

TEST REPORT

FCC ID: 2AKSAWO-X

Product: Mobile phone

Model No.: Max13

Additional Model No.: X5, X8, X9, X10, X11, X12, X13, J8, J9, J10,

Q3, Q5, Q6, Q7, Q8, Q9

Trade Mark: W&O

Report No.: TCT180420E023

Issued Date: May 11, 2018

Issued for:

Shenzhen YLWD Technology Co., Ltd
RM1002.A.Haisong BLD.RD Tairan.FuTian District, Shenzhen, China

Issued By:

Shenzhen Tongce Testing Lab.

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1. Test Certification

Report No.: TCT180420E023

Product:	Mobile phone
Model No.:	Max13
Additional Model:	X5, X8, X9, X10, X11, X12, X13, J8, J9, J10, Q3, Q5, Q6, Q7, Q8, Q9
Trade Mark:	W&O
Applicant:	Shenzhen YLWD Technology Co., Ltd
Address:	RM1002.A.Haisong BLD.RD Tairan.FuTian District, Shenzhen, China
Manufacturer:	Shenzhen YLWD Technology Co., Ltd
Address:	RM1002.A.Haisong BLD.RD Tairan.FuTian District, Shenzhen, China
Date of Test:	Apr. 23, 2018 – May 10, 2018
Applicable Standards:	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part22 FCC CFR Title 47 Part24

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:

Jin Wang

Date: May 10, 2018

Jin Wang

Reviewed By:

Date:

May 11, 2018

Approved By:

Date:

May 11, 2018



Report No.: TCT180420E023

2. Test Result Summary

	(,C, ')	L.C.Y	
Requirement	CFR 47 Section	Result	
Conducted Output Power	\$22.913; \$2.1046 \$24.232;	PASS	
Peak-to-Average Ratio	§2.1046; §24.232(d);	PASS	
Effective Radiated Power	§2.1046; §22.913(a); §24.232;	PASS	
Equivalent Isotropic Radiated Power	§2.1046; §22.913(a); §24.232;	PASS	
Occupied Bandwidth	§2.1049;	PASS	
Band Edge	§2.1051; §22.917(a); §24.238(a);	PASS	
Conducted Spurious Emission	§2.1051; §22.917; §24.238;	PASS	
Field Strength of Spurious Radiation	§2.1053; §22.917(a); §24.238;	PASS	
Frequency Stability for Temperature & Voltage	§2.1055; §22.355; §24.235;	PASS	

Note:

- 1. PASS: Test item meets the requirement.
- 2. Fail: Test item does not meet the requirement.
- 3. N/A: Test case does not apply to the test object.
- 4. The test result judgment is decided by the limit of test standard.





3. EUT Description

Product:	Mobile phone
	· ·
Model No.:	Max13
Additional Model:	X5, X8, X9, X10, X11, X12, X13, J8, J9, J10, Q3, Q5, Q6, Q7, Q8, Q9
Trade Mark:	W&O
3G Version:	WCDMA: R99 HSDPA: Release 5 HSUPA: Release 6
Tx Frequency:	GSM/GPRS 850: 824.2 MHz ~ 848.8 MHz GSM/GPRS 1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz
Rx Frequency:	GSM/GPRS 850: 869.2 MHz ~ 893.8 MHz GSM/GPRS 1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz
Maximum Output Power to Antenna:	GSM850: 32.08dBm GSM1900: 29.37dBm GPRS 850: 32.15dBm GPRS 1900: 29.17dBm WCDMA Band V: 23.70dBm WCDMA Band II: 23.62dBm
99% Occupied Bandwidth:	GSM850: 245KGXW GSM1900: 248KGXW GPRS850 Class 8: 245KG7W GPRS1900 Class 8: 246KG7W WCDMA Band V RMC 12.2Kbps: 4M17F9W WCDMA Band II RMC 12.2Kbps: 4M22F9W
Type of Modulation:	GSM/GPRS: GMSK WCDMA/HSDPA/HSUPA: QPSK
Antenna Type:	Internal Antenna
Antenna Gain:	GSM/GPRS 850: -0.8dBi GSM/GPRS 1900: -0.1dBi WCDMA Band V: -0.7dBi WCDMA Band II: 0.1dBi
Power Supply:	Rechargeable Li-ion Battery DC 3.7V
AC adapter:	Adapter Information: Input: AC 100-240V, 50/60Hz, 0.2A Output: DC 5.0V, 1000mA
Remark:	All models above are identical in interior structure, electrical circuits and components, and just model names are different for the marketing requirement.



TESTING CENTRE TECHNOLOGY Report No.: TCT180420E023

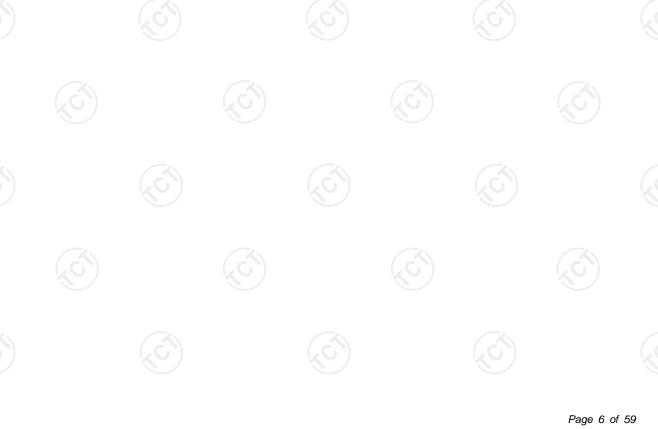
4. Genera Information

4.1. Test environment and mode

Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
est Mode:	
est wode.	

Remark: This product has a built-in rechargeable battery, so in an independent test the EUT battery was fully-charged.

The sample was placed (0.8m below 1GHz, 0.8m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.



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Description Operation Frequency

GSM 850		PCS 1900		
Channel:	Frequency (MHz)	Channel:	Frequency (MHz)	
128	128 824.20		1850.20	
129	824.40	513	1850.40	
189	836.40	660	1879.80	
190	836.60	661	1880.00	
191	836.80	662	1880.20	
(2) (2				
250	848.60	809	1909.60	
251	848.80	810	1909.80	

WCDMA Band V Channel: Frequency (MHz)		WCDMA Band II		
		Channel:	Frequency (MHz)	
4132	4132 826.40		1852.40	
4133 826.60	826.60 9263			
4182	4182 836.40 4183 836.60	9399	1879.80	
4183		9400	1880.00	
4184 836.80	9401	1880.20		
4233	846.60	9538	1907.60	



4.2. Test Mode

lode

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971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power. Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Antenna port conducted and radiated test items were performed according to KDB

Radiated emissions were investigated as following frequency range:

- 1. 30 MHz to 10000 MHz for GSM850 and WCDMA Band V.
- 2. 30 MHz to 20000 MHz for PCS1900, WCDMA Band II.

All modes and data rates and positions were investigated.

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

Test Mode				
Band	Radiated TCs	Conducted TCs		
GSM 850	GSM Link GPRS class 12 Link	GSM Link GPRS class 12 Link		
PCS 1900	GSM Link GPRS class 12 Link	GSM Link GPRS class 12 Link		
WCDMA Band V	RMC 12.2Kbps Link	RMC 12.2Kbps Link		
WCDM Band II	RMC 12.2Kbps Link	RMC 12.2Kbps Link		

Note: The maximum power levels are chosen to test as the worst case configuration as follows: GPRS multi-slot class 8 mode for GMSK modulation, RMC 12.2Kbps mode for WCDMA band V and WCDMA band II, only these modes were used for all tests. In addition to above worst-case test, below investigating on all data rates and all modes are compliance with each FCC test case which has specific test limits. For spurious emissions at antenna port, the EUT was investigated the band edges on low and high channels, and the unwanted spurious emissions on middle channel for all modes, the results are PASS, then only the worst-results were reported in the test report. The Radiated Spurious emissions for GPRS modes were investigated on the middle channel and the PASS results were not worst than those data tested from the highest power channels.





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4.3. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
1	1	/	1	1

Note:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use



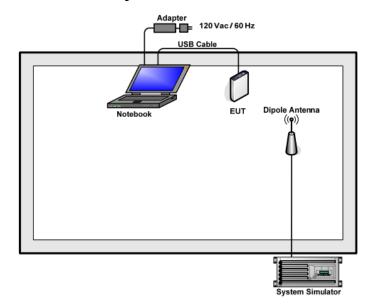
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4.4. Configuration of Tested System





4.5. Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level. The spectrum analyzer offset is derived from RF cable loss and attenuator factor. Offset = RF cable loss + attenuator factor.

The following shows an offset computation example with RF cable loss 3 dB and a 5dB attenuator.

Example: Offset (dB) = RF cable loss (dB) + attenuator factor (dB). = 8(dB)





5. Facilities and Accreditations

5.1. Facilities

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

• FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

• IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

5.2. Location

Shenzhen Tongce Testing Lab

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District,

Shenzhen, Guangdong, China

TEL: +86-755-27673339

5.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, 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	MU
1	Conducted Emission	±2.56dB
2	RF power, conducted	±0.12dB
3	Spurious emissions, conducted	±0.11dB
4	All emissions, radiated(<1G)	±3.92dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%

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6. Test Results and Measurement Data

6.1. Conducted Output Power Measurement

6.1.1. Test Specification

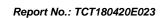
Test Requirement:	FCC part 22.913(a) and FCC part 24.232(b)
Test Method:	FCC part 2.1046
Operation mode:	Refer to item 4.1
Limits:	GSM 850 7W PCS 1900 2W WCDMA Band V:7W WCDMA Band II: 2W
Test Setup:	System Simulator EUT
Test Procedure:	 The transmitter output port was connected to the system simulator. Set EUT at maximum power through system simulator. Select lowest, middle, and highest channels for each band and different modulation. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.
Test Result:	PASS

6.1.2. Test Instruments

-					
ı	Equipment	Manufacturer	Model	Serial Number	Calibration Due
ĺ	System simulator	R&S	CMU200	111382	Sep. 27, 2018
	RF cable (9kHz-40GHz)	тст	RE-05	N/A	Sep. 27, 2018
	Antenna Connector	TCT	RFC-02	N/A	Sep. 27, 2018

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

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6.1.3. Test data

Conducted Power Measurement Results:

Average Conducted Power (*Unit: dBm)							
Band	GSM850				PCS 1900		
Channel	128	190	251	512	661	810	
Frequency(MHz)	824.2	836.6	848.8	1850.2	1880.0	1909.8	
GSM	31.80	32.08	32.00	29.30	29.21	29.37	
GPRS class8	31.93	32.10	32.15	28.96	29.17	28.89	
GPRS class10	30.58	30.86	30.61	28.38	28.62	28.21	
GPRS class11	28.63	28.16	28.32	26.18	26.81	26.12	
GPRS class12	26.57	26.80	26.63	25.11	25.76	25.15	

Average Conducted Power (*Unit: dBm)

g						
WCDMA Band V			W	CDMA Ban	d II	
4132	4183	4233	9262	9400	9538	
826.4	836.6	846.6	1852.4	1880.0	1907.6	
23.31	23.70	22.66	23.49	23.62	23.55	
22.62	22.98	22.90	23.03	23.17	23.06	
22.53	22.69	22.65	22.74	22.86	22.80	
22.49	22.59	22.52	22.67	22.80	22.73	
22.43	22.63	22.45	22.61	22.78	22.73	
22.24	22.32	22.27	22.37	22.51	22.40	
22.12	22.26	22.14	22.20	22.42	22.32	
22.04	21.83	21.82	22.24	22.05	22.00	
21.65	21.75	21.70	21.85	21.97	21.88	
21.52	21.67	21.63	21.71	21.81	21.79	
	4132 826.4 23.31 22.62 22.53 22.49 22.43 22.24 22.12 22.04 21.65	4132 4183 826.4 836.6 23.31 23.70 22.62 22.98 22.53 22.69 22.49 22.59 22.43 22.63 22.24 22.32 22.12 22.26 22.04 21.83 21.65 21.75	4132 4183 4233 826.4 836.6 846.6 23.31 23.70 22.66 22.62 22.98 22.90 22.53 22.69 22.65 22.49 22.59 22.52 22.43 22.63 22.45 22.24 22.32 22.27 22.12 22.26 22.14 22.04 21.83 21.82 21.65 21.75 21.70	4132 4183 4233 9262 826.4 836.6 846.6 1852.4 23.31 23.70 22.66 23.49 22.62 22.98 22.90 23.03 22.53 22.69 22.65 22.74 22.49 22.59 22.52 22.67 22.43 22.63 22.45 22.61 22.24 22.32 22.27 22.37 22.12 22.26 22.14 22.20 22.04 21.83 21.82 22.24 21.65 21.75 21.70 21.85	4132 4183 4233 9262 9400 826.4 836.6 846.6 1852.4 1880.0 23.31 23.70 22.66 23.49 23.62 22.62 22.98 22.90 23.03 23.17 22.53 22.69 22.65 22.74 22.86 22.49 22.59 22.52 22.67 22.80 22.43 22.63 22.45 22.61 22.78 22.24 22.32 22.27 22.37 22.51 22.12 22.26 22.14 22.20 22.42 22.04 21.83 21.82 22.24 22.05 21.65 21.75 21.70 21.85 21.97	



6.2. Peak to Average Ratio

6.2.1. Test Specification

Test Requirement:	FCC part 24.232(d); FCC part 22.913;					
Test Method:	FCC KDB 971168 D01v03 Section 5.7.1					
Operation mode:	Refer to item 4.1					
Limit:	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.					
Test Setup:	System Simulator EUT Spectrum Analyzer					
Test Procedure:	 The testing follows FCC KDB 971168 D01v03 Section 5.7.1. The EUT was connected to spectrum analyzer and system simulator via a power divider. Set EUT to transmit at maximum output power. For GSM/EGPRS operating modes, signal gating is implemented on the spectrum analyzer by triggering from the system simulator. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%. 					
Test Result:	PASS					

6.2.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
System simulator	R&S	CMU200	111382	Sep. 27, 2018
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
RF cable (9kHz-40GHz)	тст	RE-05	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-02	N/A	Sep. 27, 2018

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



6.2.3. Test Data

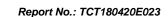
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Cellular Band							
Mode	GSM850 PCS 1900					0	
Channel	128	189	251	512	661	810	
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880	1909.8	
Peak-to- Average Ratio (dB)	2.67	2.70	2.65	2.66	2.69	2.67	

Cellular Band						
Mode	WCDMA Band V (RMC 12.2Kbps)				DMA Ba C 12.2K	
Channel	4132	4132 4183 4233			9400	9538
Frequency (MHz)	826.4	836.6	846.8	1852.4	1880	1907.6
Peak-to- Average Ratio (dB)	2.51	2.93	2.35	1.88	2.55	2.22

Test plots as follows:







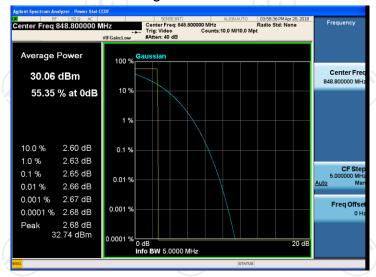
GSM 850

Peak-to-Average Ratio on Channel 128



Peak-to-Average Ratio on Channel 190

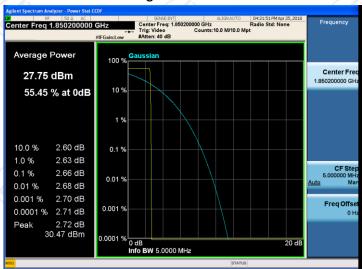








Peak-to-Average Ratio on Channel 512



Peak-to-Average Ratio on Channel 661

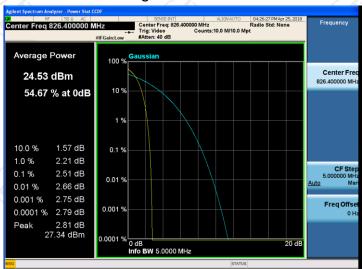


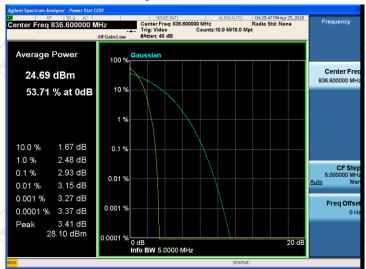






Peak-to-Average Ratio on Channel 4132





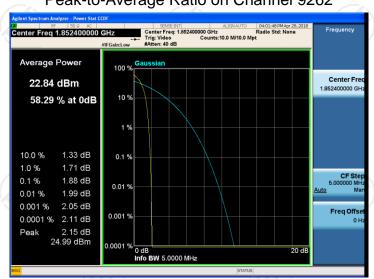
Peak-to-Average Ratio on Channel 4233







Peak-to-Average Ratio on Channel 9262



Peak-to-Average Ratio on Channel 9400







6.3. 99% Occupied Bandwidth and 26dB Bandwidth Measurement

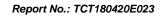
6.3.1. Test Specification

Test Requirement:	FCC part 2.1049
Test Method:	FCC part 2.1049
Operation mode:	Refer to item 4.1
Limit:	N/A
Test Setup:	System Simulator EUT Spectrum Analyzer
Test Procedure:	 The testing follows FCC KDB 971168 D01v03 Section 4.2. The EUT was connected to the spectrum analyzer and system simulator via a power divider. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3*RBW, sample detector, trace maximum hold. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.
Test Result:	PASS

6.3.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
System simulator	R&S	CMU200	111382	Sep. 27, 2018
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
RF cable (9kHz-40GHz)	тст	RE-05	N/A	Sep. 27, 2018
Antenna Connector	тст	RFC-02	N/A	Sep. 27, 2018

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).





6.3.3. Test data

Cellular Band							
Mode		GSM850 GSM1900					
Channel	128	128 189 251			661	810	
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8	
99% OBW (kHz)	244.69	244.06	243.94	244.29	248.41	246.64	
26dB BW (kHz)	314.6	310.7	320.7	307.4	319.7	317.7	

Cellular Band						
Mode		GPRS850 GPRS1900				
Channel	128	128 189 251			661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
99% OBW (kHz)	244.12	245.26	242.91	243.67	246.49	245.20
26dB BW (kHz)	317.1	317.8	317.0	313.8	318.9	314.2

Cellular Band						
Mode	WCDMA Band V (RMC 12.2Kbps)					
Channel	4132 4183 4233					
Frequency (MHz)	826.4	836.6	846.6			
99% OBW (kHz)	4151.2	4156.8	4173.6			
26dB BW (kHz)	4714	4689	4703			

Cellular Band						
Mode	WCDMA Band II (RMC 12.2Kbps)					
Channel	9262 9400 9538					
Frequency (MHz)	1852.4	1880	1907.6			
99% OBW (kHz)	4221.9	4149.6	4180.3			
26dB BW (kHz)	4775	4693	4755			

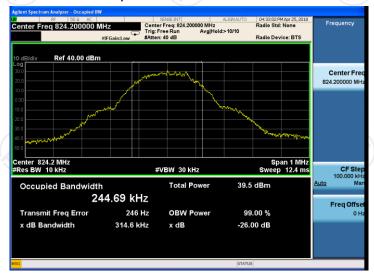
Test plots as follows:



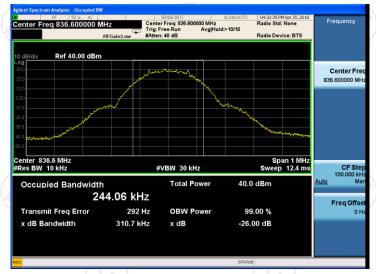
Report No.: TCT180420E023

Band: GSM 850 Test Mode: GSM Link (GMSK)

26dB&99% Occupied Bandwidth Plot on Channel 128



26dB&99% Occupied Bandwidth Plot on Channel 190

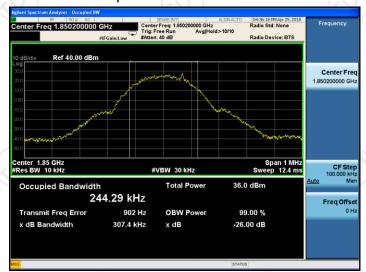






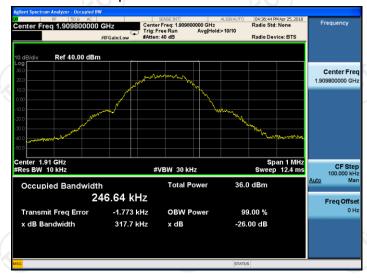
Band: GSM 1900 Test Mode: GSM Link (GMSK)

26dB&99% Occupied Bandwidth Plot on Channel 512



26dB&99% Occupied Bandwidth Plot on Channel 661







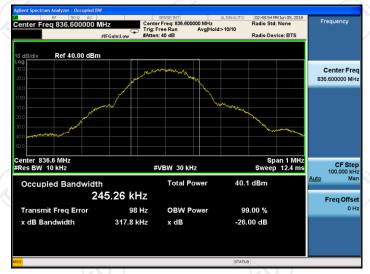
Report No.: TCT180420E023

Band: GPRS 850 Test Mode: GPRS Link (GMSK)

26dB&99% Occupied Bandwidth Plot on Channel 128



26dB&99% Occupied Bandwidth Plot on Channel 190







Band: GPRS 1900 Test Mode: GPRS Link (GMSK)

26dB&99% Occupied Bandwidth Plot on Channel 512



26dB&99% Occupied Bandwidth Plot on Channel 661







Band:

TESTING CENTRE TECHNOLOG

WCDMA Band V

Test Mode:

RMC 12.2Kbps Link (QPSK)

Report No.: TCT180420E023

26dB&99% Occupied Bandwidth Plot on Channel 4132



26dB&99% Occupied Bandwidth Plot on Channel 4183







WCDMA Band II Band:

Test Mode:

RMC 12.2Kbps Link (QPSK)

Report No.: TCT180420E023

26dB&99% Occupied Bandwidth Plot on Channel 9262



26dB&99% Occupied Bandwidth Plot on Channel 9400



