit+ actual antenna gain	
Test Results:	Pass	



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Measurement Data:

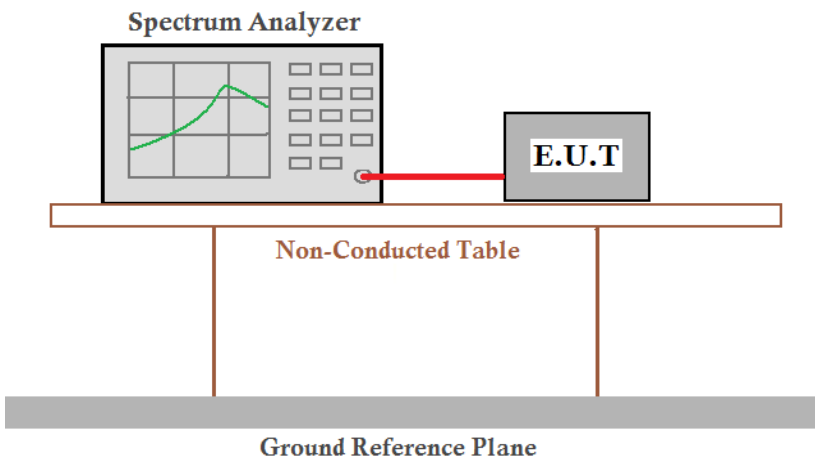
802.11a mode			
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Result
5745	19.05	30.00	Pass
5785	19.16	30.00	Pass
5825	20.11	30.00	Pass

802.11n(HT20) mode			
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Result
5745	18.86	30.00	Pass
5785	19.07	30.00	Pass
5825	20.16	30.00	Pass

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6.4 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(a)
Test Method:	ANSI C63.10: 2013
Test Setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane.</p>
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; MCS0 of rate is the worst case of 802.11n(HT20); 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)	99% Occupied Bandwidth (MHz)
5745	16.50
5785	16.50
5825	16.50

802.11n(HT20) mode	
Frequency (MHz)	99% Occupied Bandwidth (MHz)
5745	17.64
5785	17.64
5825	17.58

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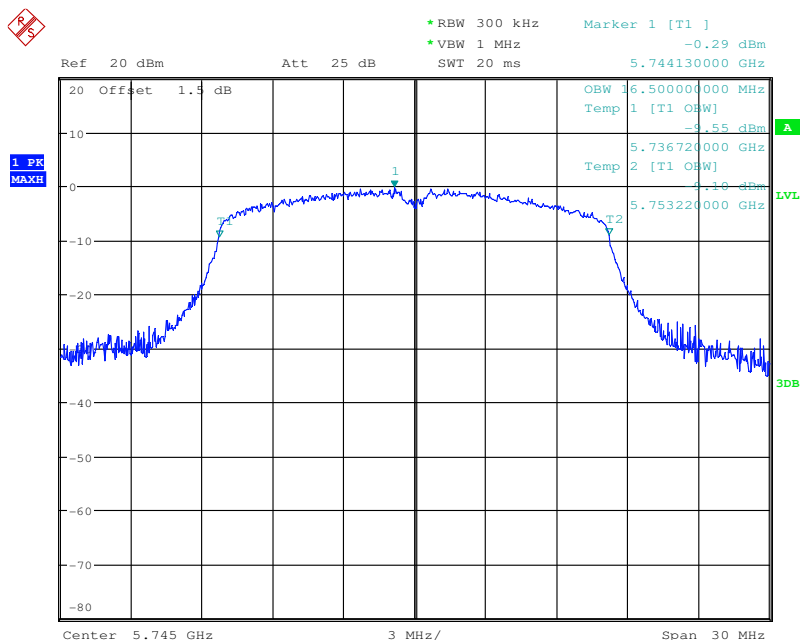


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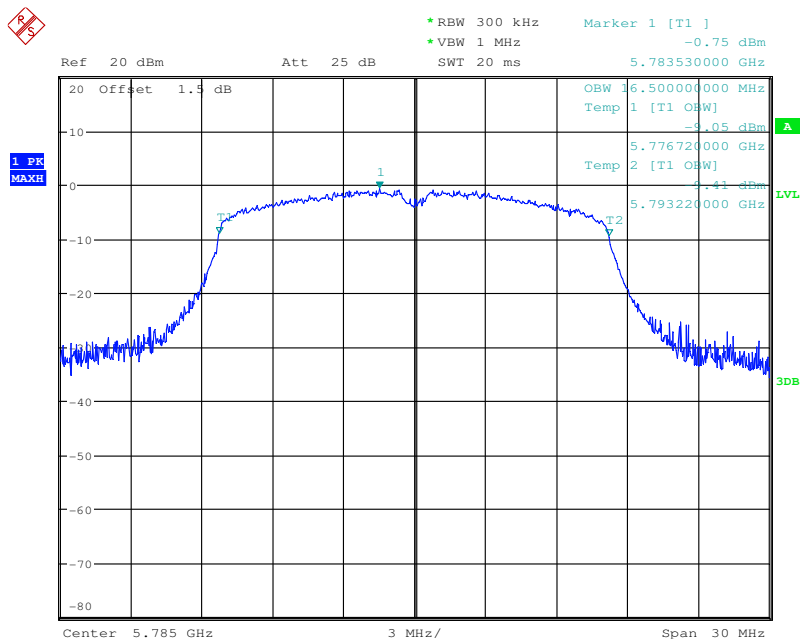
Report No.: SZEM160300165102
Page: 19 of 54

Test plot as follows:

Test mode:	802.11a	Frequency(MHz):	5745
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Test mode:	802.11a	Frequency(MHz):	5785
------------	---------	-----------------	------



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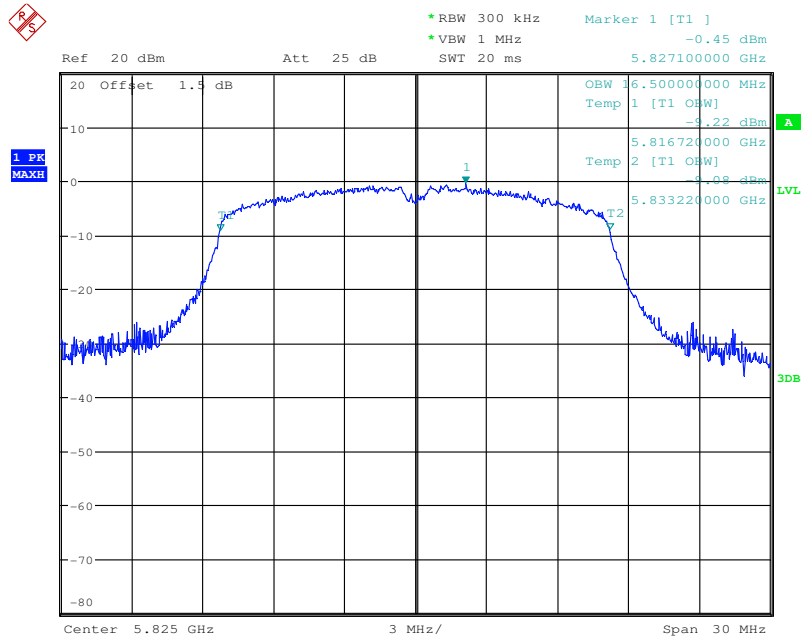


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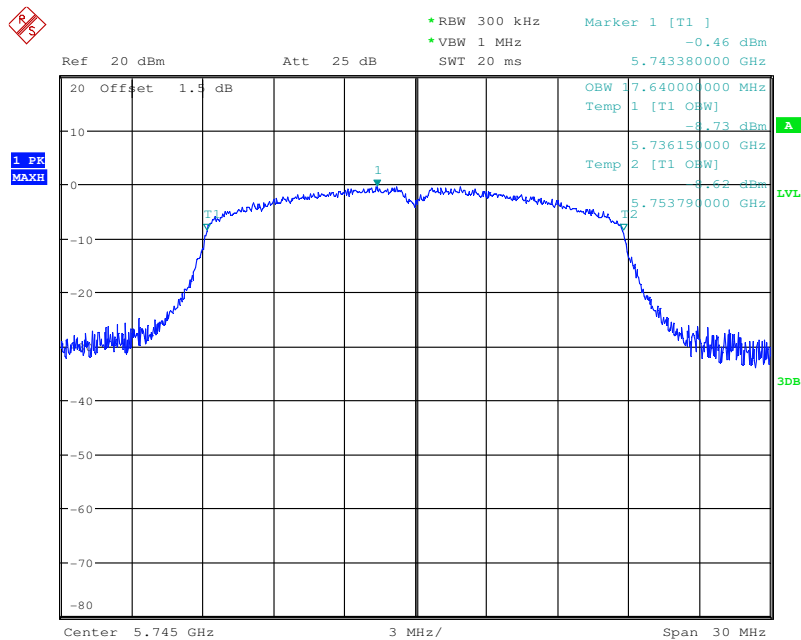
Report No.: SZEM160300165102

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Test mode:	802.11a	Frequency(MHz):	5825
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Test mode:	802.11n(HT20)	Frequency(MHz):	5745
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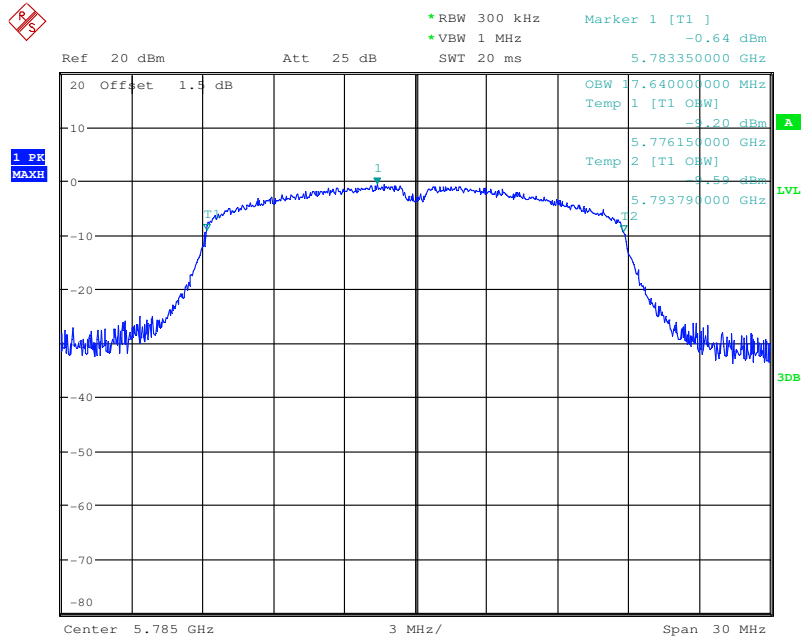


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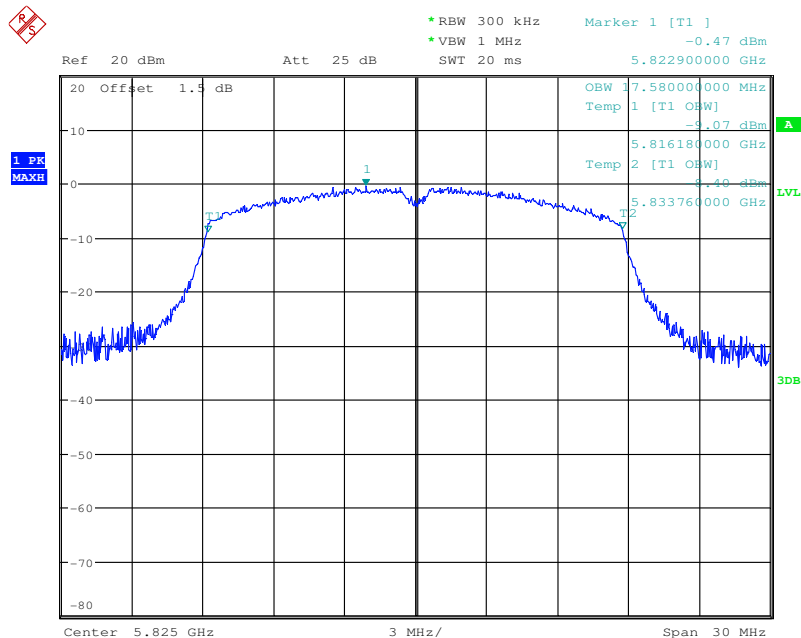
Report No.: SZEM160300165102

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Test mode:	802.11n(HT20)	Frequency(MHz):	5785
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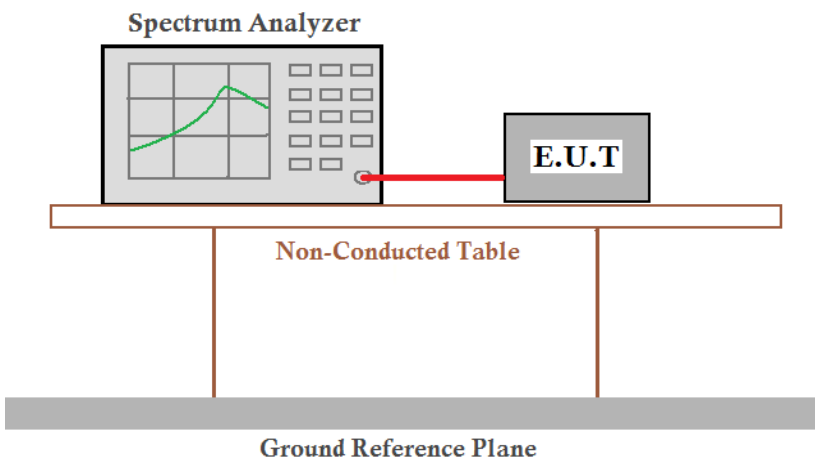
Test mode:	802.11n(HT20)	Frequency(MHz):	5825
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6.5 6dB Emission Bandwidth

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; MCS0 of rate is the worst case of 802.11n(HT20); Only the worst case is recorded in the report.	
Limit:	Frequency Band	Limit
	5725-5850MHz	At lease 500kHz
Test Results:	Pass	



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Measurement Data:

802.11a mode			
Frequency (MHz)	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
5745	15.15	≥500	Pass
5785	15.15	≥500	Pass
5825	15.15	≥500	Pass

802.11n(HT20) mode			
Frequency (MHz)	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
5745	15.15	≥500	Pass
5785	15.18	≥500	Pass
5825	15.15	≥500	Pass

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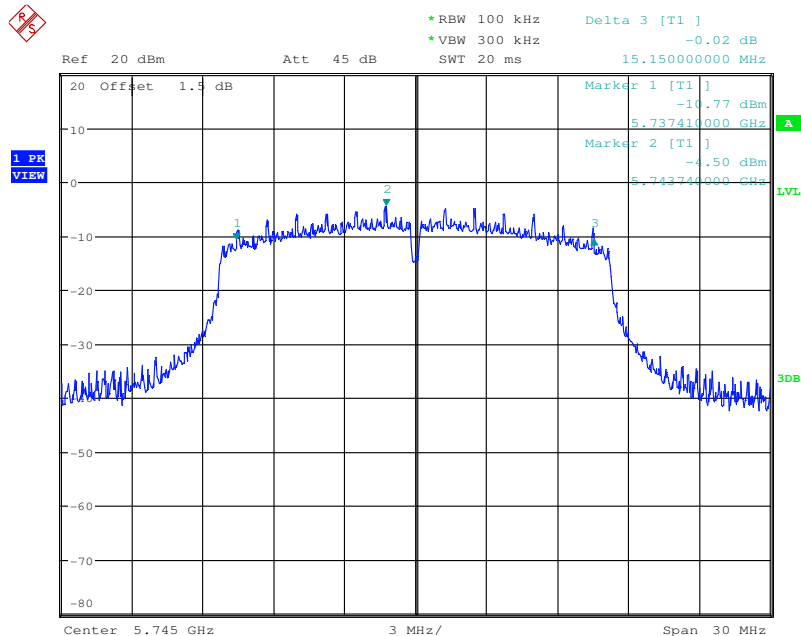
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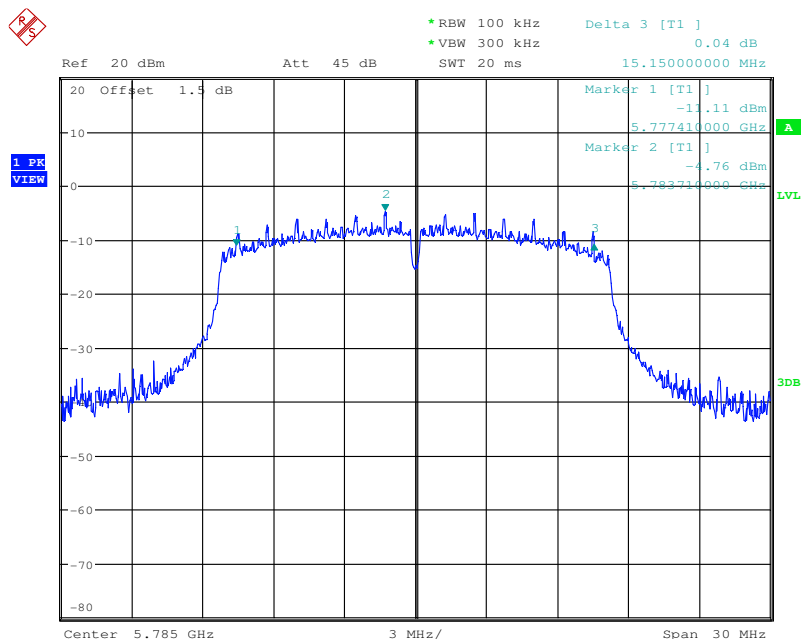
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Test plot as follows:

Test mode:	802.11a	Frequency(MHz):	5745
------------	---------	-----------------	------



Test mode:	802.11a	Frequency(MHz):	5785
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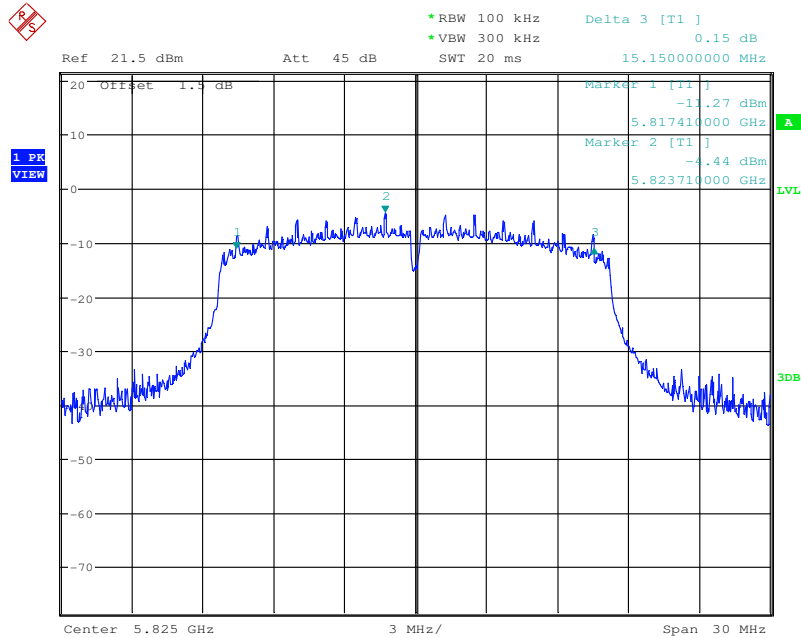


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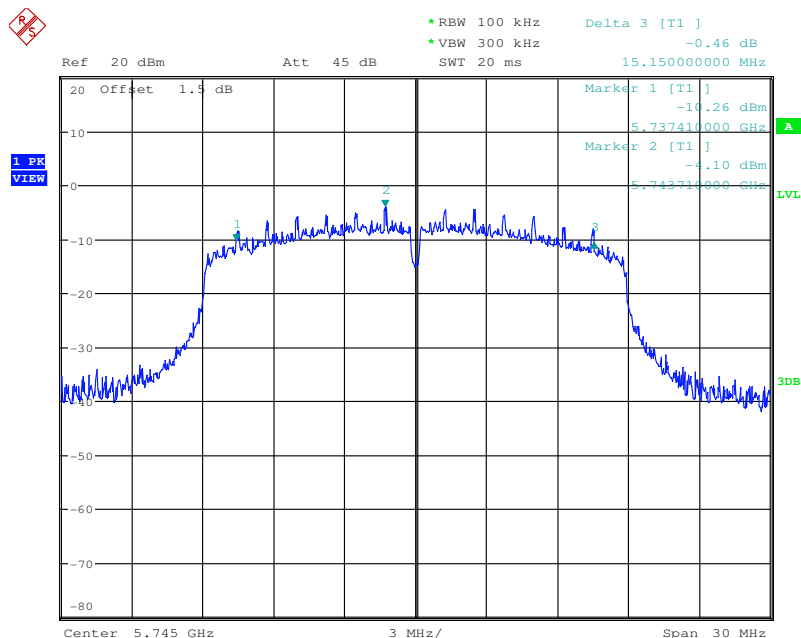
Report No.: SZEM160300165102

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Test mode:	802.11a	Frequency(MHz):	5825
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Test mode:	802.11n(HT20)	Frequency(MHz):	5745
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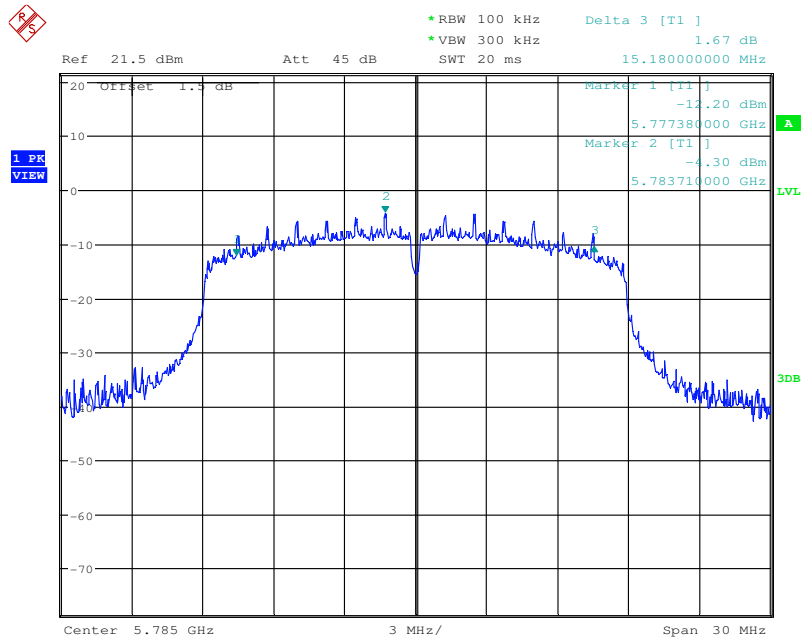


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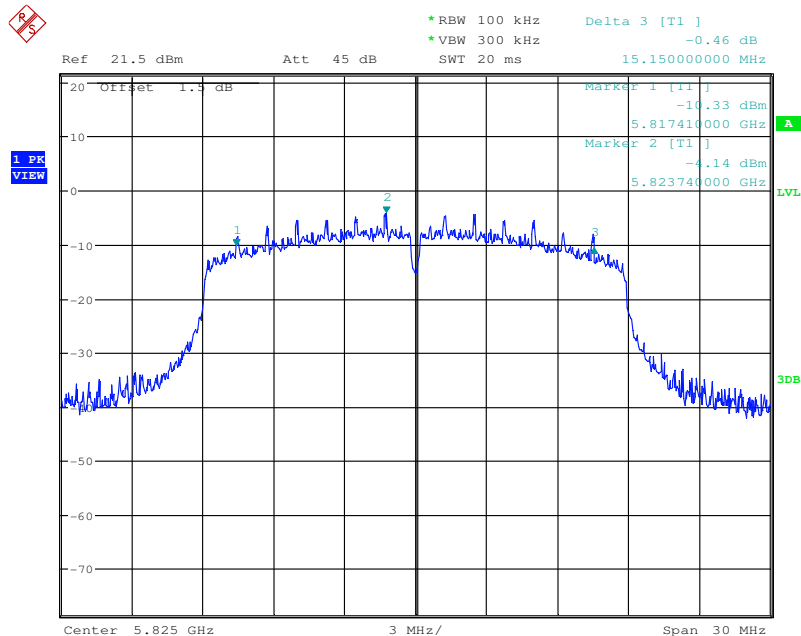
Report No.: SZEM160300165102

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Test mode:	802.11n(HT20)	Frequency(MHz):	5785
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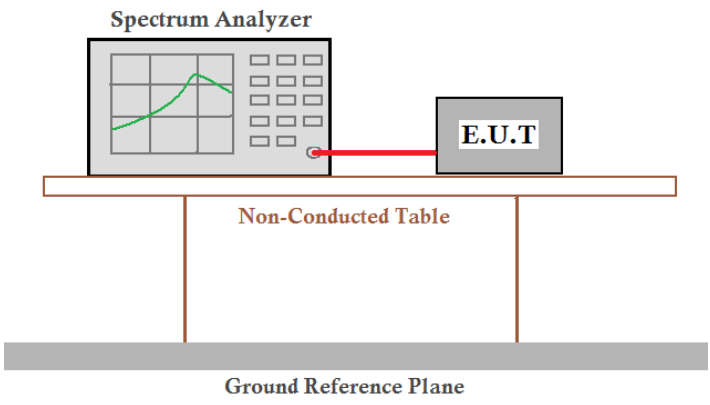
Test mode:	802.11n(HT20)	Frequency(MHz):	5825
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6.6 Power Spectral Density

Test Requirement:	47 CFR Part 15 Section 15.407(a)	
Test Method:	ANSI C63.10: 2013	
Test Setup:	 <p><i>Remark:</i> Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</p>	
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; MCS0 of rate is the worst case of 802.11n(HT20); Only the worst case is recorded in the report.	
Limit:	Frequency Band	Limit
	5725-5850MHz	The power spectral density less than 30dBm/500kHz
Test Results:	Pass	



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Measurement Data:

802.11a mode			
Frequency (MHz)	Power Spectral Density	Limit	Result
5745	1.68	$\leq 30\text{dBm}/500\text{kHz}$	Pass
5785	1.16	$\leq 30\text{dBm}/500\text{kHz}$	Pass
5825	1.56	$\leq 30\text{dBm}/500\text{kHz}$	Pass

802.11n(HT20) mode			
Frequency (MHz)	Power Spectral Density	Limit	Result
5745	2.00	$\leq 30\text{dBm}/500\text{kHz}$	Pass
5785	1.34	$\leq 30\text{dBm}/500\text{kHz}$	Pass
5825	1.27	$\leq 30\text{dBm}/500\text{kHz}$	Pass

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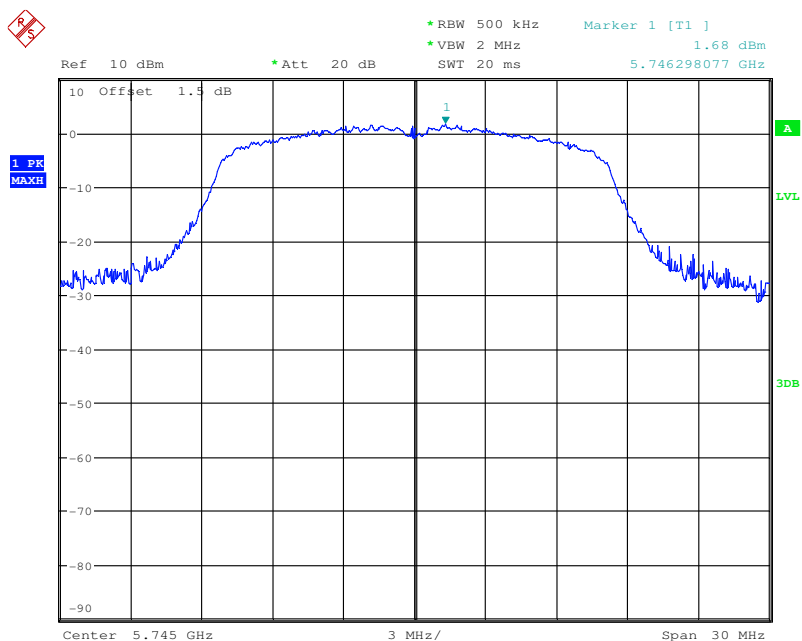


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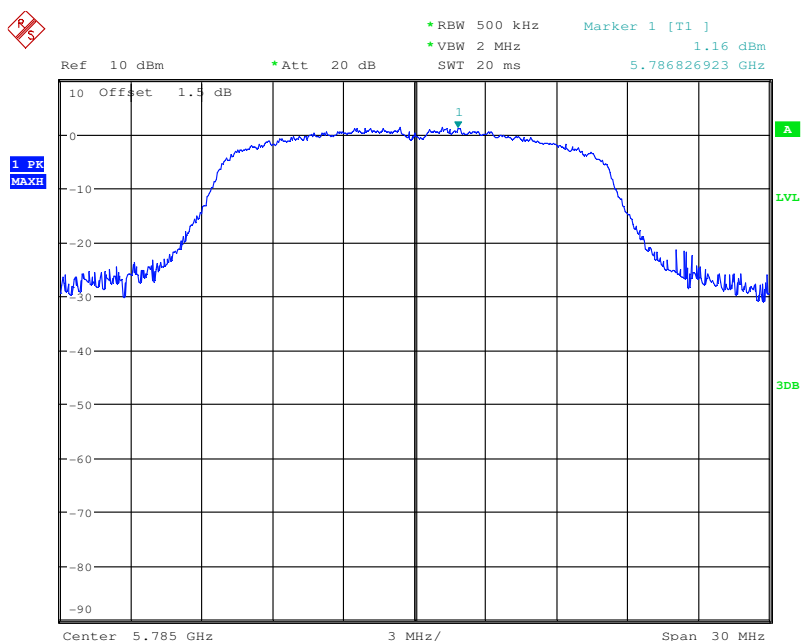
Report No.: SZEM160300165102
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Test plot as follows:

Test mode:	802.11a	Frequency(MHz):	5745
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Test mode:	802.11a	Frequency(MHz):	5785
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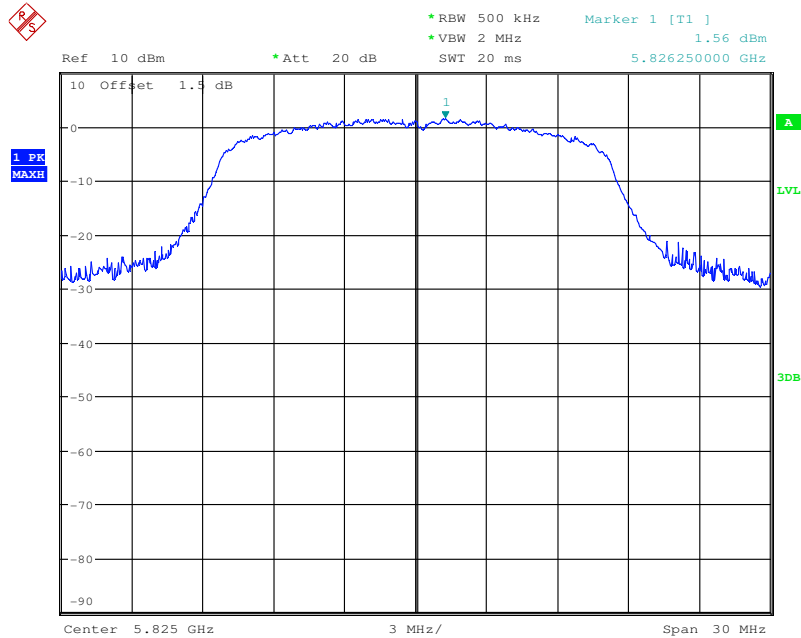


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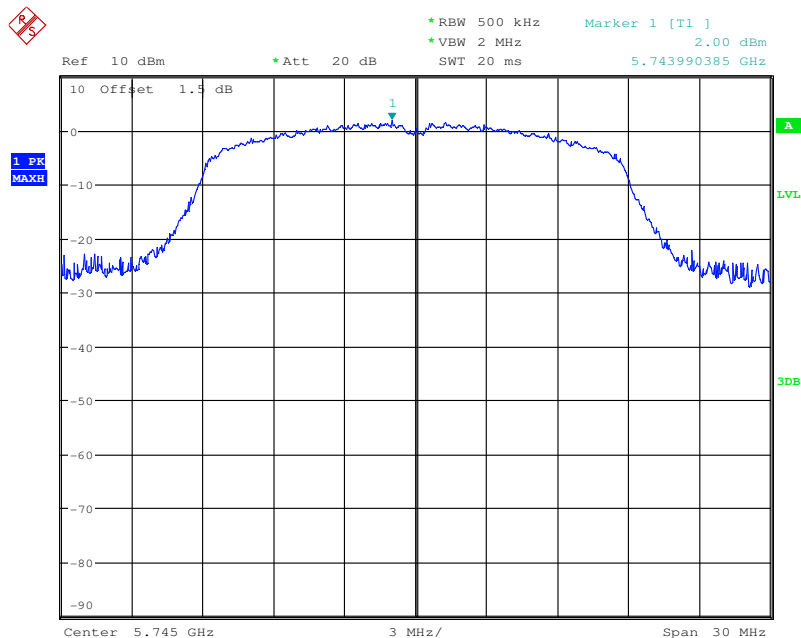
Report No.: SZEM160300165102

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Test mode:	802.11a	Frequency(MHz):	5825
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Test mode:	802.11n(HT20)	Frequency(MHz):	5745
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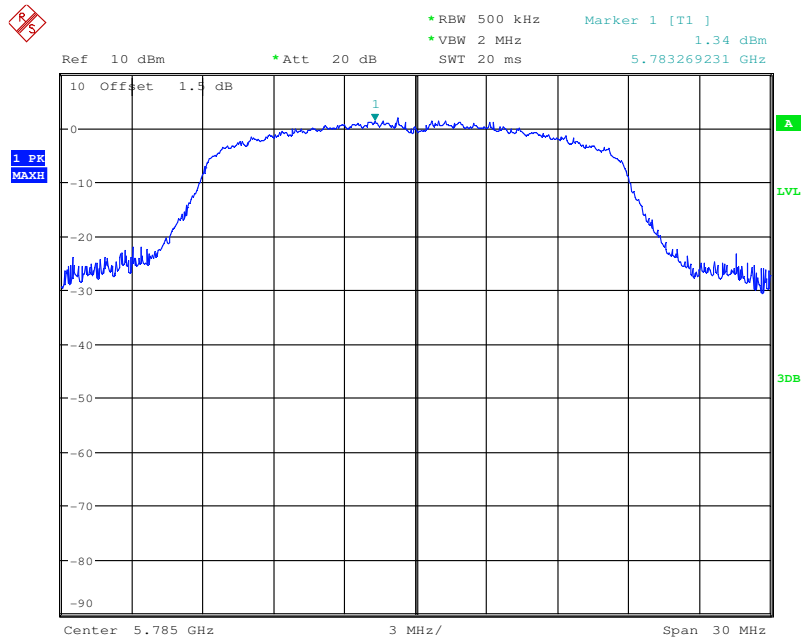


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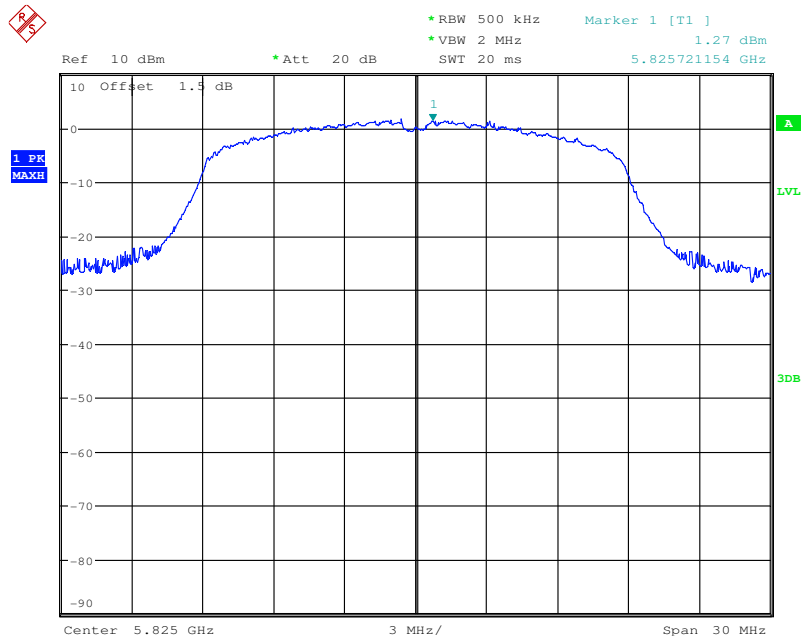
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Test mode:	802.11n(HT20)	Frequency(MHz):	5785
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Test mode:	802.11n(HT20)	Frequency(MHz):	5825
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6.7 Radiated Spurious Emissions

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

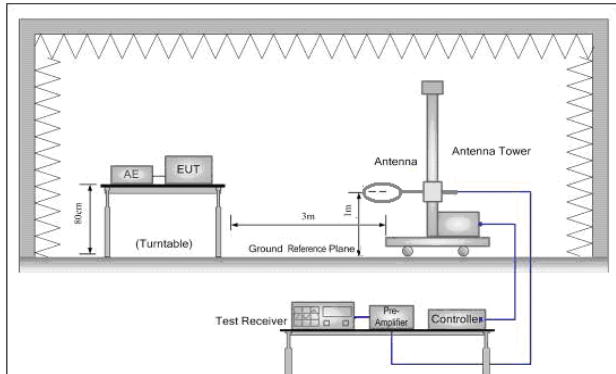


Figure 1. 30MHz to 1GHz

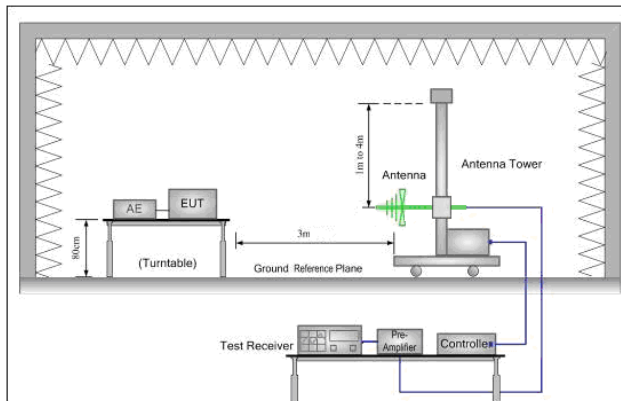


Figure 2. Above 1 GHz

Test Procedure:	<ol style="list-style-type: none"> For below 1GHz test, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. 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 chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 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. 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. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. Test the EUT in the outermost channels. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the Y axis positioning which it is worse case. 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; MCS0 of rate is the worst case of 802.11n(HT20);



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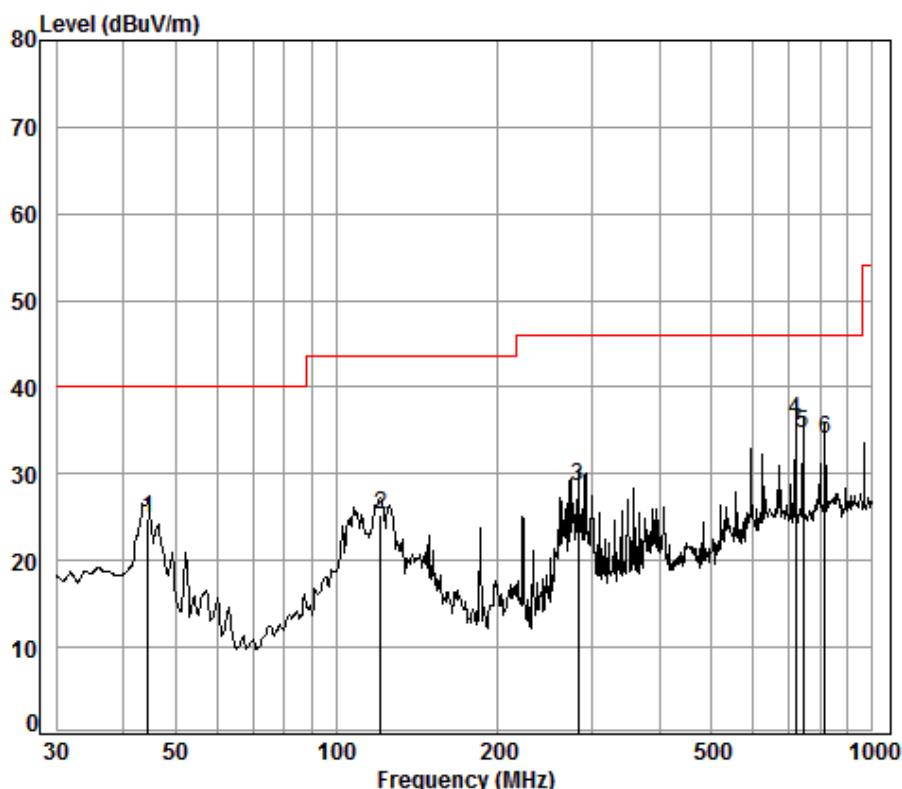
	For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

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6.7.1 Radiated emission below 1GHz

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



Condition: 3m Vertical

Job No. : 1651CR

Test Mode: TX mode

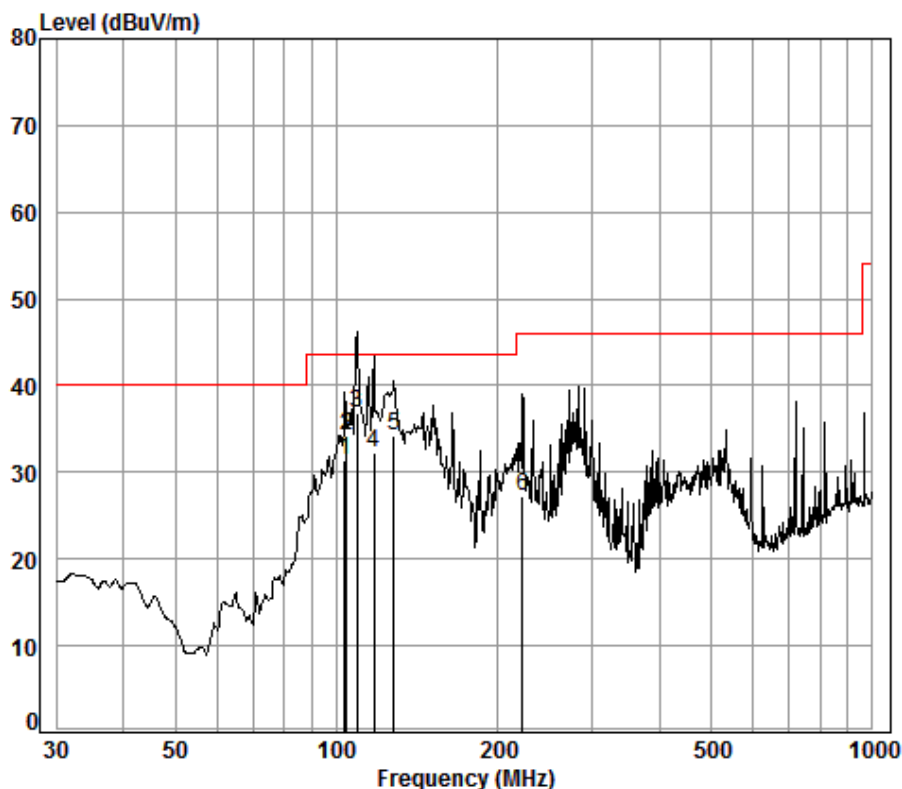
	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	44.59	0.70	14.34	25.97	35.87	24.94	40.00	-15.06
2	121.12	1.26	6.79	25.87	43.16	25.34	43.50	-18.16
3	281.99	1.82	10.26	25.71	42.22	28.59	46.00	-17.41
4 pp	719.20	2.96	17.62	25.73	41.43	36.28	46.00	-9.72
5	742.26	3.03	18.25	25.75	39.18	34.71	46.00	-11.29
6	815.97	3.27	19.70	25.68	36.70	33.99	46.00	-12.01



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Test mode:	Charge +Transmitting	Horizontal
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Condition: 3m Horizontal

Job No. : 1651CR

Test Mode: TX mode

	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	103.81	1.21	7.94	25.89	48.06	31.32	43.50	-12.18
2	104.49	1.21	7.92	25.89	51.05	34.29	43.50	-9.21
3 pp	109.41	1.23	7.72	25.88	53.80	36.87	43.50	-6.63
4	117.36	1.25	6.96	25.87	49.93	32.27	43.50	-11.23
5	128.11	1.27	7.35	25.85	51.56	34.33	43.50	-9.17
6	222.17	1.53	7.86	25.75	43.65	27.29	46.00	-18.71

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6.7.2 Transmitter 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	42.18	51.67	74.00	-22.33	Vertical	
9659.786	37.10	12.53	36.28	40.38	53.73	74.00	-20.27	Vertical	
11490.000	37.45	14.01	36.68	35.08	49.86	74.00	-24.14	Vertical	
12775.540	37.99	14.93	37.91	37.61	52.62	74.00	-21.38	Vertical	
15128.660	40.63	16.67	39.58	35.58	53.30	74.00	-20.70	Vertical	
17235.000	43.05	19.50	37.03	28.28	53.80	74.00	-20.20	Vertical	
7678.832	36.04	10.89	37.44	43.17	52.66	74.00	-21.34	Horizontal	
9659.786	37.10	12.53	36.28	40.24	53.59	74.00	-20.41	Horizontal	
11490.000	37.45	14.01	36.68	34.93	49.71	74.00	-24.29	Horizontal	
13217.380	38.32	15.61	38.46	35.76	51.23	74.00	-22.77	Horizontal	
15504.760	40.91	17.03	38.97	33.73	52.70	74.00	-21.30	Horizontal	
17235.000	43.05	19.50	37.03	28.38	53.90	74.00	-20.10	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	
7093.172	35.49	10.64	37.69	42.42	50.86	74.00	-23.14	Vertical	
8990.716	37.00	11.79	37.19	39.21	50.81	74.00	-23.19	Vertical	
11570.000	37.49	14.09	36.75	35.20	50.03	74.00	-23.97	Vertical	
13192.440	38.29	15.60	38.42	37.29	52.76	74.00	-21.24	Vertical	
15157.260	40.66	16.70	39.53	35.20	53.03	74.00	-20.97	Vertical	
17355.000	43.23	19.92	37.01	27.06	53.20	74.00	-20.80	Vertical	
7106.583	35.51	10.64	37.68	42.03	50.50	74.00	-23.50	Horizontal	
9007.715	37.00	11.80	37.18	40.72	52.34	74.00	-21.66	Horizontal	
11570.000	37.49	14.09	36.75	34.07	48.90	74.00	-25.10	Horizontal	
13192.440	38.29	15.60	38.42	36.48	51.95	74.00	-22.05	Horizontal	
15157.260	40.66	16.70	39.53	34.24	52.07	74.00	-21.93	Horizontal	
17355.000	43.23	19.92	37.01	27.24	53.38	74.00	-20.62	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	
7093.172	35.49	10.64	37.69	43.01	51.45	74.00	-22.55	Vertical	
8990.716	37.00	11.79	37.19	38.95	50.55	74.00	-23.45	Vertical	
11650.000	37.50	14.18	36.83	33.76	48.61	74.00	-25.39	Vertical	
13192.440	38.29	15.60	38.42	36.37	51.84	74.00	-22.16	Vertical	
15157.260	40.66	16.70	39.53	35.39	53.22	74.00	-20.78	Vertical	
17475.000	43.45	20.33	36.99	26.21	53.00	74.00	-21.00	Vertical	
7678.832	36.04	10.89	37.44	41.99	51.48	74.00	-22.52	Horizontal	
8990.716	37.00	11.79	37.19	39.11	50.71	74.00	-23.29	Horizontal	
11650.000	37.50	14.18	36.83	34.78	49.63	74.00	-24.37	Horizontal	
13192.440	38.29	15.60	38.42	36.77	52.24	74.00	-21.76	Horizontal	
15800.410	41.20	17.31	38.51	33.46	53.46	74.00	-20.54	Horizontal	
17475.000	43.45	20.33	36.99	27.14	53.93	74.00	-20.07	Horizontal	

Test mode:		802.11n(HT20)		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	
8328.564	36.40	11.58	37.27	42.56	53.27	74.00	-20.73	Vertical	
9659.786	37.10	12.53	36.28	40.38	53.73	74.00	-20.27	Vertical	
11490.000	37.45	14.01	36.68	35.08	49.86	74.00	-24.14	Vertical	
13778.220	39.06	16.00	39.32	37.12	52.86	74.00	-21.14	Vertical	
15800.410	41.20	17.31	38.51	33.09	53.09	74.00	-20.91	Vertical	
17235.000	43.05	19.50	37.03	28.28	53.80	74.00	-20.20	Vertical	
7678.832	36.04	10.89	37.44	43.17	52.66	74.00	-21.34	Horizontal	
9659.786	37.10	12.53	36.28	40.24	53.59	74.00	-20.41	Horizontal	
11490.000	37.45	14.01	36.68	33.93	48.71	74.00	-25.29	Horizontal	
13804.270	39.10	16.03	39.36	37.06	52.83	74.00	-21.17	Horizontal	
15800.410	41.20	17.31	38.51	32.39	52.39	74.00	-21.61	Horizontal	
17235.000	43.05	19.50	37.03	28.38	53.90	74.00	-20.10	Horizontal	

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Test mode:		802.11n(HT20)		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	
7093.172	35.49	10.64	37.69	42.42	50.86	74.00	-23.14	Vertical	
8990.716	37.00	11.79	37.19	39.21	50.81	74.00	-23.19	Vertical	
11570.000	37.49	14.09	36.75	34.20	49.03	74.00	-24.97	Vertical	
13192.440	38.29	15.60	38.42	36.29	51.76	74.00	-22.24	Vertical	
15157.260	40.66	16.70	39.53	35.20	53.03	74.00	-20.97	Vertical	
17355.000	43.23	19.92	37.01	27.06	53.20	74.00	-20.80	Vertical	
7174.020	35.57	10.67	37.65	39.39	47.98	74.00	-26.02	Horizontal	
9007.715	37.00	11.80	37.18	40.72	52.34	74.00	-21.66	Horizontal	
11570.000	37.49	14.09	36.75	34.07	48.90	74.00	-25.10	Horizontal	
13192.440	38.29	15.60	38.42	37.48	52.95	74.00	-21.05	Horizontal	
15157.260	40.66	16.70	39.53	35.24	53.07	74.00	-20.93	Horizontal	
17355.000	43.23	19.92	37.01	27.24	53.38	74.00	-20.62	Horizontal	

Test mode:		802.11n(HT20)		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	
7678.832	36.04	10.89	37.44	42.02	51.51	74.00	-22.49	Vertical	
9659.786	37.10	12.53	36.28	40.32	53.67	74.00	-20.33	Vertical	
11650.000	37.50	14.18	36.83	33.76	48.61	74.00	-25.39	Vertical	
13192.440	38.29	15.60	38.42	37.37	52.84	74.00	-21.16	Vertical	
15157.260	40.66	16.70	39.53	35.39	53.22	74.00	-20.78	Vertical	
17475.000	43.45	20.33	36.99	26.21	53.00	74.00	-21.00	Vertical	
7678.832	36.04	10.89	37.44	41.99	51.48	74.00	-22.52	Horizontal	
8990.716	37.00	11.79	37.19	39.11	50.71	74.00	-23.29	Horizontal	
11650.000	37.50	14.18	36.83	32.78	47.63	74.00	-26.37	Horizontal	
13192.440	38.29	15.60	38.42	36.77	52.24	74.00	-21.76	Horizontal	
15128.660	40.63	16.67	39.58	34.38	52.10	74.00	-21.90	Horizontal	
17475.000	43.45	20.33	36.99	27.14	53.93	74.00	-20.07	Horizontal	

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Remark:

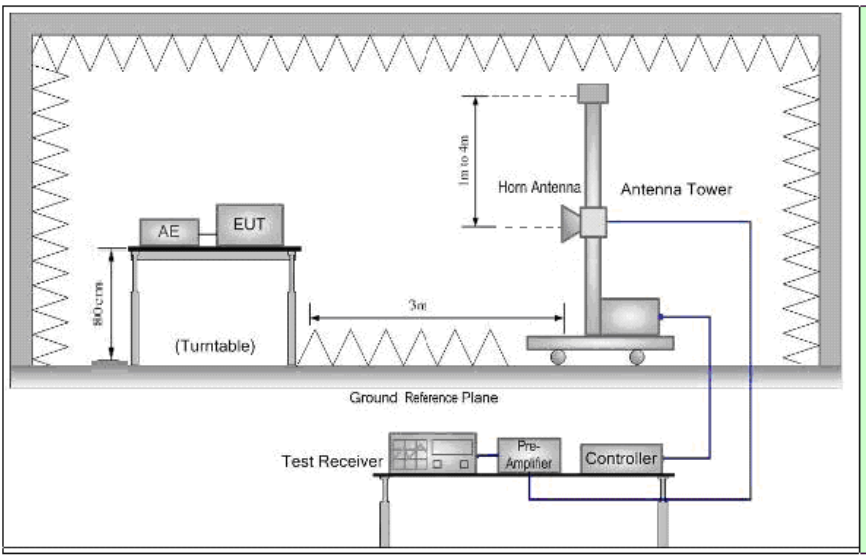
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

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.

6.8 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:	<ul style="list-style-type: none">a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. 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 channelg. 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 Y 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; MCS0 of rate is the worst case of 802.11n(HT20); 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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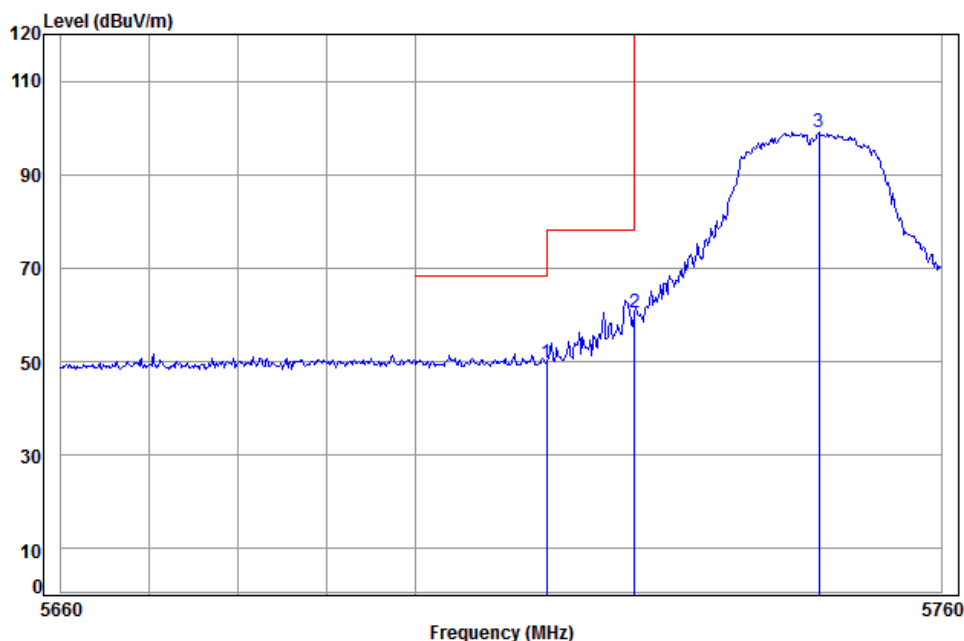
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Test plot as follows:

802.11a:

Worse case mode:		Test channel:	5745	Remark:	Peak	Vertical
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Condition: 3m VERTICAL

Job No: : 1651CR

Mode: : 5745 Band edge

: A20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5715.000	8.47	34.24	38.91	45.93	49.73	68.20	-18.47	
2	pp 5725.000	8.48	34.24	38.92	56.58	60.38	78.20	-17.82	
3	5745.995	8.50	34.23	38.92	95.13	98.94	125.20	-26.26	

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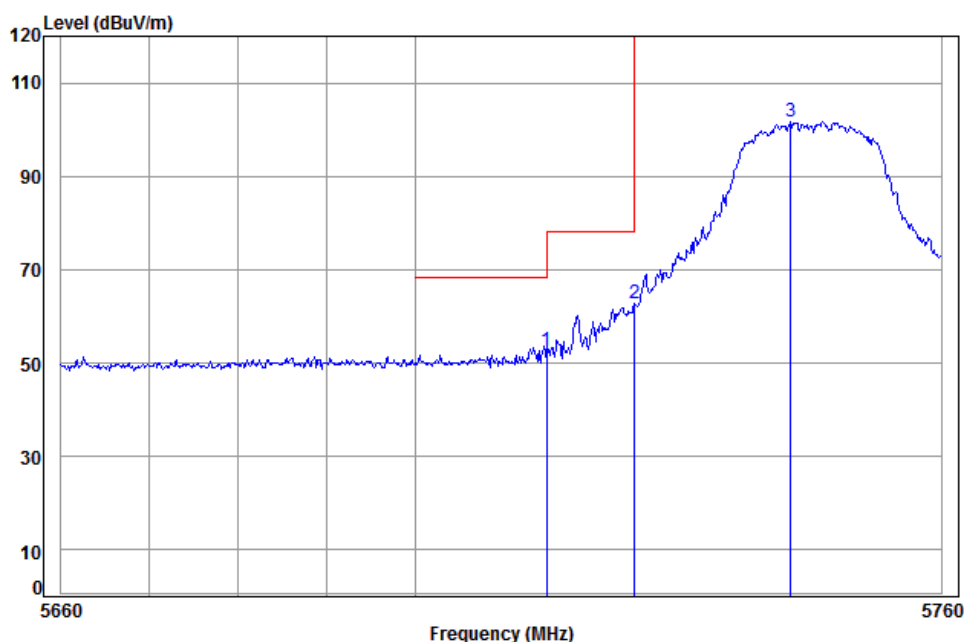


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Worse case mode:		Test channel:	5745	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL

Job No: : 1651CR

Mode: : 5745 Band edge

: A20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5715.000	8.47	34.24	38.91	48.77	52.57	68.20	-15.63	
2 pp	5725.000	8.48	34.24	38.92	58.84	62.64	78.20	-15.56	
3	5742.775	8.50	34.23	38.92	97.97	101.78	125.20	-23.42	

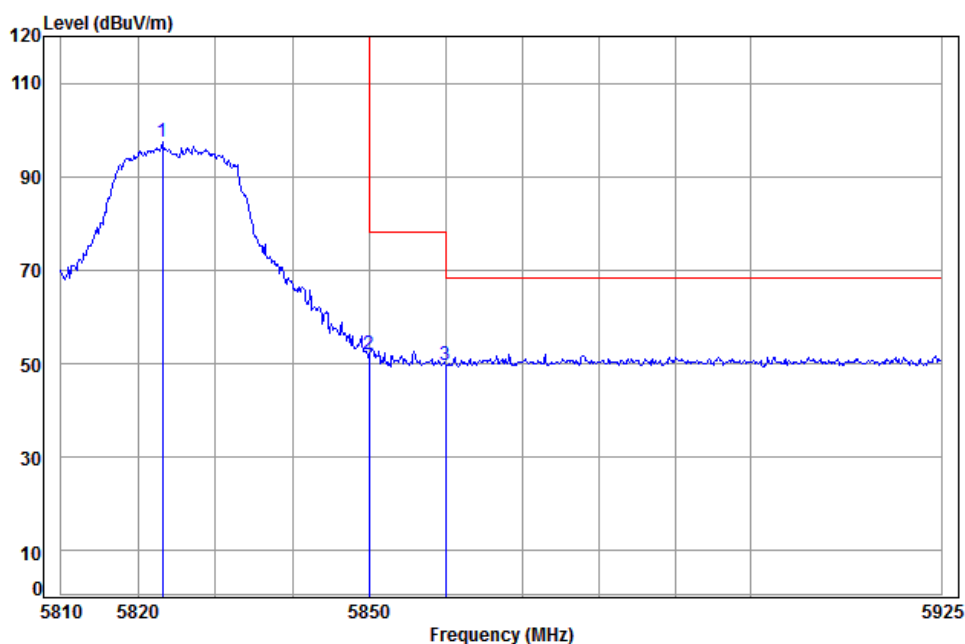
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Worse case mode:		Test channel:	5825	Remark:	Peak	Vertical
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Condition: 3m VERTICAL

Job No: : 1651CR

Mode: : 5825 Band edge

: A20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	5823.110	8.578	34.259	38.932	93.481	97.386	125.200	-27.814
2	5850.000	8.605	34.327	38.936	48.154	52.150	78.200	-26.050
3 pp	5860.000	8.614	34.352	38.938	45.764	49.792	68.200	-18.408

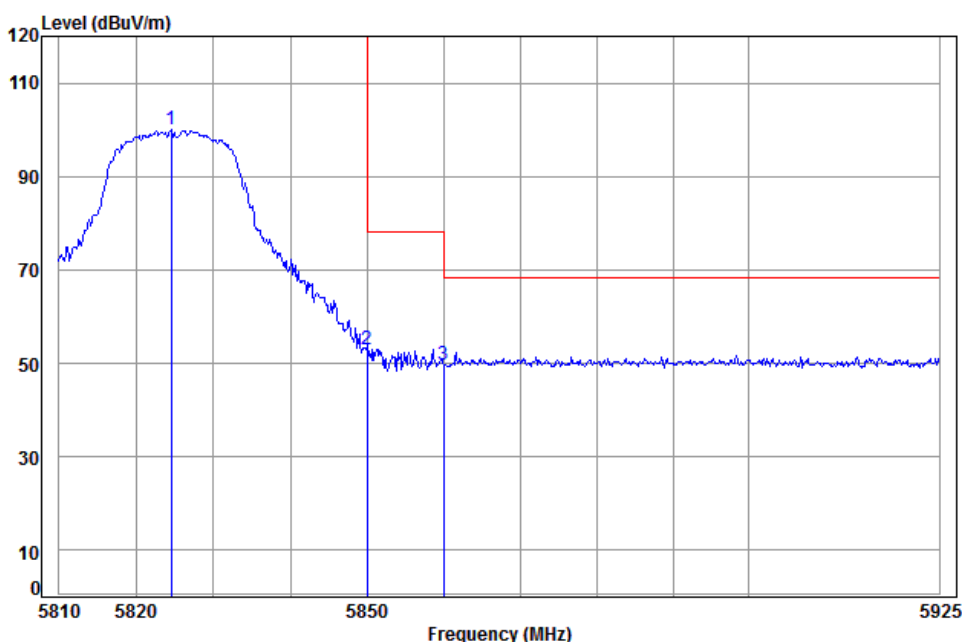
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Worse case mode:		Test channel:	5825	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL
Job No: : 1651CR
Mode: : 5825 Band edge
: A20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	5824.480	8.579	34.262	38.932	96.113	100.022	125.200	-25.178
2	5850.000	8.605	34.327	38.936	49.020	53.016	78.200	-25.184
3 pp	5860.000	8.614	34.352	38.938	45.774	49.802	68.200	-18.398

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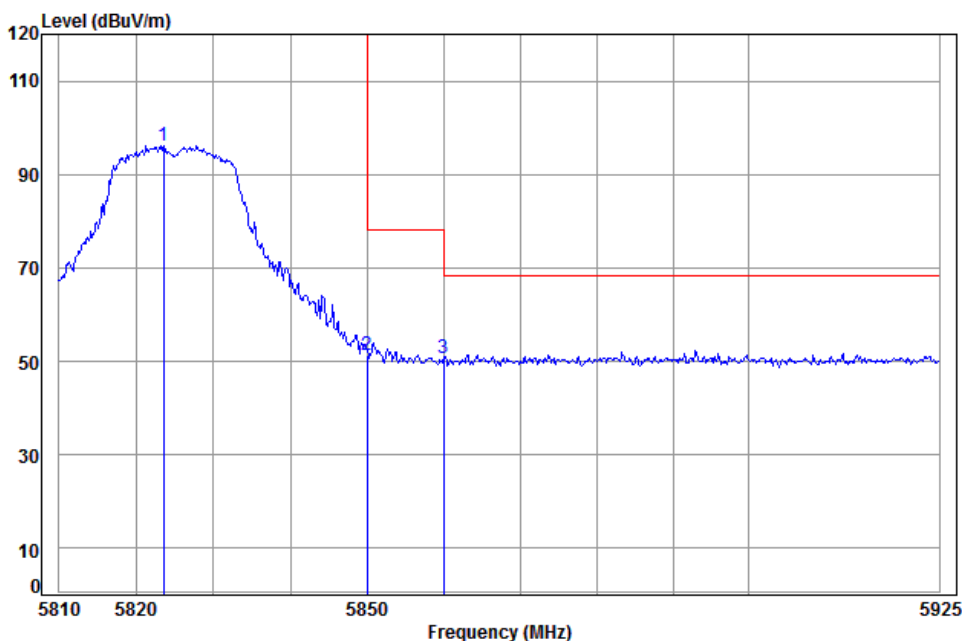


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802.11n(HT20):

Worse case mode:		Test channel:	5745	Remark:	Peak	Vertical
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Condition: 3m VERTICAL

Job No: : 1651CR

Mode: : 5825 Band edge

: N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	5823.567	8.578	34.260	38.932	92.327	96.233	125.200	-28.967
2	5850.000	8.605	34.327	38.936	47.500	51.496	78.200	-26.704
3 pp	5860.000	8.614	34.352	38.938	46.712	50.740	68.200	-17.460

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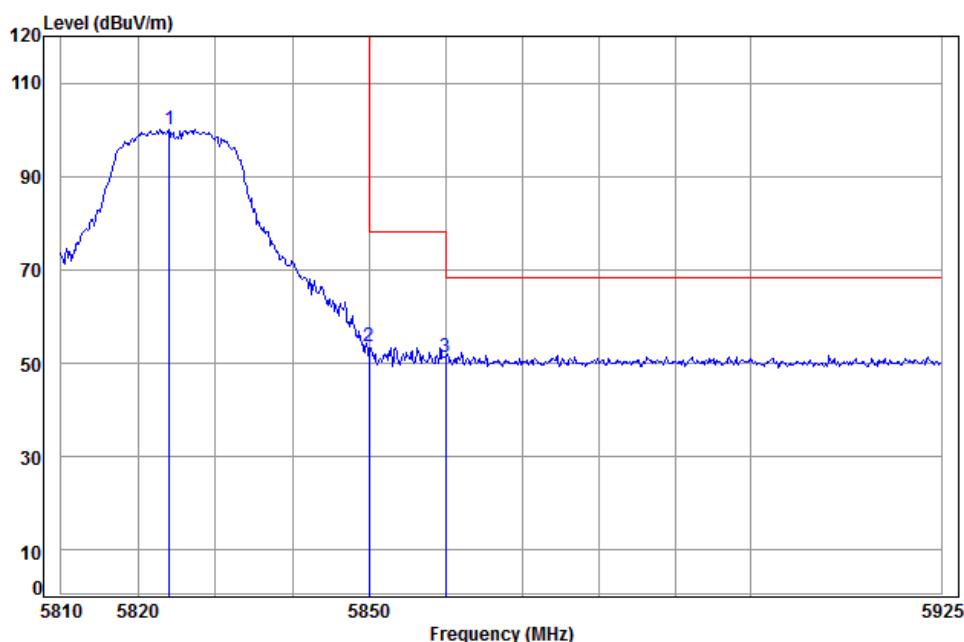


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Worse case mode:		Test channel:	5745	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL

Job No: : 1651CR

Mode: : 5825 Band edge

: N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	5824.024	8.579	34.261	38.932	96.292	100.200	125.200-25.000	
2	5850.000	8.605	34.327	38.936	49.645	53.641	78.200-24.559	
3 pp	5860.000	8.614	34.352	38.938	47.468	51.496	68.200-16.704	

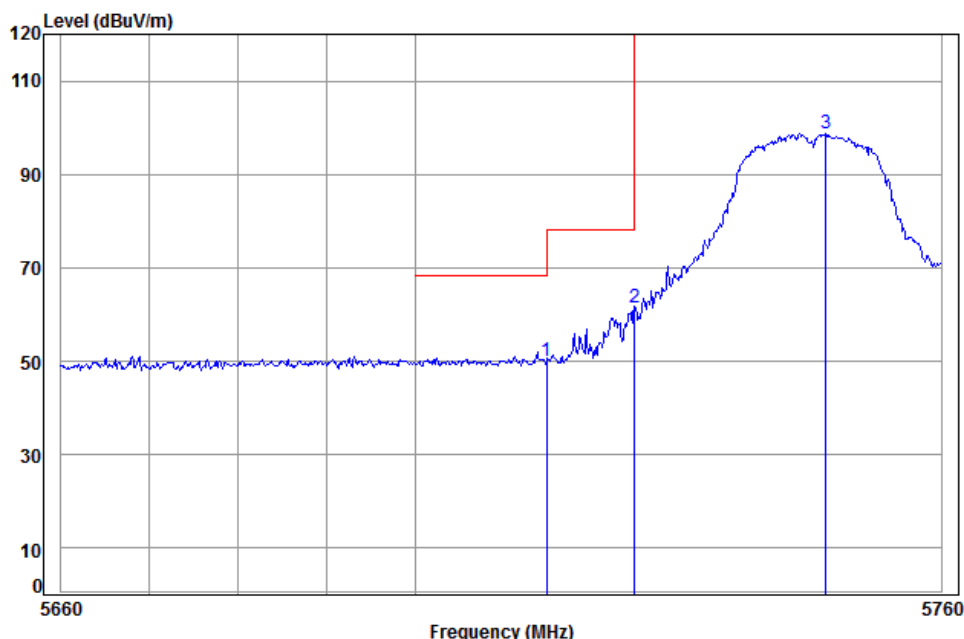
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Worse case mode:		Test channel:	5825	Remark:	Peak	Vertical
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Condition: 3m VERTICAL
Job No: : 1651CR
Mode: : 5745 Band edge
: N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5715.000	8.47	34.24	38.91	46.25	50.05	68.20	-18.15	
2	pp 5725.000	8.48	34.24	38.92	57.75	61.55	78.20	-16.65	
3	5746.800	8.50	34.23	38.92	95.02	98.83	125.20	-26.37	

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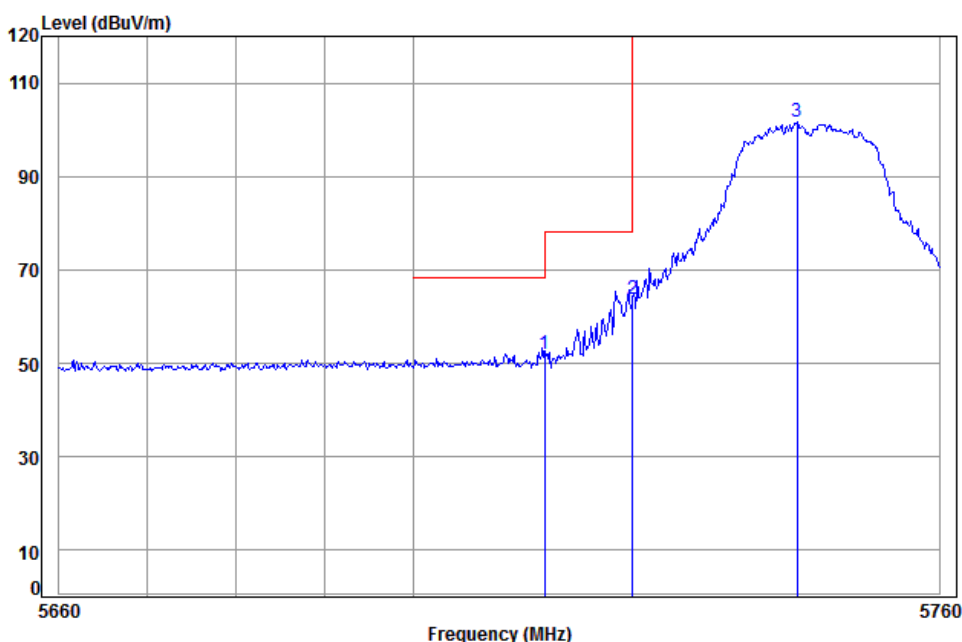


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Worse case mode:		Test channel:	5825	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL

Job No: : 1651CR

Mode: : 5745 Band edge

: N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	5715.000	8.47	34.24	38.91	48.23	52.03	68.20	-16.17	
2	pp 5725.000	8.48	34.24	38.92	60.02	63.82	78.20	-14.38	
3	5743.781	8.50	34.23	38.92	97.79	101.60	125.20	-23.60	

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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6.9 Frequency Stability

Test Requirement:	47 CFR Part 15 Section 15.407(g)
Test Method:	ANSI C63.10: 2013
Test Setup:	<pre> graph LR SA[Spectrum Analyzer] --- EUT[EUT] EUT --- P[AC/DC Power supply] subgraph TC [Temperature Chamber] EUT P end </pre>
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:	<ol style="list-style-type: none"> The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. Turn the EUT on and couple its output to a spectrum analyzer. Turn the EUT off and set the chamber to the highest temperature specified. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. 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; MCS0 of rate is the worst case of 802.11n(HT20); Only the worst case is recorded in the report.



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Test plot as follows:

Test mode:		802.11a	Frequency(MHz):	5745
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)		Result
35	11.40	5747.4834		Pass
25		5747.4840		Pass
15		5747.4841		Pass
5		5747.4838		Pass
0		5747.4828		Pass
20	10.80	5747.4837		Pass
	11.40	5747.4840		Pass
	13.05	5747.4846		Pass

Test mode:		802.11a	Frequency(MHz):	5785
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)		Result
35	11.40	5784.3697		Pass
25		5784.3700		Pass
15		5784.3706		Pass
5		5784.3698		Pass
0		5784.3696		Pass
20	10.80	5784.3690		Pass
	11.40	5784.3700		Pass
	13.05	5784.3710		Pass

Test mode:		802.11a	Frequency(MHz):	5825
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)		Result
35	11.40	5824.3692		Pass
25		5824.3700		Pass
15		5824.3709		Pass
5		5824.3706		Pass
0		5824.3703		Pass
20	10.80	5824.3696		Pass
	11.40	5824.3700		Pass
	13.05	5824.3709		Pass

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Test mode:		802.11n(HT20)	Frequency(MHz):	5745
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)		Result
35	11.40	5743.7170		Pass
25		5743.7180		Pass
15		5743.7183		Pass
5		5743.7178		Pass
0		5743.7172		Pass
20	10.80	5743.7179		Pass
	11.40	5743.7180		Pass
	13.05	5743.7182		Pass

Test mode:		802.11n(HT20)	Frequency(MHz):	5785
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)		Result
35	11.40	5782.4795		Pass
25		5782.4800		Pass
15		5782.4806		Pass
5		5782.4798		Pass
0		5782.4789		Pass
20	10.80	5782.4793		Pass
	11.40	5782.4800		Pass
	13.05	5782.4809		Pass

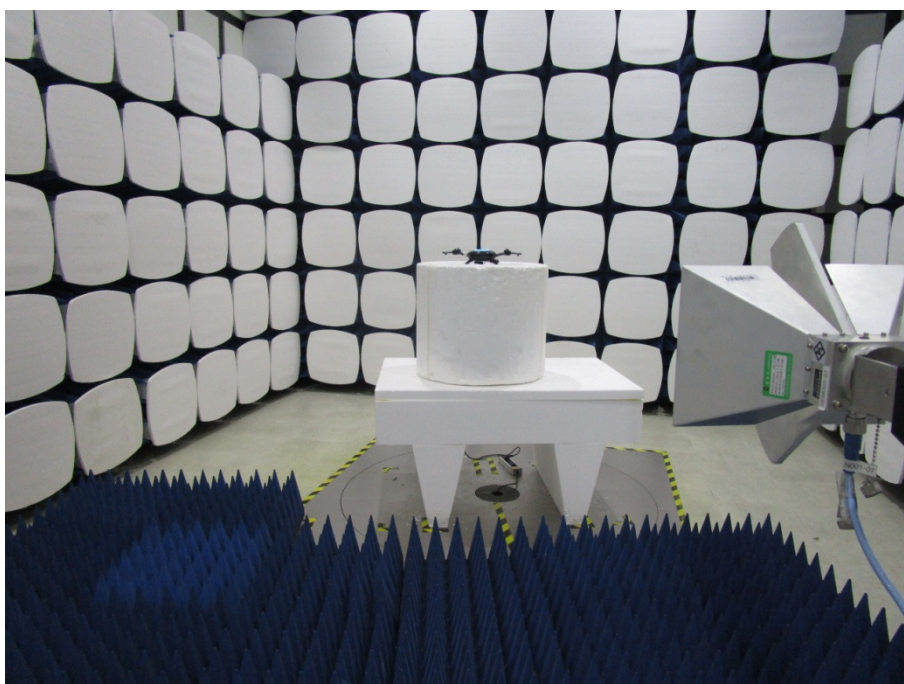
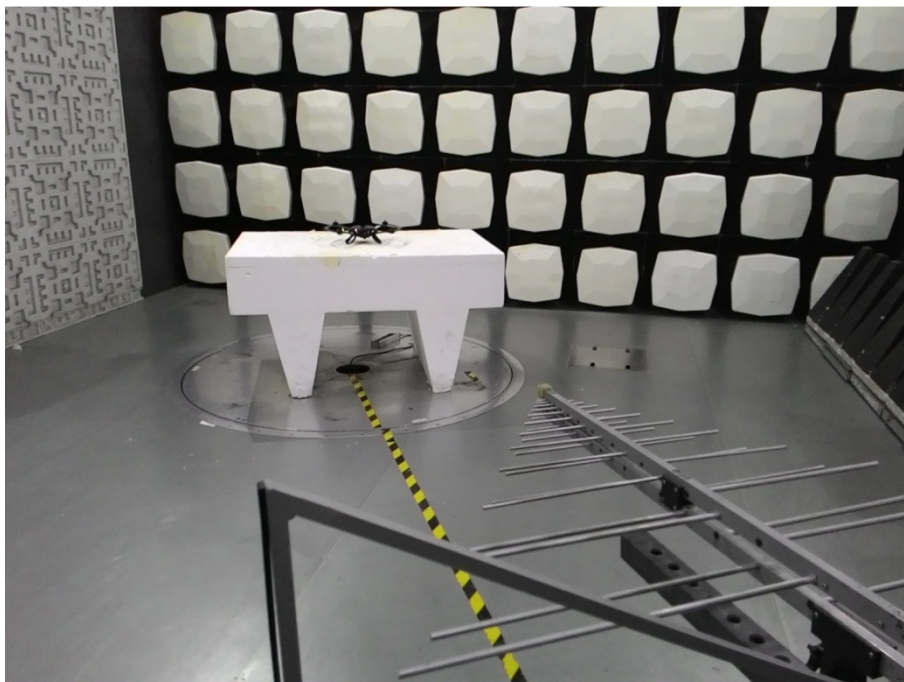
Test mode:		802.11n(HT20)	Frequency(MHz):	5825
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)		Result
35	11.40	5823.7393		Pass
25		5823.7400		Pass
15		5823.7401		Pass
5		5823.7397		Pass
0		5823.7389		Pass
20	10.80	5823.7394		Pass
	11.40	5823.7400		Pass
	13.05	5823.7403		Pass

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7 Photographs - EUT Test Setup

Test model No.: ORBTX2

7.1 Radiated Spurious Emission



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8 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1603001651CR.