FCC RF Test Report

APPLICANT	:	Logic Wireless Ltd
EQUIPMENT	:	Logic Puck
BRAND NAME	:	Logic Wireless
MODEL NAME	:	LWP-TM-0100
FCC ID	:	2BK8ILWPTM1
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System
TEST DATE(S)	:	Oct. 14, 2024 ~ Nov. 13, 2024

This product installed a RF module (Brand Name: ESPRESSIF, Model Name: ESP32-WROVER-E, FCC ID: 2AC7Z-ESP32WROVERE) during the test, only Conducted Power, AC Conducted Emission and RSE test items are tested in this report, all the other test results are leveraged from module RF report.

We, Sporton International Inc. (ShenZhen), 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. (ShenZhen), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED
Cert #5145.01

Sporton International Inc. (ShenZhen)

1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055

People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR482911C	Rev. 01	Initial issue of report	Nov. 29, 2024

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	1
-	-	99% Bandwidth	-	Report Only	1
3.1	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
-	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	1
-	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	1
		Conducted Spurious Emission		Pass	1
3.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 8.79 dB at 191.02 MHz
3.3	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.30 dB at 0.75 MHz
3.4	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-

Remark:

The conducted test results were leveraged from module RF report which can refer to Report No. RSHD200116001-00A

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

Logic Wireless Ltd
U1/ 150 Cavendish Road, Casebrook, Christchurch 8051

1.2 Manufacturer

ILR Ltd
Unit 1/11Print Place, Middleton, Christchurch 8024

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Logic Puck
Brand Name	Logic Wireless
Model Name	LWP-TM-0100
FCC ID	2BK8ILWPTM1
SN	Conducted: 24000010 Conduction: 24000023 Radiation: 24000022
HW Version	RevD
SW Version	v1.0.0
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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 : 20.47 dBm (0.1114 W) 802.11g : 23.39 dBm (0.2183 W) 802.11n HT20 : 23.29 dBm (0.2133 W) 802.11n HT40 : 23.24 dBm (0.2109 W)
Antenna Type / Gain	PCB Track Antenna type with gain 3.76 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. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	TH01-SZ	CN1256	421272

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO02-SZ ; 03CH01-SZ	CN1256	421272

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH01-SZ	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
- 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 (X 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

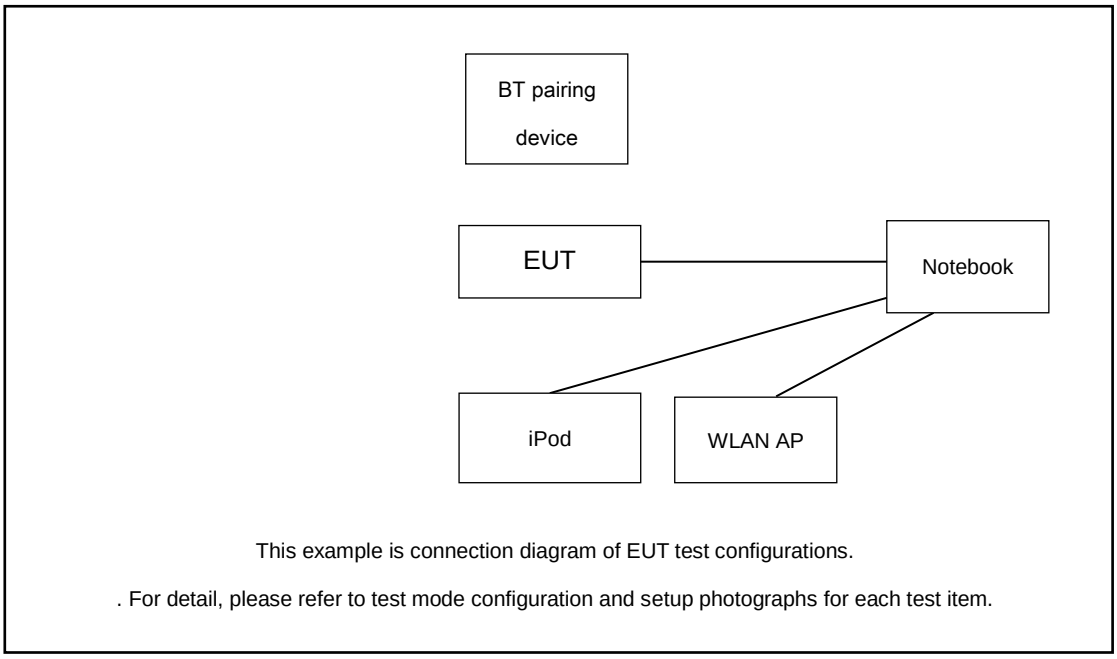
Final test modes are considering the modulation and worse data rates as below table.

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) + Debug Box + USB Cable + NB
Remark: For Radiated Test Cases, the tests were performed with notebook	

2.3 Connection Diagram of Test System

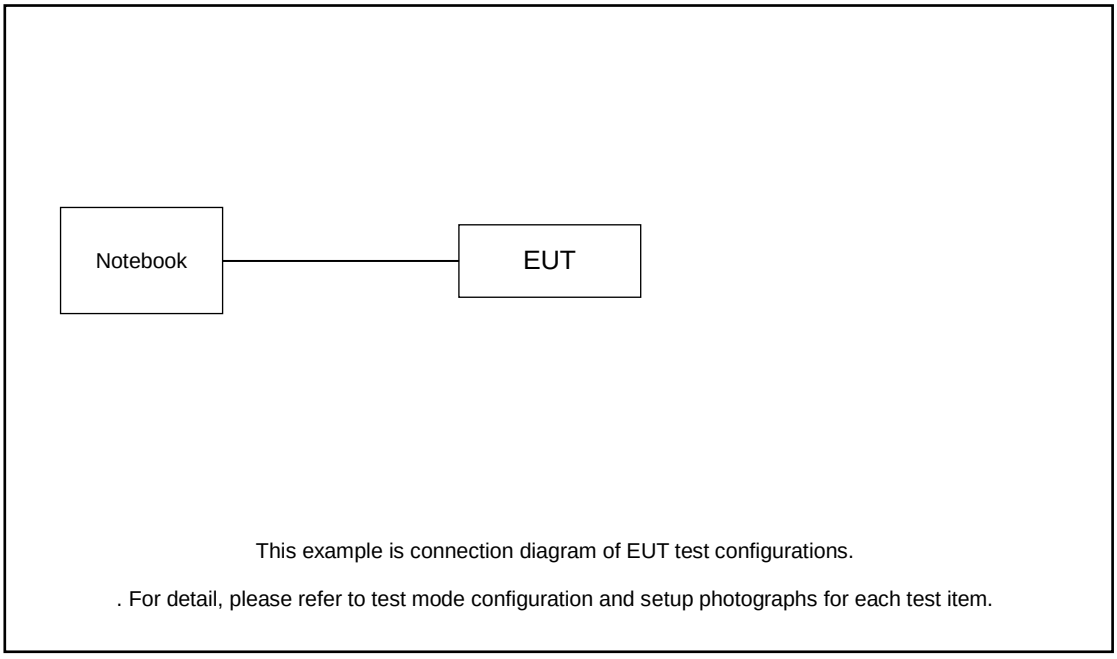
AC Conducted Emission:



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

Radiated Emission:



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	NOTE BOOK	Lenovo	E540	FCC DoC	AC I/P：Unshielded, 1.2m DC O/P：Shielded, 1.8m	NOTE BOOK
2.	WLAN AP	Dlink	DIR-820L	KA2IR820LA1	N/A	Unshielded,1.8m
3.	USB Cable	NA	NA	NA	NA	USB Cable
4.	Ipod	apple	MC69029/A	NA	NA	NA
5.	Bluetooth pairing device	NA	NA	NA	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.

3 Test Result

3.1 Output Power Measurement

3.1.1 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.

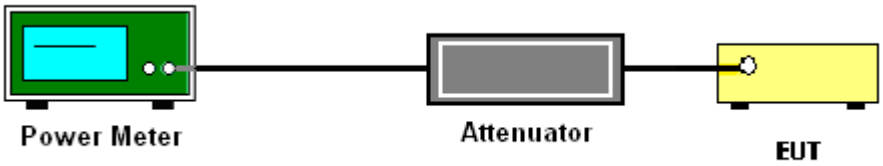
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows 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.

3.1.4 Test Setup



3.1.5 Test Result of 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
					Ant 1	Ant 1	Ant 1	Ant 1	Ant 1	
11b	1Mbps	1	1	2412	20.45	30.00	3.76	24.21	36.00	Pass
11b	1Mbps	1	6	2437	20.40	30.00	3.76	24.16	36.00	Pass
11b	1Mbps	1	11	2462	20.47	30.00	3.76	24.23	36.00	Pass
11g	6Mbps	1	1	2412	23.39	30.00	3.76	27.15	36.00	Pass
11g	6Mbps	1	6	2437	23.30	30.00	3.76	27.06	36.00	Pass
11g	6Mbps	1	11	2462	23.33	30.00	3.76	27.09	36.00	Pass
HT20	MCS0	1	1	2412	23.29	30.00	3.76	27.05	36.00	Pass
HT20	MCS0	1	6	2437	23.15	30.00	3.76	26.91	36.00	Pass
HT20	MCS0	1	11	2462	23.17	30.00	3.76	26.93	36.00	Pass
HT40	MCS0	1	3	2422	22.87	30.00	3.76	26.63	36.00	Pass
HT40	MCS0	1	6	2437	23.24	30.00	3.76	27.00	36.00	Pass
HT40	MCS0	1	9	2452	22.49	30.00	3.76	26.25	36.00	Pass

3.1.6 Test Result of Average Output Power (Reporting Only)

2.4GHz Band											
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail	Setting
					Ant 1	Ant 1	Ant 1	Ant 1	Ant 1		
11b	1Mbps	1	1	2412	17.40	30.00	3.76	21.16	36.00	Pass	0.00
11b	1Mbps	1	6	2437	17.40	30.00	3.76	21.16	36.00	Pass	0.00
11b	1Mbps	1	11	2462	17.50	30.00	3.76	21.26	36.00	Pass	0.00
11g	6Mbps	1	1	2412	15.80	30.00	3.76	19.56	36.00	Pass	0.00
11g	6Mbps	1	6	2437	15.70	30.00	3.76	19.46	36.00	Pass	0.00
11g	6Mbps	1	11	2462	15.70	30.00	3.76	19.46	36.00	Pass	0.00
HT20	MCS0	1	1	2412	15.70	30.00	3.76	19.46	36.00	Pass	0.00
HT20	MCS0	1	6	2437	15.60	30.00	3.76	19.36	36.00	Pass	0.00
HT20	MCS0	1	11	2462	15.60	30.00	3.76	19.36	36.00	Pass	0.00
HT40	MCS0	1	3	2422	13.80	30.00	3.76	17.56	36.00	Pass	7.00
HT40	MCS0	1	6	2437	15.00	30.00	3.76	18.76	36.00	Pass	0.00
HT40	MCS0	1	9	2452	13.60	30.00	3.76	17.36	36.00	Pass	8.00

3.2 Radiated Band Edges and Spurious Emission Measurement

3.2.1 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

3.2.2 Measuring Instruments

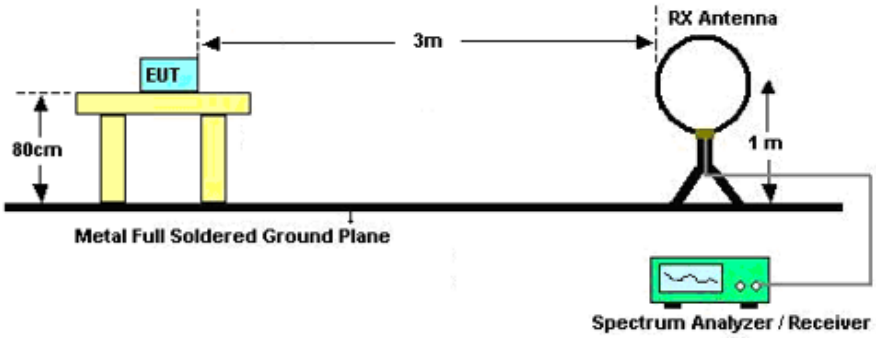
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

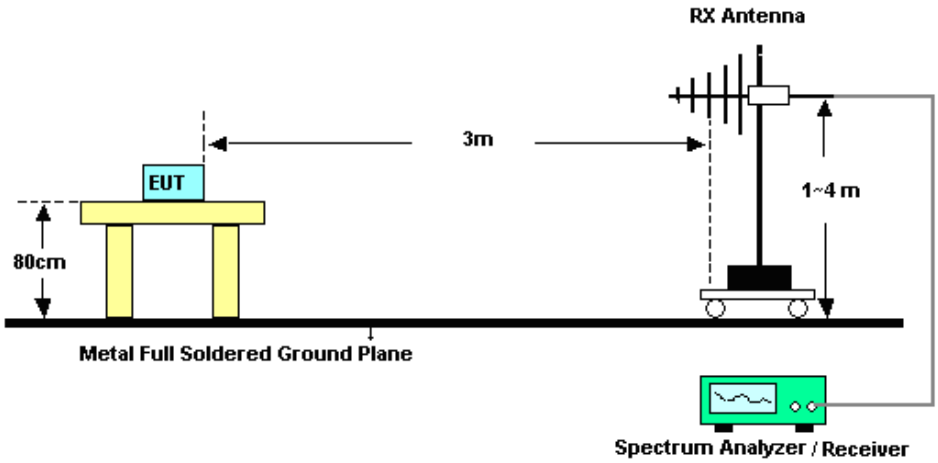
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better 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.

3.2.4 Test Setup

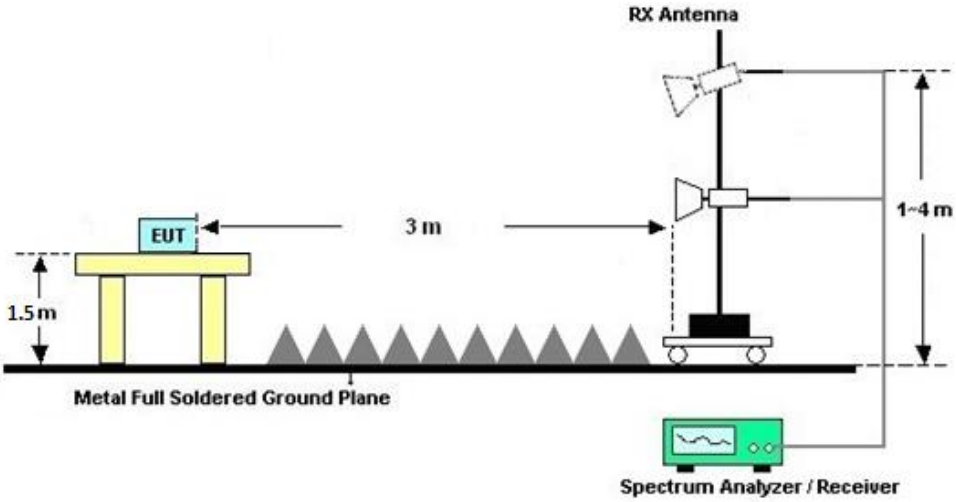
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.2.5 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.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

3.2.7 Duty Cycle

Please refer to Appendix C.

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

Please refer to Appendix B.

3.3 AC Conducted Emission Measurement

3.3.1 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.

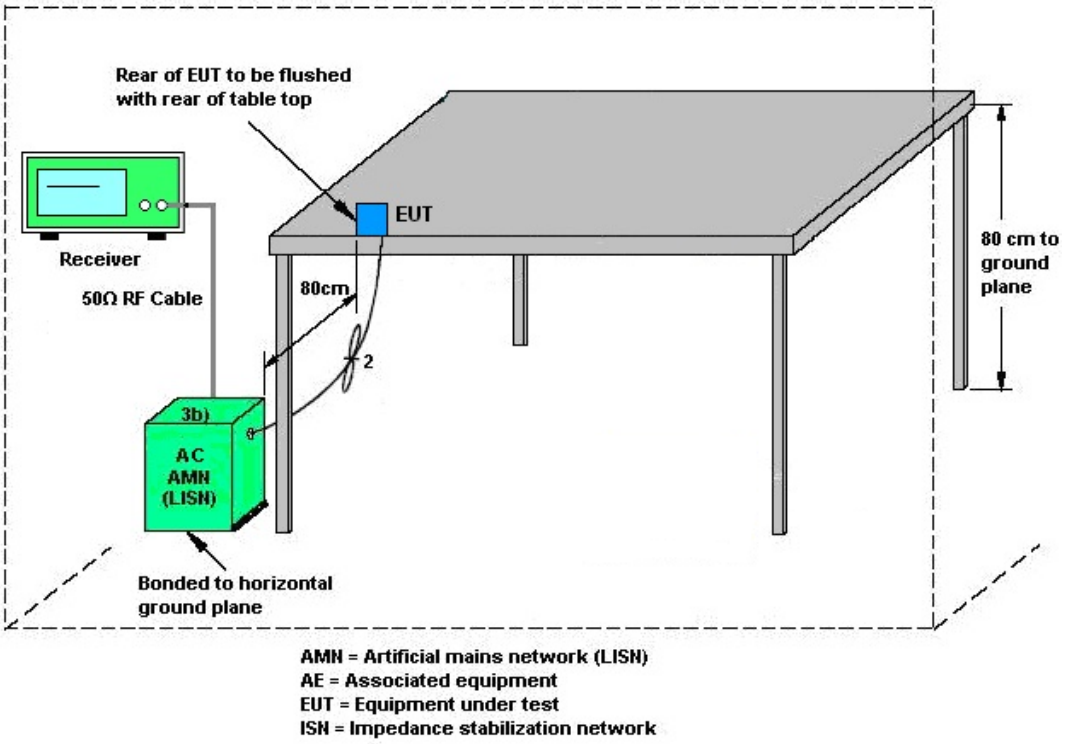
3.3.2 Measuring Instruments

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

3.3.3 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.

3.3.4 Test Setup



3.3.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.4 Antenna Requirements

3.4.1 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.

3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.4.3 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	101078	10Hz~40GHz	Apr. 09, 2024	Nov. 06, 2024	Apr. 08, 2025	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 29, 2023	Nov. 06, 2024	Dec. 28, 2024	Conducted (TH01-SZ)
Thermo meter	Anymetre	JR593	#7	- 10℃ ～ 50℃ 10%RH~99%RH	Apr. 09, 2024	Nov. 06, 2024	Apr. 08, 2025	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Dec. 27, 2023	Nov. 09, 2024~ Nov. 13, 2024	Dec. 26, 2024	Radiation (03CH01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 03, 2024	Nov. 09, 2024~ Nov. 13, 2024	Jul. 02, 2025	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2E	101141	9kHz~30MHz	Dec. 29, 2023	Nov. 09, 2024~ Nov. 13, 2024	Dec. 28, 2024	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Oct. 24, 2023	Nov. 09, 2024~ Nov. 13, 2024	Oct. 23, 2025	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 04, 2024	Nov. 09, 2024~ Nov. 13, 2024	Jul. 03, 2025	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 09, 2024	Nov. 09, 2024~ Nov. 13, 2024	Apr. 08, 2025	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 09, 2024	Nov. 09, 2024~ Nov. 13, 2024	Apr. 08, 2025	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 14, 2024	Nov. 09, 2024~ Nov. 13, 2024	Oct. 13, 2025	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 14, 2024	Nov. 09, 2024~ Nov. 13, 2024	Oct. 13, 2025	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 03, 2024	Nov. 09, 2024~ Nov. 13, 2024	Jul. 02, 2025	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	Oct. 14, 2024	Nov. 09, 2024~ Nov. 13, 2024	Oct. 13, 2025	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Nov. 09, 2024~ Nov. 13, 2024	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Nov. 09, 2024~ Nov. 13, 2024	NCR	Radiation (03CH01-SZ)
EMI Receiver	R&S	ESR7	102297	9kHz~7GHz;	Jul. 03, 2024	Oct. 14, 2024	Jul. 02, 2025	Conduction (CO02-SZ)
AC LISN	R&S	ENV216	101499	9kHz~30MHz	Jul. 03, 2024	Oct. 14, 2024	Jul. 02, 2025	Conduction (CO02-SZ)
AC Power Source	CHROMA	61601	616010002470	100Vac~250Vac	Dec. 25, 2022	Oct. 14, 2024	Dec. 24, 2024	Conduction (CO02-SZ)
Pulse Limiter (RF Cable)	SCHWARZBECK MESS-ELEKTRONIK	VTSD9561-FN	00674-1	150kHz~30MHz	Jul. 03, 2024	Oct. 14, 2024	Jul. 02, 2025	Conduction (CO02-SZ)

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 Spurious Emission & Bandedge	±1.34 dB
Occupied Channel Bandwidth	±0.012 MHz
Conducted Power	±1.34 dB
Conducted Power Spectral Density	±1.32 dB
Frequency	±1.3 Hz

Uncertainty of AC Conducted Emission Measurement (0.15 MHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.5 dB

Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.2 dB

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0 dB

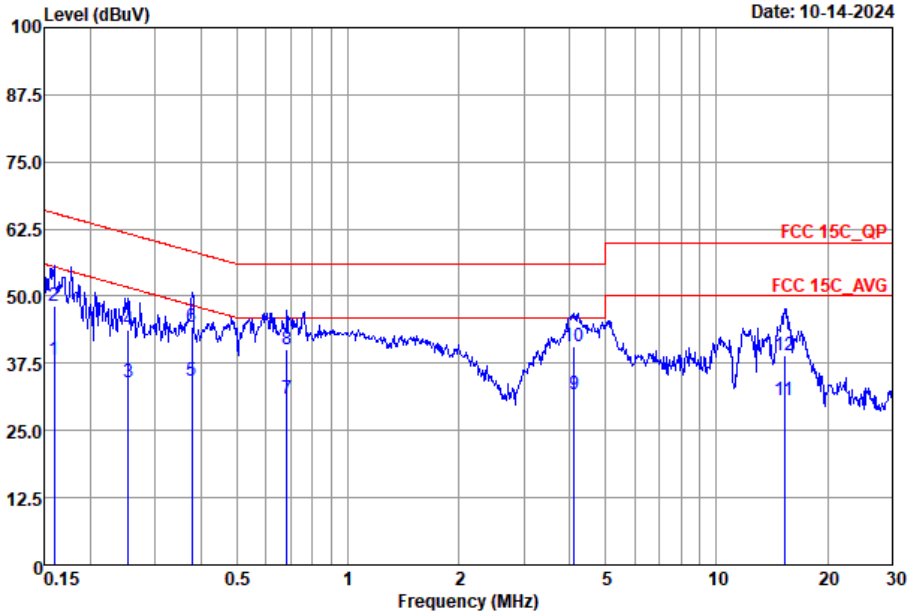
Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.3 dB

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

Appendix A. AC Conducted Emission Test Results

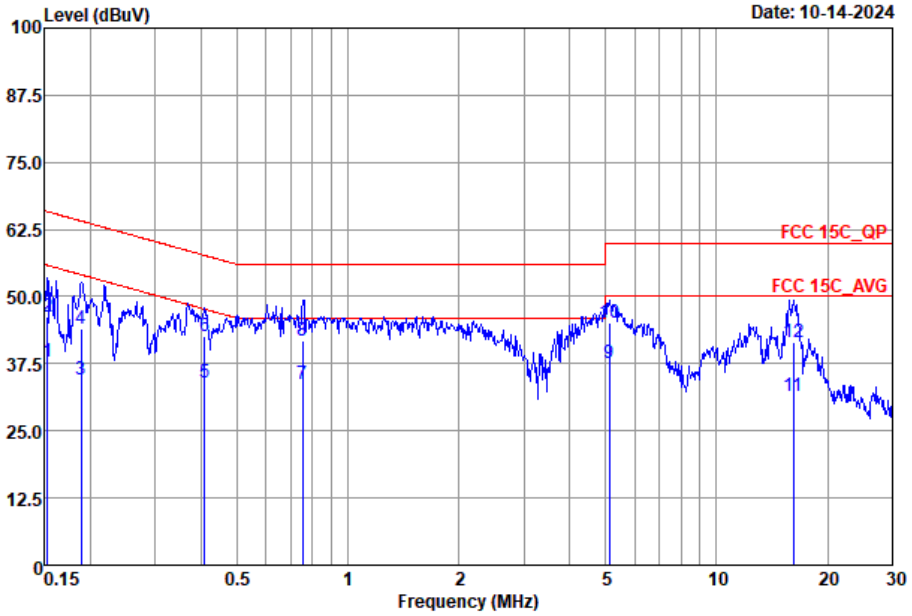
Test Engineer :	ZhangXu	**Temperature :**	22~24℃
		Relative Humidity :	44~50%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO02-SZ
Condition : FCC 15C QP LISN 2024-L LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.16	38.18	-17.29	55.47	17.90	10.12	10.16	Average
2		0.16	48.08	-17.39	65.47	27.80	10.12	10.16	QP
3		0.25	34.09	-17.55	51.64	13.90	10.04	10.15	Average
4		0.25	43.69	-17.95	61.64	23.50	10.04	10.15	QP
5		0.38	34.27	-14.07	48.34	14.10	10.00	10.17	Average
6	*	0.38	44.17	-14.17	58.34	24.00	10.00	10.17	QP
7		0.68	30.81	-15.19	46.00	10.60	9.98	10.23	Average
8		0.68	40.11	-15.89	56.00	19.90	9.98	10.23	QP
9		4.11	31.71	-14.29	46.00	11.60	9.87	10.24	Average
10		4.11	40.61	-15.39	56.00	20.50	9.87	10.24	QP
11		15.31	30.55	-19.45	50.00	10.50	9.56	10.49	Average
12		15.31	38.95	-21.05	60.00	18.90	9.56	10.49	QP

Test Engineer :	ZhangXu	**Temperature :**	22~24℃
		Relative Humidity :	44~50%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO02-SZ
Condition : FCC 15C_QP LISN_2024-N NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	37.88	-17.94	55.82	17.60	10.12	10.16	Average
2	0.15	46.28	-19.54	65.82	26.00	10.12	10.16	QP
3	0.19	34.51	-19.55	54.06	14.30	10.05	10.16	Average
4	0.19	44.01	-20.05	64.06	23.80	10.05	10.16	QP
5	0.41	33.94	-13.74	47.68	13.80	9.96	10.18	Average
6	0.41	42.74	-14.94	57.68	22.60	9.96	10.18	QP
7	0.75	33.70	-12.30	46.00	13.50	9.97	10.23	Average
8 *	0.75	41.70	-14.30	56.00	21.50	9.97	10.23	QP
9	5.11	37.68	-12.32	50.00	17.60	9.84	10.24	Average
10	5.11	45.08	-14.92	60.00	25.00	9.84	10.24	QP
11	16.14	31.59	-18.41	50.00	11.40	9.69	10.50	Average
12	16.14	41.49	-18.51	60.00	21.30	9.69	10.50	QP

Note:

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

Appendix B. Radiated Spurious Emission Test Data

Test Engineer :	Zhaohui Liang	**Relative Humidity :**	50%
		Temperature :	20-22℃

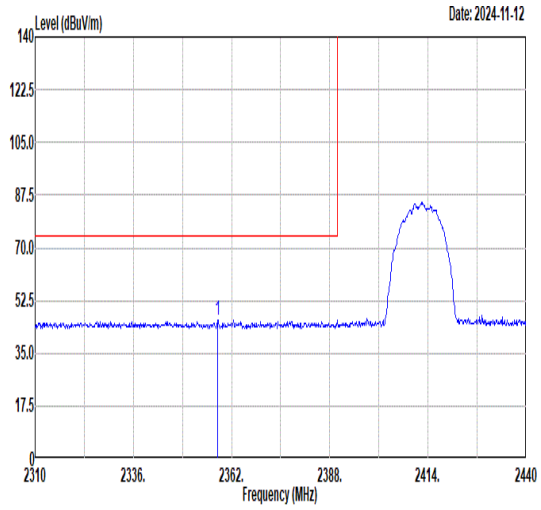
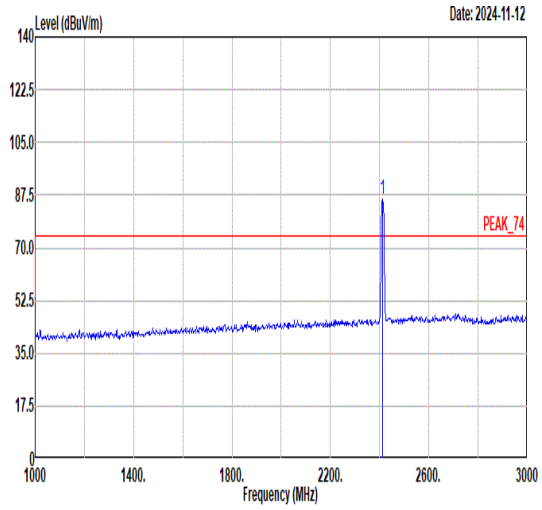
Radiated Spurious Emission Test Modes

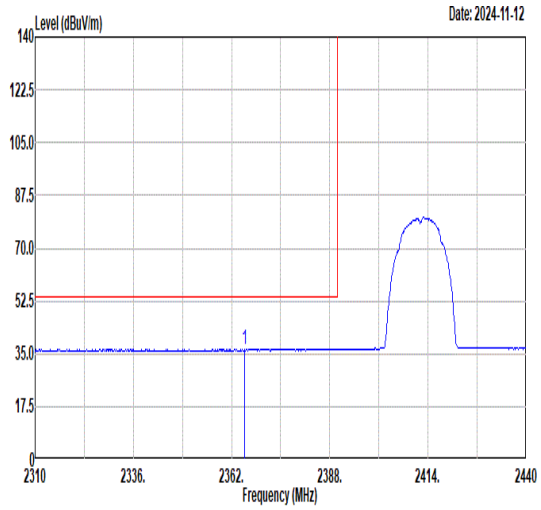
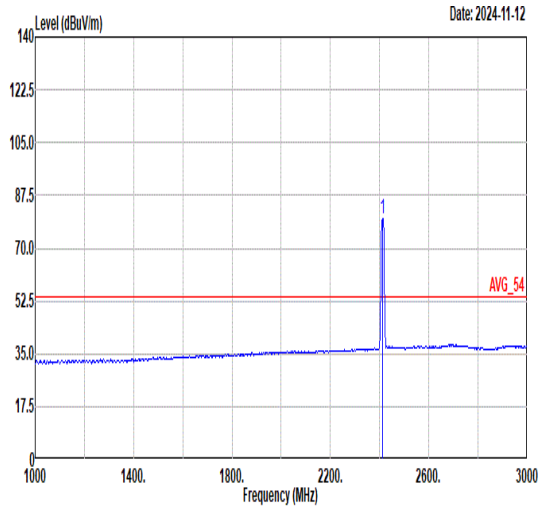
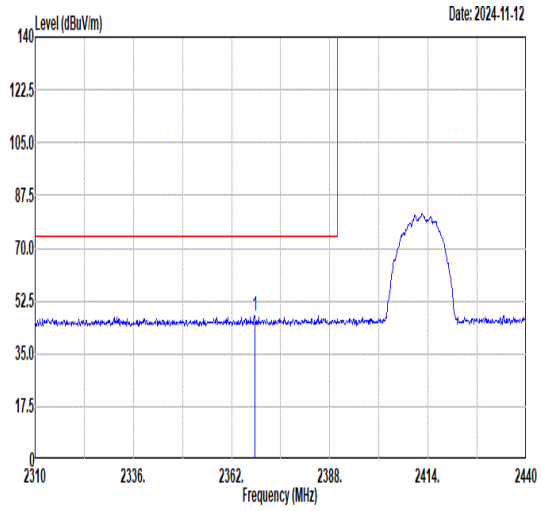
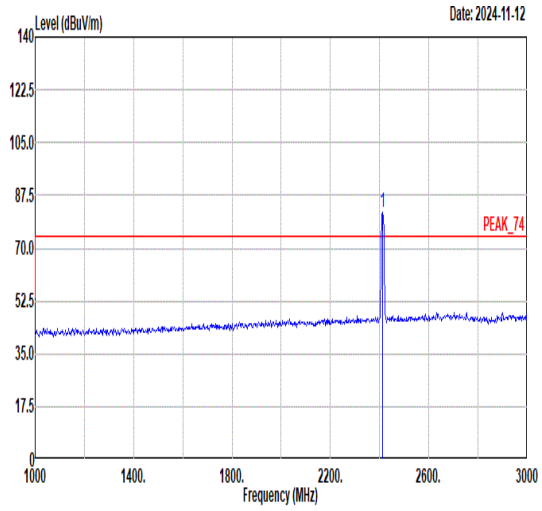
Mode	Band (MHz)	Antenna	Modulation	Channel	Frequency	Data Rate	RU	Remark
Mode 9	2400-2483.5	SISO	802.11b	01	2412	1Mbps	-	-
Mode 10	2400-2483.5	SISO	802.11b	06	2437	1Mbps	-	-
Mode 11	2400-2483.5	SISO	802.11b	11	2462	1Mbps	-	-
Mode 12	2400-2483.5	SISO	802.11g	01	2412	6Mbps	-	-
Mode 13	2400-2483.5	SISO	802.11g	06	2437	6Mbps	-	-
Mode 14	2400-2483.5	SISO	802.11g	11	2462	6Mbps	-	-
Mode 15	2400-2483.5	SISO	802.11n HT20	01	2412	MCS0	-	-
Mode 16	2400-2483.5	SISO	802.11n HT20	06	2437	MCS0	-	-
Mode 17	2400-2483.5	SISO	802.11n HT20	11	2462	MCS0	-	-
Mode 18	2400-2483.5	SISO	802.11n HT40	03	2422	MCS0	-	-
Mode 19	2400-2483.5	SISO	802.11n HT40	09	2452	MCS0	-	-
Mode 20	2400-2483.5	SISO	802.11b	11	2462	6Mbps	-	LF

Summary of each worse mode

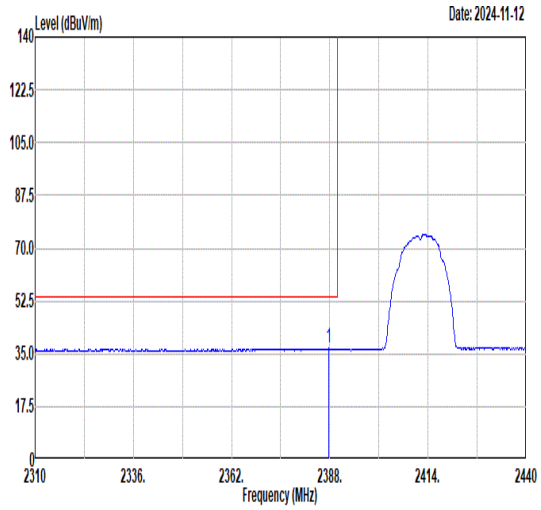
Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	Remark
9	802.11b	01	2387.74	36.72	54.00	-17.28	V	AVERAGE	Pass	Band Edge
9	802.11b	01	4824.00	44.04	74.00	-29.96	V	Peak	Pass	Harmonic
10	802.11b	06	--	-	-	-	-	-	-	Band Edge
10	802.11b	06	7311.00	46.65	74.00	-27.35	H	Peak	Pass	Harmonic
11	802.11b	11	2485.48	37.18	54.00	-16.82	V	AVERAGE	Pass	Band Edge
11	802.11b	11	7386.00	46.03	74.00	-27.97	H	Peak	Pass	Harmonic
12	802.11g	01	2387.61	36.51	54.00	-17.49	V	AVERAGE	Pass	Band Edge
12	802.11g	01	4824.00	44.08	74.00	-29.92	V	Peak	Pass	Harmonic
13	802.11g	06	-	-	-	-	-	-	-	Band Edge
13	802.11g	06	7311.00	45.98	74.00	-28.02	H	Peak	Pass	Harmonic
14	802.11g	11	2483.93	37.04	54.00	-16.96	V	AVERAGE	Pass	Band Edge
14	802.11g	11	7386.00	47.13	74.00	-26.87	V	Peak	Pass	Harmonic
15	802.11n HT20	01	2389.17	36.66	54.00	-17.34	H	AVERAGE	Pass	Band Edge
15	802.11n HT20	01	4824.00	43.95	74.00	-30.05	H	Peak	Pass	Harmonic
16	802.11n HT20	06	-	-	-	-	-	-	-	Band Edge
16	802.11n HT20	06	7311.00	46.10	74.00	-27.90	H	Peak	Pass	Harmonic
17	802.11n HT20	11	2486.13	36.75	54.00	-17.25	V	AVERAGE	Pass	Band Edge
17	802.11n HT20	11	7386.00	46.52	74.00	-27.48	V	Peak	Pass	Harmonic
18	802.11n HT40	03	2484.48	36.48	54.00	-17.52	V	AVERAGE	Pass	Band Edge
18	802.11n HT40	03	-	-	-	-	-	-	-	Harmonic

19	802.11n HT40	09	2484.59	36.73	54.00	-17.27	H	AVERAGE	Pass	Band Edge
19	802.11n HT40	09	-	-	-	-	-	-	-	Harmonic
20	802.11b	11	191.02	34.71	43.50	-8.79	H	Peak	Pass	LF

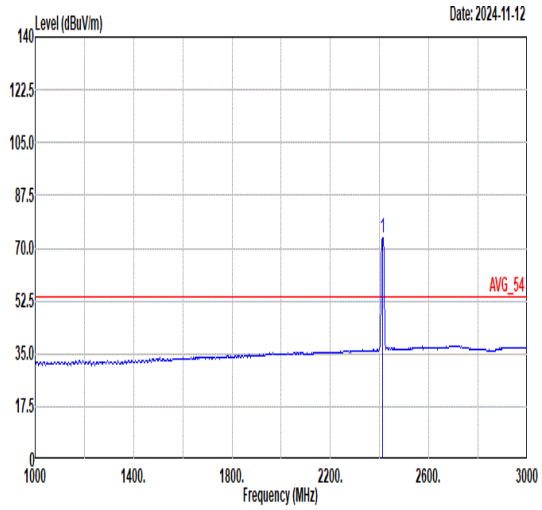
Mode	**9**	
	Band Edge	
	2400-2483.5_802.11b_CH01_2412MHz	
ANT	**SISO**	
Pol.	**Horizontal**	**Fundamental**
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2358.23 46.16 74.00 -27.84 39.96 30.60 7.67 32.07 342 352 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2412.00 85.99 ------ ------ 79.64 30.62 7.81 32.08 342 352 PEAK

Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2365.51 36.66 54.00 -17.34 30.44 30.60 7.69 32.07 342 352 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2412.00 79.87 ------ ------ 73.52 30.62 7.81 32.08 342 352 AVERAGE
Mode	**9**	
	Band Edge	
	2400-2483.5_802.11b_CH01_2412MHz	
ANT	**SISO**	
Pol.	**Vertical**	**Fundamental**
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2368.11 47.62 74.00 -26.38 41.39 30.60 7.70 32.07 378 325 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2412.00 81.80 ------ ------ 75.45 30.62 7.81 32.08 378 325 PEAK

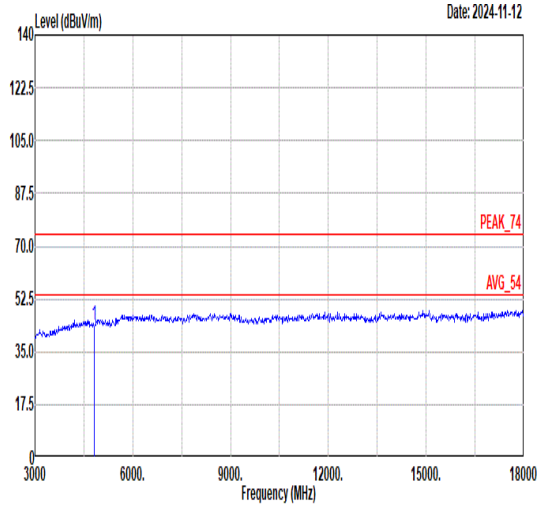
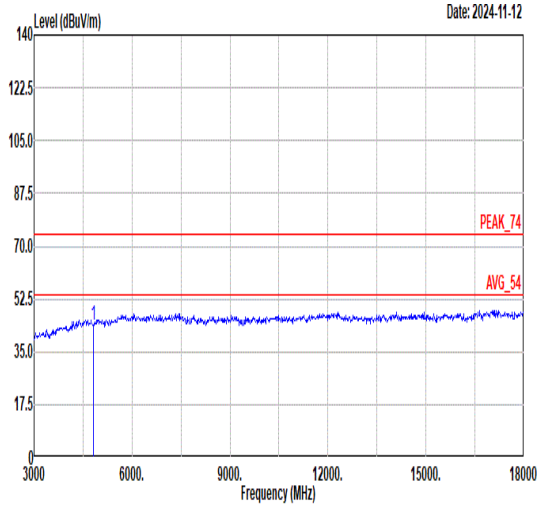
Avg

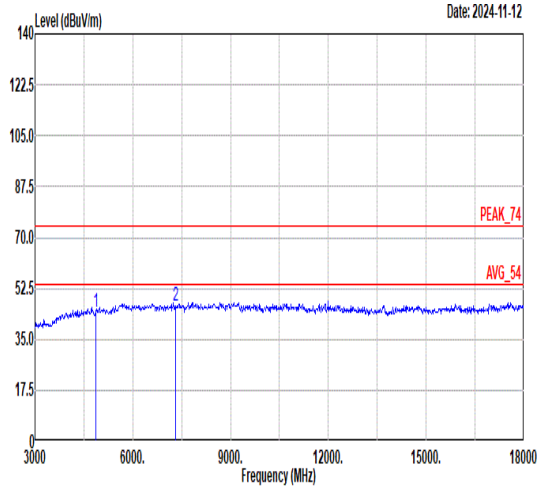
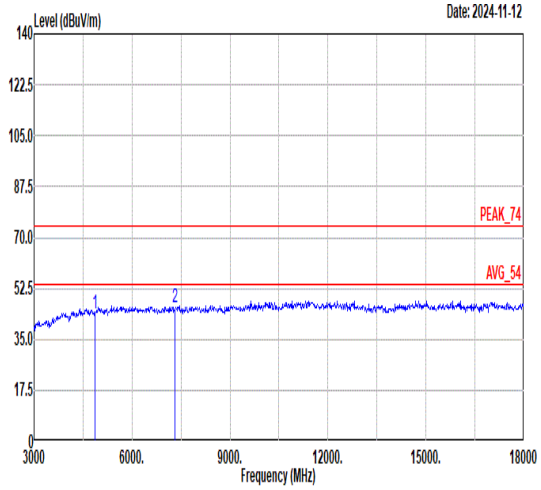


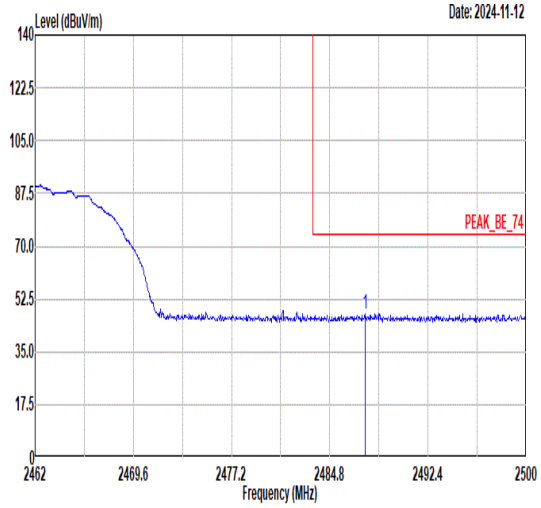
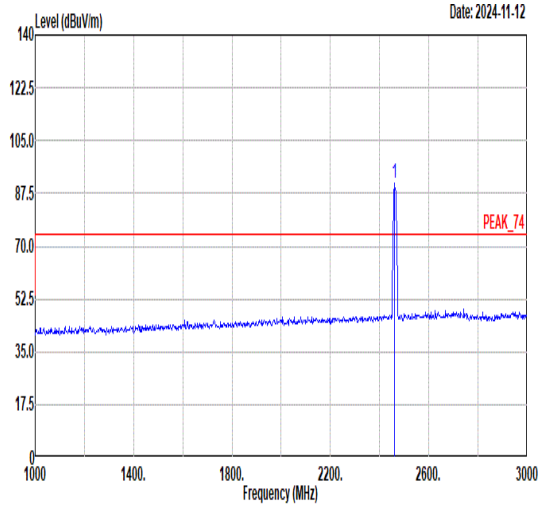
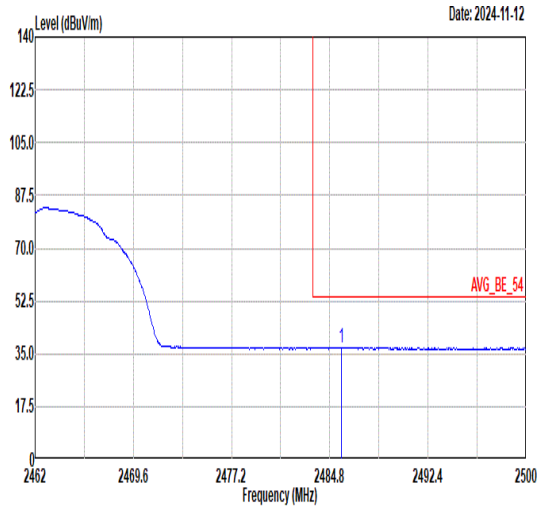
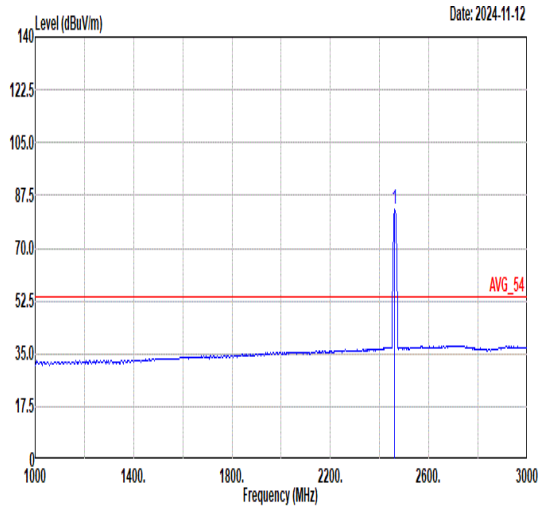
	Freq	Level	Limit Line	Margin (dB)	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m		dBuV	dB/m	dB	dB	cm	deg	
1	2387.74	36.72	54.00	-17.28	30.45	30.60	7.75	32.08	378	325	AVERAGE

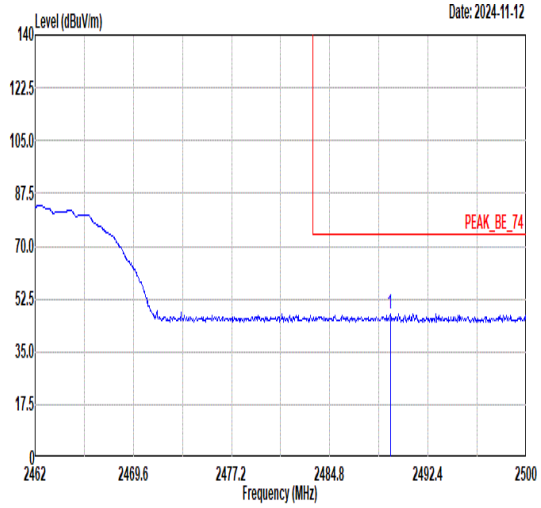
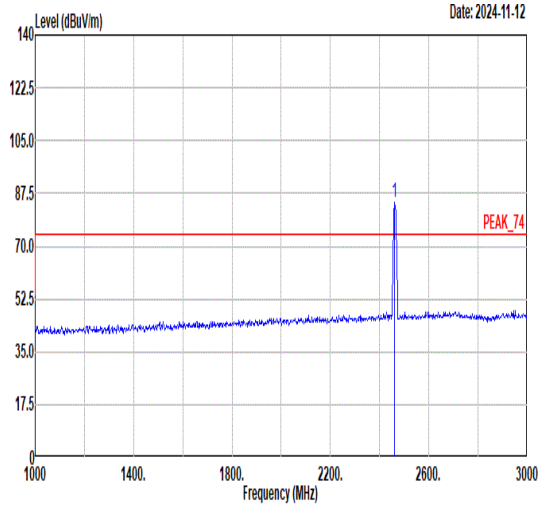
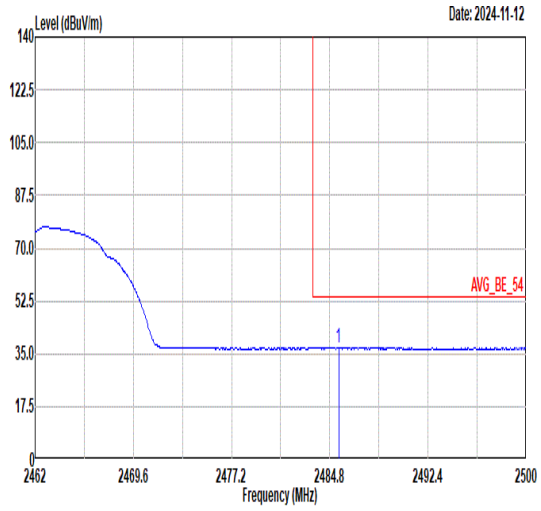
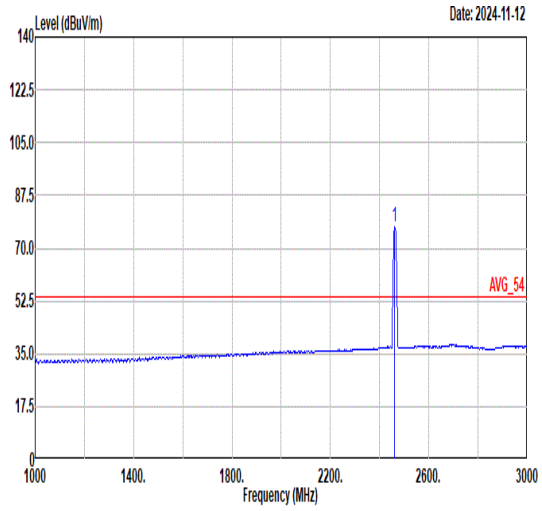


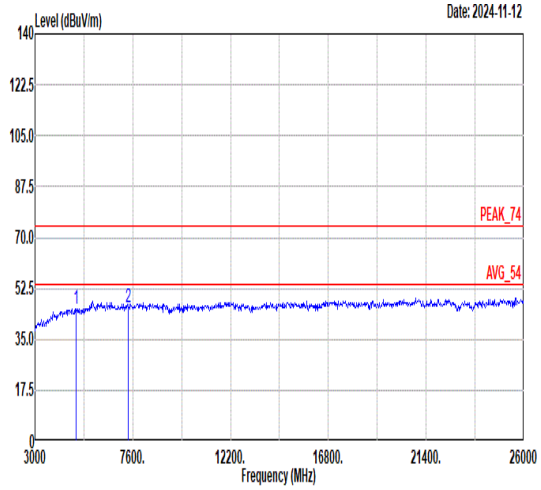
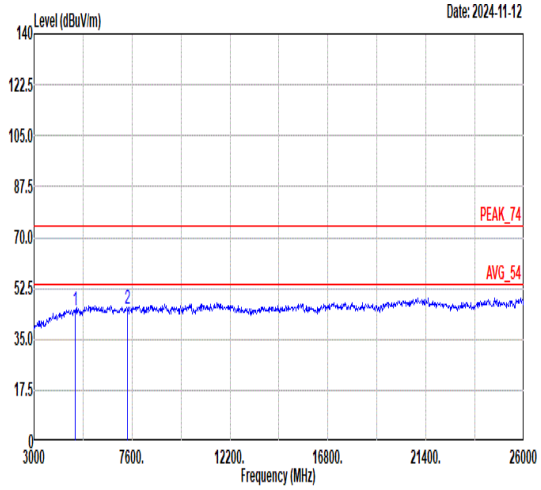
	Freq	Level	Limit Line	Margin (dB)	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m		dBuV	dB/m	dB	dB	cm	deg	
1	2412.00	73.61	------	------	67.26	30.62	7.81	32.08	378	325	AVERAGE

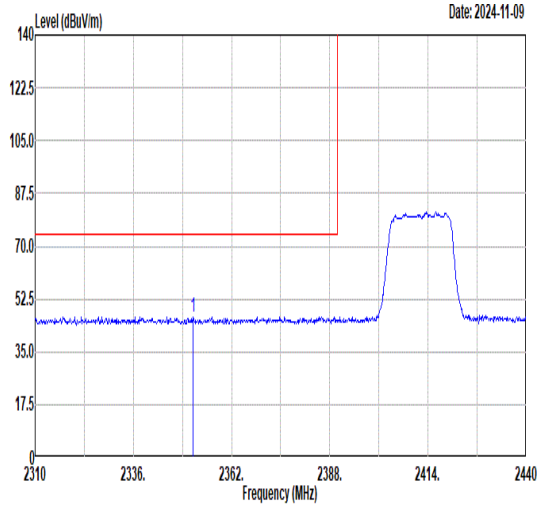
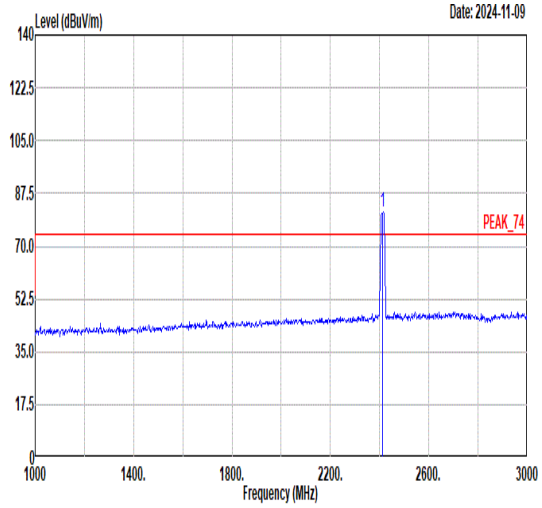
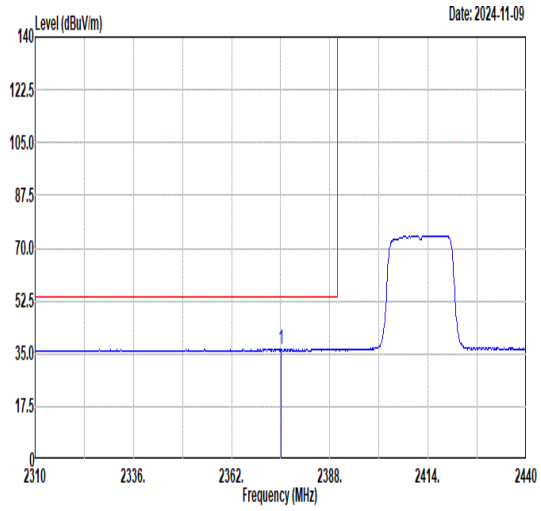
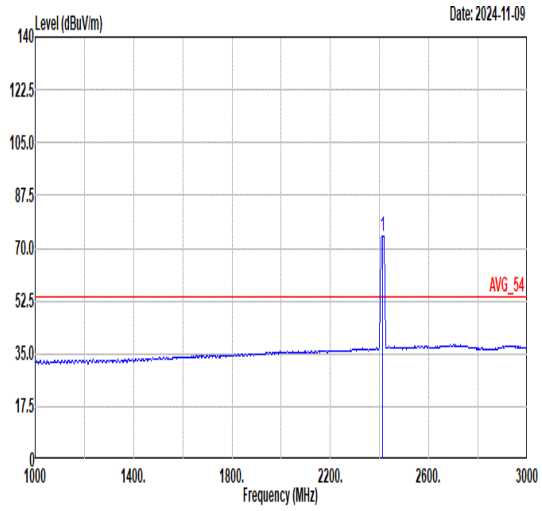
Mode	9	
	Harmonic	
	2400-2483.5_802.11b_CH01_2412MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4824.00 43.92 74.00 -30.08 49.58 34.83 11.08 51.57 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4824.00 44.04 74.00 -29.96 49.70 34.83 11.08 51.57 --- --- Peak

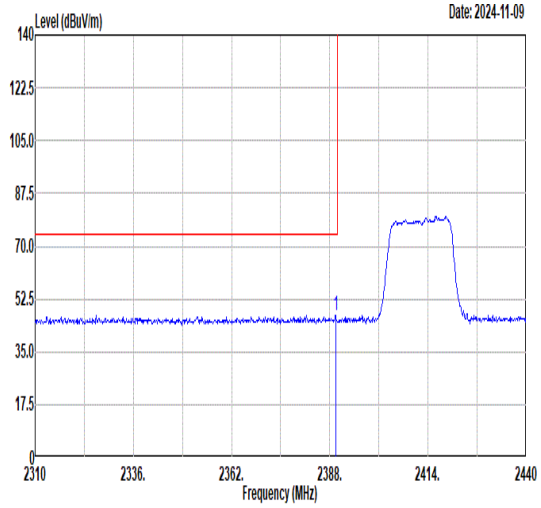
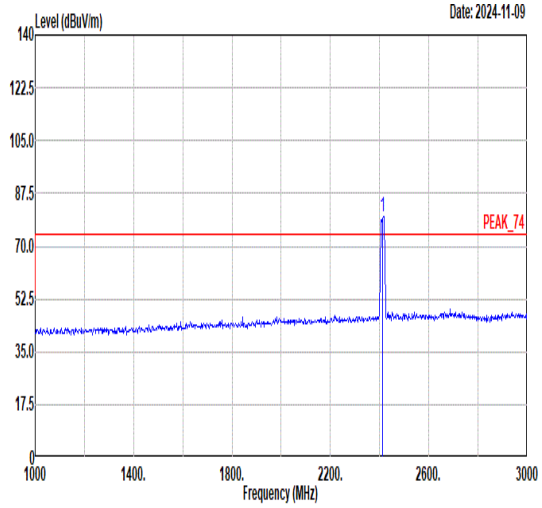
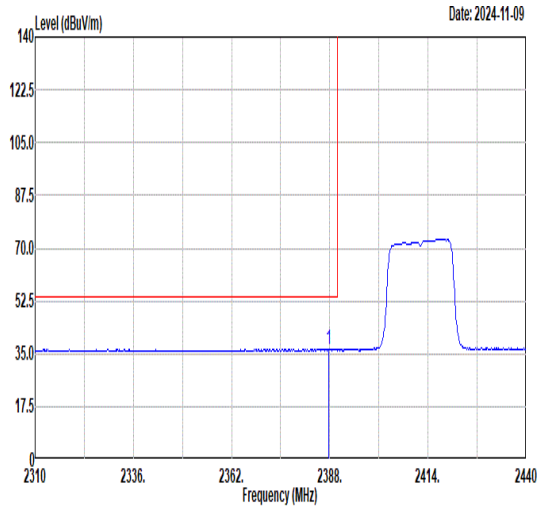
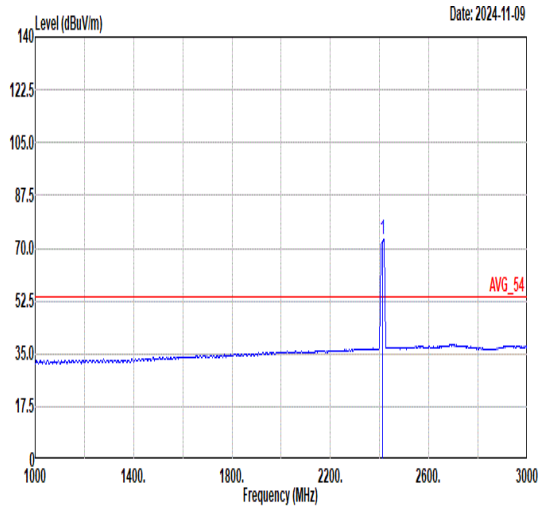
Mode	10	
	Harmonic	
	2400-2483.5_802.11b_CH06_2437MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4874.00 44.46 74.00 -29.54 50.06 34.85 11.10 51.55 --- --- Peak 2 7311.00 46.65 74.00 -27.35 48.41 36.32 13.08 51.16 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4874.00 43.97 74.00 -30.03 49.57 34.85 11.10 51.55 --- --- Peak 2 7311.00 46.08 74.00 -27.92 47.84 36.32 13.08 51.16 --- --- Peak

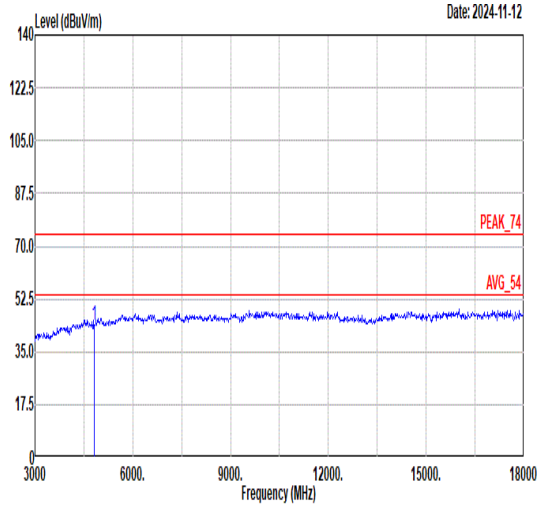
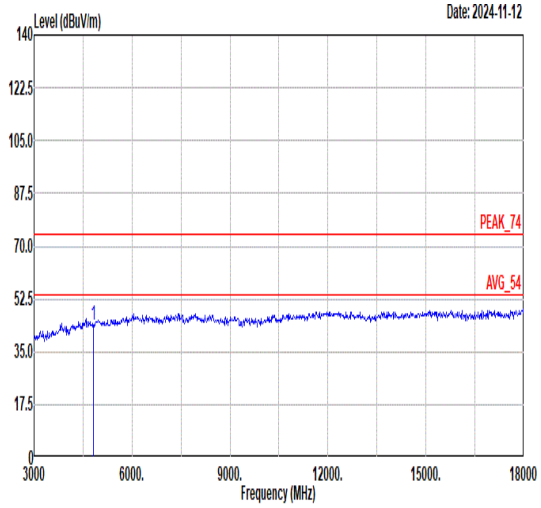
Mode	11	
	Band Edge	
	2400-2483.5_802.11b_CH11_2462MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2487.54 47.47 74.00 -26.53 41.07 30.62 7.88 32.10 370 350 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2462.00 90.63 ------ ------ 84.18 30.68 7.86 32.09 370 350 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2485.71 37.08 54.00 -16.92 30.67 30.63 7.88 32.10 370 350 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2462.00 82.76 ------ ------ 76.31 30.68 7.86 32.09 370 350 AVERAGE

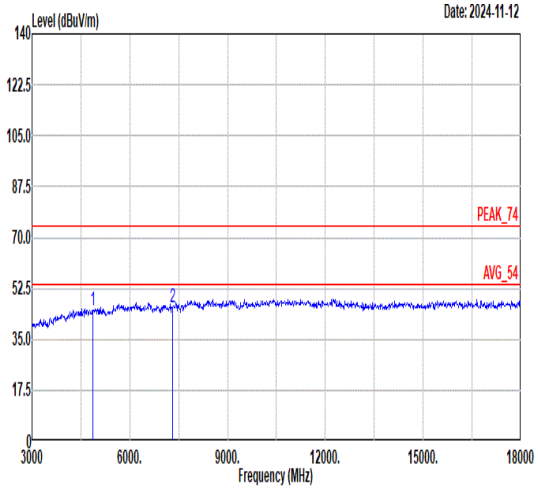
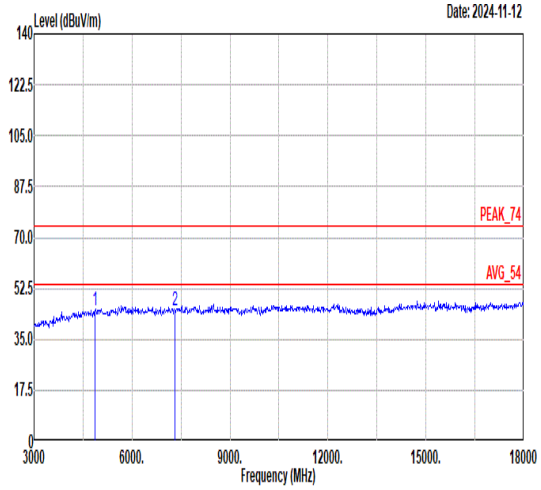
Mode	11	
	Band Edge	
	2400-2483.5_802.11b_CH11_2462MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2489.47 47.48 74.00 -26.52 41.08 30.62 7.88 32.10 368 324 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2462.00 84.54 ------ ------ 78.09 30.68 7.86 32.09 368 324 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2485.48 37.18 54.00 -16.82 30.77 30.63 7.88 32.10 368 324 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2462.00 76.94 ------ ------ 70.49 30.68 7.86 32.09 368 324 AVERAGE

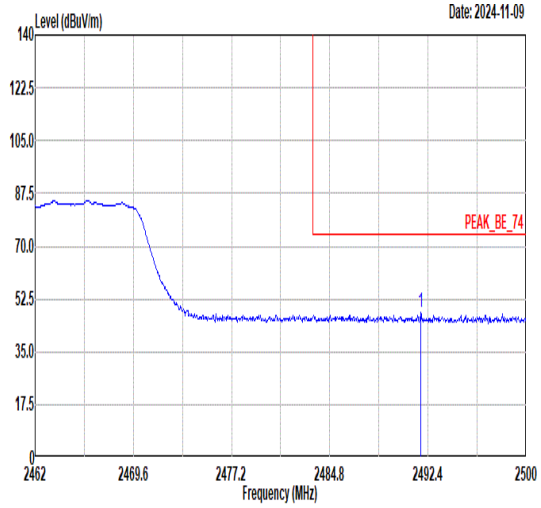
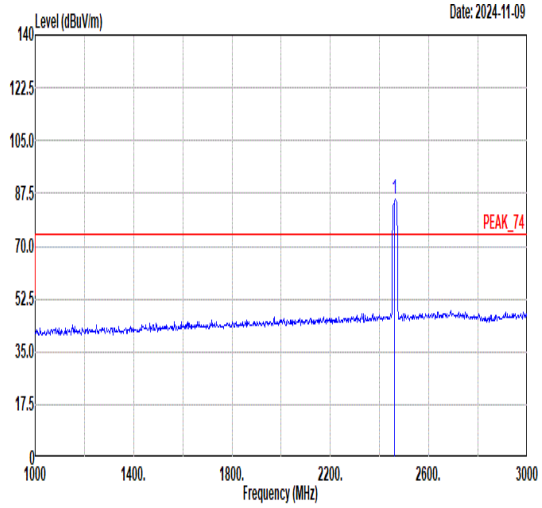
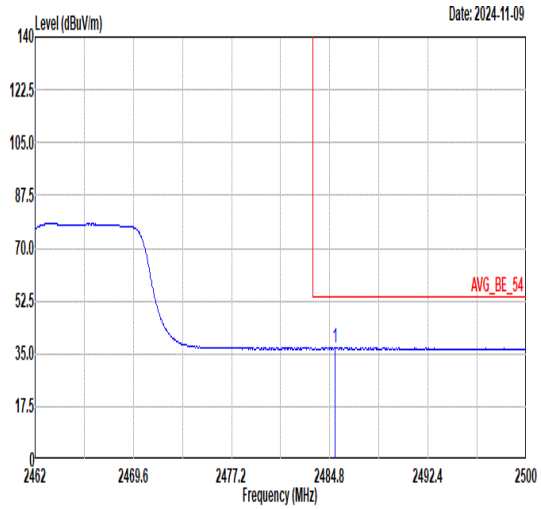
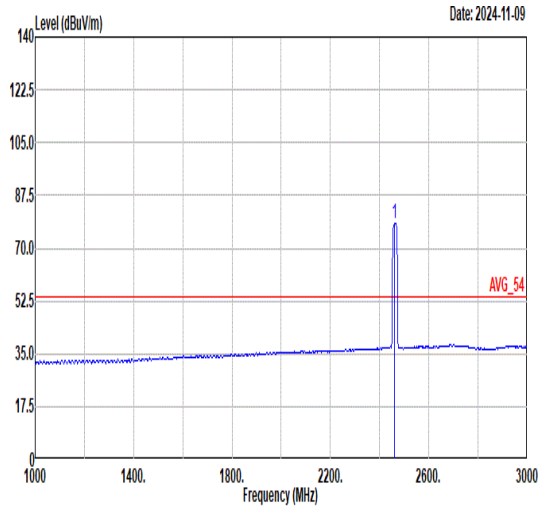
Mode	11	
	Harmonic	
	2400-2483.5_802.11b_CH11_2462MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4924.00 45.39 74.00 -28.61 50.93 34.87 11.12 51.53 --- --- Peak 2 7386.00 46.03 74.00 -27.97 47.73 36.35 13.13 51.18 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4924.00 44.68 74.00 -29.32 50.22 34.87 11.12 51.53 --- --- Peak 2 7386.00 45.59 74.00 -28.41 47.29 36.35 13.13 51.18 --- --- Peak

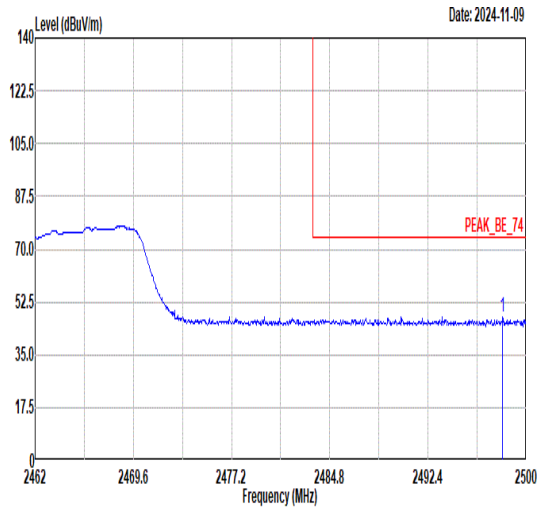
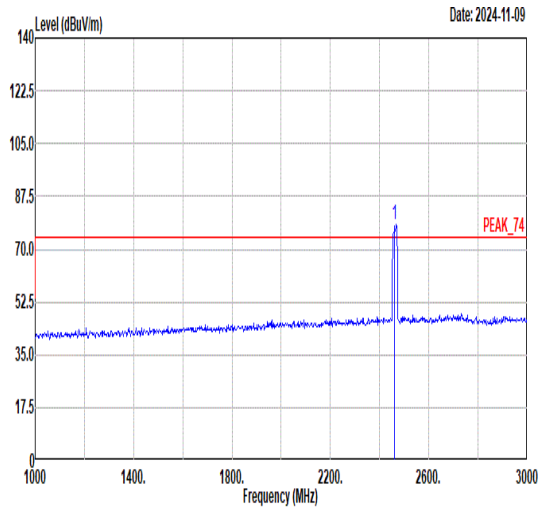
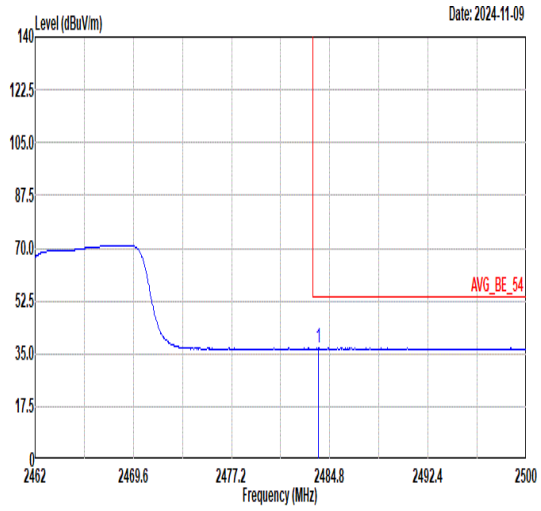
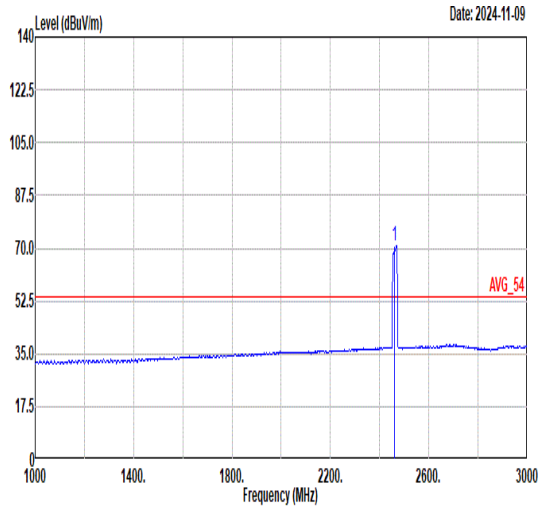
Mode	12	
	Band Edge	
	2400-2483.5_802.11g_CH01_2412MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2351.73 46.70 74.00 -27.30 40.52 30.60 7.65 32.07 380 77 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2412.00 81.53 ------ ------ 75.17 30.63 7.81 32.08 380 77 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2375.13 36.51 54.00 -17.49 30.26 30.60 7.72 32.07 380 77 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2412.00 74.17 ------ ------ 67.81 30.63 7.81 32.08 380 77 AVERAGE

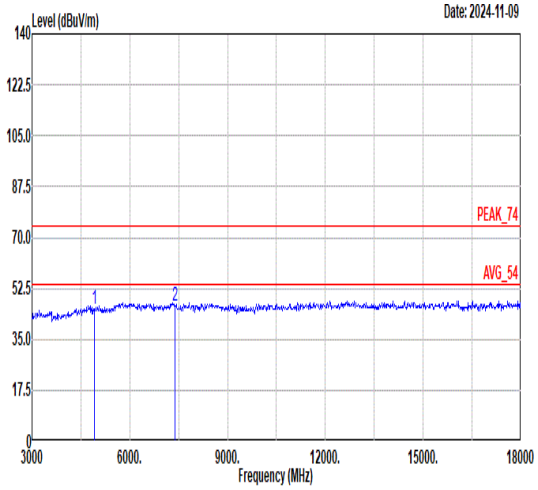
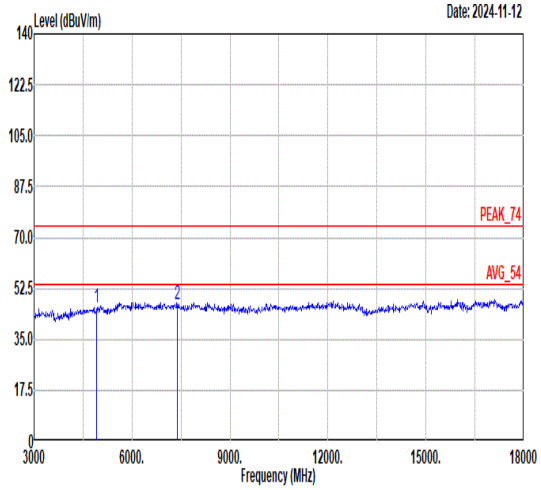
Mode	12	
	Band Edge	
	2400-2483.5_802.11g_CH01_2412MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2389.56 47.21 74.00 -26.79 40.93 30.60 7.76 32.08 383 265 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2412.00 80.00 ------ ------ 73.63 30.64 7.81 32.08 383 265 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2387.61 36.51 54.00 -17.49 30.24 30.60 7.75 32.08 383 265 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2412.00 72.88 ------ ------ 66.51 30.64 7.81 32.08 383 265 AVERAGE

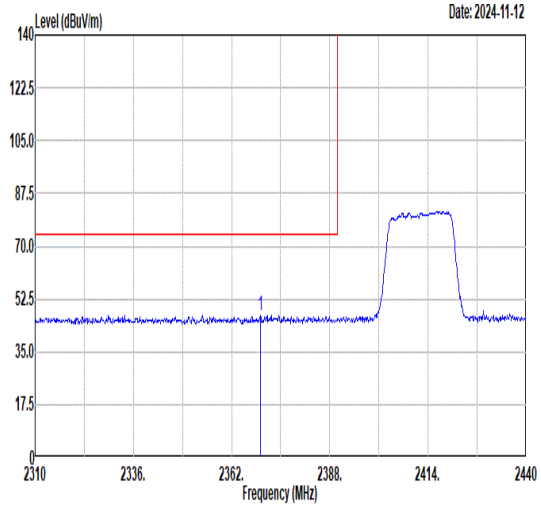
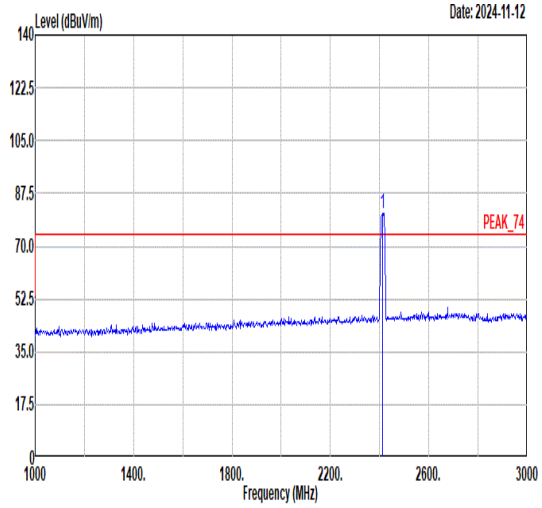
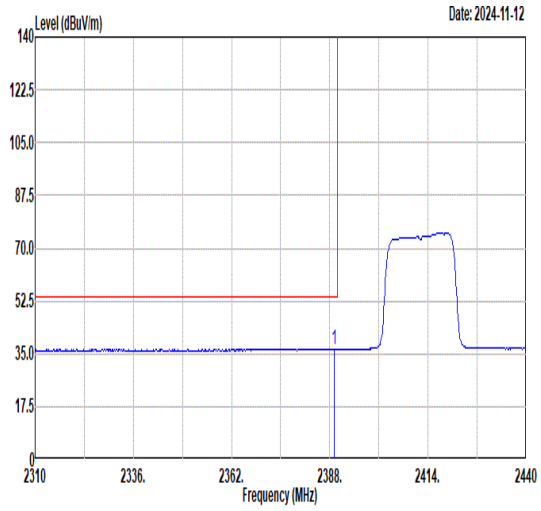
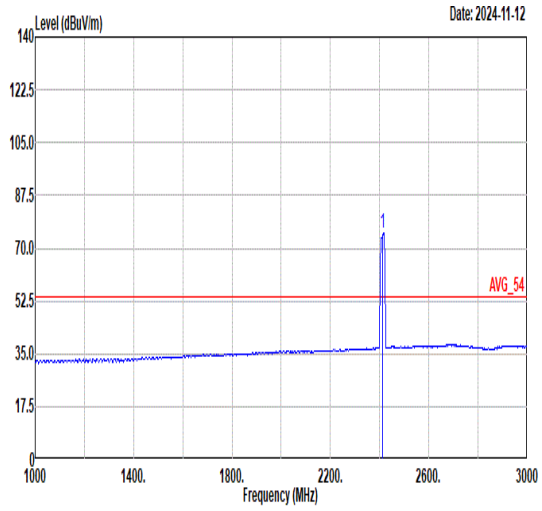
Mode	12	
	Harmonic	
	2400-2483.5_802.11g_CH01_2412MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4824.00 43.99 74.00 -30.01 49.65 34.83 11.08 51.57 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4824.00 44.08 74.00 -29.92 49.74 34.83 11.08 51.57 --- --- Peak

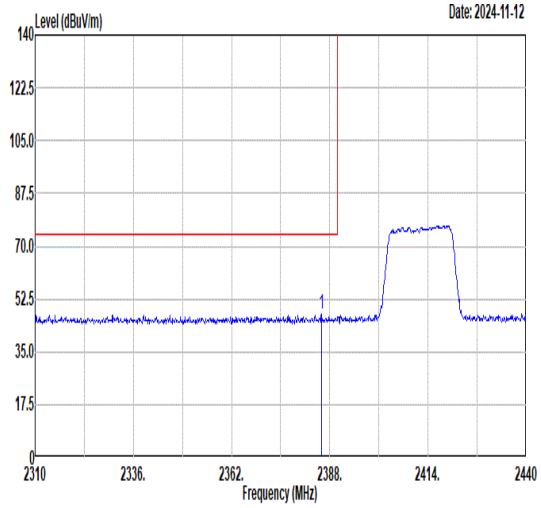
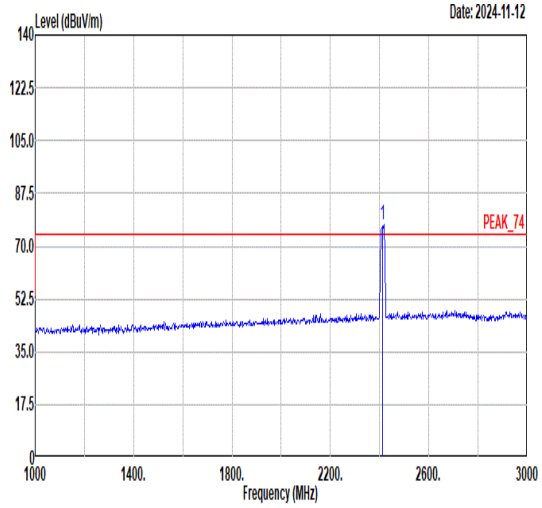
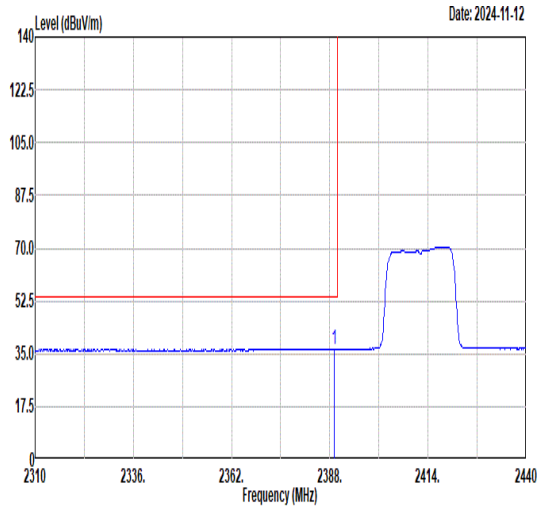
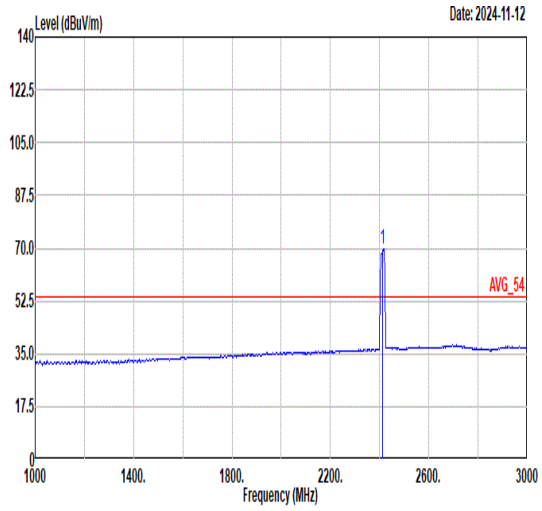
Mode	13	
	Harmonic	
	2400-2483.5_802.11g_CH06_2437MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4874.00 44.97 74.00 -29.03 50.57 34.85 11.10 51.55 --- --- Peak 2 7311.00 45.98 74.00 -28.02 47.74 36.32 13.08 51.16 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4874.00 45.12 74.00 -28.88 50.72 34.85 11.10 51.55 --- --- Peak 2 7311.00 45.14 74.00 -28.86 46.90 36.32 13.08 51.16 --- --- Peak

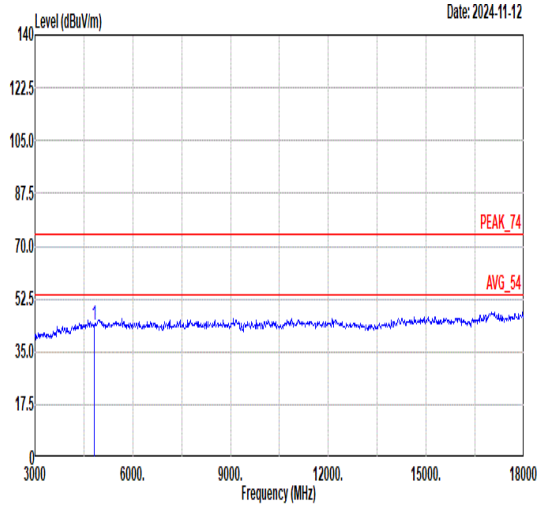
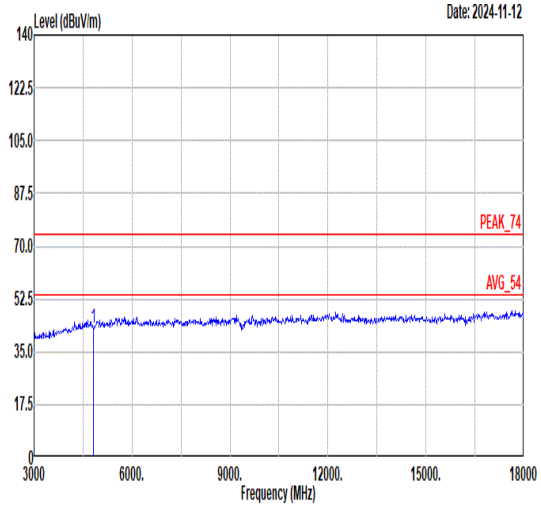
Mode	14	
	Band Edge	
	2400-2483.5_802.11g_CH11_2462MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2491.83 47.83 74.00 -26.17 41.42 30.62 7.89 32.10 370 314 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2462.00 85.39 ------ ------ 78.95 30.67 7.86 32.09 370 314 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2485.22 36.95 54.00 -17.05 30.54 30.63 7.88 32.10 370 314 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2462.00 77.99 ------ ------ 71.54 30.68 7.86 32.09 370 314 AVERAGE

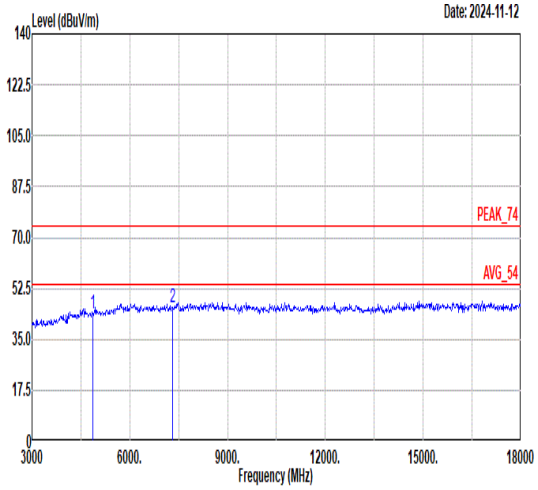
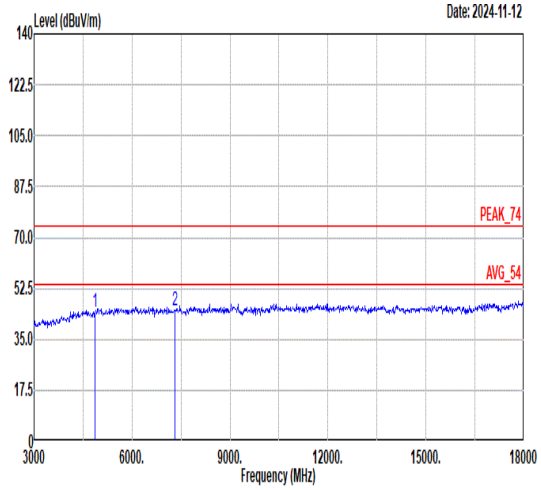
Mode	14	
	Band Edge	
	2400-2483.5_802.11g_CH11_2462MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2498.18 47.60 74.00 -26.40 41.21 30.60 7.89 32.10 400 259 PEAK	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2462.00 77.98 ------ ------ 71.55 30.66 7.86 32.09 400 259 PEAK
Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2483.93 37.04 54.00 -16.96 30.63 30.63 7.88 32.10 400 259 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2462.00 70.87 ------ ------ 64.44 30.66 7.86 32.09 400 259 AVERAGE

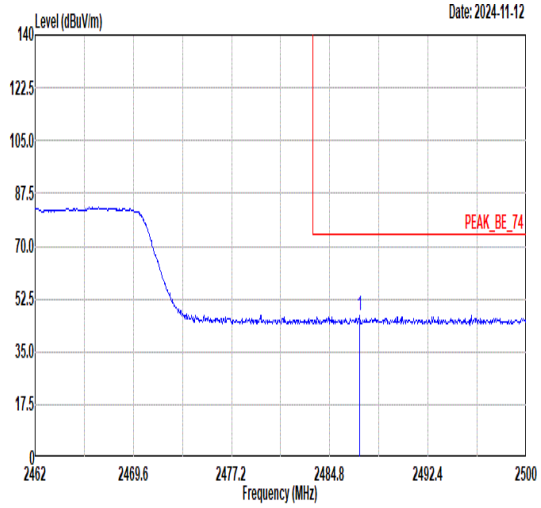
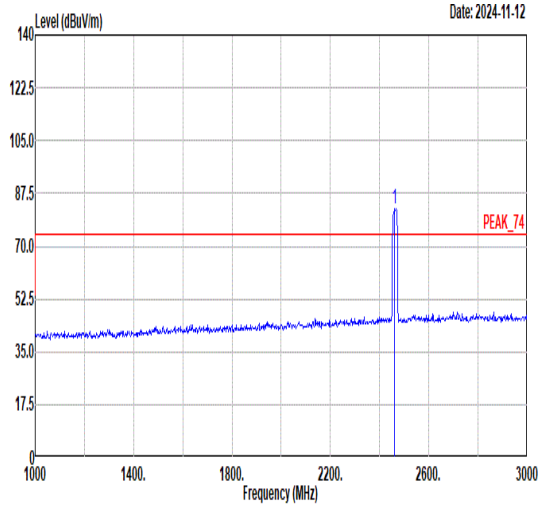
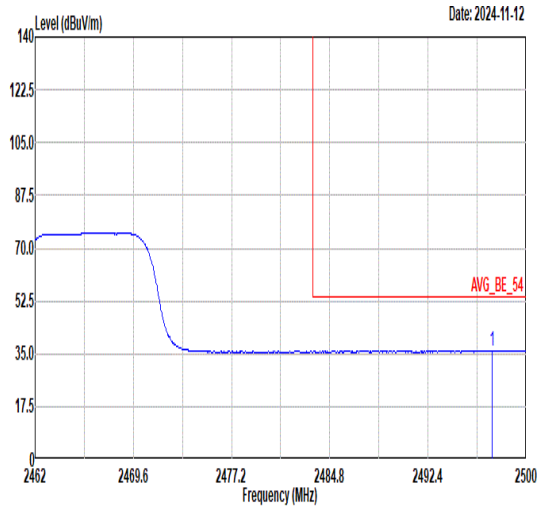
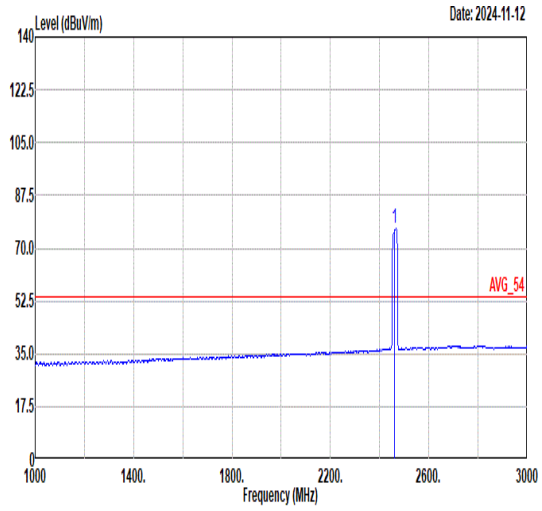
Mode	14	
	Harmonic	
	2400-2483.5_802.11g_CH11_2462MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4924.00 45.25 74.00 -28.75 50.79 34.87 11.12 51.53 --- --- Peak 2 7386.00 46.61 74.00 -27.39 48.31 36.35 13.13 51.18 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4924.00 45.93 74.00 -28.07 51.47 34.87 11.12 51.53 --- --- Peak 2 7386.00 47.13 74.00 -26.87 48.83 36.35 13.13 51.18 --- --- Peak

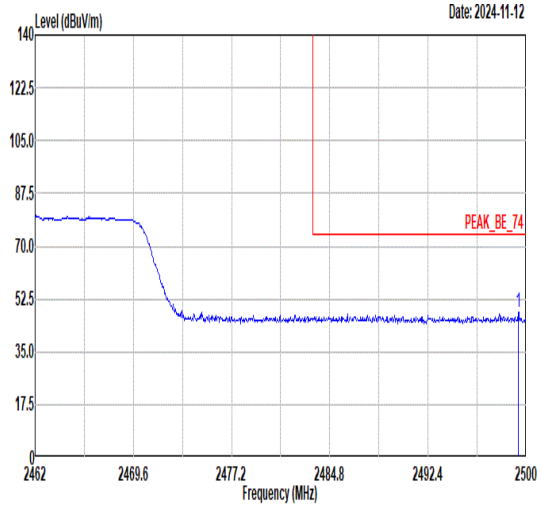
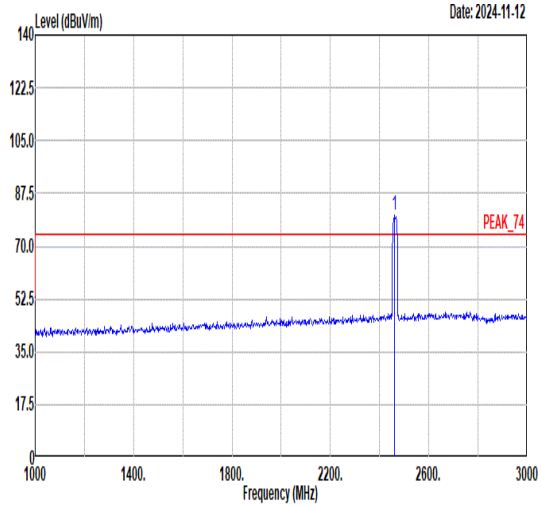
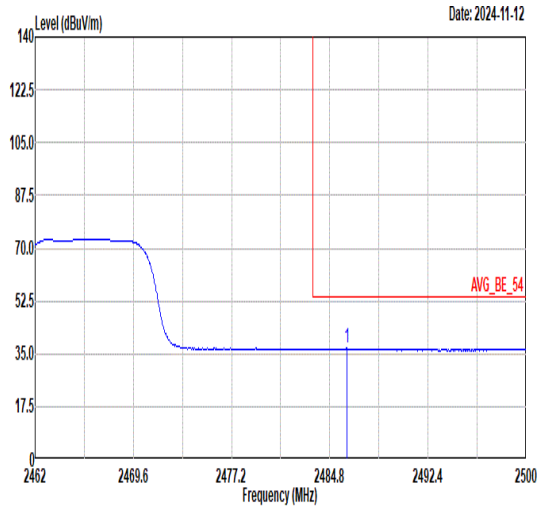
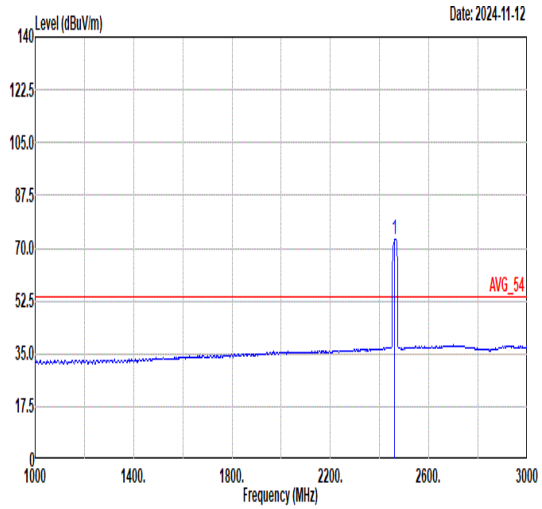
Mode	15	
	Band Edge	
	2400-2483.5_802.11n HT20_CH01_2412MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2369.67 47.14 74.00 -26.86 40.91 30.60 7.70 32.07 342 351 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2412.00 80.97 ------ ------ 74.60 30.64 7.81 32.08 342 351 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2389.17 36.66 54.00 -17.34 30.38 30.60 7.76 32.08 342 351 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2412.00 75.06 ------ ------ 68.69 30.64 7.81 32.08 342 351 AVERAGE

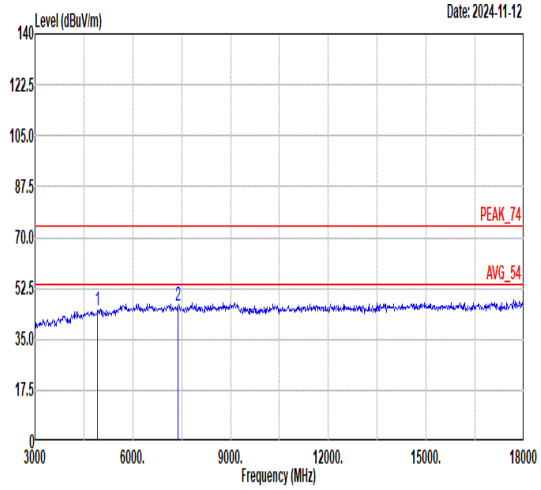
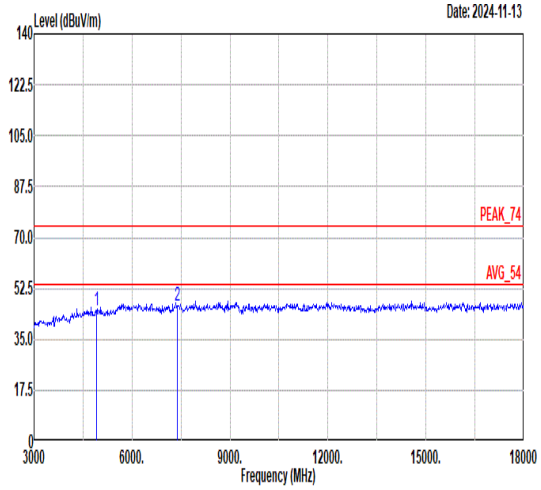
Mode	15	
	Band Edge	
	2400-2483.5_802.11n HT20_CH01_2412MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2385.79 47.44 74.00 -26.56 41.17 30.60 7.75 32.08 379 282 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2412.00 76.95 ------ ------ 70.58 30.64 7.81 32.08 379 282 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2389.17 36.64 54.00 -17.36 30.36 30.60 7.76 32.08 379 282 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2412.00 69.75 ------ ------ 63.38 30.64 7.81 32.08 379 282 AVERAGE

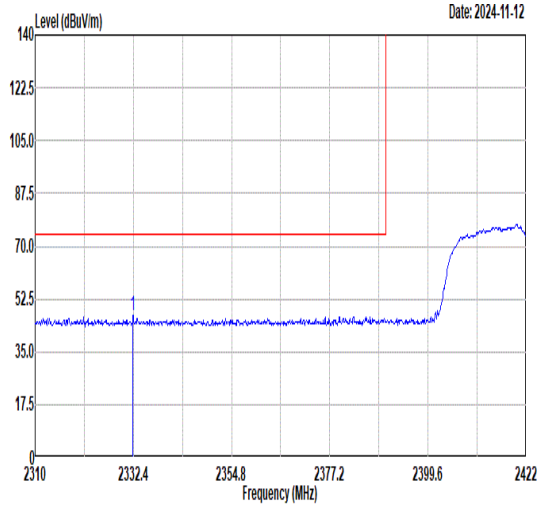
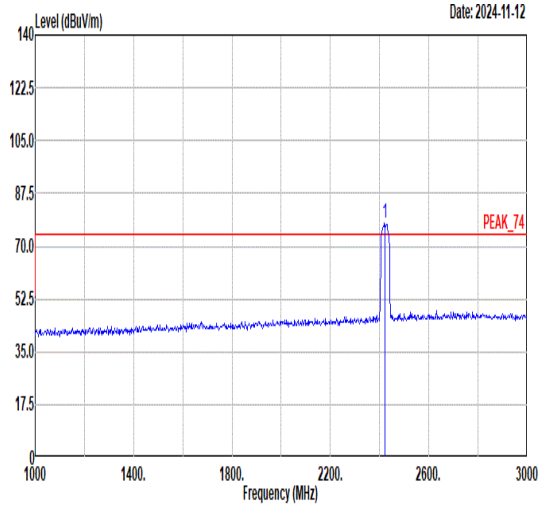
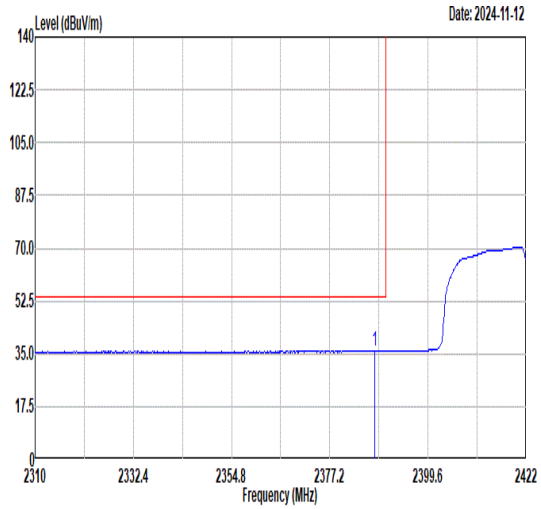
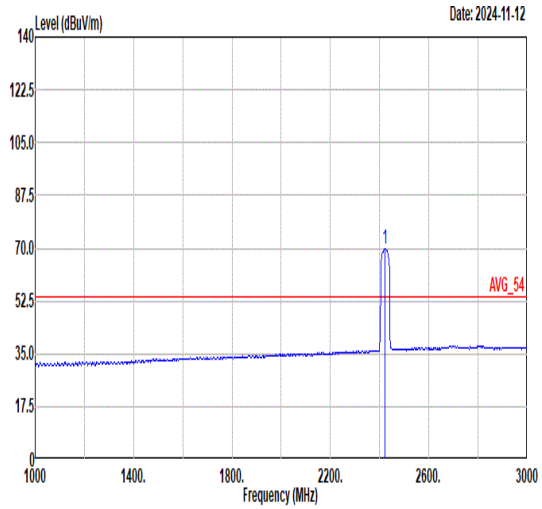
Mode	15	
	Harmonic	
	2400-2483.5_802.11n HT20_CH01_2412MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4824.00 43.95 74.00 -30.05 49.61 34.83 11.08 51.57 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4824.00 42.76 74.00 -31.24 48.42 34.83 11.08 51.57 --- --- Peak

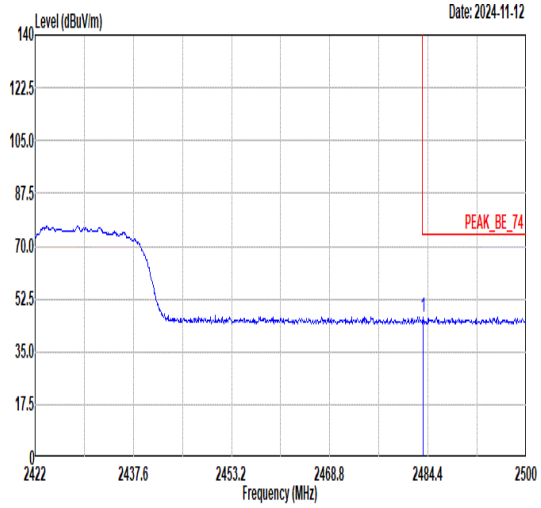
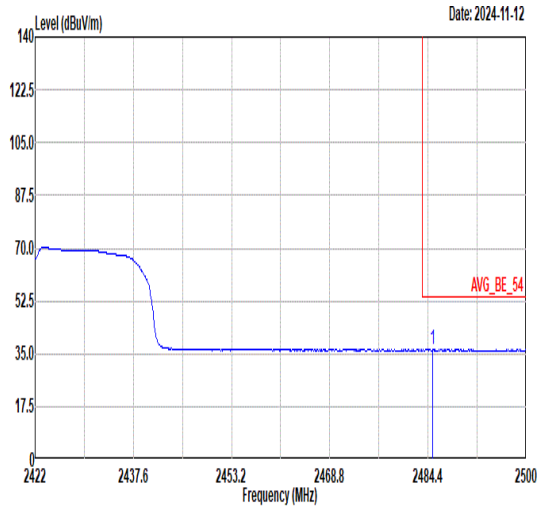
Mode	16	
	Harmonic	
	2400-2483.5_802.11n HT20_CH06_2437MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4874.00 43.64 74.00 -30.36 49.24 34.85 11.10 51.55 --- --- Peak 2 7311.00 46.10 74.00 -27.90 47.86 36.32 13.08 51.16 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4874.00 44.52 74.00 -29.48 50.12 34.85 11.10 51.55 --- --- Peak 2 7311.00 44.96 74.00 -29.04 46.72 36.32 13.08 51.16 --- --- Peak

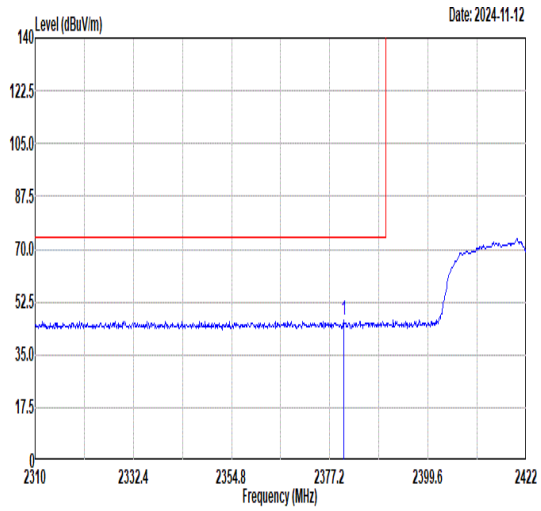
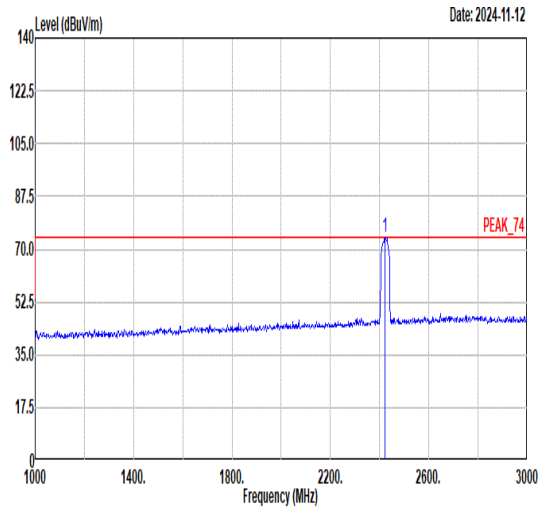
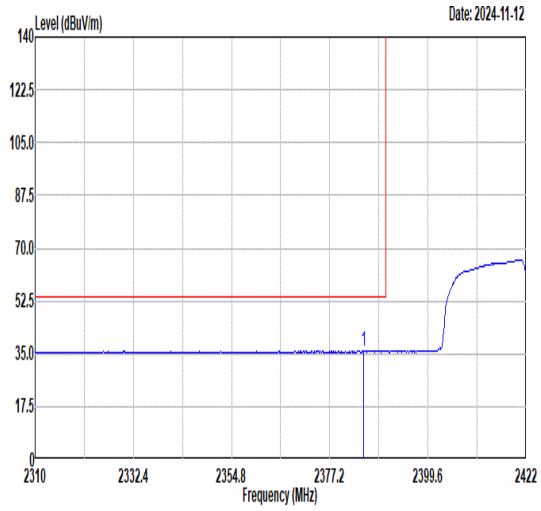
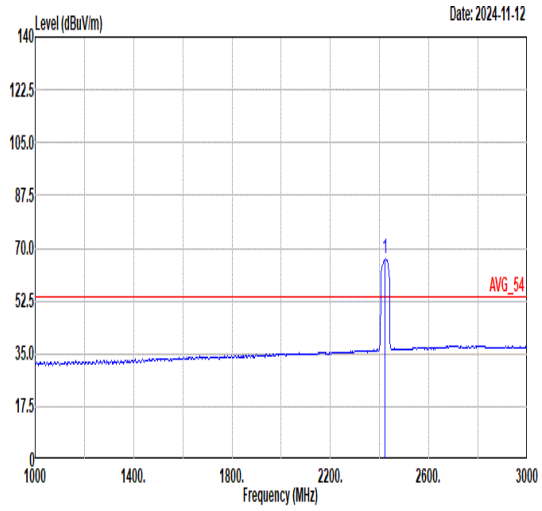
Mode	17	
	Band Edge	
	2400-2483.5_802.11n HT20_CH11_2462MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2487.12 46.88 74.00 -27.12 40.98 30.63 7.88 32.61 151 339 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2462.00 82.50 ------ ------ 76.58 30.68 7.86 32.62 151 339 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2497.34 36.12 54.00 -17.88 30.22 30.61 7.89 32.60 151 339 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2462.00 76.63 ------ ------ 70.71 30.67 7.86 32.61 151 339 AVERAGE

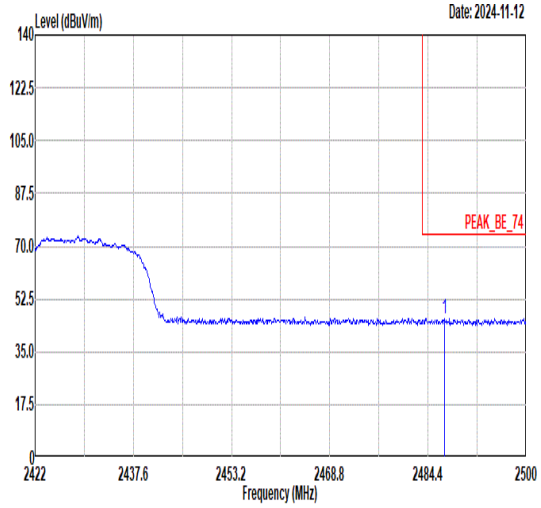
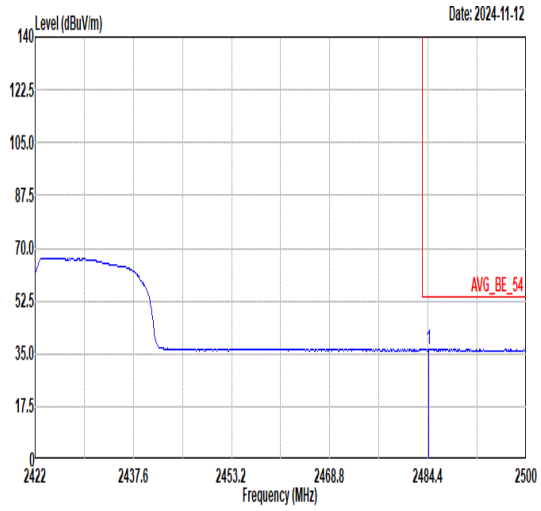
Mode	17	
	Band Edge	
	2400-2483.5_802.11n HT20_CH11_2462MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2499.39 47.90 74.00 -26.10 41.51 30.60 7.89 32.10 377 175 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2462.00 80.18 ------ ------ 73.73 30.68 7.86 32.09 377 175 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2486.13 36.75 54.00 -17.25 30.34 30.63 7.88 32.10 377 175 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2462.00 72.94 ------ ------ 66.50 30.67 7.86 32.09 377 175 AVERAGE

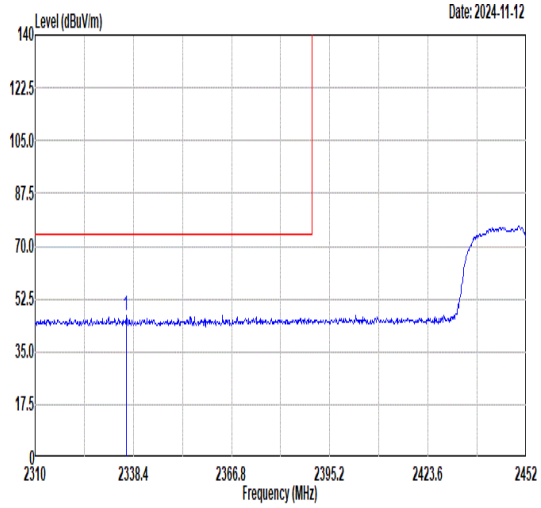
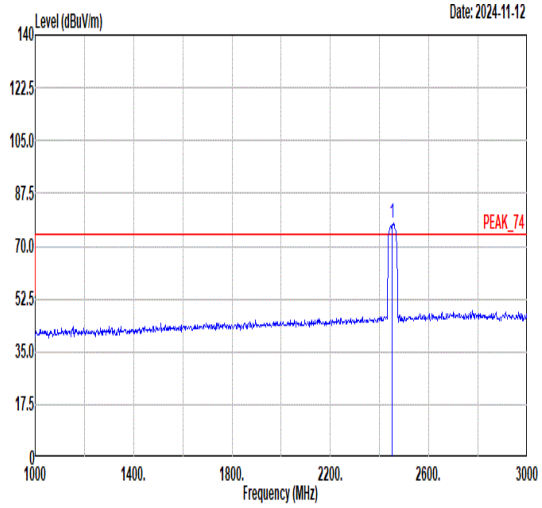
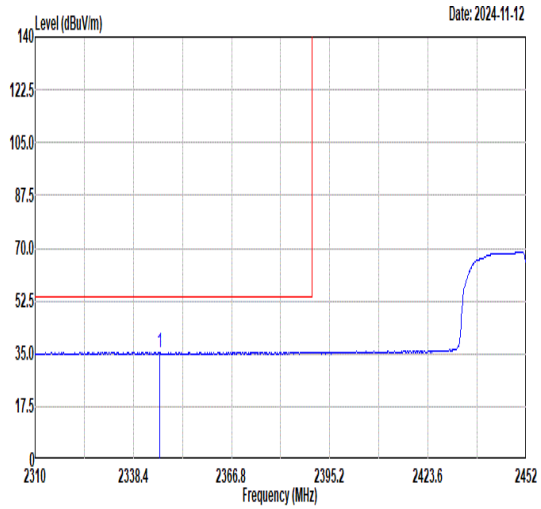
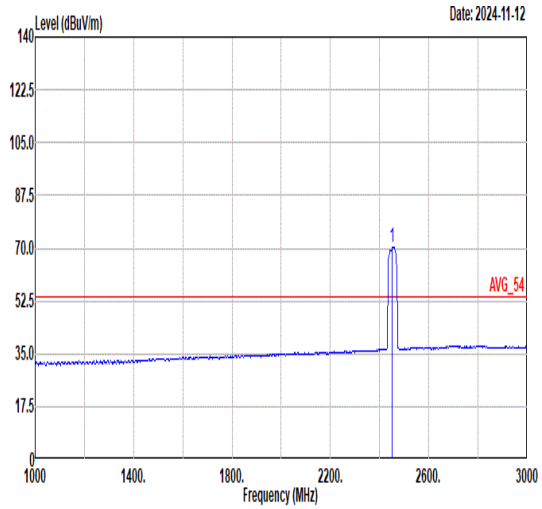
Mode	17	
	Harmonic	
	2400-2483.5_802.11n HT20_CH11_2462MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4924.00 44.65 74.00 -29.35 50.19 34.87 11.12 51.53 --- --- Peak 2 7386.00 46.35 74.00 -27.65 48.05 36.35 13.13 51.18 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4924.00 44.69 74.00 -29.31 50.23 34.87 11.12 51.53 --- --- Peak 2 7386.00 46.52 74.00 -27.48 48.22 36.35 13.13 51.18 --- --- Peak

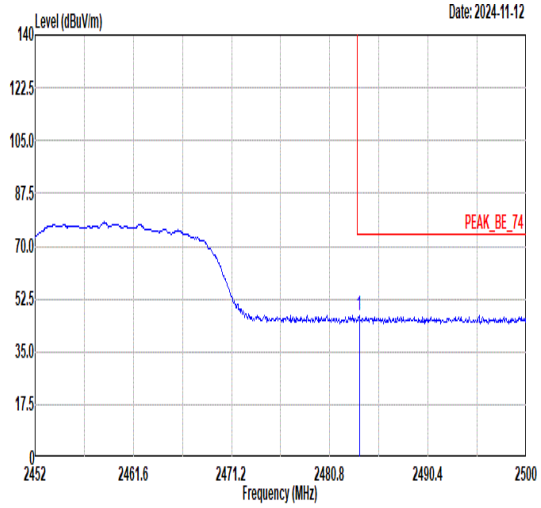
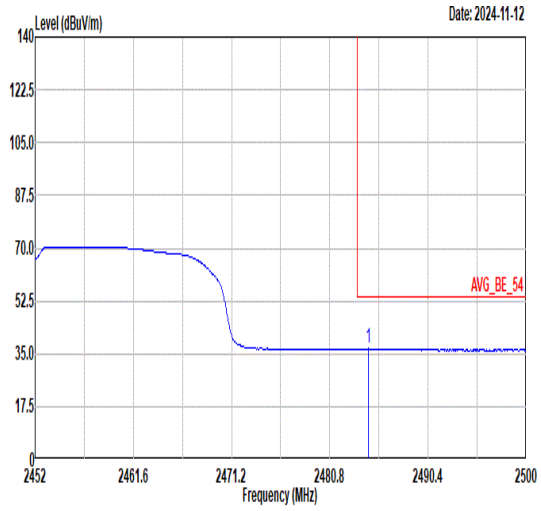
Mode	18	
	Band Edge - L	
	2400-2483.5_802.11n HT40_CH03_2422MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2332.29 47.02 74.00 -26.98 41.49 30.60 7.60 32.67 342 0 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2422.00 77.64 ------ ------ 71.81 30.64 7.82 32.63 342 0 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2387.39 36.11 54.00 -17.89 30.41 30.60 7.75 32.65 342 0 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2422.00 69.95 ------ ------ 64.12 30.64 7.82 32.63 342 0 AVERAGE

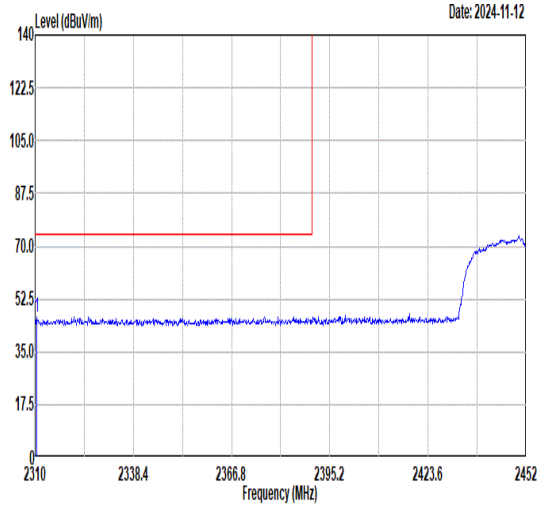
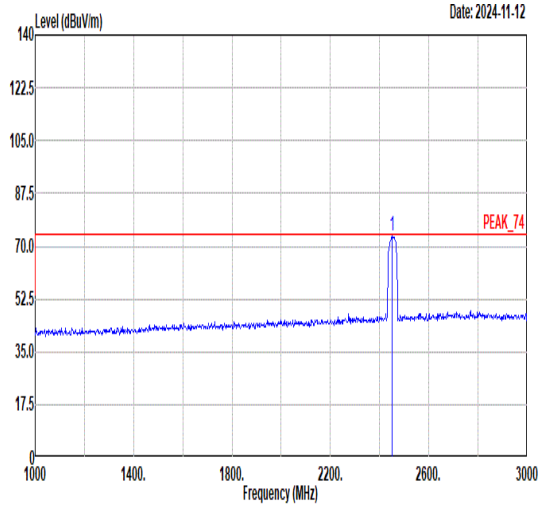
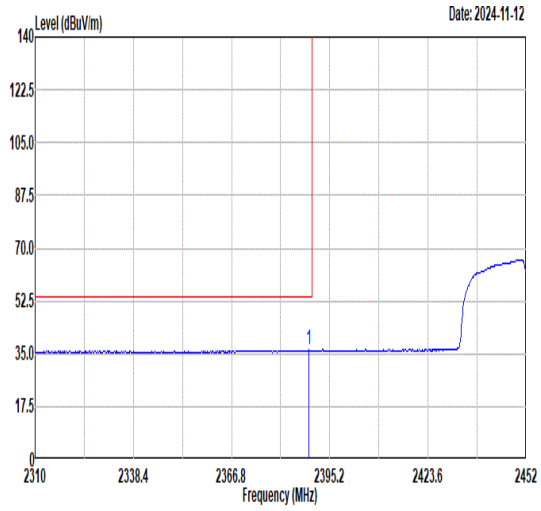
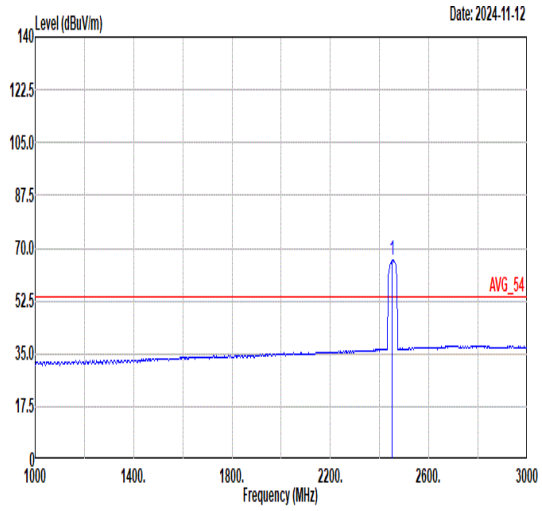
Mode	18	
	Band Edge - R	
	2400-2483.5_802.11n HT40_CH03_2422MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.62 46.59 74.00 -27.41 40.69 30.63 7.88 32.61 342 0 PEAK	Blank
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2485.18 36.43 54.00 -17.57 30.53 30.63 7.88 32.61 342 0 AVERAGE	Blank

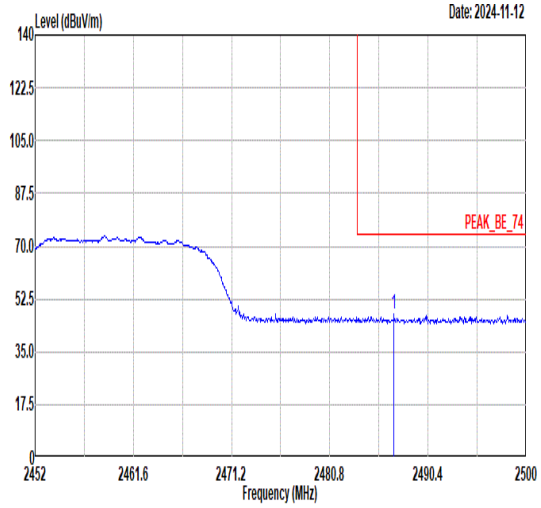
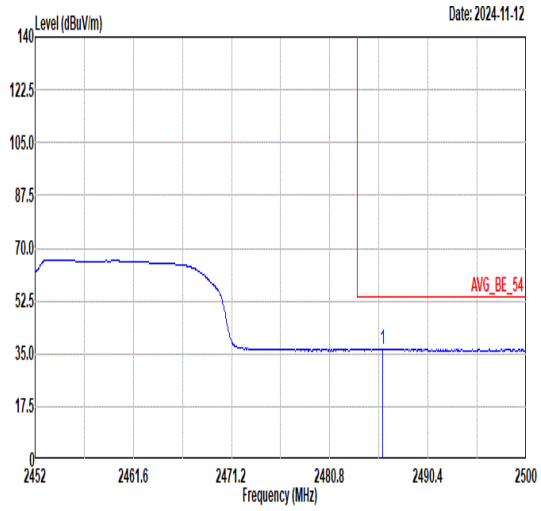
Mode	18	
	Band Edge - L	
	2400-2483.5_802.11n HT40_CH03_2422MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2380.34 46.24 74.00 -27.76 40.56 30.60 7.73 32.65 377 287 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2422.00 73.71 ------ ------ 67.87 30.65 7.82 32.63 377 287 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2384.93 36.01 54.00 -17.99 30.31 30.60 7.75 32.65 377 287 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2422.00 66.59 ------ ------ 60.75 30.65 7.82 32.63 377 287 AVERAGE

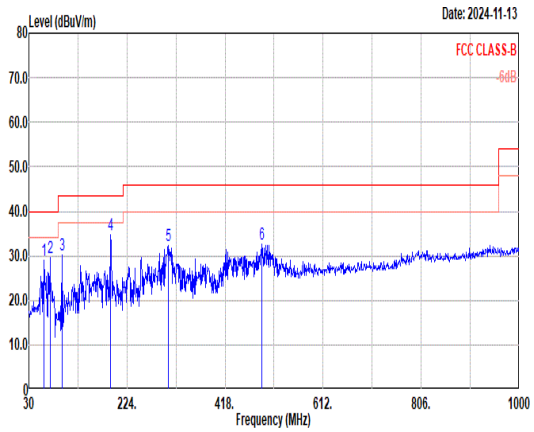
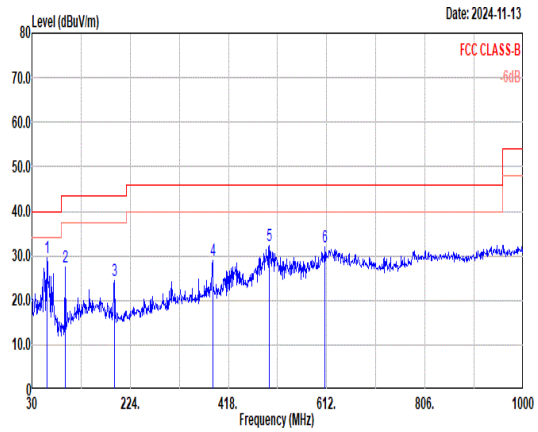
Mode	18	
	Band Edge - R	
	2400-2483.5_802.11n HT40_CH03_2422MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2487.05 46.22 74.00 -27.78 40.32 30.63 7.88 32.61 377 287 PEAK	Blank
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2484.48 36.48 54.00 -17.52 30.58 30.63 7.88 32.61 377 287 AVERAGE	Blank

Mode	19	
	Band Edge - L	
	2400-2483.5_802.11n HT40_CH09_2452MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2336.27 47.12 74.00 -26.88 41.58 30.60 7.61 32.67 330 0 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2452.00 77.69 ------ ------ 71.78 30.68 7.85 32.62 330 0 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2345.93 35.58 54.00 -18.42 30.00 30.60 7.64 32.66 330 0 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2452.00 70.37 ------ ------ 64.45 30.69 7.85 32.62 330 0 AVERAGE

Mode	19	
	Band Edge - R	
	2400-2483.5_802.11n HT40_CH09_2452MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.68 46.82 74.00 -27.18 40.92 30.63 7.88 32.61 330 0 PEAK	Blank
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2484.59 36.73 54.00 -17.27 30.83 30.63 7.88 32.61 330 0 AVERAGE	Blank

Mode	19	
	Band Edge - L	
	2400-2483.5_802.11n HT40_CH09_2452MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2310.57 46.57 74.00 -27.43 41.11 30.60 7.54 32.68 364 286 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2452.00 73.35 ------ ------ 67.43 30.70 7.84 32.62 364 286 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2389.09 36.29 54.00 -17.71 30.57 30.60 7.76 32.64 364 286 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2452.00 66.08 ------ ------ 60.16 30.70 7.84 32.62 364 286 AVERAGE

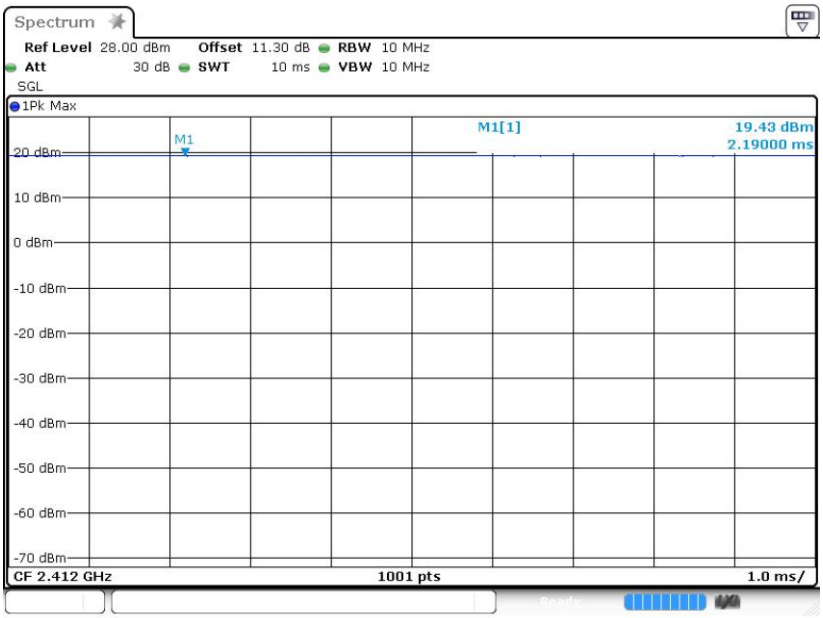
Mode	19	
	Band Edge - R	
	2400-2483.5_802.11n HT40_CH09_2452MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2487.09 47.57 74.00 -26.43 41.67 30.63 7.88 32.61 364 286 PEAK	Blank
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2485.94 36.59 54.00 -17.41 30.69 30.63 7.88 32.61 364 286 AVERAGE	Blank

Mode	20	
	LF	
	2400-2483.5_802.11b_CH11_2462MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
QP/ Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 59.10 29.00 40.00 -11.00 49.99 12.70 1.41 35.10 --- --- Peak 2 71.71 29.55 40.00 -10.45 50.46 12.64 1.55 35.10 --- --- Peak 3 95.96 30.04 43.50 -13.46 47.00 16.35 1.79 35.10 --- --- Peak 4 191.02 34.71 43.50 -8.79 51.57 15.55 2.51 34.92 --- --- Peak 5 305.48 32.36 46.00 -13.64 44.51 19.58 3.15 34.88 --- --- Peak 6 490.75 32.58 46.00 -13.42 39.69 23.60 3.99 34.70 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 59.10 29.71 40.00 -10.29 50.70 12.70 1.41 35.10 --- --- Peak 2 95.96 27.42 43.50 -16.08 44.38 16.35 1.79 35.10 --- --- Peak 3 192.96 24.58 43.50 -18.92 41.41 15.56 2.52 34.91 --- --- Peak 4 386.96 29.09 46.00 -16.91 38.61 21.57 3.54 34.63 --- --- Peak 5 498.51 32.42 46.00 -13.58 39.35 23.75 4.02 34.70 --- --- Peak 6 608.12 31.98 46.00 -14.02 36.77 25.25 4.46 34.50 --- --- Peak

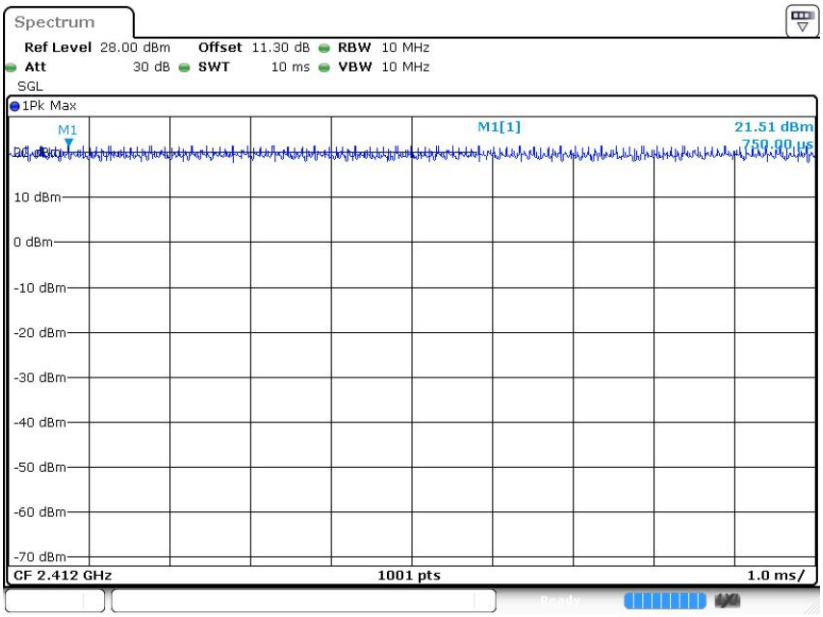
Appendix C. Duty Cycle Plots

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

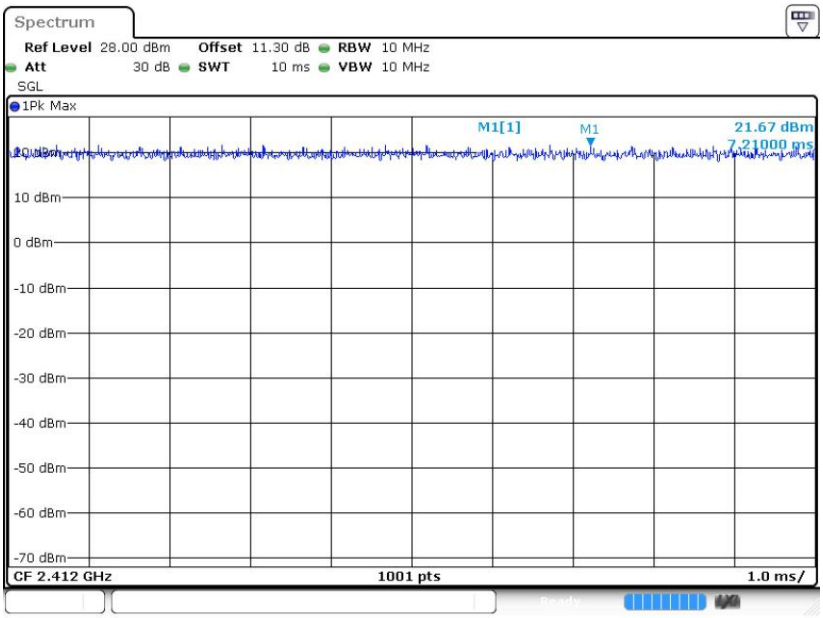
802.11b



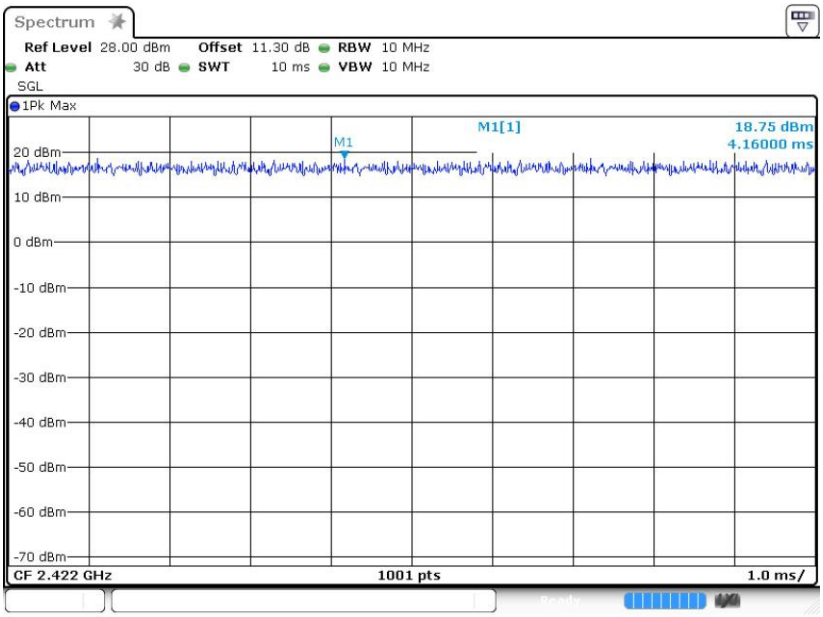
802.11g



802.11n HT20



802.11n HT40


Spectrum
Ref Level 28.00 dBm Offset 11.30 dB RBW 10 MHz
Att 30 dB SWT 10 ms VBW 10 MHz
SGL
1Pk Max
M1[1] 18.75 dBm
4.16000 ms
M1
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.422 GHz
1001 pts
1.0 ms/