TEST REPORT

REPORT NUMBER: I22W00060-GSM-RF-Rev4

ON

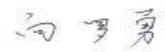
Type of Equipment:	tracker
Type of Designation:	AT-NG5
Brand Name：	PRIME
Manufacturer:	Micron Electronics LLC.
FCC ID:	ZKQ-P61G

ACCORDING TO

PART 22, PUBLIC MOBILE SERVICES，e-CFR
PART 24, PERSONAL COMMUNICATIONS SERVICES，e-CFR
ANSI C63.26-2015 American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

Chongqing Academy of Information and Communications Technology

Month date, year
Feb,01, 2023
Signature



Xiang Luoyong
Director

Note:
The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of Chongqing Academy of Information and Communications Technology.

Revision Version

Report Number	Revision	Date	Memo
I22W00060-GSM- RF	00	2022-09-16	Initial creation of test report
I22W00060-GSM- RF	01	2022-09-26	--
I22W00060-GSM- RF	02	2023-01-06	--
I22W00060-GSM- RF	03	2023-01-31	--
I22W00060-GSM- RF	04	2023-02-01	--

CONTENTS

1. Test Laboratory

1.1. Testing Location

Name:	Chongqing Academy of Information and Communications Technology
FCC Registration number:	CN1239
Address:	Building C, Technology Innovation Center, No.8, Yuma Road, Chayuan New Area, Nan'an District, Chongqing, People's Republic of China
Postal Code:	401336
Telephone:	0086-23-88069965
Fax:	0086-23-88608777

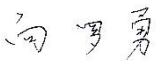
1.2. Testing Environment

Normal Temperature:	28.0-28.55℃
Relative Humidity:	48.0-51.0%

1.3. Project data

Testing Start Date:	2022-08-16
Testing End Date:	2023-01-31

1.4. Signature

	2023-02-01
Li Quan (Prepared this test report)	**Date**
	2023-02-01
Xiao Yu (Reviewed this test report)	**Date**
	2023-02-01
Xiang LuoyongDirector of the laboratory(Approved this test report)	**Date**

2. Client Information

2.1. Applicant Information

Company name:	Micron Electronics LLC.
Address /Post:	1001 Yamato Road, Suite 400, Boca Raton, FL 33431, USA
City:	Boca Raton
Country:	USA
Telephone:	18885383489
Fax:	--
Email:	pcheng@micron-electronics.com
Contact Person:	Ping Cheng

2.2. Manufacturer Information

Company name:	Micron Electronics LLC.
Address /Post:	1001 Yamato Road, Suite 400, Boca Raton, FL 33431, USA
City:	Boca Raton
Country:	USA
Telephone:	18885383489
Fax:	--
Email:	pcheng@micron-electronics.com
Contact Person:	Ping Cheng

3. Equipment under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	tracker
Model name	AT-NG5
Brand name	PRIME
GSM Frequency Band	850/1900
NB-IoT Frequency Band	2/4/5/12/13/26
CAT-M Frequency Band	2/4/5/12/13/26
Type of modulation	GMSK/8PSK/BPSK/QPSK/16QAM
Power supply	USB 5Vdc; Internal Battery power supply:3.7Vdc

Note: Photographs of EUT are shown in ANNEX A of this test report.
Note: High and low voltage values in extreme condition test are given by manufacturer.

3.2. Internal Identification of EUT used during the test

EUT ID	SN or IMEI	HW Version	SW Version	Date of receipt
S1	IMEI:355197370060068	A513_V1	P61V01.01B03.I01	2022-07-14

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Outline of Equipment under Test

Technology	Band	UL Freq.(MHz)	DL Freq.(MHz)	Note
GSM	GSM850	824 – 849	869 – 894	--
	PCS1900	1850 – 1910	1930 – 1990	--
NB-IoT	Band2	1850 – 1910	1930 – 1990	--
	Band4	1710-1755	2110-2155	--
	Band5	824 – 849	869 – 894	Covered by Band26 (Band5 is a subset of Band26. Both Bands share the same hardware and have the same radio performance. Separate measurement in Band5 is not required.)
	Band12	699 – 716	729 – 746	--
	Band13	777 – 787	746 – 756	--
	Band26	814 – 849	859 – 894	--
CAT-M	Band2	1850 – 1910	1930 – 1990	--
	Band4	1710 – 1755	2110 – 2155	--
	Band5	824 – 849	869 – 894	Covered by Band26 (Band5 is a subset of Band26. Both Bands share the same hardware and have the same radio performance. Separate measurement in Band5 is not required.)
	Band12	698 – 716	728 – 746	--
	Band13	777 – 787	746 – 756	--
	Band26	814 – 849	859 – 894	--

3.4. Internal Identification of AE used during the test

AE ID*	Description	Information
AE1	Adapter	Model：CD112 Input：AC100-240V,50/60Hz，0.15Amax Output:DC5V,1Amax

Antenna gain(dBi)：

Band	Antenna gain(dBi)
GSM1900/NB-IoT/CAT-M2	1.50
NB-IoT/CAT-M4	1.40
GSM850/NB-IoT/CAT-M5 (824MHz-849MHz)	3.46
NB-IoT/CAT-M 12	2.36
NB-IoT/CAT-M 13	1.32
NB-IoT/CAT-M 26 (814MHz-824MHz)	3.04
NB-IoT/CAT-M 26 (824MHz-849MHz)	3.46

Antenna style: FPC antenna

*AE ID: is used to identify the test sample in the lab internally.

dB*： is provided customer.

4. Reference Documents

4.1. Documents supplied by applicant

PICS/PIXIT, referring to Annex B for detailed information, is supplied by the client or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
PART 22	PUBLIC MOBILE SERVICES	--
PART 24	PERSONAL COMMUNICATIONS SERVICES,e-CFR,	--
ANSI C63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015

5. Test Equipments Utilized

5.1. RSE Test System

No.	Equipment	Model	SN	HW Version	SW Version	Manufacture	Cal.Due Date
1	Test Receiver	ESU26	100367	--	5.1-24-3	R&S	2023-06-29
2	Ultra-wideband Log Periodic Antenna	VULB 9163	01392	--	--	Schwarzbeck	2023-03-04
3	Double Ridged Guide Antenna	HF907	100357	--	--	R&S	2023-02-10
4	Universal Radio Communication Tester	CMW500	152395	--	--	R&S	2023-06-29
5	Generator	SMF100A	102222	--	--	R&S	2023-06-29
6	Ultra-wideband Log Periodic Antenna	VULB 9163	00995	--	--	R&S	2023-04-03
7	Double Ridged Guide Antenna	HF907	100356	--	--	R&S	2023-07-07

5.2. Climate Chamber

No.	Name	Type	SN	Manufacture	Cal.Due Date
2	Fully-Anechoic Chamber	FACT3-2	--	ETS	2025-04-29

5.3. Vibration table

No.	Name	Type	SN	Manufacture	Cal.Due Date
--	--	--	--	--	--

5.4. Test software

No.	Name	version	SN	Manufacture
1	EMC32	V 8.51.00	--	R&S

6. Test Results

6.1. Summary of Test Results

A brief summary of the tests carried out is shown as following.

FCC Rules	Name of Test	Result
2.1046,22.913(a),24.232(c)	ERP and EIRP	Pass
24.238,22.917,	Radiated Spurious Emission	Pass

6.2. ERP and EIRP

This is the test for the maximum radiated power from the EUT.

According to Part 22.913(a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

According to Part24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

Conducted RF Power+Antenna Gain(dBi)=EIRP
Conducted RF Power+Antenna Gain(dBd)=ERP
Antenna Gain(dBd)= Antenna Gain(dBi)-2.15

Frequency Band	AntennaGain (dBi)	AntennaGain (dBd)
GSM 850	N/A	1.31
GSM 1900	1.50	N/A

GSM 850 Measurement result

Limits 38.5dBm(7w)

Max ERP:31.94dBm

GSM850 GSM(GMSK)

Frequency (MHz)	Avg power (dBm)	Radiated Power(dBm) G_T=1.31dBd
824.2	30.56	31.87
836.6	30.35	31.66
848.8	30.40	31.71

GSM850 GPRS(GMSK)

Frequency (MHz)	Slot	Avg power (dBm)	Radiated Power(dBm) G_T=1.31dBd
824.2	1TS	30.63	31.94
824.2	2TS	30.18	31.49
824.2	3TS	29.57	30.88
824.2	4TS	29.18	30.49
836.6	1TS	30.17	31.48
836.6	2TS	29.76	31.07
836.6	3TS	29.30	30.61
836.6	4TS	28.89	30.20
848.8	1TS	30.17	31.48
848.8	2TS	29.82	31.13
848.8	3TS	29.37	30.68
848.8	4TS	28.98	30.29

GSM850 EGPRS(GMSK)

Frequency (MHz)	Slot	Avg power (dBm)	Radiated Power(dBm) G_T=1.31dBd
824.2	1TS	30.32	31.63
824.2	2TS	29.87	31.18
824.2	3TS	29.37	30.68
824.2	4TS	28.94	30.25
836.6	1TS	30.00	31.31
836.6	2TS	29.62	30.93
836.6	3TS	29.21	30.52
836.6	4TS	28.88	30.19
848.8	1TS	30.10	31.41

848.8	2TS	29.71	31.02
848.8	3TS	29.30	30.61
848.8	4TS	28.98	30.29

GSM850 EGPRS(8PSK)

Frequency (MHz)	Slot	Avg power (dBm)	Radiated Power(dBm) G_T= 1.31dBd
824.2	1TS	27.79	29.10
824.2	2TS	27.42	28.73
824.2	3TS	26.67	27.98
824.2	4TS	26.86	28.17
836.6	1TS	27.60	28.91
836.6	2TS	27.23	28.54
836.6	3TS	26.90	28.21
836.6	4TS	26.63	27.94
848.8	1TS	27.66	28.97
848.8	2TS	27.29	28.60
848.8	3TS	26.95	28.26
848.8	4TS	26.19	27.50

PCS 1900 Measurement result

GSM GMSK Mode

Limits 33.0dBm(2w)

Max EIRP:31.93dBm

GSM(GMSK)

Frequency (MHz)	Avg power (dBm)	Radiated Power(dBm) G_T= 1.50dBi
1850.2	30.33	31.83
1880	30.02	31.52
1909.8	29.68	31.18

PCS1900

GPRS(GMSK)

Frequency (MHz)	Slot	Avg power (dBm)	Radiated Power(dBm) G_T= 1.50dBi
1850.2	1TS	30.43	31.93
1850.2	2TS	30.28	31.78
1850.2	3TS	30.18	31.68
1850.2	4TS	30.14	31.64
1880	1TS	30.05	31.55
1880	2TS	29.86	31.36
1880	3TS	29.90	31.40
1880	4TS	29.86	31.36
1909.8	1TS	29.64	31.14
1909.8	2TS	29.61	31.11
1909.8	3TS	29.57	31.07
1909.8	4TS	29.53	31.03

PCS1900

EGPRS(GMSK)

Frequency (MHz)	Slot	Avg power (dBm)	Radiated Power(dBm) G_T= 1.50dBi
1850.2	1TS	30.30	31.80
1850.2	2TS	30.20	31.70
1850.2	3TS	30.15	31.65
1850.2	4TS	30.09	31.59
1880	1TS	29.84	31.34
1880	2TS	29.91	31.41
1880	3TS	29.88	31.38
1880	4TS	29.82	31.32

1909.8	1TS	29.90	31.40
1909.8	2TS	29.91	31.41
1909.8	3TS	29.54	31.04
1909.8	4TS	29.78	31.28

PCS1900

EGPRS(8PSK)

Frequency (MHz)	Slot	Avg power (dBm)	Radiated Power(dBm) G_T= 1.50dBi
1850.2	1TS	29.53	29.71
1850.2	2TS	29.45	29.59
1850.2	3TS	29.46	29.65
1850.2	4TS	29.40	29.56
1880	1TS	29.19	29.30
1880	2TS	29.20	29.29
1880	3TS	29.16	29.19
1880	4TS	28.93	29.12
1909.8	1TS	28.96	29.11
1909.8	2TS	28.90	28.97
1909.8	3TS	28.49	28.98
1909.8	4TS	28.82	28.83

6.3. Radiated Spurious Emission

Specifications:	FCC Part 24.238, 22.917
DUT Serial Number:	866884046100616
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

According to Part 22.917 (a), i.e., Out of Band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to Part 24.238 (a), i.e., Out of Band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB, so the limit level is: P(dBm)– (43 + 10 log(P)) dB= -13dBm.

Limits for Radiated spurious emissions(UE)	
Frequency range	**Limit Level /Resolution Bandwidth**
30 MHz to 20000 MHz	-13dBm/1MHz

Measurement Uncertainty:

Item	Uncertainty
Expanded Uncertainty（30MHz-150MHz）	5.15 dB (k=2)
Expanded Uncertainty（150MHz-1GHz）	4.09dB (k=2)
Expanded Uncertainty（1GHz-3GHz）	2.92dB (k=2)
Expanded Uncertainty（3GHz-6GHz）	2.93dB (k=2)
Expanded Uncertainty（3GHz-18GHz）	2.69dB (k=2)

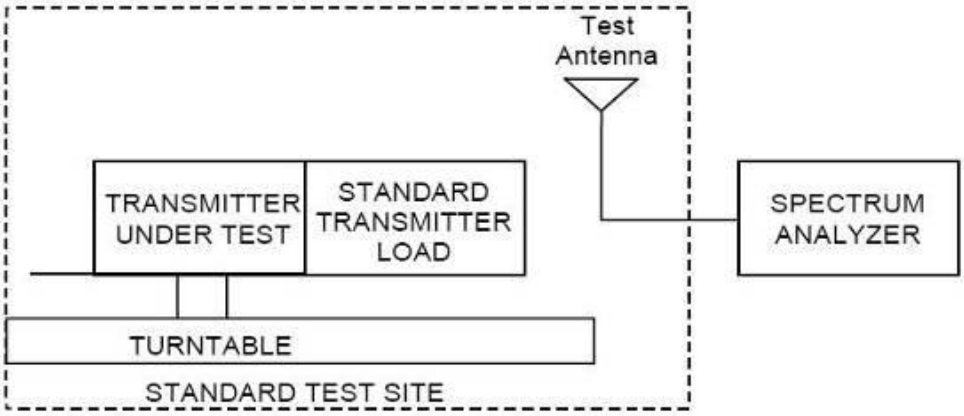
Test Setup:

The EUT was placed in an anechoic chamber. The Wireless Communications Test Set was used to set the TX channel and power level and modulate the TX signal with different bit patterns.

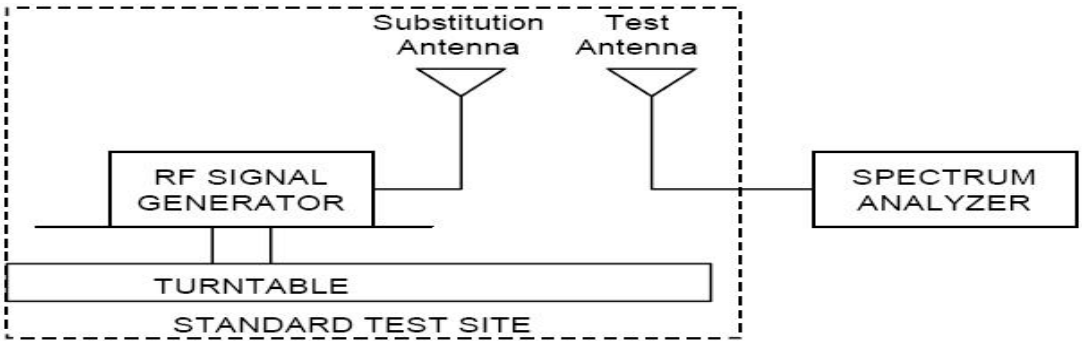
Test Method:

The measurement method is substitution method accordance with section 2.2.12 of ANSI/TIA-603-E: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

(a) Connect the equipment as illustrated and measure the spurious emissions as the method as above. The distance from the device to the antenna is 3 m .



(b) Reconnect the equipment as illustrated.



(c) Remove the transmitter and replace it with a substitution antenna. The center of the substitution antenna should be approximately at the same location as the center of the transmitter.

(d) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

(e) Repeat step d) with both antennas vertically polarized for each spurious frequency.

(f) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps d) and e) by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:

P_d(dBm) = P_g(dBm) – cable loss (dB) + antenna gain (dB)

Radiated Spurious Emission Results

Test frequency：30MHz-20GHz

All modes were tested,only the worst case was reported.

GSM850 Radiated Spurious Emission Results

Test Data （GSM850 GPRS GMSK 824.2MHz 1TS）

Frequency [MHz]	Generator output power(Pg) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (Pd) [dBm]	Antenna Polarization [H/V]
1648.4	-56.1	1.0	1.6	-55.5	H
2472.6	-49.7	1.3	0.3	-50.7	H
3296.8	-59.35	1.5	8.85	-52.0	V
4121.0	-58.65	1.8	9.25	-51.2	V
4945.2	-55.26	1.9	9.46	-47.7	V
5769.4	-58.46	2.3	11.16	-49.6	V

Test Data （GSM850 EGPRS GMSK 824.2MHz 1TS）

Frequency [MHz]	Generator output power(Pg) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (Pd) [dBm]	Antenna Polarization [H/V]
1648.4	-56.8	1.0	1.6	-56.2	V
2472.6	-49.3	1.3	0.3	-50.3	H
3296.8	-59.95	1.5	8.85	-52.6	V
4121.0	-58.25	1.8	9.25	-50.8	V
4945.2	-55.26	1.9	9.46	-47.7	V
5769.4	-57.96	2.3	11.16	-49.1	V

GSM 1900 Radiated Spurious Emission Results

Test Data （GSM 1900 GPRS GMSK 1850.2MHz 1TS）

Frequency [MHz]	Generator output power(Pg) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (Pd) [dBm]	Antenna Polarization [H/V]
3700.4	-61.72	1.6	9.02	-54.3	V
5550.6	-59.25	2.1	10.35	-51.0	V
7400.8	-59.12	2.5	11.82	-49.8	V
9251.0	-54.22	3.1	12.22	-45.1	V
11101.2	-53.18	3.6	13.58	-43.2	V
12951.4	-52.48	3.7	14.08	-42.1	V

Test Data （GSM 1900 EGPRS GMSK 1850.2MHz 1TS）

Frequency [MHz]	Generator output power(Pg) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (Pd) [dBm]	Antenna Polarization [H/V]
3700.4	-62.22	1.6	9.02	-54.8	V
5550.6	-60.95	2.1	10.35	-52.7	V
7400.8	-57.12	2.5	11.82	-47.8	V
9251.0	-53.02	3.1	12.22	-43.9	V
11101.2	-52.58	3.6	13.58	-42.6	V
12951.4	-52.38	3.7	14.08	-42.0	V

Annex A EUT Photos

See the document" I22W00060-External Photos".
See the document" I22W00060-Internal Photos ".

ANNEX B Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

END OF REPORT