

ISED TEST REPORT FOR CERTIFICATION
On Behalf of

Hui Zhou Gaoshengda Technology Co., Ltd

WIFI+BT Module

Model Number: WKCT27M2501

IC: 12290A-WKCT27

Applicant:	Hui Zhou Gaoshengda Technology Co.,LTD
Address:	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
	Tel: 86-769-83081888-808

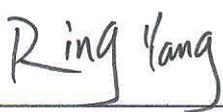
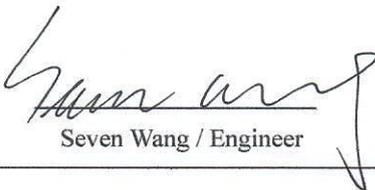
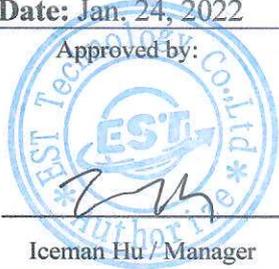
Report Number:	ESTE-R2201207
Date of Test:	Dec. 17, 2021~Jan. 18, 2022
Date of Report:	Jan. 24, 2022

TABLE OF CONTENTS

Description	Page
TEST REPORT VERIFICATION.....	3
1. GENERAL INFORMATION.....	5
1.1. Description of Device (EUT).....	5
1.2. Antenna Information.....	6
1.3. Information of RF Cable.....	6
2. SUMMARY OF TEST.....	7
2.1. Summary of test result.....	7
2.2. Test Facilities.....	8
2.3. Measurement uncertainty.....	9
2.4. Assistant equipment used for test.....	9
2.5. Block Diagram.....	9
2.6. Test Mode.....	10
2.7. Power Setting of Test Software.....	11
2.8. Duty Cycle.....	11
2.9. Channel List.....	14
2.10. Test Equipment List.....	15
3. 6DB BANDWIDTH & 99% OCCUPIED BANDWIDTH.....	16
3.1. Limit.....	16
3.2. Test Setup.....	16
3.3. Spectrum Analyzer Setting.....	16
3.4. Test Procedure.....	16
3.5. Test Result.....	17
4. MAXIMUM PEAK OUTPUT POWER.....	34
4.1. Limit.....	34
4.2. Test Setup.....	34
4.3. Spectrum Analyzer Setting.....	34
4.4. Test Procedure.....	34
4.5. Test Result.....	35
5. POWER SPECTRAL DENSITY.....	48
5.1. Limit.....	48
5.2. Test Setup.....	48
5.3. Spectrum Analyzer Setting.....	48
5.4. Test Procedure.....	48
5.5. Test Result.....	49
6. CONDUCTED BAND EDGE.....	62
6.1. Limit.....	62
6.2. Test Setup.....	62
6.3. Spectrum Analyzer Setting.....	62
6.4. Test Procedure.....	62
6.5. Test Result.....	63
7. CONDUCTED SPURIOUS EMISSIONS.....	64
7.1. Limit.....	64
7.2. Test Setup.....	64
7.3. Spectrum Analyzer Setting.....	64

7.4.	Test Procedure.....	64
7.5.	Test Result.....	65
8.	RADIATED SPURIOUS EMISSIONS AND BAND EDGE	67
8.1.	Limit.....	67
8.2.	Test Setup.....	69
8.3.	Spectrum Analyzer Setting.....	70
8.4.	Test Procedure.....	71
8.5.	Test Result.....	72
9.	AC POWER LINE CONDUCTED EMISSIONS	88
9.1.	Limit.....	88
9.2.	Test Setup.....	88
9.3.	Spectrum Analyzer Setting.....	88
9.4.	Test Procedure.....	88
9.5.	Test Result.....	89
10.	TRANSMIT ANTENNA.....	91
10.1.	Limit.....	91
10.2.	Test Result.....	91
11.	TEST SETUP PHOTO	92
12.	EUT PHOTO.....	94

EST Technology Co., Ltd.

Applicant:	Hui Zhou Gaoshengda Technology Co.,LTD		
Address:	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China		
Manufacturer:	Hui Zhou Gaoshengda Technology Co.,LTD		
Address:	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China		
Factory:	Hui Zhou Gaoshengda Technology Co.,LTD		
Address:	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China		
E.U.T:	WIFI+BT Module		
Model Number:	WKCT27M2501		
Power Supply:	DC 3.3V From PC		
Trade Name:	GSD	Serial No.:	-----
Date of Receipt:	Dec. 17, 2021	Date of Test:	Dec. 17, 2021~Jan. 18, 2022
Test Specification:	RSS-247 Issue 2 RSS-Gen Issue 5 ANSI C63.10:2013		
Test Result:	<p>The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the Regulations RSS-247 and RSS-Gen requirements.</p> <p style="text-align: center;">This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.</p>		
Prepared by:	Reviewed by:	Date: Jan. 24, 2022	
		Approved by:	
 Ring Yang / Assistant	 Seven Wang / Engineer	 Iceman Hu / Manager	
Other Aspects:	None.		
<i>Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested</i>			
<i>This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.</i>			

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Product Name	:	WIFI+BT Module
Model Number	:	WKCT27M2501
Operation frequency	:	2412MHz~2462MHz 2422MHz~2452MHz
Number of channel	:	IEEE 802.11b: 11 Channels IEEE 802.11g: 11 Channels IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels
Max Output Power (PEAK)	:	IEEE 802.11b:17.82dBm IEEE 802.11g: 22.83dBm IEEE 802.11n HT20:25.65dBm IEEE 802.11n HT40: 25.49dBm
Modulation Type	:	IEEE 802.11b mode: DSSS(CCK/QPSK/BPSK) IEEE 802.11g mode: OFDM (BPSK/QPSK/16QAM/64QAM) IEEE 802.11n mode: OFDM (BPSK/QPSK/16QAM/64QAM)
Software Version	:	V01
Hardware Version	:	V01
Sample Type	:	Prototype production

Note:

For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

1.2. Antenna Information

Ant No.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	-	-	PCB	-	1.5
2	-	-	PCB	-	1.5

Note:

1. The EUT has two antennas, the antennas can support SISO function in IEEE 802.11b and IEEE 802.11g, and can support MIMO function in IEEE 802.11n.
2. The EUT can work as CDD mode in IEEE 802.11n HT20 and IEEE 802.11n HT40, and can operate with one spatial stream.
3. According to ANSI C63.10:2013 14.4.3.2.5 a):
 $Directional\ gain = 1.5dBi + 10 \times \log(2/1)dB = 4.51dBi < 6dBi$
 So, the output power limit and power spectral density no need to be reduced.
4. After pre-test all antenna configurations, the worst case configuration as list below.
5. This information is provided by the applicant.

TX Mode \ Ant No.	SISO Configuration	MIMO Configuration
802.11b	Ant 1 and Ant 2	/
802.11g	Ant 1 and Ant 2	/
802.11n HT20	/	Ant 1+Ant 2
802.11n HT40	/	Ant 1+Ant 2

1.3. Information of RF Cable

Cable Loss(dB)	Provided by
1.0	Hui Zhou Gaoshengda Technology Co.,LTD

Note: 1. The customer declared the loss value of the RF Cable, and the test results of this report only apply to the sample as received.
 2. This information is provided by the applicant.

2. SUMMARY OF TEST

2.1. Summary of test result

Report Section	Description of Test Item	IC Standards Section	Results
3	6dB Bandwidth&99% Occupied Bandwidth	RSS-247 5.2 (a) RSS-Gen 6.7	PASS
4	Maximum Peak Output Power	RSS-247 5.4 (d)	PASS
5	Power Spectral Density	RSS-247 5.2 (b)	PASS
6	Conducted Band Edge	RSS-247 5.5	PASS
7	Conducted Spurious Emissions	RSS-247 5.5	PASS
8	Radiated Spurious Emissions and Band Edge	RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	PASS
9	AC Power Line Conducted Emissions	RSS-Gen 8.8	PASS
10	Transmit Antenna	RSS-Gen 6.8	PASS

Note:

(1) "N/A" denotes test is not applicable in this test report

2.2. Test Facilities

EMC Lab : Certificated by CNAS, CHINA
Registration No.: L5288
This Certificate is valid until: November 12, 2023

Certificated by FCC, USA
Designation Number: CN1215
This Certificate is valid until: January 31, 2022

Certificated by A2LA, USA
Registration No.: 4366.01
This Certificate is valid until: January 31, 2022

Certificated by Industry Canada
CAB identifier No.: CN0035
This Certificate is valid until: January 31, 2022

Certificated by VCCI, Japan
Registration No.:C-14103; T-20073; R-13663;
R-20103; G-20097
Date of registration: Apr. 20, 2020
This Certificate is valid until: Apr. 19, 2023

Certificated by TUV Rheinland, Germany
Registration No.: UA 50413872 0001
Date of registration: July 31, 2018

Certificated by Intertek
Registration No.: 2011-RTL-L2-64
Date of registration: November 08, 2018

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China

2.3. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	±3.48dB
Uncertainty for spurious emissions test (Below 30MHz)	±1.62 dB
Uncertainty for spurious emissions test (30MHz-1GHz)	±4.60 dB(Polarize: H)
	±4.68 dB(Polarize: V)
Uncertainty for spurious emissions test (1GHz to 25GHz)	±4.96dB
Uncertainty for radio frequency	7×10^{-8}
Uncertainty for conducted RF Power	1.08dB
Uncertainty for Power density test	0.26dB

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

2.4. Assistant equipment used for test

Item	Equipment	Brand	Model Name/Type No.	IC ID	Series No.
A	Notebook	-	Thinkpad X280	-	-

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	-

2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground. EUT was beset into 2.4G WIFI test mode by software before test.



DC 3.3V From PC

(EUT: WIFI+BT Module)

2.6. Test Mode

The test mode was selected for the final test as listed below.

Test Item	Mode	Date Rate	Test Channel
6dB Bandwidth&99% Occupied Bandwidth	IEEE 802.11b	1Mbps	Low/Middle/High
	IEEE 802.11g	6Mbps	Low/Middle/High
	IEEE 802.11n HT20	MCS8	Low/Middle/High
	IEEE 802.11n HT40	MCS8	Low/Middle/High
Maximum Peak Output Power	IEEE 802.11b	1Mbps	Low/Middle/High
	IEEE 802.11g	6Mbps	Low/Middle/High
	IEEE 802.11n HT20	MCS8	Low/Middle/High
	IEEE 802.11n HT40	MCS8	Low/Middle/High
Power Spectral Density	IEEE 802.11b	1Mbps	Low/Middle/High
	IEEE 802.11g	6Mbps	Low/Middle/High
	IEEE 802.11n HT20	MCS8	Low/Middle/High
	IEEE 802.11n HT40	MCS8	Low/Middle/High
Conducted Band Edge	IEEE 802.11b	1Mbps	Low/ High
	IEEE 802.11g	6Mbps	Low/ High
	IEEE 802.11n HT20	MCS8	Low/ High
	IEEE 802.11n HT40	MCS8	Low/ High
Conducted Spurious Emissions	IEEE 802.11b	1Mbps	Low/Middle/High
	IEEE 802.11g	6Mbps	Low/Middle/High
	IEEE 802.11n HT20	MCS8	Low/Middle/High
	IEEE 802.11n HT40	MCS8	Low/Middle/High
Radiated Spurious Emissions(Below 1GHz)	IEEE 802.11b	1Mbps	Low/Middle/High
	IEEE 802.11g	6Mbps	Low/Middle/High
	IEEE 802.11n HT20	MCS8	Low/Middle/High
	IEEE 802.11n HT40	MCS8	Low/Middle/High
Radiated Spurious Emissions(Above 1GHz)	IEEE 802.11b	1Mbps	Low/Middle/High
	IEEE 802.11g	6Mbps	Low/Middle/High
	IEEE 802.11n HT20	MCS8	Low/Middle/High
	IEEE 802.11n HT40	MCS8	Low/Middle/High
Radiated Band Edge	IEEE 802.11b	1Mbps	Low/Middle/High
	IEEE 802.11g	6Mbps	Low/Middle/High
	IEEE 802.11n HT20	MCS8	Low/Middle/High
	IEEE 802.11n HT40	MCS8	Low/Middle/High
AC Power Line Conducted Emissions	IEEE 802.11b	1Mbps	Low/Middle/High
	IEEE 802.11g	6Mbps	Low/Middle/High
	IEEE 802.11n HT20	MCS8	Low/Middle/High
	IEEE 802.11n HT40	MCS8	Low/Middle/High

Note:

1. In radiated measurement,the EUT had been pre-scan on the positioned of each 3 axis(X,Y,Z), the worst case was found when positioned on **X-plane**.

2.7. Power Setting of Test Software

Software Name	QATool_Dbg.exe		
Frequency(MHz)	2412	2437	2462
IEEE 802.11b Setting	15	15	15
IEEE 802.11g Setting	16/15	16/15	16/15
IEEE 802.11n HT20 Setting	17/16	17/16	17/16
Frequency(MHz)	2422	2437	2452
IEEE 802.11n HT40 Setting	16.5/15.5	16.5/15.5	16.5/15.5

Note: This information is provided by the applicant.

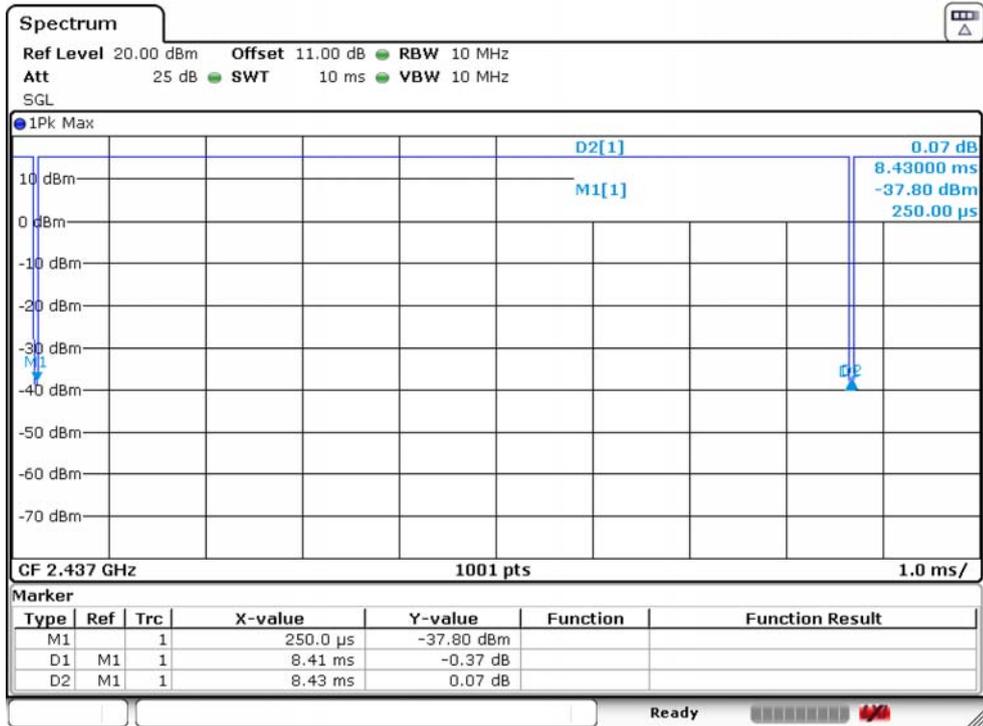
2.8. Duty Cycle

Temperature	25.4°C	Relative Humidity	56%	Test Voltage	DC 3.3V
Mode	Fre (MHz)	On time (ms)	Total Time (ms)	Duty Cycle	Duty Factor (dB)
IEEE 802.11b	2437	8.41000	8.43000	99.76%	0.00
IEEE 802.11g	2437	1.40500	1.43500	97.91%	0.09
IEEE 802.11n HT20	2437	1.30000	1.33500	97.38%	0.12
IEEE 802.11n HT40	2437	0.65400	0.69200	94.51%	0.25

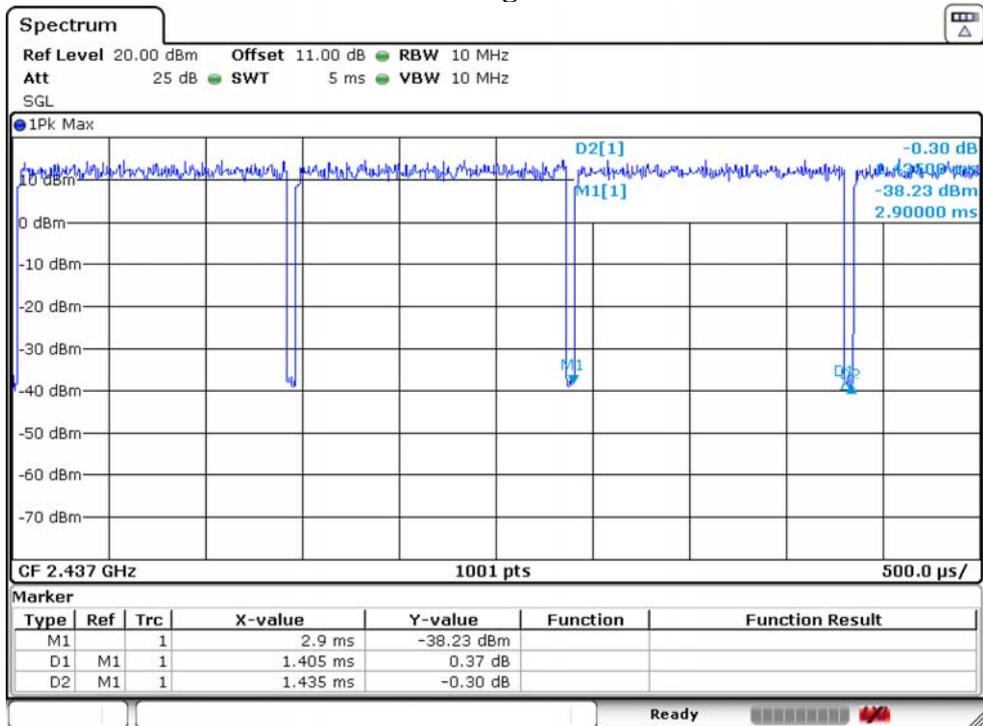
Note:

1. If duty cycle <98 %, the conducted average output power and average power spectral density should be add duty factor.
2. If duty cycle \geq 98 %,the EUT is consider to be transmitting continuously,the conducted average output power and average power spectral density no need to add duty factor(consider to be zero).
3. The conducted peak output power and peak power spectral density no need to consider duty factor.
4. The on-time time is transmission duration(T).

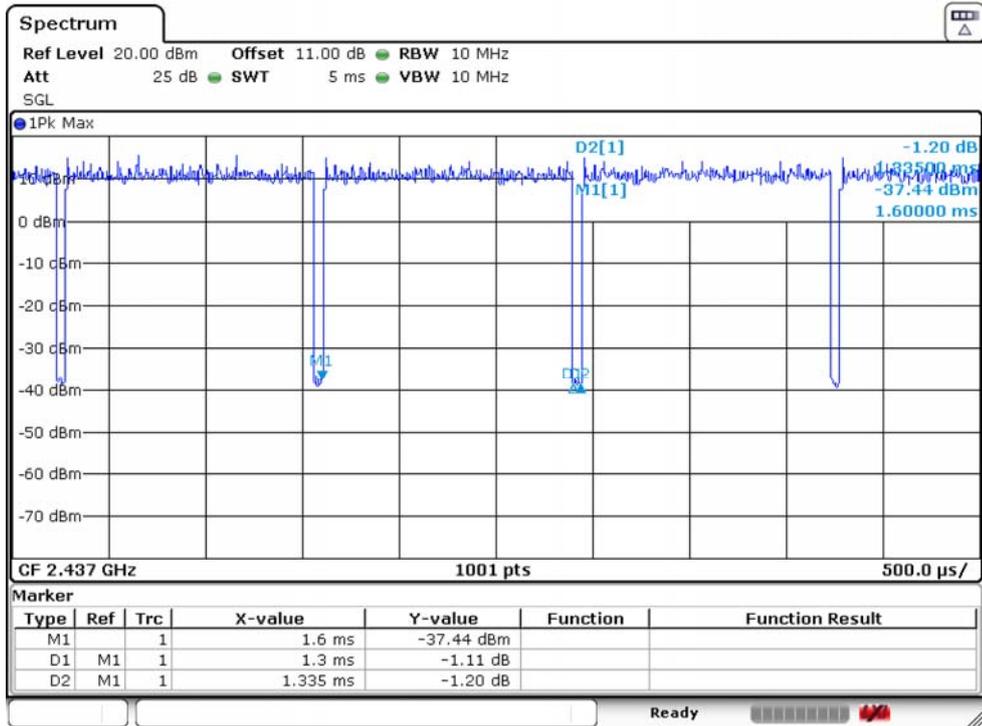
IEEE 802.11b 2437MHz



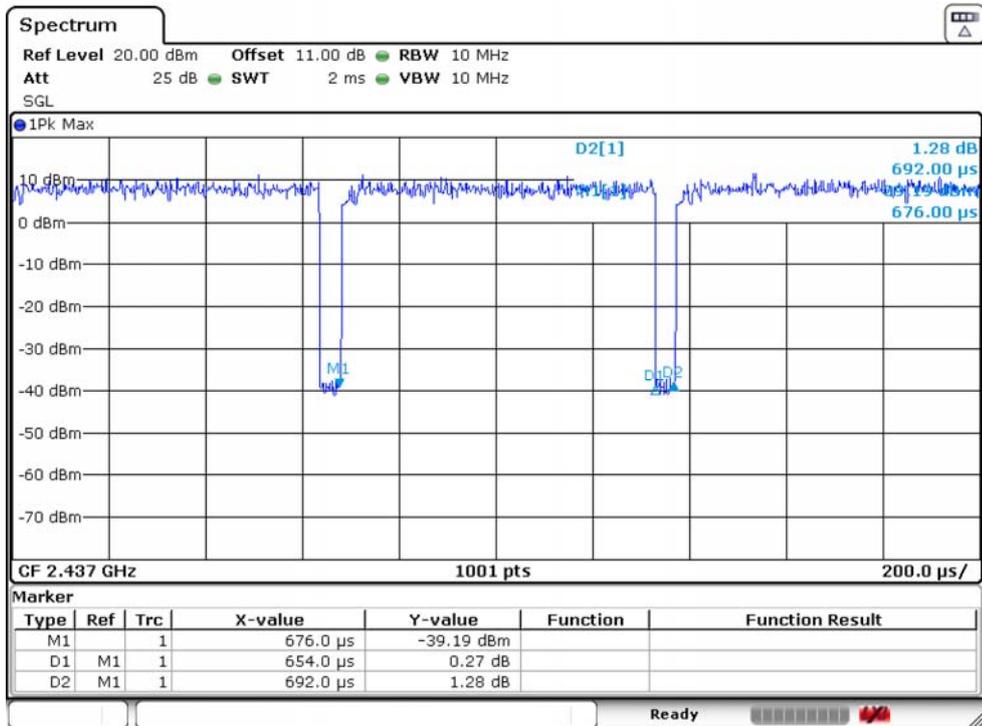
IEEE 802.11g 2437MHz



IEEE 802.11n HT20 2437MHz



IEEE 802.11n HT40 2437MHz



2.9. Channel List

IEEE 802.11b/802.11g/802.11n HT20					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462
2	2417	7	2442		
3	2422	8	2447		
4	2427	9	2452		
5	2432	10	2457		
IEEE 802.11n HT40					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	6	2437	9	2452
4	2427	7	2442		
5	2432	8	2447		

2.10. Test Equipment List

For conducted emission test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	EST-E001	LISAI	June 13,21	1 Year
Artificial Mains Network	Rohde & Schwarz	ENV216	EST-E002	LISAI	June 13,21	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	EST-E078	LISAI	June 13,21	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

For radiated emission test(9kHz-30MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 13,21	1 Year
Active Loop Antenna	SCHWARZECK	FMZB 1519B	EST-E054	LISAI	June 13,21	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
9kHz-30MHz Cable	N/A	EST-001	N/A	N/A	N/A	N/A

For radiated emissions test (30MHz-1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 13,21	1 Year
Bilog Antenna	Teseq	CBL 6111D	EST-E034	LISAI	June 13,21	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
30-1000MHz Cable	N/A	EST-002	N/A	N/A	N/A	N/A

For radiated emission test(Above 1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Horn Antenna	SCHWARZECK	BBHA9120D	EST-E031	LISAI	June 13,21	1 Year
Signal Amplifier	SCHWARZECK	BBV9718	EST-E032	LISAI	June 13,21	1 Year
Spectrum Analyzer	Rohde & Schwarz	FSV40	EST-E069	LISAI	July 19,21	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
Above 1GHz Cable	N/A	EST-003	N/A	N/A	N/A	N/A

For connect EUT antenna terminal test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Spectrum Analyzer	Rohde&Schwarz	FSV40	EST-E069	LISAI	July 19,21	1 Year

3. 6dB BANDWIDTH & 99% OCCUPIED BANDWIDTH

3.1. Limit

Systems using digital modulation techniques operate in the 2400-2483.5 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

3.2. Test Setup



3.3. Spectrum Analyzer Setting

6dB Bandwidth

Spectrum Parameters	Setting
RBW	100KHz
VBW	300KHz
Span	40MHz(20MHz Bandwidth mode)/80MHz(40MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

99% Occupied Bandwidth

Spectrum Parameters	Setting
RBW	300KHz(20MHz Bandwidth mode)/1MHz(40MHz Bandwidth mode)
VBW	1MHz(20MHz Bandwidth mode)/3MHz(40MHz Bandwidth mode)
Span	40MHz(20MHz Bandwidth mode)/80MHz(40MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

3.4. Test Procedure

For 6dB Bandwidth Measurement :

- a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- b. Spectrum analyzer setting parameters in accordance with section 3.3.
- c. Set the EUT transmit continuously with maximum output power.
- d. Allow trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
- e. Repeat above procedures until all modes and channels were measured.
- f. Record the results in the test report.

For 99% Occupied Bandwidth Measurement :

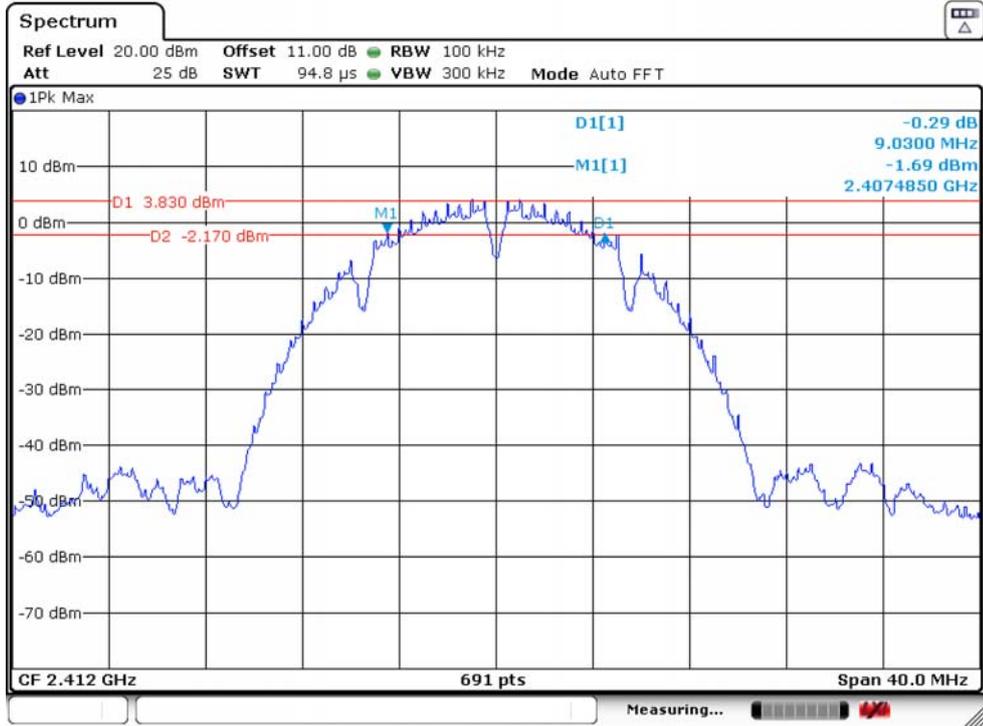
- a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- b. Spectrum analyzer setting parameters in accordance with section 3.3.
- c. Set the EUT transmit continuously with maximum output power.
- d. Allow trace to stabilize, use the 99% power bandwidth function to measure bandwidth.
- e. Repeat above procedures until all modes and channels were measured.
- f. Record the results in the test report.

3.5. Test Result

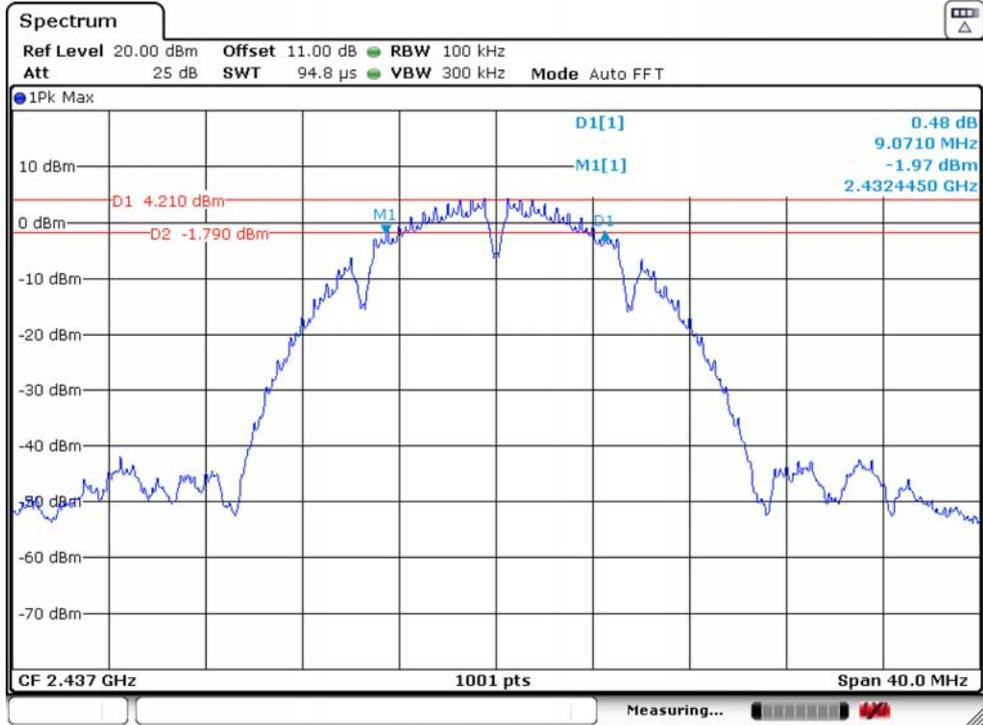
Temperature	25.4℃	Relative Humidity	56%	Test Voltage	DC 3.3V
Mode	Freq (MHz)	6dB Bandwidth(MHz)	99% Occupied Bandwidth (MHz)	6dB BW Limit (MHz)	Result
IEEE 802.11b	2412	9.030	13.3140	≥ 0.5	PASS
	2437	9.071	13.1983	≥ 0.5	PASS
	2462	9.111	13.3140	≥ 0.5	PASS
IEEE 802.11g	2412	15.105	16.6136	≥ 0.5	PASS
	2437	15.105	16.6136	≥ 0.5	PASS
	2462	15.185	16.4978	≥ 0.5	PASS
IEEE 802.11n HT20	2412	15.105	17.6556	≥ 0.5	PASS
	2437	15.105	17.6556	≥ 0.5	PASS
	2462	15.145	17.7135	≥ 0.5	PASS
IEEE 802.11n HT40	2422	35.085	36.0058	≥ 0.5	PASS
	2437	35.085	35.7742	≥ 0.5	PASS
	2452	35.085	36.0058	≥ 0.5	PASS

6dB Bandwidth

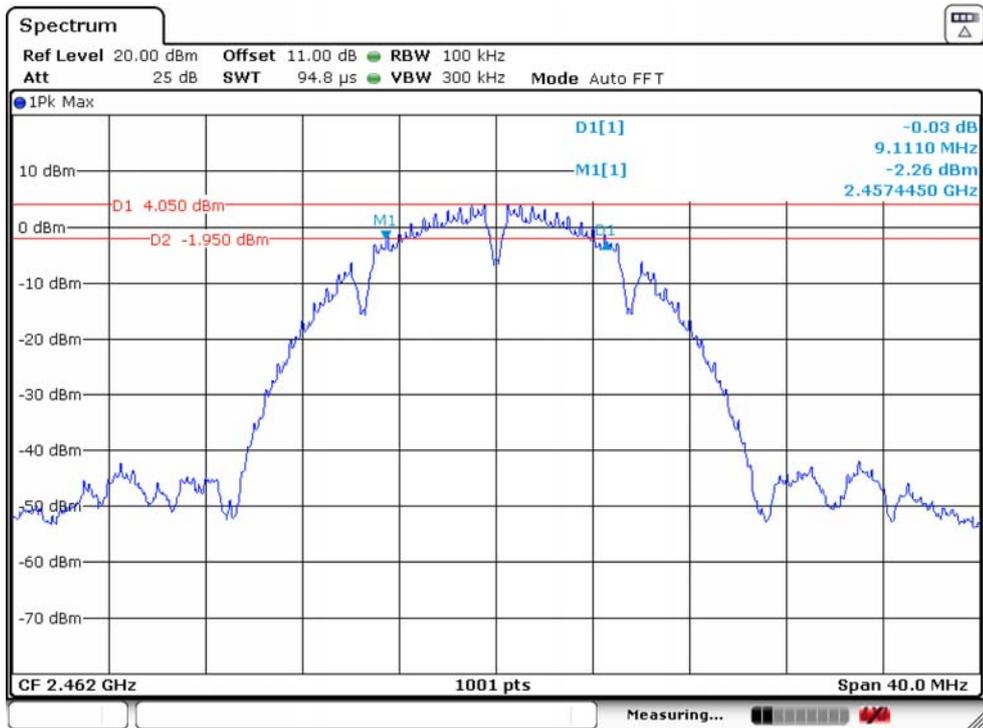
IEEE 802.11b 2412MHz



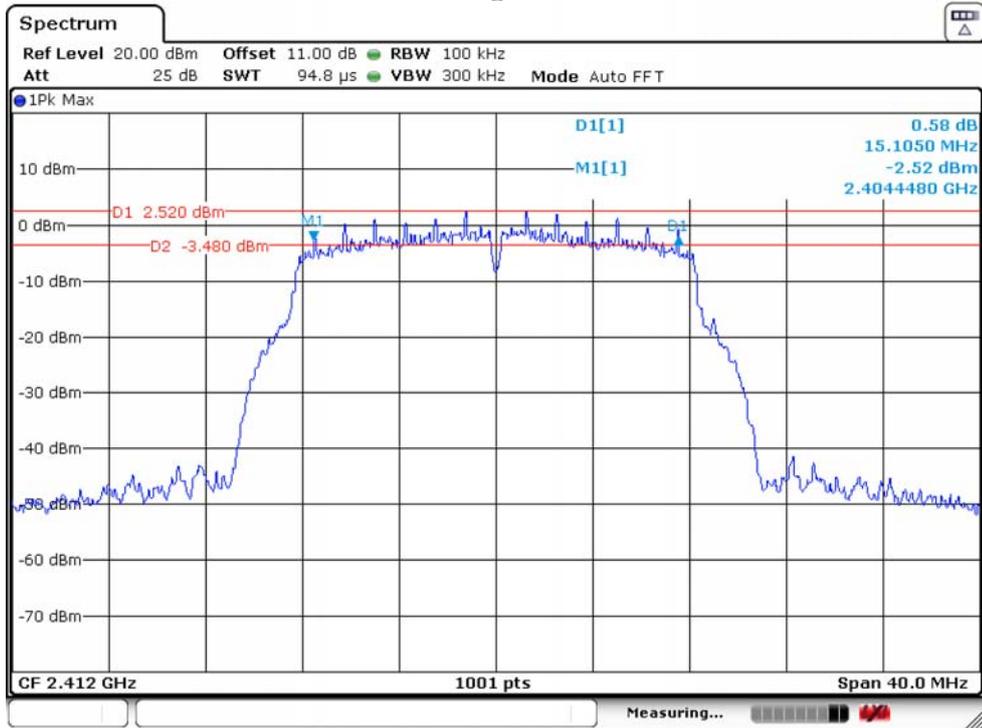
IEEE 802.11b 2437MHz



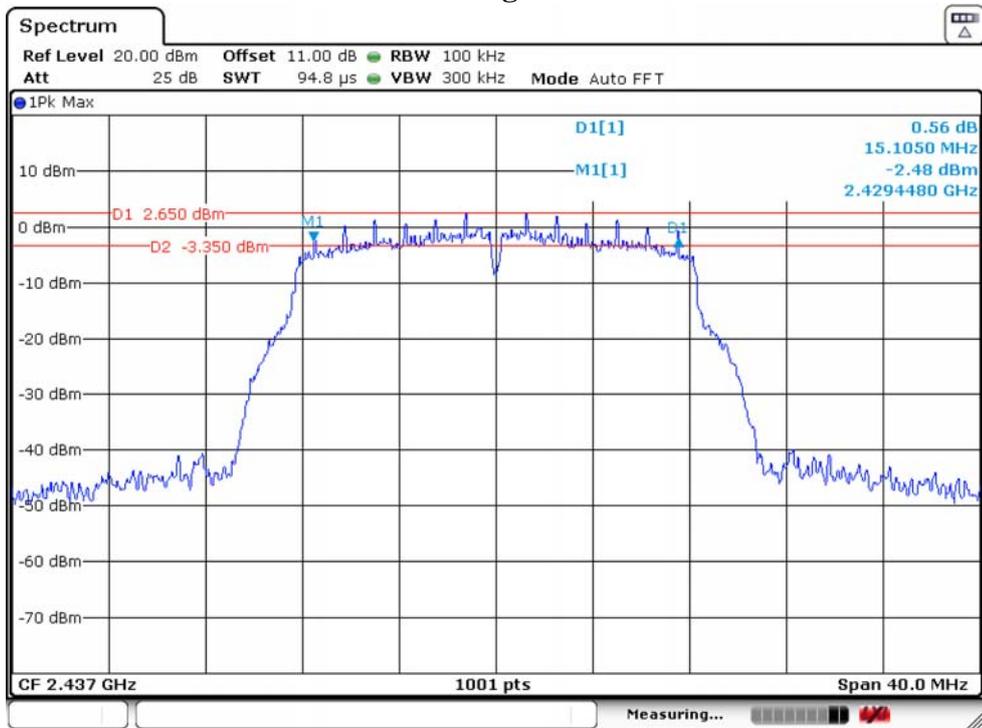
IEEE 802.11b 2462MHz



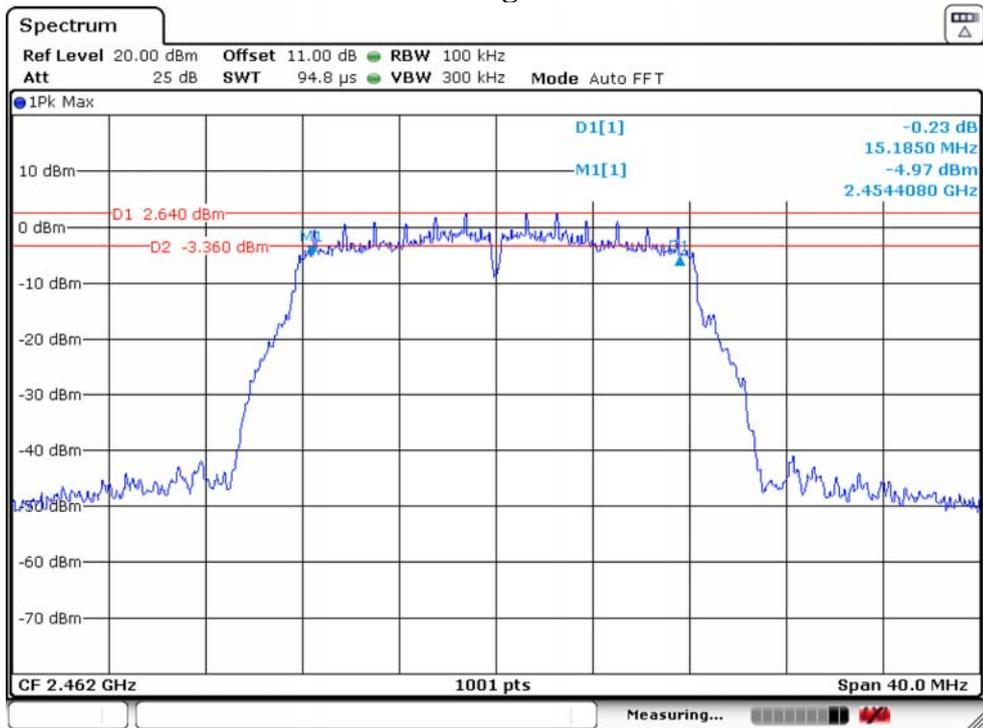
IEEE 802.11g 2412MHz 1



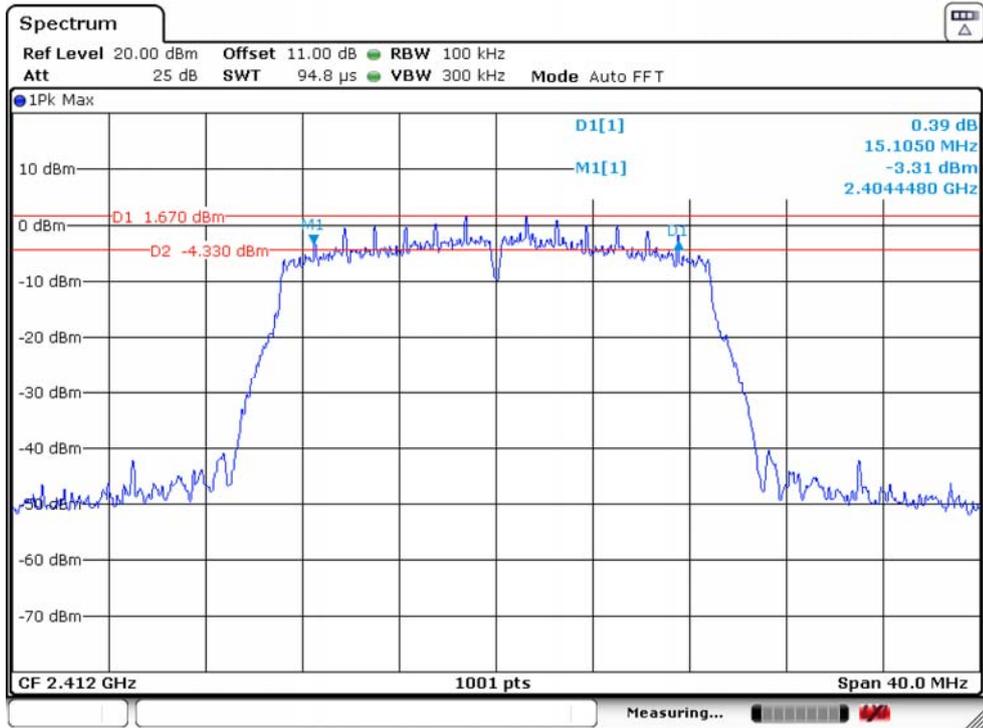
IEEE 802.11g 2437MHz



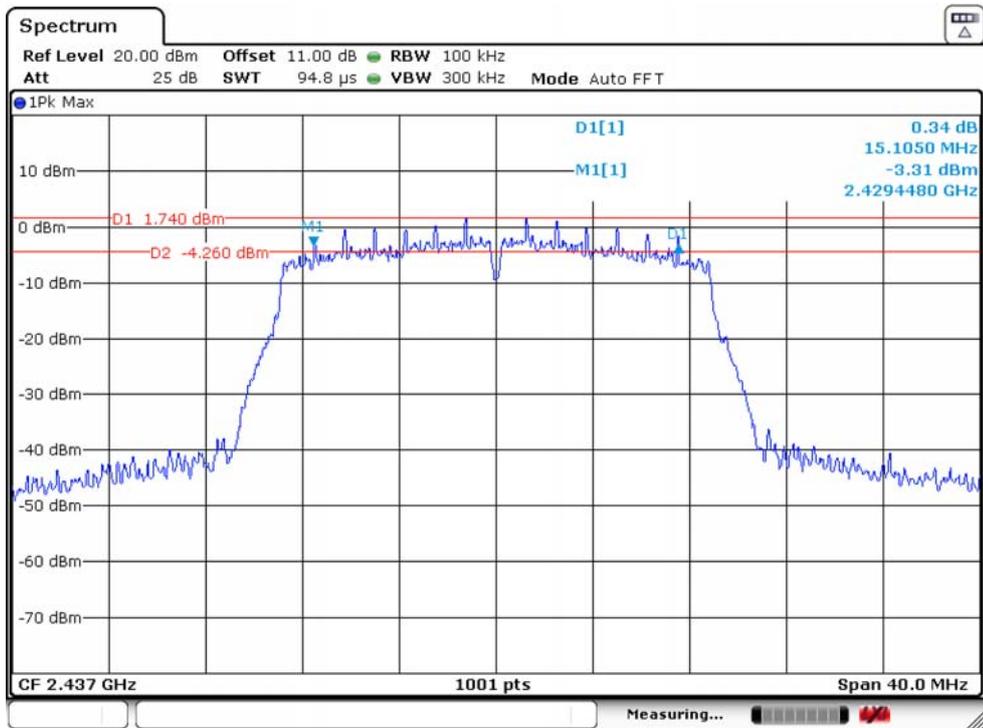
IEEE 802.11g 2462MHz



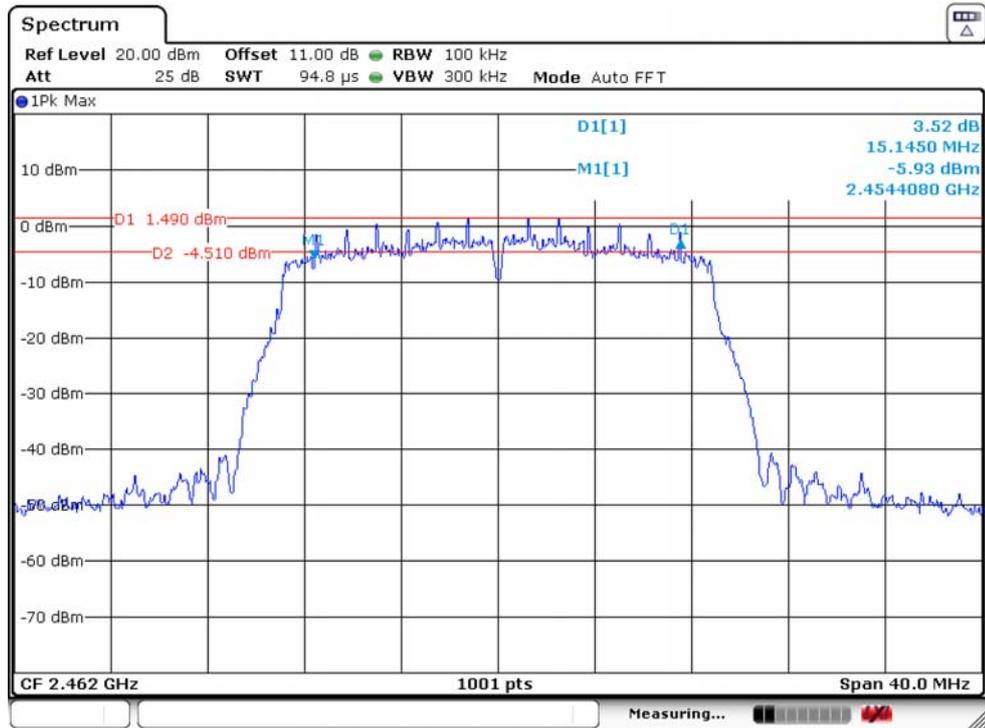
IEEE 802.11n HT20 2412MHz



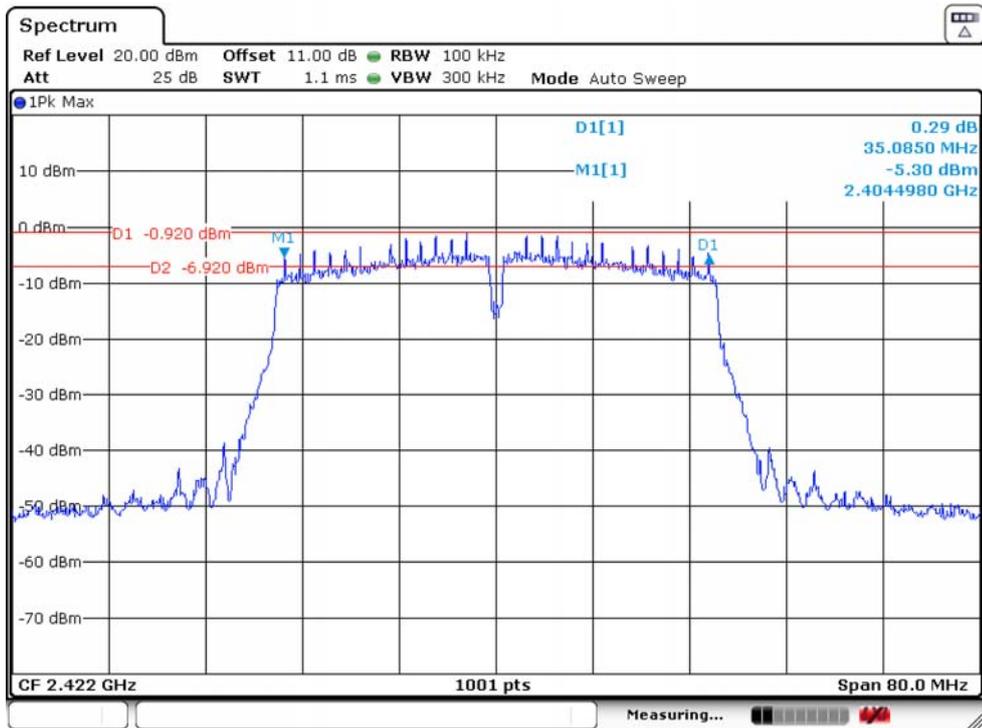
IEEE 802.11n HT20 2437MHz



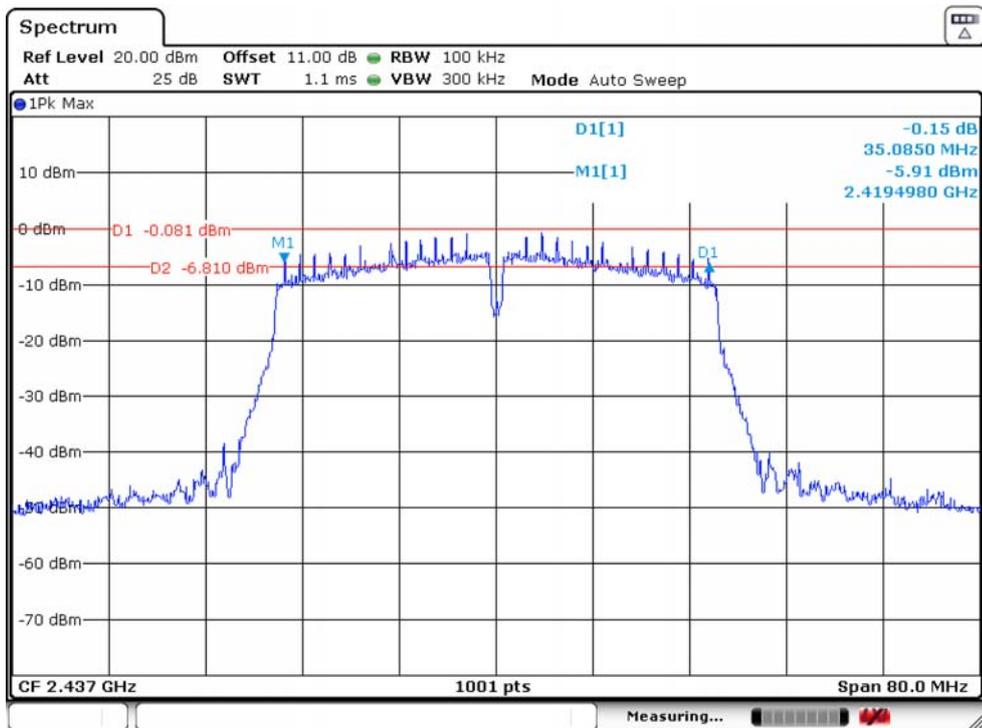
IEEE 802.11n HT20 2462MHz



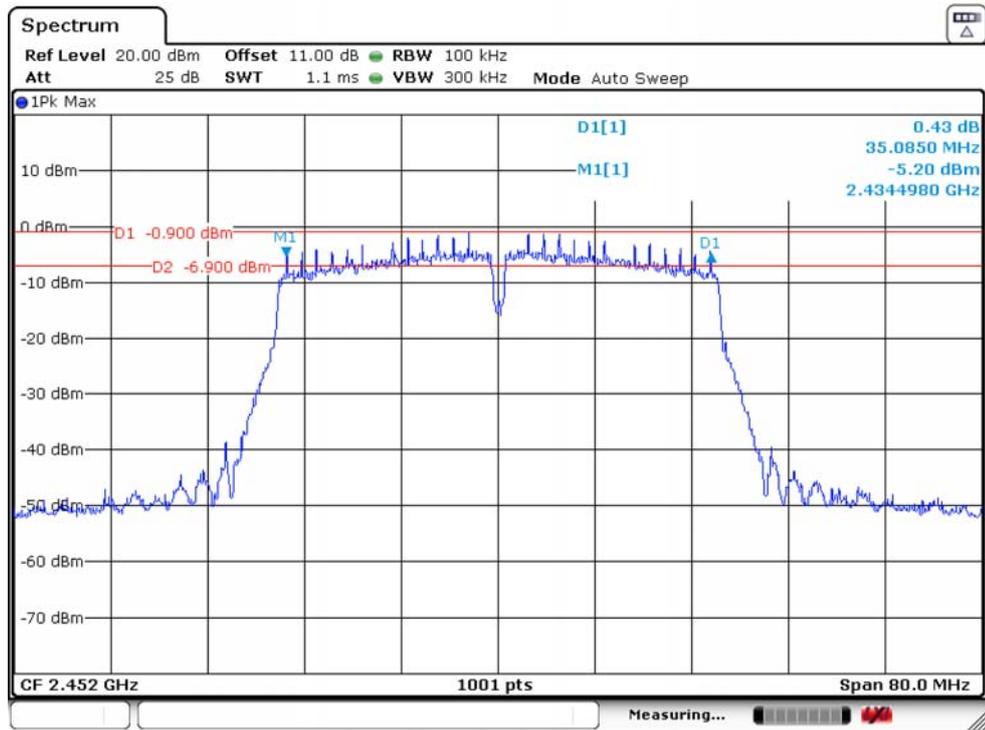
IEEE 802.11n HT40 2422MHz



IEEE 802.11n HT40 2437MHz

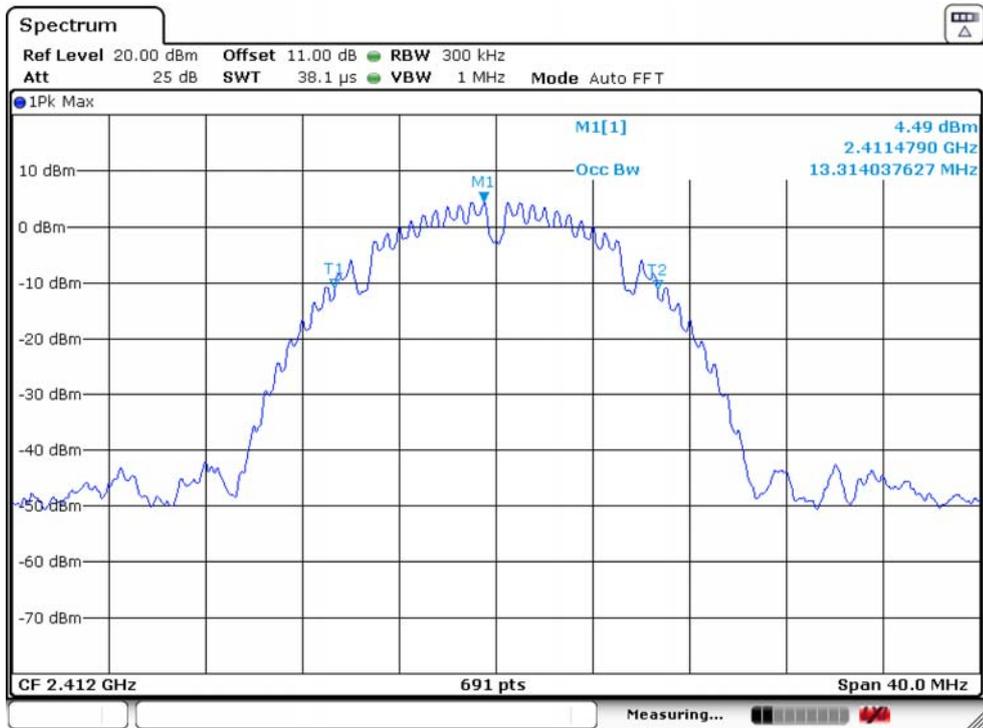


IEEE 802.11n HT40 2452MHz

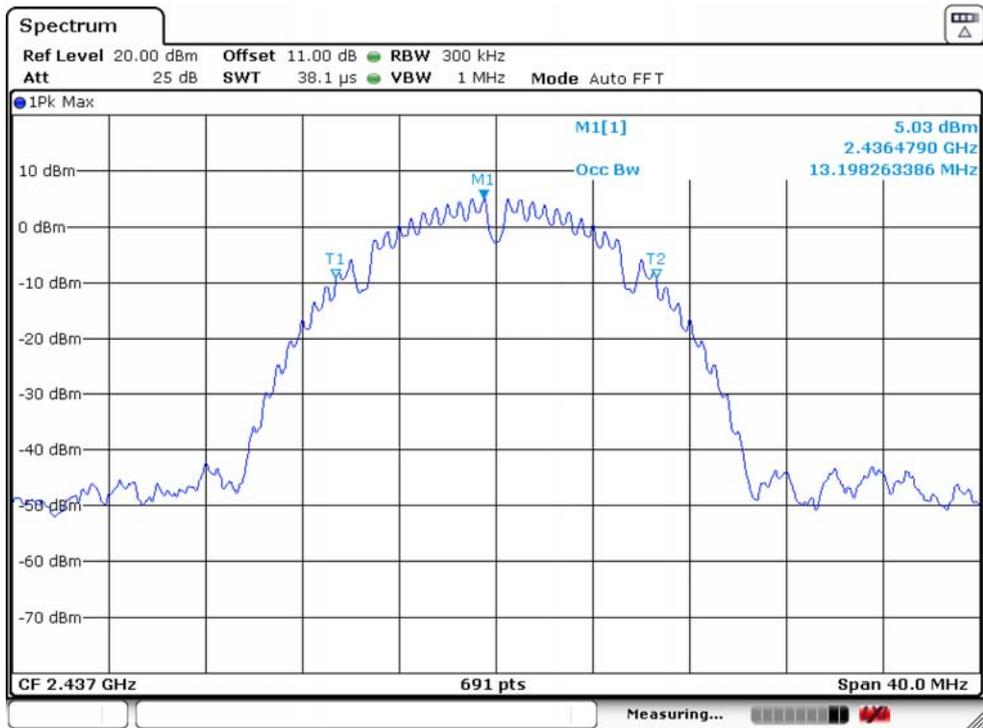


99% Occupied Bandwidth

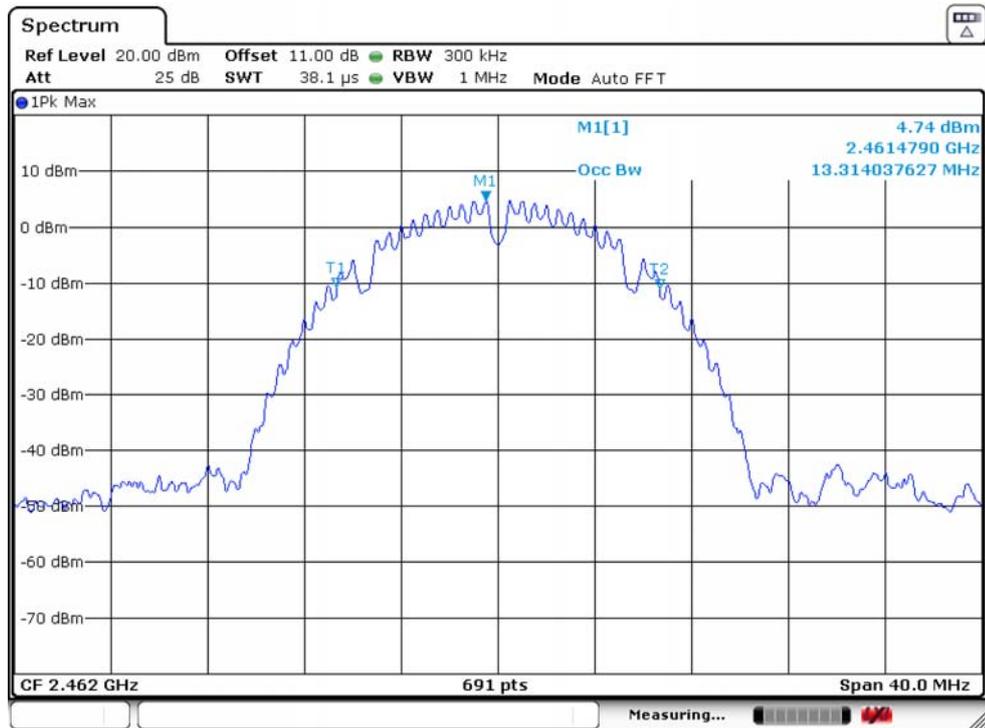
IEEE 802.11b 2412MHz



IEEE 802.11b 2437MHz



IEEE 802.11b 2462MHz



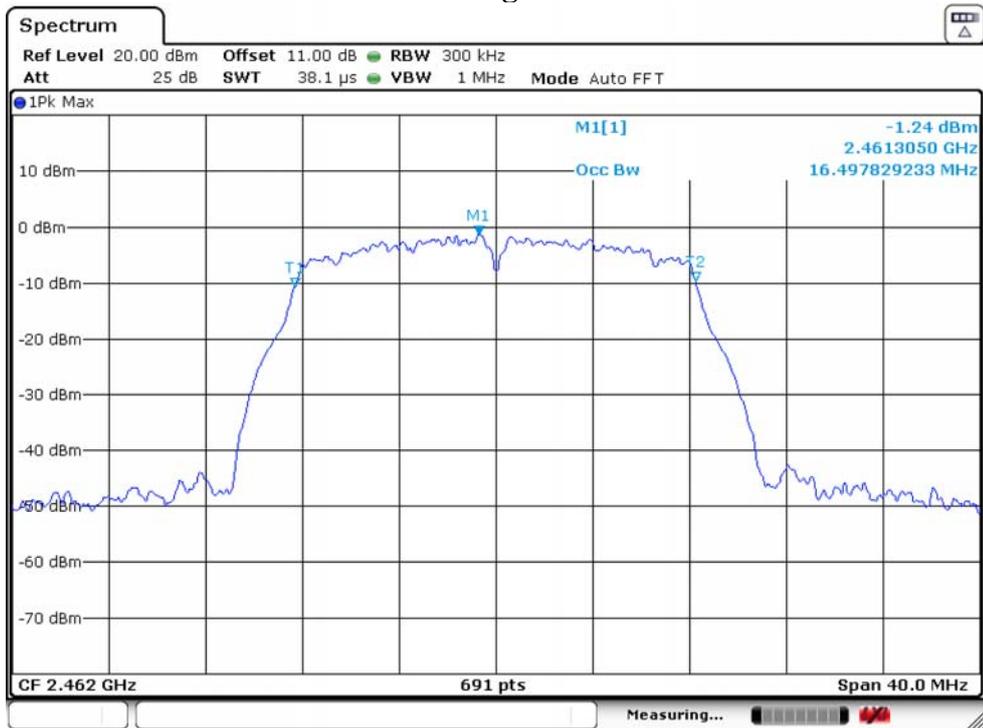
IEEE 802.11g 2412MHz



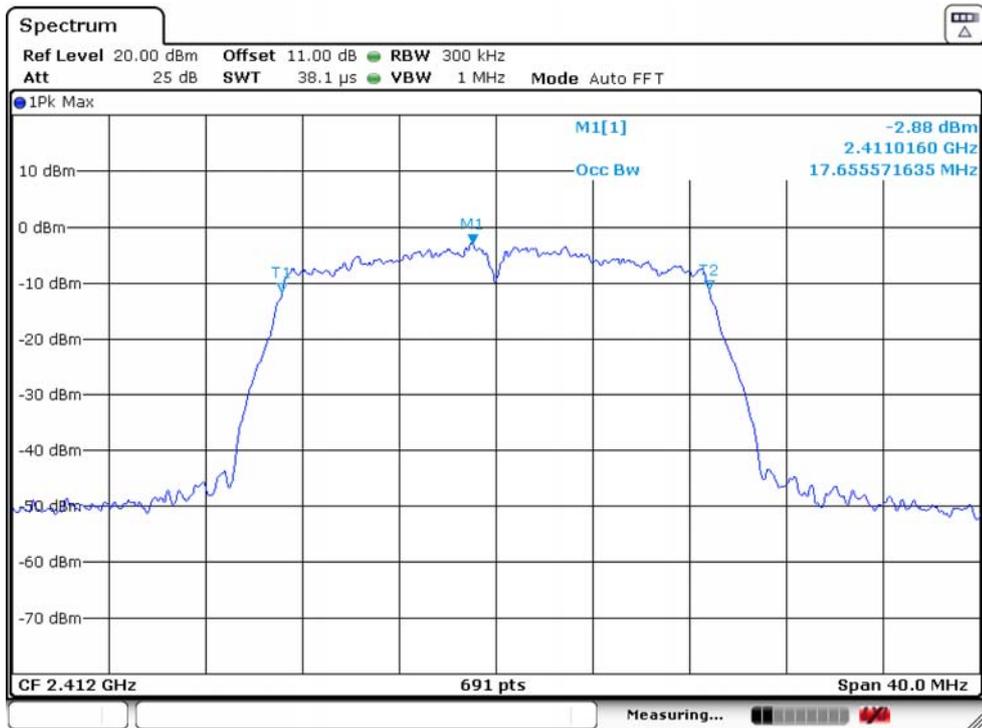
IEEE 802.11g 2437MHz



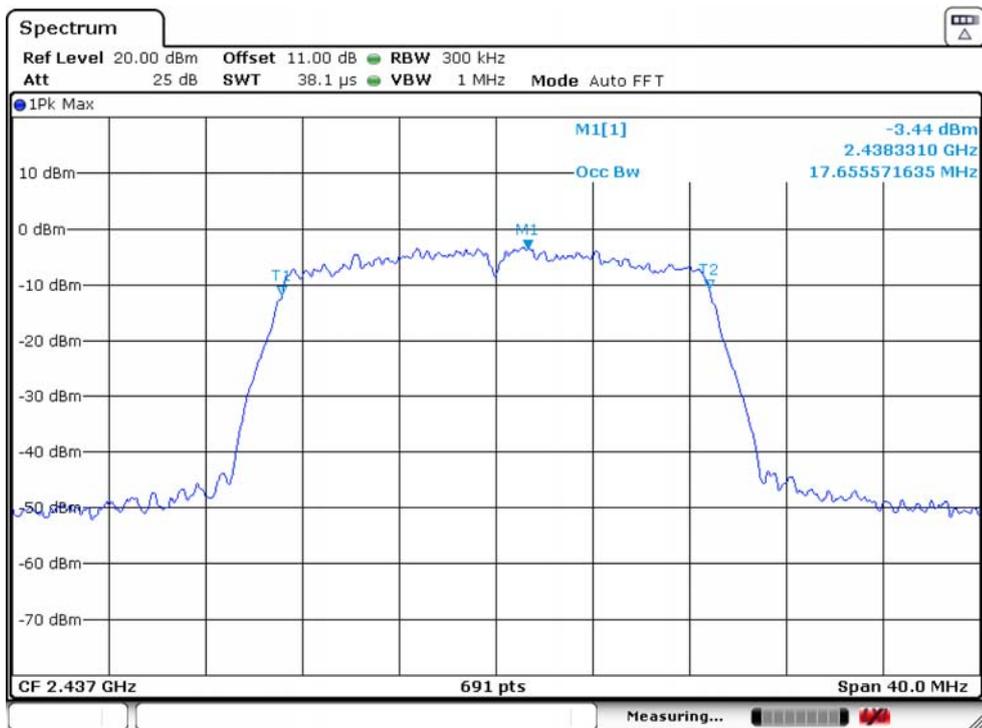
IEEE 802.11g 2462MHz



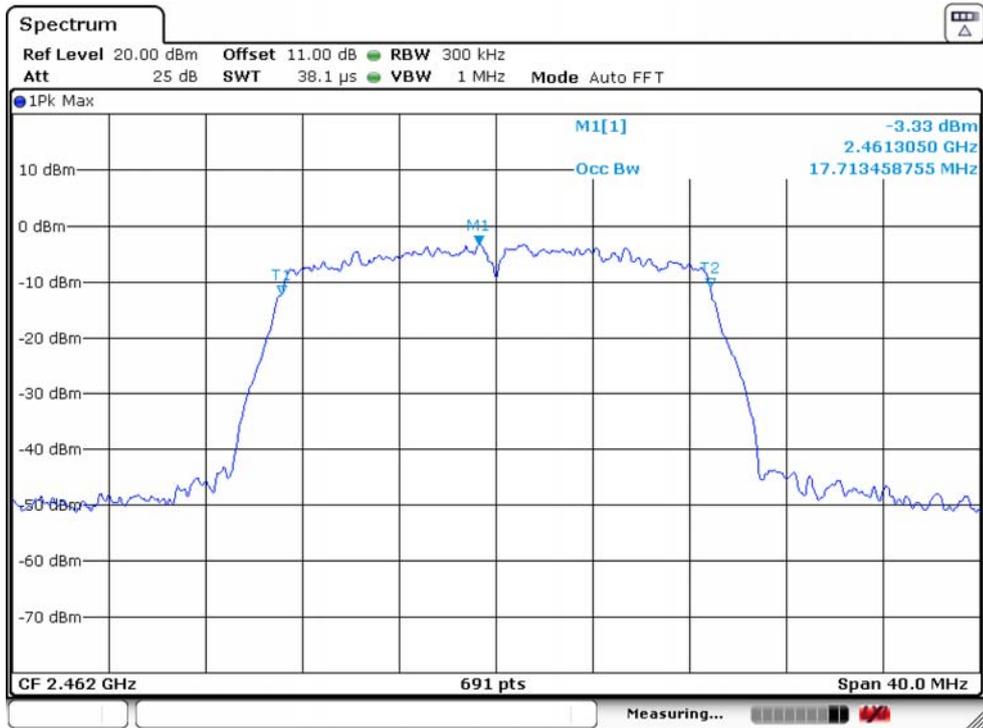
IEEE 802.11n HT20 2412MHz



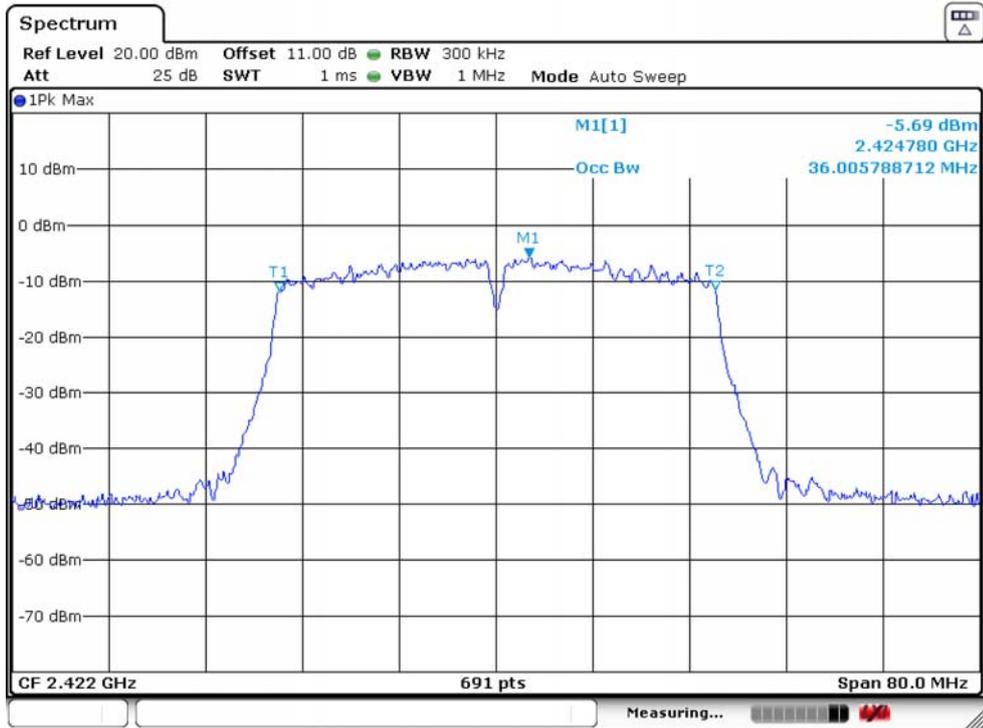
IEEE 802.11n HT20 2437MHz



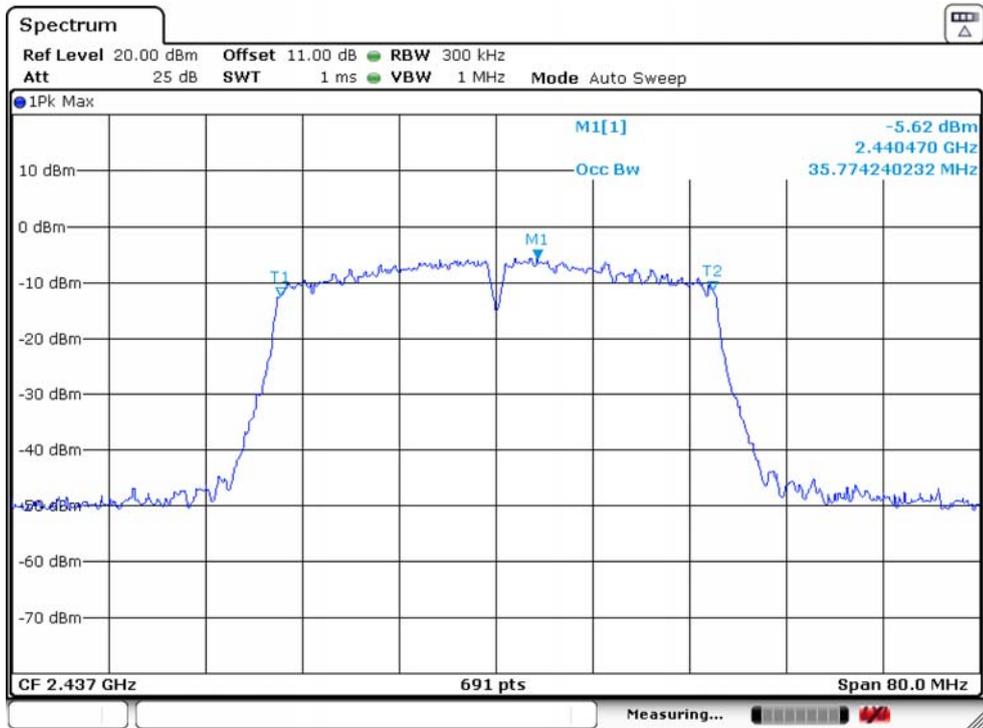
IEEE 802.11n HT20 2462MHz



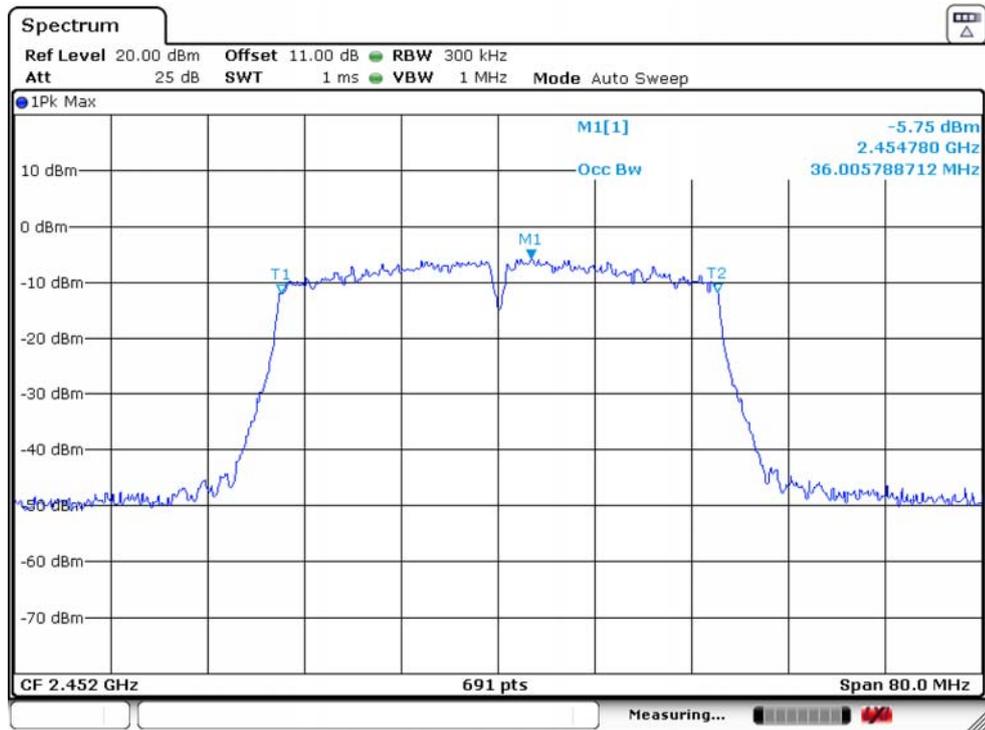
IEEE 802.11n HT40 2422MHz



IEEE 802.11n HT40 2437MHz



IEEE 802.11n HT40 2452MHz



4. MAXIMUM PEAK OUTPUT POWER

4.1. Limit

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W(30dBm).

4.2. Test Setup



4.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	1MHz
VBW	3MHz
Span	40MHz(20MHz Bandwidth mode)/80MHz(40MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

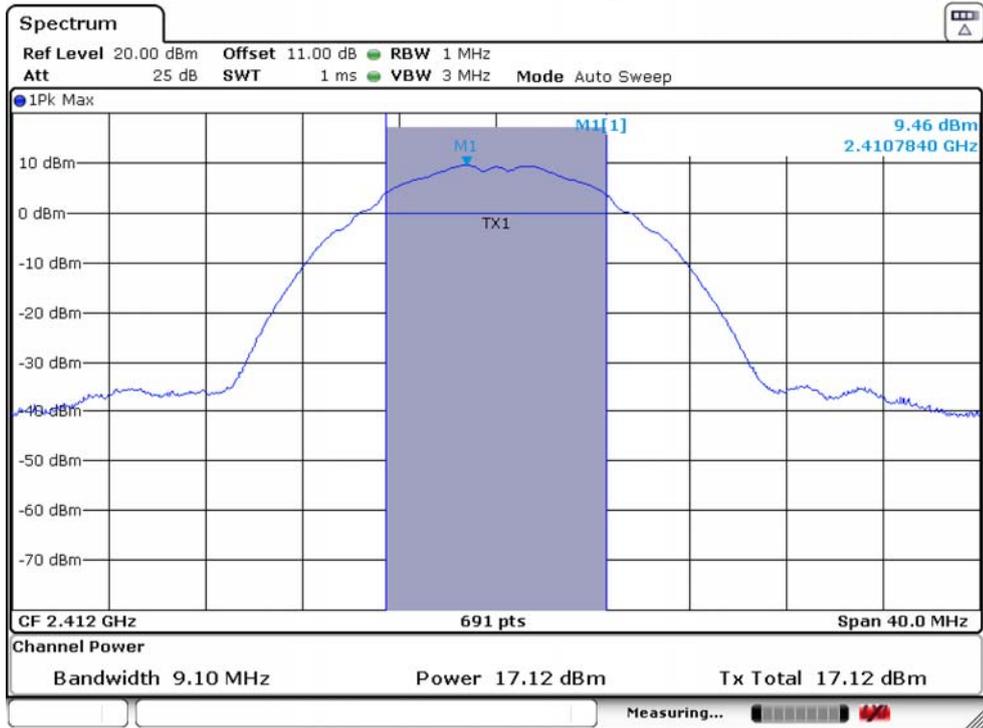
4.4. Test Procedure

- a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- b. Spectrum analyzer setting parameters in accordance with section 4.3.
- c. Set the EUT transmit continuously with maximum output power.
- d. Use the channel power function to measure maximum peak output power, allow trace to stabilize, save test pictures.
- e. Repeat above procedures until all modes and channels were measured.
- f. Record the results in the test report.

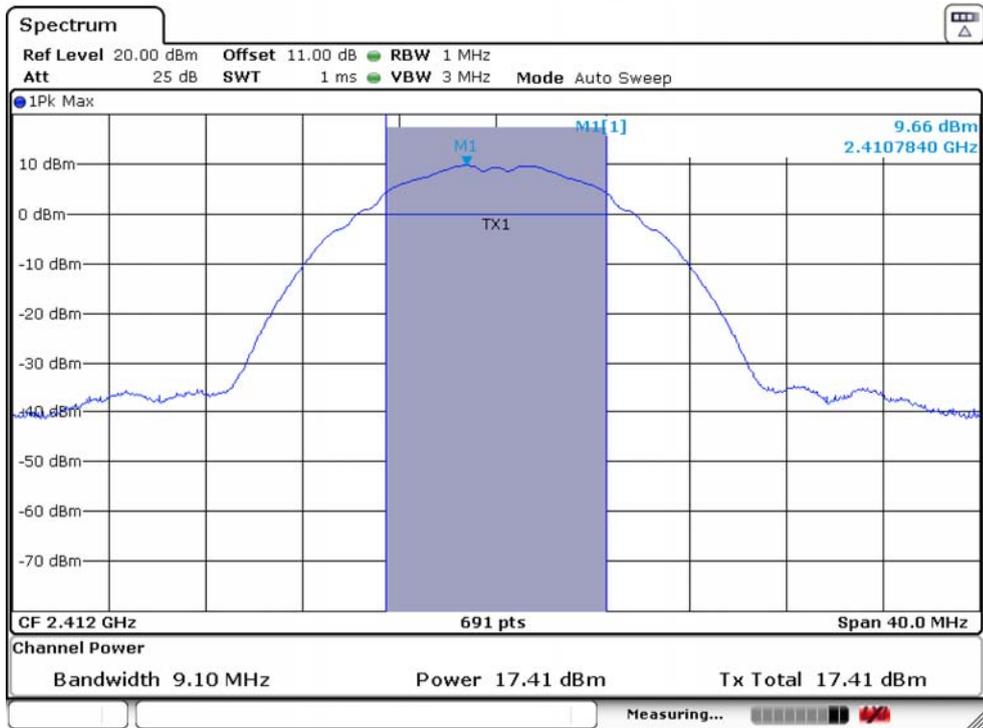
4.5. Test Result

Temperature	25.4°C	Relative Humidity		56%				Test Voltage		DC 3.3V
Mode	Freq (MHz)	Peak Output Power (dBm)		Total Peak Output Power (W)		Total Peak Output Power (dBm)		Limit		Result
		Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	W	dBm	
IEEE 802.11b	2412	17.12	17.41	0.0515	0.0551	17.12	17.41	1.0000	30.00	PASS
	2437	17.38	17.82	0.0547	0.0605	17.38	17.82	1.0000	30.00	PASS
	2462	17.17	17.75	0.0521	0.0596	17.17	17.75	1.0000	30.00	PASS
IEEE 802.11g	2412	22.83	22.51	0.1919	0.1782	22.83	22.51	1.0000	30.00	PASS
	2437	22.83	22.36	0.1919	0.1722	22.83	22.36	1.0000	30.00	PASS
	2462	22.83	22.61	0.1919	0.1824	22.83	22.61	1.0000	30.00	PASS
IEEE 802.11n HT20	2412	22.65	22.58	0.3652		25.63		1.0000	30.00	PASS
	2437	22.47	22.39	0.3500		25.44		1.0000	30.00	PASS
	2462	22.50	22.77	0.3671		25.65		1.0000	30.00	PASS
IEEE 802.11n HT40	2422	22.63	22.33	0.3542		25.49		1.0000	30.00	PASS
	2437	22.46	22.46	0.3524		25.47		1.0000	30.00	PASS
	2452	22.48	22.40	0.3508		25.45		1.0000	30.00	PASS

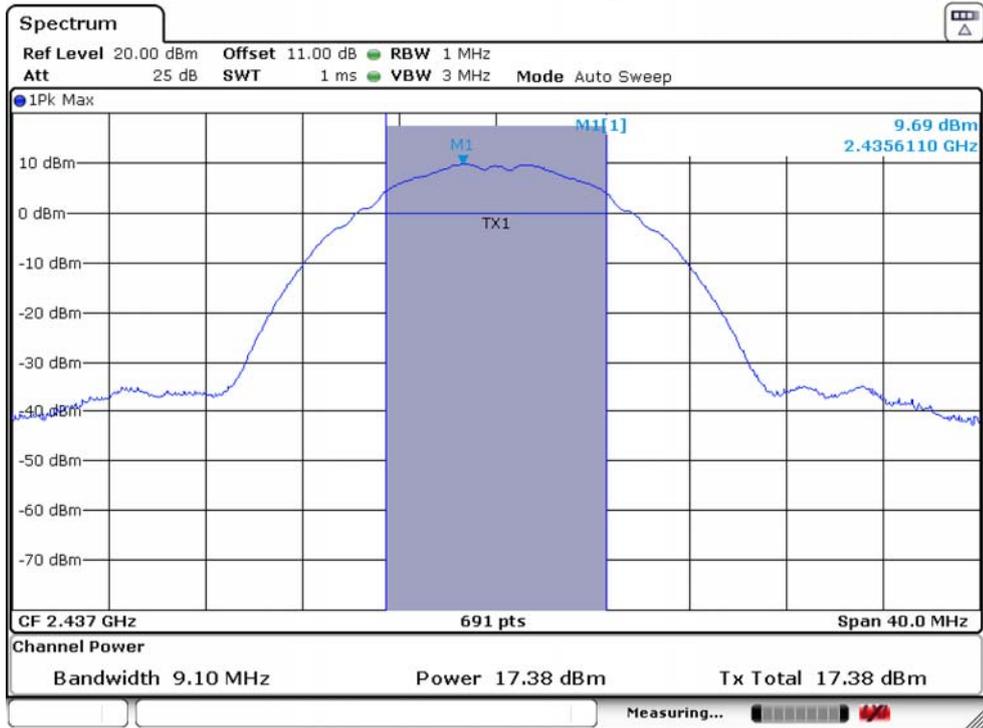
IEEE 802.11b 2412MHz_ANT 1



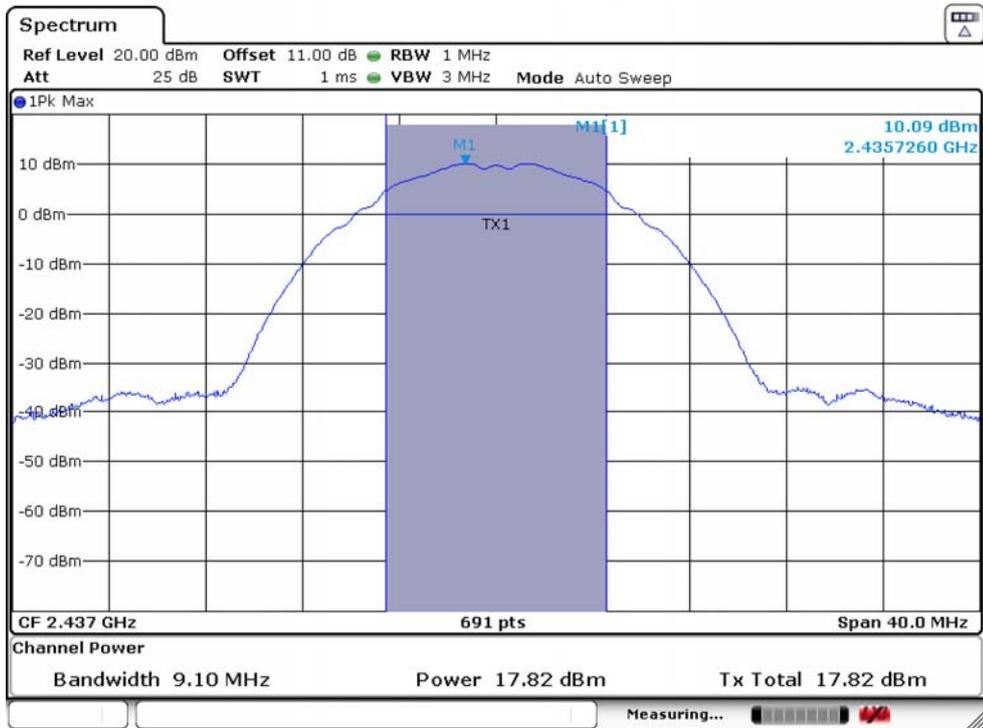
IEEE 802.11b 2412MHz_ANT 2



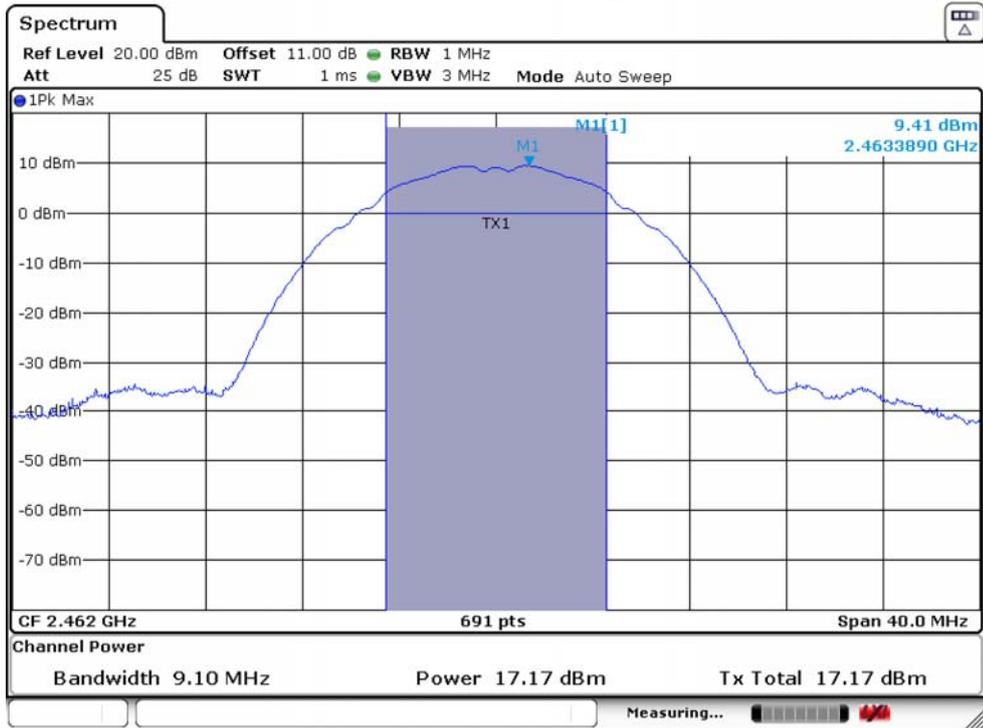
IEEE 802.11b 2437MHz_ANT 1



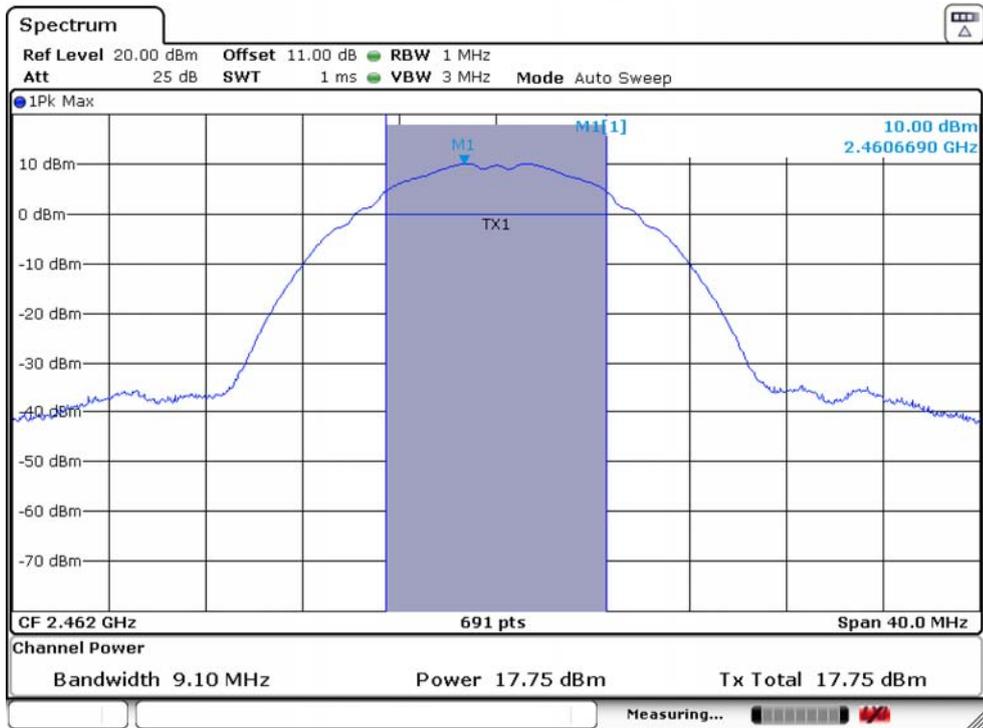
IEEE 802.11b 2437MHz_ANT 2



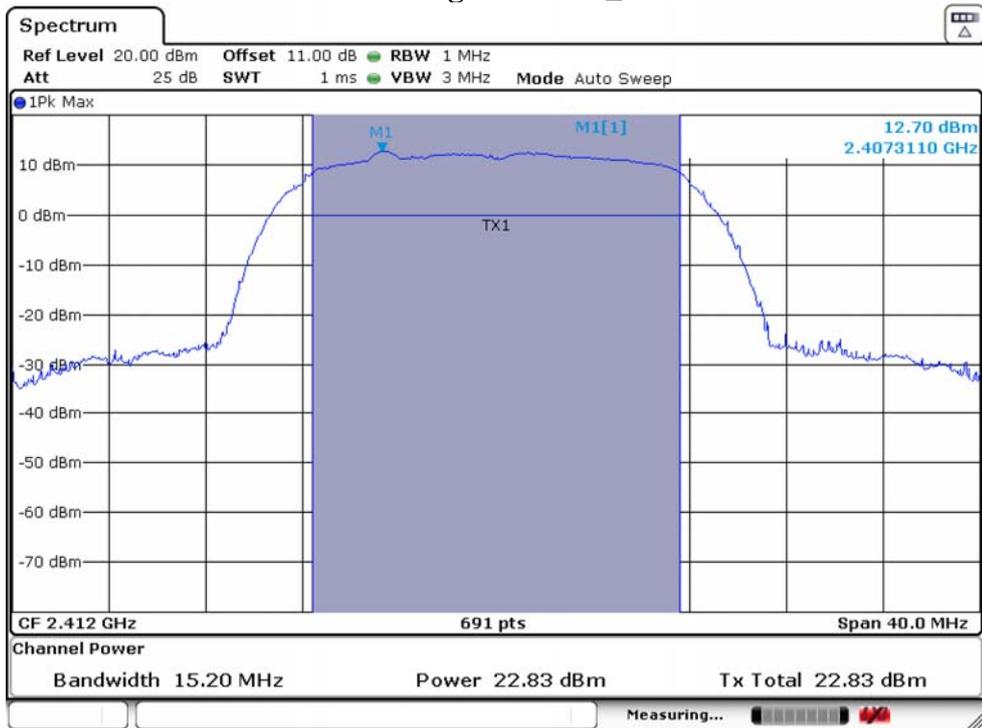
IEEE 802.11b 2462MHz_ANT 1



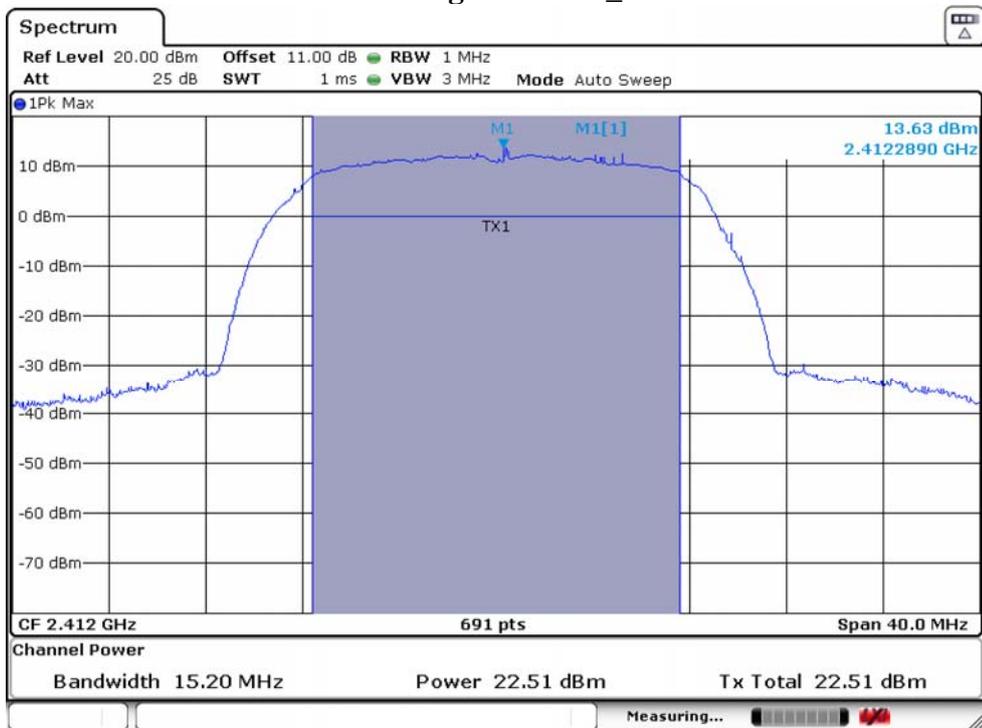
IEEE 802.11b 2462MHz_ANT 2



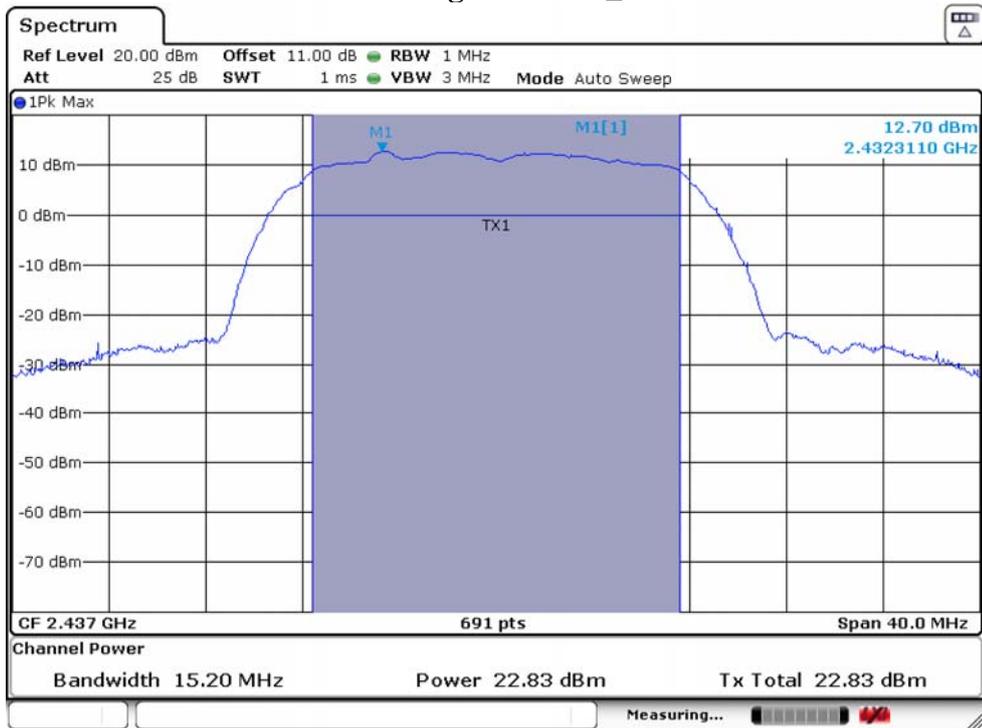
IEEE 802.11g 2412MHz_ANT 1



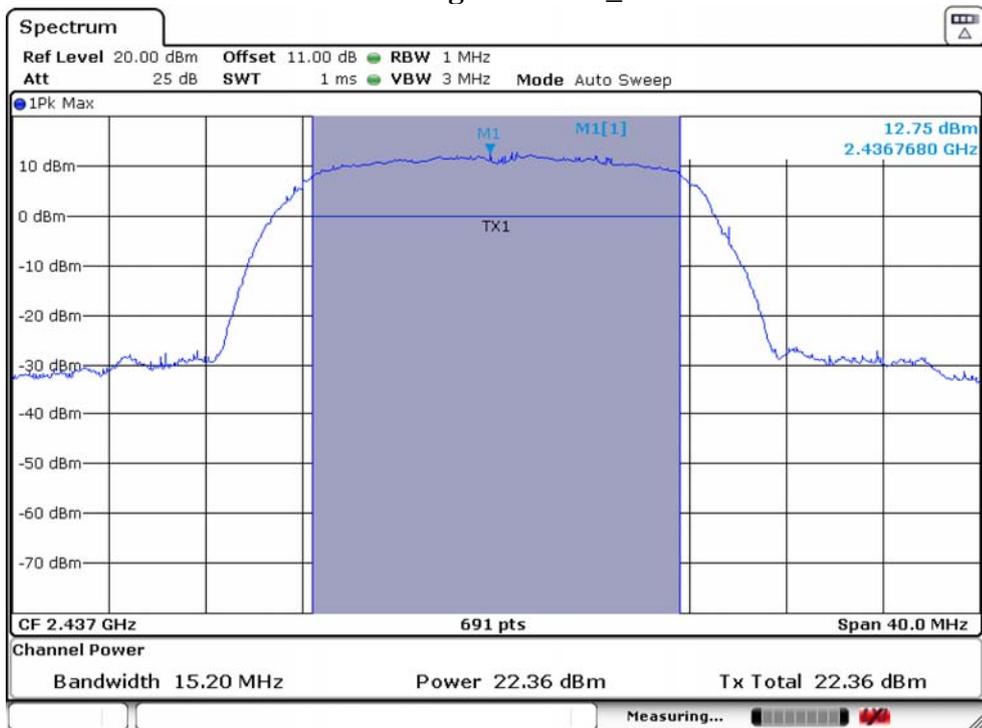
IEEE 802.11g 2412MHz_ANT 2



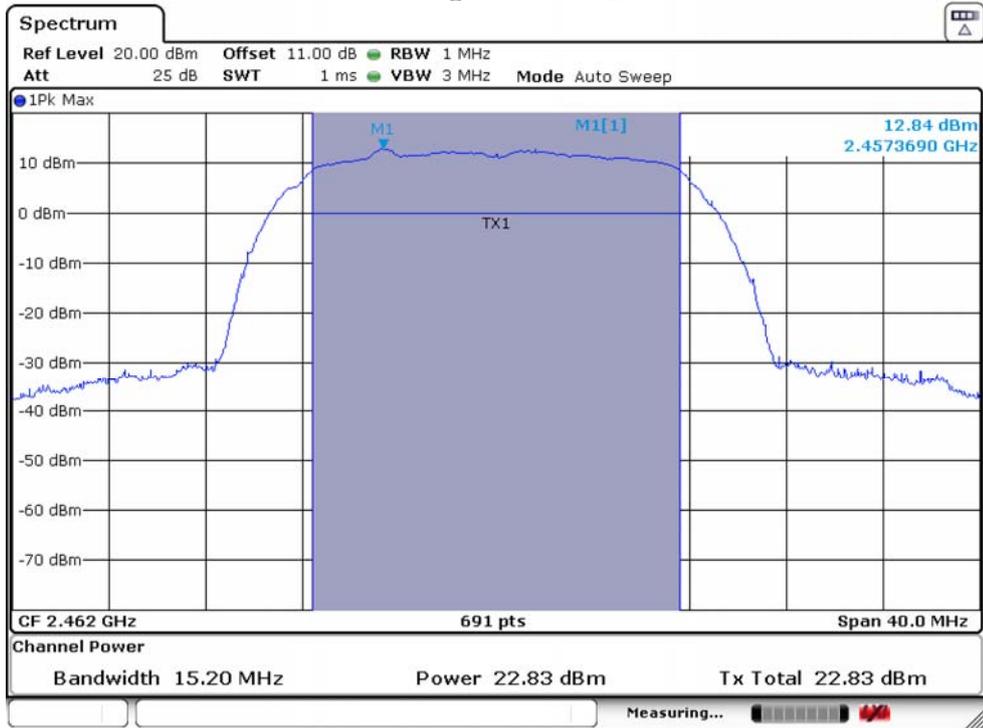
IEEE 802.11g 2437MHz_ANT 1



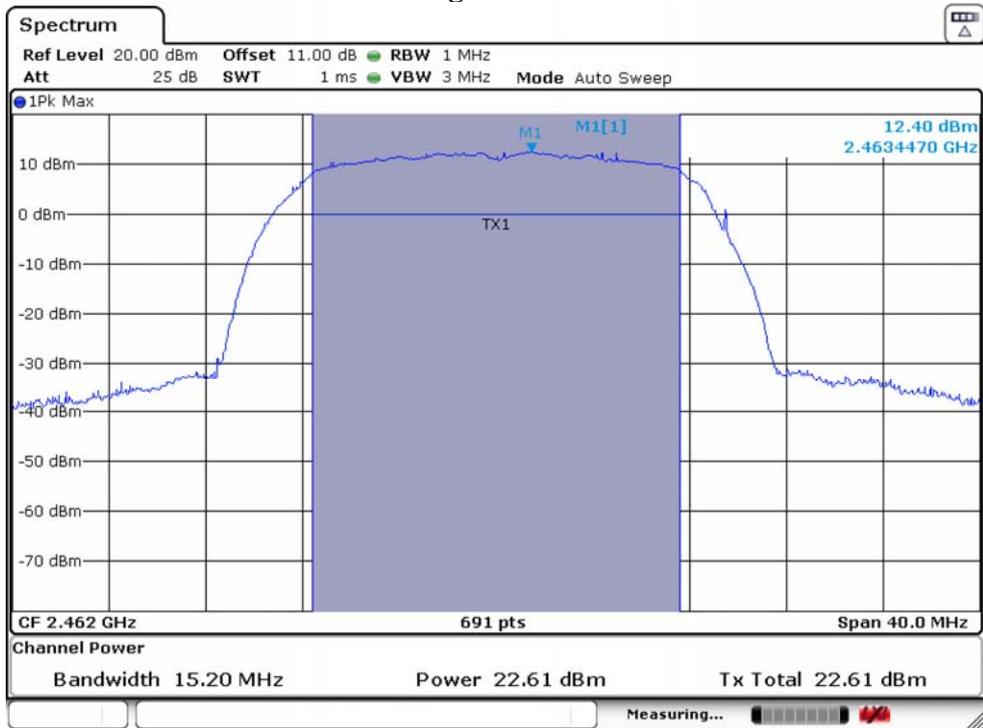
IEEE 802.11g 2437MHz_ANT 2



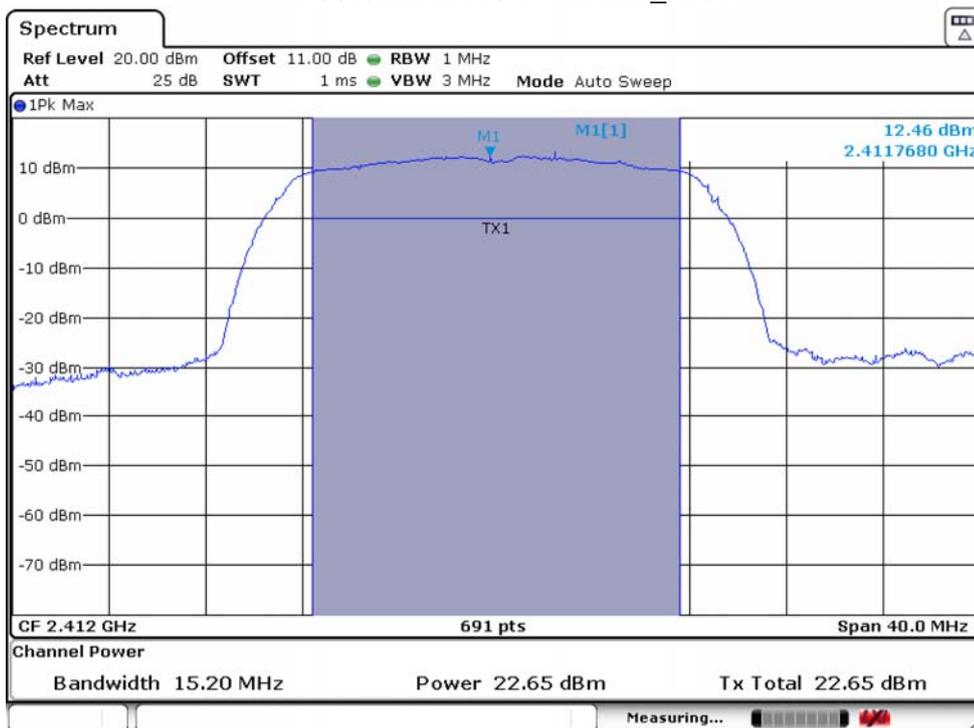
IEEE 802.11g 2462MHz_ANT 1



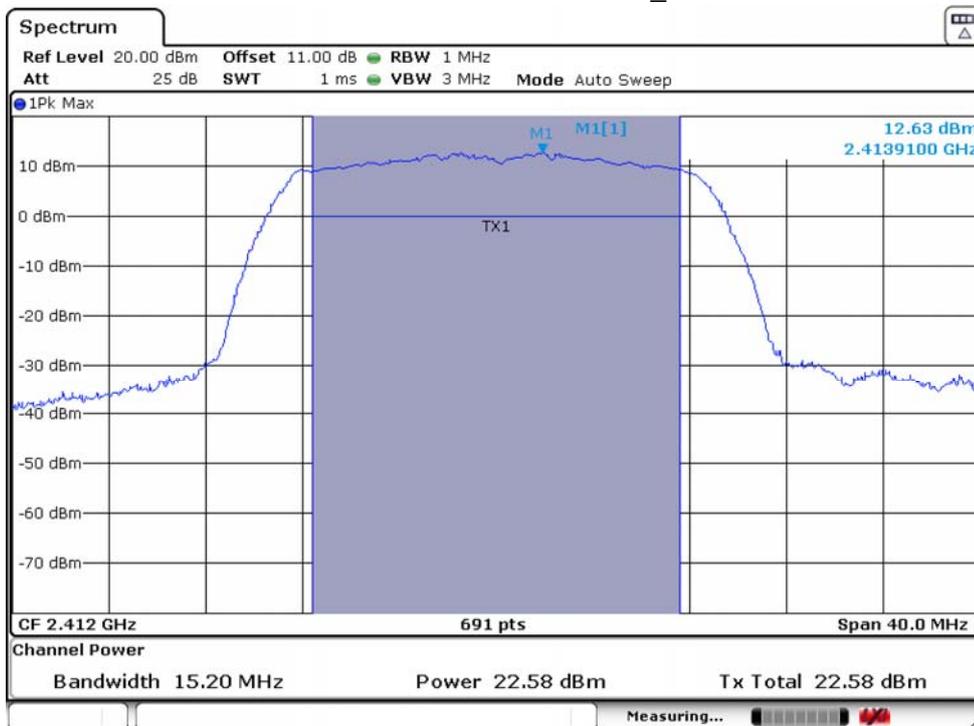
IEEE 802.11g 2462MHz_ANT 2



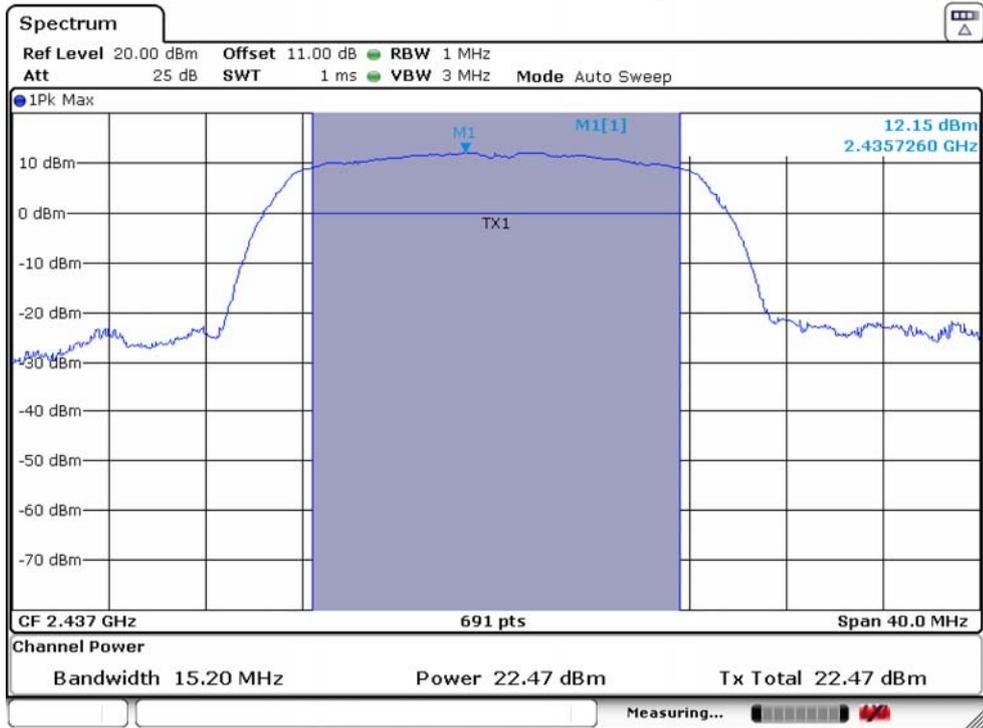
IEEE 802.11n HT20 2412MHz_ANT 1



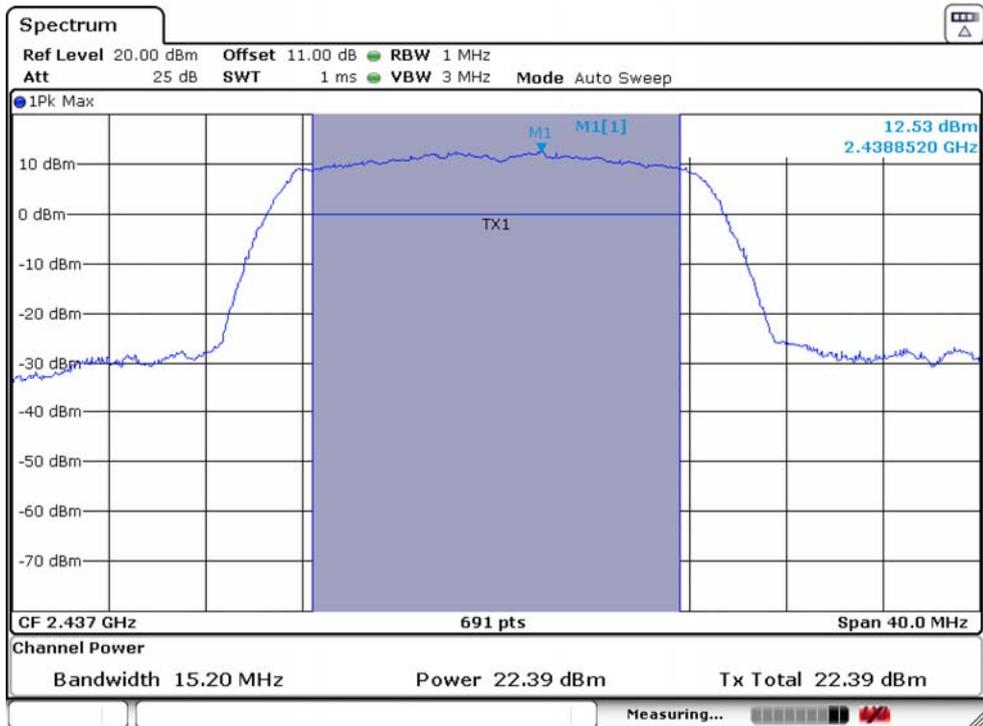
IEEE 802.11n HT20 2412MHz_ANT 2



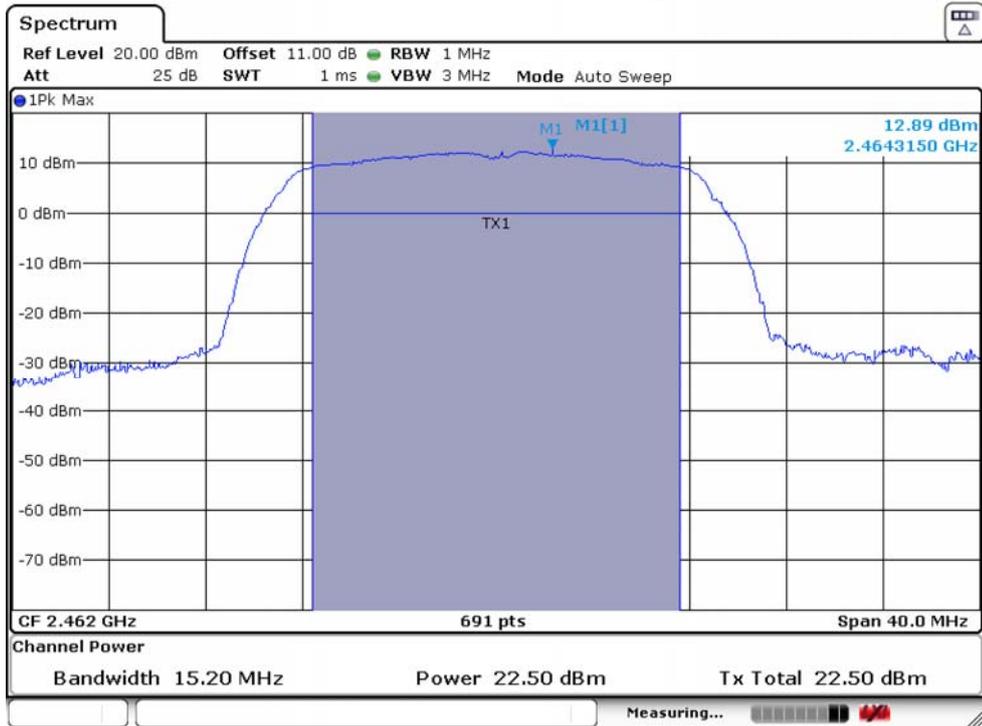
IEEE 802.11n HT20 2437MHz_ANT 1



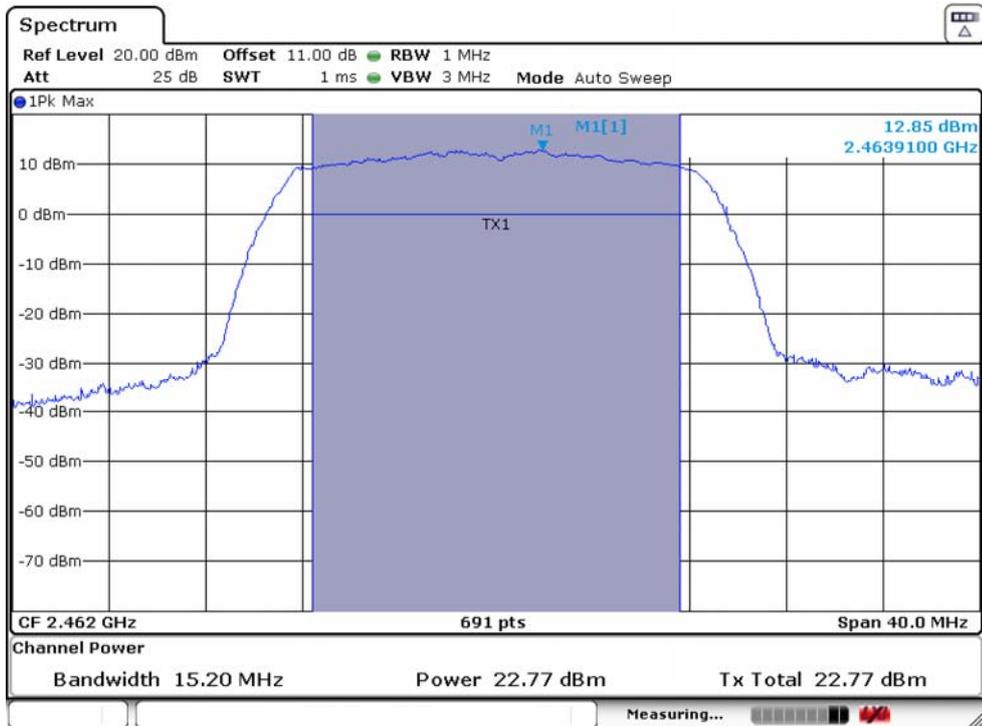
IEEE 802.11n HT20 2437MHz_ANT 2



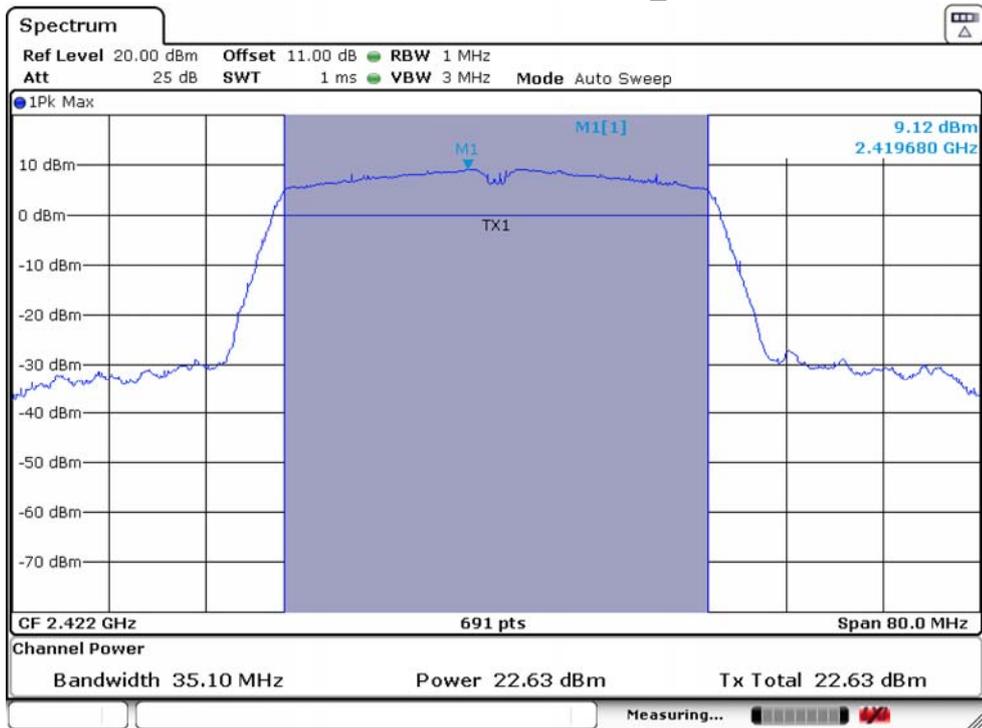
IEEE 802.11n HT20 2462MHz_ANT 1



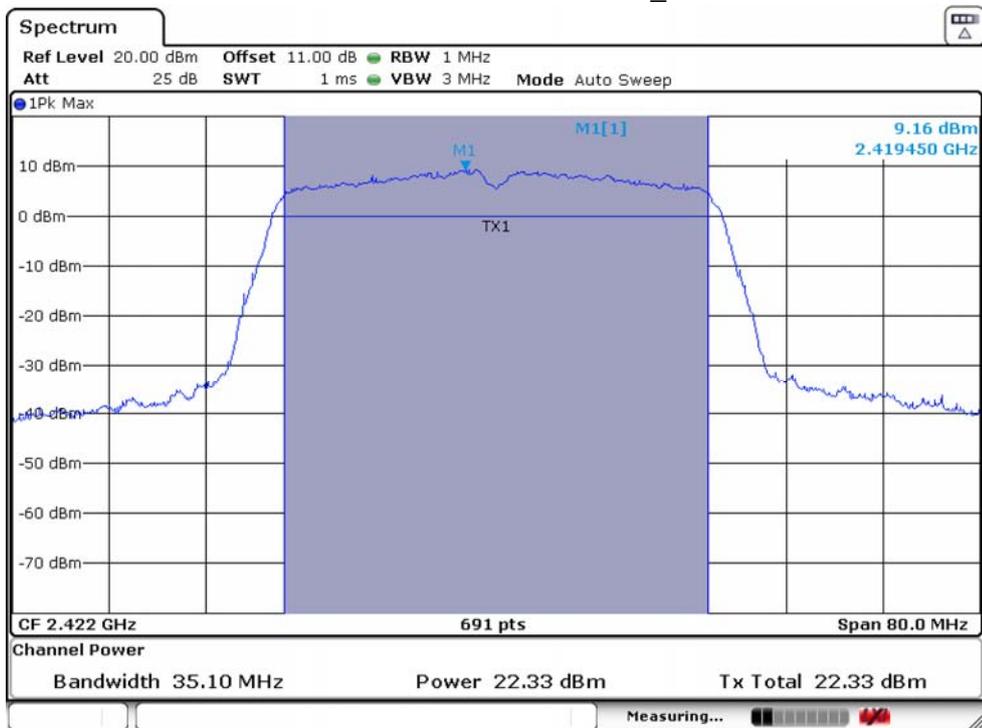
IEEE 802.11n HT20 2462MHz_ANT 2



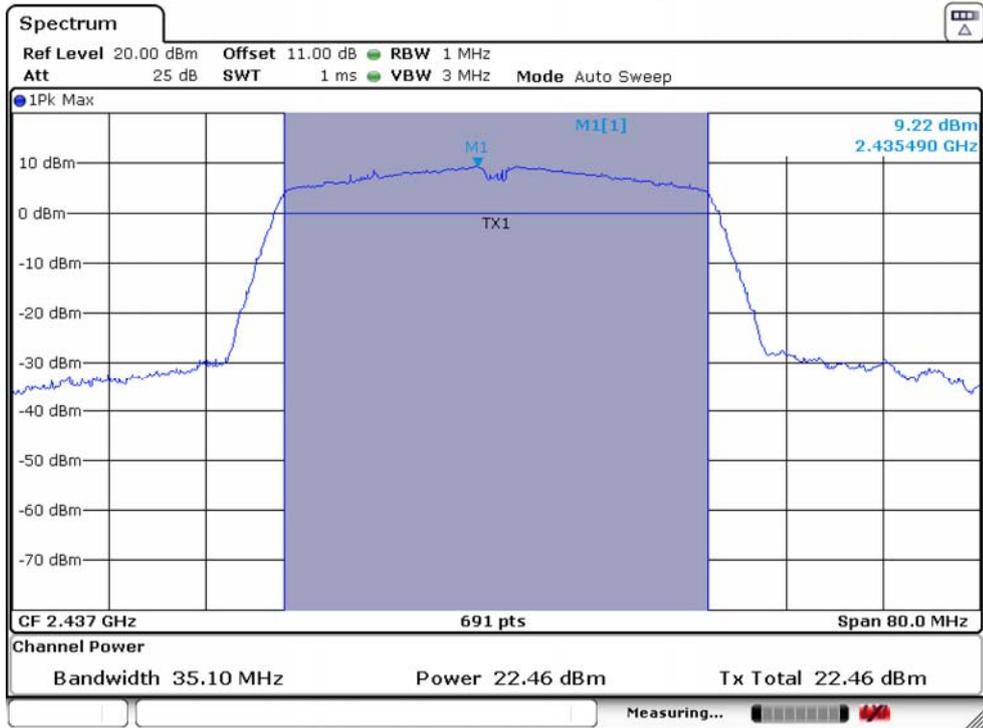
IEEE 802.11n HT40 2422MHz_ANT 1



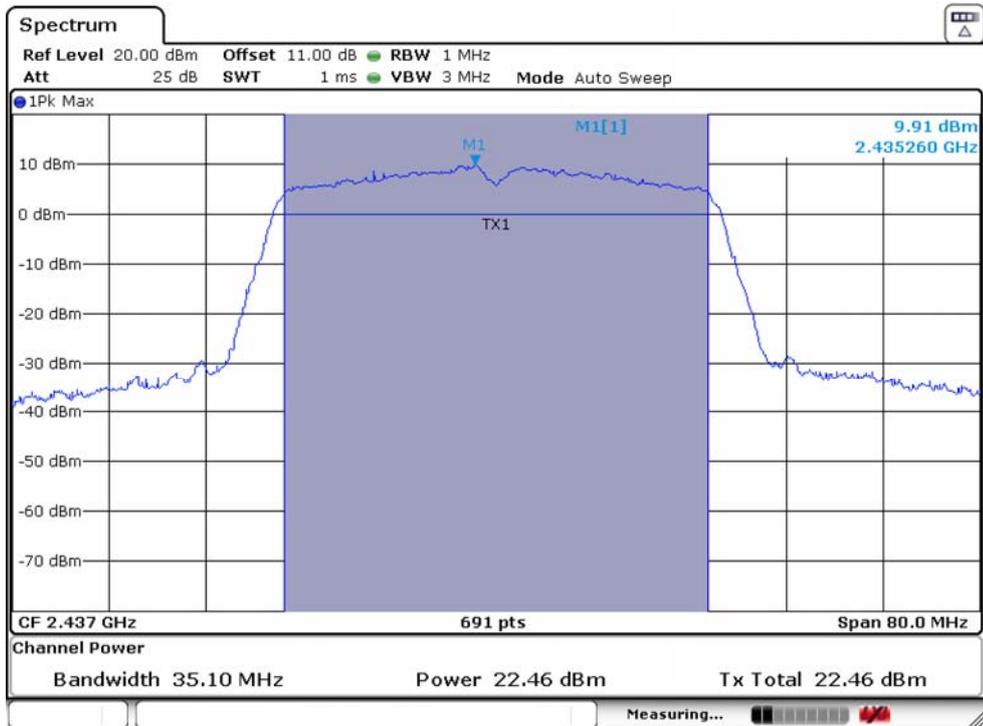
IEEE 802.11n HT40 2422MHz_ANT 2



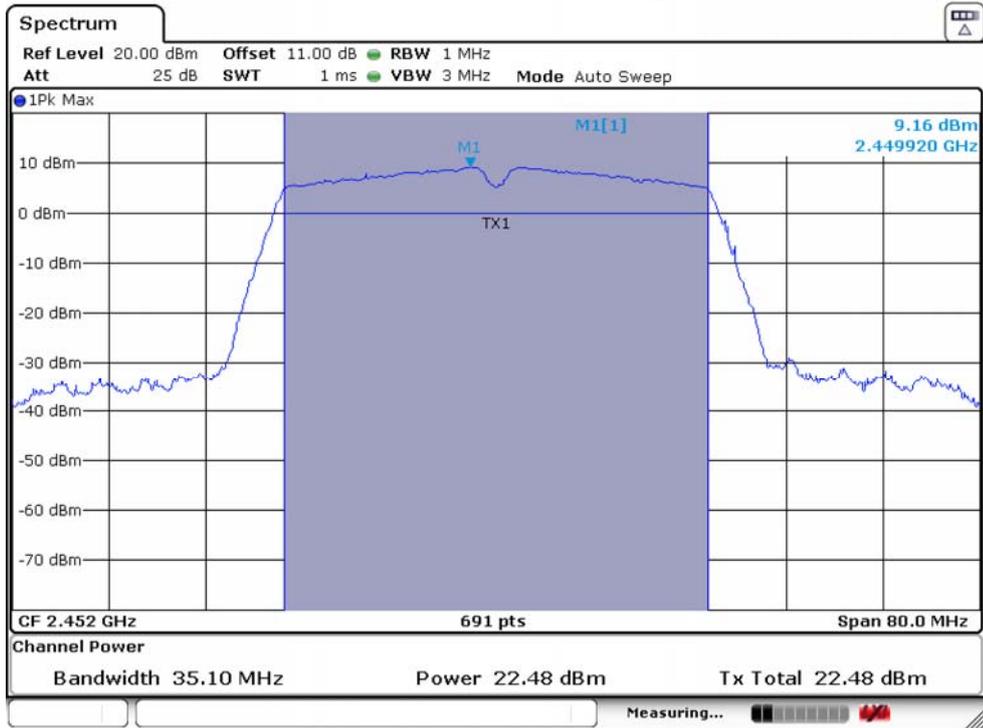
IEEE 802.11n HT40 2437MHz_ANT 1



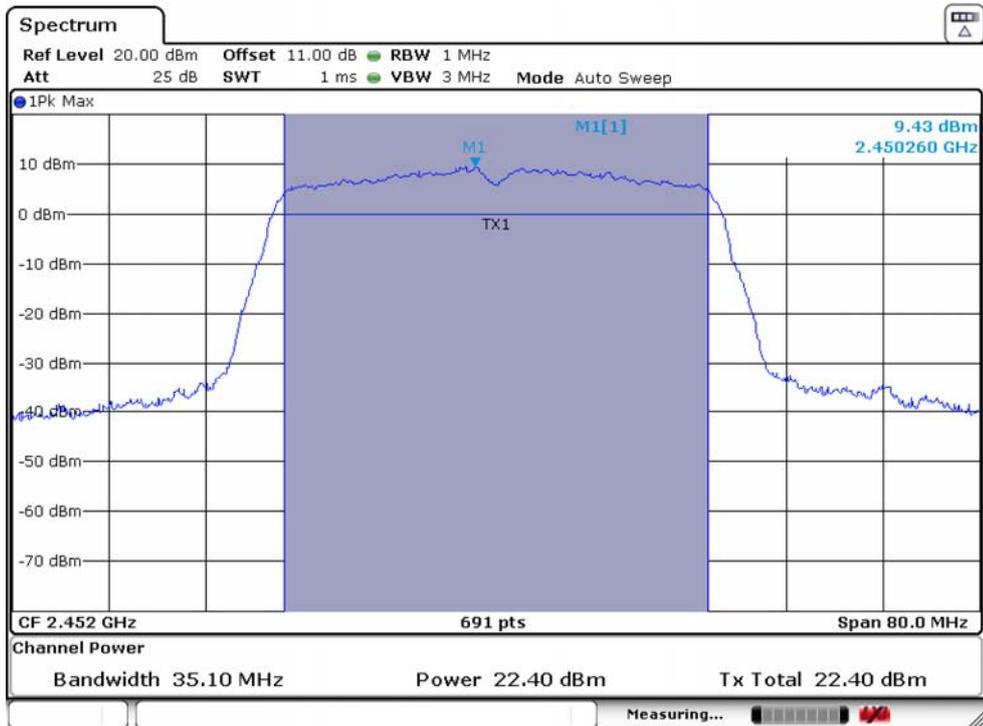
IEEE 802.11n HT40 2437MHz_ANT 2



IEEE 802.11n HT40 2452MHz_ANT 1



IEEE 802.11n HT40 2452MHz_ANT 2



5. POWER SPECTRAL DENSITY

5.1. Limit

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.2. Test Setup



5.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	3KHz
VBW	10KHz
Span	30MHz(20MHz Bandwidth mode)/60MHz(40MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

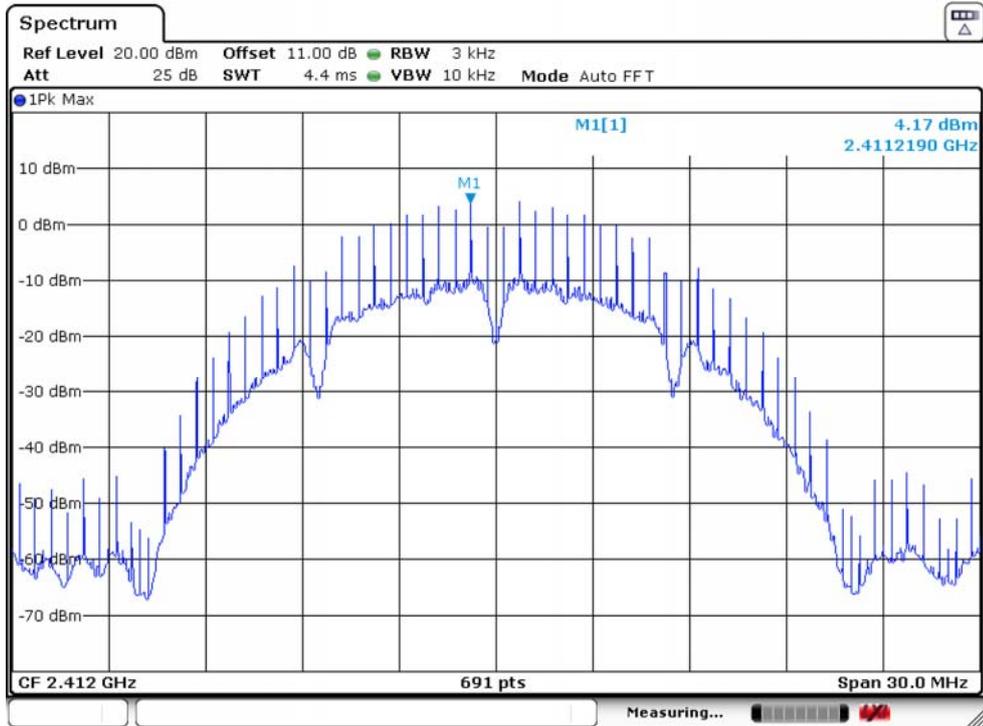
5.4. Test Procedure

- a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- b. Spectrum analyzer setting parameters in accordance with section 5.3.
- c. Set the EUT transmit continuously with maximum output power.
- d. Allow trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission.
- e. Repeat above procedures until all modes and channels were measured.
- f. Record the results in the test report.

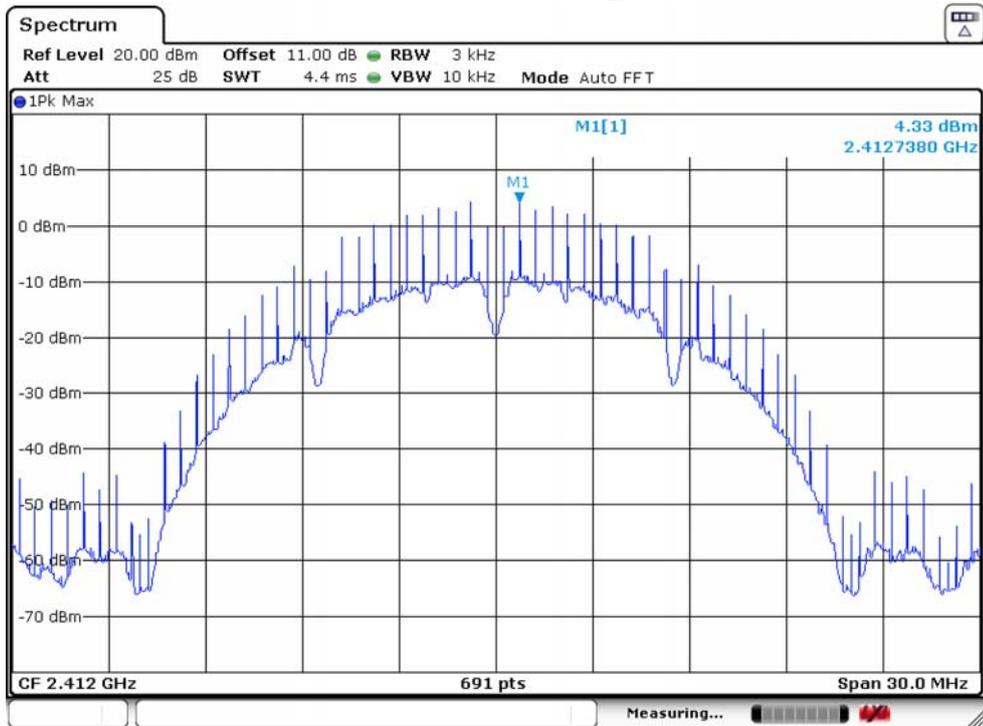
5.5. Test Result

Temperature	25.6°C	Relative Humidity		56%	Test Voltage	DC 3.3V
Mode	Freq (MHz)	Power Density (dBm/3KHz)		Total Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
		Ant 1	Ant 2			
IEEE 802.11b	2412	4.17	4.33	/	8.00	PASS
	2437	4.44	4.86	/	8.00	PASS
	2462	4.06	4.76	/	8.00	PASS
IEEE 802.11g	2412	-10.61	-10.50	/	8.00	PASS
	2437	-11.19	-11.11	/	8.00	PASS
	2462	-11.85	-9.98	/	8.00	PASS
IEEE 802.11n HT20	2412	-10.30	-10.55	-7.41	8.00	PASS
	2437	-11.04	-9.13	-6.97	8.00	PASS
	2462	-11.47	-8.56	-6.77	8.00	PASS
IEEE 802.11n HT40	2422	-13.43	-13.64	-10.52	8.00	PASS
	2437	-13.03	-14.59	-10.73	8.00	PASS
	2452	-13.51	-13.61	-10.55	8.00	PASS

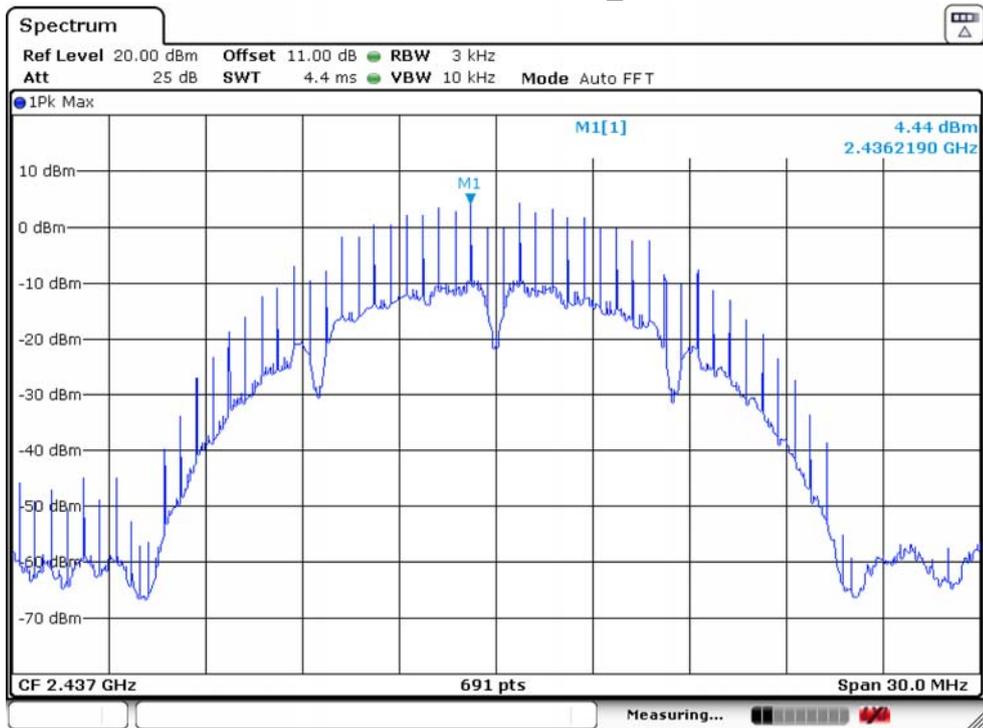
IEEE 802.11b 2412MHz_ANT 1



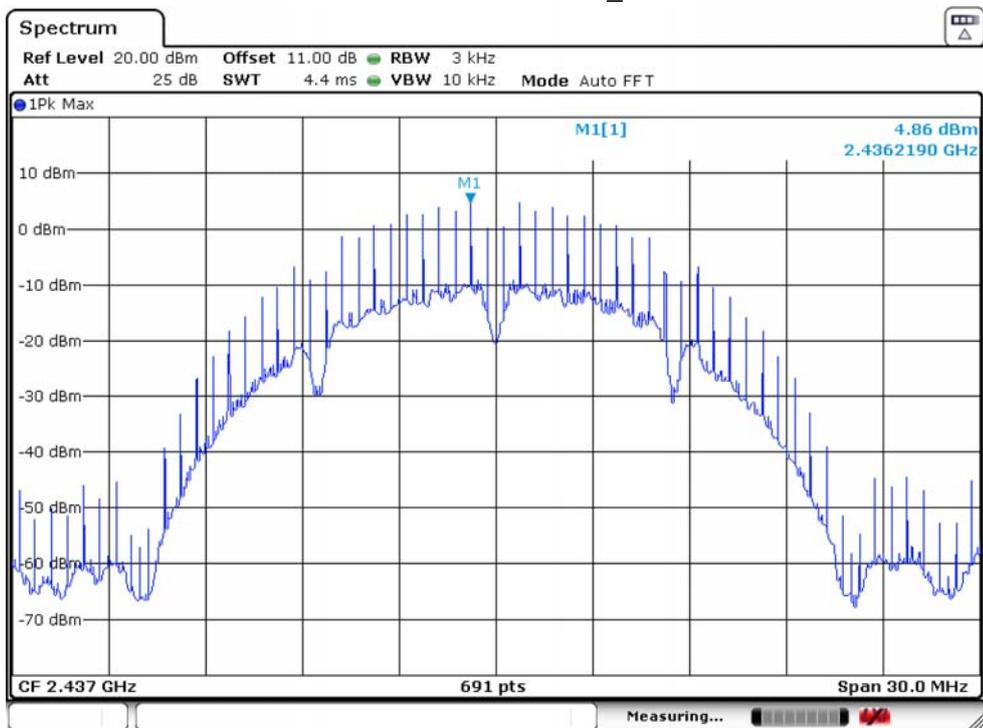
IEEE 802.11b 2412MHz_ANT 2



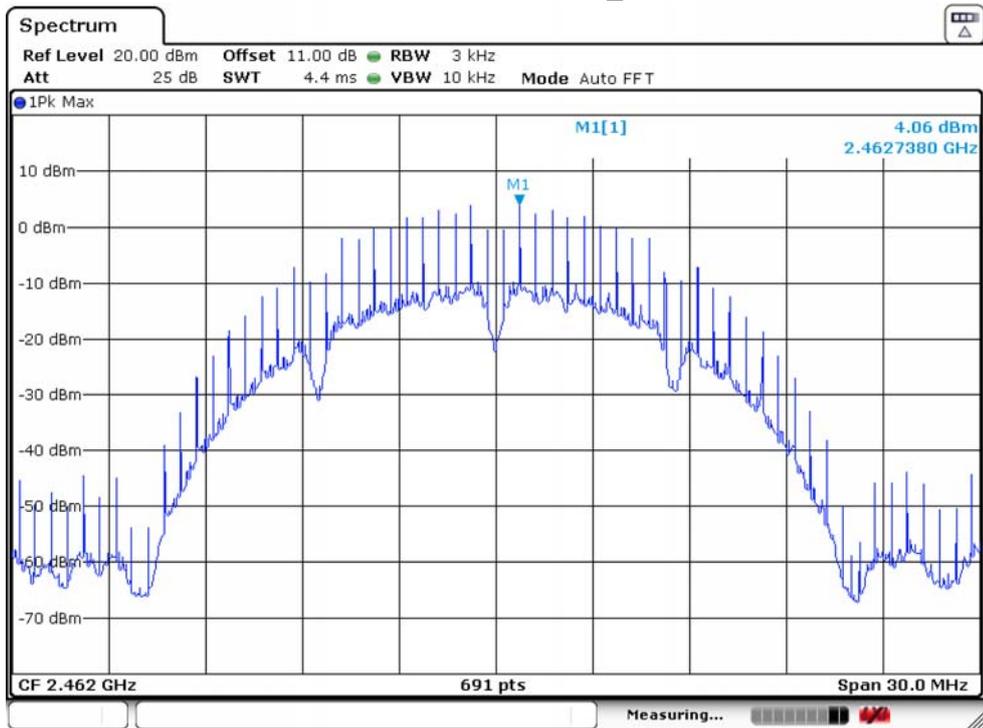
IEEE 802.11b 2437MHz_ANT 1



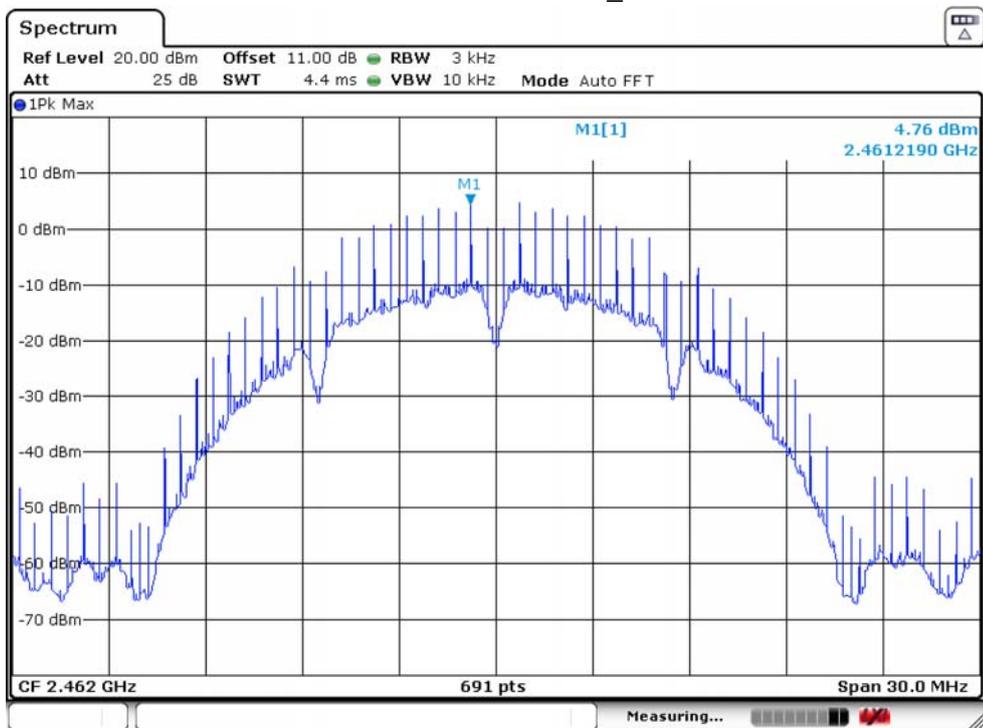
IEEE 802.11b 2437MHz_ANT 2



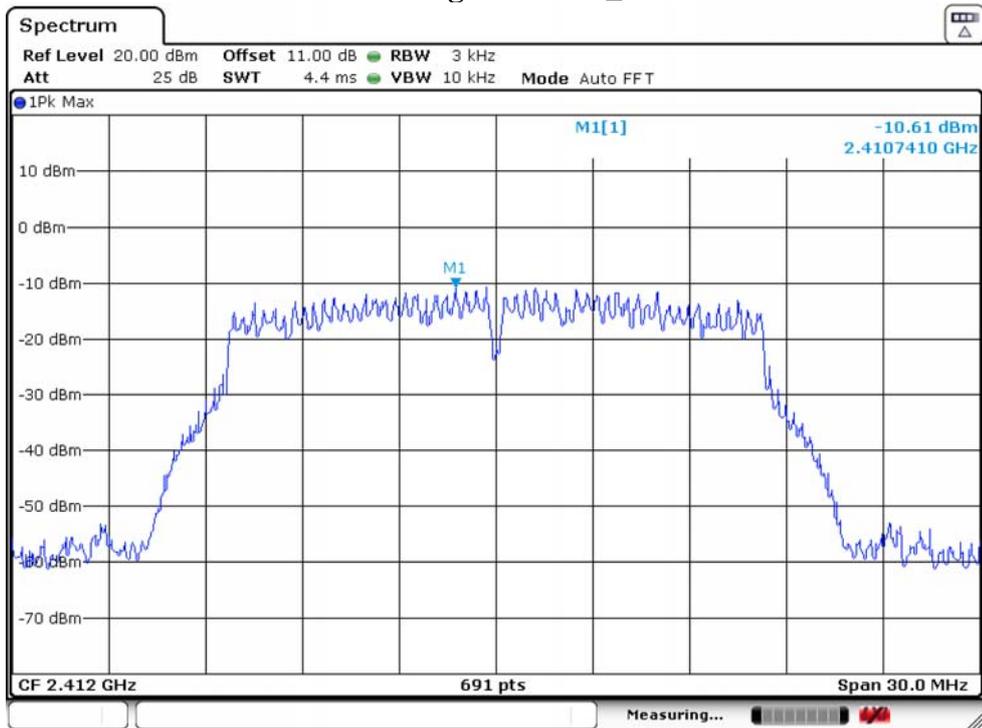
IEEE 802.11b 2462MHz_ANT 1



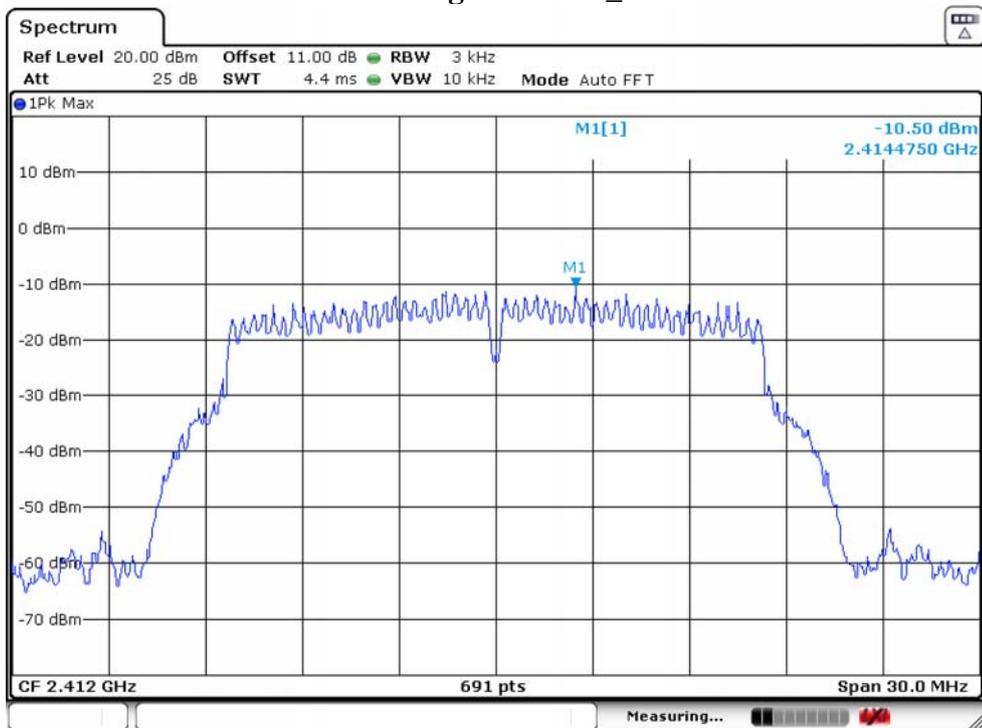
IEEE 802.11b 2462MHz_ANT 2



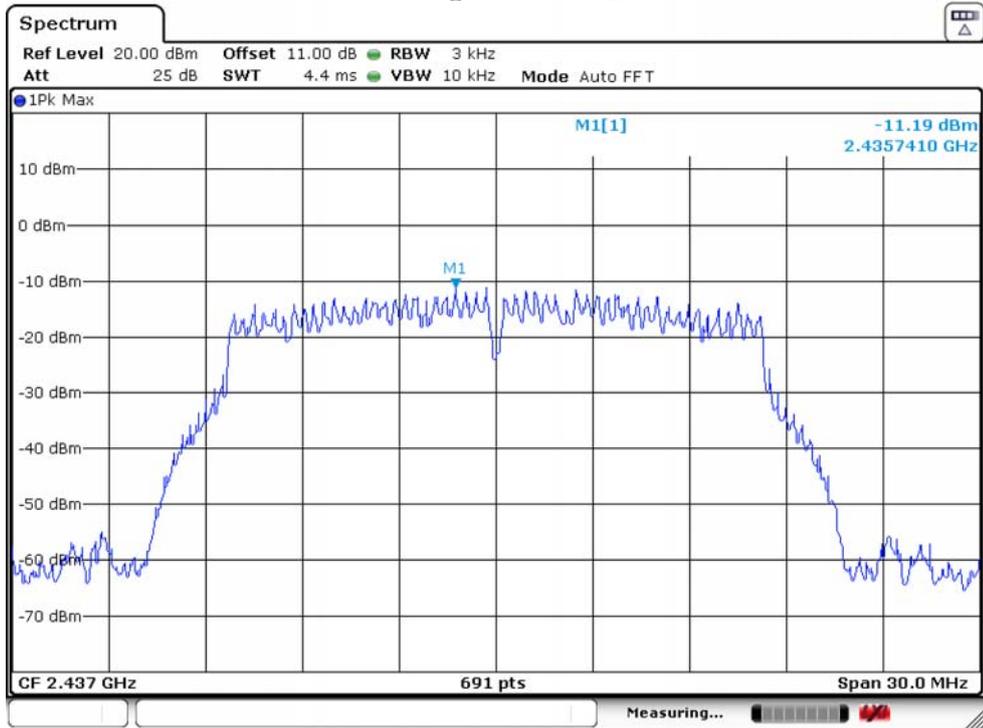
IEEE 802.11g 2412MHz_ANT 1



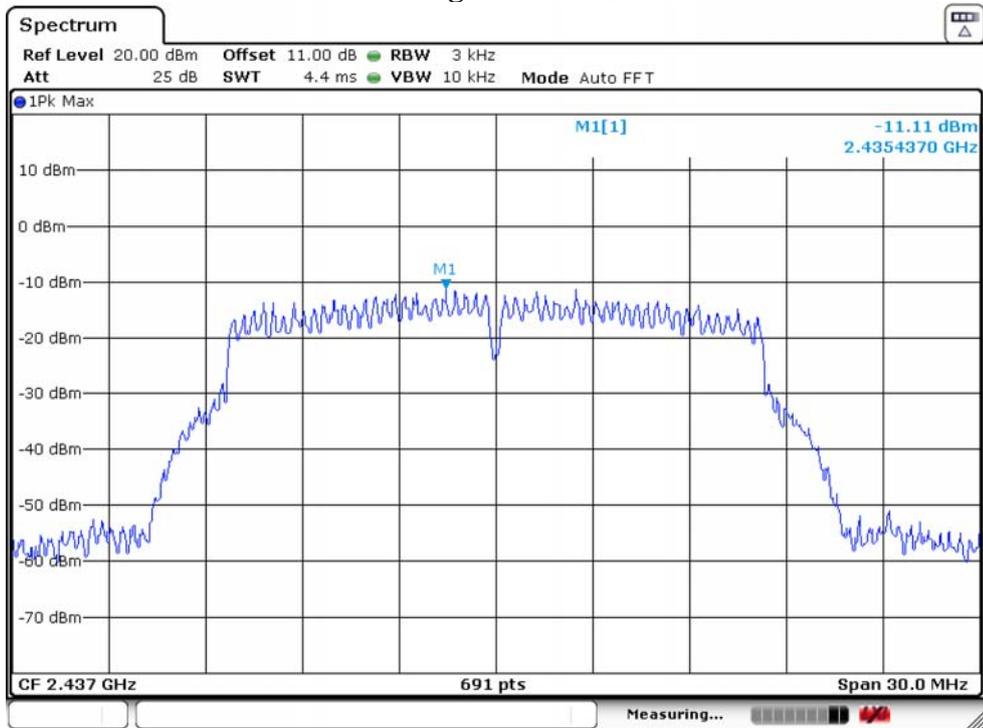
IEEE 802.11g 2412MHz_ANT 2



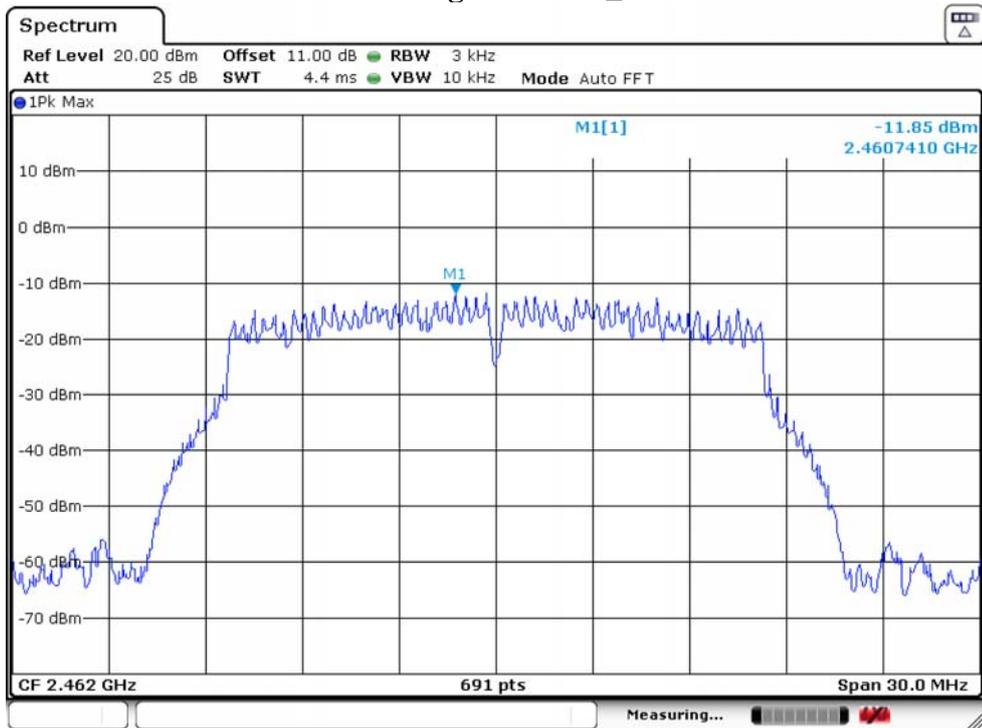
IEEE 802.11g 2437MHz_ANT 1



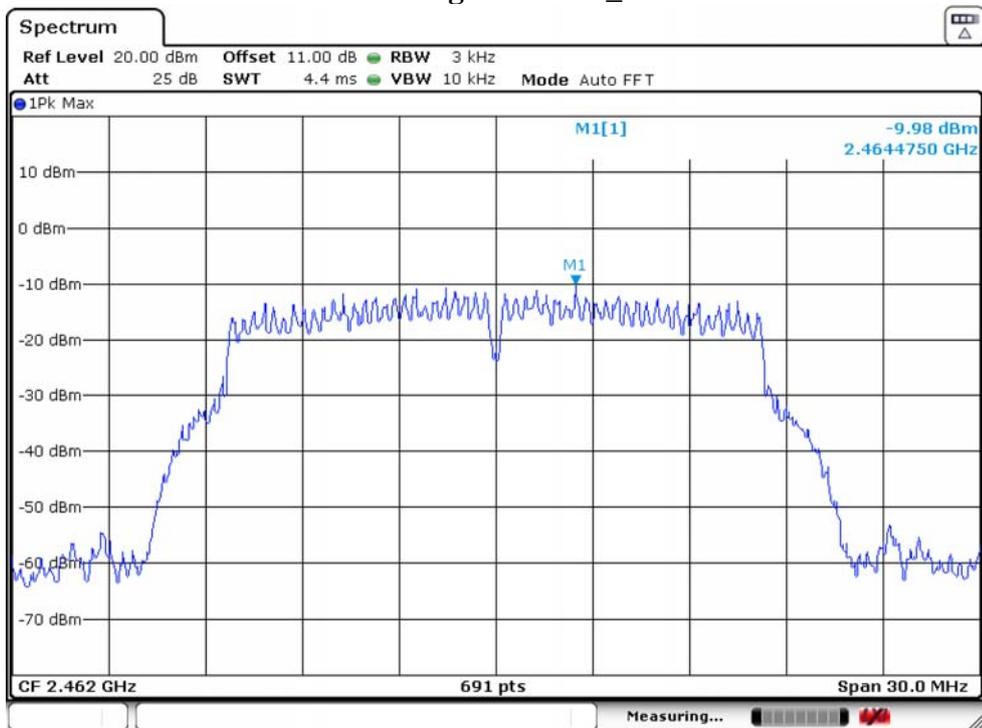
IEEE 802.11g 2437MHz_ANT 2



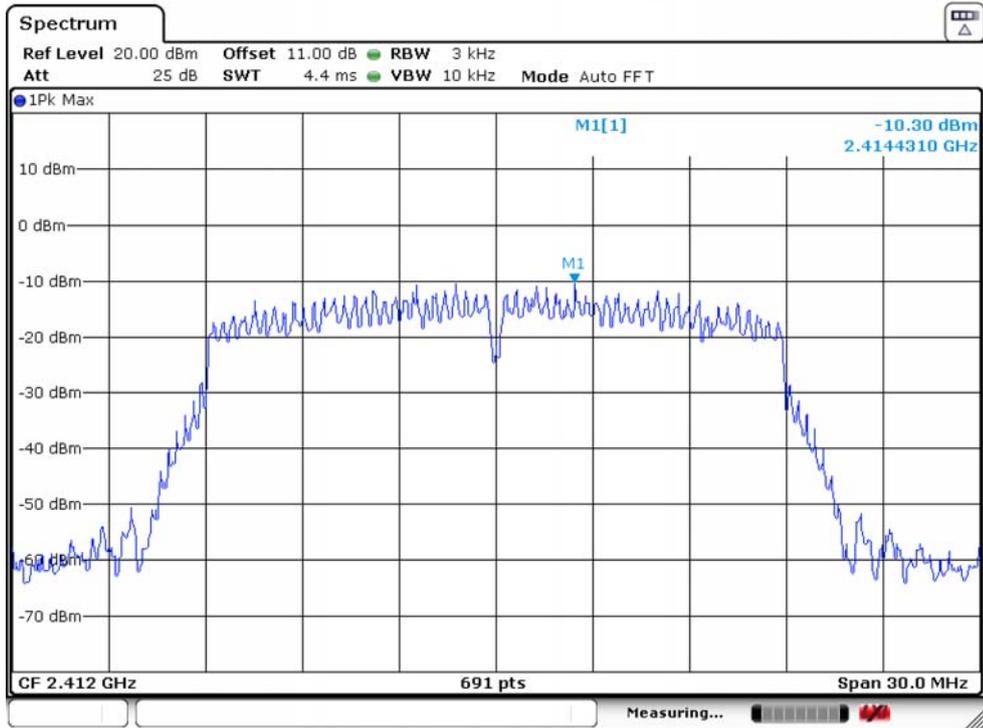
IEEE 802.11g 2462MHz_ANT 1



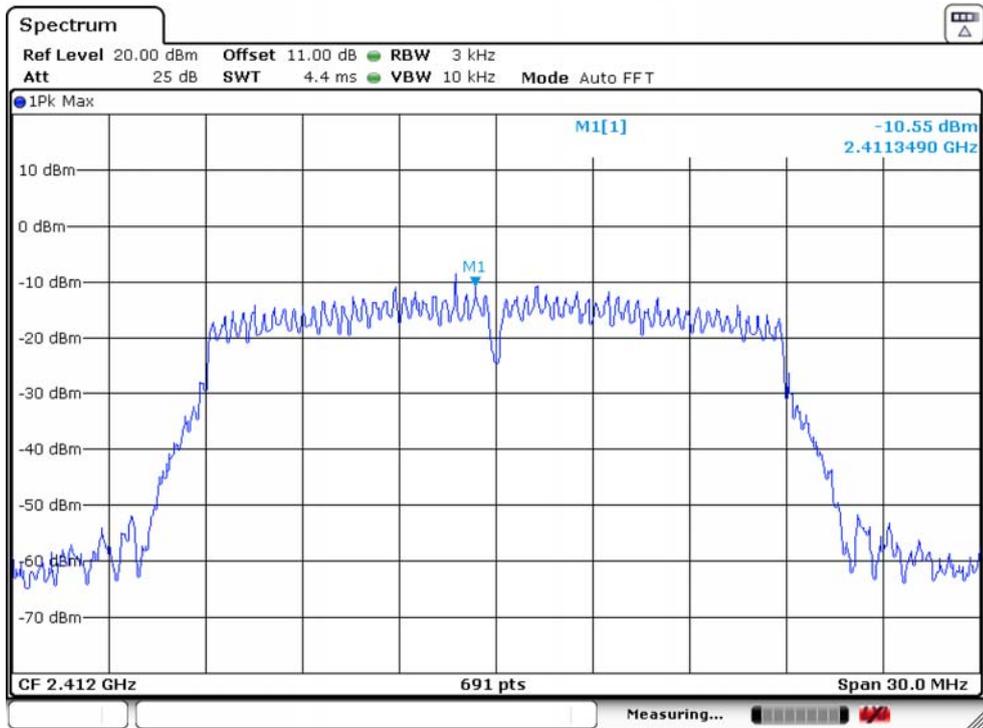
IEEE 802.11g 2462MHz_ANT 2



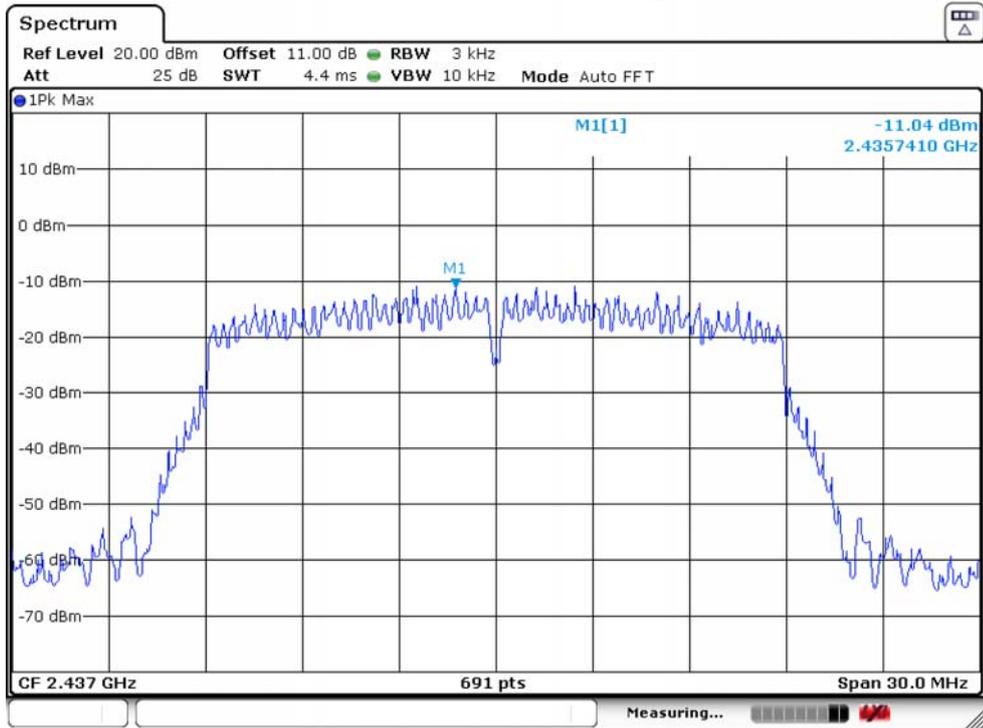
IEEE 802.11n HT20 2412MHz_ANT 1



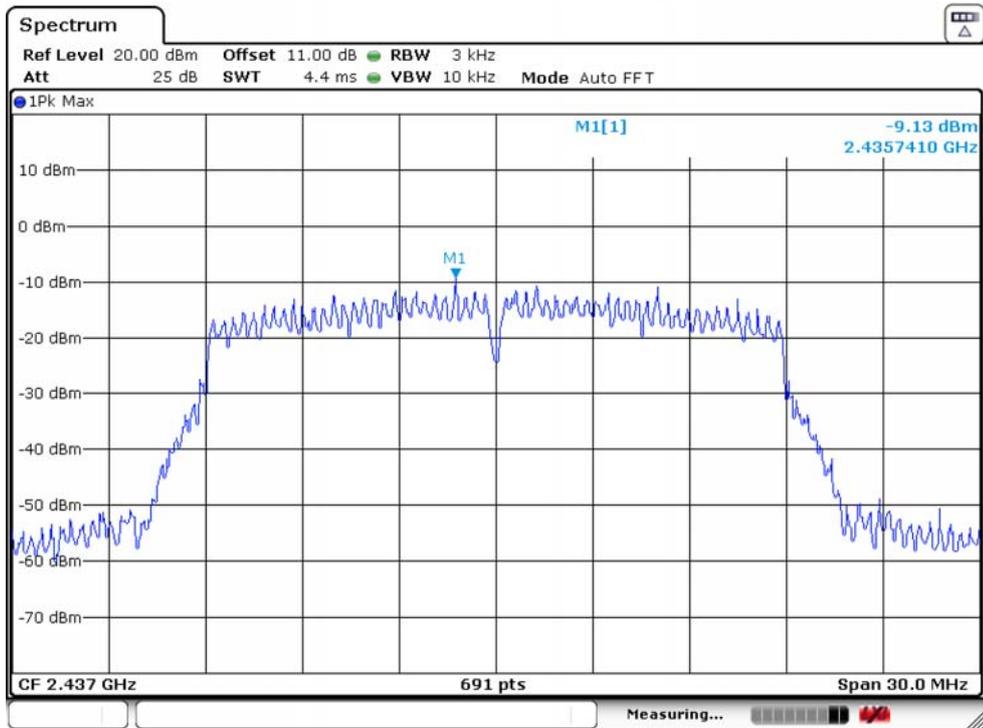
IEEE 802.11n HT20 2412MHz_ANT 2



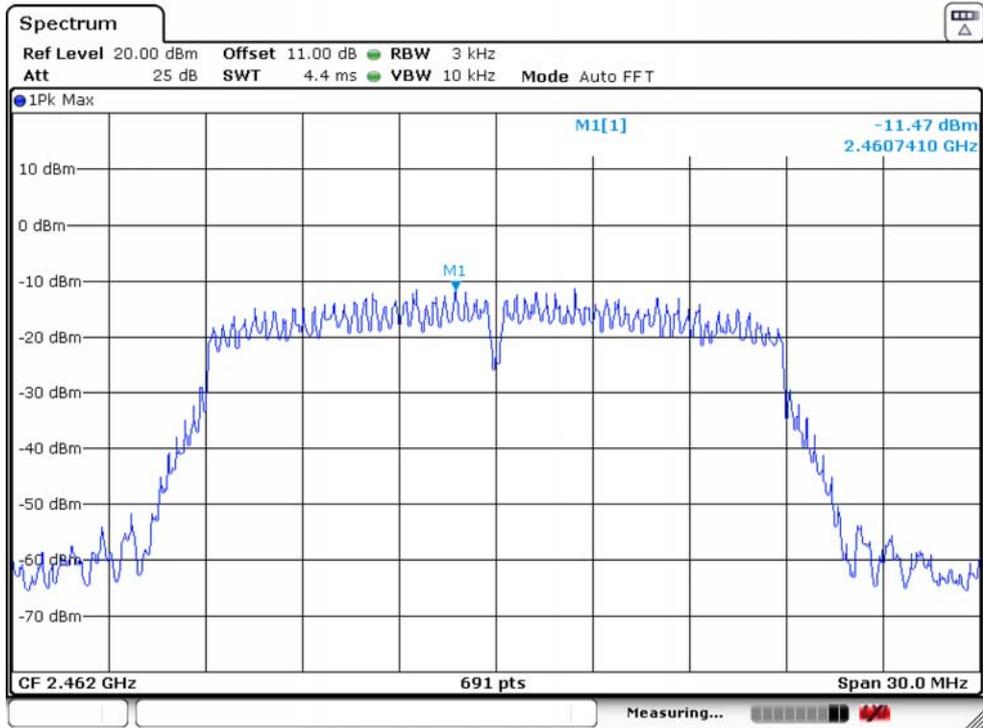
IEEE 802.11n HT20 2437MHz_ANT 1



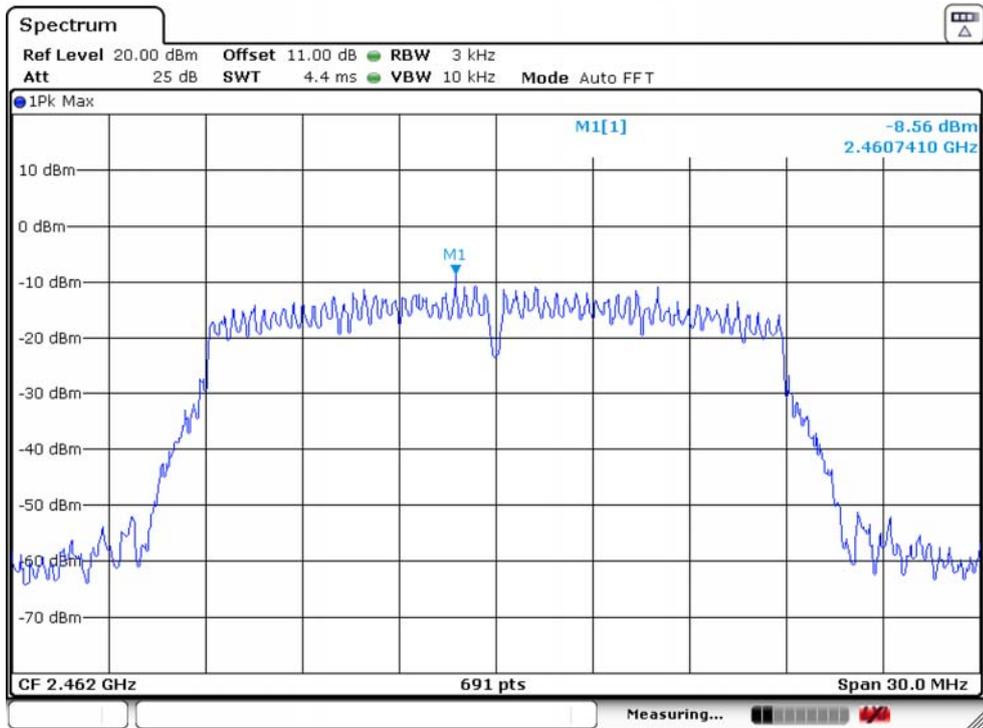
IEEE 802.11n HT20 2437MHz_ANT 2



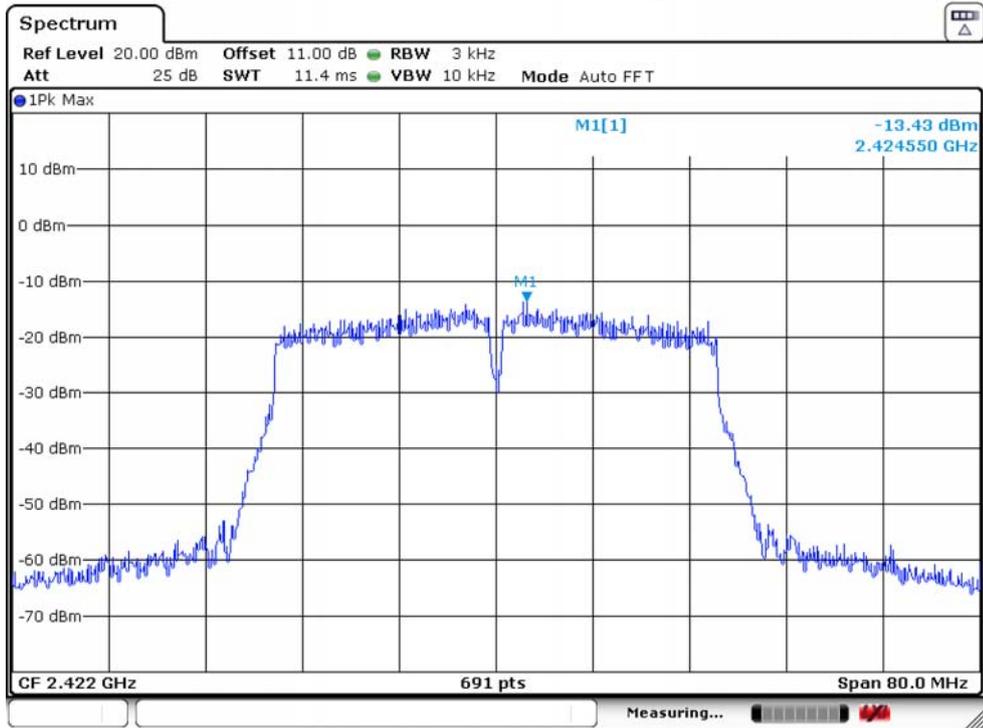
IEEE 802.11n HT20 2462MHz_ANT 1



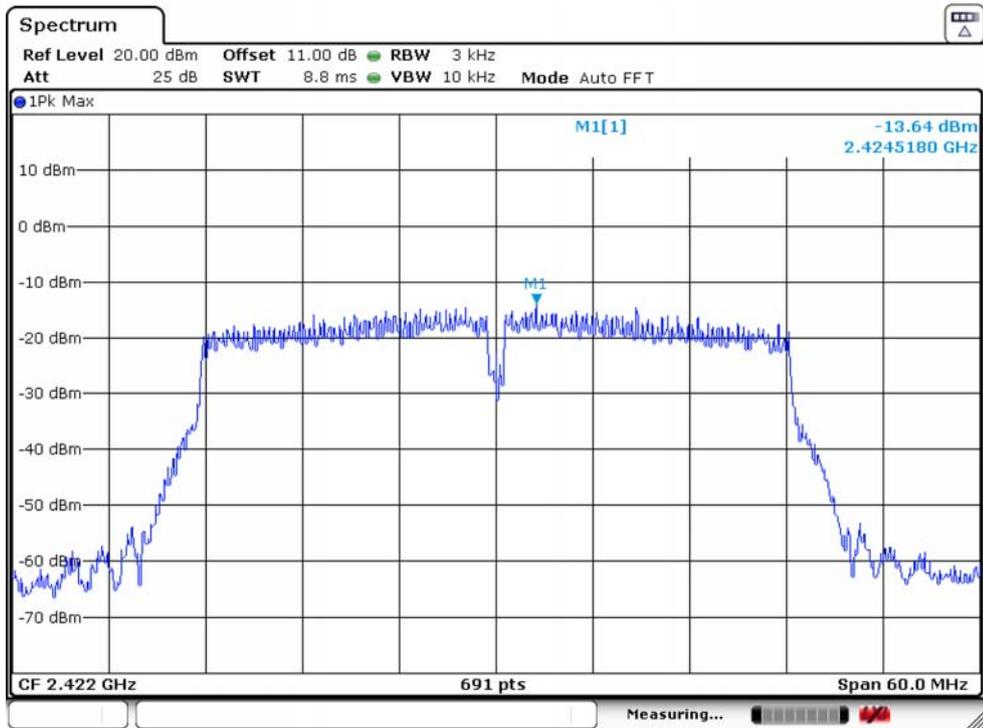
IEEE 802.11n HT20 2462MHz_ANT 2



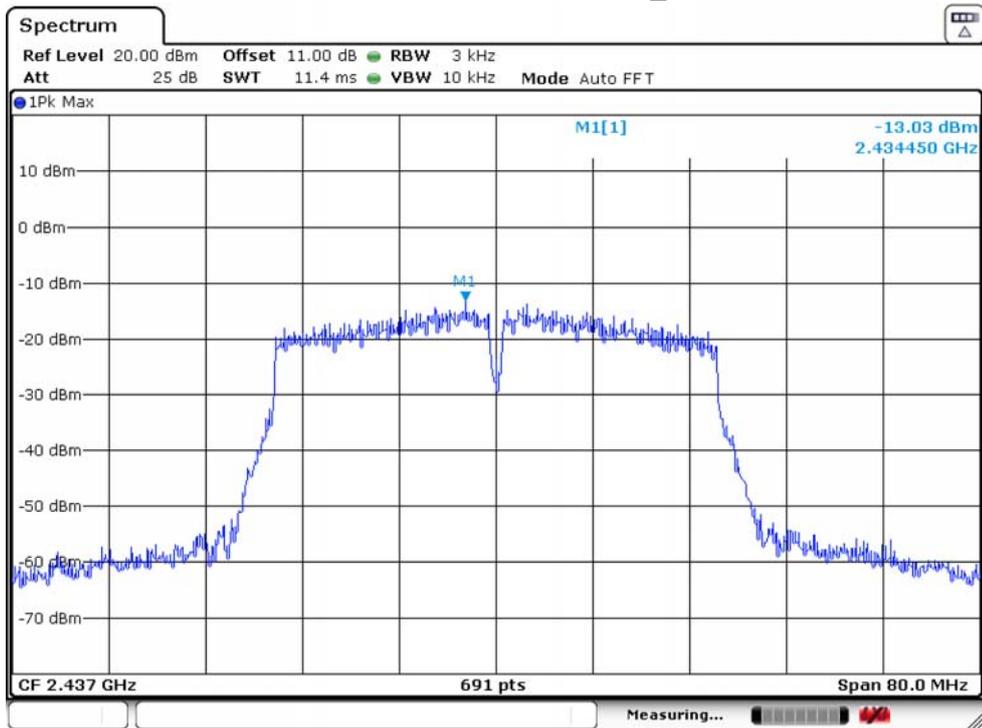
IEEE 802.11n HT40 2422MHz_ANT 1



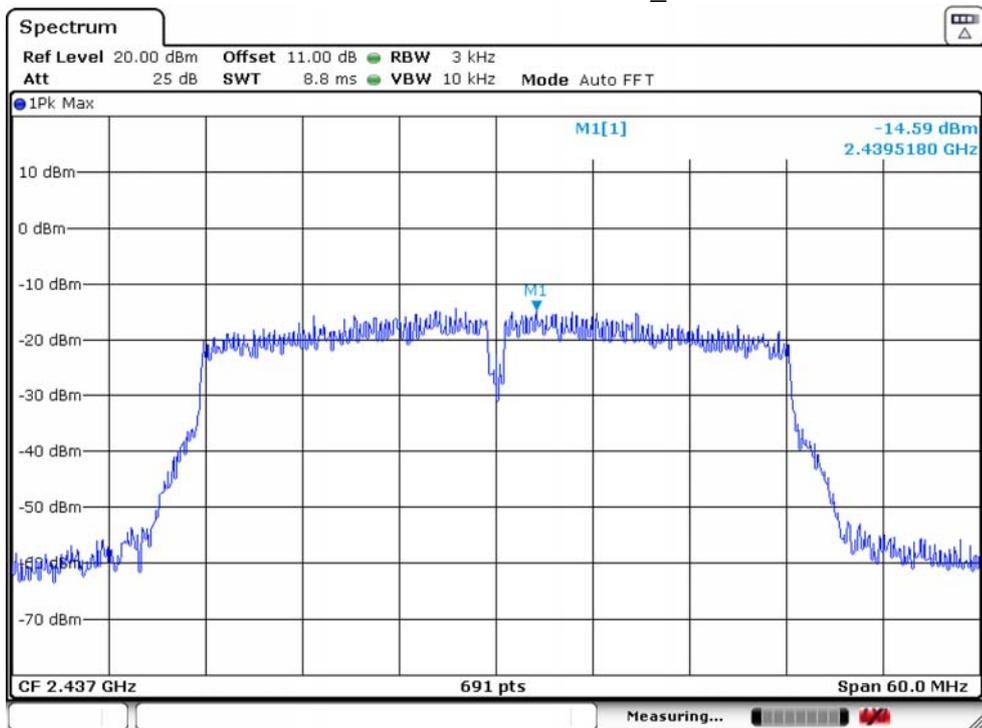
IEEE 802.11n HT40 2422MHz_ANT 2



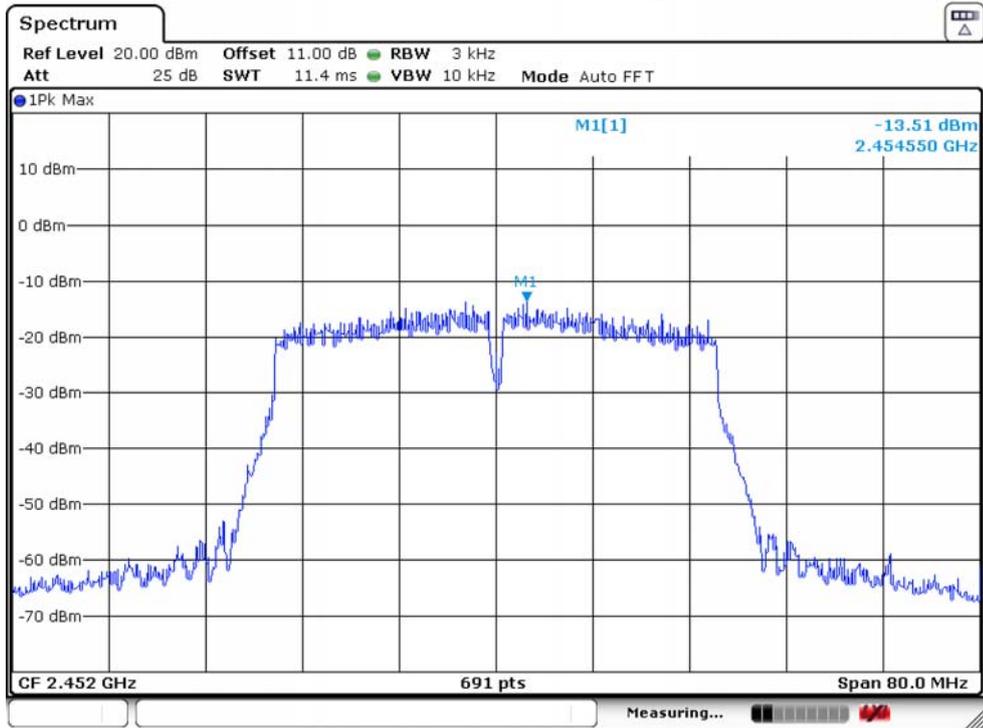
IEEE 802.11n HT40 2437MHz_ANT 1



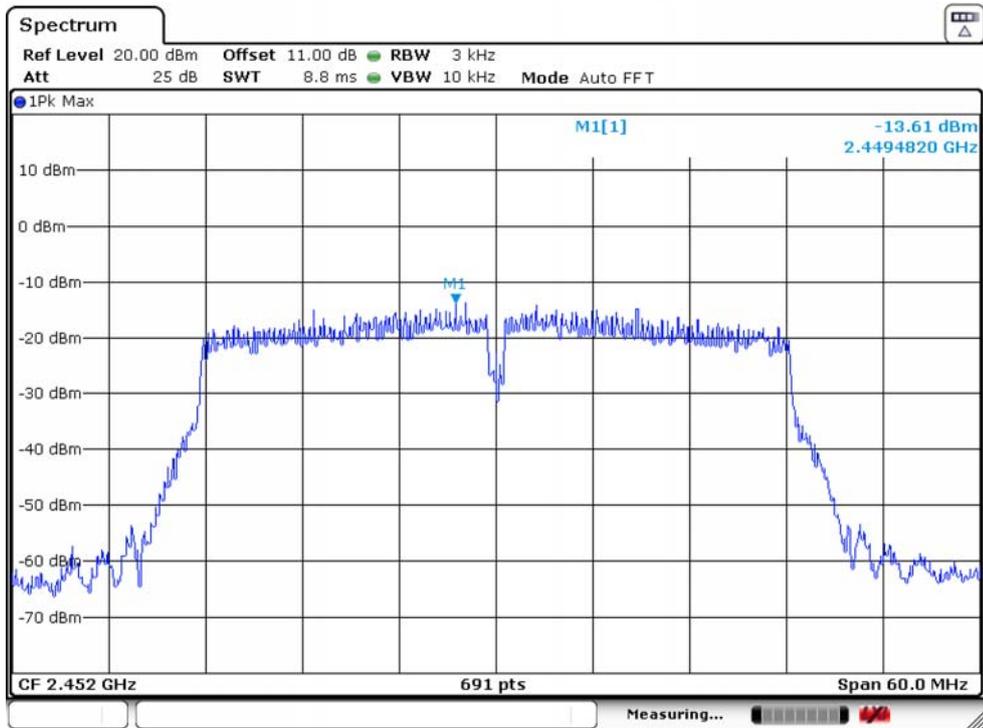
IEEE 802.11n HT40 2437MHz_ANT 2



IEEE 802.11n HT40 2452MHz_ANT 1



IEEE 802.11n HT40 2452MHz_ANT 2



6. CONDUCTED BAND EDGE

6.1. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

6.2. Test Setup



6.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	100KHz
VBW	300KHz
Span	100MHz(20MHz Bandwidth mode)/200MHz(40MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

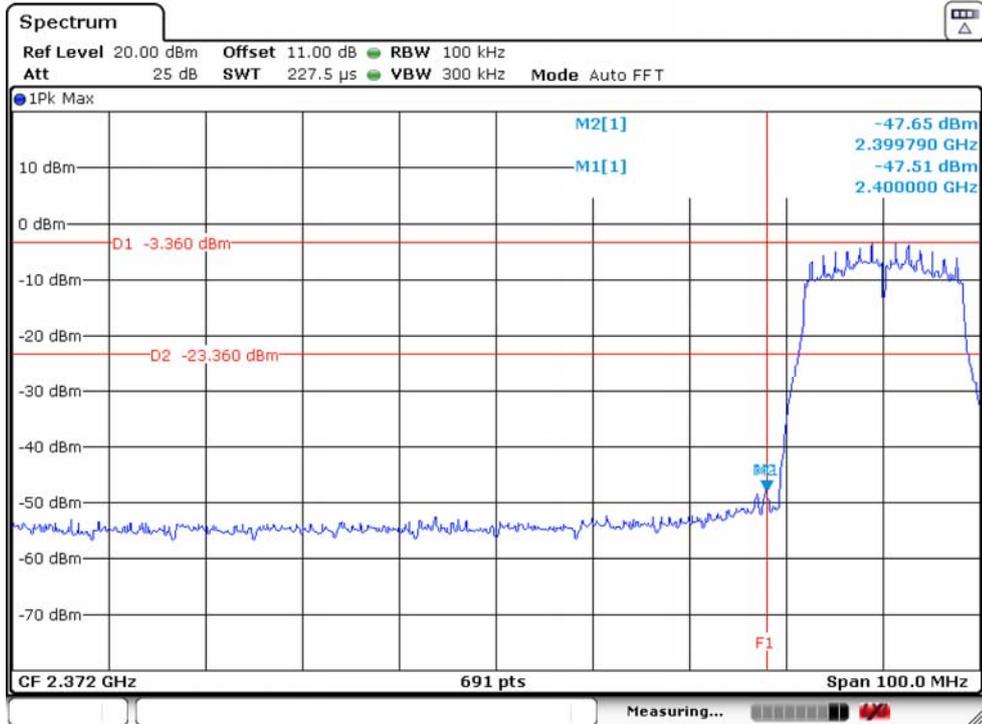
6.4. Test Procedure

- a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- b. Spectrum analyzer setting parameters in accordance with section 6.3.
- c. Set the EUT transmit continuously with maximum output power.
- d. Allow trace to stabilize, use the marker function to mark the highest emission level outside the authorized band.
- e. Repeat above procedures until all modes and channels were measured.
- f. Record the results in the test report.
- g. IEEE 802.11b, IEEE 802.11g, IEEE 802.11nHT20, IEEE 802.11nH40 all have been tested, only worst case 802.11n HT20 is recorded. The antenna 2 test data is recorded in report.

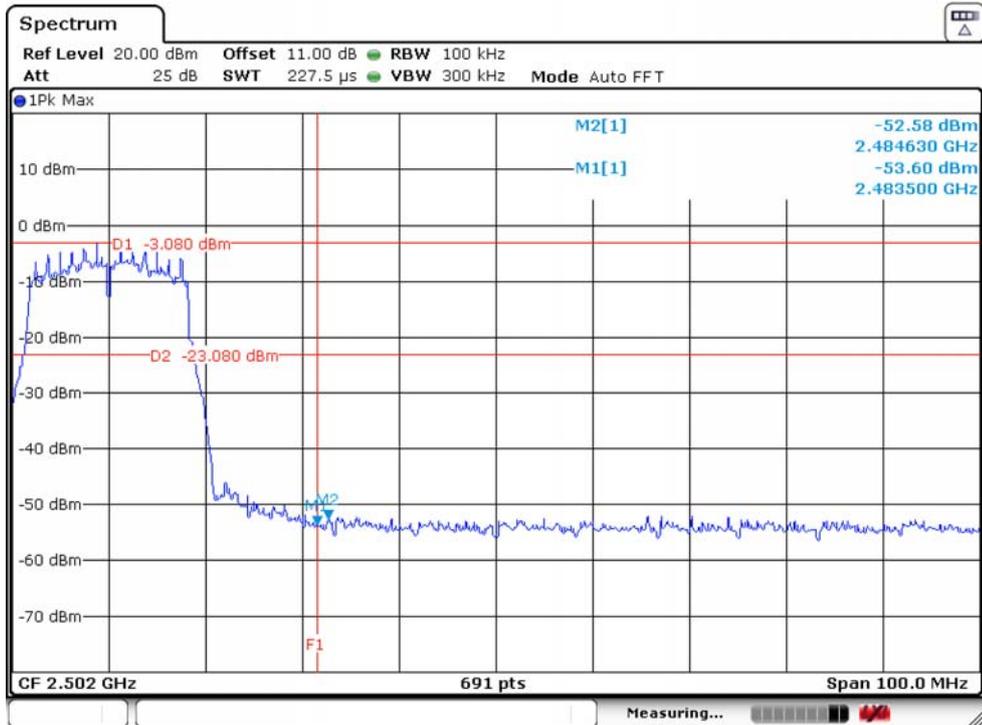
6.5. Test Result

Temperature	25.4°C	Relative Humidity	56%	Test Voltage	DC 3.3V
Result	PASS				

IEEE 802.11n HT20 2412MHz



IEEE 802.11n HT20 2462MHz



7. CONDUCTED SPURIOUS EMISSIONS

7.1. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

7.2. Test Setup



7.3. Spectrum Analyzer Setting

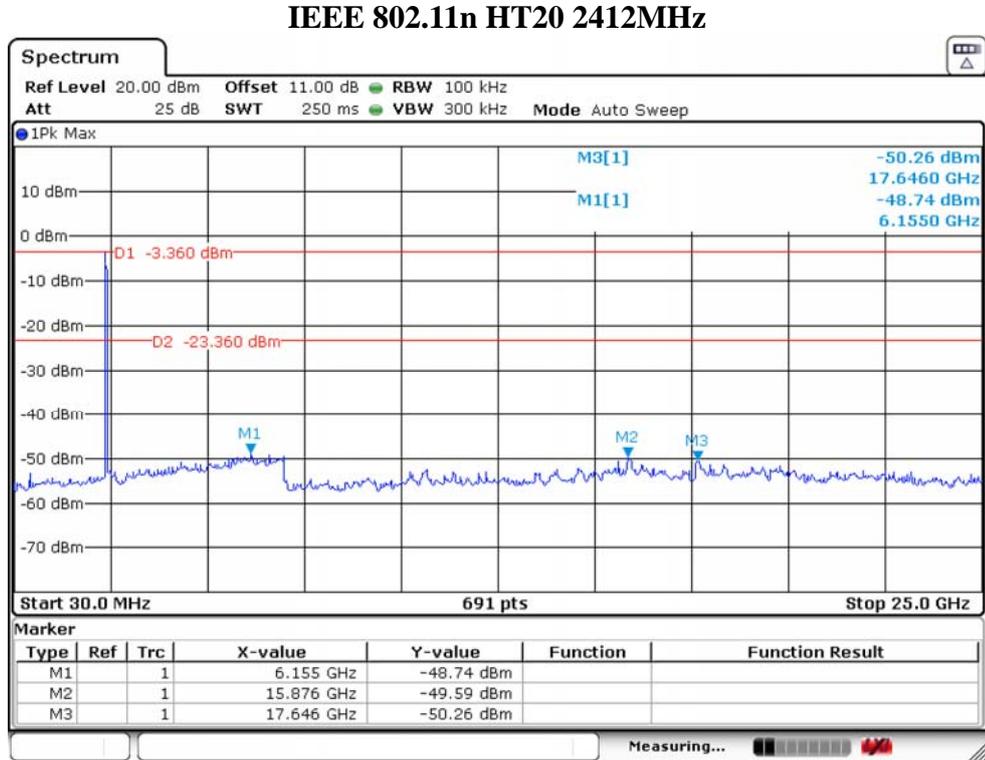
Spectrum Parameters	Setting
RBW	100KHz
VBW	300KHz
Start frequency	30MHz
Stop frequency	25GHz
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

7.4. Test Procedure

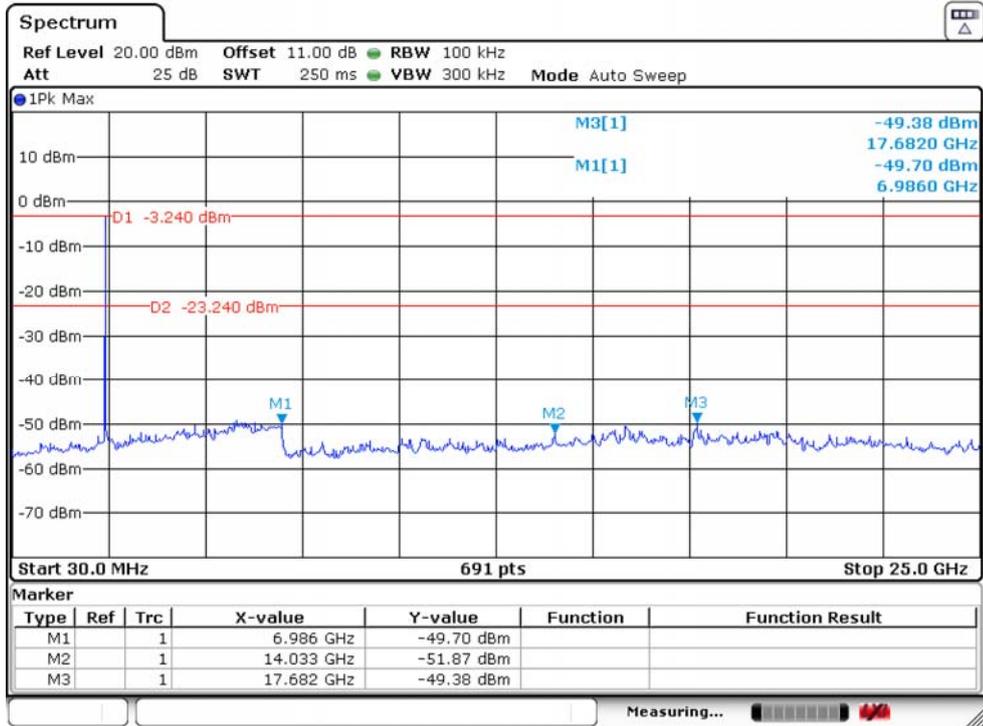
- a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- b. Spectrum analyzer setting parameters in accordance with section 7.3.
- c. Set the EUT transmit continuously with maximum output power.
- d. Allow trace to stabilize, use the marker function to mark the highest emission level outside the authorized band.
- e. Repeat above procedures until all modes and channels were measured.
- f. Record the results in the test report.
- g. IEEE 802.11b, IEEE 802.11g, IEEE 802.11nHT20, IEEE 802.11nHT40 all have been tested, only worst case 802.11n HT20 is recorded. The antenna 2 test data is recorded in report.

7.5. Test Result

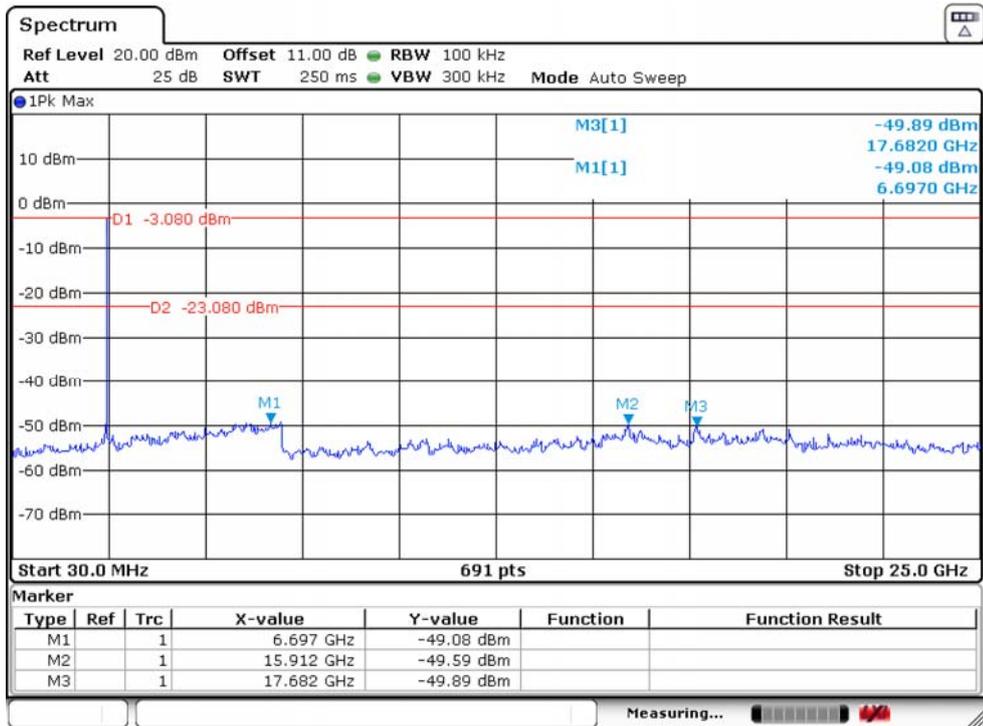
Temperature	25.4°C	Relative Humidity	56%	Test Voltage	DC 3.3V
Result	PASS				



IEEE 802.11n HT20 2437MHz



IEEE 802.11n HT20 2462MHz



8. RADIATED SPURIOUS EMISSIONS AND BAND EDGE

8.1. Limit

Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in below. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter’s fundamental emission.

Restricted frequency band

MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 - 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138	--	

General field strength limits at frequencies below 30 MHz

Frequency	Magnetic field strength (H-Field) ($\mu\text{A/m}$)	Measurement distance (m)
9 - 490 kHz	$6.37/F$ (F in kHz)	300
490 - 1705 kHz	$63.7/F$ (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note:

1. The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

General field strength limits at frequencies above 30 MHz

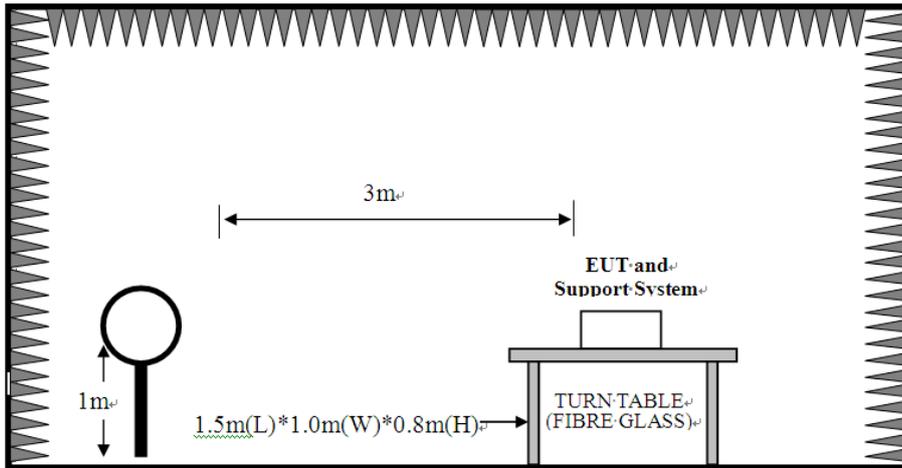
Frequency(MHz)	Field Strength($\mu\text{V/m}$ at 3 m)
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

Note:

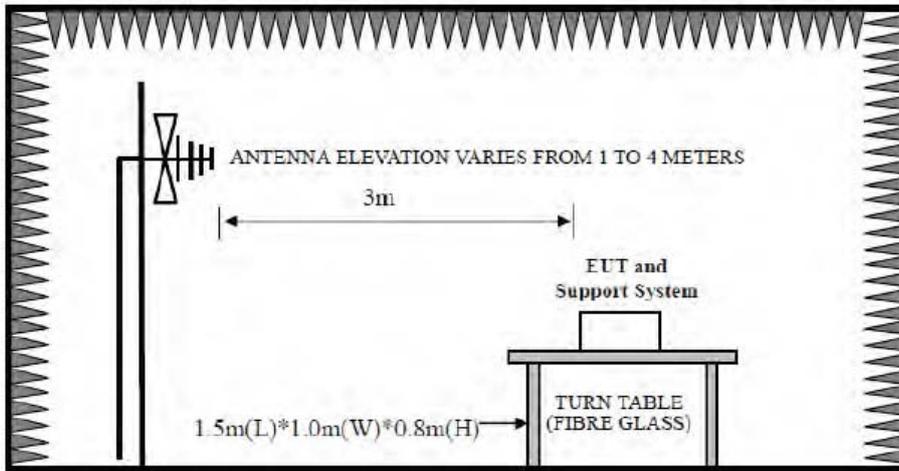
1. Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$.
2. The smaller limit shall apply at the cross point between two frequency bands.
3. Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

8.2. Test Setup

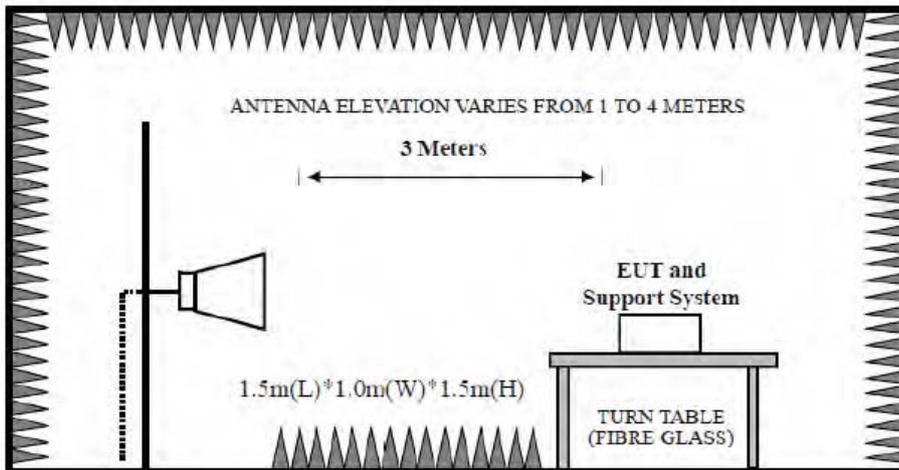
9kHz~30MHz



30~1000MHz



Above 1GHz



8.3. Spectrum Analyzer Setting

For 9KHz-150KHz

Spectrum Parameters	Setting
RBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
VBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
Start frequency	9KHz
Stop frequency	150KHz
Sweep Time	Auto
Detector	PEAK/QP/AVG
Trace Mode	Max Hold

For 150KHz-30MHz

Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

For 30MHz-1GHz

Spectrum Parameters	Setting
RBW	120KHz
VBW	300KHz
Start frequency	30MHz
Stop frequency	1GHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

For Above 1GHz

Spectrum Parameters	Setting	
RBW	1MHz	
VBW	PEAK Measurement	
	3MHz	Duty cycle $\geq 98\%$, VBW=10Hz
		Duty cycle $< 98\%$, VBW $\geq 1/T$
Start frequency	1GHz	
Stop frequency	25GHz	
Sweep Time	Auto	
Detector	PEAK	
Trace Mode	Max Hold	

Note :

1. T is the on-time time of the duty cycle,when EUT transmit continuously with maximum output power,unit is seconds. reference section 2.8 for the on-time time.

8.4. Test Procedure

- a. EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test, and which is 1.5 meter high above ground for above 1GHz test.
- b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- c. Set the EUT transmit continuously with maximum output power.
- d. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- e. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
- f. Spectrum analyzer setting parameters in accordance with section 8.3.
- g. Repeat above procedures until all channels were measured.
- h. Record the results in the test report.

Note:

1. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.
2. The frequency 2412MHz/2422MHz/2437MHz/2452MHz/2462MHz are fundamental frequency, which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.
3. IEEE 802.11b, IEEE 802.11g, IEEE 802.11nHT20, IEEE 802.11nHT40 all have been tested, only worst case 802.11n HT20 is recorded.

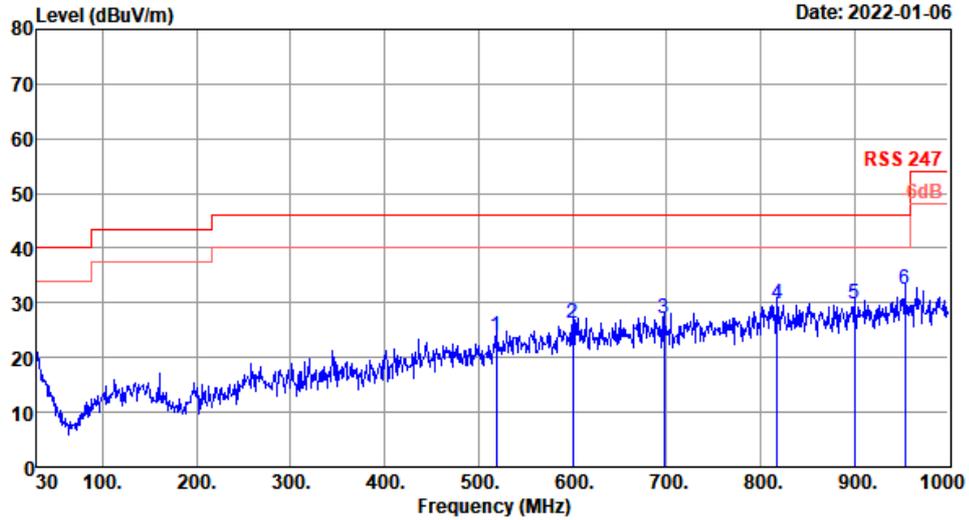
8.5. Test Result

Radiated Emissions Below 1GHz

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan, Guangdong, China
Tel: +86-769-83081888
Fax: +86-769-83081878

Data: 21 File: \\EMC-966-3\test data\2022\RF\Gao Sheng Dai\WKCT27M2501.EM6 (46) Date: 2022-01-06

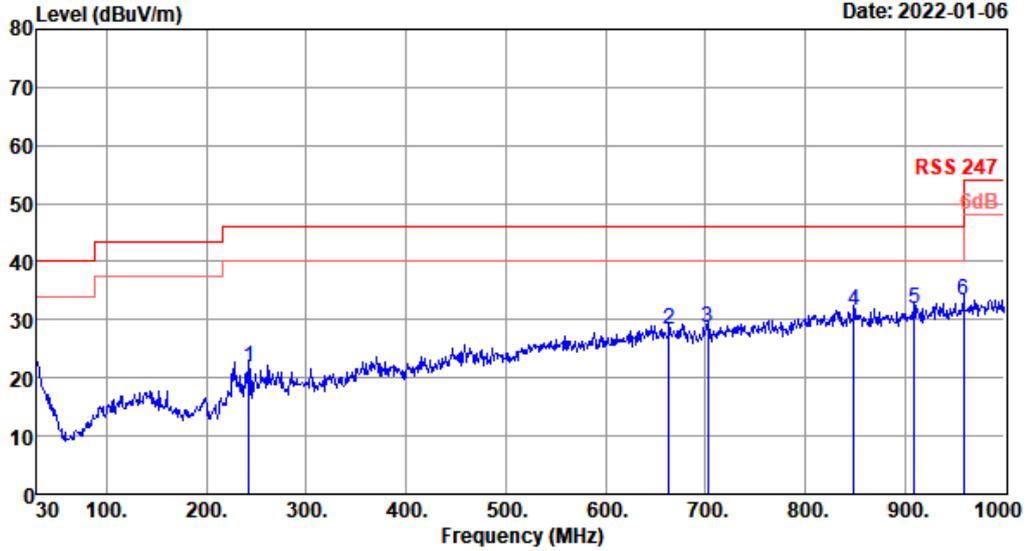


Site no. : 3# 966 Chamber Data no. : 21
 Dis. / Ant. : 3m 31218 Ant. pol. : VERTICAL
 Limit : RSS 247
 Env. / Ins. : Temp:23.6'; Humi:56%; Press:101.52kPa
 Engineer : Carlos
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	518.88	18.97	2.34	2.60	23.91	46.00	22.09	QP
2	600.36	20.20	2.54	3.54	26.28	46.00	19.72	QP
3	697.36	21.47	2.73	2.98	27.18	46.00	18.82	QP
4	817.64	23.48	3.16	3.30	29.94	46.00	16.06	QP
5	900.09	23.90	3.31	2.70	29.91	46.00	16.09	QP
6	953.44	24.64	3.90	3.83	32.37	46.00	13.63	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

Data: 22 File: \\EMC-966-3\test data\2022\RF\Gao Sheng Da\WKCT27M2501.EM6 (46) Date: 2022-01-06



Site no. : 3# 966 Chamber Data no. : 22
 Dis. / Ant. : 3m 31218 Ant. pol. : HORIZONTAL
 Limit : RSS 247
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Carlos
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : TX Mode

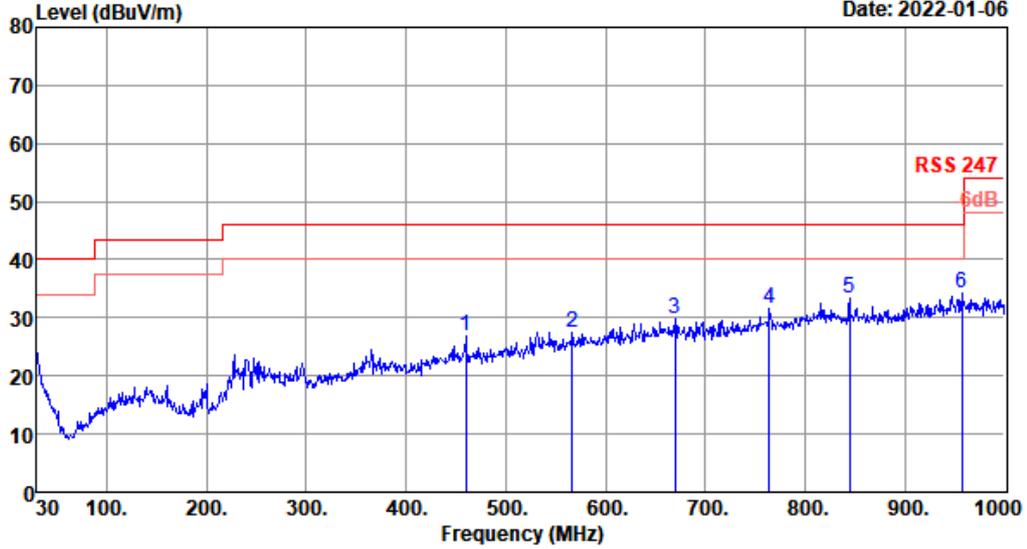
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	242.43	11.65	1.39	8.91	21.95	46.00	24.05	QP
2	663.41	21.44	2.75	4.10	28.29	46.00	17.71	QP
3	702.21	21.50	2.81	4.46	28.77	46.00	17.23	QP
4	848.68	23.91	3.17	4.48	31.56	46.00	14.44	QP
5	909.79	24.50	3.34	4.08	31.92	46.00	14.08	QP
6	959.26	24.69	4.06	4.61	33.36	46.00	12.64	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

Data: 23

File: \\EMC-966-3\test data\2022\RF\Gao Sheng Da\WKCT27M2501.EM6 (46)

Date: 2022-01-06

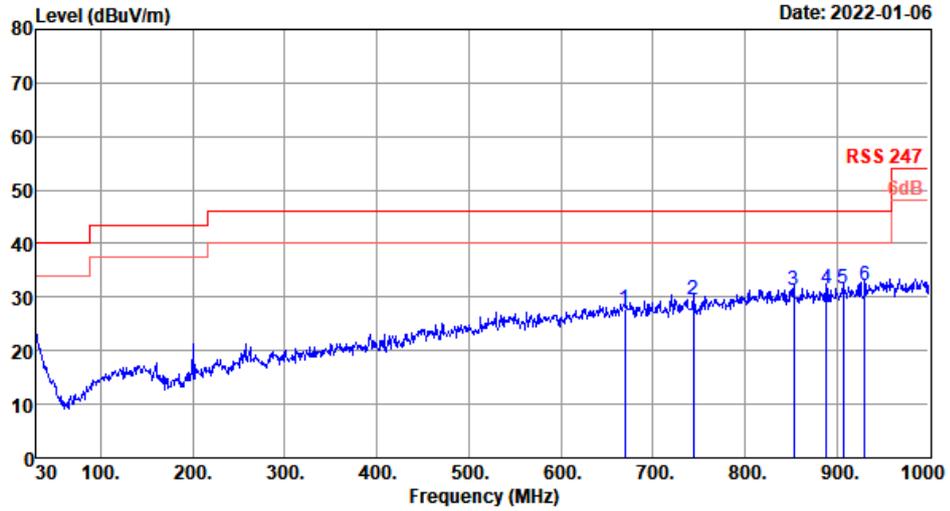


Site no. : 3# 966 Chamber Data no. : 23
 Dis. / Ant. : 3m 31218 Ant. pol. : HORIZONTAL
 Limit : RSS 247
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Carlos
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : RX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	459.71	17.70	2.24	6.94	26.88	46.00	19.12	QP
2	566.41	19.63	2.46	5.42	27.51	46.00	18.49	QP
3	669.23	21.49	2.74	5.59	29.82	46.00	16.18	QP
4	764.29	22.44	2.99	6.09	31.52	46.00	14.48	QP
5	844.80	23.55	3.15	6.52	33.22	46.00	12.78	QP
6	957.32	24.67	3.93	5.58	34.18	46.00	11.82	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

Data: 24 File: \\EMC-966-3\test data\2022\RF\Gao Sheng Dai\WKCT27M2501.EM6 (46) Date: 2022-01-06



Site no. : 3# 966 Chamber Data no. : 24
 Dis. / Ant. : 3m 31218 Ant. pol. : VERTICAL
 Limit : RSS 247
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa
 Engineer : Carlos
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : RX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	669.23	21.49	2.74	3.61	27.84	46.00	18.16	QP
2	743.92	21.84	3.11	4.48	29.43	46.00	16.57	QP
3	853.53	23.78	3.19	4.33	31.30	46.00	14.70	QP
4	888.45	23.55	3.30	4.65	31.50	46.00	14.50	QP
5	906.88	24.32	3.28	4.12	31.72	46.00	14.28	QP
6	930.16	24.10	3.54	4.58	32.22	46.00	13.78	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

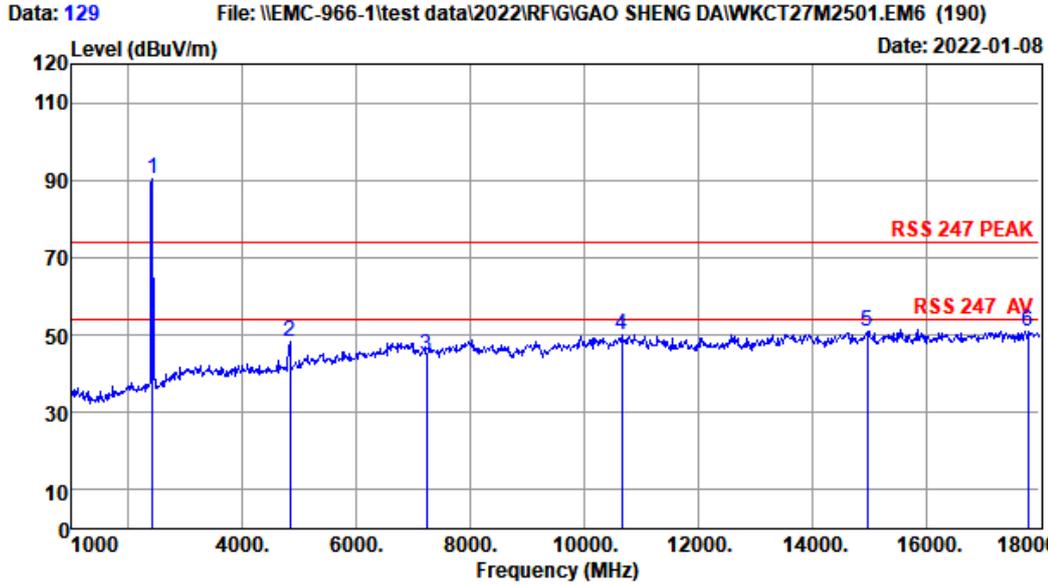
Note:

1. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
2. All channels had been pre-test, only the worst case was reported.

Radiated Emissions Above 1G

EST Technology

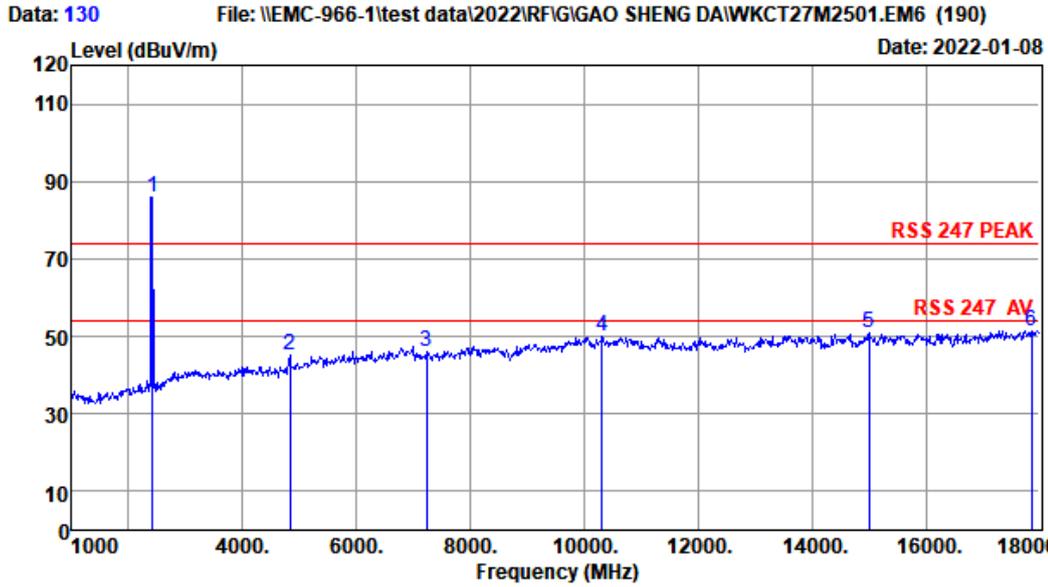
Chilingxiang, Qishantou, Santun,
Houjie, Dongguan, Guangdong, China
Tel: +86-769-83081888
Fax: +86-769-83081878



Site no. : 1# 966 Chamber Data no. : 129
 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : VERTICAL
 Limit : RSS 247 PEAK
 Env. / Ins. : Temp:22.8';Humi:51%;Press:101.52kPa
 Engineer : JBR
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : IEEE 802.11n HT20 TX 2412MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2412.00	27.28	1.46	34.64	96.06	90.16	74.00	-16.16	Peak
2	4824.00	31.18	3.26	34.67	48.40	48.17	74.00	25.83	Peak
3	7236.00	36.28	5.20	34.82	37.98	44.64	74.00	29.36	Peak
4	10656.00	39.56	6.05	34.40	38.98	50.19	74.00	23.81	Peak
5	14974.00	40.91	6.82	34.59	37.93	51.07	74.00	22.93	Peak
6	17796.00	47.27	8.11	34.32	30.04	51.10	74.00	22.90	Peak

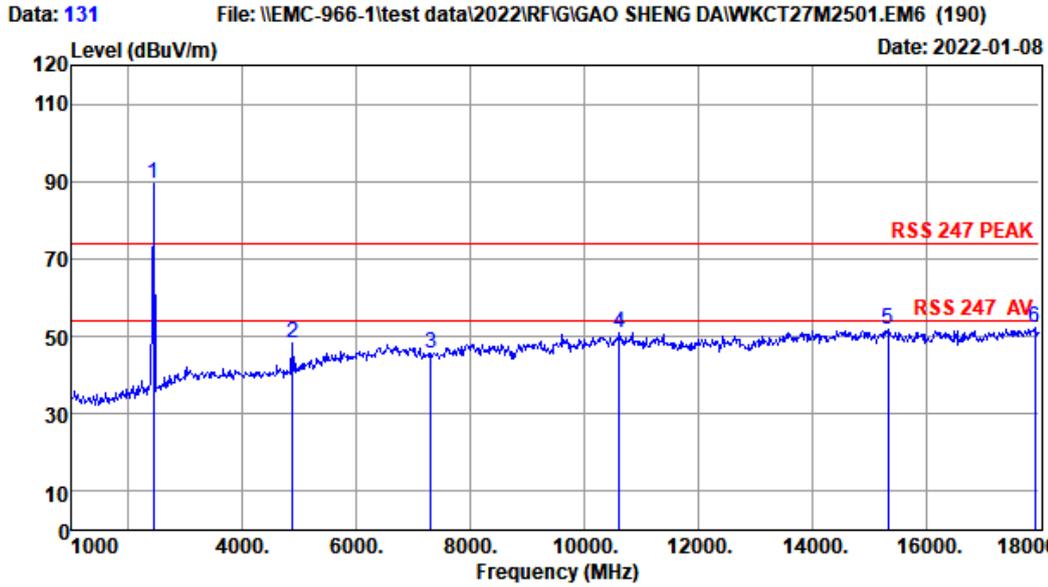
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 130
 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : HORIZONTAL
 Limit : RSS 247 PEAK
 Env. / Ins. : Temp:22.8';Humi:51%;Press:101.52kPa
 Engineer : JBR
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : IEEE 802.11n HT20 TX 2412MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2412.00	27.28	1.46	34.64	91.91	86.01	74.00	-12.01	Peak
2	4824.00	31.18	3.26	34.67	45.26	45.03	74.00	28.97	Peak
3	7236.00	36.28	5.20	34.82	39.26	45.92	74.00	28.08	Peak
4	10316.00	39.22	5.97	34.30	39.35	50.24	74.00	23.76	Peak
5	15008.00	40.90	6.81	34.60	37.82	50.93	74.00	23.07	Peak
6	17864.00	47.82	8.15	34.31	29.82	51.48	74.00	22.52	Peak

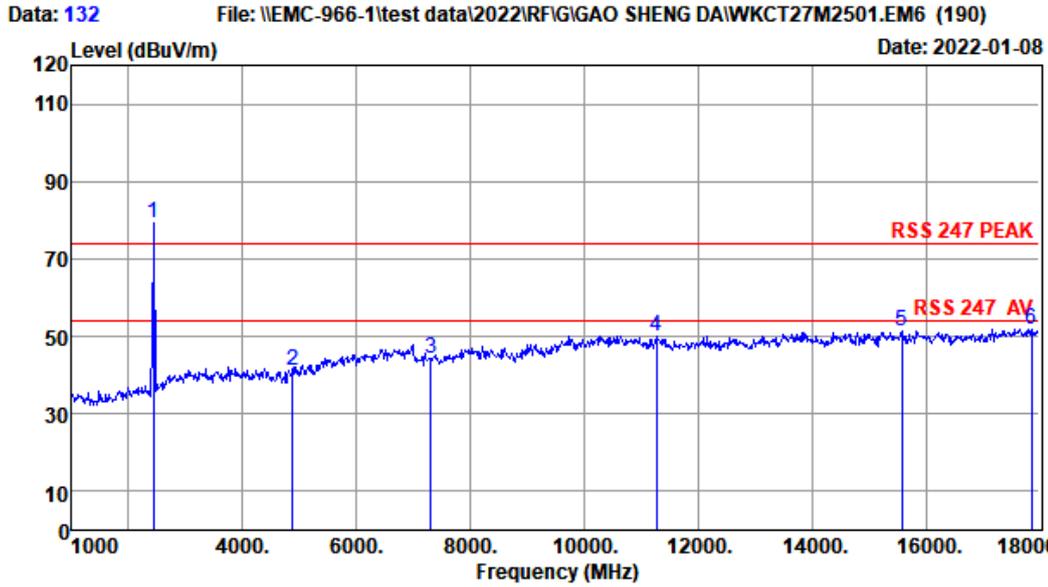
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 131
 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : VERTICAL
 Limit : RSS 247 PEAK
 Env. / Ins. : Temp:22.8';Humi:51%;Press:101.52kPa
 Engineer : JBR
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : IEEE 802.11n HT20 TX 2437MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2437.00	27.33	1.47	34.62	95.13	89.31	74.00	-15.31	Peak
2	4874.00	31.37	3.31	34.68	48.48	48.48	74.00	25.52	Peak
3	7311.00	36.42	5.22	34.83	38.75	45.56	74.00	28.44	Peak
4	10622.00	39.53	6.04	34.39	39.76	50.94	74.00	23.06	Peak
5	15331.00	40.54	6.56	34.47	39.32	51.95	74.00	22.05	Peak
6	17915.00	48.22	8.18	34.31	29.99	52.08	74.00	21.92	Peak

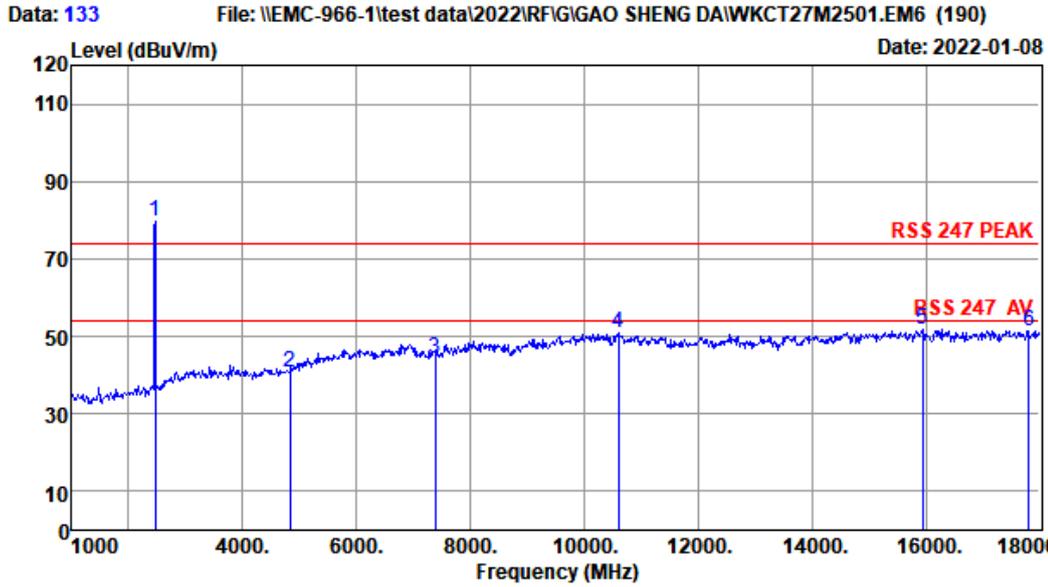
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 132
 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : HORIZONTAL
 Limit : RSS 247 PEAK
 Env. / Ins. : Temp:22.8';Humi:51%;Press:101.52kPa
 Engineer : JBR
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : IEEE 802.11n HT20 TX 2437MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2437.00	27.33	1.47	34.62	85.12	79.30	74.00	-5.30	Peak
2	4874.00	31.37	3.31	34.68	41.24	41.24	74.00	32.76	Peak
3	7311.00	36.42	5.22	34.83	37.60	44.41	74.00	29.59	Peak
4	11268.00	39.90	6.13	34.58	38.65	50.10	74.00	23.90	Peak
5	15586.00	40.26	6.51	34.37	38.82	51.22	74.00	22.78	Peak
6	17864.00	47.82	8.15	34.31	30.23	51.89	74.00	22.11	Peak

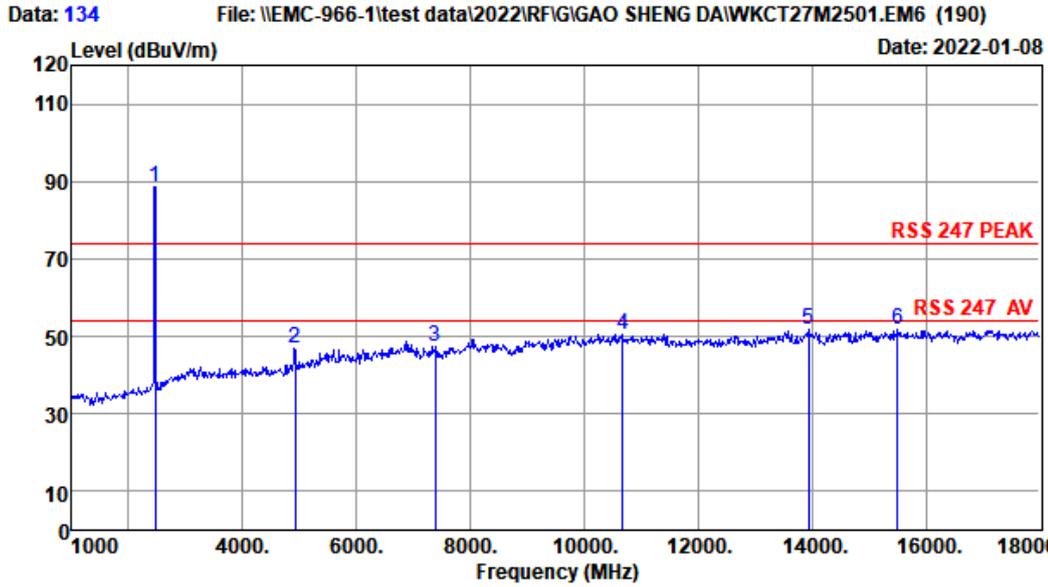
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 133
 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : HORIZONTAL
 Limit : RSS 247 PEAK
 Env. / Ins. : Temp:22.8';Humi:51%;Press:101.52kPa
 Engineer : JBR
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : IEEE 802.11n HT20 TX 2462MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2462.00	27.35	1.48	34.62	85.59	79.80	74.00	-5.80	Peak
2	4824.00	31.18	3.26	34.67	41.08	40.85	74.00	33.15	Peak
3	7386.00	36.59	5.24	34.84	37.46	44.45	74.00	29.55	Peak
4	10605.00	39.51	6.04	34.38	39.86	51.03	74.00	22.97	Peak
5	15943.00	39.86	6.86	34.22	39.14	51.64	74.00	22.36	Peak
6	17813.00	47.41	8.12	34.32	30.29	51.50	74.00	22.50	Peak

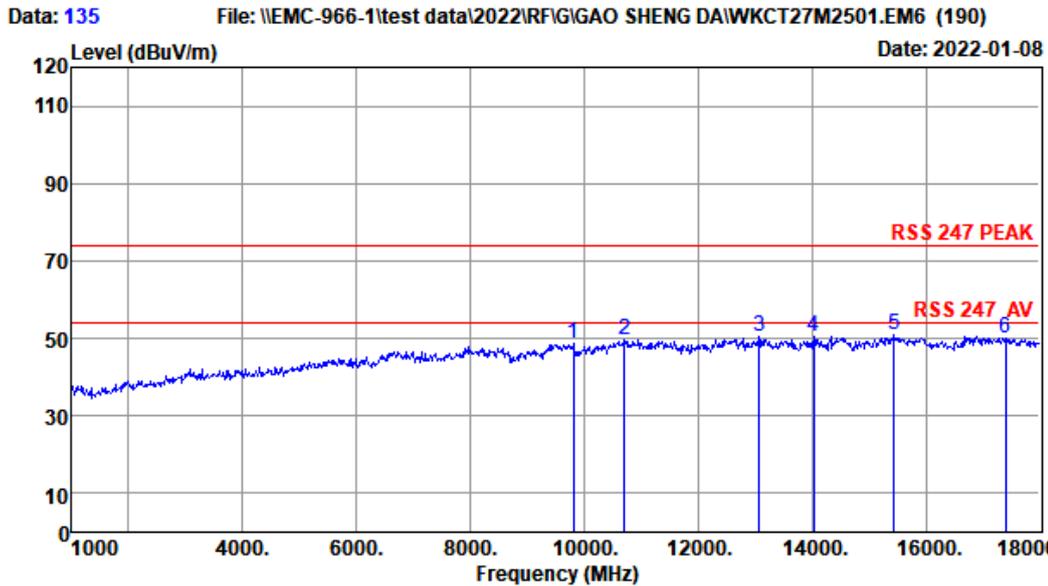
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 134
 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : VERTICAL
 Limit : RSS 247 PEAK
 Env. / Ins. : Temp:22.8';Humi:51%;Press:101.52kPa
 Engineer : JBR
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : IEEE 802.11n HT20 TX 2462MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2462.00	27.35	1.48	34.62	94.49	88.70	74.00	-14.70	Peak
2	4924.00	31.55	3.35	34.69	46.56	46.77	74.00	27.23	Peak
3	7386.00	36.59	5.24	34.84	40.34	47.33	74.00	26.67	Peak
4	10673.00	39.58	6.05	34.40	39.26	50.49	74.00	23.51	Peak
5	13937.00	40.98	6.50	34.31	38.73	51.90	74.00	22.10	Peak
6	15501.00	40.35	6.43	34.40	39.24	51.62	74.00	22.38	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

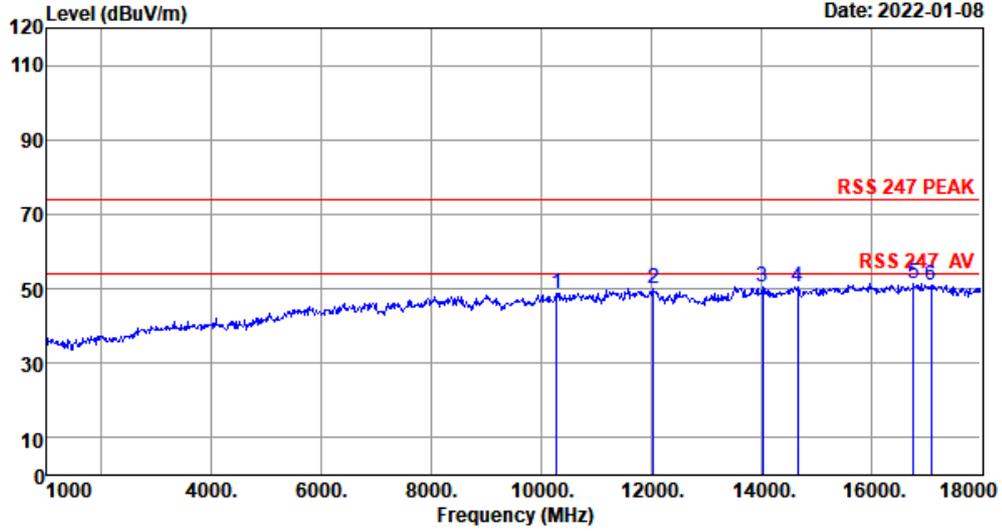


Site no. : 1# 966 Chamber Data no. : 135
 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : HORIZONTAL
 Limit : RSS 247 PEAK
 Env. / Ins. : Temp:22.8';Humi:51%;Press:101.52kPa
 Engineer : JBR
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : RX Mode

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	9806.00	38.52	5.74	34.24	38.88	48.90	74.00	25.10	Peak
2	10707.00	39.61	6.06	34.41	38.27	49.53	74.00	24.47	Peak
3	13070.00	39.52	6.28	34.39	39.18	50.59	74.00	23.41	Peak
4	14039.00	41.09	6.56	34.31	37.32	50.66	74.00	23.34	Peak
5	15450.00	40.41	6.47	34.42	38.27	50.73	74.00	23.27	Peak
6	17405.00	44.15	7.82	34.36	32.62	50.23	74.00	23.77	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

Data: 136 File: \\EMC-966-1\test data\2022\RF\GIGAO SHENG DAI\WKCT27M2501.EM6 (190) Date: 2022-01-08



Site no. : 1# 966 Chamber Data no. : 136
 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : VERTICAL
 Limit : RSS 247 PEAK
 Env. / Ins. : Temp:22.8';Humi:51%;Press:101.52kPa
 Engineer : JBR
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : RX Mode

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	10282.00	39.19	5.96	34.29	37.95	48.81	74.00	25.19	Peak
2	12050.00	39.87	5.93	34.78	39.18	50.20	74.00	23.80	Peak
3	14039.00	41.09	6.56	34.31	37.20	50.54	74.00	23.46	Peak
4	14668.00	40.97	6.87	34.50	37.20	50.54	74.00	23.46	Peak
5	16776.00	40.66	7.29	34.36	37.68	51.27	74.00	22.73	Peak
6	17099.00	41.71	7.52	34.39	36.12	50.96	74.00	23.04	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

Note:

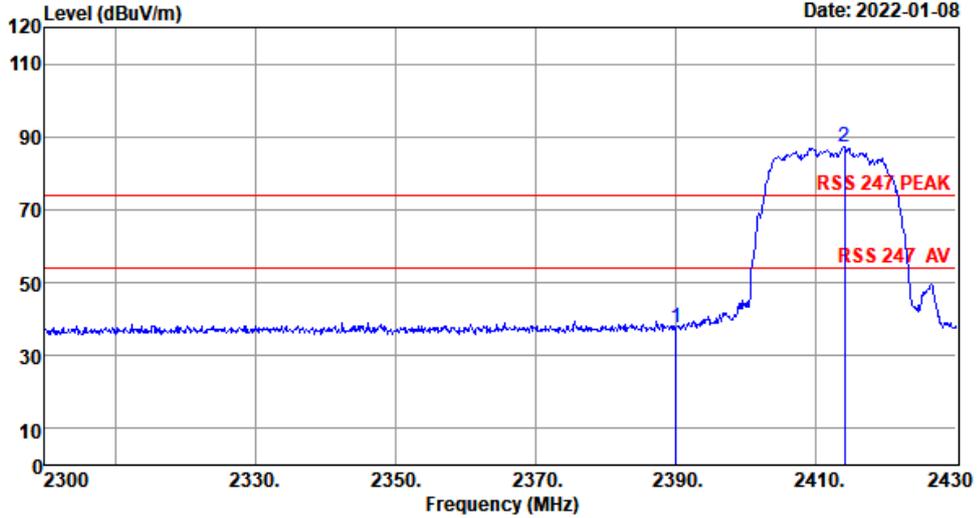
1. The amplitude of 18GHz to 25GHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Radiated Band Edge

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan, Guangdong, China
Tel: +86-769-83081888
Fax: +86-769-83081878

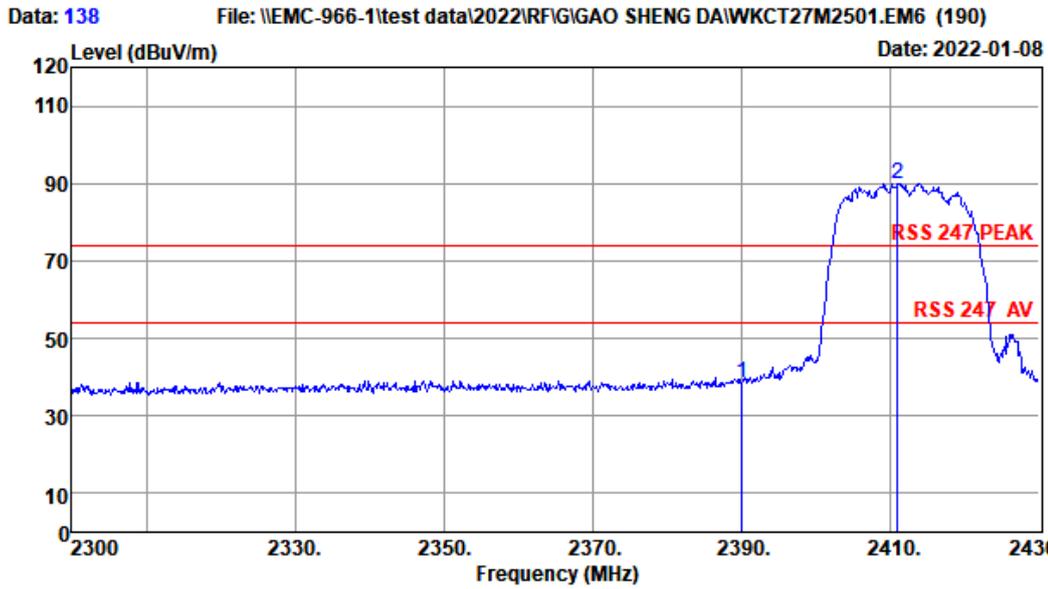
Data: 137 File: \\EMC-966-1\test data\2022\RF\FIGIAO SHENG DAI\WKCT27M2501.EM6 (190) Date: 2022-01-08



Site no. : 1# 966 Chamber Data no. : 137
 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : HORIZONTAL
 Limit : RSS 247 PEAK
 Env. / Ins. : Temp:22.8';Humi:51%;Press:101.52kPa
 Engineer : JBR
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : IEEE 802.11n HT20 TX 2412MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	27.26	1.45	34.64	43.72	37.79	74.00	36.21	Peak
2	2414.01	27.28	1.46	34.64	93.13	87.23	74.00	-13.23	Peak

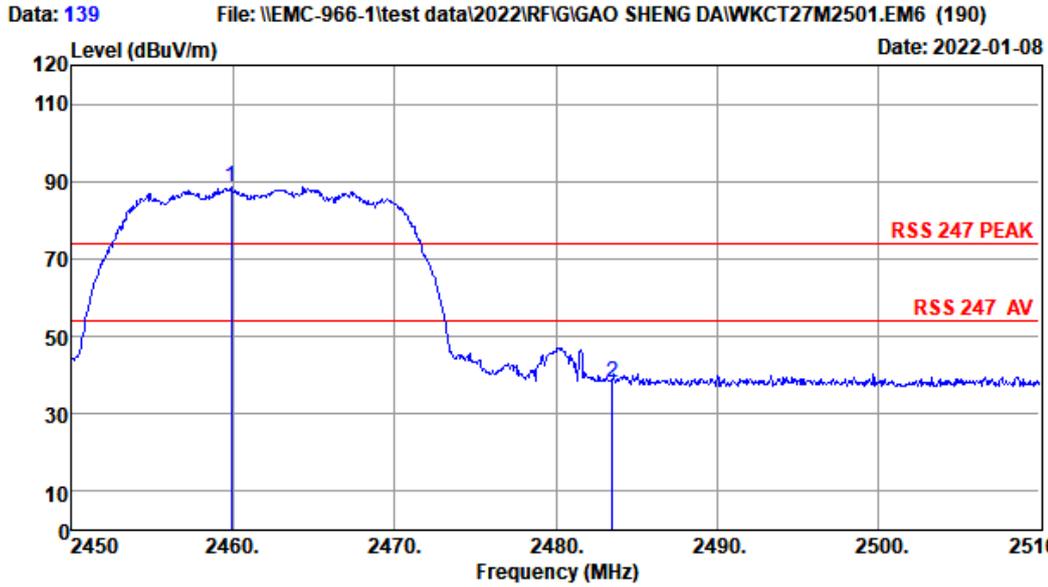
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 138
 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : VERTICAL
 Limit : RSS 247 PEAK
 Env. / Ins. : Temp:22.8';Humi:51%;Press:101.52kPa
 Engineer : JBR
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : IEEE 802.11n HT20 TX 2412MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	27.26	1.45	34.64	44.59	38.66	74.00	35.34	Peak
2	2410.89	27.28	1.46	34.64	95.93	90.03	74.00	-16.03	Peak

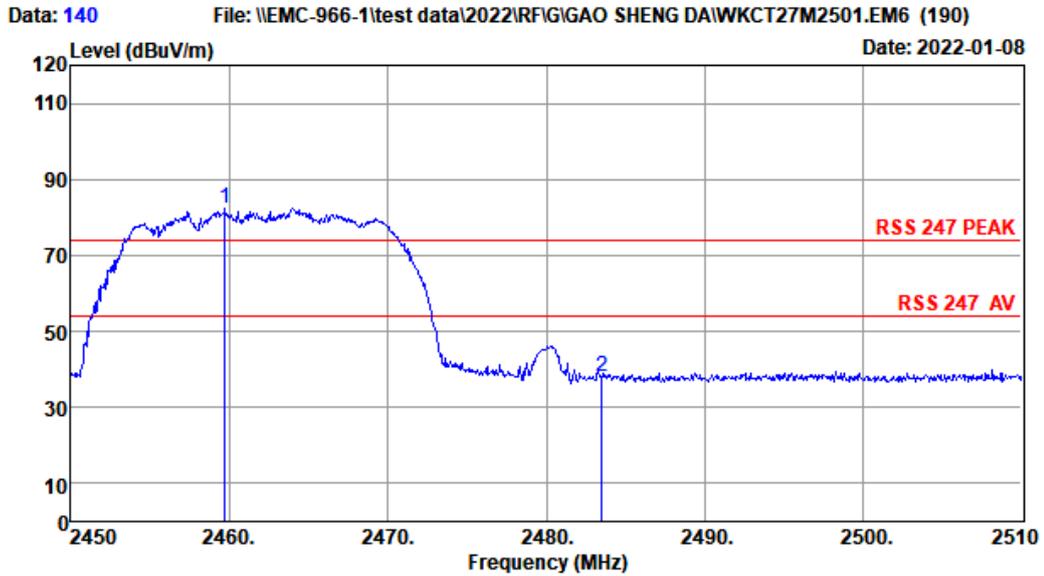
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 139
 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : VERTICAL
 Limit : RSS 247 PEAK
 Env. / Ins. : Temp:22.8';Humi:51%;Press:101.52kPa
 Engineer : JBR
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : IEEE 802.11n HT20 TX 2462MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2459.90	27.35	1.48	34.62	94.36	88.57	74.00	-14.57	Peak
2	2483.50	27.38	1.48	34.61	43.94	38.19	74.00	35.81	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 140
 Dis. / Ant. : 3m ANT9120D 1-18G Ant. pol. : HORIZONTAL
 Limit : RSS 247 PEAK
 Env. / Ins. : Temp:22.8';Humi:51%;Press:101.52kPa
 Engineer : JBR
 EUT : WIFI+BT Module
 Power : DC 3.3V
 M/N : WKCT27M2501
 Test Mode : IEEE 802.11n HT20 TX 2462MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2459.72	27.35	1.48	34.62	88.34	82.55	74.00	-8.55	Peak
2	2483.50	27.38	1.48	34.61	43.91	38.16	74.00	35.84	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

Note:

1. All channels had been pre-test, only of the worst case channels were reported.

9. AC POWER LINE CONDUCTED EMISSIONS

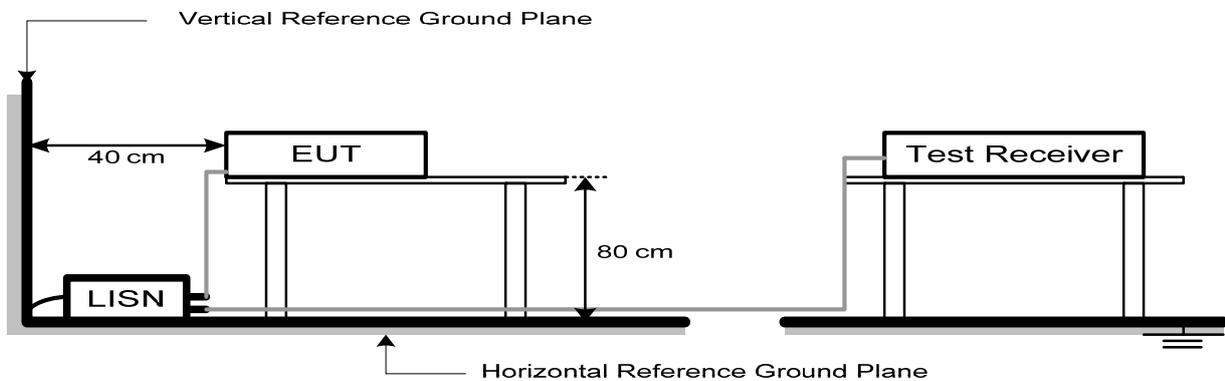
9.1. Limit

Frequency (MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

Note:

1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

9.2. Test Setup



9.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP/AVG
Trace Mode	Max Hold

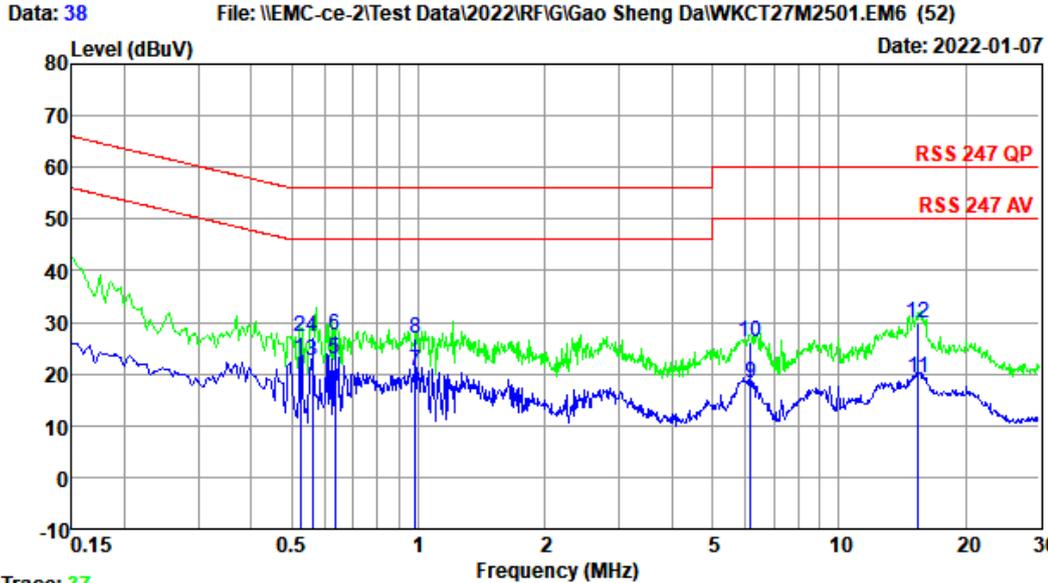
9.4. Test Procedure

- a. The EUT was placed on a non-metallic table, 80cm above the ground plane.
- b. The EUT Power connected to the power mains through a line impedance stabilization network.
- c. Provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).
- d. Set the EUT transmit continuously with maximum output power.
- e. Spectrum analyzer setting parameters in accordance with section 9.3.
- f. The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.
- g. Record the results in the test report.

9.5. Test Result

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan, Guangdong, China
Tel: +86-769-83081888
Fax: +86-769-83081878

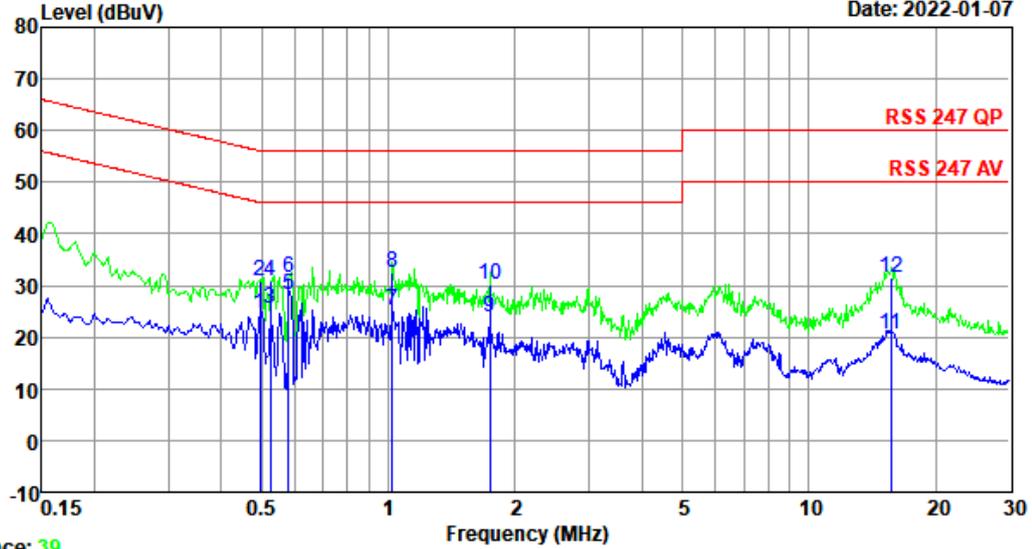


Trace: 37
 Site no. : 2#CE Shield Room Data no. : 38
 Env. / Ins. : Temp:22.8°C Humi:58% Press:101.30kPa. : LINE
 Limit : RSS 247 QP
 Engineer : ZSX
 EUT : WIFI+BT Module
 Power : DC 3.3V From PC Input AC 120V/60Hz
 M/N : WKCT27M2501
 Test Mode : TX Mode

	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.5238	9.84	0.05	13.14	23.03	46.00	22.97	Average
2	0.5238	9.84	0.05	17.44	27.33	56.00	28.67	QP
3	0.5611	9.84	0.05	12.55	22.44	46.00	23.56	Average
4	0.5611	9.84	0.05	17.39	27.28	56.00	28.72	QP
5	0.6338	9.83	0.05	13.00	22.88	46.00	23.12	Average
6	0.6338	9.83	0.05	17.63	27.51	56.00	28.49	QP
7	0.9839	9.94	0.06	10.57	20.57	46.00	25.43	Average
8	0.9839	9.94	0.06	16.70	26.70	56.00	29.30	QP
9	6.1534	9.90	0.07	8.31	18.28	50.00	31.72	Average
10	6.1534	9.90	0.07	16.17	26.14	60.00	33.86	QP
11	15.4701	9.86	0.08	9.30	19.24	50.00	30.76	Average
12	15.4701	9.86	0.08	19.93	29.87	60.00	30.13	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Data: 40 File: \\EMC-ce-2\Test Data\2022\RF\G\Gao Sheng Da\WKCT27M2501.EM6 (52) Date: 2022-01-07



Trace: 39
 Site no. : 2#CE Shield Room Data no. : 40
 Env. / Ins. : Temp:22.8°C Humi:58% Press:101.30kPa. : NEUTRAL
 Limit : RSS 247 QP
 Engineer : ZSX
 EUT : WIFI+BT Module
 Power : DC 3.3V From PC Input AC 120V/60Hz
 M/N : WKCT27M2501
 Test Mode : TX Mode

	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.4941	9.76	0.05	14.69	24.50	46.10	21.60	Average
2	0.4941	9.76	0.05	20.95	30.76	56.10	25.34	QP
3	0.5238	9.76	0.05	15.59	25.40	46.00	20.60	Average
4	0.5238	9.76	0.05	20.92	30.73	56.00	25.27	QP
5	0.5792	9.75	0.05	18.47	28.27	46.00	17.73	Average
6	0.5792	9.75	0.05	21.68	31.48	56.00	24.52	QP
7	1.0211	9.82	0.06	15.37	25.25	46.00	20.75	Average
8	1.0211	9.82	0.06	22.76	32.64	56.00	23.36	QP
9	1.7437	9.91	0.06	13.83	23.80	46.00	22.20	Average
10	1.7437	9.91	0.06	20.26	30.23	56.00	25.77	QP
11	15.6349	10.13	0.08	10.24	20.45	50.00	29.55	Average
12	15.6349	10.13	0.08	21.36	31.57	60.00	28.43	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

10. TRANSMIT ANTENNA

10.1. Limit

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

10.2. Test Result

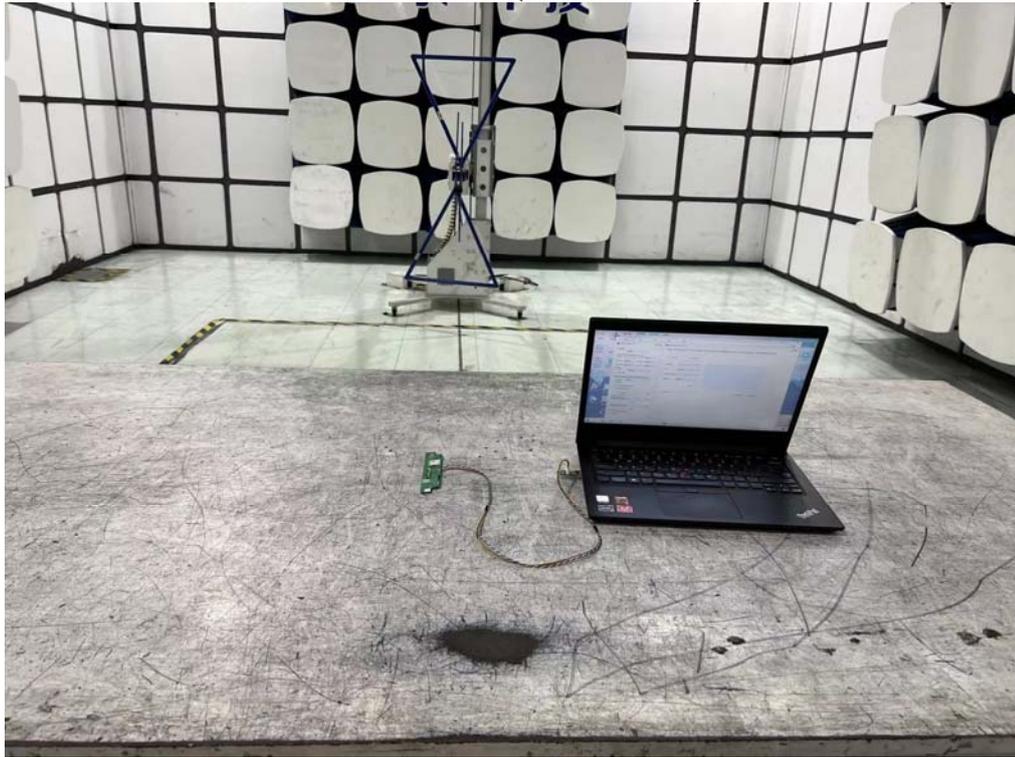
All antennas are listed in section 1.2. And the antennas used for this product is PCB antenna, So the notice does not need to be displayed in the user manual.

11. TEST SETUP PHOTO

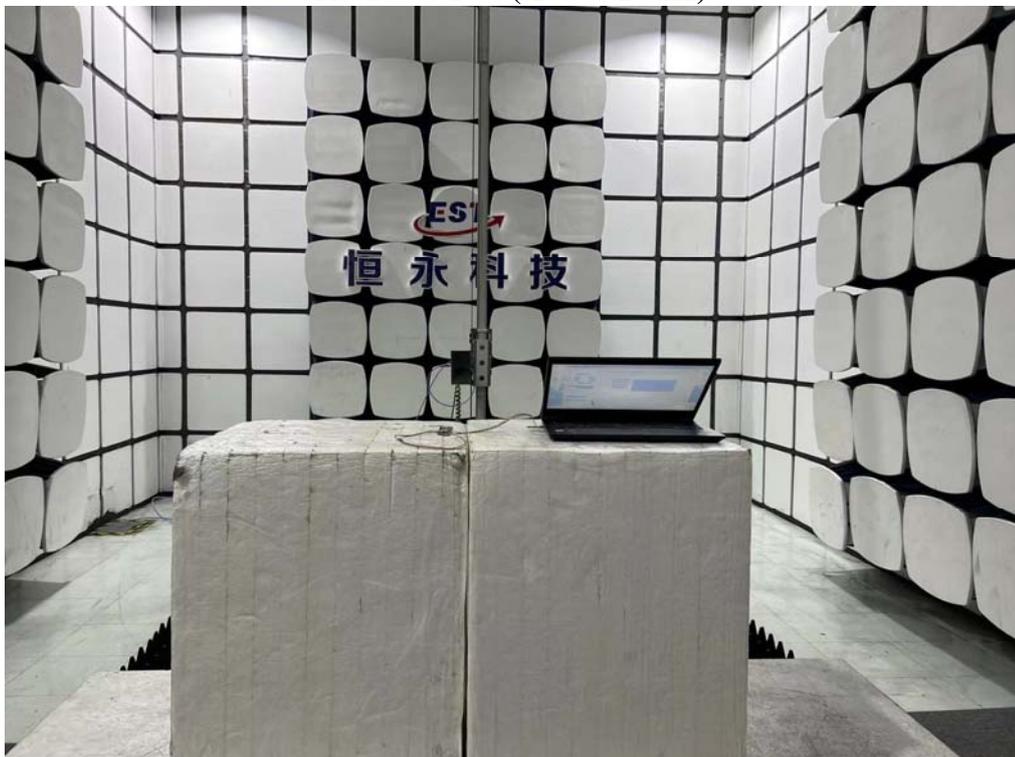
Conducted Test



Radiated Test (Below 1GHz)

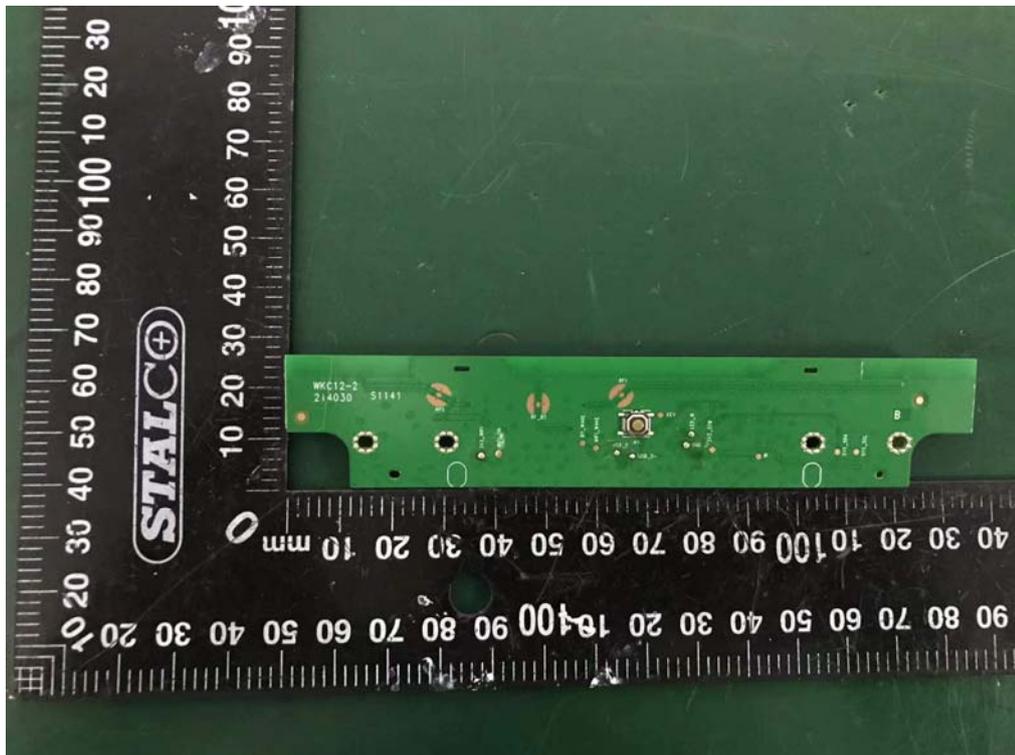
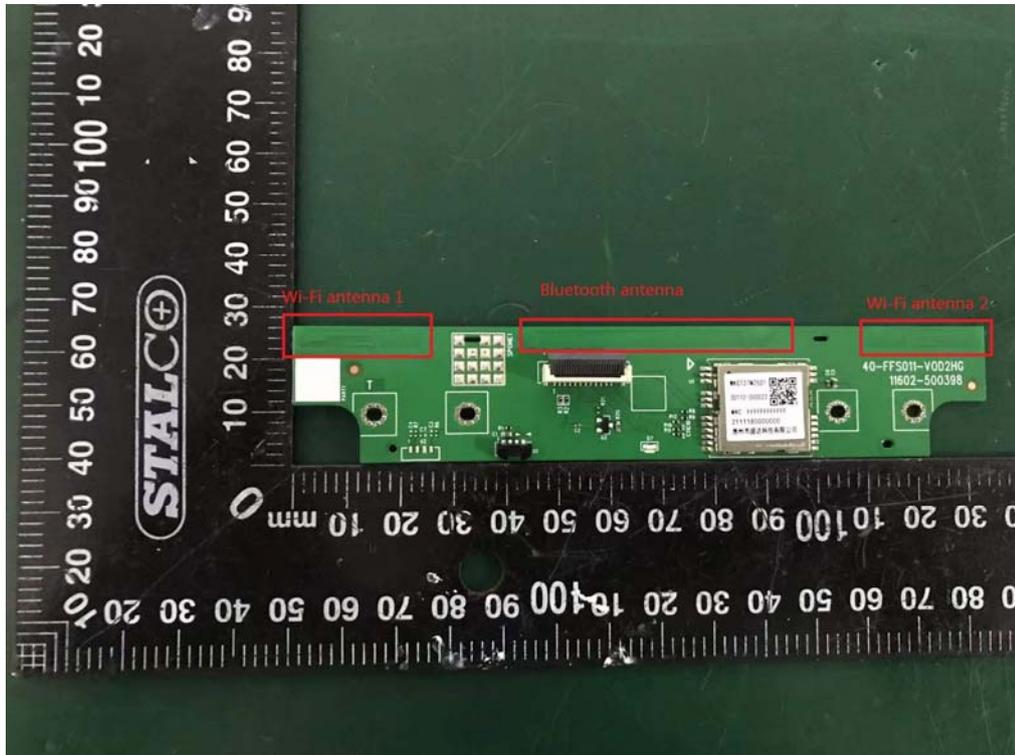


Radiated Test (Above 1GHz)

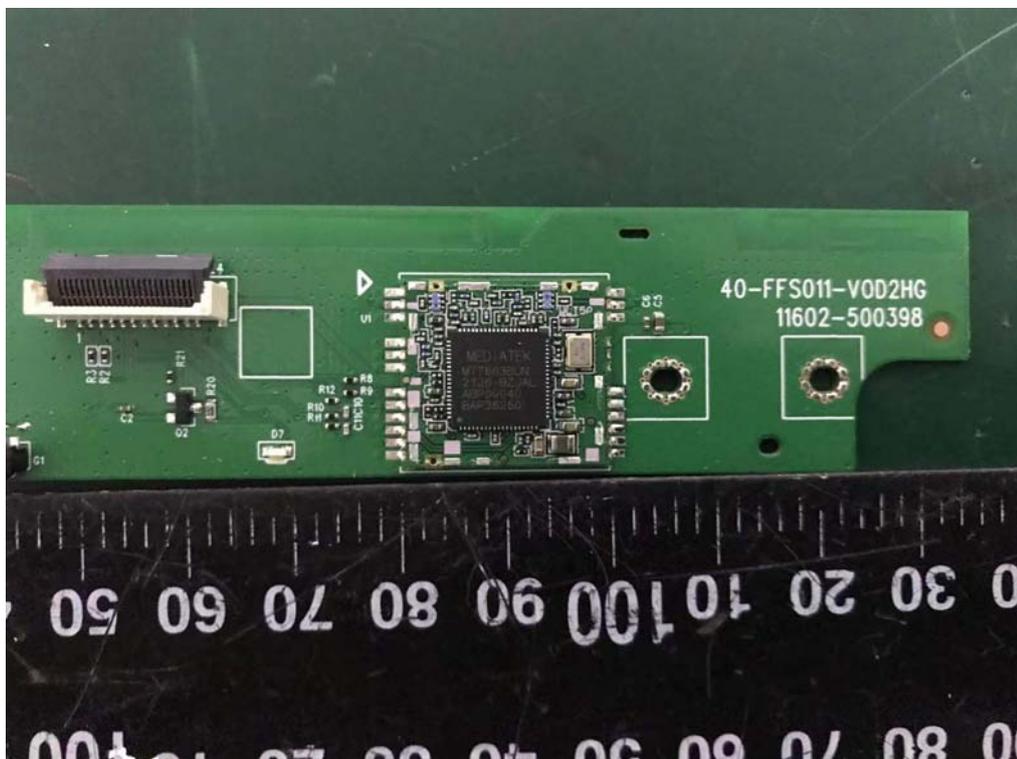
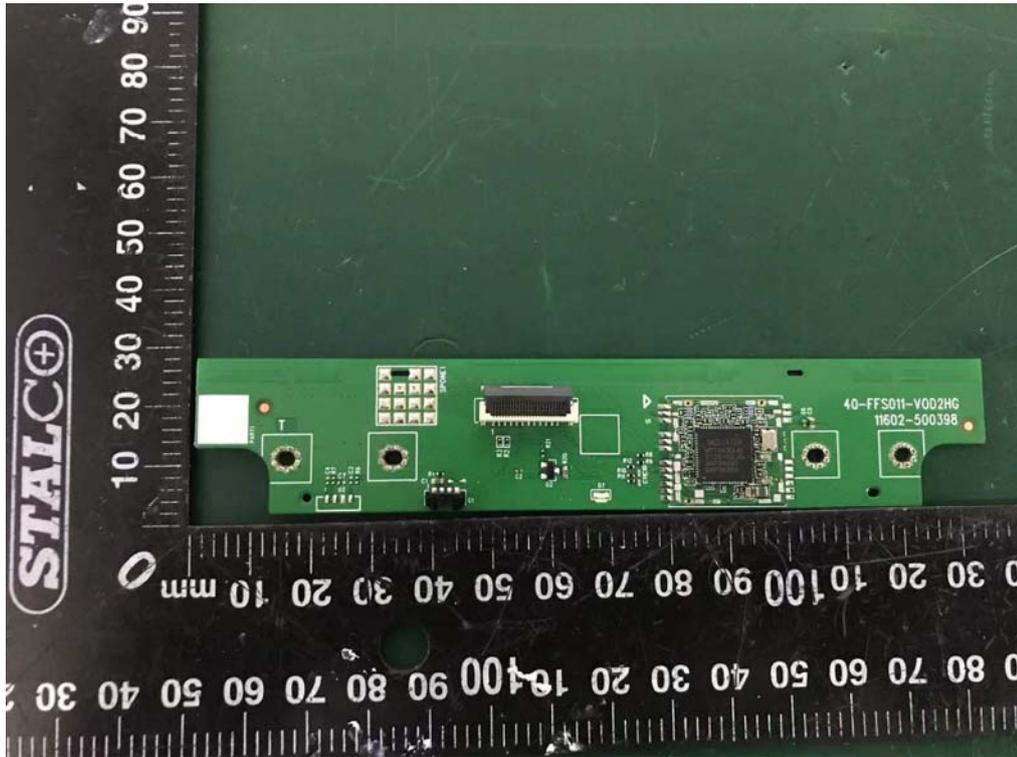


12. EUT PHOTO

External Photos
M/N: WKCT27M2501



Internal Photos
M/N: WKCT27M2501



End of Test Report