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Electromagnetic Emissions Test Report In Accordance With Industry Canada Radio Standards Specification 131 issue 2, FCC Part 24 Subpart E on the Broadlink Research Model: Personal Smart Antenna - PSA 1900

FCC ID:	SLS-PSA1900
UPN:	5309A-PSA1900
GRANTEE:	Broadlink Research 4779 Josefa Lane Los Altos, CA 94022
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086
REPORT DATE:	August 23, 2004
FINAL TEST DATE:	July 27 and August 17, 2004
AUTHORIZED SIGNATORY:	Juan Martinez Senior EMC Engineer

ACCREDITED

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FCC CERTIFICATION INFORMATION

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

2.1033(c)(1) Grantee:
Broadlink Research
4779 Josefa Lane
Los Altos, CA 94022

2.1033(c)(2) & RSP-100 (4) FCC ID: SLS-PSA1900
UPN: 5309A-PSA1900

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

Please refer to Exhibit 7: User Manual, Theory of Operation, and Tune-up Procedure

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

FCC 24E & RSS-131**: F9W, DXW, GXW, G7W**

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

FCC 24E & RSS-131**:** 1850 - 1910 MHz & 1930 – 1990 MHz

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

FCC 24E & RSS-131**:** .18 W (mobile), .186 W (Base)

2.1033(c)(7) & RSP-100 (7.2(a)) Maximum FCC & IC Allowed Power Level

24.235(b) & RSS-131 (6.2): Mobile/portable stations are limited to 2 watts E.I.R.P. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

24.235(b) & RSS-131 (6.2): For base station transmitters operating in the band 1930-1990 MHz the output power shall not exceed 100 watts.

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

Refer to Exhibit 6. The schematic diagram

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

Please refer to Exhibit 7: User Manual, Theory of Operation, and Tune-up Procedure

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

Refer to Exhibit 6. The schematic diagram

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

N/A EUT is an amplifier

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

Refer to Exhibit 6. The schematic diagram

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

For more information please refer to Exhibit 7: Tune-up Procedure

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

For more information please refer to Exhibit 7: Tune-up Procedure

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

Refer to Exhibit 4

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

Refer to Exhibit 5

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

N/A EUT is an amplifier and does not produce its own modulation

2.1033(c)(14) & RSP-100 (7.2(b)(ii)) Data taken per Section 2.1046 to 2.1057 and RSS-131 issue 2, Rev. 1.

Refer to Exhibit 2

DECLARATIONS OF COMPLIANCE

Equipment Name and Model:
Personal Smart Antenna - PSA 1900

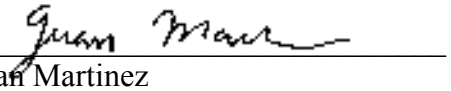
Manufacturer:
Broadlink Research
4779 Josefa Lane
Los Altos, CA 94022

Tested to applicable standards:
RSS-131 Issue 2, Rev. 1 July 2003 (Zone Enhancers for the Land Mobile Service)
FCC Part 24 Subpart E

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC2845 **SV2** Dated August 12, 2001

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of TIA/EIA-603 and the specific RSS standards applicable to this device); and that the equipment performed in accordance with the data submitted in this report.

Signature	
Name	Juan Martinez
Title	Senior EMC Engineer
Company	Elliott Laboratories Inc.
Address	684 W. Maude Ave Sunnyvale, CA 94086 USA
Date:	August 23, 2004

Maintenance of compliance with the above standards 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.).

SCOPE

FCC Part 24 Subpart E & IC RSS-131 testing was performed for the equipment mentioned in this report. The equipment was tested in accordance with the procedures specified in Sections 2.1046 to 2.1057 of the FCC Rules & IC RSS-131. TIA-603 was also used as a test procedure guideline to perform some of the required tests.

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

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

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

OBJECTIVE

The primary objective of the manufacturer is compliance with the FCC 24 Subpart E & IC RSS-131. Certification of these devices is required as a prerequisite to marketing as defined in Section 2.1033 & RSP-100.

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

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

SUMMARY OF TEST RESULTS

Part 24E and RSS-131 Test Summary

Measurement Required	FCC Part 2 & 90 Sections	RSS-131 Section	Test Performed	Measured Value	Test Procedure Used	Result
Modulation Tested	CDMA, GSM, TDMA, EDGE	CDMA, GSM, TDMA, EDGE	-	-	-	-
Modulation characteristics	2.1047 / 24.238(b)	5.6	Modulated with appropriated signal	(99%)	D & H	-
Radiated RF power output (ERP/EIRP)	2.1046 / 24.232(b)	6.2	Radiated Output Power Test	30.2 dBm EIRP (1 Watt)	A	-
Conducted RF power output	2.1046 / 24.232(b)	6.2	Conducted Output Power Test	22.7 dBm (0.2 Watts)	B	Complies
Spurious emissions at antenna Port	2.1051/ 24.238 (a) & (b)	6.4	Emission Limits and/or Unwanted Emission 30MHz – 5GHz (**Antenna Conducted**)	All spurious emissions < -13 dBm	I	Complies
Occupied Bandwidth	2.1049/ 24.238 (a) & (b)	6.3	Emission Mask and 99% Bandwidth	Refer to Plots	C & D	Complies
Field strength of spurious radiation	2.1053 / 24.238 (a) & (b)	6.4	Radiated Spurious Emissions 30MHz – 5GHz	-20.7dBm @ 3820 MHz (-5.5 dB)	N	Complies
Frequency stability	2.1055 / 24.235	7(a)	Frequency Vs. Temperature	-	K	Unit is an Amplifier
Frequency stability	2.1055 / 24.235	7(b)	Frequency Vs. Voltage	-	L & M	Unit is an Amplifier
Exposure to Mobile devices	2.1091	RSS-102	Exposure of Humans to RF Fields	MPE	-	-
Receiver	15.109	-	Receiver Spurious Emissions	-	-	-

MEASUREMENT UNCERTAINTIES

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

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

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Broadlink Research model Personal Smart Antenna - PSA 1900 is a PCS repeater, which is designed to amplify incoming PCS signals. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, 2 Amps.

The sample was received on July 27, 2004 and tested on July 27 and August 17, 2004. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	Proposed FCC ID
Broadlink	PSA 1900	PCS Repeater	N/A	SLS-PSA1900
Broadlink	GPSS-0750130	Power Supply	N/A	N/A

OTHER EUT DETAILS

ENCLOSURE

The EUT enclosure is primarily constructed of plastic mold. It measures approximately 6 cm wide by 20 cm deep by 30 cm high.

MODIFICATIONS

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

SUPPORT EQUIPMENT

Local Support Equipment:

Manufacturer	Model	Description	Serial Number	Proposed FCC ID
Agilent	E4433B	Signal Generator	US40052329	N/A

EUT INTERFACE PORTS

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
AC power	EUT	2 wire	unshielded	1.5

EUT OPERATION DURING TESTING

EUT was set to receive signal generator at maximum input. The EUT was configured to transmit at maximum power on the low and high edges of the PCS block.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on July 27 and August 17, 2004at the Elliott Laboratories Open Area Test Site #2 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Federal Communications Commission. In accordance with Industry Canada rules detailed in RSS 210 Issue 5 and RSS-212, construction, calibration, and equipment data for the test sites have been filed with the Federal Communications Commission.

CONDUCTED EMISSIONS CONSIDERATIONS

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

RADIATED EMISSIONS CONSIDERATIONS

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

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

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

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

INSTRUMENT CONTROL COMPUTER

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

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

PEAK POWER METER

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

FILTERS/ATTENUATORS

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

ANTENNAS

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

ANTENNA MAST AND EQUIPMENT TURNTABLE

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

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

INSTRUMENT CALIBRATION

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

TEST PROCEDURES

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

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

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

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

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

RSS-131: 4.3.2 Single Channel Enhancer
A suitably modulated signal, representative of the technology for which certification is sought, is applied to the input of the amplifier. The input power level is increased until the manufacturer's rated input power level is achieved or until a 2 dB increase in input level results in a 1 dB increase in output level (i.e. compression begins). Record the output power in the 99% emission bandwidth using any suitable means.

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

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

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

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

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

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

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

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

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

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

RSS 131: 4.4.2 Single Channel Enhancer & 6.4 Spurious Emissions

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

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

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

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

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

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

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

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

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

1) Set the receiver was set to the midpoint of the operating band as specified in the standard.
2) Set the spectrum analyzer display line function to 2 nanowatts for measurements below 1 GHz and 5 nanowatts for measurements above 1 GHz.
3) Set the spectrum analyzer bandwidth to 1 MHz.
4) For the spectrum analyzer, the start frequency was set to 30 MHz and the stop frequency set to the 5^{th} harmonic of the receiver LO. All spurious or intermodulation emission must not exceed the specified limit.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

RADIATED EMISSIONS SPECIFICATION LIMITS

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

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

CALCULATIONS – EFFECTIVE RADIATED POWER

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

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

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

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

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

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

Note: Substitution Method is performed for spurious emissions with less than 20dB of margin relative to the calculated field strength limit.

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 30 - 1,000 MHz, 27-Jul-04
Engineer: Joseph Cadigal

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	12-May-05
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1404	17-Nov-04
EMCO	Biconical Antenna, 30-300 MHz	3110B	1498	15-Jan-05

Conducted Emissions - AC Power Ports, 27-Jul-04
Engineer: Joseph Cadigal

Manufacturer	Description	Model #	Asset #	Cal Due
Elliott Laboratories	FCC / CISPR LISN	LISN-3, OATS	304	01-Jul-05
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	12-May-05
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	1398	12-Jan-05

RF Antenna Measurements, 17-Aug-04
Engineer: Juan Martinez

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	Power Sensor 100uW - 10 Watts	NRV-Z53	1236	11-Sep-04
Hewlett Packard	EMC Spectrum Analyzer, 9KHz - 22GHz	8593EM	1319	20-Nov-04
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1534	18-Mar-05

Radiated Emissions, 1000 - 20,00 MHz, 08-Sep-04
Engineer: Juan Martinez

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	786	29-Oct-04
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	12-Jan-05
Hewlett Packard	EMC Spectrum Analyzer, 9KHz-26.5GHz	8593EM	1141	23-Mar-05

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T 55817 63 Pages

Elliott

EMC Test Data

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Emissions Spec:	FCC Part 15 / 24 E & RSS-131	Class:	B / Radio
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

Broadlink

Model

PSA 1900

Date of Last Test: 7/27/2004

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Emissions Spec:	FCC Part 15 / 24 E & RSS-131	Class:	B / Radio
Immunity Spec:	-	Environment:	-

EUT INFORMATION

General Description

The EUT is a PCS repeater which is designed to amplify incoming PCS signals. Normally, the EUT would be placed on a table top during operation. The EUT was, therefore, treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, 2 Amps.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Broadlink	PSA 1900	PCS Repeater	N/A	SLS-PSA1900
Balance Electronics	GPSS-0750130	Power Supply	N/A	N/A

Other EUT Details

EUT Enclosure

The EUT enclosure is primarily constructed of plastic mold. It measures approximately 6 cm wide by 20 cm deep by 30 cm high.

Modification History

Mod. #	Test	Date	Modification
1			
2			
3			

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

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Emissions Spec:	FCC Part 15 / 24 E & RSS-131	Class:	B / Radio
Immunity Spec:	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Agilent	E4433B	Signal Generator	US40052329	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
none	-	-	-	-

Interface Cabling and Ports

		Cable(s)		
Port	Connected To	Description	Shielded or Unshielded	Length(m)
AC power	EUT	2 wire	unshielded	1.5

EUT Operation During Emissions

EUT was set to receive signal generator at maximum input. The EUT was configured to transmit at maximum power on the low and high edges of the PCS block.

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	B / Radio

Radiated Emissions

Test Specifics

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

Date of Test: 7/27/2004
Test Engineer: Joseph Cadigal
Test Location: SVOATS #2

Config. Used: 1
Config Change: none
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

Unless otherwise specified, the measurement antenna was located 3m from the EUT for the frequency range 1 - 20 GHz.

Ambient Conditions:

Temperature: 17.2 °C
Rel. Humidity: 80 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 1000 - 18000 MHz, Spurious Emissions	FCC Part 24E	Pass	-6.3dB @ 3760 MHz
2	Radiated Power Output	FCC Part 24E	Pass	30.2 dBm

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Elliott

EMC Test Data

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	B / Radio

Run #1: Spurious Emissions, 1000 - 18000 MHz

Frequency	Level	Pol	FCC Part 24E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1850.00	132.6	H	-	-	Pk	-	-	Peak reading, peak limit
1850.00	130.6	v	-	-	Pk	-	-	Peak reading, peak limit
3700.00	78.1	V	84.4	-6.3	Pk	-	-	Peak reading, peak limit
3700.00	75.1	H	84.4	-9.3	Pk	-	-	Peak reading, peak limit
5550.00	66.6	V	84.4	-17.8	Pk	-	-	Peak reading, peak limit
5550.00	62.9	V	84.4	-21.5	Pk	-	-	Peak reading, peak limit
7400.00	61.2	H	84.4	-23.2	Pk	-	-	Peak reading, peak limit
7400.00	59.9	H	84.4	-24.5	Pk	-	-	Peak reading, peak limit
9250.00	59.0	V	84.4	-25.4	Pk	-	-	Peak reading, peak limit
9250.00	58.3	V	84.4	-26.1	Pk	-	-	Peak reading, peak limit

Note 1:	The limit in the table above is an approximate field strength limit. It has been calculated form the erp or eirp limit detailed in the EN standard using Friis' equation for free space propagation: E = 30PG/d . This limit is a conservative limit because it does not consider the presence of the ground plane. The actual signal level, in terms of erp or eirp, is determined from a substitution measurement for all signals with less than 10dB of margin relative to the calculated field strength limit.

Run #2: Spurious Emissions, 1000 - 18000 MHz

Frequency	Level	Pol	FCC Part 24E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1910.00	130.0	H	-	-	Pk	-	-	Peak reading, peak limit
1910.00	127.5	v	-	-	Pk	-	-	Peak reading, peak limit
3820.00	79.5	V	84.4	-4.9	Pk	-	-	Peak reading, peak limit
3820.00	74.2	H	84.4	-10.2	Pk	-	-	Peak reading, peak limit
5730.00	65.6	V	84.4	-18.8	Pk	-	-	Peak reading, peak limit
5730.00	61.5	V	84.4	-22.9	Pk	-	-	Peak reading, peak limit
7640.00	60.5	H	84.4	-23.9	Pk	-	-	Peak reading, peak limit
7640.00	58.4	H	84.4	-26.0	Pk	-	-	Peak reading, peak limit
9550.00	57.4	V	84.4	-27.0	Pk	-	-	Peak reading, peak limit
9550.00	56.2	V	84.4	-28.2	Pk	-	-	Peak reading, peak limit

Note 1:	The limit in the table above is an approximate field strength limit. It has been calculated form the erp or eirp limit detailed in the EN standard using Friis' equation for free space propagation: E = 30PG/d . This limit is a conservative limit because it does not consider the presence of the ground plane. The actual signal level, in terms of erp or eirp, is determined from a substitution measurement for all signals with less than 10dB of margin relative to the calculated field strength limit.

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	B / Radio

Run #3: Spurious Emissions, 1000 - 18000 MHz

Frequency	Level	Pol	FCC Part 24E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1930.00	132.0	H	-	-	Pk	-	-	Peak reading, peak limit
1930.00	130.0	v	-	-	Pk	-	-	Peak reading, peak limit
3860.00	77.5	V	84.4	-6.9	Pk	-	-	Peak reading, peak limit
3860.00	74.5	H	84.4	-9.9	Pk	-	-	Peak reading, peak limit
5790.00	65.2	V	84.4	-19.2	Pk	-	-	Peak reading, peak limit
5790.00	61.2	V	84.4	-23.2	Pk	-	-	Peak reading, peak limit
7720.00	60.2	H	84.4	-24.2	Pk	-	-	Peak reading, peak limit
7720.00	58.4	H	84.4	-26.0	Pk	-	-	Peak reading, peak limit
9650.00	57.1	V	84.4	-27.3	Pk	-	-	Peak reading, peak limit
9650.00	55.5	V	84.4	-28.9	Pk	-	-	Peak reading, peak limit

Note 1:	The limit in the table above is an approximate field strength limit. It has been calculated form the erp or eirp limit detailed in the EN standard using Friis' equation for free space propagation: E = 30PG/d . This limit is a conservative limit because it does not consider the presence of the ground plane. The actual signal level, in terms of erp or eirp, is determined from a substitution measurement for all signals with less than 10dB of margin relative to the calculated field strength limit.

Run #4: Spurious Emissions, 1000 - 18000 MHz

Frequency	Level	Pol	FCC Part 24E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1990.00	131.2	H	-	-	Pk	-	-	Peak reading, peak limit
1990.00	129.1	v	-	-	Pk	-	-	Peak reading, peak limit
3980.00	77.5	V	84.4	-6.9	Pk	-	-	Peak reading, peak limit
3980.00	74.2	H	84.4	-10.2	Pk	-	-	Peak reading, peak limit
5970.00	64.2	V	84.4	-20.2	Pk	-	-	Peak reading, peak limit
5970.00	61.0	V	84.4	-23.4	Pk	-	-	Peak reading, peak limit
7960.00	60.2	H	84.4	-24.2	Pk	-	-	Peak reading, peak limit
7960.00	57.1	H	84.4	-27.3	Pk	-	-	Peak reading, peak limit
9950.00	56.5	V	84.4	-27.9	Pk	-	-	Peak reading, peak limit
9950.00	54.2	V	84.4	-30.2	Pk	-	-	Peak reading, peak limit

Note 1:	The limit in the table above is an approximate field strength limit. It has been calculated form the erp or eirp limit detailed in the EN standard using Friis' equation for free space propagation: E = 30PG/d . This limit is a conservative limit because it does not consider the presence of the ground plane. The actual signal level, in terms of erp or eirp, is determined from a substitution measurement for all signals with less than 10dB of margin relative to the calculated field strength limit.

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	B / Radio

Run #2: Radiated Spurious Emissions, Transmit Mode: Final Field Strength and Substitution Measurements

Frequency	Substitution measurements			Site	EUT measurements			eirp Limit	erp Limit	Margin
MHz	Pin[1]	Gain[2]	FS[3]	Factor[4]	FS[5]	eirp (dBm)	erp (dBm)	dBm	dBm	dB
3700.000	-11.7	9.5	95.8	98.0	78.1	-19.9	-22.1	-13.0		-6.9
3700.000	-11.7	9.5	94.9	97.1	75.1	-22.0	-24.2	-13.0		-9.0
5550.000	-11.0	9.2	95.5	97.3	66.6	-30.7	-32.9	-13.0		-17.7
5550.000	-11.0	9.2	94.6	96.4	62.9	-33.5	-35.7	-13.0		-20.5
3820.000	-11.7	9.5	95.8	98.0	79.5	-18.5	-20.7	-13.0		-5.5
3820.000	-11.7	9.5	94.9	97.1	74.2	-22.9	-25.1	-13.0		-9.9
5730.000	-11.0	9.2	95.5	97.3	65.6	-31.7	-33.9	-13.0		-18.7
5730.000	-11.0	9.2	94.6	96.4	61.5	-34.9	-37.1	-13.0		-21.9
3860.000	-11.7	9.5	95.8	98.0	77.5	-20.5	-22.7	-13.0		-7.5
3860.000	-11.7	9.5	94.9	97.1	74.5	-22.6	-24.8	-13.0		-9.6
5790.000	-11.0	9.2	95.5	97.3	65.2	-32.1	-34.3	-13.0		-19.1
5790.000	-11.0	9.2	94.6	96.4	61.2	-35.2	-37.4	-13.0		-22.2
3980.000	-11.7	9.5	95.8	98.0	77.5	-20.5	-22.7	-13.0		-7.5
3980.000	-11.7	9.5	94.9	97.1	74.4	-22.7	-24.9	-13.0		-9.7
5970.000	-11.0	9.2	95.5	97.3	64.2	-33.1	-35.3	-13.0		-20.1
5970.000	-11.0	9.2	94.6	96.4	61.0	-35.4	-37.6	-13.0		-22.4
1990.000	-10.5	8.5	100.4	102.4	132.2	29.8				
1990.000	-10.5	8.5	99.3	101.3	130.2	28.9				
1930.000	-10.5	8.5	100.4	102.4	132.0	29.6				
1930.000	-10.5	8.5	99.3	101.3	130.0	28.7				
1910.000	-10.5	8.5	100.4	102.4	130.0	27.6				
1910.000	-10.5	8.5	99.3	101.3	127.5	26.2				
1850.000	-10.5	8.5	100.4	102.4	132.6	30.2				
1850.000	-10.5	8.5	99.3	101.3	130.6	29.3				

Note 1:	Pin is the input power (dBm) to the substitution antenna
Note 2:	Gain is the gain (dBi) for the substitution antenna. A dipole has a gain of 2.2dBi.
Note 3:	FS is the field strength (dBuV/m) measured from the substitution antenna.
Note 4:	Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.
Note 5:	EUT field strength as measured during initial run.

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Radio Performance Test -24E & RSS-131
RF Port Measurements

Test Specifics

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

Date of Test: 8/17/2004
Test Engineer: Juan Martinez
Test Location: SVOATS #2
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT's rf port was connected to the measurement instrument's rf port, via an attenuator or dc-block if necessary.

Ambient Conditions:

Temperature: 14 °C
Rel. Humidity: 51 %

Summary of Results

Run #	Test Performed	Limit	Result	Value / Margin
1	Power Output	Part 24E & RSS-131	Pass	Refer to run
2	Bandedge	Part 24E & RSS-131	Pass	Refer to run
2	Out of Band	Part 24E & RSS-131	Pass	Refer to run
2	Input and output (99%)	Part 24E & RSS-131	Pass	Refer to run

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Run #1: Antenna port Power Measurements

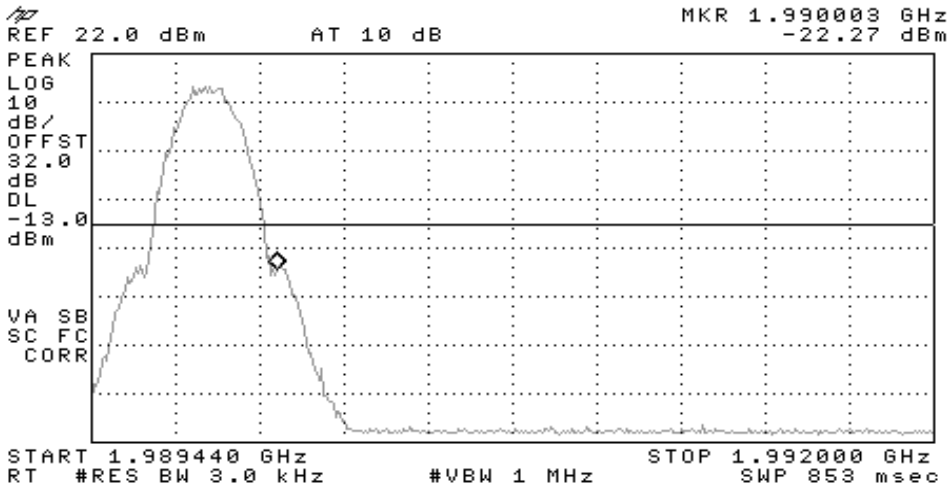
Freq.	Pmeas	Duty Cycle	Pout
1930	17.9	1	17.9
1950	21.5	1	21.5
1990	22.7	1	22.7

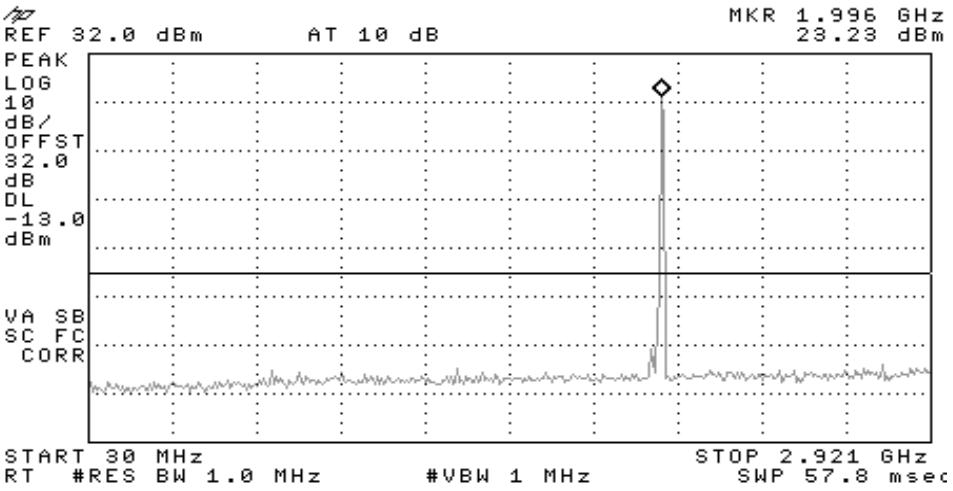
Setting: software power setting of EUT
Pmeas: Measured output power (average)
Duty Cycle: Duty cycleof transmissions (1 = 100%)

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

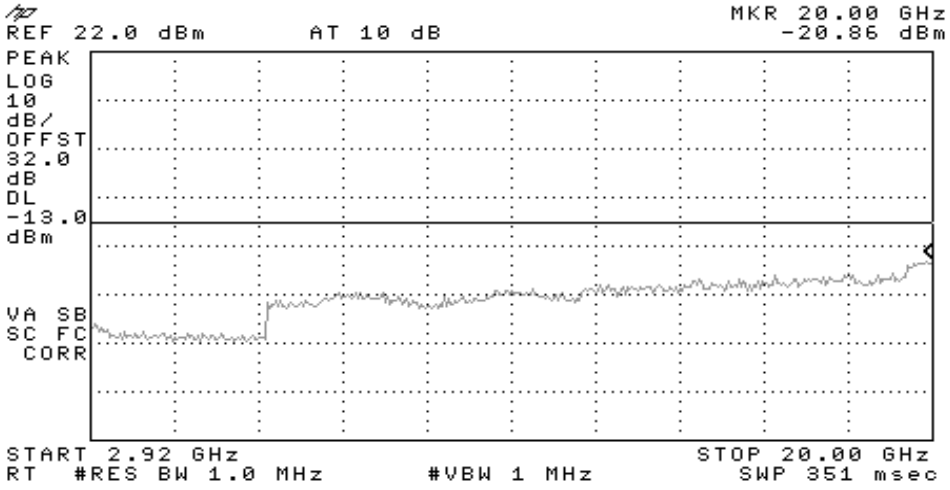
Run #2: Bandedge, 99%, Out of band

GSM High (Base)

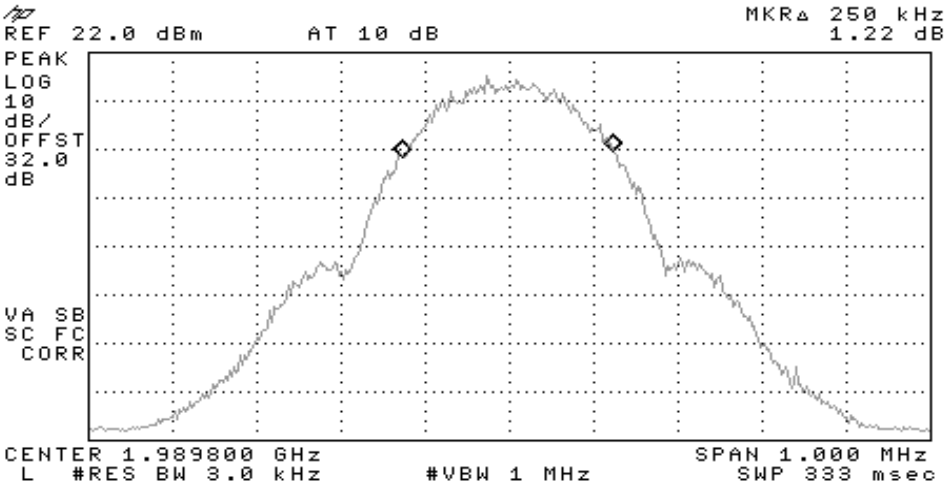




Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

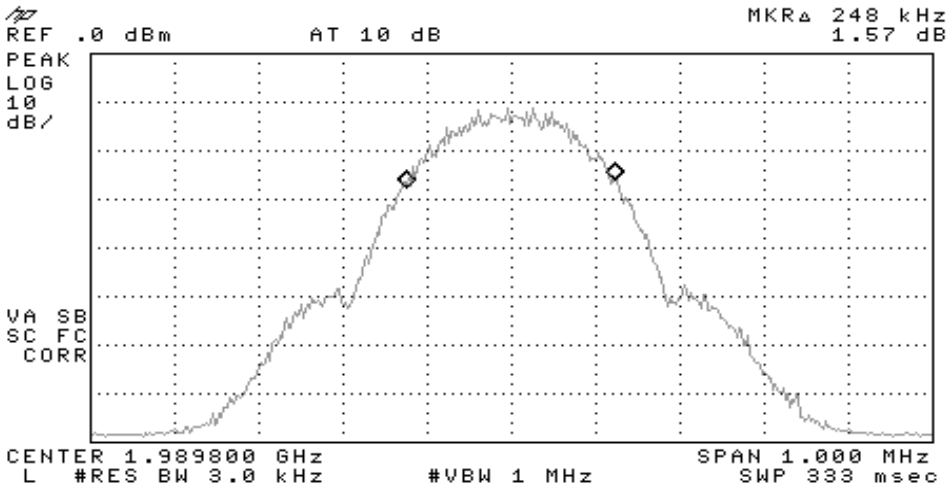


Output Plot



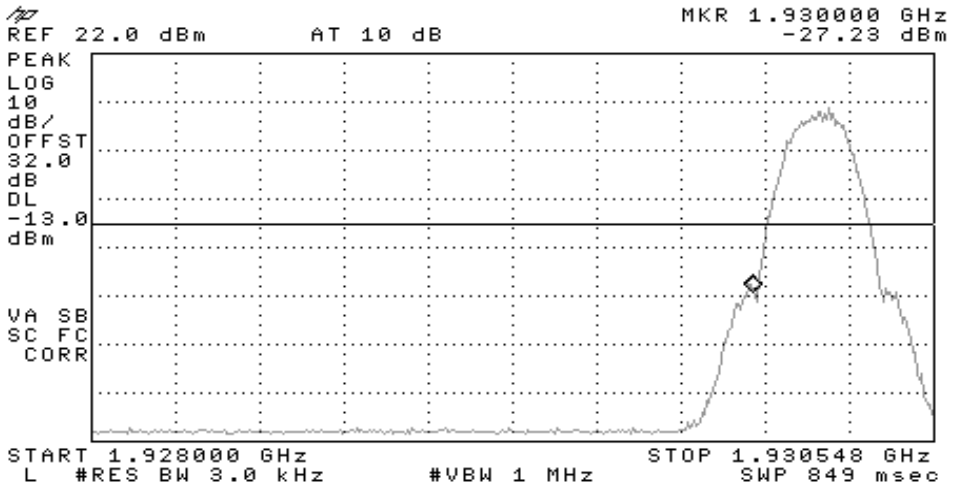
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

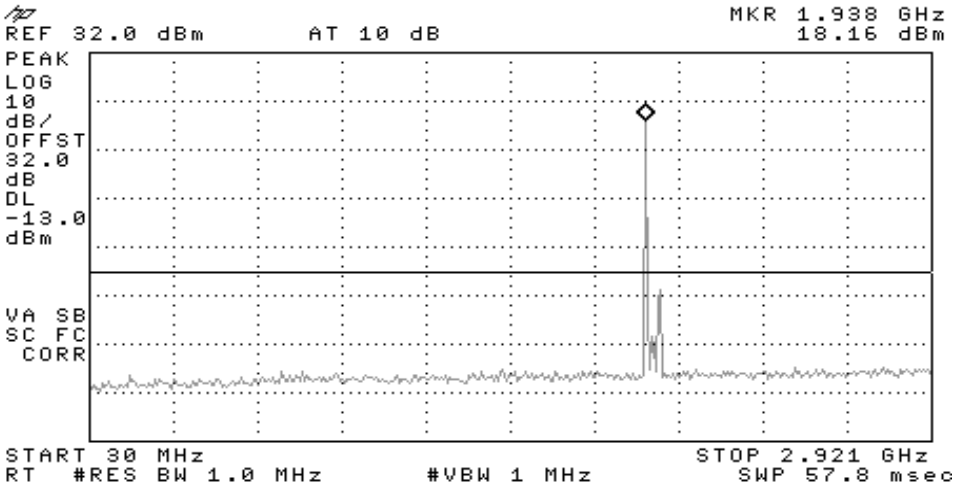
Input Plot



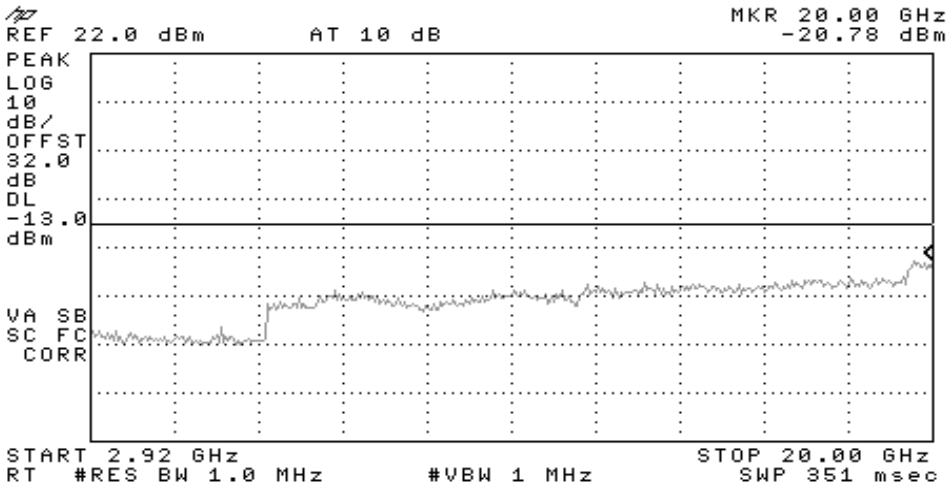
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

GSM Low (Base)

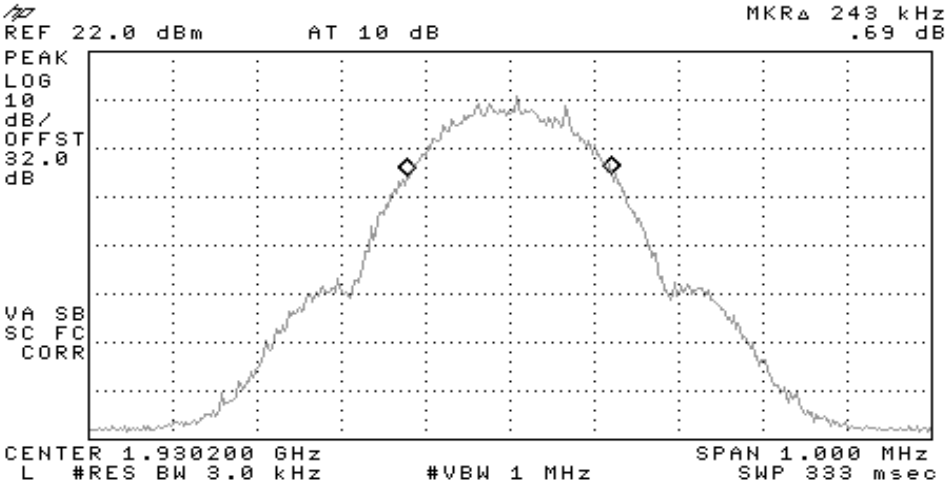




Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

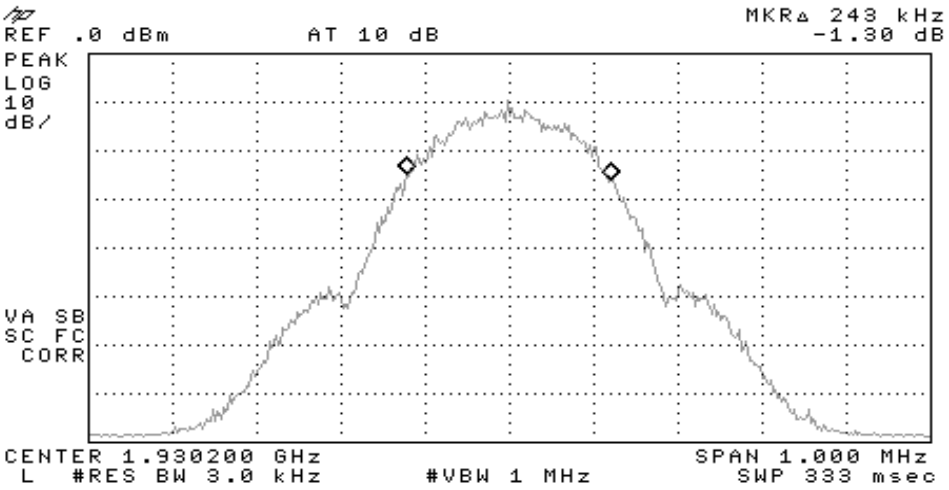


Output Plot



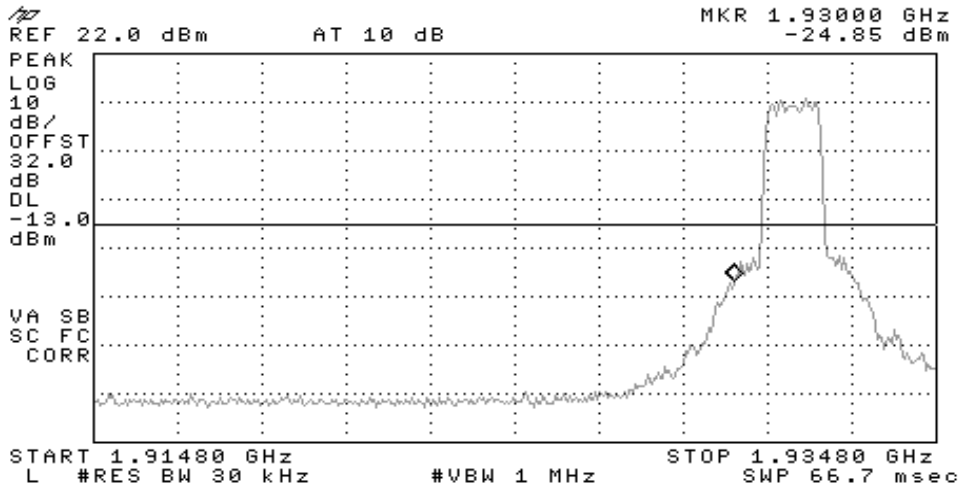
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

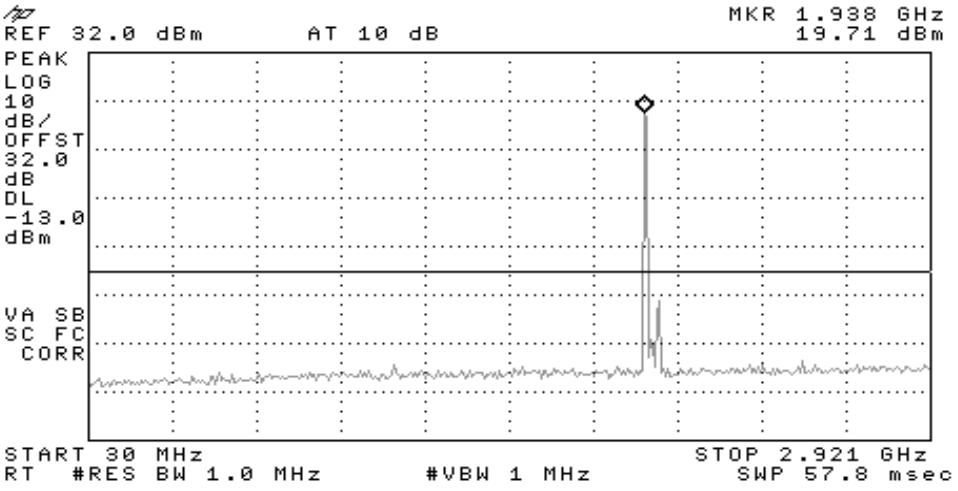
Input Plot



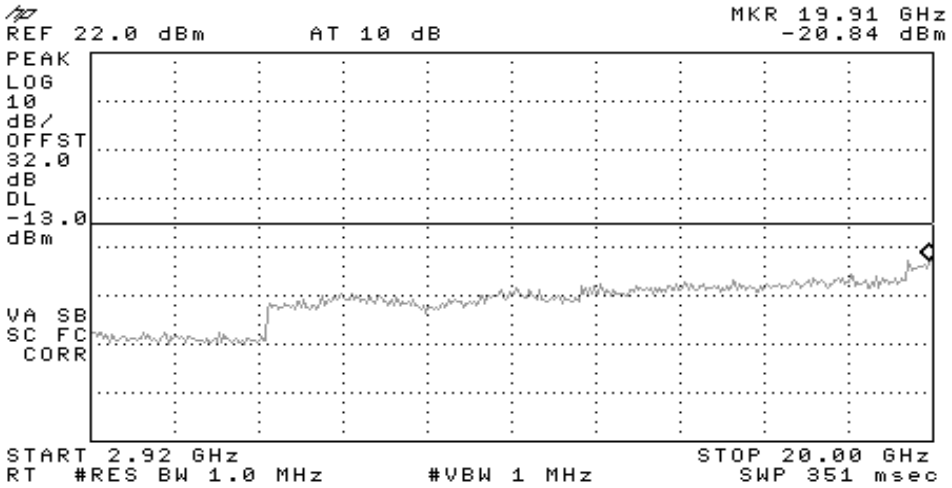
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

CDMA Low (Base)





Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A



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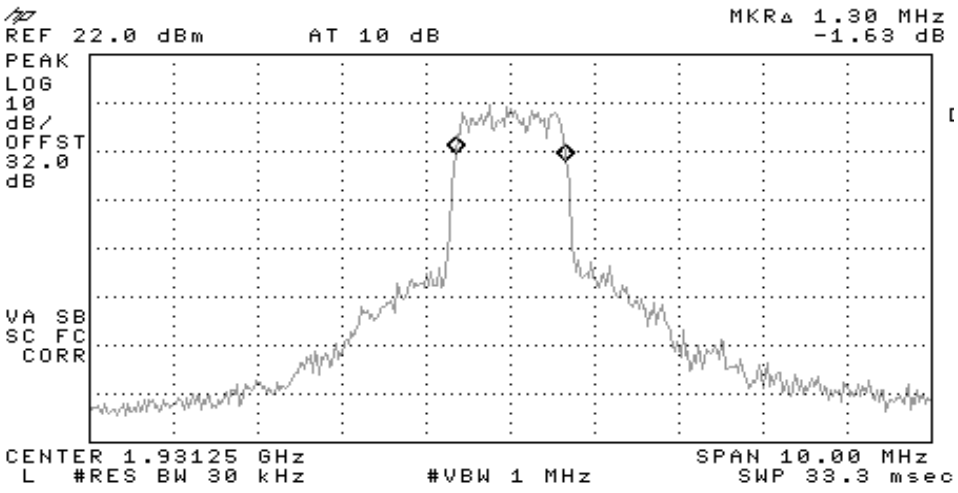
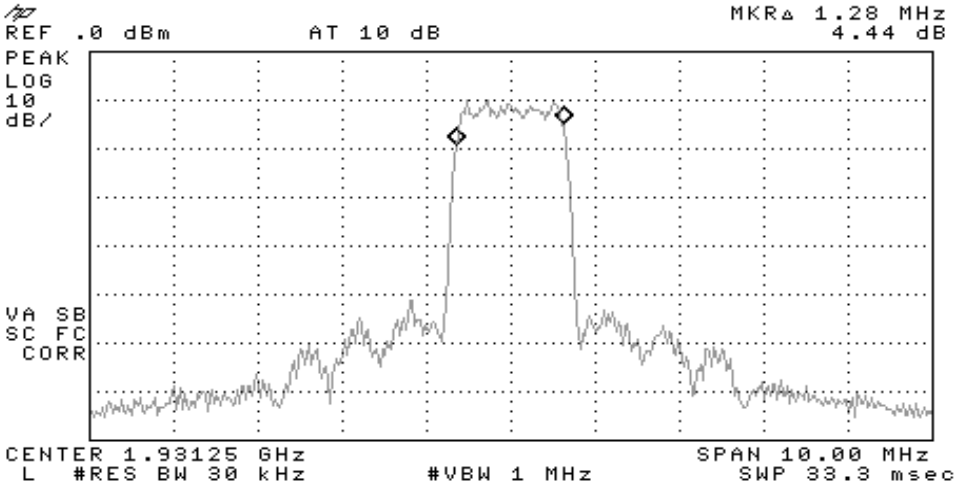


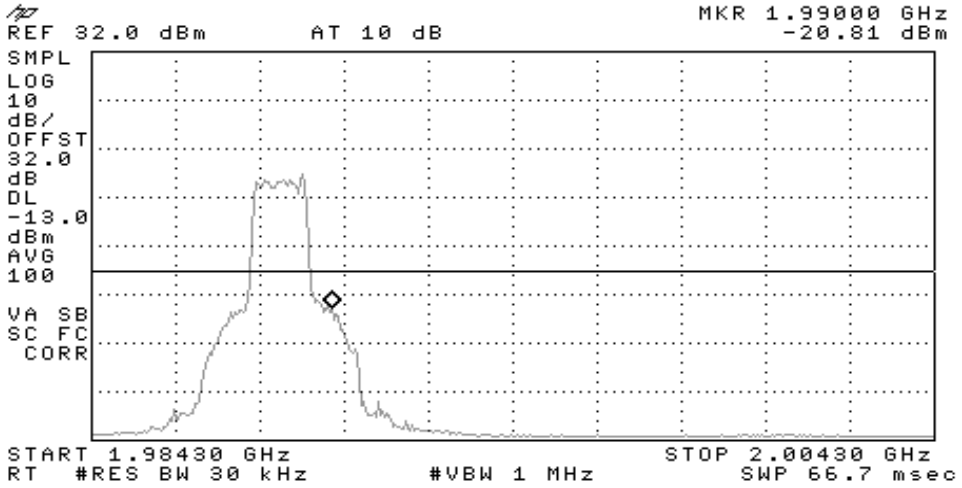
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

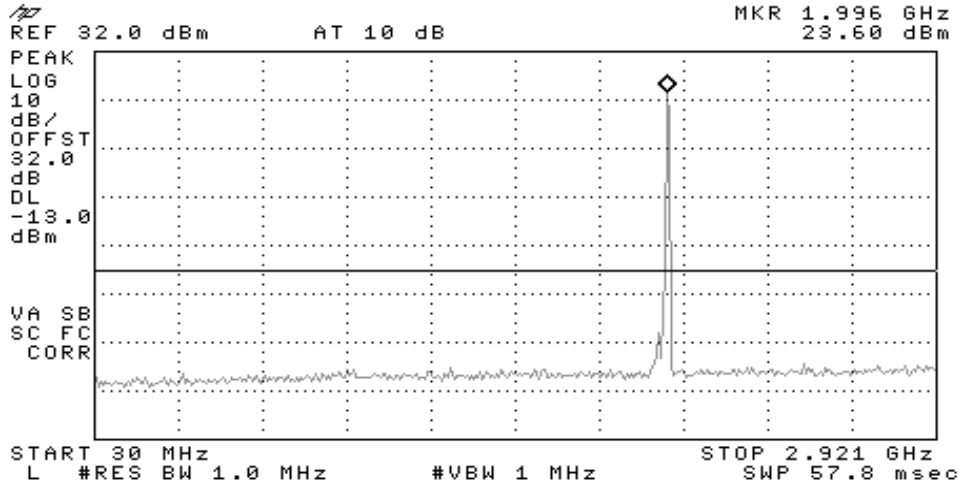
Input Plot



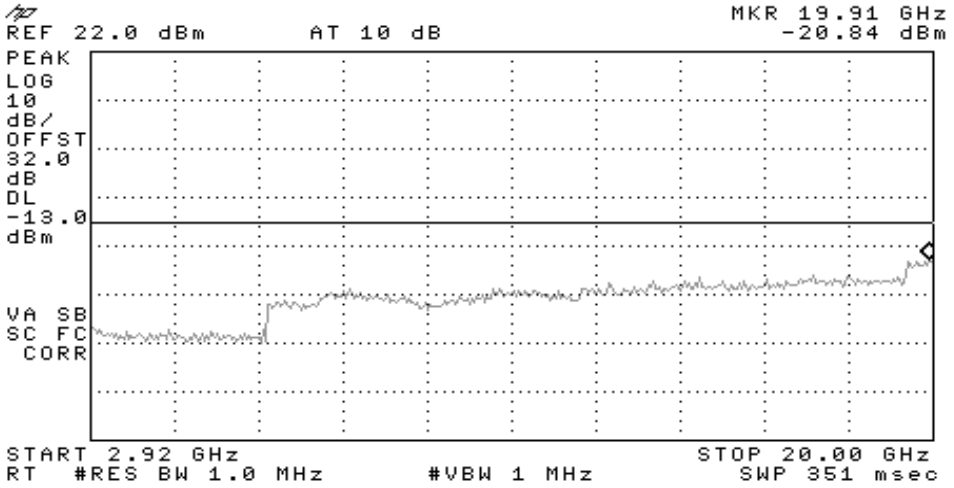
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

CDMA High (Base)

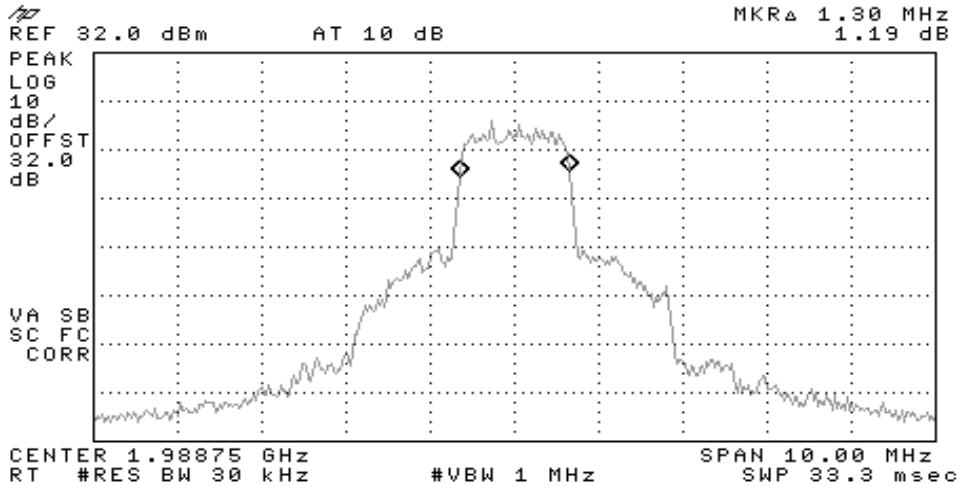




Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

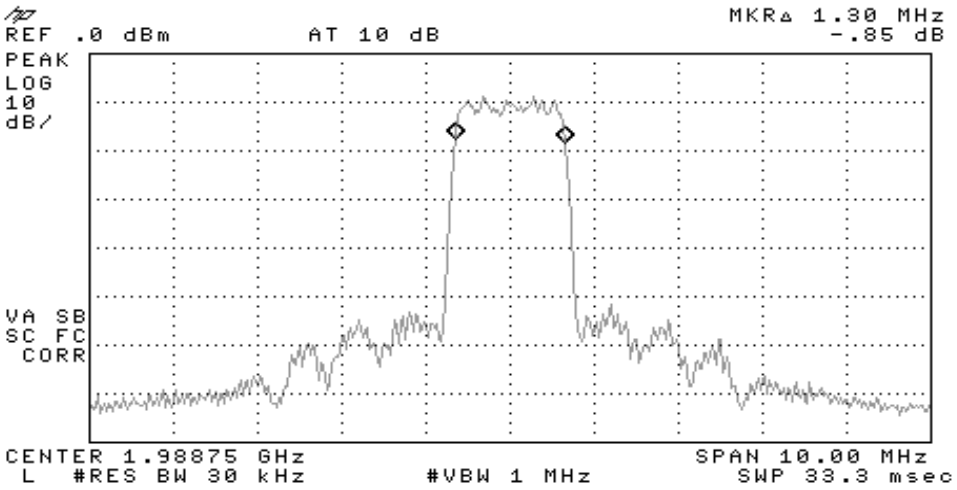


Output Plot



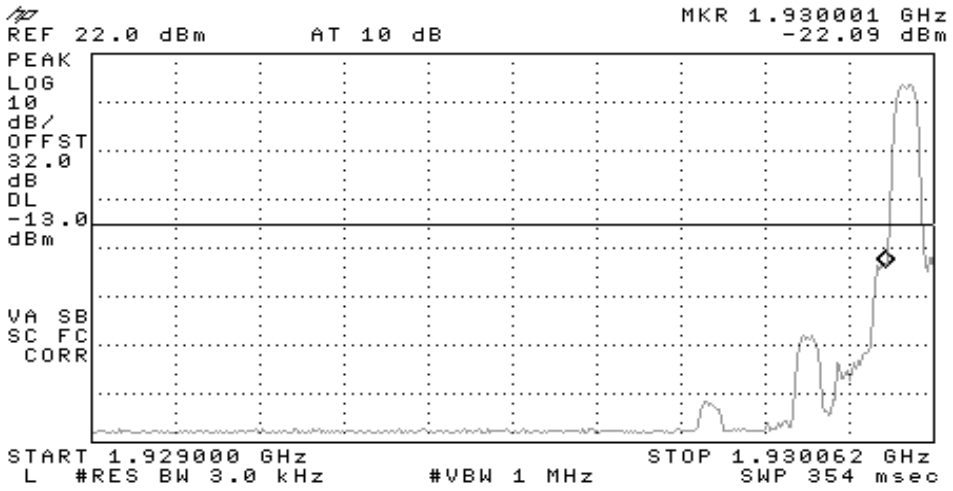
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

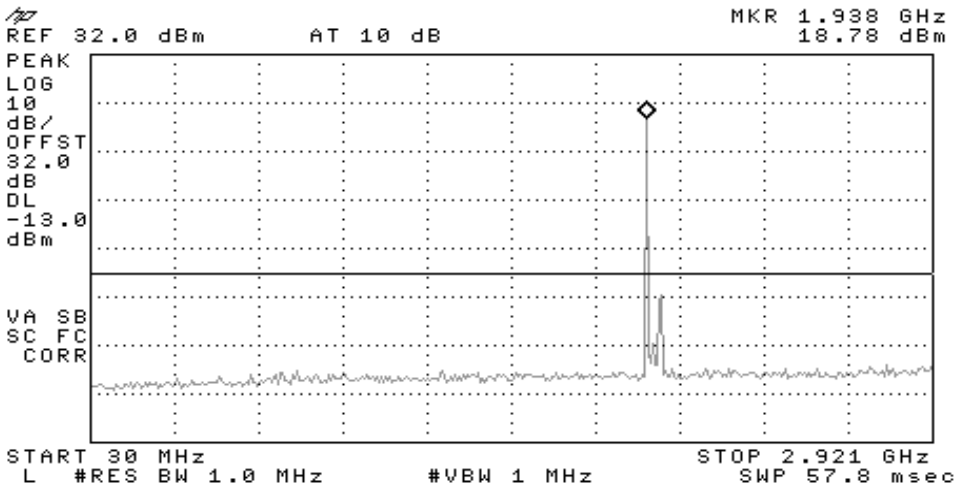
Input Plot



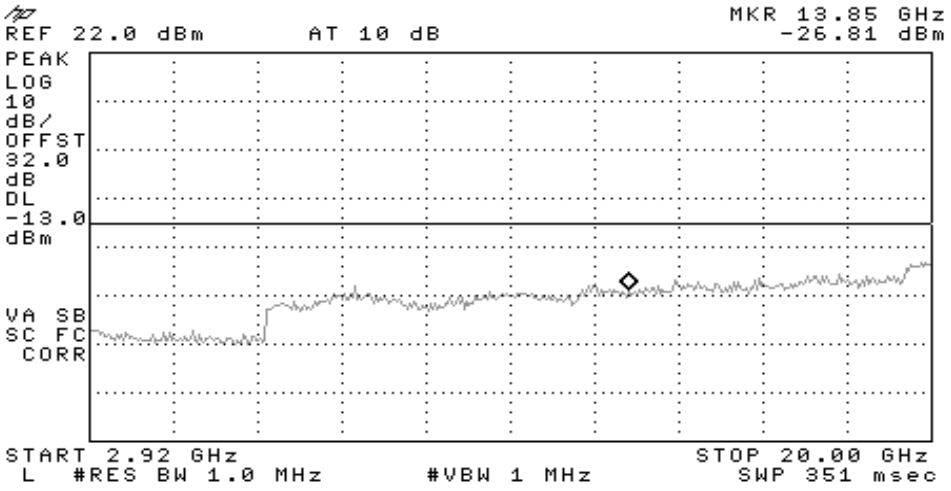
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

TDMA Low (Base)

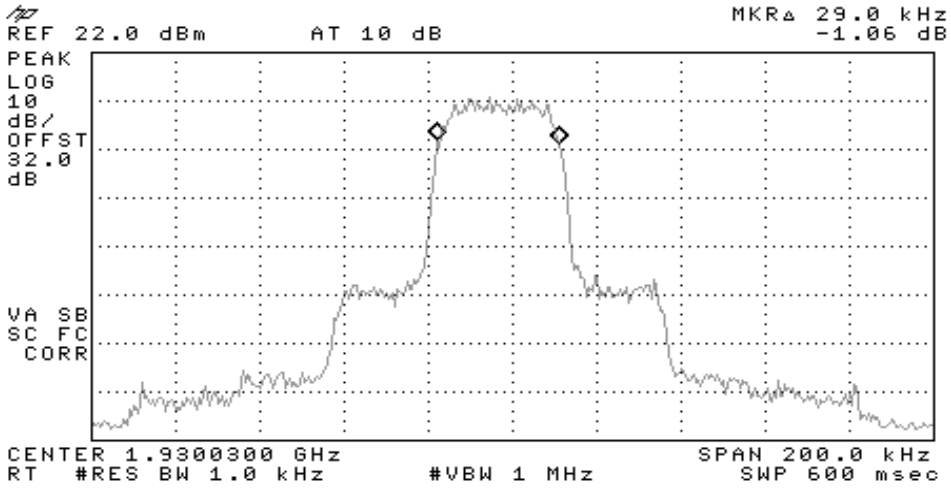




Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

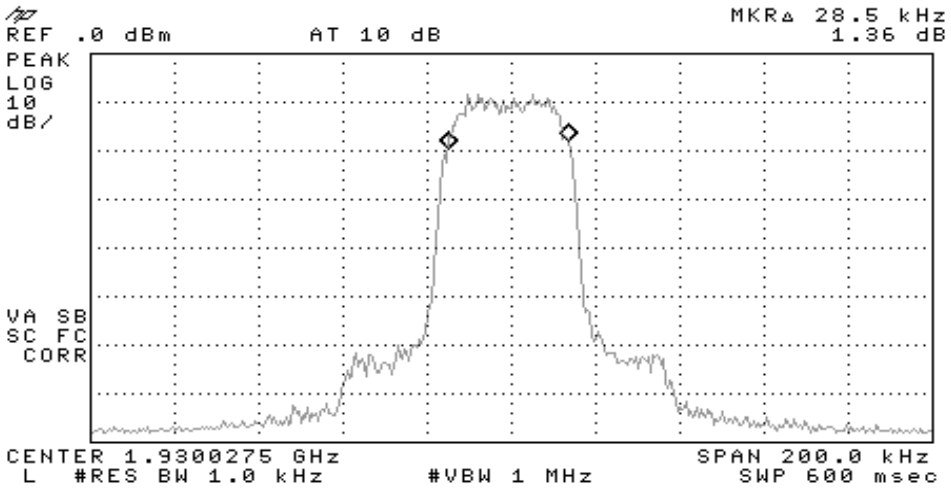


Output Plot



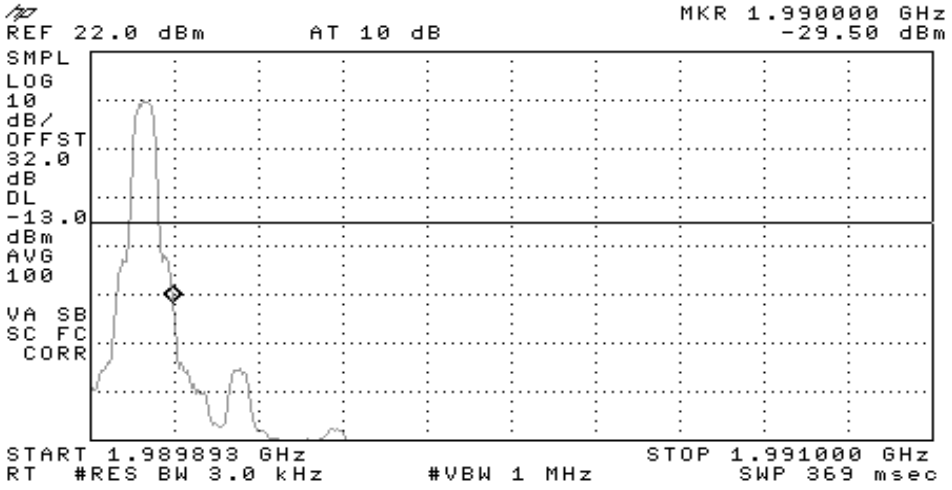
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

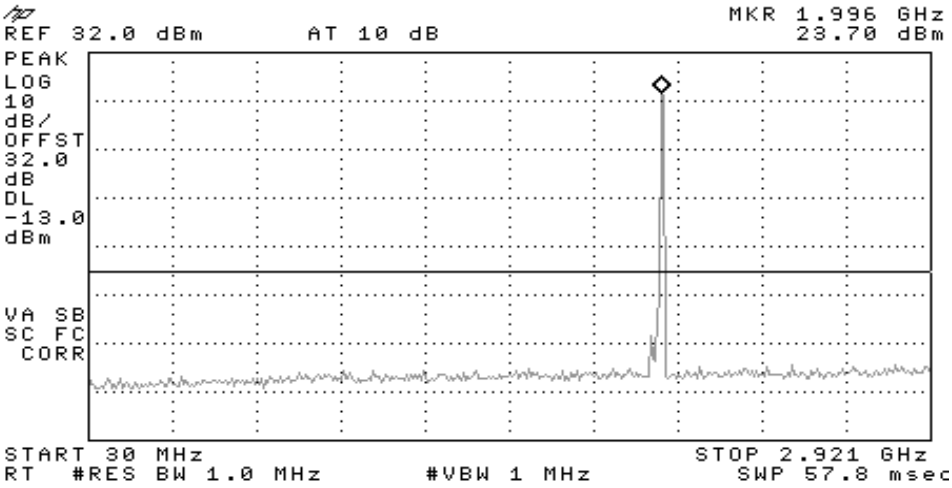
Input Plot



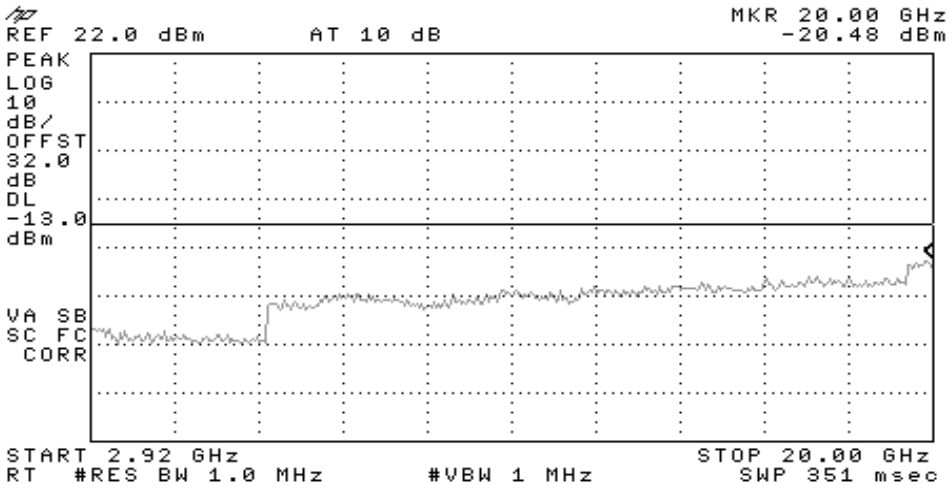
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

TDMA High (Base)





Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A



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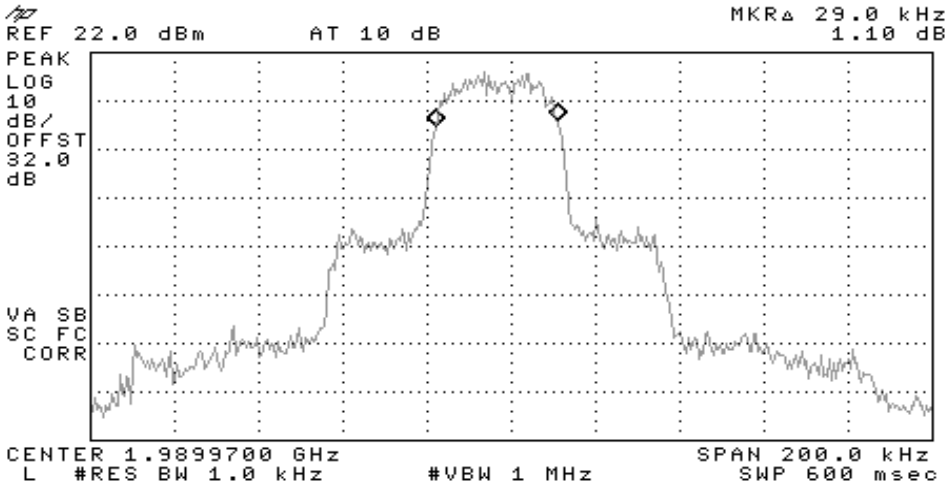
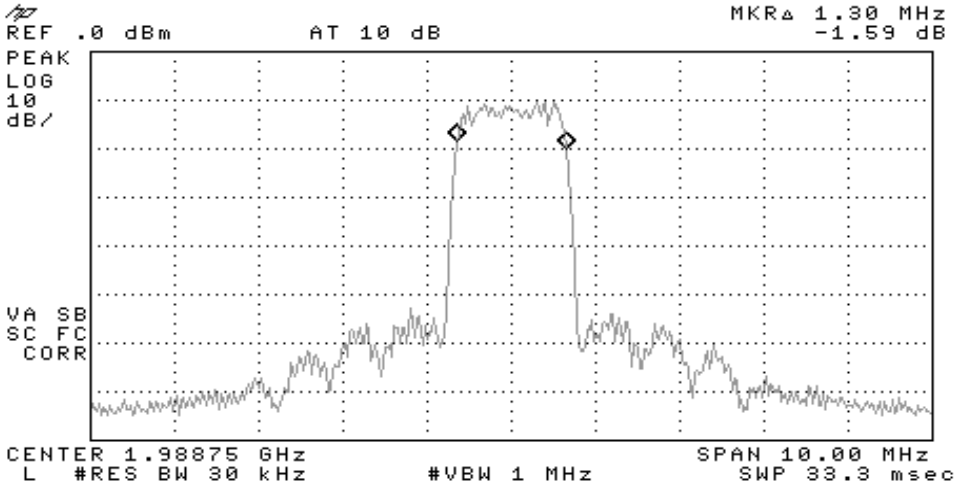


Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Input Plot



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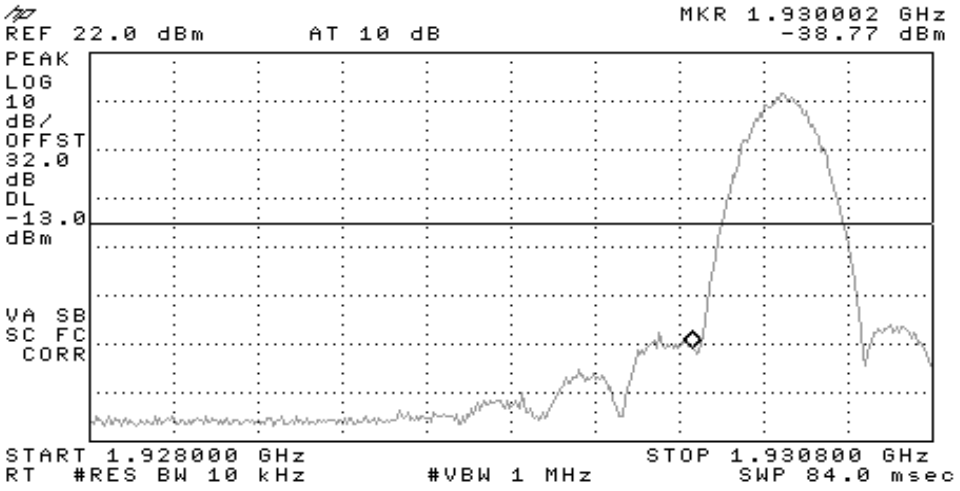
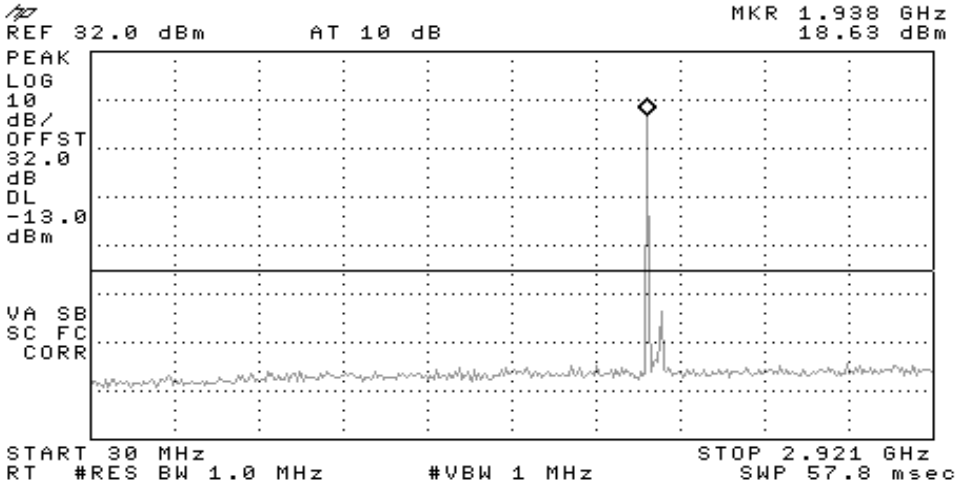
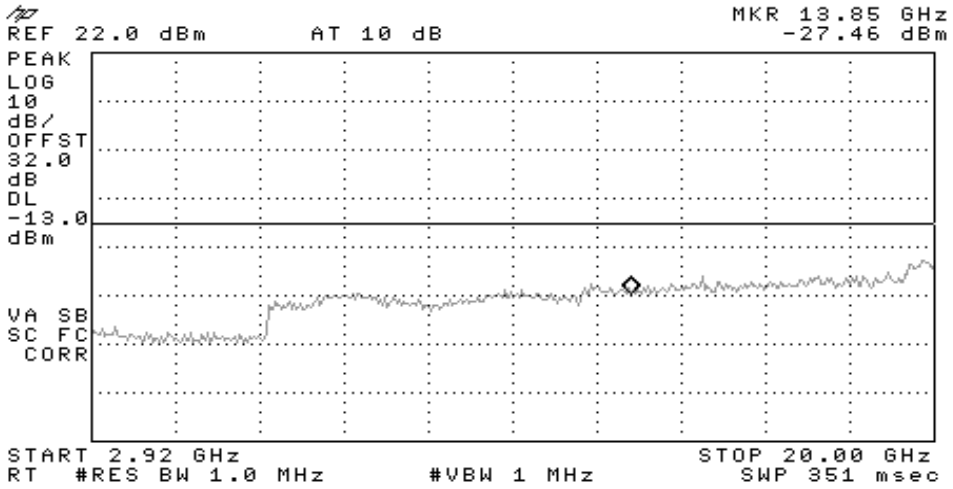
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

EDGE Low (Mobile)

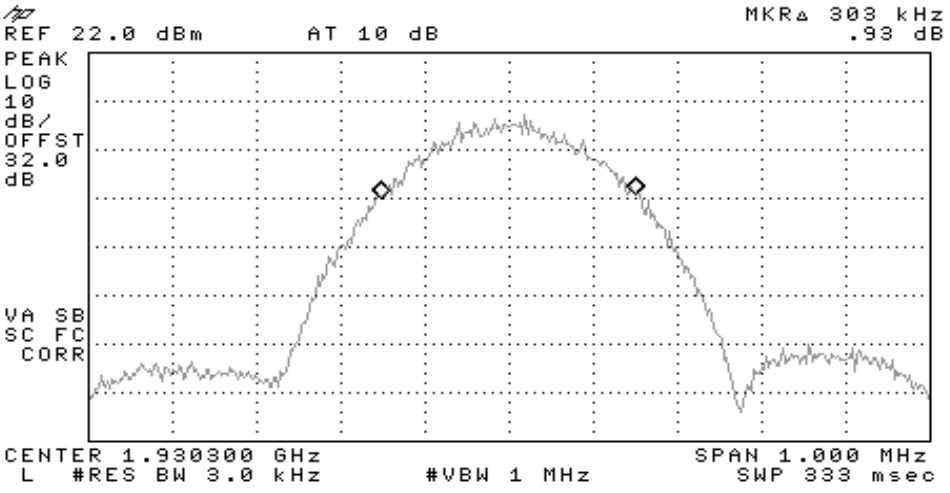




Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

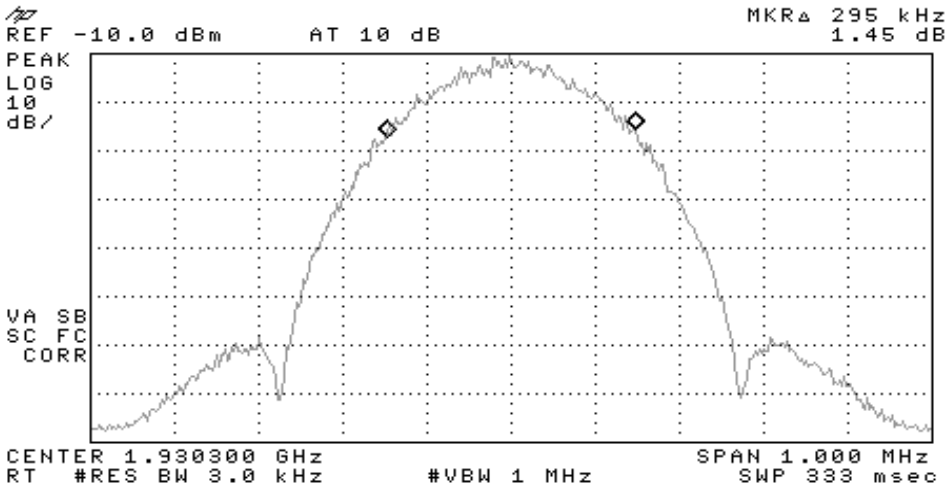


Output Plot



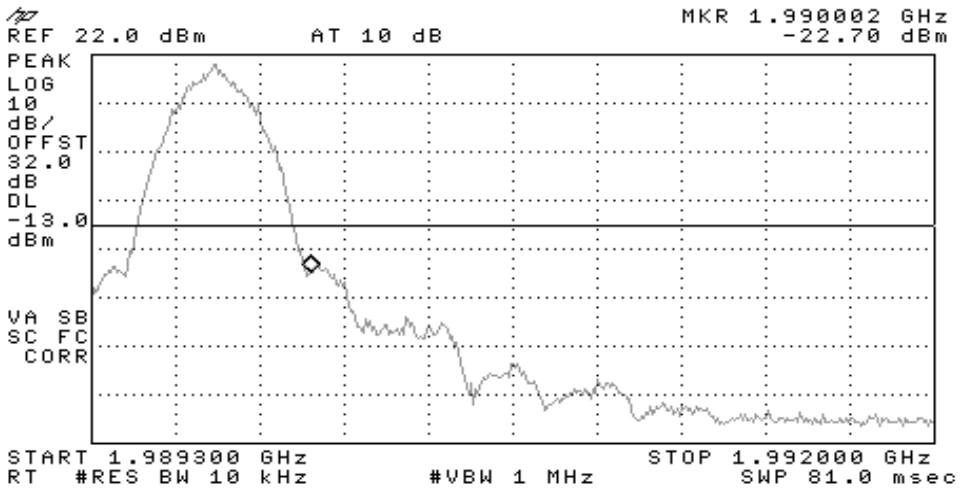
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

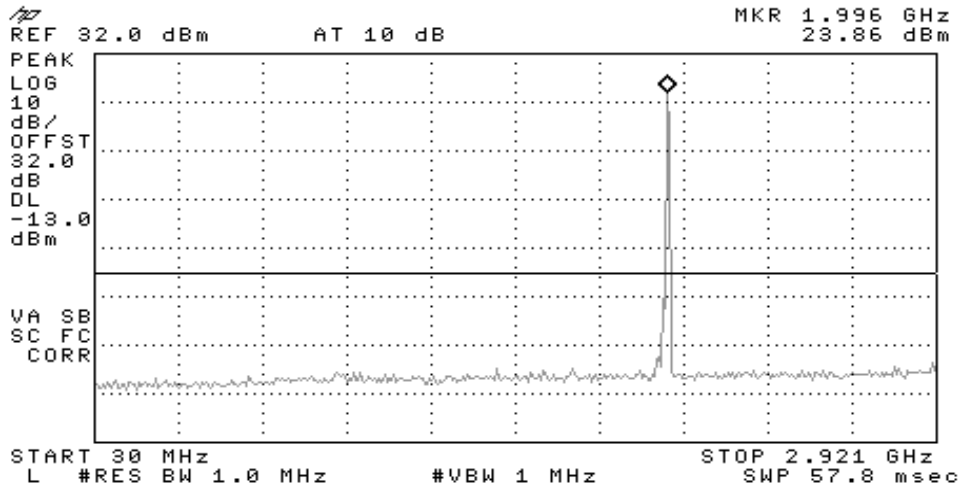
Input Plot



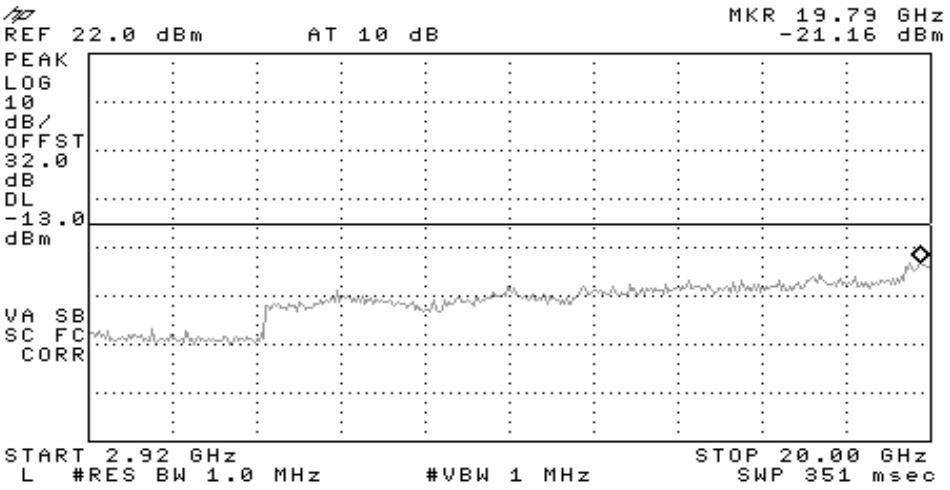
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

EDGE High (Mobile)

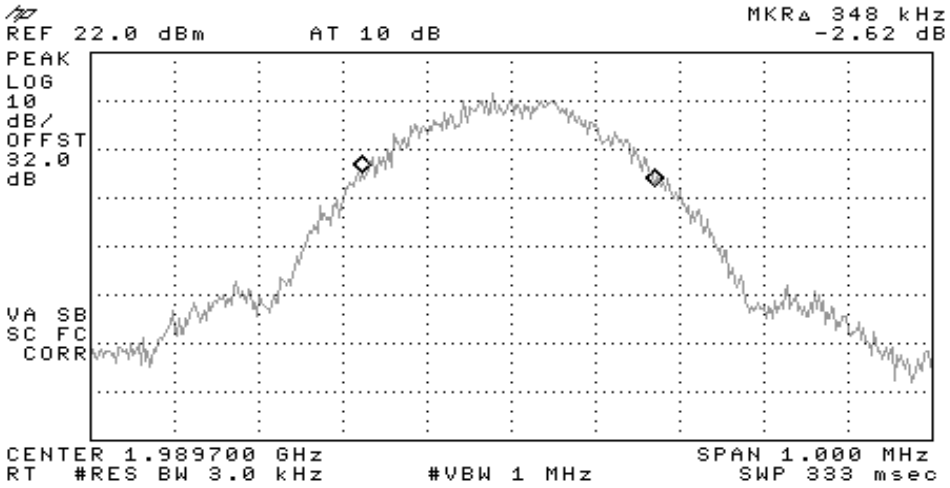




Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

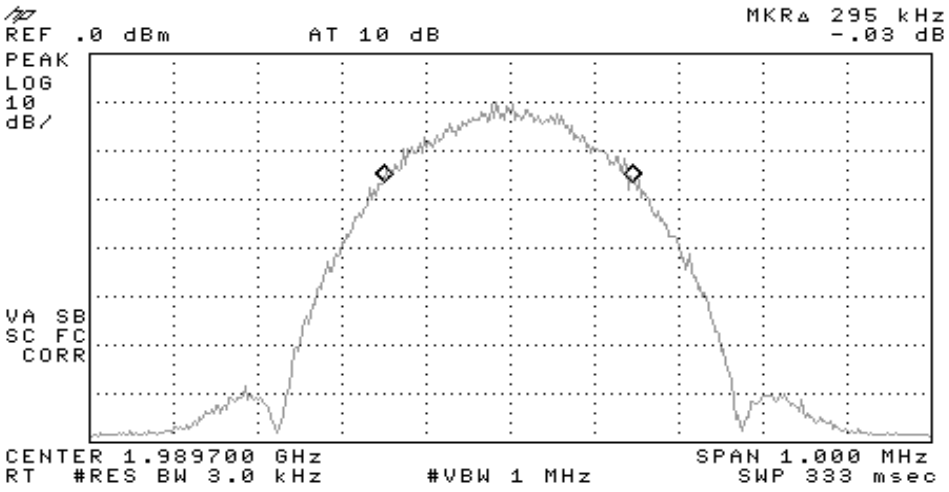


Output Plot



Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Input Plot



Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Radio Performance Test -24E & RSS-131
RF Port Measurements

Test Specifics

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

Date of Test: 8/17/2004
Test Engineer: Juan Martinez
Test Location: SVOATS #2
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT's rf port was connected to the measurement instrument's rf port, via an attenuator or dc-block if necessary.

Ambient Conditions:

Temperature: 14 °C
Rel. Humidity: 51 %

Summary of Results

Run #	Test Performed	Limit	Result	Value / Margin
1	Power Output	Part 24E & RSS-131	Pass	Refer to run
2	Bandedge	Part 24E & RSS-131	Pass	Refer to run
2	Out of Band	Part 24E & RSS-131	Pass	Refer to run
2	Input and output (99%)	Part 24E & RSS-131	Pass	Refer to run

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Run #1: Antenna port Power Measurements

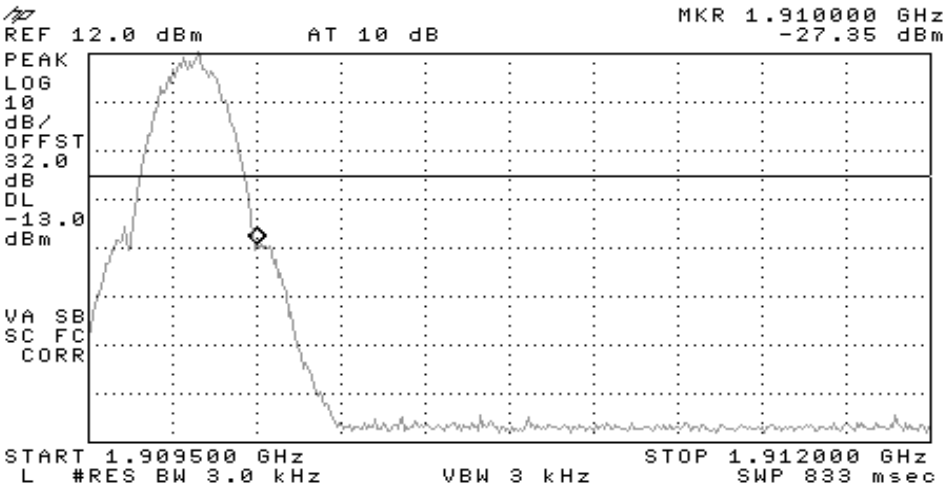
Freq.	Pmeas	Duty Cycle	Pout
1850	22.6	1	22.6
1880	21.5	1	21.5
1910	20.3	1	20.3

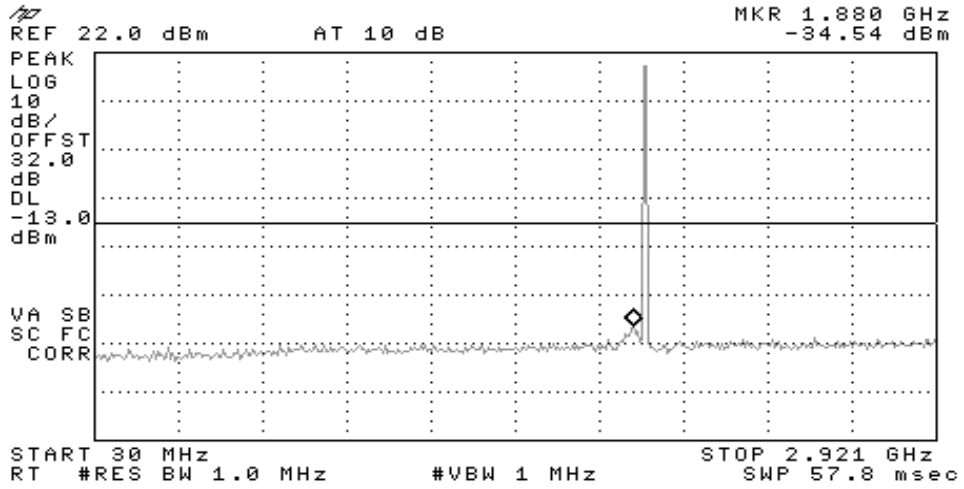
Setting: software power setting of EUT
Pmeas: Measured output power (average)
Duty Cycle: Duty cycleof transmissions (1 = 100%)

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Run #2: Bandedge, 99%, Out of band

GSM High (Mobile)





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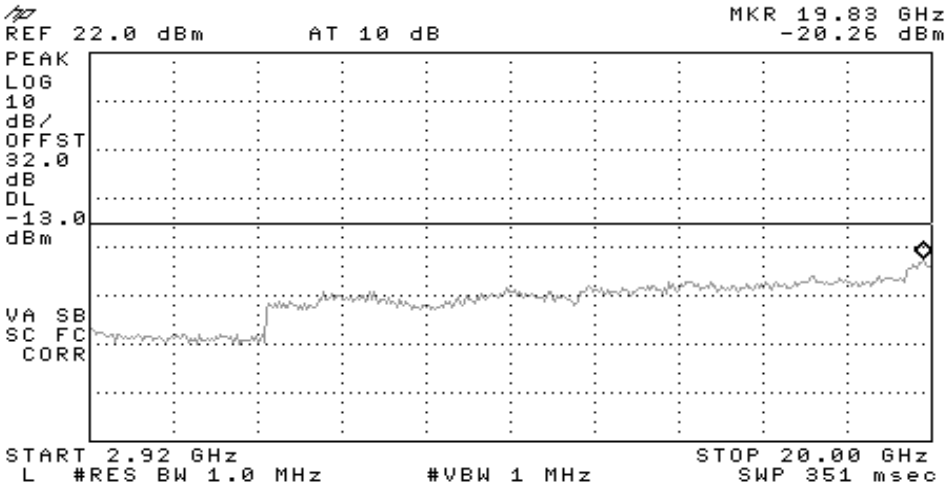
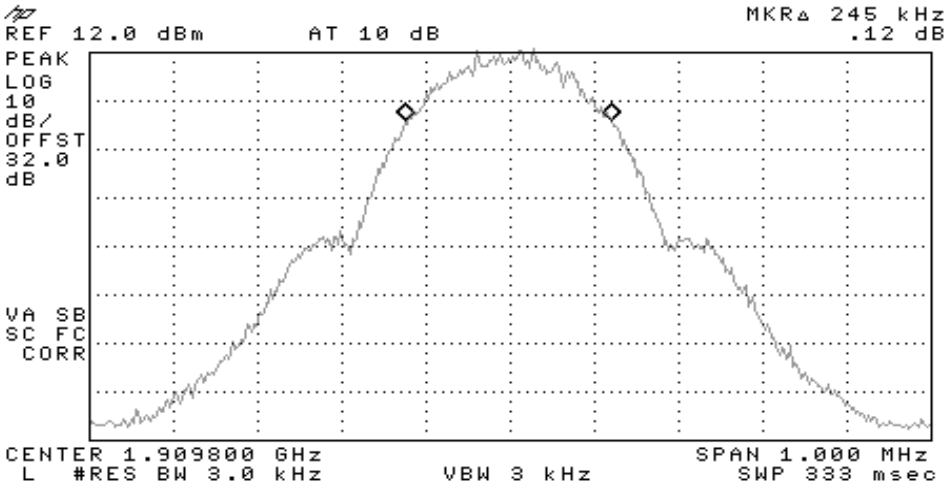
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

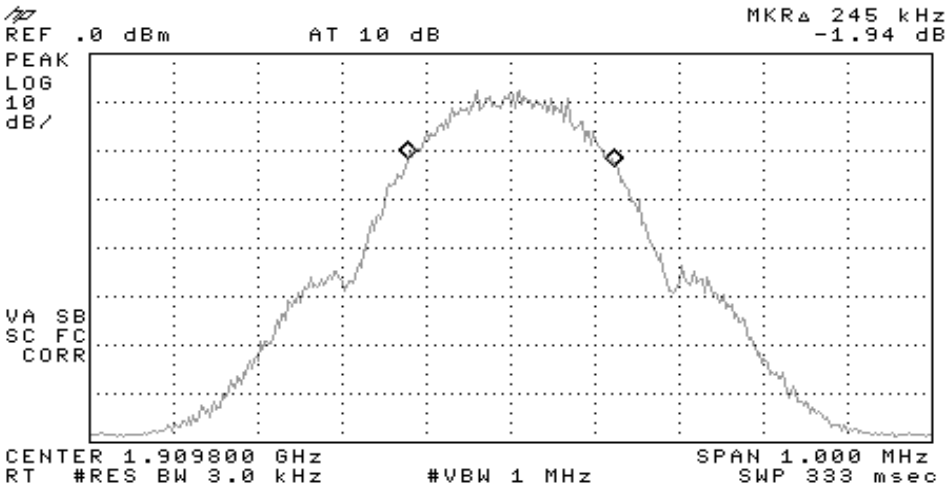


Output Plot



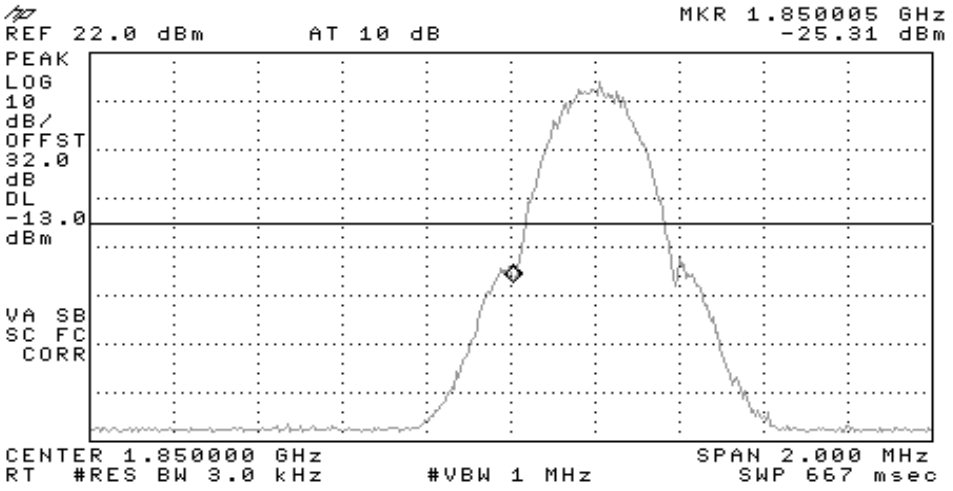
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

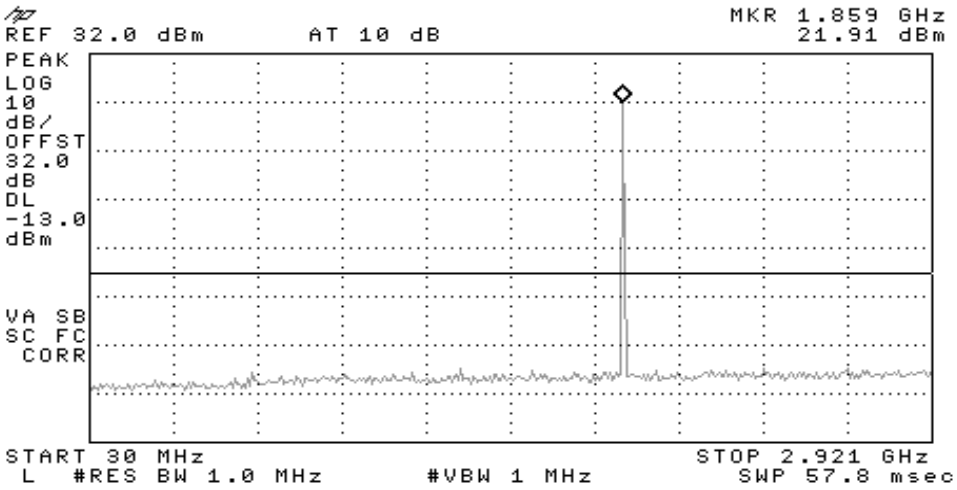
Input Plot



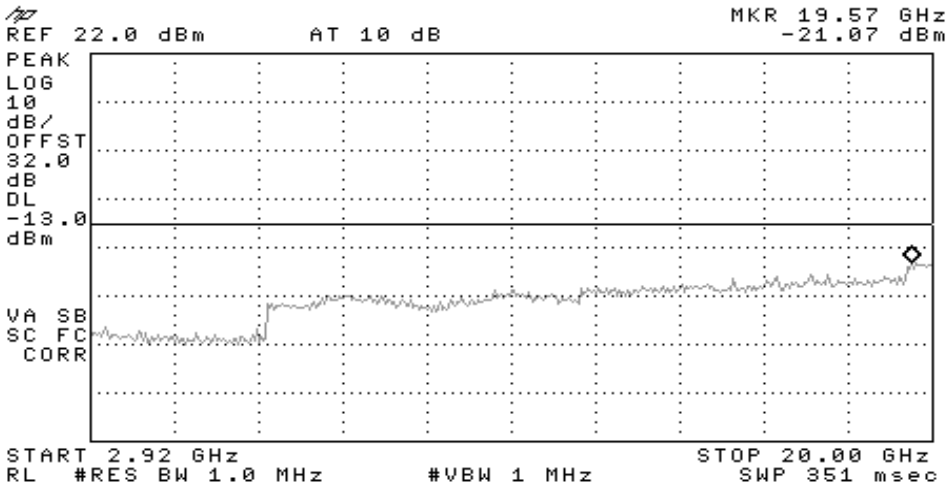
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

GSM Low (Mobile)

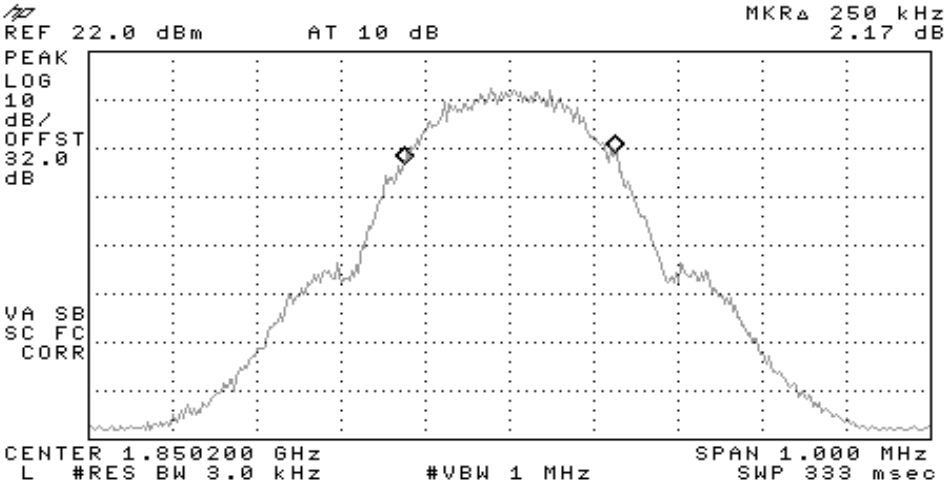




Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A



Output Plot



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Model:	PSA 1900	T-Log Number:	T55817
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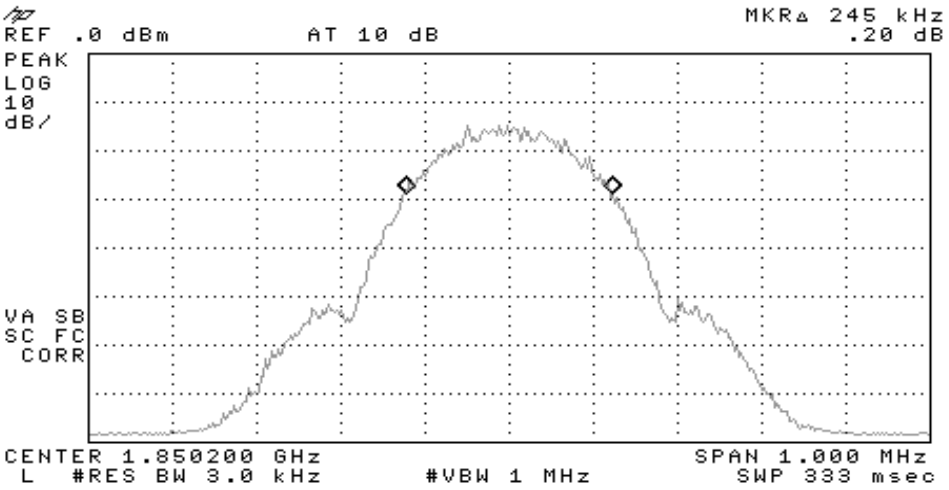
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Input Plot



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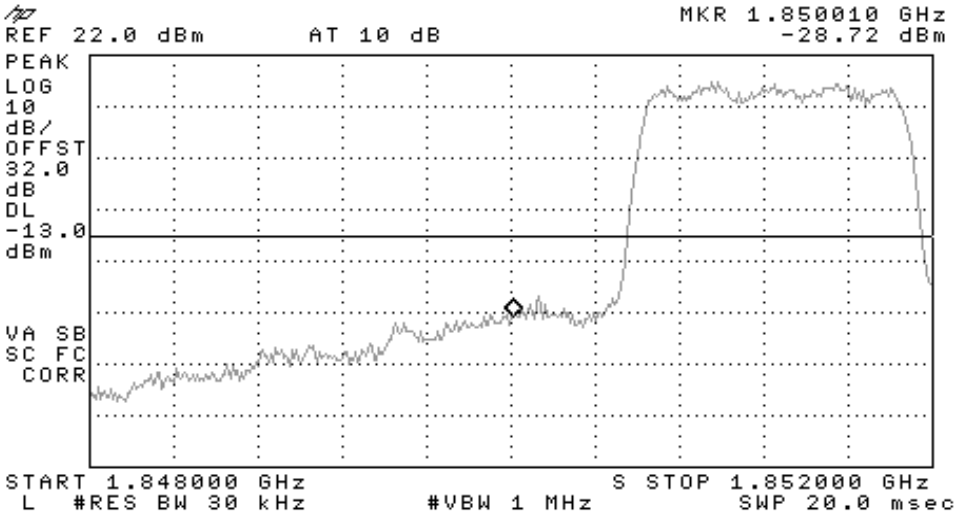
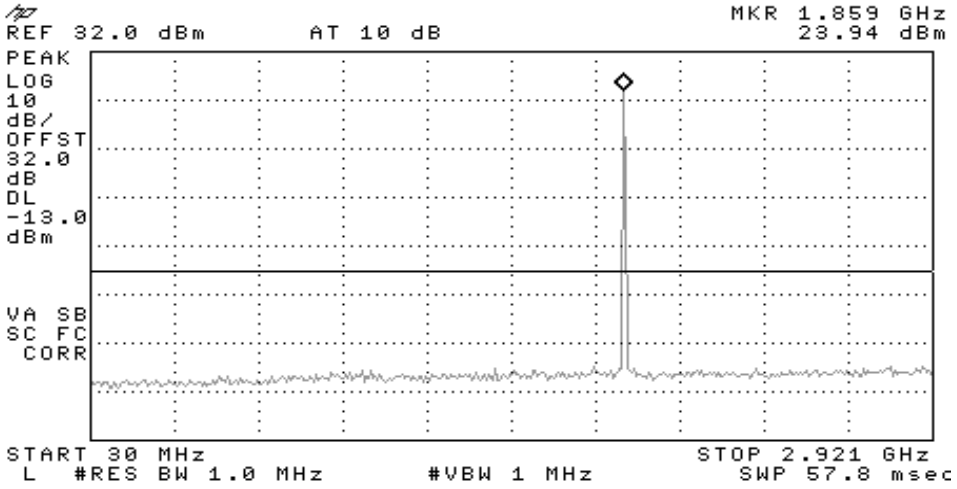
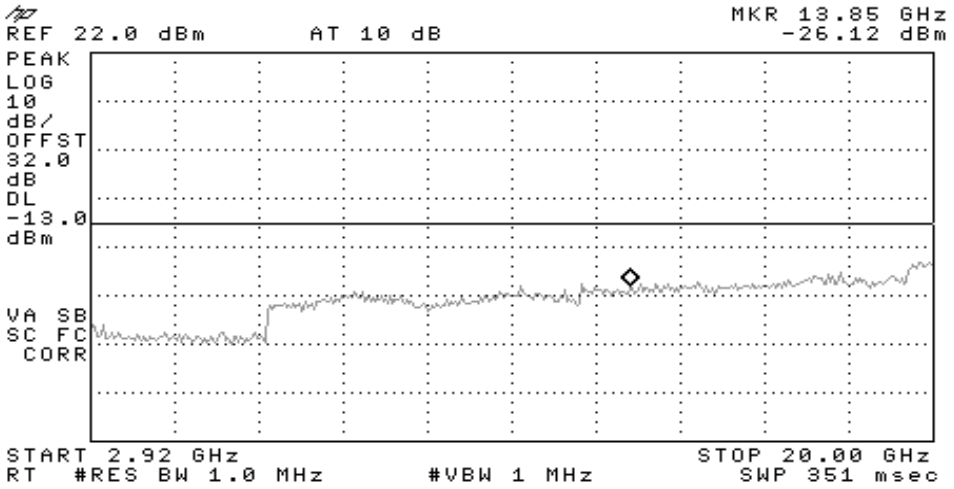
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

CDMA Low (Mobile)

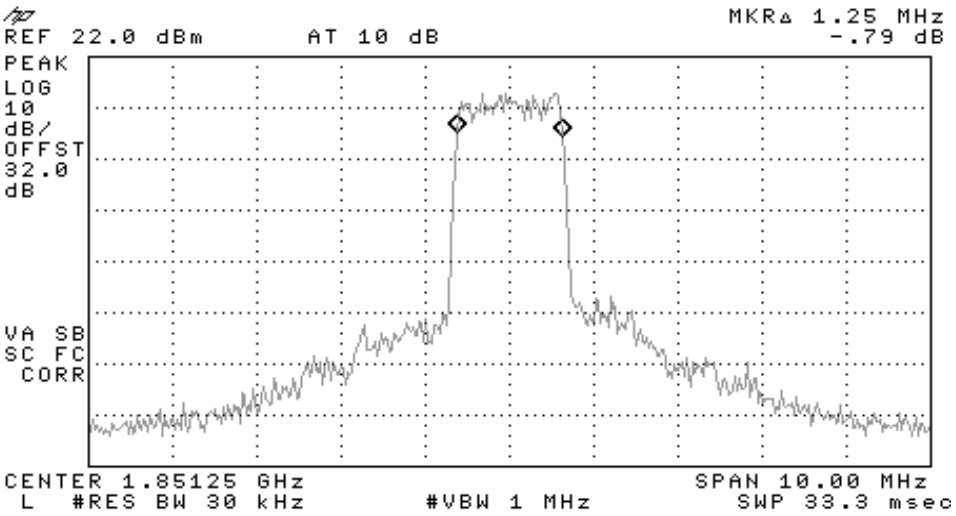




Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A



Output Plot



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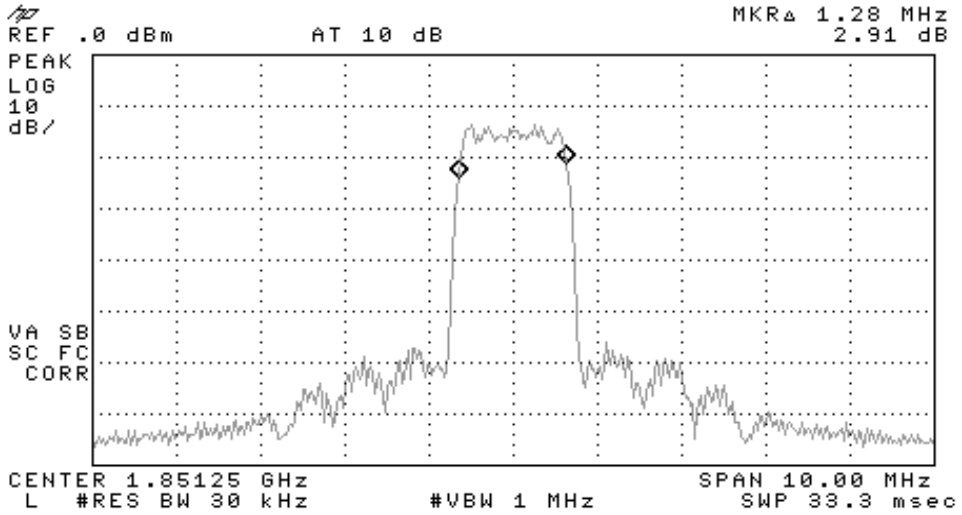
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Input Plot



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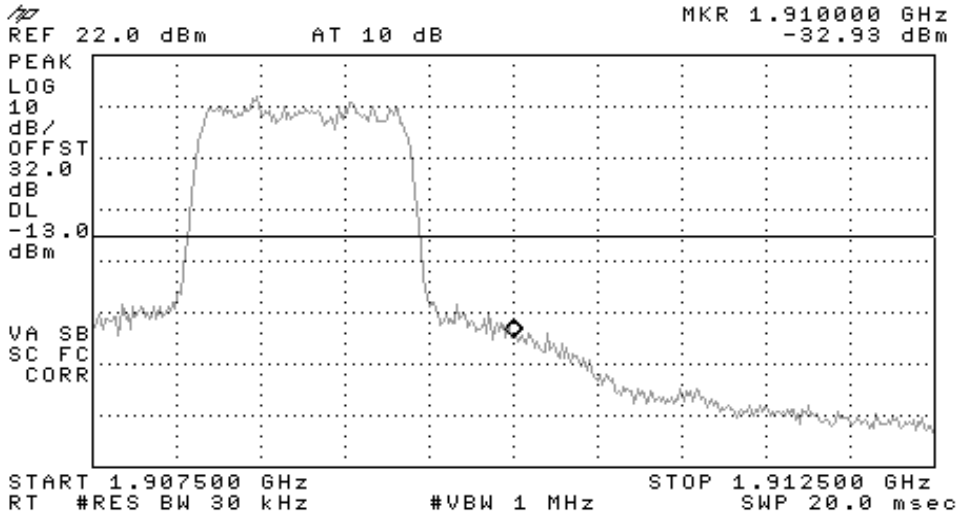
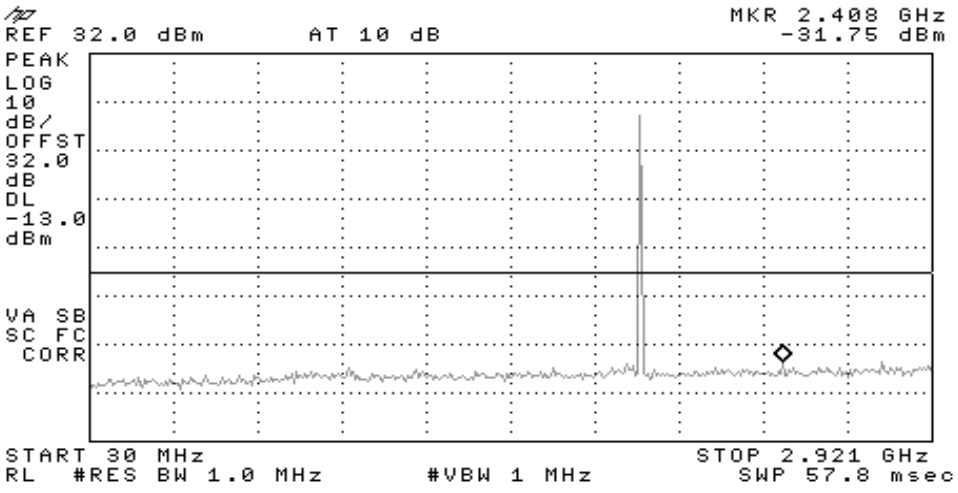
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

CDMA High (Mobile)





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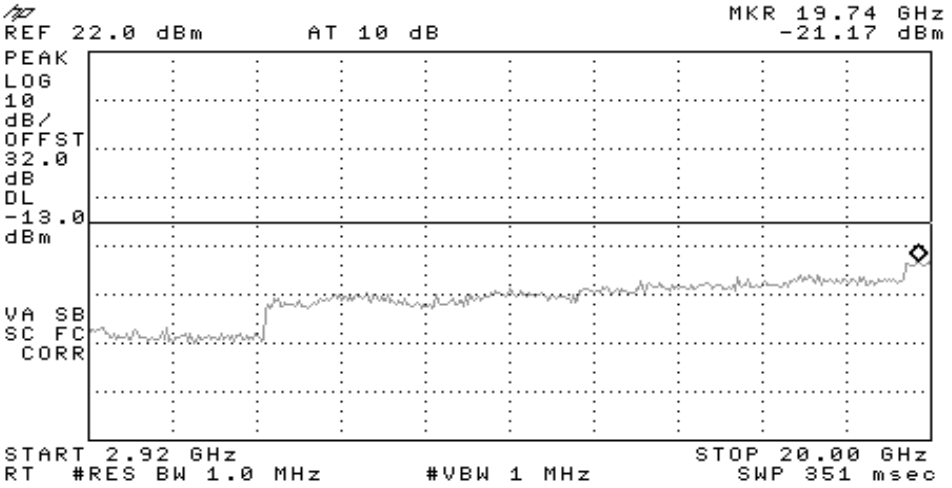
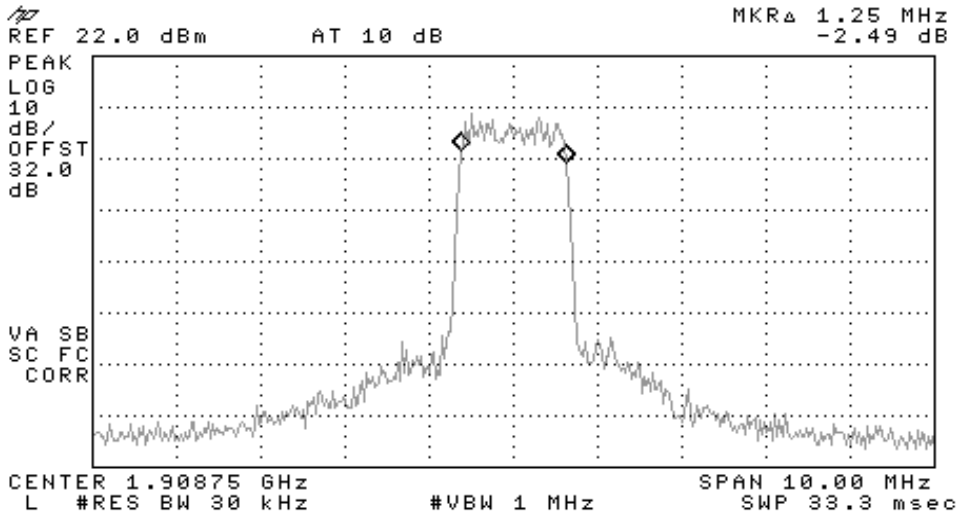
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A



Output Plot



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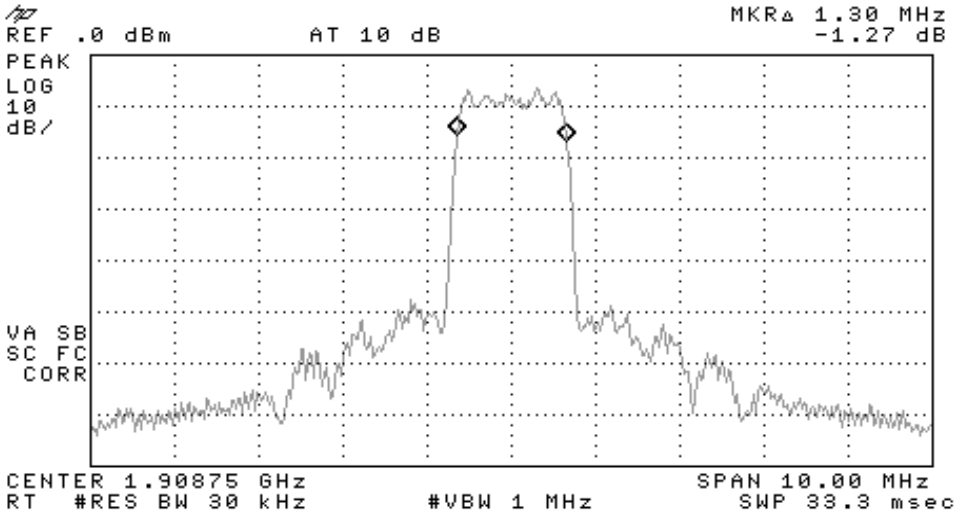
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Input Plot



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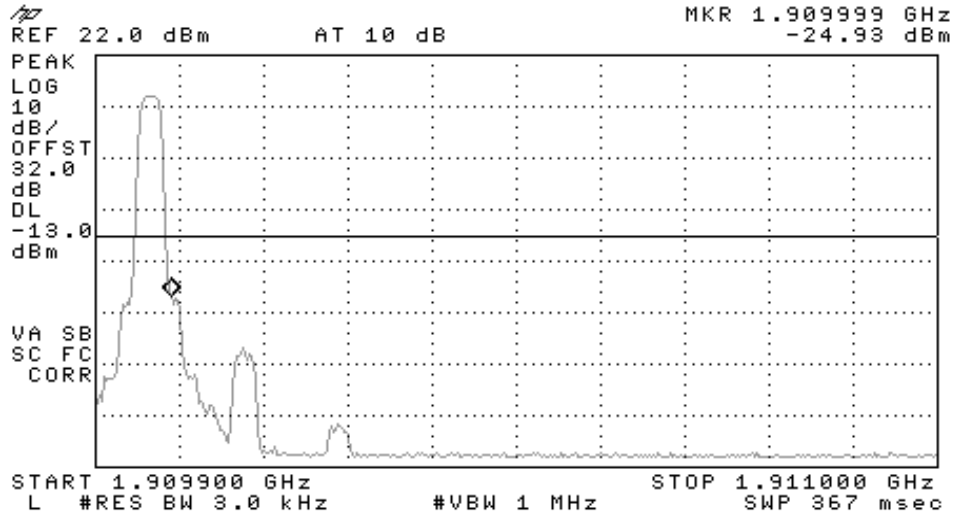
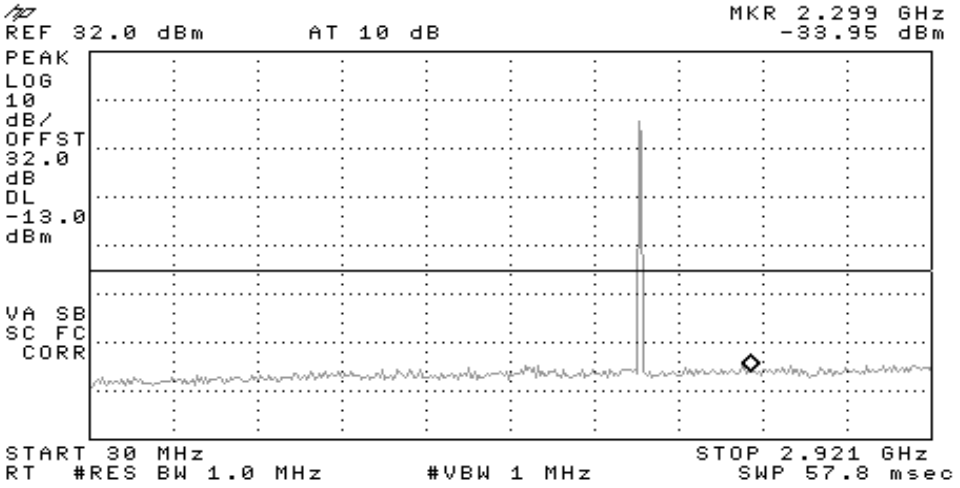
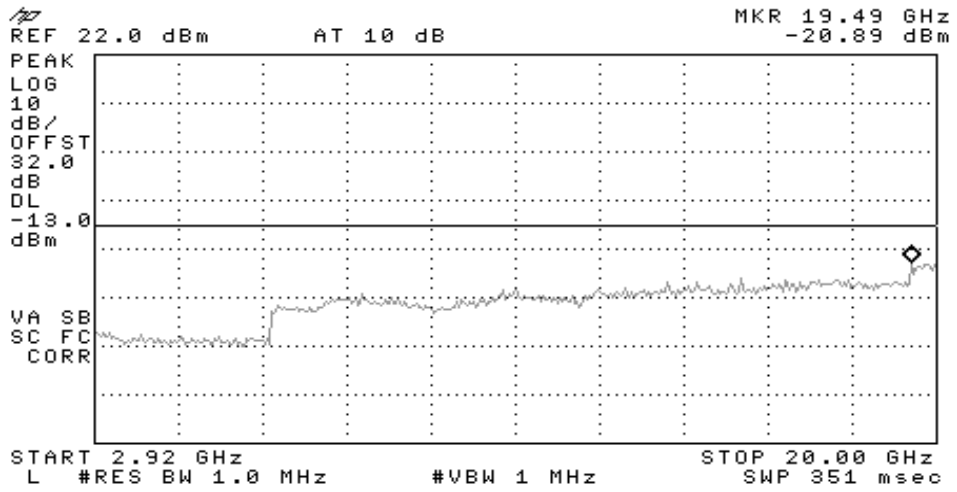
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

TDMA High (Mobile)

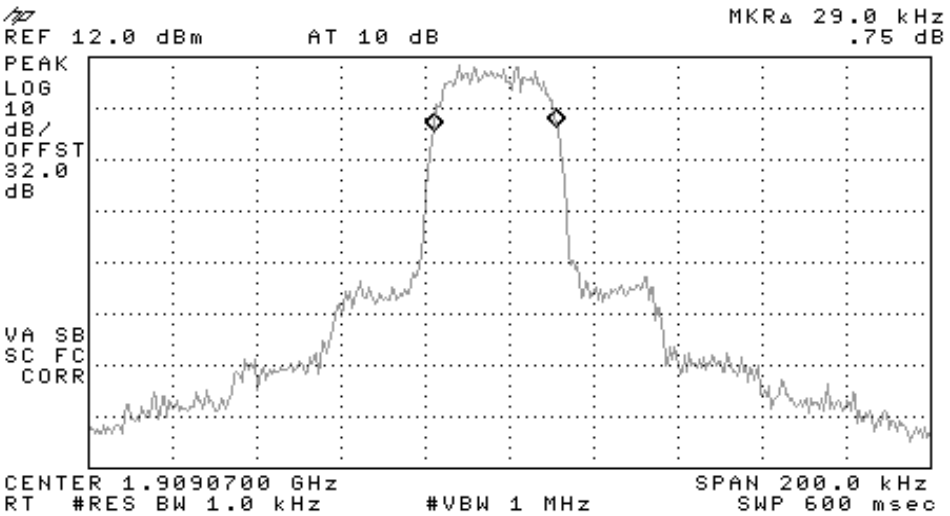




Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

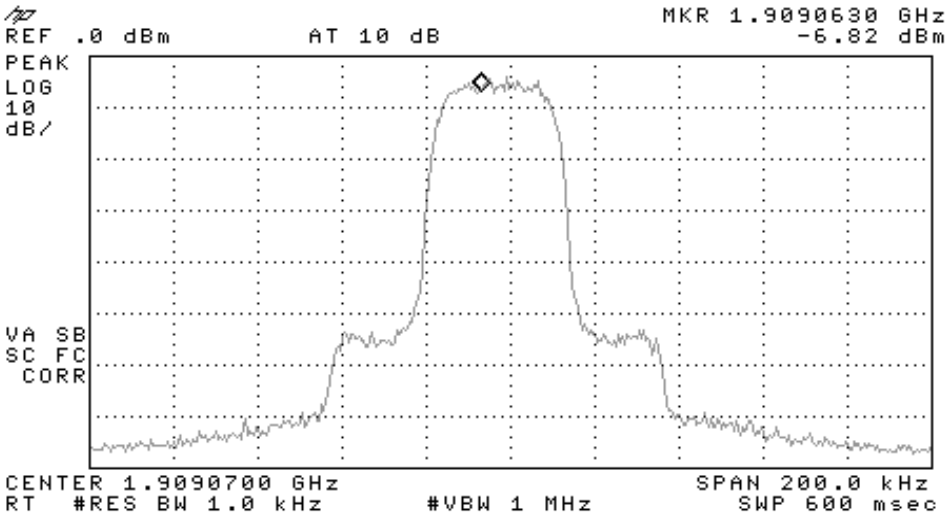


Output Plot



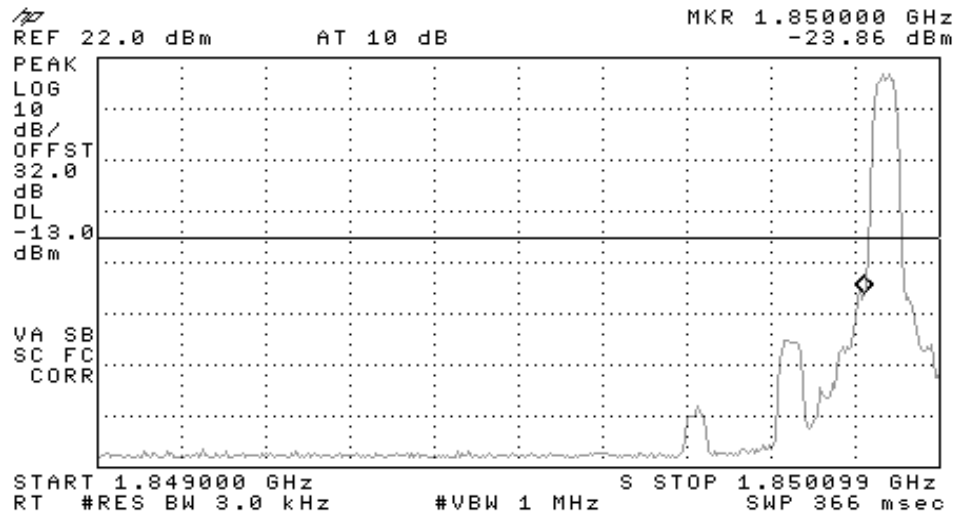
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

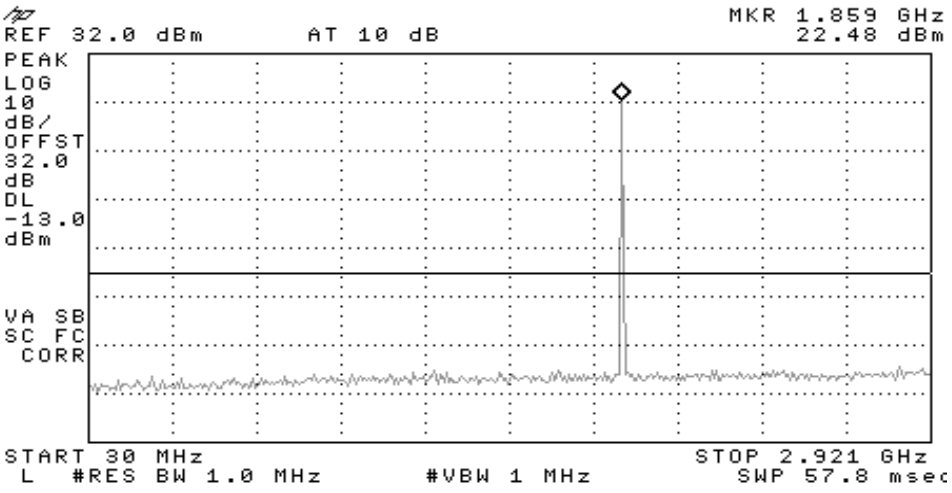
Input Plot



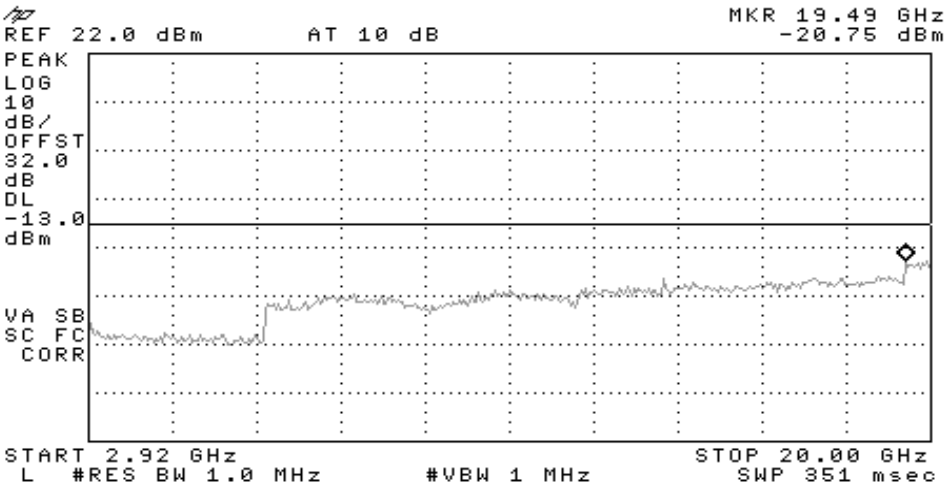
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

TDMA Low (Mobile)

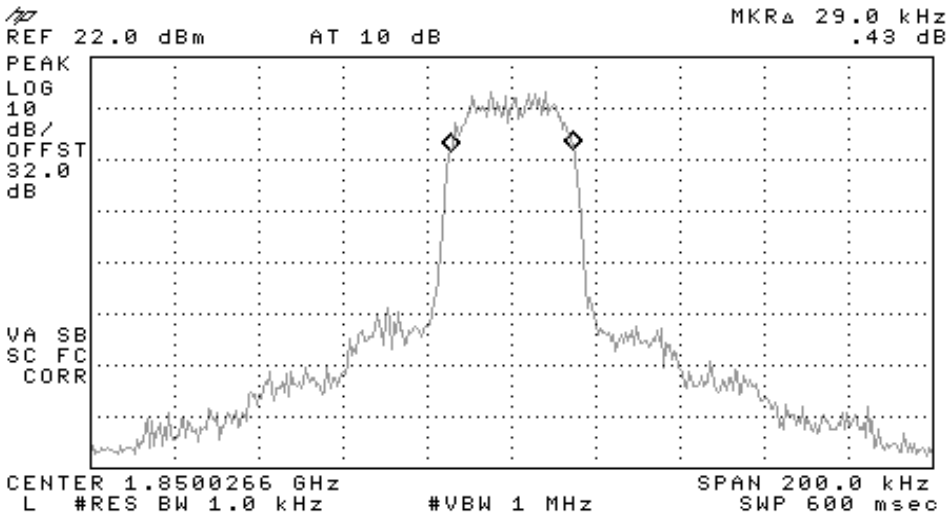




Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

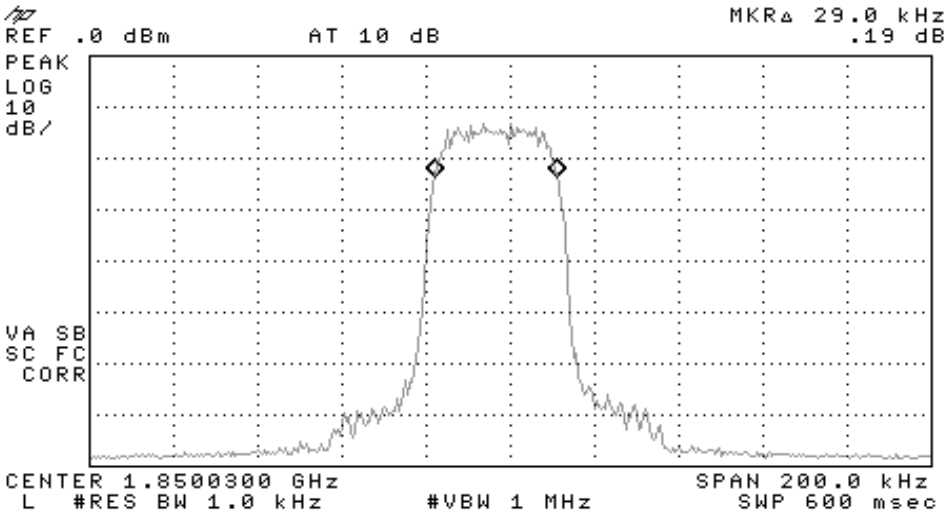


Output Plot



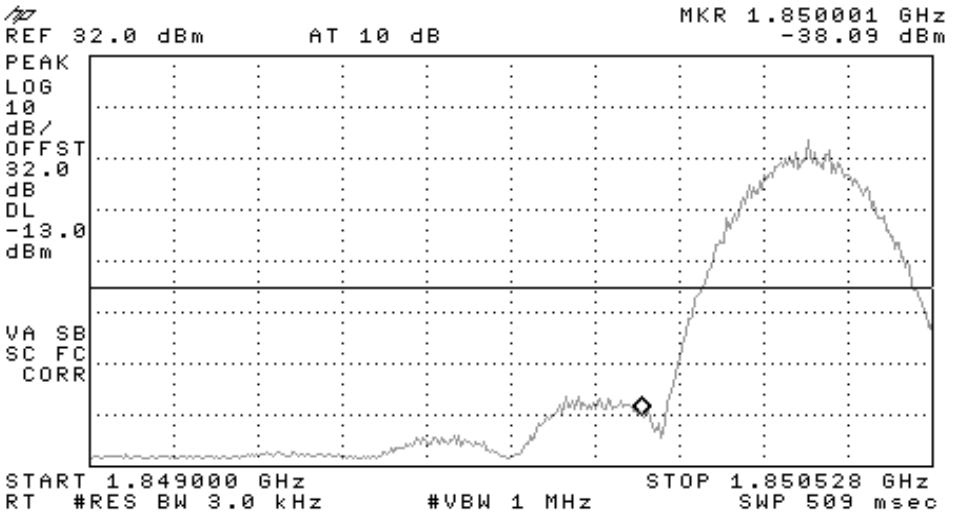
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

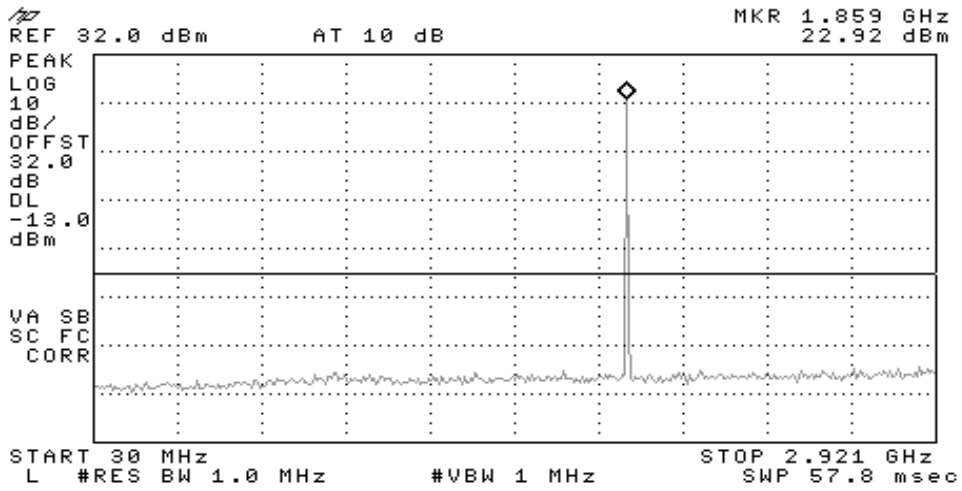
Input Plot



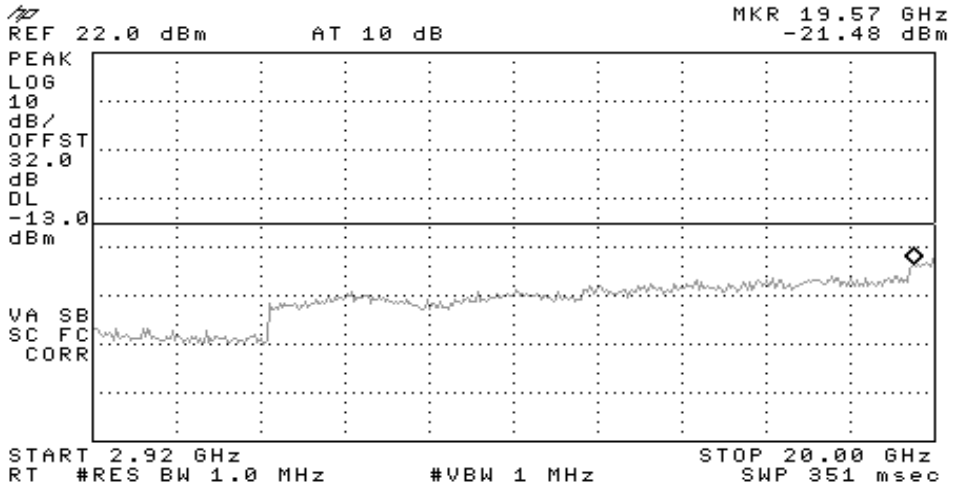
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

EDGE Low (Mobile)

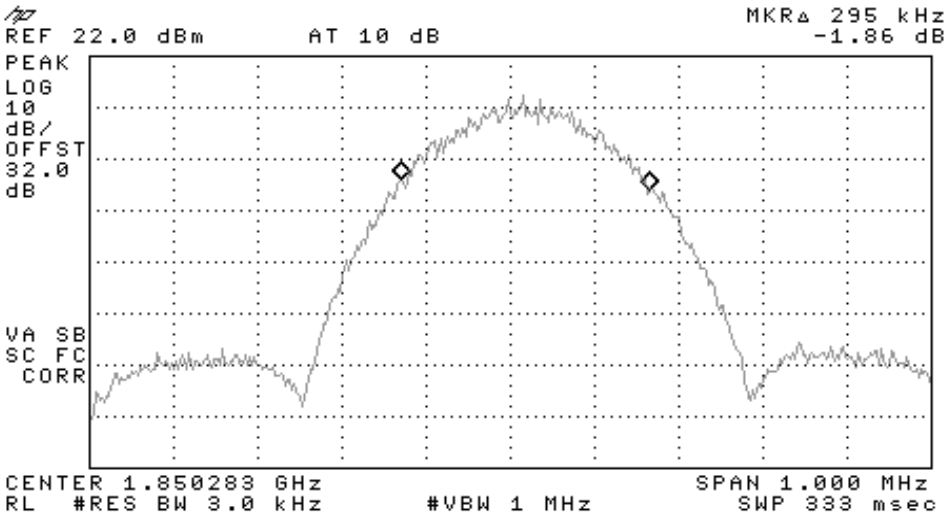




Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A



Output Plot



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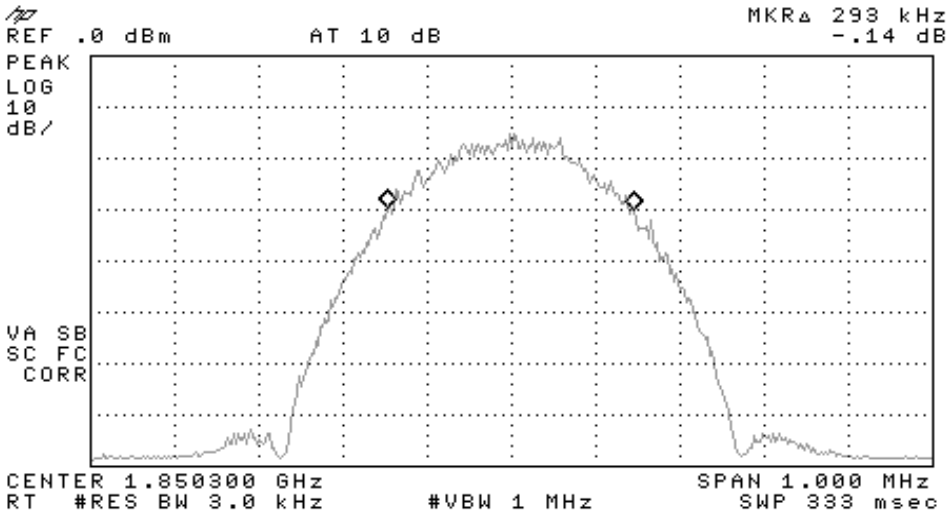
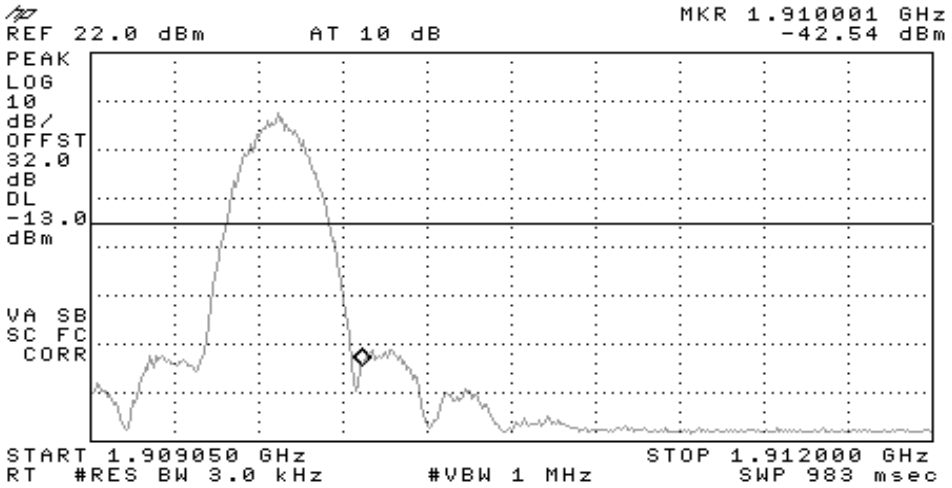
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

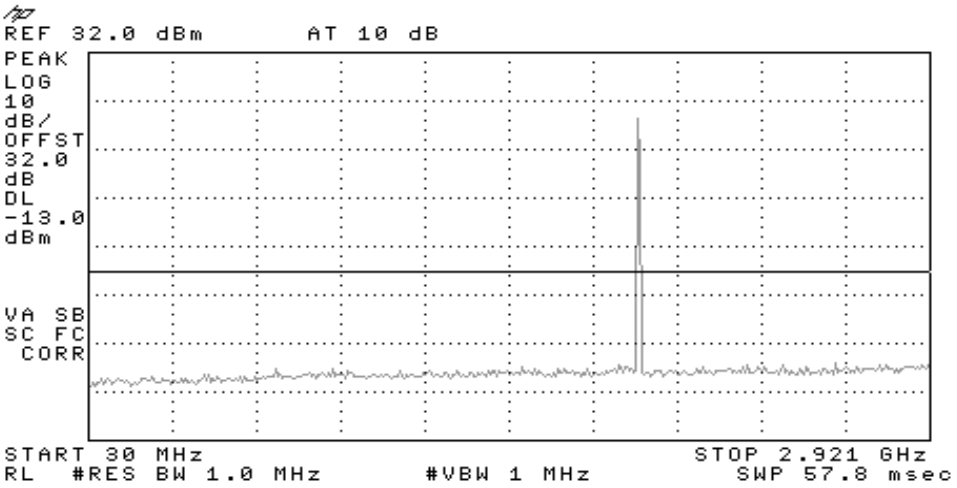
Input Plot



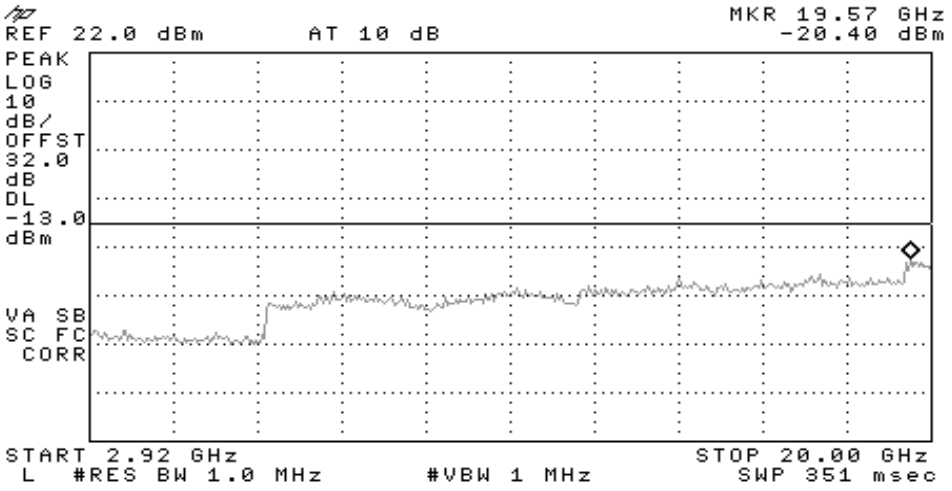
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

EDGE High (Mobile)

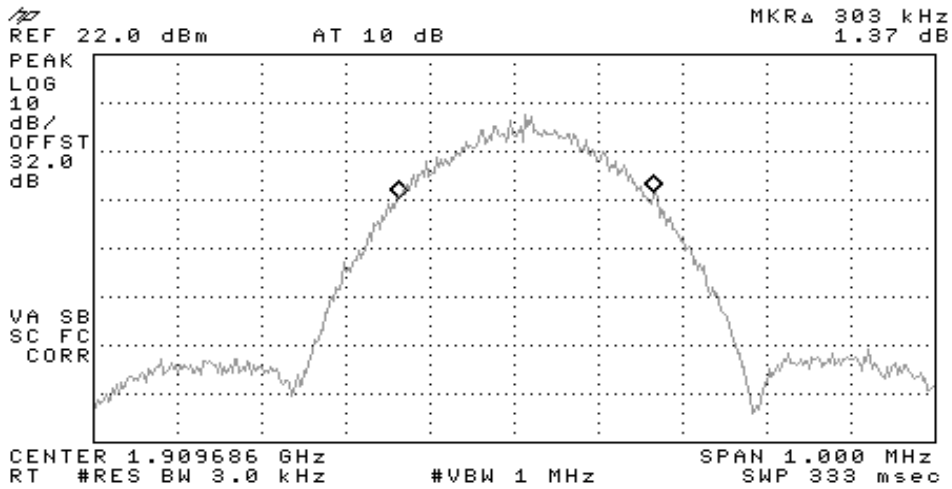




Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

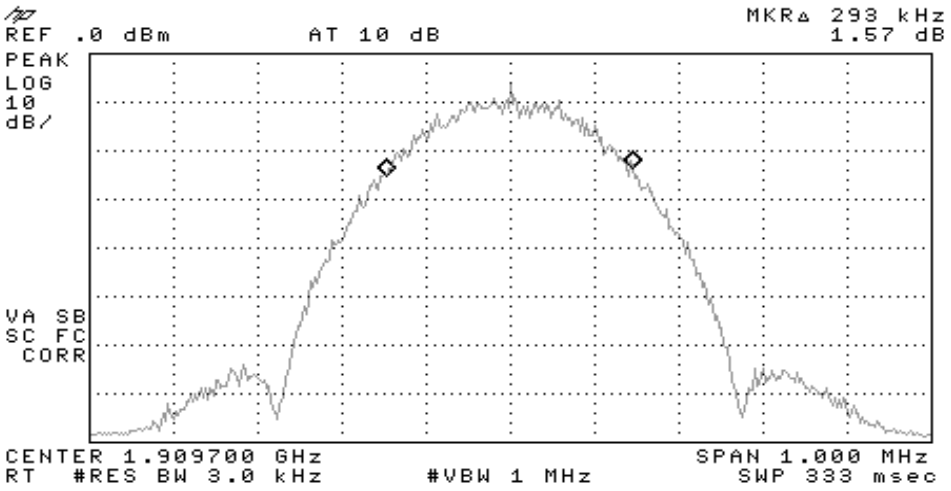


Output Plot



Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Input Plot



Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Radio Performance Test - RSS-131
RF Port Measurements

Test Specifics

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

Date of Test: 8/17/2004
Test Engineer: Juan Martinez
Test Location: SVOATS #2
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT's rf port was connected to the measurement instrument's rf port, via an attenuator or dc-block if necessary.

Ambient Conditions:

Temperature: 14 °C
Rel. Humidity: 51 %

Summary of Results

Run #	Test Performed	Limit	Result	Value / Margin
1	Passband Bandwidth	RSS-131 (4.2)	Pass	Refer to run
2	Passband Gain	RSS-131 (4.2)	Pass	Refer to run

Modifications Made During Testing:

No modifications were made to the EUT during testing

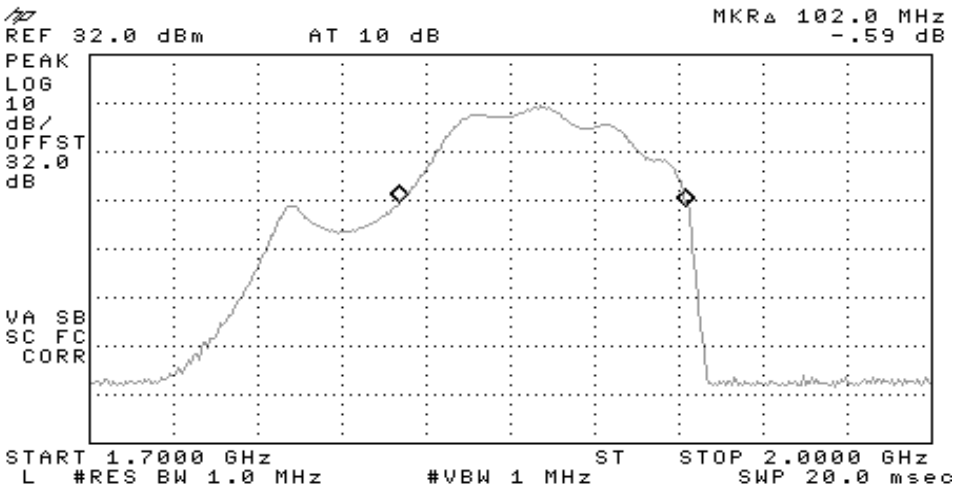
Deviations From The Standard

No deviations were made from the requirements of the standard.

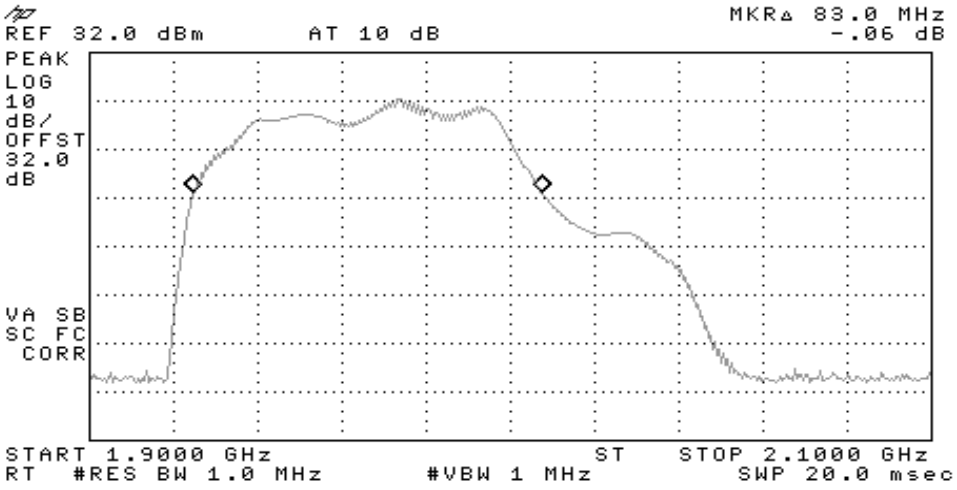
Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Run #1: Passband Bandwidth

Passband Bandwidth (1850 - 1910MHz)



Passband Bandwidth (1930 - 1990MHz)

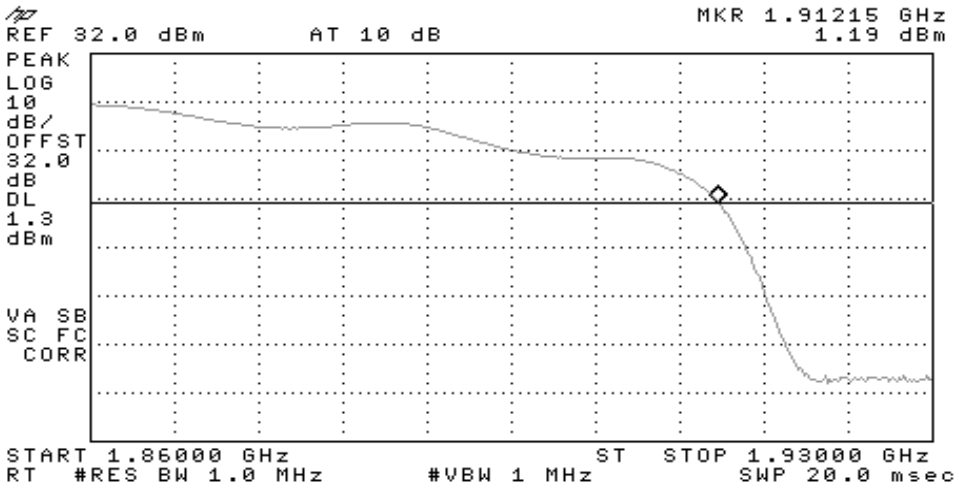


Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Run #2: Passband Gain

Passband Bandwidth (1850 - 1910MHz)

	dBm	Watts
Input	-4	0.00
output	22.6	0.18
Amplifier Gain (dB)	26.6	26.6

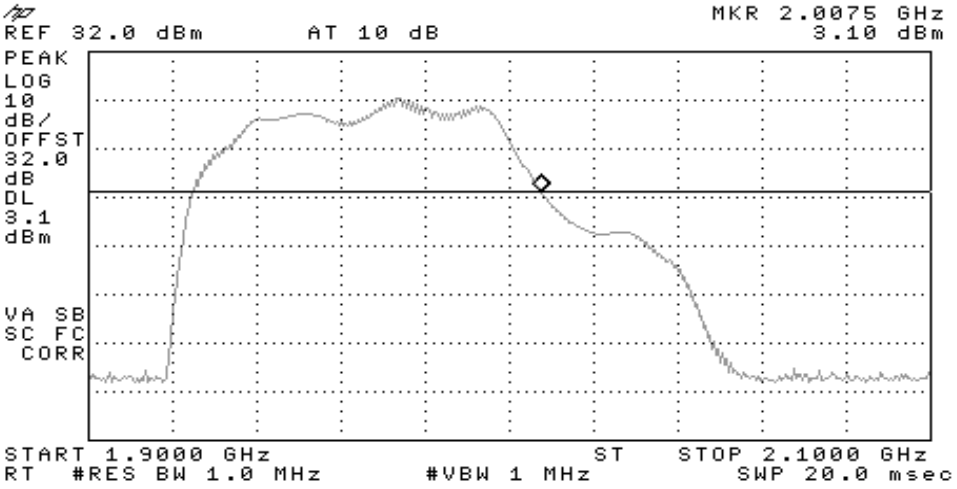


Measure Gain @ 20-dB point	Amplifier Gain Limit	Margin
(dB)	(dB)	(dB)
1.19	26.6	-25.41

Client:	Broadlink	Job Number:	J55671
Model:	PSA 1900	T-Log Number:	T55817
		Account Manager:	Sue Pelzl
Contact:	Hamid Najafi		
Spec:	FCC Part 15 / 24 E & RSS-131	Class:	N/A

Passband Bandwidth (1930 - 1990MHz)

	dBm	Watts
Input	0	0.00
output	22.7	0.19
Amplifier Gain (dB)	22.7	22.7



Measure Gain @ 20-dB point	Amplifier Gain Limit	Margin
(dB)	(dB)	(dB)
3.1	22.7	-19.6