FCC RF Test Report

APPLICANT	:	Ningbo Lingzhu Technology CO., Ltd.
EQUIPMENT	:	Control Panel MAX
MODEL NAME	:	TPA10-M2U,TPA10-M2X
FCC ID	:	2A789-TPA10
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System
TEST DATE(S)	:	May 19, 2023 ~ Jun. 01, 2023

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED
Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

TABLE OF CONTENTS

REVISION HISTORY **3**
SUMMARY OF TEST RESULT **4**
1 GENERAL DESCRIPTION **5**
1.1 Applicant 5
1.2 Manufacturer 5
1.3 Product Feature of Equipment Under Test 5
1.4 Product Specification of Equipment Under Test 5
1.5 Modification of EUT 5
1.6 Testing Location 6
1.7 Test Software 6
1.8 Applicable Standards 6
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST **7**
2.1 Carrier Frequency and Channel 7
2.2 Test Mode 8
2.3 Connection Diagram of Test System 9
2.4 Support Unit used in test configuration and system 9
2.5 EUT Operation Test Setup 10
2.6 Measurement Results Explanation Example 10
3 TEST RESULT **11**
3.1 6dB and 99% Bandwidth Measurement 11
3.2 Output Power Measurement 13
3.3 Power Spectral Density Measurement 14
3.4 Conducted Band Edges and Spurious Emission Measurement 16
3.5 Radiated Band Edges and Spurious Emission Measurement 29
3.6 AC Conducted Emission Measurement 33
3.7 Antenna Requirements 35
4 LIST OF MEASURING EQUIPMENT **36**
5 MEASUREMENT UNCERTAINTY **37**
APPENDIX A. CONDUCTED TEST RESULTS
APPENDIX B. AC CONDUCTED EMISSION TEST RESULT
APPENDIX C. RADIATED SPURIOUS EMISSION AND PLOTS
APPENDIX D. DUTY CYCLE PLOTS
APPENDIX E. SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR350402C	Rev. 01	Initial issue of report	Aug. 18, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Report Only	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 7.81 dB at 2483.50 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 6.82 dB at 0.297 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Ningbo Lingzhu Technology CO., Ltd.
No.578,Building 7,No.535 Kangqiao South Road,Jiangbei District,Ningbo,PRC

1.2 Manufacturer

Ningbo Lingzhu Technology CO., Ltd.
No.578,Building 7,No.535 Kangqiao South Road,Jiangbei District,Ningbo,PRC

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Control Panel MAX
Model Name	TPA10-M2U,TPA10-M2X
FCC ID	2A789-TPA10
SN	RSE: FWAED13ZJ0007D Conducted: ZNVEC28KL00004 Conduction: ZNVEC28KL00017
HW Version	V1.0
SW Version	V2.X.X

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The two model name are only for different markets purpose, no other difference.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to antenna	802.11b : 17.84 dBm (0.0608 W) 802.11g : 24.01 dBm (0.2518 W) 802.11n HT20 : 22.61 dBm (0.1824 W) 802.11n HT40 : 23.06 dBm (0.2023 W)
99% Occupied Bandwidth	802.11b : 14.840 MHz 802.11g : 16.833 MHz 802.11n HT20 : 17.882 MHz 802.11n HT40 : 35.764 MHz
Antenna Type / Gain	IPEX Antenna type with gain 3.91 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-KS 03CH08-KS TH01-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH08-KS	AUDIX	E3	6.2009-8-24al
2.	CO01-KS	AUDIX	E3	6.2009-8-24

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437	-	-

2.2 Test Mode

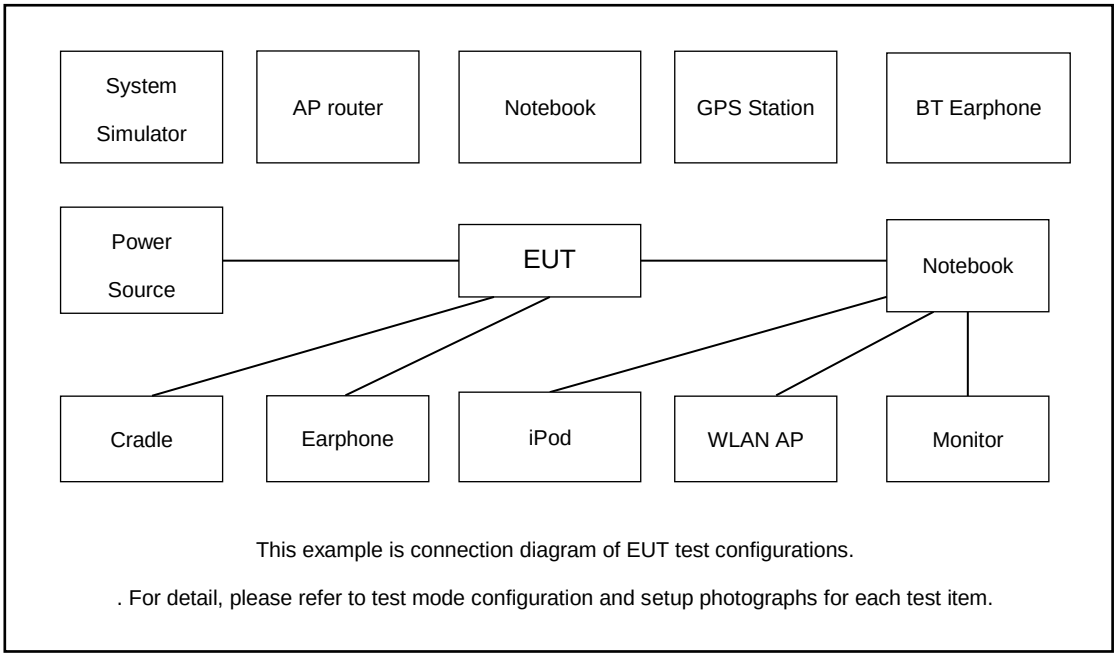
Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

Test Cases	
AC Conducted Emission	Mode 1 :Bluetooth Link + WLAN Link(2.4G) + AC 120V/60Hz + Notebook(RJ45 Link) + Lamp bulb(L1) + Lamp bulb(L2)

Simultaneous transmission
Bluetooth-LE 1M_CH00 + Zigbee_CH26 + WLAN 11n HT40_CH09

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
2.	Notebook	Lenovo	V130-15IKB005	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
3.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
4.	Lamp bulb	NA	N/A	N/A	N/A	N/A
5.	Lamp bulb	NA	N/A	N/A	N/A	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5.60 dB

Offset(dB) = RF cable loss(dB)

= 5.60(dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

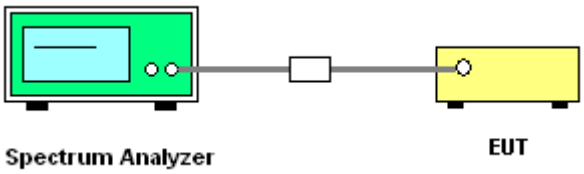
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

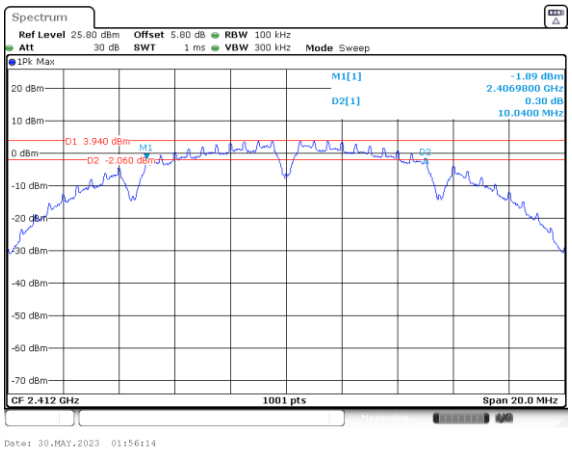
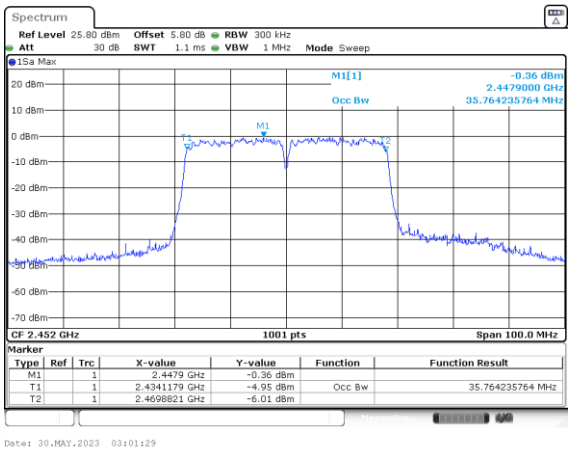
1. The testing follows ANSI C63.10-2013 clause 11.8
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1%~5% of OBW and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.

Minimum 6dB Bandwidth	Maximum 99% Occupied Bandwidth
	

Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

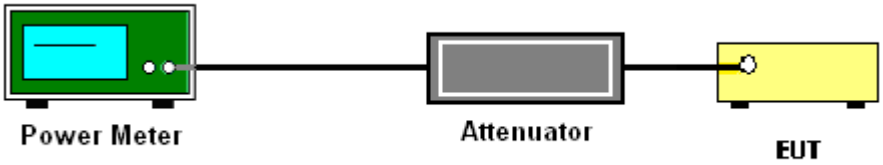
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter or ANSI C63.10-2013 clause 11.9.2.3.1 Method AVGPM method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.2.6 Test Result of Average Output Power (Reporting Only)

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

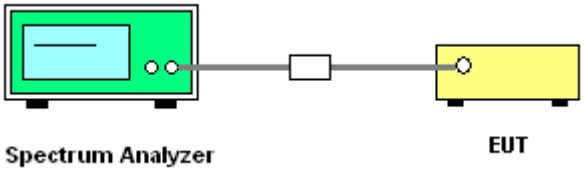
3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The testing follows Measurement Procedure of ANSI C63.10-2013 clause 11.10.2 Method PKPSD.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.

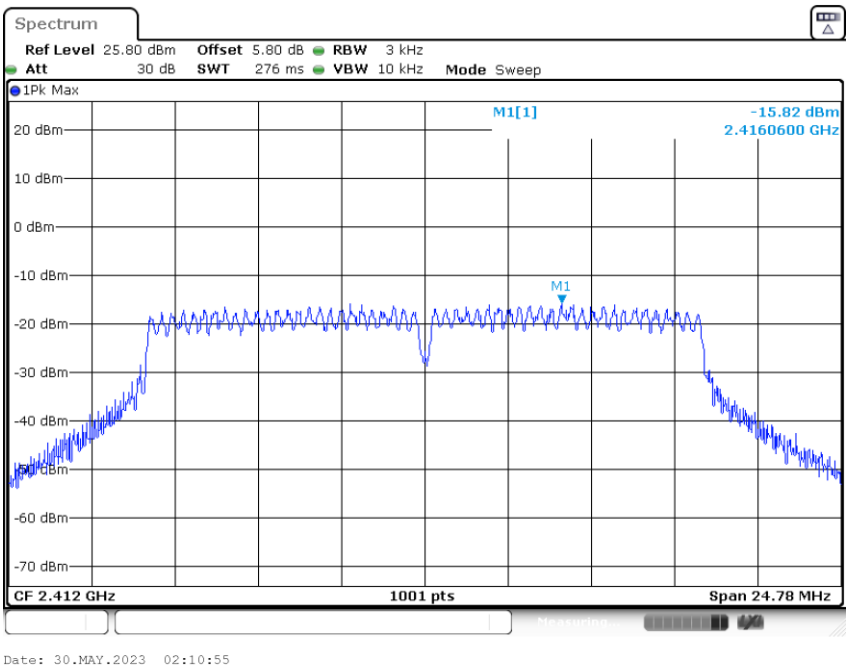
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/3kHz)



3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

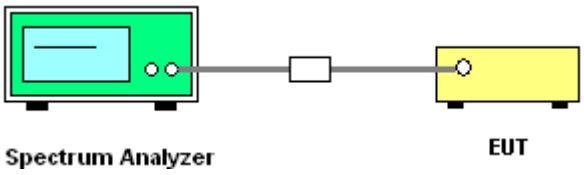
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.11
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup

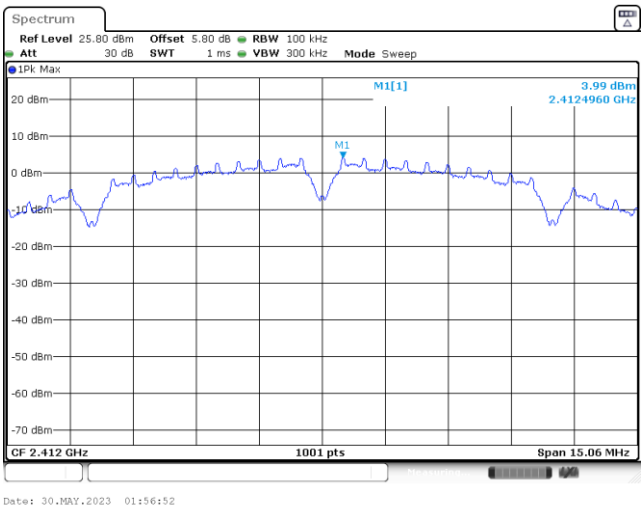


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

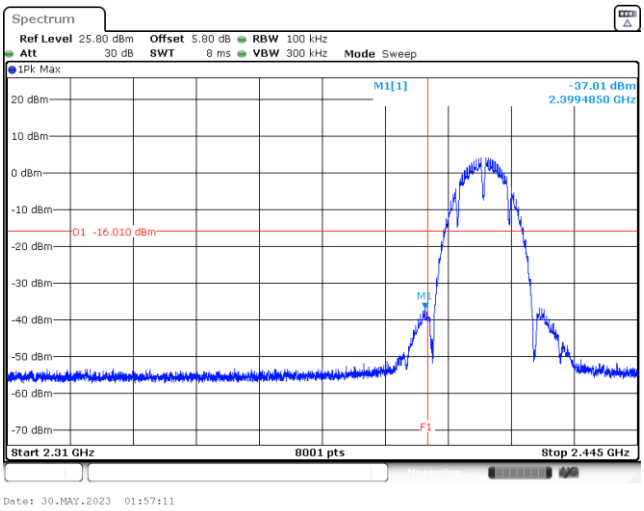
Test Engineer :	Jacob Zhang	**Temperature :**	20~26℃
		Relative Humidity :	40~51%

Test Mode :	802.11b	**Test Channel :**	01

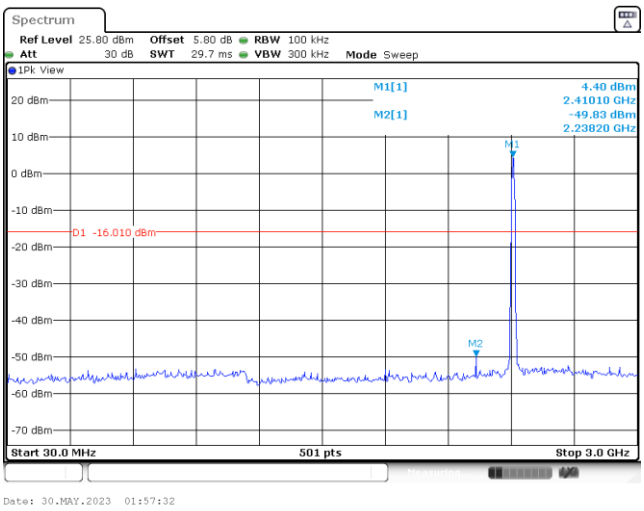
100kHz PSD reference Level



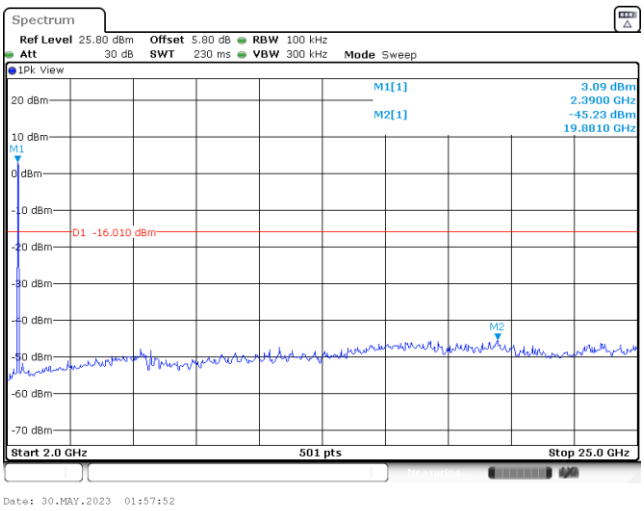
Channel Plot



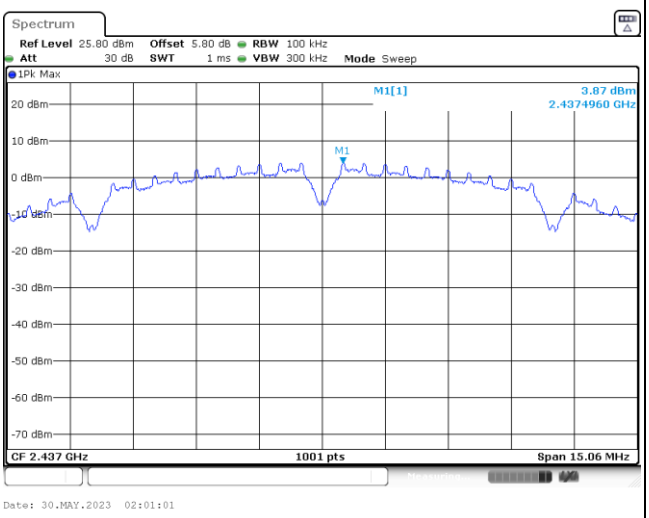
Spurious Emission 30MHz~3GHz

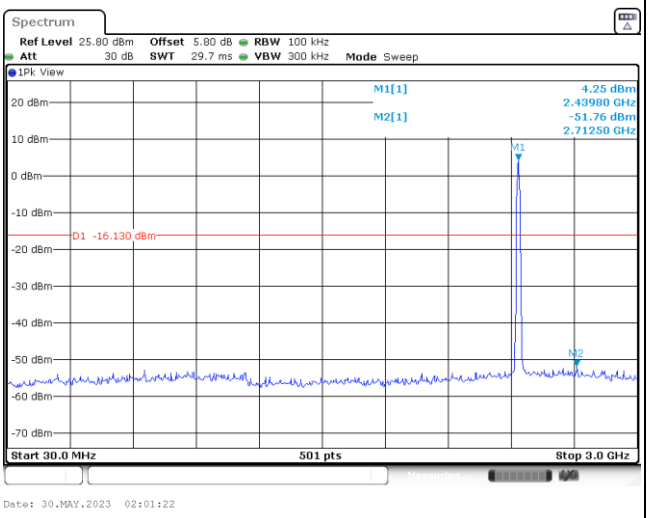
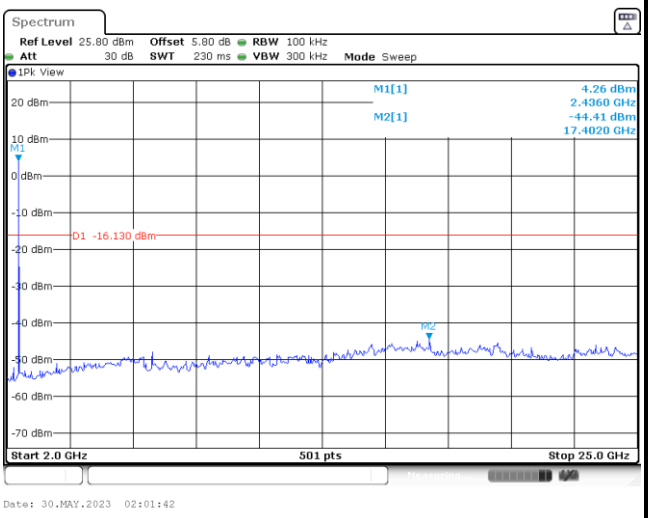


Spurious Emission 2GHz~25GHz

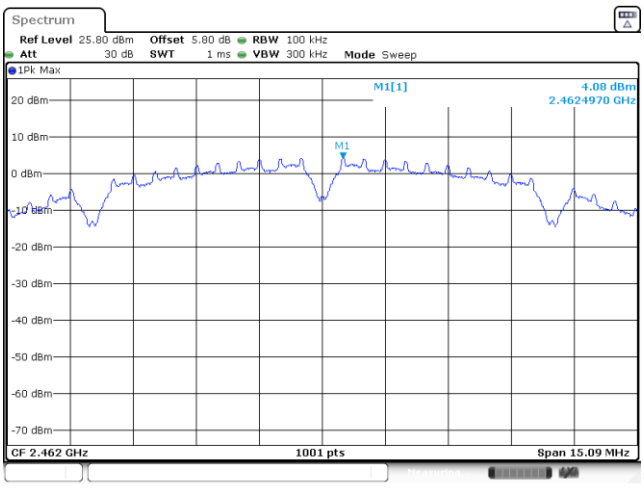
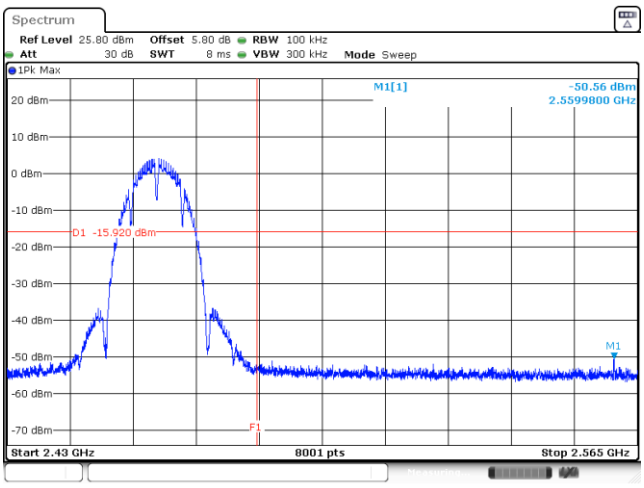
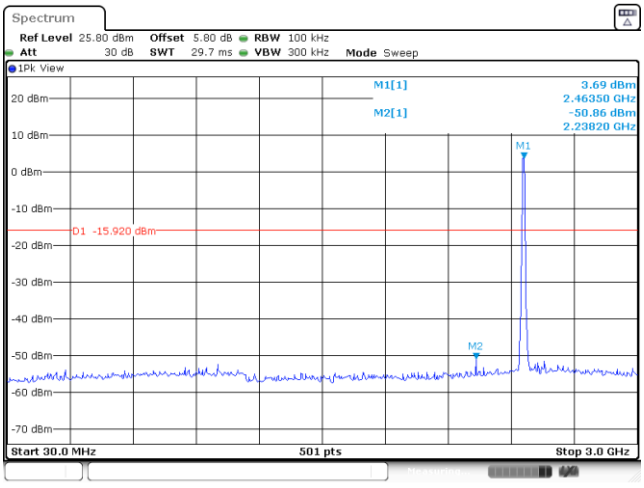
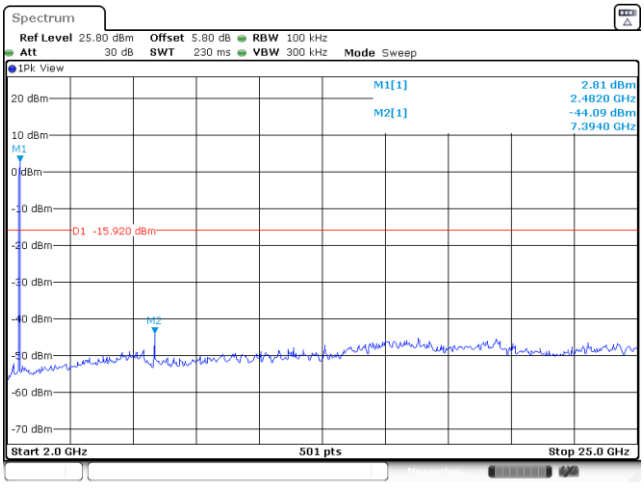


Test Mode :	802.11b	Test Channel :	06

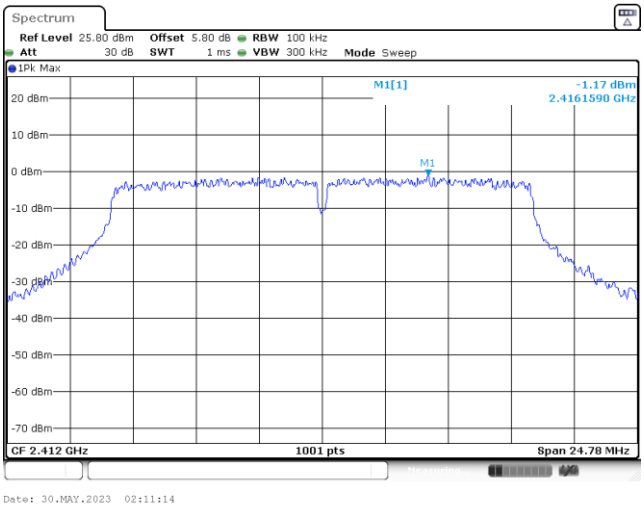
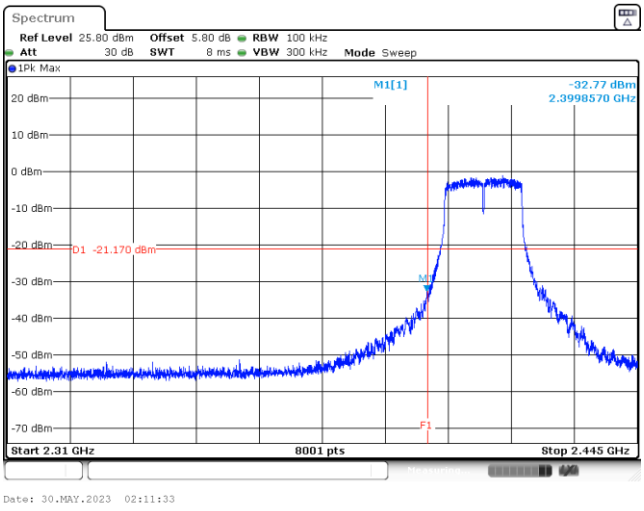
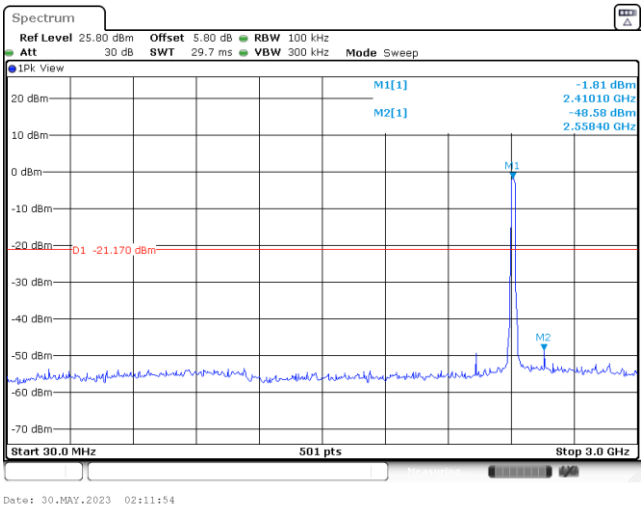
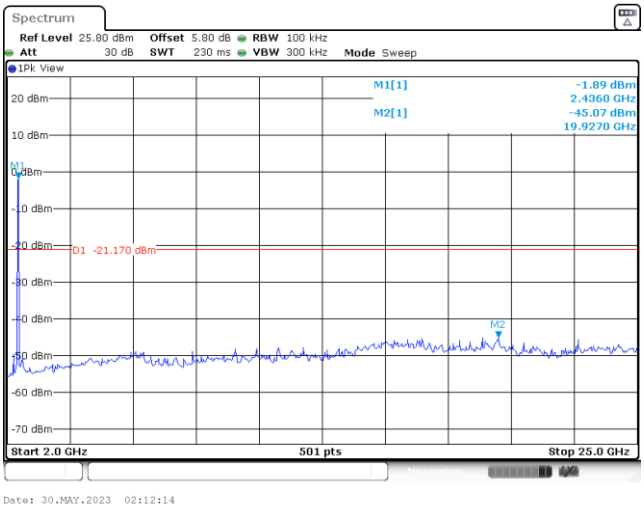
100kHz PSD reference Level	Channel Plot
	-

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

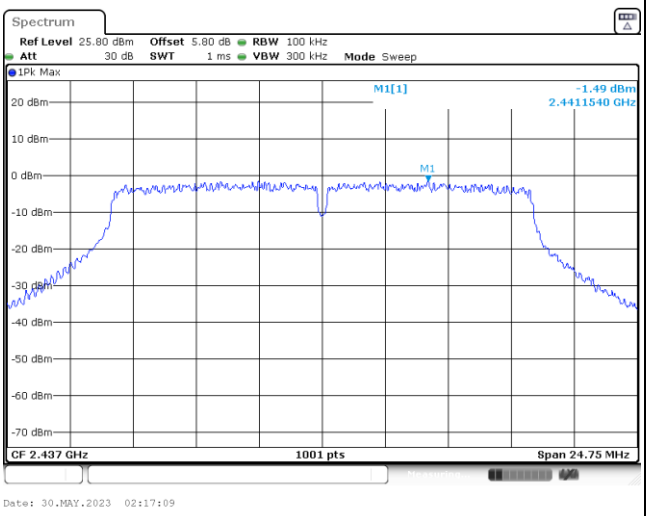
Test Mode :	802.11b	Test Channel :	11

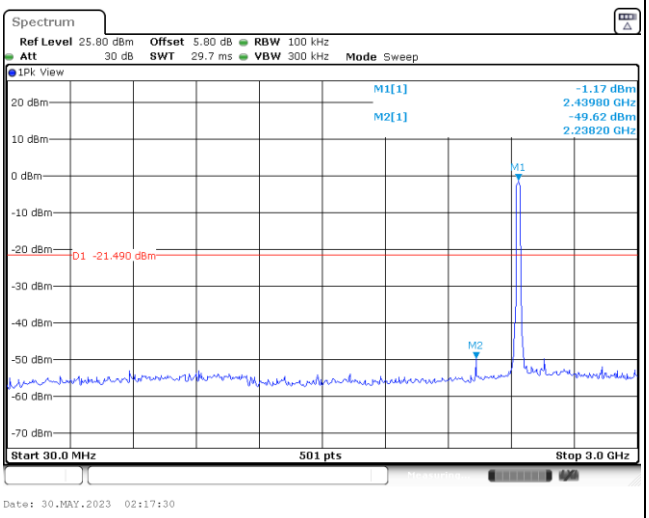
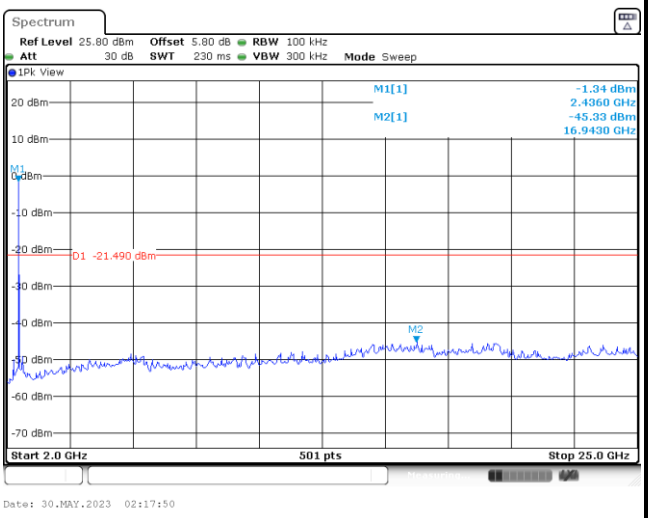
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11g	Test Channel :	01

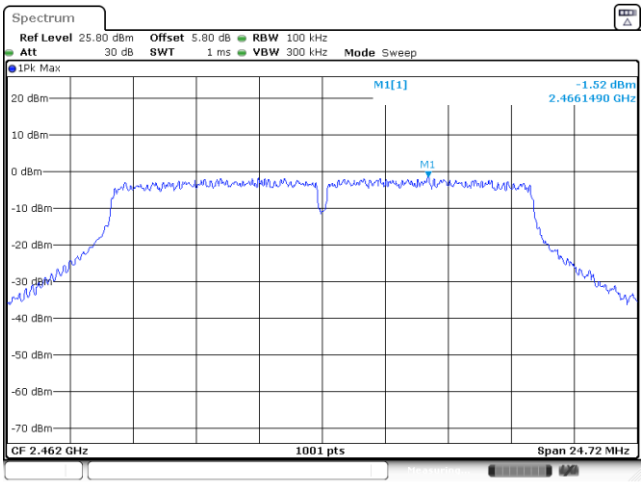
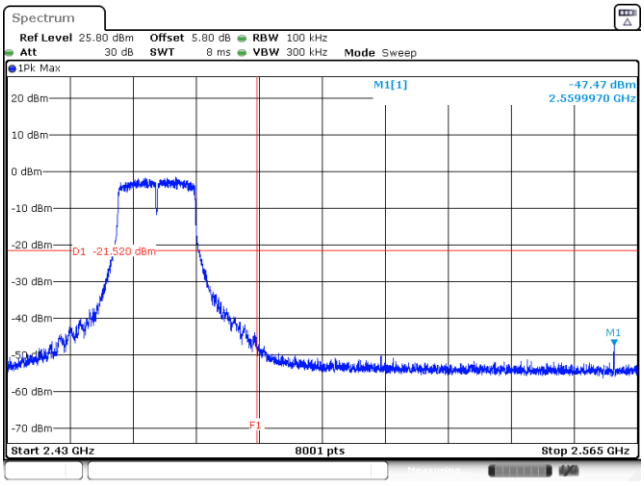
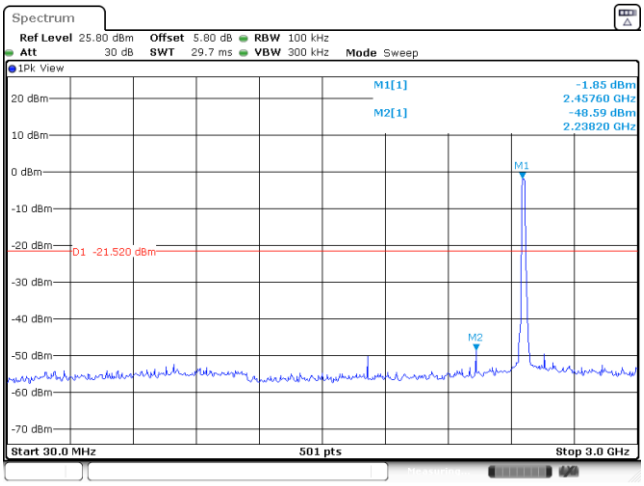
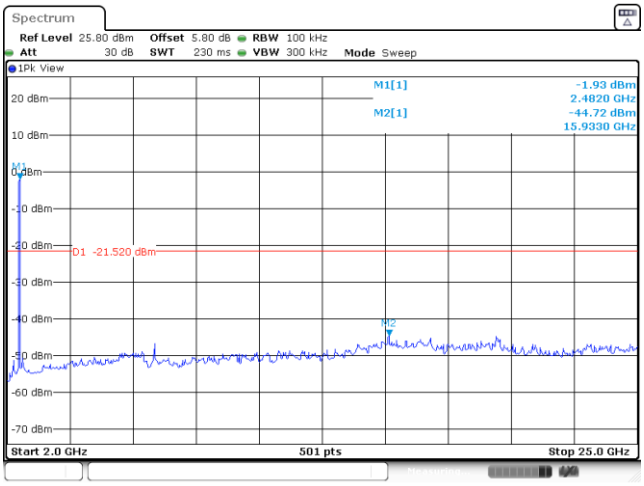
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11g	Test Channel :	06

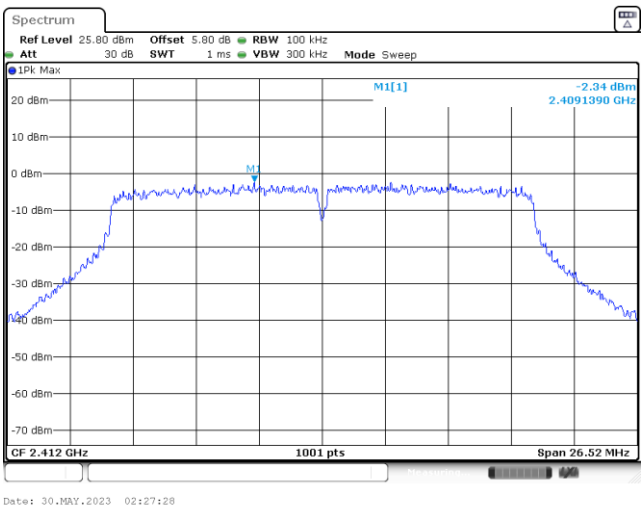
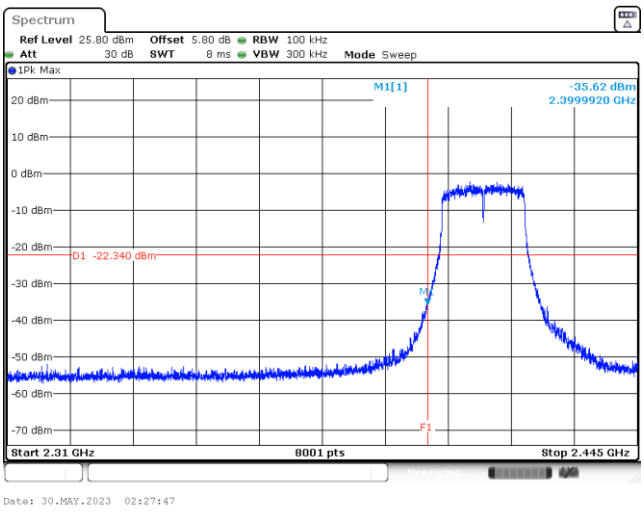
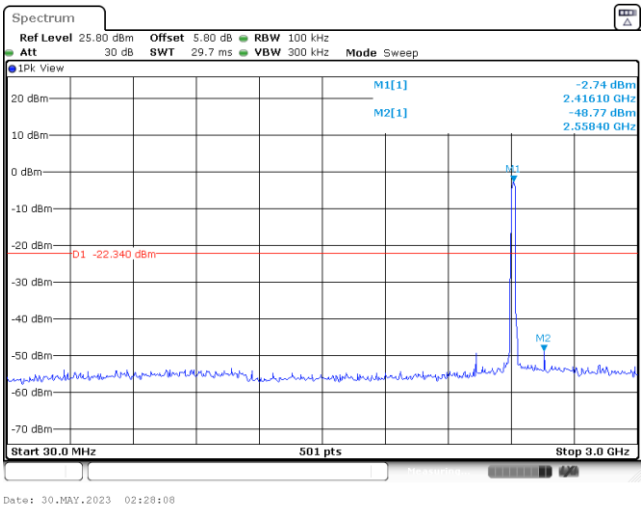
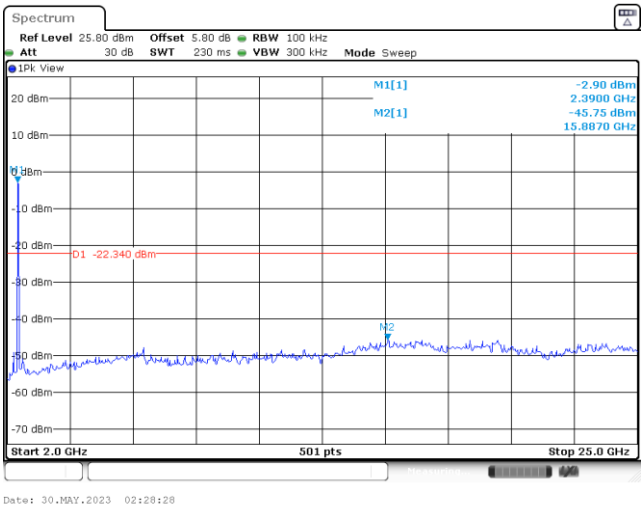
100kHz PSD reference Level	Channel Plot
	-

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

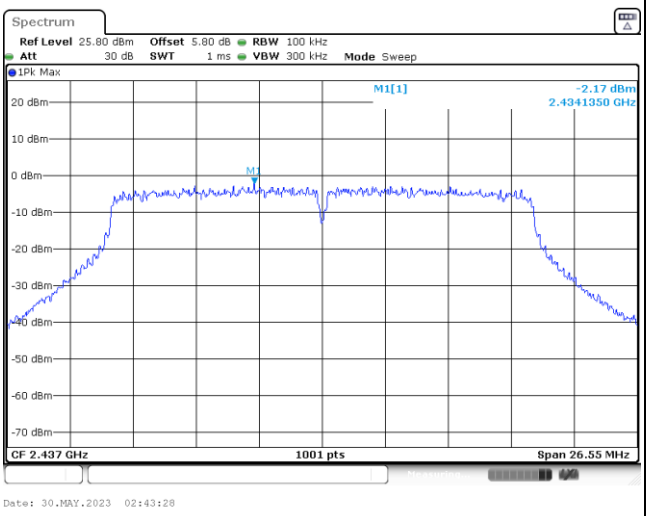
Test Mode :	802.11g	Test Channel :	11

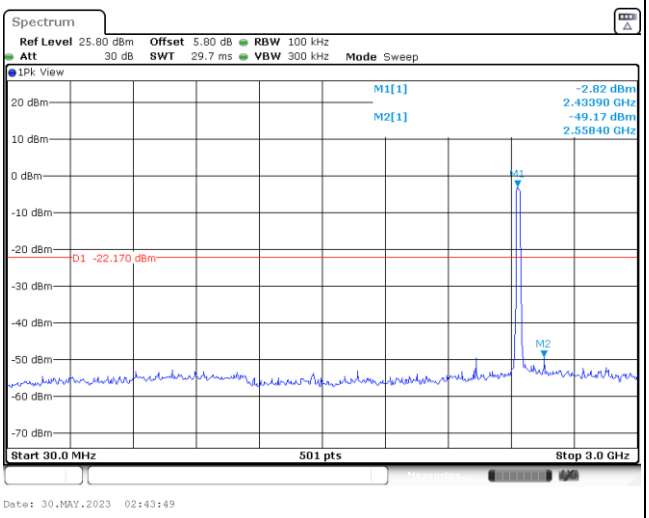
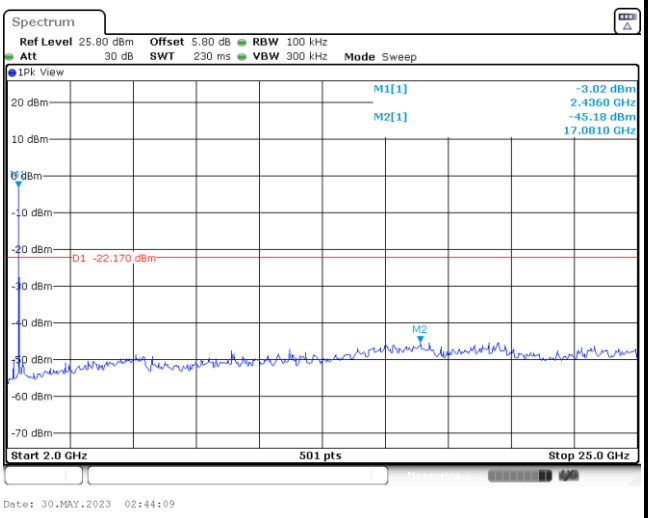
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT20	Test Channel :	01

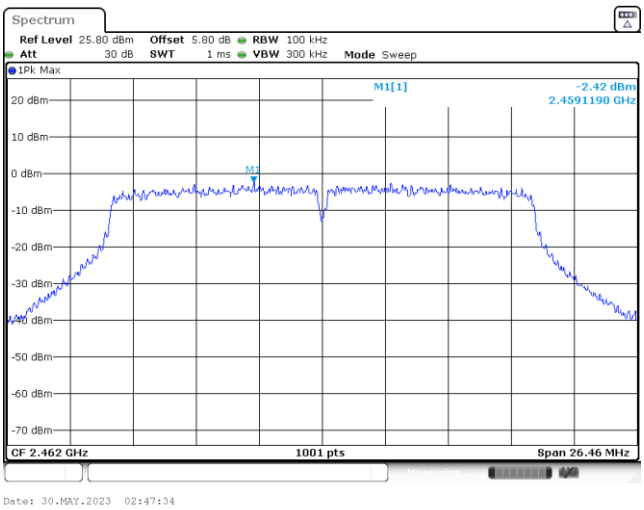
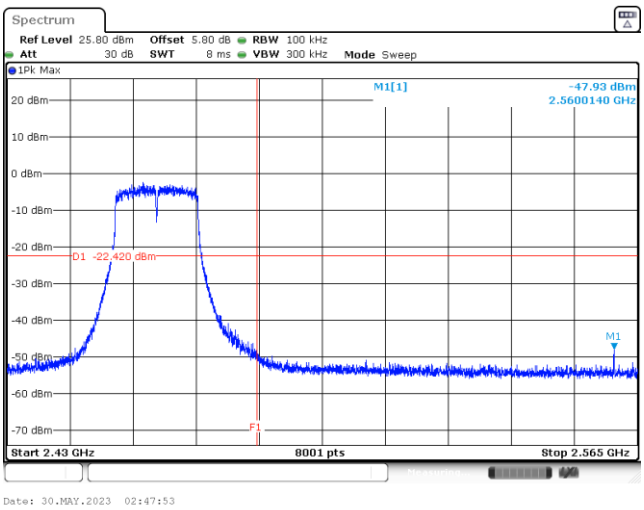
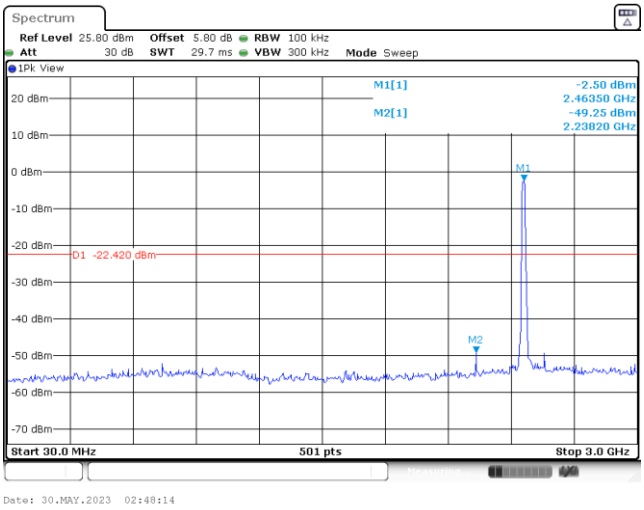
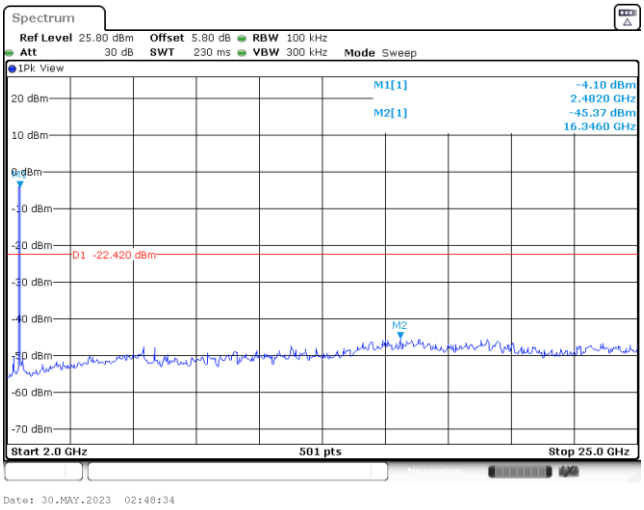
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT20	Test Channel :	06

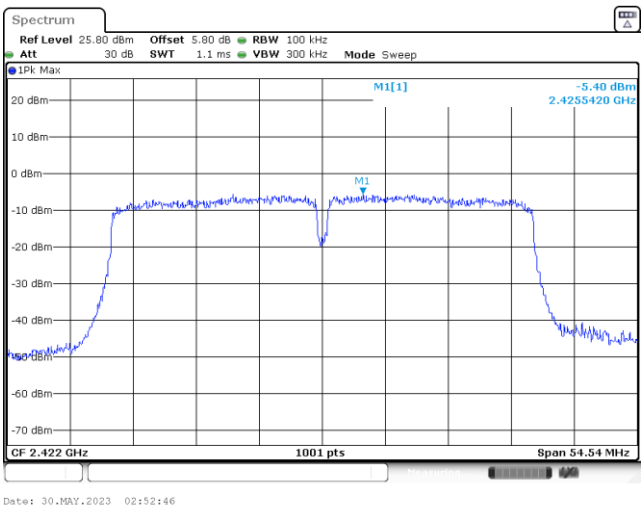
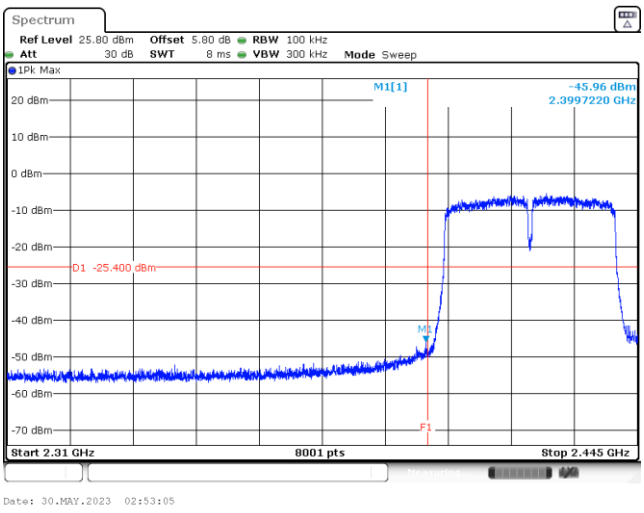
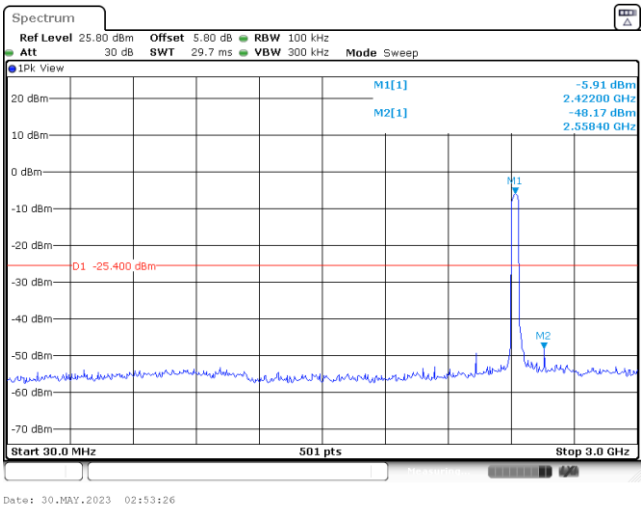
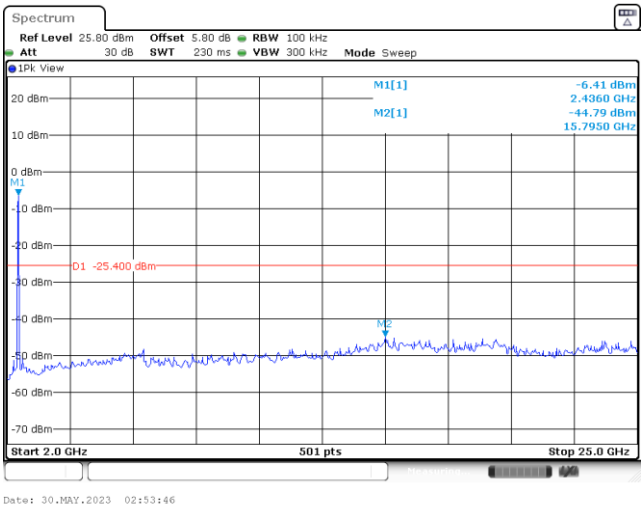
100kHz PSD reference Level	Channel Plot
	-

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

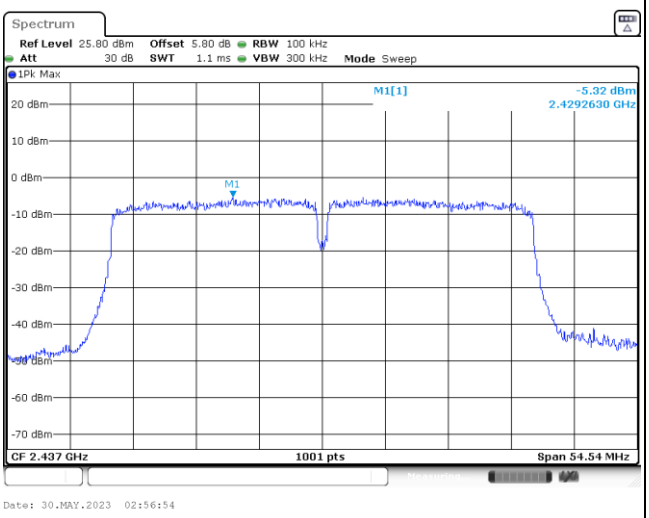
Test Mode :	802.11n HT20	Test Channel :	11

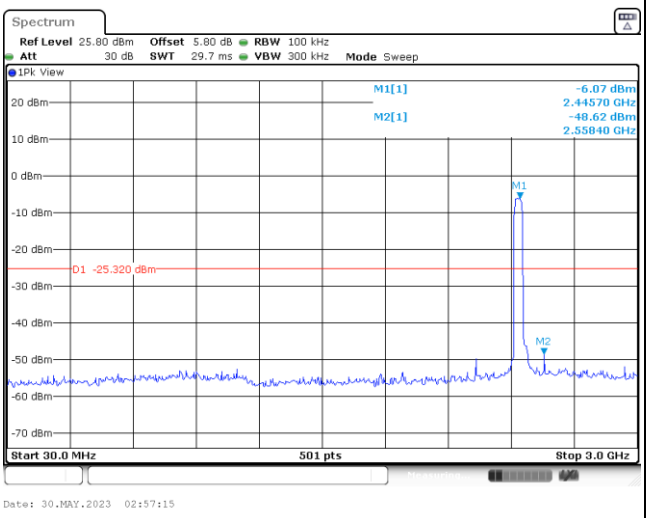
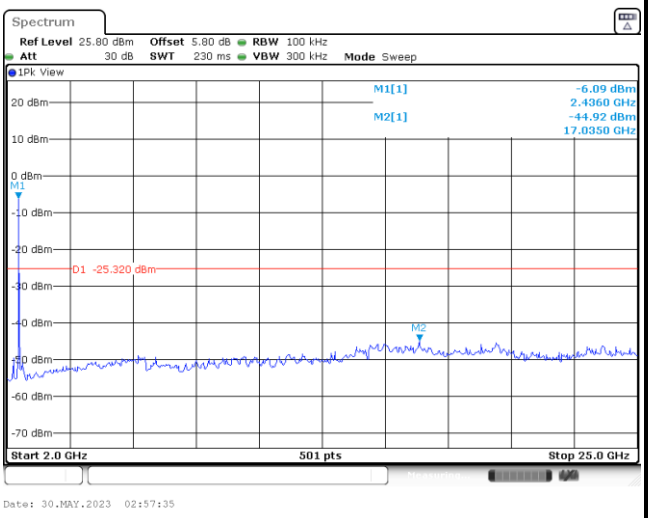
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT40	Test Channel :	03

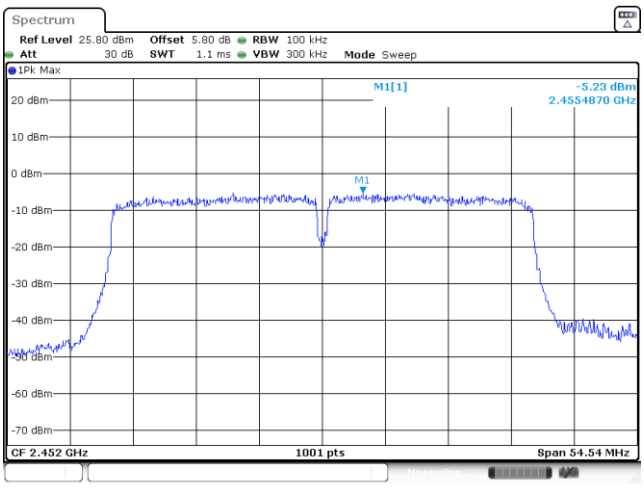
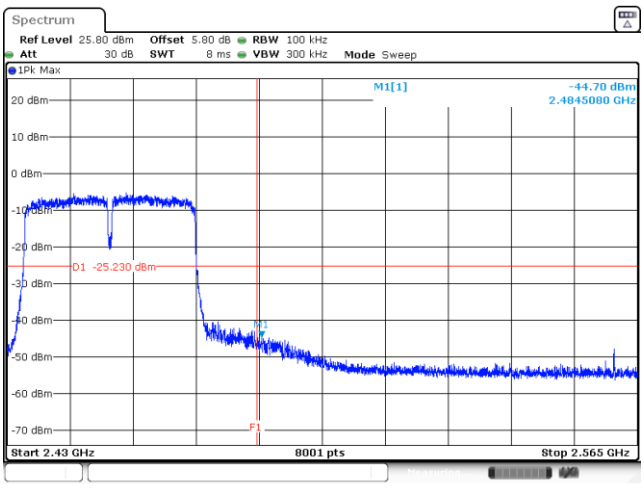
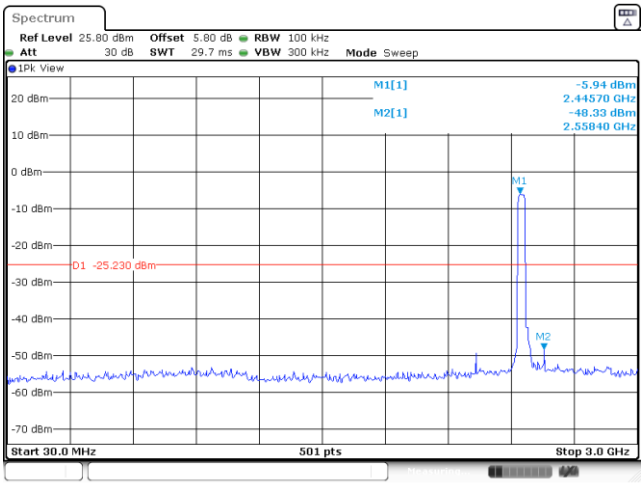
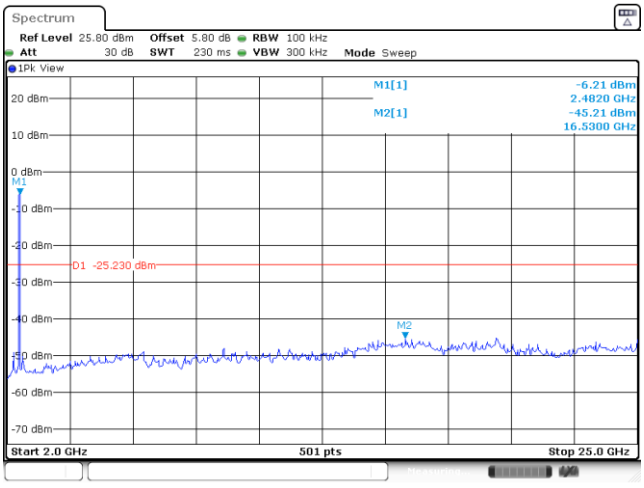
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11n HT40	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	-

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Test Mode :	802.11n HT40	Test Channel :	09

100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

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

3.5.2 Measuring Instruments

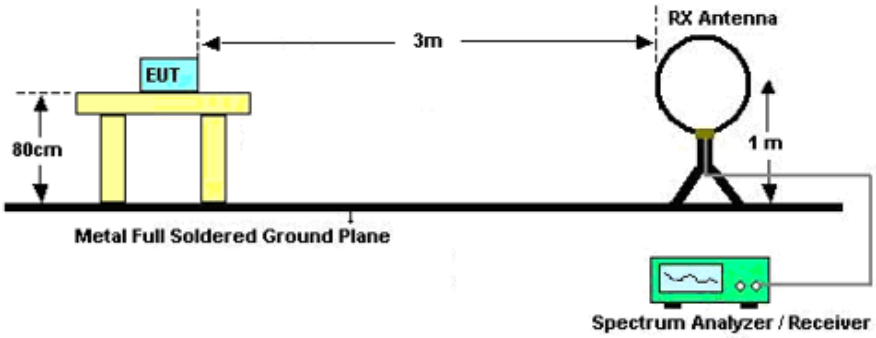
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

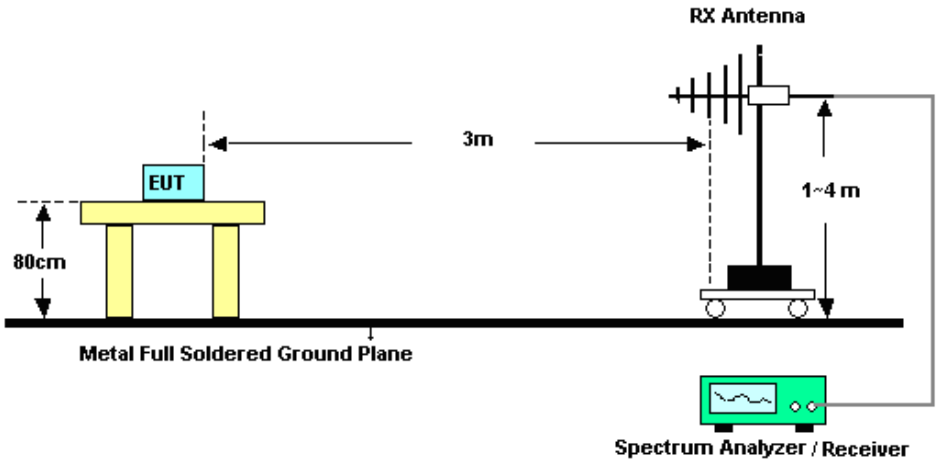
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

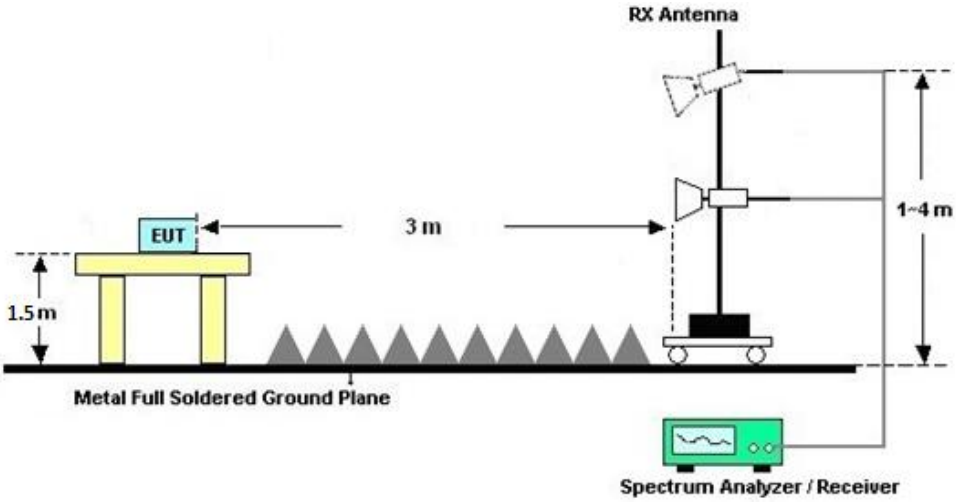
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C

3.5.7 Duty Cycle

Please refer to Appendix D.

3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix C

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (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

*Decreases with the logarithm of the frequency.

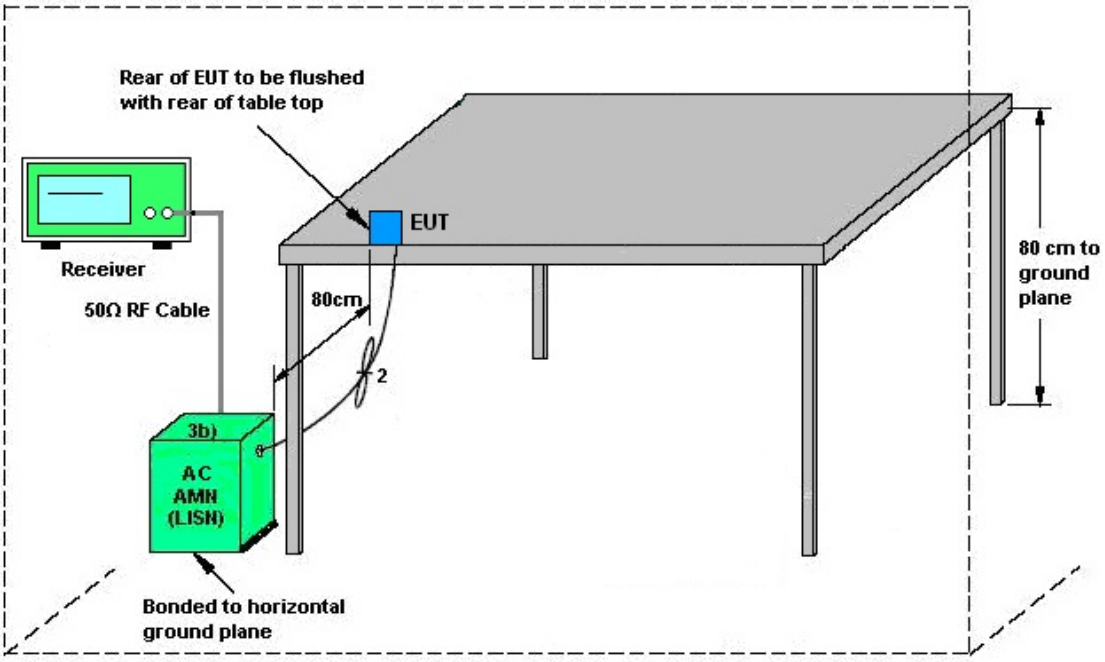
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

3.6.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 12, 2022	May 30, 2023 ~May 31, 2023	Oct. 11, 2023	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 05, 2023	May 30, 2023 ~May 31, 2023	Jan. 04, 2024	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 05, 2023	May 30, 2023 ~May 31, 2023	Jan. 04, 2024	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY57290151	3Hz~8.5GHz;Max 30dBm	Jul. 11, 2022	May 19, 2023 ~Jun. 01, 2023	Jul. 10, 2023	Radiation (03CH08-KS)
Spectrum Analyzer	R&S	FSV40	101932	10kHz~40GHz; Max 30dBm	Oct. 12, 2022	May 19, 2023 ~Jun. 01, 2023	Oct. 11, 2023	Radiation (03CH08-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	May 19, 2023 ~Jun. 01, 2023	Oct. 15, 2023	Radiation (03CH08-KS)
Bilog Antenna	TESEQ& VGT	CBL 61110	59915	30MHz-1GHz	Aug. 26, 2022	May 19, 2023 ~Jun. 01, 2023	Aug. 25, 2023	Radiation (03CH08-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00240138	1GHz~18GHz	Jul. 08, 2022	May 19, 2023 ~Jun. 01, 2023	Jul. 07, 2023	Radiation (03CH08-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 08, 2023	May 19, 2023 ~Jun. 01, 2023	Jan. 07, 2024	Radiation (03CH08-KS)
Amplifier	SONOMA	310N	413741	9KHz-1GHz	Jan. 05, 2023	May 19, 2023 ~Jun. 01, 2023	Jan. 04, 2024	Radiation (03CH08-KS)
Amplifier	EM	EM01G18GA	060834	1Ghz-18Ghz	Oct. 12, 2022	May 19, 2023 ~Jun. 01, 2023	Oct. 11, 2023	Radiation (03CH08-KS)
high gain Amplifier	EM	EM01G18GA	060845	1Ghz-18Ghz	Jan. 05, 2023	May 19, 2023 ~Jun. 01, 2023	Jan. 04, 2024	Radiation (03CH08-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2023	May 19, 2023 ~Jun. 01, 2023	Jan. 04, 2024	Radiation (03CH08-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	May 19, 2023 ~Jun. 01, 2023	NCR	Radiation (03CH08-KS)
Turn Table	EM	EM 1000-T	N/A	0~360 degree	NCR	May 19, 2023 ~Jun. 01, 2023	NCR	Radiation (03CH08-KS)
Antenna Mast	EM	EM 1000-A	N/A	1 m~4 m	NCR	May 19, 2023 ~Jun. 01, 2023	NCR	Radiation (03CH08-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 16, 2023	May 30, 2023 ~May 31, 2023	May 15, 2024	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2022	May 30, 2023 ~May 31, 2023	Oct. 12, 2023	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	May 16, 2023	May 30, 2023 ~May 31, 2023	May 15, 2024	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2022	May 30, 2023 ~May 31, 2023	Oct. 11, 2023	Conduction (CO01-KS)

NCR: No Calibration Required

5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Power	±0.46 dB
Conducted Emissions	±0.48 dB
Occupied Channel Bandwidth	±0.1 %
Conducted Power Spectral Density	±0.40 dB

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.94dB

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	6.28dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.90dB

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.26dB

---------- THE END ----------

Appendix A. Conducted Test Results

Report Number : FR350402C

Test Engineer:	Jacob Zhang	Temperature:	20~26	°C
Test Date:	2023.5.30~2023.6.1	Relative Humidity:	40~51	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band								
Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	14.84	10.04	0.50	Pass
11b	1Mbps	1	6	2437	14.84	10.04	0.50	Pass
11b	1Mbps	1	11	2462	14.84	10.06	0.50	Pass
11g	6Mbps	1	1	2412	16.83	16.52	0.50	Pass
11g	6Mbps	1	6	2437	16.83	16.50	0.50	Pass
11g	6Mbps	1	11	2462	16.79	16.48	0.50	Pass
HT20	MCS0	1	1	2412	17.88	17.68	0.50	Pass
HT20	MCS0	1	6	2437	17.83	17.70	0.50	Pass
HT20	MCS0	1	11	2462	17.83	17.64	0.50	Pass
HT40	MCS0	1	3	2422	35.66	36.36	0.50	Pass
HT40	MCS0	1	6	2437	35.76	36.36	0.50	Pass
HT40	MCS0	1	9	2452	35.76	36.36	0.50	Pass

TEST RESULTS DATA
Peak Output Power

2.4GHz Band										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
11b	1Mbps	1	1	2412	17.53	30.00	3.91	21.44	36.00	Pass
11b	1Mbps	1	6	2437	17.84	30.00	3.91	21.75	36.00	Pass
11b	1Mbps	1	11	2462	17.62	30.00	3.91	21.53	36.00	Pass
11g	6Mbps	1	1	2412	24.01	30.00	3.91	27.92	36.00	Pass
11g	6Mbps	1	6	2437	23.89	30.00	3.91	27.80	36.00	Pass
11g	6Mbps	1	11	2462	23.62	30.00	3.91	27.53	36.00	Pass
HT20	MCS0	1	1	2412	22.49	30.00	3.91	26.40	36.00	Pass
HT20	MCS0	1	6	2437	22.61	30.00	3.91	26.52	36.00	Pass
HT20	MCS0	1	11	2462	22.22	30.00	3.91	26.13	36.00	Pass
HT40	MCS0	1	3	2422	23.06	30.00	3.91	26.97	36.00	Pass
HT40	MCS0	1	6	2437	22.74	30.00	3.91	26.65	36.00	Pass
HT40	MCS0	1	9	2452	22.67	30.00	3.91	26.58	36.00	Pass

Note: Measured power (dBm) has offset with cable loss.

TEST RESULTS DATA
Average Output Power

2.4GHz Band						
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.00	15.36
11b	1Mbps	1	6	2437	0.00	15.69
11b	1Mbps	1	11	2462	0.00	15.41
11g	6Mbps	1	1	2412	0.00	14.14
11g	6Mbps	1	6	2437	0.00	14.16
11g	6Mbps	1	11	2462	0.00	14.06
HT20	MCS0	1	1	2412	0.00	13.13
HT20	MCS0	1	6	2437	0.00	13.16
HT20	MCS0	1	11	2462	0.00	13.08
HT40	MCS0	1	3	2422	0.00	13.28
HT40	MCS0	1	6	2437	0.00	13.07
HT40	MCS0	1	9	2452	0.00	12.98

Note: Measured power (dBm) has offset with cable loss.

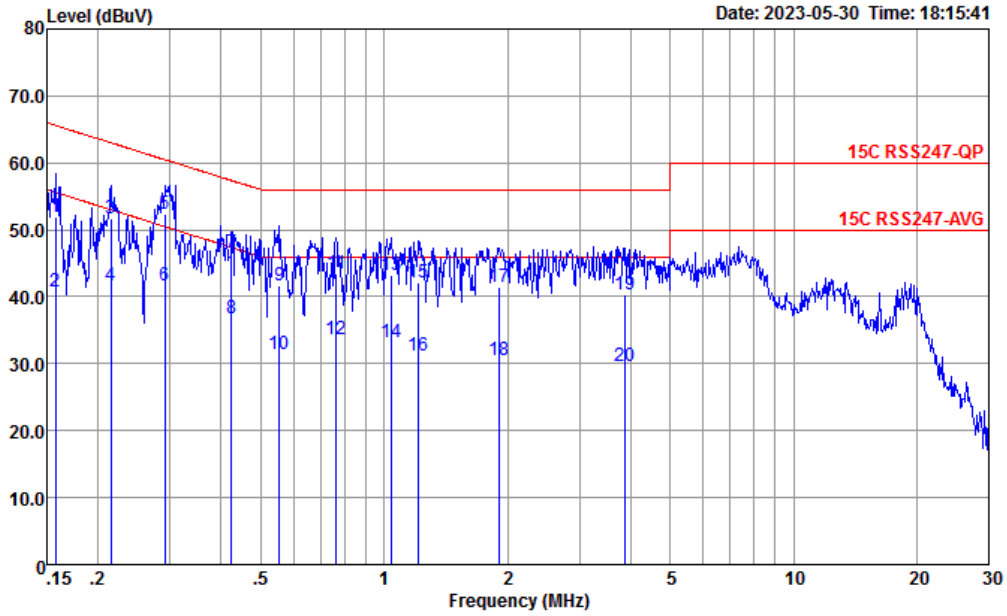
TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)	DG (dBi)	Peak PSD Limit (dBm/3kHz)	Pass/Fail
11b	1Mbps	1	1	2412	-16.23	3.91	8.00	Pass
11b	1Mbps	1	6	2437	-16.25	3.91	8.00	Pass
11b	1Mbps	1	11	2462	-16.01	3.91	8.00	Pass
11g	6Mbps	1	1	2412	-15.82	3.91	8.00	Pass
11g	6Mbps	1	6	2437	-15.93	3.91	8.00	Pass
11g	6Mbps	1	11	2462	-16.18	3.91	8.00	Pass
HT20	MCS0	1	1	2412	-16.90	3.91	8.00	Pass
HT20	MCS0	1	6	2437	-16.73	3.91	8.00	Pass
HT20	MCS0	1	11	2462	-16.74	3.91	8.00	Pass
HT40	MCS0	1	3	2422	-17.01	3.91	8.00	Pass
HT40	MCS0	1	6	2437	-16.87	3.91	8.00	Pass
HT40	MCS0	1	9	2452	-16.68	3.91	8.00	Pass

Measured power density (dBm) has offset with cable loss.

Appendix B. AC Conducted Emission Test Results

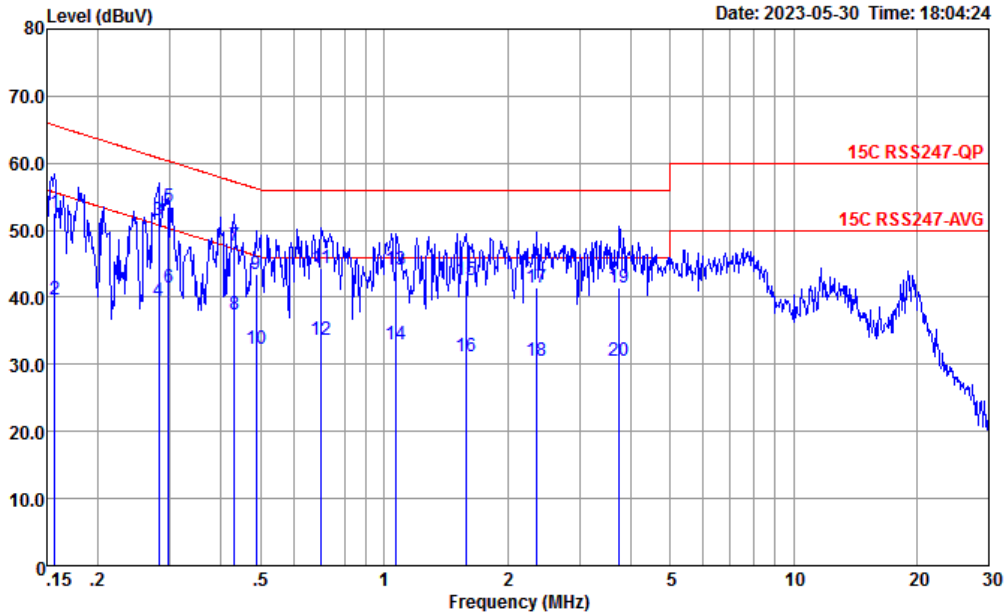
Test Engineer :	Amos Zhang	**Temperature :**	24.2~25.6℃
		Relative Humidity :	37~39%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : 15C RSS247-QP LISN-060105-LINE LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.157	51.99	-13.61	65.60	41.50	0.06	10.43	QP
2		0.157	40.69	-14.91	55.60	30.20	0.06	10.43	Average
3		0.215	51.63	-11.38	63.01	41.19	0.03	10.41	QP
4		0.215	41.63	-11.38	53.01	31.19	0.03	10.41	Average
5	*	0.291	52.31	-8.19	60.50	41.90	0.06	10.35	QP
6		0.291	41.61	-8.89	50.50	31.20	0.06	10.35	Average
7		0.424	46.48	-10.89	57.37	36.20	0.00	10.28	QP
8		0.424	36.88	-10.49	47.37	26.60	0.00	10.28	Average
9		0.555	41.65	-14.35	56.00	31.51	-0.05	10.19	QP
10		0.555	31.35	-14.65	46.00	21.21	-0.05	10.19	Average
11		0.763	43.55	-12.45	56.00	33.49	-0.09	10.15	QP
12		0.763	33.65	-12.35	46.00	23.59	-0.09	10.15	Average
13		1.043	43.30	-12.70	56.00	33.29	-0.10	10.11	QP
14		1.043	33.30	-12.70	46.00	23.29	-0.10	10.11	Average
15		1.216	42.19	-13.81	56.00	32.21	-0.11	10.09	QP
16		1.216	31.29	-14.71	46.00	21.31	-0.11	10.09	Average
17		1.908	41.44	-14.56	56.00	31.50	-0.12	10.06	QP
18		1.908	30.54	-15.46	46.00	20.60	-0.12	10.06	Average
19		3.881	40.44	-15.56	56.00	30.50	-0.12	10.06	QP
20		3.881	29.54	-16.46	46.00	19.60	-0.12	10.06	Average

Test Engineer :	Amos Zhang	**Temperature :**	24.2~25.6℃
		Relative Humidity :	37~39%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : 15C RSS247-QP LISN-060105-NEUTRAL NEUTRAL

		Freq MHz	Level dBuV	Over Limit dB	Limit Line dBuV	Read Level dBuV	LISN Factor dB	Cable Loss dB	Remark
1		0.156	52.66	-12.99	65.65	42.20	0.03	10.43	QP
2		0.156	39.76	-15.89	55.65	29.30	0.03	10.43	Average
3		0.282	51.52	-9.24	60.76	41.20	-0.04	10.36	QP
4		0.282	39.52	-11.24	50.76	29.20	-0.04	10.36	Average
5	*	0.297	53.50	-6.82	60.32	43.20	-0.05	10.35	QP
6		0.297	41.50	-8.82	50.32	31.20	-0.05	10.35	Average
7		0.431	47.80	-9.44	57.24	37.60	-0.07	10.27	QP
8		0.431	37.40	-9.84	47.24	27.20	-0.07	10.27	Average
9		0.486	43.44	-12.79	56.23	33.30	-0.08	10.22	QP
10		0.486	32.24	-13.99	46.23	22.10	-0.08	10.22	Average
11		0.701	44.27	-11.73	56.00	34.20	-0.09	10.16	QP
12		0.701	33.67	-12.33	46.00	23.60	-0.09	10.16	Average
13		1.071	44.19	-11.81	56.00	34.20	-0.11	10.10	QP
14		1.071	32.89	-13.11	46.00	22.90	-0.11	10.10	Average
15		1.585	42.56	-13.44	56.00	32.60	-0.12	10.08	QP
16		1.585	31.16	-14.84	46.00	21.20	-0.12	10.08	Average
17		2.358	41.44	-14.56	56.00	31.50	-0.12	10.06	QP
18		2.358	30.54	-15.46	46.00	20.60	-0.12	10.06	Average
19		3.759	41.44	-14.56	56.00	31.50	-0.12	10.06	QP
20		3.759	30.54	-15.46	46.00	20.60	-0.12	10.06	Average

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)

Appendix C. Radiated Spurious Emission Test Data

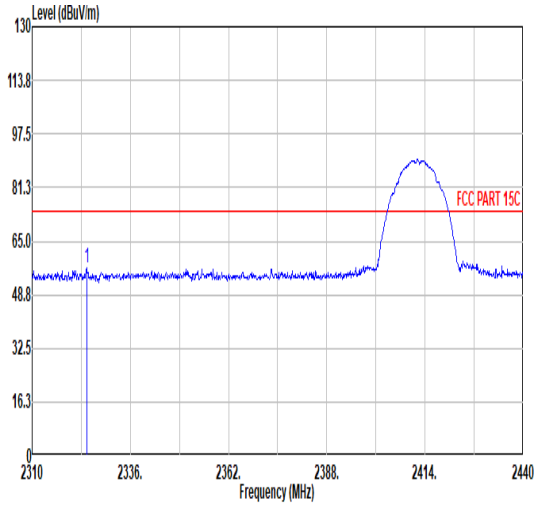
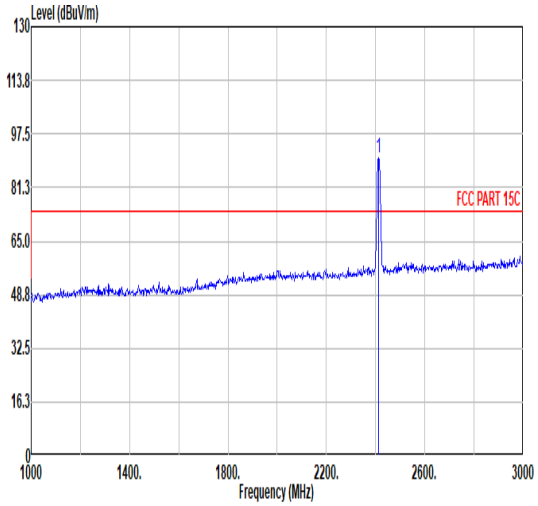
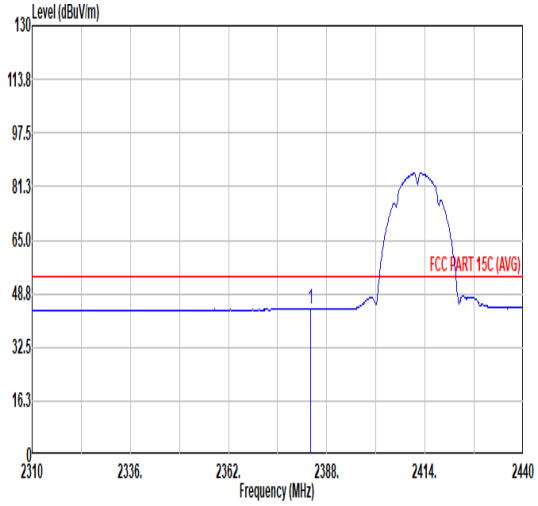
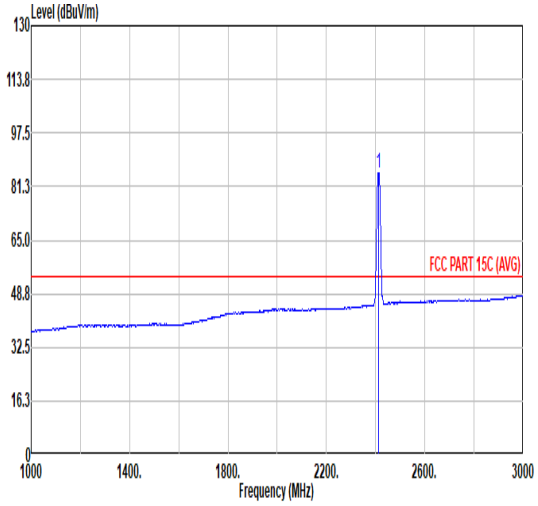
Test Engineer :	Koi Ji	Relative Humidity :	41 ~ 42 ％
		Temperature :	22 ~ 23 ℃

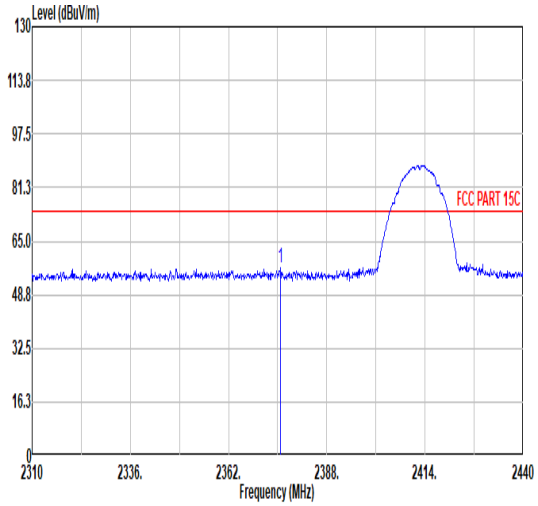
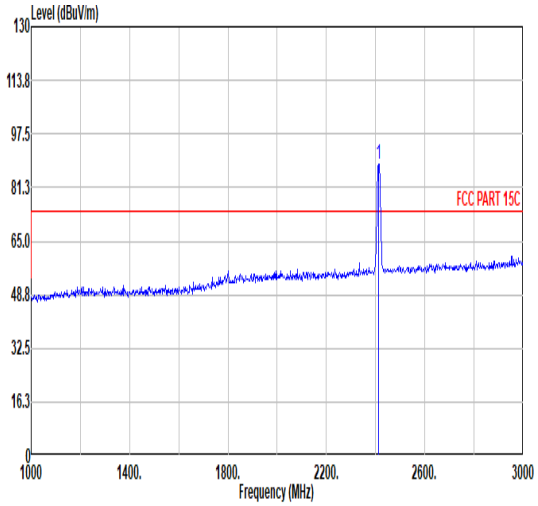
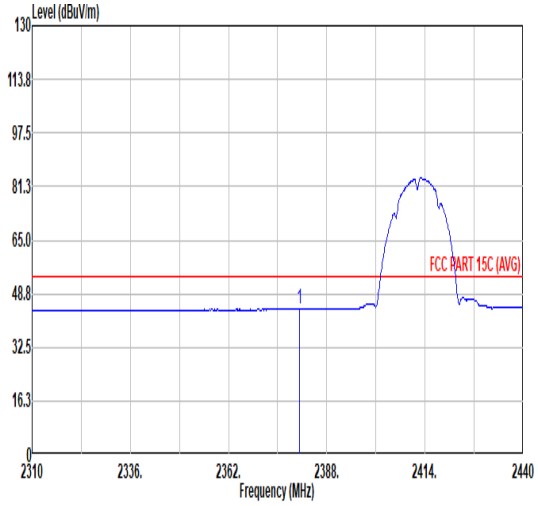
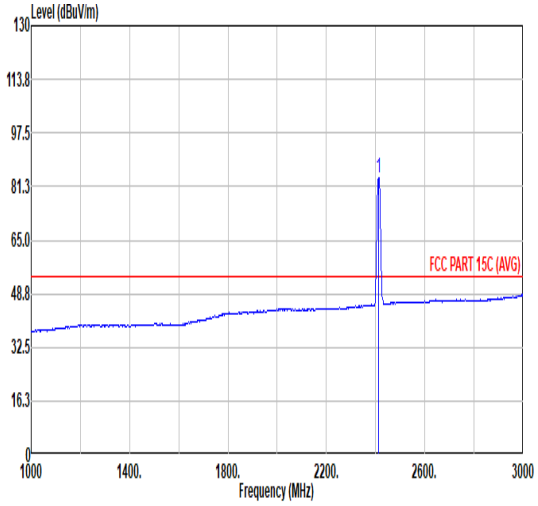
Radiated Spurious Emission Test Modes

Mode	Band (MHz)	Modulation	Channel	Frequency	Data Rate	Remark
Mode 1	2400-2483.5	802.11b	01	2412	1Mbps	-
Mode 2	2400-2483.5	802.11b	06	2437	1Mbps	-
Mode 3	2400-2483.5	802.11b	11	2462	1Mbps	-
Mode 4	2400-2483.5	802.11g	01	2412	6Mbps	-
Mode 5	2400-2483.5	802.11g	06	2437	6Mbps	-
Mode 6	2400-2483.5	802.11g	11	2462	6Mbps	-
Mode 7	2400-2483.5	802.11n HT20	01	2412	MCS0	-
Mode 8	2400-2483.5	802.11n HT20	06	2437	MCS0	-
Mode 9	2400-2483.5	802.11n HT20	11	2462	MCS0	-
Mode 10	2400-2483.5	802.11n HT40	03	2422	MCS0	-
Mode 11	2400-2483.5	802.11n HT40	06	2437	MCS0	-
Mode 12	2400-2483.5	802.11n HT40	09	2452	MCS0	-
Mode 13	2400-2483.5	802.11n HT40	09	2452	MCS0	LF
Mode 14	2400-2483.5	Bluetooth-LE 1M_CH00 + Zigbee_CH26 + WLAN 11n HT40_CH09				co-lacation

Summary of each worse mode

Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	Remark
1	802.11b	01	2380.72	44.07	54.00	-9.93	V	AVERAGE	Pass	Band Edge
	802.11b	01	4824.00	39.62	74.00	-34.38	V	PEAK	Pass	Harmonic
2	802.11b	06	-	-	-	-	-	-	-	Band Edge
	802.11b	06	7311.00	43.34	74.00	-30.66	H	PEAK	Pass	Harmonic
3	802.11b	11	2498.14	44.98	54.00	-9.02	H	AVERAGE	Pass	Band Edge
	802.11b	11	7386.00	43.49	74.00	-30.51	H	PEAK	Pass	Harmonic
4	802.11g	01	2389.95	44.33	54.00	-9.67	H	AVERAGE	Pass	Band Edge
	802.11g	01	4824.00	39.61	74.00	-34.39	H	PEAK	Pass	Harmonic
5	802.11g	06	-	-	-	-	-	-	-	Band Edge
	802.11g	06	7311.00	43.31	74.00	-30.69	H	PEAK	Pass	Harmonic
6	802.11g	11	2483.50	46.10	54.00	-7.90	H	AVERAGE	Pass	Band Edge
	802.11g	11	7386.00	43.48	74.00	-30.52	H	PEAK	Pass	Harmonic
7	802.11n HT20	01	2389.95	44.38	54.00	-9.62	H	AVERAGE	Pass	Band Edge
	802.11n HT20	01	4824.00	40.32	74.00	-33.68	H	PEAK	Pass	Harmonic
8	802.11n HT20	06	-	-	-	-	-	-	-	Band Edge
	802.11n HT20	06	7311.00	41.87	74.00	-32.13	H	PEAK	Pass	Harmonic
9	802.11n HT20	11	2483.50	46.19	54.00	-7.81	H	AVERAGE	Pass	Band Edge
	802.11n HT20	11	7386.00	42.80	74.00	-31.20	V	PEAK	Pass	Harmonic
10	802.11n HT40	03	2497.35	44.99	54.00	-9.01	V	AVERAGE	Pass	Band Edge
	802.11n HT40	03	7266.00	43.44	74.00	-30.56	V	PEAK	Pass	Harmonic
11	802.11n HT40	06	2483.56	45.42	54.00	-8.58	H	AVERAGE	Pass	Band Edge
	802.11n HT40	06	7311.00	42.97	74.00	-31.03	V	PEAK	Pass	Harmonic
12	802.11n HT40	09	2484.54	49.60	54.00	-4.40	H	AVERAGE	Pass	Band Edge
	802.11n HT40	09	7356.00	43.93	74.00	-30.07	V	PEAK	Pass	Harmonic
13	802.11n HT40	09	728.40	37.61	46.00	-8.39	H	PEAK	Pass	LF
14	802.11n HT40	9	2483.536	45.95	54	-8.05	V	Average	Pass	Band Edge
	802.11n HT40	9	7356.00	41.18	74.00	-32.82	H	PEAK	Pass	Harmonic

Mode	1	
	Band Edge	
	2400-2483.5_802.11b_CH01_2412MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2324.43 57.07 74.00 -16.93 41.61 31.83 8.57 30.94 6.00 293 129 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2412.00 90.29 ------ ------ 74.28 32.02 8.84 30.85 6.00 293 129 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2383.71 44.06 54.00 -9.94 28.24 31.96 8.75 30.89 6.00 293 129 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2412.00 85.42 ------ ------ 69.41 32.02 8.84 30.85 6.00 293 129 AVERAGE

Mode	1	
	Band Edge	
	2400-2483.5_802.11b_CH01_2412MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2375.78 56.78 74.00 -17.22 41.00 31.95 8.73 30.90 6.00 100 344 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2412.00 88.45 ------ ------ 72.44 32.02 8.84 30.85 6.00 100 344 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2380.72 44.07 54.00 -9.93 28.27 31.96 8.74 30.90 6.00 100 344 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2412.00 83.86 ------ ------ 67.85 32.02 8.84 30.85 6.00 100 344 AVERAGE

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	Harmonic	
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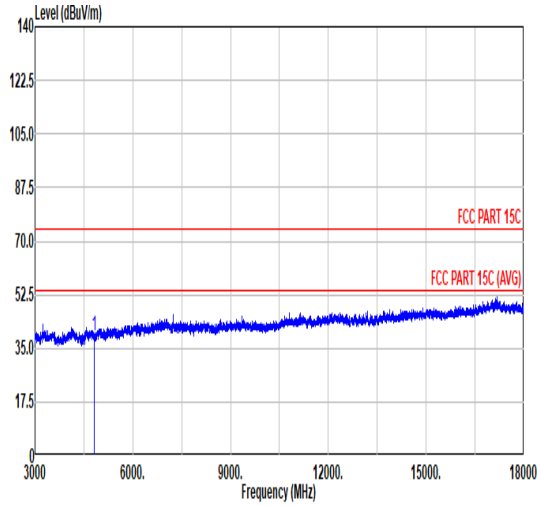
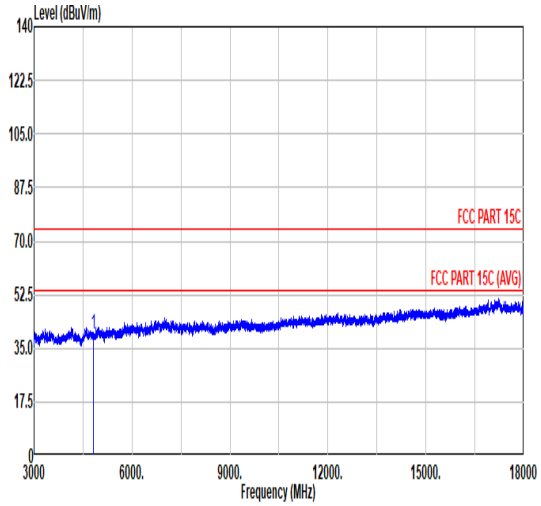
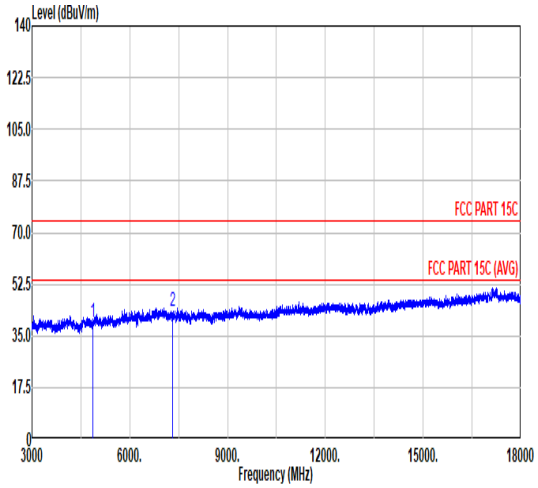
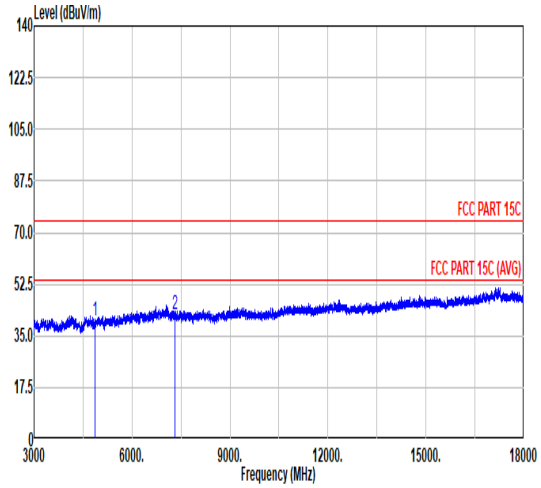
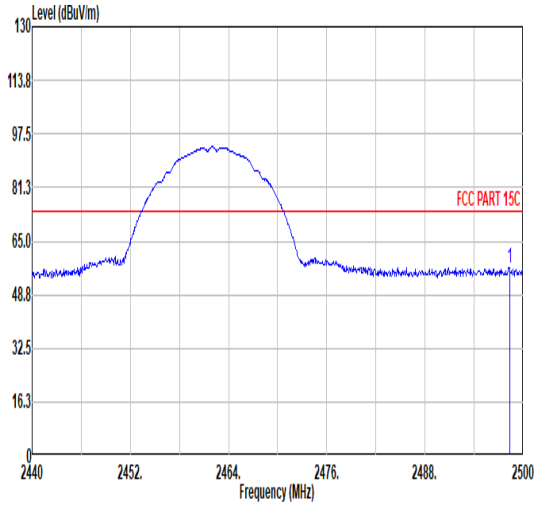
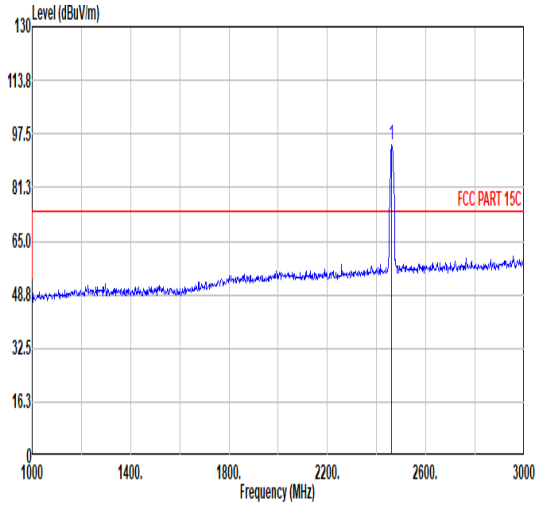
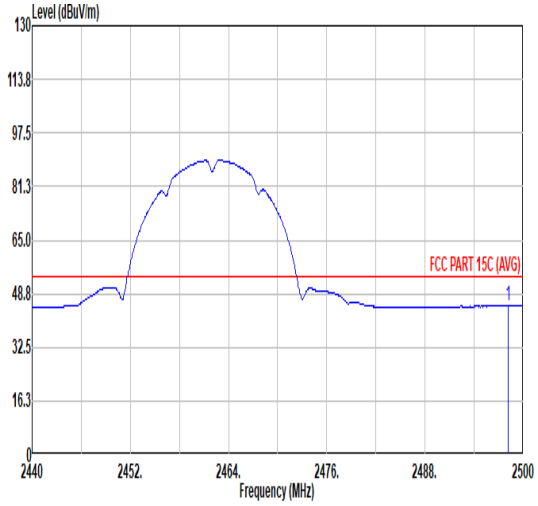
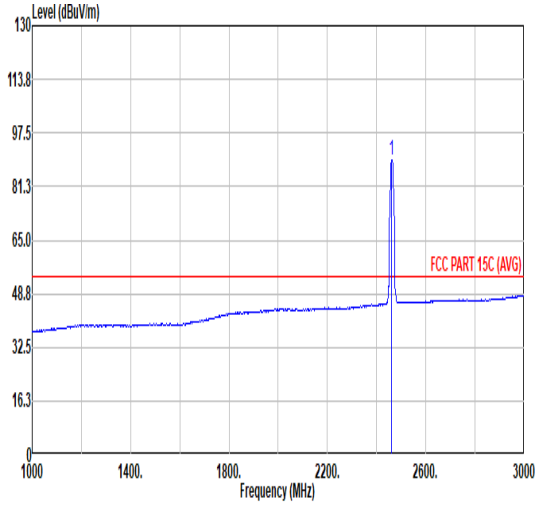
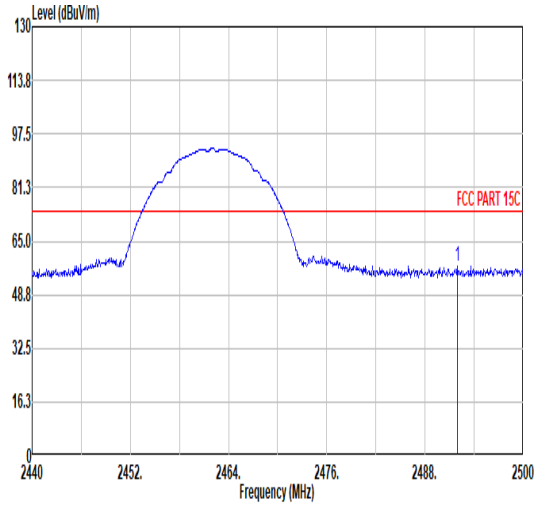
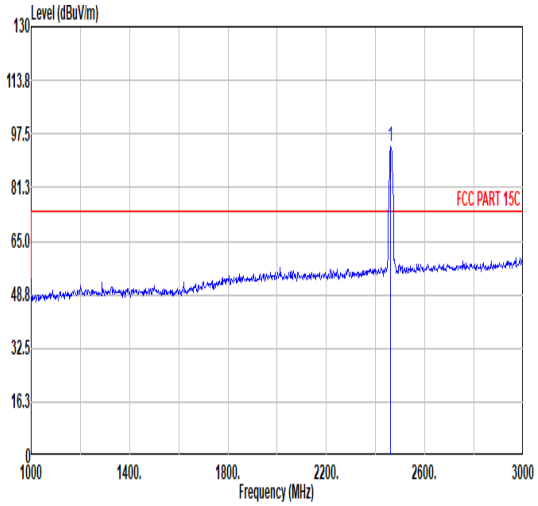
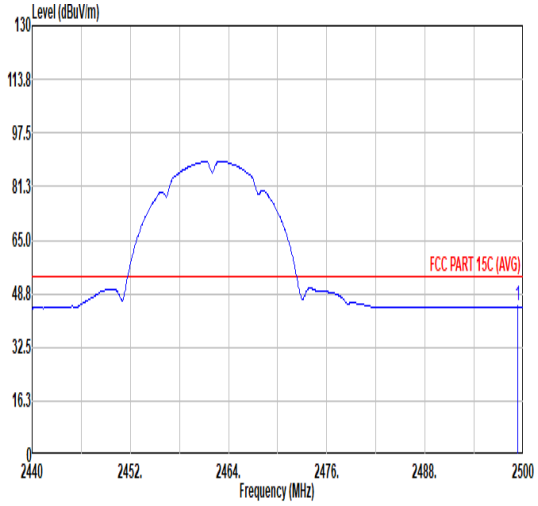
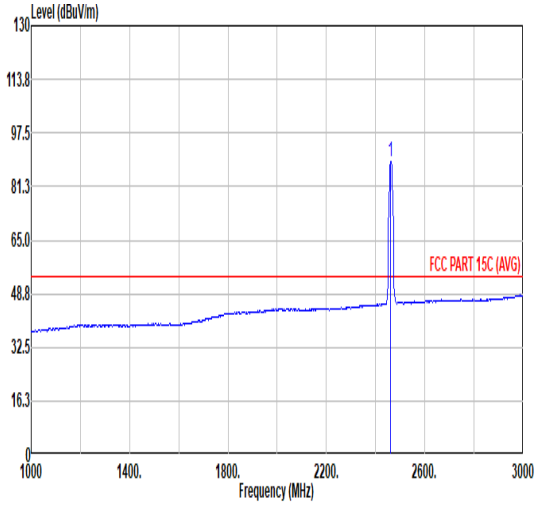
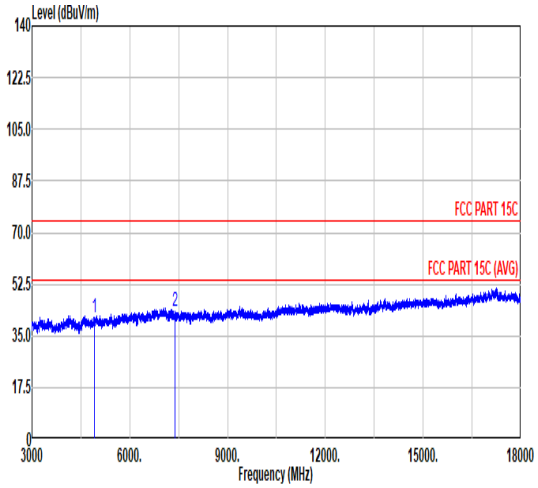
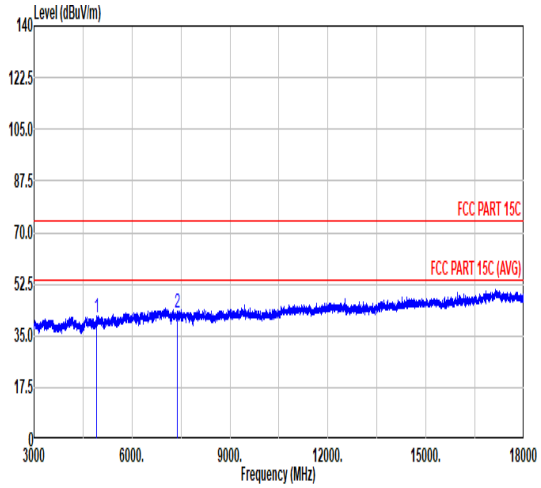
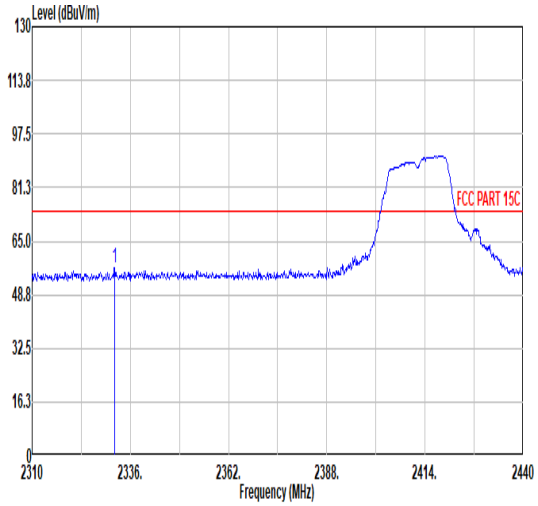
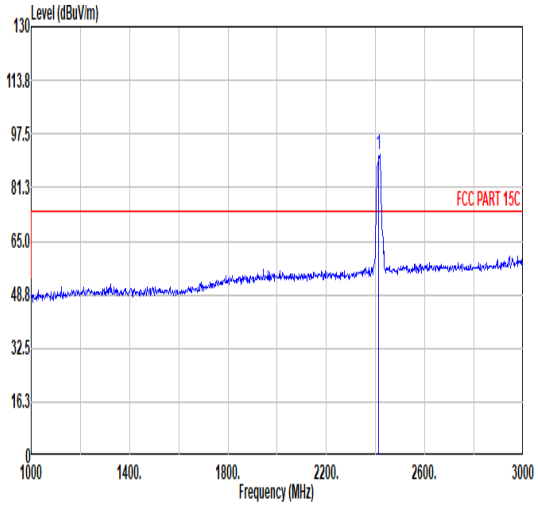
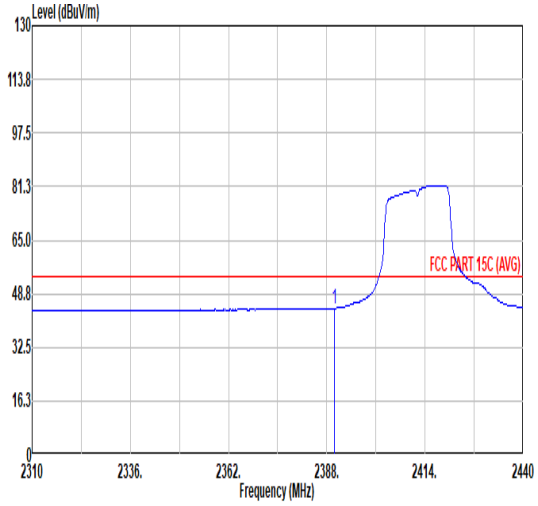
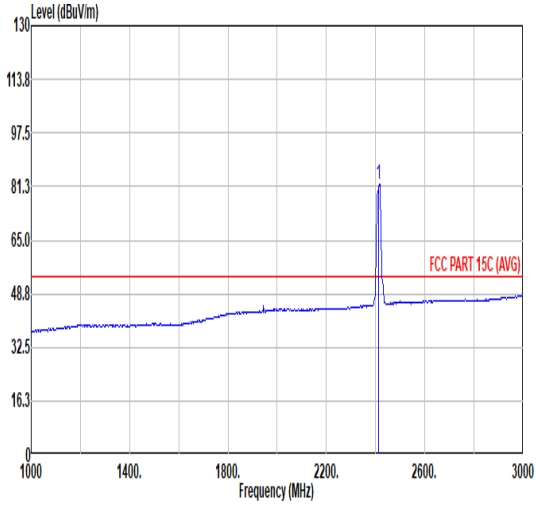
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4824.00 39.10 74.00 -34.90 57.95 34.10 12.48 65.43 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4824.00 39.62 74.00 -34.38 58.47 34.10 12.48 65.43 0.00 --- --- PEAK

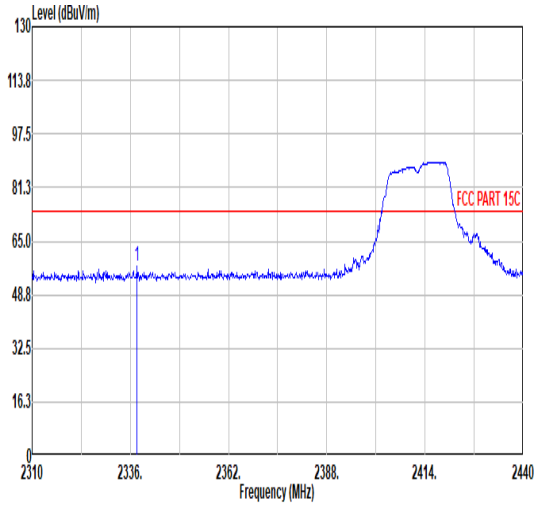
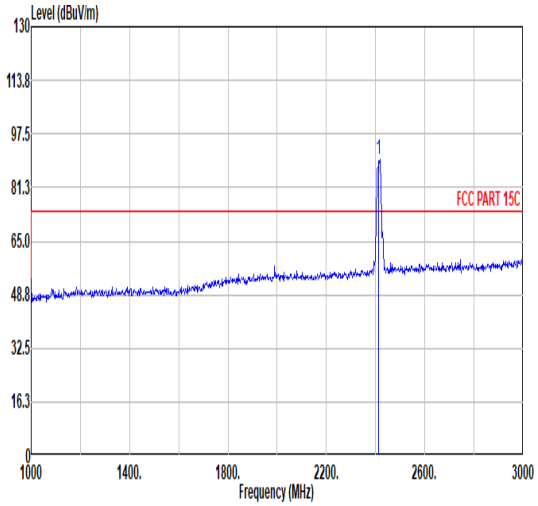
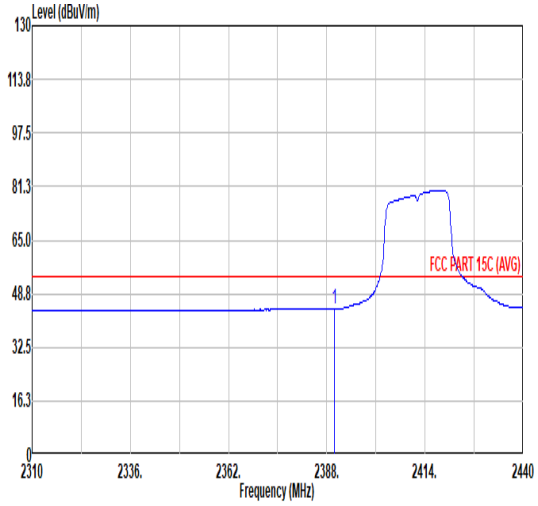
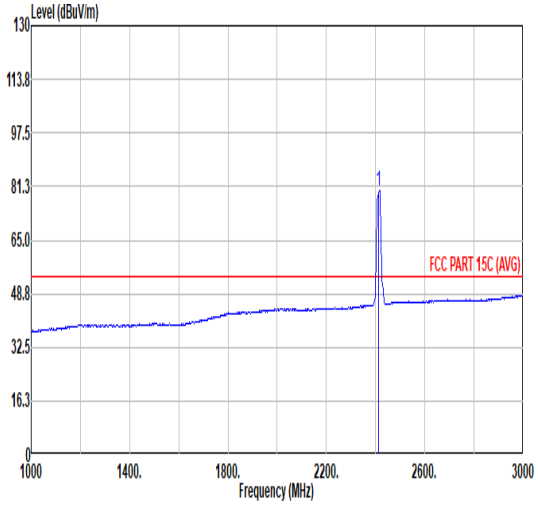
Mode	2	
	Harmonic	
	2400-2483.5_802.11b_CH06_2437MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4874.00 39.58 74.00 -34.42 58.63 34.10 12.29 65.44 0.00 --- --- PEAK 2 7311.00 43.34 74.00 -30.66 58.06 35.80 14.73 65.25 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4874.00 39.92 74.00 -34.08 58.97 34.10 12.29 65.44 0.00 --- --- PEAK 2 7311.00 42.52 74.00 -31.48 57.24 35.80 14.73 65.25 0.00 --- --- PEAK

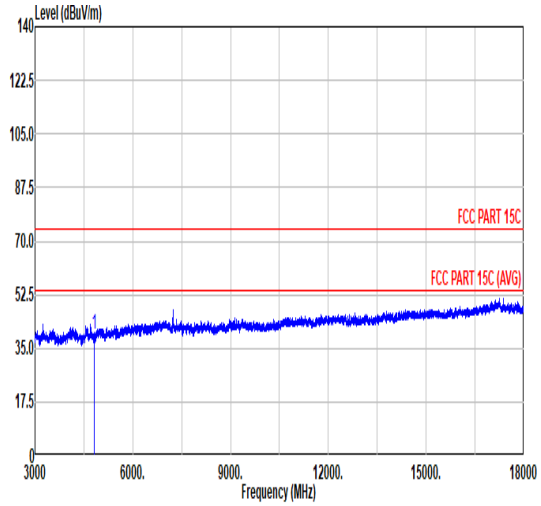
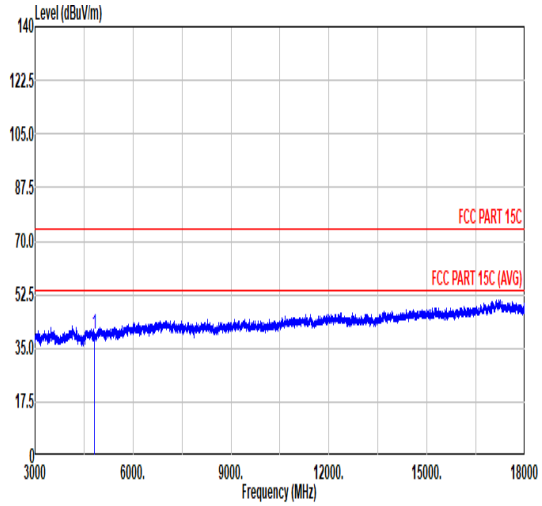
Mode	3	
	Band Edge	
	2400-2483.5_802.11b_CH11_2462MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2498.32 57.13 74.00 -16.87 40.49 32.15 9.09 30.60 6.00 268 182 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2462.00 94.07 ------ ------ 77.70 32.09 8.99 30.71 6.00 268 182 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2498.14 44.98 54.00 -9.02 28.35 32.15 9.09 30.61 6.00 268 182 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2462.00 89.31 ------ ------ 72.94 32.09 8.99 30.71 6.00 268 182 AVERAGE

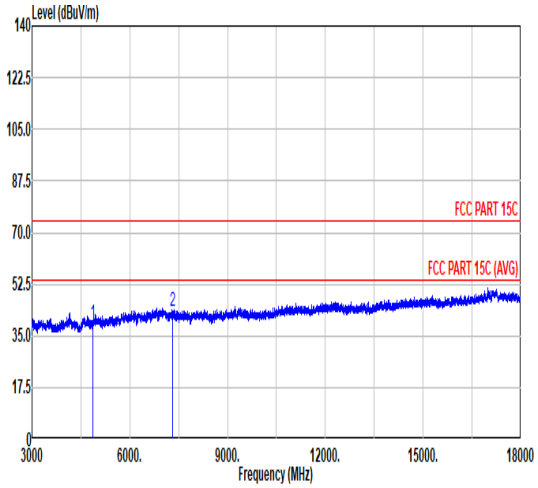
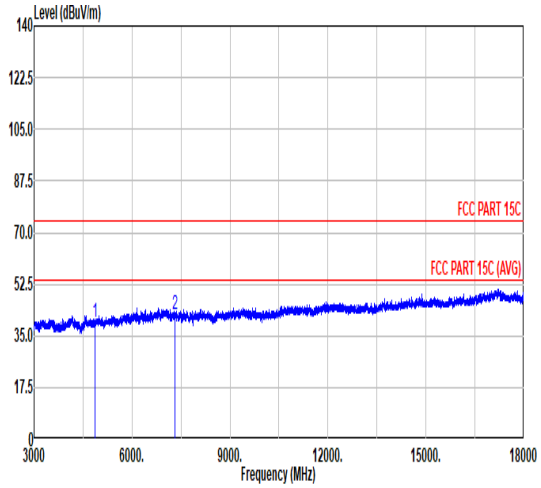
Mode	3	
	Band Edge	
	2400-2483.5_802.11b_CH11_2462MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2491.96 57.25 74.00 -16.75 40.65 32.14 9.08 30.62 6.00 113 347 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2462.00 93.79 ------ ------ 77.42 32.09 8.99 30.71 6.00 113 347 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2499.28 44.89 54.00 -9.11 28.24 32.15 9.10 30.60 6.00 113 347 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2462.00 89.03 ------ ------ 72.66 32.09 8.99 30.71 6.00 113 347 AVERAGE

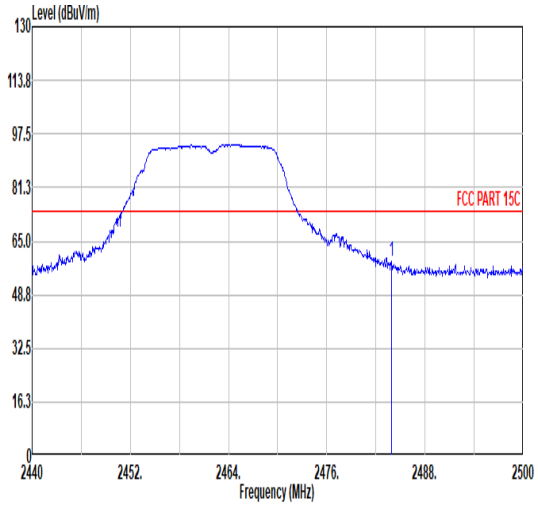
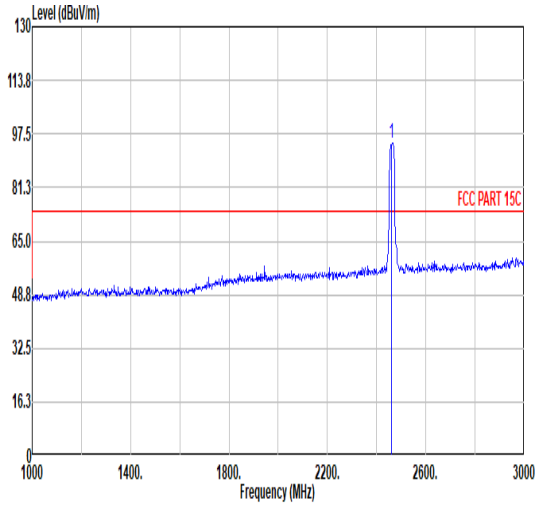
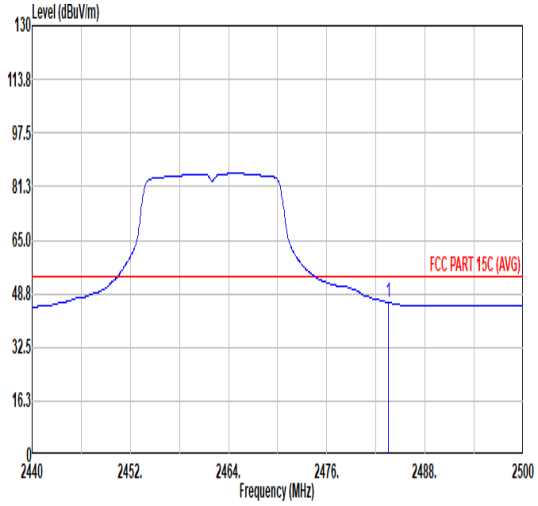
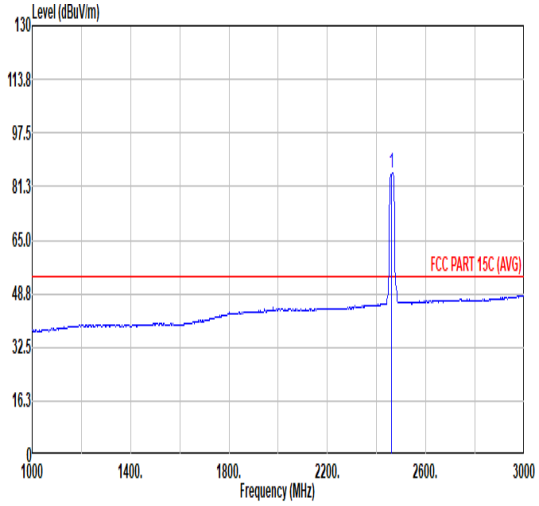
Mode	3	
	Harmonic	
	2400-2483.5_802.11b_CH11_2462MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4924.00 41.07 74.00 -32.93 60.19 34.10 12.22 65.44 0.00 --- --- PEAK 2 7386.00 43.49 74.00 -30.51 58.20 35.80 14.78 65.29 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4924.00 41.20 74.00 -32.80 60.32 34.10 12.22 65.44 0.00 --- --- PEAK 2 7386.00 42.69 74.00 -31.31 57.40 35.80 14.78 65.29 0.00 --- --- PEAK

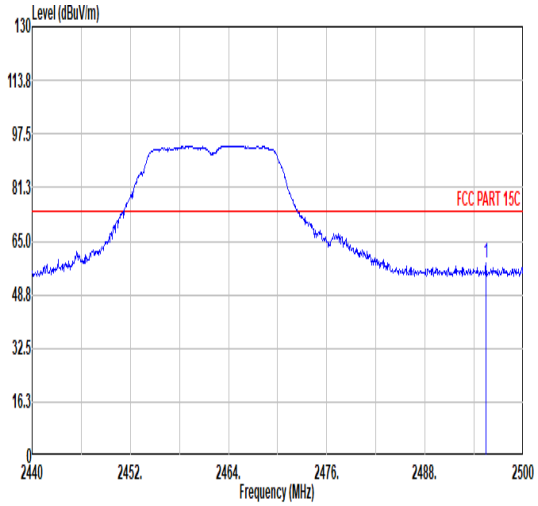
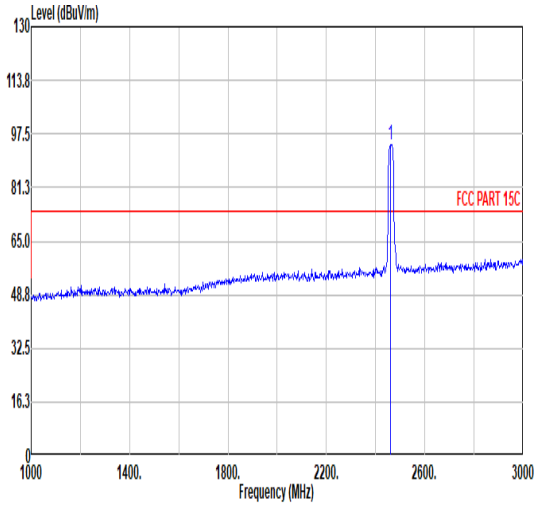
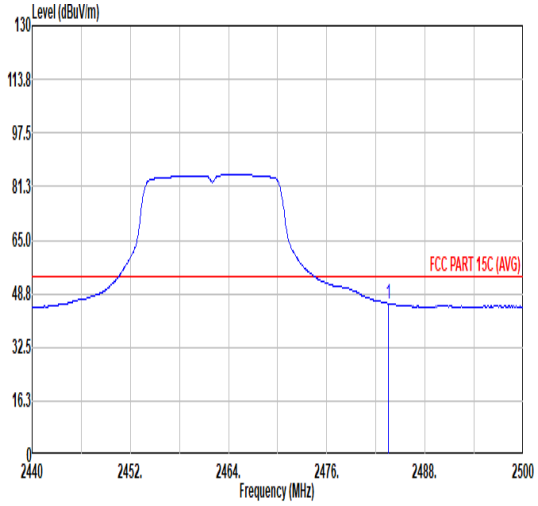
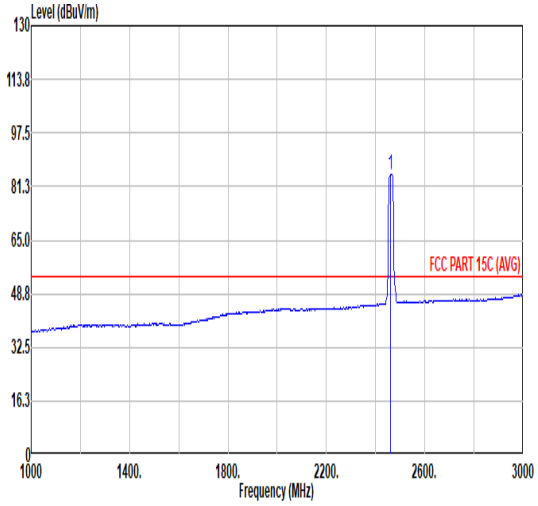
Mode	4	
	Band Edge	
	2400-2483.5_802.11g_CH01_2412MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2331.84 57.01 74.00 -16.99 41.49 31.85 8.60 30.93 6.00 247 178 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2412.00 91.24 ------ ------ 75.19 32.03 8.85 30.83 6.00 247 178 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2389.95 44.33 54.00 -9.67 28.47 31.98 8.77 30.89 6.00 247 178 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2412.00 81.76 ------ ------ 65.71 32.03 8.85 30.83 6.00 247 178 AVERAGE

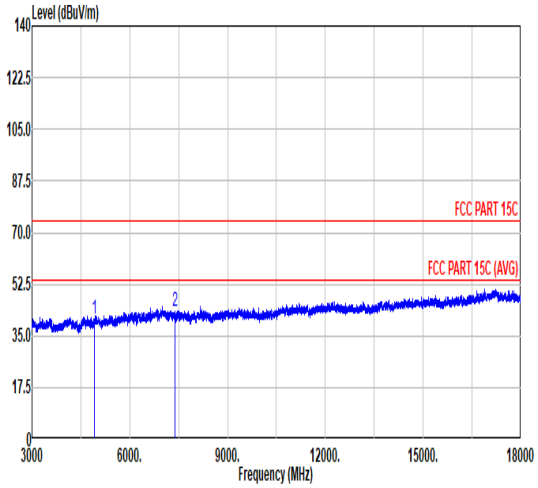
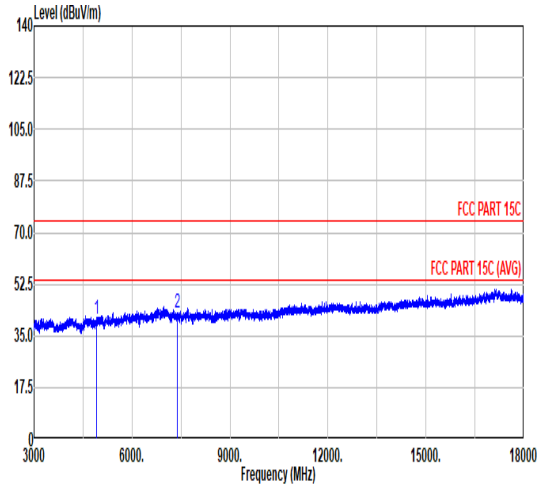
Mode	4	
	Band Edge	
	2400-2483.5_802.11g_CH01_2412MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2337.82 57.22 74.00 -16.78 41.68 31.86 8.61 30.93 6.00 100 343 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2412.00 89.54 ------ ------ 73.49 32.03 8.85 30.83 6.00 100 343 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2389.95 44.15 54.00 -9.85 28.29 31.98 8.77 30.89 6.00 100 343 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2412.00 80.00 ------ ------ 63.95 32.03 8.85 30.83 6.00 100 343 AVERAGE

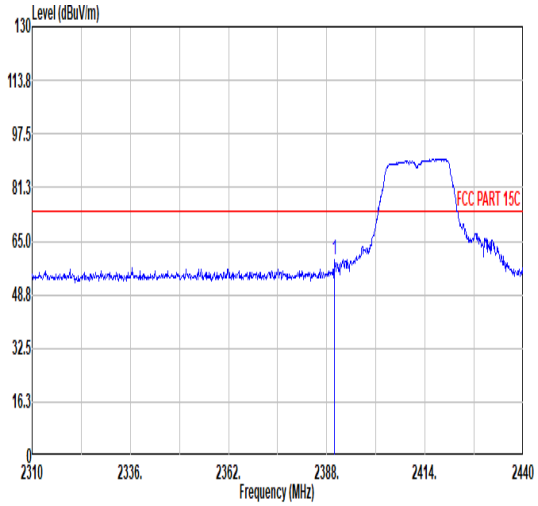
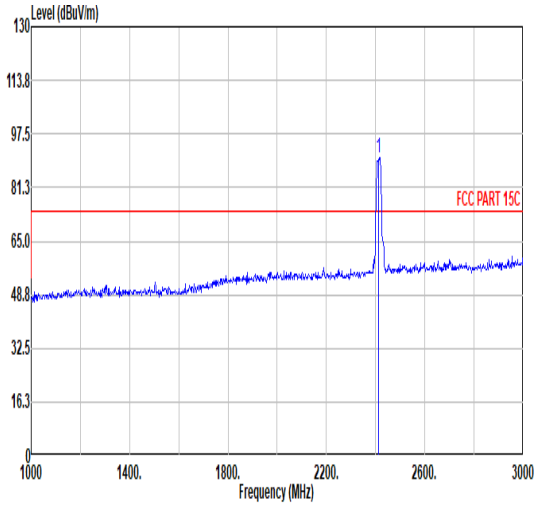
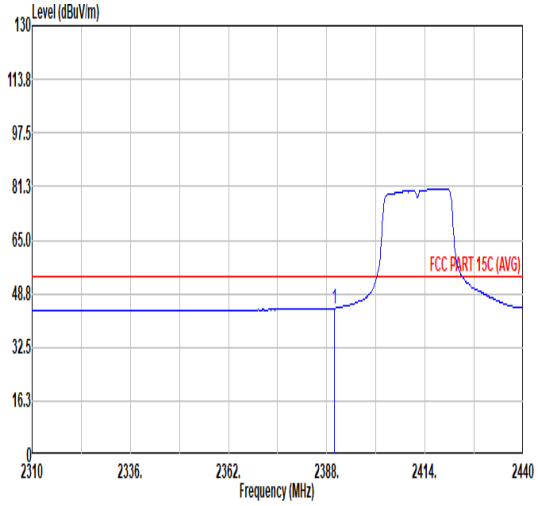
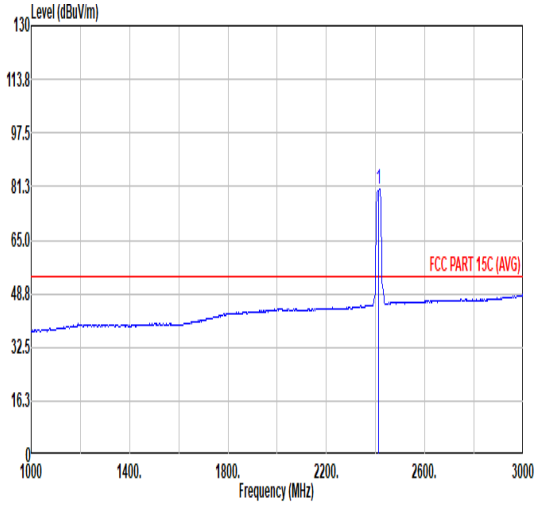
Mode	4	
	Harmonic	
	2400-2483.5_802.11g_CH01_2412MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4824.00 39.61 74.00 -34.39 58.46 34.10 12.48 65.43 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4824.00 39.52 74.00 -34.48 58.37 34.10 12.48 65.43 0.00 --- --- PEAK

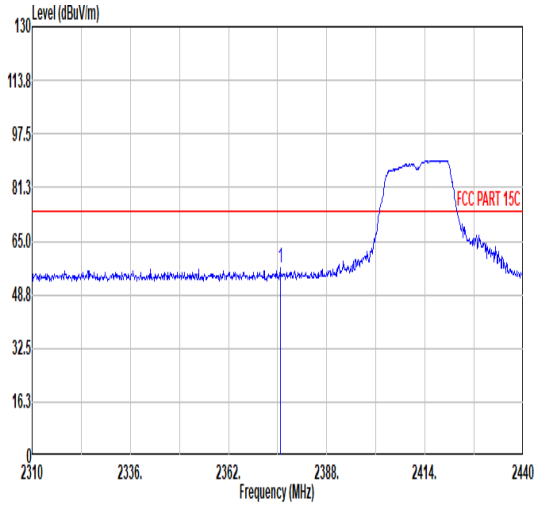
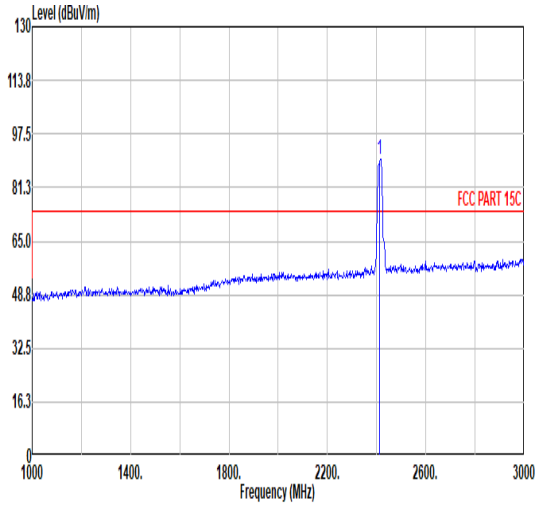
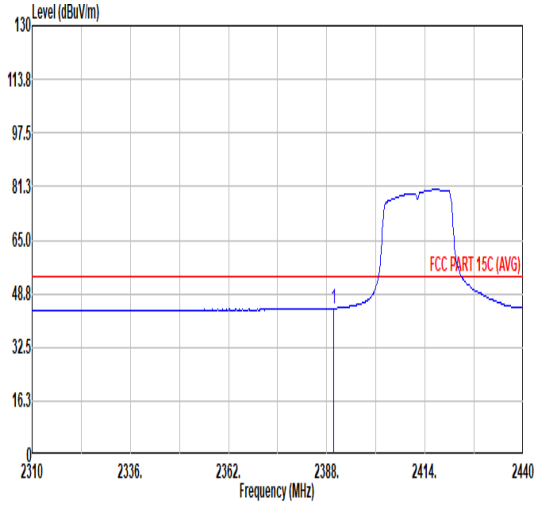
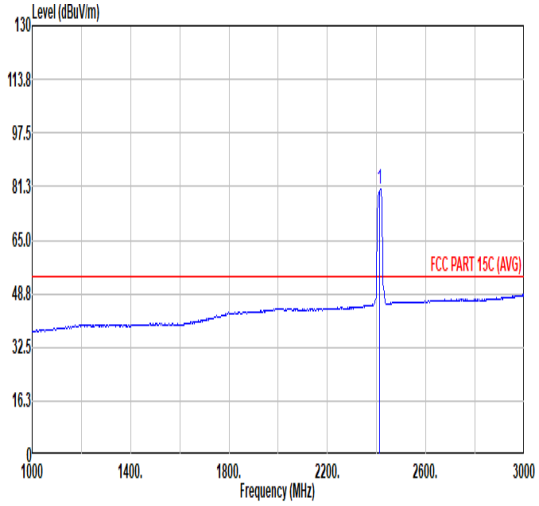
Mode	5	
	Harmonic	
	2400-2483.5_802.11g_CH06_2437MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4874.00 39.33 74.00 -34.67 58.38 34.10 12.29 65.44 0.00 --- --- PEAK 2 7311.00 43.31 74.00 -30.69 58.03 35.80 14.73 65.25 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4874.00 39.81 74.00 -34.19 58.86 34.10 12.29 65.44 0.00 --- --- PEAK 2 7311.00 42.18 74.00 -31.82 56.90 35.80 14.73 65.25 0.00 --- --- PEAK

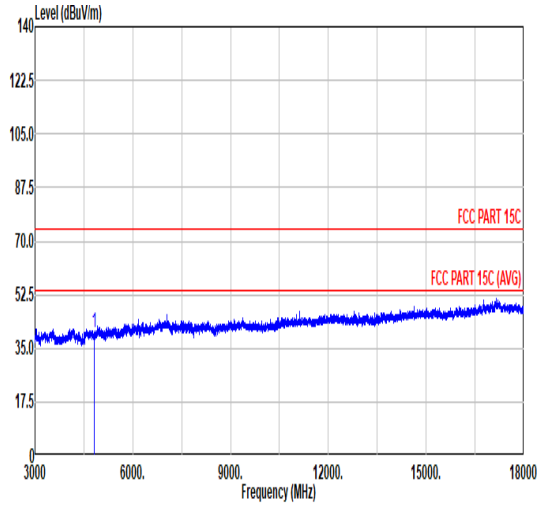
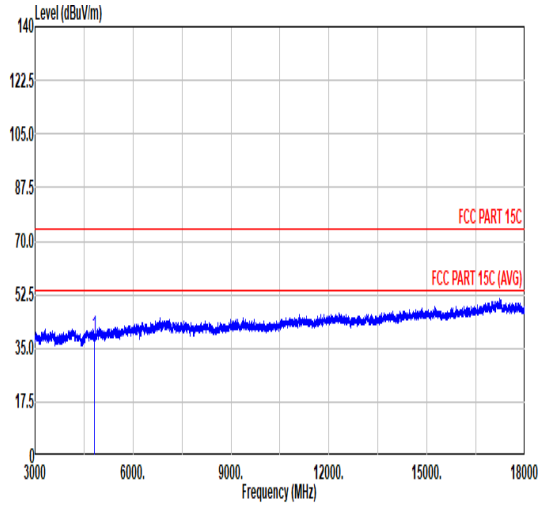
Mode	6	
	Band Edge	
	2400-2483.5_802.11g_CH11_2462MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.92 58.92 74.00 -15.08 42.39 32.13 9.05 30.65 6.00 267 181 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2462.00 94.67 ------ ------ 78.28 32.10 8.99 30.70 6.00 267 181 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.50 46.10 54.00 -7.90 29.57 32.13 9.05 30.65 6.00 267 181 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2462.00 85.28 ------ ------ 68.89 32.10 8.99 30.70 6.00 267 181 AVERAGE

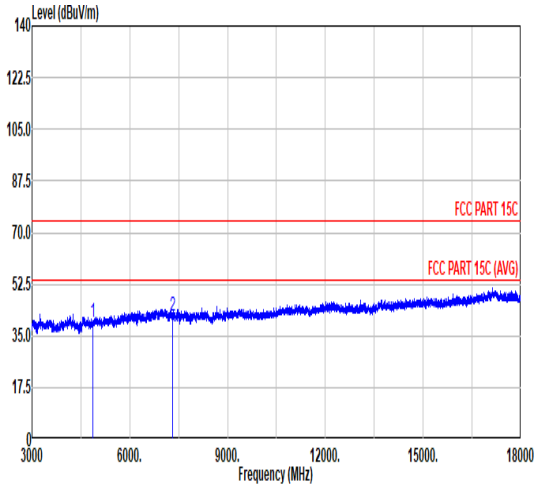
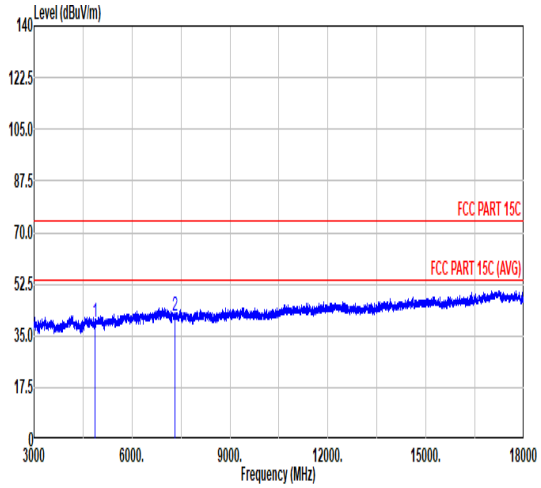
Mode	6	
	Band Edge	
	2400-2483.5_802.11g_CH11_2462MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2495.44 58.30 74.00 -15.70 41.68 32.14 9.09 30.61 6.00 113 347 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2462.00 94.24 ------ ------ 77.84 32.10 9.00 30.70 6.00 113 347 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.50 45.78 54.00 -8.22 29.25 32.13 9.05 30.65 6.00 113 347 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2462.00 84.97 ------ ------ 68.58 32.10 8.99 30.70 6.00 113 347 AVERAGE

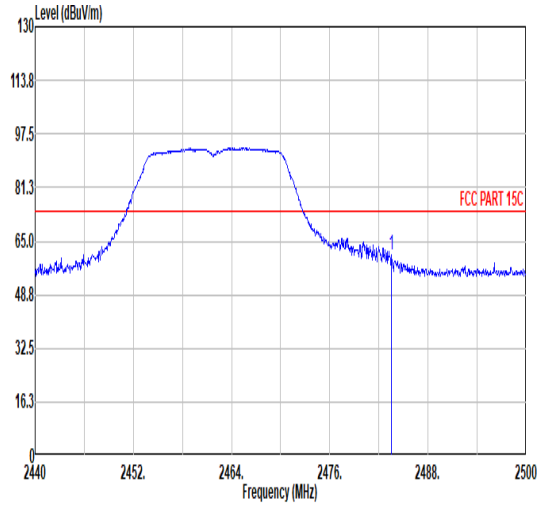
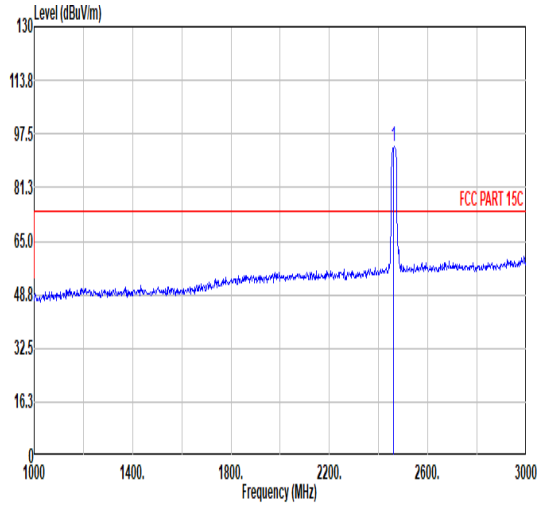
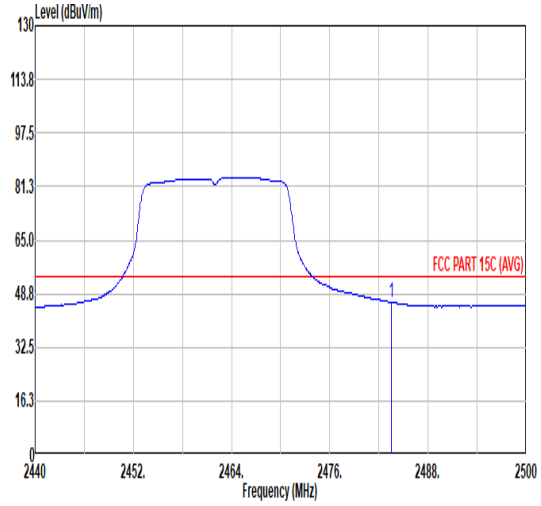
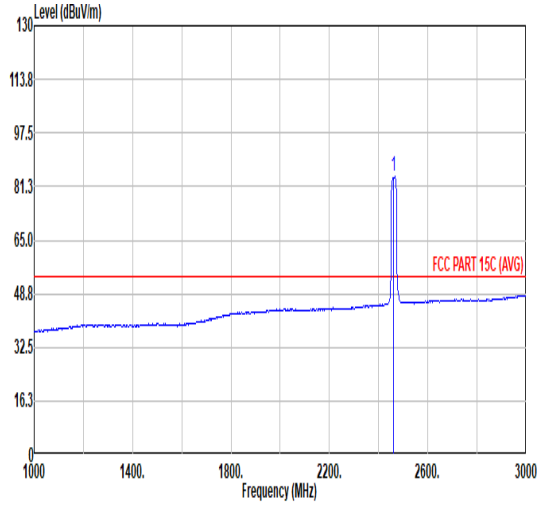
Mode	6	
	Harmonic	
	2400-2483.5_802.11g_CH11_2462MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4924.00 40.71 74.00 -33.29 59.83 34.10 12.22 65.44 0.00 --- --- PEAK 2 7386.00 43.48 74.00 -30.52 58.19 35.80 14.78 65.29 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4924.00 40.56 74.00 -33.44 59.68 34.10 12.22 65.44 0.00 --- --- PEAK 2 7386.00 42.76 74.00 -31.24 57.47 35.80 14.78 65.29 0.00 --- --- PEAK

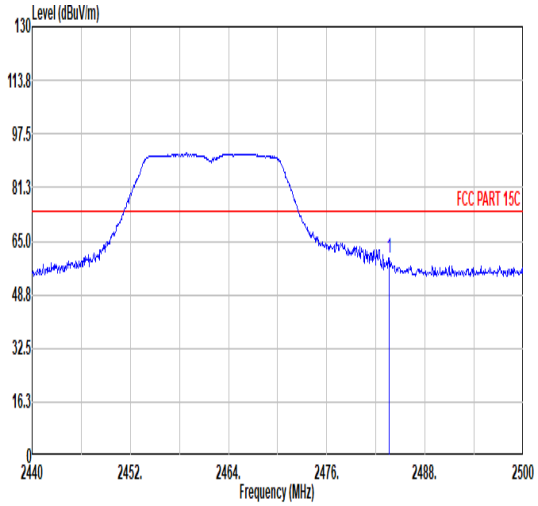
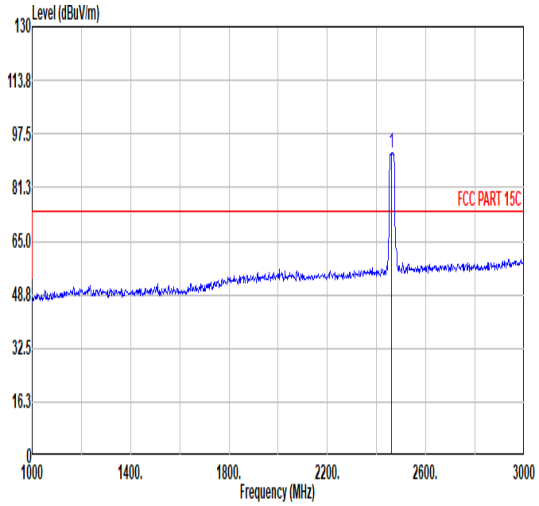
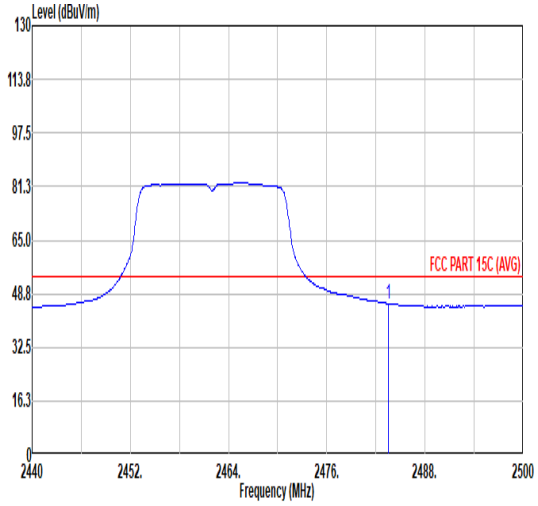
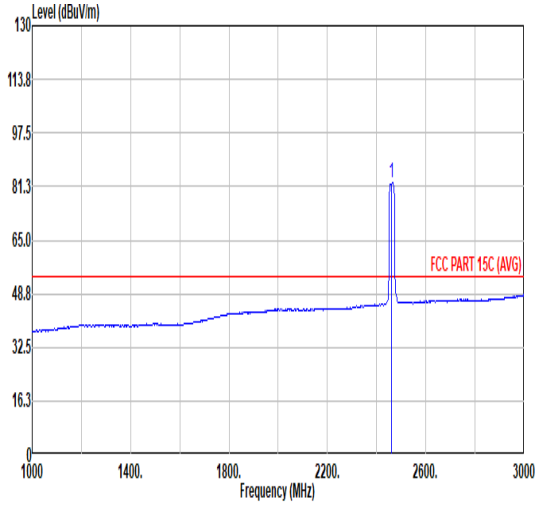
Mode	7	
	Band Edge	
	2400-2483.5_802.11n HT20_CH01_2412MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2389.95 59.27 74.00 -14.73 43.41 31.98 8.77 30.89 6.00 294 131 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2412.00 90.09 ------ ------ 74.06 32.02 8.85 30.84 6.00 294 131 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2389.95 44.38 54.00 -9.62 28.52 31.98 8.77 30.89 6.00 294 131 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2412.00 80.69 ------ ------ 64.64 32.03 8.85 30.83 6.00 294 131 AVERAGE

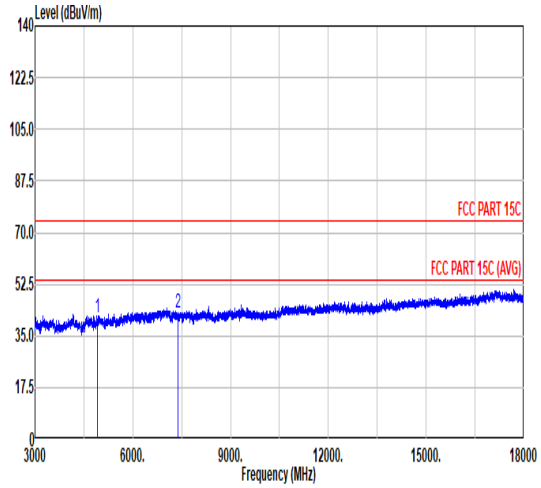
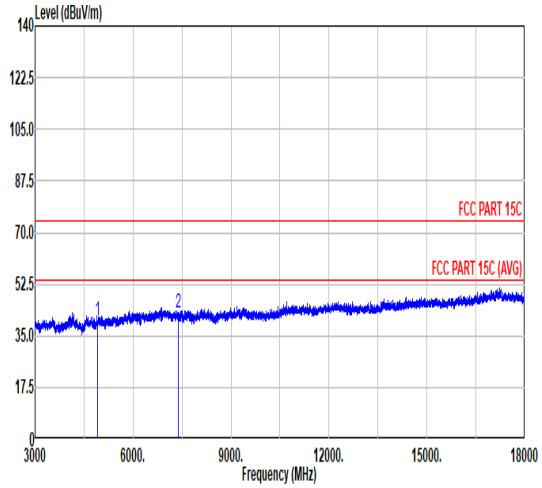
Mode	7	
	Band Edge	
	2400-2483.5_802.11n HT20_CH01_2412MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2375.65 56.67 74.00 -17.33 40.89 31.95 8.73 30.90 6.00 120 63 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2412.00 89.83 ------ ------ 73.80 32.02 8.85 30.84 6.00 120 63 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2389.82 44.33 54.00 -9.67 28.47 31.98 8.77 30.89 6.00 120 63 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2412.00 80.47 ------ ------ 64.42 32.03 8.85 30.83 6.00 120 63 AVERAGE

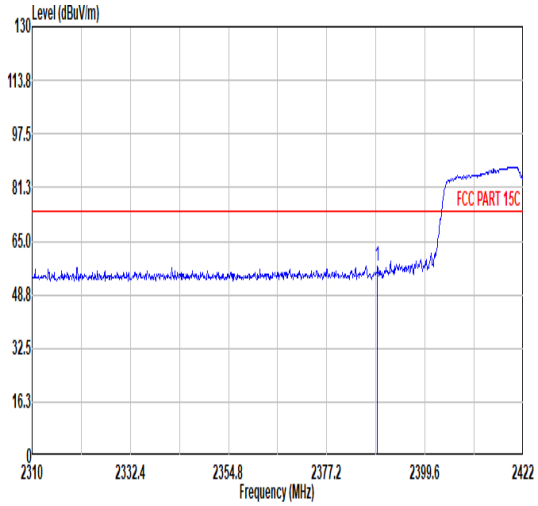
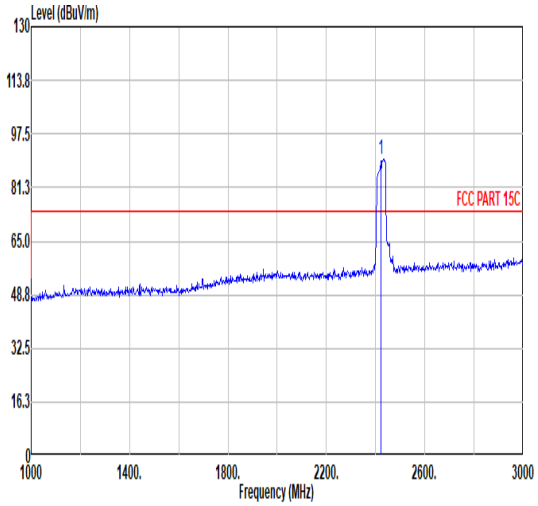
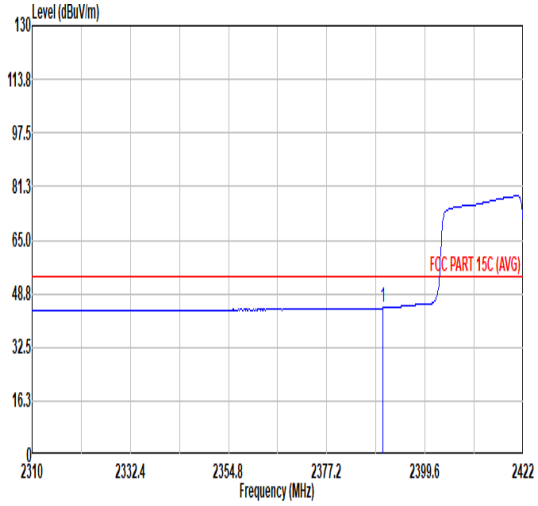
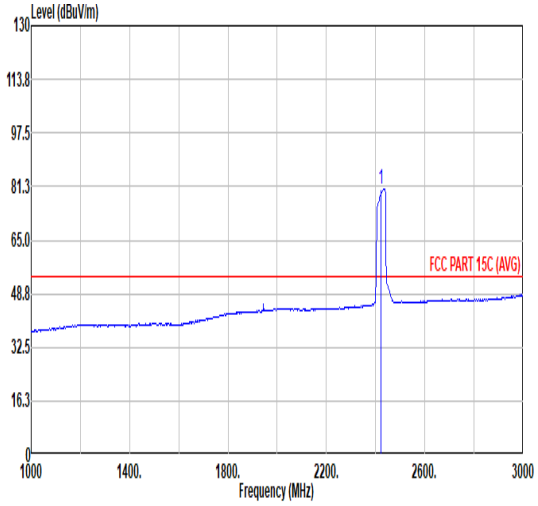
Mode	7	
	Harmonic	
	2400-2483.5_802.11n HT20_CH01_2412MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4824.00 40.32 74.00 -33.68 59.17 34.10 12.48 65.43 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4824.00 39.11 74.00 -34.89 57.96 34.10 12.48 65.43 0.00 --- --- PEAK

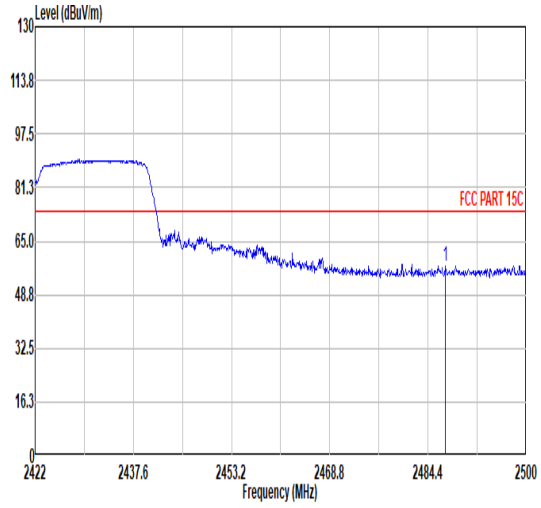
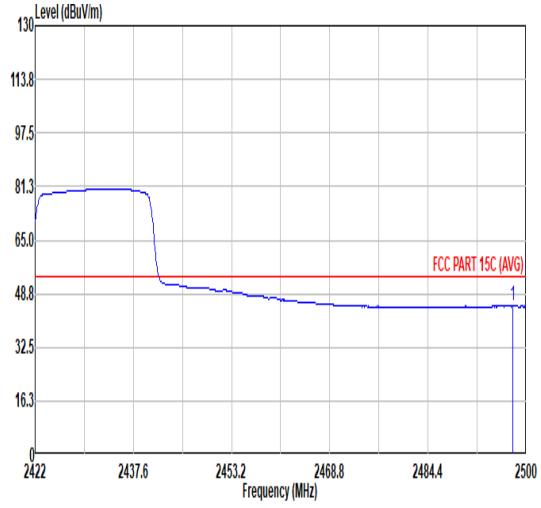
Mode	8	
	Harmonic	
	2400-2483.5_802.11n HT20_CH06_2437MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4874.00 39.49 74.00 -34.51 58.54 34.10 12.29 65.44 0.00 --- --- PEAK 2 7311.00 41.87 74.00 -32.13 56.59 35.80 14.73 65.25 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4874.00 39.74 74.00 -34.26 58.79 34.10 12.29 65.44 0.00 --- --- PEAK 2 7311.00 41.71 74.00 -32.29 56.43 35.80 14.73 65.25 0.00 --- --- PEAK

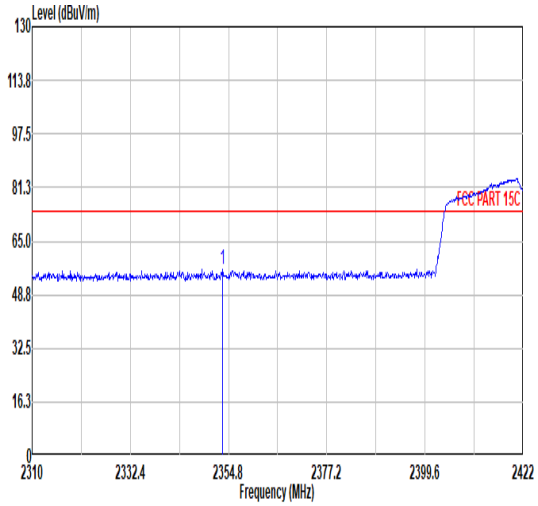
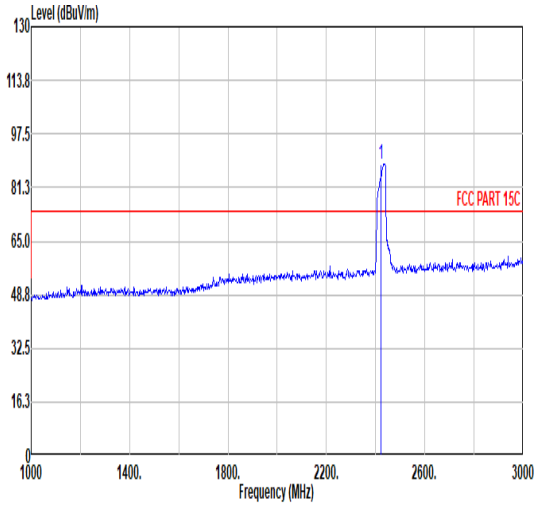
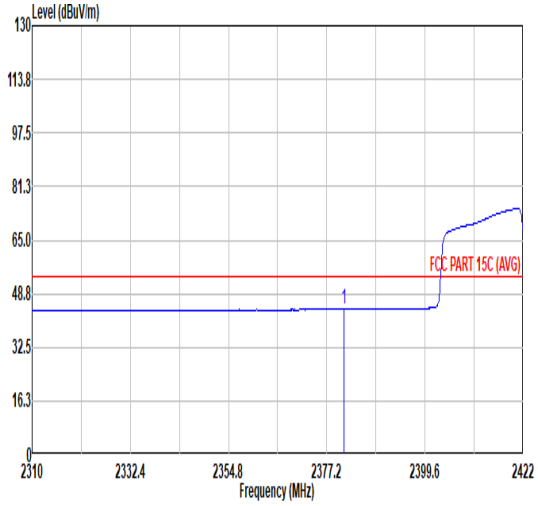
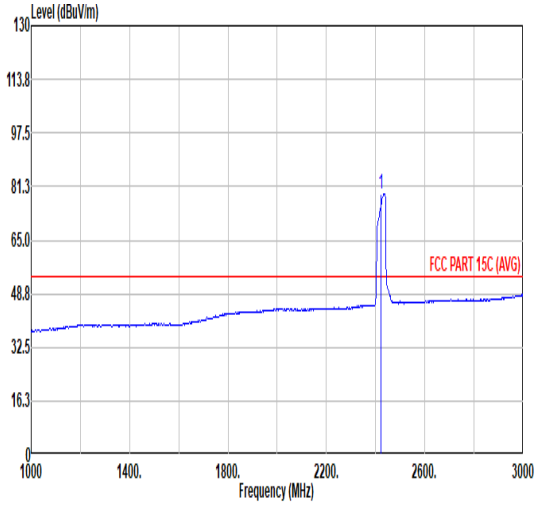
Mode	9	
	Band Edge	
	2400-2483.5_802.11n HT20_CH11_2462MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.56 61.02 74.00 -12.98 44.49 32.13 9.05 30.65 6.00 267 181 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2462.00 93.50 ------ ------ 77.11 32.10 8.99 30.70 6.00 267 181 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.50 46.19 54.00 -7.81 29.66 32.13 9.05 30.65 6.00 267 181 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2462.00 84.15 ------ ------ 67.75 32.10 9.00 30.70 6.00 267 181 AVERAGE

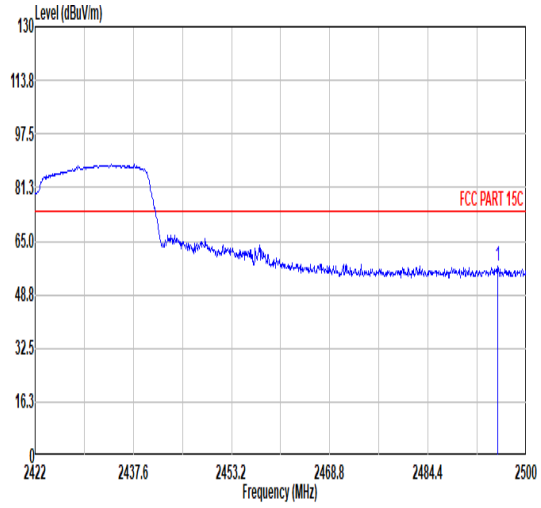
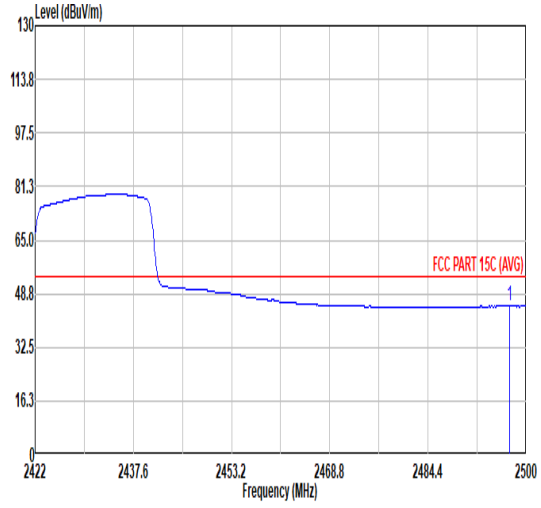
Mode	9	
	Band Edge	
	2400-2483.5_802.11n HT20_CH11_2462MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.62 59.82 74.00 -14.18 43.29 32.13 9.05 30.65 6.00 100 64 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2462.00 91.78 ------ ------ 75.38 32.10 9.00 30.70 6.00 100 64 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.50 45.81 54.00 -8.19 29.28 32.13 9.05 30.65 6.00 100 64 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2462.00 82.40 ------ ------ 66.00 32.10 9.00 30.70 6.00 100 64 AVERAGE

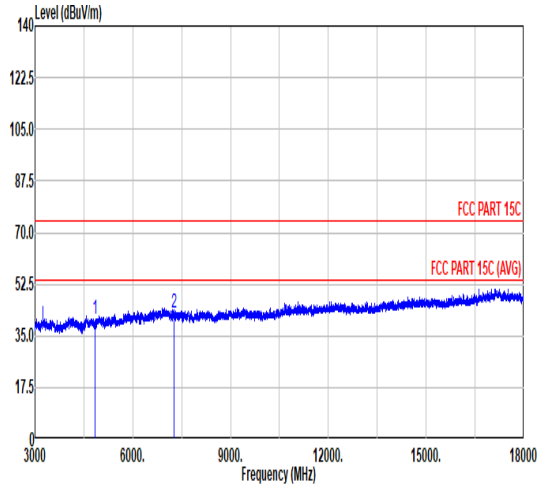
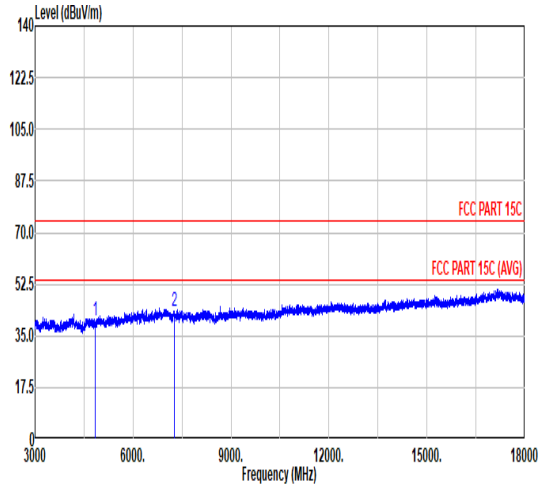
Mode	9	
	Harmonic	
	2400-2483.5_802.11n HT20_CH11_2462MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4924.00 41.37 74.00 -32.63 60.49 34.10 12.22 65.44 0.00 --- --- PEAK 2 7386.00 42.60 74.00 -31.40 57.31 35.80 14.78 65.29 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4924.00 40.31 74.00 -33.69 59.43 34.10 12.22 65.44 0.00 --- --- PEAK 2 7386.00 42.80 74.00 -31.20 57.51 35.80 14.78 65.29 0.00 --- --- PEAK

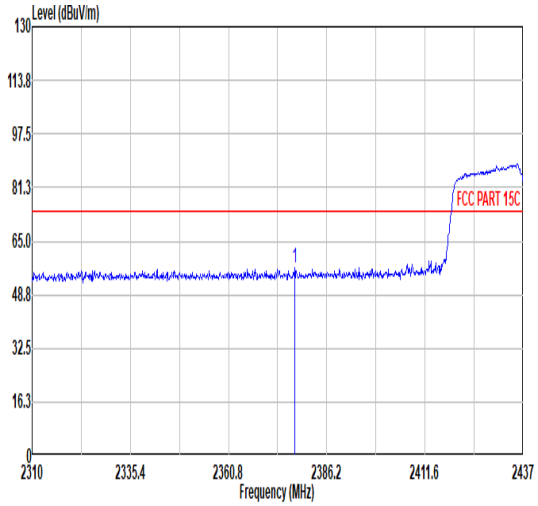
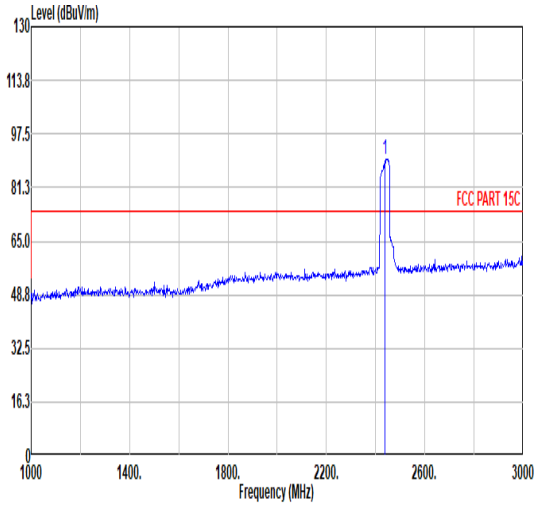
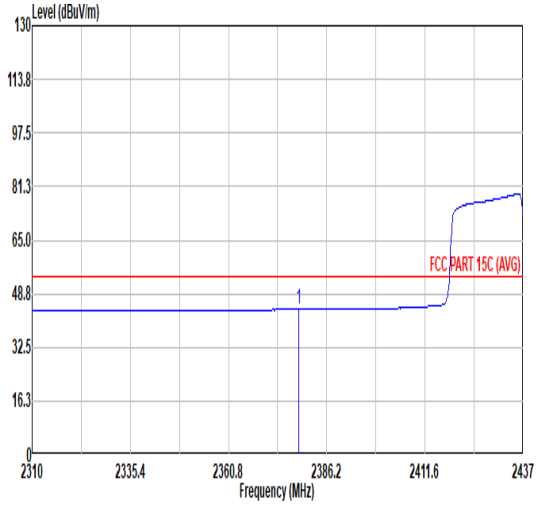
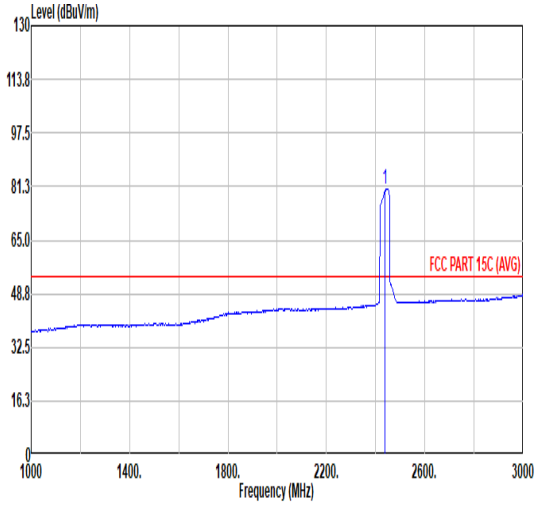
Mode	10	
	Band Edge - L	
	2400-2483.5_802.11n HT40_CH03_2422MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2388.74 57.63 74.00 -16.37 41.77 31.98 8.77 30.89 6.00 308 184 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2422.00 89.90 ------ ------ 73.77 32.04 8.89 30.80 6.00 308 184 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2389.97 44.41 54.00 -9.59 28.55 31.98 8.77 30.89 6.00 308 184 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2422.00 80.54 ------ ------ 64.36 32.05 8.91 30.78 6.00 308 184 AVERAGE

Mode	10	
	Band Edge - R	
	2400-2483.5_802.11n HT40_CH03_2422MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2487.21 57.55 74.00 -16.45 41.00 32.13 9.06 30.64 6.00 308 184 PEAK	Blank
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2497.89 44.95 54.00 -9.05 28.32 32.15 9.09 30.61 6.00 308 184 AVERAGE	Blank

Mode	10	
	Band Edge - L	
	2400-2483.5_802.11n HT40_CH03_2422MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2353.34 56.46 74.00 -17.54 40.82 31.90 8.66 30.92 6.00 195 65 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2422.00 88.36 ------ ------ 72.20 32.05 8.90 30.79 6.00 195 65 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2381.12 44.08 54.00 -9.92 28.28 31.96 8.74 30.90 6.00 195 65 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2422.00 79.07 ------ ------ 62.89 32.05 8.91 30.78 6.00 195 65 AVERAGE

Mode	10	
	Band Edge - R	
	2400-2483.5_802.11n HT40_CH03_2422MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2495.48 57.28 74.00 -16.72 40.66 32.14 9.09 30.61 6.00 195 65 PEAK	Blank
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2497.35 44.99 54.00 -9.01 28.36 32.15 9.09 30.61 6.00 195 65 AVERAGE	Blank

Mode	10	
	Harmonic	
	2400-2483.5_802.11n HT40_CH03_2422MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4844.00 40.79 74.00 -33.21 59.72 34.10 12.40 65.43 0.00 --- --- PEAK 2 7266.00 42.75 74.00 -31.25 57.48 35.80 14.69 65.22 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4844.00 40.30 74.00 -33.70 59.23 34.10 12.40 65.43 0.00 --- --- PEAK 2 7266.00 43.44 74.00 -30.56 58.17 35.80 14.69 65.22 0.00 --- --- PEAK

Mode	11	
	Band Edge - L	
	2400-2483.5_802.11n HT40_CH06_2437MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2377.95 56.84 74.00 -17.16 41.06 31.95 8.73 30.90 6.00 270 181 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2437.00 89.79 ------ ------ 73.53 32.07 8.94 30.75 6.00 270 181 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2378.96 44.03 54.00 -9.97 28.24 31.95 8.74 30.90 6.00 270 181 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2437.00 80.46 ------ ------ 64.17 32.08 8.95 30.74 6.00 270 181 AVERAGE

Mode	11	
	Band Edge - R	
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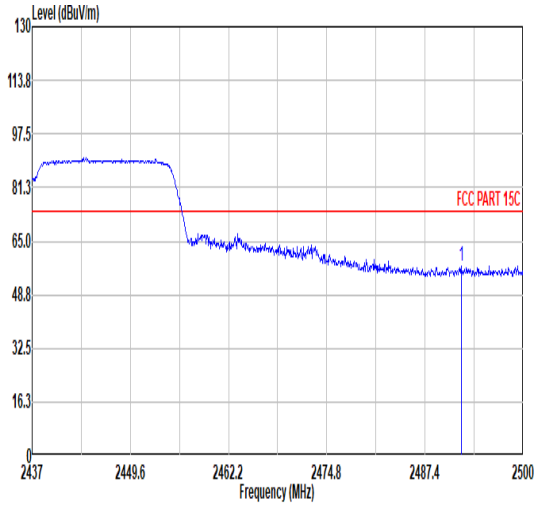
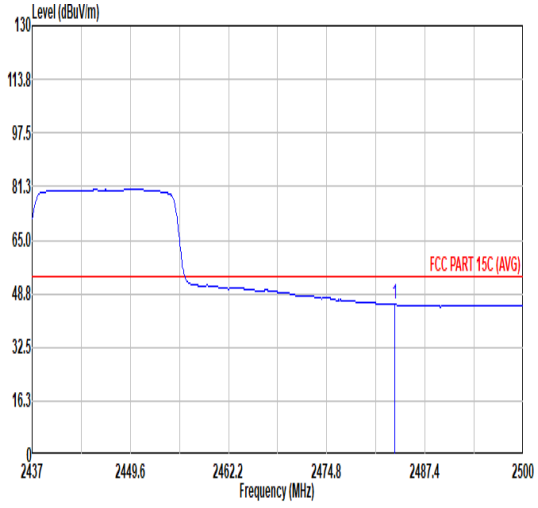
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2492.06 57.28 74.00 -16.72 40.68 32.14 9.08 30.62 6.00 270 181 PEAK	Blank
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.56 45.42 54.00 -8.58 28.89 32.13 9.05 30.65 6.00 270 181 AVERAGE	Blank

Mode	11	
	Band Edge - L	
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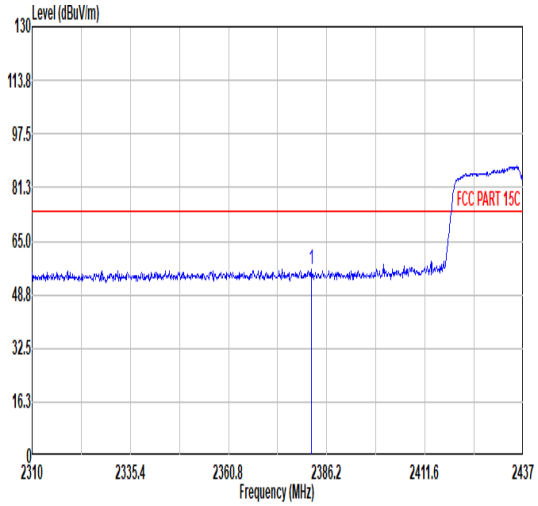
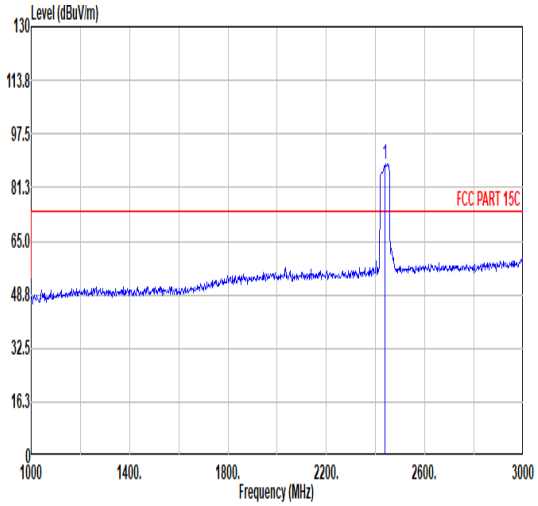
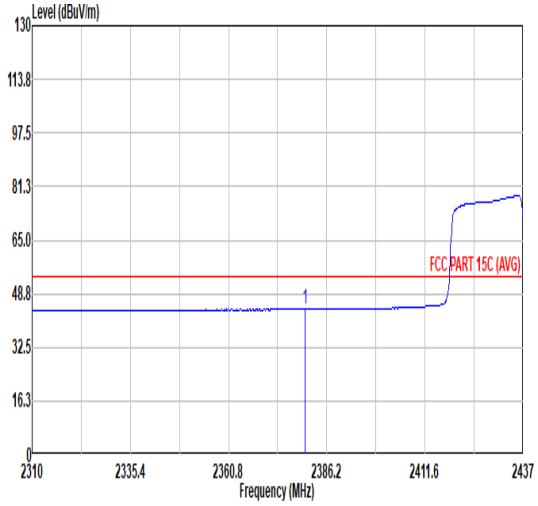
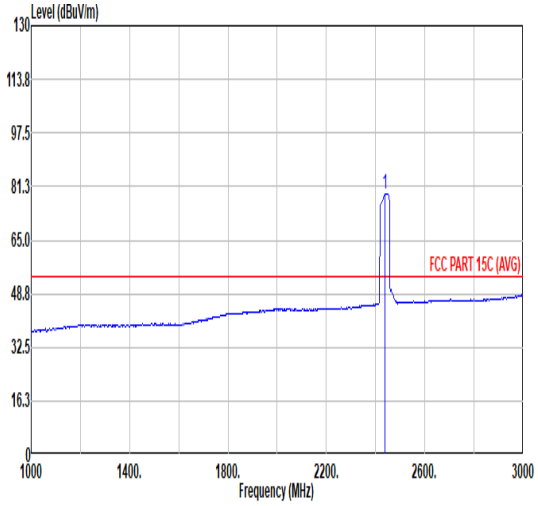
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2382.14 56.24 74.00 -17.76 40.42 31.96 8.75 30.89 6.00 100 65 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2437.00 88.38 ------ ------ 72.09 32.08 8.95 30.74 6.00 100 65 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2380.49 44.07 54.00 -9.93 28.27 31.96 8.74 30.90 6.00 100 65 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2437.00 79.04 ------ ------ 62.83 32.06 8.92 30.77 6.00 100 65 AVERAGE

Mode	11	
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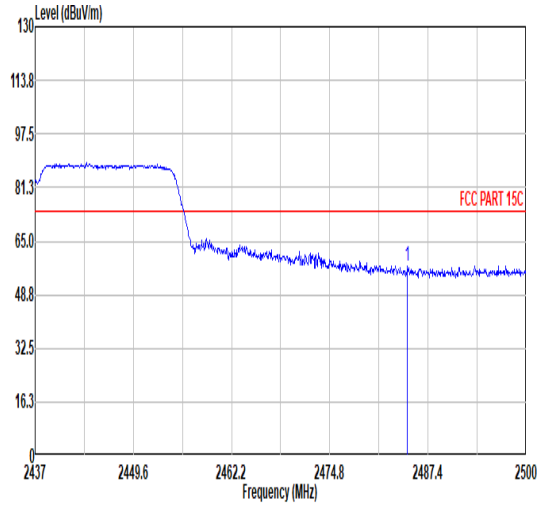
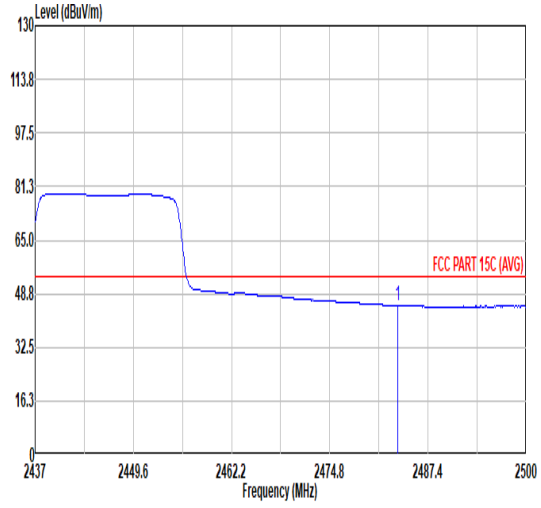
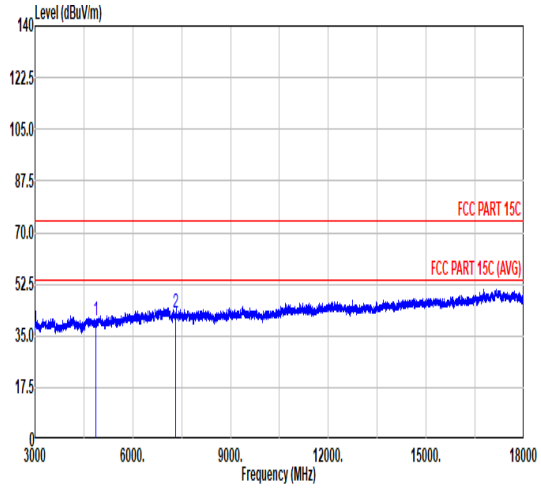
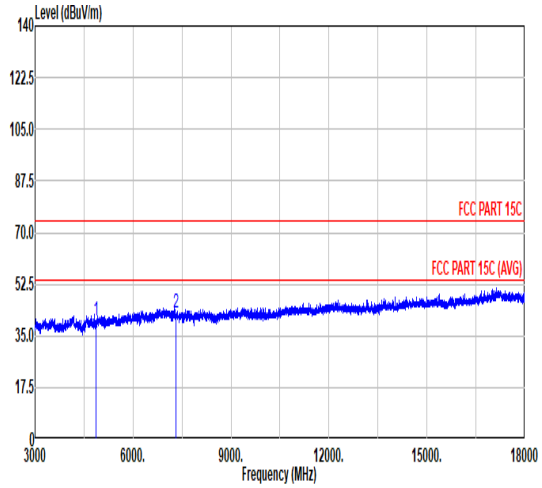
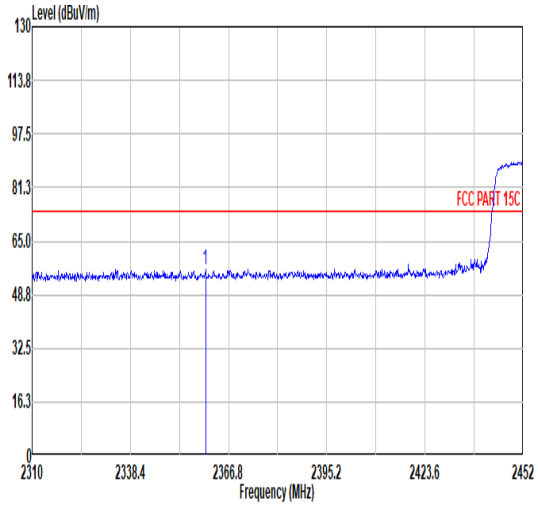
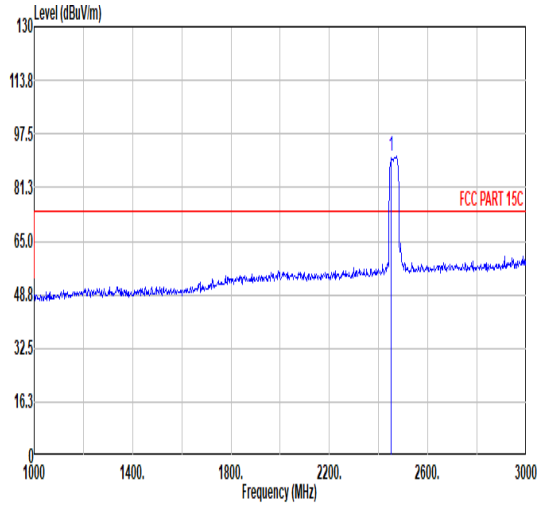
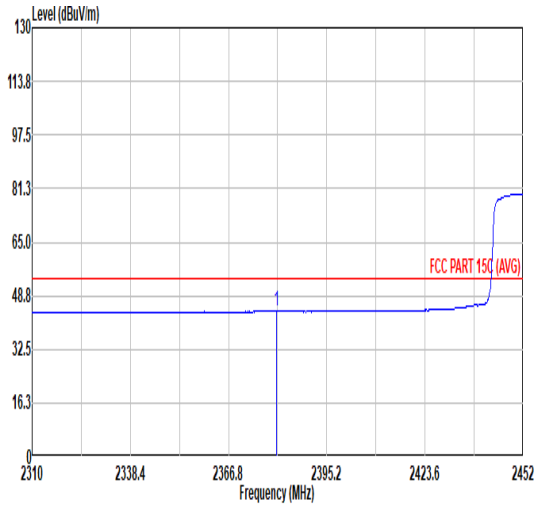
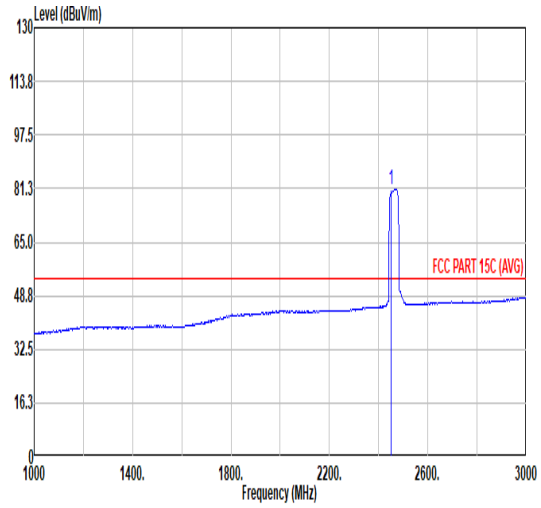
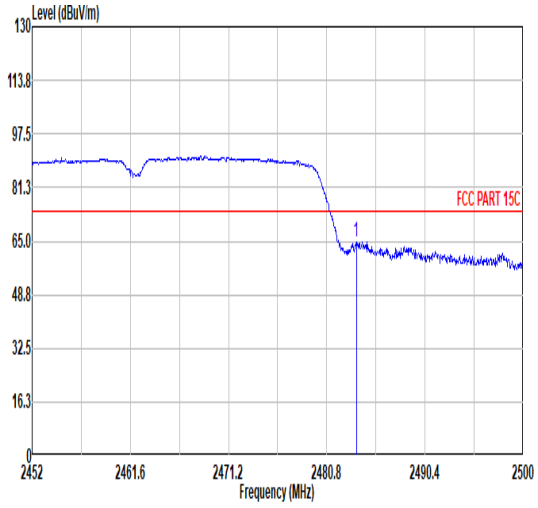
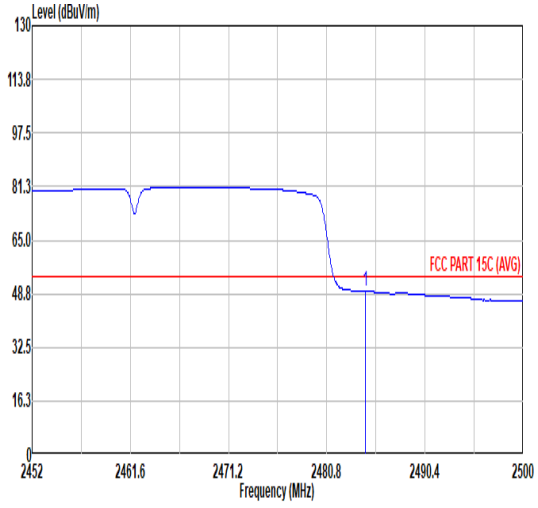
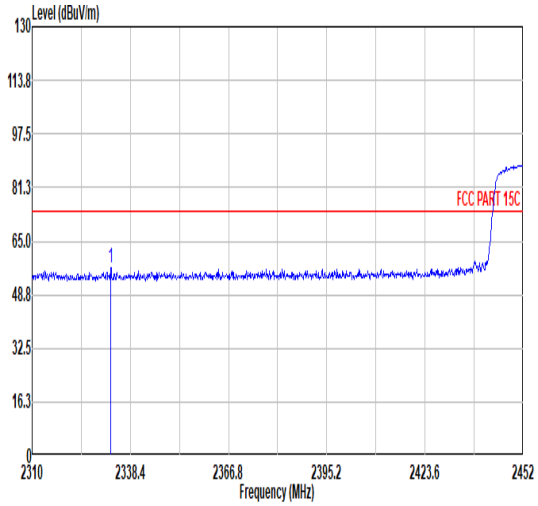
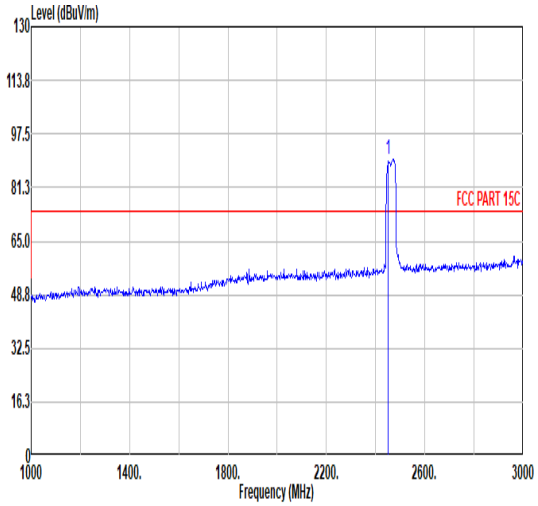
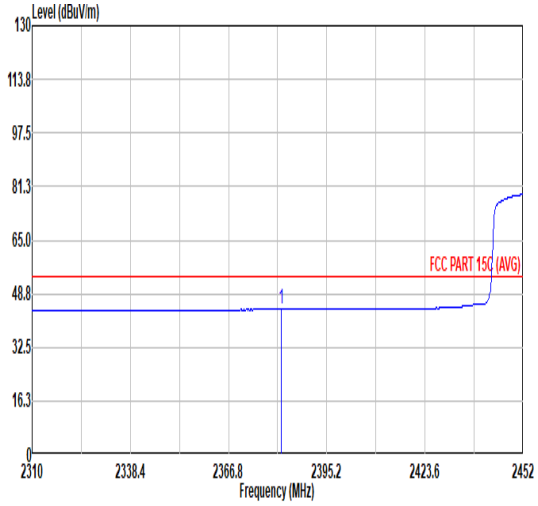
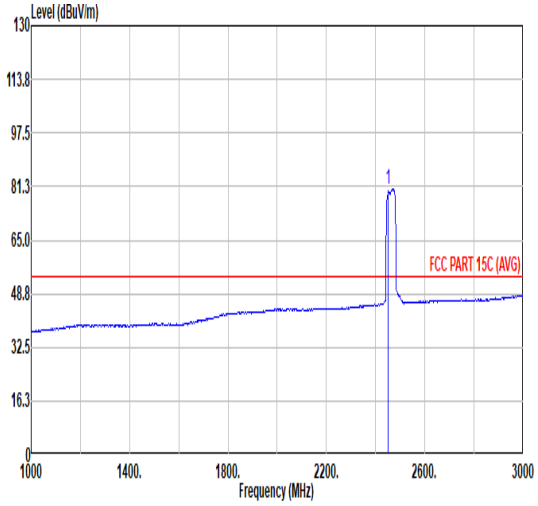
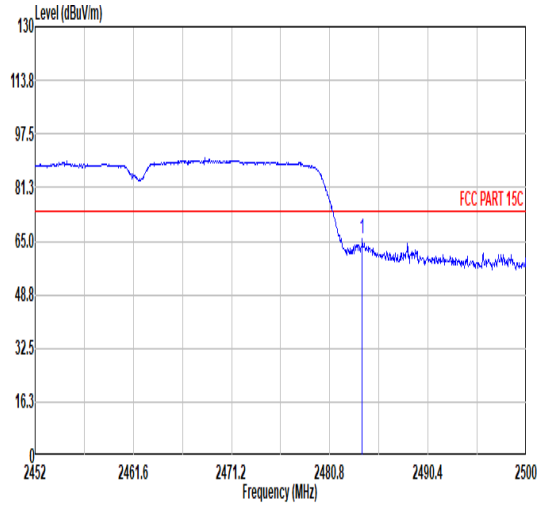
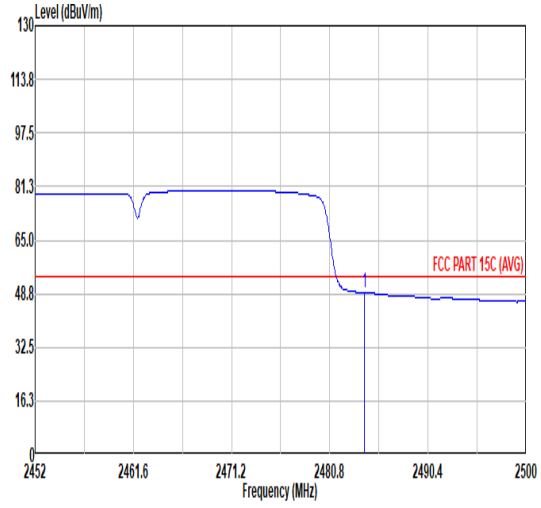
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2484.75 57.48 74.00 -16.52 40.94 32.13 9.05 30.64 6.00 100 65 PEAK	Blank
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.56 45.13 54.00 -8.87 28.60 32.13 9.05 30.65 6.00 100 65 AVERAGE	Blank

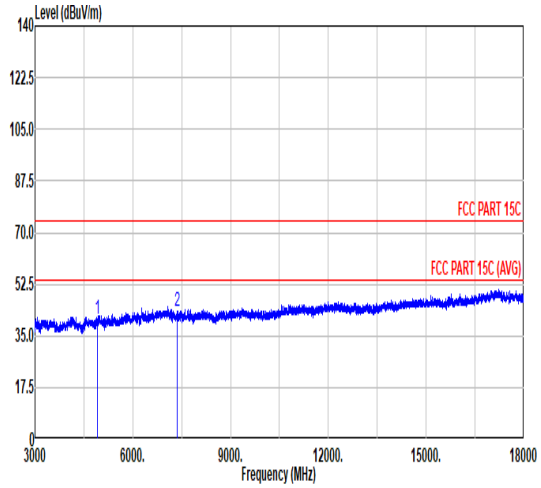
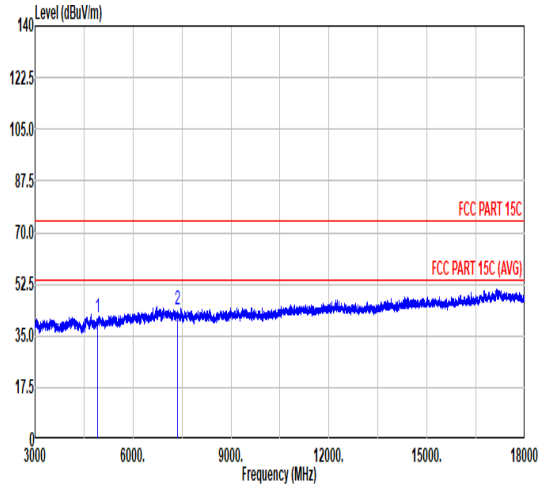
Mode	11	
	Harmonic	
	2400-2483.5_802.11n HT40_CH06_2437MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4874.00 40.20 74.00 -33.80 59.25 34.10 12.29 65.44 0.00 --- --- Peak 2 7311.00 42.87 74.00 -31.13 57.59 35.80 14.73 65.25 0.00 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4874.00 40.30 74.00 -33.70 59.35 34.10 12.29 65.44 0.00 --- --- Peak 2 7311.00 42.97 74.00 -31.03 57.69 35.80 14.73 65.25 0.00 --- --- Peak

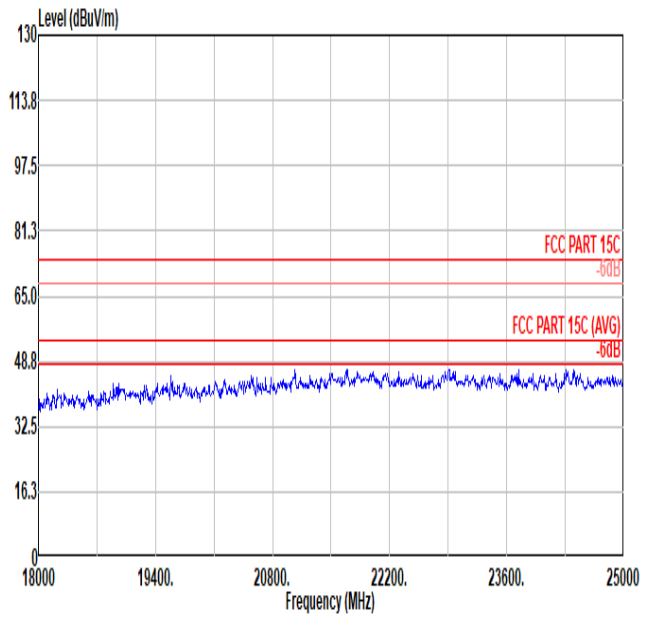
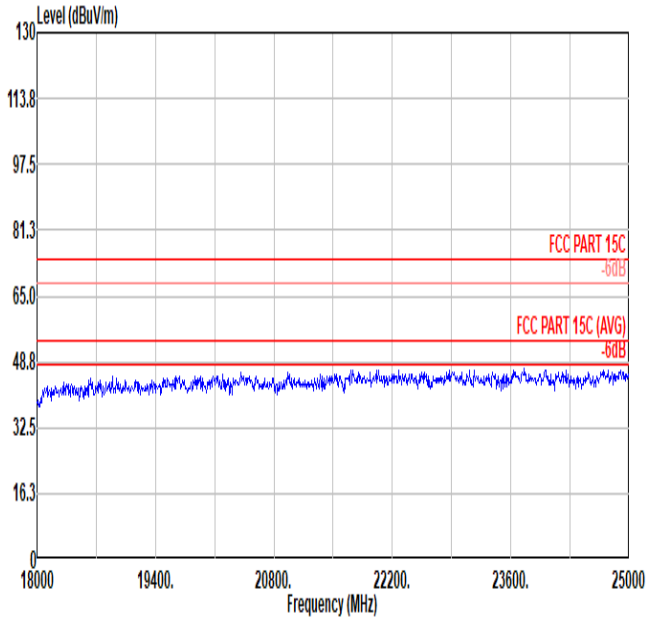
Mode	12	
	Band Edge - L	
	2400-2483.5_802.11n HT40_CH09_2452MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2360.13 56.60 74.00 -17.40 40.92 31.91 8.68 30.91 6.00 300 180 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2452.00 90.62 ------ ------ 74.17 32.11 9.02 30.68 6.00 300 180 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2380.72 44.03 54.00 -9.97 28.23 31.96 8.74 30.90 6.00 300 180 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2452.00 81.15 ------ ------ 64.72 32.10 9.01 30.68 6.00 300 180 AVERAGE

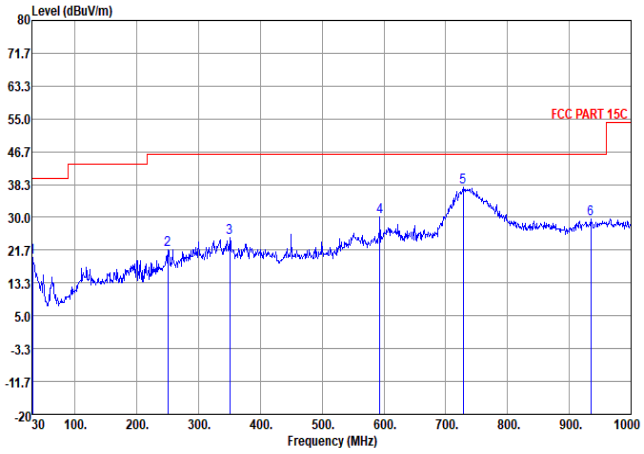
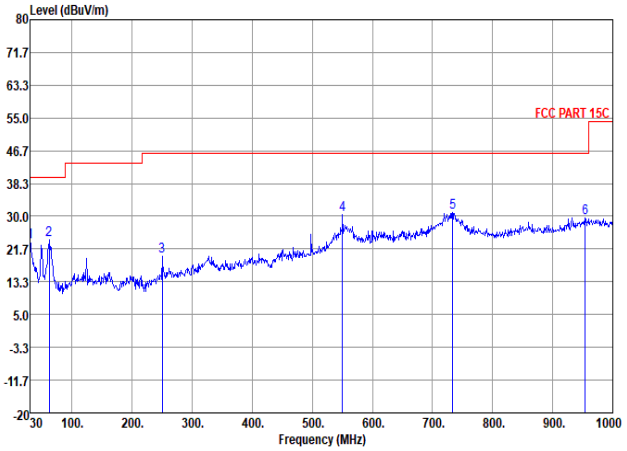
Mode	12	
	Band Edge - R	
	2400-2483.5_802.11n HT40_CH09_2452MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.68 64.77 74.00 -9.23 48.24 32.13 9.05 30.65 6.00 300 180 PEAK	Blank
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2484.54 49.60 54.00 -4.40 33.06 32.13 9.05 30.64 6.00 300 180 AVERAGE	Blank

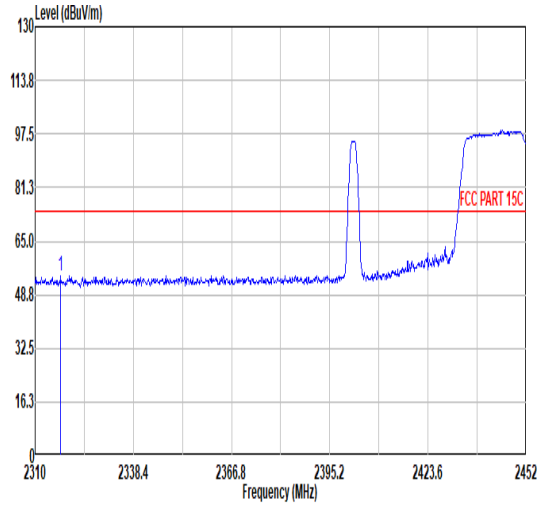
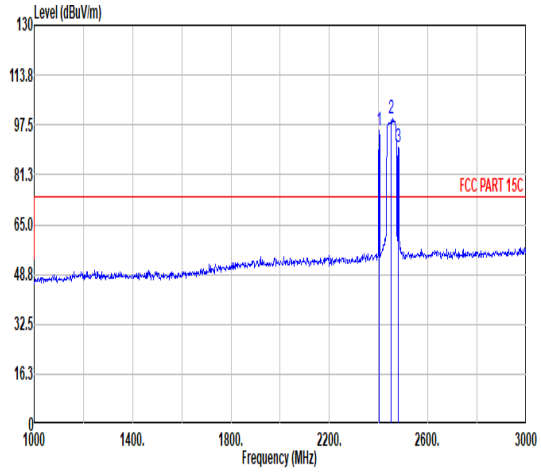
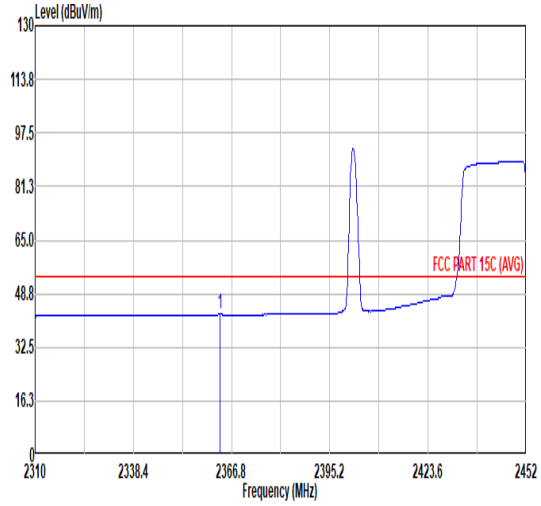
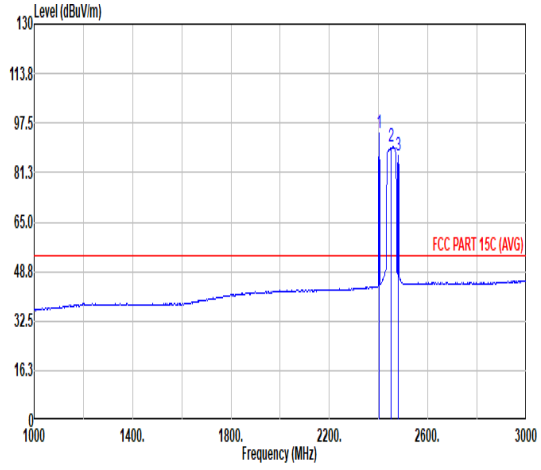
Mode	12	
	Band Edge - L	
	2400-2483.5_802.11n HT40_CH09_2452MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2332.72 56.76 74.00 -17.24 41.24 31.85 8.60 30.93 6.00 100 61 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2452.00 89.71 ------ ------ 73.28 32.10 9.01 30.68 6.00 100 61 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2381.99 44.03 54.00 -9.97 28.21 31.96 8.75 30.89 6.00 100 61 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2452.00 80.31 ------ ------ 63.88 32.10 9.01 30.68 6.00 100 61 AVERAGE

Mode	12	
	Band Edge - R	
	2400-2483.5_802.11n HT40_CH09_2452MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.97 65.59 74.00 -8.41 49.05 32.13 9.05 30.64 6.00 100 61 PEAK	Blank
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2484.21 49.20 54.00 -4.80 32.66 32.13 9.05 30.64 6.00 100 61 AVERAGE	Blank

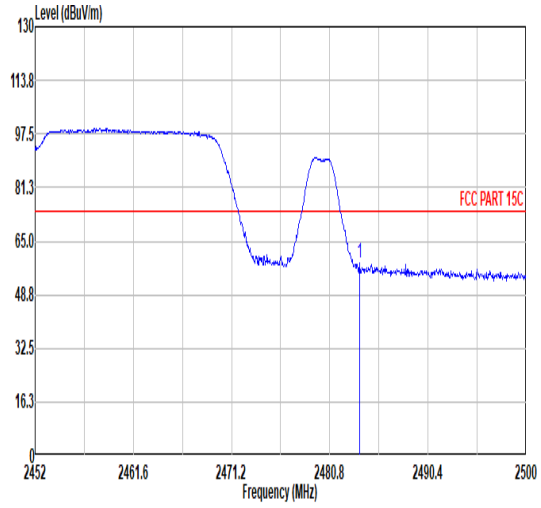
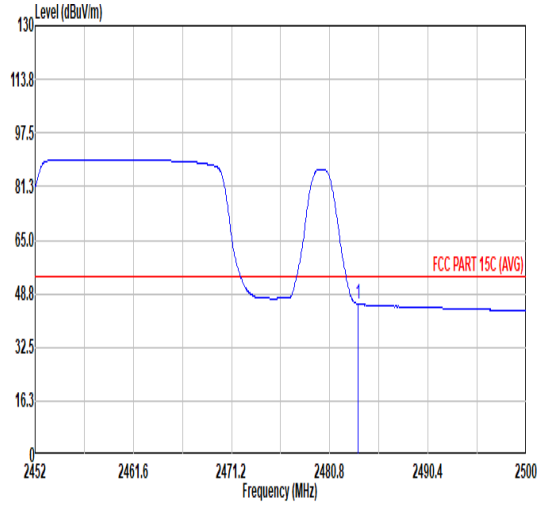
Mode	12	
	Harmonic	
	2400-2483.5_802.11n HT40_CH09_2452MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4904.00 40.53 74.00 -33.47 59.67 34.10 12.20 65.44 0.00 --- --- PEAK 2 7356.00 43.11 74.00 -30.89 57.82 35.80 14.76 65.27 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4904.00 41.05 74.00 -32.95 60.19 34.10 12.20 65.44 0.00 --- --- PEAK 2 7356.00 43.93 74.00 -30.07 58.64 35.80 14.76 65.27 0.00 --- --- PEAK

Mode	13	
	Emission above 18GHz	
	2400-2483.5_802.11n HT40_CH09_2452MHz	
Pol.	Horizontal	Vertical
Peak Avg		

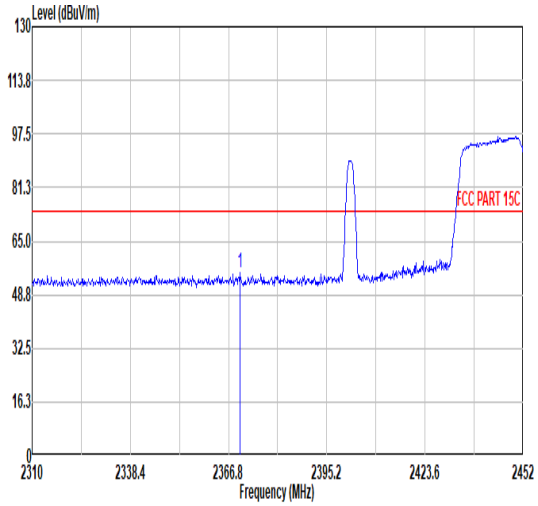
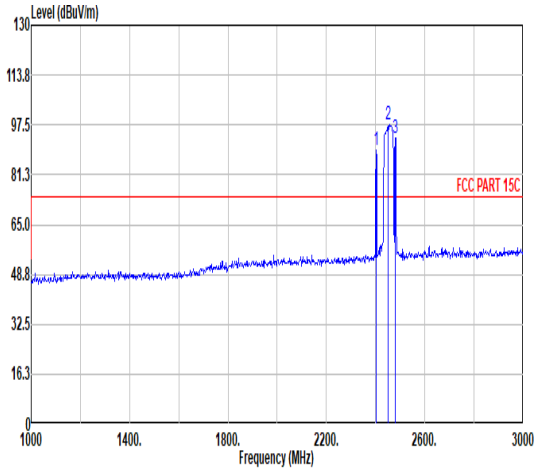
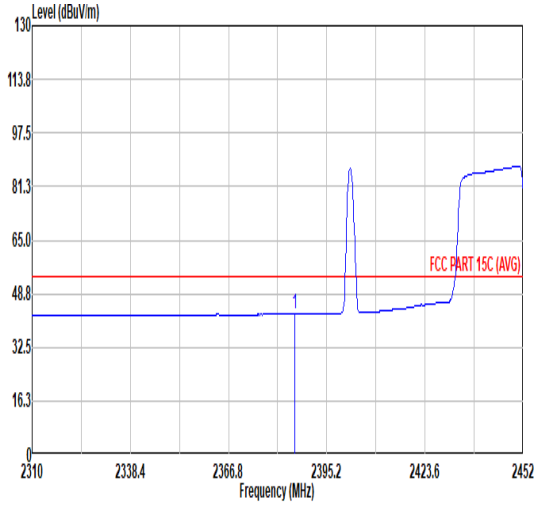
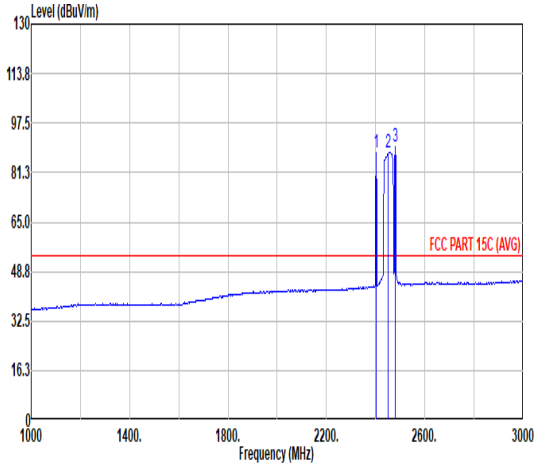
Mode	13	
	Emission below 1GHz	
	2400-2483.5_802.11n HT40_CH09_2452MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Over Limit Limit Line ReadLevel Antenna Factor Cable Loss Preamp Factor A/Pos T/Pos Remark MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 30.97 19.82 -20.18 40.00 27.03 25.09 0.51 32.81 --- --- Peak 2 250.19 21.91 -24.09 46.00 34.06 18.56 2.30 33.01 --- --- Peak 3 350.10 24.81 -21.19 46.00 34.38 20.61 2.73 32.91 --- --- Peak 4 593.57 30.27 -15.73 46.00 33.97 26.04 3.55 33.29 --- --- Peak 5 728.40 37.61 -8.39 46.00 39.78 27.14 3.94 33.25 --- --- Peak 6 935.01 29.52 -16.48 46.00 27.48 29.61 4.45 32.02 --- --- Peak	 Freq Level Over Limit Limit Line ReadLevel Antenna Factor Cable Loss Preamp Factor A/Pos T/Pos Remark MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 30.00 23.39 -16.61 40.00 29.95 25.74 0.50 32.80 --- --- Peak 2 62.01 24.06 -15.94 40.00 43.21 12.83 0.94 32.92 --- --- Peak 3 250.19 19.90 -26.10 46.00 32.05 18.56 2.30 33.01 --- --- Peak 4 549.92 30.44 -15.56 46.00 35.27 25.10 3.41 33.34 --- --- Peak 5 733.25 30.99 -15.01 46.00 33.06 27.21 3.95 33.23 --- --- Peak 6 954.41 29.54 -16.46 46.00 26.95 29.91 4.49 31.81 --- --- Peak

Mode	14 (Co-lacation)	
	Band Edge - L	
	2400-2483.5_802.11n HT40_CH9_2452MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2317.38 54.65 74.00 -19.35 40.77 31.82 7.01 30.95 6.00 300 109 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2402.00 95.49 74.00 21.49 81.23 32.00 7.13 30.87 6.00 300 109 Peak 2 2452.00 99.71 74.00 25.71 85.13 32.08 7.23 30.73 6.00 300 109 Peak 3 2480.00 90.40 74.00 16.40 75.66 32.12 7.28 30.66 6.00 300 109 Peak
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2363.39 42.67 54.00 -11.33 28.58 31.92 7.08 30.91 6.00 300 109 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2402.00 94.04 54.00 40.04 79.78 32.00 7.13 30.87 6.00 300 109 Average 2 2452.00 89.59 54.00 35.59 75.01 32.08 7.23 30.73 6.00 300 109 Average 3 2480.00 86.69 54.00 32.69 71.95 32.12 7.28 30.66 6.00 300 109 Average

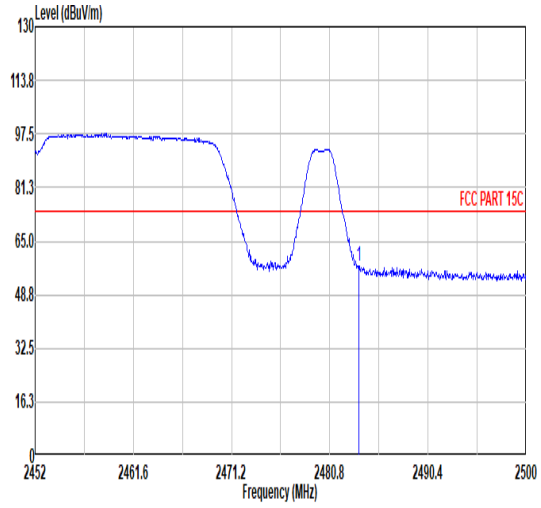
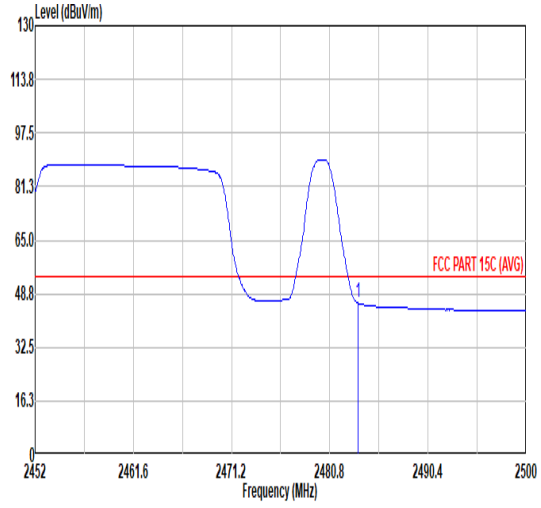
Note: the highest signal over limit are BLE + Zigbee + WLAN co-location fundamental signals.

Mode	14	
	Band Edge - R	
	2400-2483.5_802.11n HT40_CH9_2452MHz	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.73 58.61 74.00 -15.39 43.84 32.13 7.29 30.65 6.00 300 109 PEAK	Blank
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.54 45.70 54.00 -8.30 30.93 32.13 7.29 30.65 6.00 300 109 AVERAGE	Blank

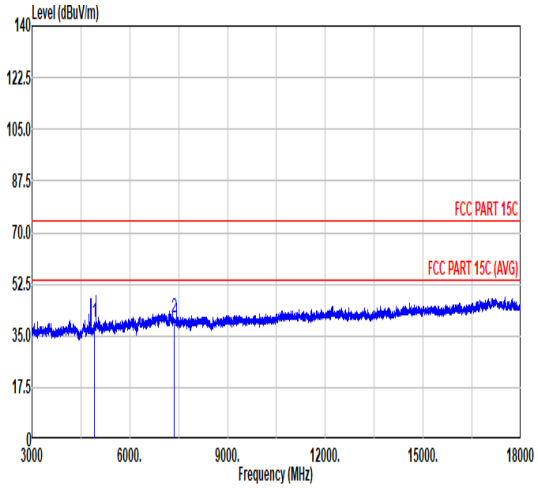
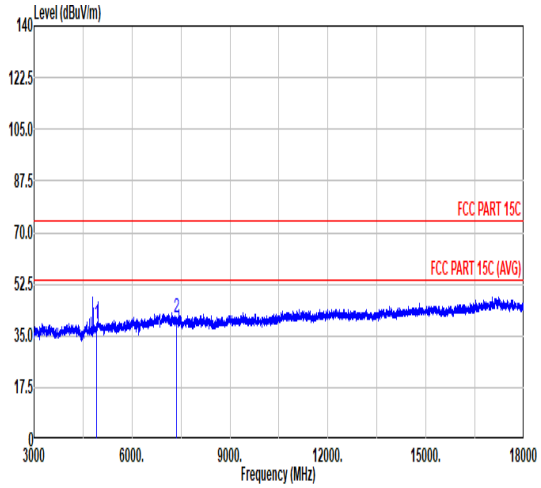
Note: the highest signal over limit are BLE + Zigbee + WLAN co-location fundamental signals.

Mode	14	
	Band Edge - L	
	2400-2483.5_802.11n HT40_CH9_2452MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2370.21 55.55 74.00 -18.45 41.43 31.93 7.09 30.90 6.00 113 186 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2402.00 89.45 74.00 15.45 75.19 32.00 7.13 30.87 6.00 113 186 Peak 2 2452.00 97.42 74.00 23.42 82.84 32.08 7.23 30.73 6.00 113 186 Peak 3 2480.00 93.16 74.00 19.16 78.42 32.12 7.28 30.66 6.00 113 186 Peak
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2385.83 42.54 54.00 -11.46 28.35 31.97 7.11 30.89 6.00 113 186 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2402.00 87.92 54.00 33.92 73.66 32.00 7.13 30.87 6.00 113 186 Average 2 2452.00 88.01 54.00 34.01 73.43 32.08 7.23 30.73 6.00 113 186 Average 3 2480.00 89.58 54.00 35.58 74.84 32.12 7.28 30.66 6.00 113 186 Average

Note: the highest signal over limit are BLE + Zigbee + WLAN co-location fundamental signals.

Mode	14	
	Band Edge - R	
	2400-2483.5_802.11n HT40_CH9_2452MHz	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.63 57.47 74.00 -16.53 42.70 32.13 7.29 30.65 6.00 113 186 PEAK	Blank
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.54 45.95 54.00 -8.05 31.18 32.13 7.29 30.65 6.00 113 186 AVERAGE	Blank

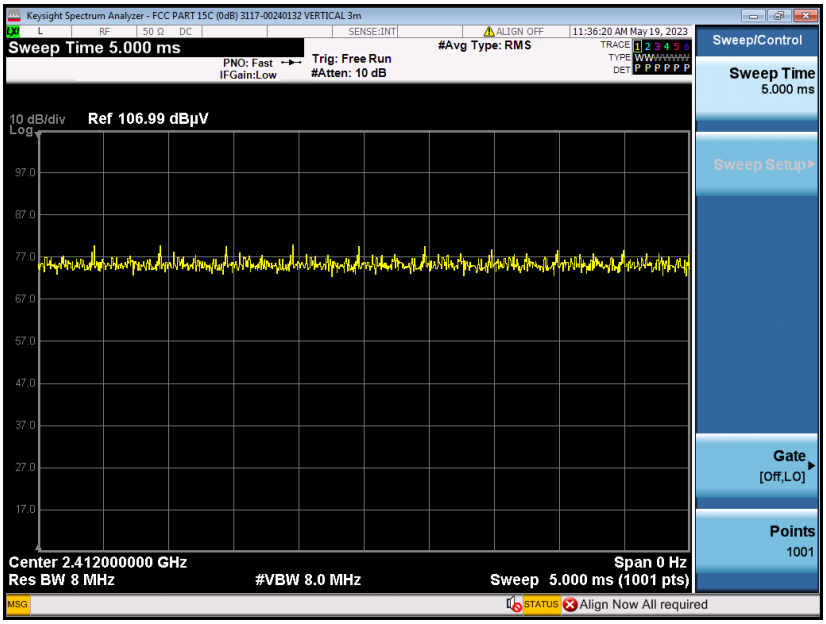
Note: the highest signal over limit are BLE + Zigbee + WLAN co-location fundamental signals.

Mode	14	
	Harmonic	
	2400-2483.5_802.11n HT40_CH9_2452MHz	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4904.00 39.74 74.00 -34.26 60.66 34.10 10.42 65.44 0.00 --- --- PEAK 2 7356.00 41.18 74.00 -32.82 57.82 35.80 12.83 65.27 0.00 --- --- PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 4904.00 38.97 74.00 -35.03 59.89 34.10 10.42 65.44 0.00 --- --- PEAK 2 7356.00 40.95 74.00 -33.05 57.59 35.80 12.83 65.27 0.00 --- --- PEAK

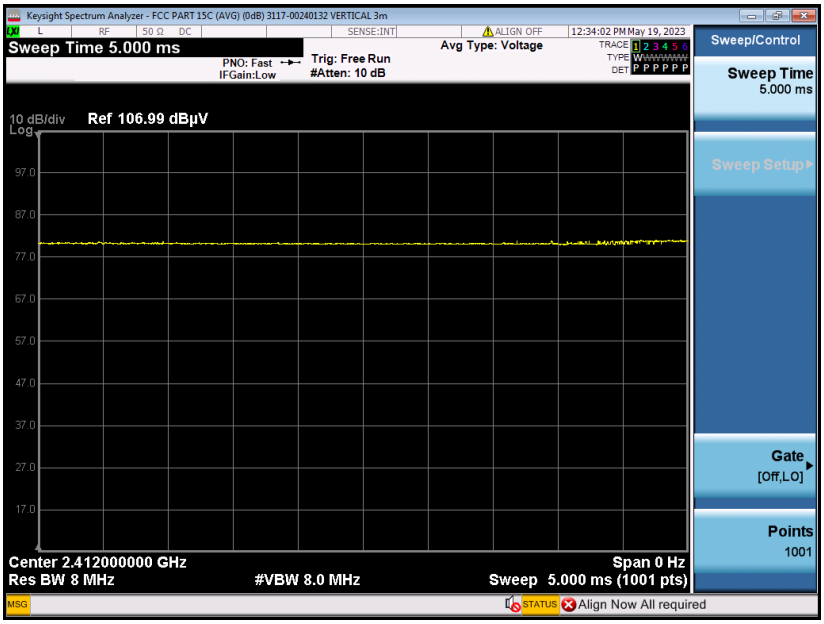
Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	100	-	-	10Hz
802.11g	100	-	-	10Hz
802.11n HT20	100	-	-	10Hz
802.11n HT40	100	-	-	10Hz

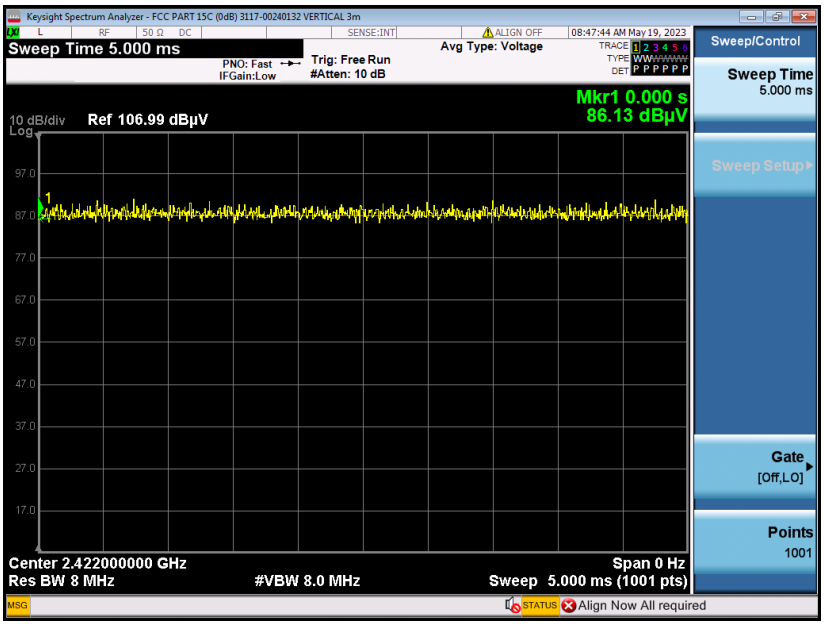
802.11b



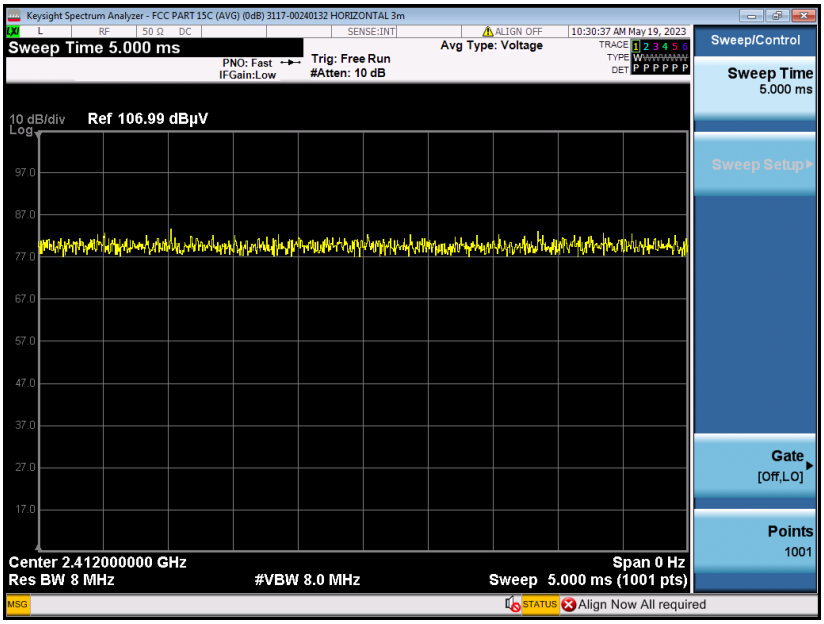
802.11g



802.11n HT20



802.11n HT40


Keysight Spectrum Analyzer - FCC PART 15C (AVG) (0dB) 3117-00240132 HORIZONTAL 3m
Sweep Time 5.000 ms
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 10 dB
Avg Type: Voltage
10:30:37 AM May 19, 2023
Sweep/Control
Sweep Time
5.000 ms
Sweep Setup
Gate
[Off,LO]
Points
1001
10 dB/div
Ref 106.99 dBµV
Log
97.0
87.0
77.0
67.0
57.0
47.0
37.0
27.0
17.0
Center 2.412000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
Align Now All required