Nemko Korea CO., Ltd.

300-2, Osan-Ri, Mohyun-Myun, Yongin-City, Gyunggi-Do, KOREA
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FCC EVALUATION REPORT FOR CERTIFICATION

Applicant :
CMOTech Co., Ltd.
5F BLD. Etronix 17-10, Yoido-dong, Youngdungpo-Gu
Seoul, Korea, (Post code : 150-874)

Dates of Issue : Jun, 15, 2005
Test Report No. : NK2FR108
Test Site : Nemko Korea Co., Ltd.

FCC ID	*TARCCU-550*
Brand Name	**CMOTECH**
CONTACT PERSON	**CMOTech Co., Ltd.** **5F BLD. Etronix 17-10, Yoido-dong,** **Youngdungpo-gu, Seoul Korea(150-874)** **Mr. Byung-Young Choi** **Telephone No. : +82 2 785-5540**

Applied Standard:	FCC 47 CFR Part 15 & 2 FCC 47 CFR Part 22, Subpart H
Classification:	FCC Class B Device
Equipment Class:	Public Mobile Services
EUT Type:	CDMA 1x EVDO Wireless USB DATA Modem

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 : S. Lee
Engineer

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

TABLE OF CONTENTS

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 :	CMOTech Co., Ltd.
Contact Person :	Mr. Byung-Young Choi Tel No. : +82 2 785 5540
Manufacturer :	CMOTech Co., Ltd. 5F BLD. Etronix 17-10, Yoido-dog, Youngdungpo-gu, Seoul Korea(150-874)

- FCC ID: TARCCU-550
- Model: CCU-550
- Brand Name: CMOTECH
- EUT Type: CDMA 1x EVDO Wireless USB DATA Modem
- Electric Rating: Input : +5V DC, 1A
Output : +3.4V DC, 600mA
- Port / Connector: USB, Earphone Jack
- Equipment Class: Public Mobile Services
- Classification: FCC Class B
- Applied Standard: FCC 47 CFR Part 15 & 2
FCC 47 CFR Part 22 , Subpart H
- Test Procedure(s): ANSI C63.4 (2003), DA 02-2138(2002)
- Dates of Test: JUN 01, 2005 to JUN 14, 2005
- Place of Tests: Nemko Korea Co., Ltd.
- Test Report No.: NK2FR108

2. INTRODUCTION

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 **CMOTech Co., Ltd.**
FCC ID : **TARCCU-550**

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.

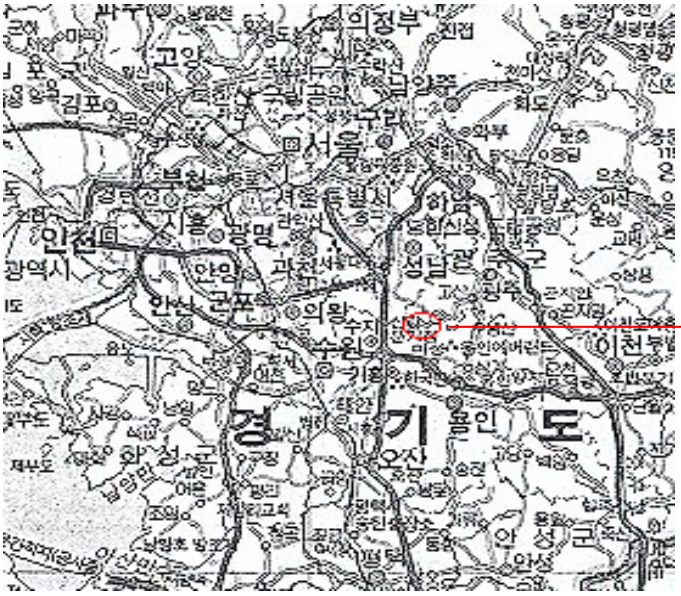

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Fig. 1. The map above shows the Seoul in Korea vicinity area.
The map also shows Nemko Korea Corporation Ltd. and Incheon Airport.

3. TEST CONDITIONS & EUT INFORMATION

Operating During Test

The EUT was tested at the lowest channel, middle channel and the highest channel with the maximum RF power 24.5dBm and all data recorded in the report.

Environmental Conditions

Temperature	20℃ ~ 25℃
Relative Humidity	41% ~ 58%

Description of EUT

Clock	XT300 (32.768kHz), XT301 (48MHz)
Chipset(s)	U400(MSM5500), U100(ITM2520),
	U101(S1M8662A), U200(RFT-3100)
Port(s)	USB, Earphone Jack
Frequency Range	Tx : 824.70MHz ~ 848.31MHz Rx : 869.70MHz ~ 893.31MHz
Output Power	0.28W (24.5dBm/1.23MHz)
Type of Oscillation	PLL Synthesizer & VCTCXO(19.2MHz)
Modulation Method	OQPSK
Emission Designator	1M25F9W
Number of channels	20CH
Antenna Type	Internal Antenna (Helical Type)
Antenna Gain	Gain: -3.0dBi
Dimensions	93mm X 31mm X 12.5mm
Weight	Approx.25g
Operating Conditions	-20℃ ~ +60℃ , 95%
DC Input Voltage	+5.0Vdc from USB Host connector

Support Equipment (Part 15)

CDMA 1xEVDO Wireless USB Data Modem (EUT)	CMOTech Co., Ltd., FCC ID: TARCCU-550 0.8m Unshielded cable 0.8m Shielded USB cable	S/N : N/A
Computer	Dell Computer Corporation, Model : DHM2(Dimension 4550) 1.8m Unshielded AC power cable	S/N : N/A
LCD Monitor	Hansol LCD Inc., Model : B17DF 1.8m Shielded Video cable 1.8m Unshielded AC power cable	S/N : N/A
Printer	Epson, Model : EPSON STYLUS C80 1.8m Shielded Parallel cable	S/N : D3FE005162
Keyboard	LG International Corp, Model : LGK-3000Plus 1.8m Unshielded Din cable	S/N : 112060509
PS/2 Mouse	Samsung Electro-Mechanics Co., Ltd., Model : SMOP5000WX 1.5m Unshielded Din cable	S/N : 03100016732
Serial Mouse	ALL SPIRIT, Model : WS-V1-400, 1.5m Unshielded D-Sub cable	S/N : B050402

Support Equipment (Part 22)

Laptop	SAMSUNG, Model : SENS640 0.8m Shielded USB cable	S/N : 668391AR311176

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
Conducted Emission	15.107(a)	Complies
Radiated Emission	15.109(g)	Complies
Modulation Characteristics	2.1047	N/A
Effective Radiated Power	2.1046 22.912(d)	Complies
Conducted Output Power	2.1046 22.913(a)	Complies
Occupied Bandwidth / 26dB Emission Bandwidth	2.1049 22.917 22.905	Complies
Spurious Emission at antenna Terminals	2.1051 22.917	Complies
Field Strength of spurious Radiation	2.1053	Complies
Frequency Stability / Temperature Variation	2.1055 22.355	Complies
Band Edge	22.917	Complies

6. RECOMMENDATION / CONCLUSION

The data collected shows that the **CMOTech Co., Ltd.**
FCC ID : **TARCCU-550, CDMA 1xEVDO Wireless USB Data Modem.**
The highest emission observed was at **0.35MHz** for conducted emissions with a A.V margin of **18.3 dB,** at **80.01MHz** for radiated emissions with a margin of **7.0 dB.**

7. SAMPLE CALCULATION

7.1 Radiation for Part 15

$$\text{dB } \mu N = 20 \log_{10} (\mu N/\text{m})$$

$$\mu N = 10^{(\text{dB } \mu N/20)}$$

EX. 1.

@165.0 MHz Class B limit = 30.0 dB μN/m

Reading = 38.2 dB μN(calibrated level)

Antenna factor + Cable Loss + Amplifier Gain = -12.9 dB

Total = 25.30 dB μN/m

Margin = 30.0 – 25.30 = 4.70

4.70 dB below the limit

7.2 Radiation for Part 22

The formula below was used to calculate the EIRP of the EUT.
$P_{subst\_TX[dBm]}$, $P_{subst\_RX[dBm]}$, $L_{Cable[dB]}$ and $G_{substitute\_antenna[dBi]}$ factors are combined in one correction factor.

$$P_{EIRP[W]} = \frac{10^{(P_{Subst\_TX[dBm]}+(P_{EUT[dBm]}-P_{Subst\_RX[dBm]})+G_{Substitute\_antenna[dBi]}-L_{Cable[dB]})/10}}{1000}$$

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 isotropic radiator
$L_{Cable\ [dB]}$	Loss of the cable between signal generator and the substituting antenna

8. TEST EQUIPMENT LIST

No.	Instrument	Manufacturer	Model	Calibration Date
1	*Test Receiver	R & S	ESCS 30	2004.08
2	*Test Receiver	R & S	ESCS 30	2004.12
3	*Amplifier	HP	8449B	2005.03
4	*Amplifier	HP	8447F	2004.07
5	*Amplifier	HP	8447F	2005.01
6	*Spectrum Analyzer	HP	8566B	2005.03
7	*Spectrum Analyzer	HP	8568B	2004.10
8	*Spectrum Analyzer	HP	8593E	2004.10
9	*VSA Series Transmmitter Tester	Agilent	E4406A	2004.08
10	*Logbicon Super Antenna	Schwarzbeck	VULB9166	2005.05
11	*Horn Antenna	Schwarzbeck	BBHA 9120 A	2004.08
12	*Doppels Teg Horn	EMCO	DAA-37121	2004.10
13	Dipole Antenna	R & S	VHA9103	2004.07
14	Dipole Antenna	R & S	UHA9105	2005.05
15	*Biconical Log Antenna	ARA	LPB-2520/A	2005.01
16	*Signal Generater	R & S	SMP02	2004.07
17	*Signal Generater	HP	E4436B	2005.01
18	*LISN	R & S	ESH3-Z5	2004.10
19	*LISN	Kyoritsu	KNW-407	2005.03
20	*CDN	FCC	NCD-T4	2005.05
21	*Tunable Band Reject Filter	K&h Microwave Incorporated	3TNF-5001 1000-N1N	2005.07
22	*Position Controller	EM Eng.	N/A	N/A
23	*Turn Table	EM Eng.	N/A	N/A
24	*Antenna Mast	EM Eng.	N/A	N/A
25	*Anechoic Chamber	EM Eng.	N/A	N/A
26	*Shielded Room	EM Eng.	N/A	N/A
27	*Position Controller	Seo-Young EMC	N/A	N/A
28	*Turn Table	Seo-Young EMC	N/A	N/A
29	*Antenna Mast	Seo-Young EMC	N/A	N/A
30	*Anechoic Chamber	Seo-Young EMC	N/A	N/A
31	*Shielded Room	Seo-Young EMC	N/A	N/A

***) Test equipment used during the test**

9. DESCRIPTION OF TESTS

9.1 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.

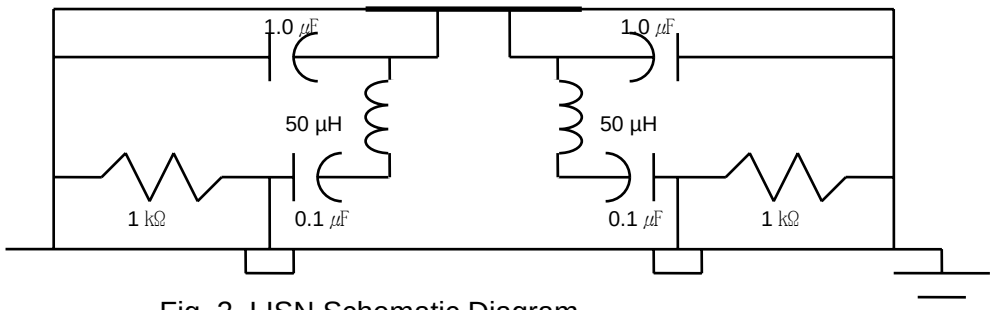


Fig. 2. LISN Schematic Diagram

9.2 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

9.3 Effective Radiated Power / Equivalent Isotropic Radiated Power

Test Set-up

Effective Radiated Power Output and Equivalent Isotropic Radiated Power output Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2003.

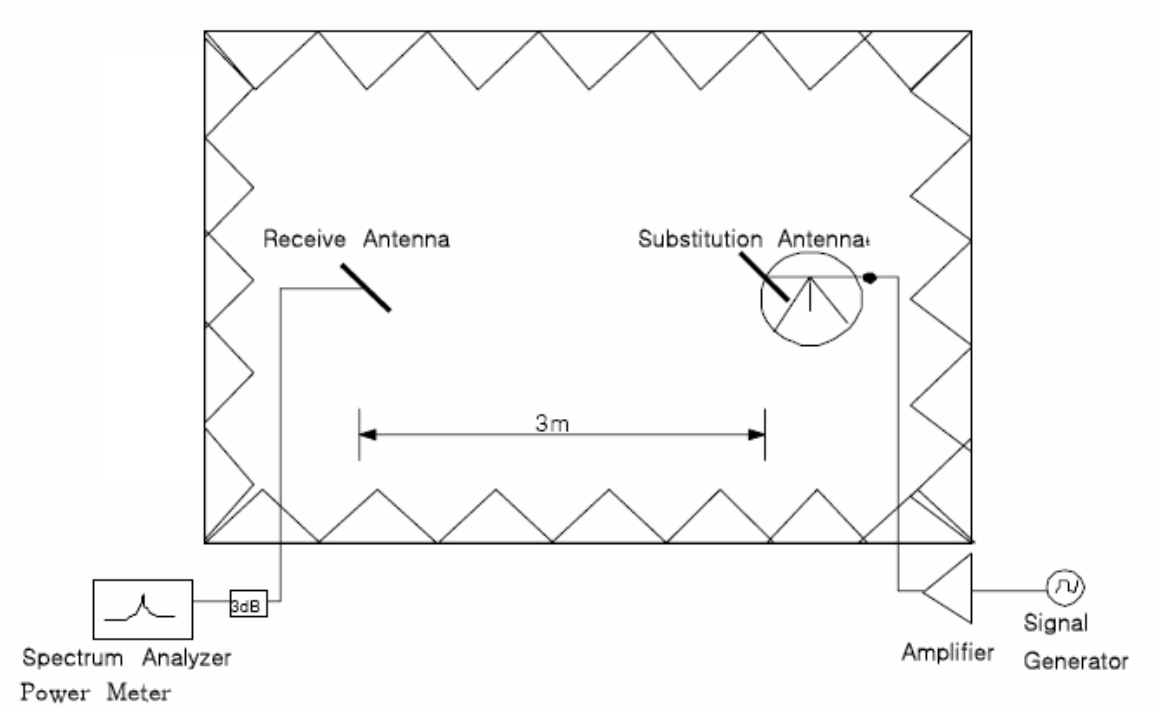


Figure 4. Diagram of ERP/EIRP test Set-up

The EUT was placed on a Non-conducted turntable 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer.
For CDMA signals, an average detector is used, with RBW=VBW=3MHz.
A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of dipole is measured. The ERP is recorded.

9.4 Radiated Spurious & Harmonic Emission

Test Set-up

Effective Radiated Power Output and Equivalent Isotropic Radiated Power output Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2003.

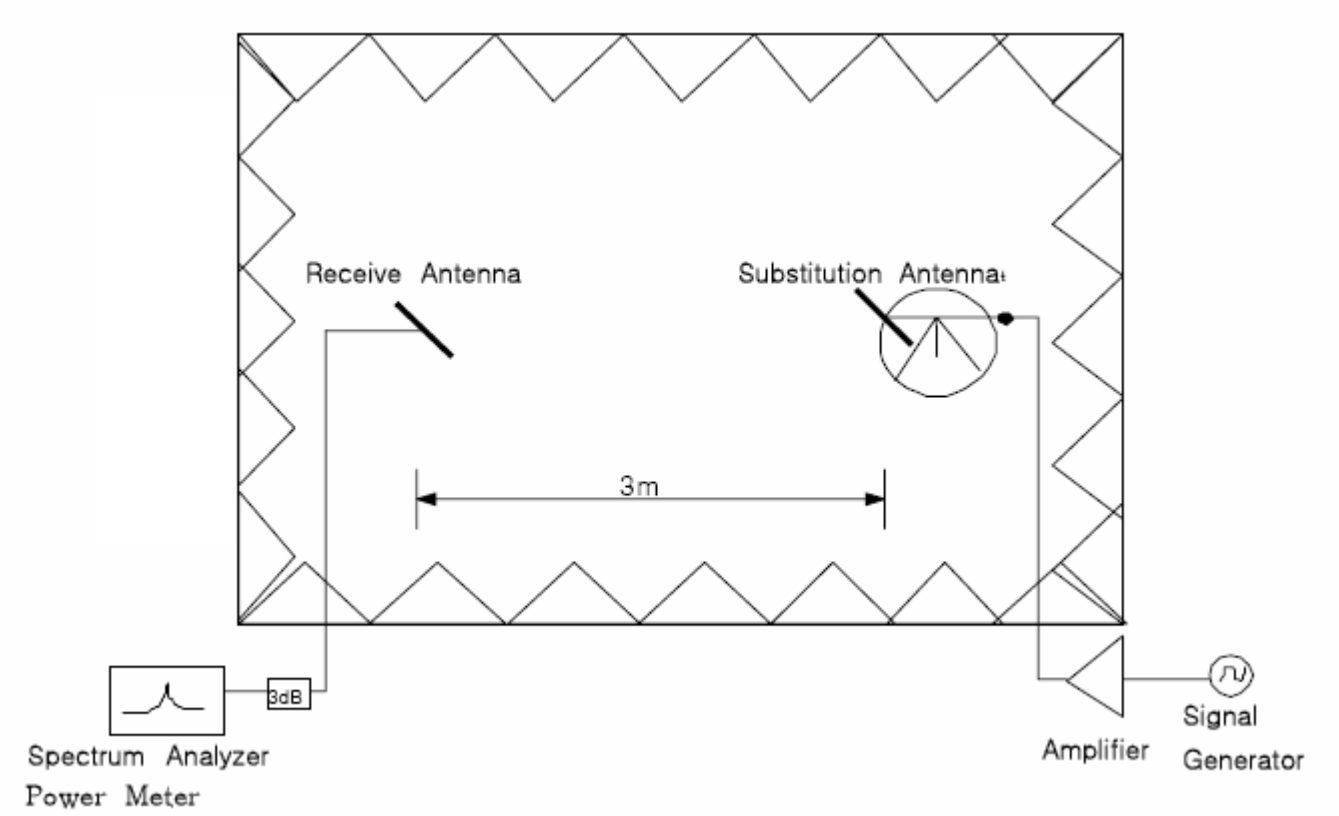


Figure 5. Diagram of Radiated Spurious & Harmonic test Set-up

The EUT was placed on a Non-conducted turntable 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. The Spectrum was investigated from 30MHz to the 10th Harmonic of the fundamental. A peak detector is used, with RBW=VBW=1MHz.
The value that we could measure was only reported A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

9.5 Occupied Bandwidth / 26dB Emission Bandwidth

Occupied Bandwidth

The EUT was setup to maximum output power at its lowest channel. The occupied bandwidth was measured using a spectrum analyzer. The measurements are repeated for the highest and a middle channel.
The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power. Plots of the EUT's occupied bandwidth are shown herein.

26dB Emission Bandwidth

The transmitter output is connected to the spectrum analyzer.
The RBW of spectrum analyzer is set to approximately 1% of the emission bandwidth And peak detection is used. The emission bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 26dB.

9.6 Spurious and Harmonic Emissions at Antenna Terminal

9.6.1 Occupied Bandwidth Emission Limits

(a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB.

(b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater.
However, in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed.
The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

(c) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(d) The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

BLOCK	Frequency Range(MHz) Transmitter(Tx)	Frequency Range(MHz) Receiver(Tx)
A* Low +A	824 ~ 835	869 ~ 880
B	835 ~ 845	880 ~ 890
A* High	845 ~ 846.5	890 ~ 891.5
B*	846.5 ~ 849	891.5 ~ 894

Table 1. Cellular Service Frequency Blocks

9.6.2 Conducted Spurious Emission

Minimum standard:

On any frequency outside a license frequency block, the power of any emission shall be attenuated below the transmitter power(P) by at least 43+10log (P)dB. Limit equivalent to –13dBm, calculation shown below.
43 + 10log (0.281 W) = 37.48 dB
24.5 dBm – 37.48 dB = -13 dBm

Test Procedure:

The EUT was setup to maximum output power at its lowest channel.
The Resolution BW of the analyzer is set to 1% of the emission bandwidth to show compliance with the –13dBm limit, in the 1MHz bands immediately outside and adjacent to the edge of the frequency block.
The measurements are repeated for the EUT's highest channel. For the Out-of-Band measurements a 1MHz RBW was used to scan from 10MHz to 10GHz.
A display line was placed at –13dBm to show compliance. The high, lowest and a middle channel were tested for out of band measurements.
Plots are shown herein.

9.7 Frequency Stability / Temperature Variation

The frequency stability of the transmitter is measured by:

Temperature: The temperature is carried from -30°C to +60°C using an environmental chamber.

Specification - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature(20°C to 25°C to provide a reference).
2. The equipment is subjected to an overnight “soak” at -30°C without any power applied.
3. After the overnight “soak” at -30°C (Usually 14~16 hours), the equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter and the individual oscillators is made within a three minute interval after applying to the transmitter.
4. Frequency measurements are made at 10°C interval up to room temperature. At least a period of one and one half-hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency measurements are at 10 intervals starting at -30°C up to +60°C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after re-applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

10. TEST DATA

10.1 Conducted Emissions

▶Test Mode : Lowest Channel

Frequency	Level(dBμV)		Line	Limit(dBμV)		Margin(dB)	
(MHz)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.20	38.0	31.7	L	63.6	53.6	25.6	21.9
0.21	38.7	31.8	L	63.2	53.2	24.5	21.4
0.35	32.9	30.7	L	59.0	49.0	26.1	18.3
0.77	34.0	15.2	N	56.0	46.0	22.0	30.8
14.58	35.3	25.0	N	60.0	50.0	24.7	25.0
15.47	34.8	22.8	N	60.0	50.0	25.2	27.2

) Correction factor was included to Test Level (dBuV)

Table 2. Line Conducted Emissions Tabulated Data

▶Test Mode : Middle Channel

Frequency	Level(dBμV)		Line	Limit(dBμV)		Margin(dB)	
(MHz)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.20	38.1	31.7	L	63.6	53.6	25.5	21.9
0.21	38.7	32.0	L	63.2	53.2	24.5	21.2
0.35	33.0	30.7	L	59.0	49.0	26.0	18.3
0.77	33.9	20.7	L	56.0	46.0	22.1	25.3
14.76	38.3	25.2	N	60.0	50.0	21.7	24.8
15.47	37.2	22.7	N	60.0	50.0	22.8	27.3

) Correction factor was included to Test Level (dBuV)

Table 3. Line Conducted Emissions Tabulated Data

▶**Test Mode : Highest Channel**

Frequency (MHz)	Level(dBμV)		Line	Limit(dBμV)		Margin(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.20	38.1	31.7	L	63.6	53.6	25.5	21.9
0.21	38.7	31.9	L	63.2	53.2	24.5	21.3
0.77	33.9	11.8	N	56.0	46.0	22.1	34.2
14.48	39.8	24.7	N	60.0	50.0	20.2	25.3
14.55	36.9	22.0	L	60.0	50.0	23.1	28.0
15.47	35.5	22.0	N	60.0	50.0	24.5	28.0

) Correction factor was included to Test Level (dBuV)

Table 4. Line Conducted Emissions Tabulated Data

NOTES:

1. Measurements using CISPR quasi-peak mode & average mode.
2. All modes were measured and the worst -case emission are reported. See attached Plots.
3. LINE : L =Line , N = Neutral
4. The limit for Class B device is on the FCC Part section 15.107(a).

10.2 Radiated Emissions

▶Test Mode : Lowest Channel

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
50.00	36.9	V	-21.5	15.4	30.0	14.6
80.00	39.4	V	-20.7	18.7	30.0	11.3
166.00	35.6	V	-13.0	22.6	30.0	7.4
277.16	29.3	V	-11.9	17.4	37.0	19.6
648.18	22.2	H	-2.3	19.9	37.0	17.1
672.09	25.1	H	-1.7	23.4	37.0	13.6

NOTES: Measurements using CISPR quasi-peak mode.

Table 5. Radiated Measurements at 10meters

▶Test Mode : Middle Channel

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
47.99	40.9	V	-21.4	19.5	30.0	10.5
80.01	43.7	V	-20.7	23.0	30.0	7.0
165.98	29.1	V	-13.0	16.1	30.0	13.9
277.19	34.5	H	-11.9	22.6	37.0	14.4
648.16	22.5	H	-2.3	20.2	37.0	16.8
672.09	28.5	H	-1.7	26.8	37.0	10.2

NOTES: Measurements using CISPR quasi-peak mode.

Table 6. Radiated Measurements at 10meters

▶Test Mode : Highest Channel

Frequency (MHz)	Reading (dBμN)	Pol* (H/V)	AF+CL+Amp (dB)**	Result (dBμN/m)	Limit (dBμN/m)	Margin (dB)
46.81	34.2	H	-21.4	12.8	30.0	17.2
80.01	37.4	V	-20.7	16.7	30.0	13.3
166.00	30.6	H	-13.0	17.6	30.0	12.4
247.52	37.3	H	-12.6	24.7	37.0	12.3
277.16	28.8	V	-11.9	16.9	37.0	20.1
277.19	31.8	H	-11.9	19.9	37.0	17.1

NOTES: Measurements using CISPR quasi-peak mode.

Table 7. Radiated Measurements at 10meters

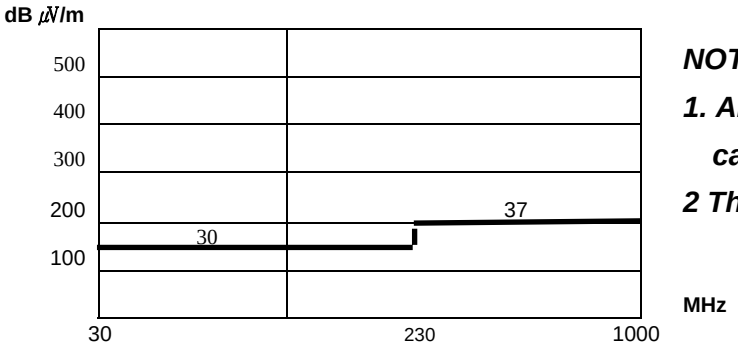


Fig. 6. Limits at 10 meters

NOTES:

1. All modes were measured and the worst-case emission

2 The radiated limits are shown on Figure 6.

NOTES:

1. *Pol. H =Horizontal V=Vertical

2. **AF+CL+Amp. = Antenna Factor + Cable Loss + Amplifier.

3. The limit for Class B device is on the FCC Part section 15.109(g).

10.3 Effective Radiated Power

Modulation : CDMA

Test Mode : The test data show the worst emission level from the three-azimuth.

Results :

	P_{EUT} (dBm)	P_{TX} (dBm)	P_{RX} (dBm)	$G_{antenna}$ (dBd)	L_{Cable} (dB)	ERP (dBm)	Limit (dBm)
824.70MHz	-18.1	10	-28.5	3.22	-2.20	21.42	38.4
835.89MHz	-18.5	10	-28.3	3.22	-2.20	20.82	38.4
848.31MHz	-18.9	10	-28.1	3.22	-2.20	20.22	38.4

Table 8. Radiated Measurements at 3meters

where the variables are as follows:

$P_{EUT\ [dBm]}$	Measured power level from the EUT
$P_{TX\ [dBm]}$	Power fed to the substituting antenna
$P\_{RX\ [dBm]}$	Power received with the spectrum analyzer
$G_{antenna\ [dBd]}$	Gain over half-wave dipole
$L_{Cable\ [dB]}$	Loss of the cable between signal generator and the substituting antenna

*** Radiated measurements at 3 meters by Substitution Method**

10.4 Conducted Output Power

Modulation : CDMA

Test Mode : Set to Lowest channel and Middle channel and Highest channel

Results

Channel	Frequency (MHz)	Measurement Power (dBm)
1013	824.70	24.51
363	835.89	24.54
777	848.31	24.33

- End of page -

10.5 Occupied Bandwidth / 26dB Emission Bandwidth

Modulation : CDMA

Test Mode : Set to Lowest channel and Middle channel and Highest channel

Results

Channel	Frequency (MHz)	Occupied BW (MHz)	26dB Emission BW (MHz)
1013	824.70	1.28	1.43
363	835.89	1.29	1.44
777	848.31	1.27	1.43

- End of page -

10.6 Radiated Spurious & Harmonic Emission

Modulation : CDMA

Test Mode : Set to Lowest channel and Middle channel and Highest channel

Results

Frequency (MHz)	Pol (H/V)	ERP (dBm)	Limit (dBm)	Margin (dB)
NO TX SPURIOUS EMISSIONS SEEN ABOVE THE NOISE FLOOR				

- End of page -

10.7 Frequency Stability / Temperature Variation

Modulation : CDMA

Test Mode : Set to Middle channel (835.89MHz)

Deviation Limit : 2.5ppm

Results

Voltage (%)	Power (Vdc)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	ppm
100%	5.0	+23(Ref.)	835,889,926	-74	-0.080
100%		-30	835,889,918	-82	-0.090
100%		-20	835,890,055	+55	0.060
100%		-10	835,889,997	-3	0.003
100%		0	835,889,870	-130	-0.100
100%		+10	835,889,887	-113	-0.100
100%		+20	835,889,934	-66	-0.070
100%		+30	835,889,950	-50	-0.050
100%		+40	835,889,830	-170	-0.200
100%		+50	835,890,137	137	0.100
100%		+60	835,890,088	88	0.100

***The temperature is varied from -30°C to +60°C using an environmental chamber.**

11. TEST PLOTS

● ***Conducted Emission at the Mains port (Lowest Channel, Line)***

NEMKO KOREA (NK-2F-E-332) 08 Jun 2005 12:46

Conducted Emissions

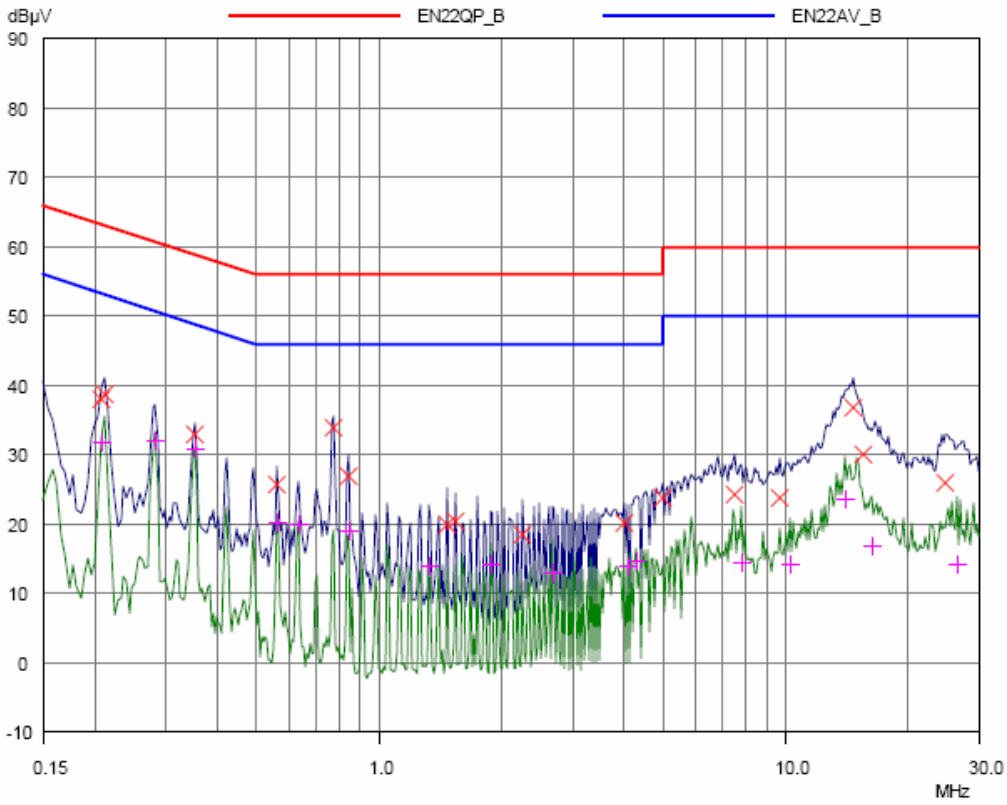
EUT:	CDMA 1x EVDO Wireless USB Data Modem
Manuf:	CMOTech Co., Ltd.
Op Cond:	AC 120V / 60Hz (Maximum Power)
Operator:	Chang-Soo, Choi
Test Spec:	CISPR 22 Class B
Comment:	MODEL : CCU-550
	LINE : LINE-PE
Result File:	e332l1.dat : Lowest

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	10 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: 40 dB



● ***Conducted Emission at the Mains port (Lowest Channel, Neutral)***

NEMKO KOREA (NK-2F-E-332) 08 Jun 2005 12:33

Conducted Emissions

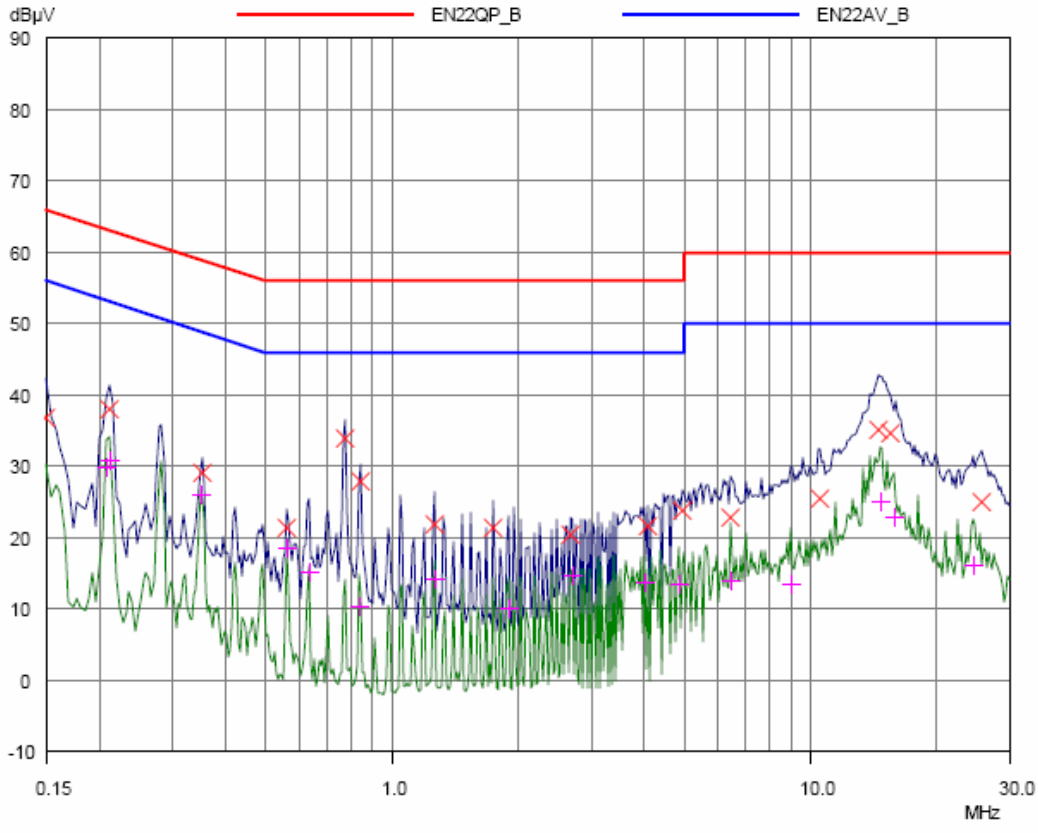
EUT:	CDMA 1x EVDO Wireless USB Data Modem
Manuf:	CMOTech Co., Ltd.
Op Cond:	AC 120V / 60Hz (Maximum Power)
Operator:	Chang-Soo, Choi
Test Spec:	CISPR 22 Class B
Comment:	MODEL : CCU-550
	LINE : NEUTRAL-PE
Result File:	e332n1.dat : Lowest

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	10 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: 40 dB



● ***Conducted Emission at the Mains port (Middle Channel, Line)***

NEMKO KOREA (NK-2F-E-332) 08 Jun 2005 13:18

Conducted Emissions

EUT:	CDMA 1x EVDO Wireless USB Data Modem
Manuf:	CMOTech Co., Ltd.
Op Cond:	AC 120V / 60Hz (Maximum Power)
Operator:	Chang-Soo, Choi
Test Spec:	CISPR 22 Class B
Comment:	MODEL : CCU-550
	LINE : LINE-PE
Result File:	e332l2.dat : Middle

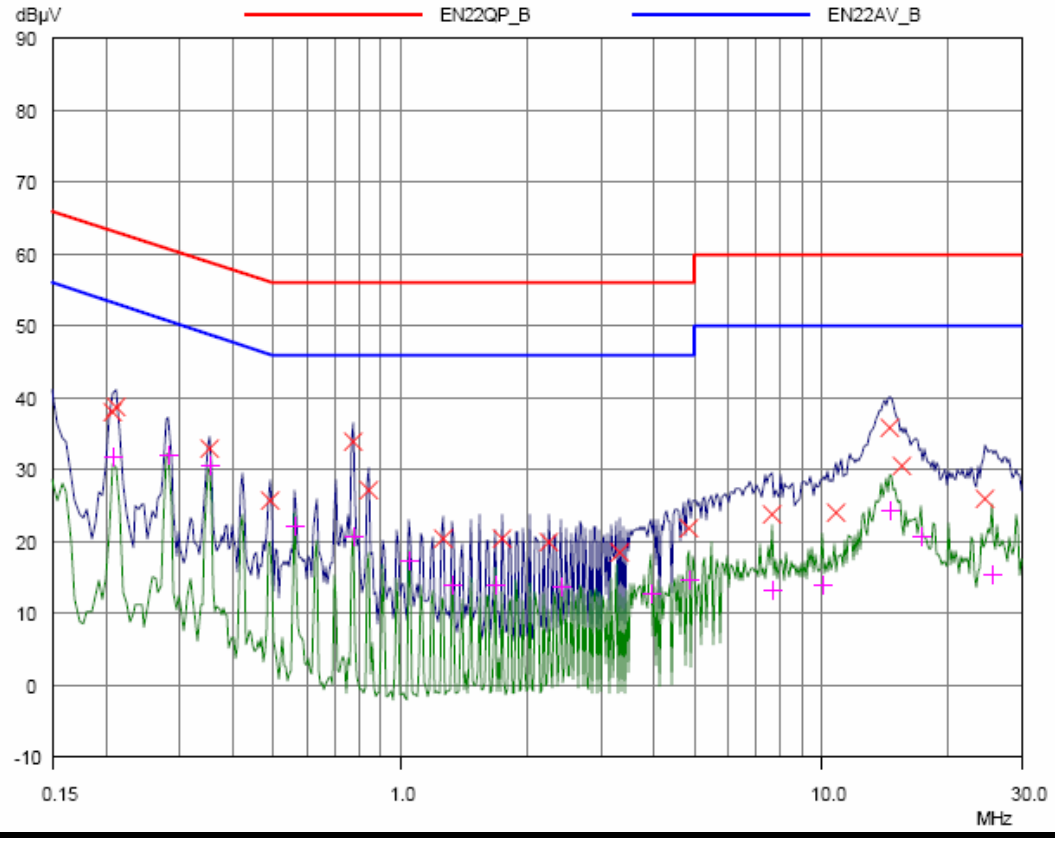
Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	10 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:	40 dB



● ***Conducted Emission at the Mains port (Middle Channel, Neutral)***

NEMKO KOREA (NK-2F-E-332) 08 Jun 2005 13:27

Conducted Emissions

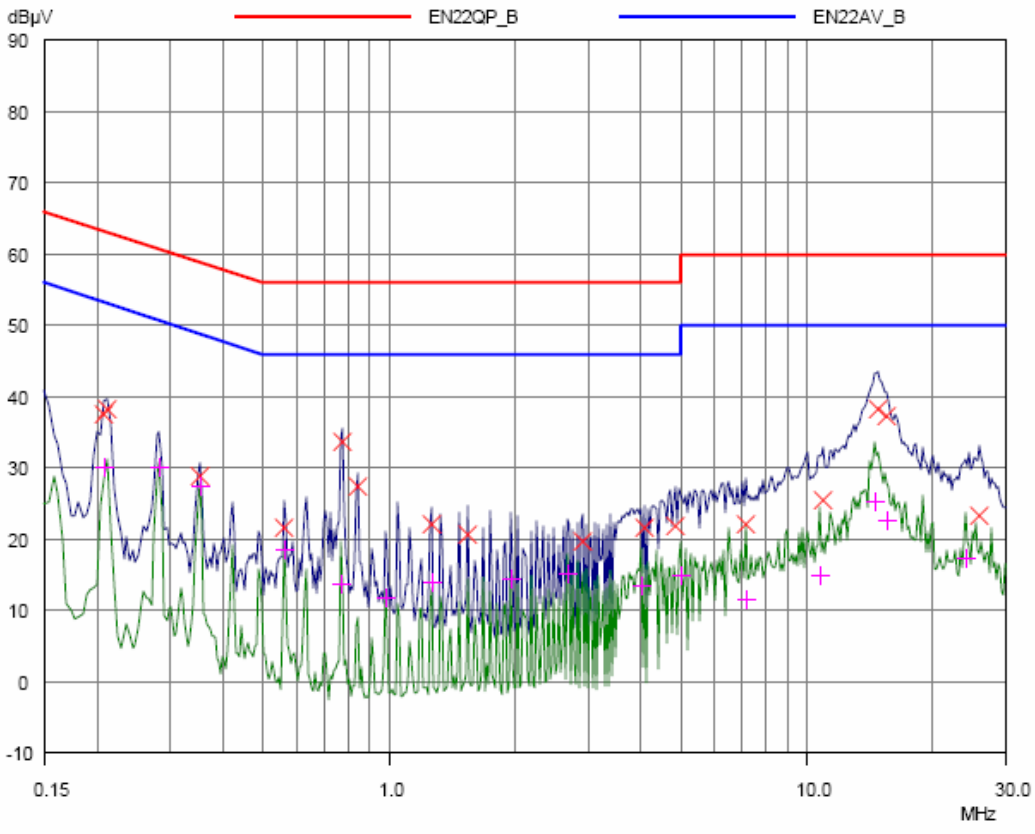
EUT:	CDMA 1x EVDO Wireless USB Data Modem
Manuf:	CMOTech Co., Ltd.
Op Cond:	AC 120V / 60Hz (Maximum Power)
Operator:	Chang-Soo, Choi
Test Spec:	CISPR 22 Class B
Comment:	MODEL : CCU-550
	LINE : NEUTRAL-PE
Result File:	e332n2.dat : Middle

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	10 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:	40 dB



● ***Conducted Emission at the Mains port (Highest Channel, Line)***

NEMKO KOREA (NK-2F-E-332) 08 Jun 2005 13:44

Conducted Emissions

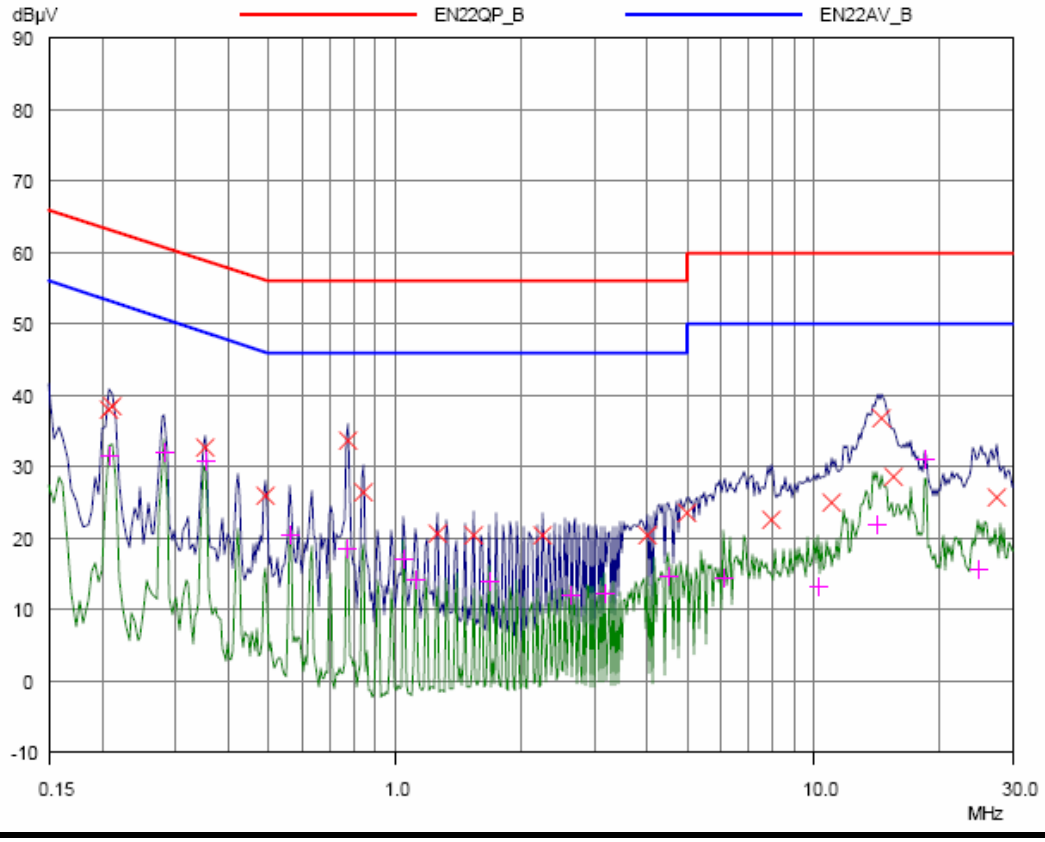
EUT:	CDMA 1x EVDO Wireless USB Data Modem
Manuf:	CMOTech Co., Ltd.
Op Cond:	AC 120V / 60Hz (Maximum Power)
Operator:	Chang-Soo, Choi
Test Spec:	CISPR 22 Class B
Comment:	MODEL : CCU-550
	LINE : LINE-PE
Result File:	e332l3.dat : Highest

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	10 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: 40 dB



● ***Conducted Emission at the Mains port (Highest Channel, Neutral)***

NEMKO KOREA (NK-2F-E-332) 08 Jun 2005 13:35

Conducted Emissions

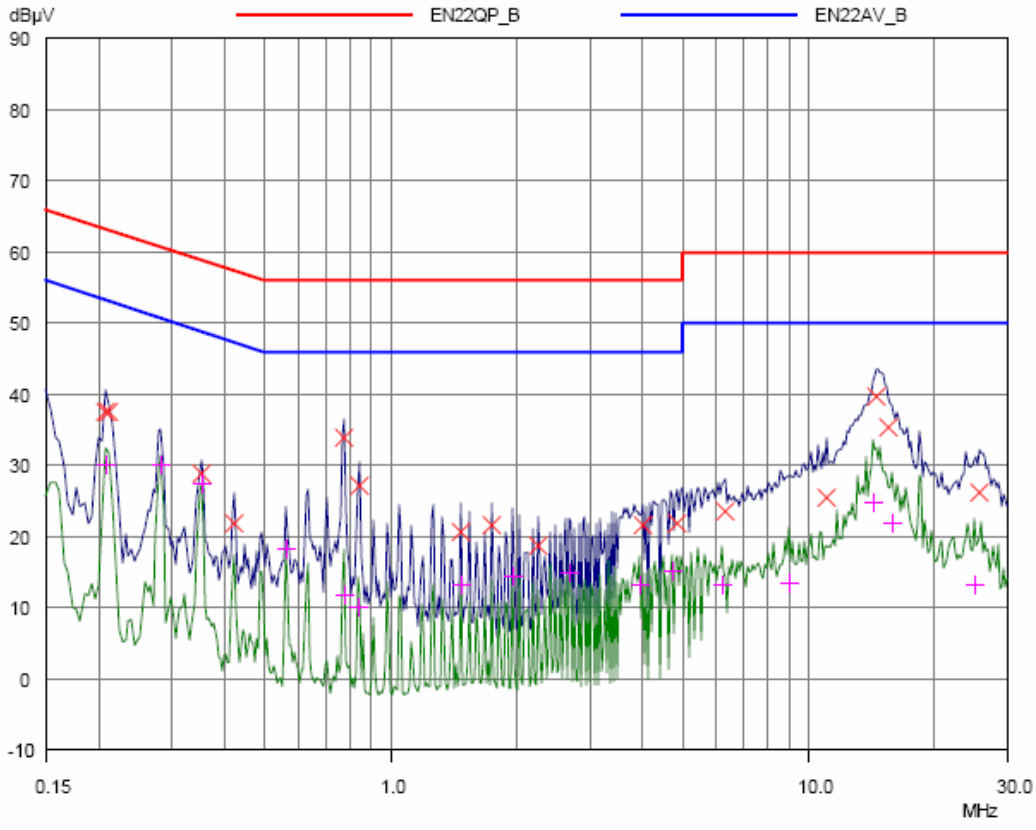
EUT:	CDMA 1x EVDO Wireless USB Data Modem
Manuf:	CMOTech Co., Ltd.
Op Cond:	AC 120V / 60Hz (Maximum Power)
Operator:	Chang-Soo, Choi
Test Spec:	CISPR 22 Class B
Comment:	MODEL : CCU-550
	LINE : NEUTRAL-PE
Result File:	e332n3.dat : Highest

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	10 dB	OFF	60dB

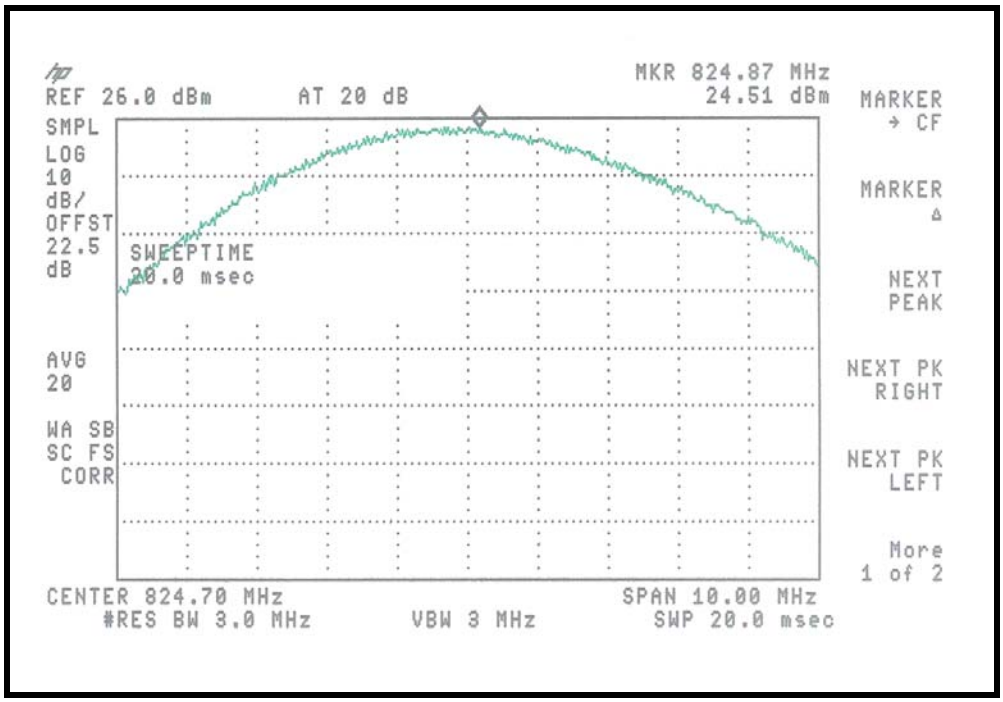
Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	CE_LINE

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Subranges: 16
Acc Margin: 40 dB

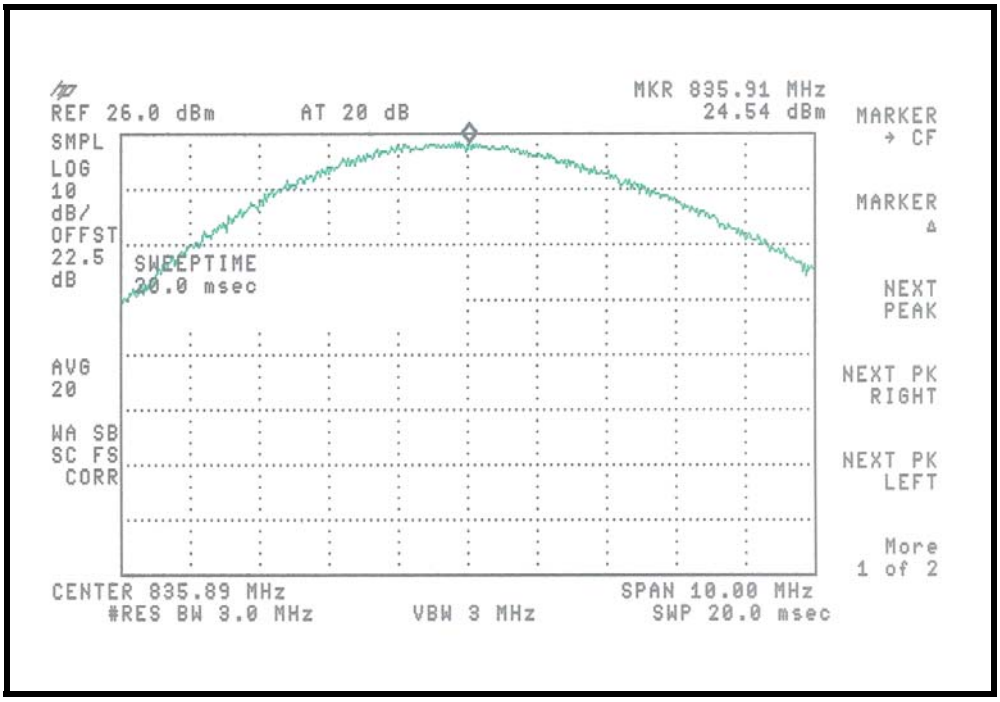


● **Conducted Output Power**

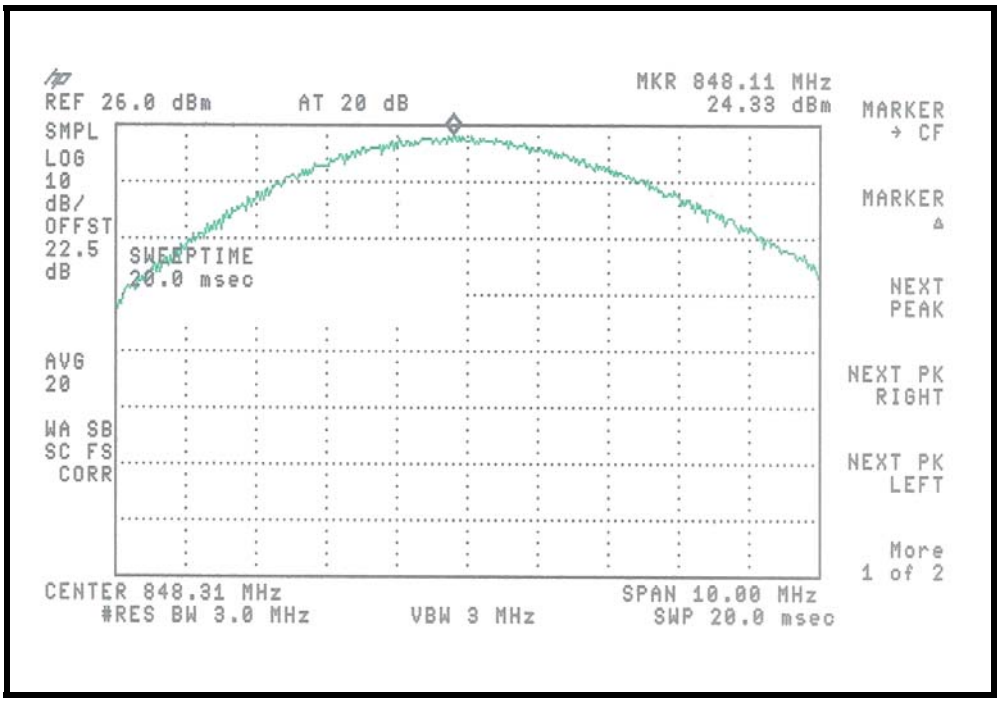
Low Channel



Middle Channel

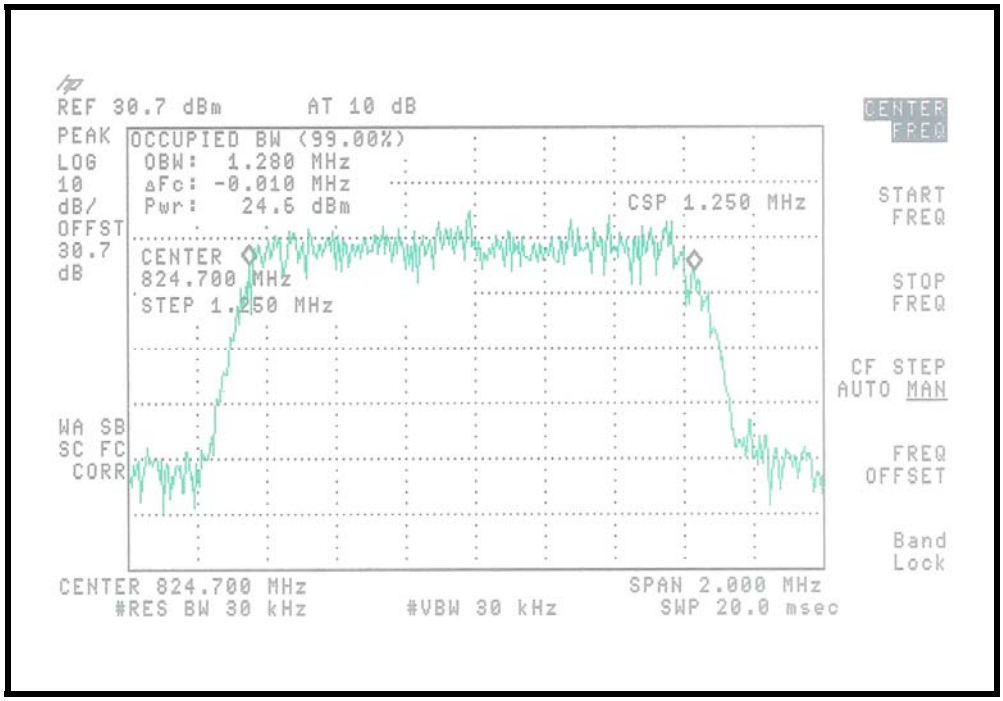


High Channel

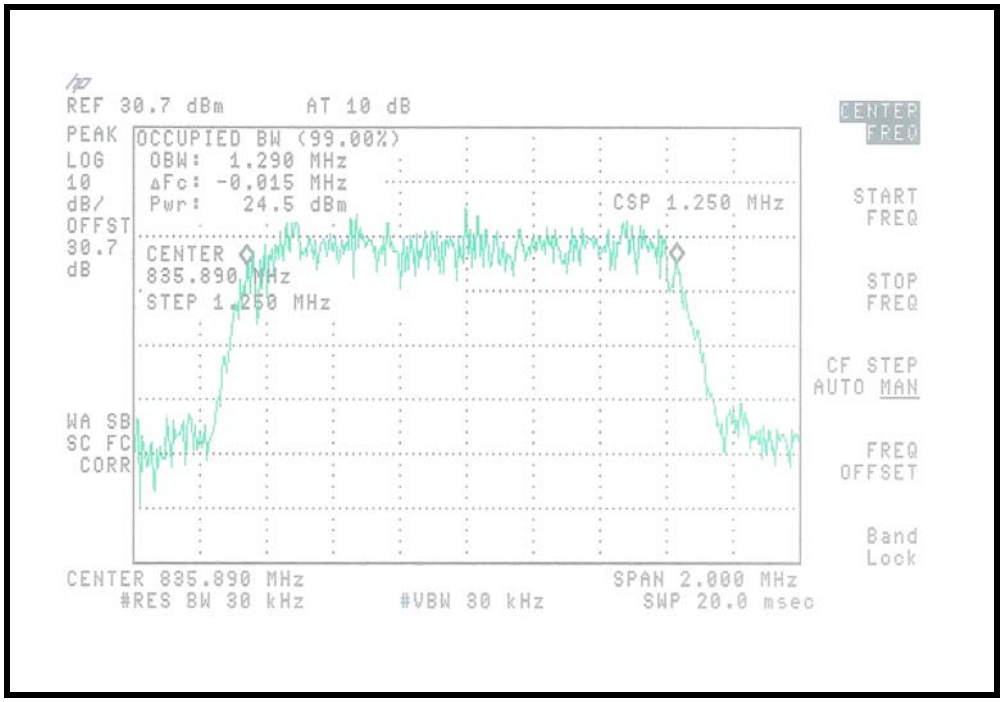


● **Occupied Bandwidth**

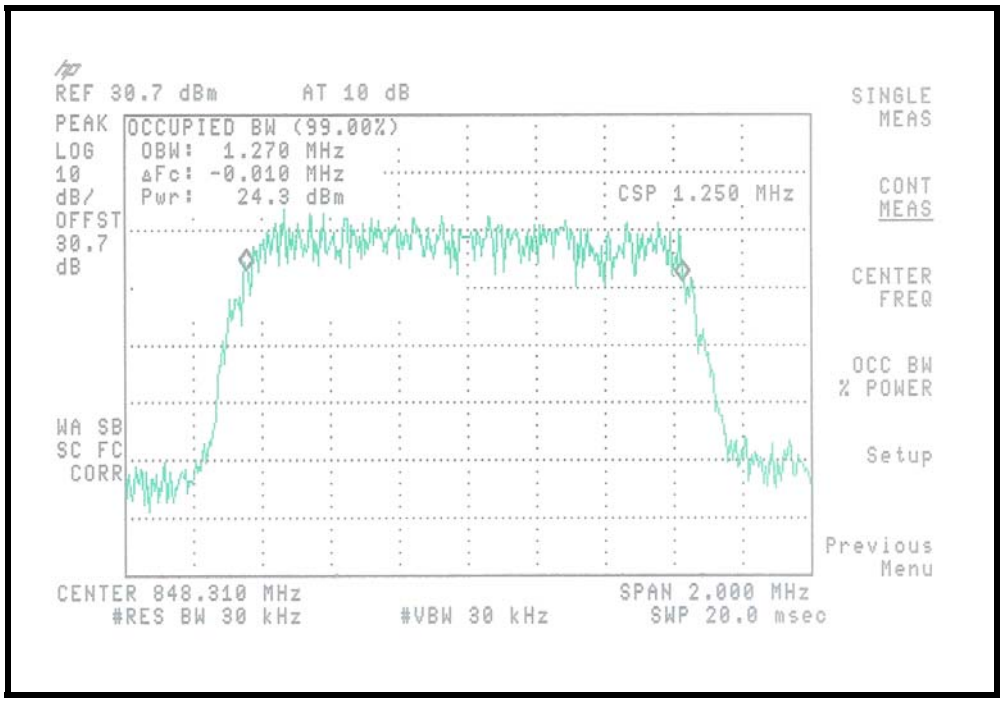
Low Channel



Middle Channel

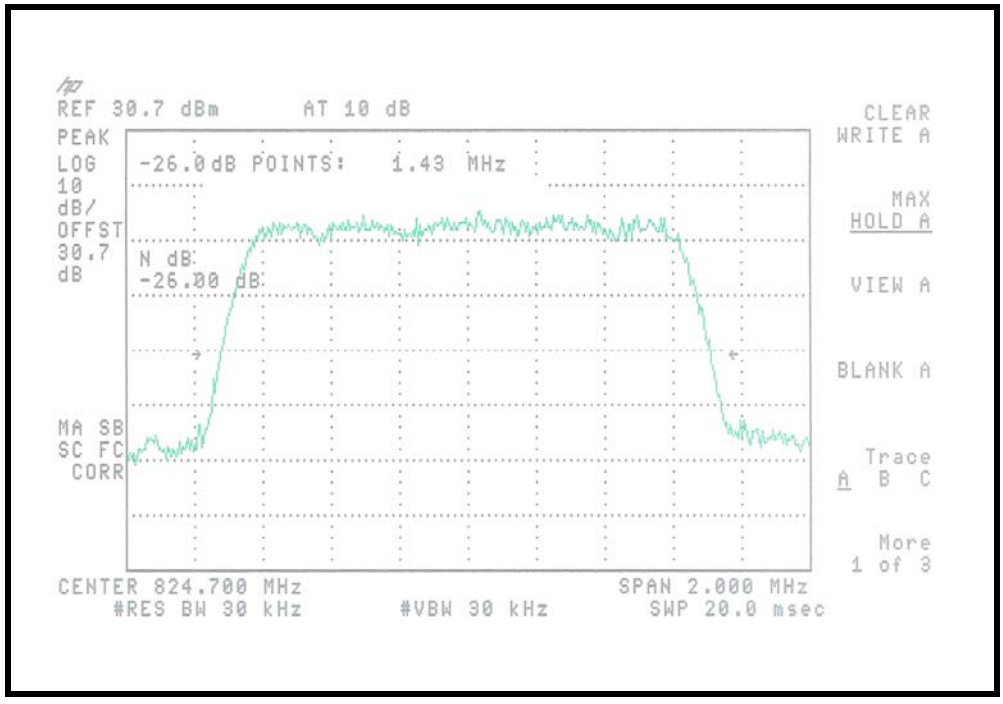


High Channel

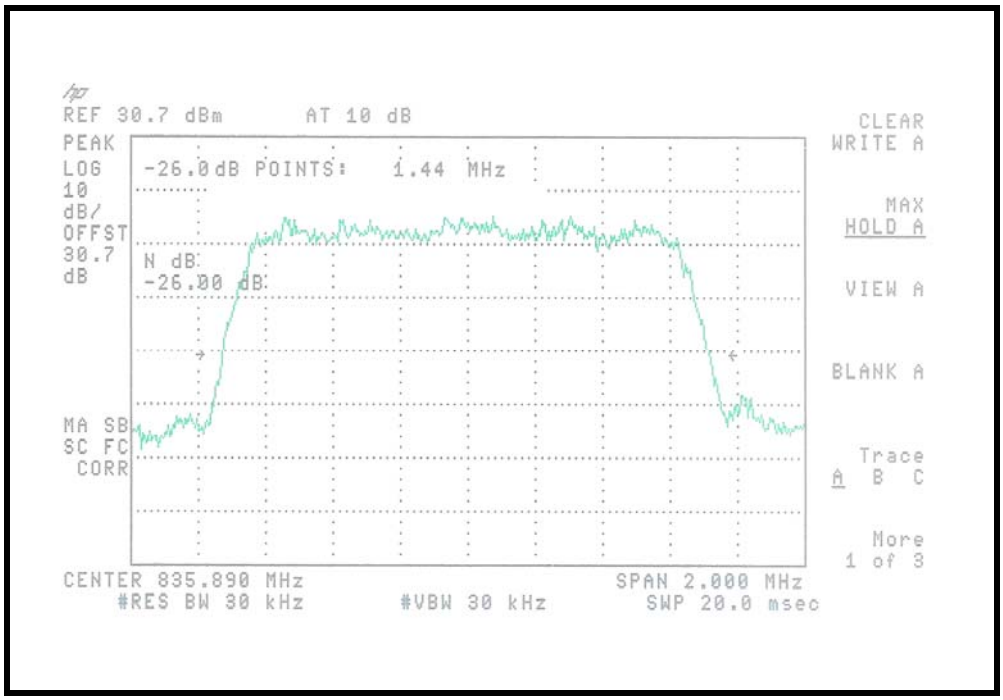


● **26dB Emission Bandwidth**

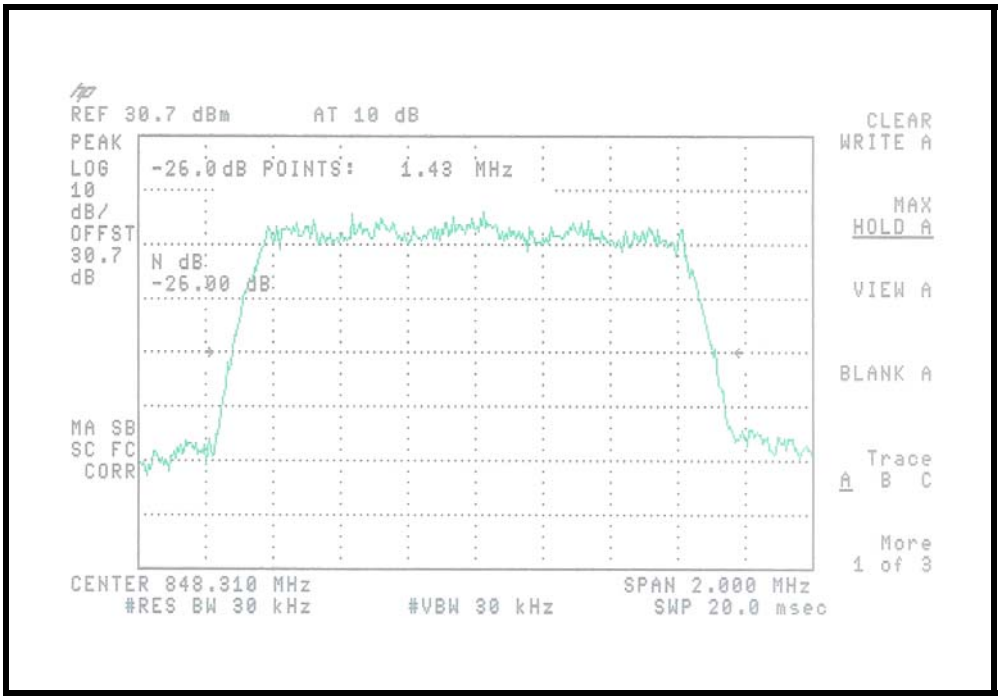
Low Channel



Middle Channel

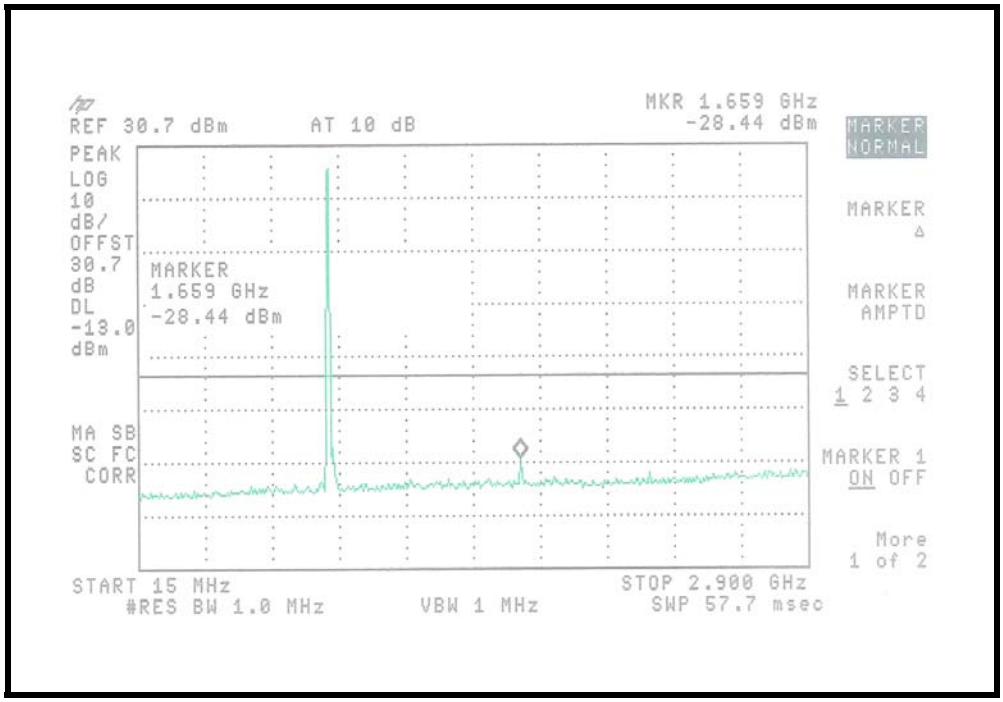


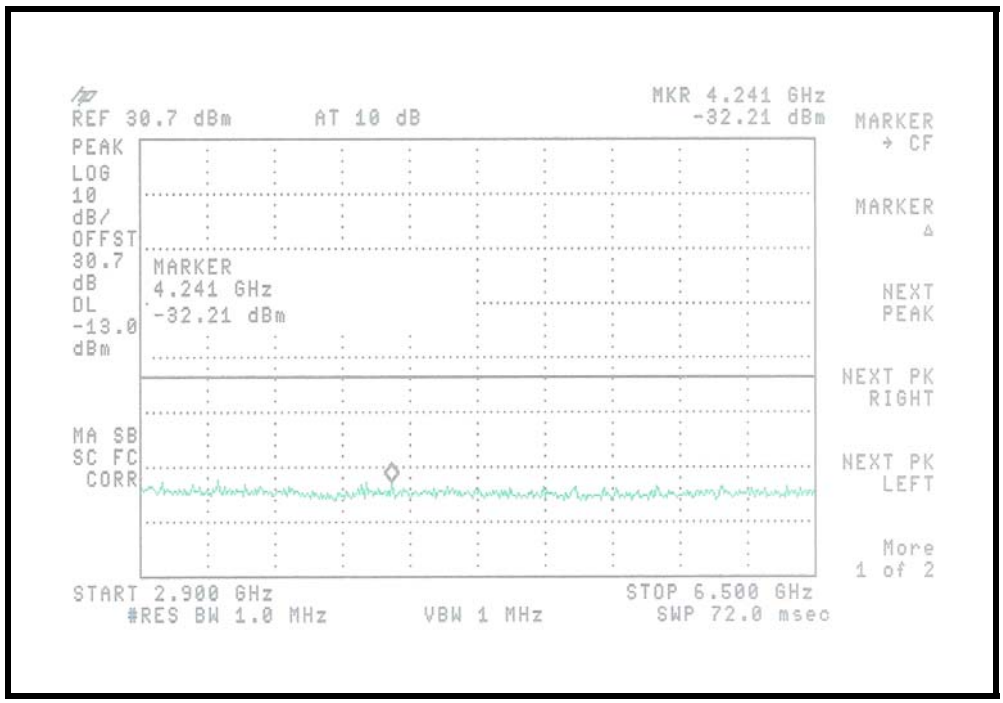
High Channel

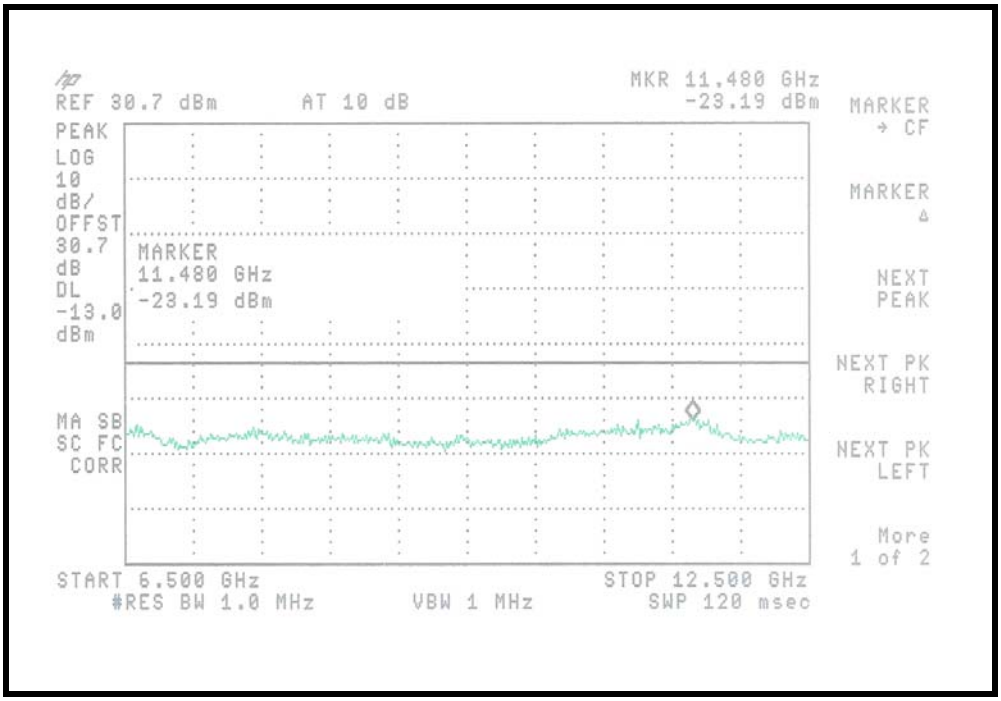


● **Spurious Emission at antenna Terminals**

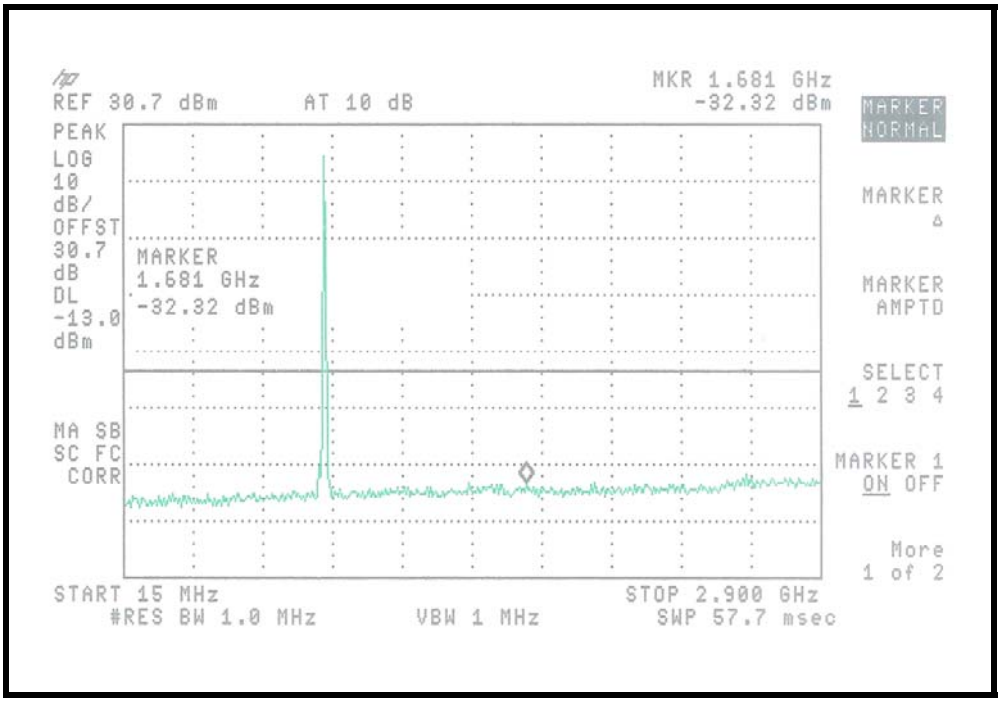
Low Channel

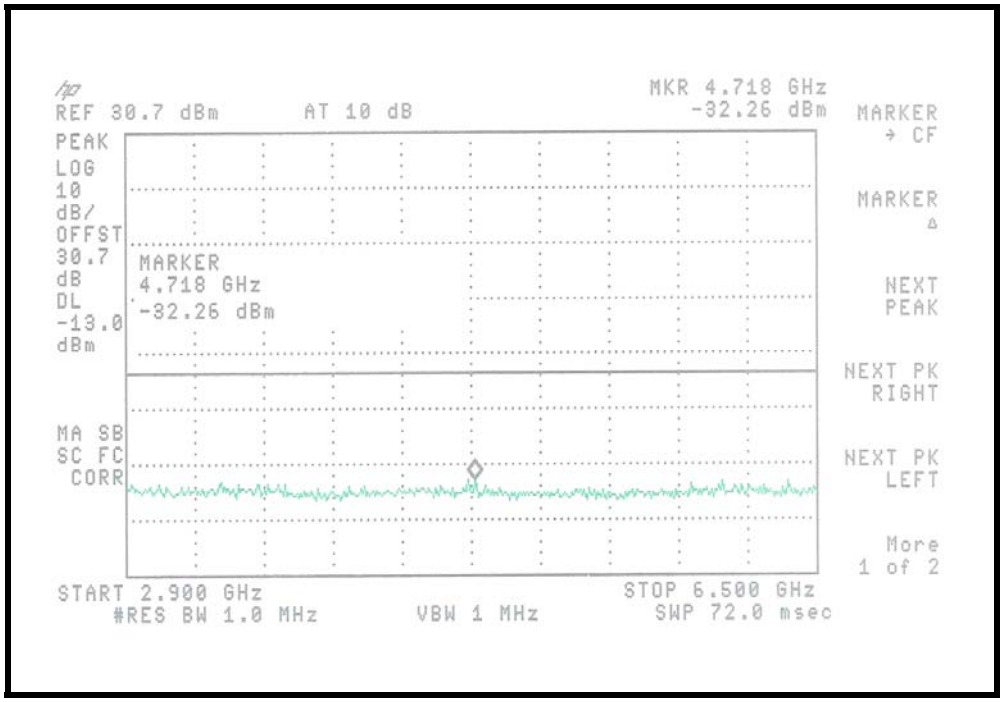


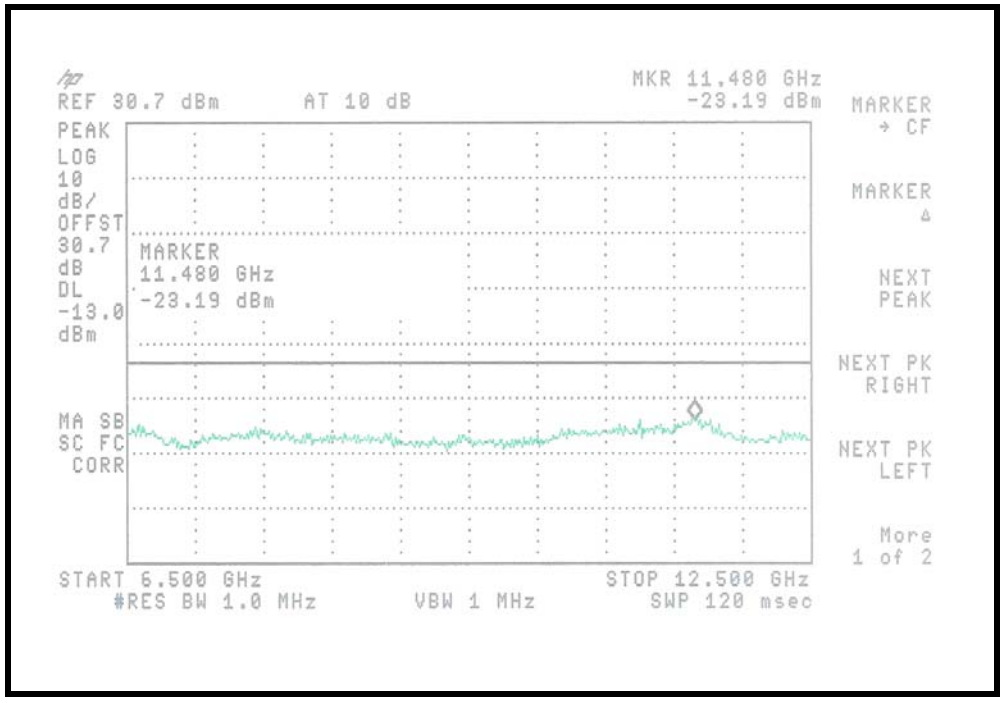




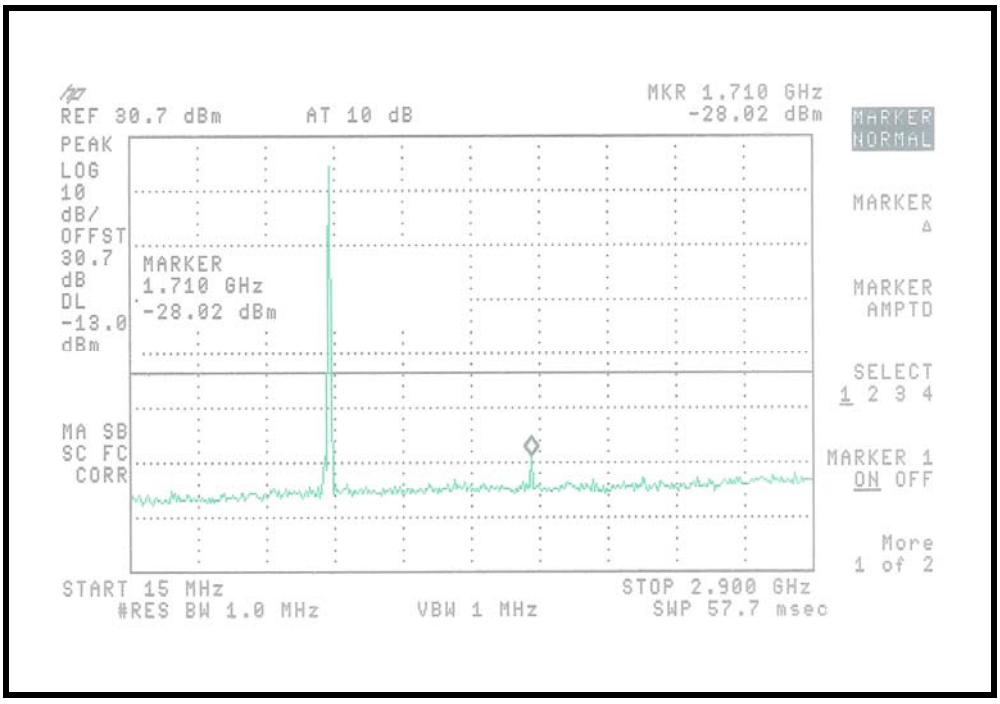
Middle Channel

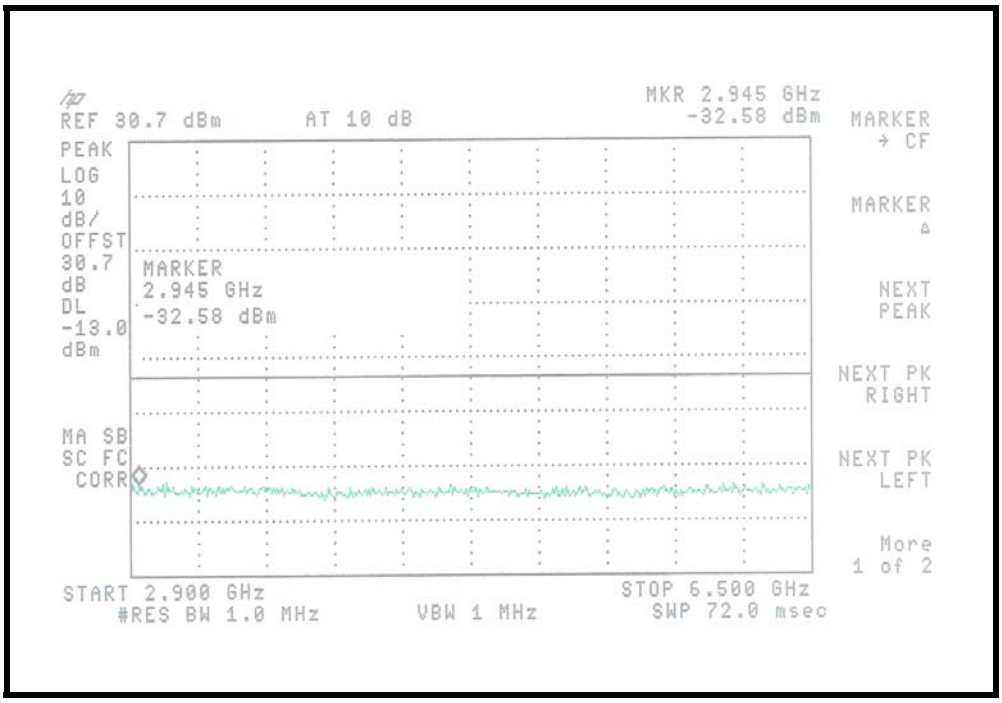


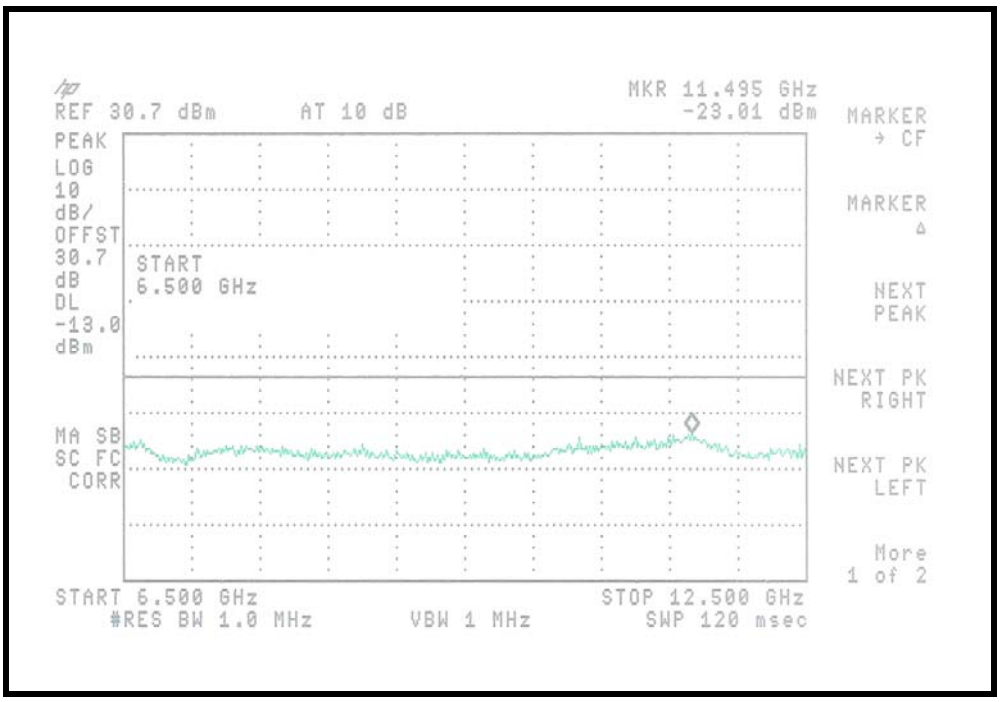

MKR 4.718 GHz
REF 30.7 dBm
AT 10 dB
-32.26 dBm
MARKER
→ CF
PEAK
LOG
10
dB/
OFFST
30.7
dB
DL
-13.0
dBm
MARKER
4.718 GHz
-32.26 dBm
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
MA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
START 2.900 GHz
#RES BW 1.0 MHz
VBW 1 MHz
STOP 6.500 GHz
SWP 72.0 msec


MKR 11.480 GHz
REF 30.7 dBm
AT 10 dB
-23.19 dBm
MARKER
→ CF
PEAK
LOG
10
dB/
OFFST
30.7
dB
DL
-13.0
dBm
MARKER
11.480 GHz
-23.19 dBm
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
MA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
START 6.500 GHz
#RES BW 1.0 MHz
VBW 1 MHz
STOP 12.500 GHz
SWP 120 msec

High Channel

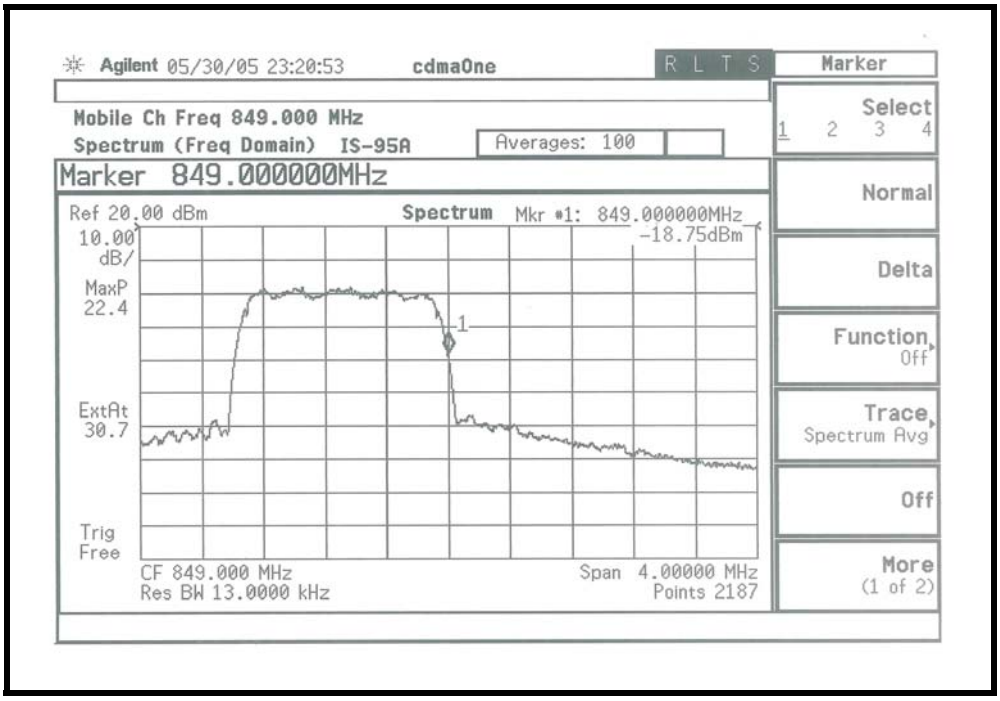


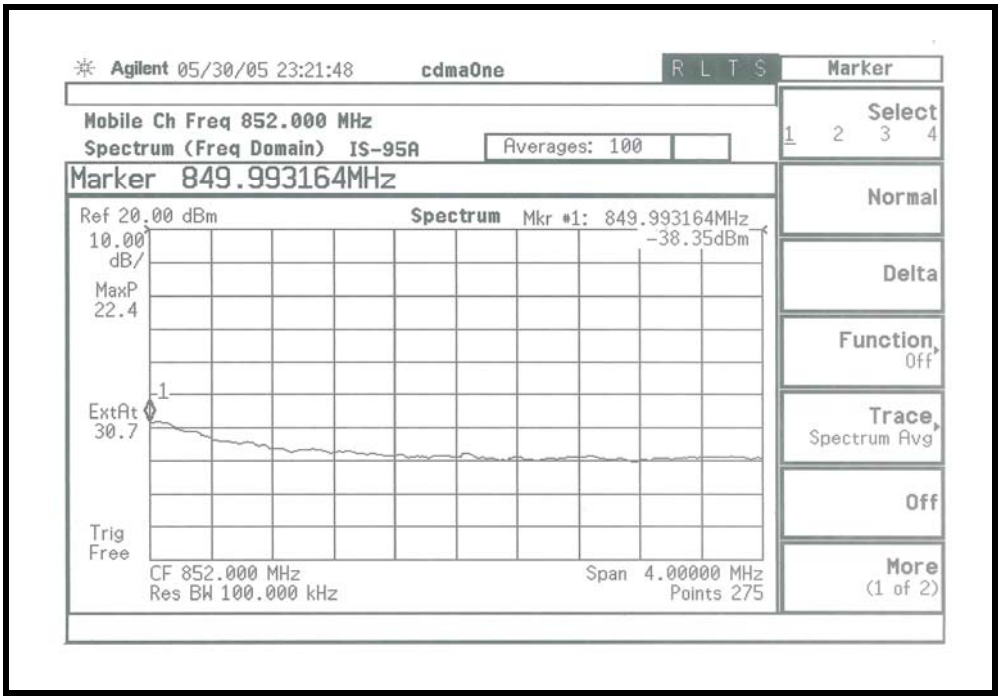



REF 30.7 dBm
AT 10 dB
MKR 11.495 GHz
-23.01 dBm
PEAK
LOG
10
dB/
OFFST
30.7
dB
DL
-13.0
dBm
START
6.500 GHz
MA SB
SC FC
CORR
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
START 6.500 GHz
#RES BW 1.0 MHz
VBW 1 MHz
STOP 12.500 GHz
SWP 120 msec

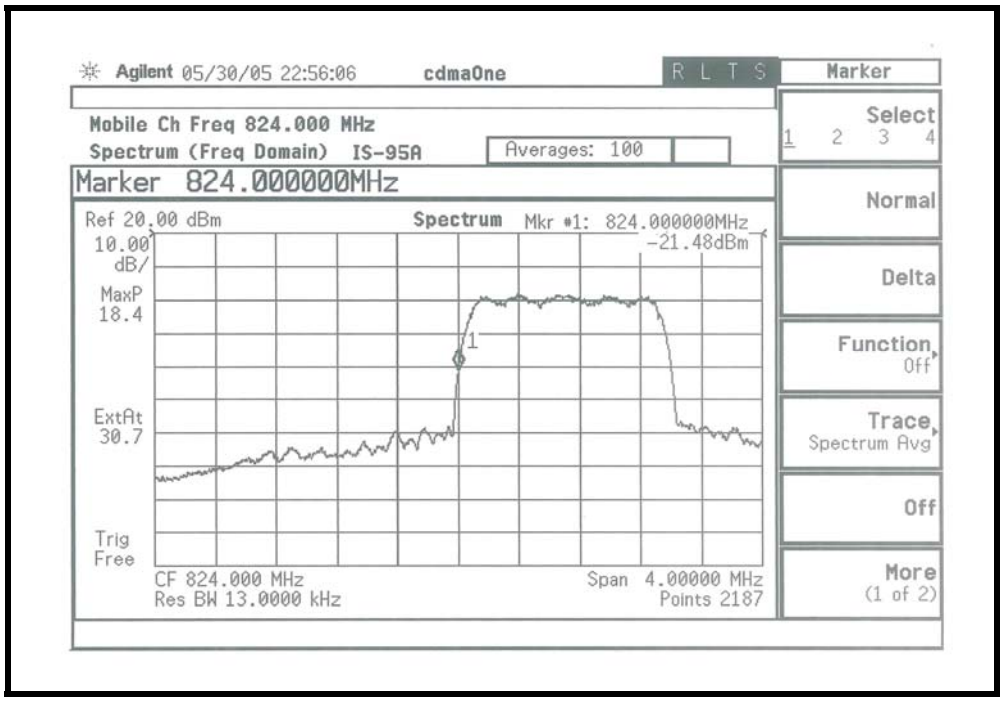
● **Band Edge**

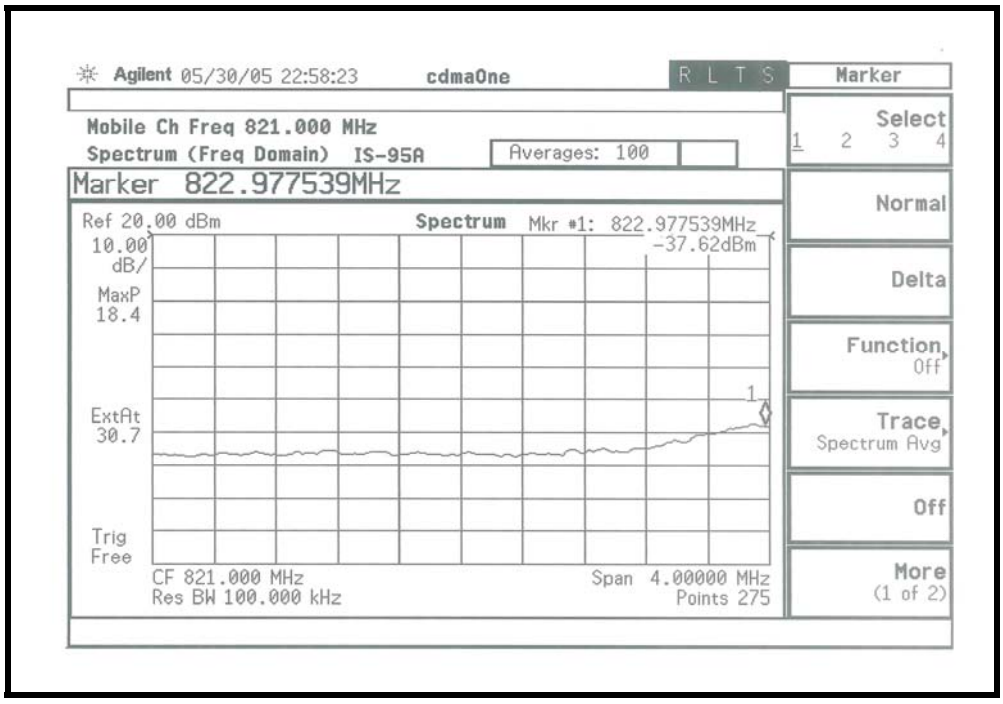
Low Channel





High Channel





APPENDIX D – SCHEMATIC DIAGRAM

APPENDIX E – BLOCK DIAGRAM

APPENDIX F – USER'S MANUAL

APPENDIX G – OPERATIONAL DESCRIPTION