

TEST REPORT

Reference No...... : WTS16S0960994-3E V1
FCC ID : 2AJVK-SP4513
Applicant..... : Foto Electric Supply Co., INC.
Address..... : 1 Rewe St. Brooklyn, New York, 11211, USA
Manufacturer : The same as above
Address..... : The same as above
Product Name..... : Smart Phone
Model No : SP4513, SP4523, CBP3154, CBP3254
Brand..... : SLIDE, COBY

2 Laboratories Introduction

Waltek Services Test Group Ltd is a professional third-party testing and certification organization with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by CNAS (China National Accreditation Service for Conformity Assessment) AQSIC, CMA and IECEE for CBTL. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CPSC(Consumer Product Safety Commission), CEC(California energy efficiency), IC(Industry Canada) and ELI(Efficient Lighting Initiative). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as UL, Intertek(ETL-SEMKO), CSA, TÜV Rheinland, TÜV SÜD, etc.



Waltek Services Test Group Ltd. is one of the largest and the most comprehensive third party testing organizations in China, our headquarter located in Shenzhen and have branches in Foshan, Dongguan, Zhongshan, Suzhou, Ningbo and Hong Kong, Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), reliability and energy performance, Chemical test. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

3 Contents

	Page
1 COVER PAGE.....	1
2 LABORATORIES INTRODUCTION.....	2
3 CONTENTS	3
4 REVISION HISTORY	5
5 GENERAL INFORMATION.....	6
5.1 GENERAL DESCRIPTION OF E.U.T.	6
5.2 DETAILS OF E.U.T.	6
5.3 TEST MODE	8
5.4 TEST FACILITY.....	8
6 TEST SUMMARY	9
7 EQUIPMENT USED DURING TEST	10
7.1 EQUIPMENTS LIST	10
7.2 MEASUREMENT UNCERTAINTY	11
7.3 TEST EQUIPMENT CALIBRATION	11
8 RF OUTPUT POWER	12
8.1 EUT OPERATION.....	12
8.2 TEST PROCEDURE	12
8.3 TEST RESULT	13
9 PEAK-TO-AVERAGE RATIO.....	18
9.1 EUT OPERATION.....	18
9.2 TEST PROCEDURE	18
9.3 TEST RESULT	19
10 BANDWIDTH.....	21
10.1 EUT OPERATION.....	21
10.2 TEST PROCEDURE.....	21
10.3 TEST RESULT	22
11 SPURIOUS EMISSIONS AT ANTENNA TERMINALS	29
11.1 EUT OPERATION.....	29
11.2 TEST PROCEDURE.....	29
11.3 TEST RESULT	30
12 SPURIOUS RADIATED EMISSIONS.....	36
12.1 EUT OPERATION.....	36
12.2 TEST SETUP	36
12.3 SPECTRUM ANALYZER SETUP	37
12.4 TEST PROCEDURE.....	38
12.5 SUMMARY OF TEST RESULTS	39
13 BAND EDGE MEASUREMENT	41
13.1 EUT OPERATION.....	41
13.2 TEST PROCEDURE.....	41
13.3 TEST RESULT	42
14 FREQUENCY STABILITY.....	48
14.1 EUT OPERATION.....	48
14.2 TEST PROCEDURE.....	48

14.3 TEST RESULT49

15 RF EXPOSURE.....52

16 PHOTOGRAPHS OF TEST SETUP AND EUT.....53

4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS16S0960994-3E	Sep. 19, 2016	Sep. 20 – Nov. 10, 2016	Nov. 11, 2016	original	-	Replaced
WTS16S0960994-3E V1	Sep. 19, 2016	Sep. 20 – Nov. 10, 2016	Dec. 08, 2016	Version 1	Updated	Valid

5 General Information

5.1 General Description of E.U.T.

Product Name:	Smart Phone
Model No.:	SP4513, SP4523, CBP3154, CBP3254
Model Description:	Only the model names and brand names are different.
GSM Band(s):	GSM 850/900/1800/1900MHz
GPRS Class:	12
WCDMA Band(s):	FDD Band II/V
LTE Band(s):	N/A
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/n HT40
Bluetooth Version:	Bluetooth v4.0 with BLE
GPS:	Support
NFC:	N/A
Hardware Version:	T223-2_MB_V10
Software Version:	SLIDE_SP4513_20160830
Highest frequency (Exclude Radio):	26MHz
Storage Location:	Internal Storage
Note:	This EUT has two SIM card slots, and use same one RF module. We found that RF parameters are the same, when we insert the card 1 and card 2. So we usually performed the test under main card slot 1.

5.2 Details of E.U.T.

Operation Frequency:	GSM/GPRS 850: 824~849MHz PCS/GPRS 1900: 1850~1910MHz WCDMA Band II: 1850~1910MHz WCDMA Band V: 824~849MHz WiFi: 802.11b/g/n HT20: 2412~2462MHz 802.11n HT40: 2422~2452MHz Bluetooth: 2402~2480MHz
Max. RF output power:	GSM 850: 32.64dBm PCS1900: 29.88dBm WCDMA Band II: 22.56dBm WCDMA Band V: 22.51dBm WiFi(2.4G): 9.47dBm Bluetooth: 5.22dBm

Type of Modulation:	GSM,GPRS: GMSK WCDMA: BPSK WiFi: CCK, OFDM Bluetooth: GFSK, Pi/4 DQPSK, 8DPSK
Antenna installation:	GSM/WCDMA: internal permanent antenna WiFi/Bluetooth: internal permanent antenna
Antenna Gain:	GSM 850: 0.5dBi PCS1900: 1.0dBi WCDMA Band II: 1.0dBi WCDMA Band V: 0.5dBi WiFi(2.4G): 1.0dBi Bluetooth: 1.0dBi
Technical Data:	Battery DC 3.7V, 1400mAh DC 5V, 1.0A, charging from adapter (Adapter Input: 100-240V~50/60Hz 0.2A)
Adapter:	Manufacture: XINYU EAGLETRON ELECTRONIC CO.LTD. Model No.: SWN006S050100U1
Type of Emission:	GSM850: 244KGXW, GPRS850: 245KGXW, PCS1900: 247KGXW, GPRS1900: 247KGXW, WCDMA850: 4M22F9W, WCDMA1900: 4M17F9W

5.3 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Support Band	Test Mode	Channel Frequency	Channel Number
GSM 850	GSM/GPRS	824.2 MHz	128
		836.6 MHz	190
		848.8 MHz	251
PCS 1900	GSM/GPRS	1850.2 MHz	512
		1880.0 MHz	661
		1909.8 MHz	810
WCDMA Band V	WCDMA/HSUPA/HSDPA	826.4 MHz	4132
		836.6 MHz	4183
		846.6 MHz	4233
WCDMA Band II	WCDMA/HSUPA/HSDPA	1852.4MHz	9262
		1880.0MHz	9400
		1907.6MHz	9538
Remark: All mode(s) were tested and the worst data was recorded.			

5.4 Test Facility

The test facility has a test site registered with the following organizations:

- IC – Registration No.: 7760A**
 Waltek Services(Shenzhen) Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A, October 15, 2015.
- FCC Test Site 1#– Registration No.: 880581**
 Waltek Services(Shenzhen) Co., Ltd. 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 880581, April 29, 2014.
- FCC Test Site 2#– Registration No.: 328995**
 Waltek Services(Shenzhen) Co., Ltd. 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 328995, December 3, 2014.

6 Test Summary

Test Items	Test Requirement	Result
RF Output Power	2.1046 22.913 (a) 24.232 (c)	PASS
Peak-to-Average Ratio	24.232 (d)	PASS
Bandwidth	2.1049 22.905 22.917 24.238	PASS
Spurious Emissions at Antenna Terminal	2.1051 22.917 (a) 24.238 (a)	PASS
Field Strength of Spurious Radiation	2.1053 22.917 (a) 24.238 (a)	PASS
Out of band emission, Band Edge	22.917 (a) 24.238 (a)	PASS
Frequency Stability	2.1055 22.355 24.235	PASS
Maximum Permissible Exposure (SAR)	1.1307 2.1093	PASS

7 Equipment Used during Test

7.1 Equipments List

Conducted Emissions Test Site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	Sep.12,2016	Sep.11,2017
2.	LISN	R&S	ENV216	101215	Sep.12,2016	Sep.11,2017
3.	Cable	Top	TYPE16(3.5M)	-	Sep.12,2016	Sep.11,2017
Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	Sep.12,2016	Sep.11,2017
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.12,2016	Sep.11,2017
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.12,2016	Sep.11,2017
4.	Cable	LARGE	RF300	-	Sep.12,2016	Sep.11,2017
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP	100091	Apr.29, 2016	Apr.28, 2017
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Apr.09,2016	Apr.08,2017
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.09,2016	Apr.08,2017
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.12,2016	Sep.11,2017
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.09,2016	Apr.08,2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.09,2016	Apr.08,2017
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Apr.13,2016	Apr.12,2017
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.13,2016	Apr.12,2017
9	Universal Radio Communication Tester	R&S	CMU 200	112461	Apr.13,2016	Apr.12,2017
10	Signal Generator	R&S	SMR20	100046	Sep.12,2016	Sep.11,2017
11	Smart Antenna	SCHWARZBECK	HA08	-	Apr.09,2016	Apr.08,2017
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date

1	Test Receiver	R&S	ESCI	101296	Apr.13,2016	Apr.12,2017
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Apr.09,2016	Apr.08,2017
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Apr.13,2016	Apr.12,2017
4	Cable	HUBER+SUHNER	CBL2	525178	Apr.13,2016	Apr.12,2017
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	Sep.12,2016	Sep.11,2017
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.12,2016	Sep.11,2017
3.	Universal Radio Communication Tester	R&S	CMU 200	112461	Apr.13,2016	Apr.12,2017
4	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.12,2016	Sep.11,2017

7.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

7.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

8 RF OUTPUT POWER

Test Requirement: FCC Part 2.1046,22.913 (a),24.232 (c)

Test Method: TIA/EIA-603-D:2010
KDB971168 D01 v02r02

Test Mode: TX transmitting

8.1 EUT Operation

Operating Environment :

Temperature: 22.5 °C

Humidit

8.3 Test Result

Conducted Power

GSM - Burst Average Power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
GSM	32.52	32.29	32.54	29.44	29.18	29.20
GPRS (1 slot)	32.36	32.09	32.64	29.88	29.66	29.19
GPRS (2 slots)	31.25	31.47	31.59	28.47	28.18	28.37
GPRS (3 slots)	30.01	30.20	30.19	27.41	27.27	27.09
GPRS (4 slots)	29.58	29.61	29.31	26.59	26.51	26.37

WCDMA - Average Power (dBm)						
Band	WCDMA Band II			WCDMA Band V		
Channel	9262	9400	9538	4132	4183	4233
Frequency (MHz)	1852.4	1880	1907.6	826.4	836.6	846.6
RMC 12.2k	22.16	22.56	22.26	22.51	22.09	22.10
HSDPA Subtest-1	21.08	21.54	21.71	21.96	21.34	21.64
HSDPA Subtest-2	21.56	21.47	21.02	21.18	21.09	21.47
HSDPA Subtest-3	21.58	21.40	21.64	21.58	21.19	21.57
HSDPA Subtest-4	21.34	21.19	21.42	21.28	21.68	21.47
HSUPA Subtest-1	21.05	21.48	21.12	21.79	21.56	21.77
HSUPA Subtest-2	21.58	21.08	21.69	21.29	21.32	21.07
HSUPA Subtest-3	21.04	21.13	21.17	21.58	21.69	21.34
HSUPA Subtest-4	21.58	21.69	21.24	21.28	21.08	21.59
HSUPA Subtest-5	21.58	21.47	21.34	21.47	21.02	21.39

Radiated Power

ERP and EIRP

Cellular Band 850 (Part 22H)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 22H	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
GSM 850 Channel 128										
824.20	93.58	51	2.0	H	26.55	0.20	0.00	26.35	38.45	-12.10
824.20	97.85	82	2.2	V	30.75	0.20	0.00	30.55	38.45	-7.90
GSM 850 Channel 190										
836.60	92.12	244	1.3	H	25.09	0.20	0.00	24.89	38.45	-13.56
836.60	97.93	248	2.3	V	30.83	0.20	0.00	30.63	38.45	-7.82
GSM 850 Channel 251										
848.80	90.30	344	2.5	H	23.27	0.20	0.00	23.07	38.45	-15.38
848.80	97.50	181	1.1	V	30.40	0.20	0.00	30.20	38.45	-8.25
GPRS 850 Channel 128										
824.20	92.72	238	2.1	H	25.69	0.20	0.00	25.49	38.45	-12.96
824.20	97.14	194	1.7	V	30.04	0.20	0.00	29.84	38.45	-8.61
GPRS 850 Channel 190										
836.60	90.82	332	1.1	H	23.79	0.20	0.00	23.59	38.45	-14.86
836.60	97.85	346	2.2	V	30.75	0.20	0.00	30.55	38.45	-7.90
GPRS 850 Channel 251										
848.80	91.34	32	2.4	H	24.31	0.20	0.00	24.11	38.45	-14.34
848.80	97.73	47	2.1	V	30.63	0.20	0.00	30.43	38.45	-8.02

Cellular Band 1900 (Part 24E)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 22H	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
PCS 1900 Channel 512										
1850.20	85.06	122	2.1	H	11.09	0.31	10.40	21.18	33	-11.82
1850.20	92.46	238	1.8	V	19.18	0.31	10.40	29.27	33	-3.73
PCS 1900 Channel 661										
1880.00	85.75	318	1.8	H	11.90	0.31	10.40	21.99	33	-11.01
1880.00	92.42	93	1.2	V	19.30	0.31	10.40	29.39	33	-3.61
PCS 1900 Channel 810										
1909.80	85.40	327	2.4	H	11.67	0.32	10.40	21.75	33	-11.25
1909.80	92.58	204	1.7	V	19.62	0.32	10.40	29.70	33	-3.30
GPRS 1900 Channel 512										
1850.20	87.55	207	1.8	H	13.58	0.31	10.40	23.67	33	-9.33
1850.20	92.87	103	1.1	V	19.59	0.31	10.40	29.68	33	-3.32
GPRS 1900 Channel 661										
1880.00	86.42	246	1.2	H	12.57	0.31	10.40	22.66	33	-10.34
1880.00	92.84	204	1.4	V	19.72	0.31	10.40	29.81	33	-3.19
GPRS 1900 Channel 810										
1909.80	85.95	57	2.5	H	12.22	0.32	10.40	22.30	33	-10.70
1909.80	92.17	207	1.2	V	19.21	0.32	10.40	29.29	33	-3.71

WCDMA Band V (Part 22H)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 22H	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
WCDMA Band V Voice Channel 4132										
826.40	78.67	167	1.7	H	11.64	0.20	0.00	11.44	38.45	-27.01
826.40	84.96	275	1.9	V	17.86	0.20	0.00	17.66	38.45	-20.79
WCDMA Band V Voice Channel 4183										
836.60	79.34	198	1.9	H	12.31	0.20	0.00	12.11	38.45	-26.34
836.60	84.86	54	2.4	V	17.76	0.20	0.00	17.56	38.45	-20.89
WCDMA Band V Voice Channel 4233										
846.60	79.28	315	2.5	H	12.25	0.20	0.00	12.05	38.45	-26.40
846.60	84.77	104	2.3	V	17.67	0.20	0.00	17.47	38.45	-20.98
WCDMA Band V HSDPA Channel 4132										
826.40	76.74	286	1.8	H	9.71	0.20	0.00	9.51	38.45	-28.94
826.40	84.56	296	1.3	V	17.46	0.20	0.00	17.26	38.45	-21.19
WCDMA Band V HSDPA Channel 4183										
836.60	79.01	14	1.0	H	11.98	0.20	0.00	11.78	38.45	-26.67
836.60	84.38	54	1.1	V	17.28	0.20	0.00	17.08	38.45	-21.37
WCDMA Band V HSDPA Channel 4233										
846.60	78.67	35	1.2	H	11.64	0.20	0.00	11.44	38.45	-27.01
846.60	84.88	128	1.1	V	17.78	0.20	0.00	17.58	38.45	-20.87
WCDMA Band V HSUPA Channel 4132										
826.40	78.80	135	1.2	H	11.77	0.20	0.00	11.57	38.45	-26.88
826.40	84.45	139	1.7	V	17.35	0.20	0.00	17.15	38.45	-21.30
WCDMA Band V HSUPA Channel 4183										
836.60	79.61	319	1.3	H	12.58	0.20	0.00	12.38	38.45	-26.07
836.60	84.09	145	1.5	V	16.99	0.20	0.00	16.79	38.45	-21.66
WCDMA Band V HSUPA Channel 4233										
846.60	77.01	211	1.8	H	9.98	0.20	0.00	9.78	38.45	-28.67
846.60	84.57	295	2.0	V	17.47	0.20	0.00	17.27	38.45	-21.18

WCDMA Band II (Part 24E)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 24E	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
WCDMA Band II Voice Channel 9262										
1852.40	77.59	97	1.3	H	3.62	0.31	10.40	13.71	33	-19.29
1852.40	84.76	47	1.6	V	11.48	0.31	10.40	21.57	33	-11.43
WCDMA Band II Voice Channel 9400										
1880.00	76.73	261	1.4	H	2.88	0.31	10.40	12.97	33	-20.03
1880.00	84.90	126	2.3	V	11.78	0.31	10.40	21.87	33	-11.13
WCDMA Band II Voice Channel 9538										
1907.60	79.96	81	1.1	H	6.23	0.32	10.40	16.31	33	-16.69
1907.60	84.89	175	1.5	V	11.93	0.32	10.40	22.01	33	-10.99
WCDMA Band II HSDPA Channel 9262										
1852.40	79.80	43	1.9	H	5.83	0.31	10.40	15.92	33	-17.08
1852.40	84.93	205	2.1	V	11.65	0.31	10.40	21.74	33	-11.26
WCDMA Band II HSDPA Channel 9400										
1880.00	77.27	180	2.1	H	3.42	0.31	10.40	13.51	33	-19.49
1880.00	84.44	264	2.5	V	11.32	0.31	10.40	21.41	33	-11.59
WCDMA Band II HSDPA Channel 9538										
1907.60	76.24	146	2.2	H	2.51	0.32	10.40	12.59	33	-20.41
1907.60	84.92	22	1.7	V	11.96	0.32	10.40	22.04	33	-10.96
WCDMA Band II HSUPA Channel 9262										
1852.40	76.77	190	1.8	H	2.80	0.31	10.40	12.89	33	-20.11
1852.40	84.78	272	2.2	V	11.50	0.31	10.40	21.59	33	-11.41
WCDMA Band II HSUPA Channel 9400										
1880.00	79.29	318	1.9	H	5.44	0.31	10.40	15.53	33	-17.47
1880.00	84.48	277	1.4	V	11.36	0.31	10.40	21.45	33	-11.55
WCDMA Band II HSUPA Channel 9538										
1907.60	77.77	354	1.8	H	4.04	0.32	10.40	14.12	33	-18.88
1907.60	84.04	87	1.9	V	11.08	0.32	10.40	21.16	33	-11.84

9 Peak-to-Average Ratio

Test Requirement:	24.232 (d)
Test Method:	N/A
Test Mode:	TX transmitting

9.1 EUT Operation

Operating Environment :	
Temperature:	22.5 °C
Humidit	

9.3 Test Result

Cellular Band (Part 24E)

Remark: Only the worst case (middle channel mode) were reported.

Mode	PCS 1900			GPRS 1900			Limit (dB)
Channel	512	661	810	512	661	810	
Frequency (MHz)	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8	
Peak-to-Average Ratio (dB)	9.33	9.41	9.38	9.23	9.27	9.20	13

Mode	WCDMA Band II			Limit (dB)
Channel	512	661	810	
Frequency (MHz)	1850.2	1880.0	1909.8	
Peak-to-Average Ratio (dB)	2.33	2.46	2.32	13

Test Plots (Part 24E)

PCS1900 Middle Channel



GPRS 1900 Middle Channel



WCDMA Band II Middle Channel



10 BANDWIDTH

Test Requirement:	FCC Part 2.1049,22.917,22.905,24.238
Test Method:	TIA/EIA-603-D:2010 KDB971168 D01 v02r02
Test Mode:	TX transmitting

10.1 EUT Operation

Operating Environment :	
Temperature:	22.5 °C
Humidit	

10.3 Test Result

Remark: Only the worst case (middle channel mode) were reported.

Cellular Band (Part 22H)

Test Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth(kHz)	26 dB Emission Bandwidth(kHz)
GSM 850	128	824.2	243.54	313.71
	190	836.6	243.62	313.80
	251	848.8	243.47	313.77
GPRS 850	128	824.2	244.91	311.25
	190	836.6	244.96	311.40
	251	848.8	244.86	311.29

Test Mode		Channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)	26 dB Emission Bandwidth(MHz)
WCDMA Band V	RMC12.2k	4132	826.4	4.10	4.64
		4183	836.6	4.15	4.65
		4233	846.6	4.09	4.59
	HSDPA(16QAM)	4132	826.4	4.06	4.51
		4183	836.6	4.15	4.65
		4233	846.6	4.06	4.59
	HSUPA(BPSK)	4132	826.4	4.14	4.84
		4183	836.6	4.22	4.88
		4233	846.6	4.20	4.78

Cellular Band (Part 24E)

Test Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth(kHz)	26 dB Emission Bandwidth(kHz)
PCS 1900	512	1850.2	247.20	309.38
	661	1880.0	247.25	309.40
	810	1909.8	247.10	309.25
GPRS 1900	512	1850.2	246.67	316.41
	661	1880.0	246.80	316.50
	810	1909.8	246.65	316.46

Test Mode		Channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)	26 dB Emission Bandwidth(MHz)
WCDMA Band II	RMC12.2k	9262	1852.4	4.12	4.57
		9400	1880.0	4.17	4.69
		9538	1907.6	4.02	4.60
	HSDPA(16QAM)	9262	1852.4	3.99	4.56
		9400	1880.0	4.14	4.67
		9538	1907.6	4.04	4.53
	HSUPA(BPSK)	9262	1852.4	4.12	4.60
		9400	1880.0	4.15	4.67
		9538	1907.6	4.14	4.53

Test Plots (worst case)

Cellular Band (Part 22H)

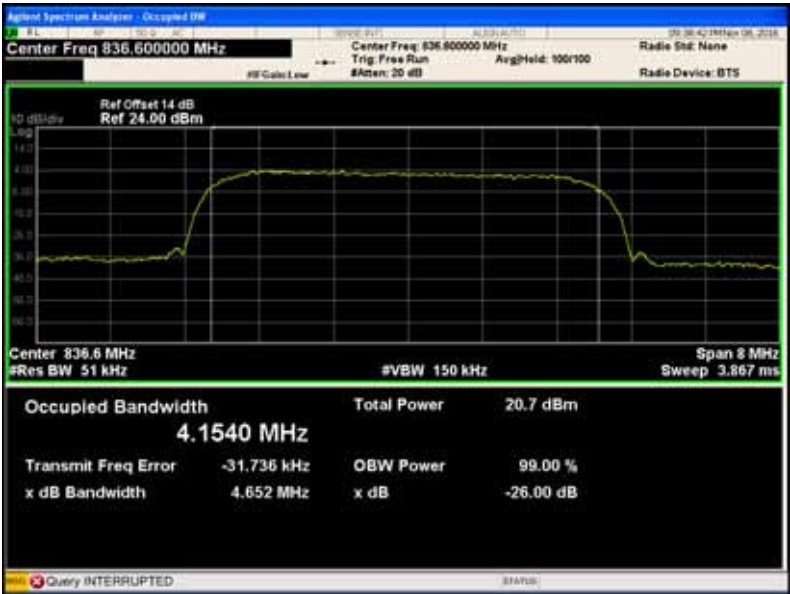
GSM 850



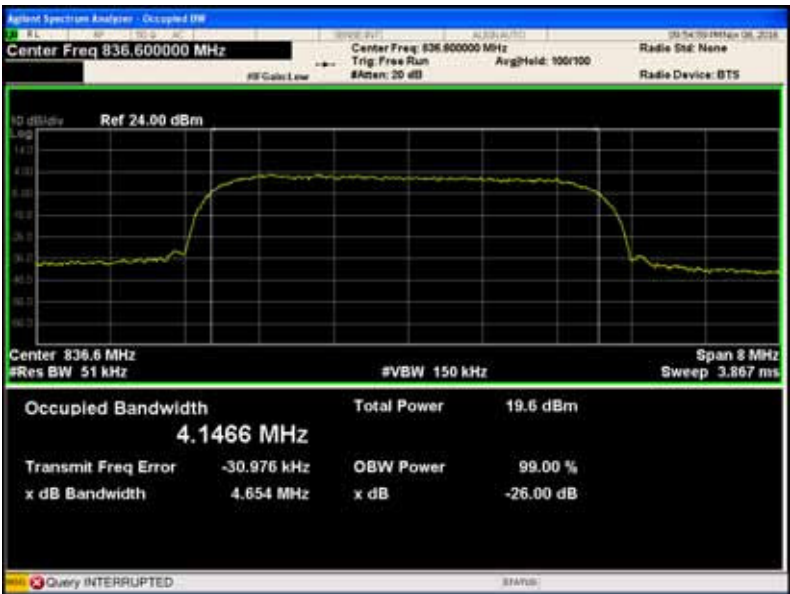
GPRS 850



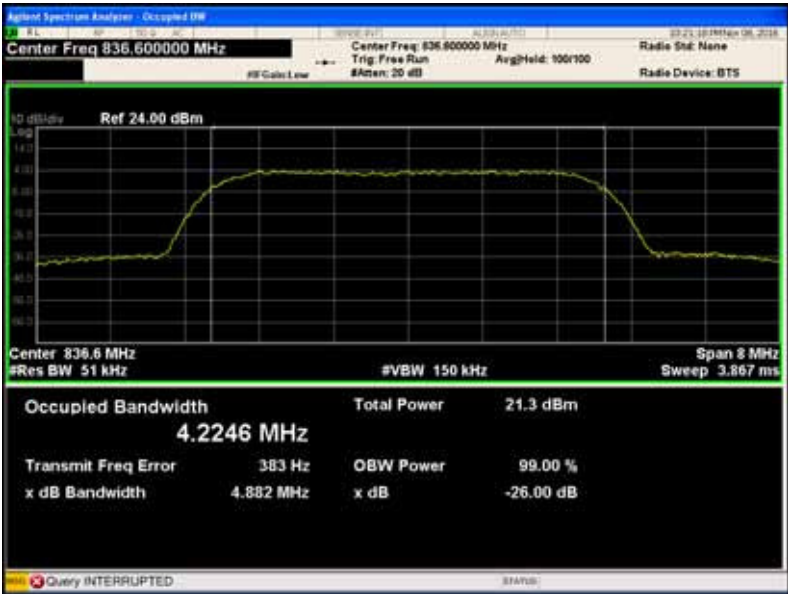
WCDMA band V
RMC12.2k



HSDPA

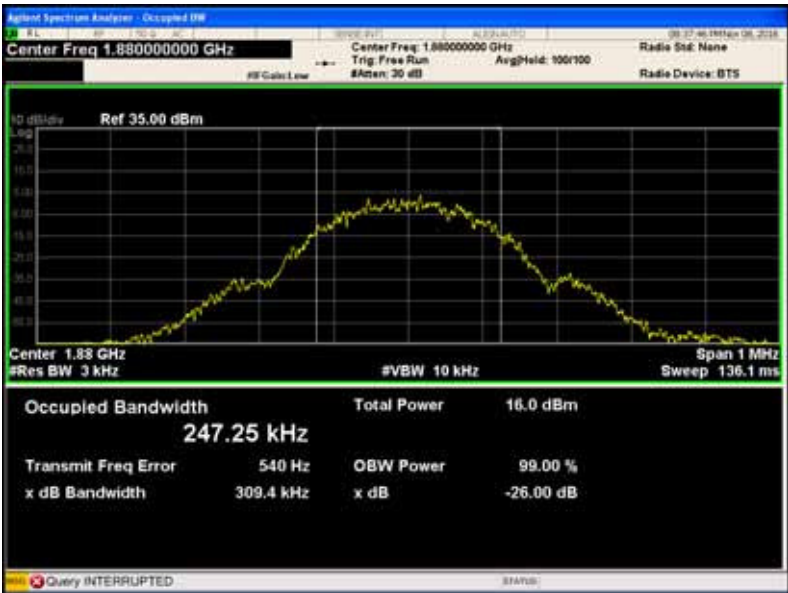


HSUPA

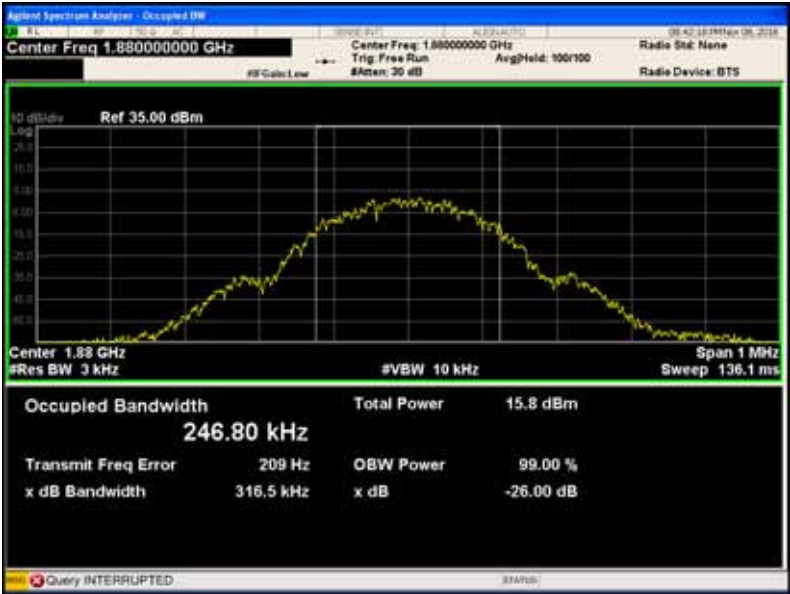


Cellular Band (Part 24E)

PCS 1900

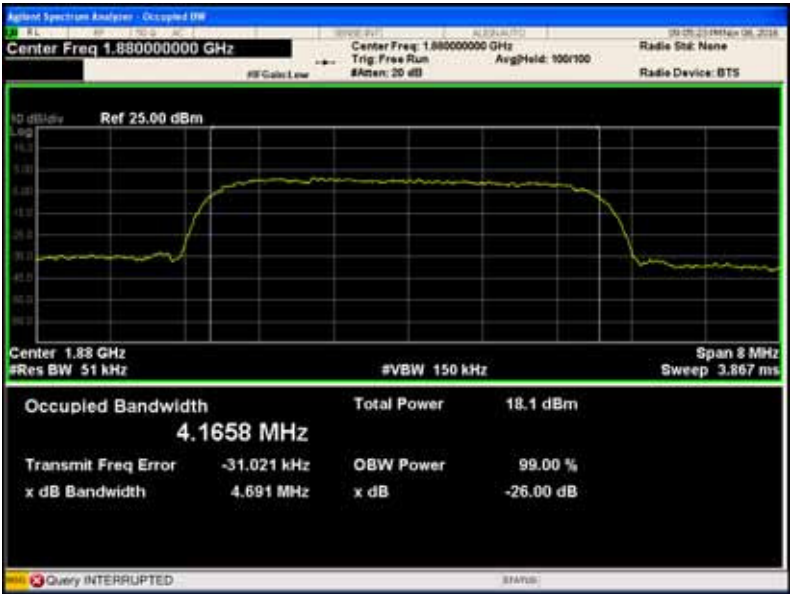


GPRS 1900

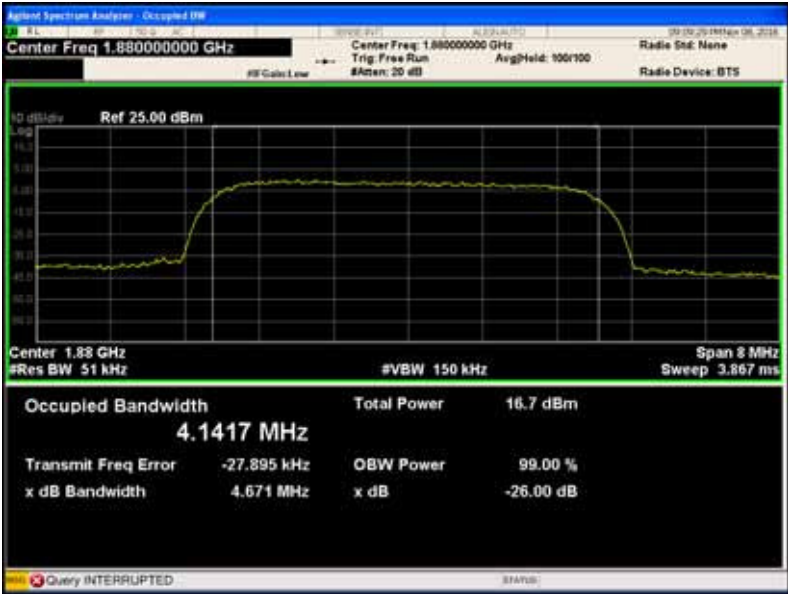


WCDMA band II

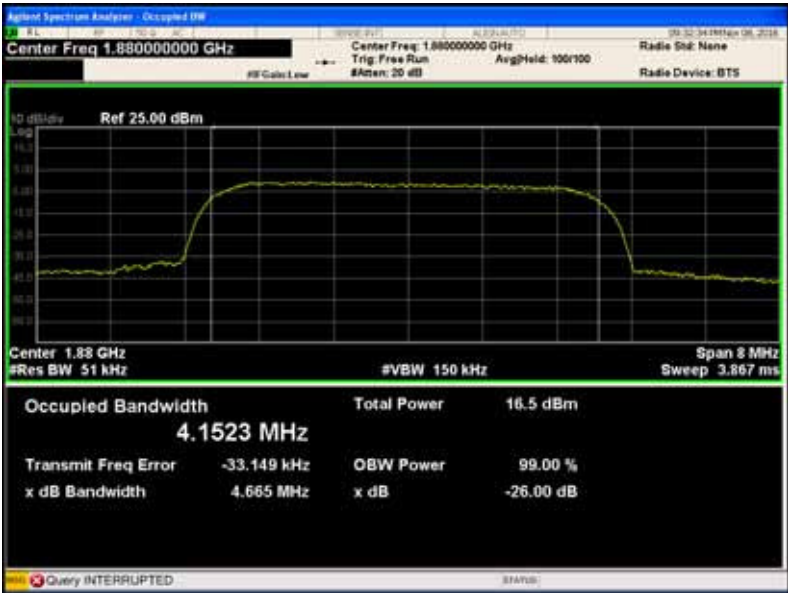
RMC12.2k



HSDPA



HSUPA



11 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Requirement: FCC Part 2.1051,22.917(a),24.238(a)

Test Method: TIA/EIA-603-D:2010

KDB971168 D01 v02r02

Test Mode: TX transmitting

11.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidit

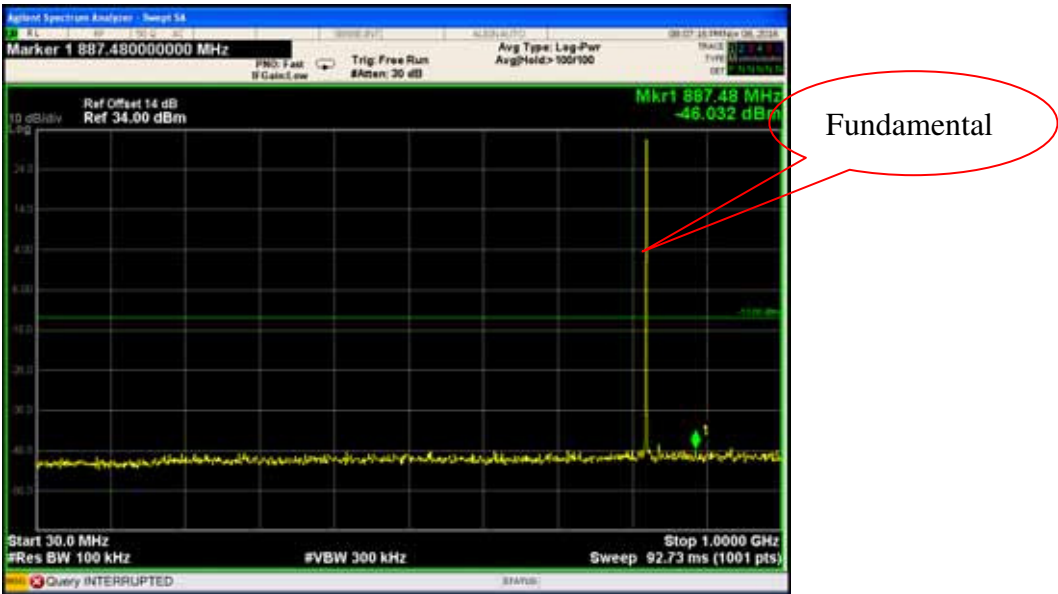
11.3 Test Result

Remark: only the worst data were recorded.

Cellular Band (Part 22H)

GSM 850 - channel 128

30MHz-1GHz



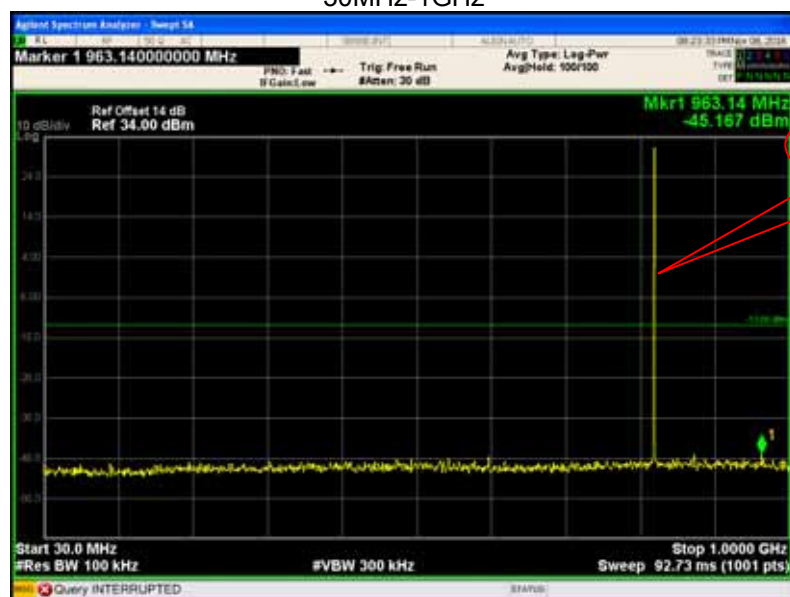
Above 1GHz



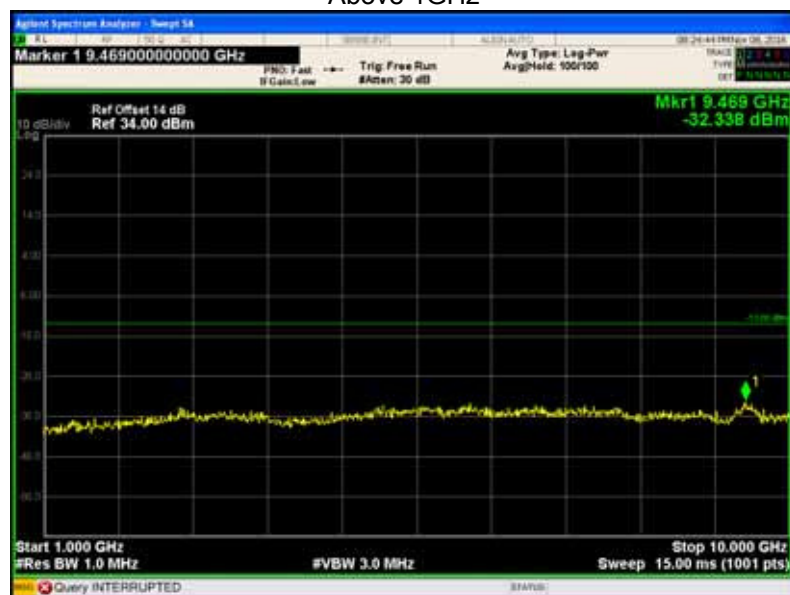
Cellular Band (Part 22H)

GPRS 850 - channel 128

30MHz-1GHz



Above 1GHz

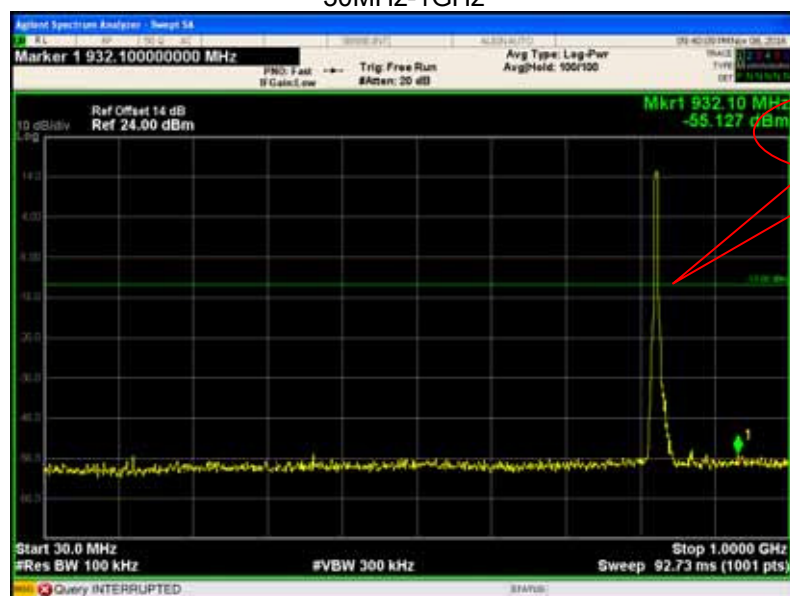


Cellular Band (Part 22H)

Cellular Band (Part 22H)

WCDMA band V - channel 4233

30MHz-1GHz



Fundamental

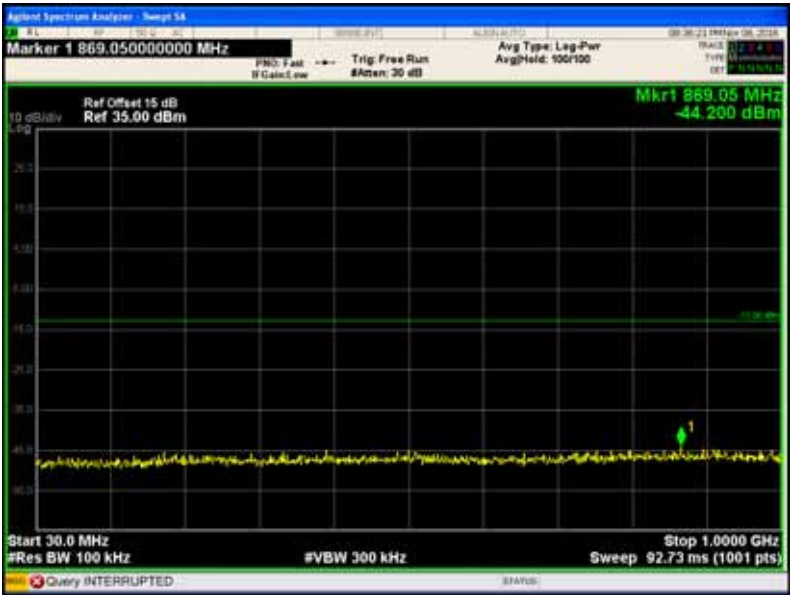
Above 1GHz



Cellular Band (Part 24E)

PCS 1900 - channel 512

30MHz-1GHz



Above 1GHz

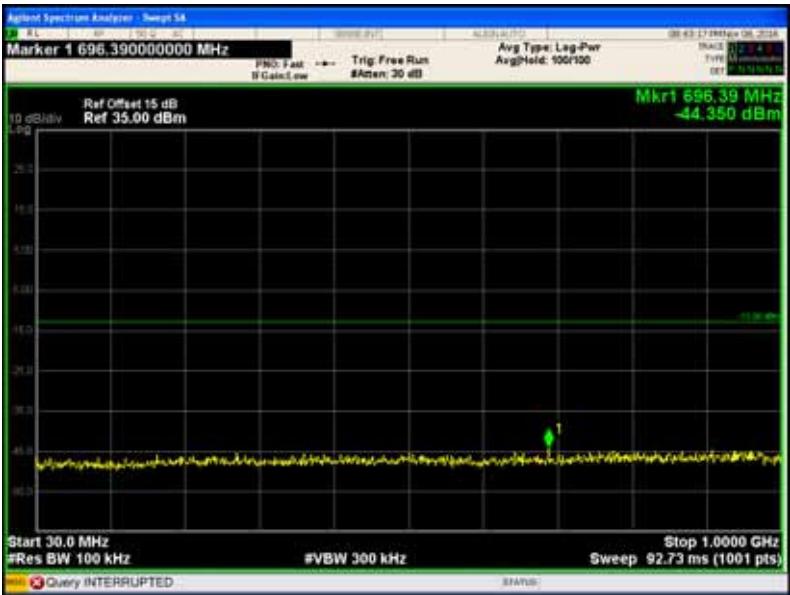
Fundamental



Cellular Band (Part 24E)

GPRS 1900 - channel 512

30MHz-1GHz



Above 1GHz

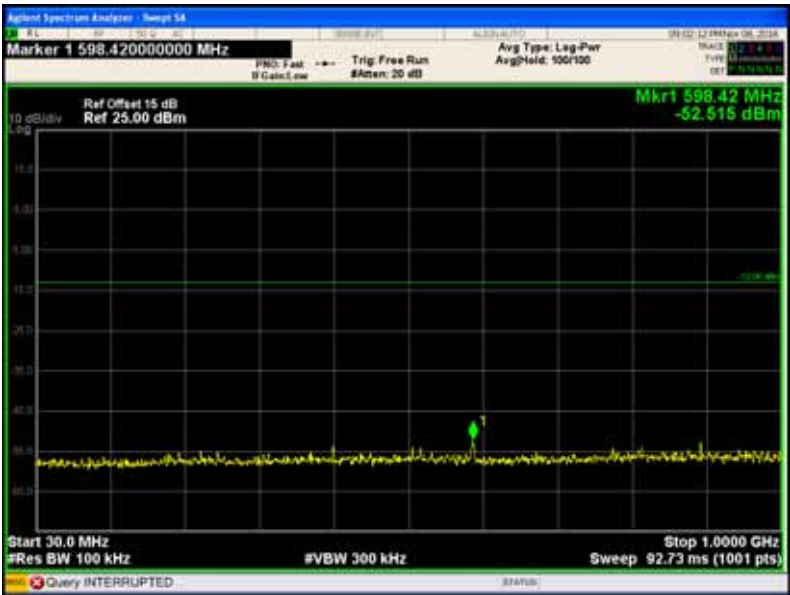
Fundamental



Cellular Band (Part 24E)

WCDMA band II - channel 9400

30MHz-1GHz



Above 1GHz

Fundamental



12 SPURIOUS RADIATED EMISSIONS

Test Requirement: FCC Part 2.1053,22.917,24.238

Test Method: TIA/EIA-603-D:2010

KDB971168 D01 v02r02

Test Mode: TX transmitting

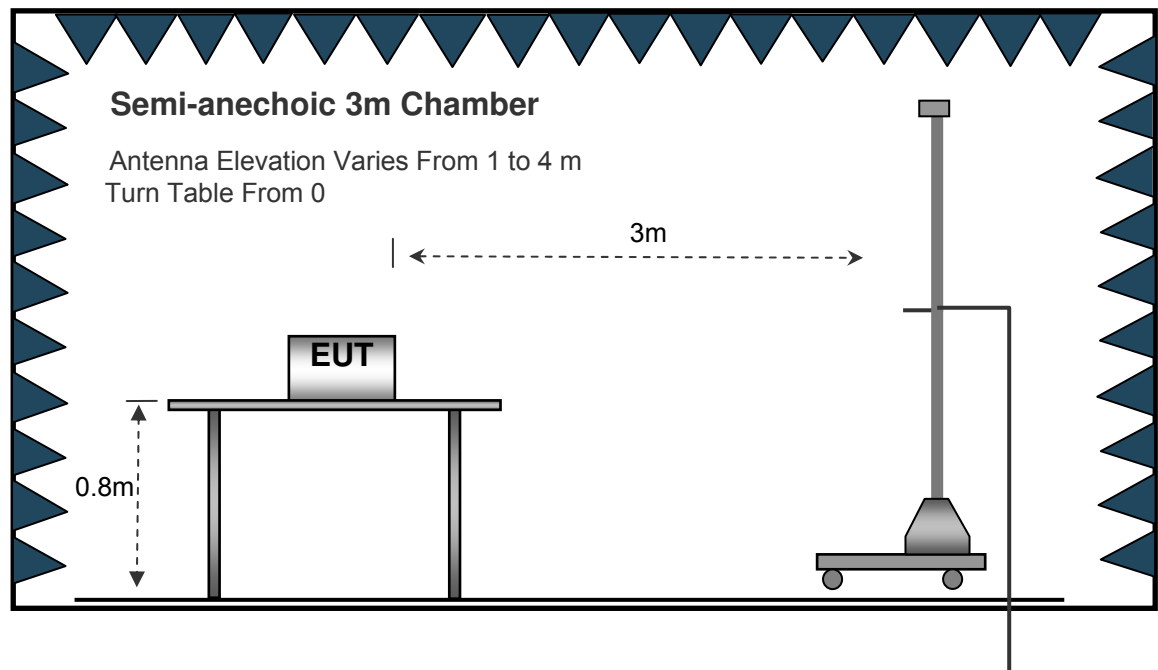
12.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidit

The test setup for emission measurement above 1 GHz.



12.3 Spectrum Analyzer Setup

30MHz ~ 1GHz

Sweep Speed Auto
Detector PK
Resolution Bandwidth..... 100kHz
Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed Auto
Detector PK
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 3MHz
Detector Ave.
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 10Hz

12.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from 30MHz up to the tenth harmonic of the highest fundamental frequency.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the Z position. So the data shown was the Z position only.
7. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = $10 \lg (\text{TXpwr in Watts}/0.001)$ – the absolute level
Spurious attenuation limit in dB = $43 + 10 \lg (\text{power out in Watts})$
8. Repeat above procedures until the measurements for all frequencies are completed.

12.5 Summary of Test Results

For 26MHz~30MHz,

The measurements were more than 20 dB below the limit and not reported.

Remark: Test performed from 30MHz to 10th harmonics with low/middle/high channels, only the worst data were recorded.

Cellular Band (Part 22H)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
GSM 850 Channel 128										
199.38	44.42	153	1.1	H	-66.09	0.15	0.00	-66.24	-13.00	-53.24
199.38	46.80	301	1.5	V	-60.79	0.15	0.00	-60.94	-13.00	-47.94
1648.40	70.30	85	2.1	H	-43.67	0.30	9.40	-34.57	-13.00	-21.57
1648.40	59.15	257	1.9	V	-54.38	0.30	9.40	-45.28	-13.00	-32.28
2472.60	56.43	228	1.3	H	-57.57	0.43	10.60	-47.40	-13.00	-34.40
2472.60	48.14	123	1.5	V	-62.14	0.43	10.60	-51.97	-13.00	-38.97
WCDMA Band V Channel 4233										
199.38	41.75	323	1.9	H	-68.76	0.15	0.00	-68.91	-13.00	-55.91
199.38	45.29	91	1.9	V	-62.30	0.15	0.00	-62.45	-13.00	-49.45
1693.20	58.74	169	1.9	H	-55.23	0.30	9.40	-46.13	-13.00	-33.13
1693.20	49.23	310	2.1	V	-64.30	0.30	9.40	-55.20	-13.00	-42.20
2539.80	49.46	244	1.9	H	-64.54	0.43	10.60	-54.37	-13.00	-41.37
2539.80	39.16	5	1.8	V	-71.12	0.43	10.60	-60.95	-13.00	-47.95

Cellular Band (Part 24E)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
PCS 1900 Channel 512										
199.38	46.22	240	1.9	H	-64.29	0.15	0.00	-64.44	-13.00	-51.44
199.38	38.64	138	1.5	V	-68.95	0.15	0.00	-69.10	-13.00	-56.10
3700.40	65.95	206	1.3	H	-45.59	2.37	12.50	-35.46	-13.00	-22.46
3700.40	59.98	123	2.0	V	-49.83	2.37	12.50	-39.70	-13.00	-26.70
5550.60	53.58	260	1.2	H	-56.03	2.86	12.90	-45.99	-13.00	-32.99
5550.60	44.73	43	2.0	V	-64.15	2.86	12.90	-54.11	-13.00	-41.11
WCDMA Band II Channel 9400										
199.38	50.04	288	2.0	H	-60.47	0.15	0.00	-60.62	-13.00	-47.62
199.38	38.05	303	1.4	V	-69.54	0.15	0.00	-69.69	-13.00	-56.69
3760.00	58.18	241	1.2	H	-53.36	2.37	12.50	-43.23	-13.00	-30.23
3760.00	53.41	156	1.6	V	-56.40	2.37	12.50	-46.27	-13.00	-33.27
5640.00	45.81	320	1.7	H	-63.80	2.86	12.90	-53.76	-13.00	-40.76
5640.00	38.49	291	1.2	V	-70.39	2.86	12.90	-60.35	-13.00	-47.35

Note: 1) Absolute Level = SG Level - Cable loss + Antenna Gain

2) Margin = Limit- Absolute Level

13 Band Edge Measurement

Test Requirement:	FCC Part 2.1051,22.917(a),24.238(a)
Test Method:	TIA/EIA-603-D:2010 KDB971168 D01 v02r02
Test Mode:	TX transmitting

13.1 EUT Operation

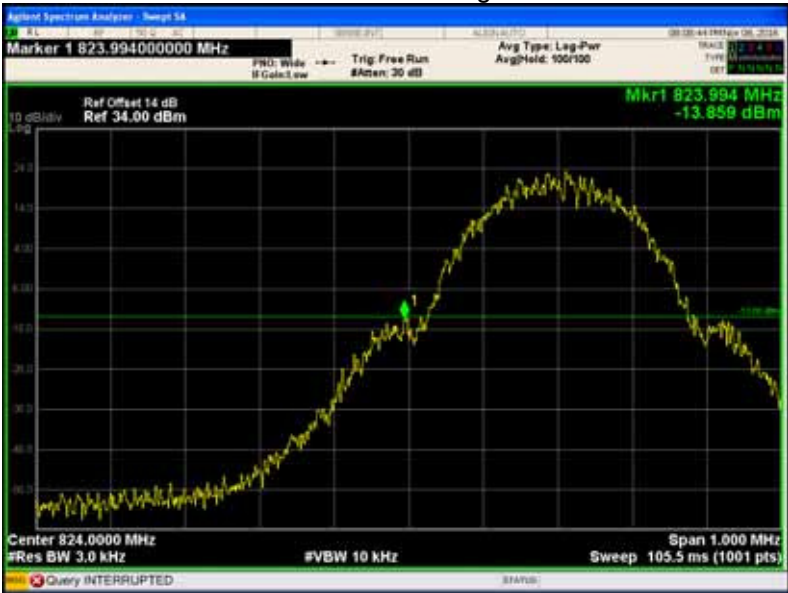
Operating Environment :	
Temperature:	23.5 °C
Humidit	

13.3 Test Result

Test plots

Cellular Band (Part 22H)

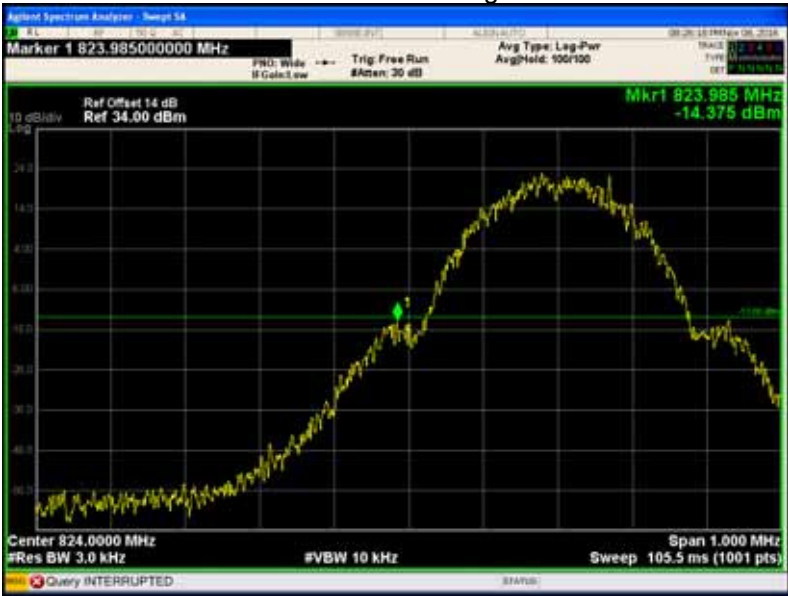
GSM 850 band edge-left side



GSM 850 band edge-right side



GPRS 850 band edge-left side



GPRS 850 band edge-right side



WCDMA band V band edge-left side



WCDMA band V band edge-right side



Cellular Band (Part 24E)
PCS 1900 band edge-left side



PCS 1900 band edge-right side



GPRS 1900 band edge-left side



GPRS 1900 band edge-right side



WCDMA band II band edge-left side



WCDMA band II band edge-right side



14 FREQUENCY STABILITY

Test Requirement:	FCC Part 2.1055,22.355,24.235
Test Method:	TIA/EIA-603-D:2010 KDB971168 D01 v02r02
Test Mode:	TX transmitting

14.1 EUT Operation

Operating Environment :	
Temperature:	22.9 °C
Humidit	

14.3 Test Result

Cellular Band (Part 22H)	
GSM 850 Test Frequency:836.6MHz	
Temperature	
(	

WCDMA Band V Test Frequency:836.6MHz

Temperature (

GPRS 1900 Test Frequency:1880.0MHz

Temperature
(

15 RF Exposure

Remark: refer to SAR test report: WTS16S0960986E

16 Photographs of test setup and EUT.

Note: Please refer to appendix: WTS16S0960992E_Photo.

===== End of Report =====