



FCC RADIO TEST REPORT

FCC ID : 2AEUPBHARG001
Equipment : Battery Doorbell
Brand Name : ring
Model Name : 5F97F2
Applicant : Ring LLC
12515 Cerise Ave, Hawthorne, CA 90250 USA
Manufacturer : Ring LLC
12515 Cerise Ave, Hawthorne, CA 90250 USA
Standard : FCC PART 15 Subpart C §15.247

The product was received on Dec. 01, 2023 and testing was performed from Dec. 05, 2023 to Dec. 22, 2023. We, Sporton International Inc. Wensan Laboratory, 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 from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description	5
1.1 Product Feature of Equipment Under Test.....	5
1.2 Modification of EUT	5
1.3 Testing Location	6
1.4 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.....	8
2.4 Support Unit used in test configuration and system	9
2.5 EUT Operation Test Setup	9
2.6 Measurement Results Explanation Example.....	9
3 Test Result	10
3.1 6dB and 99% Bandwidth Measurement	10
3.2 Output Power Measurement.....	11
3.3 Power Spectral Density Measurement	12
3.4 Conducted Band Edges and Spurious Emission Measurement	13
3.5 Radiated Band Edges and Spurious Emission Measurement	14
3.6 AC Conducted Emission Measurement.....	19
3.7 Antenna Requirements.....	21
4 List of Measuring Equipment.....	22
5 Measurement Uncertainty	24
Appendix A. Conducted Test Results	
Appendix B. AC Conducted Emission Test Result	
Appendix C. Radiated Spurious Emission	
Appendix D. Radiated Spurious Emission Plots	
Appendix E. Duty Cycle Plots	
Appendix F. Setup Photographs	



History of this test report

Report No.	Version	Description	Issue Date
FR3N2810B	01	Initial issue of report	Jan. 26, 2024
FR3N2810B	02	Revise Product Feature and Appendix A This report is an updated version, replacing the report issued on Jan. 26, 2024.	Feb. 26, 2024
FR3N2810B	03	Revise Product Feature of Equipment Under Test This report is an updated version, replacing the report issued on Feb. 26, 2024.	Feb. 29, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(2)	6dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.247(b)	Power Output Measurement	Pass	-
3.3	15.247(e)	Power Spectral Density	Pass	-
3.4	15.247(d)	Conducted Band Edges	Pass	-
		Conducted Spurious Emission	Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	1.60 dB under the limit at 2483.52 MHz
3.6	15.207	AC Conducted Emission	Pass	13.61 dB under the limit at 15.13 MHz
3.7	15.203	Antenna Requirement	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/manufacture 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.

Reviewed by: Keven Cheng

Report Producer: Ming Chen

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
General Specs	Bluetooth-LE, Wi-Fi 2.4GHz 802.11b/g/n
Sample 1	EUT With Battery 1
Sample 2	EUT With Battery 2
Sample 3	PIR cover remove
Antenna Type	WLAN: IFA Antenna Bluetooth-LE: IFA Antenna

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	3.5

Remark:

1. The sample 3 only differences with other sample in design is the cover remove for auxiliary light (PIR) for camera for sample 3, therefore, this change does not affect the assessment of RF test.
2. The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No. CO05-HY (TAF Code: 1190)
Remark	The AC Conducted Emission test item subcontracted to Sporton International Inc. EMC & Wireless Communications Laboratory.

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. TH05-HY, 03CH13-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW1190 and TW3786

1.4 Applicable Standards

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

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ ANSI C63.10-2013

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. 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, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and accessory (Type C Adapter), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and only the worst case emissions were reported 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

The final test modes include the worst data rates for each modulation shown in the table below.

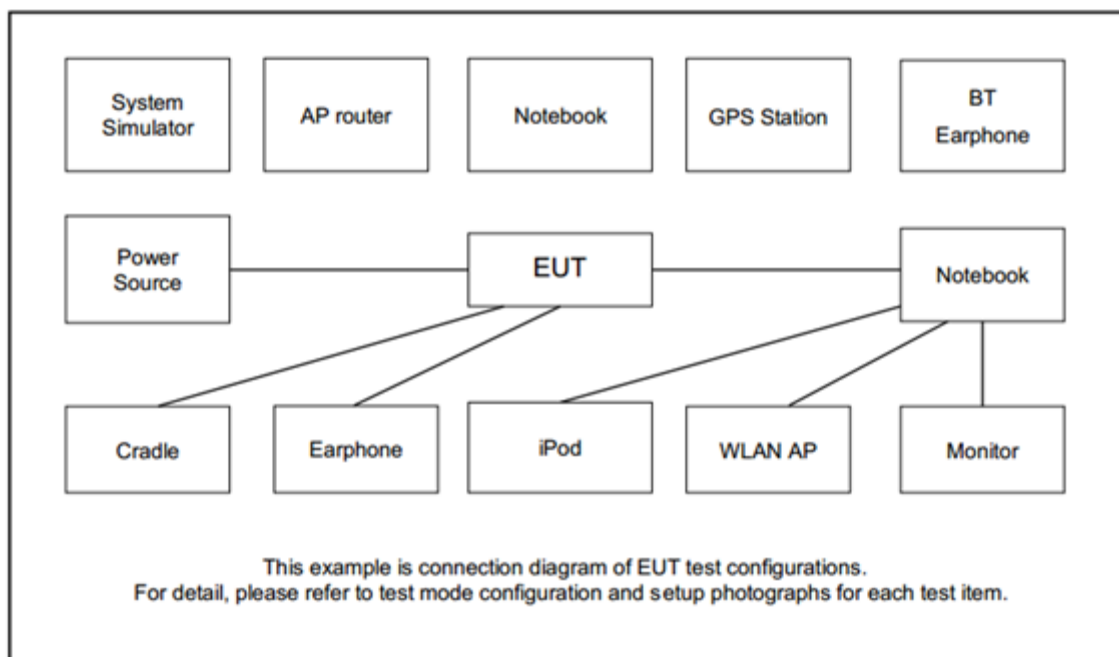
Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0

Test Cases	
AC Conducted Emission	Mode 1 :IR LED on +LED on +WLAN (2.4GHz) Link + 2-way Audio + Camera Video + Battery 1 + Adapter for Sample 1
Remark: For Radiated Test Cases, the tests were performed with Sample 1	

Ch. #	2400-2483.5 MHz		
	802.11b	802.11g	802.11n HT20
Low	01	01	01
Middle	06	06	06
High	11	11	11

Remark: For radiation spurious emission, the modulation and the data rate picked for testing are determined by the Max. RF conducted power.

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
2.	Notebook	Dell	Latitude 3420	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Mobile Phone	Samsung	Galaxy A8+	A3LSMA730F	N/A	N/A
4.	Adapter	Ring	DSA-12PF16-24	N/A	N/A	N/A
5.	Adapter	Amazon	PS57CP	N/A	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “Compliance 1.0.1.29” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

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 4.2 dB and 10 dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (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

Please refer to the measuring equipment list in this test report.

3.1.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 11.8.1 (6dB BW).
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to 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) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) $\geq 3 * RBW$.
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.

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5 MHz, the limit for output power is 30 dBm. If transmitting antenna with directional gain greater than 6 dBi is used, the 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 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

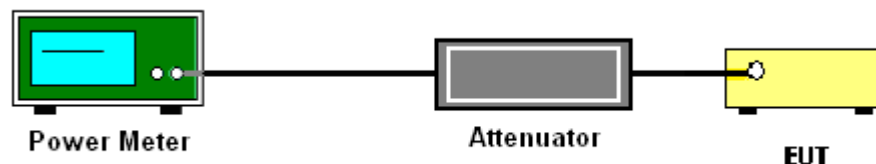
3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.2.3 Test Procedures

1. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G
2. The RF output of EUT is connected to the power meter by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to 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 Average Output Power

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 8 dBm in any 3 kHz band at any time interval of continuous transmission.

3.3.2 Measuring Instruments

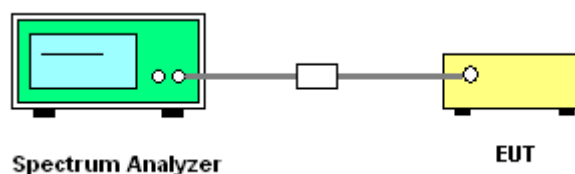
Please refer to the measuring equipment list in this test report.

3.3.3 Test Procedures

Method AVGPSSD-3

1. The testing follows the ANSI C63.10 Section 11.10.7 Method AVGPSSD-3.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 10 kHz. Video bandwidth VBW = 30 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW).
5. Number of points in sweep $\geq 2 \text{ Span} / \text{RBW}$. (This ensures that bin-to-bin spacing is $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins).
6. Detector = RMS, Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
9. 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.

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 / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

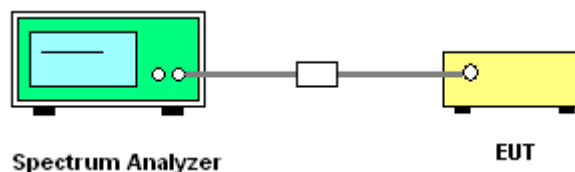
3.4.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.4.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.11.3 Emission level measurement
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to 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

Please refer to Appendix A.

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 is 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

Please refer to the measuring equipment list in this test report.

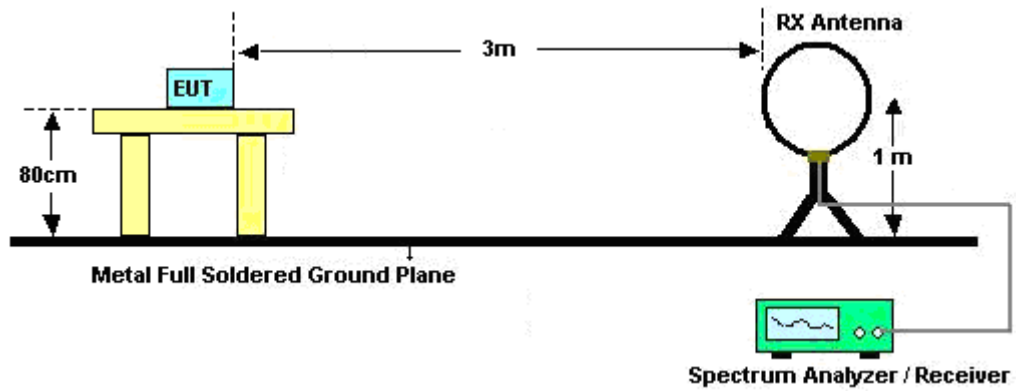


3.5.3 Test Procedures

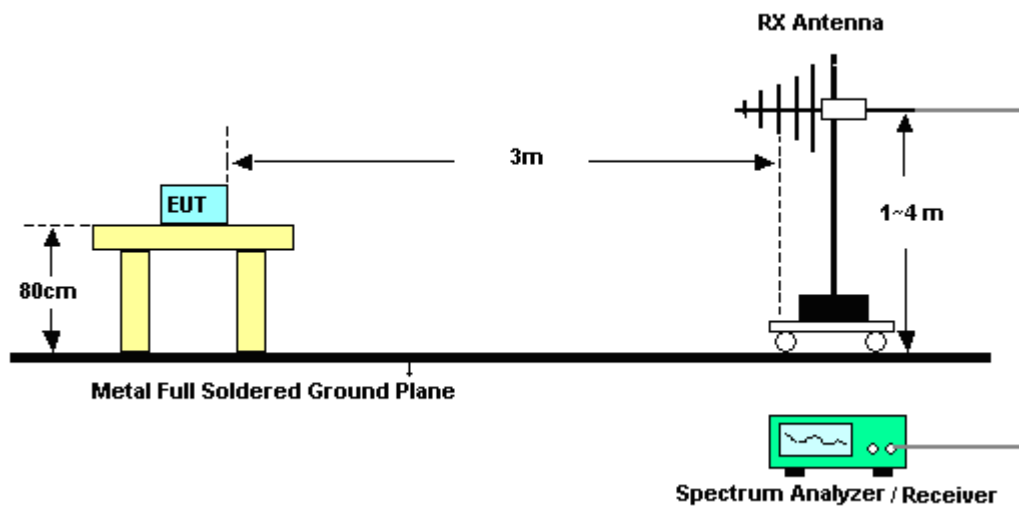
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements
2. The EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
4. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamplifier Factor = Level
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-”.
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-”.
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 $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW = 3 MHz for $f \geq 1$ GHz for peak measurement.For average measurement:
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, 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

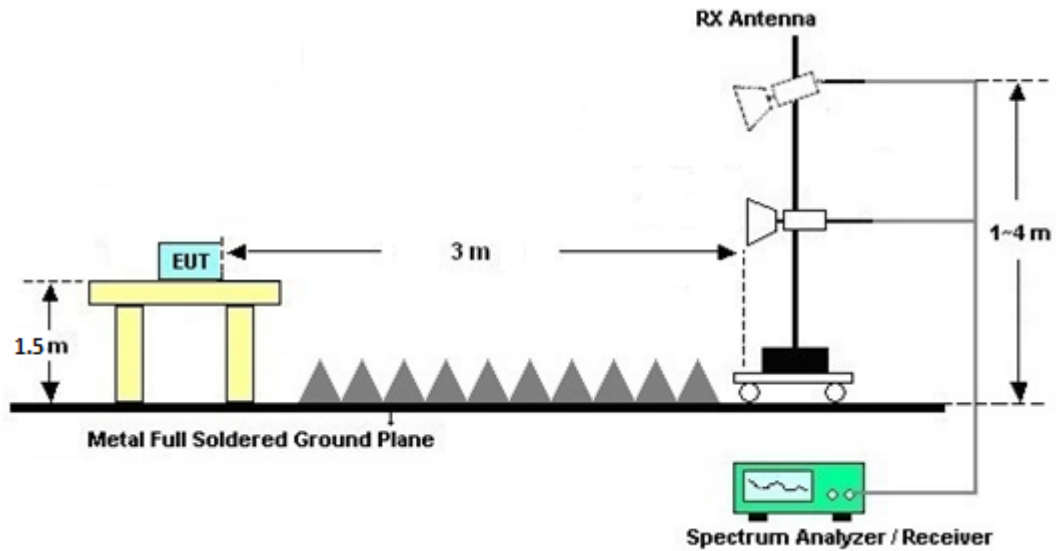
For radiated emissions below 30MHz



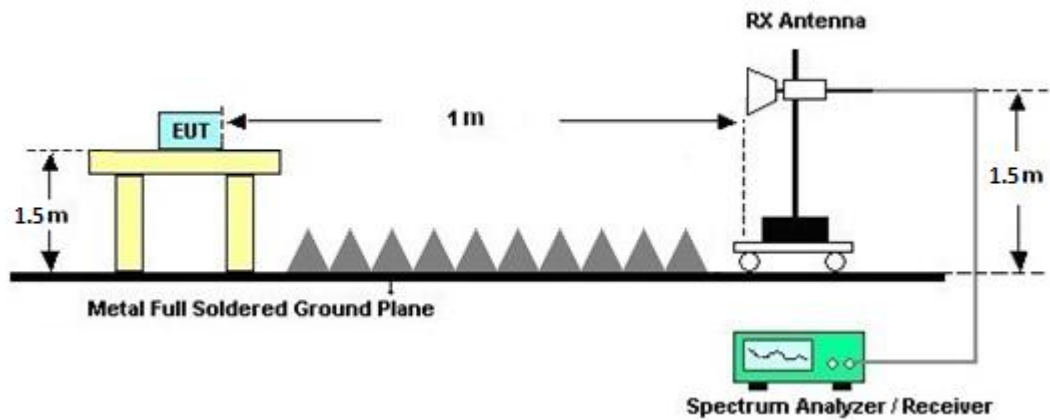
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz





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

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

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result comes out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.5.7 Duty Cycle

Please refer to Appendix E.

3.5.8 Test Result of Radiated Spurious Emission (30 MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

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 (dB μ V)	
	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.

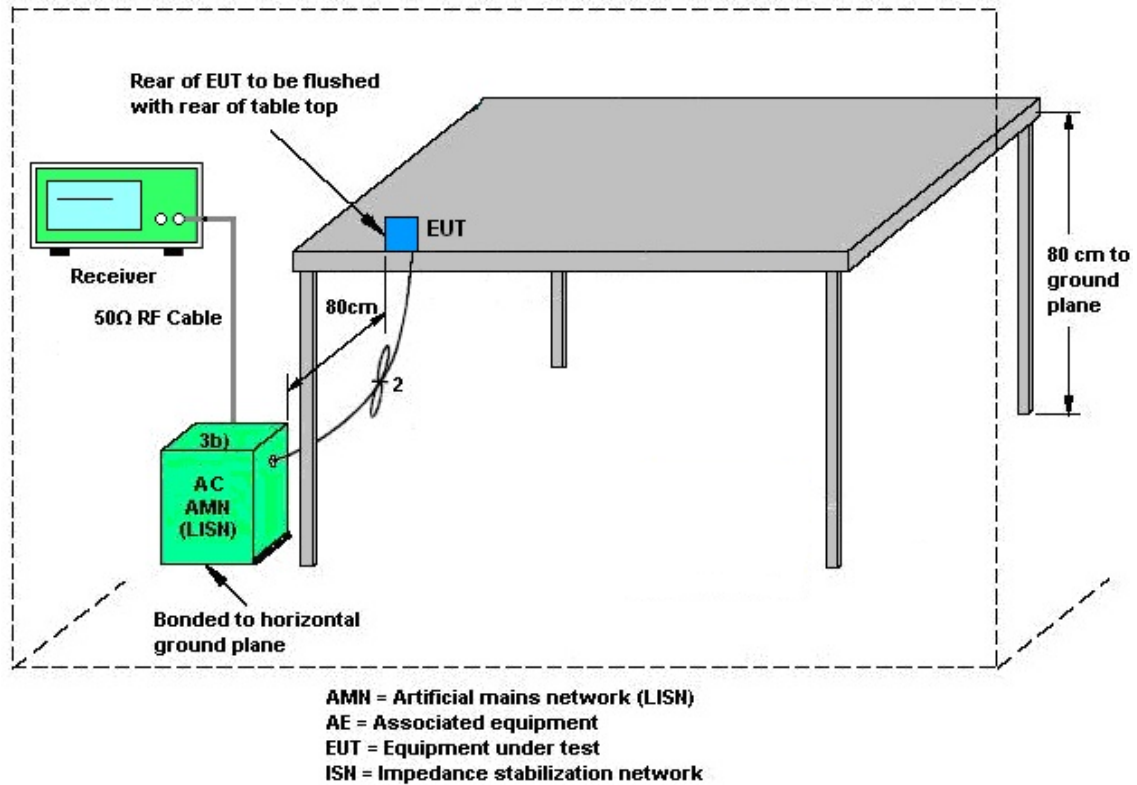
3.6.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.6.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is 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 shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9 kHz) with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.7 Antenna Requirements

3.7.1 Standard Applicable

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.



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Dec. 14, 2023	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 20, 2023	Dec. 14, 2023	Sep. 19, 2024	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Oct. 26, 2023	Dec. 14, 2023	Oct. 25, 2024	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 22, 2023	Dec. 14, 2023	Nov. 21, 2024	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Dec. 14, 2023	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-FN	00691	9kHz-200MHz	Jul. 28, 2023	Dec. 14, 2023	Jul. 27, 2024	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 29, 2022	Dec. 14, 2023	Dec. 28, 2023	Conduction (CO05-HY)
Hygrometer	TECEPEL	DTM-303A	TP201996	N/A	Nov. 07, 2023	Dec. 05, 2023~Dec. 22, 2023	Nov. 06, 2024	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	17I00015SNO37 (NO:167)	10MHz~6GHz	Dec. 01, 2023	Dec. 05, 2023~Dec. 22, 2023	Nov. 30, 2024	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	10190	10Hz - 40GHz	Aug. 09, 2023	Dec. 05, 2023~Dec. 22, 2023	Aug. 08, 2024	Conducted (TH05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 12, 2023	Dec. 15, 2023~Dec. 18, 2023	Sep. 11, 2024	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9K~30M	Mar. 07, 2023	Dec. 15, 2023~Dec. 18, 2023	Mar. 06, 2024	Radiation (03CH13-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 07, 2023	Dec. 15, 2023~Dec. 18, 2023	Dec. 06, 2024	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00993	18GHz-40GHz	Nov. 24, 2023	Dec. 15, 2023~Dec. 18, 2023	Nov. 23, 2024	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803953/2	30MHz~40GHz	Dec. 18, 2023	Dec. 15, 2023~Dec. 18, 2023	Dec. 17, 2024	Radiation (03CH13-HY)
Amplifier	SONOMA	310N	187282	9kHz~1GHz	Dec. 13, 2023	Dec. 15, 2023~Dec. 18, 2023	Dec. 12, 2024	Radiation (03CH13-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	40103 & 07	30MHz~1GHz	Apr. 23, 2023	Dec. 15, 2023~Dec. 18, 2023	Apr. 22, 2024	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz~18GHz	Aug. 17, 2023	Dec. 15, 2023~Dec. 18, 2023	Aug. 16, 2024	Radiation (03CH13-HY)
Hygrometer	TECEPEL	DTM-303A	TP215159	N/A	Sep. 13, 2023	Dec. 15, 2023~Dec. 18, 2023	Sep. 12, 2024	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590074	1GHz~18GHz	May 16, 2023	Dec. 15, 2023~Dec. 18, 2023	May 15, 2024	Radiation (03CH13-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Preamplifier	EM Electronics	EM01G18G	060803	1GHz~18GHz	Jan. 10, 2023	Dec. 15, 2023~ Dec. 18, 2023	Jan. 09, 2024	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 23, 2023	Dec. 15, 2023~ Dec. 18, 2023	Mar. 22, 2024	Radiation (03CH13-HY)
Filter	Wainwright	WLK4-1000-15 30-8000-40SS	SN12	1.53GHz Low Pass Filter	Sep. 12, 2023	Dec. 15, 2023~ Dec. 18, 2023	Sep. 11, 2024	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-2700 -3000-18000-6 0SS	SN2	3GHz High Pass Filter	Jul. 10, 2023	Dec. 15, 2023~ Dec. 18, 2023	Jul. 09, 2024	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30MHz~18GHz	Feb. 08, 2023	Dec. 15, 2023~ Dec. 18, 2023	Feb. 07, 2024	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	804793/4	30MHz~18GHz	Feb. 08, 2023	Dec. 15, 2023~ Dec. 18, 2023	Feb. 07, 2024	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/4	30MHz~18GHz	Feb. 08, 2023	Dec. 15, 2023~ Dec. 18, 2023	Feb. 07, 2024	Radiation (03CH13-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Dec. 15, 2023~ Dec. 18, 2023	N/A	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Dec. 15, 2023~ Dec. 18, 2023	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Dec. 15, 2023~ Dec. 18, 2023	N/A	Radiation (03CH13-HY)
Software	Audix	N/A	RK-001124	N/A	N/A	Dec. 15, 2023~ Dec. 18, 2023	N/A	Radiation (03CH13-HY)



5 Measurement Uncertainty

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.5 dB
--	--------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	6.5 dB
--	--------

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

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

Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.6 dB
--	--------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.3 dB
--	--------

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Wei Shun Hung	Temperature:	21~25	°C
Test Date:	2023/12/5-2023/12/22	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band Single Antenna										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant1	Ant2	Ant1	Ant2		
11b	1Mbps	1	1	2412	14.09	-	9.08	-	0.50	Pass
11b	1Mbps	1	6	2437	14.04	-	9.08	-	0.50	Pass
11b	1Mbps	1	11	2462	13.99	-	8.60	-	0.50	Pass
11g	6Mbps	1	1	2412	16.53	-	15.14	-	0.50	Pass
11g	6Mbps	1	6	2437	16.53	-	15.08	-	0.50	Pass
11g	6Mbps	1	11	2462	16.48	-	15.10	-	0.50	Pass
HT20	MCS0	1	1	2412	17.58	-	15.14	-	0.50	Pass
HT20	MCS0	1	6	2437	17.58	-	15.14	-	0.50	Pass
HT20	MCS0	1	11	2462	17.58	-	15.12	-	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band Single Antenna																
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
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	1	1	2412	19.40	-		30.00	-	3.50	-	22.90	-	36.00	-	Pass
11b	1Mbps	1	6	2437	19.50	-		30.00	-	3.50	-	23.00	-	36.00	-	Pass
11b	1Mbps	1	11	2462	18.90	-		30.00	-	3.50	-	22.40	-	36.00	-	Pass
11g	6Mbps	1	1	2412	16.80	-		30.00	-	3.50	-	20.30	-	36.00	-	Pass
11g	6Mbps	1	6	2437	17.10	-		30.00	-	3.50	-	20.60	-	36.00	-	Pass
11g	6Mbps	1	11	2462	14.53	-		30.00	-	3.50	-	18.03	-	36.00	-	Pass
HT20	MCS0	1	1	2412	15.90	-		30.00	-	3.50	-	19.40	-	36.00	-	Pass
HT20	MCS0	1	6	2437	15.80	-		30.00	-	3.50	-	19.30	-	36.00	-	Pass
HT20	MCS0	1	11	2462	13.65	-		30.00	-	3.50	-	17.15	-	36.00	-	Pass

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

TEST RESULTS DATA
Peak Power Spectral Density

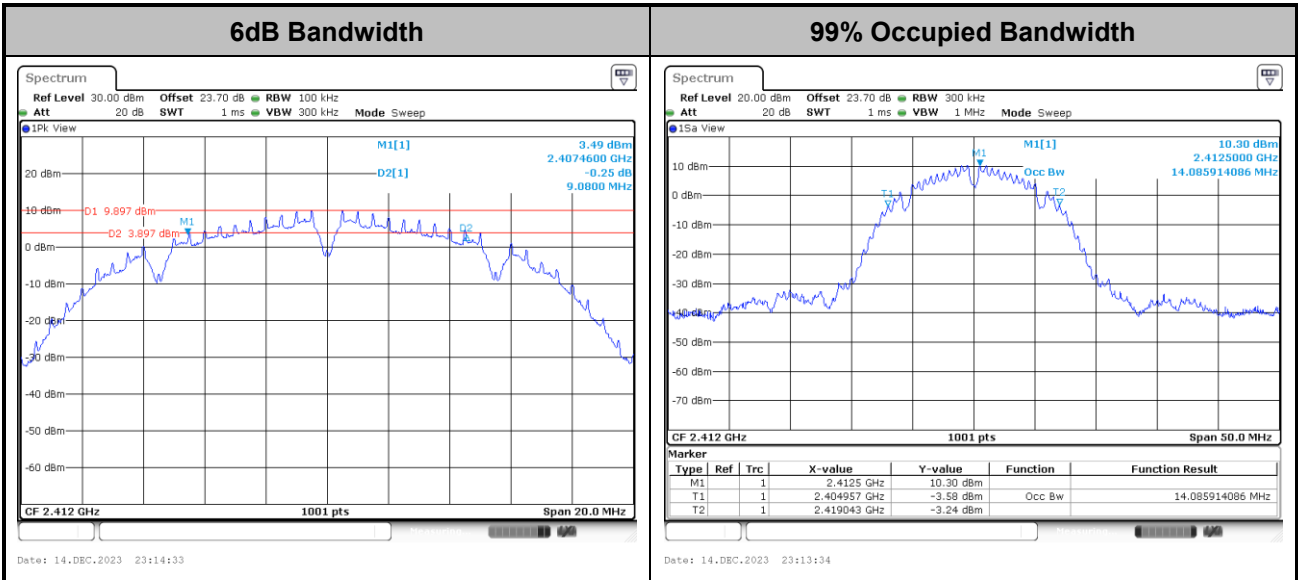
2.4GHz Band Single Antenna												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant1	Ant2	Worse + 3.01	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	1	1	2412	-1.92	-		3.50	-	8.00	-	Pass
11b	1Mbps	1	6	2437	-3.06	-		3.50	-	8.00	-	Pass
11b	1Mbps	1	11	2462	-2.93	-		3.50	-	8.00	-	Pass
11g	6Mbps	1	1	2412	-7.26	-		3.50	-	8.00	-	Pass
11g	6Mbps	1	6	2437	-7.87	-		3.50	-	8.00	-	Pass
11g	6Mbps	1	11	2462	-10.12	-		3.50	-	8.00	-	Pass
HT20	MCS0	1	1	2412	-8.03	-		3.50	-	8.00	-	Pass
HT20	MCS0	1	6	2437	-8.33	-		3.50	-	8.00	-	Pass
HT20	MCS0	1	11	2462	-10.62	-		3.50	-	8.00	-	Pass

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



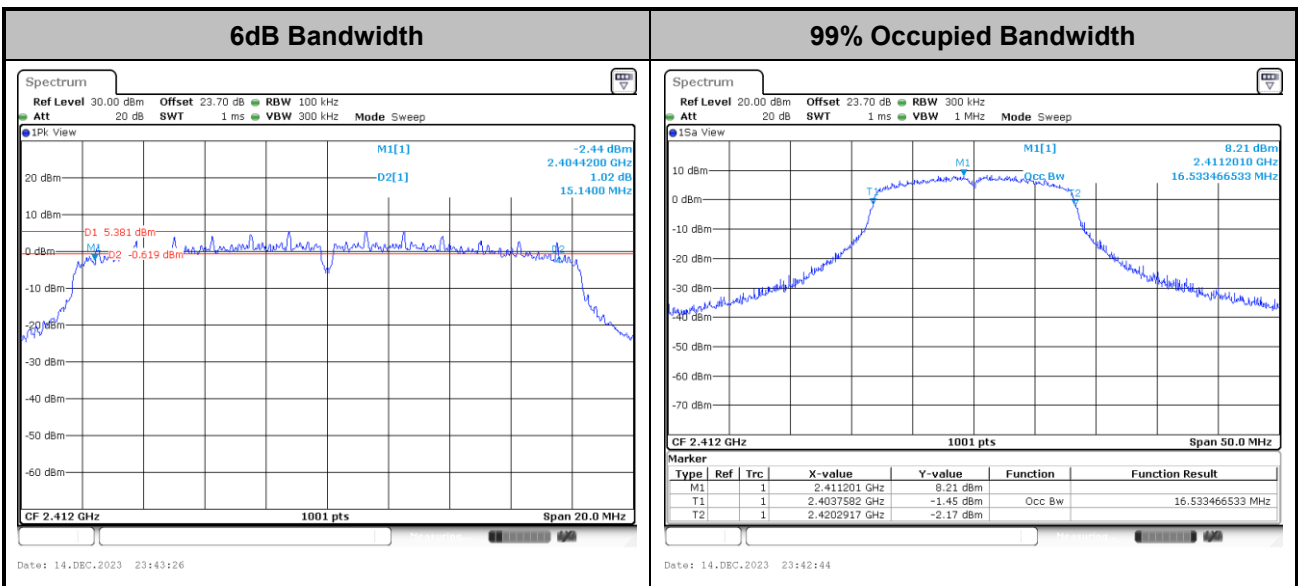
6dB and 99% Occupied Bandwidth

<802.11b>



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

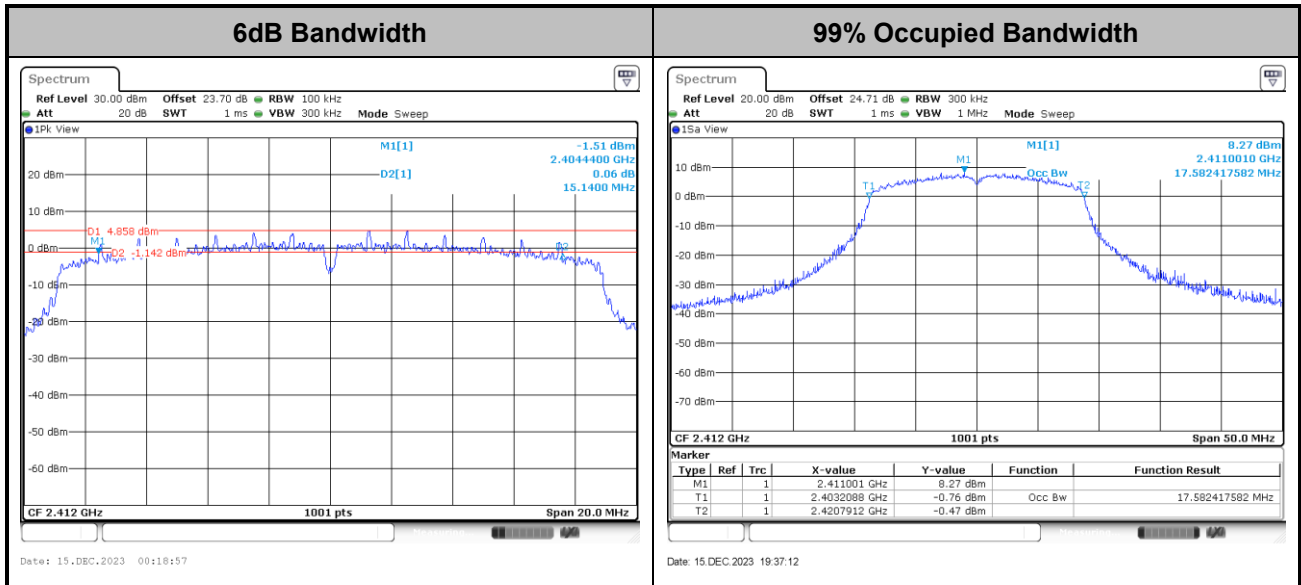
<802.11g>



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



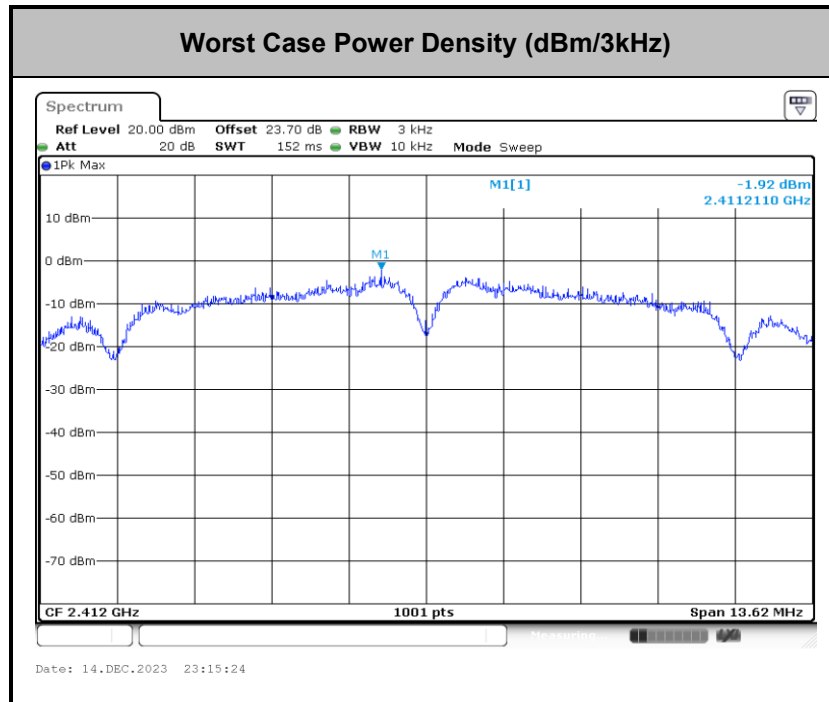
<802.11n HT20>



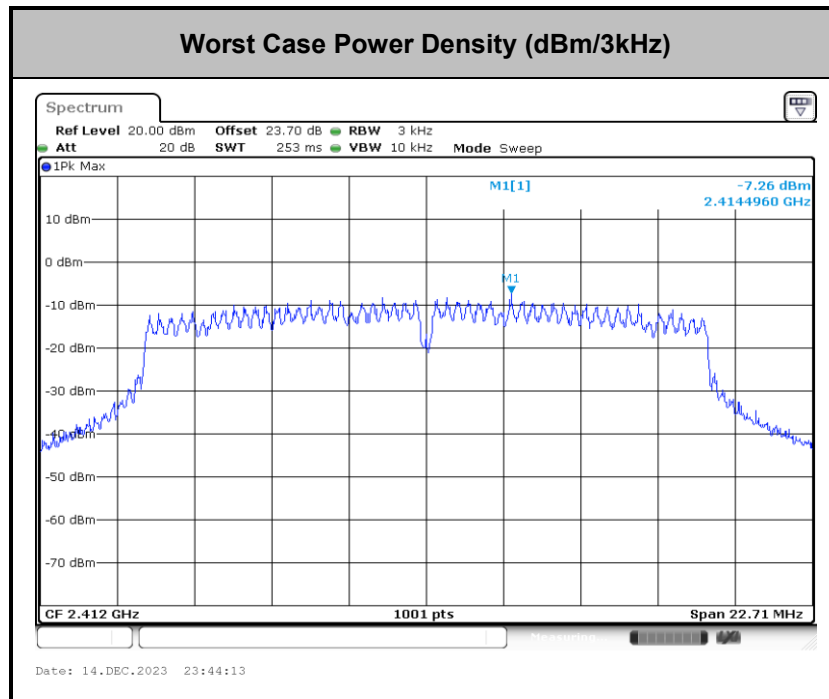
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

Power Spectral Density(dBm/3kHz)

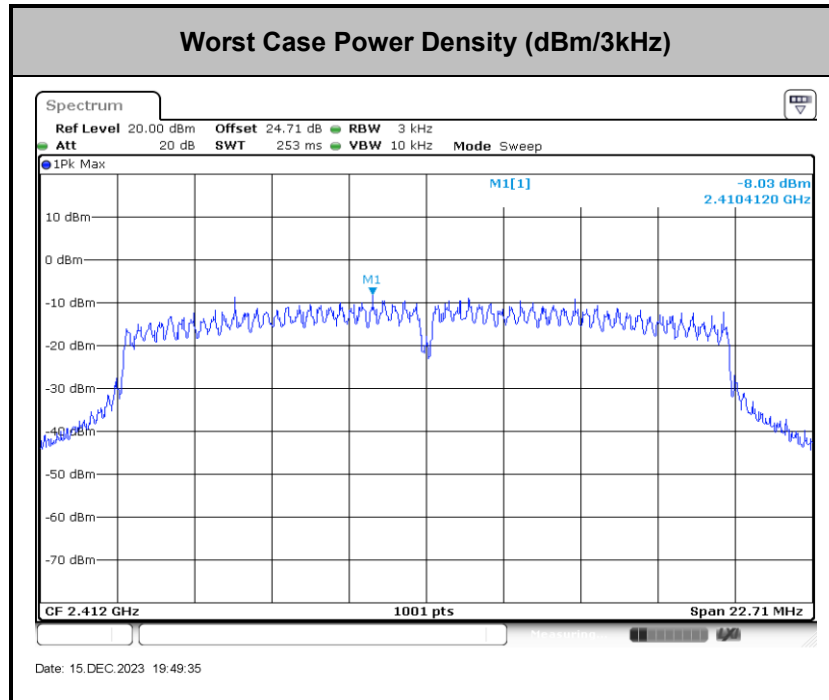
<802.11b>



<802.11g>



<802.11n HT20>

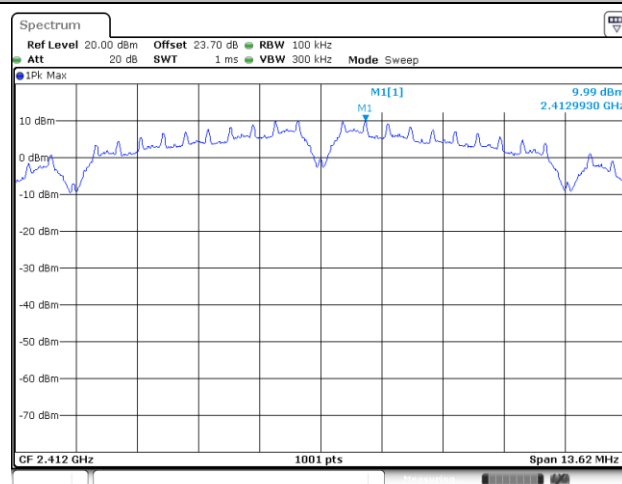


**Band Edges and Spurious Emission**

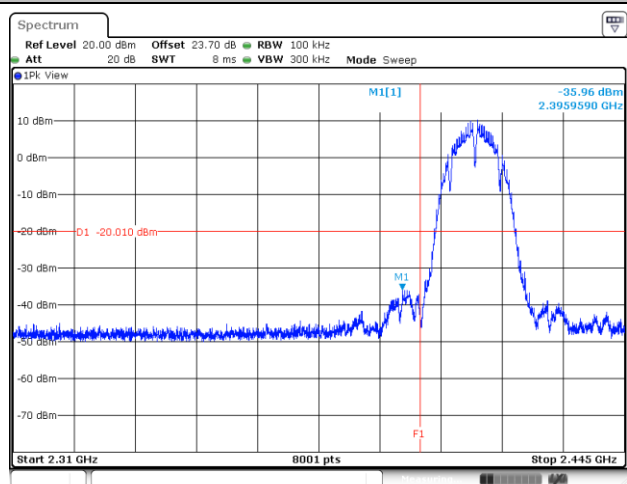
Number of TX = 1, Ant. 1 (Measured)

Test Mode : 802.11b

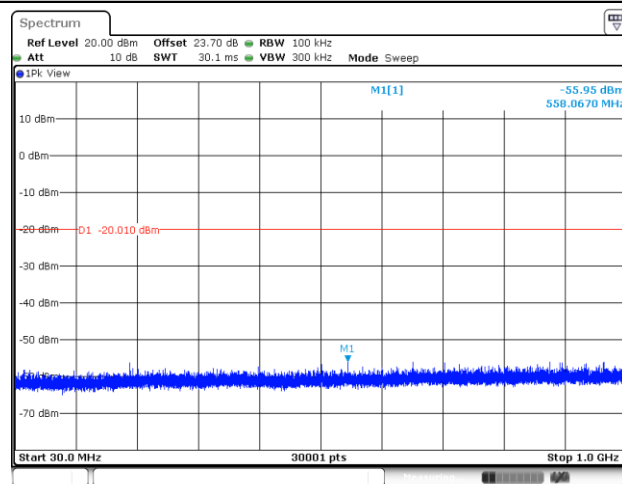
Test Channel : 01

100kHz PSD reference Level

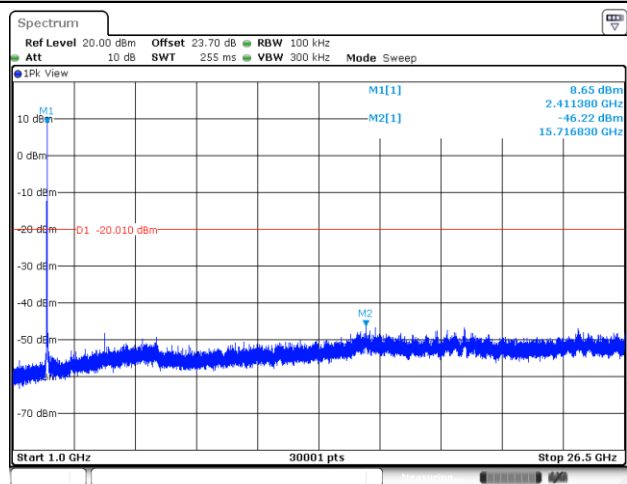
Date: 14.DEC.2023 23:15:49

Low Channel Plot

Date: 14.DEC.2023 23:18:20

Spurious Emission 30MHz~1GHz

Date: 14.DEC.2023 23:17:16

Spurious Emission 1GHz~26.5GHz

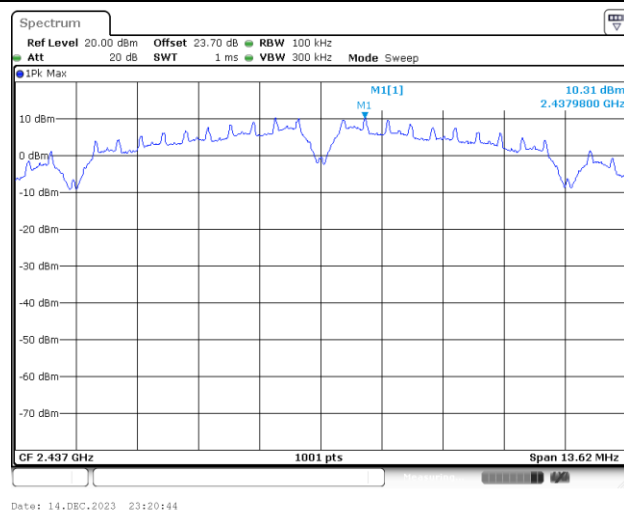
Date: 14.DEC.2023 23:17:51



Test Mode : 802.11b

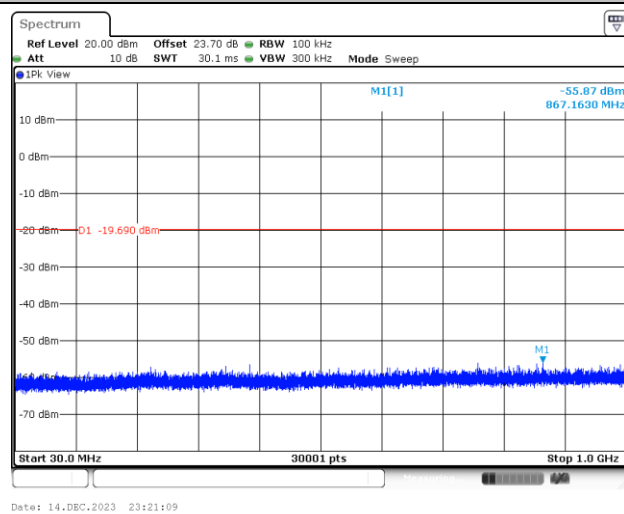
Test Channel : 06

100kHz PSD reference Level

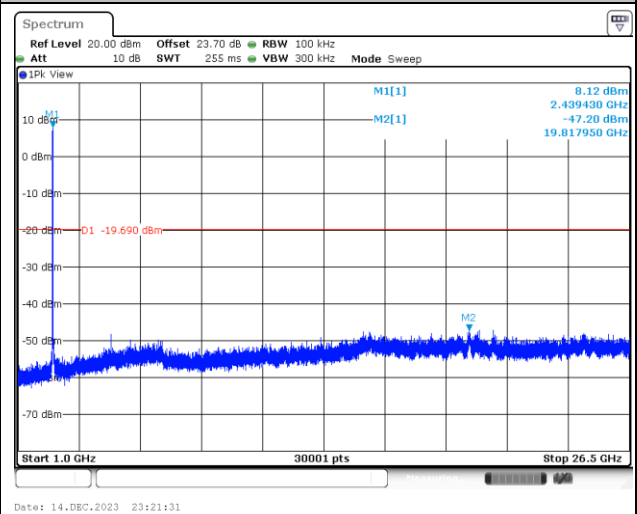


Middle Channel Plot

Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz

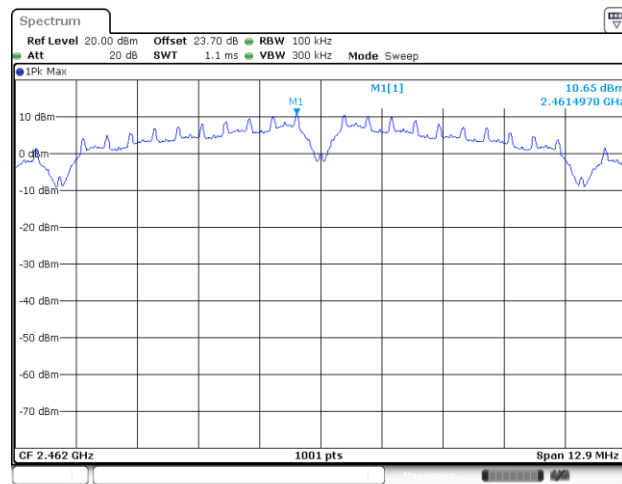




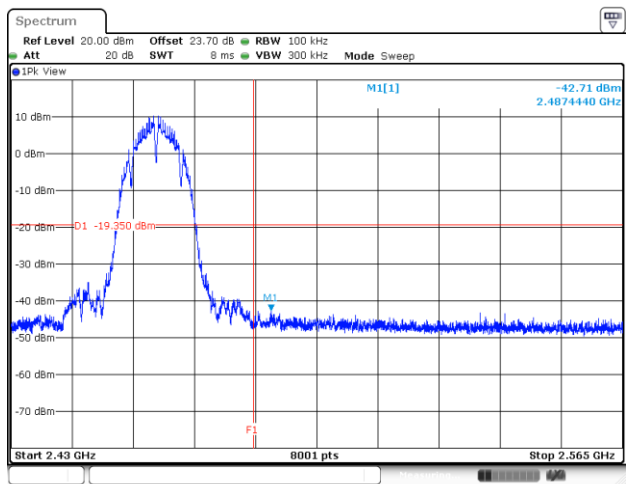
Test Mode : 802.11b

Test Channel : 11

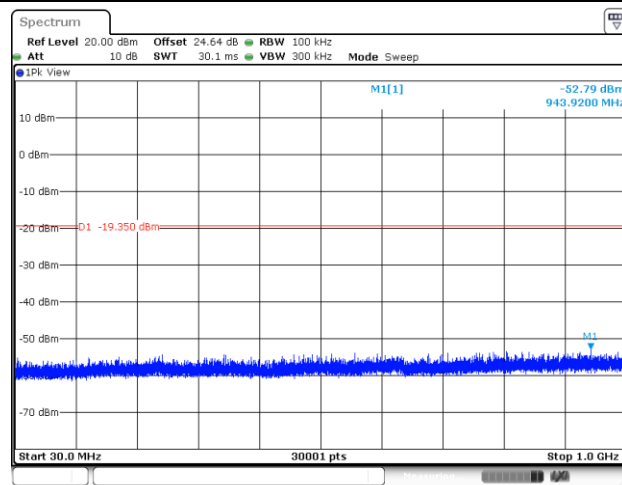
100kHz PSD reference Level



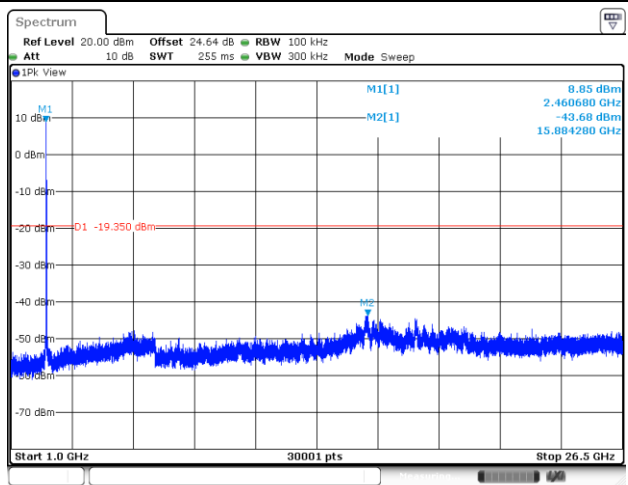
High Channel Plot



Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz

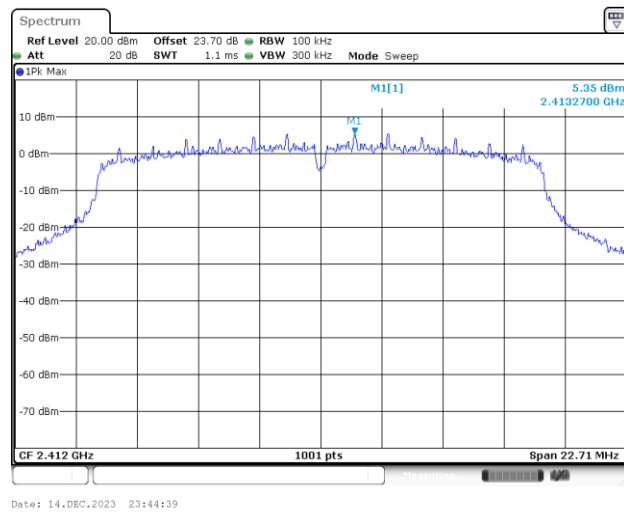




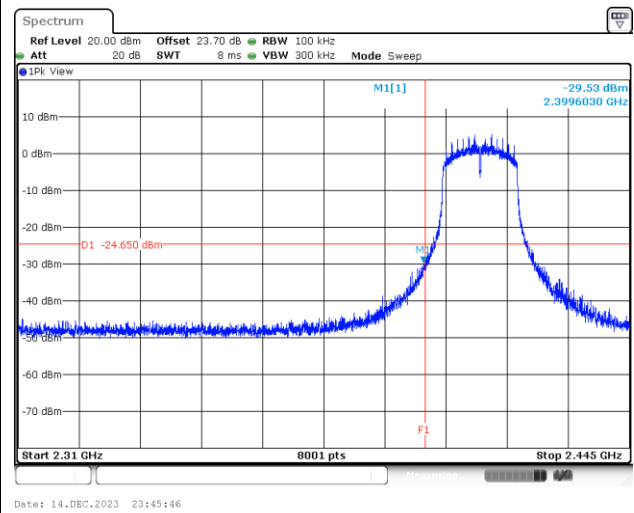
Test Mode : 802.11g

Test Channel : 01

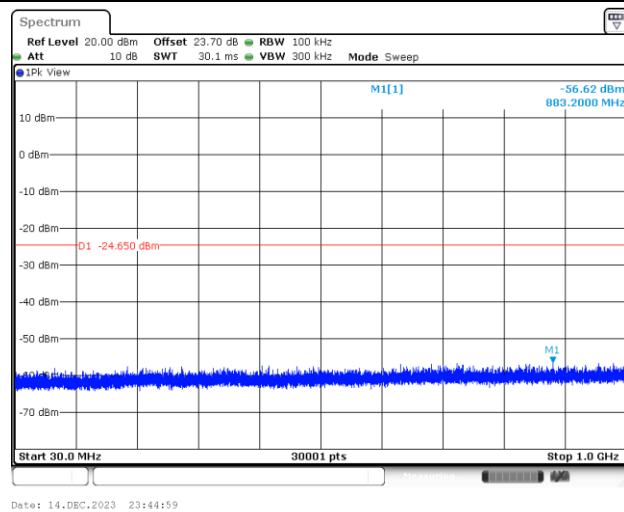
100kHz PSD reference Level



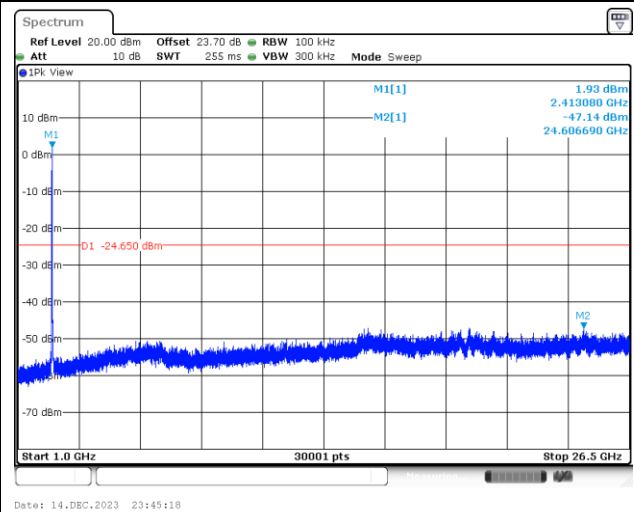
Low Channel Plot



Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz

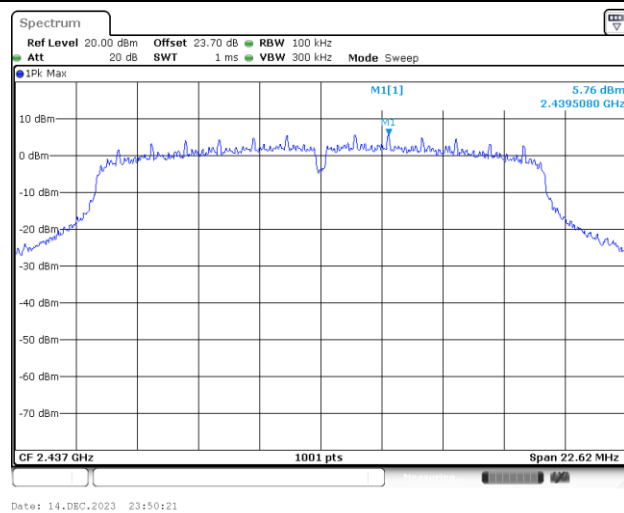




Test Mode : 802.11g

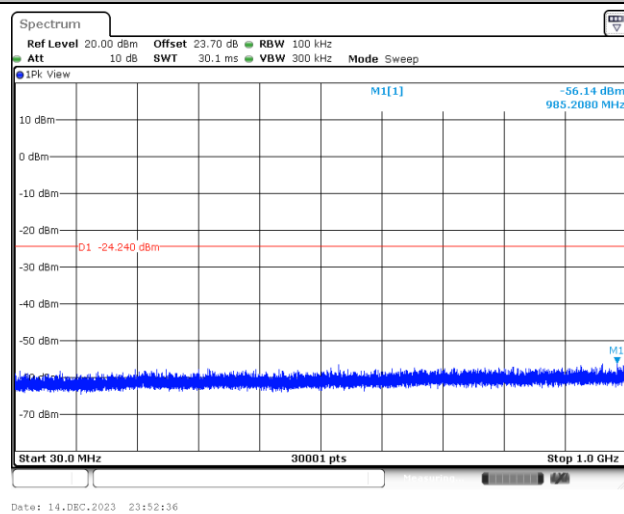
Test Channel : 06

100kHz PSD reference Level

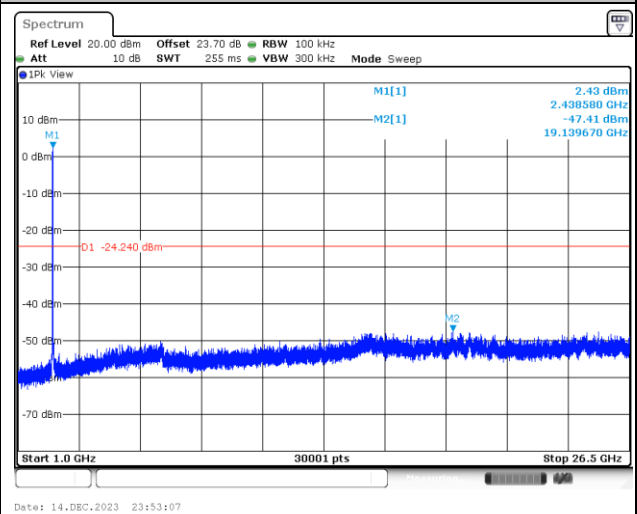


Middle Channel Plot

Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz

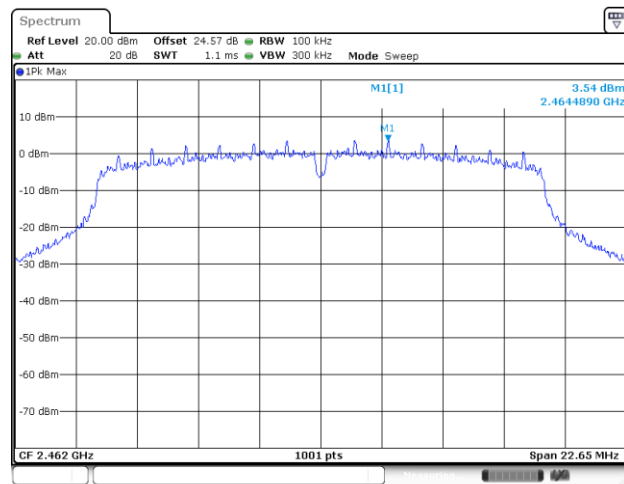




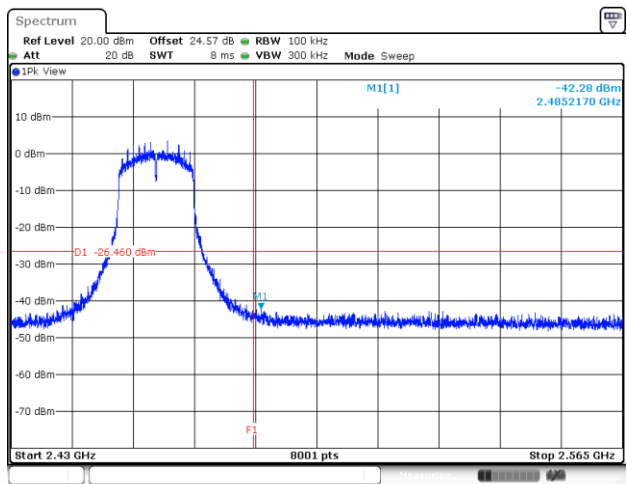
Test Mode : 802.11g

Test Channel : 11

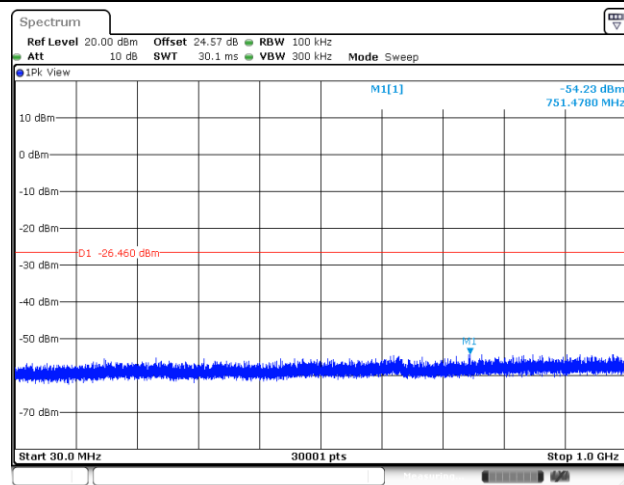
100kHz PSD reference Level



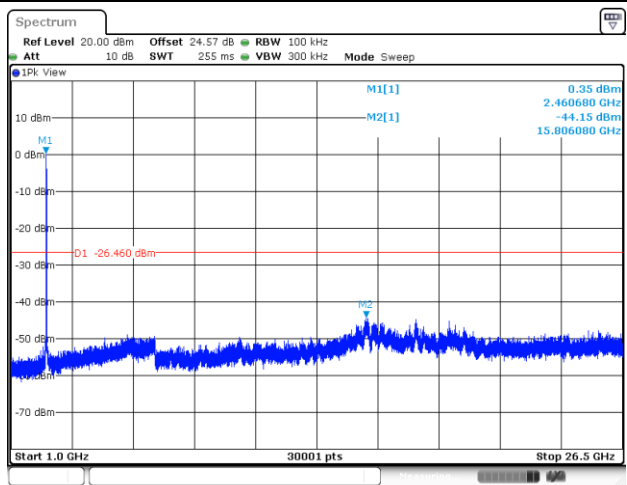
High Channel Plot



Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz

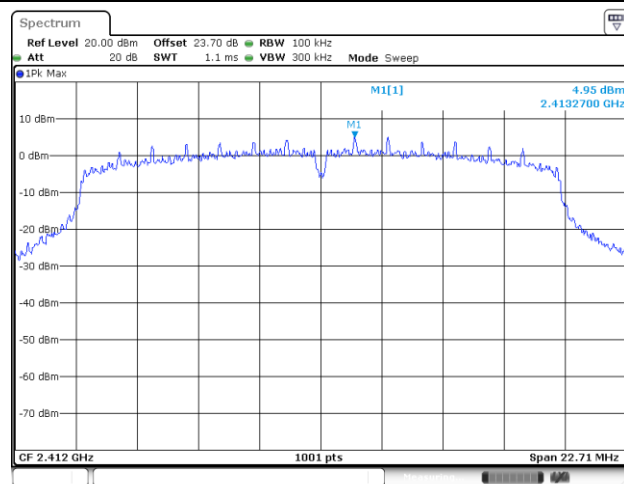




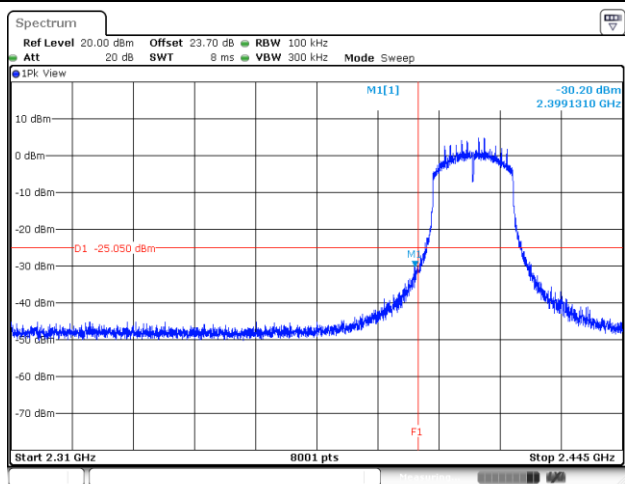
Test Mode : 802.11n HT20

Test Channel : 01

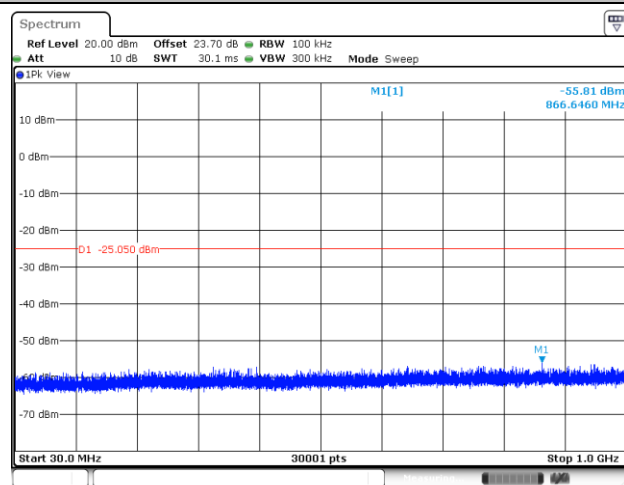
100kHz PSD reference Level



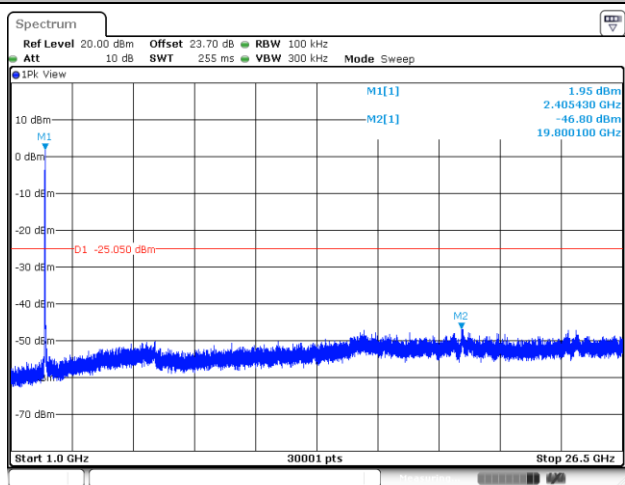
Low Channel Plot



Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz

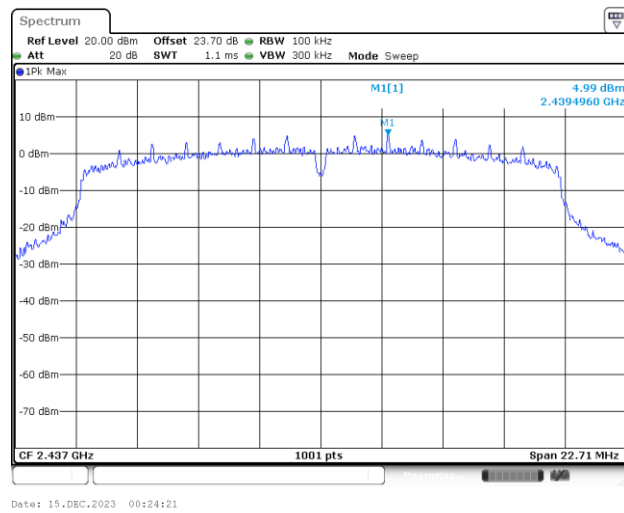




Test Mode : 802.11n HT20

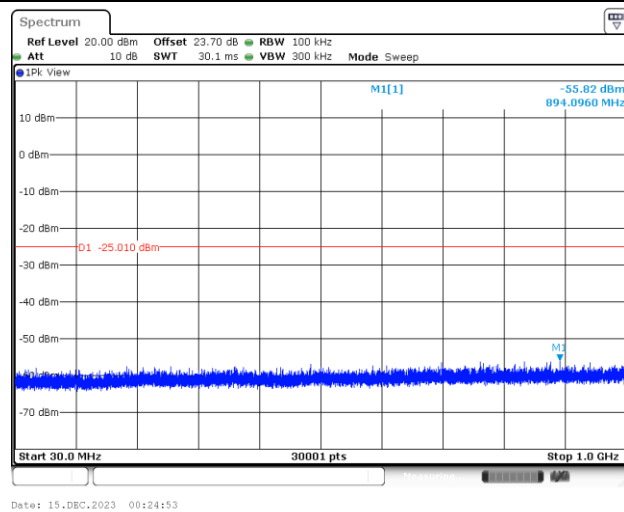
Test Channel : 06

100kHz PSD reference Level

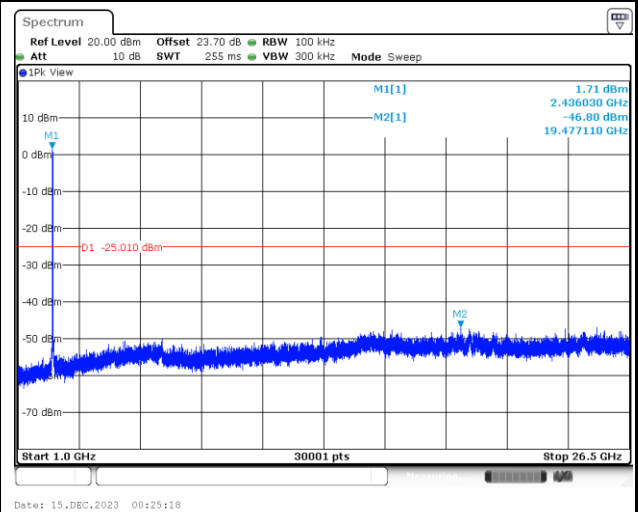


Middle Channel Plot

Spurious Emission 30MHz~1GHz



Spurious Emission 1GHz~26.5GHz

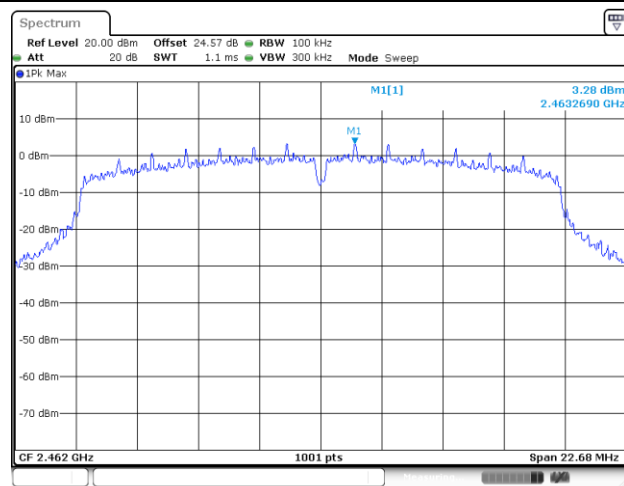




Test Mode : 802.11n HT20

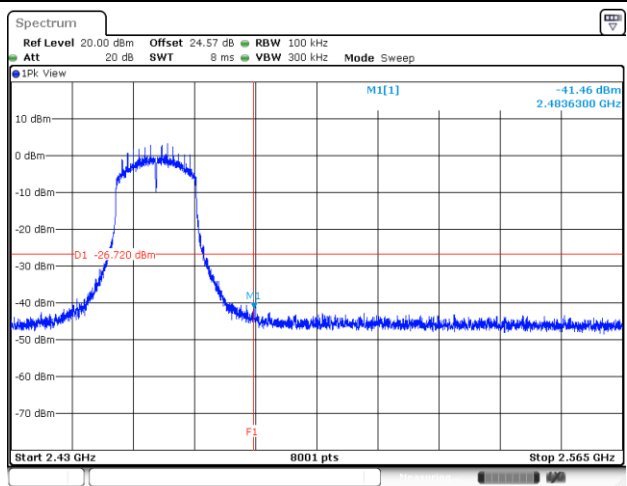
Test Channel : 11

100kHz PSD reference Level



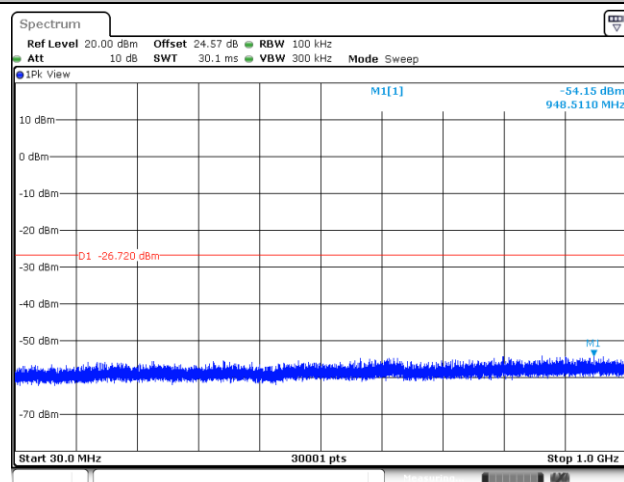
Date: 20 DEC 2023 02:12:53

High Channel Plot



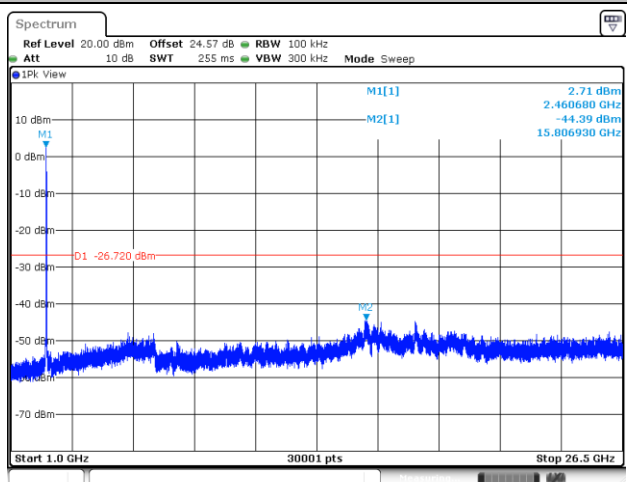
Date: 20 DEC 2023 02:14:35

Spurious Emission 30MHz~1GHz



Date: 20 DEC 2023 02:13:42

Spurious Emission 1GHz~26.5GHz



Date: 20 DEC 2023 02:14:08



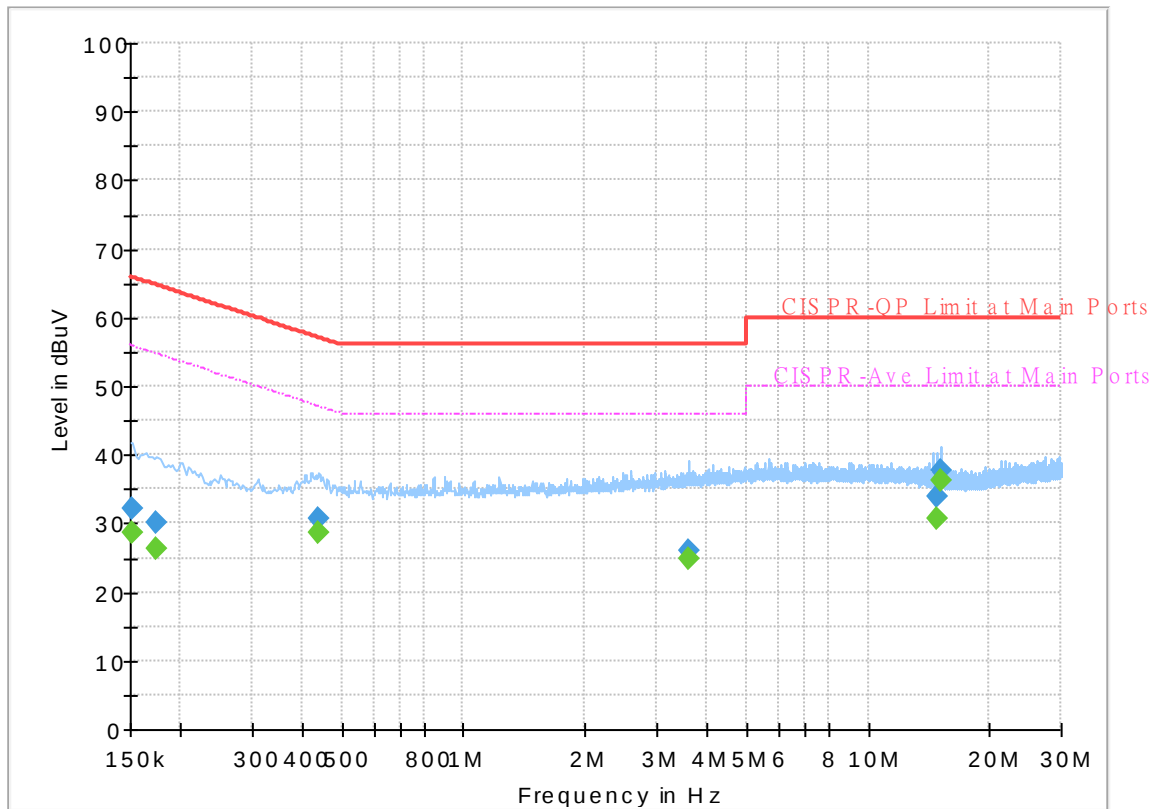
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Calvin Wang	Temperature :	23~26°C
		Relative Humidity :	45~55%

EUT Information

Report NO : 3N2810
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Line

Full Spectrum



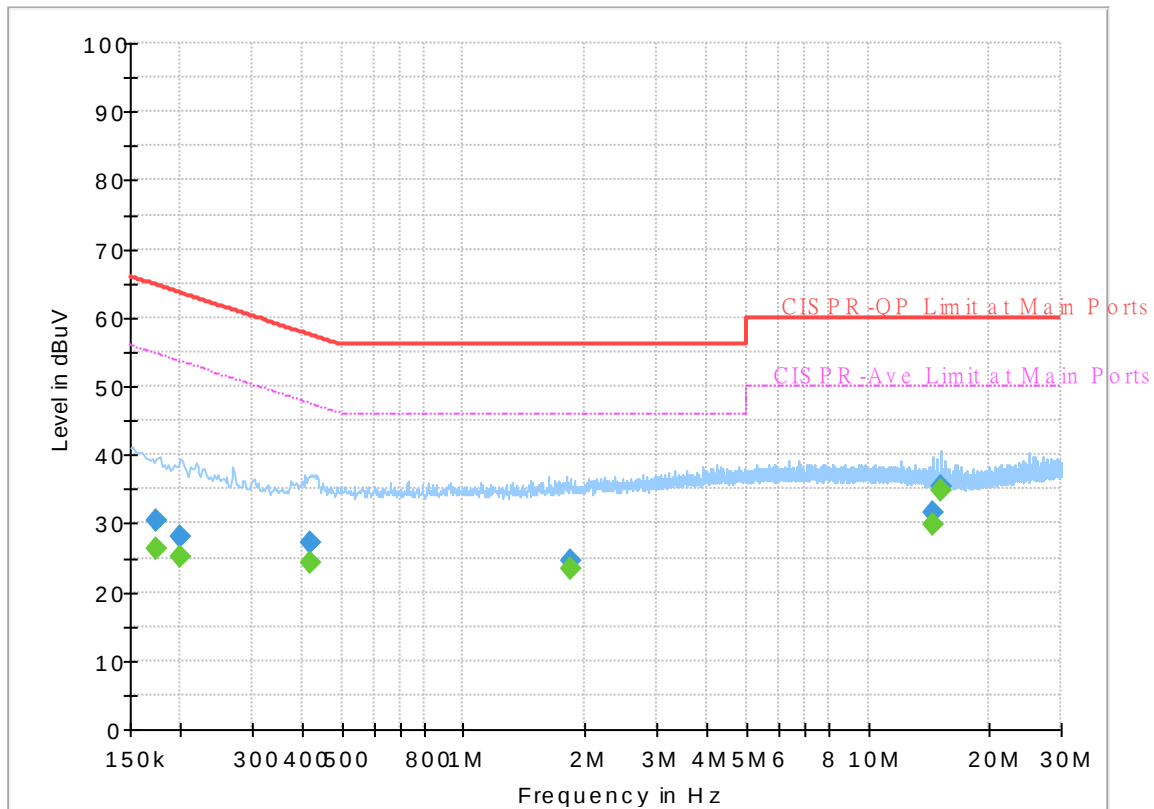
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	28.56	55.88	27.32	L1	OFF	19.9
0.152250	32.15	---	65.88	33.73	L1	OFF	19.9
0.174750	---	26.19	54.73	28.54	L1	OFF	19.9
0.174750	30.01	---	64.73	34.72	L1	OFF	19.9
0.438000	---	28.55	47.10	18.55	L1	OFF	19.9
0.438000	30.74	---	57.10	26.36	L1	OFF	19.9
3.615000	---	24.79	46.00	21.21	L1	OFF	20.0
3.615000	26.04	---	56.00	29.96	L1	OFF	20.0
14.822250	---	30.77	50.00	19.23	L1	OFF	20.3
14.822250	33.95	---	60.00	26.05	L1	OFF	20.3
15.132750	---	36.39	50.00	13.61	L1	OFF	20.3
15.132750	37.79	---	60.00	22.21	L1	OFF	20.3

EUT Information

Report NO : 3N2810
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.174750	---	26.22	54.73	28.51	N	OFF	19.9
0.174750	30.29	---	64.73	34.44	N	OFF	19.9
0.199500	---	25.19	53.63	28.44	N	OFF	19.9
0.199500	28.17	---	63.63	35.46	N	OFF	19.9
0.420000	---	24.18	47.45	23.27	N	OFF	19.9
0.420000	27.32	---	57.45	30.13	N	OFF	19.9
1.833000	---	23.44	46.00	22.56	N	OFF	19.9
1.833000	24.63	---	56.00	31.37	N	OFF	19.9
14.518500	---	29.82	50.00	20.18	N	OFF	20.4
14.518500	31.52	---	60.00	28.48	N	OFF	20.4
15.135000	---	34.76	50.00	15.24	N	OFF	20.4
15.135000	35.49	---	60.00	24.51	N	OFF	20.4



Appendix C. Radiated Spurious Emission

Test Engineer :	Rain Lee, Jacky Hong and Mancy Chou	Temperature :	20~26°C
		Relative Humidity :	40~65%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		2385.6	56.14	-17.86	74	51.46	27.46	14.34	37.12	369	6	P	H
		2385.6	47.99	-6.01	54	43.31	27.46	14.34	37.12	369	6	A	H
	*	2412	107.36	-	-	102.62	27.5	14.36	37.12	369	6	P	H
	*	2412	104.18	-	-	99.44	27.5	14.36	37.12	369	6	A	H
													H
													H
		2382.66	57.78	-16.22	74	53.13	27.43	14.34	37.12	100	96	P	V
		2385.6	50.32	-3.68	54	45.64	27.46	14.34	37.12	100	96	A	V
	*	2412	111.03	-	-	106.29	27.5	14.36	37.12	100	96	P	V
	*	2412	108.01	-	-	103.27	27.5	14.36	37.12	100	96	A	V
													V
													V
802.11b CH 06 2437MHz		2387.14	53.27	-20.73	74	48.58	27.47	14.34	37.12	346	9	P	H
		2387.42	42.36	-11.64	54	37.67	27.47	14.34	37.12	346	9	A	H
	*	2437	109.67	-	-	104.81	27.6	14.39	37.13	346	9	P	H
	*	2437	106.41	-	-	101.55	27.6	14.39	37.13	346	9	A	H
		2492.98	53.61	-20.39	74	48.5	27.8	14.45	37.14	346	9	P	H
		2484.7	42.64	-11.36	54	37.54	27.8	14.44	37.14	346	9	A	H
		2383.78	53.51	-20.49	74	48.85	27.44	14.34	37.12	111	91	P	V
		2387.14	43.39	-10.61	54	38.7	27.47	14.34	37.12	111	91	A	V
	*	2437	112.16	-	-	107.3	27.6	14.39	37.13	111	91	P	V
	*	2437	108.95	-	-	104.09	27.6	14.39	37.13	111	91	A	V
		2484.88	56.4	-17.6	74	51.3	27.8	14.44	37.14	111	91	P	V
		2484.61	45.91	-8.09	54	40.81	27.8	14.44	37.14	111	91	A	V



802.11b CH 11 2462MHz	*	2462	108.31	-	-	103.4	27.62	14.42	37.13	374	2	P	H
	*	2462	105.25	-	-	100.34	27.62	14.42	37.13	374	2	A	H
		2485.6	56.18	-17.82	74	51.08	27.8	14.44	37.14	374	2	P	H
		2484.04	46.64	-7.36	54	41.54	27.8	14.44	37.14	374	2	A	H
													H
													H
	*	2462	111.74	-	-	106.83	27.62	14.42	37.13	100	88	P	V
	*	2462	108.57	-	-	103.66	27.62	14.42	37.13	100	88	A	V
		2491.56	57.99	-16.01	74	52.88	27.8	14.45	37.14	100	88	P	V
		2483.96	48.82	-5.18	54	43.72	27.8	14.44	37.14	100	88	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		3618	43.86	-30.14	74	65.64	29.64	6.85	58.27	100	350	P	H
		3618	36.73	-17.27	54	58.51	29.64	6.85	58.27	100	350	A	H
		4824	42.37	-31.63	74	60.04	32.44	7.23	57.34	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4824	46.7	-27.3	74	64.37	32.44	7.23	57.34	282	189	P	V
		4824	41.67	-12.33	54	59.34	32.44	7.23	57.34	282	189	A	V
													V
													V
													V
													V
													V
													V
													V
													V
													V



WIFI Ant.	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 06 2437MHz		3655	42.52	-31.48	74	64.27	29.72	6.84	58.31	100	354	P	H
		3655	38.01	-15.99	54	59.76	29.72	6.84	58.31	100	354	A	H
		4874	46.21	-27.79	74	63.5	32.65	7.26	57.2	100	321	P	H
		4874	40.09	-13.91	54	57.38	32.65	7.26	57.2	100	321	A	H
		7311	50.73	-23.27	74	61.75	36.96	8.85	56.83	227	47	P	H
		7311	43.64	-10.36	54	54.66	36.96	8.85	56.83	227	47	A	H
													H
													H
													H
													H
													H
													H
		4874	46.46	-27.54	74	63.75	32.65	7.26	57.2	321	360	P	V
		4874	41.31	-12.69	54	58.6	32.65	7.26	57.2	321	360	A	V
		7311	48.7	-25.3	74	59.72	36.96	8.85	56.83	256	35	P	V
		7311	41.8	-12.2	54	52.82	36.96	8.85	56.83	256	35	A	V
													V
													V
													V
													V
													V
													V
													V
													V



WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 11 2462MHz		3693	42.96	-31.04	74	64.61	29.87	6.82	58.34	108	353	P	H
		3693	37.04	-16.96	54	58.69	29.87	6.82	58.34	108	353	A	H
		4924	46.44	-27.56	74	63.38	32.84	7.28	57.06	100	23	P	H
		4924	40.35	-13.65	54	57.29	32.84	7.28	57.06	100	23	A	H
		7386	45.62	-28.38	74	57.15	36.58	8.85	56.96	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
		4924	47.15	-26.85	74	64.09	32.84	7.28	57.06	326	360	P	V
		4924	41.55	-12.45	54	58.49	32.84	7.28	57.06	326	360	A	V
		7386	45.17	-28.83	74	56.7	36.58	8.85	56.96	-	-	P	V
													V
													V
													V
													V
													V
Remark	1. No other spurious found.												
	2. All results are PASS against Peak and Average limit line.												
	3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												



2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 01 2412MHz		2389.17	63.72	-10.28	74	59.01	27.49	14.34	37.12	247	79	P	H
		2390	49.71	-4.29	54	44.99	27.5	14.34	37.12	247	79	A	H
	*	2412	108.64	-	-	103.9	27.5	14.36	37.12	247	79	P	H
	*	2412	100.95	-	-	96.21	27.5	14.36	37.12	247	79	A	H
													H
													H
		2385.075	64.35	-9.65	74	59.68	27.45	14.34	37.12	100	93	P	V
		2390	50.96	-3.04	54	46.24	27.5	14.34	37.12	100	93	A	V
	*	2412	110.67	-	-	105.93	27.5	14.36	37.12	100	93	P	V
	*	2412	102.8	-	-	98.06	27.5	14.36	37.12	100	93	A	V
													V
													V
802.11g CH 06 2437MHz		2383.08	53.2	-20.8	74	48.55	27.43	14.34	37.12	268	74	P	H
		2389.38	42.36	-11.64	54	37.65	27.49	14.34	37.12	268	74	A	H
	*	2437	107.85	-	-	102.99	27.6	14.39	37.13	268	74	P	H
	*	2437	100.26	-	-	95.4	27.6	14.39	37.13	268	74	A	H
		2484.67	55.51	-18.49	74	50.41	27.8	14.44	37.14	268	74	P	H
		2483.9	43.17	-10.83	54	38.07	27.8	14.44	37.14	268	74	A	H
		2389.38	56.23	-17.77	74	51.52	27.49	14.34	37.12	100	92	P	V
		2389.94	42.67	-11.33	54	37.95	27.5	14.34	37.12	100	92	A	V
	*	2437	111.32	-	-	106.46	27.6	14.39	37.13	100	92	P	V
	*	2437	103.51	-	-	98.65	27.6	14.39	37.13	100	92	A	V
		2486.14	57.84	-16.16	74	52.74	27.8	14.44	37.14	100	92	P	V
		2483.55	45.23	-8.77	54	40.13	27.8	14.44	37.14	100	92	A	V



802.11g CH 11 2462MHz	*	2462	106.04	-	-	101.13	27.62	14.42	37.13	254	73	P	H
	*	2462	98.15	-	-	93.24	27.62	14.42	37.13	254	73	A	H
		2483.56	64.46	-9.54	74	59.36	27.8	14.44	37.14	254	73	P	H
		2483.52	47.14	-6.86	54	42.04	27.8	14.44	37.14	254	73	A	H
													H
													H
	*	2462	109.46	-	-	104.55	27.62	14.42	37.13	100	91	P	V
	*	2462	101.65	-	-	96.74	27.62	14.42	37.13	100	91	A	V
		2485.64	67.88	-6.12	74	62.78	27.8	14.44	37.14	100	91	P	V
		2483.52	50.32	-3.68	54	45.22	27.8	14.44	37.14	100	91	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 01 2412MHz		3618	43.25	-30.75	74	65.03	29.64	6.85	58.27	339	0	P	H
		3618	37.16	-16.84	54	58.94	29.64	6.85	58.27	339	0	A	H
		4824	41.95	-32.05	74	59.62	32.44	7.23	57.34	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4824	43.76	-30.24	74	61.43	32.44	7.23	57.34	300	185	P	V
		4824	32.3	-21.7	54	49.97	32.44	7.23	57.34	300	185	A	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V



WIFI Ant.	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 06 2437MHz		3655.5	44.34	-29.66	74	66.09	29.72	6.84	58.31	309	360	P	H
		3655.5	38.39	-15.61	54	60.14	29.72	6.84	58.31	309	360	A	H
		4874	41.7	-32.3	74	58.99	32.65	7.26	57.2	-	-	P	H
		7311	45.22	-28.78	74	56.24	36.96	8.85	56.83	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4874	41.69	-32.31	74	58.98	32.65	7.26	57.2	-	-	P	V
		7311	45.57	-28.43	74	56.59	36.96	8.85	56.83	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V





2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 01 2412MHz		2389.485	63.52	-10.48	74	58.81	27.49	14.34	37.12	355	333	P	H
		2390	49.43	-4.57	54	44.71	27.5	14.34	37.12	355	333	A	H
	*	2412	108.3	-	-	103.56	27.5	14.36	37.12	355	333	P	H
	*	2412	100.72	-	-	95.98	27.5	14.36	37.12	355	333	A	H
													H
													H
		2389.59	65.47	-8.53	74	60.75	27.5	14.34	37.12	100	94	P	V
		2390	50.52	-3.48	54	45.8	27.5	14.34	37.12	100	94	A	V
	*	2412	109.71	-	-	104.97	27.5	14.36	37.12	100	94	P	V
	*	2412	101.95	-	-	97.21	27.5	14.36	37.12	100	94	A	V
													V
													V
802.11n HT20 CH 06 2437MHz		2315.74	52.82	-21.18	74	48.45	27.2	14.28	37.11	388	6	P	H
		2389.66	41.53	-12.47	54	36.81	27.5	14.34	37.12	388	6	A	H
	*	2437	108.21	-	-	103.35	27.6	14.39	37.13	388	6	P	H
	*	2437	100.16	-	-	95.3	27.6	14.39	37.13	388	6	A	H
		2483.62	53.55	-20.45	74	48.45	27.8	14.44	37.14	388	6	P	H
		2483.62	42.45	-11.55	54	37.35	27.8	14.44	37.14	388	6	A	H
		2387.14	53.67	-20.33	74	48.98	27.47	14.34	37.12	100	93	P	V
		2389.66	42.24	-11.76	54	37.52	27.5	14.34	37.12	100	93	A	V
	*	2437	110	-	-	105.14	27.6	14.39	37.13	100	93	P	V
	*	2437	102.36	-	-	97.5	27.6	14.39	37.13	100	93	A	V
		2486.68	57.02	-16.98	74	51.92	27.8	14.44	37.14	100	93	P	V
		2483.8	44.44	-9.56	54	39.34	27.8	14.44	37.14	100	93	A	V



802.11n HT20 CH 11 2462MHz	*	2462	104.5	-	-	99.59	27.62	14.42	37.13	372	72	P	H
	*	2462	96.77	-	-	91.86	27.62	14.42	37.13	372	72	A	H
		2484.92	65.17	-8.83	74	60.07	27.8	14.44	37.14	372	72	P	H
		2483.52	45.15	-8.85	54	40.05	27.8	14.44	37.14	372	72	A	H
													H
													H
	*	2462	109.22	-	-	104.31	27.62	14.42	37.13	100	90	P	V
	*	2462	101.53	-	-	96.62	27.62	14.42	37.13	100	90	A	V
		2485	68	-6	74	62.9	27.8	14.44	37.14	100	90	P	V
		2483.56	48.47	-5.53	54	43.37	27.8	14.44	37.14	100	90	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 01 2412MHz		3618	43.42	-30.58	74	65.2	29.64	6.85	58.27	340	360	P	H
		3618	36.95	-17.05	54	58.73	29.64	6.85	58.27	340	360	A	H
		4824	41.6	-32.4	74	59.27	32.44	7.23	57.34	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4824	41.75	-32.25	74	59.42	32.44	7.23	57.34	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V



WIFI Ant.	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 06 2437MHz		3655.5	44.65	-29.35	74	66.4	29.72	6.84	58.31	308	357	P	H
		3655.5	38.19	-15.81	54	59.94	29.72	6.84	58.31	308	357	A	H
		4874	41.2	-32.8	74	58.49	32.65	7.26	57.2	-	-	P	H
		7311	45.42	-28.58	74	56.44	36.96	8.85	56.83	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4874	41.83	-32.17	74	59.12	32.65	7.26	57.2	-	-	P	V
		7311	44.98	-29.02	74	56	36.96	8.85	56.83	-	-	P	V
													V
													V
													V
													V
													V
													V



TEL: 886-3-327-0868
FAX: 886-3-327-0855

Page Number : C15 of C18



WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
2.4GHz 802.11n HT20 LF		31.35	22.44	-17.56	40	29.53	24.4	0.84	32.33	-	-	P	H	
		126.39	20.72	-22.78	43.5	33.94	17.73	1.3	32.25	-	-	P	H	
		248.16	22.22	-23.78	46	34.36	18.29	1.71	32.14	-	-	P	H	
		636	27.25	-18.75	46	30.5	26.58	2.39	32.22	-	-	P	H	
		837.6	31.42	-14.58	46	31.61	28.69	2.91	31.79	-	-	P	H	
		953.8	32.82	-13.18	46	29.91	30.78	3.09	30.96	-	-	P	H	
														H
														H
														H
														H
														H
														H
		31.08	22.64	-17.36	40	29.56	24.58	0.83	32.33	-	-	P	V	
		100.74	19.37	-24.13	43.5	34.01	16.43	1.21	32.28	-	-	P	V	
		248.16	22.14	-23.86	46	34.28	18.29	1.71	32.14	-	-	P	V	
		561.8	27.35	-18.65	46	30.9	26.38	2.28	32.21	-	-	P	V	
		729.8	31.38	-14.62	46	33.07	27.69	2.71	32.09	-	-	P	V	
		958	33.44	-12.56	46	30.24	31.02	3.1	30.92	-	-	P	V	
														V
														V
													V	
													V	
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against limit line. 3. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.													



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is Margin line.
P/A	Peak or Average
H/V	Horizontal or Vertical

A calculation example for radiated spurious emission is shown as below:

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

- Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
- Level(dBμV/m) =
Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
- Margin (dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

- Level(dBμV/m)
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)
= 55.45 (dBμV/m)
- Margin (dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

For Average Limit @ 2390MHz:

- Level(dBμV/m)
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
= 43.54 (dBμV/m)
- Margin (dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 43.54(dBμV/m) – 54(dBμV/m)
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix D. Radiated Spurious Emission Plots

Test Engineer :	Rain Lee, Jacky Hong and Mancy Chou	Temperature :	20~26°C
		Relative Humidity :	40~65%

Note symbol

-L	Low channel location
-R	High channel location

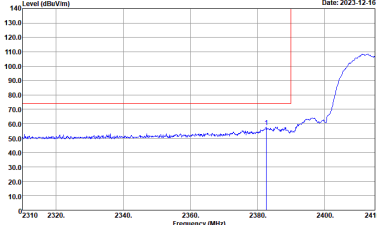
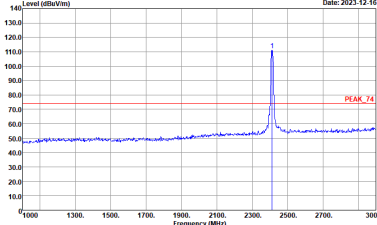
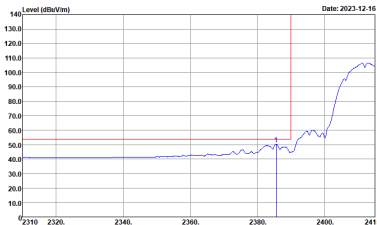
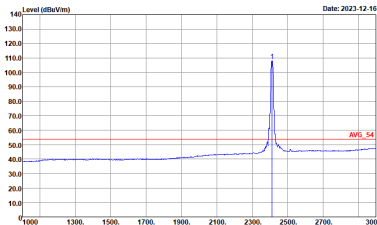


2.4GHz 2400~2483.5MHz

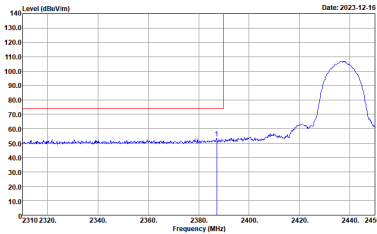
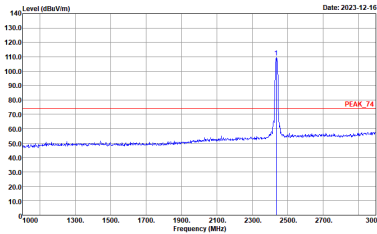
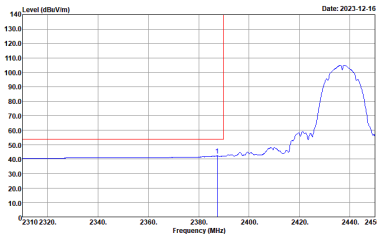
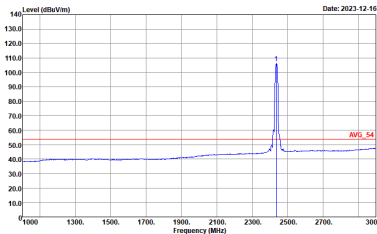
WIFI 802.11b (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Fundamental
Peak	Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto

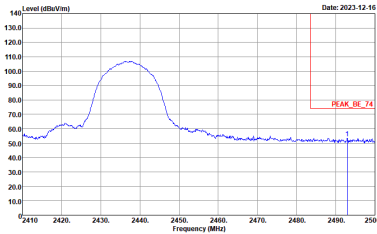
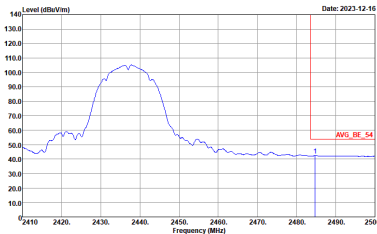


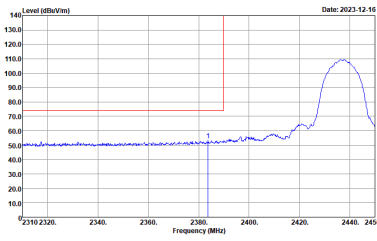
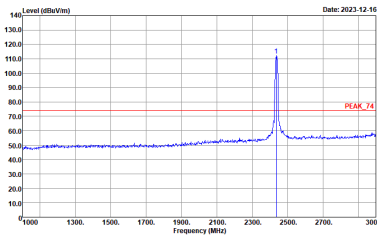
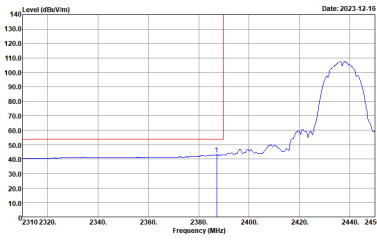
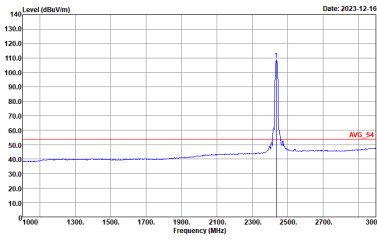
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto



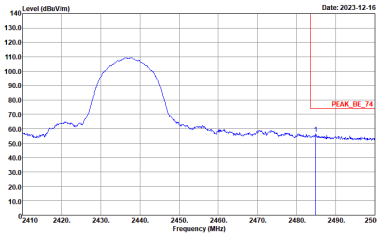
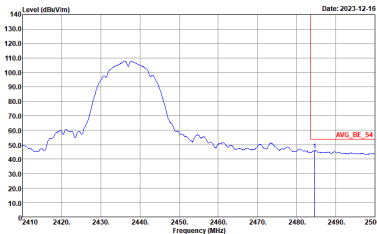
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto



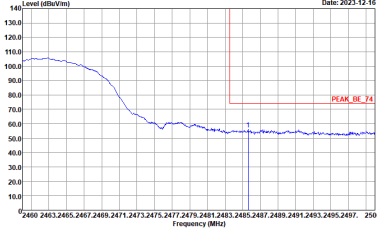
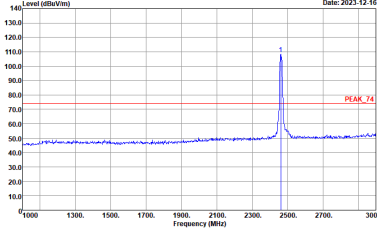
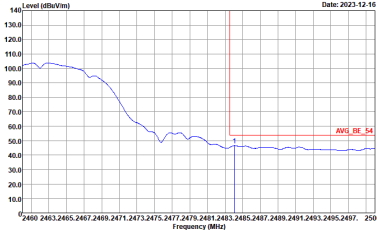
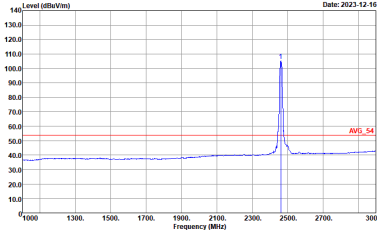
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT-Auto	Left blank
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT-Auto	Left blank

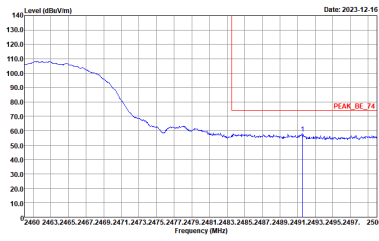
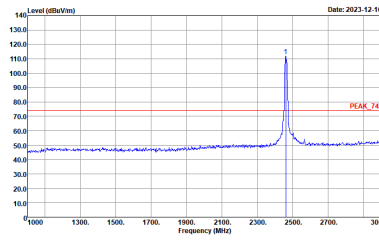
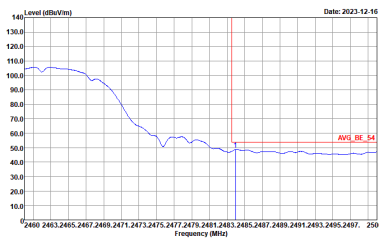
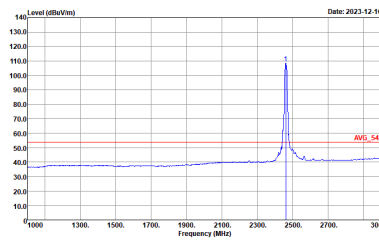
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto



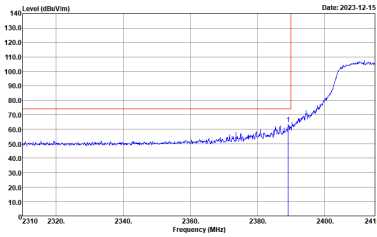
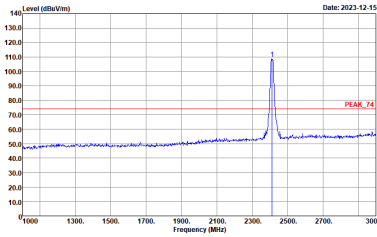
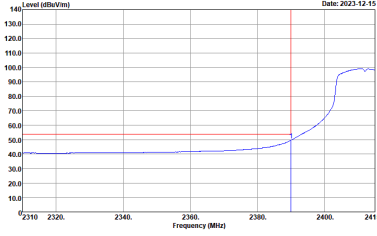
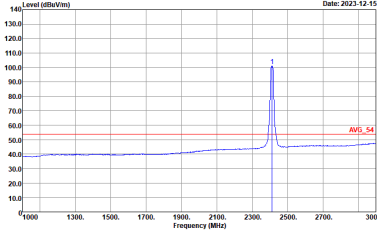
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT-Auto	Left blank
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT-Auto	Left blank

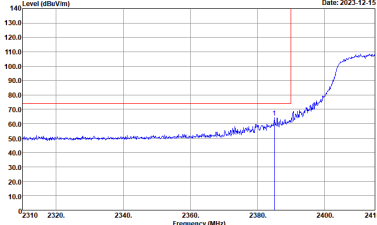
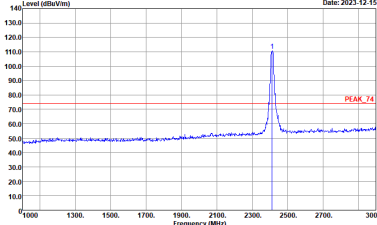
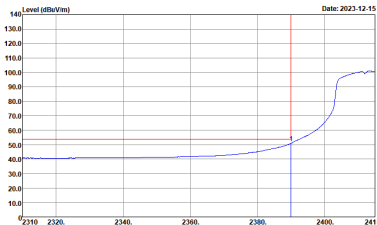
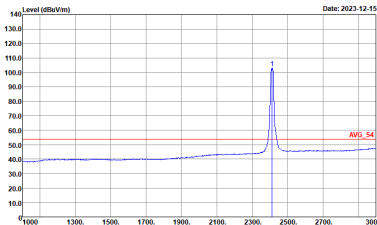


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto

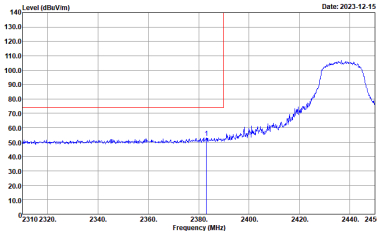
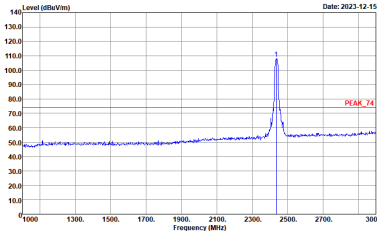
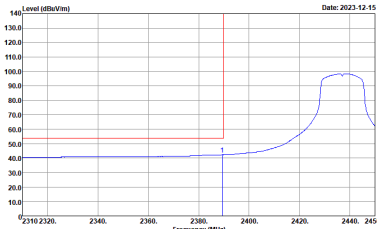
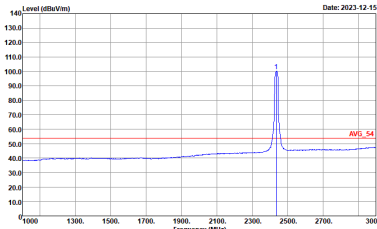
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto
Avg.		

2.4GHz 2400~2483.5MHz
WIFI 802.11g (Band Edge @ 3m)

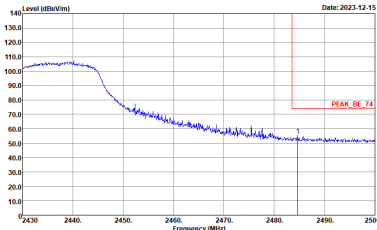
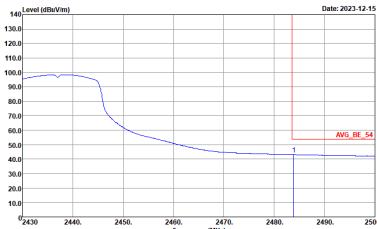
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto
Avg.		

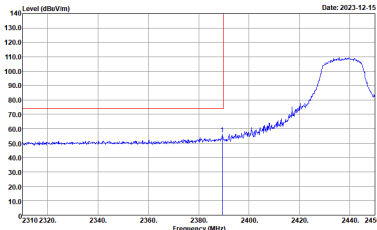
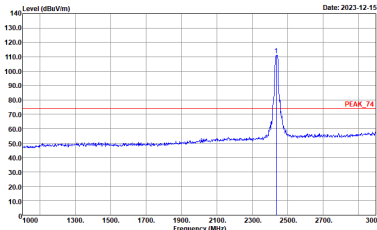
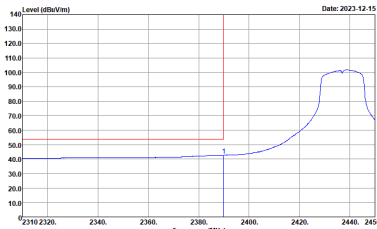
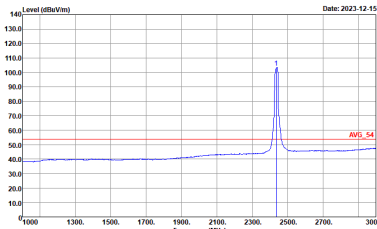
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto
Avg.		



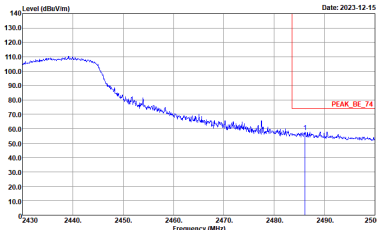
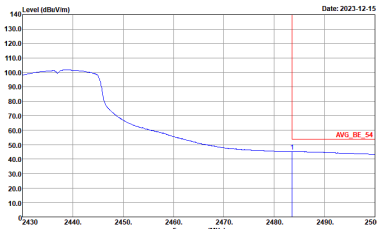
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto

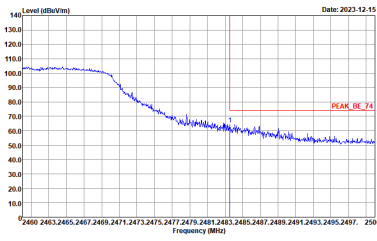
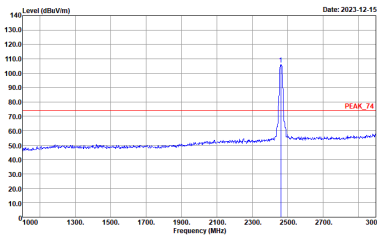
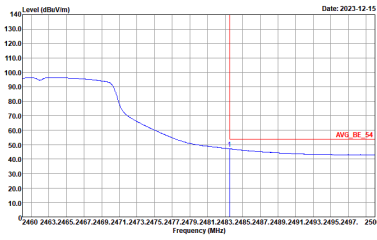
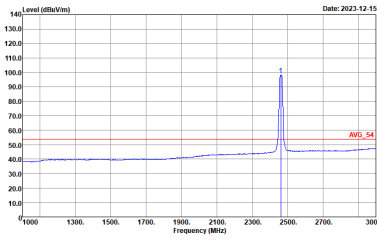


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	Left blank

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto
Avg.		



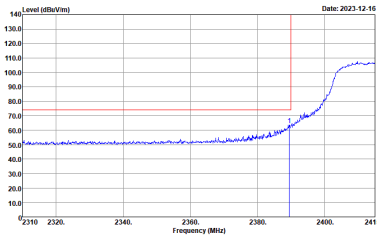
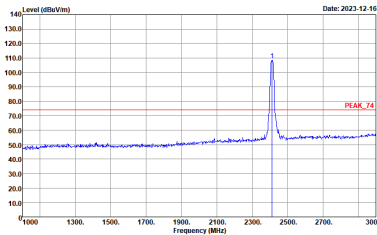
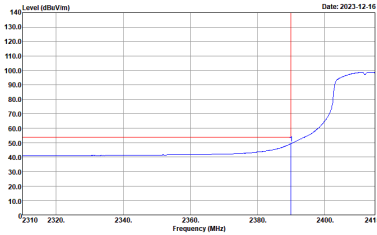
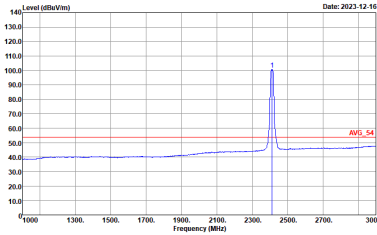
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left Blank
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	Left Blank

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto

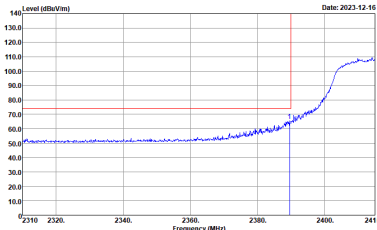
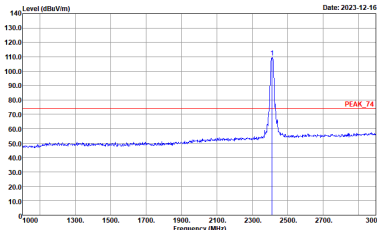
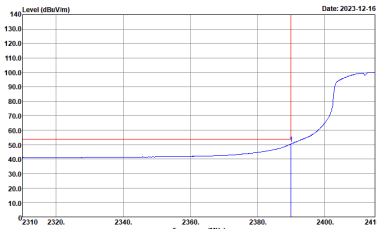
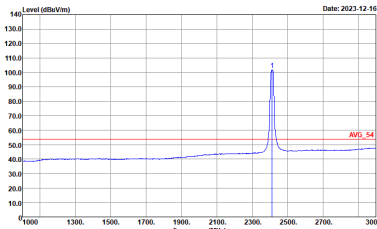


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Vertical	Fundamental
Peak	Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto

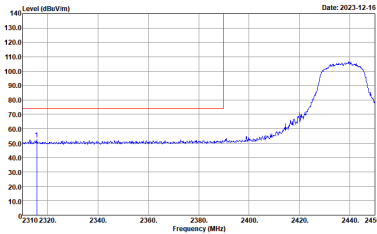
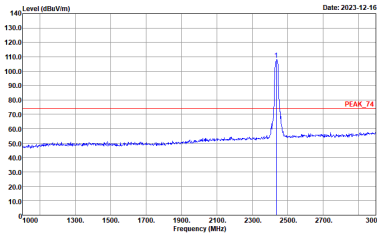
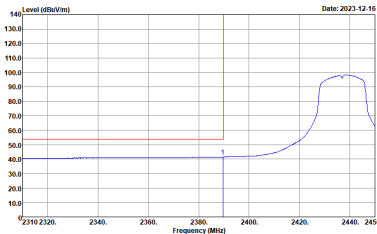
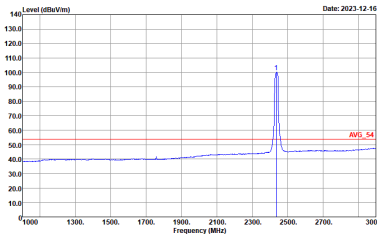
2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000kHz VBW:0.010kHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000kHz VBW:0.010kHz SWT:Auto

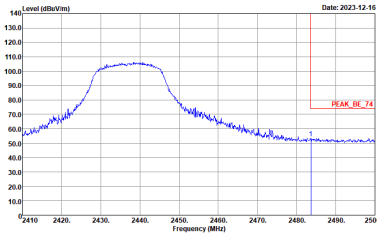
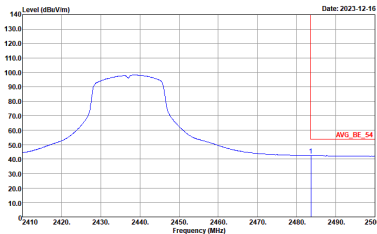


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto

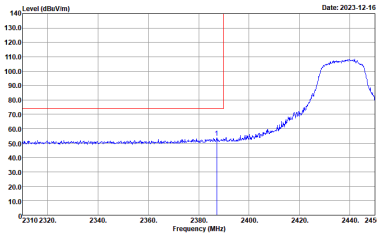
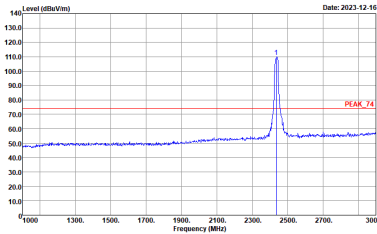
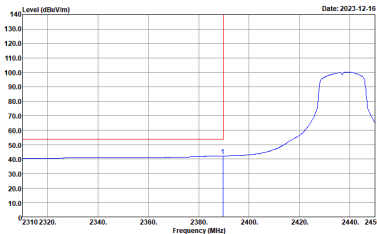
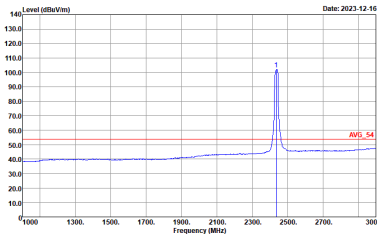


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		

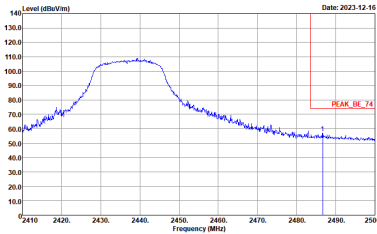
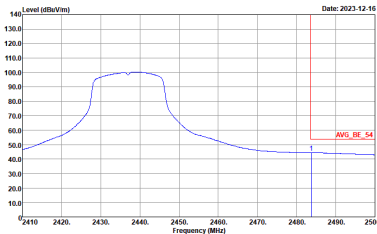


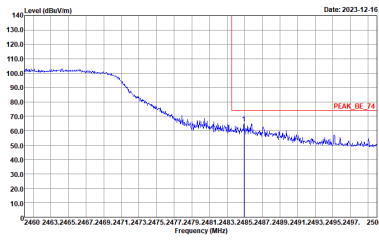
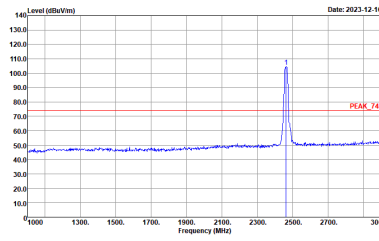
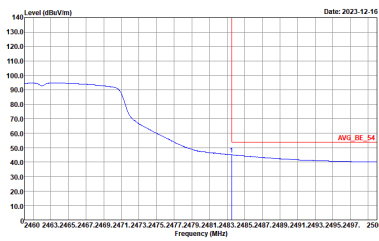
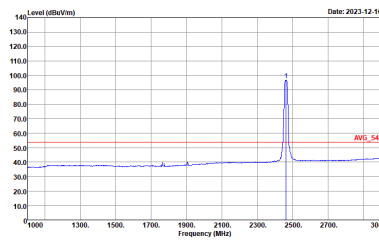
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	Left blank

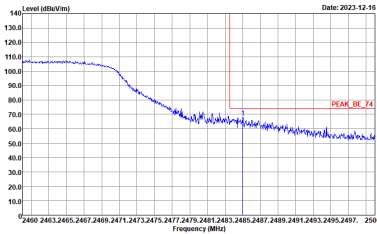
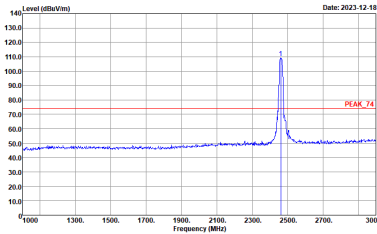
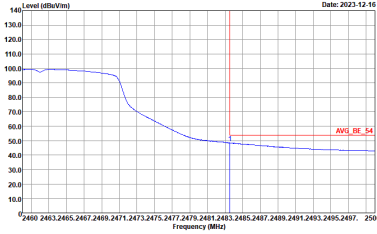
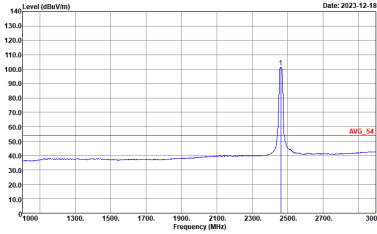


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto



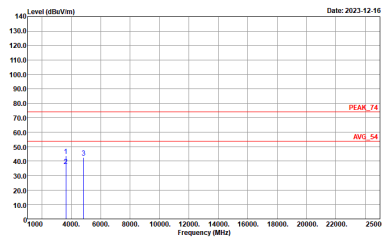
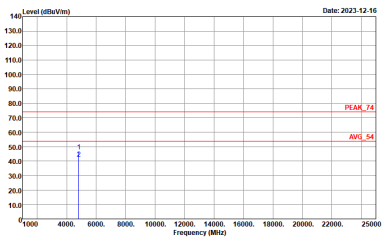
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left Blank
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	Left Blank

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto
Avg.		

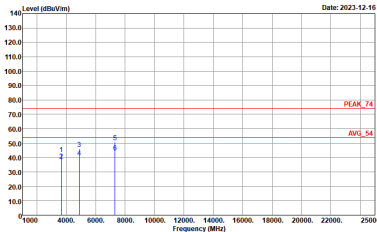
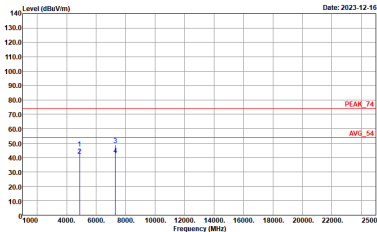
WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto



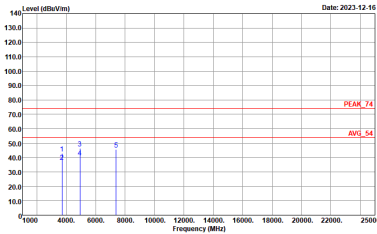
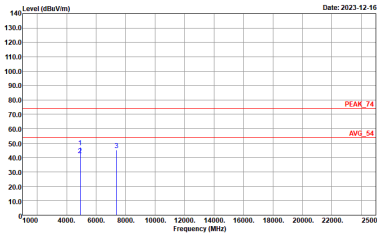
2.4GHz 2400~2483.5MHz
WIFI 802.11b (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-4V Condition : PEAK_74 3m HORN_91200_1326 HORIZONTAL :	 Site : 03CH13-4V Condition : PEAK_74 3m HORN_91200_1326 VERTICAL :



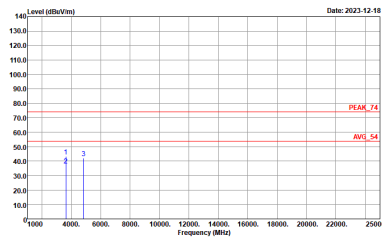
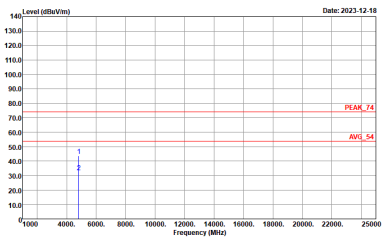
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 HORIZONTAL :	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1326 VERTICAL :



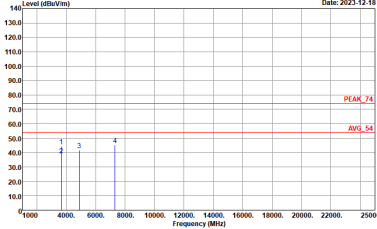
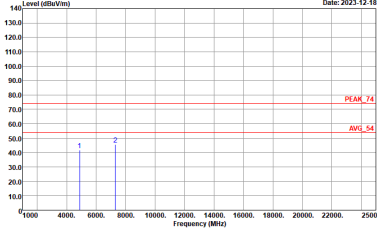
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1326 HORIZONTAL :	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1326 VERTICAL :



2.4GHz 2400~2483.5MHz
WIFI 802.11g (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-4V Condition : PEAK_74 3m HORN_91200_1326 HORIZONTAL :	 Site : 03CH13-4V Condition : PEAK_74 3m HORN_91200_1326 VERTICAL :



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1326 HORIZONTAL :	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1326 VERTICAL :



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2023-12-18 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1326 HORIZONTAL :	Level (dBuV/m) Date: 2023-12-18 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1326 VERTICAL :



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.	Site : 03CH13-4V Condition : PEAK_74 3m HORN_91200_1326 HORIZONTAL :	Site : 03CH13-4V Condition : PEAK_74 3m HORN_91200_1326 VERTICAL :



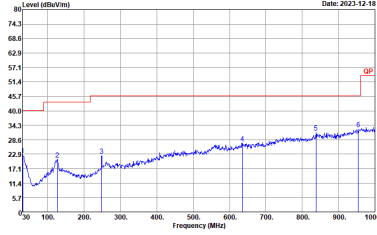
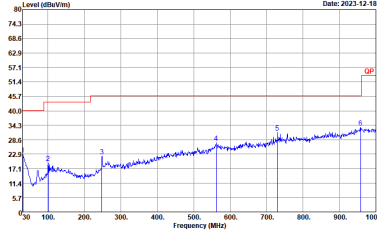
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2023-12-18 Frequency (MHz) Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1326 HORIZONTAL :	Level (dBuV/m) Date: 2023-12-18 Frequency (MHz) Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1326 VERTICAL :



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.		



Emission below 1GHz
2.4GHz WIFI 802.11n HT20 (LF)

WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11n HT20 LF	
1	Horizontal	Vertical
QP / Peak	 Site : 03CH13-4V Condition : QP 3m B1LOG_40103_300M-16 HORIZONTAL :	 Site : 03CH13-4V Condition : QP 3m B1LOG_40103_300M-16 VERTICAL :



Appendix E. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1	802.11b	100.00	-	-	10Hz
1	802.11g	98.10	-	-	10Hz
1	2.4GHz 802.11n HT20	98.97	-	-	10Hz

