

TEST REPORT

Applicant Name: RCA Communications Systems
Address: 555 W. Victoria Street, Compton, California, United States
90220
Report Number: 2501R47291E-RF-00
FCC ID: XYH-RDR8000U1

Test Standard (s)

FCC PART 90

Sample Description

Product Type: Professional Digital Two-Way Radio Repeater
Model No.: RDR8000U1
Multiple Model(s) No.: N/A
Trade Mark: N/A
Date Received: 2025/03/13
Report Date: 2025/07/29

Test Result:	Pass▲
--------------	-------

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

Prepared and Checked By:

Bruce Lin

Bruce Lin
RF Engineer

Approved By:

Jimmy Xiao

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 cannot be reproduced except in full, without prior written approval of the Company. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP▼ or any agency of the Government. This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "▼".

Bay Area Compliance Laboratories Corp. (Shenzhen)

5F(B-West), 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China
Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY	4
GENERAL INFORMATION.....	5
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	5
OBJECTIVE	5
TEST METHODOLOGY	5
MEASUREMENT UNCERTAINTY	6
TEST FACILITY	6
SYSTEM TEST CONFIGURATION.....	7
DESCRIPTION OF TEST CONFIGURATION	7
EQUIPMENT MODIFICATIONS	7
SUPPORT EQUIPMENT LIST AND DETAILS	7
EXTERNAL I/O CABLE.....	7
BLOCK DIAGRAM OF TEST SETUP	8
SUMMARY OF TEST RESULTS	9
TEST EQUIPMENT LIST	10
FCC §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE).....	11
APPLICABLE STANDARD	11
FCC §2.1046 & §90.205 - RF OUTPUT POWER.....	12
APPLICABLE STANDARD	12
TEST PROCEDURE	12
TEST DATA	12
FCC §2.1047 & §90.207 - MODULATION CHARACTERISTIC.....	26
APPLICABLE STANDARD	26
TEST BLOCK DIAGRAM	26
AUDIO LOW PASS FILTER RESPONSE	26
TEST PROCEDURE	26
TEST DATA	28
FCC §2.1049 & §90.209 & §90.210 - OCCUPIED BANDWIDTH & EMISSION MASK.....	34
APPLICABLE STANDARD	34
TEST PROCEDURE	34
TEST DATA	35
FCC §2.1051 & §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS	49
APPLICABLE STANDARD	49
TEST PROCEDURE	49
TEST DATA	49
FCC §2.1053 & §90.210 - RADIATED SPURIOUS EMISSIONS	62
APPLICABLE STANDARD	62
TEST PROCEDURE	62
TEST DATA	62

FCC §2.1055 & §0.213 - FREQUENCY STABILITY	65
APPLICABLE STANDARD	65
TEST PROCEDURE	65
TEST DATA	65
FCC §0.214 - TRANSIENT FREQUENCY BEHAVIOR.....	67
APPLICABLE STANDARD	67
TEST PROCEDURE	67
TEST DATA	68
EUT PHOTOGRAPHS	70
TEST SETUP PHOTOGRAPHS	71

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	2501R47291E-RF-00	Original Report	2025/07/29

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Professional Digital Two-Way Radio Repeater
Tested Model	RDR8000U1
Multiple Model(s)	N/A
Frequency Range	400-470MHz
Rated Transmit Power	50Watts/30Watts/10Watts/5Watts
Channel separation	12.5kHz
Modulation Technique	FM, 4FSK
Antenna Specification [#]	12dBi (provided by the applicant)
Voltage Range	AC 100-240V
Sample serial number	2ZHG-1 (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	N/A

Objective

This test report is in accordance with Part 2, and Part 90 of the Federal Communication Commissions rules.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, Sub-part J as well as the following individual parts:

Part 90 – Private Land Mobile Radio Service

Applicable Standards: TIA 603-E, ANSI C63.26-2015.

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.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		109.2kHz(k=2, 95% level of confidence)
RF Frequency		56.6Hz(k=2, 95% level of confidence)
RF output power, conducted		0.86dB(k=2, 95% level of confidence)
Unwanted Emission, conducted		1.60dB(k=2, 95% level of confidence)
Audio Frequency Response		0.1dB
Low Pass Filter Response		1.2dB
Modulation Limiting		1%
Radiated Emissions	9kHz - 30MHz	3.60dB(k=2, 95% level of confidence)
	30MHz~200MHz (Horizontal)	5.32dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	5.43dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	5.77dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.73dB(k=2, 95% level of confidence)
	1GHz - 6GHz	5.34dB(k=2, 95% level of confidence)
	6GHz - 18GHz	5.40dB(k=2, 95% level of confidence)
	18GHz - 40GHz	5.64dB(k=2, 95% level of confidence)
Temperature		±1°C
Humidity		±1%
Supply voltages		±0.4%

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

Test Facility

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

Each test item follows test standards and with no deviation.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a test mode which has been done in the factory.

Test channel information

Test Mode	Test Frequency (MHz)
FM, 12.5kHz	400.0125
	435.0125
	469.9875
4FSK, 12.5kHz	400.0125
	435.0125
	469.9875

Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

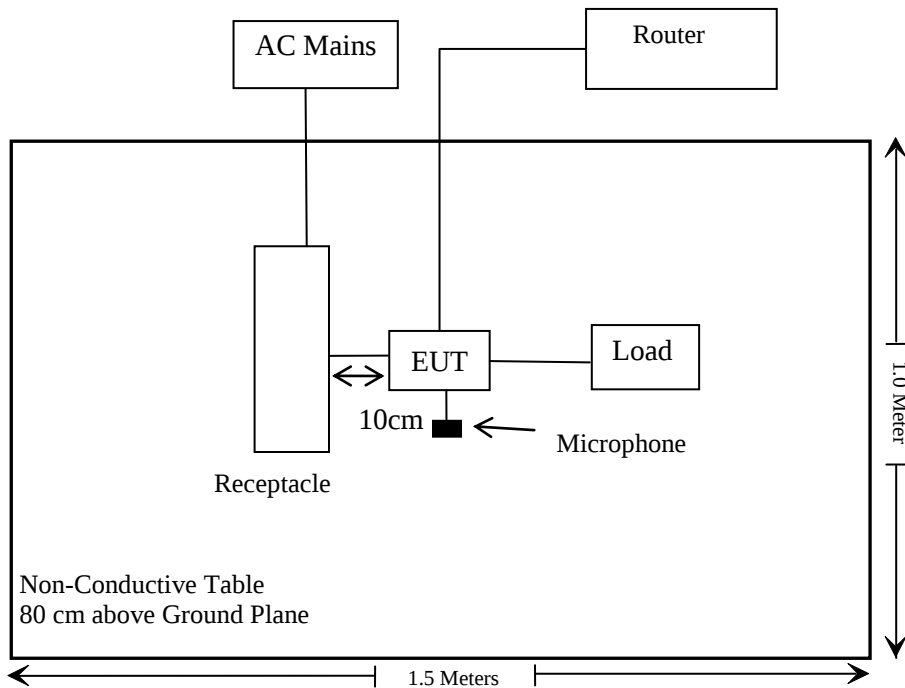
Manufacturer	Description	Model	Serial Number
Unknown	Load	Unknown	Unknown
OUPU	Receptacle	PDU-OP1606K	6971041358020
TP-Link	Router	RE705X	Unknown
Lisheng	Microphone	BF-59	Unknown

External I/O Cable

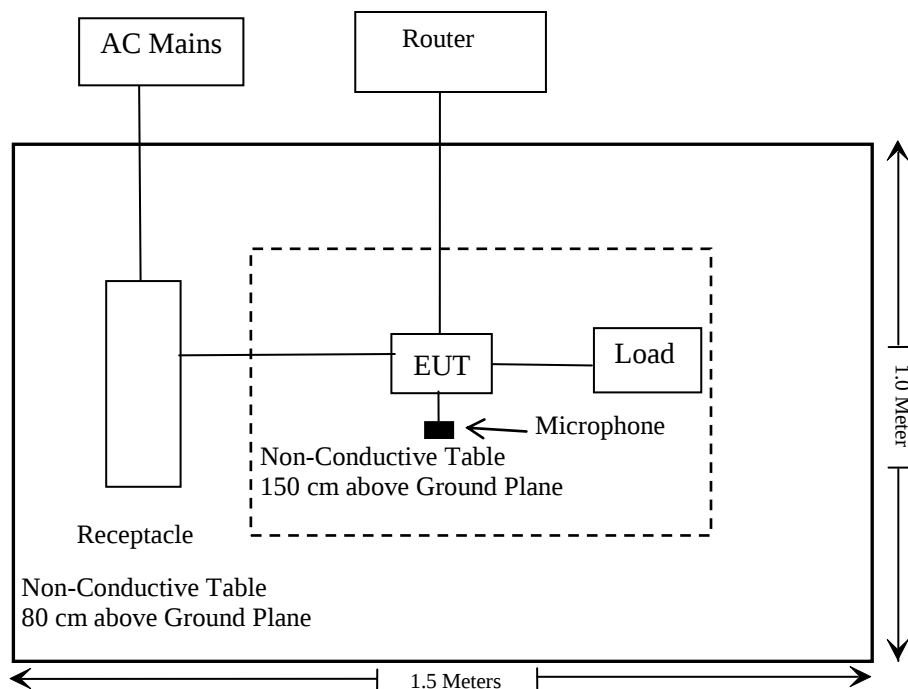
Cable Description	Length (m)	From Port	To
Unshielded Detachable AC Cable	1.5	AC mains	Receptacle
Unshielded Detachable AC Cable	1.5	EUT	Receptacle
Unshielded Detachable RJ45 Cable	2.0	EUT	Router

Block Diagram of Test Setup

Below 1GHz



Above 1GHz



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§2.1091	Maximum Permissible Exposure(MPE)	Compliant
§2.1046; §90.205	RF Output Power	Compliant
§2.1047; §90.207	Modulation Characteristic	Compliant
§2.1049; §90.209; §90.210	Occupied Bandwidth & Emission Mask	Compliant
§2.1051; §90.210	Spurious Emission at Antenna Terminal	Compliant
§2.1053; §90.210	Spurious Radiated Emissions	Compliant
§2.1055; §90.213	Frequency Stability	Compliant
§90.214	Transient Frequency Behavior	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2024/12/04	2025/12/03
Sonoma instrument	Pre-amplifier	310 N	186238	2024/05/21	2025/05/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2026/07/19
Unknown	Cable	Chamber A Cable 1	N/A	2024/06/18	2025/06/17
Unknown	Cable	XH500C	J-10M-A	2024/06/18	2025/06/17
Unknown	Cable	2Y194	0735	2024/12/04	2025/12/03
Unknown	Cable	PNG214	1354	2024/12/04	2025/12/03
Agilent	Signal Generator	N5183A	MY50140588	2024/09/13	2025/09/12
COM-POWER	Dipole Antenna	3121C	9209-860	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2025/03/26	2026/03/25
A.H.System	Preamplifier	PAM-0118P	489	2024/11/15	2025/11/14
Schwarzbeck	Horn Antenna	BBHA9120D(1201)	1143	2023/07/26	2026/07/25
The Electro-Mechanics Co.	Horn Antenna	3115	9107-3694	2024/06/06	2027/06/05
Unknown	RF Cable	KMSE	735	2024/12/06	2025/12/05
Unknown	RF Cable	UFA147	219661	2024/12/06	2025/12/05
Unknown	RF Cable	XH750A-N	J-10M	2024/12/06	2025/12/05
JD	Filter Switch Unit	DT7220FSU	DS79906	2024/09/09	2025/09/08
JD	Multiplex Switch Test Control Set	DT7220SCU	DS79903	2024/09/09	2025/09/08
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200982	2024/09/20	2025/09/19
BACL	Temperature & Humidity Chamber	BTH-150-40	30144	2024/12/06	2025/12/05
HP	RF Communication test set	8920B	US36141849	2024/12/04	2025/12/03
Fluke	Digital Multimeter	287	19000011	2024/05/21	2025/05/20
Rohde & Schwarz	Audio Analyzer	UPV	101782	2024/12/04	2025/12/03
HELLVIAO	Contact voltage regulator	TDGC2-5KVA	Unknown	NCR	NCR
JFW	30dB Attenuator	50FH-030-100 RF	F-03-EM032	2024/06/27	2025/06/26
Unknown	Power Splitter	PD2	2000-600	2024/06/27	2025/06/26
Micro-Tronics	RF Cable	8082135	W1113	2024/06/27	2025/06/26
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2024/12/04	2025/12/03

* 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 §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(i) LIMITS FOR OCCUPATIONAL/CONTROLLED EXPOSURE				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6

f = frequency in MHz

* = Plane-wave equivalent power density

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Frequency (MHz)	Antenna Gain [#] (dBi)	Max Tune-up Power [#] (dBm)	Evaluation Distance (m)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
400-470	12	47.2	2.3	1.252	1.333

Note: For the example site configuration, the maximum separation distance for a controlled environment is 2.3m.

Result: Compliant

FCC §2.1046 & §90.205 - RF OUTPUT POWER

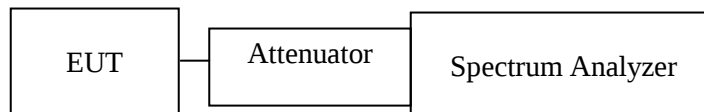
Applicable Standard

FCC §2.1046 and §90.205

Test Procedure

According to ANSI C63.26-2015 section 5.2.3.3

Conducted RF Output Power:



Note: The path loss from EUT to Spectrum Analyzer has included in the result.

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Spectrum Analyzer Setting:

R B/W	Video B/W
100 kHz	300 kHz

Test Data

Environmental Conditions

Temperature:	25~25.5 °C
Relative Humidity:	42~47 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2025-04-28 to 2025-05-27.

Test Mode: Transmitting

Test Result: Pass. Please refer to following table and plots.

Rated Output Power: 50Watts

Modulation Mode	Channel Separation	f_c	Reading (dBm)	Limit (dBm)
		MHz		
FM	12.5kHz	400.0125	47.09	47.78
		435.0125	47.04	47.78
		469.9875	47.17	47.78
4FSK	12.5kHz	400.0125	47.08	47.78
		435.0125	47.04	47.78
		469.9875	47.16	47.78

Rated Output Power: 30Watts

Modulation Mode	Channel Separation	f_c	Reading (dBm)	Limit (dBm)
		MHz		
FM	12.5kHz	400.0125	44.72	45.56
		435.0125	44.70	45.56
		469.9875	44.81	45.56
4FSK	12.5kHz	400.0125	44.72	45.56
		435.0125	44.71	45.56
		469.9875	44.81	45.56

Rated Output Power: 10Watts

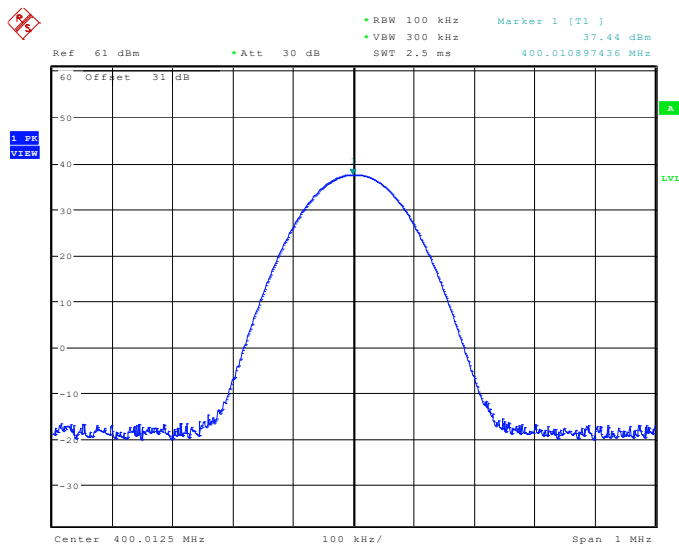
Modulation Mode	Channel Separation	f_c	Reading (dBm)	Limit (dBm)
		MHz		
FM	12.5kHz	400.0125	40.12	40.79
		435.0125	39.99	40.79
		469.9875	40.13	40.79
4FSK	12.5kHz	400.0125	40.01	40.79
		435.0125	40.01	40.79
		469.9875	40.15	40.79

Rated Output Power: 5Watts

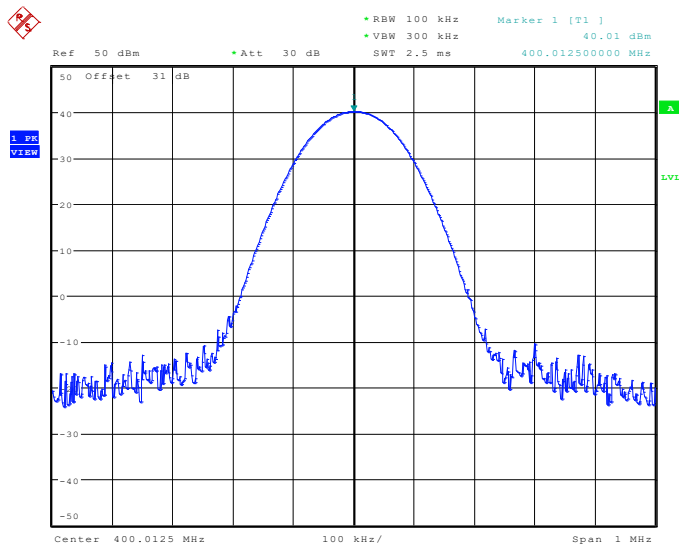
Modulation Mode	Channel Separation	f_c	Reading (dBm)	Limit (dBm)
		MHz		
FM	12.5kHz	400.0125	37.44	37.78
		435.0125	37.44	37.78
		469.9875	37.60	37.78
4FSK	12.5kHz	400.0125	37.44	37.78
		435.0125	37.43	37.78
		469.9875	37.60	37.78

Note: The output power shall not exceed by more than 20 percent the manufacturer's rated output power for the particular transmitter specifically listed on the authorization

Digital signal, 12.5kHz

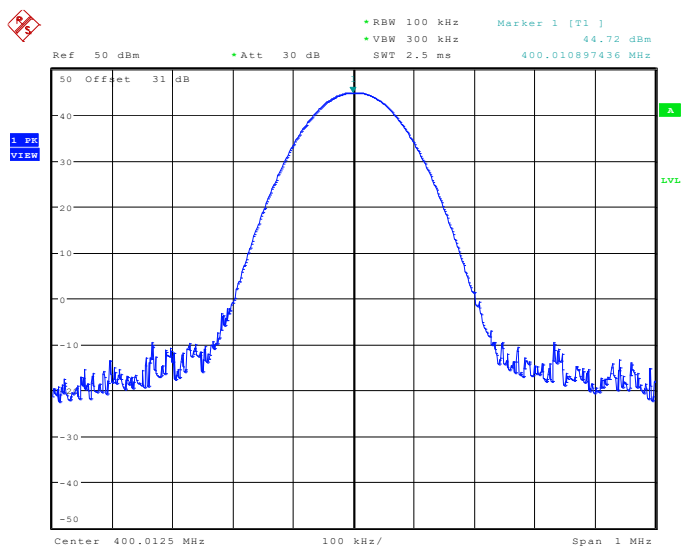
Frequency 400.0125MHz, 5Watts

ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 28.APR.2025 19:57:42

Frequency 400.0125MHz, 10Watts

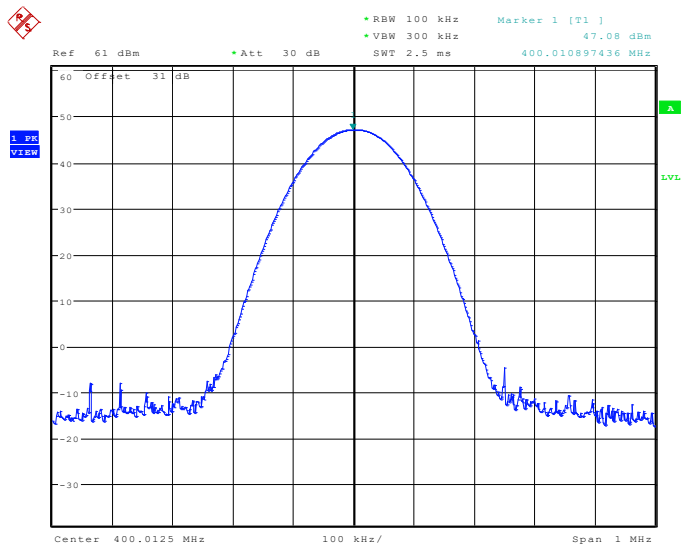
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 27.MAY.2025 10:01:29

Frequency 400.0125MHz, 30Watts



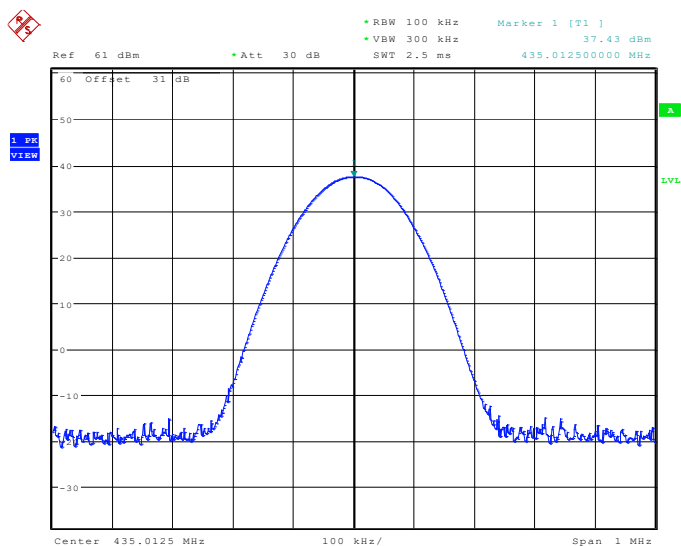
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 27.MAY.2025 10:01:04

Frequency 400.0125 MHz, 50Watts



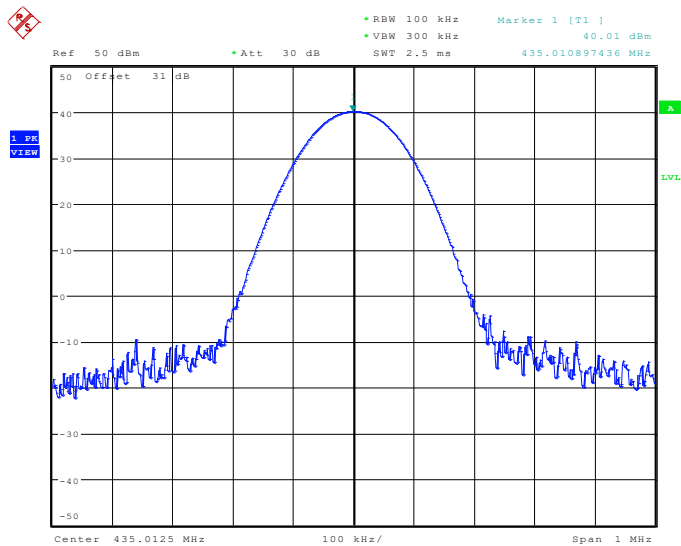
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 28.APR.2025 19:58:51

Frequency 435.0125MHz, 5Watts



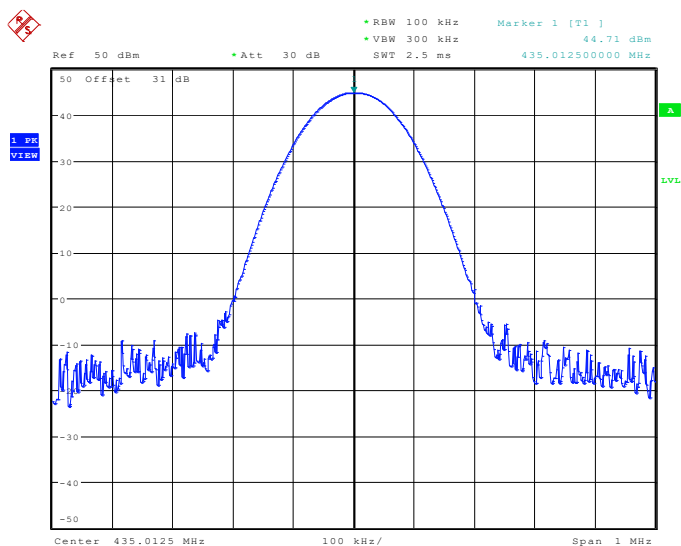
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 28.APR.2025 20:01:53

Frequency 435.0125MHz, 10Watts



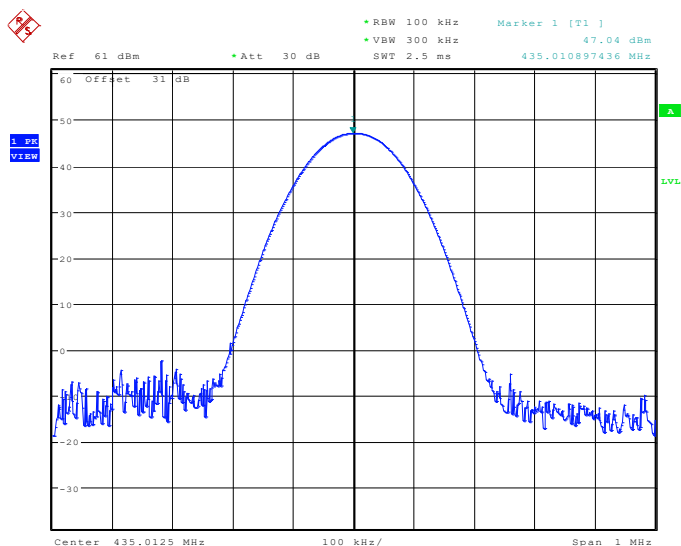
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 27.MAY.2025 10:07:20

Frequency 435.0125MHz, 30Watts



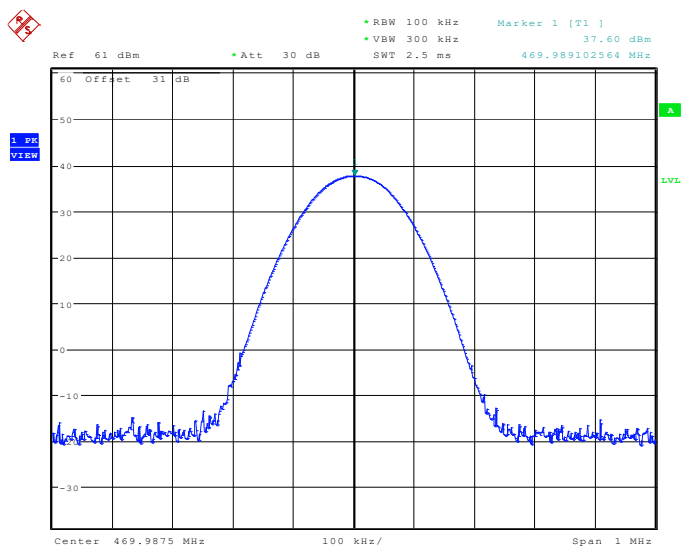
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
 Date: 27.MAY.2025 10:06:45

Frequency 435.0125MHz, 50Watts



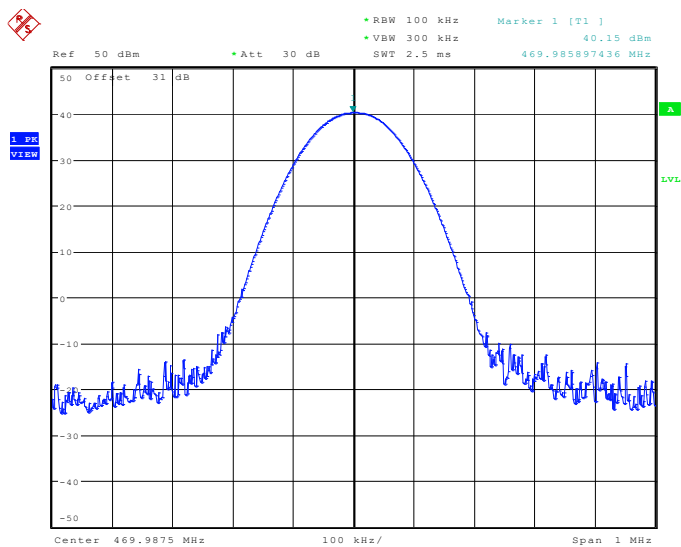
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
 Date: 28.APR.2025 20:01:24

Frequency 469.9875 MHz, 5Watts



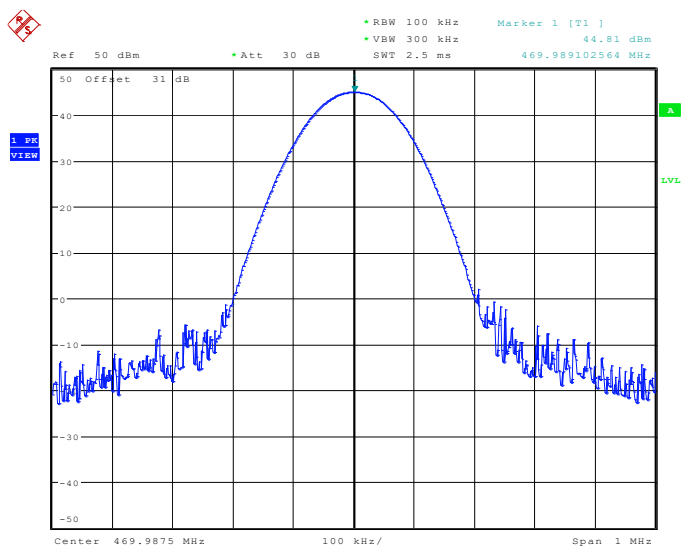
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
 Date: 28.APR.2025 20:04:35

Frequency 469.9875 MHz, 10Watts



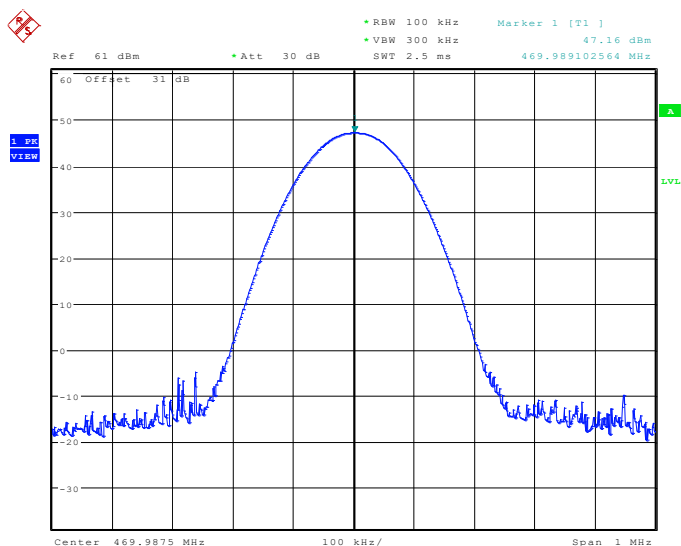
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
 Date: 27.MAY.2025 10:15:28

Frequency 469.9875 MHz, 30Watts



ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 27.MAY.2025 10:14:43

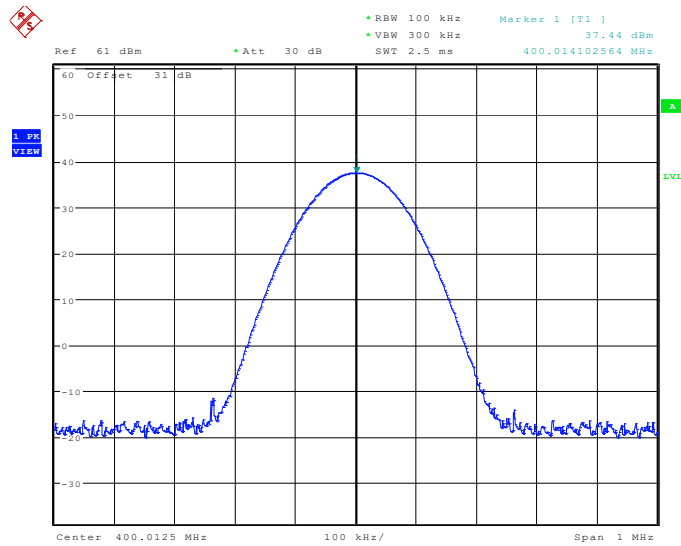
Frequency 469.9875 MHz, 50Watts



ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 28.APR.2025 20:04:56

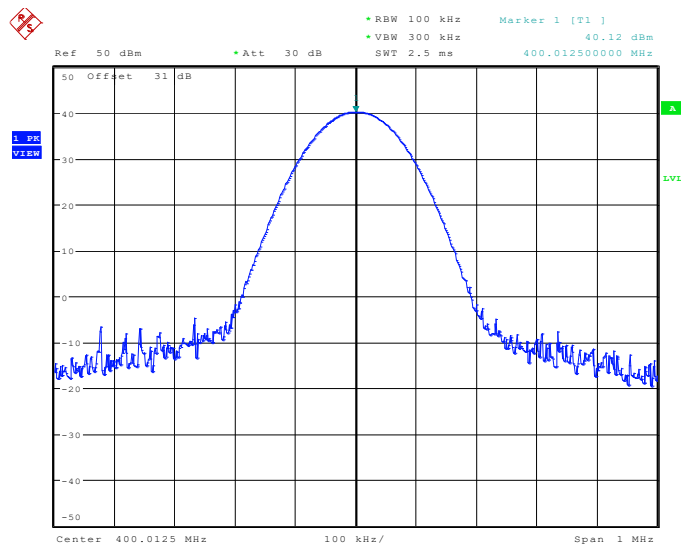
Analog signal, 12.5kHz

Frequency 400.0125MHz, 5Watts



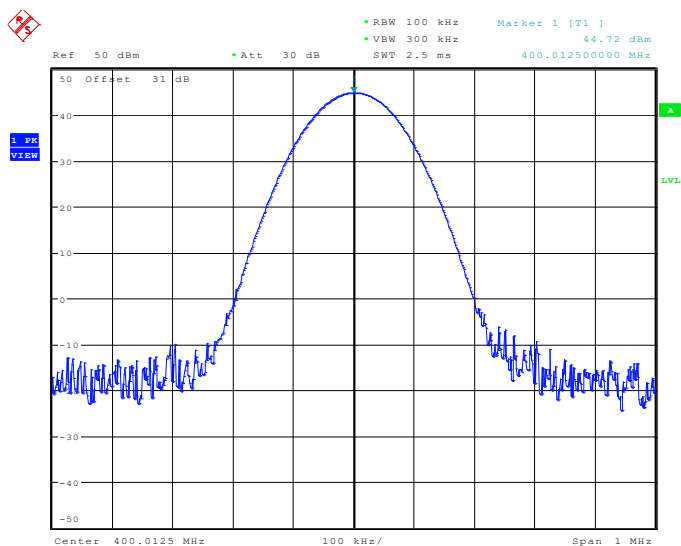
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 28.APR.2025 19:57:04

Frequency 400.0125MHz, 10Watts



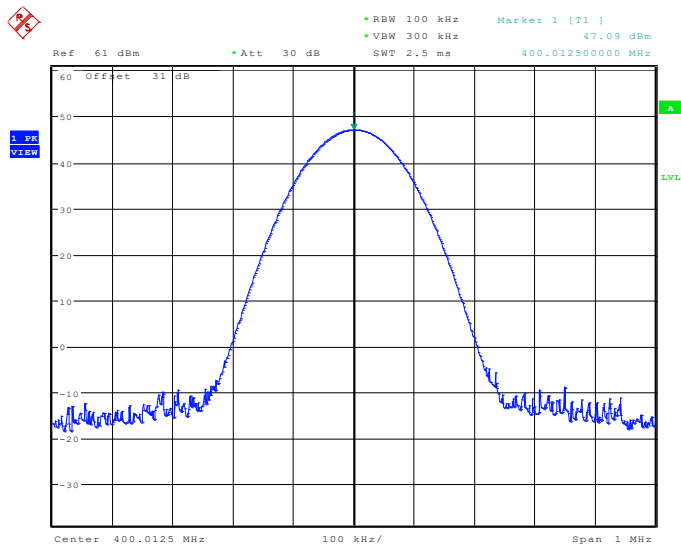
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 27.MAY.2025 09:57:02

Frequency 400.0125MHz, 30Watts



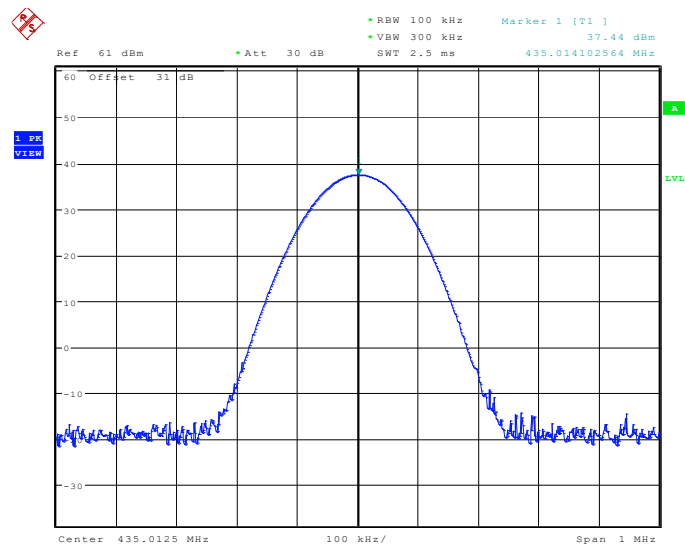
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
 Date: 27.MAY.2025 10:00:38

Frequency 400.0125 MHz, 50Watts



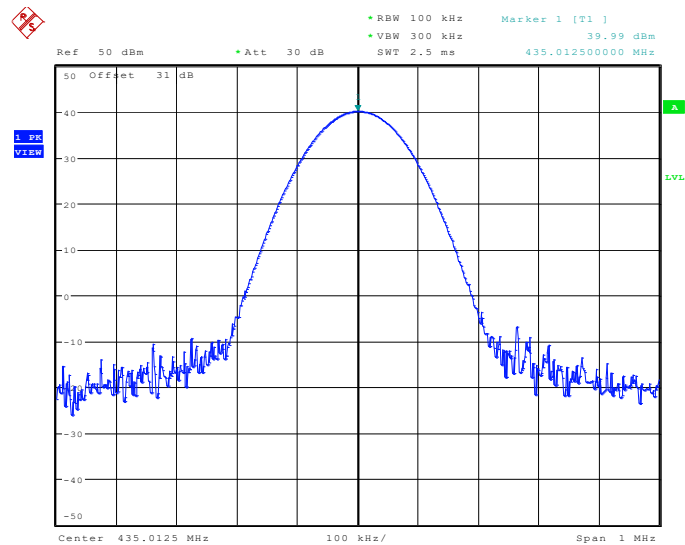
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
 Date: 28.APR.2025 19:59:51

Frequency 435.0125MHz, 5Watts



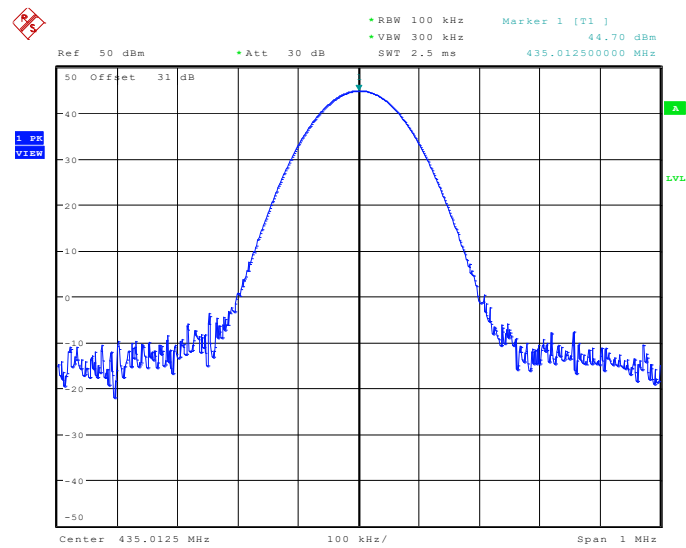
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 28.APR.2025 20:02:21

Frequency 435.0125MHz, 10Watts



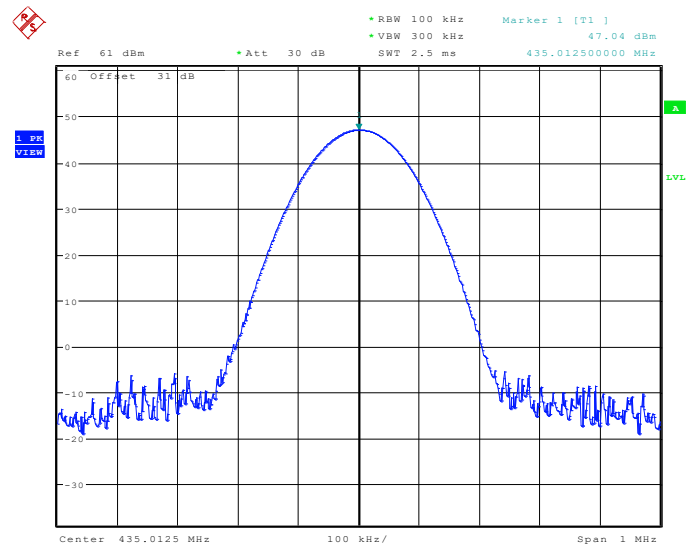
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 27.MAY.2025 10:04:35

Frequency 435.0125MHz, 30Watts



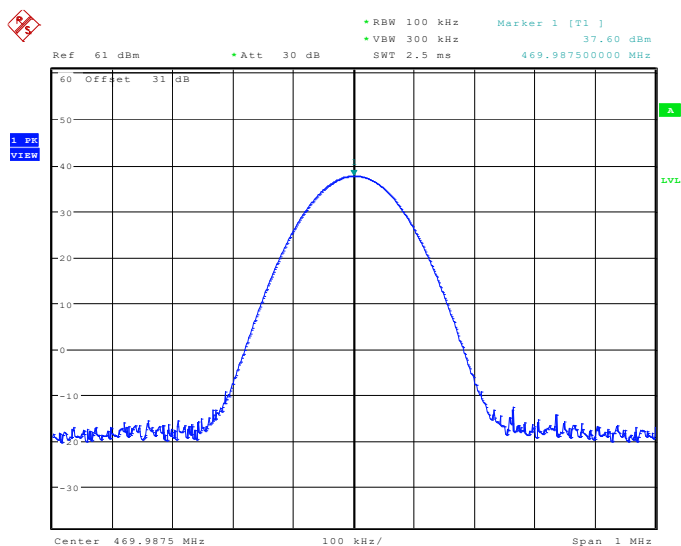
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 27.MAY.2025 10:06:10

Frequency 435.0125MHz, 50Watts



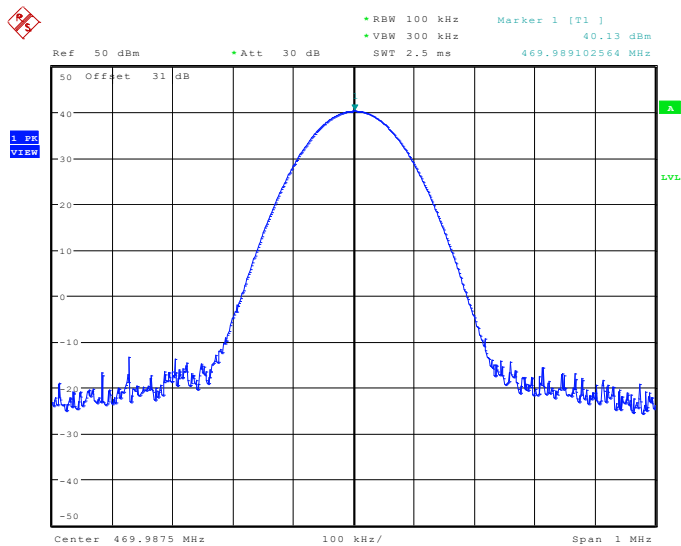
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 28.APR.2025 20:00:56

Frequency 469.9875 MHz, 5Watts



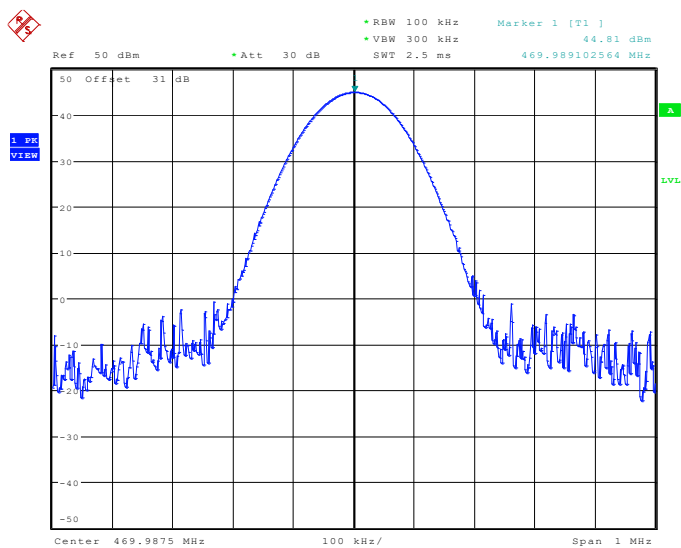
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 28.APR.2025 20:03:02

Frequency 469.9875 MHz, 10Watts



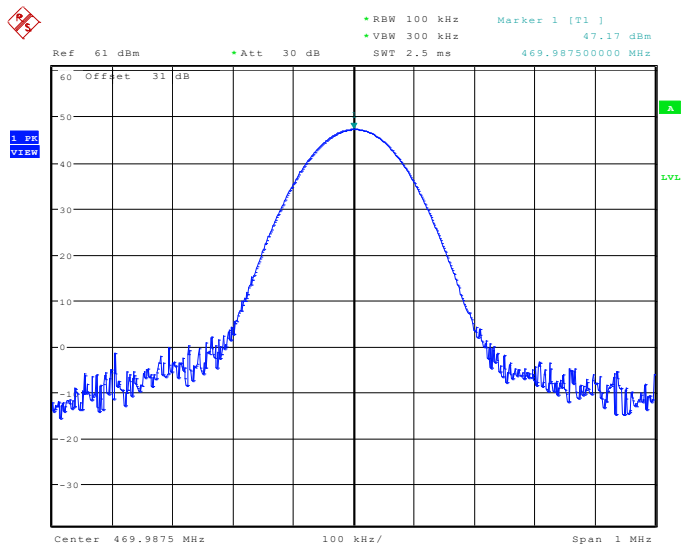
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 27.MAY.2025 10:13:46

Frequency 469.9875 MHz, 30Watts



ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
 Date: 27.MAY.2025 10:14:13

Frequency 469.9875 MHz, 50Watts



ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
 Date: 28.APR.2025 20:05:36

FCC §2.1047 & §90.207 - MODULATION CHARACTERISTIC

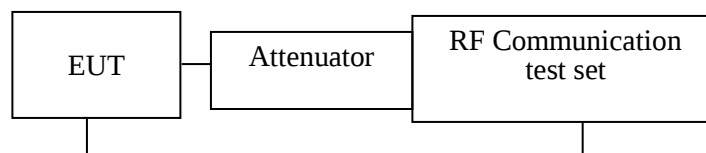
Applicable Standard

FCC §2.1047 and §90.207:

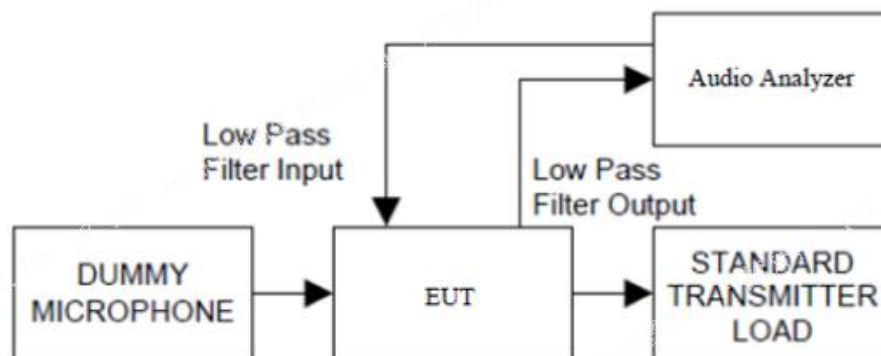
- (a) Equipment which utilizes voice modulated communication shall show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz. for equipment which is required to have a low pass filter, the frequency response of the filter, or all of the circuitry installed between the modulation limited and the modulated stage shall be supplied.
- (b) Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

Test Block Diagram

Modulation limiting & Audio frequency response



Audio Low Pass Filter Response



Test Procedure

ANSI C63.26-2015 5.3.2 Modulation limiting test methodology

Modulation limiting is the ability of a transmitter circuit to limit the transmitter from producing deviations in excess of a rated system deviation.

- a) Connect the equipment as illustrated in Figure 1.
- b) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
- c) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤ 0.25 Hz to $\geq 15\,000$ Hz. Turn the de-emphasis function off.
- d) Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and

- adjust the level to obtain 60% of full rated system deviation. This is the 0 dB reference level.
- e) Increase the level from the audio generator by 20 dB in 5 dB increments recording the deviation as measured from the test receiver in each step. Verify that the audio level used to make the OBW measurement is included in the sweep.
 - f) Repeat for step e) at 300 Hz, 2500 Hz and 3000 Hz at a minimum using the 0 dB reference level obtained in step d).
 - g) Set the test receiver to measure peak negative deviation and repeat step d) through step f).
 - h) The values recorded in step f) and step g) are the modulation limiting.
 - i) Plot the data set as a percentage of deviation relative to the 0 dB reference point versus input voltage.

ANSI C63.26-2015 5.3.3.2 Audio frequency response test methodology—Constant Input

- a) Connect the equipment as illustrated in Figure 3.
- b) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤ 50 Hz to $\geq 15\,000$ Hz. Turn the de-emphasis function off.
- c) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
- d) Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation.
- e) Set the test receiver to measure rms deviation and record the deviation reading as DEVREF.
- f) Set the audio frequency generator to the desired test frequency between 300 Hz and 3000 Hz.
- g) Record the test receiver deviation reading as DEVFREQ.
- h) Calculate the audio frequency response at the present frequency as follows in Equation (4):

$$\text{audio frequency response} = 20 \log_{10} \left(\frac{\text{DEV}_{\text{FREQ}}}{\text{DEV}_{\text{REF}}} \right) \quad (4)$$

- i) Repeat step f) through step h) for all the desired test frequencies.

According to ANSI/TIA 603-E-2016 Section 2.2.15: Audio Low Pass Filter Response

- a) Connect the equipment as illustrated.
- b) Connect the Audio Generator as close as possible the input of the post limiter low pass filter within the transmitter under test.
- c) Connect the RF Communications Test Set to the output of the post limiter low pass filter within the transmitter under test.
- d) Apply a 1000 Hz tone from the audio frequency generator and adjust the level per manufacturer's specifications.
- e) Record the dB level of the 1000 Hz spectral line on the RF Communications Test Set as LEV_{REF} .
- f) Set the audio frequency generator to the desired test frequency between 3000 Hz and the upper low pass filter limit.
- g) Record RF Communications Test Set levels, at the test frequency in step f).
- h) Record the dB level on the RF Communications Test Set as LEV_{FREQ} .
- i) Calculate the audio frequency response at the test frequency as:

$$\text{low pass frequency response} = \text{LEV}_{\text{FREQ}} - \text{LEV}_{\text{REF}}$$
- j) Repeat steps f) through i) for all the desired test frequencies.

Test Data**Environmental Conditions**

Temperature:	25~25.5 °C
Relative Humidity:	42~47 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2025-04-14 to 2025-04-28.

Test Mode: Transmitting

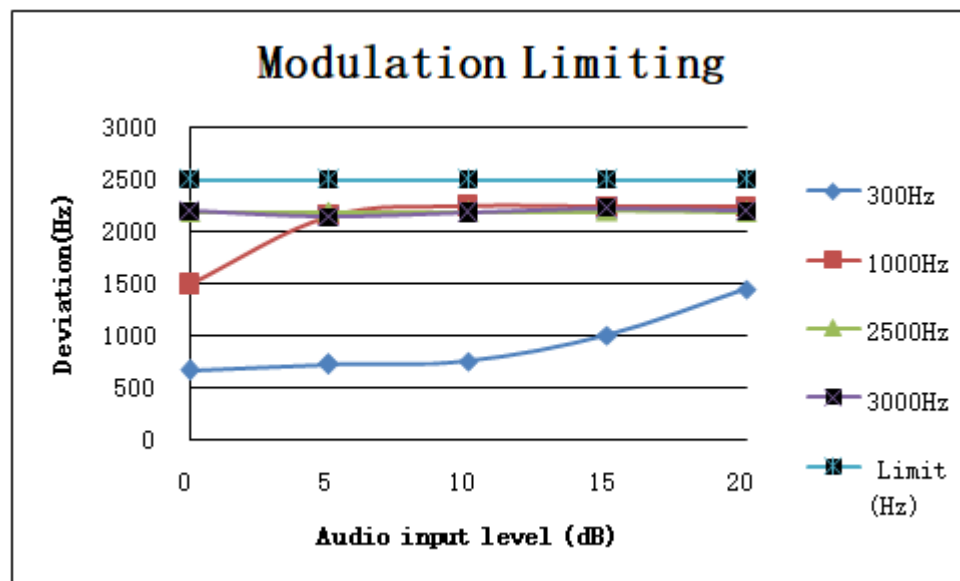
Test Result: Pass. Please refer to the following tables and plots.

Analog Modulation:**MODULATION LIMITING**

Carrier Frequency: 435.0125MHz, Separation: 12.5 kHz

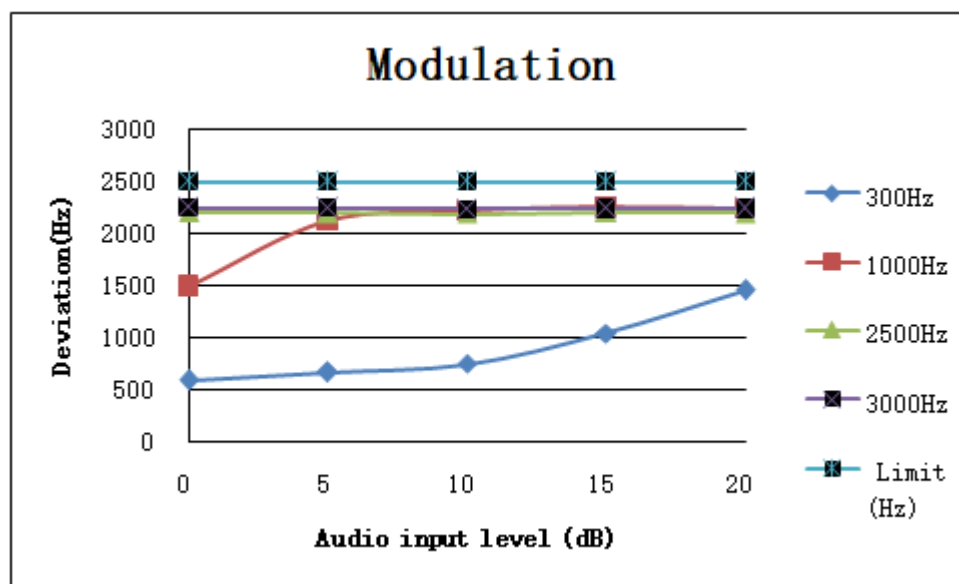
Peak+ deviation

Audio input level (dB)	Deviation (Hz)				Limit (Hz)
	300Hz	1000Hz	2500Hz	3000Hz	
20	1452	2235	2189	2195	2500
15	1005	2239	2194	2227	2500
10	756	2246	2185	2186	2500
5	729	2154	2193	2142	2500
0	673	1500	2185	2196	2500



Peak- deviation

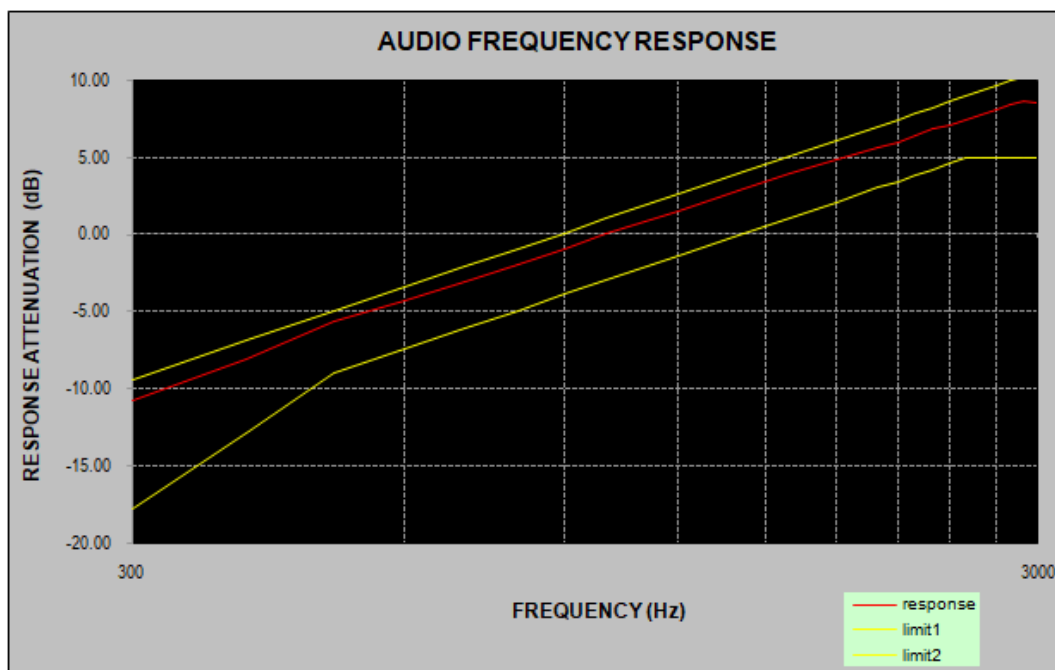
Audio input level (dB)	Deviation (Hz)				Limit (Hz)
	300Hz	1000Hz	2500Hz	3000Hz	
20	1459	2236	2197	2243	2500
15	1045	2253	2208	2245	2500
10	754	2218	2193	2235	2500
5	672	2125	2203	2247	2500
0	596	1500	2208	2251	2500



Audio Frequency Response

Carrier Frequency: 435.0125MHz, Separation: 12.5 kHz

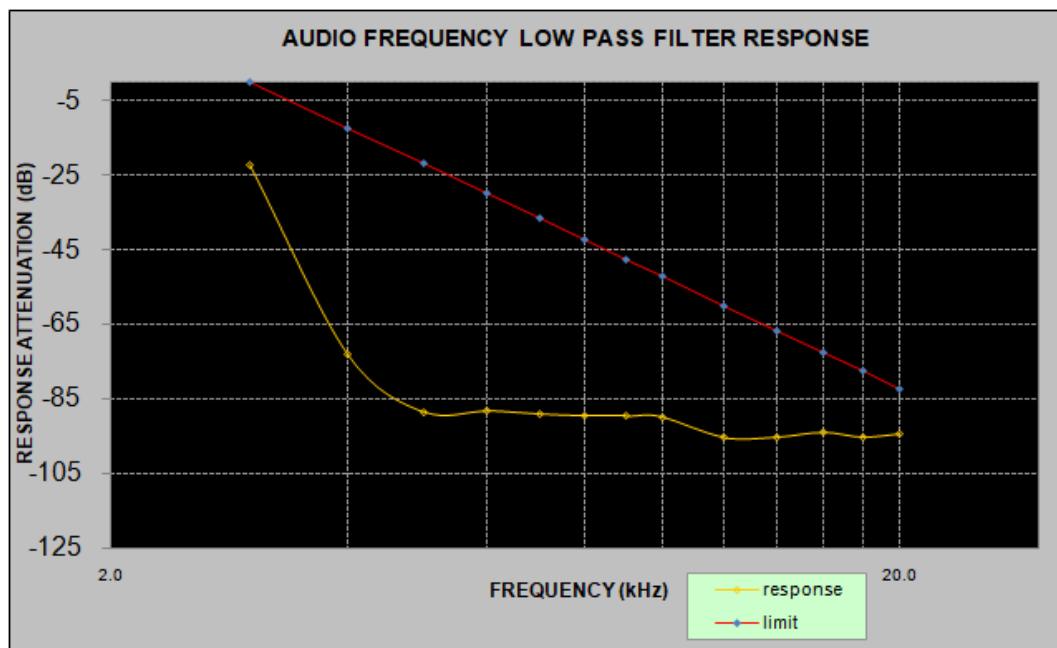
Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.81
400	-8.13
500	-5.65
600	-4.35
700	-3.07
800	-1.96
900	-0.95
1000	0.00
1200	1.53
1400	2.78
1600	3.95
1800	4.87
2000	5.65
2100	6.00
2200	6.42
2300	6.82
2400	7.12
2500	7.42
2600	7.73
2700	8.03
2800	8.39
2900	8.63
3000	8.57



Audio Frequency Lows Pass Filter Response

Carrier Frequency: 435.0125MHz, Separation: 12.5 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0.0	/
3.0	-22.3	0.0
4.0	-73.2	-12.5
5.0	-88.6	-22.2
6.0	-88.4	-30.1
7.0	-89.2	-36.8
8.0	-89.5	-42.6
9.0	-89.7	-47.7
10.0	-89.9	-52.3
12.0	-95.5	-60.2
14.0	-95.2	-66.9
16.0	-94.1	-72.7
18.0	-95.4	-77.8
20.0	-94.5	-82.5



FCC §2.1049 & §90.209 & §90.210 - OCCUPIED BANDWIDTH & EMISSION MASK

Applicable Standard

FCC §2.1049 and §90.210

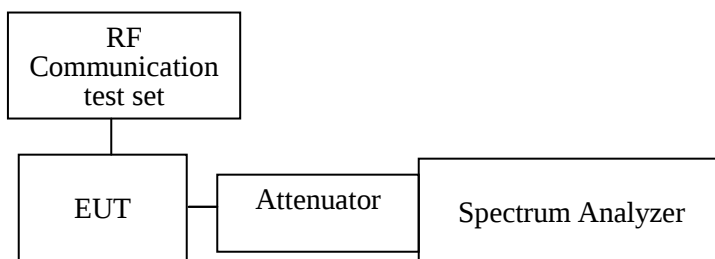
Emission Mask D - 12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- 1) For any frequency removed from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0 , 0dB.
- 2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.626 kHz but no more than 12.5 kHz, at least 7.27 ($f_d - 2.88$ kHz) dB.
- 3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz at least: At least $50 + 10 \log(P)$ dB or 70 dB, whichever is the lesser attenuation.

Test Procedure

According to ANSI C63.26-2015 section 5.4

Analog mode:



Note: The path loss from EUT to Spectrum Analyzer has included in the result.

- a) Connect the equipment as illustrated.
- b) Adjust the spectrum analyzer for the following settings:
 - 1) Resolution Bandwidth: 100Hz for 12.5Hz Channel spacing, 200Hz for 25Hz Channel spacing .
 - 2) Video Bandwidth at least 10 times the resolution bandwidth.
 - 3) Sweep Speed slow enough to maintain measurement calibration.
 - 4) Detector Mode = Positive Peak.
 - 5) Span that will allow proper viewing of the test bandwidth.
- c) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency. Key the transmitter, and set the level of the unmodulated carrier to a full scale reference line. This is the 0 dB reference for the measurement.
- d) Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation. The input level shall be established at the frequency of maximum

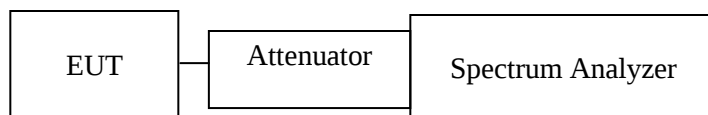
response of the audio modulating circuit. Transmitters employing digital modulation techniques that bypass the limiter and the audio low-pass filter shall be modulated as specified by the manufacturer.

e) Path loss for the measurement included.

f) Measured the 26dB bandwidth, and use the spectrum analyzer Occupied bandwidth function to measurement the 99% Occupied bandwidth, save the plot

g) Record the resulting spectrum analyzer presentation of the emission level with an on-line recording device or in a photograph. It is recommended that the emission limit be drawn on the plotted graph or photograph. The spectrum analyzer presentation is the sideband spectrum

Digital mode:



a) Program and set radio to operate in desire test frequency and digital mode with modulation.

b) Connect the equipment as illustrated.

c) Adjust the spectrum analyzer for the following settings:

- 1) Resolution Bandwidth: 100Hz.
- 2) Video Bandwidth at least 10 times the resolution bandwidth.
- 3) Sweep Speed slow enough to maintain measurement calibration.
- 4) Detector Mode = Positive Peak.
- 5) Span that will allow proper viewing of the test bandwidth.

d) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency. Key the transmitter, and set the level of the unmodulated carrier to a full scale reference line. This is the 0 dB reference for the measurement.

e) Path loss for the measurement included in plot

f) Measured the 26dB bandwidth, and use the spectrum analyzer Occupied bandwidth function to measurement the 99% Occupied bandwidth, save the plot

g) Record the resulting spectrum analyzer presentation of the emission level with an on-line recording device or in a photograph. It is recommended that the emission limit be drawn on the plotted graph or photograph. The spectrum analyzer presentation is the sideband spectrum

Test Data

Environmental Conditions

Temperature:	25~25.5 °C
Relative Humidity:	42~47 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2025-04-01 to 2025-05-29.

Test mode: Transmitting

Test Result: Pass. Please refer to the following tables and plots.

Modulation Mode	Channel Separation	f_c	High Power Level	Low Power Level
			99% Occupied Bandwidth	99% Occupied Bandwidth
		MHz	kHz	kHz
FM	12.5kHz	400.0125	9.936	9.936
		435.0125	9.936	9.885
		469.9875	9.936	9.936
4FSK	12.5kHz	400.0125	7.692	7.772
		435.0125	7.772	7.692
		469.9875	8.013	8.013

Note 1: Emission designator is base on calculation instead of measurement.

Emission Designator Per CFR 47 §2.201& §2.202&, $B_n = 2M + 2D$

For FM Mode (Channel Spacing: 12.5 kHz)

Emission Designator 11K0F3E. In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation. $BW = 2(M+D) = 2*(3.0 \text{ kHz} + 2.5 \text{ kHz}) = 11 \text{ kHz} \rightarrow 11K0$

F3E portion of the designator represents an FM voice transmission Therefore, the entire designator for 12.5 kHz channel spacing FM mode is 11K0F3E.

For Digital Mode (Channel Spacing:12.5kHz)

Emission Designator 7K60F1D and 7K60F1E

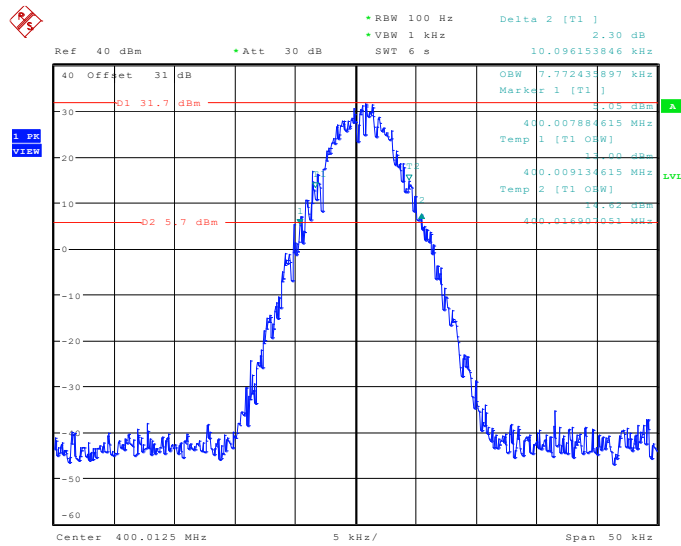
The 99% energy rule(title 47 CFR 2.1049) was used for digital mode. It basically states that 99% of the modulation enery falls within x kHz, in this case, 7.6kHz. The emission mask was obtained from 47CFR 90.210(d).

F1D and F1E portion of the designator indicates digital information.

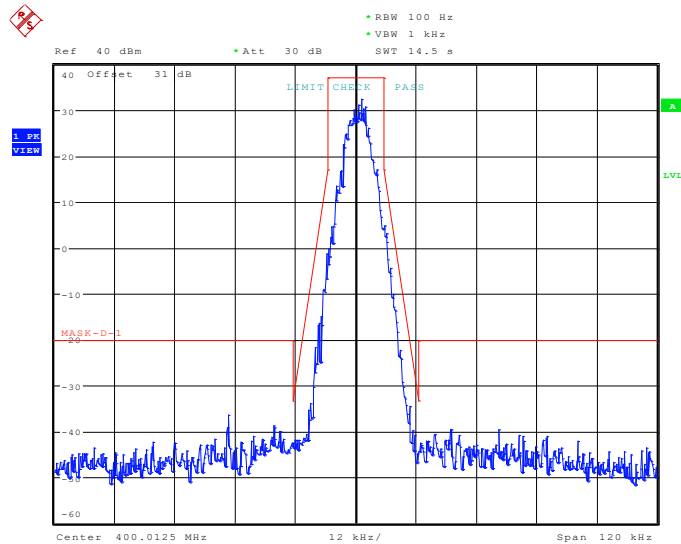
Therefore, the entire designator for the 12.5kHz channel spacing digital mode is 7K60F1D and 7K60F1E.

Note 2: The high power level is 50Watts, the low power level is 5Watts.

Digital signal, 12.5kHz

Frequency 400.0125 MHz: 99% Occupied Bandwidth, Low Power

ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 16:43:04

Frequency 400.0125 MHz: Emission Mask D, Low Power

ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 16:58:48

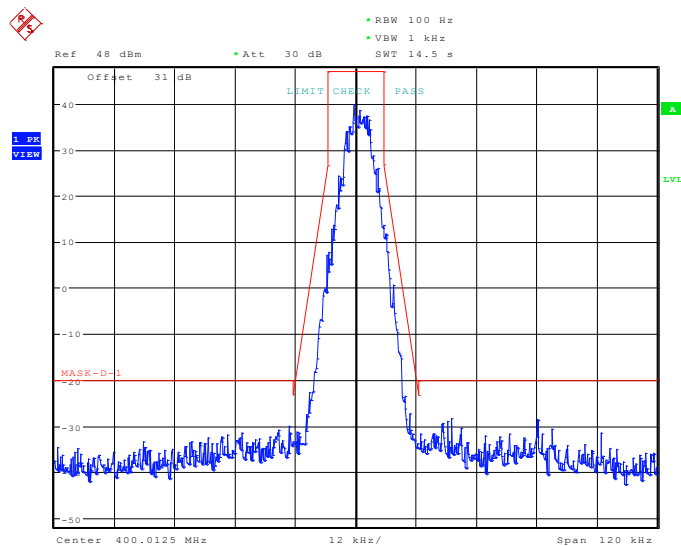
REF 48 dBm
 Att 30 dB
 RBW 100 Hz
 VBW 1 kHz
 SWT 6 s
 Delta 2 [T1]
 -2.17 dB
 10.368589744 kHz

Offset 31 dB
 D1 39.4 dBm
 D2 11.4 dBm
 OBW 7.69230692 kHz
 Marker 1 [T1]
 11.70 dBm
 400.00830282 MHz
 Temp 1 [T1 OBW]
 23.93 dBm
 400.009216744 MHz
 Temp 2 [T1 OBW]
 20.73 dBm
 400.016307051 MHz

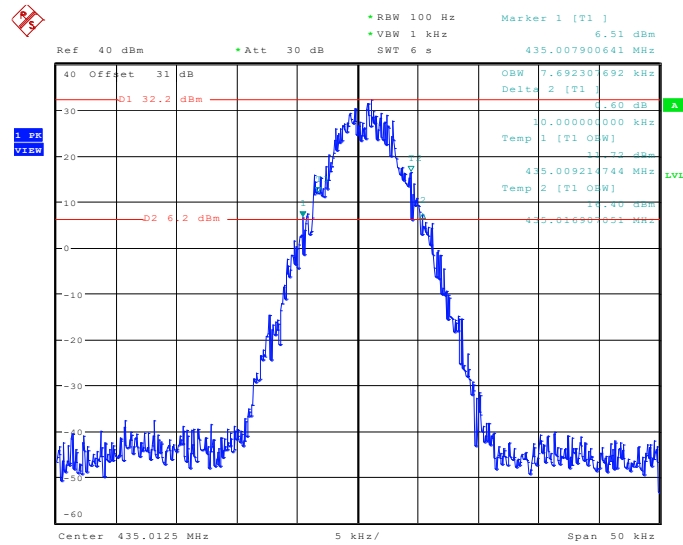
1.00
 View

Center 400.0125 MHz
 5 kHz/
 Span 50 kHz

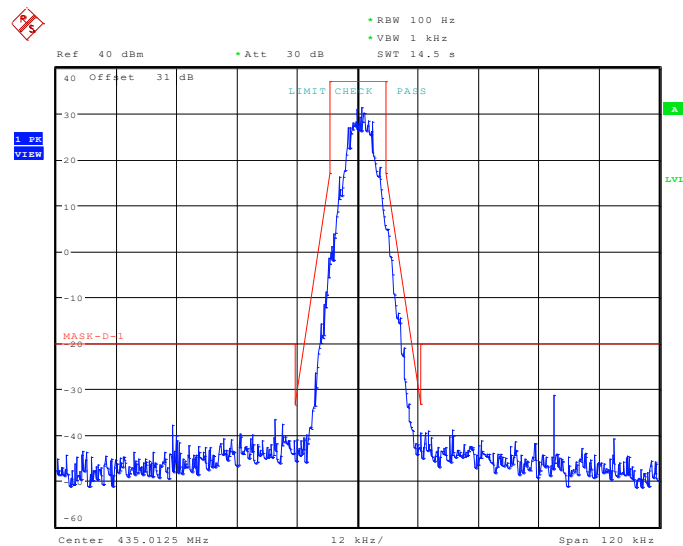
Frequency 400.0125 MHz: Emission Mask D, High Power



Version 3.0

Frequency 435.0125 MHz: 99% Occupied Bandwidth, Low Power

ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 16:47:45

Frequency 435.0125 MHz: Emission Mask D, Low Power

ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 16:56:29

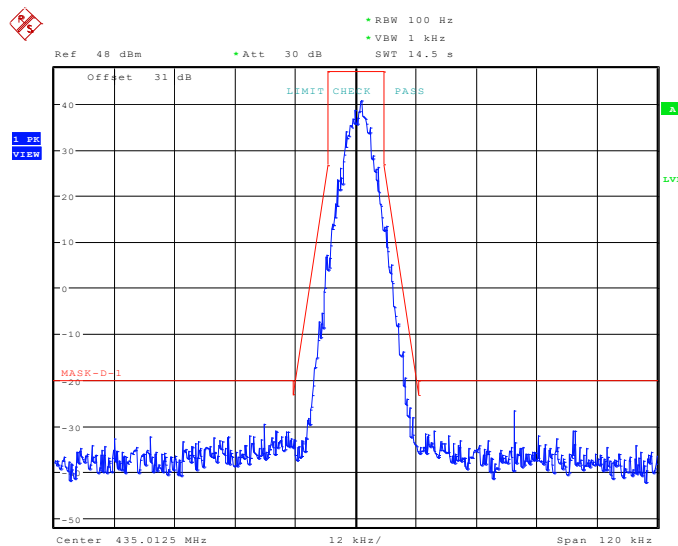
Ref 48 dBm • Att 30 dB • RBW 100 Hz Marker 1 [T1] 18.18 dBm
 • VBW 1 kHz SWT 6 s 435.008141026 MHz

Offset 31 dB OSW 7.772435897 kHz Delta 2 [T1] -4.03 dBm
 240 9.727564103 kHz Temp 1 [T1 OSW] 21.09 dBm
 -30 435.009214744 MHz Temp 2 [T1 OSW] 25.62 dBm
 -20 435.016981179 MHz

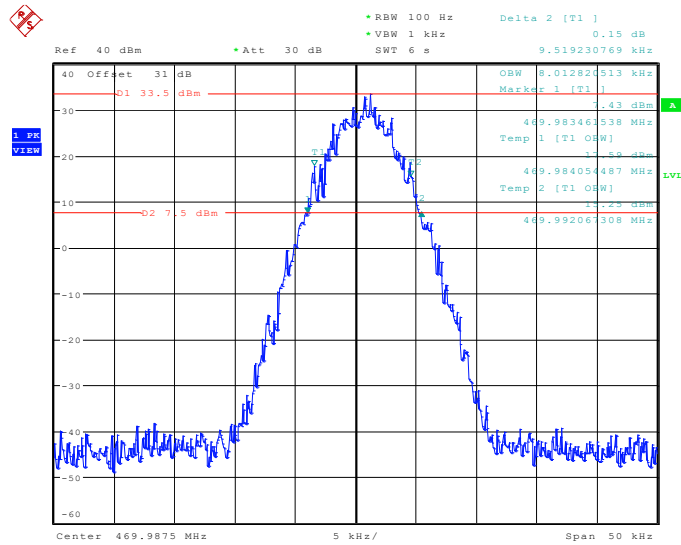
-10 -2 -10 -20 -30 -40 -50

Center 435.0125 MHz 5 kHz/ Span 50 kHz

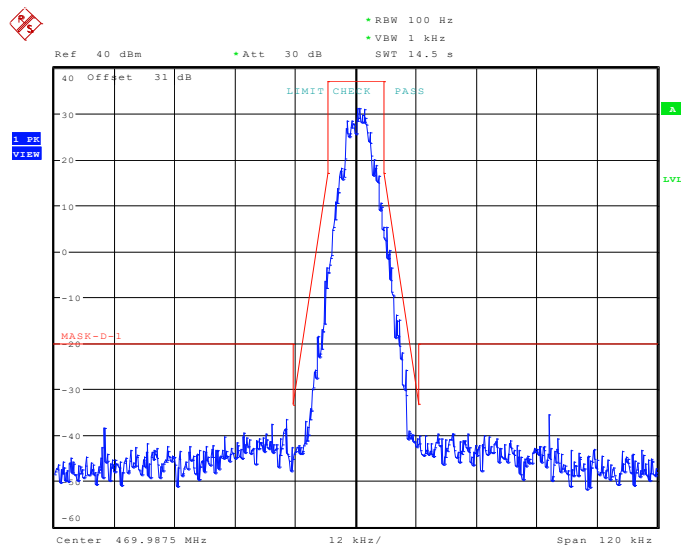
Frequency 435.0125 MHz: Emission Mask D, High Power



Version 3.0

Frequency 469.9875 MHz: 99% Occupied Bandwidth, Low Power

ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 16:49:36

Frequency 469.9875 MHz: Emission Mask D, Low Power

ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 16:52:44

RBW 100 Hz Delta 2 [T1]
 VBW 1 kHz 0.79 dB
 SWT 6 s 10.528846154 kHz

Ref 48 dBm Att 30 dB

Offset 31 dB

OBW 8.012820513 kHz
 Marker 1 [T1]

D1 39.4 dBm

1 39.4 dBm

469.983255205 MHz
 Temp 1 [T1 OBW]

20.35 dBm

469.984055487 MHz
 Temp 2 [T1 OBW]

23.61 dBm

D2 11.4 dBm

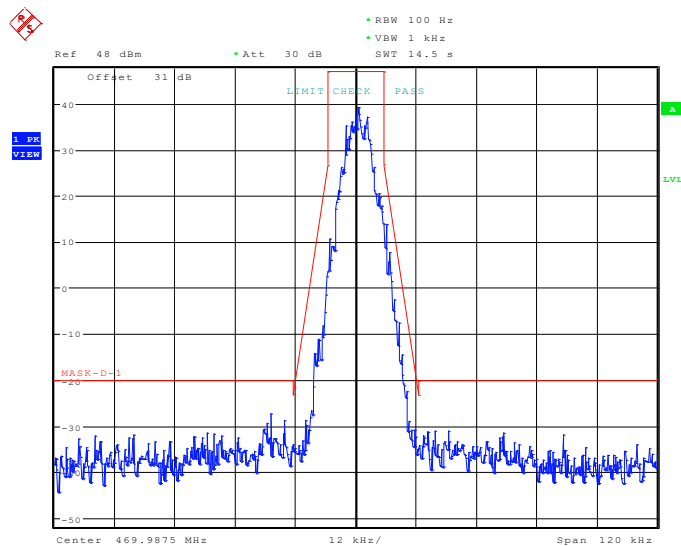
469.992067308 MHz

1 39.4 dBm

2 23.61 dBm

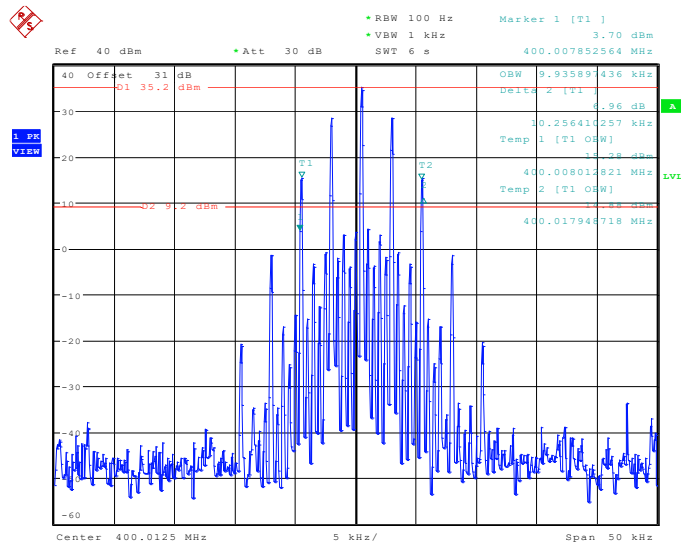
Center 469.9875 MHz 5 kHz/
 Span 50 kHz

Frequency 469.9875 MHz: Emission Mask D, High Power

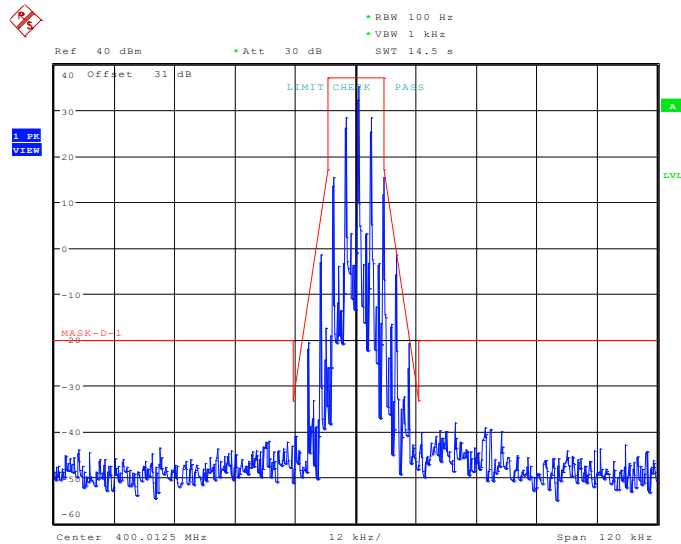


Version 3.0

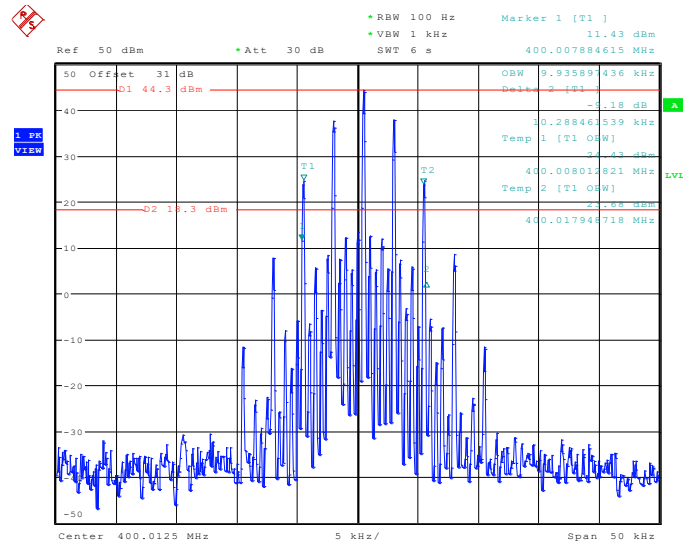
Analog signal, 12.5kHz

Frequency 400.0125 MHz: 99% Occupied Bandwidth, Low Power

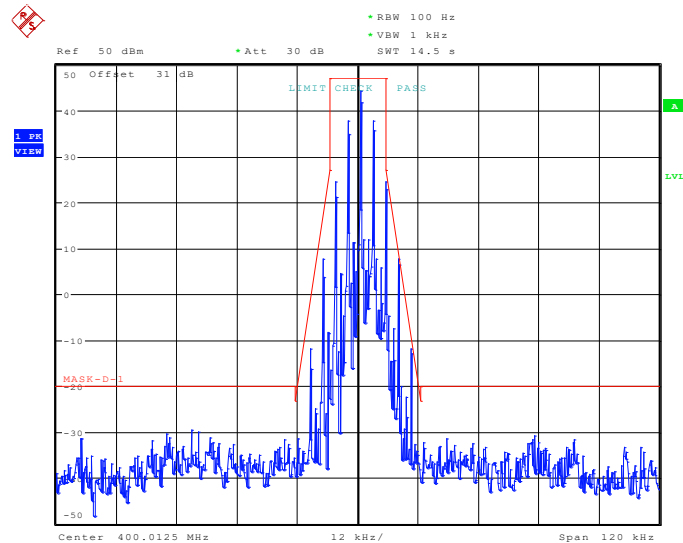
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 14.APR.2025 15:06:04

Frequency 400.0125 MHz: Emission Mask D, Low Power

ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 14.APR.2025 14:31:07

Frequency 400.0125 MHz: 99% Occupied Bandwidth, High Power

ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 14.APR.2025 15:01:36

Frequency 400.0125 MHz: Emission Mask D, High Power

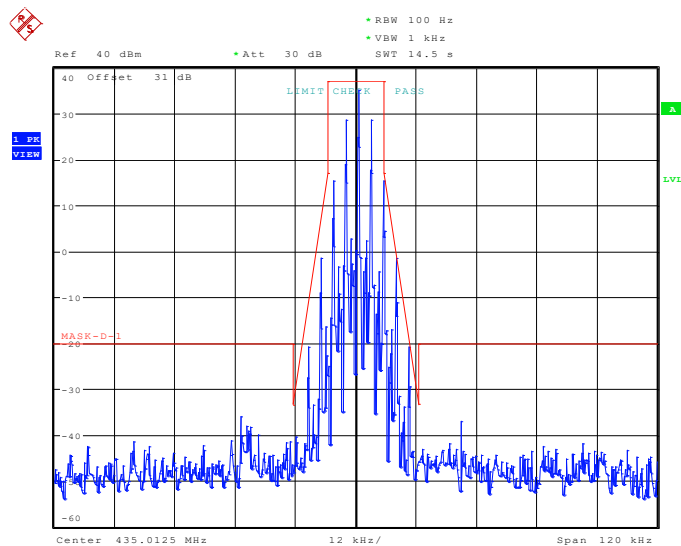
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 14.APR.2025 14:22:05

RBW 300 Hz
 VBW 3 kHz
 SWT 560 ms
 Delta [T1]
 3.53 dB
 Ref 43 dBm
 Att 30 dB
 10.480769231 kHz

Offset 31 dB
 36.1 dBm
 Marker 1 [T1]
 7.19 dBm
 435.007600641 MHz
 Temp 1 [T1] 0.0W
 15.82 dBm
 435.008225721 MHz
 Temp 2 [T1] 0.0W
 15.63 dBm
 435.018105606 MHz

Center 435.0125 MHz
 5 kHz/
 Span 50 kHz

Frequency 435.0125 MHz: Emission Mask D, Low Power



Version 3.0

RBW 100 Hz Delta 2 [T1] ~7.25 dB
 VBW 1 kHz
 SWT 6 s 10.320512820 kHz

Ref 50 dBm Att 30 dB

50 Offset 31 dB
 -1.3 dBm
 -40
 -30
 -20
 -10
 0
 -10
 -20
 -30
 -50

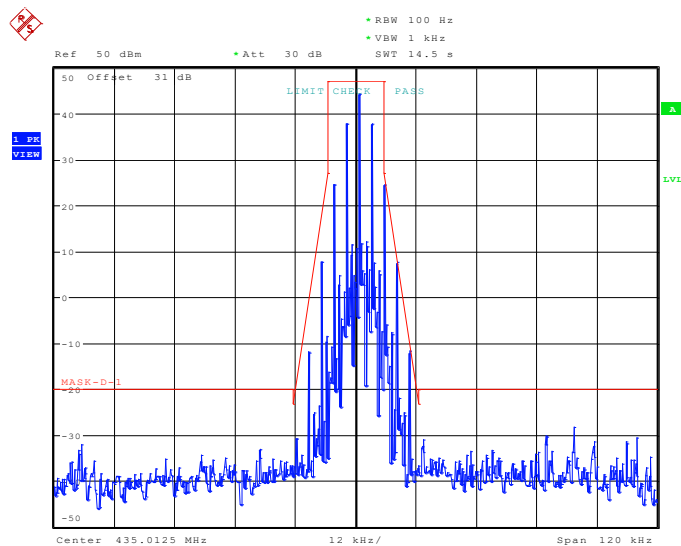
OBW 9.93589 436 kHz
 Marker 1 [T1] 20.11 dBm
 435.00790641 MHz
 Temp 1 [T1] OBW 5.03 dBm
 435.008092949 MHz
 Temp 2 [T1] OBW 5.40 dBm
 435.01802846 MHz

T1 T2

-02 11.3 dBm

Center 435.0125 MHz 5 kHz / Span 50 kHz

Frequency 435.0125 MHz: Emission Mask D, High Power



Version 3.0

RBW 100 Hz
 VBW 1 kHz
 SWT 6 s

Ref 40 dBm
 Att 30 dB

Marker 1 [T1]
 10.24 dBm
 469.98290641 MHz

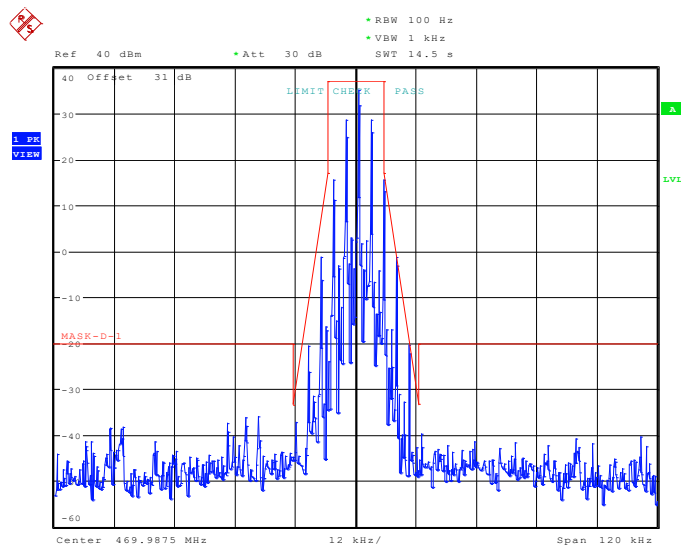
Offset 31 dB
 35.5 dBm

OBW 9.93589436 kHz
 Delta 2 [T1]
 -5.35 dB
 10.32051820 kHz
 Temp 1 [T1] OBW
 469.98309949 MHz
 Temp 2 [T1] OBW
 469.99302846 MHz

S1
 S2

Center 469.9875 MHz
 5 kHz/
 Span 50 kHz

Frequency 469.9875 MHz: Emission Mask D, Low Power



Version 3.0

RBW 100 Hz Marker 1 [T1] 15.92 dBm
VBW 1 kHz
SWT 6 s 469.98290641 MHz

Ref 50 dBm * Att 30 dB

50 Offset 31 dB
D1 43.7 dBm
OBW 9.93589 436 kHz
Delta 2 [T1] 0.94 dB
10.32051820 kHz
Temp 1 [T1 OBW] 3.87 dBm
469.983092949 MHz
Temp 2 [T1 OBW] 2.98 dBm
469.993026846 MHz

T1
T2

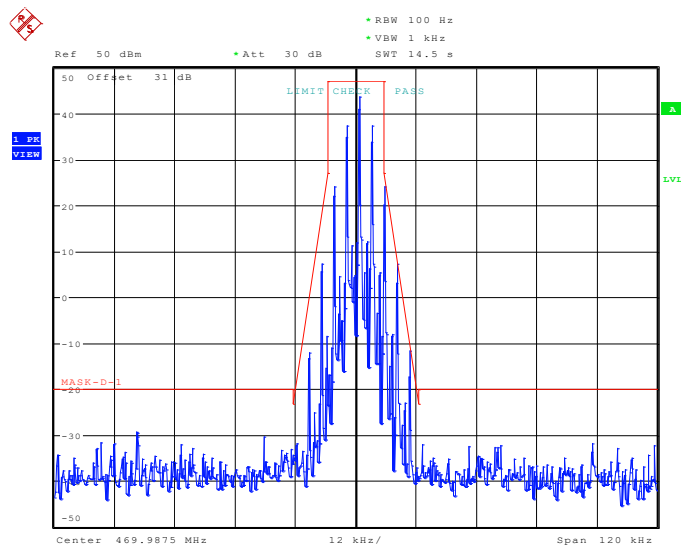
D2 17.7 dBm

Center 469.9875 MHz 5 kHz/
Span 50 kHz

1.98
VIEW

LVL

Frequency 469.9875 MHz: Emission Mask D, High Power



Version 3.0

FCC §2.1051 & §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

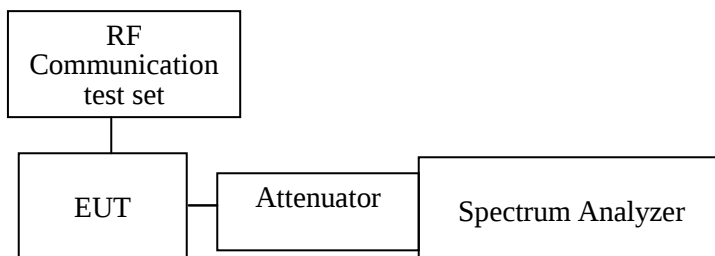
Applicable Standard

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- 1) For any frequency removed from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0 , 0 dB.
- 2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.626 kHz but no more than 12.5 kHz, at least 7.27 ($f_d - 2.88$ kHz) dB.
- 3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10 \log(P)$ dB or 70 dB, whichever is the lesser attenuation.

Test Procedure

According to ANSI C63.26-2015 section 5.7



Note: The path loss from EUT to Spectrum Analyzer has included in the result.

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for below 1GHz, and 1MHz for above 1GHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

Test Data

Environmental Conditions

Temperature:	25~25.5 °C
Relative Humidity:	42~47 %
ATM Pressure:	101 kPa

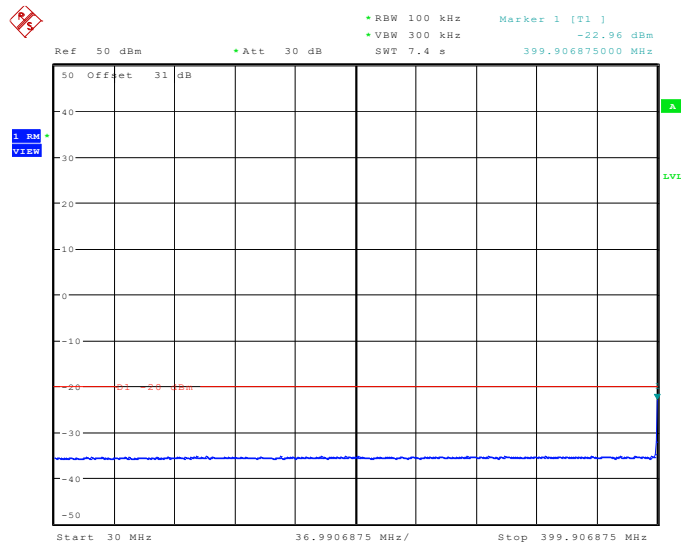
The testing was performed by Cheeb Huang on 2025-04-01.

Test Mode: Transmitting, worst case for highest power level.

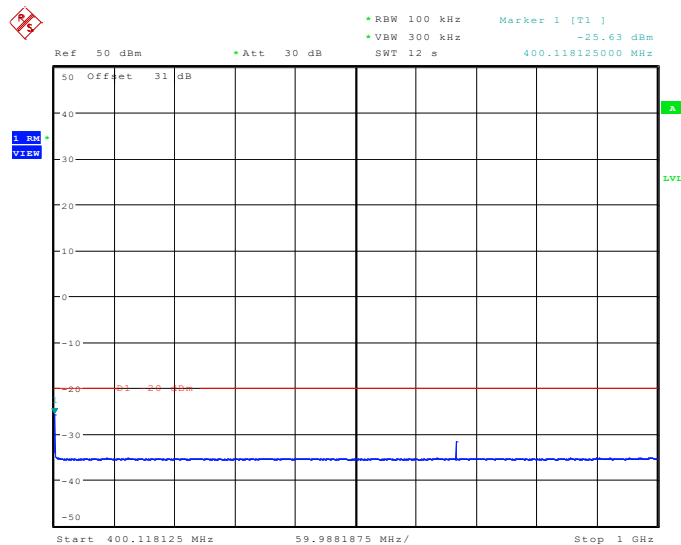
Test Result: Pass. Please refer to the following plots.

Digital signal, 12.5kHz

30MHz – 1 GHz, Low Channel

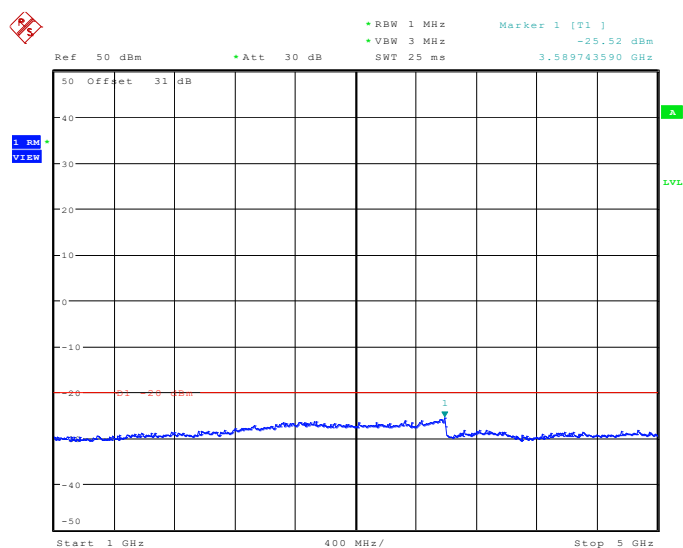


ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 14:33:40



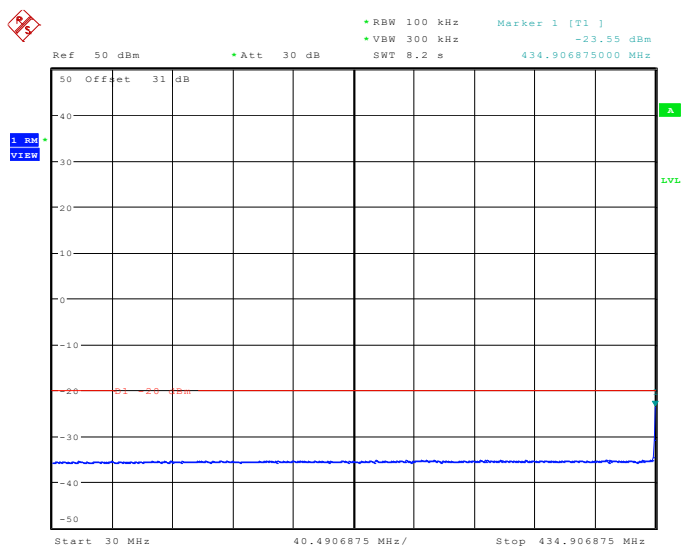
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 14:43:01

1 GHz – 5 GHz, Low Channel

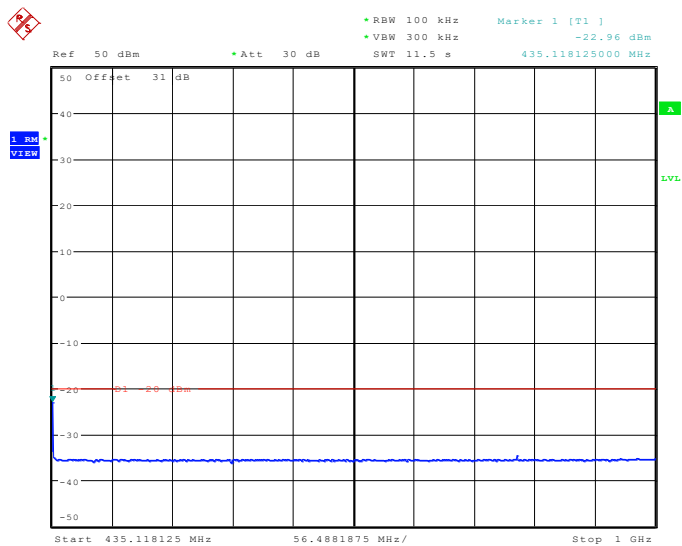


ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 14:44:09

30MHz – 1 GHz, Middle Channel

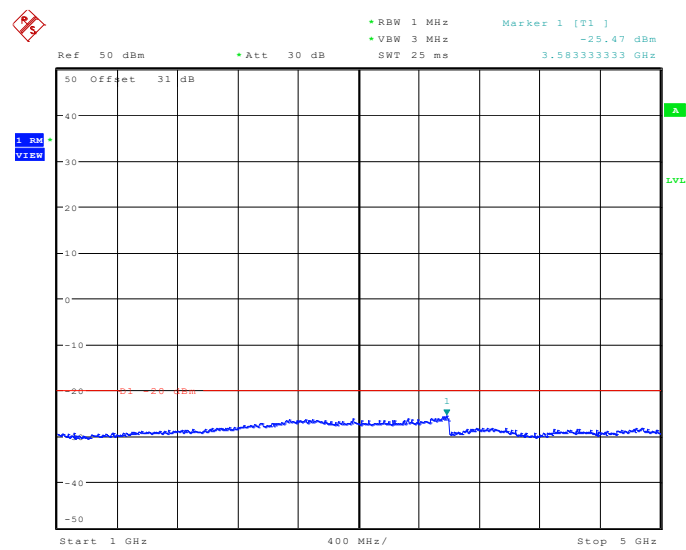


ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 14:45:48



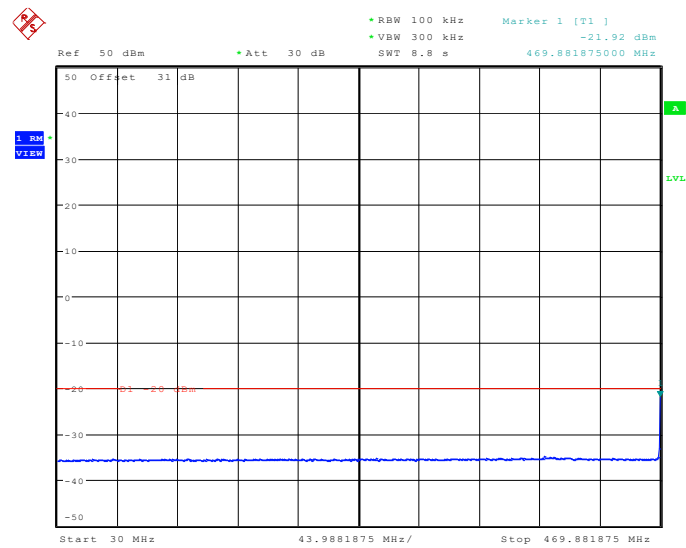
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 14:48:31

1 GHz – 5 GHz, Middle Channel

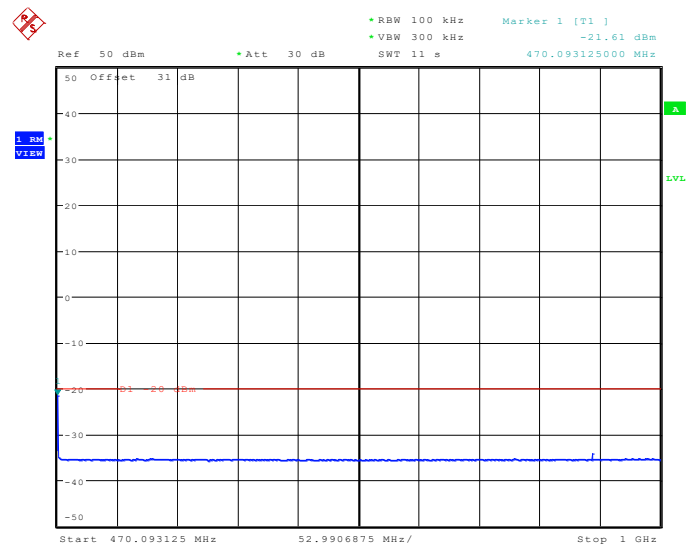


ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 14:49:38

30MHz – 1 GHz, High Channel

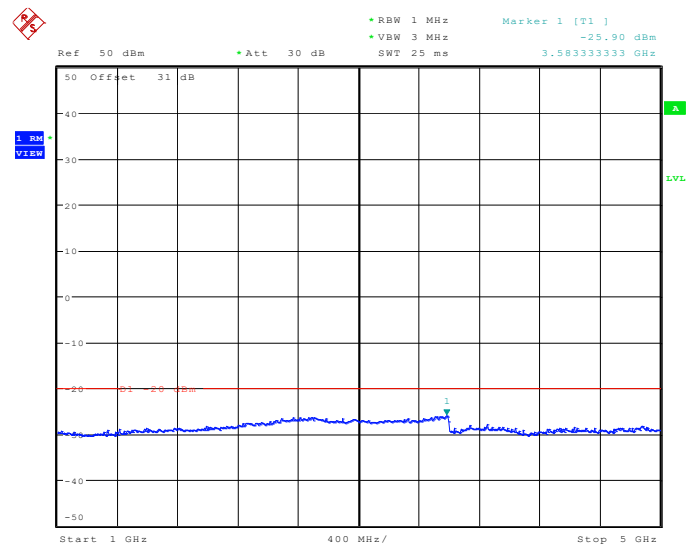


ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 14:52:51



ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 14:56:39

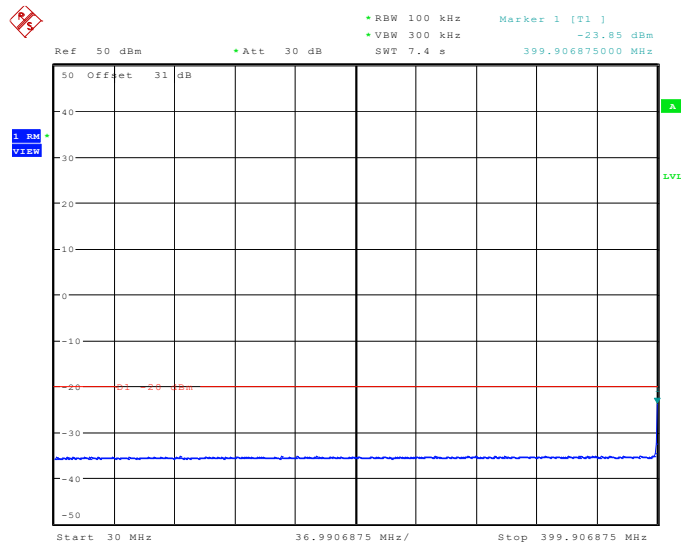
1 GHz – 5 GHz, High Channel



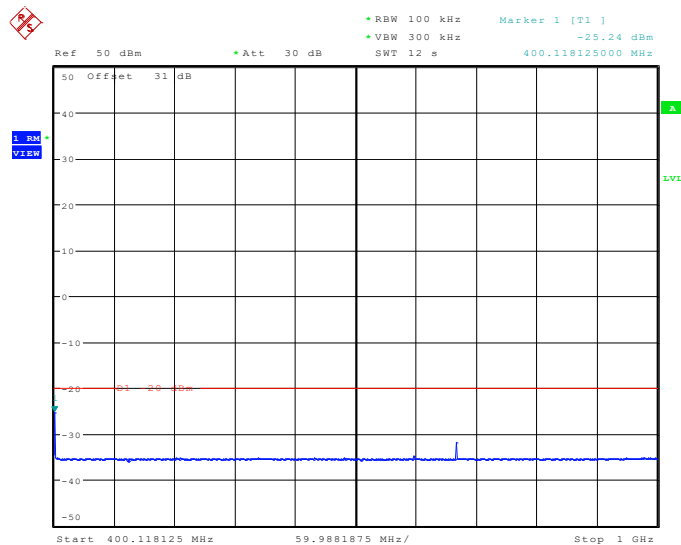
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 14:58:41

Analog signal, 12.5kHz

30MHz – 1 GHz, Low Channel

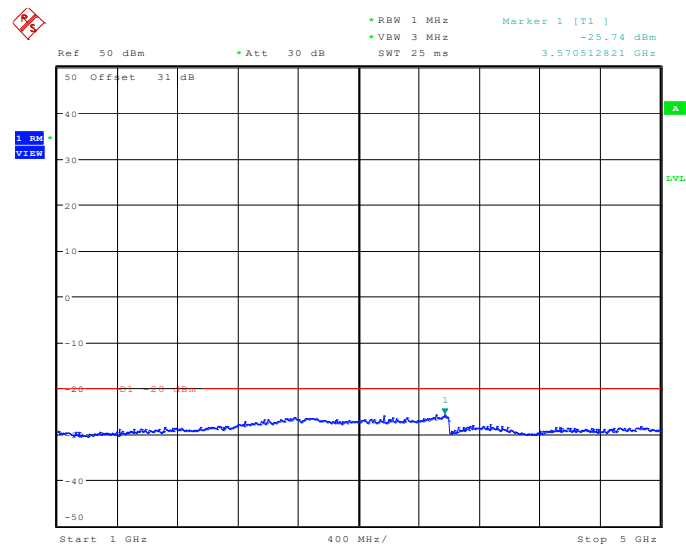


ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 15:03:41



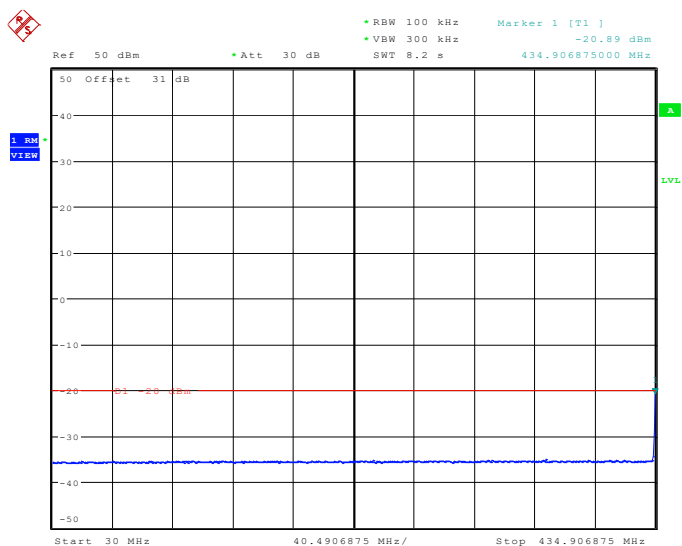
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 15:06:20

1 GHz – 5 GHz, Low Channel

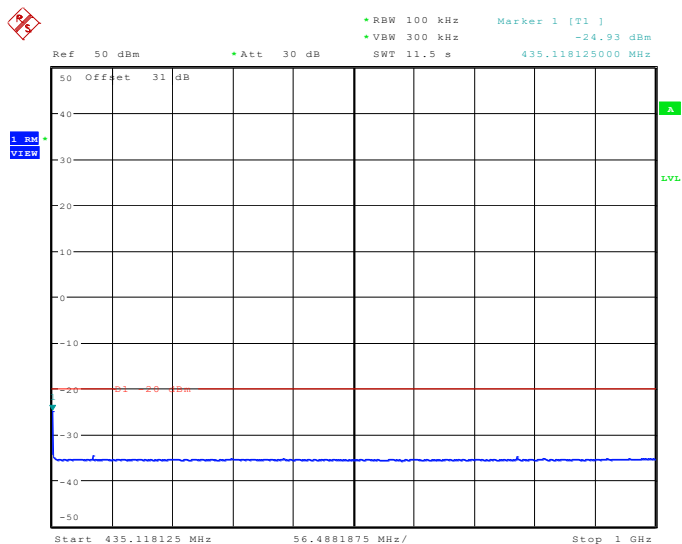


ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 15:00:27

30MHz – 1 GHz, Middle Channel

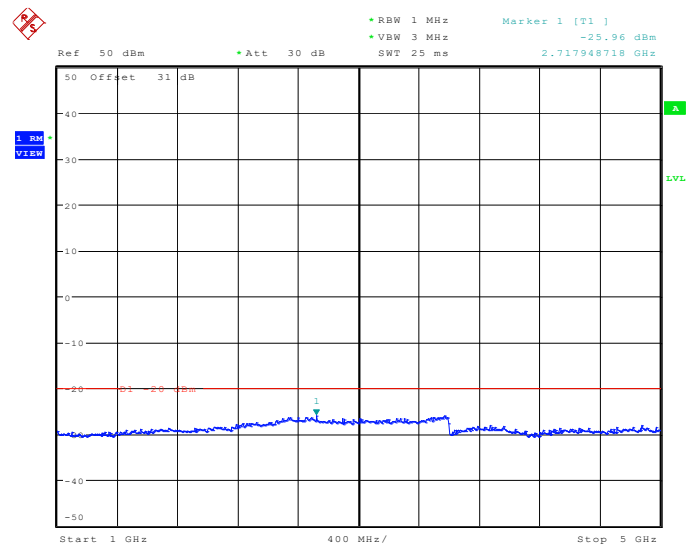


ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 15:09:12



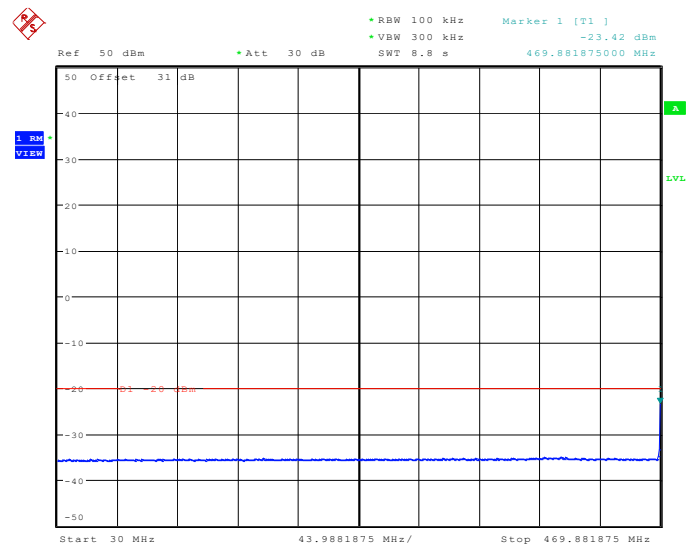
ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 15:07:34

1 GHz – 5 GHz, Middle Channel

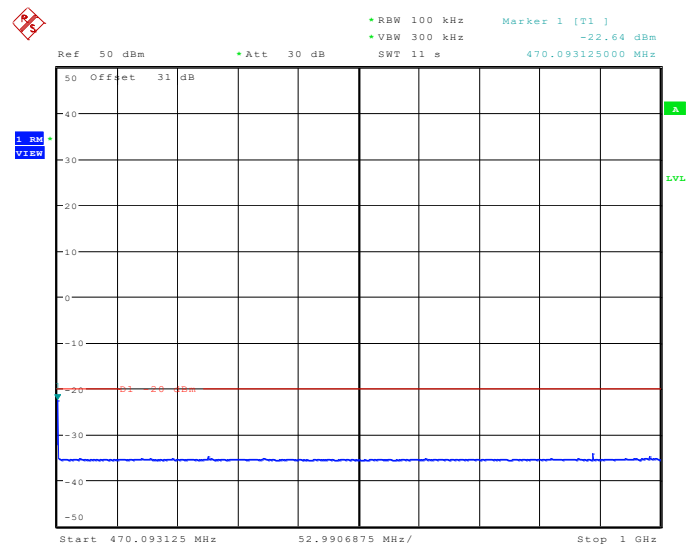


ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 14:59:53

30MHz – 1 GHz, High Channel

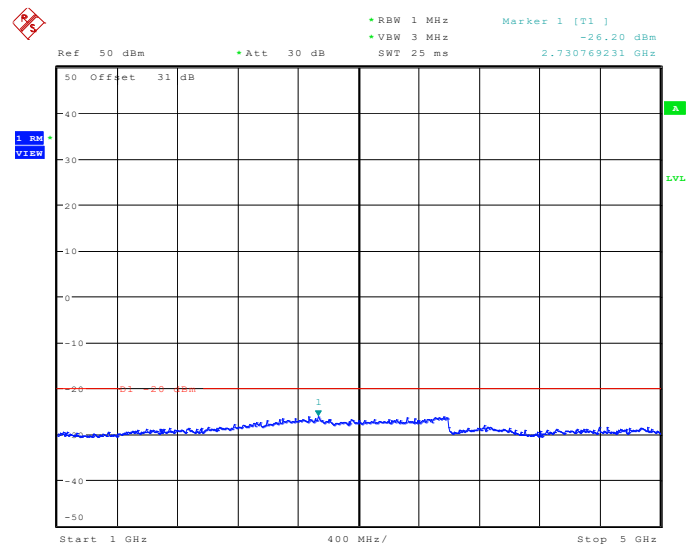


ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 15:10:56



ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 15:13:00

1 GHz – 5 GHz, High Channel



ProjectNo.:2501R47291E-RF Tester:Cheeb Huang
Date: 1.APR.2025 14:59:35

FCC §2.1053 & §90.210 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §2.1053 and §90.210

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB = 50 + 10 Log₁₀ (power out in Watts) for EUT with a 12.5 kHz channel bandwidth.

Test Data

Environmental Conditions

Temperature:	19.9~26.0 °C
Relative Humidity:	47~50 %
ATM Pressure:	100.8~101.4 kPa

The testing was performed by Alex Yan on 2025-04-22 for below 1GHz and Wing K Ji on 2025-04-21 for above 1GHz.

Test Mode: Transmitting, worst case for highest power level.

Test Result: Pass. Please refer to the following tables.

Digital signal, 12.5kHz

Frequency (MHz)	Receiver Reading (dBμV)	Polar (H / V)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)			
Low Channel								
800.025	29.56	H	-36.6	1.30	0.0	-37.90	-20	17.90
800.025	30.35	V	-33.6	1.30	0.0	-34.90	-20	14.90
1200.04	60.82	H	-53.4	1.10	6.70	-47.80	-20	27.80
1200.04	58.64	V	-56.3	1.10	6.70	-50.70	-20	30.70
1600.05	54.37	H	-60.0	1.50	8.60	-52.90	-20	32.90
1600.05	52.79	V	-62.1	1.50	8.60	-55.00	-20	35.00
Middle Channel								
870.025	30.94	H	-34.5	1.32	0.0	-35.82	-20	15.82
870.025	29.68	V	-34.4	1.32	0.0	-35.72	-20	15.72
1305.00	61.98	H	-52.4	1.00	7.30	-46.10	-20	26.10
1305.00	59.37	V	-55.9	1.00	7.30	-49.60	-20	29.60
1740.00	50.84	H	-63.3	1.50	8.80	-56.00	-20	36.00
1740.00	49.78	V	-65.0	1.50	8.80	-57.70	-20	37.70
High Channel								
939.975	30.33	H	-35.0	1.33	0.0	-36.33	-20	16.33
939.975	29.15	V	-35.9	1.33	0.0	-37.23	-20	17.23
1409.96	52.03	H	-62.3	0.90	7.80	-55.40	-20	35.40
1409.96	51.78	V	-63.2	0.90	7.80	-56.30	-20	36.30
1879.95	51.59	H	-62.8	1.20	9.40	-54.60	-20	34.60
1879.95	50.09	V	-64.9	1.20	9.40	-56.70	-20	36.70

Analog signal, 12.5kHz

Frequency (MHz)	Receiver Reading (dBμV)	Polar (H / V)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)			
Low Channel								
800.025	30.36	H	-35.8	1.30	0.0	-37.10	-20	17.10
800.025	29.28	V	-34.7	1.30	0.0	-36.00	-20	16.00
1200.04	58.85	H	-55.4	1.10	6.70	-49.80	-20	29.80
1200.04	56.44	V	-58.5	1.10	6.70	-52.90	-20	32.90
1600.05	52.25	H	-62.1	1.50	8.60	-55.00	-20	35.00
1600.05	50.89	V	-64.0	1.50	8.60	-56.90	-20	36.90
Middle Channel								
870.025	29.75	H	-35.7	1.32	0.0	-37.02	-20	17.02
870.025	30.79	V	-33.3	1.32	0.0	-34.62	-20	14.62
1305.00	60.05	H	-54.3	1.00	7.30	-48.00	-20	28.00
1305.00	57.46	V	-57.8	1.00	7.30	-51.50	-20	31.50
1740.00	49.68	H	-64.5	1.50	8.80	-57.20	-20	37.20
1740.00	48.26	V	-66.5	1.50	8.80	-59.20	-20	39.20
High Channel								
939.975	30.25	H	-35.1	1.33	0.0	-36.43	-20	16.43
939.975	30.78	V	-34.3	1.33	0.0	-35.63	-20	15.63
1409.96	52.32	H	-62.0	0.90	7.80	-55.10	-20	35.10
1409.96	51.2	V	-63.8	0.90	7.80	-56.90	-20	36.90
1879.95	50.03	H	-64.3	1.20	9.40	-56.10	-20	36.10
1879.95	48.92	V	-66.1	1.20	9.40	-57.90	-20	37.90

Note:

Absolute Level = Reading Level + Substituted Factor

Substituted Factor contains: Substituted Level - Cable loss+ Antenna Gain

Margin = Limit-Absolute Level

FCC §2.1055 & §90.213 - FREQUENCY STABILITY

Applicable Standard

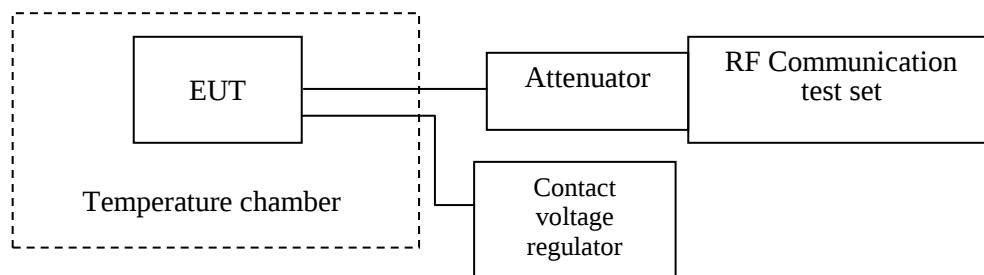
FCC §2.1055 and §90.213

Test Procedure

According to ANSI C63.26-2015 section 5.6

Frequency Stability vs. Temperature: The equipment under test was connected to a contact voltage regulator and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The power cable and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.



Test Data

Environmental Conditions

Temperature:	25~25.5 °C
Relative Humidity:	42~47 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2025-04-14 to 2025-04-28.

Test Mode: Transmitting (Unmodulation Highest power level)

Test Result: Pass. Please refer to the following tables.

fc =		435.0125	MHz	
Temperature	Voltage	Reading	Frequency Error	Limit
°C	V _{AC}	MHz	ppm	ppm
-30	120	435.0125380	0.09	1.5
-20		435.0126140	0.26	
-10		435.0124170	-0.19	
0		435.0123740	-0.29	
10		435.0125160	0.04	
20		435.0123420	-0.36	
30		435.0122480	-0.58	
40		435.0125570	0.13	
50		435.0125770	0.18	
20	102	435.0123670	-0.31	
20	138	435.0124240	-0.17	

FCC §90.214 - TRANSIENT FREQUENCY BEHAVIOR

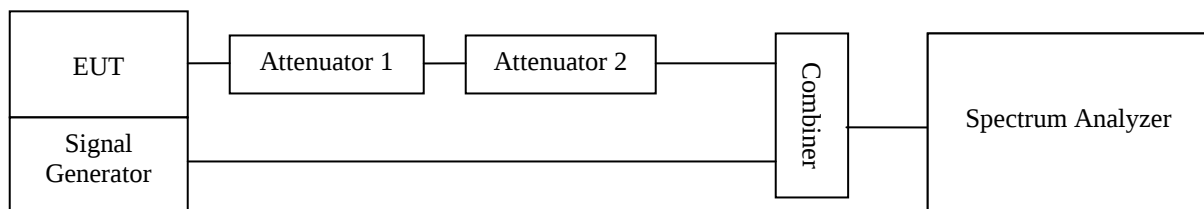
Applicable Standard

Regulations: FCC §90.214

Test method: ANSI C63.26-2015 6.5.2.2

Test Procedure

- a) Connect the EUT and test equipment as shown on the following block diagram.
- b) Verify RF attenuator power rating for EUT providing adequate protection to the combining network and measurement equipment. Instrumentation linearity shall be confirmed per item j) of 4.2.3.
- c) Tune spectrum analyzer center frequency to EUT frequency and span to at least 100 kHz. Set amplitude according to EUT RF power.
- d) Switch transmitter on and adjust settings in accordance with step c); switch transmitter to the off position.
- e) Set analyzer to FM mode; re-tune analyzer to EUT frequency and span according to step c), while in FM demodulation mode.
- f) An RF test signal of the same frequency as the EUT from the signal generator shall be modulated by a frequency of 1 kHz with a deviation equal to plus or minus the value of the channel spacing (separation). The RF signal strength shall be adjusted allowing the analyzer to demodulate the signal in FM mode.
- g) Adjust analyzer x axis to capture at least 100 ms of demodulated signal.
- h) Adjust analyzer y axis for the correct deviation amplitude.
- i) The analyzer display should show a continuous 1 kHz signal and the channel spacing deviation amplitude.
- j) Change analyzer settings to single sweep and external trigger. For newer analyzers, the channel bandwidth might have to be adjusted for the correct sample rate and sweep speed.
- k) Turn on EUT and adjust analyzer to display desired signal by adjusting trigger settings and considerations in step j). Turn off EUT.
- l) Repeat step k) until optimum set-up is achieved.
- m) Start measurement by turning on EUT. Observe measurements results in analyzer display, EUT_{ON} starts at the moment the 1 kHz signal is suppressed (t_2). See Figure 11 for transient frequency behavior with switch on.
- n) Record values observed in step m) as frequency difference versus time.
- o) Turn off EUT. EUT_{OFF} is considered at the start of the 1 kHz signal defined as t_3 . See Figure 12 for transient frequency behavior with switch off.
- p) Record the values observed in step o) as frequency difference versus time.



Test Data**Environmental Conditions**

Temperature:	25~25.5 °C
Relative Humidity:	42~47 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2025-04-14 to 2025-04-28.

Test Result: Pass. Please refer to the following tables and plots.

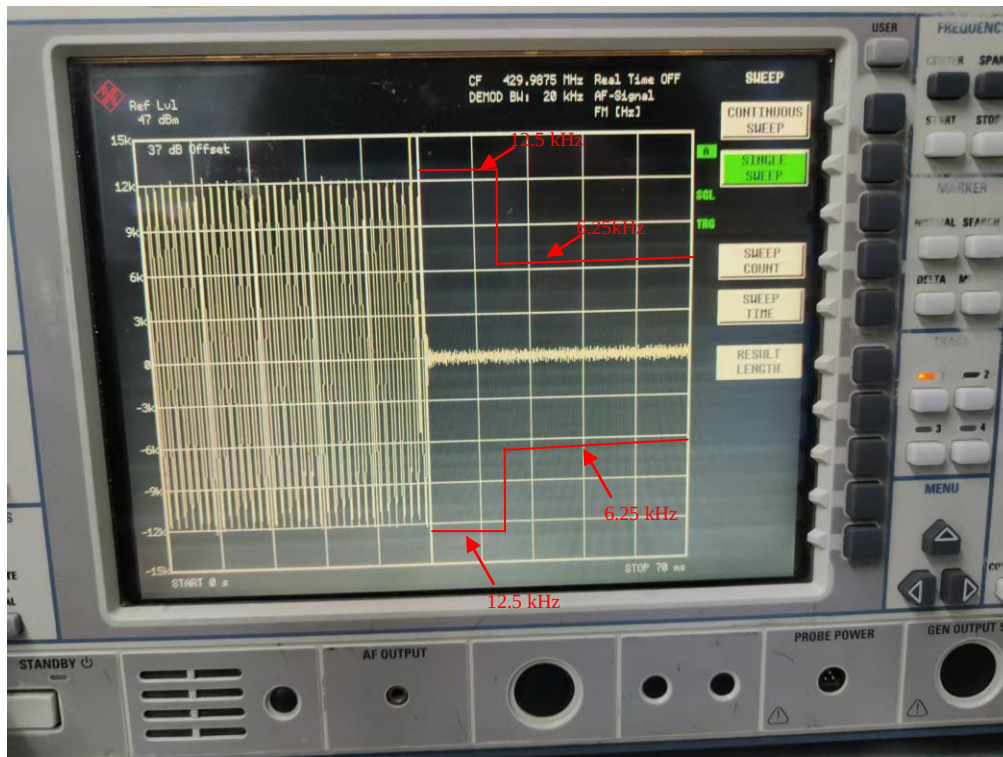
Channel Separation (kHz)	Transient Period (ms)	Transient Frequency (kHz)	Result
12.5	10(t1)	± 12.5	Pass
	25(t2)	± 6.25	
	10(t1)	± 12.5	

Note: During the time from the end of t_2 to the beginning of t_3 , the frequency difference not exceed the limits specified in §90.213

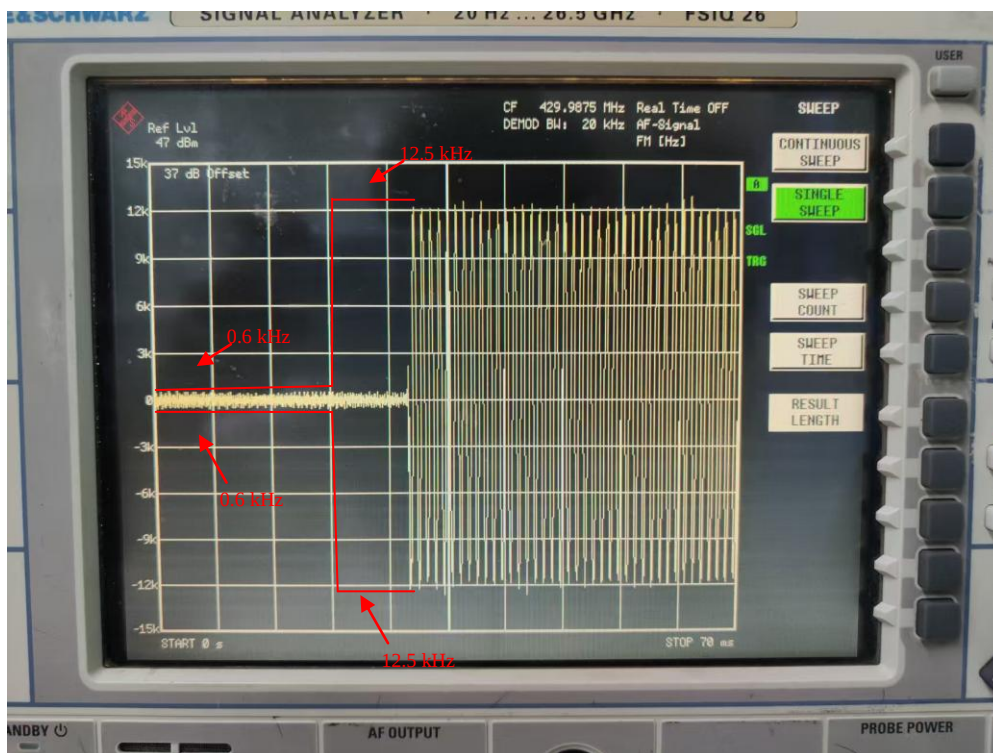
For 429.9875MHz 12.5 kHz mode, the limit is $429.9875\text{MHz} \times 1.5\text{ppm} = 0.6\text{kHz}$

12.5kHz

Turn on



Turn off



EUT PHOTOGRAPHS

Please refer to the attachment 2501R47291E-RF External photo and 2501R47291E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2501R47291E-RF Test Setup photo.

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