Nemko Korea CO., Ltd.

300-2, Osan-Ri, Mohyun-Myun, Yongin-City, Gyunggi-Do, KOREA
TEL:+82 31 322 2333 FAX:+82 31 322 2332

FCC EVALUATION REPORT FOR CERTIFICATION

Applicant :
KISAN TELECOM CO., LTD
2F, Segi Bldg., Bangyi-Dong, SongPa-Gu, Seoul, 138-828,Korea

Dates of Issue : September,16, 2006
Test Report No. : NK2GR186
Test Site : Nemko Korea Co., Ltd.

FCC ID	*T7MCP-800*
Brand Name	**AnyCess+**
CONTACT PERSON	**2F, Segi Bldg., Bangyi-Dong, SongPa-Gu, Seoul, 138-828, Korea** **Mr. Pan Soo Kim** **Telephone No. : +82 02 3433 8316**

Applied Standard:	FCC 47 CFR Part 15 & 2 FCC 47 CFR Part 22H
Equipment Class:	Licensed Non-Broadcast Station Transmitter
EUT Type:	Cellular Booster

The device bearing the brand name and FCC ID specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003.
I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Tested By : Minchul Shin
Engineer

Reviewed By : H.H. Kim
Manager & Chief Engineer

TABLE OF CONTENTS

1.	**Scope**	**4**
2.	**Introduction (Site Description)**	**5**
3.	**Test Conditions & EUT Information**	**6**
4.	**Measuring Instrument Calibration**	**8**
5.	**Summary of Test Results**	**9**
6.	**Recommendation / Conclusion**	**9**
7.	**Test Equipment**	**10**
8.	**Description of Test**	**11**
	8.1 Conducted Emissions	11
	8.2 Radiated Emissions	12
	8.3 Field Strength of Spurious Emissions	13
	8.4 RF Power Output	14
	8.5 Occupied Bandwidth	15
	8.6 Spurious Emissions at Antenna Terminals and Two-Tone test	16
	8.7 Band Edge	17
9.	**Test Data**	**18**
	9.1 Conducted Emissions	18
	9.2 Radiated Emissions	32
	9.3 Field Strength of Spurious Emissions	34
	9.4 RF Power Output	37
	9.5 Occupied Bandwidth	38
	9.6 Spurious Emissions at Antenna Terminals and Two-Tone test	45
	9.7 Band Edge	67
	9.8 Maximum Permissible Exposure	74

Appendix A: Labelling Requirement **76**

Appendix B: Photographs of Test Set-up **77**

Appendix C: EUT Photographs **78**

Appendix D: Schematic Diagram **89**

Appendix E: Block Diagram **90**

Appendix F: USER'S Manual **91**

Appendix G: Operational Description **92**

Appendix H: Turn up Procedure **93**

1. Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC Part 15 & Part 22.

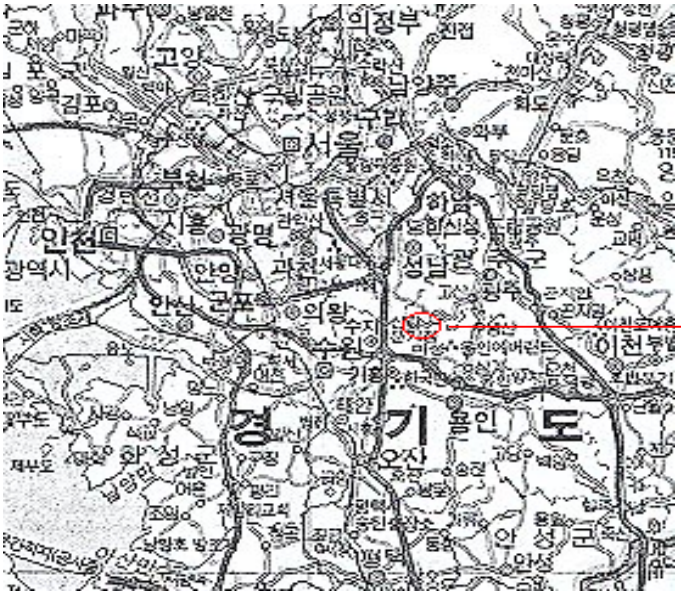
Responsible Party:	Kisan Telecom Co.,Ltd.
Contact Person:	Mr. Pansoo Kim Tel : +82 2 3433-8316
Manufacturer:	Kisan Telecom Co.,Ltd. 2F, Segi Bldg., Bangyi-Dong, SongPa-Gu, Seoul, 138-828, Korea

- FCC ID: T7MCP-800
- Model: CP-800
- Brand Name: AnyCess+
- EUT Type: Cellular Booster
- Electric Rating: Adapter(Input: AC100V-240V, 0.3A Output: DC5V, 1.5A)
- Equipment Class: Licensed Non-Broadcast Station Transmitter
- Applied Standard: FCC 47 CFR Part 15 & 2
FCC 47 CFR Part 22H
- Test Procedure(s): ANSI C63.4 (2003), TIA/EIA603
- Dates of Test: September 12, 2006 to September 15, 2006
- Place of Tests: Nemko Korea Co., Ltd.

2. Introduction (Site Description)

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-2003) was used in determining radiated and conducted emissions emanating from **Kisan Telecom Co., Ltd**
FCC ID : **T7MCP-800**

These measurement tests were conducted at ***Nemko Korea Co., Ltd.***
The site address is 300-2, Osan-Ri, Mohyun-Myun, Yongin-City, GyungGi-Do, KOREA
The area of Nemko Korea Corporation Ltd. Test Site is located in a mountain area at 80 kilometers (48 miles) southeast and Incheon International Airport (Incheon Airport), 30 kilometers (18miles) south-southeast from central Seoul.
It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures.
The detailed description of the measurement facility was found to be in compliance with the requirements of §2.948 according to ANSI C63.4 2003.



Nemko Korea Co., Ltd.
300-2, Osan-Ri, Mohyun-Myun,
Yongin-City GyungGi-Do,KOREA
449-852
Tel)+82-31-322-2333
Fax)+82-31-322-2332

Fig. 1. The map above shows the Seoul in Korea vicinity area.
The map also shows Nemko Korea Corporation Ltd. and Incheon Airport.

3. Test Conditions & EUT Information

Operating During Test

The EUT was configured and tested utilizing the maximum input drive level resulting in maximum gain conditions for all tests. If the maximum input drive level is exceeded, internal attenuators are activated to produce a level RF output and eliminate the device from operating beyond the maximum RF ouput power that is below the saturated RF output power.

Environmental Conditions

Temperature	22℃ ~ 25℃
Relative Humidity	35% ~ 65%

Description of EUT

Frequency Range	Tx : 824MHz ~ 849MHz Rx : 869MHz ~ 894MHz	
Output Power	Uplink	F9W: 2.99dBm DXW: 4.82dBm GXW,F1D: 6.05dBm
	Downlink	F9W: 3.23dBm DXW: 4.30dBm GXW,F1D: 5.51dBm
Emission Designator	F9W,DXW,GXW,F1D	
Modulation(s)	CDMA,TDMA,GSM,AMPS	
Antenna Type	Patch, Dipole antenna	
Dimensions (L X W X H)	140mm X 110 mm X 30 mm	
Weight	255g	
Voltage	Adapter(Input:100V-240Vac, 0.3A Output: 5Vdc, 1.5A)	

Support Equipment

Cellular Booster (EUT)	Kisan Telecom Co., Ltd. FCC ID: T7MCP-800	S/N: N/A
Adaptor	HONOR ELECTRONICS CO.,LTD. Model : ADS-10W-06 0508PCU 2.0m unshielded dc power cable	S/N: N/A
Spectrum Analyzer	Agilent Model : E4440A	S/N: MY44022567
Signal Generator	Agilent Model: E4438C	S/N: MY45092564
Signal Generator	R&S Model: SMP02	S/N: 833286/003
Attenuator	HP 8491B	S/N: 57773

4. Measuring Instrument Calibration

All measurements were made with instruments calibrated according to the recommendation by manufacturer. Measurement of radiated emissions and conducted emissions were made with instruments conforming to American National Standards Institute, ANSI C63.4-2003.
The calibration of measuring instrument, including any accessories that may affect test results, were performed according to the recommendation by manufacturer.

- End of page -

5. Summary of Test Results

The EUT has been tested according to the following specification:

Description of Test	FCC Rule	Result
Modulation Characteristics	§2.1047	N/A
Two Tone Test	§2.1051	Complies
RF Output Power	§2.1046 §22.913(a)	Complies
Occupied Bandwidth	§2.1049	Complies
Spurious Emission at antenna Terminals	§2.1051 §22.917	Complies
Radiated Spurious Emissions	§2.1053 §22.917	Complies
Frequency Stability / Temperature Variation	§2.1055 §22.355	N/A
Band Edge	§22.917	Complies
Conducted Emission	§15.207	Complies

6. Recommendation / Conclusion

The data collected shows that Kisan Telecom Co.,Ltd.'s Cellular Booster (FCC ID : T7MCP-800) complies with all the requirements of Parts 2 & 22 of the FCC Rules.

7. Test Equipment List

No.	Instrument	Manufacturer	Model	Serial No.	Calibration Date	Calibration Interval
1	*Test Receiver	R & S	ESCS 30	833364/020	Aug. 17 2006	1year
2	*Test Receiver	R & S	ESCS 30	100302	Dec. 06 2005	1year
3	Amplifier	Agilent	8447F	3113A04549	Aug. 17 2006	1year
4	Amplifier	HP	8447F	2944A03956	Aug. 17 2006	1year
5	*Amplifier	HP	8447F	2805A03351	Oct. 25 2005	1year
6	*Amplifier	HP	8449B	3008A00107	Mar. 15 2006	1year
7	Spectrum Analyzer	HP	8566B	267A03469	Mar.10 2006	1year
8	*Spectrum Analyzer	Advantest	R3265A	45060401	Dec.06 2005	1year
9	Spectrum Analyzer	HP	8568B	1912A00573	Oct.25 2005	1year
10	*Biconical Log-Perio. Antenna	ARA	LBP-2520/A	1203	May. 18 2006	1year
11	*Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-474	Apr. 05 2006	1year
12	*Biconical Log Antenn	ARA	LPB-2520/A	1180	Mar. 06 2006	1year
13	Signal Generater	R & S	SMP02	833286/003	Aug. 17 2006	1year
14	*LISN	R & S	ESH3-Z5	833874/006	Oct. 25 2005	1year
15	*LISN	Kyoritsu	KNW-407	8-1034-10	Mar. 10 2006	1year
16	*Position Controller	DAEIL EMC	N/A	N/A	N/A	N/A
17	*Turn Table	DAEIL EMC	N/A	N/A	N/A	N/A
18	*Antenna Mast	DAEIL EMC	N/A	N/A	N/A	N/A
19	*Anechoic Chamber	EM Eng.	N/A	N/A	N/A	N/A
20	*Shielded Room	EM Eng.	N/A	N/A	N/A	N/A
21	*Position Controller	Seo-Young EMC	N/A	N/A	N/A	N/A
22	*Turn Table	Seo-Young EMC	N/A	N/A	N/A	N/A
23	*Antenna Mast	Seo-Young EMC	N/A	N/A	N/A	N/A
24	*Anechoic Chamber	Seo-Young EMC	N/A	N/A	N/A	N/A
25	*Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-508	Oct. 12 2005	1year
26	*10dB ATTenuator	HP	8491B	57773	Dec.06 2005	1year
27	*Spectrum Analyzer	Agilent	E4440A	MY44022567	Dec.31 2005	1year
28	*Signal Generator	Agilent	E4438C	MY45092564	Apr.09 2006	1year

*) Test equipment used during the test

8. Description of Tests

8.1 Conducted Emissions

The Line conducted emission test facility is located inside a 4 X 7 X 2.5 meter shielded enclosure.
It is manufactured by EM engineering. The shielding effectiveness of the shielded room is in accordance with MIL-STD-285 or NSA 65-6.
A 1m X 1.5m wooden table 0.8m height is placed 0.4m away from the vertical wall and 1.5m away from the side of wall of the shielded room
Rohde & Schwarz (ESH3-Z5) and Kyoritsu (KNW-407) of the 50ohm/50uH Line Impedance Stabilization Network(LISN) are bonded to the shielded room.
The EUT is powered from the Rohde & Schwarz LISN and the support equipment is powered from the Kyoritsu LISN. Power to the LISN s are filtered by high-current high insertion loss Power line filters. The purpose of filter is to attenuate ambient signal interference and this filter is also bonded to shielded enclosure. All electrical cables are shielded by tinned copper zipper tubing with inner diameter of 1/2”.
If DC power device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the LISNs,
All interconnecting cables more than 1 meter were shortened by non inductive bundling (serpentine fashion) to a 1 meter length.
Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.
The spectrum was scanned from 150kHz to 30MHz with 20msec sweep time.
The frequency producing the maximum level was re-examined using the EMI test receiver. (Rohde & Schwarz ESCS30).
The detector function were set to CISPR quasi-peak mode & average mode.
The bandwidth of receiver was set to 9KHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.
Each emission was maximized by; switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux AC outlet, if applicable; which ever determined the worst case emission.
Each EME reported was calibrated using the R&S signal generator.

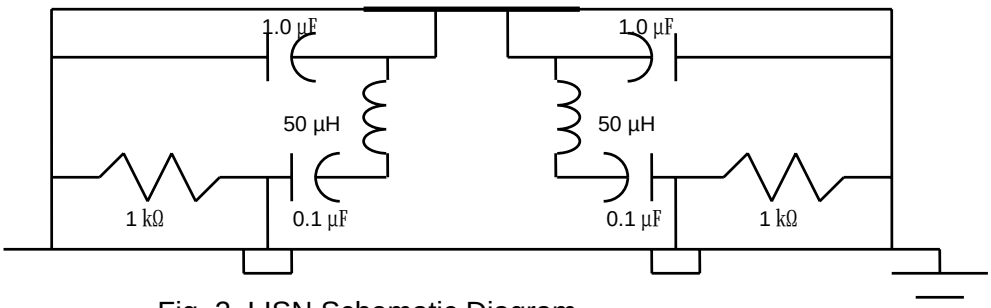


Fig. 2. LISN Schematic Diagram

8.2 Radiated Emissions

Preliminary measurement were made indoors at 3 meter using broad band antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The Technology configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna was note for each frequency found. The spectrum was scanned from 30 to 1000MHz using Biconical log Antenna (ARA, LPB-2520/A).
Final Measurements were made outdoors at 3 or 10m test range using Logbicon Super Antenna (Schwarzbeck, VULB 9166).
The test equipment was placed on a wooden table.
Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.
Each frequency found during pre-scan measurements was reexamined and investigated using EMI test receiver.(ESCS30)
The detector function were set to CISPR quasi-peak and peak mode and the bandwidth of the receiver were set to 120KHz and 1MHz depending on the frequency or type of signal.
The half wave dipole antenna was tuned to the frequency found during preliminary radiated measurements.
The EUT support equipment and interconnecting cables were re configured to the setup producing the maximum emission for the frequency and were placed on top of a 0.8m high non- metallic 1.0X 1.5 meter table.
The EUT, support equipment and interconnecting cables were re-arranged and manipulated to maximize each EME emission.
The turn table containing the Technology was rotated; the antenna height was varied 1 to 4meter and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by : switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux AC outlet, if applicable; which ever determined the worst case emission.
Each EME reported was calibrated using the R/S signal generator.

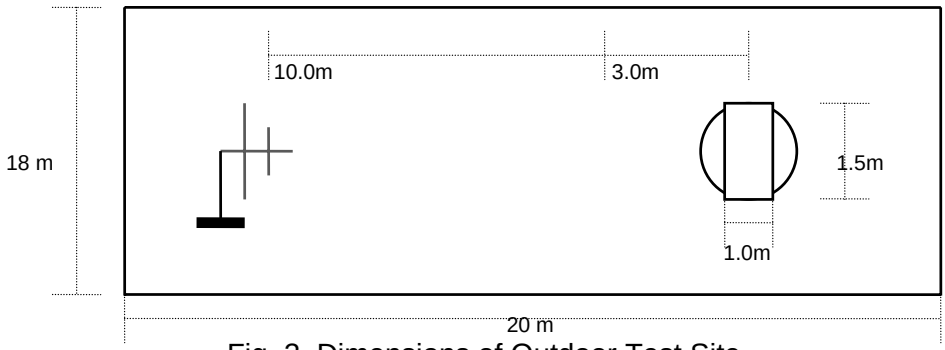


Fig. 3. Dimensions of Outdoor Test Site

8.3 Field Strength of Spurious Emissions

Test Method

The EUT was set on a non-conductive turntable in a semi anechoic chamber.
For testing each spurious emission, The antenna mast is raised and lowered from one to four meters and the turntables is rotated 360˚and maximum reading on the spectrum analyzer is recorded. This repeated for both horizontal and vertical polarizations of the receive antenna.

The EUT is then replaced with a substitution antenna which is connected with a signal generator. The signal generator's frequency is set to that of the spurious emission record from the equipment under test. The antenna mast is raised and lowered from one to four meters to obtain a aximum reading on the spectrum analyzer. The output of the signal generator is then adjusted until the reading on the spectrum analyzer matches that obtained from the EUT. The signal generator level is recorded.

The power in dBm of each spurious emission is calculated by correcting the signal generator level for the cable loss and gain of the substitution antenna referenced to a dipole. The spectrum was investigated in accordance to CFR 47 Part 2.1057. A CW was used for both uplink and downlink for low, middle and high channels. The worst case emissions are reported of both uplink and downlink configurations. All emissions not reported were below the noise floor of the measurement equipment.

CALCULATION

The formula below was used to calculate the ERP/EIRP of the EUT.
$P_{subst_TX[dBm]}$, $P_{subst_RX[dBm]}$, $L_{Cable[dB]}$ and $G_{substitute_antenna[dBd]/[dBi]}$ factors are combined in one correction factor.

$$P_{ERP[W]} = \frac{10^{(P_{sust_Tx[dBm]}+P_{EUT[dBm]}-P_{subst_Rx[dBm]})+G_{subst_antenna[dBi]}-L_{cable[dB]})/10}}{1000}$$

where the variables are as follows:

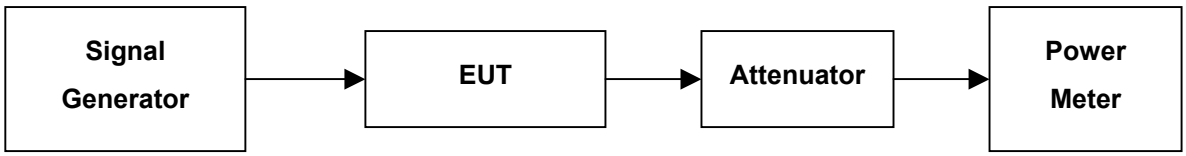
$P_{EUT\ [dBm]}$	Measured power level from the EUT
$P_{Subst_TX\ [dBm]}$	Power fed to the substituting antenna
$P_{Subst_RX\ [dBm]}$	Power received with the spectrum analyzer
$G_{Substitute_antenna\ [dBi]}$	Gain of the substitutive antenna over dipole (dBi)
$L_{Cable\ [dB]}$	Loss of the cable between signal generator and the substituting antenna

8.4 RF Power Output

Test Method

The EUT's the RF output terminals was connected with Power meter through a attenuator.
This test was performed in all applicable modulations.

Test Setup

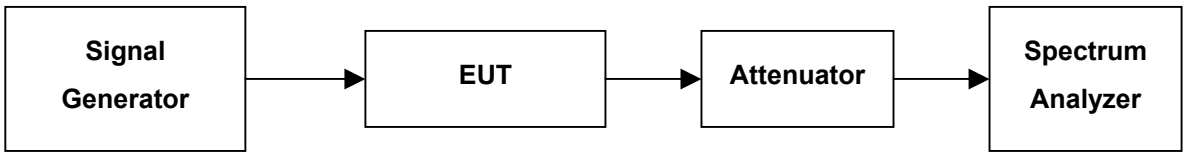


8.5 Occupied Bandwidth

Test Method

The EUT which was setup to maximum output power at it's the middle channel was directly connected to the input of the Spectrum Analyzer.
The Spectrum Analyzer's RBW and VBW were set to 1% the emission bandwidth.
The Spectrum Analyzer was set for max hold using a peak detector.
Both the input and output bandwidths were evaluated to show similar characteristics of the emissions.
Occupied bandwidth's Plots of the Uplink and Downlink are shown.

Test Setup



8.6 Spurious Emissions at Antenna Terminals and Two-Tone Test

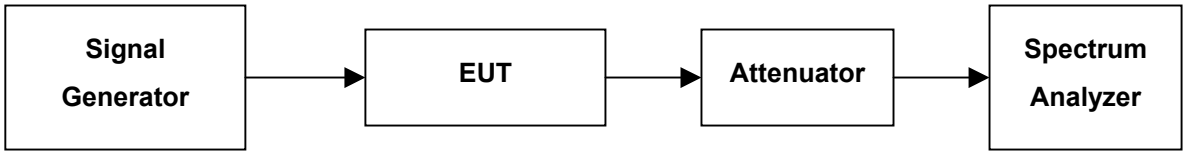
Test Method

The RF output of the EUT was directly connected to the input of the Spectrum Analyzer. The two tone test method was used with the device operating at maximum drive levels. Two tones were placed at both lower and upper band-edges and adjusted such that the third order harmonics were maximized and within the operating frequency band.

For in band measurements the spectrum analyzer resolution and video bandwidths were
set to 1% the emission bandwidth. For out of band emissions the spectrum analyzer resolution and video bandwidths were set to 1MHz according to Section 22.917 (b). The spectrum was investigated for the 30MHz to 10GHz in accordance to CFR 47 Part 2.1057 . The analyzer was set for max hold using a peak detector.
In band inter-modulation data was collected at the lower band edge and upper band edge for uplink and downlink configurations using the two tone method. CW covers FM (GSM and F1D) for inter-modulation products.

GSM modulation was included to show compliance for spurious emissions.

Test Setup

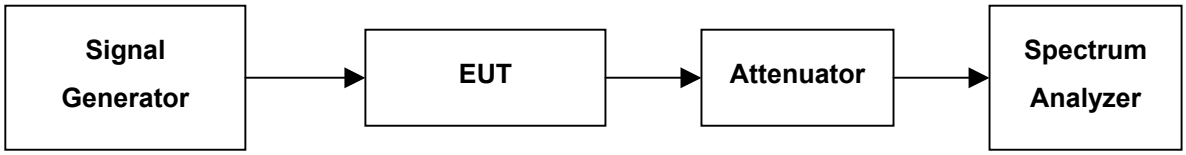


8.7 Band-edge Compliance

Test method

The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer. The Spectrum Analyzer RBW and VBW were set to 1% the emission bandwidth. The Spectrum Analyzer was set for max hold using a peak detector. The center frequency was set to both the upper and lower cellular frequency block edges.

Test Setup



9. Test Data

9.1 Power LINE Conducted Emission

Measurement Result :

UP Link – Low Channel

Frequency (MHz)	Level(dBμV)		Line	Limit(dBμV)		Margin(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.15	45.4	34.0	N	66.0	56.0	20.6	22.0
0.20	43.2	33.9	N	63.6	53.6	20.4	19.7
0.24	46.4	37.4	L	62.1	52.1	15.7	14.7
0.29	44.9	38.0	L	60.5	50.5	15.6	12.5
0.34	39.0	29.4	N	59.2	49.2	20.2	19.8
0.59	33.2	29.8	L	56.0	46.0	22.8	16.2

Table 1. Line Conducted Emissions Tabulated Data

UP Link - Middle Channel

Frequency (MHz)	Level(dBμV)		Line	Limit(dBμV)		Margin(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.15	45.4	33.8	N	66.0	56.0	20.6	22.2
0.20	43.8	33.7	N	63.6	53.6	19.8	19.9
0.24	46.9	38.0	L	62.1	52.1	15.2	14.1
0.30	44.3	35.9	L	60.2	50.2	15.9	14.3
0.54	34.1	29.3	L	56.0	46.0	21.9	16.7
10.23	33.9	24.4	N	60.0	50.0	26.1	25.6

Table 2. Line Conducted Emissions Tabulated Data

UP Link - High Channel

Frequency (MHz)	Level(dBμV)		Line	Limit(dBμV)		Margin(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.15	44.9	34.1	N	66.0	56.0	21.1	21.9
0.20	43.1	34.2	N	63.6	53.6	20.5	19.4
0.24	46.2	37.9	L	62.1	52.1	15.9	14.2
0.30	44.3	37.8	L	60.2	50.2	15.9	12.4
0.54	32.2	22.2	N	56.0	46.0	23.8	23.8
10.23	28.5	20.1	N	60.0	50.0	31.5	29.9

Table 3. Line Conducted Emissions Tabulated Data

DOWN Link - Low Channel

Frequency (MHz)	Level(dBμV)		Line	Limit(dBμV)		Margin(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.24	46.1	37.9	N	62.1	52.1	16.0	14.2
0.29	44.9	38.2	N	60.5	50.5	15.6	12.3
0.59	31.5	24.8	L	56.0	46.0	24.5	21.2
1.09	30.4	26.4	L	56.0	46.0	25.6	19.6
2.12	27.3	19.2	N	56.0	46.0	28.7	26.8
23.13	34.1	29.9	N	60.0	50.0	25.9	20.1

Table 4. Line Conducted Emissions Tabulated Data

DOWN Link - Middle Channel

Frequency (MHz)	Level(dBμV)		Line	Limit(dBμV)		Margin(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.24	46.5	38.4	L	62.1	52.1	15.6	13.7
0.30	44.8	38.2	L	60.2	50.2	15.4	12.0
0.54	34.3	29.6	L	56.0	46.0	21.7	16.4
1.13	29.1	20.4	L	56.0	46.0	26.9	25.6
2.38	28.1	19.2	N	56.0	46.0	27.9	26.8
23.12	34.8	30.5	N	60.0	50.0	25.2	19.5

Table 5. Line Conducted Emissions Tabulated Data

DOWN Link - High Channel

Frequency (MHz)	Level(dBμV)		Line	Limit(dBμV)		Margin(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.25	46.5	38.3	L	61.8	51.8	15.3	13.5
0.30	44.9	38.3	L	60.2	50.2	15.3	11.9
0.54	34.2	29.5	L	56.0	46.0	21.8	16.5
1.13	29.1	21.5	L	56.0	46.0	26.9	24.5
2.38	28.1	18.0	N	56.0	46.0	27.9	28.0
23.11	34.3	30.1	N	60.0	50.0	25.7	19.9

Table 6. Line Conducted Emissions Tabulated Data

NOTES:

1. ***Measurements using CISPR quasi-peak mode & average mode.***
2. ***All modes of operation were investigated and the worst -case emission are reported. See attached Plots.***
3. ***LINE : L =Line , N = Neutral***
4. ***The limit is on the FCC Part section 15.207(a).***

PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (UP Link - Low mode, Line)***

NEMKO KOREA (NK2GE700) 08 Sep 2006 17:26

Conducted Emissions

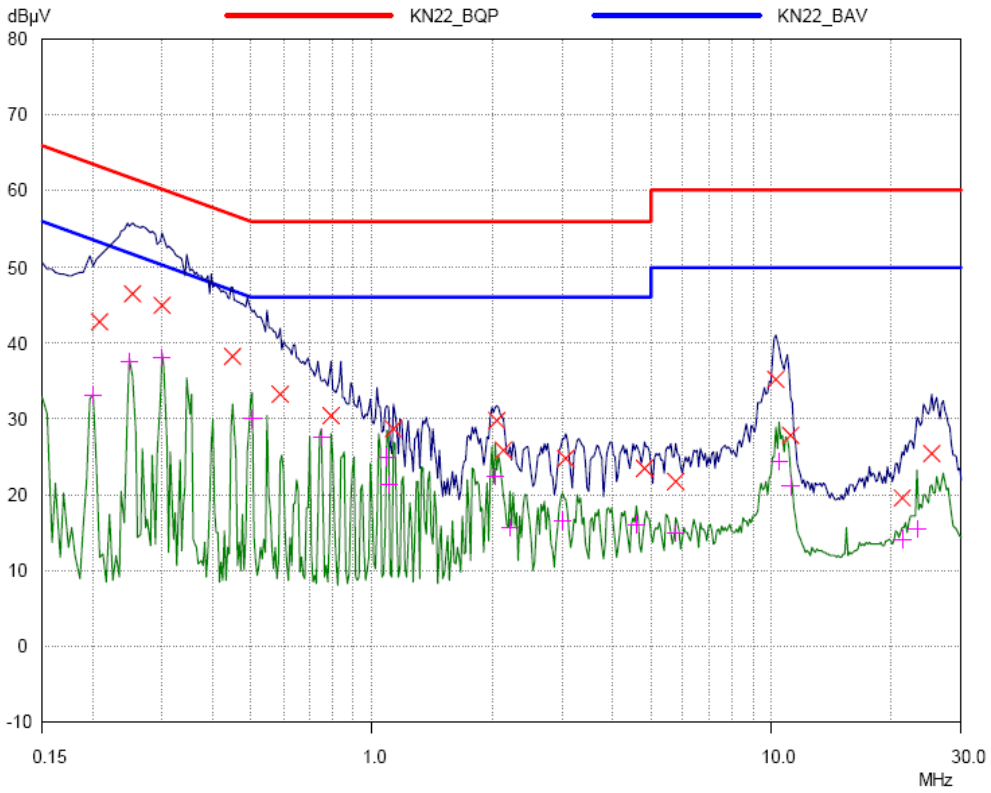
EUT:	Cellular Booster
Manuf:	KISAN TELECOM CO., LTD.
Op Cond:	AC 120V / 60Hz
Operator:	UP Link(824MHz)
Test Spec:	FCC Part 15 (Class B)
Comment:	Model : CP-800
	LINE : LINE-PE
Result File:	E700UL-L.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	16
	Acc Margin:	50 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (UP Link - Low mode, Neutral)***

NEMKO KOREA (NK2GE700) 08 Sep 2006 17:12

Conducted Emissions

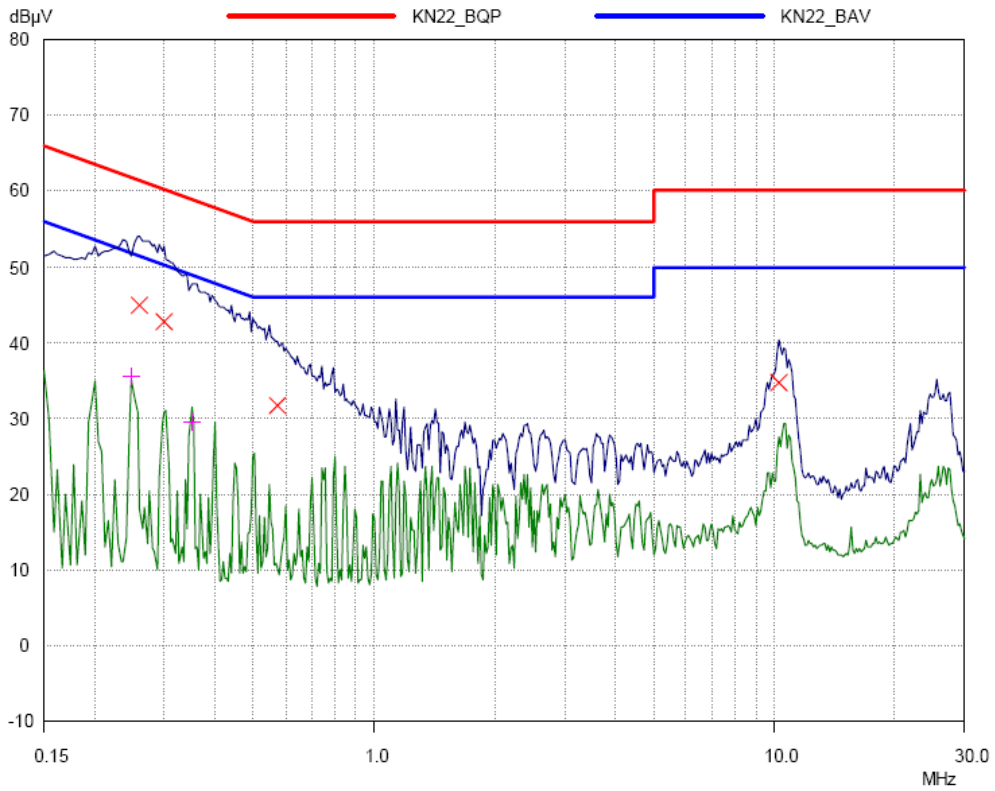
EUT:	Cellular Booster
Manuf:	KISAN TELECOM CO., LTD.
Op Cond:	AC 120V / 60Hz
Operator:	UP Link(824MHz)
Test Spec:	FCC Part 15 (Class B)
Comment:	Model : CP-800
	LINE :NEUTRAL
Result File:	E700UL-N.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	20 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (UP Link - Middle mode, Line)***

NEMKO KOREA (NK2GE700) 08 Sep 2006 17:35

Conducted Emissions

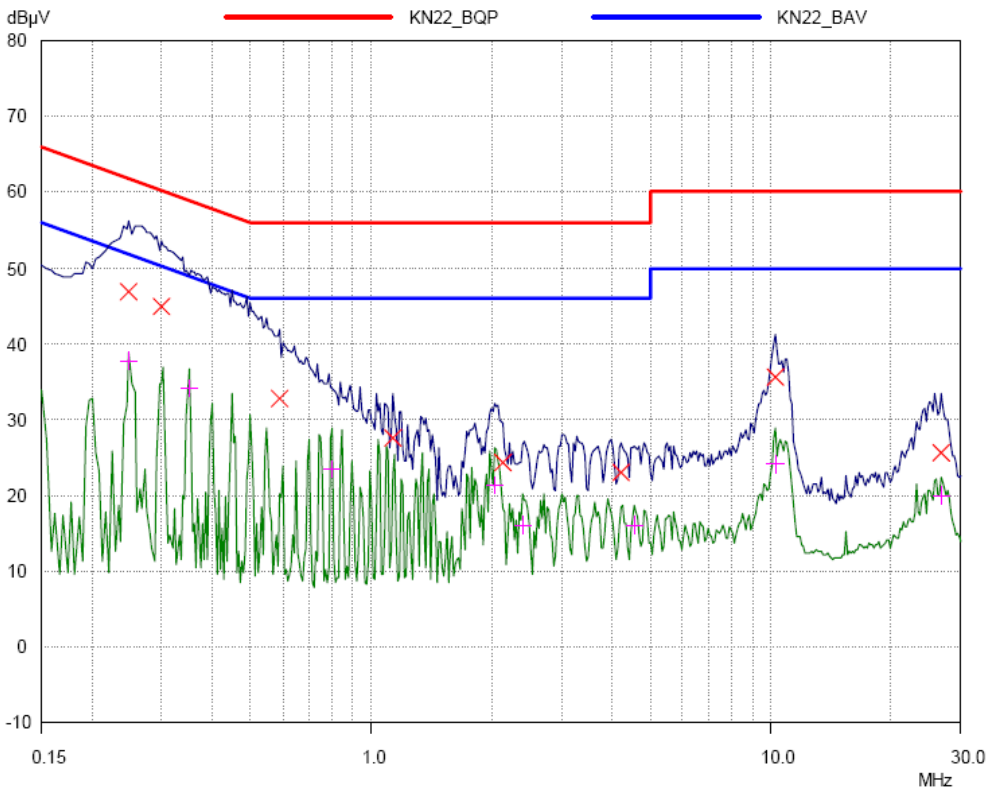
EUT:	Cellular Booster
Manuf:	KISAN TELECOM CO., LTD.
Op Cond:	AC 120V / 60Hz
Operator:	UP Link-MIDDLE(836.5MHz)
Test Spec:	FCC Part 15 (Class B)
Comment:	Model : CP-800
	LINE : LINE-PE
Result File:	E700UM-L.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	50 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (UP Link - Middle mode, Neutral)***

NEMKO KOREA (NK2GE700) 08 Sep 2006 17:45

Conducted Emissions

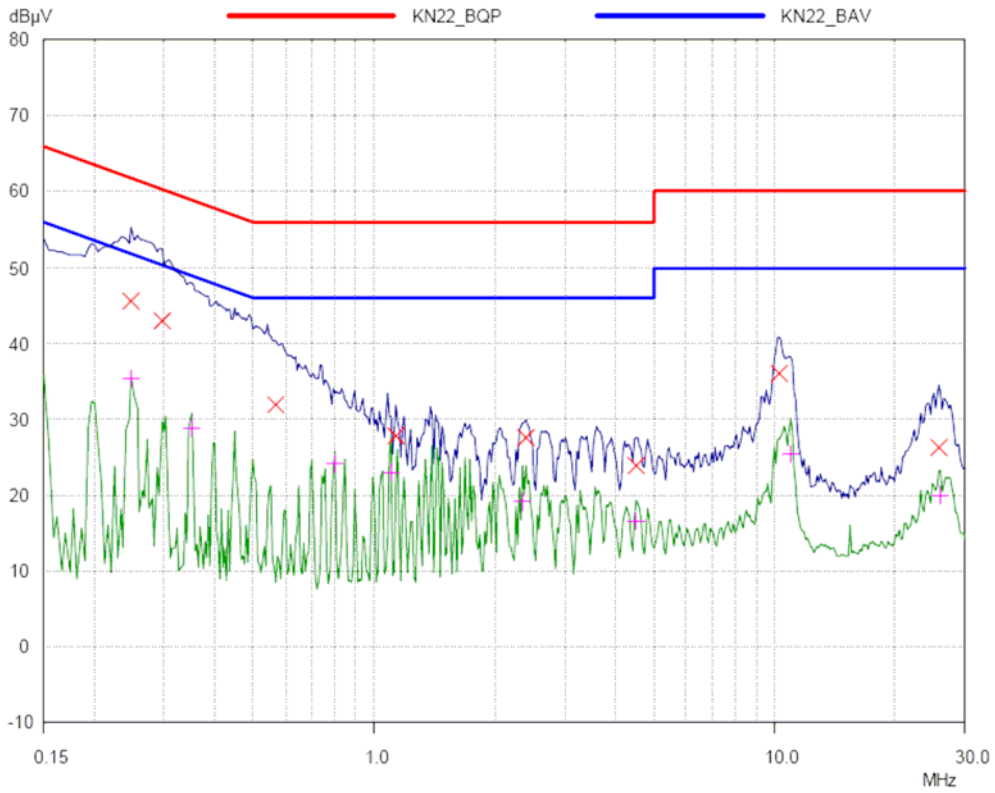
EUT:	Cellular Booster
Manuf:	KISAN TELECOM CO., LTD.
Op Cond:	AC 120V / 60Hz
Operator:	UP Link-MIDDLE(836.5MHz)
Test Spec:	FCC Part 15 (Class B)
Comment:	Model : CP-800
	LINE : NEUTRAL
Result File:	E700UM-N.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	50 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (UP Link - High mode, Line)***

NEMKO KOREA (NK2GE700) 09 Sep 2006 10:11

Conducted Emissions

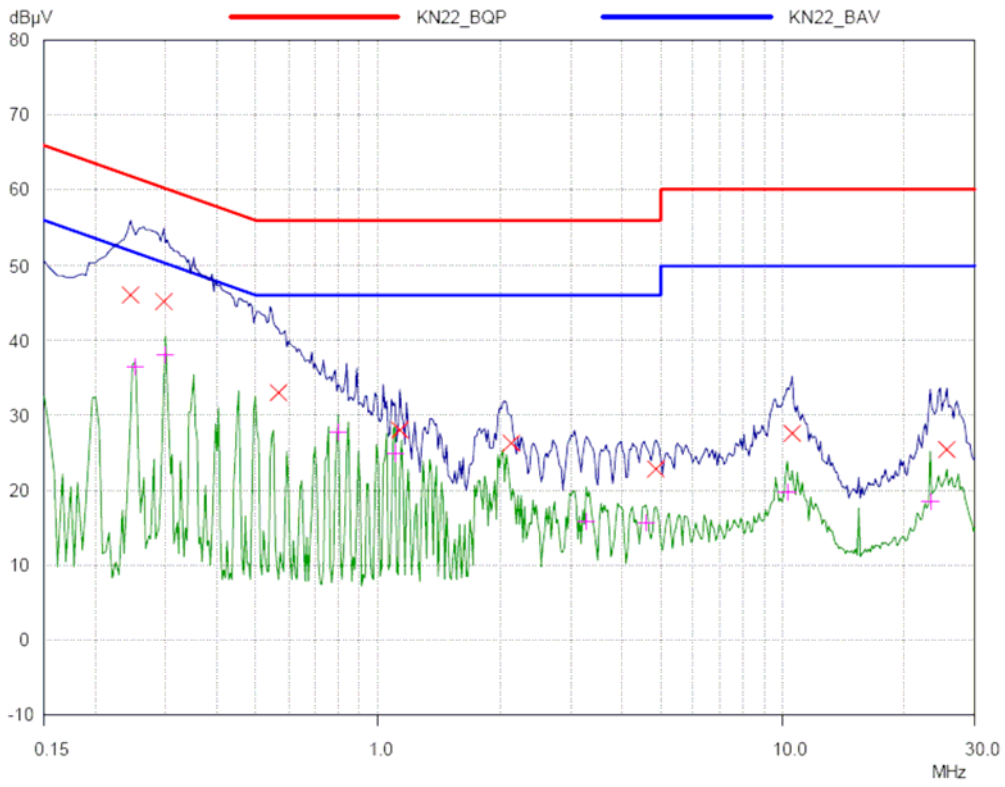
EUT:	Cellular Booster
Manuf:	KISAN TELECOM CO., LTD.
Op Cond:	AC 120V / 60Hz
Operator:	UP Link-HIGH(849MHz)
Test Spec:	FCC Part 15 (Class B)
Comment:	Model : CP-800
	LINE : LINE-PE
Result File:	E700UH-L.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	50 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (UP Link - High mode, Neutral)***

NEMKO KOREA (NK2GE700) 09 Sep 2006 09:57

Conducted Emissions

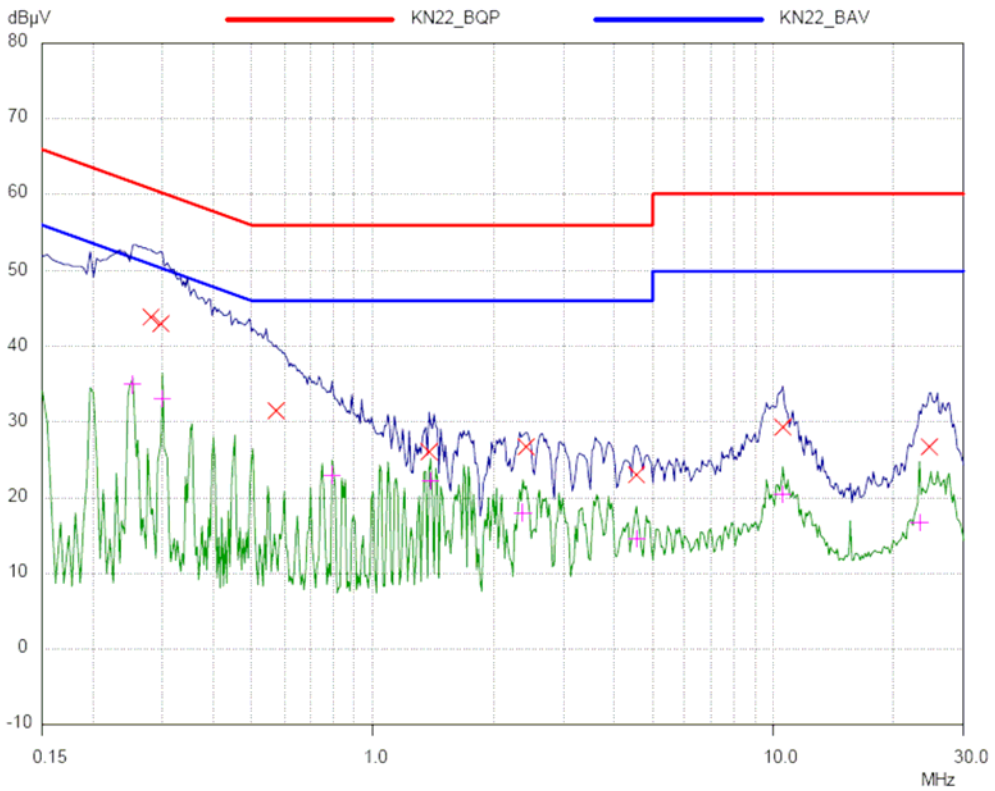
EUT:	Cellular Booster
Manuf:	KISAN TELECOM CO., LTD.
Op Cond:	AC 120V / 60Hz
Operator:	UP Link-HIGH(849MHz)
Test Spec:	FCC Part 15 (Class B)
Comment:	Model : CP-800
	LINE : NEUTRAL
Result File:	e700uH-n.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	50 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (DOWN Link - Low mode, Line)***

NEMKO KOREA (NK2GE700) 09 Sep 2006 10:25

Conducted Emissions

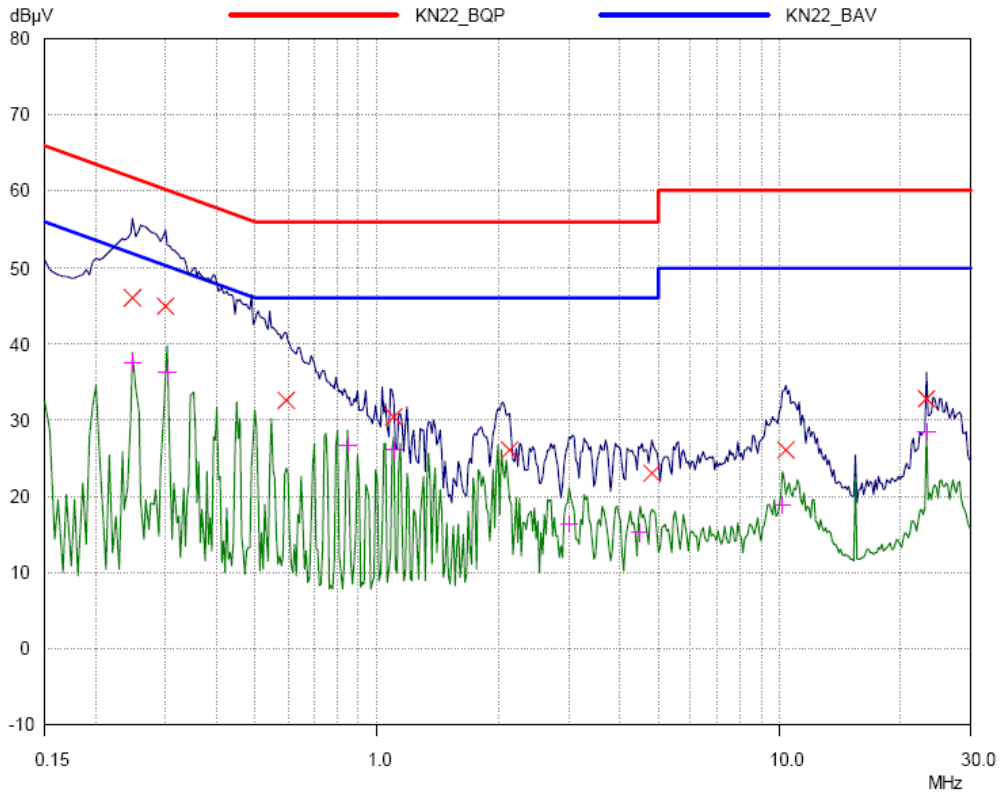
EUT:	Cellular Booster
Manuf:	KISAN TELECOM CO., LTD.
Op Cond:	AC 120V / 60Hz
Operator:	Down Link-LOW(869MHz)
Test Spec:	FCC Part 15 (Class B)
Comment:	Model : CP-800
	LINE : LINE-PE
Result File:	E700DL-L.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	50 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (DOWN Link - Low mode, Neutral)***

NEMKO KOREA (NK2GE700) 09 Sep 2006 10:35

Conducted Emissions

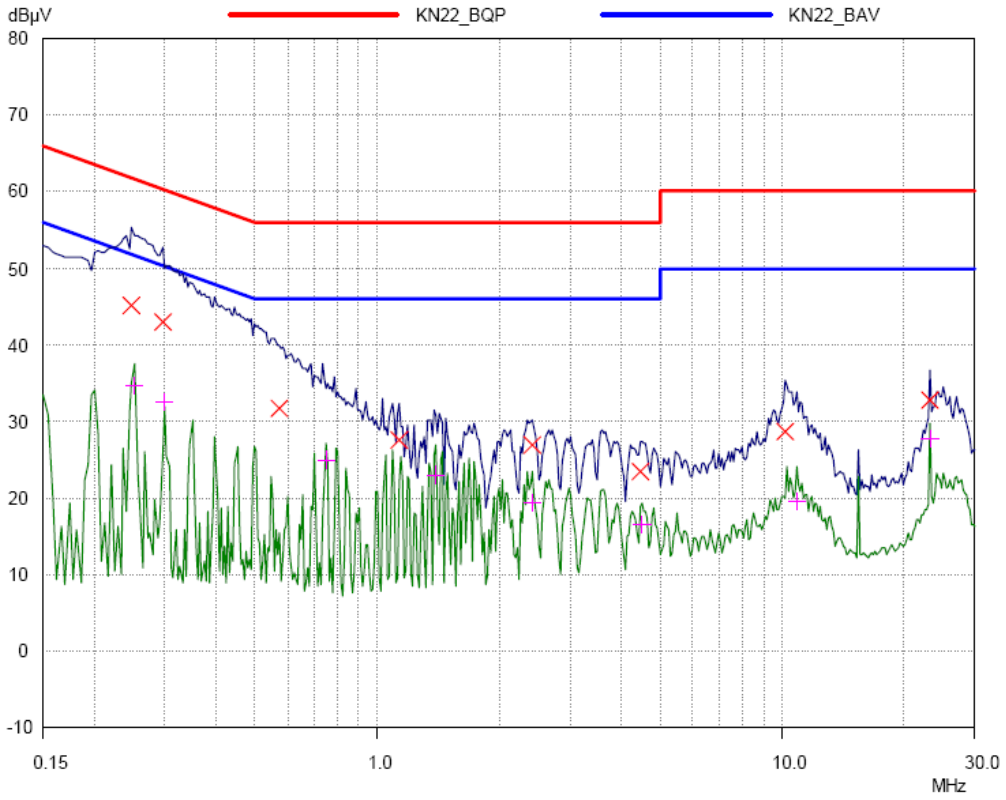
EUT:	Cellular Booster
Manuf:	KISAN TELECOM CO., LTD.
Op Cond:	AC 120V / 60Hz
Operator:	Down Link-LOW(869MHz)
Test Spec:	FCC Part 15 (Class B)
Comment:	Model : CP-800
	LINE : NEUTRAL-PE
Result File:	E700DL-N.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	50 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (DOWN Link - Middle mode, Line)***

NEMKO KOREA (NK2GE700) 09 Sep 2006 10:54

Conducted Emissions

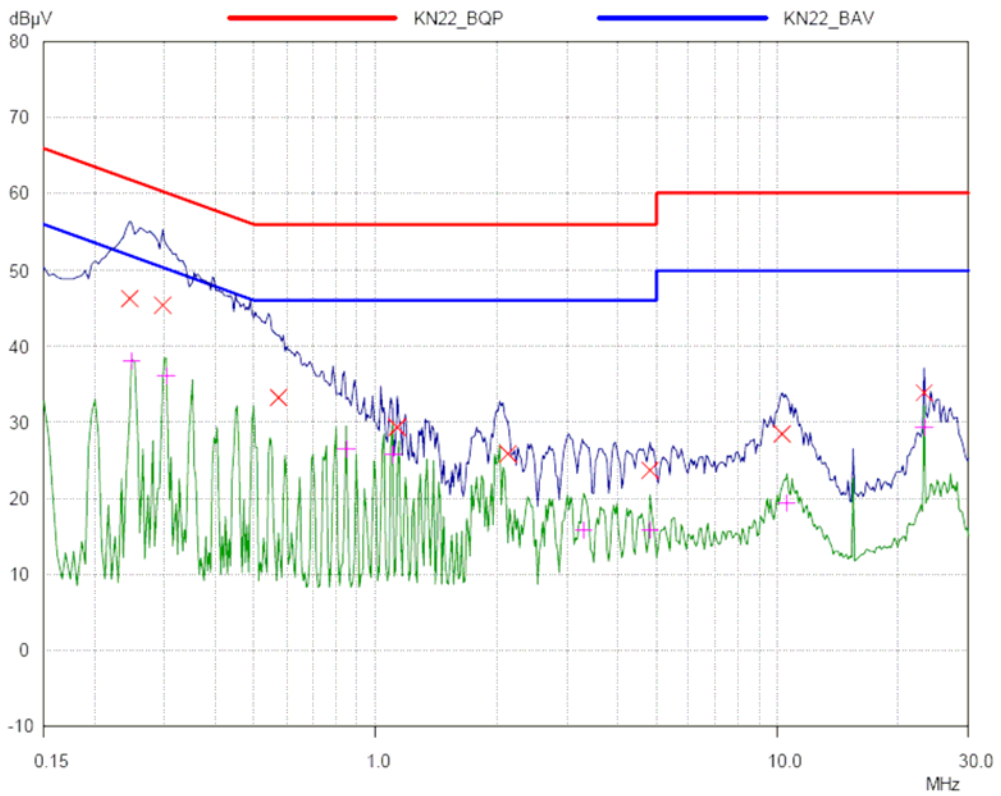
EUT:	Cellular Booster
Manuf:	KISAN TELECOM CO., LTD.
Op Cond:	AC 120V / 60Hz
Operator:	Down Link-MIDDLE(881.5MHz)
Test Spec:	FCC Part 15 (Class B)
Comment:	Model : CP-800
	LINE : LINE-PE
Result File:	E700ML-L.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	50 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (DOWN Link - Middle mode, Neutral)***

NEMKO KOREA (NK2GE700) 09 Sep 2006 10:45

Conducted Emissions

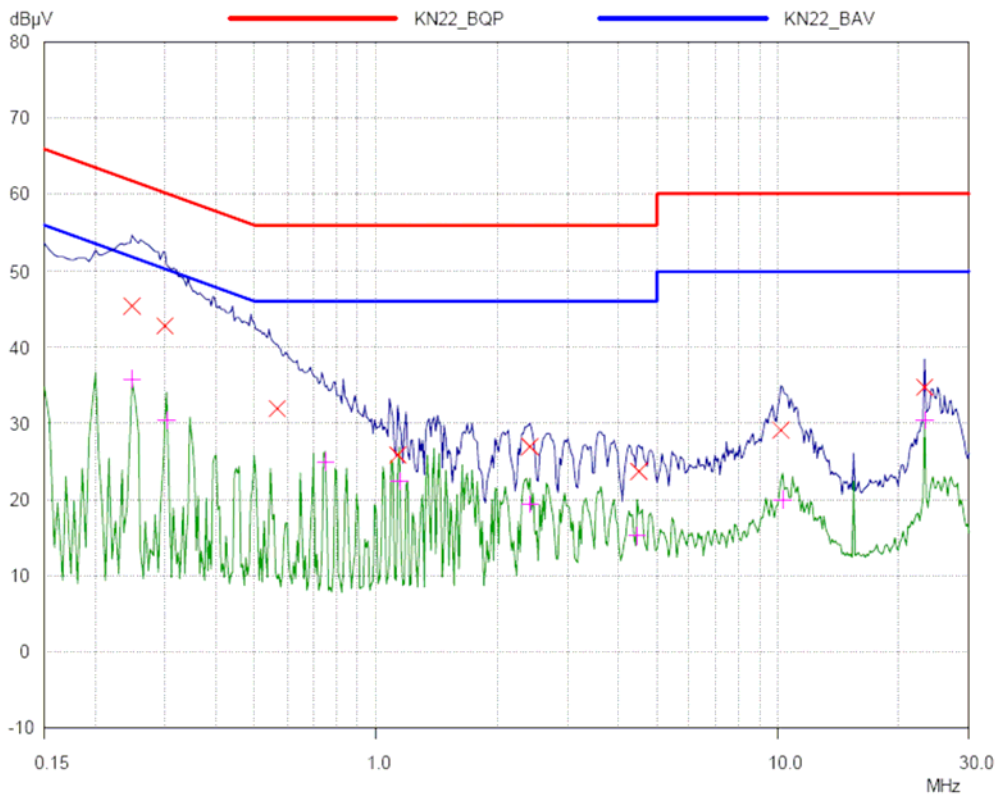
EUT:	Cellular Booster
Manuf:	KISAN TELECOM CO., LTD.
Op Cond:	AC 120V / 60Hz
Operator:	Down Link-MIDDLE(881.5MHz)
Test Spec:	FCC Part 15 (Class B)
Comment:	Model : CP-800
	LINE : NEUTRAL-PE
Result File:	E700ML-N.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	50 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (DOWN Link - High mode, Line)***

NEMKO KOREA (NK2GE700) 09 Sep 2006 11:03

Conducted Emissions

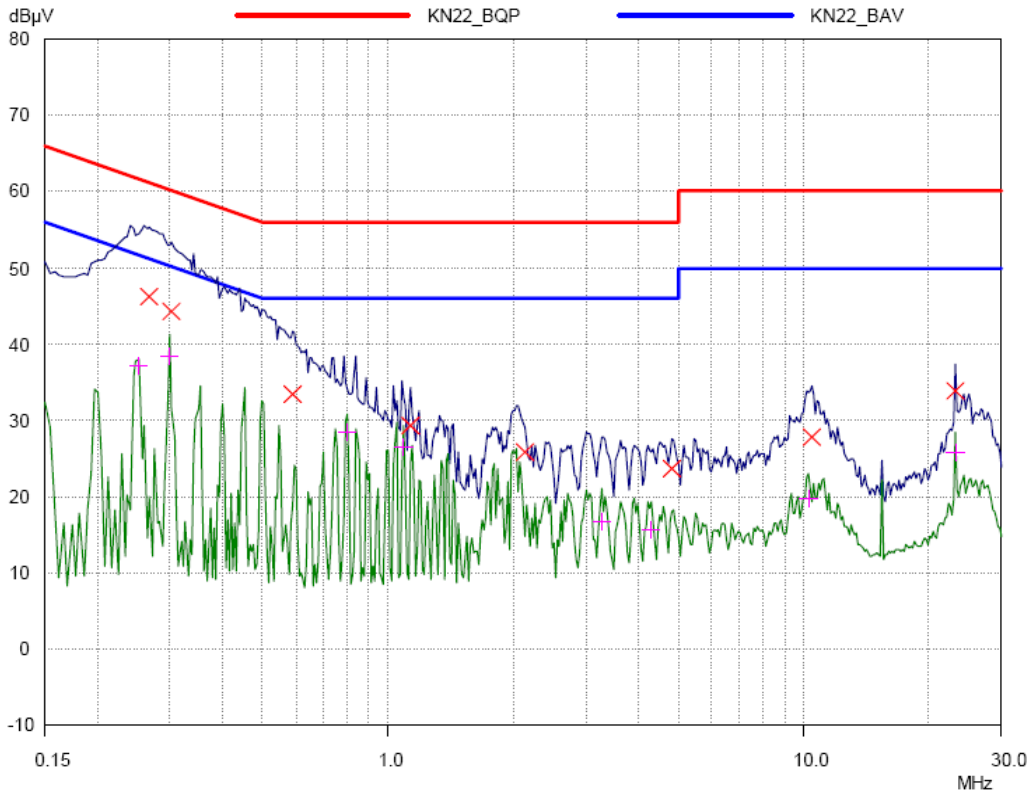
EUT:	Cellular Booster
Manuf:	KISAN TELECOM CO., LTD.
Op Cond:	AC 120V / 60Hz
Operator:	Down Link-HIGH(894MHz)
Test Spec:	FCC Part 15 (Class B)
Comment:	Model : CP-800
	LINE : LINE-PE
Result File:	E700DH-L.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	50 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (DOWN Link - High mode, Neutral)***

NEMKO KOREA (NK2GE700) 09 Sep 2006 11:13

Conducted Emissions

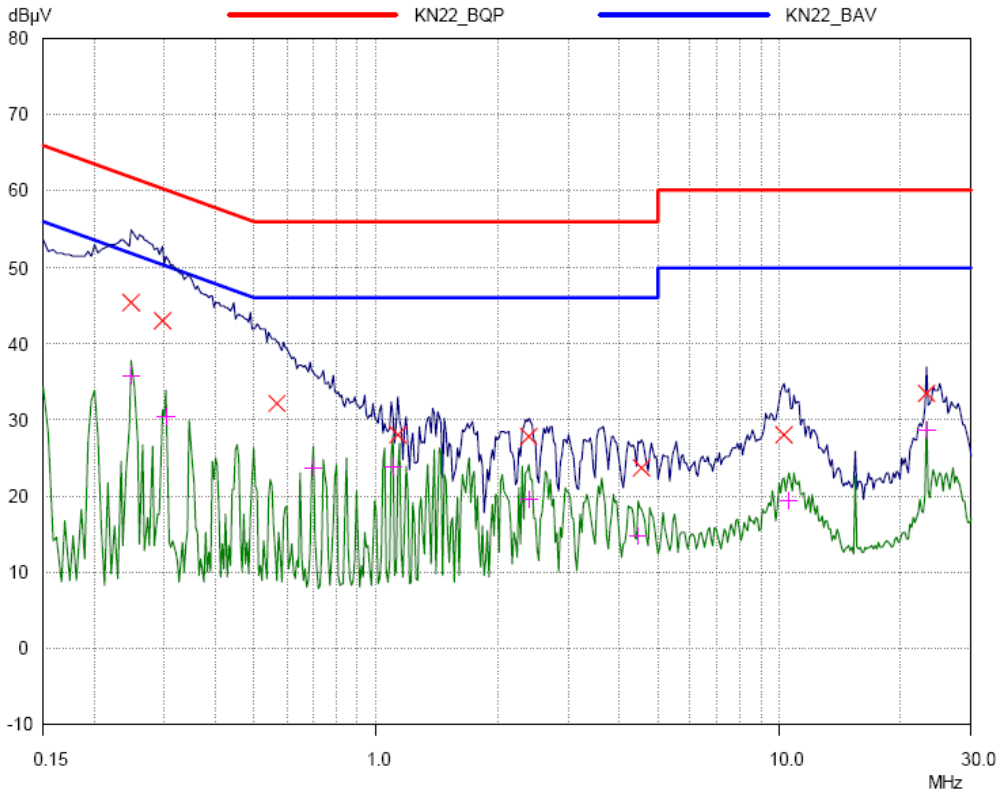
EUT:	Cellular Booster
Manuf:	KISAN TELECOM CO., LTD.
Op Cond:	AC 120V / 60Hz
Operator:	Down Link-HIGH(894MHz)
Test Spec:	FCC Part 15 (Class B)
Comment:	Model : CP-800
	LINE : NEUTRAL-PE
Result File:	E700DH-N.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	50 dB



9.2 Radiated Emissions

Measurement Result :

UP Link – Low Channel

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
206.31	48.2	V	-11.0	37.2	43.5	6.3
303.97	42.8	V	-9.4	33.4	46.0	12.6
412.63	46.5	V	-7.4	39.1	46.0	6.9
512.06	39.4	V	-5.3	34.1	46.0	11.9
618.97	32.9	V	-2.8	30.1	46.0	15.9
826.97	37.4	V	1.1	38.5	46.0	7.5

Table 7. Radiated Measurements at 3meters

UP Link – Middle Channel

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
206.31	48.1	V	-11.0	37.1	43.5	6.4
303.97	42.3	V	-9.4	32.9	46.0	13.1
412.63	46.8	V	-7.4	39.4	46.0	6.6
512.06	37.8	V	-5.3	32.5	46.0	13.5
618.97	33.2	V	-2.8	30.4	46.0	15.6
826.91	37.3	V	1.1	38.4	46.0	7.6

Table 8. Radiated Measurements at 3meters

UP Link – High Channel

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
207.21	47.4	V	-11.0	36.4	43.5	7.1
304.24	39.6	V	-9.4	30.2	46.0	15.8
412.63	47.5	V	-7.4	40.1	46.0	5.9
512.24	37.9	V	-5.3	32.6	46.0	13.4
619.97	39.0	V	-2.7	36.3	46.0	9.7
826.91	35.1	V	1.1	36.2	46.0	9.8

Table 9. Radiated Measurements at 3meters

DOWN Link – Low Channel

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
154.30	39.9	H	-9.2	30.7	43.5	12.8
191.90	41.8	H	-11.6	30.2	43.5	13.3
207.50	47.5	H	-11.0	36.5	43.5	7.0
304.10	42.1	H	-9.4	32.7	46.0	13.3
320.10	43.7	H	-9.4	34.3	46.0	11.7
415.37	49.0	H	-7.3	41.7	46.0	4.3

Table 10. Radiated Measurements at 3meters

DOWN Link – Middle Channel

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
128.00	41.0	V	-12.6	28.4	43.5	15.1
208.00	43.7	H	-11.0	32.7	43.5	10.8
320.00	42.5	V	-9.4	33.1	46.0	12.9
416.22	45.7	V	-7.3	38.4	46.0	7.6
512.00	45.3	V	-5.3	40.0	46.0	6.0
624.33	38.9	V	-2.6	36.3	46.0	9.7

Table 11. Radiated Measurements at 3meters

DOWN Link – High Channel

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
128.00	41.3	V	-12.6	28.7	43.5	14.8
208.00	41.1	V	-11.0	30.1	43.5	13.4
320.00	42.6	V	-9.4	33.2	46.0	12.8
416.90	47.2	V	-7.3	39.9	46.0	6.1
512.00	37.0	V	-5.3	31.7	46.0	14.3
833.80	37.4	V	1.2	38.6	46.0	7.4

Table 12. Radiated Measurements at 3meters

9.3 Field Strength of Spurious Emissions

Measurement Result:

UP Link – Low Channel

Freq. (MHz)	Ant. Pol.	P_{EUT} (dBm)	P_{TX} (dBm)	P_{RX} (dBm)	$G_{antenna}$ (dBi)	L_{Cable} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1649.40	H	-65.61	0.00	-1.15	9.66	2.28	-57.08	-13	44.08
	V	-64.17	0.00	-1.11	9.66	2.28	-55.68	-13	42.68
2474.10	H	-65.97	0.00	-3.57	10.49	3.03	-54.94	-13	41.94
	V	-64.93	0.00	-3.70	10.49	3.03	-53.77	-13	40.77
3298.80	H	-65.65	0.00	-5.23	12.54	3.62	-51.50	-13	38.50
	V	-64.38	0.00	-5.06	12.54	3.62	-50.40	-13	37.40
4123.50	H	-67.01	0.00	-8.80	12.66	4.16	-49.71	-13	36.71
	V	-65.32	0.00	-8.77	12.66	4.16	-48.05	-13	35.05
4948.20	H	-67.41	0.00	-10.86	12.63	4.60	-48.08	-13	35.08
	V	-66.99	0.00	-10.80	12.63	4.60	-48.16	-13	35.16
5772.90	H	-67.31	0.00	-10.55	13.10	5.17	-48.83	-13	35.83
	V	-66.28	0.00	-11.47	13.10	5.17	-46.88	-13	33.88

Table 13. Field Strength of Spurious Emissions

UP Link – Middle Channel

Freq. (MHz)	Ant. Pol.	P_{EUT} (dBm)	P_{TX} (dBm)	P_{RX} (dBm)	$G_{antenna}$ (dBi)	L_{Cable} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1649.40	H	-63.89	0.00	-1.22	9.77	2.30	-55.20	-13	42.20
	V	-65.14	0.00	-1.15	9.77	2.30	-56.52	-13	43.52
2474.10	H	-64.26	0.00	-3.74	10.57	3.04	-52.99	-13	39.99
	V	-64.68	0.00	-3.78	10.57	3.04	-53.37	-13	40.37
3298.80	H	-65.78	0.00	-5.02	12.72	3.63	-51.67	-13	38.67
	V	-64.07	0.00	-4.87	12.72	3.63	-50.11	-13	37.11
4123.50	H	-66.67	0.00	-8.62	12.69	4.17	-49.53	-13	36.53
	V	-66.17	0.00	-8.55	12.69	4.17	-49.10	-13	36.10
4948.20	H	-68.23	0.00	-11.08	12.67	4.77	-49.25	-13	36.25
	V	-68.20	0.00	-10.84	12.67	4.77	-49.46	-13	36.46
5772.90	H	-67.61	0.00	-10.99	13.07	5.22	-48.77	-13	35.77
	V	-67.93	0.00	-11.83	13.07	5.22	-48.25	-13	35.25

Table 14. Field Strength of Spurious Emissions

UP Link – High Channel

Freq. (MHz)	Ant. Pol.	P_{EUT} (dBm)	P_{TX} (dBm)	P_{RX} (dBm)	$G_{antenna}$ (dBi)	L_{Cable} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1649.40	H	-64.58	0.00	-1.30	9.88	2.32	-55.72	-13	42.72
	V	-64.82	0.00	-1.19	9.88	2.32	-56.07	-13	43.07
2474.10	H	-65.12	0.00	-3.92	10.65	3.04	-53.59	-13	40.59
	V	-65.29	0.00	-3.87	10.65	3.04	-53.81	-13	40.81
3298.80	H	-65.04	0.00	-4.78	12.93	3.64	-50.97	-13	37.97
	V	-65.25	0.00	-4.65	12.93	3.64	-51.31	-13	38.31
4123.50	H	-67.12	0.00	-8.80	12.70	4.21	-49.83	-13	36.83
	V	-66.78	0.00	-8.68	12.70	4.21	-49.61	-13	36.61
4948.20	H	-68.84	0.00	-10.87	12.74	4.75	-49.98	-13	36.98
	V	-67.14	0.00	-10.66	12.74	4.75	-48.49	-13	35.49
5772.90	H	-68.03	0.00	-11.64	13.03	5.24	-48.60	-13	35.60
	V	-68.03	0.00	-12.09	13.03	5.24	-48.15	-13	35.15

Table 15. Field Strength of Spurious Emissions

DOWN Link – Low Channel

Freq. (MHz)	Ant. Pol.	P_{EUT} (dBm)	P_{TX} (dBm)	P_{RX} (dBm)	$G_{antenna}$ (dBi)	L_{Cable} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1649.40	H	-64.61	0.00	-1.42	10.07	2.36	-55.48	-13	42.48
	V	-64.27	0.00	-1.25	10.07	2.36	-55.31	-13	42.31
2474.10	H	-65.08	0.00	-4.25	10.80	3.05	-53.08	-13	40.08
	V	-63.81	0.00	-4.07	10.80	3.05	-51.99	-13	38.99
3298.80	H	-65.99	0.00	-5.31	12.80	3.64	-51.52	-13	38.52
	V	-65.01	0.00	-5.20	12.80	3.64	-50.65	-13	37.65
4123.50	H	-66.83	0.00	-9.44	12.71	4.28	-48.96	-13	35.96
	V	-65.57	0.00	-9.26	12.71	4.28	-47.88	-13	34.88
4948.20	H	-66.41	0.00	-10.55	12.88	4.75	-47.26	-13	34.26
	V	-67.13	0.00	-10.39	12.88	4.75	-48.61	-13	35.61
5772.90	H	-67.59	0.00	-12.27	12.93	5.30	-47.69	-13	34.69
	V	-67.93	0.00	-12.35	12.93	5.30	-47.95	-13	34.95

Table 16. Field Strength of Spurious Emissions

DOWN Link –Middle Channel

Freq. (MHz)	Ant. Pol.	P_{EUT} (dBm)	P_{TX} (dBm)	P_{RX} (dBm)	$G_{antenna}$ (dBi)	L_{Cable} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1649.40	H	-64.63	0.00	-1.49	10.18	2.38	-55.34	-13	42.34
	V	-64.00	0.00	-1.28	10.18	2.38	-54.92	-13	41.92
2474.10	H	-62.32	0.00	-4.47	10.92	3.07	-50.00	-13	37.00
	V	-60.25	0.00	-4.29	10.92	3.07	-48.11	-13	35.11
3298.80	H	-66.20	0.00	-5.64	12.71	3.63	-51.48	-13	38.48
	V	-66.10	0.00	-5.54	12.71	3.63	-51.48	-13	38.48
4123.50	H	-65.48	0.00	-9.71	12.71	4.31	-47.37	-13	34.37
	V	-66.40	0.00	-9.52	12.71	4.31	-48.48	-13	35.48
4948.20	H	-67.32	0.00	-10.47	12.98	4.85	-48.72	-13	35.72
	V	-67.10	0.00	-10.36	12.98	4.85	-48.61	-13	35.61
5772.90	H	-67.45	0.00	-12.42	12.85	5.34	-47.52	-13	34.52
	V	-67.12	0.00	-12.42	12.85	5.34	-47.19	-13	34.19

Table 17. Field Strength of Spurious Emissions

DOWN Link –High Channel

Freq. (MHz)	Ant. Pol.	P_{EUT} (dBm)	P_{TX} (dBm)	P_{RX} (dBm)	$G_{antenna}$ (dBi)	L_{Cable} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1649.40	H	-65.36	0.00	-1.56	10.29	2.41	-55.92	-13	42.92
	V	-64.15	0.00	-1.32	10.29	2.41	-54.95	-13	41.95
2474.10	H	-65.58	0.00	-4.68	11.04	3.09	-52.95	-13	39.95
	V	-62.63	0.00	-4.68	11.04	3.09	-50.00	-13	37.00
3298.80	H	-66.30	0.00	-5.98	12.61	3.63	-51.34	-13	38.34
	V	-64.96	0.00	-5.88	12.61	3.63	-50.10	-13	37.10
4123.50	H	-66.11	0.00	-9.50	12.69	4.29	-48.21	-13	35.21
	V	-65.65	0.00	-9.41	12.69	4.29	-47.84	-13	34.84
4948.20	H	-67.21	0.00	-10.39	13.08	4.95	-48.69	-13	35.69
	V	-67.44	0.00	-10.34	13.08	4.95	-48.97	-13	35.97
5772.90	H	-68.54	0.00	-12.83	12.70	5.37	-48.38	-13	35.38
	V	-67.61	0.00	-12.79	12.70	5.37	-47.49	-13	34.49

Table 18. Field Strength of Spurious Emissions

Note: **1. All modes of operation were investigated and the worst -case emission are reported.**

9.4 RF Power Output

Measurement Result:

Up/Down Link	Modulation	Channel	Frequency (MHz)	RF Output Power (dBm)
Uplink	CDMA	Low	824.70	4.11
		Middle	836.52	4.66
		High	848.31	4.75
	TDMA	Low	824.04	5.61
		Middle	836.52	6.76
		High	848.97	6.83
	GSM	Low	824.20	6.78
		Middle	836.60	7.80
		High	848.80	7.82
Downlink	CDMA	Low	824.70	5.09
		Middle	836.52	4.52
		High	848.31	4.94
	TDMA	Low	824.04	6.14
		Middle	836.52	6.33
		High	848.97	6.20
	GSM	Low	824.20	7.21
		Middle	836.60	7.28
		High	848.80	7.41

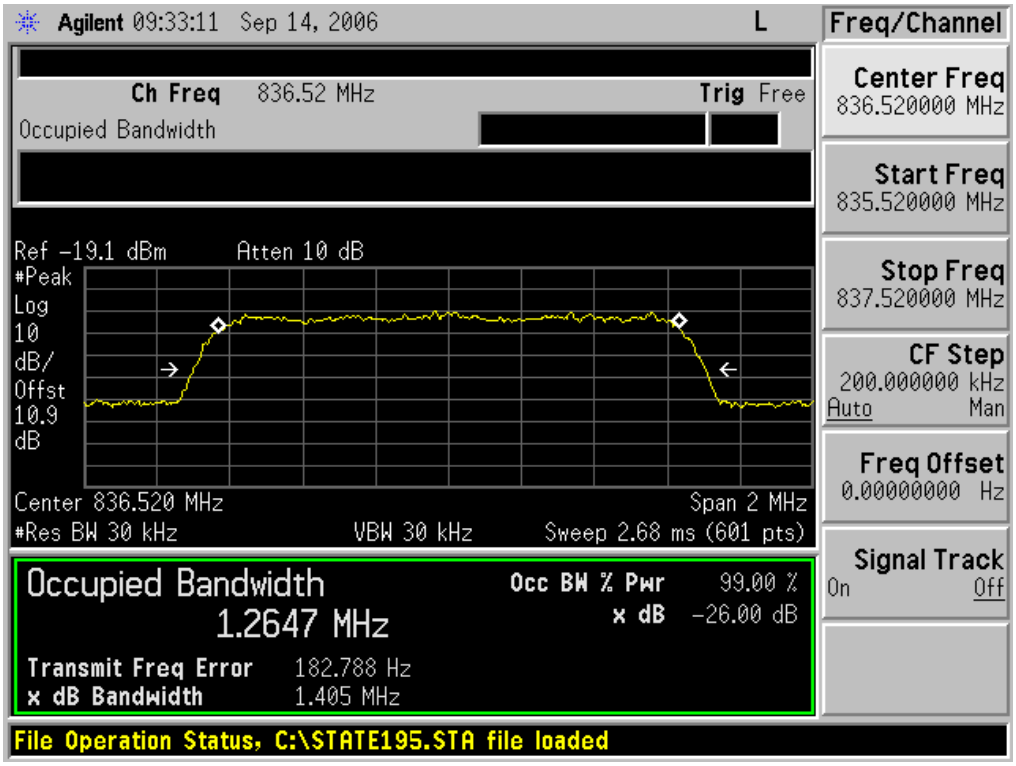
Table 19. RF Output power

9.5 Occupied Bandwidth

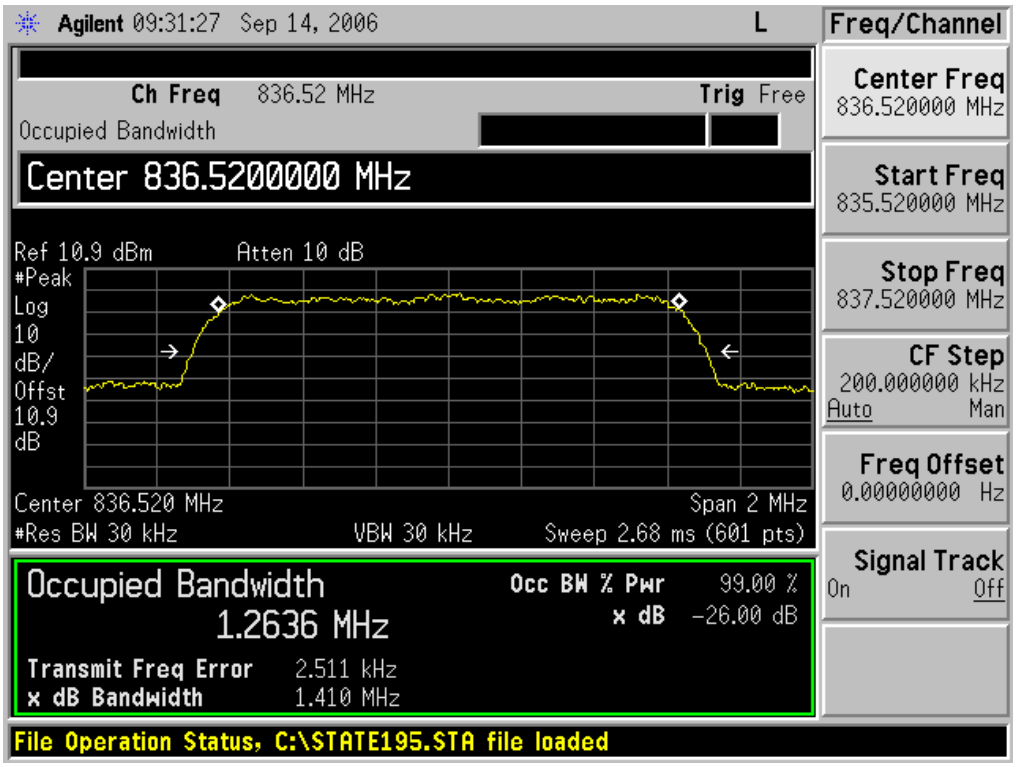
Measurement Result:

Up/Down Link	Modulation	Channel	Frequency (MHz)	Plots number
Uplink	CDMA	Middle	836.52	Plot 1 ~ Plot 2
	TDMA	Middle	836.52	Plot 3 ~ Plot 4
	GSM	Middle	836.60	Plot 5 ~ Plot 6
Downlink	CDMA	Middle	836.52	Plot 7 ~ Plot 8
	TDMA	Middle	836.52	Plot 9 ~ Plot 10
	GSM	Middle	836.60	Plot 11 ~ Plot 12

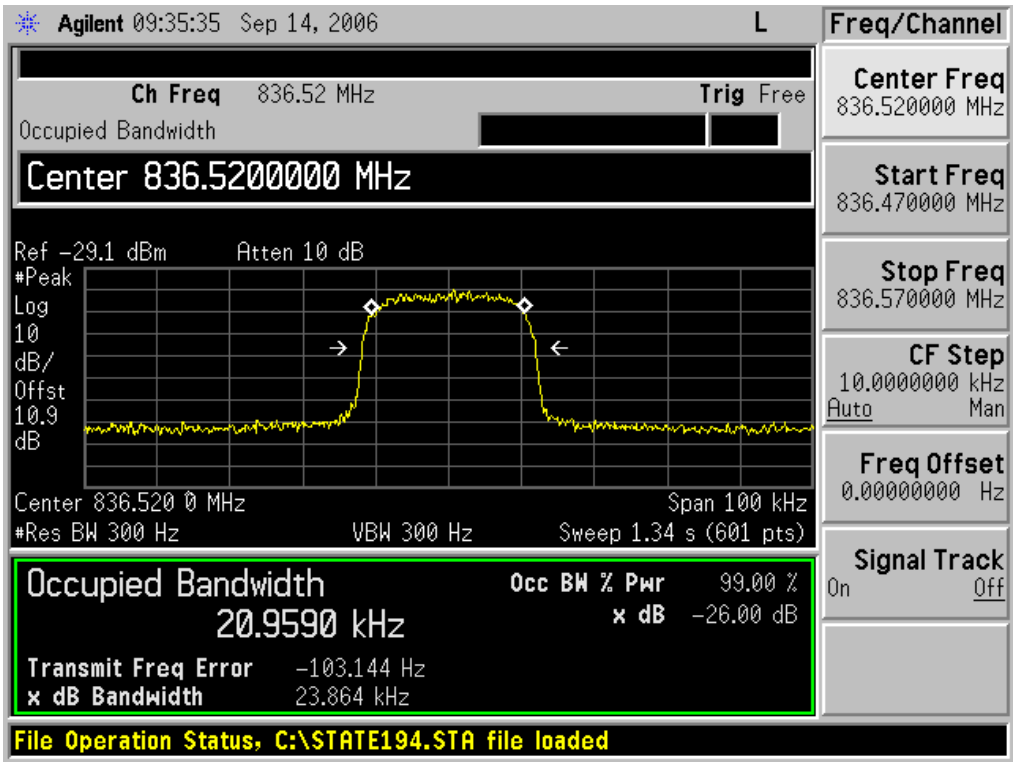
Table 20. Occupied Bandwidth



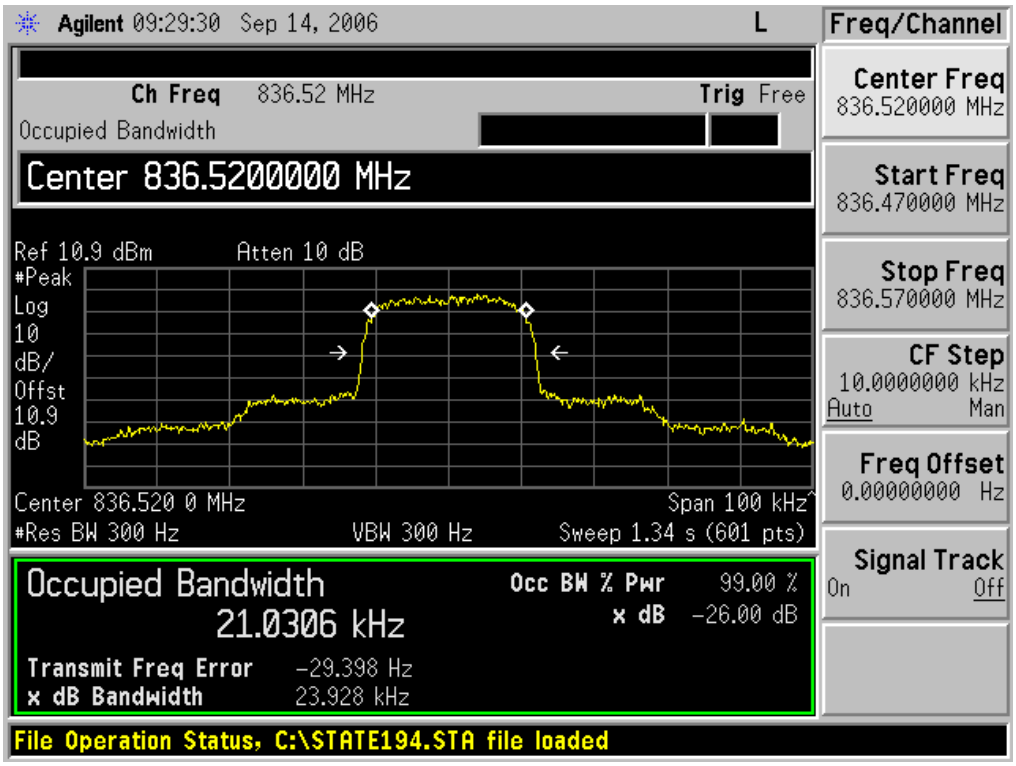
Plot 1. CDMA Uplink Input



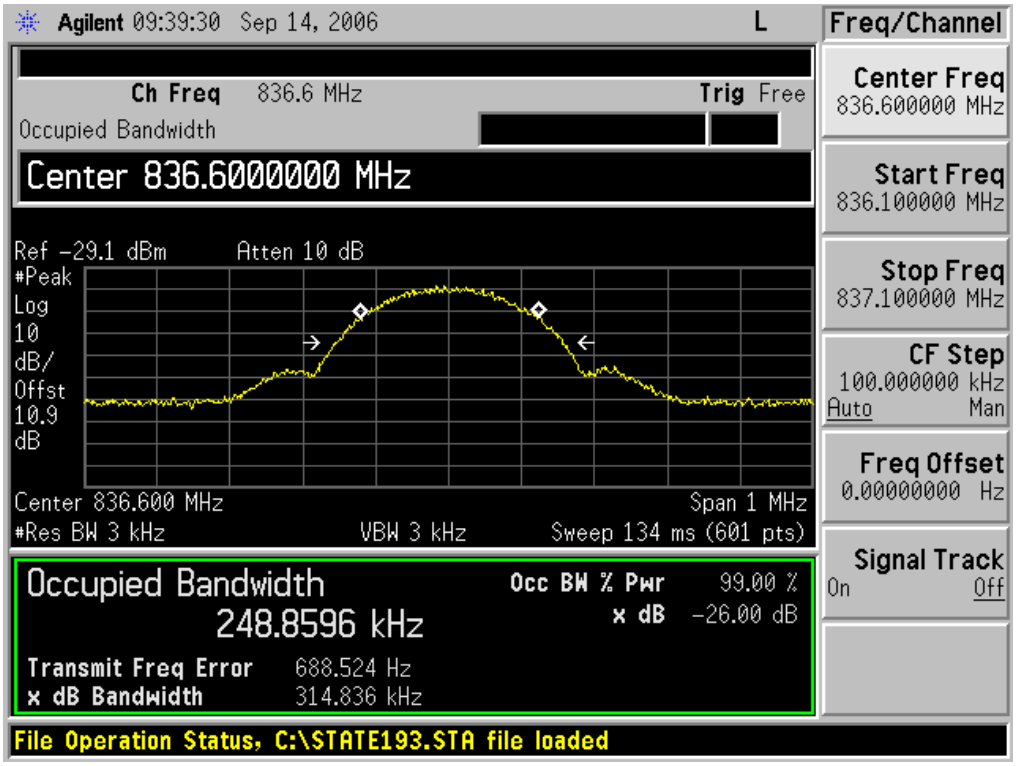
Plot 2. CDMA UplinkOutput



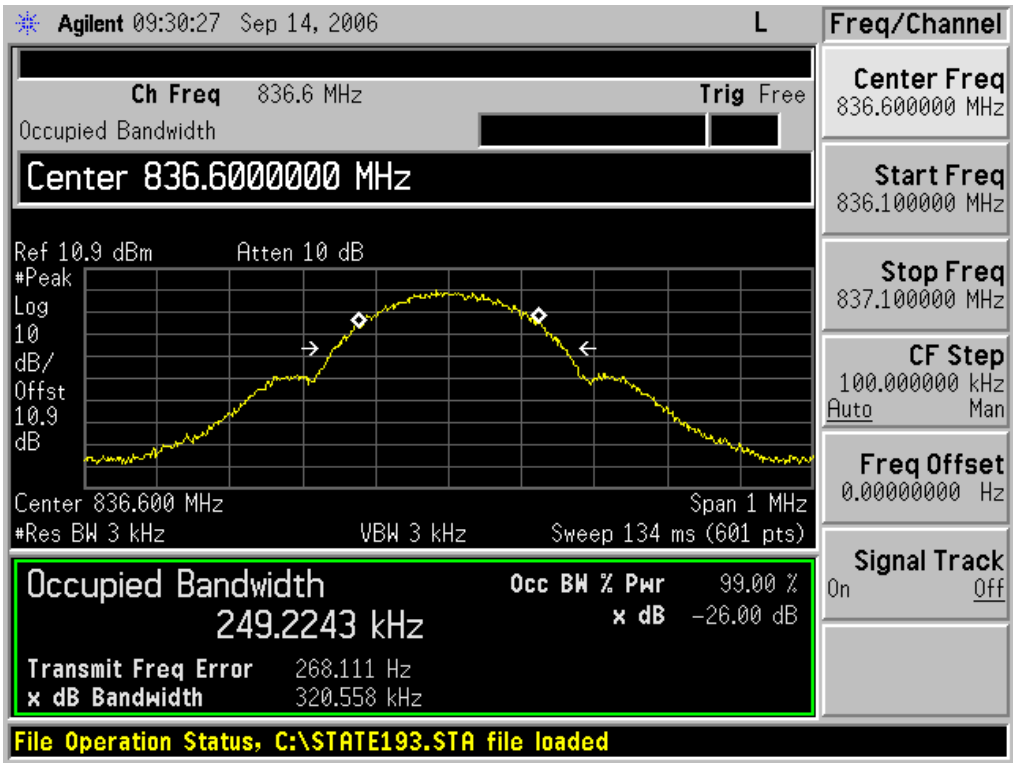
Plot 3. TDMA Uplink Input



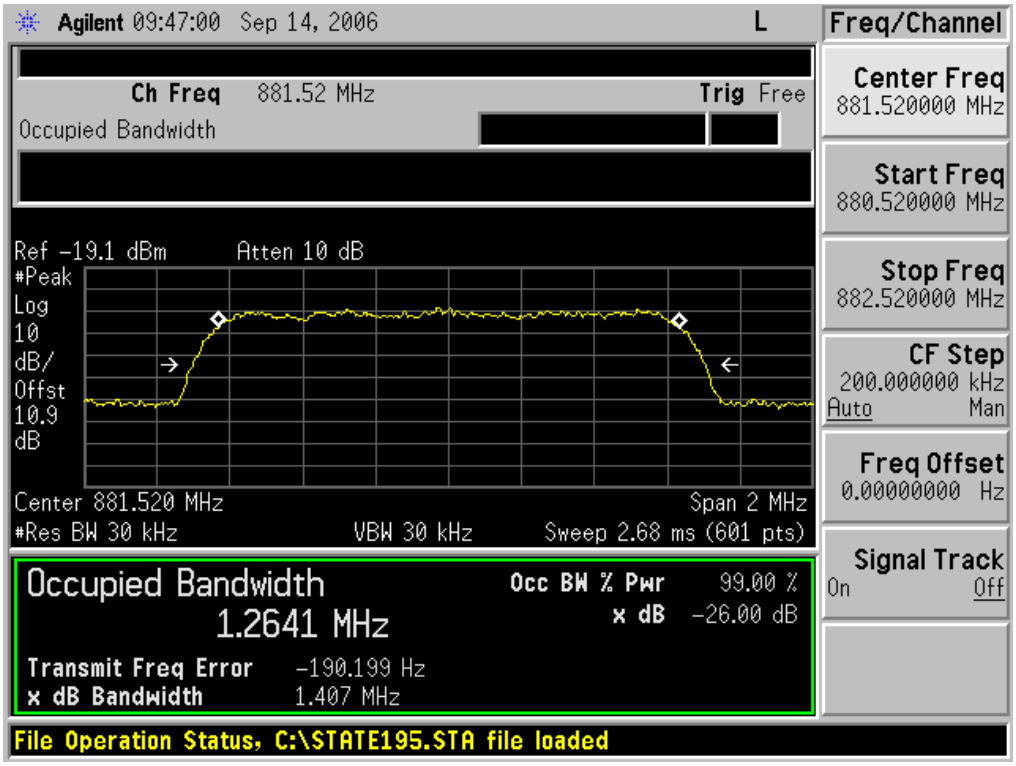
Plot 4. TDMA Uplink Output



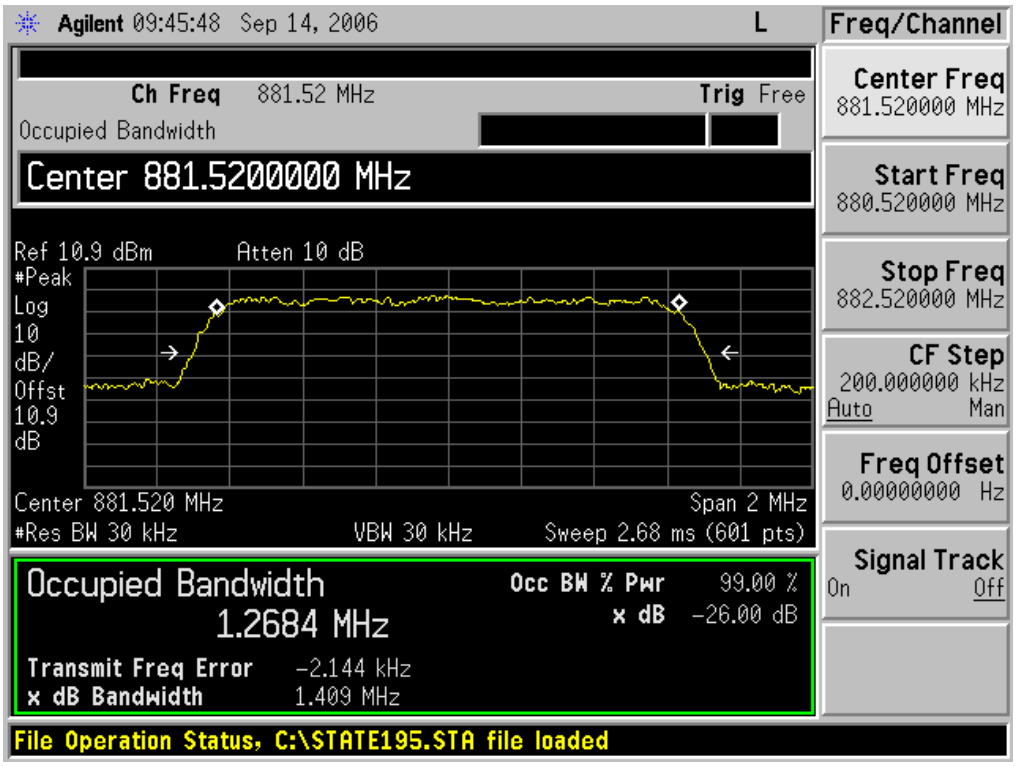
Plot 5. GSM Uplink Input



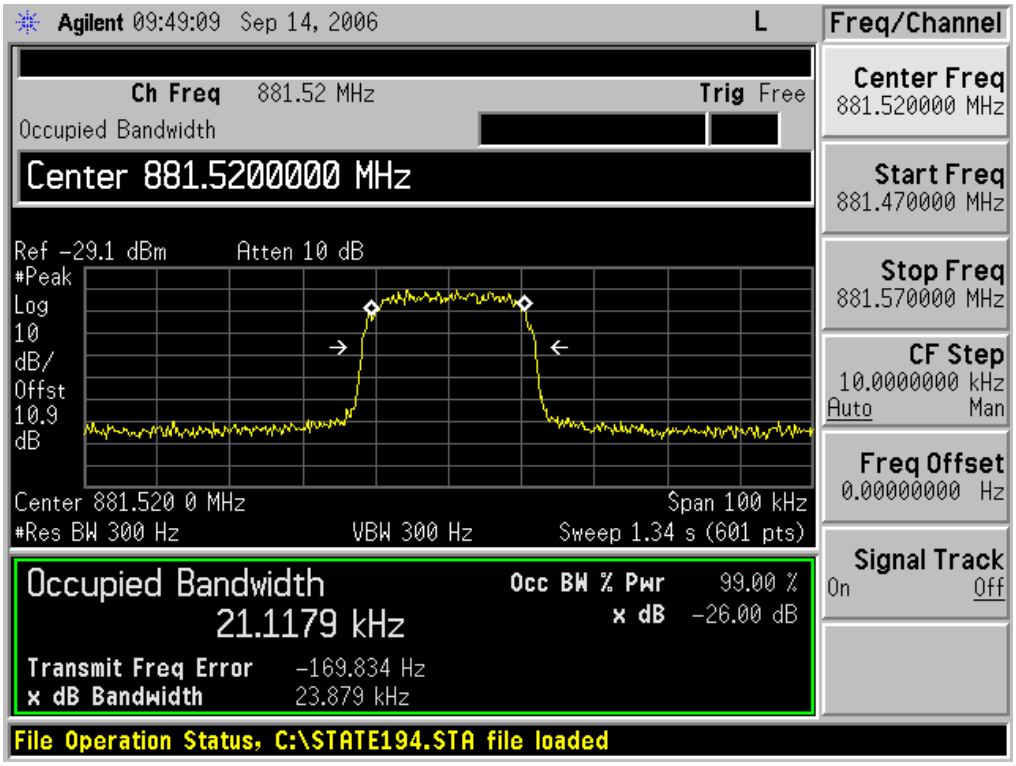
Plot 6. GSM Uplink Output



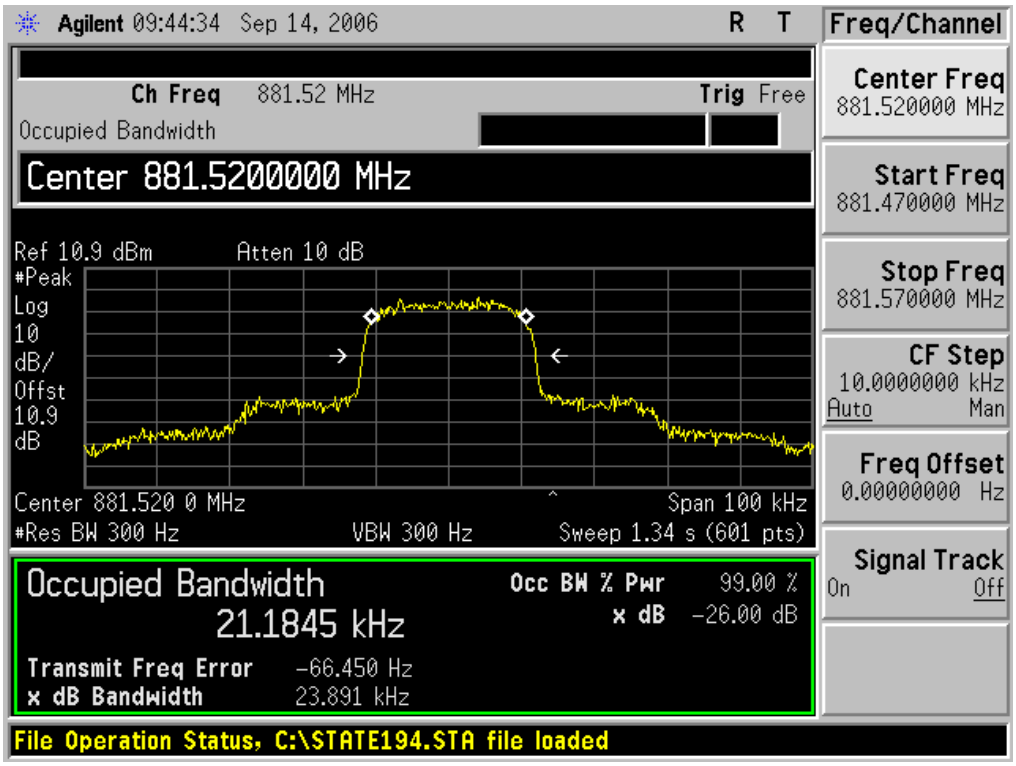
Plot 7. CDMA Downlink input



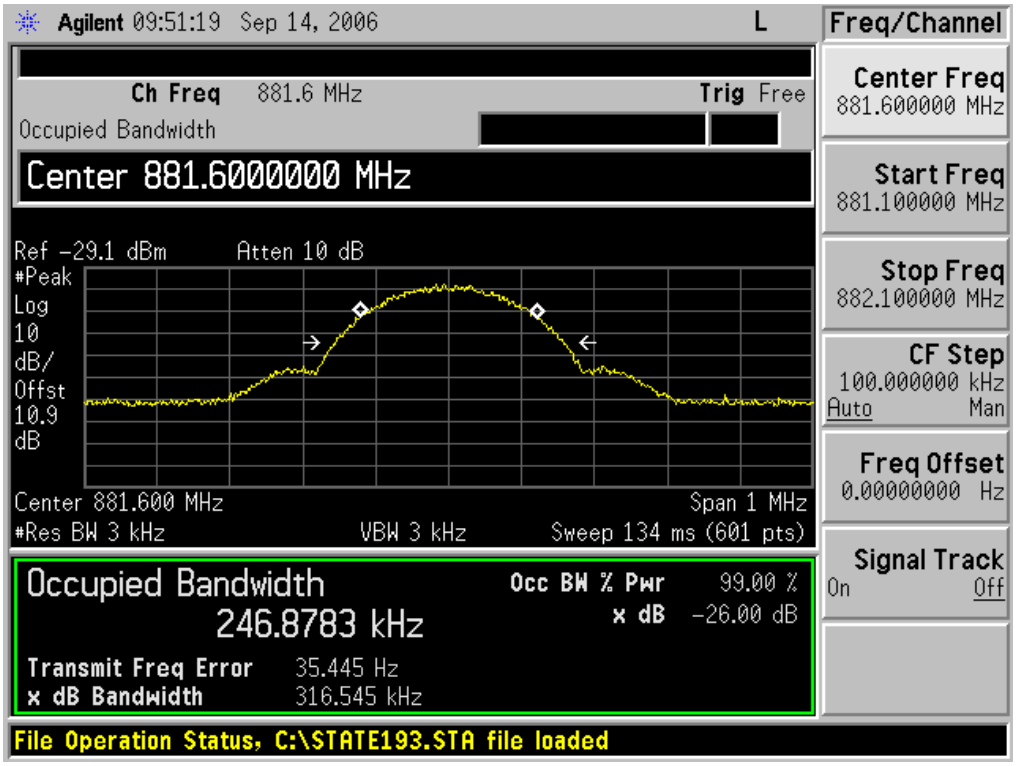
Plot 8. CDMA Downlink input



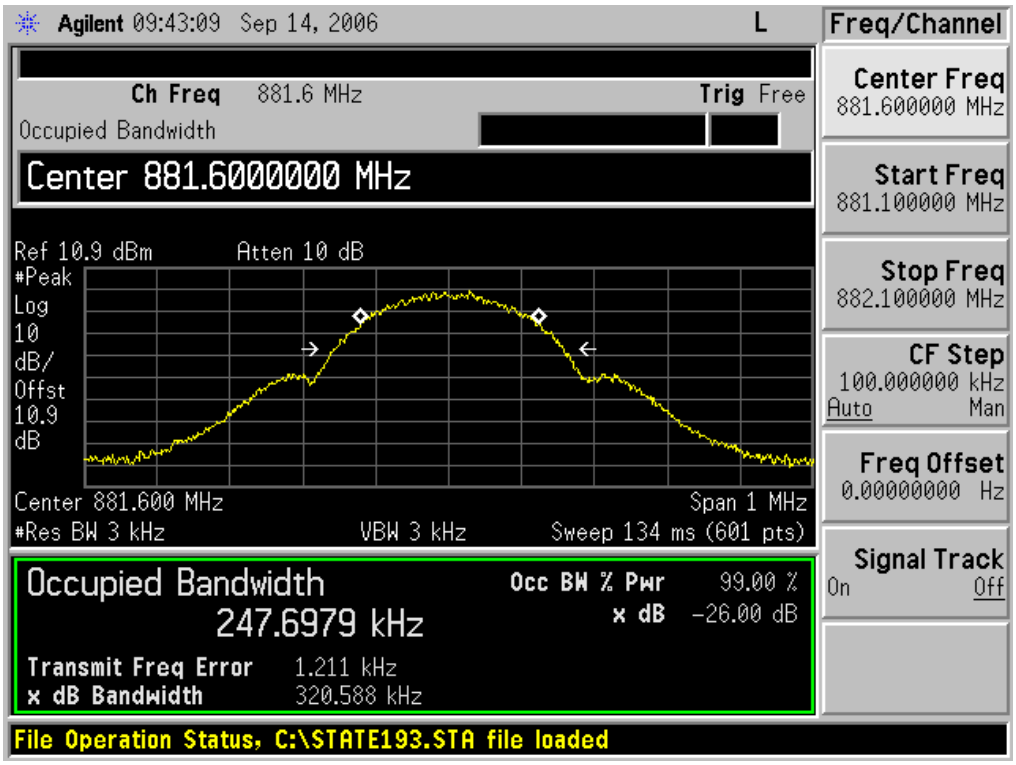
Plot 9. TDMA Downlink input



Plot 10. TDMA Downlink Output



Plot 11. GSM Downlink input



Plot 12. GSM Downlink Output

9.6 Spurious Emissions at Antenna Terminals and Two-Tone Test

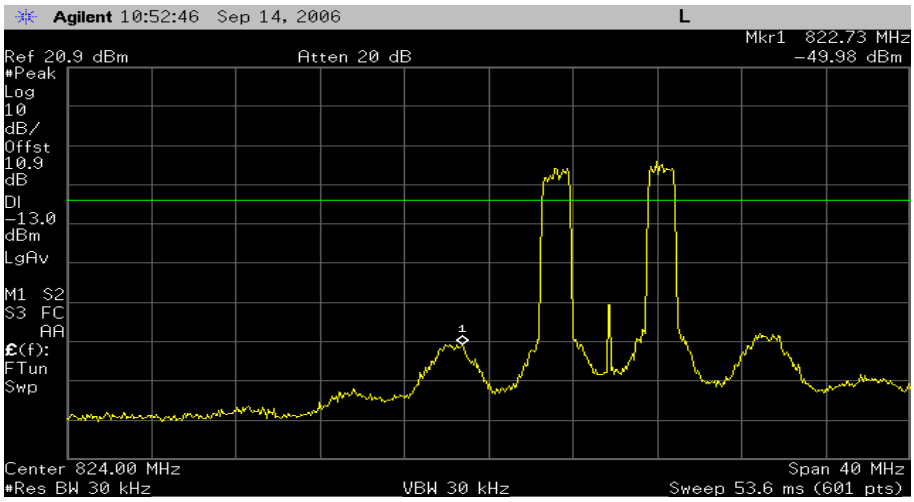
Measurement Result:

Up/Down Link	Modulation	Channel	Frequency Range (MHz)	Plots number
Uplink	CDMA	Low	Inband	Plot 13
			30-1000	Plot 14
			1000-10000	Plot 15
		Middle	30-1000	Plot 16
			1000-10000	Plot 17
		High	Inband	Plot 18
			30-1000	Plot 19
			1000-10000	Plot 20
	TDMA	Low	Inband	Plot 21
			30-1000	Plot 22
			1000-10000	Plot 23
		Middle	30-1000	Plot 24
			1000-10000	Plot 25
		High	Inband	Plot 26
			30-1000	Plot 27
			1000-10000	Plot 28
	CW	Low	Inband	Plot 29
			30-1000	Plot 30
			1000-10000	Plot 31
		Middle	30-1000	Plot 32
			1000-10000	Plot 33
		High	Inband	Plot 34
			30-1000	Plot 35
			1000-10000	Plot 36
	GSM	Low	30-1000	Plot 37
			1000-10000	Plot 38
		Middle	30-1000	Plot 39
			1000-10000	Plot 40
		High	30-1000	Plot 41
			1000-10000	Plot 42

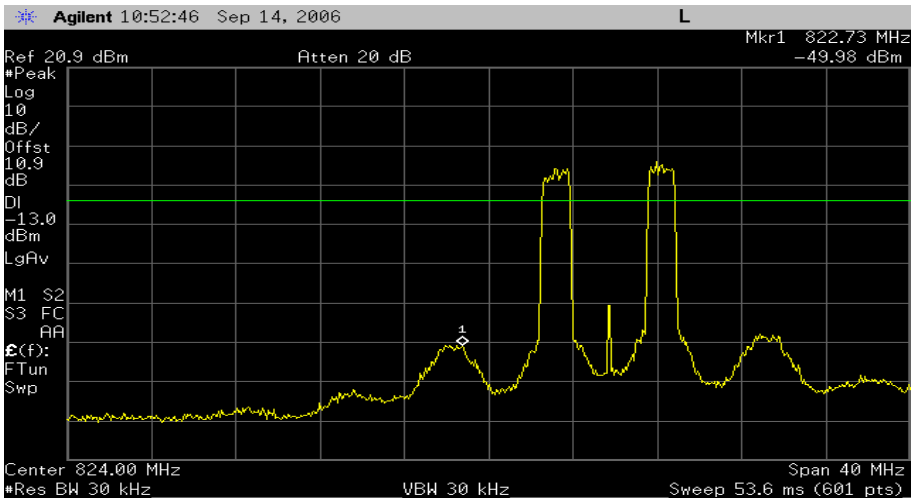
Table 21. Spurious Emissions at antenna terminals – Uplink

Up/Down Link	Modulation	Channel	Frequency Range (MHz)	Plots number
Downlink	CDMA	Low	Inband	Plot 43
			30-1000	Plot 44
			1000-10000	Plot 45
		Middle	30-1000	Plot 46
			1000-10000	Plot 47
		High	Inband	Plot 48
			30-1000	Plot 49
			1000-10000	Plot 50
	TDMA	Low	Inband	Plot 51
			30-1000	Plot 52
			1000-10000	Plot 53
		Middle	30-1000	Plot 54
			1000-10000	Plot 55
		High	Inband	Plot 56
			30-1000	Plot 57
			1000-10000	Plot 58
	CW	Low	Inband	Plot 59
			30-1000	Plot 60
			1000-10000	Plot 61
		Middle	30-1000	Plot 62
			1000-10000	Plot 63
		High	Inband	Plot 64
			30-1000	Plot 65
			1000-10000	Plot 66
	GSM	Low	30-1000	Plot 67
			1000-10000	Plot 68
		Middle	30-1000	Plot 69
			1000-10000	Plot 70
		High	30-1000	Plot 71
			1000-10000	Plot 72

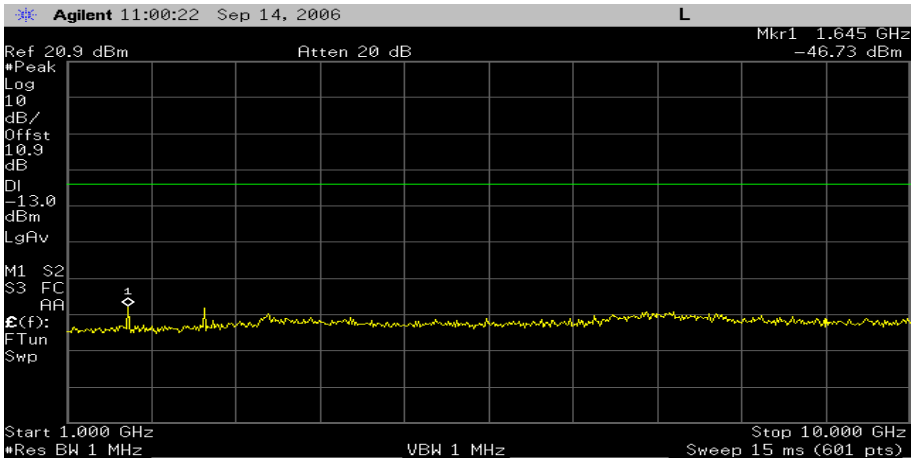
Table 22. Spurious Emissions at antenna terminals - Downlink



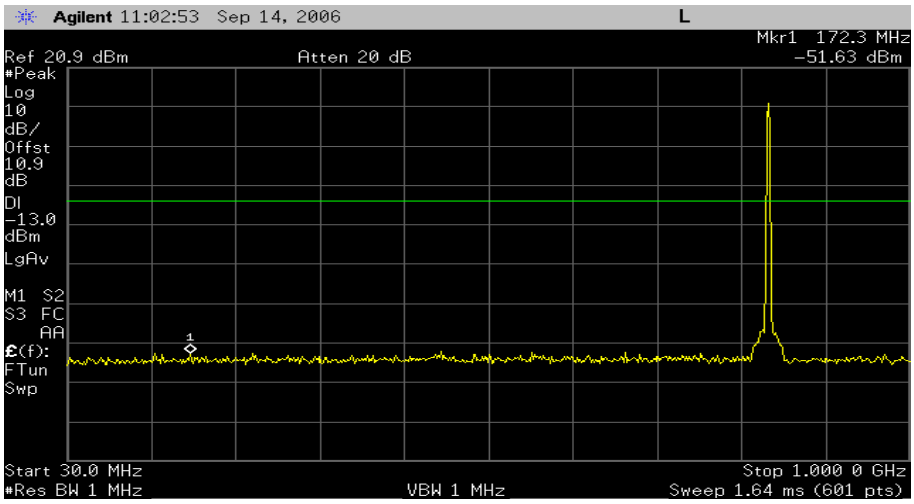
Plot 13. Uplink CDMA Low Channel(Inband)



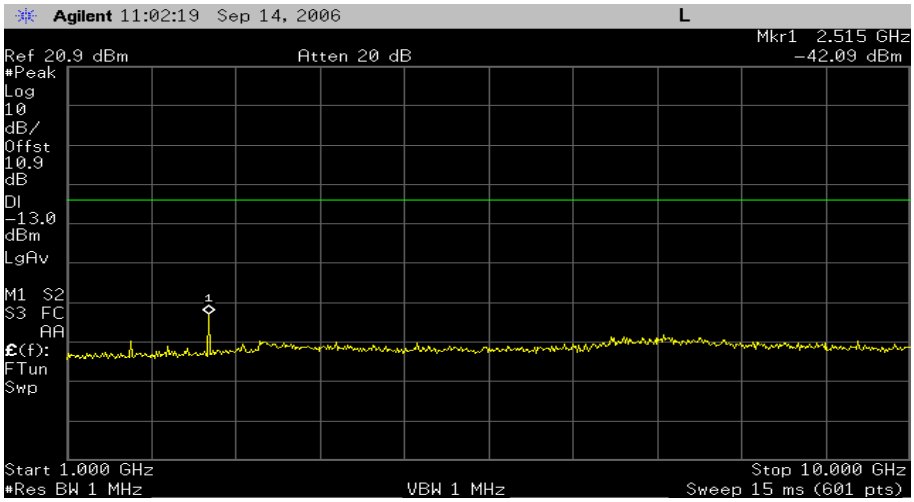
Plot 14. Uplink CDMA Low Channel(30MHz~1GHz)



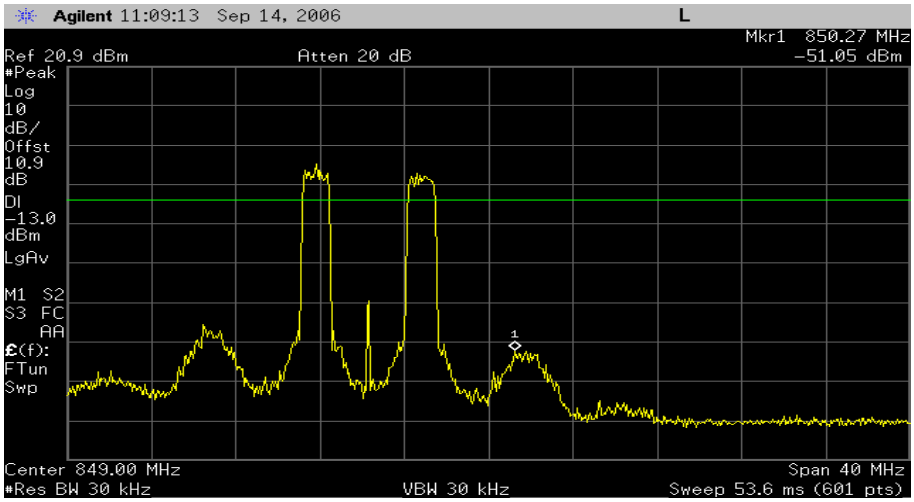
Plot 15. Uplink CDMA Low Channel(1GHz~10GHz)



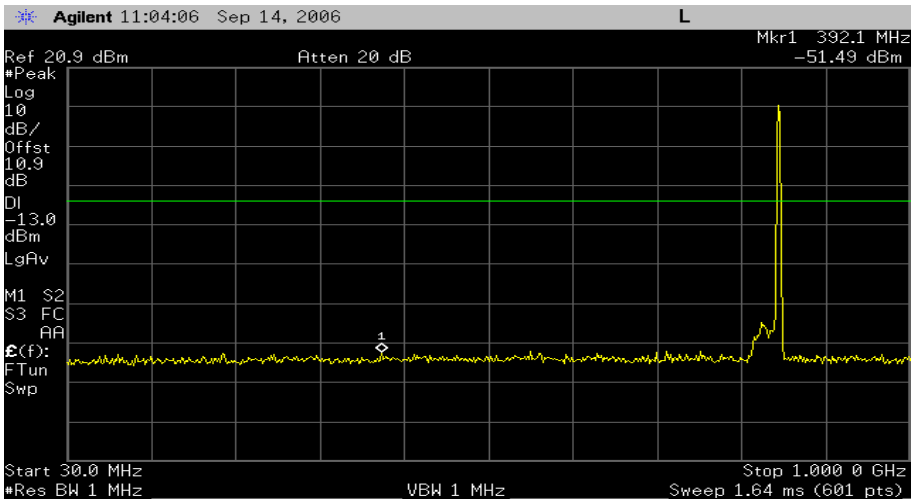
Plot 16. Uplink CDMA Middle Channel(30MHz~1GHz)



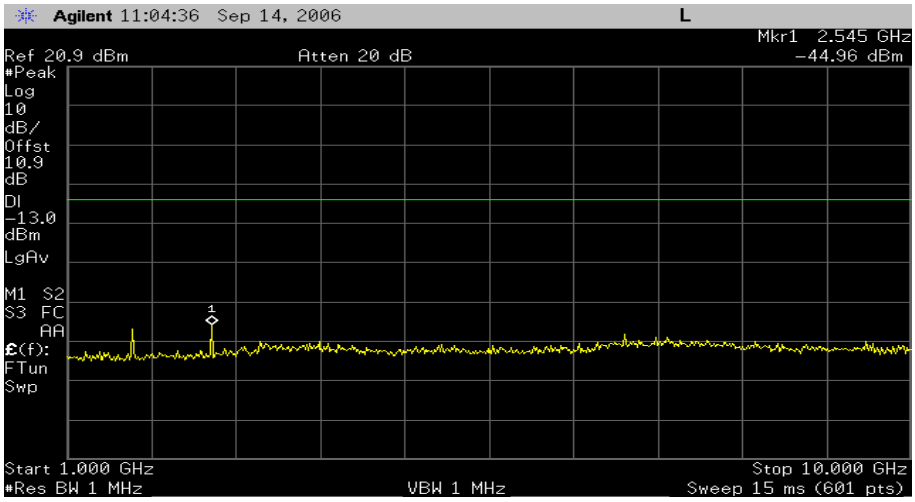
Plot 17. Uplink CDMA Middle Channel(1GHz~10GHz)



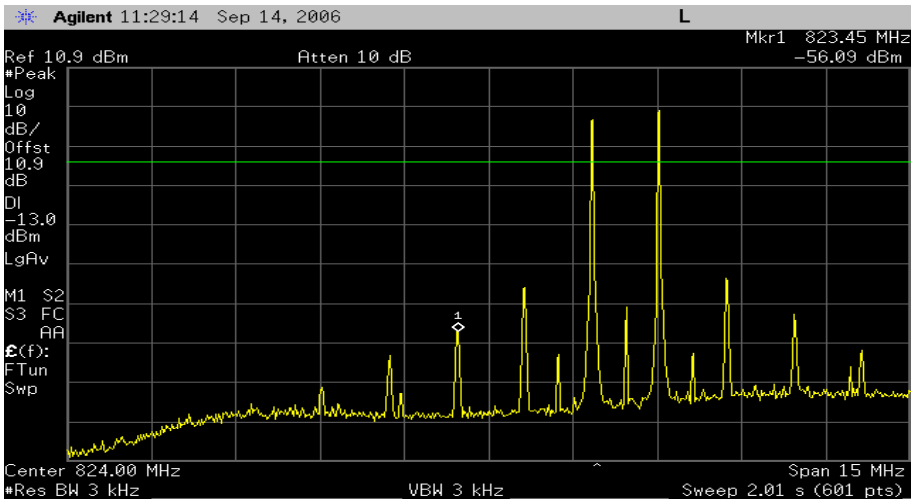
Plot 18. Uplink CDMA High Channel(Inband)



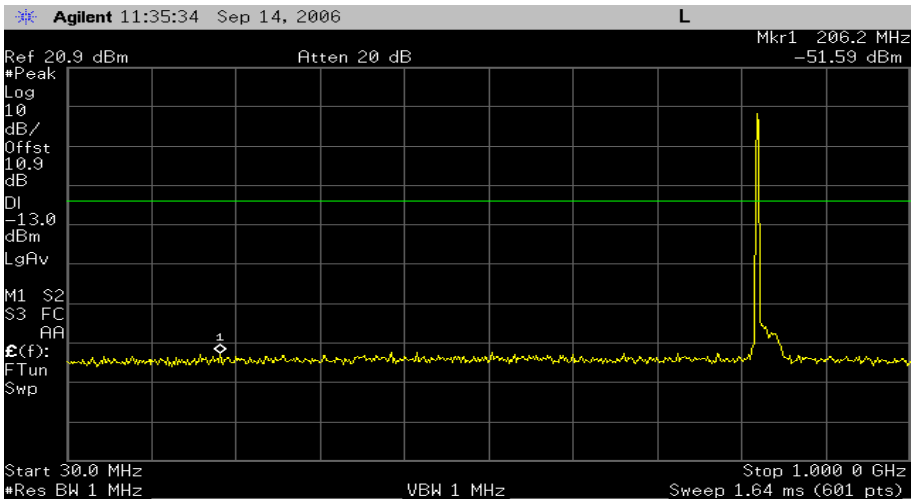
Plot 19. Uplink CDMA High Channel(30MHz~1GHz)



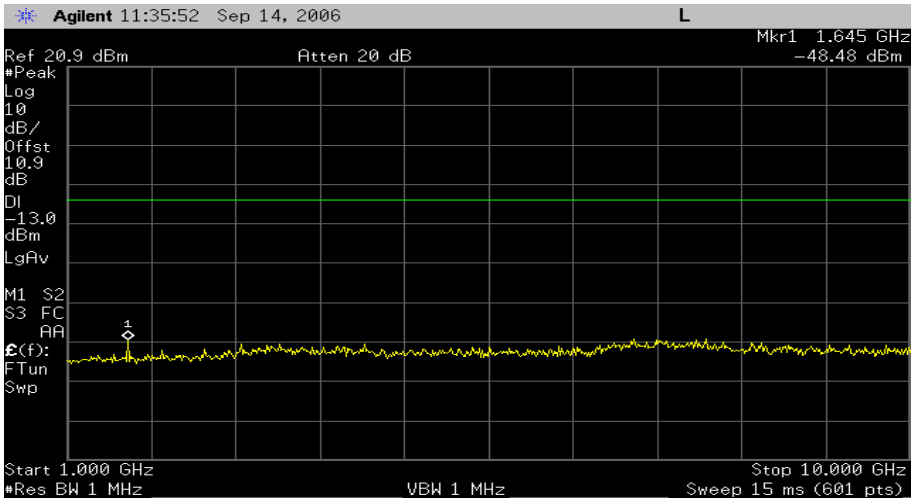
Plot 20. Uplink CDMA High Channel(1GHz~10GHz)



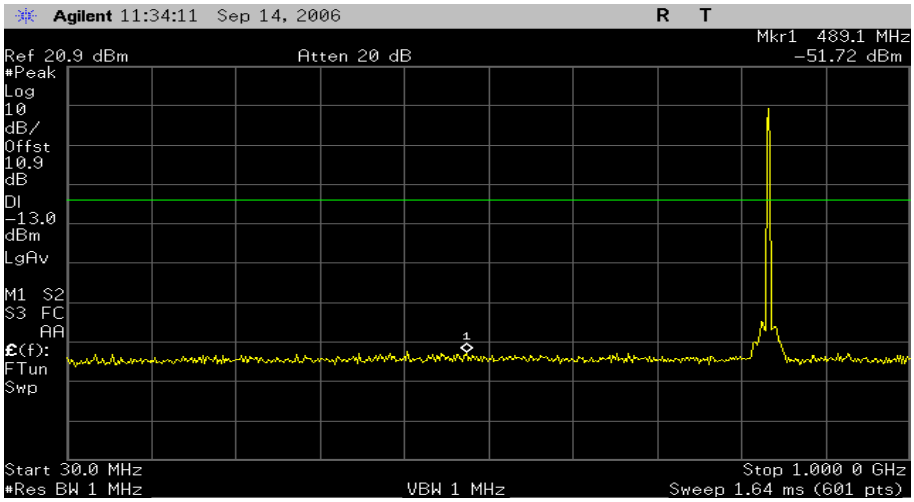
Plot 21. Uplink TDMA Low Channel(Inband)



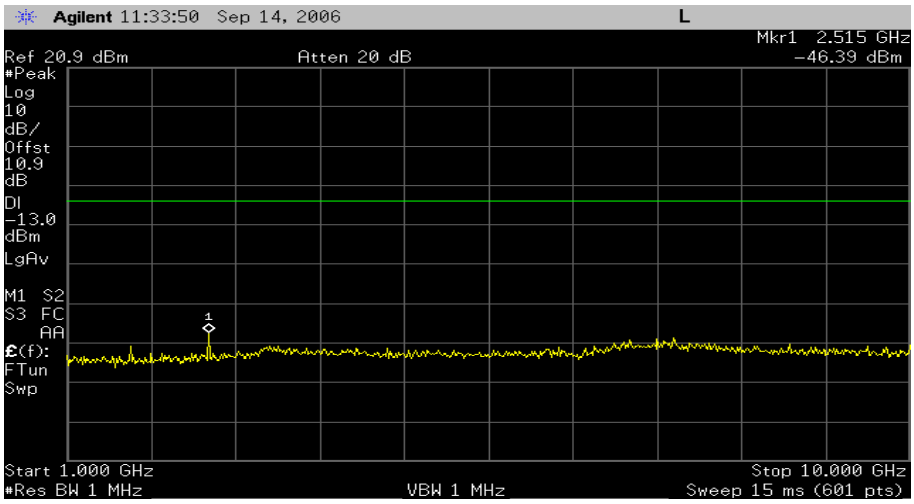
Plot 22. Uplink TDMA Low Channel(30MHz~1GHz)



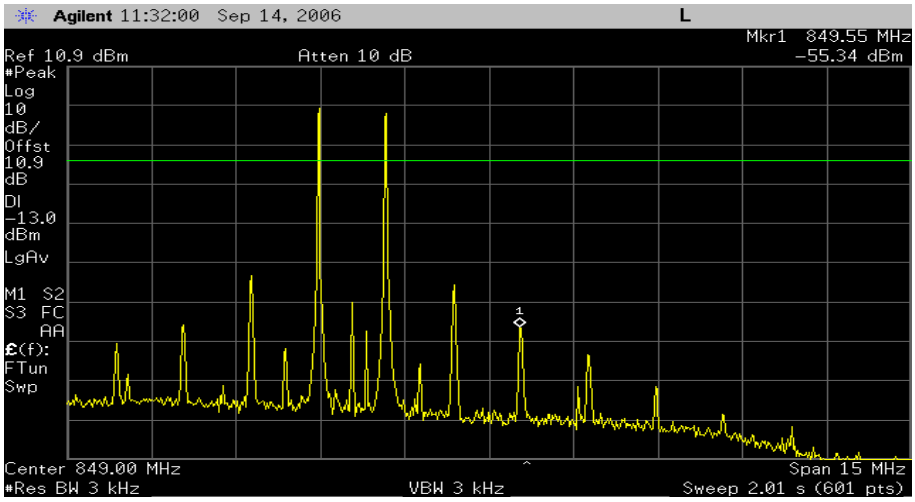
Plot 23. Uplink TDMA Low Channel(1GHz~10GHz)



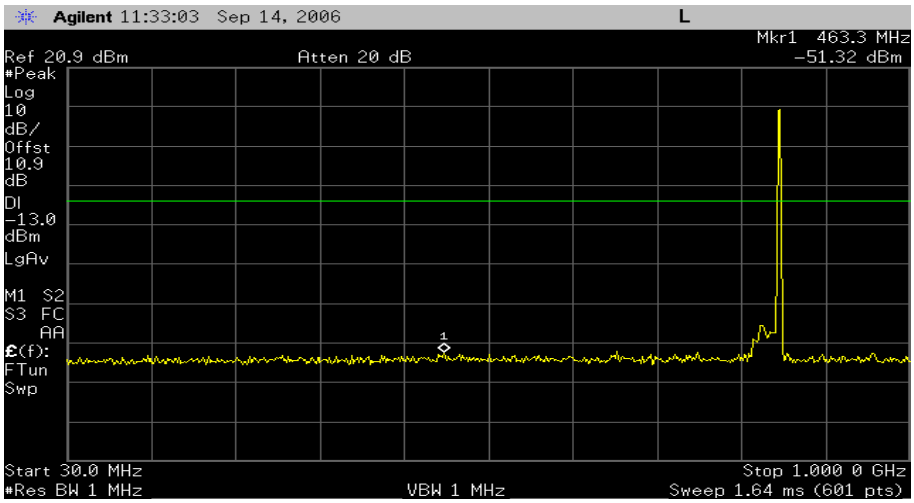
Plot 24. Uplink TDMA Middle Channel(30MHz~1GHz)



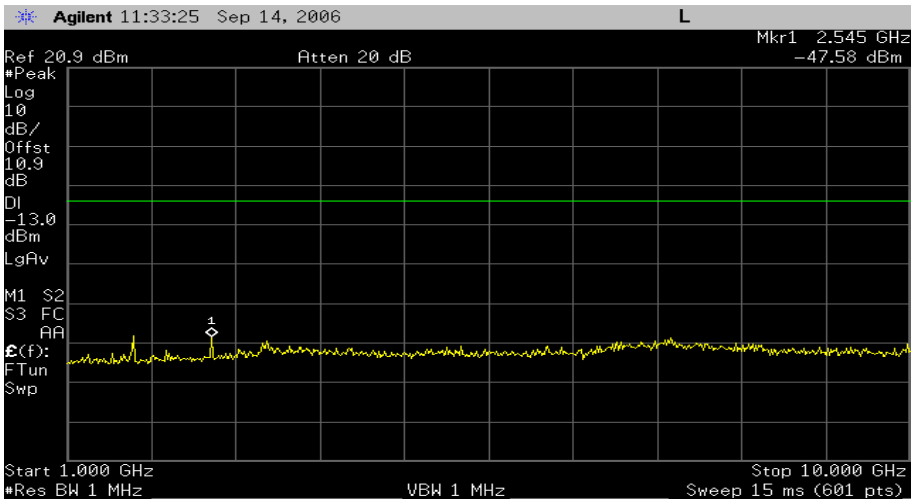
Plot 25. Uplink TDMA Middle Channel(1GHz~10GHz)



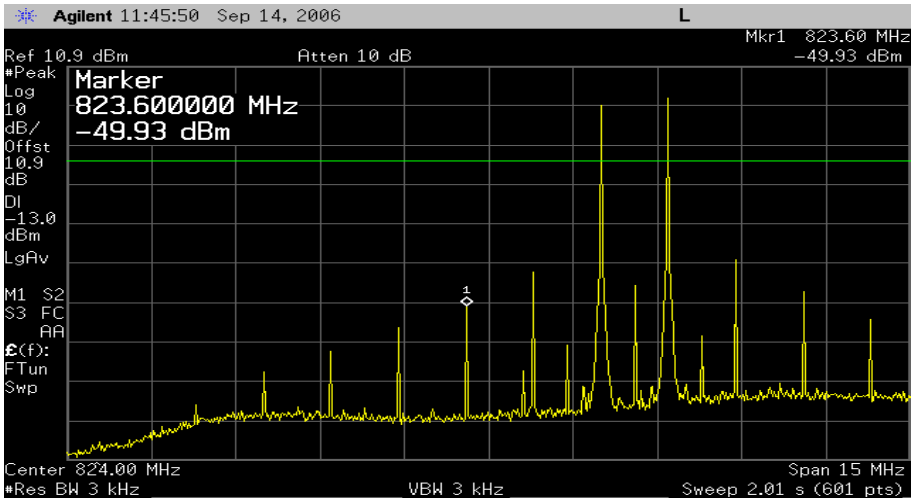
Plot 26. Uplink TDMA High Channel(Inband)



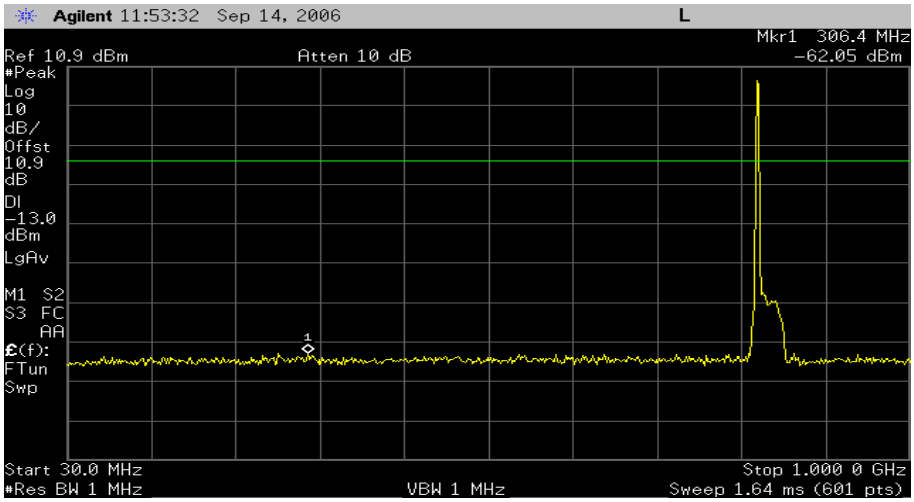
Plot 27. Uplink TDMA High Channel(30MHz~1GHz)



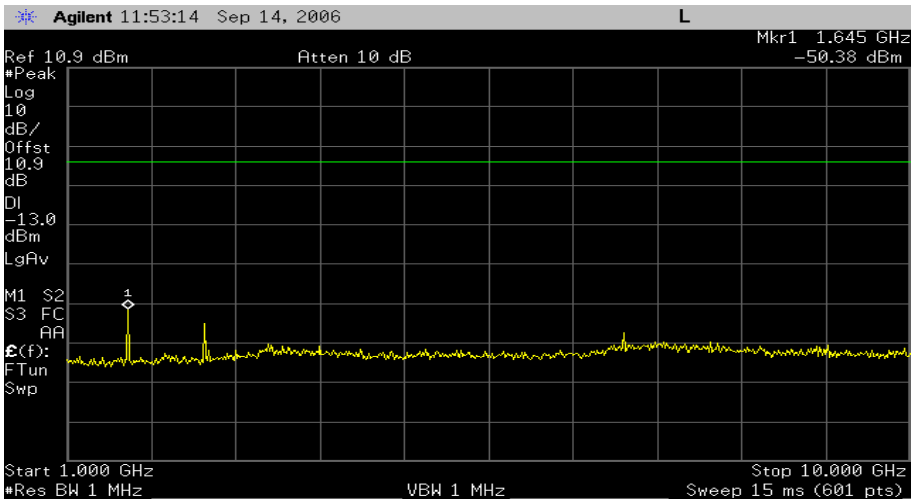
Plot 28. Uplink TDMA High Channel(1GHz~10GHz)



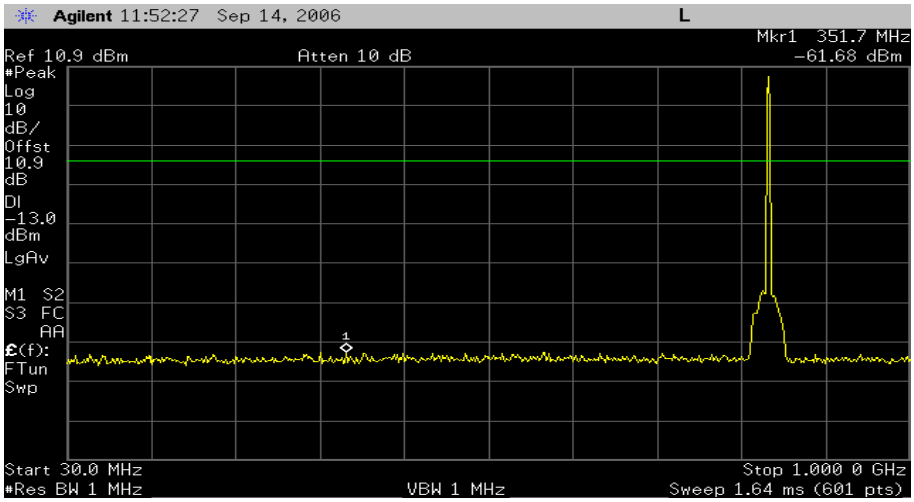
Plot 29. Uplink CW Low Channel(Inband)



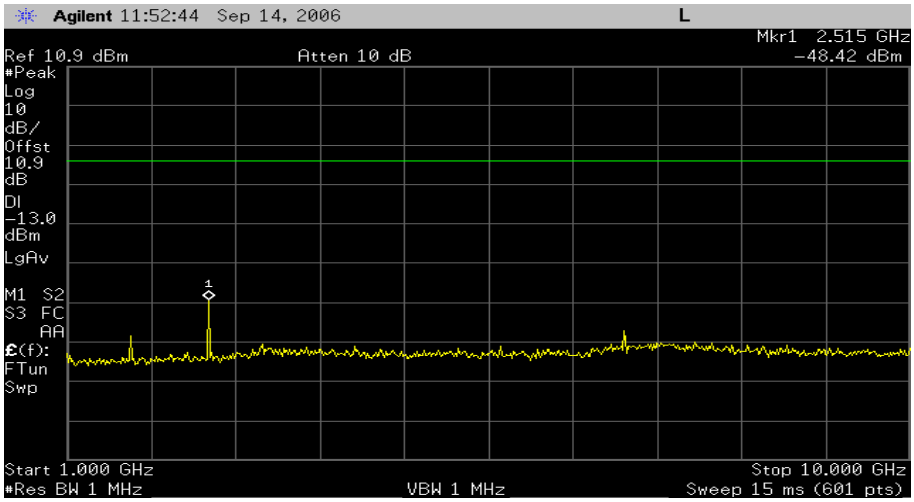
Plot 30. Uplink CW Low Channel(30MHz~1GHz)



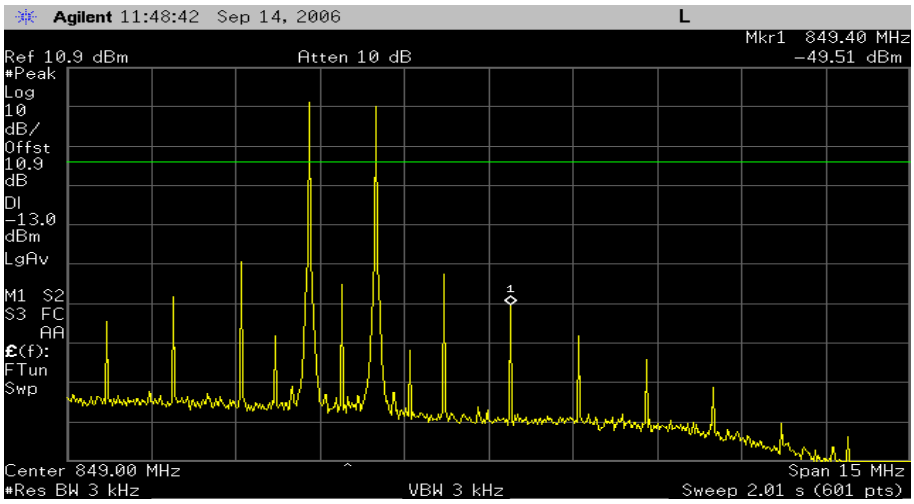
Plot 31. Uplink CW Low Channel(1GHz~10GHz)



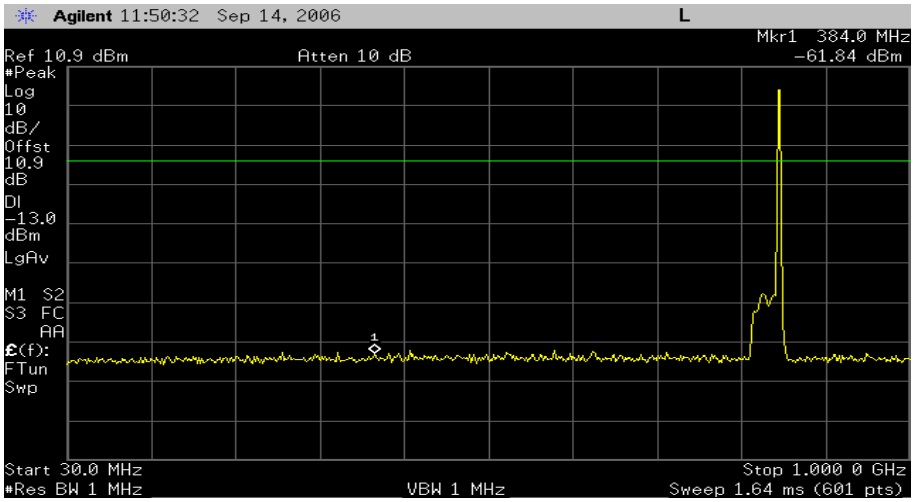
Plot 32. Uplink CW Middle Channel(30MHz~1GHz)



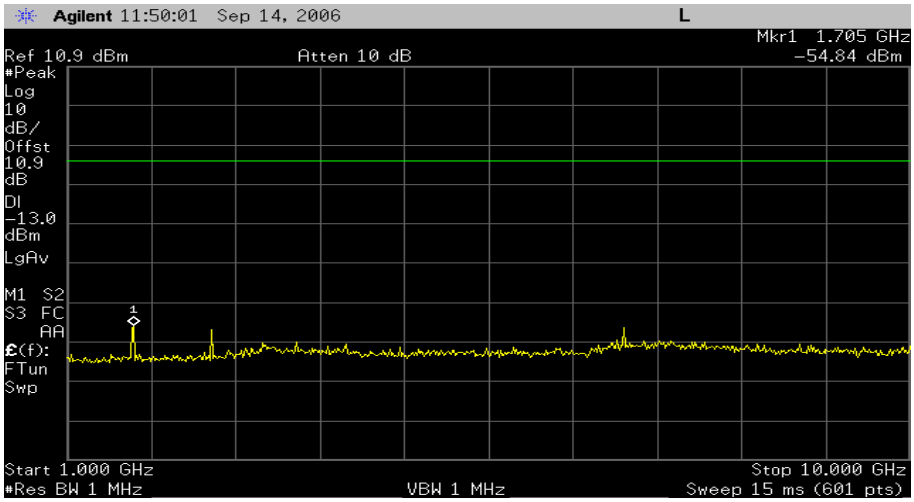
Plot 33. Uplink CW Middle Channel(1GHz~10GHz)



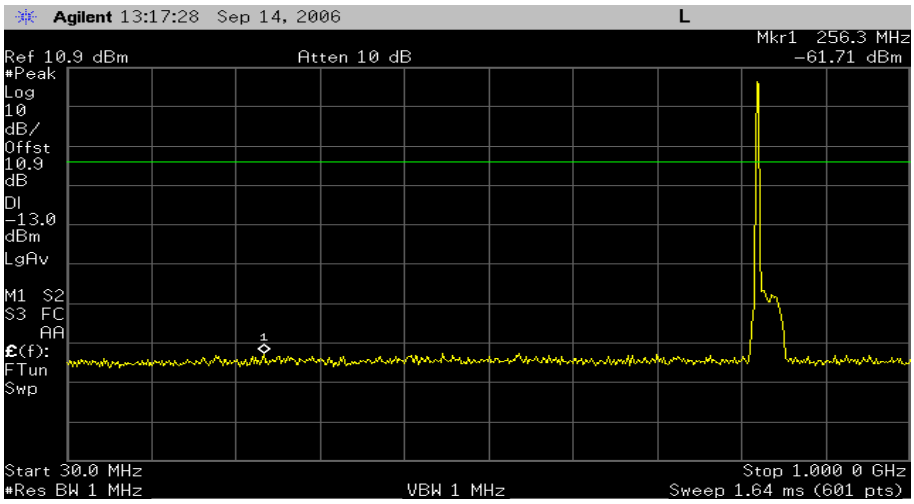
Plot 34. Uplink CW High Channel(Inband)



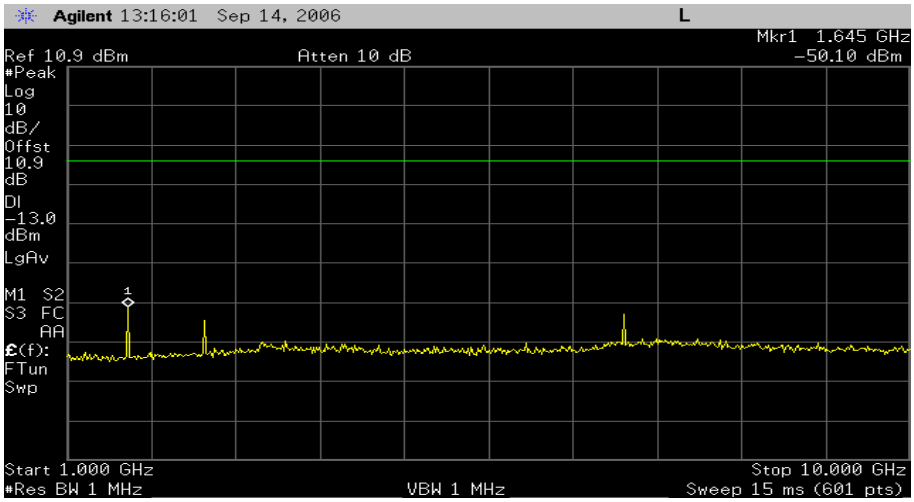
Plot 35. Uplink CW High Channel(30MHz~1GHz)



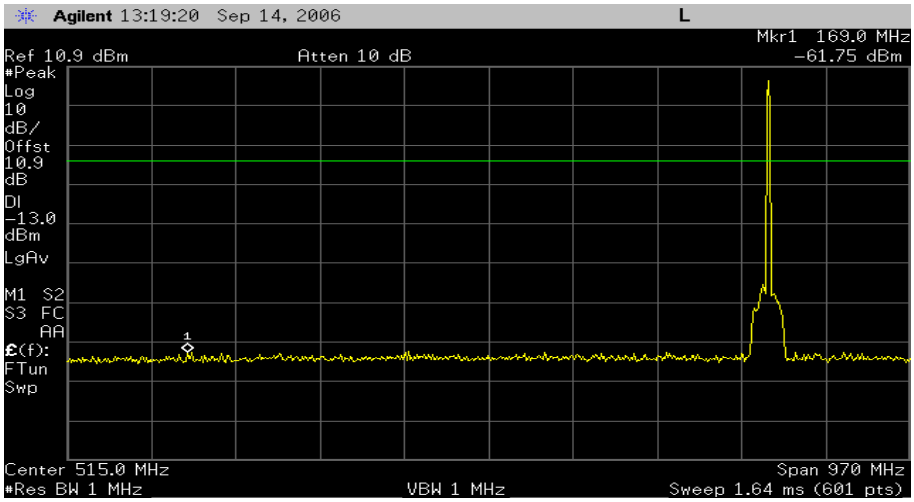
Plot 36. Uplink CW High Channel(1GHz~10GHz)



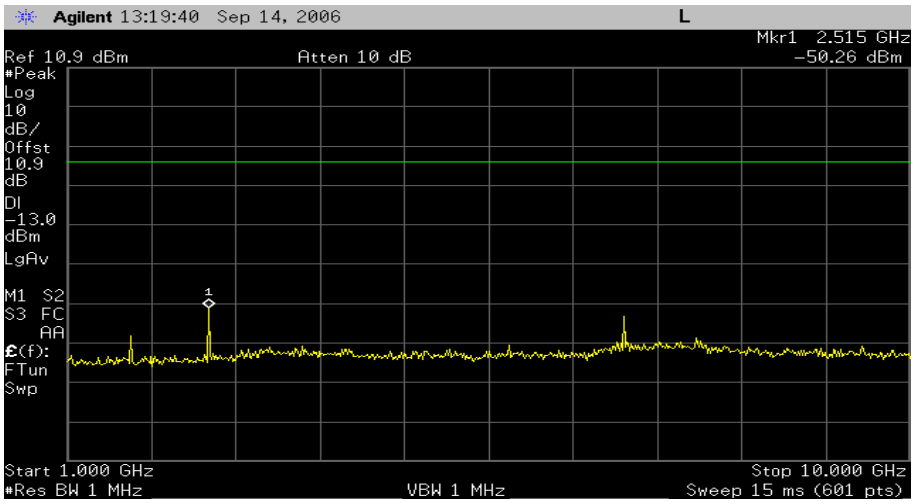
Plot 37. Uplink GSM Low Channel(30MHz~1GHz)



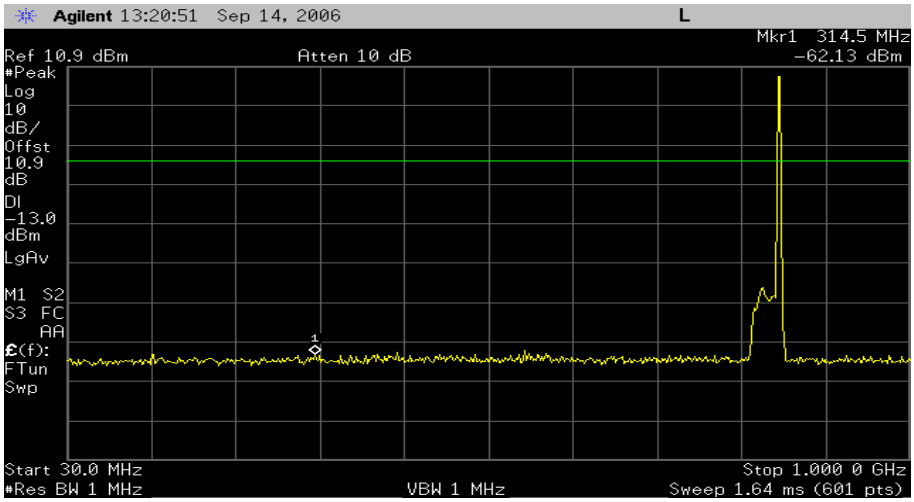
Plot 38. Uplink GSM Low Channel(1GHz~10GHz)



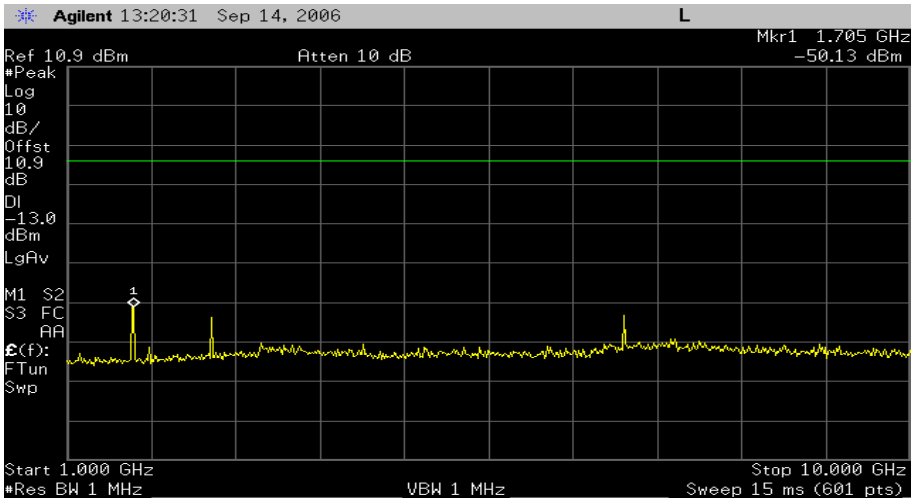
Plot 39. Uplink GSM Middle Channel(30MHz~1GHz)



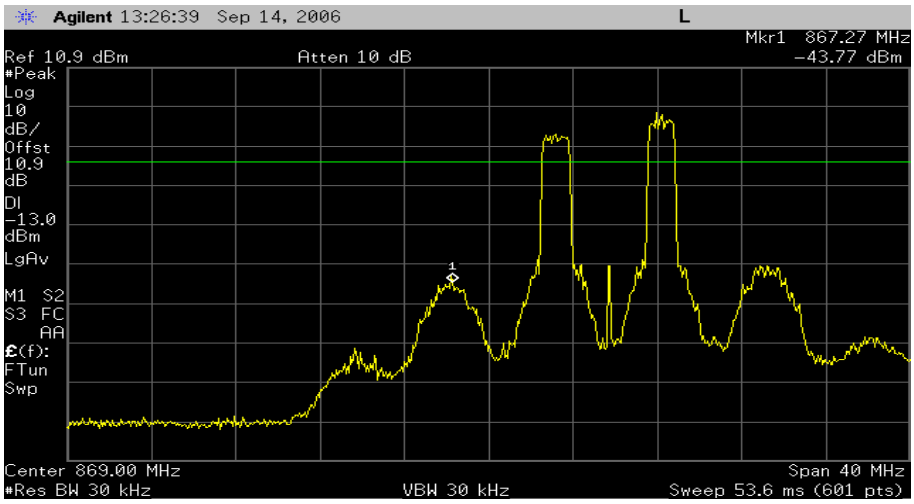
Plot 40. Uplink GSM Middle Channel(1GHz~10GHz)



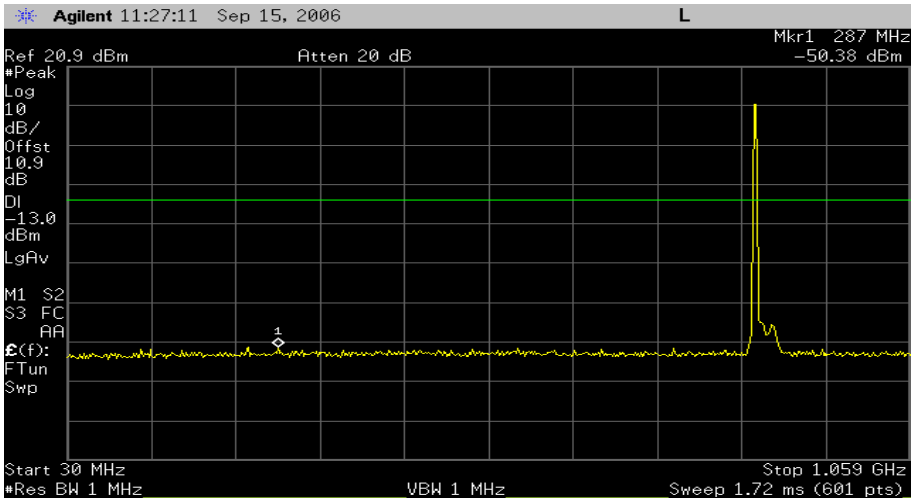
Plot 41. Uplink GSM High Channel(30MHz~1GHz)



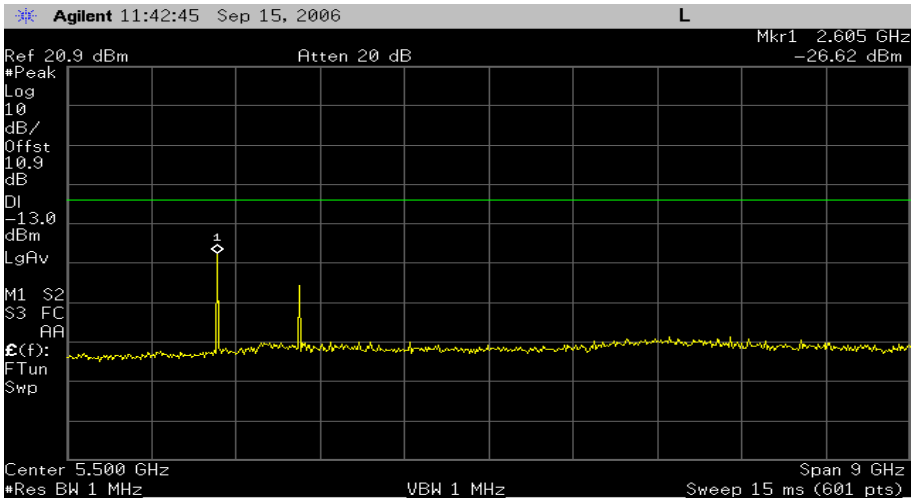
Plot 42. Uplink GSM High Channel(1GHz~10GHz)



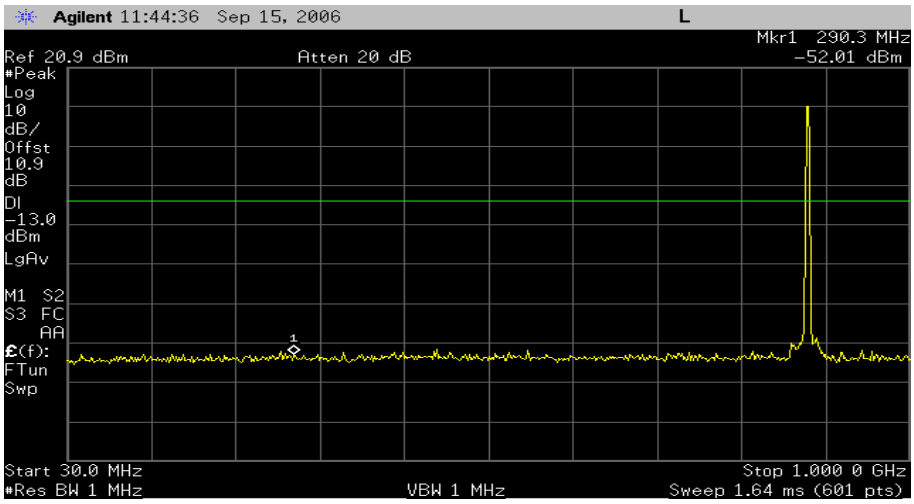
Plot 43. Downlink CDMA Low Channel(Inband)



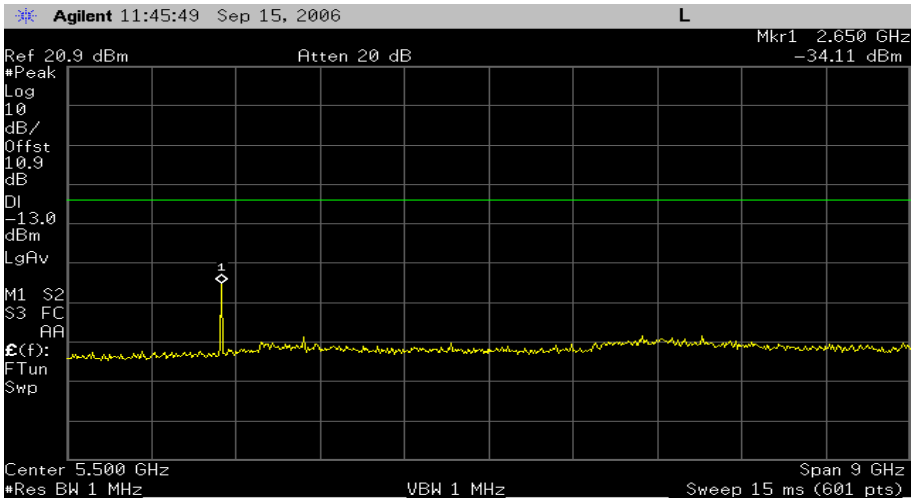
Plot 44. Downlink CDMA Low Channel(30MHz~1GHz)



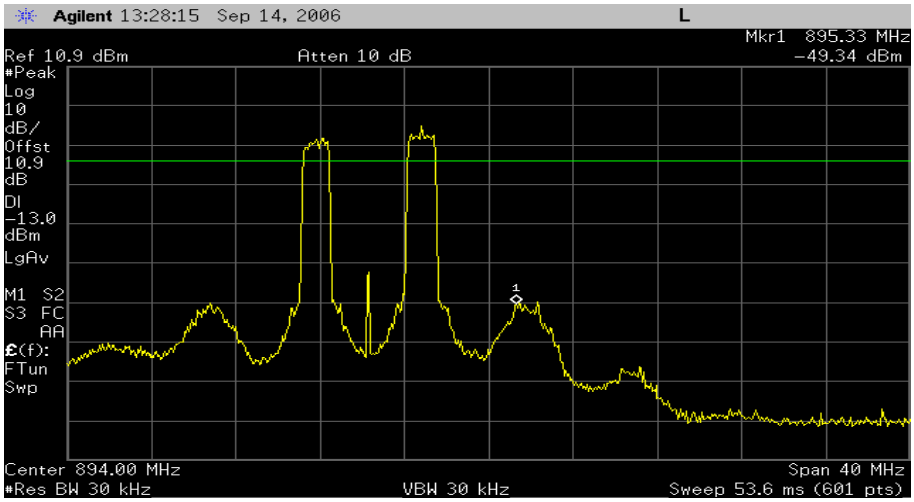
Plot 45. Downlink CDMA Low Channel(1GHz~10GHz)



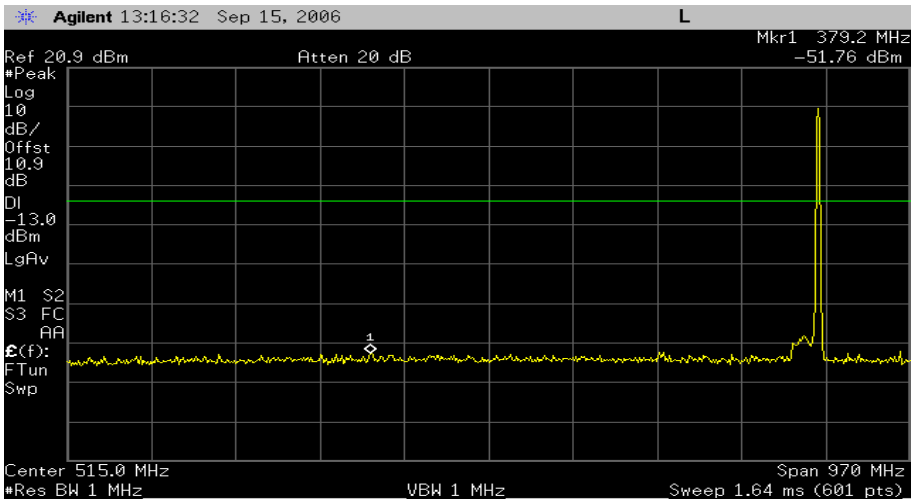
Plot 46. Downlink CDMA Middle Channel(30MHz~1GHz)



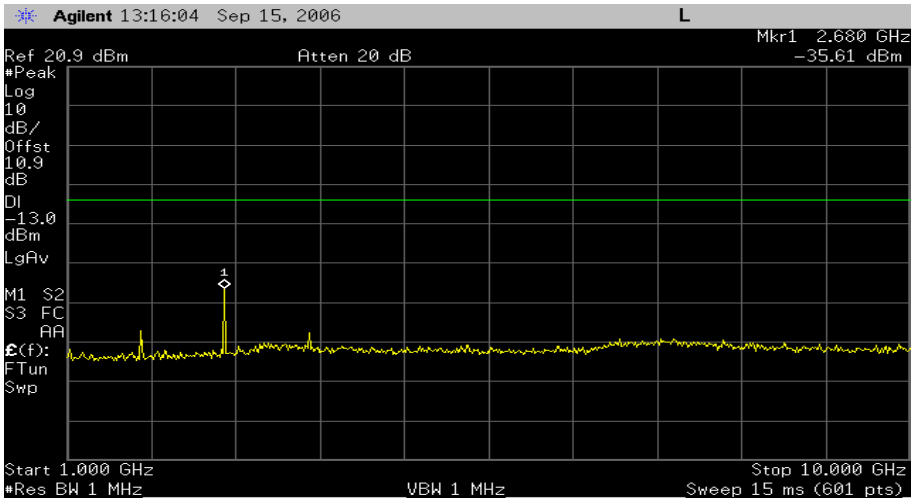
Plot 47. Downlink CDMA Middle Channel(1GHz~10GHz)



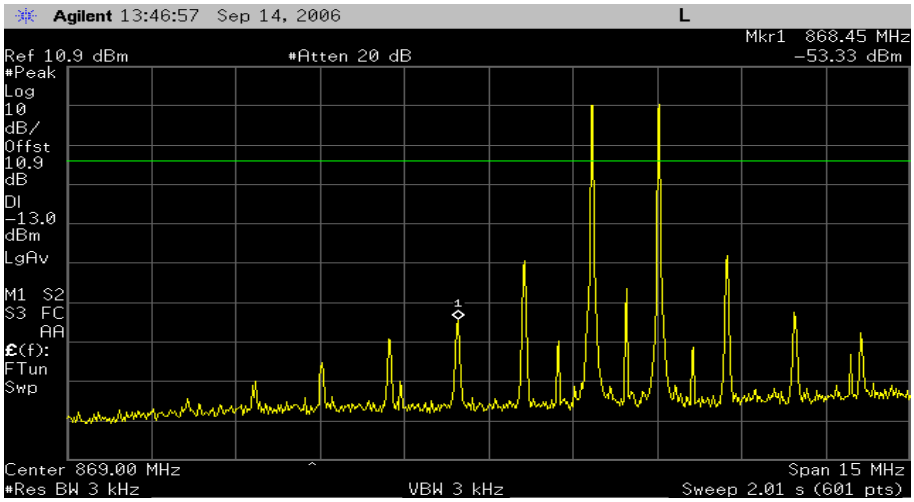
Plot 48. Downlink CDMA High Channel(Inband)



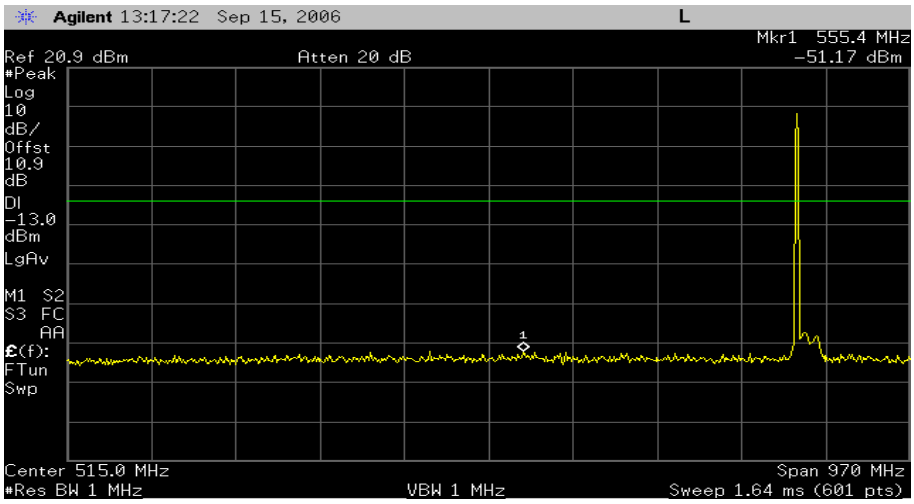
Plot 49. Downlink CDMA High Channel(30MHz~1GHz)



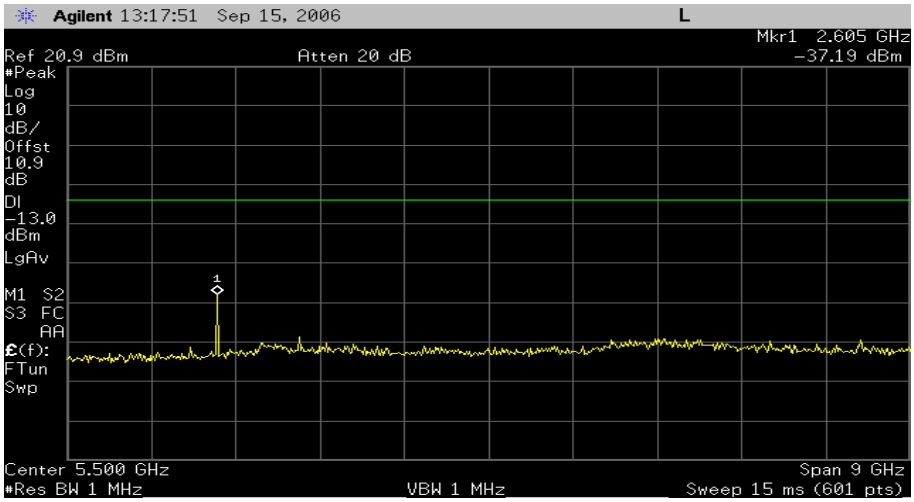
Plot 50. Downlink CDMA High Channel(1GHz~10GHz)



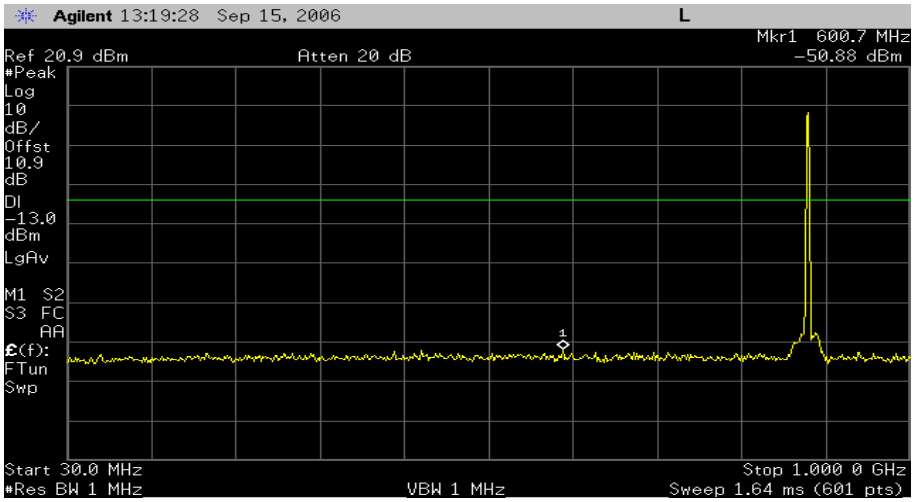
Plot 51. Downlink TDMA Low Channel(Inband)



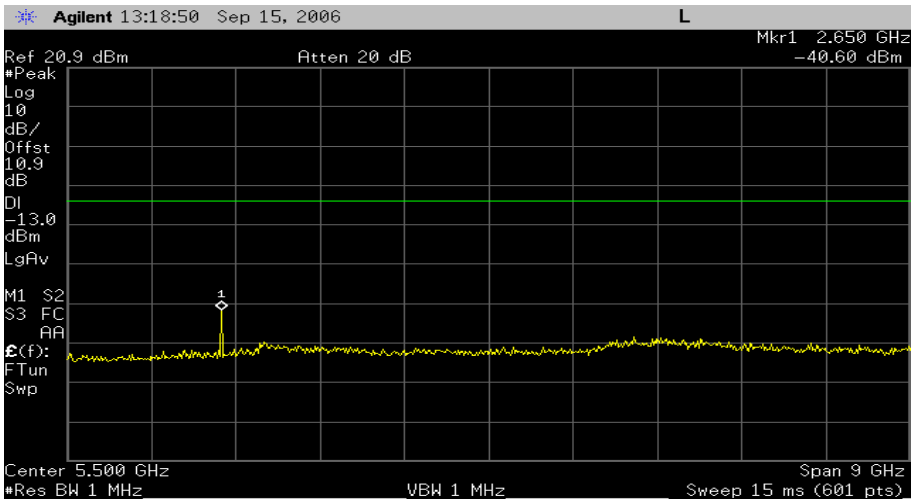
Plot 52. Downlink TDMA Low Channel(30MHz~1GHz)



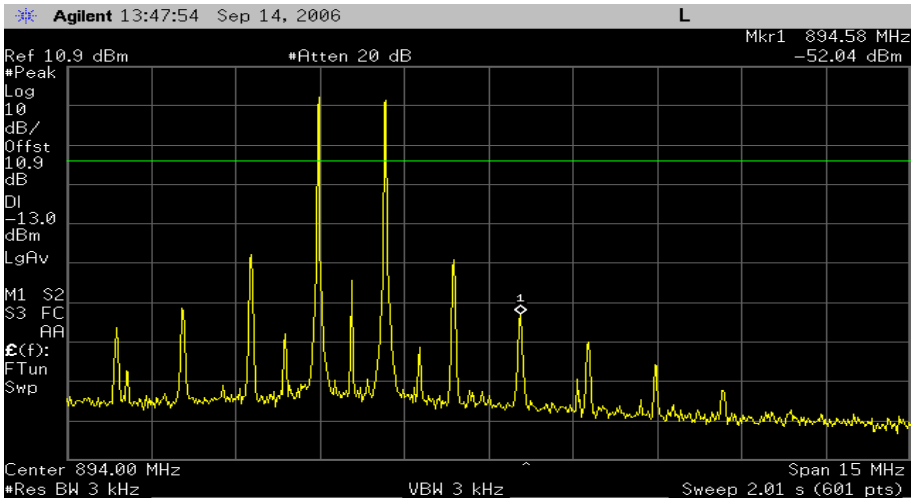
Plot 53. Downlink TDMA Low Channel(1GHz~10GHz)



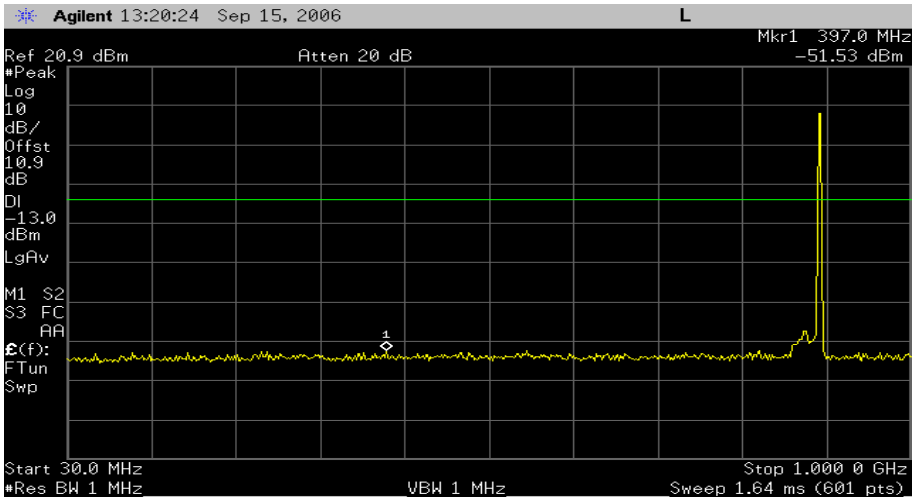
Plot 54. Downlink TDMA Middle Channel(30MHz~1GHz)



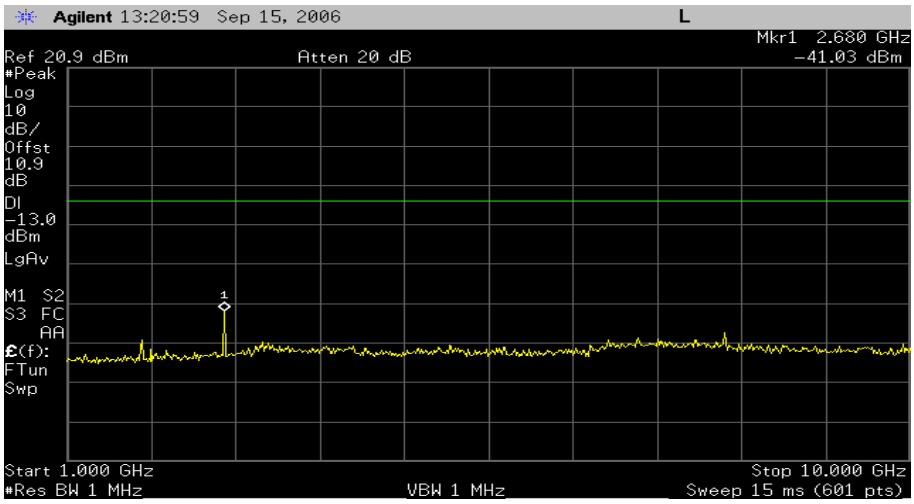
Plot 55. Downlink TDMA Middle Channel(1GHz~10GHz)



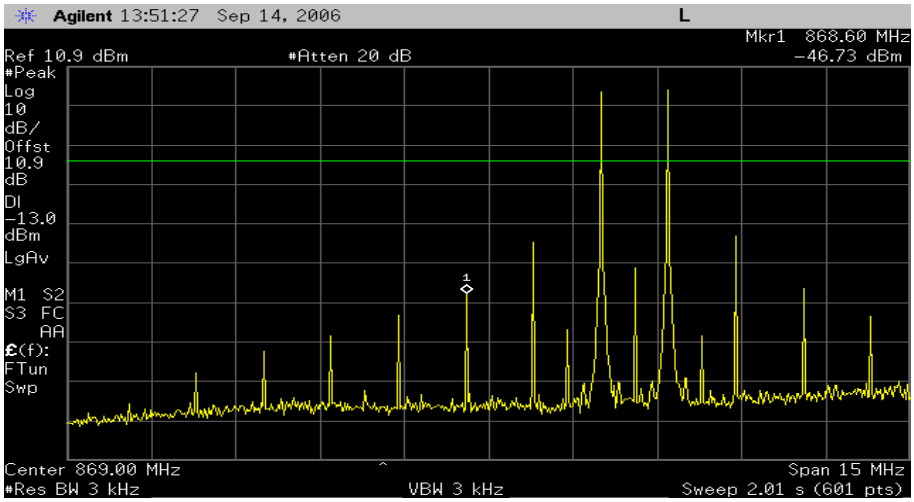
Plot 56. Downlink TDMA High Channel(Inband)



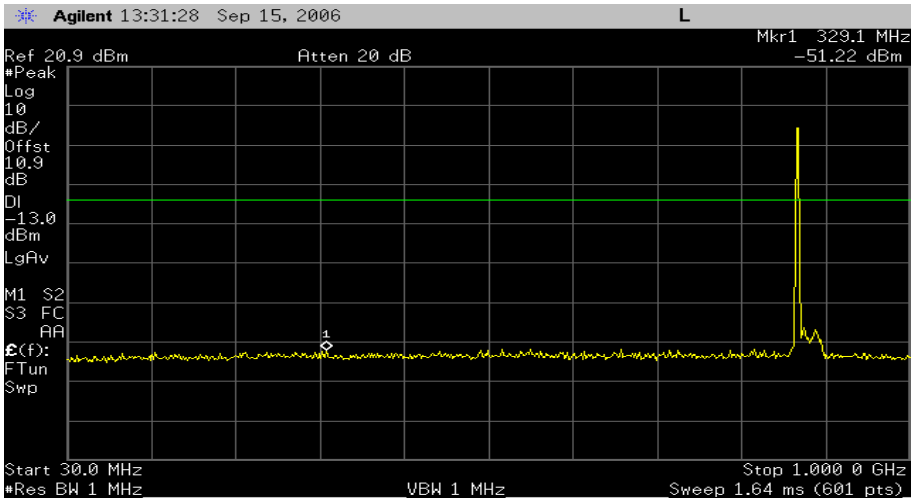
Plot 57. Downlink TDMA High Channel(30MHz~1GHz)



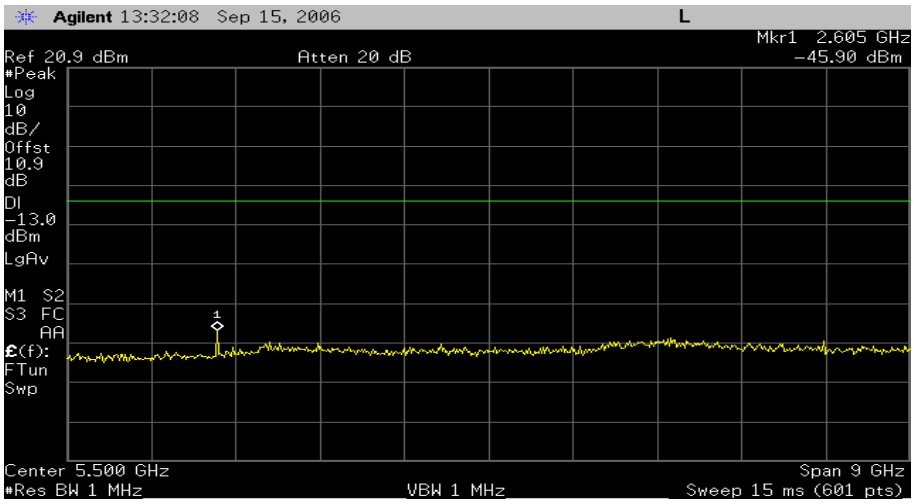
Plot 58. Downlink TDMA High Channel(1GHz~10GHz)



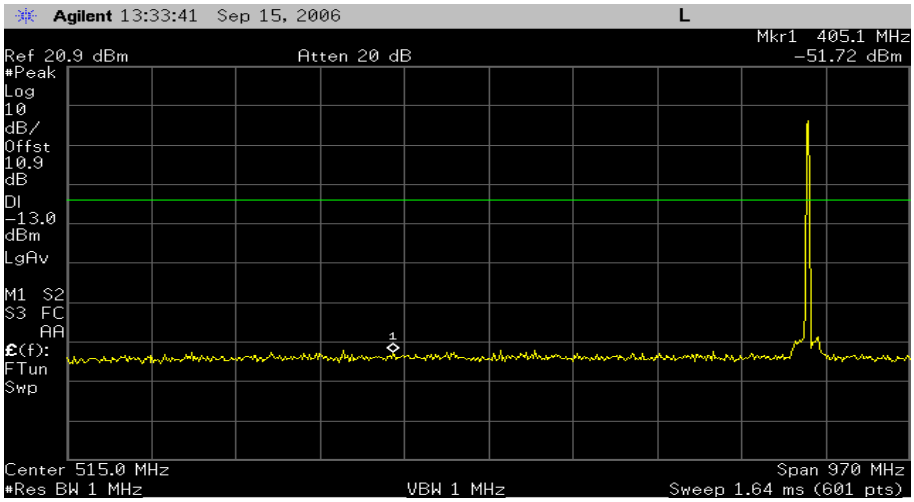
Plot 59. Downlink CW Low Channel(Inband)



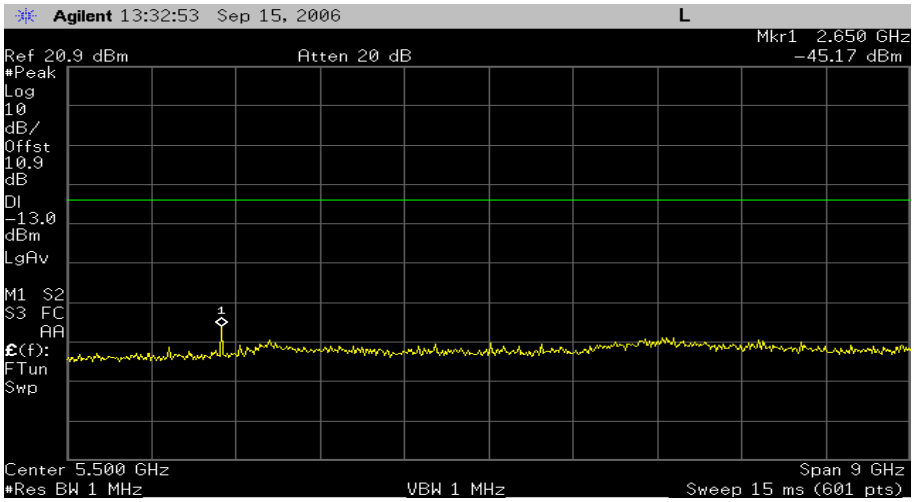
Plot 60. Downlink CW Low Channel(30MHz~1GHz)



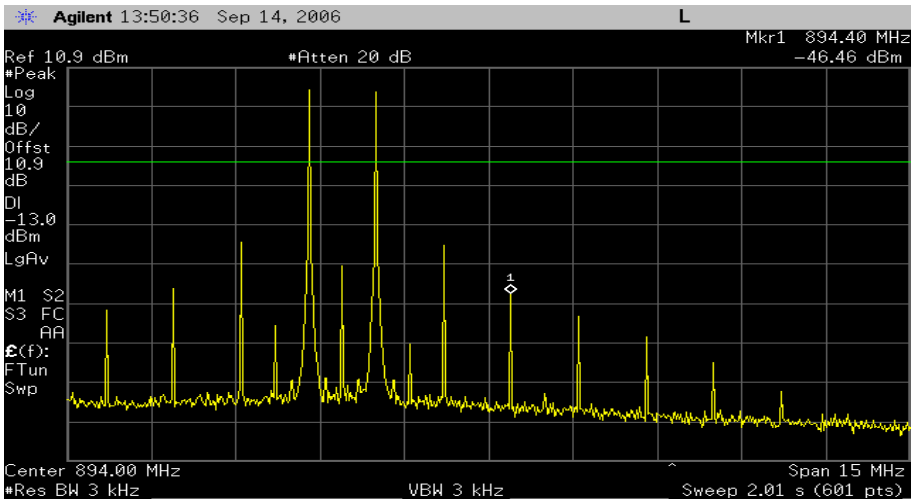
Plot 61. Downlink CW Low Channel(1GHz~10GHz)



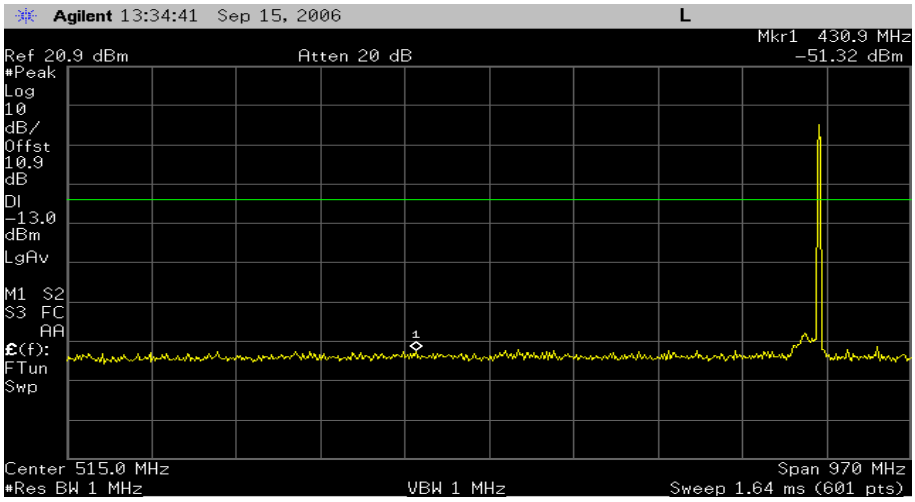
Plot 62. Downlink CW Middle Channel(30MHz~1GHz)



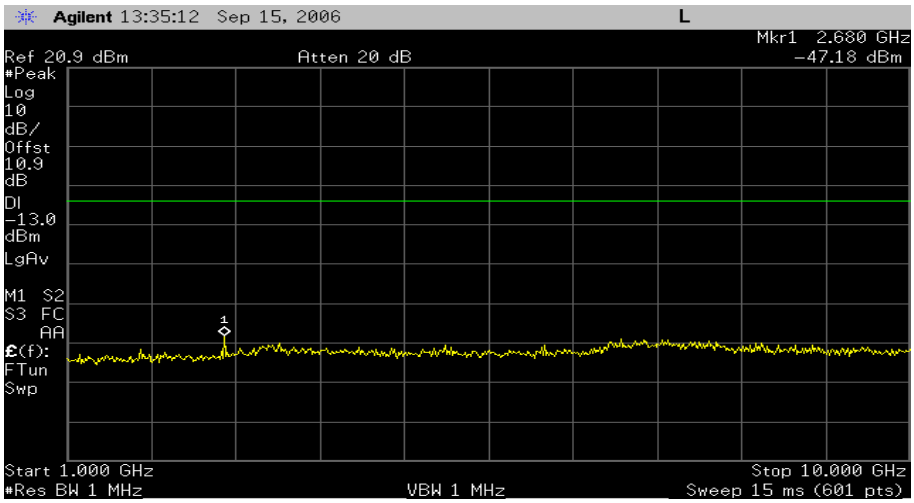
Plot 63. Downlink CW Middle Channel(1GHz~10GHz)



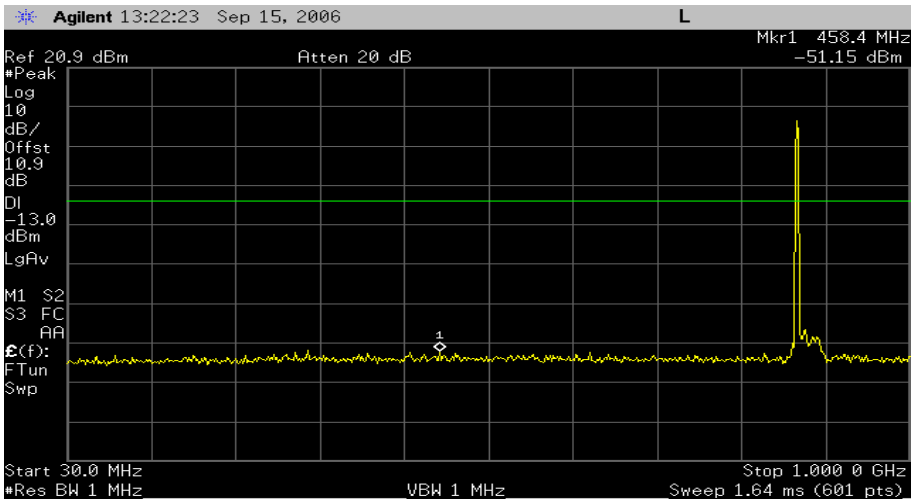
Plot 64. Downlink CW High Channel(Inband)



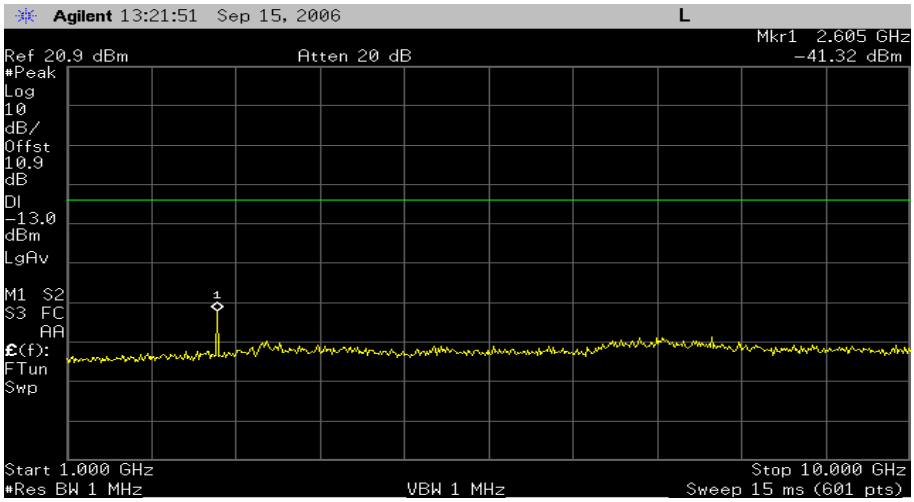
Plot 65. Downlink CW High Channel(30MHz~1GHz)



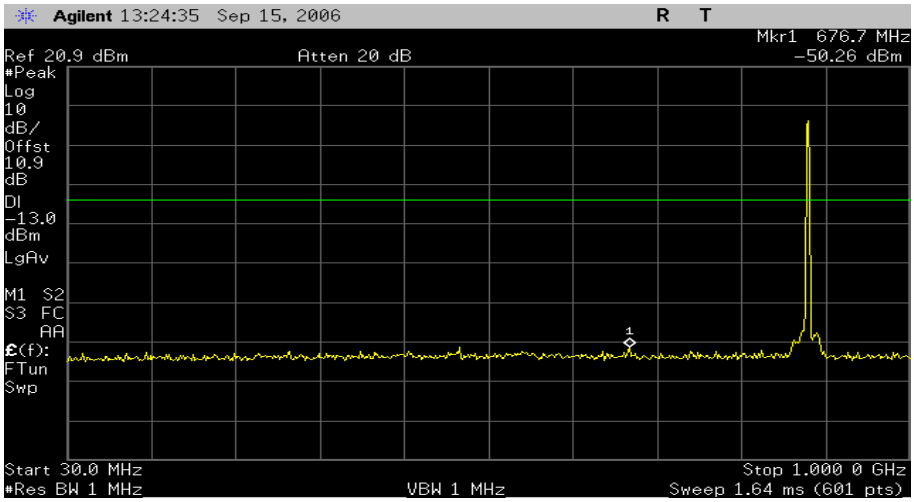
Plot 66. Downlink CW High Channel(1GHz~10GHz)



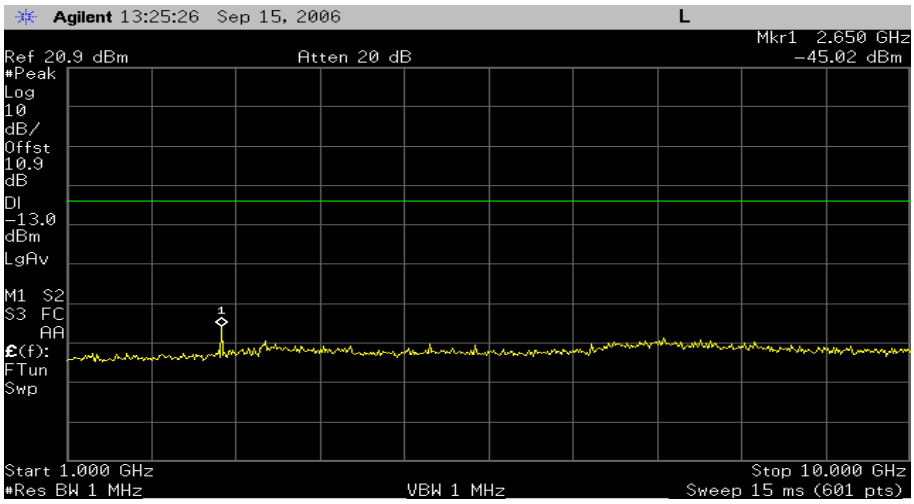
Plot 67. Downlink GSM Low Channel(30MHz~1GHz)



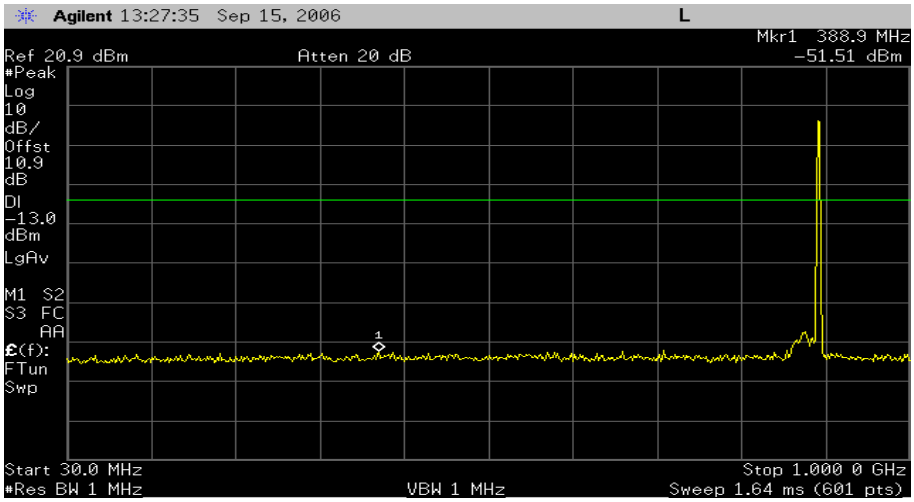
Plot 68. Downlink GSM Low Channel(1GHz~10GHz)



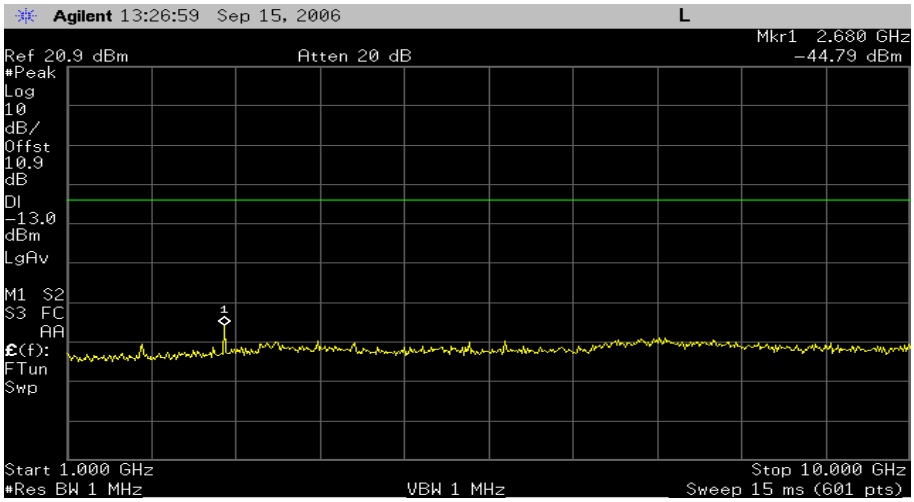
Plot 69. Downlink GSM Middle Channel(30MHz~1GHz)



Plot 70. Downlink GSM Middle Channel(1GHz~10GHz)



Plot 71. Downlink GSM High Channel(30MHz~1GHz)



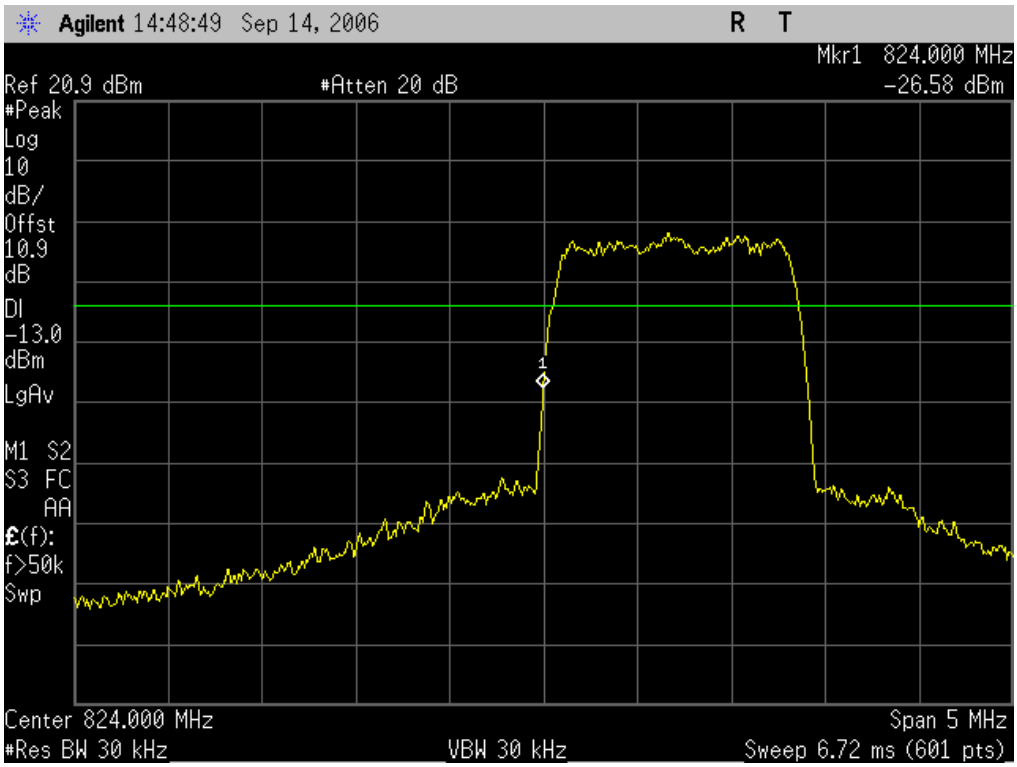
Plot 72. Uplink GSM High Channel(1GHz~10GHz)

9.7 Band-edge Compliance

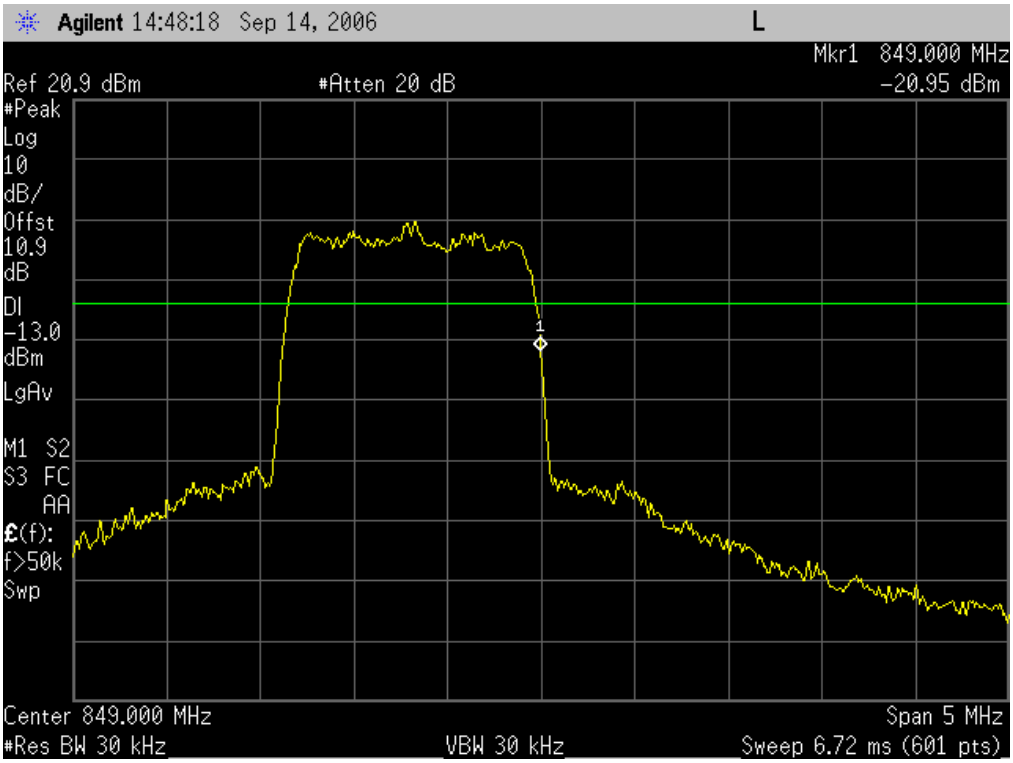
Measurement Result:

Up/Down Link	Modulation	Channel	Frequency (MHz)	Plots number
Uplink	CDMA	Low	824.70	Plot 73
		High	848.31	Plot 74
	TDMA	Low	824.04	Plot 75
		High	848.97	Plot 76
	GSM	Low	824.20	Plot 77
		High	848.80	Plot 78
Downlink	CDMA	Low	824.70	Plot 79
		High	848.31	Plot 80
	TDMA	Low	824.04	Plot 81
		High	848.97	Plot 82
	GSM	Low	824.20	Plot 83
		High	848.80	Plot 84

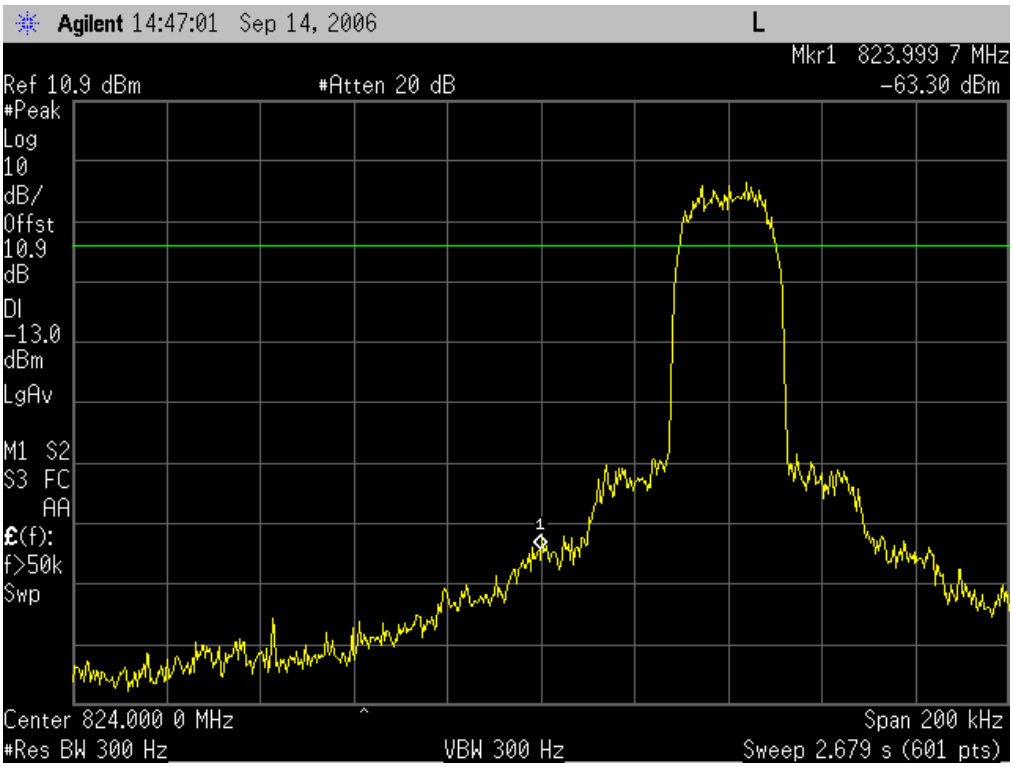
Table 23. Band-edge



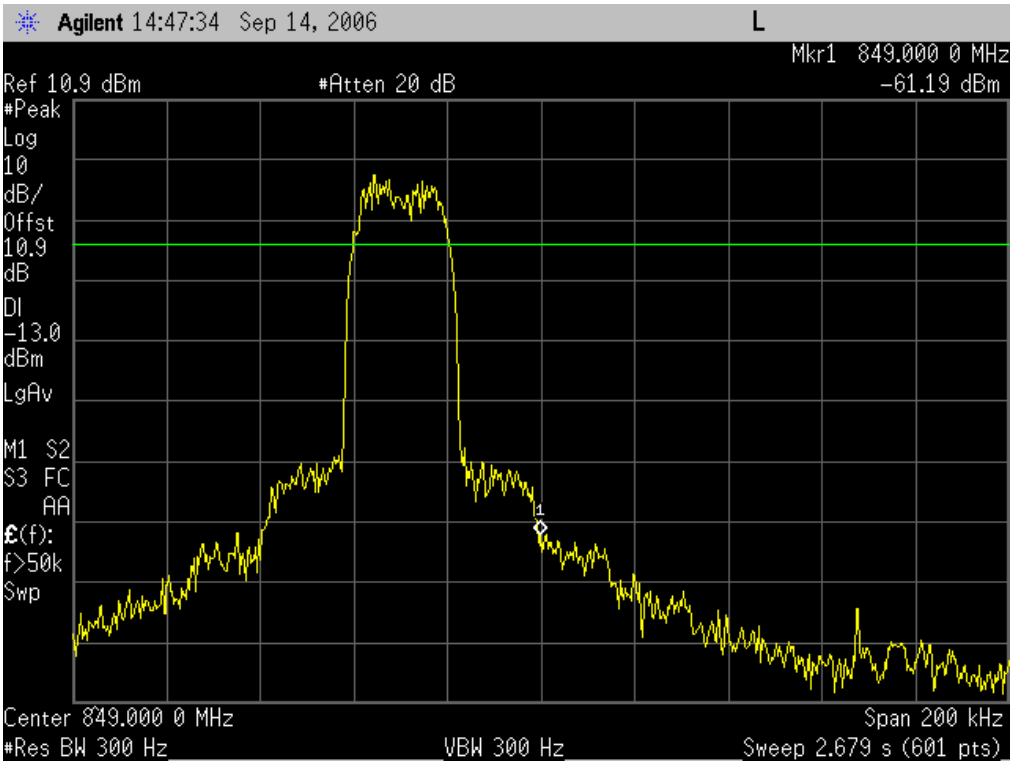
Plot 73. Uplink CDMA Low Channel



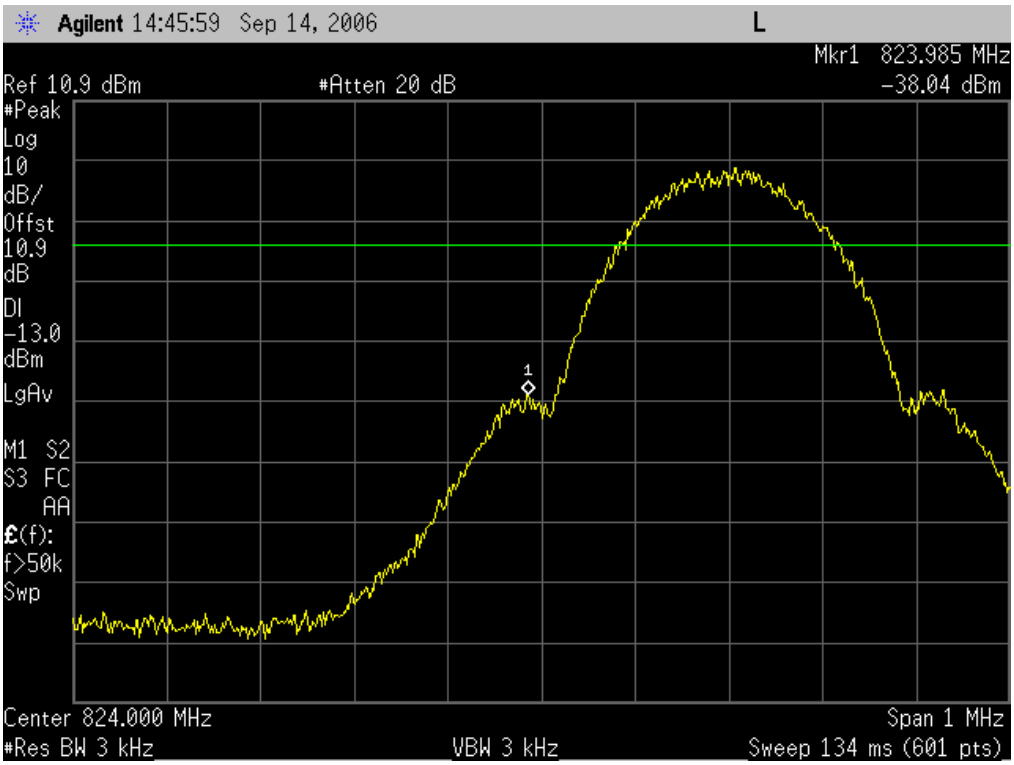
Plot 74. Uplink CDMA High Channel



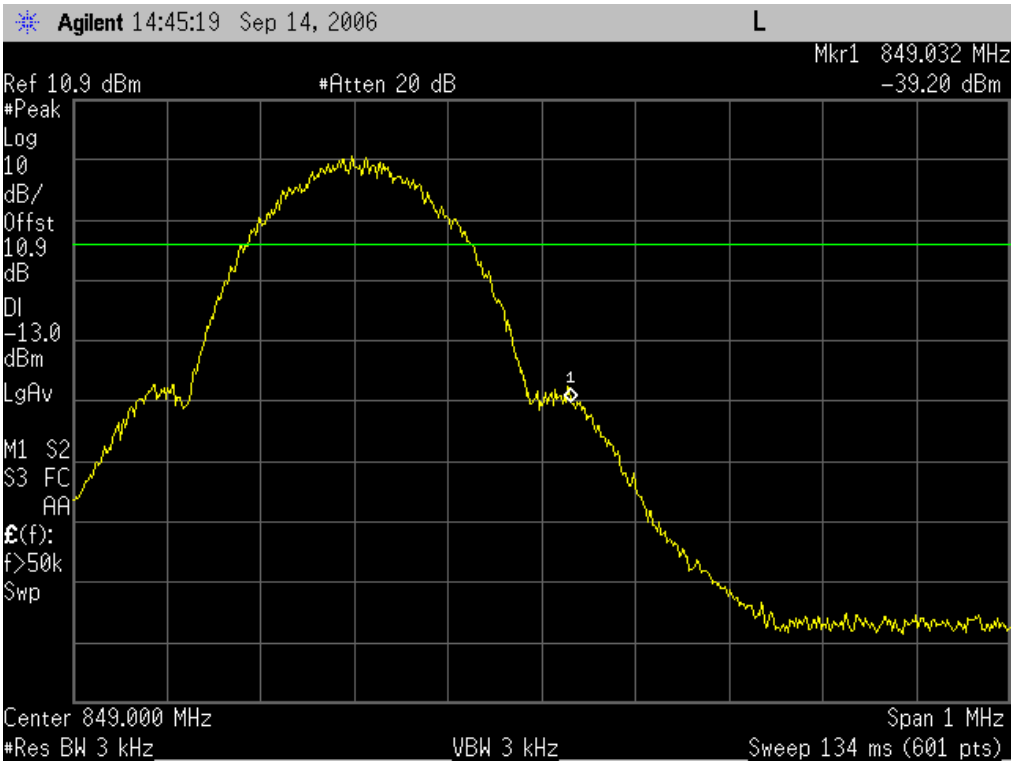
Plot 75. Uplink TDMA Low Channel



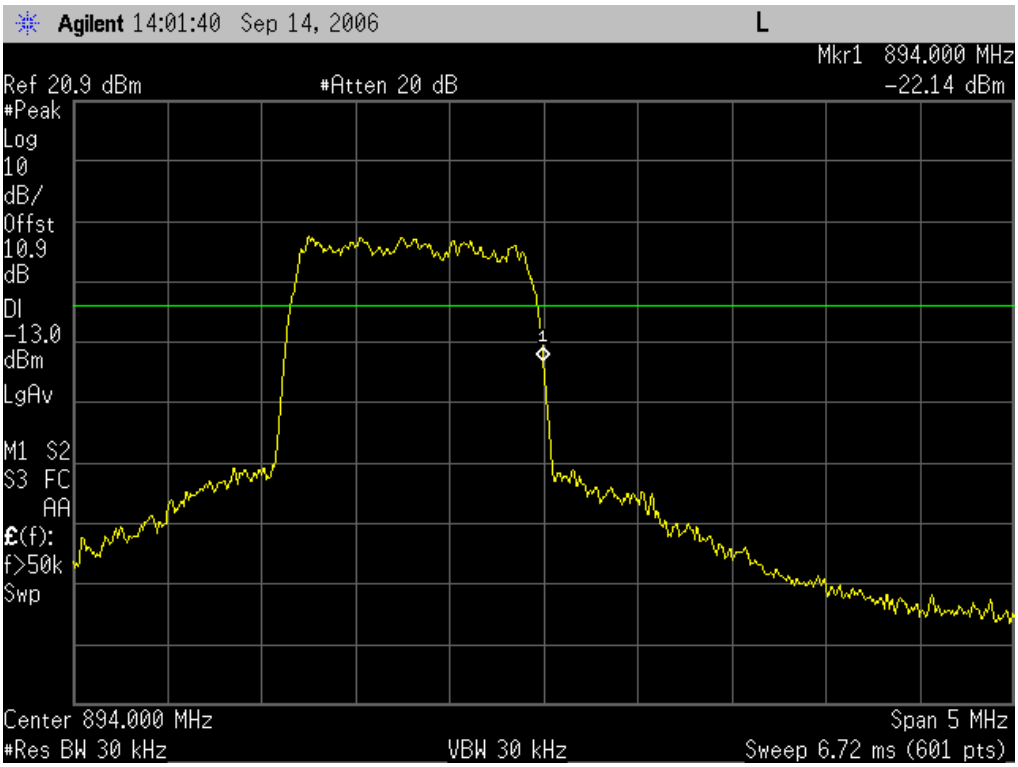
Plot 76. Uplink TDMA High Channel



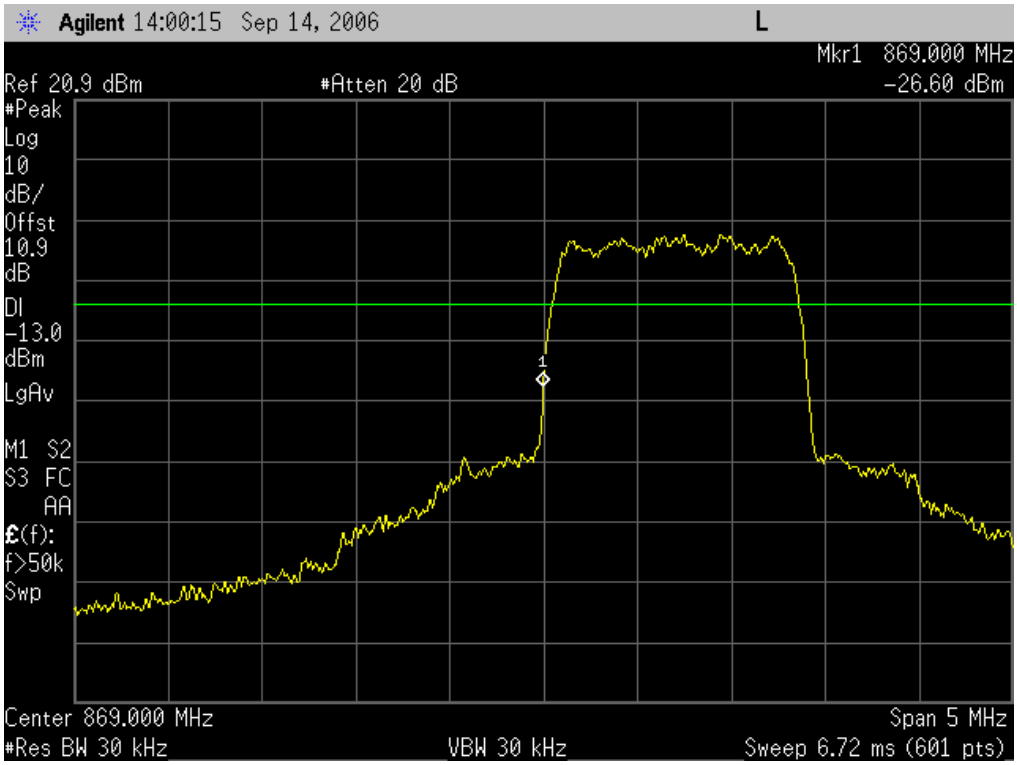
Plot 77. Uplink GSM Low Channel



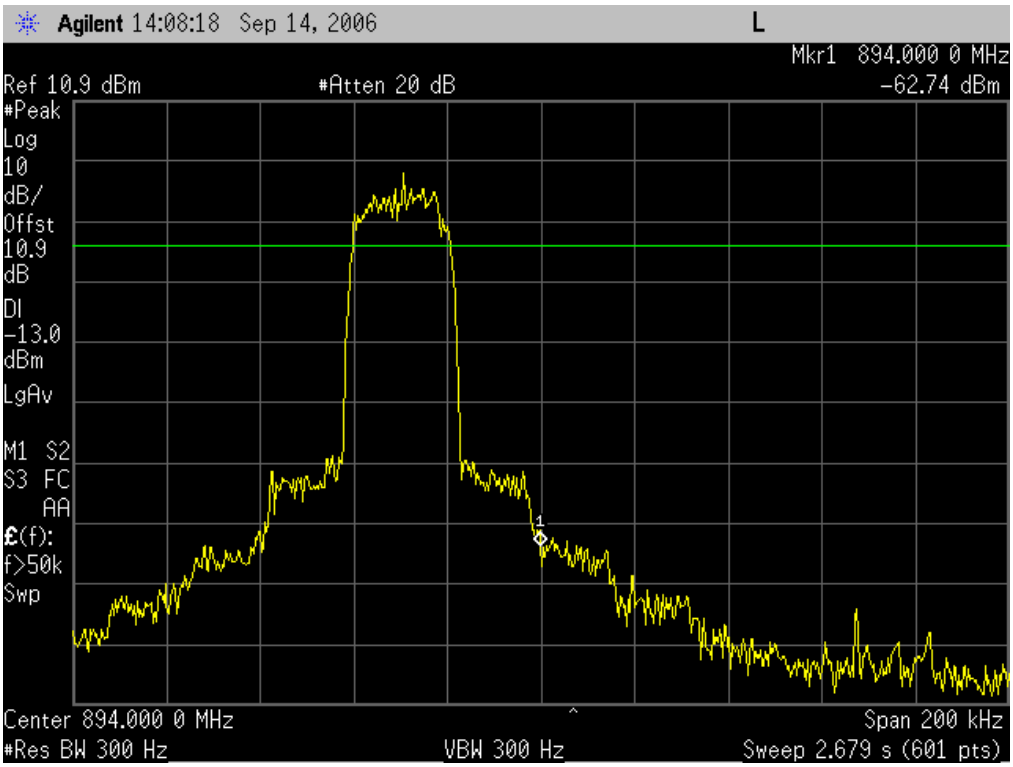
Plot 78. Uplink GSM High Channel



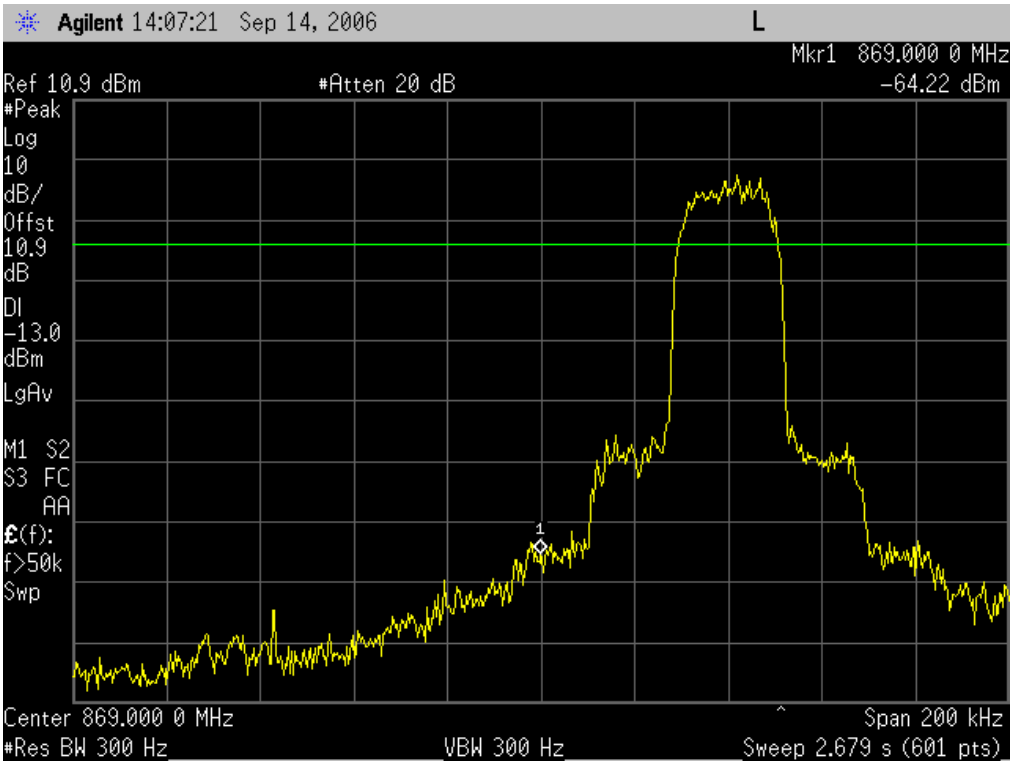
Plot 79. Downlink CDMA Low Channel



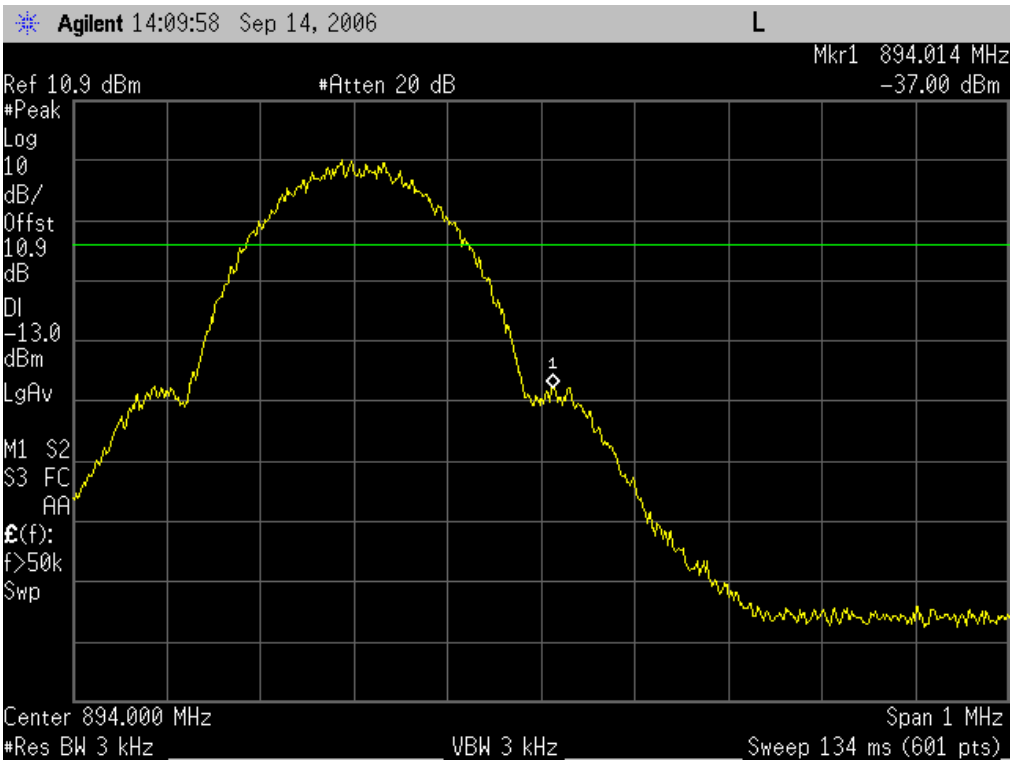
Plot 80. Downlink CDMA High Channel



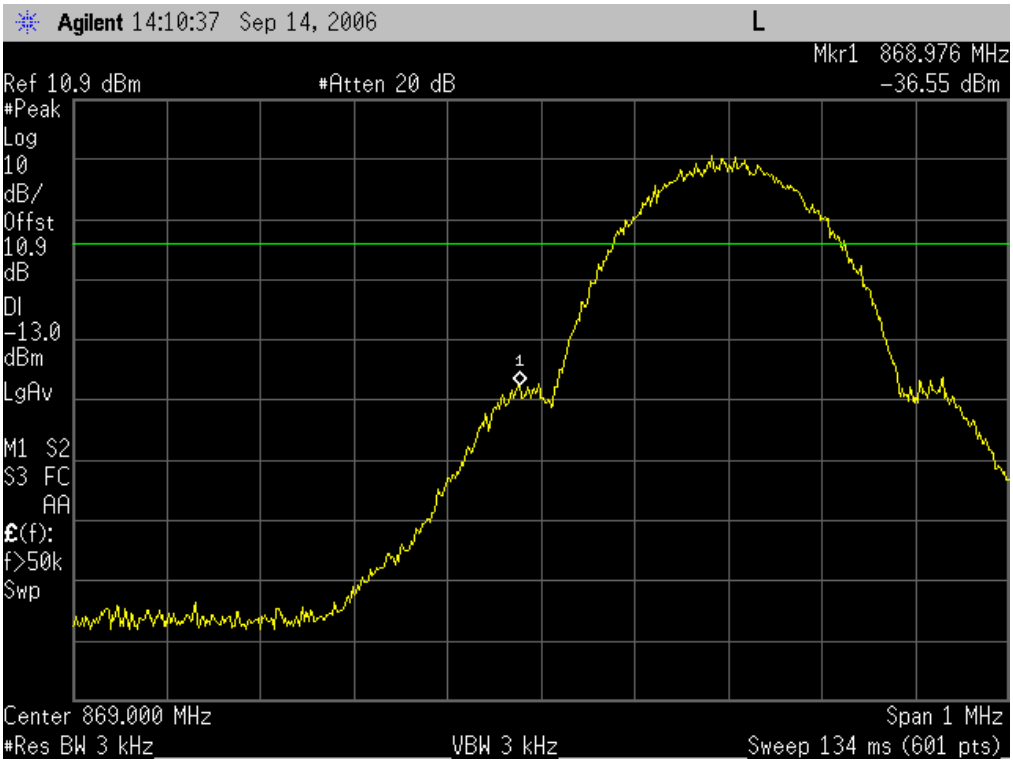
Plot 81. Downlink TDMA Low Channel



Plot 82. Downlink TDMA High Channel



Plot 83. Downlink GSM Low Channel



Plot 84. Downlink GSM High Channel

9.8 Maximum Permissible Exposure

RF Exposure Limit:

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the

Environmental of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm^2)	Averaging Time (Minutes)
(A) Limits for occupational / Contral Exposure				
30 - 300	61.4	0.163	1	6
300 - 1500	…	…	F/300	6
1500 - 100000	…	…	5	6
(B) Limits for General Population / Uncontrolled Exposure				
30 - 300	27.5	0.073	0.2	30
300 - 1500	…	…	F/1500	30
1500 - 100000	…	…	1	30

F = Frequency (MHz)

Fries formula

Fries transmission formula : $Pd = (Pout * G) / (4 * \pi * r^2)$

$r = \sqrt{((Pout * G) / 4 * \pi * Pd)}$

Where

Pd = Power density in mW/cm^2

Pout = Output power to antenna in mW

G = Gain of antenna in linear scale

$\pi = 3.1416$

r = Distance between observation point center of the radiator in cm

Pd is the limit of MPE, F/1500 mW/cm^2. If we know the Maximum Gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Test Result :

The maximum Downlink antenna gain is 2dBi or 1.58(Numeric) and Uplink antenna gain is 5dBi or 3.16(Numeric).

RF Exposure Distance

Configuration	Frequency (MHz)	Output Power to Antenna (mW)	Power Density Limit (mW/cm²)	Antenna Gain	RF Exposure Distance (cm)
Uplink	848.8	6.05	0.57	3.16	1.63
Downlink	893.8	5.51	0.60	1.58	1.07

Conclusion:

MPE Safe Distance is 1.63cm (Uplink) and 1.07cm (Downlink).