



REPORT No.: SZ15120141W01

FCC RF TEST REPORT

APPLICANT : SHENZHEN ANTOP TECHNOLOGY CO.,LTD.

PRODUCT NAME : Router Antenna

MODEL NAME : MV-9818

TRADE NAME : N.A

BRAND NAME : N.A

FCC ID : 2AG6P09818

STANDARD(S) : 47 CFR Part 15 Subpart C

ISSUE DATE : 2016-01-20



SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

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Change History

Issue	Date	Reason for change
1.0	2016-01-20	First edition

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TEST REPORT DECLARATION

Applicant	SHENZHEN ANTOP TECHNOLOGY CO.,LTD.
Applicant Address	301, No.1 Workshop, Longqiaohua Industrial Zone, Luotian Forest Farm, Songgang Street, Baoan District, 518100 Shenzhen City, Guangdong Province, People's Republic Of China
Manufacturer	SHENZHEN ANTOP TECHNOLOGY CO.,LTD.
Manufacturer Address	301, No.1 Workshop, Longqiaohua Industrial Zone, Luotian Forest Farm, Songgang Street, Baoan District, 518100 Shenzhen City, Guangdong Province, People's Republic Of China
Product Name	Router Antenna
Model Name	MV-9818
Brand Name	N.A
HW Version	V1.0
SW Version	V1.0
Test Standards	47 CFR Part 15 Subpart C
Test Date	2015-12-23 to 2015-12-30
Test Result	PASS

Tested by : Zou Jian
Zou Jian(Test Engineer)

Reviewed by : Qiu Xiaojun
Qiu Xiaojun(RF Manager)

Approved by : Zeng Dexin
Zeng Dexin(Chief Engineer)

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1. TECHNICAL INFORMATION

Note: Provide by applicant.

1.1 Applicant Information

Company:	SHENZHEN ANTOP TECHNOLOGY CO.,LTD.
Address:	301, No.1 Workshop, Longqiaohua Industrial Zone, Luotian Forest Farm, Songgang Street, Baoan District, 518100 Shenzhen City, Guangdong Province, People's Republic Of China

1.2 Equipment under Test (EUT) Description

Brand Name:	N.A
Trade Name:	N.A
Model Name:	MV-9818
Frequency Range:	802.11b/g/n-20MHz: 2.412GHz - 2.462GHz 802.11n-40MHz: 2.422GHz - 2.452GHz
Channel Number:	802.11b/g/n-20MHz: 11 802.11n-40MHz: 7
Modulation Type:	DSSS, OFDM
Antenna Type:	Dedicated Antenna
Antenna Gain:	ANT 1: 5dBi ANT 2: 5dBi

NOTE:

1. The EUT is a Router Antenna, it contains WIFI operating at 2.4GHz ISM; it supports 802.11b, 802.11g, 802.11n and they are all tested in this report.
2. For 802.11b/g/n-20MHz (2.4GHz band), the frequencies allocated is F (MHz) = $2412+5*(n-1)$ ($1 \leq n \leq 11$). The lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 1 (2412MHz), 6 (2437MHz) and 11 (2462MHz).
3. For 802.11n-40MHz, the frequencies allocated is F (MHz) = $2412+5*(n-1)$ ($3 \leq n \leq 9$). The lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 3 (2422MHz), 6 (2437MHz) and 9 (2452MHz).
4. The duty cycle of the EUT is 100%.
5. The EUT has 2 antennas, the EUT incorporates a MIMO function.
6. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers (2T2R) for 2.4GHz band.



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Operation mode TX mode	1TX	2TX
802.11b	ANT 1 or ANT 2	
802.11g	ANT 1 or ANT 2	
802.11n(20MHz)		ANT 1 & ANT 2
802.11n(40MHz)		ANT 1 & ANT 2

According to KDB 662911 D01, the directional gain = $G_{ANT} + 10\log(N_{ANT})$ dBi, where G_{ANT} is the antenna gain in dBi, N_{ANT} is the number of outputs.

7. For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.
8. The antenna connector of EUT is designed with permanent attachment and no consideration of replacement.
9. This report recoded the worst case situation test data; the data of the test mode 802.11b/g recorded the worst test data of antenna 1.

1.2.1 Identification of all used EUTs

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the following two numerical characters indicate the software version of the test sample.

EUT Identity	Hardware Version	Software Version
A01	V1.0	V1.0



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1.3 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (Bluetooth, 2.4GHz ISM band radiators) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-13 Edition)	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Result
1	15.203	Antenna Requirement	N.A	<u>PASS</u>
2	15.247(b)	Peak Output Power	Dec 25, 2015	<u>PASS</u>
3	15.247(a)	Bandwidth	Dec 25, 2015	<u>PASS</u>
4	15.247(d)	Conducted Spurious Emission and Band Edge	Dec 25, 2015	<u>PASS</u>
5	15.247(d)	Restricted Frequency Bands	Dec 24, 2015	<u>PASS</u>
6	15.209 ,15.247(d)	Radiated Emission	Oct 28, 2015	<u>PASS</u>
7	15.247(e)	Power spectral density (PSD)	Dec 24, 2015& Dec 25, 2015	<u>PASS</u>

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10, 2013.

These RF tests were performed according to the method of measurements prescribed in KDB558074 D01 v03r03 (09/06/2015).

1.3.1 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106



2. 47 CFR PART 15C REQUIREMENTS

2.1 Antenna requirement

2.1.1 Applicable Standard

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

2.1.2 Result: Compliant

The maximum gain of antenna was defined by manufacturer. The max gain of the antenna1 is 5dBi, The max gain of the antenna2 is 5dBi. The antenna type is SMA Antenna.

For more info, please refer to the user manual.

2.2 Peak Output Power

2.2.1 Requirement

According to FCC section 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: The maximum peak conducted output power of the intentional radiator shall not exceed 1 Watt.

2.2.2 Test Description

The measured output power was calculated by the reading of the Power sensor and calibration.

A. Test Setup:



The EUT (Equipment under the test) which is coupled to the Power sensor; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading, all test result in Power sensor.

B. Equipments List:

Please reference ANNEX A(1.4).



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2.2.3 Test Result

The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the EUT.

2.2.3.1 802.11b Test Mode

Peak power:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	20.82	0.12078	30	1	PASS
6	2437	19.12	0.08166			PASS
11	2462	19.11	0.08147			PASS

Average power:

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	17.45	0.05559	30	1	PASS
6	2437	15.61	0.03639			PASS
11	2462	15.65	0.03673			PASS

2.2.3.2 802.11g Test mode

Peak power:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	22.12	0.16293	30	1	PASS
6	2437	21.78	0.15066			PASS
11	2462	21.31	0.13521			PASS

Average power:

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	12.89	0.01945	30	1	PASS
6	2437	12.15	0.01641			PASS
11	2462	12.85	0.01928			PASS



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2.2.3.3 802.11n-20MHz Test mode

Peak power:

ANT 1:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	21.18	0.13122	30	1	PASS
6	2437	20.05	0.10116			PASS
11	2462	19.54	0.08995			PASS

ANT 2:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	20.52	0.11272	30	1	PASS
6	2437	20.82	0.12078			PASS
11	2462	19.42	0.08750			PASS

ANT 1+ANT 2:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	23.87	0.24394	30	1	PASS
6	2437	23.46	0.22194			PASS
11	2462	22.49	0.17745			PASS

Average power:

ANT 1:

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	13.68	0.02333	30	1	PASS
6	2437	12.24	0.01675			PASS
11	2462	12.52	0.01786			PASS

ANT 2:

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	12.24	0.01675	30	1	PASS
6	2437	13.05	0.02018			PASS
11	2462	10.71	0.01178			PASS



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ANT 1+ANT 2:

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	16.03	0.04008	30	1	PASS
6	2437	15.67	0.03693			PASS
11	2462	14.72	0.02964			PASS

2.2.3.4 802.11n-40MHz Test mode

Peak power:

ANT 1:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	18.65	0.07328	30	1	PASS
6	2437	18.95	0.07852			PASS
9	2452	19.21	0.08337			PASS

ANT 2:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	19.58	0.09078	30	1	PASS
6	2437	19.89	0.09750			PASS
9	2452	19.36	0.08630			PASS

ANT 1+ANT 2:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	22.15	0.16406	30	1	PASS
6	2437	22.46	0.17602			PASS
9	2452	22.30	0.16967			PASS

Average power:

ANT 1:

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	11.15	0.01303	30	1	PASS
6	2437	11.58	0.01439			PASS
9	2452	11.62	0.01452			PASS



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ANT 2:

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	11.91	0.01552	30	1	PASS
6	2437	12.08	0.01614			PASS
9	2452	11.79	0.01510			PASS

ANT 1+ANT 2:

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	14.56	0.02856	30	1	PASS
6	2437	14.85	0.03053			PASS
9	2452	14.72	0.02962			PASS

Note: Each antenna port was measured individually, and the aggregated power was summed mathematically.

Remark:

- 1) The MIMO test requirement, RF conducted output power shall measure each transmitter chain. And after obtain each individual transmitter chain power, then sum the output power by using the following formula;
 $((\text{dBm}/\text{Chain 1})/10^{\text{Log}}) + (\text{dBm}/\text{Chain 2})/10^{\text{Log}}) + (\text{dBm}/\text{Chain N})/10^{\text{Log}}) = \text{Combined peak output power in mW.}$



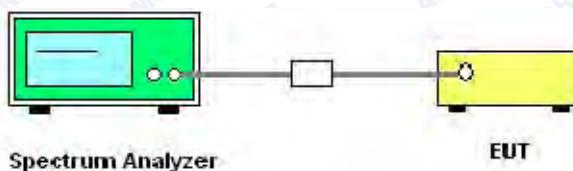
2.3 Bandwidth

2.3.1 Requirement

According to FCC section 15.247(a) (2), Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

2.3.2 Test Description

A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ω; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

B. Equipments List:

Please reference ANNEX A(1.4).

2.3.3 Test Result

The lowest, middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the EUT.

2.3.3.1 802.11b Test mode

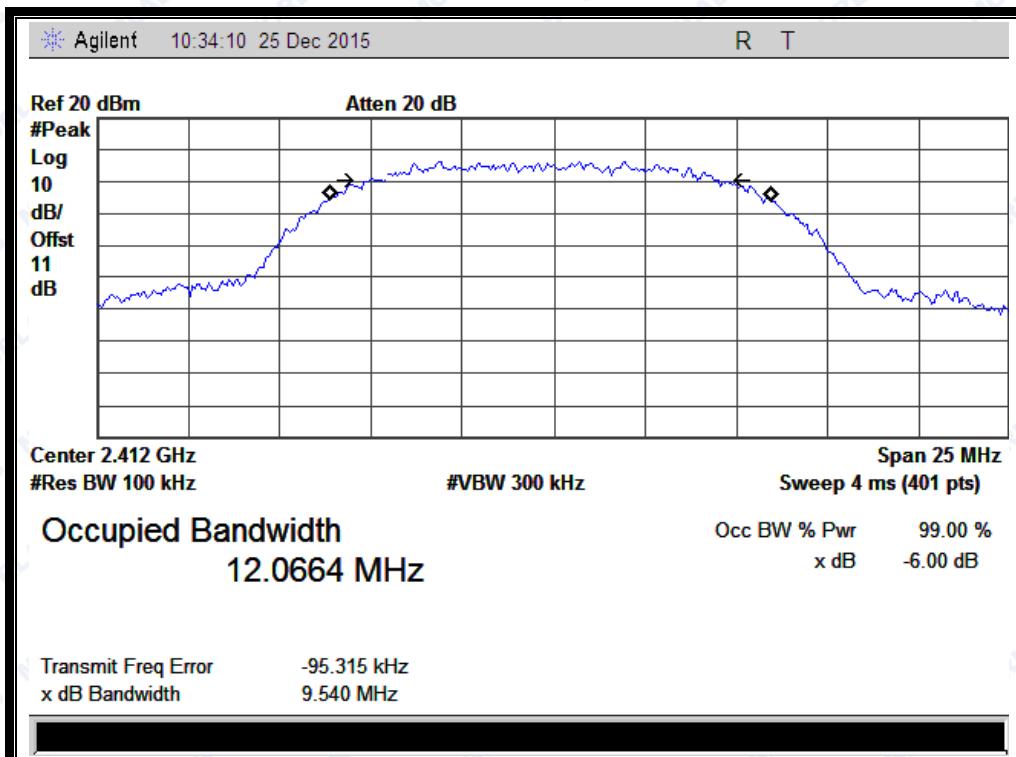
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	9.54	≥500	PASS
6	2437	9.29	≥500	PASS
11	2462	9.56	≥500	PASS

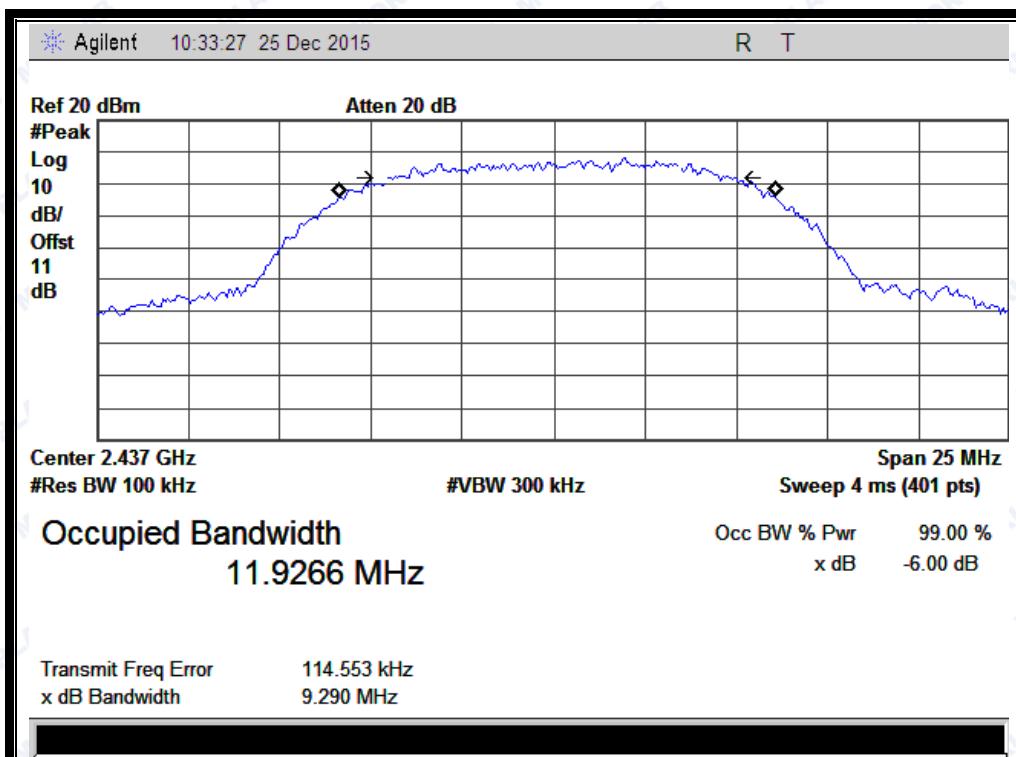
B. Test Plots



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(Channel 1: 2412MHz @ 802.11b)



(Channel 6: 2437 MHz @ 802.11b)

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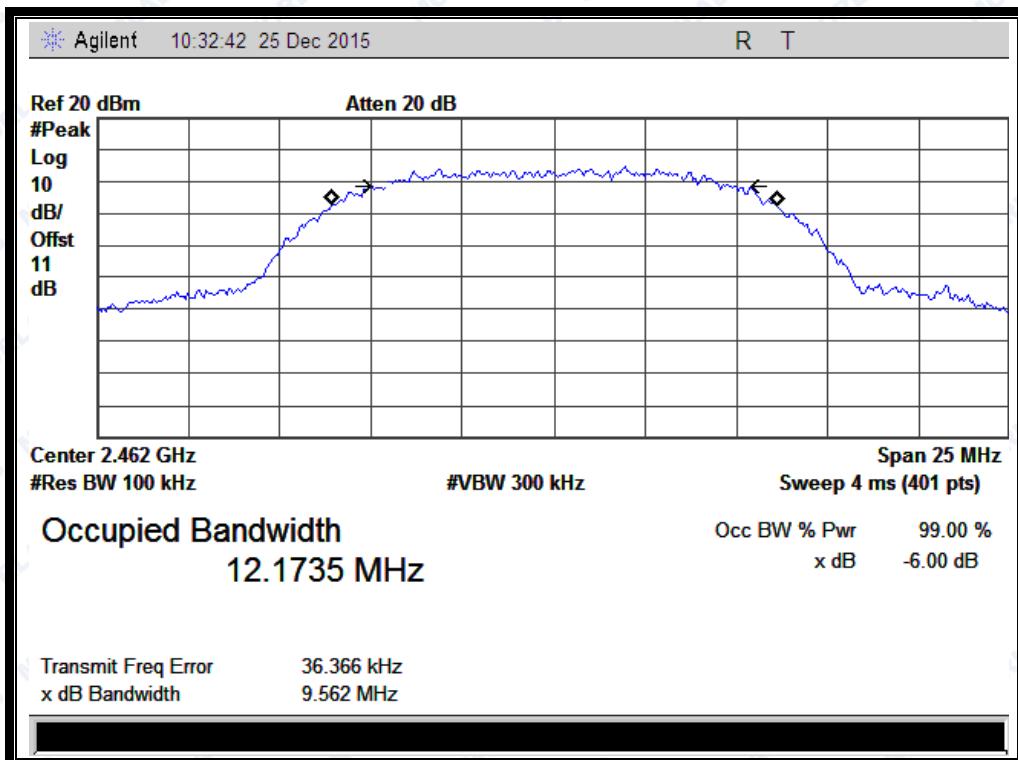
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(Channel 11: 2462MHz @ 802.11b)

2.3.3.2 802.11g Test mode

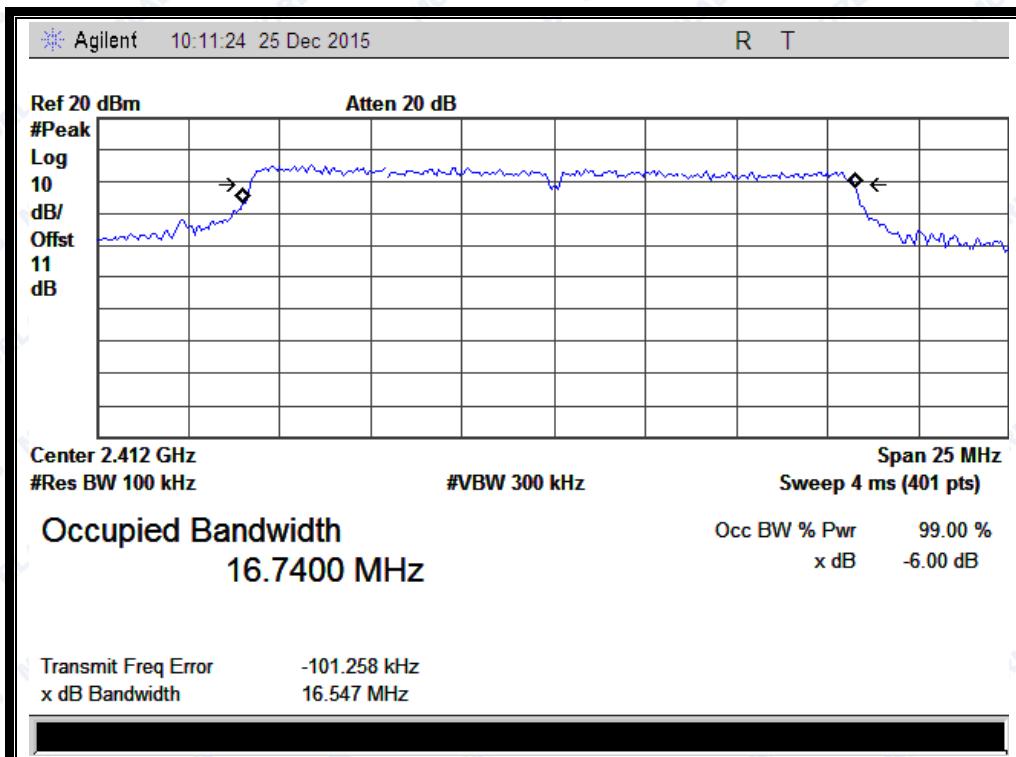
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	16.55	≥500	PASS
6	2437	16.55	≥500	PASS
11	2462	16.61	≥500	PASS

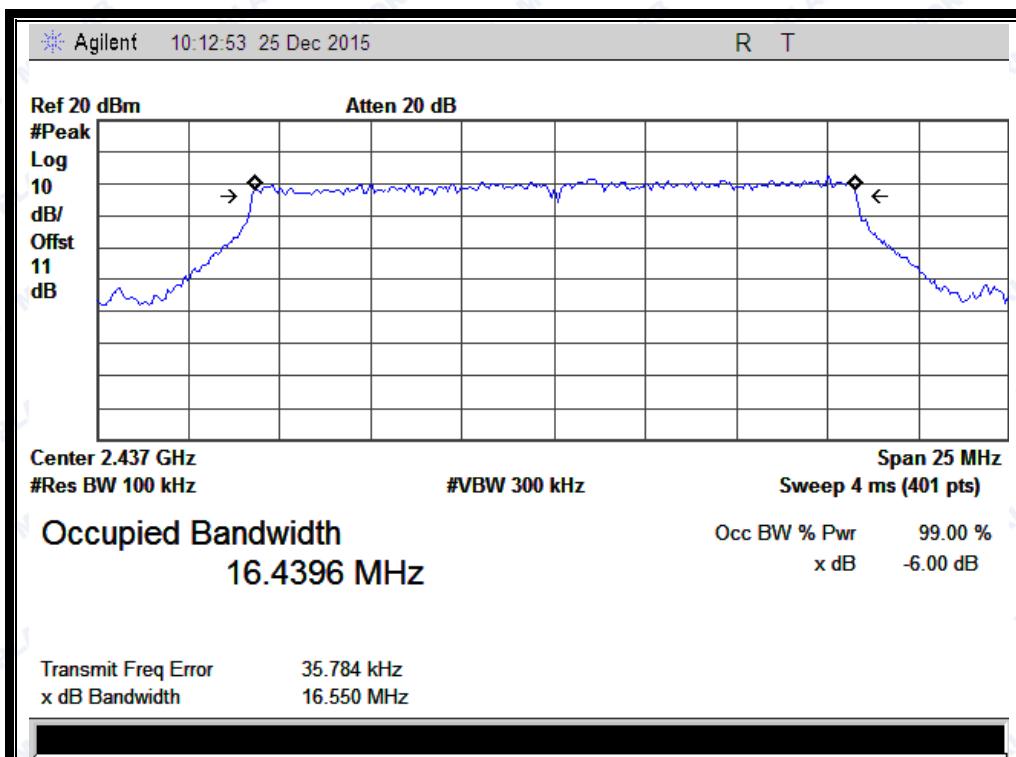
B. Test Plots:



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(Channel 1: 2412MHz @ 802.11g)



(Channel 6: 2437MHz @ 802.11g)

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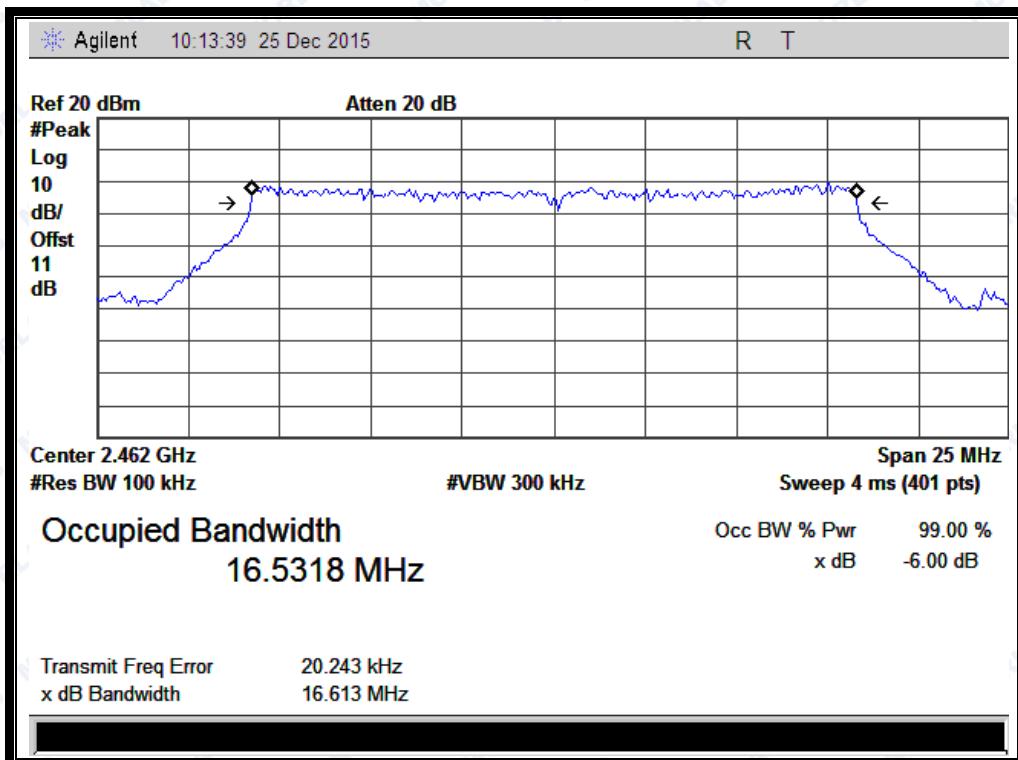
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(Channel 11: 2462MHz @ 802.11g)

2.3.3.3 802.11n-20 Test mode

ANT 1:

B. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	17.72	≥500	PASS
6	2437	17.75	≥500	PASS
11	2462	17.80	≥500	PASS

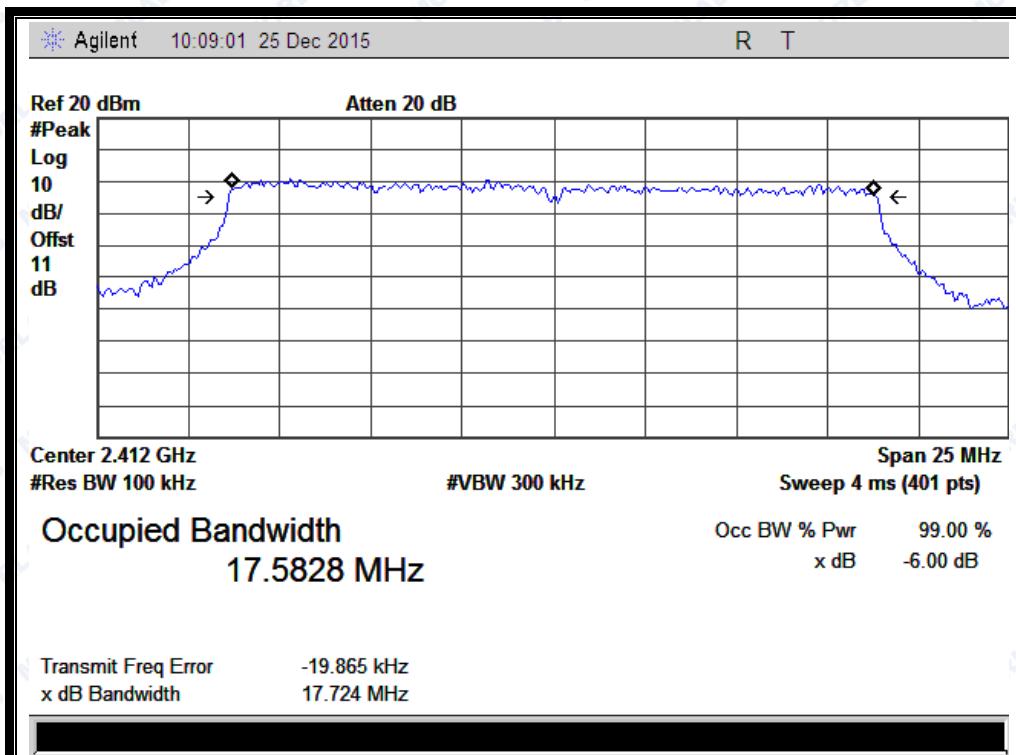
B. Test Plots:

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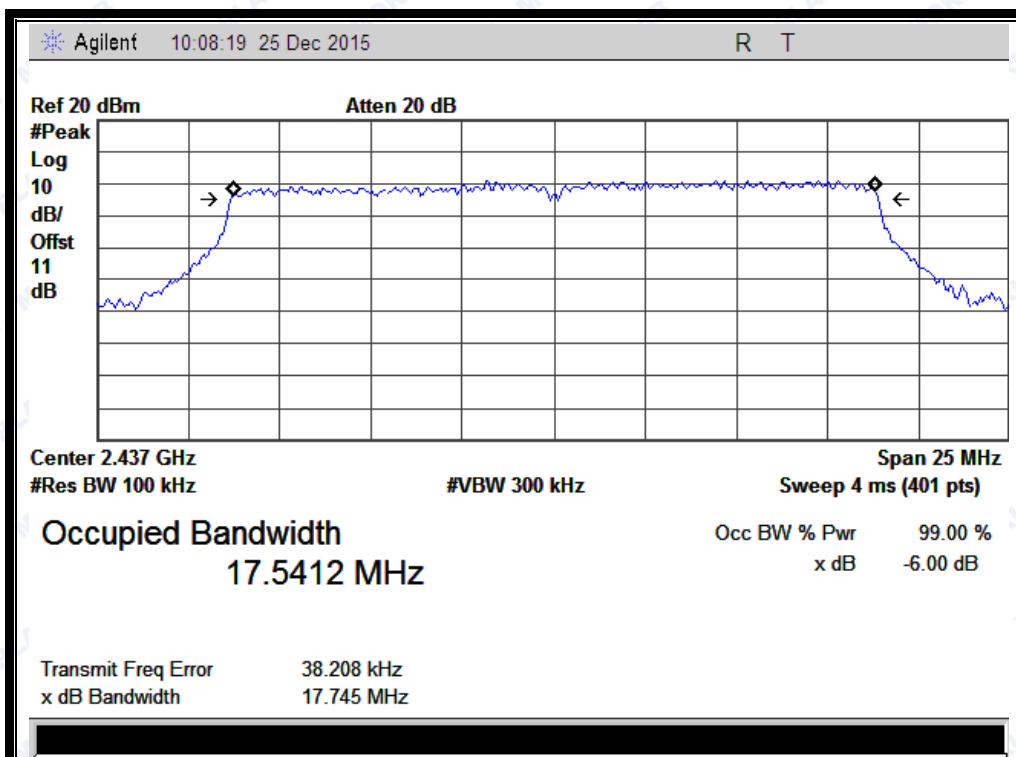
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(Channel 1: 2412MHz @ 802.11n-20)



(Channel 6: 2437MHz @ 802.11n-20)

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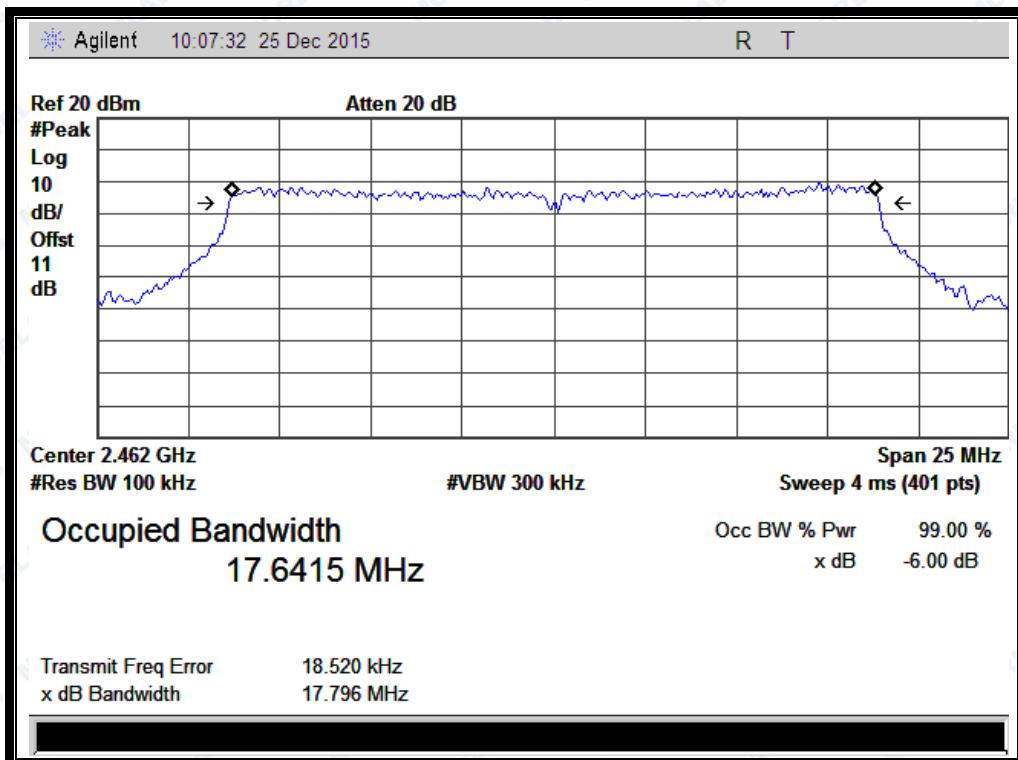
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(Channel 11: 2462MHz @ 802.11n-20)

ANT 2:

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	17.73	≥500	PASS
6	2437	17.81	≥500	PASS
11	2462	17.37	≥500	PASS

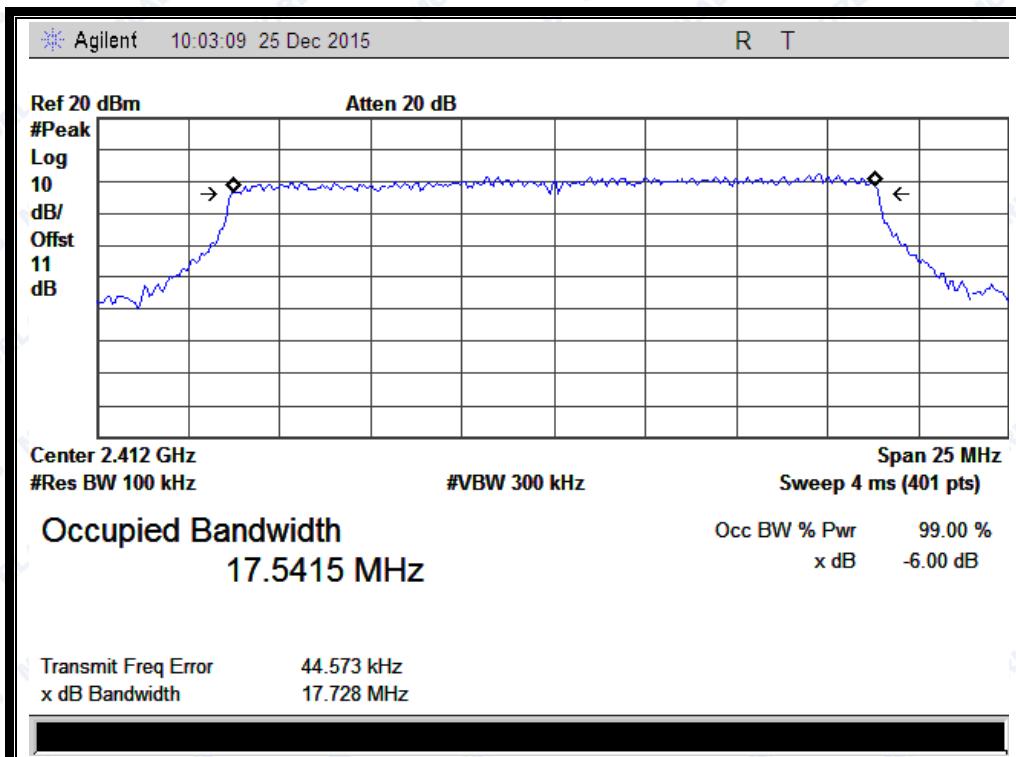
B. Test Plots

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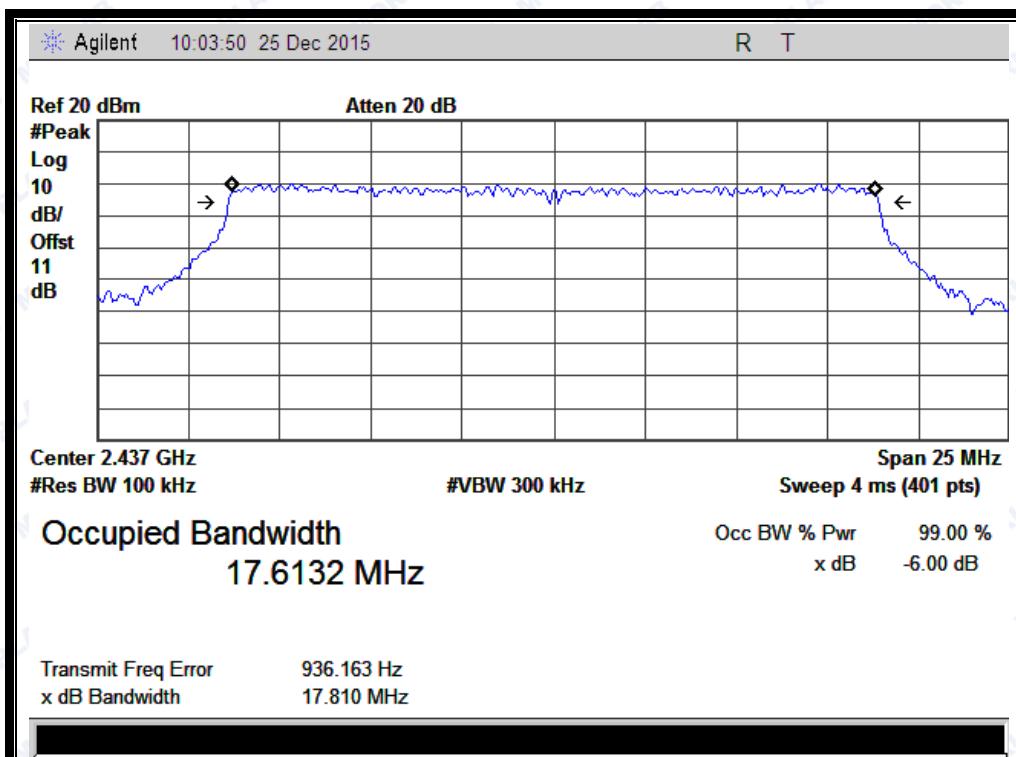
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(Channel 1: 2412MHz @ 802.11 n-20)



(Channel 6: 2437 MHz @ 802.11 n-20)

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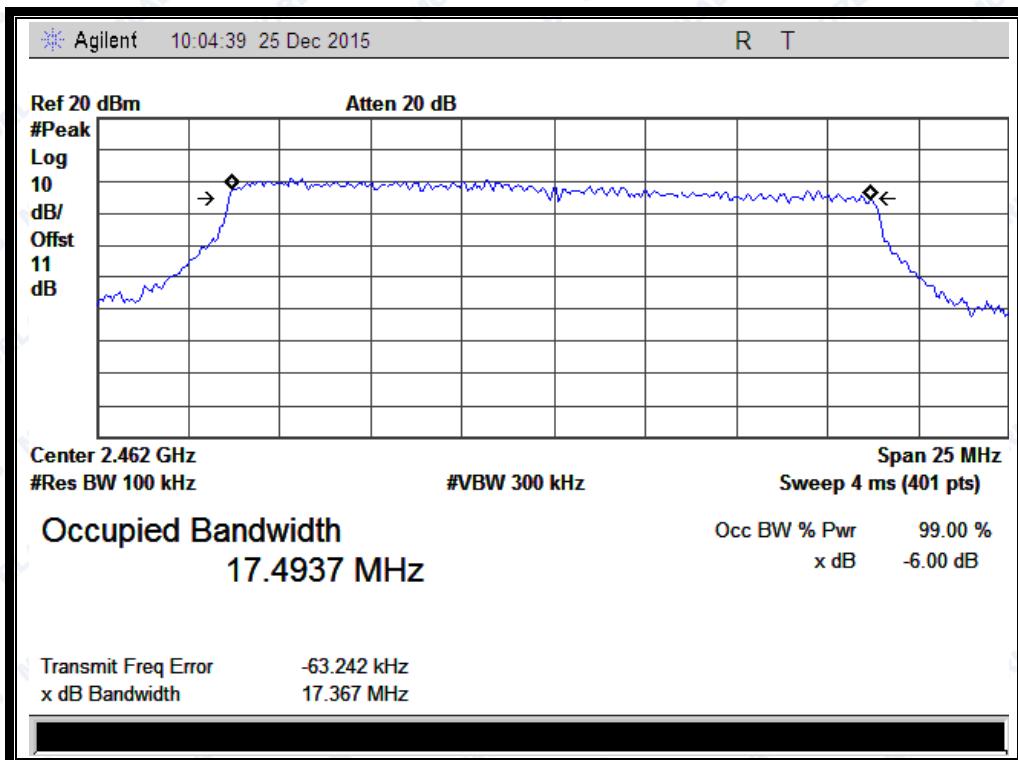
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(Channel 11: 2462MHz @ 802.11 n-20)

2.3.3.4 802.11n-40 Test mode

ANT 1:

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
3	2422	36.58	≥500	PASS
6	2437	36.36	≥500	PASS
9	2452	36.51	≥500	PASS

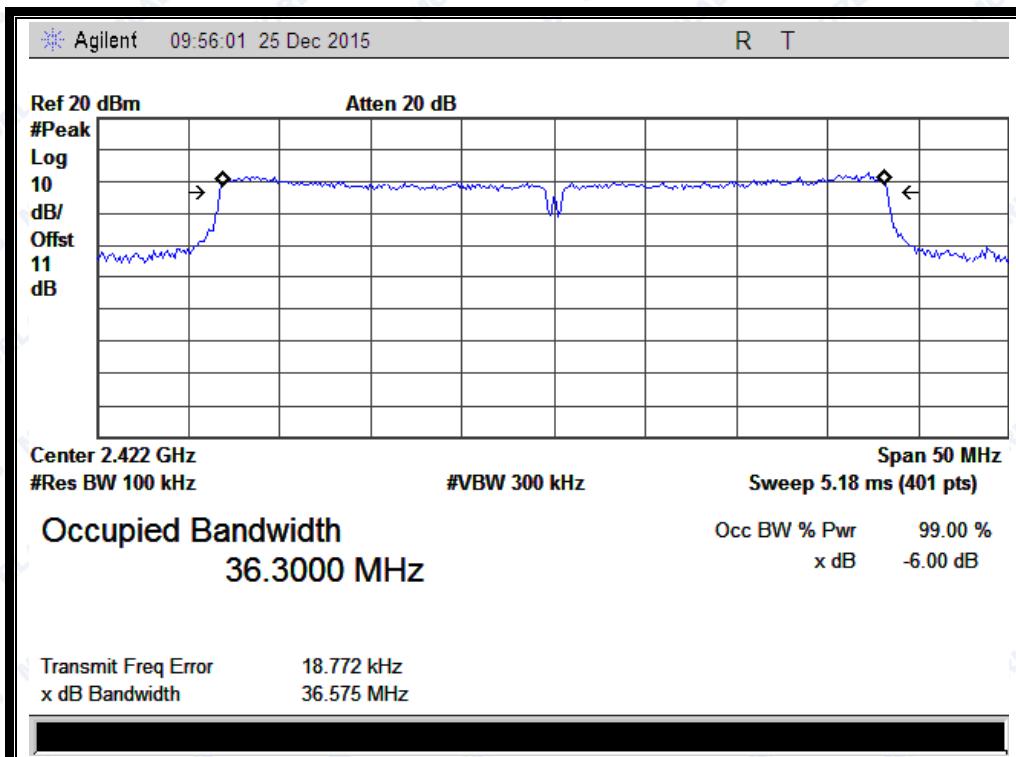
B. Test Plots:

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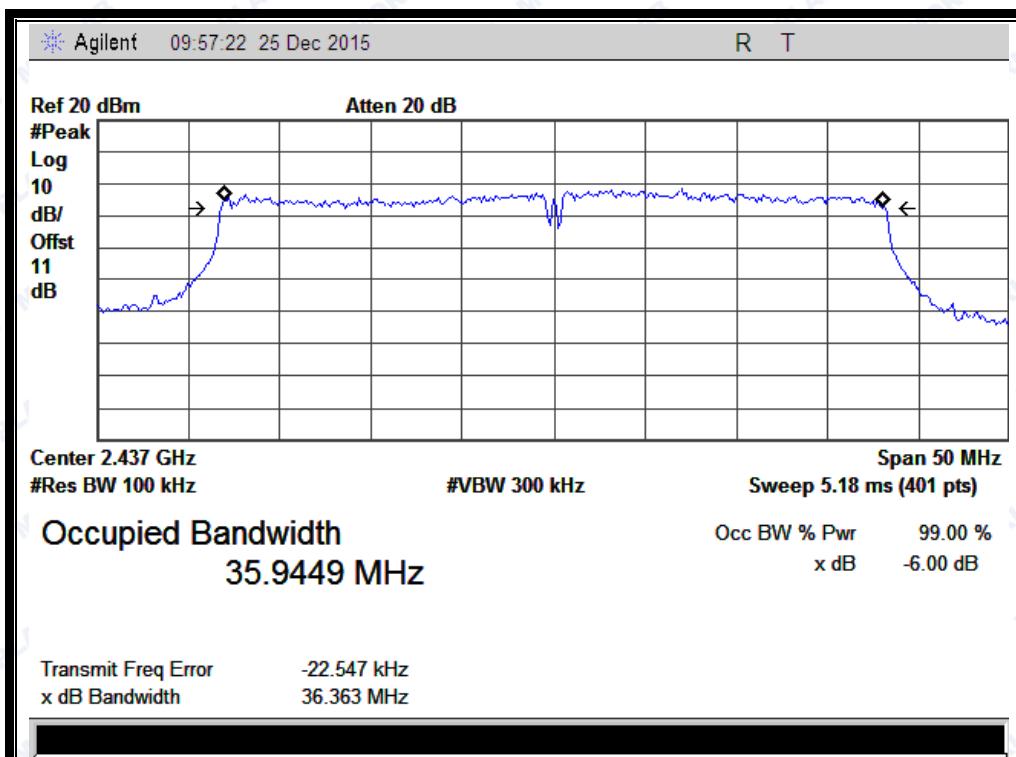
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(Channel 3: 2422MHz @ 802.11n-40)



(Channel 6: 2437MHz @ 802.11n-40)

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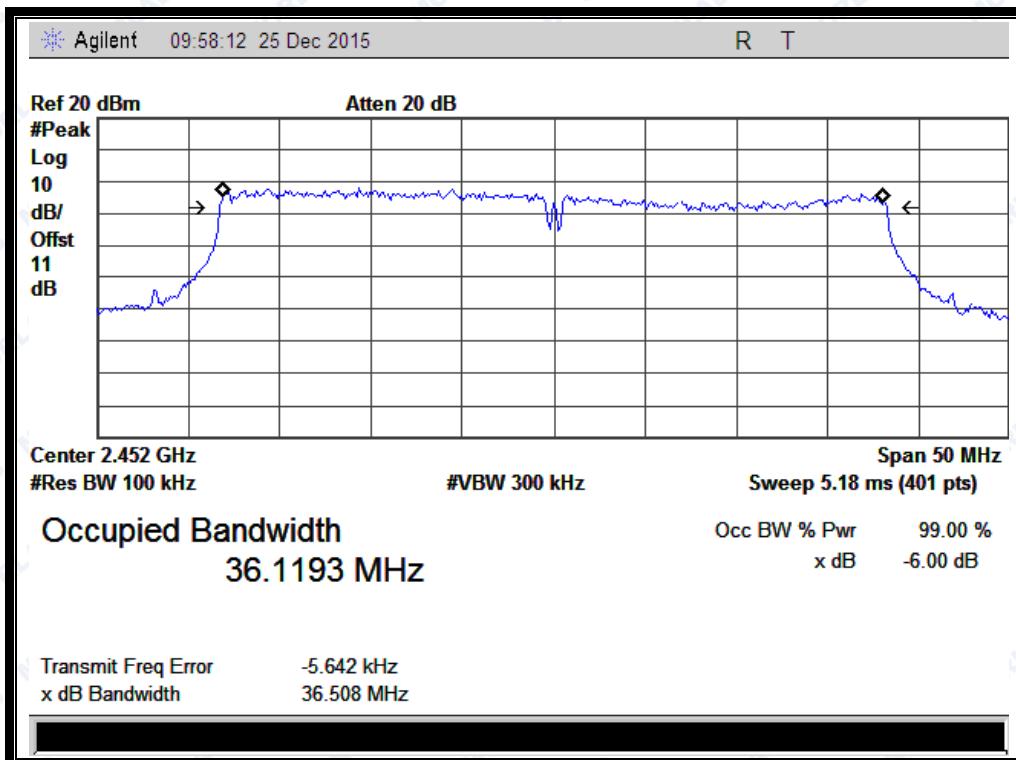
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REPORT No.: SZ15120141W01



(Channel 9: 2452MHz @ 802.11n-40)

ANT 2:

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
3	2422	36.29	≥500	PASS
6	2437	36.52	≥500	PASS
9	2452	35.13	≥500	PASS

B. Test Plots

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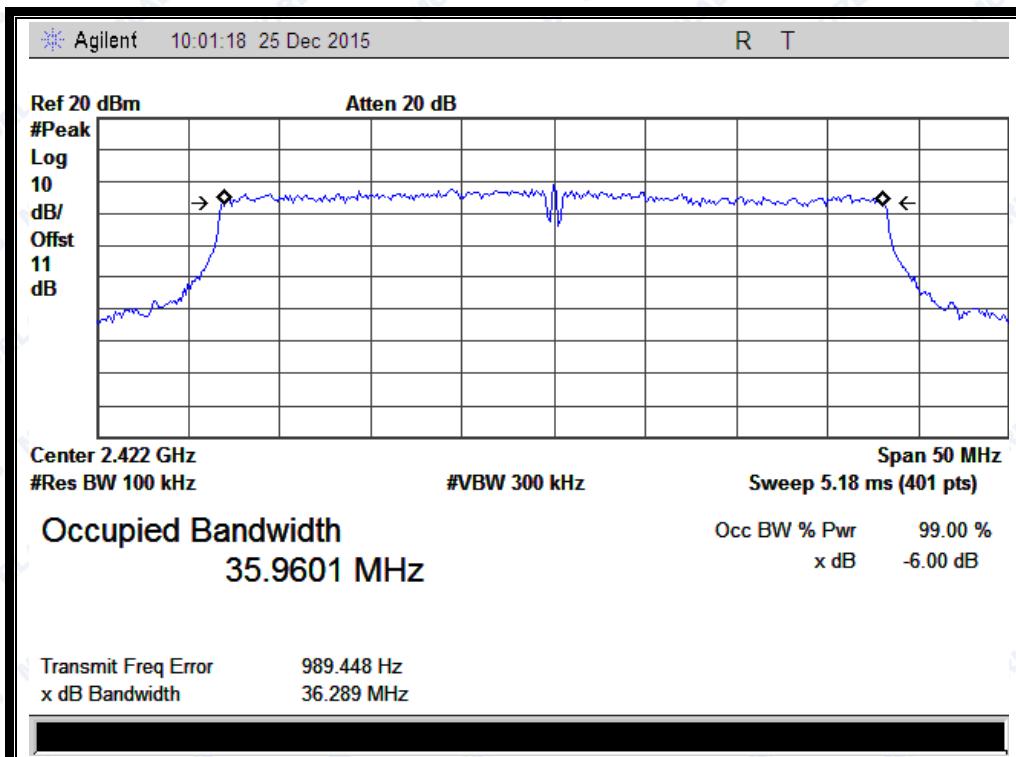
Http://www.morlab.com

Fax: 86-755-36698525

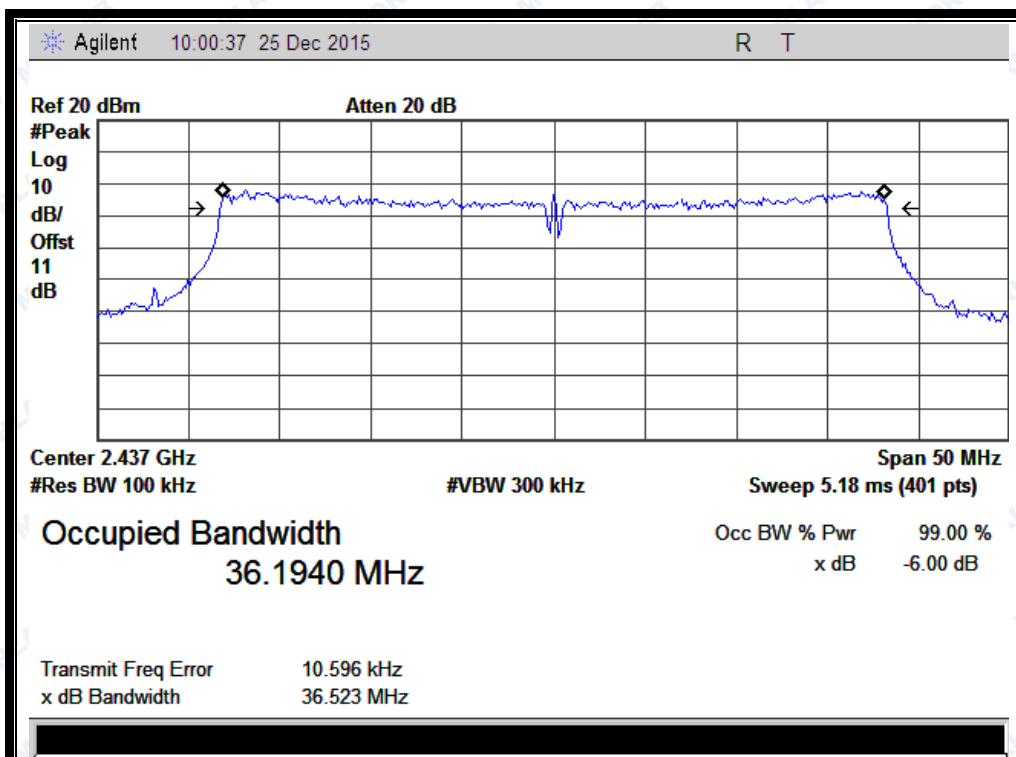
E-mail: service@morlab.cn



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(Channel 1: 2412MHz @ 802.11 n-40)



(Channel 6: 2437 MHz @ 802.11 n-40)

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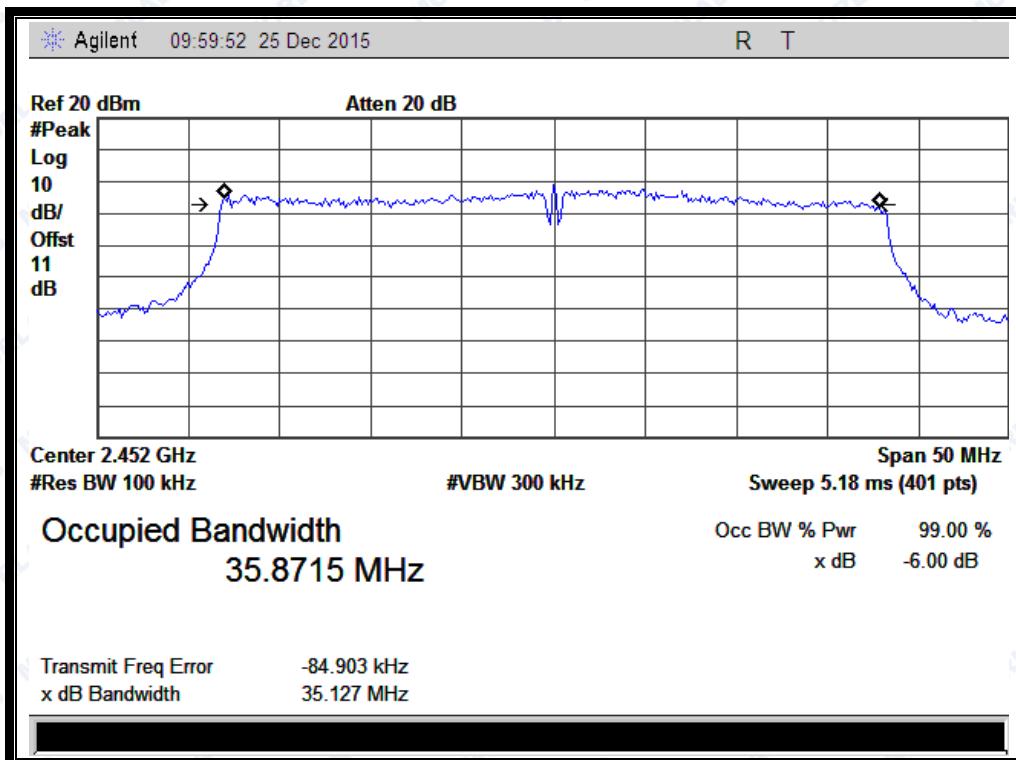
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

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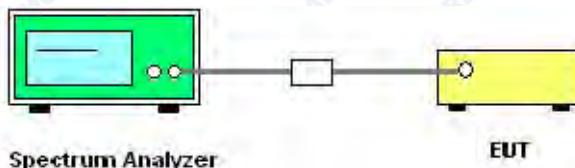
2.4 Conducted Spurious Emissions and Band Edge

2.4.1 Requirement

According to FCC section 15.247(c), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

2.4.2 Test Description

A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

C. Equipments List:

Please reference ANNEX A(1.4).

2.4.3 Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.



REPORT No.: SZ15120141W01

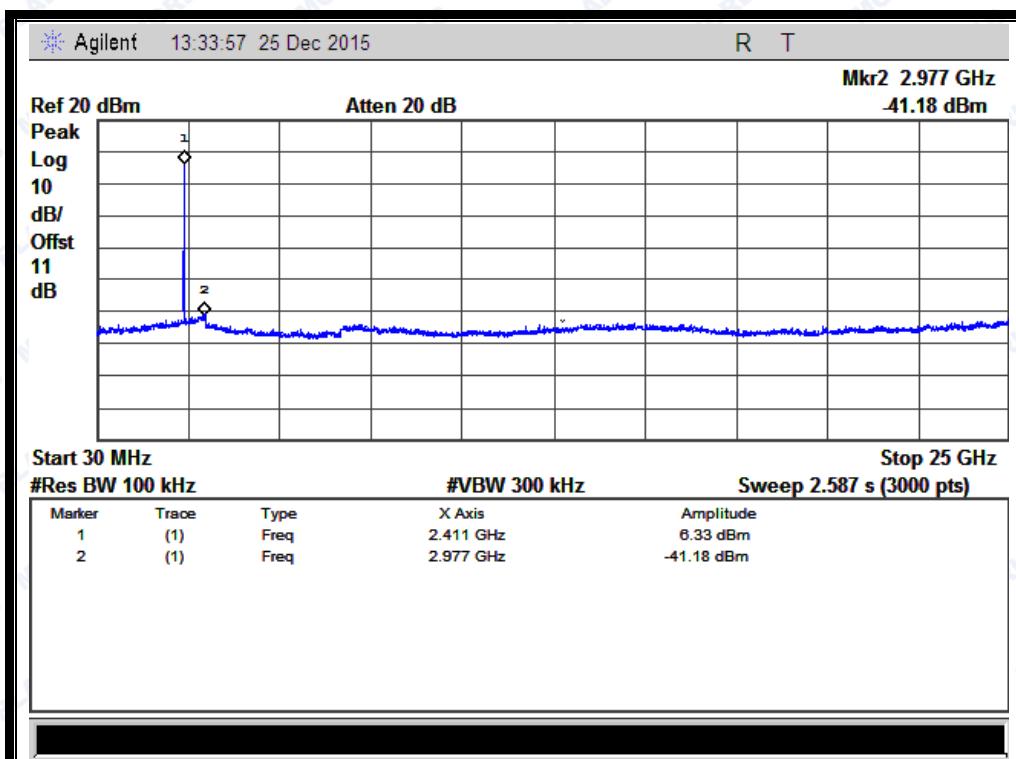
2.4.3.1 802.11b Test mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-41.18	6.33	-13.67	PASS
6	2437	-40.97	7.73	-12.27	PASS
11	2462	-42.3	4.88	-15.12	PASS

B. Test Plots:

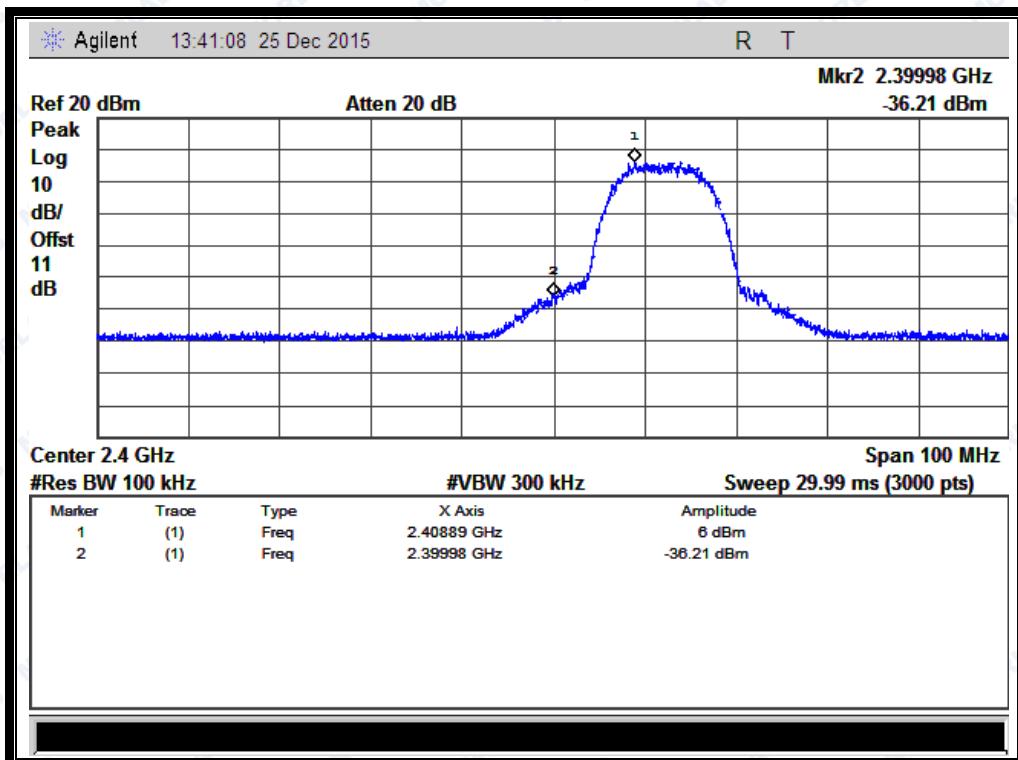
Note: the power of the EUT transmitting frequency should be ignored.



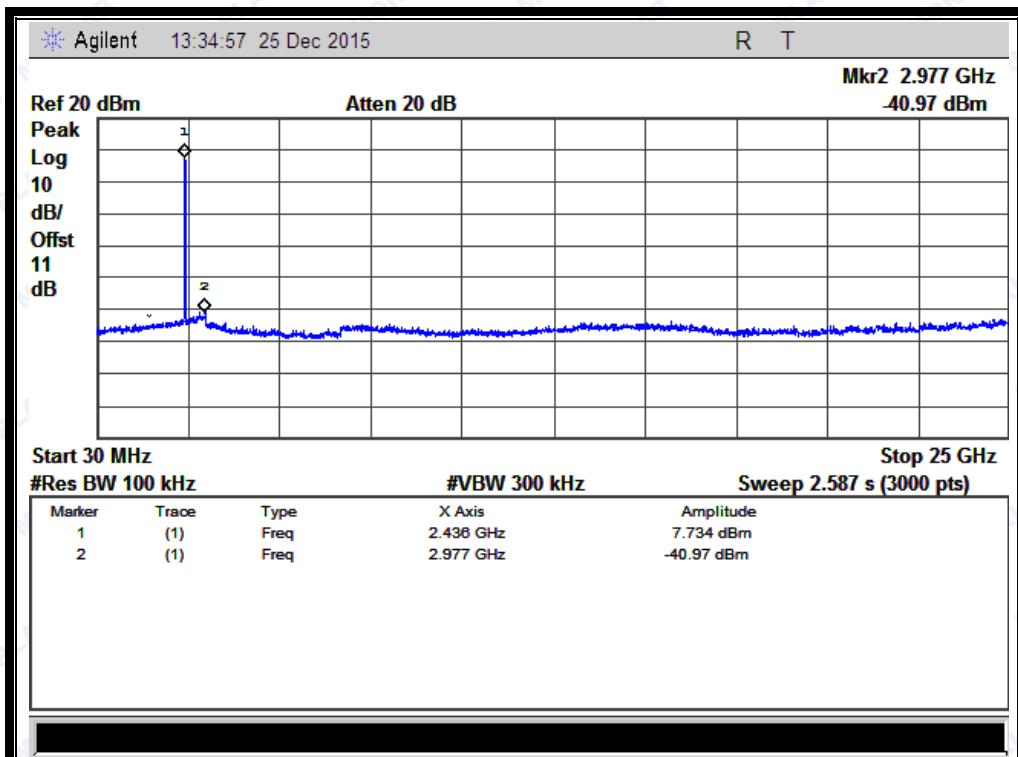
(Channel = 1, 30MHz to 25GHz)



REPORT No.: SZ15120141W01



(Band Edge @ Channel = 1)



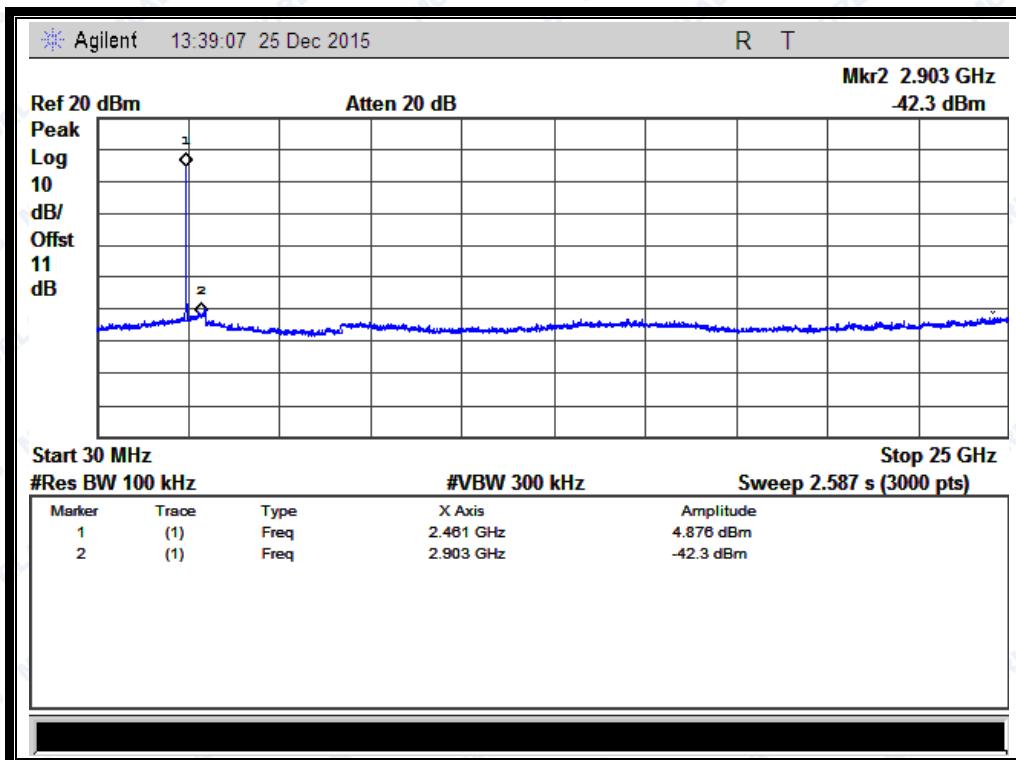
(Channel = 6, 30MHz to 25GHz)

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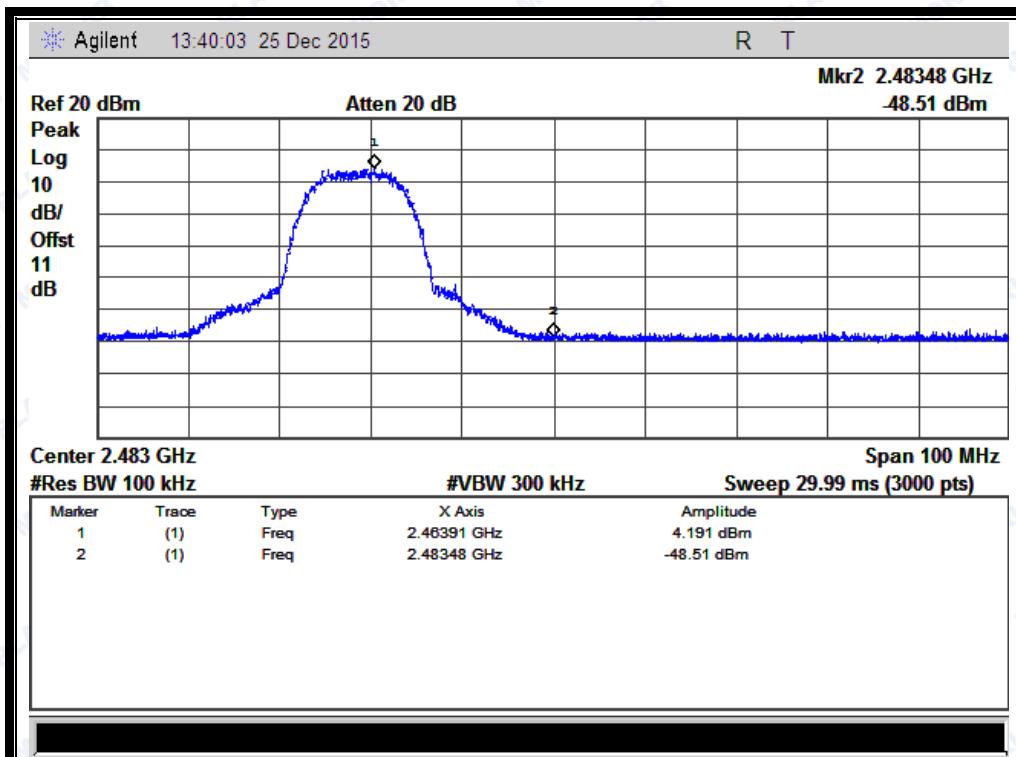
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(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)

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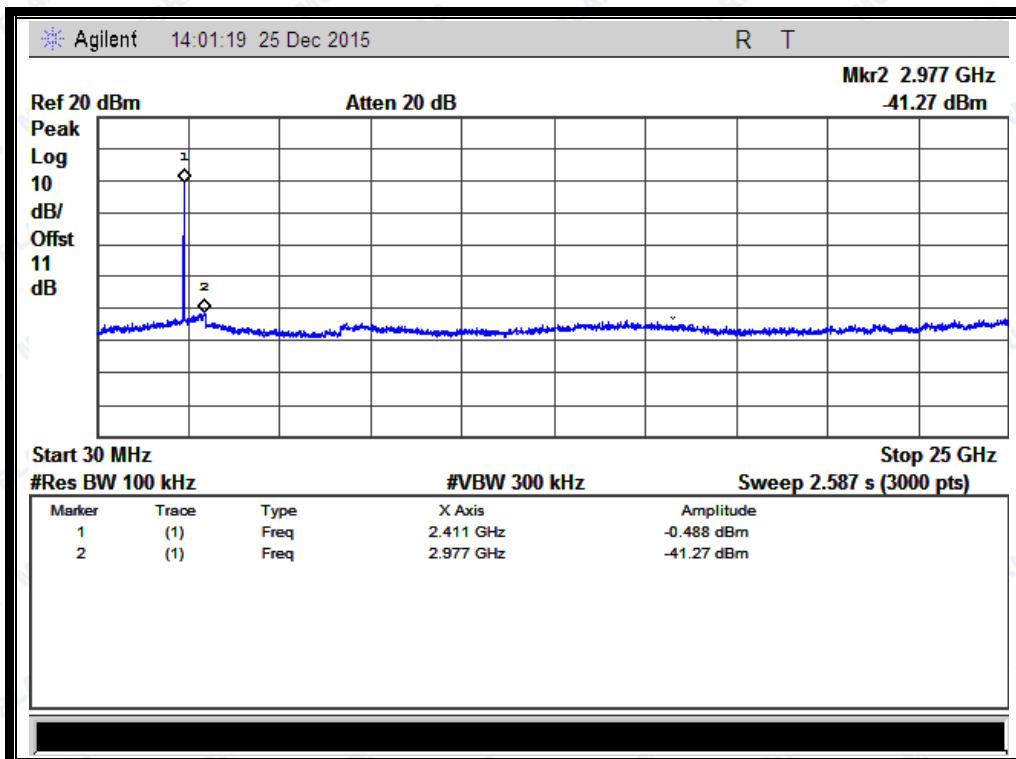
2.4.3.2 802.11g Test mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-41.27	-0.49	-20.49	PASS
6	2437	-41.35	-0.22	-20.22	PASS
11	2462	-41.4	-1.45	-21.45	PASS

B. Test Plots:

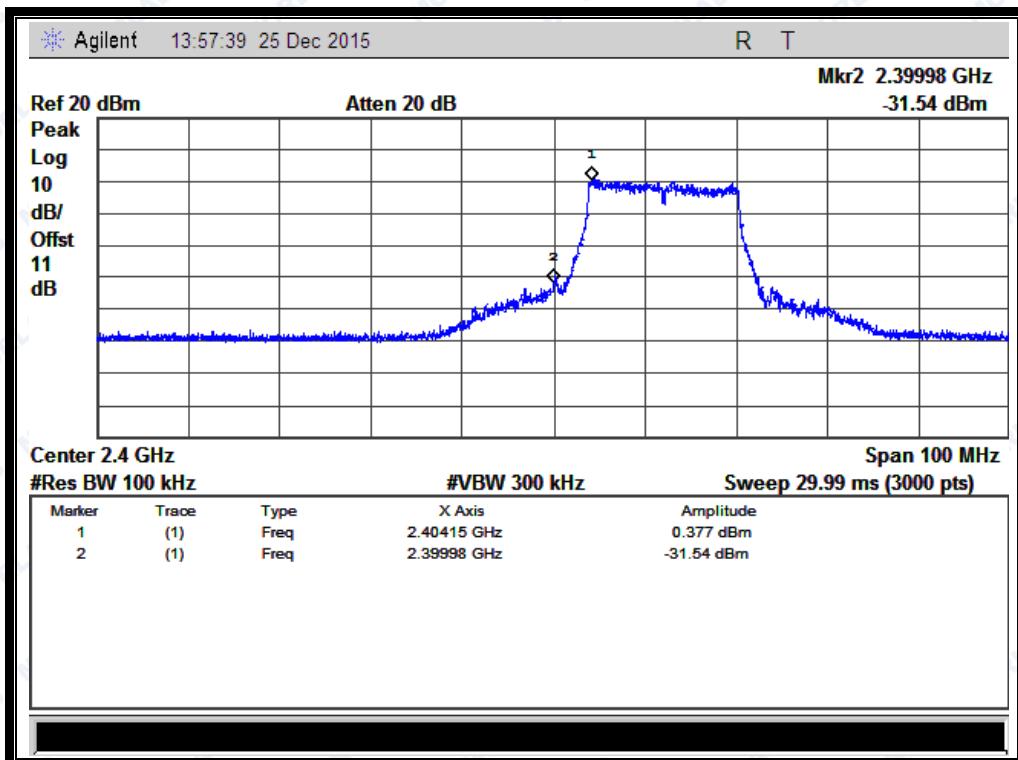
Note: the power of the EUT transmitting frequency should be ignored.



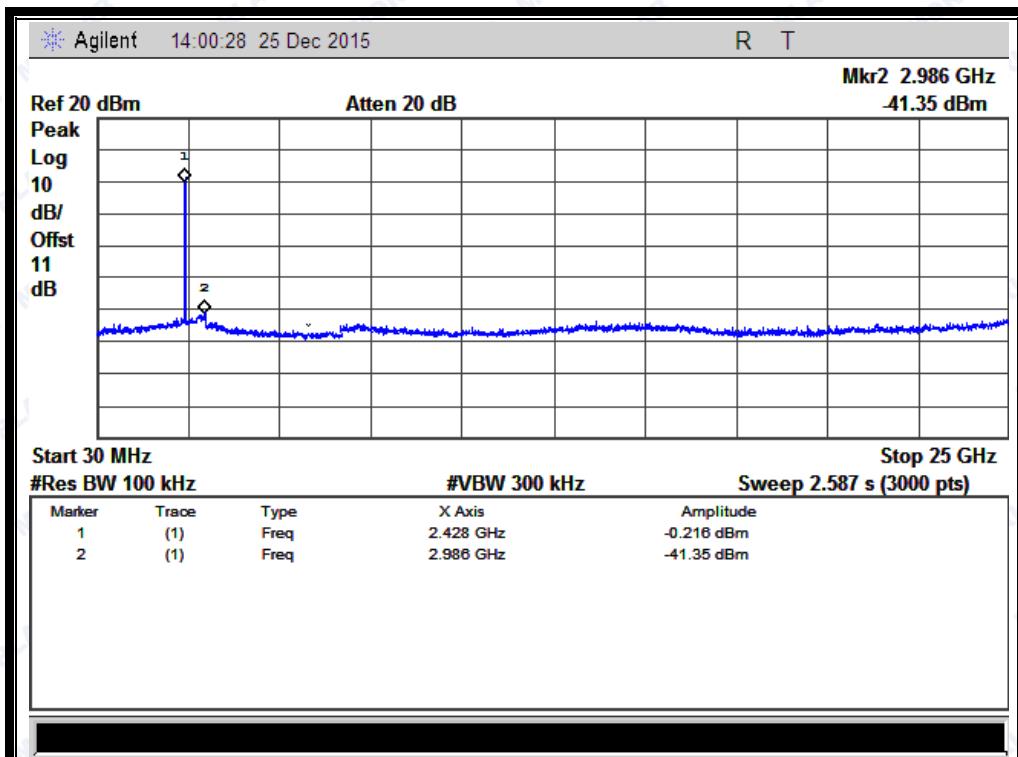
(Channel = 1, 30MHz to 25GHz)



REPORT No.: SZ15120141W01



(Band Edge @ Channel = 1)



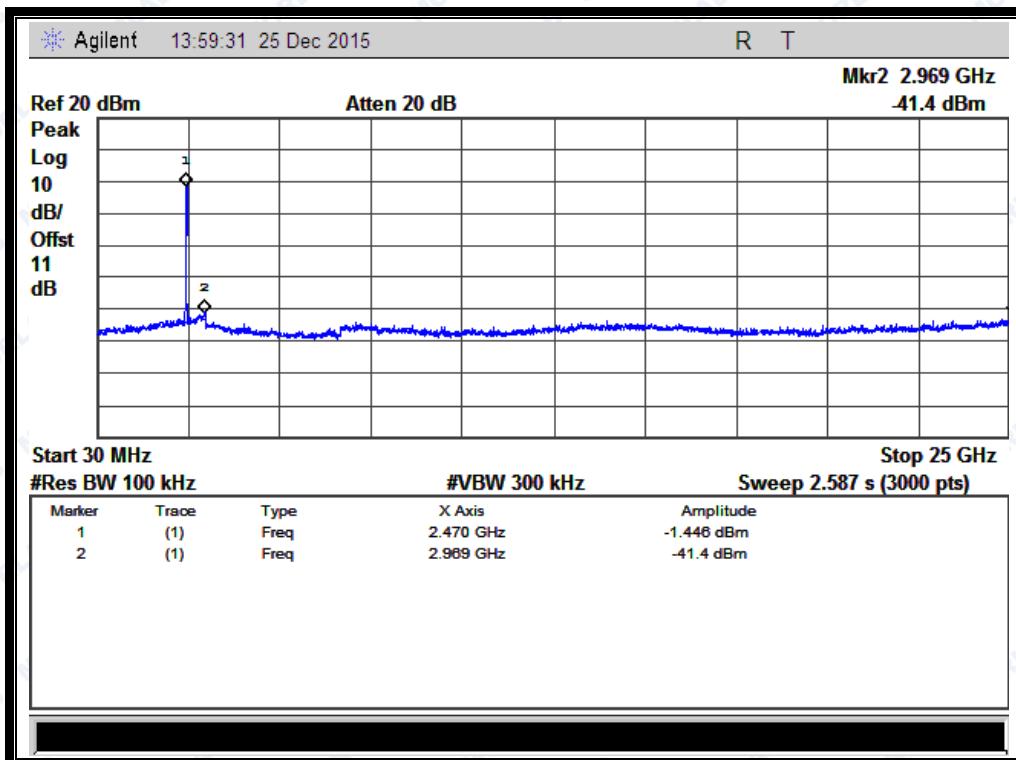
(Channel = 6, 30MHz to 25GHz)

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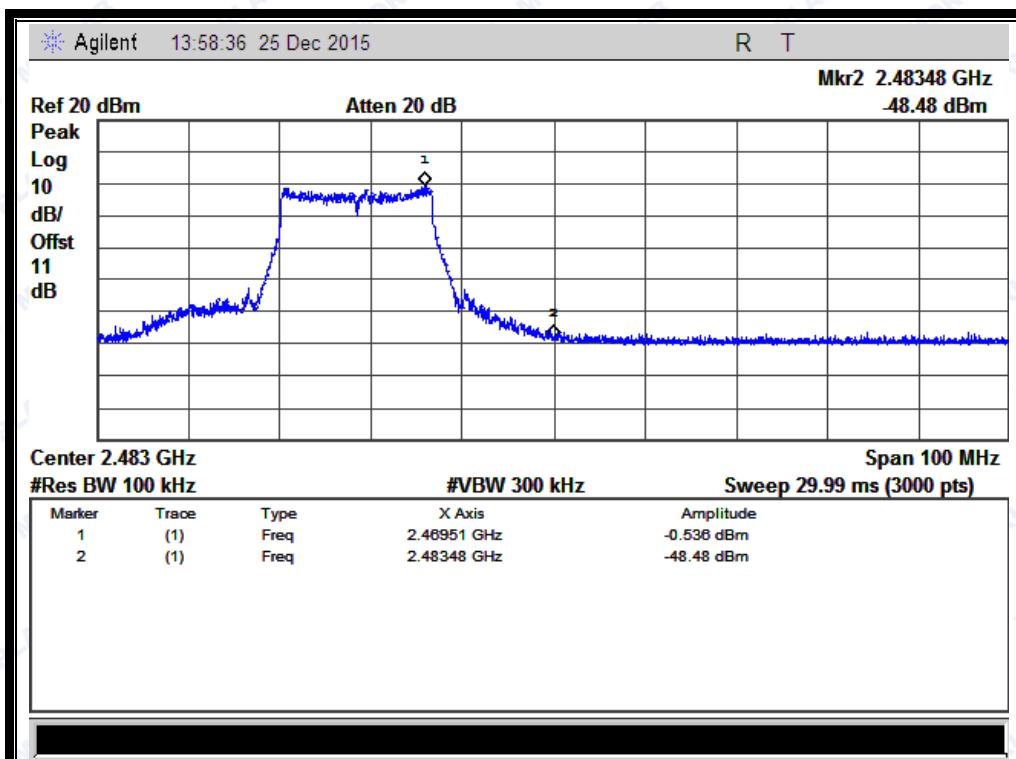
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(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)

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2.4.3.3 802.11n -20MHz Test mode

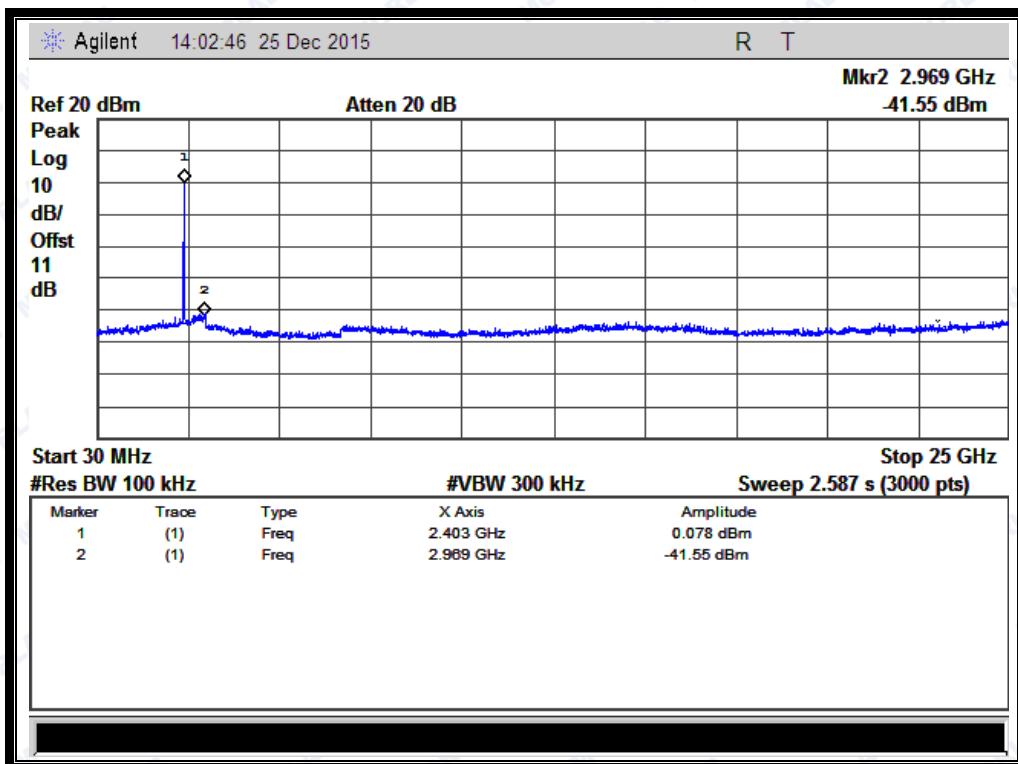
ANT 1:

A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-41.55	0.08	-19.92	PASS
6	2437	-40.53	0.41	-19.59	PASS
11	2462	-42.9	-2.28	-22.28	PASS

B. Test Plots:

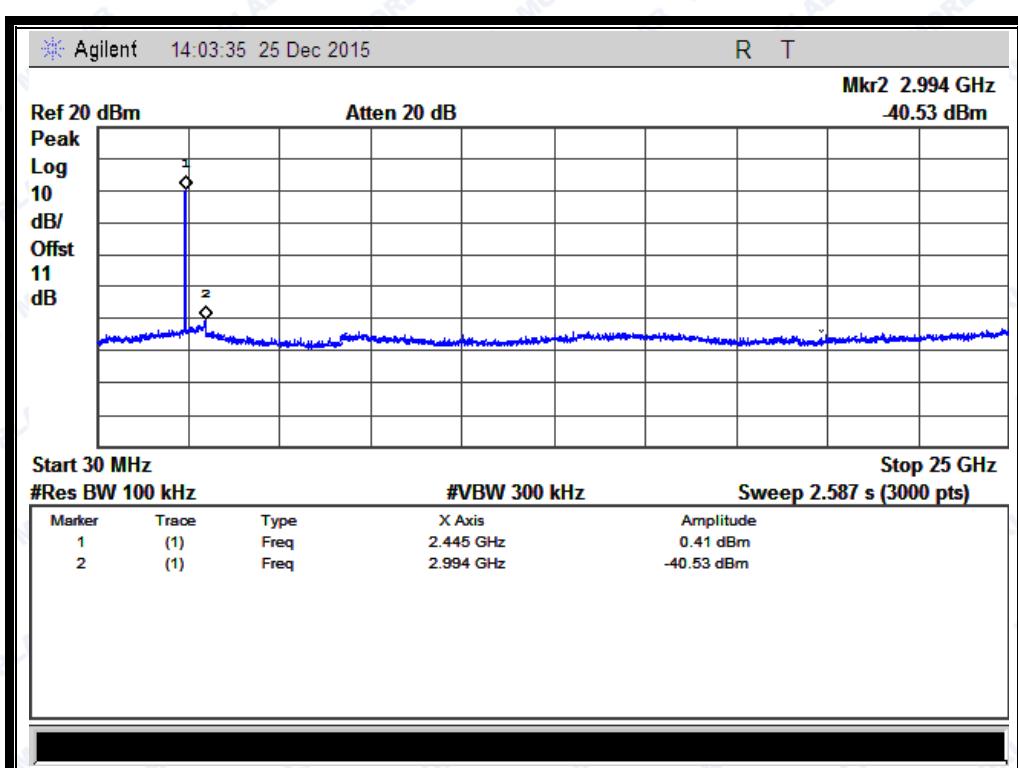
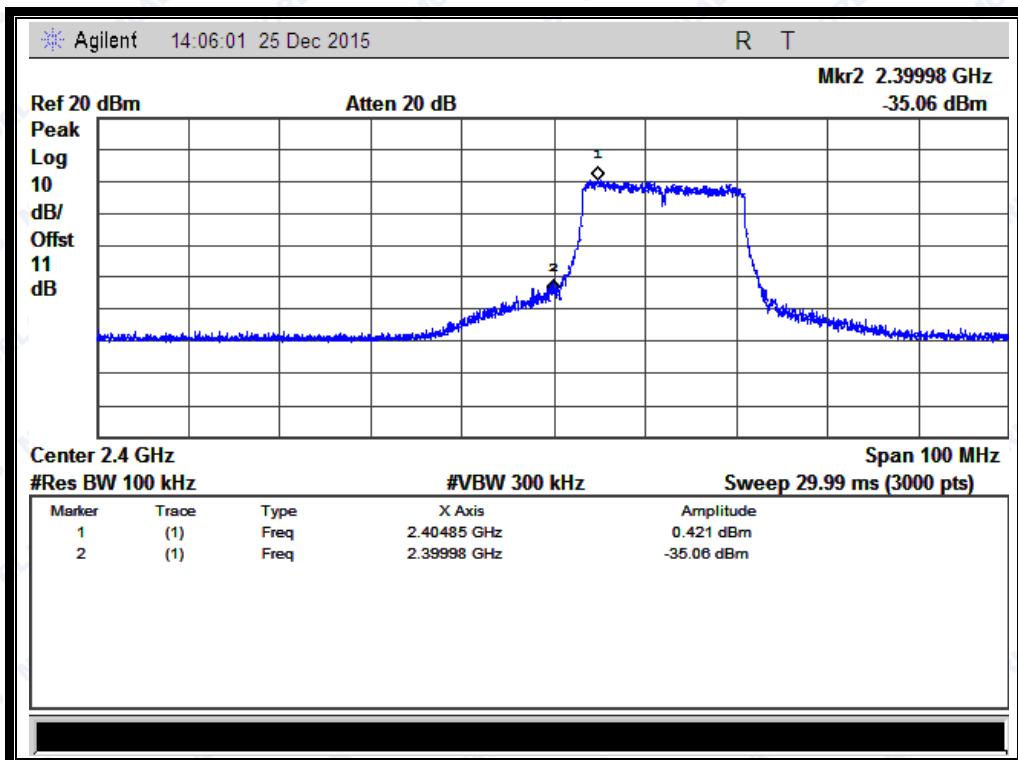
Note: the power of the EUT transmitting frequency should be ignored.



(Channel = 1, 30MHz to 25GHz)



REPORT No.: SZ15120141W01

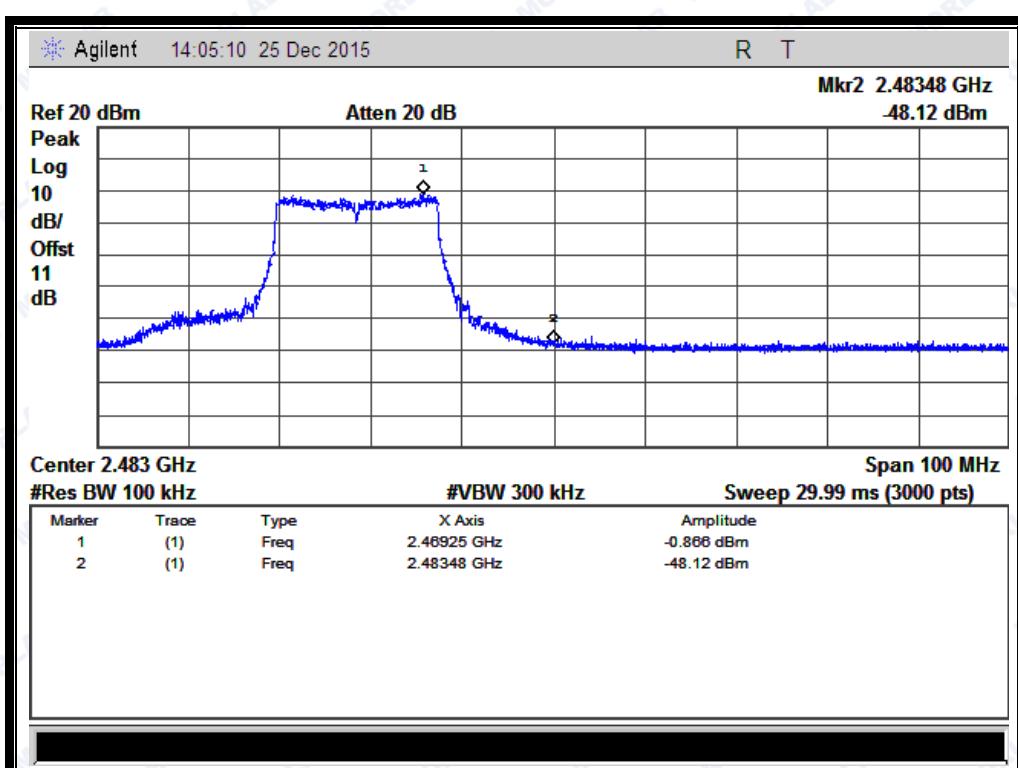
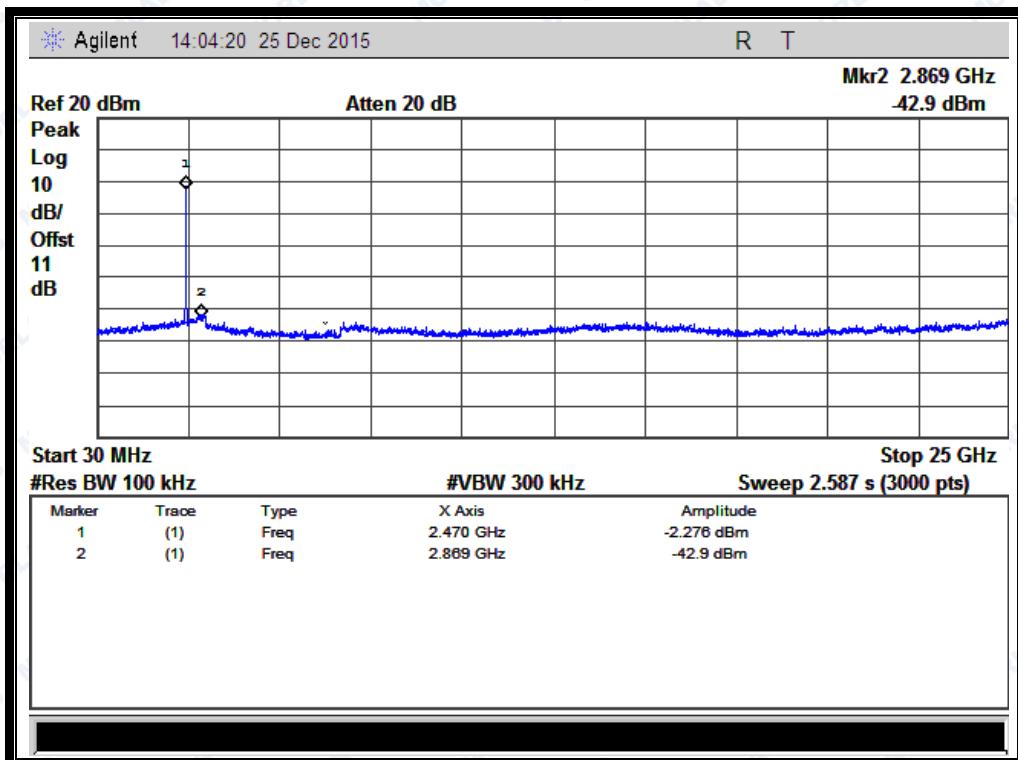


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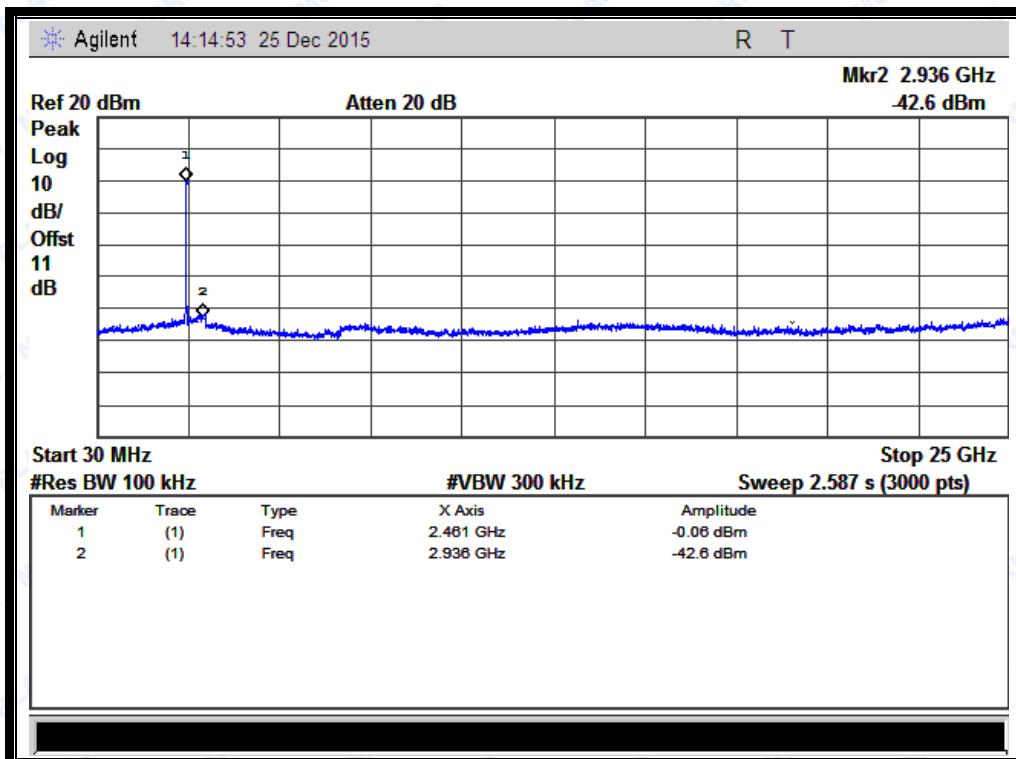


REPORT No.: SZ15120141W01

ANT 2:

A. Test Verdict:

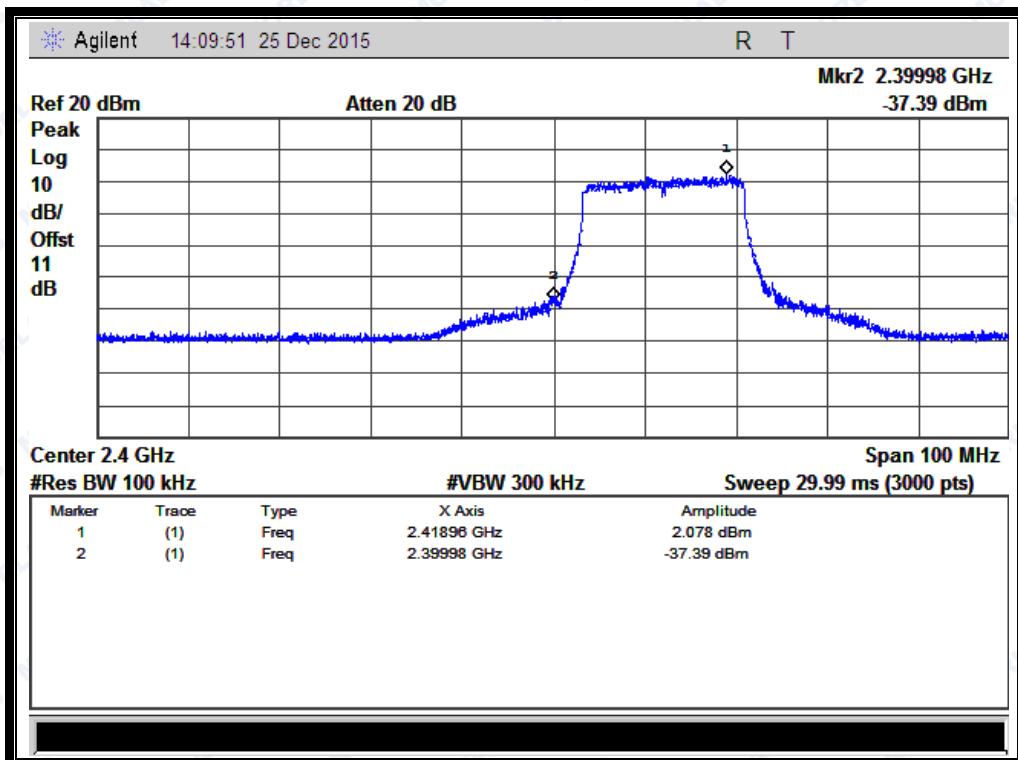
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-42.6	-0.06	-20.06	PASS
6	2437	-42.97	0.23	-19.77	PASS
11	2462	-41.89	1.23	-18.77	PASS

B. Test Plots:**Note:** the power of the EUT transmitting frequency should be ignored.

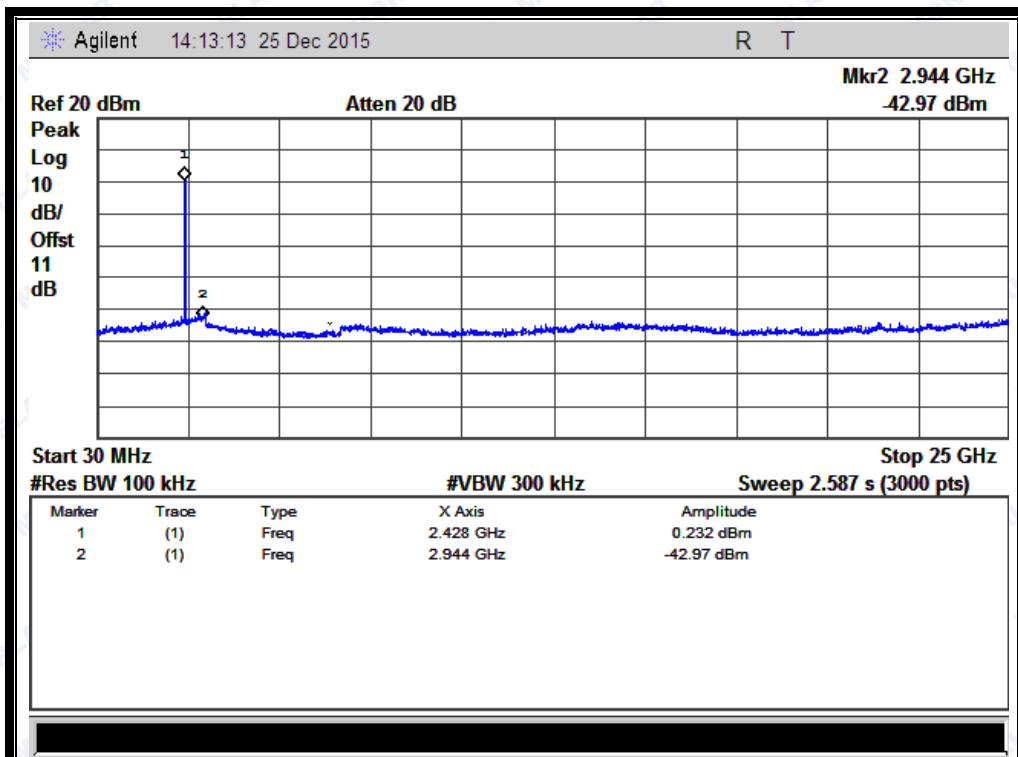
(Channel = 1, 30MHz to 25GHz)



REPORT No.: SZ15120141W01



(Band Edge @ Channel = 1)



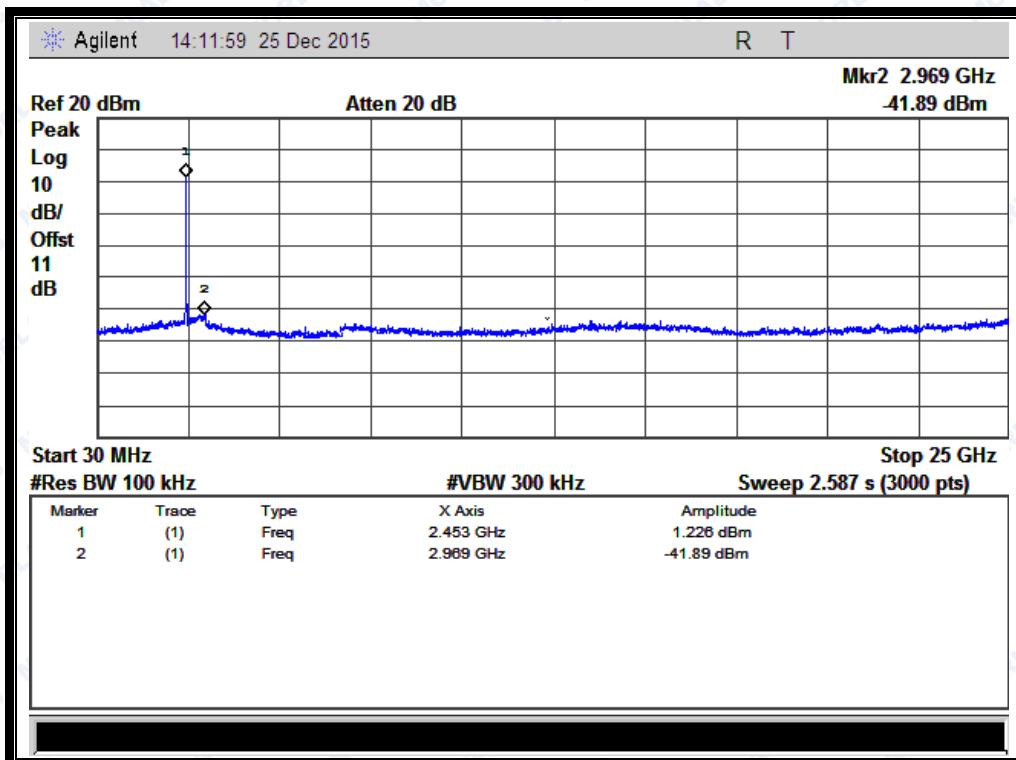
(Channel = 6, 30MHz to 25GHz)

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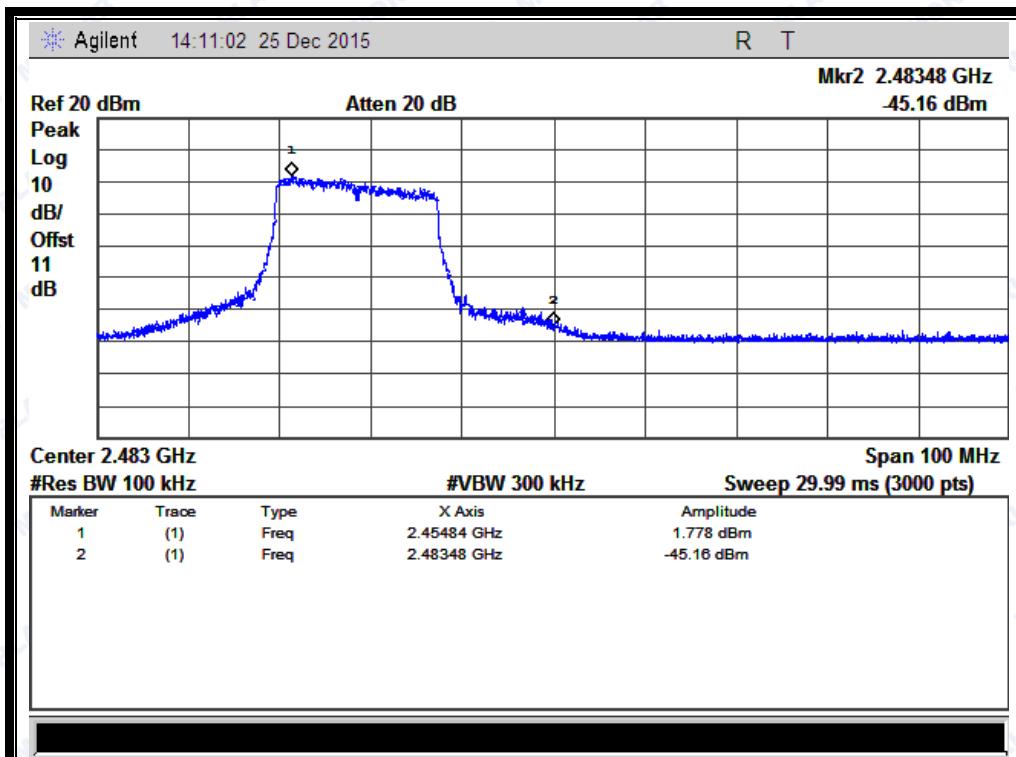
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(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)

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2.4.3.4 802.11n -40MHz Test mode

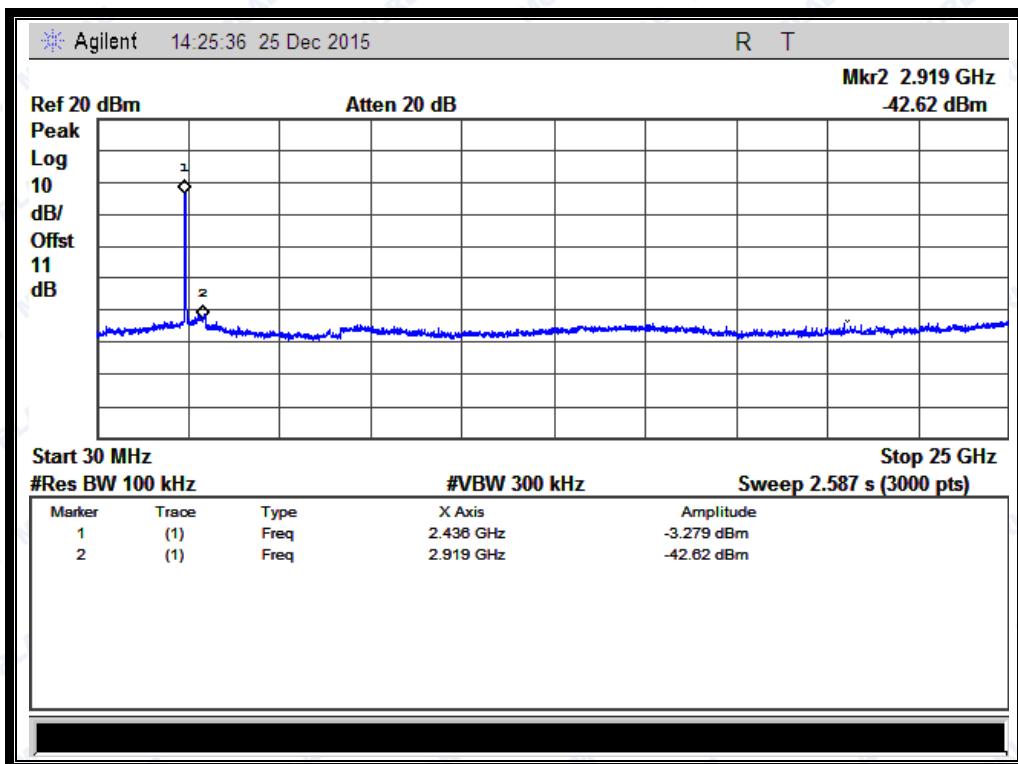
ANT 1:

A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
3	2422	-42.62	-3.28	-23.28	PASS
6	2437	-41.78	-3.16	-23.16	PASS
9	2452	-41.91	-3.21	-23.21	PASS

B. Test Plots:

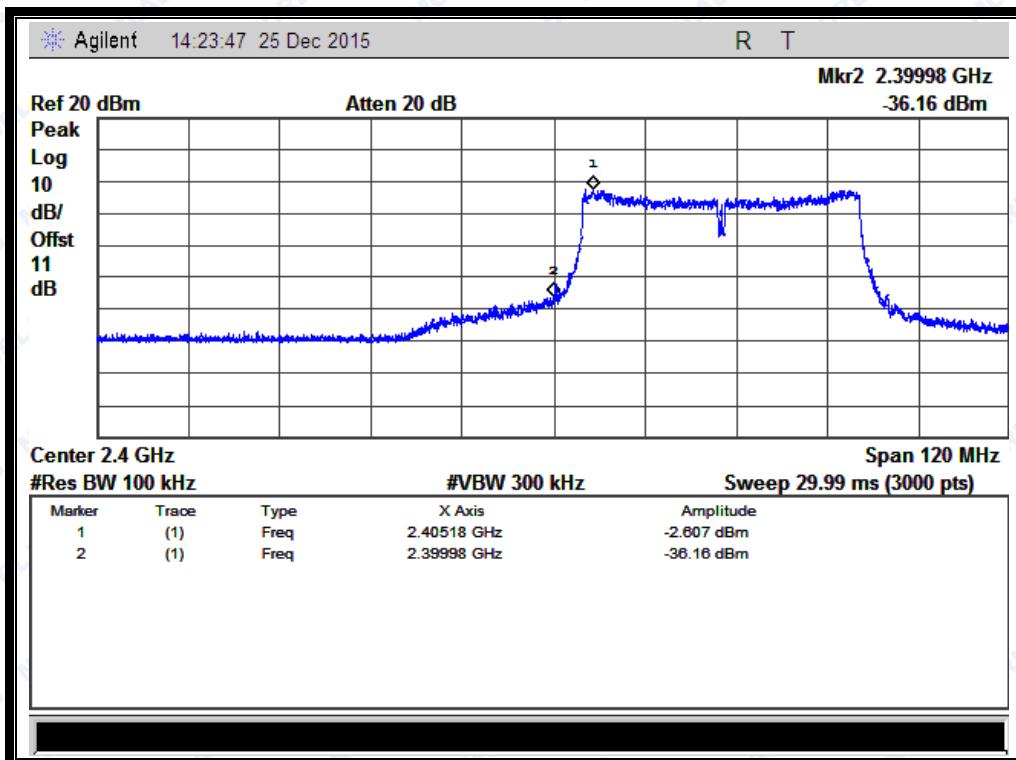
Note: the power of the EUT transmitting frequency should be ignored.



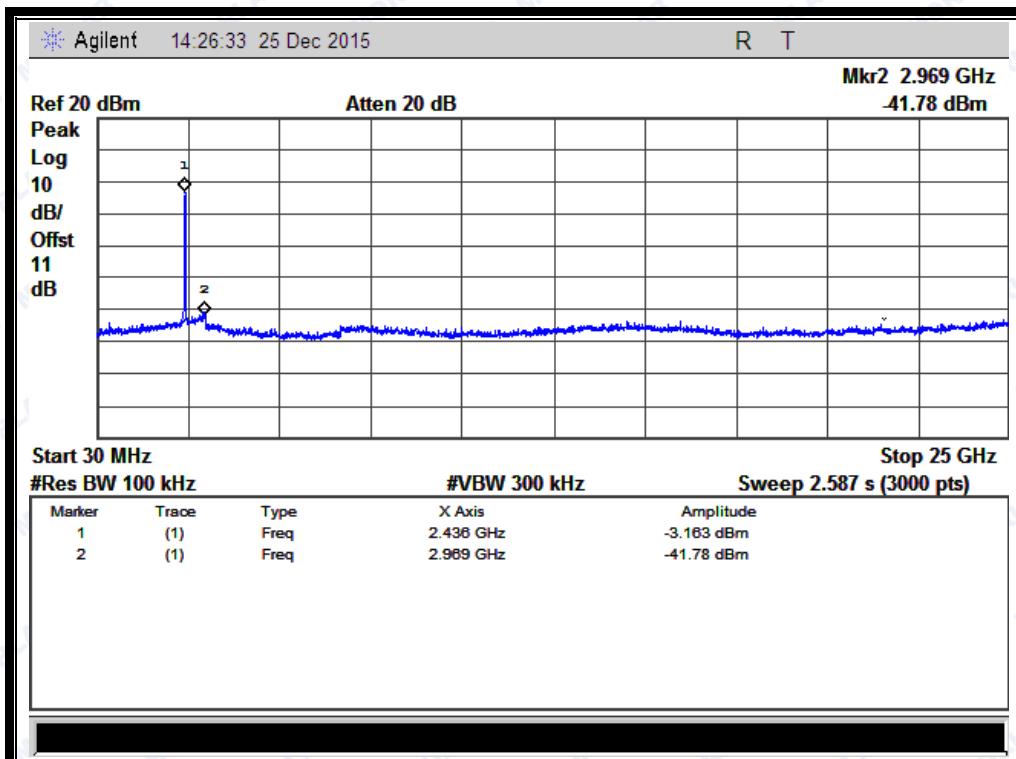
(Channel = 3, 30MHz to 25GHz)



REPORT No.: SZ15120141W01



(Band Edge @ Channel = 3)



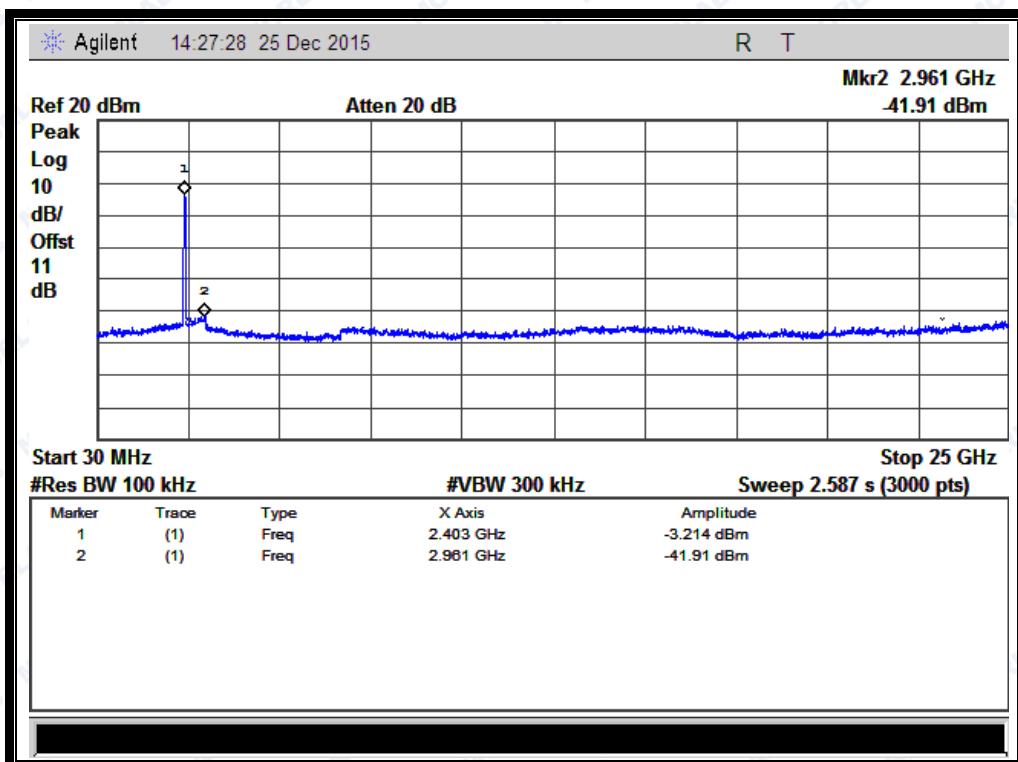
(Channel = 6, 30MHz to 25GHz)

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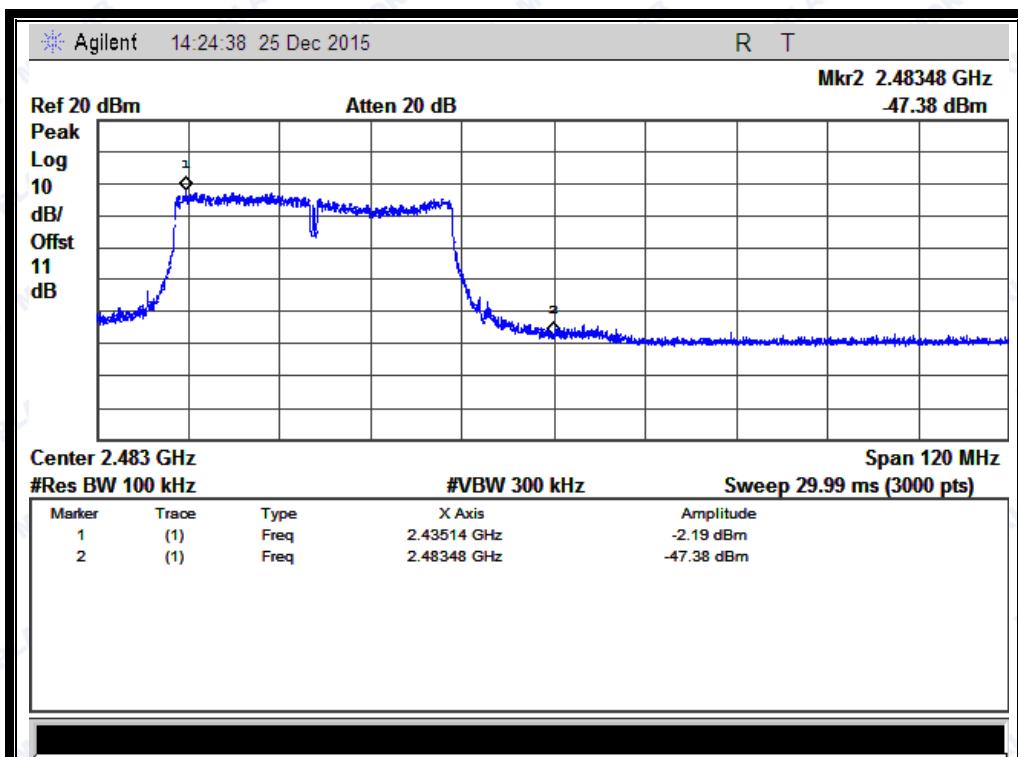
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(Band Edge @ Channel = 9)

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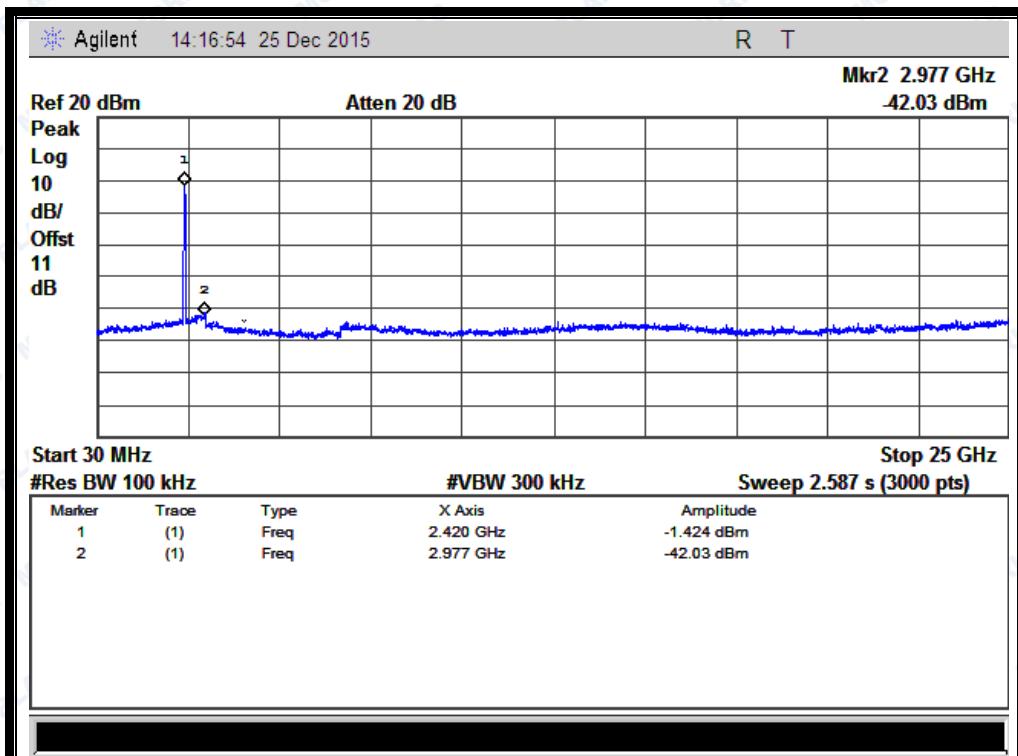


REPORT No.: SZ15120141W01

ANT 2:

A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
3	2422	-42.03	-1.42	-21.42	PASS
6	2437	-42.74	-1.05	-21.05	PASS
9	2452	-42.19	-2.23	-22.23	PASS

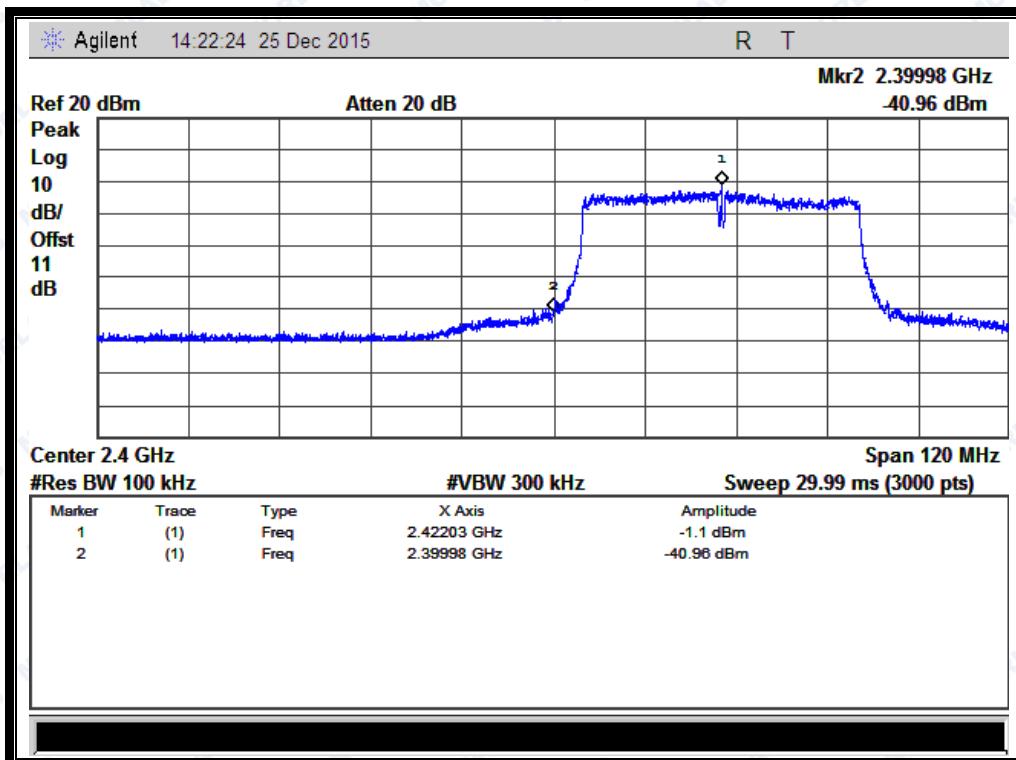
B. Test Plots:**Note:** the power of the EUT transmitting frequency should be ignored.

(Channel = 3, 30MHz to 25GHz)

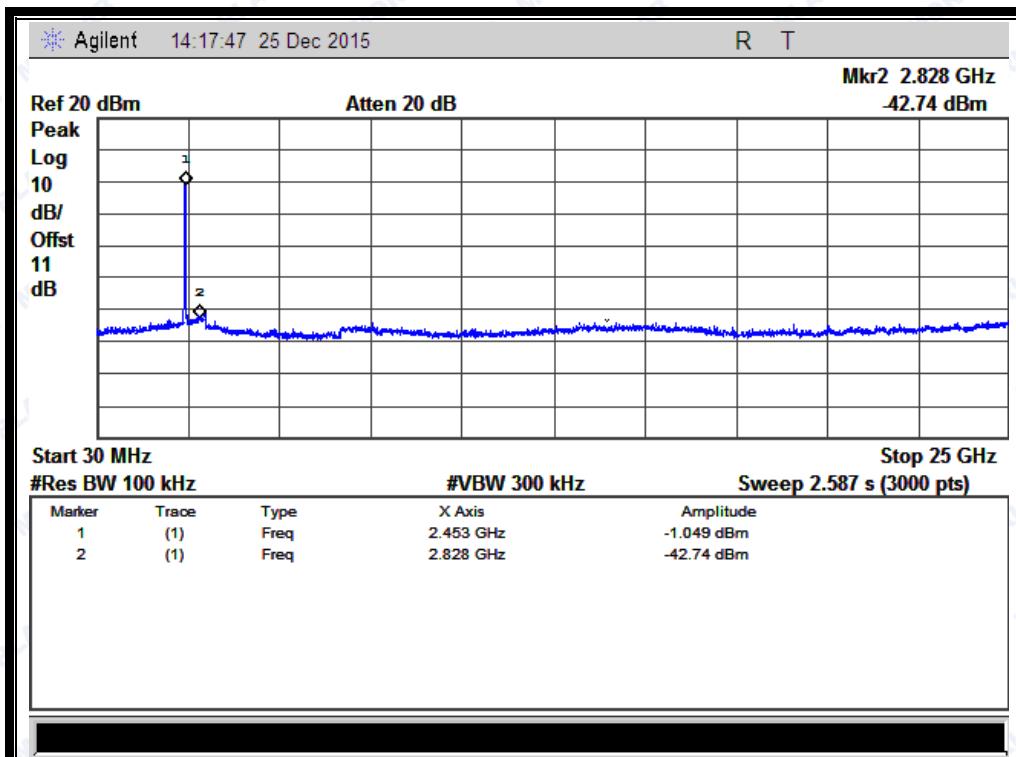
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(Band Edge @ Channel = 3)



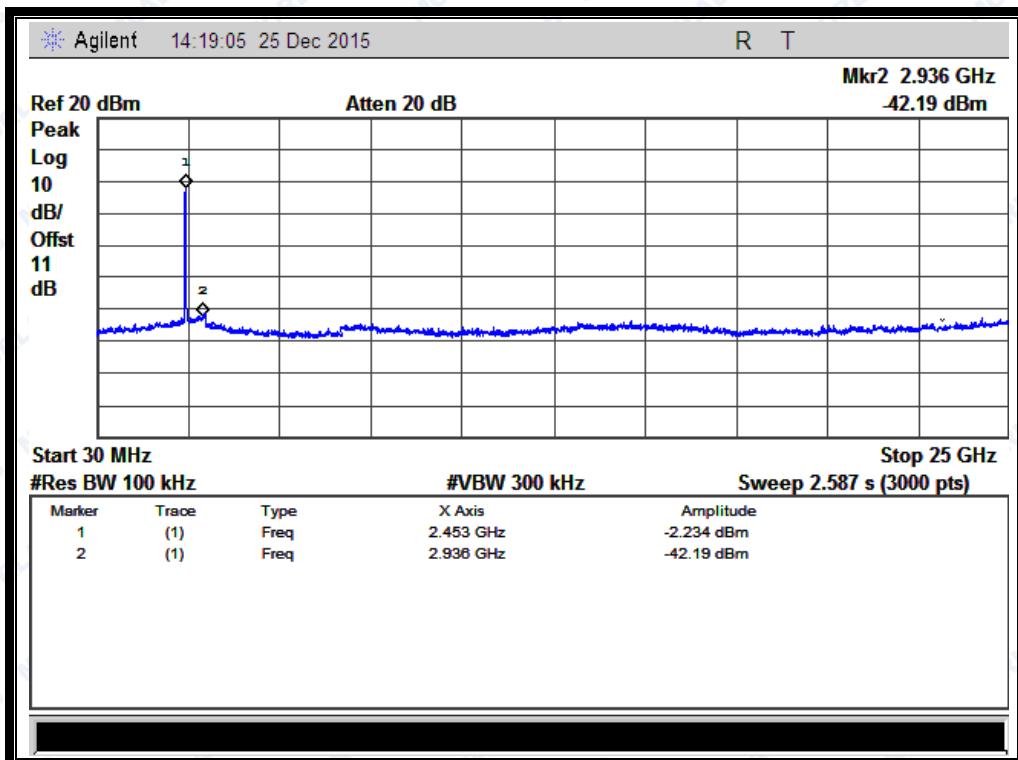
(Channel = 6, 30MHz to 25GHz)

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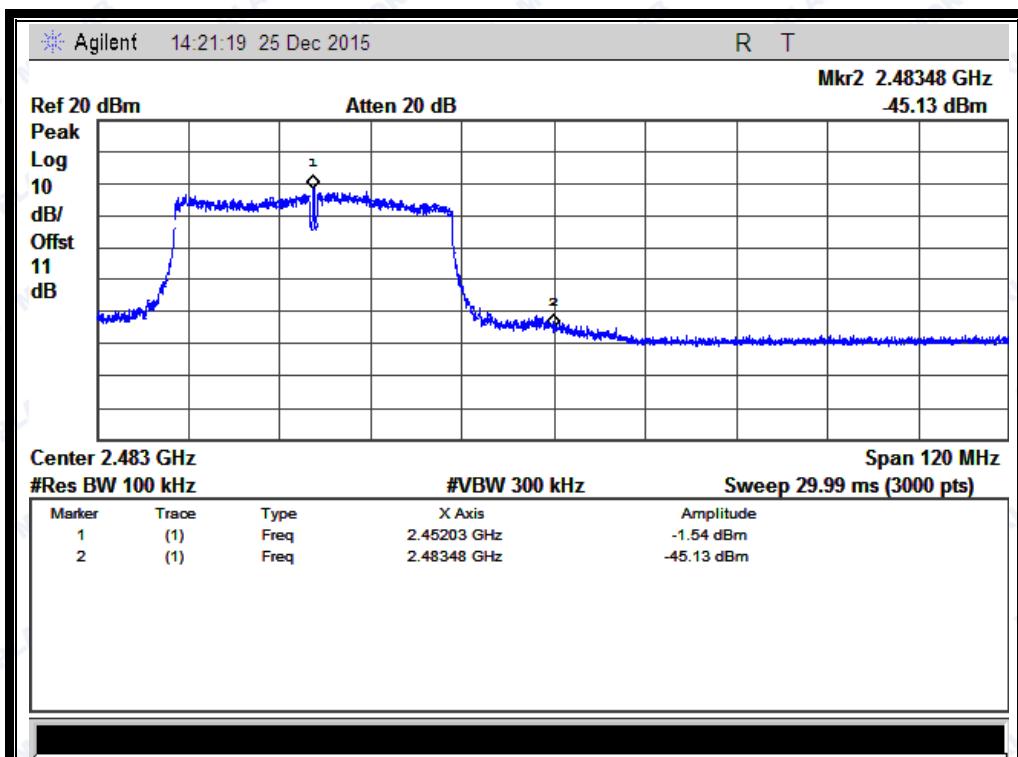
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(Channel = 9, 30MHz to 25GHz)



(Band Edge @ Channel = 9)

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2.5 Power spectral density (PSD)

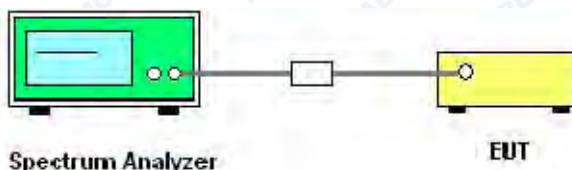
2.5.1 Requirement

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

The power spectral density of ANT1+ANT2 is : $P(\text{dBm}) = 10 * \lg [(P_{(\text{ANT1})}(\text{mW}) + P_{(\text{ANT2})}(\text{mW}))]$

2.5.2 Test Description

A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

B. Equipments List:

Please reference ANNEX A(1.4).



REPORT No.: SZ15120141W01

2.5.3 Test Result

2.5.3.1 802.11b Test mode

A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-5.36	8	PASS
6	2437	-7.13	8	PASS
11	2462	-6.68	8	PASS

Measurement uncertainty: $\pm 1.3\text{dB}$

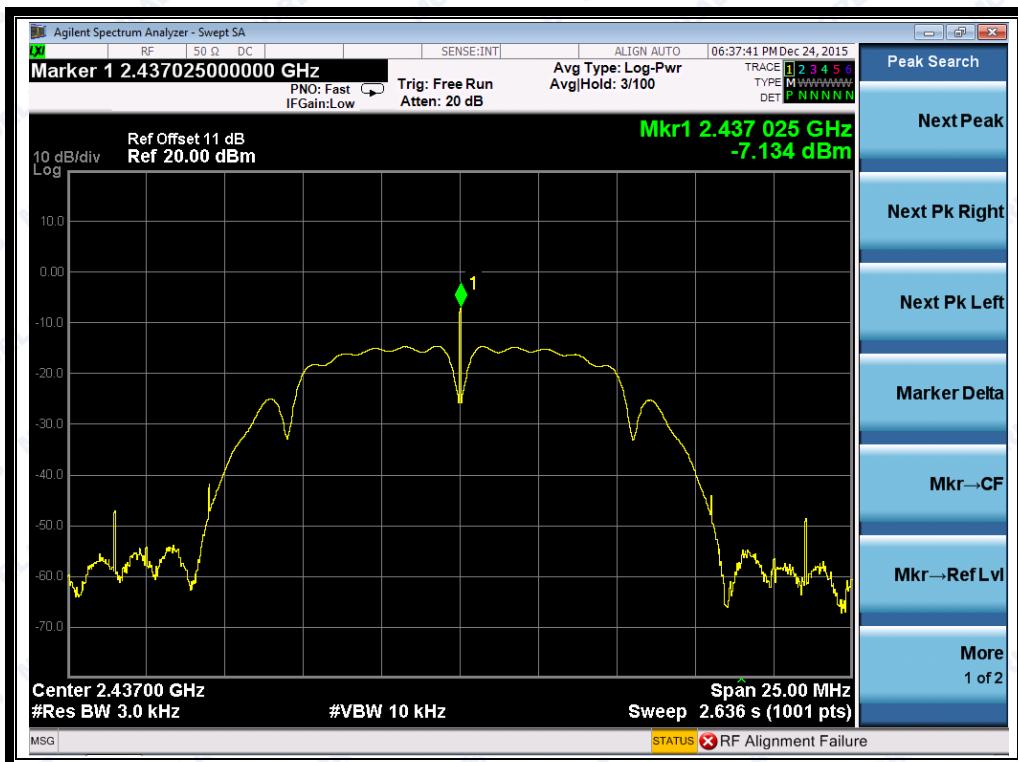
B. Test Plots:



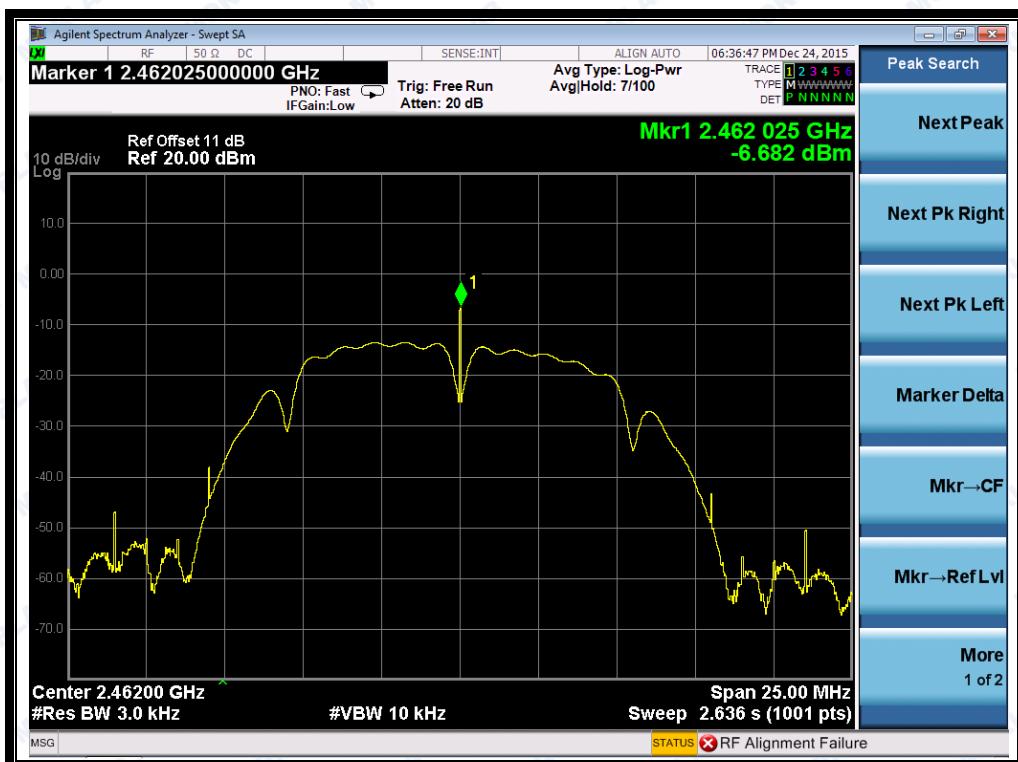
(Channel = 1 @ 802.11b)



REPORT No.: SZ15120141W01



(Channel = 6 @ 802.11b)



(Channel = 11 @ 802.11b)

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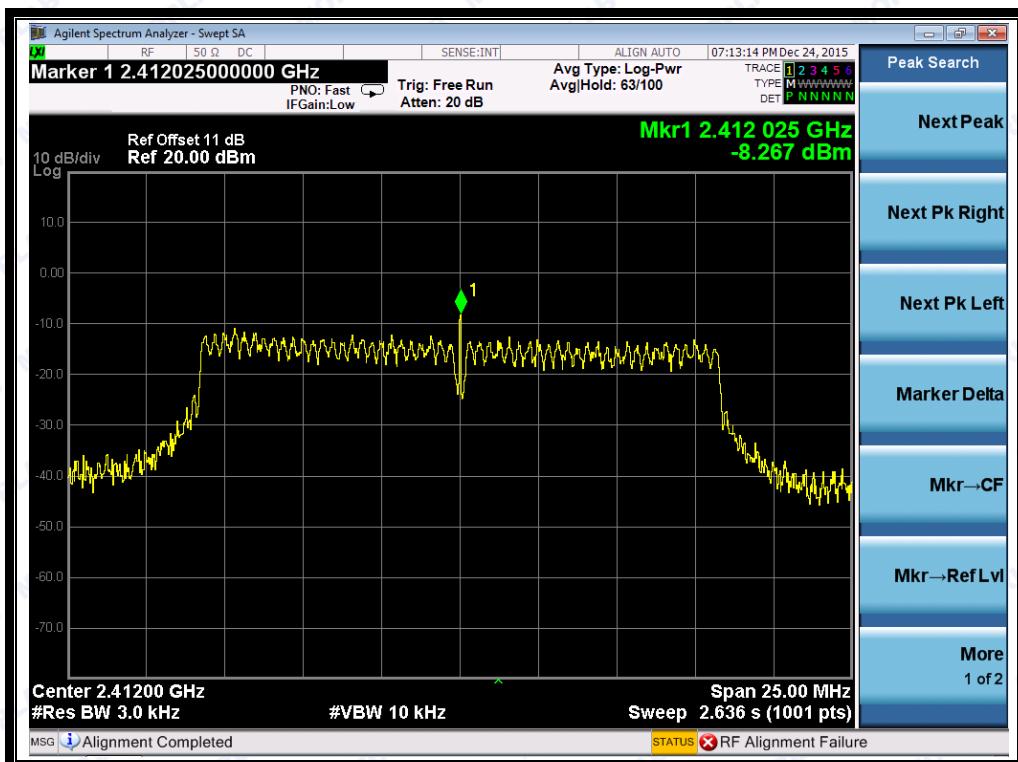
2.5.3.2 802.11g Test mode

A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-8.27	8	PASS
6	2437	-6.53	8	PASS
11	2462	-9.88	8	PASS

Measurement uncertainty: $\pm 1.3\text{dB}$

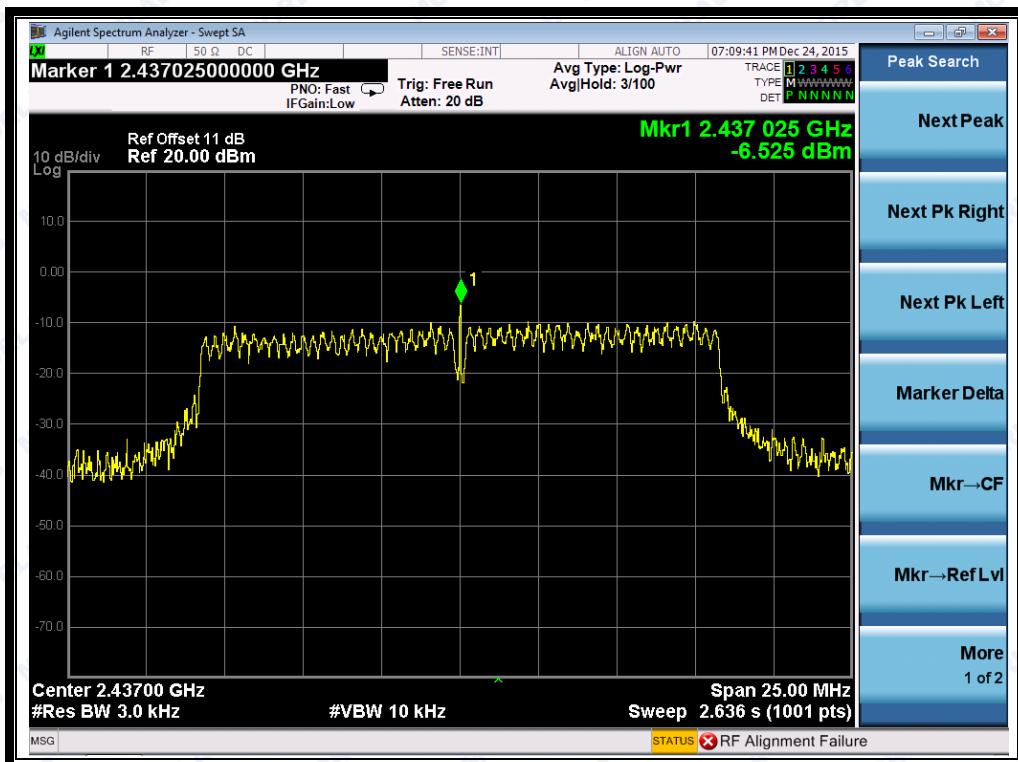
B. Test Plots:



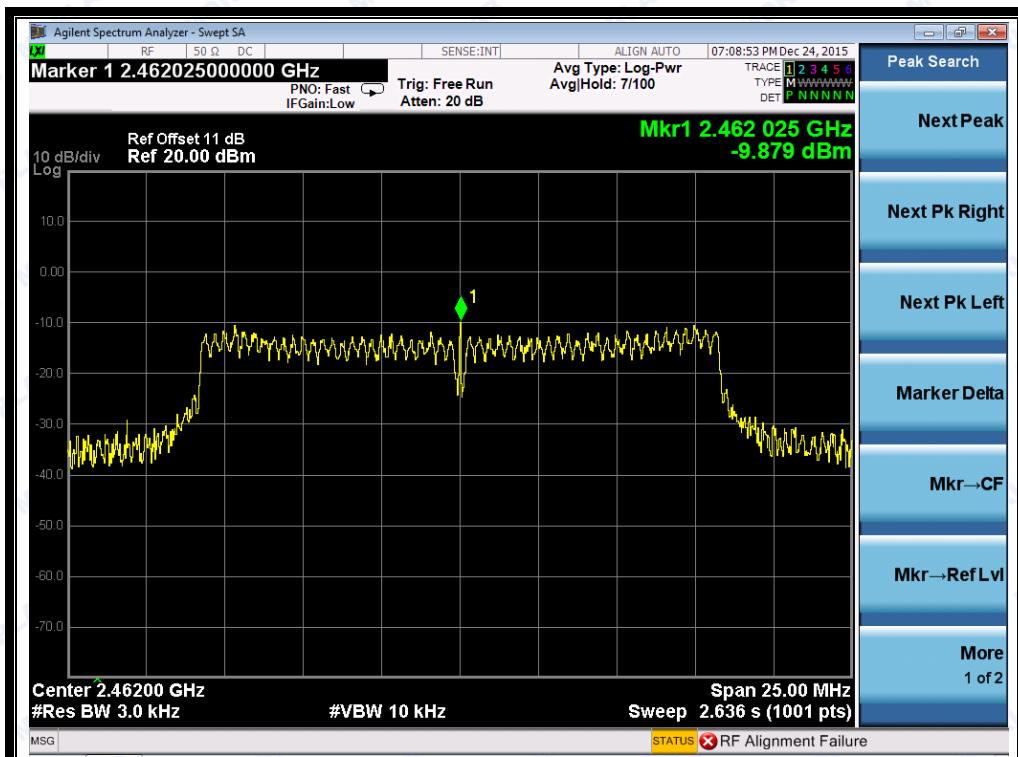
(Channel = 1 @ 802.11g)



REPORT No.: SZ15120141W01



(Channel = 6 @ 802.11g)



(Channel = 11 @ 802.11g)

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REPORT No.: SZ15120141W01

2.5.3.3 802.11n-20MHz Test mode

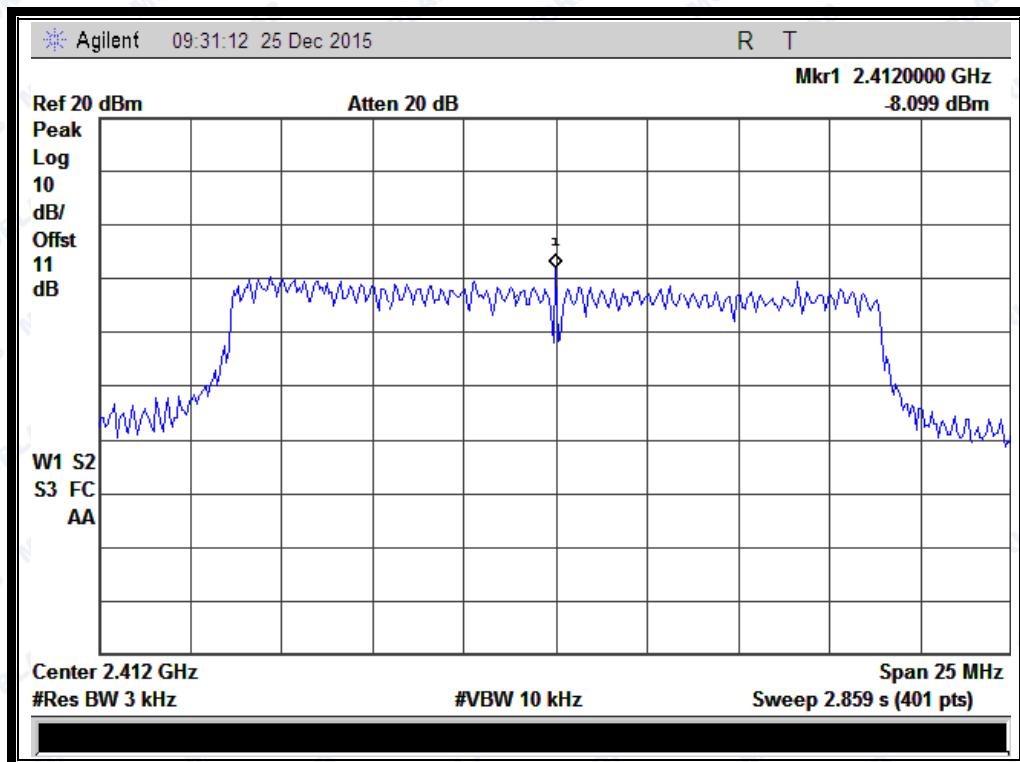
ANT 1:

A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-8.10	8	PASS
6	2437	-6.14	8	PASS
11	2462	-9.07	8	PASS

Measurement uncertainty: $\pm 1.3\text{dB}$

B. Test Plots:



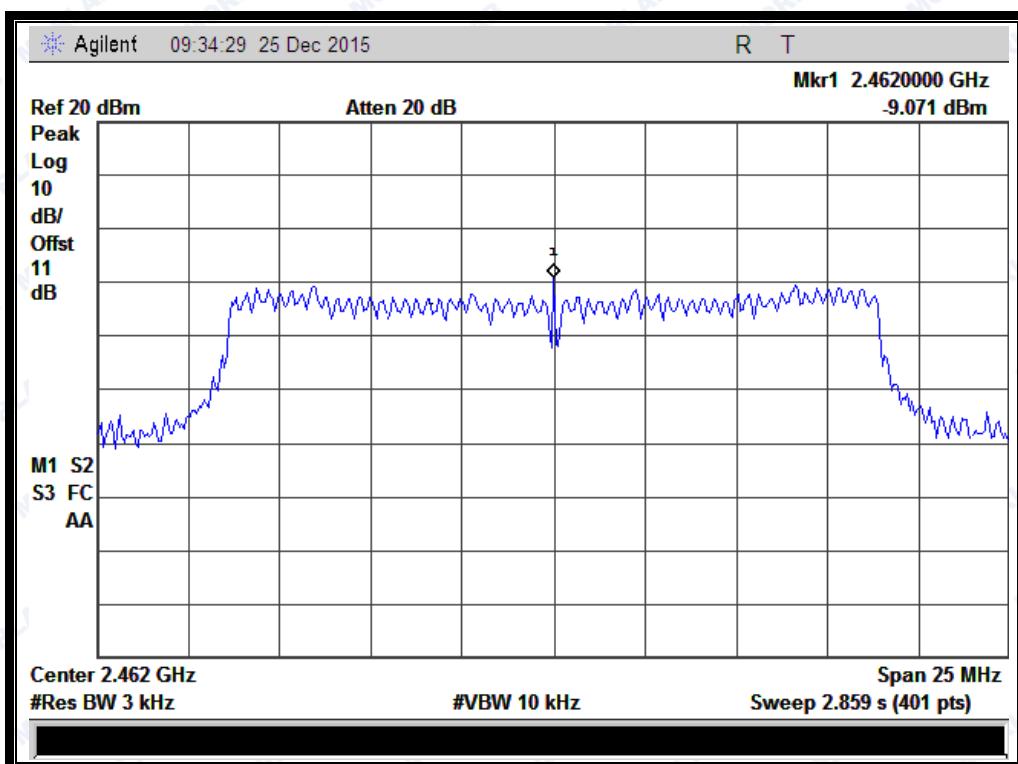
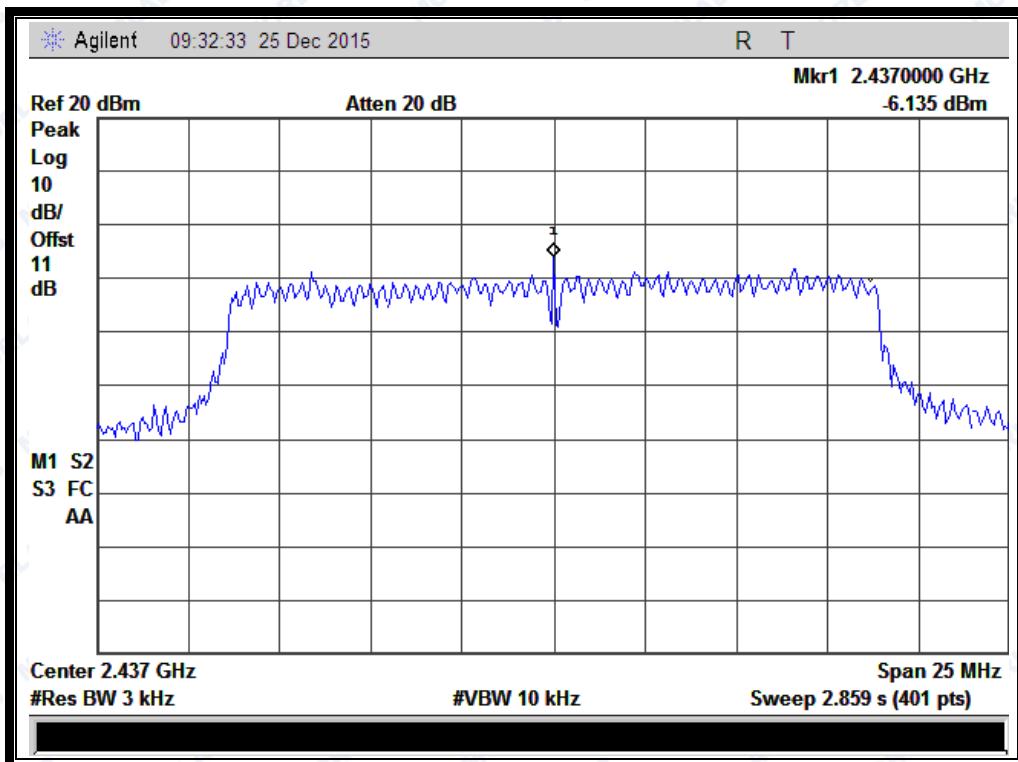
(Channel = 1 @ 802.11n-20MHz)

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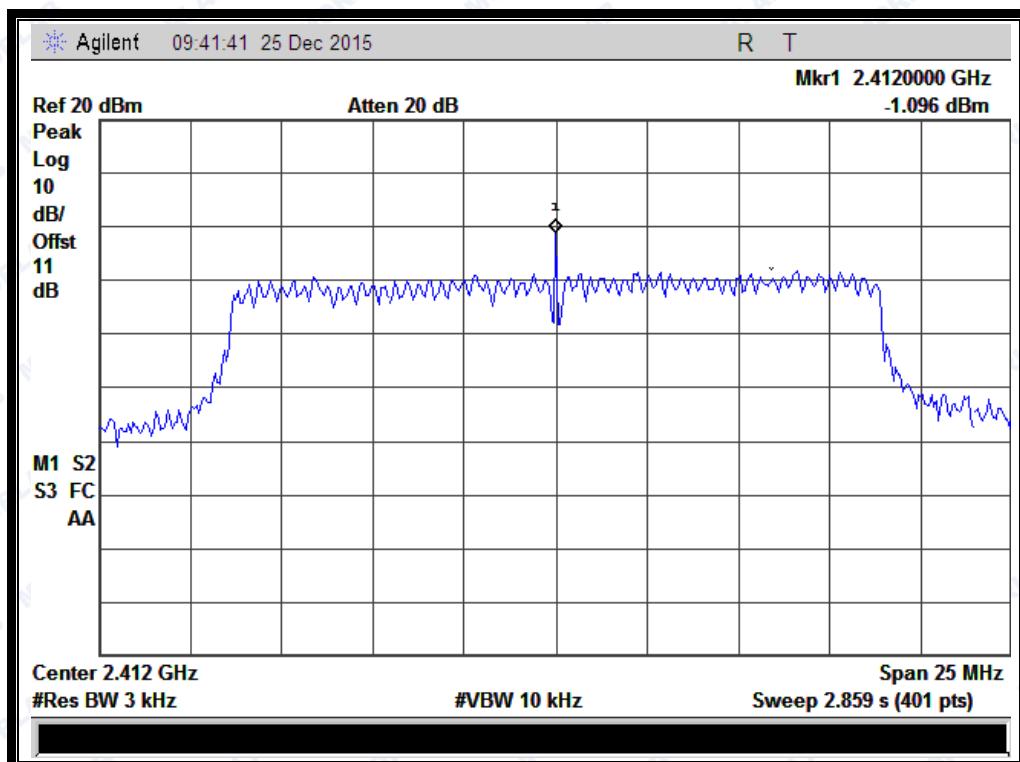
REPORT No.: SZ15120141W01

ANT 2:

A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-1.10	8	PASS
6	2437	-3.43	8	PASS
11	2462	-2.91	8	PASS

Measurement uncertainty: $\pm 1.3\text{dB}$

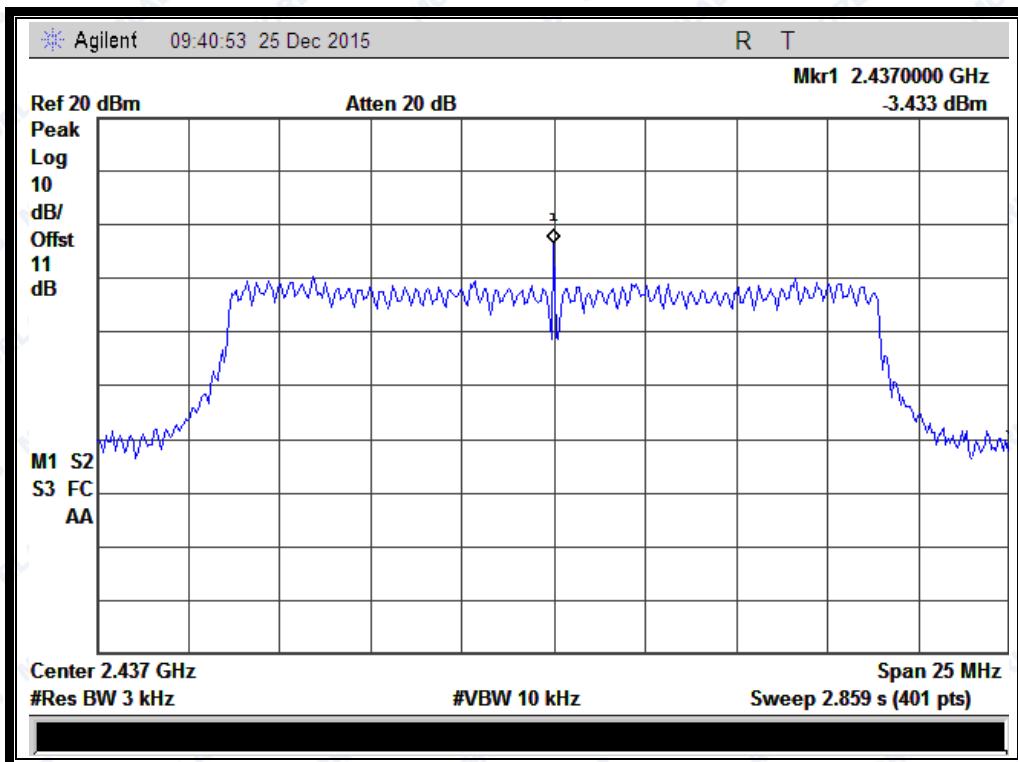
B. Test Plots:

(Channel = 1 @ 802.11n-20MHz)

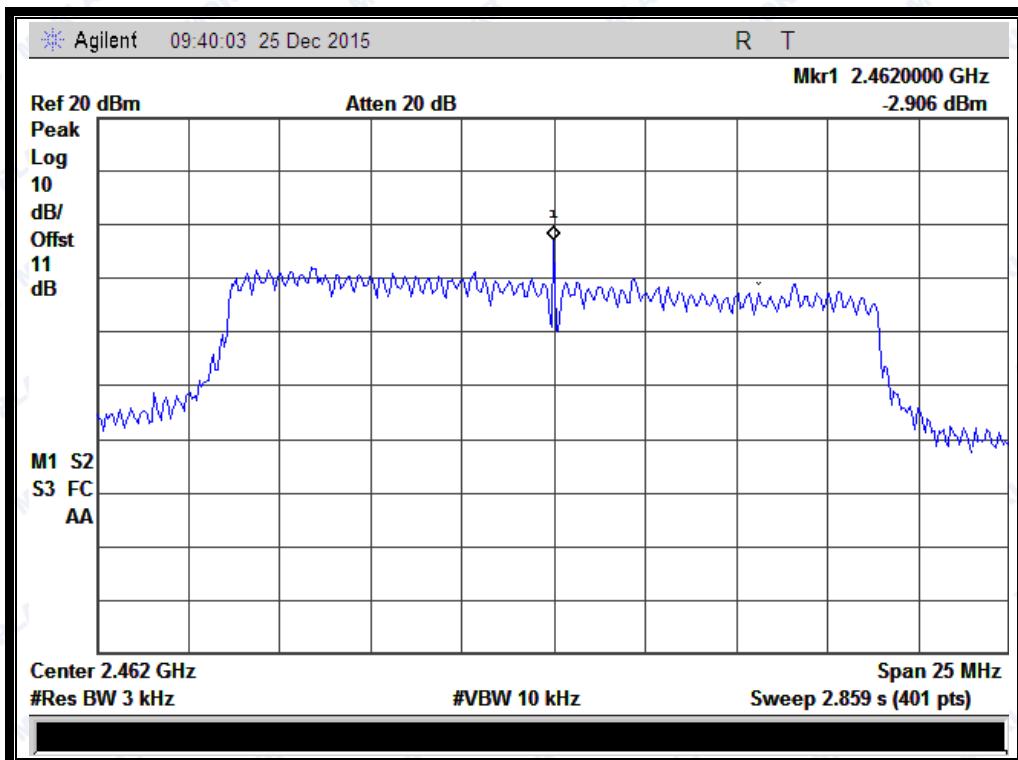
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(Channel = 6 @ 802.11n-20MHz)



(Channel = 11 @ 802.11n-20MHz)

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Ant 1 + Ant 2:

A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-0.31	8	PASS
6	2437	-1.57	8	PASS
11	2462	-1.97	8	PASS

Measurement uncertainty: ±1.3dB

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2.5.3.4 802.11n-40MHz Test mode

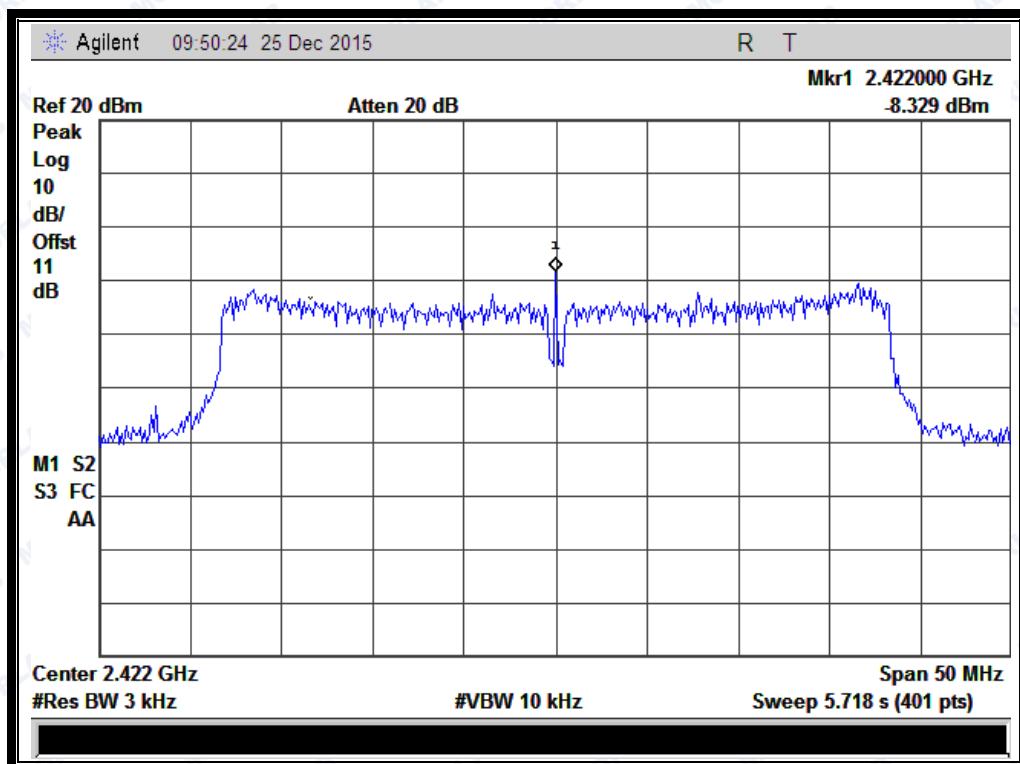
ANT 1:

A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
3	2422	-8.33	8	PASS
6	2437	-6.28	8	PASS
9	2452	-7.79	8	PASS

Measurement uncertainty: $\pm 1.3\text{dB}$

B. Test Plots:



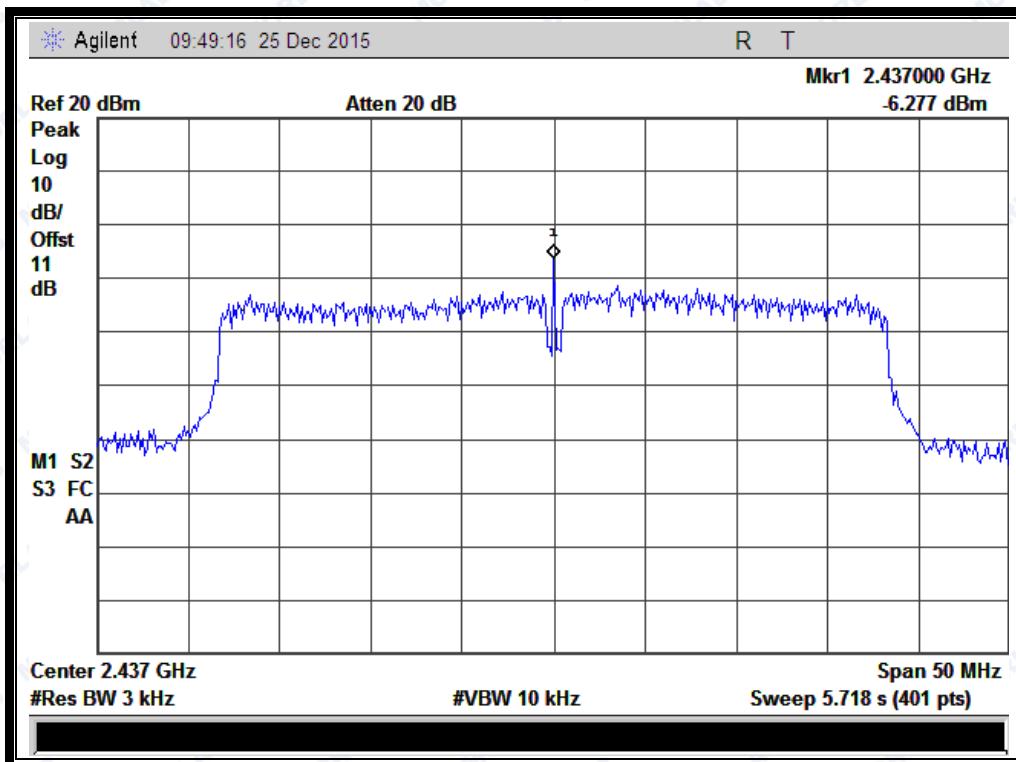
(Channel = 3 @ 802.11n-40MHz)

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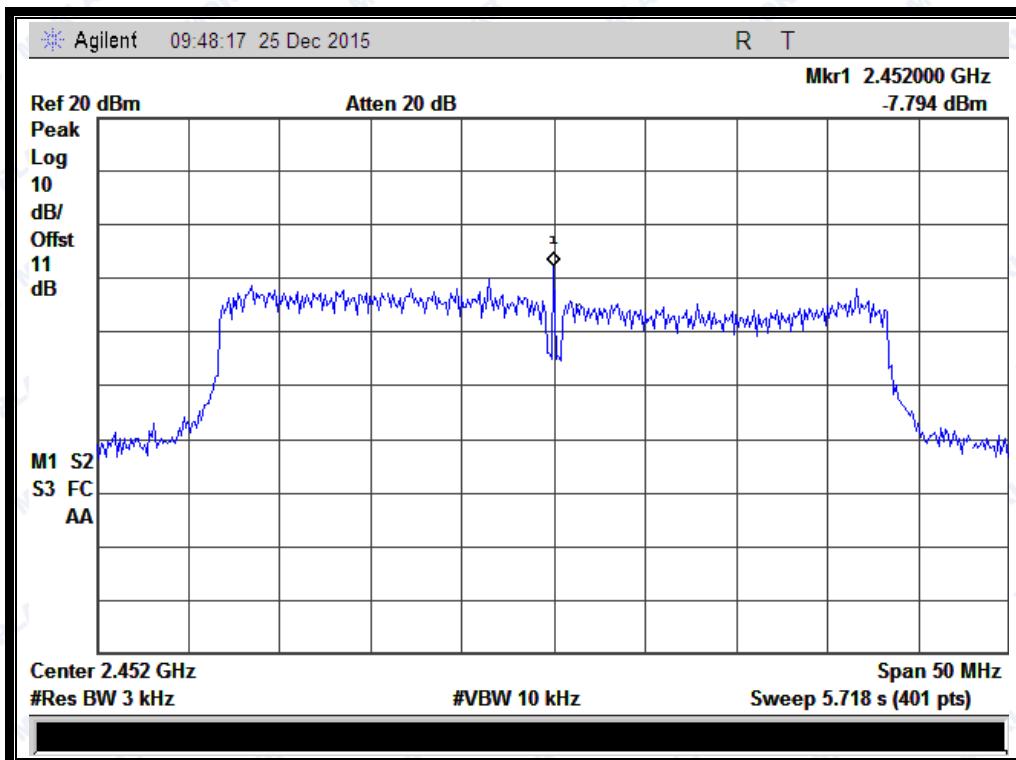
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(Channel = 6 @ 802.11n-40MHz)



(Channel = 9 @ 802.11n-40MHz)

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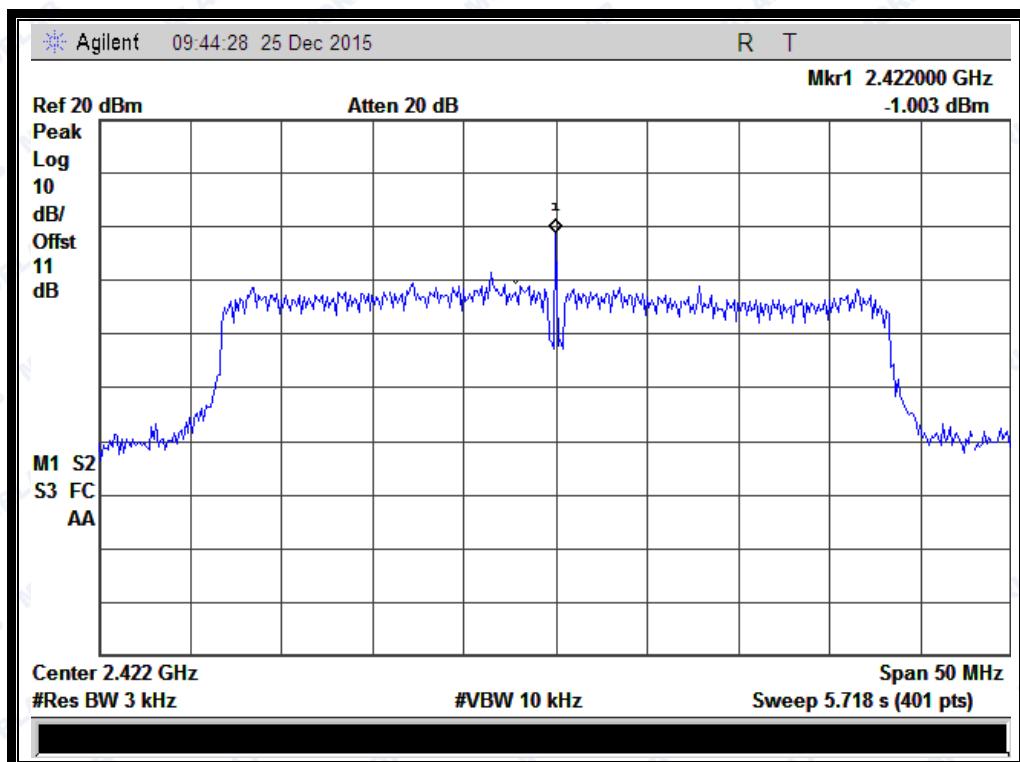
REPORT No.: SZ15120141W01

ANT 2:

A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
3	2422	-1.00	8	PASS
6	2437	-3.27	8	PASS
9	2452	-0.94	8	PASS

Measurement uncertainty: $\pm 1.3\text{dB}$

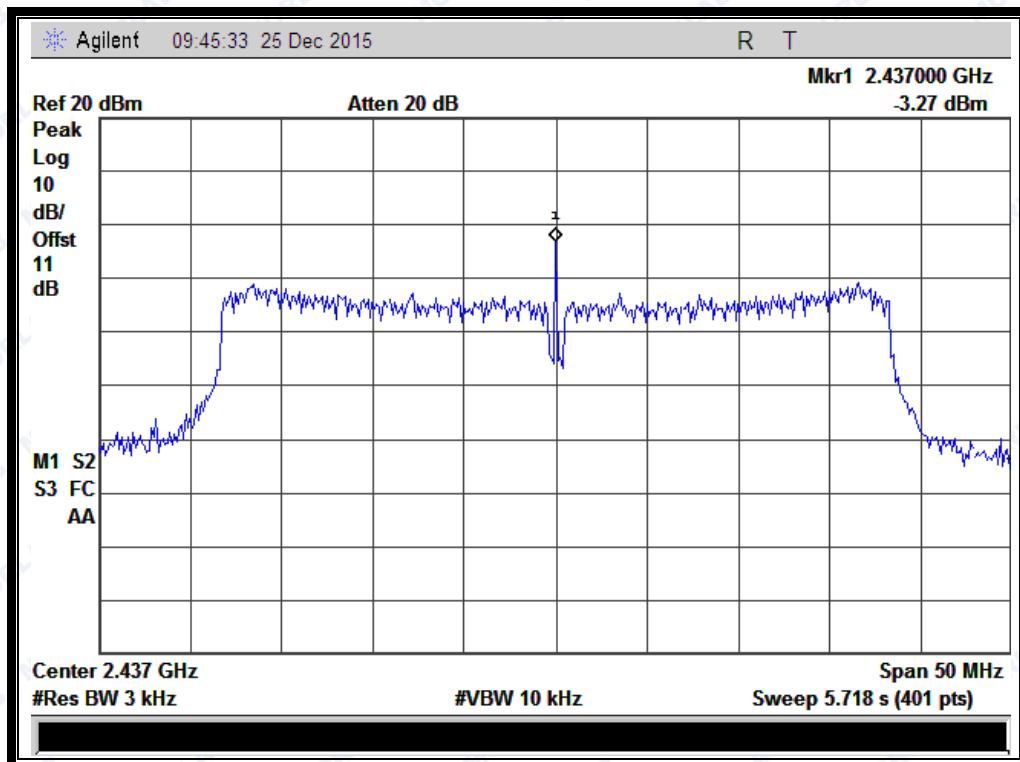
B. Test Plots:

(Channel = 3 @ 802.11n-40MHz)

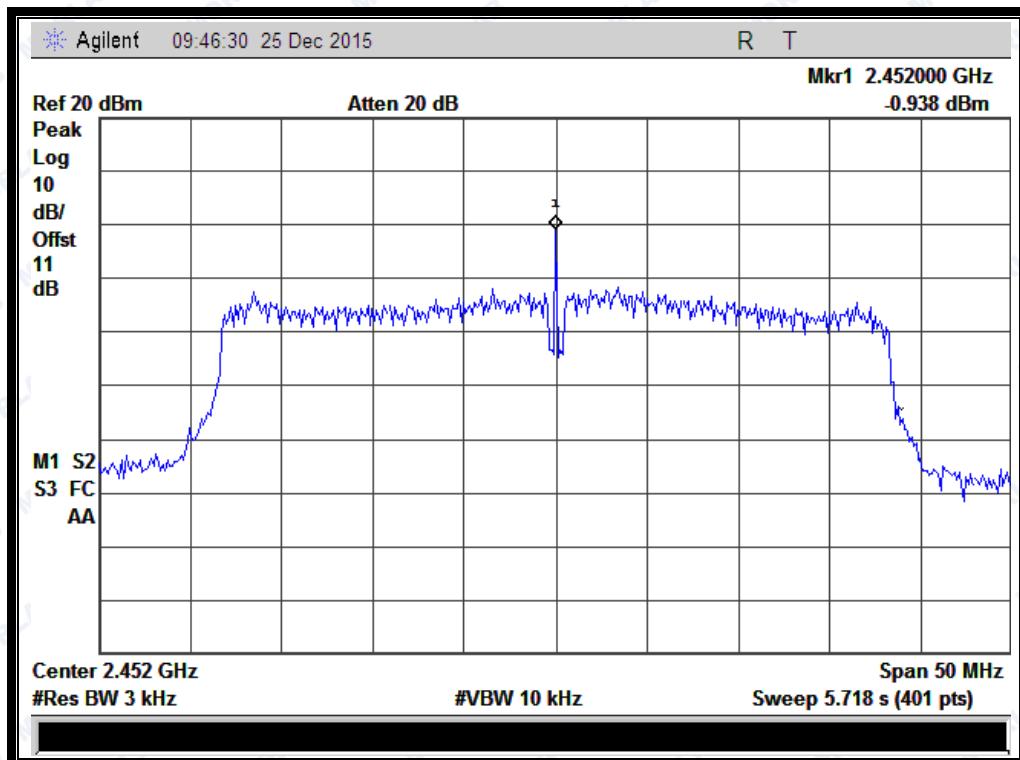
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(Channel = 6 @ 802.11n-40MHz)



(Channel = 9 @ 802.11n-40MHz)

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Ant 1 + Ant 2:

B. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
3	2422	-0.26	7.27 _{Note}	PASS
6	2437	-1.51	7.27 _{Note}	PASS
9	2452	-0.12	7.27 _{Note}	PASS

Measurement uncertainty: ±1.3dB

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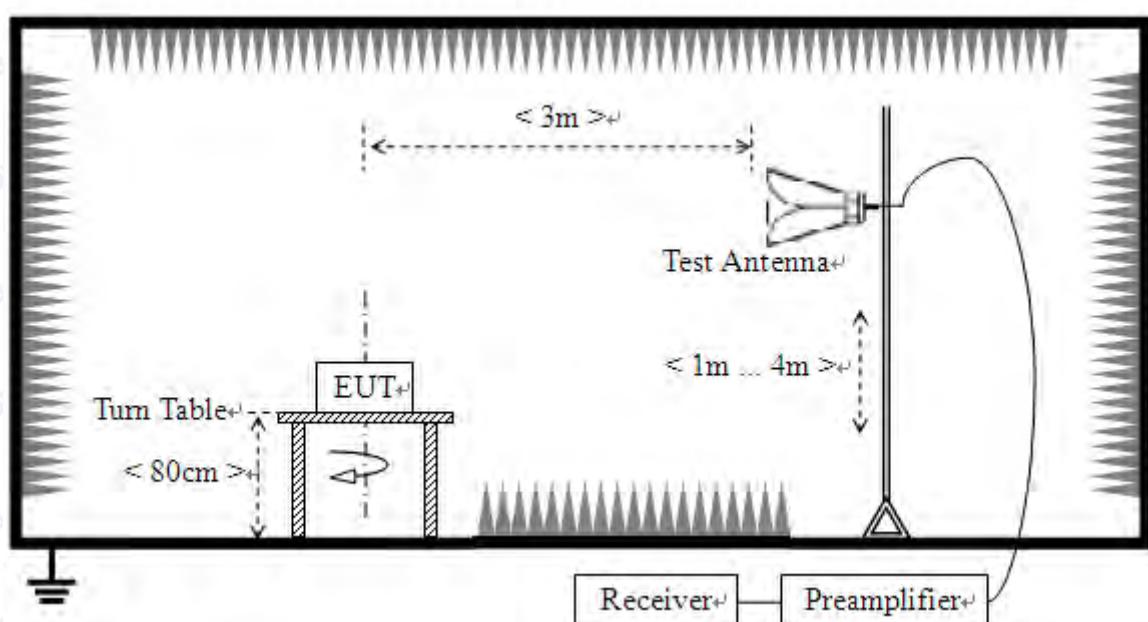
2.6 Restricted Frequency Bands

2.6.1 Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

2.6.2 Test Description

A. Test Setup



The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

B. Equipments List:

Please reference ANNEX A(1.4).



2.6.3 Test Result

The lowest and highest channels are tested to verify Restricted Frequency Bands.

The measurement results are obtained as below:

$$E [\text{dB}\mu\text{V}/\text{m}] = U_R + A_T + A_{\text{Factor}} [\text{dB}]; A_T = L_{\text{Cable loss}} [\text{dB}] - G_{\text{preamp}} [\text{dB}]$$

A_T : Total correction Factor except Antenna

U_R : Receiver Reading

G_{preamp} : Preamplifier Gain

A_{Factor} : Antenna Factor at 3m

Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

2.6.3.1 802.11b Test mode

The lowest and highest channels are tested to verify the band edge emissions.

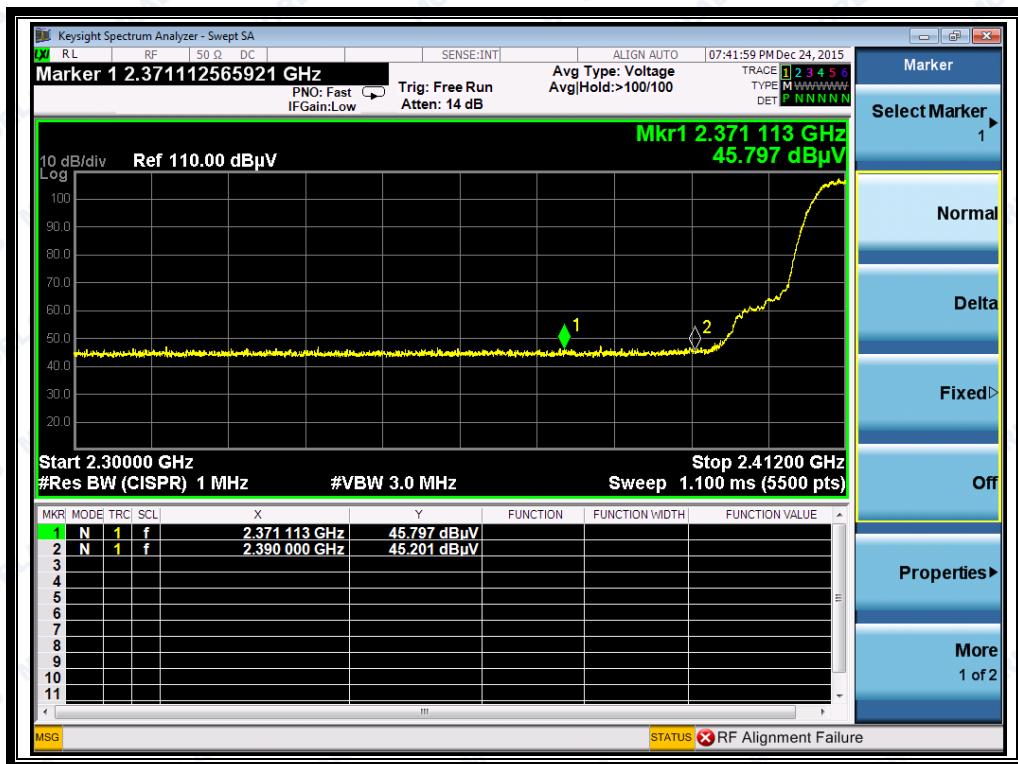
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
			Reading U_R (dB μ V)					
1	2371.11	PK	45.80	-33.63	32.56	44.73	74	Pass
1	2387.53	AV	37.06	-33.63	32.56	35.99	54	Pass
11	2484.85	PK	44.87	-33.18	32.5	44.19	74	Pass
11	2484.68	AV	35.39	-33.18	32.5	34.71	54	Pass

B. Test Plots:



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(Channel = 1 PEAK @ 802.11b)



(Channel = 1 AVG @ 802.11b)

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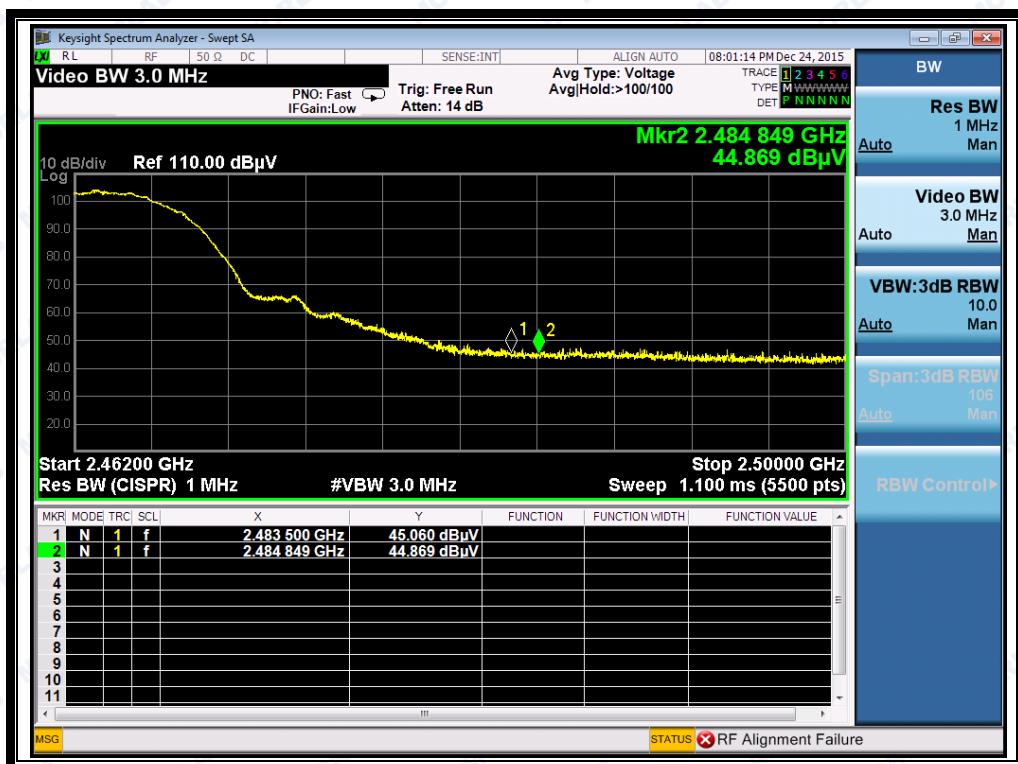
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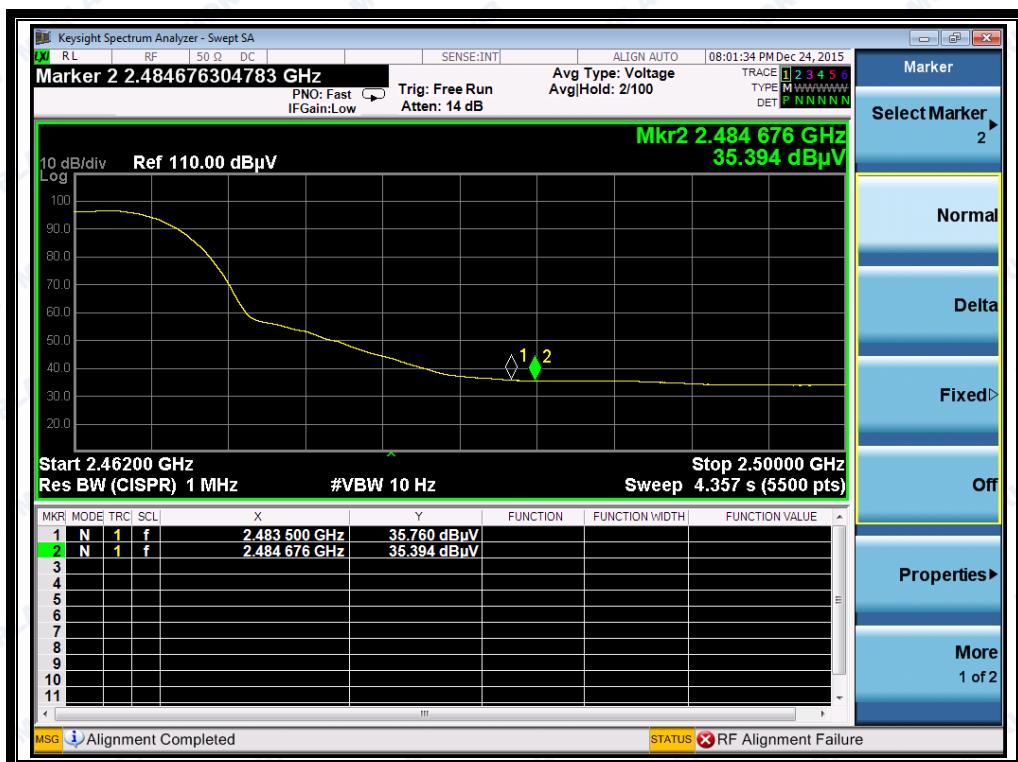
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(Channel = 11 PEAK @ 802.11b)



(Channel = 11 AVG @ 802.11b)

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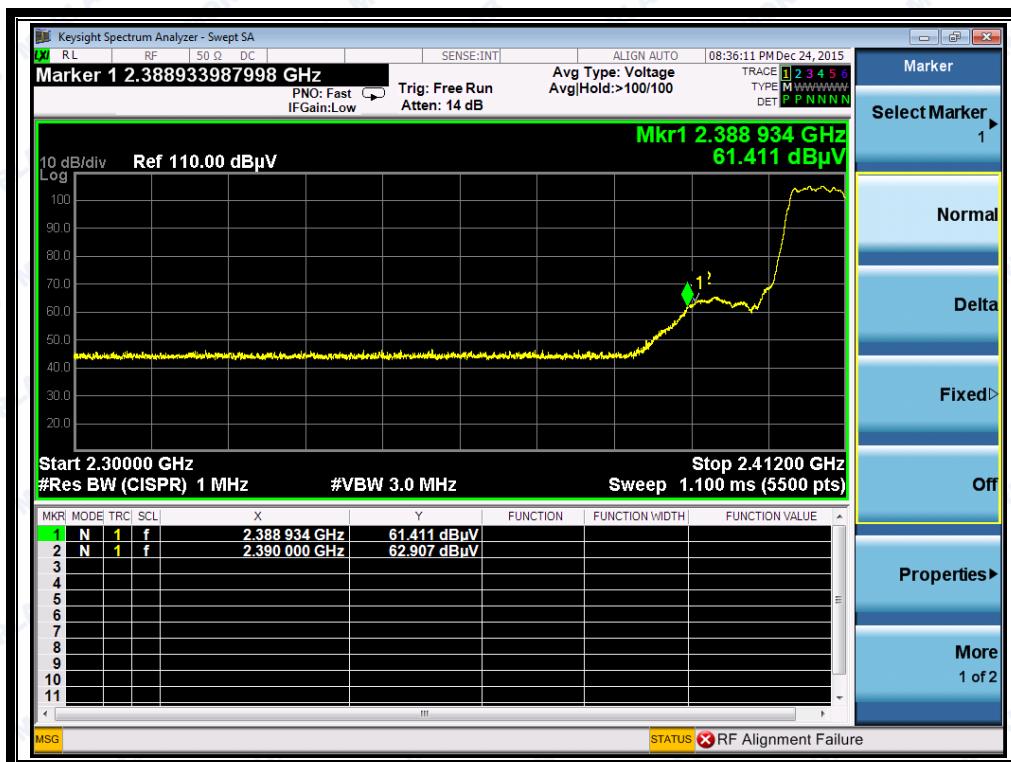
2.6.3.2 802.11g Test mode

The lowest and highest channels are tested to verify the band edge emissions.

A. Test Verdict:

Channel	Frequency (MHz)	Detector PK/ AV	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
1	2388.93	PK	61.41	-33.63	32.56	60.34	74	Pass
1	2389.14	AV	45.49	-33.63	32.56	44.42	54	Pass
11	2484.06	PK	56.54	-33.18	32.5	55.86	74	Pass
11	2484.03	AV	44.40	-33.18	32.5	43.72	54	Pass

B. Test Plots:



(Channel = 1 PEAK @ 802.11g)

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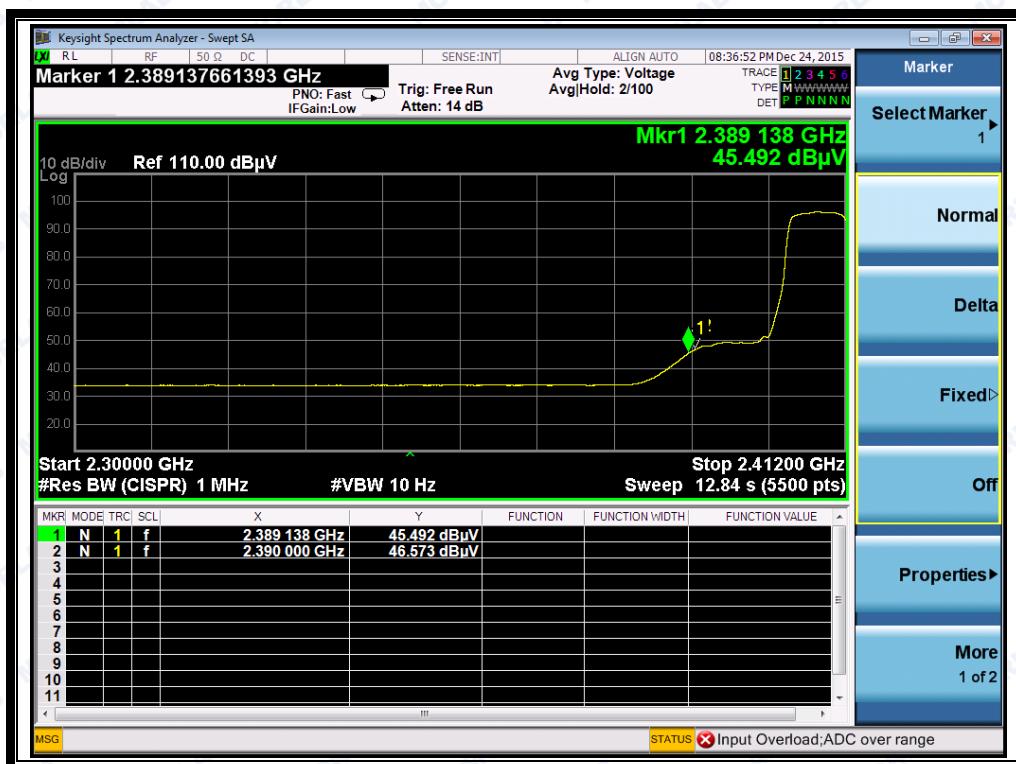
Fax: 86-755-36698525

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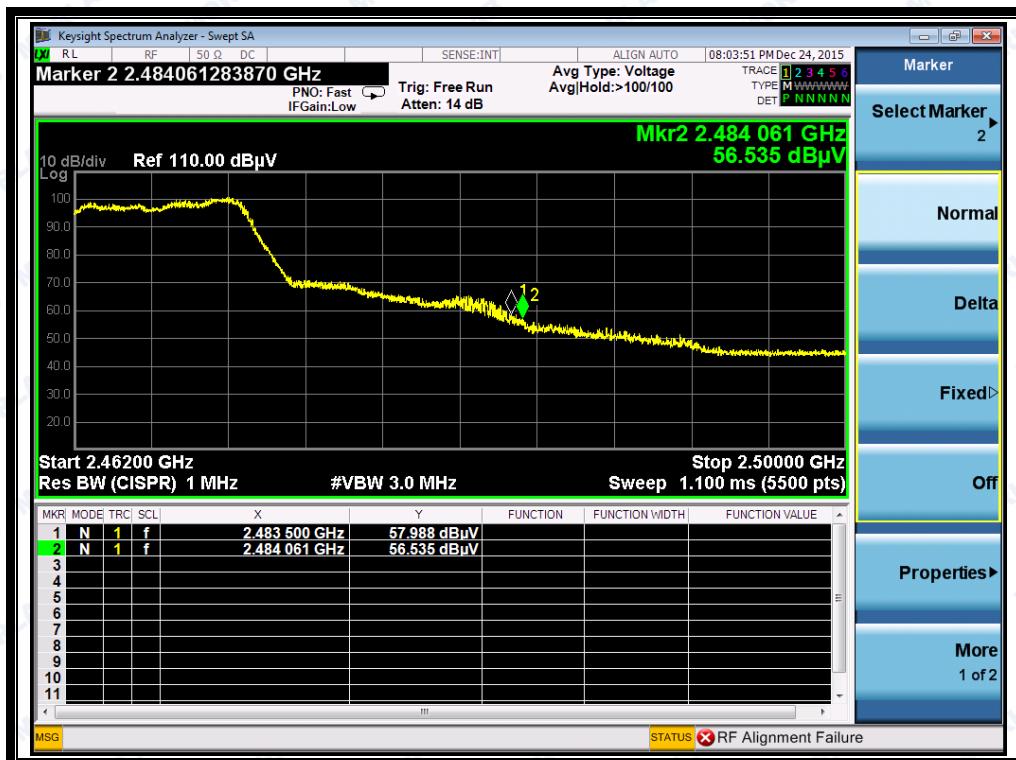
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REPORT No.: SZ15120141W01



(Channel = 1 AVG @ 802.11g)



(Channel = 11 PEAK @ 802.11g)

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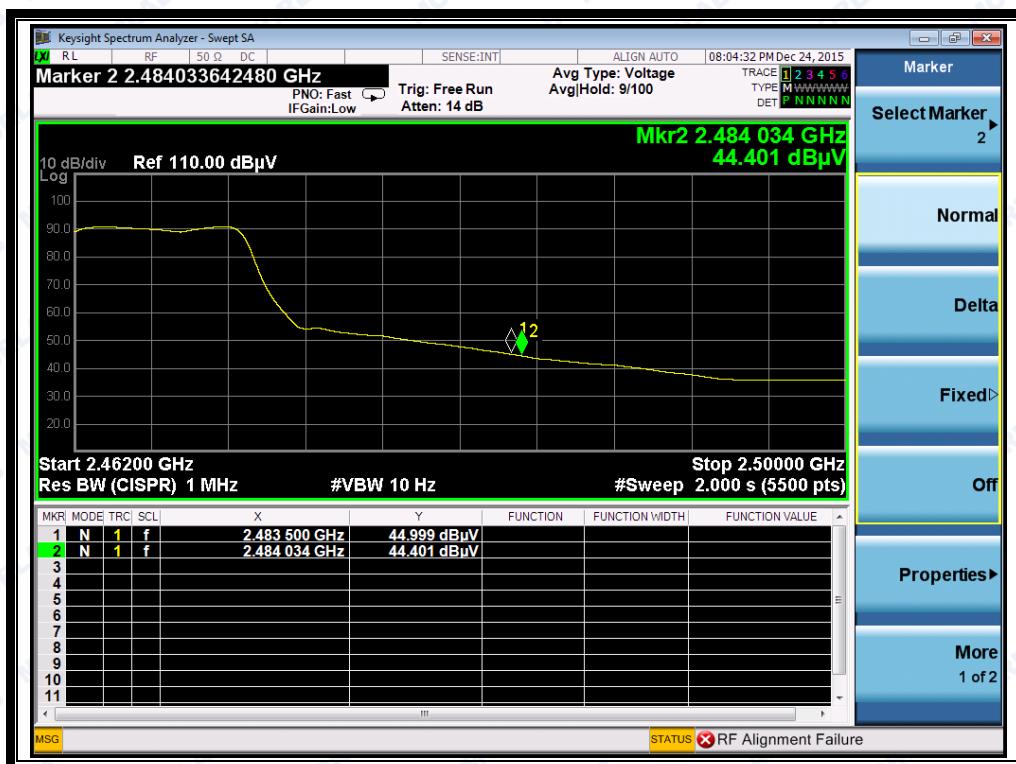
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(Channel = 11 AVG @ 802.11g)

2.6.3.3 802.11n-20MHz Test mode

The lowest and highest channels are tested to verify the band edge emissions.

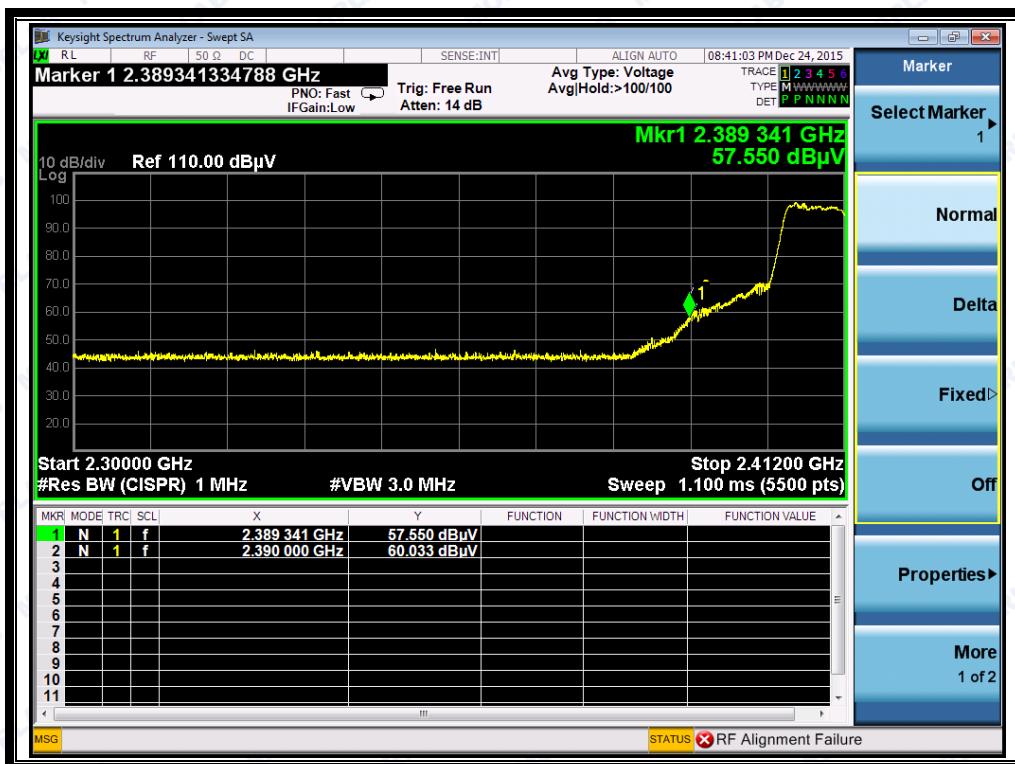
ANT 1:

A. Test Verdict:

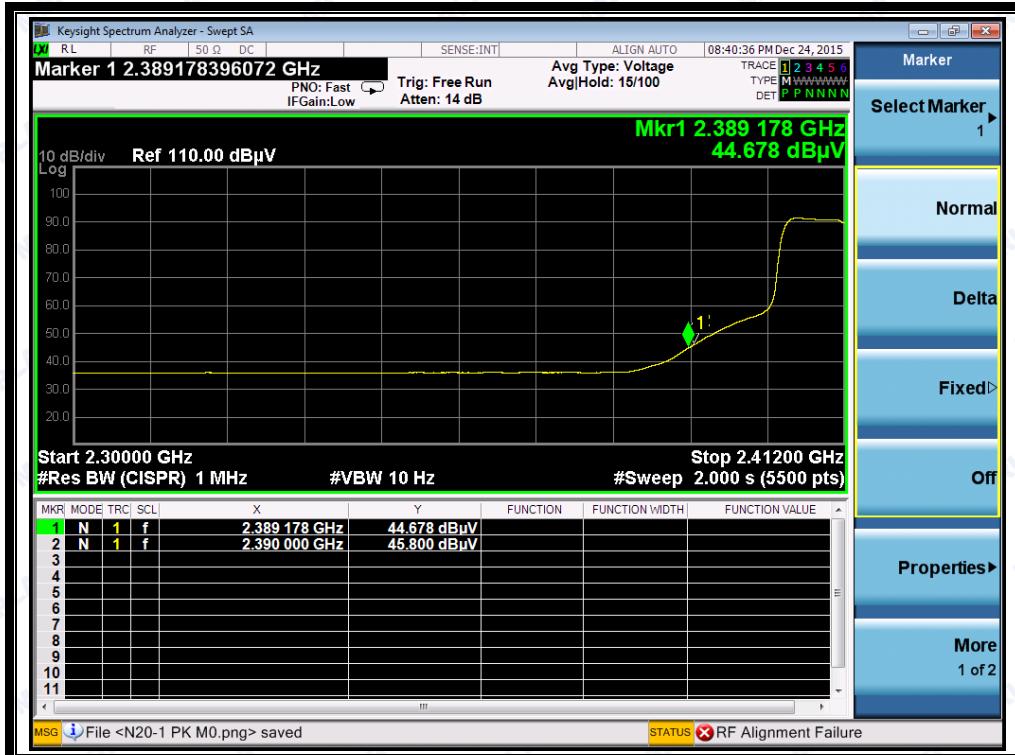
Channel	Frequency (MHz)	Detector	Receiver Reading U _R (dB μ V)	A _T (dB)	A _{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
1	2389.34	PK	57.55	-33.63	32.56	56.48	74	Pass
1	2389.18	AV	44.68	-33.63	32.56	43.61	54	Pass
11	2483.96	PK	62.56	-33.18	32.5	61.88	74	Pass
11	2484.06	AV	43.70	-33.18	32.5	43.02	54	Pass



REPORT No.: SZ15120141W01

B. Test Plots:

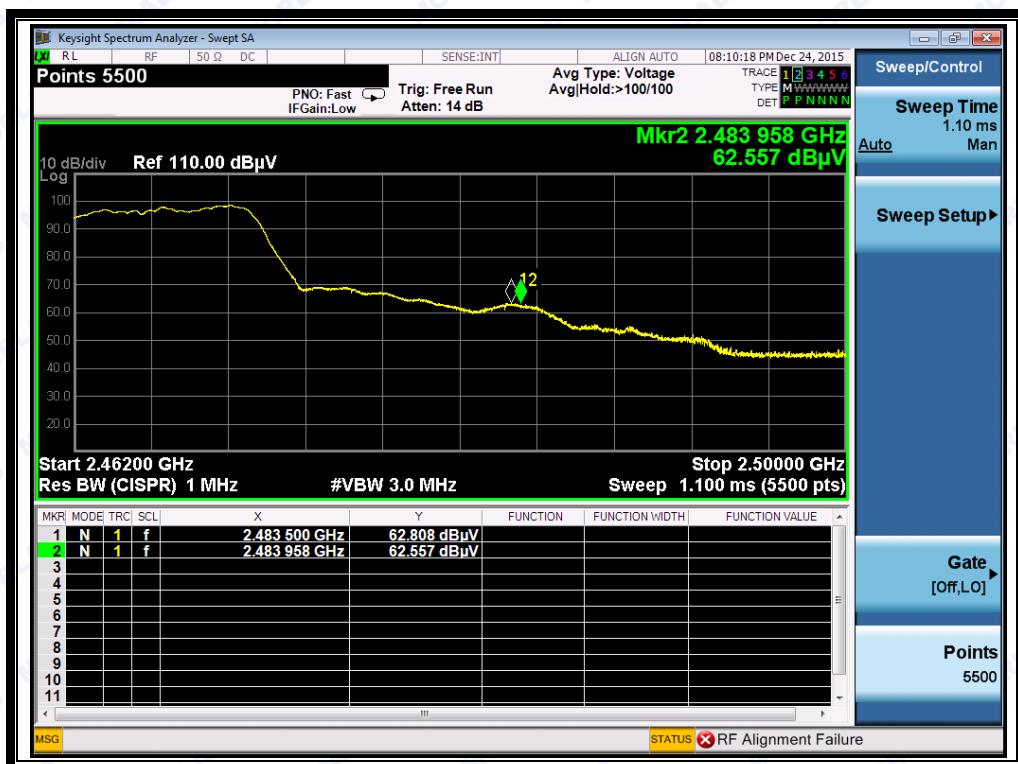
(Channel = 1 PEAK @ 802.11n-20)



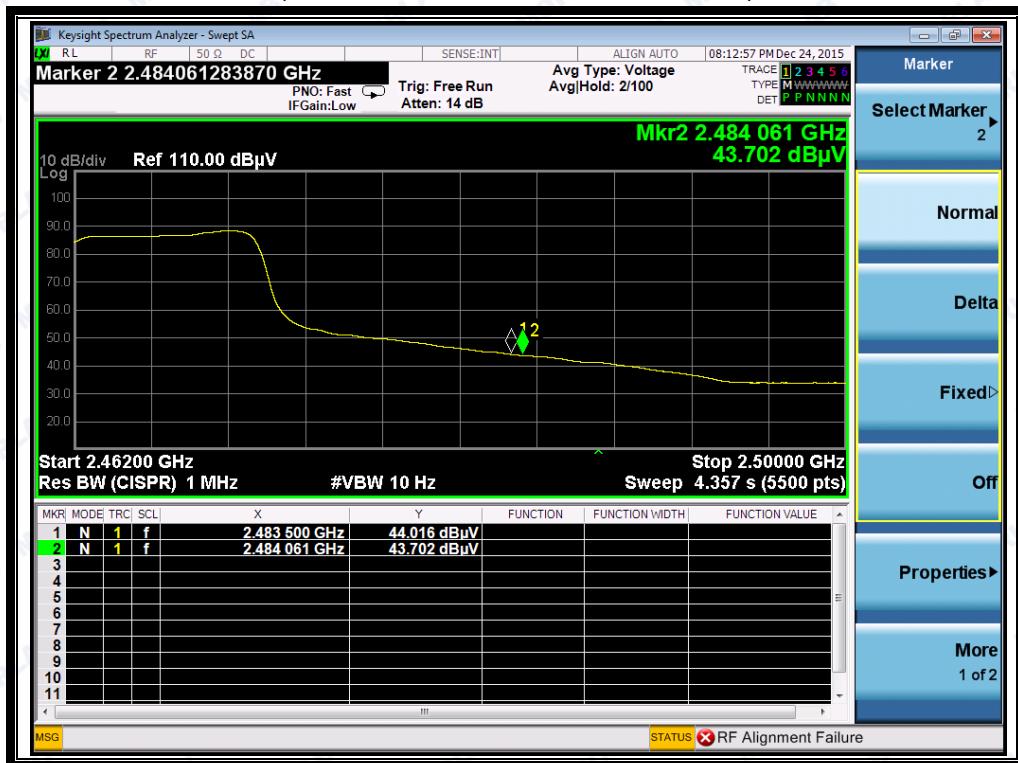
(Channel = 1 AVG @ 802.11n-20)



REPORT No.: SZ15120141W01



(Channel = 11 PEAK @ 802.11n-20)



(Channel = 11 AVG @ 802.11n-20)

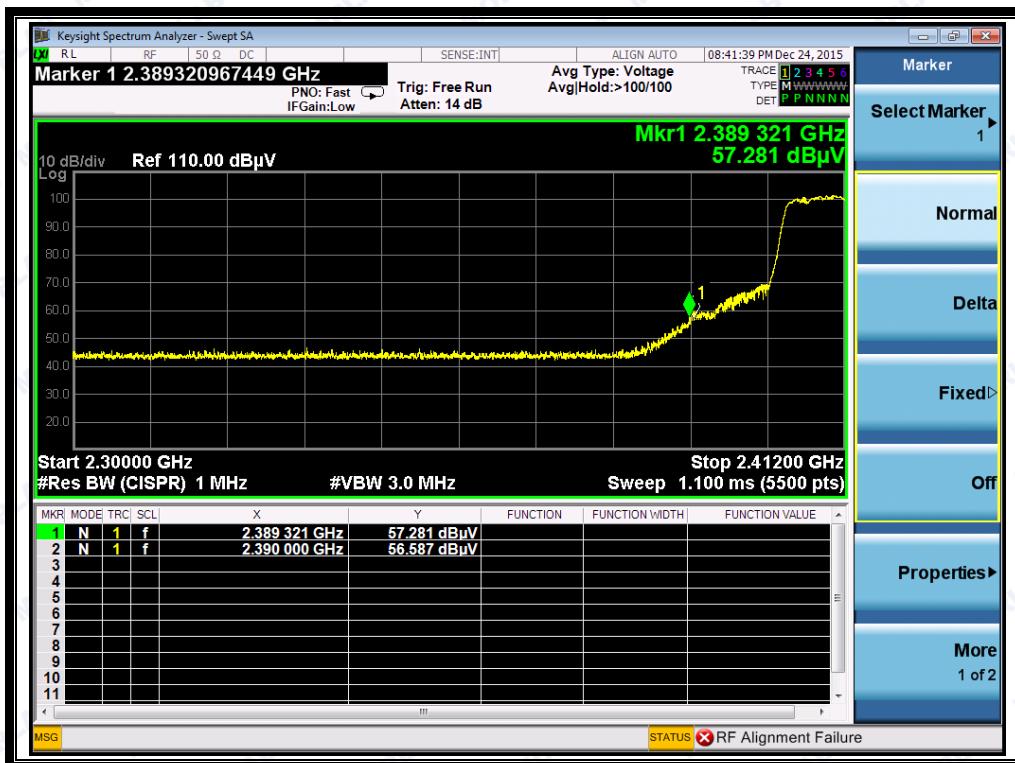


REPORT No.: SZ15120141W01

ANT 2:

C. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading	A _T (dB)	A _{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
			U _R (dB μ V)					
1	2389.32	PK	57.28	-33.63	32.56	56.21	74	Pass
1	2389.02	AV	43.94	-33.63	32.56	42.87	54	Pass
11	2485.04	PK	49.78	-33.18	32.5	49.10	74	Pass
11	2484.81	AV	37.73	-33.18	32.5	37.05	54	Pass

D. Test Plots:

(Channel = 1 PEAK @ 802.11n-20)

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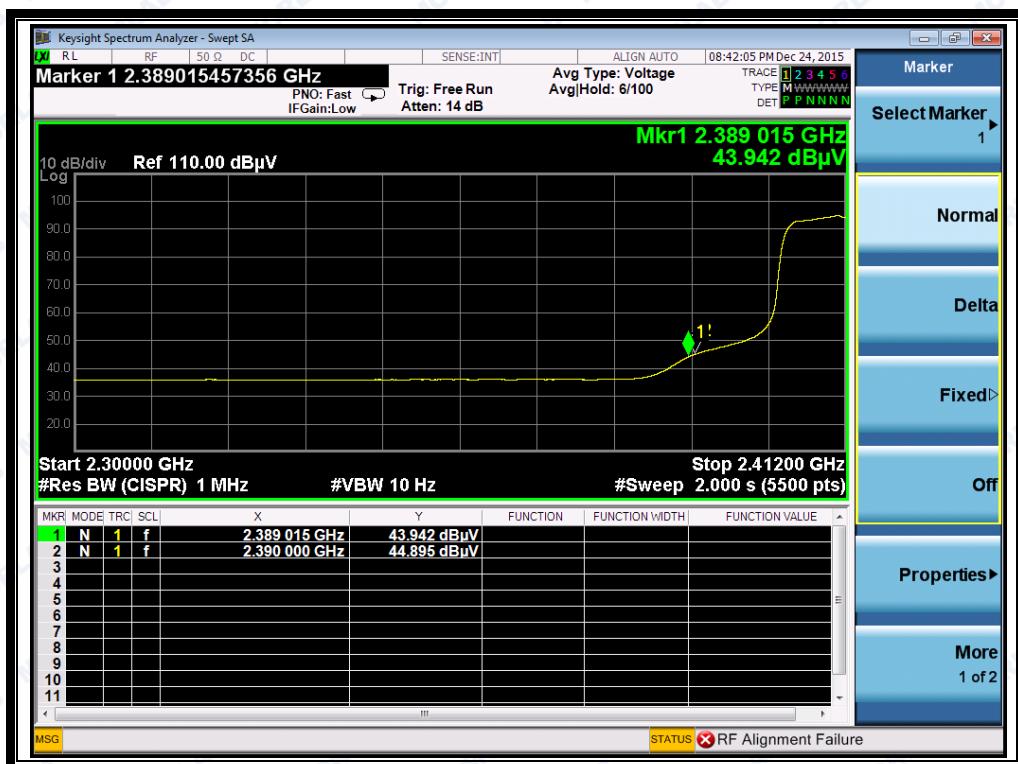
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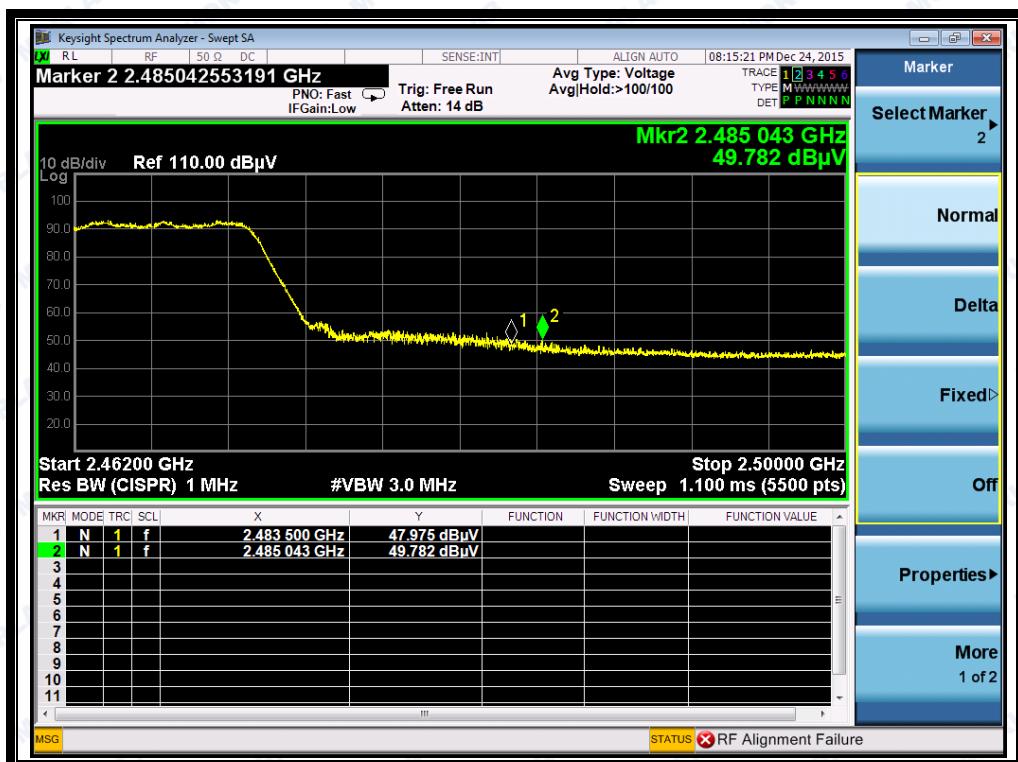
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(Channel = 1 AVG @ 802.11n-20)



(Channel = 11 PEAK @ 802.11n-20)

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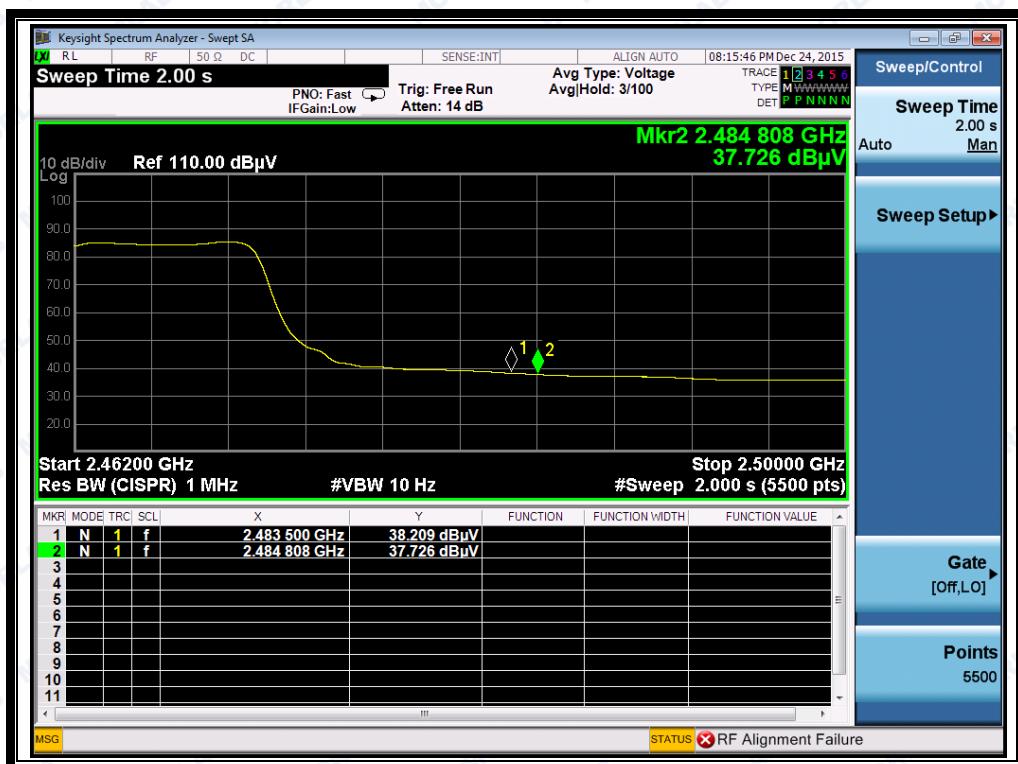
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(Channel = 11 AVG @ 802.11n-20)

ANT 1+ANT 2:

E. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U _R (dB μ V)	A _T (dB)	A _{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
		PK/ AV						
1	2388.83	PK	62.86	-33.63	32.56	61.79	74	Pass
1	2389.06	AV	46.20	-33.63	32.56	45.13	54	Pass
11	2484.19	PK	60.30	-33.18	32.5	59.62	74	Pass
11	2484.28	AV	44.16	-33.18	32.5	43.48	54	Pass

F. Test Plots:

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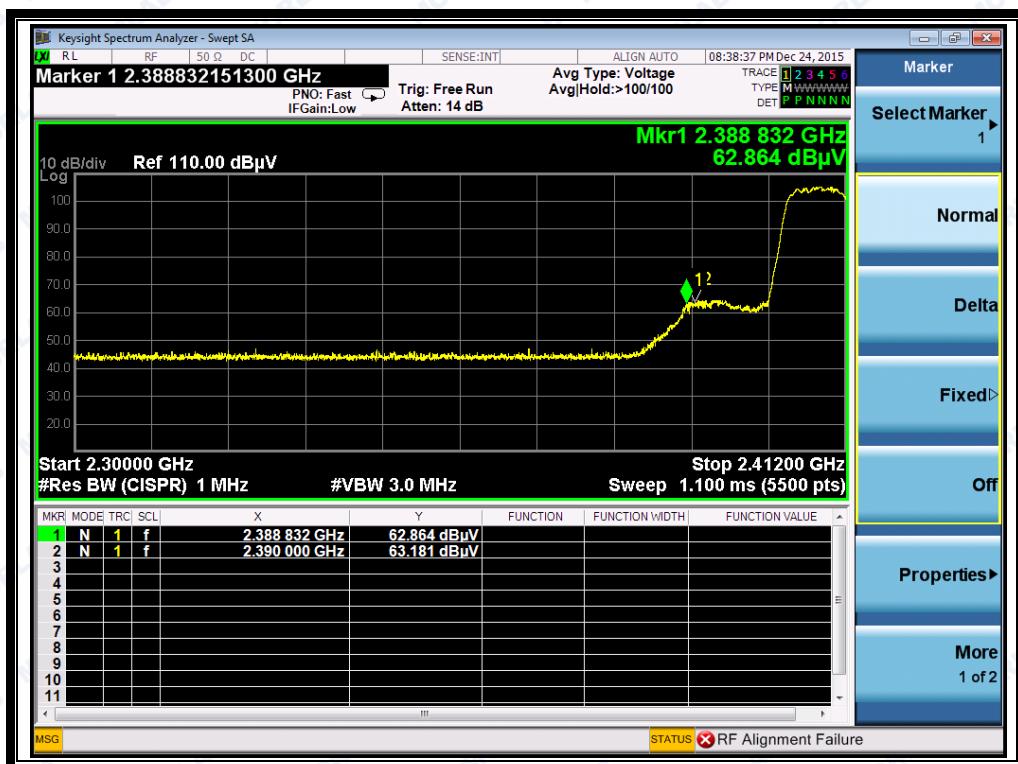
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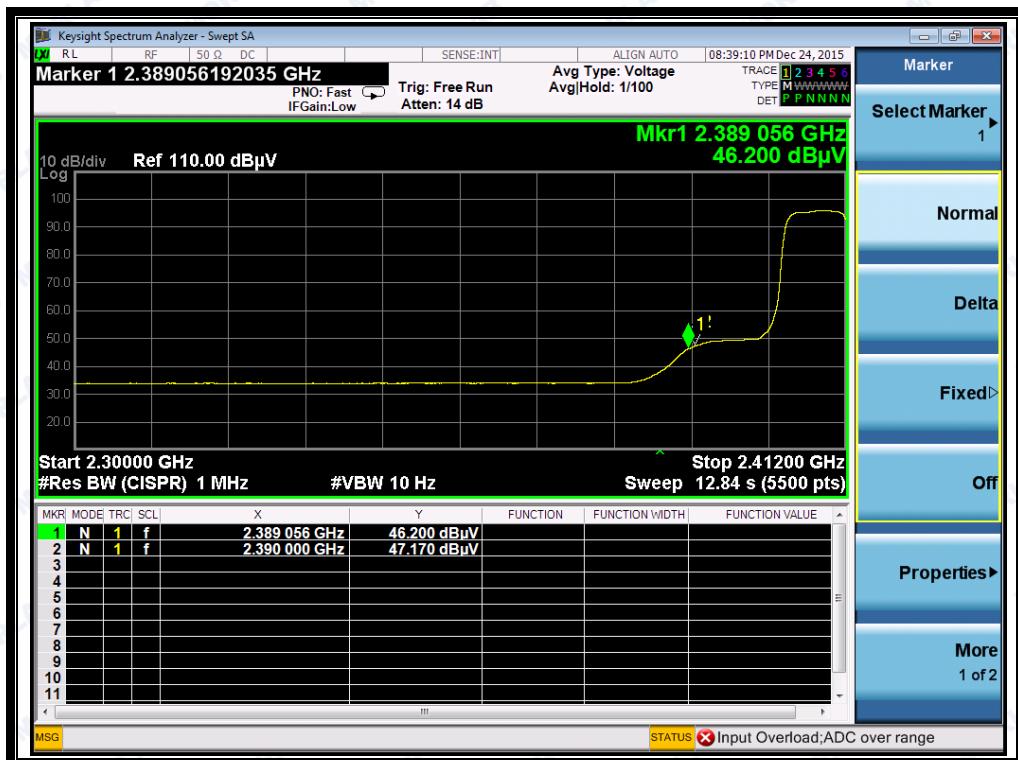
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(Channel = 1 PEAK @ 802.11n-20)



(Channel = 1 AVG @ 802.11n-20)

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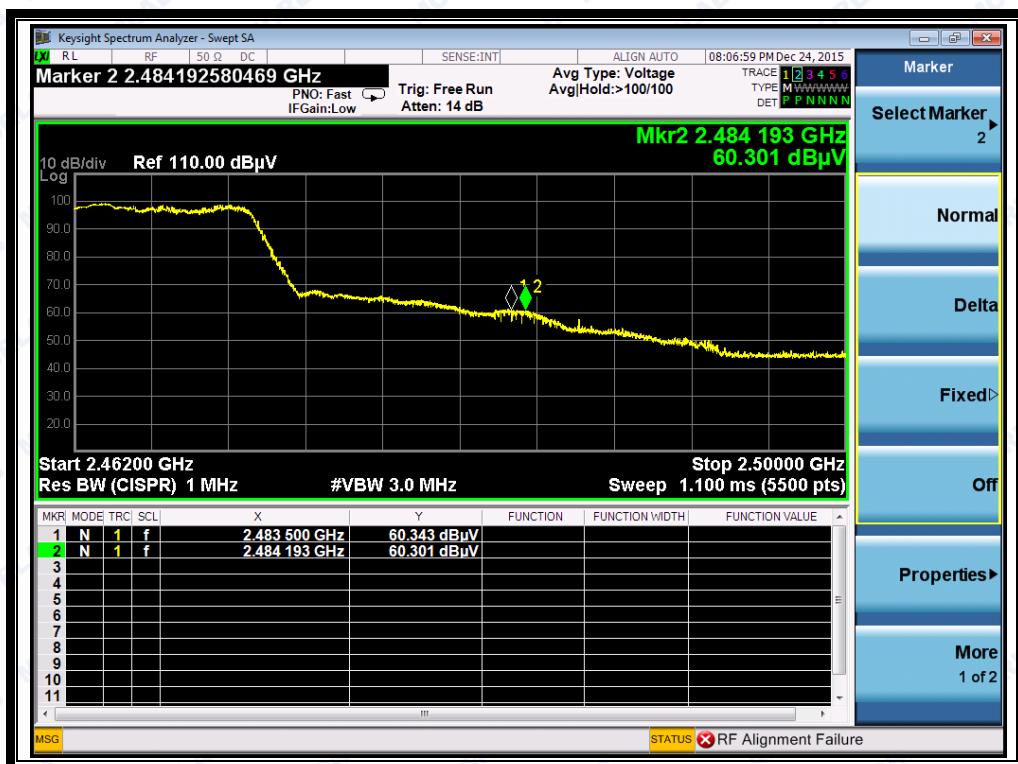
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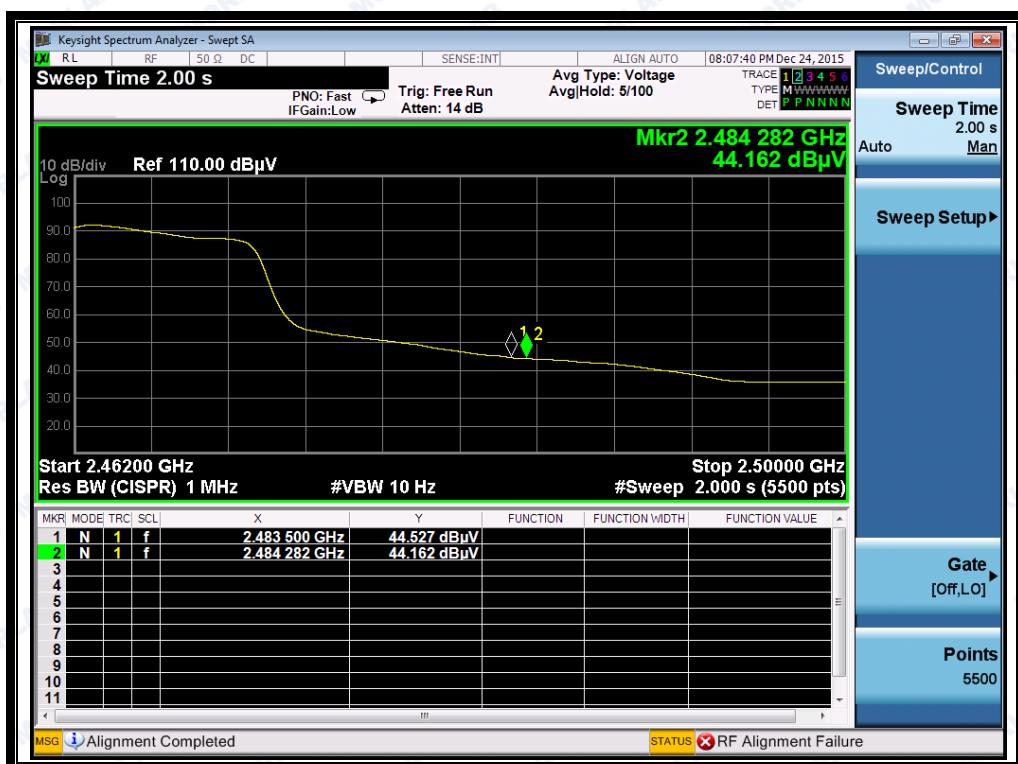
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(Channel = 11 PEAK @ 802.11n-20)



(Channel = 11 AVG @ 802.11n-20)

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2.6.3.4 802.11n-40MHz Test mode

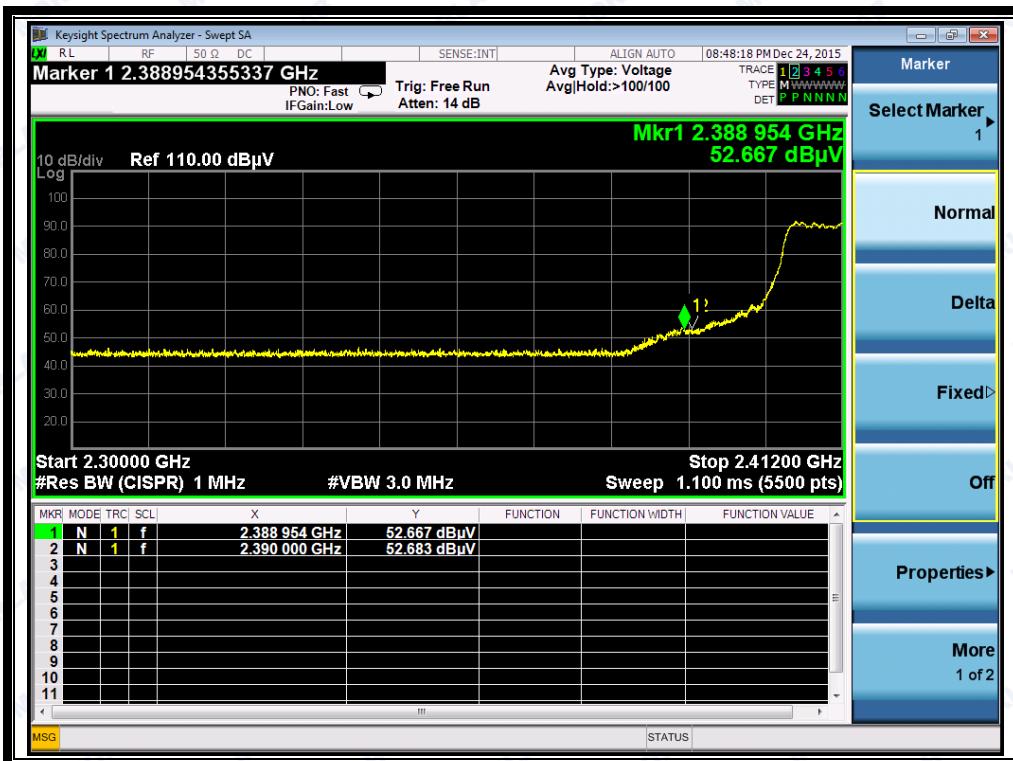
The lowest and highest channels are tested to verify the band edge emissions.

ANT 1:

A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver	A _T (dB)	A _{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
			U _R (dB μ V)					
3	2388.95	PK	52.67	-33.63	32.56	51.60	74	Pass
3	2389.18	AV	43.89	-33.63	32.56	42.82	54	Pass
9	2482.05	PK	53.36	-33.18	32.5	52.68	74	Pass
9	2481.73	AV	42.24	-33.18	32.5	41.56	54	Pass

B. Test Plots:



(Channel = 3 PEAK @ 802.11n-40)

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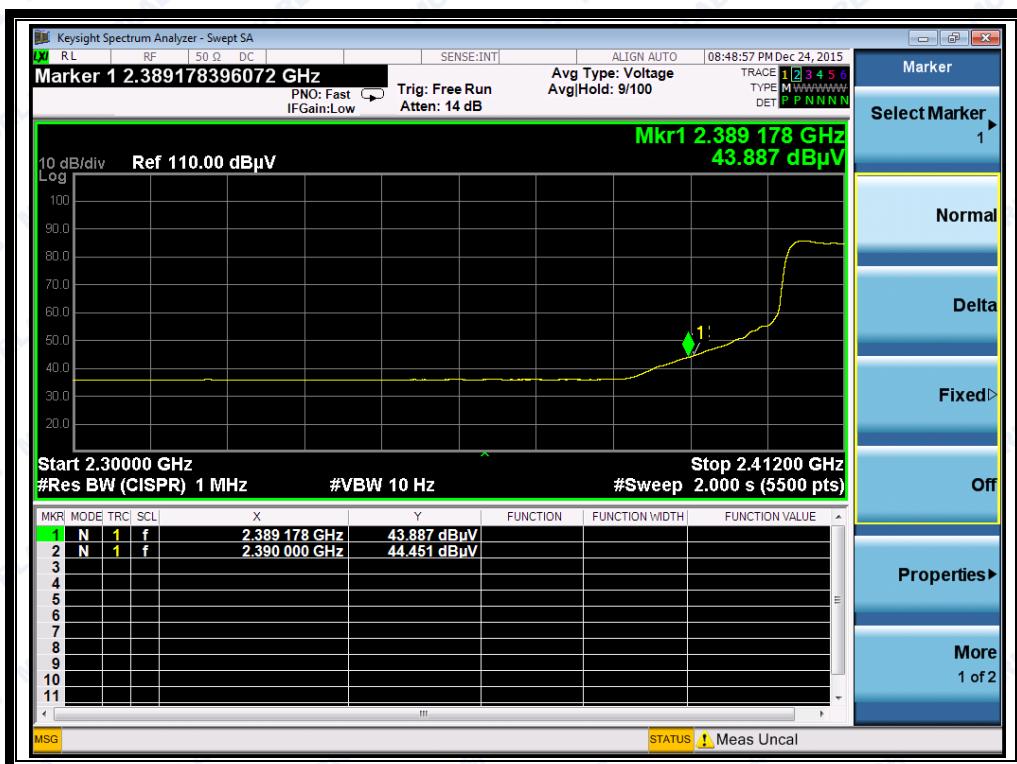
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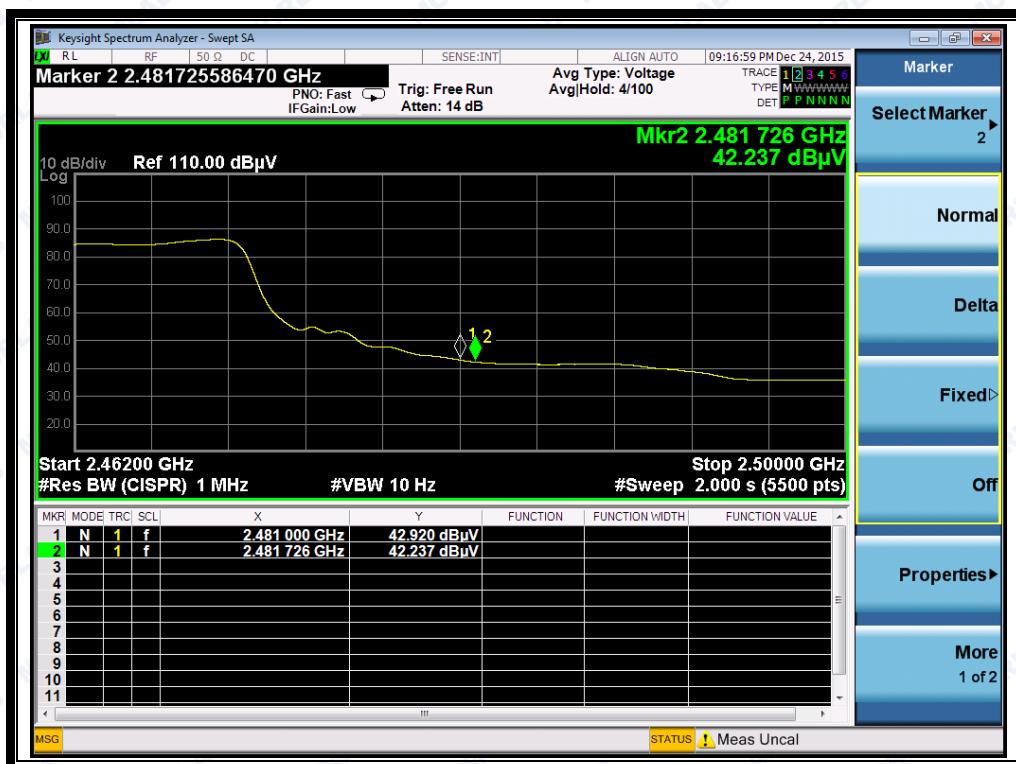
(Channel = 3 AVG @ 802.11n-40)



(Channel = 9 PEAK @ 802.11n-40)



REPORT No.: SZ15120141W01



(Channel = 9 AVG @ 802.11n-40)

ANT 2:

C. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver	A _T (dB)	A _{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
			U _R (dB μ V)					
3	2388.89	PK	47.39	-33.63	32.56	46.32	74	Pass
3	2388.69	AV	39.15	-33.63	32.56	38.08	54	Pass
9	2481.73	PK	50.81	-33.18	32.5	50.13	74	Pass
9	2481.64	AV	41.03	-33.18	32.5	40.35	54	Pass

D. Test Plots:

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Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555

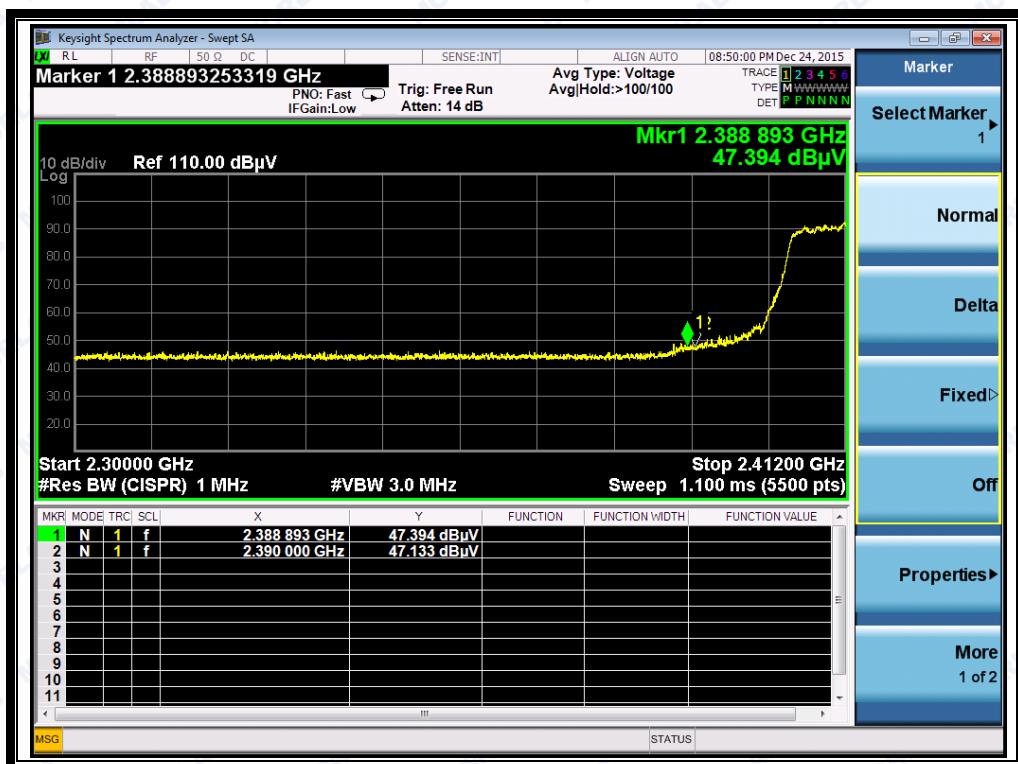
Fax: 86-755-36698525

Http://www.morlab.com

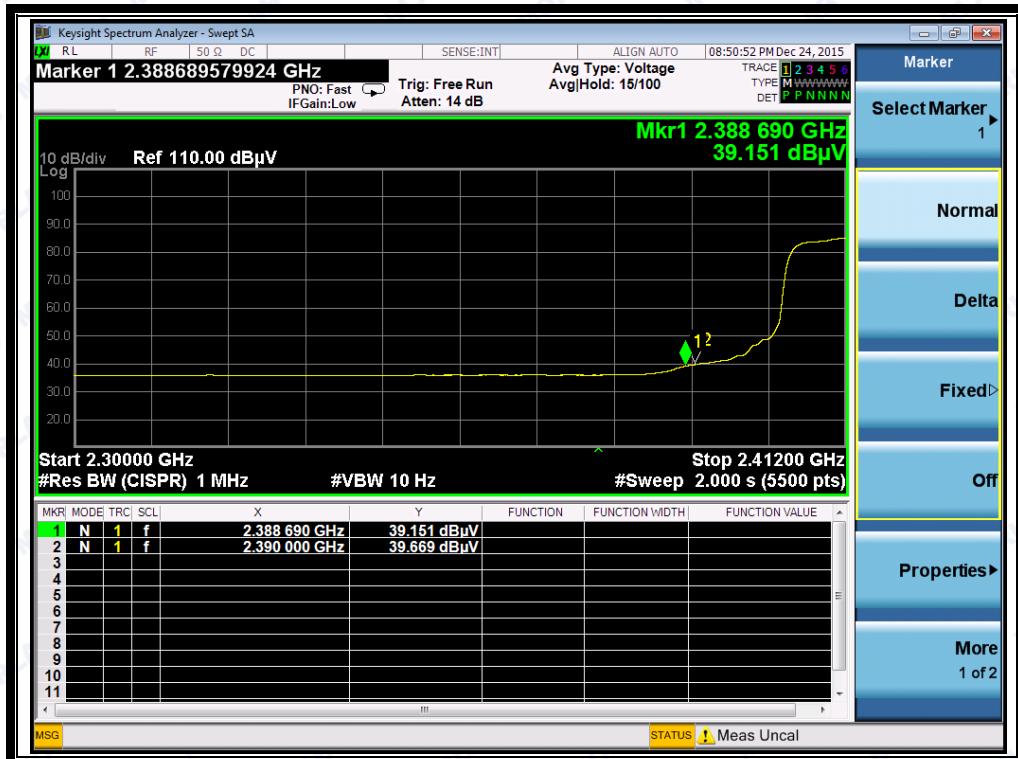
E-mail: service@morlab.cn



REPORT No.: SZ15120141W01



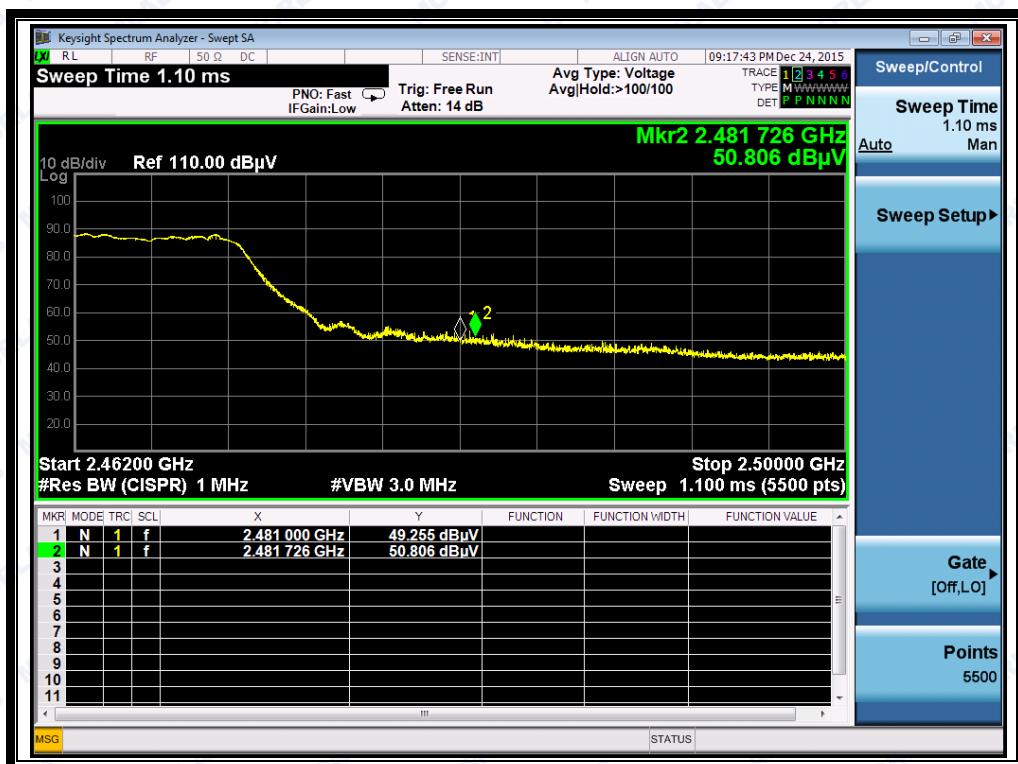
(Channel = 3 PEAK @ 802.11n-40)



(Channel = 3 AVG @ 802.11n-40)



REPORT No.: SZ15120141W01



(Channel = 9 PEAK @ 802.11n-40)



(Channel = 9 AVG @ 802.11n-40)

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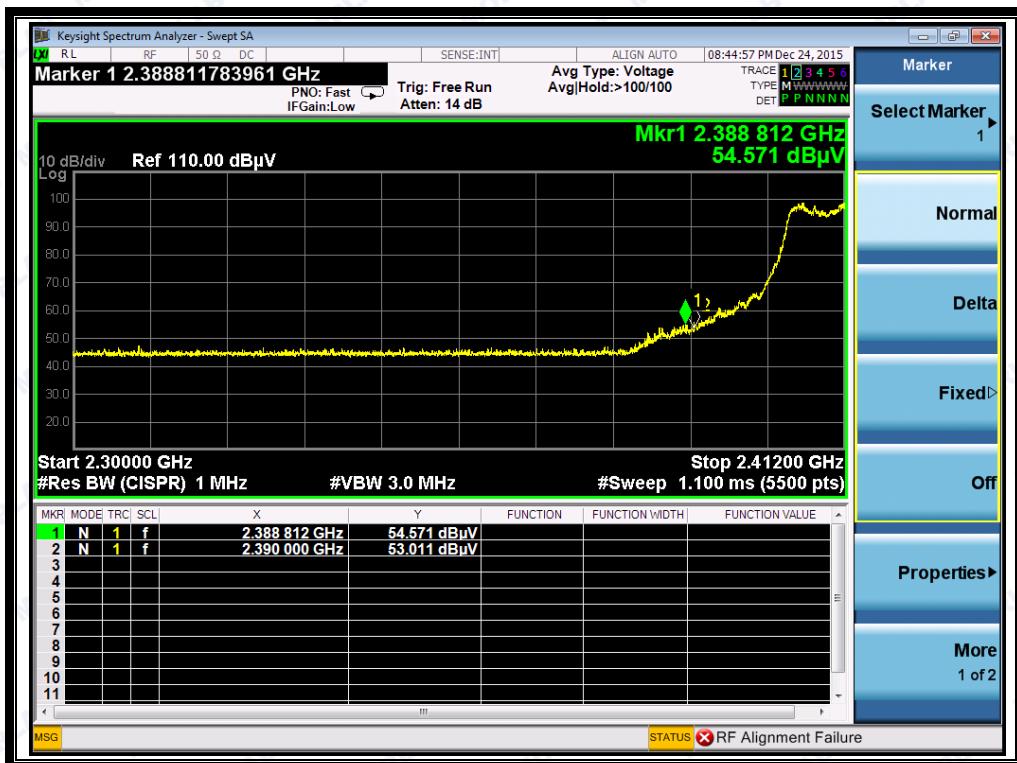


REPORT No.: SZ15120141W01

ANT 1+ANT 2:

E. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U _R (dBuV)	A _T (dB)	A _{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
		PK/ AV						
3	2388.81	PK	54.57	-33.63	32.56	53.50	74	Pass
3	2388.81	AV	43.86	-33.63	32.56	42.19	54	Pass
9	2481.79	PK	55.29	-33.18	32.5	54.61	74	Pass
9	2481.59	AV	43.51	-33.18	32.5	42.83	54	Pass

F. Test Plots:

(Channel = 3 PEAK @ 802.11n-40)

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Tel: 86-755-36698555

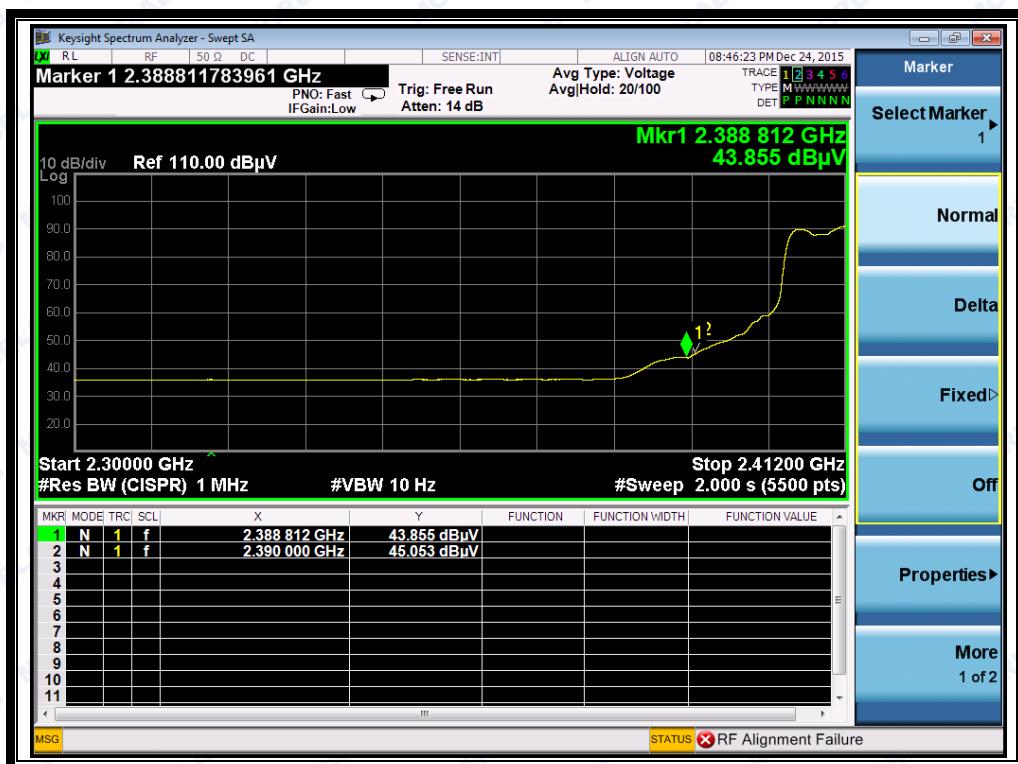
Fax: 86-755-36698525

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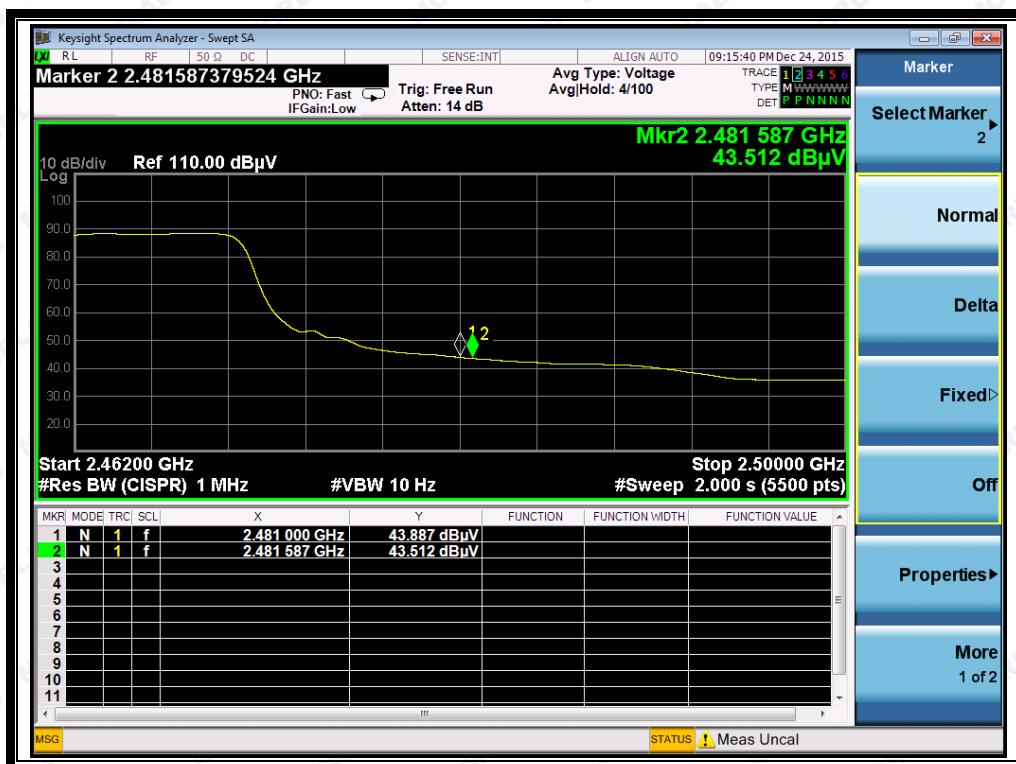
(Channel = 3 AVG @ 802.11n-40)



(Channel = 9 PEAK @ 802.11n-40)



REPORT No.: SZ15120141W01



(Channel = 9 AVG @ 802.11n-40)

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2.7 Radiated Emission

2.7.1 Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

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

Frequency (MHz)	Field Strength (μ V/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

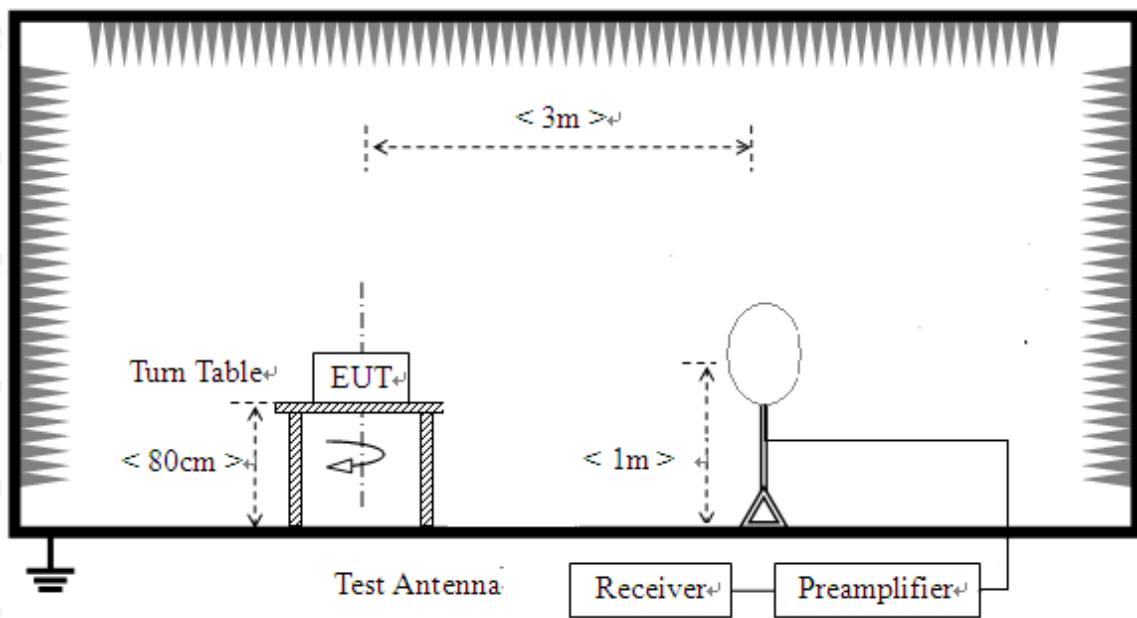
For above 1000MHz, limit field strength of harmonics: 54dB_{UV}/m@3m (AV) and 74dB_{UV}/m@3m (PK)

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

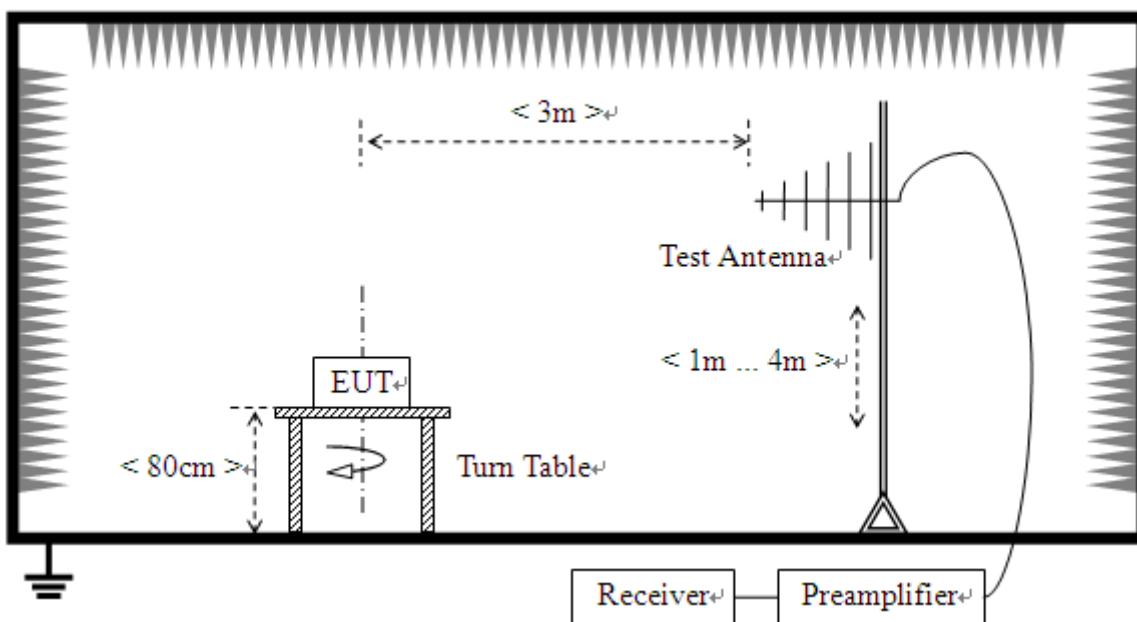
2.7.2 Test Description

A. Test Setup:

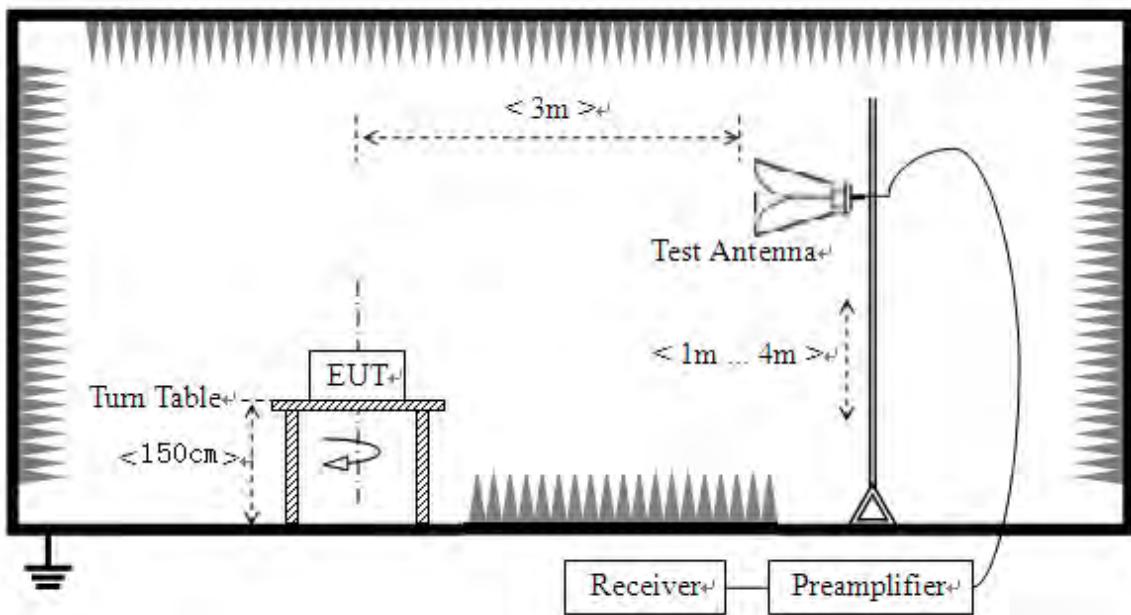
- 1) For radiated emissions from 9kHz to 30MHz



- 2) For radiated emissions from 30MHz to 1GHz



3) For radiated emissions above 1GHz



The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10-2013. For radiated emissions below or equal to 1GHz, The EUT was set-up on insulator 80cm above the Ground Plane, For radiated emissions above 1GHz, The EUT was set-up on insulator 1.5m above the Ground Plane. The set-up and test methods were according to ANSI C63.10-2013.

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading

For the Test Antenna:

- (a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna.



The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.

(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

B. Equipments List:

Please reference ANNEX A(1.4).

2.7.3 Test Result

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$$E [\text{dB}\mu\text{V/m}] = U_R + A_T + A_{\text{Factor}} [\text{dB}]; A_T = L_{\text{Cable loss}} [\text{dB}] - G_{\text{preamp}} [\text{dB}]$$

A_T : Total correction Factor except Antenna

U_R : Receiver Reading

G_{preamp} : Preamplifier Gain

A_{Factor} : Antenna Factor at 3m

During the test, the total correction Factor A_T and A_{Factor} were built in test software.

The low frequency, which started from 9KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

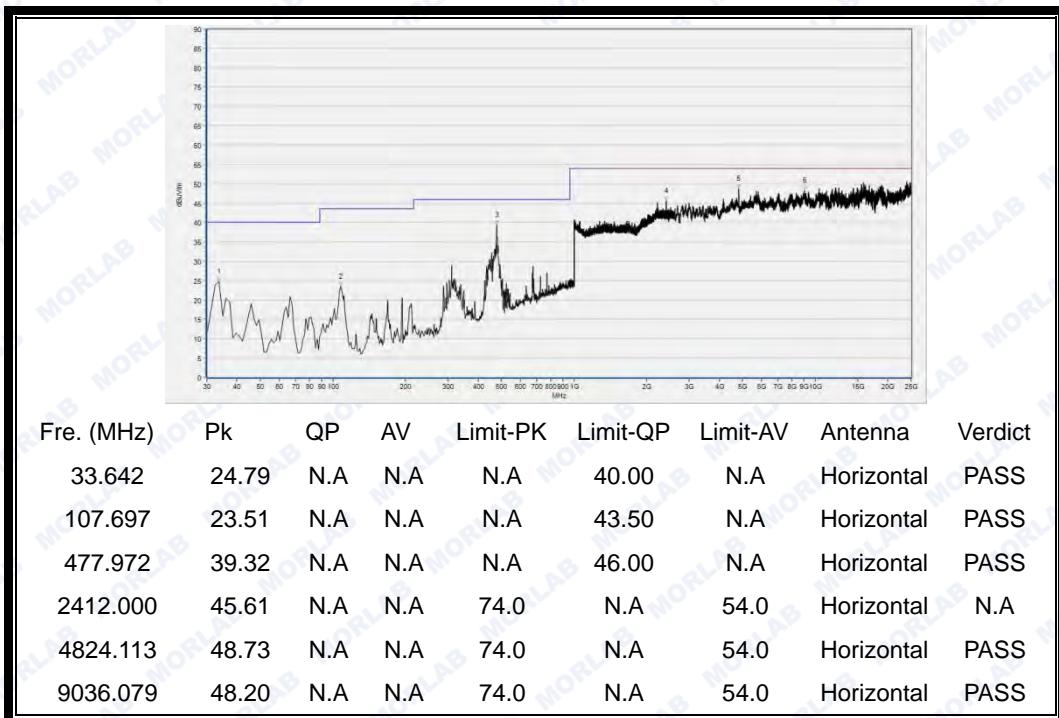


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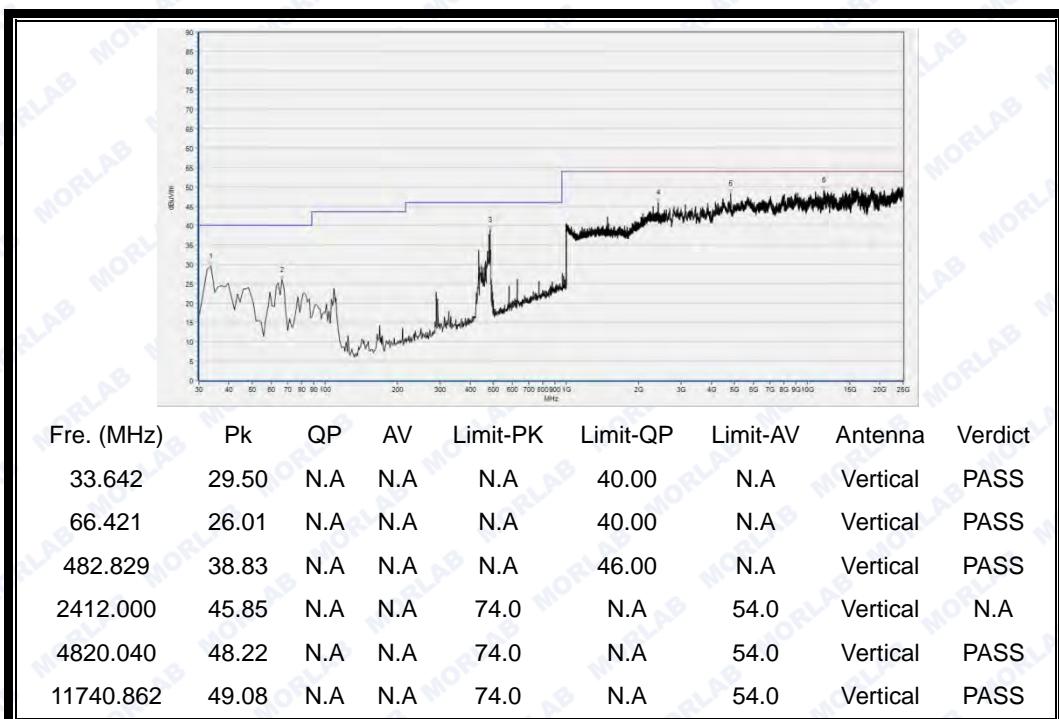
2.7.3.1 802.11b Test mode

A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 1



(Antenna Horizontal, 30MHz to 25GHz)

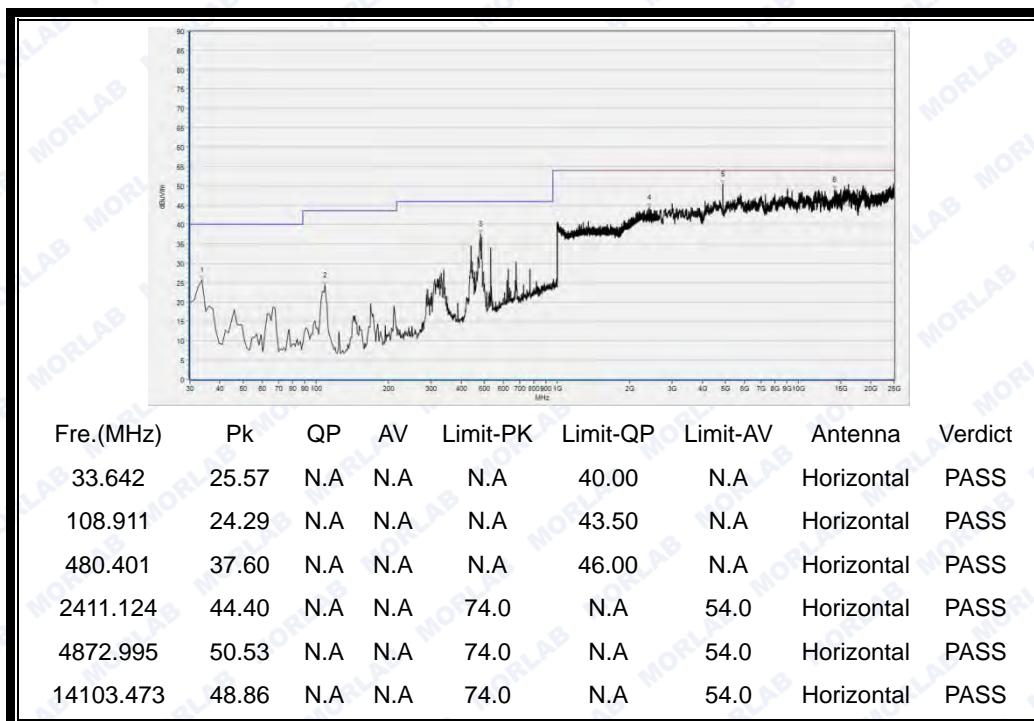


(Antenna Vertical, 30MHz to 25GHz)

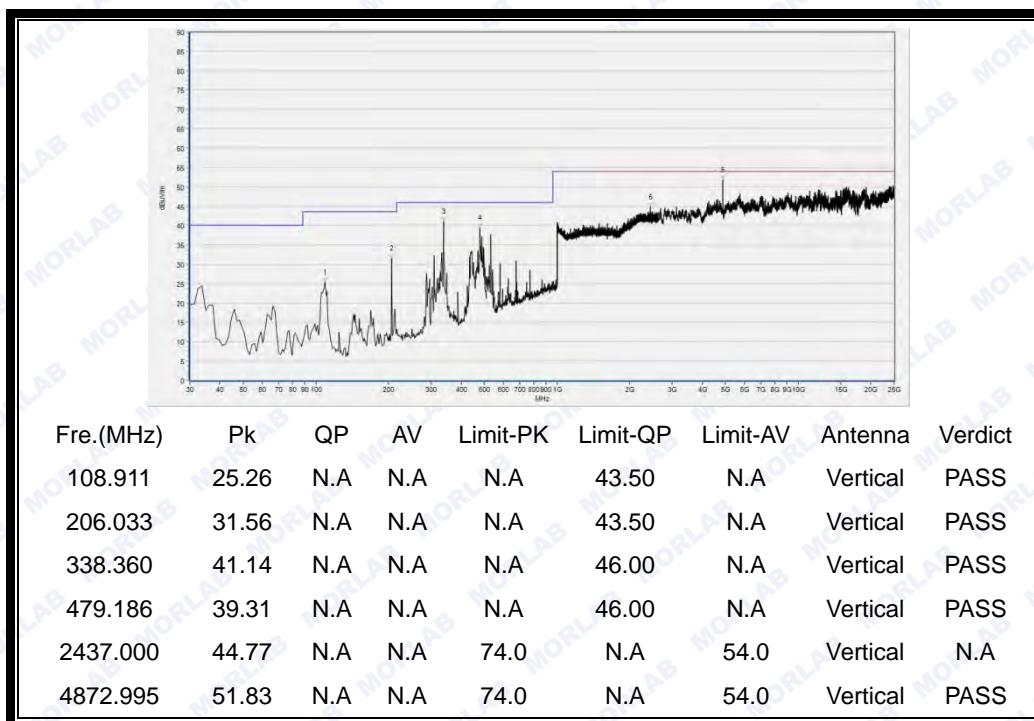


REPORT No.: SZ15120141W01

Plot for Channel = 6



(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

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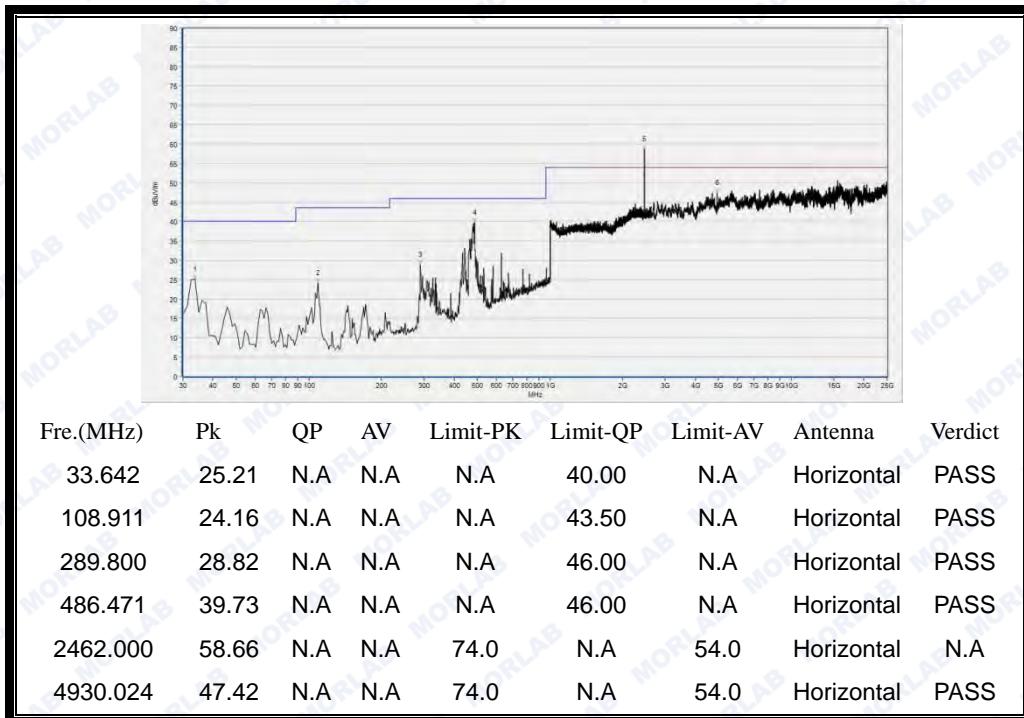
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E-mail: service@morlab.cn

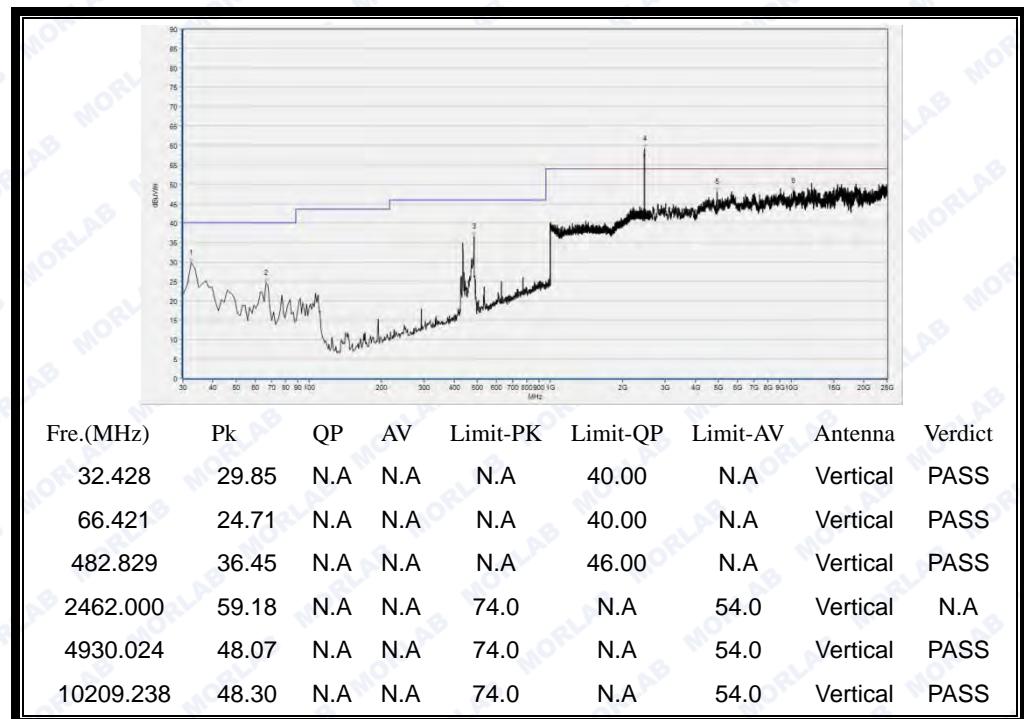


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Plot for Channel = 11



(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

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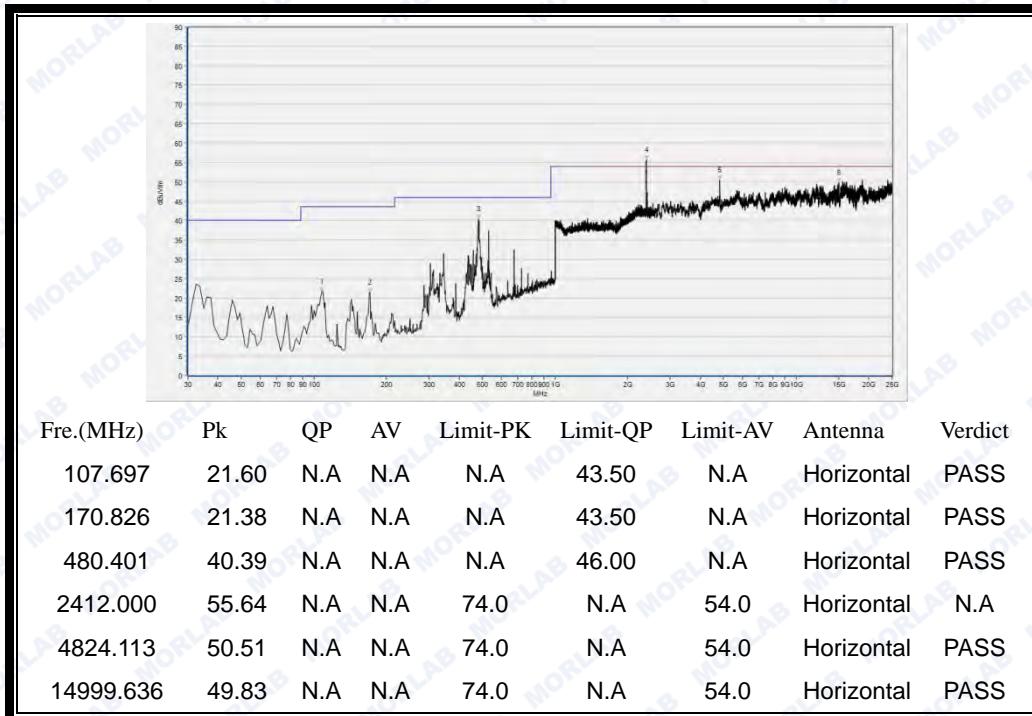


REPORT No.: SZ15120141W01

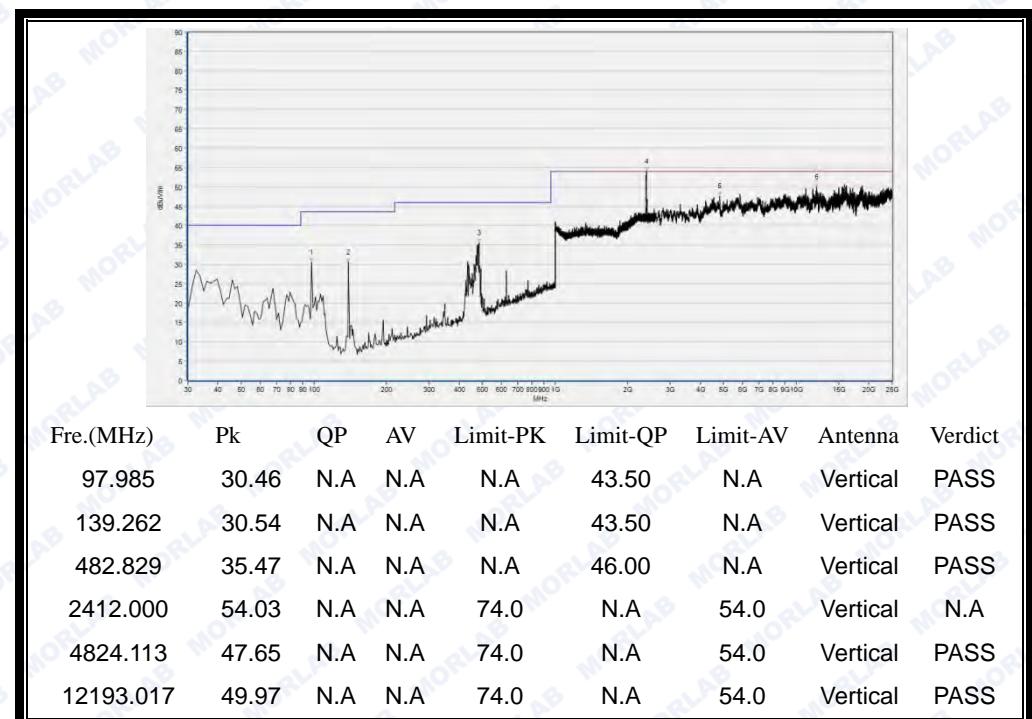
2.7.3.2 802.11g Test mode

A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 1



(Antenna Horizontal, 30MHz to 25GHz)

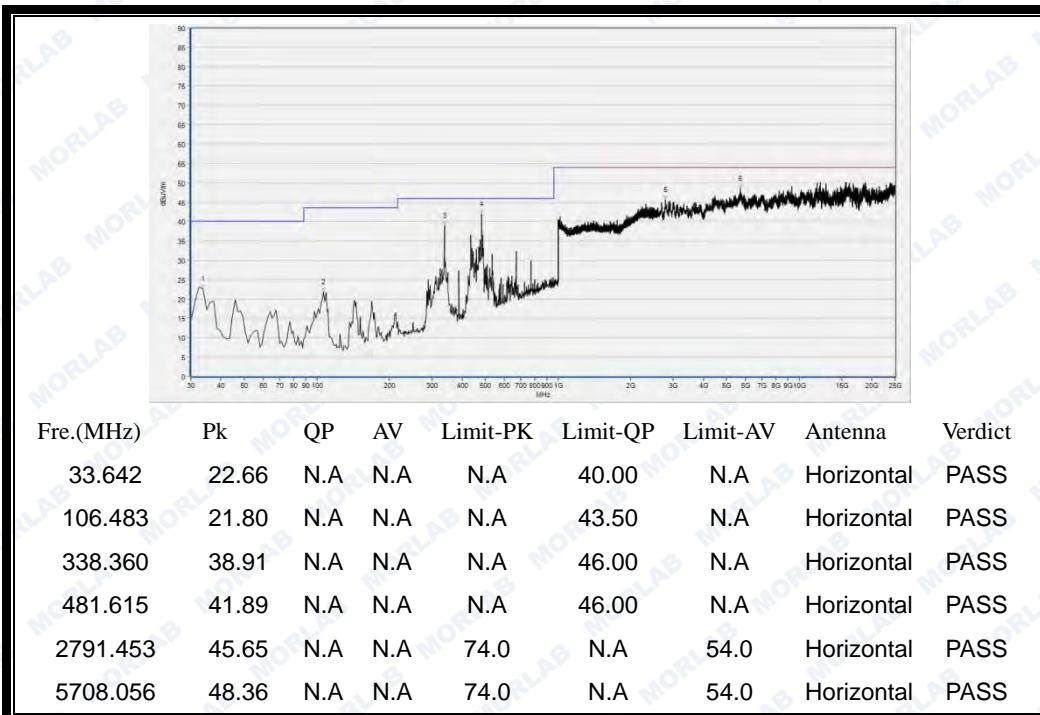


(Antenna Vertical, 30MHz to 25GHz)

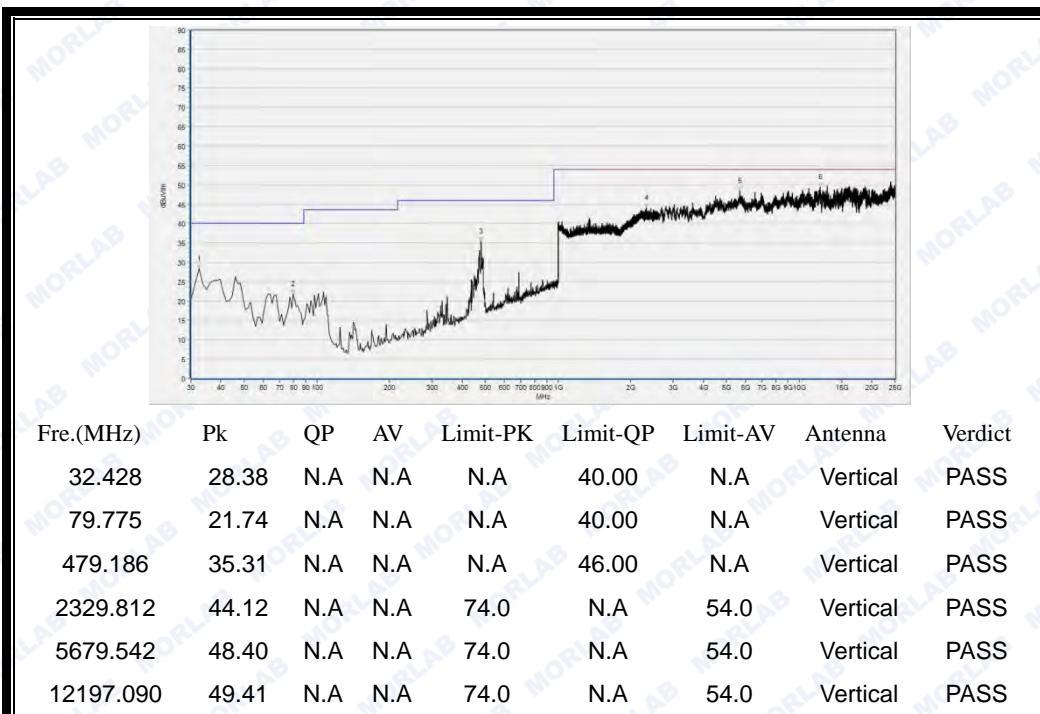


REPORT No.: SZ15120141W01

Plot for Channel = 6



(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

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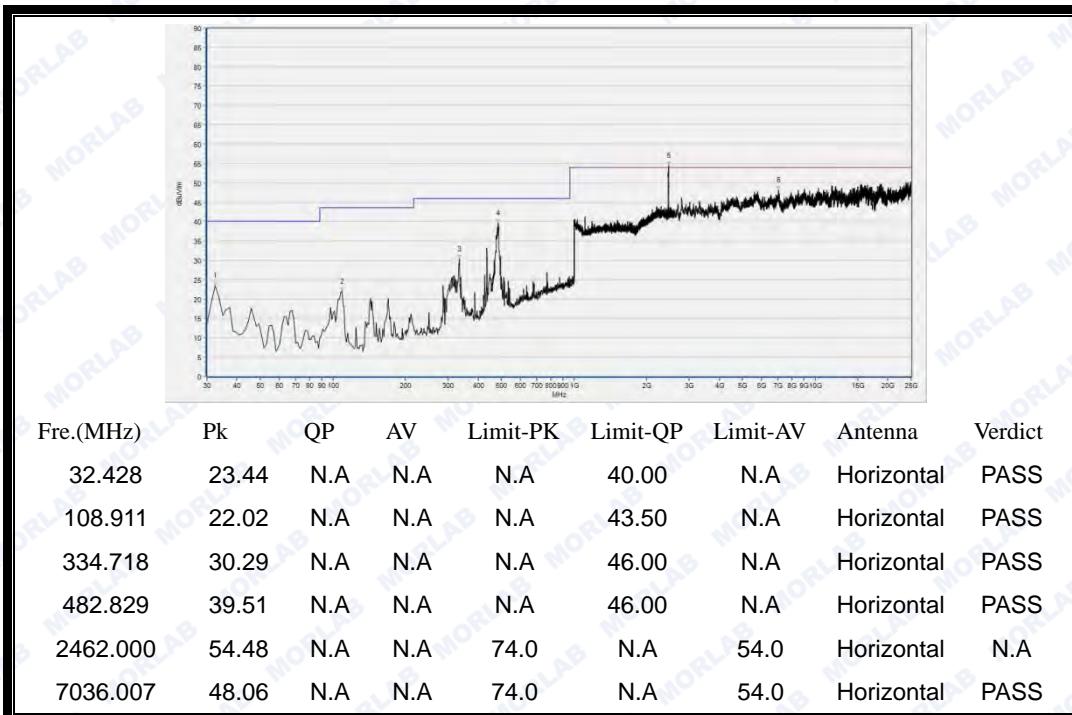
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E-mail: service@morlab.cn

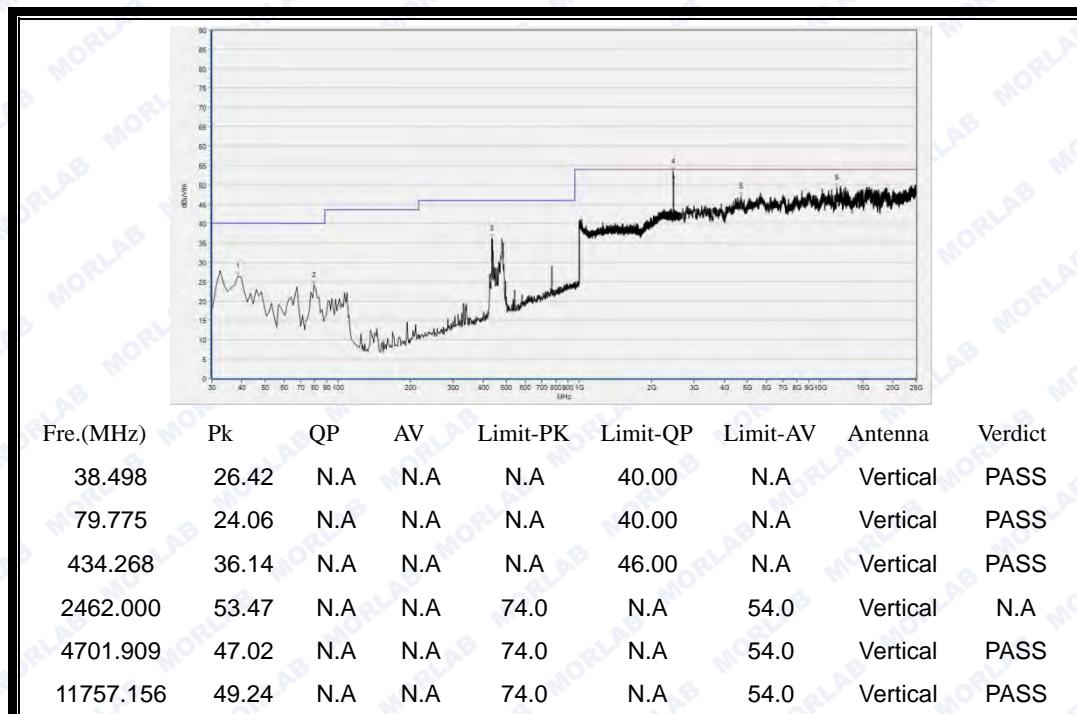


REPORT No.: SZ15120141W01

Plot for Channel = 11



(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

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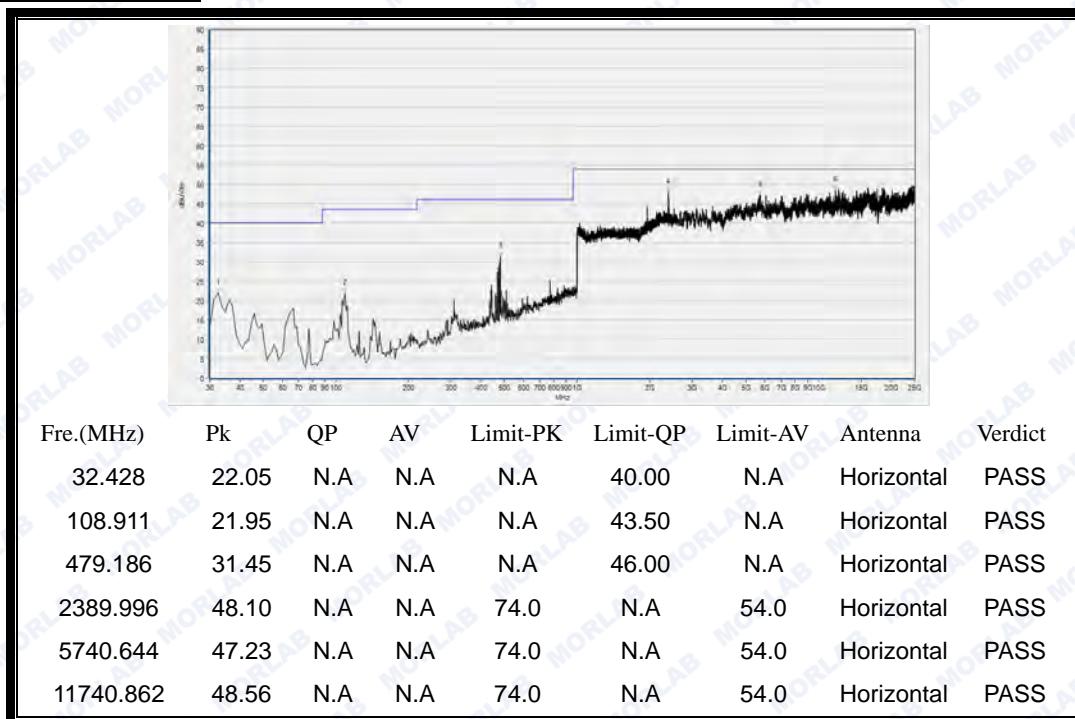
REPORT No.: SZ15120141W01

2.7.3.3 802.11n-20MHz Test mode

ANT 1:

A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 1



(Antenna Horizontal, 30MHz to 25GHz)

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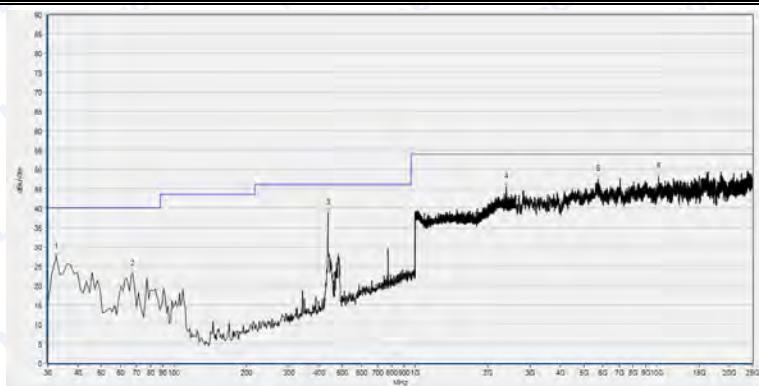
Fax: 86-755-36698525

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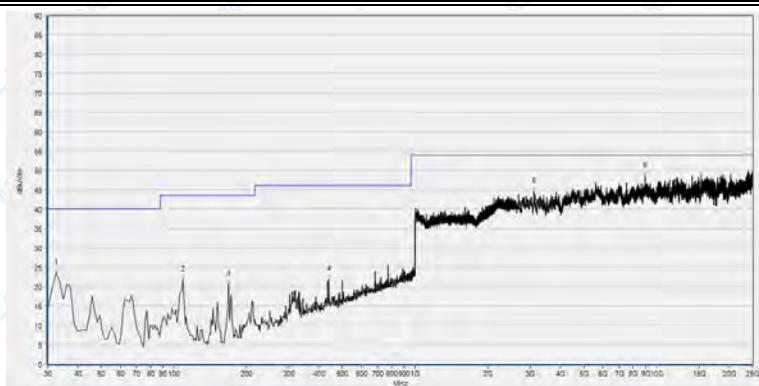
REPORT No.: SZ15120141W01



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
32.428	27.53	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
67.635	22.97	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
434.268	38.72	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2389.996	45.49	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
5748.791	47.57	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
10209.238	48.20	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 6



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
32.428	23.51	N.A	N.A	N.A	40.00	N.A	Horizontal	PASS
108.911	21.75	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
168.398	20.50	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
439.124	21.88	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
3109.183	44.68	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
8958.683	48.61	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

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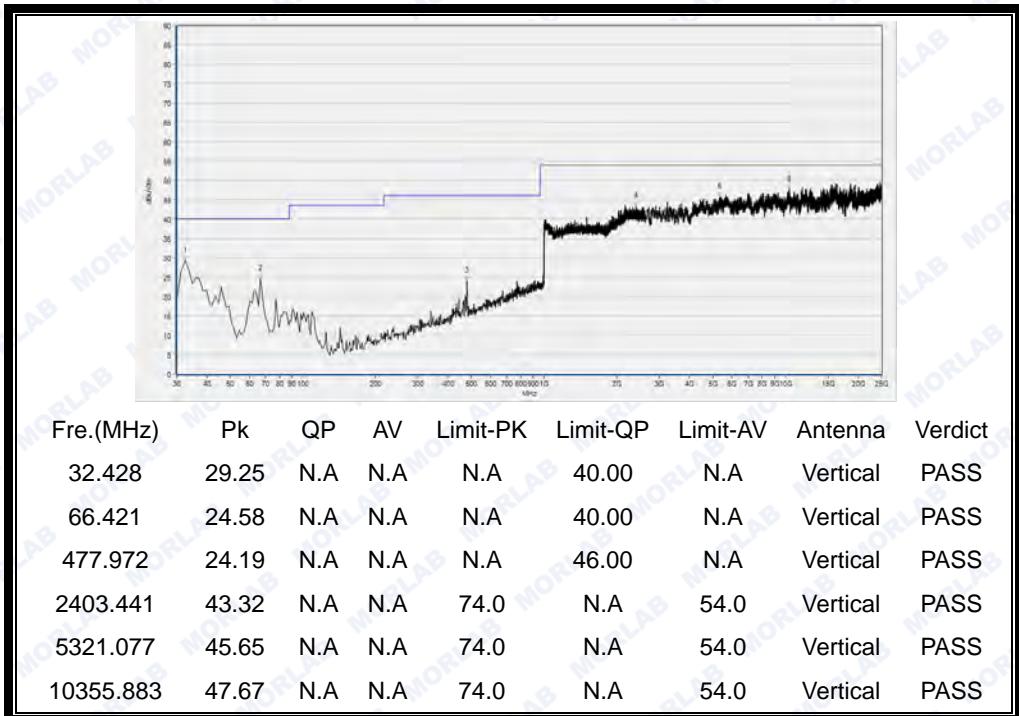
Fax: 86-755-36698525

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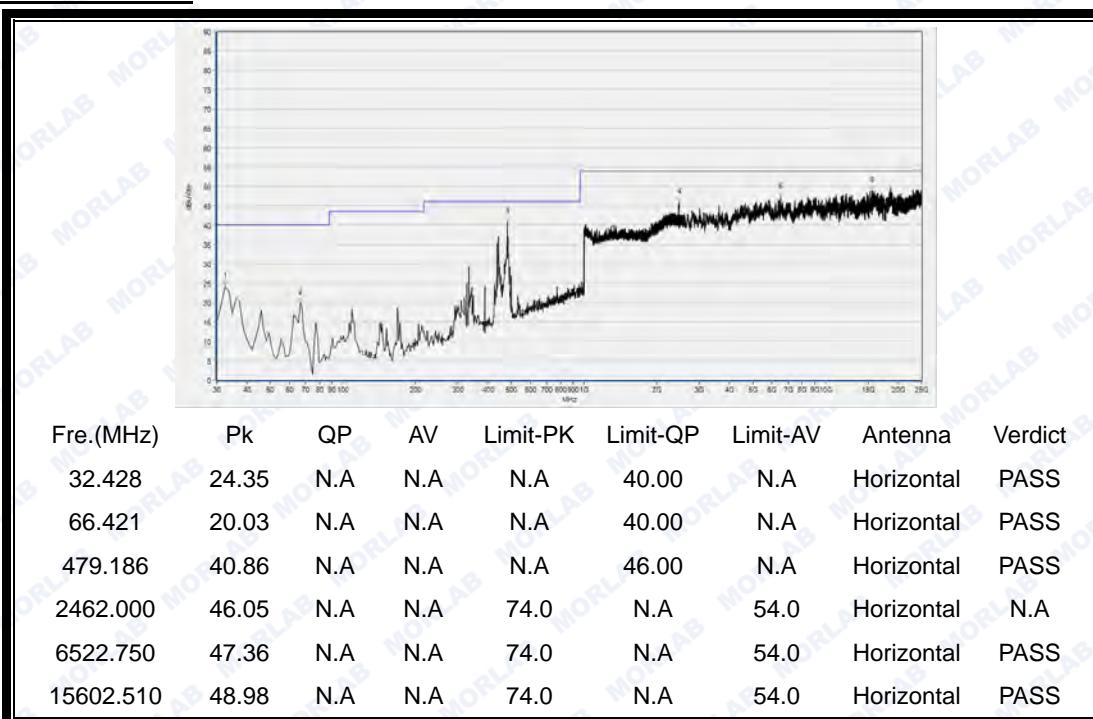


REPORT No.: SZ15120141W01



(Antenna Vertical, 30MHz to 25GHz)

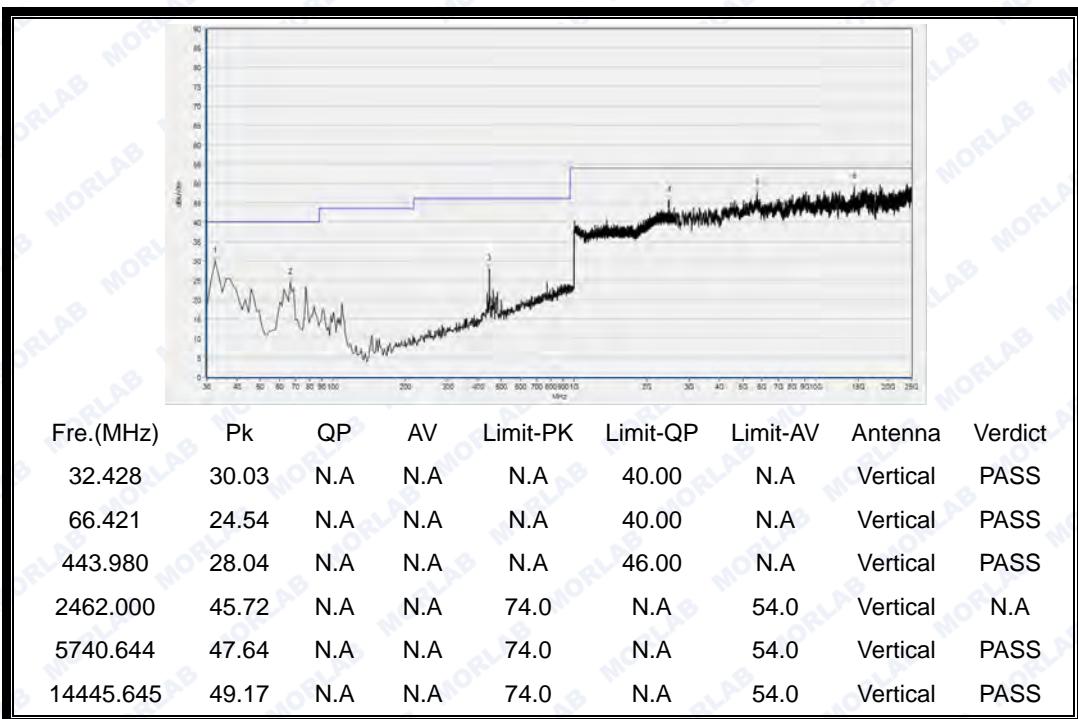
Plot for Channel = 11



(Antenna Horizontal, 30MHz to 25GHz)



REPORT No.: SZ15120141W01



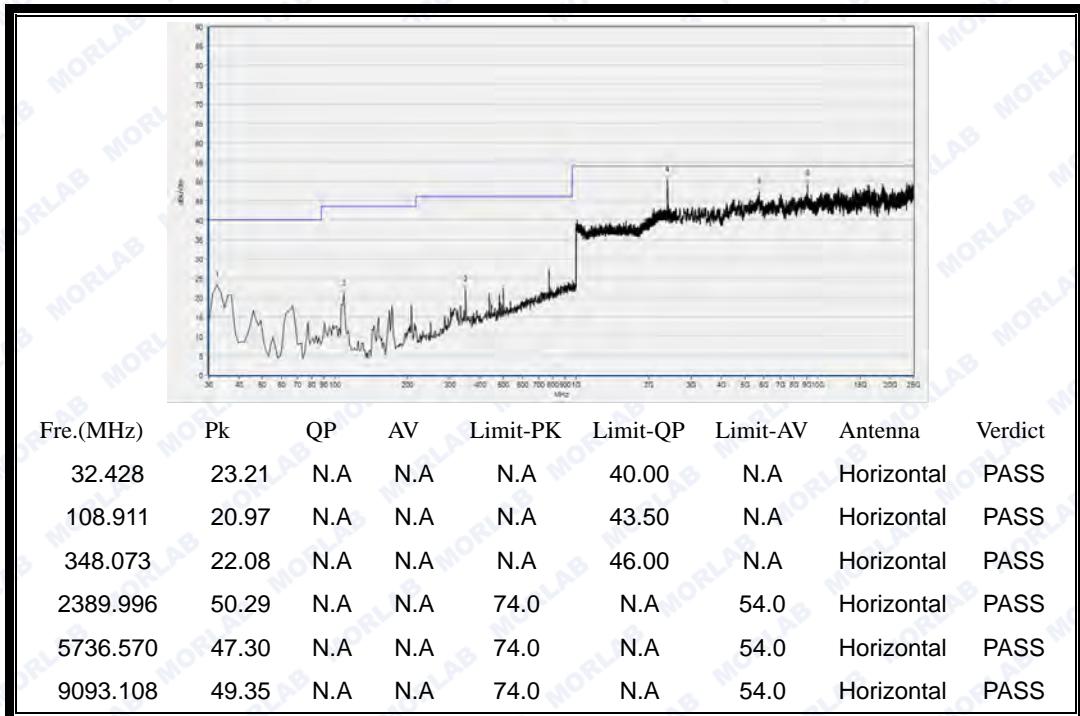
(Antenna Vertical, 30MHz to 25GHz)

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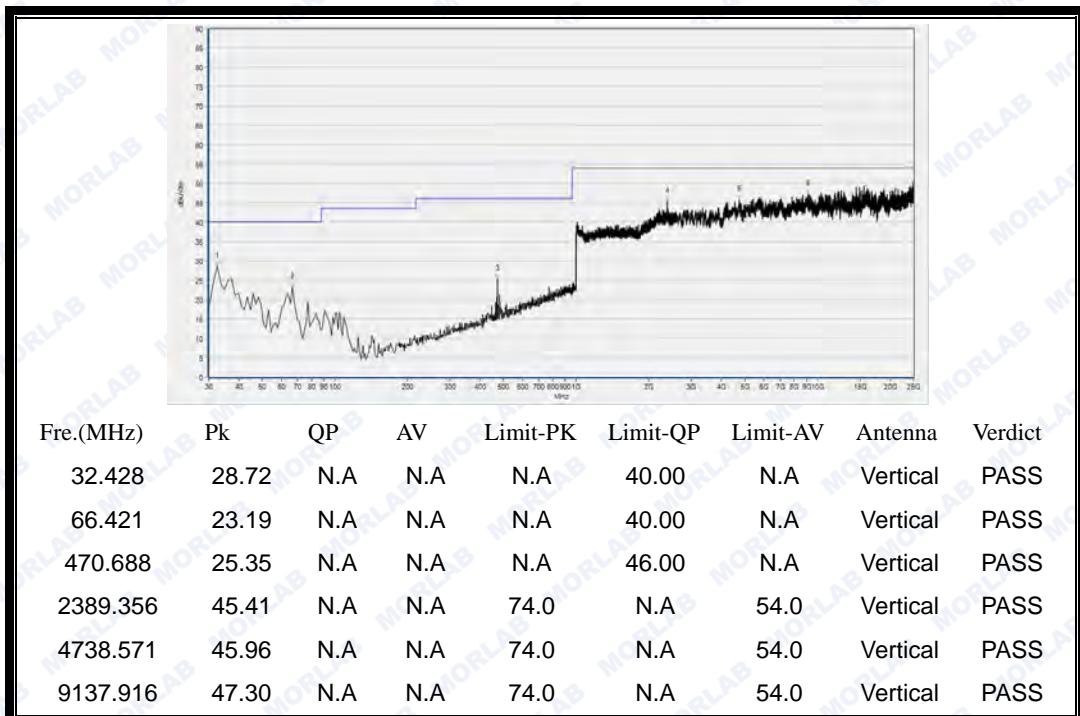
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ANT 2:

B. Test Plots for the Whole Measurement Frequency Range:Plots for Channel = 1

(Antenna Horizontal, 30MHz to 25GHz)

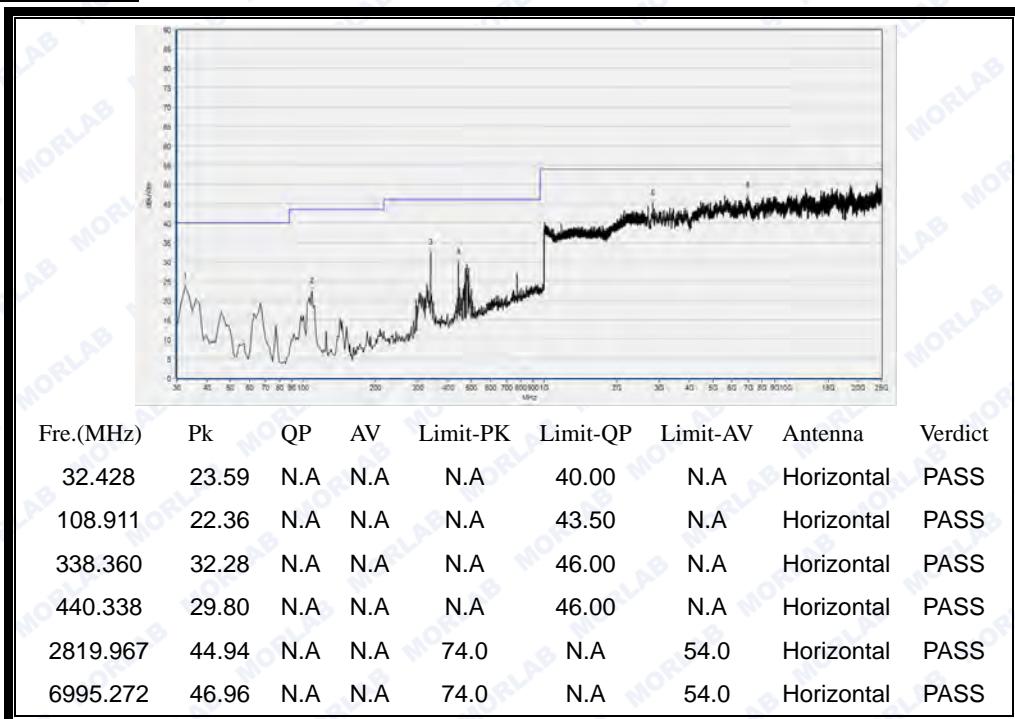


(Antenna Vertical, 30MHz to 25GHz)

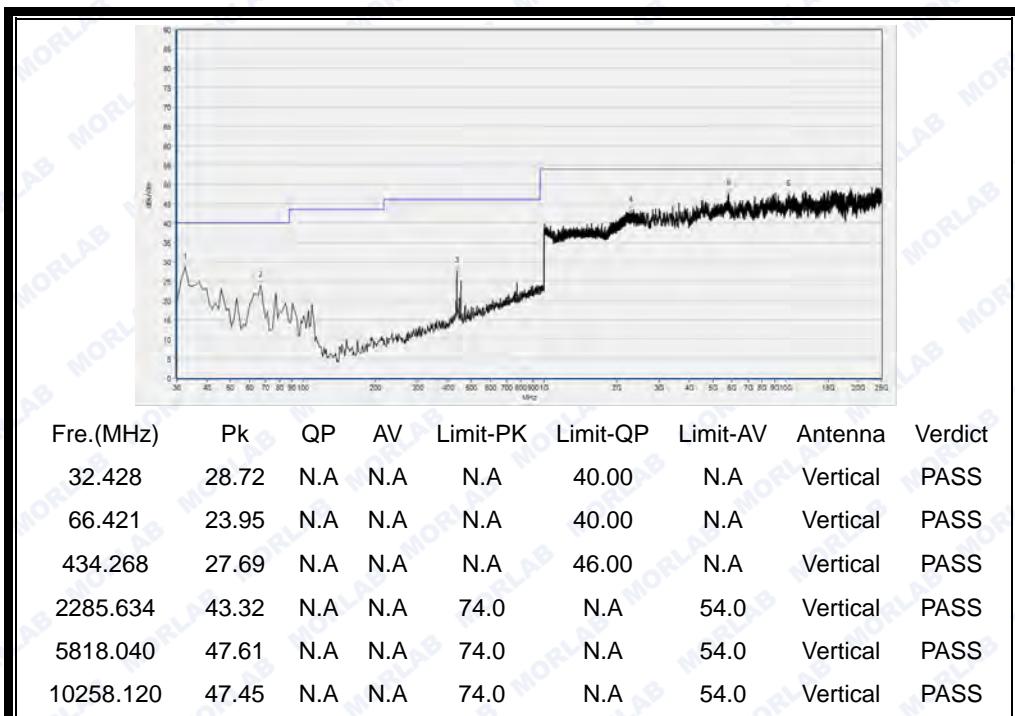


REPORT No.: SZ15120141W01

Plot for Channel = 6



(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

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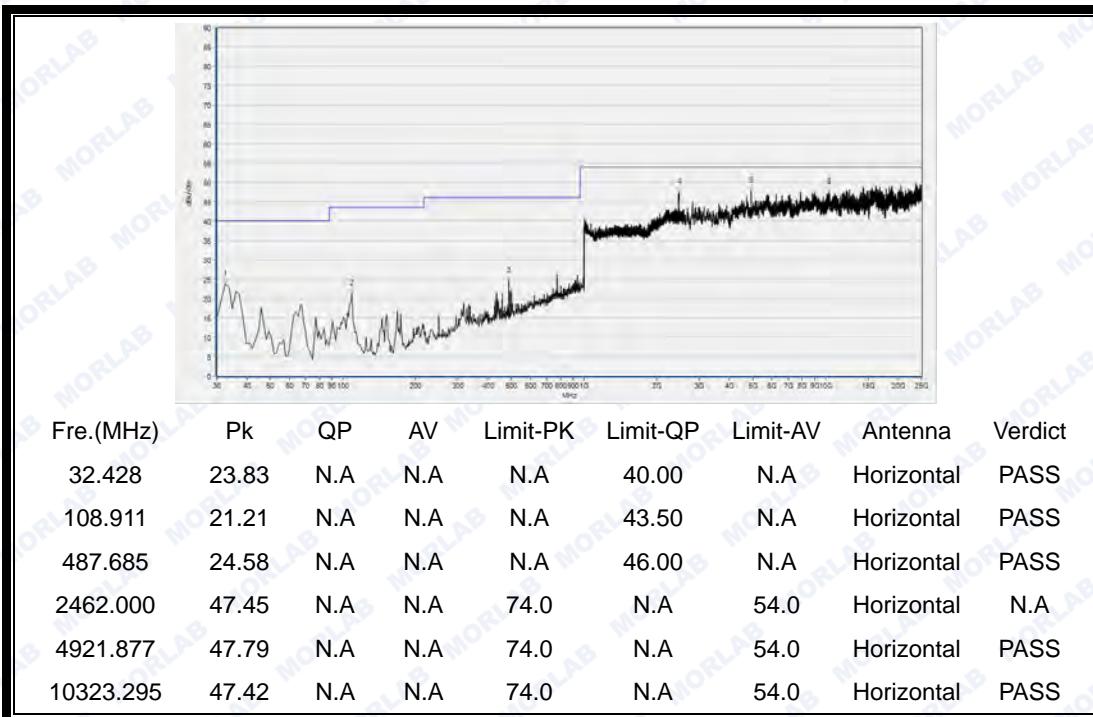
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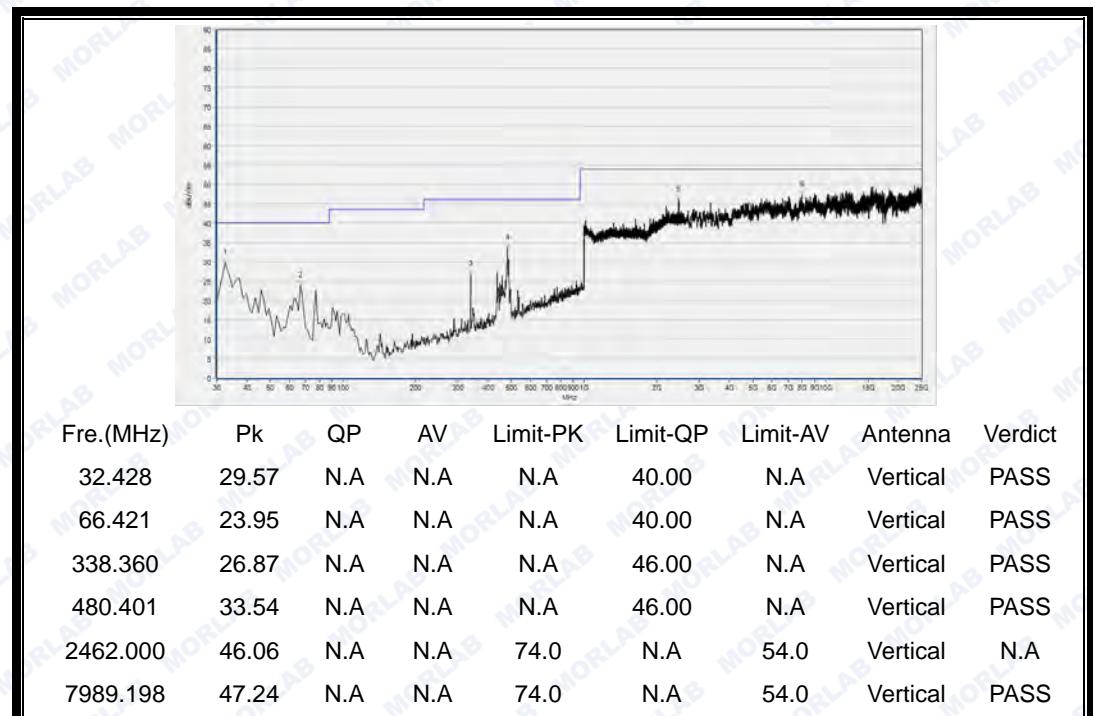


REPORT No.: SZ15120141W01

Plot for Channel = 11



(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

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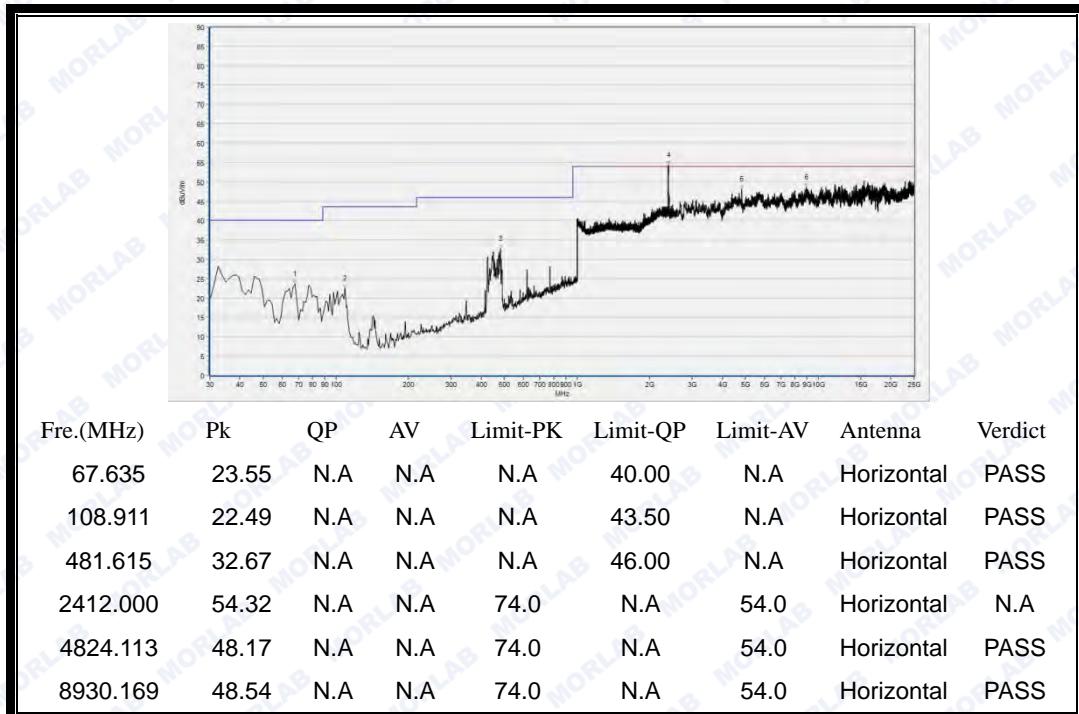
Fax: 86-755-36698525

Http://www.morlab.com

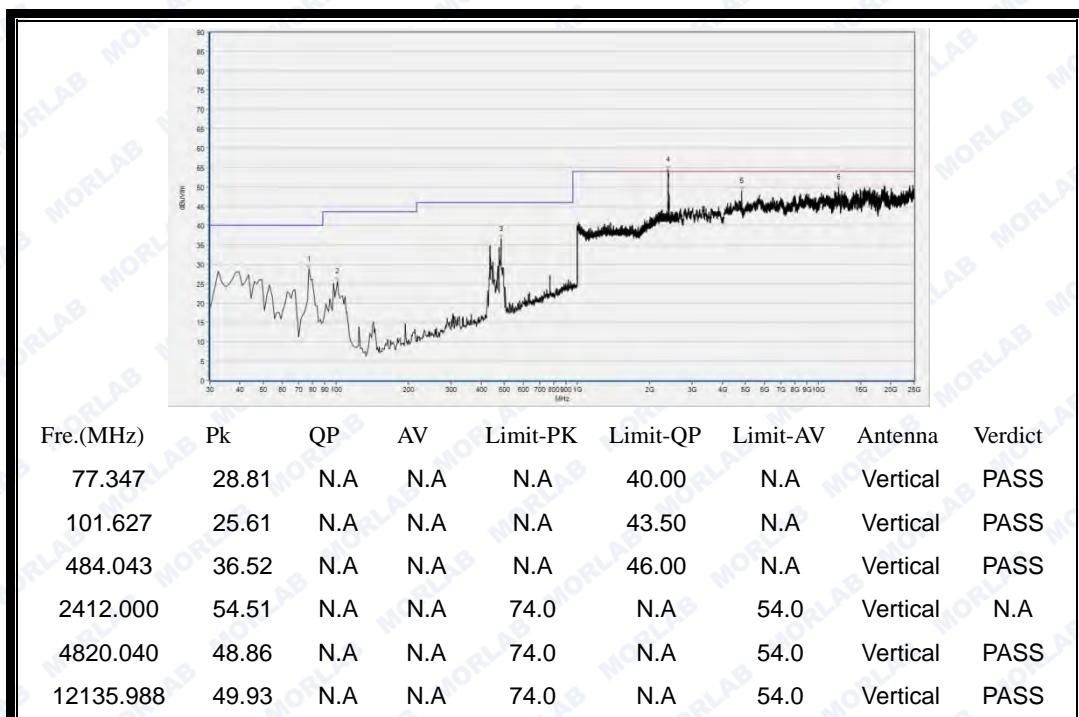
E-mail: service@morlab.cn



ANT 1+ANT 2:

C. Test Plots for the Whole Measurement Frequency Range:Plots for Channel = 1

(Antenna Horizontal, 30MHz to 25GHz)

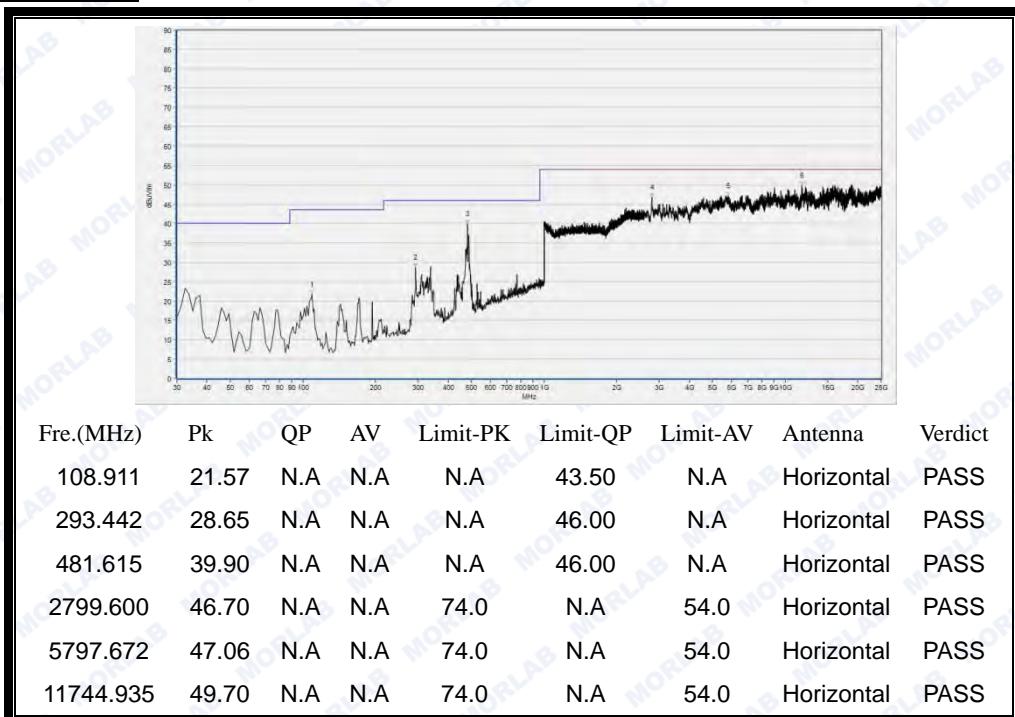


(Antenna Vertical, 30MHz to 25GHz)

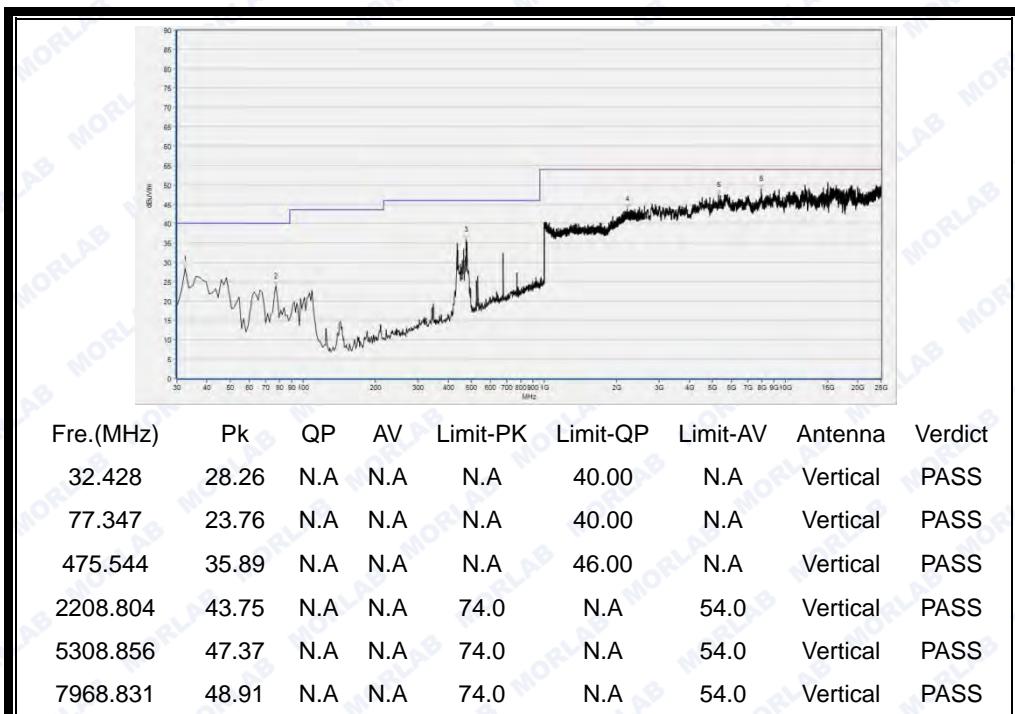


REPORT No.: SZ15120141W01

Plot for Channel = 6



(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

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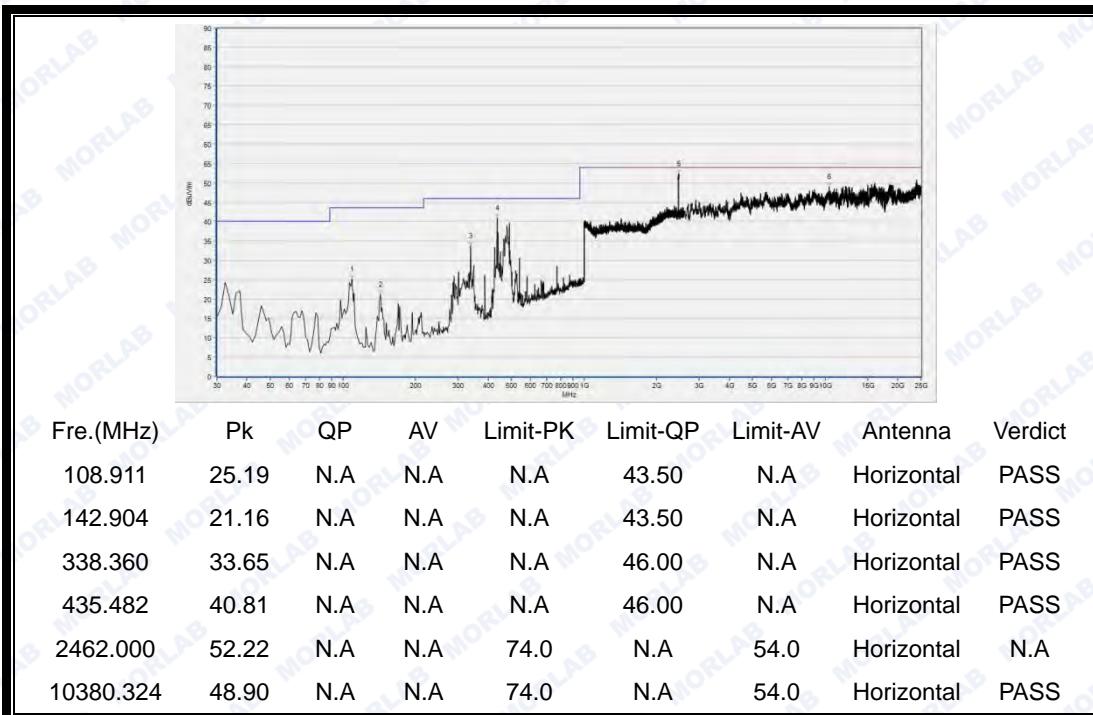
Http://www.morlab.com

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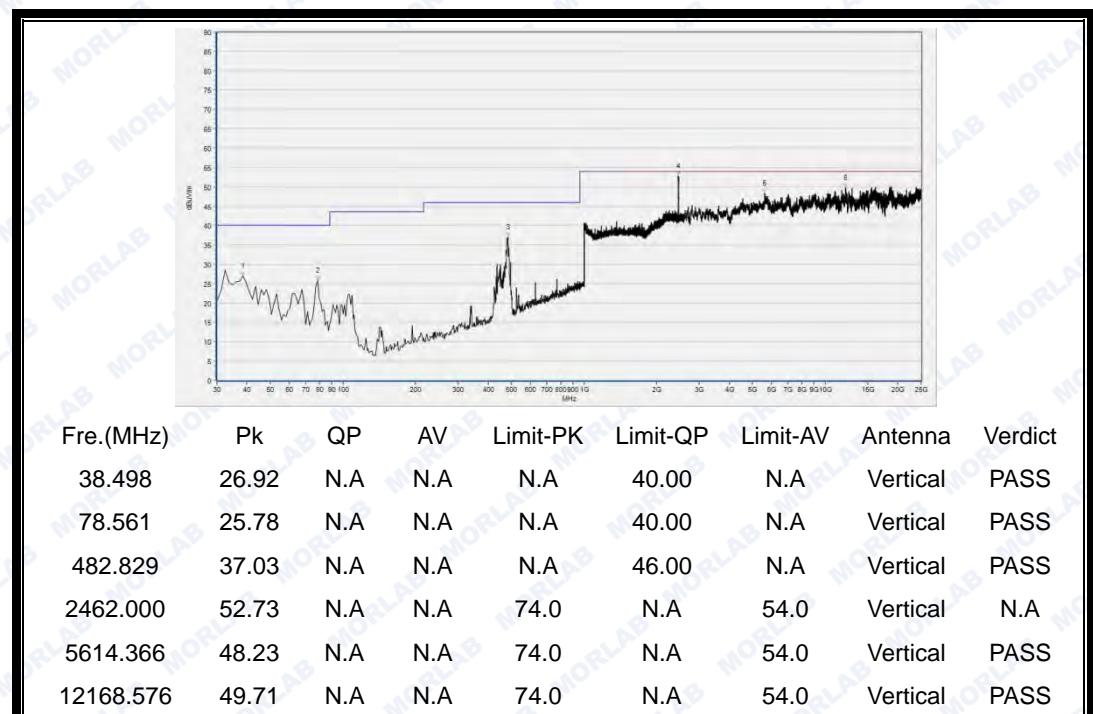


REPORT No.: SZ15120141W01

Plot for Channel = 11



(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

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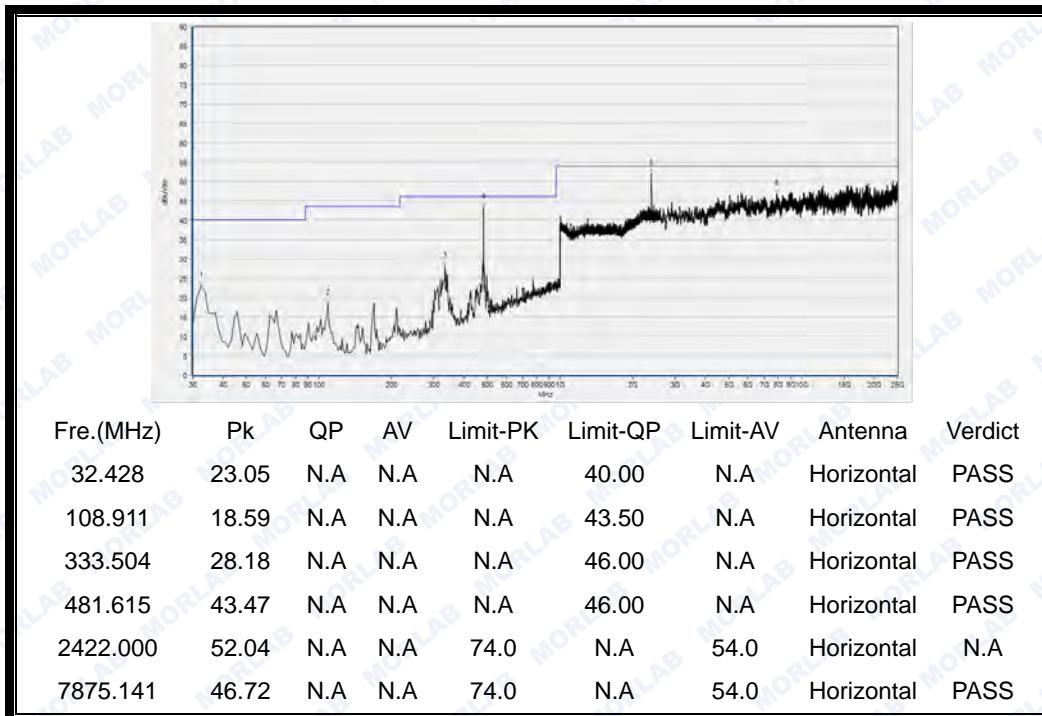
REPORT No.: SZ15120141W01

2.7.3.4 802.11n-40MHz Test mode

ANT 1:

A. Test Plots for the Whole Measurement Frequency Range:

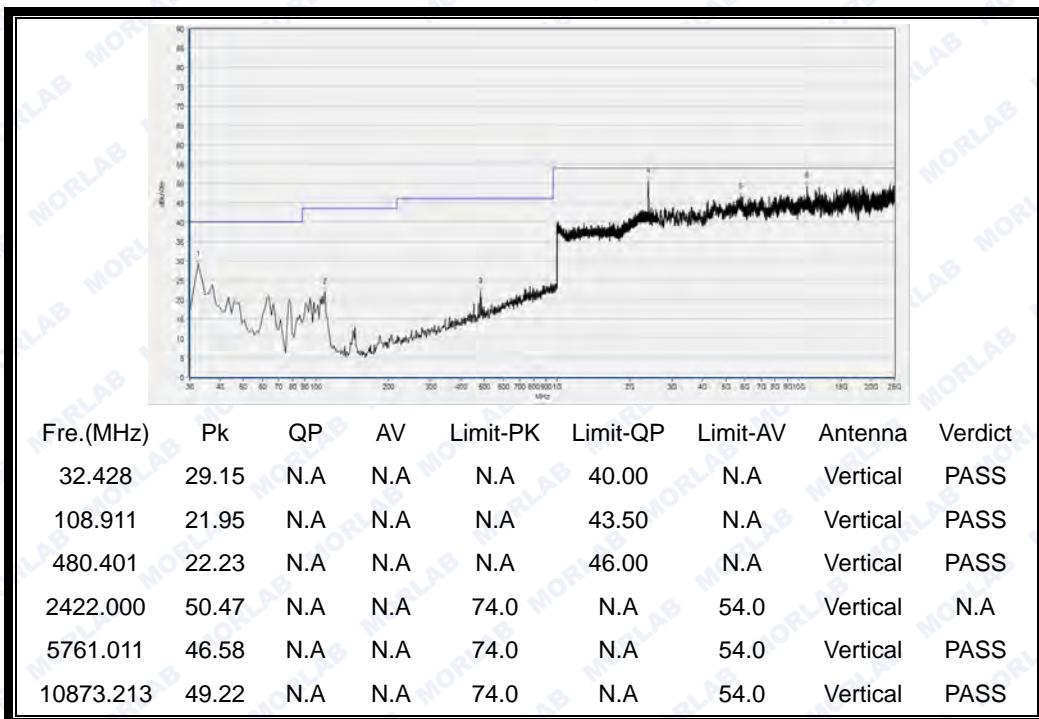
Plots for Channel = 3



(Antenna Horizontal, 30MHz to 25GHz)

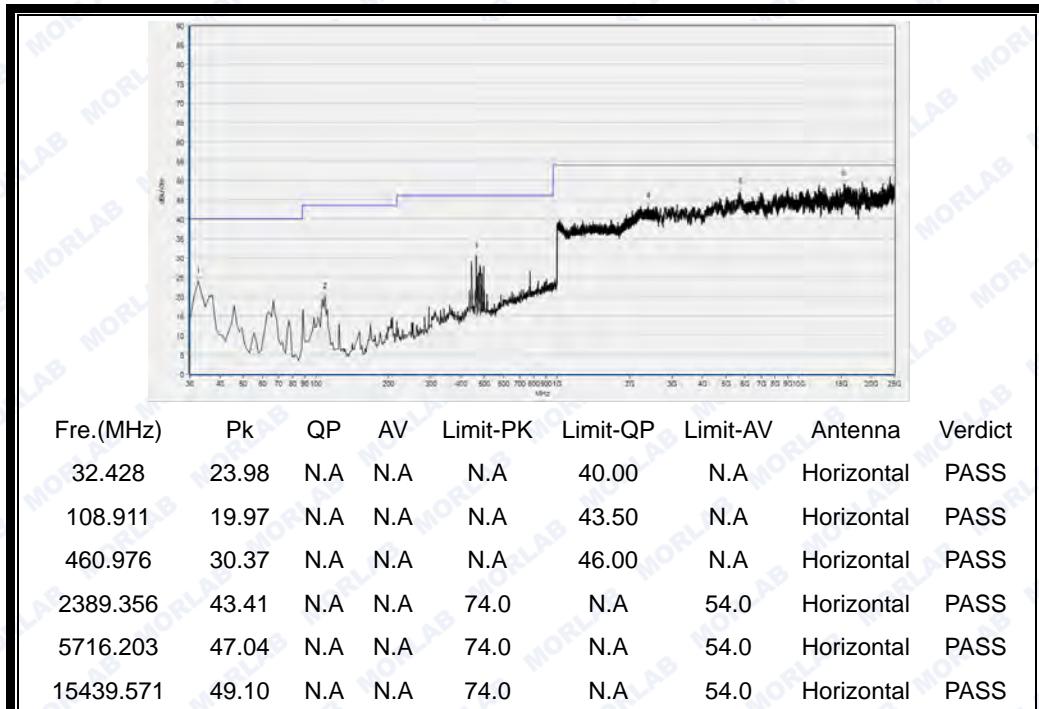


REPORT No.: SZ15120141W01



(Antenna Vertical, 30MHz to 25GHz)

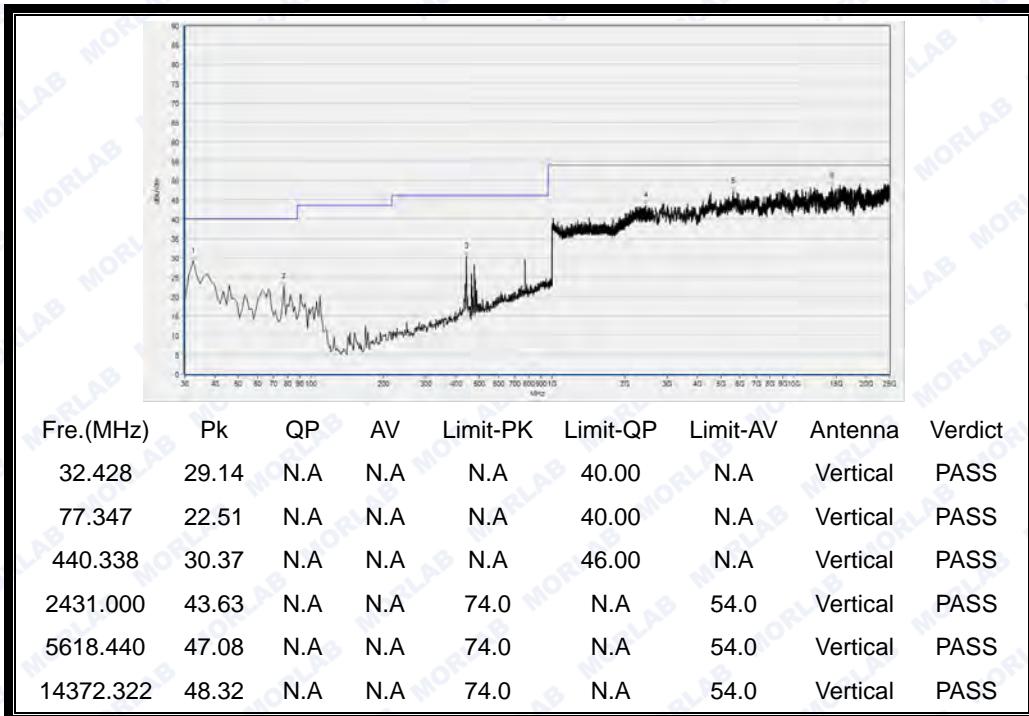
Plots for Channel = 6



(Antenna Horizontal, 30MHz to 25GHz)

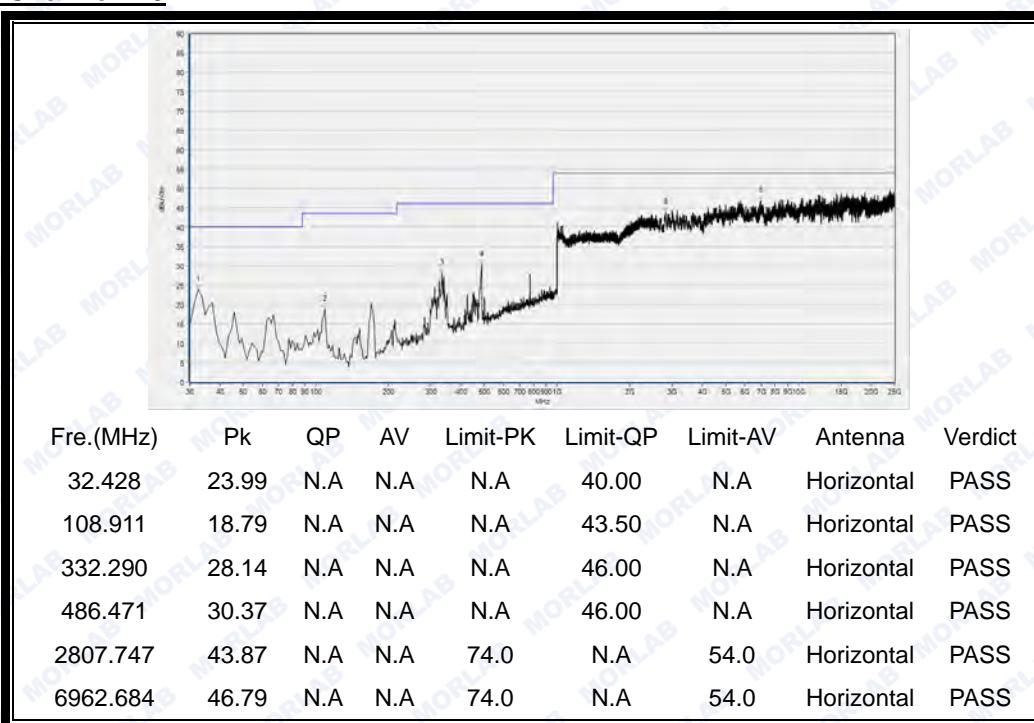


REPORT No.: SZ15120141W01



(Antenna Vertical, 30MHz to 25GHz)

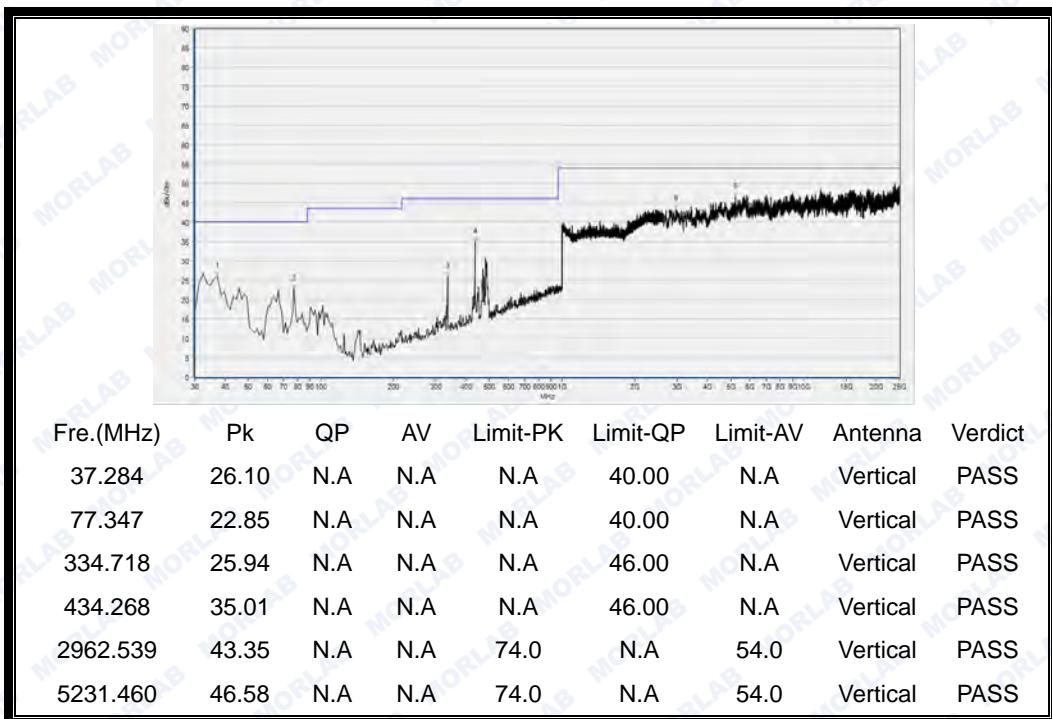
Plots for Channel = 9



(Antenna Horizontal, 30MHz to 25GHz)



REPORT No.: SZ15120141W01



(Antenna Vertical, 30MHz to 25GHz)

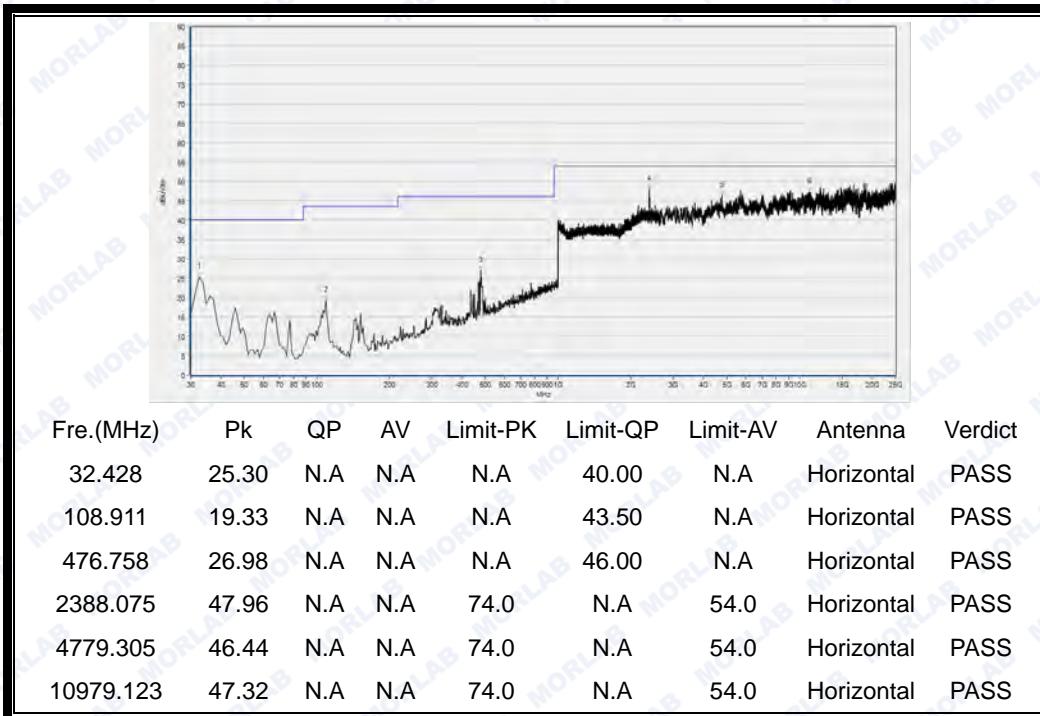
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FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. ChinaTel: 86-755-36698555
Http://www.morlab.comFax: 86-755-36698525
E-mail: service@morlab.cn

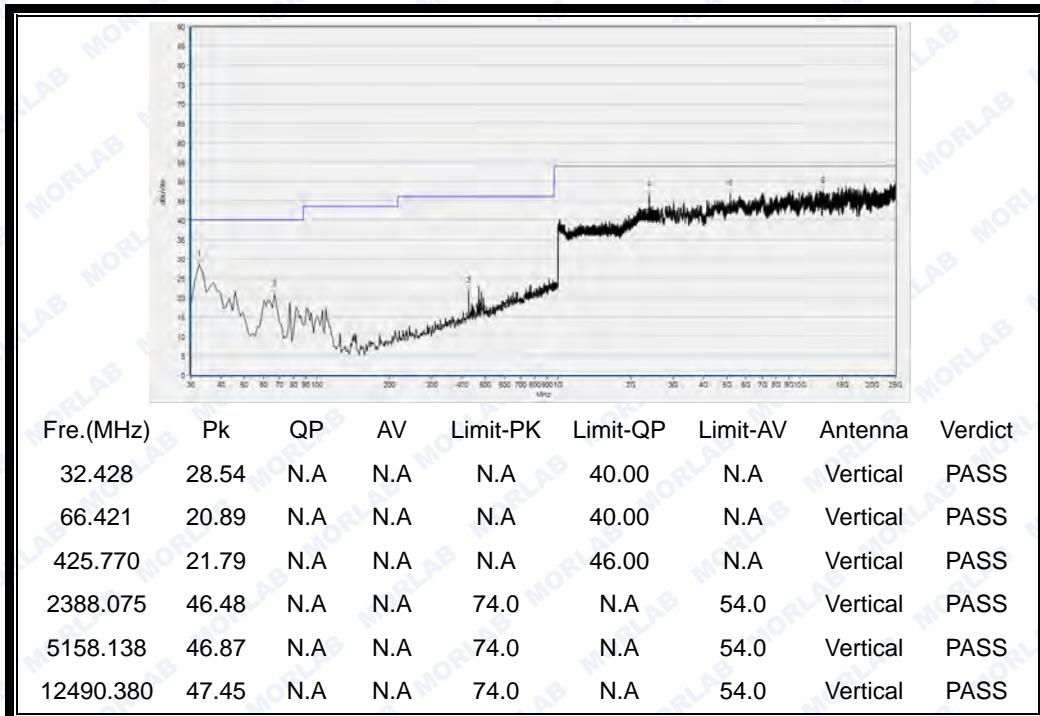


REPORT No.: SZ15120141W01

ANT 2:

B. Test Plots for the Whole Measurement Frequency Range:Plots for Channel = 3

(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

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Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555

Fax: 86-755-36698525

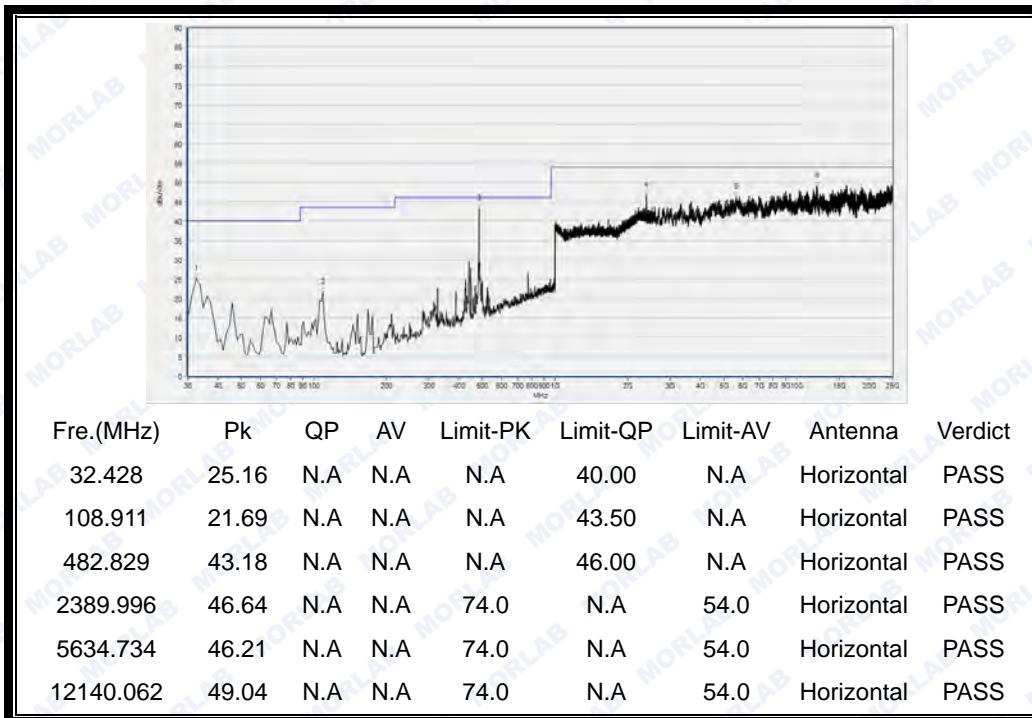
Http://www.morlab.com

E-mail: service@morlab.cn

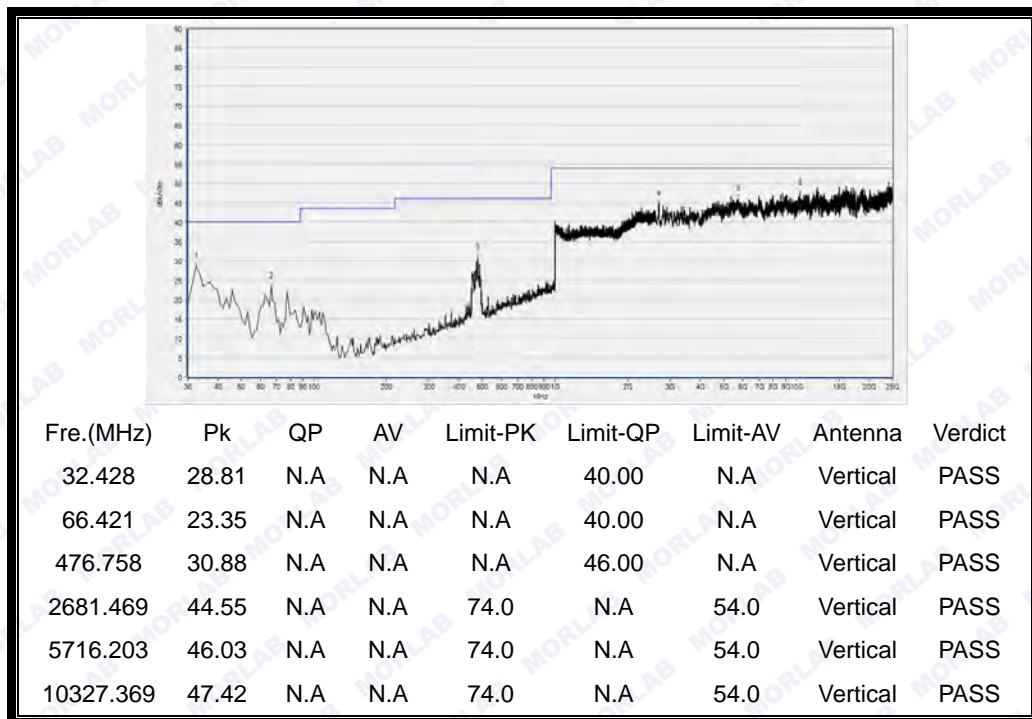


REPORT No.: SZ15120141W01

Plots for Channel = 6



(Antenna Horizontal, 30MHz to 25GHz)

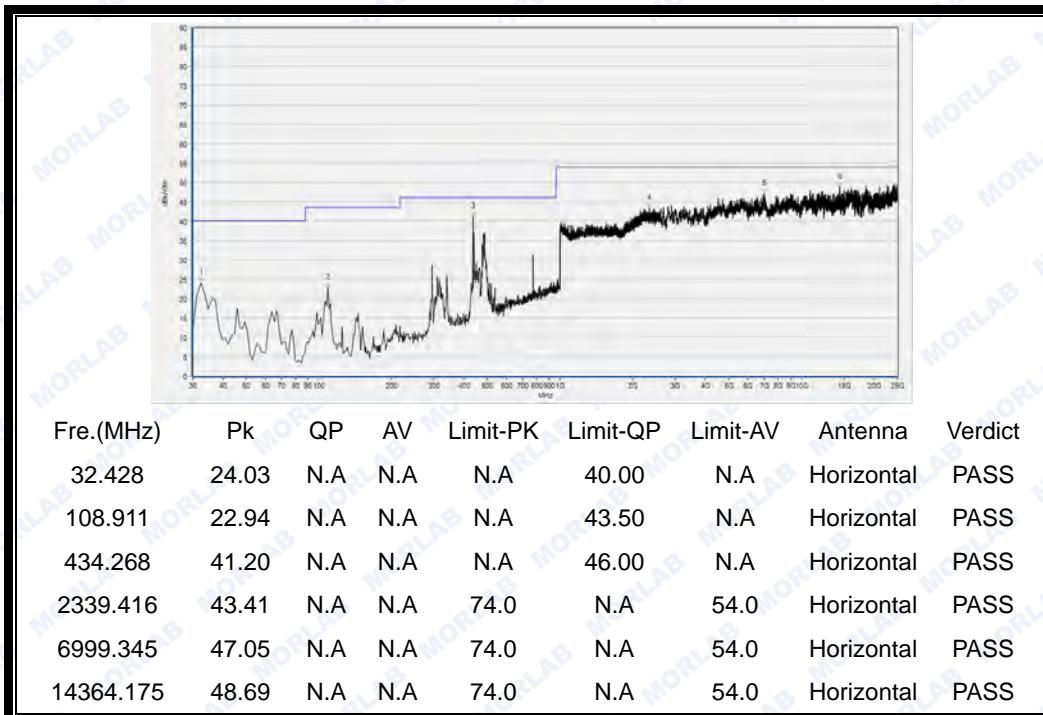


(Antenna Vertical, 30MHz to 25GHz)

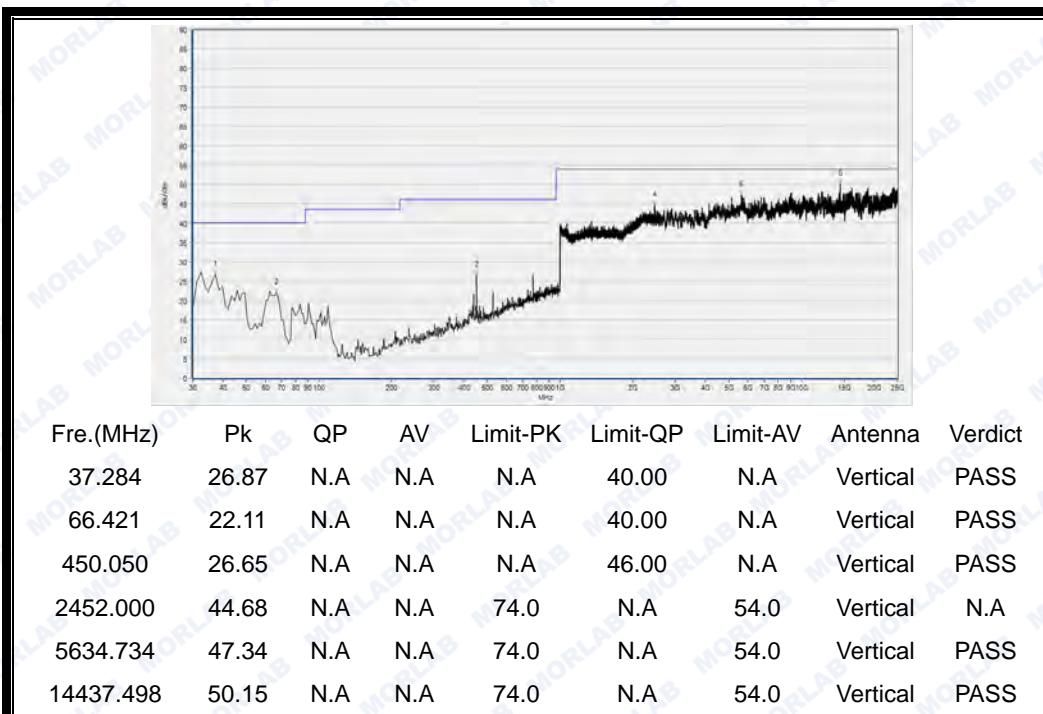


REPORT No.: SZ15120141W01

Plots for Channel = 9



(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

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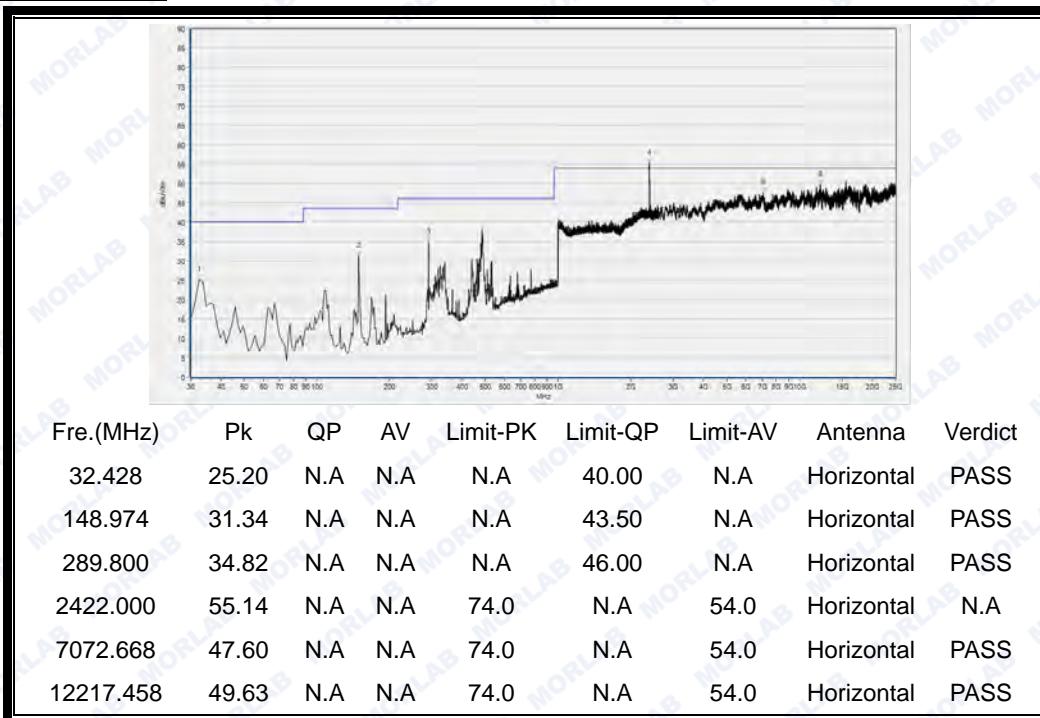


REPORT No.: SZ15120141W01

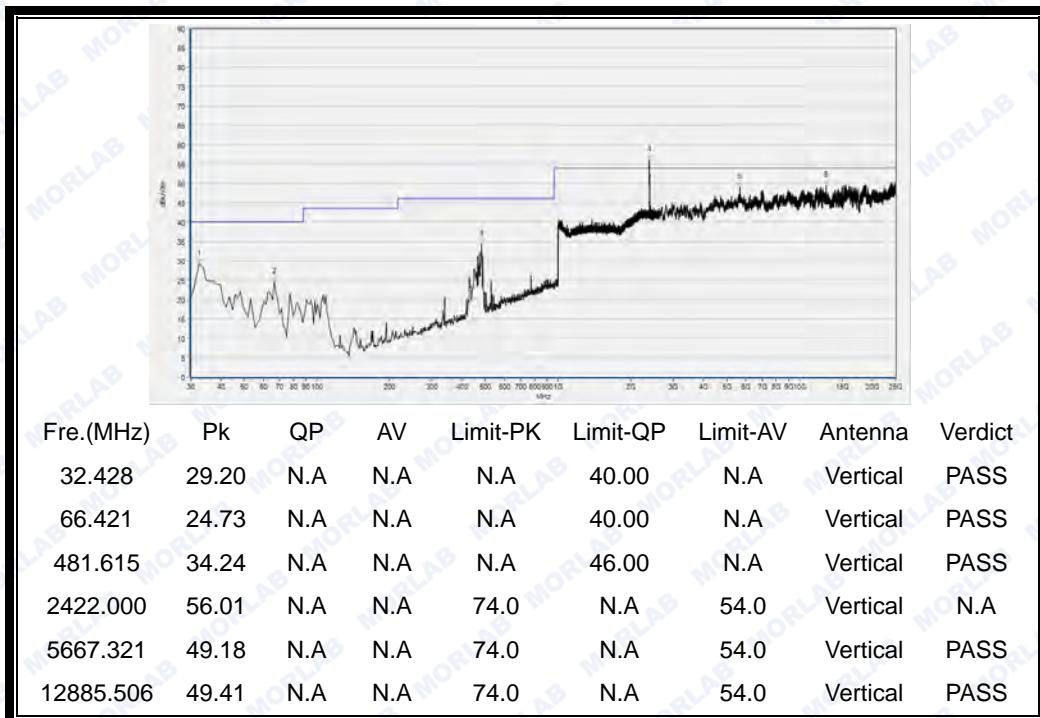
ANT 1+ANT 2:

C. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 3



(Antenna Horizontal, 30MHz to 25GHz)

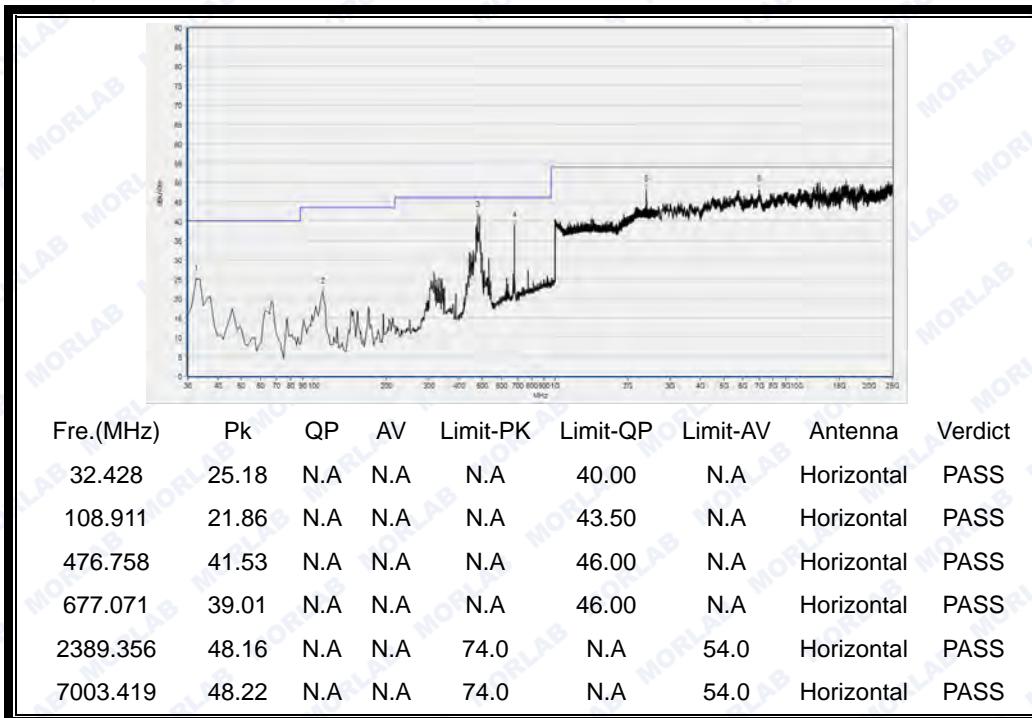


(Antenna Vertical, 30MHz to 25GHz)

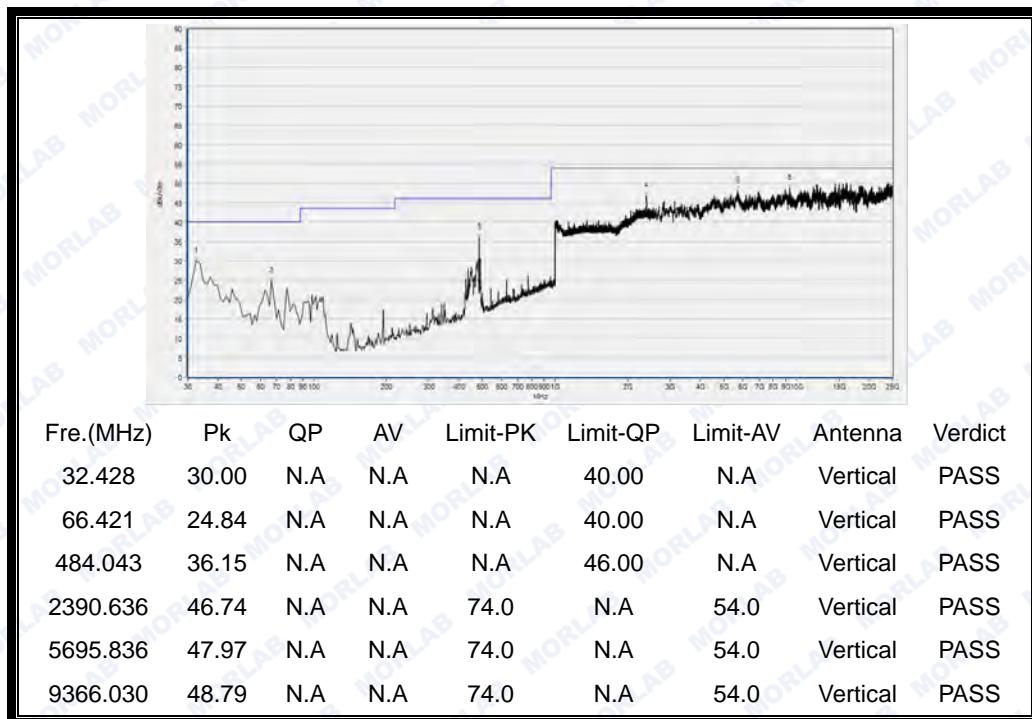


REPORT No.: SZ15120141W01

Plots for Channel = 6



(Antenna Horizontal, 30MHz to 25GHz)

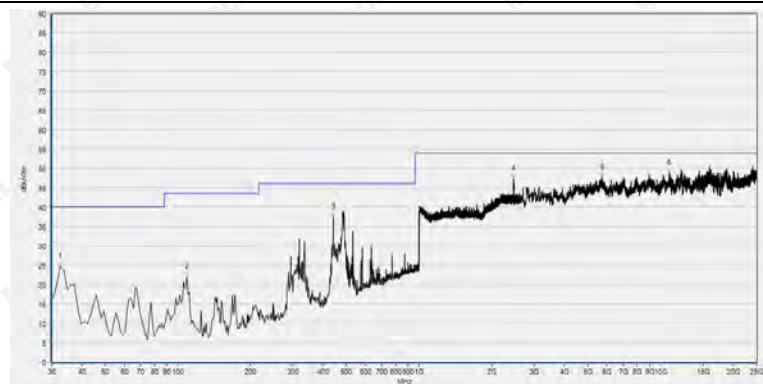


(Antenna Vertical, 30MHz to 25GHz)



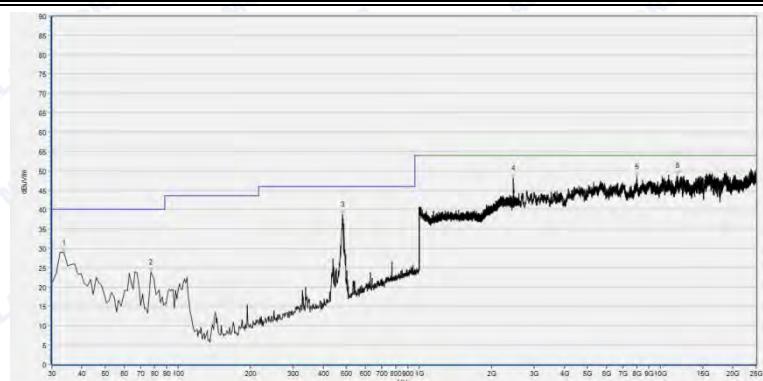
REPORT No.: SZ15120141W01

Plots for Channel = 9



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
32.428	24.68	N.A	N.A	N.A	40.00	N.A	Horizontal	PASS
108.911	22.04	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
440.338	37.49	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2452.000	47.27	N.A	N.A	74.0	N.A	54.0	Horizontal	N.A
5724.350	47.74	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
10856.919	48.81	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
33.642	28.87	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
77.347	23.79	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
480.401	38.78	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2452.000	48.17	N.A	N.A	74.0	N.A	54.0	Vertical	N.A
7985.125	48.35	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
11761.229	48.79	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)



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ANNEX A GENERAL INFORMATION

1.1 Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Department:	Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Responsible Test Lab Manager:	Mr. Su Feng
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

1.2 Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

1.3 Facilities and Accreditations

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at FL.1, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10,2013 and CISPR Publication 22; the FCC registration number is 695796.

1.4 Maximum measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Measurements	Frequency	Uncertainty
Conducted emissions Radiated emissions	9KHz~30MHz	2.44dB
	9KHz~30MHz	2.44dB
	30MHz~200MHz	2.93
	200MHz~1000MHz	2.95
	1GHz~18GHz	2.26
	18GHz~40GHz	1.94



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This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2

1.5 Test Equipments Utilized

1.5.1 Conducted Test Equipments

Conducted Test Equipment						
No.	Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
1	Spectrum Analyzer	MY45101810	E4407B	Agilent	2015.03.28	2016.03.27
2	USB Wideband Power Sensor	MY54210011	U2021XA	Agilent	2015.03.28	2016.03.27
3	EXA Signal Analyzer	MY53470838	N9010A	Agilent	2015.08.26	2016.08.25
4	RF cable	CB01	RF01	Morlab	N/A	N/A
5	Attenuator	(n.a.)	10dB	Resnet	N/A	N/A
6	SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

1.5.2 Conducted Emission Test Equipments

Conducted Emission Test Equipments						
No.	Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
1	Receiver	595WX11007	PMM9010	Narda S.T.S/PMM	2015.05.07	2016.05.06
2	LISN	812744	NSLK 8127	Schwarzbeck	2015.06.18	2016.06.17
3	Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2015.05.07	2016.05.06
4	Coaxial cable(BNC)	CB01	EMC01	Morlab	N/A	N/A

1.5.3 Auxiliary Test Equipment

Auxiliary Test Equipment						
No.	Equipment Name	Serial No.	Type	Manufacturer	Cal.Date	Cal.Due Date
1	Computer	N.A	N.A	Asus	N.A	N.A



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1.5.4 Radiated Test Equipments

Radiated Test Equipments						
No.	Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal.Due Date
1	System Simulator	GB4536084 6	8960-E5515 C	Agilent	2015.05.07	2016.05.06
2	Receiver	MY5413001 6	N9038A	Agilent	2015.05.07	2016.05.06
3	Test Antenna - Bi-Log	N/A	VULB9163	Schwarzbeck	2015.05.14	2016.05.13
4	Test Antenna - Horn	9170C-531	BBHA9170	Schwarzbeck	2015.03.31	2016.03.30
5	Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2015.02.26	2016.02.25
6	Test Antenna - Horn	71688	BBHA 9120D	Schwarzbeck	2015.02.26	2016.02.25
7	Coaxial cable(N male)	CB02	EMC02	Morlab	N/A	N/A
8	Coaxial cable(N male)	CB03	EMC03	Morlab	N/A	N/A
9	1-18GHz pre-Amplifier	MA02	TS-PR18	Rohde&Schwarz	2015.02.26	2016.02.25
10	18-26.5GHz pre-Amplifier	MA03	TS-PR18	Rohde&Schwarz	2015.02.26	2016.02.25

1.5.5 Climate Chamber

Climate Chamber						
No.	Equipment Name	Serial No.	Type	Manufacturer	Cal.Date	Cal.Due Date
1	Climate Chamber	2004012	HL4003T	Yinhe	2015.02.26	2016.02.25

1.5.6 Vibration Table

Vibration Table						
No.	Equipment Name	Serial No.	Type	Manufacturer	Cal.Date	Cal.Due Date
1	Vibration Table	N/A	ACT2000-S015L	CMI-COM	2015.02.26	2016.02.25

1.5.7 Anechoic Chamber

Anechoic Chamber						
No.	Equipment Name	Serial No.	Type	Manufacturer	Cal.Date	Cal.Due Date
1	Anechoic Chamber	N/A	9m*6m*6m	Changning	2015.05.14	2016.05.13

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

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