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Electromagnetic Emissions Test Report and Request for Class II Permissive Change pursuant to Industry Canada Radio Standards Specification 131 & FCC Part 22 Subpart H on the REMEC Model: MCPS2135

FCC ID:	I2OMCPS2135
GRANTEE:	REMEC 1590 Buckeye Drive Milpitas, CA 95035
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Ave Sunnyvale, CA 94086
REPORT DATE:	March 10, 2005
FINAL TEST DATE:	March 8, 2005
AUTHORIZED SIGNATORY:	Juan Martinez Senior EMC Engineer

ACCREDITED
2016-01

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FCC CERTIFICATION INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part 2, Subpart J, Section 2.1033(C) & to Industry Canada RSP-100.

2.1033(c)(1) Applicant:

REMEC
1590 Buckeye Drive
Milpitas, CA 95035

2.1033(c)(2) & RSP-100 (4)

FCC ID: I2OMCPS2135

2.1033(c)(3) & RSP-100 (7.2(a)) Instructions/Installation Manual

Application is a Class II permissive change.

2.1033(c)(4) & RSP-100 (7.2(b)(iii)) Type of emissions

4M15FXW (W-CDMA)
1M25F9W (1xEV-DO)

2.1033(c)(5) & RSP-100 (7.2(a)) Frequency Range

Transmitter: 869 – 894 MHz

2.1033(c)(6) & RSP-100 (7.2(a)) Range of Operation Power

Maximum power: 500 Watts

2.1033(c)(6) & RSP-100 (7.2(a)) Range of Operation Power

Section 22.913: limited to 500 Watts ERP

2.1033(c)(8) & RSP-100 (7.2(a)) Applied voltage and currents into the final transistor elements

Application is a Class II permissive change.

2.1033(c)(9) & RSP-100 (7.2(a)) Tune-up Procedure

Application is a Class II permissive change.

2.1033(c)(10) & RSP 100 (7.2(a)) Schematic Diagram of the Transmitter

Application is a Class II permissive change.

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Frequency Stabilization

Application is a Class II permissive change.

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Suppression of Spurious radiation

Application is a Class II permissive change.

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Limiting Modulation

Application is a Class II permissive change.

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Limiting Power

Application is a Class II permissive change.

2.1033(c)(11) & RSP-100 (7.2(g)) Photographs or Drawing of the Equipment Identification Plate or Label

Application is a Class II permissive change.

2.1033(c)(12) & RSP-100 (7.2(c)) Photographs of equipment

Application is a Class II permissive change.

2.1033(c)(13) & RSP-100 (7.2(a)) Equipment Employing Digital Modulation

N/A

2.1033(c)(14) & RSP-100 (7.2(b)(ii)) Data taken per Section 2.1046 to 2.1057 and RSS-133 issue 2, Rev. 1.

Refer to Exhibit 2

SCOPE

FCC Part 22 Subpart H & IC RSS-131 testing was performed for the equipment mentioned in this report. The equipment was tested in accordance with the procedures specified in Sections 2.1046 to 2.1057 of the FCC Rules & in IC RCC-118. TIA-603 was also used as a test procedure guideline to perform some of the required tests.

The intentional radiator above was tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

OBJECTIVE

The primary objective of the manufacturer is compliance with the FCC Rules part 22 Subpart H & IC RSS-131. Certification of these devices is required as a prerequisite to marketing as defined in Section 2.1033 & RSP-100.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to FCC. FCC issues a grant of equipment authorization and a certification number upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product that may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

EMISSION TEST RESULTS

Part 22H and RSS-129 Test Summary

Part 2 Measurements Required Section	FCC Part 22 Subpart H Section	RSS-131 Section	Test Performed	Measured Value	Test Procedure Used	Result
Modulation Tested	W-CDMA / 1xEV-DO	W-CDMA / 1xEV-DO	-	-	-	-
2.1047: Modulation characteristics	22.901 (d)(1)(2)	5.6	99% Bandwidth	4.15 MHz (W-CDMA), 1.25 MHz (1xEV-DO)	D	Complies
2.1046: RF power output	22.913	6.2	Output Power Test	N/A	N/A	N/A
2.1046: RF power output	22.913	6.2	Conducted Output Power Test (**Antenna Conducted**)	56.99 dBm (500 Watts)	B	Complies
2.1051: Spurious emissions at antenna Port	22.917 (e)	6.4	Emission Limits and/or Unwanted Emission 30MHz – 10GHz (**Antenna Conducted**)	All spurious emissions < -13dBm	J	Complies
2.1049: Occupied Bandwidth	22.917 (e)	6.3	Out of Block Emissions (**Antenna Conducted**)	All spurious emissions < -13dBm	I	Complies
2.1053 Field strength of spurious radiation	22.917 (e)	6.4	Radiated Spurious Emissions 30MHz – 25GHz	N/A	N/A	N/A
2.1055: Frequency stability	22.355	9.2.1	Frequency Stability (Frequency Vs. Temperature)	N/A	N/A	N/A
2.1055: Frequency stability	22.355	7(a)	Frequency Stability (Frequency Vs. Voltage)	N/A	N/A	N/A
-	-	7(b)	Frequency Stability (Power Vs. Voltage)	N/A	N/A	N/A

2.1093: Exposure to portable devices	-	RSS-102	Exposure of Humans to RF Fields	N/A	N/A	-
-	15.109	-	Receiver Spurious Emissions	N/A	N/A	-

MEASUREMENT UNCERTAINTIES

ISO Guide 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with NAMAS document NIS 81.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.6

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The REMEC model MCPS2135 is a multi carrier cellular transmit band amplifier. Normally, the EUT would be placed in a rack during operation. The EUT was treated as table top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 27V DC, 50 Amps per amplifier (typical).

The sample was received on March 3, 2005 and tested on March 3, 2005. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Remec	MCPS-5000	Multi channel amplifier	199214	I2OMCPS2135
Remec	MCPA2135	Multi channel amplifier	199224	I2OMCPS2135

OTHER EUT DETAILS

These tests are to add WCDMA and 1xEV-DO modes of operation for both the MCPS2500 (4 MCPA2135 amplifiers) and an MCPS2135 (1 MCPA2135 amplifier).

ENCLOSURE

The EUT enclosure is primarily constructed of fabricated sheet steel. The MCPS2500 measures approximately 54.5 cm wide by 48.0 cm deep by 35.5 cm high. The MCPS2135 measures approximately 43.0 cm wide by 48.0 cm deep by 13.0 cm high.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with the emission specifications.

SUPPORT EQUIPMENT

The following equipment was used as local support equipment for emissions testing:

Manufacturer/Model/Description	Serial Number	FCC ID Number
Agilent/E4433B/Signal Generator	US40051573	N/A
Agilent/E4433B/Signal Generator	U37231291	N/A
Narda/3001-10/Directional Coupler	33832	N/A
Narda/41620/Combiner	N/A	N/A
Weinschel/82-30-34/30-dB Attenuator	N/A	N/A

EUT INTERFACE PORTS

The I/O cabling configuration during emissions testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Input	Signal Generators	Coaxial	Shielded	1.5
Output	Attenuator	Coaxial	Shielded	1.5
DC input	DC Power Supply	2 wire	Unshielded	1.5

EUT OPERATION DURING TESTING

EUT was set to continuously transmit at maximum power.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on March 8, 2005 at the Elliott Laboratories Open Area Test Site #2 located at 684 West Maude Avenue, Sunnyvale, California. Pursuant to Section 2.948 of the FCC Rules, construction, calibration, and equipment data has been filed with the Commission.

Departmental Acknowledgement Number: IC2845 **SV4,** Dated July 19, 2001

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing are performed in conformance with Section 2 of FCC Rules. Measurements are made with the EUT connected to a spectrum analyzer through an attenuator to prevent overloading the analyzer.

RADIATED EMISSIONS CONSIDERATIONS

Radiated measurements are performed in an open field environment. The test site is maintained free of conductive objects within the CISPR 16-1 defined elliptical area.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers are capable of measuring over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the particular detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. If average measurements above 1000MHz are performed, the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz is used.

INSTRUMENT CONTROL COMPUTER

A personal computer is utilized to record the receiver measurements of the field strength at the antenna, which is then compared directly with the appropriate specification limit. The receiver is programmed with appropriate factors to convert the received voltage into filed strength at the antenna. Results are printed in a graphic and/or tabular format, as appropriate.

The test receiver also provides a visual display of the signal being measured.

POWER METER

A power meter and thermister mount may be used for output power measurements from transmitters as they provide a broadband indication of the power output.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or EUT and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transmitters and transient events.

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor drive to vary the antenna height.

The requirements of ANSI C63.4 were used for configuration of the equipment turntable. It specifies that the test height above ground for table-mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An appendix of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

General: For Transmitters with detachable antenna, direct measurements for output power, modulation characterization, occupied bandwidth, and frequency stability are performed with the antenna port of the EUT connected to either the power meter, modulation analyzer, or spectrum analyzer via a suitable attenuator and/or filter. The attenuators and/or filters are used to ensure that the transmitter fundamental will not overload the front end of the measurement instrument.

Procedure A – Power Measurement (Radiated Method): The following procedure was used for transmitters that do not use external antennas or with devices with test port were the output power can be measured directly, but Power must still be made with antenna attached.

1) Set the EUT to maximum power and to the lowest channel.
2) A spectrum analyzer was use to measure the power output. The search antenna was located 3 meter from the EUT.
3) The spectrum analyzer resolution and video bandwidth was set to 2 MHz to measure the power output. No amplifier was used since the fundamental will cause the amplifier to saturate.
4) The EUT was then rotated for a complete 360 degrees and the search antenna was raised and lowered to maximize the fundamental. Both vertical and horizontal polarization's were performed. All correction factors are applied to the fundamental.
5) Substitution is then performed. Substitution method is performed by replacing the EUT with a transmit antenna and signal generator. The substitution antenna can be reference to a half-wave dipole in dBi. The signal generator is then set to a fix output level of either –10 or –20dBm. This is then injected into the substitution antenna. The field strength produced by the substitution antenna is then measured. This measured value is then used to determine the conversion factor to convert the EUTs field strength levels to a dBm value.
6) Steps 1 to 5 are repeated for the middle and the highest channel.

Procedure B – Power Measurement (Conducted Method): The following procedure was used for transmitters that do use external antennas.

1) Set the EUT to maximum power and to the lowest channel.
2) Either a power meter or a spectrum analyzer was used to measure the power output.
3) If a spectrum analyzer was used a resolution and video bandwidth 1MHz was used to measure the power output. Corrected for any external attenuation used for the protection of the input of analyzer. In addition, For CDMA or TDMA modulations set spectrum analyzer resolution to 2MHz and video to 3MHz.
4) If a power meter was used, corrected for any external attenuation used for the protection of the input of the sensor head. Also set the power sensor correction by setting up the frequency range that will be measured.
5) Repeat this for the high channel and all modulations that will be used and all output ports used for transmission

RSS-131: 4.3.2 Single Channel Enhancer

A suitably modulated signal, representative of the technology for which certification is sought, is applied to the input of the amplifier. The input power level is increased until the manufacturer's rated input power level is achieved or until a 2 dB increase in input level results in a 1 dB increase in output level (i.e. compression begins). Record the output power in the 99% emission bandwidth using any suitable means.

Procedure D - Occupied Bandwidth (Conducted Method): Either for analog, digital, or data modulations, occupied bandwidth was performed. The EUT was set to transmit the appropriate modulation at maximum power. The bandwidth was measured using following methods:

1) The built-in 99% function of the spectrum analyzer was used.
2) If the built-in 99% is not available then the following method is used:

26-dB was subtracted to the maximum peak of the emission. Then the display line function was used, in conjunction with the marker delta function, to measure the emissions bandwidth.

3) For the above two methods a resolution and video bandwidth of 10 or 30 kHz was used to measure the emission's bandwidth.

RSS 131: 6.3 Non-Linearity & 6.3.2 Single Channel Enhancer

Transmitter signals amplified by a non-linear device (enhancer or translator) will alter the occupied bandwidth of the transmitted signals; therefore, the extent of non-linearity shall be tested.

For a single channel amplifier, the 99% emission bandwidth shall be measured under the conditions described in section 4.3.2 and the spectrum analyzer plots submitted in the test report. Set the resolution bandwidth of the spectrum analyzer from 1% to 3% of the 99% emission bandwidth and set the video bandwidth to 3 times the resolution bandwidth. Record both the amplifier input and output signals.

Procedure H - Other Types of Equipment: Either digital or data modulated signals were simulated, by software or external sources, to performed the required tests. The EUT was set to transmit the appropriate digital modulation.

Procedure I – Bandedge: Where Bandedge measurements are specified the following procedure was performed:

1) Set the transmitting signal as close as possible to the edge of the frequency band/block as specified in the standard. Power is set to maximum
2) Set the spectrum analyzer display line function to –13 dBm.
3) Set the spectrum analyzer bandwidth to the minimum 1% of the emission bandwidth. The emission bandwidth is determined by using **procedure D**.
4) Set the marker function to the FCC or IC specified frequency band/block.
5) Set the spectrum analyzer span to show any emission within 2 MHz above or below the frequency band/block. All spurious or intermodulation emission must not exceed the –13 dBm limit.
7) Steps 1 to 5 were repeated for all modulations and output ports that will be used for transmission. Also, bandedge is determined for blocks A (high edge) & C (low edge).

RSS 131: 4.4.2 Single Channel Enhancer & 6.4 Spurious Emissions

The enhancer shall be operated as described in section 4.3.2 during the search for spurious emissions. Using a spectrum analyzer with a resolution bandwidth set at 100 kHz, search for spurious emissions from 30 MHz to at least 5 times the highest RF passband frequency. The search may omit the band that contains the input signal.

Spurious emissions of zone enhancers and translators shall be suppressed as much as possible. Spurious emissions shall be attenuated below the rated power of the enhancer by at least: $43 + 10 \text{ Log}_{10} (P_{rated} \text{ in watts})$, or 70 dB, whichever is less stringent.

Procedure K - Frequency Stability: The EUT is placed inside a temperature chamber with all support and test equipment located outside of the chamber. The spectrum analyzer is configured to give a 6-digit display for the marker-frequency function. The spectrum analyzer's built-in frequency counter is used to measure the maximum deviation of the fundamental frequency at each temperature. The Temperature chamber was varied from –30 to +50° C (or +60° C) for some IC RSS standards, if applicable) in 10 degrees increment. The EUT was allowed enough time to stabilize for each temperature variation.

Procedure L - Frequency Stability: For AC or DC operated devices the nominal voltage is varied to 85% and to 115% at either room temperature or at a controlled +20°C temperature.

Procedure M - Frequency Stability: For battery-powered devices the voltage battery end-point is determined by reducing the dc voltage until the unit ceases to function. This is performed at either room temperature or at a controlled +20°C temperature.

Procedure N - Field Strength Measurement: The EUT was set on the turntable and the search antenna position 3 meters away. The output antenna terminal was terminated with a 50-ohm terminator. The EUT was set at the middle of the frequency band and set at maximum output power.

For the first scan, a pre-liminary measurement is performed. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. One or more of these is with the antenna polarized vertically while the one or more of these are with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

For the final measurement, Substitution method is performed on spurious emissions not being 20-dB below the calculated radiated limit. Substitution method is performed by replacing the EUT with a transmit antenna and signal generator. The substitution antenna can be reference to a half-wave dipole in dBi. The signal generator is then set to a fix output level of either –10 or –20dBm. This is then injected into the substitution antenna. The field strength produced by the substitution antenna is then measured. This measured value is then used to determine the conversion factor to convert the EUTs field strength levels to a dBm value.

Procedure P – Receiver Antenna Conducted Emissions: Receiver spurious emission was measured at the antenna terminal, as a port was available.

1) Set the receiver was set to the midpoint of the operating band as specified in the standard.
2) Set the spectrum analyzer display line function to 2 nanowatts for measurements below 1 GHz and 5 nanowatts for measurements above 1 GHz.
3) Set the spectrum analyzer bandwidth to 1 MHz.

For the spectrum analyzer, the start frequency was set to 30 MHz and the stop frequency set to the 5^{th} harmonic of the receiver LO. All spurious or intermodulation emission must not exceed the specified limit.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

RADIATED EMISSIONS SPECIFICATION LIMITS

The limits for radiated emissions are based on the power of the transmitter at the operating frequency. Data is measured in the logarithmic form of decibels relative to one milliwatt (dBm) or one microvolt/meter (dBuV/m,). The field strength of the emissions from the EUT is measured on a test site with a receiver.

Below is a formula example used to calculate the attenuation requirement, relative to the transmitters power output, in dBuV/m. For this example an operating power range of 3 watts is used. The radiated emissions limit for spurious signals outside of the assigned frequency block is $43+10\text{Log}_{10}$ (mean output power in watts) dB below the measured amplitude at the operating power.

CALCULATIONS – EFFECTIVE RADIATED POWER

$$E(V/m) = \frac{\sqrt{30 * P * G}}{d}$$

E= Field Strength in V/m
P= Power in Watts (for this example we use 3 watts)
G= Gain of antenna in numeric gain (Assume 1.64 for ERP)
d= distance in meters

$$E(V/m) = \frac{\sqrt{30 * 3 \text{ watts} * 1.64 \text{ dB}}}{3 \text{ meters}}$$

20 * log (4.049 V/m * 1,000,000) = 132.14 dBuV/m @ 3 meters

FCC Rules request an attenuation of 43 + 10 log (3) or 47.8 dB for all emissions outside the assigned block, the limit for spurious and harmonic emissions is:

132.1 dBuV/m – 47.8 dB = 84.3 dBuV/m @ 3 meter.

Note: Substitution Method is performed for spurious emission not being 20-dB below the calculated field strength.

EXHIBIT 1: Test Equipment Calibration Data

Radio Antenna Port (Power and Spurious Emissions), 08-Mar-05
Engineer: David Bare

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 40 GHz, Fremont	8564E (84125C)	1393	26-Oct-05

EXHIBIT 2: Test Measurement Data

The following data includes conducted and radiated emission measurements of the REMEC, model: MCPS2135.

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Elliott

EMC Test Data

Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	
Contact:	Gary Glaze		
Emissions Spec:	FCC Part 22, RSS-131	Class:	-
Immunity Spec:	-	Environment:	

EMC Test Data

For The

Remec

Model

MCPS2500 & MCPS2135

Date of Last Test: 3/8/2005

Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	
Contact:	Gary Glaze		
Emissions Spec:	FCC Part 22, RSS-131	Class:	-
Immunity Spec:	-	Environment:	

EUT INFORMATION

General Description

The EUT is a multi carrier cellular transmit band amplifier. Normally, the EUT would be placed in a rack during operation. The EUT was treated as table top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 27V DC, 50 Amps per amplifier (typical).

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Remec	MCPS2500	Multi channel amplifier	199214	I2OMCPS2135
Remec	MCPA2135	Multi channel amplifier	199224	I2OMCPS2135

Other EUT Details

These tests are to add WCDMA and 1xED-VO modes of operation for both the MCPS2500 (4 MCPA2135 amplifiers) and an MCPS2135 (1 MCPA2135 amplifier).

EUT Enclosure

The EUT enclosure is primarily constructed of fabricated sheet steel. The MCPS2500 measures approximately 54.5 cm wide by 48.0 cm deep by 35.5 cm high. The MCPS2135 measures approximately 43.0 cm wide by 48.0 cm deep by 13.0 cm high.

Modification History

Mod. #	Test	Date	Modification
1	-	-	None

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	
Contact:	Gary Glaze		
Emissions Spec:	FCC Part 22, RSS-131	Class:	-
Immunity Spec:	-	Environment:	

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Agilent	E4433B	Signal Generator	US40051573	N/A
Agilent	E4433B	Signal Generator	U37231291	N/A
Narda	3001-10	Directional Coupler	33832	N/A
Narda	41620	Combiner	N/A	N/A
Weinschel	82-30-34	30-dB Attenuator	MK969	N/A

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Input	Signal Generators	Coaxial	Shielded	1.5
Output	Attenuator	Coaxial	Shielded	1.5
DC input	DC Power Supply	2 wire	Unshielded	1.5

EUT Operation During Radio Emissions Tests

EUT was set to continuously transmit at maximum power.

Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Section 2.1049: Occupied Bandwidth

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 3/8/2005
Test Engineer: David Bare
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
EUT Voltage: 27VDC

General Test Configuration

When performing conducted measurements from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected. Modulation must not exceed manufactures stated bandwidth.

For this specific test the occupied bandwidth was measured to provide the correct Resolution bandwidth that will be used for the bandedge measurements. This requirement is specified in 24.238(b).

Because the EUT is an amplifer, input and output plots were made to show that the bandwidth was not altered. By altered we refer to the bandwidth increasing in width.

Ambient Conditions:

Temperature: 25°C
Rel. Humidity: 55%

Summary of Results

Run #	Test Performed	Limit	Result	Comment
1 - 4	Occupied Bandwidth	FCC 24.238(b)	Pass	

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

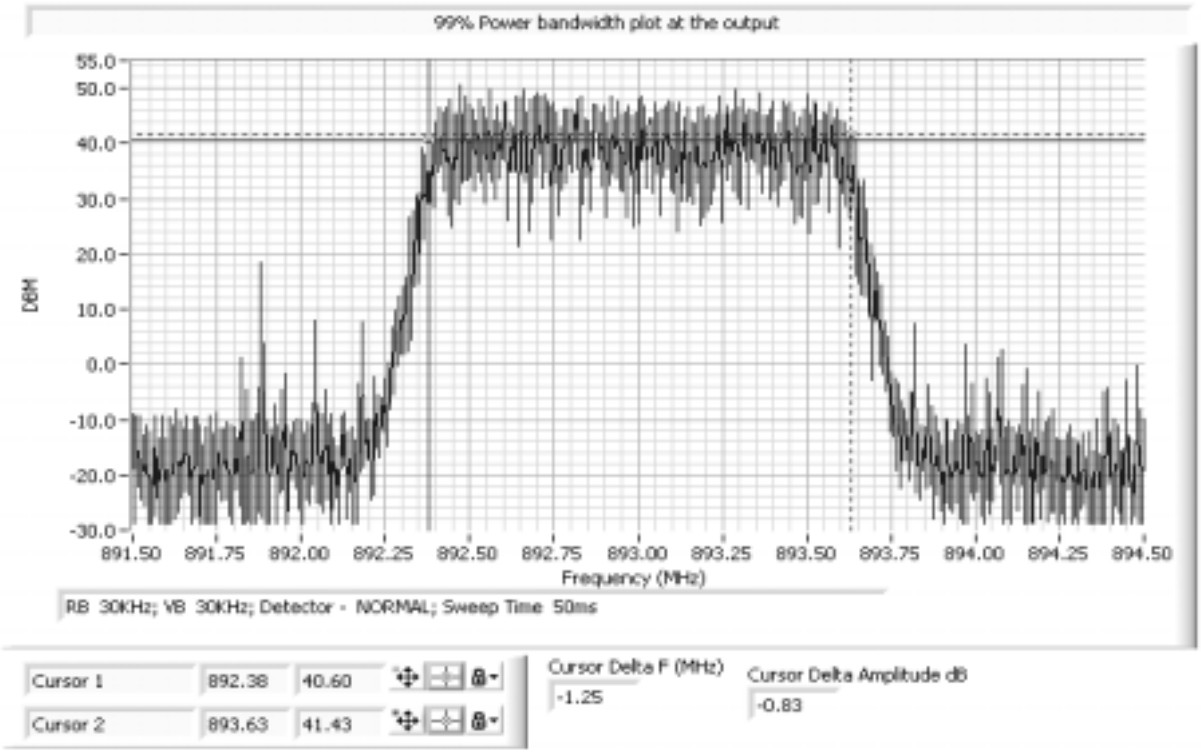
No deviations were made from the requirements of the standard.

Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #1: Occupied Bandwidth (1xEV-DO modulation); Low Channel

Measured Value	Specified Bandwidth	Resolution	Comments
(kHz)	(kHz)	(kHz)	
1250.0	1250	30	

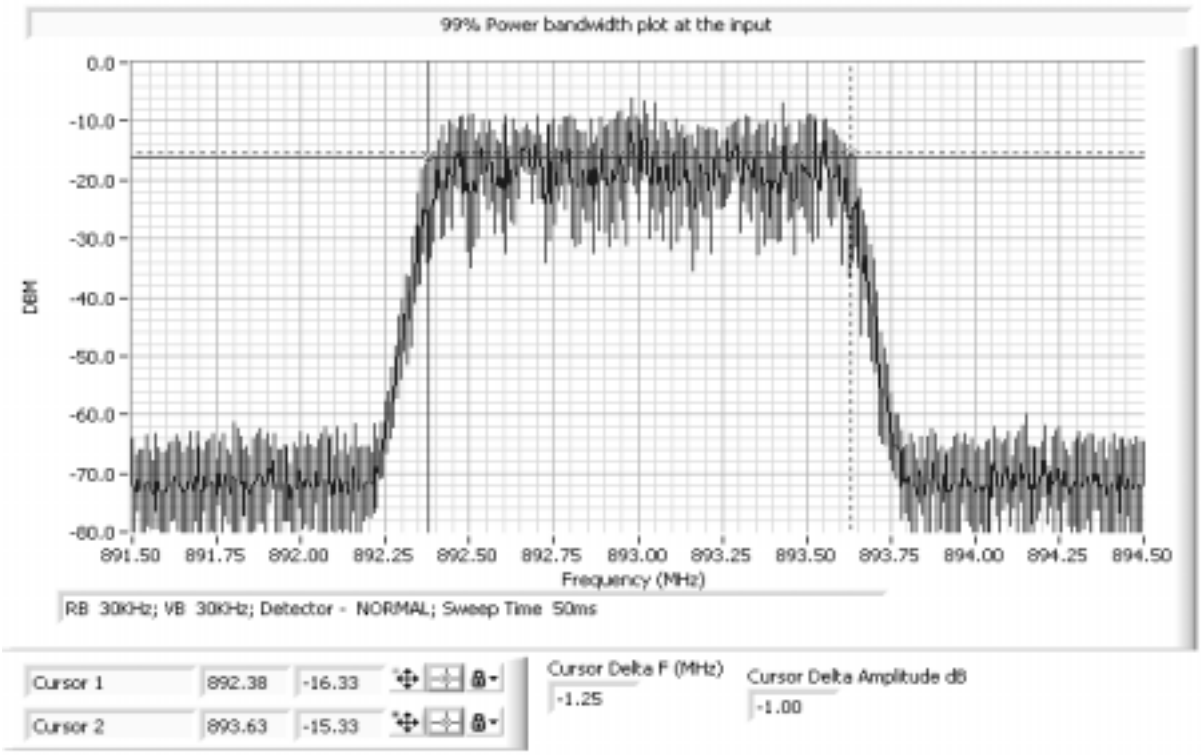
Output Plot



Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #1: Occupied Bandwidth (1xEV-DO modulation); Low Channel

Input Plot

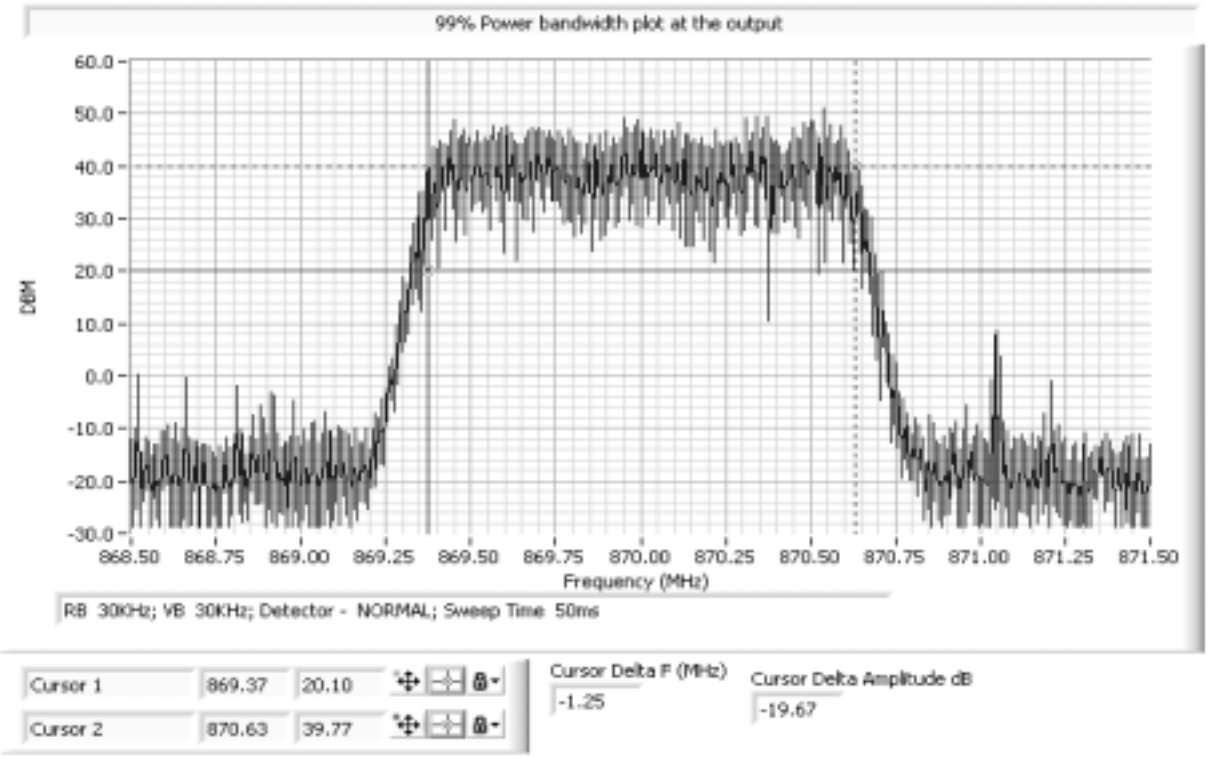


Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #2: Occupied Bandwidth (1xEV-DO), High Channel

Measured Value	Specified Bandwidth	Resolution	Comments
(kHz)	(kHz)	(kHz)	
1250	1250	30	

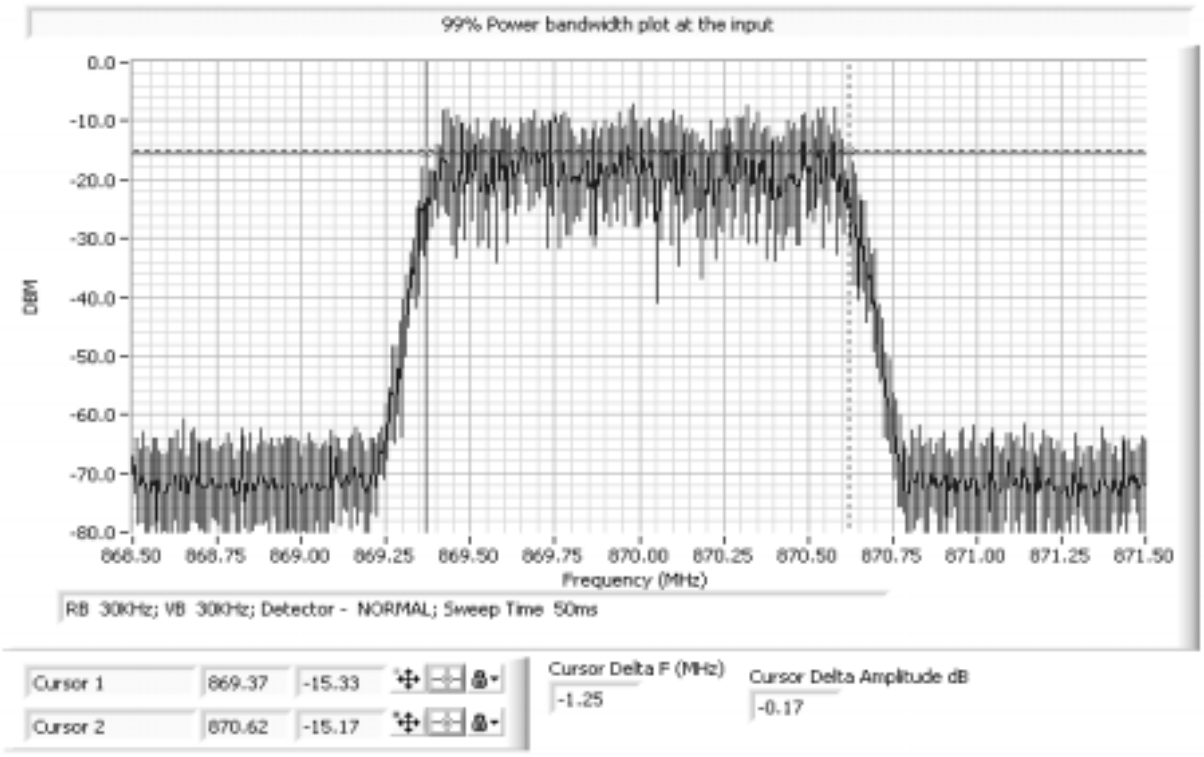
Output Plot



Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #2: Occupied Bandwidth (1xEV-DO), High Channel

Input Plot

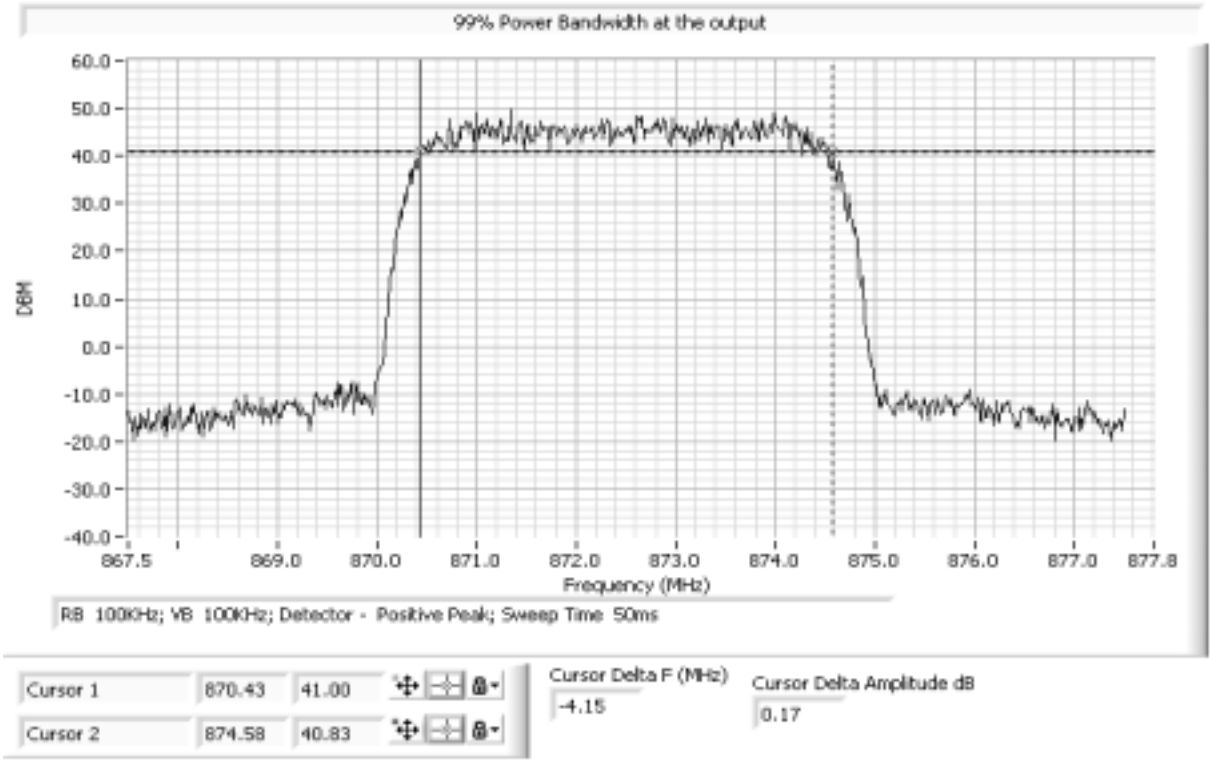


Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #3: Occupied Bandwidth (WCDMA modulation); Low Channel

Measured Value	Specified Bandwidth	Resolution	Comments
(kHz)	(kHz)	(kHz)	
4150.0	4150	100	

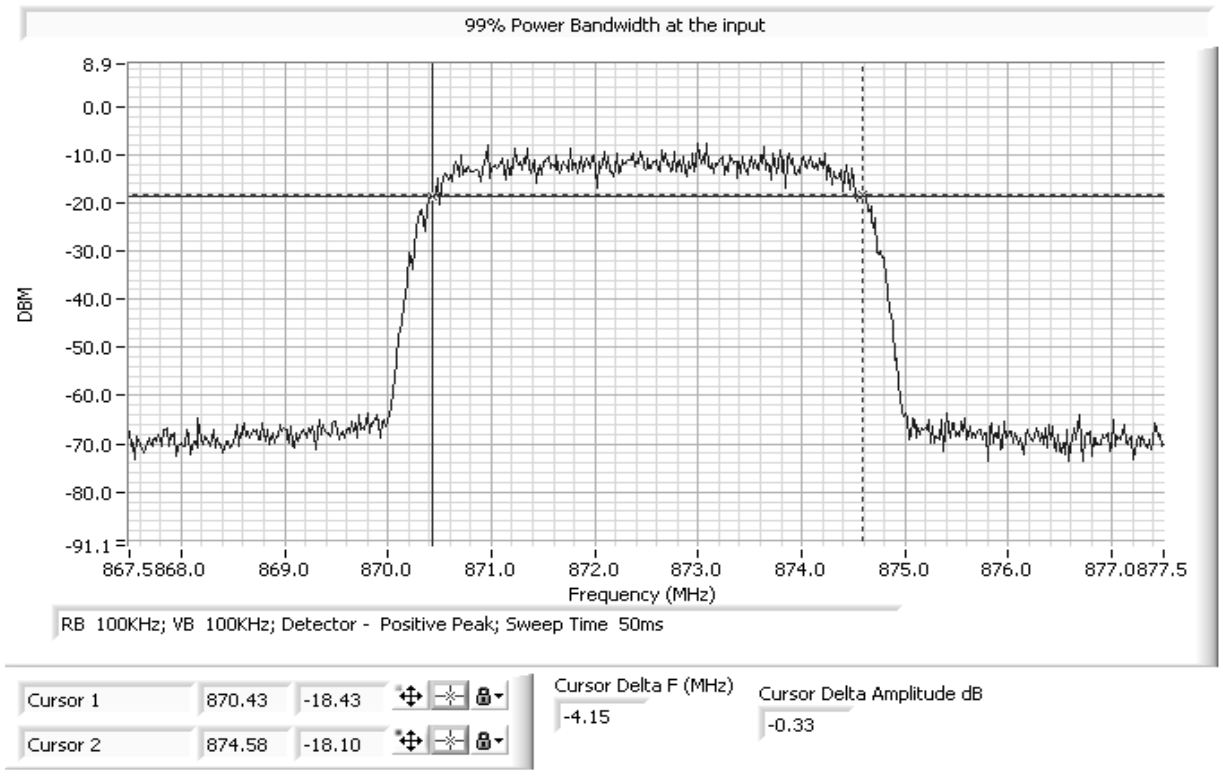
Output Plot



Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #3: Occupied Bandwidth (WCDMA modulation); Low Channel

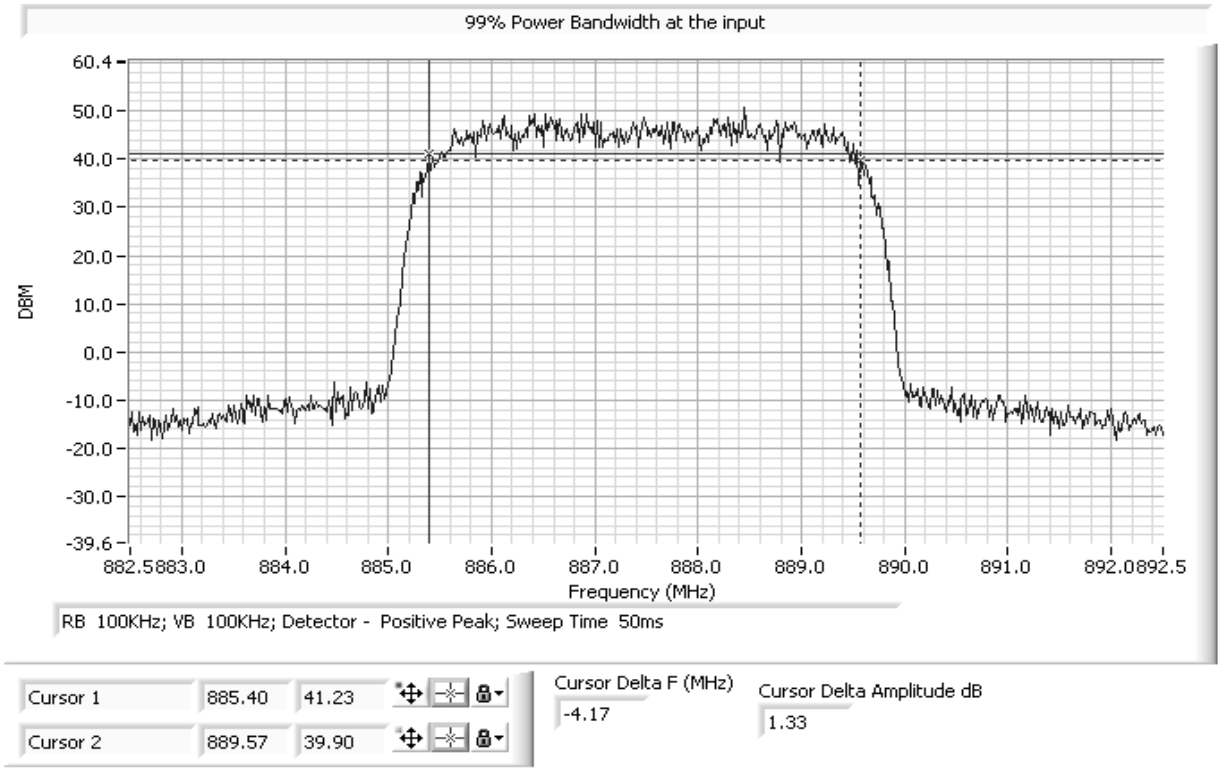
Input Plot



Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #4: Occupied Bandwidth (WCDMA modulation); High Channel

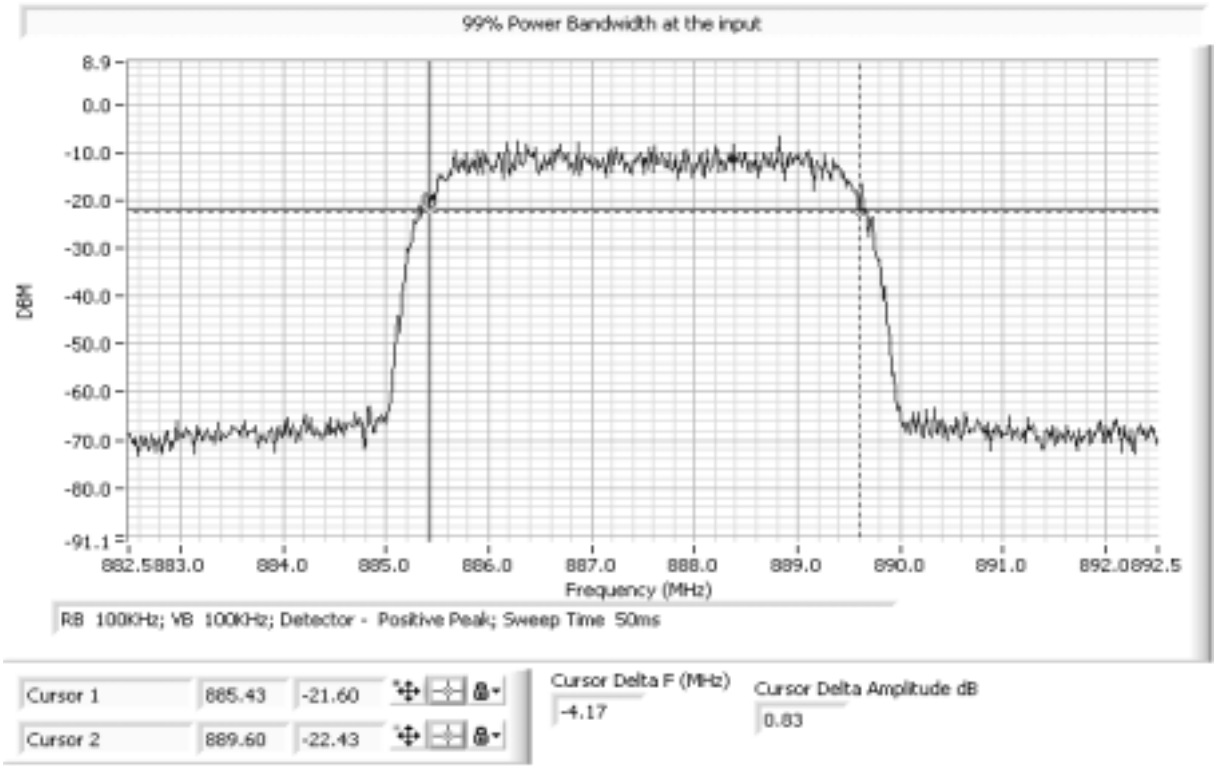
Output Plot



Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #4: Occupied Bandwidth (WCDMA modulation); High Channel

Input Plot



Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Section 2.1046: RF Power

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 3/8/2005
Test Engineer: David Bare
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
EUT Voltage: 27VDC

General Test Configuration

When performing conducted measurements from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected. Modulation must not exceed manufactures stated bandwidth.

Ambient Conditions:

Temperature: 25°C
Rel. Humidity: 55%

Summary of Results

Run #	Test Performed	Limit	Result	Measurement
1 - 4	Conducted Output Power	FCC 22.913(a)	Pass	56.99 dBm

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #1: Conducted Output Power, 1xEV-DO, MCPS2500

Output power

Freq (MHz)	Measured Value (dBm)	Correction factor (dB)	Power Output (dBm)	Comments
893.00	-2.91	59.9	56.99	Power Meter
870.00	-2.91	59.9	56.99	Power Meter

Run #2: Conducted Output Power, WCDMA, MCPS2500

Output power

Freq (MHz)	Measured Value (dBm)	Correction factor (dB)	Power Output (dBm)	Comments
887.50	-2.91	59.9	56.99	Power Meter
872.50	-2.91	59.9	56.99	Power Meter

Run #3: Conducted Output Power, 1xEV-DO, MCPA2135

Output power

Freq (MHz)	Measured Value (dBm)	Correction factor (dB)	Power Output (dBm)	Comments
893.00	-8.57	59.9	51.33	Power Meter
870.00	-8.57	59.9	51.33	Power Meter

Run #4: Conducted Output Power, WCDMA, MCPA2135

Output power

Freq (MHz)	Measured Value (dBm)	Correction factor (dB)	Power Output (dBm)	Comments
887.50	-8.60	59.9	51.30	Power Meter
872.50	-8.60	59.9	51.30	Power Meter

Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Section 2.1051: Spurious Emissions at the Antenna Terminal

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 3/8/2005
Test Engineer: David Bare
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
EUT Voltage: 27VDC

General Test Configuration

The EUT and all local support equipment were located on the table for testing. The EUT was connected through an attenuator to the test receiver.

Ambient Conditions:

Temperature: 25°C
Rel. Humidity: 55%

Summary of Results

Run #	Test Performed	Limit	Result	Level
1	Spurious Emissions, Low, 1xEV-DO, MCPS-2500	FCC 22.917(e)	Pass	-14.3 dBm
2	Spurious Emissions, High, 1xEV-DO, MCPS-2500	FCC 22.917(e)	Pass	-14.5 dBm
3	Spurious Emissions, Low, WCDMA, MCPS-2500	FCC 22.917(e)	Pass	-16.8 dBm
4	Spurious Emissions, High, WCDMA, MCPS-2500	FCC 22.917(e)	Pass	-15.2 dBm
5	Spurious Emissions, Low, 1xEV-DO, MCPA-2135	FCC 22.917(e)	Pass	-20.8 dBm
6	Spurious Emissions, High, 1xEV-DO, MCPA-2135	FCC 22.917(e)	Pass	-21.0 dBm
7	Spurious Emissions, Low, WCDMA, MCPA-2135	FCC 22.917(e)	Pass	-25.7 dBm
8	Spurious Emissions, High, WCDMA, MCPA-2135	FCC 22.917(e)	Pass	-23.8 dBm

Only bandedge spurious measurements were made on the MCPA-2135.

Modifications Made During Testing:

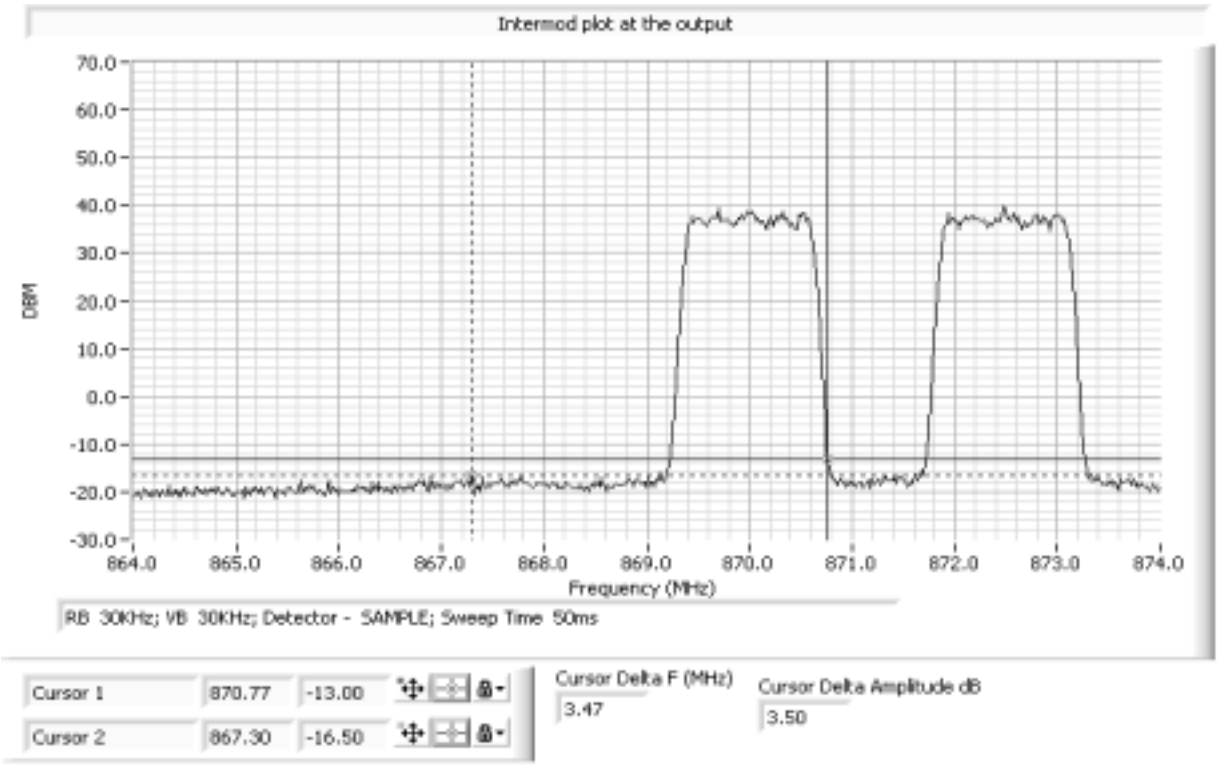
No modifications were made to the EUT during testing

Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Deviations From The Standard

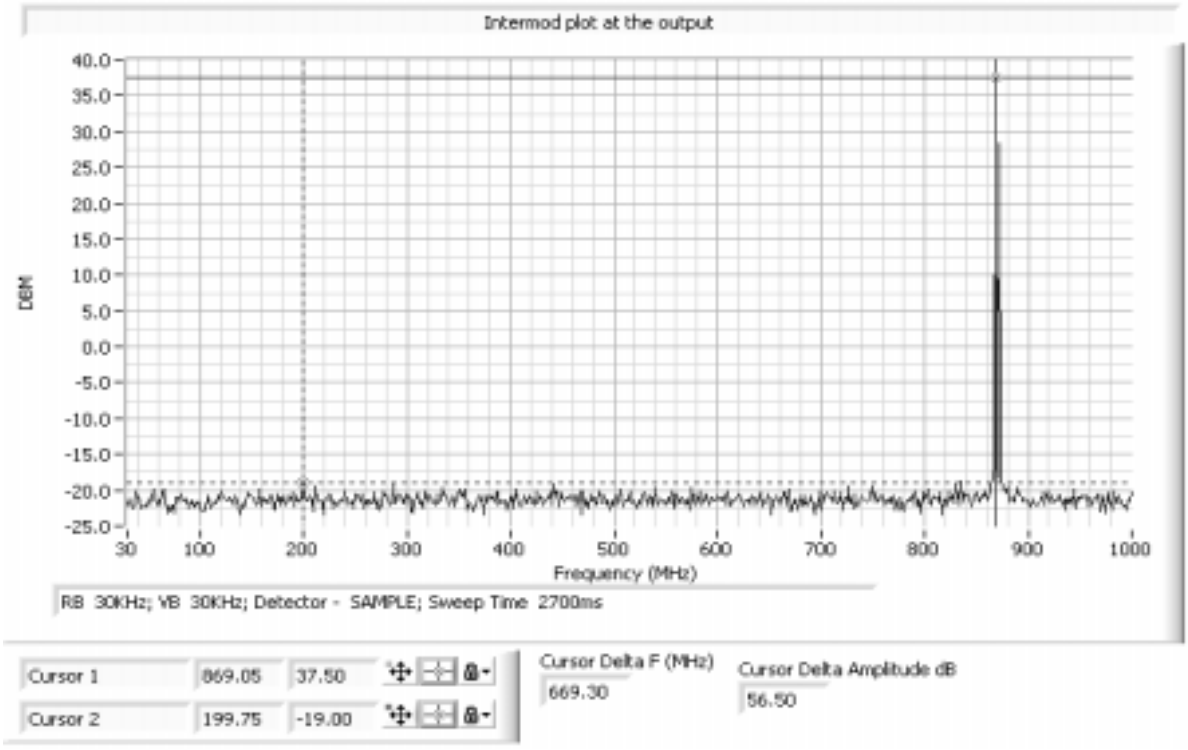
No deviations were made from the requirements of the standard.

Run #1: Low Channel: 870 MHz (Bandedge) 1xEV-DO modulation, MCPS-2500



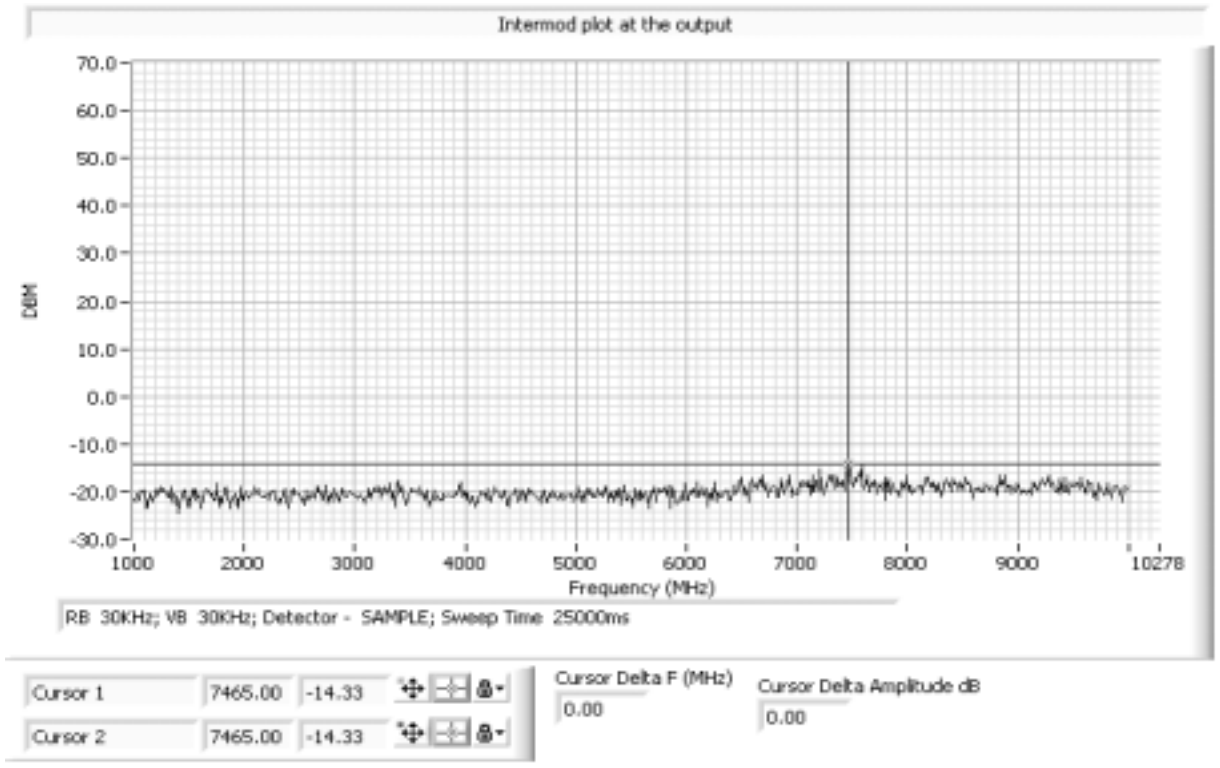
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #1: Low Channel: 870 MHz (Bandedge) 1xEV-DO modulation, MCPS-2500



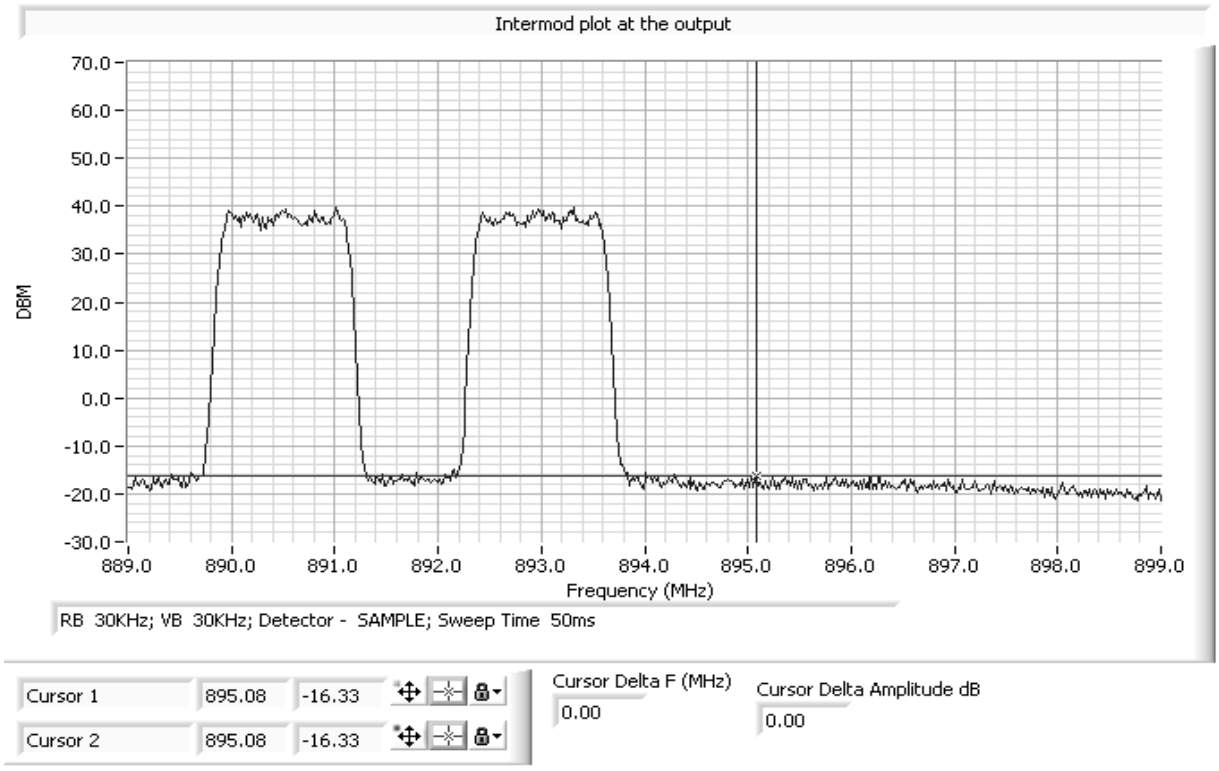
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #1: Low Channel: 870 MHz (Bandedge) 1xEV-DO modulation, MCPS-2500



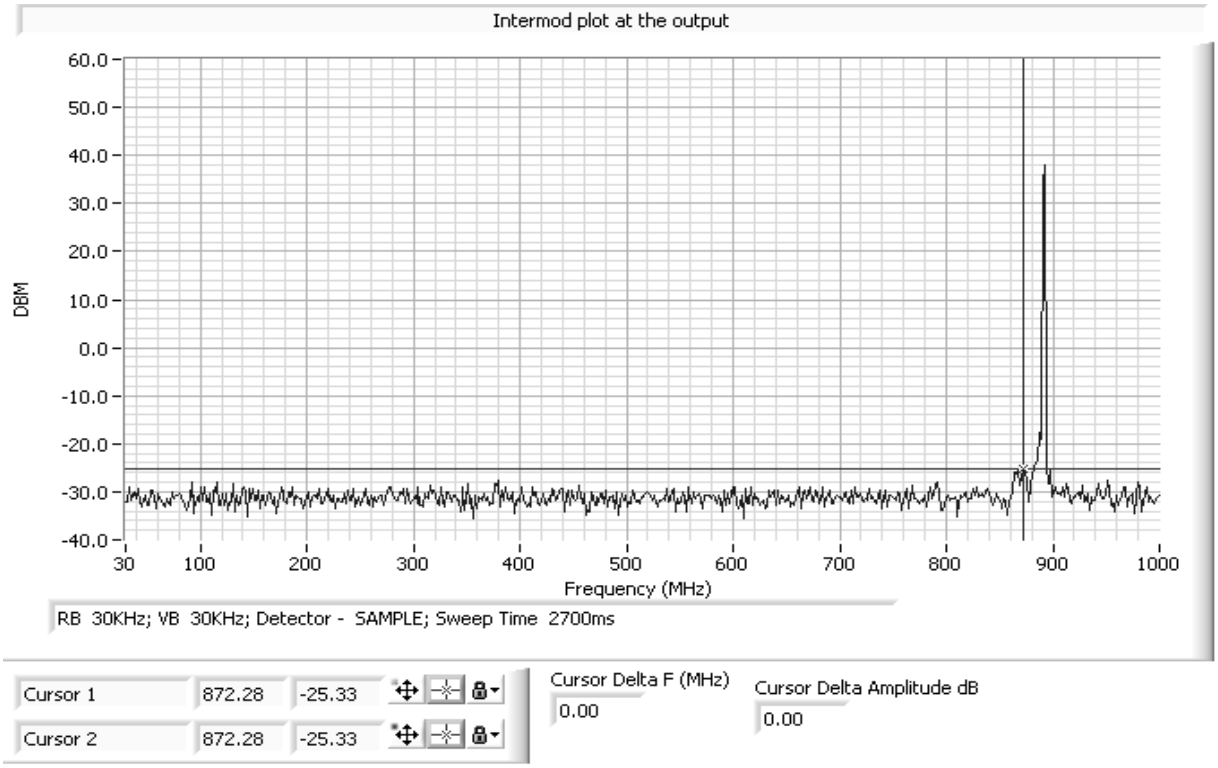
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #2: High Channel: 893 MHz (Bandedge) 1xEV-DO modulation, MCPS-2500



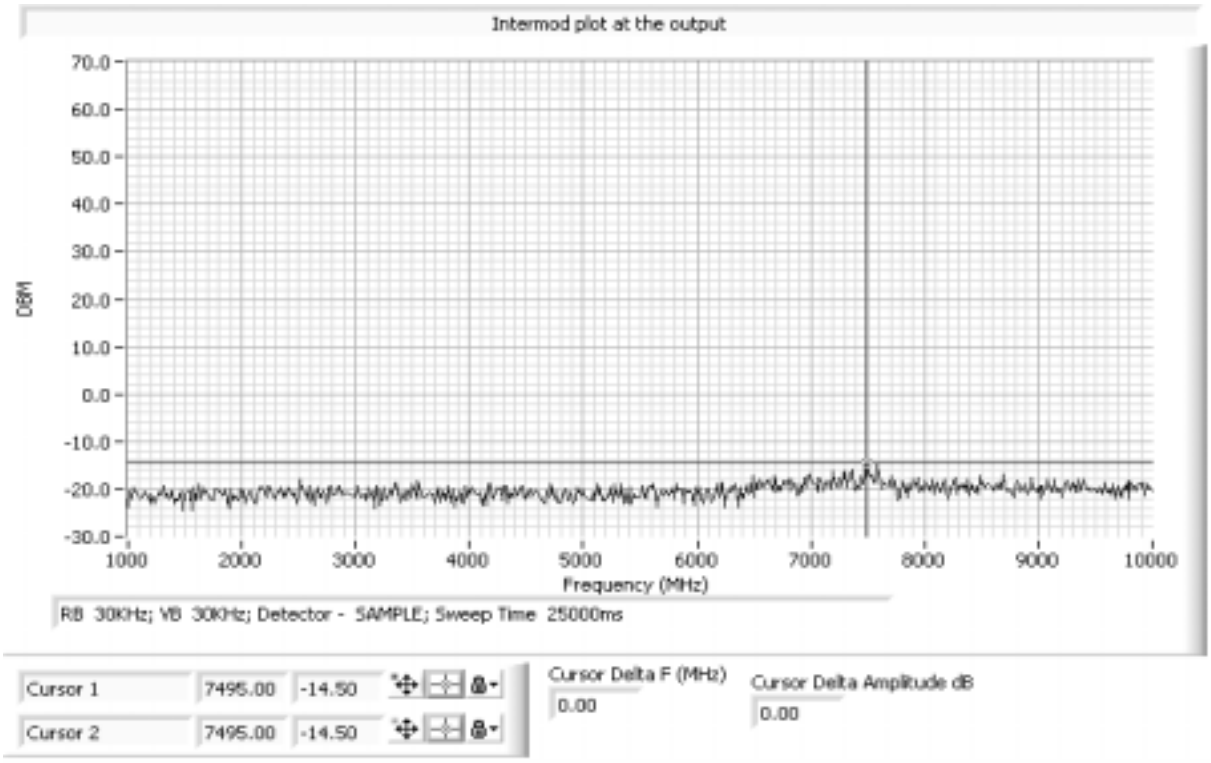
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #2: High Channel: 893 MHz (Bandedge) 1xEV-DO modulation, MCPS-2500



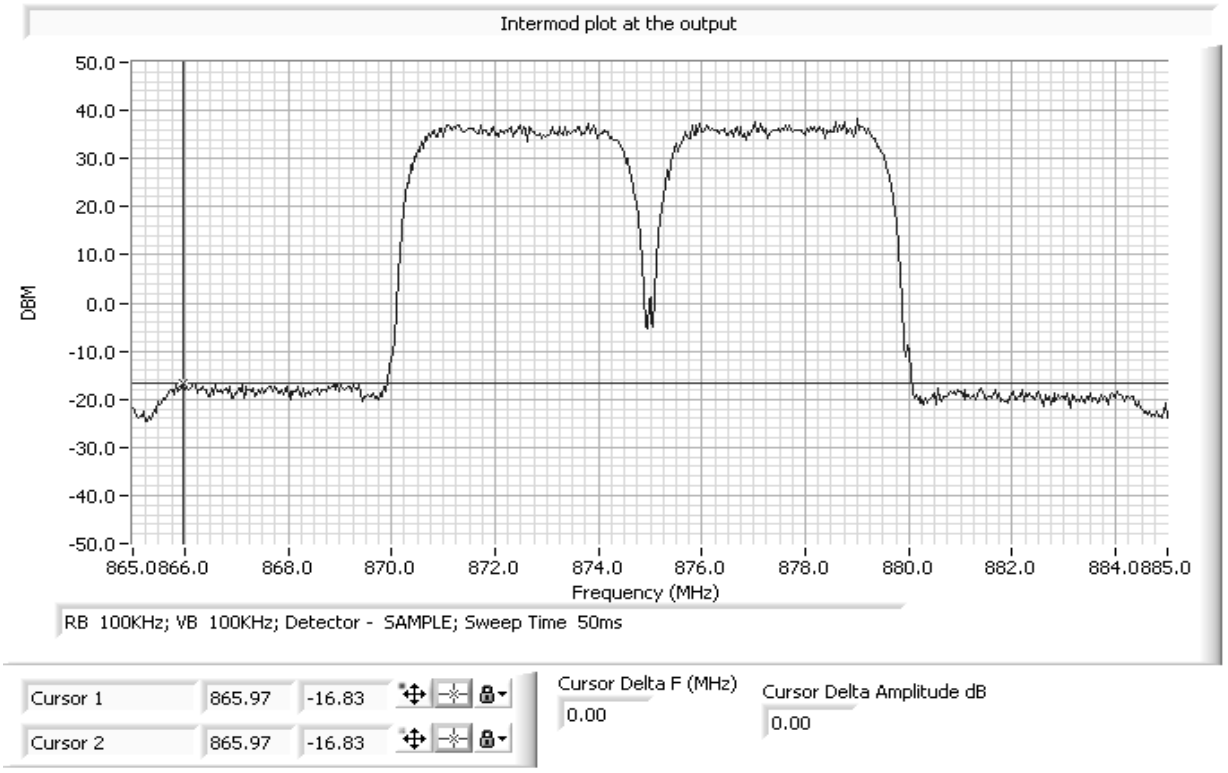
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #2: High Channel: 893 MHz (Bandedge) 1xEV-DO modulation, MCPS-2500



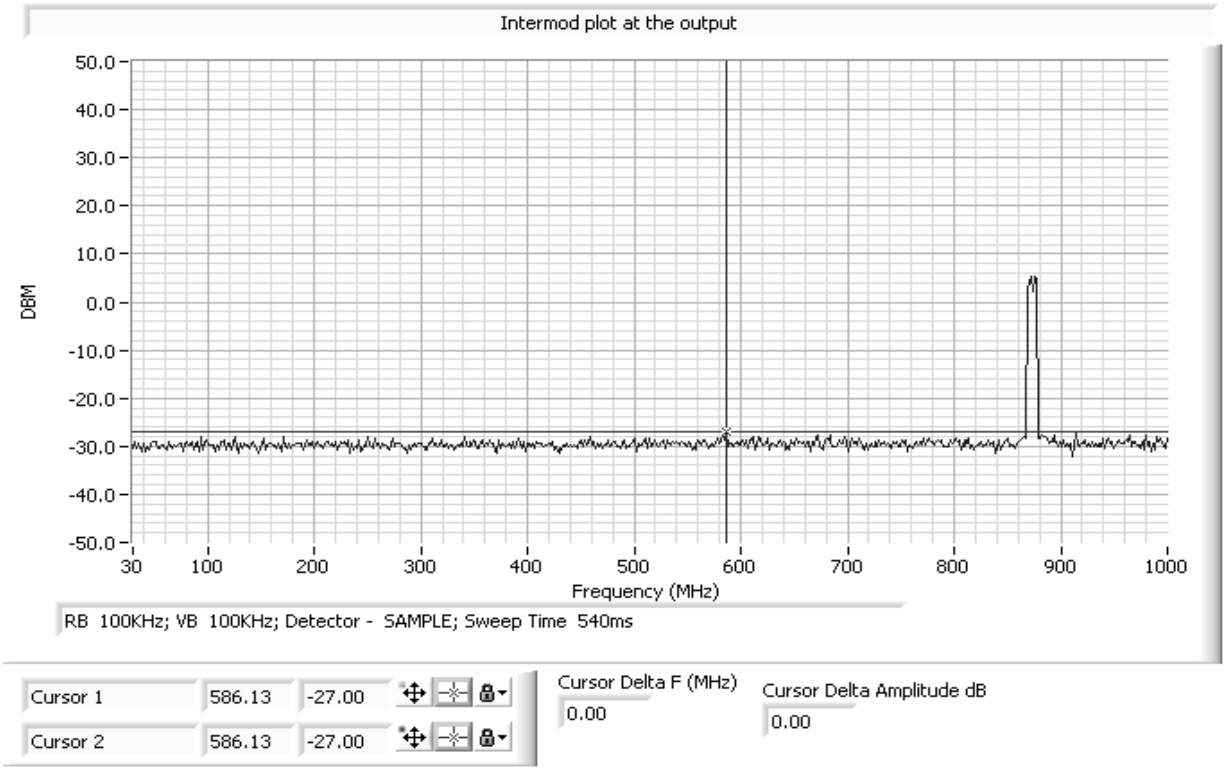
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #3: Low Channel: 872.5 MHz (Bandedge) WCDMA modulation, MCPS-2500



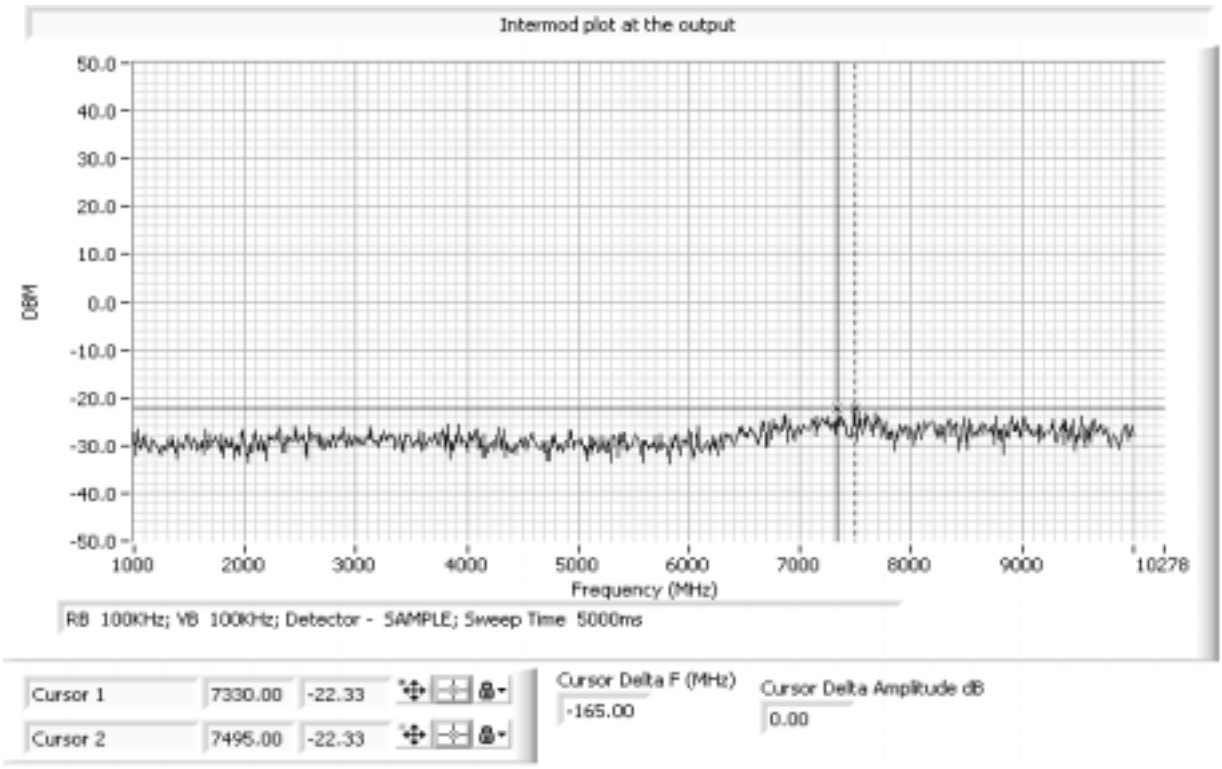
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #3: Low Channel: 872.5 MHz (Bandedge) WCDMA modulation, MCPS-2500



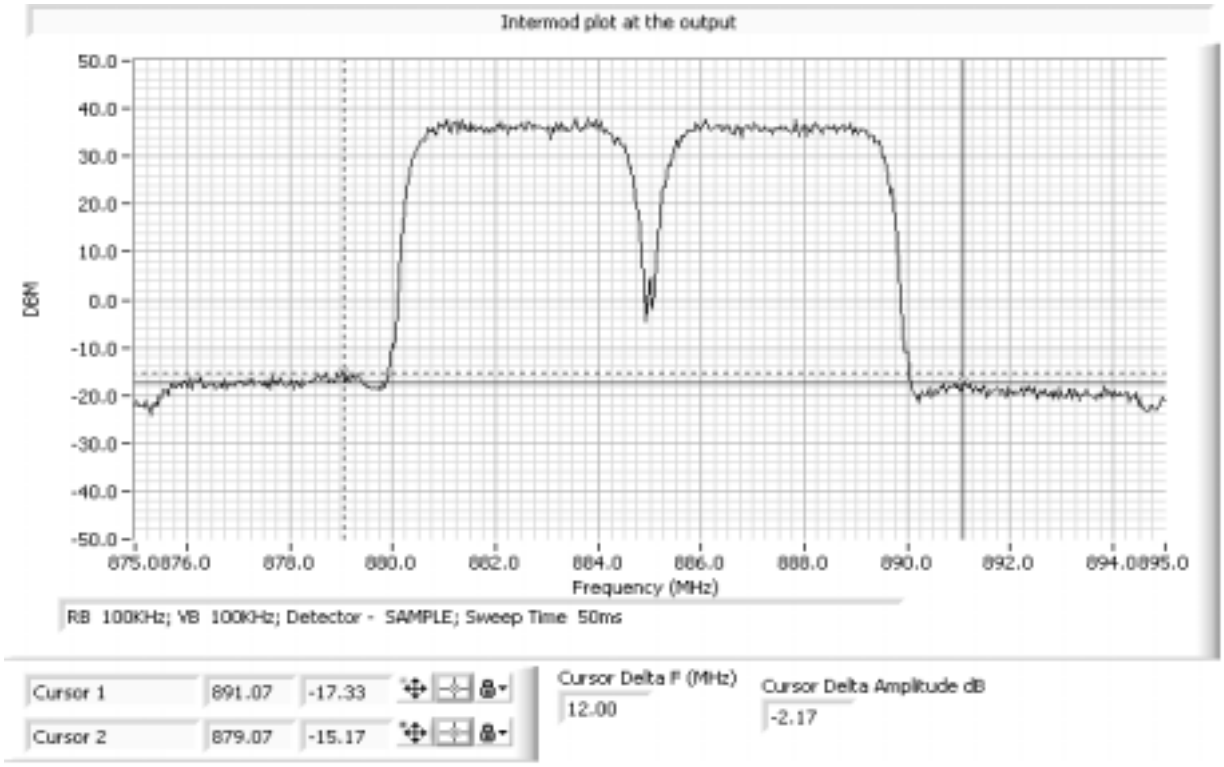
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #3: Low Channel: 872.5 MHz (Bandedge) WCDMA modulation, MCPS-2500



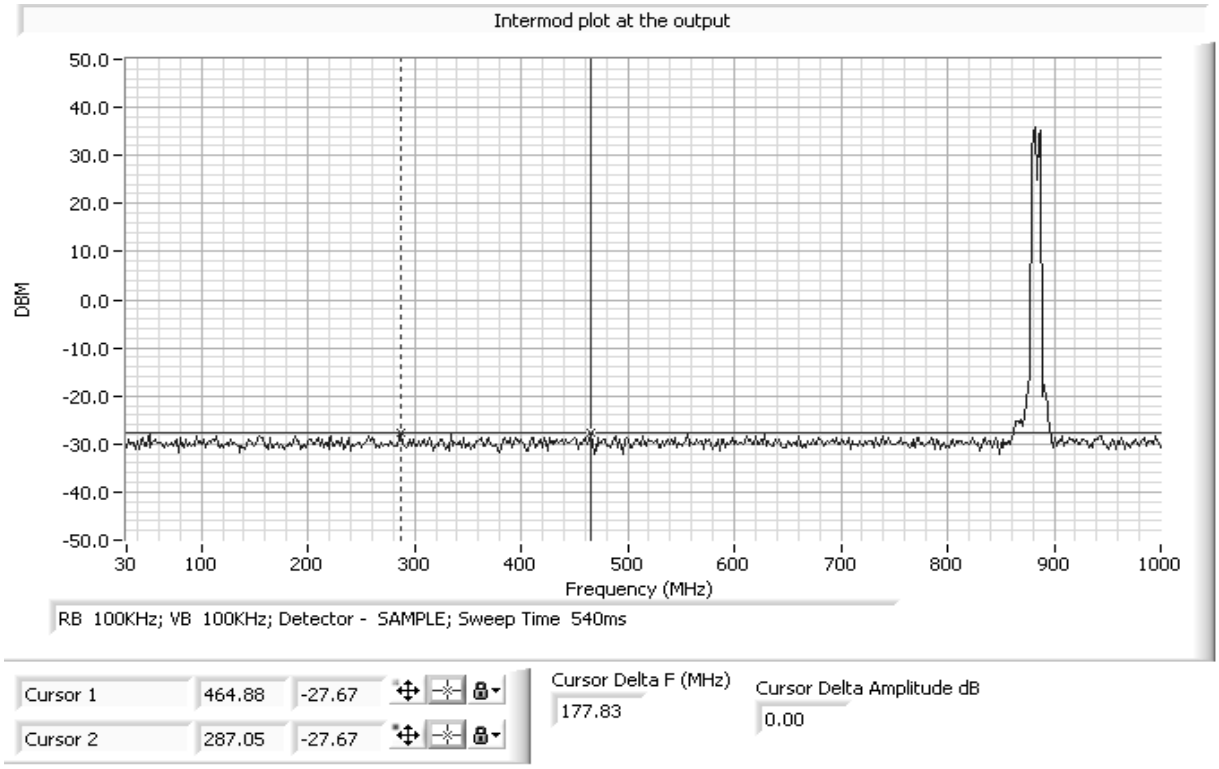
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #4: High Channel: 887.5 MHz (Bandedge) WCDMA modulation, MCPS-2500



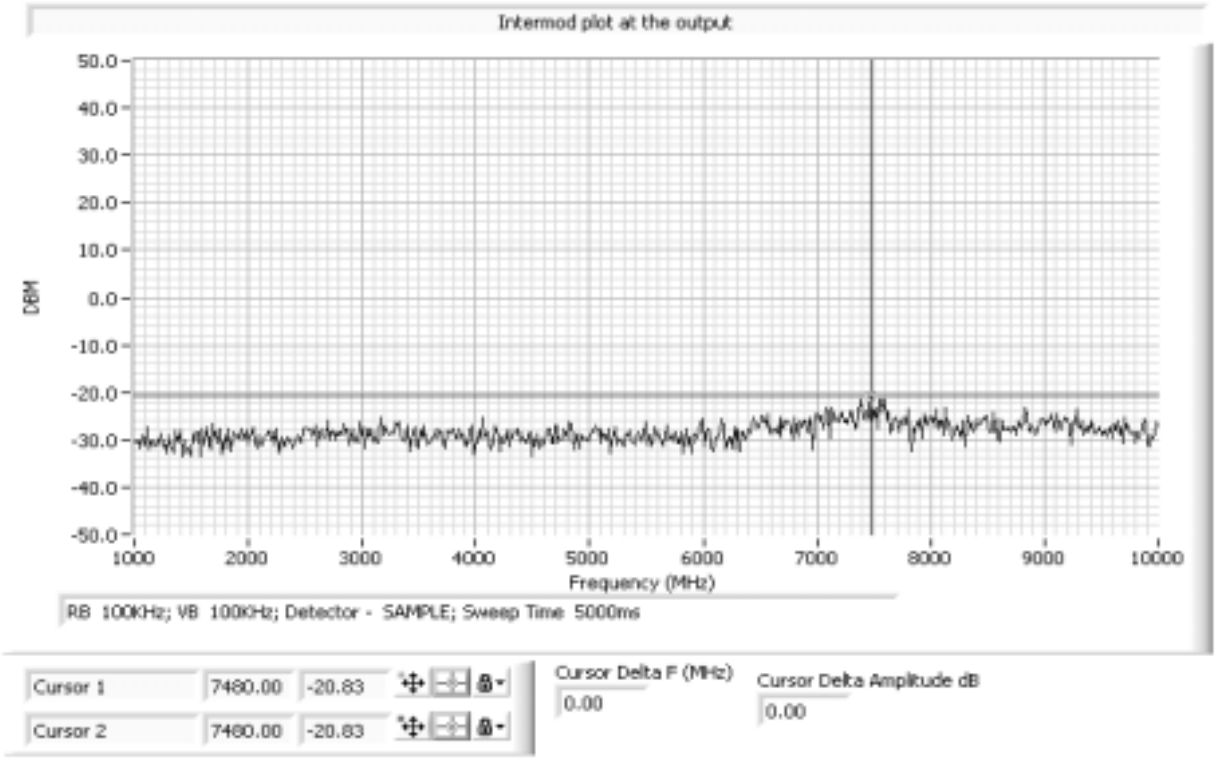
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #4: High Channel: 887.5 MHz (Bandedge) WCDMA modulation, MCPS-2500



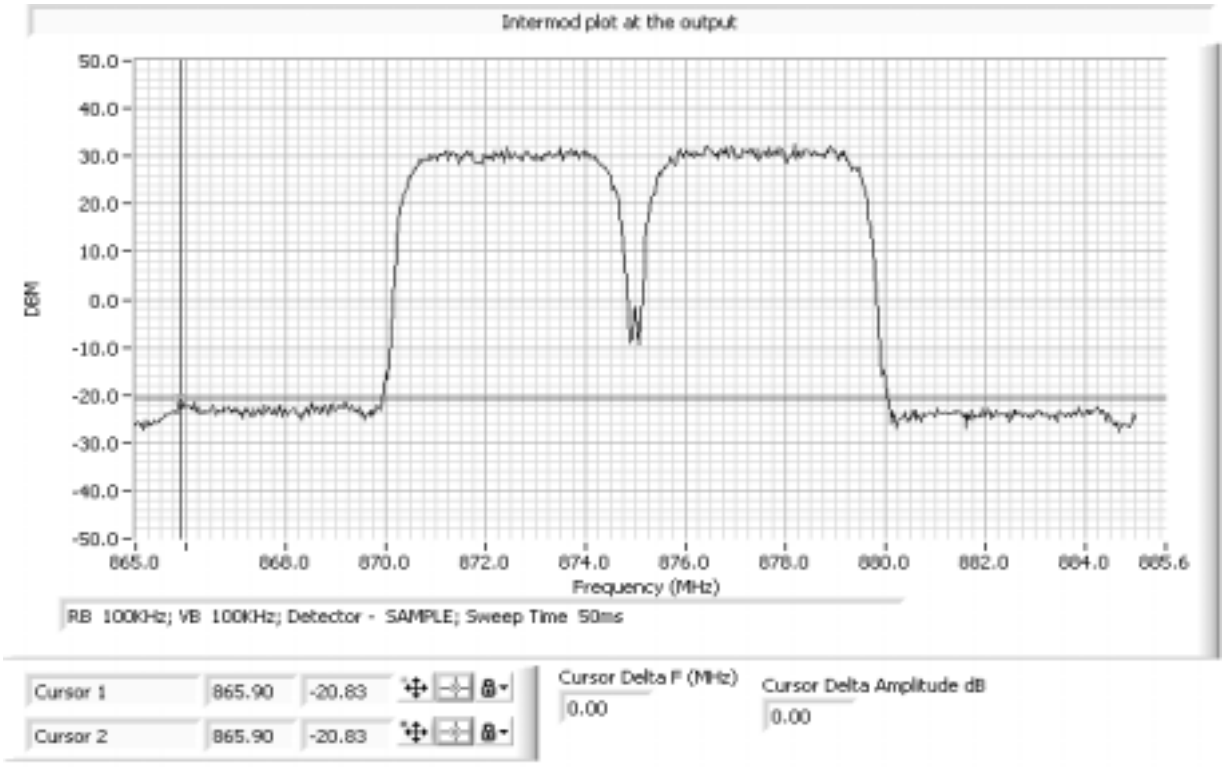
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #4: High Channel: 887.5 MHz (Bandedge) WCDMA modulation, MCPS-2500



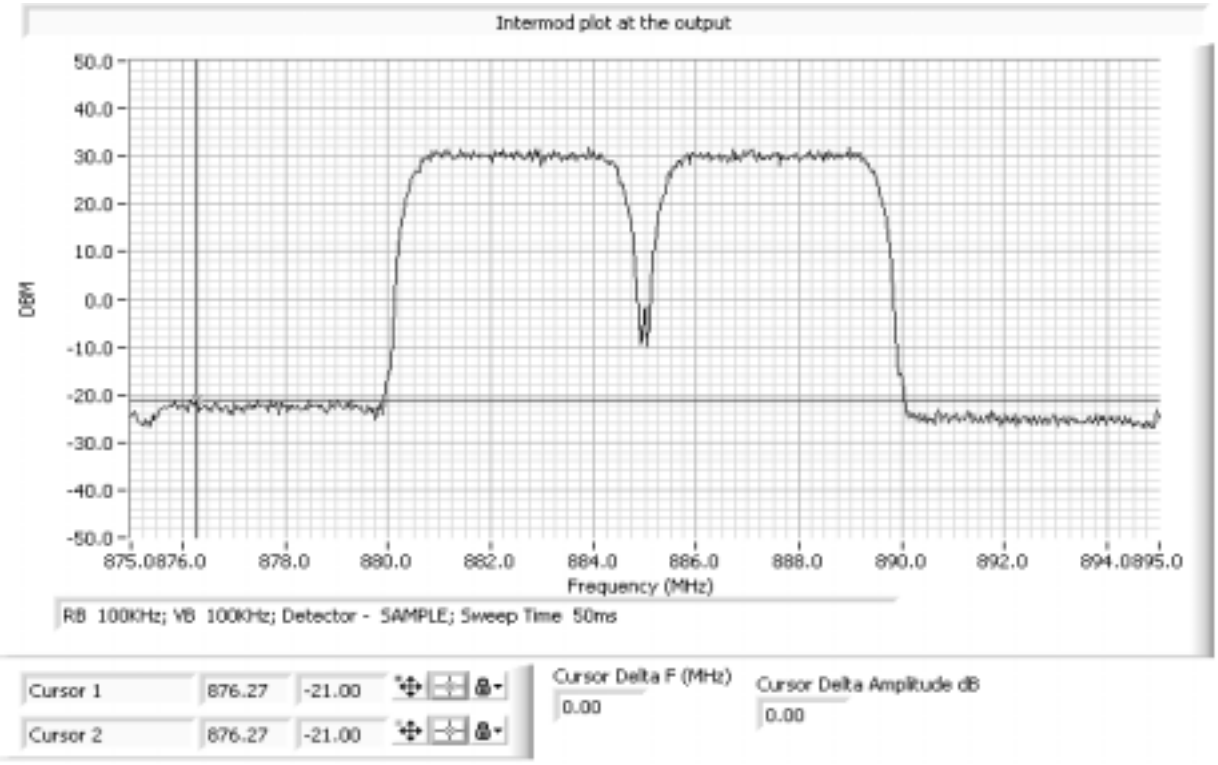
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #5: Low Channel: 872.5 MHz (Bandedge) WCDMA modulation, MCPA-2135



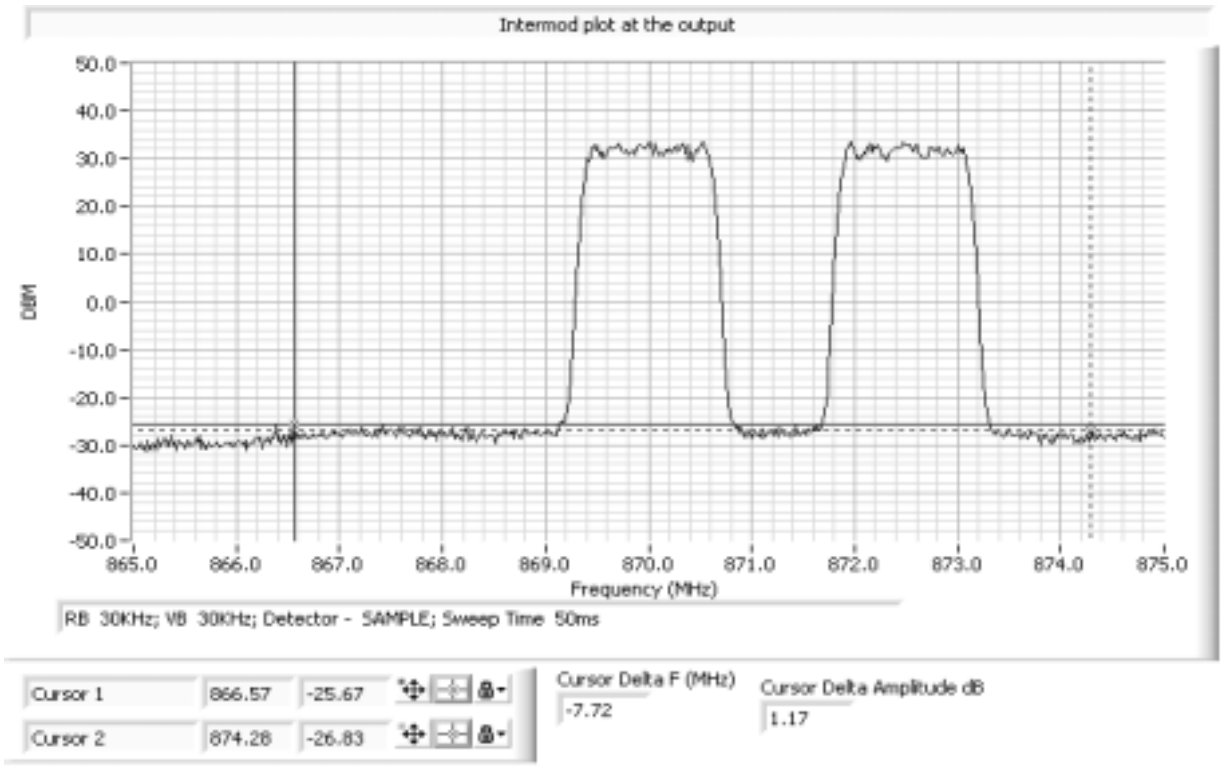
Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #6: High Channel: 887.5 MHz (Bandedge) WCDMA modulation, MCPA-2135



Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #7: Low Channel: 870 MHz (Bandedge) 1xEV-DO modulation, MCPA-2135



Client:	Remec	Job Number:	J58485
Model:	MCPS2500 & MCPS2135	T-Log Number:	T58963
		Account Manager:	-
Contact:	Gary Glaze		
Spec:	FCC Part 22, RSS-131	Class:	-

Run #8: High Channel: 893 MHz (Bandedge) 1xEV-DO modulation, MCPA-2135

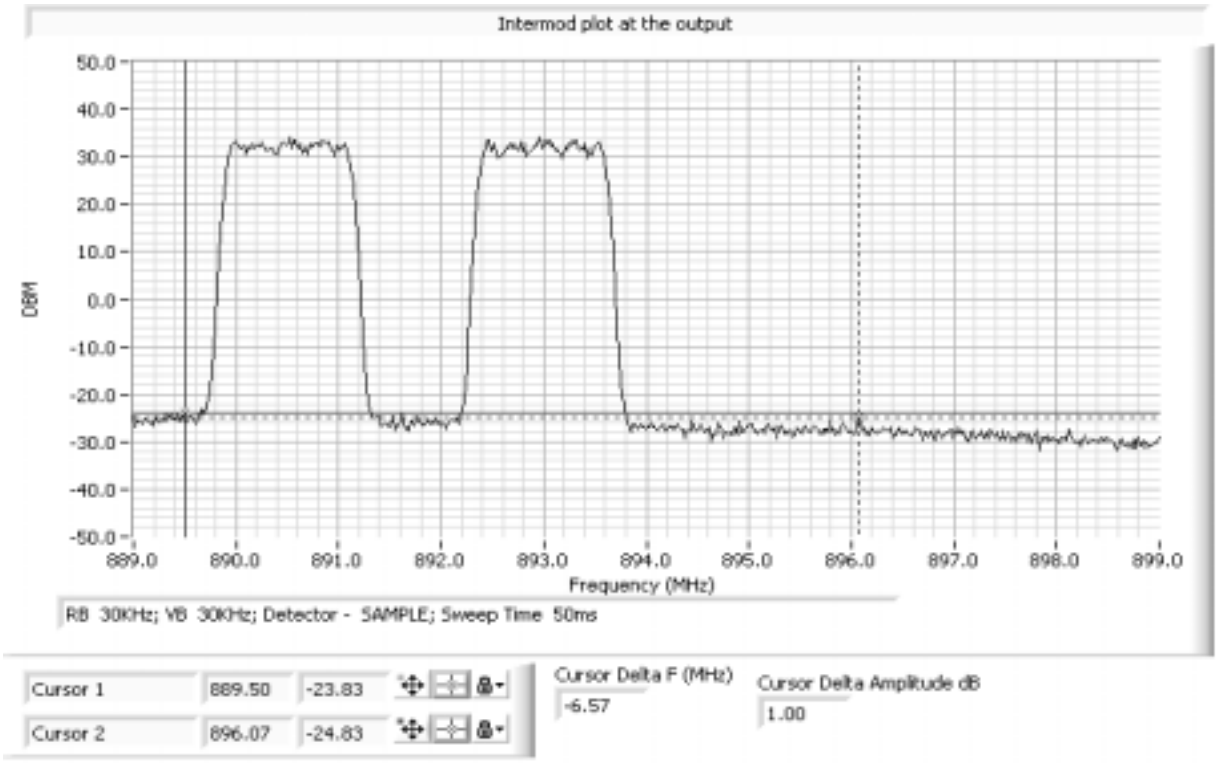


EXHIBIT 3: FCC ID Label and Location

Unchanged from original application

EXHIBIT 4: Detailed Photographs of REMEC model MCPS2135 Construction

Unchanged from original application

EXHIBIT 5: Operator's Manual for REMEC model MCPS2135

Unchanged from original application

EXHIBIT 6: Block Diagram of REMEC model MCPS2135

Unchanged from original application

EXHIBIT 7: Schematic Diagrams for REMEC model MCPS2135

Unchanged from original application

EXHIBIT 8: Theory of Operation for REMEC model MCPS2135

Unchanged from original application

EXHIBIT 9: Advertising Literature

Unchanged from original application

EXHIBIT 10: RF Exposure Information

Unchanged from original application