March 11, 2002

Federal Communications Commission
Authorization and Evaluation Division
7435 Oakland Mills Road
Columbia, MD 21046

Attention: Applications Examiner

Applicant: Hitachi
832-2 Horiguchi, Hitachinaka-shi, Ibaraki 312-0034 Japan

Equipment: Hitachi SH-P300 Handy Phone
FCC ID: ABLSP20

Specification: for a 47 CFR 24 Licensed Certification

Dear Examiner:

The following application for Grant of Equipment Authorization is presented on behalf of Hitachi Ltd. for the Licensed Certification of their Cellular Phone, Model: SH-P300 Handy Phone.

Enclosed, please find a complete data and documentation package demonstrating that this device complies with the technical requirements of 47 CFR 24, for a PCS Handset.

If you have any questions, please contact the undersigned, who is authorized to act as Agent.

Sincerely,

Chris Harvey, Director
EMC Laboratory
MET Laboratories, Inc.

914 WEST PATAPSCO AVENUE ! BALTIMORE, MARYLAND 21230-3432 ! PHONE (410) 354-3300 ! FAX (410) 354-3313

ENGINEERING TEST REPORT

in support of the
Application for Grant of Equipment Authorization

EQUIPMENT:	Hitachi SH-P300 Handy Phone
FCC ID:	ABLSP20
Specification:	47 CFR 24
On Behalf of the Applicant:	Hitachi Ltd. 6, Kanda-Surugadai 4 Chome, Chiyoda-ku, Tokyo 101-8010 Japan
Manufacturer:	Hitachi Ltd. Mobile Information & Communication Appliance Division 1410 Inada, Hitachinaka-shi Ibaraki-ken 312-8505 Japan
Manufacturer's Representative	Mr. Yasumasa Usui
Test Date(s):	March 1-5, 2002

ENGINEERING STATEMENT

I ATTEST: the measurements shown in this report were made in accordance with the procedures indicated, and that the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements. On the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 24 of the FCC Rules under normal use and maintenance.

_____ _____

Liming Xu
EMC Engineer, MET Laboratories

Summary of Test Results

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 24, of 47 CFR. All tests were conducted using measurement procedure ANSI C63.4-1992.

Type of Submission/Rule Part:	Original Filing/Part 24
EUT:	Hitachi SH-P300 Handy Phone
FCC ID:	ABLSP20
Type of Emissions:	1M28F9W (CDMA)
RF Power output:	CDMA : 0.25 Watts at all channels (Conducted RF power) 0.34 Watts at all channels (ERP RF power max)
Frequency Range (MHz):	1850-1910 Tx (1851.25- 1908.75) and 1930-1990 Re
Frequency Stability:	+/-50 Hz

Summary of Test Data

Name of Test	FCC Rule Part/Section	Results
Radiated Spurious Emissions	2.1053; 24.238(a)	Complies
Occupied Bandwidth	2.1049	Complies
RF Power Output	2.1046; 24.232(a),(c)	Complies
Spurious Emissions at Antenna Terminals	2.1051; 24.238(a)	Complies
Spurious Emissions at Antenna Terminals Frequency Block Edges	2.1051; 24.238(b)	Complies
Frequency Stability over temperature variations	2.1055(a)(1)	Complies
Frequency Stability over battery power	2.1055(d)(2)	Complies
Modulation Characteristics	2.1047(a)	Complies

1.0 INTRODUCTION

The following data is presented on behalf of the Applicant, Hitachi, Ltd. as verification of the compliance of the Hitachi SH-P300 Handy Phone.

2.0 TEST SITE

All testing was conducted at MET Laboratories, Inc., 914 West Patapsco Avenue, Baltimore, Maryland 21230-3493. Radiated emissions measurements were performed on a three-meter semi-anechoic chamber (equivalent to an Open Area Test Site, OATS). A complete site description is on file with the FCC Laboratory Division as 31040/SIT/MET.

3.0 TEST EQUIPMENT USED

Manufacturer	Equipment	Calibration Due Date @ time of testing	Cal. Interval
Hewlett Packard	8563A Spectrum Analyzer	9/14/02	annual
EMCO	Double Ridge Guided Horn	6/24/02	annual
Hewlett Packard	8564E Analyzer	10/18/02	annual

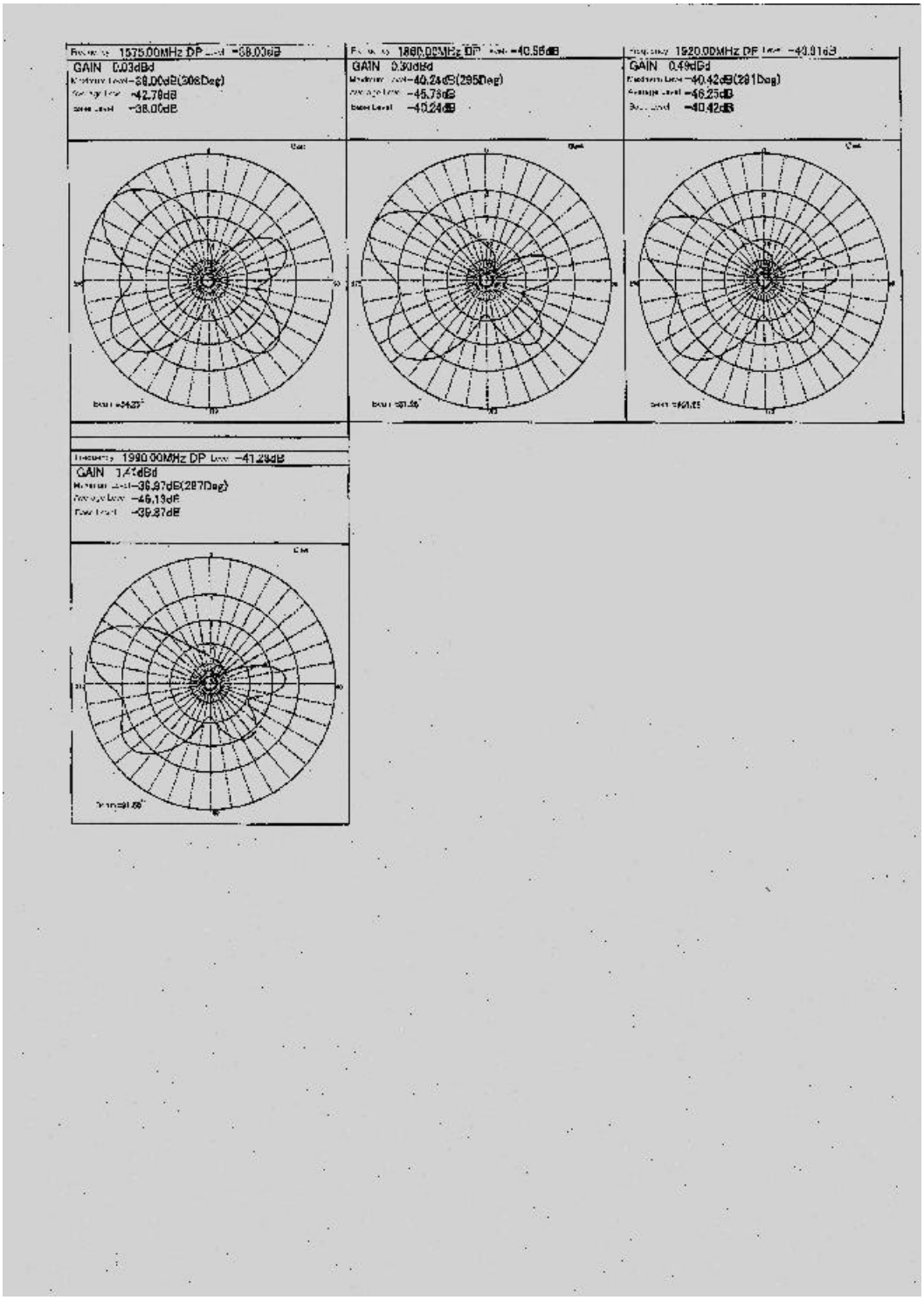
4.0 EQUIPMENT UNDER TEST CONFIGURATION

The Hitachi SH-P300 Handy Phone was configured with a fully charged battery, an external CDMA service test set, and PCS interface to program the EUT to output a CDMA Modulation type PCS RF signal. The EUT was configured for maximum signal gain and bandwidth. The EUT was operated in a manner representative of the typical usage of the equipment. During all testing, system components were manipulated within the confines of typical usage to maximize each emission.

5.0 TEST TYPE(S)

5.1 Radiated Emissions: 47 CFR2.1053, , 24.238(a)
5.2 Occupied Bandwidth: 47 CFR2.1049
5.3 RF Power Output: 47 CFR 2.1046, 24.232(a), (c)
5.4 Spurious Emission at Antenna Terminals: 47 CFR 2.1051, 24.238(a)
5.5 Spurious Emission at Antenna Terminals at Frequency Block edges +/- 1 MHz, 47 CFR 2.1051, 24.238(b)
5.6 Frequency Stability over temperature variations: 47 CFR 2.1055(a)(1)
5.7 Frequency Stability over battery power: 47 CFR 2.1055(d)(2)
5.8 Modulation Characteristics: 47 CFR 2.1047(a)

Antenna Gain = 1.41 dBi max



6.0 TEST RESULTS

6.1 TEST TYPE: Radiated Emissions

6.1.1 TECHNICAL SPECIFICATION: 47 CFR 2.1053; 24.238(a)

6.1.2 TEST DATE(S): March 1, 2002

6.1.3 MEASUREMENT PROCEDURES:

As required by §2.1053, *field strength of spurious radiation measurements* were made in accordance with the general procedures of ANSI C63.4-1992 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". Preliminary radiated emission measurements were performed inside a shielded chamber with all digital signal generators on and terminated. The frequency list from the preliminary measurements was used as a guide for making final measurements in a 3 meter semi-anechoic chamber (equivalent to an Open Area Test Site). The unit was scanned over the frequency range of the lowest system oscillator value to 20 GHz. The Radiated Spurious Emissions *Limit* is obtained by the following:
Based on an output power (as measured at the output of the Amplifier) of 0.34 watts:

$$P_o = 0.34\ W$$

the radiated power level of all spurious emissions must be attenuated by at least 43 + 10log(Po) below Po, yielding:

$$Po - [43 + 10Log(Po)] = -13dBm$$

6.1.4 RESULTS:

All of the measurable radiated emissions are related to the digital device portion of the EUT, and thus are compared to the 47CFR 15 Class B field strength limit. Mathematical calculations indicate that these field strengths yield radiated power levels greater than 30 dB below the -13 dBm limit for spurious emissions from the transmitter portion of the EUT calculated above. There were no observable radiated emissions from the transmitter portion of the EUT.

The Spurious Radiated Emissions were measured from 1GHz to 20GHz for the Hitachi SH-P300 Handy Phone. There were no detectable spurious emissions in that frequency range.

Photograph of Radiated Emissions
Test Configuration

6.2 TEST TYPE: Occupied Bandwidth

6.2.1 TECHNICAL SPECIFICATION: 47CFR 2.1049

6.2.2 TEST DATE(S): March 1, 2002

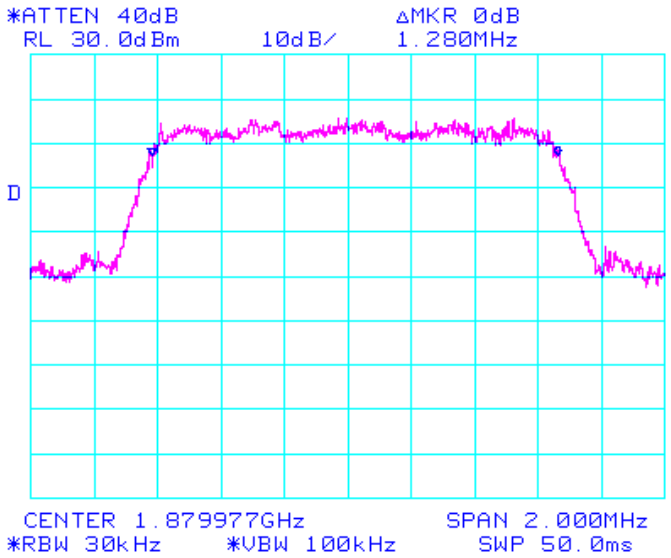
6.2.3 MEASUREMENT PROCEDURES:

As required by §2.1049 of CFR 47, *occupied bandwidth measurements* were made on the Hitachi SH-P300 Handy Phone. The EUT was configured to transmit a PCS CDMA modulated carrier signal. Using a bandwidth of 30KHz, we determined the occupied bandwidth of the emission at the center of the selectable channel range.

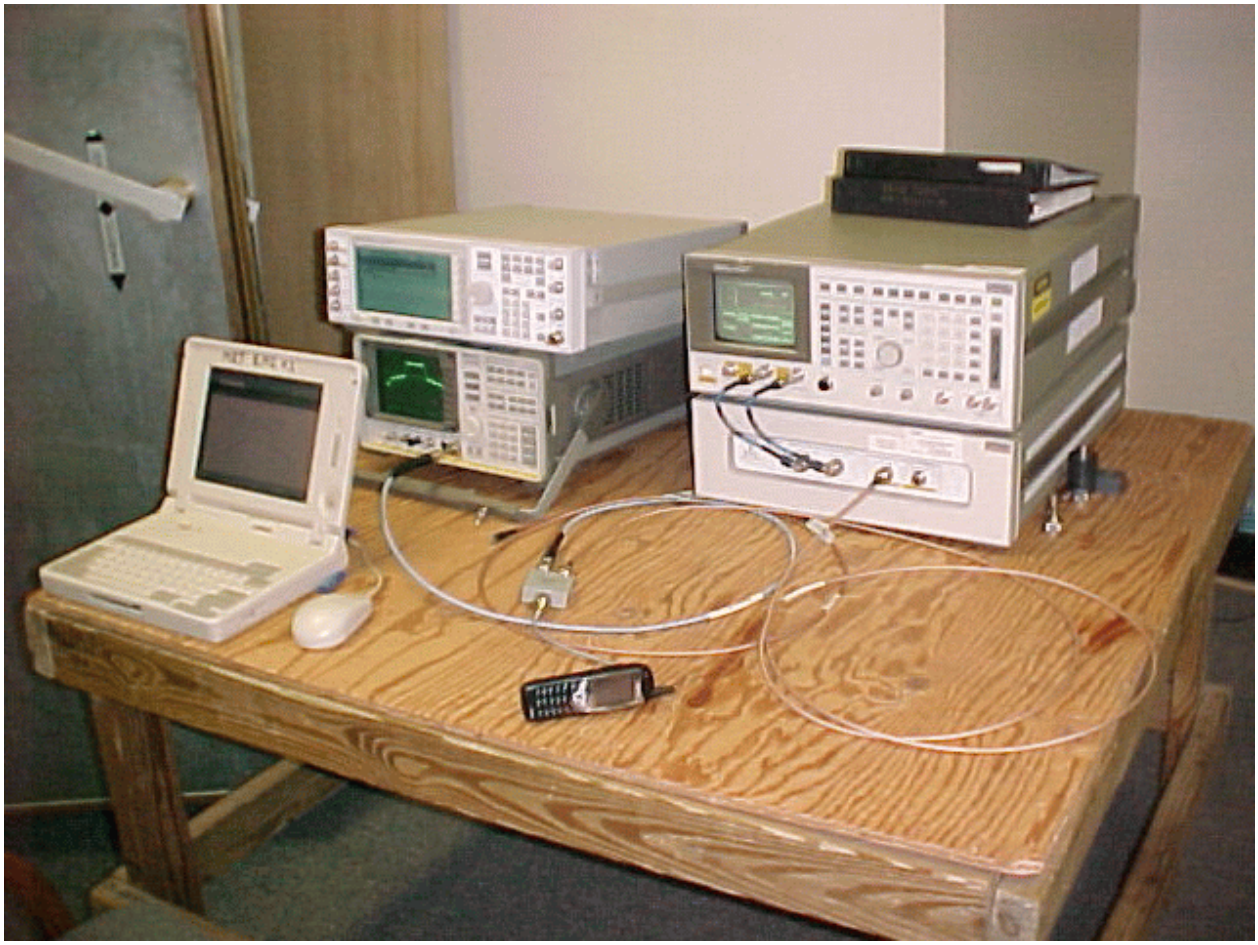
6.2.4 RESULTS:

Equipment complies with Section 2.1049. A plot of the occupied bandwidth, as measured at the RF output port follows:

Occupied B/W @ Center Channel Met 12027



Photograph of Conducted Spur Emissions, RF Output Power and Occupied B/W Test Configuration



6.3 TEST TYPE: RF Power Output

6.3.1 TECHNICAL SPECIFICATION: 47CFR 2.1046 and 24.232(a), (c)

6.3.2 TEST DATE(S): March 1, 2002

6.3.3 MEASUREMENT PROCEDURES:

As required by §2.1046 of CFR 47, *RF power output measurements* were made at the RF output terminals using an attenuator and spectrum analyzer. This test was performed with carrier modulated by a CDMA modulation signal.

Plots of the RF output Power level of the Digitally modulated carrier, as measured at the RF output, are included on the following page .

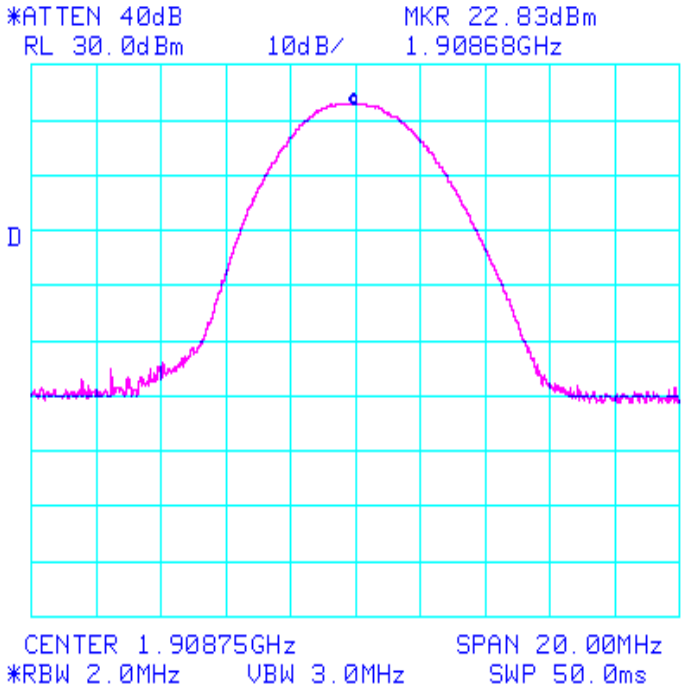
6.3.4 RESULTS:

Equipment complies with 47CFR 2.1046 and 24.232(a), (c). The Hitachi SH-P300 Handy Phone does not exceed limit at the carrier frequency.

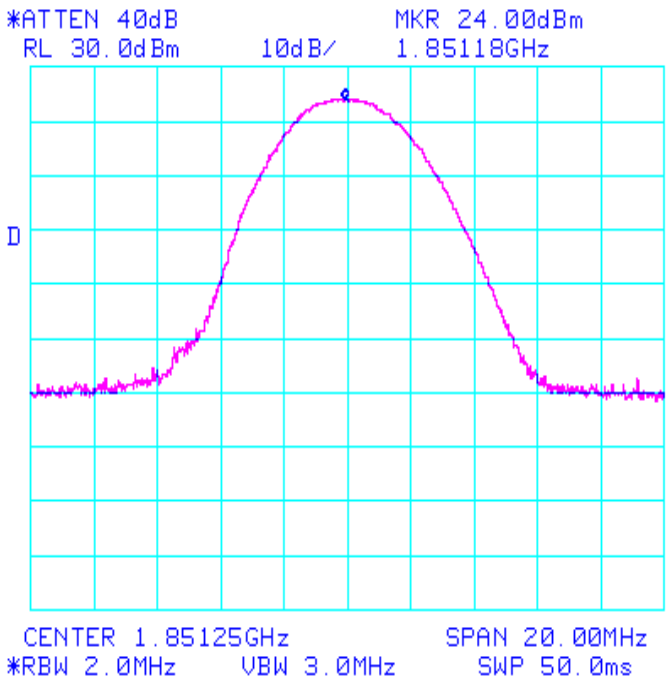
The following pages show measurements of RF power output which is summarized below:

CDMA : 0.25 Watts at all channels

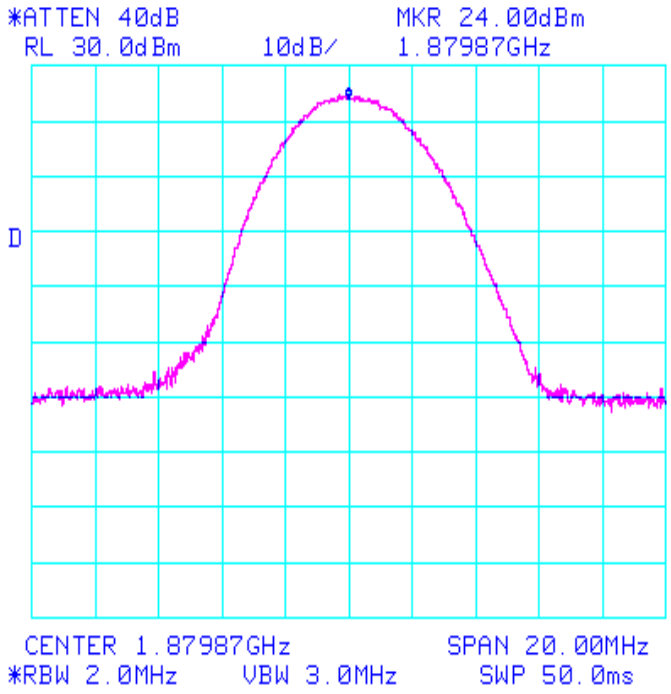
RF output power @ Channel 1175 Met12027



RF output power @ Channel 25 Met12027



RF output power @ Channel 600 Met12027



6.4 TEST TYPE: Spurious Emissions at Antenna Terminals

6.4.1 TECHNICAL SPECIFICATION: 47 CFR 2.1051; 24.238(a)

6.4.2 TEST DATE(S): March 1, 2002

6.4.3 MEASUREMENT PROCEDURES:

As required by §2.1051 of CFR 47, *spurious emissions at antenna terminal measurements* were made at the RF output terminals using a 50 S attenuator and spectrum analyzer set for a 100 kHz bandwidth. The RBW of 100 kHz was used to investigate and search for spurious emissions; any spurs found with this technique are to be re-measured with the appropriate 1MHz RBW. There were no detectable spurious emissions for this EUT. This test was performed with Digitally modulated carrier signals, and the EUT was adjusted for continuous transmission on frequencies across the operating band. The frequency spectrum was investigated from 9.0 KHz to 20.0 GHz.

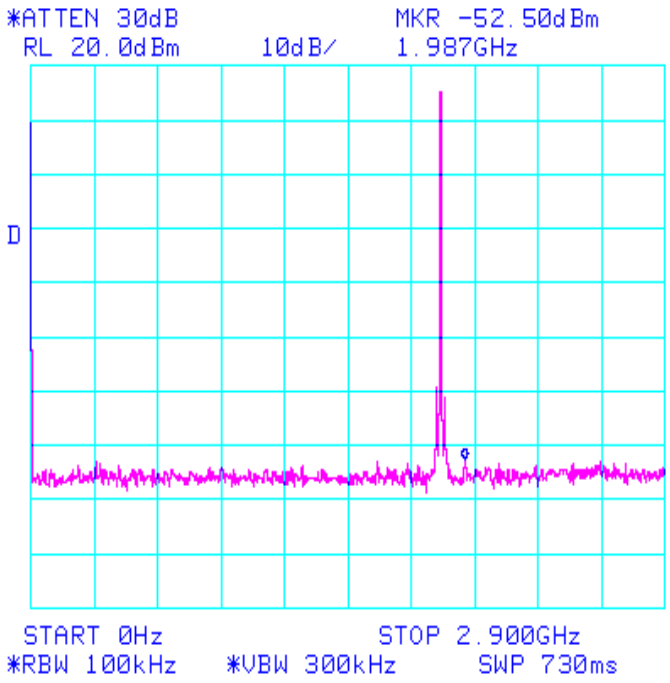
6.4.4 RESULTS:

The following plots are included to illustrate compliance with the requirements of 47 CFR Part 24.238(a):

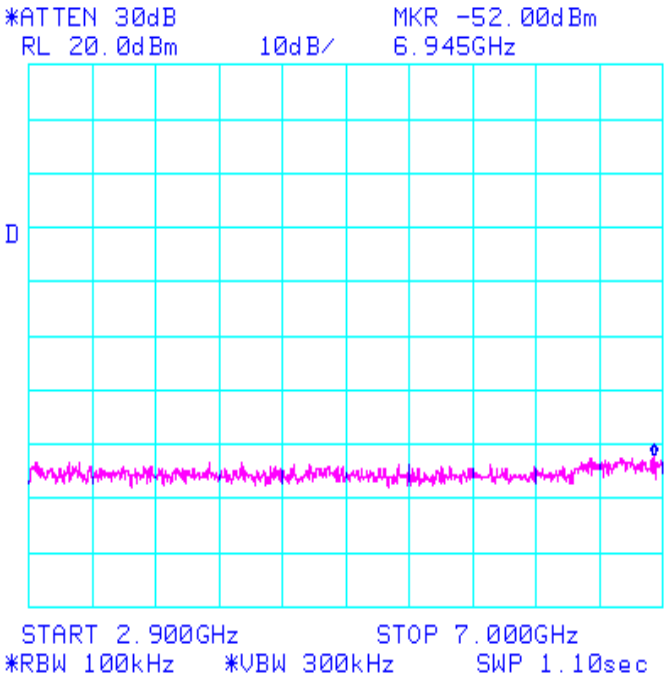
Frequency Range	Emission Frequency	Emission Level (dBm)	Limit (dBm)
9 kHz - 2.9 GHz	1.987 GHz	-52.5 (noise floor)	-13.1
2.9 GHz - 8.0 GHz	6.945 GHz	-52.0 (noise floor)	-13.1
8.0 GHz - 14.0 GHz	14.213 GHz	-49.17 (noise floor)	-13.1
14.0 GHz - 20.0 GHz	19.567 Ghz	-49.5 (noise floor)	-13.1

Equipment complies with Section 2.1051and 24.238(a). Note, the signal at approximately 1880 MHz is the carrier signal and not a spurious emission. Spurious emissions for CDMA modulation types were measured.

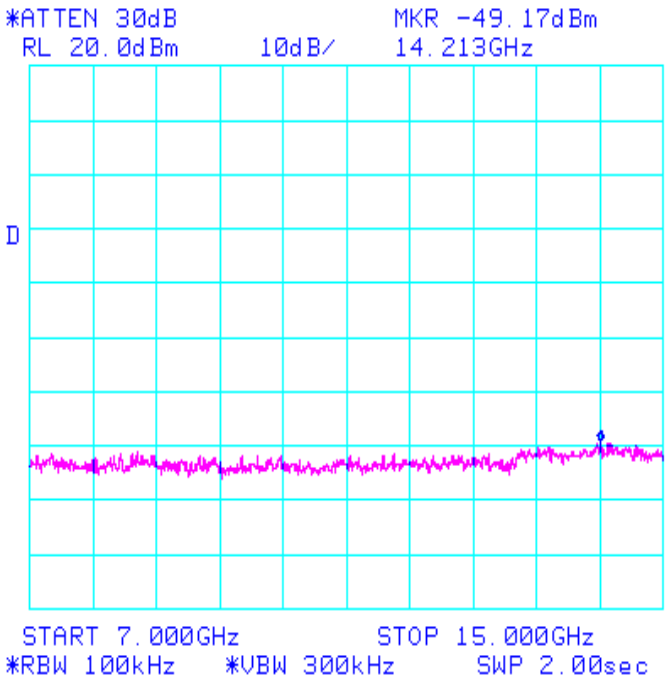
Conducted spur emissions @ antenna port Met 12027



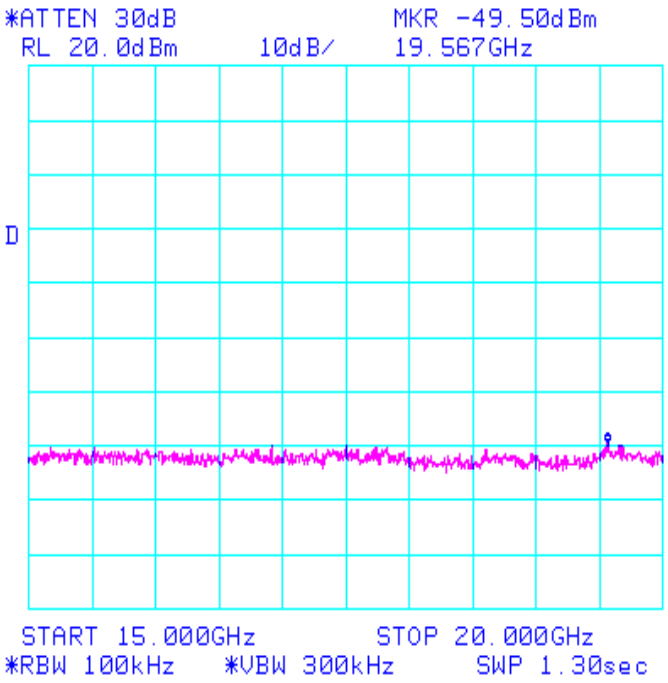
Conducted spur emissions @ antenna port Met12027



Conducted spur emissions @ antenna port Met 12027



Conducted spur emissions @ antenna port Met 12027



6.5 TEST TYPE: Spurious Emissions at Antenna Terminals at Block Edges +/- 1 MHz

6.5.1 TECHNICAL SPECIFICATION: 47 CFR 2.1051; 24.238(b)

6.5.2 TEST DATE(S): March 1, 2002

6.5.3 MEASUREMENT PROCEDURES:

As recommended in FCC Part 24, Great than or equal to 1% of emission spectrum bandwidth was chosen to measure the peak of any emission inside the 1.0 MHz frequency band adjacent to each frequency block edge. All other frequencies were measured using a 30 KHz RBW. The unit was exercised using signal types required by §2.1049.

6.5.4 RESULTS:

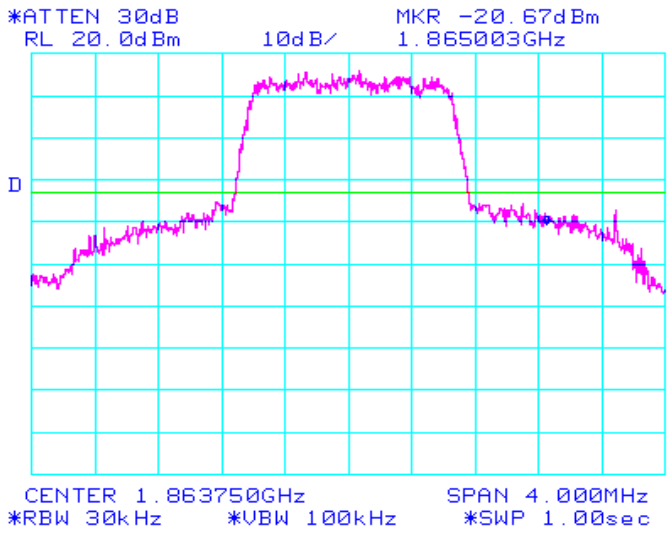
Modulation products outside of this band are attenuated at least 43 + 10 Log (P) below the level of the modulated carrier. A Plot of the spurious emissions at +/- 1 MHz around the transmit frequency, as measured at the antenna port, appears on the following page.

SPURIOUS EMISSION FREQUENCY BLOCKS

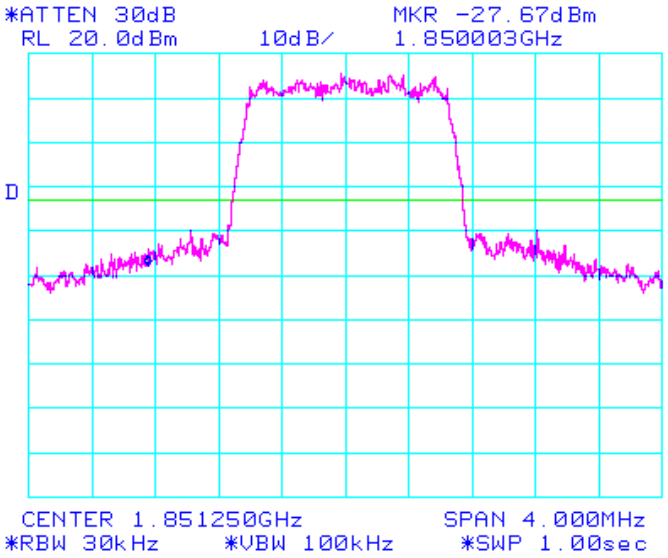
Frequency Block (MHz)	Low Frequency (CH #)	Hi Frequency (CH #)
A (1850-1865)	1851.25 (25)	1863.75
B (1870-1885)	1871.25	1883.75
C (1895-1910)	1896.25	1908.75 (1175)
D (1865-1870)	1866.25	1868.75
E (1885-1890)	1886.25	1888.75
F (1890-1895)	1891.25	1893.75

Plots of the spurious emissions as measured at the extremes of each frequency block appear on the following pages.

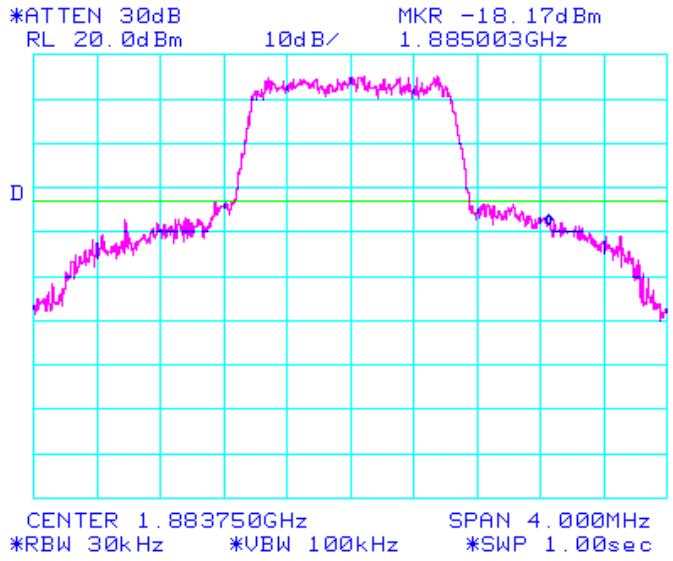
Spur emissions at frequency block-edge, High side of Block A Met 12027



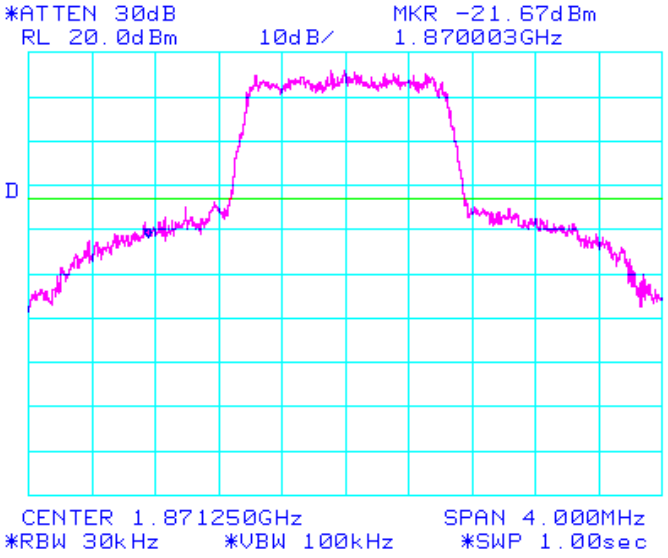
Spur emissions at frequency block-edge, Low side of Block A Met12027



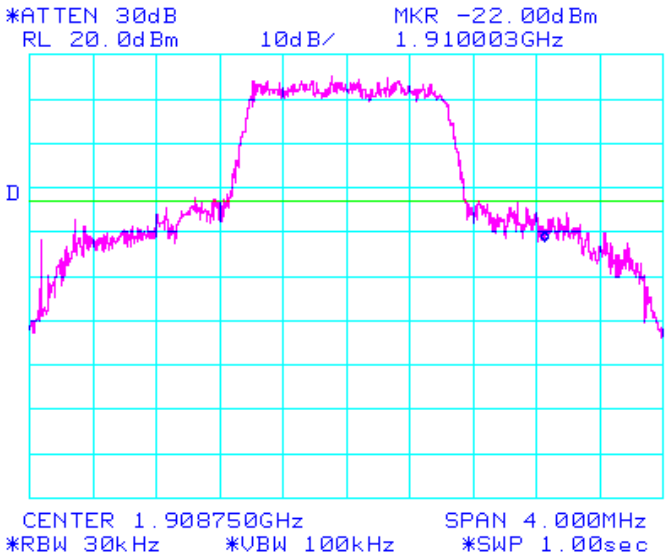
Spur emissions at frequency block-edge, High side of block B Met 12027



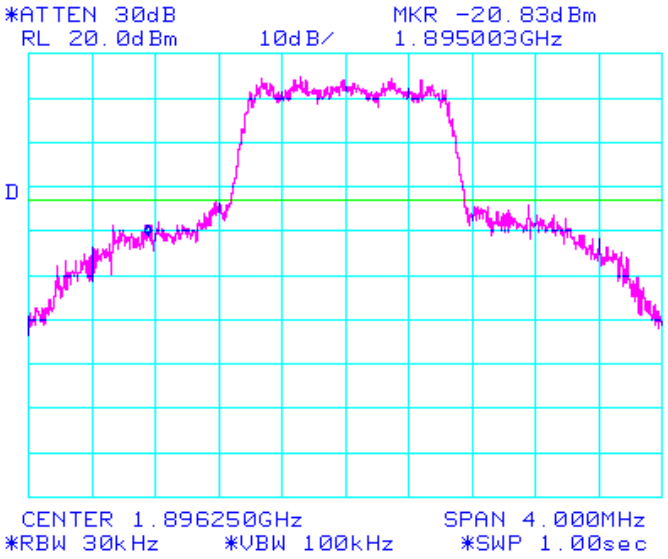
Spur emissions at frequency block-edge, Low side of block B Met 12027



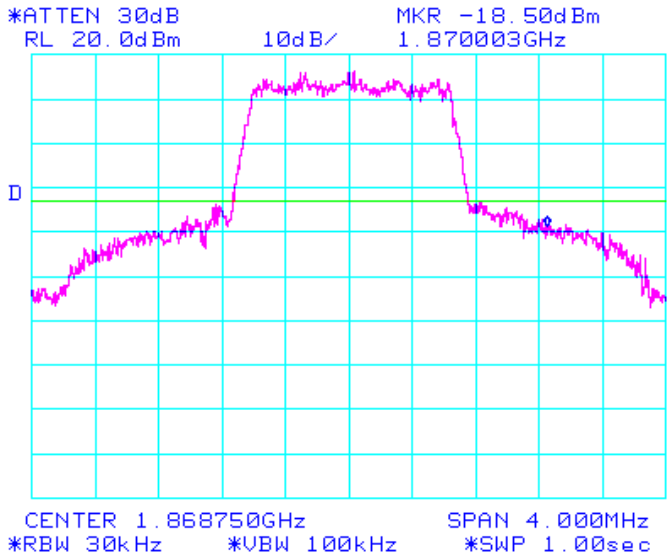
Spur emissions at frequency block-edge, High side of block C Met 12027



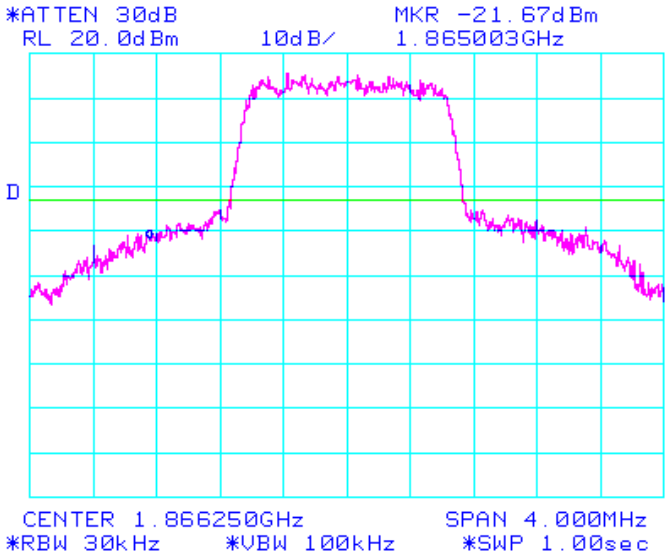
Spur emissions at frequency block-edge, Low side of block C Met12027



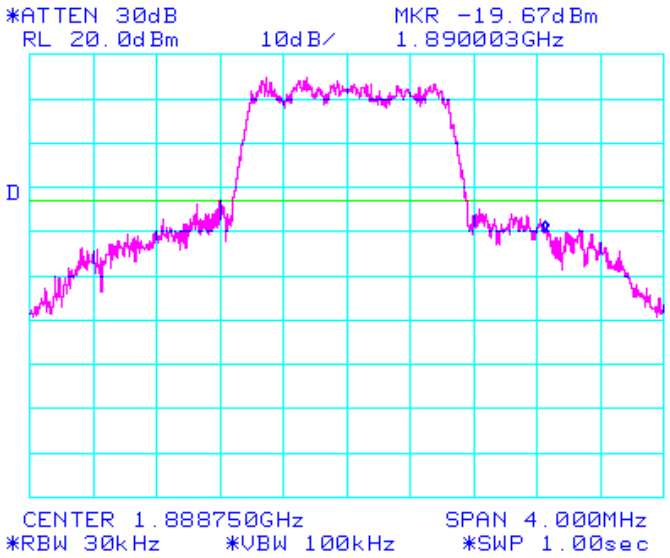
Spur emissions at frequency block-edge, High side of block D Met 12027



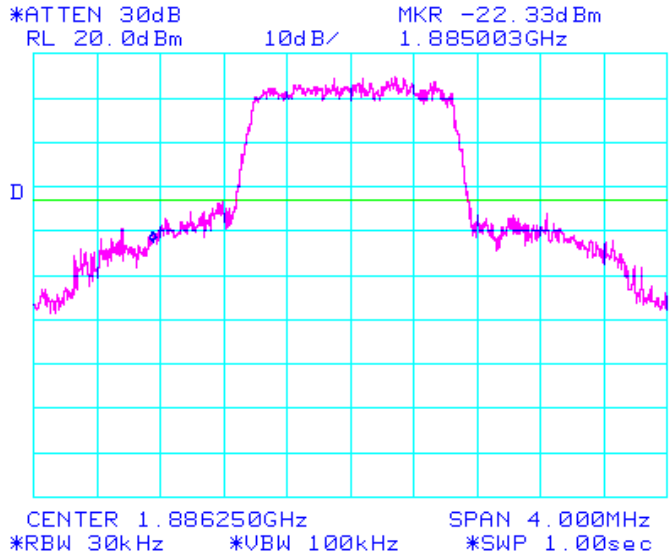
Spur emissions at frequency block-edge, Low side of block D Met 12027



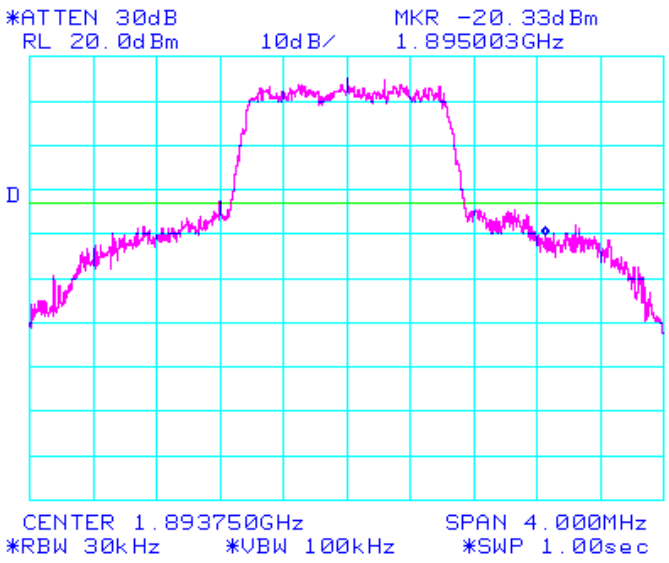
Spur emissions at frequency block-edge, High side of block E Met 12027



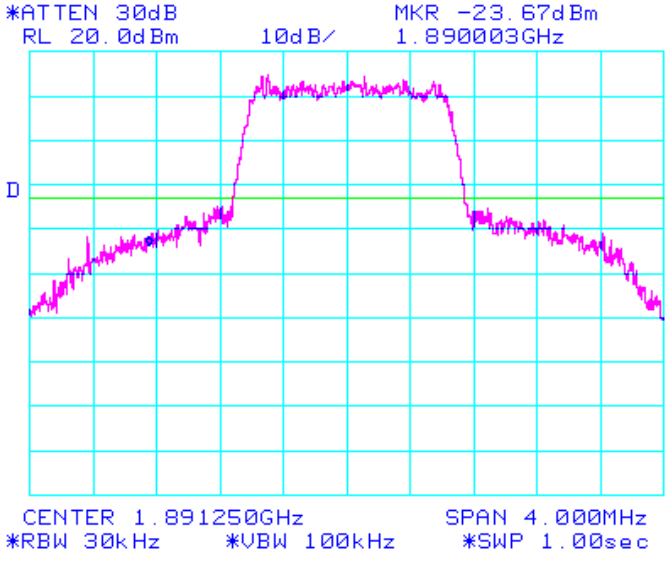
Spur emissions at frequency block-edge, Low side of block E Met 12027



Sper emissions at frequency block-edge, High side of block F Met 12027



Spur emissions at frequency block-edge, Low side of block F Met 12027



6.6 TEST TYPE: Frequency Stability over Temperature Variations

6.6.1 TECHNICAL SPECIFICATION: 47 CFR 2.1055(a)(1)

6.6.2 TEST DATE(S): March 5, 2002

6.6.3 MEASUREMENT PROCEDURES:

As required by §2.1055(a)(1) of CFR 47, *frequency tolerance measurements* were made over the temperature range of -30EC to +50EC. The frequency measurements were made using direct input to a spectrum analyzer. Climatic control was accomplished using an environmental simulation chamber. The temperature was first lowered to -30EC and then raised hourly in 10E increments. The unit remained in the chamber during temperature transitions and during the measurement process.

6.6.4 RESULTS:

Frequency tolerance of carrier signal: +/- 0.005% for a temperature variation from - 30EC to + 50EC at normal supply voltage.

CARRIER FREQUENCY DEVIATIONS DUE TO TEMPERATURE INSTABILITY

Temperature (EC)	Carrier Frequency (GHz)	Frequency Deviation (Hz)	Deviation Limit (KHz)
-30	1.8800966xx*	+/- 50	± 94
-20	1.8800966xx*	+/- 50	± 94
-10	1.8800966xx*	+/- 50	± 94
0	1.8800966xx*	+/- 50	± 94
+10	1.8800966xx*	+/- 50	± 94
+20	1.8800966xx*	+/- 50	± 94
+30	1.8800966xx*	+/- 50	± 94
+40	1.8800966xx*	+/- 50	± 94
+50	1.8800966xx*	+/- 50	± 94

The unit meets the requirements of 2.1055 (a)(1)

*** The frequency deviation (+/-50 Hz) can only affect the two least significant numbers of carrier frequency.**

6.7 TEST TYPE: Frequency Stability over Battery Power

6.7.1 TECHNICAL SPECIFICATION: 47 CFR 2.1055(d)(2)

6.7.2 TEST DATE(S): March 5, 2002

6.7.3 MEASUREMENT PROCEDURES:

As required by §2.1055(d)(2) of CFR 47, *frequency tolerance measurements* were made over the battery power operating to the end point of battery capacity which is indicated by LCD indicator on the phone or handset. The frequency measurements were made using direct input to a spectrum analyzer.

6.7.4 RESULTS:

Frequency tolerance of carrier signal: +/- 0.005% for battery power from full to end point:

CARRIER FREQUENCY DEVIATIONS DUE TO BATTERY POWER DROP

Battery Power	Carrier Frequency (GHz)	Frequency Deviation (Hz)	Deviation Limit (KHz)
FULL	1.8800966xx*	+/- 50	± 94
END POINT	1.8800966xx*	+/- 50	± 94

The unit meets the requirements of 2.1055 (d)(2)

*** The frequency deviation (+/-50 Hz) can only affect the two least significant numbers of carrier frequency.**

6.8 TEST TYPE: Modulation Characteristics

6.8.1 TECHNICAL SPECIFICATION: 47 CFR 2.1047(a)

6.8.2 TEST DATE(S): March 1, 2002

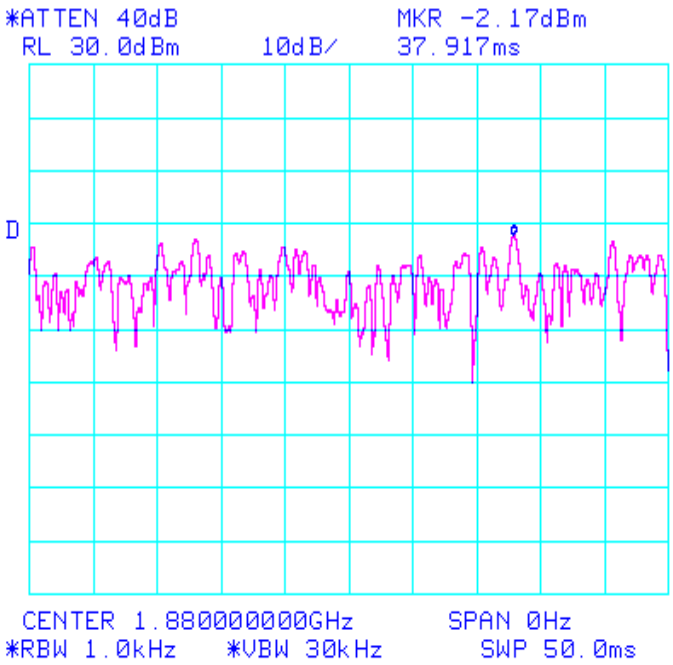
6.8.3 MEASUREMENTS REQUIRED:

The EUT uses CDMA modulation. In CDMA modulation, voice or data information is digitized and coded into a Wolsh code.

6.8.4 RESULTS:

The following plots give a detailed explanation of the modulation scheme used in the EUT of the PCS system.

Modulation Characteristic Met 12027



Modulation Characteristic Met 12027