

# FCC RADIO TEST REPORT FCC ID: 2AEHF-BLAST

Product:NOBUX™ BLAST-FLAMETrade Name:NOBUX™Model Number:BLASTSerial Model:FLAMEReport No.:NTEK-2015NT03241355F3

### **Prepared for**

NOBUX, LLC

8600 NW SOUTH RIVER DR #103 MIAMI, FLORIDA 33166, United States

### **Prepared by**

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### **TEST RESULT CERTIFICATION**

Applicant's name	NOBUX, LLC
Address:	8600 NW SOUTH RIVER DR #103 MIAMI, FLORIDA 33166 United States
Manufacture's Name	NOBUX, LLC
Address:	8600 NW SOUTH RIVER DR #103 MIAMI, FLORIDA 33166 United States
Product name:	NOBUX™ BLAST-FLAME
Model and/or type reference:	BLAST
Serial Model :	FLAME
Standards	FCC Part 22H and 24E: 01 Oct. 2014
Test procedure:	ANSI C63.4-2003, TIA/EIA 603D
This device described above has be under test (EUT) is in compliance w sample identified in the report.	en tested by NTEK, and the test results show that the equipment vith the FCC requirements. And it is applicable only to the tested
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Date of Test	
Date (s) of performance of tests	24 Mar. 2015 ~07 Apr. 2015
Date of Issue	07 Apr. 2015
Test Result	Pass
Testing Engineer	: Jason chen
	(Jason Chen)
Technical Manager	Brown Lu
	(Brown Lu)
Authorized Signatory	: Bin
	(Bill Yao)



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### **1. GENERAL INFORMATION**

### **1.1 PRODUCT DESCRIPTION**

A major technical description of EUT is described as following:

Product Designation:	NOBUX™ BLAST-FLAME		
Hardware version:			
Software version:			
Frequency Bands:	GSM 850 PCS 1900 (U.S. Bands)   GSM 900 DCS 1800 (Non-U.S. Bands)   U.S. Bands: UMTS FDD Band II UMTS FDD Band V   Non-U.S. Bands: UMTS FDD Band I UMTS FDD Band VIII		
Antenna:	PIFA Antenna		
Antenna gain:	1.0 dBi		
Power Supply:	DC 3.7V by battery		
Battery parameter:	DC 3.7V, 600mAh		
Adapter Input:	100-240V~,50/60 Hz		
Adapter Output:	5.0V,0.5A		
GPRS/EDGE Class	Multi-Class12 Only 4 timeslots are used for GPRS		
SIM CARD	The Phone Two SIM Card sockets		
Extreme Vol. Limits:	DC3.5 V to 4.2V (Nominal DC3.7 V)		
Extreme Temp. Tolerance	-10℃ to +50℃		
** Note: The High Voltage 4.2V and Low Voltage 3.5V 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:2AEHF-BLAST** filing to comply with the FCC Part 22H&24E .

#### **1.3 TEST METHODOLOGY**

The radiated emission testing was performed according to the procedures of ANSI C 63.4: 2003; TIA/EIA 603D and FCC CFR 47 Rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.

#### 1.4 TEST FACILITY

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

NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.

FCC Registration No.:238937

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

#### **1.5 MEASUREMENT INSTRUMENTS**

NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	NEXT CAL. DATE
SPECTRUM ANALYZER	AGILENT	E4440A	US44300399	2015.6.26
TEST RECEIVER	R&S	ESCI	A0304218	2015.6.26
COMMUNICATION TESTER	AGILENT	8960	3104A03367	2015.6.26
COMMUNICATION TESTER	R&S	CMU200	A0304247	2015.6.26
TEST RECEIVER	R&S	FCKL1528	A0304230	2015.6.26
LISN	SCHWARZBECK	NSLK8127	A0304233	2015.6.26
CLIMATE CHAMBER	ALBATROSS			2015.6.26
Loop Antenna	Daze	ZN30900N	SEL0097	2015.6.26
Bilogical Antenna	A.H. Systems Inc.	SAS-521-4	N/A	2015.6.26
Horn Antenna	EM	EM-AH-10180	N/A	2015.6.26

#### **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 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.



### 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.

Item Number	Item Description		FCC Rules	
4	Output	Conducted output power	22.012(a)/24.222(b)	
I	Power	Radiated output power	22.913(a) / 24.232(b)	
2 Spurious Emission	Spurious	Conducted		
	Emission	spurious emission	2.1051 / 22.917 / 24.238	
		Radiated spurious emission		
3	Frequency Stability		2.1055 /24.235	
4	Occupied Bandwidth		2.1049 (h)(i)	
5	Emission Bandwidth		22.917(b) / 24.238 (b)	
6	Band Edge		22.917(b) / 24.238 (b)	
7	Peak-to-Average Ratio		24.232(d)	

#### 2.3 GENERAL TECHNICAL REQUIREMENTS



### 2.4 CONFIGURATION OF EUT SYSTEM

Fig. 2-1 Configuration of EUT System

EUT

Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	NOBUX™ BLAST-FLAME	BLAST FCC ID: 2AEHF-BLAS		EUT

Note: All the accessories have been used during the test.

the following "EUT" in setup diagram means EUT system.



### **3. SUMMARY OF TEST RESULTS**

ltem Number	Item Description		FCC Rules	Result	
		Conducted			
1	Output	Output Power	22013(a) / 24232(b)	Page	
	Power	Radiated	22.913(a) / 24.232 (b) Pass		
		Output Power			
2 2 Emissior		Conducted		Pass	
	Spurious	Spurious Emission	2 4054 / 22 047 / 24 229		
	Emission	Radiated	2.1051/22.917/24.230		
		Spurious Emission			
3	Frequency Stability		2.1055 /24.235	Pass	
4	Occupied Bandwidth		2.1049 (h)(i)	Pass	
5	Emission Bandwidth		22.917(b) / 24.238 (b)	Pass	
6	Band Edge		22.917(b) / 24.238 (b)	Pass	

### 4. DESCRIPTION OF TEST MODES

During the testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication Tester (CMU 200) to ensure max power transmission and proper modulation. Three channels (The top channel, the middle channel and the bottom channel) were chosen for testing on both GPRS850 and GPRS1900 frequency band.

**Note:** GSM/GPRS 850, GSM/GPRS 1900 modes have been tested during the test. the worst condition (GSM850, GSM1900 RMC 12.2k) be recorded in the test report if no other modes test data.



### **5. OUTPUT POWER**

### 5.1 Conducted Output Power

### 5.1.1 MEASUREMENT METHOD

The EUT was setup for the max output power with pseudo random data modulation. Power was measured with Spectrum Analyzer. The measurements were performed on all modes(GSM/GPRS 850, GSM/GPRS 1900) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

### 5.1.2 MEASUREMENT RESULT

#### GSM 850:

	Eroquepey	Maximum
Mode	(MU-)	Burst-Average Output
		Power
	824.2	32.81
GSM850	836.6	32.57
	848.8	32.19
CDDS950	824.2	32.75
(1 Slot)	836.6	32.48
	848.8	32.44
CDDS950	824.2	31.91
(2 Slot)	836.6	31.73
(2 301)	848.8	31.63
CDDS950	824.2	30.23
(2 Slot)	836.6	29.95
(3 5101)	848.8	29.83
CDDC050	824.2	29.13
(4 Slot)	836.6	28.82
(4 3101)	848.8	28.58



### PCS 1900:

	Fraguanay	Maximum
Mode	/MU=)	Burst-Average Output
	(11172)	Power
	1850.2	30.57
GSM1900	1880	30.41
	1909.8	30.73
	1850.2	29.64
GFR31900	1880	29.43
(1 Slot)	1909.8	29.42
	1850.2	28.89
GPRS1900	1880	28.74
(2 5101)	1909.8	28.69
	1850.2	27.18
GPRS1900	1880	27.16
(3 5101)	1909.8	27.22
CDRS1000	1850.2	26.15
GFRS 1900	1880	26.14
(4 5101)	1909.8	26.32



### 5.2 Radiated Output Power

### **5.2.1 MEASUREMENT METHOD**

The measurements procedures specified in TIA-603D-2004 were applied.

- In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (Pin) is applied to the input of the dipole, and the power received (Pr) at the chamber's probe antenna is recorded.
- 2 The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established as ARpl=Pin + 2.15 Pr. The ARpl is the attenuation of "reference path loss", and including the gain of receive antenna, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+ARpl
- 3 The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.
- 4 From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.
- 5 The EUT is then put into continuously transmitting mode at its maximum power level.
- 6 Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 24.232 (b) and (c). The "reference path loss" from Step1 is added to this result.
- 7 This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power (Pin).
- 8 ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi..
- 9. Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 5.2.2 PROVISIONS APPLICABLE

This is the test for the maximum radiated power from the EUT. Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage." Rule Part 22.913(a) specifies "Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

Mode	Nominal Peak Power
GSM 850	<=38.45 dBm (7W)
PCS 1900	<=33 dBm (2W)



### 5.2.3 MEASUREMENT RESULT

Radiated Power (ERP) for GSM 850 MHZ				
		Result		
Mode	Frequency	Max. Peak ERP	Polarization	Conclusion
		(dBm)	Of Max. ERP	
	824.2	30.15	Horizontal	Pass
	824.2	28.98	Vertical	Pass
0004050	836.6	30.89	Horizontal	Pass
GS101850	836.6	28.05	Vertical	Pass
	848.8	30.83	Horizontal	Pass
	848.8	30.14	Vertical	Pass

Radiated Power (E.I.R.P) for PCS 1900 MHZ				
		Re		
Mode	Frequency	Max. Peak	Polarization	Conclusion
		E.I.R.P.(dBm)	Of Max. E.I.R.P.	
	1850.2	28.77	Horizontal	Pass
	1850.2	27.64	Vertical	Pass
PCS1900	1880	29.69	Horizontal	Pass
	1880	27.49	Vertical	Pass
	1909.8	29.71	Horizontal	Pass
	1909.8	28.46	Vertical	Pass

Radiated Power (ERP) for GPRS 850 MHZ				
		Re		
Mode	Frequency	Max. Peak ERP	Polarization	Conclusion
		(dBm)	Of Max. ERP	
	824.2	28.56	Horizontal	Pass
	824.2	29.49	Vertical	Pass
	836.6	29.58	Horizontal	Pass
GFK3050	836.6	29.12	Vertical	Pass
	848.8	29.65	Horizontal	Pass
	848.8	28.78	Vertical	Pass



Radiated Power (E.I.R.P) for GPRS 1900 MHZ				
	Resu		sult	
Mode	Frequency	Max. Peak	Polarization	Conclusion
		E.I.R.P.(dBm)	Of Max. E.I.R.P.	
	1850.2	26.53	Horizontal	Pass
	1850.2	26.74	Vertical	Pass
GPRS	1880	26.82	Horizontal	Pass
1900	1880	26.55	Vertical	Pass
	1909.8	26.62	Horizontal	Pass
	1909.8	26.65	Vertical	Pass



### 6. SPURIOUS EMISSION

### 6.1 CONDUCTED SPURIOUS EMISSION

### 6.1.1 MEASUREMENT METHOD

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1, Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of PCS1900 band, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For GSM850, data taken from 30 MHz to 9 GHz.

2, Determine EUT transmit frequencies: the following typical channels were chosen to conducted emissions testing.

Typical Channels for testing of GSM/GPRS 850 MHz		
Channel	Frequency (MHz)	
128	824.2	
190	836.6	
251	848.8	

Typical Channels for testing of PCS/ GPRS 1900 MHz			
Channel	Frequency (MHz)		
512	1850.2		
661	1880.0		
810	1909.8		



### 6.1.2 PROVISIONS APPLICABLE

On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

#### 6.1.3 MEASUREMENT RESULT

PLEASE REFER TO : APPENDIX I TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

Note: 1. Below 30MHZ no Spurious found and The GSM modes is the worst condition.

2. As no emission found in standby or receive mode, no recording in this report.



### 6.2 Radiated Spurious Emission

### 6.2.1 MEASUREMENT METHOD

The measurements procedures specified in TIA-603D-2004 were used for testing. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set 1MHz as outlined in Part 24.238. The measurements were performed on all modes(GPRS850, GPRS1900,) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.Only shown the worst data.

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, RSE=Rx (dBuV) +CL (dB) +SA (dB) +Gain (dBi) -107 (dBuV to dBm) The SA is calibrated using following setup.



b) EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.





Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS 1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz) ,GSM850 band (824.2MHz, 836.6MHz, 848.8MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+A\_{Rpl}

### 6.2.2 PROVISIONS APPLICABLE

(a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(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.

Note: only result the worst condition of each test mode:



#### 6.2.3 MEASUREMENT RESULT

GSM 850:

	Test Re	sults for Cha	innel 128/824.2	2 MHz	
Frequency(MHz)	Power(dBm)	A <sub>Rpl</sub> (dBm)	Р <sub>меа</sub> (dBm)	Limit (dBm)	Polarity
1648.4	-24.43	7.8	-16.63	-13.00	Vertical
1648.4	-31.24	7.8	-23.44	-13.00	Horizontal
2472.6	-25.56	11	-14.56	-13.00	Vertical
2472.6	-30.07	11	-19.07	-13.00	Horizontal
3296.8	-31.13	12.3	-18.83	-13.00	Horizontal
3296.8	-32.13	12.3	-19.83	-13.00	Vertical
	Test Re	sults for Cha	nnel 190/836.0	6 MHz	
1673.2	-22.31	8	-14.31	-13.00	Vertical
1673.2	-27.74	8	-19.74	-13.00	Horizontal
2509.8	-26.45	11.2	-15.25	-13.00	Vertical
2509.8	-27.15	11.2	-15.95	-13.00	Horizontal
3346.4	-29.31	12.6	-16.71	-13.00	Horizontal
3346.4	-30.13	12.6	-17.53	-13.00	Vertical
	Test Re	sults for Cha	innel 251/848.8	8 MHz	
1697.6	-30.65	8.1	-22.55	-13.00	Vertical
1697.6	-30.11	8.1	-22.01	-13.00	Horizontal
2546.4	-26.91	11.69	-15.22	-13.00	Vertical
2546.4	-27.51	11.69	-15.82	-13.00	Horizontal
3395.2	-28.45	12.92	-15.53	-13.00	Horizontal
3395.2	-31.33	12.92	-18.41	-13.00	Vertical



### PCS 1900:

Test Results for Channel 512/1850.2MHz					
Frequency(MHz)	Power(dBm)	A <sub>Rpl</sub> (dBm)	Р <sub>меа</sub> (dBm)	Limit (dBm)	Polarity
3700.4	-30.12	13.42	-16.7	-13.00	Horizontal
3700.4	-32.56	13.42	-19.14	-13.00	Vertical
5550.6	-35.23	17.12	-18.11	-13.00	Vertical
5550.6	-34.64	17.12	-17.52	-13.00	Horizontal
7400.8	-35.67	19.26	-16.41	-13.00	Horizontal
7400.8	-34.16	19.26	-14.90	-13.00	Vertical
	Test Res	sults for Cha	nnel 661/1880	).0MHz	
3760	-30.34	13.76	-16.58	-13.00	Horizontal
3760	-31.67	13.76	-17.91	-13.00	Vertical
5640	-33.14	17.56	-15.58	-13.00	Vertical
5640	-41.14	17.56	-23.58	-13.00	Horizontal
7520	-35.91	19.6	-16.31	-13.00	Horizontal
7520	-37.45	19.6	-17.85	-13.00	Vertical
	Test Res	sults for Cha	nnel 810/1909	9.8MHz	
3819.6	-31.87	13.87	-18.00	-13.00	Horizontal
3819.6	-30.51	13.87	-16.64	-13.00	Vertical
5729.4	-35.42	17.66	-17.76	-13.00	Vertical
5729.4	-37.51	17.66	-19.85	-13.00	Horizontal
7639.2	-38.13	19.75	-18.38	-13.00	Horizontal
7639.2	-39.18	19.75	-19.43	-13.00	Vertical

Note: Below 30MHZ no Spurious found.



### 7. FREQUENCY STABILITY

### 7.1 MEASUREMENT METHOD

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMU200 DIGITAL RADIO COMMUNICATION TESTER.

- 1 , Measure the carrier frequency at room temperature.
- 2 , Subject the EUT to overnight soak at -10  $^\circ\! \mathbb{C}.$

3 , With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on channel 661 for PCS 1900 band , channel 190 for GSM 850 band measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.

4 , Repeat the above measurements at  $10^{\circ}$ C increments from  $-10^{\circ}$ C to  $+50^{\circ}$ C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.

5 , Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.

6 , Subject the EUT to overnight soak at +50  $^\circ\!\!\mathbb{C}.$ 

7 , With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.

8 , Repeat the above measurements at  $10^{\circ}$ C increments from +50°C to -10°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.

9 , At all temperature levels hold the temperature to +/-  $0.5^{\circ}$ C during the measurement procedure.

### 7.2 PROVISIONS APPLICABLE

### 7.2.1 For Hand carried battery powered equipment

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.5VDC and 4.2VDC, with a nominal voltage of 3.7VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.



### 7.2.2 For equipment powered by primary supply voltage

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment, the normal environment temperature is 20°C.

### 7.3 MEASUREMENT RESULT

Frequency Error Against Voltage for GSM 850 band			
Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	
3.5	15	0.018	
3.7	24	0.029	
4.2	12	0.014	

Frequency Error Against Temperature for GSM 850 band			
Temperature (℃)	Frequency Error (Hz)	Frequency Error (ppm)	
-10	45	0.054	
0	58	0.069	
10	30	0.036	
20	32	0.038	
30	23	0.027	
40	37	0.044	
50	36	0.043	

Note: The EUT doesn't work below -10  $^\circ\!\mathrm{C}$ 



Frequency Error Against Voltage for GSM 1900 band			
Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	
3.5	23	0.012	
3.7	35	0.019	
4.2	32	0.017	

Frequency Error Against Temperature for GSM 1900 band			
Temperature (℃)	Frequency Error (Hz)	Frequency Error (ppm)	
-10	31	0.016	
0	19	0.010	
10	22	0.012	
20	34	0.018	
30	22	0.012	
40	16	0.009	
50	30	0.016	

Note: The EUT doesn't work below -10  $^\circ\!\mathrm{C}$ 



### 8. BANDWIDTH

### 8.1APPLICABLE STANDARD

FCC §2.1049, §22.917, §22.905 and §24.238.

### **8.2** Test Procedure

- 1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
- 2. The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers.
- 3. Details according with KDB 971168 section 4.1 & 4.2.



### **Test Equipment List and Details**

Refer a test equipment and calibration data table in this test report.

### **8.3 MEASUREMENT RESULT**

Occupied Bandwidth (99%) for GSM 850 band			
Mode	Frequency(MHz)	Occupied Bandwidth (99%)( kHz)	
Low Channel	824.2	245.652	
Middle Channel	836.6	244.248	
High Channel	848.8	243.137	

Occupied Bandwidth (99%) for GSM1900 band						
Mode	Frequency(MHz) Occupied Bandwidth (99%)( kHz					
Low Channel	1850.2	247.164				
Middle Channel	1880.0	249.099				
High Channel	1909.8	246.049				



Occupied Bandwidth (99%) for GPRS 850 band					
Mode Frequency(MHz) Occupied Bandwidth (99%)( kH					
Low Channel	824.2	251.602			
Middle Channel	836.6	246.134			
High Channel	848.8	247.041			

Occupied Bandwidth (99%) for GPRS 1900 band						
Mode	Frequency(MHz) Occupied Bandwidth (99%)( kH					
Low Channel	1850.2	247.067				
Middle Channel	1880.0	247.992				
High Channel	1909.8	245.940				

Emission Bandwidth (-26dBc) for GSM850 band						
Mode	Frequency(MHz) Emission Bandwidth (-26dBc)(					
Low Channel	824.2	323.271				
Middle Channel	836.6	320.793				
High Channel	848.8	316.018				

Emission Bandwidth (-26dBc) for GSM1900 band					
Mode	Frequency(MHz) Emission Bandwidth (-26dBc)( k				
Low Channel	1850.2	316.829			
Middle Channel	1880.0	323.373			
High Channel	1909.8	317.019			

Emission Bandwidth (-26dBc) for GPRS850 band						
Mode	Frequency(MHz) Emission Bandwidth (-26dBc)( k					
Low Channel	824.2	315.236				
Middle Channel 836.6		325.393				
High Channel	848.8	322.360				

Emission Bandwidth (-26dBc) for GPRS1900 band					
Mode	Frequency(MHz) Emission Bandwidth (-26dBc)( kH				
Low Channel	1850.2	322.676			
Middle Channel	1880.0	320.393			
High Channel	1909.8	314.790			



### 9. BAND EDGE

### 9.1 Applicable Standard

According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P) dB$ .

According to \$24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P) dB$ .

### 9.2 Test Procedure

- 1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
- 2. The Band Edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.
- 3. Details according with KDB 971168 section 6.0.



### **Test Equipment List and Details**

Refer a test equipment and calibration data table in this test report.

#### 9.3 MEASUREMENT RESULT

Please refers to Appendix III for compliance test plots for band edges



### 10. Peak-to-Average Ratio

### DESCRIPTION OF THE PAR MEASUREMENT

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

### **10.1 MEASURING INSTRUMENTS**

See list of measuring instruments of this test report.

### **10.2 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.

### 10.3 TEST SETUP





### 10.4 TEST RESULT OF PEAK-TO-AVERAGE RATIO

Cellular Band						
Modes	GSM1900			GPRS1900		
Channel	512	512	512	512	661	810
Channel	(Low)	(Low)	(Low)	(Low)	(Mid)	(High)
Frequency(MHz)	1850.2	1850.2	1850.2	1850.2	1880	1909.8
Peak-to-Average Ratio (dB)	0.02	0.01	0.01	0.52	0.48	0.40



## **APPENDIX I**

## **TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION**





### CONDUCTED EMISSION IN GSM 850 BAND Conducted Emission Transmitting Mode CH 128 30MHz – 5GHz

### Conducted Emission Transmitting Mode CH 128 5GHz - 10GHz







### Conducted Emission Transmitting Mode CH 190 30MHz – 5GHz









Conducted Emission Transmitting Mode CH 251 30MHz - 5GHz

#### Conducted Emission Transmitting Mode CH 251 5GHz - 10GHz







### CONDUCTED EMISSION IN GPRS 850 BAND Conducted Emission Transmitting Mode CH 128 30MHz – 5GHz

### Conducted Emission Transmitting Mode CH 128 5GHz - 10GHz







### Conducted Emission Transmitting Mode CH 190 30MHz – 5GHz









Conducted Emission Transmitting Mode CH 251 30MHz - 5GHz

#### Conducted Emission Transmitting Mode CH 251 5GHz - 10GHz







### CONDUCTED EMISSION IN GSM1900 BAND Conducted Emission Transmitting Mode CH 512 30MHz – 10GHz

### Conducted Emission Transmitting Mode CH 512 10GHz - 20GHz







### Conducted Emission Transmitting Mode CH 661 30MHz – 10GHz









### Conducted Emission Transmitting Mode CH 810 30MHz – 10GHz

#### Conducted Emission Transmitting Mode CH 810 10GHz - 20GHz







### CONDUCTED EMISSION IN GPRS 1900 BAND Conducted Emission Transmitting Mode CH 512 30MHz – 10GHz

### Conducted Emission Transmitting Mode CH 512 10GHz - 20GHz







### Conducted Emission Transmitting Mode CH 661 30MHz – 10GHz









Conducted Emission Transmitting Mode CH 810 30MHz – 10GHz

#### Conducted Emission Transmitting Mode CH 810 10GHz – 20GHz





# APPENDIX II TEST PLOTS FOR OCCUPIED BANDWIDTH (99%) EMISSION BANDWIDTH (-26dBC)





#### Occupied Bandwidth (99%) GSM 850 BAND CH 190







#### Occupied Bandwidth (99%) GPRS 850 BAND CH 128





🔆 Agilent



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### Occupied Bandwidth (99%) GSM 1900 BAND CH 661







### Occupied Bandwidth (99%) GPRS 1900 BAND CH 512



Occupied Bandwidth (99%) GPRS 1900 BAND CH 661







#### Occupied Bandwidth (99%) GPRS 1900 BAND CH 810





## APPENDIX III TEST PLOTS FOR BAND EDGES





### High Band Edge GSM 850 BAND CH 251







### High Band Edge GPRS 850 BAND CH 251







### High Band Edge GSM 1900 BAND CH 810







#### High Band Edge GPRS 1900 BAND CH 810













----END OF REPORT----