



FCC REPORT

Applicant	:	Shanghai EFIX Geomatics Co.,Ltd.
Address of Applicant	:	Room 1137, Area D, 11th Floor, Building 1, No. 158, Shuanglian Road, Qingpu District, Shanghai
Manufacturer	:	Shanghai EFIX Geomatics Co.,Ltd.
Address of Manufacturer	:	Room 1137, Area D, 11th Floor, Building 1, No. 158, Shuanglian Road, Qingpu District, Shanghai
Equipment under Test	:	Geodetic GNSS Receiver
Model No.	:	F6
FCC ID	:	2A3MU-F61W
Test Standard(s)	:	FCC CFR Title 47 Part 90, FCC CFR Title 47 Part 2, ANSI TIA-603-E:2016
Report No.	:	A2503163-C07-R04
Issue Date	:	2025/06/10
Issued By	:	Shenzhen Alpha Product Testing Co., Ltd. Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen City, Guangdong Province, P.R. China.

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Test Report Declare

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Equipment under Test	:	Geodetic GNSS Receiver
Model No.	:	F6
Trademark	:	

Test Standard Used:

FCC CFR Title 47 Part 90, FCC CFR Title 47 Part 2, ANSI TIA-603-E:2016

We Declare:

The equipment described above is tested by Shenzhen Alpha Product Testing Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. 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.

Report No.:	A2503163-C07-R04		
Date of Receipt:	2025/05/08	Date of Test:	2025/05/08 - 2025/05/30

Prepared By:

Yannis Wen

Yannis Wen/Engineer

Approved By:

Jack Xu

Jack Xu/EMC Manager



Note: 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.

Revision History

Rev.	Revisions	Issue Date	Revised By
V0	Initial issue	2025/06/10	Yannis Wen

1. Summary of Test Results

No.	Test Parameter	Clause No.	Result
1	Transmitter Power (Conducted)	FCC CFR Title 47 Part 90.205	Pass
2	Occupied Bandwidth and Emission Mask	FCC CFR Title 47 Part 90.209, FCC CFR Title 47 Part 90.210	Pass
3	Spurious Emissions(conducted)	FCC CFR Title 47 Part 90.210	Pass
4	Radiated Spurious Emission	FCC CFR Title 47 Part 90.210	Pass
5	Transient Frequency Behavior	FCC CFR Title 47 Part 90.214	Pass
6	Behavior Frequency Stability	FCC CFR Title 47 Part 90.213	Pass
7	Adjacent Channel Power	FCC CFR Title 47 Part 90.221	Pass
8	Modulation Characteristic	FCC CFR Title 47 Part 90.207, FCC CFR Title 47 Part 2.1047(a), FCC CFR Title 47 Part 2.1047(b)	N/A

Note: 1.N/A is an abbreviation for Not Applicable, and means this item is not applicable for this device or no need to test according to standard.

2. Decision rules for the conclusion of this test report: decision by actual test data without considering measurement uncertainty.

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

2. General Test Information

2.1. Description of EUT

EUT Name	: Geodetic GNSS Receiver
Model Number	: F6
Difference of model number	: /
Power Supply	: DC 7.2V from battery, DC 5V from adapter
Hardware Version	: V1.3.0
Software Version	: V1.0

Radio Specification	: UHF
Operation Frequency	: 410MHz to 470MHz
Conducted Power	: 0.5W, 1W
Channel spacing	: 12.5KHz, 25KHz
Modulation	: GMSK
Antenna Type	: Whip Antenna
Max Antenna Gain(dBi)	: 2dBi (Antenna information is provided by applicant.)

Note: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

“☒” means to be chosen or applicable; “☐” means don't to be chosen or not applicable; This note applies to entire report.

2.2. Accessories of EUT

Accessories	Manufacturer	Model number	Description
/	/	/	/

2.3. Block diagram of EUT configuration for test



2.4. Test mode description

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

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

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

2.5. Deviations of test standard

No deviation.

2.6. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Items	Required
Temperature range:	15-35°C
Humidity range:	25-75%
Pressure range:	86-106kPa

Note: The specific temperature and humidity information of each test item refers to the temperature and humidity record in the corresponding test data.

2.7. Test laboratory

Shenzhen Alpha Product Testing Co., Ltd.

Add.: Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen City, Guangdong Province, P.R. China.

Tel.: 4008-3008-95, Website: <http://www.a-lab.cn>, Email: service@a-lab.cn

CNAS Accreditation No. L7472; A2LA Accreditation Number: 4762.01

FCC Designation Number: CN1182, Test Firm Registration Number: 203110

Innovation, Science and Economic Development Canada Site Registration Number: 12135A

2.8. Measurement uncertainty

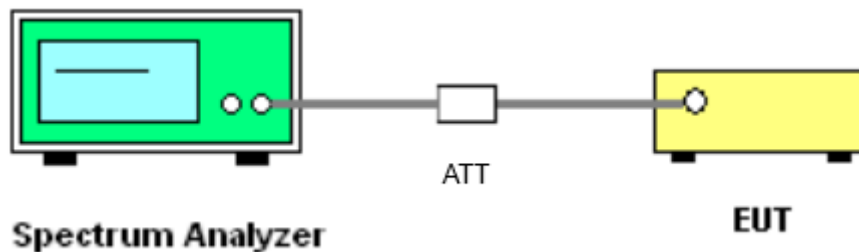
Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.74dB(Polarize: V)
	3.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for 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%

3. Transmitter Power (Conducted)

3.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal Due To
CMW500	ROHDE&SCH WARZ	CMW500	Aa-EE073	2024/08/08	2025/08/07
Spectrum analyzer	ROHDE&SCH WARZ	FSV40-N	Aa-EE081	2024/08/08	2025/08/07
Signal Analyzer	Agilent	N9020A	Aa-EE039	2024/08/08	2025/08/07
Power Sensor	Agilent	E9300A	Aa-EE046	2024/08/08	2025/08/07
Vector Signal Generator	Agilent	N5182A	Aa-EE040	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE071	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE070	2024/08/08	2025/08/07

3.2. Block diagram of test setup



3.3. Limits

Please refer section FCC Part 90.205

3.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

3.5. Test procedure

- Connect the equipment as illustrated.
- Turn on the Spectrum Analyzer
- Record value

3.6. Test result

Test Site: RF Laboratory	Test Date: 2025/05/26--2025/05/27
Condition: 24.2°C,56%RH,101kPa	Test Engineer: Yannis Wen
Memo: /	

EUT Name: Geodetic GNSS Receiver	EUT Model: F6
Sample No.: A2503163-S0001	Test Mode: All modes
Power supply: DC 7.2V from battery	Memo: /

/

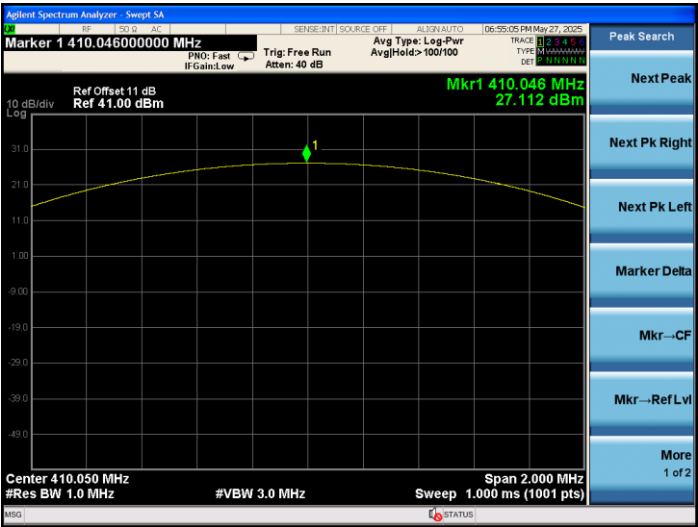
3.7. Test data

GMSK mode (0.5W):						
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	27.655	27.505	29	26.99±1	PASS
25	410.050	27.717	27.567	29	26.99±1	PASS
12.5	440.000	27.525	27.375	29	26.99±1	PASS
25	440.000	27.447	27.297	29	26.99±1	PASS
12.5	469.950	26.985	26.835	29	26.99±1	PASS
25	469.950	26.964	26.814	29	26.99±1	PASS

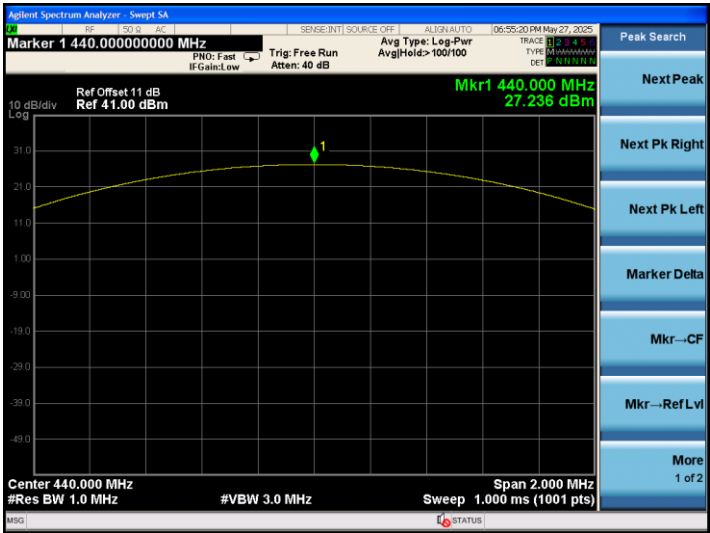
GMSK mode (1W):						
Channel spacing (KHz)	Frequency (MHz)	Maximum Conducted Output Power(Peak) (dBm)	Maximum ERP (dBm)	Stated ERP Power (dBm)	Conducted Output Power Limit (dBm)	Result
12.5	410.050	30.688	30.538	32	30±1	PASS
25	410.050	30.827	30.677	32	30±1	PASS
12.5	440.000	29.772	29.622	32	30±1	PASS
25	440.000	29.902	29.752	32	30±1	PASS
12.5	469.950	30.733	30.583	32	30±1	PASS
25	469.950	30.813	30.663	32	30±1	PASS

Note: 1. $\text{Maximum ERP} = \text{Maximum Conducted Output Power(Peak)} + \text{Antenna Gain} - 2.15\text{dB}$

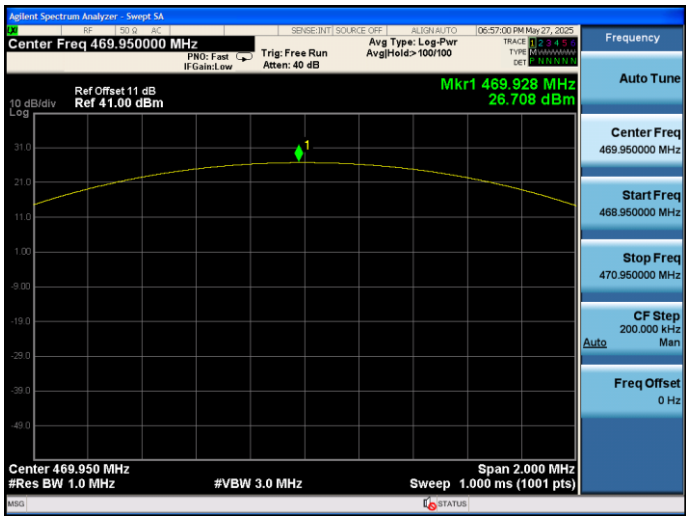
Test plots as follows:
GMSK 0.5W 12.5KHz Channel Spacing: Transmitter Power
Low: 410.050MHz



Mid: 440.000MHz

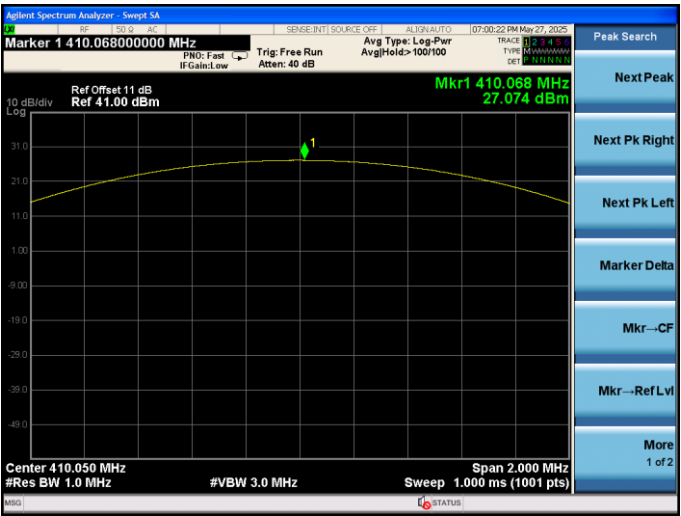


High: 470.00MHz

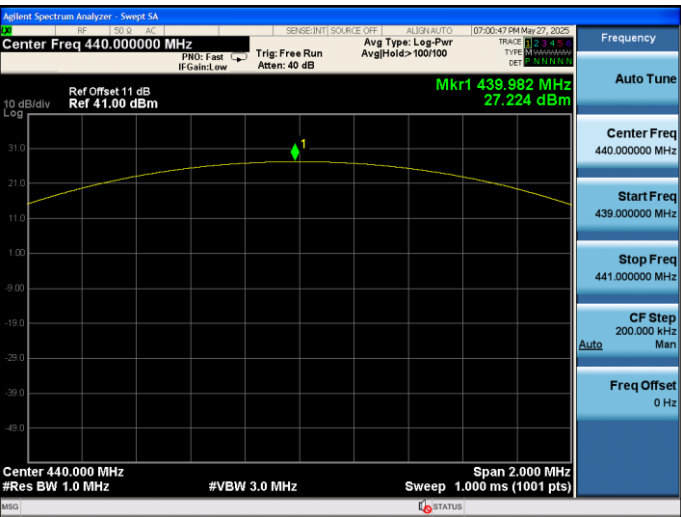


GMSK 0.5W 25KHz Channel Spacing: Transmitter Power

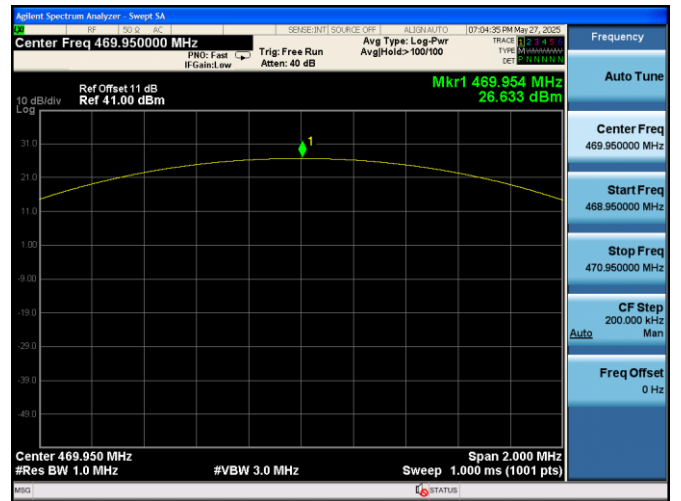
Low: 410.050MHz



Mid: 440.000MHz

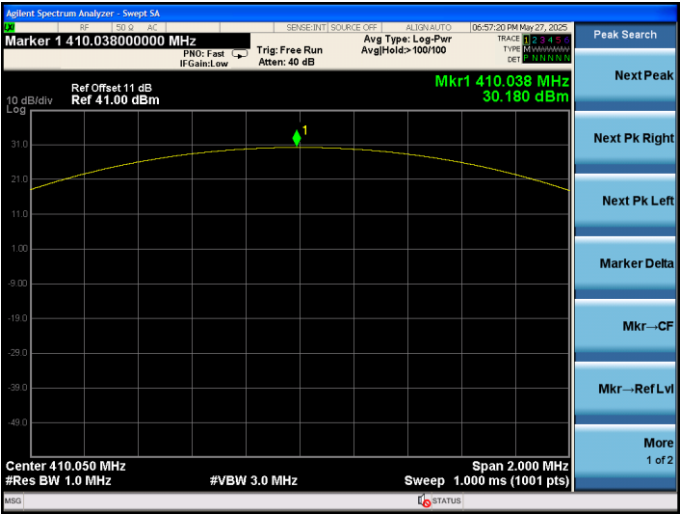


High: 470.00MHz

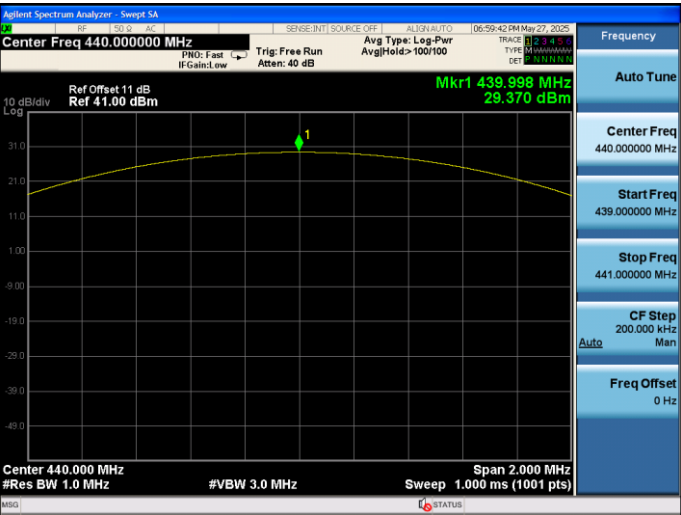


GMSK 1W 12.5KHz Channel Spacing: Transmitter Power

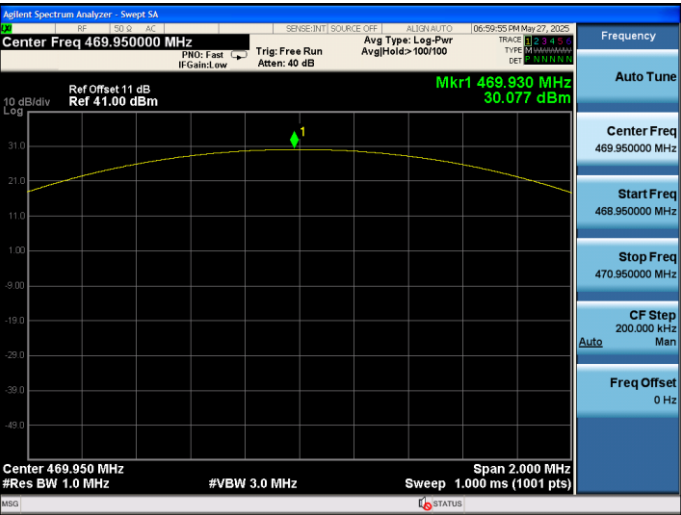
Low: 410.050MHz



Mid: 440.000MHz

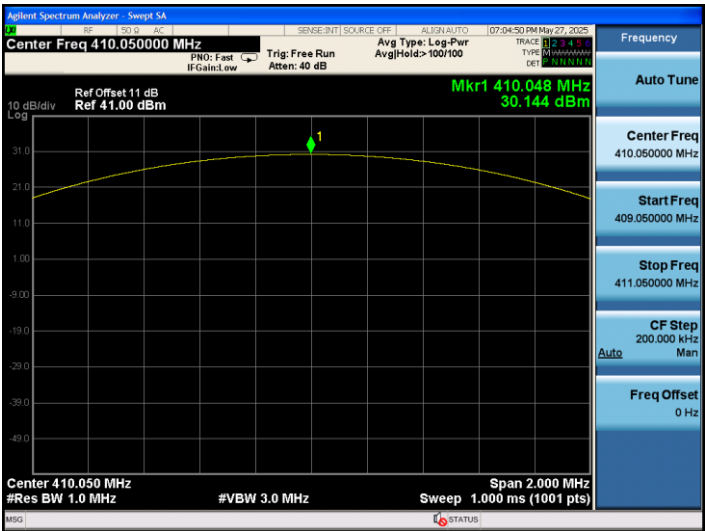


High: 470.00MHz

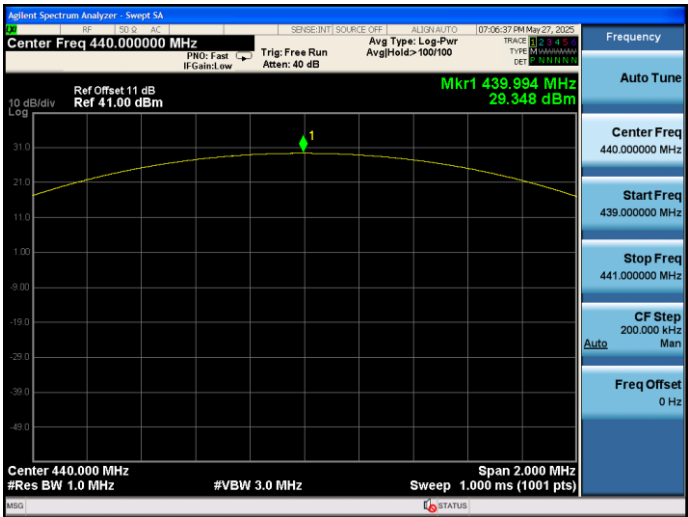


GMSK 1W 25KHz Channel Spacing: Transmitter Power

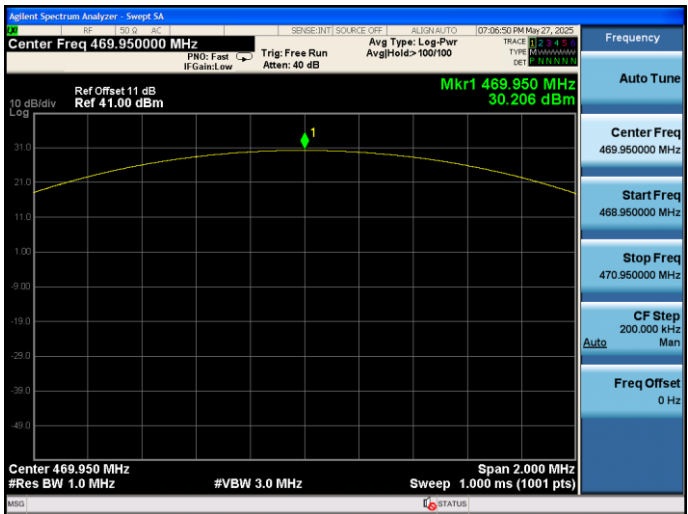
Low: 410.050MHz



Mid: 440.000MHz



High: 470.00MHz

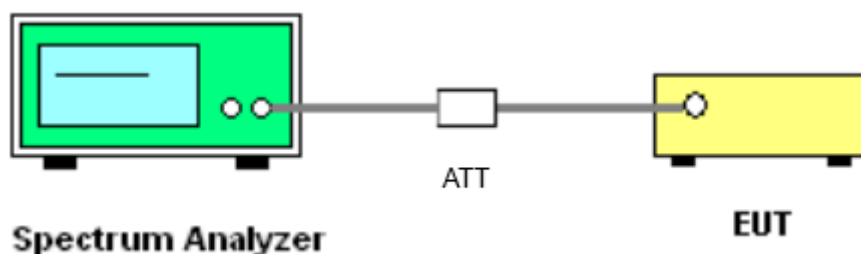


4. Occupied Bandwidth and Emission Mask

4.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal Due To
CMW500	ROHDE&SCH WARZ	CMW500	Aa-EE073	2024/08/08	2025/08/07
Spectrum analyzer	ROHDE&SCH WARZ	FSV40-N	Aa-EE081	2024/08/08	2025/08/07
Signal Analyzer	Agilent	N9020A	Aa-EE039	2024/08/08	2025/08/07
Power Sensor	Agilent	E9300A	Aa-EE046	2024/08/08	2025/08/07
Vector Signal Generator	Agilent	N5182A	Aa-EE040	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE071	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE070	2024/08/08	2025/08/07

4.2. Block diagram of test setup



4.3. Limits

Please refer section FCC Part 90.209& FCC Part 90.210

4.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

4.5. 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.

4.6. Test result

Test Site: RF Laboratory	Test Date: 2025/05/26--2025/05/27
Condition: 24.2°C,56%RH,101kPa	Test Engineer: Yannis Wen
Memo: /	

EUT Name: Geodetic GNSS Receiver	EUT Model: F6
Sample No.: A2503163-S0001	Test Mode: All modes
Power supply: DC 7.2V from battery	Memo: /

/

4.7. Test data**Occupied Bandwidth:**

GMSK mode (0.5W) 12.5KHz Channel Spacing:

Channel	Frequency (MHz)	26dB Bandwidth (KHz)	99% Occupied Bandwidth (KHz)	99% Occupied Bandwidth Limit (KHz)	Result
Low	410.050	7.219	5.928	11.25	PASS
Mid	440.000	6.547	5.937	11.25	PASS
High	469.950	6.582	5.949	11.25	PASS

GMSK mode (0.5W) 25KHz Channel Spacing:

Channel	Frequency (MHz)	26dB Bandwidth (KHz)	99% Occupied Bandwidth (KHz)	99% Occupied Bandwidth Limit (KHz)	Result
Low	410.050	11.98	11.209	20	PASS
Mid	440.000	12.08	11.189	20	PASS
High	469.950	12.07	11.194	20	PASS

GMSK mode (1W) 12.5KHz Channel Spacing:

Channel	Frequency (MHz)	26dB Bandwidth (KHz)	99% Occupied Bandwidth (KHz)	99% Occupied Bandwidth Limit (KHz)	Result
Low	410.050	6.516	5.950	11.25	PASS
Mid	440.000	6.450	5.961	11.25	PASS
High	469.950	6.434	5.951	11.25	PASS

GMSK mode (1W) 25KHz Channel Spacing:

Channel	Frequency (MHz)	26dB Bandwidth (KHz)	99% Occupied Bandwidth (KHz)	99% Occupied Bandwidth Limit (KHz)	Result
Low	410.050	12.07	11.190	20	PASS
Mid	440.000	11.94	11.232	20	PASS
High	469.950	11.94	11.190	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

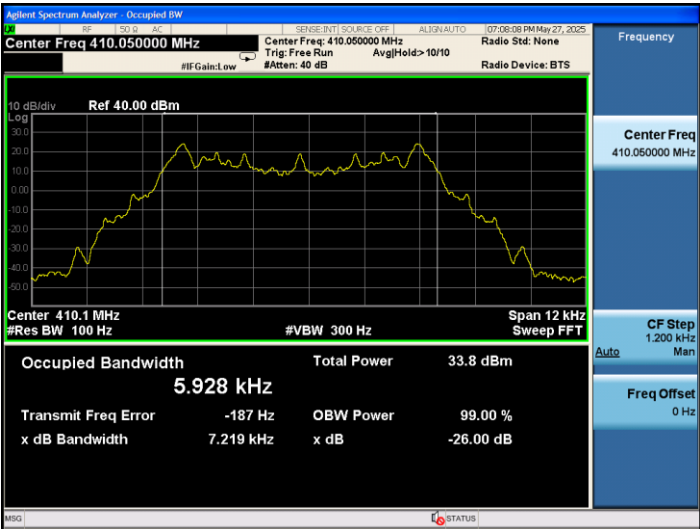
GMSK mode (2W) 25KHz Channel Spacing:

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

Test plots as follows:

GMSK mode (0.5W) 12.5KHz Channel Spacing: Occupied Bandwidth

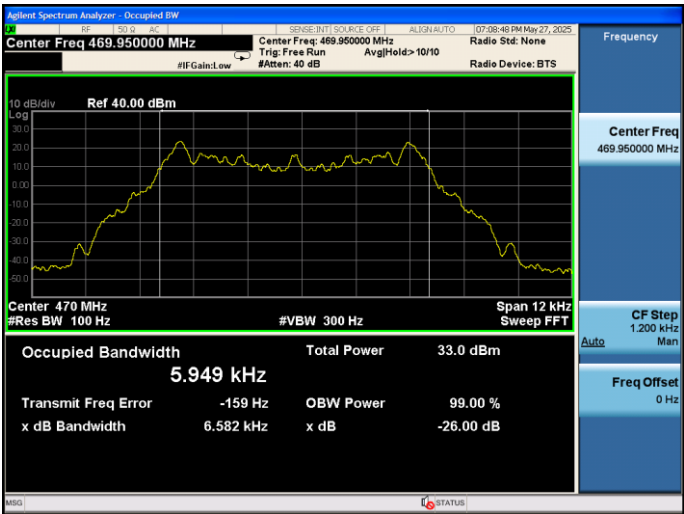
Low: 410.050MHz



Mid: 440.000MHz

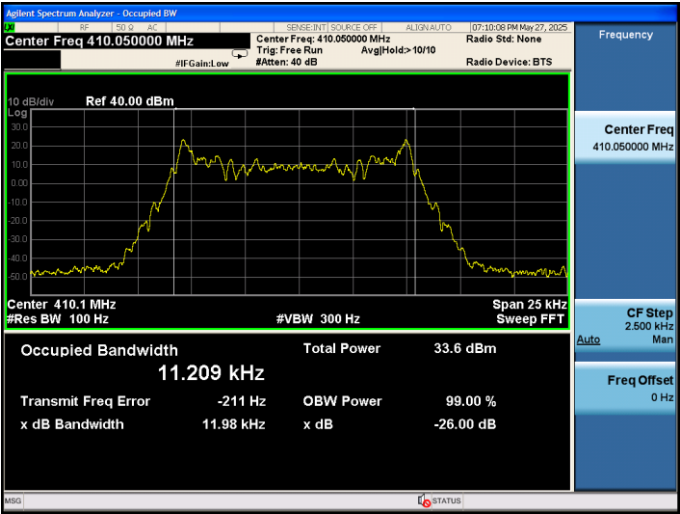


High: 470.00MHz

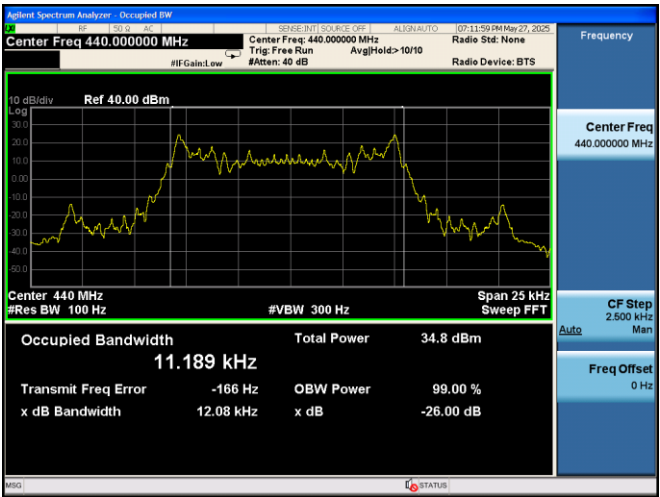


GMSK mode (0.5W) 25KHz Channel Spacing: Occupied Bandwidth

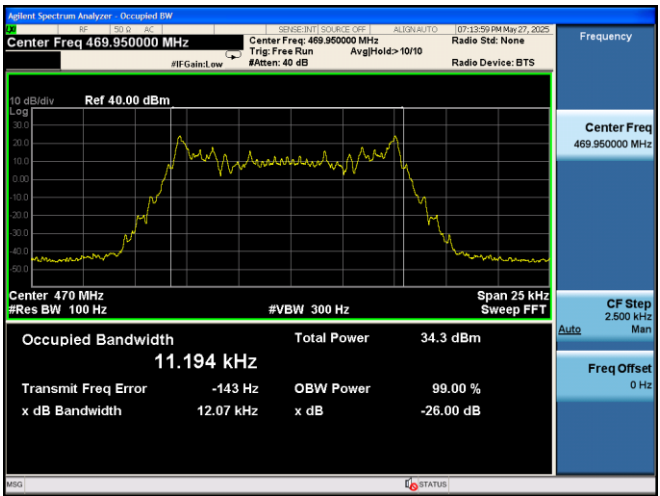
Low: 410.050MHz



Mid: 440.000MHz

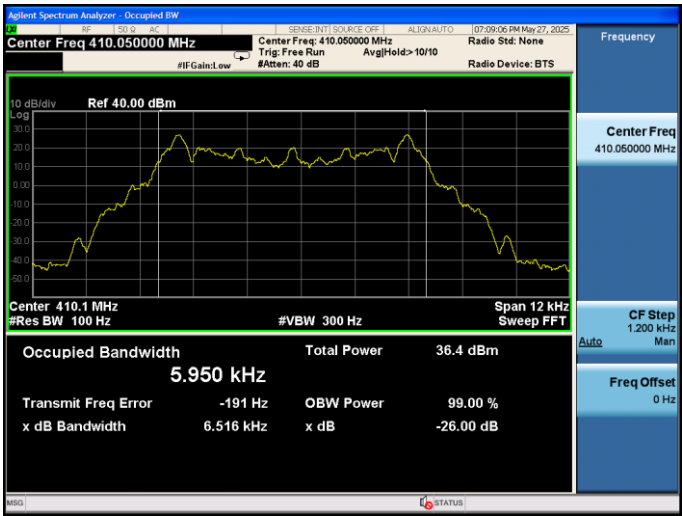


High: 469.850MHz

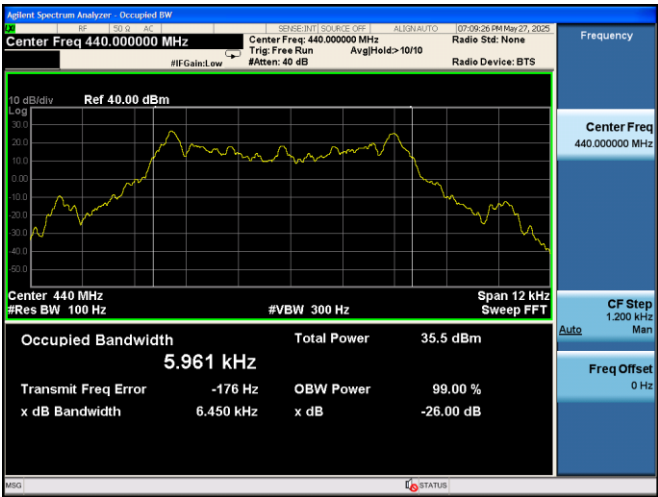


GMSK mode (1W) 12.5KHz Channel Spacing: Occupied Bandwidth

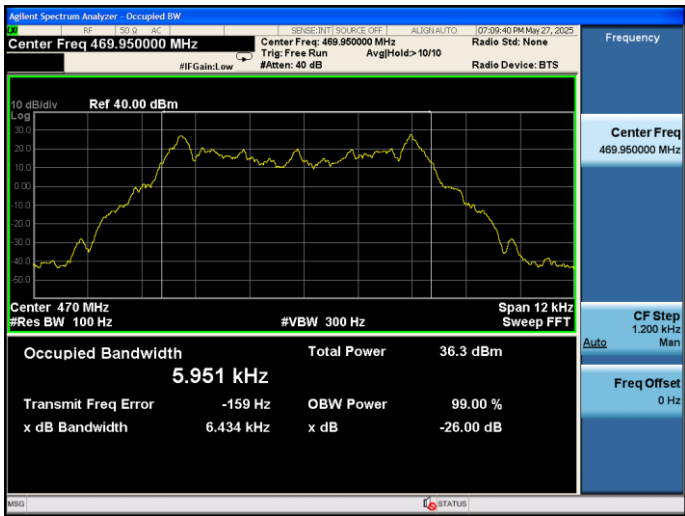
Low: 410.050MHz



Mid: 440.000MHz

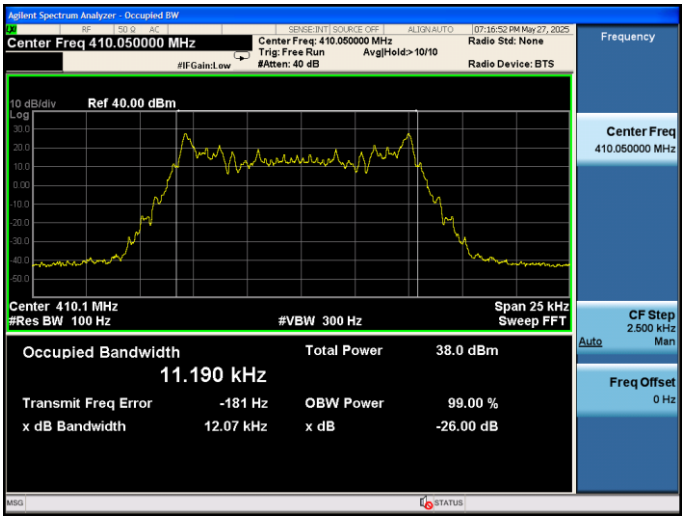


High: 470.00MHz

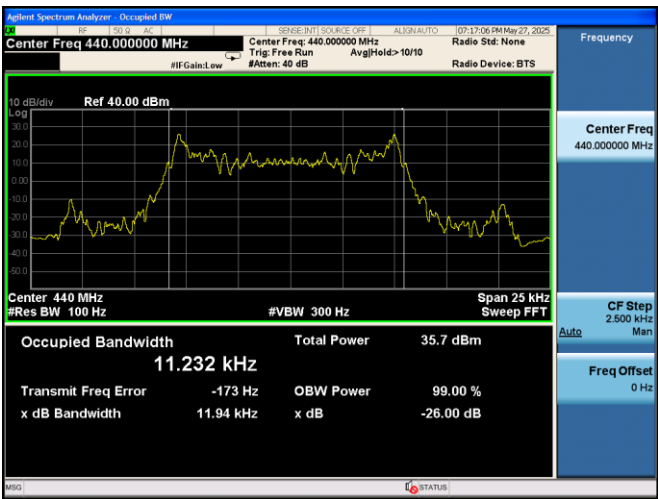


GMSK mode (1W) 25KHz Channel Spacing: Occupied Bandwidth

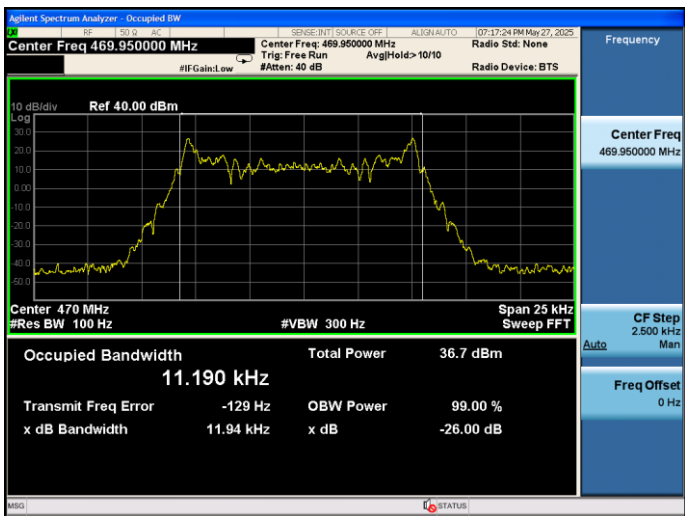
Low: 410.050MHz



Mid: 440.000MHz

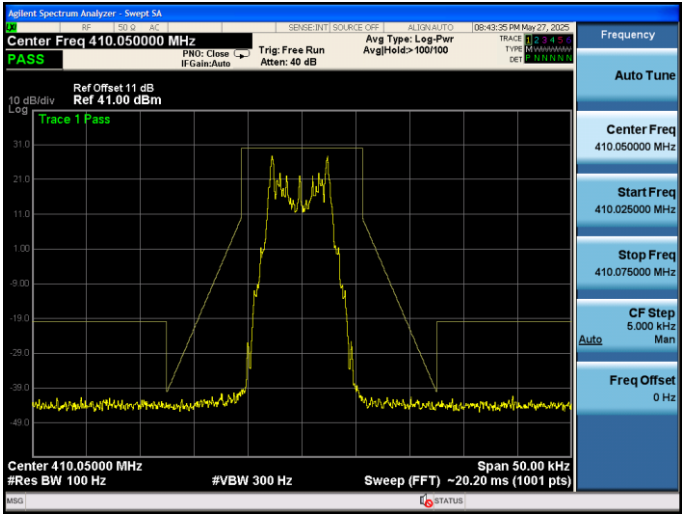


High: 469.850MHz

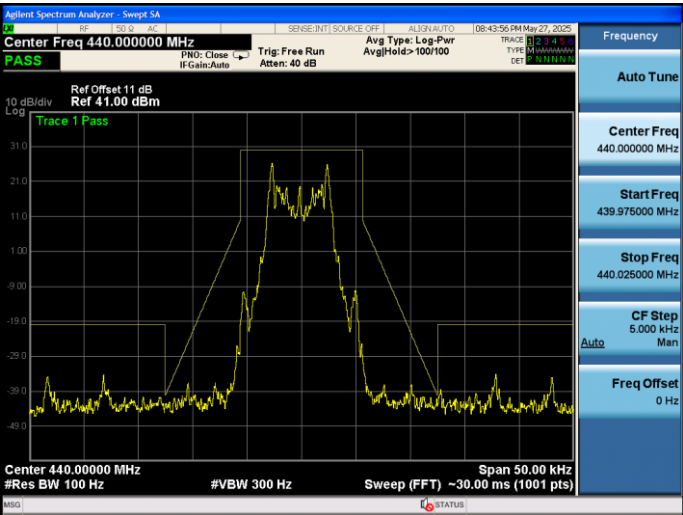


GMSK mode (1W) 12.5KHz Channel Spacing: Emission Mask

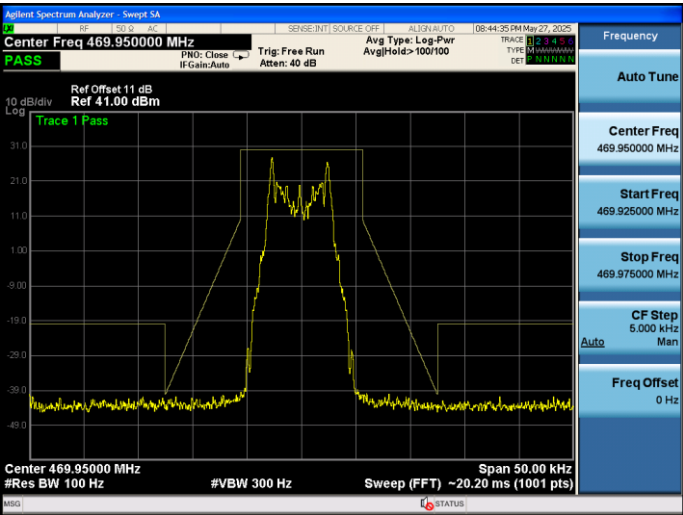
Low: 410.050MHz



Mid: 440.000MHz

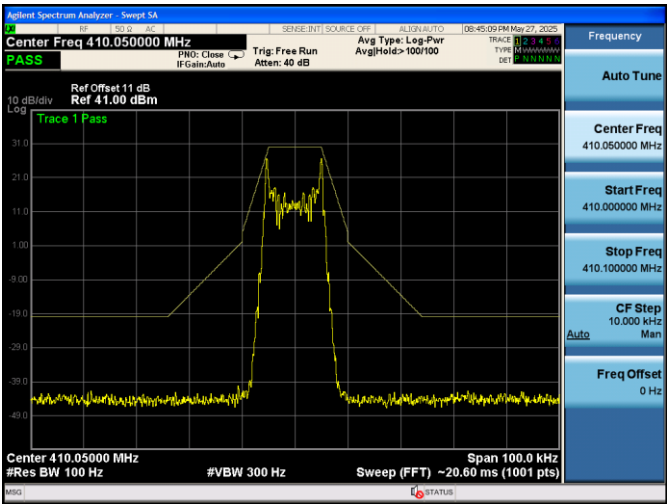


High: 469.950MHz

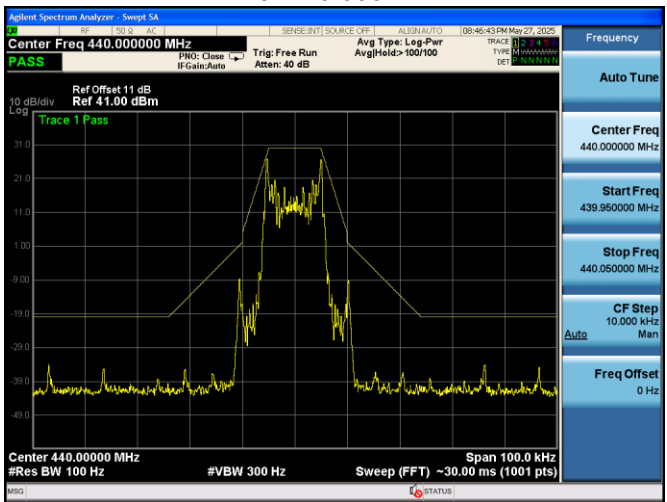


GMSK mode (1W) 25KHz Channel Spacing: Emission Mask

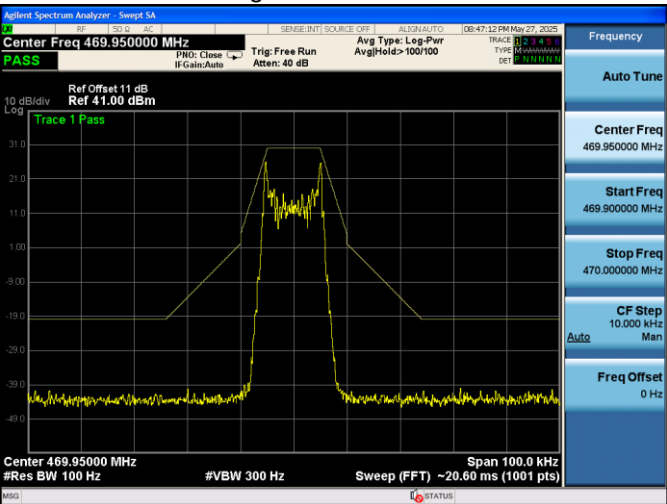
Low: 410.050MHz



Mid: 440.000MHz



High: 469.950MHz

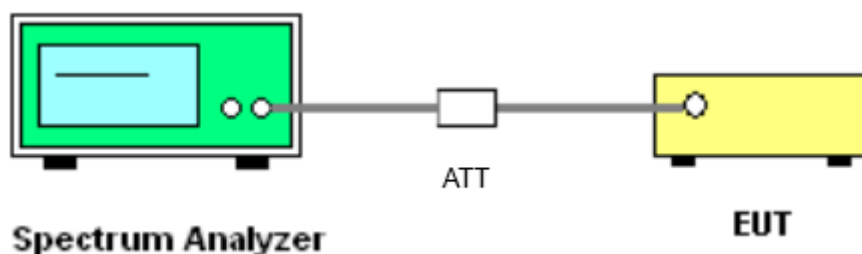


5. Spurious Emissions(conducted)

5.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal Due To
CMW500	ROHDE&SCH WARZ	CMW500	Aa-EE073	2024/08/08	2025/08/07
Spectrum analyzer	ROHDE&SCH WARZ	FSV40-N	Aa-EE081	2024/08/08	2025/08/07
Signal Analyzer	Agilent	N9020A	Aa-EE039	2024/08/08	2025/08/07
Power Sensor	Agilent	E9300A	Aa-EE046	2024/08/08	2025/08/07
Vector Signal Generator	Agilent	N5182A	Aa-EE040	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE071	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE070	2024/08/08	2025/08/07

5.2. Block diagram of test setup



5.3. Limits

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 (fd in kHz) of more than 4.6 kHz at least: 55 + 10 log (P) or 65 dB, whichever is the lesser attenuation.

Calculation: Limit (dBm) = EL - 55 - 10 log₁₀ (TP)

Notes: EL is the emission level of the Output Power expressed in dBm,

For 12.5 bandwidth:

On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd 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 log₁₀ (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 dBm

For 25 kHz bandwidth:

On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd 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 log₁₀ (TP)

In this application, the EL is 33.01 dBm for High rated power.

Limit (dBm) = 33.01 – 43 – 10log (2) = -13 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 (fd 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.

5.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

5.5. Test procedure

Please refer ANSI TIA-603-E:2016

5.6. Test result

Test Site: RF Laboratory	Test Date: 2025/05/26--2025/05/27
Condition: 24.2°C,56%RH,101kPa	Test Engineer: Yannis Wen
Memo: /	

EUT Name: Geodetic GNSS Receiver	EUT Model: F6
Sample No.: A2503163-S0001	Test Mode: All modes
Power supply: DC 7.2V from battery	Memo: /

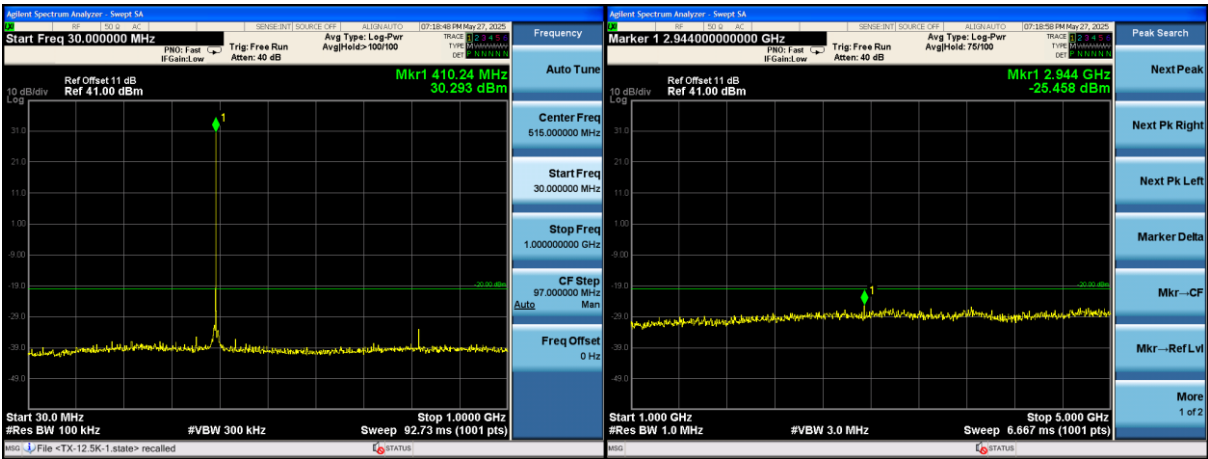
/

5.7. Test data

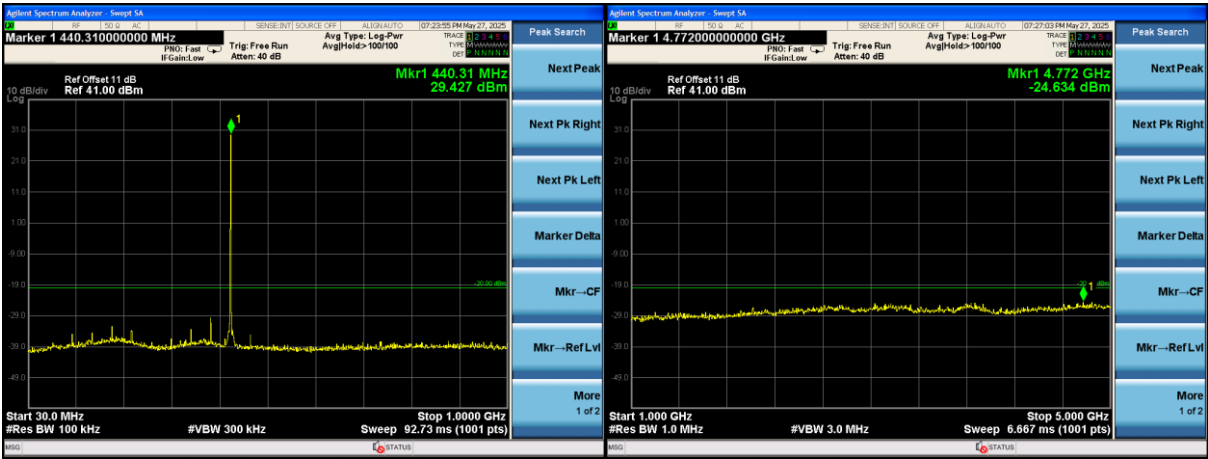
Test plots as follows:

GMSK 12.5KHz Channel Spacing:

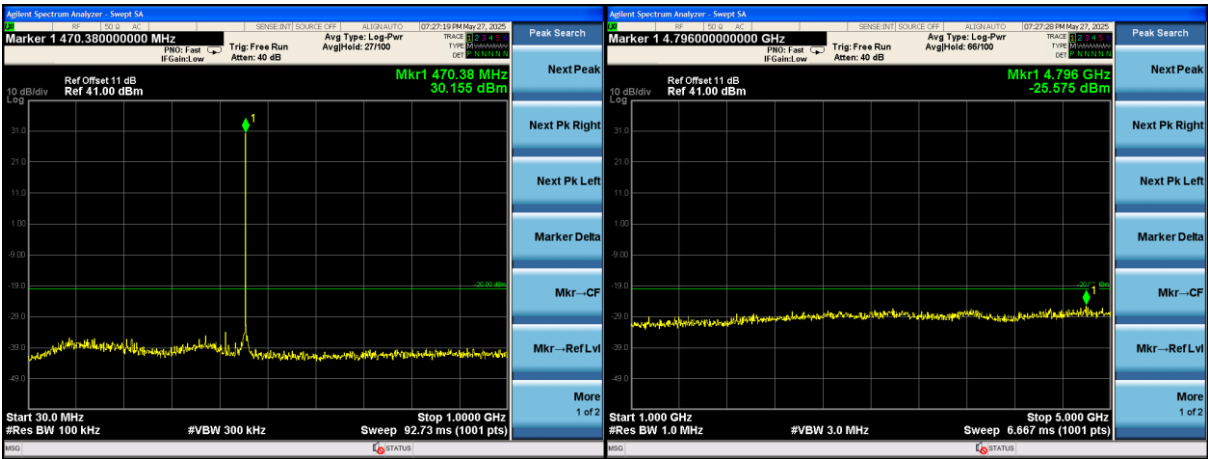
Low: 410.050MHz



Mid: 440.000MHz

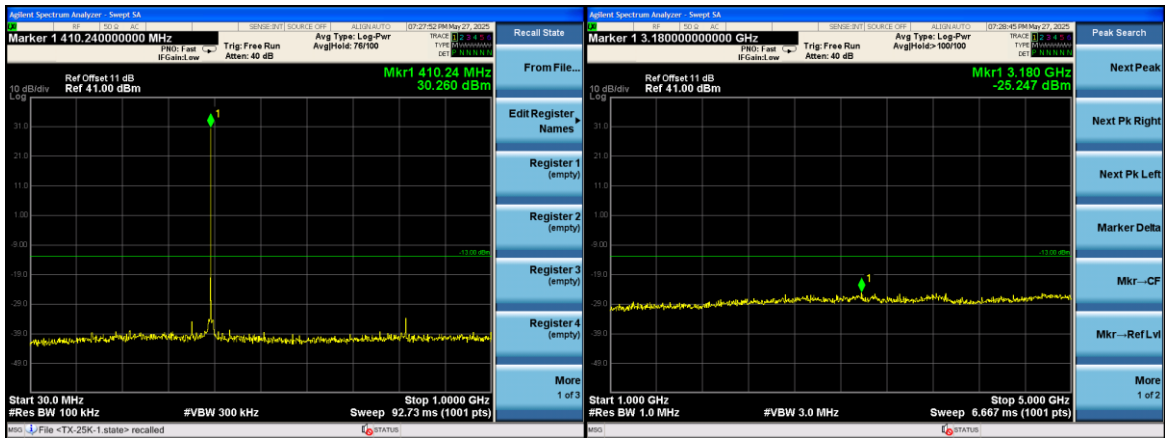


High: 469.950MHz

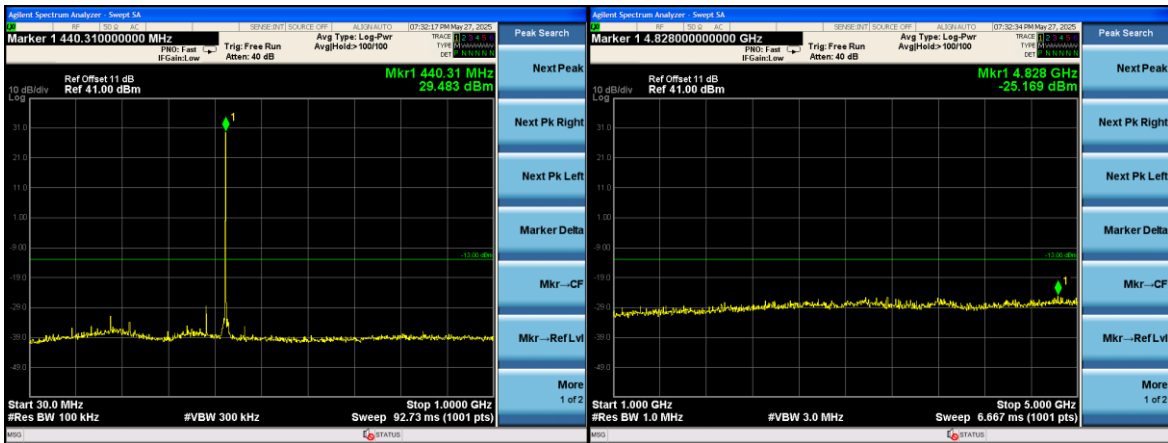


GMSK 25KHz Channel Spacing:

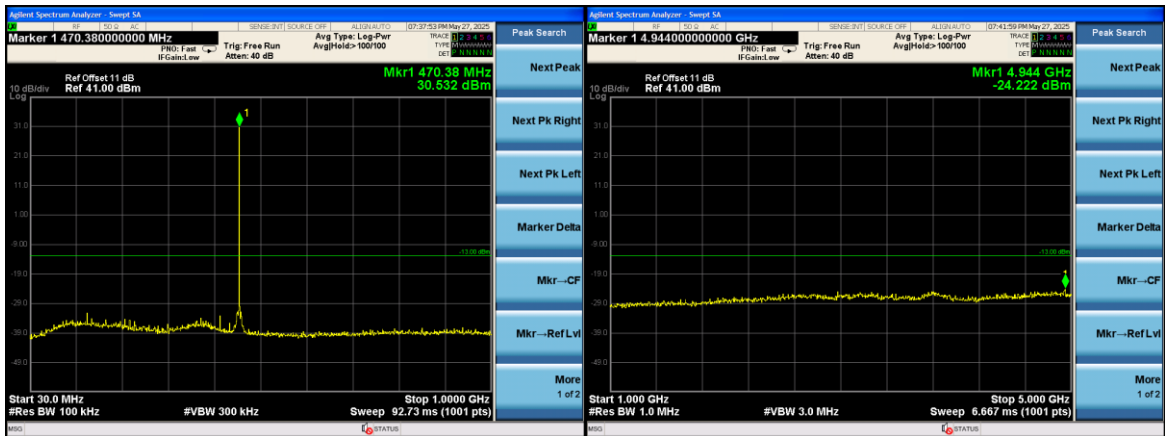
Low: 410.050MHz



Mid: 440.000MHz



High: 469.950MHz

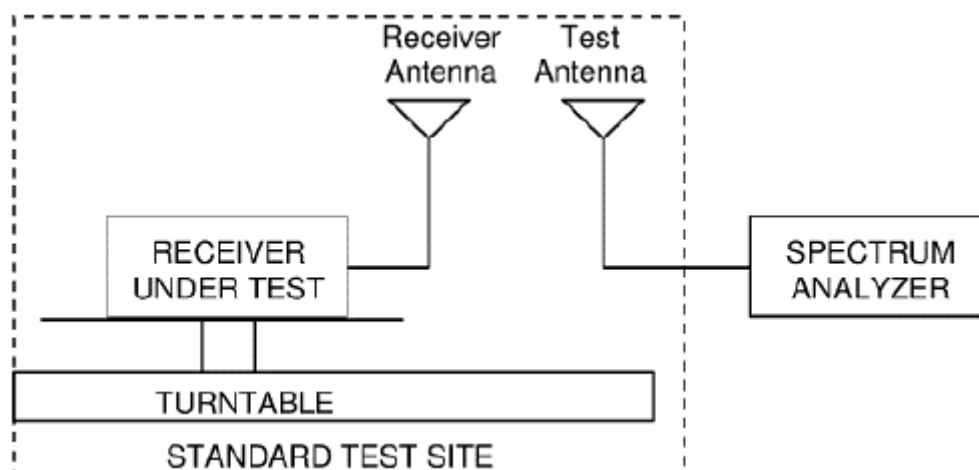


6. Radiated Spurious Emission

6.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal Due To
Spectrum analyzer	ROHDE&SCHWARZ	FSU	Aa-EE075	2024/08/08	2025/08/07
Horn Antenna	SCHWARZBECK	BBHA 9120 D	Aa-EE076	2023/08/19	2025/08/18
Test Receiver	ROHDE&SCHWARZ	ESR	Aa-EE048	2024/08/08	2025/08/07
Bilog Antenna	SCHWARZBECK	VULB 9168	Aa-EE001	2023/08/28	2025/08/27
Amplifier	SKET	LNPA_0118G-45	Aa-EE087	2024/08/08	2025/08/07
Horn Antenna	SCHWARZBECK	BBHA 9170	Aa-EE077	2023/08/19	2025/08/18
Loop Antenna	SCHWARZBECK	FMZB 1519B	Aa-EE074	2023/08/19	2025/08/18

6.2. Block diagram of test setup



6.3. Limits

For equipment using 25 kHz channel spacing, on any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least $43 + 10\log(P)$ dB.

For equipment using 12.5 kHz channel spacing, 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.

For equipment using 6.25 kHz channel spacing, On any frequency removed from the center of the authorized bandwidth by more than 4.6 kHz: At least $55 + 10\log(P)$ or 65 dB, whichever is the lesser attenuation.

6.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

6.5. 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, 1g (TXpwr in Watts/0.001)-the absolute level

6.6. Test result

Test Site: Chamber 1#(RSE)	Test Date: 2025/05/21--2025/05/21
Condition: 24.1°C,56%RH,101kPa	Test Engineer: Yannis Wen
Memo: /	

EUT Name: Geodetic GNSS Receiver	EUT Model: F6
Sample No.: A2503163-S0001	Test Mode: All modes
Power supply: DC 7.2V from battery	Memo: /

/

6.7. Test data

GMSK:

Test Mode: Low: 410.050MHz, Channel Spacing 12.5KHz

Frequency (MHz)	Reading level (dBm)	Antenna Polarization	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
150.791	-93.149	V	0.24	31.35	-62.039	-20	-42.039
359.033	-89.781	V	0.26	31.34	-58.701	-20	-38.701
672.689	-95.389	V	0.42	31.24	-64.569	-20	-44.569
862.013	-93.067	V	0.58	30.71	-62.937	-20	-42.937
1262.623	-81.081	V	1.23	26.38	-55.931	-20	-35.931
3864.041	-82.227	V	1.68	25.47	-58.437	-20	-38.437
286.787	-95.637	H	0.43	31.24	-64.827	-20	-44.827
398.045	-96.790	H	0.45	30.68	-66.560	-20	-46.560
480.502	-92.322	H	0.64	30.85	-62.112	-20	-42.112
676.905	-100.103	H	0.79	31.12	-69.773	-20	-49.773
1367.062	-84.016	H	1.29	26.12	-59.186	-20	-39.186
3258.196	-82.660	H	1.62	25.41	-58.870	-20	-38.870

Test Mode: Mid: 440.000MHz, Channel Spacing 12.5KHz

Frequency (MHz)	Reading level (dBm)	Antenna Polarization	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
153.420	-89.038	V	0.24	31.35	-57.928	-20	-37.928
367.434	-91.322	V	0.26	31.34	-60.242	-20	-40.242
669.448	-100.993	V	0.42	31.24	-70.173	-20	-50.173
860.694	-92.481	V	0.58	30.71	-62.351	-20	-42.351
1262.932	-89.103	V	1.23	26.38	-63.953	-20	-43.953
3857.409	-84.893	V	1.68	25.47	-61.103	-20	-41.103
293.732	-96.617	H	0.43	31.24	-65.807	-20	-45.807
400.020	-93.315	H	0.45	30.68	-63.085	-20	-43.085
477.846	-98.580	H	0.64	30.85	-68.370	-20	-48.370
681.927	-101.024	H	0.79	31.12	-70.694	-20	-50.694
1369.948	-81.386	H	1.29	26.12	-56.556	-20	-36.556
3262.627	-85.191	H	1.62	25.41	-61.401	-20	-41.401

Test Mode: High: 469.950MHz, Channel Spacing 12.5KHz

Frequency (MHz)	Reading level (dBm)	Antenna Polarization	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
152.893	-93.406	V	0.24	31.35	-62.296	-20	-42.296
362.863	-94.823	V	0.26	31.34	-63.743	-20	-43.743
671.508	-99.213	V	0.42	31.24	-68.393	-20	-48.393
866.077	-95.915	V	0.58	30.71	-65.785	-20	-45.785
1261.072	-85.870	V	1.23	26.38	-60.720	-20	-40.720
3857.945	-80.798	V	1.68	25.47	-57.008	-20	-37.008
291.970	-97.644	H	0.43	31.24	-66.834	-20	-46.834
404.596	-93.625	H	0.45	30.68	-63.395	-20	-43.395
473.980	-96.691	H	0.64	30.85	-66.481	-20	-46.481
678.464	-97.158	H	0.79	31.12	-66.828	-20	-46.828
1373.422	-85.335	H	1.29	26.12	-60.505	-20	-40.505
3267.105	-83.106	H	1.62	25.41	-59.316	-20	-39.316

Test Mode: Low: 410.050MHz, Channel Spacing 25KHz

Frequency (MHz)	Reading level (dBm)	Antenna Polarization	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
148.351	-93.962	V	0.24	31.35	-62.852	-13	-49.852
359.735	-94.218	V	0.26	31.34	-63.138	-13	-50.138
674.967	-91.316	V	0.42	31.24	-60.496	-13	-47.496
869.223	-94.939	V	0.58	30.71	-64.809	-13	-51.809
1257.660	-81.356	V	1.23	26.38	-56.206	-13	-43.206
3855.101	-79.240	V	1.68	25.47	-55.450	-13	-42.450
287.137	-94.760	H	0.43	31.24	-63.950	-13	-50.950
399.678	-99.370	H	0.45	30.68	-69.140	-13	-56.140
478.113	-92.677	H	0.64	30.85	-62.467	-13	-49.467
676.374	-92.635	H	0.79	31.12	-62.305	-13	-49.305
1371.518	-83.696	H	1.29	26.12	-58.866	-13	-45.866
3261.437	-80.094	H	1.62	25.41	-56.304	-13	-43.304

Test Mode; Mid: 440.000MHz, Channel Spacing 25KHz

Frequency (MHz)	Reading level (dBm)	Antenna Polarization	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
159.066	-97.008	V	0.24	31.35	-65.898	-13	-52.898
363.875	-93.600	V	0.26	31.34	-62.520	-13	-49.520
671.655	-96.471	V	0.42	31.24	-65.651	-13	-52.651
861.175	-95.698	V	0.58	30.71	-65.568	-13	-52.568
1261.232	-85.503	V	1.23	26.38	-60.353	-13	-47.353
3861.571	-79.741	V	1.68	25.47	-55.951	-13	-42.951
288.208	-96.981	H	0.43	31.24	-66.171	-13	-53.171
403.849	-97.790	H	0.45	30.68	-67.560	-13	-54.560
474.575	-96.520	H	0.64	30.85	-66.310	-13	-53.310
681.406	-95.927	H	0.79	31.12	-65.597	-13	-52.597
1371.695	-84.255	H	1.29	26.12	-59.425	-13	-46.425
3261.679	-82.001	H	1.62	25.41	-58.211	-13	-42.260

Test Mode: High: 469.950MHz, Channel Spacing 25KHz

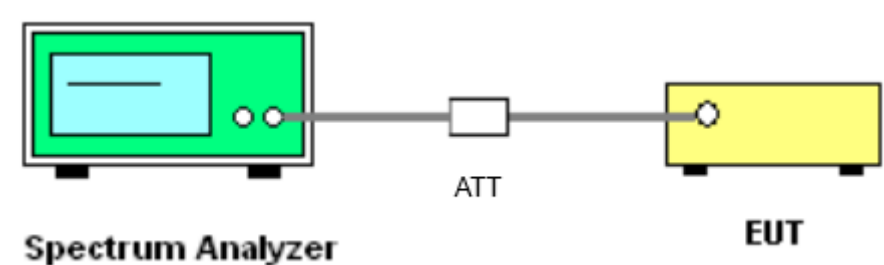
Frequency (MHz)	Reading level (dBm)	Antenna Polarization	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
153.071	-95.903	V	0.24	31.35	-64.793	-13	-51.793
363.115	-91.650	V	0.26	31.34	-60.570	-13	-47.570
670.068	-92.500	V	0.42	31.24	-61.680	-13	-48.680
863.090	-97.861	V	0.58	30.71	-67.731	-13	-54.731
1257.073	-78.303	V	1.23	26.38	-53.153	-13	-40.153
3858.912	-79.162	V	1.68	25.47	-55.372	-13	-42.372
289.292	-98.998	H	0.43	31.24	-68.188	-13	-55.188
397.506	-94.681	H	0.45	30.68	-64.451	-13	-51.451
472.564	-95.758	H	0.64	30.85	-65.548	-13	-52.548
679.404	-96.640	H	0.79	31.12	-66.310	-13	-53.310
1370.740	-85.564	H	1.29	26.12	-60.734	-13	-47.734
3260.510	-79.678	H	1.62	25.41	-55.888	-13	-42.888

7. Transient Frequency Behavior

7.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal Due To
CMW500	ROHDE&SCHWARZ	CMW500	Aa-EE073	2024/08/08	2025/08/07
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	Aa-EE081	2024/08/08	2025/08/07
Signal Analyzer	Agilent	N9020A	Aa-EE039	2024/08/08	2025/08/07
Power Sensor	Agilent	E9300A	Aa-EE046	2024/08/08	2025/08/07
Vector Signal Generator	Agilent	N5182A	Aa-EE040	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE071	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE070	2024/08/08	2025/08/07

7.2. Block diagram of test setup



7.3. Limits

Channel Bandwidth(kHz)	Time Inter'vals (Notes 1, 2)	Maximum Frequency Difference (kHz)	Transient Duration Limit (ms)
		138-174MHz	406.1-512MHz
25	+25	5	10
	+12.5	20	25
	+25	5	10
12.5	+12.5	5	10
	±6.25	20	25
	+12.5	5	10
6.25	+6.25	5	10
	+3.125	20	25
	+6.25	5	10

7.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

7.5. Test procedure

The EUT was set in the climate chamber and connected to an external DC power supply and AC power supply. The RF output was directly connected to Oscilloscope. The coupling loss of the additional cables was recorded and taken in account for all the measurements. The result was recorded.

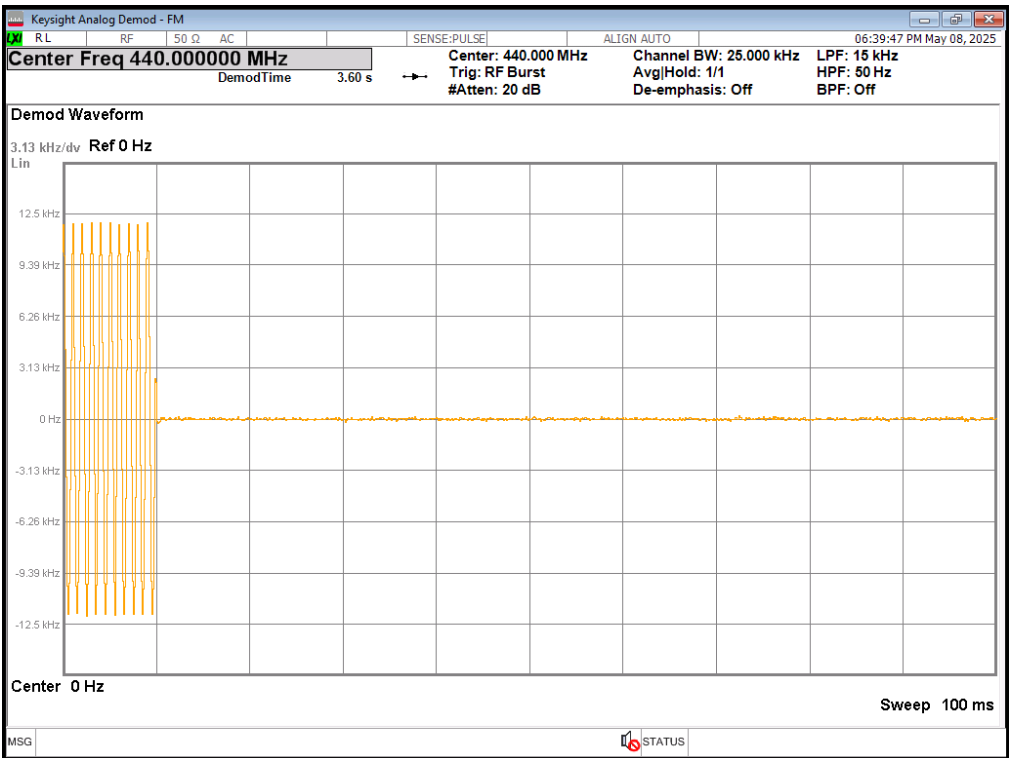
7.6. Test result

Test Site: RF Laboratory	Test Date: 2025/05/08--2025/05/08
Condition: 24.1°C,56%RH,101kPa	Test Engineer: Yannis Wen
Memo: Only show the test data of the worst Channel in this report.	

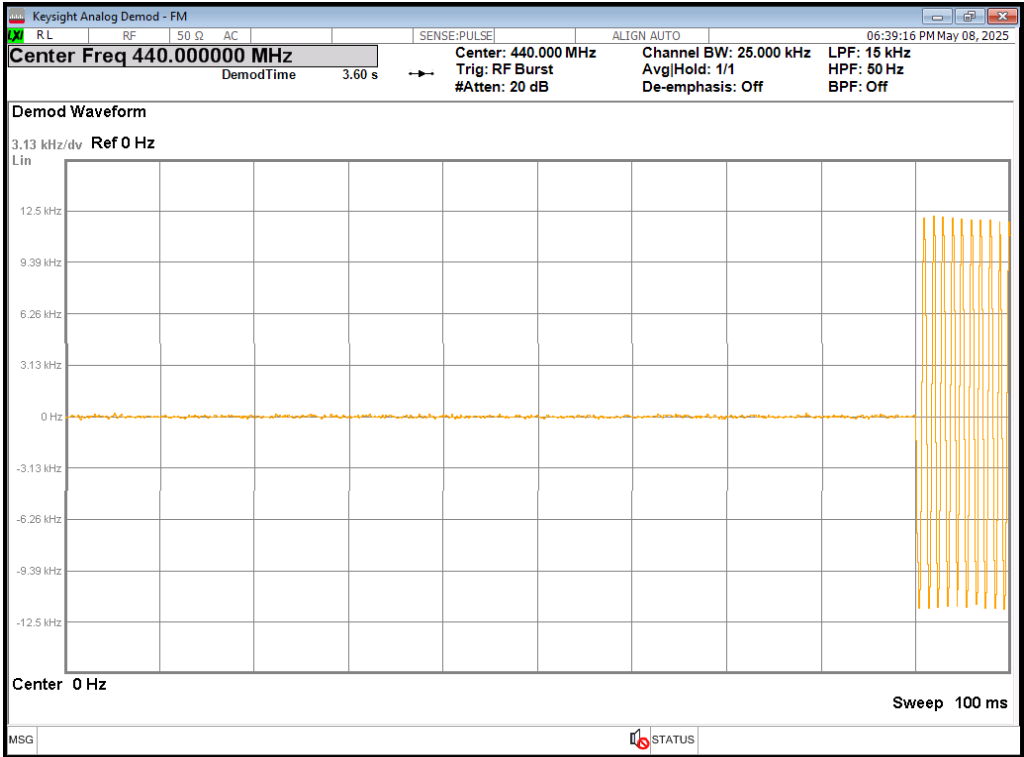
EUT Name: Geodetic GNSS Receiver	EUT Model: F6
Sample No.: A2503163-S0001	Test Mode: All modes
Power supply: DC 7.2V from battery	Memo: /

7.7. Test data

Test Plots for channel spacing 12.5KHz, EUT power setting: Maximum Power On

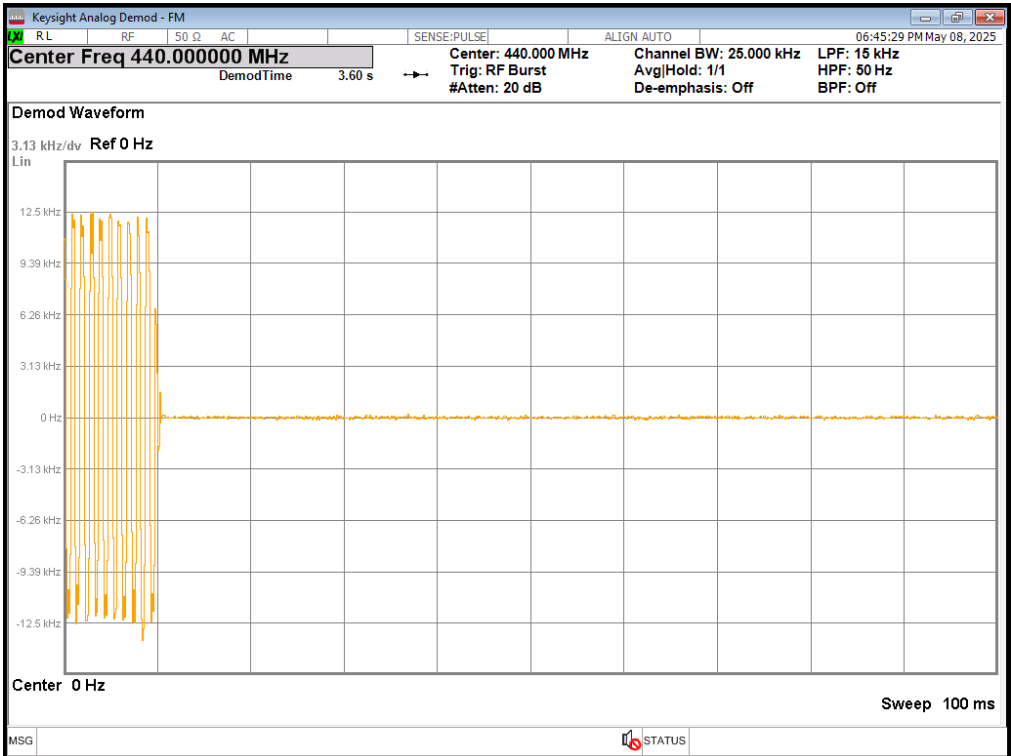


Power Off

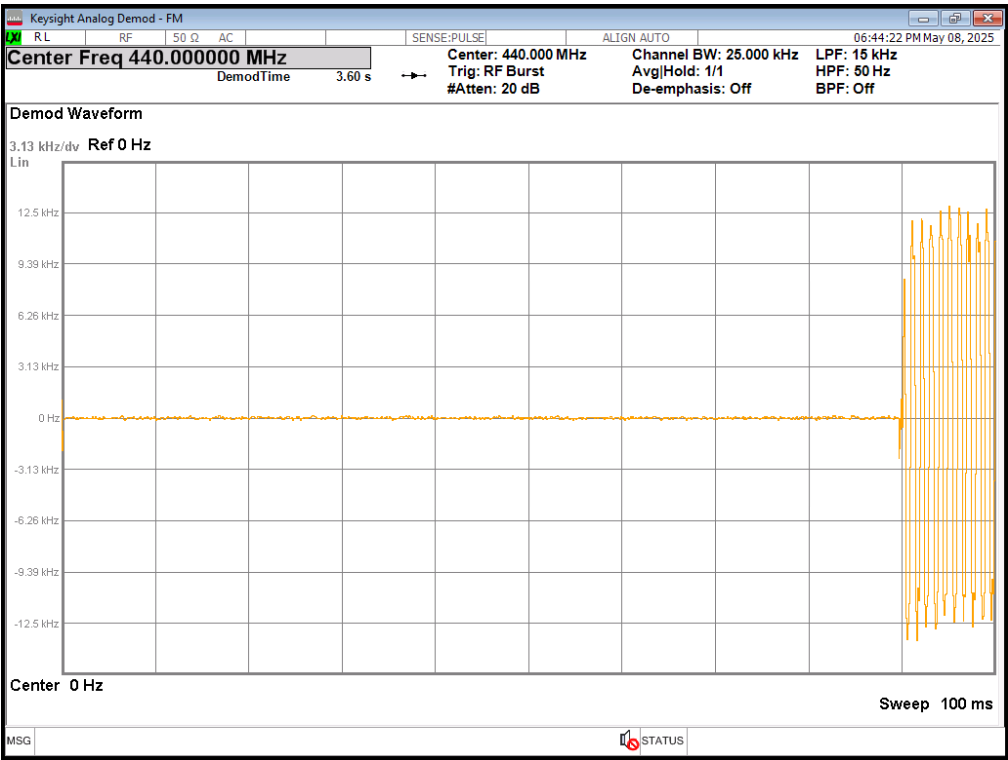


Test Plots for channel spacing 25KHz, EUT power setting: Maximum

Power On



Power Off

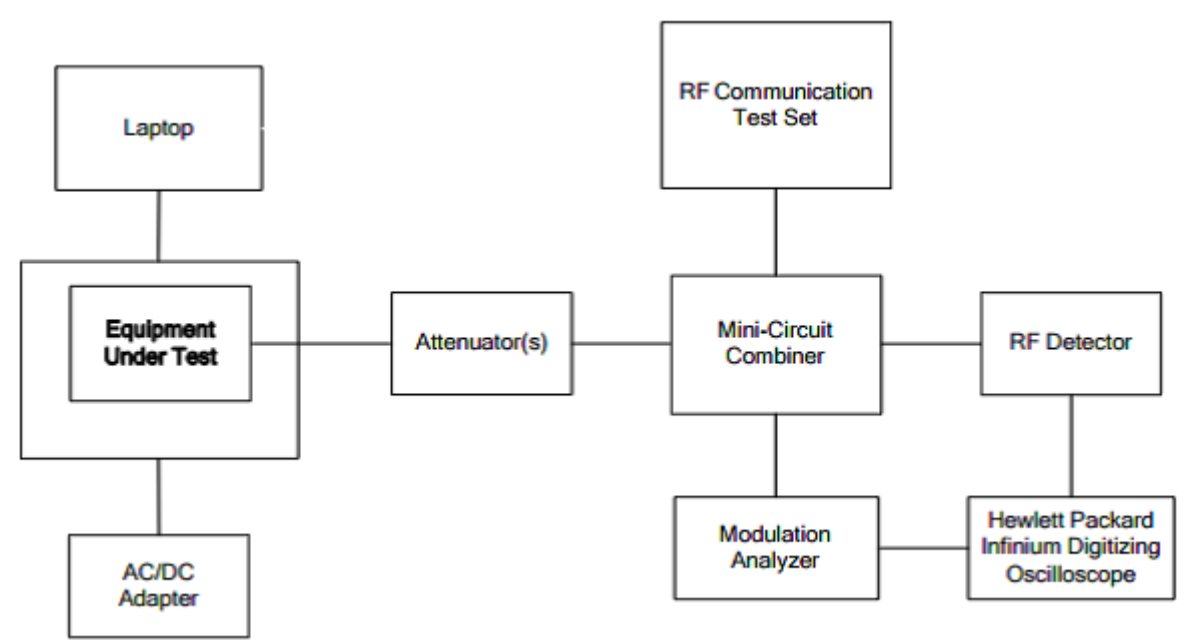


8. Behavior Frequency Stability

8.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal Due To
CMW500	ROHDE&SCH WARZ	CMW500	Aa-EE073	2024/08/08	2025/08/07
Spectrum analyzer	ROHDE&SCH WARZ	FSV40-N	Aa-EE081	2024/08/08	2025/08/07
Signal Analyzer	Agilent	N9020A	Aa-EE039	2024/08/08	2025/08/07
Power Sensor	Agilent	E9300A	Aa-EE046	2024/08/08	2025/08/07
Vector Signal Generator	Agilent	N5182A	Aa-EE040	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE071	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE070	2024/08/08	2025/08/07

8.2. Block diagram of test setup



8.3. Limits

Please refer section FCC Part 90.213

8.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

8.5. Test procedure

Method of Measurement:

After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded. For Frequency stability Vs. Voltage the EUT

was connected to a DC power supply or AC power supply and the voltage was adjusted in the required ranges.

8.6. Test result

Test Site: RF Laboratory	Test Date: 2025/05/30--2025/05/30
Condition: 24.2°C,56%RH,101kPa	Test Engineer: Yannis Wen
Memo: Only show the test data of the worst case.	

EUT Name: Geodetic GNSS Receiver	EUT Model: F6
Sample No.: A2503163-S0001	Test Mode: All modes
Power supply: DC 7.2V from battery	Memo: at 1W for transmitter

8.7. Test data

Conclusion: PASS			
Mode	Voltage (V)	Frequency error (Hz)	frequency error (ppm)
Middle Channel 12.5KHz Channel Spacing	6.12	20.38	0.046
	6.48	29.14	0.066
	6.84	16.49	0.037
	7.2	10.80	0.025
	7.56	0.40	0.001
	7.92	-1.62	-0.004
	8.82	11.74	0.027
Limit	2.5ppm		
Middle Channel 25KHz Channel Spacing	6.12	-6.50	-0.015
	6.48	17.90	0.041
	6.84	20.55	0.047
	7.2	6.93	0.016
	7.56	7.43	0.017
	7.92	12.47	0.028
	8.82	8.60	0.020
Limit	5ppm		

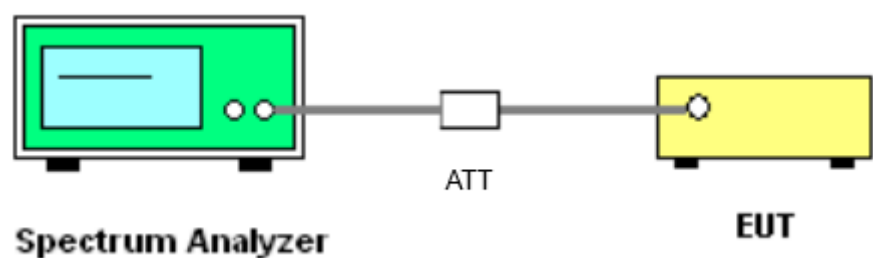
Mode	Temperature (°C)	Frequency error (Hz)	frequency error (ppm)
Middle Channel 12.5KHz Channel Spacing	-20	16.14	0.037
	-10	6.60	0.015
	0	18.16	0.041
	10	-2.87	-0.007
	20	-7.34	-0.017
	30	6.18	0.014
	40	18.40	0.042
	50	5.49	0.012
Limit	2.5ppm		
Middle Channel 25KHz Channel Spacing	-20	6.03	0.014
	-10	-4.85	-0.011
	0	16.35	0.037
	10	29.56	0.067
	20	19.68	0.045
	30	14.09	0.032
	40	2.06	0.005
	50	6.69	0.015
Limit	5ppm		

9. Adjacent Channel Power

9.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal Due To
CMW500	ROHDE&SCH WARZ	CMW500	Aa-EE073	2024/08/08	2025/08/07
Spectrum analyzer	ROHDE&SCH WARZ	FSV40-N	Aa-EE081	2024/08/08	2025/08/07
Signal Analyzer	Agilent	N9020A	Aa-EE039	2024/08/08	2025/08/07
Power Sensor	Agilent	E9300A	Aa-EE046	2024/08/08	2025/08/07
Vector Signal Generator	Agilent	N5182A	Aa-EE040	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE071	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE070	2024/08/08	2025/08/07

9.2. Block diagram of test setup



9.3. Limits

Please refer section FCC Part 90.221

9.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

9.5. Test procedure

The resolution bandwidth of the spectrum analyzer was set at 100 Hz and the spectrum was recorded in the Frequency band 0Kz from the wanted frequency

9.6. Test result

Test Site: RF Laboratory	Test Date: 2025/05/26--2025/05/27
Condition: 24.2°C,56%RH,101kPa	Test Engineer: Yannis Wen
Memo: /	
EUT Name: Geodetic GNSS Receiver	EUT Model: F6
Sample No.: A2503163-S0001	Test Mode: All modes
Power supply: DC 7.2V from battery	Memo: /

/

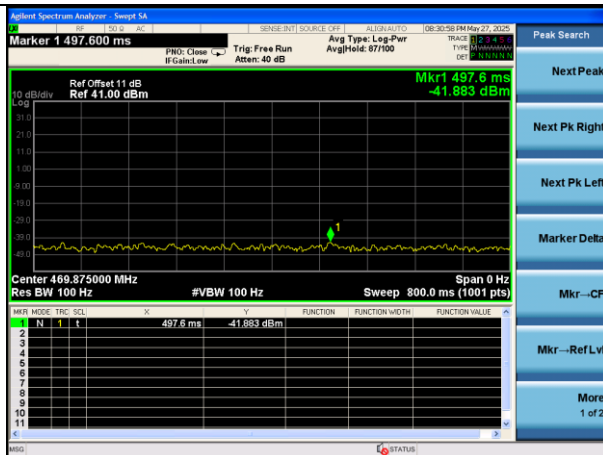
9.7. Test data

GMSK 25KHz spacing 450MHz-470MHz

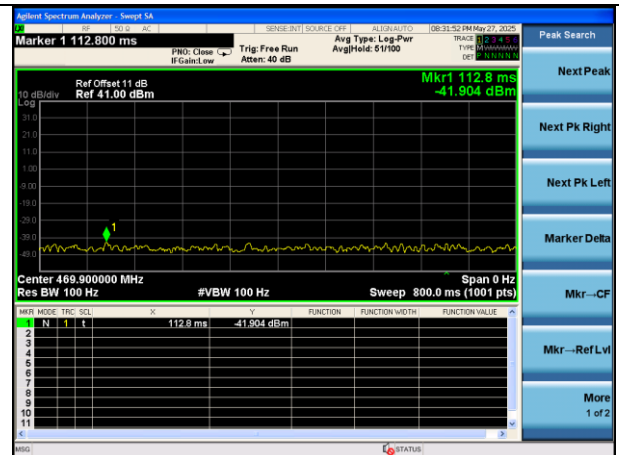
Carrier frequency (MHz)	Test Frequency (MHz)	Test Value (dBm)	Limit (dBm)	Result
450.000	449.925	-41.883	44-70=-26	PASS
	449.95	-41.904	44-70=-26	PASS
	449.975	-41.033	44-60=-16	PASS
	450.025	-42.114	44-60=-16	PASS
	450.05	-40.212	44-70=-26	PASS
	450.075	-40.023	44-70=-26	PASS
469.950	469.875	-41.404	44-70=-26	PASS
	469.900	-41.686	44-70=-26	PASS
	469.925	-39.396	44-60=-16	PASS
	469.975	-38.513	44-60=-16	PASS
	470.000	-42.475	44-70=-26	PASS
	470.025	-41.982	44-70=-26	PASS

GMSK 25KHz spacing 450MHz-470MHz

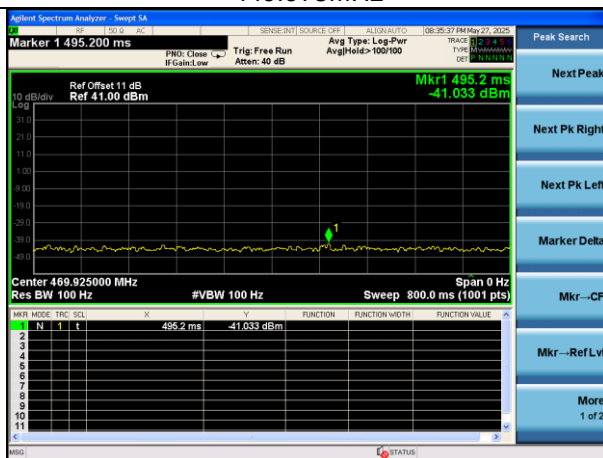
449.925MHz



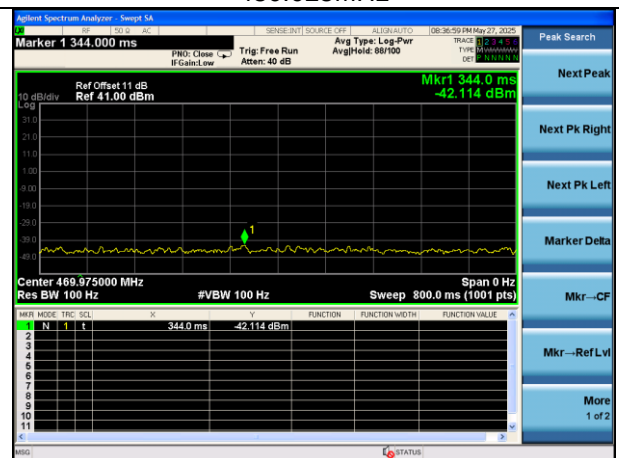
449.95MHz



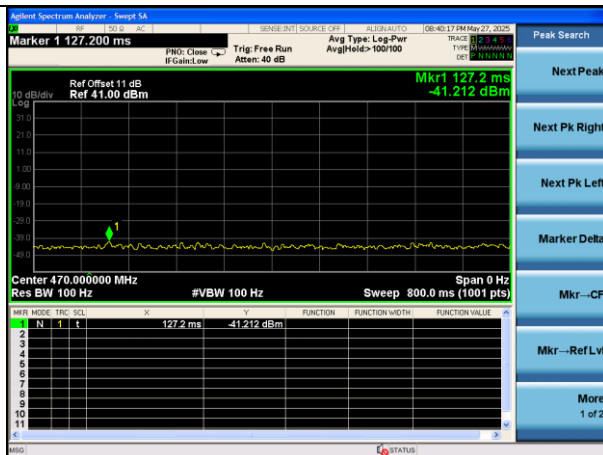
449.975MHz



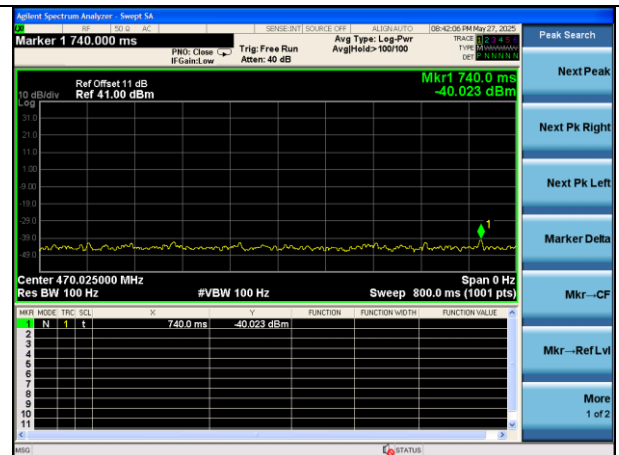
450.025MHz



450.05MHz

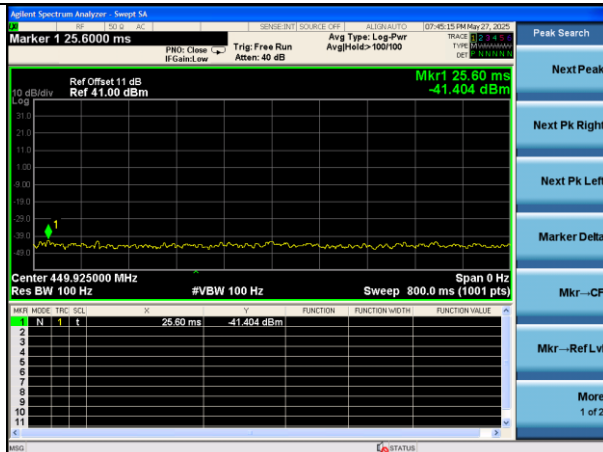


450.075MHz

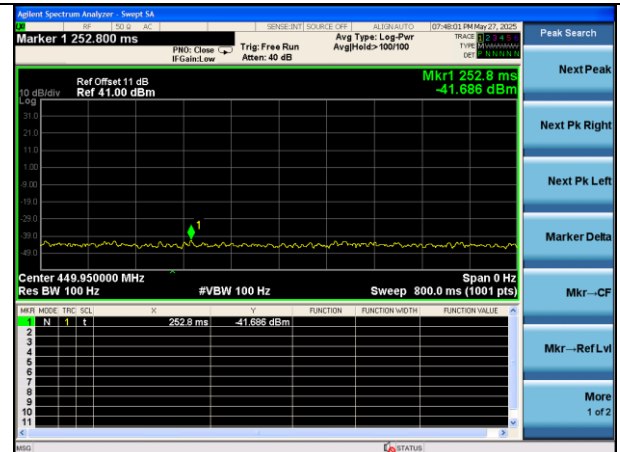


450MHz

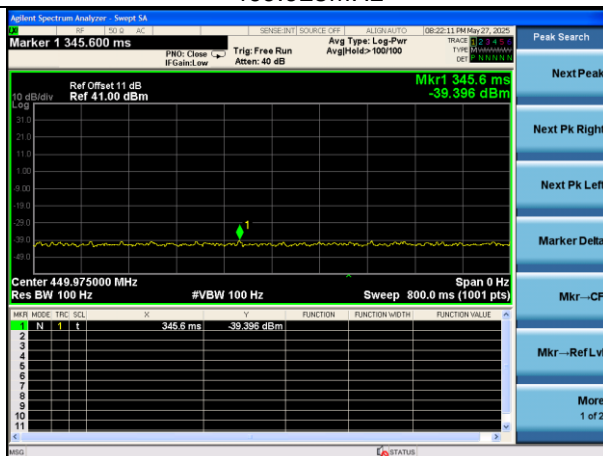
469.875MHz



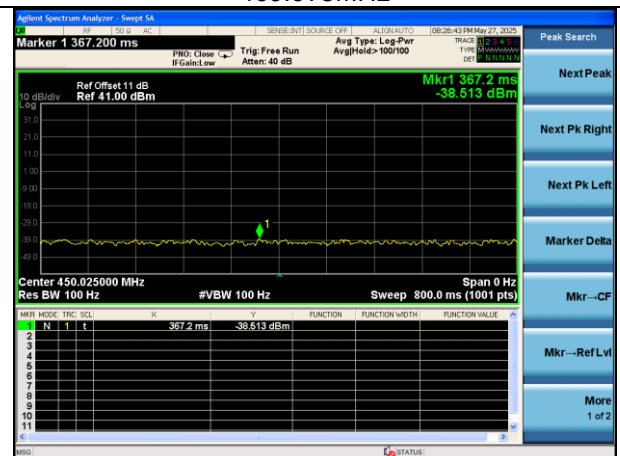
469.9MHz



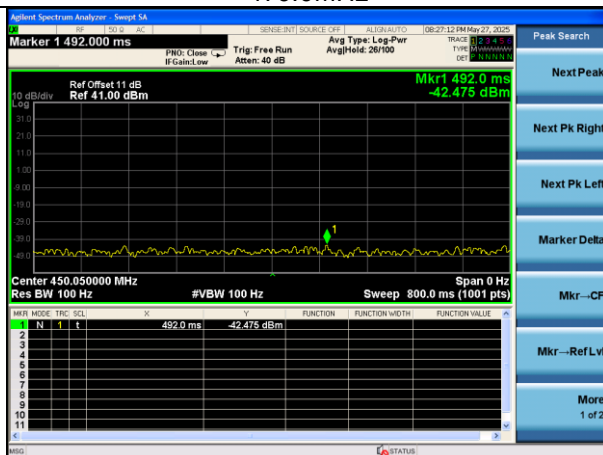
469.925MHz



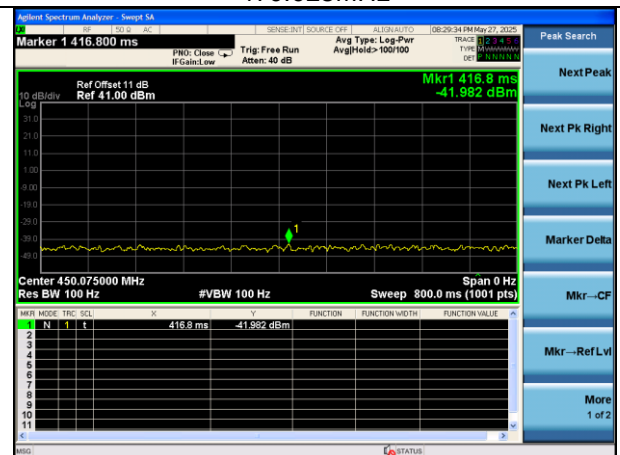
469.975MHz



470.0MHz



470.025MHz



469.95MHz

10. Modulation Characteristic

10.1. Limits

Please refer section FCC Part 90.207

10.2. Assessment procedure

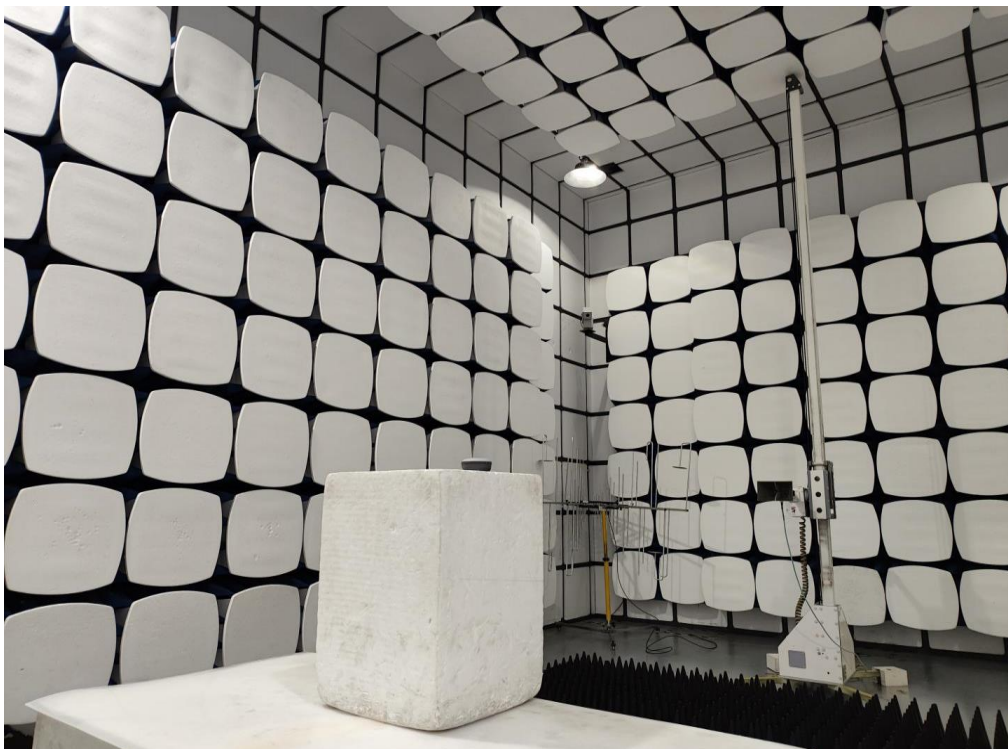
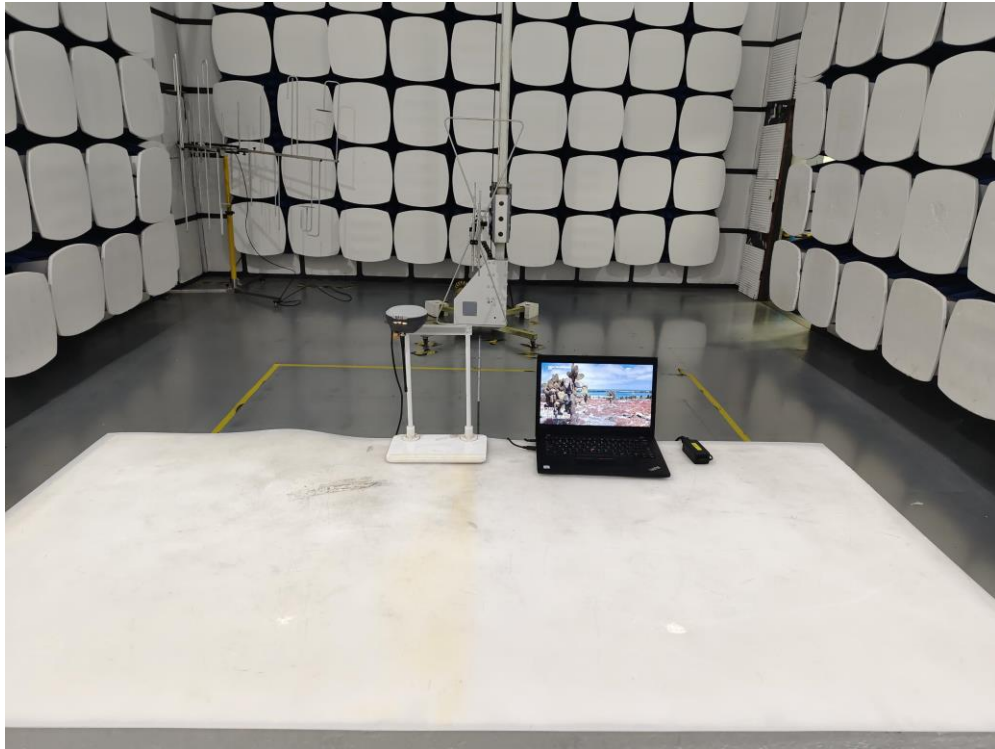
According to 90.207

Unless specified elsewhere in this part, stations will be authorized emissions as provided for in paragraphs (b) through (n) of this section.

10.3. Assess result

According to FCC § 2.1047(d), Part 22, 74, 90 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

11. Test Setup Photograph





12. Photos of the EUT

Please refer to the report A2503163-C07-R01.

-----End Report-----