FCC Test Report

Report No.:	2405V85308EE
Applicant:	Shenzhen Qianyan Technology LTD
Address:	No.3301, Block C, Section 1, ChuangzhiYuncheng Building, Liuxian Avenue, Xili Community, Xili Street, Nanshan District, Shenzhen, China
Product Name:	Govee Outdoor Projector Light
Product Model:	H7070
Multiple Models:	N/A
Trade Mark:	Govee
FCC ID:	2A7VD-H7070
Standards:	FCC CFR Title 47 Part 15C (§15.247)
Test Date:	2024-07-12 to 2024-08-06
Test Result:	Complied
Report Date:	2024-08-07

Reviewed by: Frank Yin — Project Engineer

Approved by: Jacob Kong — Manager

Prepared by:

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

NVLAP TESTING NVLAP LAB CODE 600335-0

ilac-MRA

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3. This sample tested is in compliance with the limits of the above regulation.

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5. 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.

Revision History

Version No.	Issued Date	Description
00	*2024-08-07*	*Original*

Contents

1 General Information

1.1 Client Information

Applicant:	Shenzhen Qianyan Technology LTD
Address:	No.3301, Block C, Section 1, ChuangzhiYuncheng Building, Liuxian Avenue, Xili Community, Xili Street, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Qianyan Technology LTD
Address:	No.3301, Block C, Section 1, ChuangzhiYuncheng Building, Liuxian Avenue, Xili Community, Xili Street, Nanshan District, Shenzhen, China

1.2 Product Description of EUT

The EUT is Govee Outdoor Projector Light that contains BLE and 2.4G WLAN radio, this report covers the full testing of the 2.4G WLAN radio.

Sample Serial Number	2O9N-3 & 2O9N-11 for CE&RE test, 2O9N-10 for RF conducted test (assigned by WATC)
Sample Received Date	2024-07-10
Sample Status	Good Condition
Frequency Range	2412MHz - 2462MHz(802.11b, g, n-HT20)
Maximum Conducted Peak Output Power	22.60dBm
Modulation Technology	DSSS, OFDM
Antenna Gain#	3.98dBi
Spatial Streams#	SISO (1TX, 1RX)
Power Supply	AC 120V/60Hz
Adapter Information	Model: BI24G-120200-AdU Input: AC100-240V, 50/60Hz, 0.8A Output: DC 12V/2.0A,
Modification	Sample No Modification by the test lab

1.3 Antenna information

15.203 requirement:

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, 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.

Device Antenna information:	

The Wi-Fi antenna is an internal antenna which cannot replace by end-user. Please see product internal photos for details.

1.4 Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s)

1.5 Measurement Uncertainty

Parameter		Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
AC Power Lines Conducted Emissions		±3.14dB
Emissions, Radiated	Below 30MHz	±2.78dB
	Below 1GHz	±4.84dB
	Above 1GHz	±5.44dB
Emissions, Conducted		1.75dB
Conducted Power		0.74dB
Frequency Error		150Hz
Bandwidth		0.34%
Power Spectral Density		0.74dB

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.*

1.6 Laboratory Location

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: qa@watc.com.cn

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. : 463912, the FCC Designation No. : CN5040.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0160.

1.7 Test Methodology

FCC CFR 47 Part 2

FCC CFR 47 Part 15

KDB 558074 D01 DTS Meas Guidance v05r02

ANSI C63.10-2013

2 Description of Measurement

2.1 Test Configuration

Operating channels:					
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	6	2437	11	2462
2	2417	7	2442	/	/
3	2422	8	2447	/	/
4	2427	9	2452	/	/
5	2432	10	2457	/	/
According to ANSI C63.10-2013 chapter 5.6.1 Table 11 requirement, select lowest channel, middle channel, and highest channel in the frequency range in which device operates for testing. The detailed frequency points are as follows:					
802.11b, 802.11g, 802.11n-HT20					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	6	2437	11	2462

Test Mode:				
Transmitting mode:	Keep the EUT in continuous transmitting with modulation			
Exercise software#:	mptool *			
Mode	**Worst-case Data rate**	**Power Level Setting#**		
		Low Channel	**Middle Channel**	**High Channel**
802.11b	1Mbps	84	84	84
802.11g	6Mbps	80	80	80
802.11n-HT20	6.5Mbps	75	75	75
The exercise software and the maximum power setting that provided by manufacturer.				

Worst-Case Configuration:
For radiated emissions, EUT was investigated in three orthogonal orientation, the worst-case orientation was recorded in report For AC power line conducted emission and radiated emission 9kHz-1GHz and above 18GHz were performed with the EUT transmits at the channel with highest output power as worst-case scenario.

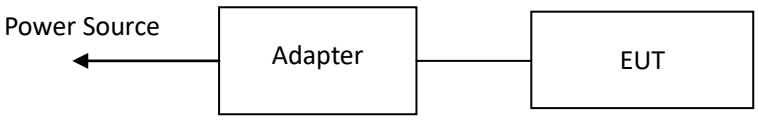
2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
/	/	/	/

2.3 Interconnecting Cables

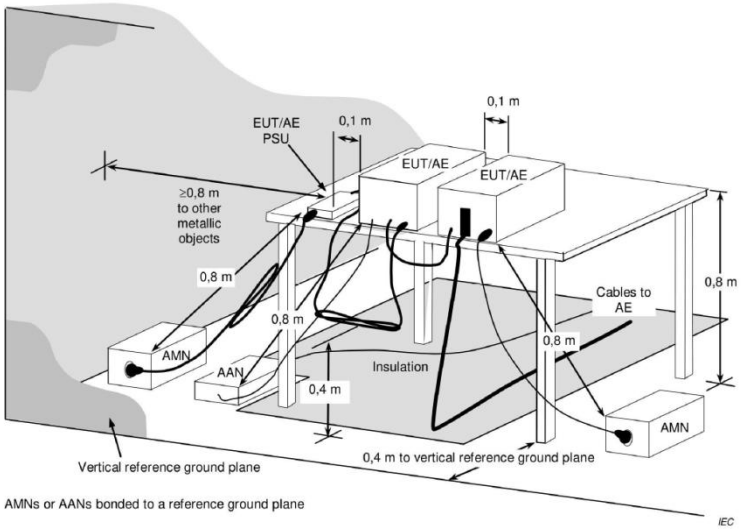
Manufacturer	Description	From	To
Dong Guan Royal	DC Power Cable	Adapter	EUT

2.4 Block Diagram of Connection between EUT and AE



2.5 Test Setup

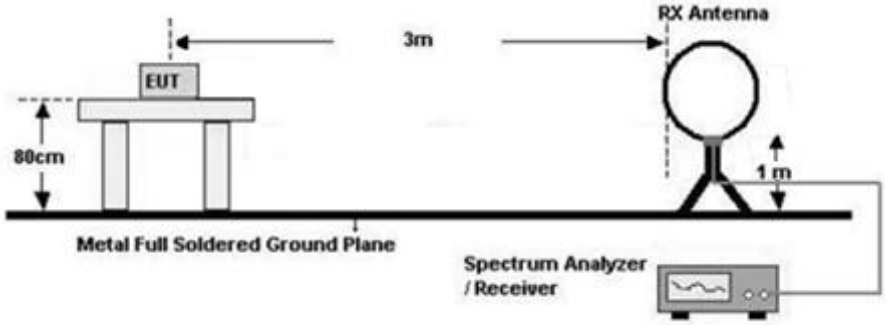
1) Conducted emission measurement:



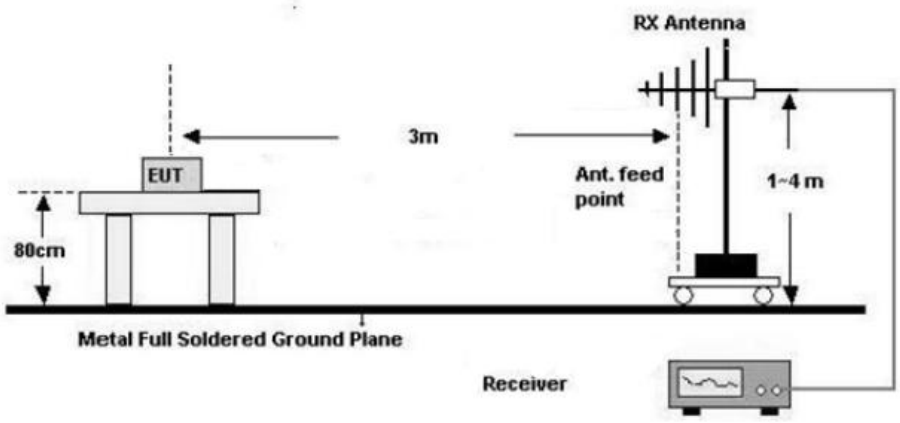
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

2) Radiated emission measurement:

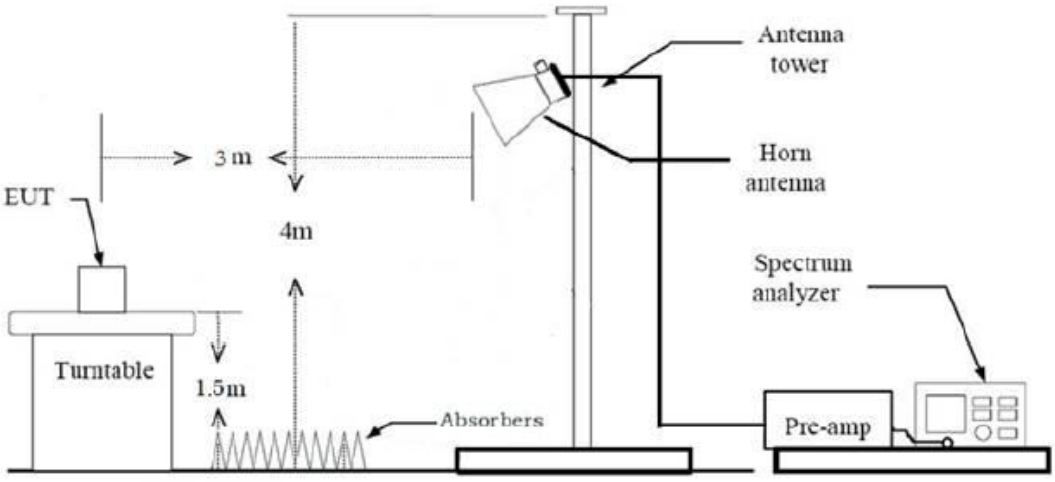
Below 30MHz (3m SAC)



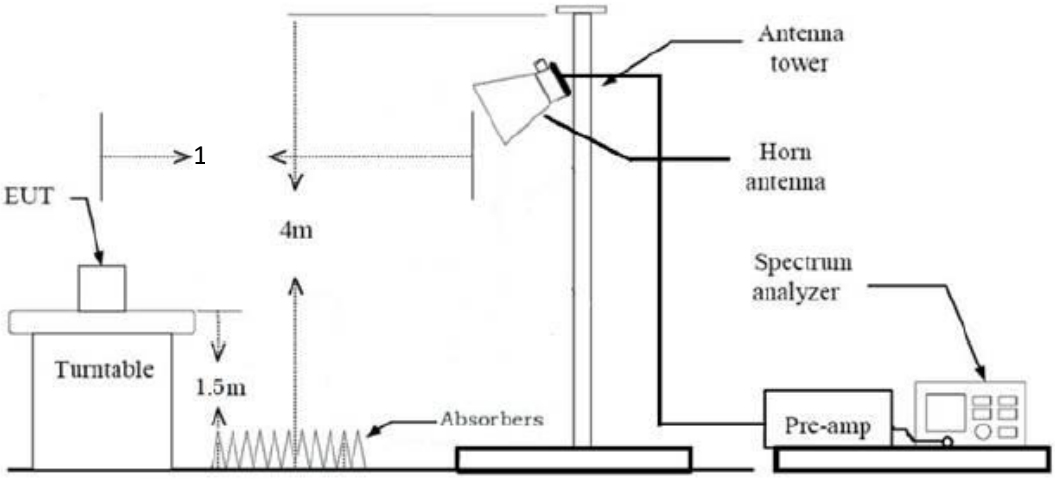
30MHz-1GHz (3m SAC)



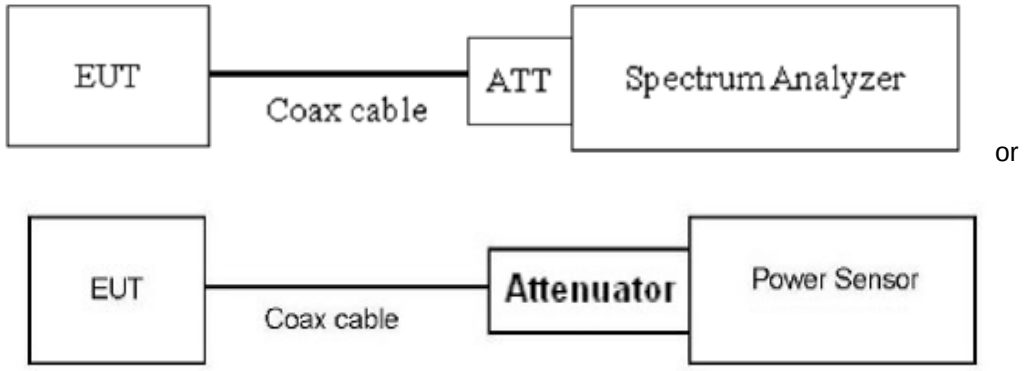
1GHz-18GHz(3m FAC)



Above 18GHz (3m FAC)



3) RF Conducted Test



2.6 Test Procedure

Conducted emission:

1. The E.U.T is placed on a non-conducting table 40cm from the vertical ground plane and 80cm above the horizontal ground plane (Please refer to the block diagram of the test setup and photographs).
2. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
3. Line conducted data is recorded for both Line and Neutral

Radiated Emission Procedure:

a) For below 30MHz

1. All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz- 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were 40*Log (test distance / specification distance).
2. Loop antenna use, investigation was done on the three antenna orientations (parallel, perpendicular, gound-parallel)

b) For 30MHz-1GHz:

1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m.
2. EUT works in each mode of operation that needs to be tested. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.

c) For above 1GHz:

1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m (1-18GHz) and 1.5 m

(above 18GHz).

2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.
3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
4. Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

RF Conducted Test:

1. The antenna port of EUT was connected to the RF port of the test equipment (Power Meter or Spectrum analyzer) through Attenuator and RF cable.
2. The cable assembly insertion loss of 7.0dB (including 6.0 dB Attenuator and 1.0 dB cable) was entered as an offset in the power meter. Note: Actual cable loss was unavailable at the time of testing, therefore a loss of 1.0dB was assumed as worst case. This was later verified to be true by laboratory. (if the RF cable provided by client, the cable loss declared by client)
3. The EUT is keeping in continuous transmission mode and tested in all modulation modes.

2.7 Measurement Method

Description of Test	Measurement Method
AC Line Conducted Emissions	ANSI C63.10-2013 Section 6.2
Maximum Conducted Output Power	ANSI C63.10-2013 Section 11.9.1.2 PKPM1 Peak power meter method or ANSI C63.10-2013 Section 11.9.2.3.2 Method AVGPM-G
Power Spectral Density	ANSI C63.10-2013 Section 11.10.2 Method PKPSD (peak PSD)
6 dB Emission Bandwidth	ANSI C63.10-2013 Section 11.8.1
99% Occupied Bandwidth	ANSI C63.10-2013 Section 6.9.3
100kHz Bandwidth of Frequency Band Edge	ANSI C63.10-2013 Section 6.10
Radiated emission	ANSI C63.10-2013 Section 11.11&11.12
Duty Cycle	ANSI C63.10-2013 Section 11.6

2.8 Measurement Equipment

Manufacturer	Description	Model	Management No.	Calibration Date	Calibration Due Date
AC Line Conducted Emission Test					
ROHDE& SCHWARZ	EMI TEST RECEIVER	ESR	101817	2024/6/4	2025/6/3
R&S	LISN	ENV216	101748	2024/6/4	2025/6/3
N/A	Coaxial Cable	NO.12	N/A	2024/6/4	2025/6/3
Farad	Test Software	EZ-EMC	Ver. EMEC-3A1	/	/
Radiated Emission Test					
R&S	EMI test receiver	ESR3	102758	2024/6/4	2025/6/3
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSV40-N	101608	2024/6/4	2025/6/3
SONOMA INSTRUMENT	Low frequency amplifier	310	186014	2024/6/4	2025/6/3
COM-POWER	preamplifier	PAM-118A	18040152	2024/6/4	2025/6/3
COM-POWER	Amplifier	PAM-840A	461306	2023/8/8	2024/8/7
BACL	Loop Antenna	1313-1A	4010611	2024/2/7	2027/2/6
SCHWARZBECK	Log - periodic wideband antenna	VULB 9163	9163-872	2023/7/7	2026/7/6
Astro Antenna Ltd	Horn antenna	AHA-118S	3015	2023/7/6	2026/7/5
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2023/7/10	2026/7/9
Oulitong	Band Reject Filter	OBSF-2400-248 3.5-50N	OE02103119	2024/6/4	2025/6/3
N/A	Coaxial Cable	N/A	NO.9	2024/6/4	2025/6/3
N/A	Coaxial Cable	N/A	NO.13	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.14	2024/6/4	2025/6/3
N/A	Coaxial Cable	N/A	NO.15	2024/6/4	2025/6/3
N/A	Coaxial Cable	N/A	NO.16	2024/6/4	2025/6/3
N/A	Coaxial Cable	N/A	NO.17	2024/6/4	2025/6/3
Audix	Test Software	E3	191218 V9	/	/
RF Conducted Test					
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSU-26	200680/026	2024/6/4	2025/6/3
ANRITSU	USB Power Sensor	MA24418A	12620	2024/6/4	2025/6/3
narda	6dB attenuator	603-06-1	N/A	2024/6/4	2025/6/3

Note: All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or International standards.

3 Test Results

3.1 Test Summary

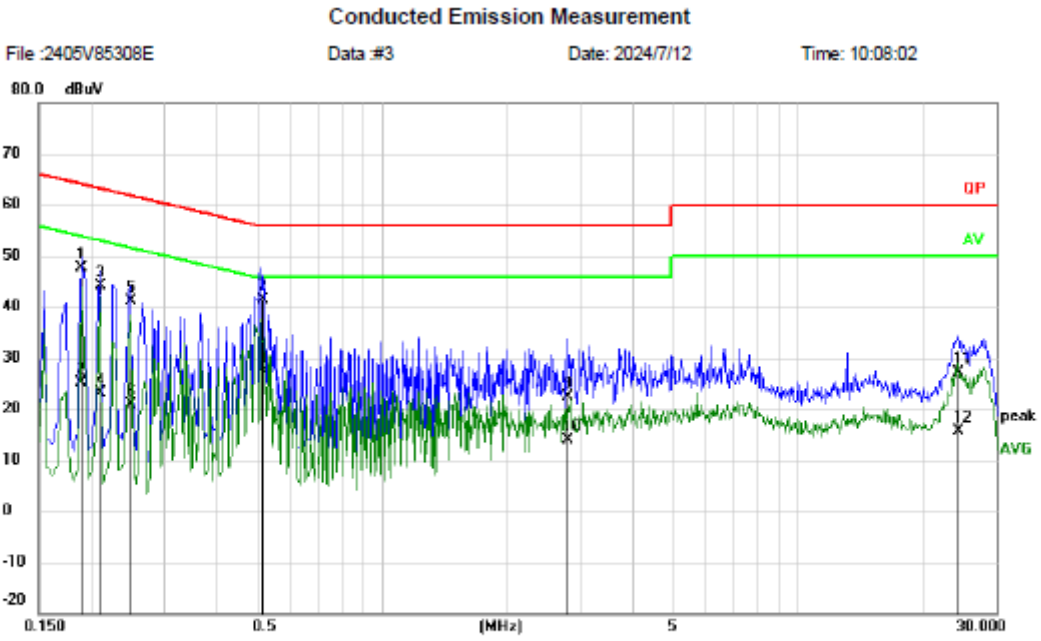
FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.247(b)(3)	Maximum Conducted Output Power	Compliance
§15.247(e)	Power Spectral Density	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
-	99% Occupied Bandwidth	Report only
§15.247(d)	100kHz Bandwidth of Frequency Band Edge	Compliance
§15.205, §15.209, §15.247(d)	Radiated emission	Compliance
-	Duty Cycle	Report only

3.2 Limit

Test items	Limit
AC Line Conducted Emissions	See details §15.207 (a)
Conducted Output Power	For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.
6dB Emission Bandwidth	The minimum 6 dB bandwidth shall be at least 500 kHz.
Power Spectral Density	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.
Spurious Emissions, 100kHz Bandwidth of Frequency Band Edge	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)).

3.3 AC Line Conducted Emissions Test Data

Test Date:	2024-07-12	Test By:	Lirou Li
Environment condition:	Temperature: 26.1°C; Relative Humidity:62%; ATM Pressure: 101.4kPa		



Limit: QP
Mode:transmitting
Note: 802.11g L Channel

Phase: L1
Power: AC 120V/60Hz

Temperature: 26.1 ℃
Humidity: 62 %
Air Pressure: 1014 hpa

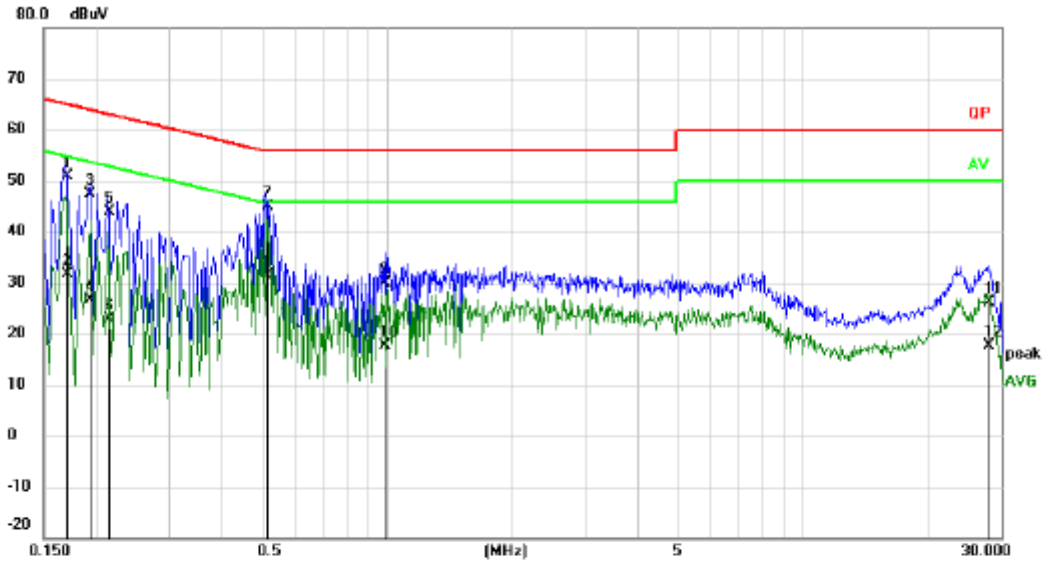
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1900	36.90	10.65	47.55	64.04	-16.49	QP	
2		0.1900	14.49	10.65	25.14	54.04	-28.90	AVG	
3		0.2100	33.52	10.62	44.14	63.21	-19.07	QP	
4		0.2100	12.59	10.62	23.21	53.21	-30.00	AVG	
5		0.2500	30.45	10.66	41.11	61.76	-20.65	QP	
6		0.2500	10.14	10.66	20.80	51.76	-30.96	AVG	
7	*	0.5180	30.56	10.82	41.38	56.00	-14.62	QP	
8		0.5180	16.67	10.82	27.49	46.00	-18.51	AVG	
9		2.7900	11.62	10.74	22.36	56.00	-33.64	QP	
10		2.7900	3.12	10.74	13.86	46.00	-32.14	AVG	
11		24.3620	16.54	10.50	27.04	60.00	-32.96	QP	
12		24.3620	5.19	10.50	15.69	50.00	-34.31	AVG	

*:Maximum data x:Over limit !:over margin

Engineer Signature: Lirou

Conducted Emission Measurement

File :2405V85308E Data :#4 Date: 2024/7/12 Time: 10:10:52



Limit: QP
Mode:transmitting
Note: 802.11g L Channel

Phase: N
Power: AC 120V/60Hz

Temperature: 26.1 ℃
Humidity: 62 %
Air Pressure: 1014 hpa

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1700	40.37	10.53	50.90	64.96	-14.06	QP	
2		0.1700	21.14	10.53	31.67	54.96	-23.29	AVG	
3		0.1940	36.96	10.43	47.39	63.86	-16.47	QP	
4		0.1940	16.21	10.43	26.64	53.86	-27.22	AVG	
5		0.2140	33.36	10.42	43.78	63.05	-19.27	QP	
6		0.2140	12.52	10.42	22.94	53.05	-30.11	AVG	
7	*	0.5180	34.23	10.70	44.93	56.00	-11.07	QP	
8		0.5180	20.59	10.70	31.29	46.00	-14.71	AVG	
9		0.9940	19.10	10.66	29.76	56.00	-26.24	QP	
10		0.9940	6.99	10.66	17.65	46.00	-28.35	AVG	
11		27.9460	15.27	10.76	26.03	60.00	-33.97	QP	
12		27.9460	6.92	10.76	17.68	50.00	-32.32	AVG	

*:Maximum data x:Over limit !:over margin

Engineer Signature: Lirou

Remark:

Measurement (dBuV)= Reading Level (dBuV) + Correct Factor(dB)

Correct Factor (dB)= LISN Voltage Division Factor (dB)+ Cable loss(dB)

Over Limit = Measurement – Limit

3.4 Radiated emission Test Data

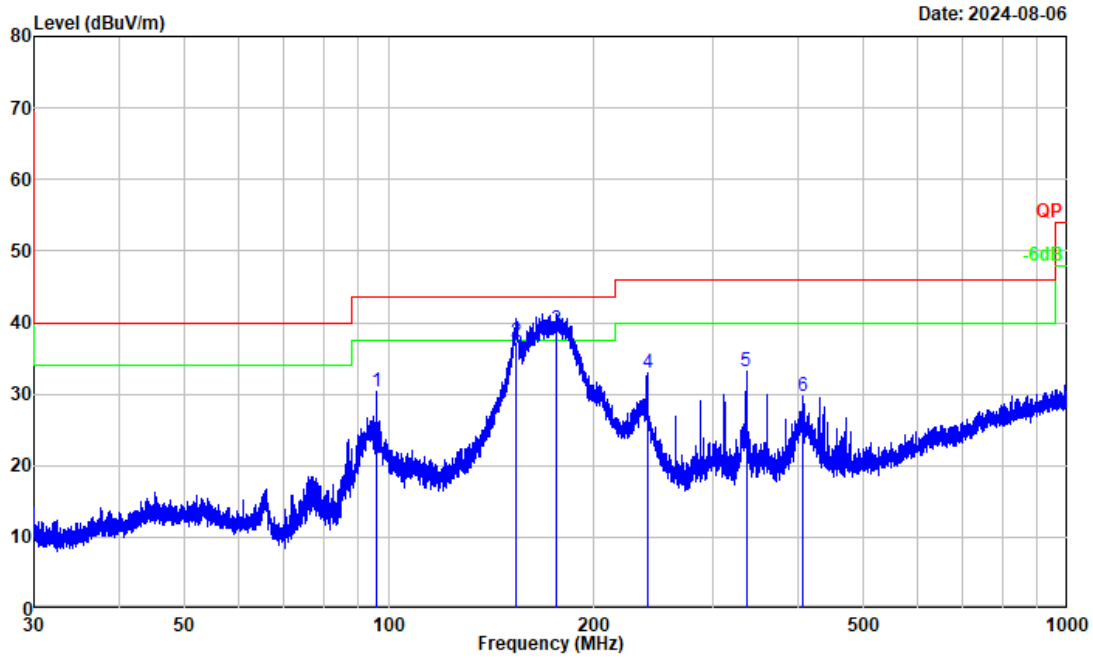
9 kHz-30MHz:

Test Date:	2024-07-15	**Test By:**	Bard Huang
Environment condition:	Temperature: 24.5°C; Relative Humidity:65%; ATM Pressure: 100.2kPa		

For radiated emissions below 30MHz, there were no emissions found within 20dB of limit.

30MHz-1GHz:

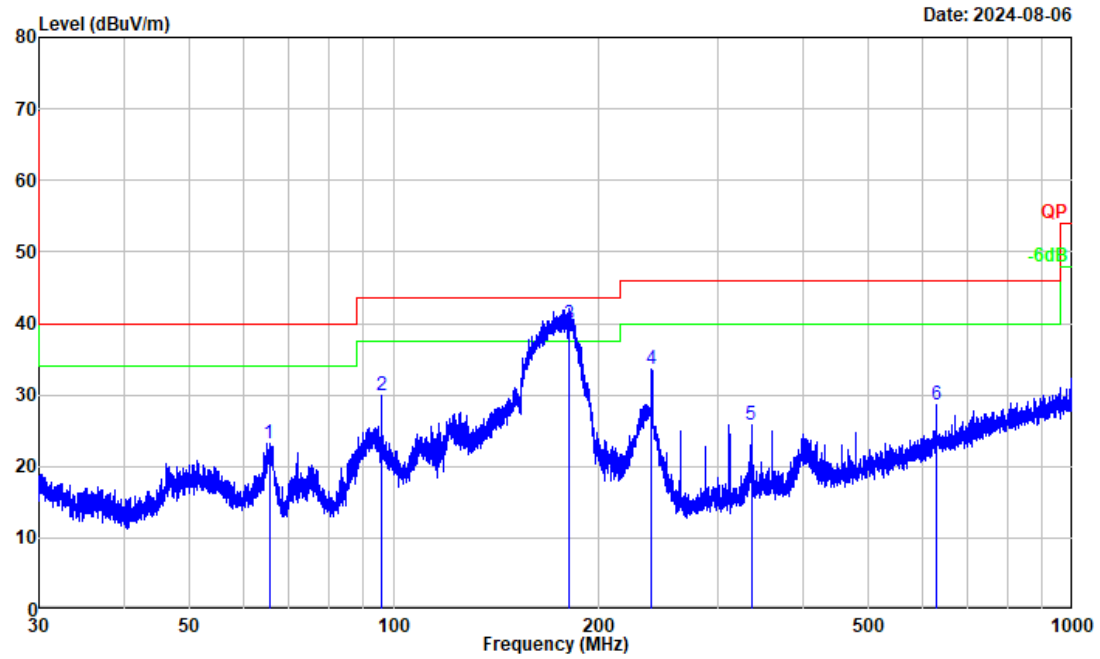
Test Date:	2024-08-06	Test By:	Bard Huang
Environment condition:	Temperature: 23.2°C; Relative Humidity:69%; ATM Pressure: 99.5kPa		



Project No. : 2405V85308E
Test Mode : Tranmsitting
Test Voltage : AC 120V/60Hz
Environment : 23.2℃/69%R.H./99.5kPa
Tested by : Bard Huang
Polarization : horizontal
Remark : 802.11g low channel

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	96.028	44.64	-14.35	30.29	43.50	-13.21	Peak
2	154.175	54.10	-16.79	37.31	43.50	-6.19	QP
3	176.850	54.41	-15.42	38.99	43.50	-4.51	QP
4	240.050	45.04	-11.98	33.06	46.00	-12.94	Peak
5	335.989	42.24	-9.11	33.13	46.00	-12.87	Peak
6	408.005	36.96	-7.26	29.70	46.00	-16.30	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain



Project No. : 2405V85308E
Test Mode : Tranmsitting
Test Voltage : AC 120V/60Hz
Environment : 23.2℃/69%R.H./99.5kPa
Tested by : Bard Huang
Polarization : vertical
Remark : 802.11g low channel

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	65.493	37.54	-14.29	23.25	40.00	-16.75	Peak
2	95.944	44.29	-14.36	29.93	43.50	-13.57	Peak
3	180.848	54.91	-15.07	39.84	43.50	-3.66	QP
4	239.945	45.50	-11.98	33.52	46.00	-12.48	Peak
5	335.989	34.88	-9.11	25.77	46.00	-20.23	Peak
6	630.269	31.46	-2.76	28.70	46.00	-17.30	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

Remark:

Result = Reading + Factor

Factor = Antenna factor + Cable loss – Amplifier gain

Over Limit = Result – Limit

Above 1GHz:

Test Date:	2024-07-25	Test By:	Bard Huang
Environment condition:	Temperature: 23.2°C; Relative Humidity:69%; ATM Pressure: 99.5kPa		

Frequency (MHz)	Reading level (dBμV)	Polar	Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
802.11b							
Low Channel							
2390.000	37.46	horizontal	7.18	44.64	54.00	-9.36	Average
2390.000	48.73	horizontal	7.18	55.91	74.00	-18.09	Peak
2390.000	37.05	vertical	7.18	44.23	54.00	-9.77	Average
2390.000	48.55	vertical	7.18	55.73	74.00	-18.27	Peak
4824.000	49.24	horizontal	-0.15	49.09	74.00	-24.91	Peak
4824.000	49.30	vertical	-0.15	49.15	74.00	-24.85	Peak
Middle Channel							
4874.000	47.07	horizontal	0.05	47.12	74.00	-26.88	Peak
4874.000	46.94	vertical	0.05	46.99	74.00	-27.01	Peak
High Channel							
2483.500	39.24	horizontal	7.25	46.49	54.00	-7.51	Average
2483.500	50.18	horizontal	7.25	57.43	74.00	-16.57	Peak
2483.500	39.16	vertical	7.25	46.41	54.00	-7.59	Average
2483.500	48.17	vertical	7.25	55.42	74.00	-18.58	Peak
4924.000	49.70	horizontal	0.23	49.93	74.00	-24.07	Peak
4924.000	47.40	vertical	0.23	47.63	74.00	-26.37	Peak
802.11g							
Low Channel							
2390.000	36.43	horizontal	7.18	43.61	54.00	-10.39	Average
2390.000	51.33	horizontal	7.18	58.51	74.00	-15.49	Peak
2390.000	36.38	vertical	7.18	43.56	54.00	-10.44	Average
2390.000	48.25	vertical	7.18	55.43	74.00	-18.57	Peak
4824.000	46.60	horizontal	-0.15	46.45	74.00	-27.55	Peak
4824.000	47.50	vertical	-0.15	47.35	74.00	-26.65	Peak
Middle Channel							
4874.000	47.11	horizontal	0.05	47.16	74.00	-26.84	Peak
4874.000	46.85	vertical	0.05	46.90	74.00	-27.10	Peak
High Channel							
2483.567	42.13	horizontal	7.25	49.38	54.00	-4.62	Average

2483.567	58.44	horizontal	7.25	65.69	74.00	-8.31	Peak
2483.500	36.85	vertical	7.25	44.10	54.00	-9.90	Average
2483.500	48.64	vertical	7.25	55.89	74.00	-18.11	Peak
4924.000	46.89	horizontal	0.23	47.12	74.00	-26.88	Peak
4924.000	47.23	vertical	0.23	47.46	74.00	-26.54	Peak
802.11n20							
Low Channel							
2389.480	39.97	horizontal	7.18	47.15	54.00	-6.85	Average
2389.480	53.63	horizontal	7.18	60.81	74.00	-13.19	Peak
2390.000	38.14	vertical	7.18	45.32	54.00	-8.68	Average
2390.000	47.94	vertical	7.18	55.12	74.00	-18.88	Peak
4824.000	47.55	horizontal	-0.15	47.40	74.00	-26.60	Peak
4824.000	47.00	vertical	-0.15	46.85	74.00	-27.15	Peak
Middle Channel							
4874.000	47.74	horizontal	0.05	47.79	74.00	-26.21	Peak
4874.000	46.49	vertical	0.05	46.54	74.00	-27.46	Peak
High Channel							
2483.617	43.23	horizontal	7.25	50.48	54.00	-3.52	Average
2483.617	60.00	horizontal	7.25	67.25	74.00	-6.75	Peak
2483.500	38.13	vertical	7.25	45.38	54.00	-8.62	Average
2483.500	48.07	vertical	7.25	55.32	74.00	-18.68	Peak
4924.000	46.94	horizontal	0.23	47.17	74.00	-26.83	Peak
4924.000	46.61	vertical	0.23	46.84	74.00	-27.16	Peak

Remark:

Corrected Amplitude= Reading level + corrected Factor

Corrected Factor = Antenna factor + Cable loss – Amplifier gain

Margin = Corrected Amplitude – Limit

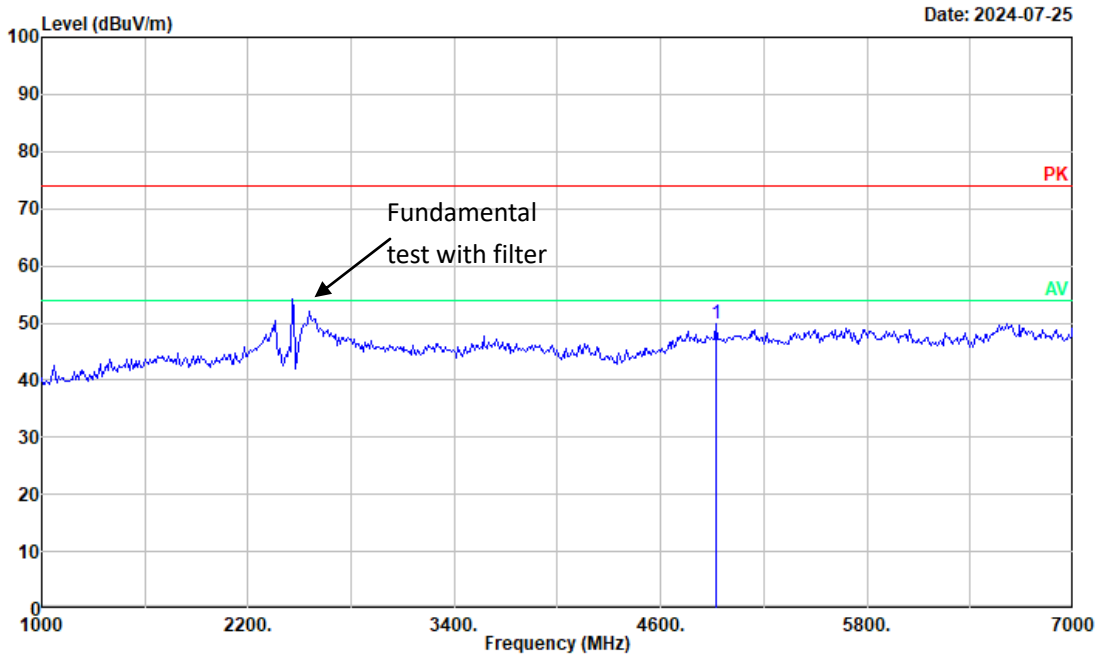
For the test result of Peak below the Peak limit more than 20dB, which can compliance with the average limit, just the Peak level was recorded.

The emission levels of other frequencies that were lower than the limit 20dB not show in test report.

For emissions in 18GHz-25GHz range, all emissions were investigated and in the noise floor level.

Test plot for example as below:

Mode:	802.11b	Channel:	2462MHz

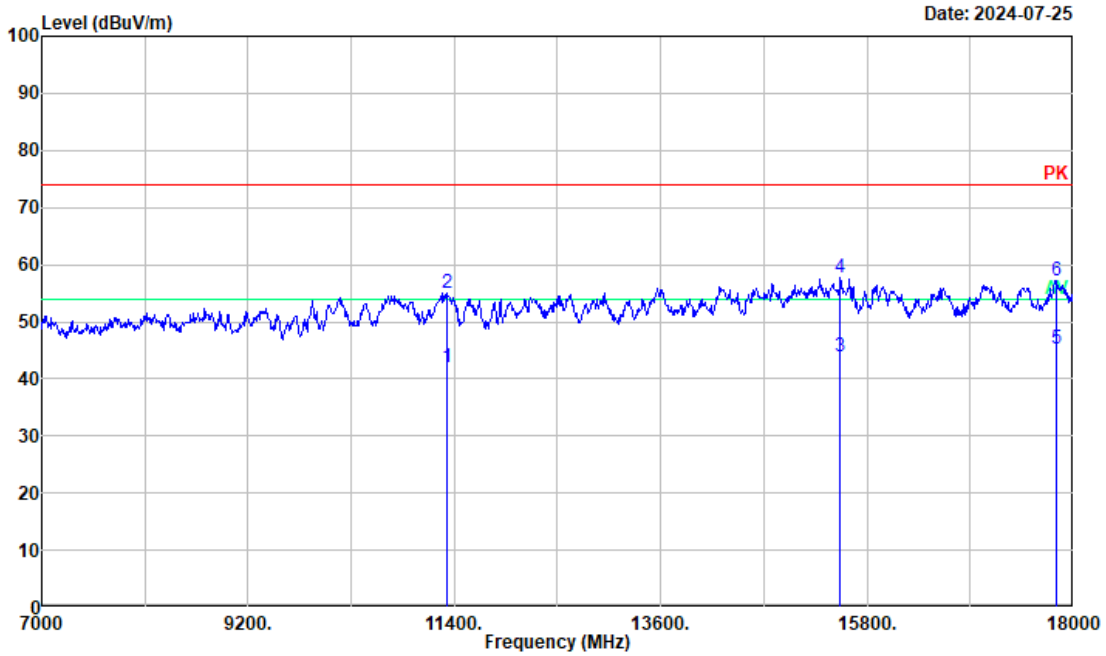


Project No. : 2405V85308E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.2℃/69%R.H./99.5kPa
Tested by : Bard Huang
Polarization : horizontal
Remark : 802.11b high channel

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	4924.000	49.70	0.23	49.93	74.00	-24.07	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit

Mode:	802.11b	Channel:	2462MHz

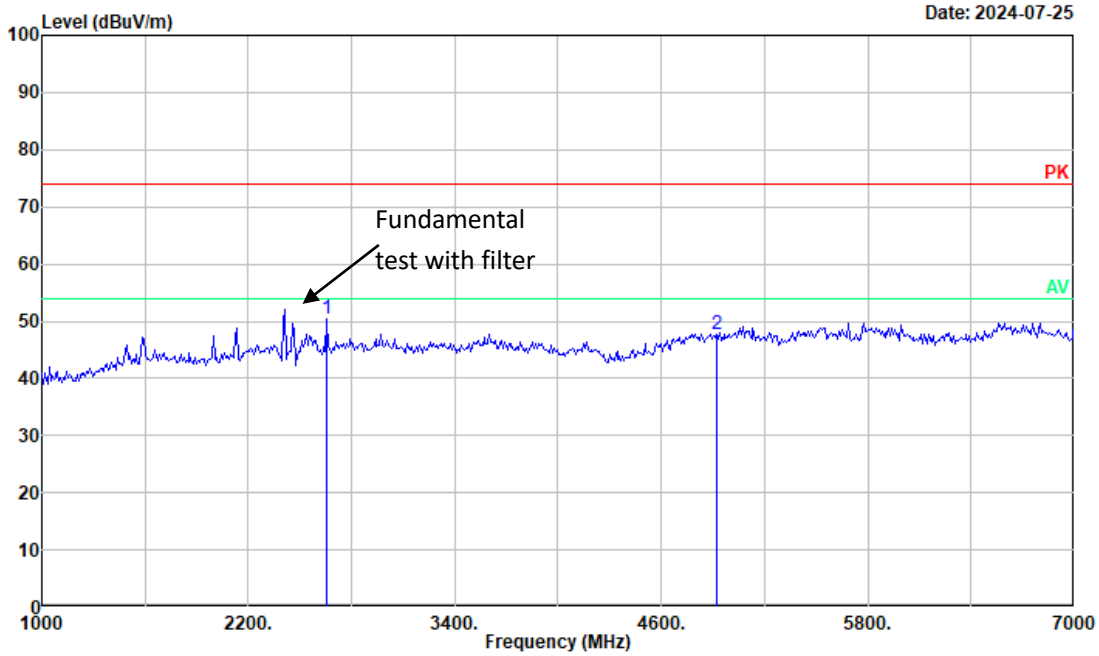


Project No. : 2405V85308E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.2℃/69%R.H./99.5kPa
Tested by : Bard Huang
Polarization : horizontal
Remark : 802.11b high channel

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	11315.660	35.19	6.86	42.05	54.00	-11.95	Average
2	11315.660	48.22	6.86	55.08	74.00	-18.92	Peak
3	15516.760	34.98	9.05	44.03	54.00	-9.97	Average
4	15516.760	48.74	9.05	57.79	74.00	-16.21	Peak
5	17821.410	37.02	8.36	45.38	54.00	-8.62	Average
6	17821.410	48.83	8.36	57.19	74.00	-16.81	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit

Mode:	802.11b	Channel:	2462MHz

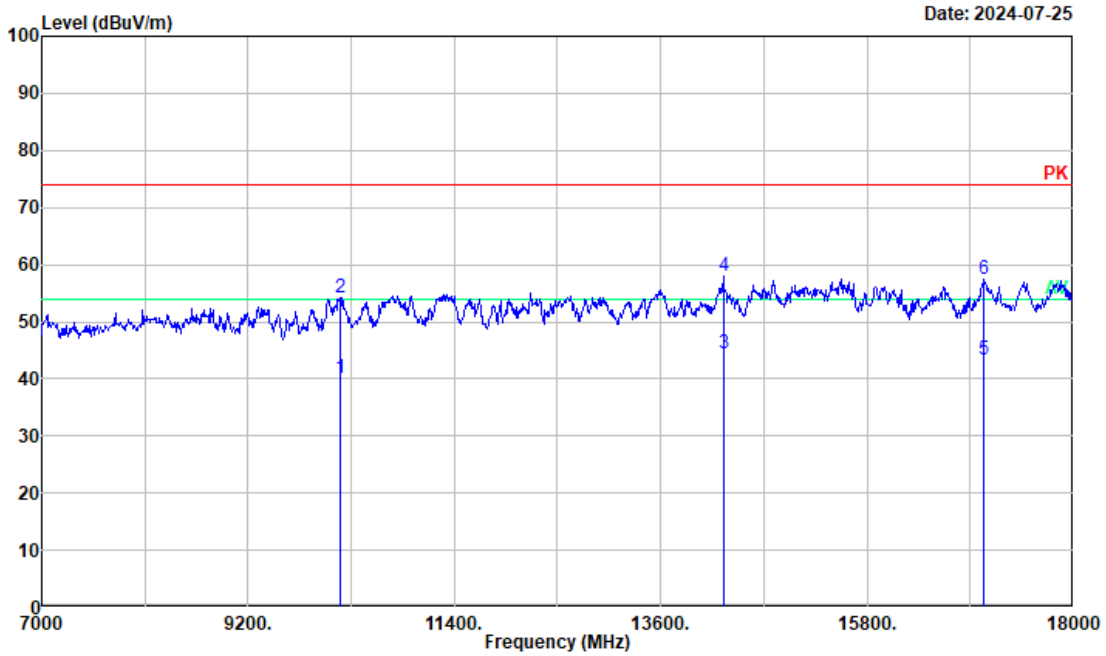


Project No. : 2405V85308E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.2℃/69%R.H./99.5kPa
Tested by : Bard Huang
Polarization : vertical
Remark : 802.11b high channel

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	2658.329	53.07	-2.56	50.51	74.00	-23.49	Peak
2	4924.000	47.40	0.23	47.63	74.00	-26.37	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit

Mode:	802.11b	Channel:	2462MHz

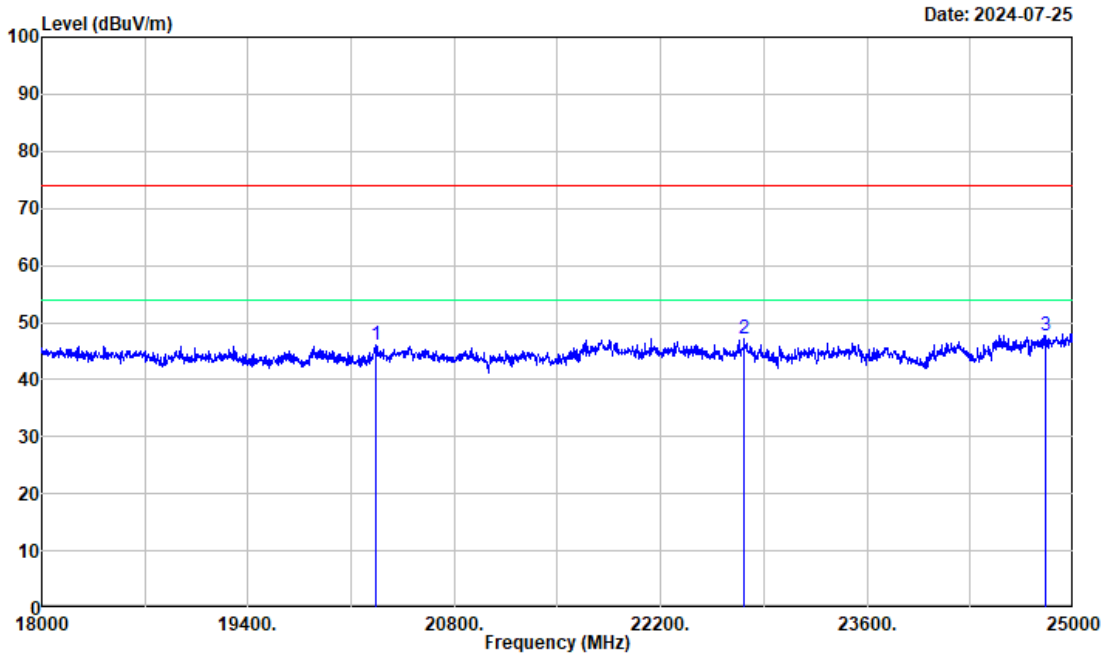


Project No. : 2405V85308E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.2℃/69%R.H./99.5kPa
Tested by : Bard Huang
Polarization : vertical
Remark : 802.11b high channel

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	10184.590	35.16	4.91	40.07	54.00	-13.93	Average
2	10184.590	49.42	4.91	54.33	74.00	-19.67	Peak
3	14266.630	35.59	8.87	44.46	54.00	-9.54	Average
4	14266.630	49.00	8.87	57.87	74.00	-16.13	Peak
5	17047.520	36.31	7.13	43.44	54.00	-10.56	Average
6	17047.520	50.46	7.13	57.59	74.00	-16.41	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit

Mode:	802.11b	Channel:	2462MHz



Project No. : 2405V85308E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.2℃/69%R.H./99.5kPa
Tested by : Bard Huang
Polarization : horizontal
Remark : 802.11b high channel

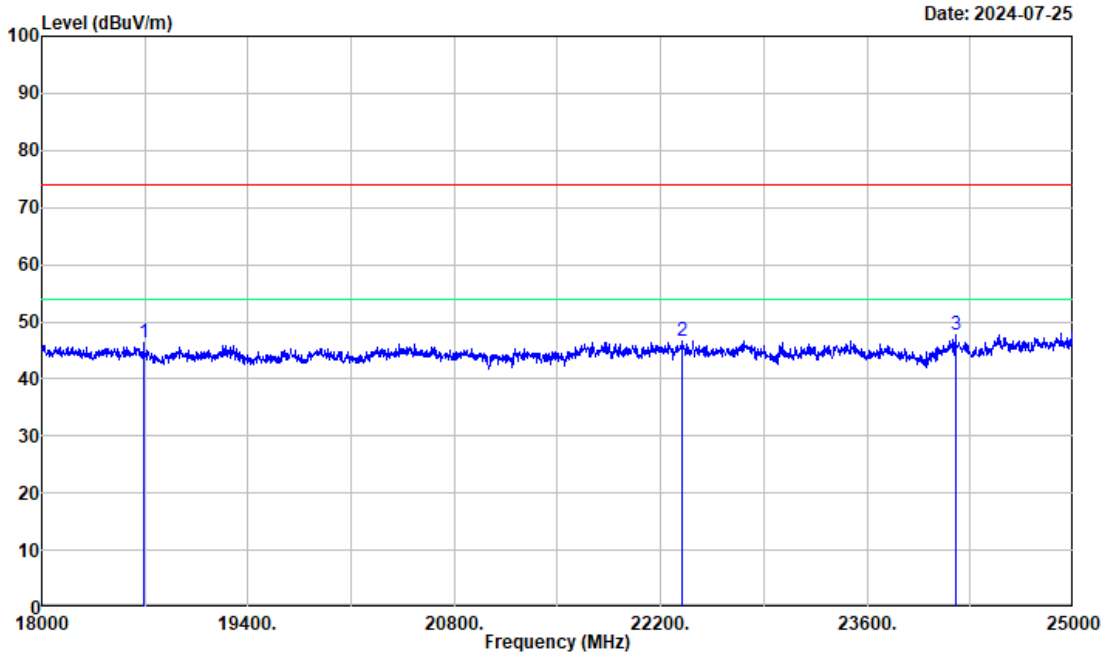
--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	20262.130	53.34	-7.35	45.99	74.00	-28.01	Peak
2	22765.880	54.00	-6.87	47.13	74.00	-26.87	Peak
3	24814.410	51.77	-3.99	47.78	74.00	-26.22	Peak

Remarks: Factor = Antenna factor + Cable loss -Preamp gain - distance extrapolate factor

Distance extrapolate factor = 20*log(distance specified/distance measured)

Distance specified = 3m, Distance measured = 1.5m

Mode:	802.11b	Channel:	2462MHz



Project No. : 2405V85308E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 23.2℃/69%R.H./99.5kPa
Tested by : Bard Huang
Polarization : vertical
Remark : 802.11b high channel

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	18693.350	52.65	-6.37	46.28	74.00	-27.72	Peak
2	22345.670	53.65	-7.05	46.60	74.00	-27.40	Peak
3	24198.100	53.63	-5.91	47.72	74.00	-26.28	Peak

Remarks: Factor = Antenna factor + Cable loss -Preamp gain - distance extrapolate factor

Distance extrapolate factor = 20*log(distance specified/distance measured)

Distance specified = 3m, Distance measured = 1.5m

3.5 RF Conducted Test Data

Test Date:	2024-07-29~2024-07-30	Test By:	Ryan Zhang
Environment condition:	Temperature: 25.1~25.4°C; Relative Humidity:44~47%; ATM Pressure: 100.6~100.8kPa		

3.5.1 6dB Emission Bandwidth

Mode	Value (MHz)	Limit (MHz)	Result
b_2412MHz_Chain 0	9.169	≥0.5	Pass
b_2437MHz_Chain 0	9.169	≥0.5	Pass
b_2462MHz_Chain 0	9.169	≥0.5	Pass
g_2412MHz_Chain 0	16.617	≥0.5	Pass
g_2437MHz_Chain 0	16.617	≥0.5	Pass
g_2462MHz_Chain 0	16.617	≥0.5	Pass
n20_2412MHz_Chain 0	17.858	≥0.5	Pass
n20_2437MHz_Chain 0	17.818	≥0.5	Pass
n20_2462MHz_Chain 0	17.898	≥0.5	Pass

3.5.2 99% Occupied Bandwidth

Mode	99% OBW (MHz)
b_2412MHz_Chain 0	14.080
b_2437MHz_Chain 0	14.080
b_2462MHz_Chain 0	14.080
g_2412MHz_Chain 0	16.600
g_2437MHz_Chain 0	16.600
g_2462MHz_Chain 0	16.600
n20_2412MHz_Chain 0	17.800
n20_2437MHz_Chain 0	17.800
n20_2462MHz_Chain 0	17.800

3.5.3 Maximum Conducted Peak Output Power

Mode	Value (dBm)	Limit (dBm)	Result
b_2412MHz_Chain 0	18.70	30	Pass
b_2437MHz_Chain 0	19.01	30	Pass
b_2462MHz_Chain 0	19.23	30	Pass
g_2412MHz_Chain 0	22.60	30	Pass
g_2437MHz_Chain 0	21.89	30	Pass
g_2462MHz_Chain 0	22.05	30	Pass
n20_2412MHz_Chain 0	19.66	30	Pass
n20_2437MHz_Chain 0	19.93	30	Pass
n20_2462MHz_Chain 0	20.22	30	Pass

3.5.4 Power Spectral Density

Mode	Value (dBm/3kHz)	Limit (dBm/3kHz)	Result
b_2412MHz_Chain 0	-14.64	8	Pass
b_2437MHz_Chain 0	-14.28	8	Pass
b_2462MHz_Chain 0	-13.97	8	Pass
g_2412MHz_Chain 0	-17.92	8	Pass
g_2437MHz_Chain 0	-17.45	8	Pass
g_2462MHz_Chain 0	-17.06	8	Pass
n20_2412MHz_Chain 0	-18.57	8	Pass
n20_2437MHz_Chain 0	-18.12	8	Pass
n20_2462MHz_Chain 0	-17.66	8	Pass

3.5.5 100 kHz Bandwidth of Frequency Band Edge

Mode	Value (dB)	Limit (dB)	Result
b_2412MHz_Chain 0	49.37	20	Pass
b_2462MHz_Chain 0	56.23	20	Pass
g_2412MHz_Chain 0	30.89	20	Pass
g_2462MHz_Chain 0	47.40	20	Pass
n20_2412MHz_Chain 0	31.25	20	Pass
n20_2462MHz_Chain 0	46.70	20	Pass

3.5.6 Duty Cycle

Mode	Ton (ms)	Ton+Toff (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/Ton (Hz)	VBW Setting (kHz)
b_2437MHz_Chain 0	100	100	100	0	NA	0.010
g_2437MHz_Chain 0	100	100	100	0	NA	0.010
n20_2437MHz_Chain 0	100	100	100	0	NA	0.010

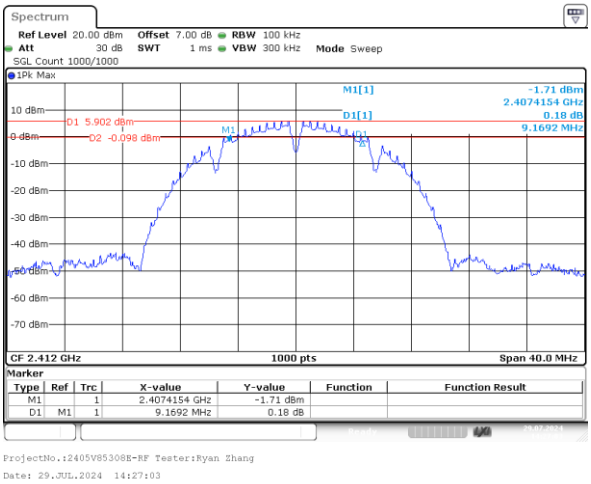
Duty Cycle = Ton/(Ton+Toff)*100%

Test Plots:

6 dB Emission Bandwidth:

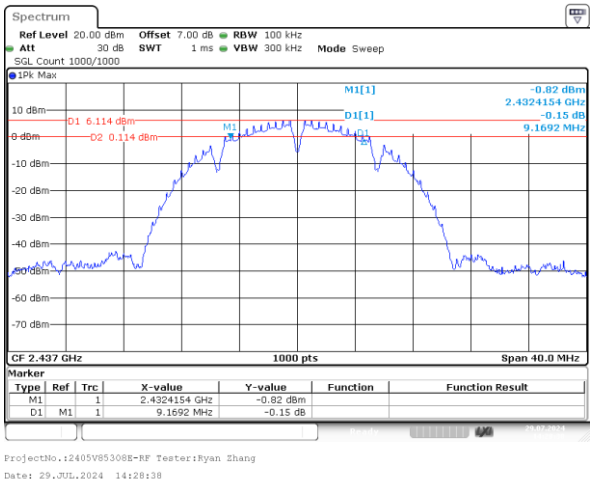
2412~2462

b_2412MHz_Chain 0 9.169MHz



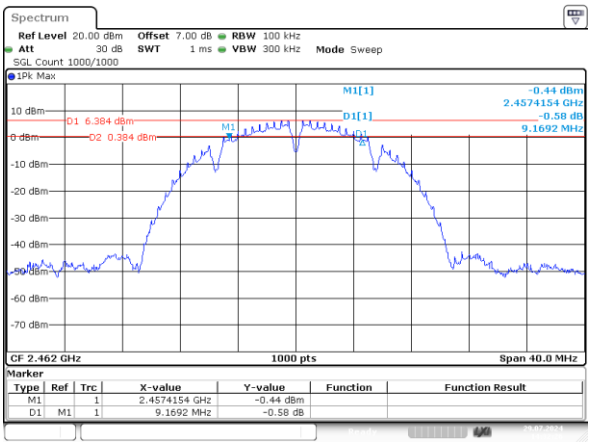
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:27:03

b_2437MHz_Chain 0 9.169MHz



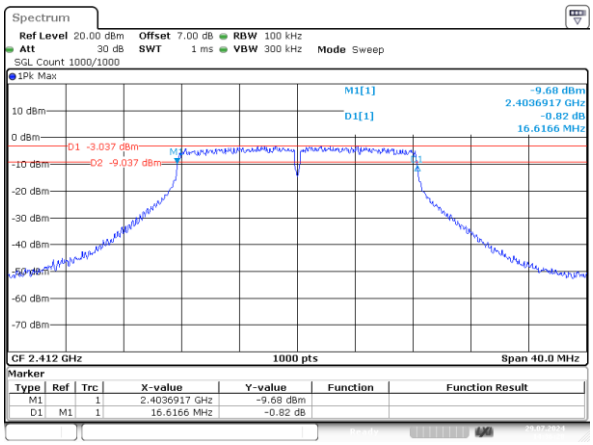
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:28:38

b_2462MHz_Chain 0 9.169MHz



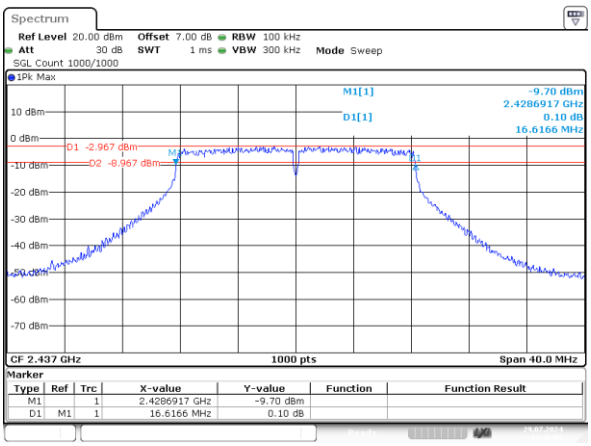
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:32:26

g_2412MHz_Chain 0 16.617MHz



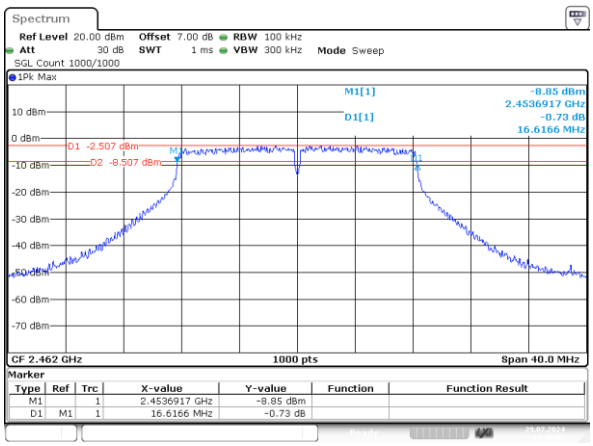
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:36:28

g_2437MHz_Chain 0 16.617MHz



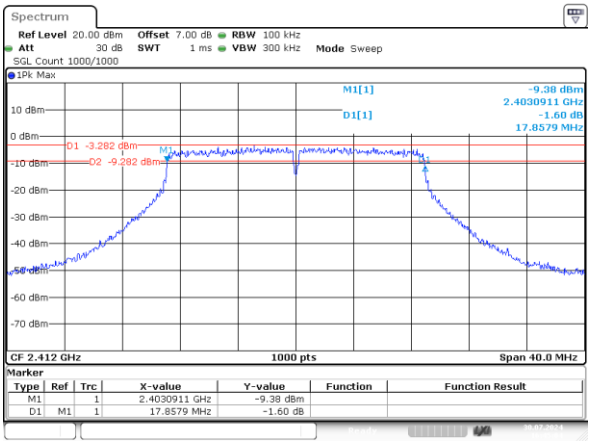
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:38:00

g_2462MHz_Chain 0 16.617MHz



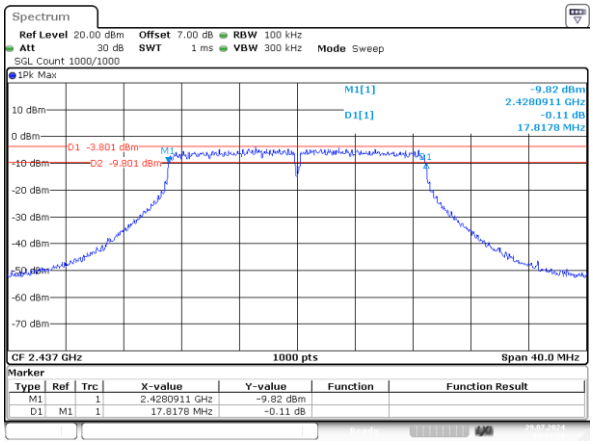
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:40:05

n20_2412MHz_Chain 0 17.858MHz



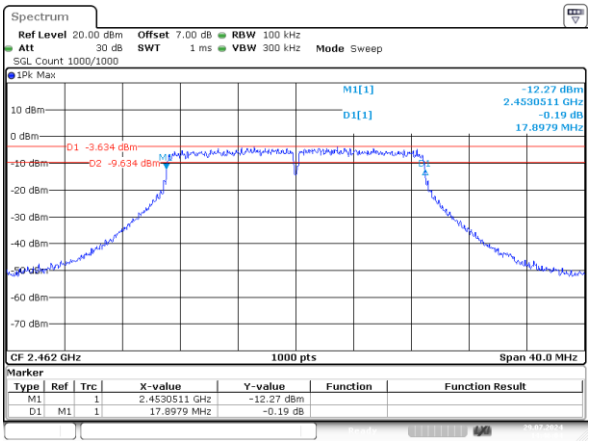
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 30.JUL.2024 16:45:05

n20_2437MHz_Chain 0 17.818MHz



ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:43:58

n20_2462MHz_Chain 0 17.898MHz

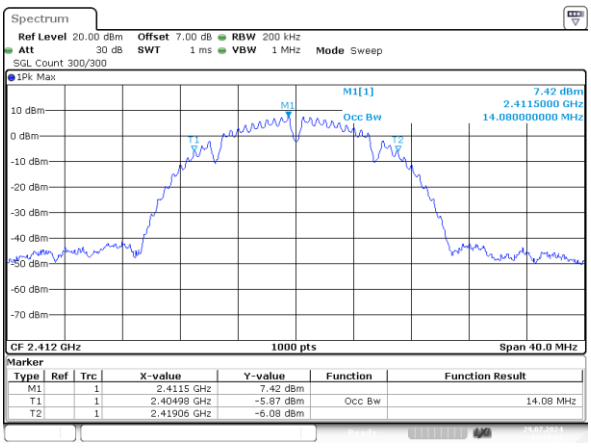


ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:46:05

99% Occupied Bandwidth:

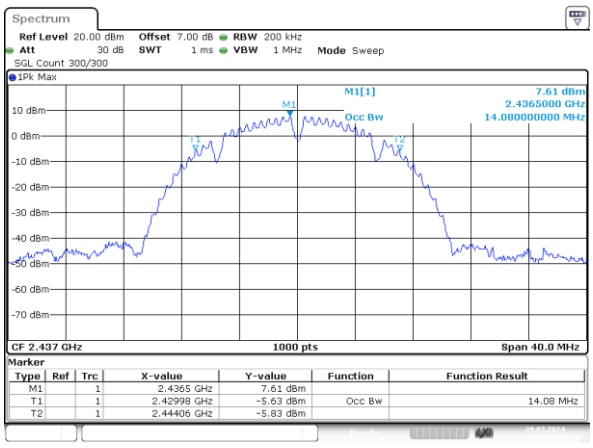
2412~2462

b_2412MHz_Chain 0 14.080MHz



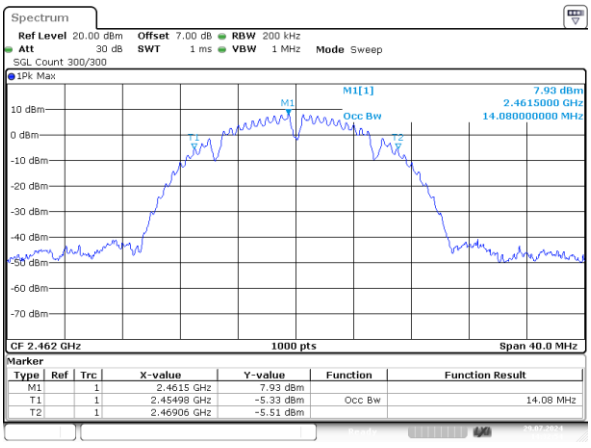
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:27:32

b_2437MHz_Chain 0 14.080MHz



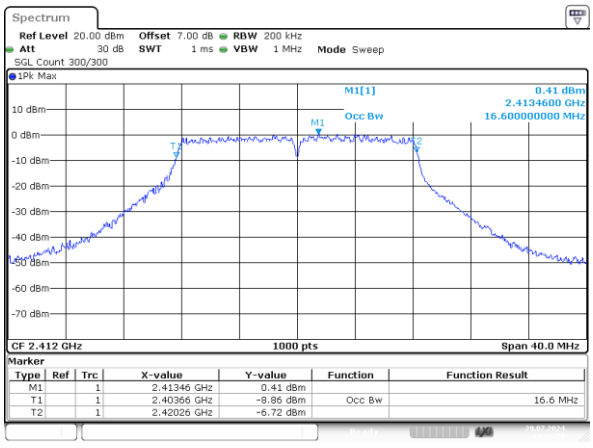
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:29:04

b_2462MHz_Chain 0 14.080MHz



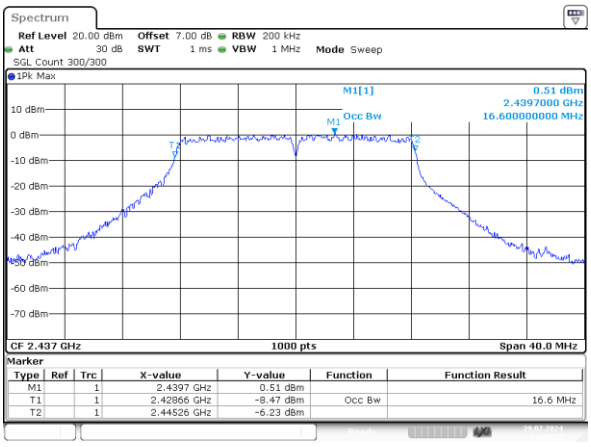
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:32:54

g_2412MHz_Chain 0 16.600MHz



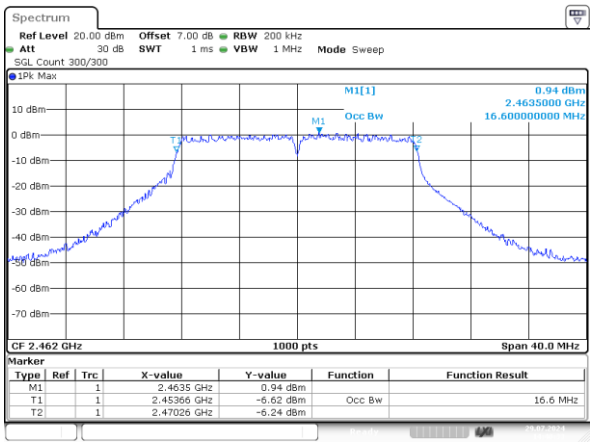
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:36:57

g_2437MHz_Chain 0 16.600MHz



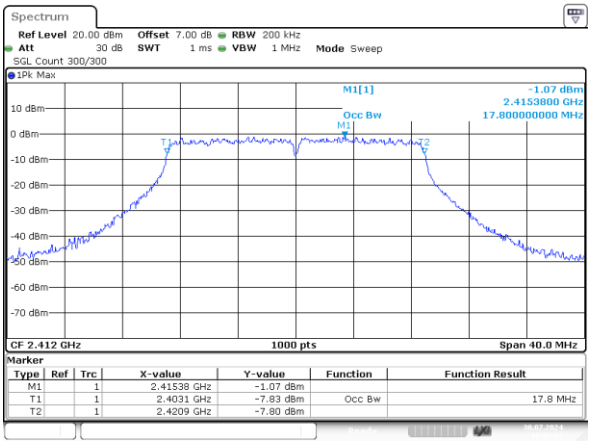
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:38:26

g_2462MHz_Chain 0 16.600MHz

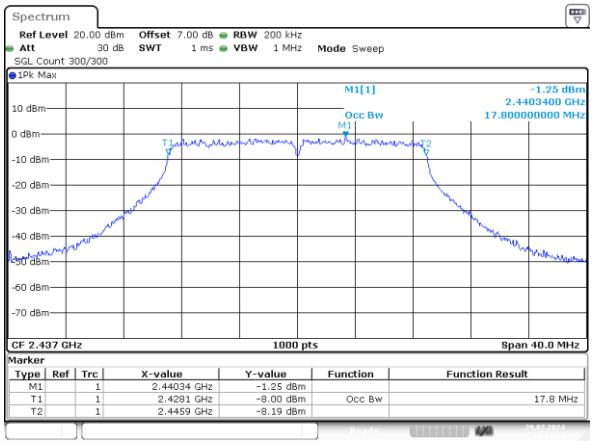


ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:40:33

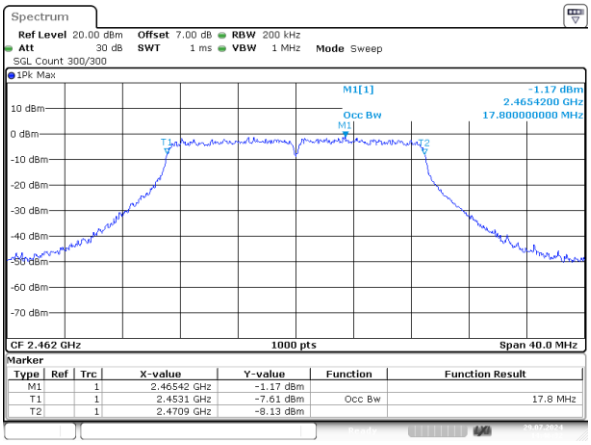
n20_2412MHz_Chain 0 17.800MHz



n20_2437MHz_Chain 0 17.800MHz



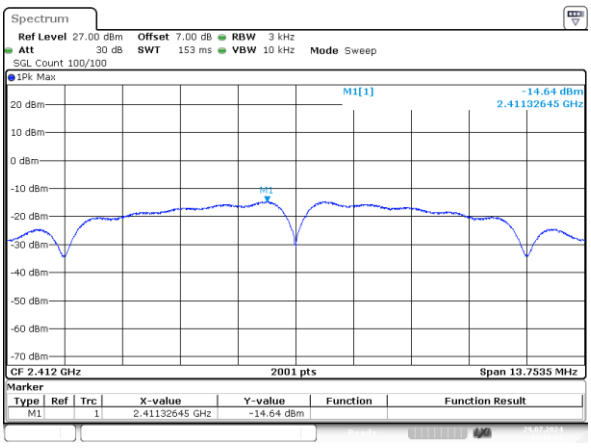
n20_2462MHz_Chain 0 17.800MHz



Power Spectral Density:

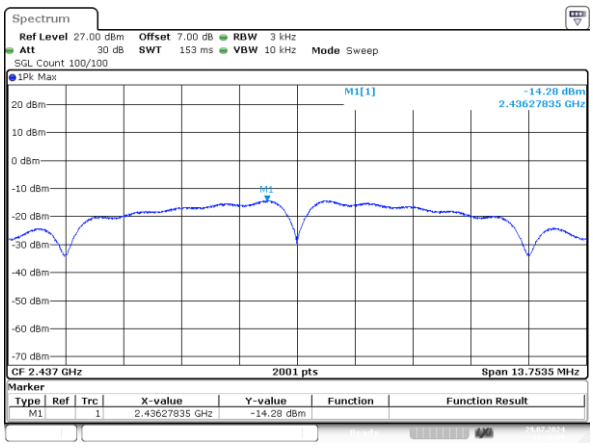
2412~2462

b_2412MHz_Chain 0 -14.64dBm/3kHz



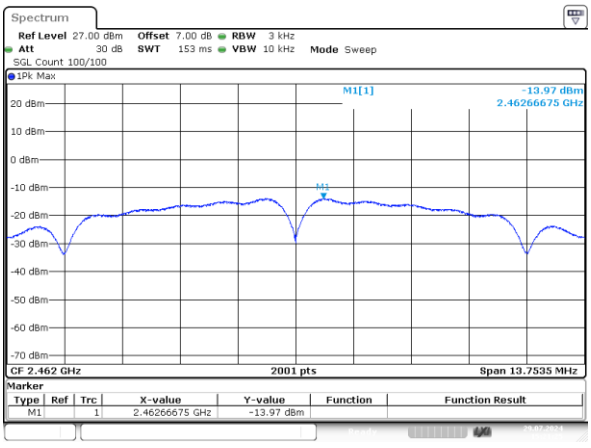
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 15:19:32

b_2437MHz_Chain 0 -14.28dBm/3kHz



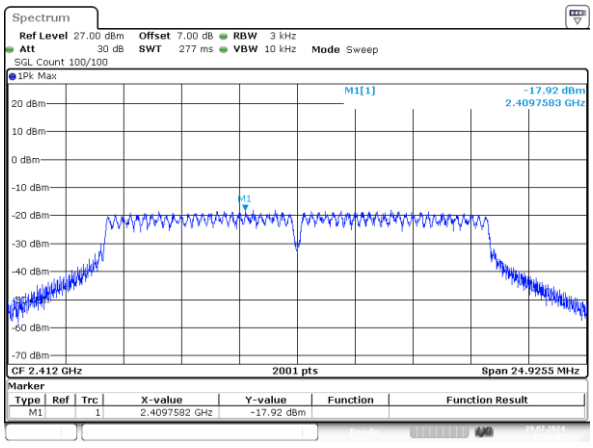
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 15:20:28

b_2462MHz_Chain 0 -13.97dBm/3kHz



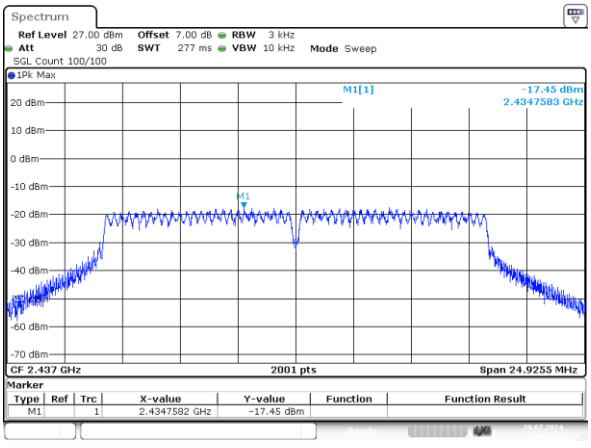
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 15:21:25

g_2412MHz_Chain 0 -17.92dBm/3kHz



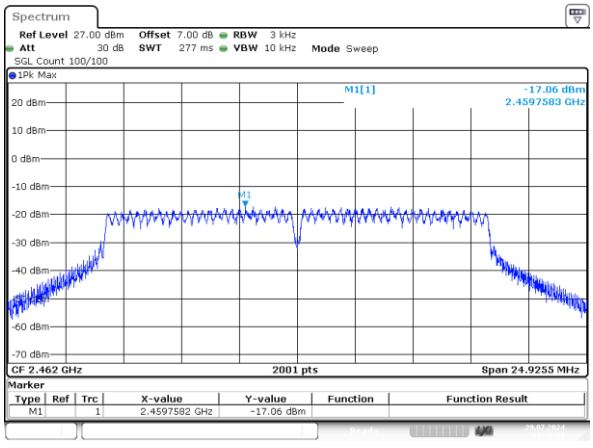
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 15:26:07

g_2437MHz_Chain 0 -17.45dBm/3kHz



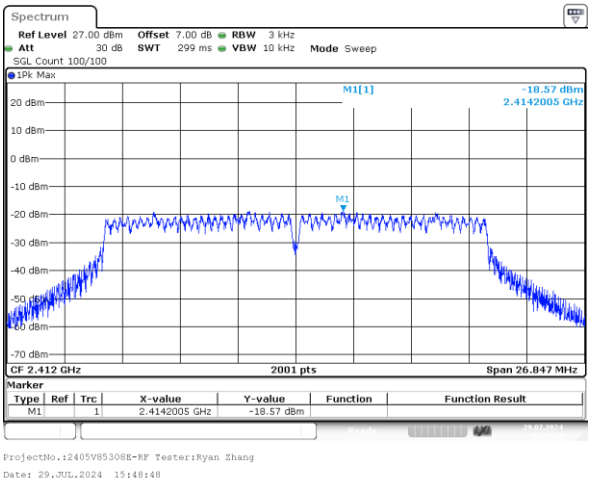
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 15:27:57

g_2462MHz_Chain 0 -17.06dBm/3kHz

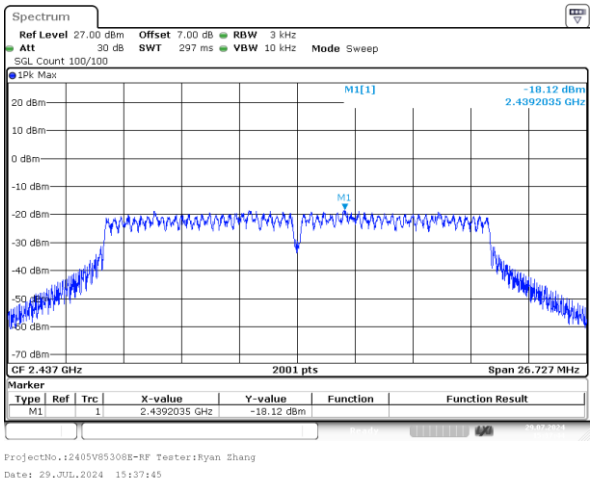


ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 15:30:31

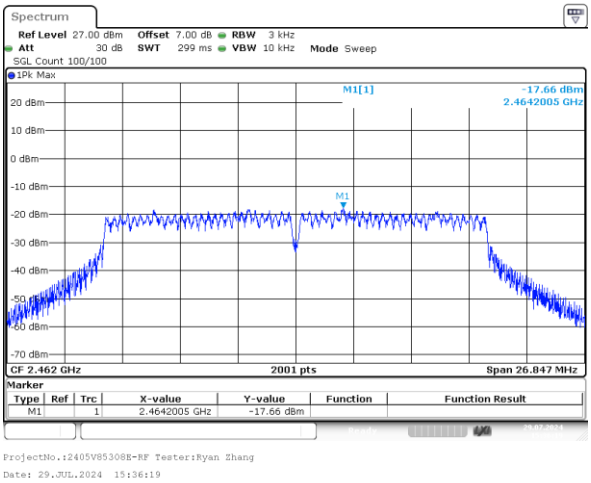
n20_2412MHz_Chain 0 -18.57dBm/3kHz



n20_2437MHz_Chain 0 -18.12dBm/3kHz



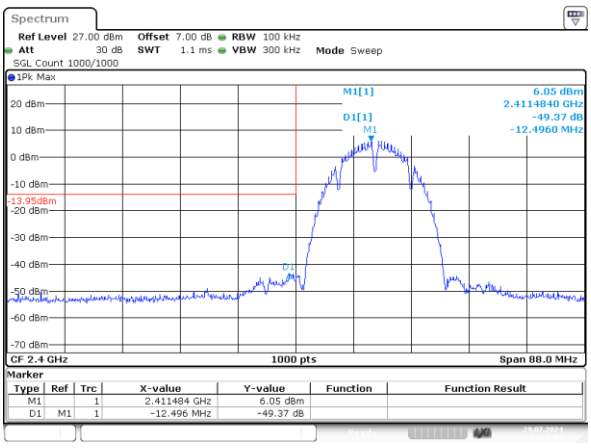
n20_2462MHz_Chain 0 -17.66dBm/3kHz



100kHz Bandwidth of Frequency Band Edge:

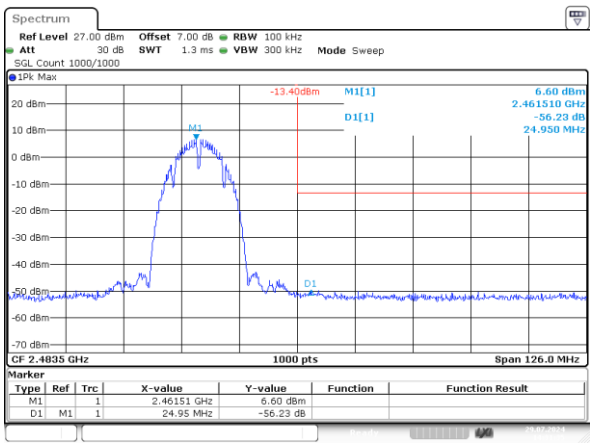
2412~2462

b_2412MHz_Chain 0 49.37dB



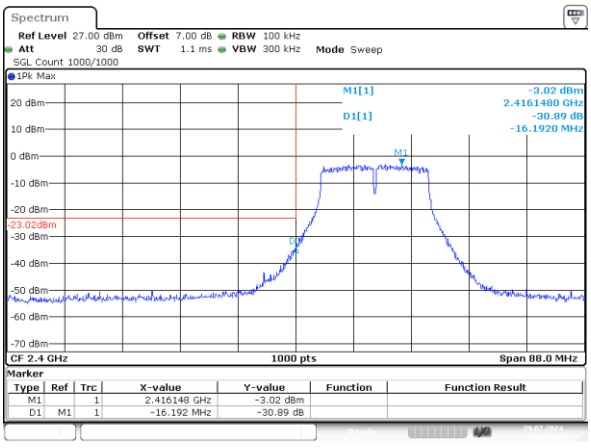
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:26:06

b_2462MHz_Chain 0 56.23dB



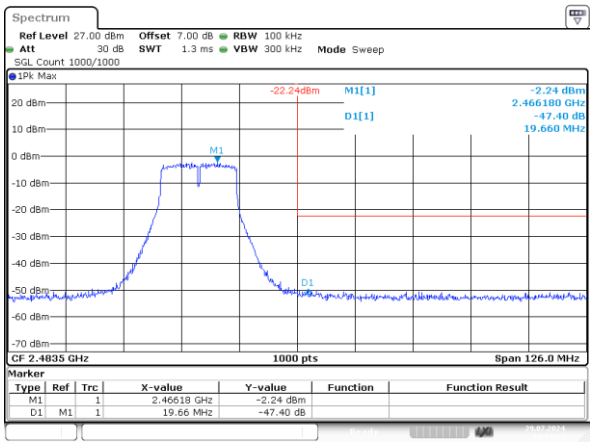
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:31:34

g_2412MHz_Chain 0 30.89dB



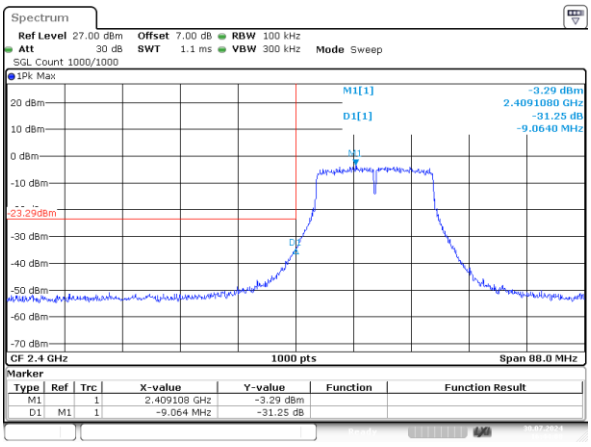
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:35:30

g_2462MHz_Chain 0 47.40dB



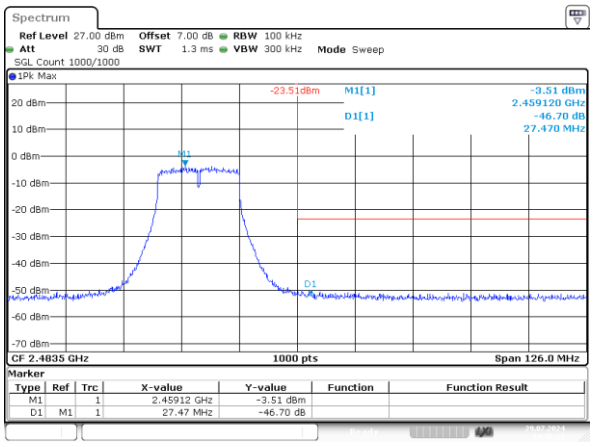
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:39:14

n20_2412MHz_Chain 0 31.25dB



ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 30.JUL.2024 16:44:08

n20_2462MHz_Chain 0 46.70dB



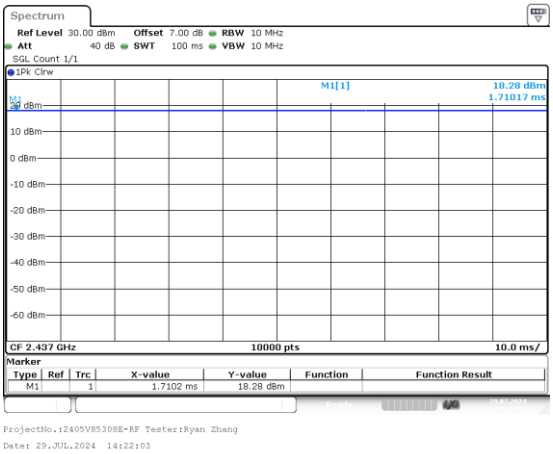
ProjectNo.:2405V85308E-RF Tester:Ryan Zhang
Date: 29.JUL.2024 14:45:13

Duty Cycle:

2412~2462

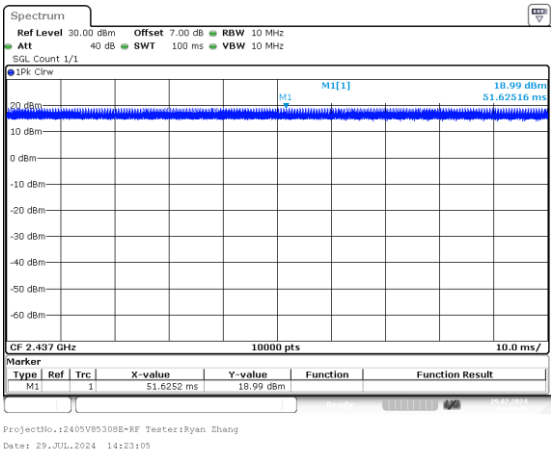
b_2437MHz_Chain 0

100ms,100ms



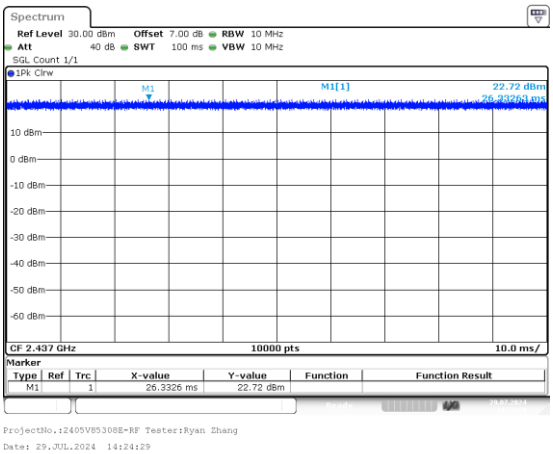
g_2437MHz_Chain 0

100ms,100ms



n20_2437MHz_Chain 0

100ms,100ms



4 Test Setup Photo

Please refer to the attachment 2405V85308E Test Setup photo.

5 E.U.T Photo

Please refer to the attachment 2405V85308E External photo and 2405V85308E Internal photo.

---End of Report---