FCC CFR47 PART 27
CERTIFICATION TEST REPORT
FCC ID: 2BAK2-F112PRO

Product： smartphone

Trade Mark： FOSSiBOT

Model Number： F112 Pro

Family Model： F112, F112 S, F112 P

Report No.： S24103102705007

Issue Date： Jan. 08, 2025

Prepared for

Shenzhen Qichang Intelligent Technology Co., Ltd

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Prepared by

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TEST RESULT CERTIFICATION

Applicant's name	Shenzhen Qichang Intelligent Technology Co., Ltd
Address	Room 510, Building 7, Yunli Intelligent Park, No. 7, Bantian Street, Longgang , Shenzhen
Manufacturer's Name	Shenzhen Qichang Intelligent Technology Co., Ltd
Address	Room 510, Building 7, Yunli Intelligent Park, No. 7, Bantian Street, Longgang , Shenzhen
Product name	smartphone
Trade Mark	FOSSiBOT
Model and/or type reference .:	F112 Pro
Family Model	F112, F112 S, F112 P
Test Sample number.....	S241031027006
Date of Test.....	Nov. 01, 2024 ~ Jan. 07, 2025
Standards	FCC CFR 47 Part 27
Test procedure	ANSI C63.46:2015 ANSI/TIA-603-E-2016

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Prepared By :	Reviewed By :	Approved By :
Gavan Zhang	Aaron Cheng	Alex Li
(Project Engineer)	(Supervisor)	(Manager)

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Equipment	smartphone
Trade Mark	FOSSiBOT
Model Name	F112 Pro
Family Model	F112, F112 S, F112 P
Model Difference	All models have the same circuit and RF module, except for model names and colors.
FCC ID:	2BAK2-F112PRO
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; ☒ NR TDD Band 78 Uplink/Downlink: 3450 MHz - 3550 MHz
Frequency Range:	EN-DC: DC_2A_n78A
Type of Modulation:	DFT-s-OFDM:PI/2 BPSK/QPSK/16-QAM/64QAM/256QAM CP-OFDM: QPSK/16-QAM/64QAM/256QAM
Subcarrier spacing	☒15KHz, ☒30KHz, ☐60KHz
NR architecture	☒NSA
Antenna:	PIFA Antenna
Antenna gain:	B2: -0.36 dBi; N78: 1.37 dBi
Adapter	Model: QZ-0180AAA00 Input: 100-240V~50/60Hz 0.5A Output: 5.0V⎓3.0A 15.0W or 9.0V⎓2.0A 18.0W or 12.0V⎓1.5A 18.0W
Battery	DC 3.87V, 7150mAh, 27.67Wh
Power supply	DC 3.87V from battery or DC 5V/9V/12V from Adapter.
Extreme Vol. Limits:	DC 3.29V to DC 4.45V (Nominal DC 3.87V)（Note 1）
HW Version	E393 _ MAIN _PCB_V1.1
SW Version	FOSSiBOT_F112 Pro_F
** Note1: The High Voltage 4.45V and Low Voltage 3.29V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.	

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2BAK2-F112PRO** filing to comply with the FCC Part 27.

1.3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-E-2016, FCC CFR 47 Part 2, Part 27, ANSI C63.46:2015.

1.4 TEST FACILITY

The test site used to collect the radiated data is located at:

ShenZhen NTEK Testing Technology Co., Ltd.

No. 24 Xinfa East Road, Xiangshan Community, Xinqiao Street, Baoan District, Shenzhen, Guangdong, People's Republic of China.

The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.46:2015& ANSI C63.4: 2014.

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

1.5 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.5dB

1.6 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

1.7 WORST-CASE CONFIGURATION AND MODE

The worst-case scenario for all measurements is based on the investigation results.

The device has NR Bands of: Band 78.

The RB Size was selected to measure for peak or average ERP and EIRP, which was based on the conducted power verification baseline data.

For the fundamental investigation of radiated emissions, the EUT is investigated for vertical and horizontal antenna orientations and X Y and Z orientations of the EUT alone. After the investigations the worst case was determined to be at X orientation for all LTE bands.

1.8 SUMMARY OF TEST RESULTS

FCC Part27, Subpart L, KDB 971168 D01 Power Meas License Digital Systems v03			
FCC Rule	**Test Item**	**Verdict**	**Remark**
2.1046	Conducted Output Power	PASS	
27.50(d)(5) KDB 971168 D01 Clause 5.7	Peak-to-Average Ratio	PASS	
2.1049 KDB 971168 D01 Clause 4.2	Occupied Bandwidth	PASS	
2.1051 27.53(c), (g), (h) KDB 971168 D01 Clause 6	Band Edge	PASS	
27.50(b)(10), (c)(10) KDB 971168 D01 Clause 5.6	Effective Radiated Power	PASS	
27.50(h)(2), (d)(4) KDB 971168 D01 Clause 5.6	Equivalent Isotropic Radiated Power	PASS	
2.1053 27.53(c)(g)(h)(m) KDB 971168 D01 Clause 7	Field Strength of Spurious Radiation	PASS	
2.1055 27.54 KDB 971168 D01 Clause 9	Frequency Stability for Temperature & Voltage	PASS	
2.1051 27.53(c)(g)(h)(m) KDB 971168 D01 Clause 6	Conducted Emission	PASS	

Remark:

1. “N/A” denotes test is not applicable in this Test Report.
2. All test items were verified and recorded according to the standards and without any deviation during the test.
3. No modifications are made to the EUT during all test items.

2. SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

2.3 CONFIGURATION OF EUT SYSTEM

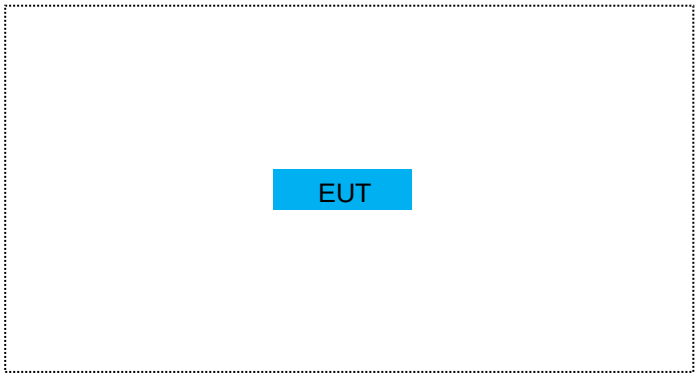
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	smartphone	F112 Pro	FCC ID: 2BAK2-F112PRO	EUT

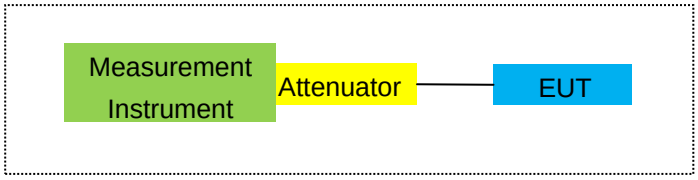
Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.

2.4 TEST SETUP

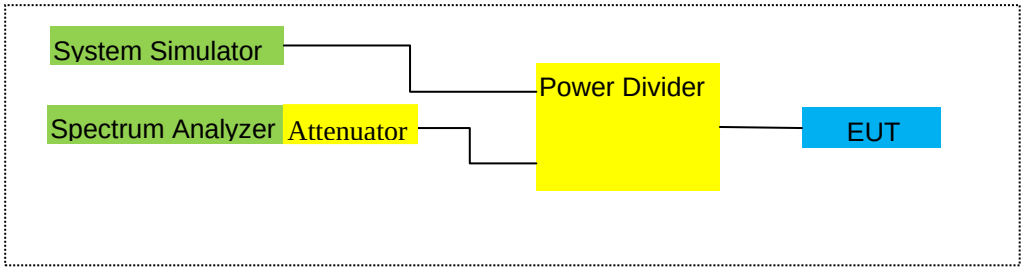
For Radiated Test Cases



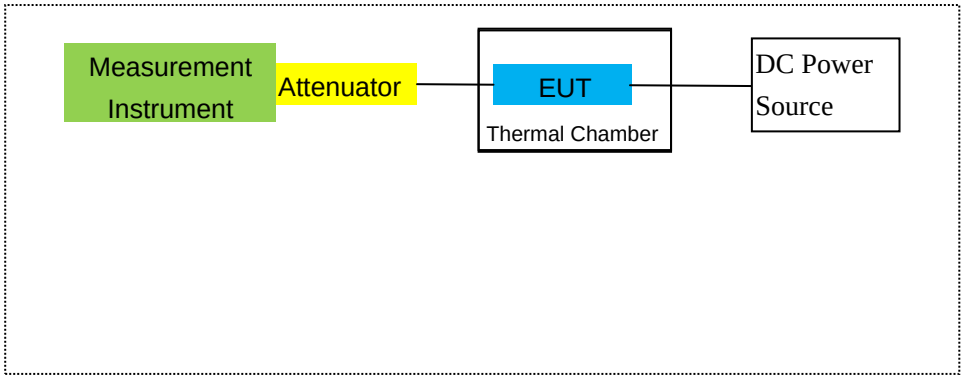
For Conducted Output Power



For Peak-to Average Ratio, Occupied Bandwidth, Conducted Band edge and Conducted Spurious Emission



For Frequency Stability



Note: EUT built-in battery-powered, the battery is fully-charged.

3.TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2024.04.25	2025.04.24	1 year
2	Test Receiver	R&S	ESPI	101318	2024.04.26	2025.04.25	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2024.05.12	2025.05.11	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2024.04.26	2027.04.25	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2024.05.12	2027.05.11	3 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2024.05.12	2027.05.11	3 year
7	Amplifier	EM	EM-30180	060538	2024.04.26	2025.04.25	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2024.03.12	2025.03.11	1 year
9	Power Meter	R&S	NRVS	100696	2024.04.26	2025.04.25	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2024.04.26	2025.04.25	1 year
11	Test Cable	N/A	R-01	N/A	2022.06.17	2025.06.16	3 year
12	Test Cable	N/A	R-02	N/A	2022.06.17	2025.06.16	3 year
13	Test Cable	N/A	R-03	N/A	2022.06.17	2025.06.16	3 year
14	Test Receiver	R&S	ESCI	101160	2024.04.26	2025.04.25	1 year
15	LISN	R&S	ENV216	101313	2024.04.25	2025.04.24	1 year
16	LISN	EMCO	3816/2	00042990	2024.04.25	2025.04.24	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2024.03.12	2025.03.11	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2024.03.12	2025.03.11	1 year
19	Test Cable	N/A	C01	N/A	2023.05.06	2026.05.05	3 year
20	Test Cable	N/A	C02	N/A	2023.05.06	2026.05.05	3 year
21	Test Cable	N/A	C03	N/A	2023.05.06	2026.05.05	3 year
22	Attenuator	MCE	24-10-34	BN9258	2024.03.12	2025.03.11	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2024.03.12	2025.03.11	1 year
24	test receiver	R&S	ESCI	a0304218	2024.03.12	2025.03.11	1 year
25	Communication Tester	R&S	CMU200	A0304247	2024.04.26	2025.04.25	1 year
26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2024.03.12	2025.03.11	1 year

27	DC Power Source	N/A	PS-6005D	20170402923	2024.04.25	2027.04.24	3 year
28	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2024.04.25	2025.04.24	1 year
29	Communication Tester	R&S	CMW500	148500	2024.05.30	2025.05.29	1 year
30	Radio Communication Analyzer	Anritsu	MT8821C	SN 6262186364	2024.04.25	2025.04.24	1 year
31	Radio Communication Test Station	Anritsu	MT8000A	SN 6262192315	2024.04.25	2025.04.24	1 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable& DC Power Source which is scheduled for calibration every 3 years.

Measurement Software

Item	Manufacturer	Software Name	Software Version	Description
1	MWRFtest	MTS 8200 NR	2.0	RF Conducted Test
2	Farad	EZ-EMC_RE	AIT-03A	RadiatedTest
3	raditeq	RadiMation	2023.1.3	RadiatedTest
4	Farad	EZ-EMC_CE	AIT-03A	AC Conducted Test

4. OUTPUT POWER

4.1 OUTPUT POWER MEASUREMENT

NR Measurement Procedure:

All NR bands conducted power peak and average are obtained from the MT8821C telecommunication test set. The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS 38.521-1 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table Table 6.2.2.3-1: of the 3GPP TS 38.521-1 (V15.3.0) (07-2019).

Table 6.2.2.3-1: UE Power Class

EUTRA band	Class 1 (dBm)	Tolerance (dB)	Class 2 (dBm)	Tolerance (dB)	Class 3 (dBm)	Tolerance (dB)	Class 4 (dBm)	Tolerance (dB)
1					23	±2		
2					23	±2[2]		
3					23	±2[2]		
4					23	±2		
5					23	±2		
40					23	±2		
41					23	±2[2]		
42					23	+2/-3		
43					23	+2/-3		
44					23	+2/[-3]		
45					23	±2		
47			26	±2	23	±2		

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS 38.521-1 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of “NS_01”.3

Test data reference attachment.

5. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

MODES TESTED

NSA(DC_2A_n78A)

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051, §27.53(c)(g)(h)(m)

FCC: §2.1046,

LIMITS

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 7 is as following.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is 65 + 10log10(P) = -35dBm in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, 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.

TEST PROCEDURE

The transmitter output was connected to a CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

Set a marker to point the corresponding band edge frequency in each test case.

Set display line

Set resolution bandwidth to at least 1% of emission bandwidth.

MODES TESTED

NSA(DC_2A_n78A)

RESULTS

Test data reference attachment.

Note: Both DFT-s-OFDM:PI/2 BPSK/QPSK/16-QAM/64QAM/256QAM

CP-OFDM: QPSK/16-QAM/64QAM/256QAM has been tested, the worst case is CP_QPSK mode, the report just reported the worst case.

7. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §27.53(c)(g)(h)(m)

LIMITS

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.
The minimum permissible attenuation level for Band 7 is as following.
Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.
Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.
For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is 65 + 10log10(P) = -35dBm in a 6.25kHz bandwidth.
Per 27.53(m) for operations in the BRS/EBS bands, 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.

TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.
For each out of band emissions measurement:
Set display line
Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

MODES TESTED

NSA(DC_2A_n78A)

MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

Test data reference attachment.

Note: Both DFT-s-OFDM:PI/2 BPSK/QPSK/16-QAM/64QAM/256QAM
CP-OFDM: QPSK/16-QAM/64QAM/256QAM has been tested, the worst case is CP_QPSK mode, the report just reported the worst case.

8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §27.50 (h)(2), (b)(10), (c)(10), (d)(4)

LIMITS:

27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.
27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.
27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.
27.50 (h)(2)Mobile and other user stations in the 2500–2570 MHz and 2620–2690 MHz bands. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17
KDB 971168 v02r01 RF power output using broadband peak and average power meter method.
KDB 971168 D01 Power Meas License Digital Systems v02r01, “Measurement Guidance for Certification of Licensed Digital Transmitters”

MODES TESTED

NSA(DC_2A_n78A)

RESULTS

Pass

8.2 NSA(DC_2A_n78A) /SCS (30kHz)

Radiated Power (EIRP) for EN-DC: DC_2A_n78A									
Mode	RB/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5+20.0MHz DFT_QPSK	8@LOW	1852.5	13.53	3.77	8.9	18.66	73.451	Horizontal	Pass
	12@6	3460	-0.39	5.12	29.16	23.65	231.739	Horizontal	Pass
						24.85	305.492		
40.0MHz DFT_QPSK	8@LOW	1880	-4.59	5.13	28.98	19.26	84.333	Horizontal	Pass
	12@6	3500	-0.29	5.18	28.92	23.45	221.309	Horizontal	Pass
						24.85	305.492		
50.0MHz DFT_QPSK	8@LOW	1907.5	-4.81	5.14	28.98	19.03	79.983	Horizontal	Pass
	12@6	3540	-0.1	5.18	28.93	23.65	231.739	Horizontal	Pass
						24.94	311.889		
60.0MHz DFT_QPSK	8@LOW	1860	-4.37	5.14	28.99	19.48	88.716	Horizontal	Pass
	12@6	3500	-0.14	5.18	28.92	23.6	229.087	Horizontal	Pass
						25.02	317.687		
80.0MHz DFT_QPSK	8@LOW	1880	-4.36	5.14	28.95	19.45	88.105	Horizontal	Pass
	12@6	3500	0.31	5.18	28.93	24.06	254.683	Horizontal	Pass
						25.35	342.768		
90.0MHz DFT_QPSK	8@LOW	1900	-5.02	5.14	28.96	18.8	75.858	Horizontal	Pass
	12@6	3500	0.46	5.18	28.93	24.21	263.633	Horizontal	Pass
						25.31	339.625		

NSA(DC_2A_n78A) /SCS (30kHz)

Radiated Power (EIRP) for EN-DC: DC_2A_n78A									
Mode	RB/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5+	8@LOW	1852.5	14.22	3.77	8.9	19.35	86.099	Vertical	Pass
20	12@6	3460	18.69	3.91	8.9	23.68	233.346	Vertical	Pass
Sum						25.04	319.154		
5+	8@LOW	1880	-4.84	5.13	28.98	19.01	79.616	Vertical	Pass
20	12@6	3500	-0.34	5.18	28.92	23.4	218.776	Vertical	Pass
Sum						24.75	298.538		
5+	8@LOW	1907.5	-4.9	5.14	28.98	18.94	78.343	Vertical	Pass
20	12@6	3540	0.51	5.18	28.93	24.26	266.686	Vertical	Pass
Sum						25.38	345.144		
5+	8@LOW	1860	-5.15	5.14	28.99	18.7	74.131	Vertical	Pass
20	12@6	3500	-0.24	5.18	28.92	23.5	223.872	Vertical	Pass
Sum						24.74	297.852		
5+	8@LOW	1880	-4.56	5.14	28.95	19.25	84.140	Vertical	Pass
20	12@6	3500	-0.35	5.18	28.93	23.4	218.776	Vertical	Pass
Sum						24.81	302.691		
5+	8@LOW	1900	-4.71	5.14	28.96	19.11	81.470	Vertical	Pass
20	12@6	3500	-0.06	5.18	28.93	23.69	233.884	Vertical	Pass
Sum						24.99	315.500		

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Factor Gain (dB)+ SG Level (dBm)- Cable Loss(dBm)

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

FCC: §2.1051, §27.53(c)(g)(h)(m)

LIMIT

For Band 7, the minimum permissible attenuation level of any spurious emission is 55 + log10 (P [Watts]).

The minimum permissible attenuation level of any spurious emission is 43 + log10 (P [Watts]), where P is the transmitter power in Watts.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). 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 emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). 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 emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power, P (dBW), as follows:
a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB; and
b. for mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB at the channel edges and 55 + 10 Log10 (p) at 5.5 MHz away and beyond the channel edges where p in (a) and (b) is the transmitter power measured in watts.

MODES TESTED

NSA(DC_2A_n78A)

RESULTS

PASS

9.1 NSA(DC_2A_n78A) /SCS (30kHz)

QPSK NSA(DC_2A_n78A) 10MHZ SCS 30kHz

Test Results for Low Channel 3455MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
6920	-52.96	2.63	28.37	-27.22	-13	-14.22	Horizontal
6920	-51.37	2.63	28.37	-25.63	-13	-12.63	Vertical
10380	-50.89	3.38	28.25	-26.02	-13	-13.02	Vertical
10380	-49.92	3.38	28.25	-25.05	-13	-12.05	Horizontal
178.2	-43.81	0.61	15.10	-29.32	-13	-16.32	Vertical
260.2	-38.57	1.38	15.45	-24.50	-13	-11.50	Horizontal
Test Results for Mid Channel 3500MHz							
7000	-46.12	2.65	28.33	-20.44	-13	-7.44	Horizontal
7000	-50.87	2.65	28.33	-25.19	-13	-12.19	Vertical
10500	-53.35	4.14	28.26	-29.23	-13	-16.23	Vertical
10500	-53.82	4.14	28.26	-29.70	-13	-16.70	Horizontal
198.6	-42.66	0.62	16.35	-26.93	-13	-13.93	Vertical
342.8	-39.53	1.39	15.55	-25.37	-13	-12.37	Horizontal
Test Results for High Channel 3545MHz							
7080	-47.96	2.65	28.41	-22.20	-13	-9.20	Horizontal
7080	-49.96	2.65	28.41	-24.20	-13	-11.20	Vertical
10620	-46.68	5.23	28.15	-23.76	-13	-10.76	Vertical
10620	-53.12	5.23	28.89	-29.46	-13	-16.46	Horizontal
209.7	-36.09	0.65	15.20	-21.54	-13	-8.54	Vertical
373.6	-42.26	1.10	15.16	-28.20	-13	-15.20	Horizontal

QPSK NSA(DC_2A_n78A) 100MHZ SCS 30kHz

Test Results for Mid Channel 3500MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
7000	-47.36	2.63	28.33	-21.66	-13	-8.66	Horizontal
7000	-44.88	2.63	28.33	-19.18	-13	-6.18	Vertical
10500	-45.93	3.38	28.26	-21.05	-13	-8.05	Vertical
10500	-53.87	3.38	28.26	-28.99	-13	-15.99	Horizontal
180.5	-36.99	0.62	15.28	-22.33	-13	-9.33	Vertical
377.2	-40.71	1.24	16.64	-25.31	-13	-12.31	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(dBm)-Limit(dBm)

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16QAM NSA(DC_2A_n78A) 10MHZ SCS 30kHz

Test Results for Low Channel 3455MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
6910	-46.99	2.63	28.37	-21.25	-13	-8.25	Horizontal
6910	-53.43	2.63	28.37	-27.69	-13	-14.69	Vertical
10365	-46.21	3.38	28.25	-21.34	-13	-8.34	Vertical
10365	-53.95	3.38	28.25	-29.08	-13	-16.08	Horizontal
197.1	-42.30	0.59	15.16	-27.73	-13	-14.73	Vertical
361.0	-38.59	1.40	16.07	-23.92	-13	-10.92	Horizontal
Test Results for Mid Channel 3500MHz							
7000	-48.21	2.65	28.33	-22.53	-13	-9.53	Horizontal
7000	-48.01	2.65	28.33	-22.33	-13	-9.33	Vertical
10500	-48.37	4.14	28.26	-24.25	-13	-11.25	Vertical
10500	-51.57	4.14	28.26	-27.45	-13	-14.45	Horizontal
207.7	-44.37	0.64	15.06	-29.95	-13	-16.95	Vertical
352.2	-42.46	1.44	15.22	-28.68	-13	-15.68	Horizontal
Test Results for High Channel 3545MHz							
7090	-48.95	2.65	28.41	-23.19	-13	-10.19	Horizontal
7090	-51.44	2.65	28.41	-25.68	-13	-12.68	Vertical
10635	-45.02	5.23	28.15	-22.10	-13	-9.10	Vertical
10635	-50.24	5.23	28.89	-26.58	-13	-13.58	Horizontal
202.6	-37.00	0.62	16.25	-21.37	-13	-8.37	Vertical
381.9	-37.38	1.42	16.41	-22.39	-13	-9.39	Horizontal

16QAM NSA(DC_2A_n78A) 100MHZ SCS 30kHz

Test Results for Mid Channel 3500MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
7000	-52.62	2.63	28.33	-26.92	-13	-13.92	Horizontal
7000	-48.79	2.63	28.33	-23.09	-13	-10.09	Vertical
10500	-47.99	3.38	28.26	-23.11	-13	-10.11	Vertical
10500	-53.26	3.38	28.26	-28.38	-13	-15.38	Horizontal
182.5	-37.90	0.69	16.00	-22.59	-13	-9.59	Vertical
427.9	-34.51	0.79	16.05	-19.25	-13	-6.25	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(dBm)-Limit(dBm)

10. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §27.54

LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

§24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

Temp. = −30° to +50°C

Voltage =low voltage, DC 3.29V, Normal, DC 3.87V and High voltage, DC 4.45V.

Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to -30ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

MODES TESTED

NSA(DC_2A_n78A)

RESULTS

See the following pages.

10.1 NSA(DC_2A_n78A)

NSA(DC_2A_n78A) QPSK, (100MHz CH 633333 RB Allocation 135@67)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	3500	12.7	0.003633	2.5
3.87	3500	14.1	0.004020	2.5
4.45	3500	12.9	0.003677	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	3500	12.2	0.003498	2.5
Extreme (50C)	3500	12.0	0.003433	2.5
Extreme (40C)	3500	13.9	0.003962	2.5
Extreme (30C)	3500	13.5	0.003852	2.5
Extreme (10C)	3500	13.5	0.003858	2.5
Extreme (0C)	3500	12.2	0.003486	2.5
Extreme (-10C)	3500	13.1	0.003734	2.5
Extreme (-20C)	3500	14.1	0.004033	2.5
Extreme (-30C)	3500	15.2	0.004329	2.5

NSA(DC_2A_n78A) 16QAM, (100MHz CH 633333 RB Allocation 135@67)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	3500	10.3	0.002930	2.5
3.87	3500	9.3	0.002659	2.5
4.45	3500	8.2	0.002329	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	3500	9.4	0.002687	2.5
Extreme (50C)	3500	8.6	0.002463	2.5
Extreme (40C)	3500	8.2	0.002337733	2.5
Extreme (30C)	3500	8.6	0.002460757	2.5
Extreme (10C)	3500	9.0	0.00256282	2.5
Extreme (0C)	3500	8.3	0.002368801	2.5
Extreme (-10C)	3500	9.1	0.002585796	2.5
Extreme (-20C)	3500	8.6	0.002443162	2.5
Extreme (-30C)	3500	8.0	0.002292612	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

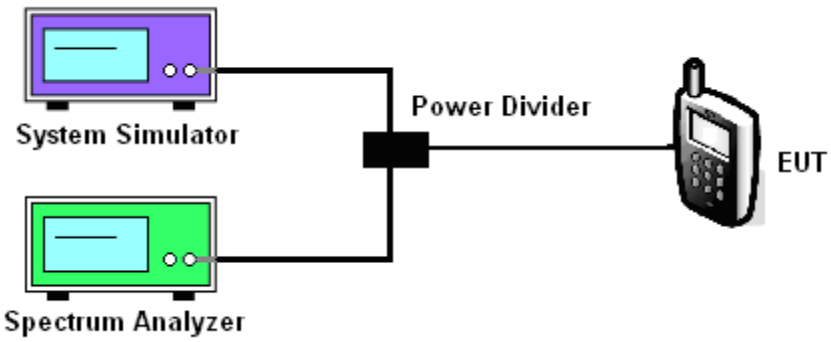
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For GSM/EGPRS operating modes:
   a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
   b. Set EUT in maximum power output, and triggered the burst signal.
   c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
4. For UMTS operating modes:
   a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
   b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

11.4 Test Setup



11.5 MODES TESTED

NSA(DC_2A_n78A)

Test data reference attachment.

----END OF REPORT----