

TEST REPORT

Applicant Name: M&M Electronics, S.A.
Address: Cocosolito, Colon Free Zone, Main Entrance Warehouse 10D and 11D, Colon Panama
Report Number: 2401A37173E-RF-00A
FCC ID: 2BLU9-QA25I3

Test Standard (s)

FCC PART 15.247

Sample Description

Product Type: ALL IN ONE PC
Model No.: QA25I3GW8256
Multiple Model(s) No.: N/A
Trade Mark: COMPAQ
Date Received: 2024-12-19
Issue Date: 2025-01-17

Test Result:	Pass▲
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▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

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Ekko Wu
RF Engineer

Approved By:

Jimmy Xiao

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EMC Manager

Note: The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	2401A37173E-RF-00A	Original Report	2025-01-17

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	2412~2462MHz
Maximum Conducted Output Peak Power	21.33dBm for Ant 0 (Chain 0) 20.74dBm for Ant 1 (Chain 1)
Modulation Technique	DSSS, OFDM
Antenna Specification[#]	3dBi for Ant 0 (Chain 0) 1.99dBi for Ant 1 (Chain 1) (provided by the applicant)
Voltage Range	DC 19.0V from Adapter
Sample serial number	2W9C-9 for Conducted and Radiated Emissions Test 2W9C-2 for RF Conducted Test (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	Model: SOY-1900474 Input: AC 100-240V,50/60Hz, 1.8A Max Output: DC 19.0V, 4.74A, 90.06W
Note: the EUT has two antennas which only support the SISO and share the same power level.	

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commission's rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

And KDB 558074 D01 15.247 Meas Guidance v05r02.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		109.2kHz(k=2, 95% level of confidence)
RF output power, conducted		0.86dB(k=2, 95% level of confidence)
AC Power Lines Conducted Emissions	9kHz~150 kHz	3.63dB(k=2, 95% level of confidence)
	150 kHz ~30MHz	3.66dB(k=2, 95% level of confidence)
Radiated Emissions	0.009MHz~30MHz	3.60dB(k=2, 95% level of confidence)
	30MHz~200MHz (Horizontal)	5.32dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	5.43dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	5.77dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.73dB(k=2, 95% level of confidence)
	1GHz - 6GHz	5.34dB(k=2, 95% level of confidence)
	6GHz - 18GHz	5.40dB(k=2, 95% level of confidence)
	18GHz - 40GHz	5.64dB(k=2, 95% level of confidence)
Temperature		±1°C
Humidity		±1%
Supply voltages		±0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 715558, the FCC Designation No. : CN5045.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

For 2.4GHz Wi-Fi mode, total 11 channels are provided to testing:

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

802.11b, 802.11g and 802.11n-HT20 mode was tested with Channel 1, 6 and 11.

802.11n-HT40 mode was tested with Channel 3, 6 and 9.

EUT Exercise Software

Exercise Software [#]		MPTOOL		
Mode	Data rate	Power Level [#]		
		Low Channel	Middle Channel	High Channel
802.11b	1Mbps	38	38	38
802.11g	6Mbps	38	38	38
802.11n20	MCS0	38	38	38
802.11n40	MCS0	38	38	38

Note: The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the power and PSD across all data rates bandwidths, and modulations.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

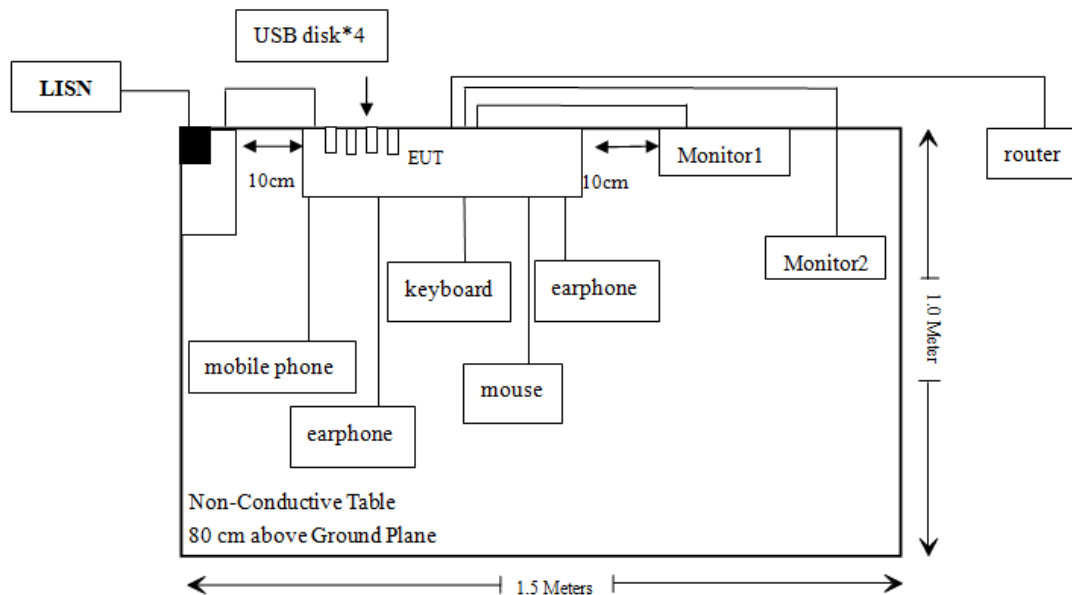
Manufacturer	Description	Model	Serial Number
Redmi	Monitor1	RMMNT238NF	6971041358020
Redmi	Monitor2	A22FAB-RA	DL0ZCS1
TOTOLINK	router	T6	X7D-IP04338
Unknown	Earphone*2	Unknown	Unknown
Unknown	USB disk*4pcs	Unknown	Unknown

External I/O Cable

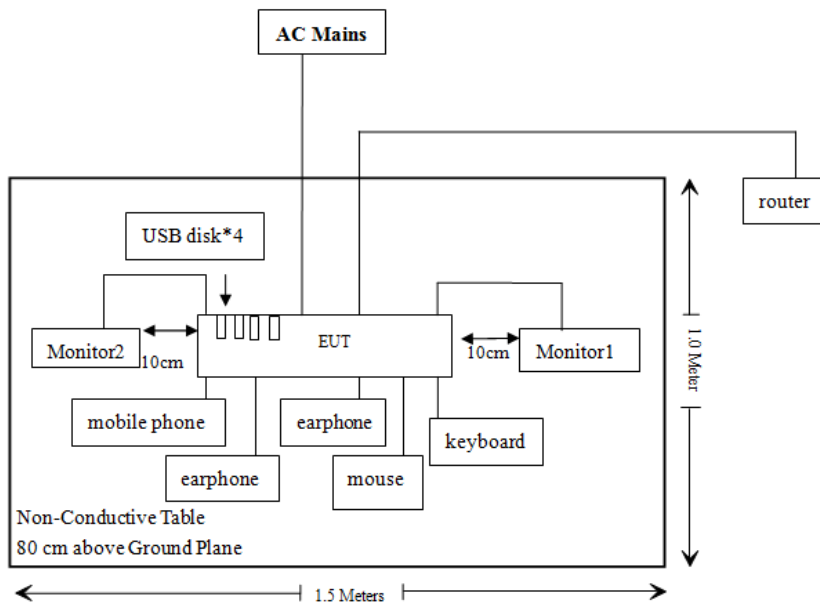
Cable Description	Length (m)	From Port	To
Shielded un-detachable DC cable	1.5	EUT	Adapter
Unshielded detachable AC cable	1.5	Adapter	LISN
Unshielded un-detachable earphone cable	1.2	EUT	earphone
Unshielded un-detachable USB cable	1.5	EUT	mouse
Unshielded un-detachable USB cable	1.5	EUT	keyboard
Unshielded detachable HDMI cable	2	EUT	Monitor1
Unshielded detachable VGA cable	2	EUT	Monitor2
Unshielded detachable RJ45 cable	5	EUT	router

Block Diagram of Test Setup

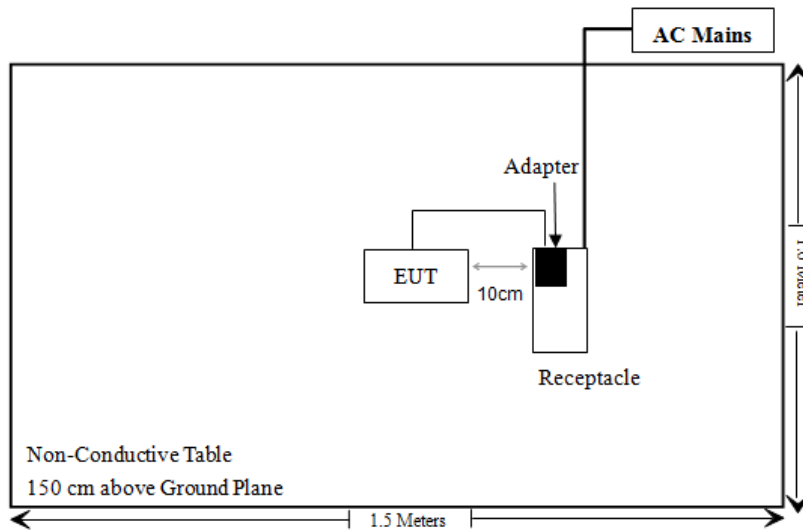
For Conducted Emissions:



For Radiated Emissions below 1GHz:



For Radiated Emissions above 1GHz:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.203	Antenna Requirement	Compliant
FCC §15.207(a)	AC Line Conducted Emissions	Compliant
FCC §15.205, §15.209, §15.247(d)	Radiated Spurious Emission	Compliant
FCC §15.207(a)(2)	6dB Emission Bandwidth	Compliant
FCC §15.247(b)(1)	Maximum Conducted Output Power	Compliant
FCC §15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
FCC §15.247(e)	Power Spectral Density	Compliant
C63.10 §11.6	Duty Cycle	Compliant
§15.247 (i), §1.1307 (b) (3) & §2.1091	MPE-Based Exemption	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2024/12/04	2025/12/03
Rohde & Schwarz	LISN	ENV216	101613	2024/12/04	2025/12/03
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2024/05/21	2025/05/20
Unknown	CE Cable	Unknown	UF A210B-1-0720-504504	2024/05/21	2025/05/20
Audix	EMI Test software	E3	191218(V9)	NCR	NCR
Radiated Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2024/12/04	2025/12/03
Sonoma instrument	Pre-amplifier	310 N	186238	2024/05/21	2025/05/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2026/07/19
Unknown	Cable	Chamber A Cable 1	N/A	2024/06/18	2025/06/17
Unknown	Cable	XH500C	J-10M-A	2024/06/18	2025/06/17
BACL	Active Loop Antenna	1313-1A	4031911	2024/05/14	2027/05/13
Unknown	Cable	2Y194	0735	2024/12/04	2025/12/03
Unknown	Cable	PNG214	1354	2024/12/04	2025/12/03
Audix	EMI Test software	E3	19821b(V9)	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2024/03/27	2025/03/26
A.H.System	Preamplifier	PAM-0118P	489	2024/11/15	2025/11/14
Schwarzbeck	Horn Antenna	BBHA9120D(1201)	1143	2023/07/26	2026/07/25
Unknown	RF Cable	KMSE	735	2024/12/06	2025/12/05
Unknown	RF Cable	UFA147	219661	2024/12/06	2025/12/05
Unknown	RF Cable	XH750A-N	J-10M	2024/12/06	2025/12/05
JD	Filter Switch Unit	DT7220FSU	DS79906	2024/09/09	2025/09/08
JD	Multiplex Switch Test Control Set	DT7220SCU	DS79903	2024/09/09	2025/09/08
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2024/03/27	2025/03/26
A.H.System	Pre-amplifier	PAM-1840VH	190	2024/06/18	2025/06/17
Electro-Mechanics Co	Horn Antenna	3116	9510-2270	2023/09/18	2026/09/17
UTIFLEX	RF Cable	NO. 13	232308-001	2024/12/18	2025/12/17
Audix	EMI Test software	E3	191218(V9)	NCR	NCR

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
ANRITSU	Microwave peak power sensor	MA24418A	12622	2024/05/21	2025/05/20
Rohde & Schwarz	Spectrum Analyzer	FSU26	200982	2024/09/20	2025/09/19
MARCONI	10dB Attenuator	6534/3	2942	2024/06/27	2025/06/26

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

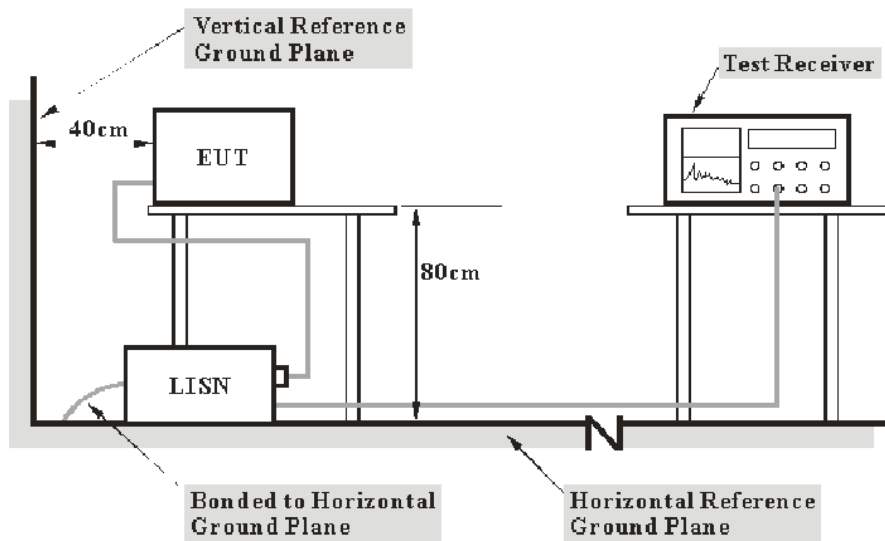
REQUIREMENTS AND TEST PROCEDURES

AC Line Conducted Emissions

Applicable Standard

FCC§15.207

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Factor & Over Limit Calculation

The factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

$$\text{Factor} = \text{LISN VDF} + \text{Cable Loss}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\begin{aligned}\text{Over Limit} &= \text{level} - \text{Limit} \\ \text{Level} &= \text{reading level} + \text{Factor}\end{aligned}$$

Note: The term "cable loss" refers to the combination of a cable and a 10dB transient limiter (attenuator).

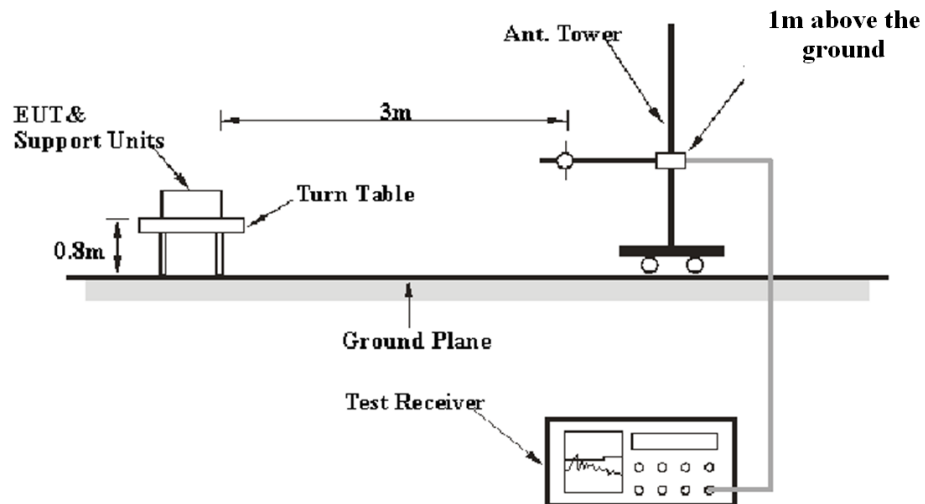
Spurious Emissions

Applicable Standard

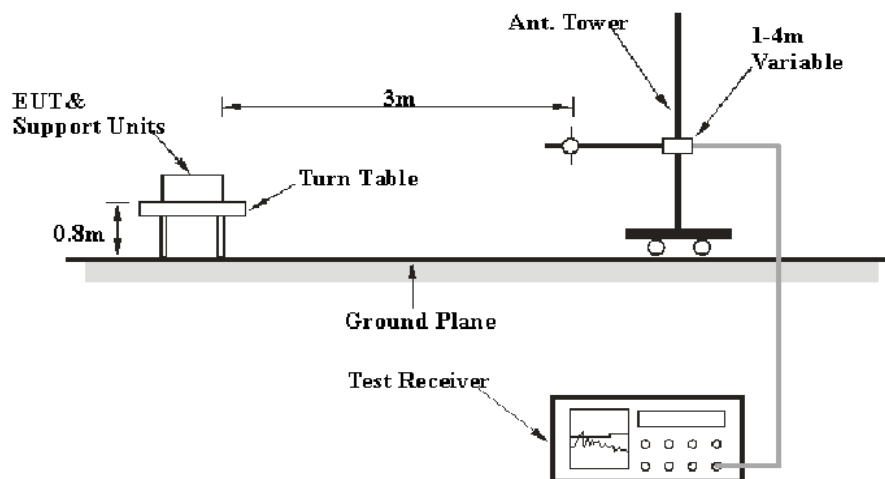
FCC §15.247 (d); §15.209; §15.205;

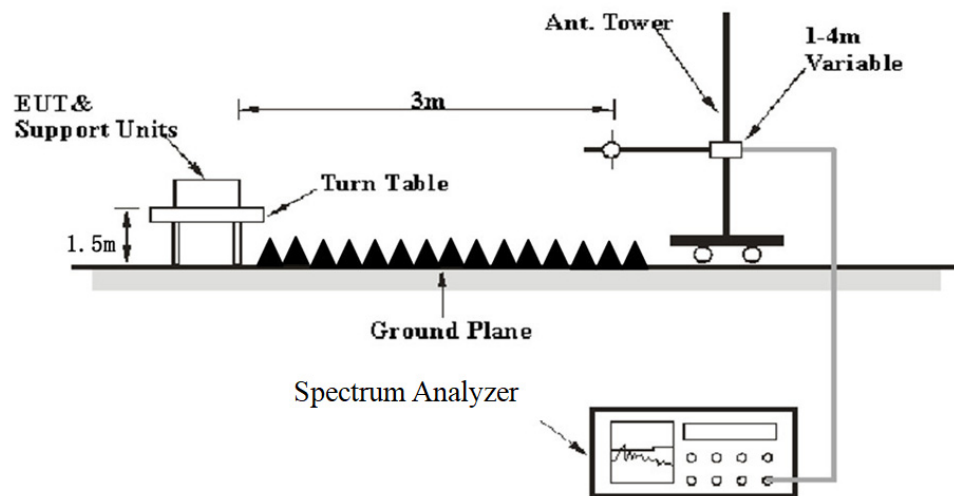
EUT Setup

9 kHz-30MHz:



30MHz-1GHz:



Above 1GHz:

The radiated emission performed in the 3 meters, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, FCC 15.247 limits.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

9 kHz-1GHz:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
9 kHz – 150 kHz	/	/	200 Hz	QP
	300 Hz	1 kHz	/	PK
150 kHz – 30 MHz	/	/	9 kHz	QP
	10 kHz	30 kHz	/	PK
30 MHz – 1000 MHz	/	/	120 kHz	QP
	100 kHz	300 kHz	/	PK

1-25GHz:

Pre-scan

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
AV	>98%	1MHz	3 kHz
	<98%	1MHz	≥1/Ton, not less than 3 kHz

Final measurement for emission identified during pre-scan

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
AV	>98%	1MHz	10 Hz
	<98%	1MHz	≥1/Ton

Note: Ton is minimum transmission duration

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All final data was recorded in Quasi-peak detection mode except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz, average detection modes for frequency bands 9–90 kHz and 110–490 kHz, peak and average detection modes for frequencies above 1 GHz.

For 9 kHz-30MHz, the report shall list the six emissions with the smallest margin relative to the limit, for each of the three antenna orientations (parallel, perpendicular, and ground-parallel) unless the margin is greater than 20 dB.

All emissions under the average limit and under the noise floor have not recorded in the report.

Factor & Over Limit/Margin Calculation

The Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain. The basic equation is as follows:

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Over Limit/Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

$$\begin{aligned} \text{Over Limit/Margin} &= \text{Level/Corrected Amplitude} - \text{Limit} \\ \text{Level / Corrected Amplitude} &= \text{Read Level} + \text{Factor} \end{aligned}$$

6 dB Emission Bandwidth

Applicable Standard

According to FCC §15.247(a) (2)

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

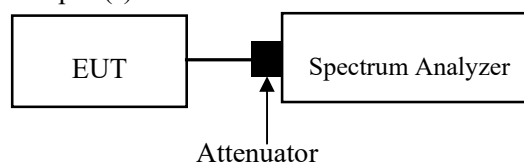
Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.8.1

- a) Set RBW = 100 kHz.
- b) Set the VBW $\geq [3 \times \text{RBW}]$.
- c) Detector = peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. Procedure as below

- a. The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
- b. The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW (for RSS rules, VBW shall not be smaller than three times the RBW, unless otherwise specified by the applicable requirement).
- c. Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW}/\text{RBW})]$ below the reference level.
- d. Step a) through step c) might require iteration to adjust within the specified range.
- e. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- f. Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
- g. If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
- h. The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data maybe reported in addition to the plot(s).



Maximum Conducted Output Power

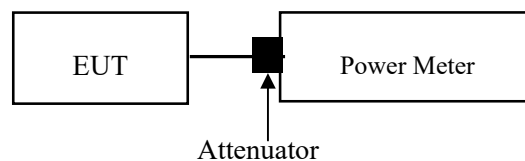
Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

Test method: ANSI C63.10-2013 clause 11.9.1.3 for peak power method or clause 11.9.2.3.2 for average power method.

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



Note: A short RF cable with low cable loss connected to the EUT antenna port, which was provided by client or lab, the cable loss was added with offset into test equipment, the total offset consists of attenuator and/or RF cable and/or power splitter loss

100 kHz Bandwidth of Frequency Band Edge

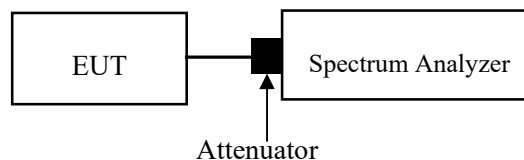
Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.11

1. Set the RBW =100 kHz.
 2. Set the VBW $\geq 3 \times$ RBW.
 3. Detector = peak
 4. Sweep time = auto couple.
 5. Trace mode=max hold
 6. All trace to fully stabilize
 7. Use the peak marker function to determine the maximum amplitude level.
- Ensure that amplitude of all unwanted emissions outside of the authorized frequency band(excluding restricted frequency bands) is attenuated by at least the minimum requirement specified in 11.11.
Report the three highest emissions relative to the limit.



Power Spectral Density

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.10.2

Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.

1. Set the RBW to: $3\text{kHz} \leq \text{RBW} \leq 100\text{ kHz}$.
2. Set the VBW $\geq 3 \times \text{RBW}$.
3. Set the span to 1.5 times the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level within the RBW.
9. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Method: ANSI C63.10-2013 Clause 11.10.3 Method AVGPSD-1

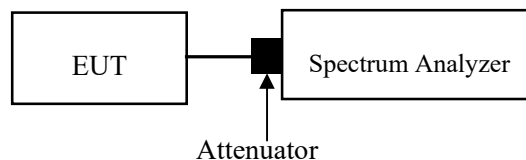
The following procedure may be used when the maximum (average) conducted output power was used to determine compliance to the fundamental output power limit. This is the baseline method for determining the maximum (average) conducted PSD level. If the instrument has a power averaging (rms) detector, then it must be used; otherwise, use the sample detector. The EUT must be configured to transmit continuously ($D \geq 98\%$), or else sweep triggering/signal gating must be implemented to ensure that measurements are made only when the EUT is transmitting at its maximum power control level (no transmitter OFF time to be considered):

1. Set instrument center frequency to DTS channel center frequency.
2. Set span to at least 1.5 times the OBW.
3. Set the RBW to: $3\text{kHz} \leq \text{RBW} \leq 100\text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{BW}$.
5. Detector = power averaging (rms) or sample detector (when rms not available)
6. Ensure that the number of measurement points in the sweep $\geq [2 \times \text{span} / \text{RBW}]$.
7. Sweep time = auto couple.
8. Employ trace averaging (rms) mode over a minimum of 100 traces.
9. Use the peak marker function to determine the maximum amplitude level.
10. If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

Test Method: ANSI C63.10-2013 Clause 11.10.5 Method AVGPDS-2

The following procedure is applicable when the EUT cannot be configured to transmit continuously (i.e., $D < 98\%$), when sweep triggering/signal gating cannot be used to measure only when the EUT is transmitting at its maximum power control level, and when the transmission duty cycle is constant (i.e., duty cycle variations are less than $\pm 2\%$):

1. Measure the duty cycle (D) of the transmitter output signal as described in 11.6.
2. Set instrument center frequency to DTS channel center frequency.
3. Set span to at least 1.5 times the OBW.
4. Set the RBW to: $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$.
5. Set the VBW $\geq 3 \times \text{BW}$.
6. Detector = power averaging (rms) or sample detector (when rms not available)
7. Ensure that the number of measurement points in the sweep $\geq [2 \times \text{span} / \text{RBW}]$.
8. Sweep time = auto couple.
9. Do not use sweep triggering; allow sweep to “free run.”
10. Employ trace averaging (rms) mode over a minimum of 100 traces.
11. Use the peak marker function to determine the maximum amplitude level.
12. If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).



Note: A short RF cable with low cable loss connected to the EUT antenna port, which was provided by client or lab, the cable loss was added with offset into test equipment, the total offset consists of attenuator and/or RF cable and/or power splitter loss

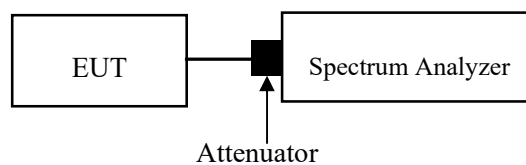
Duty Cycle

Test Procedure

According to ANSI C63.10-2013 Section 11.6

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

- 1) Set the center frequency of the instrument to the center frequency of the transmission.
- 2) Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.
- 3) Set $VBW \geq RBW$. Set detector = peak or average.
- 4) The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if $T \leq 16.7 \mu s$.)



ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Antenna Connector Construction

The EUT has two internal antennas arrangement, which were permanently attached, the antenna gain[#] is 3dBi for Ant 0 and 1.99dBi for Ant 1, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliant

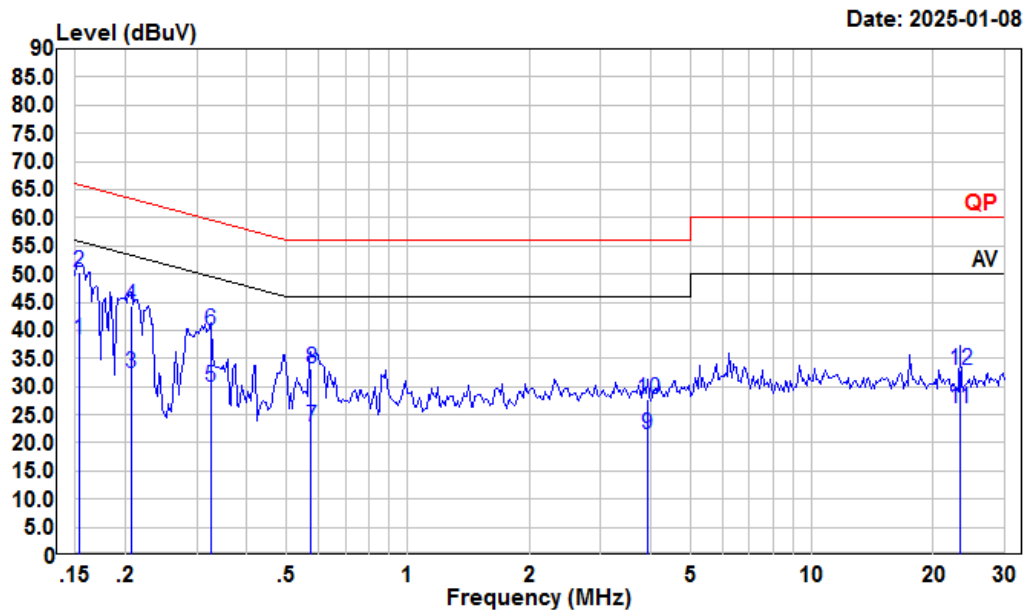
TEST DATA AND RESULTS

AC Line Conducted Emissions

Environmental Conditions

Temperature (°C)	22.8	Relative Humidity (%)	43
ATM Pressure (kPa)	101-103	Test engineer	Macy Shi
Test date	2025/01/08		
EUT operation mode	Transmitting(Maximum output power mode, Ant 0 802.11g Low channel)		

AC 120V 60 Hz, Line



Condition: Line

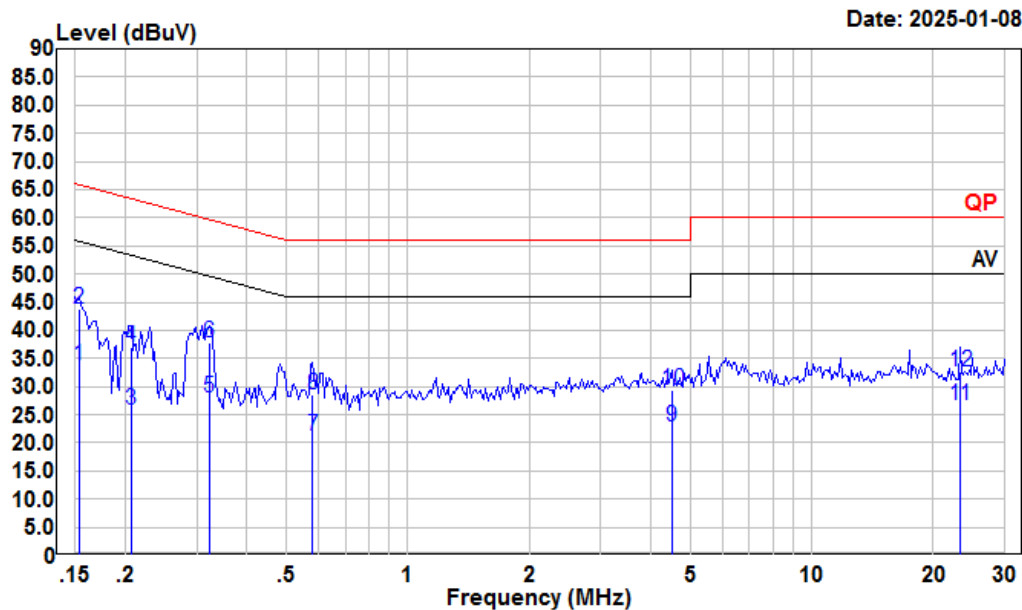
Project : 2401A37173E-RF

tester : Macy.shi Note:Transmitting

Setting : RBW:9kHz VBW:Auto SWT:Auto

	Freq	Read Level	LISN Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.153	18.12	38.43	10.18	10.13	55.82	-17.39	Average
2	0.153	30.10	50.41	10.18	10.13	65.82	-15.41	QP
3	0.206	12.27	32.28	9.92	10.09	53.36	-21.08	Average
4	0.206	24.31	44.32	9.92	10.09	63.36	-19.04	QP
5	0.325	9.51	29.85	10.22	10.12	49.57	-19.72	Average
6	0.325	19.71	40.05	10.22	10.12	59.57	-19.52	QP
7	0.576	2.02	22.72	10.58	10.12	46.00	-23.28	Average
8	0.576	12.50	33.20	10.58	10.12	56.00	-22.80	QP
9	3.922	1.32	21.54	10.01	10.21	46.00	-24.46	Average
10	3.922	7.65	27.87	10.01	10.21	56.00	-28.13	QP
11	23.263	5.57	26.11	10.36	10.18	50.00	-23.89	Average
12	23.263	12.24	32.78	10.36	10.18	60.00	-27.22	QP

AC 120V 60 Hz, Neutral



Condition: Neutral

Project : 2401A37173E-RF

tester : Macy.shi Note:Transmitting

Setting : RBW:9kHz VBW:Auto SWT:Auto

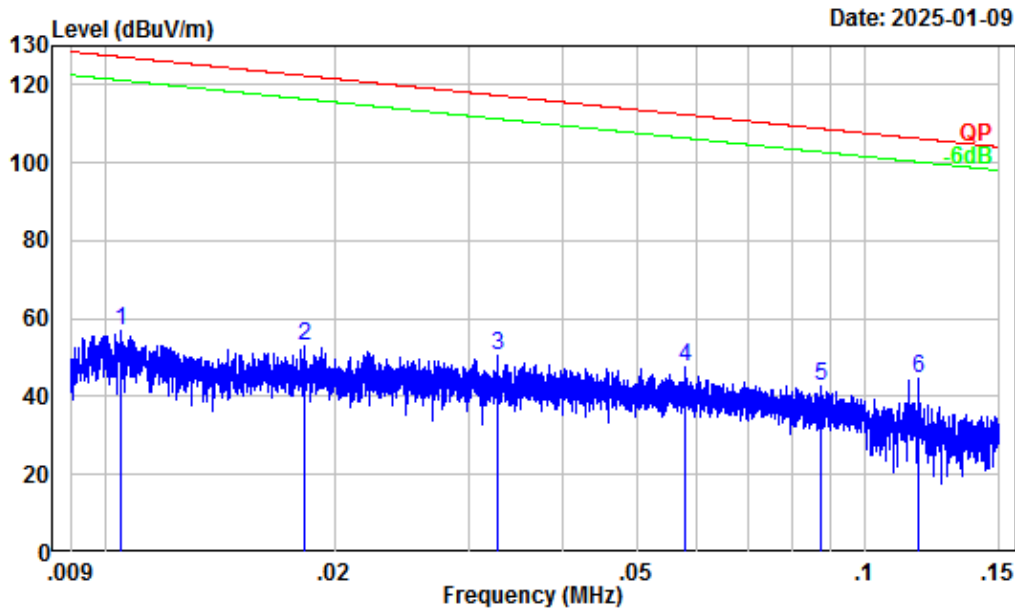
	Freq	Read Level	LISN Level	Cable Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.153	13.35	33.77	10.29	10.13	55.82	-22.05	Average
2	0.153	23.45	43.87	10.29	10.13	65.82	-21.95	QP
3	0.206	5.65	25.86	10.12	10.09	53.36	-27.50	Average
4	0.206	16.66	36.87	10.12	10.09	63.36	-26.49	QP
5	0.322	7.61	28.08	10.36	10.11	49.66	-21.58	Average
6	0.322	17.36	37.83	10.36	10.11	59.66	-21.83	QP
7	0.582	0.46	21.13	10.55	10.12	46.00	-24.87	Average
8	0.582	7.88	28.55	10.55	10.12	56.00	-27.45	QP
9	4.501	2.40	22.80	10.21	10.19	46.00	-23.20	Average
10	4.501	8.93	29.33	10.21	10.19	56.00	-26.67	QP
11	23.263	6.11	26.56	10.27	10.18	50.00	-23.44	Average
12	23.263	12.18	32.63	10.27	10.18	60.00	-27.37	QP

Spurious Emissions**Environmental Conditions**

Temperature (°C)	23.3~23.5	Relative Humidity (%)	40~39
ATM Pressure (kPa):	101.4~101.1	Test engineer:	Jack Liu & Dylan Yang
Test date:	2025/01/09~2025/01/12		
EUT operation mode:	Below 1GHz: Transmitting (Maximum output power mode, 802.11g Low channel) Above 1GHz: Transmitting		
Note:	1. For the radiated spurious emission below 30MHz, only the worst case (parallel) was recorded. 2. For the radiated spurious emission below 30MHz, When the test result of peak was less than the limit of QP/Average more than 6dB, just peak value were recorded. 3. After pre-scan in the X, Y and Z axes of orientation, the worst case z-axis of orientation were recorded.		

Below 1GHz:

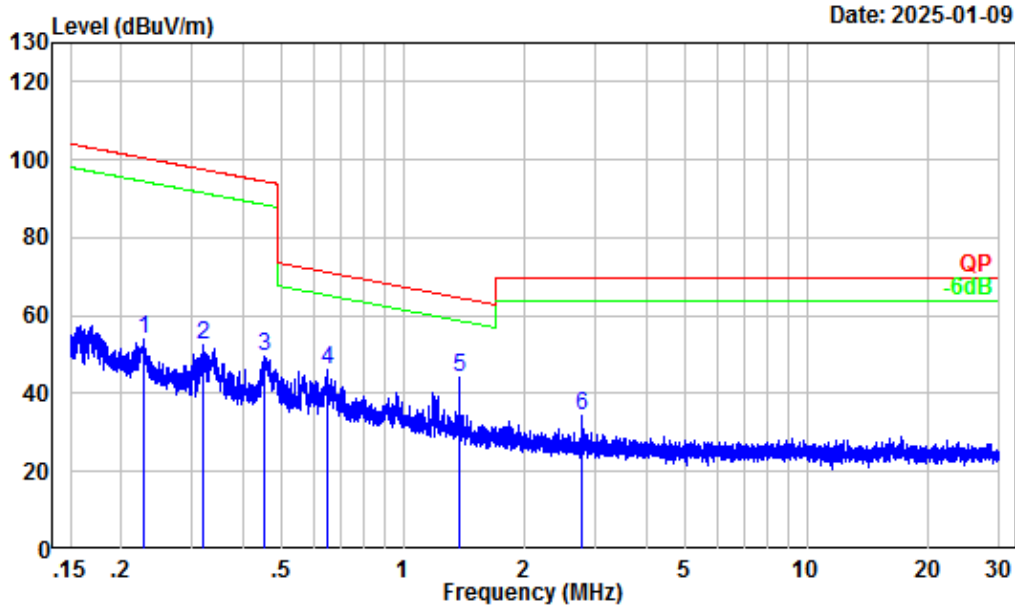
9kHz-150kHz_Ant0



Site : Chamber A
Condition : 3m
Project Number: 2401A37173E-RF
Test Mode : Transmitting
Setting QP RBW: 0.3KHz VBW:1KHz
Tester : Jack Liu

	Freq	Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.01	32.21	24.72	56.93	127.21	-70.28	Peak
2	0.02	30.72	22.25	52.97	122.36	-69.39	Peak
3	0.03	28.20	22.38	50.58	117.27	-66.69	Peak
4	0.06	25.60	21.76	47.36	112.34	-64.98	Peak
5	0.09	22.89	20.01	42.90	108.79	-65.89	Peak
6	0.12	20.97	23.62	44.59	106.20	-61.61	Peak

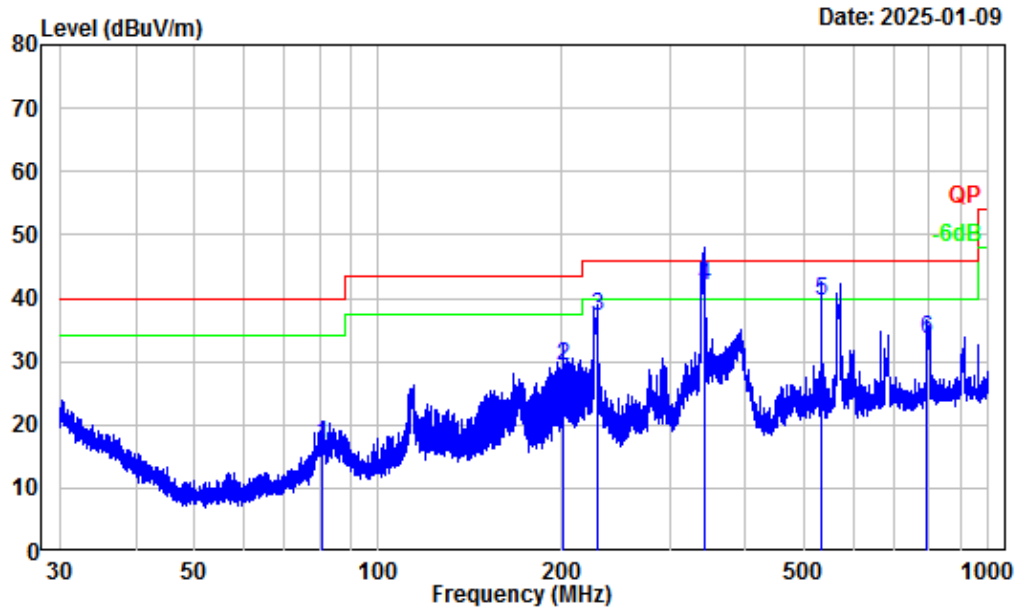
150kHz-30MHz_Ant0



Site : Chamber A
Condition : 3m
Project Number: 2401A37173E-RF
Test Mode : Transmitting
Setting QP RBW: 10KHz VBW:30KHz
Tester : Jack Liu

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.23	14.45	39.48	53.93	100.45	-46.52	Peak
2	0.32	9.81	42.58	52.39	97.48	-45.09	Peak
3	0.45	7.27	42.28	49.55	94.46	-44.91	Peak
4	0.65	4.54	41.39	45.93	71.29	-25.36	Peak
5	1.38	0.13	44.26	44.39	64.60	-20.21	Peak
6	2.77	-2.02	36.18	34.16	69.54	-35.38	Peak

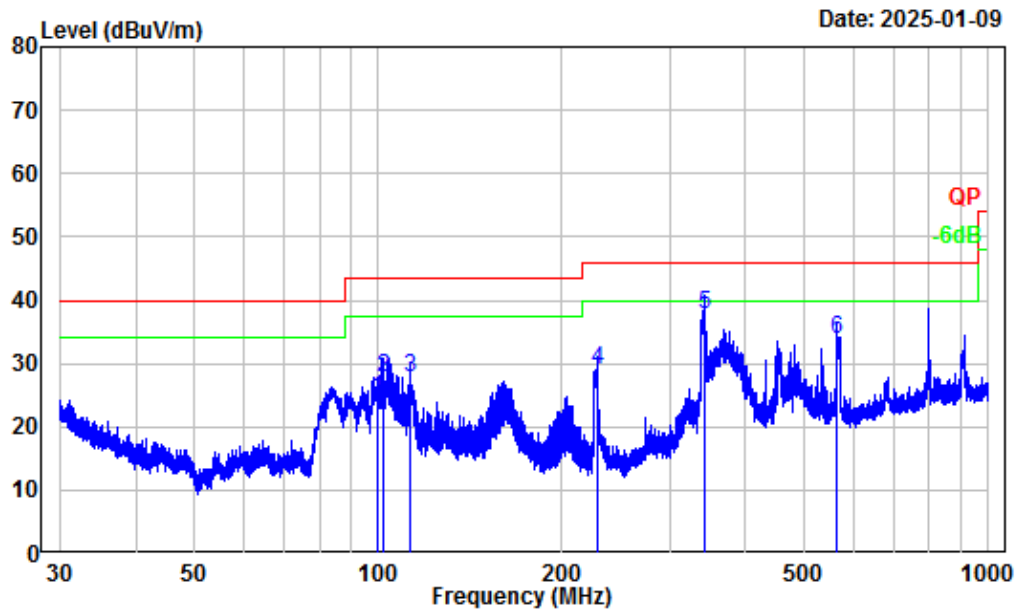
30MHz-1GHz_Horizontal_Ant0



Site : Chamber A
Condition : 3m Horizontal
Project Number: 2401A37173E-RF
Test Mode : Transmitting
Setting QP RBW: 120KHz
Tester : Jack Liu

	Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	80.71	-17.97	34.98	17.01	40.00	-22.99	QP
2	200.51	-13.10	42.43	29.33	43.50	-14.17	QP
3	228.89	-13.90	50.88	36.98	46.00	-9.02	QP
4	342.88	-10.33	52.39	42.06	46.00	-3.94	QP
5	532.43	-5.75	45.31	39.56	46.00	-6.44	QP
6	789.93	-2.25	35.77	33.52	46.00	-12.48	QP

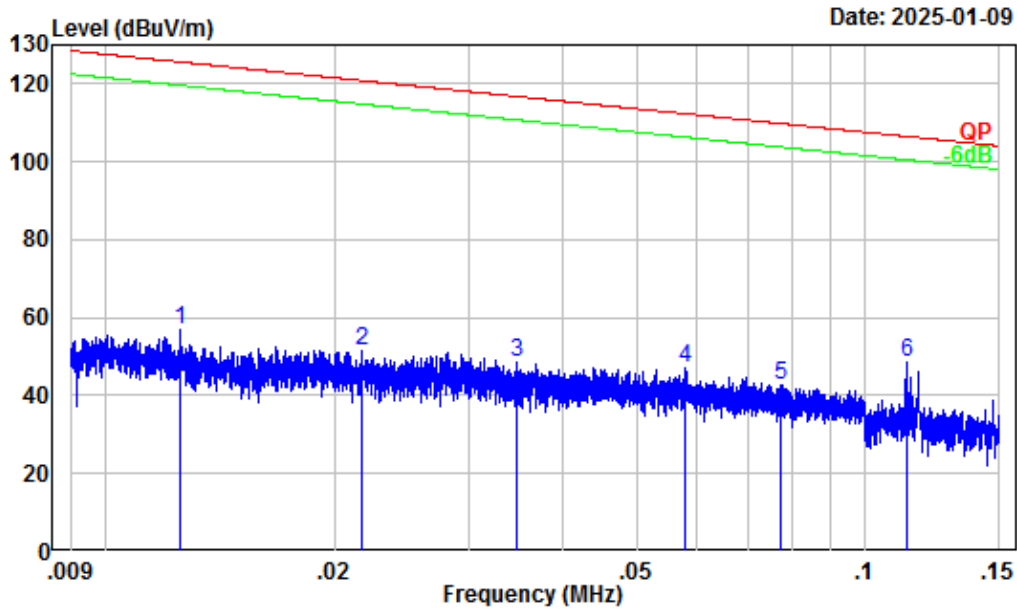
30MHz-1GHz_Vertical_Ant0



Site : Chamber A
Condition : 3m Vertical
Project Number: 2401A37173E-RF
Test Mode : Transmitting
Setting QP RBW: 120KHz
Tester : Jack Liu

	Freq Factor		Read	Limit	Over	Remark
	MHz	dB/m	Level	Line	Limit	
			dBuV	dBuV/m	dBuV/m	
1	99.66	-15.99	40.37	24.38	43.50	-19.12 QP
2	102.09	-15.34	43.05	27.71	43.50	-15.79 QP
3	113.02	-12.55	40.36	27.81	43.50	-15.69 QP
4	228.89	-13.90	42.93	29.03	46.00	-16.97 QP
5	343.48	-10.32	48.05	37.73	46.00	-8.27 QP
6	564.39	-5.24	39.06	33.82	46.00	-12.18 QP

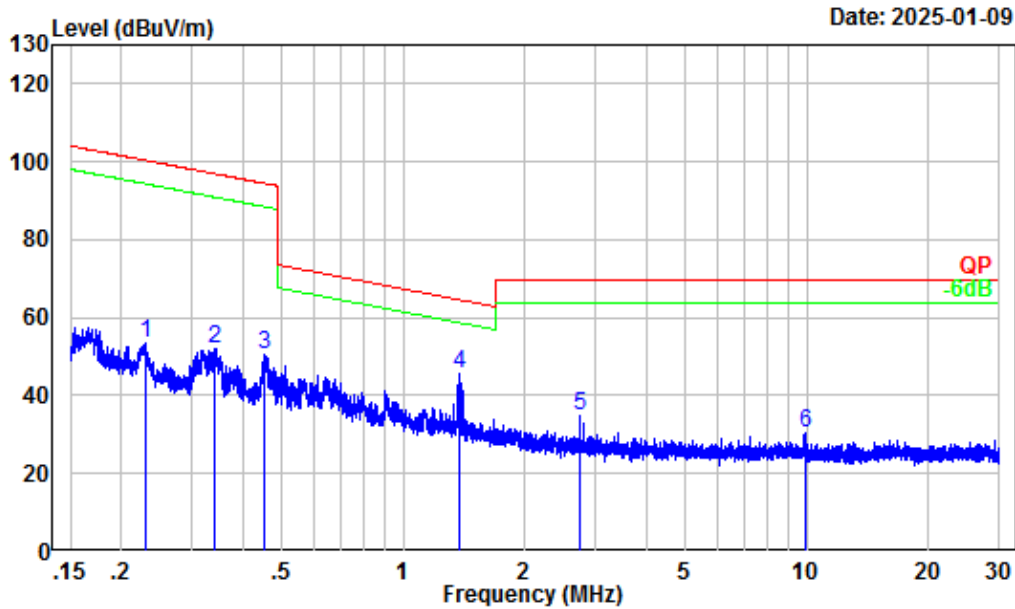
9kHz-150kHz_Ant1



Site : Chamber A
Condition : 3m
Project Number: 2401A37173E-RF
Test Mode : Transmitting
Setting QP RBW: 0.3KHz VBW:1KHz
Tester : Jack Liu

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.01	31.82	24.91	56.73	125.64	-68.91	Peak
2	0.02	30.08	21.40	51.48	120.87	-69.39	Peak
3	0.03	28.01	20.49	48.50	116.80	-68.30	Peak
4	0.06	25.61	21.62	47.23	112.35	-65.12	Peak
5	0.08	23.68	18.91	42.59	109.85	-67.26	Peak
6	0.11	21.21	27.16	48.37	106.52	-58.15	Peak

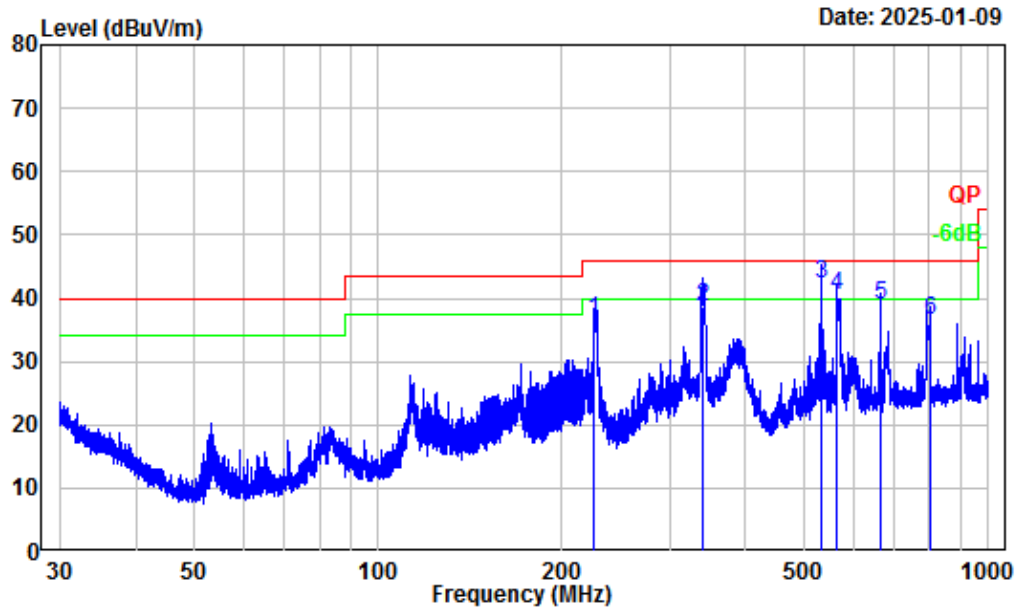
150kHz-30MHz_Ant1



Site : Chamber A
Condition : 3m
Project Number: 2401A37173E-RF
Test Mode : Transmitting
Setting QP RBW: 10KHz VBW:30KHz
Tester : Jack Liu

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.23	14.38	39.29	53.67	100.40	-46.73	Peak
2	0.34	9.41	42.59	52.00	96.94	-44.94	Peak
3	0.45	7.31	43.35	50.66	94.50	-43.84	Peak
4	1.38	0.15	45.45	45.60	64.64	-19.04	Peak
5	2.75	-2.01	36.96	34.95	69.54	-34.59	Peak
6	9.89	-2.81	33.45	30.64	69.54	-38.90	Peak

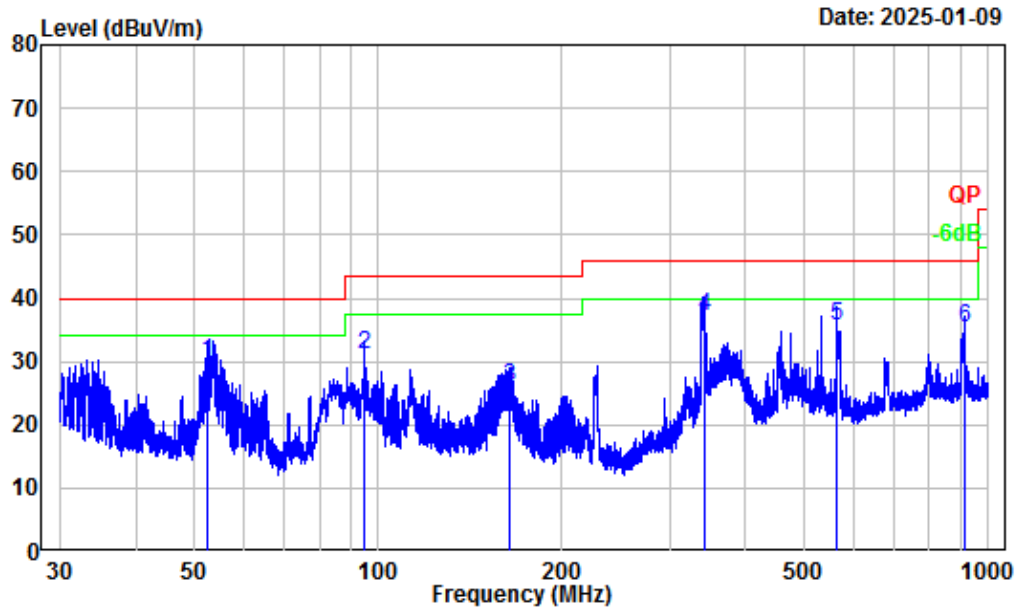
30MHz-1GHz_Horizontal_Ant1



Site : Chamber A
Condition : 3m Horizontal
Project Number: 2401A37173E-RF
Test Mode : Transmitting
Setting QP RBW: 120KHz
Tester : Jack Liu

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	226.20	-14.02	50.43	36.41	46.00	-9.59	QP
2	339.29	-10.42	49.19	38.77	46.00	-7.23	QP
3	532.43	-5.75	48.13	42.38	46.00	-3.62	QP
4	564.14	-5.24	45.58	40.34	46.00	-5.66	QP
5	664.35	-3.88	42.73	38.85	46.00	-7.15	QP
6	801.79	-2.14	38.75	36.61	46.00	-9.39	QP

30MHz-1GHz_Vertical_Ant1



Site : Chamber A
Condition : 3m Vertical
Project Number: 2401A37173E-RF
Test Mode : Transmitting
Setting QP RBW: 120KHz
Tester : Jack Liu

	Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	52.35	-18.24	48.01	29.77	40.00	-10.23	QP
2	94.97	-17.34	48.57	31.23	43.50	-12.27	QP
3	163.90	-12.81	38.71	25.90	43.50	-17.60	QP
4	343.63	-10.32	47.56	37.24	46.00	-8.76	QP
5	564.39	-5.24	40.99	35.75	46.00	-10.25	QP
6	916.47	-1.13	36.31	35.18	46.00	-10.82	QP

Above 1GHz:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave					
Ant 0 802.11b							
Low Channel							
2390	63.36	PK	H	-10.98	52.38	74	-21.62
2390	63.39	PK	V	-10.98	52.41	74	-21.59
4824	60.09	PK	H	-7.75	52.34	74	-21.66
4824	61.36	PK	V	-7.75	53.61	74	-20.39
Middle Channel							
4874	55.82	PK	H	-7.61	48.21	74	-25.79
4874	58.69	PK	V	-7.61	51.08	74	-22.92
High Channel							
2483.5	64.22	PK	H	-10.97	53.25	74	-20.75
2483.5	63.27	PK	V	-10.97	52.3	74	-21.70
4924	54.22	PK	H	-7.57	46.65	74	-27.35
4924	55.72	PK	V	-7.57	48.15	74	-25.85
Ant1 802.11b							
Low Channel							
2390	63.62	PK	H	-10.98	52.64	74	-21.36
2390	63.32	PK	V	-10.98	52.34	74	-21.66
4824	60.00	PK	H	-7.75	52.25	74	-21.75
4824	61.66	PK	V	-7.75	53.91	74	-20.09
Middle Channel							
4874	58.17	PK	H	-7.61	50.56	74	-23.44
4874	61.46	PK	V	-7.61	53.85	74	-20.15
High Channel							
2483.5	63.65	PK	H	-10.97	52.68	74	-21.32
2483.5	64.18	PK	V	-10.97	53.21	74	-20.79
4924	55.83	PK	H	-7.57	48.26	74	-25.74
4924	59.91	PK	V	-7.57	52.34	74	-21.66

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave					
Ant 0_802.11g							
Low Channel							
2390	69.27	PK	H	-10.98	58.29	74	-15.71
2390	52.17	AV	H	-10.98	41.19	54	-12.81
2390	71.85	PK	V	-10.98	60.87	74	-13.13
2390	53.18	AV	V	-10.98	42.2	54	-11.80
4824	52.96	PK	H	-7.75	45.21	74	-28.79
4824	55.11	PK	V	-7.75	47.36	74	-26.64
Middle Channel							
4874	52.88	PK	H	-7.61	45.27	74	-28.73
4874	54.13	PK	V	-7.61	46.52	74	-27.48
High Channel							
2483.5	66.22	PK	H	-10.97	55.25	74	-18.75
2483.5	54.21	AV	H	-10.97	43.24	54	-10.76
2483.5	68.64	PK	V	-10.97	57.67	74	-16.33
2483.5	57.49	AV	V	-10.97	46.52	54	-7.48
4924	52.96	PK	H	-7.57	45.39	74	-28.61
4924	52.67	PK	V	-7.57	45.10	74	-28.90
Ant 1_802.11 g							
Low Channel							
2390	65.62	PK	H	-10.98	54.64	74	-19.36
2390	50.23	AV	H	-10.98	39.25	54	-14.75
2390	67.26	PK	V	-10.98	56.28	74	-17.72
2390	52.38	AV	V	-10.98	41.4	54	-12.60
4824	52.91	PK	H	-7.75	45.16	74	-28.84
4824	54.10	PK	V	-7.75	46.35	74	-27.65
Middle Channel							
4874	53.29	PK	H	-7.61	45.68	74	-28.32
4874	52.36	PK	V	-7.61	44.75	74	-29.25
High Channel							
2483.5	66.88	PK	H	-10.97	55.91	74	-18.09
2483.5	54.21	AV	H	-10.97	43.24	54	-10.76
2483.5	68.65	PK	V	-10.97	57.68	74	-16.32
2483.5	55.58	AV	V	-10.97	44.61	54	-9.39
4924	53.22	PK	H	-7.57	45.65	74	-28.35
4924	55.42	PK	V	-7.57	47.85	74	-26.15

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave					
Ant0_802.11n20							
Low Channel							
2390	76.40	PK	H	-10.98	65.42	74	-8.58
2390	52.55	AV	H	-10.98	41.57	54	-12.43
2390	75.95	PK	V	-10.98	64.97	74	-9.03
2390	53.21	AV	V	-10.98	42.23	54	-11.77
4824	55.00	PK	H	-7.75	47.25	74	-26.75
4824	53.36	PK	V	-7.75	45.61	74	-28.39
Middle Channel							
4874	52.73	PK	H	-7.61	45.12	74	-28.88
4874	53.28	PK	V	-7.61	45.67	74	-28.33
High Channel							
2483.5	68.23	PK	H	-10.97	57.26	74	-16.74
2483.5	46.69	AV	H	-10.97	35.72	54	-18.28
2483.5	71.70	PK	V	-10.97	60.73	74	-13.27
2483.5	50.89	AV	V	-10.97	39.92	54	-14.08
4924	53.24	PK	H	-7.57	45.67	74	-28.33
4924	52.89	PK	V	-7.57	45.32	74	-28.68
Ant1_802.11n20							
Low Channel							
2390	65.32	PK	H	-10.98	54.34	74	-19.66
2390	51.25	AV	H	-10.98	40.27	54	-13.73
2390	69.14	PK	V	-10.98	58.16	74	-15.84
2390	53.84	AV	V	-10.98	42.86	54	-11.14
4824	53.42	PK	H	-7.75	45.67	74	-28.33
4824	54.33	PK	V	-7.75	46.58	74	-27.42
Middle Channel							
4874	53.48	PK	H	-7.61	45.87	74	-28.13
4874	54.07	PK	V	-7.61	46.46	74	-27.54
High Channel							
2483.5	66.92	PK	H	-10.97	55.95	74	-18.05
2483.5	53.99	AV	H	-10.97	43.02	54	-10.98
2483.5	70.97	PK	V	-10.97	60.00	74	-14.00
2483.5	56.48	AV	V	-10.97	45.51	54	-8.49
4924	53.88	PK	H	-7.57	46.31	74	-27.69
4924	52.93	PK	V	-7.57	45.36	74	-28.64

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave					
Ant 0_802.11n40							
Low Channel							
2390	73.63	PK	H	-10.98	62.65	74	-11.35
2390	50.23	AV	H	-10.98	39.25	54	-14.75
2390	75.94	PK	V	-10.98	64.96	74	-9.04
2390	51.87	AV	V	-10.98	40.89	54	-13.11
4844	52.19	PK	H	-7.61	44.58	74	-29.42
4844	52.25	PK	V	-7.61	44.64	74	-29.36
Middle Channel							
4874	52.29	PK	H	-7.61	44.68	74	-29.32
4874	51.86	PK	V	-7.61	44.25	74	-29.75
High Channel							
2483.5	69.82	PK	H	-10.97	58.85	74	-15.15
2483.5	51.21	AV	H	-10.97	40.24	54	-13.76
2483.5	71.89	PK	V	-10.97	60.92	74	-13.08
2483.5	52.78	AV	V	-10.97	41.81	54	-12.19
4904	52.89	PK	H	-7.53	45.36	74	-28.64
4904	52.27	PK	V	-7.53	44.74	74	-29.26
Ant 1_802.11n40							
Low Channel							
2390	64.30	PK	H	-10.98	53.32	74	-20.68
2390	64.62	PK	V	-10.98	53.64	74	-20.36
4844	52.25	PK	H	-7.61	44.64	74	-29.36
4844	53.08	PK	V	-7.61	45.47	74	-28.53
Middle Channel 2							
4874	53.23	PK	H	-7.61	45.62	74	-28.38
4874	53.45	PK	V	-7.61	45.84	74	-28.16
High Channel							
2483.5	68.39	PK	H	-10.97	57.42	74	-16.58
2483.5	56.00	AV	H	-10.97	45.03	54	-8.97
2483.5	72.18	PK	V	-10.97	61.21	74	-12.79
2483.5	58.42	AV	V	-10.97	47.45	54	-6.55
4904	53.10	PK	H	-7.53	45.57	74	-28.43
4904	52.49	PK	V	-7.53	44.96	74	-29.04

Note:

Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

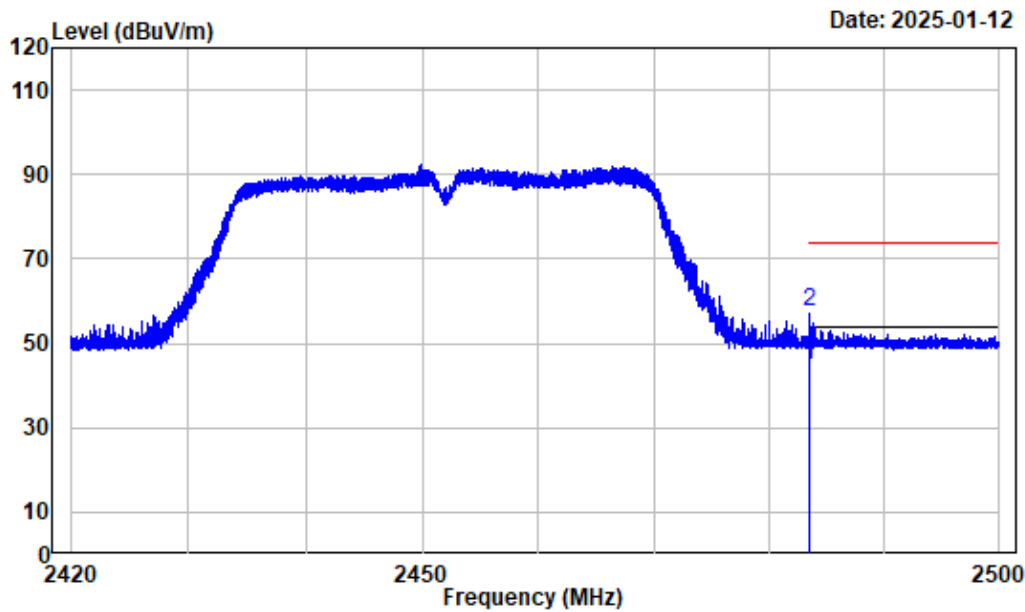
Corrected Amplitude = Corrected Factor + Reading

Margin = Corrected. Amplitude - Limit

The other spurious emission which is in the noise floor level was not recorded. The test result of peak was less than the limit of average, so just peak values were recorded.

Test plots (Worst Case)

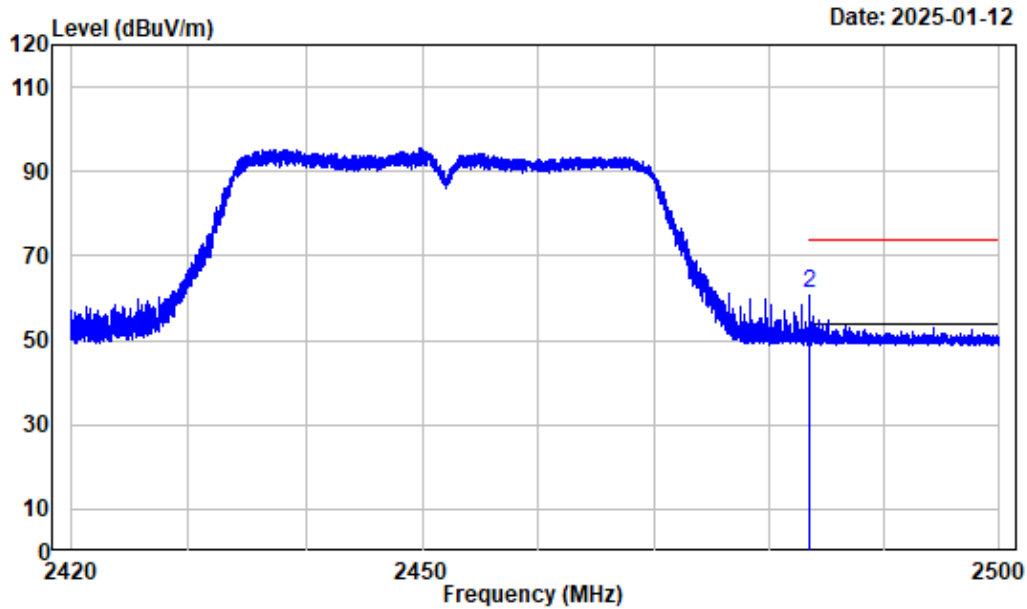
Left Band edge_Horizontal



Condition : Horizontal
Project No.: 2401A37173E-RF
Tester : Dylan Yang
Note : 2.4GWiFi-n40_ANT1-2452

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2483.500	-10.97	56.00	45.03	54.00	-8.97	Average
2	2483.500	-10.97	68.39	57.42	74.00	-16.58	Peak

Left Band edge_Vertical

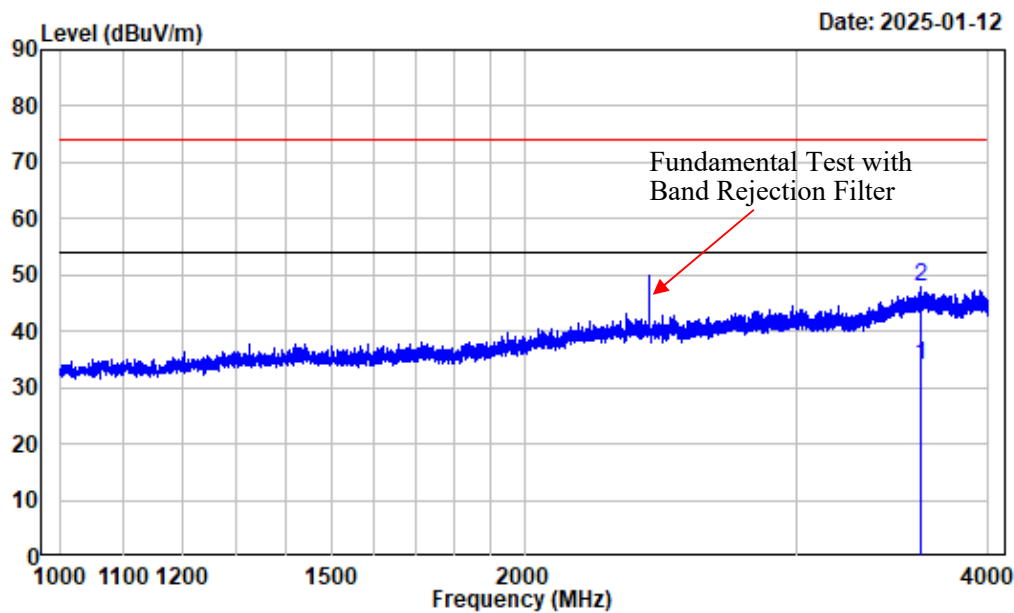


Condition : Vertical
Project No.: 2401A37173E-RF
Tester : Dylan Yang
Note : 2.4GWiFi-n40_ANT1-2452

	Freq	Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	2483.500	-10.97	58.42	47.45	54.00	-6.55	Average
2	2483.500	-10.97	72.18	61.21	74.00	-12.79	Peak

1-18GHz (Listed with the worst harmonic margin test plot)

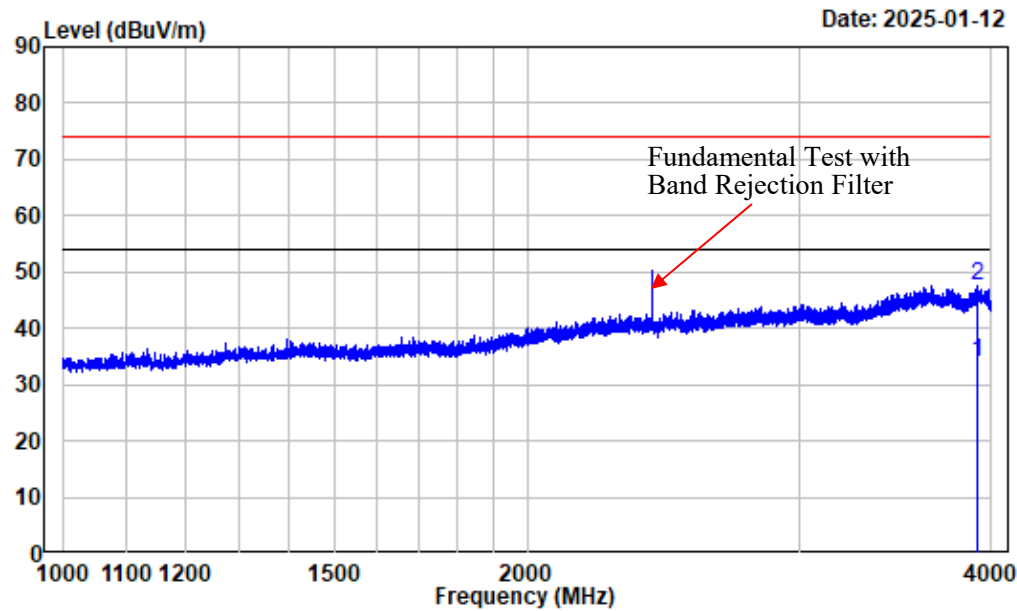
1-4GHz_Horizontal



Condition : Horizontal
Project No.: 2401A37173E-RF
Tester : Dylan Yang
Note : 2.4GWiFi-b_ANT1-2412

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	3621.203	-10.00	43.94	33.94	54.00	-20.06	Average
2	3621.203	-10.00	58.03	48.03	74.00	-25.97	Peak

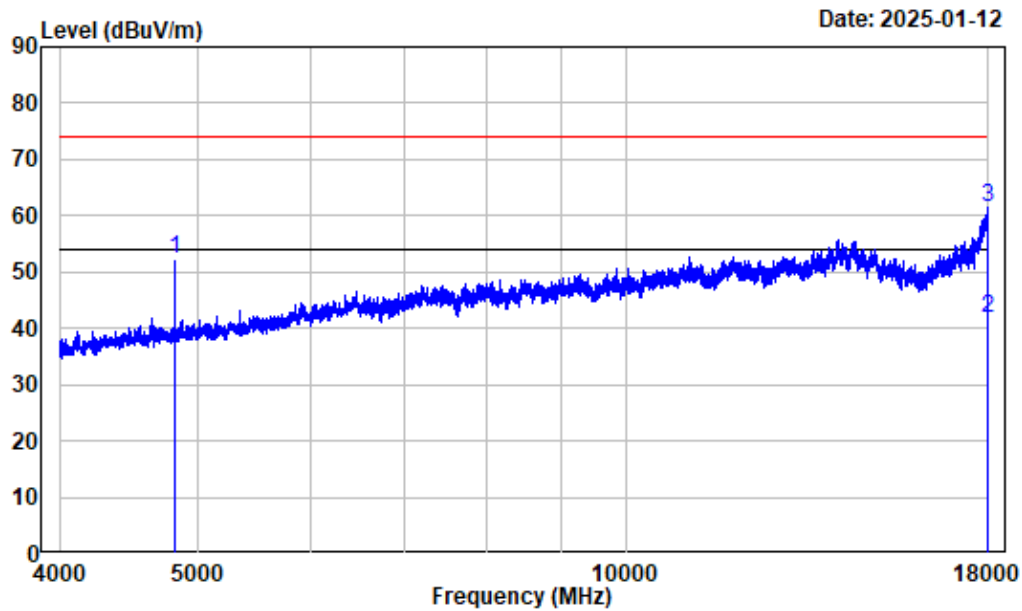
1-4GHz_Vertical



Condition : Vertical
Project No.: 2401A37173E-RF
Tester : Dylan Yang
Note : 2.4GWiFi-b_ANT1-2412

Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	3920.865	-9.62	43.72	34.10	54.00	-19.90 Average
2	3920.865	-9.62	57.05	47.43	74.00	-26.57 Peak

4-18GHz_Horizontal



Condition : Horizontal

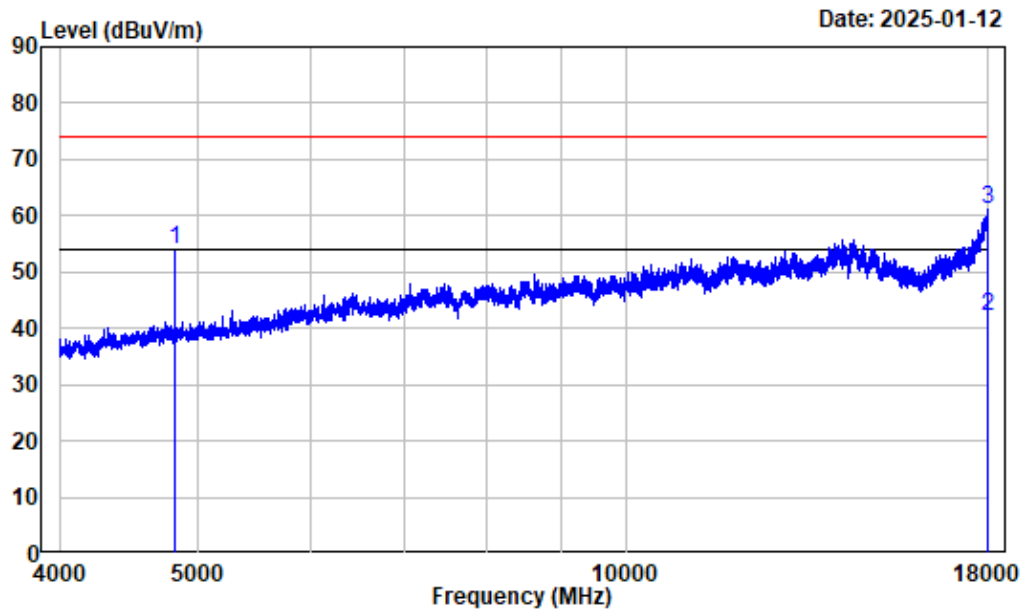
Project No.: 2401A37173E-RF

Tester : Dylan Yang

Note : 2.4GWiFi-b_ANT1-2412

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	4824.000	-7.75	60.00	52.25	74.00	-21.75	Peak
2	17973.750	13.08	28.59	41.67	54.00	-12.33	Average
3	17973.750	13.08	48.31	61.39	74.00	-12.61	Peak

4-18GHz_Vertical



Condition : Vertical

Project No.: 2401A37173E-RF

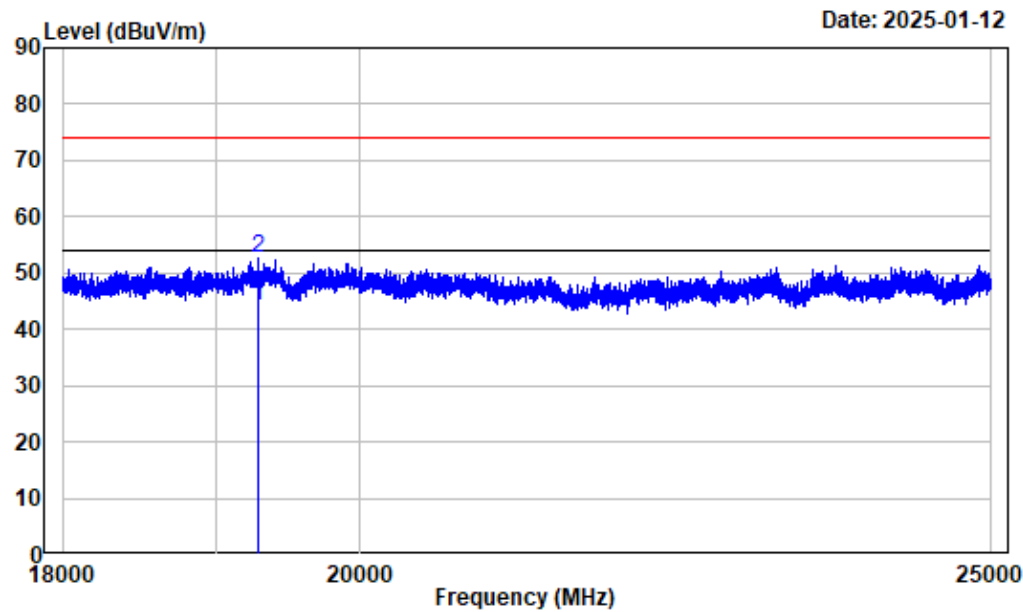
Tester : Dylan Yang

Note : 2.4GWiFi-b_ANT1-2412

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	4824.000	-7.75	61.66	53.91	74.00	-20.09	Peak
2	17987.750	13.13	28.85	41.98	54.00	-12.02	Average
3	17987.750	13.13	47.90	61.03	74.00	-12.97	Peak

18-25GHz (Only with worst case margin mode plot):

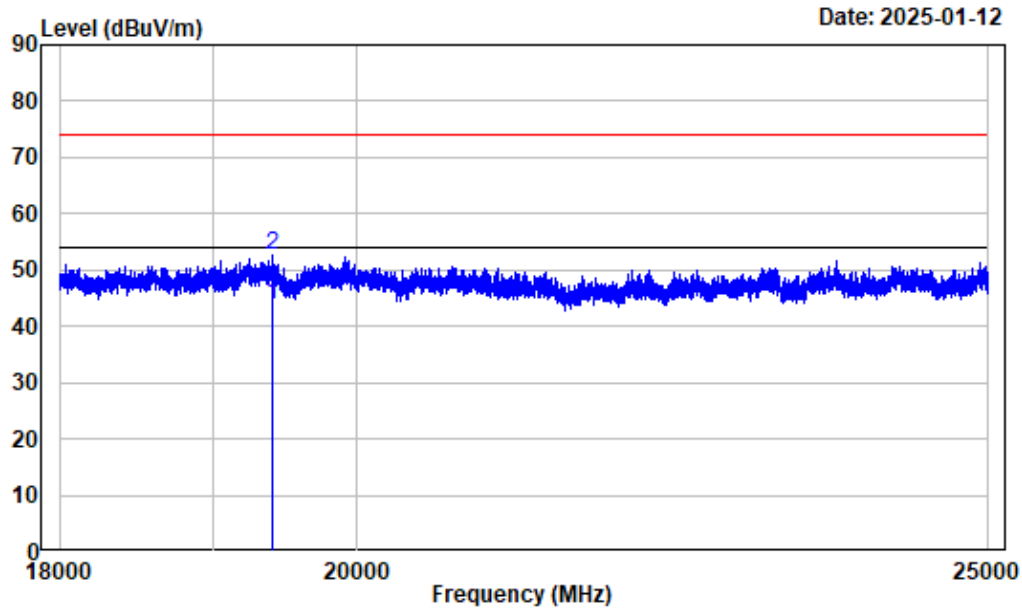
18-25GHz_Horizontal



Condition : Horizontal
Project No.: 2401A37173E-RF
Tester : Dylan Yang
Note : 2.4GWiFi-b_ANT1-2412

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	19283.790	15.23	28.95	44.18	54.00	-9.82	Average
2	19283.790	15.23	37.49	52.72	74.00	-21.28	Peak

18-25GHz_Vertical



Condition : Vertical
Project No.: 2401A37173E-RF
Tester : Dylan Yang
Note : 2.4GWiFi-b_ANT1-2412

Freq Factor		Read Level	Limit Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1 19411.550	15.10	28.75	43.85	54.00	-10.15	Average
2 19411.550	15.10	37.40	52.50	74.00	-21.50	Peak

6dB Emission Bandwidth

Test Information:

Sample No.:	2W9C-2	Test Date:	2024/12/31~2025/01/02
Test Site:	RF	Test Mode:	Transmitting
Tester:	Brian Li	Test Result:	Pass

Environmental Conditions:

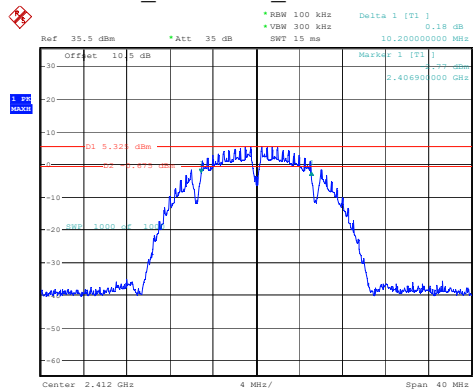
Temperature: (°C):	22	Relative Humidity: (%)	40	ATM Pressure: (kPa)	101
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Test Data:

Mode	Antenna	Test Frequency (MHz)	Result (MHz)	Limit (MHz)	Verdict
802.11b	Chain 0	2412	10.200	≥ 0.5	Pass
		2437	10.200	≥ 0.5	Pass
		2462	10.200	≥ 0.5	Pass
	Chain 1	2412	10.200	≥ 0.5	Pass
		2437	10.200	≥ 0.5	Pass
		2462	10.200	≥ 0.5	Pass
802.11g	Chain 0	2412	16.400	≥ 0.5	Pass
		2437	16.400	≥ 0.5	Pass
		2462	17.150	≥ 0.5	Pass
	Chain 1	2412	16.400	≥ 0.5	Pass
		2437	16.400	≥ 0.5	Pass
		2462	16.400	≥ 0.5	Pass
802.11n20	Chain 0	2412	17.150	≥ 0.5	Pass
		2437	17.200	≥ 0.5	Pass
		2462	17.200	≥ 0.5	Pass
	Chain 1	2412	17.050	≥ 0.5	Pass
		2437	16.800	≥ 0.5	Pass
		2462	16.800	≥ 0.5	Pass
802.11n40	Chain 0	2422	35.800	≥ 0.5	Pass
		2437	35.600	≥ 0.5	Pass
		2452	35.700	≥ 0.5	Pass
	Chain 1	2422	35.400	≥ 0.5	Pass
		2437	35.600	≥ 0.5	Pass
		2452	35.700	≥ 0.5	Pass

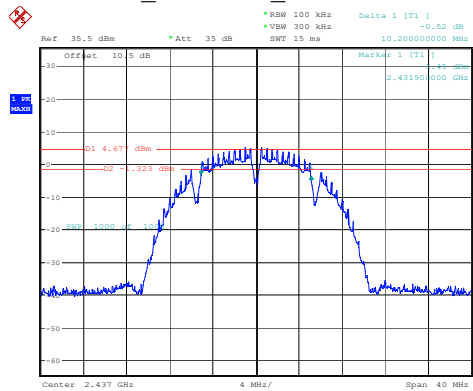
2412~2462

802.11b_2412MHz_Chain 0 10.200MHz



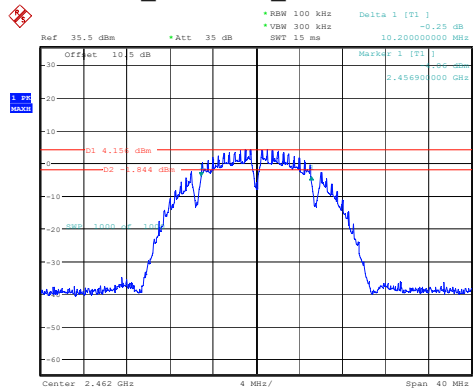
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 14:51:50

802.11b_2437MHz_Chain 0 10.200MHz



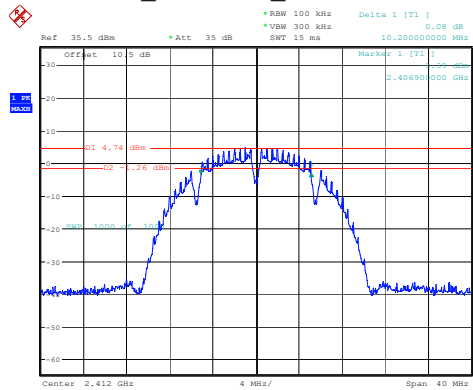
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:05:09

802.11b_2462MHz_Chain 0 10.200MHz



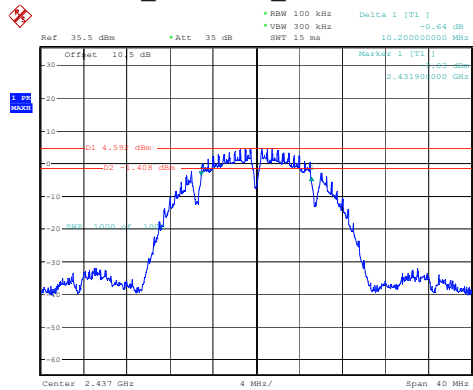
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:10:06

802.11b_2412MHz_Chain 1 10.200MHz



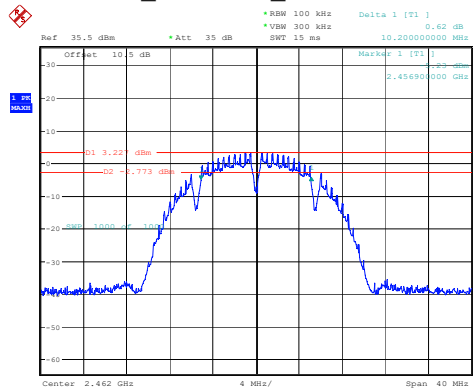
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 15:24:41

802.11b_2437MHz_Chain 1 10.200MHz



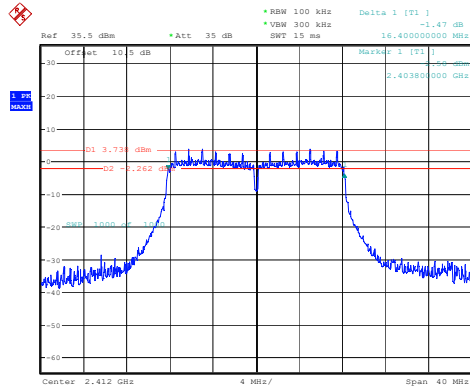
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 15:33:01

802.11b_2462MHz_Chain 1 10.200MHz



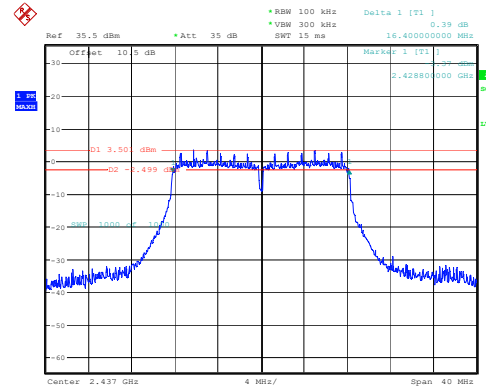
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 15:38:06

802.11g_2412MHz_Chain 0 16.400MHz



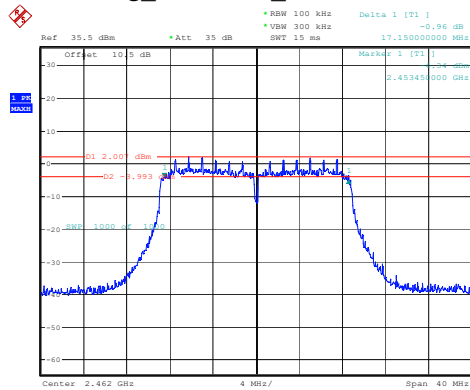
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:15:28

802.11g_2437MHz_Chain 0 16.400MHz



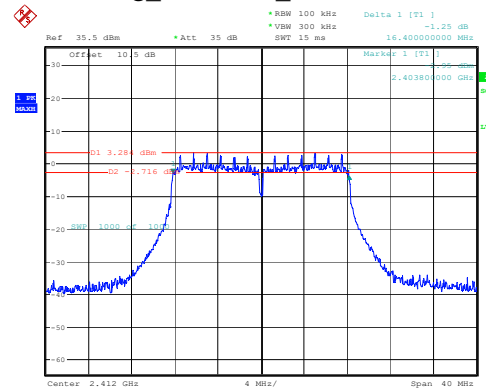
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:23:46

802.11g_2462MHz_Chain 0 17.150MHz



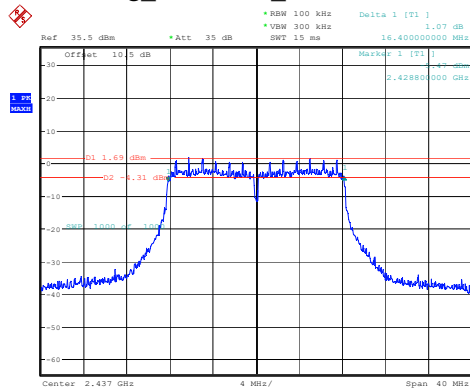
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:40:07

802.11g_2412MHz_Chain 1 16.400MHz



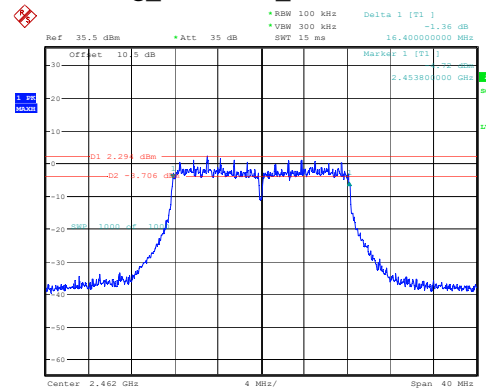
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 15:44:46

802.11g_2437MHz_Chain 1 16.400MHz



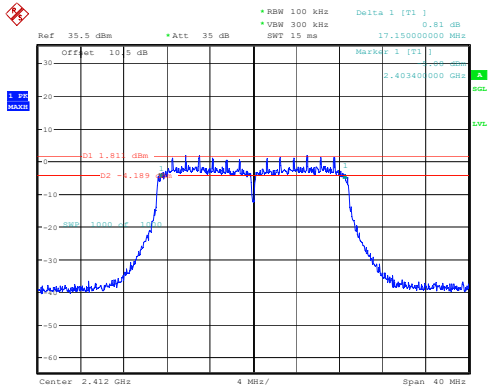
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 16:06:26

802.11g_2462MHz_Chain 1 16.400MHz



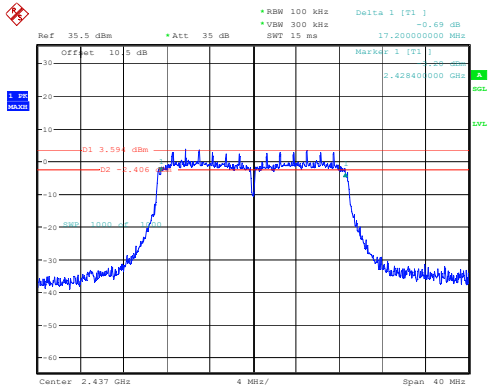
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 16:08:48

802.11n20_2412MHz_Chain 0 17.150MHz



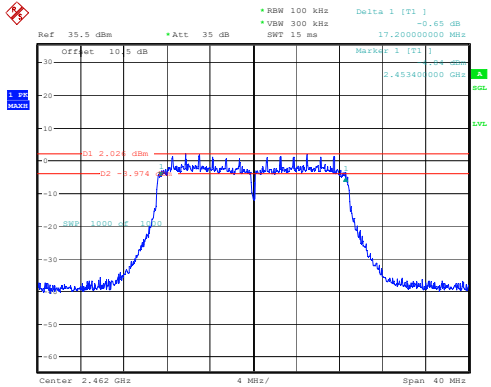
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:47:39

802.11n20_2437MHz_Chain 0 17.200MHz



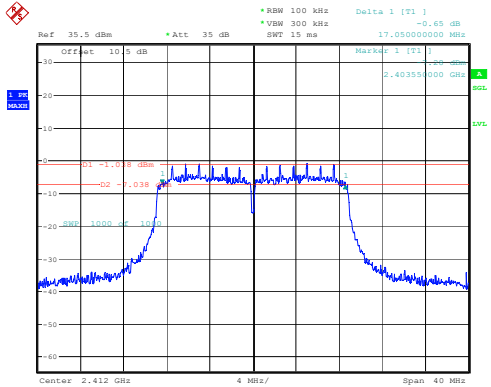
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:54:39

802.11n20_2462MHz_Chain 0 17.200MHz



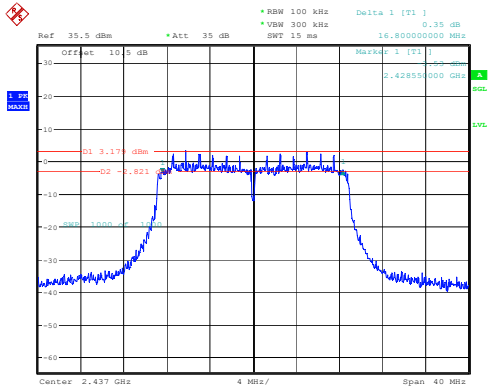
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:57:38

802.11n20_2412MHz_Chain 1 17.050MHz



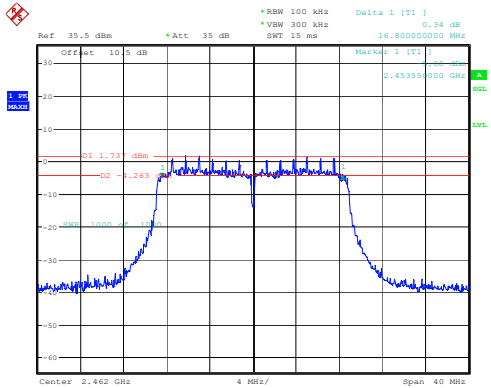
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 16:11:04

802.11n20_2437MHz_Chain 1 16.800MHz



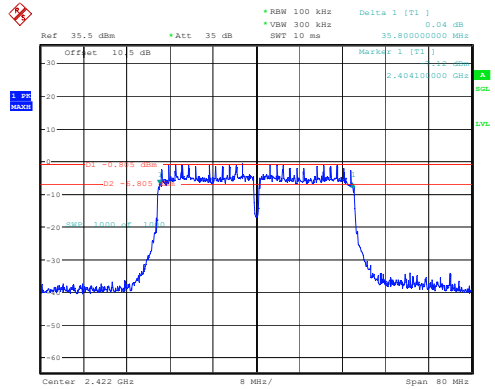
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 16:15:38

802.11n20_2462MHz_Chain 1 16.800MHz



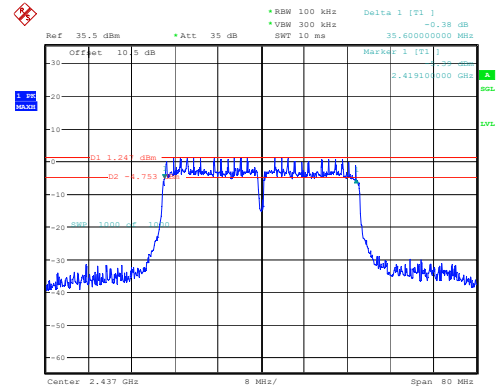
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 16:17:47

802.11n40_2422MHz_Chain 0 35.800MHz



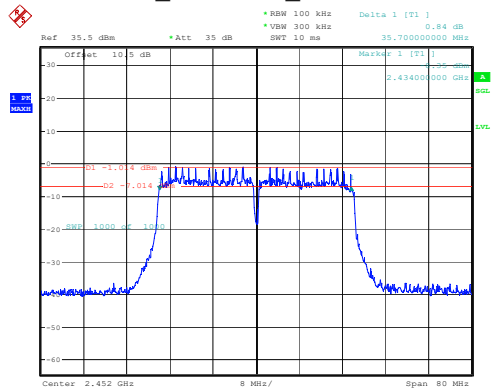
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 16:01:23

802.11n40_2437MHz_Chain 0 35.600MHz



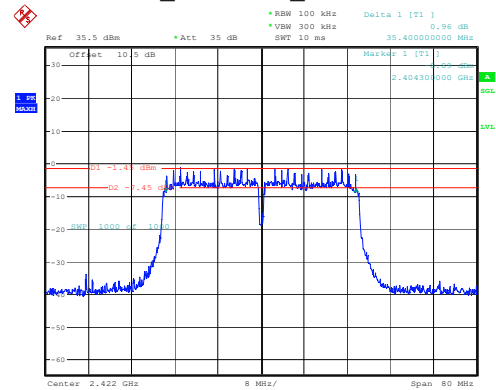
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 14:24:23

802.11n40_2452MHz_Chain 0 35.700MHz



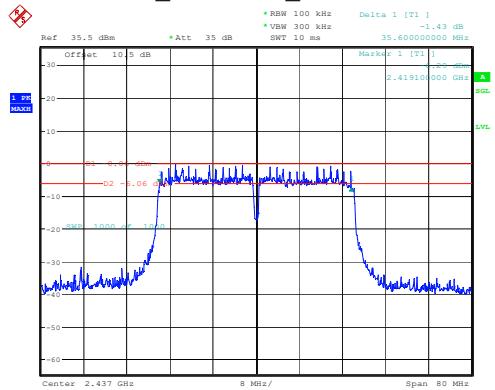
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 14:29:17

802.11n40_2422MHz_Chain 1 35.400MHz



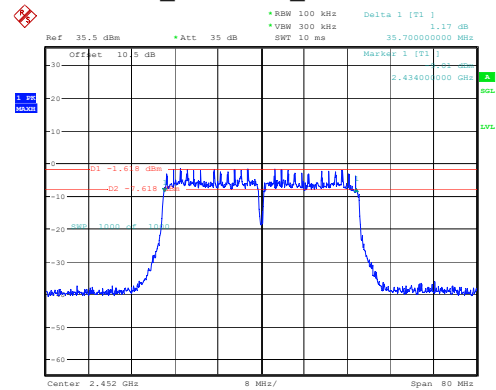
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 16:21:33

802.11n40_2437MHz_Chain 1 35.600MHz



ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 16:23:39

802.11n40_2452MHz_Chain 1 35.700MHz



ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 16:28:42

Maximum Conducted Output Power

Test Information:

Sample No.:	2W9C-2	Test Date:	2025/01/03
Test Site:	RF	Test Mode:	Transmitting
Tester:	Brian Li	Test Result:	Pass

Environmental Conditions:

Temperature: (°C):	22	Relative Humidity: (%)	40	ATM Pressure: (kPa)	101
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Test Data:

Mode	Antenna	Test Frequency (MHz)	Peak Output Power(dBm)	Average Output Power(dBm)	Limit (dBm)	Verdict
802.11b	Chain 0	2412	17.17	14.11	30	Pass
		2437	17.08	14.06	30	Pass
		2462	16.11	12.84	30	Pass
	Chain 1	2412	16.47	13.22	30	Pass
		2437	16.30	13.11	30	Pass
		2462	15.82	12.70	30	Pass
802.11g	Chain 0	2412	21.33	14.26	30	Pass
		2437	20.93	14.16	30	Pass
		2462	20.20	13.27	30	Pass
	Chain 1	2412	20.74	13.82	30	Pass
		2437	20.44	13.24	30	Pass
		2462	19.85	13.07	30	Pass
802.11n20	Chain 0	2412	19.36	10.26	30	Pass
		2437	20.81	11.13	30	Pass
		2462	19.03	9.88	30	Pass
	Chain 1	2412	18.76	9.49	30	Pass
		2437	18.61	9.30	30	Pass
		2462	17.99	8.85	30	Pass
802.11n40	Chain 0	2422	19.53	9.02	30	Pass
		2437	19.35	8.85	30	Pass
		2452	18.99	8.78	30	Pass
	Chain 1	2422	18.90	8.18	30	Pass
		2437	18.61	8.14	30	Pass
		2452	18.55	7.42	30	Pass

Power Spectral Density

Test Information:

Sample No.:	2W9C-2	Test Date:	2025/01/03
Test Site:	RF	Test Mode:	Transmitting
Tester:	Brian Li	Test Result:	Pass

Environmental Conditions:

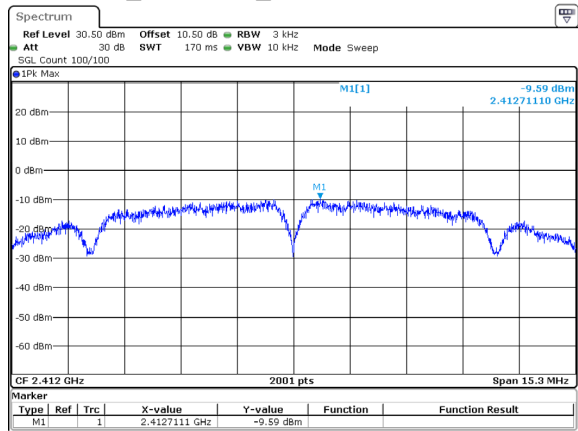
Temperature: (°C):	22	Relative Humidity: (%)	40	ATM Pressure: (kPa)	101
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Test Data:

Mode	Antenna	Test Frequency (MHz)	Result (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
802.11b	Chain 0	2412	-9.59	8	Pass
		2437	-9.67	8	Pass
		2462	-10.53	8	Pass
	Chain 1	2412	-10.16	8	Pass
		2437	-10.48	8	Pass
		2462	-10.99	8	Pass
802.11g	Chain 0	2412	-10.83	8	Pass
		2437	-11.19	8	Pass
		2462	-11.96	8	Pass
	Chain 1	2412	-11.60	8	Pass
		2437	-11.70	8	Pass
		2462	-12.33	8	Pass
802.11n20	Chain 0	2412	-13.07	8	Pass
		2437	-11.57	8	Pass
		2462	-13.02	8	Pass
	Chain 1	2412	-13.74	8	Pass
		2437	-13.86	8	Pass
		2462	-14.39	8	Pass
802.11n40	Chain 0	2422	-16.44	8	Pass
		2437	-16.76	8	Pass
		2452	-17.13	8	Pass
	Chain 1	2422	-16.98	8	Pass
		2437	-17.20	8	Pass
		2452	-17.51	8	Pass

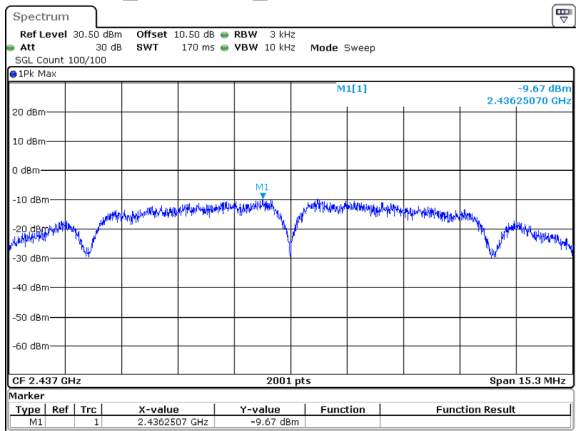
2412~2462

802.11b_2412MHz_Chain 0 -9.59dBm/3kHz



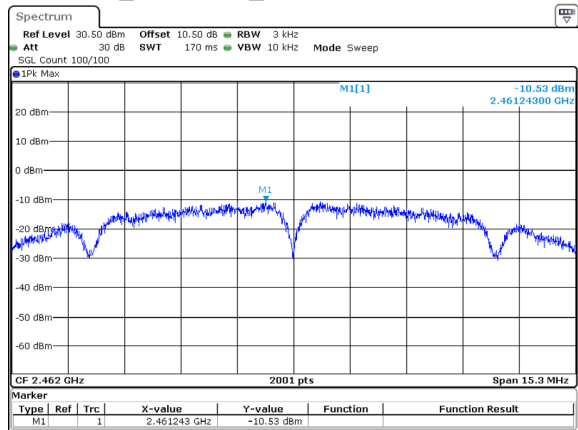
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 22:17:55

802.11b_2437MHz_Chain 0 -9.67dBm/3kHz



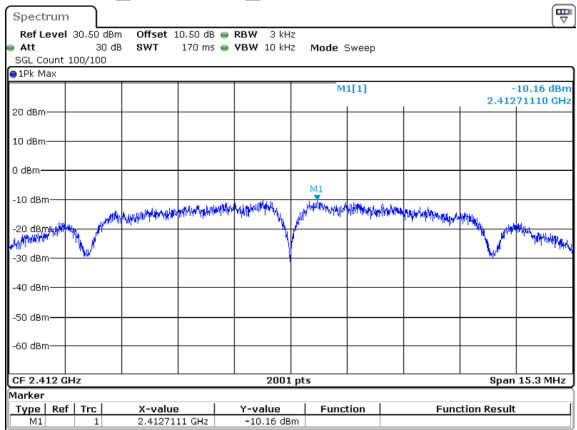
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 22:22:54

802.11b_2462MHz_Chain 0 -10.53dBm/3kHz



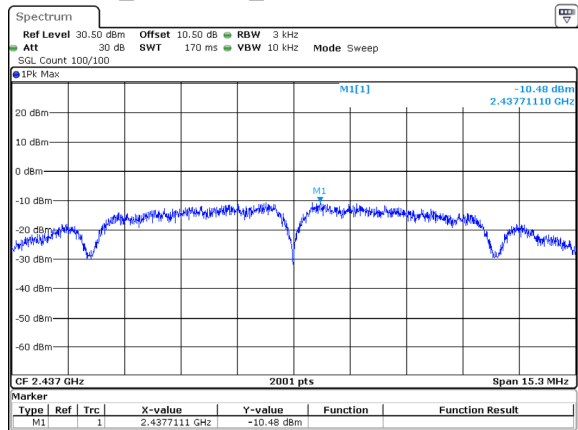
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 22:25:41

802.11b_2412MHz_Chain 1 -10.16dBm/3kHz



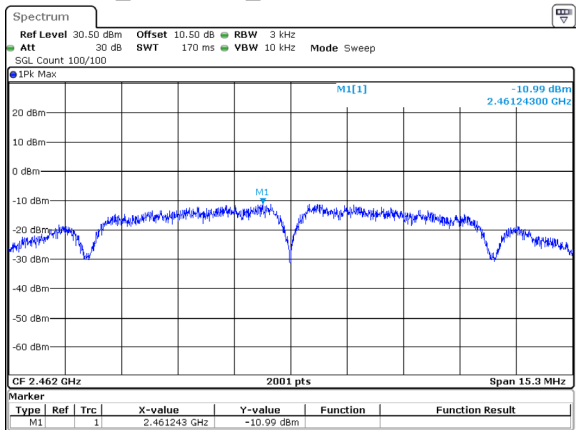
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 22:51:51

802.11b_2437MHz_Chain 1 -10.48dBm/3kHz



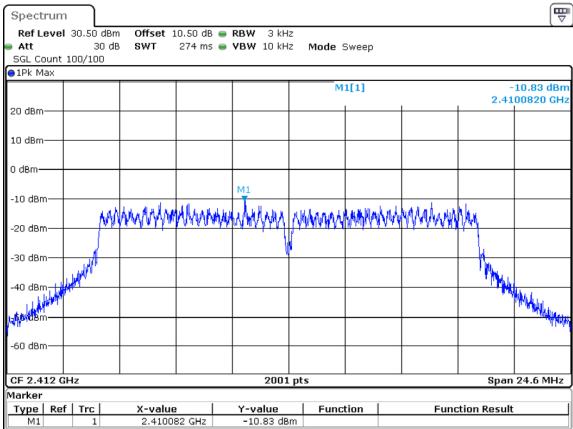
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 22:53:00

802.11b_2462MHz_Chain 1 -10.99dBm/3kHz



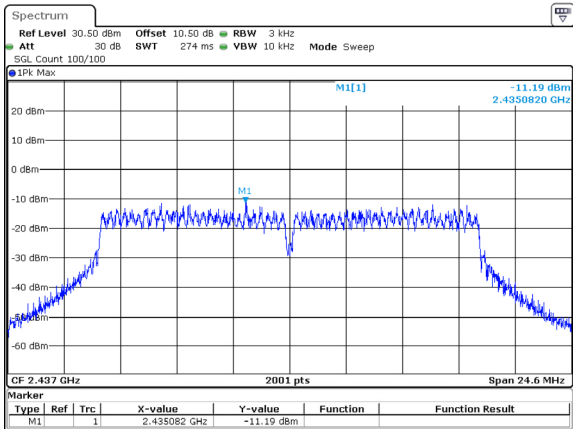
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 22:58:33

802.11g_2412MHz_Chain 0 -10.83dBm/3kHz



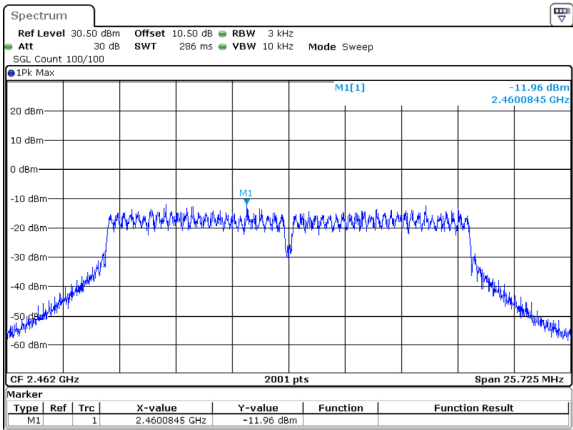
ProjectNo.:2401A37173E-RF Tester:Brian Li
 Date: 3.JAN.2025 22:27:40

802.11g_2437MHz_Chain 0 -11.19dBm/3kHz



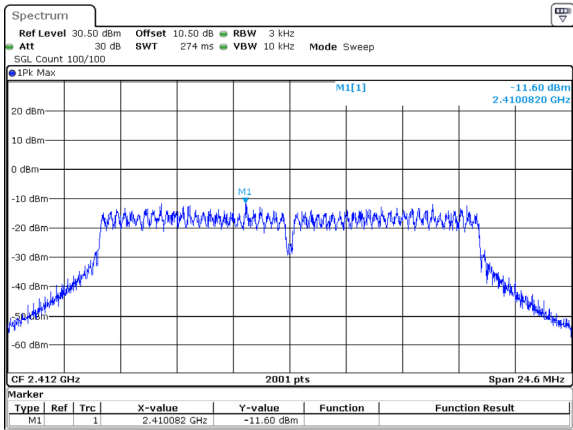
ProjectNo.:2401A37173E-RF Tester:Brian Li
 Date: 3.JAN.2025 22:29:26

802.11g_2462MHz_Chain 0 -11.96dBm/3kHz



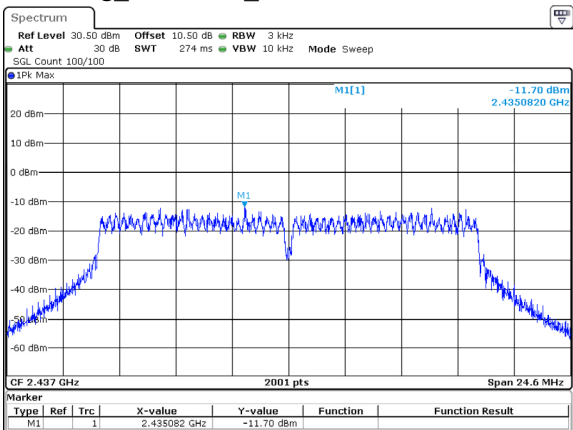
ProjectNo.:2401A37173E-RF Tester:Brian Li
 Date: 3.JAN.2025 22:30:50

802.11g_2412MHz_Chain 1 -11.60dBm/3kHz



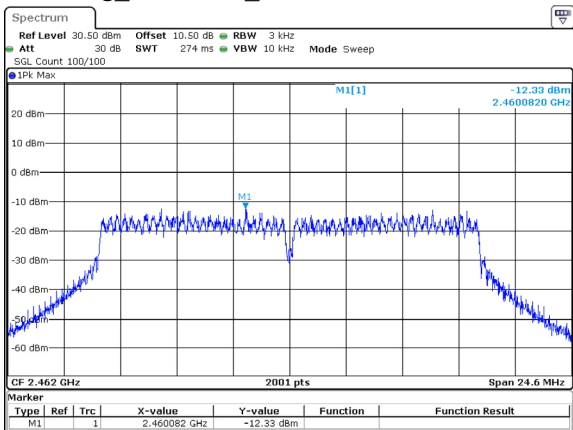
ProjectNo.:2401A37173E-RF Tester:Brian Li
 Date: 3.JAN.2025 23:01:04

802.11g_2437MHz_Chain 1 -11.70dBm/3kHz



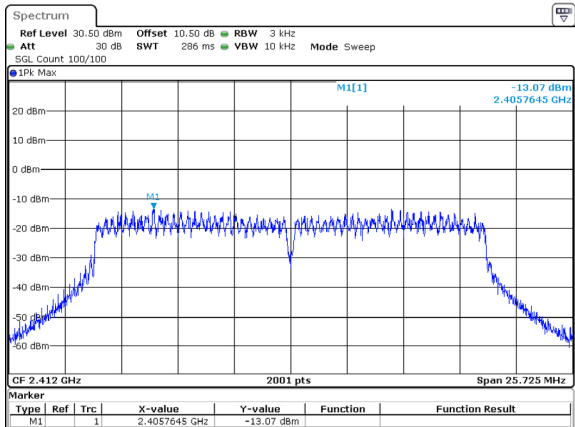
ProjectNo.:2401A37173E-RF Tester:Brian Li
 Date: 3.JAN.2025 23:02:48

802.11g_2462MHz_Chain 1 -12.33dBm/3kHz



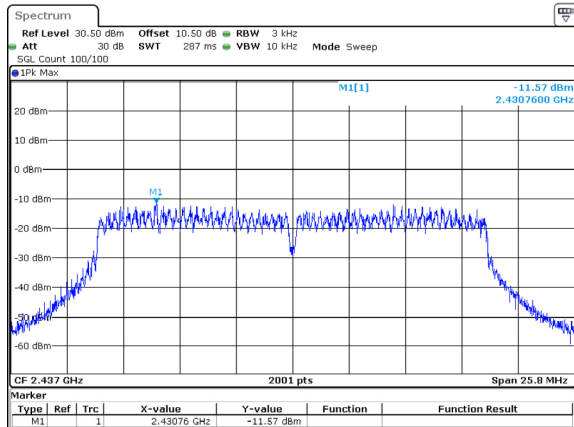
ProjectNo.:2401A37173E-RF Tester:Brian Li
 Date: 3.JAN.2025 23:05:36

802.11n20_2412MHz_Chain 0 -13.07dBm/3kHz



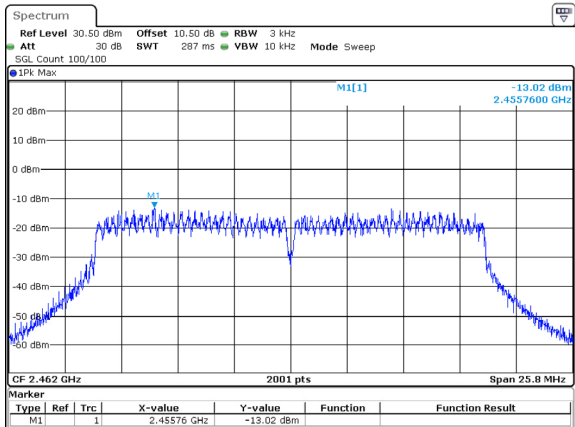
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 22:32:40

802.11n20_2437MHz_Chain 0 -11.57dBm/3kHz



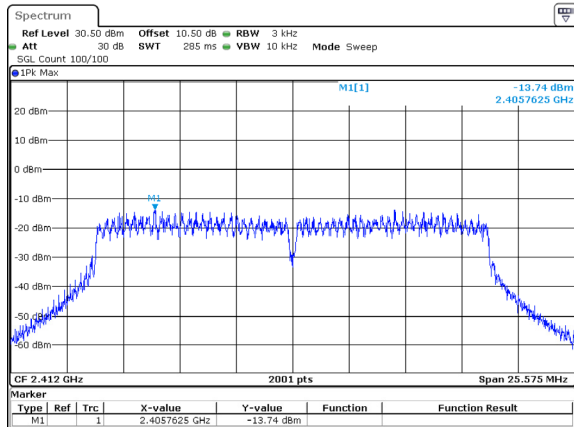
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 22:34:14

802.11n20_2462MHz_Chain 0 -13.02dBm/3kHz



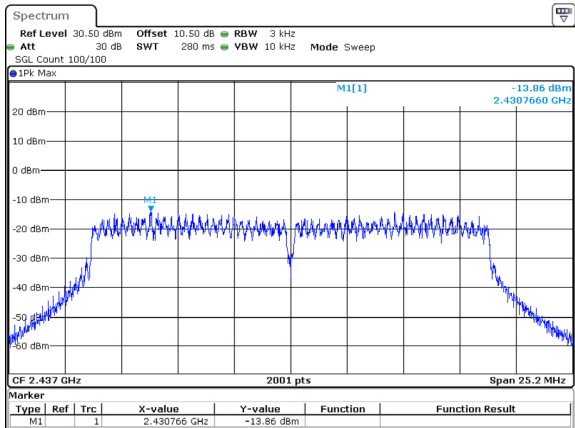
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 22:35:28

802.11n20_2412MHz_Chain 1 -13.74dBm/3kHz



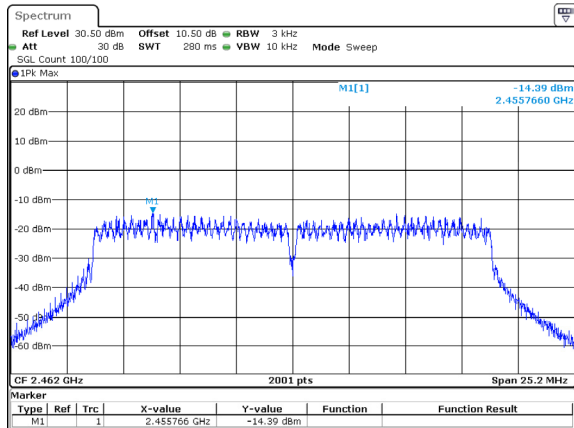
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 23:10:03

802.11n20_2437MHz_Chain 1 -13.86dBm/3kHz



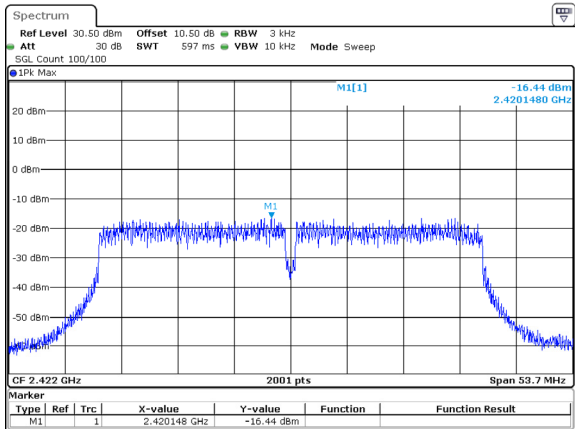
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 23:11:45

802.11n20_2462MHz_Chain 1 -14.39dBm/3kHz



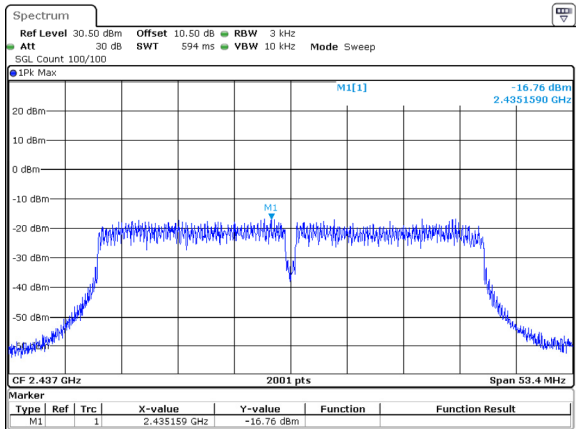
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 23:13:34

802.11n40_2422MHz_Chain 0 -16.44dBm/3kHz



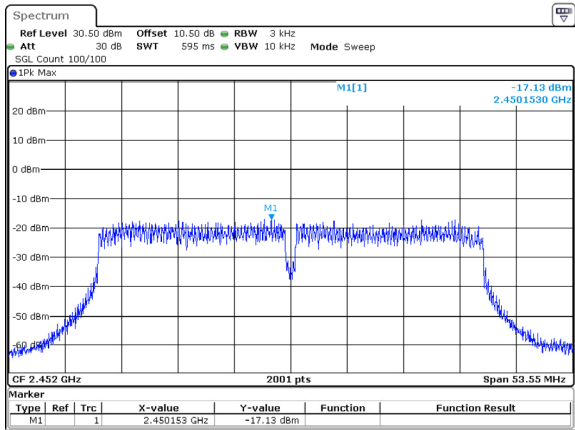
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 22:38:45

802.11n40_2437MHz_Chain 0 -16.76dBm/3kHz



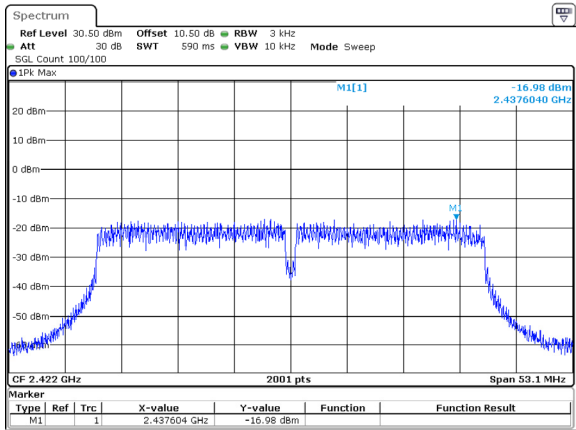
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 22:43:39

802.11n40_2452MHz_Chain 0 -17.13dBm/3kHz



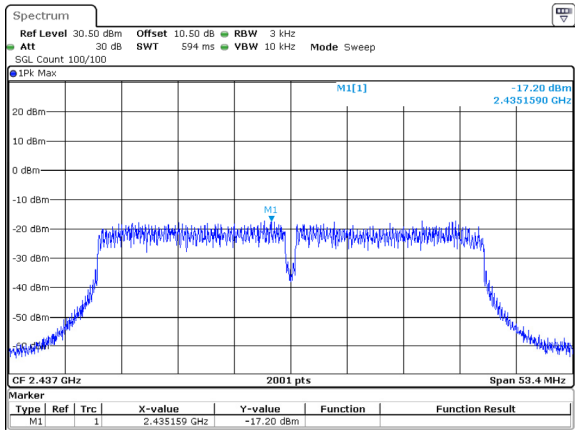
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 22:45:53

802.11n40_2422MHz_Chain 1 -16.98dBm/3kHz



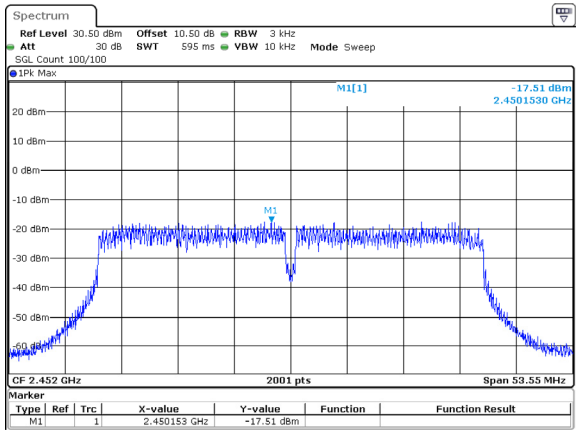
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 23:16:14

802.11n40_2437MHz_Chain 1 -17.20dBm/3kHz



ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 23:19:15

802.11n40_2452MHz_Chain 1 -17.51dBm/3kHz



ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 3.JAN.2025 23:21:21

100 kHz Bandwidth of Frequency Band Edge

Test Information:

Sample No.:	2W9C-2	Test Date:	2024/12/31~2025/01/02
Test Site:	RF	Test Mode:	Transmitting
Tester:	Brian Li	Test Result:	Pass

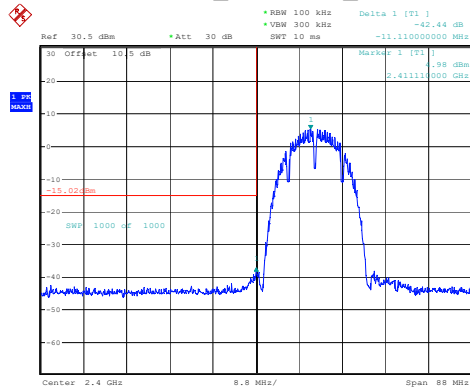
Environmental Conditions:

Temperature: (°C):	22	Relative Humidity: (%)	40	ATM Pressure: (kPa)	101
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Test Data:

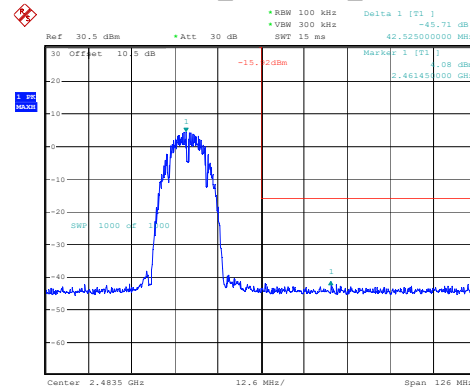
2412~2462

802.11b_2412MHz_Chain 0



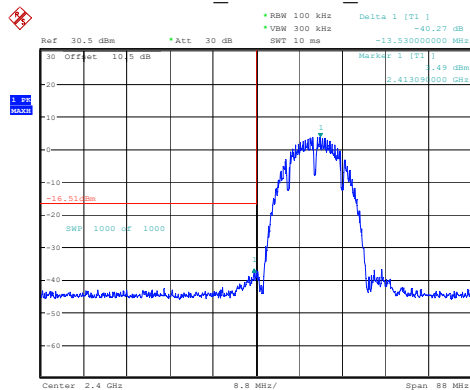
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 14:52:42

802.11b_2462MHz_Chain 0



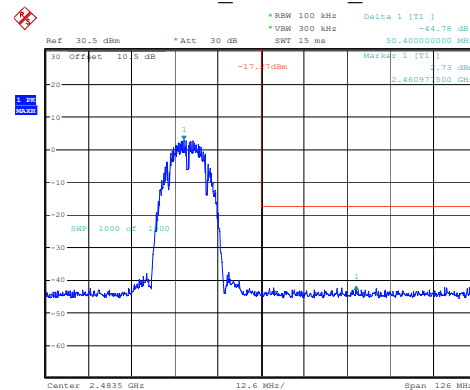
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:11:06

802.11b_2412MHz_Chain 1



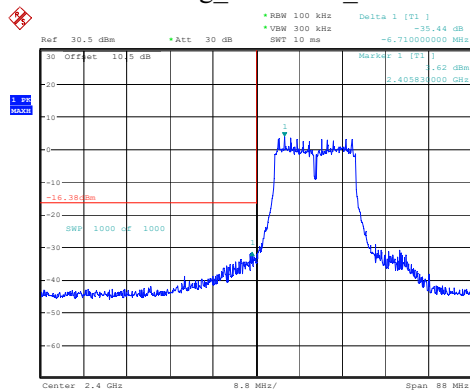
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 15:26:27

802.11b_2462MHz_Chain 1



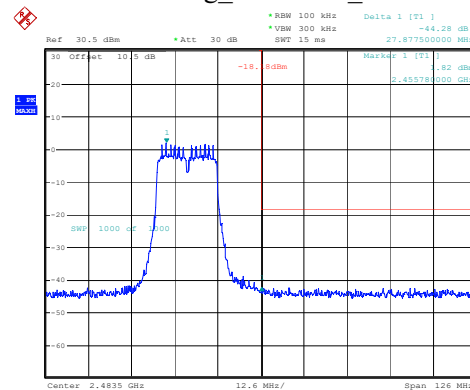
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 15:40:08

802.11g_2412MHz_Chain 0



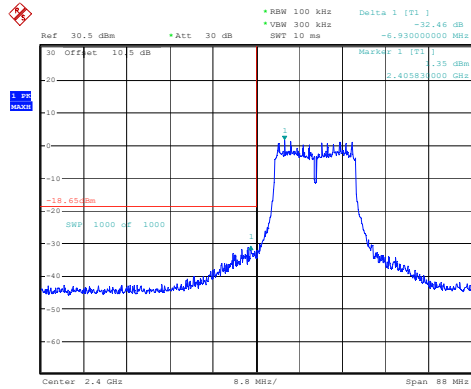
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:16:40

802.11g_2462MHz_Chain 0



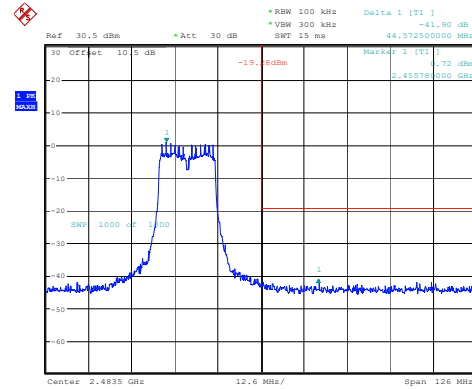
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:41:00

802.11g_2412MHz_Chain 1



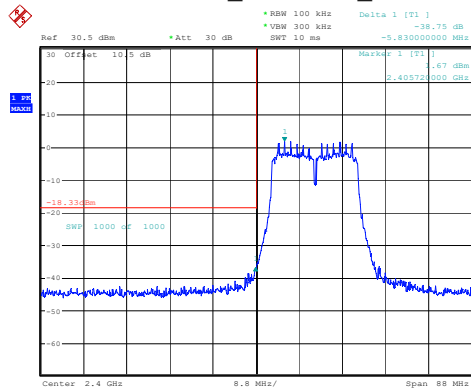
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 15:46:32

802.11g_2462MHz_Chain 1



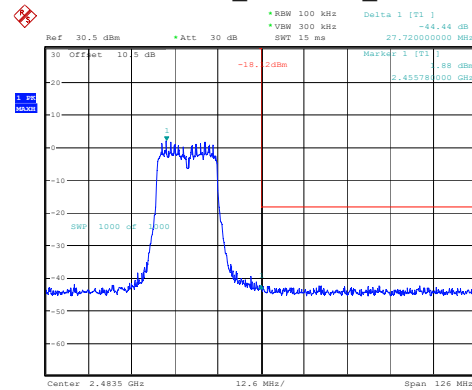
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 16:09:37

802.11n20_2412MHz_Chain 0



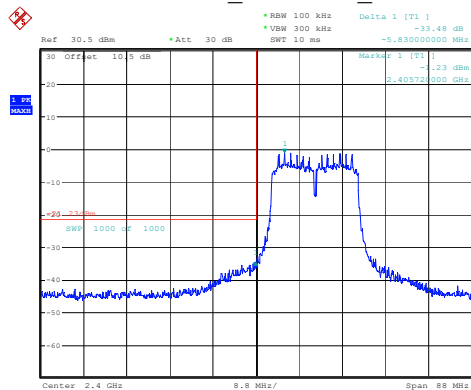
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:48:27

802.11n20_2462MHz_Chain 0



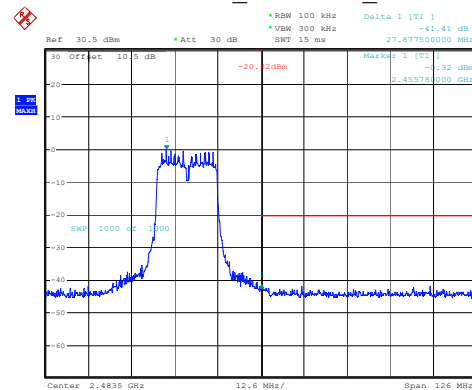
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 31.DEC.2024 15:59:18

802.11n20_2412MHz_Chain 1



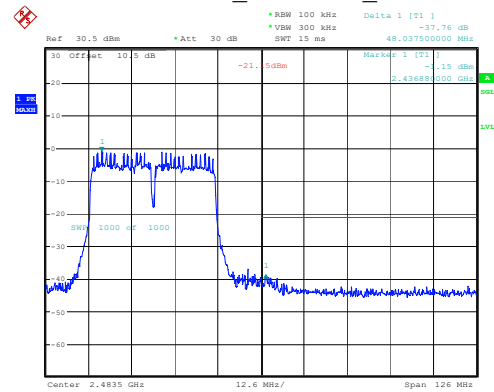
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 16:11:49

802.11n20_2462MHz_Chain 1



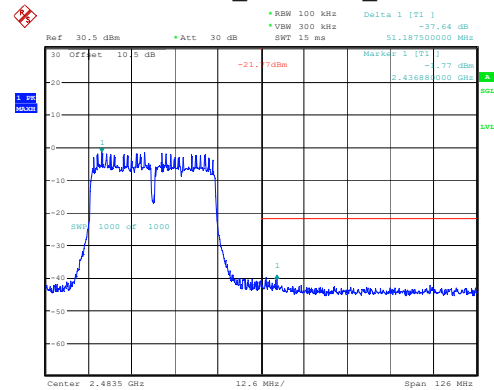
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 16:18:41

802.11n40_2452MHz_Chain 0



ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 14:30:08

802.11n40_2452MHz_Chain 1



ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 16:29:41

Duty Cycle

Test Information:

Sample No.:	2W9C-2	Test Date:	2025/01/02~2025/01/16
Test Site:	RF	Test Mode:	Transmitting
Tester:	Brian Li	Test Result:	N/A

Environmental Conditions:

Temperature: (°C):	22	Relative Humidity: (%)	40	ATM Pressure: (kPa)	101
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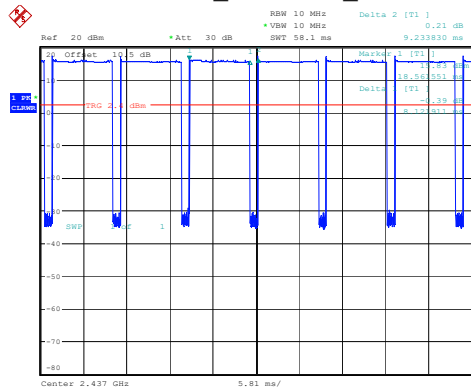
Test Data:

Mode	Antenna	Test Frequency (MHz)	Ton (ms)	Ton+Toff (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/Ton (Hz)	VBW Setting (kHz)
802.11b	Chain 0	2437	8.122	9.234	87.96	0.56	123	0.2
	Chain 1	2437	8.224	9.239	89.01	0.51	122	0.2
802.11g	Chain 0	2437	1.342	2.370	56.62	2.47	745	1
	Chain 1	2437	1.357	2.363	57.43	2.41	737	1
802.11n20	Chain 0	2437	1.271	2.278	55.79	2.53	787	1
	Chain 1	2437	1.271	2.277	55.82	2.53	787	1
802.11n40	Chain 0	2437	0.617	1.636	37.71	4.23	1621	2
	Chain 1	2437	0.630	1.635	38.53	4.14	1587	2

Duty Cycle = Ton/(Ton+Toff)*100%

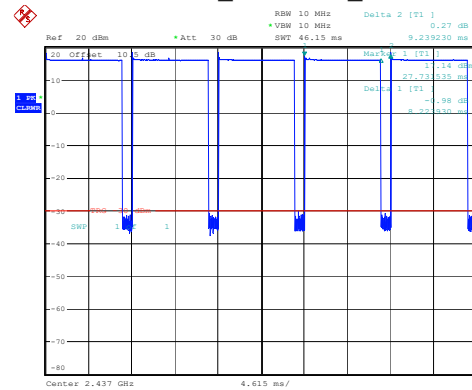
2412~2462

802.11b_2437MHz_Chain 0



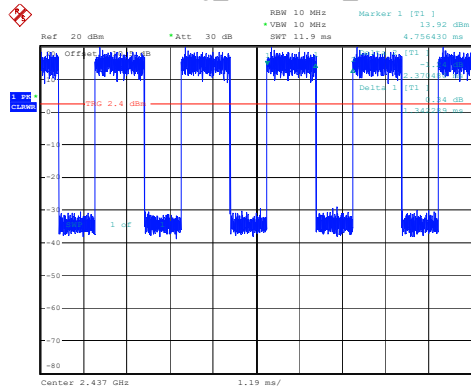
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 16.JAN.2025 17:08:41

802.11b_2437MHz_Chain 1



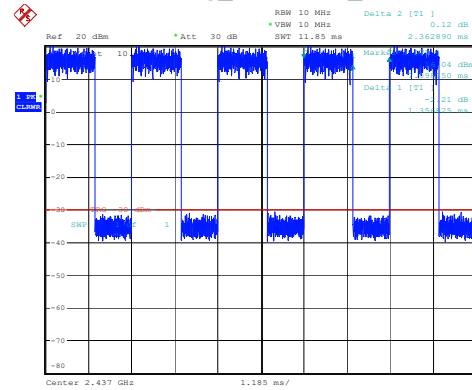
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 15:15:24

802.11g_2437MHz_Chain 0



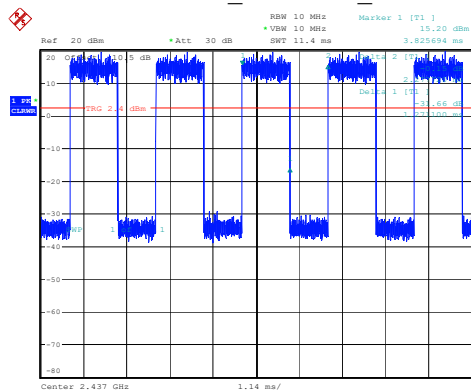
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 16.JAN.2025 17:16:22

802.11g_2437MHz_Chain 1



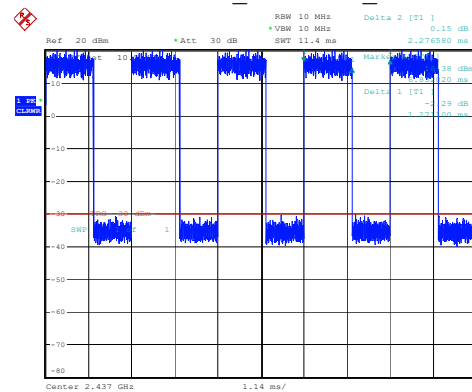
ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 15:16:04

802.11n20_2437MHz_Chain 0

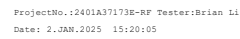
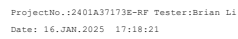


ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 16.JAN.2025 17:17:27

802.11n20_2437MHz_Chain 1



ProjectNo.:2401A37173E-RF Tester:Brian Li
Date: 2.JAN.2025 15:19:28



RF EXPOSURE EVALUATION

MPE-Based Exemption

Applicable Standard

According to subpart 15.247 (i) and subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

According to KDB 447498 D04 Interim General RF Exposure Guidance

MPE-Based Exemption:

General frequency and separation-distance dependent MPE-based effective radiated power(ERP) thresholds are in Table B.1 [Table 1 of § 1.1307(b)(3)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$.
1.34-30	$3,450 R^2/f^2$.
30-300	$3.83 R^2$.
300-1,500	$0.0128 R^2 f$.
1,500-100,000	$19.2 R^2$.

R is the minimum separation distance in meters

f = frequency in MHz

Result

Mode	Frequency (MHz)	Tune up conducted power [#] (dBm)	Antenna Gain [#]		ERP		Evaluation Distance (m)	ERP Limit (W)
			(dBi)	(dBd)	(dBm)	(W)		
BT	2402~2480	7.5	3.00	0.85	8.35	0.01	0.2	0.768
BLE	2402~2480	7.5	3.00	0.85	8.35	0.01	0.2	0.768
2.4G Wi-Fi	2412~2462	22.0	3.00	0.85	22.85	0.19	0.2	0.768
5.2G Wi-Fi	5150-5250	13.0	5.22	3.07	16.07	0.04	0.2	0.768
5.8G Wi-Fi	5725-5850	12.0	5.22	3.07	15.07	0.03	0.2	0.768

Note:

- 1) The tune up conducted power and antenna gain was declared by the applicant.
- 2) The BT, 2.4G and 5G Wi-Fi cannot simultaneous transmitting.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant

EUT PHOTOGRAPHS

Please refer to the attachment 2401A37173E-RF External photo and 2401A37173E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2401A37173E-RF-00A Test Setup photo.

******* END OF REPORT *******