



Radio Test Report

Report No.: RJ180717C14-1

Test Model: WL-8210-V1

Received Date: Jul. 17, 2018

Test Date: Aug. 01, 2018

Issued Date: Aug. 10, 2018

Applicant: CC&C Technologies, Inc.

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Release Control Record

Issue No.	Description	Date Issued
RJ180717C14-1	Original release.	Aug. 10, 2018



1 Certificate of Conformity

Product: WLAN 11ac USB Adapter

Brand: CC&C

Test Model: WL-8210-V1

Sample Status: Engineering sample


Applicant: CC&C Technologies, Inc.

Test Date: Aug. 01, 2018

Standards: ARIB STD-T71 (V6.1), MIC notice 88 Appendix 45
Certification Ordinance Article 2-1-19-3

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :


Suntee Liu / Specialist

Date:

Aug. 10, 2018

Approved by :


Bruce Chen / Project Engineer

Date:

Aug. 10, 2018

2 Summary of Test Results

The EUT has been tested according to the following specifications:

Notice 88 Appendix 45 Reference	ARIB STD-T71 Ref.	Report Reference	Parameter	Test Results (Note)
General Provisions				
C	3.1.2 (4)	4.1	Frequency tolerance	C
D	3.1.2 (11)	4.2	Occupied bandwidth	C
E	3.1.2 (8)	4.4	Spurious emissions	C
Transmitting Equipment				
F	3.1.2 (3)	4.6	Tolerance of antenna power	C
--	--	--	SAR	NA
Transmitting Antenna				
--	--	3.6	Type, configuration, etc. of transmitting antenna	C
--	--	3.6	Direction pattern of transmitting antenna	C
Receiving Equipment				
H	3.1.3 (1)	4.7	Spurious emissions of receiver	C
--	--	3.6	Refer to all articles for transmitting antenna	C
Operating Frequency				
--	3.1.8 (1)	3.2	High frequency / modulation section can not be opened easily	C
--	3.1.1(1)	3.1	Communication method	C
--	3.1.2 (1)	3.1	Modulation method	C
--	3.1.2 (6)	3.1	Signal transmission rate	C
--	3.1.2 (7)	4.8	Burst length	C
--	3.1.2 (2)	4.6	Antenna power	C
--	3.1.2 (5)	4.6	Isotropically radiated power	C
--	3.1.2 (1)	4.11	Number of carriers within 1 MHz bandwidth in OFDM	C
--	3.1.2 (10)	4.5	Out-band leakage power	C
--	3.1.2 (9)	4.5	Adjacent channel leakage power	C
--	3.1.4.1	4.9	Interference Prevention Function	C
--	3.1.7(1)	4.10	Carrier sense capability	C
--	--	--	Dynamic frequency selection	NA
Note 1: C = Conform NC = Not Conform NT = Not Tested NA = Not Applicable				

2.1 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration	Calibration Authority
Spectrum Analyzer / Rohde & Schwarz	FSP 40	100040	Aug. 18, 2017	Aug. 17, 2018	ETC
Signal Generator / Agilent	E4438C	MY49071692	Sep. 20, 2017	Sep. 19, 2018	ETC
Power Meter / Anritsu	ML2495A	0824012	Aug. 18, 2017	Aug. 17, 2018	ETC
Power Sensor / Anritsu	MA2411B	0738171	Aug. 18, 2017	Aug. 17, 2018	ETC
Power Splitter/ Agilent	11667B	52805	NA	NA	NA
Power Splitter/ Agilent	11667B	11628	NA	NA	NA

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in TR 100 028-1.

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

Parameter	Uncertainty
Occupied Bandwidth	491.896Hz
Spurious emissions	3.508dB
Output power density	2.889dB
Out of band radiated power	3.93dB
Frequency Tolerance	6805.18Hz

2.3 Modification Record

There were no modifications required for compliance.



3 General Information

3.1 General Description of EUT

Product	WLAN 11ac USB Adapter
Brand	CC&C
Test Model	WL-8210-V1
Sample Status	Engineering sample
Nominal Voltage	5Vdc
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 867Mbps
Operating Frequency	5150~5250MHz
Number of Channel	802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Rated RF Output Power Density	Refer to Note
Conducted RF Output Power Density	Refer to Note
Radiated RF Output Power Density	Refer to Note
Antenna Type	Refer to item 3.6.1
Antenna Connector	Refer to item 3.6.1
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	TX Function
802.11a	1TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX
802.11ac (VHT20)	2TX
802.11ac (VHT40)	2TX
802.11ac (VHT80)	2TX

2. The power table is listed as below.

	Rated power (mW/MHz)	Conducted RF output power density (mW/MHz)	Radiated RF output power density (mW/MHz)
W52			
802.11a	3	2.546	9.905
802.11n (HT20)	3	2.461	9.573
802.11n (HT40)	2	1.107	4.306
802.11ac (VHT80)	1	0.535	2.082



3.2 Description of Test Modes

Operated in 5150 ~ 5250MHz band (W52):

Modes	Channel	Freq. (MHz)
802.11a, 802.11n (HT20), 802.11ac (VHT20)	36	5180
	40	5200
	44	5220
	48	5240
802.11n (HT40), 802.11ac (VHT40)	38	5190
	46	5230
802.11ac (VHT80)	42	5210

By means of test software (REALTEK v0.0059.20130716) provided by manufacture, the power levels during the tests were set according to the following codes:

Operated in 5150 ~ 5250MHz band (W52):

802.11a			802.11n (HT20), 802.11ac (VHT20)		
Channel	Power Setting		Channel	Power Setting	
				Chain 0	Chain 1
36	50		36	48	48
40	47		40	47	47
48	45		48	47	48
802.11n (HT40), 802.11ac (VHT40)			802.11ac (VHT80)		
Channel	Power Setting		Channel	Power Setting	
	Chain 0	Chain 1		Chain 0	Chain 1
38	49	49	42	45	45
46	46	46			

3.3 Test Conditions

Test Conditions	Voltage (Vac)
V_{normal}	100
$V_{\text{max.}}$	110
$V_{\text{min.}}$	90

3.4 Assembly

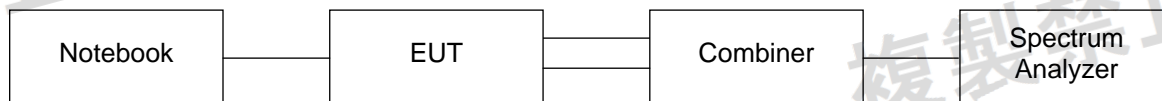


3.5 Test Setup

1TX



2TX



3.6 Antenna Specifications

3.6.1 Antenna Gain

No.	Type	Connector	Gain(dBi)	
			2.4GHz	5GHz
1	Printed	NA	-0.1	5.9
2	Printed	NA	3.5	4.4

3.6.2 Antenna Pattern

2400-2500 MHz

port1

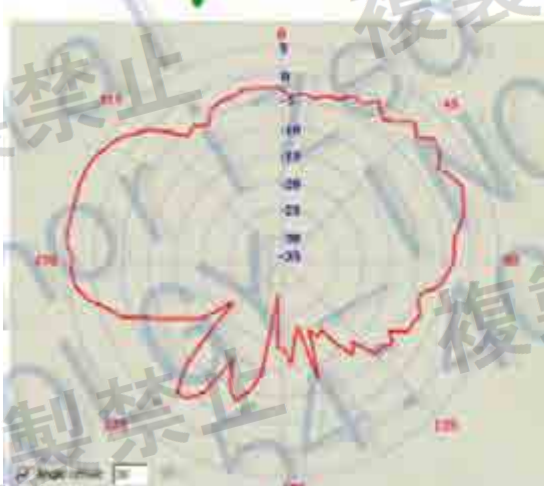


port2

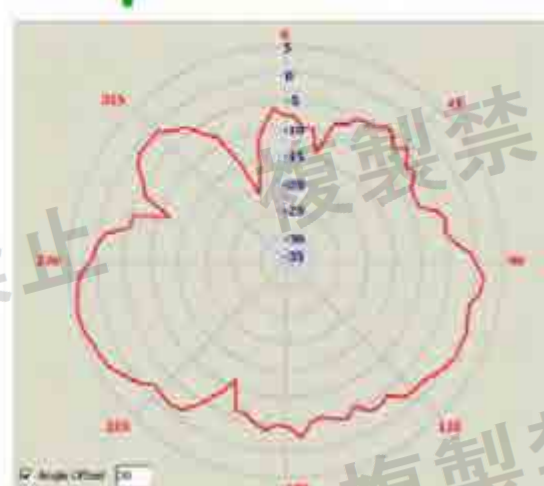


5150-5825 MHz

port1



port2





4 Test Results

4.1 Frequency Tolerance Measurement

4.1.1 Limits of Frequency Tolerance Measurement

Tolerance of frequency shall be +/- 20ppm.

4.1.2 Test Setup



4.1.3 Test Results

802.11a / 802.11n (HT20)

Environmental Conditions		24 deg.C, 70% RH					
Channel	Frequency (MHz)	Voltage _{normal}		Voltage _{max.}		Voltage _{min.}	
		Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)
36	5180	5179.976000	-4.633	5179.977600	-4.324	5179.979200	-4.015
40	5200	5199.979200	-4.000	5199.980000	-3.846	5199.980400	-3.769
48	5240	5239.980000	-3.816	5239.980800	-3.664	5239.982000	-3.435

802.11n (HT40)

Environmental Conditions		24 deg.C, 70% RH					
Channel	Frequency (MHz)	Voltage _{normal}		Voltage _{max.}		Voltage _{min.}	
		Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)
38	5190	5189.978000	-4.238	5189.980400	-3.776	5189.981200	-3.622
46	5230	5229.976000	-4.588	5229.978400	-4.130	5229.980400	-3.747

802.11ac (VHT80)

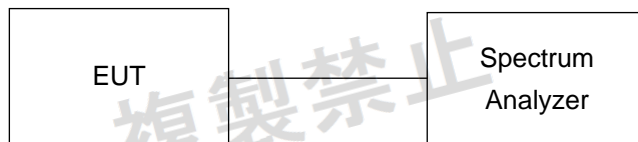
Environmental Conditions		24 deg.C, 70% RH					
Channel	Frequency (MHz)	Voltage _{normal}		Voltage _{max.}		Voltage _{min.}	
		Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)
42	5210	5209.980800	-3.685	5209.982000	-3.454	5209.984800	-2.917

4.2 Occupied Bandwidth Measurement (99% Power Bandwidth)

4.2.1 Limits of Occupied Bandwidth Measurement

Item	Operating Band	Limit	Remark
Occupied bandwidth	W52 & W53	<19MHz	802.11a/n(HT20)/ac(VHT20)
Occupied bandwidth	W56	<19.7MHz	802.11a/n(HT20)/ac(VHT20)
Occupied bandwidth	W52 & W53 & W56	<38MHz	802.11n(HT40)/ac(VHT40)
Occupied bandwidth	W52 & W53 & W56	<78MHz	802.11ac(VHT80)

4.2.2 Test Setup



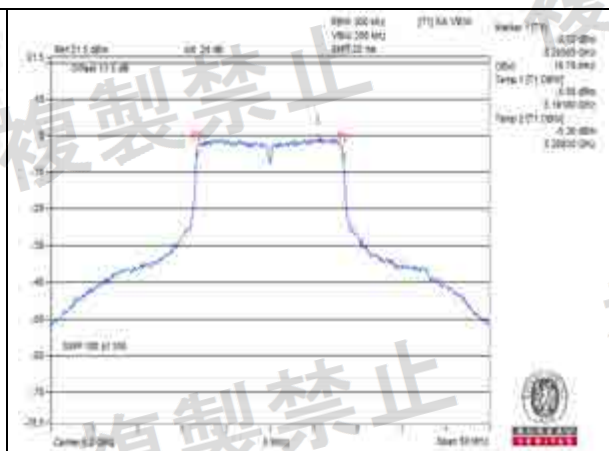
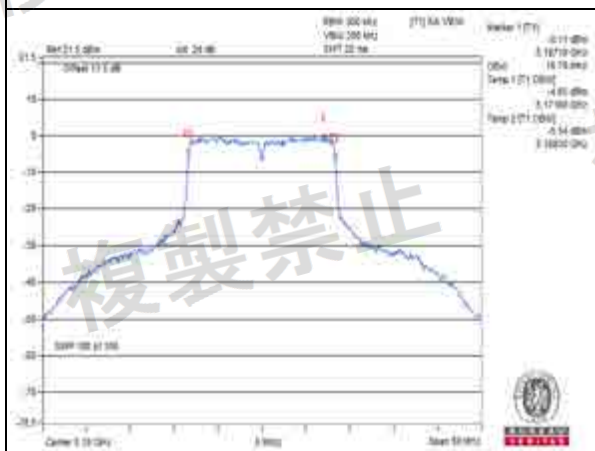
4.2.3 Test Results

802.11a

Environmental Conditions		24 deg.C, 70% RH		
Channel	Frequency (MHz)	V _{normal}	V _{max.}	V _{min.}
		Occupied Bandwidth (MHz)	Occupied Bandwidth (MHz)	Occupied Bandwidth (MHz)
36	5180	16.70	16.60	16.60
40	5200	16.70	16.60	16.60
48	5240	16.50	16.50	16.50

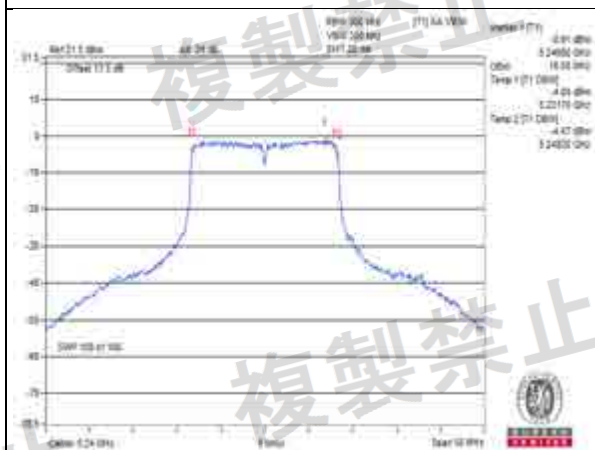
Note: For the test plots please refer to the below pages.

V_{normal}



Channel 36

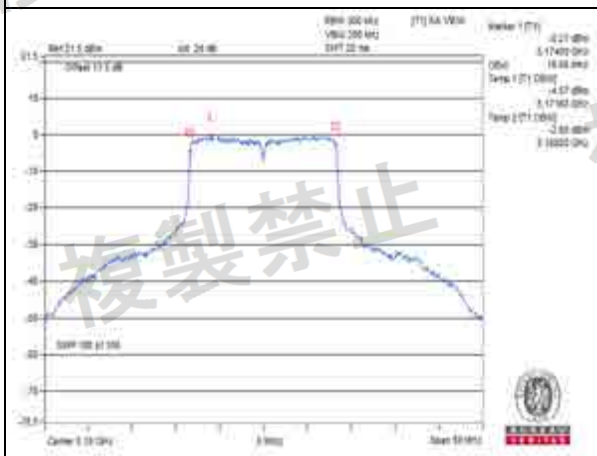
Channel 40



Channel 48

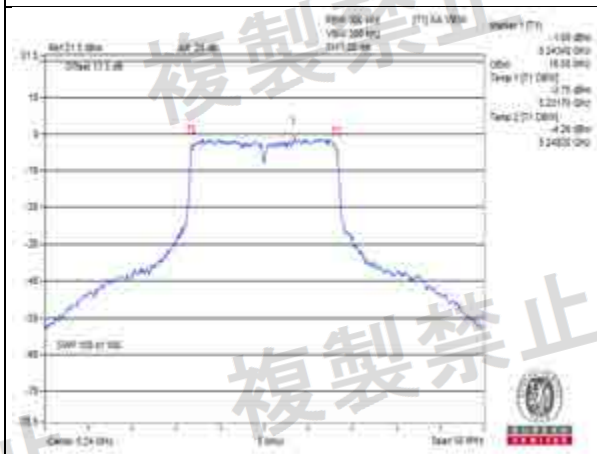
Measurement uncertainty: ± 206.50 Hz

V_{max}.



Channel 36

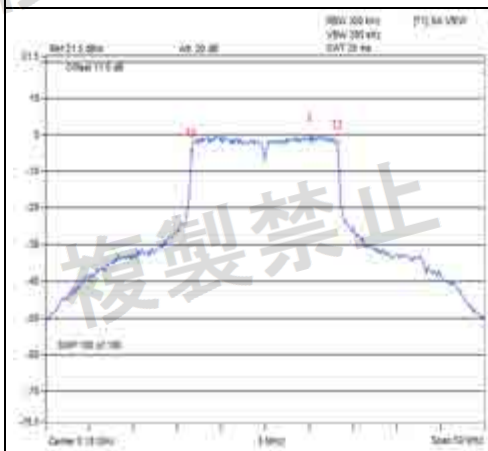
Channel 40



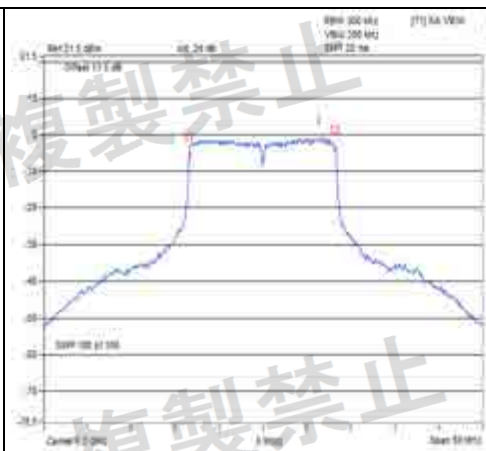
Channel 48

Measurement uncertainty: ± 206.50 Hz

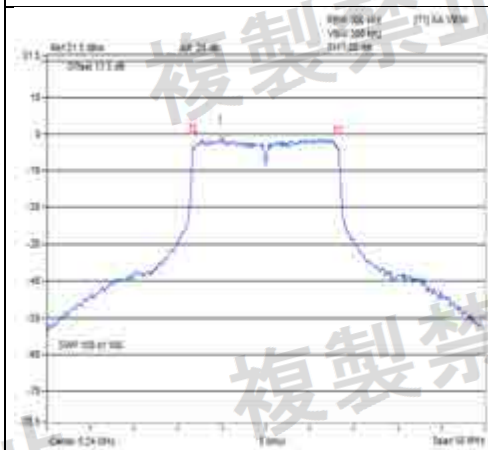
V_{min}



Channel 36



Channel 40



Channel 48

Measurement uncertainty: ± 206.50 Hz

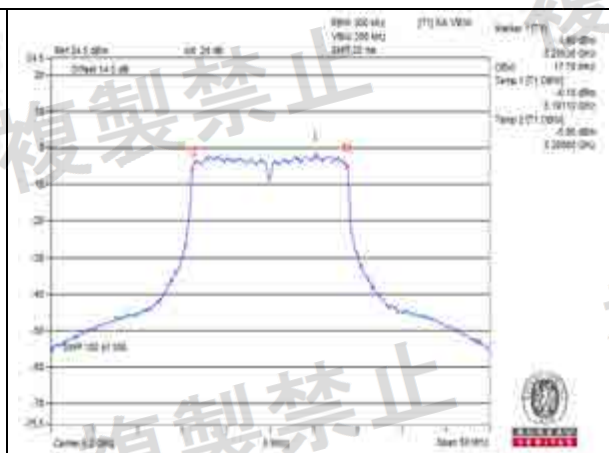
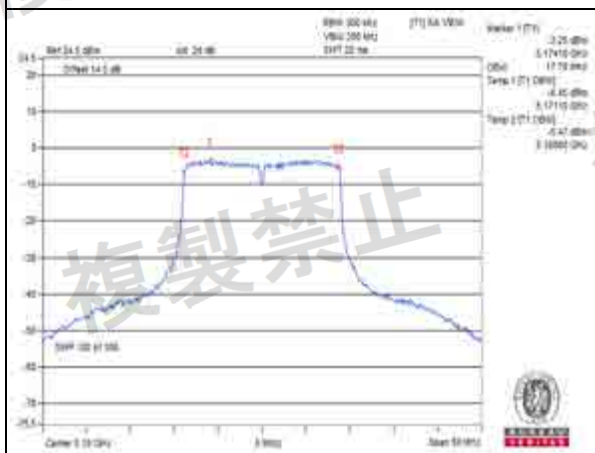


802.11n (HT20)

Environmental Conditions		24 deg.C, 70% RH		
Channel	Frequency (MHz)	V _{normal}	V _{max.}	V _{min.}
		Occupied Bandwidth (MHz)	Occupied Bandwidth (MHz)	Occupied Bandwidth (MHz)
36	5180	17.70	17.80	17.70
40	5200	17.70	17.70	17.70
48	5240	17.70	17.70	17.70

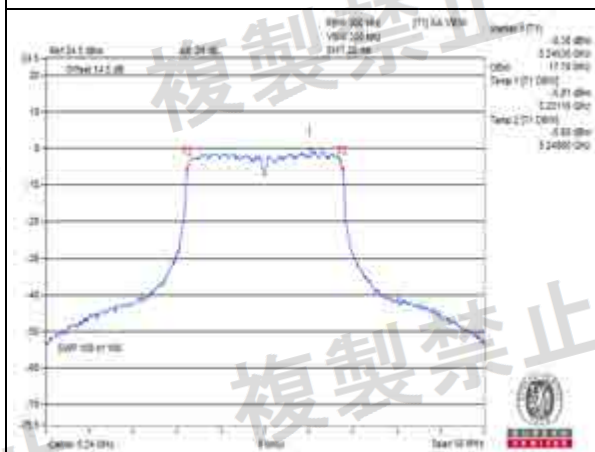
Note: For the test plots please refer to the below pages.

V_{normal}



Channel 36

Channel 40



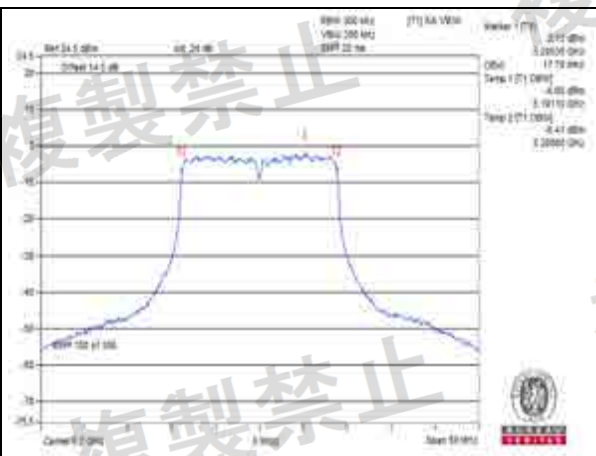
Channel 48

Measurement uncertainty: ± 206.50 Hz

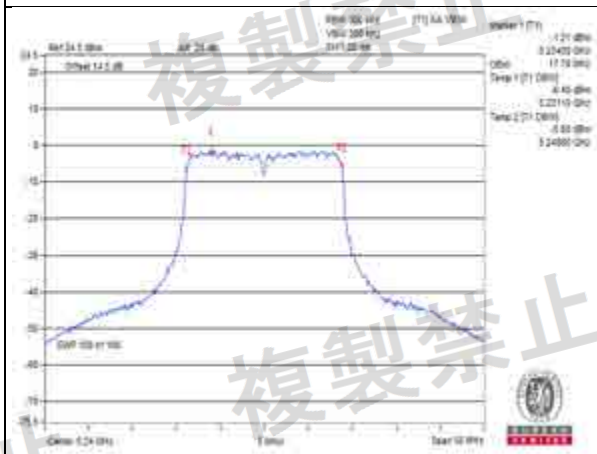
V_{max}.



Channel 36



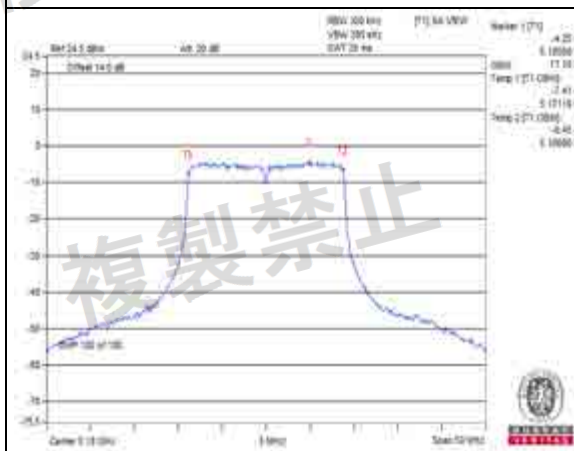
Channel 40



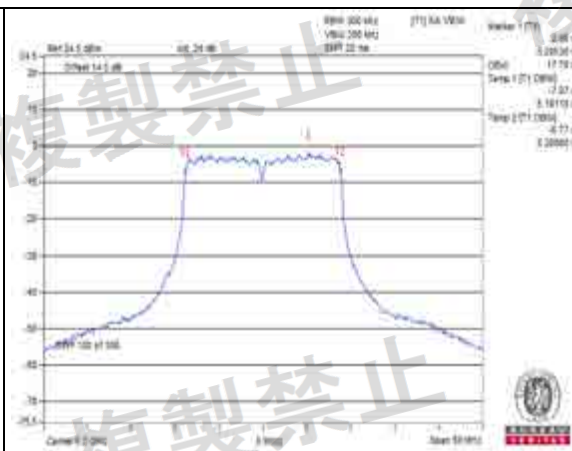
Channel 48

Measurement uncertainty: ± 206.50 Hz

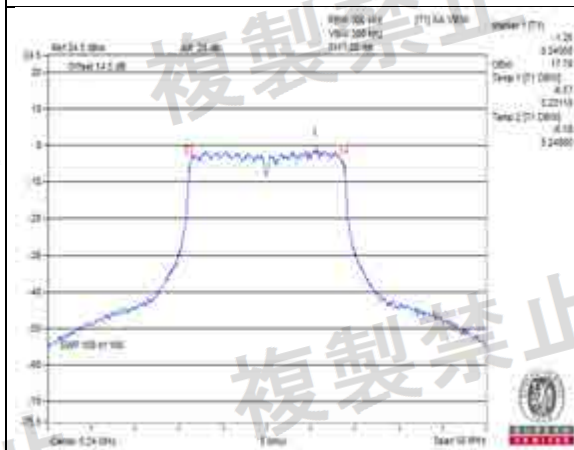
V_{min}



Channel 36



Channel 40



Channel 48

Measurement uncertainty: ± 206.50 Hz

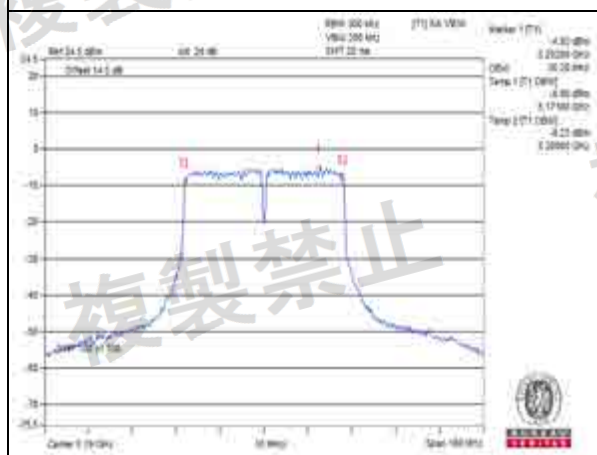


802.11n (HT40)

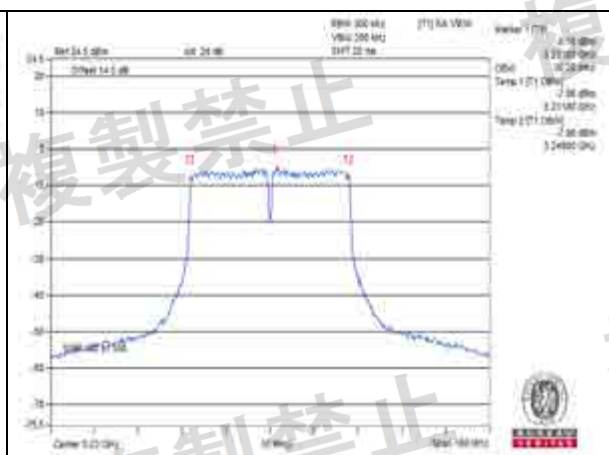
Environmental Conditions		24 deg.C, 70% RH		
Channel	Frequency (MHz)	V _{normal}	V _{max.}	V _{min.}
		Occupied Bandwidth (MHz)	Occupied Bandwidth (MHz)	Occupied Bandwidth (MHz)
38	5190	36.20	36.20	36.40
46	5230	36.20	36.20	36.20

Note: For the test plots please refer to the below pages.

V_{normal}

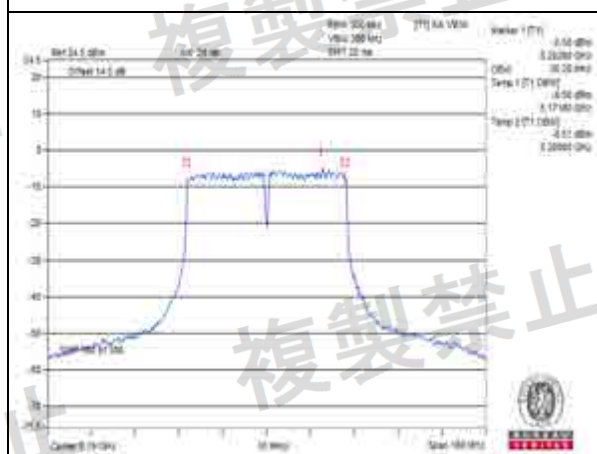


Channel 38

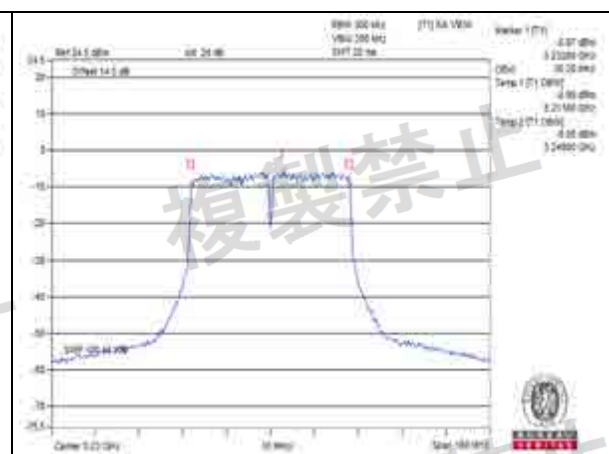


Channel 46

V_{max}

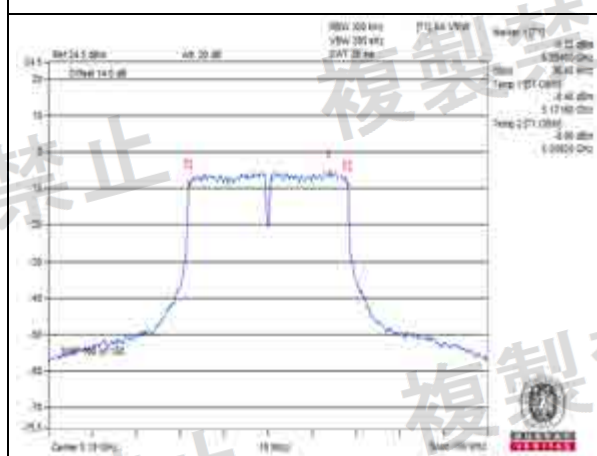


Channel 38

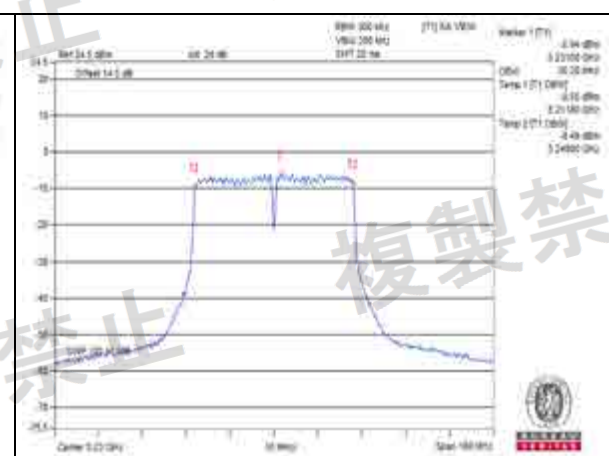


Channel 46

V_{min}



Channel 38



Channel 46

Measurement uncertainty: ± 206.50 Hz

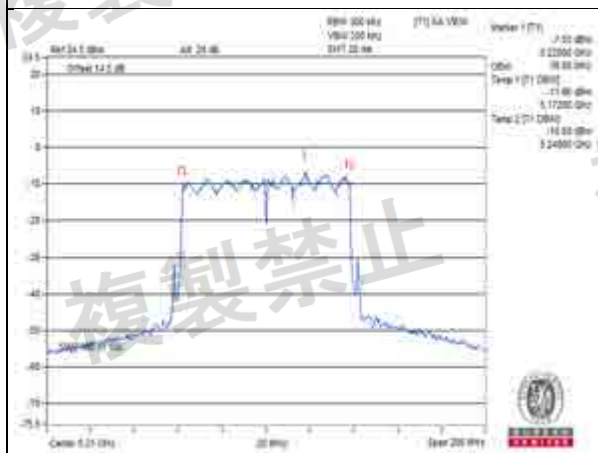


802.11ac (VHT80)

Environmental Conditions		24 deg.C, 70% RH		
Channel	Frequency (MHz)	V _{normal}	V _{max.}	V _{min.}
		Occupied Bandwidth (MHz)	Occupied Bandwidth (MHz)	Occupied Bandwidth (MHz)
42	5210	76.00	76.00	76.00

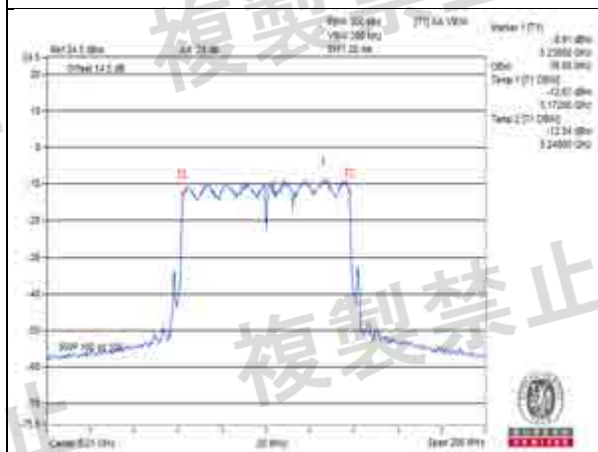
Note: For the test plots please refer to the below pages.

V_{normal}



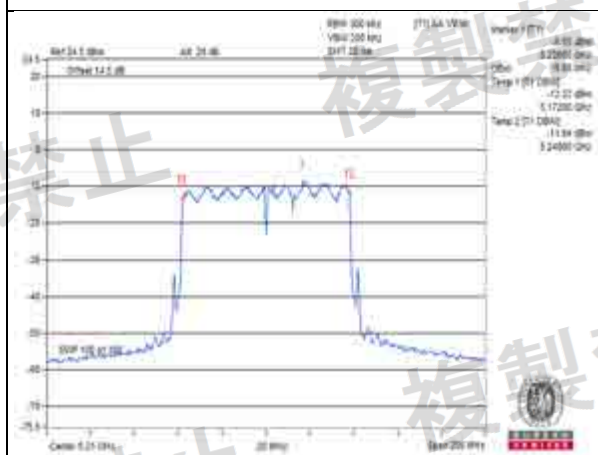
Channel 42

V_{max}



Channel 42

V_{min}



Channel 42

Measurement uncertainty: ± 206.50 Hz

4.3 Spurious Emissions for Transmitter Measurement

4.3.1 Limits of Spurious Emissions

W52 & W53 bands: 802.11a / 802.11n (HT20)

Frequencies (MHz)	Limit
OBW \leq 18MHz	
30.0MHz to 1000.0MHz	$\leq 0.25 \mu\text{W}/100\text{kHz}$
1000.0MHz to 5140.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$
5360.0MHz to 26000.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$
18MHz < OBW < 19MHz	
30.0MHz to 1000.0MHz	$\leq 0.25 \mu\text{W}/100\text{kHz}$
1000.0MHz to 5135.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$
5365.0MHz to 26000.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$

W52 & W53 bands: 802.11n (HT40)

Frequencies (MHz)	Limit
30.0MHz ~ 1000.0MHz	$\leq 0.25 \mu\text{W}/100\text{kHz}$
1000.0MHz ~ 5100.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$
5400.0MHz ~ 26000.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$

W52 & W53 bands: 802.11ac (VHT80)

Frequencies (MHz)	Limit
30.0MHz ~ 1000.0MHz	$\leq 0.25 \mu\text{W}/100\text{kHz}$
1000.0MHz ~ 5020.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$
5480.0MHz ~ 26000.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$

W56 band: 802.11a / 802.11n (HT20)

Frequencies (MHz)	Limit
30.0MHz to 1000.0MHz	$\leq 0.25 \mu\text{W}/100\text{kHz}$
1000.0MHz ~ 5455.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$
5745.0MHz ~ 26000.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$

W56 band: 802.11n (HT40)

Frequencies (MHz)	Limit
30.0MHz to 1000.0MHz	$\leq 0.25 \mu\text{W}/100\text{kHz}$
1000.0MHz ~ 5420.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$
5760.0MHz ~ 26000.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$

W56 band: 802.11ac (VHT80)

Frequencies (MHz)	Limit
30.0MHz to 1000.0MHz	$\leq 0.25 \mu\text{W}/100\text{kHz}$
1000.0MHz ~ 5340.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$
5800.0MHz ~ 26000.0MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$



4.3.2 Teset Setup



4.3.3 Test Results

W52 Band:

802.11a

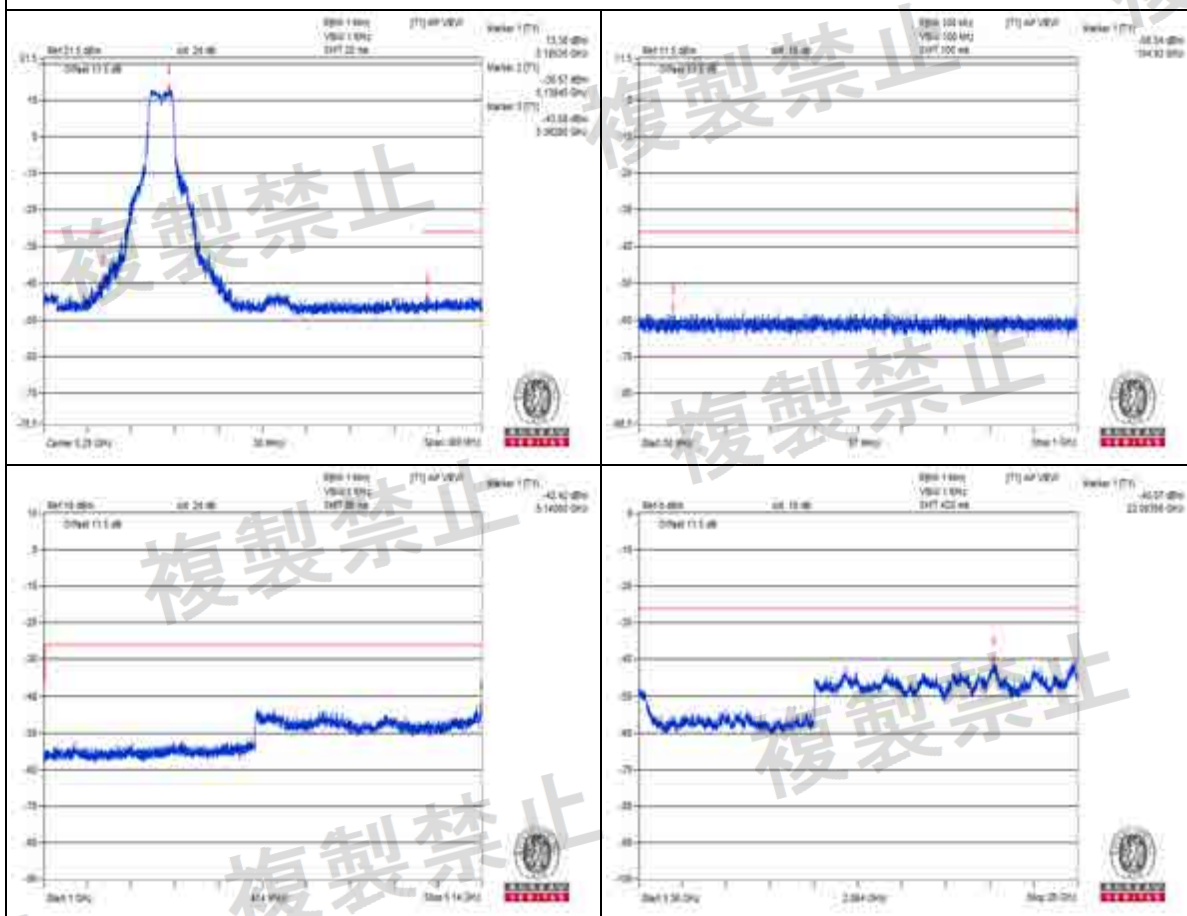
Environmental Conditions		24 deg.C, 70% RH					
Test Channel		CH36 (5180MHz)		CH40 (5200MHz)		Limit	Result
Test Condition	Frequency Range	Frequency (MHz)	Measured Value (uW)	Frequency (MHz)	Measured Value (uW)		
V _{normal}	30.0MHz ~ 1000.0MHz	104.930	0.0022	989.080	0.0021	0.25uW	PASS
	1000.0MHz ~ 5140.0MHz	5140.000	0.0572	3184.880	0.0493	2.5uW	PASS
	5360.0MHz ~ 26000.0MHz	22083.560	0.0984	25881.320	0.0909	2.5uW	PASS
V _{max.}	30.0MHz ~ 1000.0MHz	65.400	0.0025	170.160	0.0020	0.25uW	PASS
	1000.0MHz ~ 5140.0MHz	5140.000	0.0933	3026.530	0.0588	2.5uW	PASS
	5360.0MHz ~ 26000.0MHz	22114.520	0.0845	22073.240	0.1093	2.5uW	PASS
V _{min.}	30.0MHz ~ 1000.0MHz	925.550	0.0022	841.400	0.0024	0.25uW	PASS
	1000.0MHz ~ 5140.0MHz	5132.750	0.0731	5092.390	0.0452	2.5uW	PASS
	5360.0MHz ~ 26000.0MHz	25834.880	0.0734	22031.960	0.1032	2.5uW	PASS



Test Channel		CH48 (5240MHz)		Limit	Result
Test Condition	Frequency Range	Frequency (MHz)	Measured Value (uW)		
V _{normal}	30.0MHz ~ 1000.0MHz	484.930	0.0022	0.25uW	PASS
	1000.0MHz ~ 5140.0MHz	3013.070	0.0483	2.5uW	PASS
	5360.0MHz ~ 26000.0MHz	25809.080	0.0835	2.5uW	PASS
V _{max.}	30.0MHz ~ 1000.0MHz	384.050	0.0022	0.25uW	PASS
	1000.0MHz ~ 5140.0MHz	3032.740	0.0465	2.5uW	PASS
	5360.0MHz ~ 26000.0MHz	22068.080	0.0860	2.5uW	PASS
V _{min.}	30.0MHz ~ 1000.0MHz	710.450	0.0019	0.25uW	PASS
	1000.0MHz ~ 5140.0MHz	3014.110	0.0446	2.5uW	PASS
	5360.0MHz ~ 26000.0MHz	22052.600	0.0829	2.5uW	PASS

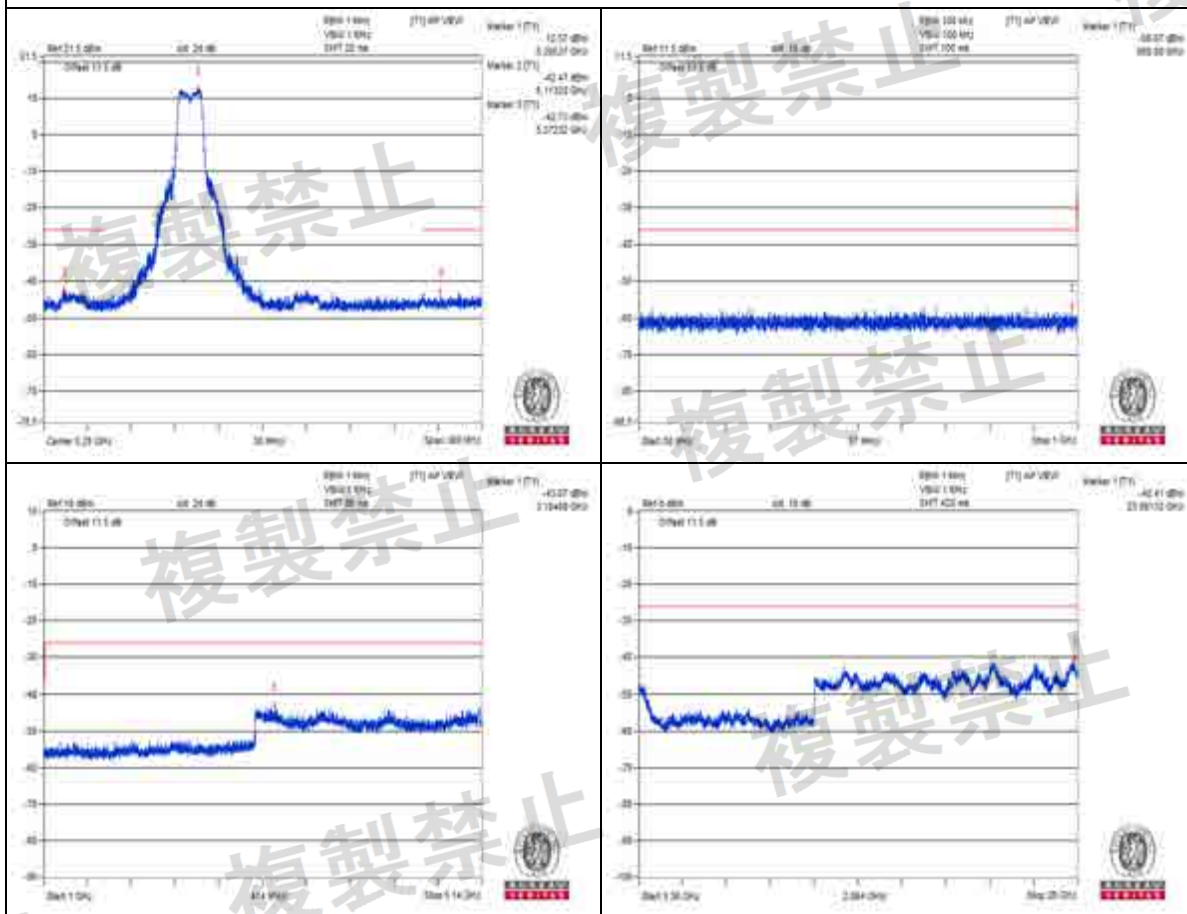
Note: 1. The worst value in each frequency range v.s. each channel has been marked by boldface.
2. The spectrum plots are attached on the following pages.

V normal
CH 36



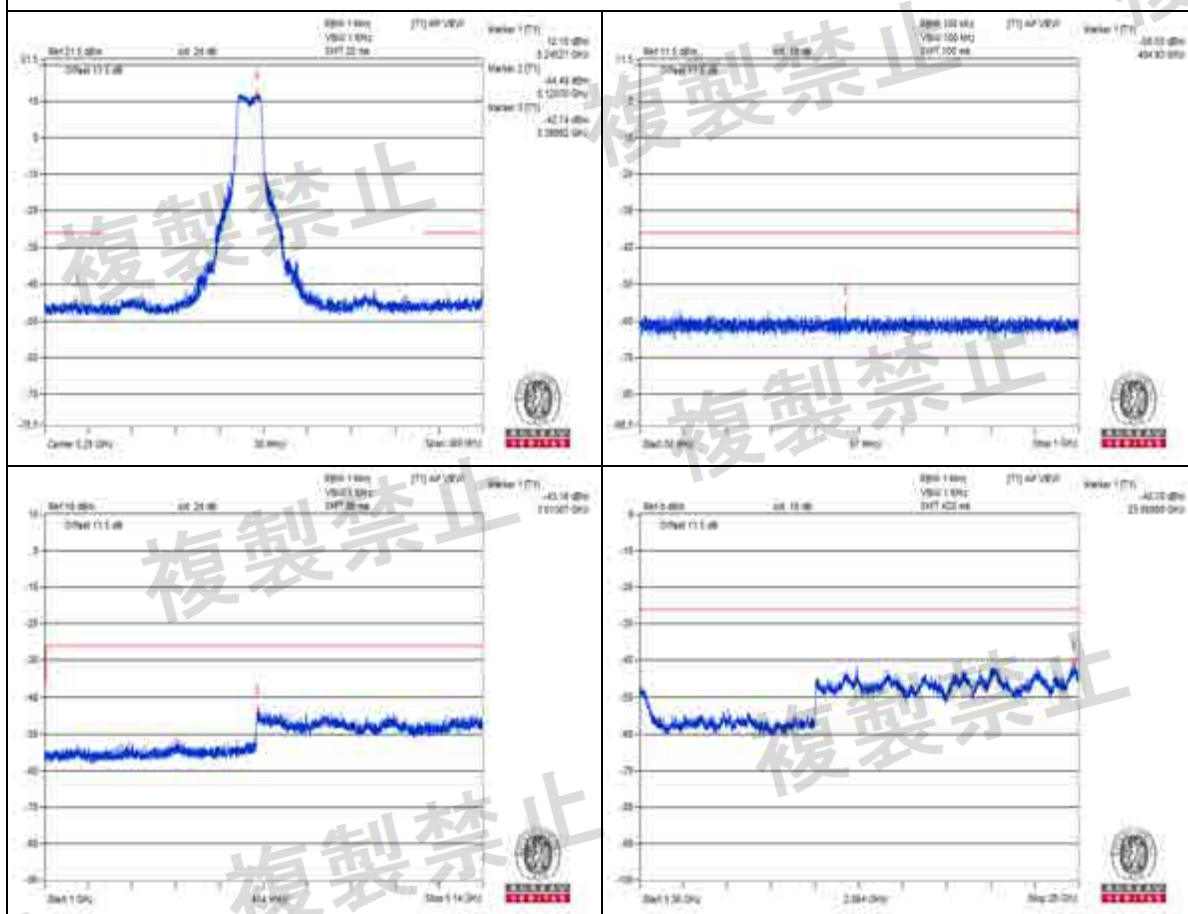
Measurement uncertainty: $\pm 3.93\text{dB}$

V normal
CH 40



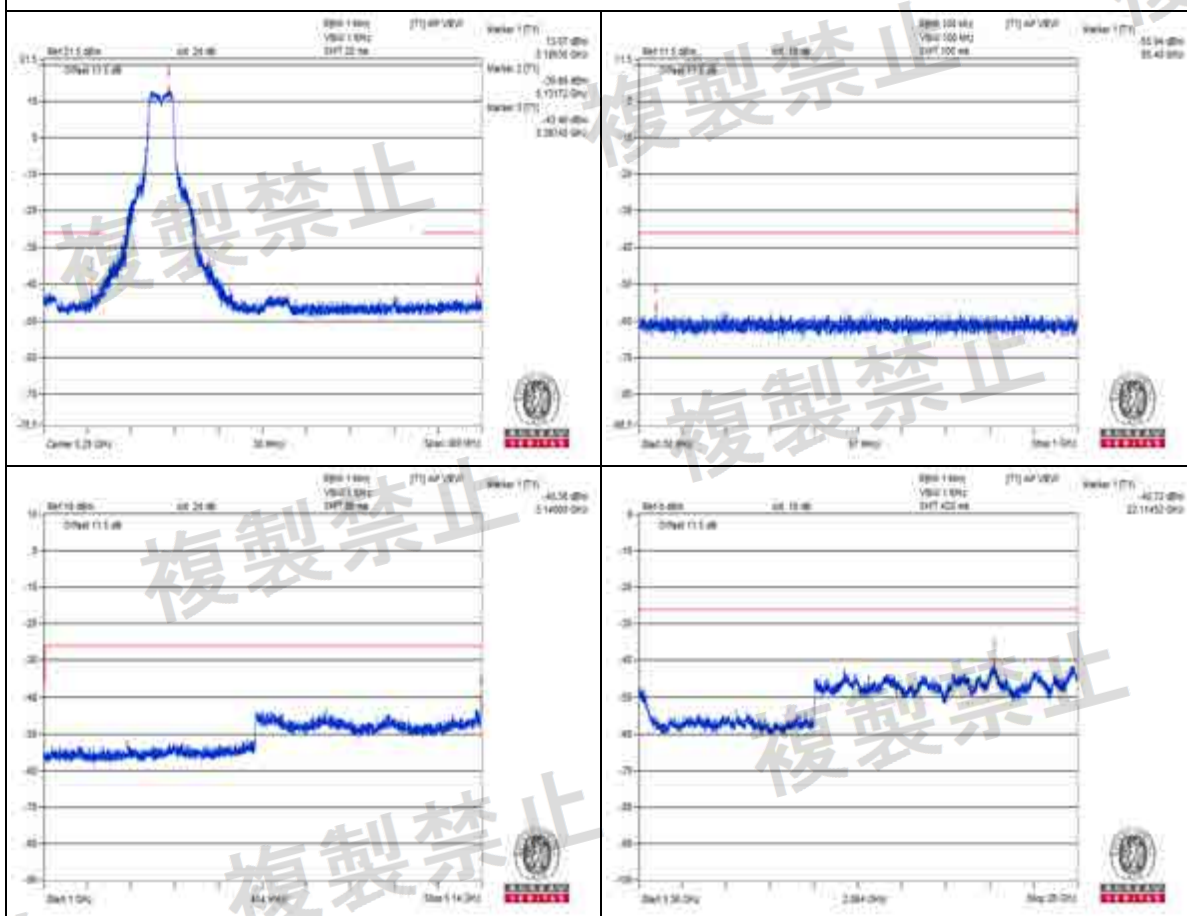
Measurement uncertainty: $\pm 3.93\text{dB}$

V_{normal}
CH 48



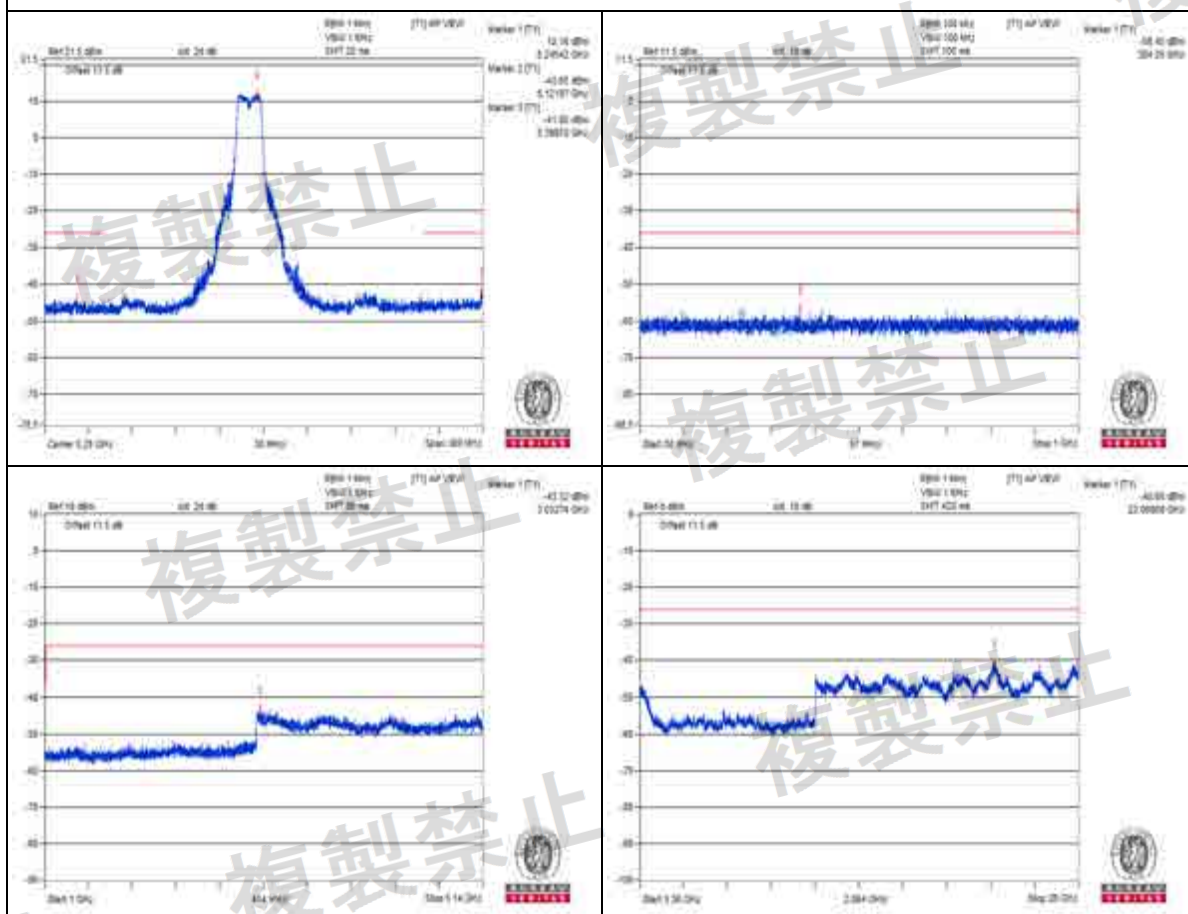
Measurement uncertainty: $\pm 3.93\text{dB}$

Vmax.
CH 36



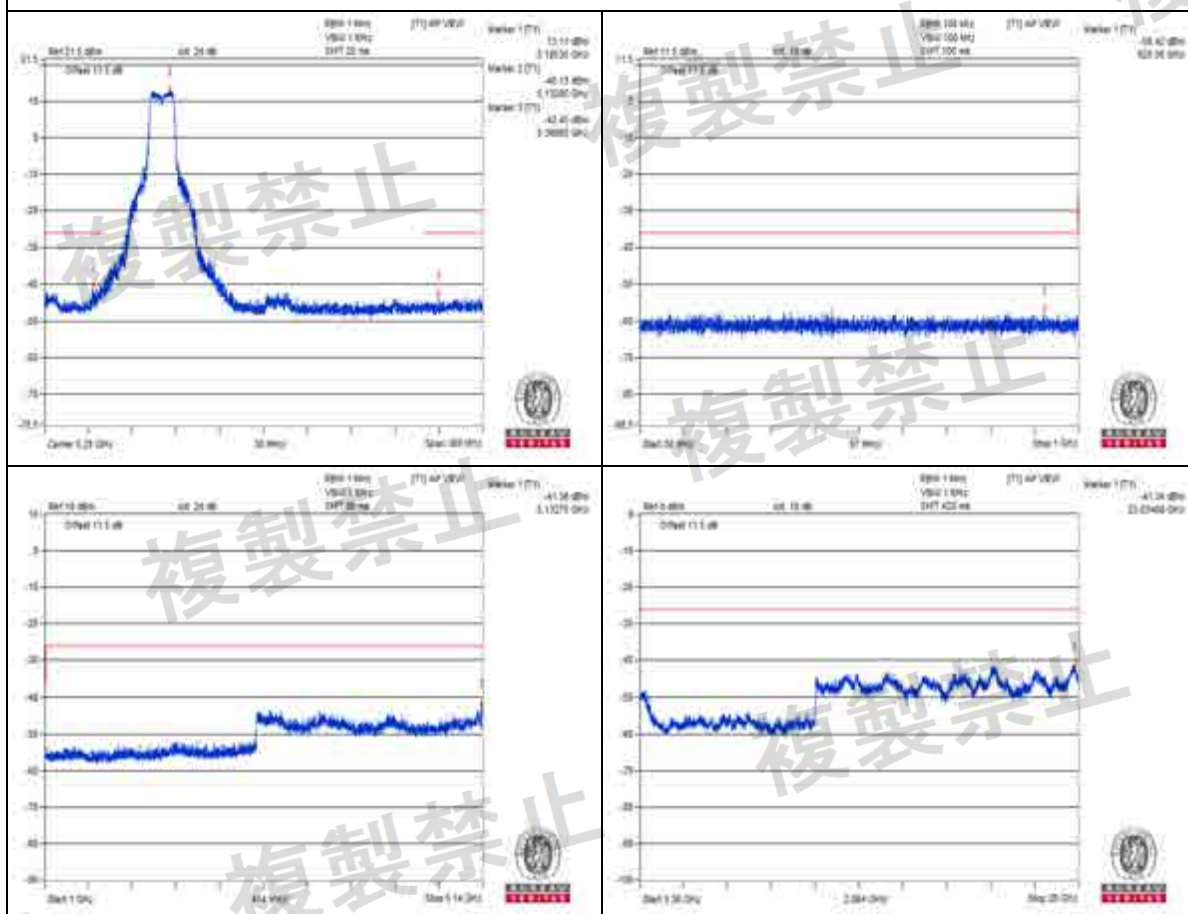
Measurement uncertainty: $\pm 3.93\text{dB}$

Vmax.
CH 48



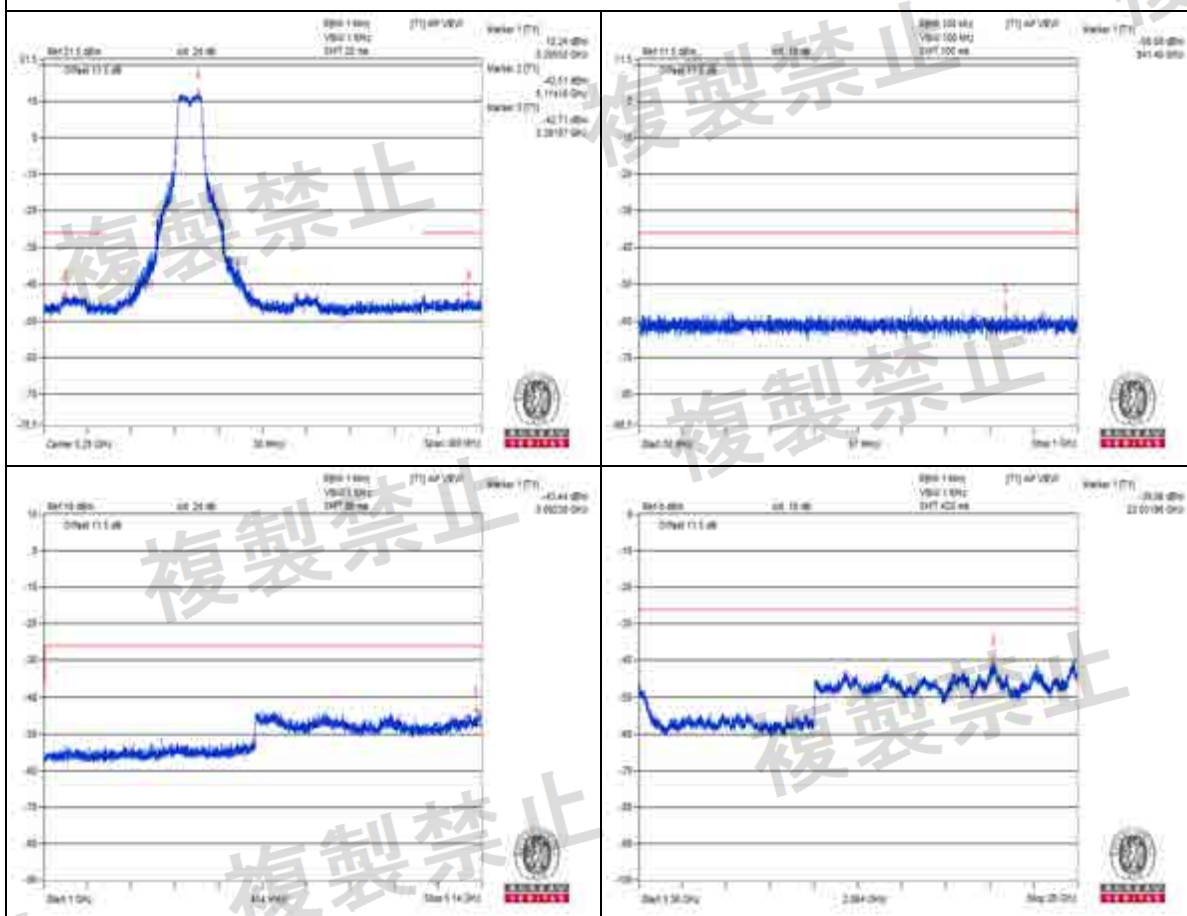
Measurement uncertainty: $\pm 3.93\text{dB}$

Vmin.
CH 36



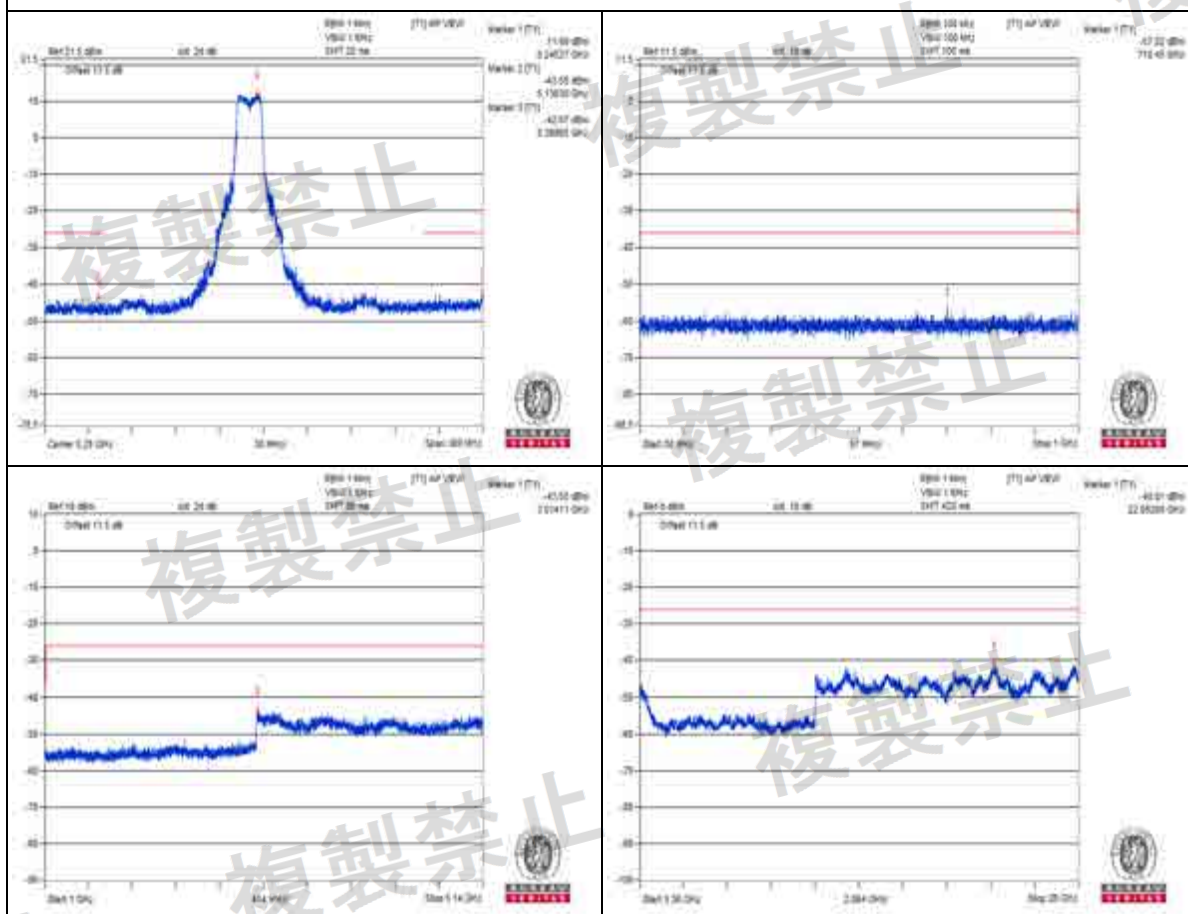
Measurement uncertainty: $\pm 3.93\text{dB}$

Vmin.
CH 40



Measurement uncertainty: $\pm 3.93\text{dB}$

Vmin.
CH 48



Measurement uncertainty: $\pm 3.93\text{dB}$



W52 Band:

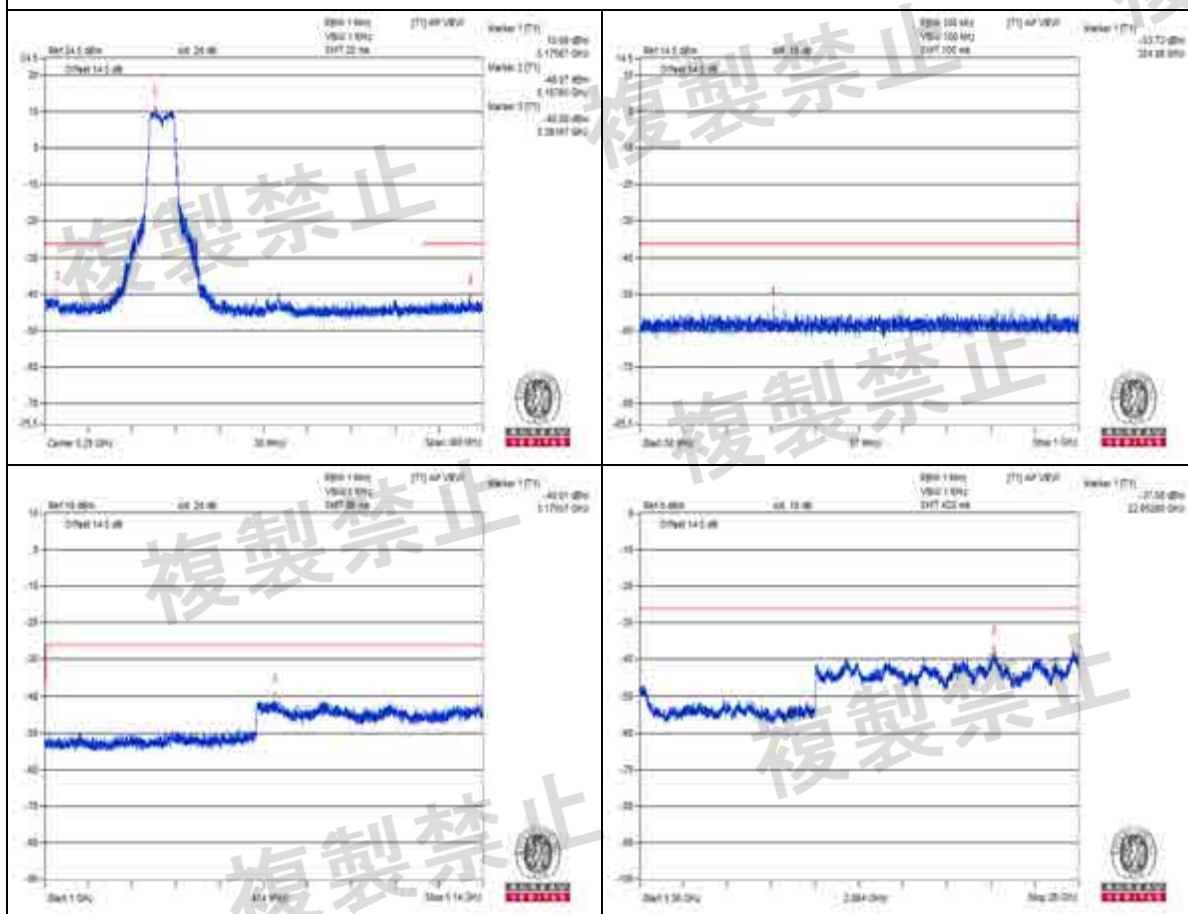
802.11n (HT20)

Environmental Conditions		24 deg.C, 70% RH					
Test Channel		CH36 (5180MHz)		CH40 (5200MHz)		Limit	Result
Test Condition	Frequency Range	Frequency (MHz)	Measured Value (uW)	Frequency (MHz)	Measured Value (uW)		
V _{normal}	30.0MHz ~ 1000.0MHz	324.880	0.0042	354.700	0.0042	0.25uW	PASS
	1000.0MHz ~ 5140.0MHz	3175.570	0.0997	3030.670	0.1039	2.5uW	PASS
	5360.0MHz ~ 26000.0MHz	22052.600	0.1958	21990.680	0.1721	2.5uW	PASS
V _{max.}	30.0MHz ~ 1000.0MHz	787.320	0.0041	849.400	0.0038	0.25uW	PASS
	1000.0MHz ~ 5140.0MHz	3024.460	0.1028	3051.370	0.0897	2.5uW	PASS
	5360.0MHz ~ 26000.0MHz	22099.040	0.1517	25788.440	0.1862	2.5uW	PASS
V _{min.}	30.0MHz ~ 1000.0MHz	976.960	0.0040	550.640	0.0038	0.25uW	PASS
	1000.0MHz ~ 5140.0MHz	3606.130	0.0968	3156.940	0.1096	2.5uW	PASS
	5360.0MHz ~ 26000.0MHz	25845.200	0.1870	22057.760	0.1857	2.5uW	PASS



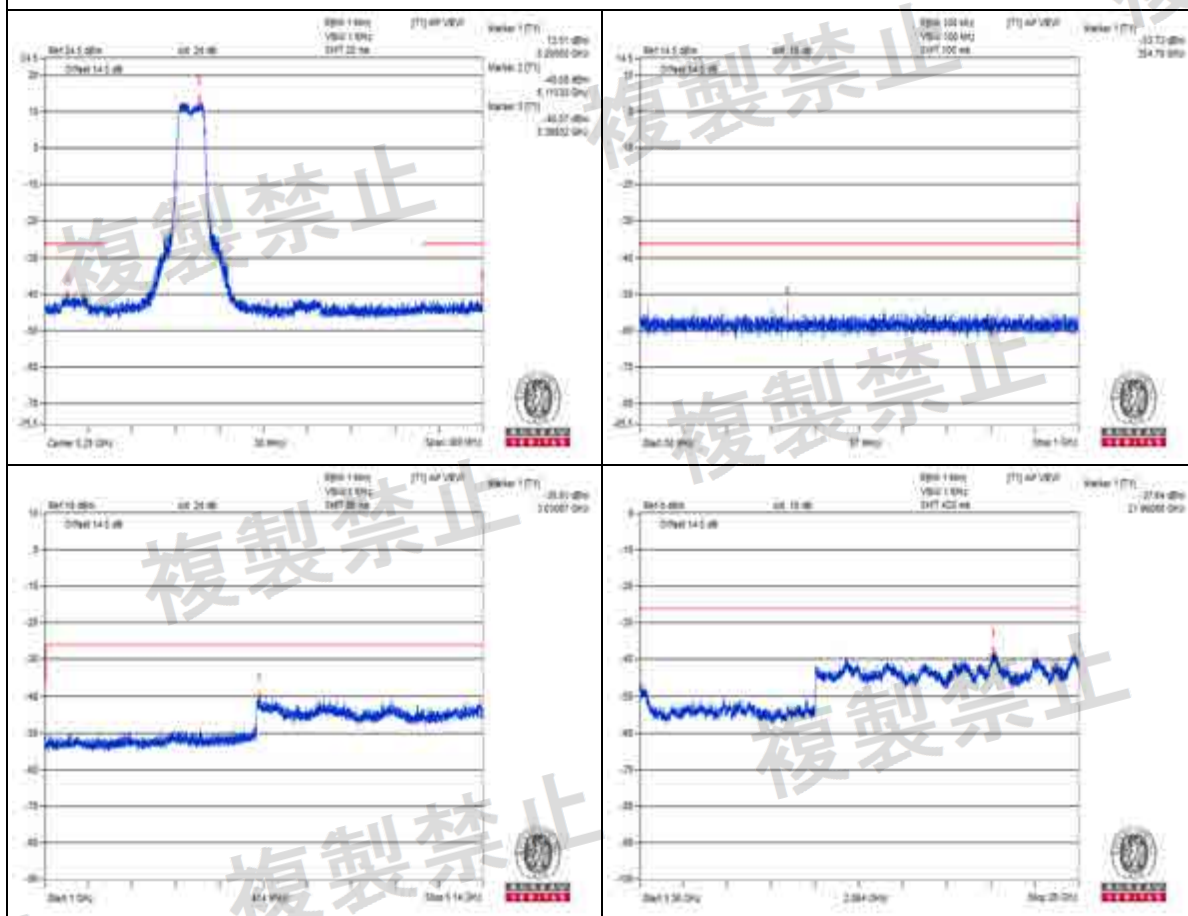
Test Channel		CH48 (5240MHz)		Limit	Result
Test Condition	Frequency Range	Frequency (MHz)	Measured Value (uW)		
V _{normal}	30.0MHz ~ 1000.0MHz	370.220	0.0039	0.25uW	PASS
	1000.0MHz ~ 5140.0MHz	3047.230	0.0937	2.5uW	PASS
	5360.0MHz ~ 26000.0MHz	25834.880	0.1901	2.5uW	PASS
V _{max.}	30.0MHz ~ 1000.0MHz	331.420	0.0038	0.25uW	PASS
	1000.0MHz ~ 5140.0MHz	3649.600	0.0893	2.5uW	PASS
	5360.0MHz ~ 26000.0MHz	22068.080	0.1819	2.5uW	PASS
V _{min.}	30.0MHz ~ 1000.0MHz	762.100	0.0040	0.25uW	PASS
	1000.0MHz ~ 5140.0MHz	3036.880	0.1081	2.5uW	PASS
	5360.0MHz ~ 26000.0MHz	25855.520	0.1887	2.5uW	PASS

V normal
CH 36



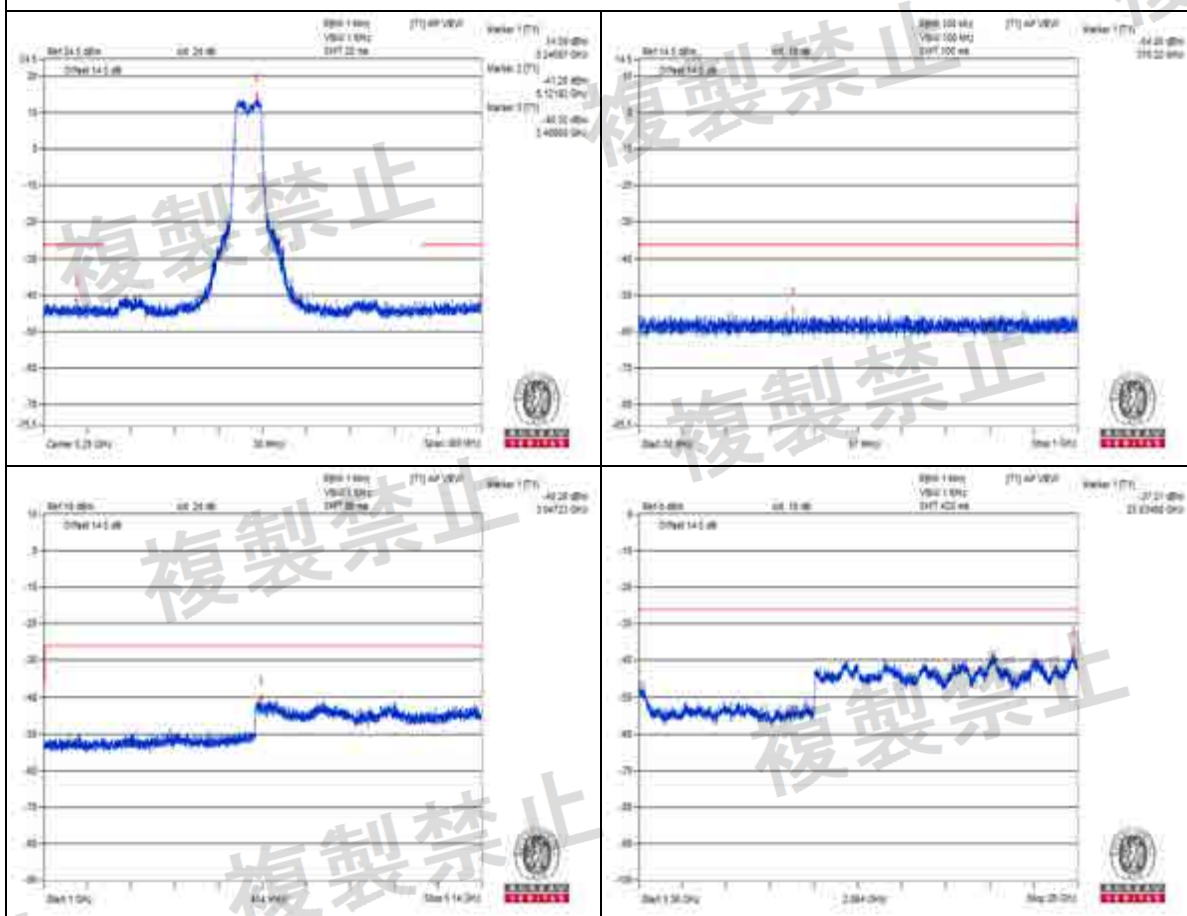
Measurement uncertainty: $\pm 3.93\text{dB}$

V normal
CH 40



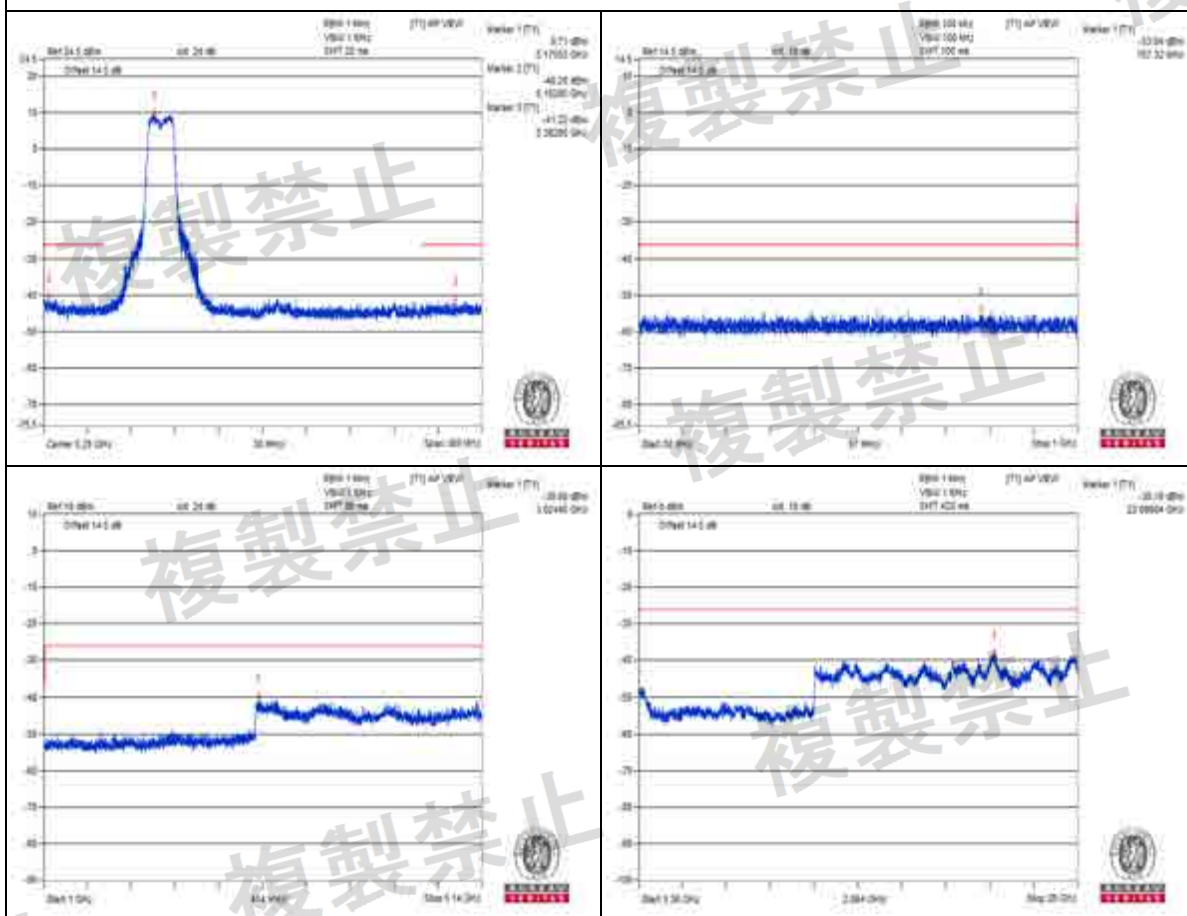
Measurement uncertainty: $\pm 3.93\text{dB}$

V normal
CH 48



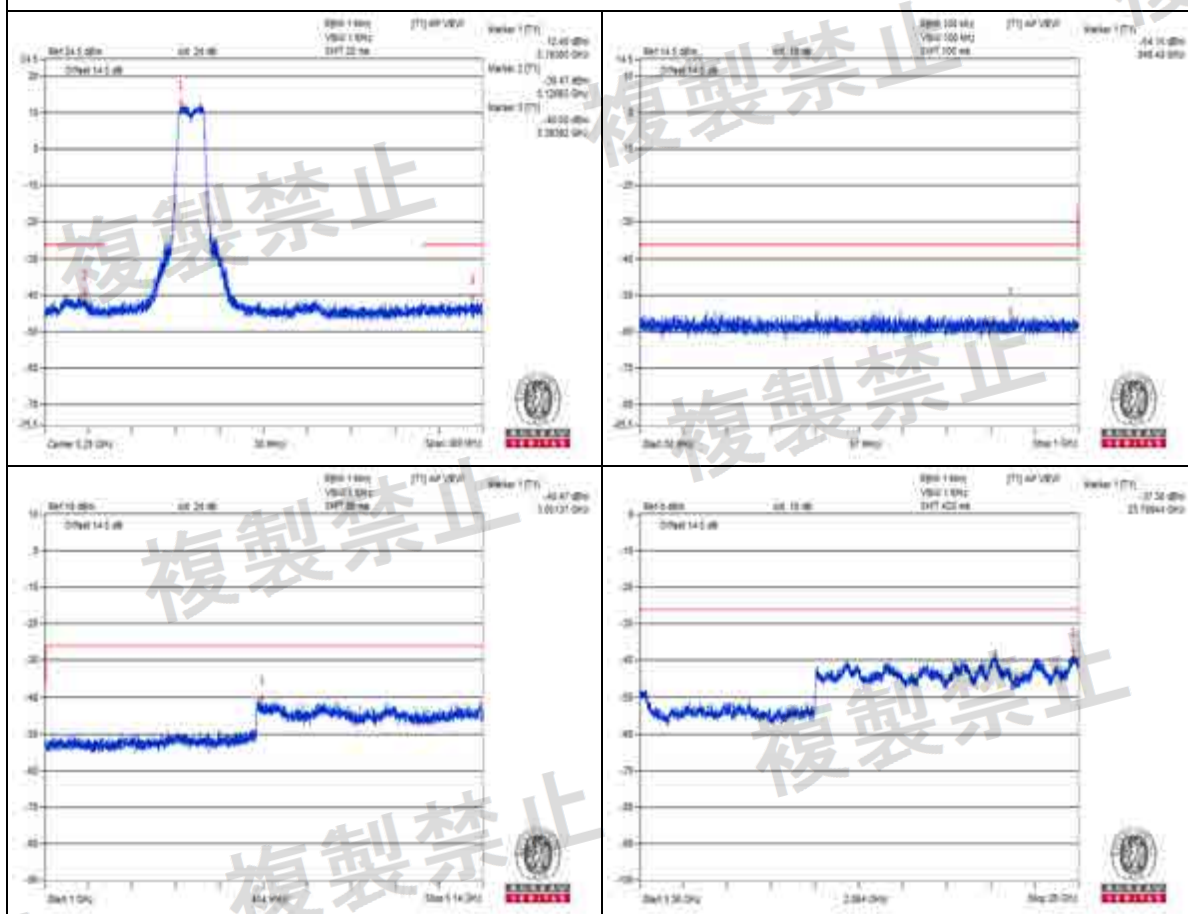
Measurement uncertainty: $\pm 3.93\text{dB}$

Vmax.
CH 36



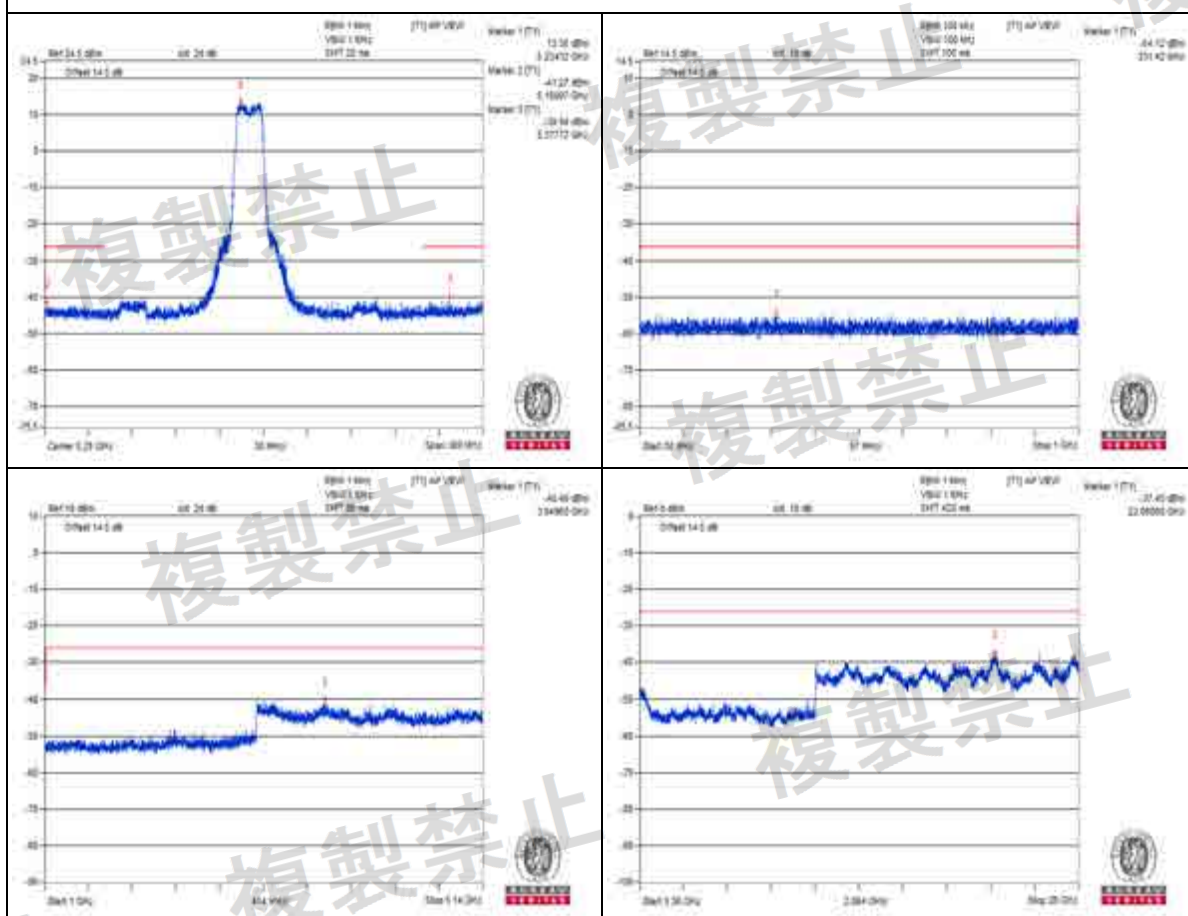
Measurement uncertainty: $\pm 3.93\text{dB}$

Vmax.
CH 40



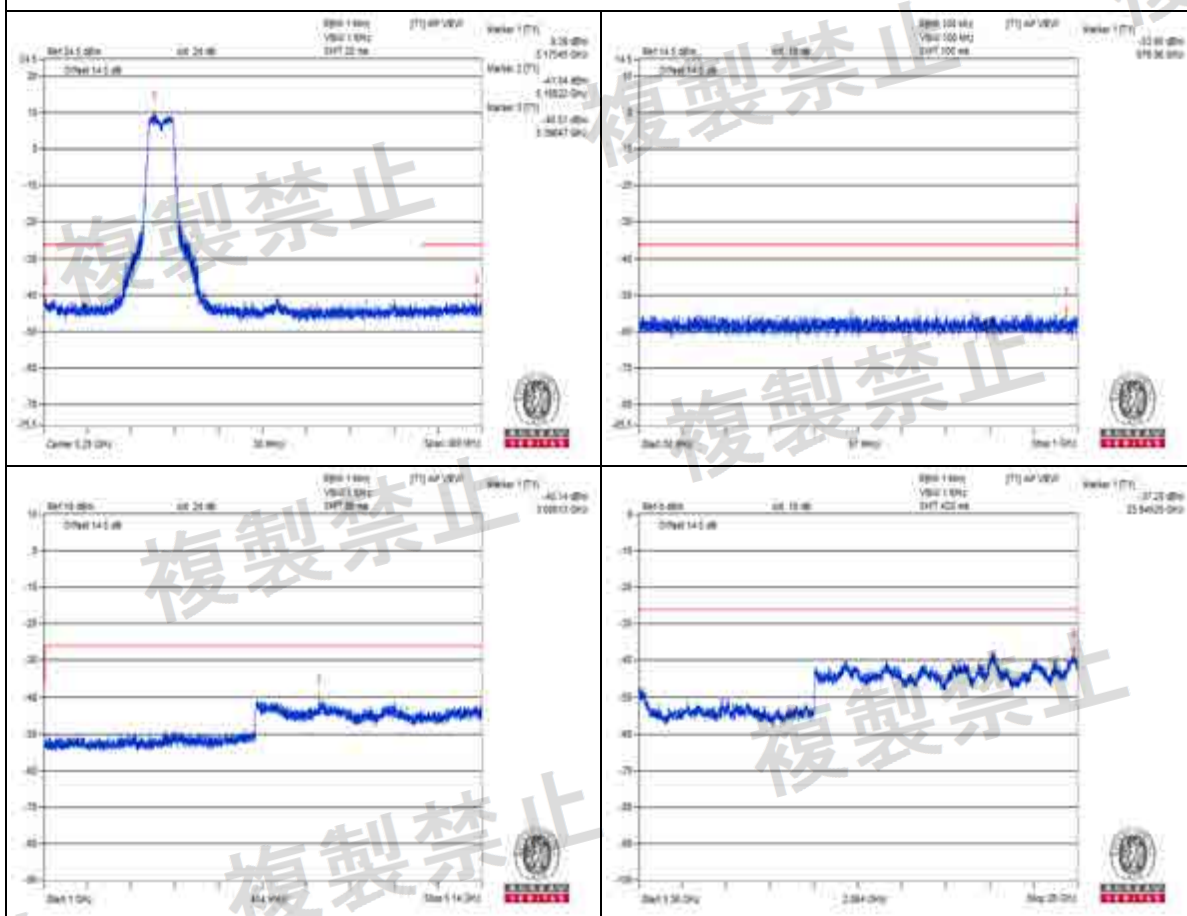
Measurement uncertainty: $\pm 3.93\text{dB}$

Vmax.
CH 48



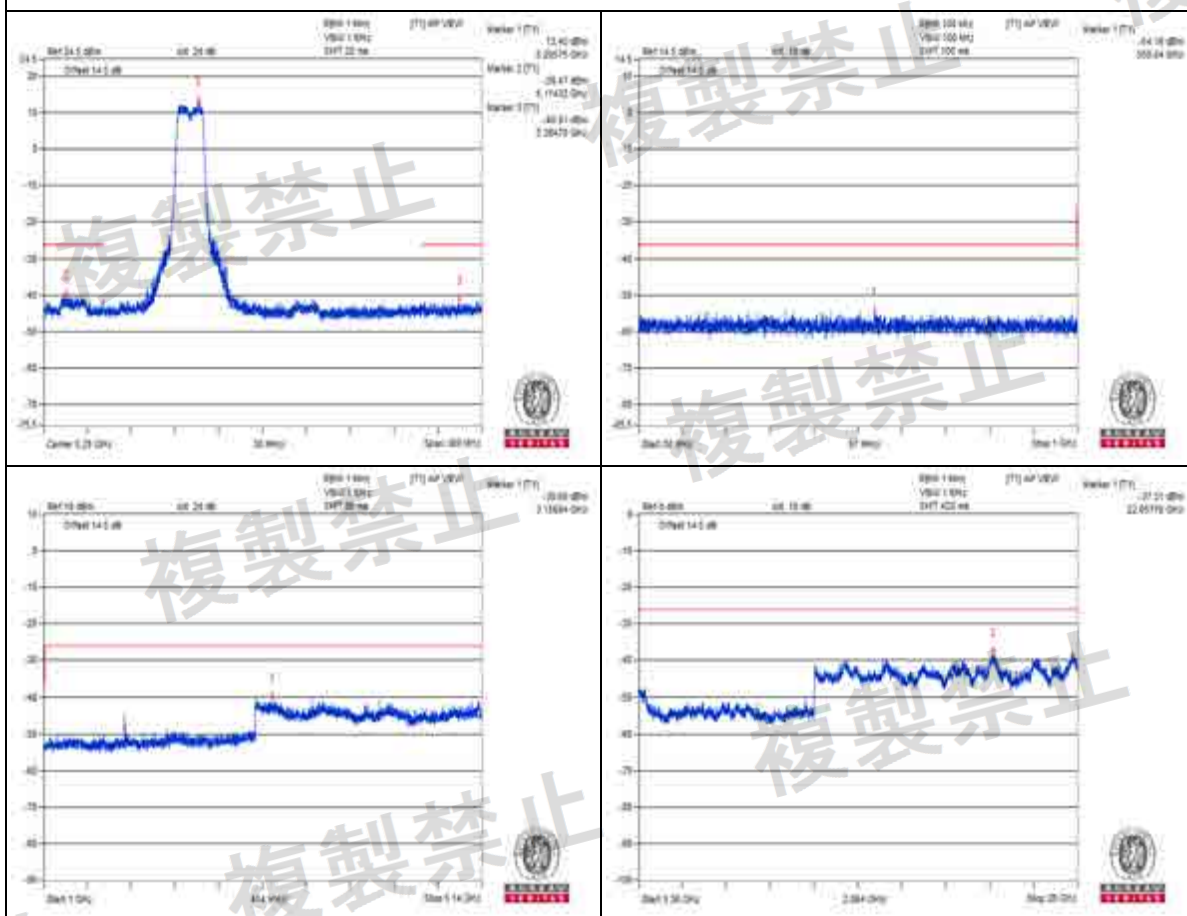
Measurement uncertainty: $\pm 3.93\text{dB}$

Vmin.
CH 36



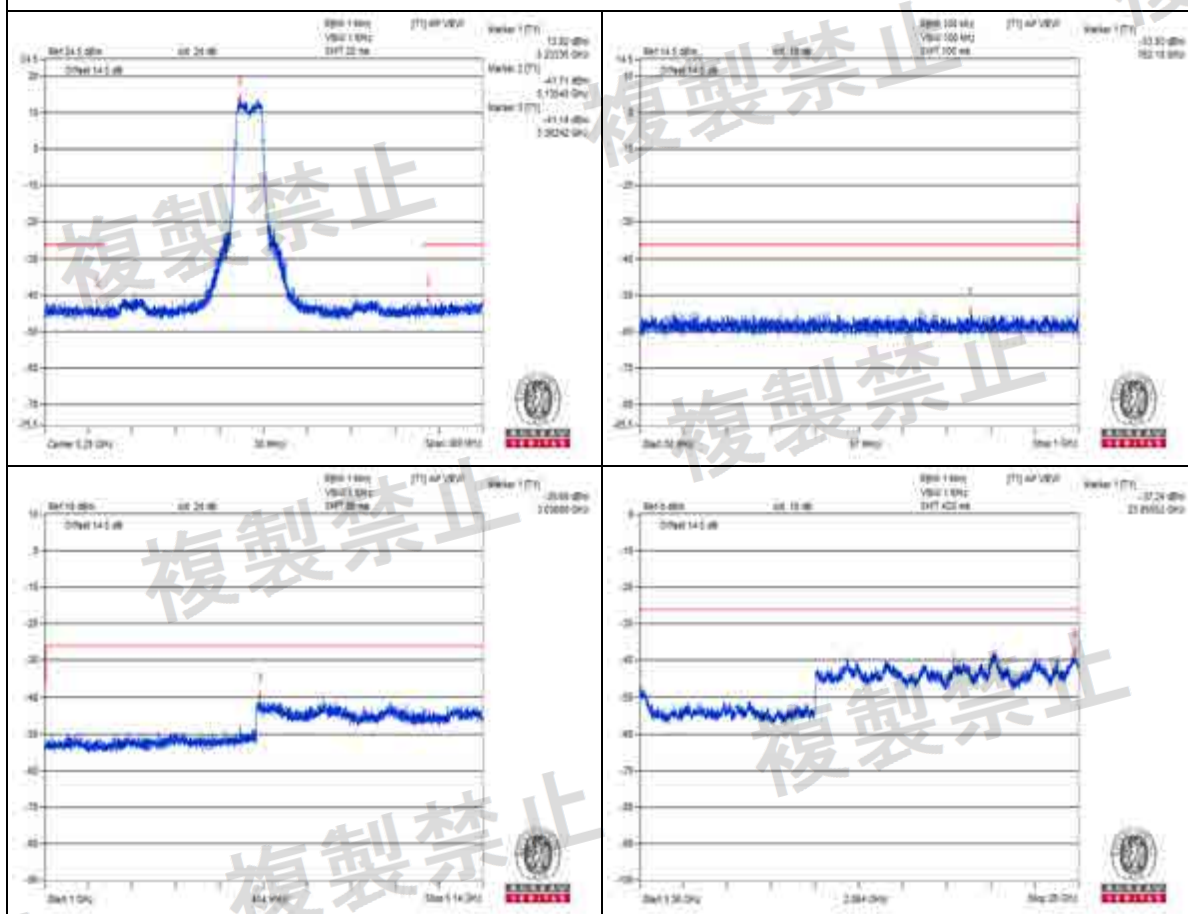
Measurement uncertainty: $\pm 3.93\text{dB}$

Vmin.
CH 40



Measurement uncertainty: $\pm 3.93\text{dB}$

Vmin.
CH 48



Measurement uncertainty: $\pm 3.93\text{dB}$



W52 Band:

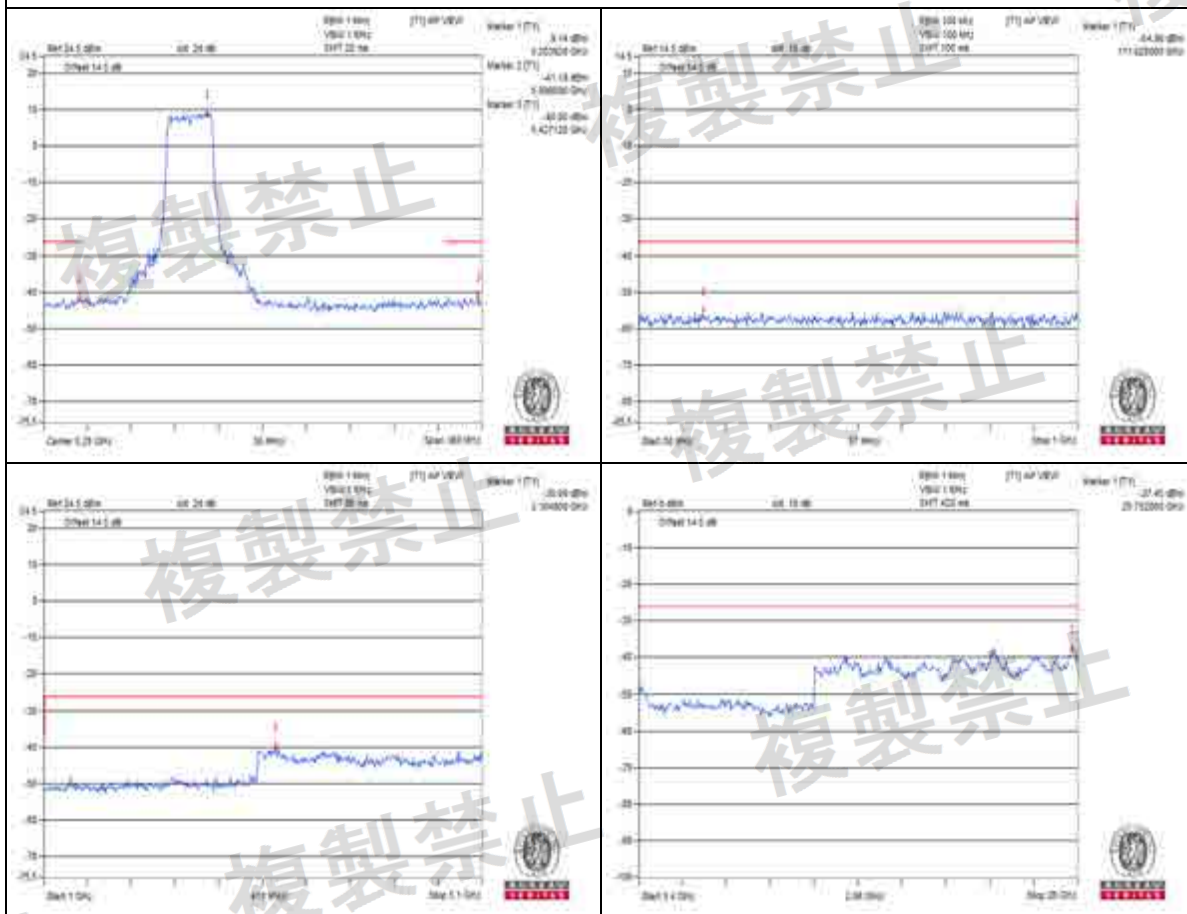
802.11n (HT40)

Environmental Conditions		24 deg.C, 70% RH					
Test Channel		CH38 (5190MHz)		CH46 (5230MHz)		Limit	Result
Test Condition	Frequency Range	Frequency (MHz)	Measured Value (uW)	Frequency (MHz)	Measured Value (uW)		
V _{normal}	30.0MHz ~ 1000.0MHz	171.620	0.0032	827.340	0.0048	0.25uW	PASS
	1000.0MHz ~ 5100.0MHz	3164.800	0.1232	3214.000	0.0854	2.5uW	PASS
	5400.0MHz ~ 26000.0MHz	25752.800	0.1797	25876.400	0.1777	2.5uW	PASS
V _{max.}	30.0MHz ~ 1000.0MHz	631.400	0.0036	951.500	0.0031	0.25uW	PASS
	1000.0MHz ~ 5100.0MHz	3517.400	0.0917	5067.200	0.1048	2.5uW	PASS
	5400.0MHz ~ 26000.0MHz	25835.200	0.1928	22086.000	0.1741	2.5uW	PASS
V _{min.}	30.0MHz ~ 1000.0MHz	464.560	0.0038	377.260	0.0037	0.25uW	PASS
	1000.0MHz ~ 5100.0MHz	3009.000	0.1035	3599.400	0.1278	2.5uW	PASS
	5400.0MHz ~ 26000.0MHz	22044.800	0.1866	21962.400	0.1685	2.5uW	PASS

Note: 1. The worst value in each frequency range v.s. each channel has been marked by boldface.

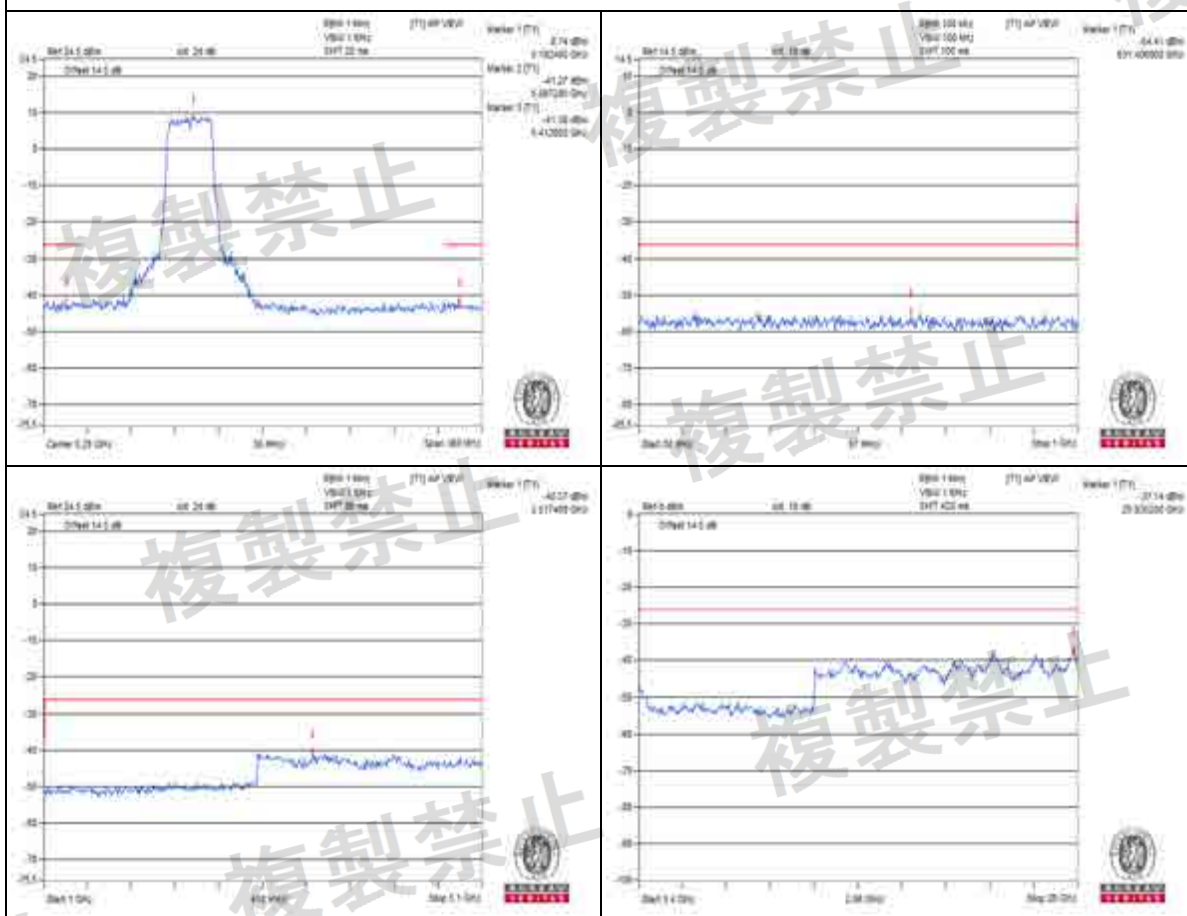
2. The spectrum plots are attached on the following pages.

V_{normal}
CH 38



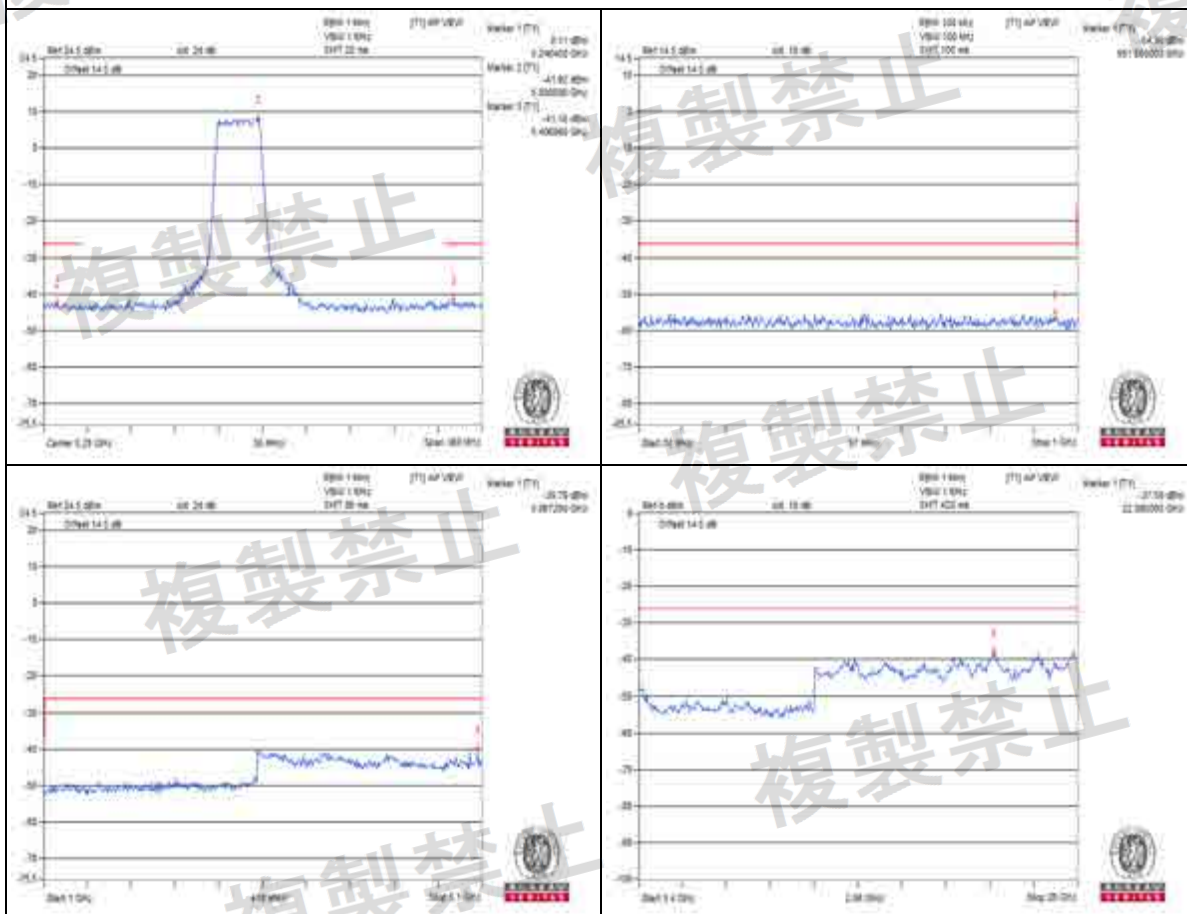
Measurement uncertainty: $\pm 3.93\text{dB}$

V_{max}
CH 38



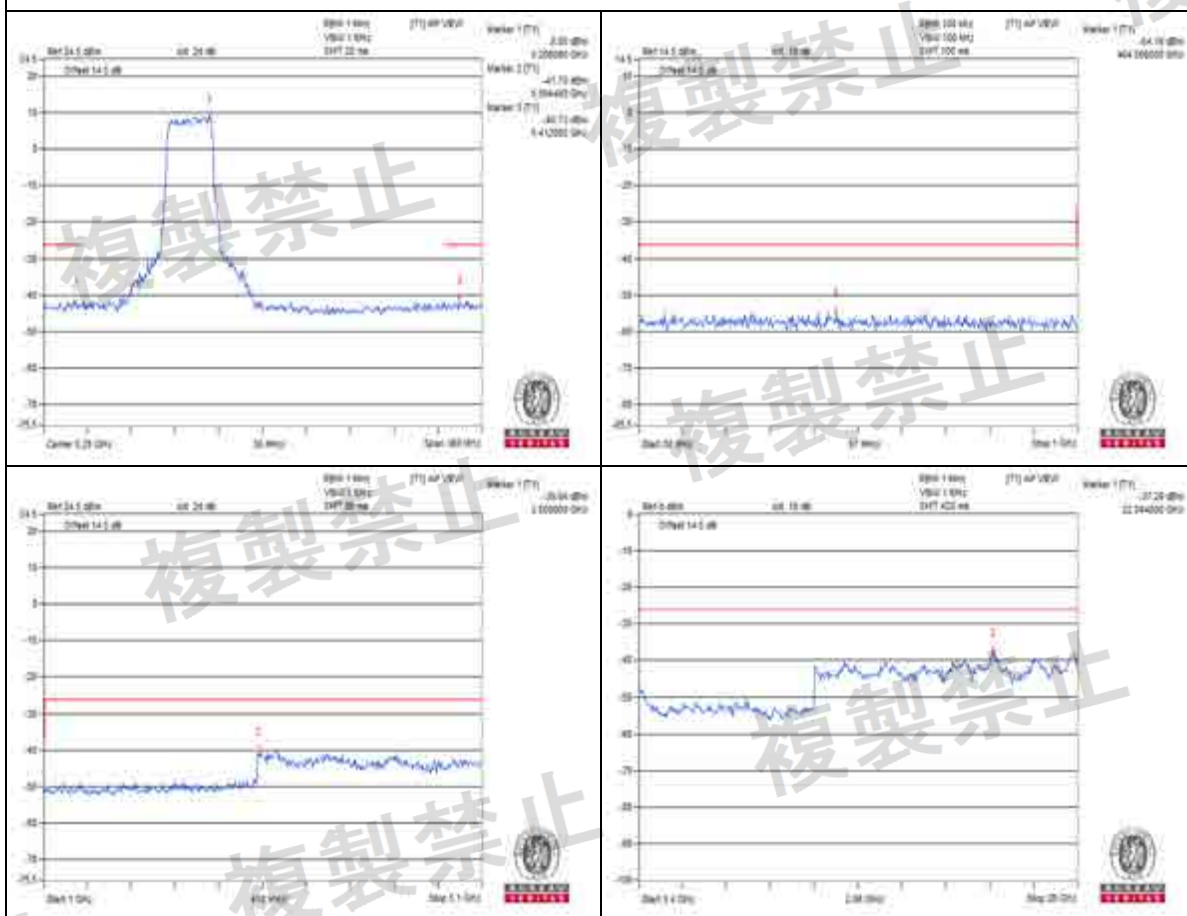
Measurement uncertainty: $\pm 3.93\text{dB}$

V_{max}
CH 46



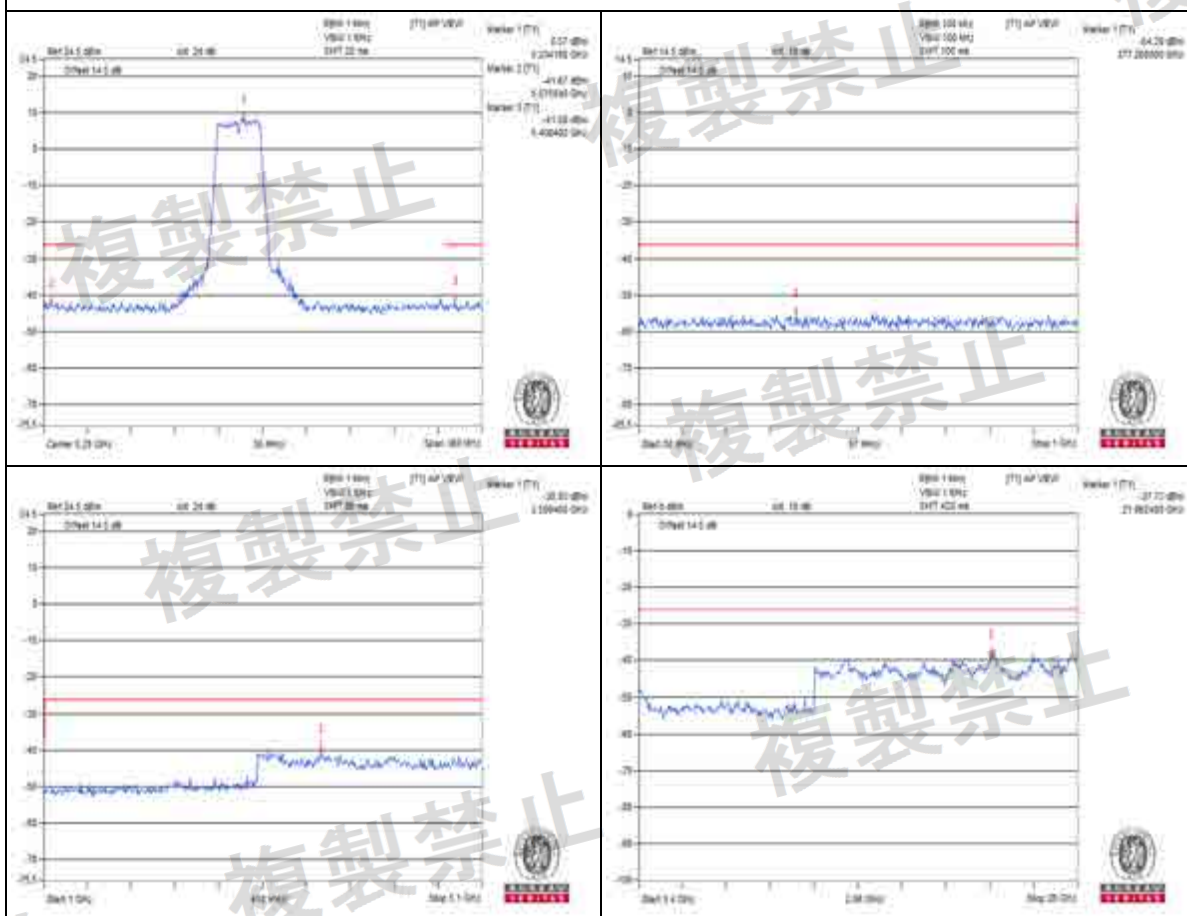
Measurement uncertainty: $\pm 3.93\text{dB}$

V_{min}.
CH 38



Measurement uncertainty: $\pm 3.93\text{dB}$

V_{min}
CH 46



Measurement uncertainty: $\pm 3.93\text{dB}$



W52 Band:

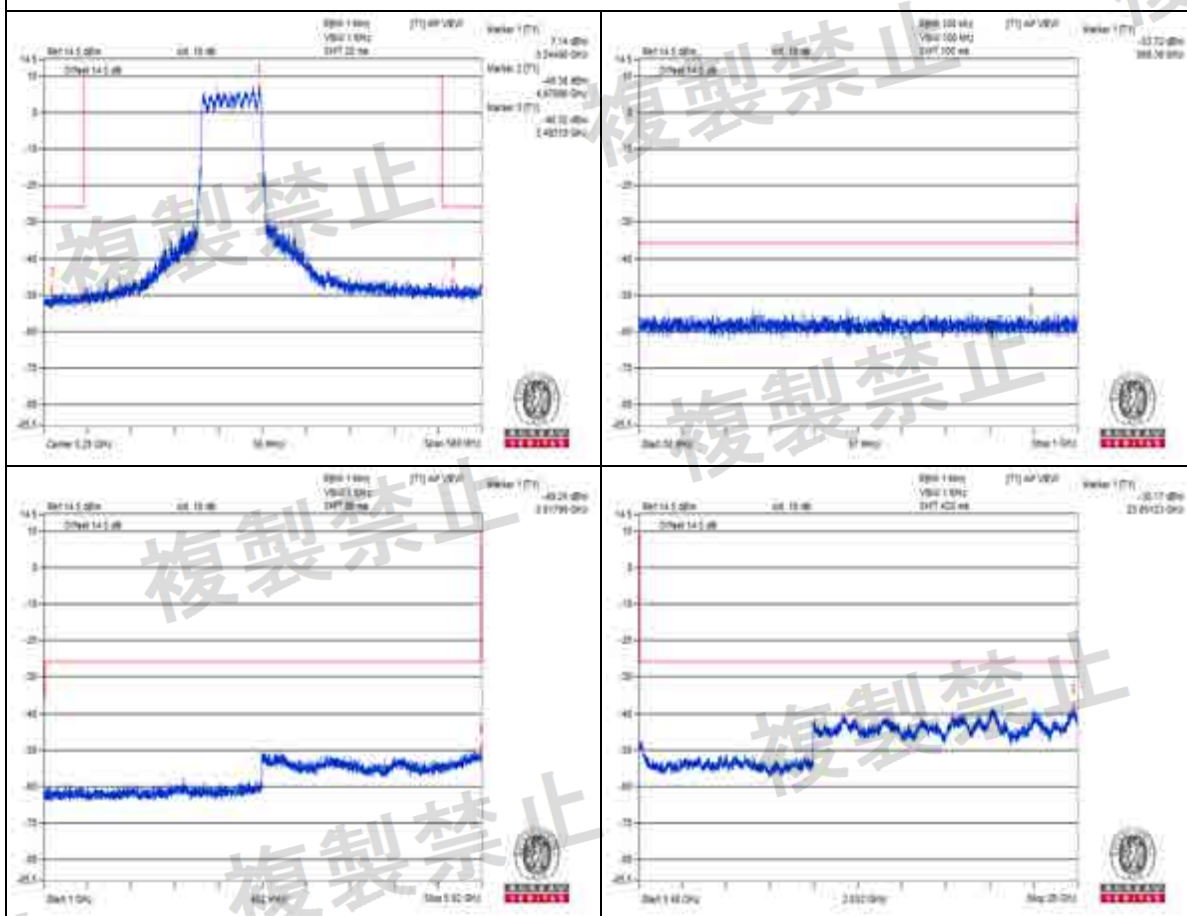
802.11ac (VHT80)

Environmental Conditions		24 deg.C, 70% RH			
Test Channel		CH42 (5210MHz)		Limit	Result
Test Condition	Frequency Range	Frequency (MHz)	Measured Value (uW)		
V _{normal}	30.0MHz ~ 1000.0MHz	898.390	0.0042	0.25uW	PASS
	1000.0MHz ~ 5020.0MHz	5017.990	0.0119	2.5uW	PASS
	5480.0MHz ~ 26000.0MHz	25851.230	0.1524	2.5uW	PASS
V _{max.}	30.0MHz ~ 1000.0MHz	245.580	0.0041	0.25uW	PASS
	1000.0MHz ~ 5020.0MHz	5013.970	0.0145	2.5uW	PASS
	5480.0MHz ~ 26000.0MHz	25861.490	0.1595	2.5uW	PASS
V _{min.}	30.0MHz ~ 1000.0MHz	99.840	0.0043	0.25uW	PASS
	1000.0MHz ~ 5020.0MHz	3113.510	0.0097	2.5uW	PASS
	5480.0MHz ~ 26000.0MHz	22116.590	0.1798	2.5uW	PASS

Note: 1. The worst value in each frequency range v.s. each channel has been marked by boldface.

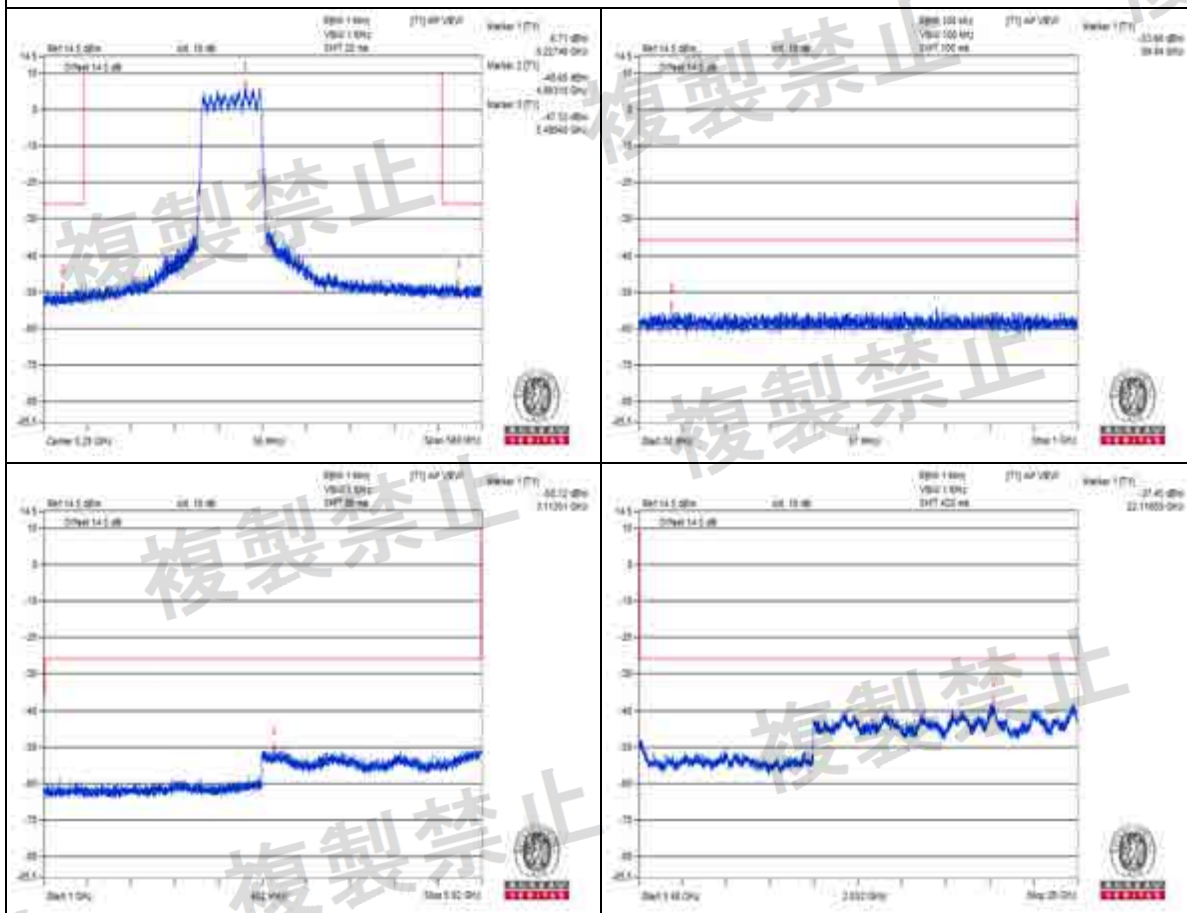
2. The spectrum plots are attached on the following pages.

V normal
CH 42



Measurement uncertainty: $\pm 3.93\text{dB}$

V_{min}
CH 42



Measurement uncertainty: $\pm 3.93\text{dB}$

4.4 Out-band Leakage Power

4.4.1 Limits of Out-band Leakage Power (EIRP)

W52 band: 802.11a / 802.11n (HT20)

Frequencies (MHz)	Limit
OBW \leq 18MHz	
$5140.0 \leq f_o \leq 5142.0\text{MHz}$	$\leq 2.5 \text{ uW/MHz}$
$5142.0 < f_o \leq 5150.0\text{MHz}$	$\leq 15.0 \text{ uW/MHz}$
$5250.0 \leq f_o < 5251.0\text{MHz}$	$\leq 10.0^{1-(f-9)} \text{ mW/MHz}$
$5251.0 \leq f_o < 5260.0\text{MHz}$	$\leq 10.0^{1-(8/90)(f-11)} \text{ mW/MHz}$
$5260.0 \leq f_o < 5266.7\text{MHz}$	$\leq 10.0^{1.8-(6/50)(f-20)} \text{ mW/MHz}$
$5266.7 \leq f_o \leq 5360.0\text{MHz}$	$\leq 2.5 \text{ }\mu\text{W/MHz}$
18MHz < OBW < 19MHz	
$5135.0 \leq f_o \leq 5142.0\text{MHz}$	$\leq 2.5 \text{ uW/MHz}$
$5142.0 < f_o \leq 5150.0\text{MHz}$	$\leq 15.0 \text{ uW/MHz}$
$5250.0 \leq f_o < 5251.0\text{MHz}$	$\leq 10.0^{1-(f-9)} \text{ mW/MHz}$
$5251.0 \leq f_o < 5260.0\text{MHz}$	$\leq 10.0^{1-(8/90)(f-11)} \text{ mW/MHz}$
$5260.0 \leq f_o < 5266.7\text{MHz}$	$\leq 10.0^{1.8-(6/50)(f-20)} \text{ mW/MHz}$
$5266.7 \leq f_o \leq 5365.0\text{MHz}$	$\leq 2.5 \text{ }\mu\text{W/MHz}$

W52 band: 802.11n (HT40)

Frequencies (MHz)	Limit
$5100.0 \leq f_o \leq 5141.6\text{MHz}$	$\leq 2.5 \text{ uW/MHz}$
$5141.6 < f_o \leq 5150.0\text{MHz}$	$\leq 15.0 \text{ uW/MHz}$
$5250.0 \leq f_o < 5251.0\text{MHz}$	$\leq 10.0^{-(f-20)+\log(1/2)} \text{ mW/MHz}$
$5251.0 \leq f_o < 5270.0\text{MHz}$	$\leq 10.0^{-(8/190)(f-21)-1+\log(1/2)} \text{ mW/MHz}$
$5270.0 \leq f_o < 5278.4\text{MHz}$	$\leq 10.0^{-(3/50)(f-40)-1.8+\log(1/2)} \text{ mW/MHz}$
$5278.4 \leq f_o \leq 5400.0\text{MHz}$	$\leq 2.5 \text{ }\mu\text{W/MHz}$

W52 band: 802.11ac (VHT80)

Frequencies (MHz)	Limit
$5020.0 \leq f_o \leq 5123.2\text{MHz}$	$\leq 2.5 \text{ uW/MHz}$
$5123.2 < f_o \leq 5150.0\text{MHz}$	$\leq 15.0 \text{ uW/MHz}$
$5250.0 \leq f_o < 5251.0\text{MHz}$	$\leq 10.0^{-(f-40)+\log(1/4)} \text{ mW/MHz}$
$5251.0 \leq f_o < 5290.0\text{MHz}$	$\leq 10.0^{-(8/390)(f-41)-1+\log(1/4)} \text{ mW/MHz}$
$5290.0 \leq f_o < 5296.7\text{MHz}$	$\leq 10.0^{-(3/100)(f-80)-1.8+\log(1/4)} \text{ mW/MHz}$
$5296.7 \leq f_o \leq 5480.0\text{MHz}$	$\leq 2.5 \text{ }\mu\text{W/MHz}$

W53 band: 802.11a / 802.11n (HT20)

Frequencies (MHz)	Limit
OBW \leq 18MHz	
$5140.0 \leq f_o \leq 5233.3\text{MHz}$	$\leq 2.5 \mu\text{W/MHz}$
$5233.3 < f_o \leq 5240.0\text{MHz}$	$\leq 10.0^{-1.8-(6/50)(f-20)}\text{mW/MHz}$
$5240.0 < f_o \leq 5249.0\text{MHz}$	$\leq 10.0^{-1-(8/90)(f-11)}\text{mW/MHz}$
$5249.0 < f_o \leq 5250.0\text{MHz}$	$\leq 10.0^{1-(f-9)}\text{mW/MHz}$
$5350.0 \leq f_o \leq 5360.0\text{MHz}$	$\leq 2.5 \mu\text{W/MHz}$
18MHz < OBW < 19MHz	
$5135.0 \leq f_o \leq 5233.3\text{MHz}$	$\leq 2.5 \mu\text{W/MHz}$
$5233.3 < f_o \leq 5240.0\text{MHz}$	$\leq 10.0^{-1.8-(6/50)(f-20)}\text{mW/MHz}$
$5240.0 < f_o \leq 5249.0\text{MHz}$	$\leq 10.0^{-1-(8/90)(f-11)}\text{mW/MHz}$
$5249.0 < f_o \leq 5250.0\text{MHz}$	$\leq 10.0^{1-(f-9)}\text{mW/MHz}$
$5350.0 \leq f_o \leq 5365.0\text{MHz}$	$\leq 2.5 \mu\text{W/MHz}$

W53 band: 802.11n (HT40)

Frequencies (MHz)	Limit
$5100.0 \leq f_o \leq 5210.0\text{MHz}$	$\leq 2.5 \mu\text{W/MHz}$
$5210.0 < f_o \leq 5221.6\text{MHz}$	$\leq 2.5 \mu\text{W/MHz}$
$5221.6 < f_o \leq 5230.0\text{MHz}$	$\leq 10.0^{-(3/50)(f-40)-1.8+\log(1/2)}\text{mW/MHz}$
$5230.0 < f_o \leq 5249.0\text{MHz}$	$\leq 10.0^{-(8/190)(f-21)-1+\log(1/2)}\text{mW/MHz}$
$5249.0 < f_o \leq 5250.0\text{MHz}$	$\leq 10.0^{-(f-20)+\log(1/2)}\text{mW/MHz}$
$5350.0 \leq f_o < 5358.4\text{MHz}$	$\leq 15 \mu\text{W/MHz}$
$5358.4 \leq f_o \leq 5400.0\text{MHz}$	$\leq 2.5 \mu\text{W/MHz}$

W53 band: 802.11ac (VHT80)

Frequencies (MHz)	Limit
$5020.0 \leq f_o \leq 5203.3\text{MHz}$	$\leq 2.5 \mu\text{W/MHz}$
$5203.3 < f_o \leq 5210.0\text{MHz}$	$\leq 10.0^{-(3/100)(f-80)-1.8+\log(1/4)}\text{mW/MHz}$
$5210.0 < f_o \leq 5249.0\text{MHz}$	$\leq 10.0^{-(8/390)(f-41)-1+\log(1/4)}\text{mW/MHz}$
$5249.0 < f_o \leq 5250.0\text{MHz}$	$\leq 10.0^{-(f-40)+\log(1/4)}\text{mW/MHz}$
$5350.0 \leq f_o < 5376.8\text{MHz}$	$\leq 15 \mu\text{W/MHz}$
$5376.8 \leq f_o \leq 5480.0\text{MHz}$	$\leq 2.5 \mu\text{W/MHz}$

W56 band: 802.11a / 802.11n (HT20)

Frequencies (MHz)	Limit
$5455 \leq f_o \leq 5460\text{MHz}$	$\leq 2.5 \mu\text{W/MHz}$
$5460 < f_o \leq 5470\text{MHz}$	$\leq 12.5 \mu\text{W/MHz}$
$5725 \leq f_o < 5740\text{MHz}$	$\leq 12.5 \mu\text{W/MHz}$
$5740 \leq f_o \leq 5745\text{MHz}$	$\leq 2.5 \mu\text{W/MHz}$

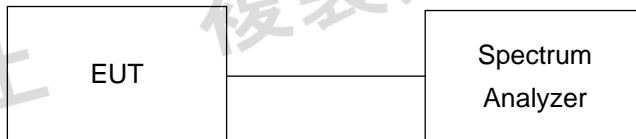
W56 band: 802.11n (HT40)

Frequencies (MHz)	Limit
$5420 \leq f_o \leq 5460\text{MHz}$	$\leq 12.5 \mu\text{W/MHz}$
$5460 < f_o \leq 5470\text{MHz}$	$\leq 50 \mu\text{W/MHz}$
$5725 \leq f_o \leq 5760\text{MHz}$	$\leq 12.5 \mu\text{W/MHz}$

W56 band: 802.11ac (VHT80)

Frequencies (MHz)	Limit
$5340 \leq f_o \leq 5460\text{MHz}$	$\leq 12.5 \mu\text{W/MHz}$
$5460 < f_o \leq 5469.5\text{MHz}$	$\leq 50 \mu\text{W/MHz}$
$5469.5 < f_o \leq 5470\text{MHz}$	$\leq 51.2 \mu\text{W/MHz}$
$5725 \leq f_o \leq 5800\text{MHz}$	$\leq 12.5 \mu\text{W/MHz}$

4.4.2 Test Setup





4.4.3 Test Results

W52 Band:

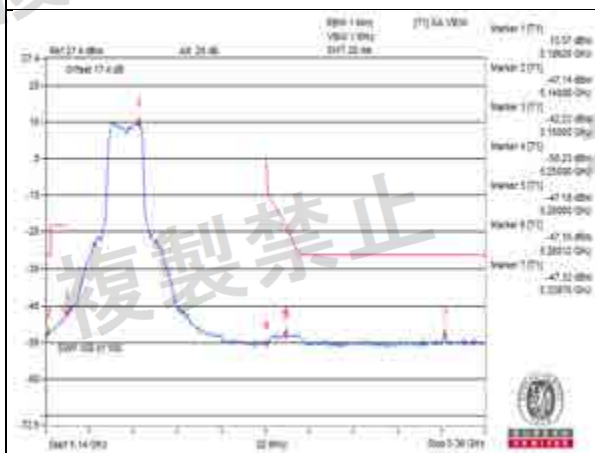
802.11a

Environmental Conditions		24 deg.C, 70% RH			
Test Channel		CH36 (5180MHz)		CH40 (5200MHz)	
Test Condition	Frequency Band	Frequency (MHz)	Measured Value (uW/MHz)	Frequency (MHz)	Measured Value (uW/MHz)
V _{normal}	5140.0 ≤ fo ≤ 5142.0 MHz	5140.88	0.019320	5140.44	0.010889
	5142.0 < fo ≤ 5150.0 MHz	5150.00	0.059841	5149.68	0.011588
	5250.0 ≤ fo < 5251.0 MHz	5250.00	0.009484	5250.44	0.011066
	5251.0 ≤ fo < 5260.0 MHz	5260.00	0.019143	5254.40	0.011940
	5260.0 ≤ fo < 5266.7 MHz	5260.12	0.019498	5261.00	0.010740
	5266.7 ≤ fo ≤ 5360.0 MHz	5339.76	0.018493	5279.92	0.020845
V _{max.}	5140.0 ≤ fo ≤ 5142.0 MHz	5141.76	0.024099	5141.76	0.010280
	5142.0 < fo ≤ 5150.0 MHz	5150.00	0.049317	5143.52	0.011858
	5250.0 ≤ fo < 5251.0 MHz	5251.00	0.009376	5250.88	0.009528
	5251.0 ≤ fo < 5260.0 MHz	5259.68	0.019055	5254.84	0.012246
	5260.0 ≤ fo < 5266.7 MHz	5260.00	0.018197	5261.44	0.012218
	5266.7 ≤ fo ≤ 5360.0 MHz	5339.76	0.019275	5279.92	0.020797
V _{min.}	5140.0 ≤ fo ≤ 5142.0 MHz	5141.76	0.023335	5140.00	0.009750
	5142.0 < fo ≤ 5150.0 MHz	5150.00	0.053333	5147.04	0.011588
	5250.0 ≤ fo < 5251.0 MHz	5250.88	0.009572	5250.88	0.012078
	5251.0 ≤ fo < 5260.0 MHz	5259.68	0.018923	5251.00	0.011588
	5260.0 ≤ fo < 5266.7 MHz	5260.00	0.017947	5262.76	0.011272
	5266.7 ≤ fo ≤ 5360.0 MHz	5340.20	0.017061	5360.00	0.018707

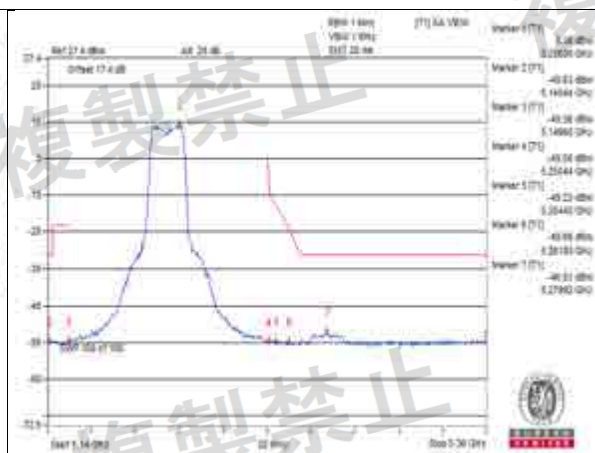
Test Channel		CH48 (5240MHz)	
Test Condition	Frequency Band	Frequency (MHz)	Measured Value (uW/MHz)
V _{normal}	5140.0 ≤ fo ≤ 5142.0 MHz	5140.44	0.010023
	5142.0 < fo ≤ 5150.0 MHz	5142.64	0.010399
	5250.0 ≤ fo < 5251.0 MHz	5250.00	13.963684
	5251.0 ≤ fo < 5260.0 MHz	5251.00	5.199960
	5260.0 ≤ fo < 5266.7 MHz	5260.00	0.361410
	5266.7 ≤ fo ≤ 5360.0 MHz	5266.72	0.048529
V _{max.}	5140.0 ≤ fo ≤ 5142.0 MHz	5141.76	0.009397
	5142.0 < fo ≤ 5150.0 MHz	5143.96	0.010715
	5250.0 ≤ fo < 5251.0 MHz	5250.00	14.859356
	5251.0 ≤ fo < 5260.0 MHz	5251.00	3.311311
	5260.0 ≤ fo < 5266.7 MHz	5260.00	0.333426
	5266.7 ≤ fo ≤ 5360.0 MHz	5267.60	0.040738
V _{min.}	5140.0 ≤ fo ≤ 5142.0 MHz	5140.00	0.010715
	5142.0 < fo ≤ 5150.0 MHz	5142.20	0.010691
	5250.0 ≤ fo < 5251.0 MHz	5250.00	15.310875
	5251.0 ≤ fo < 5260.0 MHz	5251.00	3.767038
	5260.0 ≤ fo < 5266.7 MHz	5260.00	0.358922
	5266.7 ≤ fo ≤ 5360.0 MHz	5266.72	0.044875

Note: 1. The worst value in each frequency range v.s. each channel has been marked by boldface
 2. The spectrum plots are attached on the following page.

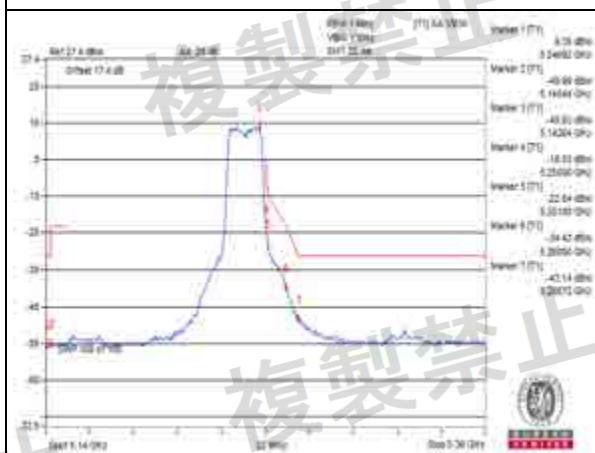
V_{normal}



Channel 36



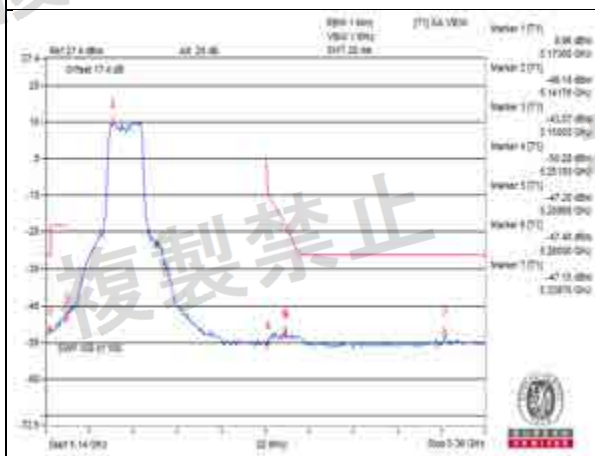
Channel 40



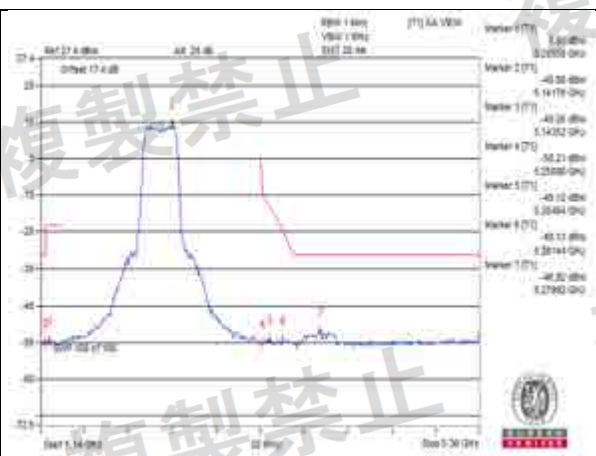
Channel 48

Measurement uncertainty: ± 206.50 Hz

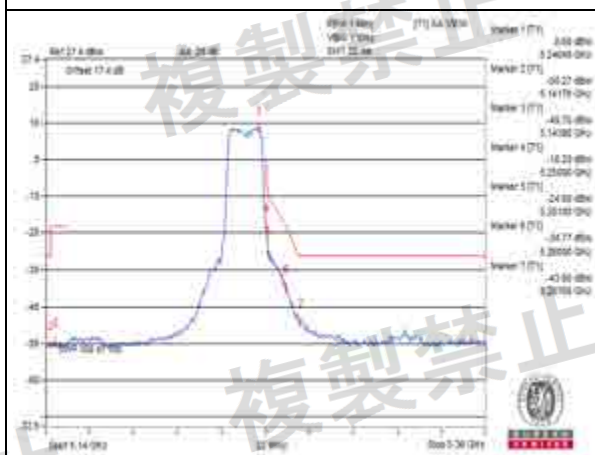
V_{max}.



Channel 36



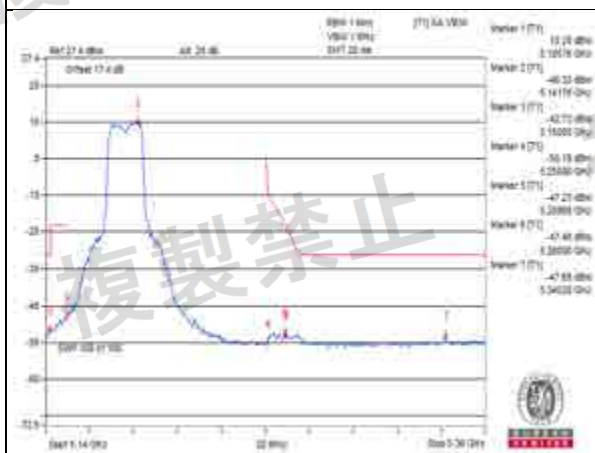
Channel 40



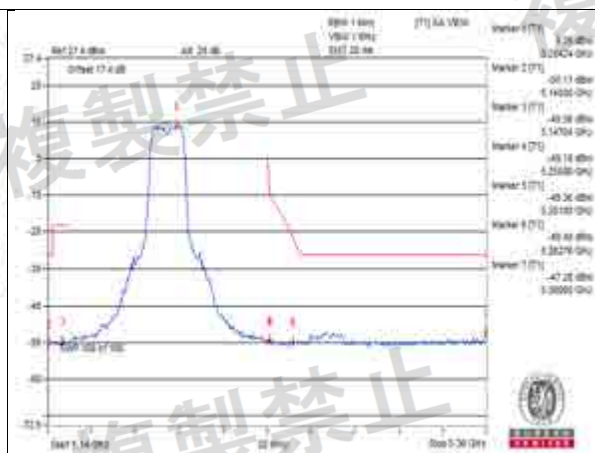
Channel 48

Measurement uncertainty: ± 206.50 Hz

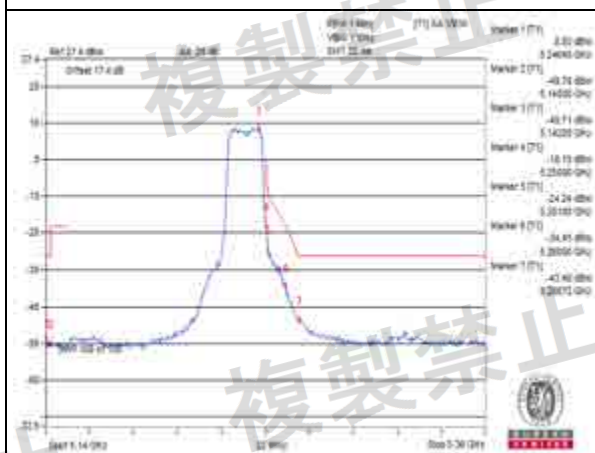
V_{min}.



Channel 36



Channel 40



Channel 48

Measurement uncertainty: ± 206.50 Hz



W52 Band:

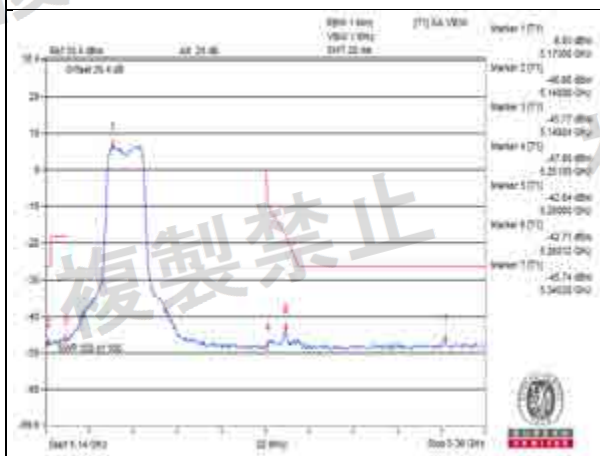
802.11n (HT20)

Environmental Conditions		24 deg.C, 70% RH			
Test Channel		CH36 (5180MHz)		CH40 (5200MHz)	
Test Condition	Frequency Band	Frequency (MHz)	Measured Value (uW/MHz)	Frequency (MHz)	Measured Value (uW/MHz)
V _{normal}	5140.0 ≤ fo ≤ 5142.0 MHz	5140.88	0.020893	5141.76	0.016749
	5142.0 < fo ≤ 5150.0 MHz	5149.24	0.026485	5148.80	0.019011
	5250.0 ≤ fo < 5251.0 MHz	5251.00	0.016596	5250.88	0.016711
	5251.0 ≤ fo < 5260.0 MHz	5260.00	0.052000	5259.24	0.017418
	5260.0 ≤ fo < 5266.7 MHz	5260.12	0.053580	5260.12	0.017660
	5266.7 ≤ fo ≤ 5360.0 MHz	5340.20	0.026669	5360.00	0.024889
V _{max.}	5140.0 ≤ fo ≤ 5142.0 MHz	5140.44	0.020045	5140.88	0.017660
	5142.0 < fo ≤ 5150.0 MHz	5150.00	0.022491	5144.84	0.019187
	5250.0 ≤ fo < 5251.0 MHz	5251.00	0.016634	5250.88	0.017378
	5251.0 ≤ fo < 5260.0 MHz	5260.00	0.044978	5251.00	0.016558
	5260.0 ≤ fo < 5266.7 MHz	5260.12	0.045814	5261.88	0.018239
	5266.7 ≤ fo ≤ 5360.0 MHz	5339.76	0.024717	5360.00	0.025942
V _{min.}	5140.0 ≤ fo ≤ 5142.0 MHz	5141.76	0.020277	5140.44	0.015776
	5142.0 < fo ≤ 5150.0 MHz	5149.68	0.024774	5147.92	0.018578
	5250.0 ≤ fo < 5251.0 MHz	5251.00	0.016444	5250.88	0.017865
	5251.0 ≤ fo < 5260.0 MHz	5259.68	0.047863	5253.52	0.019099
	5260.0 ≤ fo < 5266.7 MHz	5260.00	0.042170	5261.00	0.018365
	5266.7 ≤ fo ≤ 5360.0 MHz	5340.20	0.021135	5360.00	0.025235

Test Channel		CH48 (5240MHz)	
Test Condition	Frequency Band	Frequency (MHz)	Measured Value (uW/MHz)
V _{normal}	5140.0 ≤ fo ≤ 5142.0 MHz	5140.88	0.016904
	5142.0 < fo ≤ 5150.0 MHz	5146.16	0.017906
	5250.0 ≤ fo < 5251.0 MHz	5250.00	67.608298
	5251.0 ≤ fo < 5260.0 MHz	5251.00	3.664376
	5260.0 ≤ fo < 5266.7 MHz	5260.56	0.239883
	5266.7 ≤ fo ≤ 5360.0 MHz	5266.70	0.037154
V _{max.}	5140.0 ≤ fo ≤ 5142.0 MHz	5140.44	0.017418
	5142.0 < fo ≤ 5150.0 MHz	5143.52	0.017140
	5250.0 ≤ fo < 5251.0 MHz	5250.00	59.566214
	5251.0 ≤ fo < 5260.0 MHz	5251.00	3.111716
	5260.0 ≤ fo < 5266.7 MHz	5260.12	0.226986
	5266.7 ≤ fo ≤ 5360.0 MHz	5267.16	0.038194
V _{min.}	5140.0 ≤ fo ≤ 5142.0 MHz	5141.32	0.015631
	5142.0 < fo ≤ 5150.0 MHz	5146.16	0.017458
	5250.0 ≤ fo < 5251.0 MHz	5250.00	53.951062
	5251.0 ≤ fo < 5260.0 MHz	5251.00	2.937650
	5260.0 ≤ fo < 5266.7 MHz	5260.00	0.144877
	5266.7 ≤ fo ≤ 5360.0 MHz	5268.92	0.031477

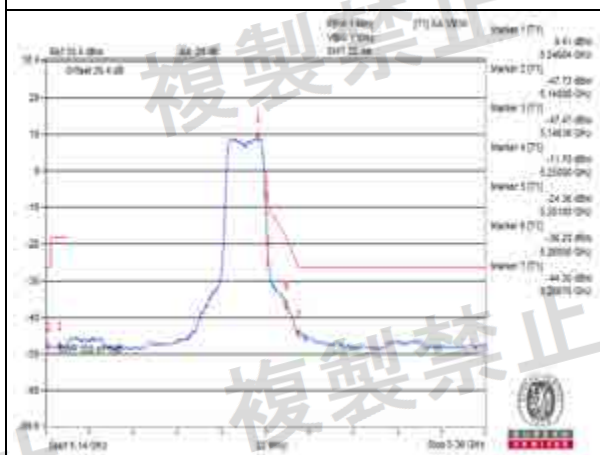
Note: 1. The worst value in each frequency range v.s. each channel has been marked by boldface
 2. The spectrum plots are attached on the following page.

V_{normal}



Channel 36

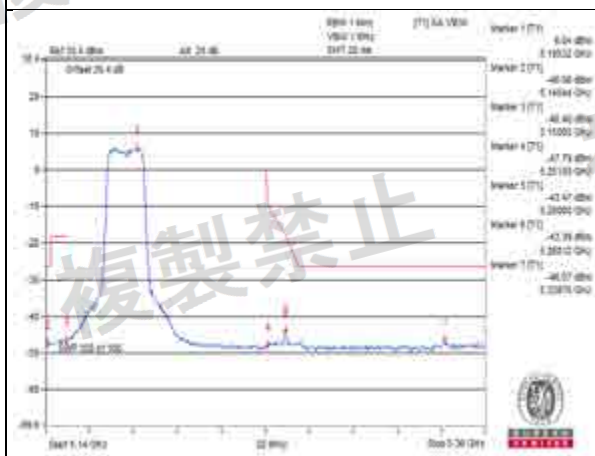
Channel 40



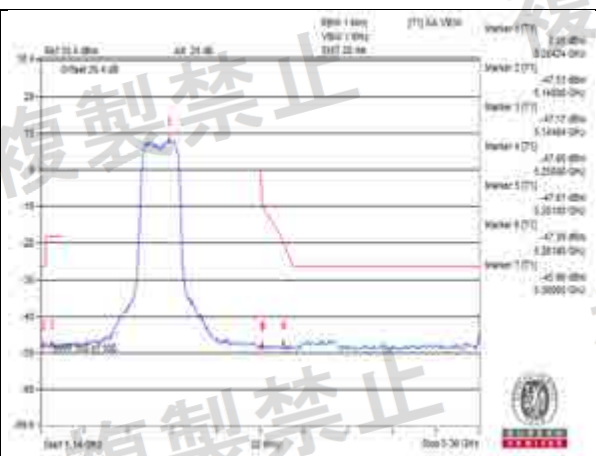
Channel 48

Measurement uncertainty: ± 206.50 Hz

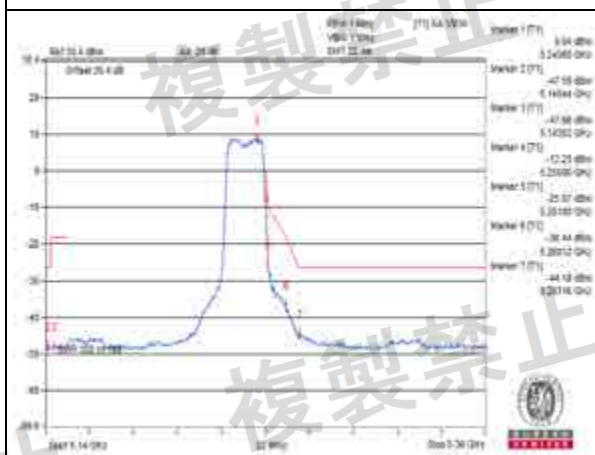
V_{max}



Channel 36



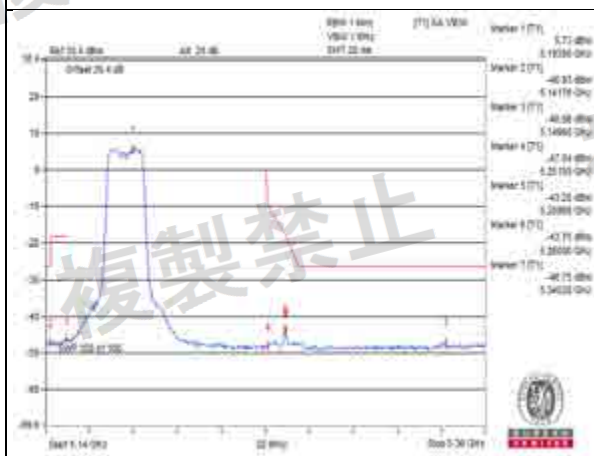
Channel 40



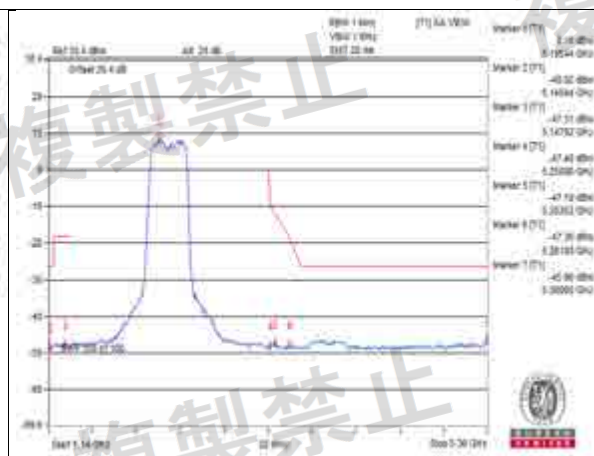
Channel 48

Measurement uncertainty: ± 206.50 Hz

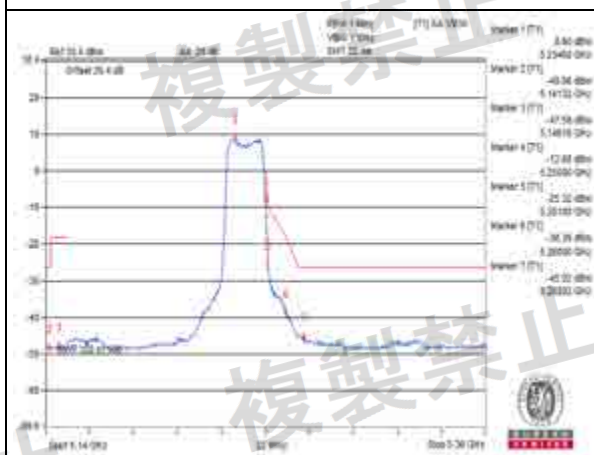
V_{min}.



Channel 36



Channel 40



Channel 48

Measurement uncertainty: ± 206.50 Hz



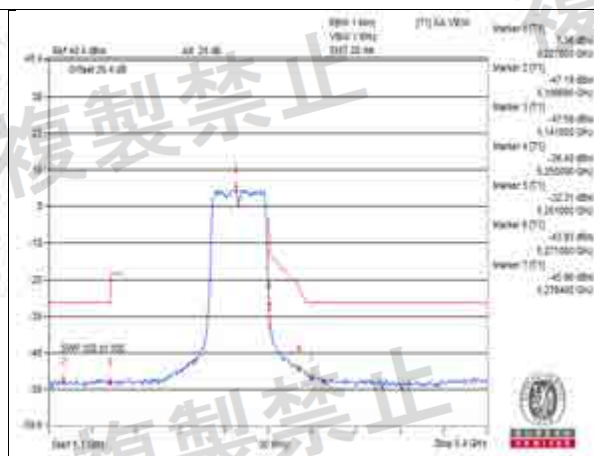
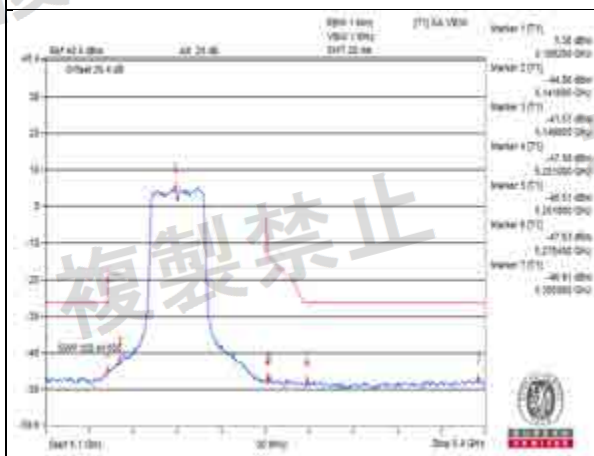
W52 Band:

802.11n (HT40)

Environmental Conditions		24 deg.C, 70% RH			
Test Channel		CH38 (5190MHz)		CH46 (5230MHz)	
Test Condition	Frequency Band	Frequency (MHz)	Measured Value (uW/MHz)	Frequency (MHz)	Measured Value (uW/MHz)
V _{normal}	5100.0 ≤ fo ≤ 5141.6MHz	5141.60	0.032469	5109.60	0.019091
	5141.6 < fo ≤ 5150.0MHz	5149.80	0.069572	5141.60	0.017403
	5250.0 ≤ fo < 5251.0MHz	5251.00	0.018277	5250.00	2.289679
	5251.0 ≤ fo < 5270.0MHz	5251.80	0.022303	5251.00	0.586812
	5270.0 ≤ fo < 5278.4MHz	5278.40	0.017225	5271.00	0.040428
	5278.4 ≤ fo ≤ 5400.0MHz	5395.80	0.020370	5279.40	0.025294
V _{max.}	5100.0 ≤ fo ≤ 5141.6MHz	5141.60	0.029920	5134.80	0.019493
	5141.6 < fo ≤ 5150.0MHz	5148.60	0.053142	5148.00	0.018577
	5250.0 ≤ fo < 5251.0MHz	5251.00	0.016520	5250.00	2.196578
	5251.0 ≤ fo < 5270.0MHz	5266.20	0.018292	5251.00	0.492517
	5270.0 ≤ fo < 5278.4MHz	5270.40	0.017781	5271.00	0.039397
	5278.4 ≤ fo ≤ 5400.0MHz	5385.00	0.019185	5279.40	0.022813
V _{min.}	5100.0 ≤ fo ≤ 5141.6MHz	5139.00	0.024938	5114.40	0.019929
	5141.6 < fo ≤ 5150.0MHz	5149.20	0.053506	5147.40	0.018785
	5250.0 ≤ fo < 5251.0MHz	5250.60	0.016280	5250.00	2.362802
	5251.0 ≤ fo < 5270.0MHz	5253.00	0.019992	5251.00	0.464469
	5270.0 ≤ fo < 5278.4MHz	5277.00	0.017090	5270.00	0.037242
	5278.4 ≤ fo ≤ 5400.0MHz	5395.80	0.020118	5295.60	0.021814

- Note: 1. The worst value in each frequency range v.s. each channel has been marked by boldface
2. The spectrum plots are attached on the following page.

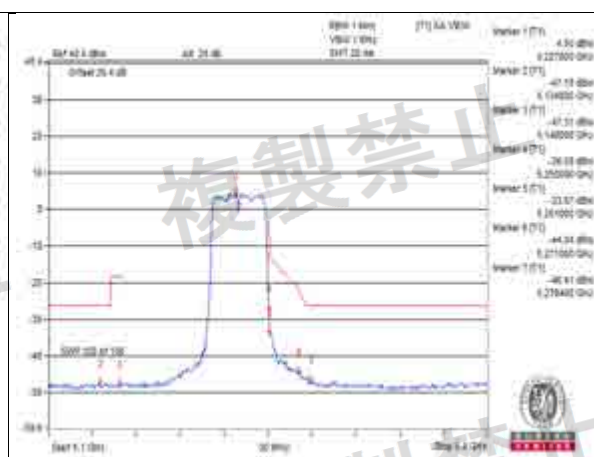
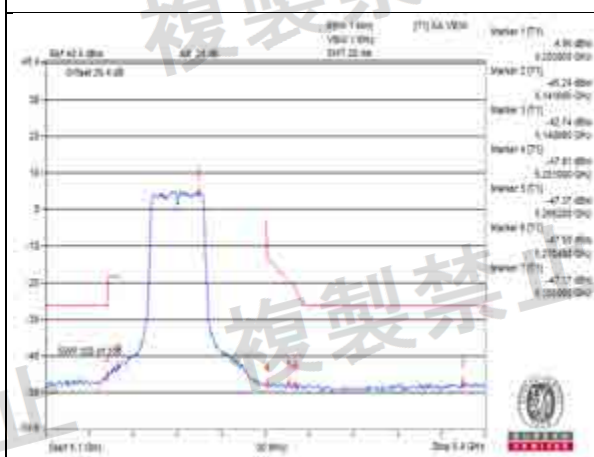
V_{normal}



Channel 38

Channel 46

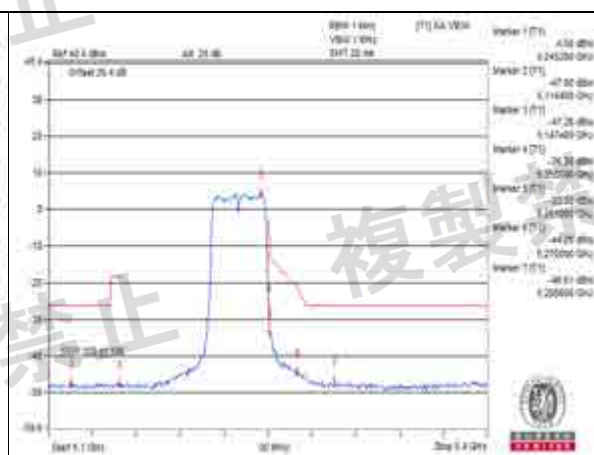
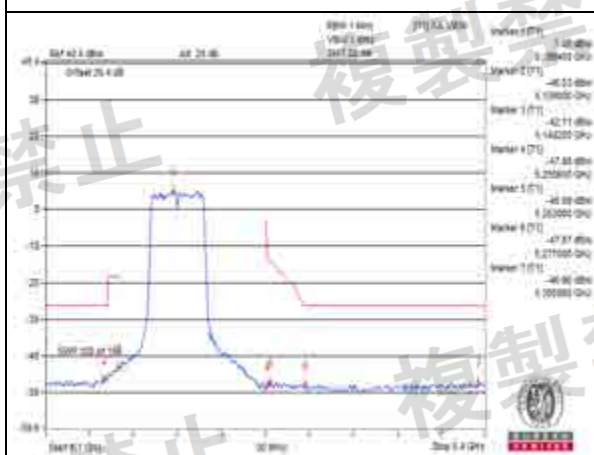
V_{max}



Channel 38

Channel 46

V_{min}



Channel 38

Channel 46

Measurement uncertainty: ± 206.50 Hz

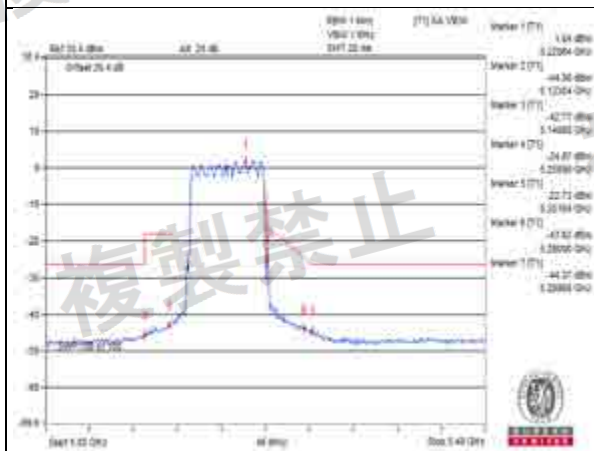


W52 Band:
802.11ac (VHT80)

Environmental Conditions		24 deg.C, 70% RH	
Test Channel		CH42 (5210MHz)	
Test Condition	Frequency Band	Frequency (MHz)	Measured Value (uW/MHz)
normal	$5020.0 \leq f_o \leq 5123.2\text{MHz}$	5123.04	0.031769
	$5123.2 < f_o \leq 5150.0\text{MHz}$	5148.80	0.052845
	$5250.0 \leq f_o < 5251.0\text{MHz}$	5250.99	3.258367
	$5251.0 \leq f_o < 5290.0\text{MHz}$	5251.84	5.333349
	$5290.0 \leq f_o < 5296.7\text{MHz}$	5290.00	0.043451
	$5296.7 \leq f_o \leq 5480.0\text{MHz}$	5299.68	0.036559
$V_{\text{max.}}$	$5020.0 \leq f_o \leq 5123.2\text{MHz}$	5123.20	0.026853
	$5123.2 < f_o \leq 5150.0\text{MHz}$	5150.00	0.041210
	$5250.0 \leq f_o < 5251.0\text{MHz}$	5250.99	3.126079
	$5251.0 \leq f_o < 5290.0\text{MHz}$	5251.84	4.560369
	$5290.0 \leq f_o < 5296.7\text{MHz}$	5292.32	0.037239
	$5296.7 \leq f_o \leq 5480.0\text{MHz}$	5296.92	0.029785
$V_{\text{min.}}$	$5020.0 \leq f_o \leq 5123.2\text{MHz}$	5123.04	0.025177
	$5123.2 < f_o \leq 5150.0\text{MHz}$	5145.12	0.041495
	$5250.0 \leq f_o < 5251.0\text{MHz}$	5250.99	2.747894
	$5251.0 \leq f_o < 5290.0\text{MHz}$	5251.84	4.335109
	$5290.0 \leq f_o < 5296.7\text{MHz}$	5290.00	0.032285
	$5296.7 \leq f_o \leq 5480.0\text{MHz}$	5296.92	0.031989

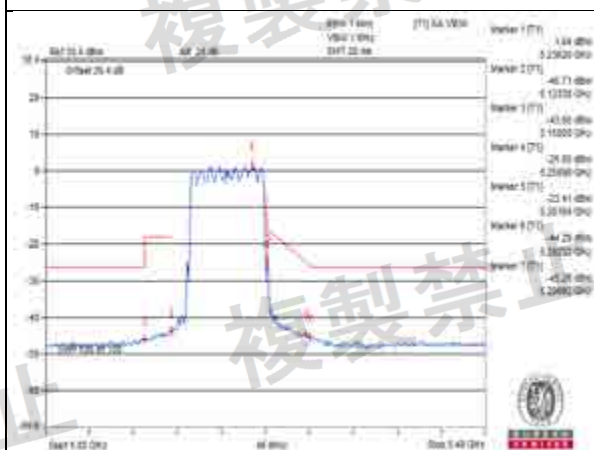
- Note: 1. The worst value in each frequency range v.s. each channel has been marked by boldface
2. The spectrum plots are attached on the following page.

V_{normal}



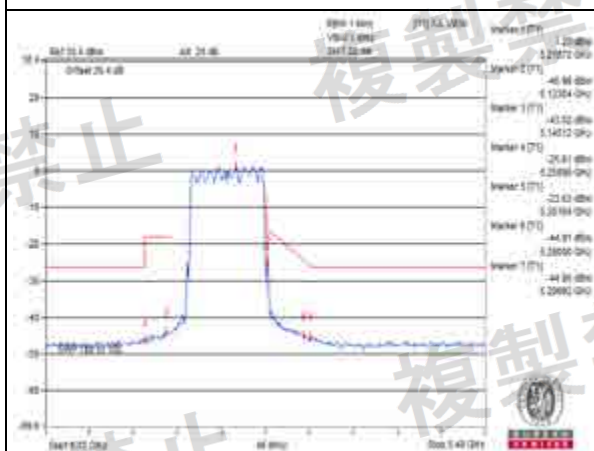
Channel 42

V_{max}



Channel 42

V_{min}



Channel 42

Measurement uncertainty: ± 206.50 Hz

4.5 Adjacent Channel Leakage Power

4.5.1 Limits of Adjacent Channel Leakage Power

802.11a / 802.11n (HT20):

Frequencies (MHz)	Limit
Mean Power 20MHz Distance of Carrier	$\geq 25\text{dBc}$
Mean Power 40MHz Distance of Carrier	$\geq 40\text{dBc}$

802.11n (HT40):

Frequencies (MHz)	Limit
Mean Power 40MHz Distance of Carrier	$\geq 25\text{dBc}$
Mean Power 80MHz Distance of Carrier	$\geq 40\text{dBc}$

802.11ac (VHT80):

Frequencies (MHz)	Limit
Mean Power 80MHz Distance of Carrier	$\geq 25\text{dBc}$

4.5.2 Test Setup





4.5.3 Test Result

W52 Band:

802.11a

Environmental Conditions		24 deg.C, 70% RH			
Voltage	Channel	CH36	CH40	CH48	Limit (dBc)
V _{nom}	Mean Power of Carrier (dBm)	24.60	23.61	23.34	-
	Mean Power +20MHz Distance of Carrier (dBc)	26.75	29.02	30.31	25
	Mean Power -20MHz Distance of Carrier (dBc)	27.52	29.46	30.30	25
	Mean Power +40MHz Distance of Carrier (dBc)	49.90	50.86	51.01	40
	Mean Power -40MHz Distance of Carrier (dBc)	50.14	51.23	51.74	40
V _{max.}	Mean Power of Carrier (dBm)	23.86	23.31	23.07	-
	Mean Power +20MHz Distance of Carrier (dBc)	27.94	29.40	30.66	25
	Mean Power -20MHz Distance of Carrier (dBc)	28.31	29.61	30.50	25
	Mean Power +40MHz Distance of Carrier (dBc)	50.21	50.73	51.03	40
	Mean Power -40MHz Distance of Carrier (dBc)	50.19	51.04	51.60	40
V _{min.}	Mean Power of Carrier (dBm)	23.89	23.22	22.97	-
	Mean Power +20MHz Distance of Carrier (dBc)	27.96	29.62	30.89	25
	Mean Power -20MHz Distance of Carrier (dBc)	28.26	29.80	30.67	25
	Mean Power +40MHz Distance of Carrier (dBc)	50.19	50.88	51.18	40
	Mean Power -40MHz Distance of Carrier (dBc)	50.12	51.25	51.83	40

W52 Band:

802.11n (HT20)

Environmental Conditions		24 deg.C, 70% RH			
Voltage	Channel	CH36	CH40	CH48	Limit (dBc)
V _{nom}	Mean Power of Carrier (dBm)	22.74	24.28	25.14	-
	Mean Power +20MHz Distance of Carrier (dBc)	29.70	35.95	34.87	25
	Mean Power -20MHz Distance of Carrier (dBc)	31.65	37.01	35.63	25
	Mean Power +40MHz Distance of Carrier (dBc)	50.58	52.93	53.15	40
	Mean Power -40MHz Distance of Carrier (dBc)	50.77	52.94	53.33	40
V _{max.}	Mean Power of Carrier (dBm)	20.76	23.11	24.23	-
	Mean Power +20MHz Distance of Carrier (dBc)	32.91	37.47	35.99	25
	Mean Power -20MHz Distance of Carrier (dBc)	34.23	37.90	36.37	25
	Mean Power +40MHz Distance of Carrier (dBc)	49.70	52.07	52.65	40
	Mean Power -40MHz Distance of Carrier (dBc)	49.72	52.03	52.81	40
V _{min.}	Mean Power of Carrier (dBm)	20.38	23.07	24.00	-
	Mean Power +20MHz Distance of Carrier (dBc)	33.67	37.48	36.50	25
	Mean Power -20MHz Distance of Carrier (dBc)	34.95	37.81	36.78	25
	Mean Power +40MHz Distance of Carrier (dBc)	49.58	52.09	52.54	40
	Mean Power -40MHz Distance of Carrier (dBc)	49.51	52.05	52.72	40



W52 Band:

802.11n (HT40)

Environmental Conditions		24 deg.C, 70% RH		
Voltage	Channel	CH38	CH46	Limit (dBc)
V _{nom}	Mean Power of Carrier (dBm)	23.65	24.31	-
	Mean Power +40MHz Distance of Carrier (dBc)	36.29	36.90	25
	Mean Power -40MHz Distance of Carrier (dBc)	37.68	38.76	25
	Mean Power +80MHz Distance of Carrier (dBc)	49.68	50.05	40
	Mean Power -80MHz Distance of Carrier (dBc)	48.89	50.24	40
V _{max.}	Mean Power of Carrier (dBm)	23.02	22.65	-
	Mean Power +40MHz Distance of Carrier (dBc)	36.89	37.89	25
	Mean Power -40MHz Distance of Carrier (dBc)	38.14	39.46	25
	Mean Power +80MHz Distance of Carrier (dBc)	49.35	48.75	40
	Mean Power -80MHz Distance of Carrier (dBc)	48.35	48.79	40
V _{min.}	Mean Power of Carrier (dBm)	22.98	22.37	-
	Mean Power +40MHz Distance of Carrier (dBc)	36.91	38.03	25
	Mean Power -40MHz Distance of Carrier (dBc)	38.18	39.46	25
	Mean Power +80MHz Distance of Carrier (dBc)	49.26	48.54	40
	Mean Power -80MHz Distance of Carrier (dBc)	48.38	48.52	40



W52 Band:

802.11ac (VHT80)

Environmental Conditions		24 deg.C, 70% RH	
Voltage	Channel	CH42	Limit (dBc)
V _{nom}	Mean Power of Carrier (dBm)	24.77	-
	Mean Power +80MHz Distance of Carrier (dBc)	34.47	25
	Mean Power -80MHz Distance of Carrier (dBc)	36.93	25
V _{max.}	Mean Power of Carrier (dBm)	22.13	-
	Mean Power +80MHz Distance of Carrier (dBc)	36.42	25
	Mean Power -80MHz Distance of Carrier (dBc)	37.83	25
V _{min.}	Mean Power of Carrier (dBm)	21.84	-
	Mean Power +80MHz Distance of Carrier (dBc)	36.63	25
	Mean Power -80MHz Distance of Carrier (dBc)	38.01	25

4.6 Antenna Power Measurement

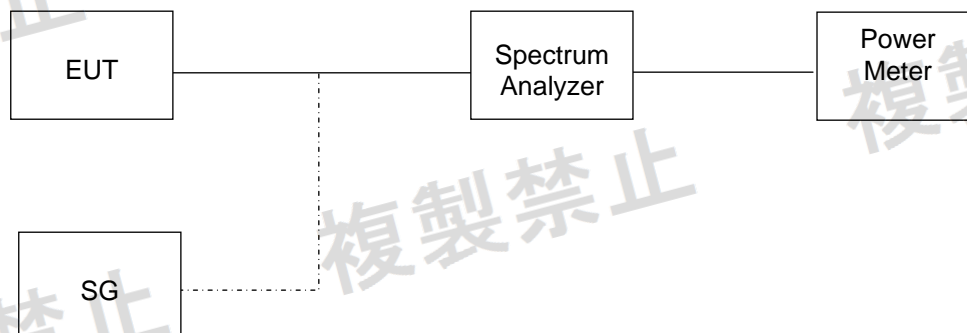
4.6.1 Limits of Antenna Power

W52 band			
Mode	802.11a / 802.11n (HT20)	802.11n (HT40)	802.11ac (VHT80)
Output power	10mW/MHz	5mW/MHz	2.5mW/MHz
E.I.R.P	10mW/MHz	5mW/MHz	2.5mW/MHz

W53 band			
Mode	802.11a / 802.11n (HT20)	802.11n (HT40)	802.11ac (VHT80)
Output power	10mW/MHz	5mW/MHz	2.5mW/MHz
E.I.R.P (with TPC)	10mW/MHz	5mW/MHz	2.5mW/MHz
E.I.R.P (without TPC)	5mW/MHz	2.5mW/MHz	1.25mW/MHz

W56 band			
Mode	802.11a / 802.11n (HT20)	802.11n (HT40)	802.11ac (VHT80)
Output power	10mW/MHz	5mW/MHz	2.5mW/MHz
E.I.R.P (with TPC)	50mW/MHz	25mW/MHz	12.5mW/MHz
E.I.R.P (without TPC)	25mW/MHz	12.5mW/MHz	6.25mW/MHz

4.6.2 Test Setup





4.6.3 Test Results

W52 bands: 802.11a

Environmental Conditions	24 deg.C, 70% RH			
Test Condition	Conducted RF Output Power Density (mW/MHz)			
	CH36 5180MHz	CH40 5200MHz	CH48 5240MHz	Max. Limit (mW/MHz)
V _{normal}	2.350	2.541	2.466	10
V _{max.}	2.357	2.546	2.471	10
V _{min.}	2.284	2.467	2.392	10
Rated Power	3mW/MHz			
Tolerance of Antenna Power	0.6mW/MHz ~ 3.6mW/MHz			

Printed antenna with antenna gain: 5.9dBi

Environmental Conditions	24 deg.C, 70% RH			
Test Condition	Radiated RF Output Power Density (mW/MHz)			
	CH36 5180MHz	CH40 5200MHz	CH48 5240MHz	Max. Limit (mW/MHz)
V _{normal}	9.141	9.886	9.594	10
V _{max.}	9.169	9.905	9.613	10
V _{min.}	8.885	9.599	9.306	10

- Note: 1. The radiated RF output power density is a “calculated” value derived from the conducted value.
2. Formula: Radiated RF output power density = Conducted RF output power density + Antenna Gain.



W52 bands: 802.11n (HT20)

Environmental Conditions	24 deg.C, 70% RH			
Test Condition	Conducted RF Output Power Density (mW/MHz)			
	CH36 5180MHz	CH40 5200MHz	CH48 5240MHz	Max. Limit (mW/MHz)
V _{normal}	2.407	2.315	2.458	10
V _{max.}	2.412	2.322	2.461	10
V _{min.}	2.335	2.248	2.384	10
Rated Power	3mW/MHz			
Tolerance of Antenna Power	0.6mW/MHz ~ 3.6mW/MHz			

Printed antenna with antenna gain: 5.9dBi

Environmental Conditions	24 deg.C, 70% RH			
Test Condition	Radiated RF Output Power Density (mW/MHz)			
	CH36 5180MHz	CH40 5200MHz	CH48 5240MHz	Max. Limit (mW/MHz)
V _{normal}	9.366	9.006	9.563	10
V _{max.}	9.384	9.033	9.573	10
V _{min.}	9.085	8.745	9.276	10

- Note: 1. The radiated RF output power density is a "calculated" value derived from the conducted value.
2. Formula: Radiated RF output power density = Conducted RF output power density + Antenna Gain.



W52 bands: 802.11n (HT40)

Environmental Conditions	24 deg.C, 70% RH		
Test Condition	Conducted RF Output Power Density (mW/MHz)		
	CH38 5190MHz	CH46 5230MHz	Max. Limit (mW/MHz)
V _{normal}	1.073	1.103	5
V _{max.}	1.075	1.107	5
V _{min.}	1.040	1.071	5
Rated Power	2mW/MHz		
Tolerance of Antenna Power	0.4mW/MHz ~ 2.4mW/MHz		

Printed antenna with antenna gain: 5.9dBi

Environmental Conditions	24 deg.C, 70% RH		
Test Condition	Radiated RF Output Power Density (mW/MHz)		
	CH38 5190MHz	CH46 5230MHz	Max. Limit (mW/MHz)
V _{normal}	4.173	4.293	5
V _{max.}	4.181	4.306	5
V _{min.}	4.047	4.168	5

- Note: 1. The radiated RF output power density is a "calculated" value derived from the conducted value.
2. Formula: Radiated RF output power density = Conducted RF output power density + Antenna Gain.



W52 bands: 802.11ac (VHT80)

Environmental Conditions	24 deg.C, 70% RH	
Test Condition	Conducted RF Output Power Density (mW/MHz)	
	CH42 5210MHz	Max. Limit (mW/MHz)
V _{normal}	0.535	2.5
V _{max.}	0.535	2.5
V _{min.}	0.520	2.5
Rated Power	1mW/MHz	
Tolerance of Antenna Power	0.2mW/MHz ~ 1.2mW/MHz	

Printed antenna with antenna gain: 5.9dBi

Environmental Conditions	24 deg.C, 70% RH	
Test Condition	Radiated RF Output Power Density (mW/MHz)	
	CH42 5210MHz	Max. Limit (mW/MHz)
V _{normal}	2.080	2.5
V _{max.}	2.082	2.5
V _{min.}	2.022	2.5

- Note: 1. The radiated RF output power density is a "calculated" value derived from the conducted value.
2. Formula: Radiated RF output power density = Conducted RF output power density + Antenna Gain.



4.7 Spurious Emission for Receiver

4.7.1 Limits of Spurious Emission for Receiver

Frequencies (MHz)	Limit
Below 1GHz	$\leq 4\text{nW}$ (-54dBm)
Above 1GHz	$\leq 20\text{nW}$ (-47dBm)

4.7.2 Test Setup





4.7.3 Test Result

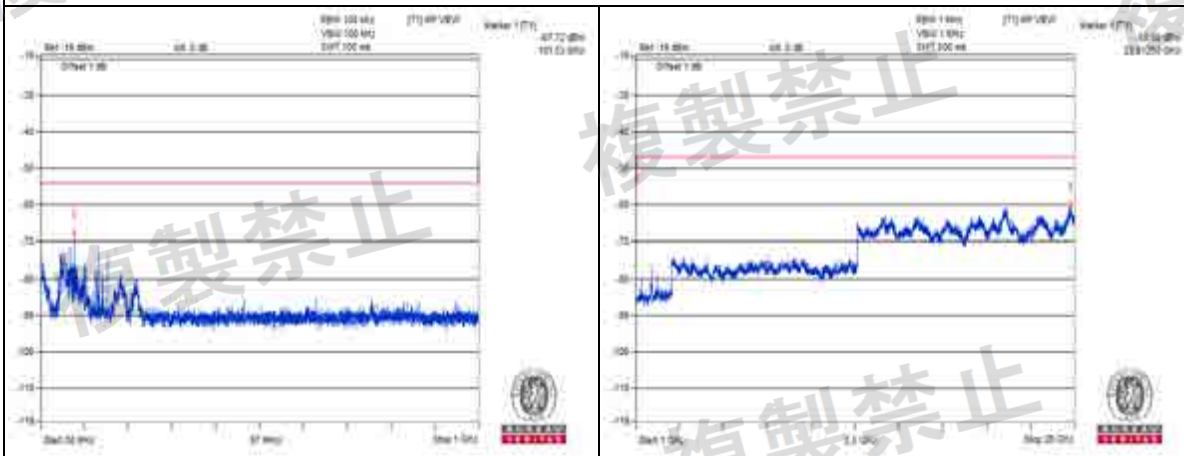
W52 bands:

802.11a

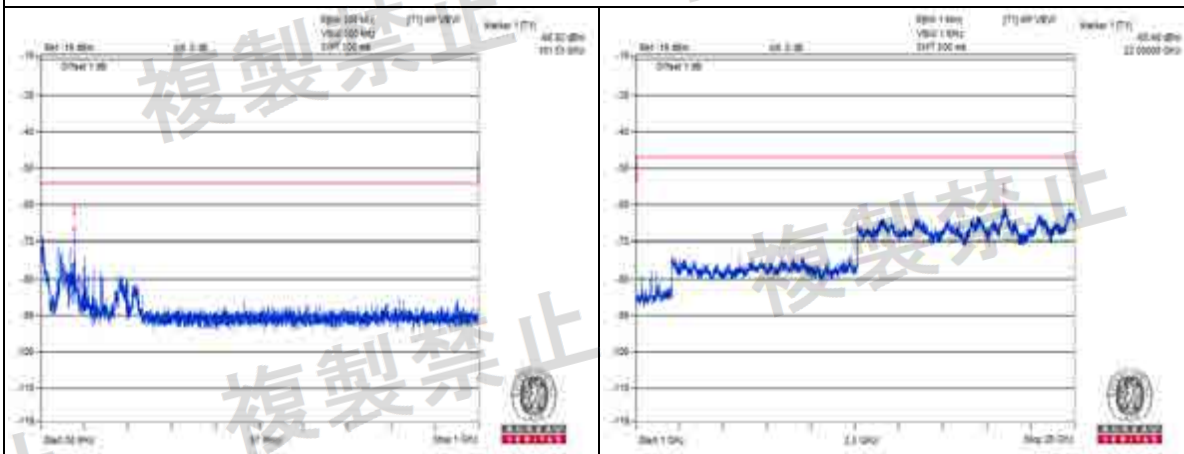
Environmental Conditions		24 deg.C, 70% RH					
Test Channel		CH36 (5180MHz)		CH40 (5200MHz)		Limit	Result
Test Condition	Frequency Range	Frequency (MHz)	Measured Value (nW)	Frequency (MHz)	Measured Value (nW)		
V _{normal}	Below 1GHz	101.530	0.169044nW	101.530	0.203236nW	4nW	PASS
	Above 1GHz	25812.500	1.028016nW	22000.000	0.895365nW	20nW	PASS
V _{max.}	Below 1GHz	101.530	0.148936nW	101.530	0.21928nW	4nW	PASS
	Above 1GHz	25812.500	1.025652nW	22037.500	0.78343nW	20nW	PASS
V _{min.}	Below 1GHz	101.530	0.207014nW	101.530	0.184502nW	4nW	PASS
	Above 1GHz	25837.500	0.812831nW	22087.500	0.918333nW	20nW	PASS
Test Channel		CH48 (5240MHz)				Limit	Result
Test Condition	Frequency Range	Frequency (MHz)		Measured Value (nW)			
V _{normal}	Below 1GHz	101.530		0.125026nW		4nW	PASS
	Above 1GHz	25800.000		1.061696nW		20nW	PASS
V _{max.}	Below 1GHz	101.530		0.10666nW		4nW	PASS
	Above 1GHz	25731.250		1.406048nW		20nW	PASS
V _{min.}	Below 1GHz	101.530		0.133352nW		4nW	PASS
	Above 1GHz	25800.000		1.009253nW		20nW	PASS

Note: 1. The worst value in each frequency range v.s. each channel has been marked by boldface.
2. The spectrum plots are attached on the following pages.

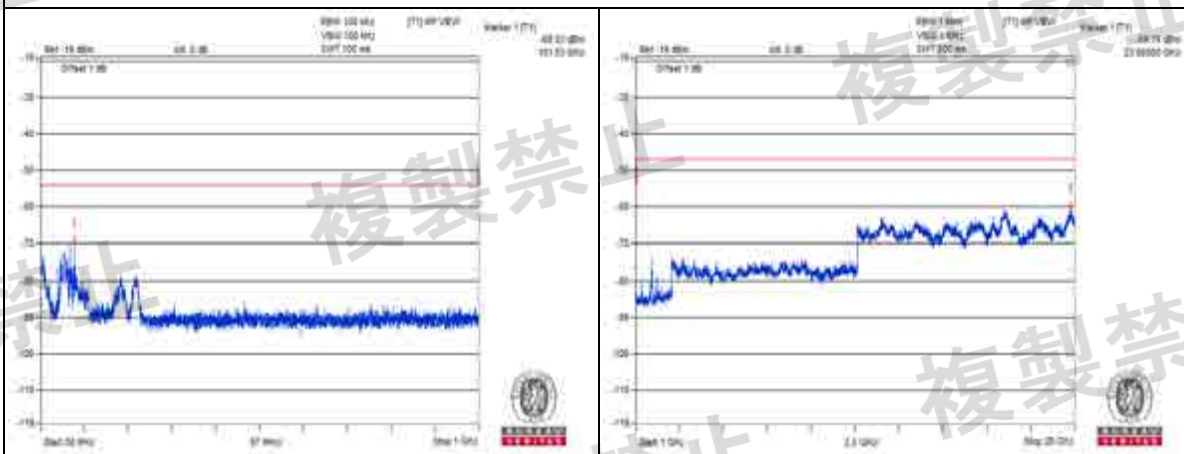
V_{normal}



Channel 36



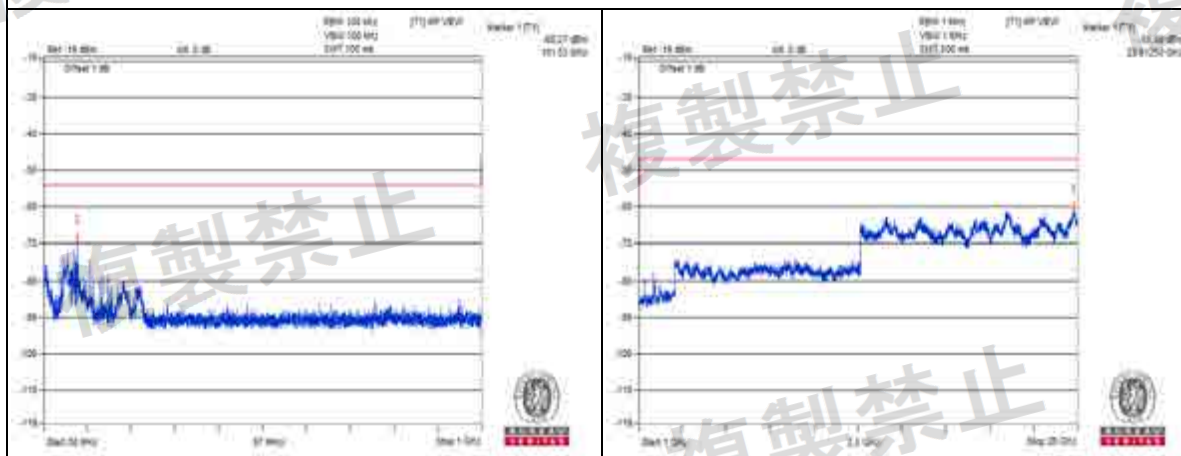
Channel 40



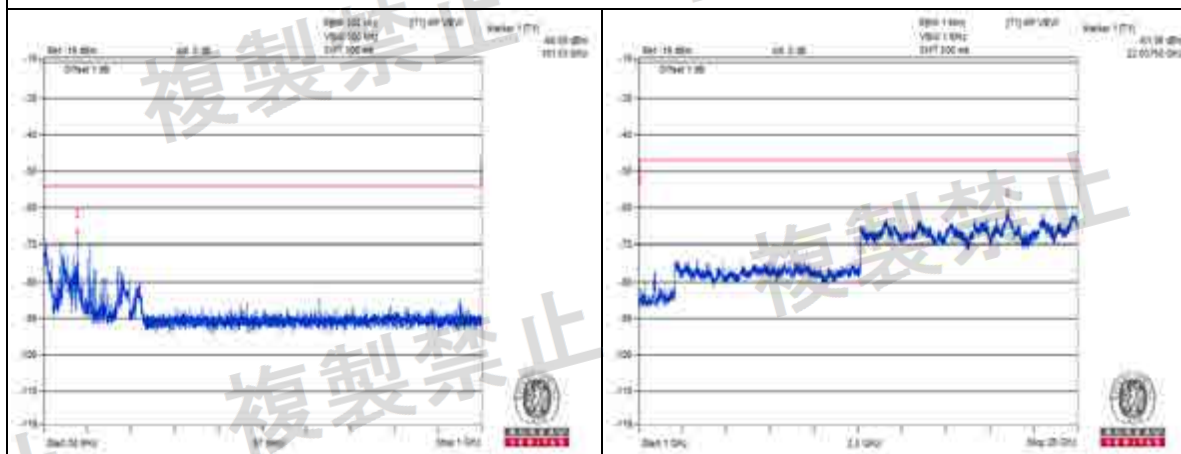
Channel 48

Measurement uncertainty: $\pm 3.93\text{dB}$

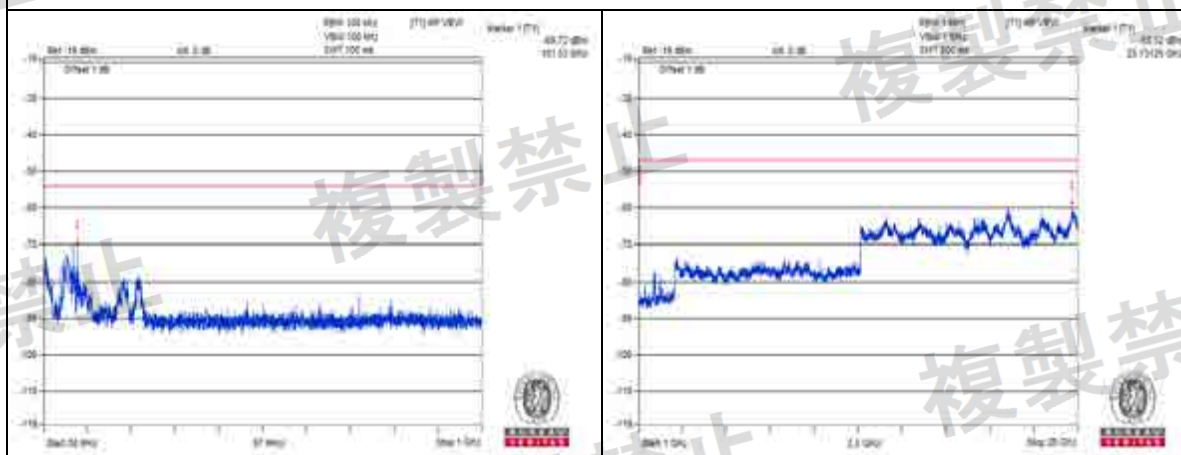
V_{max}



Channel 36



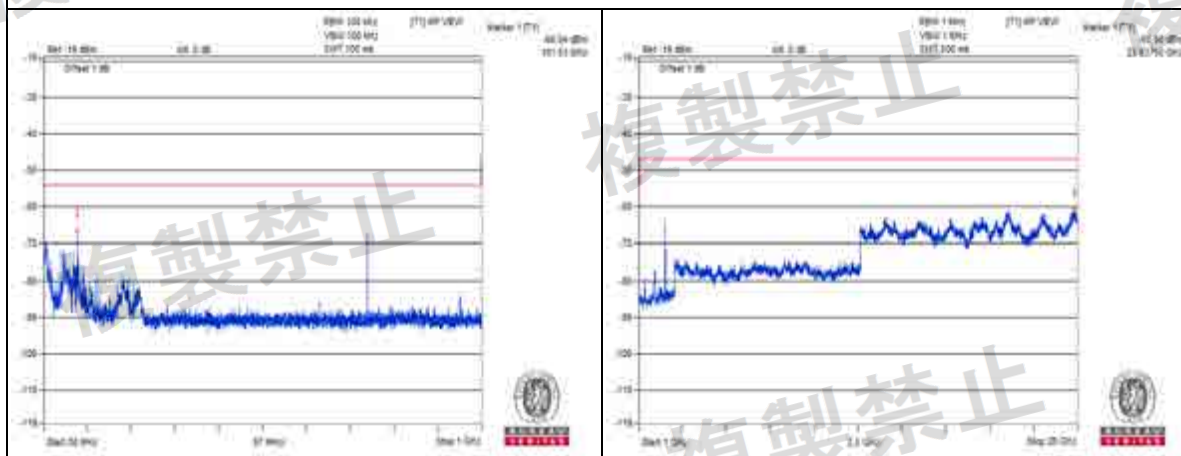
Channel 40



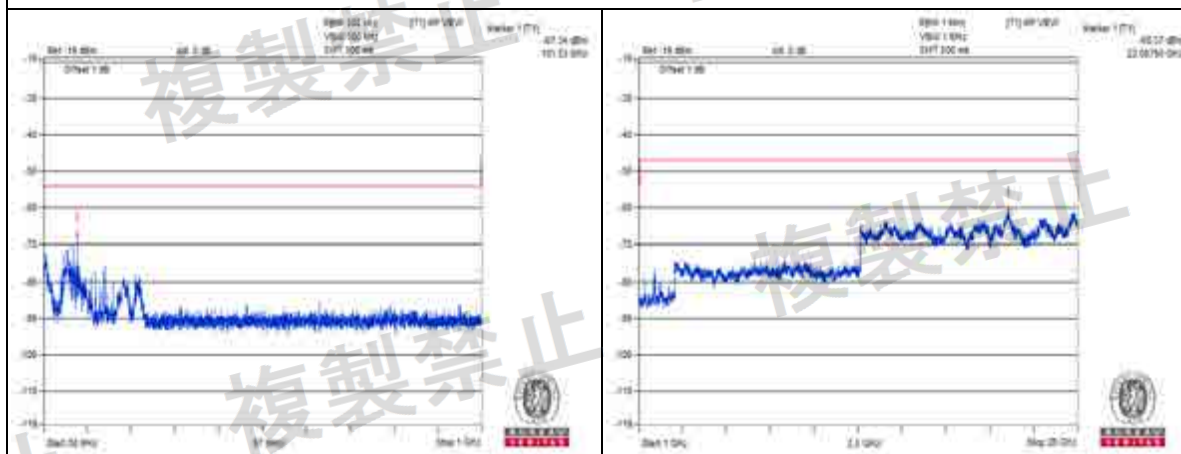
Channel 48

Measurement uncertainty: $\pm 3.93\text{dB}$

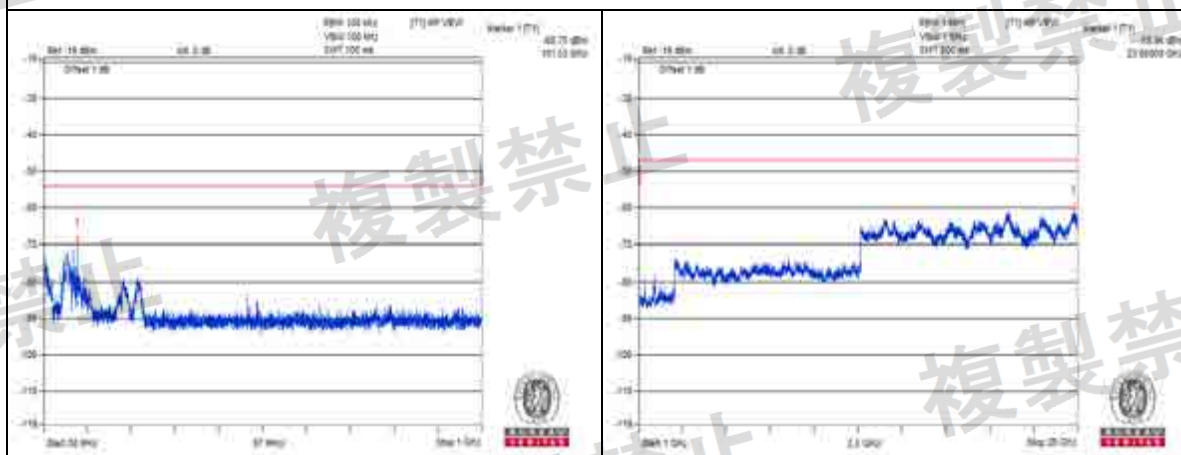
V_{min}.



Channel 36



Channel 40



Channel 48

Measurement uncertainty: $\pm 3.93\text{dB}$



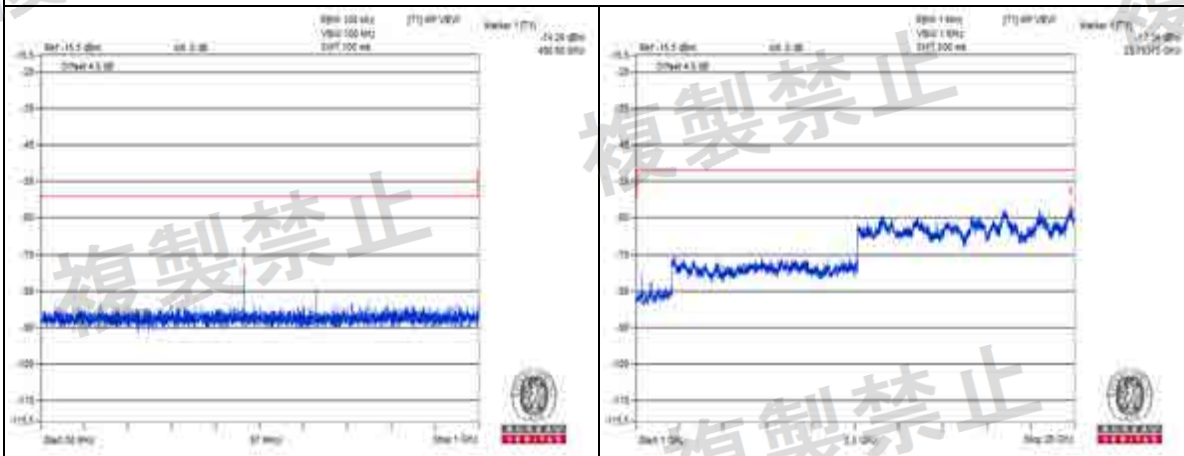
W52 bands:

802.11n (HT40)

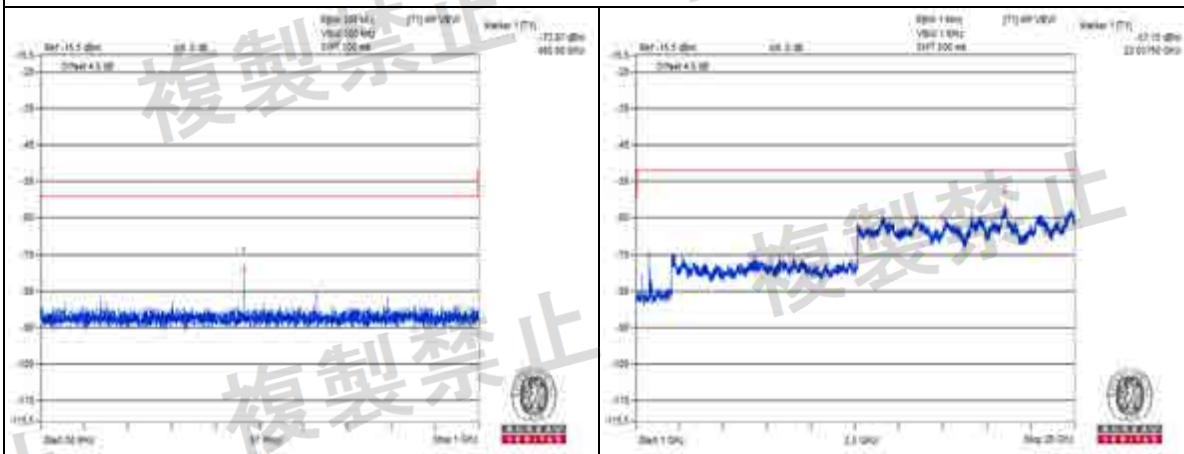
Environmental Conditions		24 deg.C, 70% RH					
Test Channel		CH38 (5190MHz)		CH46 (5230MHz)		Limit	Result
Test Condition	Frequency Range	Frequency (MHz)	Measured Value (nW)	Frequency (MHz)	Measured Value (nW)		
V_{normal}	Below 1GHz	480.080	0.037497nW	480.080	0.040087nW	4nW	PASS
	Above 1GHz	25793.750	1.845015nW	22037.500	1.927525nW	20nW	PASS
$V_{max.}$	Below 1GHz	480.080	0.047098nW	480.080	0.040458nW	4nW	PASS
	Above 1GHz	25806.250	1.694338nW	25893.750	1.86638nW	20nW	PASS
$V_{min.}$	Below 1GHz	480.080	0.036644nW	480.080	0.035563nW	4nW	PASS
	Above 1GHz	25781.250	2.17771nW	22062.500	2.037042nW	20nW	PASS

Note: 1. The worst value in each frequency range v.s. each channel has been marked by boldface.
2. The spectrum plots are attached on the following pages.

V_{normal}



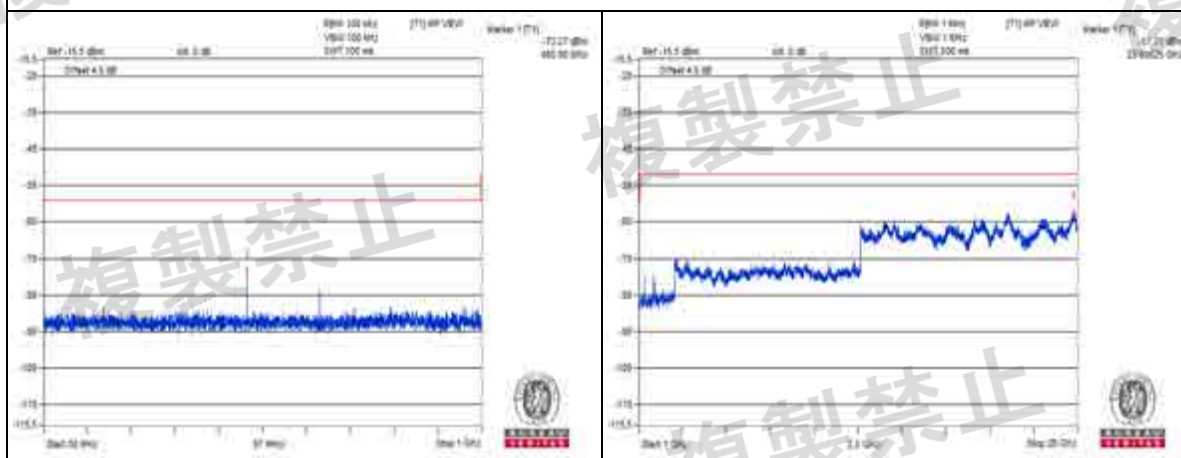
Channel 38



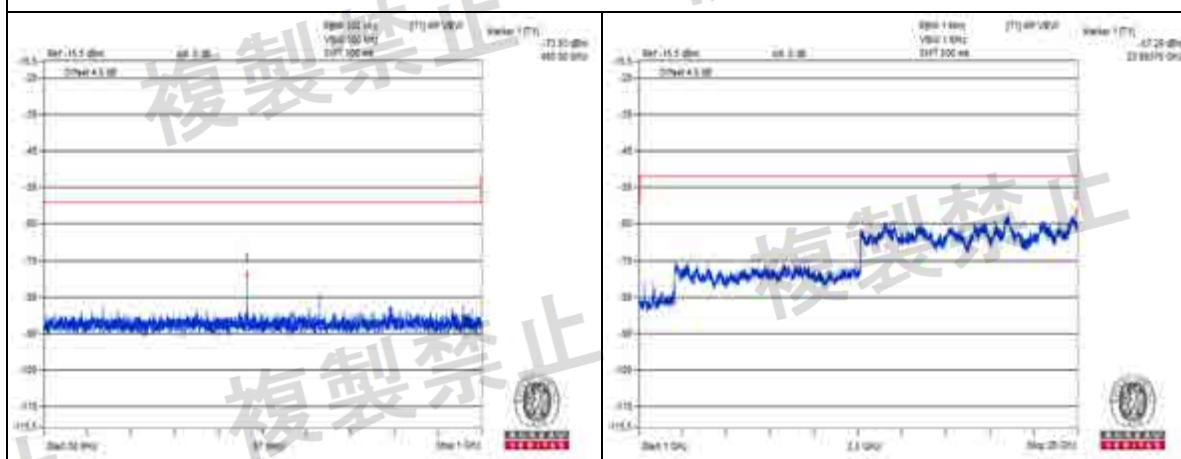
Channel 46

Measurement uncertainty: $\pm 3.93\text{dB}$

V_{max}



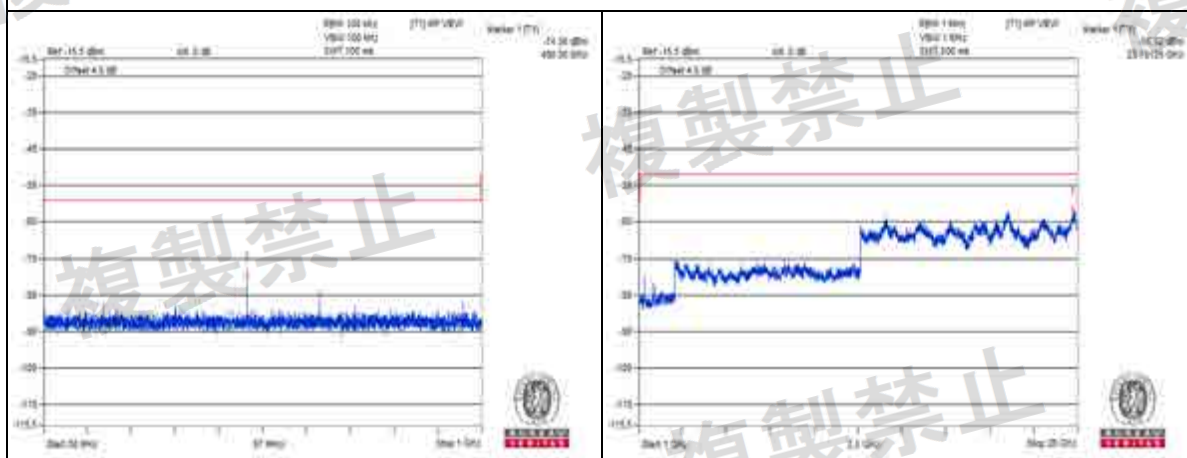
Channel 38



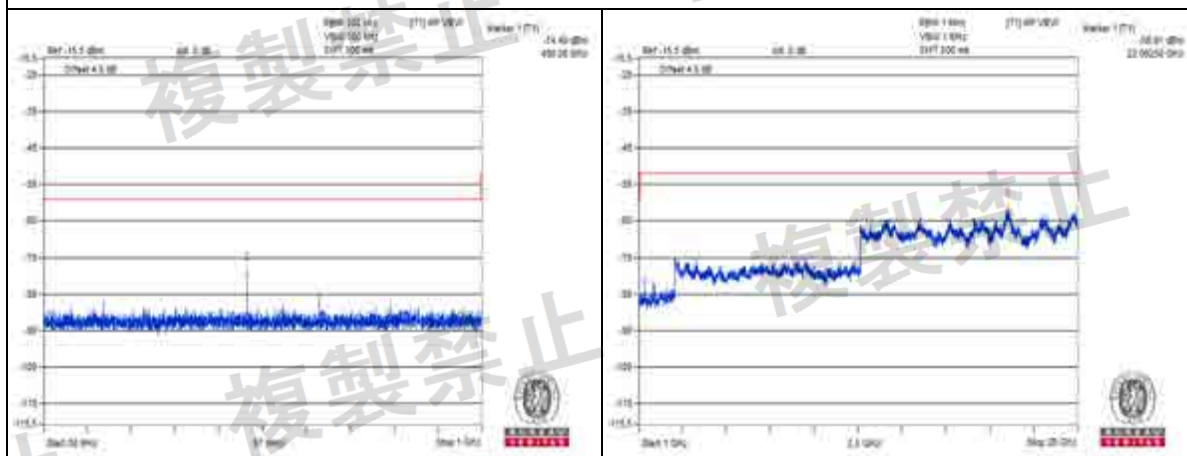
Channel 46

Measurement uncertainty: $\pm 3.93\text{dB}$

V_{min}.



Channel 38



Channel 46

Measurement uncertainty: $\pm 3.93\text{dB}$



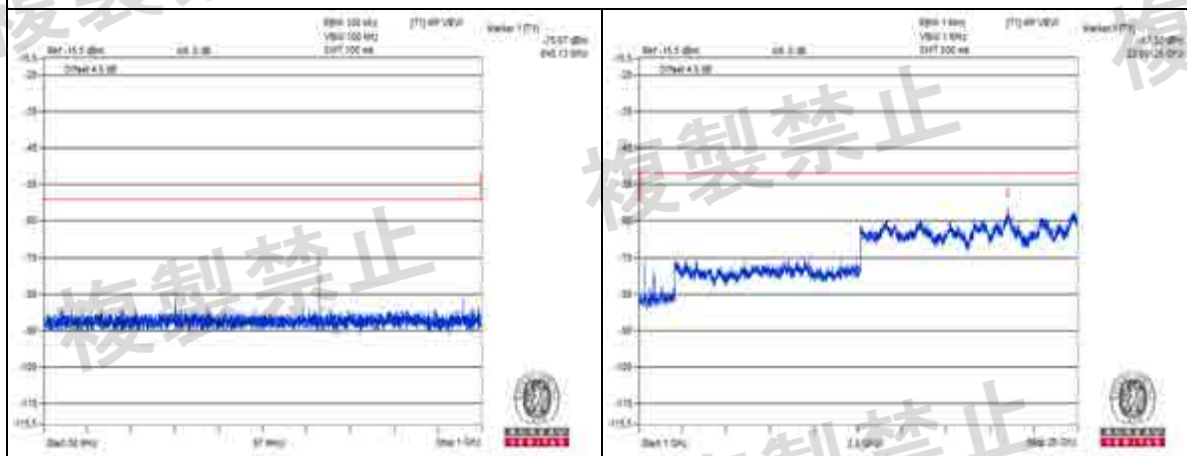
W52 bands:

802.11ac (VHT80)

Environmental Conditions		24 deg.C, 70% RH			
Test Channel		CH42 (5210MHz)		Limit	Result
Test Condition	Frequency Range	Frequency (MHz)	Measured Value (nW)		
V_{normal}	Below 1GHz	640.130	0.027102nW	4nW	PASS
	Above 1GHz	22031.250	1.849269nW	20nW	PASS
$V_{max.}$	Below 1GHz	640.130	0.02884nW	4nW	PASS
	Above 1GHz	25762.500	2.349633nW	20nW	PASS
$V_{min.}$	Below 1GHz	718.450	0.089743nW	4nW	PASS
	Above 1GHz	22068.750	2.22331nW	20nW	PASS

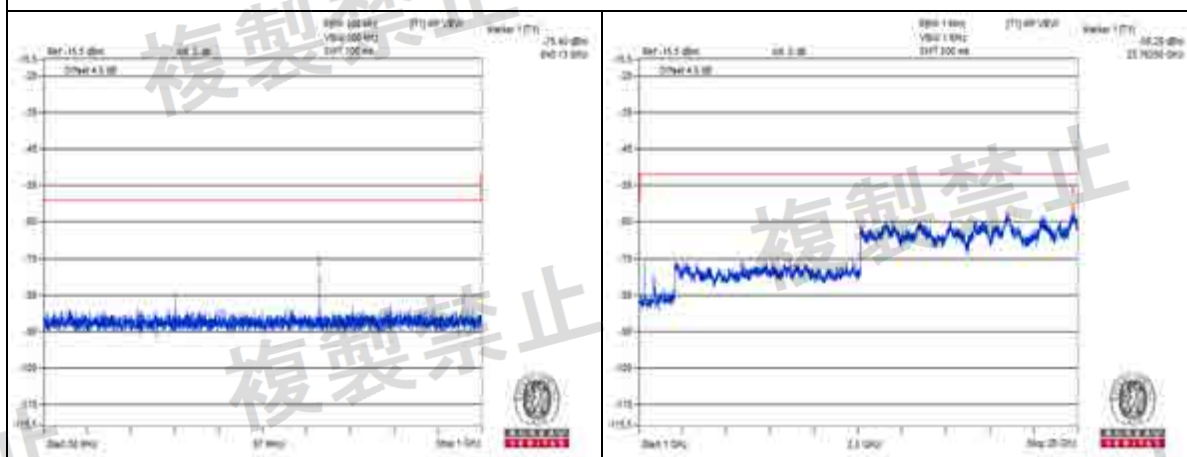
Note: 1. The worst value in each frequency range v.s. each channel has been marked by boldface.
2. The spectrum plots are attached on the following pages.

V_{normal}



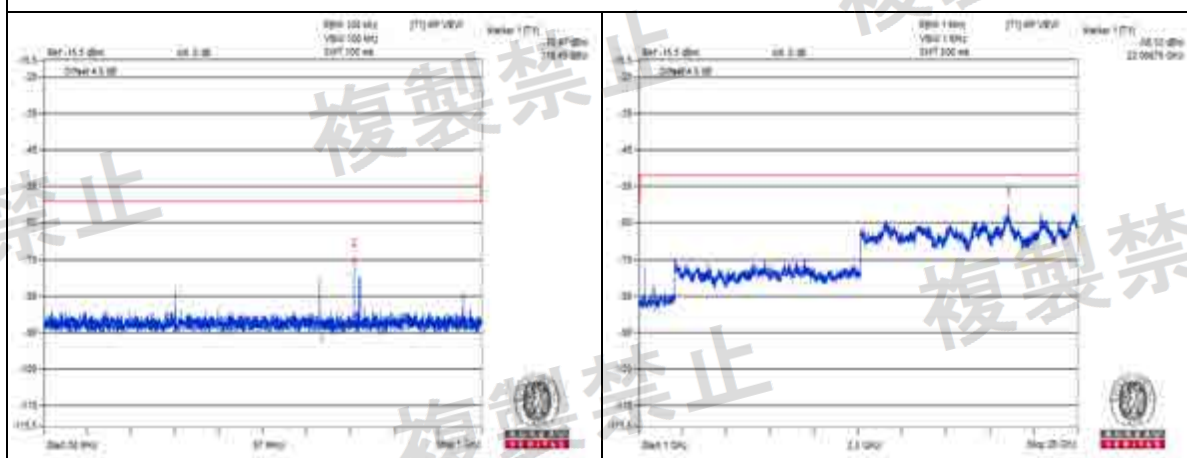
Channel 42

V_{max}.



Channel 42

V_{min}.



Channel 42

Measurement uncertainty: $\pm 3.93\text{dB}$



4.8 Burst Length

4.8.1 Limits of Burst Length

Frequencies (MHz)	Limit
Transmitter Operating	$\leq 4\text{ms}$

4.8.2 Test Setup



4.8.3 Test Result

W52 bands:
802.11a

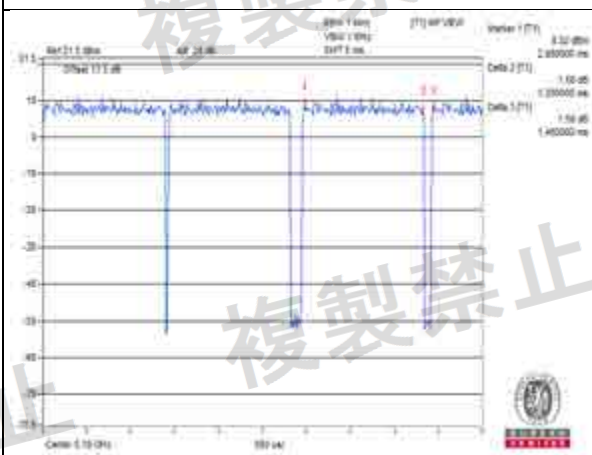
Environmental Conditions	24 deg.C, 70% RH
Test Condition	Burst Length (ms)
	CH36 5180MHz
V_{normal}	1.34
$V_{\text{max.}}$	1.35
$V_{\text{min.}}$	1.36

V_{normal}



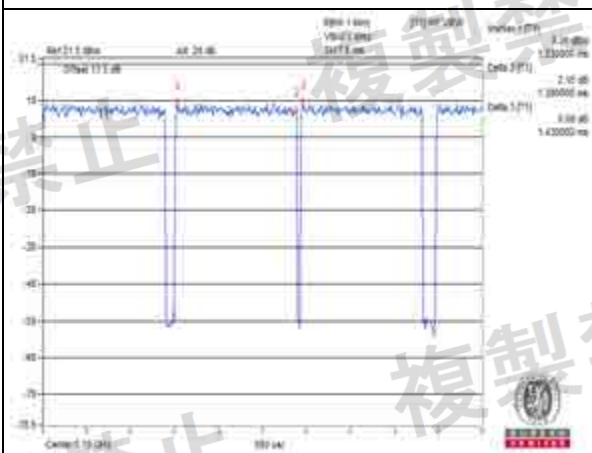
Channel 36

V_{max}



Channel 36

V_{min}



Channel 36

Measurement uncertainty: ± 0.01 dB



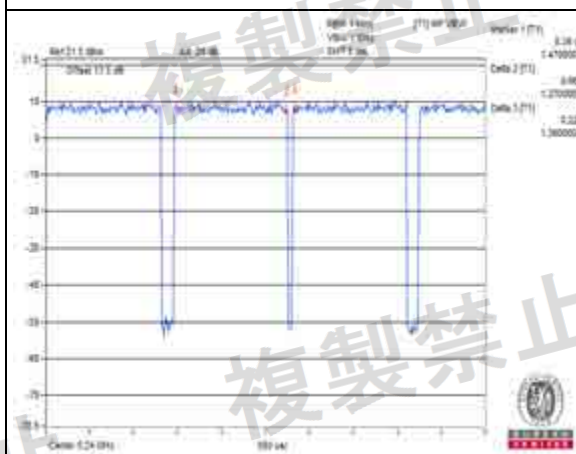
W52 bands:
802.11n (HT20)

Environmental Conditions	24 deg.C, 70% RH		
Test Condition	Burst Length (ms)		
	CH36 5180MHz	CH40 5200MHz	CH48 5240MHz
V _{normal}	1.25	1.26	1.27
V _{max.}	1.24	1.27	1.25
V _{min.}	1.24	1.26	1.28

V_{normal}

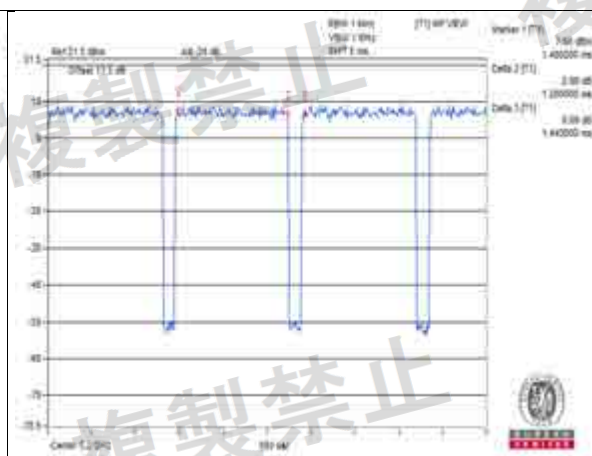


Channel 36



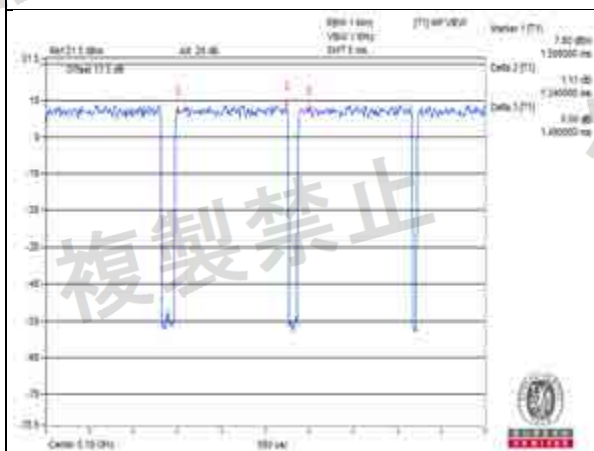
Channel 48

Measurement uncertainty: ± 0.01 dB

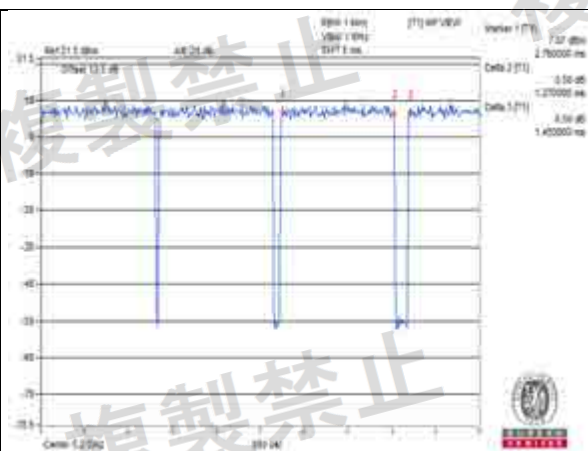


Channel 40

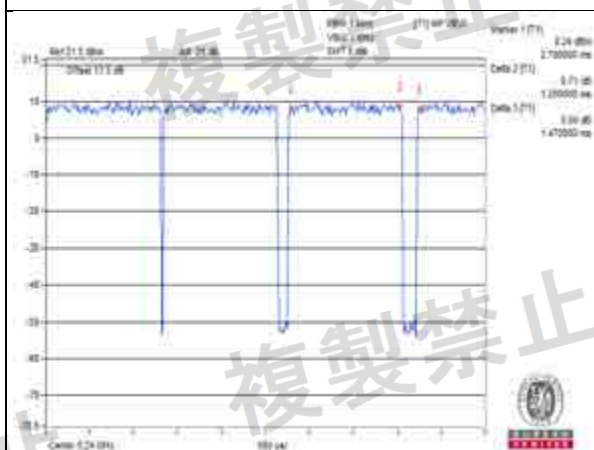
V_{max}



Channel 36



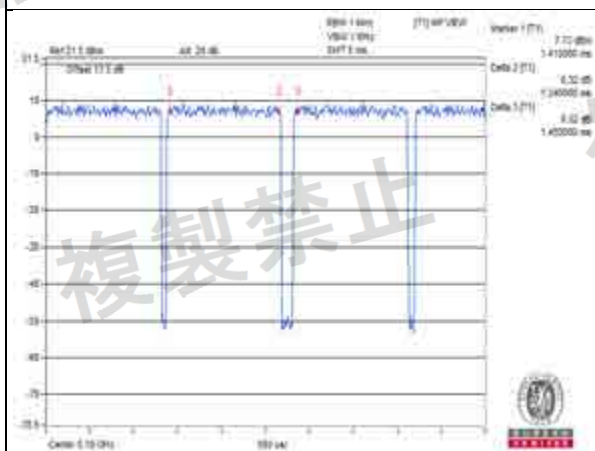
Channel 40



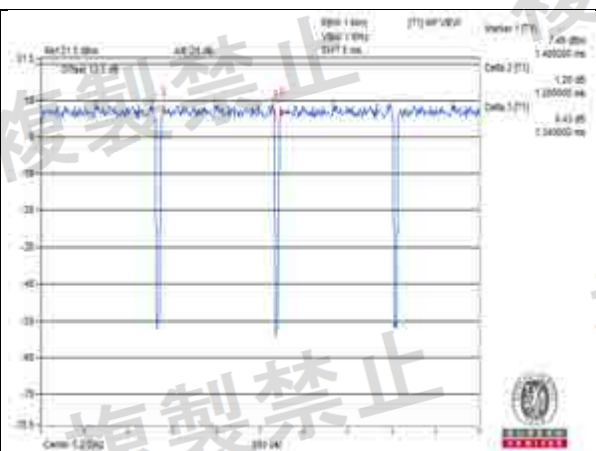
Channel 48

Measurement uncertainty: ± 0.01 dB

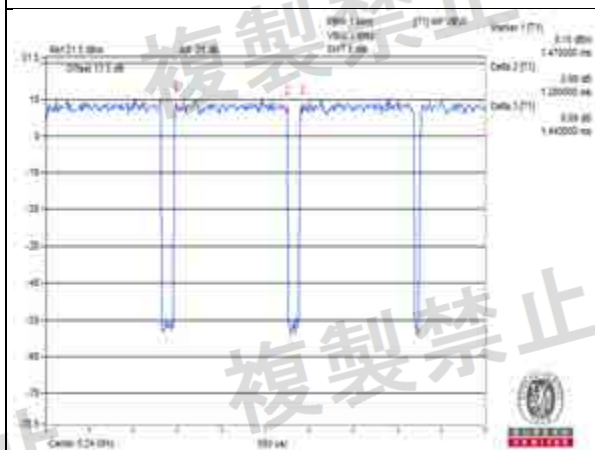
V_{min}



Channel 36



Channel 40



Channel 48

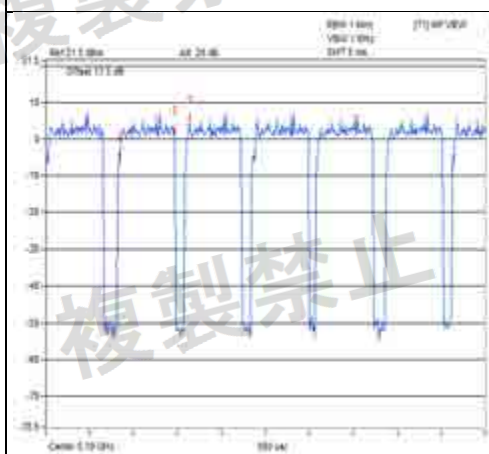
Measurement uncertainty: ± 0.01 dB



W52 bands:
802.11n (HT40)

Environmental Conditions	24 deg.C, 70% RH	
Test Condition	Burst Length (ms)	
	CH38 5190MHz	CH46 5230MHz
V _{normal}	0.62	0.63
V _{max.}	0.62	0.63
V _{min.}	0.63	0.63

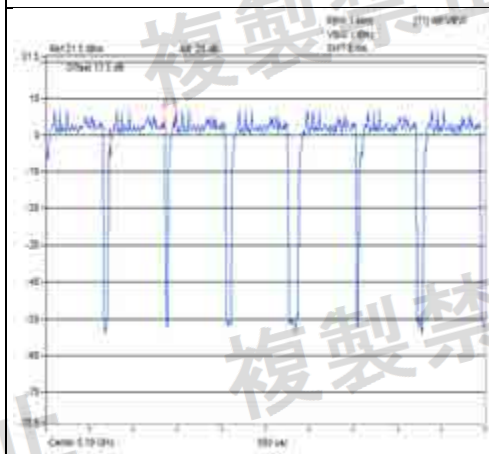
V_{normal}



Channel 38

Channel 46

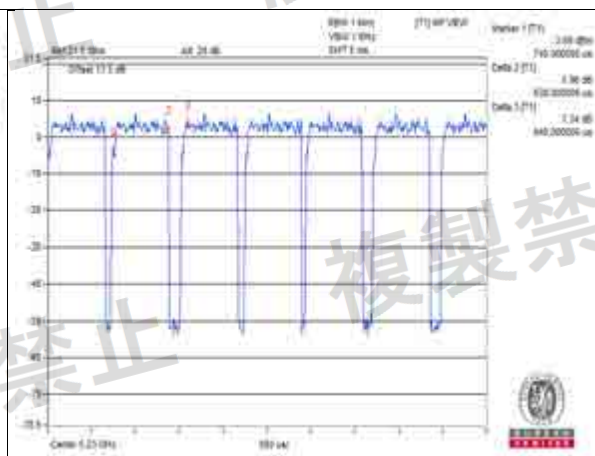
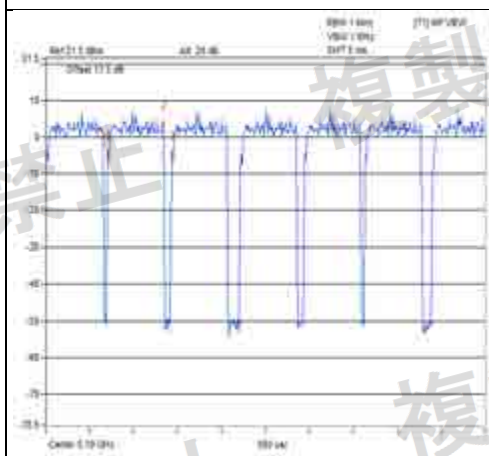
V_{max}



Channel 38

Channel 46

V_{min}



Channel 38

Channel 46

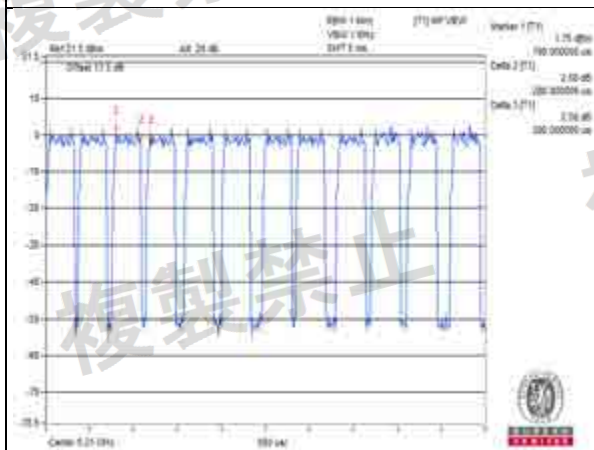
Measurement uncertainty: ± 0.01 dB



W52 bands:
802.11ac (VHT80)

Environmental Conditions	24 deg.C, 70% RH
Test Condition	Burst Length (ms)
	CH42 5210MHz
V _{normal}	0.28
V _{max.}	0.27
V _{min.}	0.28

V_{normal}



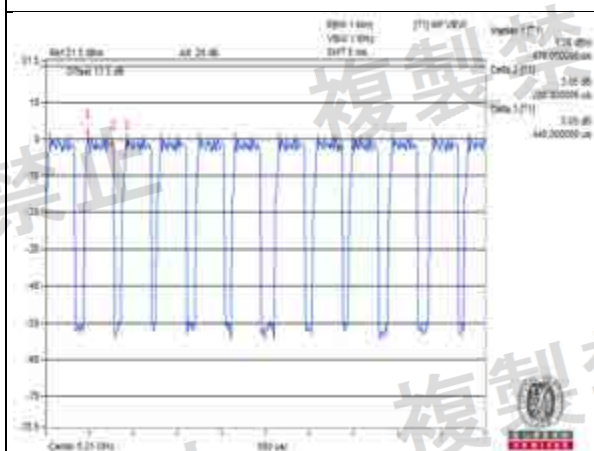
Channel 42

V_{max}.



Channel 42

V_{min}.



Channel 42

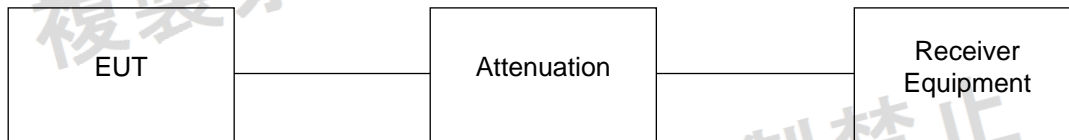
Measurement uncertainty: ± 0.01 dB

4.9 Interference Prevention Function

4.9.1 Limits of Interference Prevention Function

Radio equipment used mainly on the same premises and automatically transmits or receives identification code.

4.9.2 Test Setup

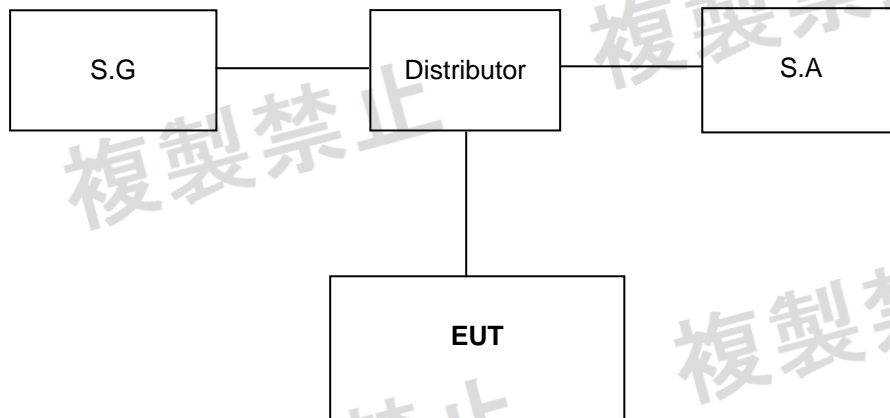


4.9.3 Test Results

Environmental Conditions	24 deg.C, 70% RH
Link Mode	Test Result
WiFi	Pass

4.10 Carrier Sense Capability

4.10.1 Measuring System Block Diagram



4.10.2 Measuring Operation Procedures

- Turn the standard signal generator output OFF. Leave the equipment under test to be ready for transmission and verify the transmission with the spectrum analyzer.
- Set the equipment under test to the receiving state.
- Turn the standard signal generator ON and leave the equipment under test to be ready for transmission and verify with the spectrum analyzer that no transmission is being made.

4.10.3 Level of the Ambient Carrier

802.11a

Frequency (MHz)	Pcs (dBm)	C.F (dB)	S.G Level
5180	-47.10	11.13	-35.966595
5240	-47.20	11.15	-36.046626

802.11n (HT20)

Frequency (MHz)	Pcs (dBm)	C.F (dB)	S.G Level
5180	-47.10	11.15	-35.946595
5240	-47.20	11.16	-36.036626

802.11n (HT40)

Frequency (MHz)	Pcs (dBm)	C.F (dB)	S.G Level
5190	-47.11	11.15	-35.963347
5230	-47.18	11.16	-36.020034

802.11ac (VHT80)

Frequency (MHz)	Pcs (dBm)	C.F (dB)	S.G Level
5210	-47.146754	11.16	-35.986754

Note:

Pcs (dBm) = 22.79 + Gr - 20log(F).

Gr: Antenna gain (W52 band: 4.4dBi).

F: Transmission frequency (MHz).

C.F = Distributor loss + cable loss.

4.10.4 Test Result

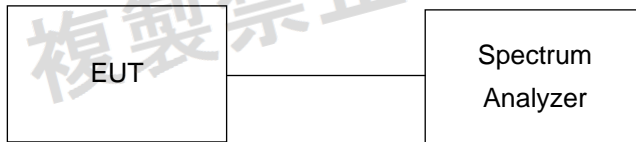
Pass

4.11 Number of Carriers within 1 MHz Bandwidth in OFDM

4.11.1 Limit of Number of Carriers

For each 1MHz bandwidth in OFDM, there should be at least 1 carrier.

4.11.2 Test Setup



4.11.3 Test Result

About OFDM Technical, one OFDM Channel will have 52 sub-carriers. At present, we observe this product via the spectrum, and we know that there are 3 carriers in 1 MHz bandwidth in OFDM.

5 Photographs of the Test Configuration

1TX



2TX





Appendix - Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab

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The address and road map of all our labs can be found in our web site also.

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