Test Report A

Applicant: Ericsson (China)

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IC: 287AJ-800MFRM3V2

Test Report for

FCC/IC Equipment Authorization

CDMA Metrocell DC Indoor BTS with M3 800 NTGZ70ABE5

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Revision History

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

References

[1] FCC Part 22 Subpart H, “Cellular Radiotelephone Services”

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

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

[4] 800MHz Dual-Mode CDMA Cellular Telephones, Industry Canada, RSS-129, Issue 2, Revision 1, September 25, 1999

Acronyms and Abbreviations

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 Net works) CDMA Metrocell DC Indoor BTS with 800MHz MFRM3 CR.

The Metrocell DC Indoor BTS 800MHz is intended for use in the Domestic Public Cellular Radio Telecommunications Service and is designed in accordance with the following standards:

- *CFR 47, Part 22, Subpart H, Cellular Radiophone Service[1]*
- *CFR 47, Part 2, Subpart J, Equipment Authorization Procedures - Equipment Authorization[2]*
- *800MHz Dual-Mode CDMA Cellular Telephones, Industry Canada, RSS-129, Issue 2, Revision 1, September 25, 1999*

1.1 Required Tests

Table 1 summarizes the measurement results for the CDMA Metrocell DC Indoor BTS 800MHz.

Table 1: Required Tests

FCC/IC Measurement Specification	FCC/IC Limit Specification	IC Cross Reference	Description	Test to be Performed
2.1033	-	ASP-100 & RSS-129, section 14	PA current specification	Yes
2.1046	22.913	RSS-129, section 9.1 & 9.2	RF Power Output	Yes
2.1049	-	RSS-GEN	Occupied Bandwidth	Yes
2.1051,2.1057	22.917, 22.359	RSS-129, section 8.1.2	Spurious Emissions at Antenna Terminals	Yes
2.1055	22.355	RSS-129, section 9.2.1	Frequency Stability	Yes

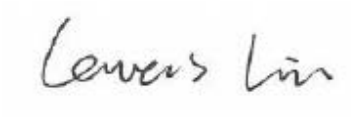
2.0 Engineering Declaration

The CDMA Metrocell DC Indoor BTS 800MHz has been tested in accordance with the requirements contained in the Federal Communications Commission Rules and Regulations Part 2 and 22.

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 MFRM3 CR 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
TDM 800 Full-BAND	NTGZ80CA	01	ACET02000W31
TDM 800 B-BAND	NTGZ80BA	N1	ANDWMA000476
TDM 800 A-BAND	NTGZ80AA	04	ACET02000HNL
MFRM3 800MHz	NTGZ70ABE5	B4	NNTMEEV0101T
FAM3	NTGZ85AAE5	A1	NNTM84G30002
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 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 BTS PA DC current draw test is illustrated in Figure 1. RF output power measurements were referenced to the BTS PA output.

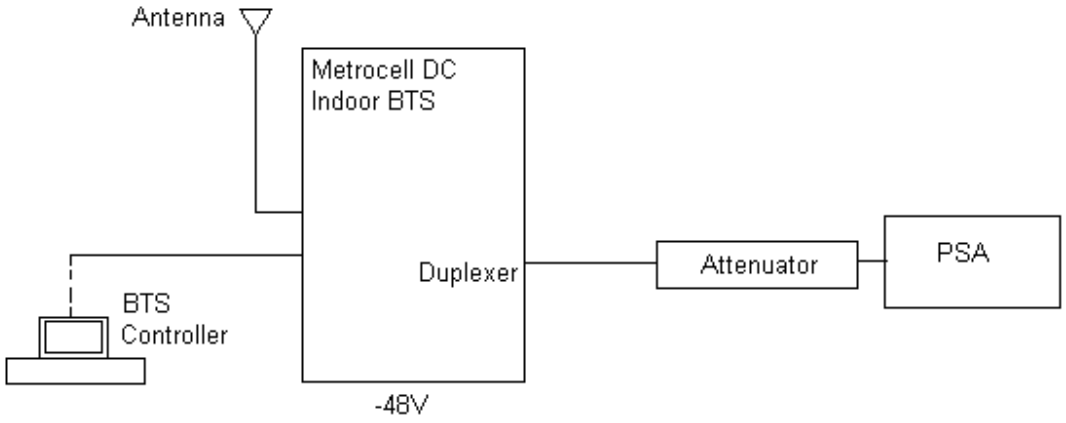


Figure 1: Test Setup for PA DC current draw measurement

4.1.4 Test Results

The final DC current is shown in Table 4.

Table 4: Average Current Values @ Pout = 47.3dBm

Average Current Values @ Pout=47.3dBm			
	PA 1	**PA 2**	**PA 3**
Drive Value	0.561A	0.521A	0.594A
Main Value	4.619A	4.453A	4.951A
Aux Value	1.699A	1.430A	1.826A

4.2 RF Power Output

4.2.1 RF Power Output Requirements

FCC Part 2.1046

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.

RSS-129

800MHz Dual-Mode CDMA Cellular Telephones, Industry Canada, RSS-129, Issue 2, Revision 1, September 25, 1999

FCC Limit (Part 22.913)

(a) The effective radiated power of base transmitters and cellular repeaters must not exceed 500 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.

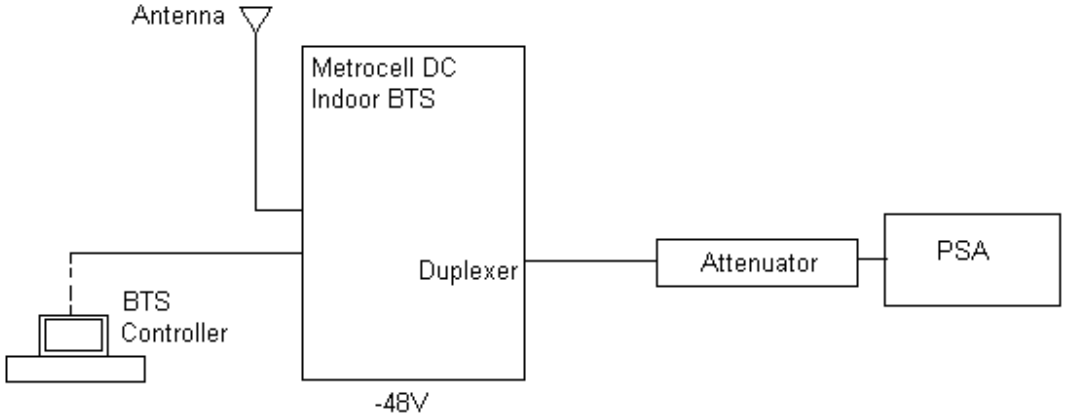


Figure 2: Test Setup for RF Power Output Measurement

4.2.4 Test Results

The Metrocell BTS 800 MHz complies with the requirement. The maximum measured RF output power was 47.3 dBm.

Table 5: RF Output Power of Metrocell BTS 800 MHz, 1 Carrier Mode IS95

Channel Number(Band)	Frequency(MHz)	Measured RF Output Power(dBm)	Typical Maximun Rated Power(dBm)
1019 (A")	869.88	47.14	47.3
283 (A)	878.49	47.2	47.3
384 (B)	881.52	47.2	47.3
758 (B')	892.74	47.33	47.3

Table 6: RF Output Power of Metrocell BTS 800MHz, 2 Carriers Mode IS95

Channel Number(Band)	Frequency(MHz)	Measured RF Output Power(dBm)	Typical Maximun Rated Power(dBm)
1019 37(A" A)	869.88 871.110	47.27	47.3
242 283 (A)	877.260 878.49	47.51	47.3
384 425 (B)	881.52 882.750	47.31	47.3
589 630 (B)	887.670 888.900	47.52	47.3

Table 7: RF Output Power of Metrocell BTS 800 MHz, 3 Carriers Mode IS95

Channel Number(Band)	Frequency(MHz)	Measured RF Output Power(dBm)	Typical Maximun Rated Power(dBm)
1019 37 78(A" A)	869.88 871.110 872.340	47.5	47.3
201 242 283 (A)	876.030 877.260 878.49	47.53	47.3
384 425 466 (B)	881.52 882.750 883.980	47.52	47.3
548 589 630 (B)	886.440 887.670 888.900	47.25	47.3

Table 8: RF Output Power of Metrocell BTS 800 MHz, 1 Carriers Mode IS856 16QAM

Channel Number(Band)	Frequency(MHz)	Measured RF Output Power(dBm)	Typical Maximun Rated Power(dBm)
283 (A)	878.49	47.28	47.5
384 (B)	881.52	47.01	47.5

Table 9: RF Output Power of Metrocell BTS 800 MHz, 2 Carriers Mode IS856 16QAM

Channel Number(Band)	Frequency(MHz)	Measured RF Output Power(dBm)	Typical Maximun Rated Power(dBm)
242 283 (A)	877.260 878.49	47.13	47.5
384 425 (B)	881.52 882.750	47.27	47.5

Table 10: RF Output Power of Metrocell BTS 800 MHz, 3 Carriers Mode IS856 16QAM

Channel Number(Band)	Frequency(MHz)	Measured RF Output Power(dBm)	Typical Maximun Rated Power(dBm)
201 242 283 (A)	876.030 877.260 878.49	47.24	47.5

384 425 466 (B)	881.52 882.750 883.980	47.33	47.5

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 MFRM3 CR 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 Occupied bandwidth test is illustrated in Figure 3.

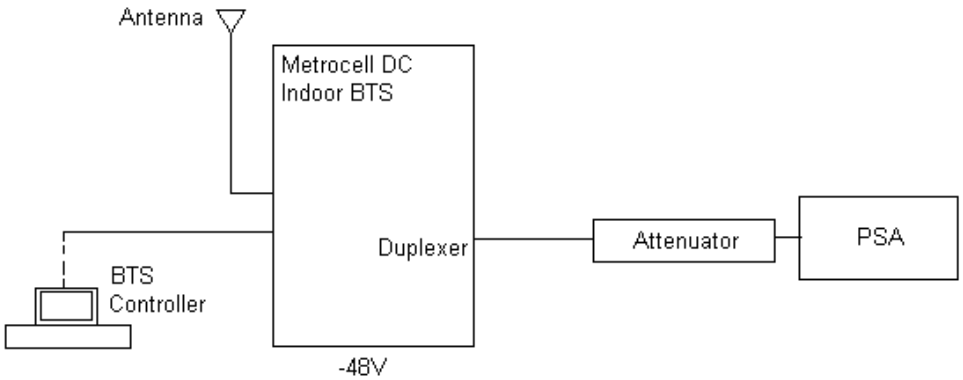


Figure 3: Test Setup for Occupied Bandwidth Measurement

4.3.4 Test Results

The Metrocell BTS 800 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 800 MHz, Single Carrier Mode IS95

Channel Number(Band)	Frequency(MHz)	Measured Occupied Bandwidth (MHz)
1019 (A")	869.88	1.2693
283 (A)	878.49	1.2623
384 (B)	881.52	1.2603
758 (B')	892.74	1.264

Table 12: Occupied Bandwidth, Metrocell BTS 800 MHz, 2 Carriers Mode IS95

Channel Number(Band)	Frequency(MHz)	Measured Occupied Bandwidth (MHz)
1019 37(A" A)	869.88 871.110	2.4686
242 283 (A)	877.260 878.49	2.4654
384 425 (B)	881.52 882.750	2.4608
589 630 (B)	887.670 888.900	2.4684

Table 13: Occupied Bandwidth, Metrocell BTS 800 MHZ, 3 Carriers Mode IS95

Channel Number(Band)	Frequency(MHz)	Measured Occupied Bandwidth (MHz)
1019 37 78(A" A)	869.88 871.110 872.340	3.6678
201 242 283 (A)	876.030 877.260 878.49	3.6695
384 425 466 (B)	881.52 882.750 883.980	3.6849
548 589 630 (B)	886.440 887.670 888.900	3.6707

Table 14: Occupied Bandwidth, Metrocell BTS 800 MHZ, 1 Carriers Mode IS856 16QAM

Channel Number(Band)	Frequency(MHz)	Measured Occupied Bandwidth (MHz)
283 (A)	878.49	1.277
384 (B)	881.52	1.2643

Table 15: Occupied Bandwidth, Metrocell BTS 800 MHZ, 2 Carriers Mode IS856 16QAM

Channel Number(Band)	Frequency(MHz)	Measured Occupied Bandwidth (MHz)
242 283 (A)	877.260 878.49	2.4656
384 425 (B)	881.52 882.750	2.4663

Table 16: Occupied Bandwidth, Metrocell BTS 800 MHZ, 3 Carriers Mode IS856 16QAM

Channel Number(Band)	Frequency(MHz)	Measured Occupied Bandwidth (MHz)
201 242 283 (A)	876.030 877.260 878.49	3.6623
384 425 466 (B)	881.52 882.750 883.980	3.6882

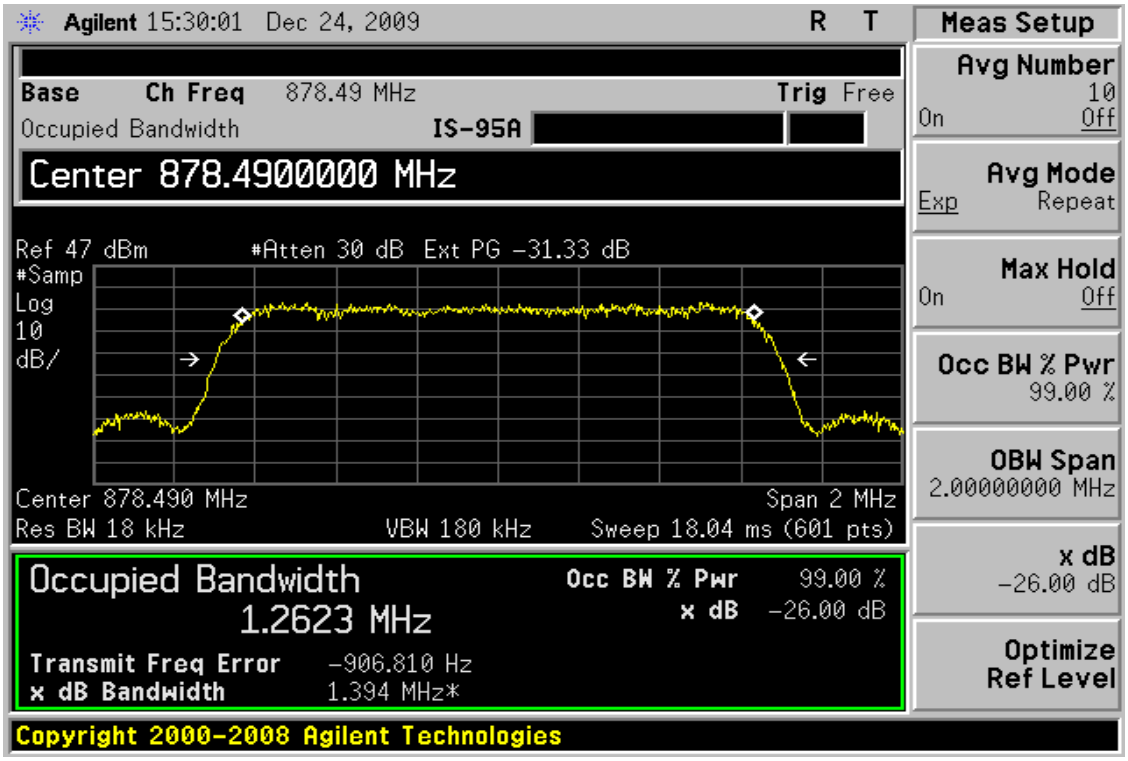


Figure 4: Occupied Bandwidth - Single Carrier Channel 283 (A) IS95

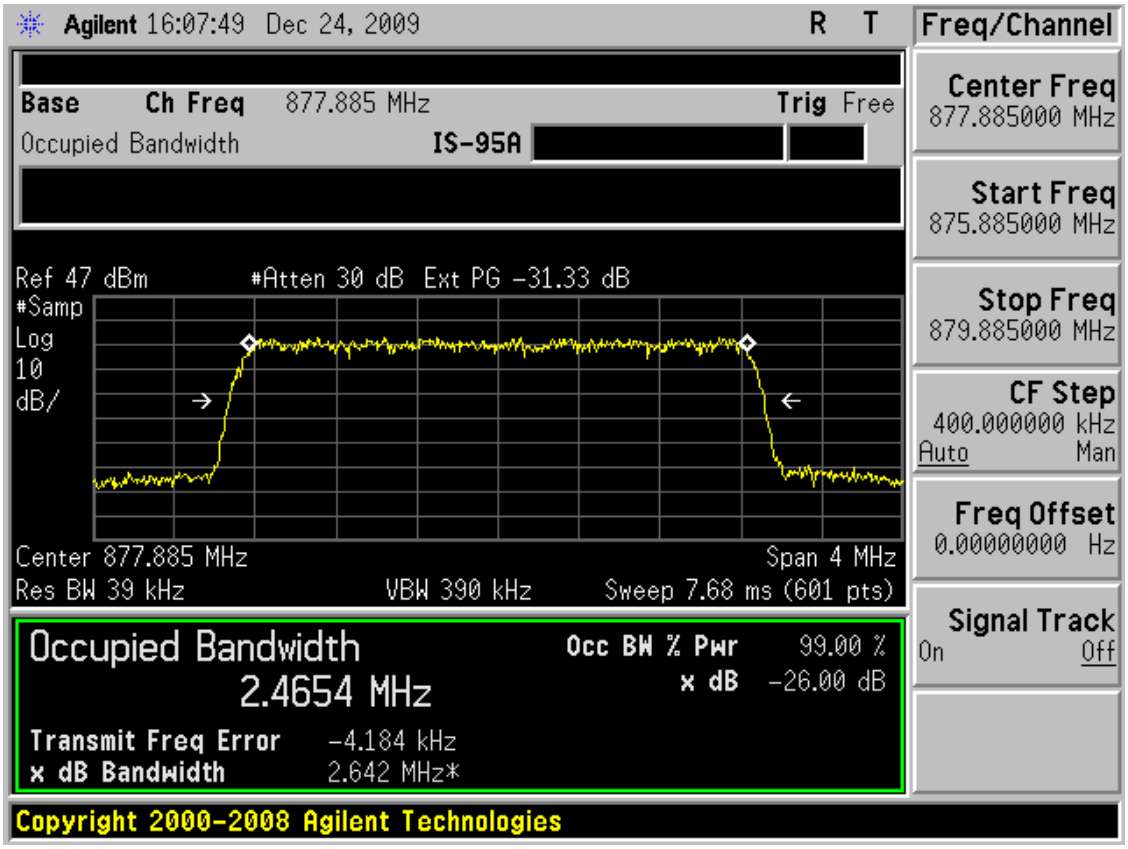


Figure 5: Occupied Bandwidth - 2 Carriers Channels 242, 283 (A) IS95

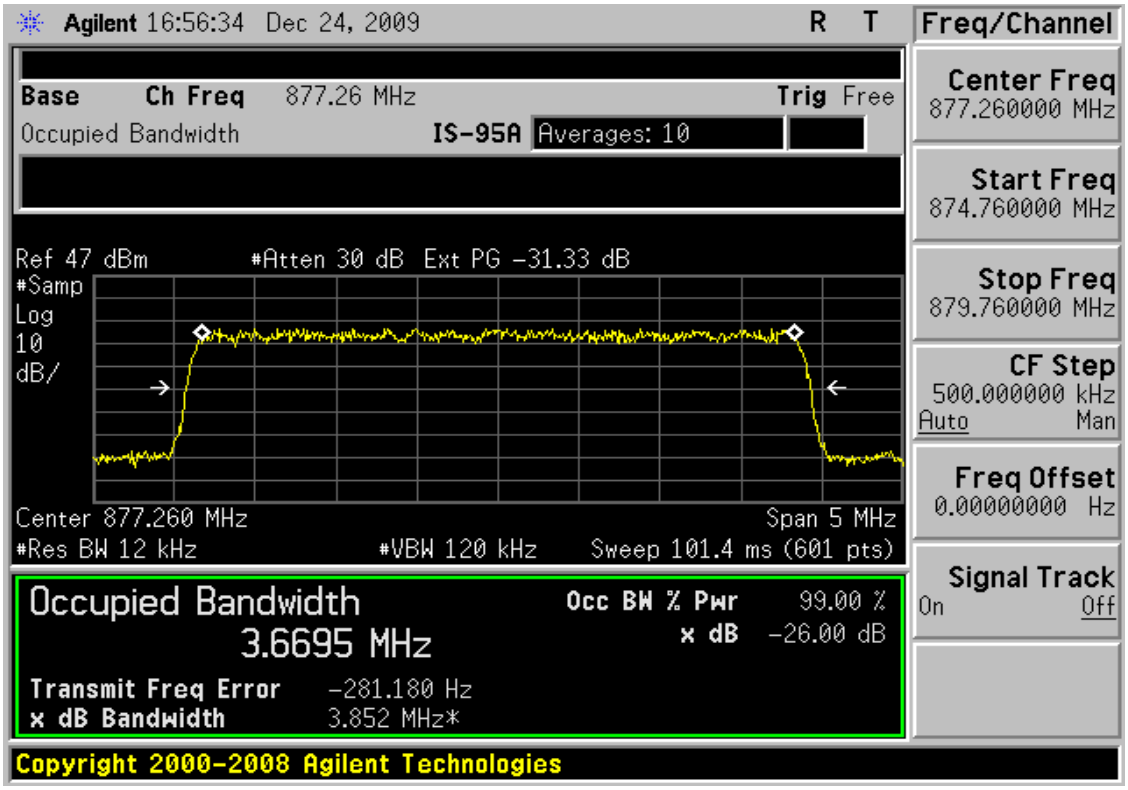


Figure 6: Occupied Bandwidth - 3 Carriers Channels 201, 242, 283 (A) IS95

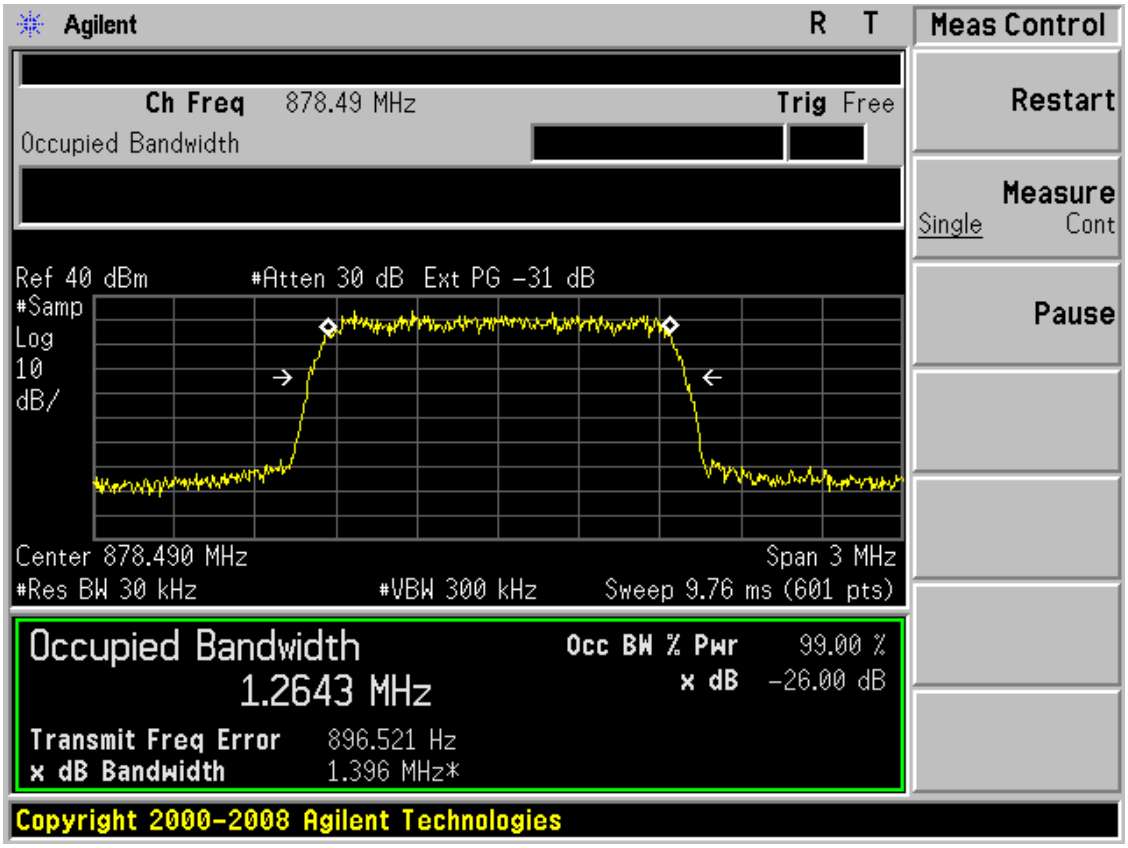


Figure 7: Occupied Bandwidth - Single Carrier Channel 283 (A) IS856 16QAM

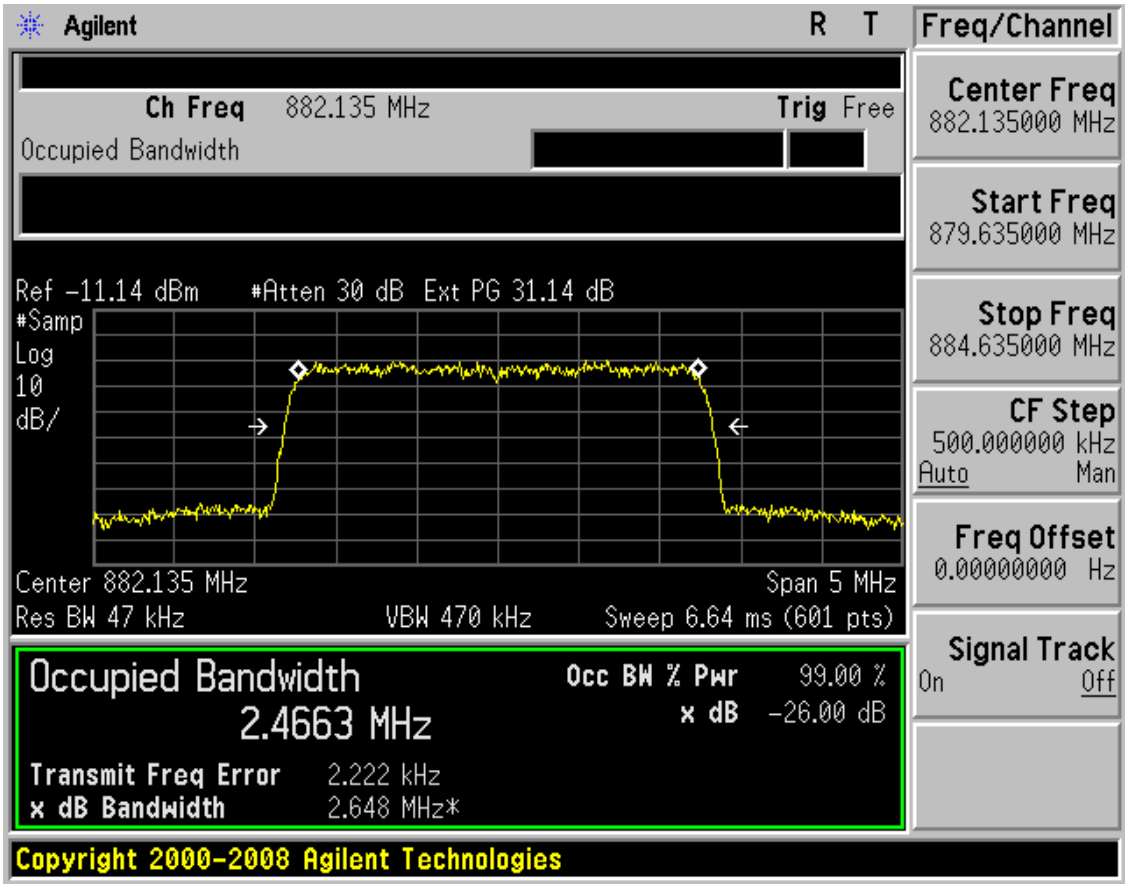


Figure 8: Occupied Bandwidth - 2 Carriers Channels 384, 425 (B) IS856 16QAM

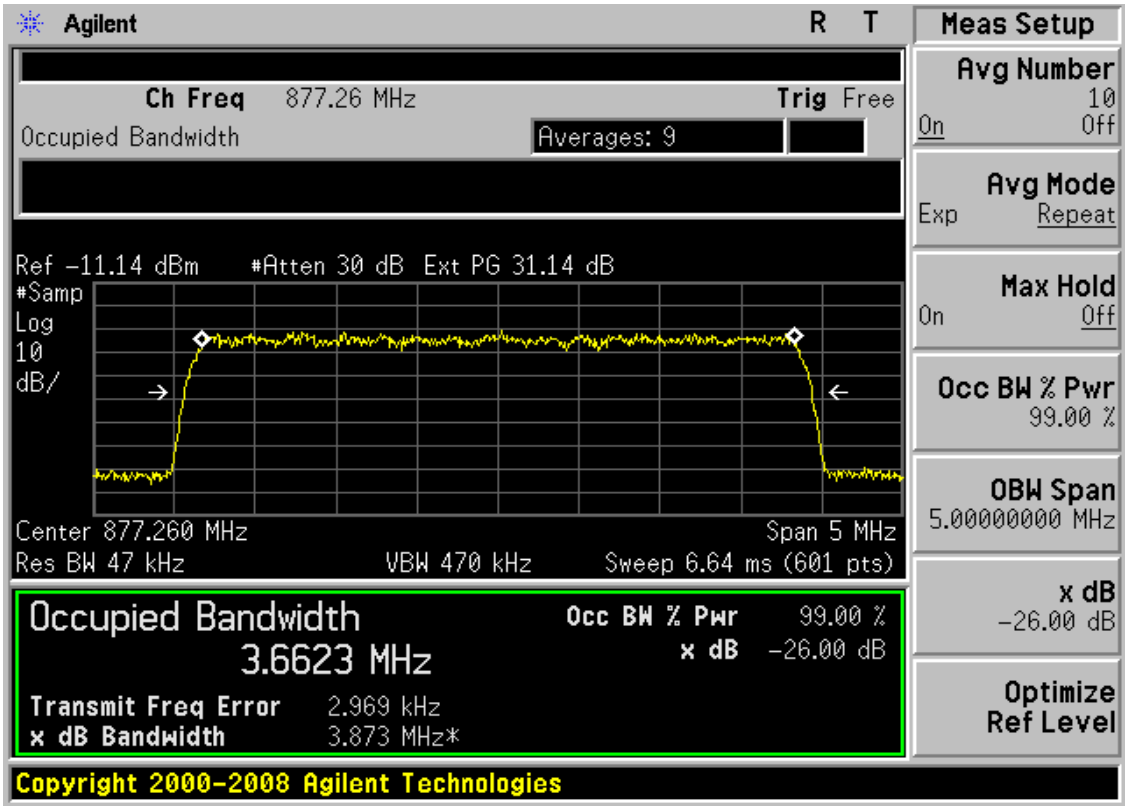


Figure 9: Occupied Bandwidth - 3 Carriers Channels 201, 242, 283 (A) IS856 16QAM

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 22.917 Limit

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

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100kHz 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. A narrow resolution bandwidth is permitted in all cases to improve measure accuracy provided the measured power is integrated over the full required measurement bandwidth. 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.

4.4.2 Test Method

The BTS digital enclosure was configured via the BTS controller to enable the MFRM3 CR to transmit at maximum power. Measurements were made on IS-97 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), 50kHz (3 carriers)
Video Bandwidth:	100kHz (1 carrier), 100kHz (2 carriers), 200kHz (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.

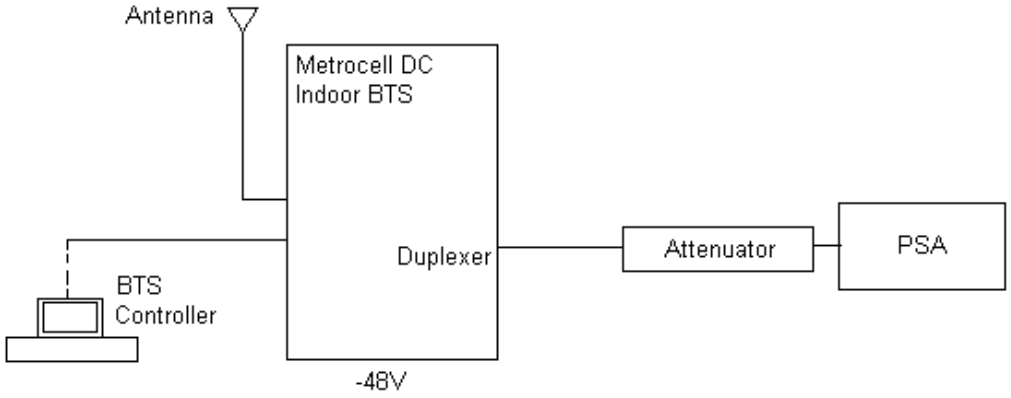


Figure 10: Test Setup for Spurious Emissions Measurement

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 11 shows the spurious emissions at the antenna port of the Metrocell BTS 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 800 MHz Antenna Port IS95

Frequency(MHz)	Spurious Emissions Level(dBm)			Margin to FCC Limit of -13 dBm (dB/1MHz)		
	A"A Band					
	1 Carrier (30kHz)	2 Carrier (30kHz)	3 Carrier (50kHz)	1 carrier	2 carrier	3 carrier
50MHz-850MHz	-32.212	-31.767	-32.686	19.212	18.767	19.686
850MHz-868MHz	-37.818	-26.395	-26.828	24.818	13.395	13.828
868MHz-869MHz	-22.326	-28.204	-23.743	9.326	15.204	10.743
880MHz-881MHz	-32.398	-26.784	-25.196	19.398	13.784	12.196
881MHz-890MHz	-40.058	-31.213	-32.304	27.058	18.213	19.304
890MHz-1GHz	-29.142	-28.797	-28.243	16.142	15.797	15.243
1GHz-5GHz	-27.512	-27.545	-27.634	14.512	14.545	14.634
5GHz-10GHz	-26.796	-27.062	-26.893	13.796	14.062	13.893
10GHz-15GHz	-23.704	-23.827	-23.81	10.704	10.827	10.81
15GHz-20GHz	-24.275	-24.159	-24.233	11.275	11.159	11.233
	A' B B'Band					
50MHz-850MHz	-28.563	-28.729	-29.618	15.563	15.729	16.618
850MHz-868MHz	-36.522	-33.717	-36.605	23.522	20.717	23.605
868MHz-869MHz	-29.518	-29.231	-27.133	16.518	16.231	14.133
880MHz-881MHz	-22.251	-26.403	-26.604	9.251	13.403	13.604
881MHz-890MHz	-33.796	-32.839	-31.465	20.796	19.839	18.465
890MHz-1GHz	-31.252	-29.207	-29.635	18.252	16.207	16.635
1GHz-5GHz	-27.575	-27.756	-27.493	14.575	14.756	14.493
5GHz-10GHz	-27.883	-27.101	-26.945	14.883	14.101	13.945
10GHz-15GHz	-23.694	-23.882	-23.822	10.694	10.882	10.822
15GHz-20GHz	-24.423	-24.351	-24.137	11.423	11.351	11.137

Table 18: Spurious Emissions at the Metrocell BTS 800 MHz Antenna Port IS856 16QAM

Frequency(MHz)	Spurious Emissions Level(dBm)			Margin to FCC Limit of -13 dBm (dB/1MHz)		
	A"A Band					
	1 Carrier (30kHz)	2 Carrier (30kHz)	3 Carrier (50kHz)	1 carrier	2 carrier	3 carrier
50MHz-850MHz	-34.521	-34.665	-34.672	21.521	21.665	21.672
850MHz-868MHz	-42.943	-34.414	-35.731	29.943	21.414	22.731
868MHz-869MHz	-34.891	-27.831	-31.603	21.891	14.831	18.603
880MHz-881MHz	-38.173	-31.404	-32.688	25.173	18.404	19.688
881MHz-890MHz	-45.013	-36.922	-37.662	32.013	23.922	24.662
890MHz-1GHz	-31.634	-29.689	-32.345	18.634	16.689	19.345
1GHz-5GHz	-30.256	-29.9	-29.397	17.256	16.9	16.397
5GHz-10GHz	-28.727	-29.025	-28.035	15.727	16.025	15.035
10GHz-15GHz	-25.098	-25.13	-25.015	12.098	12.13	12.015
15GHz-20GHz	-25.141	-23.607	-24.312	12.141	10.607	11.312
	A' B B'Band					
50MHz-850MHz	-33.156	-31.923	-31.71	20.156	18.923	18.71
850MHz-868MHz	-44.825	-35.257	-39.465	31.825	22.257	26.465
868MHz-869MHz	-39.099	-32.379	-35.1	26.099	19.379	22.1
880MHz-881MHz	-37.657	-33.287	-34.858	24.657	20.287	21.858
881MHz-890MHz	-42.756	-47.562	-34.709	29.756	34.562	21.709

890MHz-1GHz	-35.01	-32.622	-33.031	22.01	19.622	20.031
1GHz-5GHz	-29.789	-29.805	-28.941	16.789	16.805	15.941
5GHz-10GHz	-28.312	-27.821	-27.754	15.312	14.821	14.754
10GHz-15GHz	-24.511	-24.636	-24.604	11.511	11.636	11.604
15GHz-20GHz	-24.334	-23.678	-23.674	11.334	10.678	10.674

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

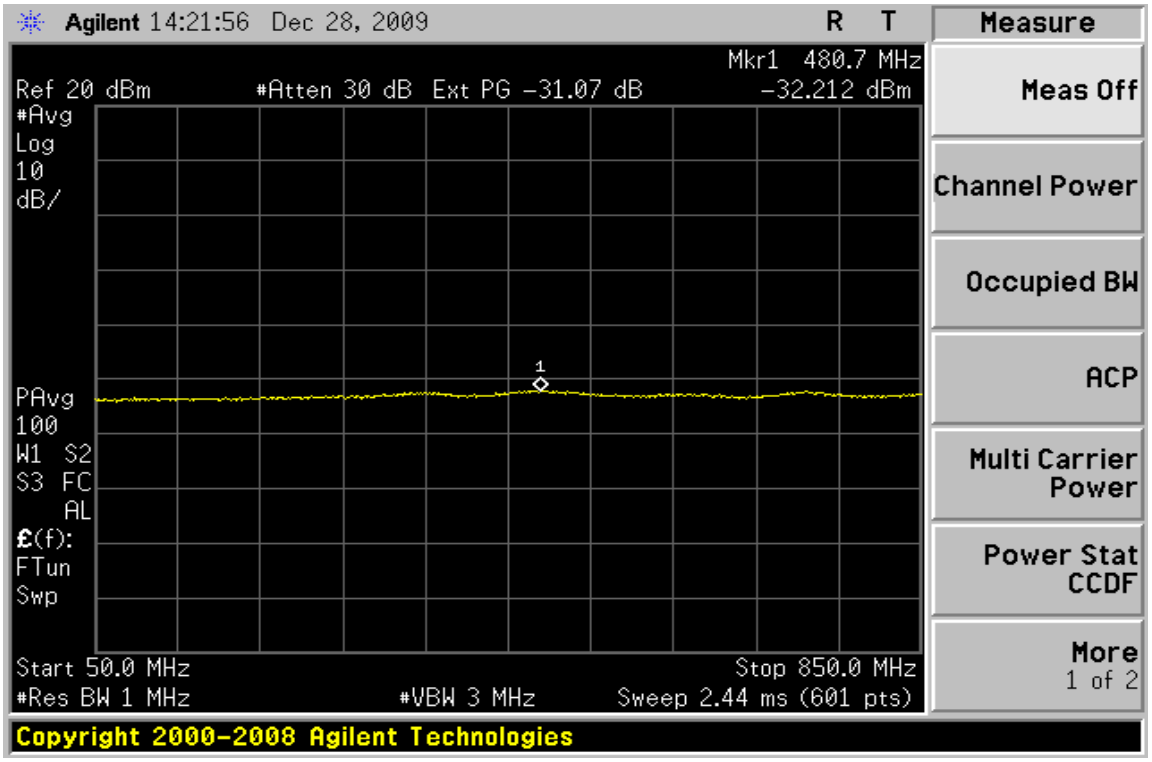


Figure 11: Conducted Spurious Emissions - 1 Carrier, Channel 1019, 50MHz-850MHz IS95

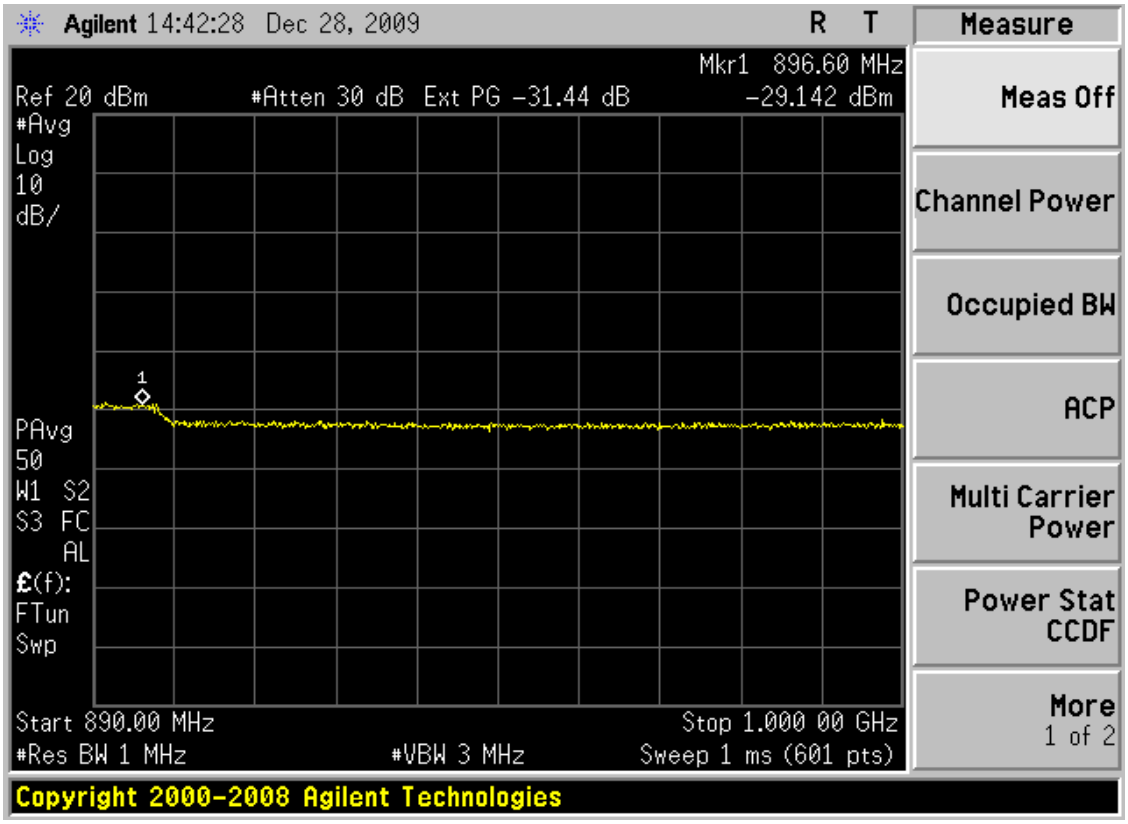


Figure 12: Conducted Spurious Emissions - 1 Carrier, Channel 283, 890MHz-1GHz IS95

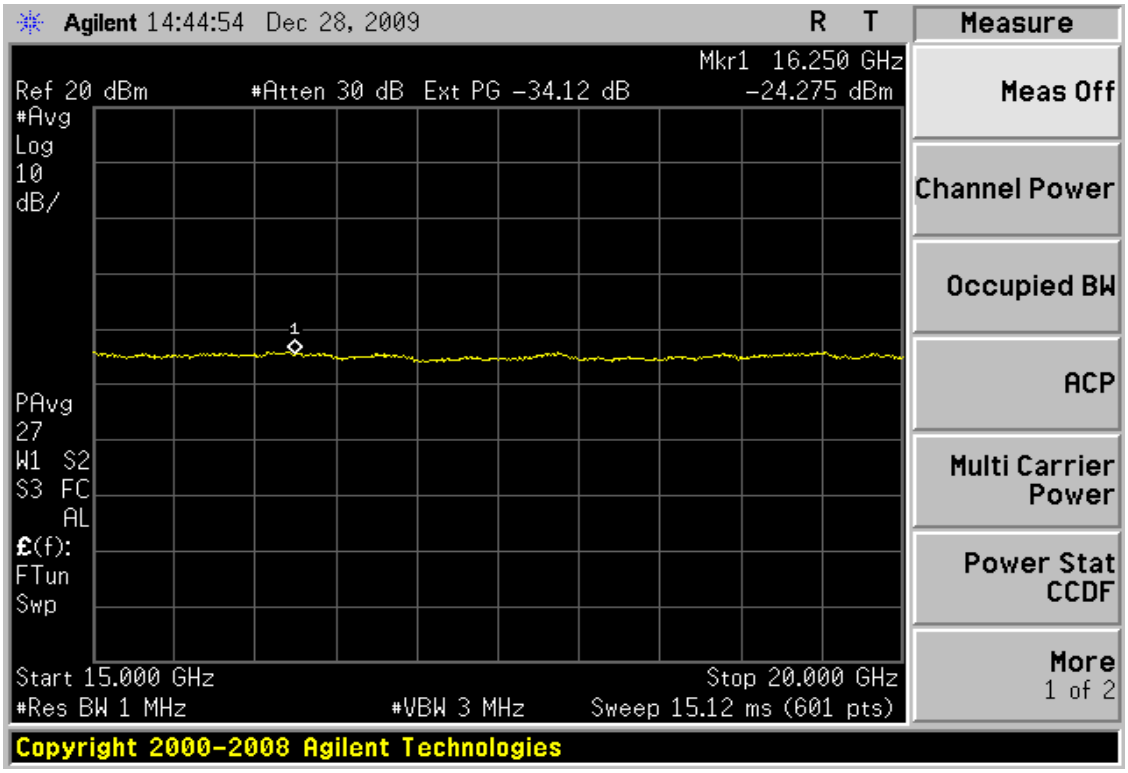


Figure 13: Conducted Spurious Emissions - 1 Carrier, Channel 283, 15GHz-20GHz IS95

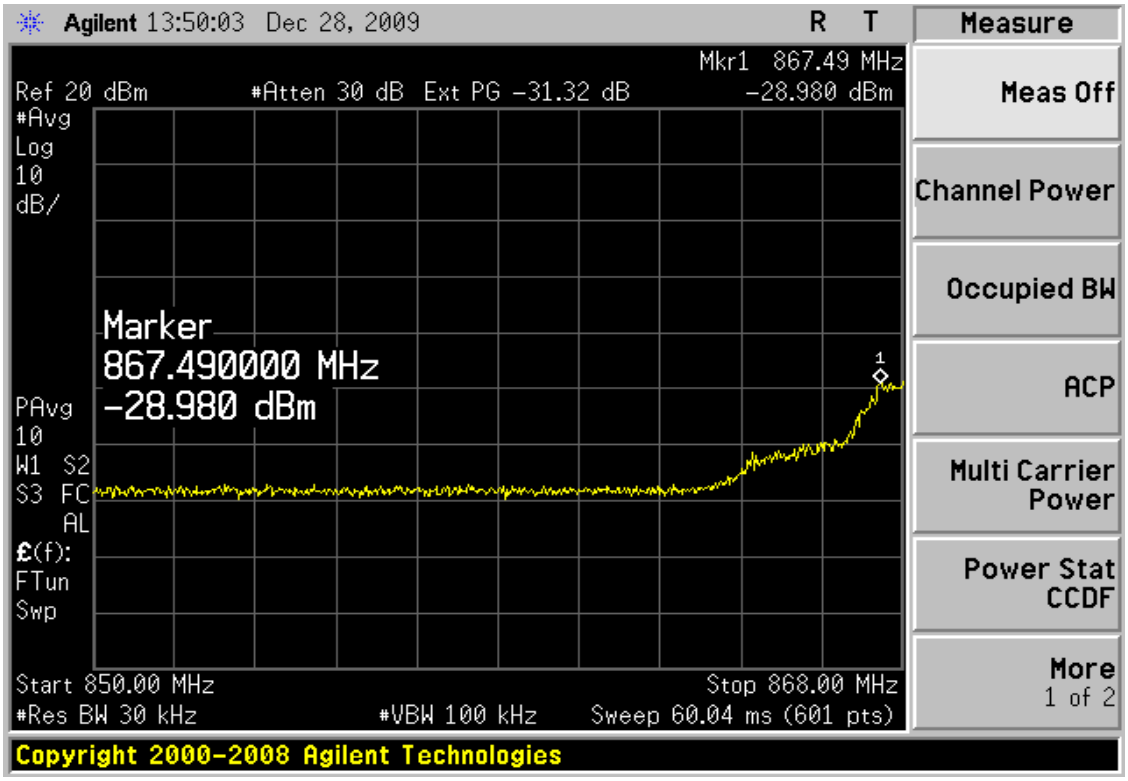


Figure 14: Conducted Spurious Emissions - 2 Carriers, Channel 1019 37, 850MHz-868MHz IS95

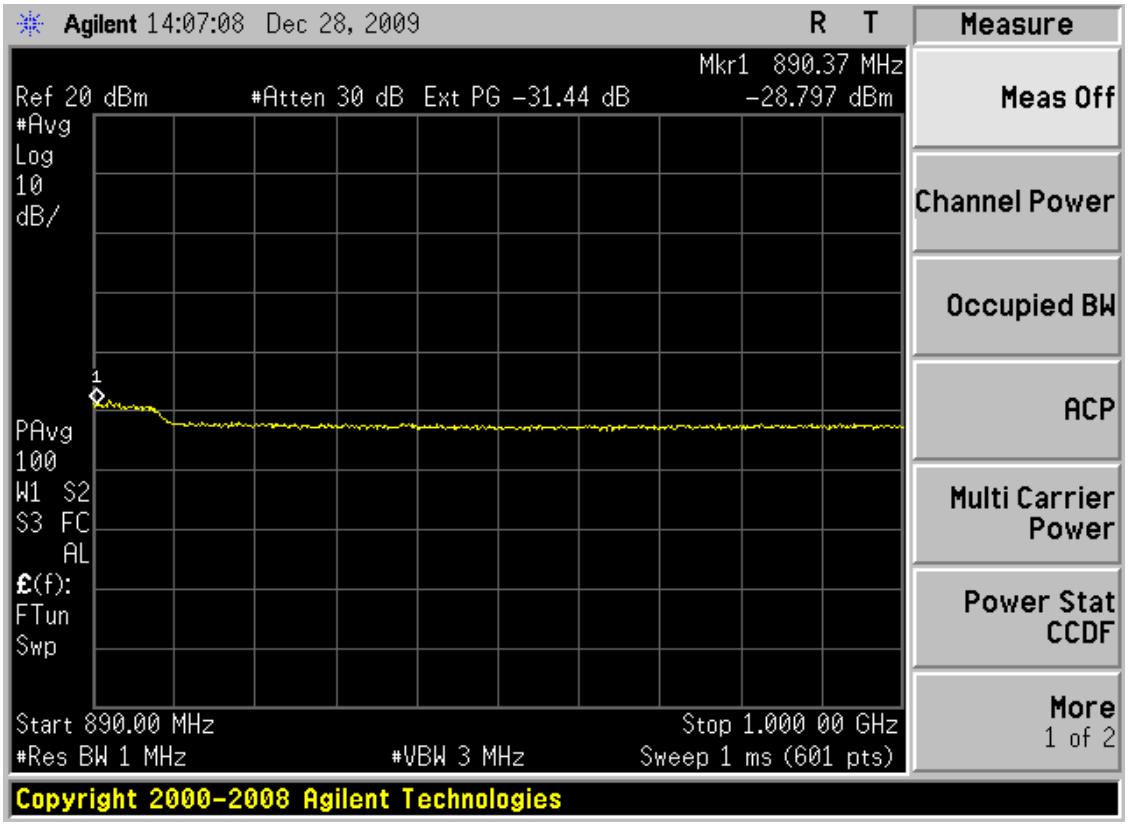


Figure 15: Conducted Spurious Emissions - 2 Carriers, Channel 242 283, 890MHz-1GHz IS95

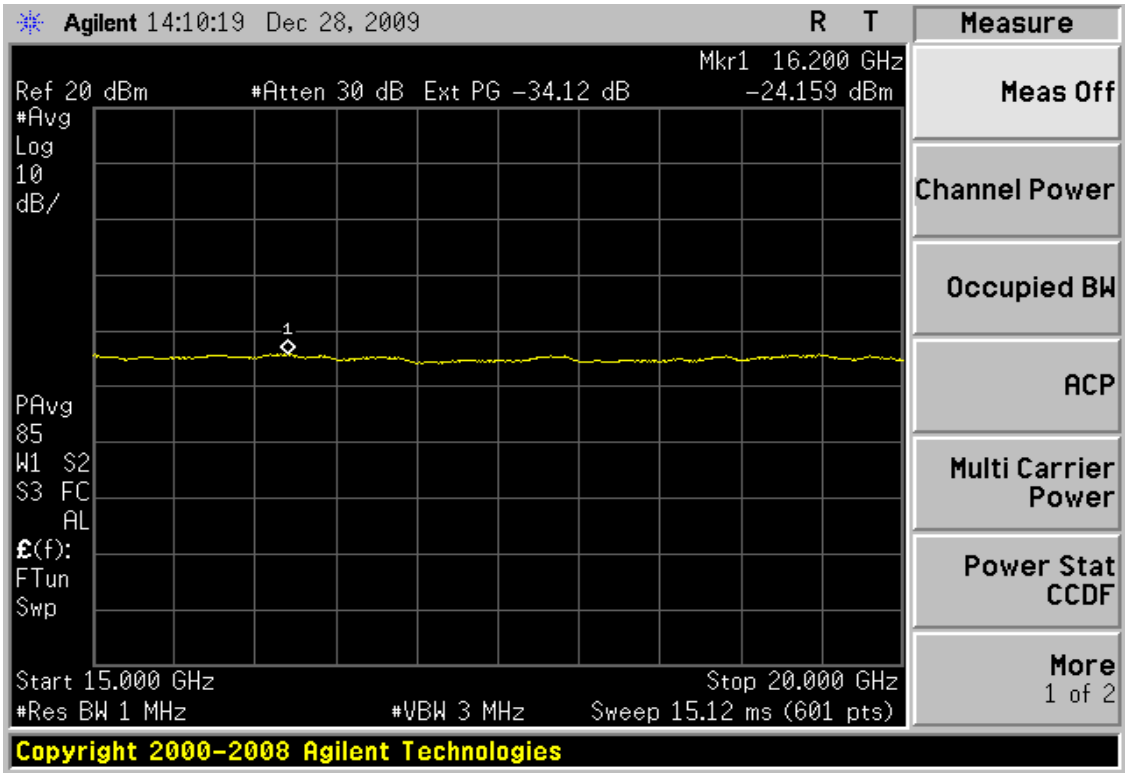


Figure 16: Conducted Spurious Emissions - 2 Carriers, Channel 242 283, 15GHz-20GHz IS95

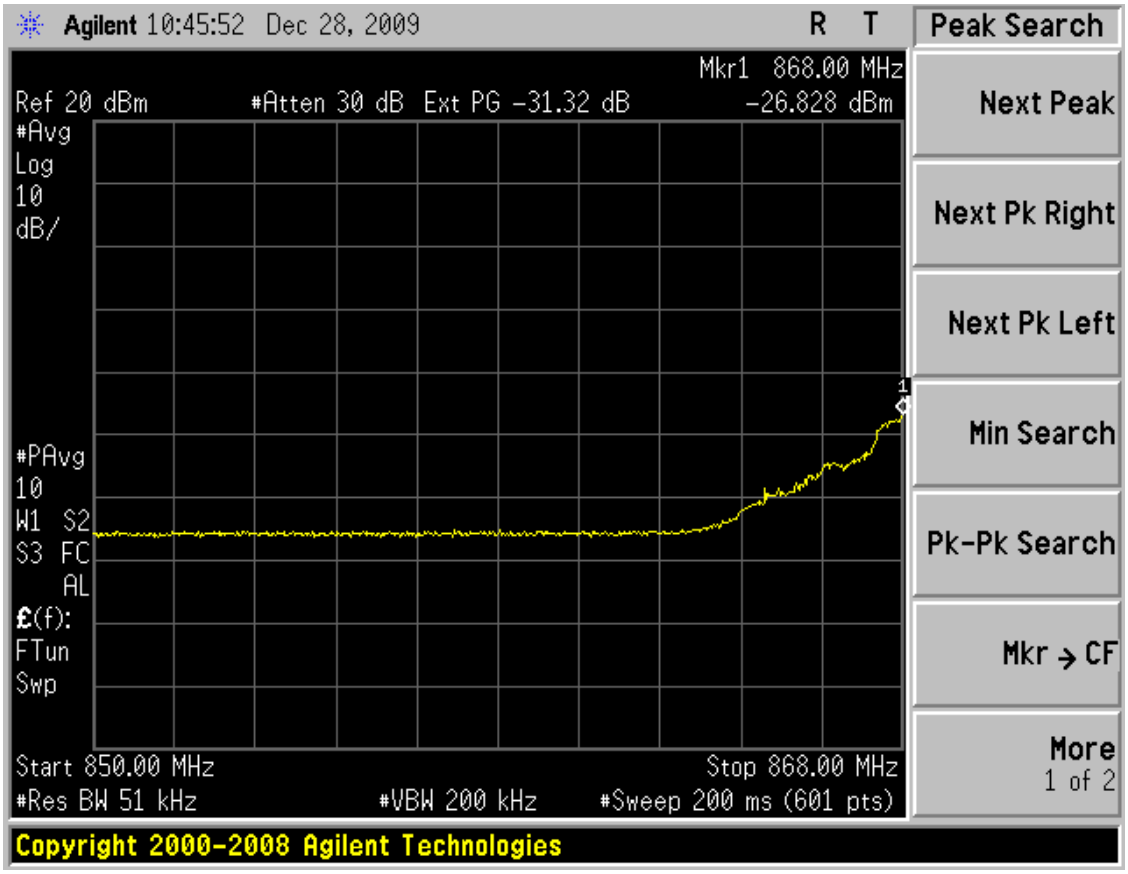


Figure 17: Conducted Spurious Emissions - 3 Carriers, Channel 1019 37 78, 850MHz-868MHz IS95

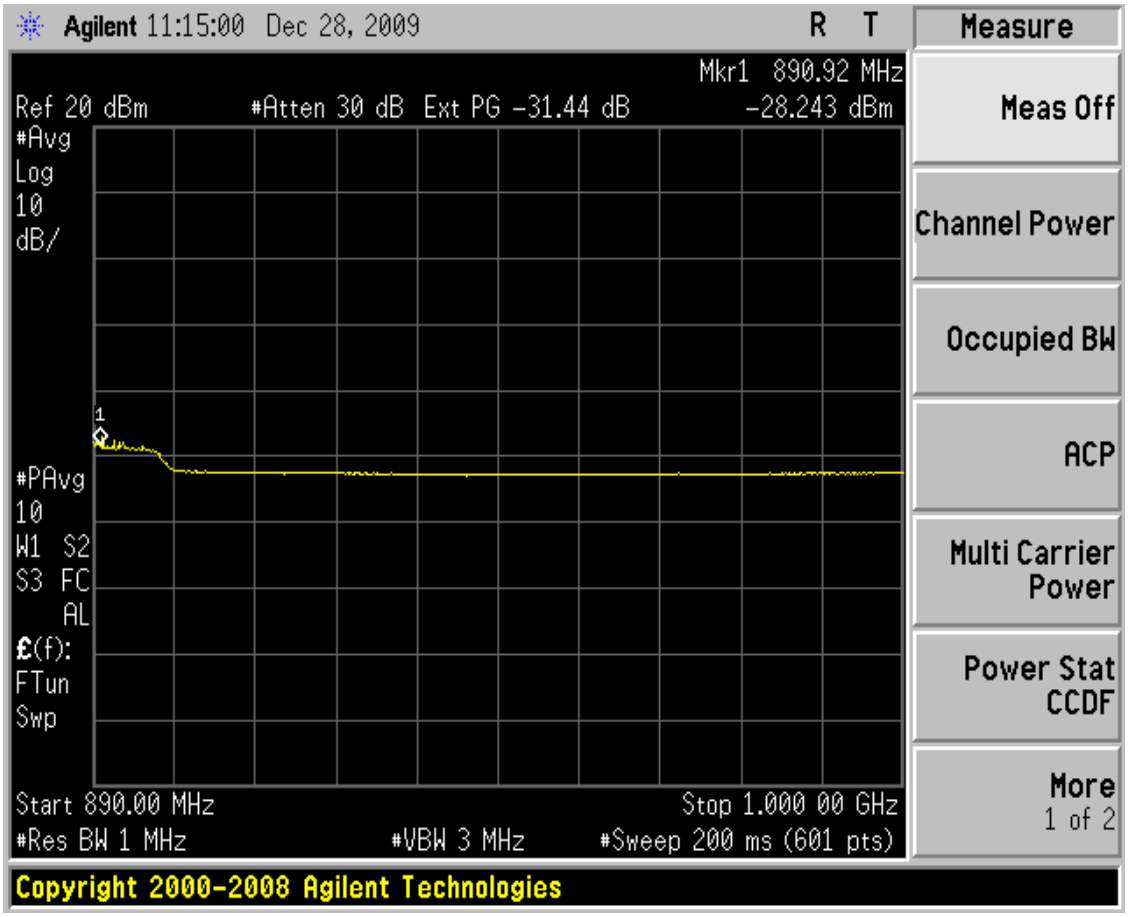


Figure 18: Conducted Spurious Emissions-3 Carriers, Channel 201 242 283, 890MHz-1GHz IS95

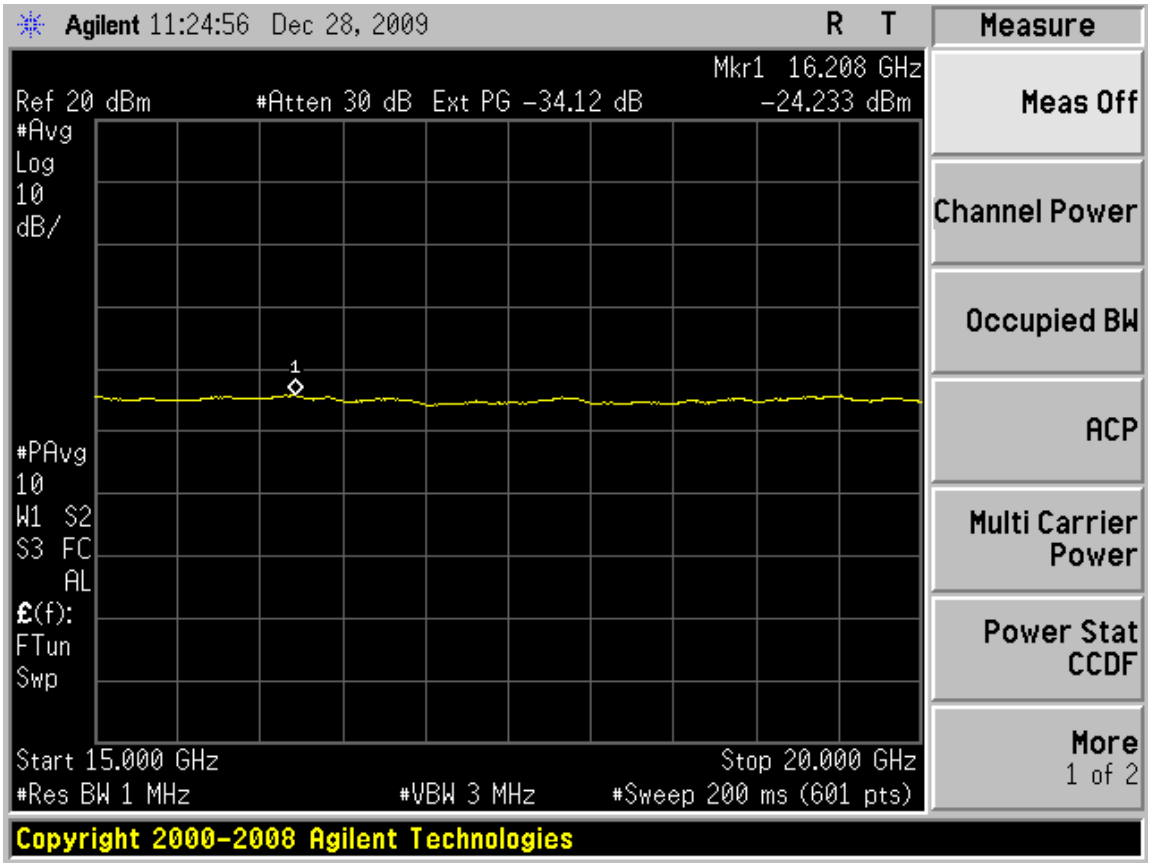


Figure 19: Conducted Spurious Emissions - 3 Carriers, Channel 201 242 283, 15GHz-20GHz IS95

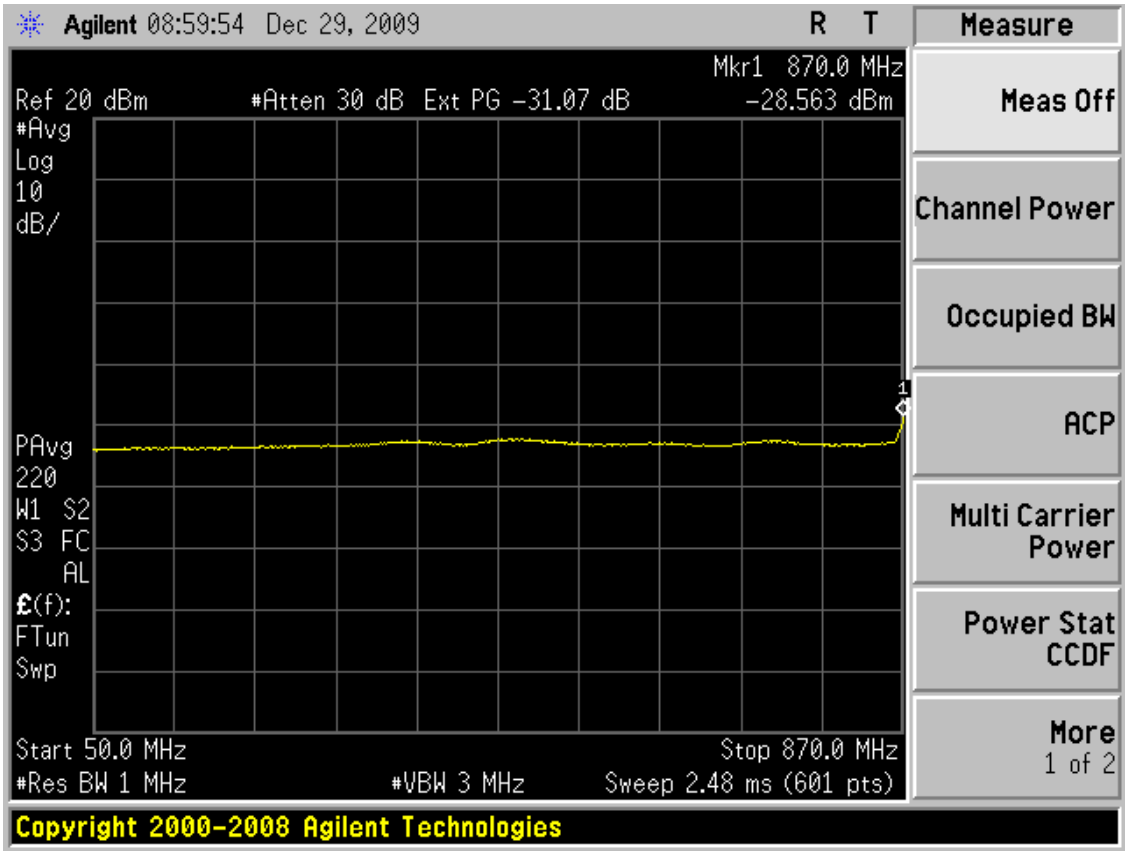


Figure 20: Conducted Spurious Emissions - 1 Carrier, Channel 384, 50MHz-870MHz IS95

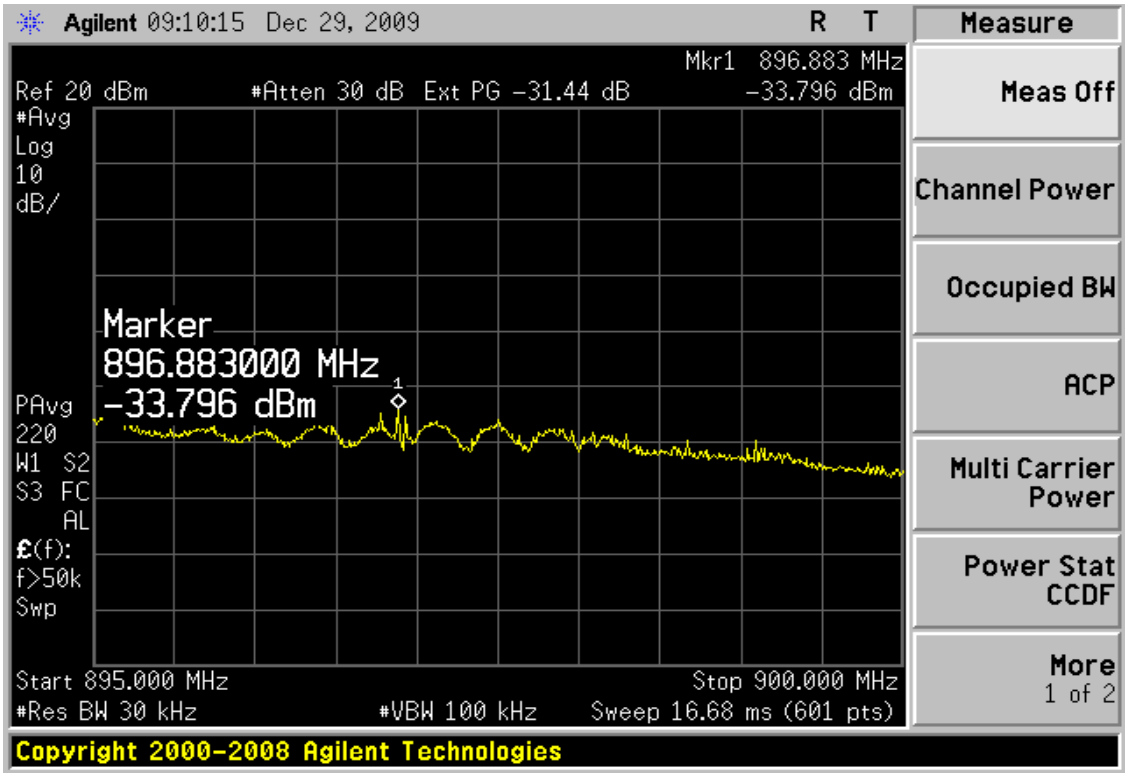


Figure 21: Conducted Spurious Emissions - 1 Carrier, Channel 758, 895MHz-900MHz IS95

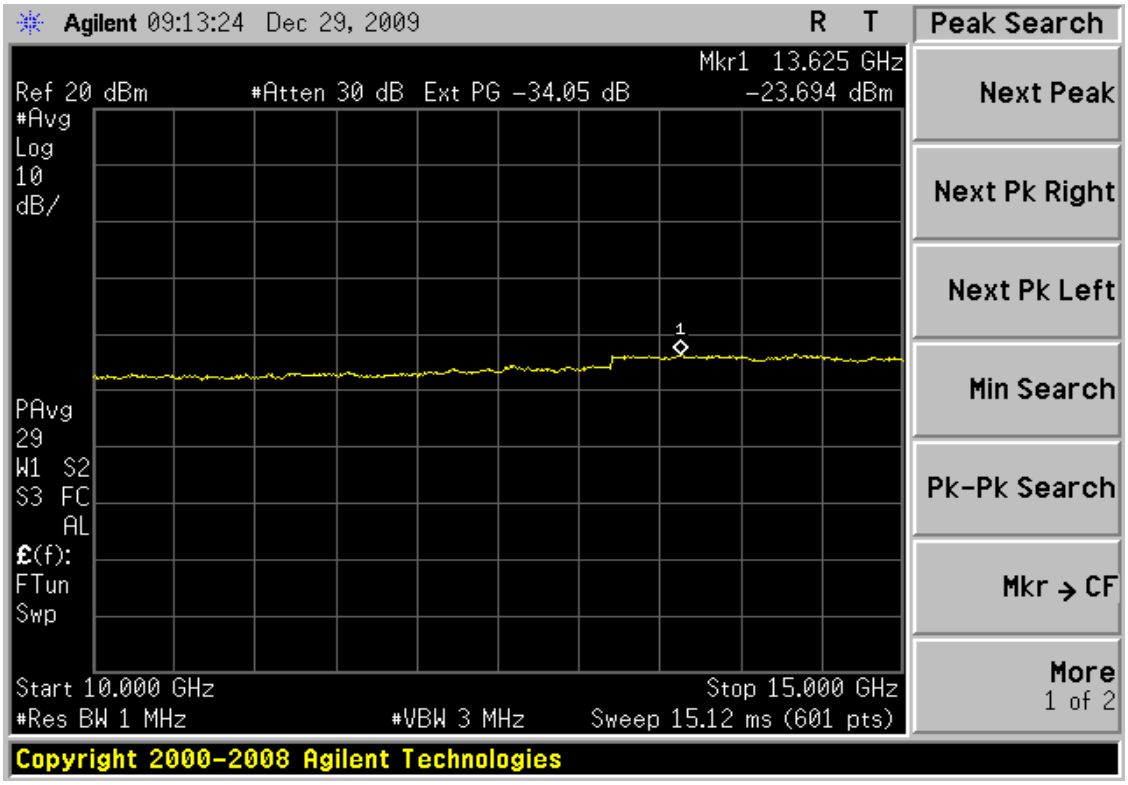


Figure 22: Conducted Spurious Emissions - 1 Carrier, Channel 758, 10GHz-15GHz IS95

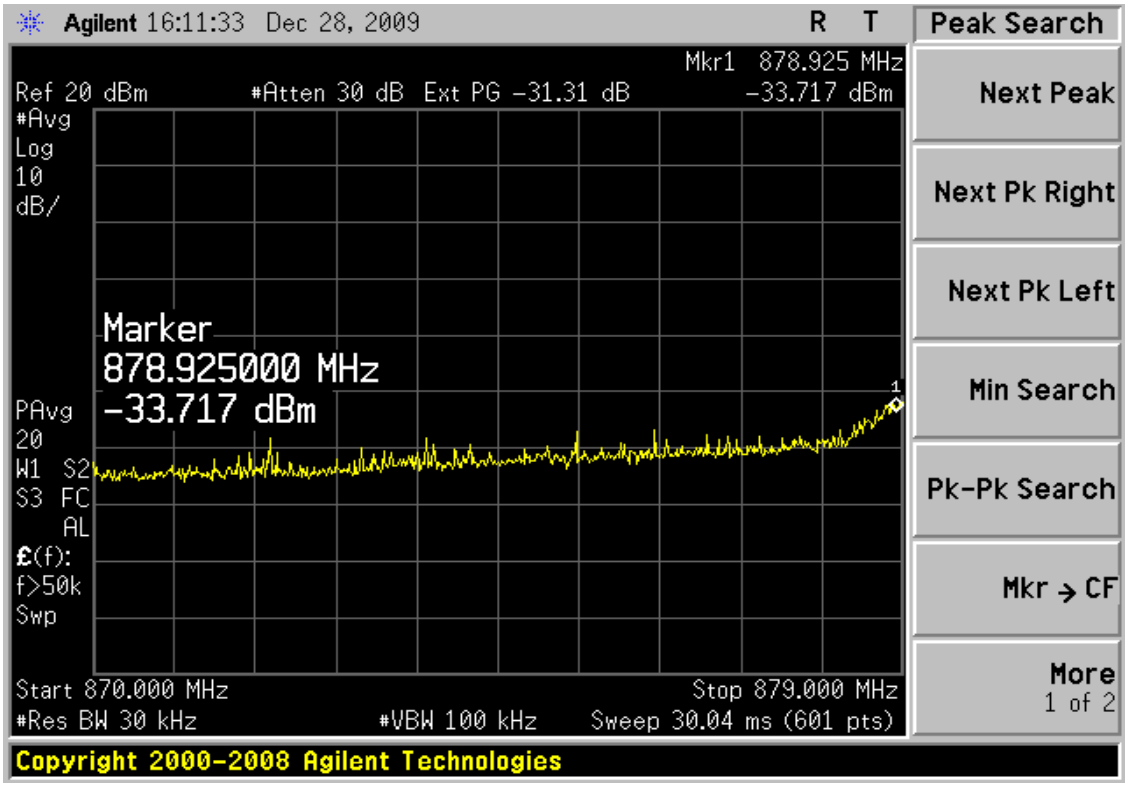


Figure 23: Conducted Spurious Emissions - 2 Carriers, Channels 384 425, 870MHz-879MHz IS95

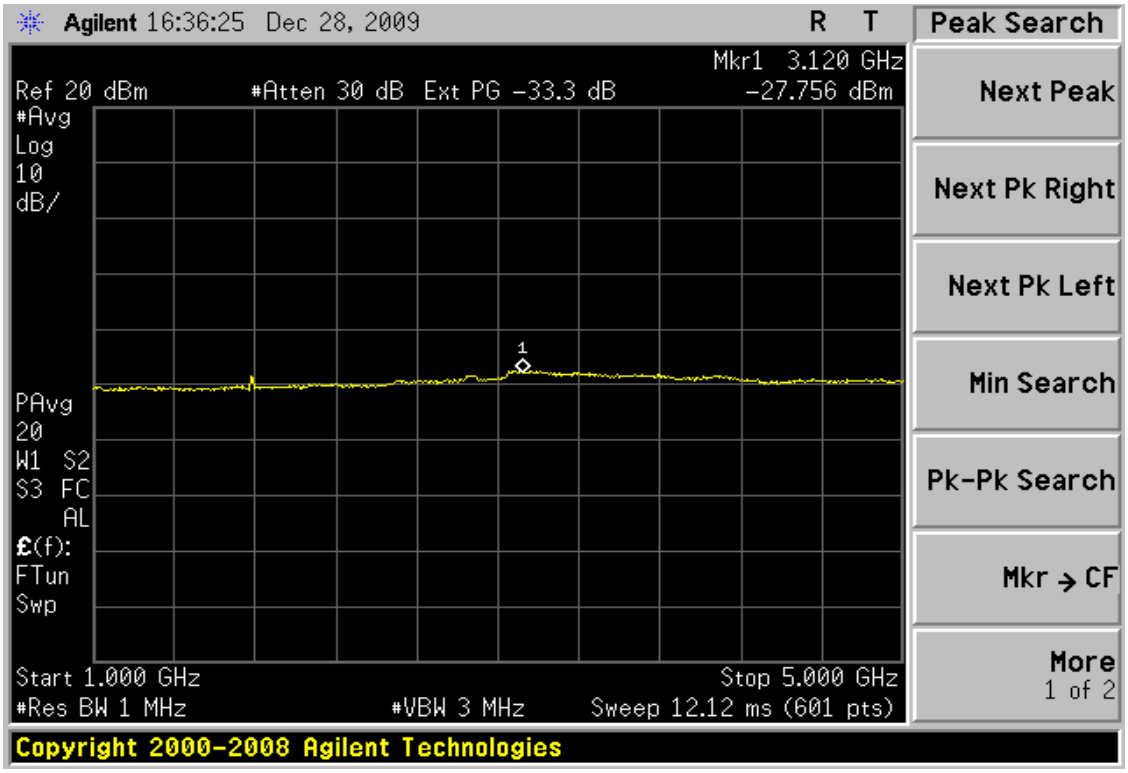


Figure 24: Conducted Spurious Emissions - 2 Carriers, Channel 692 758, 1GHz-5GHz IS95

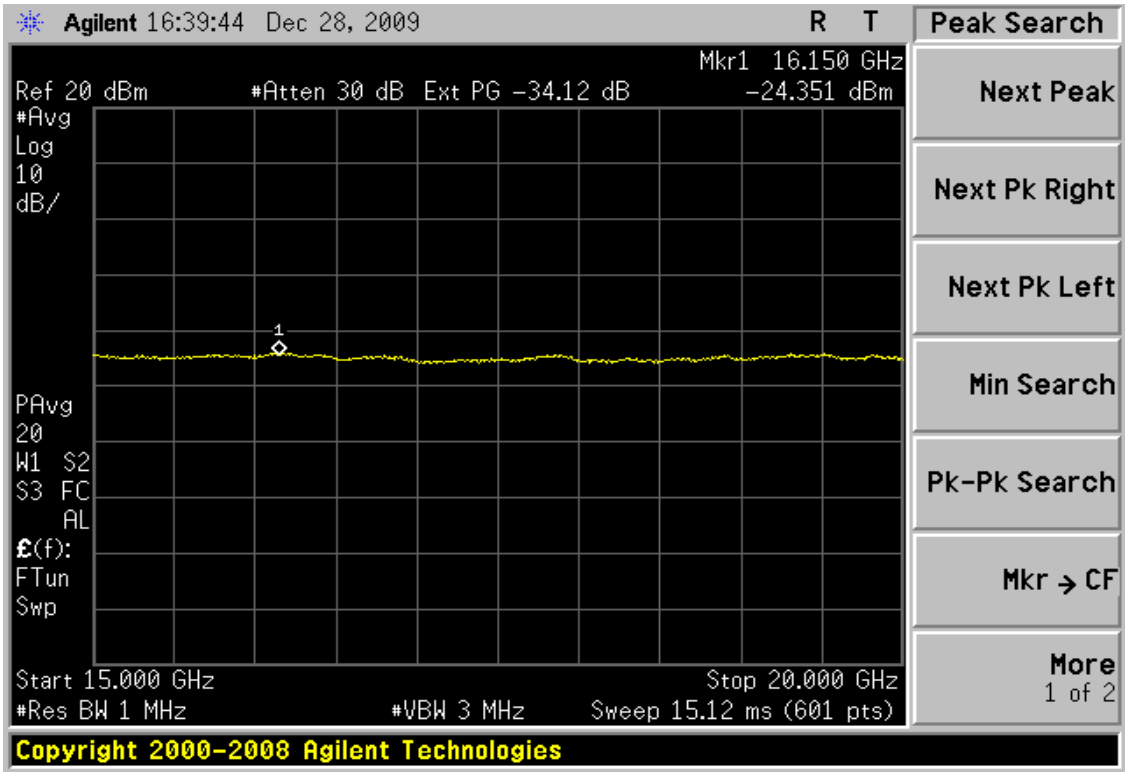


Figure 25: Conducted Spurious Emissions - 2 Carriers, Channels 692 758, 15GHz-20GHz IS95

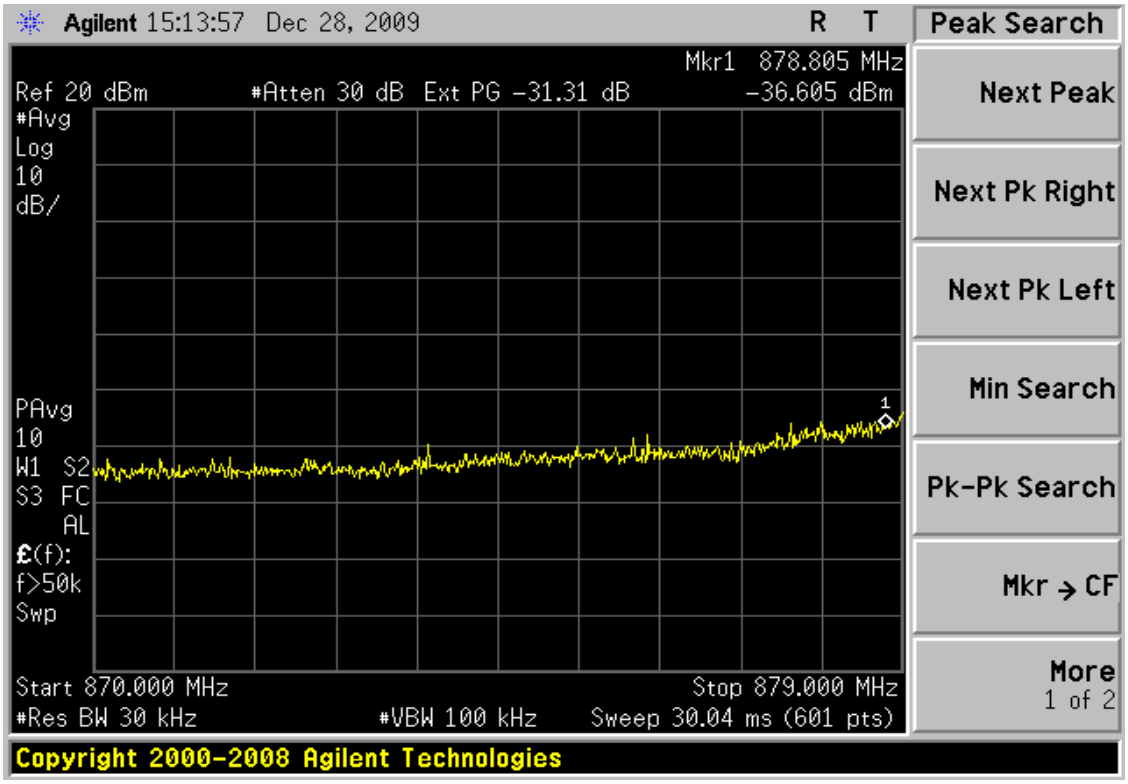


Figure 26: Conducted Spurious Emissions - 3 Carriers, Channels 384 425 466, 870MHz-879MHz IS95

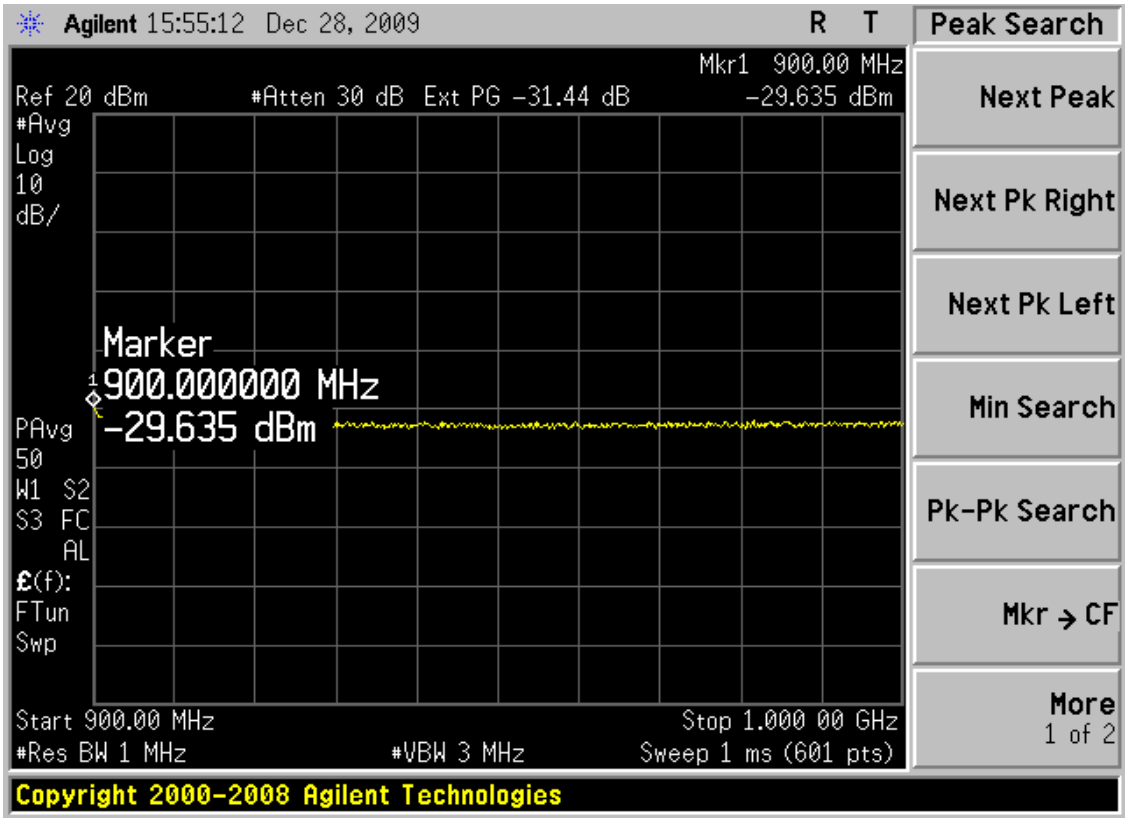


Figure 27: Conducted Spurious Emissions - 3 Carriers, Channels 630 692 758, 900MHz-1GHz IS95

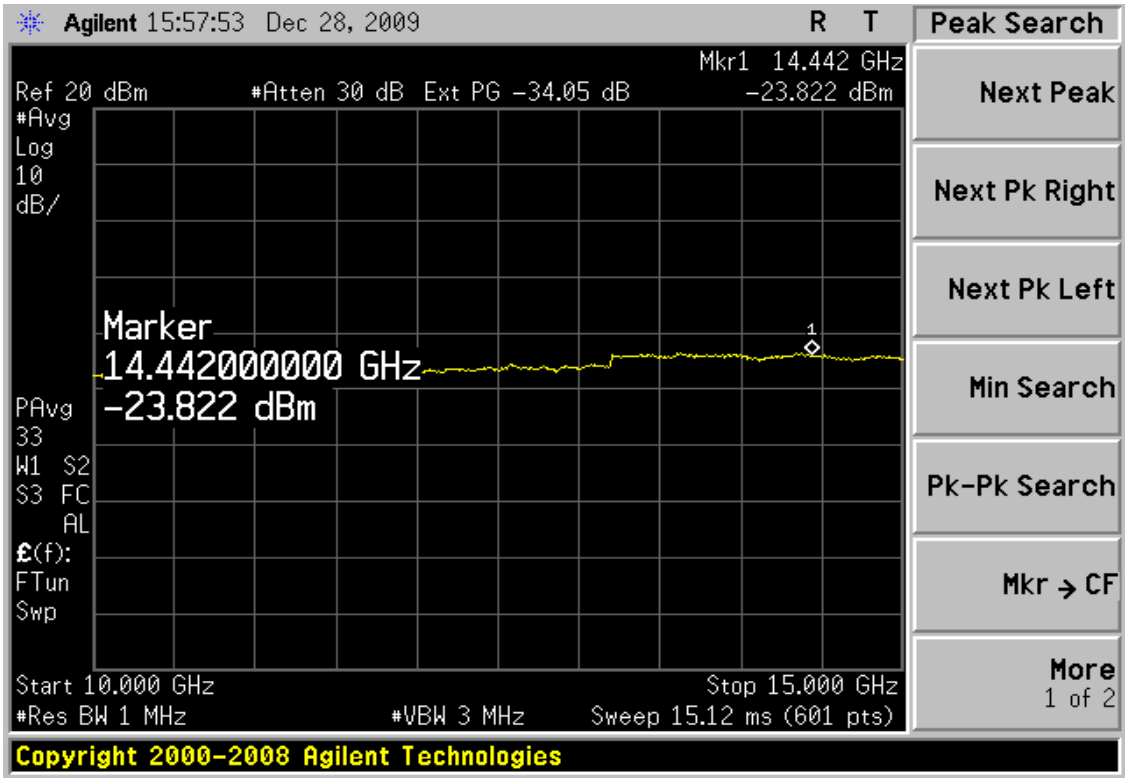


Figure 28: Conducted Spurious Emissions - 3 Carriers, Channels 630 692 758, 10GHz-15GHz IS95

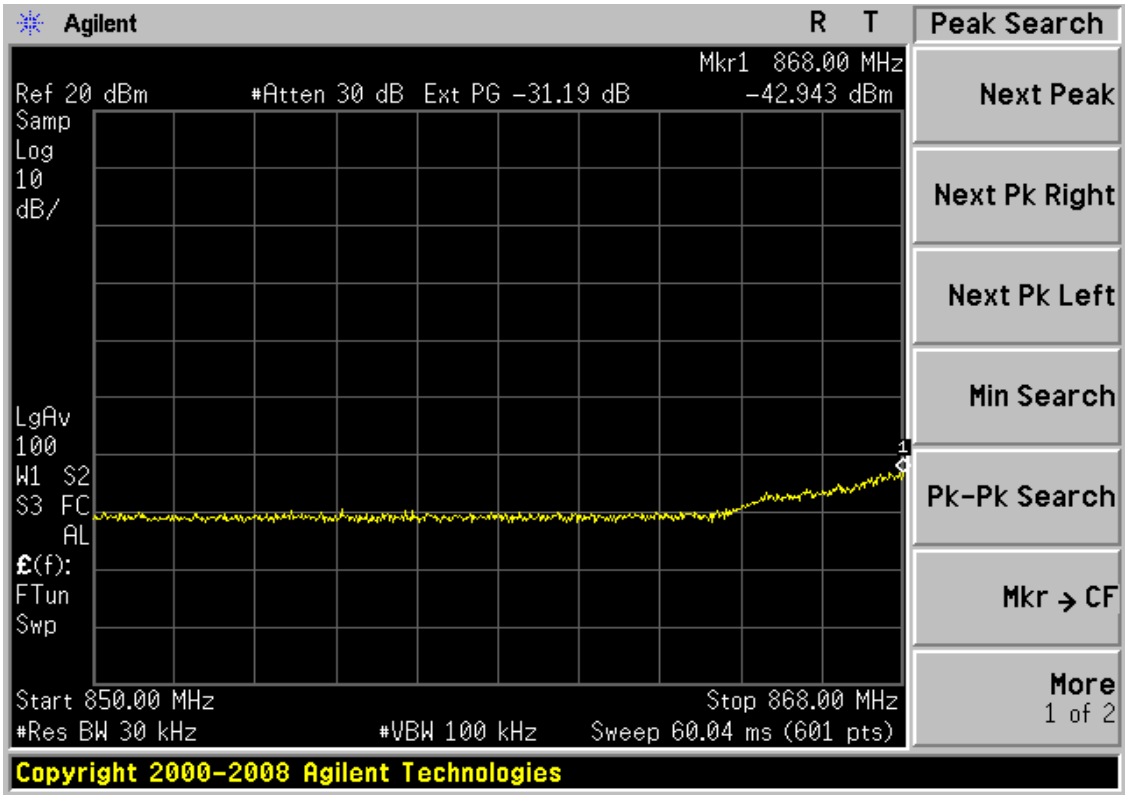


Figure 29: Conducted Spurious Emissions - 1 Carriers, Channels 1019, 850MHz-868MHz IS856 16QAM

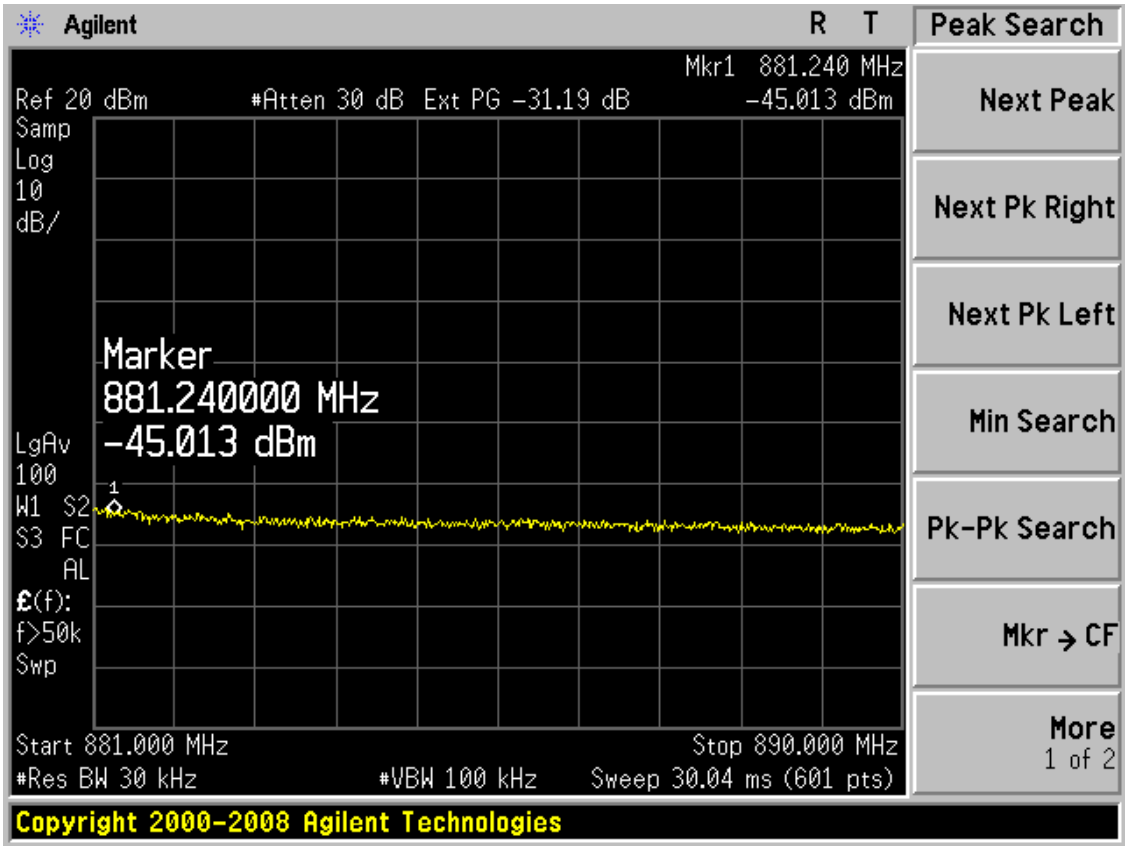


Figure 30: Conducted Spurious Emissions - 1 Carriers, Channels 283, 881MHz-890MHz IS856 16QAM

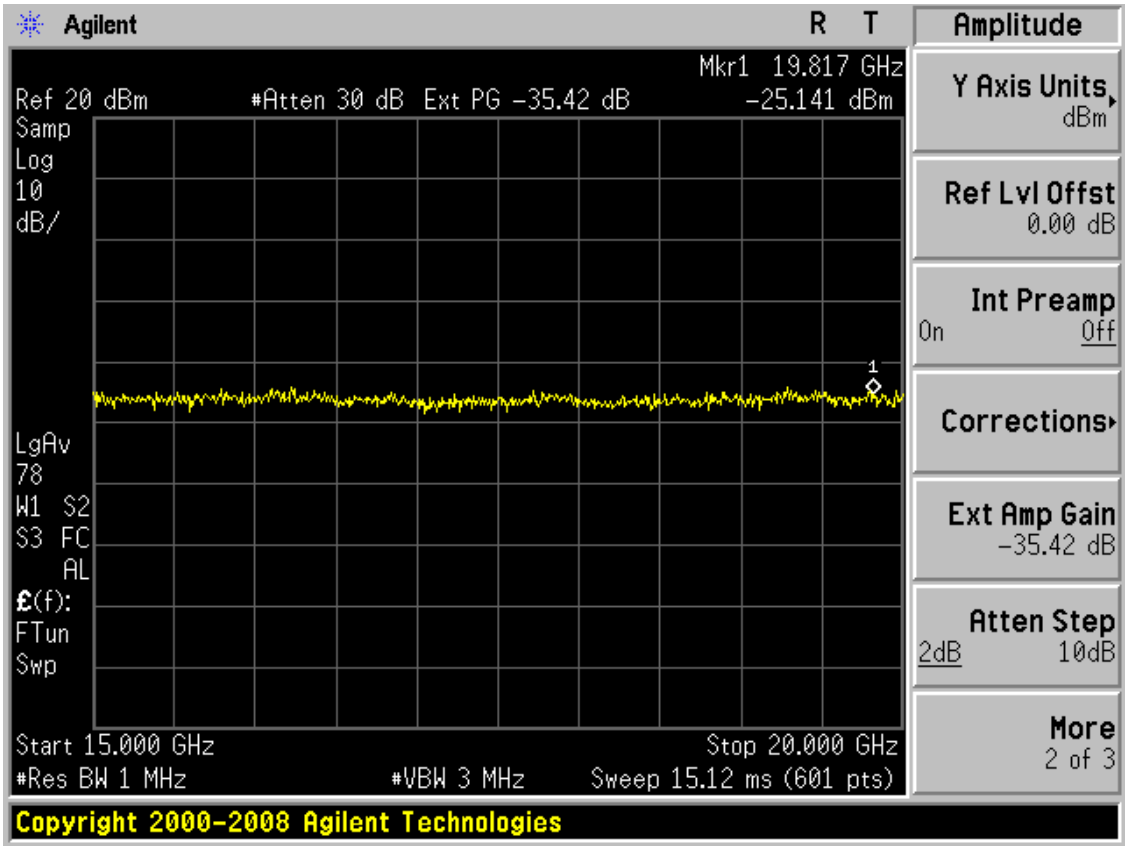


Figure 31: Conducted Spurious Emissions - 1 Carriers, Channels 283, 15GHz-20GHz IS856 16QAM

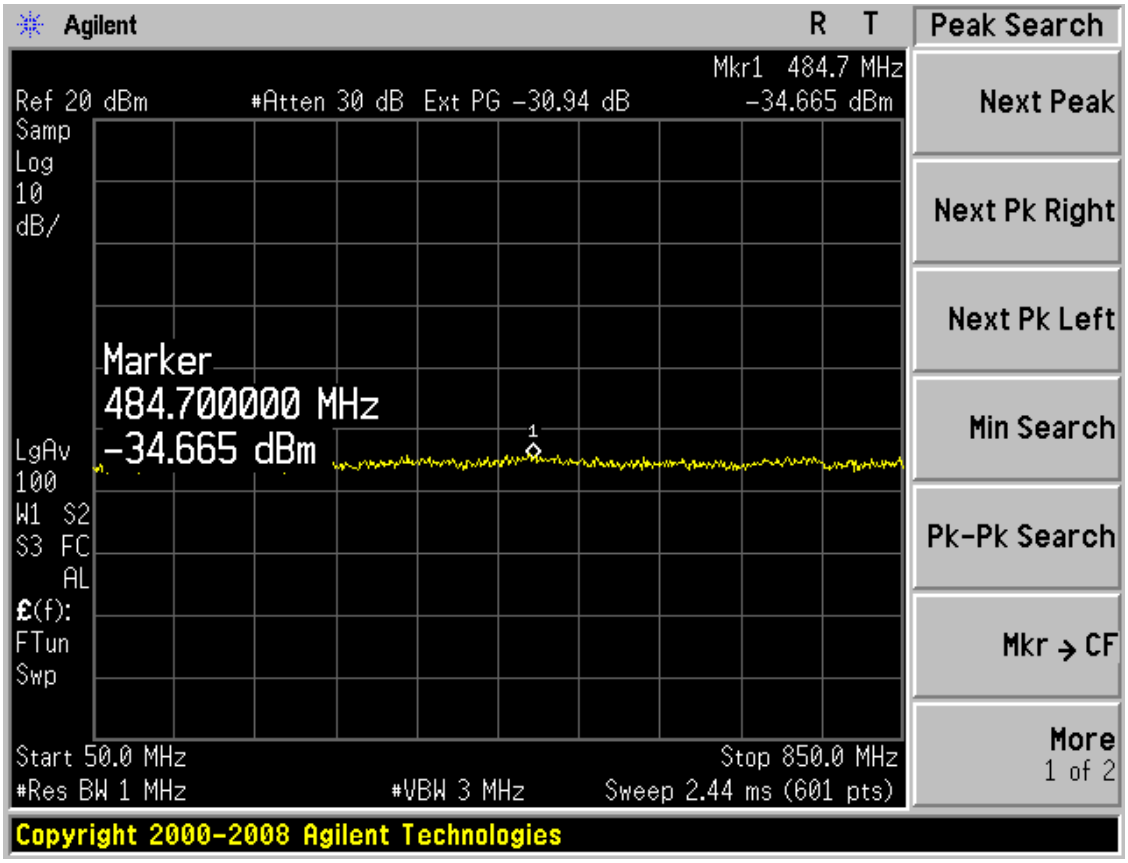


Figure 32: Conducted Spurious Emissions - 2 Carriers, Channels 1019, 37, 50MHz-850Hz IS856 16QAM

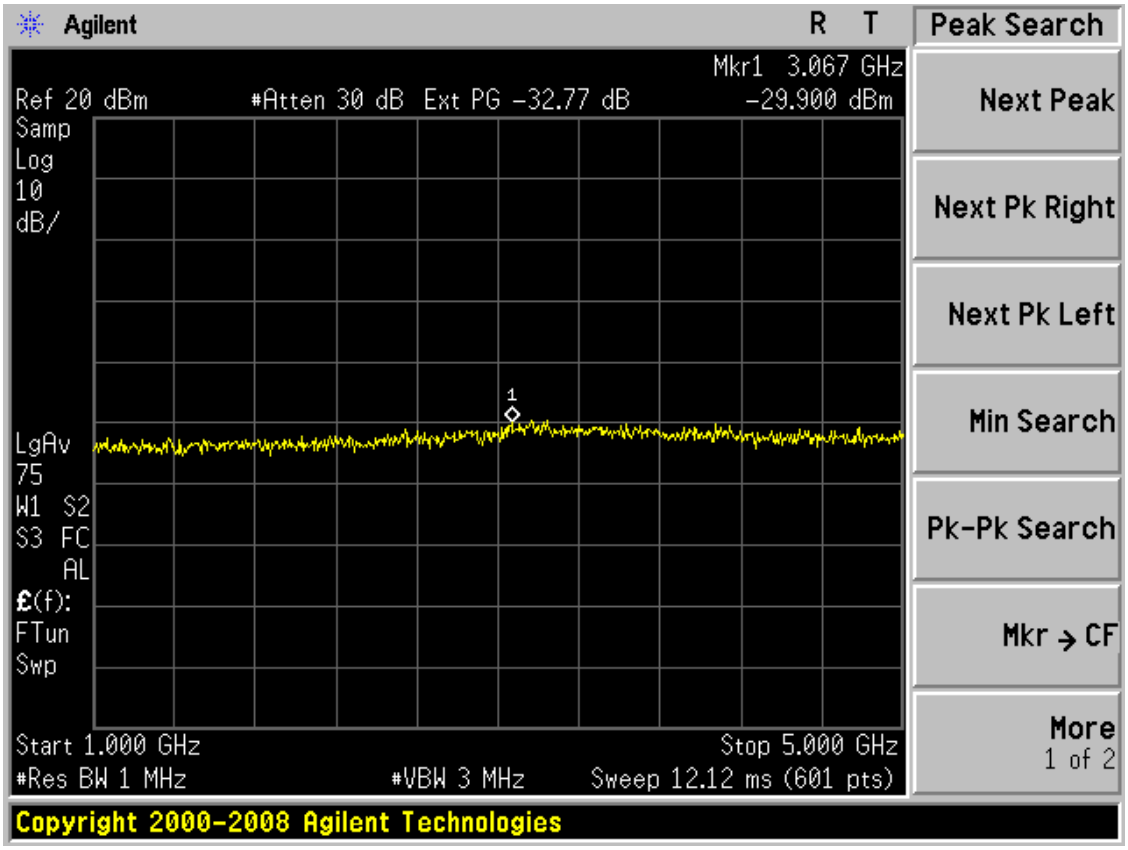


Figure 33: Conducted Spurious Emissions - 2 Carriers, Channels 242, 283, 1GHz-5GHz IS856 16QAM

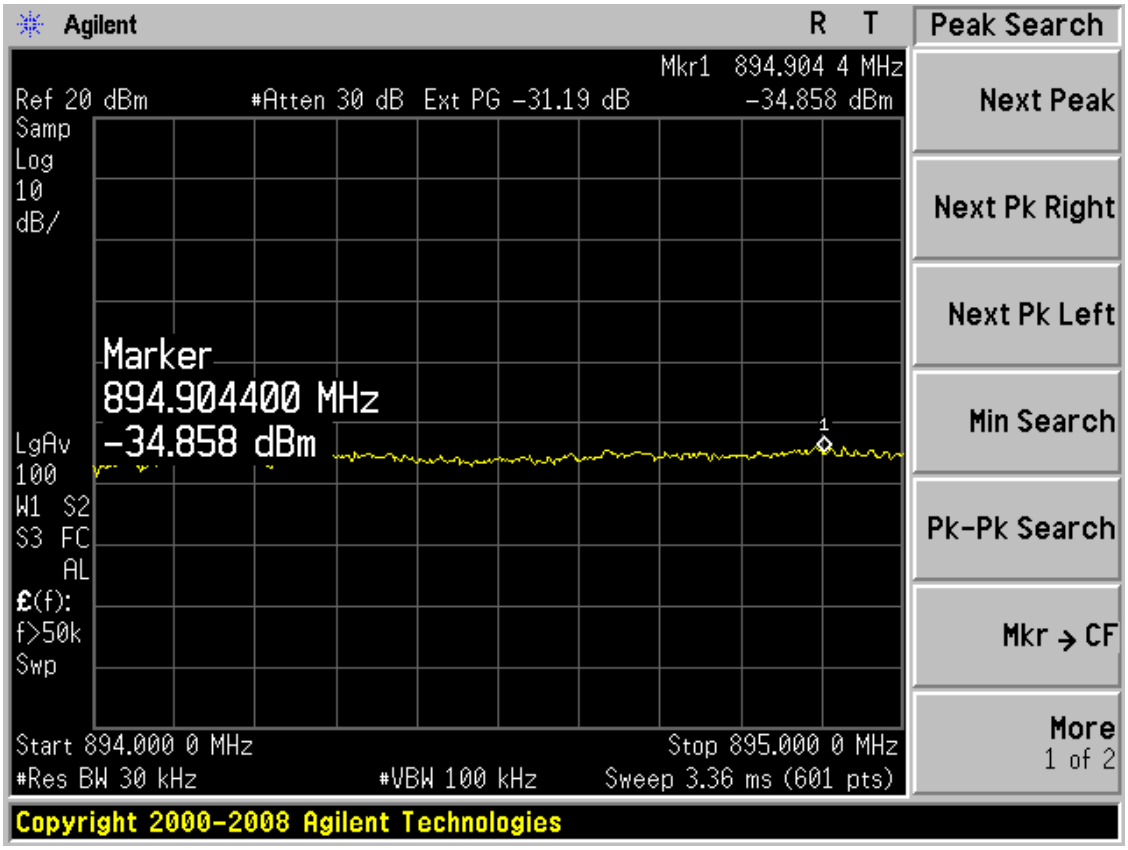


Figure 34: Conducted Spurious Emissions - 3 Carriers, Channels 630, 692, 758, 894MHz-895MHz IS856 16QAM

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.)

RSS-129

800MHz Dual-Mode CDMA Cellular Telephones, Industry Canada, RSS-129, Issue 2, Revision 1, September 25, 1999

FCC Part 22.355 Limit

Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

4.5.2 Test Procedure

The test equipment was configured as shown in figure 35.

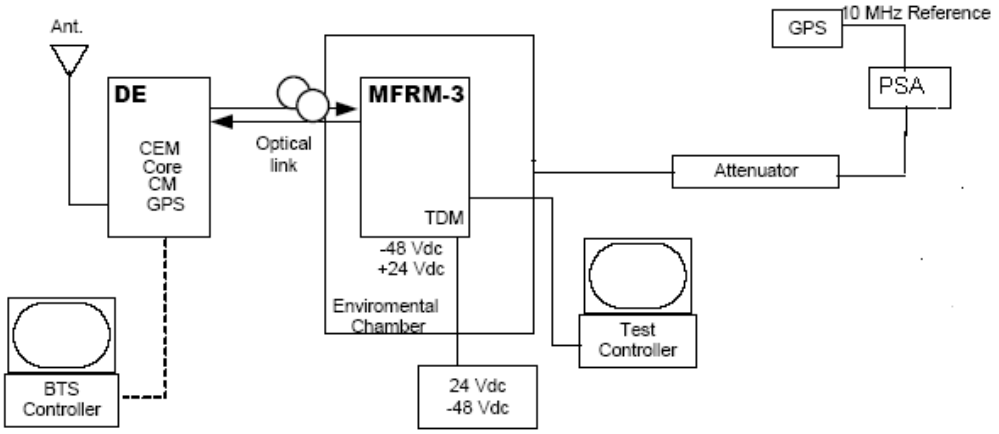


Figure 35: Test configuration for Frequency Stability

4.5.3 Frequency results

Operating temperature for the MFRM3 CR 800 MHz is from -40°C to +50°C as System Design Specification. The frequency stability was measured at channels 283 (878.49MHz) and 384 (881.52MHz). 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 283)		
Voltage (VDC)	Max Carrier Frequency Deviation (Hz)	Max Carrier Frequency Deviation (PPM)
24	16.78	0.019100957
41	17.89	0.020364489
48	14.12	0.016073034
57	17.47	0.019886396
Frequency Stability versus Voltage at +25 C (channel 384)		
Voltage (VDC)	Max Carrier Frequency Deviation (Hz)	Max Carrier Frequency Deviation (PPM)
24	16.83	0.019092023
41	17.1	0.019398312
48	14.04	0.015927035
57	16.51	0.018729014

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

Frequency Stability versus versus Temperature at -48V (channel 283)		
Temperature (℃)	Max Carrier Frequency Deviation (Hz)	Max Carrier Frequency Deviation (PPM)
-40	19.78	0.022515908
-30	19.74	0.022470375
-20	18.89	0.021502806
-10	18.84	0.02144589
0	18.72	0.021309292
10	16.54	0.018827761
20	17.69	0.020136826
30	19.62	0.022333777
40	19.66	0.02237931
50	19.51	0.022208562
Frequency Stability versus versus Temperature at 24V (channel 384)		
Temperature (℃)	Max Carrier Frequency Deviation (Hz)	Max Carrier Frequency Deviation (PPM)
-40	31.37	0.03558626
-30	19.37	0.02197341
-20	23.84	0.027044196
-10	21.17	0.024015337
0	20.83	0.02362964
10	18.85	0.021383519
20	18.33	0.020793629
30	17.74	0.020124331
40	17.83	0.020226427
50	18.25	0.020702877

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