FCC Report (GSM&WCDMA)

Applicant:	Lightcomm Technology Co., Ltd.
Address of Applicant:	RM1708-10,17/F,PROSPERITY CENTRE, 25 CHONG YIP STREET,KWUN TONG, KOWLOON, HONG KONG

Equipment Under Test (EUT)

Product Name:	Mobile Phone
Model No.:	S16, S16A, RLTP5044-BLACK
FCC ID:	XMF-MPS16
Applicable standards:	FCC CFR Title 47 Part 2: 2014 FCC CFR Title 47 Part22 Subpart H: 2014 FCC CFR Title 47 Part24 Subpart E: 2014 FCC CFR Title 47 Part27 Subpart L: 2014
Date of sample receipt:	May 20, 2015
Date of Test:	May 21-28, 2015
Date of report issued:	May 29, 2015
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*May 29, 2015*	*Original*

Prepared By: Edward.Pan ***Date:*** *May 29, 2015*

Project Engineer

Check By: hank.yan ***Date:*** *May 29, 2015*

Reviewer

3 Contents

Page

4 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Pass* (Please refer to SAR Report)
RF Output Power	Part 2.1046 Part 22.913 (a)(2) Part 24.232 (c) Part 27.50 (d)(4)	Pass
Modulation Characteristics	Part 2.1047	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917 Part 24.238 Part 27.53(a)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a) Part 27.53 (h)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a) Part 27.53 (h)	Pass
Out of band emission, Band Edge	Part 22.917 (a) Part 24.238 (a) Part 27.53(h)	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2)	Pass

Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	Lightcomm Technology Co., Ltd.
Address of Applicant:	RM1708-10,17/F,PROSPERITY CENTRE, 25 CHONG YIP STREET,KWUN TONG, KOWLOON, HONG KONG
Manufacturer/Factory:	Huizhou Hengdu Electronics Co., Ltd
Address of Manufacturer/Factory:	DIP South Area, Huiao Highway, Huizhou, Guangdong, China

5.2 General Description of EUT

Product Name:	Mobile Phone
Model No.:	S16, S16A, RLTP5044-BLACK
Support Networks:	GSM, GPRS, WCDMA
Support Bands:	GSM850, PCS1900, WCDMA Band II, Band V, Band IV
TX Frequency:	GSM850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz WCDMA Band II: 1852.40MHz-1907.60MHz WCDMA Band V: 826.40MHz-846.60MHz WCDMA Band IV: 1712.4MHz-1752.6MHz
GPRS Class:	12
Modulation type:	GSM/GPRS: GMSK WCDMA Band II/V/IV: QPSK
IMEI:	869758000073364
Hardware Version:	WW803_LG_COPPEL_V001
Software Version:	Android 4.2.2
Antenna type:	PIFA antenna
Antenna gain:	2.5dBi (declare by Applicant)
Power supply:	Adapter: Model No.: TEKA006-0501000UK Input: AC 100-240V, 50/60Hz, 0.2A Output: DC 5.0V, 1.0A or DC 3.7V Li-ion Battery

Operation Frequency List:

GSM 850		PCS1900		WCDMA Band V		WCDMA Band II		WCDMA Band IV	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20	4132	826.40	9262	1852.40	1312	1712.40
129	824.40	513	1850.40	4133	826.60	9263	1852.60	1313	1712.60
· ⋮	· ⋮	· ⋮	· ⋮	· ⋮	· ⋮	· ⋮	· ⋮	· ⋮	· ⋮
189	836.40	660	1879.80	4181	836.20	9399	1879.80	1411	1732.20
190	836.60	661	1880.00	4182	836.40	9400	1880.00	1412	1732.40
191	836.80	662	1880.20	4183	836.60	9401	1880.20	1413	1732.60
· ⋮	· ⋮	· ⋮	· ⋮	· ⋮	· ⋮	· ⋮	· ⋮	· ⋮	· ⋮
250	848.60	809	1909.60	4232	846.40	9537	1907.40	1512	1752.40
251	848.80	810	1909.80	4233	846.60	9538	1907.60	1513	1752.60

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Final test channel:

GSM 850		PCS1900		WCDMA Band V		WCDMA Band II		WCDMA Band IV	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20	4132	826.40	9262	1852.40	1312	1712.40
190	836.60	661	1880.00	4183	836.60	9400	1880.00	1412	1732.40
251	848.80	810	1909.80	4233	846.60	9538	1907.60	1513	1752.60

5.3 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules.

5.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

5.5 Test Facility

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

● **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

● **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: Room 301-309, 3th Floor, Block A, Huafeng Jinyuan Business Building, No. 300 Laodong Industrial Zone,Xixiang Road, Baoan District, Shenzhen 518102

Tel: 0755-27798480

Fax: 0755-27798960

6 Test Instruments list

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 27 2015	Mar. 26 2016
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	July 01 2014	June 30 2015
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	July 01 2014	June 30 2015
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 27 2014	June 26 2015
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 27 2015	Mar. 26 2016
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	Mar. 28 2015	Mar. 27 2016
9	Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015	Mar. 27 2016
10	Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015	Mar. 27 2016
11	Coaxial Cable	GTS	N/A	GTS212	Mar. 28 2015	Mar. 27 2016
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	July 01 2014	June 30 2015
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	July 01 2014	June 30 2015
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 27 2014	June 26 2015
15	Band filter	Amindeon	82346	GTS219	Mar. 28 2015	Mar. 27 2016
16	Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	May 08 2015	May 07 2016
17	Signal Generator	Rohde & Schwarz	SML03	GTS236	May 08 2015	May 07 2016
18	Temp. Humidity/ Barometer	Oregon Scientific	BA-888	GTS248	May 08 2015	May 07 2016
19	D.C. Power Supply	Instek	PS-3030	GTS232	NA	NA
20	Splitter	Agilent	11636B	GTS237	May 08 2015	May 07 2016
21	Power meter	Rohde & Schwarz	NRVS	GTS238	May 08 2015	May 07 2016
22	Spectrum Analyzer	Agilent	E4440A	GTS533	Dec. 4 2014	Dec. 3 2015
23	Temp.&Humidity chamber	Chuang wei	GDS-225	GTS005-1	May 06 2015	May 05 2016
24	Highpass filter	Micro-Tronics	HPM50108	GTS549	Mar. 28 2015	Mar. 27 2016
25	Highpass filter	Micro-Tronics	HPM50111	GTS550	Mar. 28 2015	Mar. 27 2016

7 System test configuration

7.1 Test mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Test modes		
Band	Radiated	Conducted
GSM 850	■ GSM link ■ GPRS 1 link	■ GSM link ■ GPRS 1 link
PCS 1900	■ GSM link ■ GPRS 1 link	■ GSM link ■ GPRS 1 link
WCDMA II	■ RMC 12.2Kbps link	■ RMC 12.2Kbps link
WCDMA Band V	■ RMC 12.2Kbps link	■ RMC 12.2Kbps link

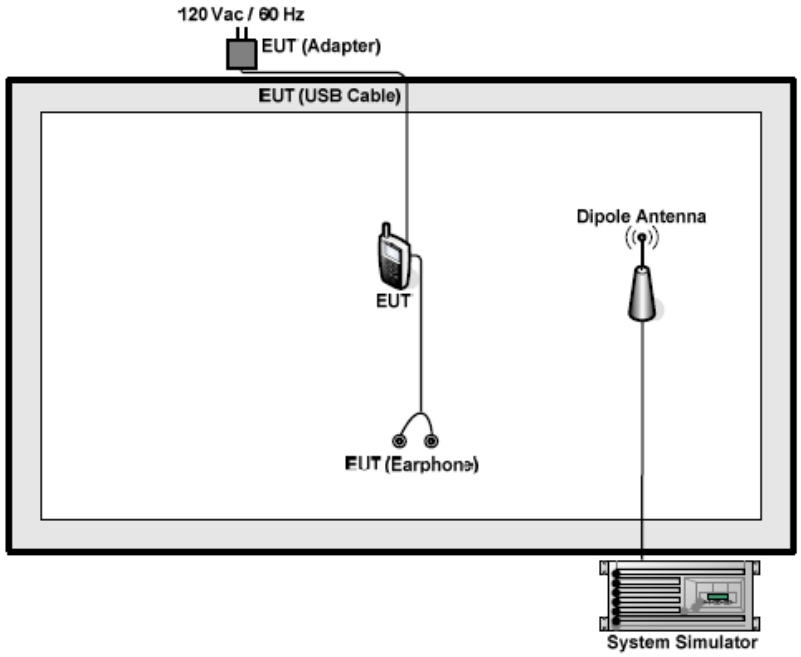
Note: The maximum power levels are GSM mode for GMSK link, GPRS multi-slot class 8 mode for GMSK link, RMC12.2Kbps mode for WCDMA Band II, IV, V. only these modes were used for all tests.

The conducted power tables are as follows:

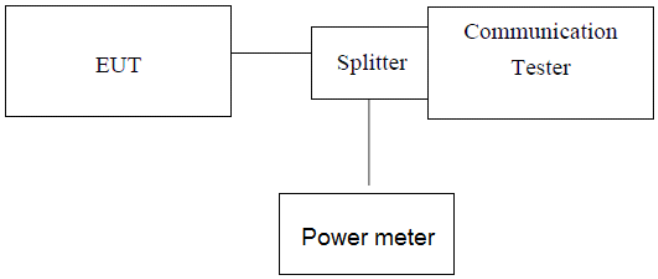
Conducted Power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency	824.20	836.60	848.80	1850.20	1880.00	1909.80
GSM (GMSK, 1 TX slot)	32.39	32.54	32.59	28.57	28.68	28.89
GPRS (GMSK, 1 TX slot)	32.35	32.46	32.47	28.52	28.62	28.78
GPRS (GMSK, 2 TX slot)	31.54	31.56	31.42	27.42	27.51	27.58
GPRS (GMSK, 3 TX slot)	30.52	30.44	30.35	26.23	26.45	26.42
GPRS (GMSK, 4 TX slot)	29.44	29.26	29.47	25.58	25.64	25.57

Conducted Power (dBm)									
Band	WCDMA Band II			WCDMA Band IV			WCDMA Band V		
Channel	9262	9400	9538	1312	1412	1513	4132	4183	4233
Frequency	1852.4	1880.0	1907.6	1712.40	1732.40	1752.60	826.4	836.6	846.6
RMC 12.2Kbps	22.06	22.19	22.27	21.03	21.34	21.17	22.13	22.37	22.58
HSDPA Subtest-1	21.79	21.97	22.17	20.85	20.76	20.59	21.73	21.85	22.06
HSDPA Subtest-2	20.45	20.61	20.87	19.84	19.68	19.47	20.35	20.49	20.96
HSDPA Subtest-3	19.42	19.53	19.69	18.52	18.45	18.39	19.51	19.65	19.84
HSDPA Subtest-4	18.28	18.63	18.49	19.01	19.12	19.03	18.34	18.45	18.76
HSUPA Subtest-1	21.86	21.85	22.08	20.15	20.53	20.29	21.75	21.93	22.14
HSUPA Subtest-2	20.34	20.19	20.36	19.20	19.12	19.05	20.54	20.76	20.99
HSUPA Subtest-3	19.51	19.63	19.78	18.23	18.34	18.06	19.64	19.77	19.85
HSUPA Subtest-4	20.12	20.05	20.23	19.34	19.28	19.11	19.41	19.32	19.12
HSUPA Subtest-5	19.56	19.23	19.33	20.04	20.11	20.09	20.11	19.32	19.16
AMR	21.83	21.84	22.07	20.19	20.34	20.13	21.72	21.92	22.13

7.2 Configuration of Tested System



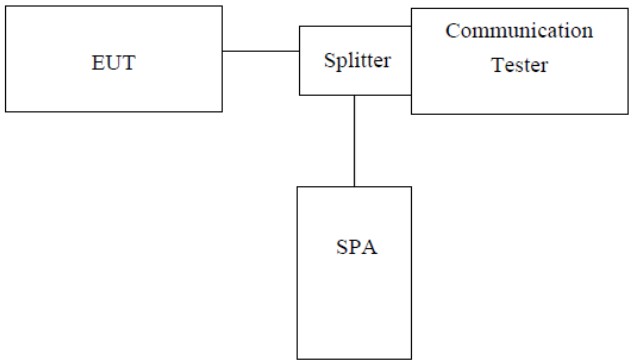
7.3 Conducted Peak Output Power

Test Requirement:	FCC part22.913(a) and FCC part24.232(b)
Test Method:	FCC part2.1046
Limit:	GSM850,: 7W PCS1900, WCDMA Band V: 2W
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1. The transmitter output port was connected to base station. 2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement. 3. Set EUT at maximum power through base station. 4. Select lowest, middle, and highest channels for each band and different modulation. 5. Measure the maximum burst average power.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

EUT Mode	Channel	Frequency (MHz)	PK power (dBm)
GSM 850 (GSM link)	128	824.20	32.39
	190	836.60	32.54
	251	848.80	32.59
GSM 850 (GPRS 1 link)	128	824.20	32.35
	190	836.60	32.46
	251	848.80	32.47
PCS 1900 (GSM link)	512	1850.20	28.57
	661	1880.00	28.68
	810	1909.80	28.89
PCS 1900 (GPRS 1 link)	512	1850.20	28.52
	661	1880.00	28.62
	810	1909.80	28.78
WCDMA Band V (RMC 12.2Kbps link)	4132	826.40	22.13
	4183	836.60	22.37
	4233	846.60	22.58
WCDMA Band II (RMC 12.2Kbps link)	9262	1852.40	22.06
	9400	1880.00	22.19
	9538	1907.60	22.27
WCDMA Band IV (RMC 12.2Kbps link)	1312	1712.40	21.03
	1412	1732.40	21.34
	1513	1752.60	21.17

7.4 Occupy Bandwidth

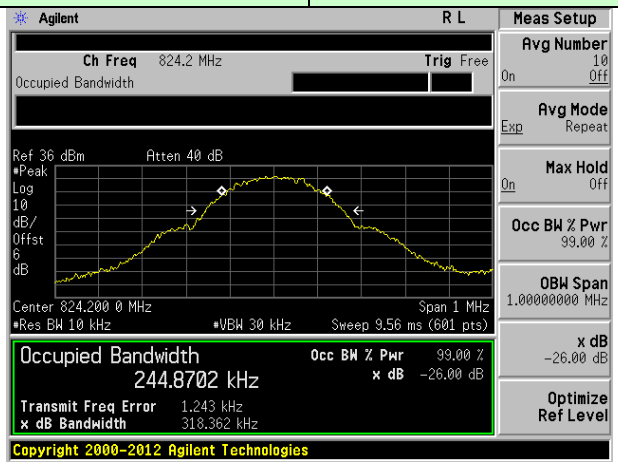
Test Requirement:	FCC part22.913(a) and FCC part24.232(b)
Test Method:	FCC part2.1049
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% of emission BW, VBW= 3 times RBW. 3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

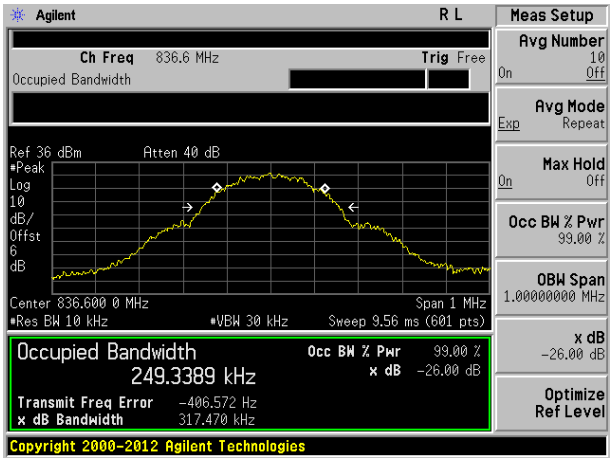
EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
GSM 850 (GSM link)	128	824.20	244.870	318.362
	190	836.60	249.339	317.470
	251	848.80	249.617	323.542
GSM 850 (GPRS 1 link)	128	824.20	249.242	317.591
	190	836.60	247.490	315.872
	251	848.80	236.959	307.857
PCS 1900 (GSM link)	512	1850.20	244.161	321.076
	661	1880.00	242.895	320.062
	810	1909.80	249.373	316.996
PCS 1900 (GPRS 1 link)	512	1850.20	243.934	322.027
	661	1880.00	245.748	318.843
	810	1909.80	250.610	318.350
WCDMA Band V (RMC 12.2Kbps link)	4132	826.40	4144.50	4710.00
	4183	836.60	4152.70	4694.00
	4233	846.60	4178.60	4755.00
WCDMA Band II (RMC 12.2Kbps link)	9262	1852.40	4163.50	4735.00
	9400	1880.00	4187.10	4751.00
	9538	1907.60	4205.10	4766.00
WCDMA Band IV (RMC 12.2Kbps link)	1312	1712.40	4162.00	4734.00
	1412	1732.40	4148.00	4696.00
	1513	1752.60	4165.20	4705.00

Test plot as follows:

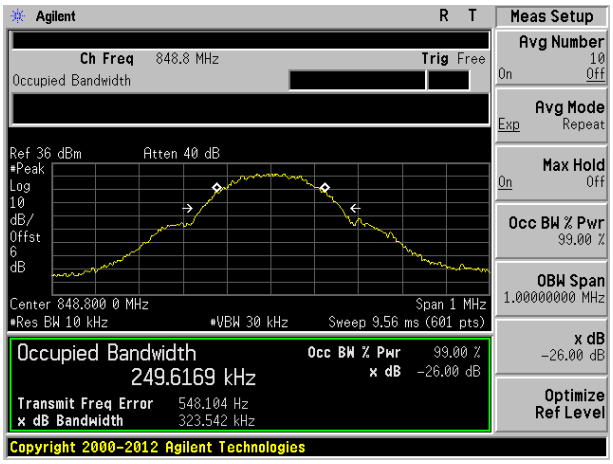
Test band:	GSM 850 (GSM link)



Lowest channel

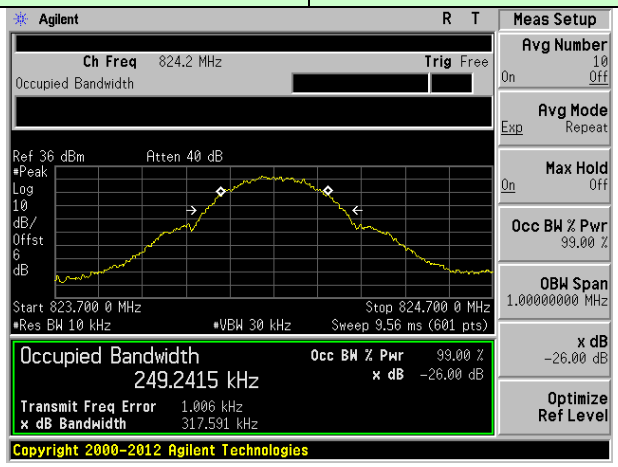


Middle channel

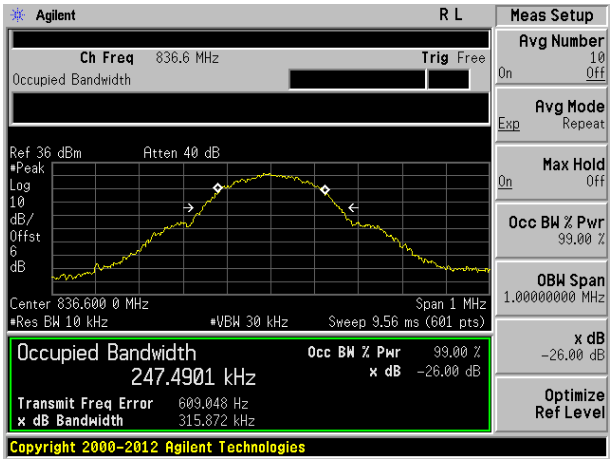


Highest channel

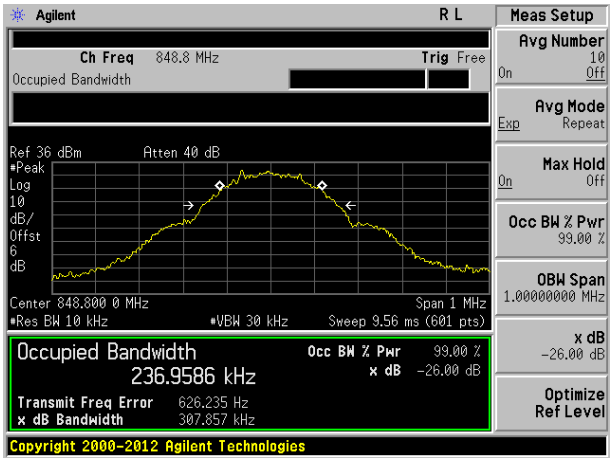
Test band:	GSM 850 (GPRS 1 link)



Lowest channel

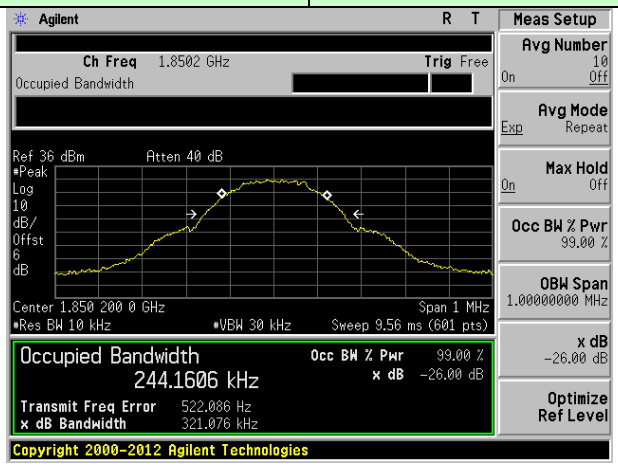


Middle channel



Highest channel

Test band:	PCS 1900 (GSM link)



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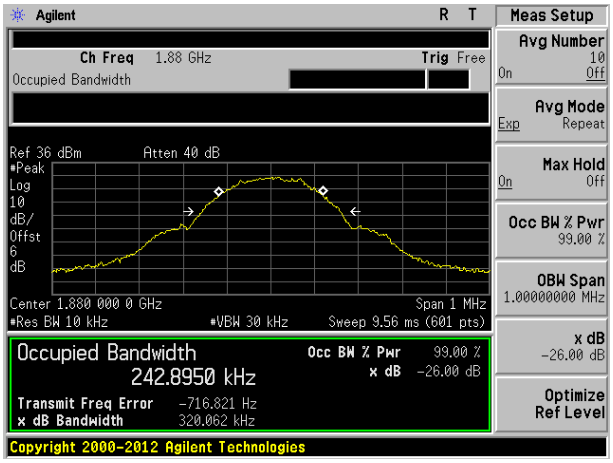
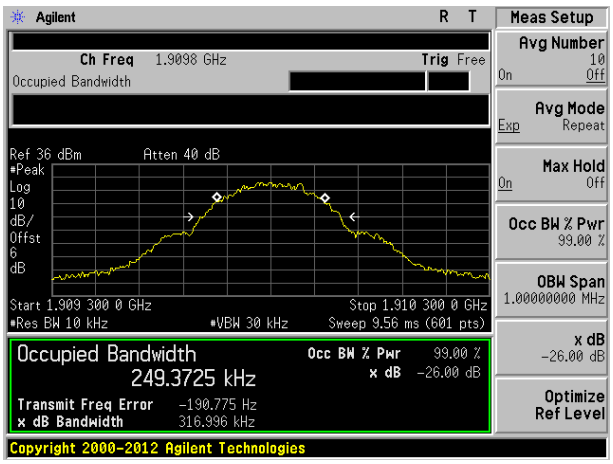
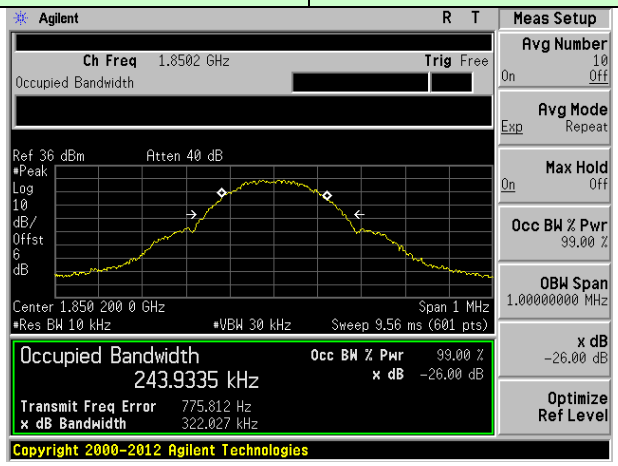


Middle channel



Highest channel

Test band:	PCS 1900 (GPRS 1 link)



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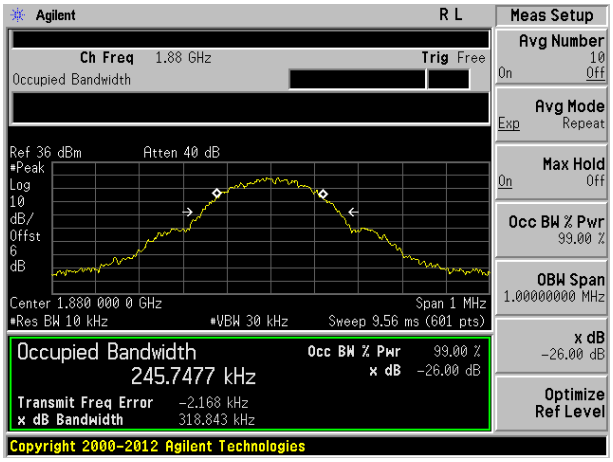
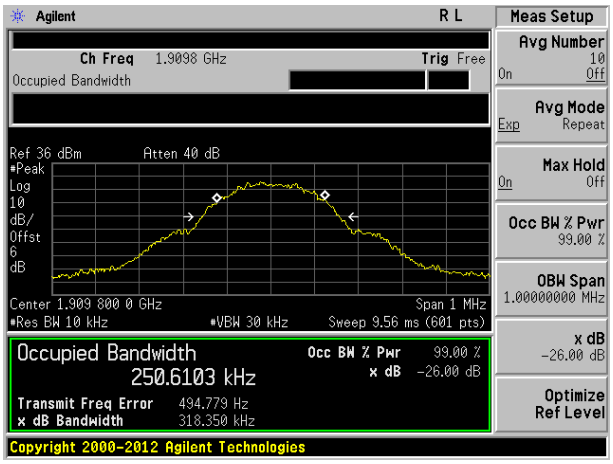
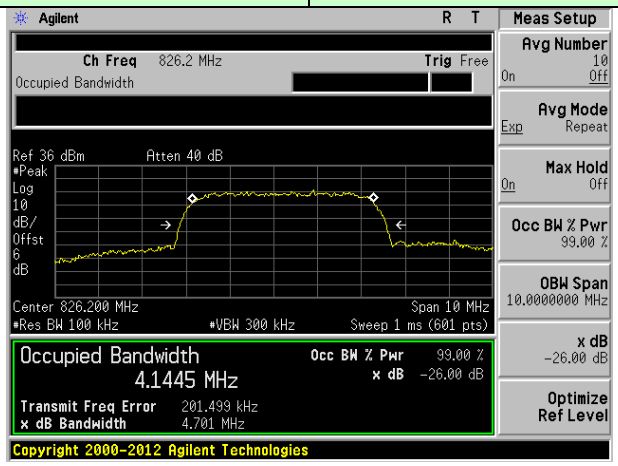


Middle channel

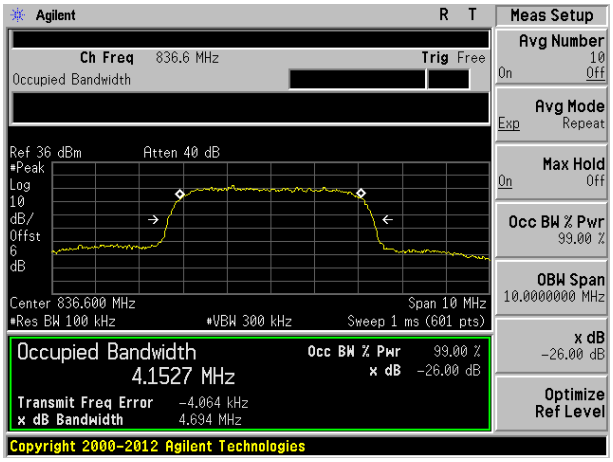


Highest channel

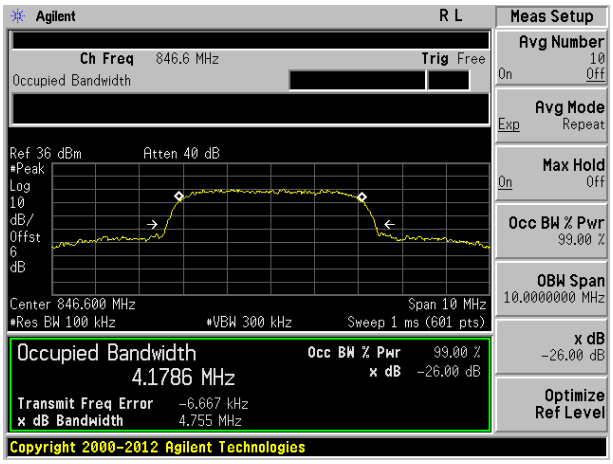
Test band:	WCDMA Band V (RMC 12.2Kbps link)



Lowest channel

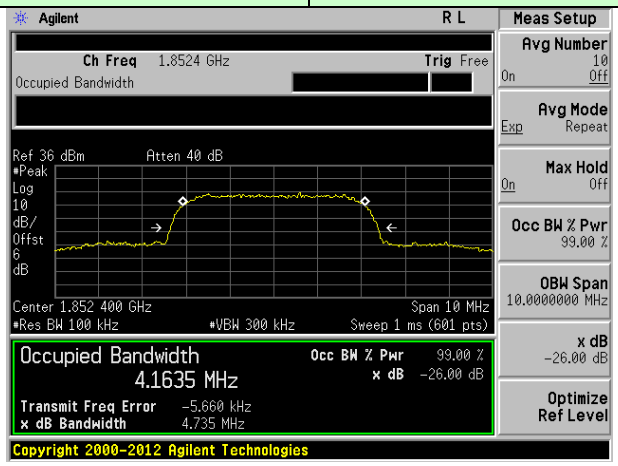


Middle channel

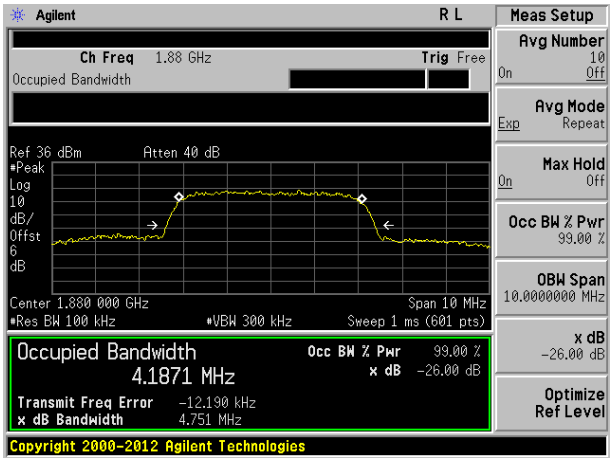


Highest channel

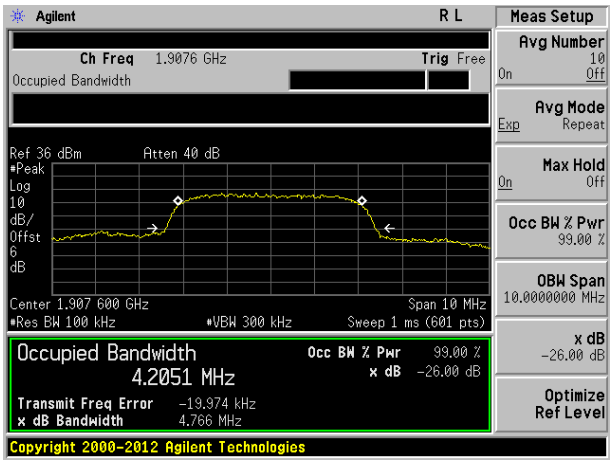
Test band:	WCDMA Band II (RMC 12.2Kbps link)



Lowest channel

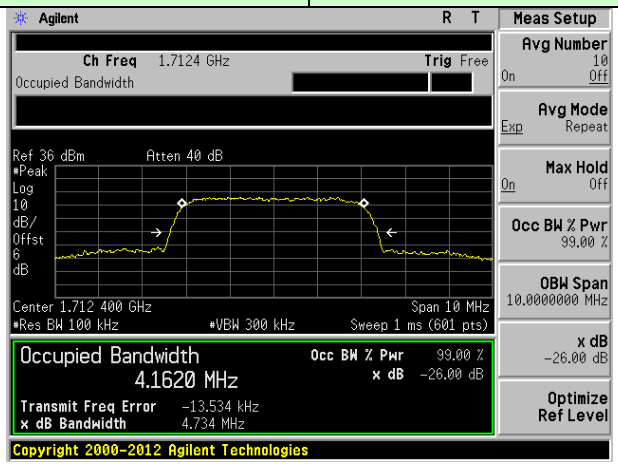


Middle channel

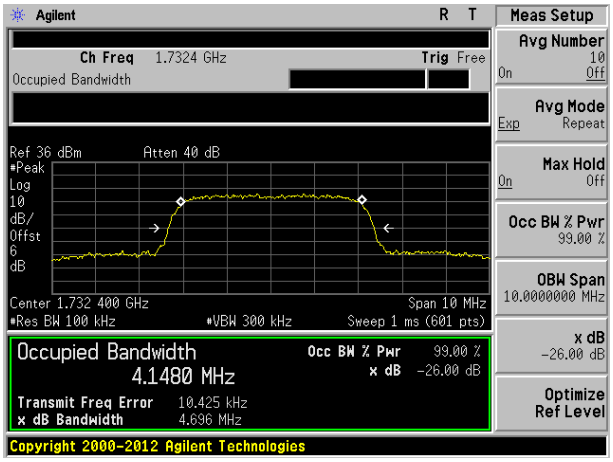


Highest channel

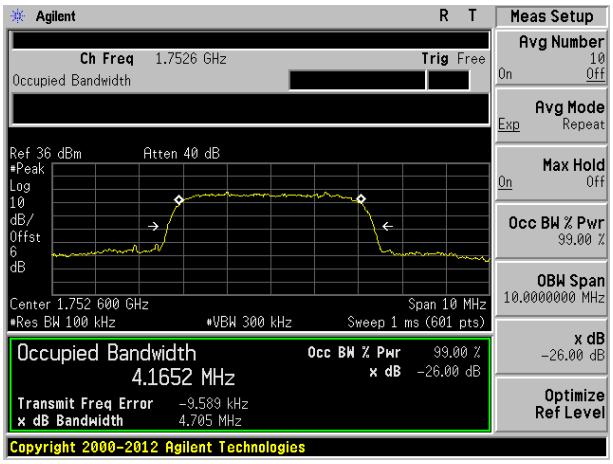
Test band:	WCDMA Band IV (RMC 12.2Kbps link)



Lowest channel



Middle channel

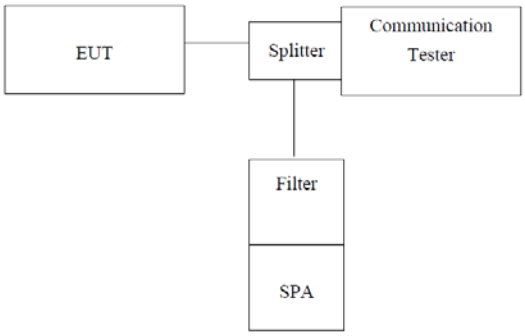


Highest channel

7.5 MODULATION CHARACTERISTIC

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

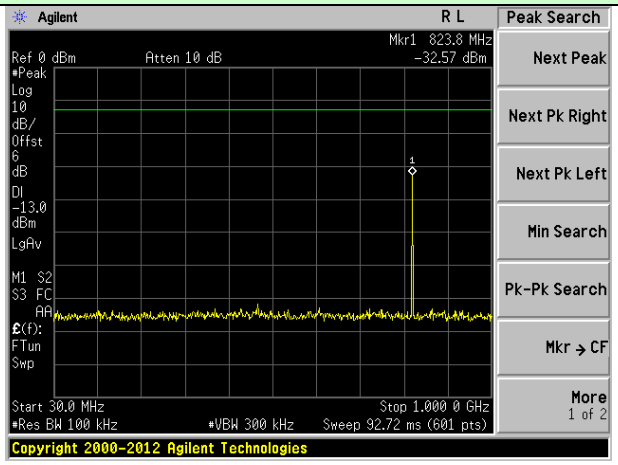
7.6 Out of band emission at antenna terminals

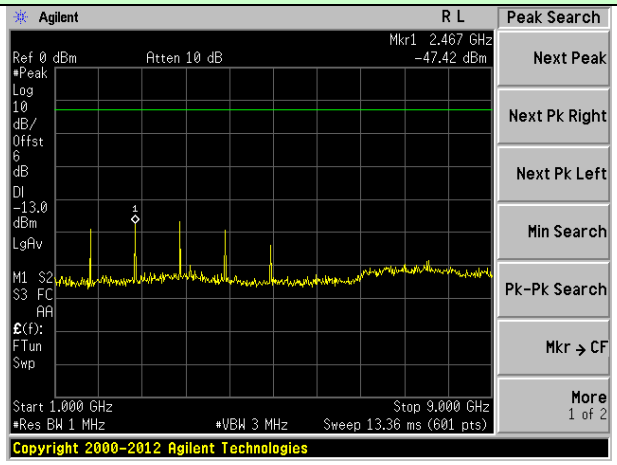
Test Requirement:	FCC part22.917(a) and FCC part24.238(a)
Test Method:	FCC part2.1051
Limit:	-13dBm
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 3 For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10th harmonic. 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Test plot as follows:

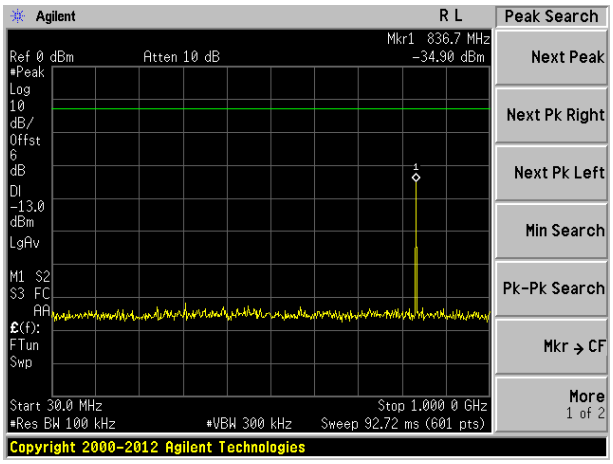
Note: During the conducted spurious emission test, a band filter was used. The information of the filter is reported at section 6.0 (refer to item 24, 25).

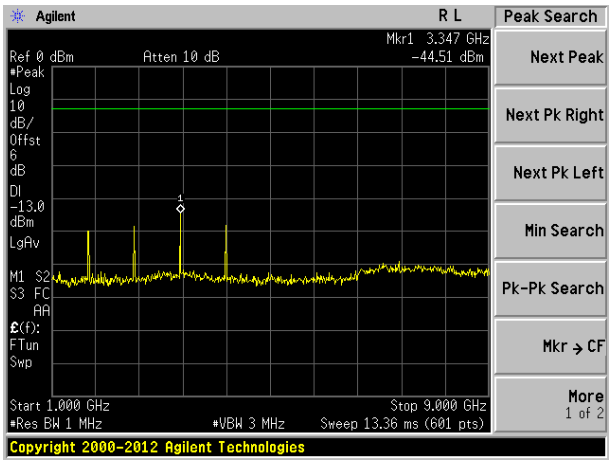
Test Mode: Traffic mode	GSM 850 (GSM link)



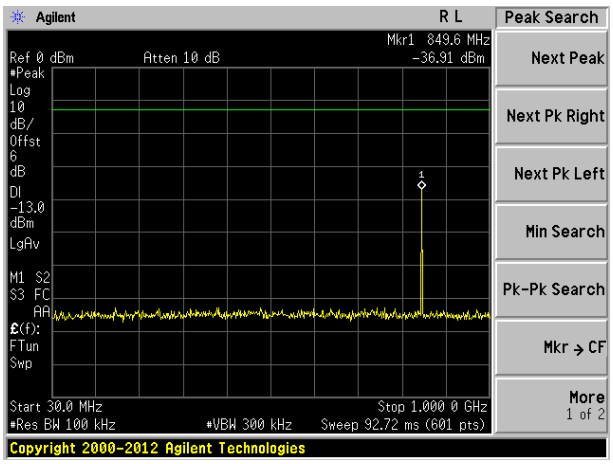


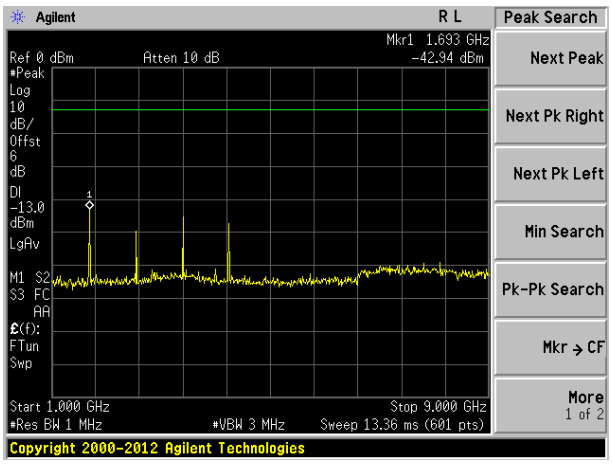
Lowest channel





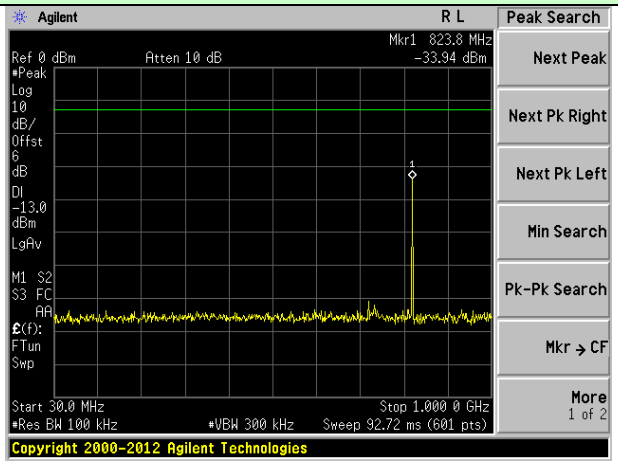
Middle channel

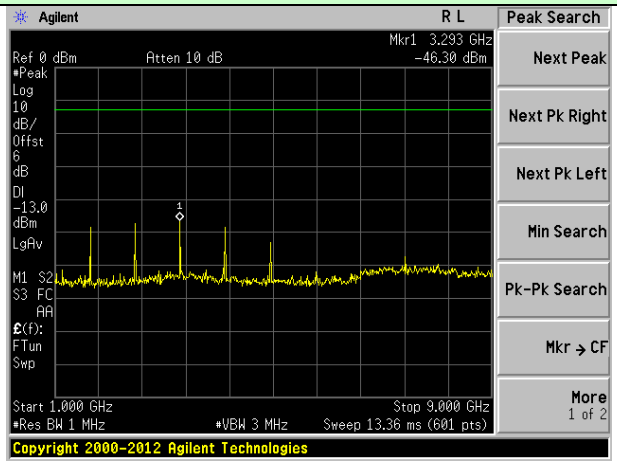




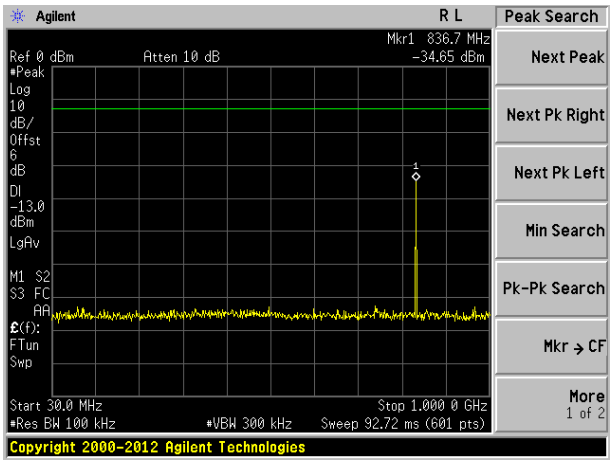
Highest channel

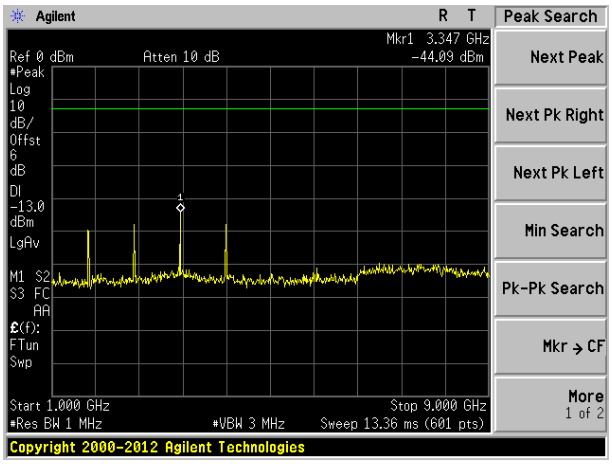
Test Mode: Traffic mode	GSM 850 (GPRS 1 link)



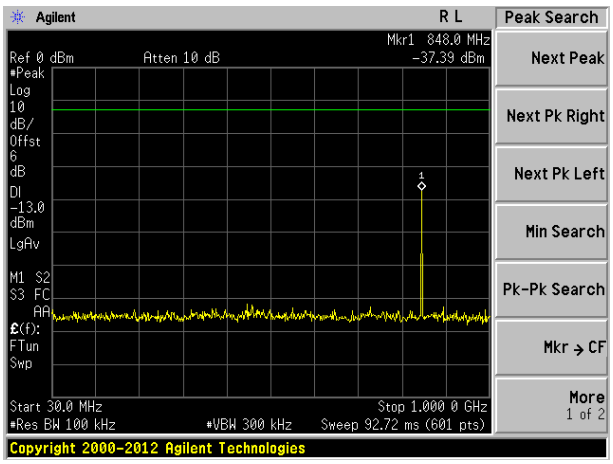


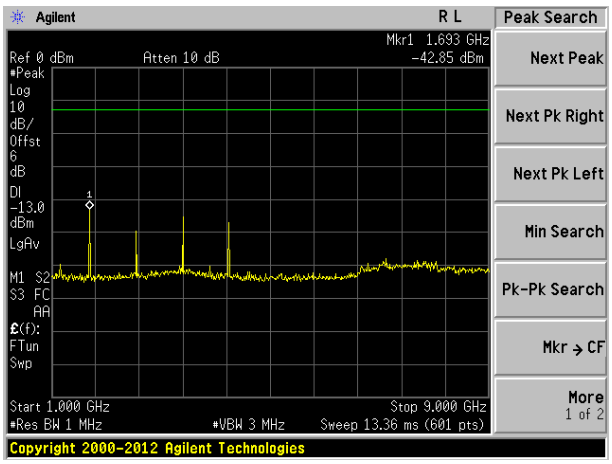
Lowest channel





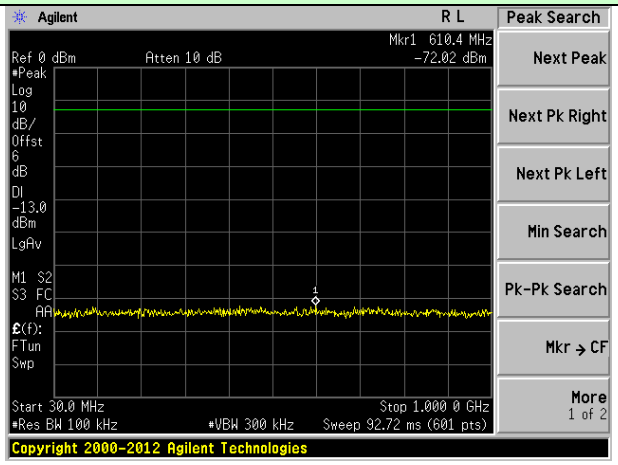
Middle channel

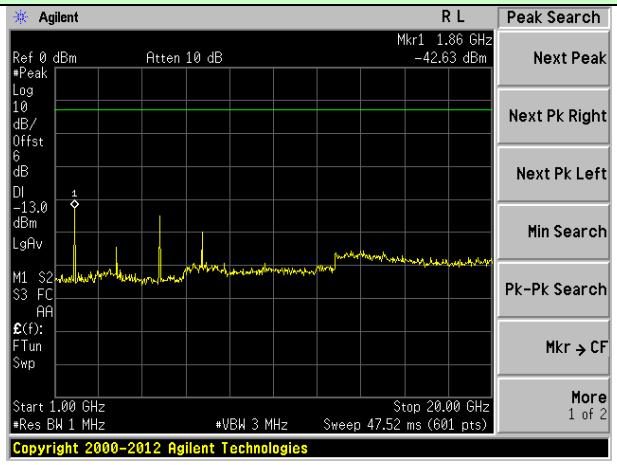




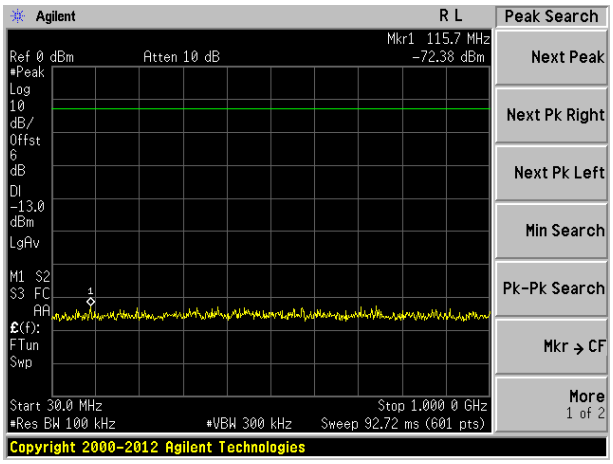
Highest channel

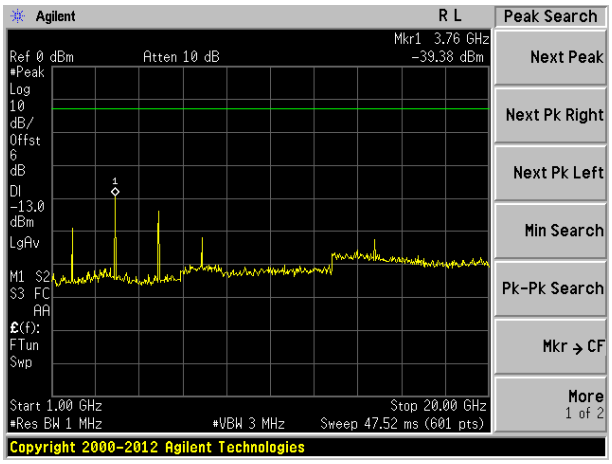
Test Mode: Traffic mode	PCS1900 (GSM link)



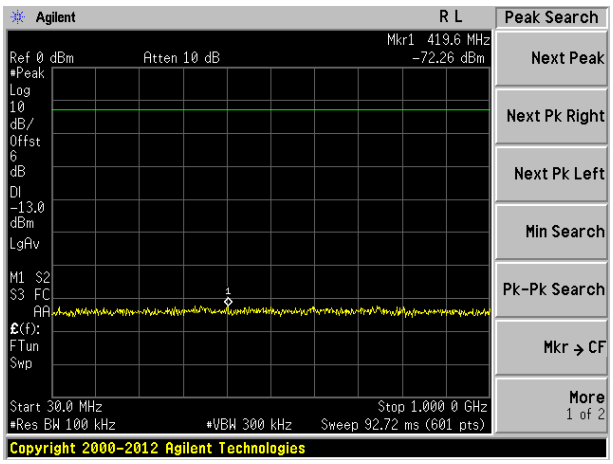


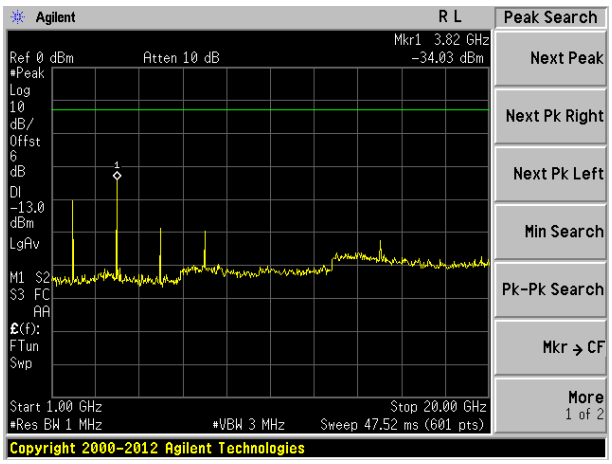
Lowest channel





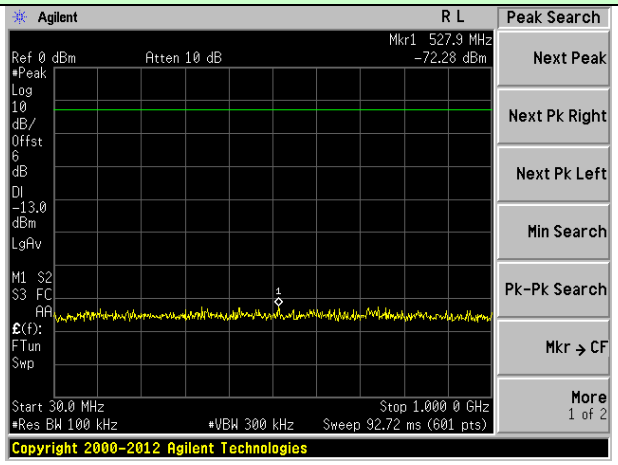
Middle channel

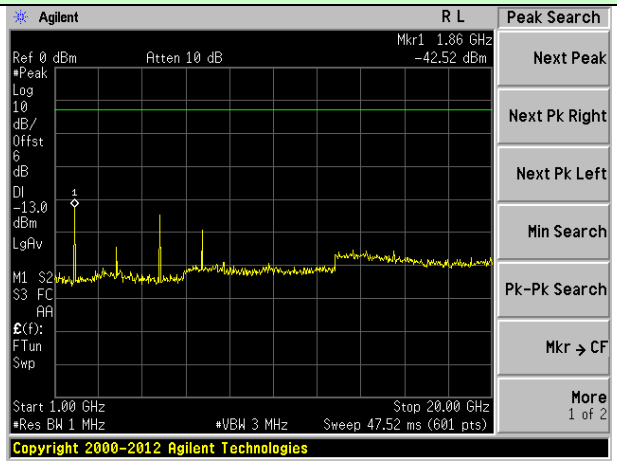




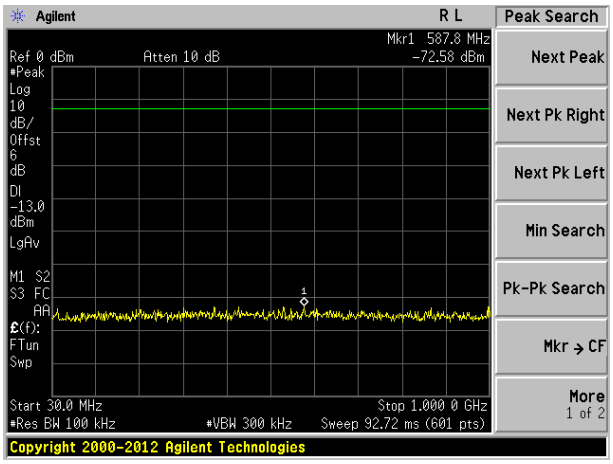
Highest channel

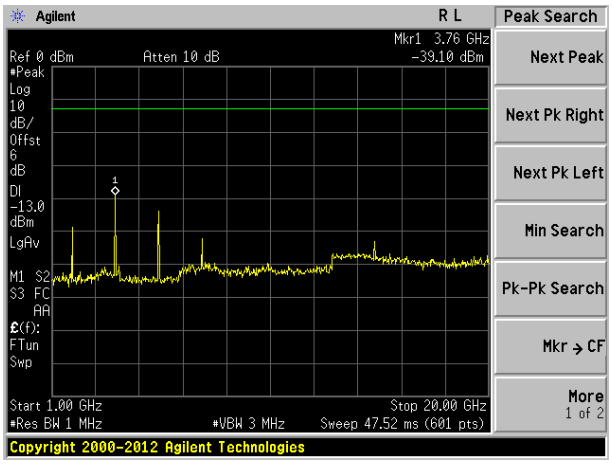
Test Mode: Traffic mode	PCS1900 (GPRS 1 link)



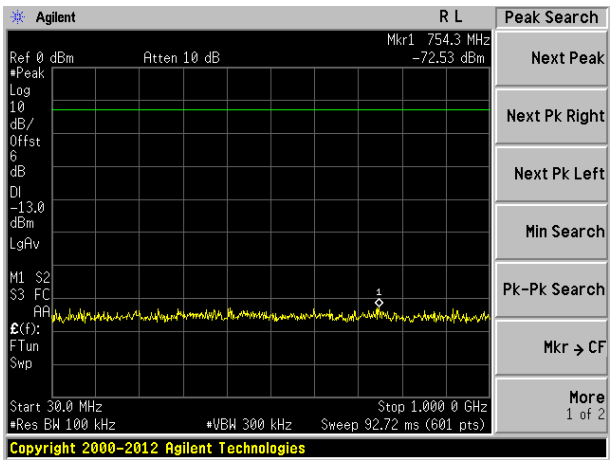


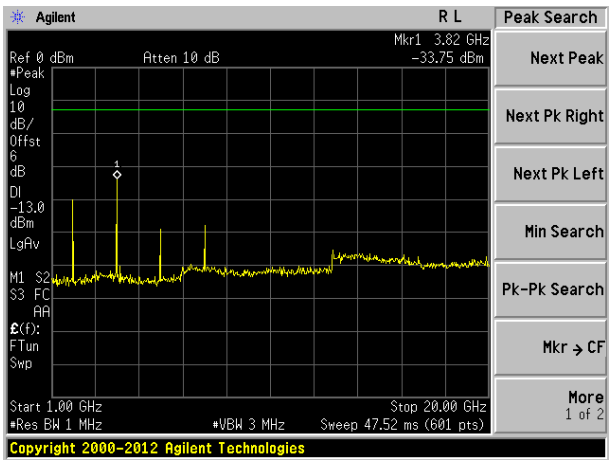
Lowest channel





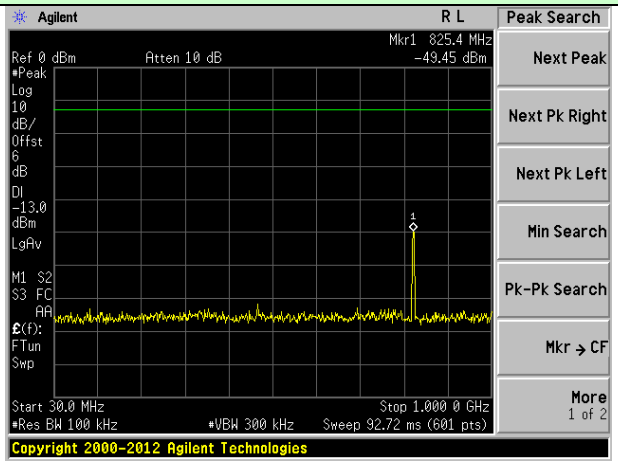
Middle channel

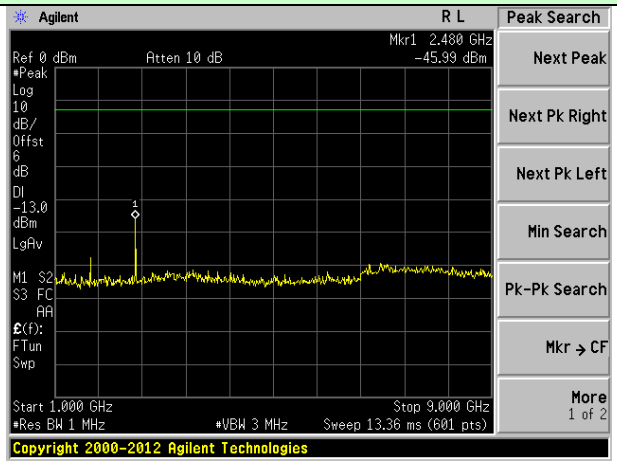




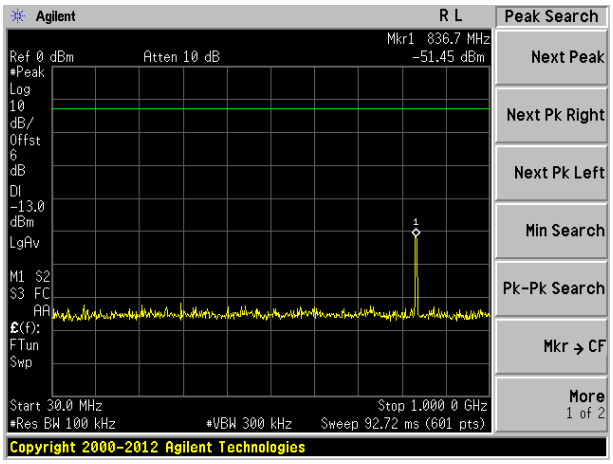
Highest channel

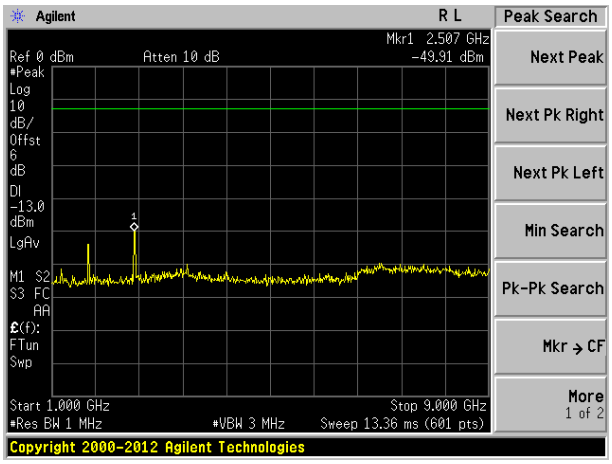
Test Mode: Traffic mode	WCDMA Band V (RMC 12.2Kbps link)



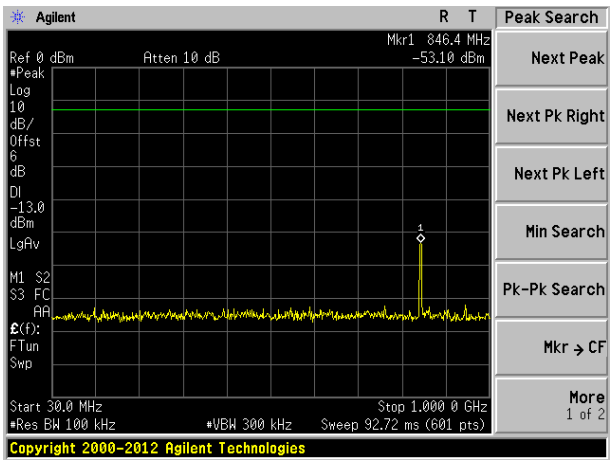


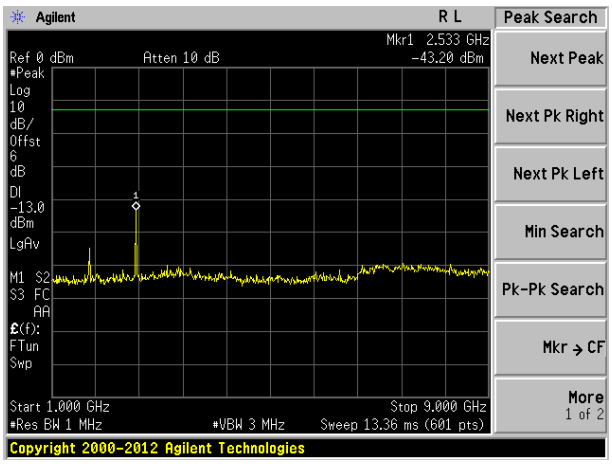
Lowest channel





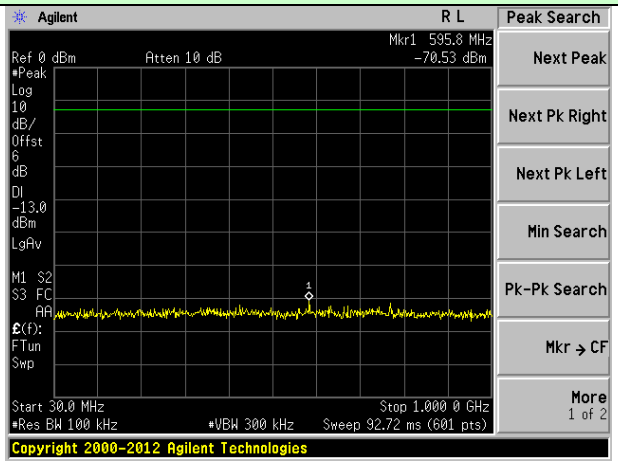
Middle channel

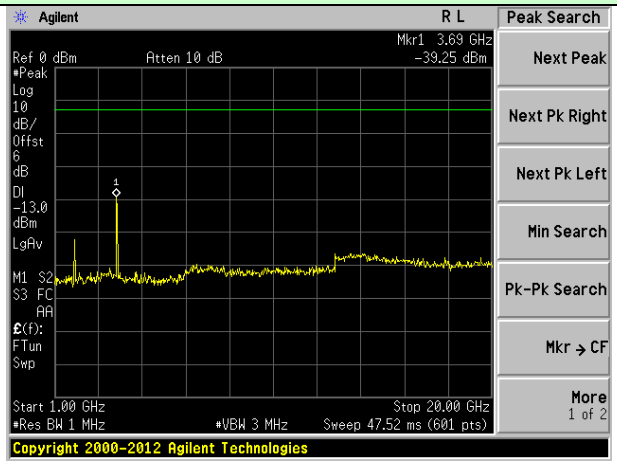




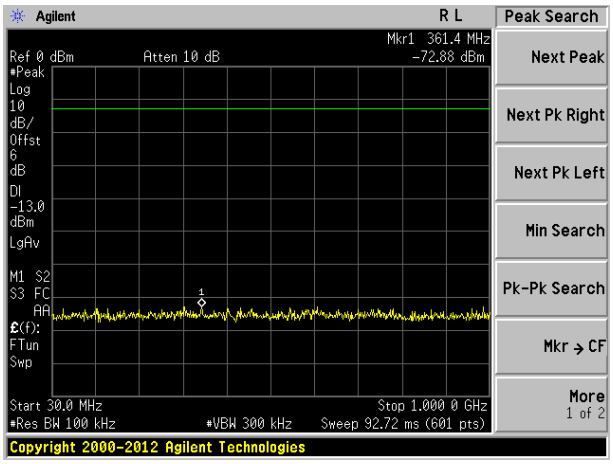
Highest channel

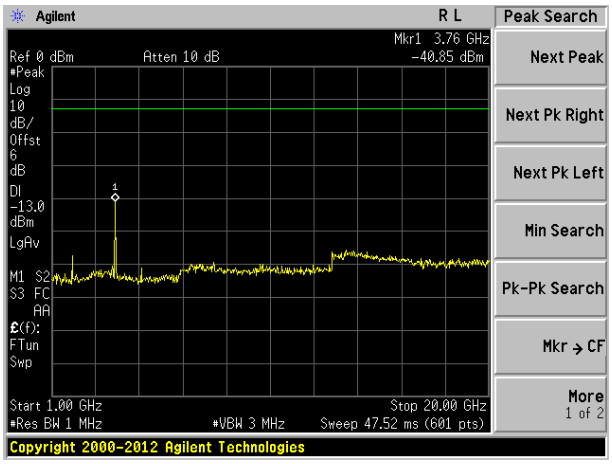
Test Mode: Traffic mode	WCDMA Band II (RMC 12.2Kbps link)



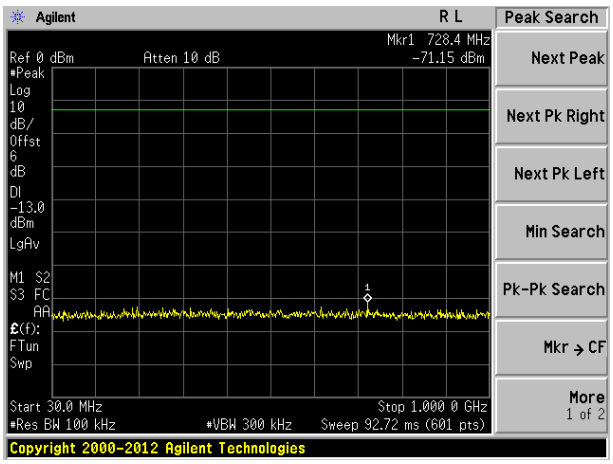


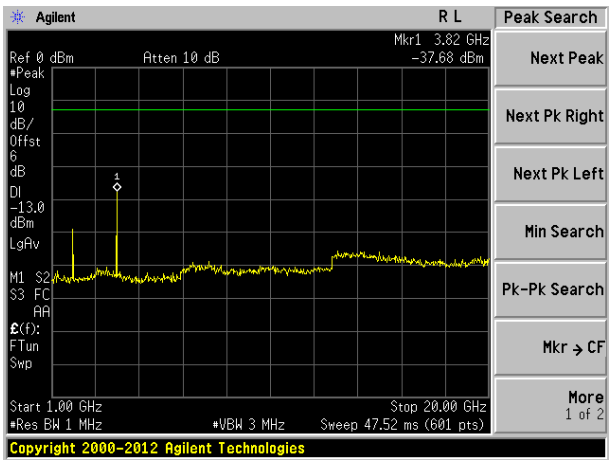
Lowest channel





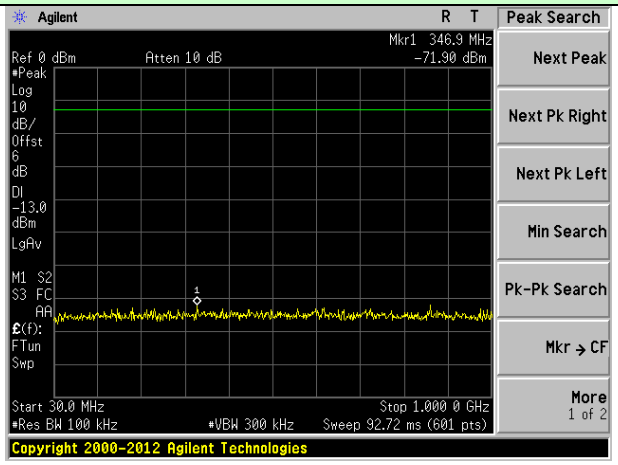
Middle channel

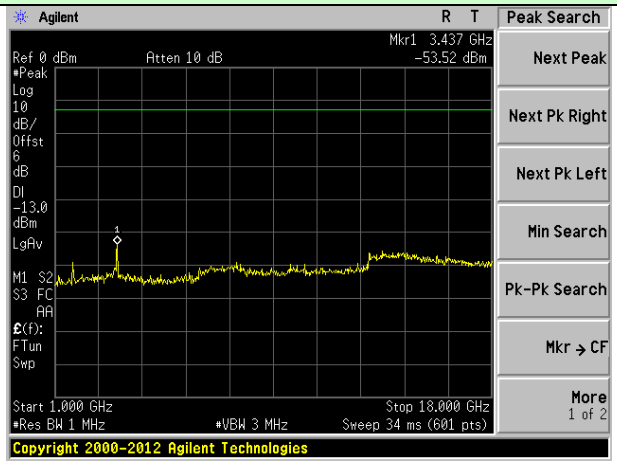




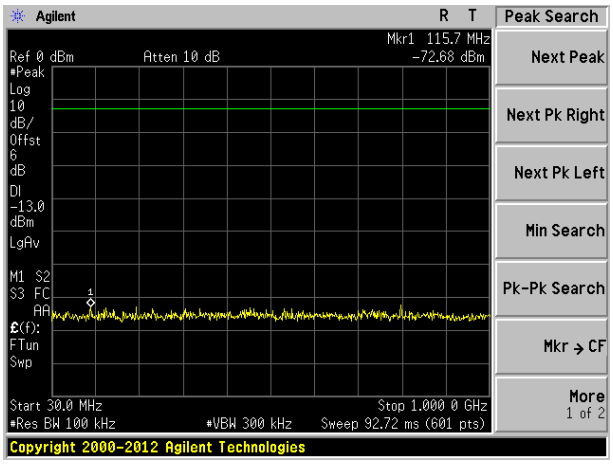
Highest channel

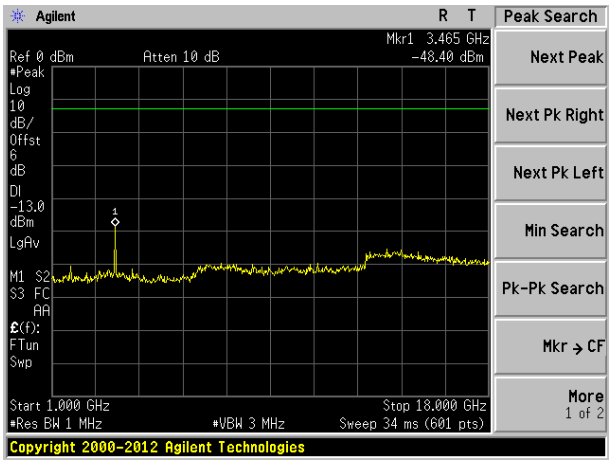
Test Mode: Traffic mode	WCDMA Band IV (RMC 12.2Kbps link)



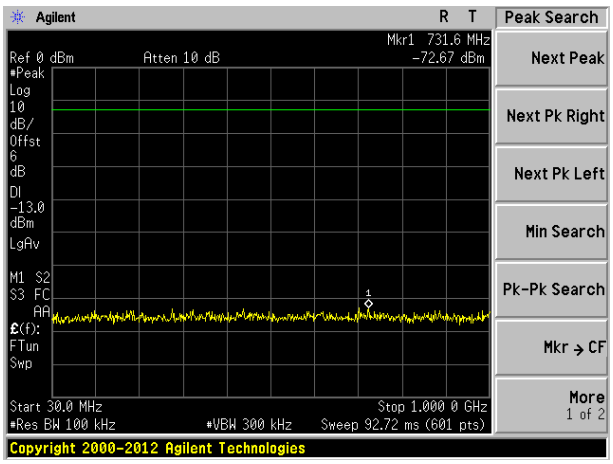


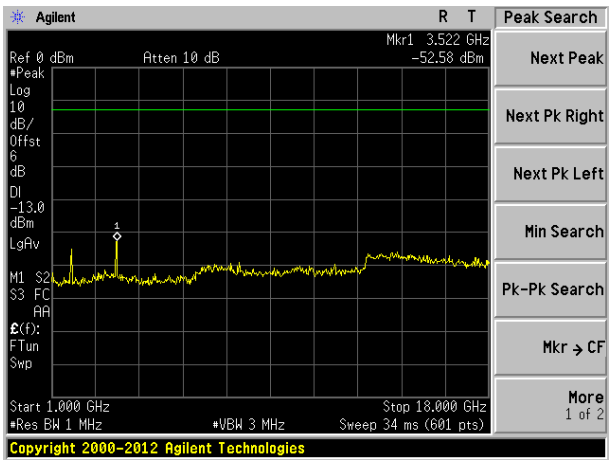
Lowest channel





Middle channel

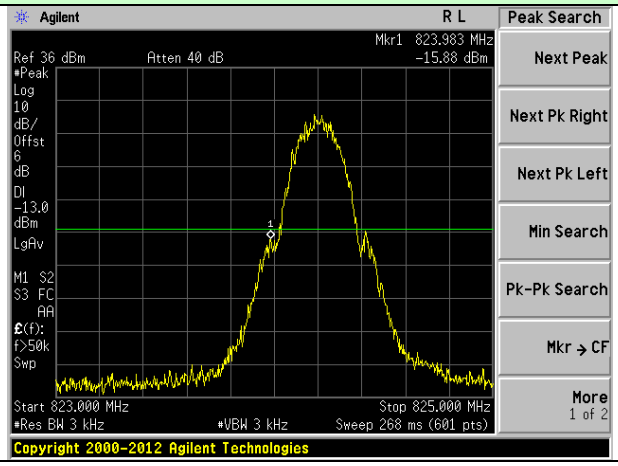




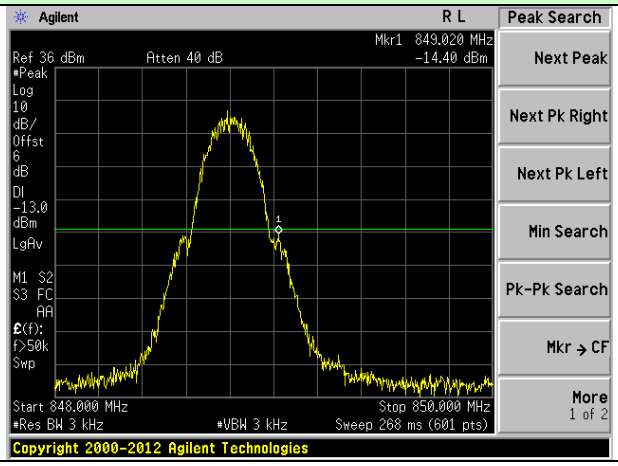
Highest channel

Band Edge:

Test Mode: Traffic mode	GSM850 (GSM link)

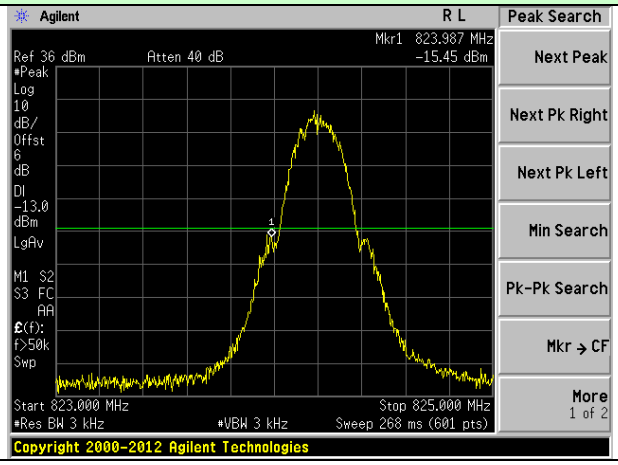


Lowest channel

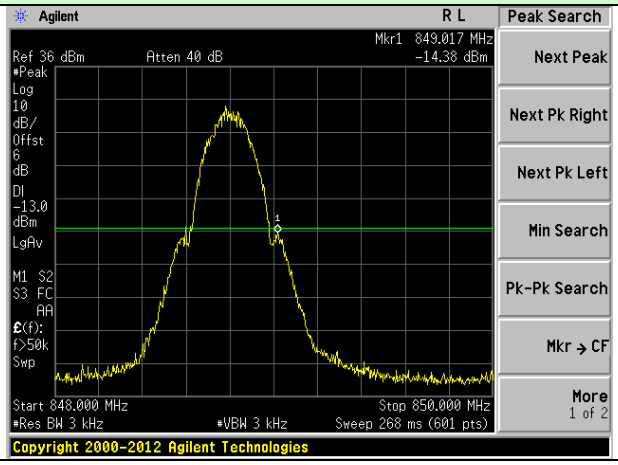


Highest channel

Test Mode: Traffic mode	GSM850 (GPRS 1 link)

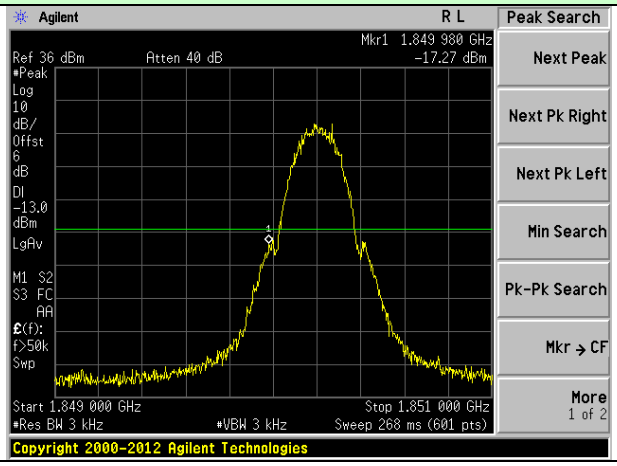


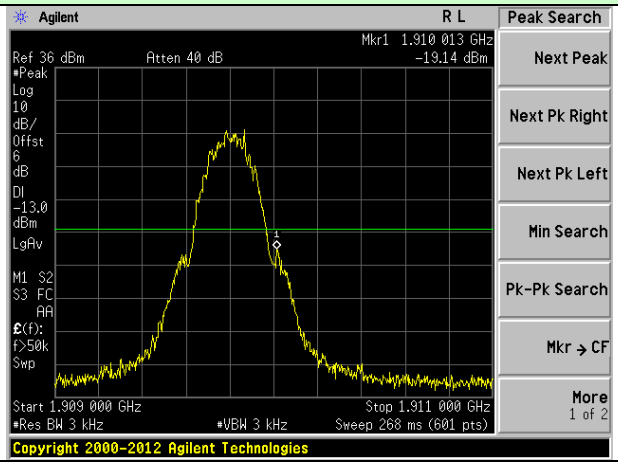
Lowest channel



Highest channel

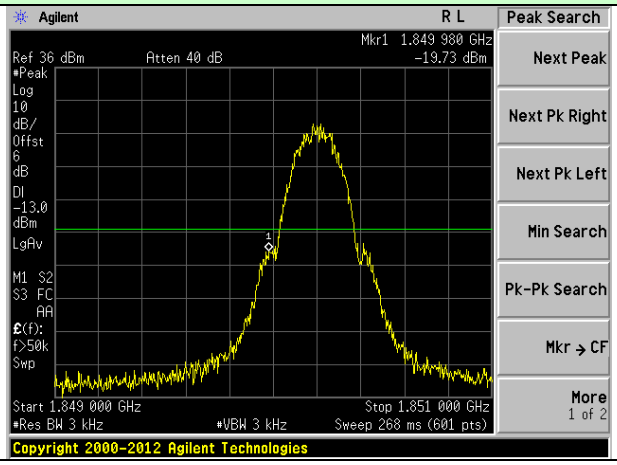
Test Mode: Traffic mode	PCS1900 (GSM link)

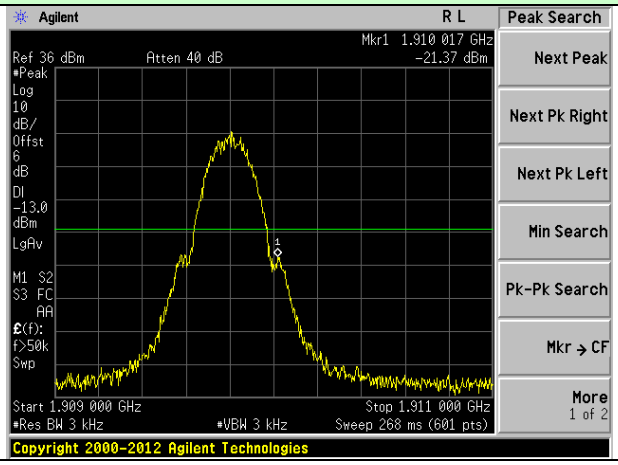




Lowest channel | Highest channel

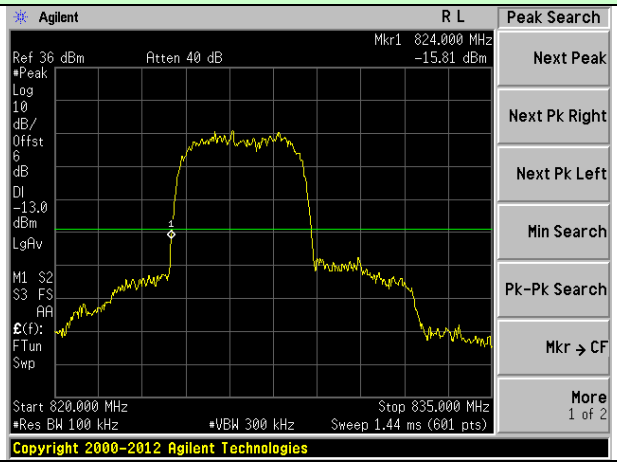
Test Mode: Traffic mode	PCS1900 (GPRS 1 link)

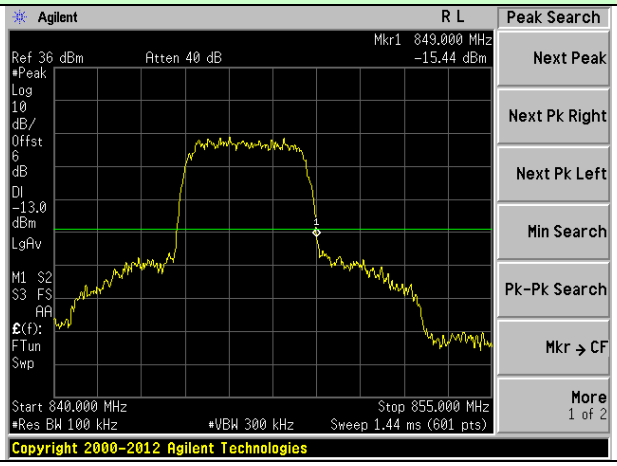




Lowest channel | Highest channel

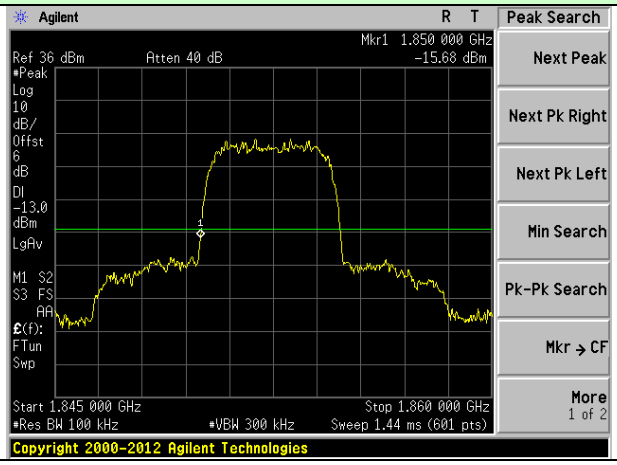
Test Mode: Traffic mode	WCDMA Band V (RMC 12.2Kbps link)

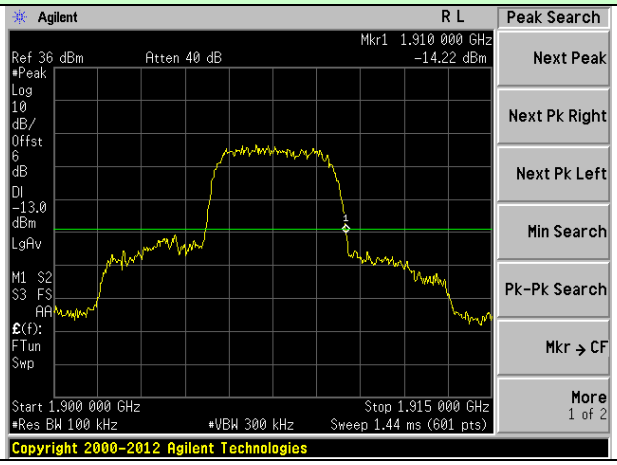




Lowest channel | Highest channel

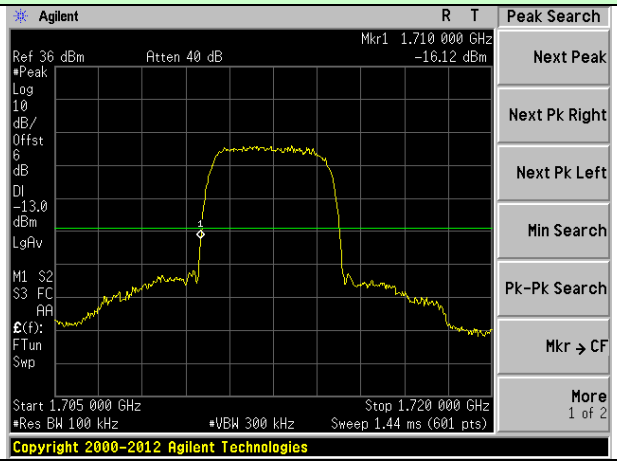
Test Mode: Traffic mode	WCDMA Band II (RMC 12.2Kbps link)

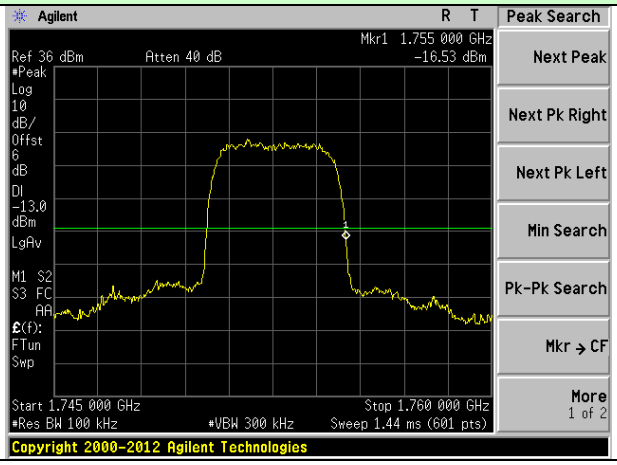




Lowest channel | Highest channel

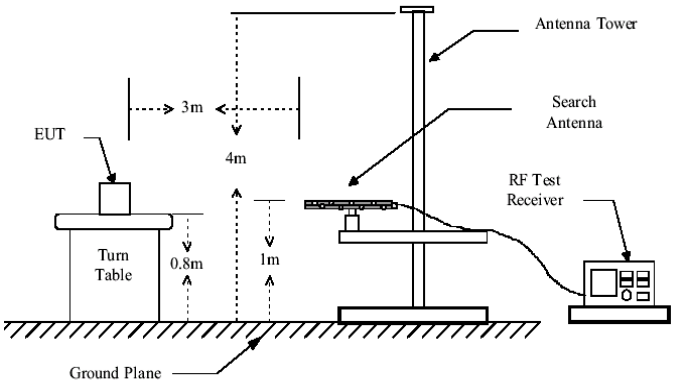
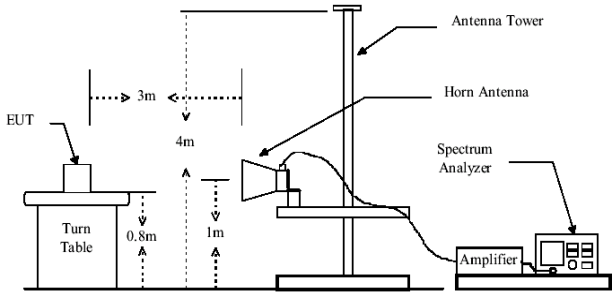
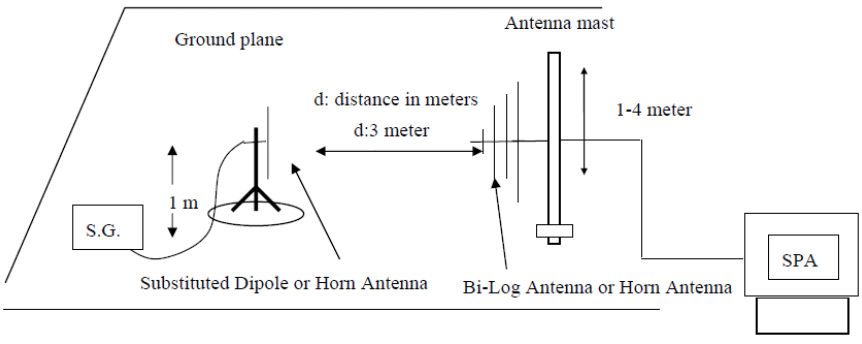
Test Mode: Traffic mode	WCDMA Band IV (RMC 12.2Kbps link)





Lowest channel | Highest channel

7.7 ERP, EIRP Measurement

Test Requirement:	FCC part22.913(a) and FCC part24.232(b)
Test Method:	FCC part2.1046
Limit:	GSM850/WCDMA Band V: 7W ERP PCS1900/WCDMA Band II: 2W EIRP WCDMA Band IV: 1W EIRP
Test setup:	Below 1GHz  Above 1GHz  Substituted method: 

Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. 2. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated. 3. ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated asfollows: ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB) 4. EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows: EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
GSM850 (GSM link)	Lowest	H	V	32.01	38.45	Pass
			H	28.90		
		E1	V	23.54		
			H	29.08		
		E2	V	22.62		
			H	26.71		
	Middle	H	V	31.91	38.45	Pass
			H	28.77		
		E1	V	23.50		
			H	29.08		
		E2	V	24.24		
			H	27.26		
	Highest	H	V	32.33	38.45	Pass
			H	28.58		
		E1	V	23.52		
			H	28.05		
		E2	V	22.50		
			H	27.89		

EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
GSM850 (GPRS 1 link)	Lowest	H	V	31.59	38.45	Pass
			H	28.44		
		E1	V	23.06		
			H	28.56		
		E2	V	22.07		
			H	26.13		
	Middle	H	V	31.37	38.45	Pass
			H	28.17		
		E1	V	22.85		
			H	28.40		
		E2	V	23.64		
			H	26.63		
	Highest	H	V	31.80	38.45	Pass
			H	28.02		
		E1	V	22.93		
			H	27.43		
		E2	V	22.03		
			H	27.38		

EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP (dBm)	Limit (dBm)	Result
PCS1900 (GSM link)	Lowest	H	V	28.25	33.01	Pass
			H	25.46		
		E1	V	20.66		
			H	25.63		
		E2	V	19.84		
			H	23.51		
	Middle	H	V	28.22	33.01	Pass
			H	25.40		
		E1	V	20.69		
			H	25.69		
		E2	V	21.35		
			H	24.05		
	Highest	H	V	28.70	33.01	Pass
			H	25.33		
		E1	V	20.81		
			H	24.86		
		E2	V	19.89		
			H	24.72		

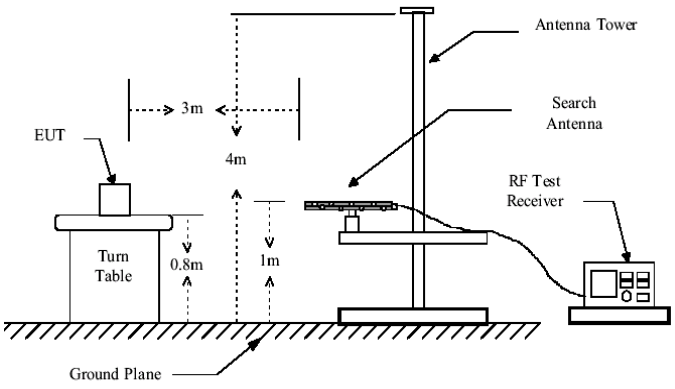
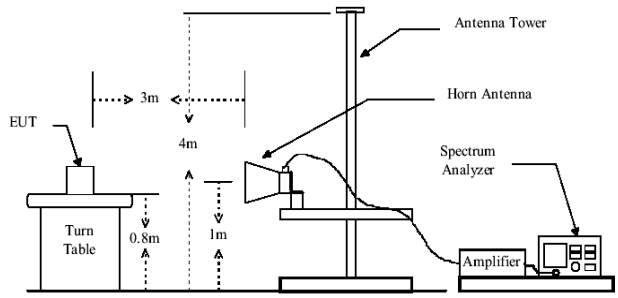
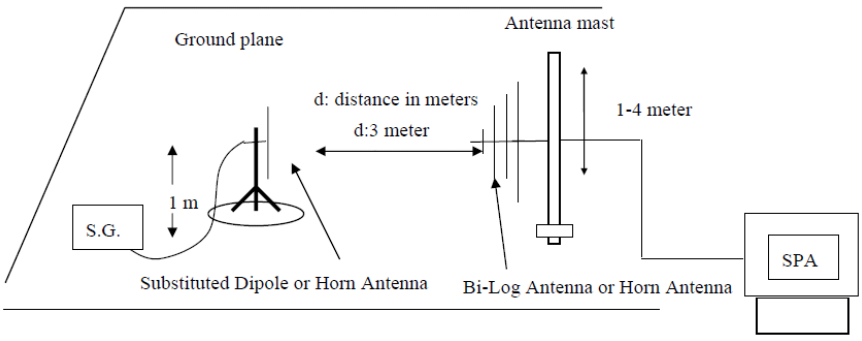
EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP (dBm)	Limit (dBm)	Result
PCS1900 (GPRS 1 link)	Lowest	H	V	27.72	33.01	Pass
			H	24.89		
		E1	V	20.04		
			H	24.96		
		E2	V	19.12		
			H	22.74		
	Middle	H	V	27.53	33.01	Pass
			H	24.60		
		E1	V	19.83		
			H	24.78		
		E2	V	20.56		
			H	23.22		
	Highest	H	V	28.01	33.01	Pass
			H	24.60		
		E1	V	20.03		
			H	24.04		
		E2	V	19.28		
			H	24.06		

EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
WCDMA Band V	Lowest	H	V	21.95	38.45	Pass
			H	18.49		
		E1	V	14.59		
			H	17.66		
		E2	V	13.06		
			H	15.21		
	Middle	H	V	21.69	38.45	Pass
			H	16.30		
		E1	V	12.35		
			H	15.44		
		E2	V	13.52		
			H	14.98		
	Highest	H	V	21.78	38.45	Pass
			H	15.50		
		E1	V	11.79		
			H	14.22		
		E2	V	12.79		
			H	15.76		

EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
WCDMA Band II	Lowest	H	V	22.42	33.01	Pass
			H	20.16		
		E1	V	16.45		
			H	19.71		
		E2	V	15.30		
			H	17.64		
	Middle	H	V	21.62	33.01	Pass
			H	18.88		
		E1	V	15.16		
			H	18.44		
		E2	V	16.05		
			H	17.70		
	Highest	H	V	21.67	33.01	Pass
			H	17.79		
		E1	V	14.27		
			H	16.89		
		E2	V	14.61		
			H	17.77		

EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
WCDMA Band IV	Lowest	H	V	20.73	30.00	Pass
			H	18.25		
		E1	V	14.32		
			H	17.36		
		E2	V	12.73		
			H	14.86		
	Middle	H	V	19.06	30.00	Pass
			H	15.93		
		E1	V	11.94		
			H	15.00		
		E2	V	13.16		
			H	14.59		
	Highest	H	V	18.07	30.00	Pass
			H	15.17		
		E1	V	11.43		
			H	13.83		
		E2	V	12.53		
			H	15.48		

7.8 Field strength of spurious radiation measurement

Test Requirement:	FCC part22.917(a) and FCC part24.238(a)
Test Method:	FCC part2.1053
Limit:	-13dBm
Test setup:	Below 1GHz  Above 1GHz  Substituted method: 

Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. 2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. 3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method. 4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB)
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

Test mode:	GSM850		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1648.40	Vertical	-36.13	-13.00	Pass
2472.60	V	-38.86		
3296.80	V	-41.12		
4121.00	V	-43.27		
4945.20	V	---		
1648.40	Horizontal	-41.36	-13.00	Pass
2472.60	H	-45.22		
3296.80	H	-46.78		
4121.00	H	-49.50		
4945.20	H	---		
Test mode:	**GSM850**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.20	Vertical	-37.40	-13.00	Pass
2509.80	V	-39.67		
3346.40	V	-41.56		
4183.00	V	-43.37		
5019.60	V	---		
1673.20	Horizontal	-41.77	-13.00	Pass
2509.80	H	-44.98		
3346.40	H	-46.29		
4183.00	H	-48.56		
5019.60	H	---		
Test mode:	**GSM850**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1697.60	Vertical	-37.88	-13.00	Pass
2546.40	V	-39.90		
3395.20	V	-41.55		
4244.00	V	-43.16		
5092.80	V	---		
1697.60	Horizontal	-41.75	-13.00	Pass
2546.40	H	-44.60		
3395.20	H	-45.74		
4244.00	H	-47.75		
5092.80	H	---		

Remark：

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

Test mode:	PCS1900		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3700.40	Vertical	-36.86	-13.00	Pass
5550.60	V	-39.25		
7400.80	V	-41.23		
9251.00	V	-43.13		
11101.20	V	---		
3700.40	Horizontal	-41.45	-13.00	Pass
5550.60	H	-44.83		
7400.80	H	-46.19		
9251.00	H	-48.57		
11101.20	H	---		
Test mode:	**PCS1900**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-34.78	-13.00	Pass
5640.00	V	-37.24		
7520.00	V	-39.27		
9400.00	V	-41.24		
11280.00	V	---		
3760.00	Horizontal	-39.51	-13.00	Pass
5640.00	H	-42.99		
7520.00	H	-44.40		
9400.00	H	-46.85		
11280.00	H	---		
Test mode:	**PCS1900**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3819.60	Vertical	-35.88	-13.00	Pass
5729.40	V	-38.27		
7639.20	V	-40.25		
9549.00	V	-42.14		
11458.80	V	---		
3819.60	Horizontal	-40.47	-13.00	Pass
5729.40	H	-43.85		
7639.20	H	-45.21		
9549.00	H	-47.59		
11458.80	H	---		

Remark：

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

Test mode:	WCDMA Band V		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1652.80	Vertical	-37.30	-13.00	Pass
2479.20	V	-41.05		
3305.60	V	-43.79		
4132.00	V	-41.32		
4958.40	V	---		
1652.80	Horizontal	-40.11	-13.00	Pass
2479.20	H	-42.81		
3305.60	H	-48.22		
4132.00	H	-51.85		
4958.40	H	---		
Test mode:	**WCDMA Band V**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1672.80	Vertical	-39.27	-13.00	Pass
2509.20	V	-40.58		
3345.60	V	-44.21		
4182.00	V	-46.68		
5018.40	V	---		
1672.80	Horizontal	-41.73	-13.00	Pass
2509.20	H	-43.65		
3345.60	H	-48.35		
4182.00	H	-50.74		
5018.40	H	---		
Test mode:	**WCDMA Band V**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1693.20	Vertical	-37.86	-13.00	Pass
2539.80	V	-40.30		
3386.40	V	-42.93		
4233.00	V	-45.83		
5079.60	V	---		
1693.20	Horizontal	-41.22	-13.00	Pass
2539.80	H	-43.64		
3386.40	H	-45.02		
4233.00	H	-51.21		
5079.60	H	---		

Remark：

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

Test mode:	WCDMA Band II		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3704.46	Vertical	-38.55	-13.00	Pass
5556.86	V	-41.65		
7409.26	V	-44.20		
9261.66	V	-46.66		
11114.40	V	---		
3704.46	Horizontal	-44.48	-13.00	Pass
5556.86	H	-48.85		
7409.26	H	-50.63		
9261.66	H	-53.71		
11114.40	H	---		
Test mode:	**WCDMA Band II**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3759.83	Vertical	-39.19	-13.00	Pass
5639.83	V	-42.13		
7519.83	V	-44.55		
9399.83	V	-46.89		
11280.00	V	---		
3759.83	Horizontal	-44.83	-13.00	Pass
5639.83	H	-48.98		
7519.83	H	-50.66		
9399.83	H	-53.59		
11280.00	H	---		
Test mode:	**WCDMA Band II**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3815.03	Vertical	-38.75	-13.00	Pass
5722.63	V	-41.48		
7630.23	V	-43.72		
9537.83	V	-45.90		
11445.60	V	---		
3815.03	Horizontal	-43.98	-13.00	Pass
5722.63	H	-47.84		
7630.23	H	-49.39		
9537.83	H	-52.11		
11445.60	H	---		

Remark：

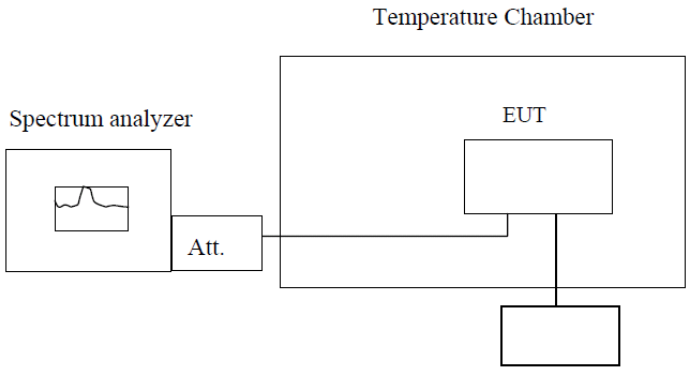
1. The emission behaviour belongs to narrowband spurious emission.
2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

Test mode:	WCDMA Band IV		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3424.80	Vertical	-39.96	-13.00	Pass
5137.20	V	-40.66		
6849.60	V	-42.09		
8562.00	V	-44.33		
10274.40	V	---		
3424.80	Horizontal	-43.16	-13.00	Pass
5137.20	H	-44.82		
6849.60	H	-45.75		
8562.00	H	-48.68		
10274.40	H	---		
Test mode:	**WCDMA Band IV**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3464.80	Vertical	-40.61	-13.00	Pass
5197.20	V	-42.73		
6929.60	V	-44.31		
8662.00	V	-48.41		
10394.40	V	---		
3464.80	Horizontal	-43.81	-13.00	Pass
5197.20	H	-44.68		
6929.60	H	-46.92		
8662.00	H	-49.99		
10394.40	H	---		
Test mode:	**WCDMA Band IV**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3505.20	Vertical	-38.50	-13.00	Pass
5257.80	V	-39.92		
7010.40	V	-41.99		
8763.00	V	-43.06		
10515.60	V	---		
3505.20	Horizontal	-44.30	-13.00	Pass
5257.80	H	-48.14		
7010.40	H	-50.23		
8763.00	H	-53.23		
10515.60	H	---		

Remark：

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark”---“ means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

7.9 Frequency stability V.S. Temperature measurement

Test Requirement:	FCC Part2.1055(a)(1)(b)
Test Method:	FCC Part2.1055(a)(1)(b)
Limit:	2.5ppm
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. The equipment under test was connected to an external DC power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

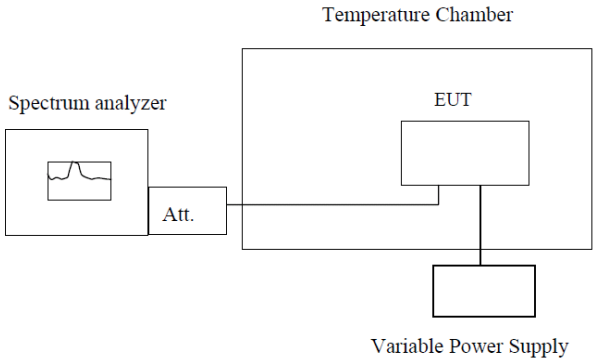
Measurement Data

Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	35	0.0416	2.5	Pass
	-20	39	0.0461		
	-10	34	0.0401		
	0	29	0.0341		
	10	32	0.0386		
	20	29	0.0341		
	30	44	0.0521		
	40	40	0.0476		
	50	39	0.0461		
Reference Frequency: GSM850 (GPRS 1 link) Middle channel=190 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	54	0.0648	2.5	Pass
	-20	63	0.0757		
	-10	52	0.0626		
	0	45	0.0538		
	10	51	0.0608		
	20	44	0.0523		
	30	77	0.0917		
	40	66	0.0792		
	50	63	0.0747		

Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error			Result
		Hz	ppm		
3.70	-30	38	0.0201	2.5	Pass
	-20	47	0.0250		
	-10	38	0.0201		
	0	30	0.0160		
	10	38	0.0201		
	20	32	0.0168		
	30	58	0.0307		
	40	48	0.0258		
	50	45	0.0242		
Reference Frequency: PCS1900 (GPRS 1 link) Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error			Result
		Hz	ppm		
3.70	-30	97	0.0519	2.5	Pass
	-20	115	0.0614		
	-10	93	0.0497		
	0	76	0.0406		
	10	95	0.0503		
	20	79	0.0419		
	30	130	0.0692		
	40	108	0.0575		
	50	114	0.0605		

Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	34	0.0404	2.5	Pass
	-20	47	0.0562		
	-10	53	0.0634		
	0	25	0.0304		
	10	37	0.0447		
	20	41	0.0490		
	30	60	0.0720		
	40	57	0.0677		
	50	67	0.0806		
Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880.0MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	98	0.0522	2.5	Pass
	-20	87	0.0463		
	-10	75	0.0398		
	0	70	0.0372		
	10	64	0.0340		
	20	55	0.0294		
	30	70	0.0372		
	40	79	0.0418		
	50	75	0.0398		
Reference Frequency: WCDMA Band IV Middle channel=1412 channel=1732.4MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	94	0.0540	2.5	Pass
	-20	85	0.0489		
	-10	70	0.0402		
	0	61	0.0351		
	10	51	0.0293		
	20	60	0.0344		
	30	76	0.0439		
	40	81	0.0468		
	50	100	0.0577		

7.10 Frequency stability V.S. Voltage measurement

Test Requirement:	FCC Part2.1055(d)(1)(2)
Test Method:	FCC Part2.1055(d)(1)(2)
Limit:	2.5ppm
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

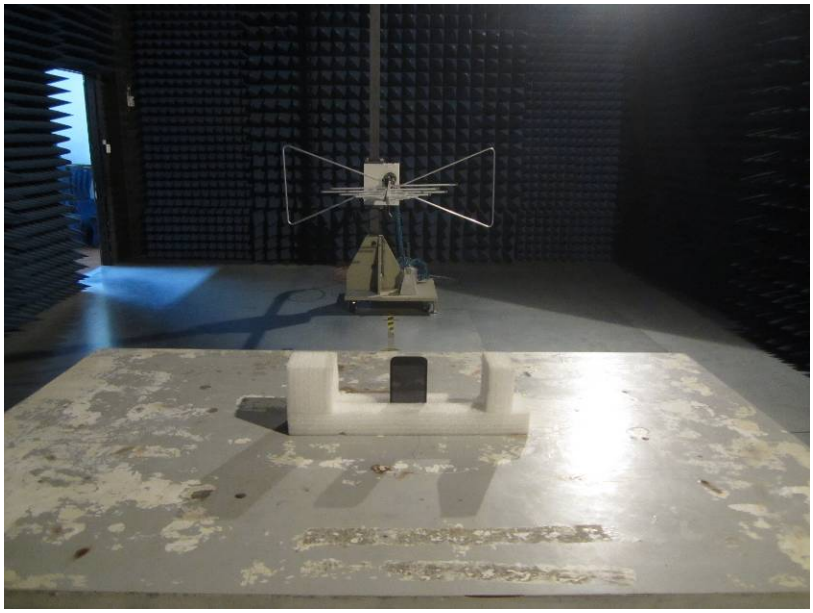
Measurement Data

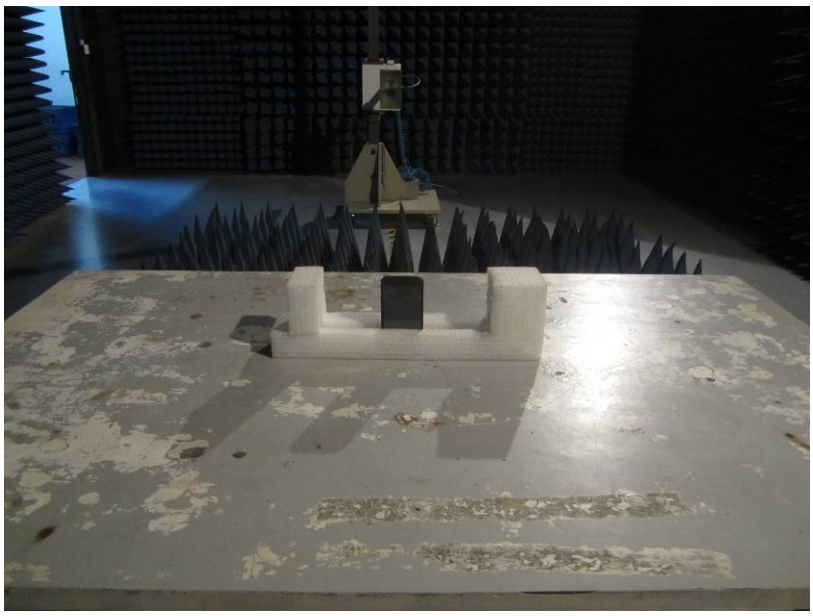
Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	20	0.0242	2.5	Pass
	3.70	23	0.0272		
	3.40	25	0.0302		
Reference Frequency: GSM850 (GPRS 1 link) Middle channel=190 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	32	0.0380	2.5	Pass
	3.70	37	0.0440		
	3.40	42	0.0499		
Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	20	0.0105	2.5	Pass
	3.70	27	0.0146		
	3.40	27	0.0146		

Reference Frequency: PCS1900 (GPRS 1 link) Middle channel=661 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	69	0.0365	2.5	Pass
	3.70	78	0.0414		
	3.40	78	0.0416		
Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	32	0.0377	2.5	Pass
	3.70	41	0.0491		
	3.40	22	0.0264		
Reference Frequency: WCDMA Band II Middle channel=940 channel=1880.0MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	47	0.0248	2.5	Pass
	3.70	38	0.0201		
	3.40	43	0.0228		
Reference Frequency: WCDMA Band IV Middle channel=1412 channel=1732.4MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	55	0.0320	2.5	Pass
	3.70	70	0.0407		
	3.40	67	0.0385		

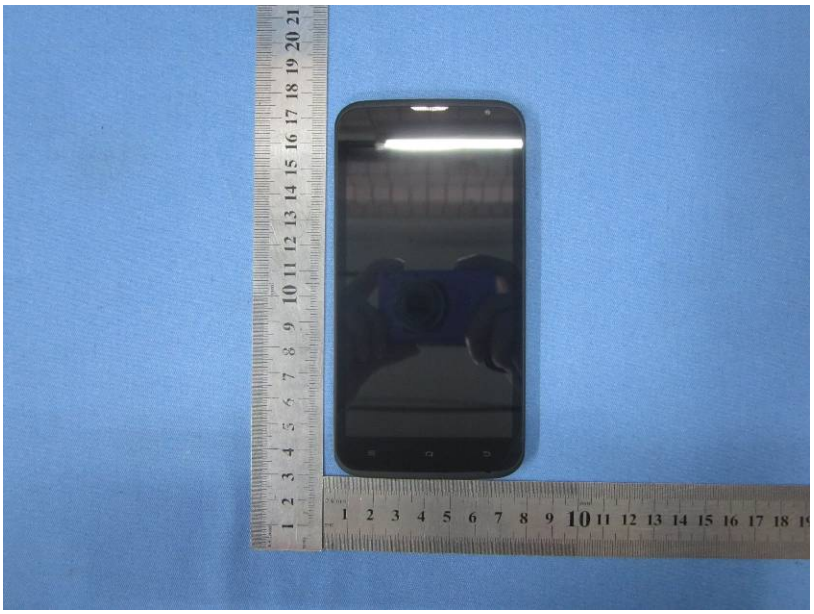
8 Test Setup Photo

Radiated Emission

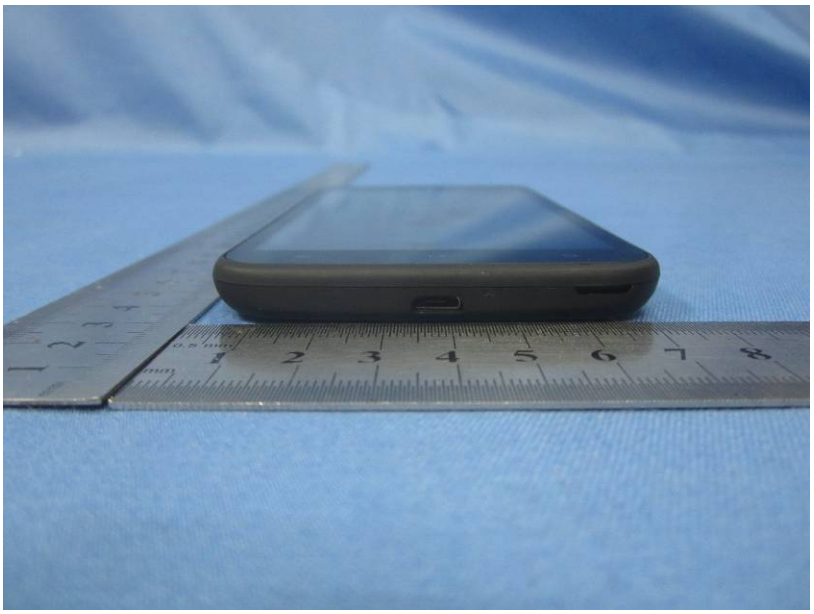


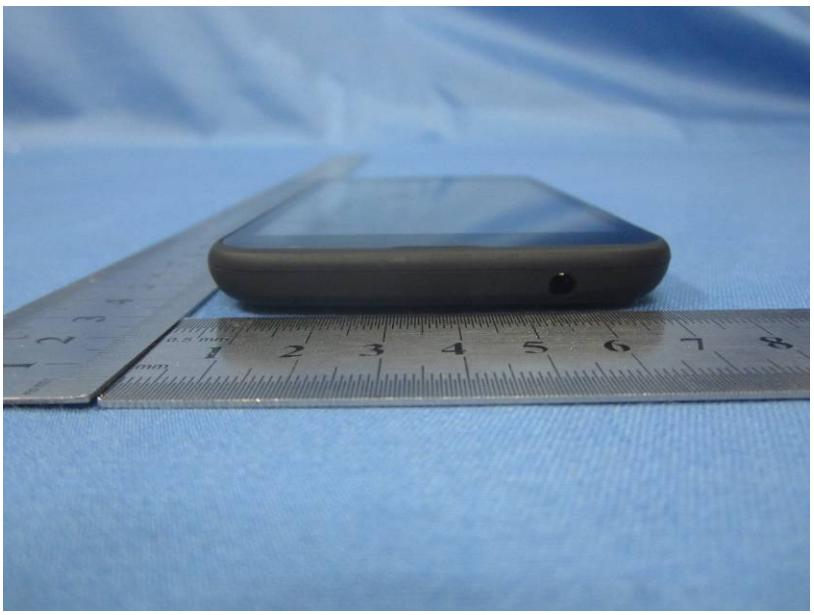


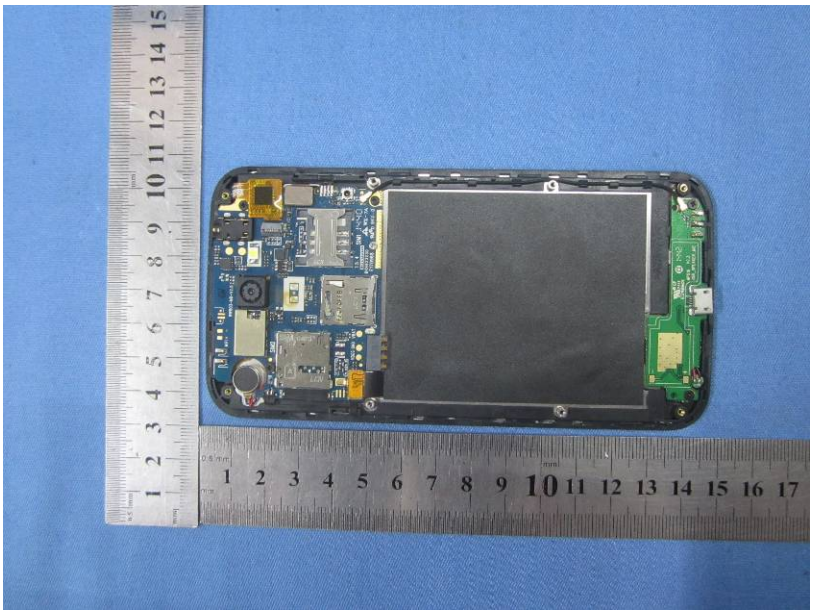
9 EUT Constructional Details

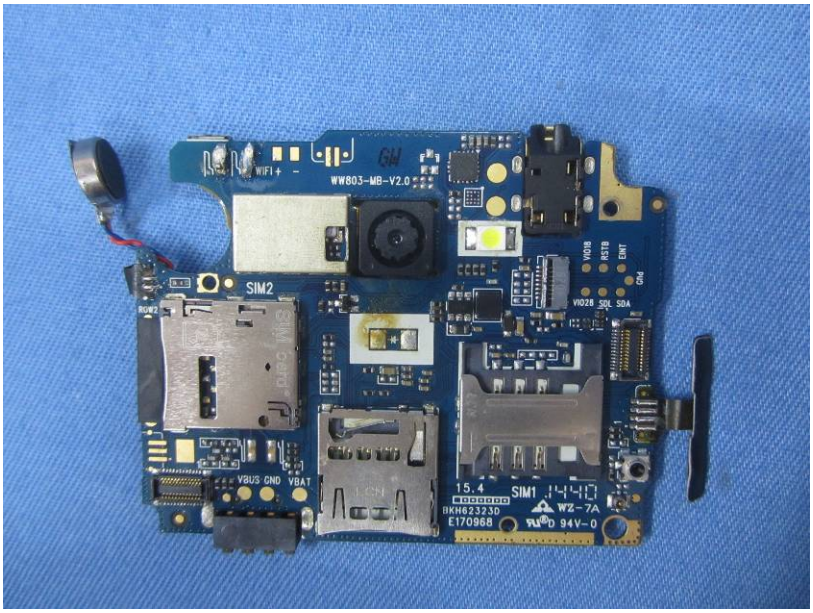



RCA





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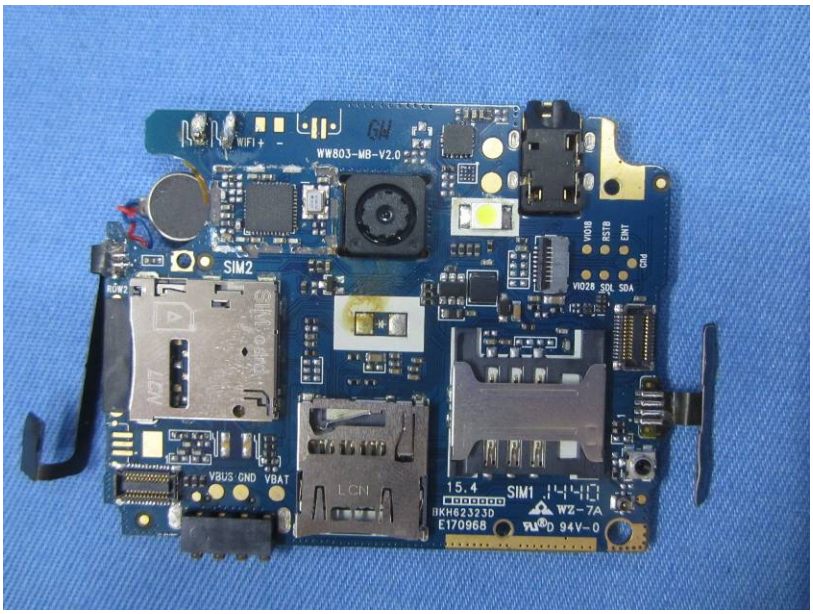
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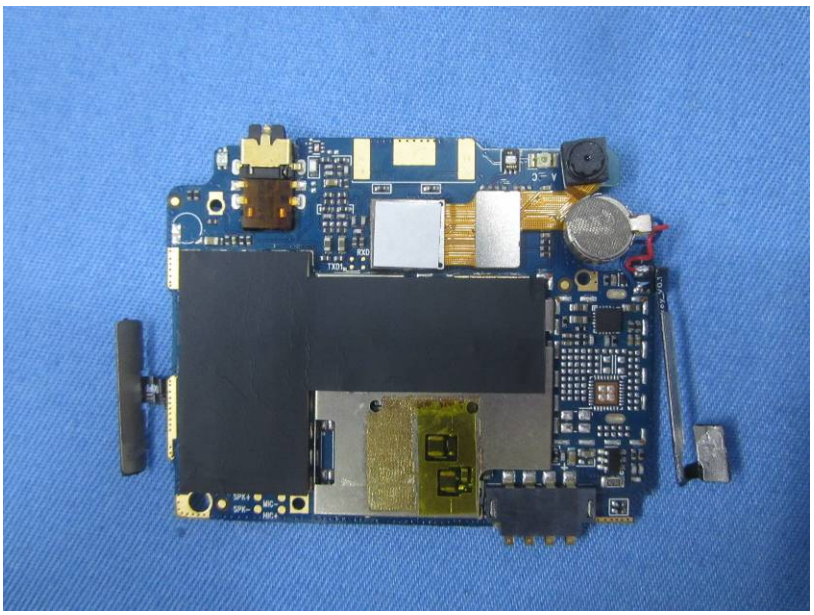

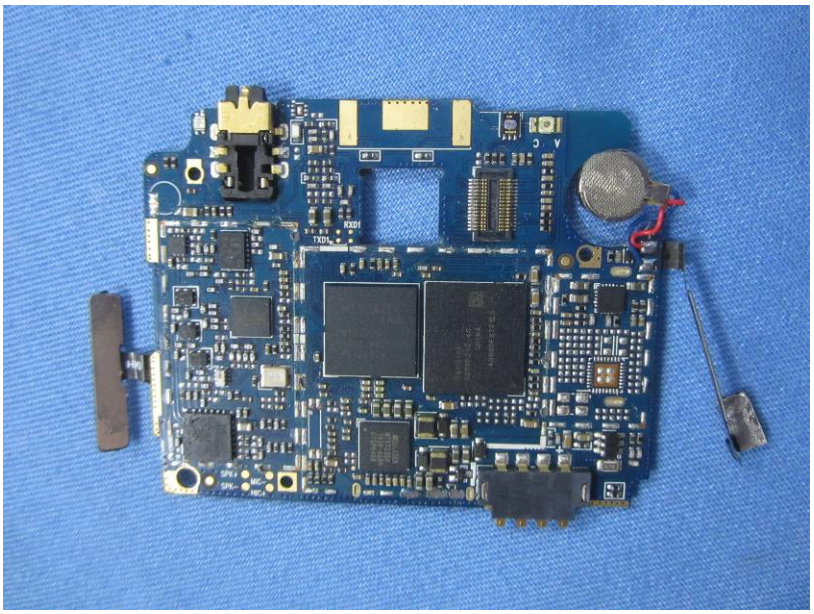

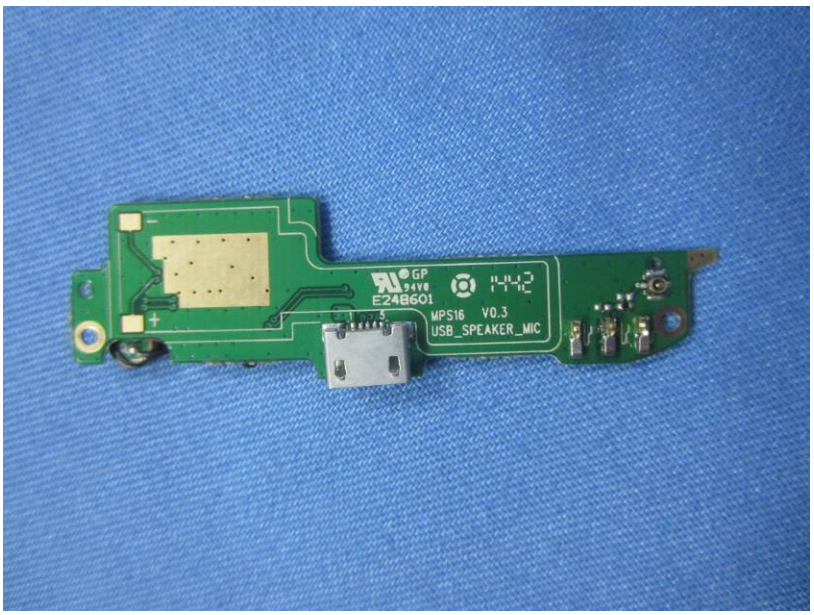
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MPS16 V0.3
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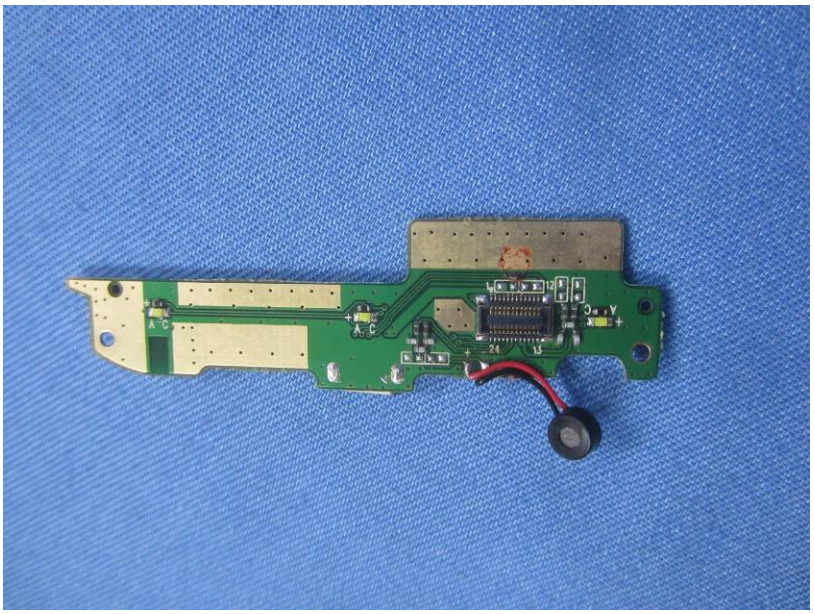


GSM/WCDMA ANT


GPS WIFI BT
WiFi/BT 3.0/BT 4.0 ANT
SIM2

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