



FCC REPORT

Applicant	:	Shanghai Huace Navigation Technology Ltd.
Address of Applicant	:	577 Songying Road, Qingpu District, 201706 Shanghai, China
Manufacturer	:	Shanghai Huace Navigation Technology Ltd.
Address of Manufacturer	:	577 Songying Road, Qingpu District, 201706 Shanghai, China
Equipment under Test	:	Geodetic GNSS Receiver
Model No.	:	i76
FCC ID	:	SY4-A02064
Test Standard(s)	:	FCC CFR Title 47 Part 90, FCC CFR Title 47 Part 2, ANSI TIA-603-E:2016
Report No.	:	A2503163-C03-R04
Issue Date	:	2025/06/06
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.	:	i76
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-C03-R04		
Date of Receipt:	2025/04/27	Date of Test:	2025/05/08 – 2025/05/30

Prepared By:


Yannis Wen/Engineer

Approved By:


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	2025/06/06	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	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
8	Adjacent Channel Power	FCC CFR Title 47 Part 90.221	Pass

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	MWRFTtest	V2.0.0.0

2. General Test Information

2.1. Description of EUT

EUT Name	: Geodetic GNSS Receiver
Model Number	: i76
Difference of model number	: /
Power Supply	: DC 7.2V from battery, DC 5V form 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

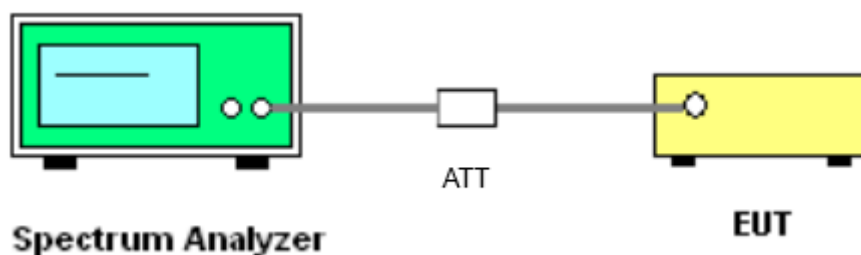
Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.74dB(Polarize: V)
	3.76dB(Polarize: H)
Uncertainty for Radiation Emission test 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
Power Sensor	DARE	RPR3006W	Aa-EE070	2024/08/08	2025/08/07
Power Sensor	Agilent	E9300A	Aa-EE046	2024/08/08	2025/08/07
Signal Analyzer	Agilent	N9020A	Aa-EE039	2024/08/08	2025/08/07
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	Aa-EE081	2024/08/08	2025/08/07
Vector Signal Generator	Agilent	N5182A	Aa-EE040	2024/08/08	2025/08/07
CMW500	ROHDE&SCHWARZ	CMW500	Aa-EE073	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE071	2024/08/08	2025/08/07
Pulse Limiter	SCHWARZBECK	9516F	Aa-EE004	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--2025/05/28
Condition: 24.2°C,56%RH,101kPa	Test Engineer: Yannis Wen
Memo: /	

EUT Name: Geodetic GNSS Receiver	EUT Model: i76
Sample No.: A2503163-S0003	Test Mode: All modes
Power supply: DC 7.2V from battery	Memo: /

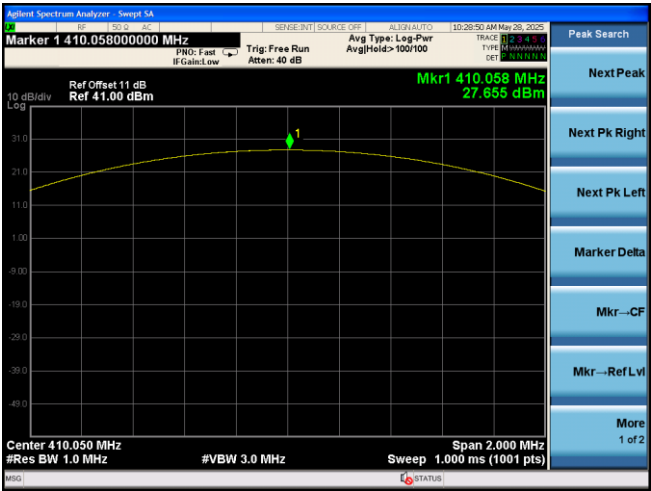
3.7. Test data

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	29.505	30	26.99±1	PASS
25	410.050	27.717	29.567	30	26.99±1	PASS
12.5	440.000	27.525	29.375	30	26.99±1	PASS
25	440.000	27.447	29.297	30	26.99±1	PASS
12.5	469.950	26.985	28.835	30	26.99±1	PASS
25	469.950	26.964	28.814	30	26.99±1	PASS

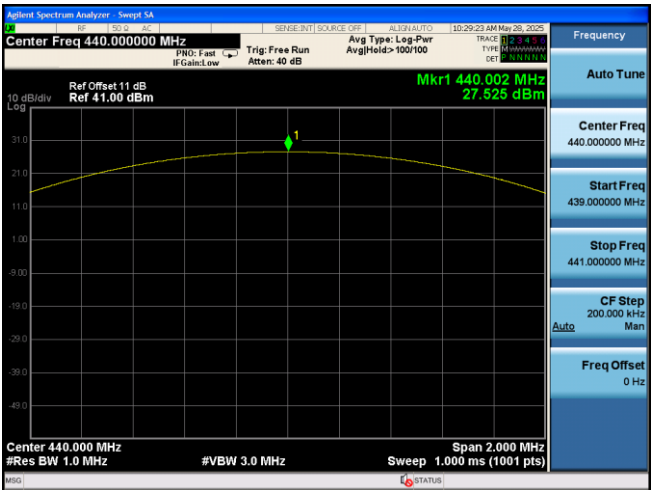
GMSK mode (1W):						
Channel spacing (KHz)	Frequency (MHz)	Maximum Conducted Output Power(Peak) (dBm)	Maximum ERP (dBm)	Stated ERP Power (dBm)	Conducted Output Power Limit (dBm)	Result
12.5	410.050	30.688	32.538	33	30±1	PASS
25	410.050	30.827	32.677	33	30±1	PASS
12.5	440.000	29.772	31.622	33	30±1	PASS
25	440.000	29.902	31.752	33	30±1	PASS
12.5	469.950	30.733	32.583	33	30±1	PASS
25	469.950	30.813	32.663	33	30±1	PASS

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

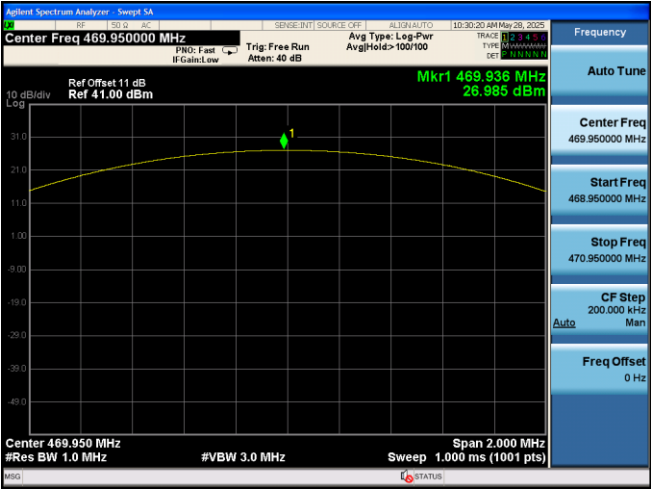
Test plots as follows:
GMSK 0.5W 12.5KHz Channel Spacing: Transmitter Power
Low: 410.050MHz



Mid: 440.000MHz

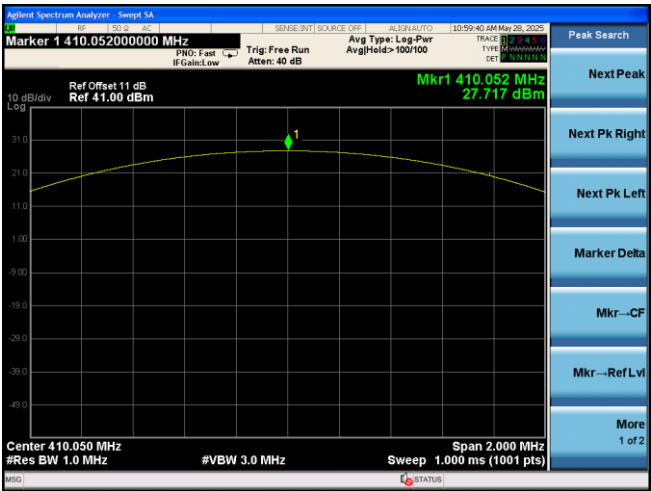


High: 470.00MHz

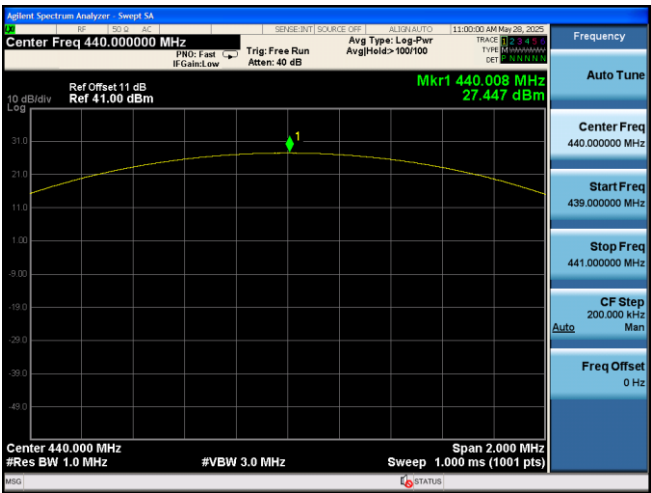


GMSK 0.5W 25KHz Channel Spacing: Transmitter Power

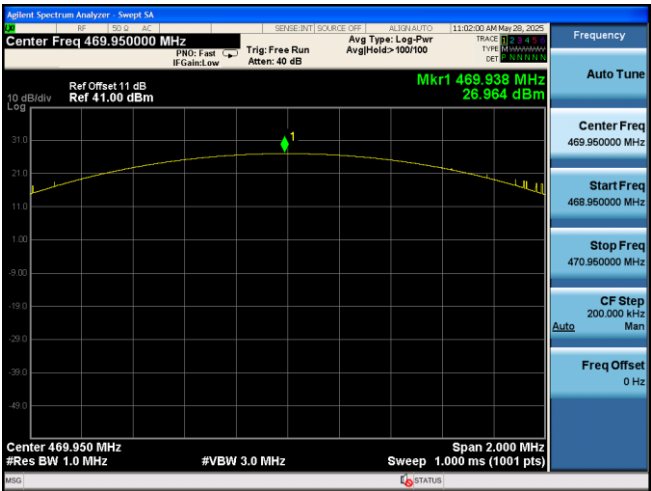
Low: 410.050MHz



Mid: 440.000MHz

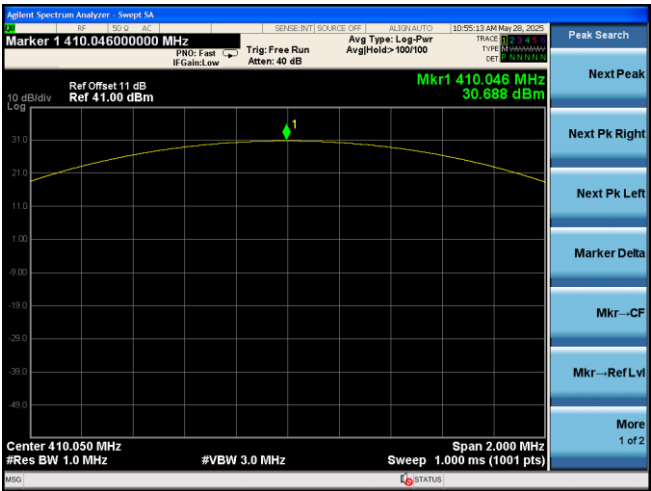


High: 470.00MHz

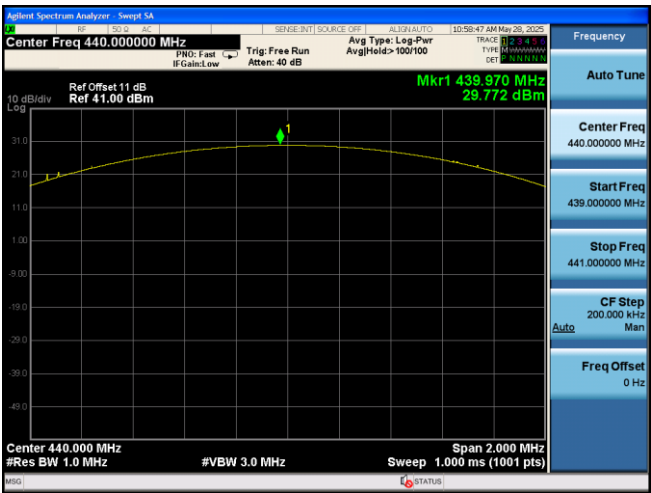


GMSK 1W 12.5KHz Channel Spacing: Transmitter Power

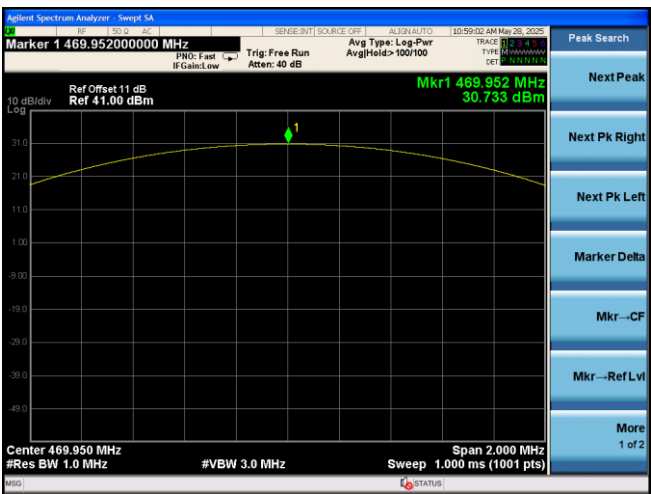
Low: 410.050MHz



Mid: 440.000MHz

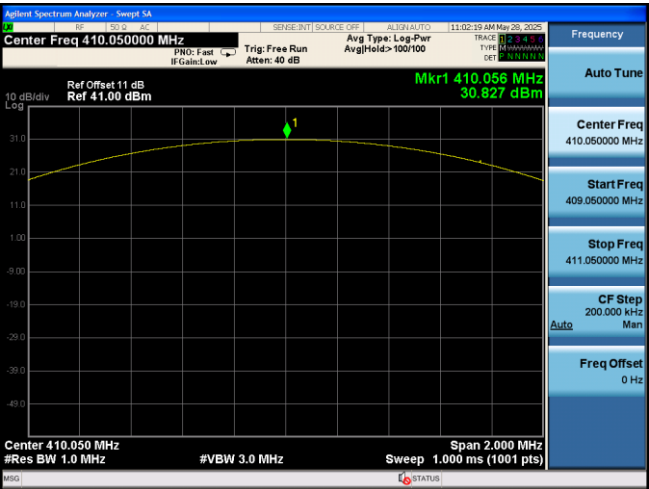


High: 470.00MHz

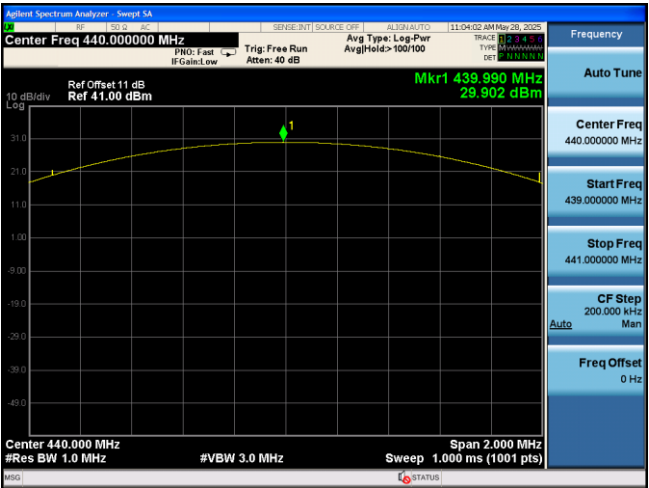


GMSK 1W 25KHz Channel Spacing: Transmitter Power

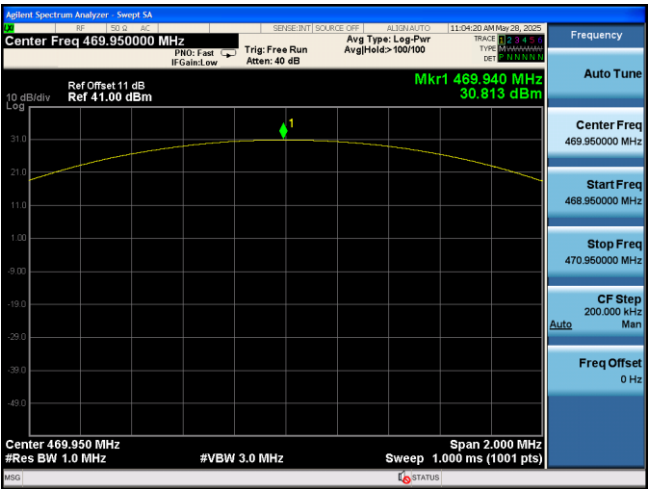
Low: 410.050MHz



Mid: 440.000MHz



High: 470.00MHz

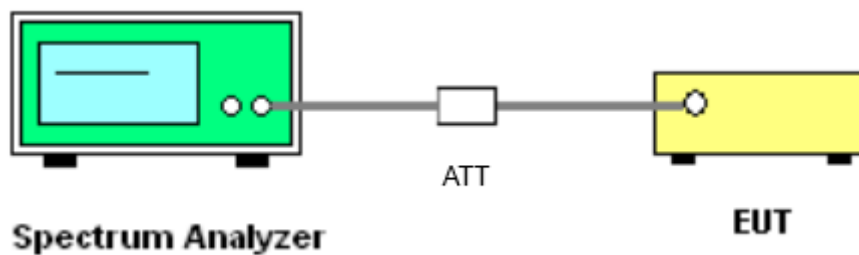


4. Occupied Bandwidth and Emission Mask

4.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal Due To
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	Aa-EE081	2024/08/08	2025/08/07
Power Sensor	Agilent	E9300A	Aa-EE046	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE070	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE071	2024/08/08	2025/08/07
Signal Analyzer	Agilent	N9020A	Aa-EE039	2024/08/08	2025/08/07
CMW500	ROHDE&SCHWARZ	CMW500	Aa-EE073	2024/08/08	2025/08/07
Vector Signal Generator	Agilent	N5182A	Aa-EE040	2024/08/08	2025/08/07
Pulse Limiter	SCHWARZBEC K	9516F	Aa-EE004	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--2025/05/28
Condition: 24.2°C,56%RH,101kPa	Test Engineer: Yannis Wen
Memo: /	

EUT Name: Geodetic GNSS Receiver	EUT Model: i76
Sample No.: A2503163-S0003	Test Mode: All modes

Power supply: DC 7.2V from battery	Memo: /
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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	6.598	5.935	11.25	PASS
Mid	440.000	7.253	5.946	11.25	PASS
High	469.950	6.501	5.972	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	12.07	11.181	20	PASS
Mid	440.000	11.96	11.210	20	PASS
High	469.950	11.90	11.209	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	6.605	5.923	11.25	PASS
Mid	440.000	7.268	5.949	11.25	PASS
High	469.950	6.411	5.948	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	11.95	11.194	20	PASS
Mid	440.000	11.96	11.211	20	PASS

High	469.950	11.90	11.242	20	PASS
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Emission Mask:

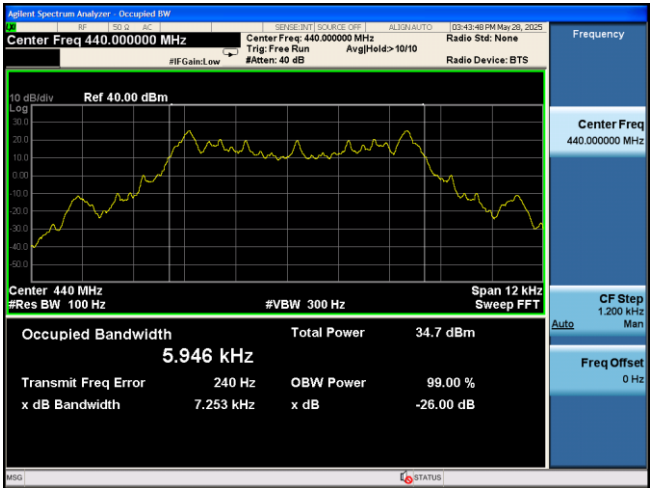
GMSK mode (2W) 12.5KHz Channel Spacing:				
Channel	Frequency (MHz)	Applicable Mask	RBW	Result
Low	410.050	D	100Hz	PASS
Mid	440.000	D	100Hz	PASS
High	469.950	D	100Hz	PASS

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

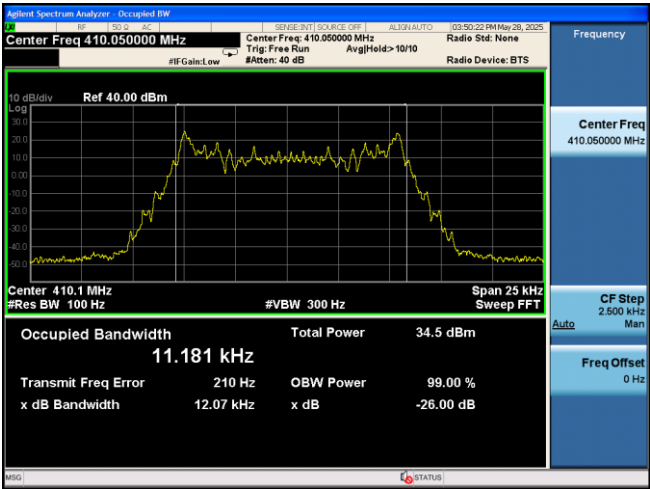


High: 470.00MHz

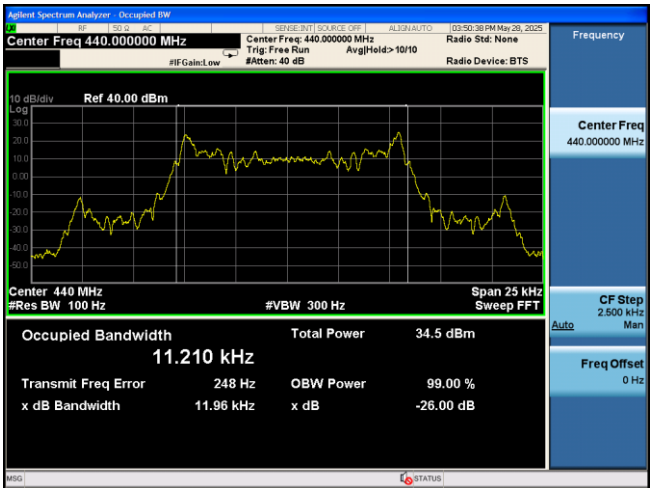


GMSK mode (0.5W) 25KHz Channel Spacing: Occupied Bandwidth

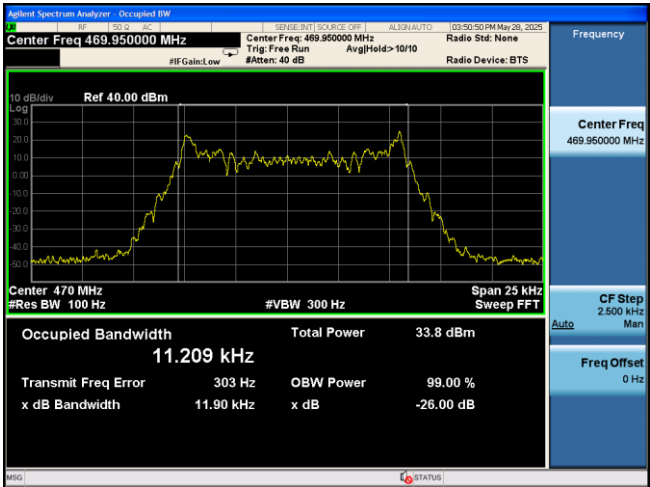
Low: 410.050MHz



Mid: 440.000MHz



High: 469.850MHz

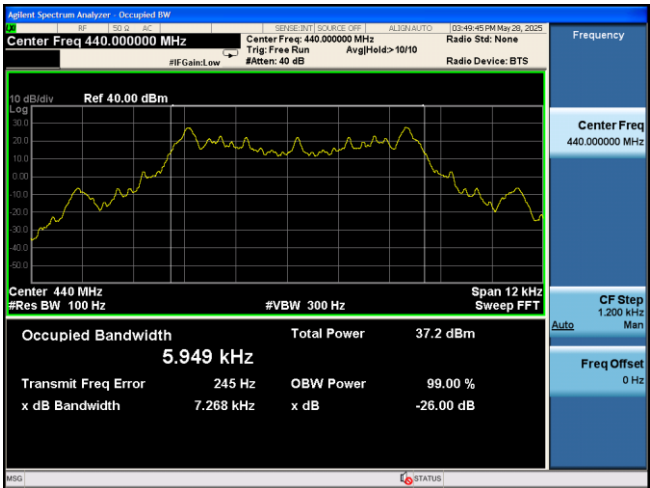


GMSK mode (1W) 12.5KHz Channel Spacing: Occupied Bandwidth

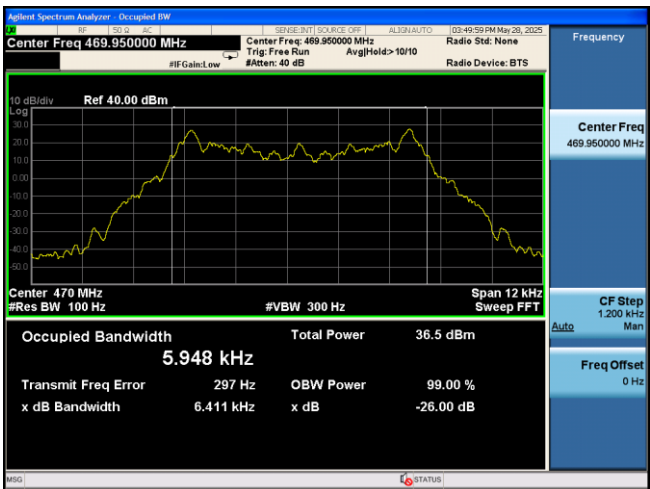
Low: 410.050MHz



Mid: 440.000MHz

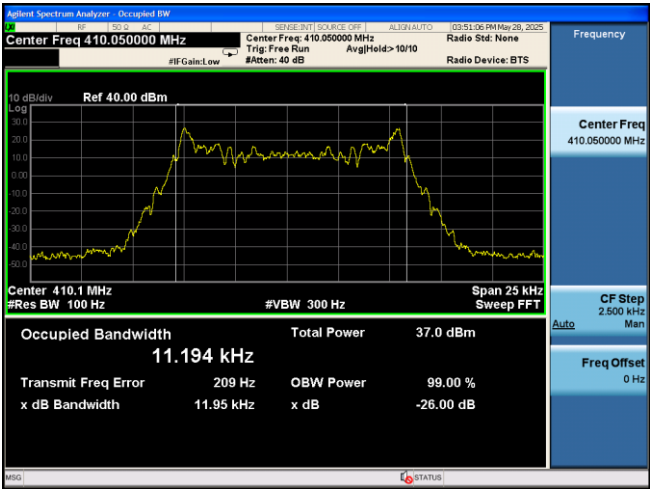


High: 470.00MHz

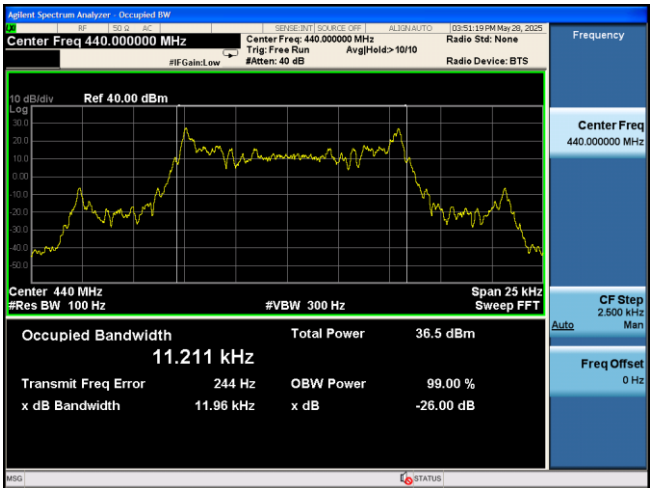


GMSK mode (1W) 25KHz Channel Spacing: Occupied Bandwidth

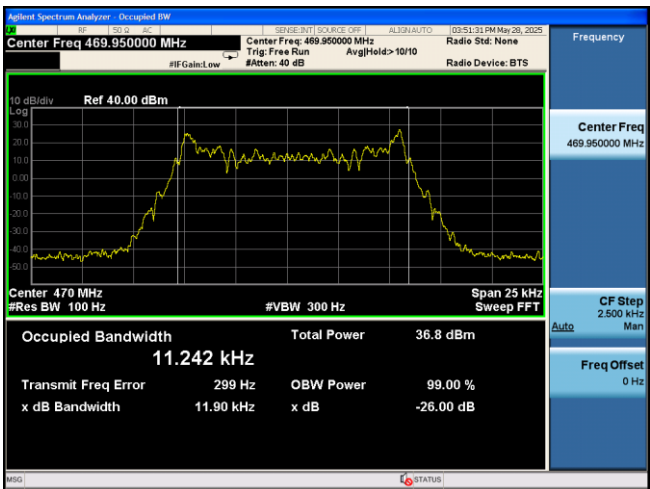
Low: 410.050MHz



Mid: 440.000MHz

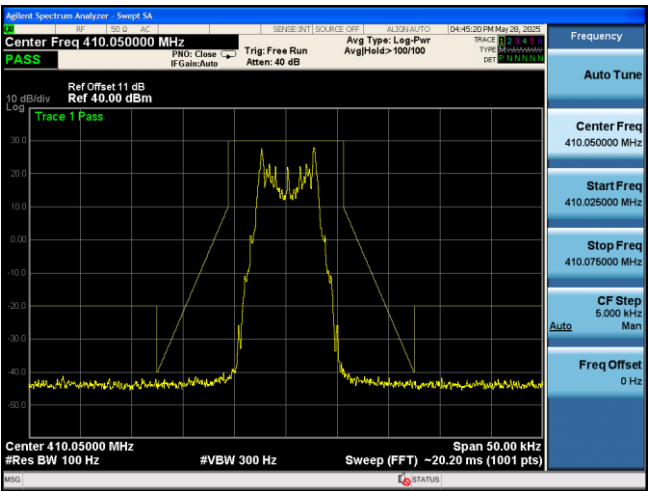


High: 469.850MHz

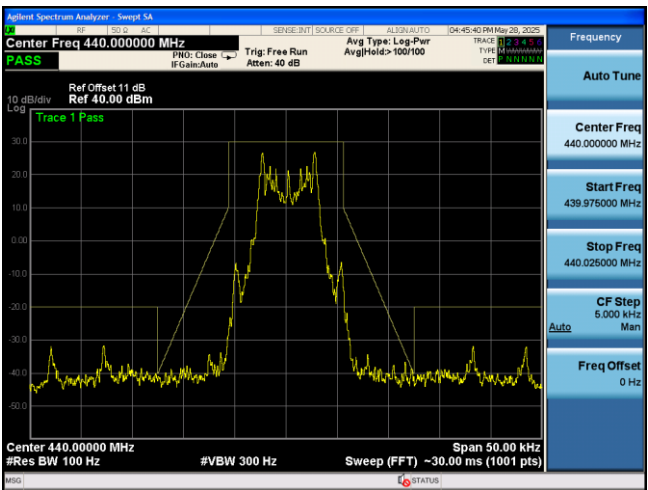


GMSK mode (1W) 12.5KHz Channel Spacing: Emission Mask

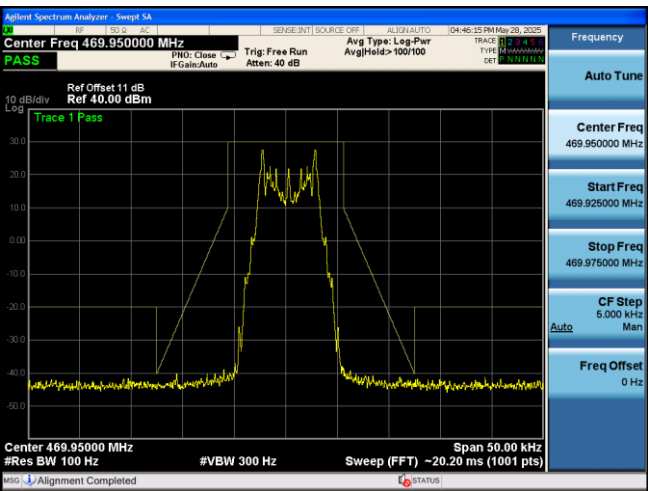
Low: 410.050MHz



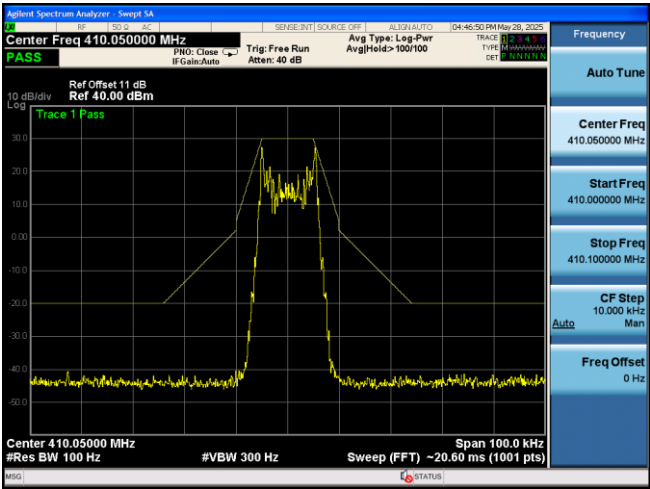
Mid: 440.000MHz



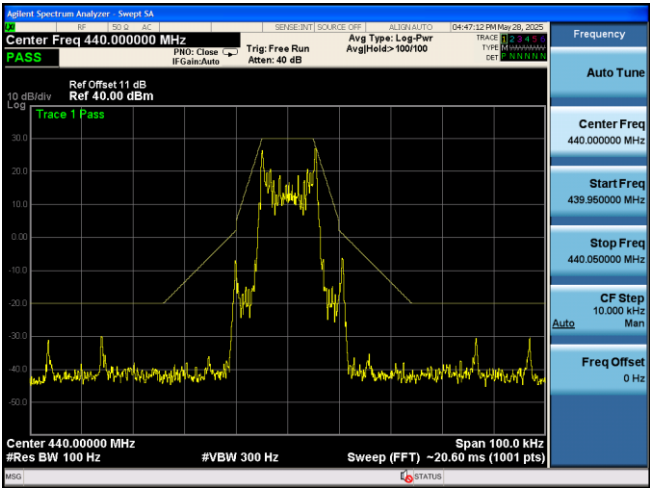
High: 469.950MHz



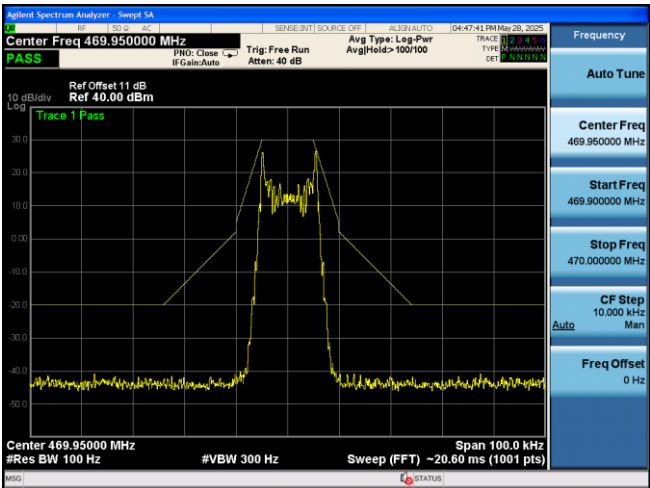
GMSK mode (1W) 25KHz Channel Spacing: Emission Mask
Low: 410.050MHz



Mid: 440.000MHz



High: 469.950MHz

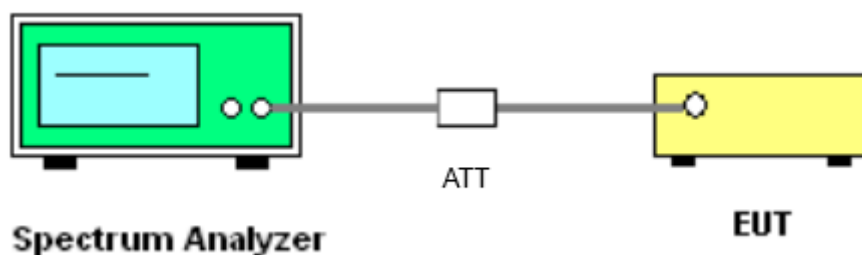


5. Spurious Emissions(conducted)

5.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal Due To
Power Sensor	DARE	RPR3006W	Aa-EE071	2024/08/08	2025/08/07
Signal Analyzer	Agilent	N9020A	Aa-EE039	2024/08/08	2025/08/07
Vector Signal Generator	Agilent	N5182A	Aa-EE040	2024/08/08	2025/08/07
Power Sensor	DARE	RPR3006W	Aa-EE070	2024/08/08	2025/08/07
Power Sensor	Agilent	E9300A	Aa-EE046	2024/08/08	2025/08/07
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	Aa-EE081	2024/08/08	2025/08/07
CMW500	ROHDE&SCHWARZ	CMW500	Aa-EE073	2024/08/08	2025/08/07
Pulse Limiter	SCHWARZBECK	9516F	Aa-EE004	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 (f_d 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 - 10log10 (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 (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 - 10log10 (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 - 10log10 (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--2025/05/28
Condition: 24.2°C,56%RH,101kPa	Test Engineer: Yannis Wen
Memo: /	

EUT Name: Geodetic GNSS Receiver	EUT Model: i76
Sample No.: A2503163-S0003	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

