Test Report A

Applicant: Ericsson (China)

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FCC: X3V1900RRUC
IC: 287AJ-1900RRUC

Test Report for

FCC/IC Equipment Authorization

CDMA Metrocell DC Indoor BTS with RRUC 1900MHz

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IC: 287AJ-1900RRUC

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Revision History

Stream/Issue	Revision Date	Status	Changes	Author/Editor
00/01	01/27/2010		Initial test report	Lewas Liu

References

[1] FCC Part 24 Subpart E, “Personal Communication Services”

[2] FCC Part 2 Subpart J, “Frequency allocations and radio treaty matters; general rules and regulations”,

[3] TIA/EIA-97-D “Recommended Minimum Performance Standards for Base Stations Sup-porting Dual Mode Spread Spectrum Systems”.

[4] 2GHz Personal Communications Services, Industry Canada, RSS-133,Issue 5,Revision 1 February 2009

Acronyms and Abbreviations

RRUC	Remote Radio Unit CDMA
ASIC	Application Specific Integrated Circuit
BBW	Breathing, Blossoming and Wilting
BPF	Bandpass Filter
BTS	Base Station Transceiver Subsystem
BW	Bandwidth
CDMA	Code Division Multiple Access
dBFS	dB relative to Full Scale
DDS	Direct Digital Synthesizer
DPM	Duplexer Preselector Module
EEPROM	Electrically Erasable and Programmable ROM
EC	Engineering Change
ERLCE	Excess Reverse Link Capacity Estimate
HSSPC	High-Speed Serial Protocol Controller
HW	Hardware
IF	Intermediate Frequency
IIC	Inter-Integrated Circuit Bus
IS	Interim Standard
LO	Local Oscillator
LPF	Low pass Filter
MCPA	Multi-Carrier Power Amplifier
MFRM	Multi-carrier Flexible Radio Module
NF	Noise Figure
OCNS	Orthogonal Channel Noise Source
OH	OverHead
PA	Power Amplifier
PC	Personal Computer
PPR	Peak Power Reduction
PSA	Product Specification Agreement
RBW	Resolution BandWidth
RF	Radio Frequency
Rx	Receive
SA	Spectrum Analyzer
SFRW	Single Carrier Flexible Radio Module
SW	Software
TBD	To Be Determined
TM	Triplexer Module
TPTL	Transmit Power Tracking Loop
TRM	Transmitter Receiver Module
Tx	Transmit
uP	Microprocessor
XCVR	Transceiver

Table of Contents

1.0 Introduction

This test report is submitted in accordance with the FCC Rules and Regulations, Part 2, Subpart J, Sections 2.1046 through 2.1057 for equipment authorization of Northern Telecom's (Nortel Networks) CDMA Metrocell DC Indoor BTS with 1900MHz RRUC.

The RRUC 1900MHz is intended for use in the Domestic Public Cellular Radio Telecommunications Service and is designed in accordance with the following standards:

- *CFR 47, Part 24, Subpart E, Broadband Personal Communications Service[1]*
- *CFR 47, Part 2, Subpart J, Equipment Authorization Procedures - Equipment Authorization[2]*
- *2GHz Personal Communications Services, Industry Canada, RSS-133,Issue 5,Revision 1 February 2009*

1.1 Required Tests

Table 1 summarizes the measurement results for the CDMA RRUC 1900MHz.

Table 1: Required Tests

FCC Measurement Specification	FCC Limit Specification	IC Cross Reference	Description	Test to be Performed
2.1033	-	ASP-100	PA current specification	Yes
2.1046	24.232	RSS-133 section 4.1 & 6.4	RF Power Output	Yes
2.1049	-	RSS-Gen	Occupied Bandwidth	Yes
2.1051,2.1057	24.238	RSS-133 section 6.6 & RSS-Gen	Spurious Emissions at Antenna Terminals	Yes
2.1055	24.235	RSS-133 section 6.3	Frequency Stability	Yes

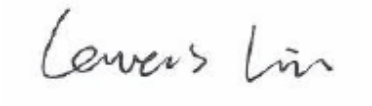
2.0 Engineering Declaration

The RRUC 1900MHz has been tested in accordance with the requirements contained in the Federal Communications Commission Rules and Regulations Part 2 and 24.

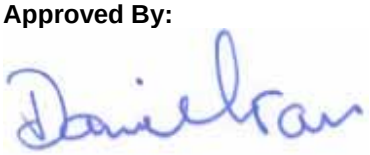
To the best of my knowledge, these tests were performed in accordance with good engineering practices using measurement procedures consistent with industry or commission standards or previous Commission correspondence or guidance and demonstrate that this equipment complies with the appropriate standards. All tests were conducted on a representative sample of the equipment for which equipment authorization is sought.

Test By:

Written By:



Approved By:



3.0 Equipment Authorization Application Requirements

3.1 Standard Test Conditions and Test Equipment

The RRUC was tested under the following standard test conditions unless otherwise noted:

- Ambient Temperature: 20 to 25 degrees C
- Ambient Humidity: 20 to 40%
- DC Supply Voltage: -48 Vdc (nominal)

3.2 EUT Identification List

Table 2 shows the identification of the components tested in this report.

Table 2: EUT Identification List

Equipment Description	Model / Part Number	Release Number	Serial Number
Metrocell BTS DC Indoor	NTGS47AEE5	P1	NNTM74XL8656
XCEM 192	VNTRZ80BAE5	P2	NNTMDV0293MK
GPSTM	NTGS50AA	14	NNTM74TM3JT0
CM-2	NTBW40BAE5	P1	NNTMDV01HFCK
CORE-2S	NTBW30DA	02	NNTM74X1WGW5
A/D-BAND Duplexer	NTTT27BA	01	WFETMT2RYY02
G-BAND Duplexer	NTTT27BD	01	WFETMT2RYY0H
RRUC 1900MHz	NTTT20BAE5	C5	NNTMEER01005
DOM-A	NTBW89SB	A1	NNTMPX0002FG
DOM-A	NTBW89SB	A1	NNTMPX0002FL
DOM-A	NTBW89SB	A1	NNTMPX0002FM

3.3 Test Equipment List

Table 3 shows the identification of the test equipment used in this report.

Table 3: Test Equipment List

Description	Manufacturer	Model	Serial Number	Cal. Due Date
PSA Series Spectrum Analyzer 3Hz-26.5GHz	Agilent	E4440A	MY48250517	2010-03-16
30dB Attenuator	Weinschel	53-30-33	NV821	Verified
RF Cable	SUCOFLEX	104PEA	28266 28267 4PEA	Verified
Climatic Chamber	CEEC	CEEC-WSHR-15C	070016	2010-06-09

4.0 Transmitter Test and Measurement Results

4.1 PA DC Current Draw

4.1.1 PA DC Current Draw Requirements

FCC Part 2.1033 Application for certification.

(c) Applications for equipment other than that operating under parts 15 and 18 of the rules shall be accompanied by a technical report containing the following information:

(8) The dc voltages applied to and dc currents into the several elements of the final radio frequency amplifying device for normal operation over the power range.

4.1.2 Test Method

The Metrocell BTS RRUC 1900MHz was setup to blossom at maximum power. The RF output power was measured using the PSA. The softfail current registers were read with the BTS controller when the Metrocell BTS was fully blossomed.

4.1.3 Test Setup

The set-up used for the Metrocell BTS RRUC 1900MHz PA DC current draw test is illustrated in Figure 1. RF output power measurements were referenced to the RRUC PA output.

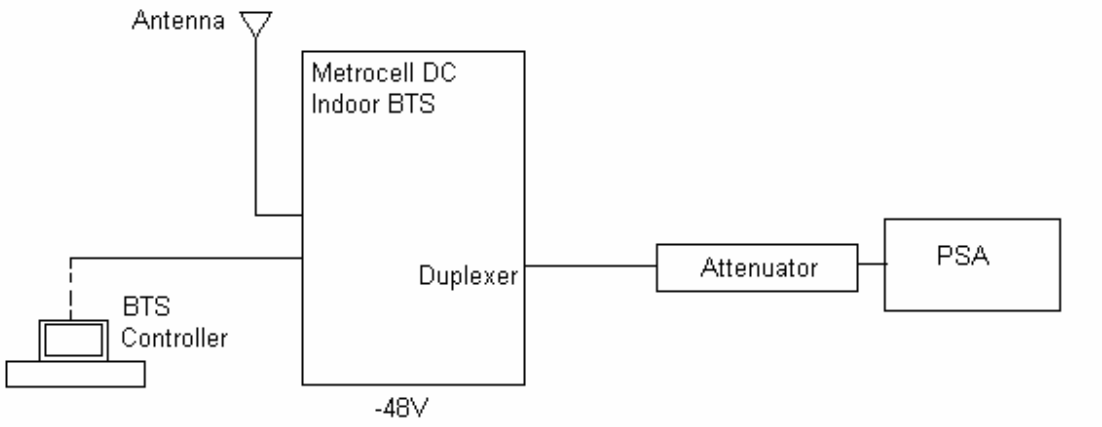


Figure 1: Test Setup for RRUC PA DC current draw measurement

4.1.4 Test Results

The final DC current is shown in Table 4.

Table 4: Average Current Values @ Pout = 46.5dBm

Average Current Values @ Pout=46.5dBm mean Ampere
4.906

4.2 RF Power Output

4.2.1 RF Power Output Requirements

FCC Part 2.1046

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune -up procedure to give the values of current and voltage on the circuit elements specified in 2.983(d)(5). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

FCC Limit (Part 24.232)

(a) The maximum RF power from a base station must not exceed 100 Watts.

4.2.2 Test Method

The DE was setup via the BTS controller to enable to transmit at maximum power. Measurements were made in one, two, and three carrier configurations. The RF output power was measured using the PSA.

4.2.3 Test Setup

The set-up used for the RF output power test is illustrated in Figure 2. RF output power measurements were referenced to the main antenna port of the duplexer.

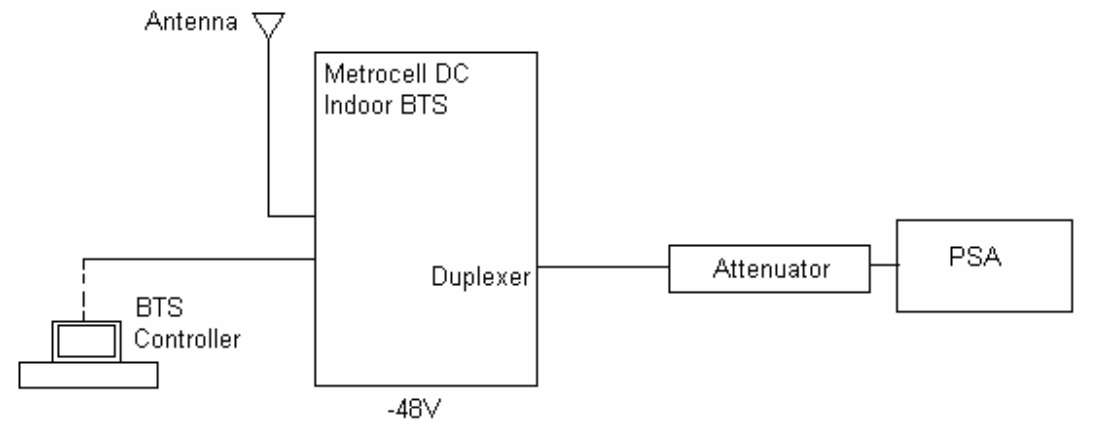


Figure 2: Test Setup for RF Power Output Measurement

4.2.4 Test Results

The Metrocell BTS RRUC 1900MHz complies with the requirement. The maximum measured RF output power was 46.5 dBm.

Table 5: RF Output Power of Metrocell BTS RRUC 1900MHz, 1 Carrier Mode IS95

Channel Number(Band)	Frequency(MHz)	Measured RF Output Power(dBm)	Typical Maximun Rated Power(dBm)
25(A)	1931.25	46.33	46.5
375(D)	1948.75	46.22	46.5
1225(G)	1991.25	46.35	46.5

Table 6: RF Output Power of Metrocell BTS RRUC 1900MHz, 2 Carriers Mode IS95

Channel Number(Band)	Frequency(MHz)	Measured RF Output Power(dBm)	Typical Maximun Rated Power(dBm)
25, 50(A)	1931.25, 1932.5	46.33	46.5
350, 375(D)	1947.5, 1948.75	46.15	46.5
1250, 1275(G)	1992.5, 1993.75	46.11	46.5

Table 7: RF Output Power of Metrocell BTS RRUC 1900MHz, 3 Carriers Mode IS95

Channel Number(Band)	Frequency(MHz)	Measured RF Output Power(dBm)	Typical Maximun Rated Power(dBm)
25, 50, 75(A)	1931.250, 1932.50, 1933.750	46.48	46.5
325, 350, 375(D)	1946.25, 1947.5, 1948.75	46.57	46.5
1225, 1250, 1275(G)	1991.25, 1992.5, 1993.75	46.17	46.5

Table 8: RF Output Power of Metrocell BTS RRUC 1900 MHz, 1 Carriers Mode IS856 8PSK

Channel Number(Band)	Frequency(MHz)	Measured RF Output Power(dBm)	Typical Maximun Rated Power(dBm)
25(A)	1931.25	46.6	46.5
375(D)	1948.75	46.32	46.5
1225(G)	1991.25	46.21	46.5

Table 9: RF Output Power of Metrocell BTS RRUC 1900 MHz, 2 Carriers Mode IS856 16QAM

Channel Number(Band)	Frequency(MHz)	Measured RF Output Power(dBm)	Typical Maximun Rated Power(dBm)
25, 50(A)	1931.250, 1932.50	46.53	46.5
350, 375(D)	1947.5, 1948.75	46.11	46.5
1250, 1275(G)	1992.5, 1993.75	46.17	46.5

Table 10: RF Output Power of Metrocell BTS RRUC 1900 MHz, 3 Carriers Mode IS856 16QAM

Channel Number(Band)	Frequency(MHz)	Measured RF Output Power(dBm)	Typical Maximun Rated Power(dBm)
25, 50, 75(A)	1931.250, 1932.50, 1933.750	46.35	46.5
325, 350, 375(D)	1946.25, 1947.5, 1948.75	46.26	46.5
1225, 1250, 1275(G)	1991.25, 1992.5, 1993.75	46.2	46.5

4.3 Occupied Bandwidth

4.3.1 Occupied Bandwidth Requirements

FCC Part 2.1049

The OBW, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0. 5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

(g) Transmitter in which the modulating baseband comprises not more than three independent channels - when modulated by the full complement of signals for which the transmitter is rated. The level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules, the tests should provide the manufacturer 's maximum rated condition

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at discretion of the user.

4.3.2 Test Mothod

The DE was setup via the BTS controller to enable the RRUC 1900MHz to transmit at maximum power. The occupied bandwidth was measured using the 99% channel power feature of the spectrum analyzer.

4.3.3 Test Setup

The set-up used for the Metrocell BTS RRUC 1900MHz Occupied bandwidth test is illustrated in Figure 3.

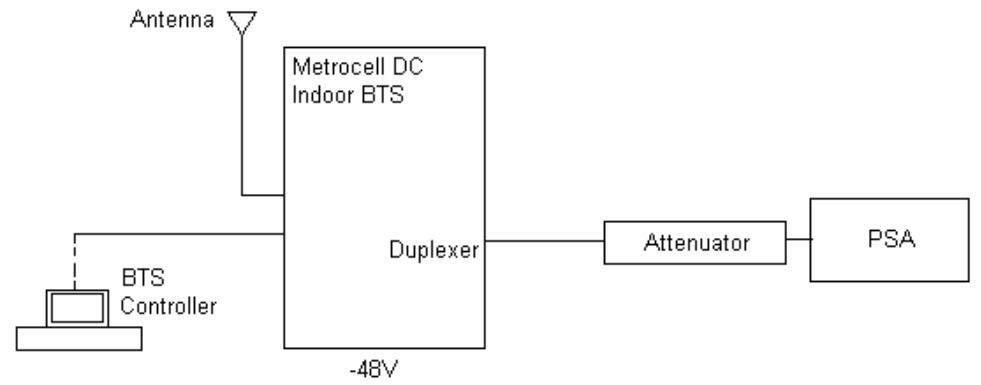


Figure 3: Test Setup for Occupied Bandwidth Measurement

4.3.4 Test Results

The Metrocell BTS RRUC 1900 MHz complies with the requirement. The occupied bandwidth measured in one, two, and three carrier configurations for each licensed band. The plots that follow show the occupied bandwidth in one, two, and three carrier configurations. (Although plots were recorded for all channels tested, only one sample plot per carrier configuration is provided reduce the number of figures.).

Table 11: Occupied Bandwidth, Metrocell BTS RRUC 1900 MHz, Single Carrier Mode IS95

Channel Number(Band)	Frequency(MHz)	Measured Occupied Bandwidth (MHz)
25(A)	1931.25	1.2623
375(D)	1948.75	1.2599
1225(G)	1991.25	1.2571

Table 12: Occupied Bandwidth, Metrocell BTS RRUC 1900 MHz, 2 Carriers Mode IS95

Channel Number(Band)	Frequency(MHz)	Measured Occupied Bandwidth (MHz)
25, 50(A)	1931.25, 1932.5	2.4911
350, 375(D)	1947.5, 1948.75	2.4877
1250, 1275(G)	1992.5, 1993.75	2.4827

Table 13: Occupied Bandwidth, Metrocell BTS RRUC 1900 MHz, 3 Carriers Mode IS95

Channel Number(Band)	Frequency(MHz)	Measured Occupied Bandwidth (MHz)
25, 50, 75(A)	1931.250, 1932.50, 1933.750	3.7335
325, 350, 375(D)	1946.25, 1947.5, 1948.75	3.7304
1225, 1250, 1275(G)	1991.25, 1992.5, 1993.75	3.7113

Table 14: Occupied Bandwidth, Metrocell BTS RRUC 1900 MHz, 1 Carriers Mode IS856 8PSK

Channel Number(Band)	Frequency(MHz)	Measured Occupied Bandwidth (MHz)
25(A)	1931.25	1.259
375(D)	1948.75	1.2623
1225(G)	1991.25	1.2661

Table 15: Occupied Bandwidth, Metrocell BTS RRUC 1900 MHz, 2 Carriers Mode IS856 16QAM

Channel Number(Band)	Frequency(MHz)	Measured Occupied Bandwidth (MHz)
25, 50(A)	1931.25, 1932.5	2.4771
350, 375(D)	1947.5, 1948.75	2.4803
1250, 1275(G)	1992.5, 1993.75	2.4818

Table 16: Occupied Bandwidth, Metrocell BTS RRUC 1900 MHz, 3 Carriers Mode IS856 16QAM

Channel Number(Band)	Frequency(MHz)	Measured Occupied Bandwidth (MHz)
25, 50, 75(A)	1931.250, 1932.50, 1933.750	3.7014
325, 350, 375(D)	1946.25, 1947.5, 1948.75	3.712
1225, 1250, 1275(G)	1991.25, 1992.5, 1993.75	3.7039

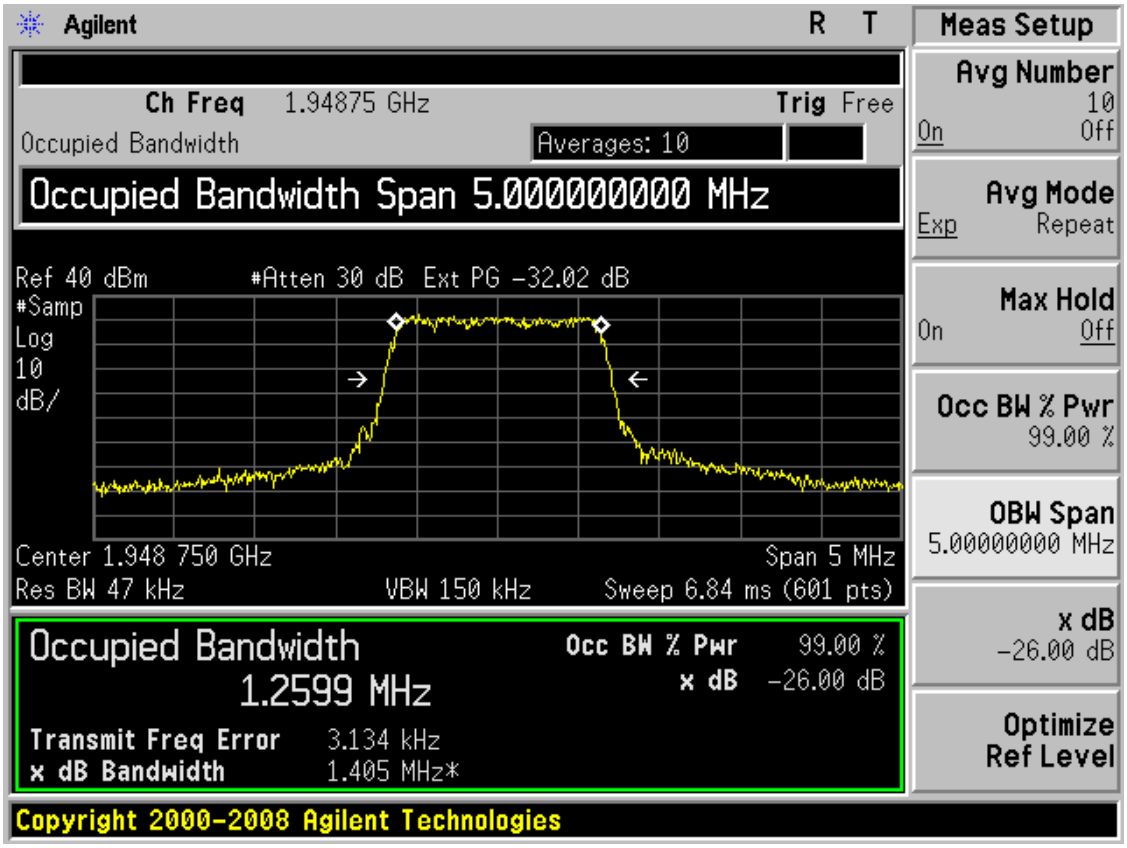


Figure 4: Occupied Bandwidth - Single Carrier Channel 375 (D) IS95

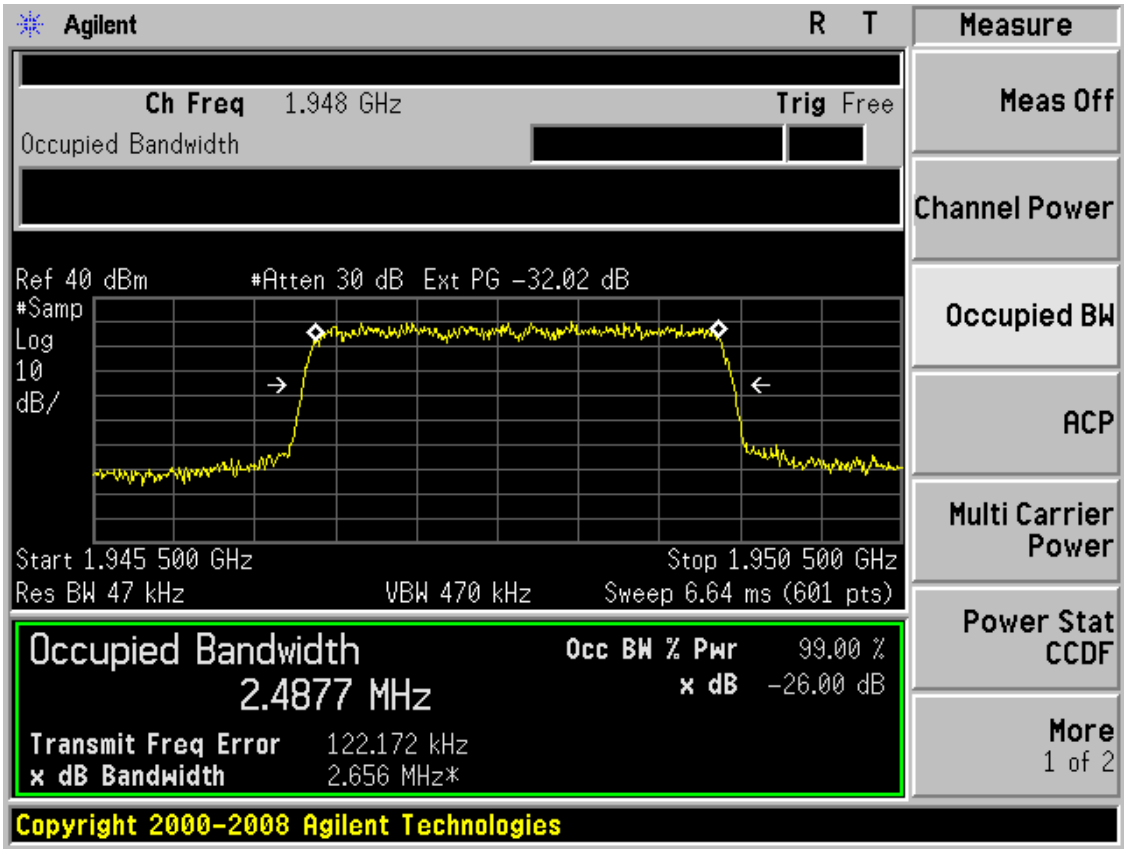


Figure 5: Occupied Bandwidth - 2 Carriers Channels 350, 375 (D) IS95

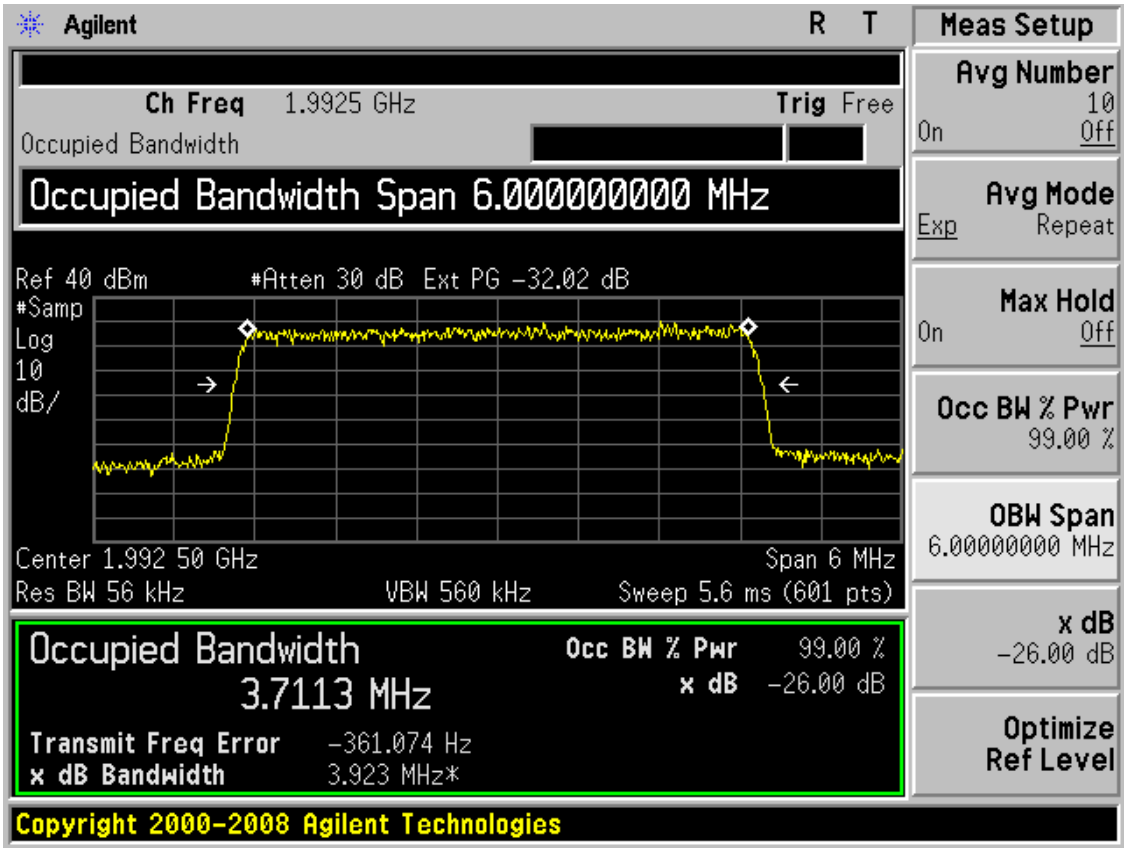


Figure 6: Occupied Bandwidth - 3 Carriers Channels 1225, 1250, 1275 (G) IS95

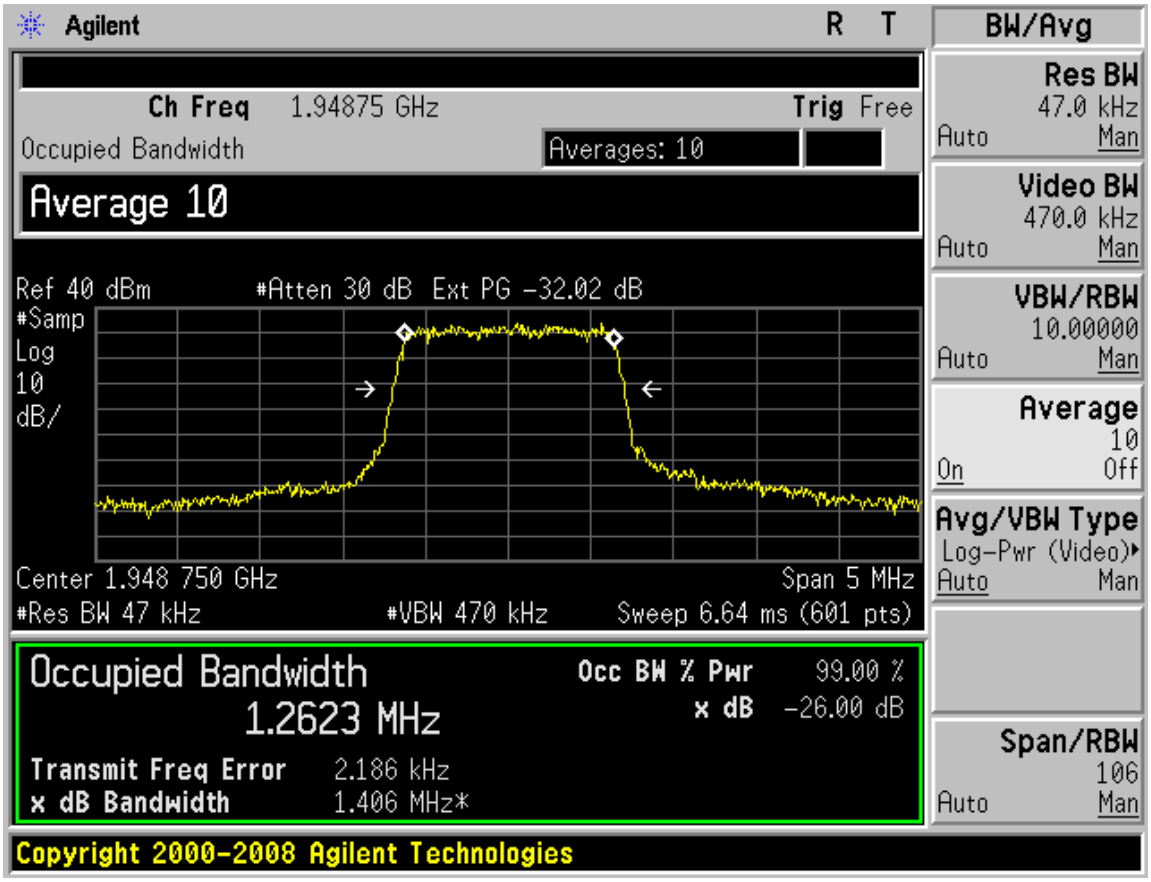


Figure 7: Occupied Bandwidth - Single Carrier Channel 375 (D) IS856 8PSK

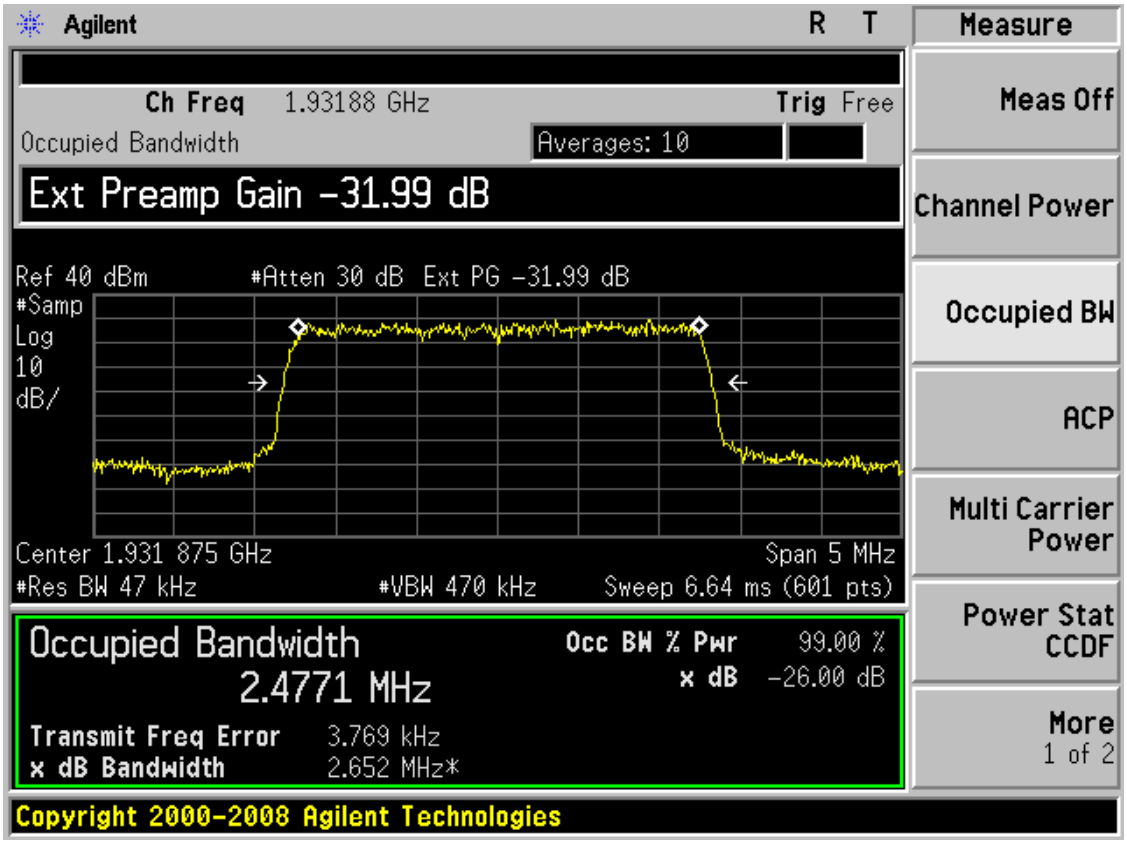


Figure 8: Occupied Bandwidth - 2 Carriers Channels 25, 50 (A) IS856 16QAM

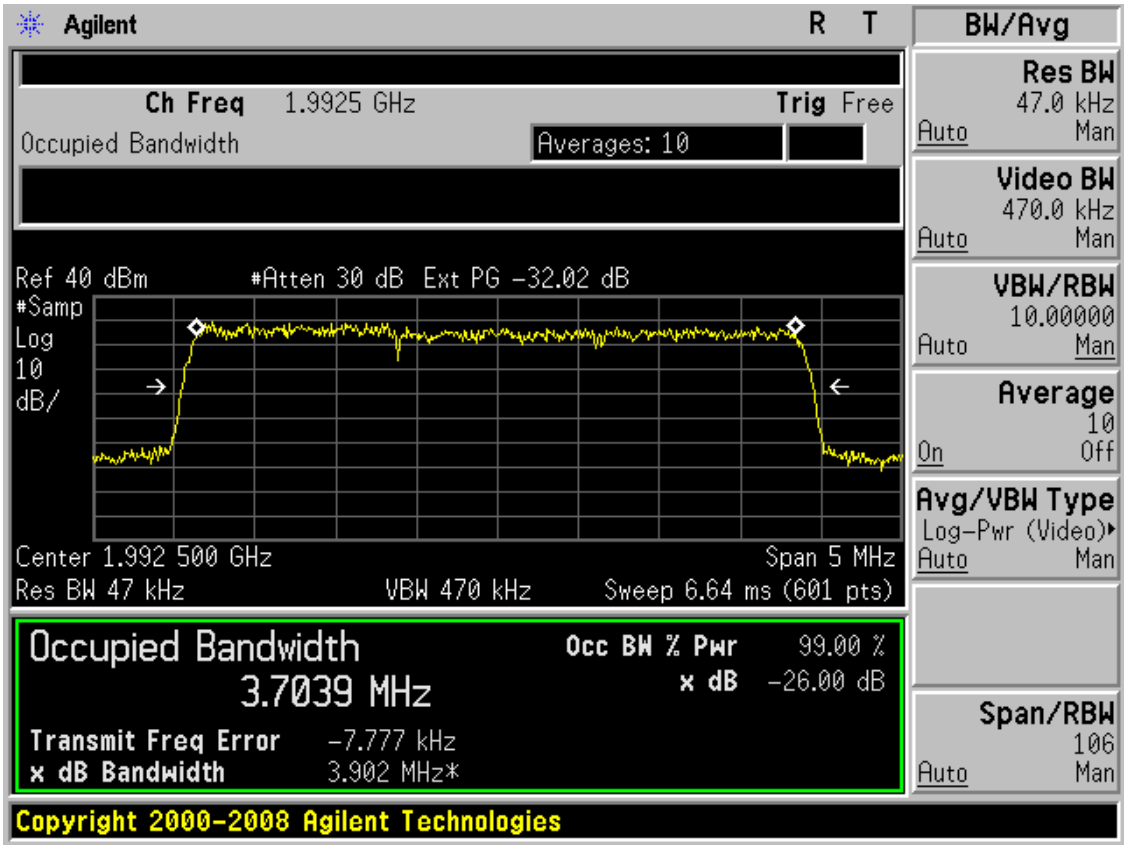


Figure 9: Occupied Bandwidth - 3 Carriers Channels 1225, 1250, 1275 (G) IS856 16QAM

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4.4 Spurious Emissions at Antenna Terminals

4.4.1 Spurious Emissions Requirements

FCC Part 2.1051

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

FCC Part 2.1057 - Frequency Spectrum to be investigated

The spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency or to the highest frequency practicable in the present state of the art of measuring techniques, whichever is lower. Particular attention should be paid to harmonics and subharmonics of the carrier frequency. Radiation at the frequencies of multiplier stages should be checked. The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

FCC Part 24.238 Limit

*(a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmit power (P) by a factor of at least 43+10*logP dB.*

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1MHz or greater. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

(c) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(d) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

4.4.2 Test Method

The BTS digital enclosure was configured via the BTS controller to enable the RRUC to transmit at maximum power. Measurements were made on IS-97 and IS-856 channels at the bottom and top of the licensed sub-bands in one, two and three carrier configurations. The following spectrum analyzer settings were used for the measurement of the antenna port spurious emissions:

Adjacent 1MHz bandwidth (Upper and Lower)

Resolution Bandwidth:	30kHz (1 carrier), 30kHz (2 carriers), 30kHz (3 carriers)
Video Bandwidth:	100kHz (1 carrier), 100kHz (2 carriers), 100kHz (3 carriers)
Average:	10 Averages
Span:	set accordingly
Attenuation:	30 dB
Ref. Level:	variable
Ref. Level Offset:	variable

All spectrum analyzer settings were coupled as per the manufacturers' recommendations to improve measurement time, without compromising data.

Out of band emissions up to 10GHz

Resolution Bandwidth:	1MHz (1 carrier), 1MHz (2 carriers), 1MHz (3 carriers)
Video Bandwidth:	3MHz (1 carrier), 3MHz (2 carriers), 3MHz (3 carriers)
Average:	10 Averages
Span:	set accordingly
Attenuation:	30 dB
Ref. Level:	variable
Ref. Level Offset:	variable

Calibrate the cables and attenuator losses using a network analyzer. The calibrated losses are the reference level offset on the spectrum analyzer.

4.4.3 Test Setup

Set-up used for the Metrocell BTS Antenna Port Spurious Emission test is illustrated in Figure 10.

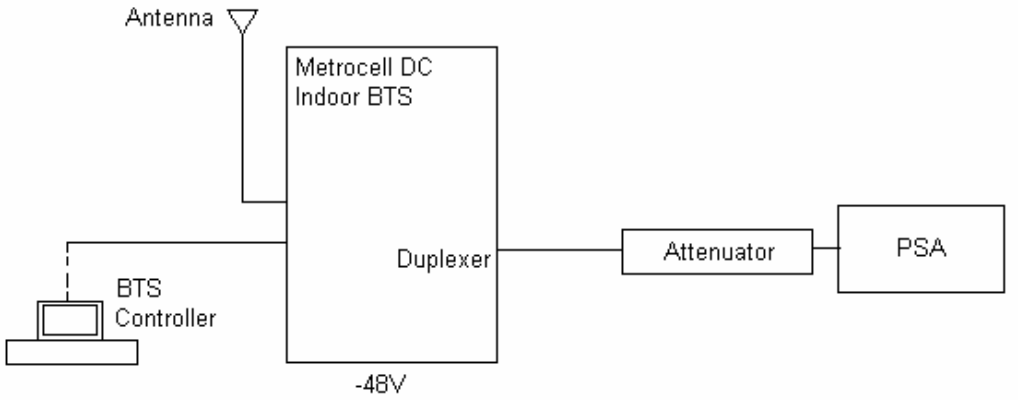

Figure 10: Test Setup for Spurious Emissions Measurement

4.4.4 Test Results

The frequency spectrum from 50 MHz to 20 GHz was scanned for emissions using the spectrum analyzer settings outlined in the test method (Section 4.4.2). The Metrocell BTS complies with the limit of -13 dBm. Table 17 & 18 shows the spurious emissions at the antenna port of the Metrocell BTS RRUC 1900MHz for 1, 2 and 3 carrier modes. The plots that follow show the spurious emissions in one, two, and three carrier configuration. (For each configuration, only some samples of one, two and three carriers are shown to reduce the number of figures). Please refer to Figures below.

Table 17: Spurious Emissions at the Metrocell BTS RRUC 1900 MHz Antenna Port IS95

Frequency(MHz)	Spurious Emissions Level(dBm)			Margin to FCC Limit of -13 dBm (dB/1MHz)		
	AD Band					
	1 Carrier (30kHz)	2 Carrier (30kHz)	3 Carrier (30kHz)	1 carrier	2 carrier	3 carrier
50MHz-1900MHz	-35.434	-33.942	-31.237	22.434	20.942	18.237
1900MHz-1929MHz	-41.077	-33.621	-29.673	28.077	20.621	16.673
1929MHz-1930MHz	-34.562	-30.313	-27.983	21.562	17.313	14.983
1950MHz-1951MHz	-30.41	-24.729	-24.742	17.41	11.729	11.742
1951MHz-2GHz	-40.554	-30.776	-28.154	27.554	17.776	15.154
2GHz-5GHz	-28.273	-27.811	-27.601	15.273	14.811	14.601
5GHz-10GHz	-29.174	-25.872	-26.311	16.174	12.872	13.311
10GHz-15GHz	-25.043	-23.283	-23.648	12.043	10.283	10.648
15GHz-20GHz	-27.161	-24.288	-24.197	14.161	11.288	11.197
G Band						
50MHz-1900MHz	N/A	N/A	-31.202	N/A	N/A	18.202
1900MHz-1989MHz	N/A	N/A	-30.545	N/A	N/A	17.545
1989MHz-1990MHz	N/A	N/A	-27.737	N/A	N/A	14.737
1995MHz-1996MHz	N/A	N/A	-25.407	N/A	N/A	12.407
1996MHz-2GHz	N/A	N/A	-29.379	N/A	N/A	16.379
2GHz-5GHz	N/A	N/A	-19.282	N/A	N/A	6.282
5GHz-10GHz	N/A	N/A	-26.494	N/A	N/A	13.494
10GHz-15GHz	N/A	N/A	-23.52	N/A	N/A	10.52
15GHz-20GHz	N/A	N/A	-23.688	N/A	N/A	10.688

Table 18: Spurious Emissions at the Metrocell BTS RRUC 1900 MHz Antenna Port IS856 16QAM

Frequency(MHz)	Spurious Emissions Level(dBm)			Margin to FCC Limit of -13 dBm (dB/1MHz)		
	AD Band					
	1 Carrier (30kHz)	2 Carrier (30kHz)	3 Carrier (30kHz)	1 carrier	2 carrier	3 carrier
50MHz-1900MHz	-30.816	-31.693	-31.891	17.816	18.693	18.891
1900MHz-1929MHz	-40.24	-33.546	-27.248	27.24	20.546	14.248
1929MHz-1930MHz	-34.347	-29.229	-28.011	21.347	16.229	15.011
1950MHz-1951MHz	-25.404	-25.634	-28.575	12.404	12.634	15.575
1951MHz-2GHz	-37.1	-34.03	-31.261	24.1	21.03	18.261
2GHz-5GHz	-27.291	-27.465	-27.555	14.291	14.465	14.555
5GHz-10GHz	-25.918	-26.193	-25.922	12.918	13.193	12.922
10GHz-15GHz	-23.766	-23.562	-23.711	10.766	10.562	10.711
15GHz-20GHz	-23.797	-23.821	-23.844	10.797	10.821	10.844
G Band						
50MHz-1900MHz	N/A	N/A	-32.098	N/A	N/A	19.098
1900MHz-1989MHz	N/A	N/A	-28.743	N/A	N/A	15.743
1989MHz-1990MHz	N/A	N/A	-28.902	N/A	N/A	15.902
1995MHz-1996MHz	N/A	N/A	-26.836	N/A	N/A	13.836
1996MHz-2GHz	N/A	N/A	-32.145	N/A	N/A	19.145
2GHz-5GHz	N/A	N/A	-22.899	N/A	N/A	9.899
5GHz-10GHz	N/A	N/A	-26.243	N/A	N/A	13.243

10GHz-15GHz	N/A	N/A	-23.492	N/A	N/A	10.492
15GHz-20GHz	N/A	N/A	-23.766	N/A	N/A	10.766

Notes: An Emission level given in these ranges represents the worst case value over all the tested channels

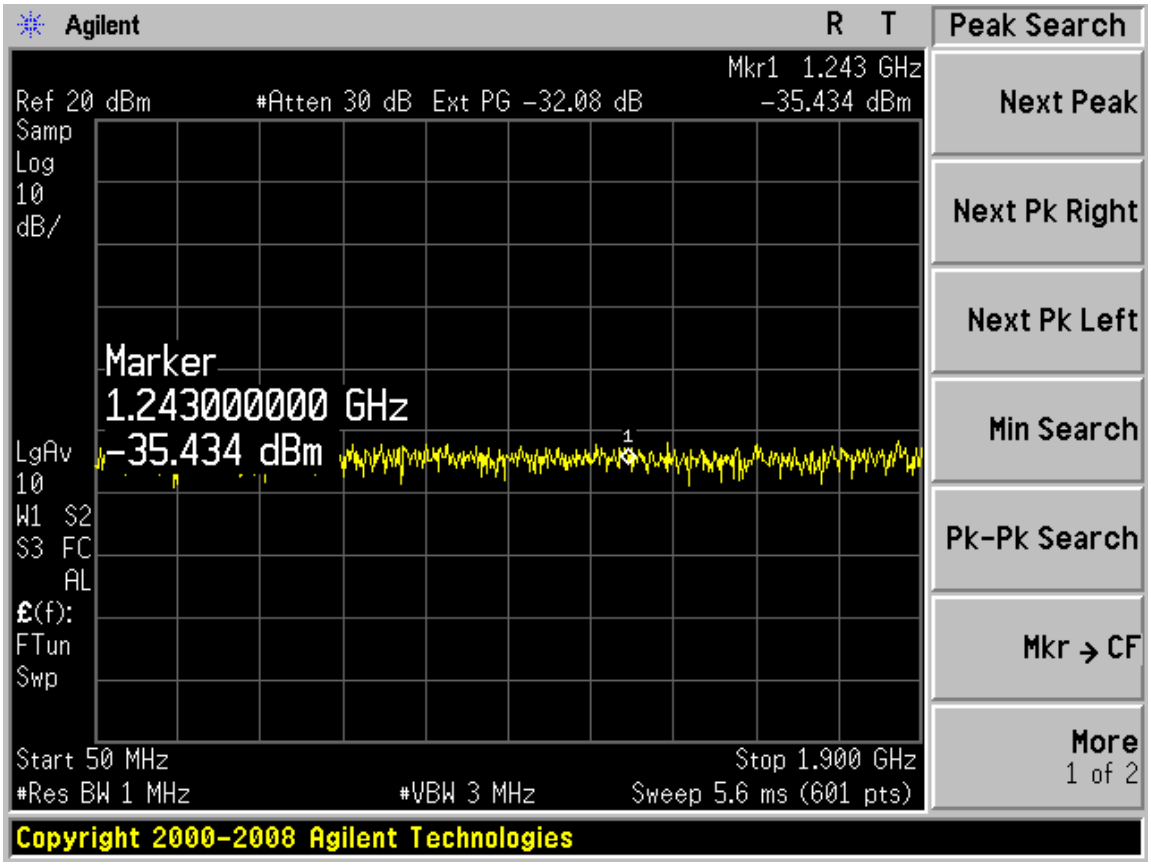

Figure 11: Conducted Spurious Emissions - 1 Carrier, Channel 25, 50MHz-1900MHz IS95

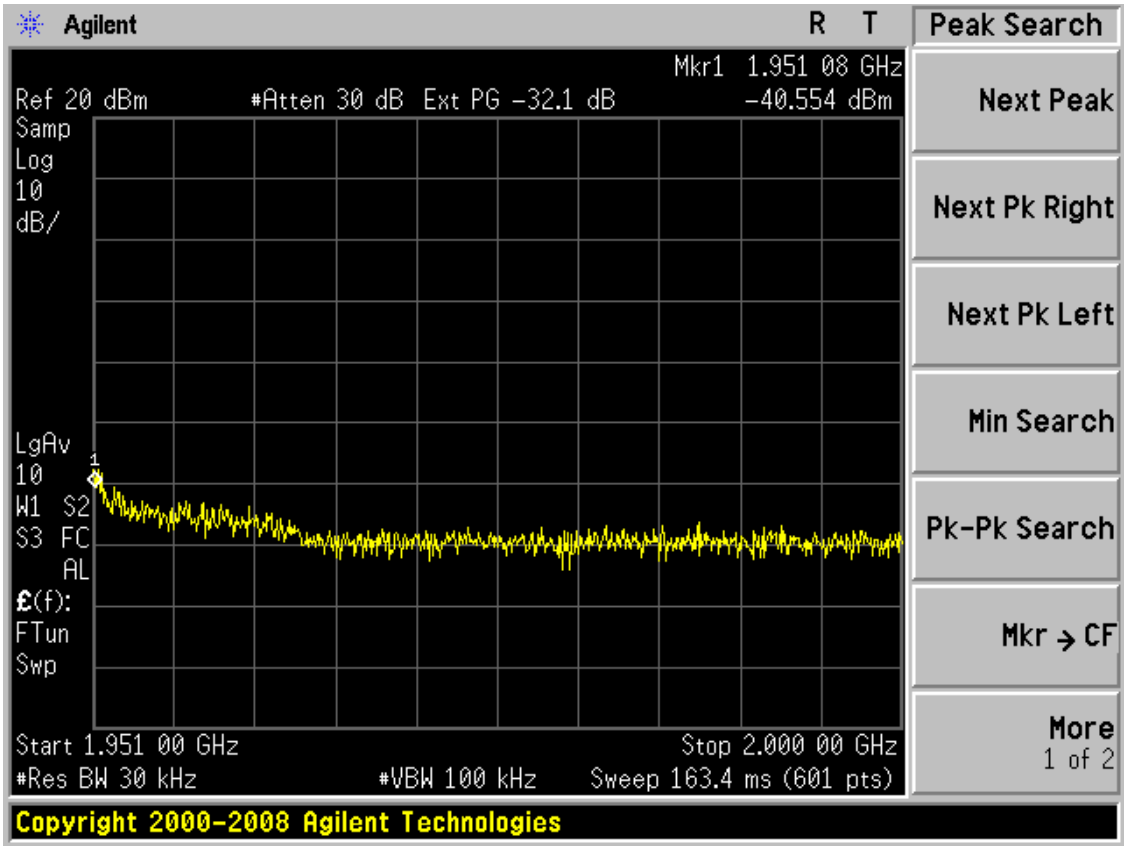

Figure 12: Conducted Spurious Emissions - 1 Carrier, Channel 375, 1951MHz-2GHz IS95

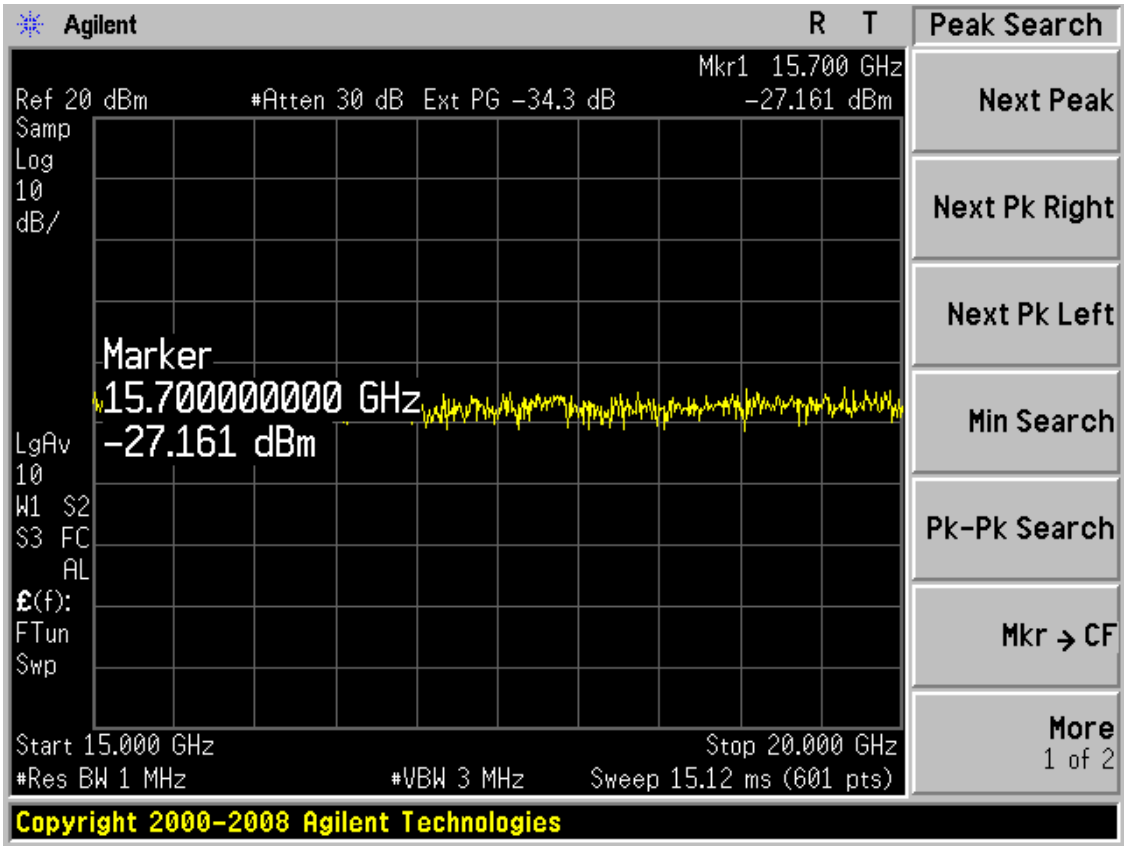

Figure 13: Conducted Spurious Emissions - 1 Carrier, Channel 375, 15GHz-20GHz IS95

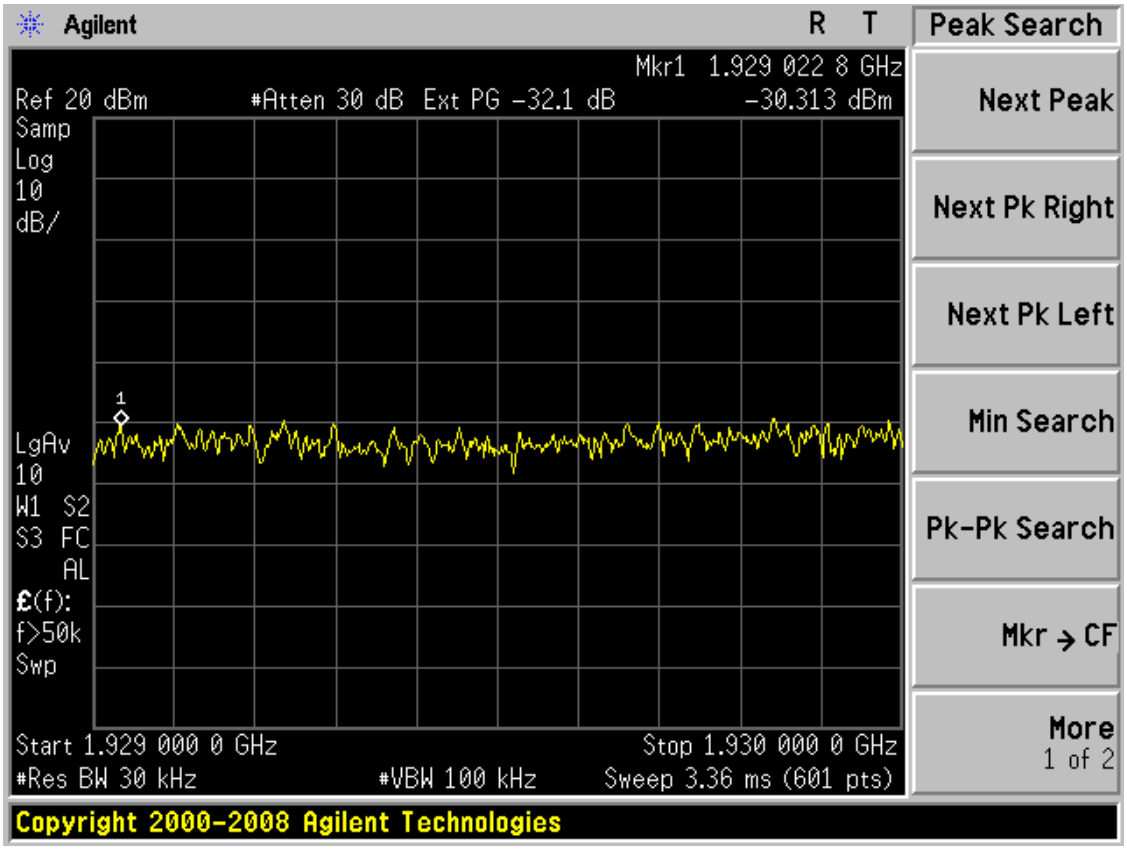

Figure 14: Conducted Spurious Emissions - 2 Carriers, Channel 25 50, 1929MHz-1930MHz IS95

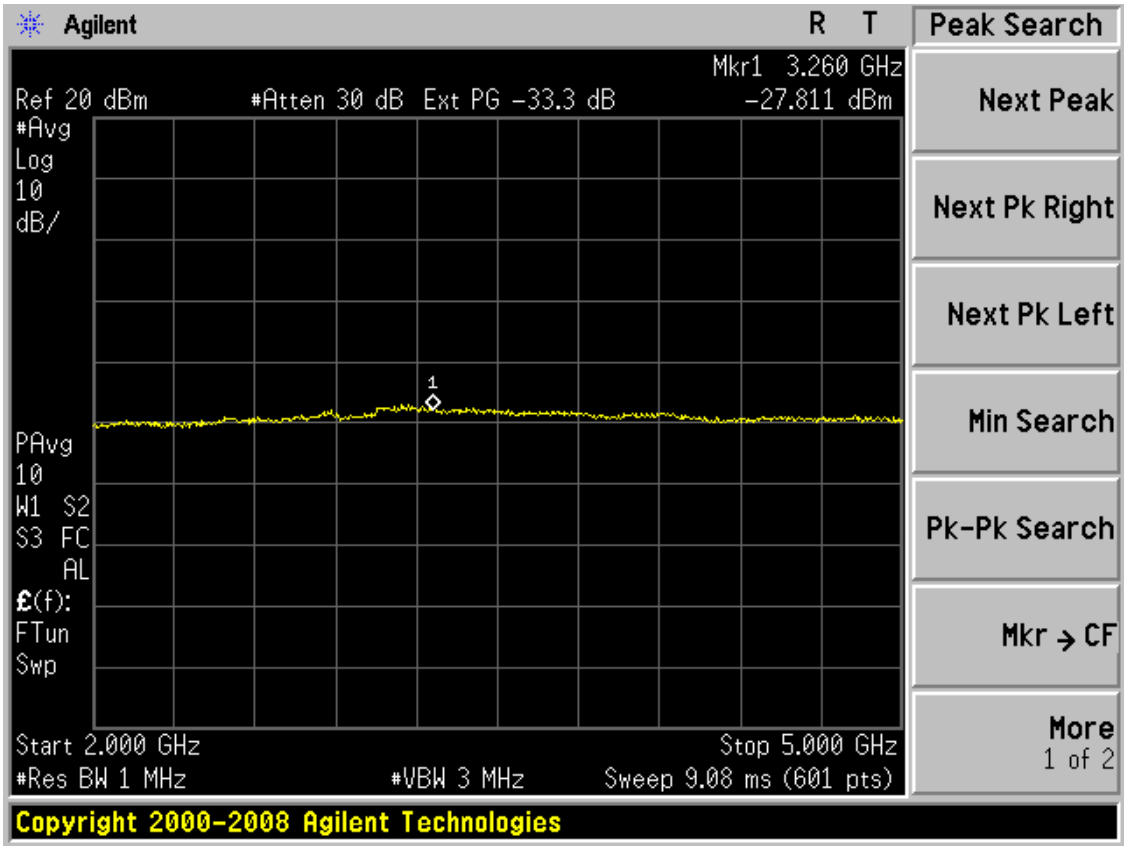

Figure 15: Conducted Spurious Emissions - 2 Carriers, Channel 350 375, 2GHz-5GHz IS95

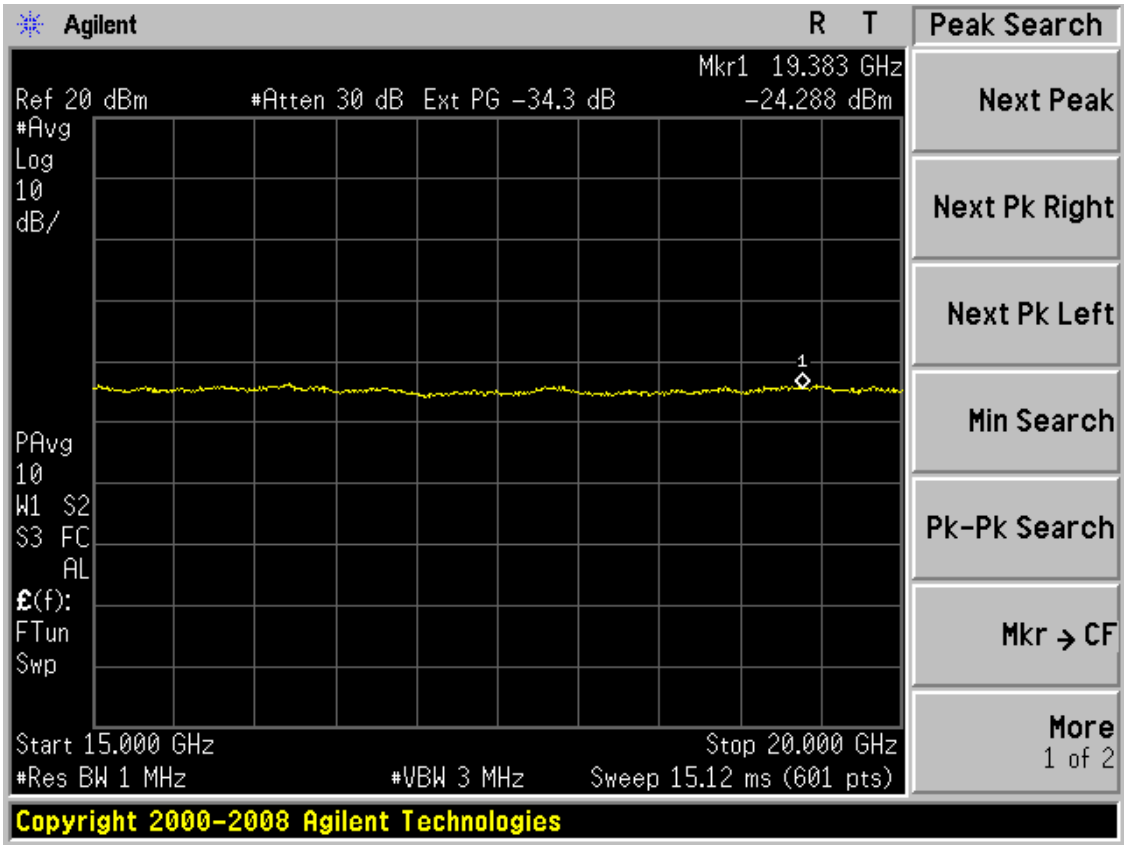

Figure 16: Conducted Spurious Emissions - 2 Carriers, Channel 350 375, 15GHz-20GHz IS95

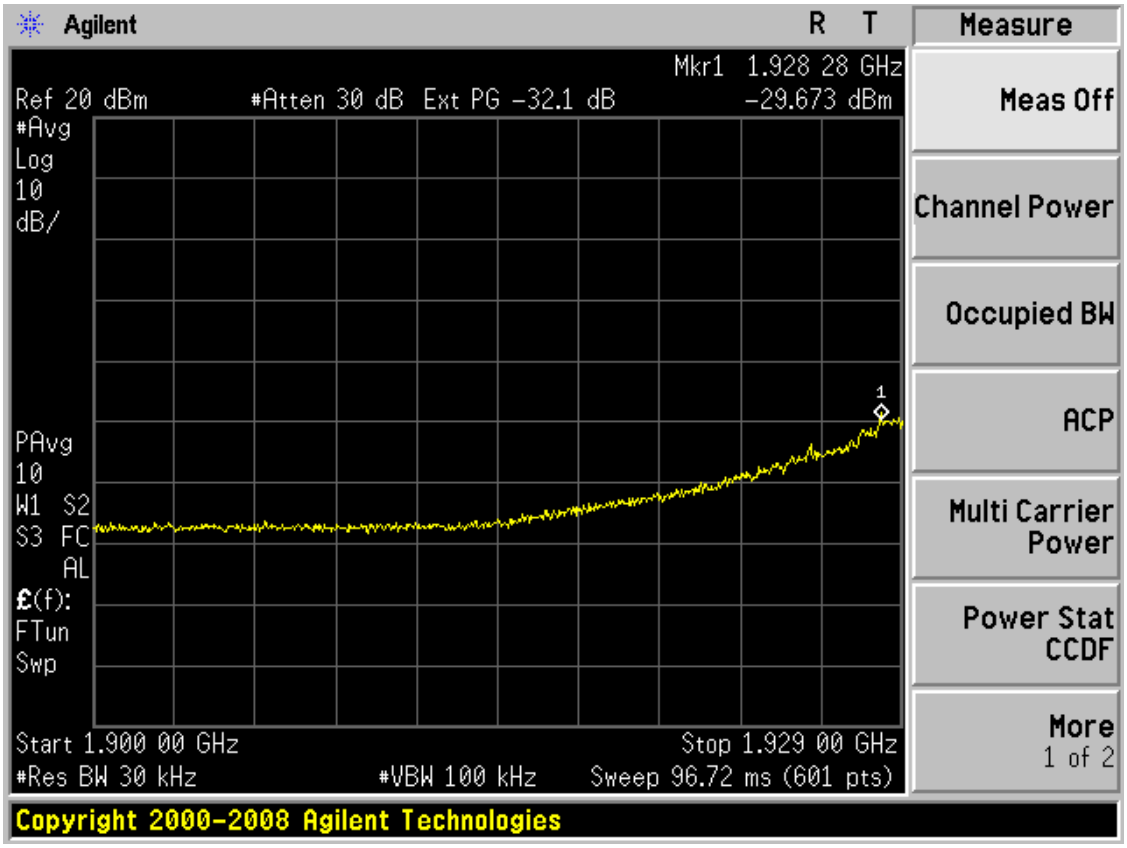

Figure 17: Conducted Spurious Emissions - 3 Carriers, Channel 25 50 75, 1900MHz-1929MHz IS95

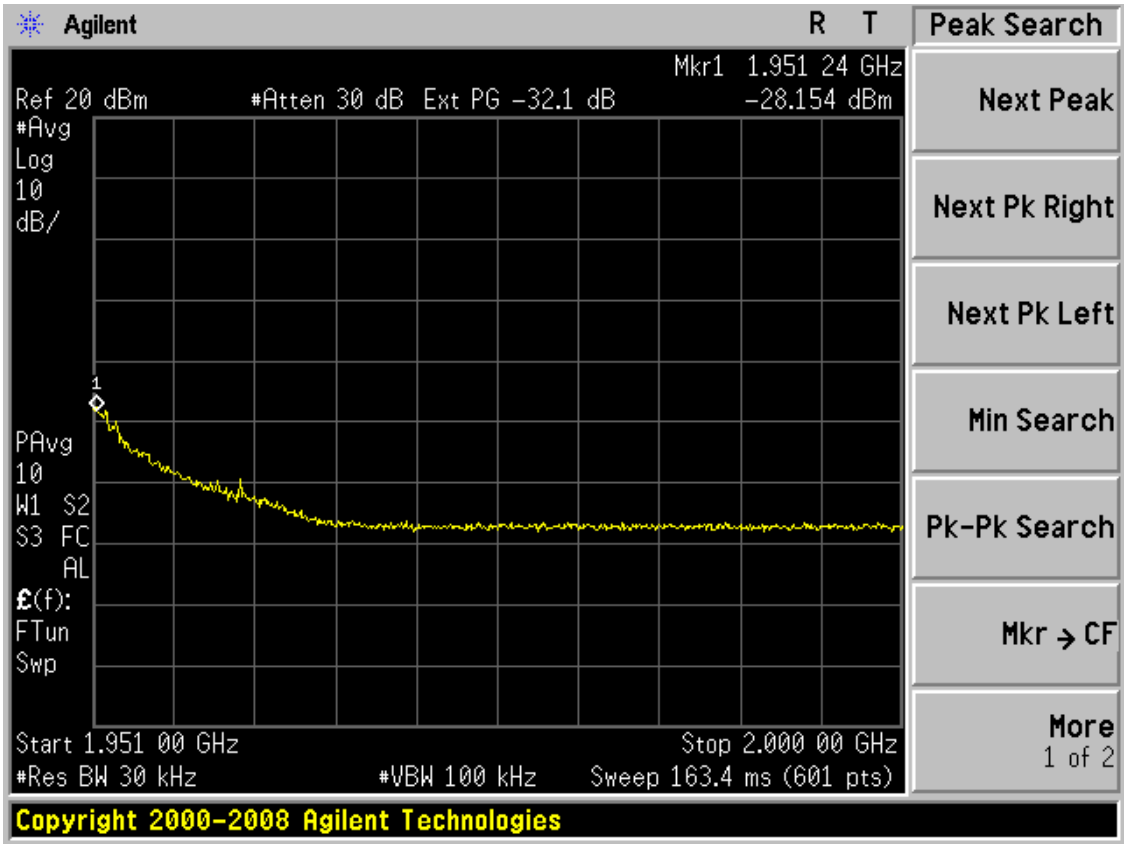

Figure 18: Conducted Spurious Emissions-3 Carriers, Channel 325 350 375, 1951MHz-2GHz IS95

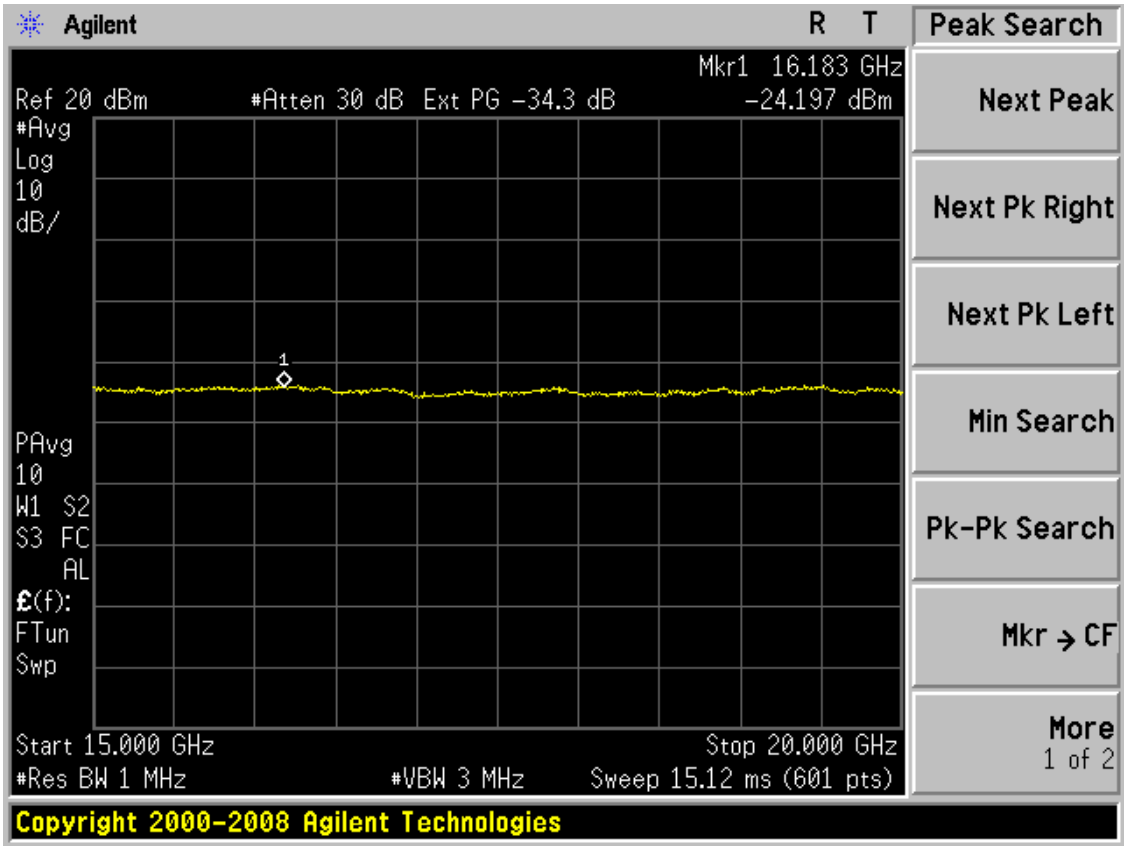

Figure 19: Conducted Spurious Emissions - 3 Carriers, Channel 325 350 375, 15GHz-20GHz IS95

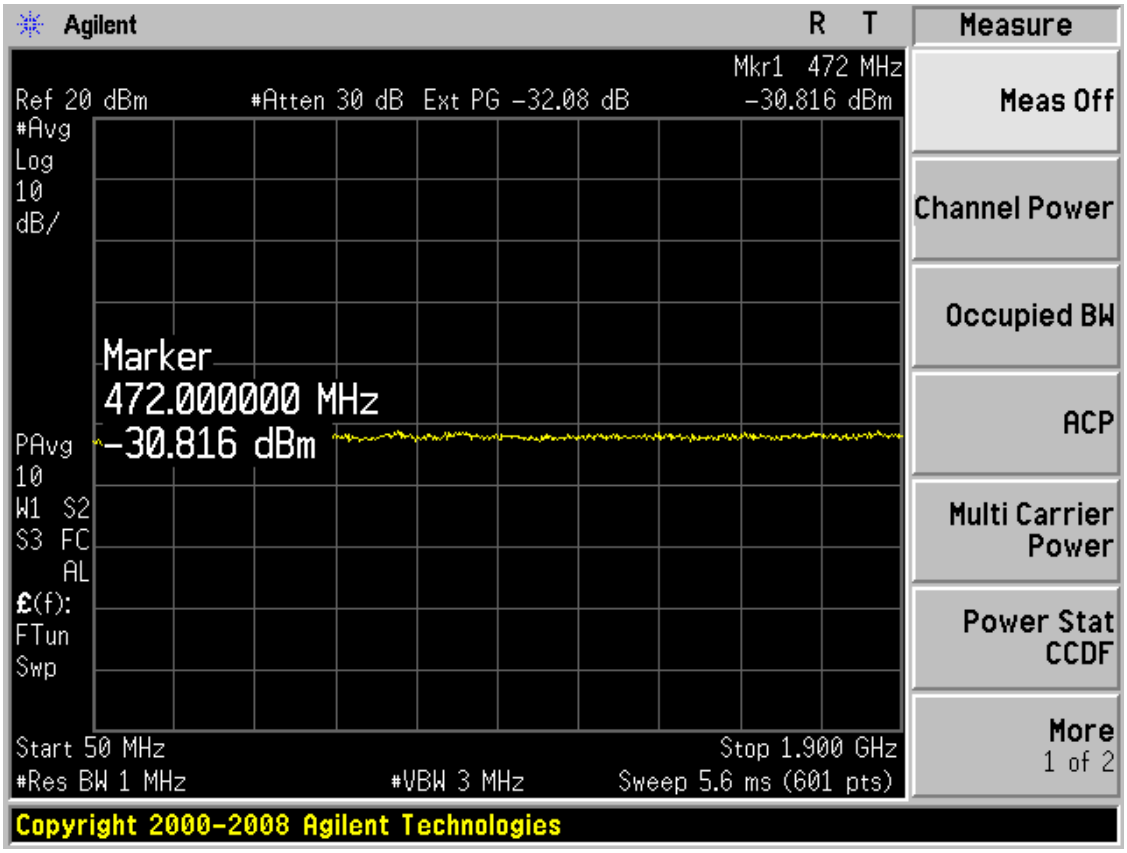

Figure 20: Conducted Spurious Emissions - 1 Carrier, Channel 25, 50MHz-1900MHz IS856 16QAM

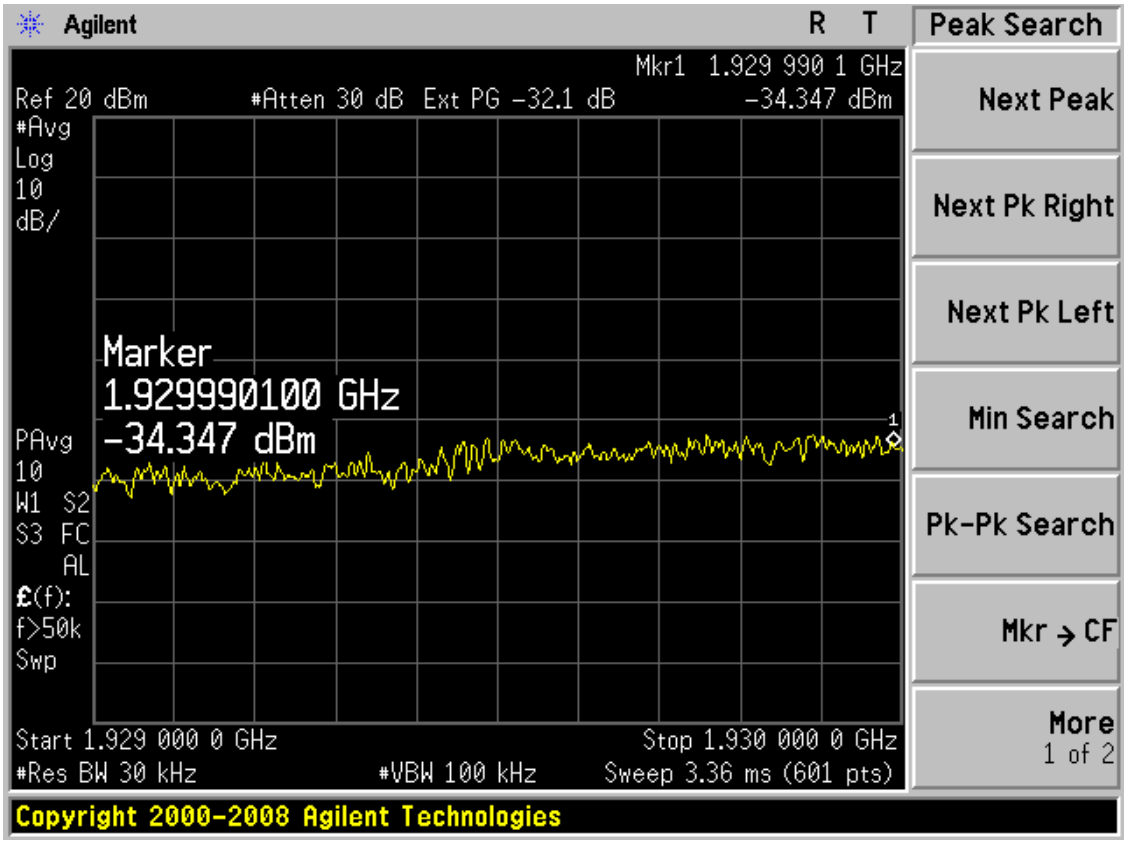

Figure 21: Conducted Spurious Emissions - 1 Carrier, Channel 25, 1929MHz-1930MHz IS856 16QAM

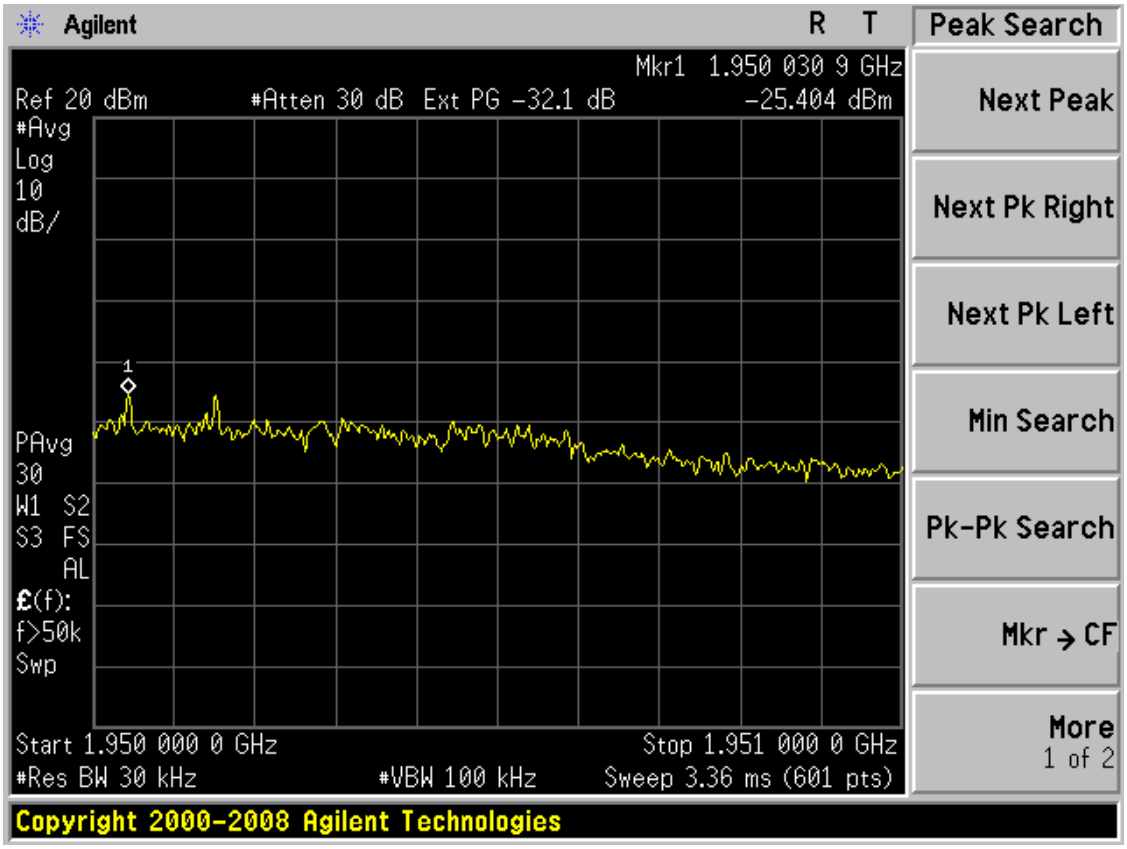

Figure 22: Conducted Spurious Emissions - 1 Carrier, Channel 375, 1950MHz-1951MHz IS856 16QAM

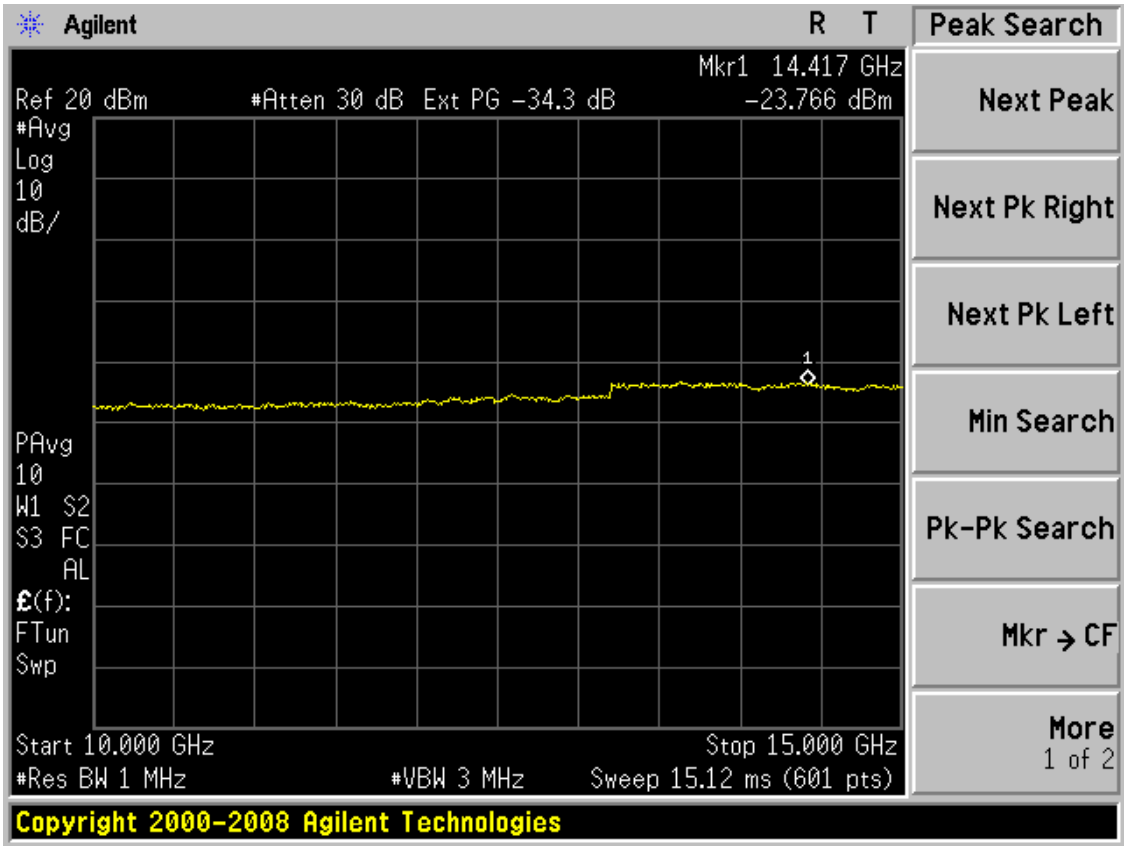

Figure 23: Conducted Spurious Emissions - 1 Carrier, Channels 375, 10GHz-15GHz IS856 16QAM

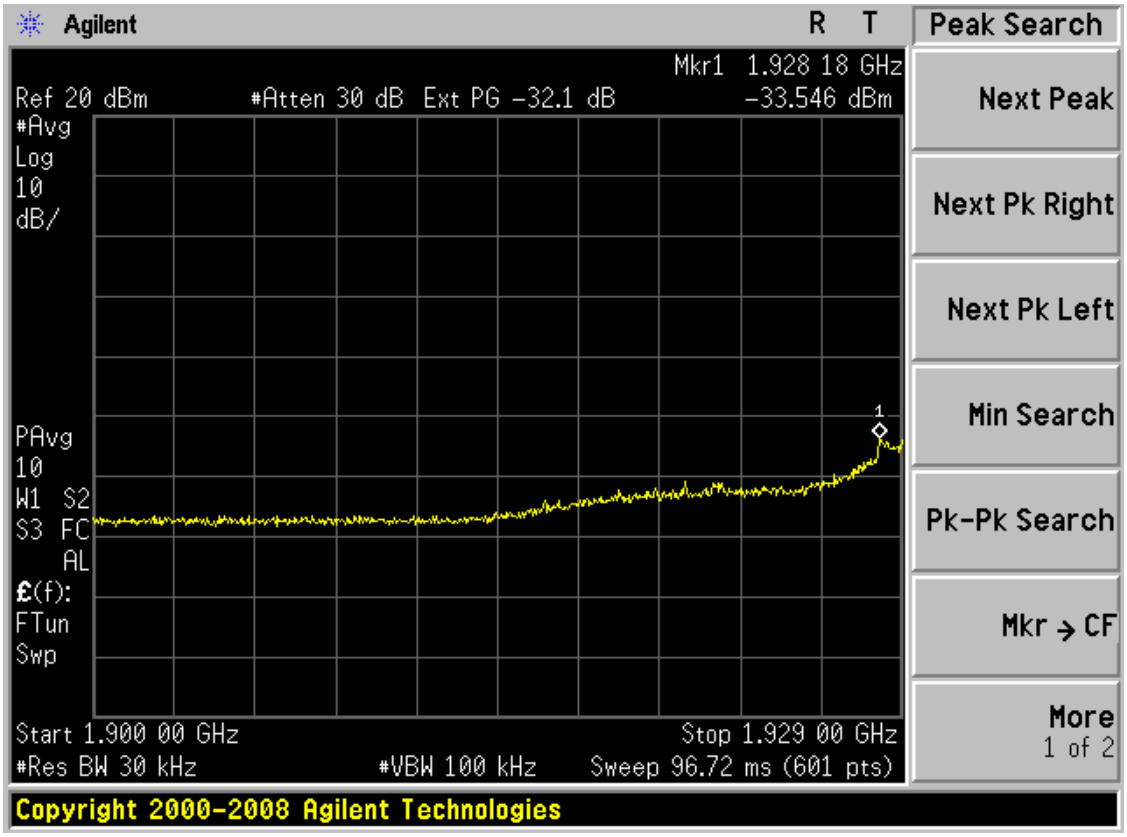

Figure 24: Conducted Spurious Emissions - 2 Carriers, Channel 25 50, 1900MHz-1929MHz IS856 16QAM

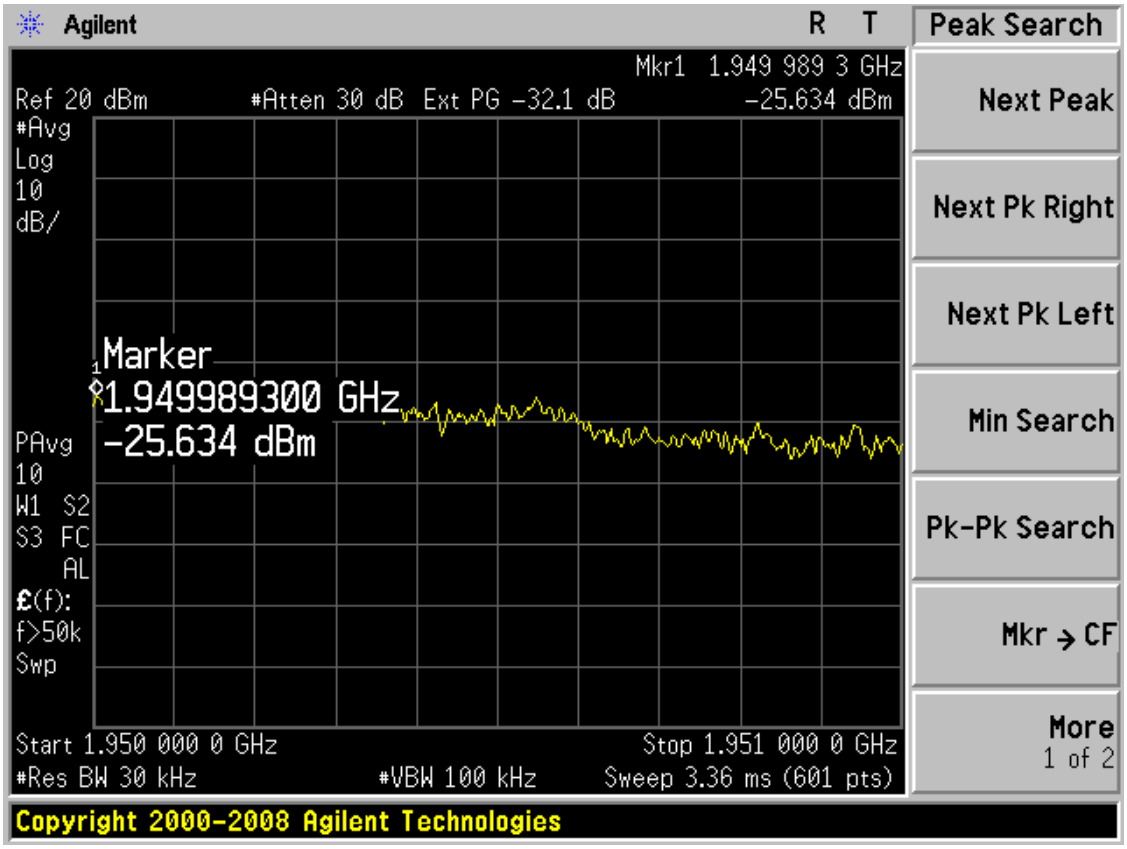

Figure 25: Conducted Spurious Emissions - 2 Carriers, Channels 350 375, 1950Hz-1951GHz IS856 16QAM

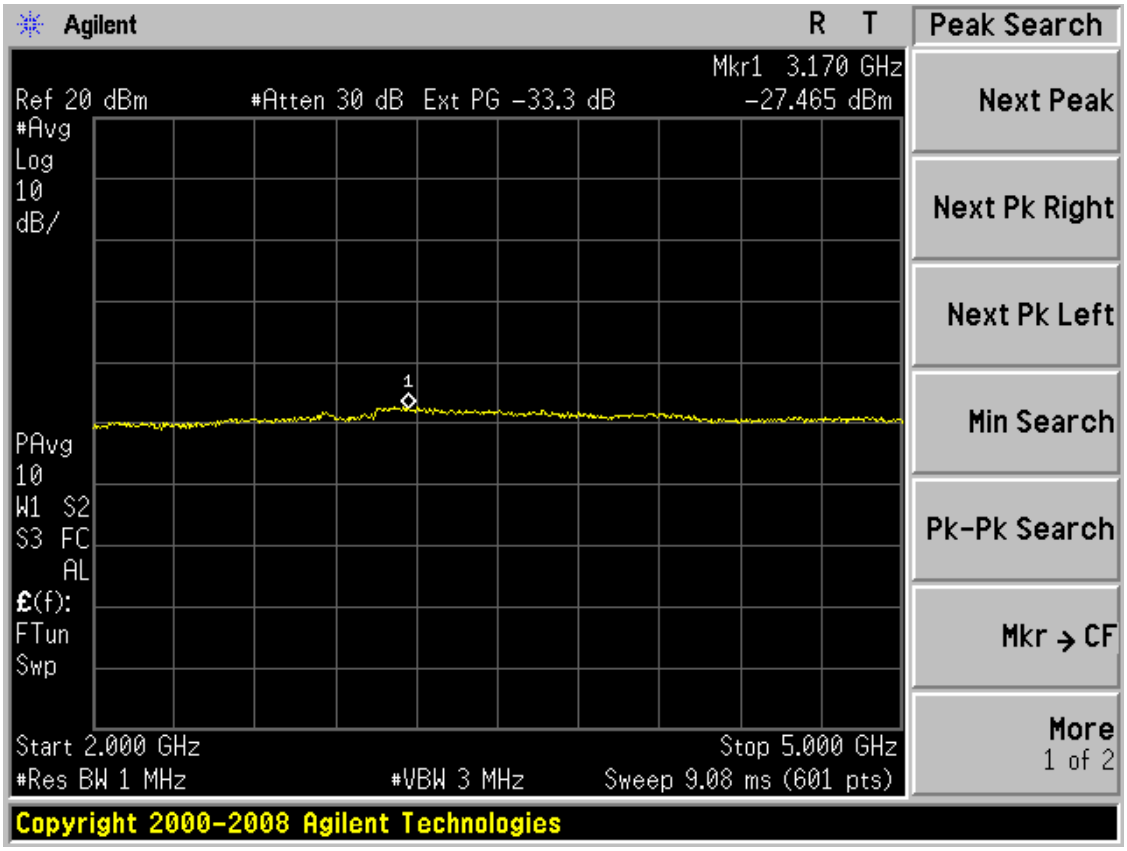

Figure 26: Conducted Spurious Emissions - 2 Carriers, Channels 350 375, 2GHz-5GHz IS856 16QAM

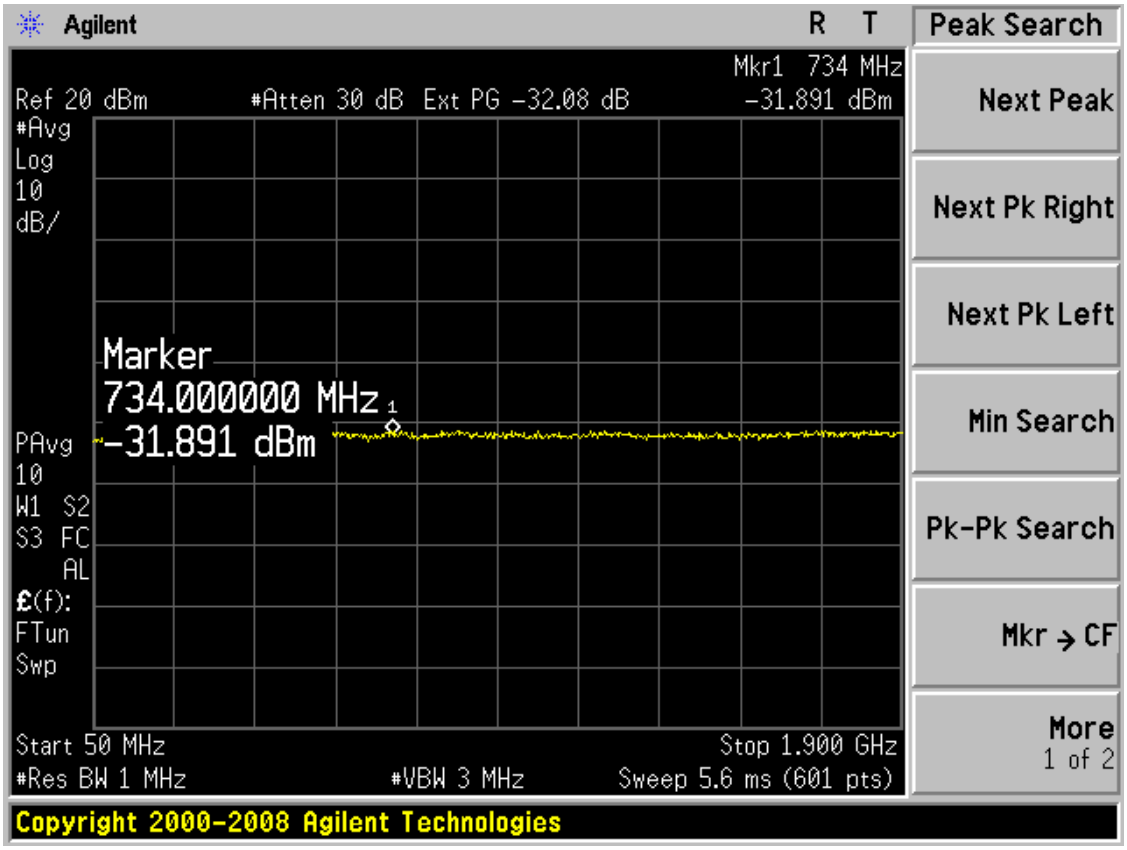

Figure 27: Conducted Spurious Emissions - 3 Carriers, Channels 25 50 75, 50MHz-1900MHz IS856 16QAM

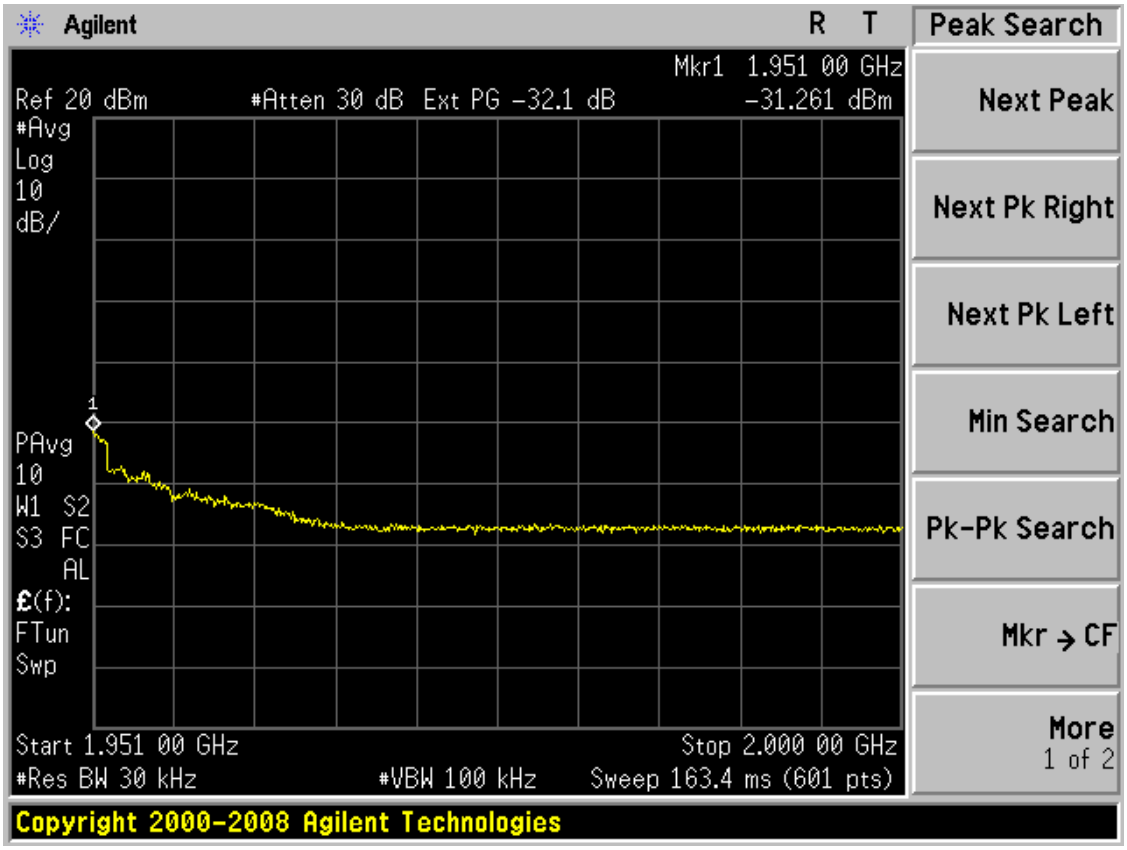

Figure 28: Conducted Spurious Emissions - 3 Carriers, Channels 325 350 375, 1951MHz-2GHz IS856 16QAM

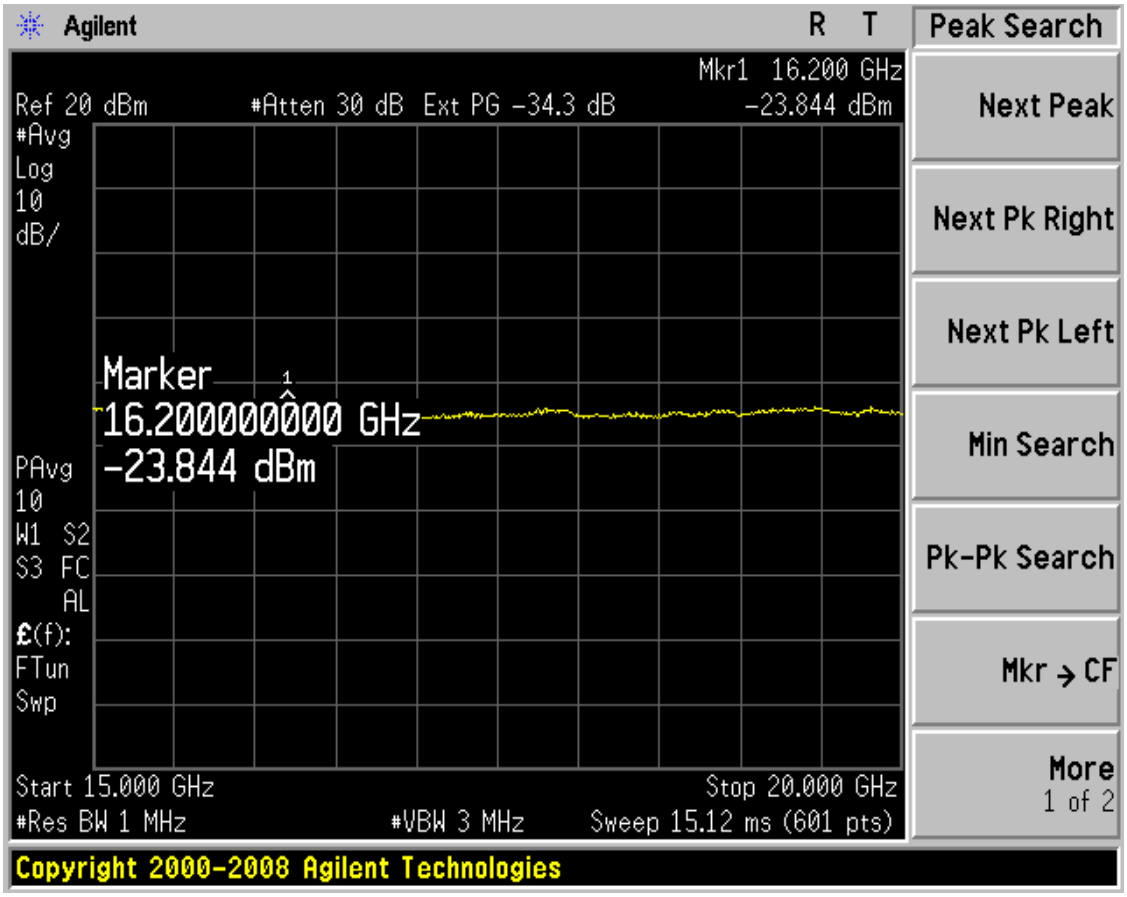

Figure 29: Conducted Spurious Emissions - 3 Carriers, Channels 325 350 375, 15GHz-20GHz IS856 16QAM

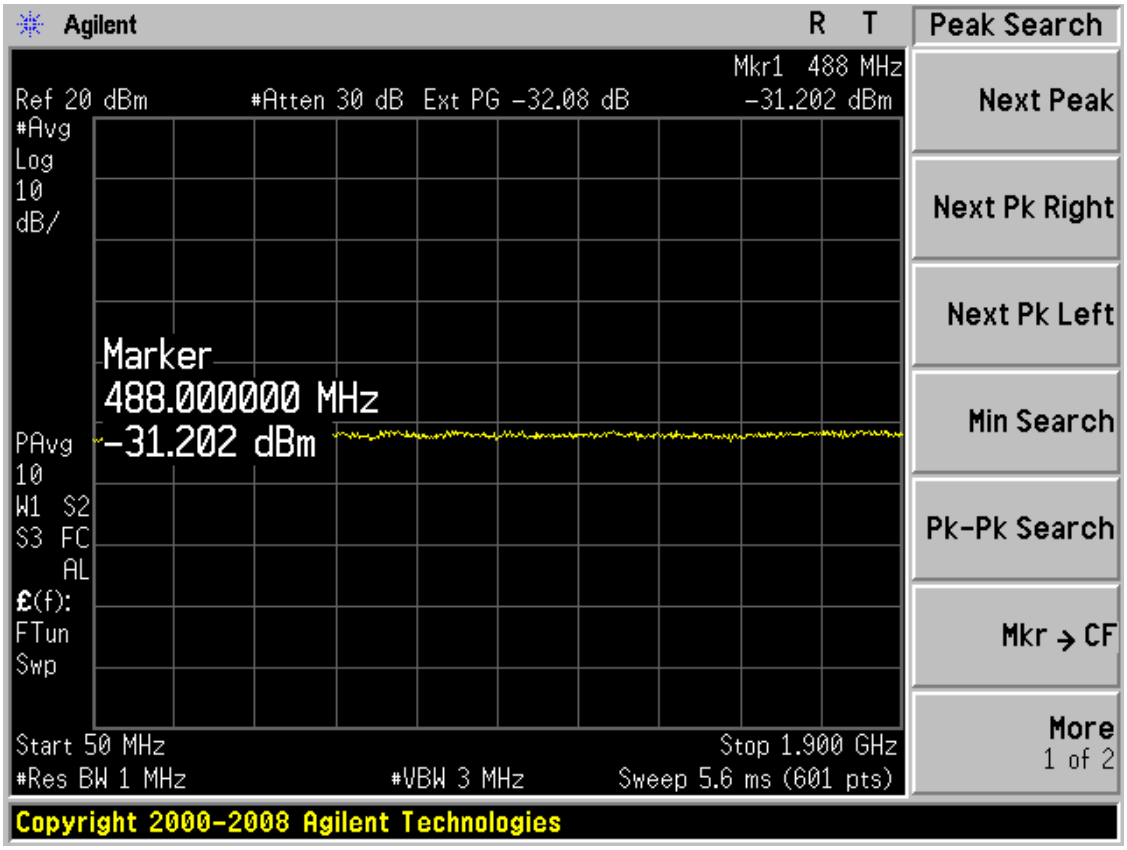

Figure 30: Conducted Spurious Emissions - 3 Carriers, Channels 1225 1250 1275, 50MHz-1900MHz IS95

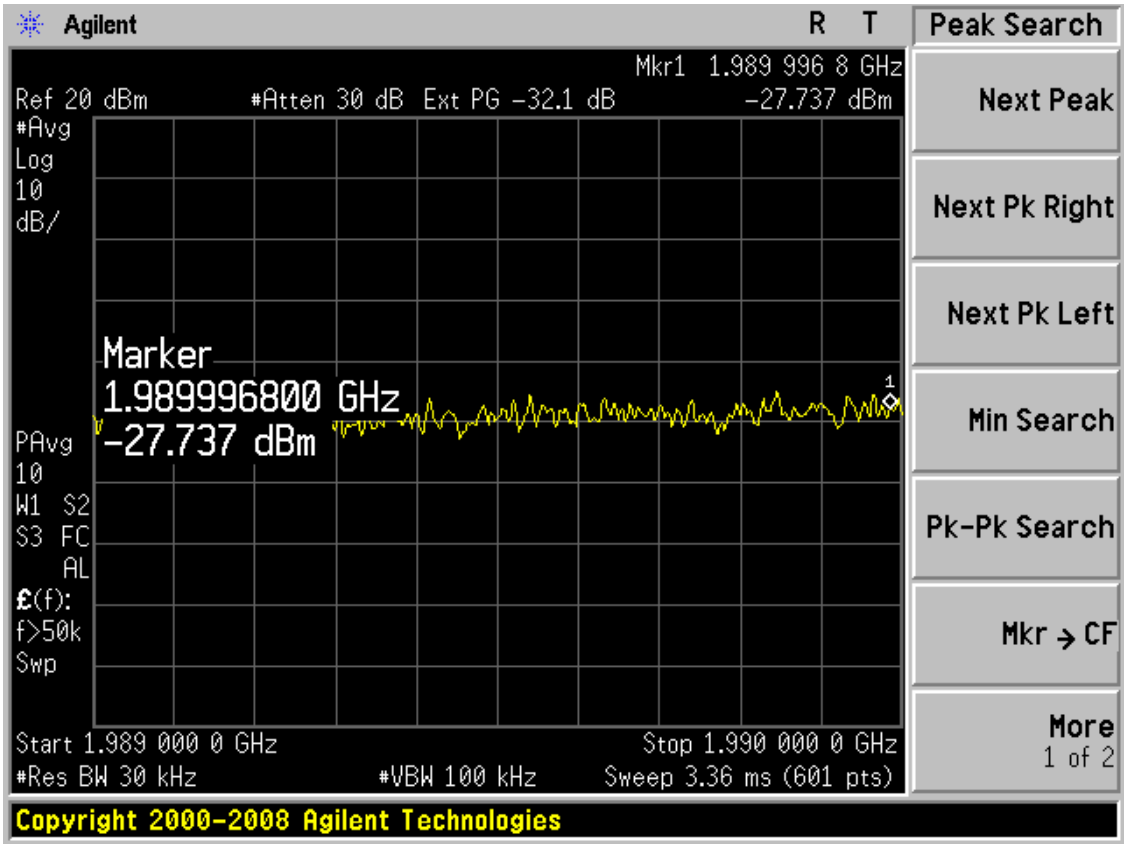

Figure 31: Conducted Spurious Emissions - 3 Carriers, Channels 1225 1250 1275, 1989MHz-1990MHz IS95

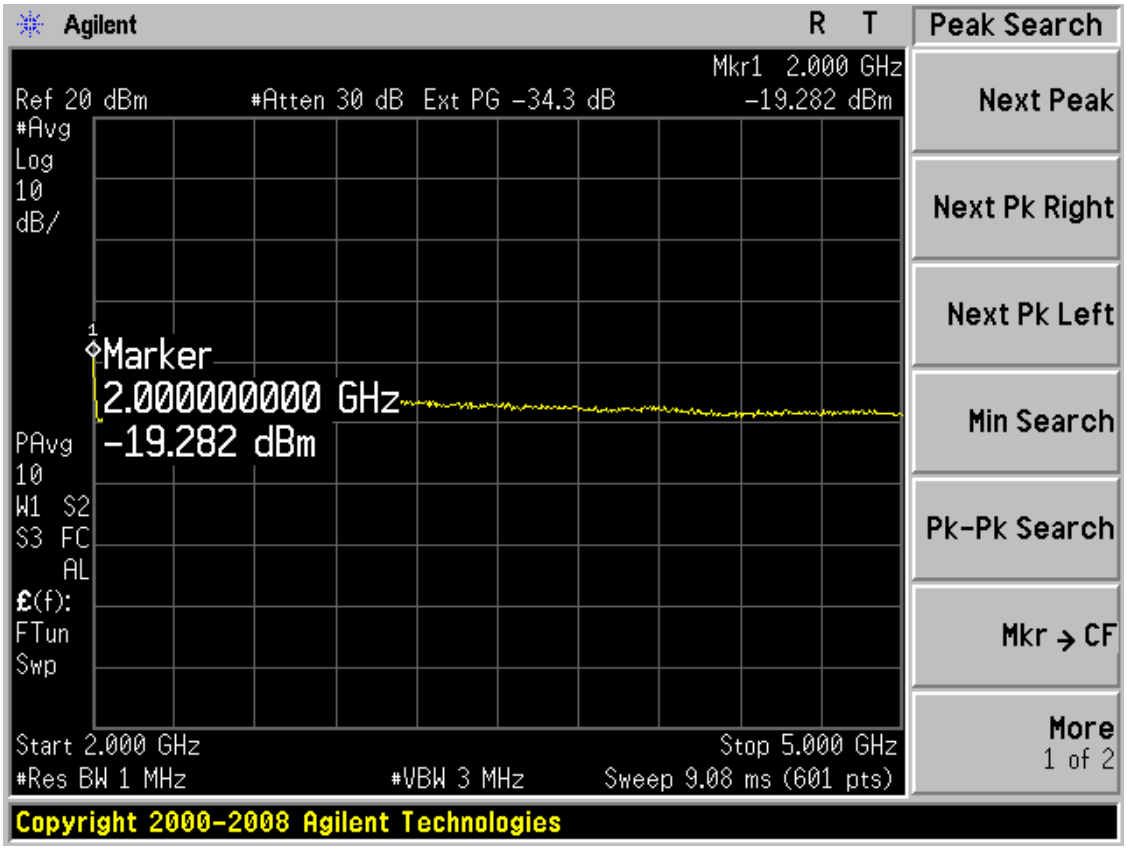

Figure 32: Conducted Spurious Emissions - 3 Carriers, Channels 1225 1250 1275, 2GHz-5GHz IS95

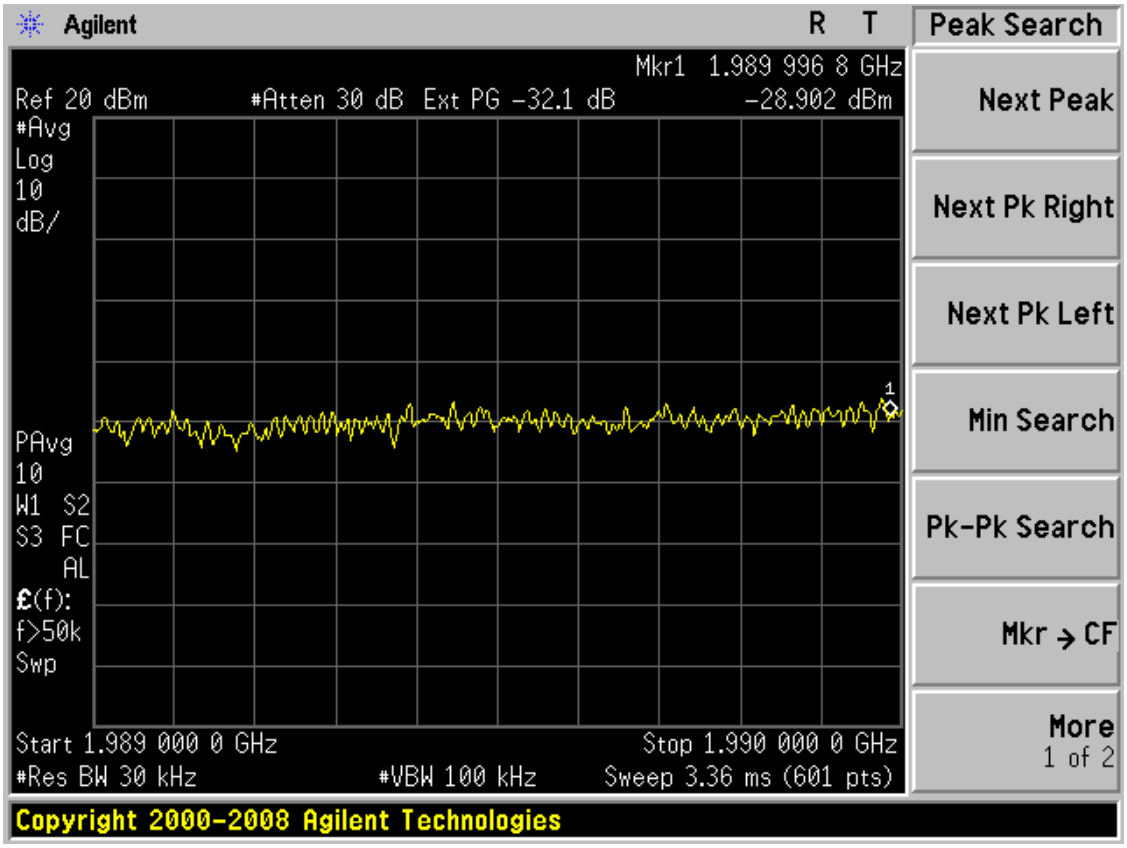

Figure 33: Conducted Spurious Emissions - 3 Carriers, Channels 1225 1250 1275, 1989MHz-1990MHz IS856 16QAM

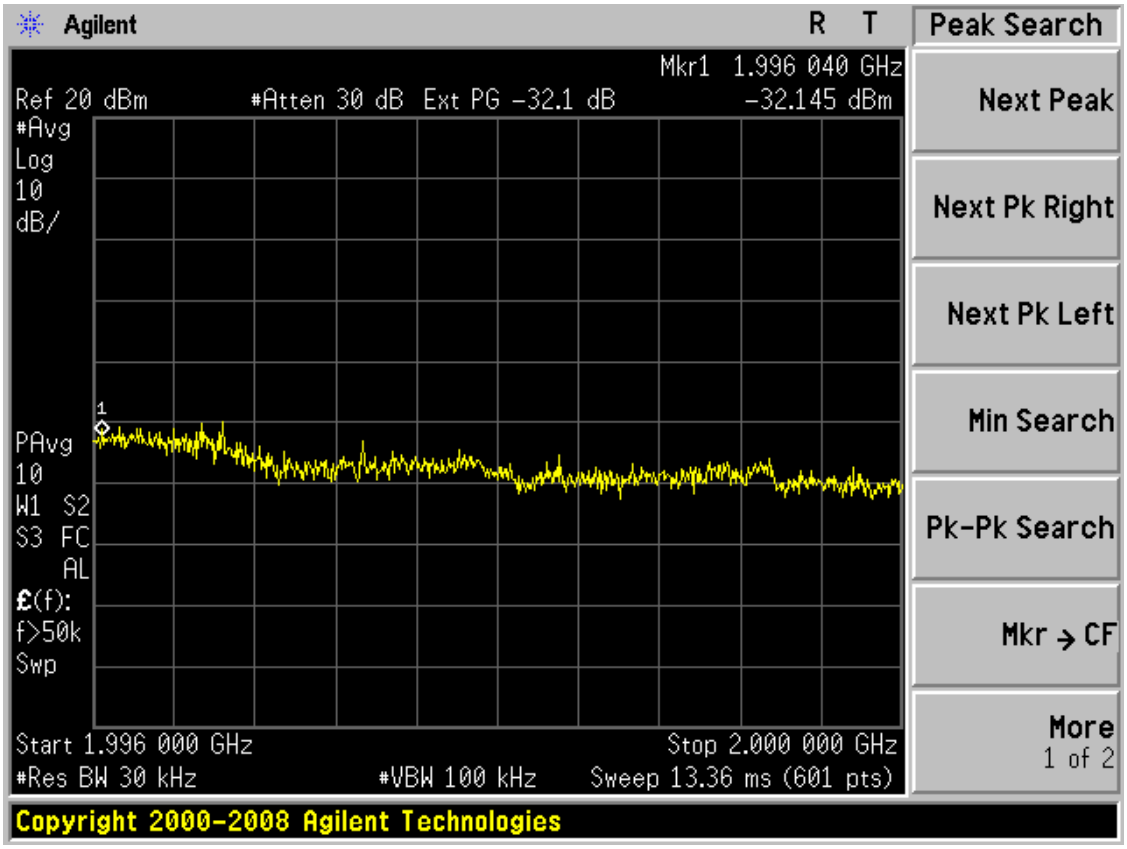

Figure 34: Conducted Spurious Emissions - 3 Carriers, Channels 1225 1250 1275, 1996MHz-2GHz IS856 16QAM

4.5 Frequency Stability

4.5.1 Frequency Stability Requirements

FCC Part 2.1055

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From -30 to +50 centigrade for all equipment except that specified in subparagraphs (2) and (3) of this paragraph.

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10 centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.
(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

(e) When deemed necessary, the Commission may require tests of frequency stability under conditions in addition to those specifically set out in paragraphs (a), (b), (c) and (d) of this section. (For example, measurements showing the effect of proximity to large metal objects, or of various types of antennas, may be required for portable equipment.)

FCC Part 22.355 Limit

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

4.5.2 Test Procedure

The test equipment was configured as shown in figure 35.

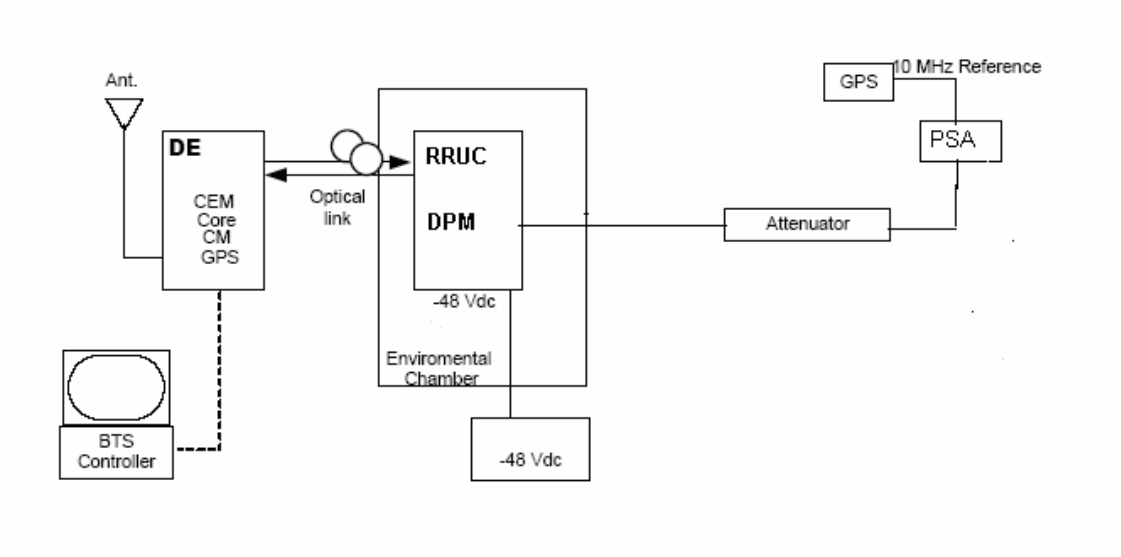

Figure 35: Test configuration for Frequency Stability

4.5.3 Frequency results

Operating temperature for the RRUC 1900MHz is from -40°C to +52°C as specified NTTT0000_SDS System Design Specification. The frequency stability was measured at channels 50 (1932.50 MHz) and 1225 (1991.25 MHz). The PSA set at 10 average.

Table 19: Test results for Frequency Stability versus Power supply Voltage at +25C

Frequency Stability versus Voltage at +25 C (channel 50)		
Voltage (VDC)	Max Carrier Frequency Deviation (Hz)	Max Carrier Frequency Deviation (PPM)
-48	44.57	0.023063389
Frequency Stability versus Voltage at +25 C (channel 1225)		
Voltage (VDC)	Max Carrier Frequency Deviation (Hz)	Max Carrier Frequency Deviation (PPM)
-48	49.06	0.02463779

Table 20: Test results for Frequency Stability versus Temperature at -48V operation

Frequency Stability versus Temperature at -48V (channel 50)		
Temperature (°C)	Max Carrier Frequency Deviation (Hz)	Max Carrier Frequency Deviation (PPM)
-40	43.58	0.0225511
-30	45.47	0.023529107
-20	44.2	0.022871928
-10	44.69	0.023125485
0	44.83	0.02319793
10	45.05	0.023311772
20	44.37	0.022959897
30	46.82	0.024227684
40	46.35	0.023984476
52	44.97	0.023270375
Frequency Stability versus Temperature at -48V (channel 1225)		
Temperature (°C)	Max Carrier Frequency Deviation (Hz)	Max Carrier Frequency Deviation (PPM)
-40	46.52	0.02336221
-30	46.05	0.023126177
-20	44.99	0.022593848
-10	46.9	0.023553045
0	44.65	0.022423101
10	47.93	0.024070308
20	47.29	0.023748901
30	46.6	0.023402385
40	45.55	0.022875078
52	48.48	0.024346516

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