

NTS Silicon Valley www.nts.com 41039 Boyce Road Fremont, CA 94538 510-578-3500 Phone 510-440-9525 Fax

# EMC Test Report

# Application for Grant of Equipment Authorization

# FCC Part 15, Subpart E

# Model: HR54-700

FCC ID:	PGRHR54-2
APPLICANT:	Pace Americas Inc. 310 Providence Mine Road Nevada City, CA 95959
TEST SITE(S):	National Technical Systems - Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
REPORT DATE:	May 16, 2016
<b>REISSUE DATE:</b>	May 25, 2016
FINAL TEST DATES:	June 19, 22, 25, 26, 28, July 1, 2, 8, 9, 10, 11, 14, 16, and August 5, 2015 and May 24, 2016
TOTAL NUMBER OF PAGES:	123

PROGRAM MGR / TECHNICAL REVIEWER:

Mark E Hill Staff Engineer

QUALITY ASSURANCE DELEGATE / FINAL REPORT PREPARER:

David Guidotti Senior Technical Writer



National Technical Systems - Silicon Valley is accredited by the A2LA, certificate number 0214.26, to perform the test(s) listed in this report, except where noted otherwise. This report and the information contained herein represent the results of testing test articles identified and selected by the client performed to specifications and/or procedures selected by the client. National Technical Systems (NTS) makes no representations, expressed or implied, that such testing is adequate (or inadequate) to demonstrate efficiency, performance, reliability, or any other characteristic of the articles being tested, or similar products. This report should not be relied upon as an endorsement or certification by NTS of the equipment tested, nor does it represent any statement whatsoever as to its merchantability or fitness of the test article, or similar products, for a particular purpose. This report shall not be reproduced except in full

# **REVISION HISTORY**

Rev#	Date	Comments	Modified By
-	May 16, 2016	First release	
1.0	May 17, 2016	Updated FCC ID	MEH
2.0	May 25, 2016	Removed reference to unused measurement procedure. Revised bandedge results for 40MHz operation. Removed reference to VBW settings for radiated measurements on the antenna conducted results section.	MEH

# TABLE OF CONTENTS

REVISION HISTORY	2
TABLE OF CONTENTS	3
SCOPE	4
OBJECTIVE	4
STATEMENT OF COMPLIANCE	
DEVIATIONS FROM THE STANDARDS	
TEST RESULTS SUMMARY	
UNII / LELAN DEVICES	
GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS	
MEASUREMENT UNCERTAINTIES	
EQUIPMENT UNDER TEST (EUT) DETAILS	9
GENERAL	
ANTENNA SYSTEM ENCLOSURE	
MODIFICATIONS	
SUPPORT EQUIPMENT	
EUT INTERFACE PORTS	
EUT OPERATION	10
TEST SITE	11
GENERAL INFORMATION	11
CONDUCTED EMISSIONS CONSIDERATIONS	
RADIATED EMISSIONS CONSIDERATIONS	
MEASUREMENT INSTRUMENTATION	
RECEIVER SYSTEM	
INSTRUMENT CONTROL COMPUTER	
LINE IMPEDANCE STABILIZATION NETWORK (LISN) FILTERS/ATTENUATORS	12
ANTENNAS	
ANTENNA MAST AND EQUIPMENT TURNTABLE	13
INSTRUMENT CALIBRATION	13
TEST PROCEDURES	14
EUT AND CABLE PLACEMENT	14
CONDUCTED EMISSIONS	
RADIATED EMISSIONS	
CONDUCTED EMISSIONS FROM ANTENNA PORT	
BANDWIDTH MEASUREMENTS SPECIFICATION LIMITS AND SAMPLE CALCULATIONS	
CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(A), RSS GEN	
GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS	
FCC 15.407 (A) OUTPUT POWER LIMITS	20
SPURIOUS EMISSIONS LIMITS –UNII AND LELAN DEVICES	
SAMPLE CALCULATIONS - CONDUCTED EMISSIONS	
SAMPLE CALCULATIONS - RADIATED EMISSIONS SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION	
APPENDIX A TEST EQUIPMENT CALIBRATION DATA	
APPENDIX B TEST DATA	
END OF REPORT	123

#### SCOPE

An electromagnetic emissions test has been performed on the Pace Americas Inc. model HR54-700, pursuant to the following rules:

FCC Part 15, Subpart E requirements for UNII Devices

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in National Technical Systems - Silicon Valley test procedures:

ANSI C63.10-2013 FCC General UNII Test Procedures KDB789033

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada 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 regulations outlined in the previous section.

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which 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.).

### STATEMENT OF COMPLIANCE

The tested sample of Pace Americas Inc. model HR54-700 complied with the requirements of the following regulations:

FCC Part 15, Subpart E requirements for UNII Devices

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

The test results recorded herein are based on a single type test of Pace Americas Inc. model HR54-700 and therefore apply only to the tested sample. The sample was selected and prepared by Mark Rieger of Pace Americas Inc..

### DEVIATIONS FROM THE STANDARDS

No deviations were made from the published requirements listed in the scope of this report.

#### TEST RESULTS SUMMARY

#### **UNII / LELAN DEVICES**

#### **Operation in the 5.15 – 5.25 GHz Band**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407 (a) (1) (iv)	-	Output Power	a: 52.5mW (17.2dBm) n20: 145.5mW (21.6dBm) n40: 167.5mW (22.2dBm) (Max eirp: 0.430W)	24 dBm	Complies
15.407 (a) (1) (iv)	-	Power Spectral Density	a: 3.2 dBm/MHz n20: 9.5 dBm/MHz n40: 7.2 dBm/MHz	11 dBm/MHz	Complies

#### **Operation in the 5.25 – 5.35 GHz Band**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)		26dB Bandwidth	20.6MHz minimum	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	-	Output Power	a: 79.4mW (19.0dBm) n20: 143.3mW (21.6dBm) n40: 133.7mW (21.3dBm) (Max eirp: 0.368W)	24dBm (250mW)	Complies
15.407(a) (2)	-	Power Spectral Density	a: 6.9 dBm/MHz n20: 9.0 dBm/MHz n40: 6.2 dBm/MHz	11 dBm/MHz	Complies

#### **Operation in the 5.47 – 5.725 GHz Band**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)		26dB Bandwidth	20.5MHz minimum	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	-	Output Power	a: 85.1mW (19.3dBm) n20: 166.5mW (22.2dBm) n40: 157.1mW (22.0dBm) (Max eirp: 0.428 W)	24dBm (250mW)	Complies
15.407(a) (2))	-	Power Spectral Density	a: 6.6 dBm/MHz n20: 9.5 dBm/MHz n40: 6.7 dBm/MHz	11 dBm/MHz	Complies



*Project number JD100795 Reissue Date: May 25, 2016* 

#### **Operation in the 5.725-5.850 GHz Band**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(e)		6dB Bandwidth	16.4MHz minimum	>500kHz	N/A
15.407(a) (3)	-	Output Power	a: 77.6mW (18.9dBm) n20: 158.9mW (22.0dBm) n40: 146.7mW (21.7dBm) (Max eirp: 0.408W)	30 dBm	Complies
15.407(a) (3)	-	Power Spectral Density	a: 6.3 dBm/MHz n20: 9.2 dBm/MHz n40: 6.6 dBm/MHz	30 dBm/500kHz	Complies

Report Date: May 16, 2016

#### **Requirements for all U-NII/LELAN bands**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407	-	Modulation	Digital Modulation is used	Digital modulation is required	Complies
15.407(b) (1), (3), and (4) / 15.209	-	Spurious Emissions	68.0 dBµV/m @ 5468.5 MHz (-0.3 dB)	Refer to page 20	Complies
15.407 (c)	-	Operation in the absence of information to transmit	Operation is discontinued in the absence of information	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	-	Frequency Stability	Frequency stability is better than 20ppm	Signal shall remain within the allocated band	Complies
15.407 (h1)	-	Transmit Power Control	TPC is not required as the device operates at below 500mW eirp	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	Complies
15.407 (h2)	-	Dynamic frequency Selection (device without radar detection)	Refer to separate test report, reference R98864	Channel move time < 10s Channel closing transmission time < 260ms	Complies

#### GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Antennas are internal to the device	Unique or integral antenna required	Complies
15.207	RSS GEN Table 3	AC Conducted Emissions	46.1 dBµV @ 0.443 MHz (-0.9 dB)	Refer to page 19	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in separate exhibit	Refer to OET 65, FCC Part 1 and RSS 102	Complies

Note: Spurious emission results for 802.11 5GHz and RF4CE simultaneous operation is found in R101641.



#### MEASUREMENT UNCERTAINTIES

ISO/IEC 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 UKAS document LAB 34.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (power meter)	dBm	25 to 7000 MHz	± 0.52 dB
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 26500 MHz	± 2.5 dB
Redicted omission (field strength)	dDu\//m	25 to 1000 MHz	± 3.6 dB
Radiated emission (field strength)	dBµV/m	1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dBµV	0.15 to 30 MHz	± 2.4 dB

# EQUIPMENT UNDER TEST (EUT) DETAILS

#### GENERAL

The Pace Americas Inc. model HR54-700 is a set-top-box DVR that incorporates 802.11abgn 2x2 and 2.4GHz RF4CE radios. Since the EUT would be placed on a tabletop during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 12 Volts DC, 4.0 Amps. The electrical rating of the EUT power adapter is 120 Volts, 60 Hz, 1.1 Amps.

The sample was received on June 19, 2015 and tested on June 19, 22, 25, 26, 28, July 1, 2, 8, 9, 10, 11, 14, 16, and August 5, 2015 and May 24, 2016. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Pace Americas, Inc.	HR54-700	DVR	G54DA5DN000024	PGRHR54-2
DirecTV	EPS44R3-16	AC/DC Adapter	DD44B1425A0039	N/A

#### ANTENNA SYSTEM

The wifi and RF4CE radios use separate antennas. The peak gain for the WiFi antennas: 3.3 dBi (2.4GHz), 4.1 dBi (5GHz) The peak gain for the RF4CE antennas: 4.9 dBi (2.4GHz)

#### ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 33 cm wide by 25 cm deep by 5.5 cm high.

#### **MODIFICATIONS**

No modifications were made to the EUT during the time the product was at NTS Silicon Valley.

#### SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Dynex	DX-LCD19-09	Television	H8984JA055002	-
-	-	USB Memory Stick	None	-
Lacie	d2 Quadra	Sata Drive Enclosure	16551411120974GH	
			В	

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

Company	Model	Description	Serial Number	FCC ID
Linksys	BEFSR41	Cable/DSL Router	687F749FC378	-

Report Date: May 16, 2016

#### EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)			
TOIL	Connected To	Description	Shielded or Unshielded	Length(m)	
Power Input	AC Adpater	2 wire with ferrite	Shielded	0.7	
SATA	Sata Drive	Multiwire	Shielded	1.2	
USB	USB Memory Stick	4 wire	Shielded	1.2	
Ethernet	Remote Switch	Cat 5	Unshielded	7	
HDMI	Television	Multiwire with ferrite	Shielded	1.2	
Coaxial	Television	Coax	Shielded	1.2	
Digital Audio Out	Not connected (optical)	-	-	-	
A/V Out	Television	Multiwire	Shielded	1.0	
Satellite In	Unterminated	Coax	Shielded	7	
Temporary Serial Programming box	CN1510 connection on PCB	Multiwire	Unshielded	0.3	
Temporary Serial Programming box	Laptop	Multiwire	Shielded	1.5	

#### EUT OPERATION

During emissions testing the EUT was set to transmit continuously on the selected frequency, data rate, bandwidth, number of chains, power level and modulation as noted for each test using the serial port. The Ethernet port was in link state.

### **TEST SITE**

#### GENERAL INFORMATION

Final test measurements were taken at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with industry Canada.

Site	Designation / Registration Numbers		Location	
Sile	FCC	Canada	Location	
Chamber 3	US0027	2845B-3	41020 Davias David	
Chamber 4	US0027	2845B-4	41039 Boyce Road	
Chamber 5	US0027	2845B-5	Fremont, CA 94538-2435	
Chamber 7	US0027	2845B-7	CA 94330-2433	

ANSI C63.4 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4.

#### CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.10. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

#### RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4.

### **MEASUREMENT INSTRUMENTATION**

#### **RECEIVER SYSTEM**

An EMI receiver as specified in CISPR 16-1-1 is used for emissions measurements. The receivers used can measure 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 CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak 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. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

#### INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

#### LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.



#### FILTERS/ATTENUATORS

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

#### ANTENNAS

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

#### ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a nonconductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.10 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 as specified in ANSI C63.4. 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 exhibit of this report contains the list of test equipment used and calibration information.

## **TEST PROCEDURES**

#### EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.10, and the worst-case orientation is used for final measurements.

#### **CONDUCTED EMISSIONS**

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

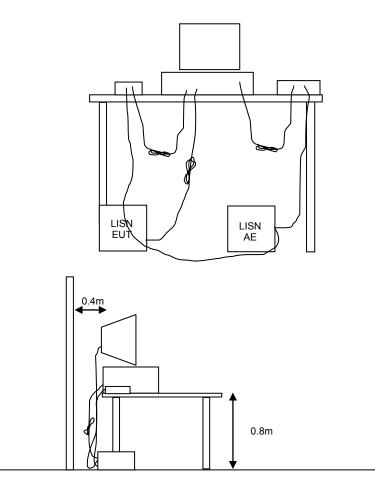


Figure 1 Typical Conducted Emissions Test Configuration



#### RADIATED EMISSIONS

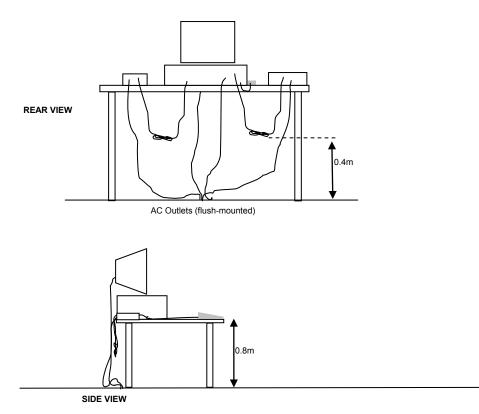
A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

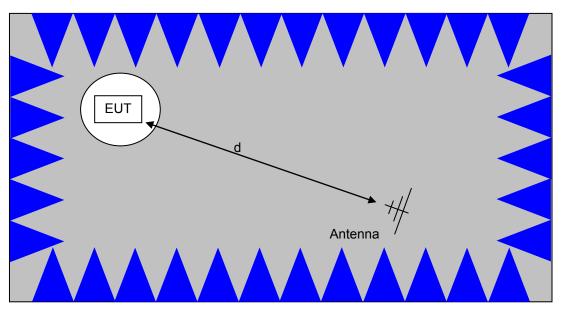
Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.

When testing above 18 GHz, the receive antenna is located at 1 meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



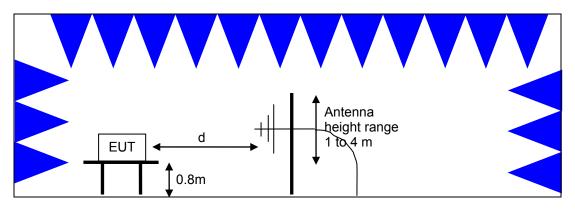


Typical Test Configuration for Radiated Field Strength Measurements



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

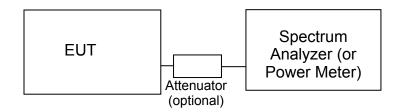
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



<u>Test Configuration for Radiated Field Strength Measurements</u> <u>Semi-Anechoic Chamber, Plan and Side Views</u>

#### CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements of power, bandwidth and power spectral density are performed, where possible, with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.



#### Test Configuration for Antenna Port Measurements

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and NTS Silicon Valley's test procedures for the type of radio being tested. When power measurements are made using a resolution bandwidth less than the signal bandwidth the power is calculated by summing the power across the signal bandwidth using either the analyzer channel power function or by capturing the trace data and calculating the power using software. In both cases the summed power is corrected to account for the equivalent noise bandwidth (ENBW) of the resolution bandwidth used.

If power averaging is used (typically for certain digital modulation techniques), the EUT is configured to transmit continuously. Power averaging is performed using either the built-in function of the analyzer or, if the analyzer does not feature power averaging, using external software. In both cases the average power is calculated over a number of sweeps (typically 100). When the EUT cannot be configured to continuously transmit then either the analyzer is configured to perform a gated sweep to ensure that the power is averaged over periods that the device is transmitting or power averaging is disabled and a max-hold feature is used.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

#### BANDWIDTH MEASUREMENTS

The 6dB, 20dB, 26dB and/or 99% signal bandwidth are measured using the bandwidths recommended by ANSI C63.10 and RSS GEN.

#### SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

#### CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(a), RSS GEN

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

#### GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands<sup>1</sup> (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

Report Date: May 16, 2016

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	2400/F <sub>KHz</sub> @ 300m	67.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 300m
0.490-1.705	24000/F <sub>KHz</sub> @ 30m	87.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

#### FCC 15.407 (a) OUTPUT POWER LIMITS

The table below shows the limits for output power and output power density.

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 – 5250	250 mW (24 dBm)	11 dBm/MHz
5250 - 5350	250 mW (24 dBm)	11 dBm/MHz
5470 - 5725	250 mW (24 dBm)	11 dBm/MHz
5725 – 5850	1 Watts (30 dBm)	30 dBm/500Hz

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi.

#### SPURIOUS EMISSIONS LIMITS – UNII and LELAN DEVICES

The spurious emissions limits for signals below 1GHz are the FCC/RSS-GEN general limits. For emissions above 1GHz, signals in restricted bands are subject to the FCC/RSS GEN general limits. All other signals have a limit of -27dBm/MHz, which is a field strength of 68.3dBuV/m/MHz at a distance of 3m. For devices operating in the 5725-5850Mhz bands under the LELAN/UNII rules, the limit within 10MHz of the allocated band is increased to -17dBm/MHz.

<sup>&</sup>lt;sup>1</sup> The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

#### SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

 $R_r - S = M$ 

where:

 $R_r = Receiver Reading in dBuV$ 

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

#### SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

 $F_{d} = 20*LOG_{10} (D_{m}/D_{s})$ 

where:

 $F_d$  = Distance Factor in dB  $D_m$  = Measurement Distance in meters  $D_s$  = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

 $F_d = 40*LOG_{10} (D_m/D_s)$ 

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

 $R_c = R_r + F_d$ 

and

 $M = R_c - L_s$ 

where:

 $R_r$  = Receiver Reading in dBuV/m

 $F_d$  = Distance Factor in dB

 $R_c$  = Corrected Reading in dBuV/m

Report Date: May 16, 2016

- $L_s$  = Specification Limit in dBuV/m
- M = Margin in dB Relative to Spec

### SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of d (meters) from the equipment under test:

 $E = \frac{1000000 \sqrt{30 P}}{d}$  microvolts per meter

where P is the eirp (Watts)

For a measurement at 3m the conversion from a logarithmic value for field strength (dBuV/m) to an eirp power (dBm) is -95.3dB.

# Appendix A Test Equipment Calibration Data

Manufacturer	Description	<u>Model</u>	<u>Asset #</u>	<b>Calibrated</b>	<u>Cal Due</u>
Radiated Emissions, EMCO Rohde & Schwarz	<b>1000 - 6,000 MHz, 19-Jun-15</b> Antenna, Horn, 1-18 GHz EMI Test Receiver, 20 Hz-40 GHz	3115 ESIB40 (1088.7490.40)	1561 2493	6/27/2014 1/23/2015	6/27/2016 1/23/2016
Radiated Emissions, EMCO Rohde & Schwarz	<b>1000 - 6,000 MHz, 22-Jun-15</b> Antenna, Horn, 1-18 GHz EMI Test Receiver, 20 Hz-40 GHz	3115 ESIB40 (1088.7490.40)	1561 2493	6/27/2014 1/23/2015	6/27/2016 1/23/2016
Radiated Emissions, EMCO Rohde & Schwarz	<b>1,000 - 6,500 MHz, 25-Jun-15</b> Antenna, Horn, 1-18 GHz EMI Test Receiver, 20 Hz-40 GHz	3115 ESIB40 (1088.7490.40)	1561 2493	6/27/2014 1/23/2015	6/27/2016 1/23/2016
Radiated Emissions, Hewlett Packard	<b>1,000 - 18,000 MHz, 26-Jun-15</b> Microwave Preamplifier, 1- 26.5GHz	8449B	785	10/31/2014	10/31/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/2/2015	5/2/2016
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	7/15/2014	7/15/2015
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	9/16/2014	9/16/2015
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	10/3/2014	10/3/2015
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Radiated Emissions, Hewlett Packard	<b>1000 - 18,000 MHz, 28-Jun-15</b> Microwave Preamplifier, 1- 26.5GHz	8449B	785	10/31/2014	10/31/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/2/2015	5/2/2016
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	7/15/2014	7/15/2015
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	9/16/2014	9/16/2015
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	10/3/2014	10/3/2015
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Radiated Emissions, Hewlett Packard	<b>18 - 40 GHz, 01-Jul-15</b> Head (Inc W1-W4, 3136) Purple		1772	6/19/2015	6/19/2016
A. H. Systems	Purple System Horn, 18- 40GHz	SAS-574, p/n: 2581	2160	8/11/2014	8/11/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	3/7/2015	3/7/2016
Radiated Emissions, Rohde & Schwarz	<b>1000 - 6,000 MHz, 01-Jul-15</b> EMI Test Receiver, 20 Hz-7	ESIB7	1538	12/20/2014	12/20/2015
EMCO	GHz Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016



Project number JD100795 Reissue Date: May 25, 2016

National Technical S	National Technical Systems - Silicon Valley Report Date: May 16, 2016		016 R	Project number eissue Date: Ma	
<u>Manufacturer</u> Bandedges, 1000 - 6	Description	<u>Model</u>	<u>Asset #</u>	<b>Calibrated</b>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1- 26.5GHz	8449B	870	2/20/2015	2/20/2016
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/20/2014	9/20/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/20/2014	12/20/2015
EMCO Micro-Tronics	Antenna, Horn, 1-18 GHz Band Reject Filter, 5470-5725 MHz	3115 BRC50704-02	1561 2240	6/27/2014 9/16/2014	6/27/2016 9/16/2015
Radiated Emissions, Hewlett Packard	, <b>1000 - 40,000MHz, 02-Jul-15</b> Microwave Preamplifier, 1- 26.5GHz	8449B	870	2/20/2015	2/20/2016
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	6/17/2014	7/17/2015
Hewlett Packard	SpecÁn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/20/2014	9/20/2015
EMCO A. H. Systems	Àntenna, Horn, 1-18 GHz Blue System Horn, 18-40GHz	3115 SAS-574, p/n: 2581	1561 2159	6/27/2014 9/2/2014	6/27/2016 9/2/2015
Radiated Emissions, EMCO	, <b>1,000 - 26,000 MHz, 08-Jul-15</b> Antenna, Horn, 1-18 GHz	3115	487	7/29/2014	7/29/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	8/4/2014	8/4/2015
Hewlett Packard	Microwave Preamplifier, 1- 26.5GHz	8449B	2199	2/20/2015	2/20/2016
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	3/7/2015	3/7/2016
	, 11000 - 25000 MHz, 09-Jul-15				
EMCO Hewlett Packard	Antenna, Horn, 1-18 GHz Microwave Preamplifier, 1- 26.5GHz	3115 8449B	487 785	7/29/2014 10/31/2014	7/29/2016 10/31/2015
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	6/5/2015	6/5/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	8/4/2014	8/4/2015
A. H. Systems	Spare System Horn, 18- 40GHz	SAS-574, p/n: 2581	2162	7/24/2014	7/24/2015
<b>Conducted Emissior</b> EMCO Rohde & Schwarz Rohde & Schwarz	ns - AC Power Ports, 09-Jul-15 LISN, 10 kHz-100 MHz Pulse Limiter EMI Test Receiver, 20 Hz-7 GHz	3825/2 ESH3 Z2 ESIB7	1293 1401 1756	6/2/2015 5/14/2015 6/20/2015	6/2/2016 5/14/2016 6/20/2016
Radiated Emissions, EMCO Micro-Tronics	, <b>1000 - 25,000MHz, 10-Jul-15</b> Antenna, Horn, 1-18 GHz Band Reject Filter, 5470-5725	3115 BRC50704-02	487 1681	7/29/2014 8/13/2014	7/29/2016 8/13/2015
Micro-Tronics	MHz Band Reject Filter, 2400-2500	BRM50702-02	1683	8/4/2014	8/4/2015
Hewlett Packard	MHz Microwave Preamplifier, 1- 26.5GHz	8449B	2199	2/20/2015	2/20/2016



Project number JD100795 Reissue Date: May 25, 2016

	Re	port Date: May 16, 2	016 R	eissue Date: Ma	y 25, 2016
<u>Manufacturer</u> Hewlett Packard	<u>Description</u> SpecAn 9 kHz - 40 GHz, (SA40) Purple	<u>Model</u> 8564E (84125C)	<u>Asset #</u> 2415	<u>Calibrated</u> 3/7/2015	<u>Cal Due</u> 3/7/2016
Radio Antenna Port	(Power and Spurious Emissio	ons), 14-Jul-15			
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/29/2014	7/29/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/20/2014	12/20/2015
Frequency Stability,	0				
Agilent Technologies	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	22-Jun-15	6/22/16
Watlow	Temp Chamber (w/ F4 watlow Controller)	96A0	2171	14-Jul-15	7/14/16



# Appendix B Test Data

T101679 Pages 27 – 122



# EMC Test Data

Client:	Pace Americas, Inc.	Job Number:	J98591
Product	HR54-700	T-Log Number:	T101679
System Configuration:		Project Manager:	Irene Radamacher
Contact:	Mark Rieger	Project Coordinator:	
Emissions Standard(s):	FCC 15.247, 15.407	Class:	N/A
Immunity Standard(s):		Environment:	Radio
Immunity Standard(s):		Environment:	Radio

# **EMC Test Data**

For The

# Pace Americas, Inc.

Product

HR54-700

Date of Last Test: 5/24/2016

# EMC Test Data

	LENGINEER SUCCESS		
Client:	Pace Americas, Inc.	Job Number:	J98591
Model:	HD54 700	T-Log Number:	T101679
	11534-700	Project Manager:	Irene Radamacher
Contact:	Mark Rieger	Project Coordinator:	-
Standard:	FCC 15.247, 15.407	Class:	N/A

# RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions

### Test Specific Details

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

## General Test Configuration

TS

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:	Temperature: 25	
	Rel. Humidity:	35 %

## Summary of Results

Mode	Channel	Target Setting	Passing Setting	Test Performed	Limit	Result / Margin
dwith Modes	i					
а	36 - 5180MHz	17	17	Restricted Band Edge at 5150 MHz	15.209	49.0 dBµV/m @ 5150.0 MHz (-5.0 dB)
а	64 - 5320MHz	18	18	Restricted Band Edge at 5350 MHz	15.209	47.7 dBµV/m @ 5350.0 MHz (-6.3 dB)
а	100 - 5500MHz	20	20	Restricted Band Edge at 5460 MHz	15.209	47.9 dBµV/m @ 5458.6 MHz (-6.3 dB)
а	100 - 5500MHz	20	20	Band Edge 5460 - 5470 MHz	15E	65.8 dBµV/m @ 5468.3 MHz (-2.5 dB)
а	140 - 5700MHz	20	19	Band Edge 5725MHz	15E	52.2 dBµV/m @ 5725.0 MHz (-1.8 dB)
а	149 - 5745MHz	16	16	Band Edge 5715MHz	15E	58.7 dBµV/m @ 5705.6 MHz (-9.6 dB)
а	149 - 5745MHz	16	16	Band Edge 5725MHz	15E	70.2 dBµV/m @ 5724.2 MHz (-8.1 dB)
а	165 - 5825MHz	19	19	Band Edge 5850MHz	15E	66.9 dBµV/m @ 5851.1 MHz (-11.4 dB)
а	165 - 5825MHz	19	19	Band Edge 5860MHz	15E	60.9 dBµV/m @ 5861.0 MHz (-7.4 dB)
	dwith Modes a a a a a a a a a a	dwith Modes       36 - 5180MHz       a     36 - 5180MHz       a     64 - 5320MHz       a     100 - 5500MHz       a     100 - 5500MHz       a     140 - 5700MHz       a     149 - 5745MHz       a     165 - 5825MHz	Mode     Channel     Setting       dwith Modes     36 - 5180MHz     17       a     36 - 5180MHz     17       a     64 - 5320MHz     18       a     100 - 5500MHz     20       a     100 - 5500MHz     20       a     140 - 5700MHz     20       a     149 - 5745MHz     16       a     165 - 5825MHz     19       a     165 - 19     19	Mode     Channel     Setting     Setting       a     36 - 5180MHz     17     17       a     64 - 5320MHz     18     18       a     100 - 5500MHz     20     20       a     100 - 5500MHz     20     20       a     100 - 5500MHz     20     20       a     140 - 5700MHz     20     19       a     149 - 5745MHz     16     16       a     165 - 5825MHz     19     19	Mode     Channel     Setting     Setting     Setting     Test Performed       a     36 - 5180MHz     17     17     Restricted Band Edge at 5150 MHz       a     64 - 5320MHz     18     18     Restricted Band Edge at 5350 MHz       a     100 - 5500MHz     20     20     Restricted Band Edge at 5350 MHz       a     100 - 5500MHz     20     20     Restricted Band Edge at 5460 MHz       a     100 - 5500MHz     20     20     Band Edge 5460 - 5470 MHz       a     140 - 5700MHz     20     19     Band Edge 5725MHz       a     149 - 5745MHz     16     16     Band Edge 5715MHz       a     149 - 5745MHz     16     16     Band Edge 5725MHz       a     149 - 5745MHz     16     16     Band Edge 5725MHz       a     149 - 5745MHz     16     16     Band Edge 5725MHz       a     165 - 5825MHz     19     19     Band Edge 5850MHz       a     165 - 5825MHz     19     19     Band Edge 5860MHz	Mode     Channel     Setting     Setting     Test Performed     Limit       a     36 - 5180MHz     17     17     Restricted Band Edge at 5150 MHz     15.209       a     64 - 5320MHz     18     18     Restricted Band Edge at 5350 MHz     15.209       a     100 - 5500MHz     20     20     Restricted Band Edge at 5460 MHz     15.209       a     100 - 5500MHz     20     20     Restricted Band Edge at 5460 MHz     15.209       a     100 - 5500MHz     20     20     Restricted Band Edge at 5460 MHz     15.209       a     140 - 5700MHz     20     20     Band Edge 5725MHz     15E       a     149 - 5745MHz     16     16     Band Edge 5715MHz     15E       a     149 - 5745MHz     16     16     Band Edge 5725MHz     15E       a     149 - 5745MHz     16     16     Band Edge 5725MHz     15E       a     165 - 5825MHz     19     19     Band Edge 5850MHz     15E       a     165 - 5825MHz     19     19     Band Edge 5850MHz

Client:	Pace Amer	r success				Job Number:	J98591
						T-Log Number:	
Model:	HR54-700						Irene Radamacher
Contact	Mark Riege	r				Project Coordinator:	
	-					-	
Standard:	FCC 15.24	7, 15.407				Class:	IN/A
Run #	Mode	Channel	Target Setting	Passing Setting	Test Performed	Limit	Result / Margin
5	n20	36 - 5180MHz	20	18	Restricted Band Edge at 5150 MHz	15.209	52.6 dBµV/m @ 5150 MHz (-1.4 dB)
6	n20	64 - 5320MHz	20	20	Restricted Band Edge at 5350 MHz	15.209	51.6 dBµV/m @ 535 MHz (-2.4 dB)
	n20	100 - 5500MHz	20	20	Restricted Band Edge at 5460 MHz	15.209	48.3 dBµV/m @ 5460 MHz (-5.7 dB)
7	n20	100 - 5500MHz	20	20	Band Edge 5460 - 5470 MHz	15E	68.0 dBµV/m @ 5466 MHz (-0.3 dB)
	n20	140 - 5700MHz	20	19	Band Edge 5725MHz	15E	52.5 dBµV/m @ 572 MHz (-1.5 dB)
	n20	149 - 5745MHz	16	16	Band Edge 5715MHz	15E	58.1 dBµV/m @ 570 MHz (-10.2 dB)
8	n20	149 - 5745MHz	16	16	Band Edge 5725MHz	15E	49.9 dBµV/m @ 572 MHz (-4.1 dB) 67.4 dBµV/m @ 585
	n20	165 - 5825MHz 165 -	19	19	Band Edge 5850MHz	15E	MHz (-0.9 dB) 60.4 dBµV/m @ 586
	n20	5825MHz	19	19	Band Edge 5860MHz	15E	MHz (-7.9 dB)
MHz Ban	dwith Modes						
9	n40	38 - 5190MHz	17	16	Restricted Band Edge at 5150 MHz	15.209	52.4 dBµV/m @ 515 MHz (-1.6 dB)
10	n40	62 - 5310MHz	19	18	Restricted Band Edge at 5350 MHz	15.209	72.5 dBµV/m @ 535 MHz (-1.5 dB)
	n40	102 - 5510MHz	19	17	Restricted Band Edge at 5460 MHz	15.209	46.9 dBµV/m @ 546 MHz (-7.1 dB)
11	n40	102 - 5510MHz	19	17	Band Edge 5460 - 5470 MHz	15E	65.2 dBµV/m @ 547 MHz (-3.1 dB)
	n40	134 - 5670MHz	20	20	Band Edge 5725MHz	15E	61.6 dBµV/m @ 572 MHz (-6.7 dB)
	n40	151 - 5755MHz	15	15	Band Edge 5715MHz	15E	62.2 dBµV/m @ 571 MHz (-6.1 dB)
12	n40	151 - 5755MHz 159 -	15	15	Band Edge 5725MHz	15E	66.8 dBµV/m @ 572 MHz (-11.5 dB) 61.6 dBµV/m @ 586
	n40	5795MHz 159 -	20	20	Band Edge 5850MHz	15E	MHz (-6.7 dB) 62.9 dBµV/m @ 585
	n40	5795MHz	20	20	Band Edge 5860MHz	15E	MHz (-15.4 dB)

	E ENGINEER SUCCESS	EMO	C Test Data
Client:	Pace Americas, Inc.	Job Number:	J98591
Model	HR54-700	T-Log Number:	T101679
MOUEI.	11/04-700	Project Manager:	Irene Radamacher
Contact:	Mark Rieger	Project Coordinator:	-
Standard:	FCC 15.247, 15.407	Class:	N/A

# 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.

# Procedure Comments:

Measurements performed in accordance with FCC KDB 789033

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mb/s	0.98	Yes	1.443	0	0	10
n20	MCS0	0.99	Yes	1.330	0	0	10
n40	MCS0	0.98	Yes	1.330	0	0	10

# Sample Notes

Sample S/N: G54DA5DN000024 Driver: 5.99 RC 188.10 Antenna: Internal

# Sample Notes (5/24/16)

Sample S/N: G54DA5DN000041 Driver: 5.99.188.21 Antenna: Internal

## Measurement Specific Notes:

Note 3:	-
Note 6:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.

HR54-700 Mark Rieger			Pace Americas, Inc.							
Mark Rieger						T-Log Number: T101679				
_						-	-	Irene Radamacher		
						Project	Coordinator:	-		
FCC 15.247	, 15.407						Class:	N/A		
diated Ban	ledae Measi	irements 5	150-5250MF	17						
				C						
est Location:	Chamber 5			E	UT Voltage:	120V / 60H	Z			
36 - 5180 M	Hz									
1 (0x01)	-									
а										
6 Mbps										
Band Edae S	Signal Radia	ted Field Sti	rength							
requency Level Po				Detector	Azimuth	Height	Comments			
dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters				
	V									
80.0 -	c	prot sover these	hummen h					///w//////////////////////////////////		
	Pate of Test: st Engineer: st Location: 36 - 5180 M 1 (0x01) a 6 Mbps Pand Edge S Level dBµV/m 49.0 67.4 47.1 62.5 MHz; VB 10 80.0 - 50.0 - 50.0 -	Pate of Test: 6/22/2015 0 st Engineer: John Caizzi st Location: Chamber 5 36 - 5180 MHz 1 (0x01) a 6 Mbps 2and Edge Signal Radia Level Pol dBµV/m v/h 49.0 H 67.4 H 47.1 V 62.5 V MHz; VB 10 Hz Blue = 80.0 - 50.0 - 50.0 - 50.0 -	Pate of Test: 6/22/2015 0:00 st Engineer: John Caizzi st Location: Chamber 5 36 - 5180 MHz 1 (0x01) a 6 Mbps 2and Edge Signal Radiated Field Str Level Pol FCC 1 dBµV/m v/h Limit 49.0 H 54.0 67.4 H 74.0 47.1 V 54.0 62.5 V 74.0 MHz; VB 10 Hz Blue = pk, black = 4 80.0 - 70.0 - 60.0 - 50.0 -	Date of Test: 6/22/2015 0:00     st Engineer: John Caizzi     st Location: Chamber 5     36 - 5180 MHz     1 (0x01)     a     6 Mbps     2and Edge Signal Radiated Field Strength     Level   Pol     FCC 15.209     dBµV/m   v/h     49.0   H     54.0   -5.0     67.4   H     74.0   -6.6     47.1   V     50.0   50.0	st Engineer: John Caizzi Con st Location: Chamber 5 E 36 - 5180 MHz 1 (0x01) a 6 Mbps 2and Edge Signal Radiated Field Strength Level Pol FCC 15.209 Detector dBµV/m v/h Limit Margin Pk/QP/Avg 49.0 H 54.0 -5.0 AVG 67.4 H 74.0 -6.6 PK 47.1 V 54.0 -6.9 AVG 62.5 V 74.0 -11.5 PK MHz; VB 10 Hz Blue = pk, black = avg H 80.0 - 70.0 - 60.0 - 50.0 -	hate of Test: 6/22/2015 0:00   Config. Used:     st Engineer: John Caizzi   Config Change:     st Location: Chamber 5   EUT Voltage:     36 - 5180 MHz   1 (0x01)     a   6 Mbps     2and Edge Signal Radiated Field Strength     Level   Pol     FCC 15.209   Detector     Azimuth     dBµV/m   v/h     Limit   Margin     Pk/QP/Avg   degrees     49.0   H     54.0   -5.0     AVG   76     67.4   H     74.0   -6.6     PK   76     47.1   V     50.0   Standard And And And And And And And And And An	hate of Test: 6/22/2015 0:00   Config. Used: 1     st Engineer: John Caizzi   Config Change: none     st Location: Chamber 5   EUT Voltage: 120V / 60H:     36 - 5180 MHz   1 (0x01)     a   6 Mbps     2and Edge Signal Radiated Field Strength     Level   Pol     FCC 15.209   Detector     Azimuth   Height     dBµV/m   v/h     Limit   Margin     Pk/QP/Avg   degrees     49.0   H     54.0   -5.0     AVG   76     1.22   67.4     47.1   V     54.0   -6.9     AVG   233     1.59     62.5   V     74.0   -11.5     PK   233     1.59     60.0   -     60.0   -     60.0   -     60.0   -     60.0   -     60.0   -     60.0   -     60.0   -     60.0   - <t< td=""><td>hate of Test: 6/22/2015 0:00   Config. Used: 1     st Engineer: John Caizzi   Config Change: none     st Location: Chamber 5   EUT Voltage: 120V / 60Hz     36 - 5180 MHz   1 (0x01)     a   6 Mbps     and Edge Signal Radiated Field Strength     Level   Pol     FCC 15.209   Detector     Agu/Vm   v/h     Limit   Margin     Pk/QP/Avg   degrees     MHz   76     49.0   H     54.0   -5.0     AVG   76     1.22   -     47.1   V     54.0   -6.9     AVG   233     1.59     62.5   V     74.0   -11.5     PK   233     1.59     MHz; VB 10 Hz   Blue = pk, black = avg     60.0   -     -   -     -   -     -   -     -   -     -   -     -   -     -   -</td></t<>	hate of Test: 6/22/2015 0:00   Config. Used: 1     st Engineer: John Caizzi   Config Change: none     st Location: Chamber 5   EUT Voltage: 120V / 60Hz     36 - 5180 MHz   1 (0x01)     a   6 Mbps     and Edge Signal Radiated Field Strength     Level   Pol     FCC 15.209   Detector     Agu/Vm   v/h     Limit   Margin     Pk/QP/Avg   degrees     MHz   76     49.0   H     54.0   -5.0     AVG   76     1.22   -     47.1   V     54.0   -6.9     AVG   233     1.59     62.5   V     74.0   -11.5     PK   233     1.59     MHz; VB 10 Hz   Blue = pk, black = avg     60.0   -     -   -     -   -     -   -     -   -     -   -     -   -     -   -		

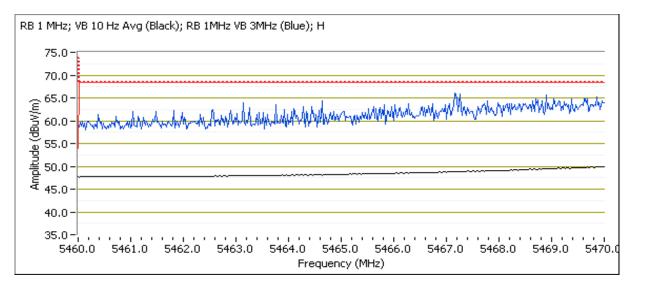
Config. Used: onfig Change: EUT Voltage: UT Voltage: Azimuth degrees 70	Proj Project : 1 : none	Job Number: J98591 -Log Number: T101679 ject Manager: Irene Radamacher t Coordinator: - Class: N/A 
Azimuth degrees	Project Project : 1 : none : 120V / 60H	ject Manager: Irene Radamacher t Coordinator: - Class: N/A
Azimuth degrees	: 1 : none : 120V / 60H	Class: N/A
Azimuth degrees	: none : 120V / 60H Height	łz
Azimuth degrees	: none : 120V / 60H Height	
Azimuth degrees	: none : 120V / 60H Height	
Azimuth degrees	: none : 120V / 60H Height	
Azimuth degrees 70	Height	
degrees 70		Comments
70	motore	
70	1.0 1.0	POS; RB 1 MHz; VB: 10 Hz POS; RB 1 MHz; VB: 3 MHz
63	1.1	POS; RB 1 MHz; VB: 10 Hz
63	1.1	POS; RB 1 MHz; VB: 3 MHz
70 53		<u>mamaliniji (mamalini) (mama</u>
	~	~ 70 5375 5

	Pace Americ	cas, Inc.						Job Number:	
Model:	HR54-700							Log Number:	
								2	Irene Radamacher
	Mark Rieger						Project	Coordinator:	-
Standard:	FCC 15.247	, 15.407						Class:	N/A
C Te	adiated Band Date of Test: est Engineer: est Location:	6/22/2015 0 Rafael Vare	:00 las	470-5725Mł	Con Con	onfig. Used: fig Change: UT Voltage:	none	z	
x Chain: Iode: )ata Rate:	100 - 5500M 1 (0x01) a 6 Mbps Band Edge S		ted Field St	renath					
Frequency	Level	Pol		5.E	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5458.560	47.9	Н	54.0	-6.3	AVG	90	1.0		MHz; VB: 10 Hz
5454.550 5426.970	60.4 47.0	H V	74.0 54.0	-13.6 -7.0	PK AVG	90 66	1.0 1.0		MHz; VB: 3 MHz MHz; VB: 10 Hz
5425.770	58.7	V	74.0	-15.3	PK	66	1.0		MHz; VB: 3 MHz
(m//m)	70.0-				rpmmurvi	hunun mini		Malutan dan dan dan dan dan dan dan dan dan d	trongotowit

	NTS He engineer success	EM	C Test Data
Client:	Pace Americas, Inc.	Job Number:	J98591
Madal	HR54-700	T-Log Number:	T101679
woder.	HK34-700	Project Manager:	Irene Radamacher
Contact:	Mark Rieger	Project Coordinator:	-
Standard:	FCC 15.247, 15.407	Class:	N/A

#### 5470 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15	i.Ε	Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5468.320	65.8	Н	68.3	-2.5	PK	90	1.0	POS; RB 1 MHz; VB: 3 MHz
5468.220	64.8	V	68.3	-3.5	PK	66	1.0	POS; RB 1 MHz; VB: 3 MHz



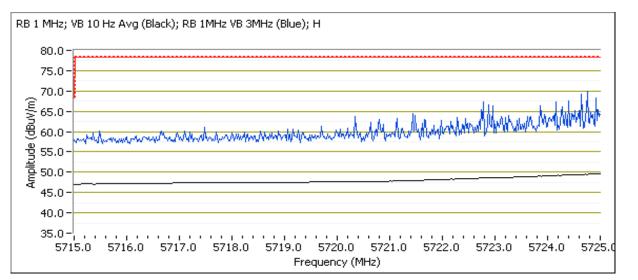
Client:	Pace Americ	as, Inc.					Job Number: J98591			
Madal	HR54-700						T-Log Number: T101679			
woder.	HK34-700						Project Manager: Irene Radamache			
Contact:	Mark Rieger						Project Coordinator: -			
Standard:	FCC 15.247,	15.407						Class: N/A		
Channel: Tx Chain: Aode: Data Rate:	140 - 5700M 1 (0x01) a 6 Mbps		tod Field St							
Frequency	Band Edge Si Level	<i>ignal Radia</i> Pol		<i>rength</i> 5.E	Detector	Azimuth	Height	Comments		
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters			
wr setting		V/11	Lutin	margin	i iv sei <i>ir</i> vy	uogrooo	motors			
5725.000	52.2	Н	54.0	-1.8	AVG	91	1.0	POS; RB 1 MHz; VB: 10 Hz		
5726.120	68.9	Н	74.0	-5.1	PK	91	1.0	POS; RB 1 MHz; VB: 3 MHz		
5725.000	48.3	V	54.0	-5.7	AVG	228	1.8	POS; RB 1 MHz; VB: 10 Hz		
5727.080	63.2	V	74.0	-10.8	PK	228	1.8	POS; RB 1 MHz; VB: 3 MHz		
Amplitude (dBuV/m)	60.0 - 55.0 - 50.0 - 45.0 - 40.0 - 35.0 -		····							
	5725	5730	5735	5740	) 5749 Frequency		50 5	755 5760 5765		

Client:	Pace Americ	cas, Inc.						Job Number: J98591
Madalı							T-	Log Number: T101679
Model:	HR54-700						Proj	ect Manager: Irene Radamacher
Contact:	Mark Rieger	,					Project	t Coordinator: -
Standard:	FCC 15.247	, 15.407						Class: N/A
		dedge Measu 6/22/2015 0		/25-5850MH		onfig. Used:	1	
		Rafael Varel				fig Change:		
		FT Chambe				UT Voltage:		Z
<b>.</b>								
	149 - 5745N 1 (0x01)	lHz				78.3		
	Vode: a 68.3							
Data Rate:	6 Mbps					00.0		
	·							
		<i>Signal Radia</i>		rength 15.209	Detector	A —lines stile	11-1-1-1-1	Ota
Frequency MHz	Level dBµV/m	Pol v/h	Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
5705.620	58.7	H	68.3	-9.6	PK	89	1.1	POS; RB 1 MHz; VB: 3 MHz
5712.720	57.2	V	68.3	-11.1	PK	233	1.6	POS; RB 1 MHz; VB: 3 MHz
(dBuV/m)	75.0 - 70.0 - 65.0 - 60.0 - 55.0 - 50.0 -	valua da	whithy who		Wahandhanah	······································	dage and a	ullunanalan an a
	45.0- 40.0- 35.0- 5685.0	5687.5 569	0.0 5692.5	5 5695.0 5	697.5 5700. Frequency	0 5702.5	5705.0 57	07.5 5710.0 5712.5 5715.0

	E ENGINEER SUCCESS	EMO	C Test Data
Client:	Pace Americas, Inc.	Job Number:	J98591
Model	HR54-700	T-Log Number:	T101679
wouer.	HK34-700	Project Manager:	Irene Radamacher
Contact:	Mark Rieger	Project Coordinator:	-
Standard:	FCC 15.247, 15.407	Class:	N/A

### *5725 MHz Band Edge Signal Radiated Field Strength*

Frequency	Level	Pol	15	.Ε	Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5724.180	70.2	Н	78.3	-8.1	PK	89	1.1	POS; RB 1 MHz; VB: 3 MHz
5724.280	64.4	V	78.3	-13.9	PK	233	1.6	POS; RB 1 MHz; VB: 3 MHz

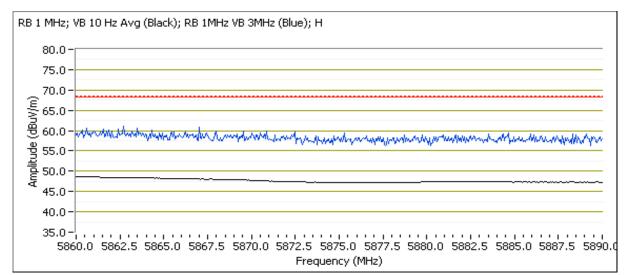


		CCESS							C Test Dat
Client:	Pace Americas,	Inc.						Job Number:	
Model:	HR54-700							Log Number:	Irene Radamacher
Contact:	Mark Rieger							Coordinator:	
	FCC 15.247, 15	407					Појесс	Class:	
annel: Chain: ode: ta Rate:	165 - 5825MHz 1 (0x01) a 6 Mbps	ol Dodiot	ind Field St	angth					
equency	Band Edge Signa Level	<i>al Radiat</i> Pol	<u>ea Fiela Str</u> 15		Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
351.120	66.9	Н	78.3	-11.4	PK	89	1.0	POS; RB 1 I	MHz; VB: 3 MHz
355.340	57.0	V	78.3	-21.3	PK	220	1.3	POS; RB 1 I	MHz; VB: 3 MHz
itude	45.0 - 40.0 - 35.0 -				54.0 5855			-~-	5859.0 5860.0

	ATS	EMC Test Data			
Client:	Pace Americas, Inc.	Job Number:	J98591		
Madal	HR54-700	T-Log Number:	T101679		
MOUEI.	HK34-700	Project Manager:	Irene Radamacher		
Contact:	Mark Rieger	Project Coordinator:	-		
Standard:	FCC 15.247, 15.407	Class:	N/A		

#### 5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15	i.E	Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5860.960	60.9	Н	68.3	-7.4	PK	89	1.0	POS; RB 1 MHz; VB: 3 MHz
5877.500	57.1	V	68.3	-11.2	PK	220	1.3	POS; RB 1 MHz; VB: 3 MHz



		SUCCESS							C Test Da
Client:	Pace Ameri	cas, Inc.						Job Number:	J98591
Model	HR54-700						T-	Log Number:	T101679
wouer.	1154-700						Proj	ect Manager:	Irene Radamacher
Contact:	Mark Rieger	•					Project	Coordinator:	-
Standard:	FCC 15.247	, 15.407						Class:	N/A
E Te Te	Date of Test: st Engineer:	dedge Meası 6/22/2015 0 Rafael Varel FT Chamber Hz	:00 las	150-5250MF	C Cor	onfig. Used: fig Change: UT Voltage:	none	Z	
/lode: Data Rate:	n20 MCS0								
		Signal Radia			Dutation	A	11.1.1.1		
Frequency MHz	Level dBµV/m	Pol v/h	Limit	15.209 Margin	Detector Pk/QP/Avg	Azimuth	Height	Comments	
wr setting		V/f1	LIITIIL	Margin	PK/QP/Avg	degrees	meters		
5150.000	52.6	Н	54.0	-1.4	AVG	88	1.0	POS: RB 1 I	MHz; VB: 10 Hz
5148.400	69.3	H	74.0	-4.7	PK	88	1.0		MHz; VB: 3 MHz
5149.360	49.3	V	54.0	-4.7	AVG	41	2.3		MHz; VB: 10 Hz
5149.440	65.9	V	74.0	-8.1	PK	41	2.3	POS; RB 1 I	MHz; VB: 3 MHz
	75.0 -	Hz Avg (Bla السبيرين		www.m		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	londerrandor 	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	5145 5150

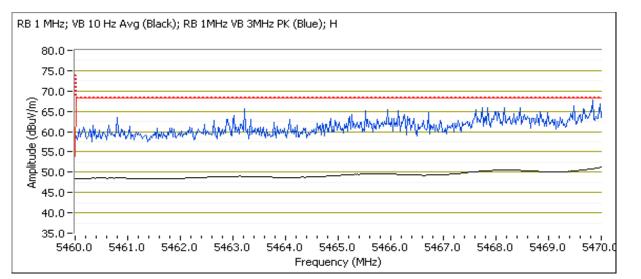
Client	Pace Americ	SUCCESS						Job Number:	.198591
								Log Number:	
Model:	HR54-700							-	Irene Radamacher
Contact:	Mark Rieger						-	Coordinator:	
	FCC 15.247							Class:	
		,							
Run #6: Ra	diated Band	ledge Meas	urements, 5	250-5350MF	łz				
I	Date of Test:	6/22/2015 0	:00		C	onfig. Used:			
	est Engineer:					fig Change:		_	
10	est Location:	FIChambe	r #5		E	UT Voltage:	120V / 60H	Z	
Channel:	64 - 5320MH	łz							
Tx Chain:	2x2								
Node:	n20								
Data Rate:	MCS0								
5350 MH7 P	Band Edge S	ianal Radia	ted Field Sti	enath					
Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5350.960	51.6	Н	54.0	-2.4	AVG	79	2.6		MHz; VB: 10 Hz
5350.560	67.3	H	74.0	-6.7	PK	79	2.6		MHz; VB: 3 MHz
5350.400 5351.120	49.1 60.7	V V	54.0 74.0	-4.9 -13.3	AVG PK	223 223	1.5 1.5		MHz; VB: 10 Hz
5551.120	00.7	V	74.0	-13.3	FN	223	1.0	FU3, ND 11	MHz; VB: 3 MHz
RB 1	MHz; VB 10	Hz Avg (Bla	ck); RB 1MH	z VB 3MHz F	YK (Blue); H				
	75.0-								
	70.0-								
Î	65.0-	Mr. we							
- Nng	60.0-	Mr. And	HAMAMAA	month	atte synnes therewy of	Mm Mille	Marshard	L. Assurable	Winner
- I I	55.0-						and the second sec	and an Additional	with the second
0	50.0-	~ -							
litude		~ _ ~	~~~~						
Amplitude	45.0-								
Amplitude (dBuV/m)									
Amplitude	45.0-								
Amplitude	40.0- 35.0-								
Amplitude	40.0-	5355	5360	5365	5 5370 Frequency	) 533	75 5	380 5	385 5390

Client:	Pace Ameri	cas, Inc.						Job Number:	J98591
Model	HR54-700							Log Number:	
							-	-	Irene Radamacher
	Mark Riege						Project	Coordinator:	-
Standard:	FCC 15.247	7, 15.407						Class:	N/A
C Te	Date of Test: st Engineer:	dedge Meas 6/22/2015 0 Rafael Vare FT Chambe	.00 as	470-5725MF	C Con	onfig. Used: fig Change: UT Voltage:	none	Z	
Tx Chain: Mode: Data Rate:	100 - 5500M 2x2 n20 MCS0	/lHz Signal Radia	tod Fiold St	ronath		Ū			
Frequency	Level	Pol		15.209	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5460.000	48.3	Н	54.0	-5.7	AVG	270	1.2		MHz; VB: 10 Hz
5449.420	.420 62.1 H		74.0	-11.9	PK	270	1.2		MHz; VB: 3 MHz
5427.210 5459.280	46.9 58.4	V	54.0 74.0	-7.1 -15.6	AVG PK	72 72	1.0 1.0		MHz; VB: 10 Hz MHz; VB: 3 MHz
(m//mb)	80.0 - 75.0 - 70.0 - 65.0 -	) Hz Avg (Bla				11-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	nd Margard	All work Market	www.hlinghand

	NTS The Engineer Success	EM	C Test Data
Client:	Pace Americas, Inc.	Job Number:	J98591
Madal	HR54-700	T-Log Number:	T101679
Model.	NR34-700	Project Manager:	Irene Radamacher
Contact:	Mark Rieger	Project Coordinator:	-
Standard:	FCC 15.247, 15.407	Class:	N/A

### *5470 MHz Band Edge Signal Radiated Field Strength*

Frequency	Level	Pol	15	j.E	Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5468.520	68.0	Н	68.3	-0.3	PK	270	1.2	POS; RB 1 MHz; VB: 3 MHz
5469.300	66.3	V	68.3	-2.0	PK	72	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Pace Americ	as. Inc.						Job Number: J98591
		,						Log Number: T101679
Model:	HR54-700							ect Manager: Irene Radamacher
Contact <sup>.</sup>	Mark Rieger							Coordinator: -
	FCC 15.247,							Class: N/A
channel: x Chain: lode: 0ata Rate:	140 - 5700M 2x2 n20 MCS0	Hz						
5725 MHz E	Band Edge S							
Frequency		Pol		5.E	Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
<u>wr setting</u> 5725.080	) = 19 52.5	Н	54.0	-1.5	AVG	292	1.0	POS; RB 1 MHz; VB: 10 Hz
5725.080	52.5 68.9	<u>н</u> Н	54.0 74.0	-1.5 -5.1	PK	292	1.0	POS; RB 1 MHz; VB: 10 Hz POS; RB 1 MHz; VB: 3 MHz
5725.000	50.7	V	54.0	-3.3	AVG	62	2.2	POS; RB 1 MHz; VB: 10 Hz
5725.000	65.6	V	74.0	-8.4	PK	62	2.2	POS; RB 1 MHz; VB: 3 MHz
Amplitude (dBuV/m)	45.0 - 40.0 - 35.0 -	~~~	~~~~~					
	5725	5730	5735	574	) 5749 Frequency		50 5	755 5760 5765

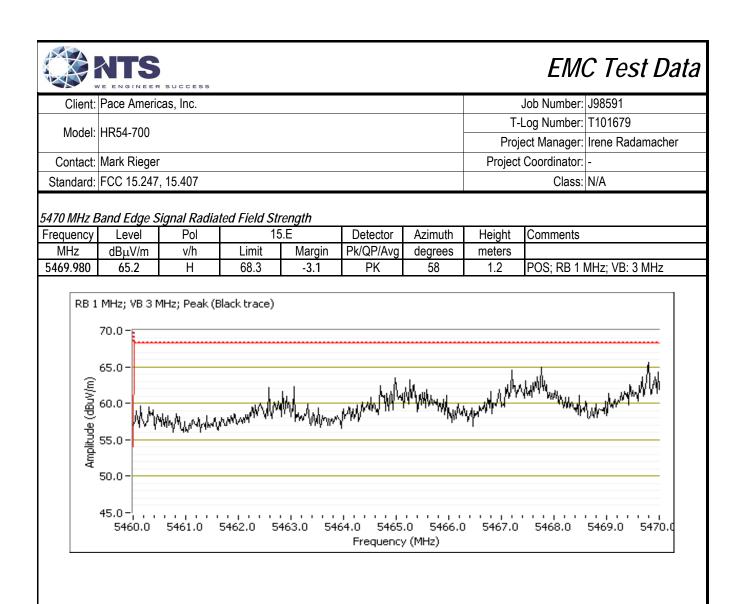
Client:	Pace Americ	cas, Inc.						Job Number:	J98591
Madalı							T-	Log Number:	T101679
Model:	HR54-700						Proj	ect Manager:	Irene Radamacher
Contact:	Mark Rieger						Project	Coordinator:	-
Standard:	FCC 15.247	, 15.407						Class:	N/A
] Te	adiated Banc Date of Test: est Location:	6/24/2015 Chamber #5		725-5850MH	Te	st Engineer: UT Voltage:			
hannel: Tx Chain:	149 - 5745N 2x2	IHZ			Data Rate:	MCS0			
Mode:					Setting:	16			
woue.	1120				oeung.	10			
	Band Edge S	ignal Radia	ted Field Sti	rength					
requency	Level	Pol	FCC	15.209	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5705.860	58.1	H	68.3	-10.2	PK	280	1.0		MHz; VB: 3 MHz
5695.220	56.7	V	68.3	-11.6	PK	135	1.0	POS; RB 1 I	MHz; VB: 3 MHz
725 MUz B	Band Edge S	ianal Dadia	tod Fiold St	ronath					
-requency	Level	Pol		5.E	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	Commonto	
5725.000	49.9	Н	54.0	-4.1	AVG	278	1.0	POS; RB 1 I	MHz; VB: 10 Hz
5724.840	48.1	V	54.0	-5.9	AVG	137	1.0	POS; RB 1 I	MHz; VB: 10 Hz
5724.520	66.4	Н	74.0	-7.6	PK	278	1.0		MHz; VB: 3 MHz
5723.880	61.2	V	74.0	-12.8	PK	137	1.0	POS; RB 1 I	MHz; VB: 3 MHz
	83.5 - 80.0 - 75.0 - 70.0 - 65.0 - 60.0 - 55.0 -	www.energenergenergenergenergenergenergener			iz; Vb 3 MHz;			Martingo	w Aprilia M
	50.0- 45.0-				0 5705				

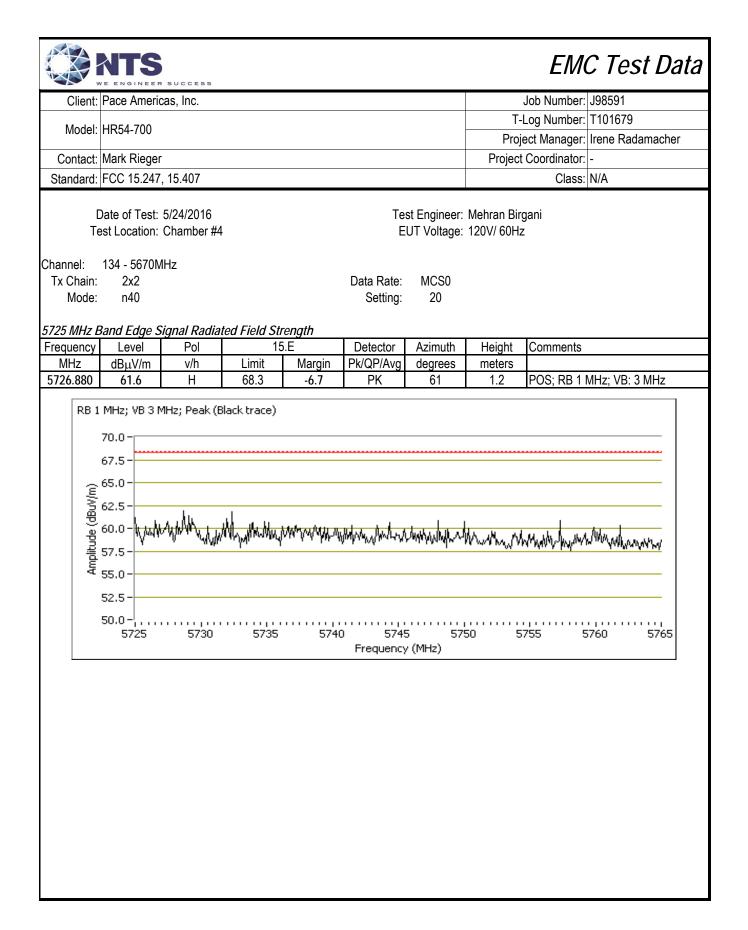
Model: H Contact: M Standard: F Da Tes Channel: 1 Tx Chain: Mode: 5850 MHz Ba Frequency MHz	Pace America HR54-700 Mark Rieger FCC 15.247, ate of Test: 6 st Location: 0 165 - 5825MH 2x2 n20	15.407 5/24/2015 Chamber #5					T-I Proj∉	Job Number: J98591 Log Number: T101679 ect Manager: Irene Radamacher Coordinator: -
Contact: N Standard: F Da Tes Channel: 1 Tx Chain: Mode: 5850 MHz Ba Frequency MHz	Mark Rieger FCC 15.247, ate of Test: 6 st Location: 0 165 - 5825Mł 2x2	5/24/2015 Chamber #5					Proje	ect Manager: Irene Radamacher Coordinator: -
Standard: F Da Tes Channel: 1 Tx Chain: Mode: 5850 MHz Ba Frequency MHz	FCC 15.247, ate of Test: 6 st Location: 0 165 - 5825MH 2x2	5/24/2015 Chamber #5					-	Coordinator: -
Standard: F Da Tes Channel: 1 Tx Chain: Mode: 5850 MHz Ba Frequency MHz	FCC 15.247, ate of Test: 6 st Location: 0 165 - 5825MH 2x2	5/24/2015 Chamber #5						
Da Tes Channel: 1 Tx Chain: Mode: 5850 MHz Ba Frequency MHz	ate of Test: 6 st Location: ( 165 - 5825Mł 2x2	5/24/2015 Chamber #5						Class: N/A
Tes Channel: 1 Tx Chain: Mode: 5850 MHz Ba Frequency MHz	st Location: ( 165 - 5825Mł 2x2	Chamber #5						
Channel: 1 Tx Chain: Mode: 5850 MHz Ba Frequency MHz	165 - 5825Mł 2x2					st Engineer:		
Tx Chain: Mode: 5850 MHz Ba Frequency MHz	2x2	łz			E	UT Voltage:	120V/ 60Hz	<u>'</u>
Tx Chain: Mode: 5850 MHz Ba Frequency MHz	2x2							
5 <i>850 MHz Ba</i> Frequency MHz	n20				Data Rate:	MCS0		
Frequency MHz					Setting:	19		
Frequency MHz								
MHz	Level	<i>gnal Radiat</i> Pol		<i>rength</i> 5.E	Detector	Azimuth	Height	Comments
	dBµV/m	v/h	Limit	.∟ Margin	Pk/QP/Avg	degrees	meters	
5850.240	67.4	H	68.3	-0.9	PK	291	1.0	POS; RB 1 MHz; VB: 3 MHz
5850.200	62.8	V	68.3	-5.5	PK	134	1.1	POS; RB 1 MHz; VB: 3 MHz
1	and Edge Si					<u> </u>		
Frequency MHz		Pol		5.E Morain	Detector	Azimuth	Height	Comments
5860.600	dBμV/m 60.4	v/h H	Limit 68.3	Margin -7.9	Pk/QP/Avg PK	degrees 291	meters 1.0	POS; RB 1 MHz; VB: 3 MHz
5861.680	58.5	V	68.3	-9.8	PK	134	1.1	POS; RB 1 MHz; VB: 3 MHz
Amplitude (dBuv/m) 2 9 9 2 2	80.0 - 75.0 - 70.0 - 65.0 - 55.0 - 55.0 - 50.0 -	tz; Average المراجعة 5855	Marthough Norg			<u>илдо марала</u> ) 587	second and a start at the start	

Client	Dooo Amor	iooo Ino						Job Number:	109501
	: Pace Amer	icas, inc.							
Model	: HR54-700							Log Number:	
0	Marila Dia an								Irene Radamacher
	: Mark Riege						Project	Coordinator:	
Standard	: FCC 15.24	7, 15.407						Class:	N/A
	Date of Test	ndedge Meası : 6/24/2015 : Chamber #5		150-5250MI	Te	st Engineer: UT Voltage:			
hannel:	38 - 5190 N	ИHz							
Tx Chain	: 2x2				Data Rate:	MCS0			
Mode	: n40				Setting:	16			
450 1211	0	0'							
		Signal Radia		r <i>ength</i> 15.209	Detector	Azimuth	Hoight	Commonto	
Frequency MHz	dBµV/m	Pol v/h	Limit	Margin	Detector Pk/QP/Avg	degrees	Height meters	Comments	
5150.000	52.4	H	54.0	-1.6	AVG	293	1.0	POS: RB 11	MHz; VB: 10 Hz
5147.350	65.6	H	74.0	-8.4	PK	293	1.0		MHz; VB: 3 MHz
5149.920	50.0	V	54.0	-4.0	AVG	96	1.0	,	MHz; VB: 10 Hz
5149.680	64.6	V	74.0	-9.4	PK	96	1.0		MHz; VB: 3 MHz
	75.0-								
Amplitude (dBuV/m)	75.0 - 70.0 - 65.0 - 60.0 - 55.0 -				and freed and the theory				

Client:	Pace America	as, Inc.						Job Number:	J98591
Madalı							T-	Log Number:	T101679
Model:	HR54-700						Proj	ect Manager:	Irene Radamacher
Contact:	Mark Rieger						Project	Coordinator:	-
Standard:	FCC 15.247,	15.407						Class:	N/A
I	Radiated Band Date of Test: 5 est Location: 0 62 - 5310MH:	5/24/2016 Chamber #4	urements,	5250-5350N	Te	st Engineer: UT Voltage:			
Tx Chain: Mode:	2x2	-			Data Rate: Setting:	MCS0 18			
5350 MHz E	Band Edge Sig	gnal Radiat							
Frequency	Level	Pol		15.209	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5350.260 5350.320	72.5 52.0	H H	74.0 54.0	-1.5 -2.0	PK AVG	60 60	1.3 1.3		MHz; VB: 3 MHz MHz; VB: 10 Hz
Amplitude (dBuV/n	65.0 - 60.0 - 55.0 - 50.0 - 45.0 - 40.0 - 5350	5355	<u> </u>	~~		 D 53			385 5390
						· · · · · ·			

		SUCCESS						EM	C Test Data
Client:	Pace Americ	cas, Inc.						Job Number:	J98591
		,					T-	Log Number:	T101679
Model:	HR54-700							-	Irene Radamacher
Contact:	Mark Rieger						-	Coordinator:	
	FCC 15.247						,	Class:	
		,							
[ Te	Radiated Bar Date of Test: Past Location: Band Edge S	5/24/2016 Chamber #4	L		Te		Mehran Birg 120V/ 60Hz		
Frequency	Level	Pol	FCC 1		Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5459.980	46.9	Н	54.0	-7.1	AVG	58	1.2	POS; RB 1	MHz; VB: 10 Hz
5458.980	62.0	Н	74.0	-12.0	PK	58	1.2	POS; RB 1	MHz; VB: 3 MHz
Amplitude (dBuV/m)	50.0 - 45.0 -				~~~~				,





· · · ·	VE ENGINEE	RSUCCESS					1		
Client:	Pace Ameri	cas, Inc.						Job Number:	
Model:	HR54-700							Log Number:	
									Irene Radamacher
	Mark Riege						Project	Coordinator:	
Standard:	FCC 15.247	7, 15.407						Class:	N/A
0	Date of Test:	ndedge Meas 5/24/2016 Chamber #4		5725-5850N	Te	st Engineer: UT Voltage:			
hannel:	151 - 5755N	ИHz							
Tx Chain:					Data Rate:	MCS0			
Mode:	n40				Setting:	15			
		<b>.</b>							
		Signal Radia		rength 15.209	Detector	۸ سنوم د ۱۹۰	Lla <sup>l</sup> abt	Comments	
requency MHz	Level dBµV/m	Pol v/h	Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments	
5711.690	<u>авµv/m</u> 62.2	H	68.3	-6.1	PK	61	1.2	POS' RR 1 M	/Hz; VB: 3 MHz
	0LIL		00.0	0.1		01		1.00,1011	
725 MHz E	Band Edge S	Signal Radia	ted Field Sti	rength					
requency	Level	Pol		5.E	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5724.940	66.8	Н	78.3	-11.5	PK	61	1.2	POS; RB 1 N	/Hz; VB: 3 MHz
Amplitude (dBuV/m)	80.0 - 75.0 - 70.0 - 65.0 - 60.0 -	hermal			manlation	Manna	www	W. Marker M	n mm
	1.0	1 1 1 1 1 1							720 5725

R54-700 ark Rieger C 15.247, 1 e of Test: 5/ Location: C 9 - 5795MH 2x2 n40 d Edge Sig Level ΔBμV/m 61.6	24/2016 hamber #4 z				st Engineer: UT Voltage: MCS0	Proj Project Mehran Bir	Coordinator: Class: gani	Irene Radamacher -
ark Rieger C 15.247, 1 e of Test: 5/ Location: C 9 - 5795MH 2x2 n40 d Edge Sig Level BµV/m 61.6	24/2016 hamber #4 z <u>nal Radiate</u> <u>Pol</u> v/h			E Data Rate:	UT Voltage: MCS0	Project Mehran Birg	Coordinator: Class: gani	-
CC 15.247, 1 e of Test: 5/ Location: C 9 - 5795MH 2x2 n40 <u>d Edge Sig</u> Level IBµV/m 61.6	24/2016 hamber #4 z <u>nal Radiate</u> Pol v/h			E Data Rate:	UT Voltage: MCS0	Mehran Bir	Class: gani	
e of Test: 5/ Location: C 9 - 5795MH 2x2 n40 <u>od Edge Sig</u> Level <u>IBµV/m</u> 61.6	24/2016 hamber #4 z <u>nal Radiate</u> Pol v/h			E Data Rate:	UT Voltage: MCS0		gani	N/A
Location: C 9 - 5795MH 2x2 n40 <u>d Edge Sig</u> Level <u>IBµV/m</u> 61.6	hamber #4 z <u>nal Radiat</u> Pol v/h		,	E Data Rate:	UT Voltage: MCS0			
2x2 n40 <u>d Edge Sig</u> Level dBμV/m 61.6	<i>nal Radiat</i> i Pol v/h							
n40 d Edge Sig Level dBµV/m 61.6	Pol v/h							
d Edge Sig Level BμV/m 61.6	Pol v/h			Settina:	~~			
Level JBµV/m 61.6	Pol v/h			<b>J</b>	20			
Level JBµV/m 61.6	Pol v/h		rength					
61.6			5.E	Detector	Azimuth	Height	Comments	
•	н	Limit	Margin	Pk/QP/Avg	degrees	meters		
	11	68.3	-6.7	PK	61	1.2	POS; RB 1 N	MHz; VB: 3 MHz
nd Edge Sig	nal Radiat	ed Field Sti	renath					
Level	Pol		5.E	Detector	Azimuth	Height	Comments	
dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
62.9	Н	78.3	-15.4	PK	61	1.2	POS; RB 1 M	MHz; VB: 3 MHz
.0 - .0 - .0 - .0 - .0 - .0 - .0 -	M	<b>₩₩₩~₩</b>	<i>М</i> ин <sub>ин</sub> и. 44 Муу 586:	5 5870	) 587			Mul-mundm 1885 5890
	0- 0- 0- 0-	0- 0- 0- 0- 0-	0- 0- 0- 0- 0-	0- 0- 0- 0- 0- 0-				

WE ENGINEER SUCCESS			EMO	C Test Da
Client: Pace Americas, Inc.			Job Number:	J98591
Model: HR54-700			T-Log Number:	T101679
			Project Manager:	Irene Radamacher
Contact: Mark Rieger			Project Coordinator:	
Standard: FCC 15.247, 15.407			Class:	N/A
RSS 210 ar	nd FCC 15.407 (UN	III) Radiated	Spurious Emission	S
est Specific Details Objective: The objective specification I		rform final qualifica	tion testing of the EUT with r	espect to the
General Test Configuration The EUT and all local support equipr For radiated emissions testing the me				e noted.
Ambient Conditions:	Temperature: Rel. Humidity:	20-27 °C 32-38 %		
<b>Nodifications Made During Teach</b> No modifications were made to the E				
Deviations From The Standard				
No deviations were made from the re	equirements of the standard	1.		

Model:     HR54-700     T-Log Number     T101679       Contact:     Mark Rieger     Project Manager:     Irene Radamacher       Standard:     FCC 15.247, 15.407     Class:     N/A       Summary of Results     Class:     N/A       Summary of Results     Radiated Emissions,     FCC 15.209/15 E     52.7 dBµV/m @ 504       1     40 - 20     20     Radiated Emissions,     FCC 15.209/15 E     52.7 dBµV/m @ 504       1     40 - 20     20     Radiated Emissions,     FCC 15.209/15 E     52.7 dBµV/m @ 504       1     40 - 20     20     Radiated Emissions,     FCC 15.209/15 E     MHz (.13 dB)       1     40 - 38 - 20     20     Radiated Emissions,     FCC 15.209/15 E     MHz (.47 dB)       1     40 - 38 - 20     20     Radiated Emissions,     FCC 15.209/15 E     MHz (.42 dB)       2     36 - 3100MHz     20     20     Radiated Emissions,     FCC 15.209/15 E     42.7 dBµV/m @ 504       2     36 - 20     20     Radiated Emissions,     FCC 15.209/15 E     42.7 dBµV/m @ 495       2     1.40 GHz	Client:	Pace Ameri	cas, Inc.				Job Number:	J98591
Model:     HR64-7/00     Project Manager     Irene Radamacher       Contact:     Mark Rieger     Project Coordinator:     -       Standard:     FCC 15.247, 15.407     Class:     N/A       Summary of Results     Item #     Mode     Channel     Setting     Test Performed     Limit     Result / Margin       icans on "center" channel in all three OFDM modes to determine the worst case mode.     FCC 15.209 / 15 E     52.7 dBµV/m @ 504       1     a     5200MHz     20     20     Radiated Emissions, 1-40 GHz     FCC 15.209 / 15 E     43.3 dBµV/m @ 496       1     m40     38 - 20     20     Radiated Emissions, 1-40 GHz     FCC 15.209 / 15 E     43.4 dBµV/m @ 504       1     M40     38 - 20     20     Radiated Emissions, 1-40 GHz     FCC 15.209 / 15 E     43.4 dBµV/m @ 504       2     a     5160MHz     20     0     1-40 GHz     FCC 15.209 / 15 E     43.7 dBµV/m @ 504       2     a     5160MHz     20     20     Radiated Emissions, 1-40 GHz     FCC 15.209 / 15 E     43.7 dBµV/m @ 504       2     M42 (-13 dB)     m42 (-13 dB)			, -					
Contact:     Mark Rieger     Project Coordinator:       Standard:     FCC 15.247, 15.407     Class:     N/A       Summary of Results     Class:     N/A       Run #     Mode     Channel     Power Setting     Test Performed     Limit     Result / Margin       cans on "center" channel in all three OFDM modes to determine the worst case mode.     FCC 15.209 / 15 E     52.7 dBµV/m @ 504 MHz (-13.80)       1     A0 - 5200MHz     20     20     Radiated Emissions, 1-40 GHz     FCC 15.209 / 15 E     45.3 dBµV/m @ 496 MHz (-8.7 dB)       1     A0 - 5300MHz     20     20     Radiated Emissions, 1-40 GHz     FCC 15.209 / 15 E     49.4 dBµV/m @ 504 MHz (-46.4B)       2     A     36 - 5180MHz     20     20     Radiated Emissions, 1-40 GHz     FCC 15.209 / 15 E     49.4 dBµV/m @ 503 MHz (-11.3 dB)       0MHz - use if worse case form 1 and also do lowest n20 channel     1 -40 GHz     FCC 15.209 / 15 E     48.7 dBµ/m @ 495 MHz (-5.3 dB)       2     36 - 20     1 -40 GHz     FCC 15.209 / 15 E     48.7 dBµ/m @ 495 MHz (-5.3 dB)       2     1 -40 GHz     FCC 15.209 / 15 E     48.7 dBµ/m @ 495 MHz (-5.3 dB)       3	Model:	HR54-700						
Standard: FCC 15.247, 15.407     Class: N/A       Summary of Results       Run # Mode Channel Power Setting     Test Performed     Limit     Result / Margin cans on "center" channel in all three OFDM modes to determine the worst case mode.       a     40 -     20     Radiated Emissions, for 20 5200MHz     CC 15.209 / 15 E     S2.7 dBµ//m @ 504 MHz (-1.3 dB)       1     A 0 -     20     Radiated Emissions, for 20 5200MHz     CC 15.209 / 15 E     S2.7 dBµ//m @ 504 MHz (-1.3 dB)       1 -40 GHz     FCC 15.209 / 15 E     49.4 dBµ//m @ 504 MHz (-1.0 dB)       2 1     36 -     20     C 15.209 / 15 E     49.4 dBµ//m @ 504 MHz (-1.0 dB)       2 1     A 36 -     20     C 15.209 / 15 E     49.4 dBµ//m @ 504 MHz (-1.1 dB)       2 1     A 36 -     20     C 15.209 / 15 E     48.7 dBµ//m @ 504 MHz (-1.1 dB)       2 1     A 48.7     20     C 15.209 / 15 E	Contact:	Mark Rieger	ſ					
Summary of Results       Run #     Mode     Channel     Power Setting     Test Performed     Limit     Result / Margin       iccans on "center" channel in all three OFDM modes to determine the worst case mode.		•					,	
Run #     Mode     Channel     Power Setting     Test Performed     Limit     Result / Margin       ccans on "center" channel in all three OFDM modes to determine the worst case mode.     40 - 5200MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     52.7 dBµ//m @ 504 MHz (-1.3 dB)       1     n20     5200MHz     20     20     Radiated Emissions, 5100MHz     FCC 15.209 / 15 E     52.7 dBµ//m @ 496 MHz (-1.3 dB)       1     n40     5200MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.9 dBµ//m @ 496 MHz (-1.1 dB)       1     n40     5180MHz     20     20     Radiated Emissions, 5240MHz     FCC 15.209 / 15 E     49.4 dBµ//m @ 504 MHz (-1.1 dB)       0MHz - use if worse case from 1 and also do lowest n20 channel     1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµ//m @ 504 MHz (-1.3 dB)       2     n20     36 - 5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµ//m @ 495 MHz (-5.3 dB)       3     n20     5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.2 dBµ//m @ 495 MHz (-5.3 dB)       3 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>L</td>								L
Run #     Mode     Channel     Setting     Test Performed     Limit     Result / Margin       cans on "center" channel in all three OFDM modes to determine the worst case mode.	Summary	of Result	S					
Cans on "center" channel in all three OFDM modes to determine the worst case mode.     FCC 15.209 / 15 E     52.7 dBµV/m @ 504 MHz (-1.3 dB)       1     1     1     40 - 5200MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     52.7 dBµV/m @ 504 MHz (-1.3 dB)       1     1     1     20     20     Radiated Emissions, 5190MHz     FCC 15.209 / 15 E     43.9 dBµV/m @ 496 MHz (-1.0 dB)       1     1     40     38 - 5190MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.9 dBµV/m @ 496 MHz (-1.0 dB)       2     1     36 - 5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     49.4 dBµV/m @ 504 MHz (-1.0 dB)       2     1     36 - 5240MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 504 MHz (-5.3 dB)       2     1     120     36 - 20     20     1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 496 MHz (-5.3 dB)       2     1     10     36 - 20     20     1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 496 MHz (-5.3 dB)       3     1	Run #	Mode	Channel			Test Performed	Limit	Result / Margin
a     40 - 5200MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     52.7 dBµV/m @ 504 MHz (-1.3 dB)       1     n20     40 - 5200MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     53.3 dBµV/m @ 496 MHz (-1.3 dB)       n40     38 - 5190MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.9 dBµV/m @ 496 MHz (-10.1 dB)       2     a     36 - 5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     49.4 dBµV/m @ 504 MHz (-4.6 dB)       2     a     36 - 5240MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     49.4 dBµV/m @ 503 MHz (-1.3 dB)       0MHz - use if worse case from 1 and also do lowest n20 channel     5240MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 504 MHz (-5.3 dB)       2     n20     36 - 5230MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 496 MHz (-5.3 dB)       3     n20     60 - 5300MHz     20     20     1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 496 MHz (-5.3 dB)		antar" ahann	al in all three		a ta datawa	ing the worst case mode		
a     5200MHz     20     20     1 - 40 GHz     FCC 15.209 / 15 E     MHz (-1.3 dB) MHz (-1.3 dB)       1     n20     40 - 5200MHz     20     20     1 - 40 GHz     FCC 15.209 / 15 E     MHz (-4.7 dB) MHz (-4.7 dB)       n40     38 - 5190MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     49.4 dBµV/m @ 496 MHz (-10.1 dB)       2     a     5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     49.4 dBµV/m @ 504 MHz (-11.3 dB)       2     a     5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 503 MHz (-11.3 dB)       0MHz - use if worse case from 1 and also do lowest n20 channel     1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 495 MHz (-5.3 dB)       2     n20     36 - 5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 495 MHz (-5.3 dB)       2     n40     5230MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.2 dBµV/m @ 495 MHz (-5.3 dB)       2     n40     60 - 5300MHz     20     20 </td <td>cans on "c</td> <td>enter" chann</td> <td></td> <td>OFDIVI mod</td> <td>es to determ</td> <td></td> <td></td> <td>52.7 dBuV/m @ 5040</td>	cans on "c	enter" chann		OFDIVI mod	es to determ			52.7 dBuV/m @ 5040
1     n20     40 - 5200MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     45.3 dBµ//m @ 496 MHz (-8.7 dB) MHz (-8.7 dB) MHz (-8.7 dB) MHz (-8.7 dB)       1     n40     38 - 20     20     1 - 40 GHz     FCC 15.209 / 15 E     43.9 dBµ//m @ 496 MHz (-8.7 dB) MHz (-8.7 dB)       2     a     36 - 5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     49.4 dBµ//m @ 504 MHz (-10.1 dB)       2     a     36 - 5240MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     49.4 dBµ//m @ 504 MHz (-11.3 dB)       2     n20     36 - 5240MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµ//m @ 504 MHz (-5.3 dB)       2     n20     36 - 5230MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµ//m @ 495 MHz (-5.3 dB)       3     n20     36 - 5230MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.2 dBµ//m @ 495 MHz (-5.3 dB)       3     n20     60 - 60 - 5230MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E		а	-	20	20		FCC 15.209 / 15 E	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	1	<b>n</b> 20		20	20		ECC 15 200 / 15 E	45.3 dBµV/m @ 4965
Indu     5190MHz     20     20     1 - 40 GHz     FCC 15.209 / 15 E     MHz (-10.1 dB)       leasurements on low and high channels in worst-case OFDM mode.     36 - 5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     49.4 dBµV/m @ 504/MHz (-6.6 dB)       2     a     38 - 5240MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     49.4 dBµV/m @ 504/MHz (-6.6 dB)       2     n20     36 - 5240MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 504/MHz (-5.3 dB)       2     n20     36 - 5230MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 495/MHz (-5.3 dB)       2     n40     46 - 20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.2 dBµV/m @ 495/MHz (-5.3 dB)       3     n20     60 - 5230MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.2 dBµV/m @ 495/MHz (-5.3 dB)       3     n20     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.4 dBµV/m @ 488/Mz (-11.8 dB)	I	1120	5200MHz	20	20		FUU 15.2097 15 E	MHz (-8.7 dB)
Image: Constraint of the constratent of the constraint of the constraint of the constraint of the		n40		20	20		FCC 15,209 / 15 E	
a     36 - 5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     49.4 dBµV/m @ 504 MHz (-4.6 dB)       a     48 - 5240MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.7 dBµV/m @ 503 MHz (-11.3 dB)       0MHz - use if worse case from 1 and also do lowest n20 channel     1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 504 MHz (-11.3 dB)       2     n20     36 - 5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 504 MHz (-5.3 dB)       2     n40     46 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.2 dBµV/m @ 495 MHz (-5.8 dB)       3     a     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.4 dBµV/m @ 488 MHz (-5.6 dB)       3     n20     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.5 dBµV/m @ 504 MHz (-11.8 dB)       4     a     52- 5270MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.5 dBµV/m @ 504 MHz (-10.5 dB)       4     a							100 10.2007 10 2	MHz (-10.1 dB)
a     5180MHz     20     20     1 - 40 GHz     FCC 15.209 / 15 E     MHz (-4.6 dB)       0MHz - use if worse case from 1 and also do lowest n20 channel     1 - 40 GHz     FCC 15.209 / 15 E     42.7 dBµV/m @ 503 MHz (-11.3 dB)       0MHz - use if worse case from 1 and also do lowest n20 channel     1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 504 MHz (-5.3 dB)       2     n40     36 - 5230MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 495 MHz (-5.3 dB)       cans on "center" channel in all three OFDM modes to determine the worst case mode.     FCC 15.209 / 15 E     48.2 dBµV/m @ 495 MHz (-5.8 dB)       3     n20     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 495 MHz (-5.8 dB)       3     n20     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.4 dBµV/m @ 488 MHz (-11.8 dB)       4     a     52 - 5270MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.5 dBµV/m @ 504 MHz (-11.6 dB)       4     a     52 - 5200MHz     20     20     Radiated Emissions, 1 - 40 GHz	leasureme	nts on low ar		nels in worst-	-case OFDM			
2     a     48 - 5240MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.7 dBµV/m @ 503. MHz (-11.3 dB)       DMHz - use if worse case from 1 and also do lowest n20 channel     a     36 - 5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 504. MHz (-5.3 dB)       2     n40     46 - 5230MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.2 dBµV/m @ 495. MHz (-5.8 dB)       cans on "center" channel in all three OFDM modes to determine the worst case mode.     FCC 15.209 / 15 E     42.2 dBµV/m @ 495. MHz (-18.8 dB)       3     n20     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.4 dBµV/m @ 495. MHz (-11.8 dB)       3     n20     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.4 dBµV/m @ 495. MHz (-10.5 dB)       leasurements on low and high channels in worst-case OFDM mode.     42.2 dBµV/m @ 504. MHz (-11.8 dB)     42.2 dBµV/m @ 504. MHz (-11.6 dB)     42.2 dBµV/m @ 504. MHz (-11.6 dB)       4     a     52 - 5200MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.2		а		20	20		FCC 15.209 / 15 E	
a     5240MHz     20     20     1 - 40 GHz     FCC 15.209 / 15 E     MHz (-11.3 dB)       0MHz - use if worse case from 1 and also do lowest n20 channel     n20     36 - 5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 504 MHz (-5.3 dB)       2     n40     46 - 5230MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.2 dBµV/m @ 495 MHz (-5.8 dB)       cans on "center" channel in all three OFDM modes to determine the worst case mode.     60 - 20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.2 dBµV/m @ 495 MHz (-11.8 dB)       3     n20     60 - 20     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.4 dBµV/m @ 495 MHz (-11.8 dB)       3     n20     60 - 20     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.4 dBµV/m @ 488 MHz (-10.5 dB)       44     a     5270MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.2 dBµV/m @ 504 MHz (-10.5 dB)       44     a     5270MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E	2							
Alternation		а		20	20		FCC 15.209 / 15 E	
2     n20     36 - 5180MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.7 dBµV/m @ 504 MHz (-5.3 dB)       cans on "center" channel in all three OFDM modes to determine the worst case mode.     FCC 15.209 / 15 E     48.2 dBµV/m @ 495 MHz (-5.8 dB)       3     a     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 495 MHz (-11.8 dB)       3     n20     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 495 MHz (-11.8 dB)       3     n20     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 488 MHz (-9.6 dB)       44.4 dBµV/m @ 488 MHz (-10.5 dB)     5270MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.5 dBµV/m @ 504 MHz (-10.5 dB)       1     a     52 - 5260MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.0 dBµV/m @ 504 MHz (-11.8 dB)       0MHz - use if worse case from 1 and also do lowest a or n20 channel     1 - 40 GHz     FCC 15.209 / 15 E     43.0 dBµV/m @ 504 MHz (-11.0 dB)       0MHz - use if worse case from 1	0MHz - use	e if worse cas		l also do low	est n20 char			
2     5180MHz     1 - 40     1 - 40     GHz     MHz (-5.3 dB)       n40     46 - 5230MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     48.2 dBµV/m @ 495 MHz (-5.8 dB)       cans on "center" channel in all three OFDM modes to determine the worst case mode.     Radiated Emissions, 5300MHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 495 MHz (-11.8 dB)       3     n20     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.4 dBµV/m @ 485 MHz (-9.6 dB)       3     n20     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.4 dBµV/m @ 495 MHz (-10.6 dB)       44.4     64 - 5270MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 504 MHz (-10.5 dB)       4     a     52 - 5260MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.0 dBµV/m @ 504 MHz (-11.8 dB)       4     a     64 - 5320MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.0 dBµV/m @ 504 MHz (-11.0 dB)       0MHz - use if worse case from 1 and also do lowest a or n20 channel     <								48.7 dBµV/m @ 5040
$\frac{1}{4} \frac{1}{4} \frac{1}{4} \frac{1}{4} \frac{1}{4} \frac{1}{2} \frac{1}{2} \frac{1}{2} \frac{1}{2} \frac{1}{2} \frac{1}{2} \frac{1}{2} \frac{1}{2} \frac{1}{4} \frac{1}$	C	n20	5180MHz	20	20		FUU 15.2097 15 E	MHz (-5.3 dB)
$\frac{1}{1 - 40 \text{ GHz}} = \frac{1 - 40 \text{ GHz}}{1 - 40 \text{ GHz}} = 1 -$	Z	n40	-	20	20		ECC 15 209 / 15 E	48.2 dBµV/m @ 495
a     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 495 MHz (-11.8 dB)       3     n20     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.4 dBµV/m @ 488 MHz (-9.6 dB)       n40     54 - 5270MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.5 dBµV/m @ 475 MHz (-10.5 dB)       leasurements on low and high channels in worst-case OFDM mode.     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 504 MHz (-10.5 dB)       4     a     52 - 5260MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 504 MHz (-11.8 dB)       0MHz - use if worse case from 1 and also do lowest a or n20 channel     1 - 40 GHz     FCC 15.209 / 15 E     43.0 dBµV/m @ 504 MHz (-11.0 dB)       4     n20     52 - 5260MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     47.3 dBµV/m @ 504 MHz (-11.0 dB)       4     n20     52 - 5260MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     47.3 dBµV/m @ 504 MHz (-6.7 dB)       4     n20     52 - 5							100 10.2007 10 E	MHz (-5.8 dB)
a     5300MHz     20     20     1 - 40 GHz     FCC 15.209 / 15 E     MHz (-11.8 dB)       3     n20     60 - 5300MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     44.4 dBµV/m @ 488 MHz (-9.6 dB)       n40     54 - 5270MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.5 dBµV/m @ 475 MHz (-10.5 dB)       leasurements on low and high channels in worst-case OFDM mode.     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 504 MHz (-11.8 dB)       4     a     52 - 5260MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.0 dBµV/m @ 504 MHz (-11.0 dB)       0MHz - use if worse case from 1 and also do lowest a or n20 channel     1 - 40 GHz     FCC 15.209 / 15 E     47.3 dBµV/m @ 504 MHz (-11.0 dB)       4     n20     52 - 5260MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     47.3 dBµV/m @ 504 MHz (-11.0 dB)       0     n20     52 - 5260MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     47.3 dBµV/m @ 504 MHz (-6.7 dB)       4     n20     52 - 5260MHz     20 <td< td=""><td>cans on "c</td><td>enter" chann</td><td></td><td>OFDM mod</td><td>es to determ</td><td></td><td></td><td></td></td<>	cans on "c	enter" chann		OFDM mod	es to determ			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		а		20	20		FCC 15.209 / 15 E	
3     n20     5300MHz     20     20     1 - 40 GHz     FCC 15.209 / 15 E     MHz (-9.6 dB)       n40     54 - 5270MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.5 dBµV/m @ 4750 MHz (-10.5 dB)       leasurements on low and high channels in worst-case OFDM mode.     1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 504 MHz (-11.8 dB)       4     a     5260MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 504 MHz (-11.8 dB)       a     64 - 5320MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.0 dBµV/m @ 504 MHz (-11.0 dB)       0MHz - use if worse case from 1 and also do lowest a or n20 channel     1 - 40 GHz     FCC 15.209 / 15 E     47.3 dBµV/m @ 504 MHz (-11.0 dB)       4     n20     52 - 20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     47.3 dBµV/m @ 504 MHz (-6.7 dB)       4     n20     64 - 20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.0 dBµV/m @ 504 MHz (-6.7 dB)       4     n20     64 - 20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E								
$\frac{1}{1.40} = \frac{1}{1.40} = 1$	3	n20		20	20		FCC 15.209 / 15 E	
$\frac{1140}{1} = \frac{1140}{1} = 1$								43.5 dBuV/m @ 4756
leasurements on low and high channels in worst-case OFDM mode.       4 52 - 5260MHz      20         20      Radiated Emissions, 1 - 40 GHz      FCC 15.209 / 15 E           42.2 dBµV/m @ 504 MHz (-11.8 dB)        4          64 - 5320MHz      20           20      Radiated Emissions, 1 - 40 GHz           FCC 15.209 / 15 E           43.0 dBµV/m @ 504 MHz (-11.8 dB)        0MHz - use if worse case from 1 and also do lowest a or n20 channel           1 - 40 GHz           FCC 15.209 / 15 E           47.3 dBµV/m @ 504 MHz (-11.0 dB)        4          n20           52 - 5260MHz           20           20           Radiated Emissions, 1 - 40 GHz           FCC 15.209 / 15 E           47.3 dBµV/m @ 504 MHz (-6.7 dB)        4            n20           64 -           20           20           FCC 15.209 / 15 E           47.3 dBµV/m @ 504 MHz (-6.7 dB)		n40		20	20		FCC 15.209 / 15 E	
a     52 - 5260MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     42.2 dBµV/m @ 504 MHz (-11.8 dB)       a     64 - 5320MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.0 dBµV/m @ 504 MHz (-11.0 dB)       0MHz - use if worse case from 1 and also do lowest a or n20 channel     1 - 40 GHz     FCC 15.209 / 15 E     47.3 dBµV/m @ 504 MHz (-6.7 dB)       4     n20     52 - 5260MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     47.3 dBµV/m @ 504 MHz (-6.7 dB)       4     n20     64 -     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.0 dBµV/m @ 504 MHz (-6.7 dB)	leasureme	nts on low ar		nels in worst-	-case OFDM	1		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $							ECC 15 200 / 15 E	42.2 dBµV/m @ 5046
a     64 - 5320MHz     20     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.0 dBµV/m @ 504. MHz (-11.0 dB)       0MHz - use if worse case from 1 and also do lowest a or n20 channel     a or n20 channel     4     1 - 40 GHz     FCC 15.209 / 15 E     47.3 dBµV/m @ 504. MHz (-11.0 dB)       4     n20     52 - 5260MHz     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     47.3 dBµV/m @ 504. MHz (-6.7 dB)       4     n20     64 -     20     20     Radiated Emissions, 1 - 40 GHz     FCC 15.209 / 15 E     43.0 dBµV/m @ 504.	4	а	5260MHz	20	20		FUU 15.2097 15 E	
and the form of the	7	а		20	20		ECC 15 209 / 15 E	
4 n20 52 - 20 20 Radiated Emissions, 1 - 40 GHz FCC 15.209 / 15 E 47.3 dBμV/m @ 504 MHz (-6.7 dB) http://www.action.org/line/line/line/line/line/line/line/line							10010.2007102	MHz (-11.0 dB)
4 n20 5260MHz 20 20 1 - 40 GHz FCC 15.209 / 15 E MHz (-6.7 dB) n20 64 - 20 20 Radiated Emissions, ECC 15.209 / 15 E 43.0 dBµV/m @ 504.	0MHz - us	e if worse ca		l also do low	est a or n20			
4 5260MHz 1 - 40 GHz MHZ (-6.7 dB) p20 64 - 20 20 Radiated Emissions, ECC 15 209 / 15 E 43.0 dBµV/m @ 504		n20		20	20		FCC 15.209 / 15 E	
	4							
		n20	64 - 5320MHz	20	20	1 - 40 GHz	FCC 15.209 / 15 E	43.0 dBµV/m @ 504: MHz (-11.0 dB)

	Pace Ameri	cas, Inc.				Job Number	: J98591
Madala						T-Log Number	: T101679
Model:	HR54-700					Project Manager	: Irene Radamacher
Contact:	Mark Riege	r				Project Coordinator	: -
Standard:	FCC 15.247	7, 15.407				Class	: N/A
Summary	of Resul	ts	_		T		1
Run #	Mode	Channel	Power Setting		Test Performed	Limit	Result / Margin
cans on "ce	enter" chanr		OFDM mod	es to determ	nine the worst case mode.		
	а	116 - 5580MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	46.9 dBµV/m @ 5355. MHz (-7.1 dB)
F		116 -	00	00	Radiated Emissions,		45.8 dBµV/m @ 5356
5	n20	5580MHz	20	20	1 - 40 GHz	FCC 15.209 / 15 E	MHz (-8.2 dB)
	n40	110 - 5550MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	45.7 dBµV/m @ 4960 MHz (-8.3 dB)
leasureme	nts on low a	nd high chanr	nels in worst-	-case OFDN			
	а	100 -	20	20	Radiated Emissions,	FCC 15.209 / 15 E	44.5 dBµV/m @ 5138
-		5500MHz 140-			1 - 40 GHz Radiated Emissions,		MHz (-9.5 dB) 47.7 dBµV/m @ 5354
6	а	5700MHz	20	20	1 - 40 GHz	FCC 15.209 / 15 E	MHz (-6.3 dB)
	а	144- 5720MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	47.7 dBµV/m @ 5354 MHz (-6.3 dB)
Scans on "co	enter" chanr		OFDM mod	es to determ	nine the worst case mode.		
	а	157 - 5785MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	47.9 dBµV/m @ 5377 MHz (-6.1 dB)
7	n20	157 - 5785MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	49.1 dBµV/m @ 5378 MHz (-4.9 dB)
	n40	159 - 5795MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	45.3 dBµV/m @ 5428 MHz (-8.7 dB)
leasureme	nts on low a	nd high chanr	nels in worst-	case OFDN			· · · ·
8	n20	149 - 5745MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	45.5 dBµV/m @ 5127 MHz (-8.5 dB)
0	n20	165- 5825MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.9 dBµV/m @ 5400 MHz (-3.1 dB)

	ATS	EMO	C Test Data
Client:	Pace Americas, Inc.	Job Number:	J98591
Model	HR54-700	T-Log Number:	T101679
MOUEI.	11/34-700	Project Manager:	Irene Radamacher
Contact:	Mark Rieger	Project Coordinator:	-
Standard:	FCC 15.247, 15.407	Class:	N/A

# Procedure Comments:

A DITO

Measurements performed in accordance with FCC KDB 789033

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emission has duty cycle  $\geq$  98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6MB/s	0.98	Yes	1.417	0	0	10
11n20	MCS 0	0.98	Yes	1.302	0	0	10
11n40	MCS 0	0.98	Yes	1.309	0.0	0.0	10

## Sample Notes

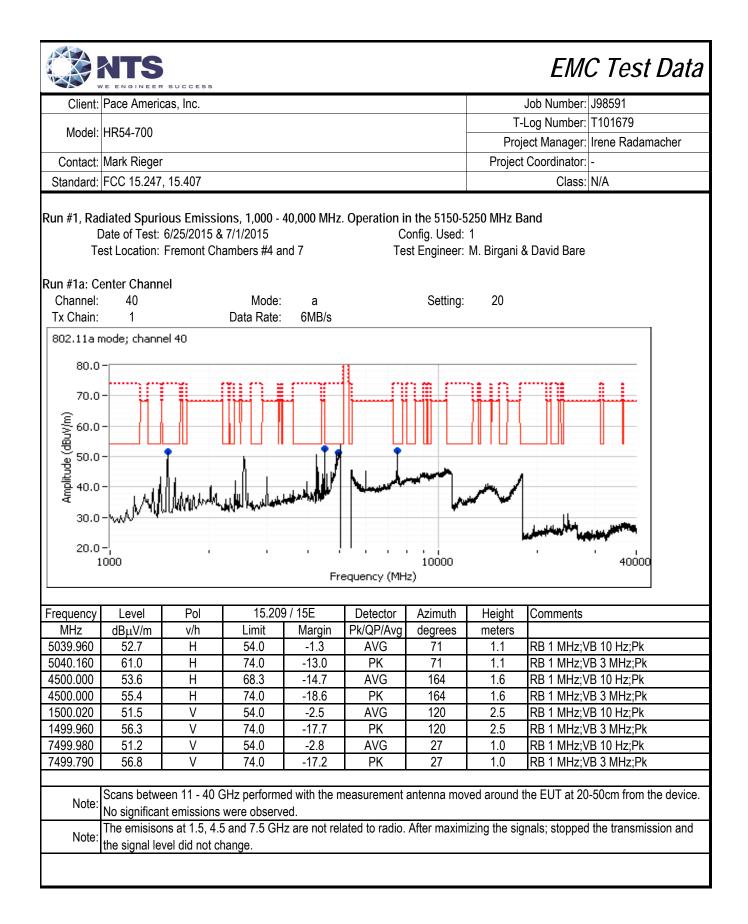
Sample S/N: G54DA5DN000024 Driver: 5.99 RC 188.10 Antenna: Internal

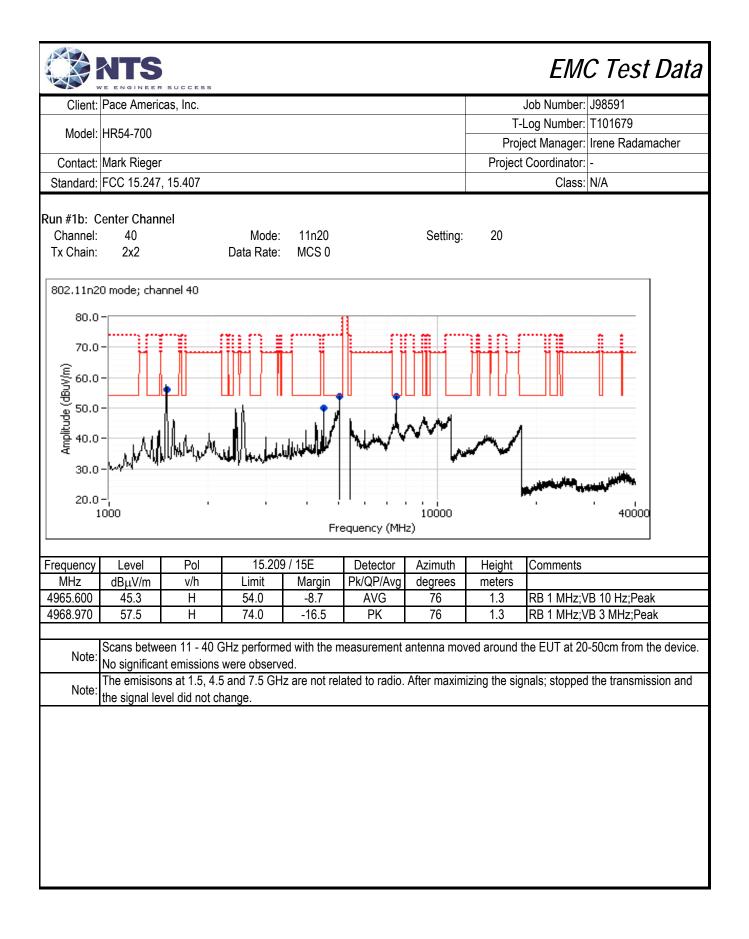
## Measurement Specific Notes:

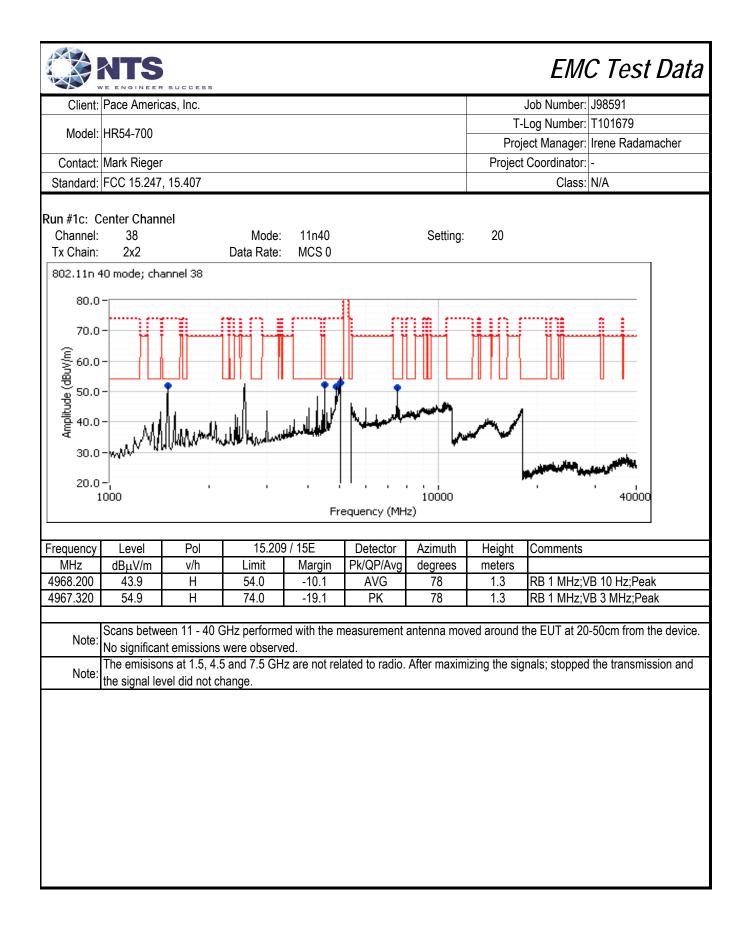
	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method
Note 1:	required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be
	demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2	Emission has duty cycle ≥ 98% for a nd n20 modes, average measurement performed using: RBW=1MHz, VBW=10Hz, Peak
Note 5.	Emission has duty cycle ≥ 98% for a nd n20 modes, average measurement performed using: RBW=1MHz, VBW=10Hz, Peak Detector, Linear mode, auto sweep, trace max hold, 50 sweeps
Note ()	Emission has duty cycle < 98% for n40 mode, average measurement performed using: RBW=1MHz, VBW=3kHz, Peak
Note 4.	Emission has duty cycle < 98% for n40 mode, average measurement performed using: RBW=1MHz, VBW=3kHz, Peak Detector, Linear mode, auto sweep, trace max hold, 54 sweeps

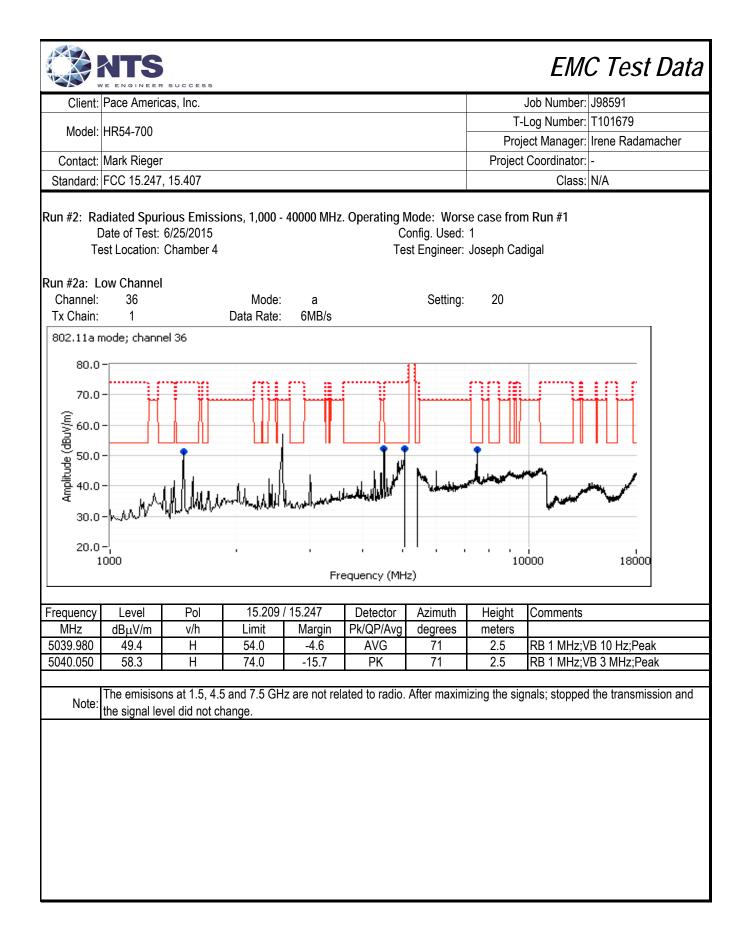
## Test Notes

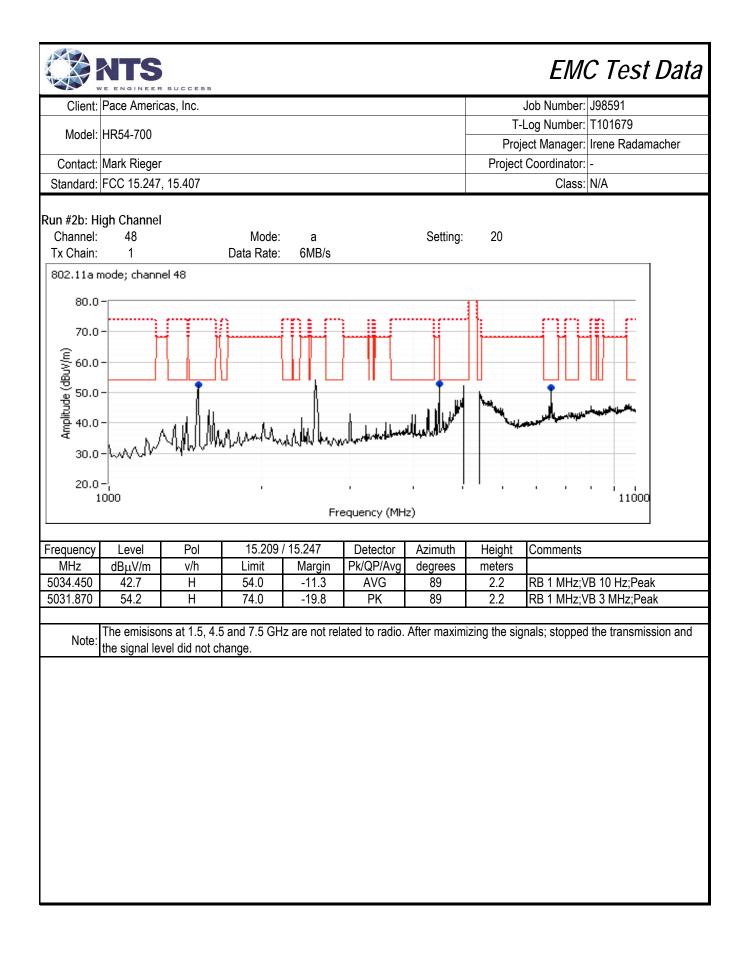
No emissions from the radio circuitry were observed below 1 GHz during preliminry tests. Emissions results of 802.11 5GHz + RF4CE are found in R98955

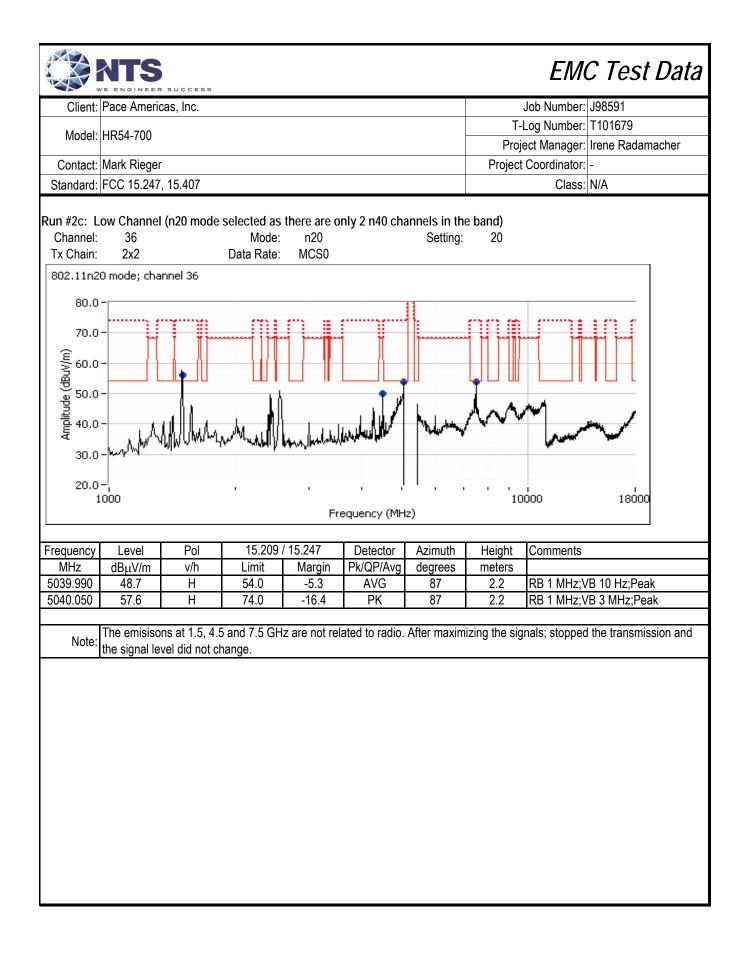


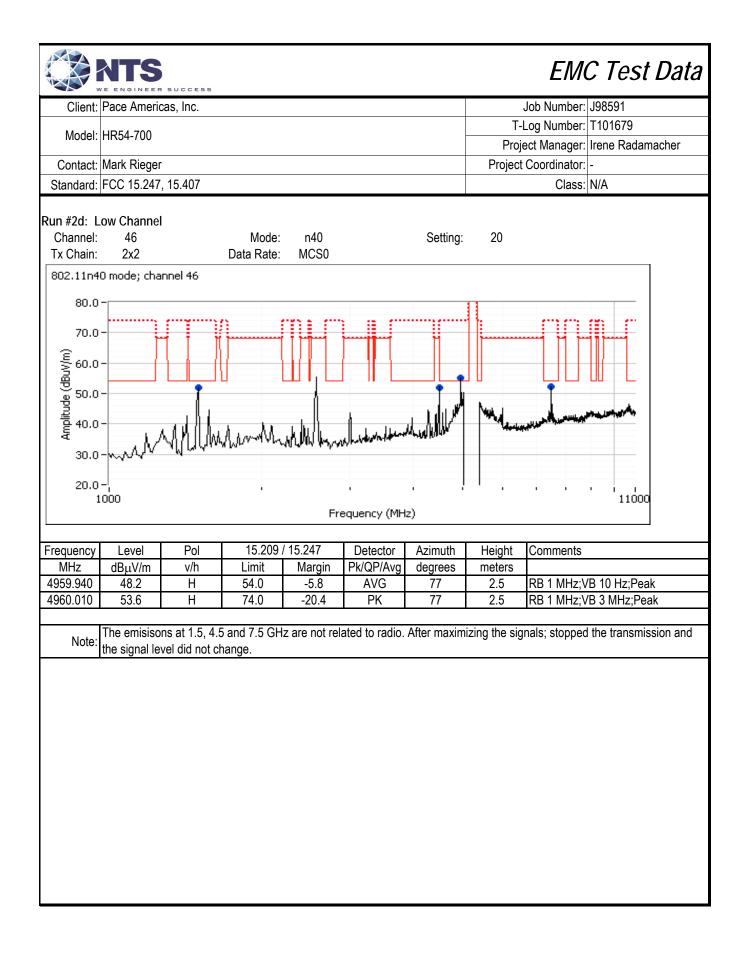


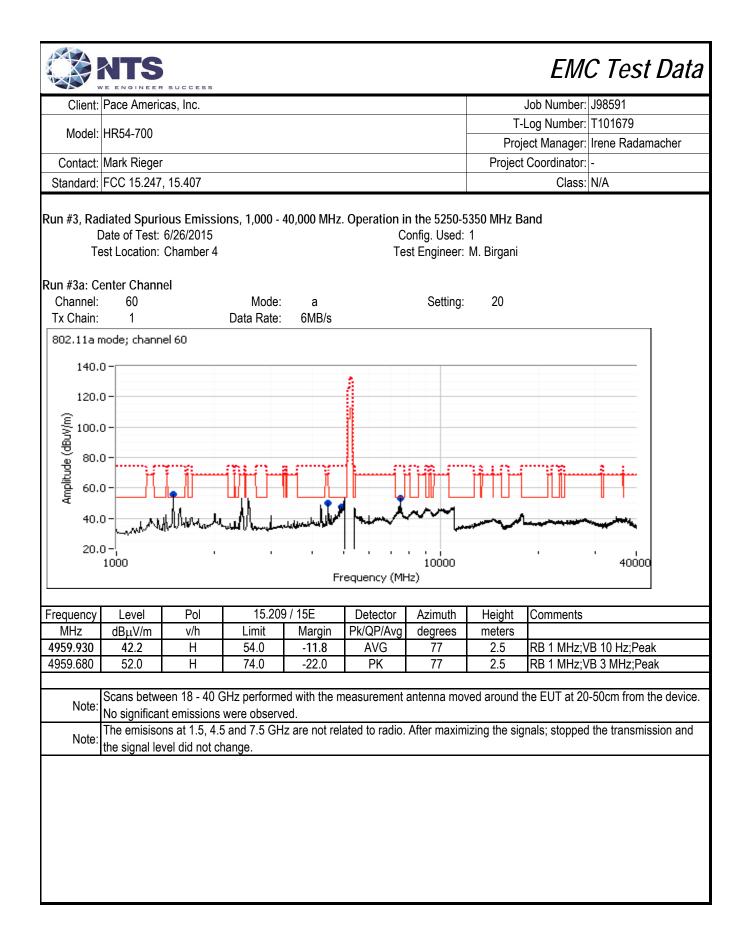


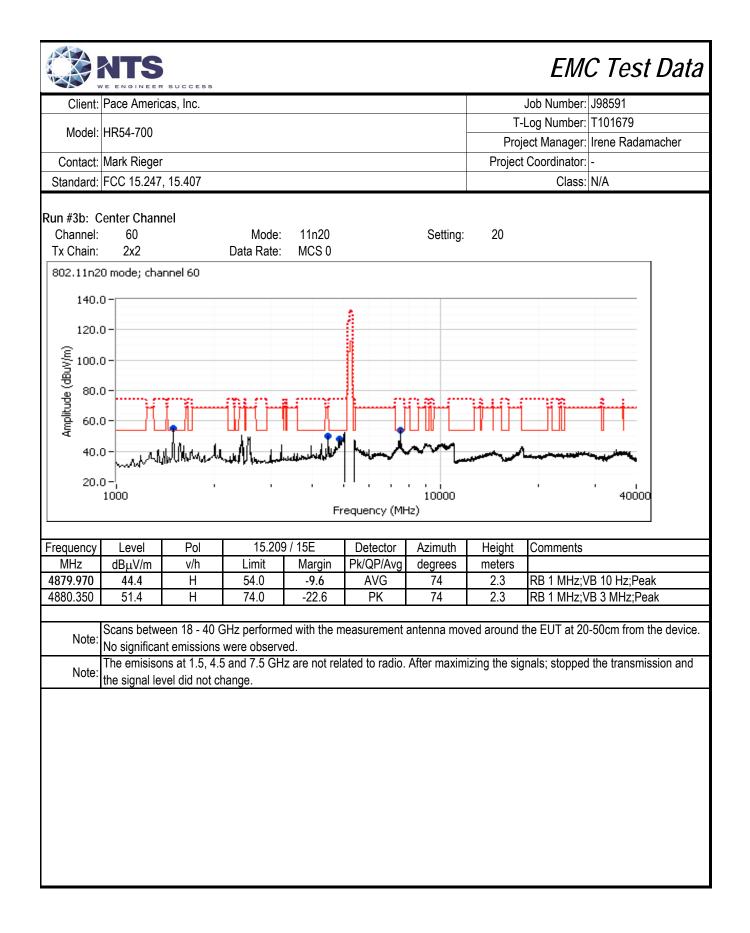








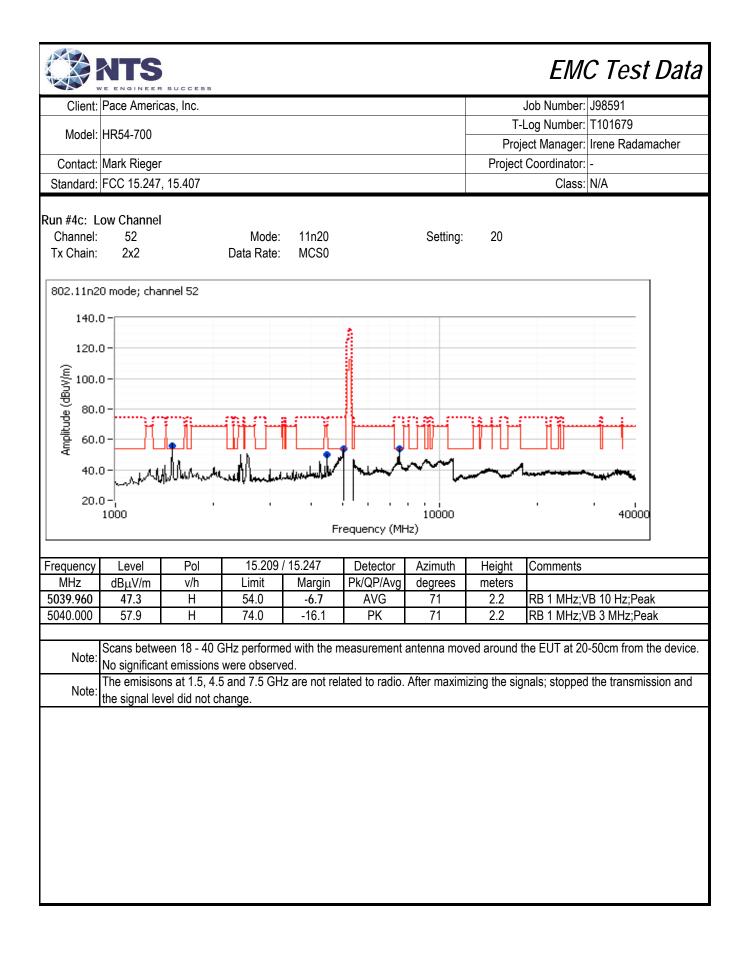




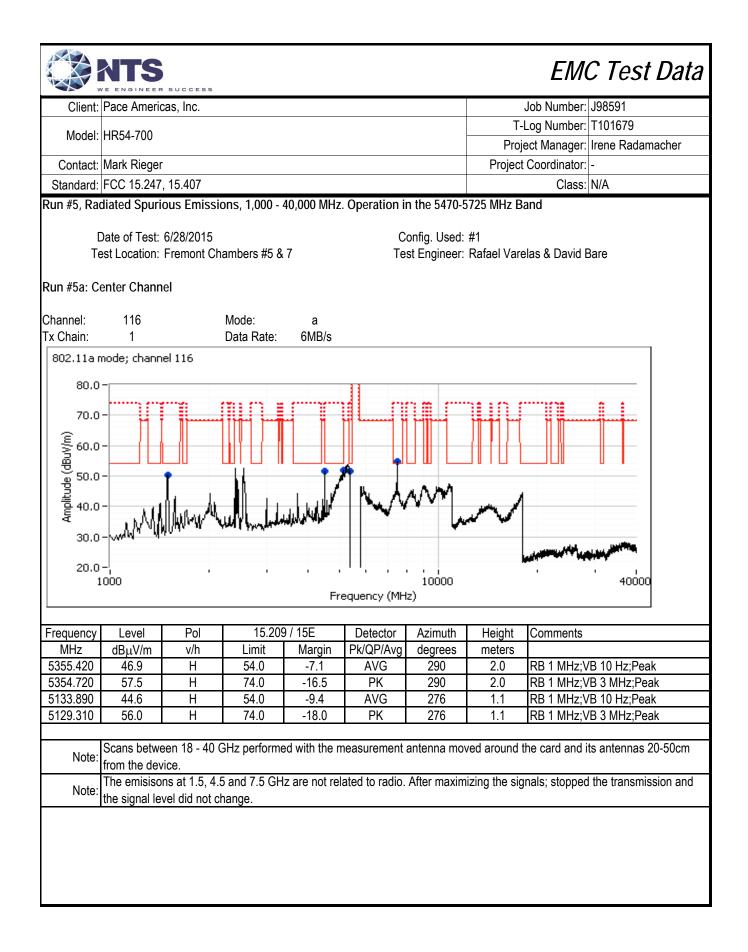
EMC Test Data										
Client:	Pace Americ	cas, Inc.						Job Number:	J98591	
Madalı	HR54-700			T-Log Number: T101679						
Model.	пкэ4-700			Proj	ect Manager:	Irene Radamacher				
Contact:	Contact: Mark Rieger Project Coordinator: -									
Standard:	Standard:     FCC 15.247, 15.407     Class:     N/A									
	Date of Test: 6/26/2015Config. Used: 1Test Location: Chamber 4Test Engineer: Joseph Cadigal									
	Center Chani	nel								
Channel:			Mode:	11n40		Setting:	20			
Tx Chain:	2x2		Data Rate:	MCS 0						
802.11n4	40 mode; cha	annel 54								
100	.0									
80	0-									
	.0	u T	V1	mur	<u>а.</u>		·		10	
Amplitude (dBuV/m)	.0-				1 1					
9   9				11		1 12	1.		A AN	
린 관 40	.0- 1	MILL	White where the	unth	well and the second	. shulphan all and a start of the start of t	1 May - Lar	and the second sec		
20	0-									
20	.0-									
0	.0-									
	1000								11000	
				F	requency (Mi	Hz)				
Frequency	Level	Pol	15.209	/ 15E	Detector	Azimuth	Height	Comments		
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters			
4755.980	43.5	Н	54.0	-10.5	AVG	84	2.2		/B 10 Hz;Peak	
4919.940	40.7	Н	54.0	-13.3	AVG	78	2.5		/B 10 Hz;Peak	
4919.990	50.2	Н	74.0	-23.8	PK	78	2.5		/B 3 MHz;Peak	
4755.510	50.0	Н	74.0	-24.0	PK	84	2.2	RB 1 MHz;V	'B 3 MHz;Peak	
Note:   Scans between 11 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.     Note:   No significant emissions were observed.     Note:   The emisisons at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and the signal level did not change.										
	and digital le		ango.							

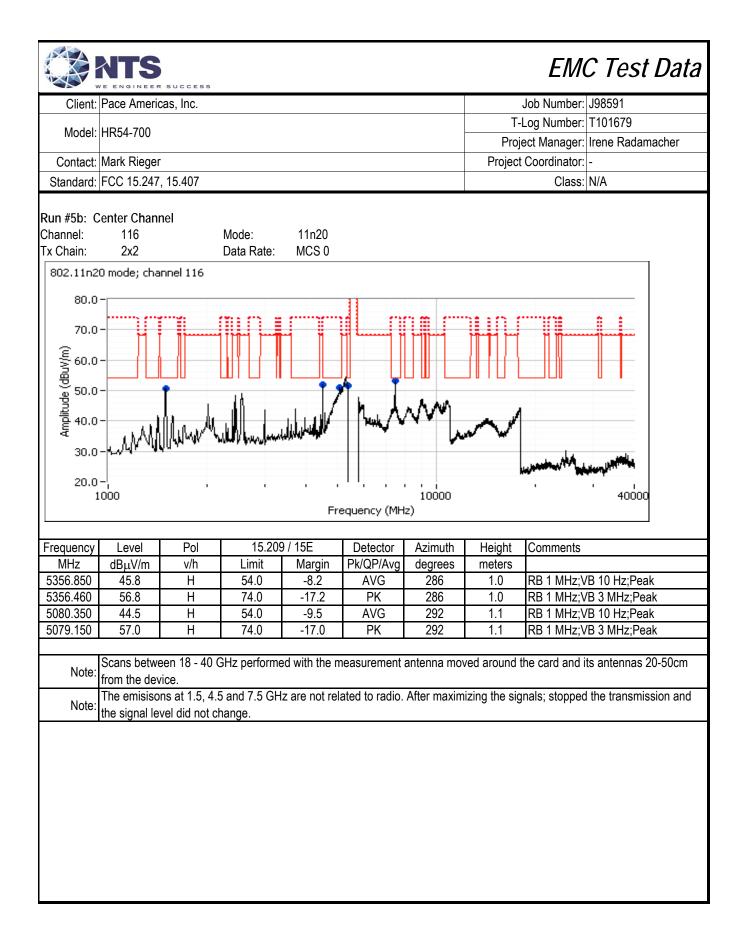
		R SUCCESS						ЕМС	CTest Data		
Client:	Pace Americ	cas, Inc.			Job Number: J98591						
Model	Nodel: HR54-700							og Number: T	101679		
								Project Manager: Irene Radamacher			
	Mark Rieger		Project	Coordinator: -							
Standard:	Standard:     FCC 15.247, 15.407     Class:     N/A										
Run #4: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Run #3Date of Test: 6/26/2015Config. Used: 1Test Location: Chamber #4Test Engineer: Joseph Cadigal											
Run #4a: L Channel: Tx Chain:	ow Channel 52 1	l	Mode: Data Rate:	11a 6MB/s		Setting:	20				
802.11a n	node; chann	nel 52									
140.0	0-										
120.0	0-				6						
(m) 100.0	D -										
-	40.0 - Milling with and										
	20.0 – 10000 40000 Trequency (MHz)										
Frequency	Level	Pol	15.209/	15 247	Detector	Azimuth	Height	Comments			
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	Commenta			
5046.170	42.2	Н	54.0	-11.8	AVG	75	2.5	RB 1 MHz;VB			
5048.330	54.5	Н	74.0	-19.5	PK	75	2.5	RB 1 MHz;VB	3 MHz;Peak		
	No significar	nt emissions	were observe	ed.					50cm from the device.		
Note: The emisisons at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and the signal level did not change.											

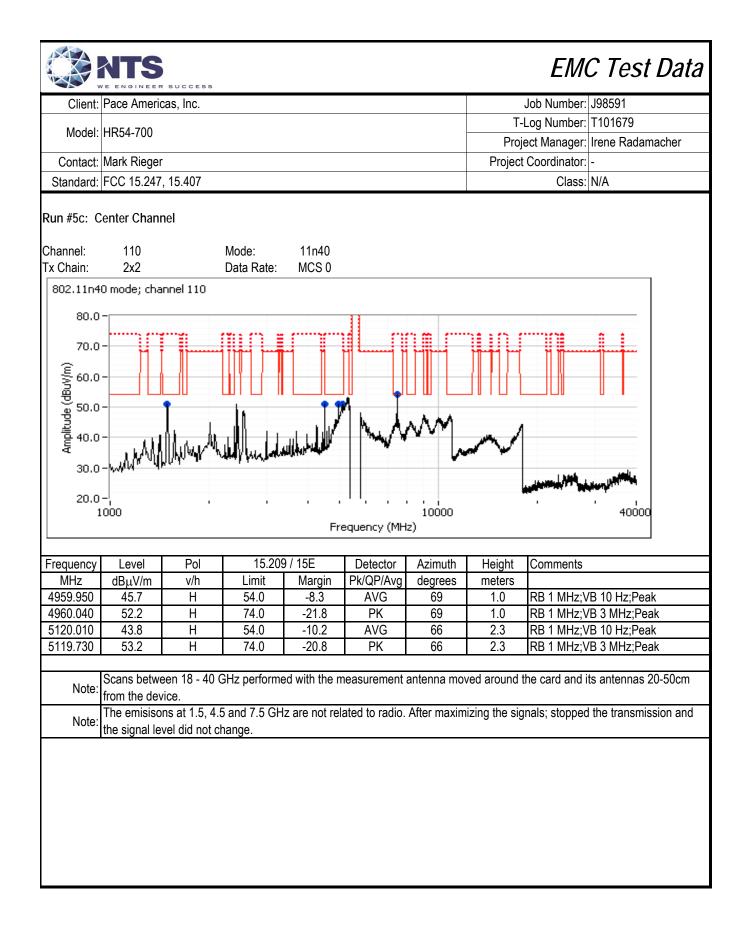
Client:   Job Number:   Job Number:   Job Number:   Job Number:   Job Number:   T101679     Model:   HR54-700   Project Coordinator:   Ir-Log Number:   Irene Radamacher     Contact:   Mark Rieger   Project Coordinator:   Irene Radamacher     Standard:   FCC 15.247, 15.407   Class:   N/A     Run #4b:   High Channel   Class:   N/A     Channel:   64   Mode:   11a   Setting:   20     Tx Chain:   1   Data Rate:   6MB/s   6MB/s   60.0     60.0	Model: HR54-700 Contact: Mark Rieger					T-I Proje	Log Number:	T101679
Model:   HR84-700   Project Manager:   Irene Radamacher     Contact:   Mark Rieger   Project Coordinator:   -     Standard:   FCC 15.247, 15.407   Class:   N/A     Run #4b: High Channel   Channel:   64   Mode::   11a   Setting::   20     Tx Chain:   1   Data Rate:   6MB/s   Setting::   20   Tx Chain::   1   Data Rate::   6MB/s     802.11a mode; channel 64	Contact: Mark Rieger					Proje	-	
Project Manager Irene Radamacher     Contact:   Mark Rieger   Project Coordinator:   -     Standard:   FCC 15.247, 15.407   Class:   N/A     Run #4b:   High Channel   Channel:   64   Mode:   11a   Setting:   20     Tx Chain:   1   Data Rate:   6MB/s   6MB/s   6MB/s   6MB/s     802.11a   mode; channel 64   140.0   0	Contact: Mark Rieger					-	ect Manager:	Irona Dadamaahar
Standard:   FCC 15:247, 15:407   Class:   N/A     Run #4b: High Channel   Channel:   64   Mode:   11a   Setting:   20     Tx Chain:   1   Data Rate:   6MB/s   6MB/s   6000000000000000000000000000000000000	-					Proiect		Irene Rauamacher
Run #4b: High Channel     Channel: 64 Mode: 11a Setting: 20     Tx Chain:   1   Data Rate: 6MB/s     802.11a mode; channel 64   140.0-     120.0-   0   0     90.0-   0.0-   0     100.0-   0   0     100.0-   0   0     100.0-   0   0     100.0-   0   0     100.0-   0   0     100.0-   0   0     100.0-   0   0     100.0-   0   0     100.0-   0   0     100.0-   0   0     100.0-   10000   40000     Frequency (MHz)   NHz   BµV/m     MHz   BµV/m   Vh   Limit   Margin     MHz   dBµV/m   Vh   Limit   Margin   Pk/QP/Avg   degrees     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz/VB 10 Hz/Peak     5046.050   56.3   H   74.0   -17.7   PK	Standard: FCC 15.247, 15.407						Coordinator:	-
Channel:   64   Mode:   11a   Setting:   20     Tx Chain:   1   Data Rate:   6MB/s     \$         002.11 a mode; channel 64           1000           1000           1000           1000           1000           1000           1000           1000           1000           1000           4000           4000           4000           4000           4000           4000           4000           4000           4000           4000           40000           40000           110           122           122           1000         1000							Class:	N/A
Tx Chain:   1   Data Rate:   6MB/s     602.11a mode; channel 64   140.0   140.0   120.0   100.0 <t< td=""><td>Run #4b: High Channel</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Run #4b: High Channel							
Image: Product of the set of the se					Setting:	20		
Image: Prequency   Level   Pol   15.209 / 15.247   Detector   Azimuth   Height   Comments     MHz   dB <sub>µ</sub> V/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.   Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.	802.11a mode; channel 64							
Image: Prequency   Level   Pol   15.209 / 15.247   Detector   Azimuth   Height   Comments     MHz   dB <sub>µ</sub> V/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.   Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.	140.0 -							
Image: Prequency   Level   Pol   15.209 / 15.247   Detector   Azimuth   Height   Comments     MHz   dBµV/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device. No significant emissions were observed.   The emissions at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and				4				
40.0   40.0   40.0   40.0     20.0   10000   10000   40000     Frequency   Level   Pol   15.209 / 15.247   Detector   Azimuth   Height   Comments     MHz   dBµV/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device. No significant emissions were observed.   The emissions at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and								
40.0   40.0   40.0   40.0     20.0   10000   10000   40000     Frequency   Level   Pol   15.209 / 15.247   Detector   Azimuth   Height   Comments     MHz   dBµV/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device. No significant emissions were observed.   The emissions at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and								
40.0   40.0   40.0   40.0     20.0   10000   10000   40000     Frequency   Level   Pol   15.209 / 15.247   Detector   Azimuth   Height   Comments     MHz   dBµV/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device. No significant emissions were observed.   The emissions at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and	80.0-			4				2 1
40.0   40.0   40.0   40.0     20.0   10000   10000   40000     Frequency   Level   Pol   15.209 / 15.247   Detector   Azimuth   Height   Comments     MHz   dBµV/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device. No significant emissions were observed.   The emissions at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and			M I	1	1 1 1		i ii	
20.0   -   1000   40000     Frequency   Level   Pol   15.209 / 15.247   Detector   Azimuth   Height   Comments     MHz   dBµV/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device. No significant emissions were observed.   The emissions at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and								U I
1000   10000   40000     Frequency (MHz)   Frequency (MHz)   40000     Frequency   Level   Pol   15.209 / 15.247   Detector   Azimuth   Height   Comments     MHz   dBµV/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.     Note:   Note:   The emissions were observed.	40.0- 10.0- 100 Milling	have the second	موالي المعالية معادية	m	<u>سا ۲</u>	المحربه سنسرد		
1000   10000   40000     Frequency (MHz)   Frequency (MHz)   40000     Frequency   Level   Pol   15.209 / 15.247   Detector   Azimuth   Height   Comments     MHz   dBµV/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.     Note:   Note:   The emissions were observed.	20.0-			ļ  , ,				
Frequency   Level   Pol   15.209 / 15.247   Detector   Azimuth   Height   Comments     MHz   dBμV/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.     No significant emissions were observed.   The emisisons at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and			-					40000
MHz   dBμV/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.   Note:   Note:   The emissions were observed.     Note:   The emissions at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and			Г	requency (Mr	12)			
MHz   dBμV/m   v/h   Limit   Margin   Pk/QP/Avg   degrees   meters     5045.160   43.0   H   54.0   -11.0   AVG   58   2.2   RB 1 MHz;VB 10 Hz;Peak     5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.   Note:   Note:   The emissions were observed.     Note:   The emissions at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and	Frequency Level Pol	15.209	/ 15.247	Detector	Azimuth	Heiaht	Comments	
5046.050   56.3   H   74.0   -17.7   PK   58   2.2   RB 1 MHz;VB 3 MHz;Peak     Note:						ž		
Note:   Scans between 18 - 40 GHz performed with the measurement antenna moved around the EUT at 20-50cm from the device.     No significant emissions were observed.     Note:   The emissions at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and								
Note: No significant emissions were observed. The emisisons at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and	5046.050 56.3 H	74.0	-17.7	PK	58	2.2	RB 1 MHz;V	/B 3 MHz;Peak
Noto:	Note: No significant emission	s were observ	ed.					
	Noto		z are not re	lated to radio.	After maxim	zing the sig	nals; stopped	I the transmission and
		change.						

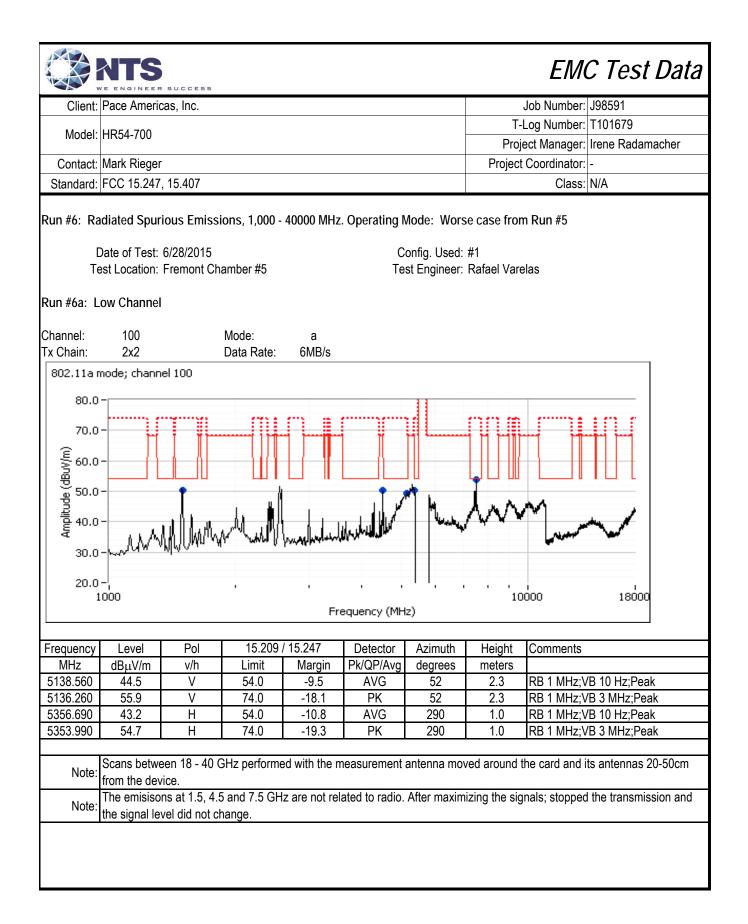


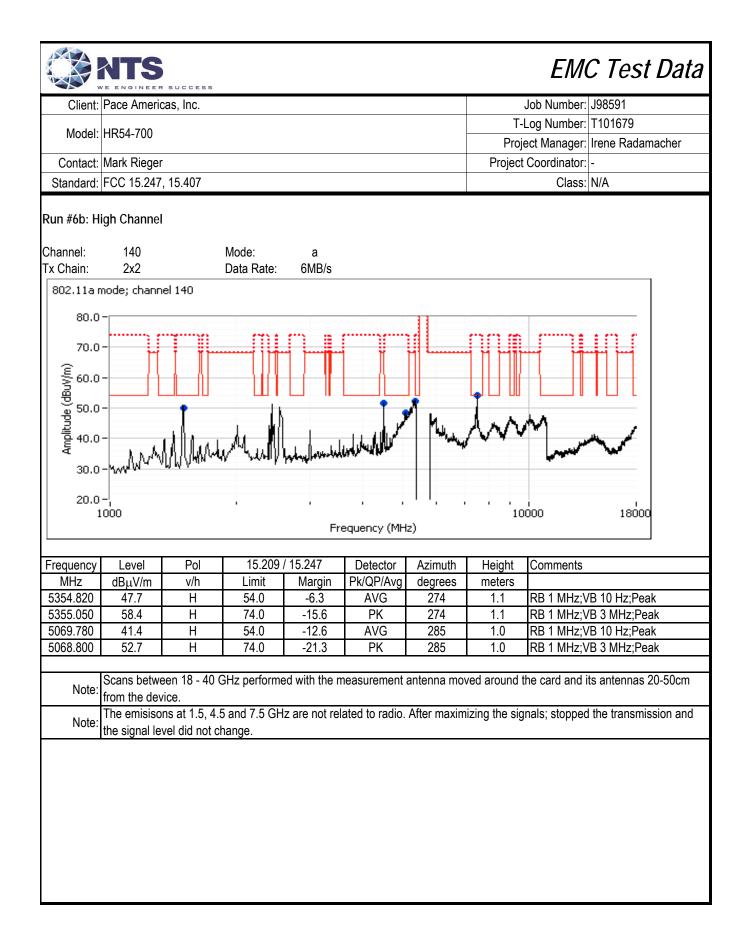
EMC Test Data										
Client:	Pace Americ	cas, Inc.						Job Number:	J98591	
Martal							T-	Log Number:	T101679	
Model:	HR54-700					-	Proje	ect Manager:	Irene Radamacher	
Contact:	Mark Rieger						Project	Coordinator:	-	
Standard:	Standard:     FCC 15.247, 15.407     Class:     N/A									
Run #4d: L	Run #4d: Low Channel									
	Date of Test:					onfig. Used:				
Te	est Location:	Chamber #5			Te	st Engineer:	Rafael Vare	elas		
Channel: Tx Chain:	64 2x2		Mode: Data Rate:	11n20 MCS0		Setting:	20			
Frequency	Level	Pol	15.209/	15.247	Detector	Azimuth	Height	Comments		
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters			
4879.950	44.0	Н	54.0	-10.0	AVG	63	2.2		B 10 Hz;Peak	
4880.140	51.4	Н	74.0	-22.6	PK	63	2.2		B 3 MHz;Peak	
5039.940	46.8	H	54.0	-7.2	AVG	80	1.0		B 10 Hz;Peak	
5039.840	55.3	Н	74.0	-18.7	PK	80	1.0	RB 1 MHz;V	B 3 MHz;Peak	
Note: Note:	No significant emissions were observed. The emisisons at 1.5, 4.5 and 7.5 GHz are not related to radio. After maximizing the signals; stopped the transmission and									
Note: No plot provided. Tabular data represents the worse case emissions observed during a preliminary scan.										

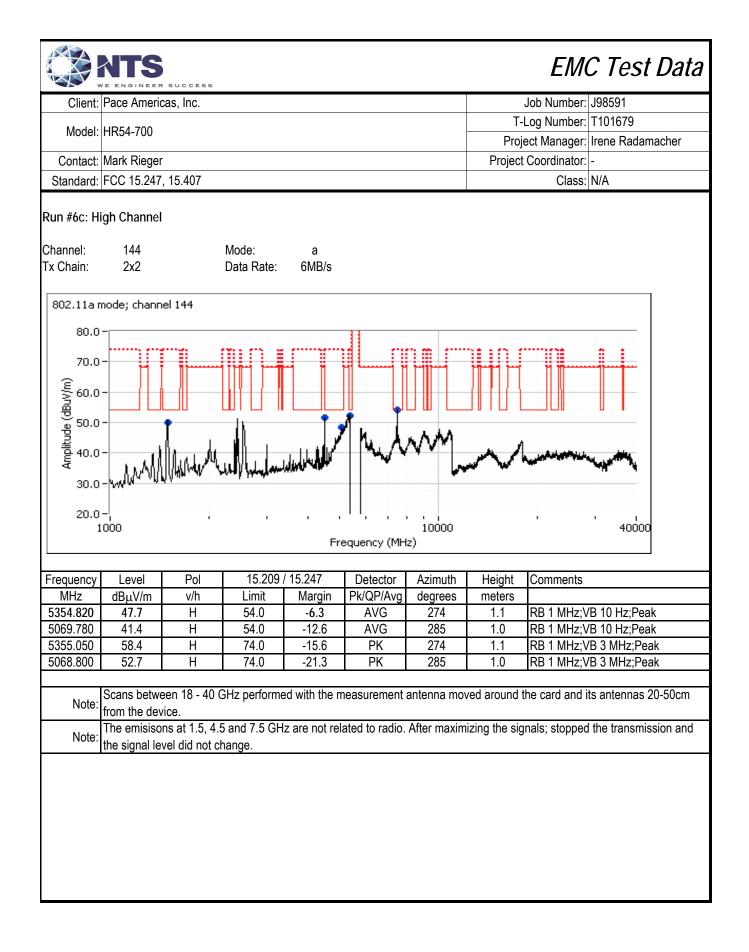


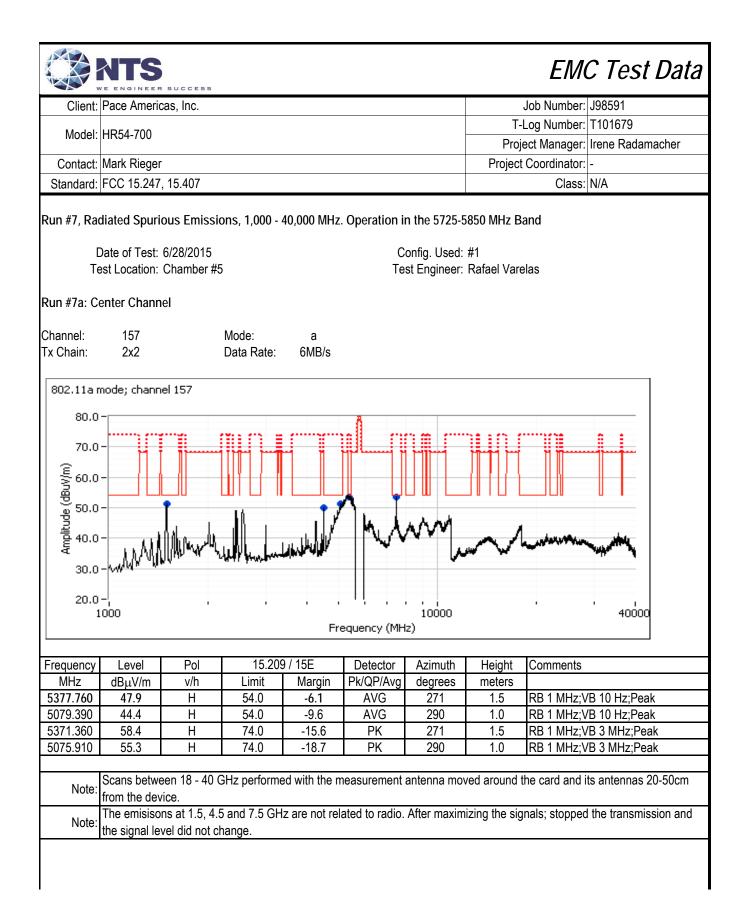


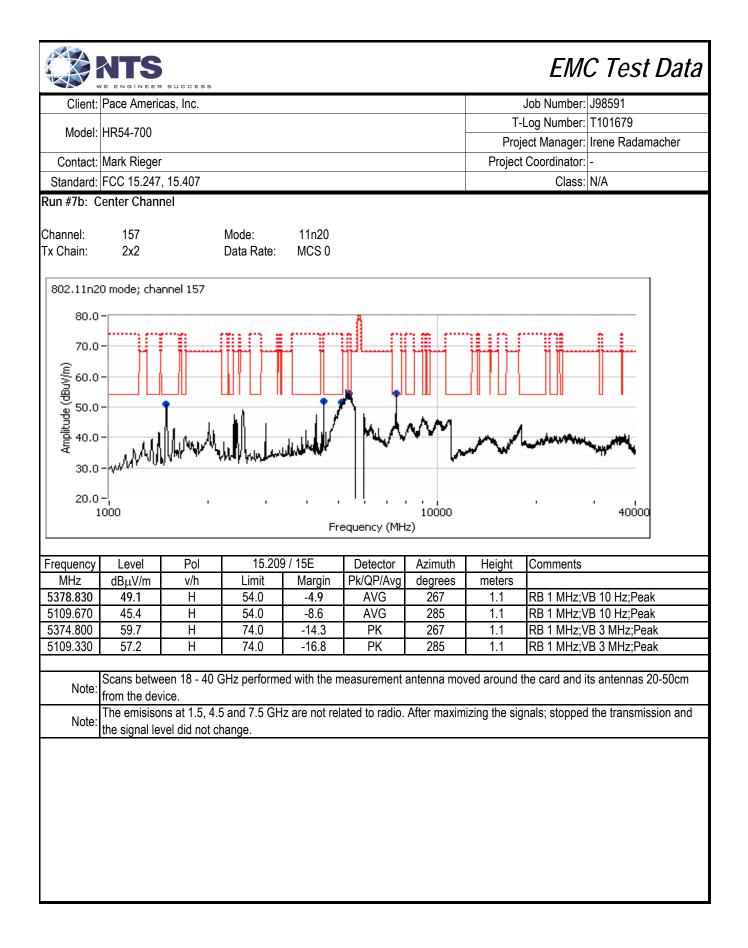


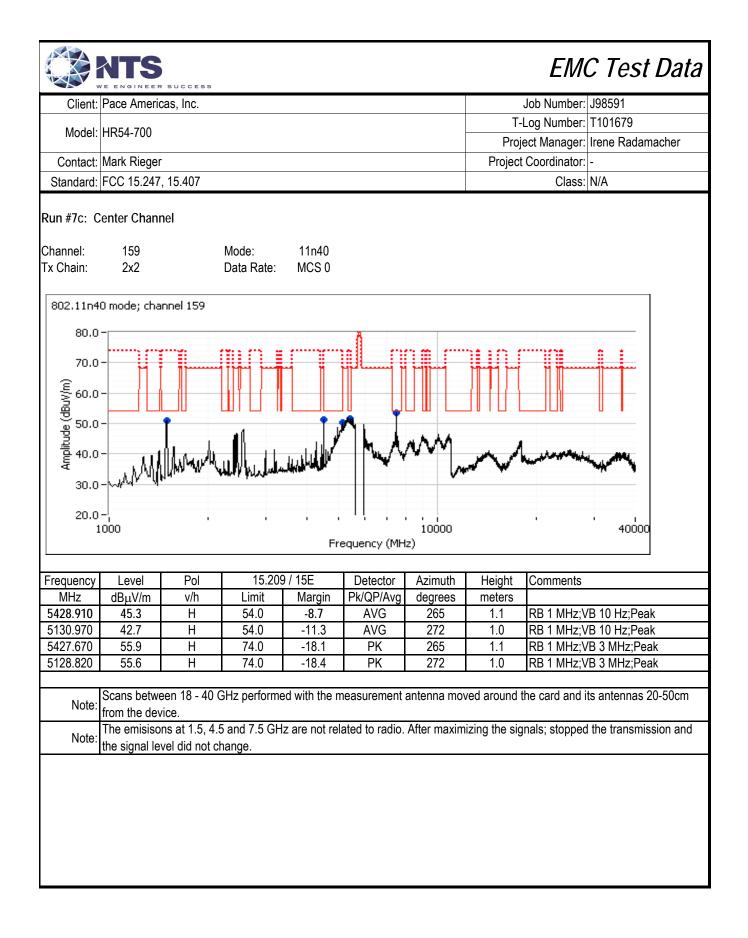




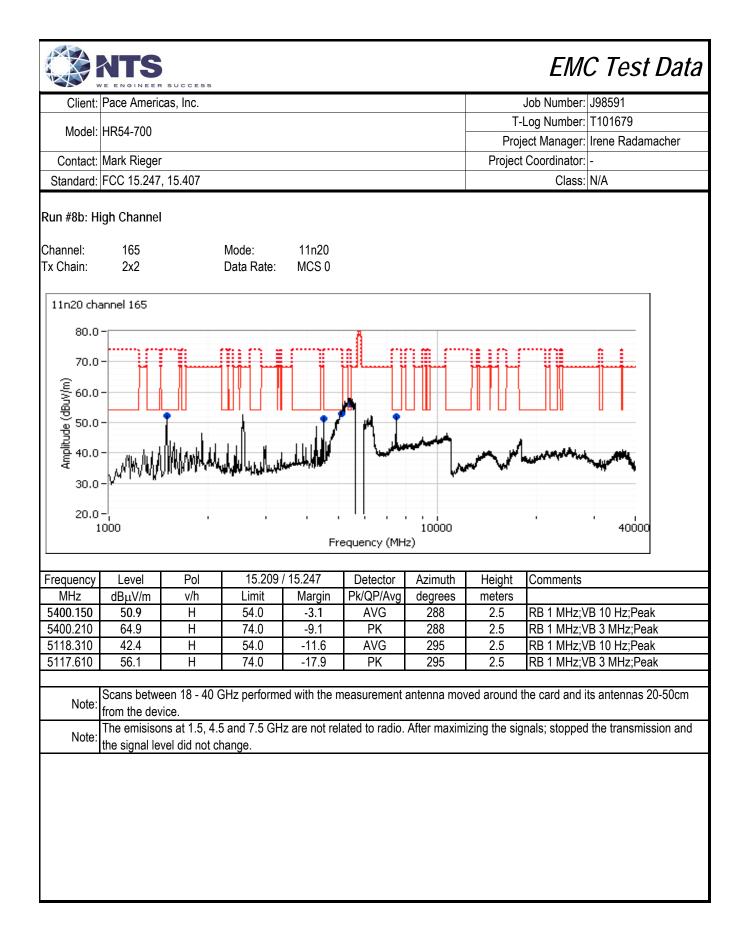








		SUCCESS						EM	C Test Dat
Client:	Pace Americ	cas, Inc.						Job Number:	J98591
							T-	Log Number:	T101679
Model:	HR54-700						Proj	ect Manager:	Irene Radamacher
Contact:	Mark Rieger						Project	Coordinator:	-
Standard:	FCC 15.247	, 15.407						Class:	N/A
0	adiated Spur Date of Test: est Location:	6/28/2015		40000 MHz		Mode: Wors onfig. Used: st Engineer:	#1		
un #8a: L	ow Channel								
hannel: ‹ Chain:	149 2x2		Mode: Data Rate:	11n20 MCS 0					
11n20 cha	annel 149								
80.0	-				8				
70.0 () = 60.0									
ළි ඉ 50.0	-				┦"╎				
(m//m) 50.0 40.0 40.0 30.0	- Minth					-lum -lum	~~^		
30.0	-wmth	JMagymlada							40000
30.0	- /////////////////////////////////	I III Illianntat		Fr	requency (MH		, , , , , , , , , , , , , , , , , , ,		40000
30.0 20.0 1	- /////////////////////////////////	Pol		Fr (15.247	Detector		Height	Comments	40000
30.0 20.0 1 equency MHz	-  .ooo	v/h	Limit	/ 15.247 Margin	Detector Pk/QP/Avg	z) Azimuth degrees	meters		
30.0 20.0 1 requency MHz 127.270	  .ooo	v/h H	Limit 54.0	/ 15.247 Margin -8.5	Detector Pk/QP/Avg AVG	Azimuth degrees 285	meters 2.2	RB 1 MHz;V	/B 10 Hz;Peak
30.0 20.0 1 <u>requency</u> <u>MHz</u> 127.270 423.460	- - μ - - - - - - - - - - - - - - - - -	v/h H H	Limit 54.0 54.0	/ 15.247 Margin -8.5 -12.0	Detector Pk/QP/Avg AVG AVG	Azimuth degrees 285 287	meters 2.2 2.5	RB 1 MHz;V RB 1 MHz;V	/B 10 Hz;Peak /B 10 Hz;Peak
30.0 20.0 1 requency MHz 127.270 423.460 126.940	- μ .0000 Level dBμV/m 45.5 42.0 57.5	v/h H H H	Limit 54.0 54.0 74.0	/ 15.247 Margin -8.5 -12.0 -16.5	Detector Pk/QP/Avg AVG AVG PK	Azimuth degrees 285 287 285	meters 2.2 2.5 2.2	RB 1 MHz;V RB 1 MHz;V RB 1 MHz;V	/B 10 Hz;Peak /B 10 Hz;Peak /B 3 MHz;Peak
30.0 20.0 1 requency MHz 127.270 423.460 126.940 417.260	- μ .000 Level dBμV/m 45.5 42.0 57.5 53.5	v/h H H H H	Limit 54.0 54.0 74.0 74.0	/ 15.247 Margin -8.5 -12.0 -16.5 -20.5	Detector Pk/QP/Avg AVG AVG PK PK	Azimuth degrees 285 287 285 285 287	meters 2.2 2.5 2.2 2.2 2.5	RB 1 MHz;V RB 1 MHz;V RB 1 MHz;V RB 1 MHz;V	/B 10 Hz;Peak /B 10 Hz;Peak /B 3 MHz;Peak /B 3 MHz;Peak
30.0 20.0 1 requency MHz 5127.270 5423.460 5126.940 5417.260	- .000 Level dBμV/m 45.5 42.0 57.5 53.5 Scans between	v/h H H H H een 18 - 40 (	Limit 54.0 54.0 74.0 74.0	/ 15.247 Margin -8.5 -12.0 -16.5 -20.5	Detector Pk/QP/Avg AVG AVG PK PK	Azimuth degrees 285 287 285 285 287	meters 2.2 2.5 2.2 2.2 2.5	RB 1 MHz;V RB 1 MHz;V RB 1 MHz;V RB 1 MHz;V	/B 10 Hz;Peak /B 10 Hz;Peak /B 3 MHz;Peak
30.0 20.0 1 requency MHz 5127.270 5423.460 5126.940 5417.260 Note:	- Level dBμV/m 45.5 42.0 57.5 53.5 Scans betwee from the dew The emisiso	v/h H H H een 18 - 40 ( rice. ns at 1.5, 4.	Limit 54.0 54.0 74.0 74.0 GHz performe 5 and 7.5 GH	/ 15.247 Margin -8.5 -12.0 -16.5 -20.5 ed with the r	Detector Pk/QP/Avg AVG AVG PK PK Neasurement	Azimuth degrees 285 287 285 287 285 287 antenna mov	meters 2.2 2.5 2.2 2.5 ved around f	RB 1 MHz;V RB 1 MHz;V RB 1 MHz;V RB 1 MHz;V RB 1 MHz;V	/B 10 Hz;Peak /B 10 Hz;Peak /B 3 MHz;Peak /B 3 MHz;Peak
30.0 20.0 1 requency MHz 5127.270 5423.460 5126.940 5417.260 Note:	 	v/h H H H een 18 - 40 ( rice. ns at 1.5, 4.	Limit 54.0 54.0 74.0 74.0 GHz performe 5 and 7.5 GH	/ 15.247 Margin -8.5 -12.0 -16.5 -20.5 ed with the r	Detector Pk/QP/Avg AVG AVG PK PK Neasurement	Azimuth degrees 285 287 285 287 285 287 antenna mov	meters 2.2 2.5 2.2 2.5 ved around f	RB 1 MHz;V RB 1 MHz;V RB 1 MHz;V RB 1 MHz;V RB 1 MHz;V	/B 10 Hz;Peak /B 10 Hz;Peak /B 3 MHz;Peak /B 3 MHz;Peak ts antennas 20-50cm



# EMC Test Data EER SUCCESS Client: Pace Americas, Inc. Job Number: J98591 T-Log Number: T101679 Model: HR54-700 Project Manager: Irene Radamacher **Project Coordinator:** Contact: Mark Rieger Standard: FCC 15.247, 15.407 Class: N/A FCC 15.407(UNII) Antenna Port Measurements Power, PSD, Bandwidth and Spurious Emissions Test Specific Details Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above. General Test Configuration When measuring the conducted emissions 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 to allow for the external attenuators and cables used. Ambient Conditions: Temperature: 20-22 °C Rel. Humidity: 30-35 % 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.

	RSUCCESS			EMC Test Data
Client: Pace Ameri	cas, Inc.			Job Number: J98591
Madali UD54 700			T-l	_og Number: T101679
Model: HR54-700			Proje	ect Manager: Irene Radamacher
Contact: Mark Rieger	r		Project	Coordinator: -
Standard: FCC 15.247				Class: N/A
	·			
Summary of Result Run #	Test Performed	Limit	Pass / Fail	Result / Margin
		Linin	1 033 / 1 01	a: 52.5 mW (17.2 dBm)
1	Power, 5150 - 5250MHz	15.407(a) (1), (2), (3)	Pass	n20: 145.5 mW (21.6 dBm)
				n40: 167.5 mW (22.2 dBm)
				a: 3.2 dBm/MHz
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2), (3)	Pass	n20: 9.5 dBm/MHz
				n40: 7.2 dBm/MHz
1	Power, 5250 - 5350MHz	15.407(a) (1), (2), (3)	Pass	a: 79.4 mW (19.0 dBm) n20: 143.3 mW (21.6 dBm)
I		10.407 (d) (1), (Z), (J)	1 455	n40: 133.7 mW (21.3 dBm)
				a: 6.9 dBm/MHz
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2), (3)	Pass	n20: 9.0 dBm/MHz
				n40: 6.2 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 25.7 dBm (368.4 mW)
				a: 85.1 mW (19.3 dBm)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2), (3)	Pass	n20: 166.5 mW (22.2 dBm)
				n40: 157.1 mW (22.0 dBm)
4		45,407(-),(1),(2),(2)	Dees	a: 6.6 dBm/MHz
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2), (3)	Pass	n20: 9.5 dBm/MHz n40: 6.7 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold	Pass	EIRP = 26.3 dBm (428.0 mW)
1	Power, 5725 - 5850MHz	15.407(a) (1), (2), (3)	Pass	a: 77.6 mW (18.9 dBm) n20: 158.9 mW (22.0 dBm) n40: 146.7 mW (21.7 dBm)
1	PSD, 5725 - 5850MHz	15.407(a) (1), (2), (3)	Pass	a: 6.3 dBm/MHz n20: 9.2 dBm/MHz n40: 6.6 dBm/MHz
1	99% Bandwidth	-	N/A	a: 17.0 MHz n20: 18.0 MHz n40: 36.2 MHz

	NTS VE ENGINEER SUCCESS	EM	C Test Data
Client:	Pace Americas, Inc.	Job Number:	J98591
Madalı	HR54-700	T-Log Number:	T101679
MOUEI.	IR34-700	Project Manager:	Irene Radamacher
Contact:	Mark Rieger	Project Coordinator:	-
Standard:	FCC 15.247, 15.407	Class:	N/A

### Summary of Results

Summary of Result	.5			
Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	26dB Bandwidth (5250-5350 and	15.407		> 20MHz for all modes
I	5470-5725 MHz Bands)	(Information only)	-	
0	6dB Bandwidth	15.407		> 500 kHz all modes
Z	(5725-5850 MHz band only)	15.407	-	
3	Antenna Conducted - Out of Band	15.407(b)		All measurements performed
5	Spurious	-27dBm/MHz	-	radiated

## General Test Configuration

When measuring the conducted emissions 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 to allow for the external attenuators and cables used.

Ambient Conditions:	Temperature:	20-22 °C
	Rel. Humidity:	30-35 %

#### 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.

#### Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D02 v01

	Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
	11a	6 Mb/s	98.4%	yes	1.41	0	0	-
	n20	MCS 0	99.2%	yes	1.33	0	0	-
[	n40	MCS 0	98.4%	yes	1.33	0	0	-

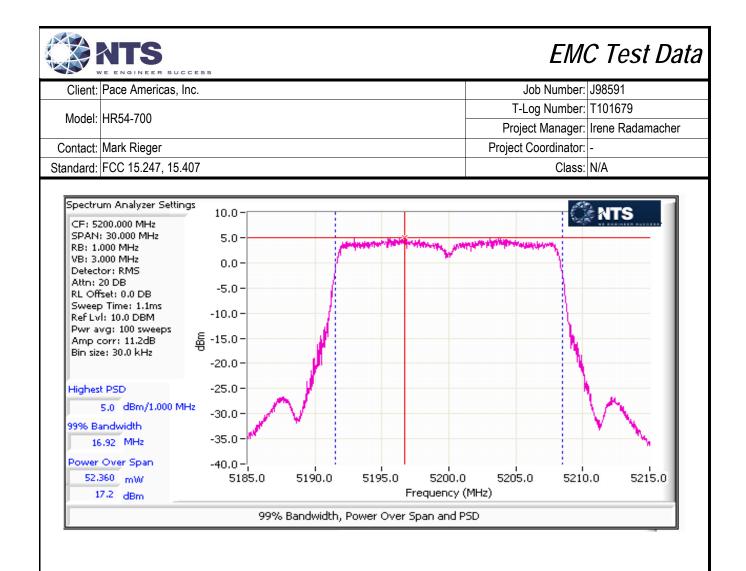
#### Sample Notes

Sample S/N: G54DA5DN000024 Driver: 5.99 RC 188.10 Antenna: Internal

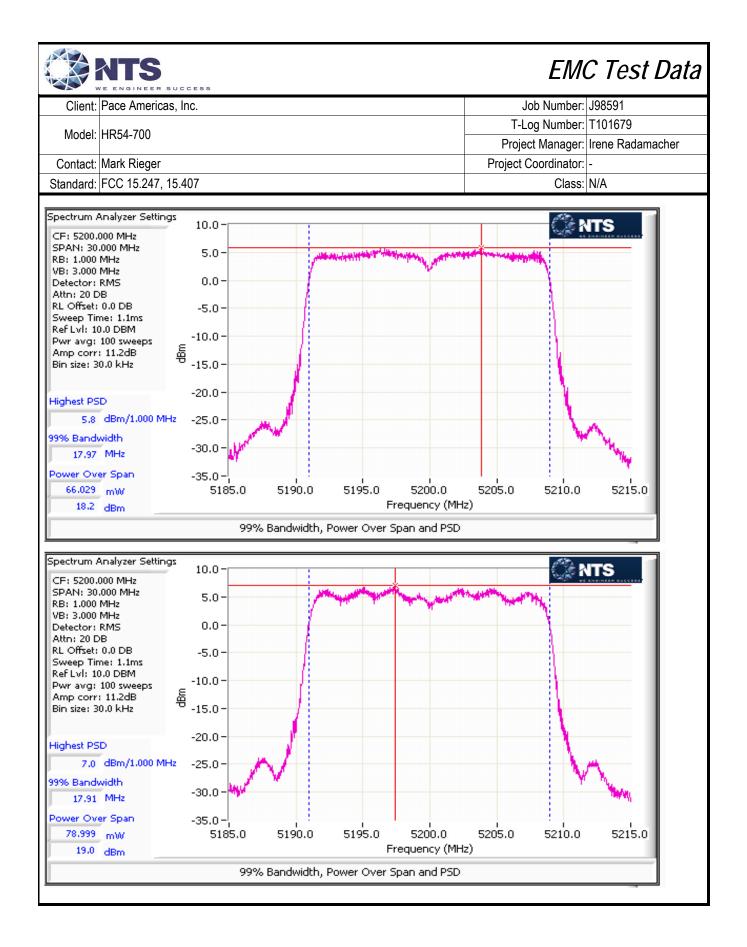
		SUCCESS					EMO	C Test	' Data
Client:	Pace Americ	cas, Inc.					Job Number:	J98591	
Model	HR54-700					T	-Log Number:	T101679	
MOUEI.	1154-700					Pro	ject Manager:	Irene Radar	nacher
Contact:	Mark Rieger					Projec	t Coordinator:	-	
Standard:	FCC 15.247	, 15.407					Class:	N/A	
Antenna Ga	ain Informati		ain (dBi) / Chain		MultiChain		Sectorized	Dir G	Dir G
Freq	1	2		BF	Legacy	CDD	/ Xpol	(PWR)	(PSD)
5150-5250	4.1	4.1		No	No	Yes	No	4.1	7.1
5250-5350	4.1	4.1		No	No	Yes	No	4.1	7.1
5470-5725	4.1	4.1		No	No	Yes	No	4.1	7.1
5725-5825	4.1	4.1		No	No	Yes	No	4.1	7.1
Notes: Notes:	cross polariz Dir G (PWR)	ed. ) = total gai	versity (or Cyclic Shift Divers in (Gant + Array Gain) for po pending on the modes supp	ower calcu	lations; GA (PS	D) = total	gain for PSD (	calculations l	based on
Notes:	Array gain fo	• •	d calculated per DKB 6629 10*log(4/2) = 3dB.	11 D01, v0	1r02. Spatial N	Iultiplexing	g with Nant=4,	Nss=2, for w	orse case
Notes:	For systems Option 1: D calculated b Option 2: A	with Beam elays are o ased on be ntennas are ssociated w	forming and CDD, choose of ptimized for beamforming, r amforming criteria. e paired for beamforming, a vith beamforming with 2 ante	ather than nd the pair	being selected s are configure	d to use th	e cyclic delay	diversity of 8	802.11; the

	NTS VE ENGINEER SUCCESS	EMO	C Test Data
Client:	Pace Americas, Inc.	Job Number:	J98591
Madalı	HR54-700	T-Log Number:	T101679
woder.	nk34-700	Project Manager:	Irene Radamacher
Contact:	Mark Rieger	Project Coordinator:	-
Standard:	FCC 15.247, 15.407	Class:	N/A
[	ndwidth, Output Power and Power Spectral Density - MIMO Systems Date of Test: 7/13 and 14/2015 Test Location: est Engineer: Mehran Birgani EUT Voltage:		
Note 1:	Output power measured using a spectrum analyzer (see plots below). RBW 2*span/RBW, RMS detector, power averaging on (transmitted signal was c 802.11a and n20 modes over 70 MHz for 802.11n40 mode (method SA-1 or section 20 modes).	ontinuous) and power inte	
Note 2:	Measured using the same analyzer settings used for output power. For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the anten	na gain as the maximum	aira allowed is
Note 3:	10dBm/MHz. The limits are also corrected for instances where the highest r PSD (calculated from the measured power divided by the measured 99% ba the measured value exceeds the average by more than 3dB.	neasured value of the PS andwidth) by more than 3	D exceeds the average
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span		
Note 5:	For MIMO systems the total output power and total PSD are calculated form (in linear terms). The antenna gain used to determine the EIRP and limits for mode of the MIMO device. If the signals on the non-coherent between the the limits is the highest gain of the individual chains and the EIRP is the sun chain. If the signals are coherent then the effective antenna gain is the sum the EIRP is the product of the effective gain and total power.	or PSD/Output power dep transmit chains then the n of the products of gain a	pends on the operating gain used to determine and power on each
Note 6:	PL8200 Grey: Port 1; PL8100 Black: Port 2		

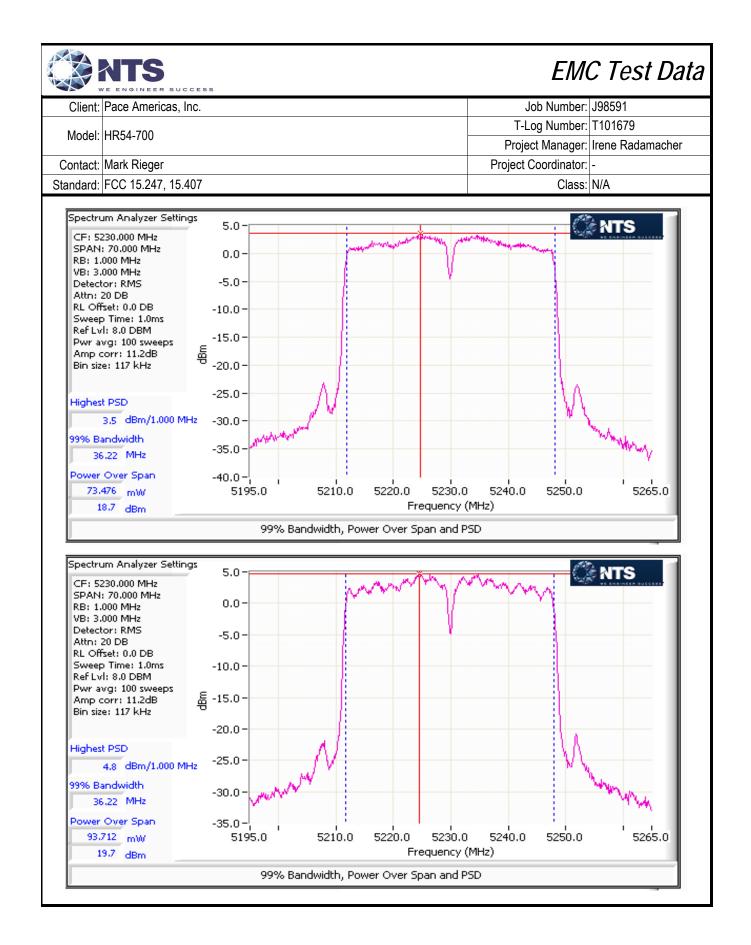
		SUCCESS						EM	C Test	Data
Client:	Pace Americ	as, Inc.						Job Number:	J98591	
Madalı	HR54-700						T-L	og Number:	T101679	
MOUEI.	HK34-700						Proje	ect Manager:	Irene Radam	nacher
	Mark Rieger						Project	Coordinator:		
Standard:	FCC 15.247,	15.407						Class:	N/A	
MIMO Devic Mode:	ce - 5150-525 11a	i0 MHz Ban	d - FCC				Мах	EIRP (mW):	134.9	
Frequency	Chain	Software		Duty Cycle	Power <sup>1</sup>	Total	Power	FCC Limit	Max Power	Result
(MHz)	Chain	Setting		%	dBm	mW	dBm	dBm	(W)	Result
5180	1	17		98.4	16.3	42.7	16.3	24.0		Pass
5200	1	18		98.4	17.2	52.5	17.2	24.0	0.052	Pass
5240	1	18		98.4	16.8	47.9	16.8	24.0		Pass
5150-5250 F Mode: Frequency	11a	Software	99% BW	Duty Cycle	PSD	Total	PSD <sup>1</sup>	FCC Limit		
(MHz)	Chain	Setting	(MHz)	%	dBm/MHz	mW/MHz	dBm/MHz		/MHz	Result
5180	1	17	16.9	98.4	4.2	2.6	4.2	11.0		Pass
5200	1	18	16.9	98.4	5.0	3.2	5.0	11.0		Pass
5240	1	18	16.9	98.4	4.6	2.9	4.6	11.0		Pass



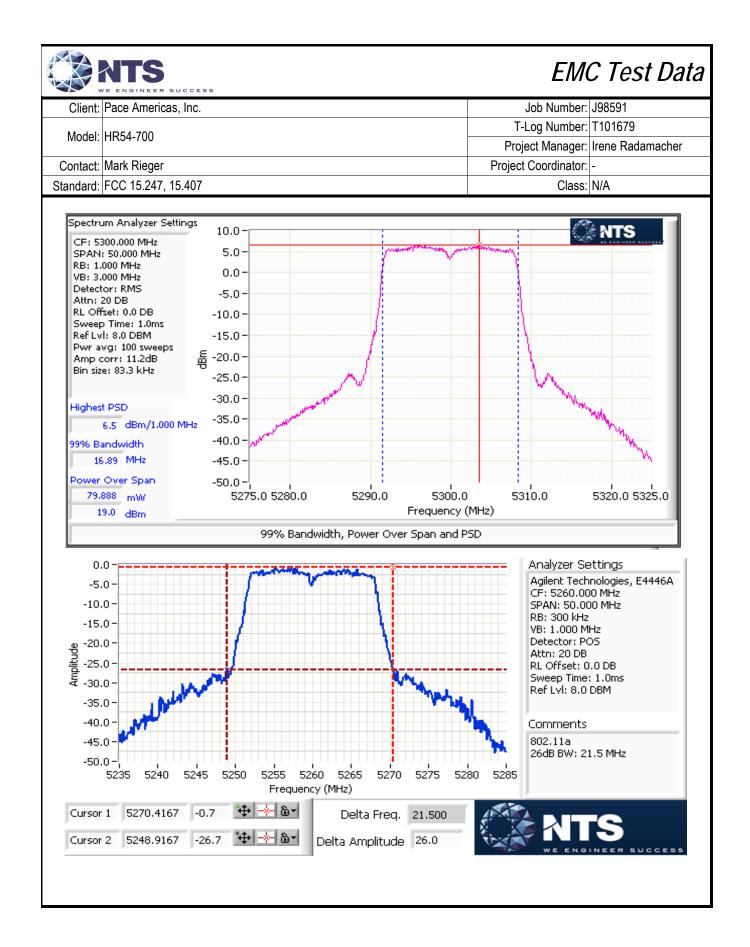
		SUCCESS						EM	C Test	Data
Client:	Pace Americ	as, Inc.						Job Number:	J98591	
							T-L	og Number:	T101679	
Model:	HR54-700						Proje	ect Manager:	Irene Radam	nacher
Contact:	Mark Rieger						Project	Coordinator:	-	
Standard:	FCC 15.247,	15.407						Class:	N/A	
MIMO Devic Mode:			d - FCC				Max	EIRP (mW):	374.0	
Frequency		Software		Duty Cycle	Power <sup>1</sup>	Total	Power		Max Power	Desult
(MHz)	Chain	Setting		%	dBm	mW	dBm	dBm	(W)	Result
5180	1 2	18		99.2	17.3 18.3	121.3	20.8	24.0		Pass
5200	1 2	19		99.2	18.2 19.0	145.5	21.6	24.0	0.146	Pass
5240	1 2	19		99.2	17.7 18.4	128.1	21.1	24.0		Pass
5150-5250 F Mode:	PSD n20	Outhers	99% BW		202			50011-11		
Frequency (MHz)	Chain	Software Setting	99% ВW (MHz)	Duty Cycle %	PSD dBm/MHz	i otai mW/MHz	PSD <sup>1</sup> dBm/MHz	FCC Limit	/MHz	Result
5180	1 2	18	18.0	99.2	4.7 6.3	7.2	8.6	9.9		Pass
5200	1 2	19	18.0	99.2	5.8 7.0	8.8	9.5	9.9		Pass
5240	1 2	19	18.0	99.2	5.2 6.3	7.6	8.8	9.9		Pass



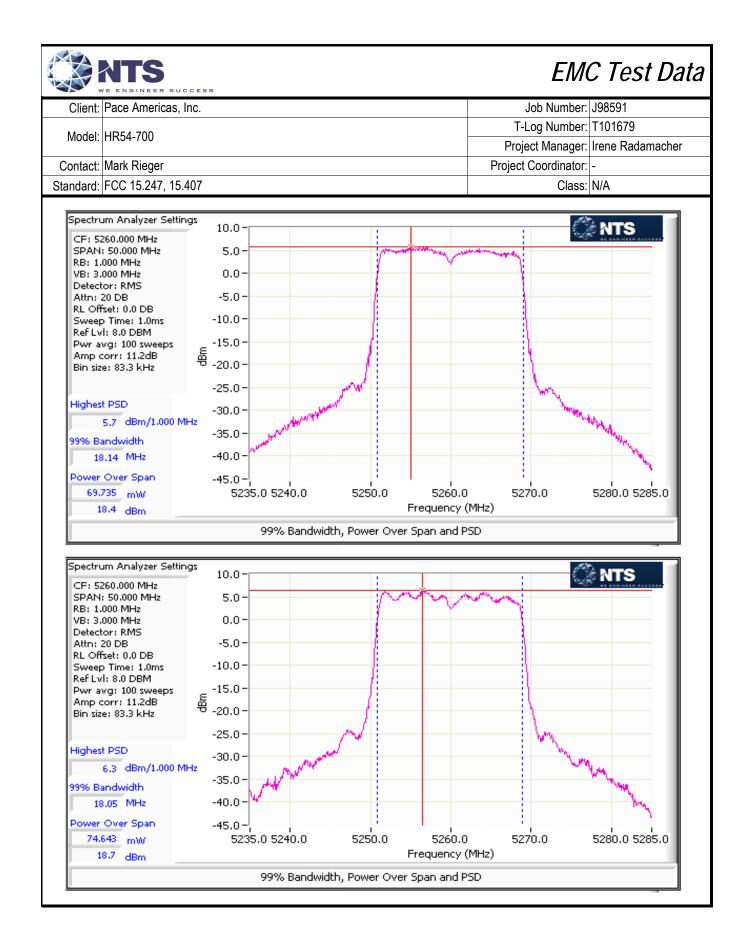
Client:		SUCCESS								
Short.	Pace Americ	as, Inc.						Job Number:		
Model.	HR54-700							og Number:		
									Irene Radam	acher
	Mark Rieger						Project	Coordinator:		
Standard:	FCC 15.247	15.407						Class:	N/A	
/IIMO Devid Mode:	ce - 5150-525 n40	i0 MHz Ban	d - FCC				Max	EIRP (mW):	430.4	
Frequency		Software		Duty Cycle	Power	Total F	Power <sup>1</sup>	FCC Limit	Max Power	
(MHz)	Chain	Setting		%	dBm	mW	dBm	dBm	(W)	Result
5190	1	16		98.4	15.1 16.5	77.0	18.9	24.0	0.407	Pass
5230	1 2	20		98.4	18.7 19.7	167.5	22.2	24.0	0.167	Pass
5150-5250 I Mode: Frequency (MHz)	n40 Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total mW/MHz	PSD <sup>1</sup> dBm/MHz	FCC Limit dBm	/MHz	Result
Mode: Frequency	n40									Result Pass

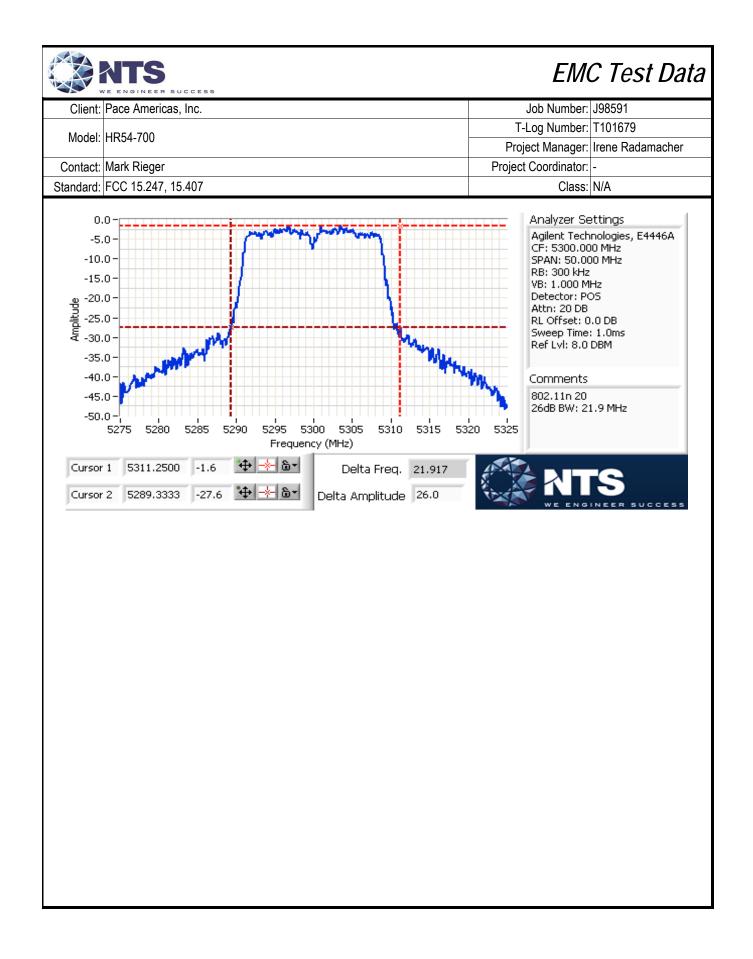


		SUCCESS						EM	C Test	Data
Client:	Pace Americ	as, Inc.					,	Job Number:	J98591	
		,					T-L	og Number:	T101679	
Model:	HR54-700								Irene Radam	acher
Contact:	Mark Rieger						Project	Coordinator:	-	
Standard:	FCC 15.247	, 15.407						Class:	N/A	
MIMO Devic Mode:	ce - 5250-535 11a	50 MHz Ban	d - FCC				Max	EIRP (mW):	204.2	
Frequency		Software	26dB BW	Duty Cycle	Power	Total F			Max Power	
(MHz)	Chain	Setting	(MHz)	%	dBm	mW	dBm	dBm	(W)	Result
5260	1	20	21.5	98.4	18.7	74.1	18.7	24.0		Pass
5300	1	20	21.2	98.4	19.0	79.4	19.0	24.0	0.079	Pass
5320	1	18	20.6	98.4	17.3	53.7	17.3	24.0		Pass
5250-5350 F Mode: Frequency	2SD 11a	Software	99% BW	Duty Cycle	PSD	Total		FCC Limit		
(MHz)	Chain	Setting	(MHz)	%	dBm/MHz	mW/MHz	dBm/MHz		/MHz	Result
5260	1	20	16.9	98.4	6.9	4.9	6.9	9.9		Pass
5300	1	20	16.9	98.4	6.5	4.5	6.5	9.9		Pass
5320	1	18	16.9	98.4	4.8	3.0	4.8	9.9		Pass

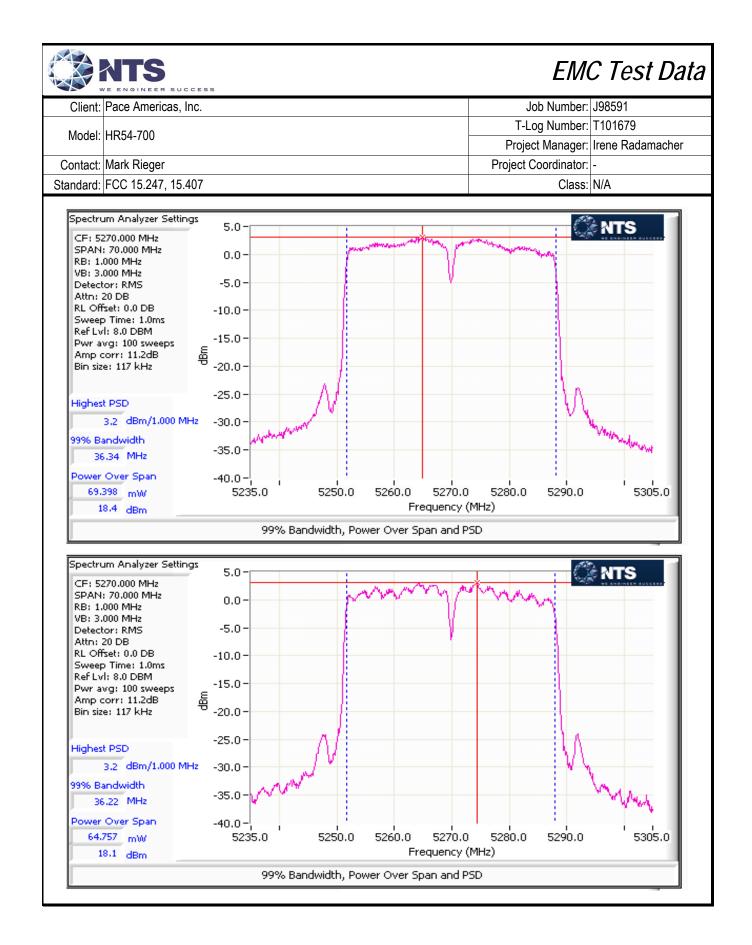


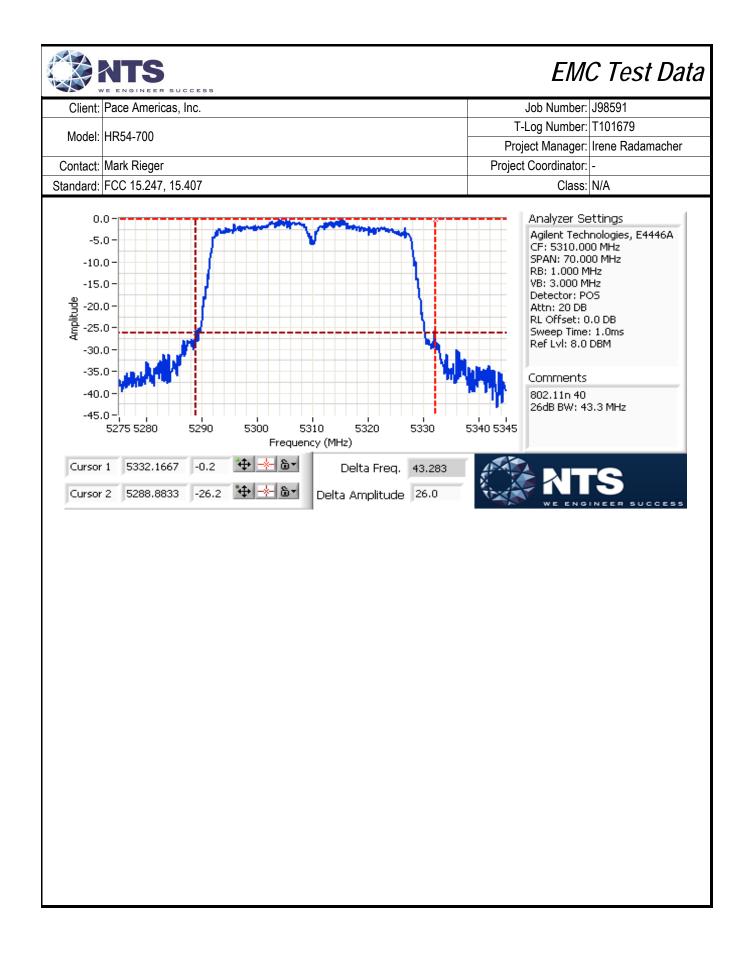
		SUCCESS						EM	C Test	Data
Client:	Pace Americ	as, Inc.					,	lob Number:	J98591	
Madalı							T-L	og Number:	T101679	
woder:	HR54-700						Proje	ct Manager:	Irene Radam	nacher
Contact:	Mark Rieger						Project	Coordinator:	-	
Standard:	FCC 15.247,	15.407						Class:	N/A	
MIMO Devic Mode:	e - 5250-535 n20	i0 MHz Band	d - FCC				Мах	EIRP (mW):	368.4	
Frequency		Software	26dB BW	Duty Cycle	Power	Total	Power <sup>1</sup>		Max Power	
(MHz)	Chain	Setting	(MHz)	%	dBm	mW	dBm	dBm	(W)	Result
5260	1 2	20	24.0	99.2	18.4 18.7	143.3	21.6	24.0		Pass
5300	1 2	20	21.9	99.2	18.6 17.8	132.7	21.2	24.0	0.143	Pass
5320	1 2	20	22.5	99.2	17.9 ////////////////////////////////////	123.3	20.9	24.0		Pass
5250-5350 F Mode: Frequency	n20	Software	99% BW	Duty Cycle	PSD	Total	PSD <sup>1</sup>	FCC Limit		
(MHz)	Chain	Setting	(MHz)	%	dBm/MHz	mW/MHz	dBm/MHz		/MHz	Result
5260	1 2	20	18.1	99.2	5.7 6.3	8.0	9.0	9.9		Pass
5300	1 2	20	18.0	99.2	5.7 5.2	7.0	8.5	9.9		Pass
5320	1	20	18.1	99.2	5.0 5.4	6.6	8.2	9.9		Pass



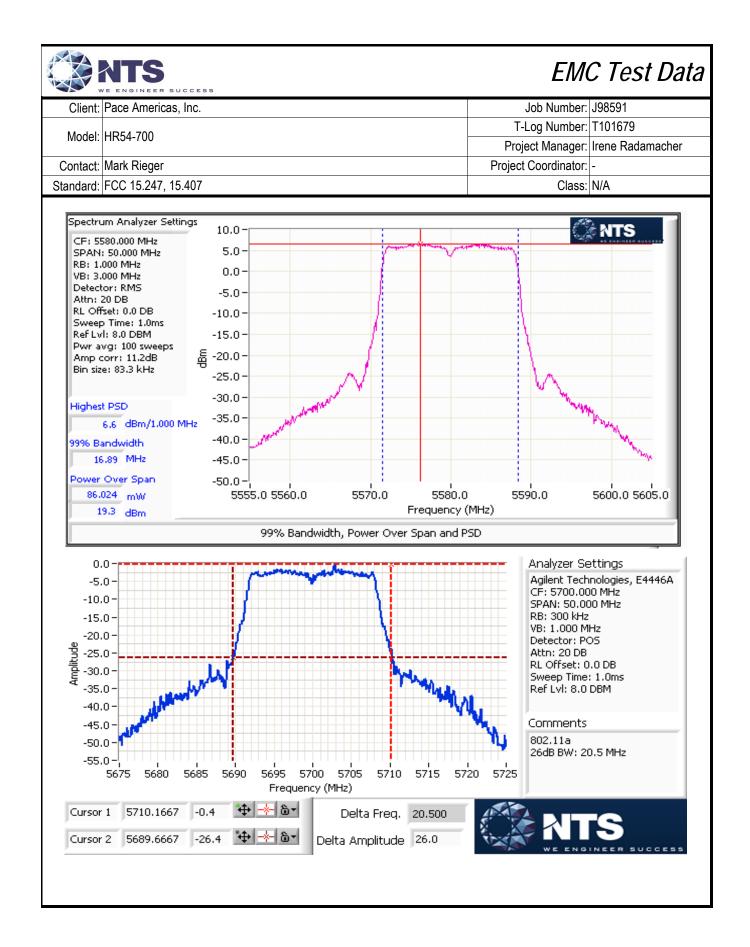


Client:     Pace Americas, Inc.     Job Number:     J98591       Model:     HR54-700     T-Log Number:     T101679       Project Manager:     Irene Radamache       Contact:     Mark Rieger     Project Coordinator:       Standard:     FCC 15.247, 15.407     Class:     N/A       MIMO Device - 5250-5350 MHz Band - FCC     Max EIRP (mW):     343.8       Frequency     Chain     Software     26dB BW     Duty Cycle     Power     Total Power <sup>1</sup> FCC Limit     Max Power     Re       (MHz)     Chain     Software     26dB BW     Duty Cycle     Power     Total Power <sup>1</sup> FCC Limit     Max Power     Re       5270     1     20     46.4     98.4     133.7     21.3     24.0     0.134       5310     1     18     43.3     98.4     133.7     21.3     24.0     Pa       MIMO Device     5250-5350 PSD     Mode:     n40     16.8     19.9     24.0     Pa       MIMO Device     5250-5350 PSD     Mode:     n40     Software
Mödel:     HR34-700     Project Manager:     Irene Radamache       Contact:     Mark Rieger     Project Coordinator:     -       Standard:     FCC 15.247, 15.407     Class:     N/A       MIMO Device - 5250-5350 MHz Band - FCC     Max EIRP (mW):     343.8       Frequency (MHz)     Chain     Software Setting     26dB BW (MHz)     Duty Cycle     Power     Total Power <sup>1</sup> FCC Limit     Max Power     Re       5270     1     20     46.4     98.4     133.7     21.3     24.0     0.134       5310     1     18     43.3     98.4     16.9     0.134     Pa       MIMO Device     5250-5350 PSD     16.8     96.8     19.9     24.0     Pa       MIMO Device     5250-5350 PSD     Mde:     n40     FCC Limit     Re       MIMO Device     5250-5350 PSD     36.3     98.4     4.2     6.2     9.9     Pa
Contact:     Mark Rieger     Irene Radamache       Contact:     Mark Rieger     Project Coordinator:     -       Standard:     FCC 15.247, 15.407     Class:     N/A       MIMO Device - 5250-5350 MHz Band - FCC     Max EIRP (mW):     343.8       Frequency     Chain     Software     26dB BW     Duty Cycle     Power     Total Power <sup>1</sup> FCC Limit     Max Power     Re       (MHz)     Chain     Software     26dB BW     Duty Cycle     Power     Total Power <sup>1</sup> FCC Limit     Max Power     Re       5270     1     20     46.4     98.4     133.7     21.3     24.0     0.134       5310     1     18     43.3     98.4     16.9     0.134     Pa       5310     1     18     43.3     98.4     16.8     19.9     24.0     Pa       MIMO Device 5250-5350 PSD     Mode:     n40     MHz     Re     MMHz     Mam/MHz     Re       MIMO Device 5250-5350 PSD     20     36.3     98.4     4.2     6.2     9.
Standard:     FCC 15.247, 15.407     Class:     N/A       MIMO Device - 5250-5350 MHz Band - FCC     Max EIRP (mW):     343.8       Frequency (MHz)     Chain     Software     26dB BW (MHz)     Duty Cycle     Power     Total Power <sup>1</sup> FCC Limit     Max Power (W):     Re       5270     1     20     46.4     98.4     133.7     21.3     24.0     0.134     Pa       5270     1     1     1     0.134     16.9     0.134     Pa       5310     1     18     43.3     98.4     16.9     0.134     Pa       5310     1     18     43.3     98.4     16.8     19.9     24.0     Pa       MIMO Device 5250-5350 PSD     16.8     19.9     24.0     Pa     Pa       MIMO Device 5250-5350 PSD     Mode:     n40     MHz)     MHz     MMHz     MMHz     MHz     Re       MIMO Device 5250-5350 PSD     36.3     98.4     3.2     4.2     6.2     9.9     Pa       5270     20 <td< td=""></td<>
MIMO Device - 5250-5350 MHz Band - FCC Mode:     Max EIRP (mW):     343.8       Frequency (MHz)     Chain     Software Setting     26dB BW (MHz)     Duty Cycle     Power dBm     Total Power <sup>1</sup> mW     FCC Limit dBm     Max Power (W)     Re       5270     1     20     46.4     98.4     18.4     133.7     21.3     24.0     Pa       5270     1     20     46.4     98.4     16.9     0.134     Pa       5310     1     18     43.3     98.4     16.9     0.134     Pa       5310     1     18     43.3     98.4     16.8     19.9     24.0     Pa       MIMO Device 5250-5350 PSD Mode:     Node:     n40     Node:     Node:     Re       MIMO Device 5250-5350 PSD Mode:     20     36.3     98.4     3.2     4.2     6.2     9.9     Pa       5270     20     36.3     98.4     3.2     4.2     6.2     9.9     Pa
Mode:     n40     Max EIRP (mW):     343.8       Frequency (MHz)     Chain     Software Setting     26dB BW (MHz)     Duty Cycle %     Power dBm     Total Power <sup>1</sup> mW     FCC Limit dBm     Max Power (W)     Re       5270     1     20     46.4     98.4     18.4     133.7     21.3     24.0     Patholic     Patholic     0.134     Patholic     Patholic     Patholic     0.134     Patholic     Patholic     Patholic     Patholic
Frequency (MHz)     Chain     Software Setting     26dB BW (MHz)     Duty Cycle %     Power dBm     Total Power <sup>1</sup> mW     FCC Limit dBm     Max Power (W)     Re       5270     1     20     46.4     98.4     18.4     133.7     21.3     24.0     0.134     Pa       5270     1     20     46.4     98.4     18.1     0.133     24.0     0.134     Pa       5310     1     18     43.3     98.4     16.9     0.134     Pa       5310     1     843.3     98.4     16.8     96.8     19.9     24.0     Pa       MIMO Device 5250-5350 PSD Mode: n40     16.8     16.8     Total PSD <sup>1</sup> FCC Limit     Re       5270     Chain     Software Setting     99% BW (MHz)     Duty Cycle %     PSD     Total PSD <sup>1</sup> FCC Limit     Re       5270     20     36.3     98.4     3.2     4.2     6.2     9.9     Pa
(MHz)     Chain     Setting     (MHz)     %     dBm     mW     dBm     dBm     (W)     Re       5270     1     20     46.4     98.4     18.4     133.7     21.3     24.0     Pa       2     1     16.9     16.9     0.134     Pa     16.9     0.134     Pa       5310     1     18     43.3     98.4     16.9     0.134     Pa       5310     18     43.3     98.4     16.8     96.8     19.9     24.0     Pa       MIMO Device 5250-5350 PSD     Mode:     n40     Node:     Re     Node:     Re     Node:     Re       5270     20     36.3     98.4     3.2     4.2     6.2     9.9     Pa
1     20     46.4     98.4     18.4     133.7     21.3     24.0     0.134     Pa       5270     1     1     1     16.9     0.134     0.134     Pa       5310     1     18     43.3     98.4     16.9     0.134     Pa       5310     2     18     43.3     98.4     16.9     0.134     Pa       5310     2     18     43.3     98.4     16.9     0.134     Pa       MIMO Device 5250-5350 PSD     16.8     16.8     19.9     24.0     Pa       Frequency (MHz)     Chain     Software     99% BW     Duty Cycle     PSD     Total PSD <sup>1</sup> FCC Limit     Re       1     20     36.3     98.4     3.2     4.2     6.2     9.9     Pa
1     16.9     96.8     19.9     24.0     0.134       5310     2     18     43.3     98.4     96.8     19.9     24.0     Pa       MIMO Device 5250-5350 PSD Mode:     n40     16.8     16.8     19.9     24.0     Pa       Frequency (MHz)     Chain     Software     99% BW (MHz)     Duty Cycle     PSD dBm/MHz     Total PSD <sup>1</sup> FCC Limit dBm/MHz     Re       5270     1     20     36.3     98.4     4.2     6.2     9.9     Pa
MIMO Device 5250-5350 PSD Mode: n40 Frequency (MHz) Chain Software 99% BW Duty Cycle PSD Total PSD <sup>1</sup> FCC Limit Re (MHz) % dBm/MHz dBm/MHz dBm/MHz dBm/MHz Re 1 20 36.3 98.4 4.2 6.2 9.9 Pa
(MHz)     Setting     (MHz)     %     dBm/MHz     mW/MHz     dBm/MHz     dBm/MHz       1     3.2     3.2     3.2     3.2     4.2     6.2     9.9     Pa
5270 20 36.3 98.4 4.2 6.2 9.9 Pa
1     1.6       5310     18     36.2     98.4     1.6       2     1.9     3.0     4.8     9.9     Pa

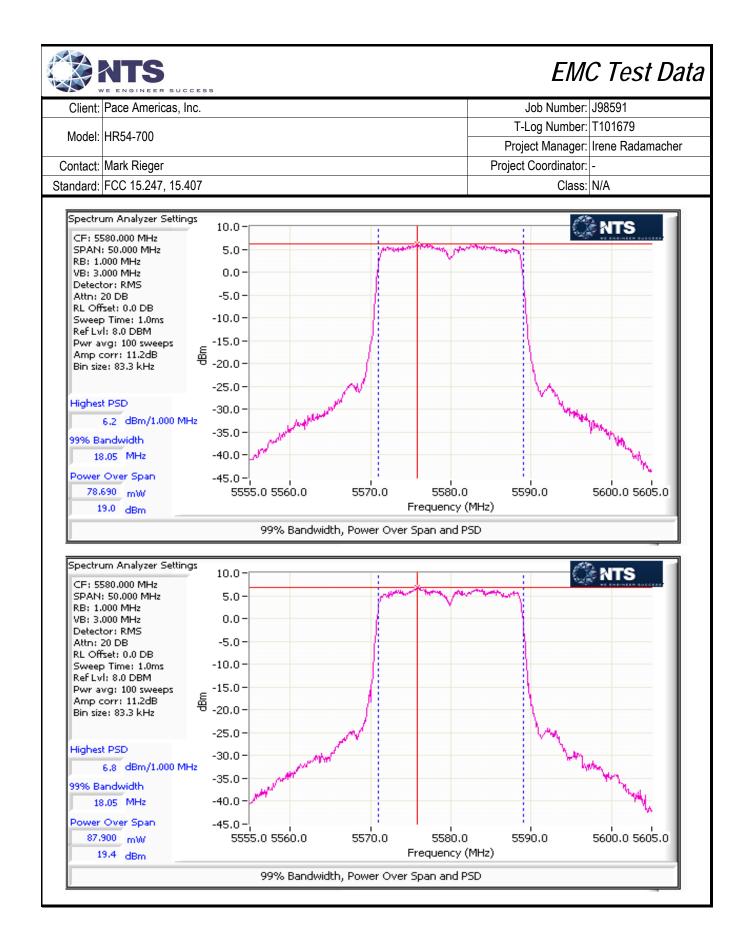


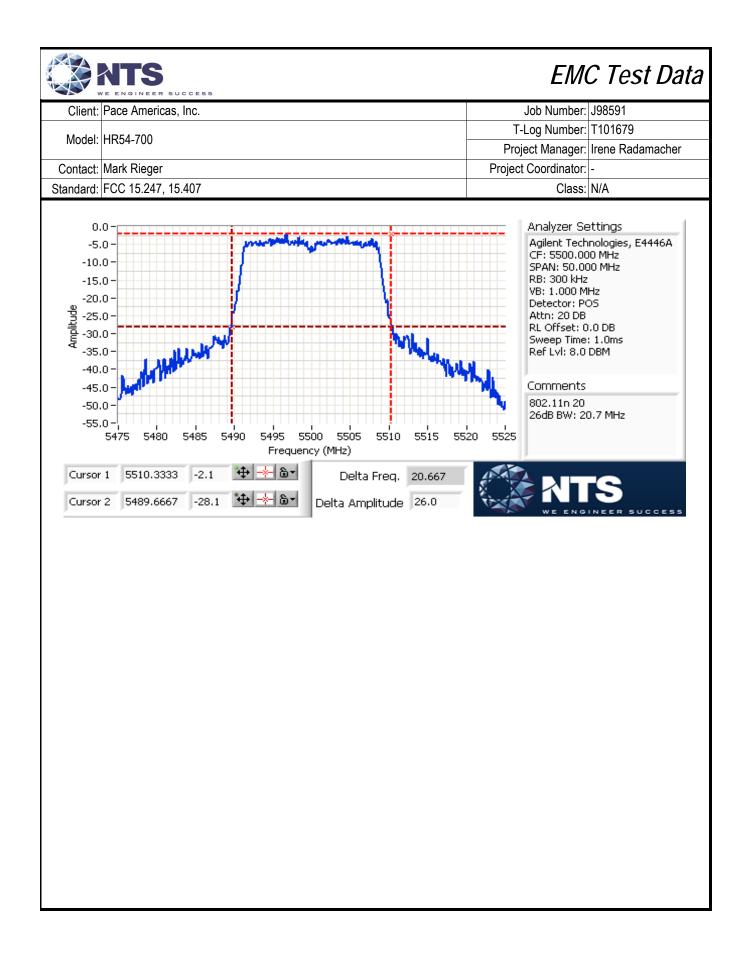


		SUCCESS						EM	C Test	Data
Client:	Pace Americ	as, Inc.					,	lob Number:	J98591	
Model	HR54-700						T-L	og Number:	T101679	
MOUEI.	111\34-700						-	-	Irene Radam	acher
Contact:	Mark Rieger						Project	Coordinator:	-	
Standard:	FCC 15.247,	, 15.407						Class:	N/A	
MIMO Devid Mode:	ce - 5470-572 11a	25 MHz Ban	d - FCC				Мах	EIRP (mW):	218.8	
Frequency		Software	26dB BW	Duty Cycle	Power	Total F	Power <sup>1</sup>		Max Power	
(MHz)	Chain	Setting	(MHz)	%	dBm	mW	dBm	dBm	(W)	Result
5500	1	20	20.5	98.4	19.0	79.4	19.0	24.0		Pass
5580	1	20	20.7	98.4	19.3	85.1	19.3	24.0	0.085	Pass
5700	1	19	20.5	98.4	18.5	70.8	18.5	24.0		Pass
5470-5700 F Mode: Frequency	11a	Software	99% BW	Duty Cycle	PSD	Total	PSD <sup>1</sup>	FCC Limit		Desult
(MHz)	Chain	Setting	(MHz)	%	dBm/MHz	mW/MHz	dBm/MHz		/MHz	Result
5500	1	20	16.9	98.4	6.5	4.5	6.5	9.9		Pass
5580	1	20	16.9	98.4	6.6	4.6	6.6	9.9		Pass
5700	1	19	16.9	98.4	5.9	3.9	5.9	9.9		Pass

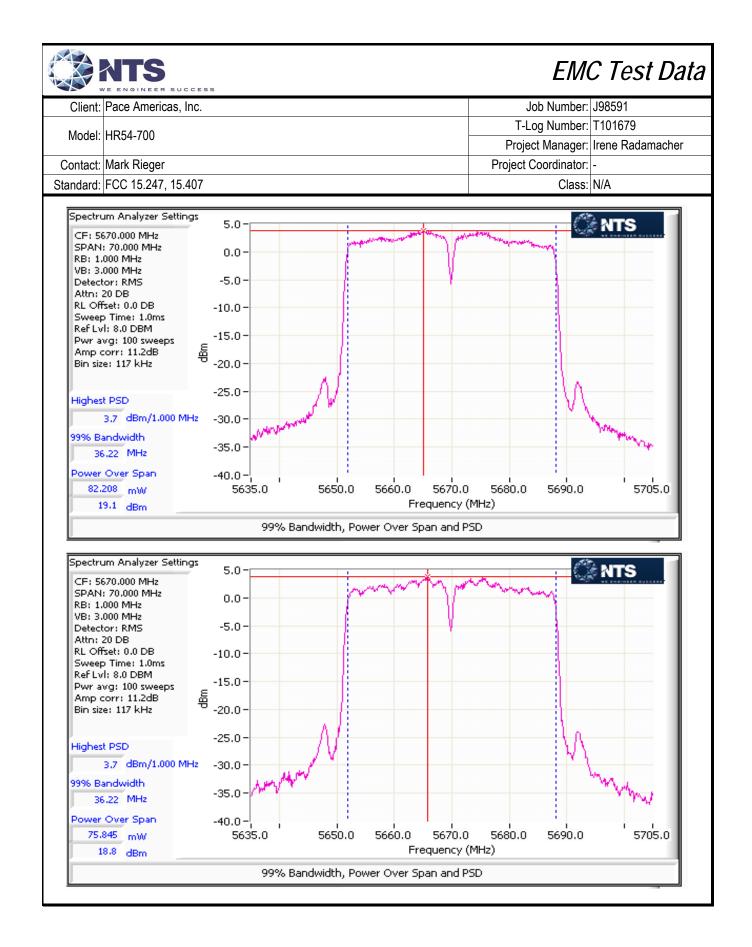


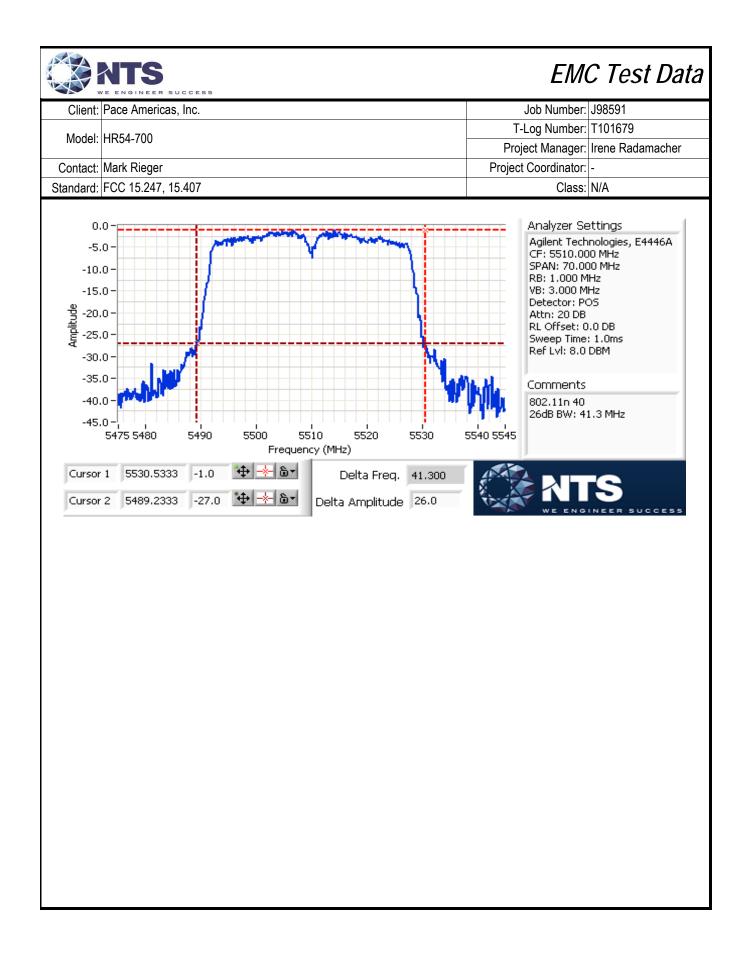
		SUCCESS						EM	C Test	Data
Client:	Pace Americ	as, Inc.					,	Job Number:	J98591	
								og Number:		
Model:	HR54-700							•	Irene Radam	nacher
Contact:	Mark Rieger						-	Coordinator:		
	FCC 15.247,	15.407						Class:		
	ce - 5470-572 n20		d - FCC				Mov			
Frequency	1120	Software	26dB BW	Duty Cyclo	Power	Total F		EIRP (mW): FCC Limit	420.0 Max Power	
(MHz)	Chain	Setting	2006 BVV (MHz)	Duty Cycle %	dBm	mW	ower dBm	dBm	(W)	Result
5500	1 2	20	20.7	99.2	17.2 18.8	128.3	21.1	24.0		Pass
5580	1 2	20	20.7	99.2	19.0 19.4	166.5	22.2	24.0	0.167	Pass
5700	1 2	19	20.7	99.2	18.4 18.4	138.4	21.4	24.0		Pass
5470-5725 F Mode: Frequency	n20	Software	99% BW	Duty Cycle	PSD	Total	PSD <sup>1</sup>	FCC Limit		
(MHz)	Chain	Setting	(MHz)	%	dBm/MHz	mW/MHz	dBm/MHz		/MHz	Result
5500	1 2	20	18.1	99.2	4.3 6.2	6.9	8.4	9.9		Pass
5580	1 2	20	18.1	99.2	6.2 6.8	9.0	9.5	9.9		Pass
5700	1 2	19	18.1	99.2	5.6 5.7	7.3	8.7	9.9		Pass



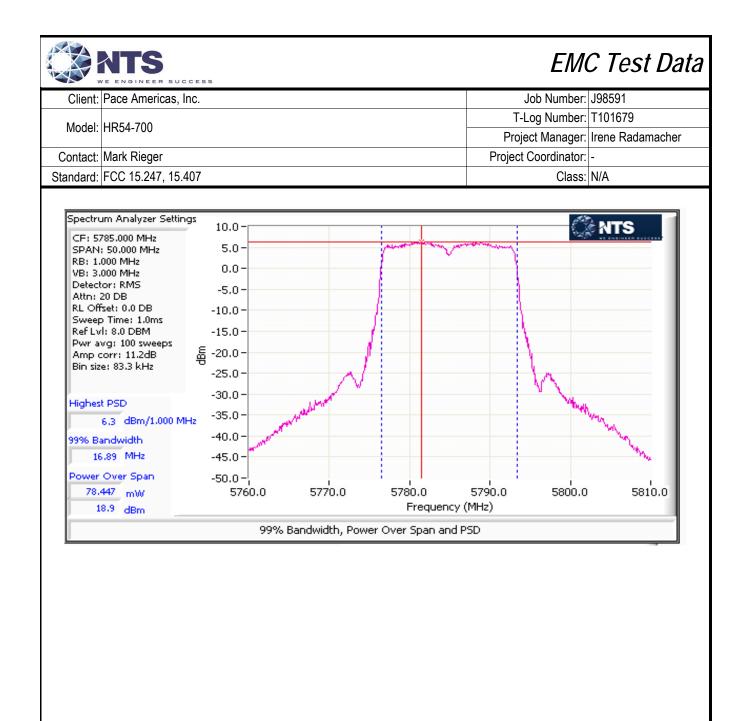


Model: Contact: Standard:	Pace Americ HR54-700 Mark Rieger							Job Number:	108501	
Contact: Standard: VIIMO Devio	Mark Rieger							og Number:		
Standard: MIMO Devi	-							-	Irene Radam	acher
Standard: MIMO Devi	-							Coordinator:		
	FUU 10.247						,	Class:		
	L.									
Mode:	ce - 5470-572	25 MHz Ban	d - FCC				.,		400.0	
Fraguanay		Software	26dB BW	Duty Ovala	Power	Total F		EIRP (mW): FCC Limit	403.9 Max Power	
Frequency (MHz)	Chain	Setting	(MHz)	Duty Cycle %	dBm	mW	dBm	dBm	(W)	Result
5510	1 2	17	41.3	98.4	15.8 15.0	69.6	18.4	24.0		Pass
5550	1	20	42.7	98.4	19.0 18.1	144.0	21.6	24.0	0.157	Pass
5670	1 2	20	44.6	98.4	19.1 18.8	157.1	22.0	24.0		Pass
/IMO Devi										
Mode: Frequency		Software	99% BW	Duty Cycle	PSD	Total		FCC Limit		Result
Mode:	n40 Chain		99% BW (MHz)	Duty Cycle %	dBm/MHz	Total mW/MHz	PSD <sup>1</sup> dBm/MHz		/MHz	Result
Mode: Frequency	n40	Software								Result Pass
Mode: Frequency (MHz)	n40 Chain 1	Software Setting	(MHz)	%	dBm/MHz 0.4	mW/MHz	dBm/MHz	dBm		

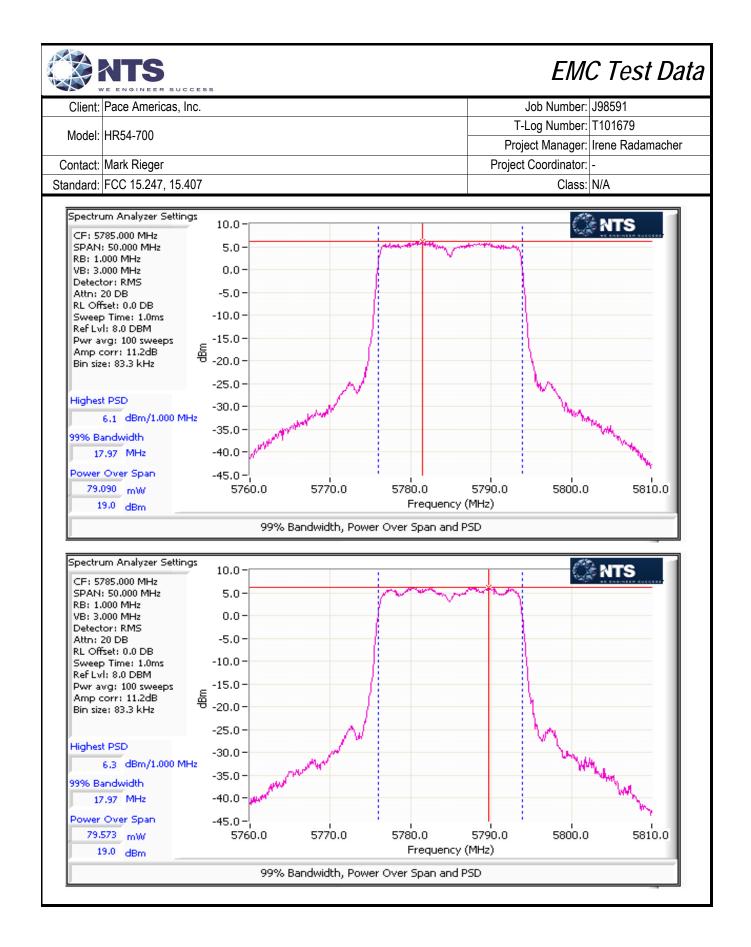




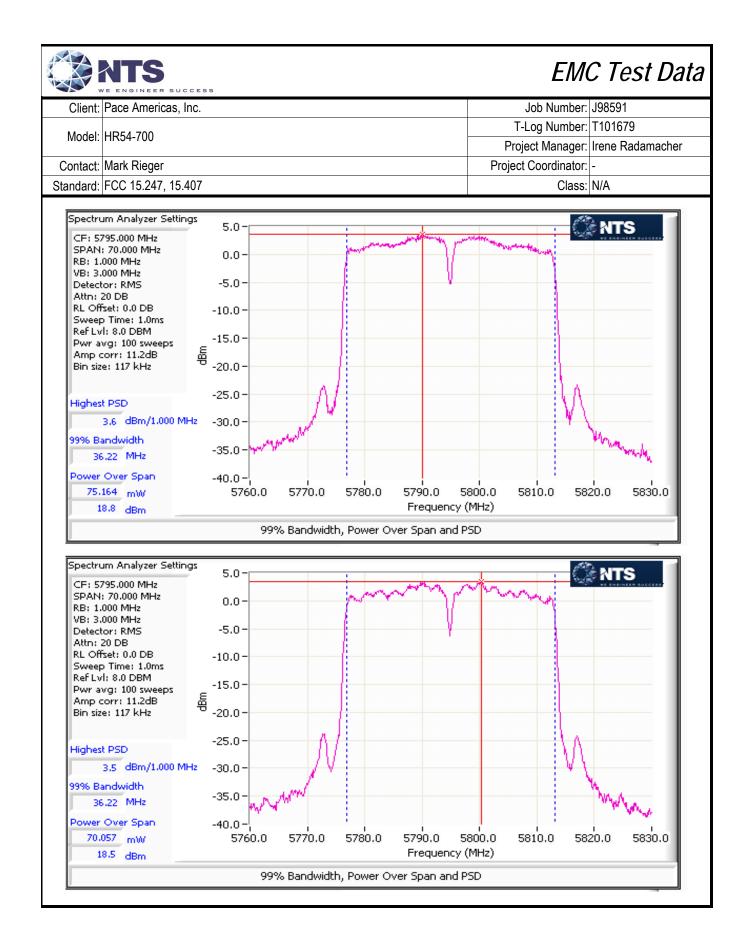
		SUCCESS						EM	C Test	Data
Client:	Pace Americ	as, Inc.						Job Number:	J98591	
Model	HR54-700						T-L	og Number:	T101679	
wouer.	HK34-700						Proje	ect Manager:	Irene Radam	nacher
	Mark Rieger						Project	Coordinator:		
Standard:	FCC 15.247,	15.407						Class:	N/A	
MIMO Devic Mode:	e - 5725-585 11a	0 MHz Band	d - FCC				Мах	EIRP (mW):	199.5	
Frequency		Software		Duty Cycle	Power	Total F	Power <sup>1</sup>		Max Power	
(MHz)	Chain	Setting		%	dBm	mW	dBm	dBm	(W)	Result
5745	1 2	16		98.4	14.7	29.5	14.7	30.0		Pass
5785	1	20		98.4	18.9	77.6	18.9	30.0	0.078	Pass
5825	1	19		98.4	17.6	57.5	17.6	30.0		Pass
5725-5850 F Mode:	PSD 11a						1			
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total mW/MHz	PSD' dBm/MHz	FCC Limit dBm/5	500kHz	Result
5745	1 2	16	16.9	98.4	2.1	1.6	2.1	30.0		Pass
5785	1 2	20	16.9	98.4	6.3	4.3	6.3	30.0		Pass
5825	1 2	19	17.0	98.4	5.0	3.2	5.0	30.0		Pass



	NTS E ENGINEER	SUCCESS						EM	C Test	Data
Client:	Pace Americ	as, Inc.						Job Number:	J98591	
Model.	HR54-700						T-L	og Number:	T101679	
							-	-	Irene Radam	nacher
	Mark Rieger						Project	Coordinator:	-	
Standard:	FCC 15.247,	15.407						Class:	N/A	
MIMO Devic Mode:	e - 5725-585: n20	io MHz Band	d - FCC				Мах	EIRP (mW):	408.3	
Frequency		Software		Duty Cycle	Power	Total F	Power <sup>1</sup>		Max Power	
(MHz)	Chain	Setting		%	dBm	mW	dBm	dBm	(W)	Result
5745	1 2	16		99.2	14.7 14.5	57.7	17.6	30.0		Pass
5785	1 2	20		99.2	19.0 19.0	158.9	22.0	30.0	0.159	Pass
5825	1 2	19		99.2	17.6 17.6	115.1	20.6	30.0		Pass
5725-5850 F Mode: Frequency	n20	Software	99% BW	Duty Cycle	PSD	Total	PSD <sup>1</sup>	FCC Limit		
(MHz)	Chain	Setting	(MHz)	%	dBm/MHz	mW/MHz	dBm/MHz		500kHz	Result
5745	1 2	16	18.0	99.2	1.9 1.7	3.0	4.8	28.9		Pass
5785	1 2	20	18.0	99.2	6.1 6.3	8.3	9.2	28.9		Pass
5825	1	19	18.0	99.2	4.8 5.1	6.3	8.0	28.9		Pass

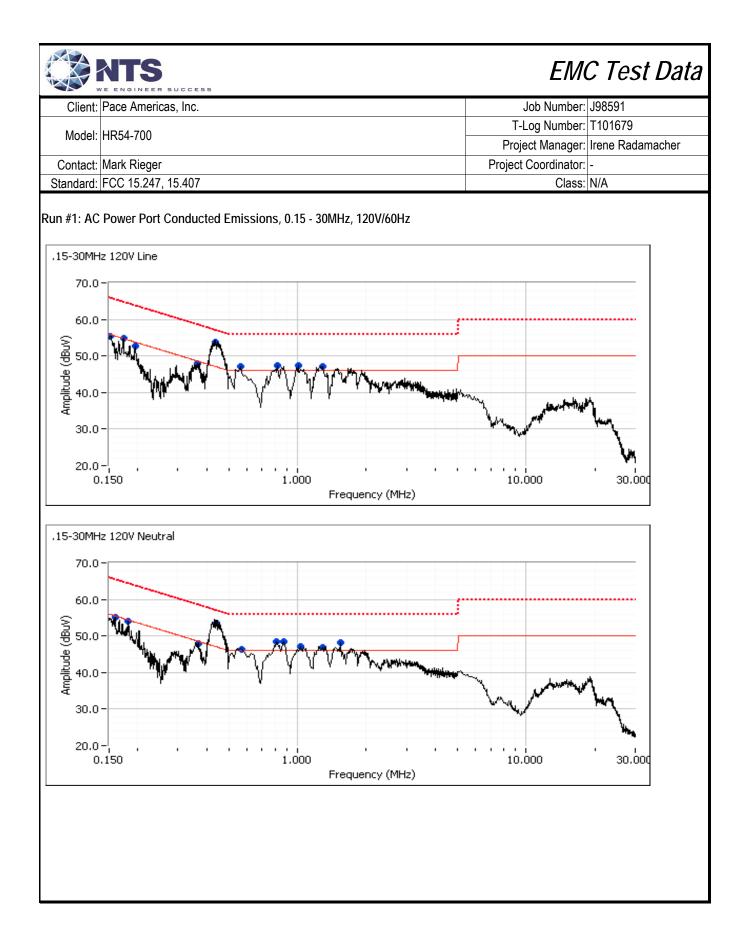


	Pace Americ	as, Inc						Job Number:	J98591	
								og Number:		
Model:	HR54-700							-	Irene Radam	acher
Contact:	Mark Rieger						-	Coordinator:		
	FCC 15.247							Class:	N/A	
/IMO Devi Mode:	ce - 5725-585 n40	50 MHz Ban	d - FCC				Мах	EIRP (mW):	377.0	
Frequency		Software		Duty Cycle	Power	Total I	Power <sup>1</sup>		Max Power	Desult
(MHz)	Chain	Setting		%	dBm	mW	dBm	dBm	(W)	Result
5755	1	15		98.4	13.7 13.4	45.3	16.6	30.0	0.447	Pass
5795	1 2	20		98.4	18.8 18.5	146.7	21.7	30.0	0.147	Pass
725-5850 I Mode:	PSD n40									
725-5850 I Mode: Frequency (MHz)	n40 Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total mW/MHz	PSD <sup>1</sup> dBm/MHz	FCC Limit dBm/5	00kHz	Result
Mode: Frequency	n40						-			Result Pass



Client:	Pace Americ	as Inc					Job Number: J98591
Cilent.		as, mc.				-	T-Log Number: T101679
Model:	HR54-700						oject Manager: Irene Radamacher
Contact	Mark Rieger						ct Coordinator: -
	-	45 407				Floje	
Standard:	FCC 15.247,	10.407					Class: N/A
un #2: - S lode:	11a	idth (5725-5850 MHz)					_
	Power	Frequency (MHz)	Bandwid	th (MHz)		Setting	
	Setting 20	5785	6dB 16.4		6dB 100 kHz		_
	20	0/00	10.4		TUU KHZ		
ode:	n20						
	Power		Bandwid	th (MHz)	RBW	Setting	7
	Setting	Frequency (MHz)	6dB	-	6dB		
	20	5785	17.6		100 kHz		
ode:	n40						
uue:	n40 Power		Bandwid	th (MHz)	RR\//	Setting	7
	Setting	Frequency (MHz)	6dB	(11 (1011 12)	6dB		
	20	5795	35.1		100 kHz		-
		BW=100kHz, VBW ≥ $3^{*}$ R Its performed on chain 0	BW, peak de	etector, max	hold, auto s	weep time.	
Note 2: 0 -5 -10 -15	Measuremen .0 - .0 - .0 - .0 -	nts performed on chain 0	BW, peak de		hold, auto se	weep time.	Analyzer Settings Agilent Technologies, E4446A CF: 5785.000 MHz SPAN: 50.000 MHz RB: 100 kHz VB: 300 kHz VB: 300 kHz
0 -5 -10	Measuremen .0 - .0 - .0 - .0 - .0 - .0 - .0 - .0 -	nts performed on chain 0			hold, auto su	weep time.	Agilent Technologies, E4446A CF: 5785.000 MHz SPAN: 50.000 MHz RB: 100 kHz
Note 2: 0 -5 -10 -15 -20 pnplifunde -30 -30 -35	Measuremen	nts performed on chain 0			hold, auto su	weep time.	Agilent Technologies, E4446A CF: 5785.000 MHz SPAN: 50.000 MHz RB: 100 kHz VB: 300 kHz Detector: POS Attn: 20 DB RL Offset: 0.0 DB Sweep Time: 4.8ms Ref LvI: 8.0 DBM
Note 2: 0 -5 -10 -15 -20 900,125 -30 -30 -40 -45 -50	Measuremen	nts performed on chain 0	5785 57	790 5795		weep time.	Agilent Technologies, E4446A CF: 5785.000 MHz SPAN: 50.000 MHz RB: 100 kHz VB: 300 kHz Detector: POS Attn: 20 DB RL Offset: 0.0 DB Sweep Time: 4.8ms Ref LvI: 8.0 DBM Comments 802.11a 6dB BW: 16.4 MHz
Note 2: 0 -5 -10 -15 -20 900,125 -30 -30 -40 -45 -50	Measuremen	nts performed on chain 0	5785 57 quency (MHz	790 5795			Agilent Technologies, E4446A CF: 5785.000 MHz SPAN: 50.000 MHz RB: 100 kHz VB: 300 kHz Detector: POS Attn: 20 DB RL Offset: 0.0 DB Sweep Time: 4.8ms Ref LvI: 8.0 DBM Comments 802.11a 6dB BW: 16.4 MHz

NTS WE ENGINEER	SUCCESS			EM	C Test Data
Client: Pace Americ	as, Inc.		Job N	lumber:	J98591
Model: HR54-700			T-Log N	lumber:	T101679
			Project M	anager:	Irene Radamacher
Contact: Mark Rieger			Project Coor		
Standard: FCC 15.247	15.407			Class:	N/A
	Conduc (NTS Silicon Valley, Fremor	ted Emissions ht Facility, Semi-Anech	oic Chamber)		
Test Specific Detail	S				
	The objective of this test session is to p specification listed above.	erform final qualification	testing of the EL	JT with r	espect to the
Date of Test: Test Engineer: Test Location:	Joseph Cadigal	Config. Used: Config Change: EUT Voltage:	none		
and 80cm from the LISN. the semi-anechoic chamb passed through a ferrite of Ambient Conditions	Rel. Humidity:	support equipment. Re	emote support eq	luipmen	was located outside of
Summary of Result	S				
Run #	Test Performed	Limit	Result Mar	gin	
1	CE, AC Power,120V/60Hz	FCC 15.209			@ 0.443 MHz (-0.9 dB)
Deviations From Th	ade to the EUT during testing le <b>Standard</b> from the requirements of the standard				
Driver: 5.99 RC 188.10 Antenna: Internal	nit on 802.11b, 1Mbps on channel 6 at r	navimum nower and PE	4CE on channel	15 at m	avimum power
	in on ouz. i ib, inibps on channel 6 at f	naximum power and RF	40E ON CHANNEL	าว สเ เทล	axiiiluili powei



Model: H Contact: M Standard: Fe Preliminary p	Mark Rieger       CC 15.247.       beak readin       Level       dBμV       55.4       54.8       52.7       53.7       47.9       47.4       47.4	15.407	d during pre FCC 1 Limit 55.9 54.8 53.8 47.1 48.6	5.209 <u>Margin</u> -0.5 0.0 -1.1	Detector QP/Ave Peak Peak	s. average lim Comments	Project Coordinator: Class:	T101679 Irene Radamacher -
Model:     H       Contact:     M       Standard:     F0       Preliminary     p       Frequency     MHz       0.152     0       0.152     0       0.196     0       0.364     1       1.277     1       0.814     0	IR54-700 Iark Rieger CC 15.247, beak readin Level dBµV 55.4 54.8 52.7 53.7 47.9 47.0 47.4 47.4	AC Line Line 1 Line 1 Line 1 Line 1 Line 1 Line 1 Line 1 Line 1 Line 1 Line 1	FCC 1 Limit 55.9 54.8 53.8 47.1	5.209 <u>Margin</u> -0.5 0.0 -1.1	Detector QP/Ave Peak Peak		T-Log Number: Project Manager: Project Coordinator: Class:	T101679 Irene Radamacher -
Contact:     M       Standard:     F       Preliminary p       Frequency       MHz       0.152       0.173       0.196       0.364       1.277       1.010       0.814	Mark Rieger       CC 15.247.       beak readin       Level       dBμV       55.4       54.8       52.7       53.7       47.9       47.4       47.4	15.407 AC Line Line 1 Line 1 Line 1 Line 1 Line 1 Line 1 Line 1 Line 1	FCC 1 Limit 55.9 54.8 53.8 47.1	5.209 <u>Margin</u> -0.5 0.0 -1.1	Detector QP/Ave Peak Peak		Project Manager: Project Coordinator: Class:	Irene Radamacher -
Standard:     F       Preliminary p       Frequency       MHz       0.152       0.173       0.196       0.364       1.277       1.010       0.814	CC 15.247, beak readin Level dBμV 55.4 54.8 52.7 53.7 47.9 47.0 47.0 47.4 47.4	15.407 AC Line Line 1 Line 1 Line 1 Line 1 Line 1 Line 1 Line 1 Line 1	FCC 1 Limit 55.9 54.8 53.8 47.1	5.209 <u>Margin</u> -0.5 0.0 -1.1	Detector QP/Ave Peak Peak		Project Coordinator: Class:	-
Standard:     F       Preliminary p     F       Frequency     MHz       0.152     0.173       0.196     0.436       0.364     1.277       1.010     0.814	CC 15.247, beak readin Level dBμV 55.4 54.8 52.7 53.7 47.9 47.0 47.0 47.4 47.4	15.407 AC Line Line 1 Line 1 Line 1 Line 1 Line 1 Line 1 Line 1 Line 1	FCC 1 Limit 55.9 54.8 53.8 47.1	5.209 <u>Margin</u> -0.5 0.0 -1.1	Detector QP/Ave Peak Peak		Class:	
Preliminary p Frequency MHz 0.152 0.173 0.196 0.436 0.364 1.277 1.010 0.814	beak readin Level dBµV 55.4 54.8 52.7 53.7 47.9 47.0 47.4 47.4	Igs captured AC Line Line 1 Line 1 Line 1 Line 1 Line 1 Line 1	FCC 1 Limit 55.9 54.8 53.8 47.1	5.209 <u>Margin</u> -0.5 0.0 -1.1	Detector QP/Ave Peak Peak			
Frequency       MHz       0.152       0.173       0.196       0.436       0.364       1.277       1.010       0.814	Level dBµV 55.4 54.8 52.7 53.7 47.9 47.0 47.0 47.4 47.4	AC Line Line 1 Line 1 Line 1 Line 1 Line 1 Line 1	FCC 1 Limit 55.9 54.8 53.8 47.1	5.209 <u>Margin</u> -0.5 0.0 -1.1	Detector QP/Ave Peak Peak		it)	
Frequency       MHz       0.152       0.173       0.196       0.436       0.364       1.277       1.010       0.814	Level dBµV 55.4 54.8 52.7 53.7 47.9 47.0 47.0 47.4 47.4	AC Line Line 1 Line 1 Line 1 Line 1 Line 1 Line 1	FCC 1 Limit 55.9 54.8 53.8 47.1	5.209 <u>Margin</u> -0.5 0.0 -1.1	Detector QP/Ave Peak Peak		ц <u>у</u>	
MHz 0.152 0.173 0.196 0.436 0.364 1.277 1.010 0.814	dBµV       55.4       54.8       52.7       53.7       47.9       47.0       47.4       47.4	Line Line 1 Line 1 Line 1 Line 1 Line 1 Line 1	Limit 55.9 54.8 53.8 47.1	Margin -0.5 0.0 -1.1	QP/Ave Peak Peak			
0.152 0.173 0.196 0.436 0.364 1.277 1.010 0.814	55.4       54.8       52.7       53.7       47.9       47.0       47.4       47.4	Line 1 Line 1 Line 1 Line 1 Line 1 Line 1	55.9 54.8 53.8 47.1	-0.5 0.0 -1.1	Peak Peak			
0.173 0.196 0.436 0.364 1.277 1.010 0.814	54.8       52.7       53.7       47.9       47.0       47.4       47.4	Line 1 Line 1 Line 1 Line 1 Line 1	54.8 53.8 47.1	0.0 -1.1	Peak			
0.196 0.436 0.364 1.277 1.010 0.814	52.7 53.7 47.9 47.0 47.4 47.4	Line 1 Line 1 Line 1 Line 1	53.8 47.1	-1.1				
0.436 0.364 1.277 1.010 0.814	53.7 47.9 47.0 47.4 47.4	Line 1 Line 1 Line 1	47.1		Peak			
0.364 1.277 1.010 0.814	47.9 47.0 47.4 47.4	Line 1 Line 1		6.6	Peak			
1.277 1.010 0.814	47.0 47.4 47.4	Line 1		-0.7	Peak			
1.010 0.814	47.4 47.4		46.0	1.0	Peak	1		
			46.0	1.4	Peak			
0.566		Line 1	46.0	1.4	Peak			
	47.0	Line 1	46.0	1.0	Peak			
0.160	55.1	Neutral	55.5	-0.4	Peak			
0.182	54.1	Neutral	54.4	-0.3	Peak			
0.368	48.0	Neutral	48.6	-0.6	Peak			
0.443	53.4	Neutral	47.0	6.4	Peak			
1.536	48.3	Neutral	46.0	2.3	Peak			
1.291	46.9	Neutral	46.0	0.9	Peak			
1.028	47.0	Neutral	46.0	1.0	Peak			
0.873	48.4	Neutral	46.0	2.4	Peak			
0.566	46.3	Neutral	46.0	0.3	Peak			
0.566	46.3	Neutral	46.0	0.3	Peak			
0.798	48.4	Neutral	46.0	2.4	Peak			
Final quasi-pe	eak and av	verage readi	ngs					
Frequency		AC	FCC 1			Comments		
MHz	dBµV	Line	Limit	Margin	QP/Ave			
0.443	46.1	Neutral	47.0	-0.9	AVG	AVG (0.10s)		
0.436	46.1	Line 1	47.1	-1.0	AVG	AVG (0.10s)		
0.436	52.1	Line 1	57.1	-5.0	QP	QP (1.00s)		
0.443	51.7	Neutral	57.0	-5.3	QP	QP (1.00s)		
0.566	39.2	Neutral	46.0	-6.8	AVG	AVG (0.10s)		
1.277	38.9	Line 1	46.0	-7.1	AVG	AVG (0.10s)		
1.028	38.9	Neutral	46.0	-7.1	AVG	AVG (0.10s)		
0.566	38.8	Line 1	46.0	-7.2	AVG	AVG (0.10s)		
0.814	38.7	Line 1	46.0	-7.3	AVG	AVG (0.10s)		
1.010	38.6	Line 1	46.0	-7.4	AVG	AVG (0.10s)		
1.291	38.5	Neutral	46.0	-7.5	AVG	AVG (0.10s)		
1.536 0.364	37.8	Neutral	46.0	-8.2	AVG	AVG (0.10s)		
0.364	40.1 39.3	Line 1 Neutral	48.6 48.5	-8.5 -9.2	AVG AVG	AVG (0.10s) AVG (0.10s)		

Client:	Pace Ameri	cas, Inc.					Job Number:	J98591
		,					T-Log Number:	T101679
Model:	HR54-700						•	Irene Radamache
Contact	Mark Riege	r					Project Coordinator:	
	FCC 15.247						Class:	
Stanuaru.	FUU 13.247	, 13.407					Class.	IN/A
0.873	36.3	Neutral	46.0	-9.7	AVG	AVG (0.10s)		
0.814	45.1	Line 1	56.0	-10.9	QP	QP (1.00s)		
0.873	44.9	Neutral	56.0	-11.1	QP	QP (1.00s)		
0.566	44.9	Neutral	56.0	-11.1	QP	QP (1.00s)		
1.277	44.8	Line 1	56.0	-11.2	QP	QP (1.00s)		
0.566	44.8	Line 1	56.0	-11.2	QP	QP (1.00s)		
1.291	44.5	Neutral	56.0	-11.5	QP	QP (1.00s)		
1.028	44.4	Neutral	56.0	-11.6	QP	QP (1.00s)		
1.010	44.2	Line 1	56.0	-11.8	QP	QP (1.00s)		
1.536	43.8	Neutral	56.0	-12.2	QP	QP (1.00s)		
0.364	45.9	Line 1	58.6	-12.7	QP	QP (1.00s)		
0.173	41.9	Line 1	54.8	-12.9	AVG	AVG (0.10s)		
0.368	45.2	Neutral	58.5	-13.3	QP	QP (1.00s)		
0.182	40.4	Neutral	54.4	-14.0	AVG	AVG (0.10s)		
0.152	51.9	Line 1	65.9	-14.0	QP	QP (1.00s)		
0.152	41.6	Line 1	55.9	-14.3	AVG	AVG (0.10s)		
0.196	39.4	Line 1	53.8	-14.4	AVG	AVG (0.10s)		
0.160	40.6	Neutral	55.5	-14.9	AVG	AVG (0.10s)		
0.182	48.6	Neutral	64.4	-15.8	QP	QP (1.00s)		
0.173	48.8	Line 1	64.8	-16.0	QP	QP (1.00s)		
0.160	49.5	Neutral	65.5	-16.0	QP	QP (1.00s)		
0.196	47.2	Line 1	63.8	-16.6	QP	QP (1.00s)		

# EMC Test Data

	LERONALER SOCCESS		
Client:	Pace Americas, Inc.	Job Number:	J98591
Madal	HR54-700	T-Log Number:	T101679
MOUEI.	11/04-700	Project Manager:	Irene Radamacher
Contact:	Mark Rieger	Project Coordinator:	-
Standard:	FCC 15.247, 15.407	Class:	N/A

## FCC Part 15 Frequency Stability

#### Test Specific Details

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

#### General Test Configuration

NTS

All measurements are made with the EUT's rf port connected to the measurement instrument via an attenuator. All amplitude measurements are adjusted to account for the attenuation between EUT and measuring instrument. For frequency stability measurements the EUT was placed inside an environmental chamber.

Ambient Conditions:	Temperature:	24 °C
	Rel. Humidity:	38 %

Run #	Test Performed	Limit	Pass / Fail	
1	Frequency Stability	Stays in band	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.

e	E ENGINEER SUCCESS			
Client:	Pace Americas, Inc.			Job Number: J98591
Model:	HR54-700			T-Log Number: T101679
				Project Manager: Irene Radamacher
	Mark Rieger			Project Coordinator: -
Standard:	FCC 15.247, 15.407			Class: N/A
Run #1: Fre	equency Stability			
	Date of Test: 8/5/2015		Config. Used:	
	st Engineer: J Caizzi and E N		Config Change:	
Te	est Location: Fremont EMC L	ab #4	EUT Voltage:	120V/60Hz
	Nominal Frequency:	5180 MHz		
requency	Stability Over Temperature			
		e for a minimum of 30	) minutes prior to starting	the transmitter and making the measurements
ensure the E	UT and chamber had stabiliz	ed at that temperatur	e.	
Tomporatura	Frequency Measured	ח	rift	1
Temperature (Celsius)	(MHz)	<u>D</u> (Hz)		4
(Ceisius)	5179.9850	-15000	(ppm) -2.9	•
		- 1,0,0,0	-2.3	
0				
0 10	5179.9850	-15000	-2.9	
0 10 20	5179.9850 5179.9700	-15000 -30000	-2.9 -5.8	
0 10	5179.9850	-15000 -30000 -40000	-2.9 -5.8 -7.7	
0 10 20 30	5179.9850 5179.9700 5179.9600	-15000 -30000	-2.9 -5.8	
0 10 20 30 40	5179.9850 5179.9700 5179.9600 5179.9450	-15000 -30000 -40000 -55000	-2.9 -5.8 -7.7 -10.6	
0 10 20 30 40 50	5179.9850 5179.9700 5179.9600 5179.9450 5179.9400	-15000 -30000 -40000 -55000 -60000 -55000	-2.9 -5.8 -7.7 -10.6 -11.6	
0 10 20 30 40 50	5179.9850 5179.9700 5179.9600 5179.9450 5179.9400 Worst case: Stability Over Input Voltage	-15000 -30000 -40000 -55000 -60000 -55000	-2.9 -5.8 -7.7 -10.6 -11.6	
0 10 20 30 40 50 Frequency Nominal Vo <u>Voltage</u> (DC)	5179.9850 5179.9700 5179.9600 5179.9450 5179.9400 Worst case: Stability Over Input Voltage Itage is 120Vac. Frequency Measured (MHz)	-15000 -30000 -40000 -55000 -60000 -55000 e <u>D</u> (Hz)	-2.9 -5.8 -7.7 -10.6 -11.6 -11.6 <u>rift</u> (ppm)	
0 10 20 30 40 50 Frequency Nominal Vo Voltage (DC) 102.00	5179.9850 5179.9700 5179.9600 5179.9450 5179.9400 Worst case: Stability Over Input Voltage Itage is 120Vac. Frequency Measured (MHz) 5179.970000	-15000 -30000 -40000 -55000 -60000 -55000 -55000 -55000 -55000 -53000	-2.9 -5.8 -7.7 -10.6 -11.6 -11.6 rift (ppm) -5.8	
0 10 20 30 40 50 Frequency Nominal Vo <u>Voltage</u> (DC)	5179.9850 5179.9700 5179.9600 5179.9450 5179.9400 Worst case: Stability Over Input Voltage Itage is 120Vac. Frequency Measured (MHz)	-15000 -30000 -40000 -55000 -60000 -55000 e <u>D</u> (Hz)	-2.9 -5.8 -7.7 -10.6 -11.6 -11.6 <u>rift</u> (ppm)	



## End of Report

This page is intentionally blank and marks the last page of this test report.