FCC TEST REPORT

Name of Sample:	**Mobile Cellular Phone**
Model of Sample:	**XT2409-2**
Applicant:	**Motorola Mobility LLC**
Issue Date:	**2024-07-11**

ADR TEST AND CERTIFICATION CENTER

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Name of Client	Motorola Mobility LLC		
Address of Client	222 W, Merchandise Mart Plaza, Chicago IL 60654 USA		
Trademark	Motorola	**Type Name or ID**	FCC ID: IHDT56AS7
Applicant No.	RF178847	**Sample No.**	1#: N74R240107 2#: N74R240275
Delivering Date	2024-05-31	**Test Date**	2024-06-12 to 2024-07-11
Sample Illustration	None		
Standard	47 CFR Part 2; 47 CFR Part 22; 47 CFR Part 24; 47 CFR Part 27; 47 CFR Part 90;		
Conclusion	Pass		
Remarks	N/A		

Editor: Wangzhenyu **Auditor:** Hexiaolin **Approver:** HuangshengLin

Matters Needing Attention

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Revision History

Report No.	Version	Description	Issued Date
TR-24ADRTCC7014	Rev.01	Initial issue of report	2024-07-05
TR-24ADRTCC7014	Rev.02	Update n5/26 max bandwidth	2024-07-09
TR-24ADRTCC7014	Rev.03	Update n78 frequency range on page 13. Update n78 data in appendix B.2 Update model difference information Update accessories information	2024-07-11

Catalogue

1. Test Summary

1.1. 5G NR Band n2

Test Item	Rule No.	Requirements	Test Result	Verdict
Conducted Power	§2.1046	Report Only	Section 1 of Appendix B	Pass
Effective Isotropic Radiated Power	§24.232(c)	EIRP < 2W		

1.2. 5G NR Band n5/n26

Test Item	Rule No.	Requirements	Test Result	Verdict
Conducted Power	§2.1046	Report Only	Section 1 of Appendix B	Pass
Effective Radiated Power	§22.913(a)(5)	ERP < 7W		
Peak-Average Ratio	§22.913(d)	<13 dB	Section 2 of Appendix B	Pass
Modulation Characteristics	§2.1047	Digital modulation	Section 3 of Appendix B	Pass
Occupied Bandwidth	§2.1049	No limit	Section 4 of Appendix B	Pass
26dB Emission Bandwidth		No limit		
Conducted Band Edges	§2.1051 §22.917(a)	< -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Section 5 of Appendix B	Pass
Conducted Spurious Emission	§2.1051 §22.917(a)	< -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges	Section 6 of Appendix B	Pass
Frequency Stability	§2.1055 §22.355	< ±2.5ppm	Section 7 of Appendix B	Pass

1.3. 5G NR Band n26 (814-824)

Test Item	Rule No.	Requirements	Test Result	Verdict
Conducted Power	§2.1046 §90.635	Report Only	Section 1 of Appendix B	PASS

1.4. 5G NR Band n7/n38/n41

Test Item	Rule No.	Requirements	Test Result	Verdict
Conducted Power	§2.1046	Report Only	Section 1 of Appendix B	Pass
Effective Isotropic Radiated Power	§27.50(h) (2)	EIRP < 2W		

1.5. 5G NR Band n66

Test Item	Rule No.	Requirements	Test Result	Verdict
Conducted Power	§2.1046	Report Only	Section 1 of Appendix B	Pass
Effective Isotropic Radiated Power	§27.50(d)	EIRP < 1W		

1.6. 5G NR Band n78 (3450-3550)

Test Item	Rule No.	Requirements	Test Result	Verdict
Conducted Power	§2.1046	Report Only	Section 1 of Appendix B	Pass
Effective Isotropic Radiated Power	§27.50(k) (3)	EIRP < 1W		
Peak-Average Ratio	§27.50(k) (4)	<13 dB	Section 2 of Appendix B	Pass
Modulation Characteristics	§2.1047	Digital modulation	Section 3 of Appendix B	Pass
Occupied Bandwidth	§2.1049	No limit	Section 4 of Appendix B	Pass
26dB Emission Bandwidth		No limit		

Test Item	Rule No.	Requirements	Test Result	Verdict
Conducted Band Edges	§2.1051 §27.53(n) (2)	< -13 dBm/MHz	Section 5 of Appendix B	Pass
Conducted Spurious Emission	§2.1051 §27.53(n) (2)	< -13 dBm/MHz	Section 6 of Appendix B	Pass
Frequency Stability	§27.54	Within authorized bands	Section 7 of Appendix B	Pass

Remark:

1, Only 5G NR Bands conducted test performed and the data displayed in this report, the radiated spurious emission refer to the report (FG452307-01).

2, The maximum E(I)RP is calculated from max output power and max antenna gain, only the max E(I)RP data displayed in this report, n5 for Antenna 0; n78 for antenna 3.

2. Summary of 5G NR Spot Check

2.1. Reference Detail Section

Rule Part	Equipment Class	Frequency Band	Reference FCC ID (Parent)	Reference on test	Reference Title	FCC ID (Variant)	Test on the variant	Data Reference (Y/N)
22, 24, 27, 90	PCE (NR)	n2/n7/n26/n38/n41/n66	IHDT56AS6	Full Test	24ADRTCC7013	IHDT56AS7	Spot Check	Y All test items
		n5	IHDT56AS6	Full Test	24ADRTCC7013	IHDT56AS7	Full Test	N All test items

2.2. Spot Check Verification Data Section

Test Item	Mode	Worst Mode Test Result		Deviation (dB)	Limit (dB)
		IHDT56AS6	IHDT56AS7		
Conducted Power	n2	23.75	23.72	- 0.03	3
	n5	23.50	23.68	0.18	3
	n7	23.83	23.67	- 0.16	3
	n26	23.39	23.26	- 0.13	3
	n38	23.87	23.89	0.02	3
	n41	23.79	23.76	- 0.03	3
	n66	23.75	23.41	- 0.34	3

This application re-uses data collected on a similar device. The subject device of this application (Model: XT2409-2, FCC ID: IHDT56AS7) is electrically identical to the reference device (Model: XT2409-1, XT2409-6, FCC ID: IHDT56AS6, Report No.:24ADRTCC7013) for the portions of the circuitry corresponding to the data being re-used. Based on their similarity. The FCC Part 2, 22, 24, 27(equipment class: PCE) ,90 referencing the original model's result and do spot check, following the FCC KDB484596 D01 Referencing Test Data v02r02.

Compared the device (Model: XT2409-2, FCC ID: IHDT56AS7) with the reference device (Model: XT2409-1, XT2409-6, FCC ID: IHDT56AS6), according to the maximum conducted output power comparison result, therefor, band n5 was defined as the worst band and full test the conducted item to demonstrate the compliance, and the data displayed in appendix B.1.

Model difference information

The main difference between FCC ID: IHDT56AS7 and FCC ID: IHDT56AS6 is as below:

- Remove LTE 18/19/20/32/39/43 and 5G NR n20/n75/n77(Part 27O)/n78(Part 27O).
- Add 5G NR n78(Part 27Q)
- LTE Band 41/41C change power class 2 to power class 3.
- Different NFC chipset.

Other difference and all the details of similarity and difference can be found in the confidential documents (XT2409-2_Operational Description of Product Equality Declaration).

3. Maximum Effective Radiated (Isotropic) Power and Emission Designator

3.1. NR System

3.1.1. NR Band n5 (824-849)

5G NR NSA (DC_66A_n5A)		Pi/2 BPSK / QPSK		16QAM/64QAM/256QAM	
Bandwidth	Frequency Range (MHz)	Maximum ERP (W)	Emission Designator (99% OBW)	Maximum ERP (W)	Emission Designator (99% OBW)
5MHz	826.5-846.5	0.033497	4M49G7D	0.024547	4M48W7D
10MHz	829.0-844.0	0.032359	9M27G7D	0.026977	9M29W7D
15MHz	831.5-841.5	0.031842	14M1G7D	0.025882	14M1W7D
20MHz	834.0-839.0	0.031842	18M9G7D	0.027797	18M9W7D

3.1.2. NR Band n78 (3450-3550)

5G NR SA (n78A)		Pi/2 BPSK / QPSK		16QAM/64QAM/256QAM	
Bandwidth	Frequency Range (MHz)	Maximum EIRP (W)	Emission Designator (99% OBW)	Maximum EIRP (W)	Emission Designator (99% OBW)
10MHz	3455.01-3544.98	0.135207	8M61G7D	0.116413	8M59W7D
15MHz	3457.50-3542.49	0.137088	13M6G7D	0.115611	13M6W7D
20MHz	3460.02-3540.00	0.138676	18M2G7D	0.113501	18M2W7D
25MHz	3462.51-3537.48	0.140929	23M3G7D	0.113240	23M2W7D
30MHz	3465.00-3534.99	0.138357	27M8G7D	0.112460	27M8W7D
40MHz	3470.01-3529.98	0.139316	37M8G7D	0.113240	37M9W7D
50MHz	3475.02-3525.00	0.139637	47M6G7D	0.111173	47M5W7D
60MHz	3480.00-3519.99	0.135519	57M7G7D	0.113763	57M8W7D
70MHz	3485.01-3514.98	0.139959	67M4G7D	0.116681	67M4W7D
80MHz	3490.02-3510.00	0.142561	77M4G7D	0.117761	77M5W7D
90MHz	3495.00-3504.99	0.142889	87M2G7D	0.119399	87M6W7D
100MHz	3500.01	0.136144	97M3G7D	0.113501	97M5W7D

5G NR NSA (DC_38A_n78A)		Pi/2 BPSK / QPSK		16QAM/64QAM/256QAM	
Bandwidth	Frequency Range (MHz)	Maximum EIRP (W)	Emission Designator (99% OBW)	Maximum EIRP (W)	Emission Designator (99% OBW)
10MHz	3455.01-3544.98	0.096828	8M57G7D	0.073961	8M59W7D
15MHz	3457.50-3542.49	0.093972	13M6G7D	0.075683	13M6W7D
20MHz	3460.02-3540.00	0.093325	18M2G7D	0.074302	18M2W7D
25MHz	3462.51-3537.48	0.097724	23M2G7D	0.075162	23M3W7D
30MHz	3465.00-3534.99	0.092045	27M8G7D	0.071614	27M9W7D
40MHz	3470.01-3529.98	0.096161	37M8G7D	0.074473	37M8W7D
50MHz	3475.02-3525.00	0.091833	47M5G7D	0.075683	47M5W7D
60MHz	3480.00-3519.99	0.092470	57M7G7D	0.076033	57M8W7D
70MHz	3485.01-3514.98	0.094406	67M4G7D	0.077090	67M6W7D
80MHz	3490.02-3510.00	0.095719	77M5G7D	0.079433	77M5W7D

90MHz	3495.00-3504.99	0.092897	87M4G7D	0.075858	87M4W7D
100MHz	3500.01	0.093325	97M3G7D	0.075162	97M5W7D

4. General Information

4.1. General Description of EUT

EUT Description:	Mobile Cellular Phone
Brand Name:	Motorola
Model Name:	XT2409-2
FCC ID:	IHDT56AS7
IMEI Code:	1#: 350074740013371/350074740013389 (Conducted); 2#: 350074740013496/350074740013504 (Conducted);
Hardware Version:	DVT2
Software Version:	UUI34.38
NR Modulation:	DFT-s-OFDM: ☒Pi/2BPSK; ☒ QPSK; ☒ 16QAM; ☒ 64QAM; ☒ 256QAM; CP-OFDM: ☒ QPSK; ☒ 16QAM; ☒ 64QAM; ☒ 256QAM;
Sample Type:	☒ Portable Device, ☐Module
Antenna Type:	☐External, ☒ Integrated
Antenna Gain:	n2 (1850-1910): -2.33dBi (Ant1); -3.40dBi (Ant4); n5 (824-849): -6.28dBi (Ant0); -6.20dBi (Ant4); n7 (2500-2570): -1.85dBi (Ant1); -0.69dBi (Ant4); n26 (814-849): -6.28dBi (Ant0); -6.20dBi (Ant4); n38 (2570-2620): -3.82dBi (Ant0); -1.80dBi (Ant1); -2.40dBi (Ant2); -0.69dBi (Ant4); n41 (2496-2690): -3.82dBi (Ant0); -1.80dBi (Ant1); -2.40dBi (Ant2); -0.69dBi (Ant4); n66 (1710-1780): -2.17dBi (Ant1); -2.39dBi (Ant4); n78 (3450-3550): -3.42dBi (Ant3); -0.11dBi (Ant5); -3.04dBi (Ant7); -2.16dBi (Ant9);

Remark

1, The information above was declared by manufacture. Please refer to the specifications or user manual for more detailed description.

4.2. Test Environment

Relative Humidity:	52.0% - 62.0%	
Atmospheric Pressure:	101.32 KPa	
Temperature:	NT (normal temperature)	25.0 °C – 27.5 °C
Voltage:	LV (Low voltage)	3.60V
	NV (Nominal voltage)	3.91V
	HV (High voltage)	4.50V

4.3. Specification of Accessories

Accessory	Brand Name	Model Name
AC Adapter 1 (US)	Motorola (Chenyang)	MC-681N
AC Adapter 2 (EU)	Motorola (Chenyang)	MC-682N
AC Adapter 3 (UK)	Motorola (Chenyang)	MC-683N
AC Adapter 4 (AU)	Motorola (Chenyang)	MC-685N
AC Adapter 5 (BR)	Motorola (Chenyang)	MC-687N
AC Adapter 6 (US)	Motorola (Acbel)	MC-681N
AC Adapter 7 (EU)	Motorola (Acbel)	MC-682N

AC Adapter 8 (UK)	Motorola (Acbel)	MC-683N
AC Adapter 9 (AU)	Motorola (Acbel)	MC-685N
AC Adapter 10 (BR)	Motorola (Acbel)	MC-687N
Battery 1	Motorola (ATL)	QV43
USB Cable 1	Motorola (Hexin)	S928E28748
USB Cable 2	Motorola (Juwei)	S928E28749
USB Cable 3	Motorola (Saibao)	S928E38943
Wireless Earphones	Motorola (Lyand)	XT2441-1

5. Test Configuration of Equipment Under Test

5.1. Test Mode for NR Configuration

Test Case	5G NR	SCS		Bandwidth	Modulation					Channel			RB	
		15KHz	30KHz		Pi/2BPSK	QPSK	16QAM	64QAM	256QAM	LCH	MCH	HCH	1	Full
Effective Isotropic Radiated Power	N2 (1850-1910)	●	○	All Supported BW	●	●	●	●	●	●	●	●	●	●
	N5 (824-849)	●	○	All Supported BW	●	●	●	●	●	●	●	●	●	●
	N7 (2500-2570)	●	○	All Supported BW	●	●	●	●	●	●	●	●	●	●
	N26 (814-824)	●	○	All Supported BW	●	●	●	●	●	●	●	●	●	●
	N26 (824-849)	●	○	All Supported BW	●	●	●	●	●	●	●	●	●	●
	N38 (2570-2620)	○	●	All Supported BW	●	●	●	●	●	●	●	●	●	●
	N41 (2496-2690)	○	●	All Supported BW	●	●	●	●	●	●	●	●	●	●
	N66 (1710-1780)	●	○	All Supported BW	●	●	●	●	●	●	●	●	●	●
	N78 (3450-3550)	○	●	All Supported BW	●	●	●	●	●	●	●	●	●	●
Peak-Average Ratio	N5 (824-849)	●	○	Highest BW	●	●	○	○	○	●	●	●	○	●
	N78 (3450-3550)	○	●	Highest BW	●	●	○	○	○	●	●	●	○	●
Modulation Characteristics	N5 (824-849)	●	○	Highest BW	●	●	●	●	●	○	●	○	○	●
	N78 (3450-3550)	○	●	Highest BW	●	●	●	●	●	○	●	○	○	●
Occupied Bandwidth & 26dB Emission Bandwidth	N5 (824-849)	●	○	All Supported BW	●	●	●	●	●	○	●	○	○	●
	N78 (3450-3550)	○	●	All Supported BW	●	●	●	●	●	○	●	○	○	●
Conducted Band Edges	N5 (824-849)	●	○	All Supported BW	●	●	○	○	○	●	○	●	●	●
	N78 (3450-3550)	○	●	All Supported BW	●	●	○	○	○	●	○	●	●	●
Conducted Spurious Emission	N5 (824-849)	●	○	All Supported BW	●	●	○	○	○	●	●	●	●	○
	N78 (3450-3550)	○	●	All Supported BW	●	●	○	○	○	●	●	●	●	○
Frequency Stability	N5 (824-849)	●	○	Highest BW	○	●	○	○	○	○	●	○	○	●
	N78 (3450-3550)	○	●	Highest BW	○	●	○	○	○	○	●	○	○	●

Remark:

1, the mark "●" means this configuration was chosen for testing, mark "○" means not selected, and the mark "✘" means not applicable.

2, All Supported BW means all supported bandwidth for selected SCS configuration.

5.2. Test Frequencies

5.2.1. 5G NR System

5.2.1.1. NR Band n2 (1850-1910)

5.2.1.1.1. SCS=15KHz

Bandwidth	LCH		MCH		HCH	
	Arfcn	Freq	Arfcn	Freq	Arfcn	Freq
5MHz	370500	1852.5	376000	1880.0	381500	1907.5
10MHz	371000	1855.0	376000	1880.0	381000	1905.0
15MHZ	371500	1857.5	376000	1880.0	380500	1902.5
20MHz	372000	1860.0	376000	1880.0	380000	1900.0
25MHz	372500	1862.5	376000	1880.0	379500	1897.5
30MHz	373000	1865.0	376000	1880.0	379000	1895.0
35MHz	373500	1867.5	376000	1880.0	378500	1892.5
40MHz	374000	1870.0	376000	1880.0	378000	1890.0

5.2.1.2. NR Band n5 (824-849)

5.2.1.2.1. SCS=15KHz

Bandwidth	LCH		MCH		HCH	
	Arfcn	Freq	Arfcn	Freq	Arfcn	Freq
5MHz	165300	826.5	167300	836.5	169300	846.5
10MHz	165800	829.0	167300	836.5	168800	844.0
15MHZ	166300	831.5	167300	836.5	168300	841.5
20MHz	166800	834.0	167300	836.5	167800	839.0

5.2.1.3. NR Band n7 (2500-2570)

5.2.1.3.1. SCS=15KHz

Bandwidth	LCH		MCH		HCH	
	Arfcn	Freq	Arfcn	Freq	Arfcn	Freq
5MHz	500500	2502.5	507000	2535.0	513500	2567.5
10MHz	501000	2505.0	507000	2535.0	513000	2565.0
15MHZ	501500	2507.5	507000	2535.0	512500	2562.5
20MHz	502000	2510.0	507000	2535.0	512000	2560.0
25MHz	502500	2512.5	507000	2535.0	511500	2557.5
30MHz	503000	2515.0	507000	2535.0	511000	2555.0
35MHz	503500	2517.5	507000	2535.0	510500	2552.5
40MHz	504000	2520.0	507000	2535.0	510000	2550.0
50MHz	505000	2525.0	507000	2535.0	509000	2545.0

5.2.1.4. NR Band n26 (814-824)

5.2.1.4.1. SCS=15KHz

Bandwidth	LCH		MCH		HCH	
	Arfcn	Freq	Arfcn	Freq	Arfcn	Freq
5MHz	163300	816.5	163800	819.0	164300	821.5
10MHz	163800	819.0	163800	819.0	163800	819.0
15MHz	164300	821.5	164300	821.5	164300	821.5
20MHz	164800	824.0	164800	824.0	164800	824.0

5.2.1.5. NR Band n26 (824-849)

5.2.1.5.1. SCS=15KHz

Bandwidth	LCH		MCH		HCH	
	Arfcn	Freq	Arfcn	Freq	Arfcn	Freq
5MHz	165300	826.5	167300	836.5	169300	846.5
10MHz	165800	829.0	167300	836.5	168800	844.0
15MHZ	166300	831.5	167300	836.5	168300	841.5
20MHz	166800	834.0	167300	836.5	167800	839.0

5.2.1.6. NR Band n38 (2570-2620)

5.2.1.6.1. SCS=30KHz

Bandwidth	LCH		MCH		HCH	
	Arfcn	Freq	Arfcn	Freq	Arfcn	Freq
10MHz	515000	2575.0	519000	2595.0	525000	2625.0
15MHz	515500	2577.5	519000	2595.0	524500	2622.5
20MHz	516000	2580.0	519000	2595.0	522000	2610.0
25MHz	516500	2582.5	519000	2595.0	521500	2607.5
30MHz	517000	2585.0	519000	2595.0	521000	2605.0
40MHz	518000	2590.0	519000	2595.0	520000	2600.0

5.2.1.7. NR Band n66 (1710-1780)

5.2.1.7.1. SCS=15KHz

Bandwidth	LCH		MCH		HCH	
	Arfcn	Freq	Arfcn	Freq	Arfcn	Freq
5MHz	342500	1712.5	349000	1745.0	355500	1777.5
10MHz	343000	1715.0	349000	1745.0	355000	1775.0
15MHz	343500	1717.5	349000	1745.0	354500	1772.5
20MHz	344000	1720.0	349000	1745.0	354000	1770.0
25MHz	344500	1722.5	349000	1745.0	353500	1767.5
30MHz	345000	1725.0	349000	1745.0	353000	1765.0
35MHz	345500	1727.5	349000	1745.0	352500	1762.5
40MHz	346000	1730.0	349000	1745.0	352000	1760.0
45MHz	346500	1732.5	349000	1745.0	351500	1757.5

5.2.1.8. NR Band n41 (2496-2690)

5.2.1.8.1. SCS=30KHz

Bandwidth	LCH		MCH		HCH	
	Arfcn	Freq	Arfcn	Freq	Arfcn	Freq
10MHz	500202	2501.01	518598	2592.99	537000	2685.00
15MHz	500700	2503.50	518598	2592.99	536496	2682.48
20MHz	501204	2506.02	518598	2592.99	535998	2679.99
25MHz	501700	2508.50	518598	2592.99	535500	2677.50
30MHz	502200	2511.00	518598	2592.99	534996	2674.98
40MHz	503202	2516.01	518598	2592.99	534000	2670.00
50MHz	504204	2521.02	518598	2592.99	532998	2664.99
60MHz	505200	2526.00	518598	2592.99	531996	2659.98
70MHz	506202	2531.01	518598	2592.99	531000	2655.00
80MHz	507204	2536.02	518598	2592.99	529998	2649.99
90MHz	508200	2541.00	518598	2592.99	528996	2644.98
100MHz	509202	2546.01	518598	2592.99	528000	2640.00

5.2.1.9. NR Band N78 (3450-3550)

5.2.1.9.1. SCS=30KHz

Bandwidth	LCH		MCH		HCH	
	Arfcn	Freq	Arfcn	Freq	Arfcn	Freq
10MHz	630334	3455.01	633334	3500.01	636332	3544.98
15MHz	630500	3457.50	633334	3500.01	636166	3542.49
20MHz	630668	3460.02	633334	3500.01	636000	3540.00
25MHz	630834	3462.51	633334	3500.01	635832	3537.48
30MHz	631000	3465.00	633334	3500.01	635666	3534.99
40MHz	631334	3470.01	633334	3500.01	635332	3529.98
50MHz	631668	3475.02	633334	3500.01	635000	3525.00
60MHz	632000	3480.00	633334	3500.01	634666	3519.99
70MHz	632334	3485.01	633334	3500.01	634332	3514.98
80MHz	632668	3490.02	633334	3500.01	634000	3510.00
90MHz	633000	3495.00	633334	3500.01	633666	3504.99
100MHz	633334	3500.01	633334	3500.01	633334	3500.01

6. Description of Tests

6.1. Conducted Output Power Measurement

6.1.1. Description of Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT, Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

6.1.2. Test Procedures

1，The testing follows ANSI C63.26 Section 5.2.

2，The transmitter output port was connected to the system simulator.

3，Set EUT at maximum power through the system simulator.

4，Select lowest, Middle, Highest channels for each band and each modulation.

5，Record the reading power from the system simulator.

6.2. Effective (Isotropic) Radiated Power

Measurement Procedure: ANSI C63.26

Calculate power in dBm by the following formula:

ERP (dBm) = Conducted Power (dBm) + antenna gain (dBd)

EIRP (dBm) = Conducted Power (dBm) + antenna gain (dBi)

EIRP=ERP+2.15dB

6.3. Peak-to-Average Ratio Measurement

6.3.1. Description of PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis, A CCDF curve depicts the probability of peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

6.3.2. Test Procedures

1，The testing follows ANSI C63.26 Section 5.2.3.4(CCDF)

2，Refer to instrument's analyser instruction manual for details on how to use the power statistics/CCDF function.

3，Centre Frequency = Carrier centre frequency.

4，Set resolution bandwidth ≥ signal's occupied bandwidth.

5，Set the number of counts to a value that stabilizes the measured CCDF curve.

6，Set the measurement interval as follows:

1) for continuous transmissions (>98% duty cycle), set to 1ms.

2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.

7，Record the maximum PAR level associated with a probability of 0.1%.

6.3.3. Alternate procedure for PAR

Measurement Procedure: 5.2.6 of ANSI C63.26

Some regulatory requirements specify a PAR limit when the output power limits are specified in terms of average power. If it becomes necessary to provide measurement data to demonstrate compliance to a PAR limit, then the appropriate procedure from those provided in 5.2.3 shall be utilized to determine the peak power (or peak PSD) and the appropriate procedure from those provided in 5.2.4 shall be used to determine the average power (or average PSD). The data from these measurements is then used in Equation (2) to determine the PAR of a narrowband CW-like signal. See 5.2.3.4 for guidance on determining the PAR of a broadband noise-like signal.

PAR (dB) = P_{Pk} (dBm or dBW) − P_{Avg} (dBm or dBW)

where

PAR peak-to-average power ratio, in dB

P_{Pk} measured peak power or peak PSD level, in dBm or dBW

P_{Avg} measured average power or average PSD level, in dBm or dBW

6.4. 99% Occupied Bandwidth & 26dB Emission Bandwidth

6.4.1. Description of 99% Occupied Bandwidth & 26dB Emission Bandwidth Measurement

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel, middle channel and high channel). The span of the analyser shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 percent of the selected span as is possible without being below 1 percent. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual. The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 percent of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

6.4.2. Test Procedures

1, The testing follows ANSI C63.26 Section 5.4
2, The signal analyzer's automatic measurement capability was used to perform the 99% occupied bandwidth and the 26dB emission bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
3, RBW ⩾1% - 5% of the expected OBW.
4, VBW ⩾3 * RBW
5, Detector=Peak
6, Trace Mode= Max Hold.
7, Sweep Time=Auto
8, The trace was allowed to stabilize.
9, If necessary, steps 2-7 were repeated after changing the RBW such that it would be within 1%-5% of the 99% occupied bandwidth observed in step 7.

6.5. Conducted Band Edge Measurement

6.5.1. Description of Conducted Band Edge Measurement

The transmitter output was connected to a calibrated coaxial cable, attenuator and spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at two frequencies (low channel and high channel).in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of 100kHz or 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed. The EUT emission bandwidth is measured as the width of the signal between two points, outside of which all emissions are attenuated at least 26dB below the transmitter power. The video bandwidth of the spectrum analyser was set at thrice the resolution bandwidth. Detector Mode was set to peak or peak hold power.

6.5.2. Test Procedures

1, The testing follows ANSI C63.26 Section 5.7
2, Start and stop frequency were set such that the band edge would be placed in the centre of the spectrum analyzer screen.
3, Span was set large enough to capture all out of band emissions near the band edge.

4，RBW ≥1% of the emission bandwidth (2% of the emission bandwidth for n7/n38/n41 except when 1MHz band is 2495-2496MHz);
5，VBW ≥3 * RBW
6，Detector=RMS
7，Trace Mode=Trace Average for continuous emissions, Max Hold for pulse emissions.
8，Sweep Points ≥2 x Span/RBW
9，Sweep Time = Auto
10， The trace was allowed to stabilize.

6.6. Conducted Spurious Emission Measurement

6.6.1. Description of Conducted Spurious Emission Measurement

The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel and high channel). The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyser. The spectrum is scanned from 9KHz up to a frequency including its 10th harmonic or 40GHz, which is lower.

6.6.2. Test Procedures

1，The testing follows ANSI C63.26 Section 5.7
2，RBW ≥100KHz for emissions below 1GHz,1MHz for emissions above 1GHz.
3，VBW ≥3 * RBW
4，Detector = RMS
5，Trace Mode = Average.
6，Sweep Points ≥2 * Span/RBW
7，Sweep Time = Auto
8，The trace was allowed to stabilize.

6.7. Frequency Stability Measurement

6.7.1. Description of Frequency Stability Measurement

The Frequency Stability should be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emissions stays within the authorized frequency block.

6.7.2. Measurement Procedure for Temperature Variation

1，The testing follows ANSI C63.26 section 5.6.4.
2，The EUT was set up in the thermal chamber and connected with the system simulator.
3，With power off, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4，With power off, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum change in frequency was recorded within one minute.

6.7.3. Measurement Procedure for Voltage Variation

1，The testing follows ANSI C63.26 section 5.6.5.
2，The EUT was placed in a thermal chamber at 20±5°C and connected with the system simulator.
3，The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4，For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5，The variation in frequency was measured for the worst case.

7. List of Measuring Equipment

Equipment	Model	Manufacture	Device No.	Cal Date	Cal Due
Radio Communication Analyzer	MT8000A	Anritsu	6272478367	2023-12-07	2024-12-06
	MT8821C	Anritsu	6272498303	2023-12-07	2024-12-06
Radio Communication Analyzer	E7515E	Keysight	MY59296045	2023-12-07	2024-12-06
Spectrum Analyzer (50Hz-40GHz)	FSV	R&S	101046	2023-12-07	2024-12-06
Spectrum Analyzer (50Hz-40GHz)	FSV	R&S	101334	2024-01-30	2025-01-29
Power Supply	2036	Keithley	4058748	2023-12-07	2024-12-06
Temperature Chamber	C/64/40/3	Weiss	56246017780020	2024-04-01	2025-03-31
Power Divider	-	WOKEN	0120A04051801O	NCR	
Power Divider	-	WOKEN	0120A02051801M	NCR	

Remark:

1, For equipment listed above that has a calibration date or calibration due date that falls within the test date range, and the equipment was used after calibrate date and before calibrate due date.

2, “NCR” means no calibration required.

8. Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26. All the measurement uncertainties value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be directly to specified limit to determine compliance.

8.1. Uncertainty of Conducted Measurement

Contribution	Expanded Uncertainty
Conducted Power	± 0.77
Conducted Emission	± 0.76
Channel Bandwidth	± 0.08%

9. Appendixes

Appendix B.1	NR Band DC_66A_n5A (824-849)
Appendix B.2	NR Band n78A (3450-3550)
Appendix B.3	NR Band DC_38A_n78A (3450-3550)

The End