TEST REPORT

Applicant Name:	Shenzhen Hollyland Technology Co.,Ltd
Address:	8F, Building 5D, Skyworth Innovation Valley, Tangtou Road, Shiyan Street, Baoan District, Shenzhen, 518055 China
Report Number:	2401U55189E-RF-00
FCC ID:	2ADZC-9622R

Test Standard (s)

FCC PART 15.407

Sample Description

Product Type:	WIRELESS VIDEO TRANSMISSION SYSTEM
Model No.:	Cosmo C2
Multiple Model(s) No.:	N/A
Trade Mark:	HOLLYLAND
Date Received:	2024/07/01
Issue Date:	2024/11/19

Test Result:	Pass▲

▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Ekko Wu
RF Engineer

Approved By:

Jimmy Xiao
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.

This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "▼".

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	2401U55189E-RF-00	Original Report	2024/11/19

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	WIRELESS VIDEO TRANSMISSION SYSTEM
Tested Model	Cosmo C2
Multiple Model(s)	N/A
Frequency Range	5G Wi-Fi: 5185-5225MHz; 5760-5820MHz
Maximum Conducted Average Output Power	5185-5225MHz: 10.08dBm 5760-5820MHz: 7.69dBm
Modulation Technique	OFDM
Antenna Specification#	5185-5225MHz: 5.45dBi (Blade Antenna), 3.31dBi (Mushroom Antenna) 5760-5820MHz: 4.34dBi (Blade Antenna), 3.14dBi (Mushroom Antenna) (provided by the applicant)
Voltage Range	DC 6-16V from DC Port or DC 6-24V from battery
Sample serial number	2NSF-1 for Conducted and Radiated Emissions Test 2NSF-2 for RF Conducted Test (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	Model: GQ24-120200-AX Input: AC 100-240V, 50/60Hz, 1.0A Max Output: DC 12.0V, 2.0A, 24.0W
Note: Test Voltage: Battery: $14.2V_{DC}$, DC Port: $12V_{DC}$	

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 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 KDB789033 D02 General U-NII Test Procedures New Rules v02r01.

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		±5%
RF Frequency		213.55 Hz(k=2, 95% level of confidence)
RF output power, conducted		0.72 dB(k=2, 95% level of confidence)
Unwanted Emission, conducted		1.75 dB(k=2, 95% level of confidence)
AC Power Lines Conducted Emissions	9kHz-150kHz	3.94dB(k=2, 95% level of confidence)
	150kHz-30MHz	3.84dB(k=2, 95% level of confidence)
Radiated Emissions	9kHz - 30MHz	3.30dB(k=2, 95% level of confidence)
	30MHz~200MHz (Horizontal)	4.48dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	4.55dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	4.85dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.05dB(k=2, 95% level of confidence)
	1GHz - 6GHz	5.35dB(k=2, 95% level of confidence)
	6GHz - 18GHz	5.44dB(k=2, 95% level of confidence)
	18GHz - 40GHz	5.16dB(k=2, 95% level of confidence)
Temperature		±1℃
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

The system was configured for testing in an engineering mode, which was provided by manufacturer.

For 5150-5250MHz Band, 3 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5185	2	5205
3	5225	/	/

EUT was tested with channel 1, 2 and 3.

For 5725-5850MHz Band, 4 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5760	2	5780
3	5800	4	5820

EUT was tested with channel 1, 2 and 4.

EUT Exercise Software

"Artosyn8030PCTool"[#] software was used and power level as below. The software and power level was provided by the applicant. The device was tested with the worst case was performed as below:

Band	Mode	Data rate	Power Level[#]		
			Low Channel	Middle Channel	High Channel
5185-5225MHz	OFDM	MCS0	0a	0a	0a
5760-5820MHz	OFDM	MCS0	0a	0a	0a
Note: The worst-case data rates are determined to be as above for each mode based upon inverstigation by measuring the average power and PSD across all data rates bandwidths, and modulations.					

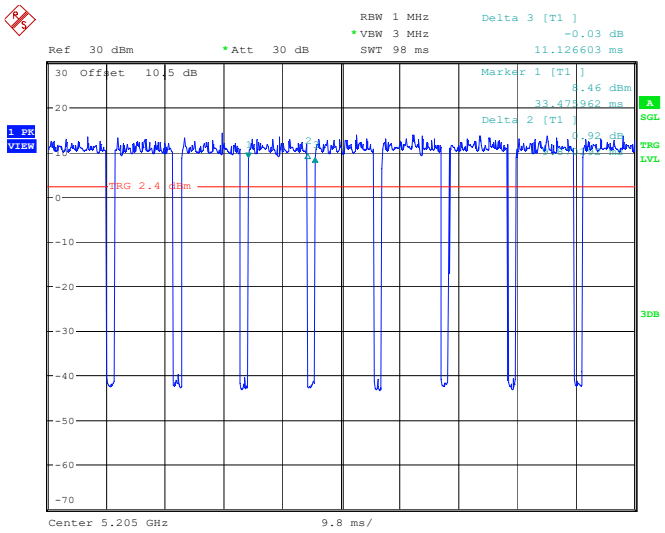
Duty cycle

Test Information		Environmental Conditions	
Test Date:	2024/09/10	**Temperature:**	25℃
Test Mode:	Transmitting	**Relative Humidity:**	55%
Tester:	Rainbow Zhu	**ATM Pressure:**	101.0 kPa

Test Data

Test Frequency (MHz)	Ton (ms)	Ton+off (ms)	Duty cycle (%)	Duty Cycle Factor (dB)	1/T (Hz)	VBW Setting (Hz)
5205	9.87	11.13	88.68	0.52	101	500
5780	9.78	11.12	87.95	0.56	102	500

5205MHz



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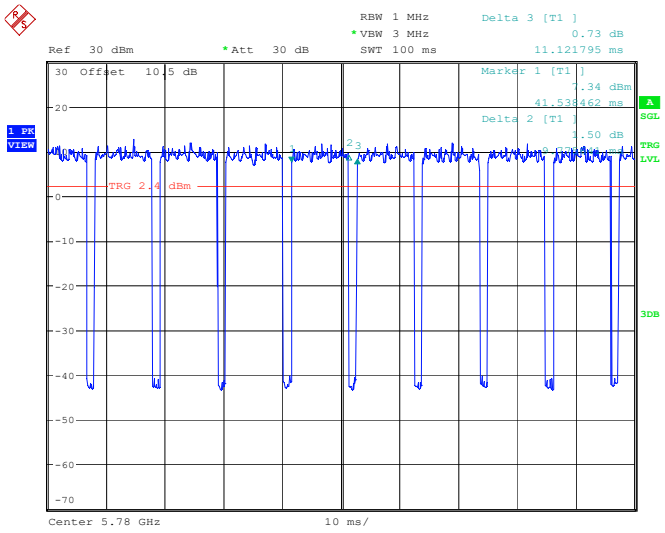
5780MHz



ProjectNo.:2401U55189E-RF Tester:Rainbow Zhu
Date: 10.SEP.2024 15:46:26

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

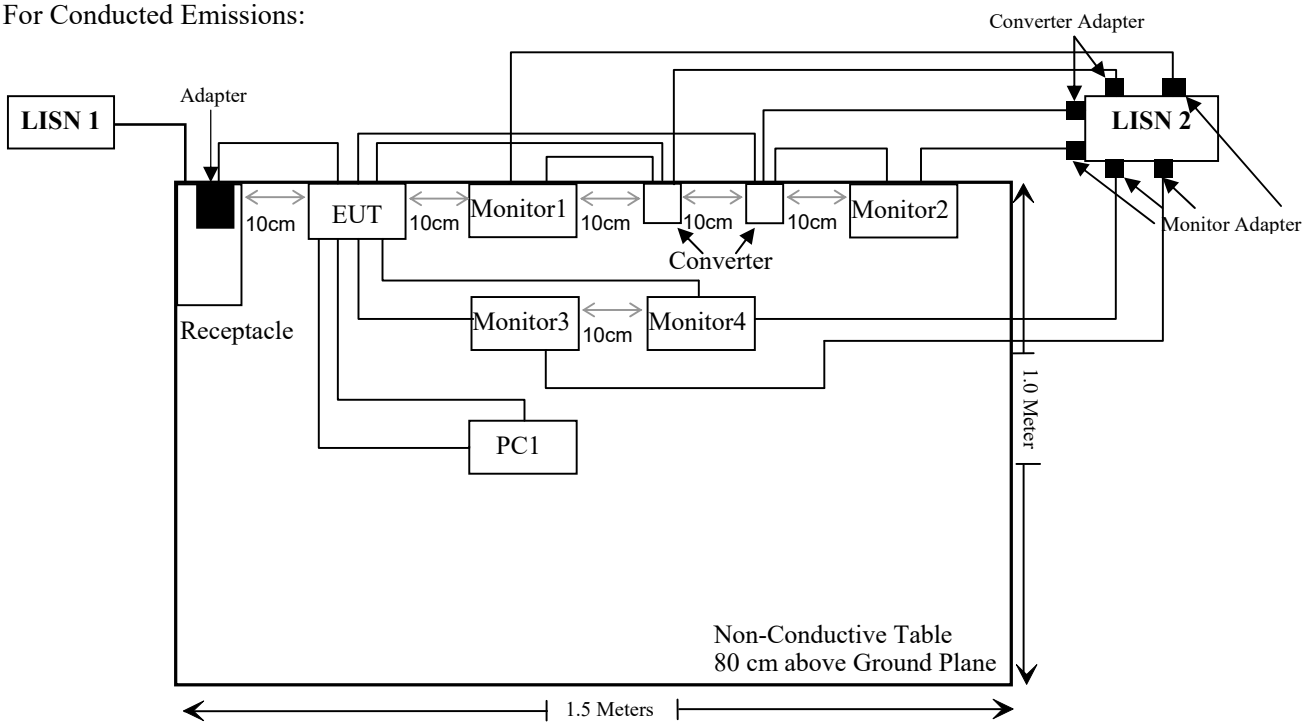
Manufacturer	Description	Model	Serial Number
Redmi	Monitor1	A22FAB-RA	47366/206100029128
Redmi	Monitor2	A22FAB-RA	47366/107100090589
Redmi	Monitor3	A22FAB-RA	47366/206100029106
Redmi	Monitor4	A22FAB-RA	47366/107100099061
DELL	PC1	Latitude E6520	DL0ZCS1
Great Wall	PC2	Unknown	Unknown
UGREEN	Converter*2	CM131	Unknown
Hollyland	Battery	ZF-BP130	L130240615
Redmi	Monitor Adapter*4	Unknown	Unknown
UGREEN	Converter Adapter*2	Unknown	Unknown

External I/O Cable

Cable Description	Length (m)	From Port	To
Shielded Un-detachable DC cable	1.5	Adapter	EUT
Un-shielded detachable SDI cable*2	1.0	Monitor1/ Monitor2/PC2	Converter
Un-shielded detachable SDI cable*2	1.0	EUT	Converter
Un-shielded detachable HDMI cable*2	2.0	EUT	Monitor3/Monitor4
Un-shielded detachable RJ45 cable	1.0	EUT	PC1
Shielded detachable USB cable	1.0	EUT	PC1
Un-shielded un-detachable DC cable*2	1.5	Converter Adapter	Converter
Un-shielded un-detachable DC cable*4	1.5	Monitor Adapter	Monitor1/2/3/4
Un-shielded un-detachable AC cable	1.5	Receptacle	AC Mains/LISN1

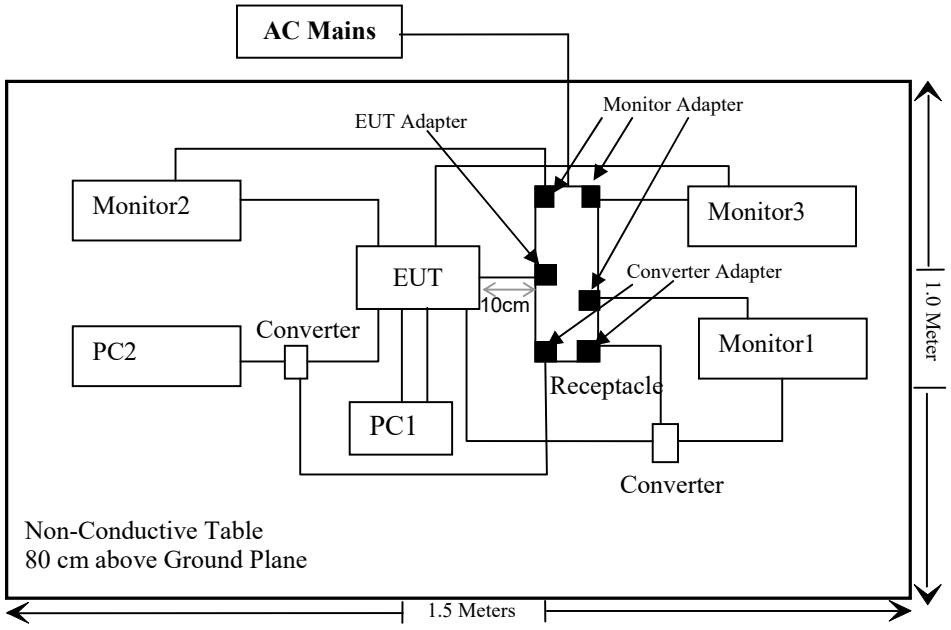
Block Diagram of Test Setup

For Conducted Emissions:

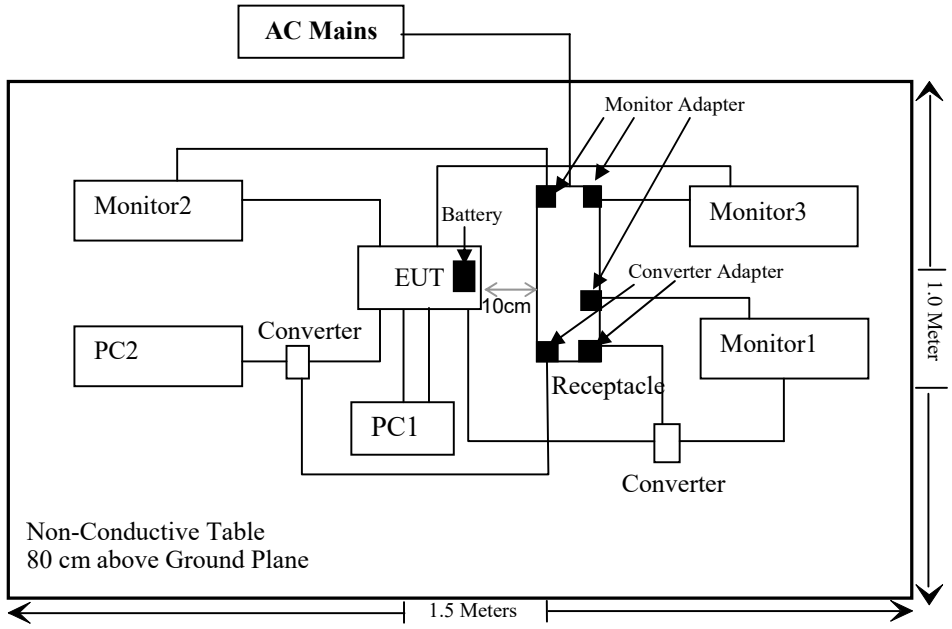


For Radiated Emissions Bolow 1GHz:

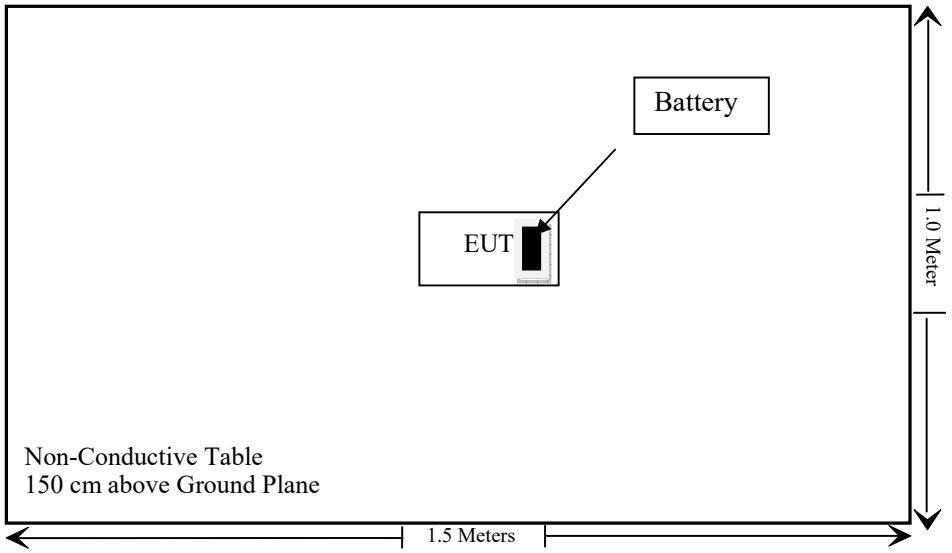
Powered By Adapter:



Powered By Battery:



For Radiated Emissions Above 1GHz:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b) & §2.1091	MPE-Based Exemption	Compliant
§15.203	Antenna Requirement	Compliant
§15.407(b)(9)& §15.207(a)	Conducted Emissions	Compliant
§15.205& §15.209 &§15.407(b)	Undesirable Emission& Restricted Bands	Compliant
§15.407(a) (e)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliant
§15.407(a)	Conducted Transmitter Output Power	Compliant
§15.407 (a)	Power Spectral Density	Compliant
§15.407 (h)	Transmit Power Control (TPC)	Not Applicable
§15.407 (h)	Dynamic Frequency Selection (DFS)	Not Applicable

Not Applicable: The device cannot operate at 5250-5350MHz/5470-5725MHz.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2024/01/16	2025/01/15
Rohde & Schwarz	LISN	ENV216	101613	2024/01/16	2025/01/15
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 Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2024/01/16	2025/01/15
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	2024/05/21	2025/05/20
Unknown	Cable	PNG214	1354	2024/05/21	2025/05/20
Audix	EMI Test software	E3	19821b(V9)	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2024/03/27	2025/03/26
COM-POWER	Pre-amplifier	PA-122	181919	2024/06/18	2025/06/17
Schwarzbeck	Horn Antenna	BBHA9120D(1201)	1143	2023/07/26	2026/07/25
Unknown	RF Cable	KMSE	735	2024/06/18	2025/06/17
Unknown	RF Cable	UFA147	219661	2024/06/18	2025/06/17
Unknown	RF Cable	XH750A-N	J-10M	2024/06/18	2025/06/17
JD	Multiplex Switch Test Control Set	DT7220FSU	DQ77926	2024/06/18	2025/06/17
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	2024/06/18	2025/06/17
Audix	EMI Test software	E3	191218(V9)	NCR	NCR

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200982	2023/12/18	2024/12/17
ANRITSU	Microwave peak power sensor	MA24418A	12622	2024/05/21	2025/05/20
Unknown	10dB Attenuator	Unknown	F-03-EM190	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).

FCC 1.1307 (B) & §2.1091- MPE-BASED EXEMPTION

Applicable Standard

According to 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)(1)(i)(C)] to support an exemptionfrom 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^2f.
1,500-100,000	19.2R^2.

Ris the minimum separation distance in meters
f = frequency in MHz

Result

Frequency (MHz)	Tune up conducted power#	Antenna Gain#		ERP		Evaluation Distance (m)	ERP Limit (mW)
	(dBm)	(dBi)	(dBd)	(dBm)	(mW)		
5185-5225	10.5	5.45	3.30	13.80	23.99	0.2	768
5760-5820	8.0	4.34	2.19	10.19	10.45	0.2	768

Note: The tune up conducted power and antenna gain was declared by the applicant.

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

Result: Compliant

FCC §15.203 - 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 kinds of external antennas with a unique antenna connector, and the maximum antenna gain# is below, fulfill the requirement of this section. Please refer to the EUT photos.

Type	Antenna Gain#	Impedance	Frequency Range
Blade Antenna	5.45dBi	50Ω	5150-5250MHz
	4.34dBi	50Ω	5725-5850MHz
Mushroom Antenna	3.31dBi	50Ω	5150-5250MHz
	3.14dBi	50Ω	5725-5850MHz

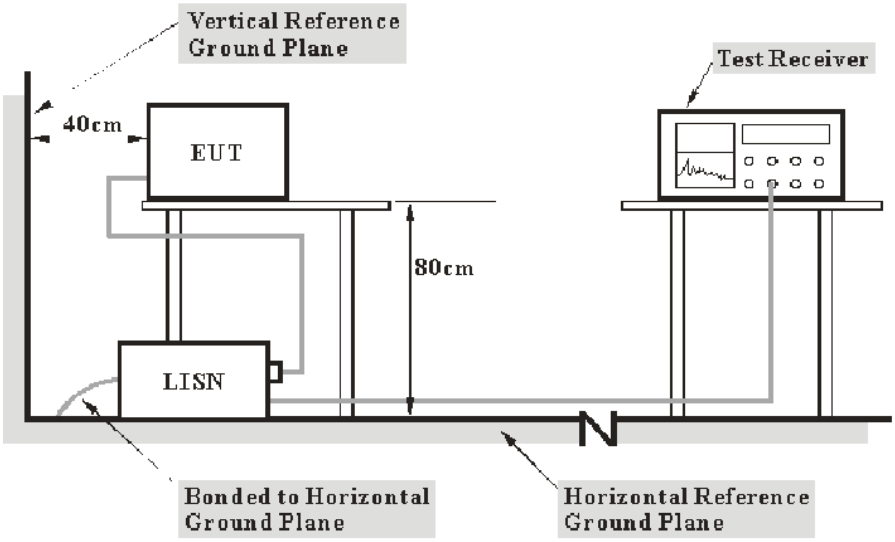
Result: Compliant

FCC §15.407 (b) (6) §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207, §15.407(b) (6)

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

During the conducted emission test, the adapter was connected to the LISN.

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

All 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:

Factor = LISN VDF + 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 calculation is as follows:

Over Limit = Level – Limit
Level = Read Level + Factor

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

Test Data

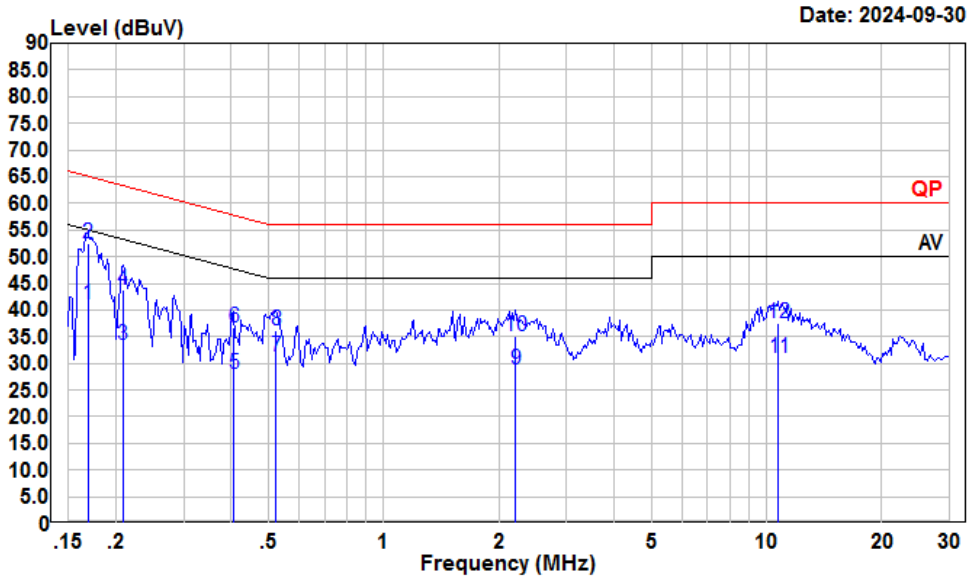
Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	70 %
ATM Pressure:	101 kPa

The testing was performed by Macy Shi on 2024-09-30.

EUT operation mode: Transmitting (Maximum output power mode, 5225MHz)

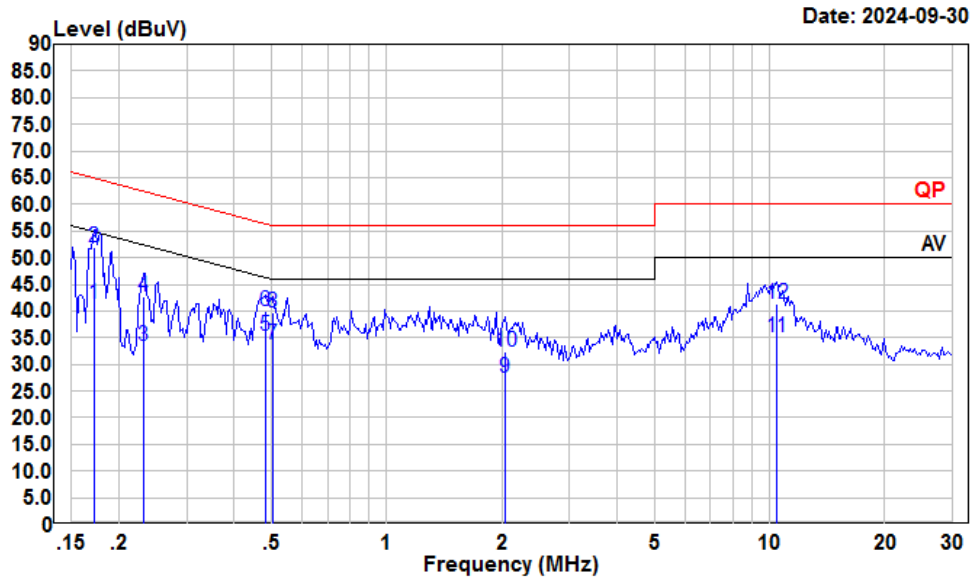
AC 120V/60 Hz, Line



Condition: Line
Project : 2401U55189E-RF
tester : Macy.shi
Note :

	Freq	Read Level	LISN Level	Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.169	20.16	41.12	10.86	10.10	55.03	-13.91	Average
2	0.169	31.57	52.53	10.86	10.10	65.03	-12.50	QP
3	0.208	12.53	33.41	10.79	10.09	53.27	-19.86	Average
4	0.208	23.00	43.88	10.79	10.09	63.27	-19.39	QP
5	0.406	7.42	28.09	10.57	10.10	47.73	-19.64	Average
6	0.406	15.92	36.59	10.57	10.10	57.73	-21.14	QP
7	0.524	10.64	31.28	10.50	10.14	46.00	-14.72	Average
8	0.524	15.47	36.11	10.50	10.14	56.00	-19.89	QP
9	2.213	8.01	28.75	10.56	10.18	46.00	-17.25	Average
10	2.213	14.42	35.16	10.56	10.18	56.00	-20.84	QP
11	10.733	10.22	31.03	10.60	10.21	50.00	-18.97	Average
12	10.733	16.59	37.40	10.60	10.21	60.00	-22.60	QP

AC 120V/60 Hz, Neutral



Condition: Neutral
Project : 2401U55189E-RF
tester : Macy.shi
Note :

	Freq	Read Level	LISN Level	Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.172	20.83	41.43	10.50	10.10	54.86	-13.43	Average
2	0.172	31.40	52.00	10.50	10.10	64.86	-12.86	QP
3	0.232	13.06	33.59	10.45	10.08	52.39	-18.80	Average
4	0.232	22.06	42.59	10.45	10.08	62.39	-19.80	QP
5	0.481	14.46	35.28	10.69	10.13	46.32	-11.04	Average
6	0.481	19.26	40.08	10.69	10.13	56.32	-16.24	QP
7	0.502	12.97	33.81	10.70	10.14	46.00	-12.19	Average
8	0.502	18.85	39.69	10.70	10.14	56.00	-16.31	QP
9	2.033	6.79	27.38	10.40	10.19	46.00	-18.62	Average
10	2.033	11.84	32.43	10.40	10.19	56.00	-23.57	QP
11	10.397	14.19	35.20	10.80	10.21	50.00	-14.80	Average
12	10.397	20.45	41.46	10.80	10.21	60.00	-18.54	QP

§15.205 & §15.209 & §15.407(B) - UNDESIRABLE EMISSION

Applicable Standard

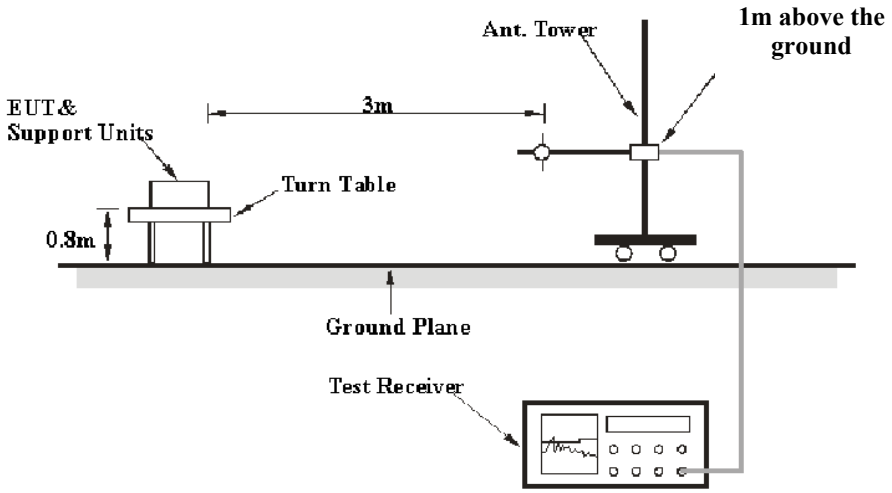
FCC §15.407 (b); §15.209; §15.205;

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band:
(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

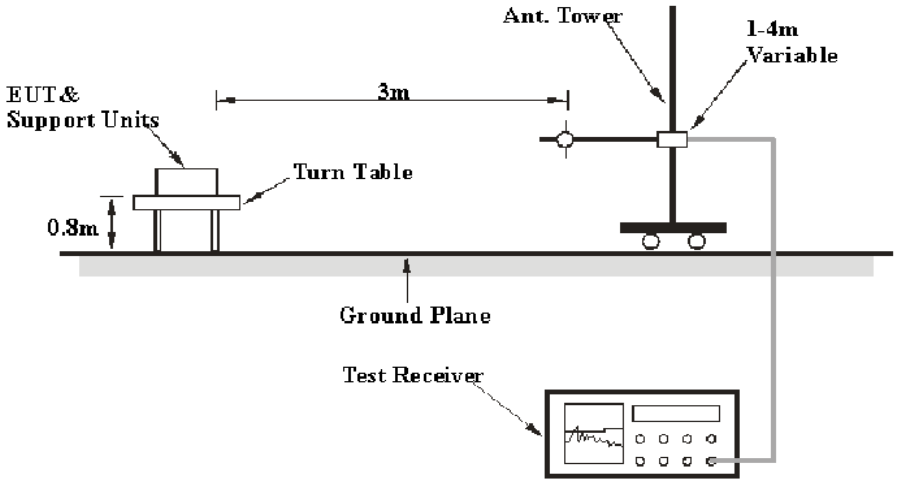
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

EUT Setup

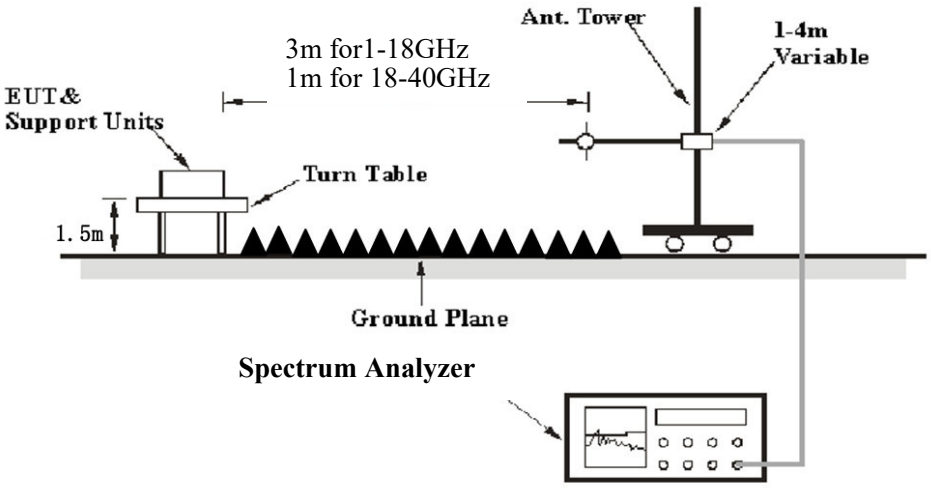
9 kHz-30MHz:



30MHz-1GHz:



Above 1 GHz:



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz to 40 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

1-40GHz:

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
Average	>98%	1MHz	≥10 Hz Note 1
	<98%	1MHz	≥1/Ton Note 2
Note 1: The detail test parameters please refer to duty cycle section. Note 2: 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

Radiated Spurious Emission

During the radiated emission test, the adapter was connected to the AC floor outlet.

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

According to ANSI C63.10-2013,9.4: For field strength measurements made at other than the distance at which the applicable limit is specified, extrapolate the measured field strength to the field strength at the distance specified by the limit using an inverse distance correction factor (20 dB/decade of distance). In some cases, a different distance correction factor may be required;

$$E_{\mathrm{SpecLimit}} = E_{\mathrm{Meas}} + 20\log\left(\frac{d_{\mathrm{Meas}}}{d_{\mathrm{SpecLimit}}}\right)$$

where

$E_{\mathrm{SpecLimit}}$	is the field strength of the emission at the distance specified by the limit, in dBµV/m
E_{Meas}	is the field strength of the emission at the measurement distance, in dBµV/m
d_{Meas}	is the measurement distance, in m
$d_{\mathrm{SpecLimit}}$	is the distance specified by the limit, in m

So the extrapolation factor of 1m is 20*log(1/3)= -9.5 dB, for 18-40GHz range, the limit of 1m distance was added by 9.5dB from limit of 3m to compared with the result measurement at 1m distance.

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:

Factor = Antenna Factor + Cable Loss - 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:

Over Limit = Level – Limit; Margin = Limit–Corrected Amplitude
Level / Corrected Amplitude = Read Level + Factor

Test Data

Environmental Conditions

Temperature:	22~25.6 ℃
Relative Humidity:	54~62 %
ATM Pressure:	101 kPa

The testing was performed by Anson Su from 2024-10-11 to 2024-10-31 for below 1GHz and Dylan Yang on 2024-08-30 for above 1GHz.

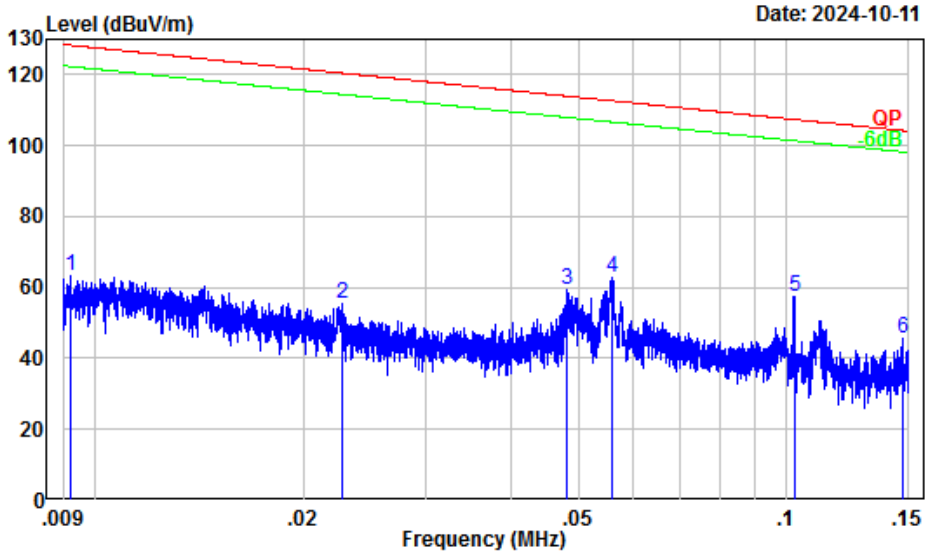
EUT operation mode: Transmitting

Note: Pre-scan in the X, Y and Z axes of orientation, the worst case z-axis of orientation was recorded

For Blade Antenna *(Maximum output power mode, 5225MHz)*

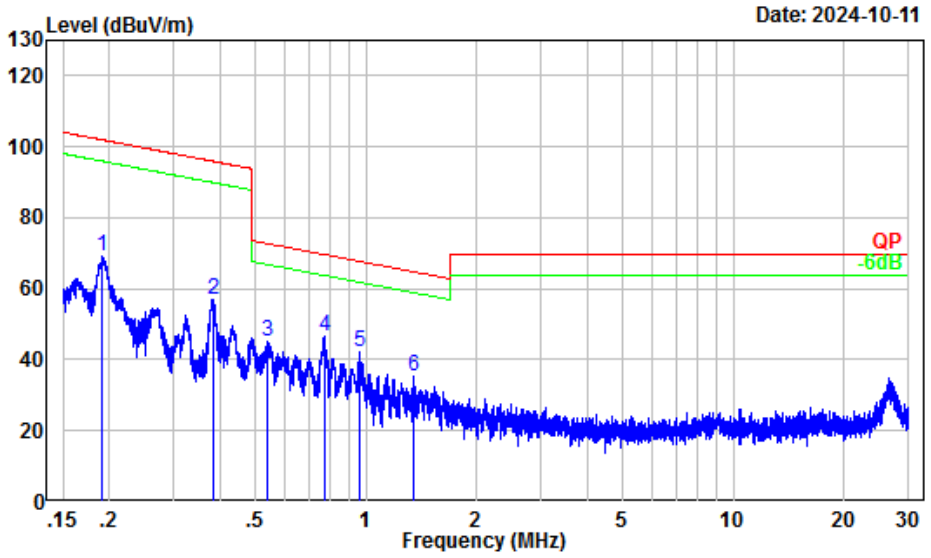
Powered by Adapter

9 kHz-30MHz: *(Worst case, parallel)*



Site : Chamber A
Condition : 3m
Project Number: 2401U55189E-RF
Test Mode : Transmitting
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.01	38.31	25.20	63.51	128.32	-64.81	Peak
2	0.02	31.19	24.03	55.22	120.47	-65.25	Peak
3	0.05	23.48	35.79	59.27	113.95	-54.68	Peak
4	0.06	22.29	40.40	62.69	112.67	-49.98	Peak
5	0.10	16.93	40.36	57.29	107.39	-50.10	Peak
6	0.15	14.85	30.65	45.50	104.24	-58.74	Peak

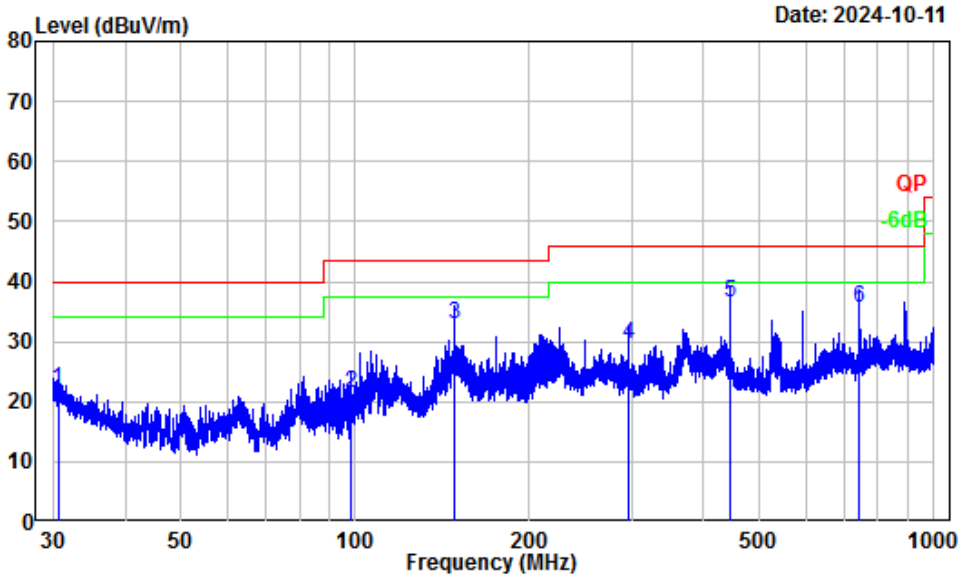


Site : Chamber A
Condition : 3m
Project Number: 2401U55189E-RF
Test Mode : Transmitting
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.19	12.76	56.46	69.22	101.94	-32.72	Peak
2	0.38	5.95	51.17	57.12	95.93	-38.81	Peak
3	0.54	2.99	42.38	45.37	72.93	-27.56	Peak
4	0.77	0.24	46.39	46.63	69.78	-23.15	Peak
5	0.96	-1.30	43.51	42.21	67.83	-25.62	Peak
6	1.35	-2.81	38.13	35.32	64.81	-29.49	Peak

30 MHz–1 GHz:

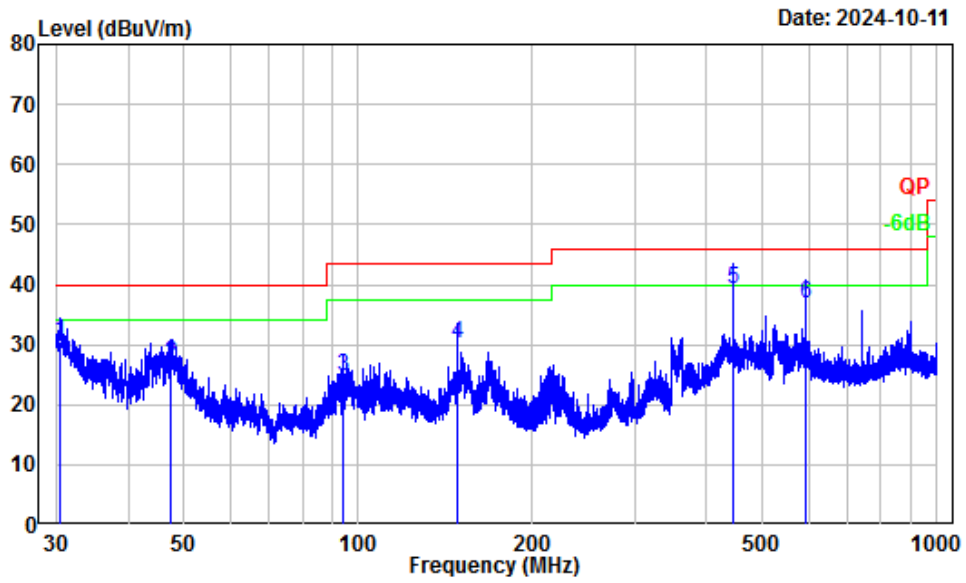
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number: 2401U55189E-RF
Test Mode : Transmitting
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	30.61	-6.28	28.26	21.98	40.00	-18.02	QP
2	98.49	-16.36	37.70	21.34	43.50	-22.16	QP
3	148.51	-12.36	45.28	32.92	43.50	-10.58	QP
4	297.09	-11.21	40.74	29.53	46.00	-16.47	QP
5	445.63	-7.52	44.02	36.50	46.00	-9.50	QP
6	742.58	-2.94	38.45	35.51	46.00	-10.49	QP

Vertical

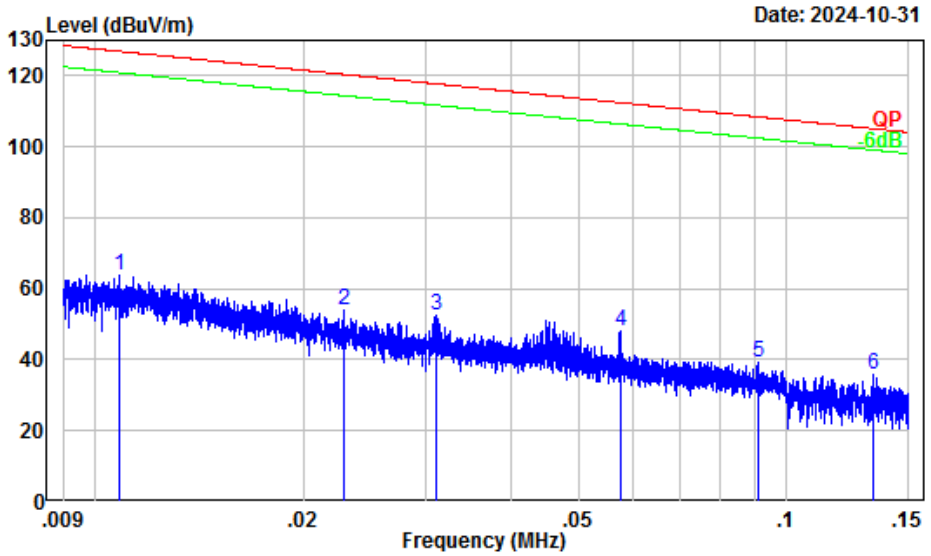


Site : Chamber A
Condition : 3m Vertical
Project Number: 2401U55189E-RF
Test Mode : Transmitting
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	30.60	-6.27	36.90	30.63	40.00	-9.37	QP
2	47.53	-17.16	44.02	26.86	40.00	-13.14	QP
3	94.39	-17.45	42.11	24.66	43.50	-18.84	QP
4	148.51	-12.36	42.60	30.24	43.50	-13.26	QP
5	445.63	-7.52	46.80	39.28	46.00	-6.72	QP
6	594.09	-5.27	42.00	36.73	46.00	-9.27	QP

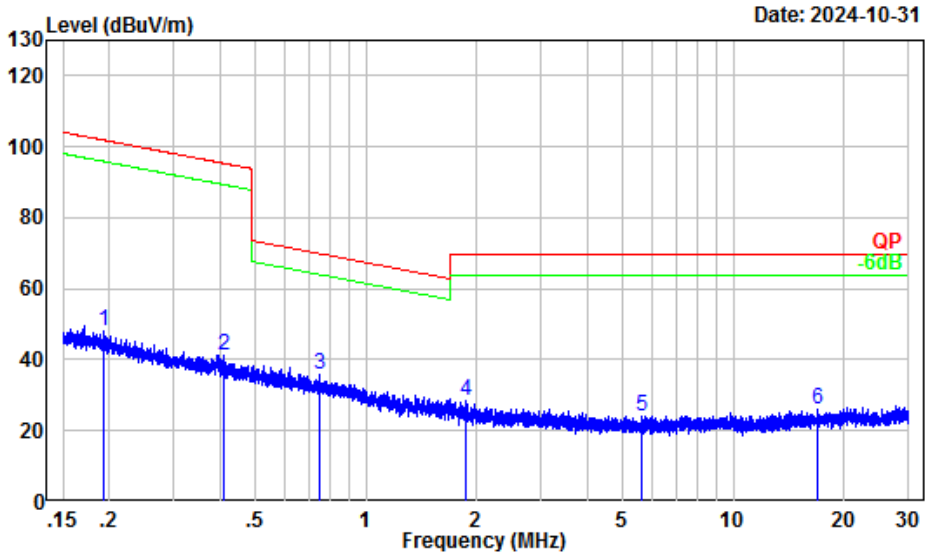
Powered by Battery:

9 kHz-30MHz: *(Worst case, parallel)*



Site : Chamber A
Condition : 3m
Project Number: 2401U55189E-RF
Test Mode : Transmitting
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.01	37.25	26.33	63.58	126.89	-63.31	Peak
2	0.02	31.08	22.73	53.81	120.39	-66.58	Peak
3	0.03	27.22	25.43	52.65	117.73	-65.08	Peak
4	0.06	22.07	26.19	48.26	112.42	-64.16	Peak
5	0.09	17.93	21.44	39.37	108.41	-69.04	Peak
6	0.13	15.48	20.15	35.63	105.09	-69.46	Peak

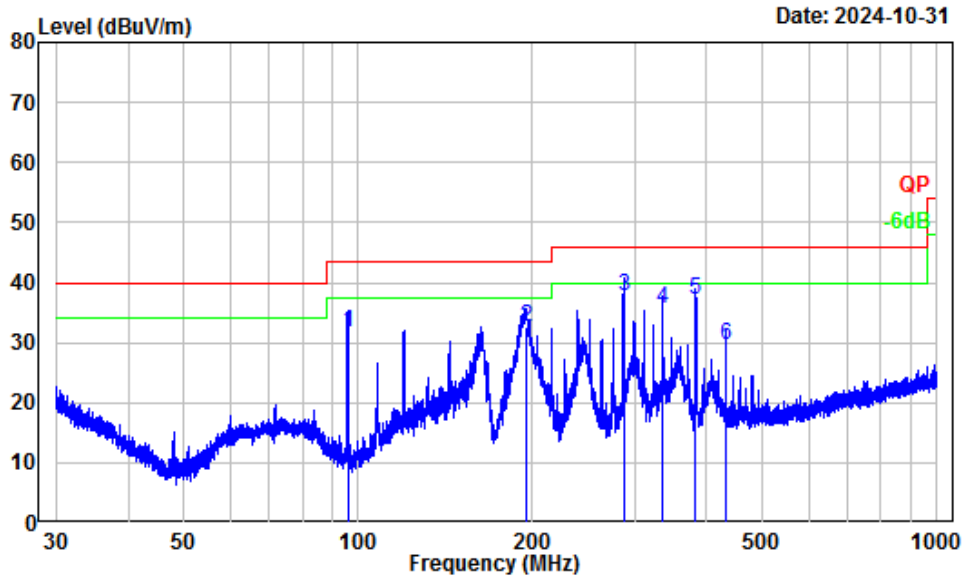


Site : Chamber A
Condition : 3m
Project Number: 2401U55189E-RF
Test Mode : Transmitting
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.19	12.72	35.55	48.27	101.90	-53.63	Peak
2	0.41	5.37	36.04	41.41	95.33	-53.92	Peak
3	0.75	0.52	35.16	35.68	70.06	-34.38	Peak
4	1.87	-4.60	33.19	28.59	69.54	-40.95	Peak
5	5.66	-6.98	31.22	24.24	69.54	-45.30	Peak
6	17.03	-5.08	31.26	26.18	69.54	-43.36	Peak

30MHz–1GHz:

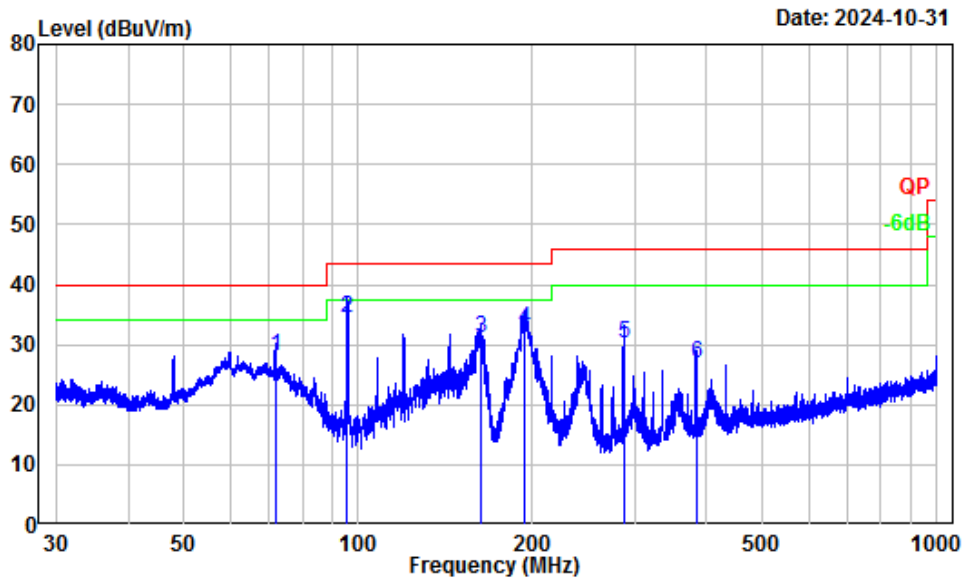
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number: 2401U55189E-RF
Test Mode : Transmitting
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	95.85	-17.81	49.54	31.73	43.50	-11.77	QP
2	195.39	-12.75	45.36	32.61	43.50	-10.89	QP
3	287.49	-12.93	50.76	37.83	46.00	-8.17	QP
4	335.01	-12.44	48.19	35.75	46.00	-10.25	QP
5	383.09	-11.41	48.44	37.03	46.00	-8.97	QP
6	431.79	-10.16	39.72	29.56	46.00	-16.44	QP

Vertical



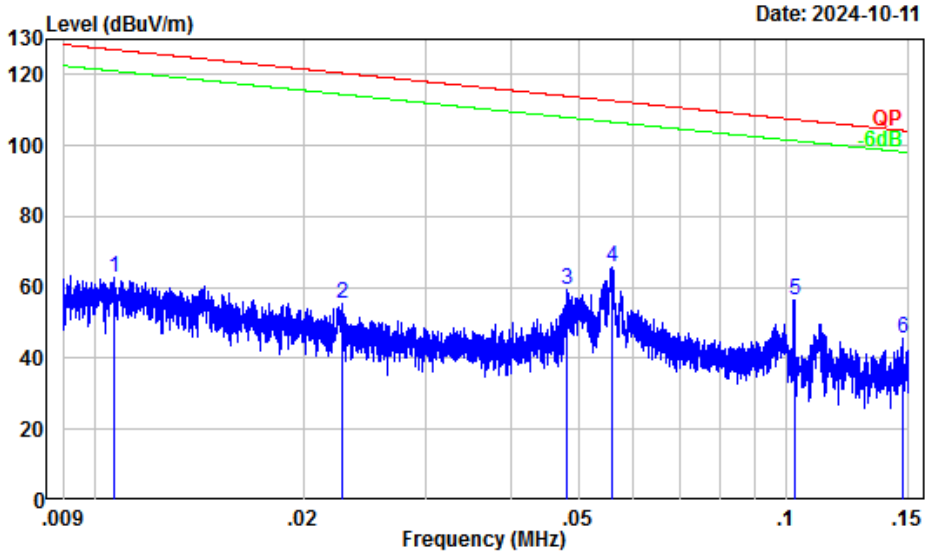
Site : Chamber A
Condition : 3m Vertical
Project Number: 2401U55189E-RF
Test Mode : Transmitting
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	71.90	-18.55	46.61	28.06	40.00	-11.94	QP
2	95.76	-17.83	52.28	34.45	43.50	-9.05	QP
3	163.04	-14.08	45.23	31.15	43.50	-12.35	QP
4	194.20	-12.86	45.45	32.59	43.50	-10.91	QP
5	287.49	-12.93	43.14	30.21	46.00	-15.79	QP
6	383.43	-11.40	38.36	26.96	46.00	-19.04	QP

For Mushroom Antenna *(Maximum output power mode, 5225MHz)*

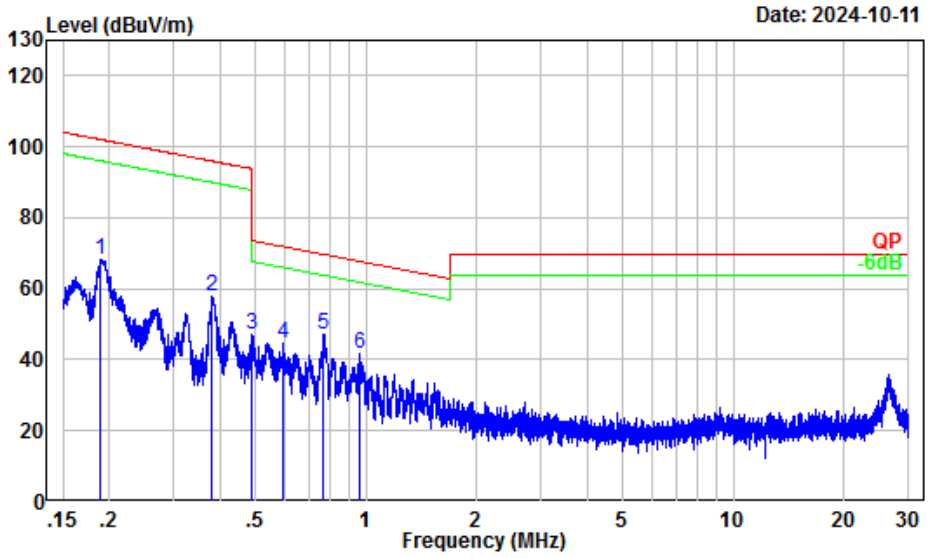
Powered by Adapter (Worst Case)

9 kHz-30MHz: *(Worst case, parallel)*



Site : Chamber A
Condition : 3m
Project Number: 2401U55189E-RF
Test Mode : Transmitting
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.01	37.36	25.36	62.72	127.07	-64.35	Peak
2	0.02	31.19	24.03	55.22	120.47	-65.25	Peak
3	0.05	23.48	35.79	59.27	113.95	-54.68	Peak
4	0.06	22.29	43.40	65.69	112.67	-46.98	Peak
5	0.10	16.93	39.36	56.29	107.39	-51.10	Peak
6	0.15	14.85	30.65	45.50	104.24	-58.74	Peak

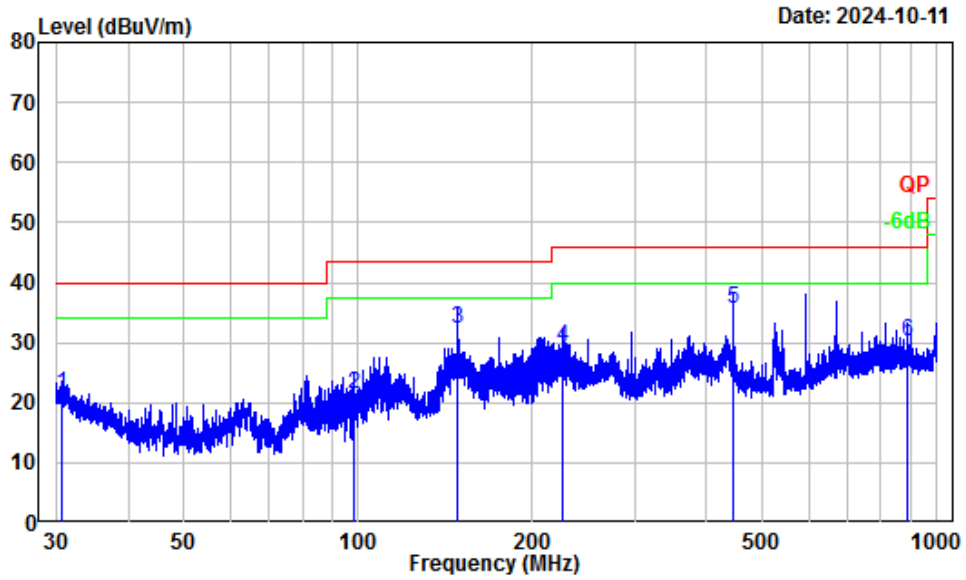


Site : Chamber A
Condition : 3m
Project Number: 2401U55189E-RF
Test Mode : Transmitting
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.19	12.86	55.40	68.26	102.03	-33.77	Peak
2	0.38	5.99	51.75	57.74	95.97	-38.23	Peak
3	0.49	3.66	43.34	47.00	73.77	-26.77	Peak
4	0.60	2.34	42.48	44.82	72.08	-27.26	Peak
5	0.77	0.27	46.98	47.25	69.81	-22.56	Peak
6	0.96	-1.30	43.02	41.72	67.83	-26.11	Peak

30 MHz–1 GHz:

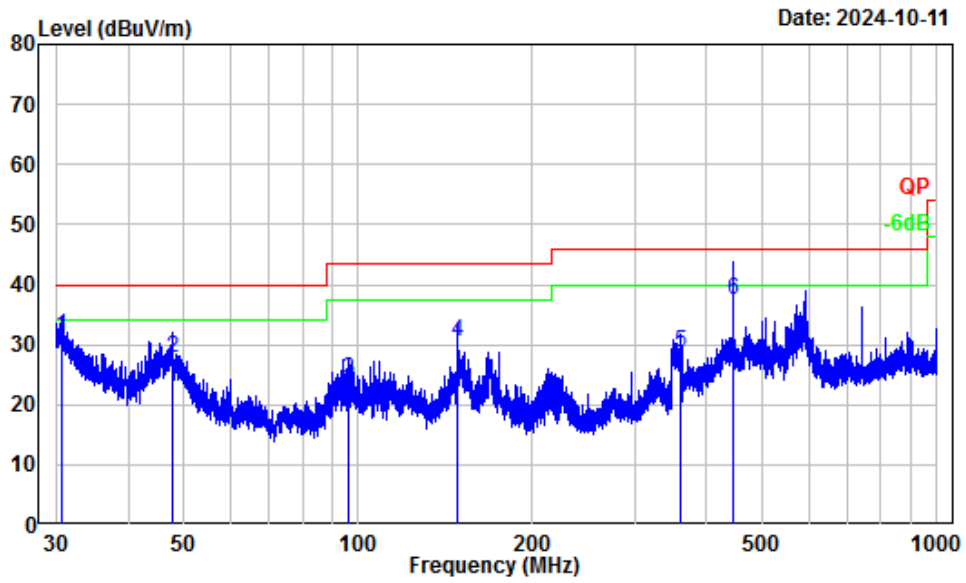
Horizontal



Site : Chamber A
Condition : 3m Horizontal
Project Number: 2401U55189E-RF
Test Mode : Transmitting
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	30.73	-6.34	27.88	21.54	40.00	-18.46	QP
2	98.44	-16.38	37.92	21.54	43.50	-21.96	QP
3	148.51	-12.36	44.73	32.37	43.50	-11.13	QP
4	225.01	-14.07	43.45	29.38	46.00	-16.62	QP
5	445.63	-7.52	43.10	35.58	46.00	-10.42	QP
6	890.73	-1.40	31.65	30.25	46.00	-15.75	QP

Vertical



Site : Chamber A
Condition : 3m Vertical
Project Number: 2401U55189E-RF
Test Mode : Transmitting
Tester : Anson Su

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	30.62	-6.28	37.60	31.32	40.00	-8.68	QP
2	47.78	-17.25	45.10	27.85	40.00	-12.15	QP
3	96.31	-16.96	41.20	24.24	43.50	-19.26	QP
4	148.51	-12.36	42.83	30.47	43.50	-13.03	QP
5	361.56	-9.82	38.37	28.55	46.00	-17.45	QP
6	445.63	-7.52	45.00	37.48	46.00	-8.52	QP

Above 1GHz:

5150-5250 MHz:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	PK/AV					
Blade Antenna							
5185MHz							
5144.78	56.62	PK	H	2.70	59.32	74	-14.68
5149.87	44.21	AV	H	2.71	46.92	54	-7.08
4894.72	54.15	PK	V	2.63	56.78	74	-17.22
5049.37	41.68	AV	V	2.95	44.63	54	-9.37
10370.00	44.98	PK	H	12.88	57.86	68.2	-10.34
10370.00	44.85	PK	V	12.88	57.73	68.2	-10.47
5205MHz							
10410.00	44.96	PK	H	12.98	57.94	68.2	-10.26
10410.00	44.89	PK	V	12.98	57.87	68.2	-10.33
5225MHz							
5382.31	55.01	PK	H	2.95	57.96	74	-16.04
5382.31	42.95	AV	H	2.95	45.90	54	-8.10
5368.59	54.63	PK	V	2.94	57.57	74	-16.43
5368.59	41.66	AV	V	2.94	44.60	54	-9.40
10450.00	44.92	PK	H	13.26	58.18	68.2	-10.02
10450.00	44.86	PK	V	13.26	58.12	68.2	-10.08
Mushroom Antenna							
5185MHz							
4962.29	55.05	PK	H	2.69	57.74	74	-16.26
4962.29	42.85	AV	H	2.69	45.54	54	-8.46
5050.17	54.73	PK	V	2.94	57.67	74	-16.33
5050.17	41.75	AV	V	2.94	44.69	54	-9.31
10370.00	51.34	PK	H	12.88	64.22	68.2	-3.98
10370.00	46.72	PK	V	12.88	59.60	68.2	-8.60
5205MHz							
10410.00	50.88	PK	H	12.98	63.86	68.2	-4.34
10410.00	46.28	PK	V	12.98	59.26	68.2	-8.94
5225MHz							
5459.46	54.62	PK	H	3.05	57.67	74	-16.33
5459.46	41.96	AV	H	3.05	45.01	54	-8.99
5386.26	53.91	PK	V	2.97	56.88	74	-17.12
5386.26	41.27	AV	V	2.97	44.24	54	-9.76
10450.00	49.41	PK	H	13.26	62.67	68.2	-5.53
10450.00	45.99	PK	V	13.26	59.25	68.2	-8.95

5725-5850 MHz:

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	PK/AV					
Blade Antenna							
5760MHz							
5630.06	57.10	PK	H	3.12	60.22	68.20	-7.98
5666.99	54.78	PK	H	3.34	58.12	80.81	-22.69
5714.93	55.31	PK	H	3.47	58.78	109.38	-50.60
5723.49	54.91	PK	H	3.48	58.39	118.76	-60.37
5635.81	54.73	PK	V	3.17	57.90	68.20	-10.30
5659.59	54.47	PK	V	3.30	57.77	75.32	-17.55
5715.25	54.80	PK	V	3.47	58.27	109.47	-51.20
5724.12	54.23	PK	V	3.48	57.71	120.20	-62.49
11520.00	44.63	PK	H	14.23	58.86	74	-15.14
11520.00	30.28	AV	H	14.23	44.51	54	-9.49
11520.00	45.11	PK	V	14.23	59.34	74	-14.66
11520.00	30.68	AV	V	14.23	44.91	54	-9.09
5780MHz							
11560.00	44.69	PK	H	14.13	58.82	74	-15.18
11560.00	31.30	AV	H	14.13	45.43	54	-8.57
11560.00	45.11	PK	V	14.13	59.24	74	-14.76
11560.00	30.48	AV	V	14.13	44.61	54	-9.39
5820MHz							
5850.00	56.95	PK	H	4.09	61.04	122.20	-61.16
5855.00	55.99	PK	H	4.09	60.08	110.80	-50.72
5875.00	55.68	PK	H	4.19	59.87	105.20	-45.33
5925.00	55.12	PK	H	4.69	59.81	68.20	-8.39
5850.00	56.19	PK	V	4.09	60.28	122.20	-61.92
5855.00	55.56	PK	V	4.09	59.65	110.80	-51.15
5875.00	55.21	PK	V	4.19	59.40	105.20	-45.80
5925.00	55.01	PK	V	4.69	59.70	68.20	-8.50
11640.00	45.09	PK	H	13.83	58.92	74	-15.08
11640.00	31.67	AV	H	13.83	45.50	54	-8.50
11640.00	44.87	PK	V	13.83	58.70	74	-15.30
11640.00	31.48	AV	V	13.83	45.31	54	-8.69

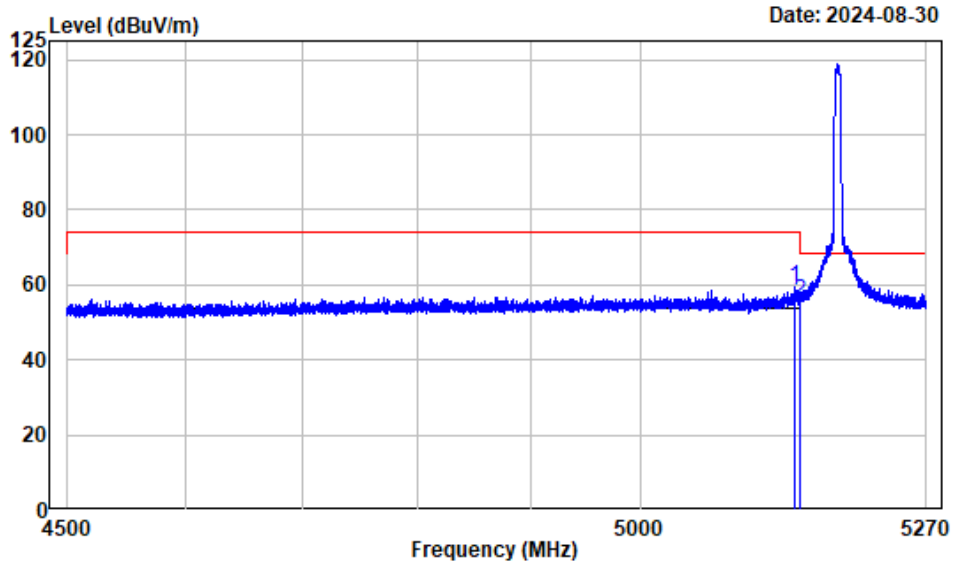
Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/AV					
Mushroom Antenna							
5760MHz							
5650.00	54.74	PK	H	3.59	58.33	68.20	-9.87
5700.00	54.02	PK	H	4.09	58.11	105.20	-47.09
5720.00	54.21	PK	H	4.09	58.30	110.80	-52.50
5725.00	54.72	PK	H	4.09	58.81	122.20	-63.39
5650.00	54.59	PK	V	3.59	58.18	68.20	-10.02
5700.00	53.74	PK	V	4.09	57.83	105.20	-47.37
5720.00	53.36	PK	V	4.09	57.45	110.80	-53.35
5725.00	54.16	PK	V	4.09	58.25	122.20	-63.95
11520.00	44.34	PK	H	14.23	58.57	74	-15.43
11520.00	32.45	AV	H	14.23	46.68	54	-7.32
11520.00	44.79	PK	V	14.23	59.02	74	-14.98
11520.00	32.99	AV	V	14.23	47.22	54	-6.78
5780MHz							
11560.00	45.03	PK	H	14.13	59.16	74	-14.84
11560.00	32.48	AV	H	14.13	46.61	54	-7.39
11560.00	45.16	PK	V	14.13	59.29	74	-14.71
11560.00	32.58	AV	V	14.13	46.71	54	-7.29
5820MHz							
5850.00	54.68	PK	H	4.09	58.77	122.20	-63.43
5855.00	55.13	PK	H	4.09	59.22	110.80	-51.58
5875.00	54.68	PK	H	4.19	58.87	105.20	-46.33
5925.00	54.01	PK	H	4.69	58.70	68.20	-9.50
5850.00	54.17	PK	V	4.09	58.26	122.20	-63.94
5855.00	54.30	PK	V	4.09	58.39	110.80	-52.41
5875.00	54.01	PK	V	4.19	58.20	105.20	-47.00
5925.00	53.52	PK	V	4.69	58.21	68.20	-9.99
11640.00	45.98	PK	H	13.83	59.81	74	-14.19
11640.00	32.57	AV	H	13.83	46.40	54	-7.60
11640.00	45.54	PK	V	13.83	59.37	74	-14.63
11640.00	32.33	AV	V	13.83	46.16	54	-7.84

Note:
Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Factor + Reading
Margin = Corrected. Amplitude - Limit
The other spurious emission which is in the noise floor level was not recorded.

Test plots for worst Band Edge Measurements (Radiated)

5150-5250MHz:

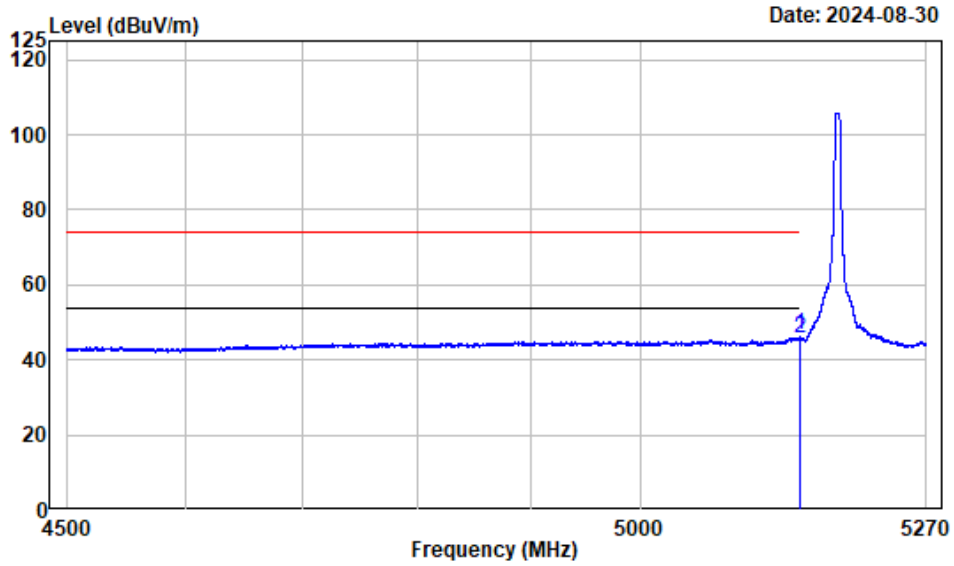
Blade Antenna			
Test Channel:	**5185MHz**	**Ant. Polar. :**	**Horizontal-Peak**



Condition : Horizontal
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5185

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	5144.779	2.70	56.62	59.32	74.00	-14.68	peak
2	5150.000	2.71	53.06	55.77	74.00	-18.23	Peak

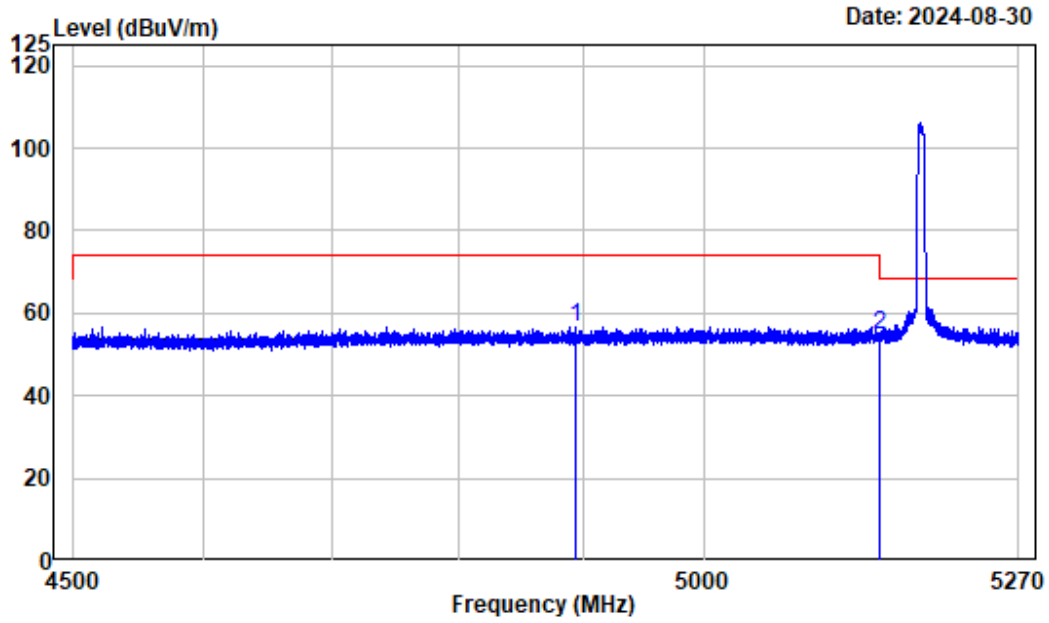
Blade Antenna			
Test Channel:	**5185MHz**	**Ant. Polar. :**	**Horizontal-Average**



Condition : Horizontal
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5185

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	5149.865	2.71	44.21	46.92	54.00	-7.08	Average
2	5150.000	2.71	43.11	45.82	54.00	-8.18	Average

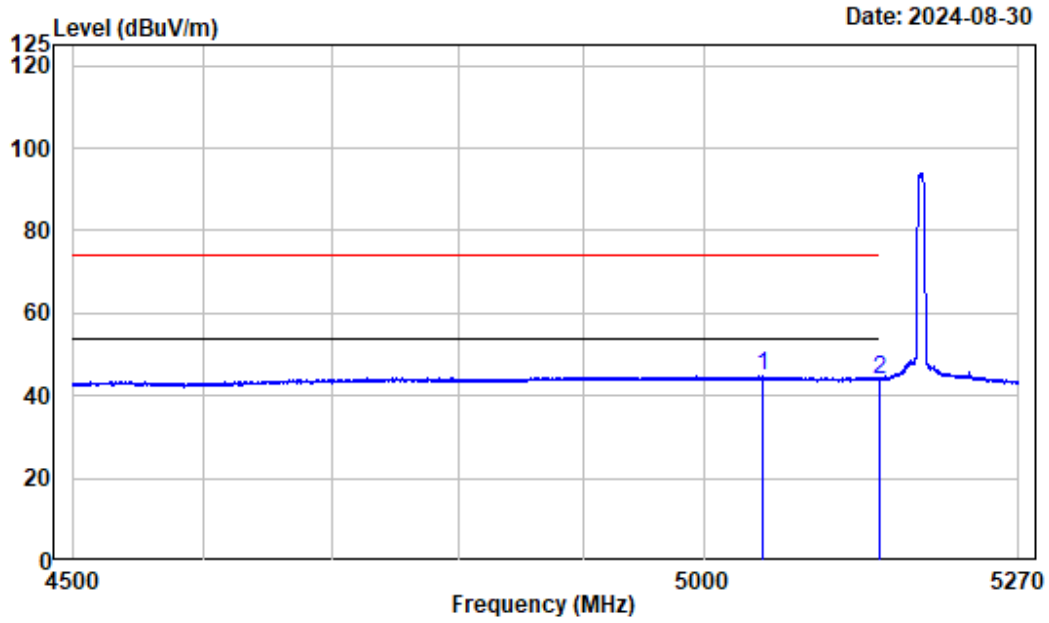
Blade Antenna			
Test Channel:	**5185MHz**	**Ant. Polar. :**	**Vertical-Peak**



Condition : Vertical
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5185

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	4894.721	2.63	54.15	56.78	74.00	-17.22	peak
2	5150.000	2.71	52.09	54.80	74.00	-19.20	Peak

Blade Antenna			
Test Channel:	**5185MHz**	**Ant. Polar. :**	**Vertical-Average**

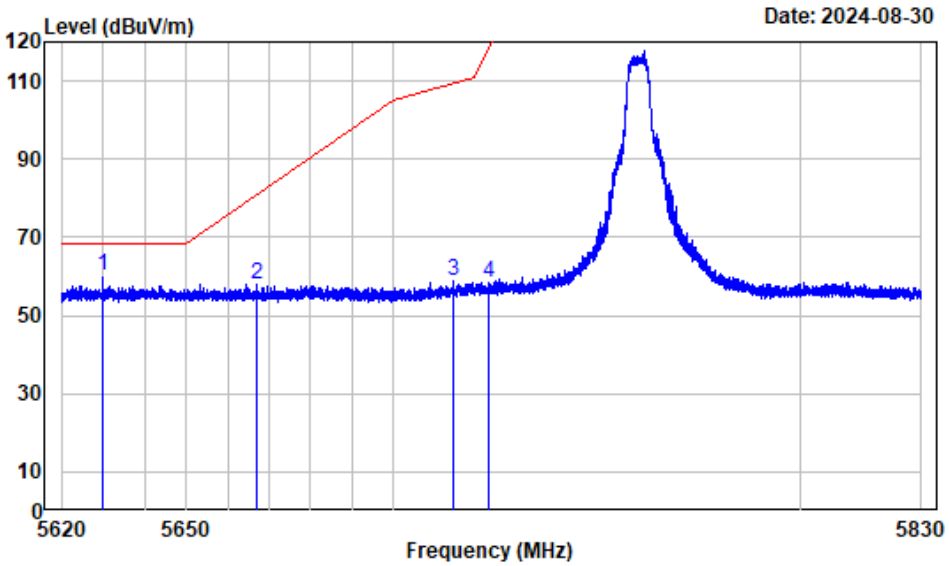


Condition : Vertical
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5185

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	5049.367	2.95	41.68	44.63	54.00	-9.37	Average
2	5150.000	2.71	41.26	43.97	54.00	-10.03	Average

5725-5850 MHz:

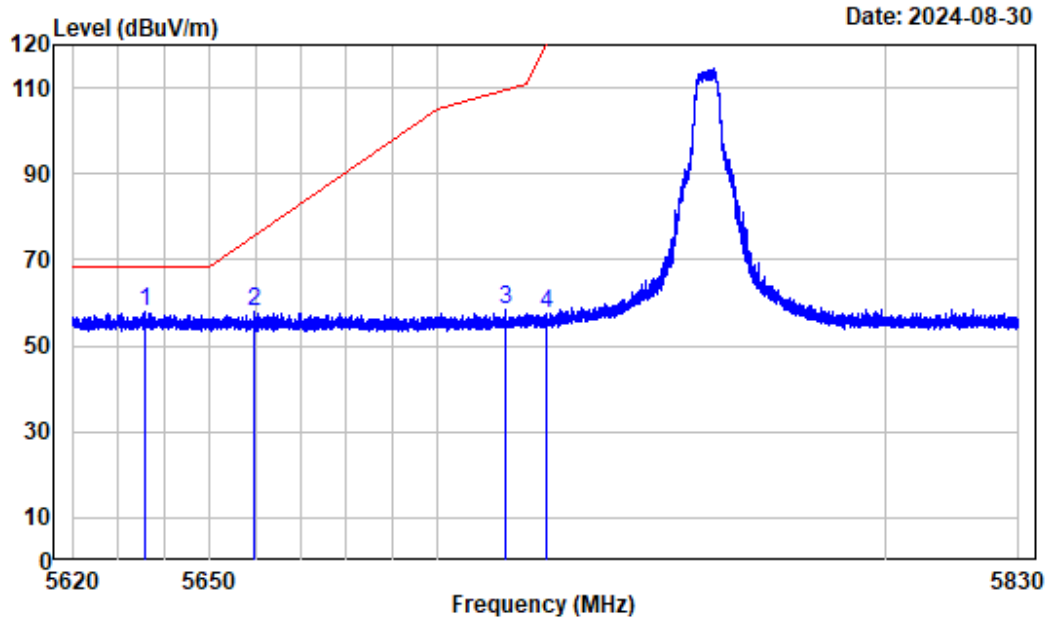
Blade Antenna			
Test Channel:	**5760MHz**	**Ant. Polar. :**	**Horizontal**



Condition : Horizontal
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5760

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	5630.055	3.12	57.10	60.22	68.20	-7.98	peak
2	5666.993	3.34	54.78	58.12	80.81	-22.69	peak
3	5714.932	3.47	55.31	58.78	109.38	-50.60	peak
4	5723.490	3.48	54.91	58.39	118.76	-60.37	peak

Blade Antenna			
Test Channel:	**5760MHz**	**Ant. Polar. :**	**Vertical**

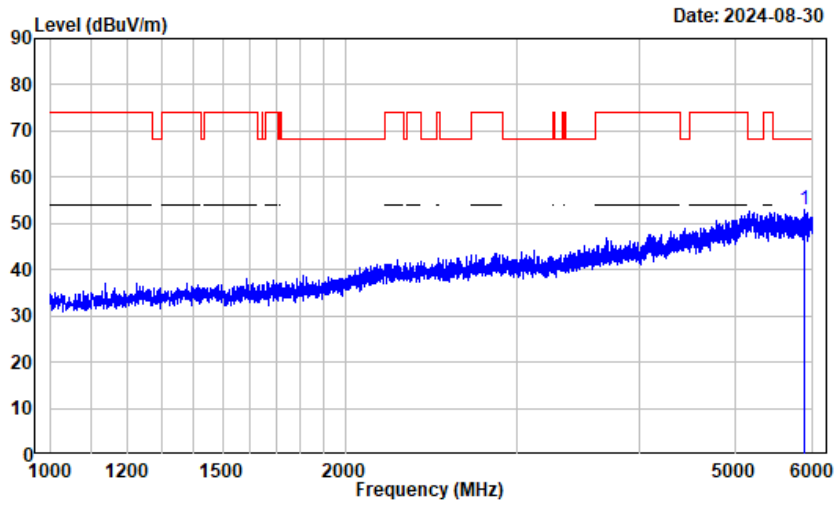


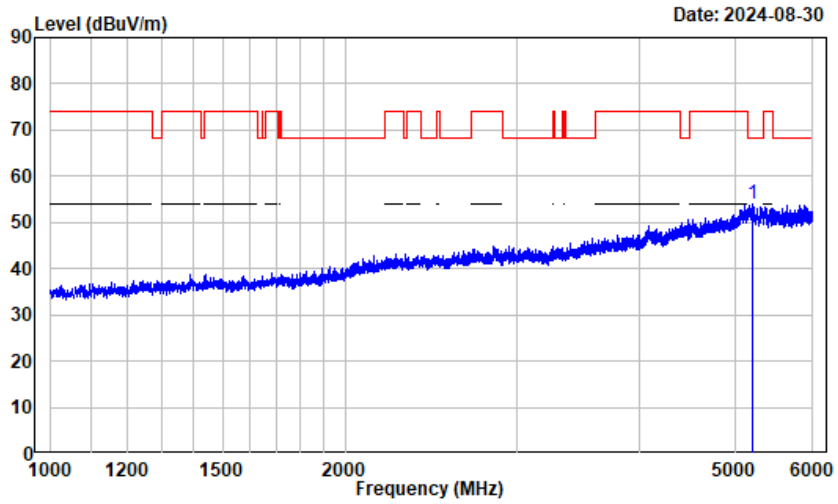
Condition : Vertical
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5760

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	5635.805	3.17	54.73	57.90	68.20	-10.30	peak
2	5659.590	3.30	54.47	57.77	75.32	-17.55	peak
3	5715.247	3.47	54.80	58.27	109.47	-51.20	peak
4	5724.121	3.48	54.23	57.71	120.20	-62.49	peak

Listed with the worst harmonic margin test plot:

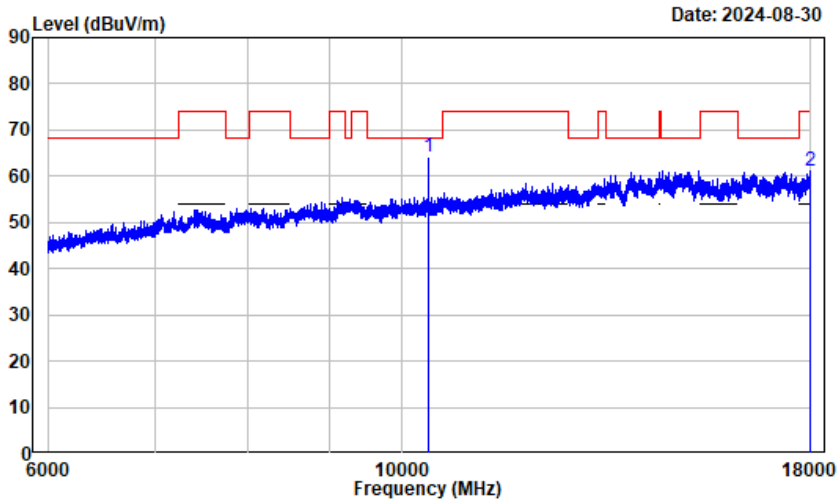
Mushroom Antenna, 5185MHz

Horizontal	
1-6GHz	 Condition : Horizontal Project No.: 2401U55189E-RF Tester : Dylan.Yang Note : 5185 Freq / Factor / Read Level / Limit Level / Limit Line / Over Limit / Remark MHz / dB/m / dBuV / dBuV/m / dBuV/m / dB 1 5879.985 3.78 49.19 52.97 68.20 -15.23 Peak

Vertical	
1-6GHz	 Condition : Vertical Project No.: 2401U55189E-RF Tester : Dylan.Yang Note : 5185 | | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark | | | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | | | 1 | 5213.652 | 3.04 | 50.95 | 53.99 | 68.20 | -14.21 | Peak |

Horizontal-Peak

6-18GHz

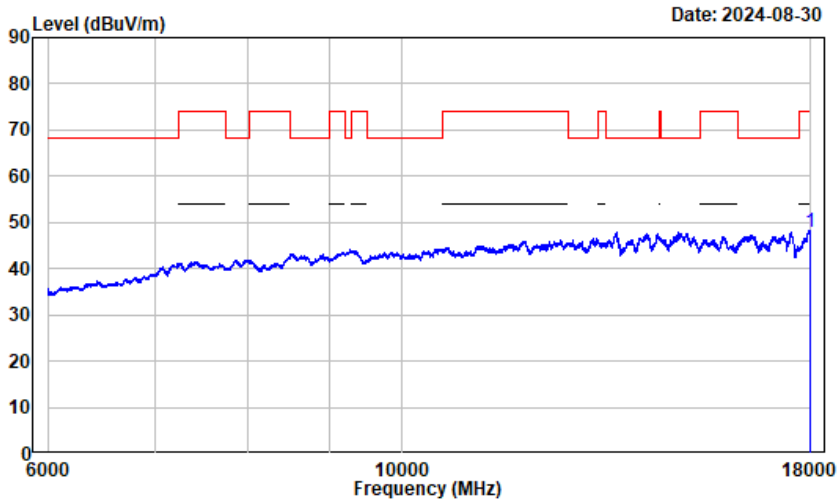


Condition : Horizontal
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5185

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	10370.000	12.88	51.34	64.22	68.20	-3.98	Peak
2	17998.500	24.61	36.65	61.26	74.00	-12.74	Peak

Horizontal-Average

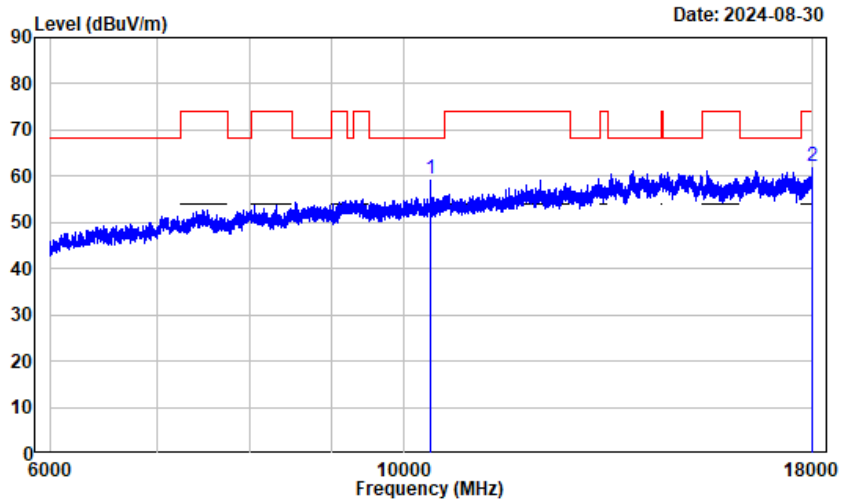
6-18GHz



Condition : Horizontal
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5185

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	17983.500	24.50	23.25	47.75	54.00	-6.25	Average

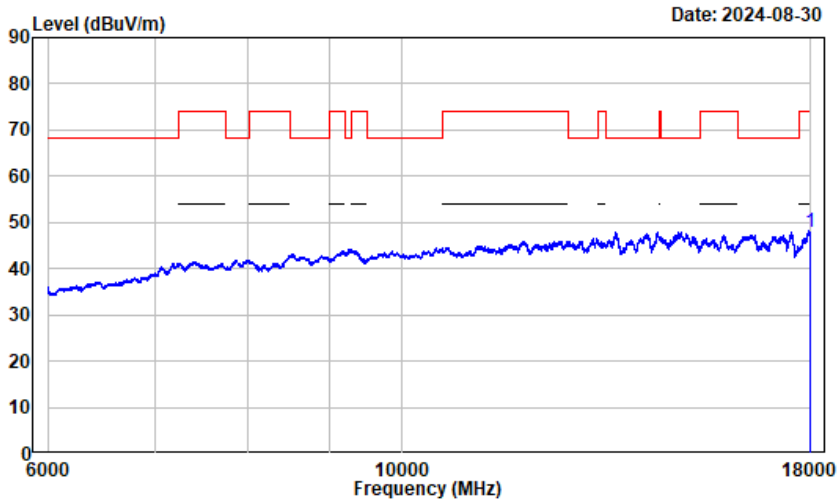
Note: Spectrum Analyzer Setting: RBW=1MHz, VBW=5kHz

Vertical-Peak	
6-18GHz	 Condition : Vertical Project No.: 2401U55189E-RF Tester : Dylan.Yang Note : 5185

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	10370.000	12.88	46.72	59.60	68.20	-8.60	Peak
2	18000.000	24.62	37.48	62.10	74.00	-11.90	Peak

Vertical-Average

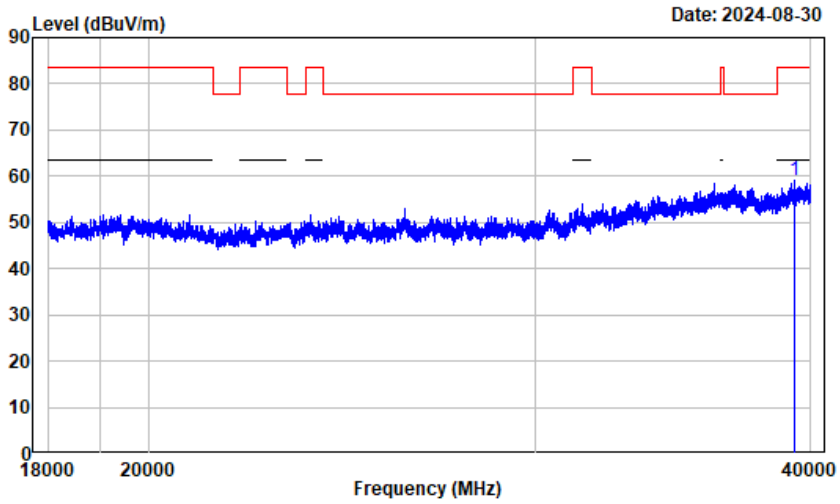
6-18GHz



Condition : Vertical
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5185

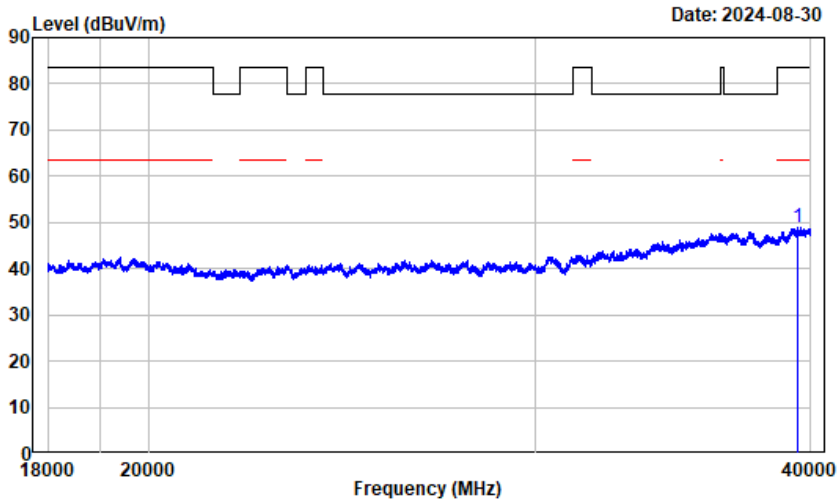
	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	17991.000	24.56	23.26	47.82	54.00	-6.18	Average

Note: Spectrum Analyzer Setting: RBW=1MHz, VBW=5kHz

Horizontal-Peak	
18-40GHz	 Condition : Horizontal Project No.: 2401U55189E-RF Tester : Dylan.Yang Note : 5185 Freq / Read Level / Limit Line / Over Limit / Remark MHz / dB/m / dBuV / dBuV/m / dBuV/m / dB 1 39342.670 22.61 36.63 59.24 83.50 -24.26 Peak

Horizontal-Average

18-40GHz



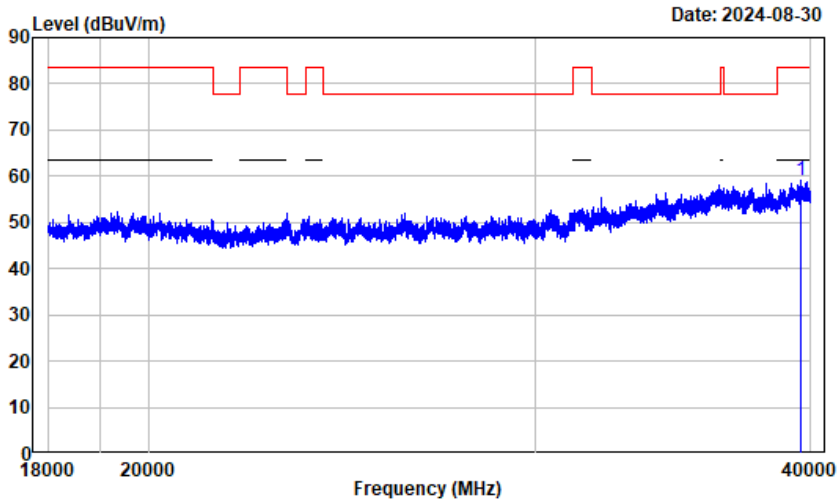
Condition : Horizontal
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5185

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	39477.430	22.59	26.41	49.00	63.50	-14.50	Average

Note: Spectrum Analyzer Setting: RBW=1MHz, VBW=5kHz

Vertical-Peak

18-40GHz

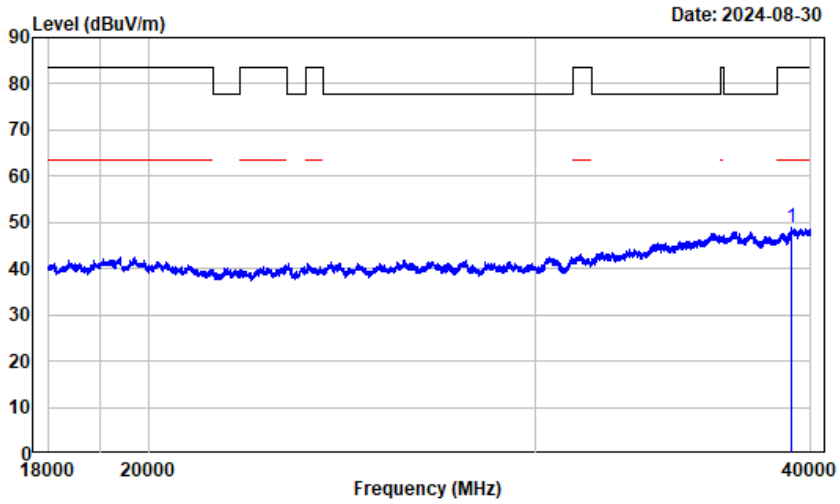


Condition : Vertical
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5185

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	39598.450	22.79	36.19	58.98	83.50	-24.52	Peak

Vertical-Average

18-40GHz

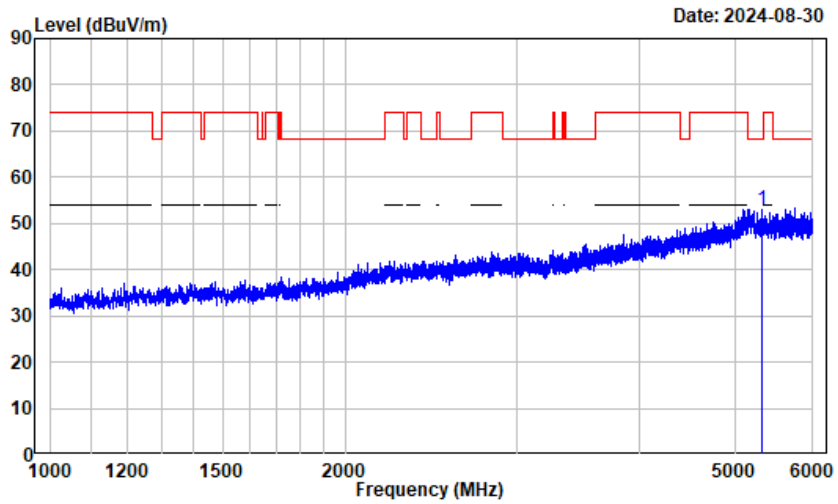


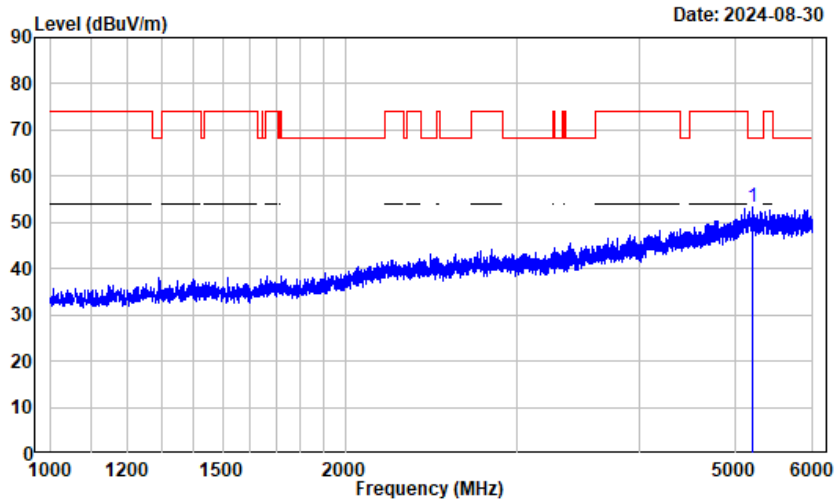
Condition : Vertical
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5185

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	39180.400	22.76	26.07	48.83	63.50	-14.67	Average

Note: Spectrum Analyzer Setting: RBW=1MHz, VBW=5kHz

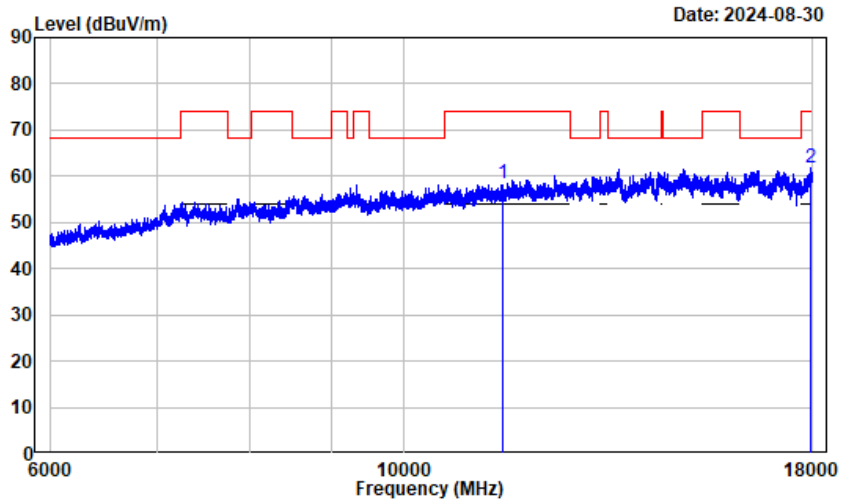
Mushroom Antenna, 5760MHz

Horizontal	
1-6GHz	 Condition : Horizontal Project No.: 2401U55189E-RF Tester : Dylan.Yang Note : 5760 Freq / Factor / Read Level / Level / Limit Line / Over Limit / Remark MHz / dB/m / dBuV / dBuV/m / dBuV/m / dB 1 5319.915 2.86 50.25 53.11 68.20 -15.09 Peak

Vertical	
1-6GHz	 Condition : Vertical Project No.: 2401U55189E-RF Tester : Dylan.Yang Note : 5760 | | Freq | Factor | Read Level | Level | Limit Line | Over Limit | Remark | | | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | | | 1 | 5206.776 | 3.06 | 50.26 | 53.32 | 68.20 | -14.88 | Peak |

Horizontal-Peak

6-18GHz

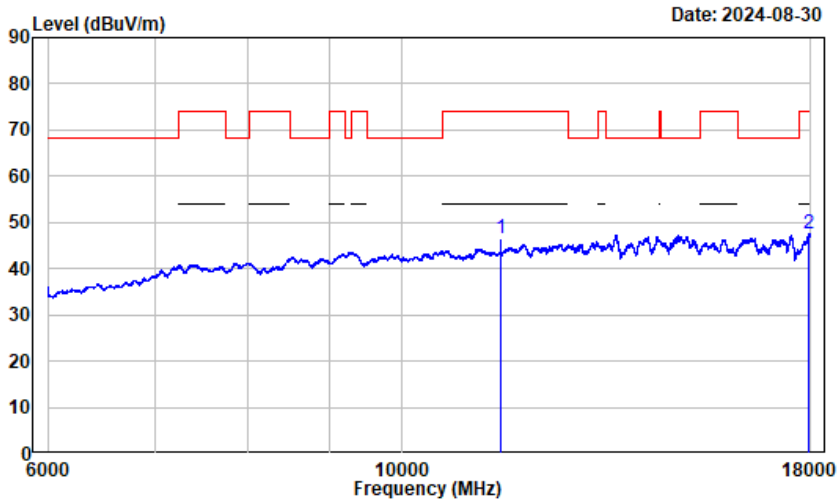


Condition : Horizontal
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5760

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	11520.000	14.23	44.34	58.57	74.00	-15.43	Peak
2	17962.500	24.36	37.47	61.83	74.00	-12.17	Peak

Horizontal-Average

6-18GHz



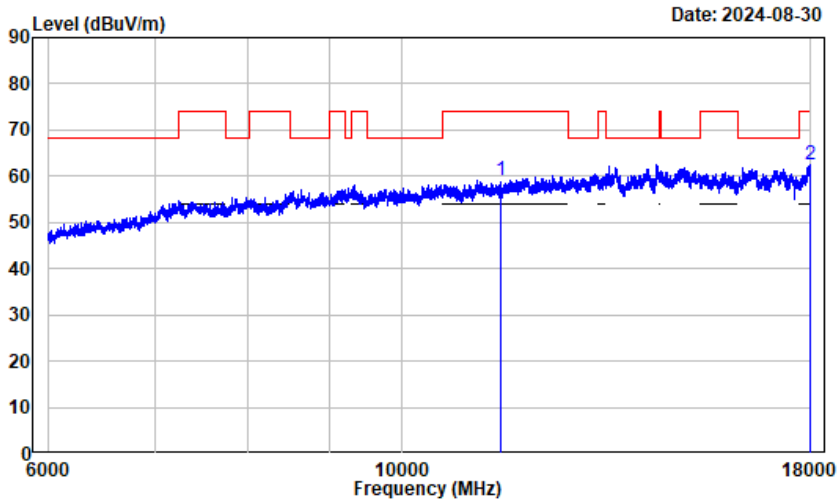
Condition : Horizontal
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5760

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	11520.000	14.23	32.45	46.68	54.00	-7.32	Average
2	17947.490	24.24	23.31	47.55	54.00	-6.45	Average

Note: Spectrum Analyzer Setting: RBW=1MHz, VBW=5kHz

Vertical-Peak

6-18GHz

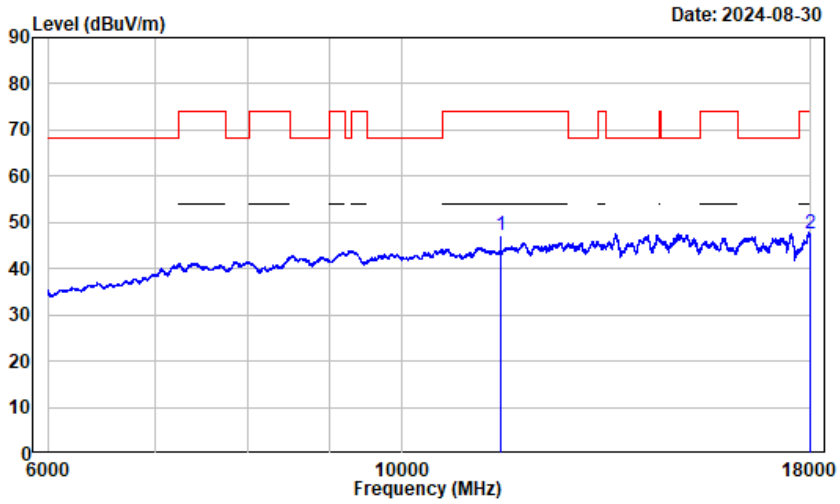


Condition : Vertical
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5760

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	11520.000	14.23	44.79	59.02	74.00	-14.98	Peak
2	17986.500	24.53	38.07	62.60	74.00	-11.40	Peak

Vertical-Average

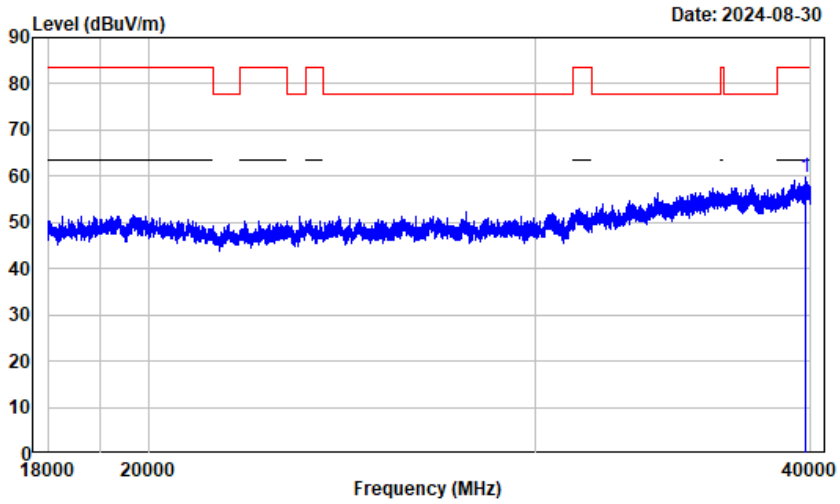
6-18GHz



Condition : Vertical
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5760

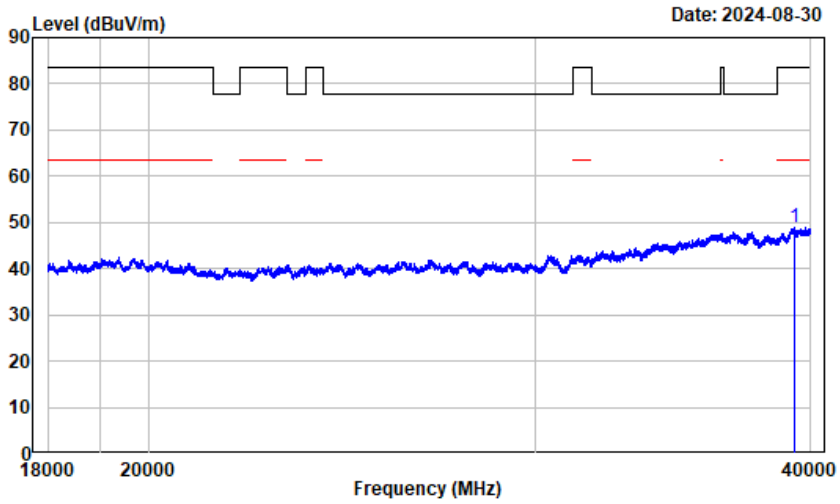
	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	11520.000	14.23	32.99	47.22	54.00	-6.78	Average
2	17997.000	24.60	22.80	47.40	54.00	-6.60	Average

Note: Spectrum Analyzer Setting: RBW=1MHz, VBW=5kHz

Horizontal-Peak	
18-40GHz	 Condition : Horizontal Project No.: 2401U55189E-RF Tester : Dylan.Yang Note : 5760 Freq / Factor / Read Level / Level / Limit Line / Over Limit / Remark MHz / dB/m / dBuV / dBuV/m / dBuV/m / dB 1 39766.220 22.54 37.08 59.62 83.50 -23.88 Peak

Horizontal-Average

18-40GHz



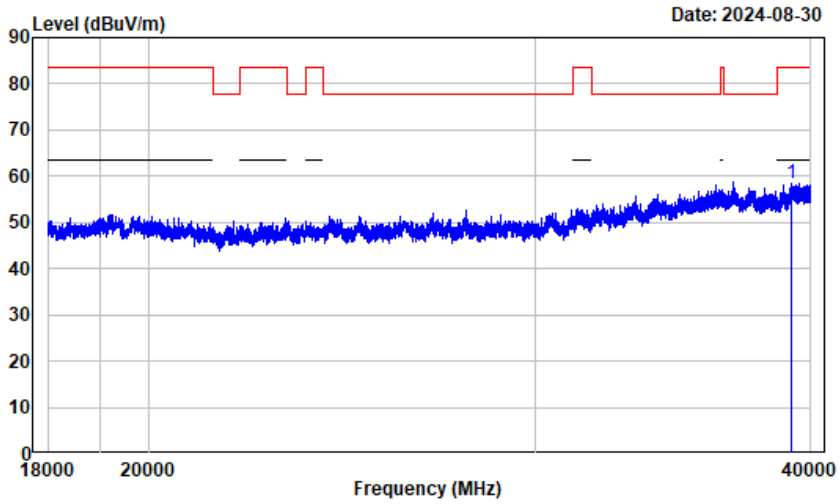
Condition : Horizontal
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5760

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	39315.160	22.67	26.22	48.89	63.50	-14.61	Average

Note: Spectrum Analyzer Setting: RBW=1MHz, VBW=5kHz

Vertical-Peak

18-40GHz

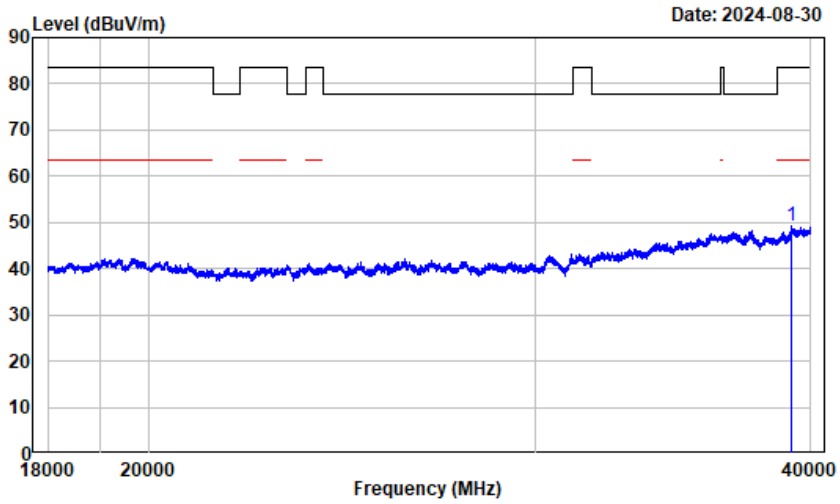


Condition : Vertical
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5760

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	39199.650	22.92	35.59	58.51	83.50	-24.99	Peak

Vertical-Average

18-40GHz



Condition : Vertical
Project No.: 2401U55189E-RF
Tester : Dylan.Yang
Note : 5760

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	39213.400	22.89	26.27	49.16	63.50	-14.34	Average

Note: Spectrum Analyzer Setting: RBW=1MHz, VBW=5kHz

FCC §15.407(a), (e) - 26 dB & 6dB EMISSION BANDWIDTH

Applicable Standard

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

According to KDB789033 D02 section II.C and section II.D

1. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

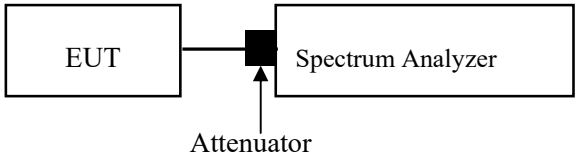
2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
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.

3. 99% Occupied Bandwidth:

According to ANSI C63.10-2013 Section 12.4.2&6.9.3

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. The following procedure shall be used for measuring 99% power bandwidth:
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, 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 (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
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 may be reported in addition to the plot(s).



Test Data

Environmental Conditions

Temperature:	23~27 ℃
Relative Humidity:	49~56 %
ATM Pressure:	101 kPa

The testing was performed by Rainbow Zhu on 2024-08-30.

EUT operation mode: Transmitting

Test Result: Compliant.

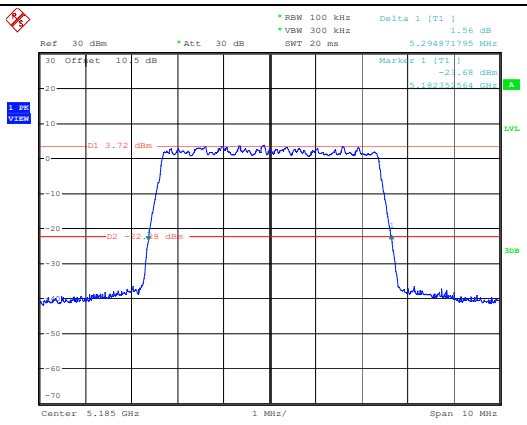
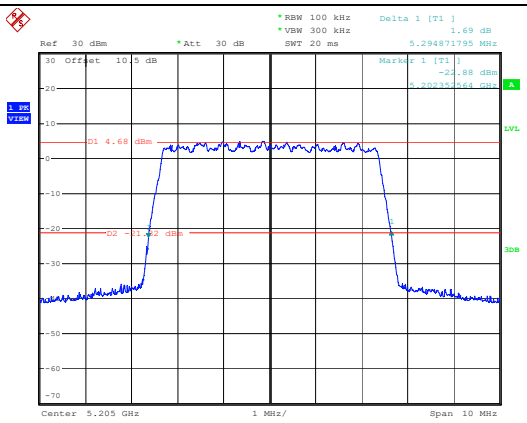
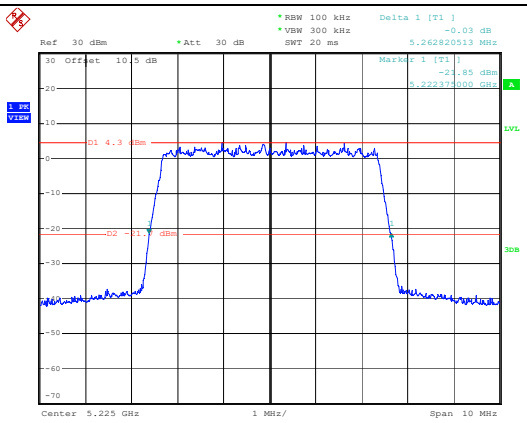
5150-5250MHz:

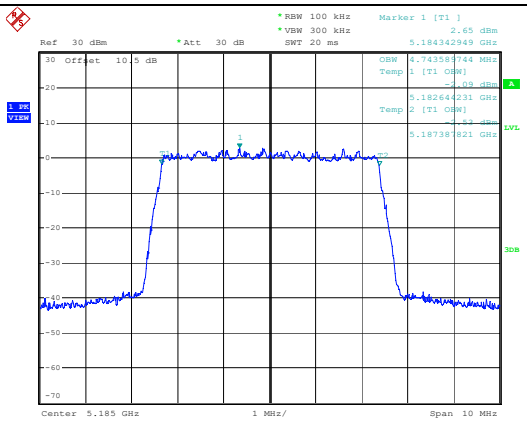
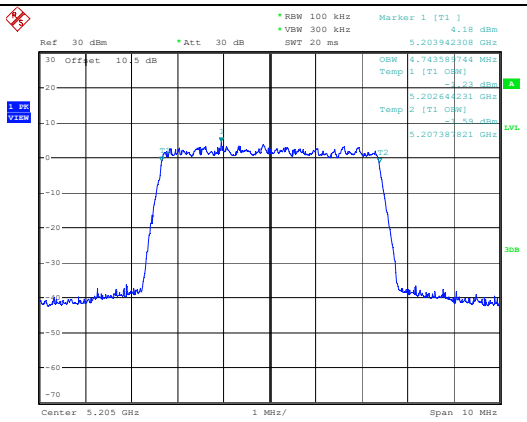
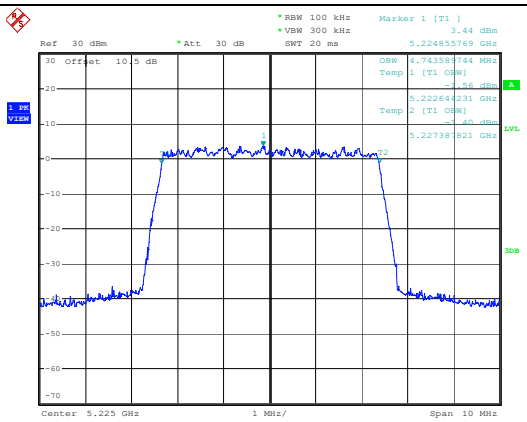
Test Modes	Test Frequency (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
OFDM	5185	5.29	4.74
	5205	5.29	4.74
	5225	5.26	4.74
Note: The 99% Occupied Bandwidth have not fall into the band 5250-5350MHz, please refer to the test plots of 99% Occupied Bandwidth.			

5725-5850MHz:

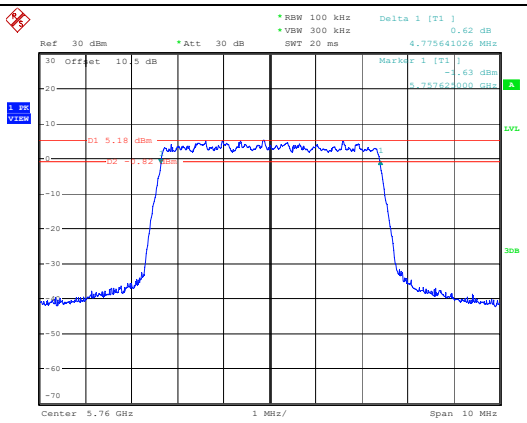
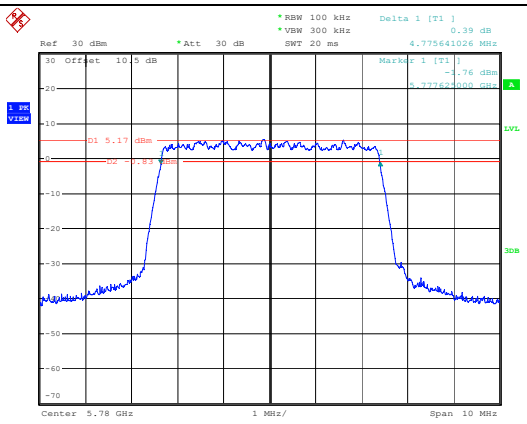
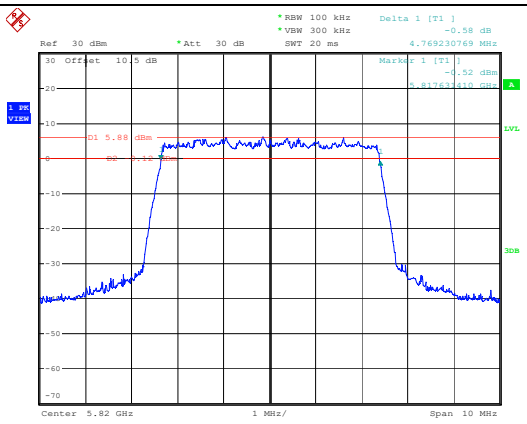
Test Modes	Test Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
OFDM	5760	4.78	4.74
	5780	4.78	4.74
	5820	4.77	4.74
Note: 6dB Emission Bandwidth Limit: ≥0.5MHz. The 99% Occupied Bandwidth have not fall into the band 5470-5725MHz, please refer to the test plots of 99% Occupied Bandwidth.			

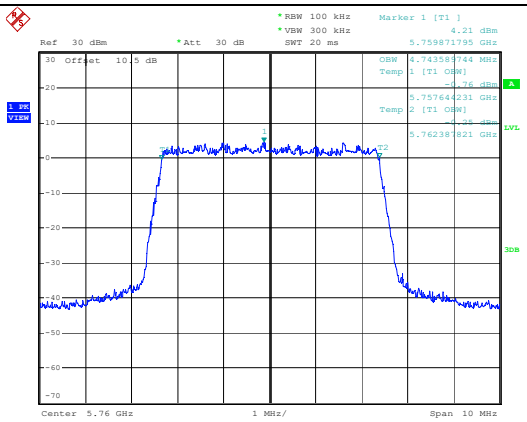
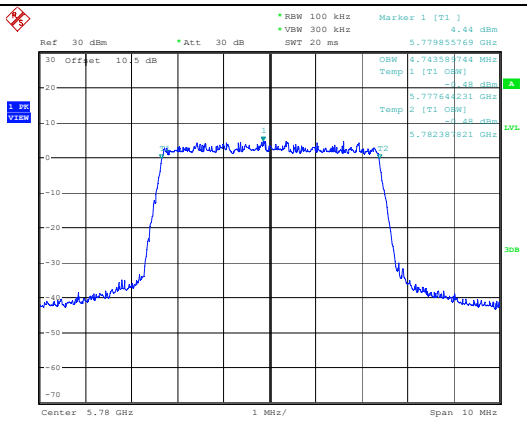
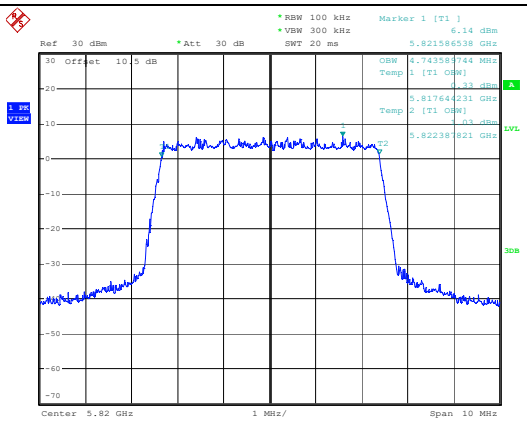
5150-5250MHz:

26dB Emission Bandwidth	
Lowest Channel	
Middle Channel	
Highest Channel	

99% Emission Bandwidth	
Lowest Channel	
Middle Channel	
Highest Channel	

5725-5850MHz:

6dB Emission Bandwidth	
Lowest Channel	
Middle Channel	
Highest Channel	

99% Emission Bandwidth	
Lowest Channel	 ProjectNo.:2401U55189E-RF Tester:Rainbow Zhu Date: 30.AUG.2024 17:20:19
Middle Channel	 ProjectNo.:2401U55189E-RF Tester:Rainbow Zhu Date: 30.AUG.2024 17:21:01
Highest Channel	 ProjectNo.:2401U55189E-RF Tester:Rainbow Zhu Date: 30.AUG.2024 17:21:57

FCC §15.407(a) - CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

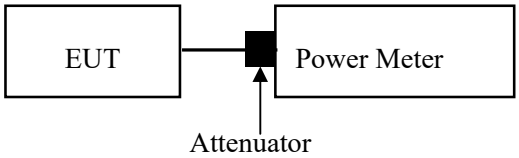
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method PM-G should be applied

a. Place the EUT on a bench and set it in transmitting mode.
b. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	52 %
ATM Pressure:	101 kPa

The testing was performed by Rainbow Zhu on 2024-08-06.

EUT operation mode: Transmitting

Test Result: Compliant.

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)	
		Result	Limit
OFDM	5185	9.94	30.00
	5205	9.95	30.00
	5225	10.08	30.00
OFDM	5760	7.66	30.00
	5780	7.38	30.00
	5820	7.69	30.00
Note: The EUT is an indoor AP.			

FCC §15.407(a) - POWER SPECTRAL DENSITY

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Duty cycle ≥98%

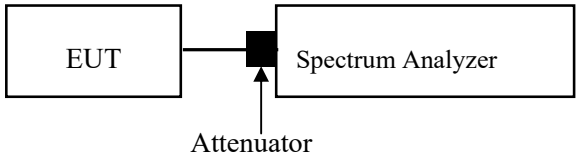
KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method SA-1 should be applied.

Duty cycle <98%, duty cycle variations are less than ±2%

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method SA-2 should be applied.

Duty cycle <98%, duty cycle variations exceed ±2%

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method SA-3 should be applied.



Test Data

Environmental Conditions

Temperature:	23~27 ℃
Relative Humidity:	49~56 %
ATM Pressure:	101 kPa

The testing was performed by Rainbow Zhu from 2024-08-31 to 2024-09-05.

EUT operation mode: Transmitting

Test Result: Compliant.

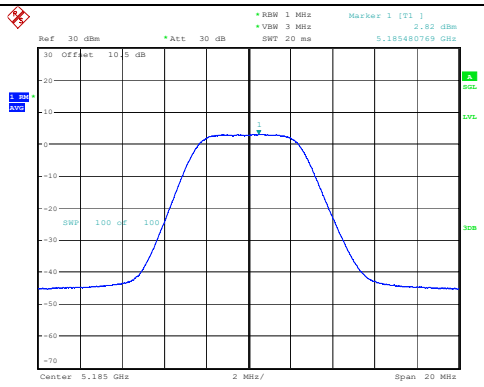
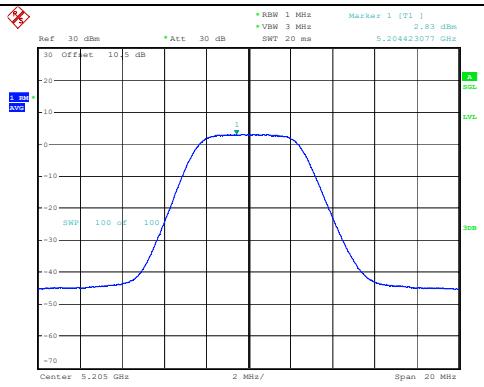
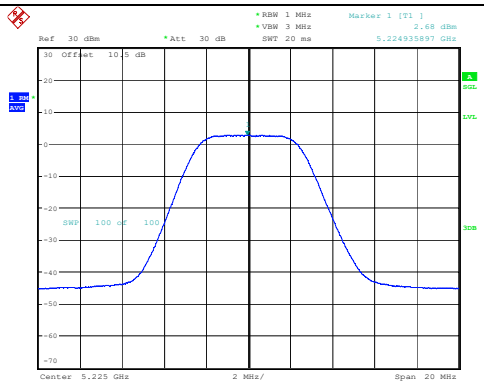
5150-5250 MHz:

Test Modes	Test Frequency (MHz)	Reading (dBm/MHz)	Duty Cycle Factor (dB)	Maximum Power Spectral Density (dBm/MHz)	
				Result	Limit
OFDM	5185	2.82	0.52	3.34	17
	5205	2.83	0.52	3.35	17
	5225	2.68	0.52	3.20	17
Note: The EUT is an indoor AP.					

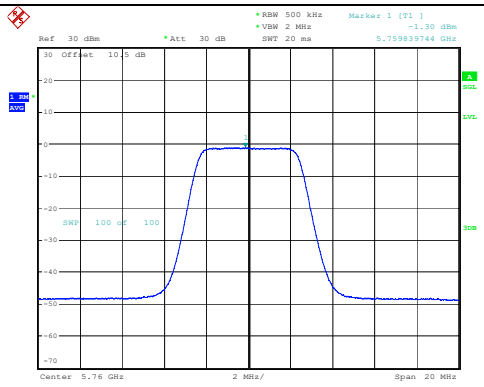
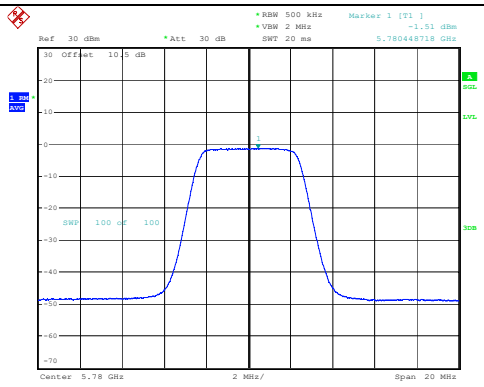
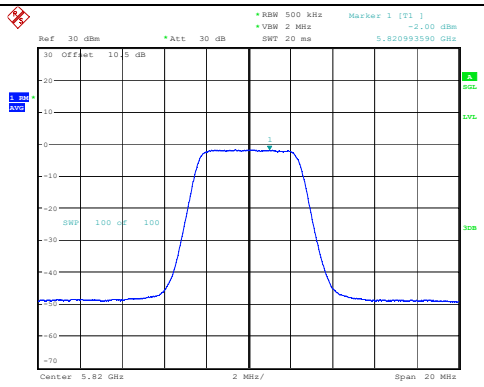
5725-5850 MHz:

Test Modes	Test Frequency (MHz)	Reading (dBm/500kHz)	Duty Cycle Factor (dB)	Maximum Power Spectral Density (dBm/500kHz)	
				Result	Limit
OFDM	5760	-1.30	0.56	-0.74	30
	5780	-1.51	0.56	-0.95	30
	5820	-2.00	0.56	-1.44	30

5150-5250MHz:

Maximum power spectral density	
Lowest Channel	
Middle Channel	
Highest Channel	

5725-5850MHz:

Maximum power spectral density	
Lowest Channel	
Middle Channel	
Highest Channel	

EUT PHOTOGRAPHS

Please refer to the attachment 2401U55189E-RF External photo and 2401U55189E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2401U55189E-RF Test Setup photo.

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