FCC CFR47 PART 22H AND PART 24 E
INDUSTRY CANADA RSS-132 AND RSS-133
CLASS II PERMISSIVE CHANGE
CERTIFICATION TEST REPORT

FOR

UNDP-1 PCI EXPRESS MINI CARD INSTALLED IN AN HP HSTNN-W47C SERIES TABLET LAPTOP

MODEL NUMBER: UNDP-1

FCC ID: J9CUNDP-1H
IC: 2723A-UNDP1

REPORT NUMBER: 08U11727-2

ISSUE DATE: MAY 08, 2008

Prepared for

QUALCOMM INCORPORATED
5775 MOREHOUSE DRIVE
SAN DIEGO, CA 29121, U.S.A.

Prepared by

COMPLIANCE CERTIFICATION SERVICES
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
---	05/08/08	Initial Issue	T. Chan

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: QUALCOMM INCORPORATED
5775 MOREHOUSE DRIVE
SAN DIEGO, CA 29121, U.S.A.

EUT DESCRIPTION: UNDP-1 WWAN mPCIe module embedded in an HP Notebook PC, Regulatory Model Name: HSTNN-W47C

MODEL: UNDP-1

SERIAL NUMBER: N/A

DATE TESTED: APRIL 22-25, 2008

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 22H and 24E	PASS
IC RSS-132 ISSUE 2 and RSS-133 ISSUE 4	PASS

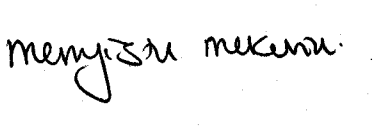
Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All expressions of Pass/Fail in this report are opinions expressed by CCS based on interpretations of the test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:



MEMGISTU MEMKURIA
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA/EIA 603C (2004), FCC CFR 47 Part 2, FCC CFR 47 Part 22H, 24E, RSS-GEN, RSS132, RSS133, SPSR503, and SPSR510.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Radiated Emission, Above 2000 MHz	+/- 4.3 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT, model number: UNDP-1, is a PCI express mini card that installed in an HP HSTNN-W47C series Tablet Laptop.

5.2. DESCRIPTION OF CLASS II CHANGE

The change filed under this application is adding an HP HSTNN-W47C series tablet laptop with Amphonol Taiwan Corporation Antenna.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an Amphonol antenna manufactured by Amphonol Taiwan Corporation with maximum gain of 1.37 and 1.57dBi for cell and PCS band respectively.

5.4. SOFTWARE AND FIRMWARE

The EUT is linked with Communication Test Set.

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5.5. WORST-CASE CONFIGURATION AND MODE

The following setting is used to configure the CMU200 to establish the link

Service selection ➔ Test Mode A – Auto Slot Config. ➔ off

Main Service ➔ Packet Data

Network Support ➔ GSM+GPRS

Slot Config ➔ 33 dBm for GSM850/EGSM900 and 30 dBm for GSM1800

27 dBm for GSM850 EPRS and 26 dBm for GSM1800 EGPRS

Application Rev, License

GSM Mode

To reset the Agilent 8960 to default all values > Shift & Preset

To adjust Input/Output offset, press SYSTEM CONFIG button above the control knob

> RF IN/OUT Amptd Offset

> RF IN/OUT Amptd Offset Setup

> Enter frequencies to be tested and corresponding offsets (enter negative values for offset, i.e.-35 is greater than -30).

Control

Operating Mode > Active Cell (GSM)

Connection Type > Auto (For Voice Mode)

Call Parms

· BCH Parameters > Cell Power > adjust to (~ -50dBm) to maintain strong link OTA

> Cell Band > PCS or GSM850 (US band)

· TCH Parameters > Timeslot >1

> Traffic Channel > PCS Channel 512 / 661 / 810

> GSM850 Channel 128 / 190 / 251

> MS TX Level > 1 (for both PCS or GSM850)

> Timeslot > 1

> Speech Setup > Speech Source > Echo (Default)

· Press “Originate Call”

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GPRS Mode

· To reset the Agilent 8960 to default all values > Shift & Preset

· To adjust Input/Output offset, press SYSTEM CONFIG button above the control knob

> RF IN/OUT Amptd Offset

> RF IN/OUT Amptd Offset Setup

> Enter frequencies to be tested and corresponding offsets (enter negative values for offset, i.e.-35 is greater than -30).

Control

· Operating Mode > Active Cell (GPRS)

· Connection Type > ETSI Type A (For Data Mode)

Call Parms

· BCH Parameters > Cell Power > adjust to (~ -50dBm) to maintain strong link OTA

> Cell Band > PCS or GSM850 (US band)

· TCH Parameters > Traffic Channel > PCS Channel 512 / 661 / 810

> GSM850 Channel 128 / 190 / 251

> MS TX Level > 3 (33dBm for Cell band); 3 (30dBm for PCS band)

· PDTCH > Multislot Config > 1 Down, 2 Up

> MS TX Level > 5 (33dBm Cell band); 1 (30dBm PCS band)

> Coding Scheme > CS-4

Based on previous experiences, from different modulations, GPRS was the worst-case scenario.

The worst-case position was investigated by measuring the ERP and EIRP powers when the EUT was sited in X, Y, Z, and Mobile positions while its antenna was oriented 90 and 180 degrees respectively.

As a result X and mobile with 90 degrees antenna orientation considered worst-case positions for Cell and PCS frequency bands respectively.

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at mid channel for both Cell and PCS bands.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	Agilent / HP	PPP009H	F3-0801000629X1	DoC
Laptop	Agilent / HP	HSTNN-W47C	2CE8112CN5	DoC
Communications Test	Agilent / HP	E5515C	C01086	N/A
Horn 1-18GHz	EMCO	3115	NA	N/A

I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identica Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	115VAC	Un-shielded	1m	NA
2	DC	1	DC	Un-shielded	2m	NA
3	RF IN/OUT	1	Horn Antenna	Un-shielded	2m	NA

TEST SETUP

The EUT is installed in a Laptop Host during the tests. Communication test set exercised the EUT.

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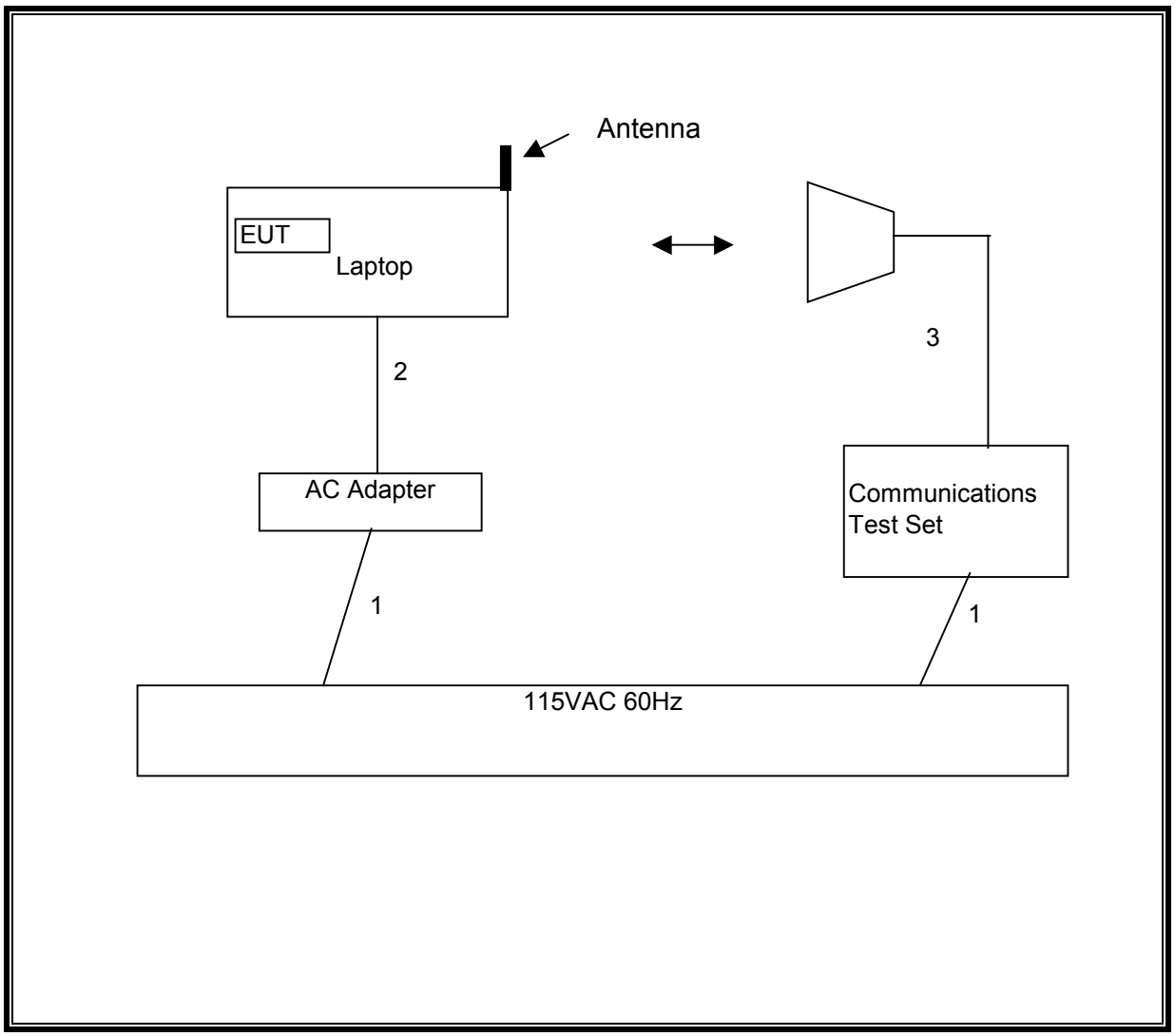
SETUP DIAGRAM FOR TESTS



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5.7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	9/27/2008
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	9/29/08
Horn 1-18GHz	EMCO	3115	C00945	04/22/09
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	8/7/08
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02689`	CNR
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Horn	EMCO	3115	C00872	05/15/08
Dipole	Speag	D900V2	NA	11/16/08
Signal Generator	R & S	SMP04	C00953	02/16/09
Communication Test Set	R & S	CMU200	C001131	4/16/09
Communications Test Set	Agilent / HP	E5515C	C01086	06/29/08

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5.7.1. OUTPUT POWER

LIMITS

22.913(a) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(b) & RSS133 § 6.4 Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

RSS-132 § 4.4 The maximum ERP shall be 6.3 Watts for mobile stations.

TEST PROCEDURE

RSS-132, RSS-133, & ANSI / TIA / EIA 603C Clause 2.2.17

RESULTS

No non-compliance noted

824 to 849 MHz Authorized Band

Frequency Range (MHz)	Modulation	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low CH - 824.2	GPRS	31.7	1479.1
Mid CH - 836.5		31.7	1479.1
High CH - 848.8		30.0	1000.0

1850 to 1910 MHz Authorized Band

Frequency Range (MHz)	Modulation	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low CH - 1850	GPRS	31.2	1318.3
Mid CH - 1880		32.1	1621.8
High CH - 1909		31.9	1548.8

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GSM, GPRS Output Power (ERP)

High Frequency Substitution Measurement
Compliance Certification Services, Fremont 5m Chamber A

Company: QUALCOMM CORPORATE
Project #: 08U11727
Date: 4/25/2008
Test Engineer: MENGISTU MEKURIA
Configuration: EUT ALONE (WORST-CASE)
Mode: TX CELL BAND GPRS

Test Equipment:
Receiving: Sunol T130, and 5m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, and 4ft SMA Cable Warehouse S/N: 177081003.

f MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.20	102.9	V	29.3	0.5	0.0	28.8	38.5	-9.6	
824.20	108.2	H	32.2	0.5	0.0	31.7	38.5	-6.8	
836.60	102.3	V	29.2	0.6	0.0	28.6	38.5	-9.9	
836.60	107.8	H	32.3	0.6	0.0	31.7	38.5	-6.8	
848.80	102.9	V	29.7	0.7	0.0	29.0	38.5	-9.5	
848.80	106.8	H	30.7	0.7	0.0	30.0	38.5	-8.5	

Rev. 1.24.7

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GSM, GPRS Output Power (EIRP)

High Frequency Fundamental Measurement
Compliance Certification Services, Fremont 5m Chamber A

Company: QUALCOMM CORPORATE
Project #: 08U11727
Date: 4/25/2008
Test Engineer: MENGISTU MEKURIA
Configuration: EUT ALONE (WORST-CASE)
Mode: TX PCS BAND GPRS

Test Equipment:
Receiving: Horn T60, and 12ft S/N: 187209002 (Setup this one for testing EUT)
Substitution: Horn T73 Substitution, 4ft SMA Cable Warehouse S/N: 177081003

f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
1.850	94.2	V	22.1	0.7	8.3	29.7	33.0	-3.3	
1.850	96.6	H	23.7	0.7	8.3	31.2	33.0	-1.8	
1.880	92.6	V	20.8	0.7	8.3	28.4	33.0	-4.6	
1.880	96.7	H	24.5	0.7	8.3	32.1	33.0	-0.9	
1.910	92.4	V	20.4	0.7	8.4	28.1	33.0	-5.0	
1.910	96.4	H	24.2	0.7	8.4	31.9	33.0	-1.1	

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5.7.2. FIELD STRENGTH OF SPURIOUS RADIATION

LIMIT

§22.917 (e) and §24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

TEST PROCEDURE

RSS-132, RSS-133, & ANSI / TIA / EIA 603C Clause 2.2.12

RESULTS

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GSM, GPRS Spurious & Harmonic (ERP)

High Frequency Substitution Measurement
Compliance Certification Services, Fremont 5m B-Chamber

Company: QUALCOMM CORPORATE
Project #: 08U11727
Date: 4/23/2008
Test Engineer: MENGISTU MEKURIA
Configuration: EUT ALONE
Mode: TX CELL BAND GPRS (WORST CASE)

Test Equipment:

EMCO Horn 1-18GHz: T73; S/N: 6717 @3m
Horn > 18GHz:
Limit: FCC 22
High Pass Filter
Hi Frequency Cables: (2 ft) (2 ~ 3 ft) (4 ~ 6 ft) (12 ft)
Pre-amplifer 1-26GHz: T34 HP 8449B
Pre-amplifer 26-40GHz:

f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low CH. (824.2 MHz)										
1.648	58.0	H	-49.0	3.8	8.0	5.8	-47.0	-13.0	-34.0	
2.473	59.6	H	-43.8	4.9	9.5	7.4	-41.3	-13.0	-28.3	
1.648	58.7	V	-49.0	3.8	8.0	5.8	-47.0	-13.0	-34.0	
2.473	61.3	V	-42.3	4.9	9.5	7.4	-39.8	-13.0	-26.8	
Mid CH. (837.0 MHz)										
1.674	58.2	H	-48.6	3.9	8.0	5.9	-46.6	-13.0	-33.6	
2.511	64.0	H	-39.2	4.9	9.6	7.4	-36.7	-13.0	-23.7	
1.674	59.6	V	-48.0	3.9	8.0	5.9	-46.0	-13.0	-33.0	
2.511	62.7	V	-40.7	4.9	9.6	7.4	-38.2	-13.0	-25.2	
Hi CH. (848.8 MHz)										
1.698	60.2	H	-46.5	3.9	8.1	5.9	-44.5	-13.0	-31.5	
2.546	59.5	H	-43.6	4.9	9.6	7.4	-41.1	-13.0	-28.1	
1.698	59.6	V	-47.8	3.9	8.1	5.9	-45.8	-13.0	-32.8	
2.546	58.1	V	-45.1	4.9	9.6	7.4	-42.6	-13.0	-29.6	
1.600	58.6	H	-48.6	3.8	7.9	5.7	-46.7	-13.0	-33.7	
1.786	54.2	H	-52.1	4.0	8.3	6.2	-50.0	-13.0	-37.0	
2.398	52.2	H	-51.6	4.8	9.5	7.4	-49.0	-13.0	-36.0	
1.600	54.1	V	-53.8	3.8	7.9	5.7	-51.9	-13.0	-38.9	
1.786	50.8	V	-56.1	4.0	8.3	6.2	-54.0	-13.0	-41.0	
2.398	56.6	V	-47.4	4.8	9.5	7.4	-44.8	-13.0	-31.8	

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GSM, GPRS Spurious & Harmonic (EIRP)

High Frequency Substitution Measurement
Compliance Certification Services, Fremont 5m B-Chamber

Company: QUALCOMM CORPORATE
Project #: 08U11727
Date: 4/23/2008
Test Engineer: MENGISTU MEKURIA
Configuration: EUT ALONE
Mode: TX PCS BAND GPRS (WORST CASE)

Test Equipment:

EMCO Horn 1-18GHz: T73; S/N: 6717 @3m
Horn > 18GHz:
Limit: FCC 24
☑ High Pass Filter
Hi Frequency Cables: ☐ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)
Pre-amplifer 1-26GHz: T34 HP 8449B
Pre-amplifer 26-40GHz:

f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low CH. (1850.2 MHz)										
3.700	45.9	H	-51.5	5.9	9.7	7.6	-47.7	-13.0	-34.7	
5.551	43.2	H	-48.1	7.4	11.3	9.1	-44.2	-13.0	-31.2	
3.700	44.2	V	-53.2	5.9	9.7	7.6	-49.4	-13.0	-36.4	
5.551	43.8	V	-48.5	7.4	11.3	9.1	-44.6	-13.0	-31.6	
Mid CH. (1880 MHz)										
3.760	46.4	H	-50.7	6.0	9.7	7.6	-46.9	-13.0	-33.9	
5.640	43.4	H	-48.2	7.4	11.5	9.3	-44.2	-13.0	-31.2	
3.760	45.9	V	-51.2	6.0	9.7	7.6	-47.5	-13.0	-34.5	
5.640	43.4	V	-49.1	7.4	11.5	9.3	-45.1	-13.0	-32.1	
Hi CH. (1909.8 MHz)										
3.820	44.2	H	-52.5	6.0	9.7	7.5	-48.9	-13.0	-35.9	
5.729	44.7	H	-47.1	7.5	11.7	9.5	-42.9	-13.0	-29.9	
3.820	43.5	V	-53.3	6.0	9.7	7.5	-49.7	-13.0	-36.7	
5.729	43.3	V	-49.4	7.5	11.7	9.5	-45.3	-13.0	-32.3	

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