TESTING
NVLAP LAB CODE 500036-0

FCC RF TEST REPORT

Applicant	:	BYD Auto Industry Company Limited
Address	:	No.3001, 3007, HengPing Road, Pingshan, Shenzhen, Guangdong, P.R. China
Equipment under Test	:	In-vehicle Multimedia Host
Model No.	:	MTCD03
Trade Mark	:	BYD
FCC ID	:	SD4-MTCD03
Report No.	:	DDT-B24111303-2E01
Issue Date	:	Jan. 09, 2025
Issued By	:	Tianjin Dongdian Testing Service Co., Ltd.
Address	:	Building D-1, No. 19, Weisi Road, Microelectronics Industrial Park, Development Area, Tianjin, China. Tel: +86-022-58038033, E-mail: ddt@dgddt.com, http://www.ddttest.com

REPORT

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Test Report Declare

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Model No.	:	MTCD03
Series Model No.	:	N/A
Trade Mark	:	BYD
Manufacturer	:	BYD Auto Industry Company Limited
Address	:	No.3001, 3007, HengPing Road, Pingshan, Shenzhen, Guangdong, P.R. China

Test Standard Used:

47 CFR FCC Part 22,
47 CFR FCC Part 24,
47 CFR FCC Part 27,
KDB 971168 D01 V03r01

We Declare:

The equipment described above is tested by Tianjin Dongdian Testing Service 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 Tianjin Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above standards.

Report No:	DDT-H24111303-2E01		
Date of Receipt:	Nov. 15, 2024	**Date of Test:**	Dec. 26, 2024 - Jan. 08, 2025

天津市东电检测技术服务（天津）有限公司 TIANJIN DONGDIAN TESTING SERVICE CO.,LTD 检验检测专用章 Inspection & Testing Services

Prepared By:	***Approved By:***
Novak Wei	Aaron Zhang
Novak Wei / Engineer	***Aaron Zhang /Manager***

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Tianjin Dongdian Testing Service Co., Ltd.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Jan. 09, 2025	

1. Summary of Test Results

1.1. GSM850/UMTS BAND 5 & LTE BAND 5 / 26

Test Item	FCC Rule No.	Requirements	Test Result
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913	FCC: ERP ≤ 7 W	Pass
Peak-Average Ratio	---	Limit≤13 dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §22.917	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §22.917	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges	Pass
Field Strength of Spurious Radiation	§2.1053, §22.917	FCC: ≤ -13 dBm/100 kHz.	Pass
Frequency Stability	§2.1055, §22.355	≤ ±2.5ppm	Pass

1.2. GSM 1900/UMTS BAND 2/ LTE BAND 2/25

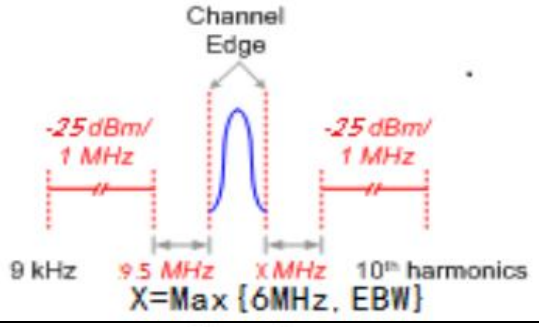
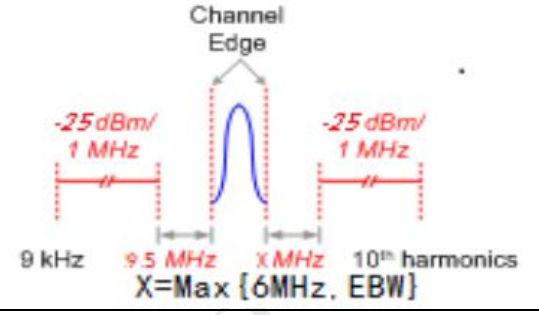
Test Item	FCC Rule No.	Requirements	Test Result
Effective (Isotropic) Radiated Power Output Data	§2.1046, §24.232	FCC: EIRP ≤ 2 W	Pass
Peak-Average Ratio	§2.1046, §24.232	Limit≤13 dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §24.238	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §24.238	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges	Pass
Field Strength of Spurious Radiation	§2.1051, §24.238	FCC: ≤ -13 dBm/100 kHz.	Pass
Frequency Stability	§2.1055, §24.235	≤ ±2.5ppm	Pass

1.3. UMTS BAND 4 /LTE BAND 4 /66

Test Item	FCC Rule No.	Requirements	Test Result
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(d)	FCC: ERP ≤ 1 W	Pass
Peak-Average Ratio	§2.1046, §27.50(d)	Limit≤13 dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §27.53(h)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(h)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges	Pass
Field Strength of Spurious Radiation	§2.1051, §27.53(h)	FCC: ≤ -13 dBm/100 kHz.	Pass
Frequency Stability	§2.1055, §27.54	≤ ±2.5ppm	Pass

1.4. LTE BADN 7/38/41

Test Item	FCC Rule No.	Requirements	Test Result
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(h)	FCC: EIRP ≤ 2 W	Pass
Peak-Average Ratio	§27.50(a)	Limit≤13 dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §27.53(m4)	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.	Pass

Spurious Emission at Antenna Terminals	§2.1051, §27.53(m)		Pass
Field Strength of Spurious Radiation	§2.1051, §27.53(m)		Pass
Frequency Stability	§2.1055, §27.54	≤ ±2.5ppm	Pass

1.5. LTE BAND 12

Test Item	FCC Rule No.	Requirements	Test Result
Effective (Isotropic) Radiated Power Output Data	§27.50(c)	FCC: ERP ≤ 3 W.	Pass
Peak-Average Ratio	§2.1046, §27.50(c)	Limit≤13 dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §27.53(g)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(g)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges	Pass
Field Strength of Spurious Radiation	§2.1051, §27.53(g)	FCC: ≤ -13 dBm/100 kHz.	Pass
Frequency Stability	§2.1055, §27.54	≤ ±2.5ppm	Pass

1.6. LTE BAND 13

Test Item	FCC Rule No.	Requirements	Test Result
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(b)	FCC: ERP ≤ 3 W.	Pass
Peak-Average Ratio	§27.50	Limit≤13 dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §27.53(c)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(c) §27.53(f)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges. On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations. For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.	Pass
Field Strength of Spurious Radiation	§2.1053, §27.53(c) §27.53(f)	FCC: ≤ -13 dBm/100 kHz. For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.	Pass
Frequency Stability	§2.1055, §27.54	Within authorized bands of operation/frequency block.	Pass

1.7. LTE BAND 17

Test Item	FCC Rule No.	Requirements	Test Result
Effective (Isotropic) Radiated Power Output Data	§27.50(c)	FCC: ERP ≤ 3 W.	Pass
Peak-Average Ratio	§2.1046, §27.50(c)	Limit≤13 dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §27.53(g)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(g)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	Pass
Field Strength of Spurious Radiation	§2.1051, §27.53(g)	FCC: ≤ -13 dBm/100 kHz.	Pass
Frequency Stability	§2.1055, §27.54	Within authorized bands of operation/frequency block.	Pass

2. General Test Information

2.1. Description of EUT

EUT Description	:	In-vehicle Multimedia Host	
Model Number	:	MTCD03	
Serial Number	:	N/A	
IMEI	:	865768070005653	
Hardware Version	:	E2_V030	
Software Version	:	BYDSW48/49.1.2	
Sample Type	:	Vehicle Device	
Radion System Type	:	☒ GSM ☒ UMTS ☒ LTE	
Support Band	:	GSM850/UMTS Band Ⅴ	Transmission（TX）:824MHz to 849 MHz
			Receiving (RX): 869MHz to 894 MHz
		GSM1900/UMTS Band Ⅱ	Transmission（TX）:1850MHz to 1910 MHz
			Receiving (RX): 1930MHz to 1990 MHz
		UMTS BandⅣ	Transmission（TX）:1710MHz to 1755 MHz
			Receiving (RX): 2110MHz to 2155 MHz
		LTE Band2	Transmission（TX）:1850MHz to 1910 MHz
			Receiving (RX): 1930MHz to 1990 MHz
		LTE Band4	Transmission（TX）:1710MHz to 1755 MHz
			Receiving (RX): 2110MHz to 2155 MHz
		LTE Band5	Transmission（TX）:824MHz to 849 MHz
			Receiving (RX): 869MHz to 894 MHz
		LTE Band7	Transmission（TX）:2500MHz to 2570 MHz
			Receiving (RX): 2620MHz to 2690 MHz
		LTE Band12	Transmission（TX）:699MHz to 716 MHz
			Receiving (RX): 729MHz to 746 MHz
		LTE Band13	Transmission（TX）:777MHz to 787 MHz
			Receiving (RX): 746MHz to 756 MHz
		LTE Band17	Transmission（TX）:704MHz to 716 MHz
			Receiving (RX): 734MHz to 746 MHz
		LTE Band38	Transmission（TX）:2570MHz to 2620 MHz
			Transmission（RX）:2570MHz to 2620 MHz
		LTE Band41	Transmission（TX）:2496MHz to 2690 MHz
			Transmission（RX）:2496MHz to 2690 MHz
Channel Bandwidth	:	GSM System	☒ 200kHz
		UMTS System	☒ 5MHz
		LTE Band2	☒ 1.4MHz, ☒ 3MHz, ☒ 5MHz, ☒ 10MHz, ☒ 15MHz, ☒ 20MHz
		LTE Band4	☒ 1.4MHz, ☒ 3MHz, ☒ 5MHz, ☒ 10MHz, ☒ 15MHz, ☒ 20MHz
		LTE Band5	☒ 1.4MHz, ☒ 3MHz, ☒ 5MHz,☒ 10MHz, ☒ 15MHz, ☒ 20MHz
		LTE Band7	☒ 5MHz, ☒ 10MHz, ☒ 15MHz,☒ 20MHz
		LTE Band12	☒ 1.4MHz, ☒ 3MHz, ☒ 5MHz,☒ 10MHz
		LTE Band13	☒ 1.4MHz, ☒ 3MHz, ☒ 5MHz,

			☒ 10MHz, ☒ 15MHz, ☒ 20MHz
		LTE Band17	☒ 5MHz, ☒ 10MHz
		LTE Band38	☒ 5MHz, ☒ 10MHz, ☒ 15MHz, ☒ 20MHz
		LTE Band41	☒ 5MHz, ☒ 10MHz, ☒ 15MHz,☒ 20MHz
Designation of Emissions (Remark: the necessary bandwidth of which is the worst value from the measured occupied bandwidths for each type of channel bandwidth configuration.)	:	GSM850	247KGXW;251KG7W
		GSM1900	253KGXW;249KG7W
		UMTS Band Ⅱ	4M15F9W
		UMTS BandⅣ	4M14F9W
		UMTS Band Ⅴ	4M15F9W
		LTE Band2	1M09G7D;1M09W7D 2M70G7D;2M69W7D 4M51G7D;4M51W7D 8M98G7D;9M00W7D 13M4G7D;13M4W7D 17M9G7D;18M0W7D
		LTE Band4	1M09G7D;1M09W7D 2M70G7D;2M70W7D 4M54G7D;4M51W7D 8M98G7D;8M96W7D 13M4G7D;13M4W7D 17M8G7D;17M9W7D
		LTE Band5	1M08G7D;1M09W7D 2M70G7D;2M70W7D 4M52G7D;4M51W7D 9M01G7D;8M99W7D
		LTE Band7	4M51G7D;4M50W7D 8M99G7D;8M97W7D 13M4G7D;13M4W7D 17M9G7D;18M0W7D
		LTE Band12	1M09G7D;1M09W7D 2M70G7D;2M70W7D 4M52G7D;4M52W7D 8M96G7D;8M98W7D
		LTE Band13	4M50G7D;4M52W7D 8M95G7D;8M96W7D
		LTE Band17	4M50G7D;4M49W7D 8M98G7D;8M98W7D
		LTE Band38	4M50G7D;4M49W7D 9M00G7D;8M98W7D 13M4G7D;13M4W7D 17M8G7D;17M8W7D
		LTE Band41	4M50G7D;4M50W7D 8M99G7D;9M03W7D 13M4G7D;13M4W7D 17M8G7D;17M8W7D
Target Power	:	GSM850	33dBm
		GSM1900	33 dBm
		WCDMA850	23 dBm
		WCDMA1700	23 dBm
		WCDMA1900	23 dBm
		LTE Band2	23 dBm
		LTE Band4	23 dBm
		LTE Band5	23 dBm

		LTE Band7	23 dBm
		LTE Band12	23 dBm
		LTE Band13	23 dBm
		LTE Band17	23 dBm
		LTE Band38	23 dBm
		LTE Band41	23 dBm
Modulation	:	GSM: GMSK,8-PSK UMTS: BPSK, QPSK,16QAM E-UTRA: QPSK ,16QAM	
Antenna Type	:	External antenna	
Antenna Gain	:	GSM 850：5.6dBi GSM 1900：3.63dBi WCDMA B2: 3.63dBi WCDMA B4: 1.94dBi WCDMA B5: 5.6dBi LTE B2：3.63dBi LTE B4：1.94dBi LTE B5：5.6dBi LTE B7：1.64dBi LTE B12：3.06dBi LTE B13：4.21dBi LTE B17：3.06dBi LTE B38：1.77dBi LTE B41：1.77dBi	
Power Supply	:	DC 9V-16V	

Note:

1. EUT is the abbreviation of equipment under test.
2.EUT support GPRS and EGPRS mode，not support GSM voice mode.

2.2. RF Channel Information

GSM Band	Transmitter/ Receiver	Lowest range(L)	Middle range(M)	Highest range(H)
GSM850	Transmitter	Channel 128 (824.2 MHz)	Channel 190 (836.6 MHz)	Channel 251 (848.8 MHz)
	Receiver	Channel 128 (869.2 MHz)	Channel 190 (881.6 MHz)	Channel 251 (893.8 MHz)
GSM 1900	Transmitter	Channel 512 (1850.2 MHz)	Channel 661 (1880 MHz)	Channel 810 (1909.8 MHz)
	Receiver	Channel 512 (1930.2 MHz)	Channel 661 (1960 MHz)	Channel 810 (1989.8 MHz)

UMTS Band	Transmitter/ Receiver	Lowest range(L)	Middle range(M)	Highest range(H)
Band 2	Transmitter	Channel 9262 (1852.4 MHz)	Channel 9400 (1880.0 MHz)	Channel 9538 (1907.6 MHz)
	Receiver	Channel 9662 (1932.4 MHz)	Channel 9800 (1960.0 MHz)	Channel 9938 (1987.6 MHz)
Band 4	Transmitter	Channel 1312 (1712.4 MHz)	Channel 1413 (1732.6 MHz)	Channel 1513 (1752.6 MHz)
	Receiver	Channel 1537 (2112.4 MHz)	Channel 1638 (2132.6 MHz)	Channel 1738 (2152.6 MHz)
Band 5	Transmitter	Channel 4132 (826.4 MHz)	Channel 4182 (836.4 MHz)	Channel 4233 (846.6 MHz)
	Receiver	Channel 4357 (871.4 MHz)	Channel 4407 (881.4 MHz)	Channel 4457 (891.4 MHz)

E-UTRA Band	Transmitter/ Receiver	Channel Bandwidth	Frequencies Under Test		
			Lowest range(L)	Middle range(M)	Highest range(H)
Band 2	Transmitter	1.4MHz	Channel 18607 (1850.7MHz)	Channel 18900 (1880MHz)	Channel 19193 (1909.3MHz)
		3MHz	Channel 18615 (1851.5MHz)	Channel 18900 (1880MHz)	Channel 19185 (1908.5MHz)
		5MHz	Channel 18625 (1852.5MHz)	Channel 18900 (1880MHz)	Channel 19175 (1907.5MHz)
		10MHz	Channel 18650 (1855MHz)	Channel 18900 (1880MHz)	Channel 19150 (1905MHz)
		15MHz	Channel 18675 (1857.5MHz)	Channel 18900 (1880MHz)	Channel 19125 (1902.5MHz)
		20MHz	Channel 18700 (1860MHz)	Channel 18900 (1880MHz)	Channel 19100 (1900MHz)
	Receiver	1.4MHz	Channel 607 (1930.7MHz)	Channel 900 (1960MHz)	Channel 1193 (1989.3MHz)
		3MHz	Channel 615 (1931.5MHz)	Channel 900 (1960MHz)	Channel 1185 (1988.5MHz)
		5MHz	Channel 625 (1932.5MHz)	Channel 900 (1960MHz)	Channel 1175 (1987.5MHz)
		10MHz	Channel 650 (1935MHz)	Channel 900 (1960MHz)	Channel 1150 (1985MHz)
		15MHz	Channel 675 (1937.5MHz)	Channel 900 (1960MHz)	Channel 1125 (1982.5MHz)

		20MHz	Channel 700 (1940MHz)	Channel 900 (1960MHz)	Channel 1100 (1980MHz)
Band 4	Transmitter	1.4MHz	Channel 19957 (1710.7MHz)	Channel 20175 (1732.5MHz)	Channel 20393 (1754.3MHz)
		3MHz	Channel 19965 (1711.5MHz)	Channel 20175 (1732.5MHz)	Channel 20385 (1753.5MHz)
		5MHz	Channel 19975 (1712.5MHz)	Channel 20175 (1732.5MHz)	Channel 20375 (1752.5MHz)
		10MHz	Channel 20000 (1715MHz)	Channel 20175 (1732.5MHz)	Channel 20350 (1750MHz)
		15MHz	Channel 20025 (1717.5 MHz)	Channel 20175 (1732.5MHz)	Channel 20325 (1747.5MHz)
		20MHz	Channel 20050 (1720 MHz)	Channel 20175 (1732.5MHz)	Channel 20300 (1745MHz)
	Receiver	1.4MHz	Channel 1957 (2110.7MHz)	Channel 2175 (2132.5MHz)	Channel 2393 (2154.3MHz)
		3MHz	Channel 1965 (2111.5MHz)	Channel 2175 (2132.5MHz)	Channel 2385 (2153.5MHz)
		5MHz	Channel 1975 (2112.5MHz)	Channel 2175 (2132.5MHz)	Channel 2375 (2152.5MHz)
		10MHz	Channel 2000 (2115MHz)	Channel 2175 (2132.5MHz)	Channel 2350 (2150MHz)
		15MHz	Channel 2025 (2117.5MHz)	Channel 2175 (2132.5MHz)	Channel 2325 (2147.5MHz)
		20MHz	Channel 2050 (2120MHz)	Channel 2175 (2132.5MHz)	Channel 2300 (2145MHz)
Band5	Transmitter	1.4MHz	Channel 20407 (824.7MHz)	Channel 20525 (836.5MHz)	Channel 20643 (848.3MHz)
		3MHz	Channel 20415 (825.5MHz)	Channel 20525 (836.5MHz)	Channel 20635 (847.5MHz)
		5MHz	Channel 20425 (826.5MHz)	Channel 20525 (836.5MHz)	Channel 20625 (846.5MHz)
		10MHz	Channel 20450 (829 MHz)	Channel 20525 (836.5MHz)	Channel 20600 (844MHz)
	Receiver	1.4MHz	Channel 2407 (869.7MHz)	Channel 2525 (881.5MHz)	Channel 2643 (893.3MHz)
		3MHz	Channel 2415 (870.5MHz)	Channel 2525 (881.5MHz)	Channel 2635 (892.5MHz)
		5MHz	Channel 2425 (871.5MHz)	Channel 2525 (881.5MHz)	Channel 2625 (891.5MHz)
		10MHz	Channel 2450 (874MHz)	Channel 2525 (881.5MHz)	Channel 2600 (889MHz)
Band 7	Transmitter	5MHz	Channel 20775 (2502.5MHz)	Channel 21100 (2535MHz)	Channel 21425 (2567.5MHz)
		10MHz	Channel 20800 (2505MHz)	Channel 21100 (2535MHz)	Channel 21400 (2565MHz)
		15MHz	Channel 20825 (2507.5MHz)	Channel 21100 (2535MHz)	Channel 21375 (2562.5MHz)
		20MHz	Channel 20850 (2510MHz)	Channel 21100 (2535MHz)	Channel 21350 (2560MHz)
	Receiver	5MHz	Channel 2775 (2622.5MHz)	Channel 3100 (2655MHz)	Channel 3425 (2687.5MHz)

		10MHz	Channel 2800 (2625MHz)	Channel 3100 (2655MHz)	Channel 3400 (2685MHz)
		15MHz	Channel 2825 (2627.5MHz)	Channel 3100 (2655MHz)	Channel 3375 (2682.5MHz)
		20MHz	Channel 2850 (2630MHz)	Channel 3100 (2655MHz)	Channel 3350 (2680MHz)
Band 12	Transmitter	1.4MHz	Channel 23017 (699.7MHz)	Channel 23095 (707.5MHz)	Channel 23173 (715.3MHz)
		3MHz	Channel 23025 (700.5MHz)	Channel 23095 (707.5MHz)	Channel 23165 (714.5MHz)
		5MHz	Channel 23035 (701.5MHz)	Channel 23095 (707.5MHz)	Channel 23155 (713.5MHz)
		10MHz	Channel 23060 (704MHz)	Channel 23095 (707.5MHz)	Channel 23130 (711MHz)
	Receiver	1.4MHz	Channel 5017 (729.7MHz)	Channel 5095 (737.5MHz)	Channel 5173 (745.3MHz)
		3MHz	Channel 5025 (730.5MHz)	Channel 5095 (737.5MHz)	Channel 5165 (744.5MHz)
		5MHz	Channel 5035 (731.5MHz)	Channel 5095 (737.5MHz)	Channel 5155 (743.5MHz)
		10MHz	Channel 5060 (734MHz)	Channel 5095 (737.5MHz)	Channel 5130 (741MHz)
Band 13	Transmitter	5MHz	Channel 23205 (779.5MHz)	Channel 23230 (782MHz)	Channel 23255 (784.5MHz)
		10MHz	Channel 23230 (782MHz)	Channel 23230 (782MHz)	Channel 23230 (782MHz)
	Receiver	5MHz	Channel 5205 (748.5MHz)	Channel 5230 (751MHz)	Channel 5255 (753.5MHz)
		10MHz	Channel 5230 (751MHz)	Channel 5230 (751MHz)	Channel 5230 (751MHz)
Band 17	Transmitter	5MHz	Channel 23755 (706.5MHz)	Channel 23790 (710MHz)	Channel 23825 (713.5MHz)
		10MHz	Channel 23780 (709MHz)	Channel 23790 (710MHz)	Channel 23800 (711MHz)
	Receiver	5MHz	Channel 5755 (736.5MHz)	Channel 5790 (740MHz)	Channel 5825 (743.5MHz)
		10MHz	Channel 5780 (739MHz)	Channel 5790 (740MHz)	Channel 5800 (741MHz)
Band 38	Transmitter& Receiver	5MHz	Channel 37775 (2572.5MHz)	Channel 38000 (2595MHz)	Channel 38225 (2617.5MHz)
		10MHz	Channel 37800 (2575MHz)	Channel 38000 (2595MHz)	Channel 38200 (2615MHz)
		15MHz	Channel 37825 (2577.5MHz)	Channel 38000 (2595MHz)	Channel 38175 (2612.5MHz)
		20MHz	Channel 37850 (2580MHz)	Channel 38000 (2595MHz)	Channel 38150 (2610MHz)
Band 41	Transmitter& Receiver	5MHz	Channel 39675 (2498.5MHz)	Channel 40620 (2593MHz)	Channel 41565 (2687.5MHz)
		10MHz	Channel 39700 (2501MHz)	Channel 40620 (2593MHz)	Channel 41540 (2685MHz)
		15MHz	Channel 39725 (2503.5MHz)	Channel 40620 (2593MHz)	Channel 41515 (2682.5MHz)
		20MHz	Channel 39750	Channel 40620	Channel 41490

			(2506MHz)	(2593MHz)	(2680MHz)

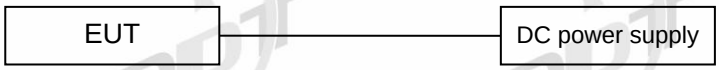
2.3. Accessories of EUT

Accessories	Manufacturer	Model number	Description
Power connecting cable	N/A	N/A	length: 2.5m, unshielded
MIC cable	N/A	N/A	length: 2.2m, unshielded
Power amplifier cable	N/A	N/A	length: 2.0m, unshielded
Camera/recorder cable	N/A	N/A	length: 2.0m, shielded
SIM cable	N/A	N/A	length: 0.8m, shielded
Bluetooth/WIFI antenna	N/A	N/A	length: 2.0m, shielded
FM/AM/DAB antenna	N/A	N/A	length: 4.2m, shielded
GNSS antenna	N/A	N/A	length: 2.2m, shielded

2.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
DC Power	N/A	N/A	N/A	N/A

2.5. Block diagram of EUT configuration for test



2.6. Test environment condition

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

Condition	Normal Condition	Extreme Condition
Pressure range	103.1KPa	N/A
Relative Humidity	20-80%	N/A
Temperature(℃)	NT: 21-26℃	LT: -30℃ HT: 70℃
Voltage(V)	NV: 12V	LV: 9V HV: 16V

Note:
N/A: Not Applicable
NV: Normal Voltage
LV: Low Extreme Test Voltage
HV: High Extreme Test Voltage
HH: High Humidity
NH: Normal Humidity
NT: Normal Temperature
LT: Low Extreme Test Temperature
HT: High Extreme Test Temperature

2.7. Test laboratory

Tianjin Dongdian Testing Service Co., Ltd.

Address: Building D-1, No. 19, Weisi Road, Microelectronics Industrial Park Development Area, Tianjin, China., 300385

Tel: +86-22-58038033, http://www.ddttest.com, Email: ddt@dgddt.com

NVLAP (National Voluntary Laboratory Accreditation Program) CODE: 500036-0

CNAS (China National Accreditation Service for Conformity Assessment) CODE: L13402

FCC Designation Number: CN5004; FCC Test Firm Registration Number: 368676

ISED (Innovation, Science and Economic Development Canada) Company Number: 27768

Conformity Assessment Body Identifier: CN0125

VCCI Facility Registration Number: C-20089, T-20093, R-20125, G-20122

3. Test Mode and Condition

3.1 Test mode(s)

Test Mode	Test Modes Description
GSM/Mode1	GSM system, GSM/GPRS, GMSK modulation
GSM/Mode2	GSM system, EDGE, 8PSK modulation
UMTS/Mode1	WCDMA system, QPSK modulation
UMTS/Mode2	HSDPA system, QPSK modulation
UMTS/Mode3	HSUPA system, QPSK modulation
LTE/Mode1	LTE system, QPSK modulation
LTE/Mode2	LTE system, 16QAM modulation

Note: The test mode(s) are selected according to relevant radio technology specifications.

3.2 Test condition

Test Case		Test conditions	
Transmit Output Power Data	Average Power, Total	Test Env.	Ambient Climate & Rated Voltage
		Channels	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
	Average Power, Spectral Density (if required)	Test Env.	Ambient Climate & Rated Voltage
		Channels	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
Peak-to-Average Ratio (if required)		Test Env.	Ambient Climate & Rated Voltage
		Channels	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
Modulation Characteristics		Test Env.	Ambient Climate & Rated Voltage
		Channels	M (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
Bandwidth	Occupied Bandwidth	Test Env.	Ambient Climate & Rated Voltage
		Channels	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
	Emission Bandwidth (if required)	Test Env.	Ambient Climate & Rated Voltage
		Channels	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
Band Edges Compliance		Test Env.	Ambient Climate & Rated Voltage
		Channels	L, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2
Spurious Emission at Antenna Terminals		Test Env.	Ambient Climate & Rated Voltage
		Channels	L, M,H (L= low channel, M= middle channel, H= high channel)
		Test	GSM/TM1,GSM/TM2,UMTS/TM1,LTE/TM1,LTE/TM2

	Mode	
Field Strength of Spurious Radiation	Test Env.	Ambient Climate & Rated Voltage
	Channels	L, M,H (L= low channel, M= middle channel, H= high channel)
	Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1/TM2/TM3,LTE/TM1,LTE/TM2 NOTE: If applicable, the EUT conf. that has maximum power density (based on the equivalent power level) is selected.
Frequency Stability	Test Env.	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) VL, VN and VH of Rated Voltage at Ambient Climate.
	Channels	L, M,H (L= low channel, M= middle channel, H= high channel)
	Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1/TM2/TM3,LTE/TM1,LTE/TM2

Note:

1. All the Bandwidth/Channel/RB conditions was tested，only report the worst case data in Appendix .
2. According exploratory test no any obvious emission was detected from 9 kHz to 30 MHz and 18 GHz to 40 GHz, so the final test was performed with frequency range from 30 MHz to 18 GHz and recorded in Appendix .

4. Equipment Used During Test

Test System					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EXA Signal Analyzer	Keysight	N9010A	MY53281492	2024/02/21	1 Year
RF SELECTOR	TOYO	NS4900	N/A	N/A	N/A
Band SELECTOR	TOYO	NS5800	N/A	N/A	N/A
Low noise amplifier	R&S	SCU03	100329	2024/02/21	1 Year
Pre-amplifier	KANGMAIWEI	DPA8 1000 18000-1012	09211739	2024/02/18	1 Year
Test software	TOYO	EP5/RSE	Ver 1.9.1	N/A	N/A
Test software	Audix	E3	V 6.11111b	N/A	N/A
Active Loop Antenna	R&S	HFH2-Z2	100269	2024/08/25	2 Year
Broadband Horn Antenna	Schwarzbeck	BBHA 9120E	327	2024/05/12	2 Year
EMI Test Receiver	R&S	ESCI	101024	2024/02/18	1 Year
EMI Test Receiver	R&S	ESCI	101030	2024/02/18	1 Year
Bilog Antenna	TESEQ	CBL6112D	29068	2024/10/10	2 Year
Bilog Antenna	TESEQ	CBL6112D	29069	2024/10/10	2 Year
Amplifier	Sonoma	310N	300913	2024/02/18	1 Year
Amplifier	Sonoma	310N	334532	2024/02/18	1 Year
Ant Mast	Innco	MA4000	N/A	N/A	N/A
Ant Mast	Innco	MA4000	N/A	N/A	N/A
Mast Controller	Innco	CO2000	N/A	N/A	N/A
RF Selector 4CH	TOYO	NS4904N	Selector1	N/A	N/A
RF Selector 4CH	TOYO	NS4904N	Selector2	N/A	N/A
Mast Controller	Innco	CO2000	N/A	N/A	N/A
Mast Controller	Innco	CO2000	N/A	N/A	N/A
RF Selector 4CH	TOYO	NS4904N	Selector1	N/A	N/A
RF Selector 4CH	TOYO	NS4904N	Selector2	N/A	N/A
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	158800	2024/02/21	1 Year
Radio Communication Analyzer	Anritsu	MT8821C	6262257930	2024/02/21	1 Year
Radio Communication Test Station	Anritsu	MT8000A	6262302490	2024/08/07	1 Year
Coupler-	European	PSA-7501R/170	406310-0001	N/A	N/A

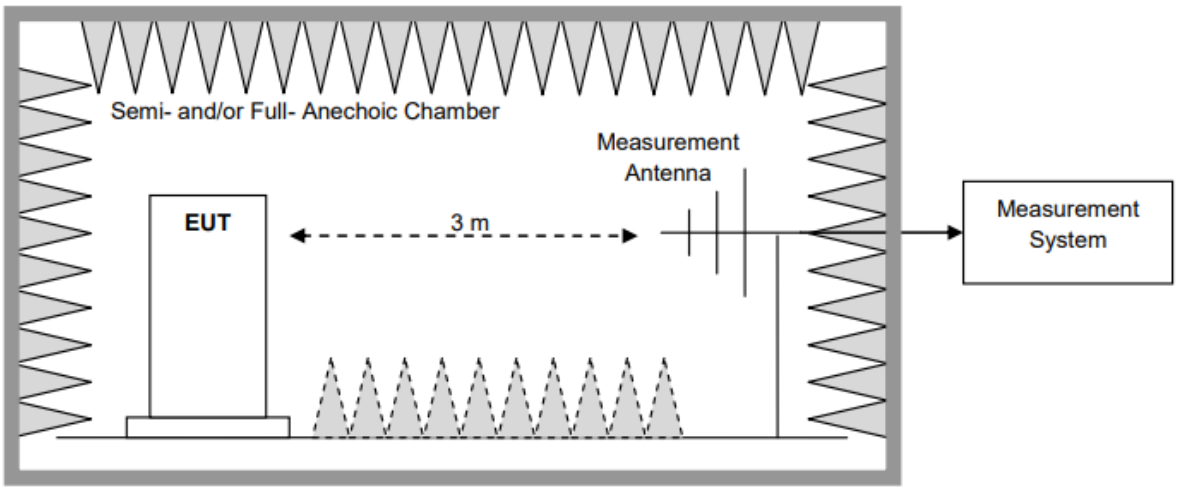
Antenna	Antenna				
tunable notch-filter 820/860Mhz	Wainwright	WRCT 820/860-0.4/40-5SSK	SN8	N/A	N/A
tunable notch-filter 840/920Mhz	Wainwright	WRCT 840/920-0.4/40-5SSK	SN9	N/A	N/A
tunable notch-filter 1700/1800Mhz	Wainwright	WRCD 1700/1800-0.2/40-5SSK	SN41	N/A	N/A
tunable notch-filter 1800/2000Mhz	Wainwright	WRCD 1800/2000-0.2/40-5SSK	SN31	N/A	N/A
band reject filter 1870/1890Mhz	Wainwright	WRCG 1877/1883-1870/1890-40/6EE	SN20	N/A	N/A
band reject filter 1940/1960Mhz	Wainwright	WRCG 1947/1953-1940/1960-40/6SS	SN28	N/A	N/A
band reject filter 2400/2483.5Mhz	Wainwright	WRCTF 2402/2480-2400/2483.5-35/12+9SS	SN42	N/A	N/A
Low pass filter 1.5Ghz	Wainwright	WLK1.5/18G-10SS	SN5	N/A	N/A
High pass filter 1.5G	Wainwright	WHKX1.5/15G-10SS	SN50	N/A	N/A
High pass filter 2.5G	Wainwright	WHKX 2.5/18G-12SS	SN5	N/A	N/A
High pass filter 3G	Kangmaiwei	ZHPF6-M3000-18000-996	03210746	N/A	N/A
High pass filter 6.5G	Kangmaiwei	ZHPF6-M6500-18000-547	03210747	N/A	N/A
High pass filter 1.0G	Kangmaiwei	ZHPF6-C1000-3000-548	11210354	N/A	N/A

5. Measurement uncertainty

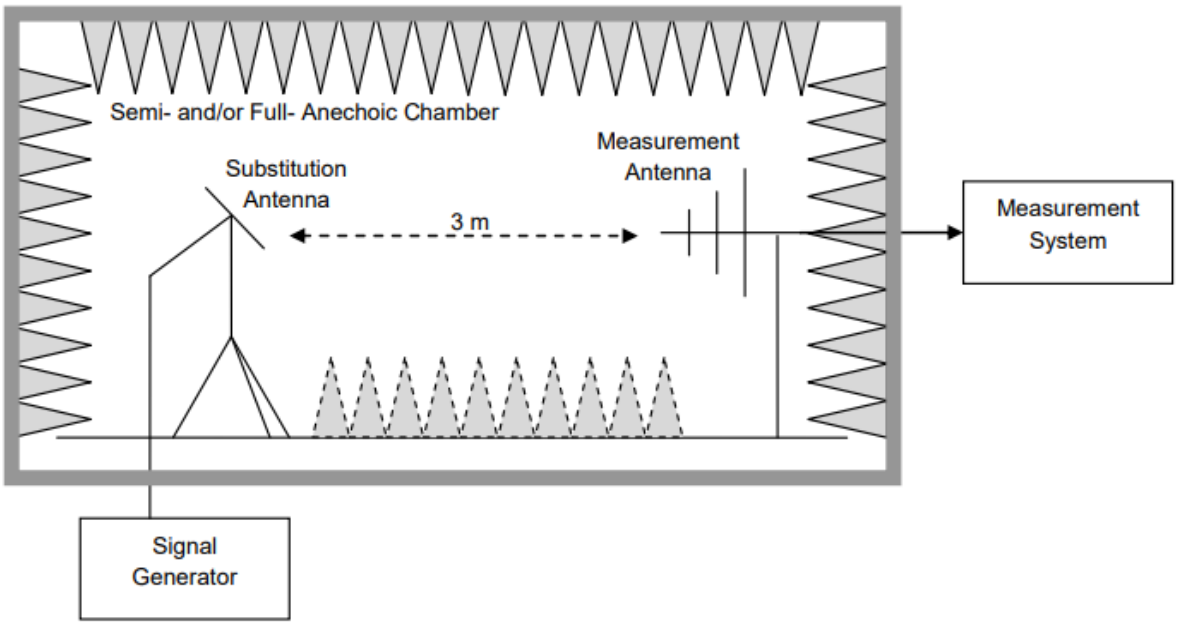
No.	Test Item	Conditions	Uncertainty
1	Frequency error	f ≤ 3.0GHz f > 3.0GHz	±15Hz ±36Hz
2	RF Output Power	f ≤ 3.0GHz BW ≤ 40MHz 4 0MHz < BW ≤ 100MHz	 ±0.6dB ±1.3dB
3	General spurious emissions	9kHz < f ≤ 3GHz 3GHz < f ≤ 4GHz 4GHz < f ≤ 19GHz 19GHz < f ≤ 26GHz	±2,0dB ±2.3dB ±4.0dB ±5.9dB
4	Occupied bandwidth	1.5% of channel bandwidth	±1.5%
5	ACLR	f ≤ 4.0GHz 4.0GHz < f ≤ 6.0GHz -	±0,8dB ±1.0dB
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.			

6. Radiated Power and Radiated Spurious Emissions

6.1. Block diagram of test setup



4.5.3.2 Step 2: Substitution method to verify the maximum ERP/EIRP



6.2. Test description

Radiated spurious emissions are investigated indoors in a semi-anechoic chamber to determine the frequencies producing the worst case emissions. Final measurements for radiated power and radiated spurious emissions are performed on the 3 meter OATS per the guidelines of ANSI/TIA-603-C-2004. The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Emissions are also investigated with the receive antenna horizontally and vertically polarized.

A portable or small unlicensed wireless device shall be placed on a non-metallic test fixture or other non-metallic support during testing. The supporting fixture shall permit orientation of the EUT in each of three orthogonal (x, y, z) axis positions such that emissions from the EUT are maximized. Measure the EUT maximum RF power and record the result.

A half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT.

The power of the emission is calculated using the following formula:

Pd [dBm] = Pg [dBm] – cable loss [dB] + antenna gain [dBd/dBi]

Where, Pd is the dipole equivalent power, Pg is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to Pg [dBm] – cable loss [dB].

The calculated Pd levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10log10(Power [Watts]).

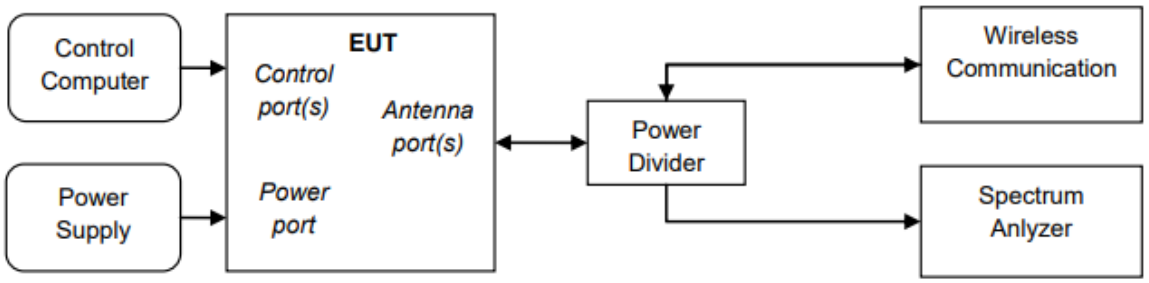
Test Item	Worst case test configuration			
Description	Modulation	Channel	Bandwidth (MHz)	RB Configuration
Radiated Spurious Emissions	QPSK	L，M，H	Maximum BW	RB size=1, RB Location= Low

6.3. Test Result

Refer to Appendix

7. Peak-Average Ratio

7.1. Block diagram of test setup



7.2. Test description

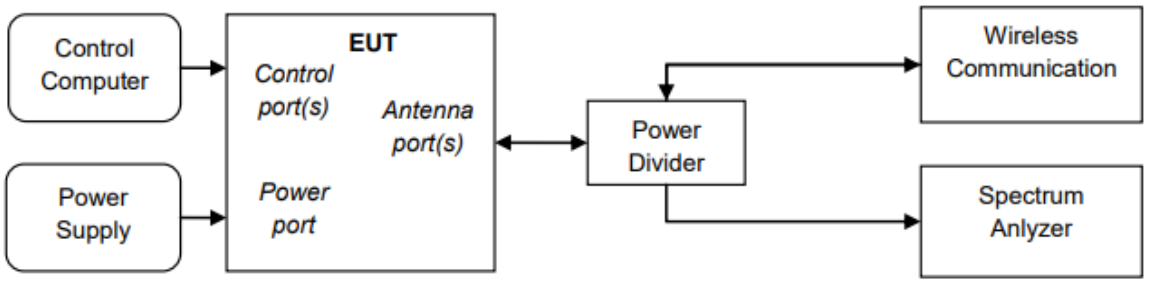
A peak to average ratio measurement is performed at the conducted port of the EUT. For WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. The traces are generated with the spectrum analyzer set to zero span mode.

7.3. Test Result

Refer to Appendix .

8. Occupied Bandwidth

8.1. Block diagram of test setup



8.2. Test description

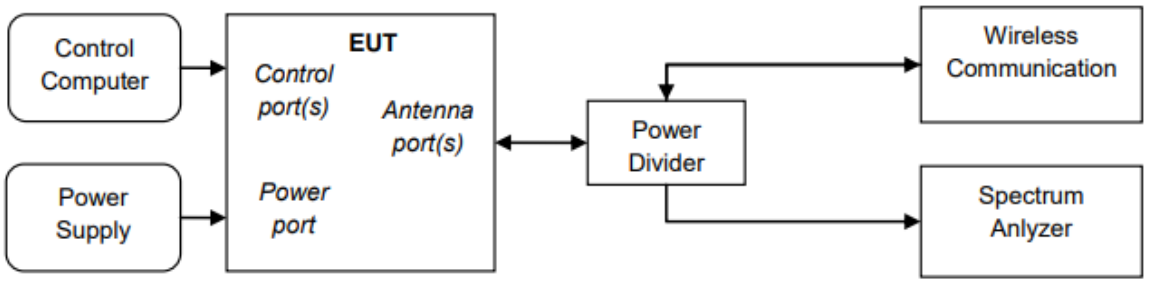
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The span of the analyzer shall be set to capture all 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.

8.3. Test Result

Refer to Appendix .

9. Band Edge Compliance

9.1. Block diagram of test setup



9.2. Test description

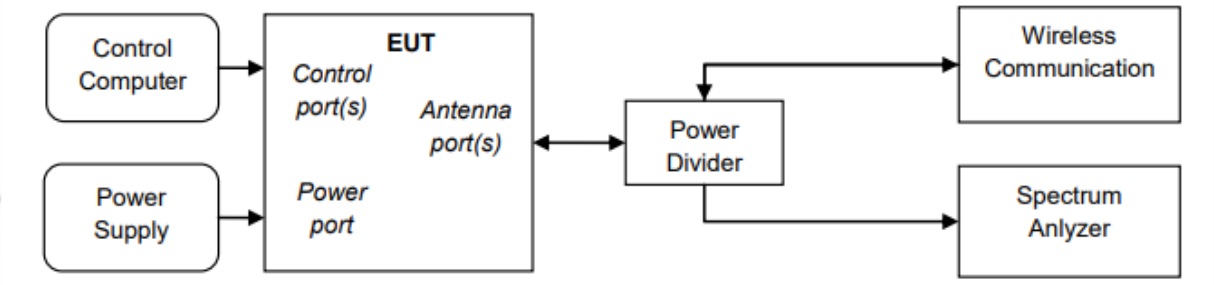
the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission power must be attenuated below the transmitting power (P) by a factor of at least 43+10log10P dB.

9.3. Test Result

Refer to Appendix.

10. Spurious and Harmonic Emissions at Antenna Terminal

10.1. Block diagram of test setup



10.2. Test Procedure

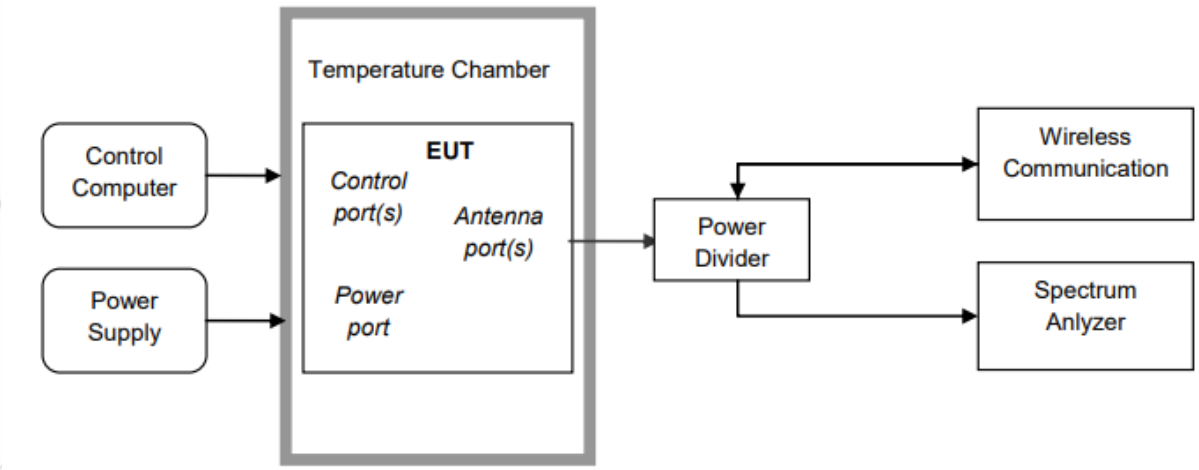
The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

10.3. Test Result

Refer to Appendix .

11. Frequency Stability / Temperature Variation

11.1. Block diagram of test setup



11.2. Test description

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. The frequency stability of the transmitter is measured by: a.) Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber. b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer. Specification – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. Time Period and Procedure: 1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference). 2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter. 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

11.3. Test Result

Refer to Appendix .

13. EUT photograph

Refer to Appendix .

END REPORT