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# **FCC Test Report**

Applicant : Shanghai Jianrong Intelligent Information

Technology Co., Ltd.

Address Room 201, Unit 6, No. 159, Tianzhou Road,

Xuhui District, Shanghai, China

Product Name : D5\_Data Collector

Report Date : Apr. 26, 2024

Shenzhen Anbotek Contribut



Laboratory Limited







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# **TEST REPORT**

Applicant : Shanghai Jianrong Intelligent Information Technology Co., Ltd.

Manufacturer : Shanghai Jianrong Intelligent Information Technology Co., Ltd.

Product Name : D5 Data Collector

Test Model No. : D5

D5pro, H8, H10, H10pro, H11, H11pro, H12, H12pro, R60, R60pro, R70,

Reference Model No. : R70pro, UC12, UC12pro, UC13, UC13pro, HC8, HC8pro, iHand60pro,

DP0041, DP0041pro, PCR500, PCR500pro, GEOMATE FC3

Trade Mark : N/A

Input: 5V= 3A, 9V= 2A

Rating(s) : Capacity: Lithium-ion: DC 3.8V, 9000mAh

Test Standard(s) : FCC PART 2, FCC Part 22(H), FCC Part 24(E), FCC Part 27(C)

ANSI C63.26-2015

Test Method(s) : KDB 971168 D01 Power Meas License Digital Systems v03r01

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 22, FCC Part 24, FCC Part 27 requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt	rep. 22, 2024
Date of Test: :	Feb. 22, 2024 to Mar. 30, 2024
	potek Anbore
Anbore All hotek Anborek Anbo	Illa Liang
Anbotes And otek Anbotek Anbo	hotek Anbote Anbotek
Prepared by :	And Anbotek Anbo
	(Ella Liang)
	ek Anbot kek Abotek Anbote An
bor Anbotek Anbotek Anb	Tolinaval Dans
Anbote Anbotek Anbo. ok	Idward pan
Approved & Authorized Signer :	Anti-
	(Edward Pan)



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# **Revision History**

Report Version			Descrip	tion	Issued Date			
· Vu	R00	Anbot	y Aupo,	Original I	ssue.	upotek	Apr. 26, 2024	o.
ek-	Anbotek	An	otek Vupo	botek Anbotek	Anborek botek	Aupotek	Anboren A	ימח,
potek	Anborek	. ak	Yupo, Potek	Anborek Anbo	tek Andotek	Anboli	Yupo, Polek	1





# 1. General Information

#### 1.1. Client Information

Applicant	:	Shanghai Jianrong Intelligent Information Technology Co., Ltd.
Address	:	Room 201, Unit 6, No. 159, Tianzhou Road, Xuhui District, Shanghai, China
Manufacturer	:	Shanghai Jianrong Intelligent Information Technology Co., Ltd.
Address	:	Room 201, Unit 6, No. 159, Tianzhou Road, Xuhui District, Shanghai, China
Factory	:	SHENZHEN 3NOD ELECTRONICS CO., LTD
Address	:	2F, No.74 , Yangchong Road, Tangxiachong Community, Yanluo Street, Bao'an District, Shenzhen

### 1.2. Description of Device (EUT)

Product Name	:	D5_Data Collector
Test Model No.	:	D5 dbatek Anbotek Anbotek Anbotek Anbotek
Reference Model No.	:	D5pro, H8, H10, H10pro, H11, H11pro, H12, H12pro, R60, R60pro, R70, R70pro, UC12, UC12pro, UC13, UC13pro, HC8, HC8pro, iHand60pro, DP0041, DP0041pro, PCR500, PCR500pro, GEOMATE FC3 (Note: All examples are the same except for colors, local reserved interfaces, and names. Therefore, we prepared "D5" for testing purposes only.)
Trade Mark	:	N/Anbotek Anbotek Anbotek Anbotek Anbotek Anbotek
Test Power Supply	:	DC 5V from adapter input AC 120V/60Hz; DC 3.8V battery inside
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	Manufacturer: Shenzhen ABP Technology Co., Ltd.  Model No.: QC0181A  Input: 100-240V~ 50-60Hz 0.5A Max  Output: 5.0V= 3.0A 15.0W/ 9.0V= 2.0A 18.0W/ 12.0V= 1.5A 18.0W
RF Specification		
Support Band	:	⊠ FDD Band II ⊠ FDD Band V ⊠ FDD Band IV
Transmit Frequency	:	FDD Band II: 1852.40MHz~1907.60MHz FDD Band V: 826.40MHz~846.60MHz FDD Band IV: 1712.40MHz~1752.60MHz
Receive Frequency	:	FDD Band II: 1932.40MHz~1987.60MHz FDD Band V: 871.40MHz~891.60MHz FDD Band IV: 2112.40MHz~2152.60MHz

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Modulation Type	:	RMC: QPSK; HSDPA/HSUPA: QPSK
Power Class	:	Class 3
Antenna Type	:	FPC Antenna
Antenna Gain(Peak):		FDD Band II: 0.88dBi FDD Band V: 0.88dBi FDD Band IV: 0.88dBi

**Remark:** 1) All of the RF specification are provided by customer. 2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.





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#### 1.3. Auxiliary Equipment Used During Test

Title Manufacturer		Model No.	Serial No.	
Anbotes / And	Anbotek / Anbot	Anbotek / Anboten	Anbotek Anbotek	

#### 1.4. Operation State

#### **Test frequency list:**

	FDD E	Band II	FDD E	Band V	FDD Band IV		
	Channel Frequency (MHz)		Channel	Frequency (MHz)	Channel	Frequency (MHz)	
	9262	1852.40	4132	826.40	1312	1712.40	
	9400	1880.00	4183	836.60	1413	1732.60	
e/K	9538	1907.60	4233	846.60	1513	1752.60	

#### Test mode:

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v03 and ANSI C63.26-2015 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

30 MHz to 10th harmonic for FDD Band II, Band V, Band IV

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

		Test modes	
Band	Item	Radiated	Conducted
tek Aupora	RMC	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
aboten Anbe	lek supotek A	■ HSDPA Subtest-1	■ HSDPA Subtest-1
Anbotek Anbo	HCDDA	■ HSDPA Subtest-2	■ HSDPA Subtest-2
FDD Band II	HSDPA	■ HSDPA Subtest-3	■ HSDPA Subtest-3
FDD Band V		■ HSDPA Subtest-4	■ HSDPA Subtest-4
FDD Band IV	abotek Anbo	■ HSUPA Subtest-1	■ HSUPA Subtest-1
lek Aupo,		■ HSUPA Subtest-2	■ HSUPA Subtest-2
botek Anbote	HSUPA	■ HSUPA Subtest-3	■ HSUPA Subtest-3
notek Anbot		■ HSUPA Subtest-4	■ HSUPA Subtest-4
Aup.		■ HSUPA Subtest-5	■ HSUPA Subtest-5







#### 1.5. Environmental Conditions

Temperature range:	21-25℃	Anbore	Aun Potek	Anbotek	Aupo,	nbotek
Humidity range:	40-75%	Anboro	Answork	Anbotek	Anboatek	abotek
Pressure range:	86-106kP	a Anbole	And	k Anbotek	Aupo.	ak aboti





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# 1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interva
1. <sub>A</sub>	EMI Preamplifier	SKET Electronic	LNPA-0118G-4 5	SKET-PA-002	Oct. 12, 2023	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 12, 2023	1 Year
3.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	Oct. 16, 2022	3 Year
4.00°	Bilog Broadband Antenna	Schwarzbeck	VULB9163	345	Oct. 23, 2022	3 Year
5. 0.5	Pre-amplifier	SONOMA	310N	186860	Oct. 12, 2023	1 Year
6.	EMI Test Software EZ-EMC	SHURPLE	N/A	o <sup>tek</sup> N/A Moote	N/A	N/A
Zek ibolek	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 12, 2023	1 Year
8.	DC Power Supply	otek LW Anbore	TPR-6420D	374470	Oct. 20, 2023	1 Year
9. <sup>Anl</sup>	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Oct. 16, 2023	1 Year
10.	Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	167336	Feb. 04, 2023	1 Year
Anbox 11.	High-Pass Filter	CDKMV	ZHPF-BM1100 -4000-0730	B2015094550	Oct. 20, 2023	1 Year
12.	High-Pass Filter	CDKMV	ZHPF-M3.5 -18G-3834	1307006523	Oct. 20, 2023	1 Year
13.	Bilog Broadband Antenna	SCHWARZBECK	VULB 9163	01109	Oct. 16, 2022	3 Year
14.	Double Ridged Horn Antenna	Chengyi Electronics Co., Ltd.	GTH-0118	351600	Nov. 02, 2022	2 Year
15.	Signal Generator	Anritsu	MG3690A	MY48180749	Oct. 12, 2023	1 Year





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#### 1.7. Measurement Uncertainty

Parameter	Uncertainty
Occupied Bandwidth	925Hz
Conducted Output Power	0.76dB
Conducted Spurious Emission	1.24dB
Radiated spurious emissions (30MHz~1GHz)	Horizontal: 3.92dB; Vertical: 4.52dB
Radiated spurious emissions (above 1GHz)	1G-6GHz: 4.78dB; 6G-18GHz: 4.88dB

The measurement uncertainty and decision risk evaluated according to AB/WI-RF-F-032.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

#### 1.8. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### FCC-Registration No.: 434132

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 434132.

#### ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

#### **Test Location**

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.







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#### 1.9. Disclaimer

- 1. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- 2. The test report is invalid if there is any evidence and/or falsification.
- 3. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- 4. This document may not be altered or revised in any way unless done so by Anbotek and all revisions are duly noted in the revisions section.
- 5. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- 6. The authenticity of the information provided by the customer is the responsibility of the customer and the laboratory is not responsible for its authenticity.

The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.





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# 2. Summary of Test

#### 2.1. Summary of test result

FCC Rules	Description of Test	Result
Part 2.1046	ok botek Anbore Arta	Anbotek Anbo
Part 22.913(a)	Conducted Output Power	Compliance
Part 24.232(c)	Conducted Output Fower	Compliance
Part 27.50(d)	sporek Anbore An otek Anbore	Aupr
Part 24.232	Peak-Average Ratio	Compliance
Part 27.50(d)	r eak-Average Mailo	Compliance
§ 2.1047	Modulation Characteristics	N/A Moore
Part 2.1049	99% Occupied Bandwidth & 26 dB Bandwidth	Compliance
Part 2.1051	Anbore Anborek Anborek Anbo	eak aborek
Part 22.917	Conducted Spurious Emission	Compliance
Part 24.238	Conducted Spurious Emission	Compliance
Part 27.53(h)	An motek Anboten And	abotek Anbors
Part 2.1051	And stek Anbotek Anbo	Anbiek Anbi
Part 22.917	Band Edge	Compliance
Part 24.238	Band Edge	Compliance
Part 27.53(h)	and atek anbotek Anbo ak bo	ek Anbore
Part 2.1055(a)(1)(b)	Anbore Anbore Anbore	otek Anbotek
Part 22.355	Frequency stability VS. temperature	Compliance
Part 24.235	requeries stability vo. temperature	Compliance
Part 27.54	tok obotek Anbor Air potek	Anboren Ano
Part 2.1055(d)(1)(2)	o. Andrew Antores Andrew	anbotek Ar
Part 22.355	Frequency stability VS. voltage	Compliance
Part 24.235	Frequency stability VS. voltage	Compliance
Part 27.54	hotek Anbote And tek	otek Anbo.
Part 2.1046	Anbotek Anbotek Anbotek	botek Anbote
Part 22.913(a)	ERP and EIRP	Compliance
	LINI and LINI	Compliance
Part 24.232(c) Part 27.50	otek vupo, by, ek potes	Anborek An
Part 2.1053	upo hotek Anbotek Anbote Ann	k anboten
Part 22.917		Compliance
Part 24.238 Part 27.53(h)	Madiated Spurious Effilssion	Compliance
Part 27.53(h)	nbotek Anbore Ant	inboten And

Note: Testing was performed by configuring EUT to maximum output power status, the declared output power class for different



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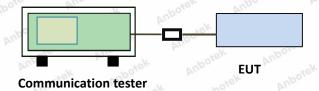
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# 3. Conducted Output Power Test

#### 3.1. Test Standard and Limit

		N. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.		640	The second secon		7.7
7	Applicable	Part 2.1046	Anbore A	'un	anborek	Aupo	hote
	Standard:	Part 22.913(a)					Vive
o'i		Part 24.232(c)					AUP
		Part 27.50(d)					P
	Limit:	N/A	Anbo	100° Yo.	lek Wupos	bu.	iek.

#### 3.2. Test Setup



#### 3.3. Test Procedure

- 1. The EUT output port was connected to communication tester.
- 2. Set EUT at maximum power through communication tester.
- 3. Select lowest, middle, and highest channels for each band and different modulation.
- 4. Measure the maximum burst average power.

#### 3.4. Test Data

Pass

Please refer to Appendix A of the Appendix Test Data.







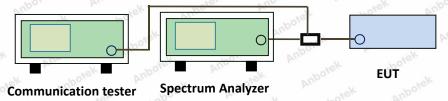
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### 4. Peak-Average Ratio

#### 4.1. Test Standard and Limit

PATE AND ADDRESS OF THE PATE A	A 1714	- Alan	WO	PAT.		V. C. J.
Applicable Standard:	Part 24.232	Aupore	Yu.	Anbotek	Anbo	hotek
	Part 27.50(d)					Vien
Limit:	13dB	k botek	Anbore	Mr. Wek	anboten	Anb

#### 4.2. Test Setup



#### 4.3. Test Procedure

#### According with KDB 971168 D01 Section 5.7:

- 1. The EUT was connected to the spectrum analyzer and communication tester via a power splitter.
- 2. Set EUT in maximum power output.
- 3. Center Frequency = Carrier frequency, RBW > Emission bandwidth of signal.
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve.
- 5. The measurement interval was set depending on the type of signal analyzed.
  - i. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms.
- ii. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power
- 6. Record the maximum PAPR level associated with a probability of 0.1%.

#### 4.4. Test Data

Pass

Please refer to Appendix B of the Appendix Test Data.







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### 5. Modulation Characteristic

According to FCC § 2.1047(d), Part 22H, Part 24E, Part 27C there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.





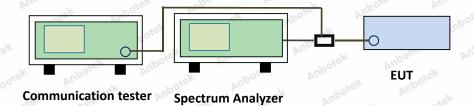
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# 6. 99% Occupied Bandwidth & 26 dB Bandwidth

#### 6.1. Test Standard and Limit

Applicable Standard:	Part 2.1049	Anbore	Ann	Anbotek	Aupo.	hotek
Limit:	N/A	Anbotek	Anbo	abotek	Anboro	b.1.

#### 6.2. Test Setup



#### 6.3. Test Procedure

- 1. The EUT was connected to the spectrum analyzer and communication tester via a power splitter.
- 2. Set EUT in maximum power output.
- Spectrum analyzer setting as follow: Center Frequency= Carrier frequency, RBW=1% to 5% of anticipated OBW, VBW= 3 \* RBW, Detector=Peak, Trace maximum hold.
- 4. Record the value of 99% Occupied bandwidth and -26dB bandwidth.

#### 6.4. Test Data

**Pass** 

Please refer to Appendix C of the Appendix Test Data.







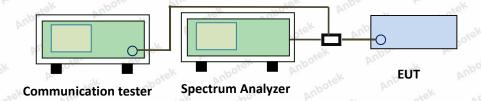
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# 7. Band Edge

#### 7.1. Test Standard and Limit

Part and a second secon	
Applicable Standard:	Part 2.1051
	Part 22.917
	Part 24.238
	Part 27.53(h)
Limit:	Part 24.238 and Part 22.917 and Part 27.53(h)specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
	The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes
	43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

#### 7.2. Test Setup



#### 7.3. Test Procedure

- 1. The EUT was connected to the spectrum analyzer and communication tester via a power splitter.
- 2. Set EUT in maximum power output.
- 3. The band edges of low and high channels were measured.
- Spectrum analyzer setting as follow:
   RBW=51KHz, VBW = 150KHz, Sweep time= Auto
- 5. Record the test plot.

#### 7.4. Test Data

Pass

Please refer to Appendix D of the Appendix Test Data.







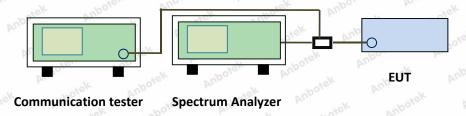
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# 8. Conducted Spurious Emission

#### 8.1. Test Standard and Limit

N	
Applicable Standard:	Part 2.1051
	Part 22.917
	Part 24.238
	Part 27.53(h)
Limit:	Part 24.238 and Part 22.917 and Part 27.53(h) specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
	The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes
	43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

#### 8.2. Test Setup



#### 8.3. Test Procedure

- 1. The EUT was connected to the spectrum analyzer and communication tester via a power splitter.
- 2. Set EUT in maximum power output.
- Spectrum analyzer setting as follow:
   Below 1GHz, RBW=100KHz, VBW = 300KHz, Detector=Peak, Sweep time= Auto
   Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peak, Sweep time= Auto
   Scan frequency range up to 10<sup>th</sup> harmonic.
- 4. Record the test plot.

#### 8.4. Test Data

**Pass** 

Please refer to Appendix E of the Appendix Test Data.







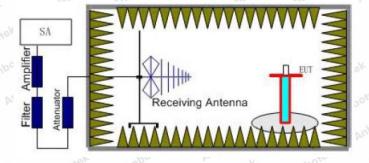
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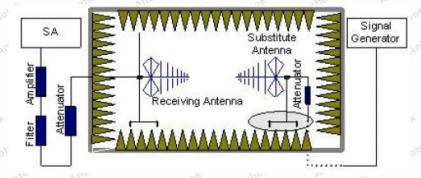
# 9. Radiated Spurious Emission

#### 9.1. Test Standard and Limit

4	Applicable Standard:	Part 2.1053	Anbore	'un otek	vupolek l	inpo ok	bote
121		Part 22.917					Vien
o'i		Part 24.238					Aup
7		Part 27.53(h)					. p
	Limit:	-13dBm	ofer Anbo	sek abot	sk Aupore	K 200	tek.

#### 9.2. Test Setup





#### 9.3. Test Procedure

- 1. Place the EUT in the center of the turntable.
  - a) For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table at a nominal height of 80 cm above the reference ground plane
  - b) For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table at a nominal height of 1.5 m above the ground plane.
- Unless the EUT uses an integral antenna, the EUT shall be terminated with a non-radiating transmitter load. In cases where the EUT uses an adjustable antenna, the antenna shall be adjusted through typical positions and lengths to maximize emissions levels.
- 3. The EUT shall be tested while operating on the frequency per manufacturer specification. Set the transmitter to operate in continuous transmit mode.
- 4. Receiver or Spectrum set as follow:

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Below 1GHz, RBW=100kHz, VBW=300kHz, Detector=Peak, Sweep time=Auto Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peck, Sweep time=Auto

- 5. Each emission under consideration shall be evaluated:
  - a) Raise and lower the measurement antenna from 1 m to 4 m, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
  - b) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
  - c) Return the turntable to the azimuth where the highest emission amplitude level was observed.
  - d) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
  - e) Record the measured emission amplitude level and frequency
- 6. Repeat step 5 for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.
- Set-up the substitution measurement with the reference point of the substitution antenna located as near as possible to where the center of the EUT radiating element was located during the initial EUT measurement.
- 8. Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.
- 9. Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.
- 10. For each emission that was detected and measured in the initial test
  - a) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
  - b) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step 5 and step 6.
  - c) Record the output power level of the signal generator when equivalence is achieved in step b)
- 11. Repeat step 8 through step 10 with the measurement antenna oriented in the opposite polarization.
- 12. Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:

Pe = Ps(dBm) - cable loss (dB) + antenna gain (dBd)

where

Pe = equivalent emission power in dBm

Ps = source (signal generator) power in dBm

NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.

13. Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from:

gain (dBd) = gain (dBi) - 2.15 dB.

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If necessary, the antenna gain can be calculated from calibrated antenna factor information

14. Provide the complete measurement results as a part of the test report.

#### 9.4. Test Data

Pass

Note: Worst case at WCDMA Band II/ WCDMA Band V/ WCDMA Band IV

			WCDMA	A Band II			
	Fraguenay		Spurious	Emission		Limit	
Channel	Frequency (MHz)	Polarization	Reading (dBm)	Factor (dB)	Level (dBm)	(dBm)	Result
Anbore	3704.80	Vertical	-48.89	13.26	-35.63	sk Aupo,	Y All
rek pi	5557.20	V	-55.93	16.62	-39.31	<-13.00	PASS
br.	7409.60	poter V Am	-58.23	17.84	-40.39		Anboten
9262	3704.80	Horizontal	-50.37	13.26	-37.11	hotek	Anborek
Anbotek	5557.20	AnbHeh	-57.32	16.62	-40.70	<-13.00	PASS
Anbore	7409.60	Hootek	-59.41	17.84	-41.57		K Anbote
Anborek	3760.00	Vertical	-47.79	13.27	-34.52	V.Up.	otek Anb
lek Anbo	5640.00	dek V and	-54.76	16.49	-38.27	<-13.00	PASS
notek	7520.00	V	-57.37	17.96	-39.41		Anbo stek
9400	3760.00	Horizontal	-49.03	13.27	-35.76	Anborek	Aupo.
Anbotek Anbotek	5640.00	Anbox H	-56.09	16.49	-39.60	<-13.00	PASS
Anbo	7520.00	H4	-58.49	17.96	-40.53		K Anboro
Pupp	3815.20	Vertical	-46.22	13.59	-32.63	stek Anb	otek Anbe
ek Aupo,	5722.80	otek V Anbe	-53.24	16.69	-36.55	<-13.00	PASS
potek An	7630.40	-botelV A	-55.72	17.95	-37.77		
9538	3815.20	Horizontal	-48.69	13.59	-35.10	Anbore	hotek
Anbotek Anbotek	5722.80	Hotek	-55.67	16.69	-38.98	<-13.00	PASS
An-	7630.40	H work	-57.95	17.95	-40.00		Y Anu

#### Remark:

- 1. The emission behaviour belongs to narrowband spurious emission.
- 2. The emission levels of not record in the report are very lower than the limit and not show in test report.







Par a		76. 70.	WCDMA	Band V	70. k.		
Channel	Frequency (MHz)	Polarization	Reading (dBm)	Emission Factor (dB)	Level (dBm)	Limit (dBm)	Result
Anbore	1652.80	Vertical	-38.67	5.62	-33.05	P.L.	iek anbo
anbote,	2479.20	ek V nbot	-46.95	9.32	-37.63	<-13.00	PASS
otek 4400 Anb'	3305.60	Jek V	-52.90	12.69	-40.21	upotek Ar	
4132	1652.80	Horizontal	-40.18	5.62	-34.56	Anbotek	Aupo
Anbotek	2479.20	Aupo, Hek	-48.37	9.32	-39.05	<-13.00	PASS
Anbo	3305.60	Aupor	-54.23	12.69	-41.54	Anbotek	
Anbo	1673.20	Vertical	-39.49	7.69	-31.80	lek vupot	Sk Vupo,
Anbotek	2509.80	sk V Anbon	-45.91	9.46	-36.45	<-13.00	PASS
nek Anbo	3346.40	potek V Anb	-51.36	12.26	-39.10	Upo. K.	
4183	1673.20	Horizontal	-41.21	7.69	-33.52	Aupo.	abotek
Anbotek	2509.80	Hek.	-47.53	9.46	-38.07	<-13.00	PASS
nbotek	3346.40	Hotek	-52.88	12.26	-40.62	Anbore	
Anbotek	1693.20	Vertical	-38.59	8.26	-30.33	ASK MUPOL	VK Num
ek woo	2539.80	V	-44.71	9.65	-35.06	<-13.00	PASS
N. 200	3386.40	V And	-50.21	12.41	-37.80	botek	
4233	1693.20	Horizontal	-40.56	8.26	-32.30	Protek.	Anbotek
Anbotek	2539.80	Anb Hek	-46.57	9.65	-36.92	<-13.00	PASS
Anboten	3386.40	A Hotek	-51.95	12.41	-39.54	K Pun	

#### Remark:

- 1. The emission behaviour belongs to narrowband spurious emission.
- 2. The emission levels of not record in the report are very lower than the limit and not show in test report.





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			WCDMA	Band IV			
	Fraguenay		Spurious	Emission		Limit	
Channel	Frequency (MHz)	Polarization	Reading (dBm)	Factor (dB)	Level (dBm)	(dBm)	Result
Anbore	1652.80	Vertical	-41.28	8.69	-32.59	N MILE	ek anb
	2479.20	ek V nook	-46.40	9.23	-37.17	<-13.00	PASS
itek 1010 Amb	3305.60	Not V	-52.34	12.59	-39.75	upoten Ar	
1312	1652.80	Horizontal	-43.10	8.69	-34.41	Anborek	Aupo
	2479.20	Anber Hek	-48.11	9.23	-38.88	<-13.00	PASS
	3305.60	Aupor	-53.94	12.59	-41.35	anbotek	
Anbo	1673.20	Vertical	-39.86	8.78	-31.08	rek noon	Sk Vupe
	2509.80	Sk Aupon	-45.40	9.65	-35.75	<-13.00	PASS
iek Anbr	3346.40	potek V Anh	-51.03	12.61	-38.42	ypo. rek	
1413	1673.20	Horizontal	-41.94	8.78	-33.16	Vupo.	abotek
	2509.80	Hek.	-47.35	9.65	-37.70	<-13.00	PASS
	3346.40	Hotek	-52.85	12.61	-40.24	Anbore	
Anborek	1693.20	Vertical	-37.99	8.69	-29.30	lek Vupo,	Dr.
	2539.80	V	-43.60	9.52	-34.08	<-13.00	PASS
	3386.40	V Am	-49.54	12.69	-36.85	abotek	
1513	1693.20	Horizontal	-40.37	8.69	-31.68	Anbotek	Anbores
	2539.80	Anb Her	-45.83	9.52	-36.31	<-13.00	PASS
	3386.40	Hotek	-51.63	12.69	-38.94	And	

#### Remark:

- 1. The emission behaviour belongs to narrowband spurious emission.
- 2. The emission levels of not record in the report are very lower than the limit and not show in test report.





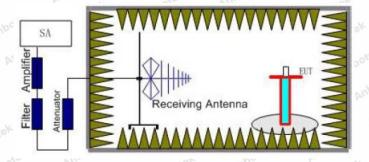
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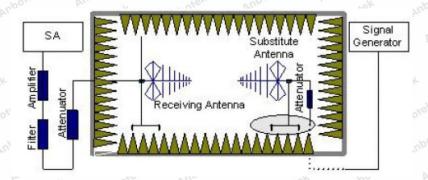
### 10. ERP and EIRP

#### 10.1. Test Standard and Limit

Y.	Applicable Standard:	Part 2.1046
		Part 22.913(a)
o'i		Part 24.232(c)
n l		Part 27.50
	Limit:	WCDMA Band II: 2W (33dBm) EIRP
		WCDMA Band V: 7W (38.45dBm) ERP
		WCDMA Band IV: 1W (30dBm) EIRP

#### 10.2. Test Setup





#### 10.3. Test Procedure

- 1. Place the EUT in the center of the turntable.
  - a) For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table at a nominal height of 80 cm above the reference ground plane
  - b) For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table at a nominal height of 1.5 m above the ground plane.
- 2. Unless the EUT uses an integral antenna, the EUT shall be terminated with a non-radiating transmitter load. In cases where the EUT uses an adjustable antenna, the antenna shall be adjusted through typical positions and lengths to maximize emissions levels.



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- The EUT shall be tested while operating on the frequency per manufacturer specification. Set the transmitter to operate in continuous transmit mode.
- 4. Receiver or Spectrum set as follow:

Below 1GHz, RBW=100kHz, VBW=300kHz, Detector=Peak, Sweep time=Auto Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peck, Sweep time=Auto

- 5. Each emission under consideration shall be evaluated:
  - a) Raise and lower the measurement antenna from 1 m to 4 m, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
  - b) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
  - c) Return the turntable to the azimuth where the highest emission amplitude level was observed.
  - d) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
  - e) Record the measured emission amplitude level and frequency
- 6. Repeat step 5 for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.
- 7. Set-up the substitution measurement with the reference point of the substitution antenna located as near as possible to where the center of the EUT radiating element was located during the initial EUT measurement.
- 8. Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.
- 9. Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.
  - For each emission that was detected and measured in the initial test
    - a) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
    - b) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step 5 and step 6.
    - c) Record the output power level of the signal generator when equivalence is achieved in step b).
  - 11. Repeat step 8 through step 10 with the measurement antenna oriented in the opposite polarization.
  - 12. Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:

Pe = Ps(dBm) - cable loss (dB) + antenna gain (dBd)

where

Pe = equivalent emission power in dBm

Ps = source (signal generator) power in dBm

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NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.

- 13. Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from:
  - gain (dBd) = gain (dBi) 2.15 dB.
  - If necessary, the antenna gain can be calculated from calibrated antenna factor information
- 14. Provide the complete measurement results as a part of the test report.

#### 10.4. Test Data

#### Pass

		ERP&EIRP				
Mada	01 1	(dE	Bm)	l : :t (-ID)	Result	
Mode	Channel	Vertical	Horizontal	Limit (dBm)		
WCDMA Band II (EIRP)	9262	26.79	24.51	br. potek	Anbore. An	
	9400	26.35	21.94	<33.00	PASS	
	9538	25.92	23.32	Ans hotek	Anborek	
WCDMA Band V (ERP)	4132	19.64	19.41	ie. Vue	ek Anbotek	
	4183	18.69	17.34	<38.45	PASS	
	4233	17.39	17.99	Anboten An	otek vul	
WCDMA Band IV (EIRP)	1312	17.97	22.99	Anboren	Aup. Hek	
	1413	17.64	18.01	<30.00	PASS	
	1513	17.15 And	20.48	sk Aupotek	Anbo, rek	





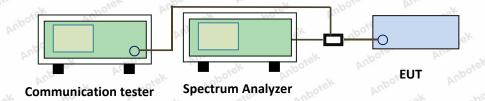
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# 11. Frequency stability VS Voltage measurement

#### 11.1. Test Standard and Limit

Applicable Standard:	Part 2.1055(d	d)(1)(2)	No. V.	ur otek	Anborek	Aupo	-botek
	Part 22.355						Alle
	Part 24.235						Anbo
	Part 27.54						ik bis
Limit:	2.5ppm	Anboren	Anbo	ok bo	yek Aupor	Dir.	otek

#### 11.2. Test Setup



#### 11.3. Test Procedure

- 1. The equipment under test was connected to an external DC power supply and input rated voltage.
- 2. The EUT output port was connected to communication tester.
- 3. The EUT was placed inside the temperature chamber at 25°C.
- 4. The power supply voltage to the EUT was varied ±15% of the nominal value measured at the input to the EUT.
- 5. Record the maximum frequency change.

#### 11.4. Test Data

Pass

Please refer to Appendix F of the Appendix Test Data.







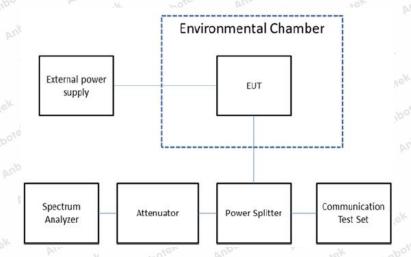
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# 12. Frequency stability VS Temperature measurement

#### 12.1. Test Standard and Limit

Applicable Standard:	Part 2.1055(	a)(1)(b)	O. D.	us of the K	nbotek	Anbo	hote
	Part 22.355						Arra
	Part 24.235						Anb
	Part 27.54						
Limit:	2.5ppm	Anboten	Anbo	ek do	yek Anbor	br.	riek

#### 12.2. Test Setup



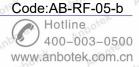
#### 12.3. Test Procedure

- 1. The equipment under test was connected to an external DC power supply and input rated voltage.
- 2. The EUT output port was connected to communication tester.
- 3. The EUT was placed inside the temperature chamber.
- 4. Turn EUT off and set the chamber temperature to –30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
- Repeat step 4 measure with 10°C increased per stage until the highest temperature of +50°C reached.

#### 12.4. Test Data

**Pass** 

Please refer to Appendix F of the Appendix Test Data







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#### **APPENDIX I -- TEST SETUP PHOTOGRAPH**

Please refer to separated files Appendix I -- Test Setup Photograph\_Licensed

#### APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- External Photograph

# **APPENDIX III -- INTERNAL PHOTOGRAPH**

Please refer to separated files Appendix III -- Internal Photograph

