

FCC TEST REPORT

Name of Sample: Mobile Cellular Phone
Model of Sample: XT2409-1; XT2409-6
Applicant: Motorola Mobility LLC
Issue Date: 2024-07-08



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Trademark	Motorola	Type Name or ID	FCC ID: IHDT56AS6
Applicant No.	RF178795	Sample No.	1#: N74E260156 2#: N74E260198
Delivering Date	2024-05-29	Test Date	2024-05-29 to 2024-07-08
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		

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Revision History

Report No.	Version	Description	Issued Date
TR-24ADRTCC7013	Rev.01	Initial issue of report	2024-07-03
TR-24ADRTCC7013	Rev.02	Update n78 EIRP power on page 13	2024-07-05
TR-24ADRTCC7013	Rev.03	Update n78 EIRP power on page 14	2024-07-05
TR-24ADRTCC7013	Rev.04	Update n5/26 max bandwidth data. Update n77/78 Max EIRP	2024-07-08

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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		
Peak-Average Ratio	§24.232(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 §24.238(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 §24.238(a)	< -13 dBm/MHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	Section 6 of Appendix B	Pass
Frequency Stability	§24.235	< ±2.5 ppm	Section 7 of Appendix B	Pass

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
Peak-Average Ratio	---	<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		
Emission Mask	§2.1051 § 90.691	For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \text{ Log}_{10}(f/6.1)$ decibels or $50+10\text{Log}_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the	Section 5 of Appendix B	PASS

Test Item	Rule No.	Requirements	Test Result	Verdict
		center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.		
Conducted Spurious Emission	§2.1051 §90.691	< 43 + 10Log10(P[Watts]) for all out-of-band emissions	Section 6 of Appendix B	PASS
Frequency Stability	§90.213	< ±2.5ppm	Section 7 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		
Peak-Average Ratio	§27.50(a)	<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 §27.53(m) (4)	For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section In addition, the attenuation factor shall not be less than 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5MHz.	Section 5 of Appendix B	Pass
Conducted Spurious Emission	§2.1051 §27.53(m) (4)	< -25 dBm/MHz for outside Band Edge Range	Section 6 of Appendix B	Pass
Frequency Stability	§27.54	Within authorized bands	Section 7 of Appendix B	Pass

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		
Peak-Average Ratio	---	<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 §27.53(h)	< -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 §27.53(h)	< -13 dBm/MHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges	Section 6 of Appendix B	Pass
Frequency Stability	§27.54	Within authorized bands	Section 7 of Appendix B	Pass

1.6. 5G NR Band n77 (3700-3980)/n78 (3700-3800)

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(j) (3)	EIRP < 1W		
Peak-Average Ratio	§27.50(j) (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		
Conducted Band Edges	§2.1051 §27.53(l) (2)	< -13 dBm/MHz	Section 5 of Appendix B	Pass
Conducted Spurious Emission	§2.1051 §27.53(l) (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 (FG452307G).
- 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/n26 for Antenna 0; n2/n38/n41/n66 for Antenna 1; n7 for Antenna 4; n77/n78 for antenna 3.
- 3, 5G NR Bands support SA mode for n2/n5/n7/n26/n38/n41/n66/n77/n78 and NSA mode for n2/n5/n7/n26/n38/n41/n66/n77/n78.
- 4, The test has been assessed on SA and NSA mode, but only the worst mode performed the whole conducted test items by referring to the max conducted power.
- 5, The ENDC combination could be referred to the product specification.
- 6, 5G NR n77/n78 supports HPUE mode.
- 7, The maximum conducted output power of CA_38A_n78A was evaluated, and the max power of PCC & SCC was lower than the single carrier, thus, the conducted items were evaluated on DC_4A_n38A and DC_4A_n78A based on the max power.

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

2.1. NR System

2.1.1. NR Band n2 (1850-1910)

5G SA (n2A)		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)
5MHz	1852.5-1907.5	0.115345	4M49G7D	0.094406	4M48W7D
10MHz	1855.0-1905.0	0.116145	9M27G7D	0.093111	9M29W7D
15MHz	1857.5-1902.5	0.118032	14M1G7D	0.095060	14M1W7D
20MHz	1860.0-1900.0	0.118304	18M9G7D	0.095280	18M9W7D
25MHz	1862.5-1897.5	0.116145	23M7G7D	0.093111	23M7W7D
30MHz	1865.0-1895.0	0.119674	28M6G7D	0.096161	28M6W7D
35MHz	1867.5-1892.5	0.119674	33M6G7D	0.096161	33M6W7D
40MHz	1870.0-1890.0	0.116950	38M6G7D	0.093756	38M6W7D

5G NR NSA (DC_66A_n2A)		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)
5MHz	1852.5-1907.5	0.099312	4M48G7D	0.077804	4M49W7D
10MHz	1855.0-1905.0	0.092897	9M29G7D	0.075336	9M31W7D
15MHz	1857.5-1902.5	0.098855	14M1G7D	0.079250	14M2W7D
20MHz	1860.0-1900.0	0.093111	18M9G7D	0.075683	18M9W7D
25MHz	1862.5-1897.5	0.092683	23M7G7D	0.074131	23M8W7D
30MHz	1865.0-1895.0	0.098855	28M6G7D	0.079616	28M7W7D
35MHz	1867.5-1892.5	0.093325	33M6G7D	0.075162	33M6W7D
40MHz	1870.0-1890.0	0.098175	38M7G7D	0.078886	38M7W7D

2.1.2. NR Band n5 (824-849)

5G NR NSA (DC_7A_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	0.028249	4M48G7D	0.022594	4M48W7D
10MHz	829.0-844.0	0.028249	9M27G7D	0.023121	9M29W7D
15MHz	831.5-841.5	0.028249	14M1G7D	0.023014	14M2W7D
20MHz	834.0-839.0	0.028184	18M9G7D	0.023067	18M9W7D

5G NR NSA (DC_4A_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	0.032734	4M49G7D	0.026607	4M48W7D
10MHz	829.0-844.0	0.032734	9M29G7D	0.026669	9M29W7D
15MHz	831.5-841.5	0.032359	14M1G7D	0.026546	14M2W7D
20MHz	834.0-839.0	0.032434	18M9G7D	0.026607	18M9W7D

2.1.3. NR Band n7 (2500-2570)

5G NR NSA (DC_4A_n7A)		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	2502.5-2567.5	0.187499	4M49G7D	0.163682	4M49W7D
10MHz	2505.0-2565.0	0.196789	9M29G7D	0.168655	9M31W7D
15MHz	2507.5-2562.5	0.197697	14M1G7D	0.169434	14M2W7D
20MHz	2510.0-2560.0	0.197242	18M9G7D	0.171002	18M9W7D
25MHz	2512.5-2557.5	0.204644	23M8G7D	0.169434	23M8W7D
30MHz	2515.0-2555.0	0.202768	28M7G7D	0.176604	28M6W7D
35MHz	2517.5-2552.5	0.206063	33M6G7D	0.168655	33M6W7D
40MHz	2520.0-2550.0	0.204644	38M7G7D	0.175792	38M7W7D
50MHz	2525.0-2545.0	0.204644	48M3G7D	0.161065	48M4W7D

2.1.4. NR Band n26 (814-824)

5G NR NSA (DC_7A_n26A)		Pi/2 BPSK / QPSK		16QAM/64QAM/256QAM	
Bandwidth	Frequency Range (MHz)	Maximum Conducted Power (W)	Emission Designator (99% OBW)	Maximum Conducted Power (W)	Emission Designator (99% OBW)
5MHz	816.5-821.5	0.218273	4M48G7D	0.178238	4M48W7D
10MHz	819.0	0.216770	9M27G7D	0.179061	9M29W7D
15MHz	821.5	0.215774	14M1G7D	0.175792	14M1W7D
20MHz	824.0	0.215278	18M9G7D	0.175792	18M9W7D

2.1.5. NR Band n26 (824-849)

5G NR NSA (DC_7A_n26A)		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	0.031117	4M48G7D	0.025468	4M48W7D
10MHz	829.0-844.0	0.030903	9M27G7D	0.025293	9M29W7D
15MHz	831.5-841.5	0.030832	14M1G7D	0.025235	14M1W7D
20MHz	834.0-839.0	0.031046	18M9G7D	0.025527	18M9W7D

2.1.6. NR Band n38 (2570-2620)

5G NR NSA (DC_4A_n38A)		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	2575.0-2615.0	0.161065	8M59G7D	0.126765	8M59W7D
15MHz	2577.5-2612.5	0.157036	13M6G7D	0.125026	13M7W7D
20MHz	2580.0-2610.0	0.160325	18M2G7D	0.125603	18M2W7D
25MHz	2582.5-2607.5	0.157036	23M2G7D	0.127350	23M2W7D
30MHz	2585.0-2605.0	0.159221	27M8G7D	0.123310	27M9W7D
40MHz	2590.0-2600.0	0.157761	37M8G7D	0.127938	37M9W7D

2.1.7. NR Band n41 (2496-2690)

5G NR NSA (DC_4A_n41A)		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	2501.01-2685.00	0.129718	8M59G7D	0.103039	8M57W7D
15MHz	2503.50-2682.48	0.146218	13M6G7D	0.115345	13M7W7D
20MHz	2506.02-2679.99	0.147911	18M2G7D	0.115878	18M2W7D
25MHz	2508.50-2677.50	0.145881	23M2G7D	0.116681	23M2W7D
30MHz	2511.00-2674.98	0.145881	27M8G7D	0.116950	27M9W7D
35MHz	2513.50-2672.50	0.146218	32M7G7D	0.118304	32M9W7D
40MHz	2516.01-2670.00	0.147571	37M8G7D	0.118850	37M9W7D
45MHz	2518.50-2667.50	0.148252	42M4G7D	0.118577	42M5W7D
50MHz	2521.02-2664.99	0.149968	47M6G7D	0.118850	47M5W7D
60MHz	2526.00-2659.98	0.152757	57M8G7D	0.120226	57M8W7D
70MHz	2531.01-2655.00	0.157398	67M4G7D	0.122744	67M4W7D
80MHz	2536.02-2649.99	0.158125	77M4G7D	0.122462	77M5W7D
90MHz	2541.00-2644.98	0.157036	87M6G7D	0.119399	87M6W7D
100MHz	2546.01-2640.00	0.154882	97M5G7D	0.121339	97M5W7D

2.1.1. NR Band n66 (1710-1780)

5G NR NSA (DC_7A_n66A)		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)
5MHz	1712.5-1777.5	0.138357	4M48G7D	0.110917	4M49W7D
10MHz	1715.0-1775.0	0.138038	9M29G7D	0.114025	9M29W7D
15MHz	1717.5-1772.5	0.118032	14M1G7D	0.095940	14M2W7D
20MHz	1720.0-1770.0	0.119674	18M9G7D	0.096605	18M9W7D
25MHz	1722.5-1767.5	0.117490	23M8G7D	0.095060	23M8W7D
30MHz	1725.0-1765.0	0.139637	28M7G7D	0.114288	28M6W7D

35MHz	1727.5-1762.5	0.119674	33M6G7D	0.096828	33M6W7D
40MHz	1730.0-1760.0	0.119674	38M6G7D	0.096828	38M6W7D
45MHz	1732.5-1757.5	0.138038	43M2G7D	0.111944	43M3W7D

5G NR NSA (DC_2A_n66A)		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)
5MHz	1712.5-1777.5	0.132434	4M48G7D	0.110917	4M48W7D
10MHz	1715.0-1775.0	0.133660	9M29G7D	0.112720	9M29W7D
15MHz	1717.5-1772.5	0.142233	14M3G7D	0.119124	14M2W7D
20MHz	1720.0-1770.0	0.142889	18M9G7D	0.119674	19M0W7D
25MHz	1722.5-1767.5	0.128825	23M8G7D	0.105439	23M8W7D
30MHz	1725.0-1765.0	0.135831	28M6G7D	0.111686	28M7W7D
35MHz	1727.5-1762.5	0.143219	33M6G7D	0.117761	33M6W7D
40MHz	1730.0-1760.0	0.143880	38M7G7D	0.118577	38M7W7D
45MHz	1732.5-1757.5	0.136144	43M2G7D	0.110917	43M3W7D

2.1.2. NR Band n77 (3700-3980)

5G NR SA (n77A UL MIMO)		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	3705.00-3975.00	0.172187	8M57G7D	0.148594	8M61W7D
15MHz	3707.52-3972.48	0.165959	13M6G7D	0.146555	13M6W7D
20MHz	3710.01-3969.99	0.171002	18M2G7D	0.151705	18M2W7D
25MHz	3712.50-3967.50	0.169824	23M2G7D	0.152405	23M2W7D
30MHz	3715.02-3964.98	0.170608	27M9G7D	0.152757	27M9W7D
40MHz	3720.00-3960.00	0.168655	37M8G7D	0.147911	37M9W7D
50MHz	3725.01-3954.99	0.164059	47M6G7D	0.148936	47M6W7D
60MHz	3730.02-3949.98	0.170608	57M8G7D	0.151356	57M9W7D
70MHz	3735.00-3945.00	0.172982	67M4G7D	0.150661	67M4W7D
80MHz	3740.01-3939.99	0.167109	77M5G7D	0.146893	77M7W7D
90MHz	3745.02-3934.98	0.167880	87M4G7D	0.148252	87M4W7D
100MHz	3750.00-3930.00	0.170608	97M5G7D	0.151705	97M5W7D

5G NR SA (n77A)		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	3705.00-3975.00	0.350752	8M59G7D	0.281190	8M61W7D
15MHz	3707.52-3972.48	0.356451	13M6G7D	0.285759	13M6W7D
20MHz	3710.01-3969.99	0.341193	18M1G7D	0.263633	18M2W7D
25MHz	3712.50-3967.50	0.352371	23M2G7D	0.264850	23M2W7D

30MHz	3715.02-3964.98	0.360579	27M8G7D	0.269774	27M9W7D
40MHz	3720.00-3960.00	0.349945	37M9G7D	0.272270	37M9W7D
50MHz	3725.01-3954.99	0.361410	47M5G7D	0.280543	47M5W7D
60MHz	3730.02-3949.98	0.352371	57M7G7D	0.271019	57M8W7D
70MHz	3735.00-3945.00	0.338065	67M4G7D	0.261818	67M4W7D
80MHz	3740.01-3939.99	0.338844	77M5G7D	0.258821	77M5W7D
90MHz	3745.02-3934.98	0.331131	87M4G7D	0.252930	87M4W7D
100MHz	3750.00-3930.00	0.372392	97M3G7D	0.291072	97M5W7D

5G NR SA (DC_7A_n77A)		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	3705.00-3975.00	0.205589	8M57G7D	0.160325	8M59W7D
15MHz	3707.52-3972.48	0.218776	13M6G7D	0.170608	13M6W7D
20MHz	3710.01-3969.99	0.222331	18M2G7D	0.170608	18M2W7D
25MHz	3712.50-3967.50	0.223357	23M1G7D	0.171002	23M2W7D
30MHz	3715.02-3964.98	0.224388	27M8G7D	0.172187	27M9W7D
40MHz	3720.00-3960.00	0.210863	37M8G7D	0.170216	37M9W7D
50MHz	3725.01-3954.99	0.228034	47M5G7D	0.162181	47M5W7D
60MHz	3730.02-3949.98	0.221309	57M9G7D	0.168655	57M9W7D
70MHz	3735.00-3945.00	0.203704	67M4G7D	0.162930	67M6W7D
80MHz	3740.01-3939.99	0.211349	77M4G7D	0.168655	77M7W7D
90MHz	3745.02-3934.98	0.209894	87M4G7D	0.167880	87M6W7D
100MHz	3750.00-3930.00	0.209894	97M5G7D	0.163305	97M5W7D

2.1.3. NR Band n78 (3700-3800)

5G NR SA (n78A UL MIMO)		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	3705.00-3795.00	0.157761	8M57G7D	0.144877	8M59W7D
15MHz	3707.52-3792.48	0.158125	13M6G7D	0.142889	13M6W7D
20MHz	3710.01-3789.99	0.157761	18M2G7D	0.142233	18M2W7D
25MHz	3712.50-3787.50	0.156315	23M2G7D	0.144544	23M2W7D
30MHz	3715.02-3784.98	0.163305	27M9G7D	0.144212	27M9W7D
40MHz	3720.00-3780.00	0.164059	37M9G7D	0.143219	37M9W7D
50MHz	3725.01-3774.99	0.162181	47M5G7D	0.144877	47M5W7D
60MHz	3730.02-3769.98	0.167109	57M8G7D	0.145546	57M9W7D
70MHz	3735.00-3765.00	0.166725	67M4G7D	0.144877	67M4W7D
80MHz	3740.01-3759.99	0.167494	77M4G7D	0.147571	77M5W7D
90MHz	3745.02-3754.98	0.168267	87M4G7D	0.146218	87M6W7D
100MHz	3750.00	0.168267	97M5G7D	0.146893	97M5W7D

5G NR NSA (n78A)		Pi/2 BPSK / QPSK	16QAM/64QAM/256QAM
Bandwidth	Frequency Range (MHz)	Maximum EIRP (W)	Maximum EIRP (W)
10MHz	3705.00-3795.00	0.339625	0.266073
15MHz	3707.52-3792.48	0.336512	0.269153
20MHz	3710.01-3789.99	0.311889	0.243781
25MHz	3712.50-3787.50	0.310456	0.238781
30MHz	3715.02-3784.98	0.316228	0.246037
40MHz	3720.00-3780.00	0.311889	0.248886
50MHz	3725.01-3774.99	0.341193	0.261818
60MHz	3730.02-3769.98	0.315500	0.249459
70MHz	3735.00-3765.00	0.322849	0.253513
80MHz	3740.01-3759.99	0.319890	0.247742
90MHz	3745.02-3754.98	0.327341	0.252348
100MHz	3750.00	0.359749	0.278612

5G NR NSA (DC_4A_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	3705.00-3795.00	0.226464	8M59G7D	0.173780	8M59W7D
15MHz	3707.52-3792.48	0.219786	13M6G7D	0.181134	13M6W7D
20MHz	3710.01-3789.99	0.220800	18M2G7D	0.183654	18M3W7D
25MHz	3712.50-3787.50	0.237684	23M2G7D	0.185353	23M2W7D
30MHz	3715.02-3784.98	0.222844	27M8G7D	0.187499	27M9W7D
40MHz	3720.00-3780.00	0.224388	37M9G7D	0.193197	37M9W7D
50MHz	3725.01-3774.99	0.221309	47M5G7D	0.178649	47M6W7D
60MHz	3730.02-3769.98	0.218273	57M8G7D	0.179887	57M8W7D
70MHz	3735.00-3765.00	0.217270	67M4G7D	0.177011	67M4W7D
80MHz	3740.01-3759.99	0.217771	77M5G7D	0.178238	77M4W7D
90MHz	3745.02-3754.98	0.215774	87M4G7D	0.173380	87M6W7D
100MHz	3750.00	0.209894	97M5G7D	0.161436	97M5W7D

5G NR NSA (DC_7A_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	3705.00-3795.00	0.202302	8M57G7D	0.164437	8M59W7D
15MHz	3707.52-3792.48	0.192309	13M6G7D	0.153815	13M7W7D
20MHz	3710.01-3789.99	0.194536	18M2G7D	0.153109	18M2W7D
25MHz	3712.50-3787.50	0.202768	23M1G7D	0.160325	23M2W7D
30MHz	3715.02-3784.98	0.197697	27M8G7D	0.156315	27M9W7D
40MHz	3720.00-3780.00	0.196336	37M8G7D	0.154525	37M9W7D
50MHz	3725.01-3774.99	0.208449	47M4G7D	0.165196	47M5W7D
60MHz	3730.02-3769.98	0.197697	57M9G7D	0.157398	57M8W7D
70MHz	3735.00-3765.00	0.197697	67M4G7D	0.157398	67M4W7D
80MHz	3740.01-3759.99	0.197697	77M4G7D	0.154170	77M5W7D
90MHz	3745.02-3754.98	0.197697	87M4G7D	0.155239	87M6W7D
100MHz	3750.00	0.212814	97M5G7D	0.161808	97M5W7D

3. General Information

3.1. General Description of EUT

EUT Description:	Mobile Cellular Phone
Brand Name:	Motorola
Model Name:	XT2409-1; XT2409-6
FCC ID:	IHDT56AS6
IMEI Code:	1#: 354637960030634/354637960030642 (Conducted); 2#: 354637960031533/354637960031541 (Conducted);
Hardware Version:	DVT2
Software Version:	UUI34.38
NR Modulation:	DFT-s-OFDM: <input checked="" type="checkbox"/> Pi/2BPSK; <input checked="" type="checkbox"/> QPSK; <input checked="" type="checkbox"/> 16QAM; <input checked="" type="checkbox"/> 64QAM; <input checked="" type="checkbox"/> 256QAM; CP-OFDM: <input checked="" type="checkbox"/> QPSK; <input checked="" type="checkbox"/> 16QAM; <input checked="" type="checkbox"/> 64QAM; <input checked="" type="checkbox"/> 256QAM;
Sample Type:	<input checked="" type="checkbox"/> Portable Device, <input type="checkbox"/> Module
Antenna Type:	<input type="checkbox"/> External, <input checked="" type="checkbox"/> 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); n77 (3700-3980): -3.09dBi (Ant3); -2.88dBi (Ant5); -6.95dBi (Ant7); -0.95dBi (Ant9); n78 (3700-3800): -3.00dBi (Ant3); -2.70dBi (Ant5); -6.91dBi (Ant7); -0.95dBi (Ant9);

Remark

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

3.2. 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

3.3. 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
Battery 2	Motorola (CosMX)	QV43
Earphone 1	Motorola (Lyand)	MI181C
USB Cable 1	Motorola (Hexin)	S928E28748
USB Cable 2	Motorola (Juwei)	S928E28749
USB Cable 3	Motorola (Saibao)	S928E38943

4. Test Configuration of Equipment Under Test

4.1. 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	●	●	●	●	●	●	●	●	●	●	●
	N77 (3700-3980)	○	●	All Supported BW	●	●	●	●	●	●	●	●	●	●	●
Peak-Average Ratio	N2 (1850-1910)	●	○	Highest BW	●	●	○	○	○	●	●	●	○	●	
	N5 (824-849)	●	○	Highest BW	●	●	○	○	○	●	●	●	○	●	
	N7 (2500-2570)	●	○	Highest BW	●	●	○	○	○	●	●	●	○	●	
	N26 (814-824)	●	○	Highest BW	●	●	○	○	○	●	●	●	○	●	
	N26 (824-849)	●	○	Highest BW	●	●	○	○	○	●	●	●	○	●	
	N38 (2570-2620)	○	●	Highest BW	●	●	○	○	○	●	●	●	○	●	
	N41 (2496-2690)	○	●	Highest BW	●	●	○	○	○	●	●	●	○	●	
	N66 (1710-1780)	●	○	Highest BW	●	●	○	○	○	●	●	●	○	●	
	N77 (3700-3980)	○	●	Highest BW	●	●	○	○	○	●	●	●	○	●	
Modulation Characteristics	N2 (1850-1910)	●	○	Highest BW	●	●	●	●	●	○	●	○	○	●	
	N5 (824-849)	●	○	Highest BW	●	●	●	●	●	○	●	○	○	●	
	N7 (2500-2570)	●	○	Highest BW	●	●	●	●	●	○	●	○	○	●	
	N26 (814-824)	●	○	Highest BW	●	●	●	●	●	○	●	○	○	●	
	N26 (824-849)	●	○	Highest BW	●	●	●	●	●	○	●	○	○	●	
	N38 (2570-2620)	○	●	Highest BW	●	●	●	●	●	○	●	○	○	●	
	N41 (2496-2690)	○	●	Highest BW	●	●	●	●	●	○	●	○	○	●	
	N66 (1710-1780)	●	○	Highest BW	●	●	●	●	●	○	●	○	○	●	
	N77 (3700-3980)	○	●	Highest BW	●	●	●	●	●	○	●	○	○	●	
Occupied	N2 (1850-1910)	●	○	All Supported BW	●	●	●	●	●	○	●	○	○	●	

Bandwidth & 26dB Emission Bandwidth	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	●	●	●	●	●	○	●	○	○	●
	N77 (3700-3980)	○	●	All Supported BW	●	●	●	●	●	○	●	○	○	●
	N78 (3700-3800)	○	●	All Supported BW	●	●	●	●	●	○	●	○	○	●
Conducted Band Edges	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	●	●	○	○	○	●	○	●	●	●
	N77 (3700-3980)	○	●	All Supported BW	●	●	○	○	○	●	○	●	●	●
N78 (3700-3800)	○	●	All Supported BW	●	●	○	○	○	●	○	●	●	●	
Conducted Spurious Emission	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	●	●	○	○	○	●	●	●	●	○
	N77 (3700-3980)	○	●	All Supported BW	●	●	○	○	○	●	●	●	●	○
N78 (3700-3800)	○	●	All Supported BW	●	●	○	○	○	●	●	●	●	○	
Frequency Stability	N2 (1850-1910)	●	○	Highest BW	○	●	○	○	○	○	●	○	○	●
	N5 (824-849)	●	○	Highest BW	○	●	○	○	○	○	●	○	○	●
	N7 (2500-2570)	●	○	Highest BW	○	●	○	○	○	○	●	○	○	●
	N26 (814-824)	●	○	Highest BW	○	●	○	○	○	○	●	○	○	●
	N26 (824-849)	●	○	Highest BW	○	●	○	○	○	○	●	○	○	●
	N38 (2570-2620)	○	●	Highest BW	○	●	○	○	○	○	●	○	○	●
	N41 (2496-2690)	○	●	Highest BW	○	●	○	○	○	○	●	○	○	●
	N66 (1710-1780)	●	○	Highest BW	○	●	○	○	○	○	●	○	○	●
	N77 (3700-3980)	○	●	Highest BW	○	●	○	○	○	○	●	○	○	●
N78 (3700-3800)	○	●	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.

4.2. Test Frequencies**4.2.1 5G NR System****4.2.1.1. NR Band n2 (1850-1910)****4.2.1.1.1. 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

4.2.1.2. NR Band n5 (824-849)**4.2.1.2.1. 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

4.2.1.3. NR Band n7 (2500-2570)**4.2.1.3.1. 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

4.2.1.4. NR Band n26 (814-824)

4.2.1.4.1. 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

4.2.1.5. NR Band n26 (824-849)

4.2.1.5.1. 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

4.2.1.6. NR Band n38 (2570-2620)

4.2.1.6.1. 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

4.2.1.7. NR Band n41 (2496-2690)

4.2.1.7.1. 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

4.2.1.8. NR Band n66 (1710-1780)**4.2.1.8.1. 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

4.2.1.9. NR Band N77 (3700-3980)**4.2.1.9.1. SCS=30KHz**

Bandwidth	LCH		MCH		HCH	
	Arfcn	Freq	Arfcn	Freq	Arfcn	Freq
10MHz	741000	3705.00	656000	3840.00	665000	3975.00
15MHz	741504	3707.52	656000	3840.00	664832	3972.48
20MHz	647334	3710.01	656000	3840.00	664666	3969.99
25MHz	742500	3712.50	656000	3840.00	664500	3967.50
30MHz	647668	3715.02	656000	3840.00	664332	3964.98
40MHz	648000	3720.00	656000	3840.00	664000	3960.00
50MHz	648334	3725.01	656000	3840.00	663666	3954.99
60MHz	648668	3730.02	656000	3840.00	663332	3949.98
70MHz	649000	3735.00	656000	3840.00	663000	3945.00
80MHz	649334	3740.01	656000	3840.00	662666	3939.99
90MHz	649668	3745.02	656000	3840.00	662332	3934.98
100MHz	650000	3750.00	656000	3840.00	662000	3930.00

4.2.1.10. NR Band N78 (3700-3800)**4.2.1.10.1. SCS=30KHz**

Bandwidth	LCH		MCH		HCH	
	Arfcn	Freq	Arfcn	Freq	Arfcn	Freq
10MHz	741000	3705.00	650000	3750.00	653000	3795.00
15MHz	741504	3707.52	650000	3750.00	652832	3792.48
20MHz	647334	3710.01	650000	3750.00	652666	3789.99
25MHz	742500	3712.50	650000	3750.00	652500	3787.50
30MHz	647668	3715.02	650000	3750.00	652332	3784.98
40MHz	648000	3720.00	650000	3750.00	652000	3780.00
50MHz	648334	3725.01	650000	3750.00	651666	3774.99
60MHz	648668	3730.02	650000	3750.00	651332	3769.98
70MHz	649000	3735.00	650000	3750.00	651000	3765.00
80MHz	649334	3740.01	650000	3750.00	650666	3759.99
90MHz	649668	3745.02	650000	3750.00	650332	3754.98

100MHz	650000	3750.00	650000	3750.00	650000	3750.00
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5. Description of Tests

5.1. Conducted Output Power Measurement

5.1.1. 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.

5.1.2. 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.

5.2. 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

5.3. Peak-to-Average Ratio Measurement

5.3.1. 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.

5.3.2. 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 \geq 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%.

5.3.3. 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.

$$\text{PAR (dB)} = P_{\text{Pk}} (\text{dBm or dBW}) - P_{\text{Avg}} (\text{dBm or dBW})$$

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

5.4. 99% Occupied Bandwidth & 26dB Emission Bandwidth

5.4.1. 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.

5.4.2. 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, $\text{RBW} \geq 1\% - 5\%$ of the expected OBW.
- 4, $\text{VBW} \geq 3 * \text{RBW}$
- 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.

5.5. Conducted Band Edge Measurement

5.5.1. 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.

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

5.6. Conducted Spurious Emission Measurement

5.6.1. 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.

5.6.2. Test Procedures

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

5.7. Frequency Stability Measurement

5.7.1. 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.

5.7.2. 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.

5.7.3. 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.

6. 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.

7. 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.

7.1. Uncertainty of Conducted Measurement

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

8. Appendixes

Appendix B.1	NR Band n2A (1850-1910)
Appendix B.2	NR Band DC_7A_n5A (824-849)
Appendix B.3	NR Band DC_4A_n7A (2500-2570)
Appendix B.4	NR Band DC_7A_n26A (814-824)
Appendix B.5	NR Band DC_7A_n26A (824-849)
Appendix B.6	NR Band DC_4A_n38A (2570-2620)
Appendix B.7	NR Band DC_4A_n41A (2496-2690)
Appendix B.8	NR Band DC_7A_n66A (1710-1780)
Appendix B.9	NR Band n77A (3700-3980)
Appendix B.10	NR Band DC_4A_n78A (3700-3800)
Appendix B.11	NR Band n77A (3700-3980) _2x2MIMO
Appendix B.12	NR Band n78A (3700-3800) _2x2MIMO
Appendix B.13	NR Band DC_66A_n2A (1850-1910)
Appendix B.14	NR Band DC_4A_n5A (824-849)
Appendix B.15	NR Band DC_2A_n66A (1710-1780)
Appendix B.16	NR Band DC_7A_n77A (3700-3980)
Appendix B.17	NR Band DC_7A_n78A (3700-3800)

The End