



UHF TEST REPORT

FCC ID: 2ABNA-TRM230

On Behalf of

Guangzhou Geoelectron Science & Technology Company Ltd.

Wireless Data Transceiver Module

Model No.: TRM230

Prepared for : Guangzhou Geoelectron Science & Technology Company Ltd.
Address : Room 1201 and 1301, No. 203 Kezhu Road, Science City, Huangpu
District, Guangzhou, China.

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District,
518103, Shenzhen, Guangdong, China

Report Number : A2410176-C01-R05
Date of Receipt : October 23, 2024
Date of Test : October 23, 2024 – August 26, 2025
Date of Report : August 26, 2025
Version Number : V0
Result **Pass**

TABLE OF CONTENTS

Description	Page
1. Summary of Standards and Results -----	5
1.1. Description of Standards and Results -----	5
2. General Information -----	6
2.1. Description of Device (EUT) -----	6
2.2. Accessories of Device (EUT) -----	7
2.3. Tested Supporting System Details -----	7
2.4. Block Diagram of Connection between EUT and Simulators-----	7
2.5. Test Mode -----	8
2.6. Test Conditions -----	9
2.7. Test Facility -----	9
2.8. Measurement Uncertainty-----	10
2.9. Test Equipment List-----	11
3. Test Results and Measurement Data -----	16
3.1. Transmitter Power (Conducted) -----	16
3.2. Occupied Bandwidth and Emission Mask -----	24
3.3. Spurious Emissions(conducted) -----	39
3.4. Radiated Spurious Emission-----	46
3.5. Transient Frequency Behavior -----	52
3.6. Behavior Frequency Stability -----	60
3.7. Modulation Characteristic -----	63
3.8. Adjacent Channel Power -----	64
4. Test Setup Photo -----	70
4.1. Photos of Radiated Emission-----	70
5. Photos of EUT -----	71

TEST REPORT DECLARATION

Applicant : Guangzhou Geoelectron Science & Technology Company Ltd.
Address : Room 1201 and 1301, No. 203 Kezhu Road, Science City, Huangpu District, Guangzhou, China.
Manufacturer : Guangzhou Geoelectron Science & Technology Company Ltd.
Address : Room 1201 and 1301, No. 203 Kezhu Road, Science City, Huangpu District, Guangzhou, China.
EUT Description : Wireless Data Transceiver Module
(A) Model No. : TRM230
(B) Trademark : 

Measurement Standard Used:

FCC CFR Title 47 Part 90, FCC CFR Title 47 Part 2

ANSI C63.26-2015

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 2, Part 90 limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Yannis Wen
Project Engineer



Approved by (name + signature).....: Jack Xu
Project Manager



Date of issue.....: August 26, 2025

Revision History

Revision	Issue Date	Revisions	Revised By
V0	August 26, 2025	Initial released Issue	Yannis Wen

1. Summary of Standards and Results

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Item	Test Requirement	Standards Paragraph	Result
Transmitter Power(Conducted)	FCC PART 90	§ 90.205,	P
Occupied Bandwidth & Emission Mask	FCC PART 90	§ 90.209, § 90.210	P
Spurious Emissions(conducted)	FCC PART 90	§ 90.210,	P
Spurious Emissions(Radiated)	FCC PART 90	§ 90.210,	P
Transient Frequency Behavior	FCC PART 90	§ 90.214,	P
Frequency Stability	FCC PART 90	§ 90.213,	P
Modulation Characteristics - Audio Frequency Response	FCC PART 2 FCC PART 90	§ 2.1047(a), § 90.207	N/A
Modulation Characteristics - Modulation Limiting	FCC PART 2 FCC PART 90	§ 2.1047(b), § 90.207	N/A
Adjacent channel power	FCC PART 90	§90.221	P
Note: 1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable. 4. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.			

2. General Information

2.1. Description of Device (EUT)

Description : Wireless Data Transceiver Module
Model Number : TRM230
DIFF. : N/A
Test Voltage : Input: DC 3.6V

UHF

Operation frequency : 410MHz-470MHz
Conducted Power : 2W(33.01±1dBm)
Channel spacing : GMSK: 12.5KHz, 25KHz
4FSK: 6.25KHz, 12.5KHz, 25KHz
Modulation type : GMSK, 4FSK
Antenna Type : Rod Antenna, Maximum Gain is 4dBi.
(Antenna information is provided by applicant.)
Software version : G002.00.03
Hardware version : V1.0
Intend use environment : Residential, commercial and light industrial environment

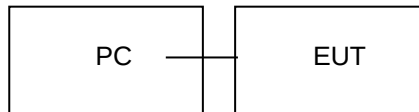
2.2. Accessories of Device (EUT)

Accessories	:	N/A
Manufacturer	:	N/A
Model	:	N/A
Ratings	:	N/A

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDOC
1.	Notebook PC	Lenovo	T430	/	/

2.4. Block Diagram of Connection between EUT and PC



The sample was placed 0.8m & 1.5m for the measurement below & above 1GHz above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

2.5. Test Mode

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Mode		
Item	Description of operation mode	Note
1	GMSK+CS12.5KHz+TX	at maximum rated power for transmitter
2	GMSK+CS25KHz+TX	at maximum rated power for transmitter
3	4FSK+CS12.5KHz+TX	at maximum rated power for transmitter
4	4FSK+CS25KHz+TX	at maximum rated power for transmitter
5	4FSK+CS12.5KHz+TX	at maximum rated power for transmitter

Note: The worst case modes for all test are the item 1, item 2, item 3, item 4 and item 5.

Description Operation Frequency

GMSK		
Test Channel	Channel spacing (KHz)	Frequency(MHz)
Low	12.5	410.050
	25	410.050
Mid	12.5	440.000
	25	440.000
High	12.5	469.950
	25	469.950

4FSK		
Test Channel	Channel spacing (KHz)	Frequency(MHz)
Low	6.25	410.050
	12.5	410.050
	25	410.050
Mid	6.25	440.000
	12.5	440.000
	25	440.000
High	6.25	469.950
	12.5	469.950
	25	469.950

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	24℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.7. Test Facility

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District,
518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293631

July 15, 2019 Certificated by IC
Registration Number: 12135A

SHENZHEN STS TEST SERVICES CO., LTD

101, Building B, Zhouke Science Park, No. 190 Chongqing Road, Zhancheng Shequ, Fuhai Sub-District,
Ban'an District, Shenzhen, Guangdong, China

FCC Registration No.: 625569; A2LA Certificate No.:4338.01.

Note: Except for the Transient Frequency Behavior projects that were completed in SHENZHEN STS TEST SERVICES CO., LTD, all other projects were completed in Shenzhen Alpha Product Testing Co., Ltd

2.8. Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.74dB(Polarize: V)
	3.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (18GHz to 40GHz)	4.31 dB(Polarize: V)
	4.30 dB(Polarize: H)
Uncertainty for radio frequency	5.06×10^{-8} GHz
Uncertainty for conducted RF Power	0.40dB
Uncertainty for temperature	0.2°C
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.9. Test Equipment List

Shenzhen Alpha Product Testing Co., Ltd

Equipment	Manufacturer	Model No.	Firmware version	Serial No.	Last Cal.	Cal. Due day
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2025.03.09	4Year
4*4*3 Shielded room	CHENYU	4*4*3	/	N/A	2025.03.09	4Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2025.08.04	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2025.08.04	1Year
Test Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-102082-Wa	2025.08.04	1Year
Test Receiver	ROHDE&SCHWARZ	ESCI	4.42 SP1	101165	2025.08.04	1Year
Bilog Antenna	SCHWARZBECK	VULB 9168	/	VULB 9168#627	2025.08.11	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2025.08.11	2Year
Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00128	2025.08.11	2Year
RF Cable	Resenberger	Cable 1	/	RE1	2025.08.04	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2025.08.04	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2025.08.04	1Year
Amplifier	HP	HP8347A	/	2834A00455	2025.08.04	1Year
Amplifier	Agilent	8449B	/	3008A02664	2025.08.04	1Year
L.I.S.N.#1	SCHWARZBECK	NSLK8126	/	8126-466	2025.08.04	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2025.08.04	1Year
Horn Antenna	SCHWARZBECK	BBHA 9170	/	00946	2025.08.11	2Year
Preamplifier	SKET	LNPA_1840-50	/	SK2018101801	2025.08.04	1 Year
Power Meter	Agilent	E4419B	/	GB40202122	2025.08.04	1 Year
Power Sensor	Agilent	E9300A	/	MY41496628	2025.08.04	1 Year
Power Sensor	Agilent	E9304A	/	MY41496815	2025.08.04	1 Year
Temp. & Humid. Chamber	Teelong	TL-HW408S	/	TL-20191205-01	2025.07.14	1 Year
Electronic Thermo-Hygrometer	S.H.Qixiang	HTC-1	/	N/A	2025.08.04	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2025.08.04	1 Year
Adjustable attenuator	MWRFTest	N/A	/	N/A	N/A	N/A
10dB Attenuator	Mini-Circuits	DC-6G	/	N/A	N/A	N/A

Equipment	Manufacture	Model No.	Firmware version	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2025.03.09	4Year
4*4*3 Shielded room	CHENYU	4*4*3	/	N/A	2025.03.09	4Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2024.08.08	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2024.08.08	1Year
Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-10 2082-Wa	2024.08.08	1Year
Receiver	R&S	ESCI	4.42 SP1	101165	2024.08.08	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2023.08.28	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2023.08.19	2Year
Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00128	2023.08.19	2Year
RF Cable	Resenberger	Cable 1	/	RE1	2024.08.08	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2024.08.08	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2024.08.08	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2024.08.08	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2024.08.08	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2024.08.08	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2024.08.08	1Year
Horn Antenna	SCHWARZBECK	BBHA 9170	/	00946	2023.08.19	2Year
Preamplifier	SKET	LNPA_1840 -50	/	SK2018101801	2024.08.08	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2024.08.08	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2024.08.08	1 Year
Temp. & Humid. Chamber	Teelong	TL-HW408S	/	TL-20191205-01	2024.07.15	1 Year
Electronic Thermo-Hygrometer	S.H.Qixiang	HTC-1	/	N/A	2024.08.11	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2024.08.08	1 Year
Adjustable attenuator	MWRFtest	N/A	/	N/A	N/A	N/A
10dB Attenuator	Mini-Circuits	DC-6G	/	N/A	N/A	N/A

SHENZHEN STS TEST SERVICES CO., LTD

RF Radiation Test Equipment						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
1	Temperature & Humidity	SW-108	SuWei	N/A	2025.02.24	2026.02.23
2	Wireless Communications Test Set	R&S	CMW 500	117239	2024.09.23	2025.09.22
3	Pre-Amplifier(0.1 M-3GHz)	EM	EM330	060665	2025.02.22	2026.02.21
4	Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018 G-45	SK2018080901	2024.09.23	2025.09.22
5	Positioning Controller	MF	MF-7802	MF-780208587	N/A	N/A
6	Signal Analyzer	R&S	FSV 40-N	101823	2024.09.23	2025.09.22
7	Switch Control Box	N/A	N/A	N/A	N/A	N/A
8	Filter Box	BALUN Technology	SU319E	BL-SZ1530051	N/A	N/A
9	Video Controller	SKET	FCS C-3	N/A	N/A	N/A
10	Bilog Antenna	TESEQ	CBL6111D	34678	2024.09.30	2025.09.29
11	Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2024.09.25	2025.09.24
12	Antenna Mast	MF	MFA-440H	N/A	N/A	N/A
13	Turn Table	MF	N/A	N/A	N/A	N/A
14	AC Power Source	APC	KDF-11010G	F214050035	N/A	N/A
15	DC Power Supply	Zhaoxin	RXN 605D	20R605D11010081	N/A	N/A
16	Test SW	EMC Test Software	15.2.0.339			

SHENZHEN STS TEST SERVICES CO., LTD

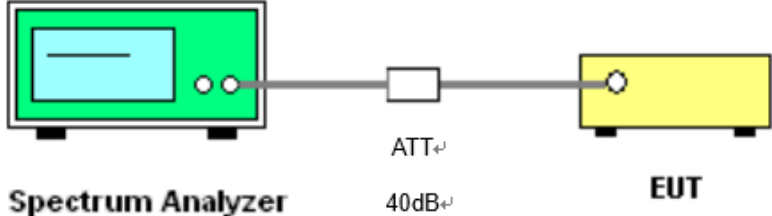
RF Connected Test Equipment						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
1	Temperature & Humidity	SW-108	SuWei	N/A	2025.02.24	2026.02.23
2	Universal Radio Communication Tester	R&S	CMU200	119907	2025.02.22	2026.02.21
3	MXG Vector Signal Generator	Keysight	N5182B	MY57301448	2024.09.23	2025.09.22
4	Signal Analyzer	Keysight	N9020A	MY52440124	2025.02.22	2026.02.21
5	Intercom comprehensive tester	HP	8920A	348A05658	2025.02.22	2026.02.21
6	Temperature& Humidity test chamber	Safety test	AG80L	171200018	2025.02.22	2026.02.21
7	Attenuator	HP	8494B	DC-18G	2025.02.25	2026.02.24
8	AC Power Source	APC	KDF-11010G	F214050035	N/A	N/A
9	DC Power Supply	Agilent	E3642A	MY40002025	N/A	N/A

Software Information			
Test Item	Software Name	Manufacturer	Version
RE	EZ-EMC	farad	Alpha-3A1
CE	EZ-EMC	farad	Alpha-3A1
RF-CE	MTS 8310	MW	V2.0.0.0

3. Test Results and Measurement Data

3.1. Transmitter Power (Conducted)

3.1.1. Test Specification

Test Requirement:	Part 90.205
Test Method:	FCC part 2.1046, ANSI C63.26-2015 Section 5.2
Limits:	Please refer section FCC Part 90.205
Test Setup:	 Spectrum Analyzer ATT EUT 40dB
Test Procedure:	a) Connect the equipment as illustrated. b) Turn on the Spectrum Analyzer c) Record value
Test Result:	PASS

3.1.2. Test Results

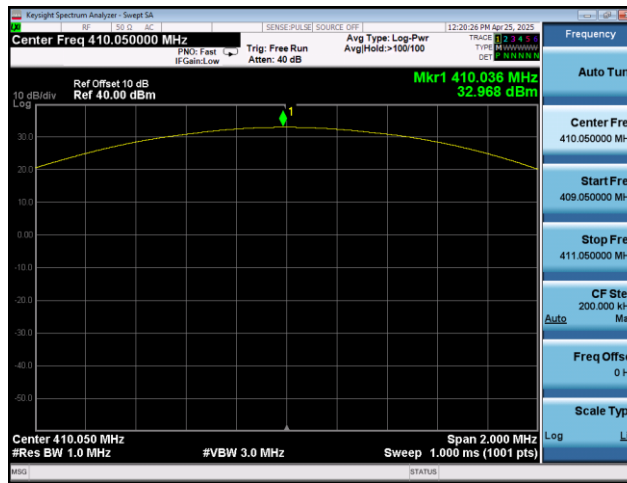
GMSK mode (2W):						
Channel spacing (KHz)	Frequency (MHz)	Maximum Conducted Output Power(Peak) (dBm)	Maximum ERP (dBm)	Stated ERP Power (dBm)	Conducted Output Power Limit (dBm)	Result
12.5	410.050	32.968	34.818	35.5	33.01±1	PASS
25	410.050	33.457	35.307	35.5	33.01±1	PASS
12.5	440.000	33.326	35.176	35.5	33.01±1	PASS
25	440.000	33.245	35.095	35.5	33.01±1	PASS
12.5	469.950	33.038	34.888	35.5	33.01±1	PASS
25	469.950	33.145	34.995	35.5	33.01±1	PASS

Note: 1. Maximum ERP= Maximum Conducted Output Power(Peak) + Antenna Gain – 2.15dB

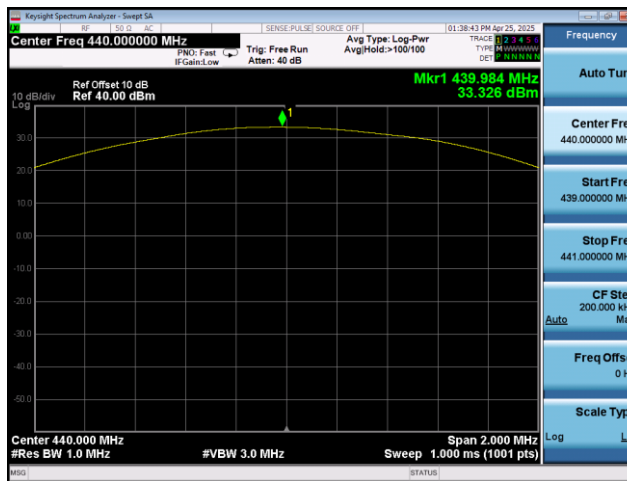
Test plots as follows:

GMSK 2W 12.5KHz Channel Spacing: Transmitter Power

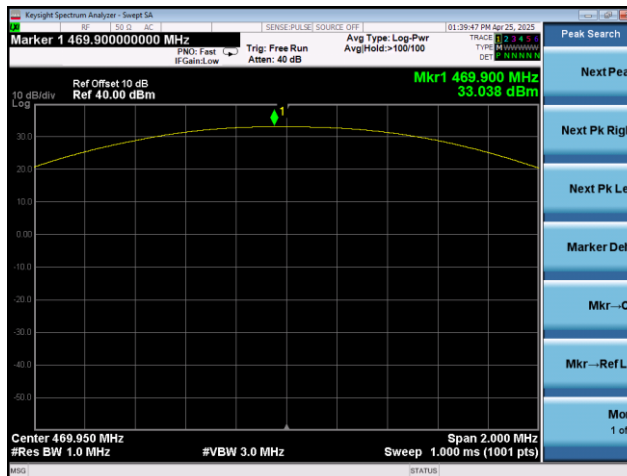
Low: 410.050MHz



Mid: 440.000MHz

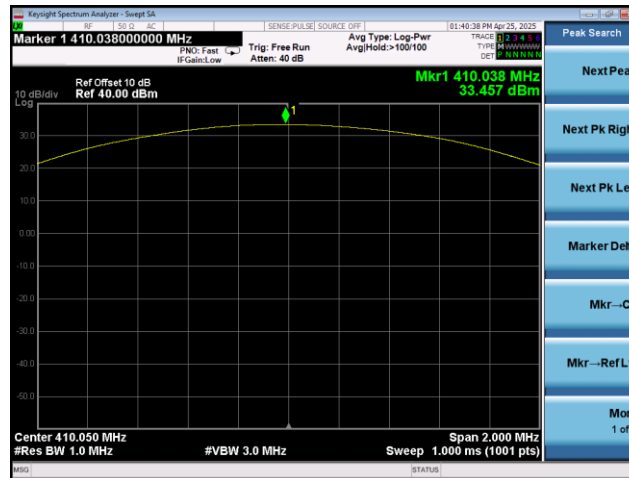


High: 470.00MHz

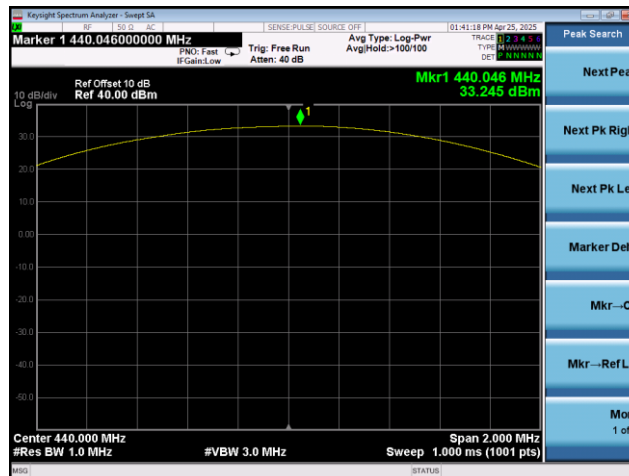


GMSK 2W 25KHz Channel Spacing: Transmitter Power

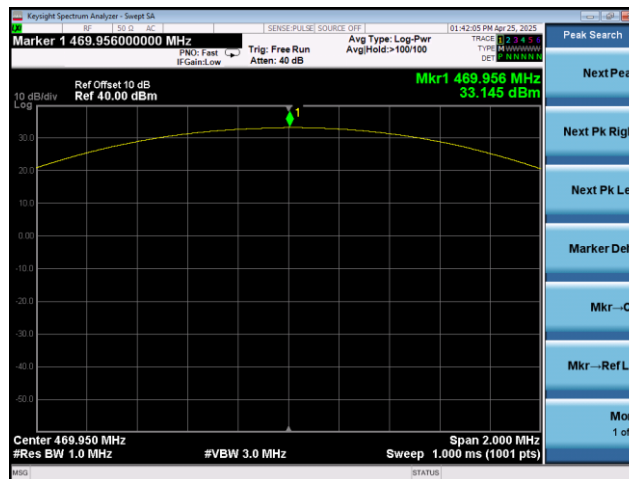
Low: 410.050MHz



Mid: 440.000MHz



High: 470.00MHz



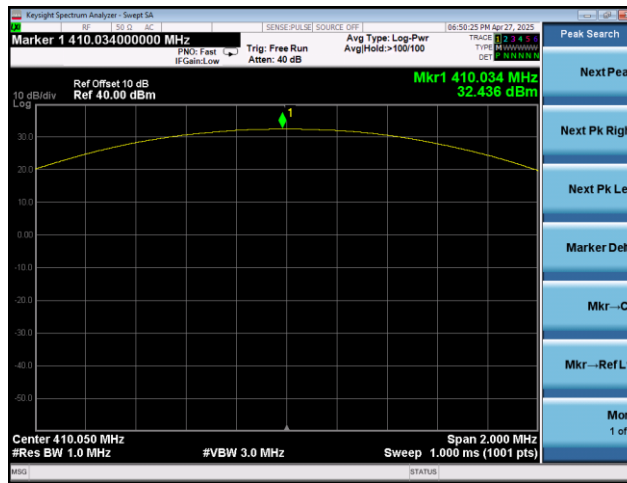
4FSK mode (2W):						
Channel spacing (KHz)	Frequency (MHz)	Maximum Conducted Output Power(Peak) (dBm)	Maximum ERP (dBm)	Stated ERP Power (dBm)	Conducted Output Power Limit (dBm)	Result
6.25	410.050	32.436	34.286	35	33.01±1	PASS
12.5	410.050	32.993	34.843	35	33.01±1	PASS
25	410.050	32.918	34.768	35	33.01±1	PASS
6.25	440.000	32.567	34.417	35	33.01±1	PASS
12.5	440.000	32.931	34.781	35	33.01±1	PASS
25	440.000	32.806	34.656	35	33.01±1	PASS
6.25	469.950	32.954	34.804	35	33.01±1	PASS
12.5	469.950	32.775	34.625	35	33.01±1	PASS
25	469.950	32.817	34.667	35	33.01±1	PASS

Note: 1. Maximum ERP= Maximum Conducted Output Power(Peak) + Antenna Gain – 2.15dB

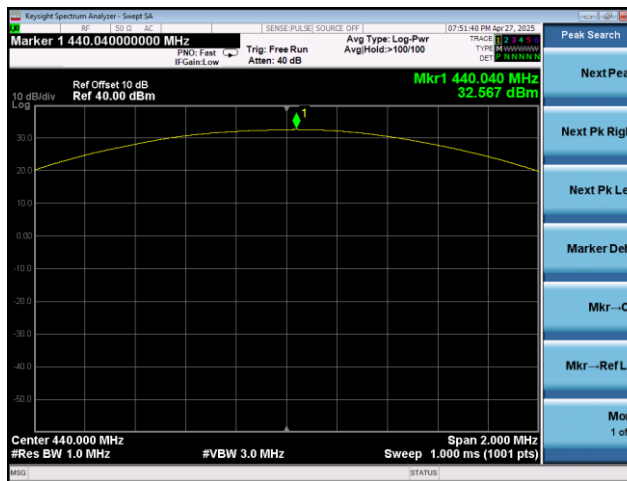
Test plots as follows:

4FSK 2W 6.25KHz Channel Spacing: Transmitter Power

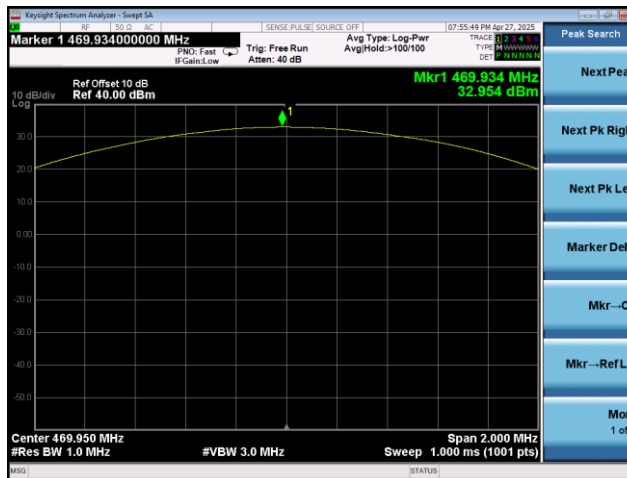
Low: 410.050MHz



Mid: 440.000MHz

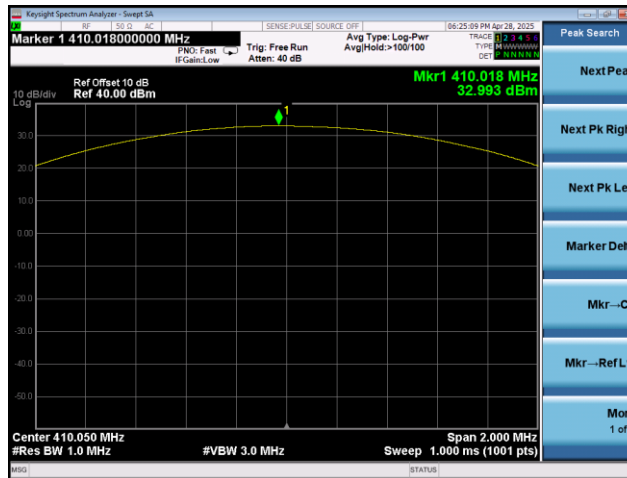


High: 470.00MHz

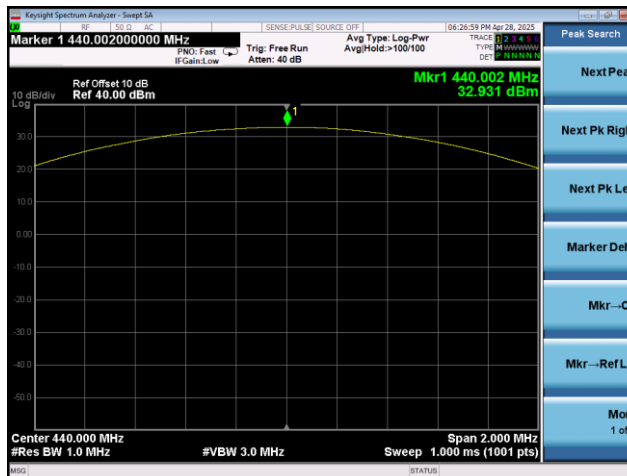


4FSK 2W 12.5KHz Channel Spacing: Transmitter Power

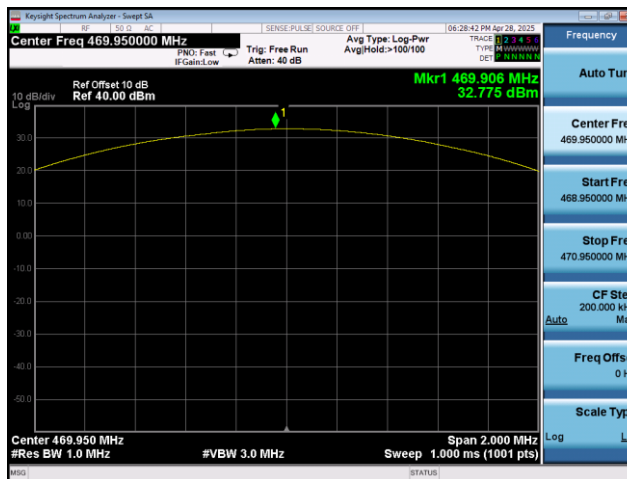
Low: 410.050MHz



Mid: 440.000MHz

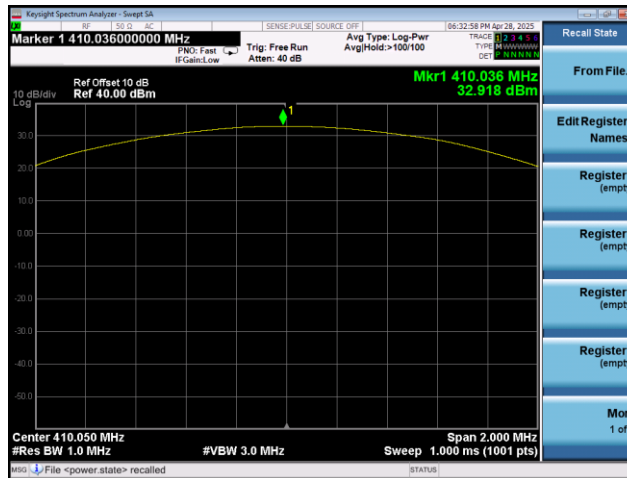


High: 470.00MHz

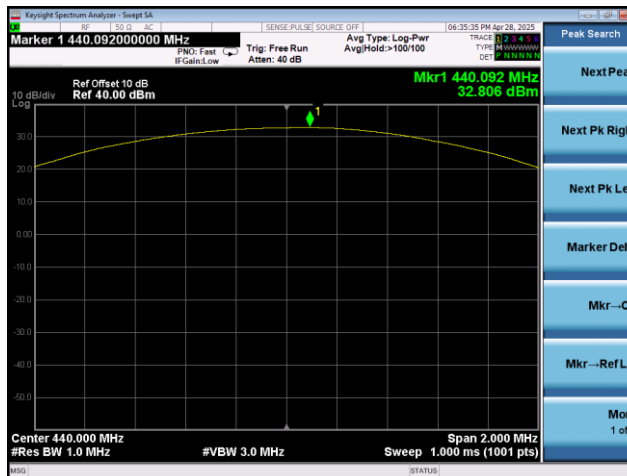


4FSK 2W 25KHz Channel Spacing: Transmitter Power

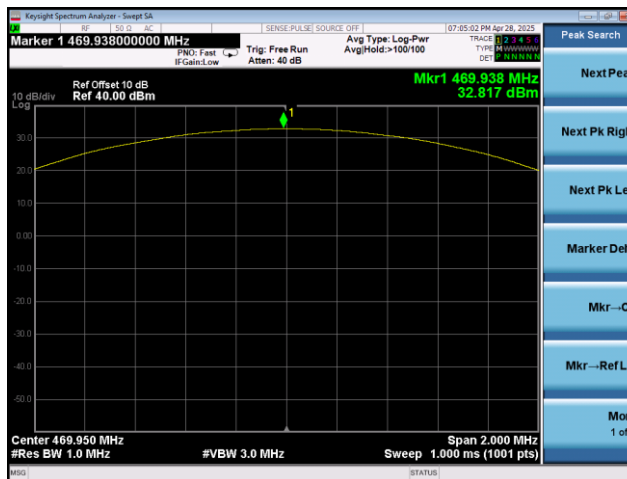
Low: 410.050MHz



Mid: 440.000MHz



High: 470.00MHz



3.2. Occupied Bandwidth and Emission Mask

3.2.1. Test Specification

Test Requirement:	FCC Part 90.209, FCC Part 90.210
Test Method:	FCC part 2.1049, ANSI C63.26-2015 Section 5.4
Test Setup:	 The diagram illustrates the test setup. On the left is a green rectangular box representing the Spectrum Analyzer, with a blue screen and two small circular ports. A grey cable connects these ports to a small white rectangular box in the center. Another grey cable connects the right side of the white box to a yellow rectangular box on the right, which represents the EUT (Equipment Under Test) and has a single circular port. Below the Spectrum Analyzer box is the label 'Spectrum Analyzer', and below the yellow box is the label 'EUT'.
Test Procedure:	The resolution bandwidth of the spectrum analyzer was set at 300 Hz and the spectrum was recorded in the Frequency band $\pm 50\text{KHz}$ from the carrier frequency for Occupied Bandwidth, the resolution bandwidth of the spectrum analyzer was set at 100 Hz and the spectrum was recorded in the Frequency band $\pm 100\text{KHz}$ from the carrier frequency for Emission Mask.
Test Result:	PASS

3.2.2. Test Data

Occupied Bandwidth:

GMSK mode (2W) 12.5KHz Channel Spacing:					
Channel	Frequency (MHz)	26dB Bandwidth (KHz)	99% Occupied Bandwidth (KHz)	99% Occupied Bandwidth Limit (KHz)	Result
Low	410.050	10.32	8.263	11.25	PASS
Mid	440.000	10.32	8.336	11.25	PASS
High	469.950	10.31	8.211	11.25	PASS

GMSK mode (2W) 25KHz Channel Spacing:					
Channel	Frequency (MHz)	26dB Bandwidth (KHz)	99% Occupied Bandwidth (KHz)	99% Occupied Bandwidth Limit (KHz)	Result
Low	410.050	11.11	9.807	20	PASS
Mid	440.000	11.03	9.763	20	PASS
High	469.950	11.09	9.788	20	PASS

4FSK mode (2W) 6.25KHz Channel Spacing:

Channel	Frequency (MHz)	26dB Bandwidth (KHz)	99% Occupied Bandwidth (KHz)	99% Occupied Bandwidth Limit (KHz)	Result
Low	410.050	5.191	3.683	6	PASS
Mid	440.000	5.281	3.726	6	PASS
High	469.950	5.181	3.685	6	PASS

4FSK mode (2W) 12.5KHz Channel Spacing:

Channel	Frequency (MHz)	26dB Bandwidth (KHz)	99% Occupied Bandwidth (KHz)	99% Occupied Bandwidth Limit (KHz)	Result
Low	410.050	9.693	7.310	11.25	PASS
Mid	440.000	8.951	7.314	11.25	PASS
High	469.950	9.725	7.311	11.25	PASS

4FSK mode (2W) 25KHz Channel Spacing:

Channel	Frequency (MHz)	26dB Bandwidth (KHz)	99% Occupied Bandwidth (KHz)	99% Occupied Bandwidth Limit (KHz)	Result
Low	410.050	16.03	14.524	20	PASS
Mid	440.000	16.02	14.532	20	PASS
High	469.950	16.02	14.517	20	PASS

Emission Mask:

GMSK mode (2W) 12.5KHz Channel Spacing:				
Channel	Frequency (MHz)	Applicable Mask	RBW	Result
Low	410.050	D	100Hz	PASS
Mid	440.000	D	100Hz	PASS
High	469.950	D	100Hz	PASS

GMSK mode (2W) 25KHz Channel Spacing:				
Channel	Frequency (MHz)	Applicable Mask	RBW	Result
Low	410.050	C	300Hz	PASS
Mid	440.000	C	300Hz	PASS
High	469.950	C	300Hz	PASS

4FSK mode (2W) 6.25KHz Channel Spacing:

Channel	Frequency (MHz)	Applicable Mask	RBW	Result
Low	410.050	E	100Hz	PASS
Mid	440.000	E	100Hz	PASS
High	469.950	E	100Hz	PASS

4FSK mode (2W) 12.5KHz Channel Spacing:

Channel	Frequency (MHz)	Applicable Mask	RBW	Result
Low	410.050	D	100Hz	PASS
Mid	440.000	D	100Hz	PASS
High	469.950	D	100Hz	PASS

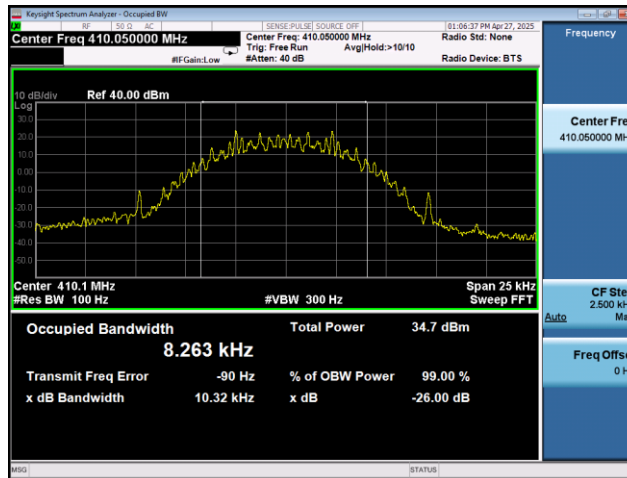
4FSK mode (2W) 25KHz Channel Spacing:

Channel	Frequency (MHz)	Applicable Mask	RBW	Result
Low	410.050	C	300Hz	PASS
Mid	440.000	C	300Hz	PASS
High	469.950	C	300Hz	PASS

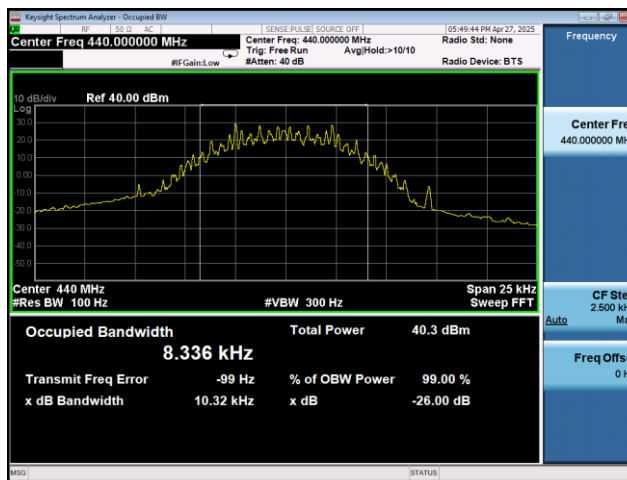
Test plots as follows:

GMSK mode (2W) 12.5KHz Channel Spacing: Occupied Bandwidth

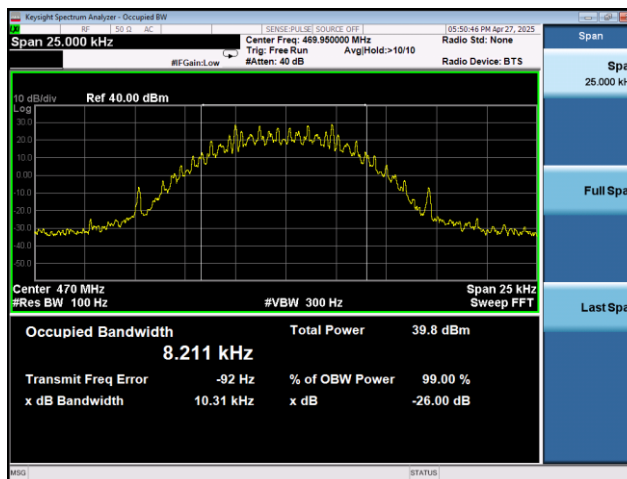
Low: 410.050MHz



Mid: 440.000MHz



High: 470.00MHz



GMSK mode (2W) 25KHz Channel Spacing: Occupied Bandwidth

Low: 410.050MHz



Mid: 440.000MHz



High: 469.850MHz



4FSK mode (2W) 6.25KHz Channel Spacing: Occupied Bandwidth

Low: 410.050MHz



Mid: 440.000MHz

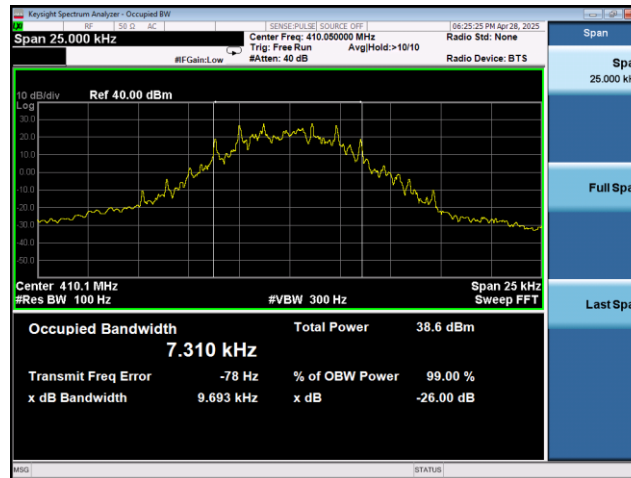


High: 470.00MHz



4FSK mode (2W) 12.5KHz Channel Spacing: Occupied Bandwidth

Low: 410.050MHz



Mid: 440.000MHz

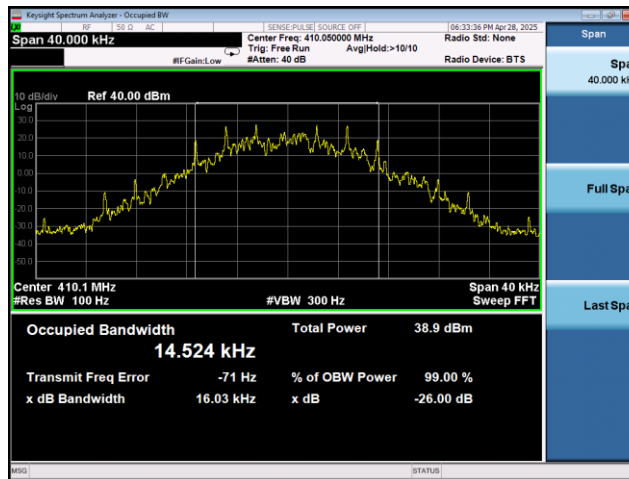


High: 469.850MHz

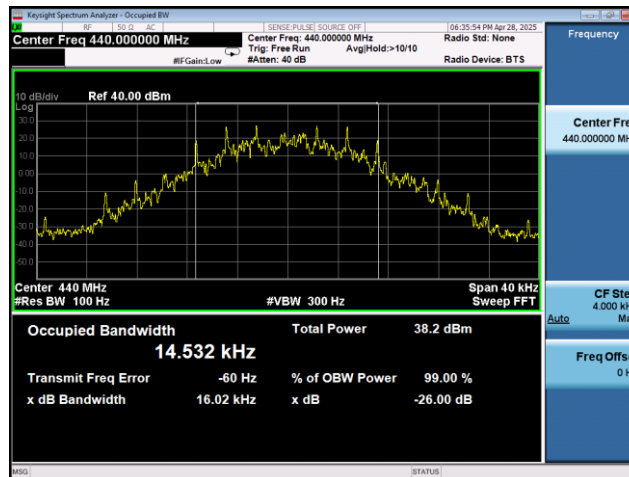


4FSK mode (2W) 25KHz Channel Spacing: Occupied Bandwidth

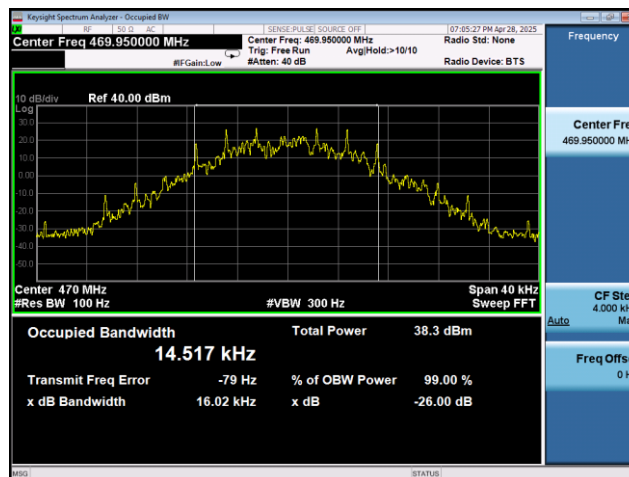
Low: 410.050MHz



Mid: 440.000MHz

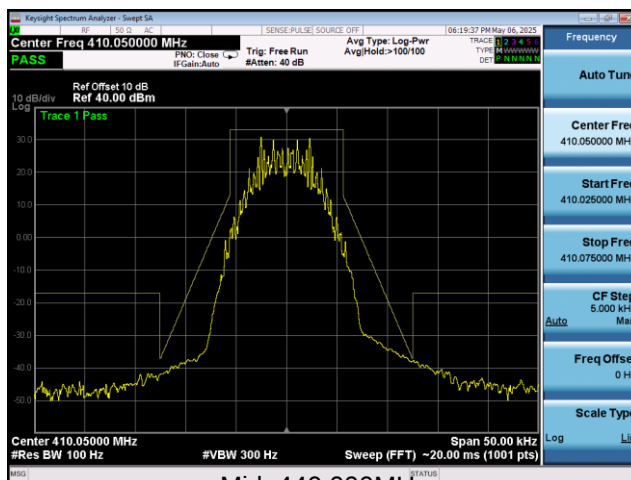


High: 469.850MHz

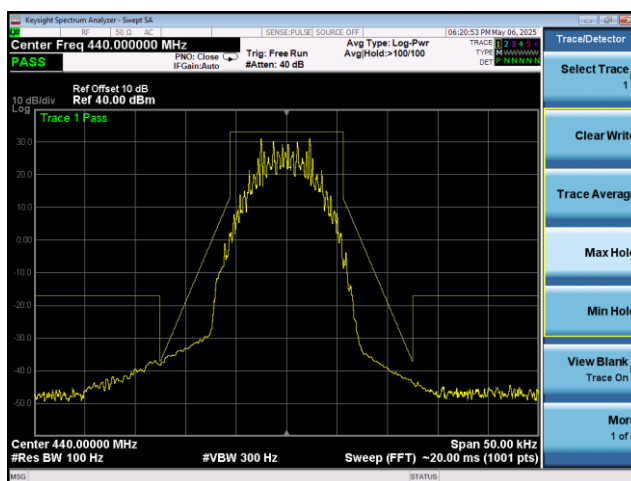


GMSK mode (2W) 12.5KHz Channel Spacing: Emission Mask

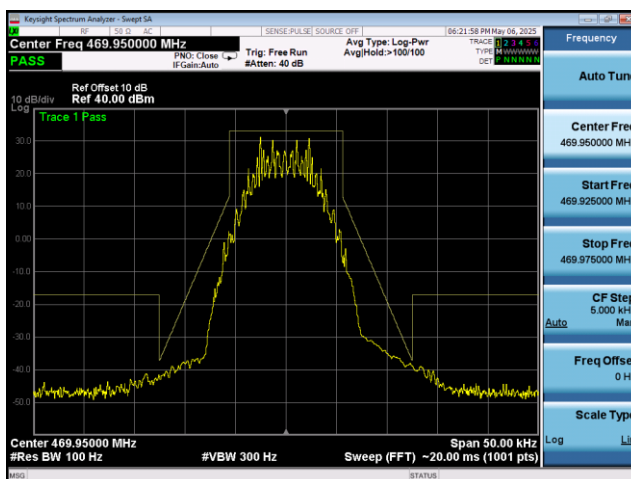
Low: 410.050MHz



Mid: 440.000MHz

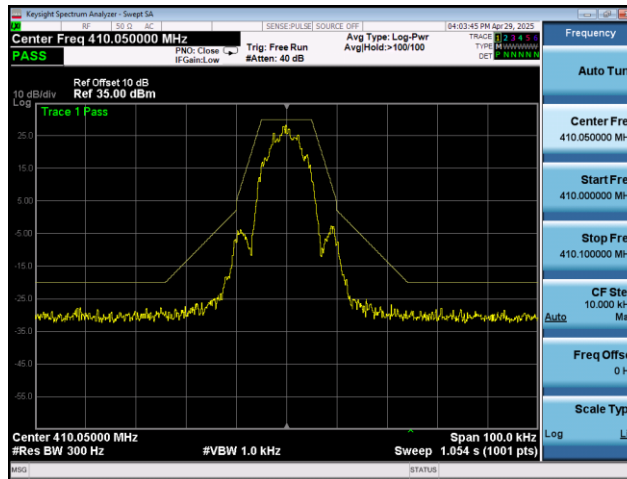


High: 469.950MHz

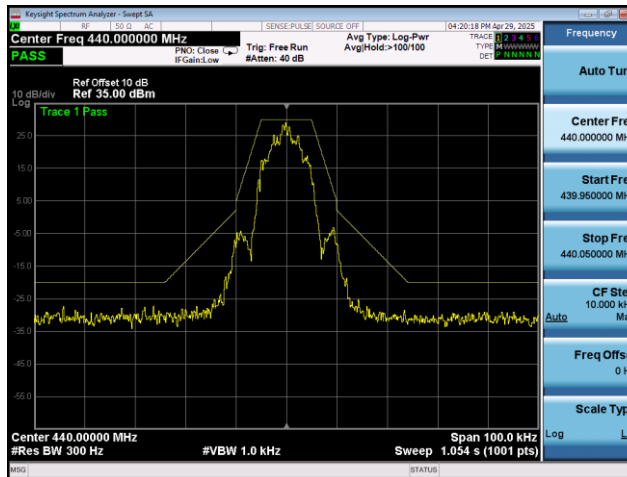


GMSK mode (2W) 25KHz Channel Spacing: Emission Mask

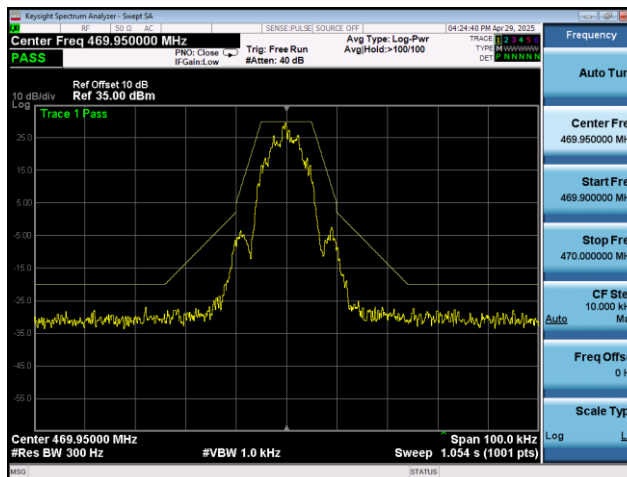
Low: 410.050MHz



Mid: 440.000MHz

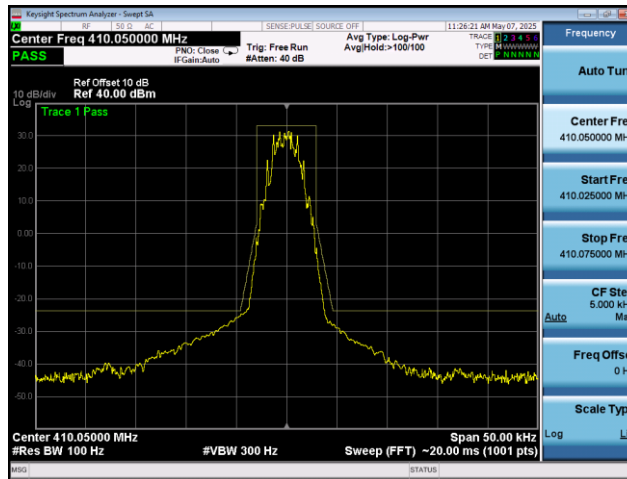


High: 469.950MHz

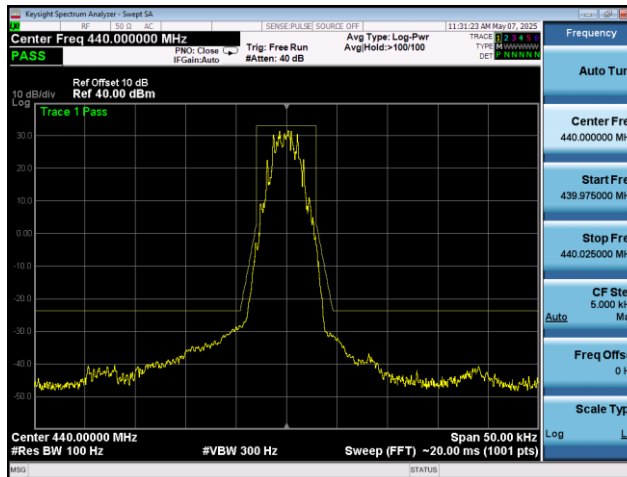


4FSK mode (2W) 6.25KHz Channel Spacing: Emission Mask

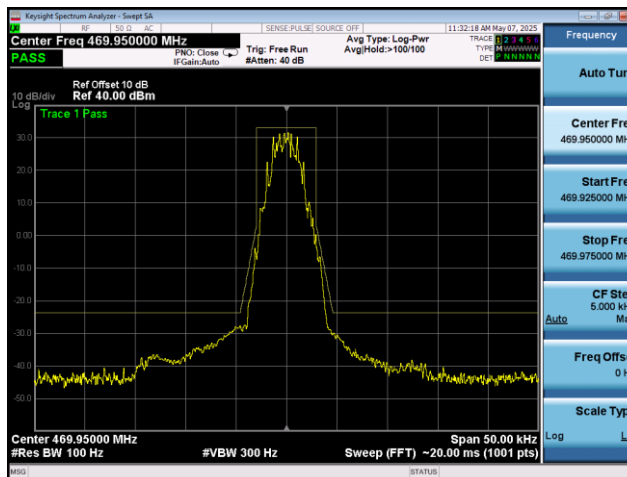
Low: 410.050MHz



Mid: 440.000MHz

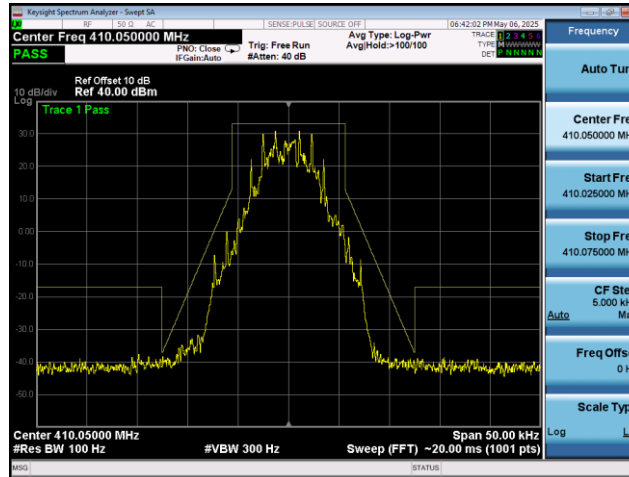


High: 469.950MHz

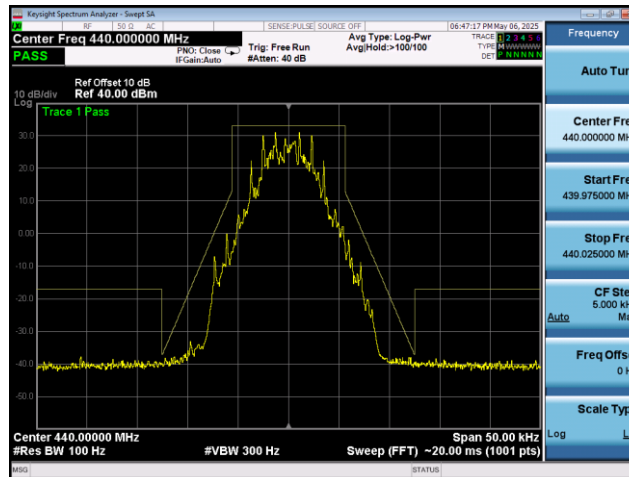


4FSK mode (2W) 12.5KHz Channel Spacing: Emission Mask

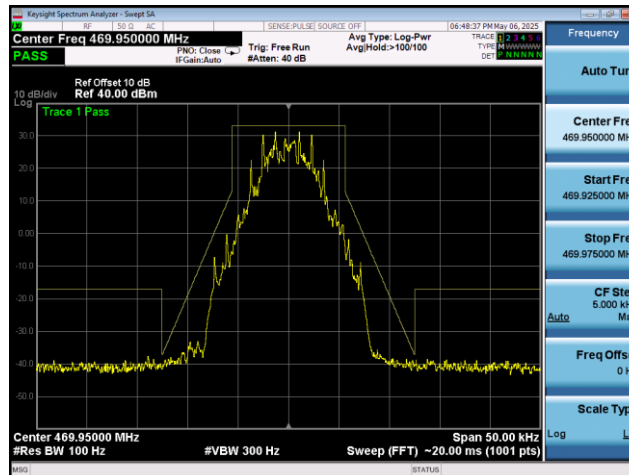
Low: 410.050MHz



Mid: 440.000MHz

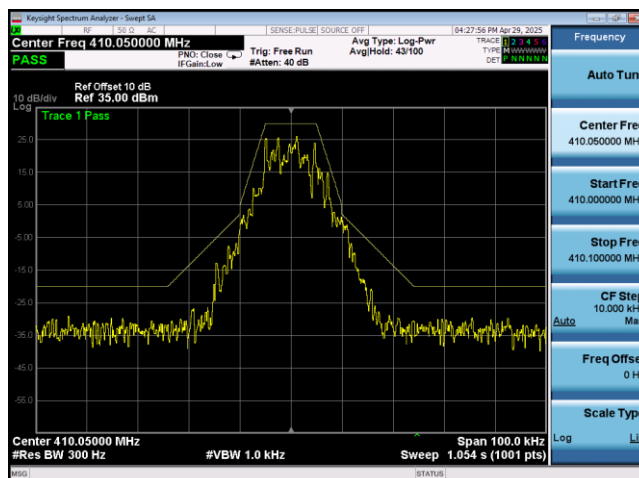


High: 469.950MHz

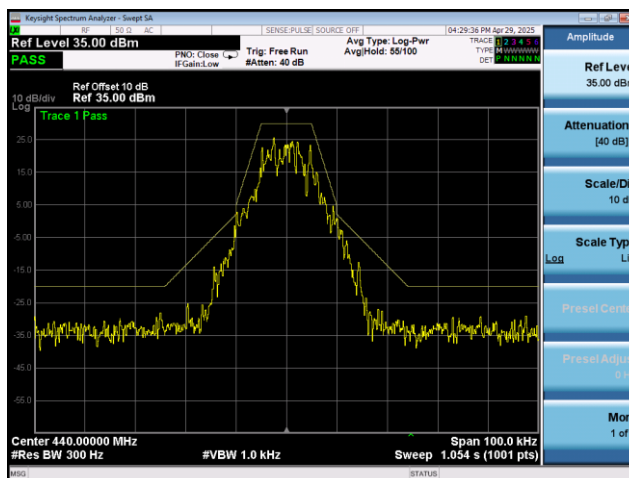


4FSK mode (2W) 25KHz Channel Spacing: Emission Mask

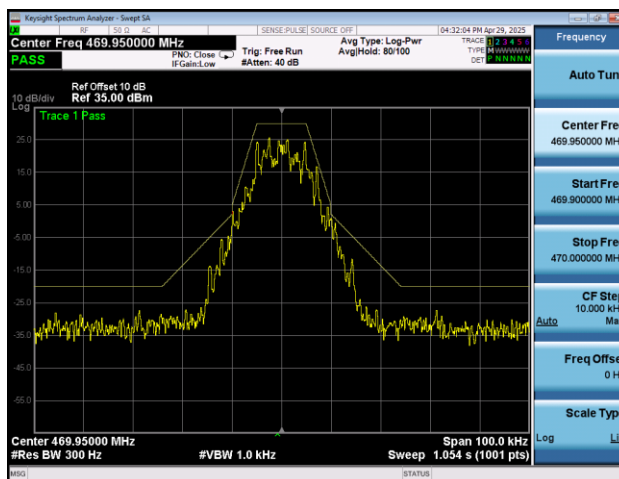
Low: 410.050MHz



Mid: 440.000MHz

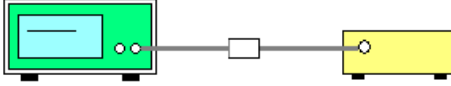


High: 469.950MHz



3.3. Spurious Emissions(conducted)

3.3.1. Test Specification

Test Requirement:	FCC Part 90.210
Test Method:	FCC part 2.1051, ANSI C63.26-2015 Section 5.7
Test Setup:	 Spectrum Analyzer EUT
Test Limit:	Modulation Type: GMSK FCC Part 22.359, 74.462, 80.211 and 90.210: For 6.25 bandwidth: On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 4.6 kHz at least: $55 + 10 \log (P)$ or 65 dB, whichever is the lesser attenuation. $55 + 10 \log (P_{\text{watts}}) = 55 + 10 \log (2) = 58.010 \text{ dB}$ Note: In general, the worst case attenuation requirement shown above was applied. Calculation: Limit (dBm) = $EL - 55 - 10 \log_{10} (TP)$ Notes: EL is the emission level of the Output Power expressed in dBm, In this application, the EL is 33.01 dBm for High rated power. Limit (dBm) = $33.01 - 55 - 10 \log (2) = -25 \text{ dBm}$ For 12.5 bandwidth: 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. $50 + 10 \log (P_{\text{watts}}) = 50 + 10 \log (2) = 53.010 \text{ dB}$ Note: In general, the worst case attenuation requirement shown above was applied. Calculation: Limit (dBm) = $EL - 50 - 10 \log_{10} (TP)$ Notes: EL is the emission level of the Output Power expressed in dBm, In this application, the EL is 33.01 dBm for High rated power. Limit (dBm) = $33.01 - 50 - 10 \log (2) = -20 \text{ dBm}$ For 25 kHz bandwidth: On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 62.5 kHz at least: $43 + 10 \log (P_{\text{watts}}) = 43 + 10 \log (2) = 46.010 \text{ dB}$ Note: In general, the worst case attenuation requirement shown above was applied. Calculation: Limit (dBm) = $EL - 43 - 10 \log_{10} (TP)$ In this application, the EL is 33.01 dBm for High rated power. Limit (dBm) = $33.01 - 43 - 10 \log (2) = -13 \text{ dBm}$ Note: 1. In general, the worst case attenuation requirement shown above was applied. For emission inside from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of channel spacing, emission

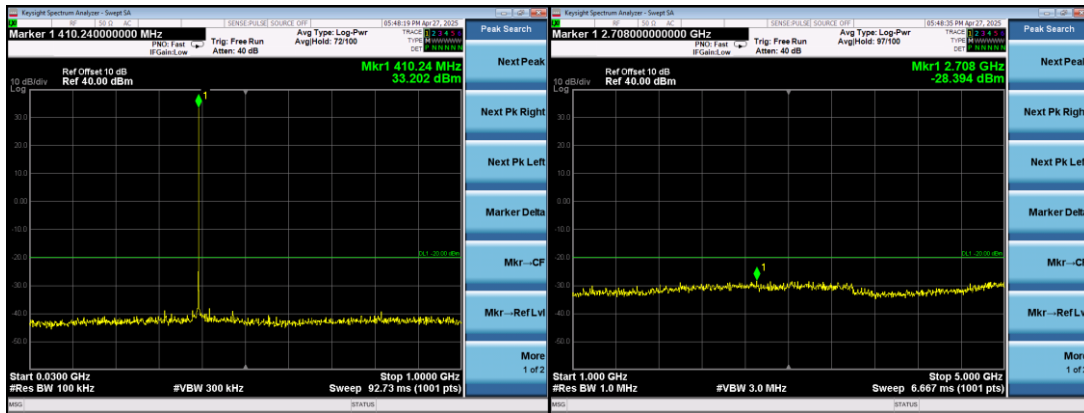
	mask limit should be compliant. 2. The measurement frequency range from 9 KHz to 5 GHz. 3. *** means that the emission level is too low to be measured or at least 20 dB down than the limit. 4. ERP for below 1GHz and EIRP above 1GHz.
Test Result:	PASS

3.3.2. Test Data

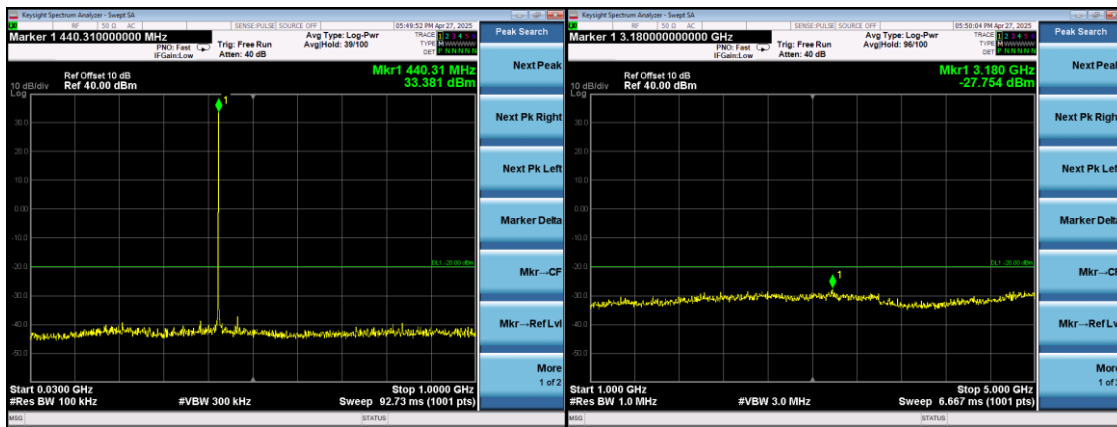
Test plots as follows:

GMSK 12.5KHz Channel Spacing:

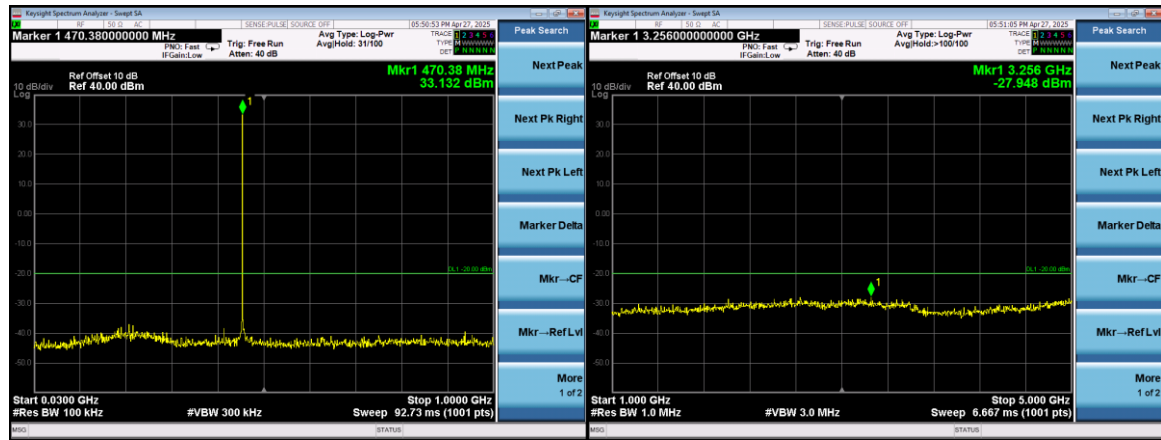
Low: 410.050MHz



Mid: 440.000MHz

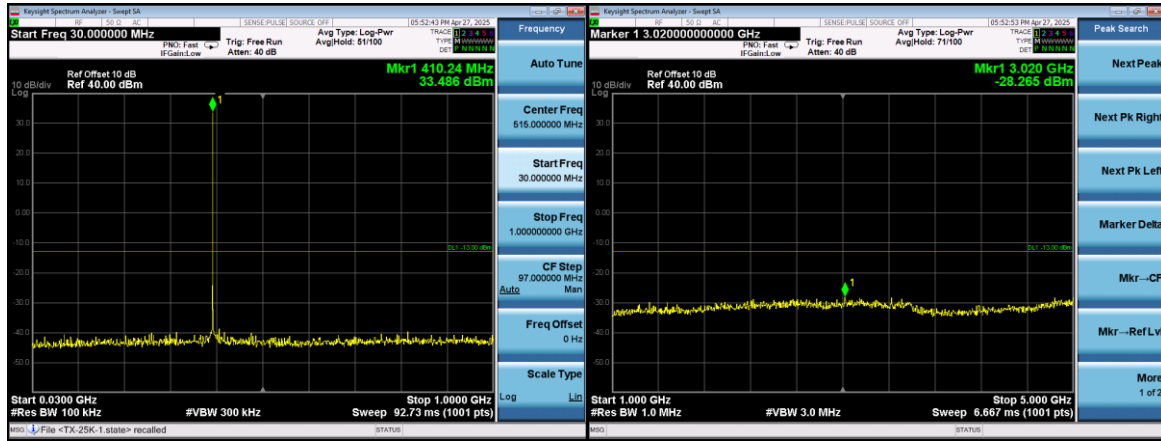


High: 469.950MHz

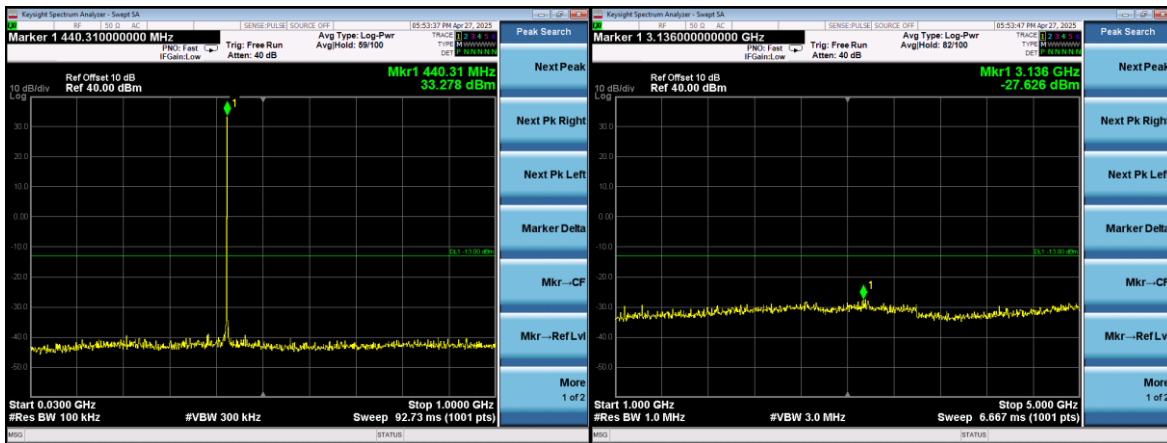


GMSK 25KHz Channel Spacing:

Low: 410.050MHz



Mid: 440.000MHz



High: 469.950MHz

