Product Integrity Laboratory

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Radio Test Report
Project Code CG-572
(Report CG-572-RA-1-1)

FCC Part 22/RSS 129 Report for

UTSTARCOM BTS
FCC ID # S52-1-05-00-02-1
IC# 4021G- 10500021

Revision: 1
(Replaces Report CG-572-RA-1-0)

September 14, 2007

Prepared for:	UTStarcom
Author:	Glen Moore EMC/Wireless Manager
Approved by:	Nick Kobrosly Director of Operations

Report Summary

Test Facility:	**National Technical Systems, Canada** Product Integrity Laboratory 5151-47th Street, N.E. Calgary Alberta T3J 3R2
Accreditation Numbers:	FCC 101386 IC 46405-3978 - File # IC3978-2 **Accredited by Standards Council of Canada** Accredited Laboratory No. 440(Conforms with requirements of CAN−P−4D (ISO/IEC 17025)) CLIENTS SERVED: All interested parties FIELDS OF TESTING: Electrical/Electronic, Mechanical/Physical ISSUED ON: 2005−06−02 VALID TO: 2009−03−20
Performed For:	UTStarcom Canada 4600 Jacombs Road Richmond, B.C. Canada V6V 3B1
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Test Summary

Appendix	Test/Requirement Description	Deviations* from:			Status	Applicable Rule Parts
		Base Standard	Test Basis	NTS Procedure		
A	RF Power Output	No	No	No	PASS	FCC -22.913
B	Occupied Bandwidth	No	No	No	PASS	FCC -22.917
C	TX Conducted Spurious Emissions	No	No	No	PASS	FCC -22.917
D	TX Frequency Stability	No	No	No	PASS	FCC -22.355
E	TX Radiated Spurious Emissions 30 MHz- 20 GHz	No	No	No	PASS	FCC -22.917
F	Test Equipment List	No	No	No	NA	NA

Test Result: The product presented for testing complied with test requirements as shown above.

Test Log

APPENDIX	Test Case	Start	End	Tester
A	RF Power Output FCC CFR 47 Part 22	July 27, 2007	August 2, 2007	Andrew Gibson RF Engineer
B	Occupied BW FCC CFR 47 Part 22	July 27, 2007	August 2, 2007	Andrew Gibson RF Engineer
C	TX Conducted Spurious Emissions FCC CFR 47 Part 22	July 27, 2007	August 2, 2007	Andrew Gibson RF Engineer
D	Frequency Stability FCC CFR 47 Part 22	August 21, 2007	August 23, 2007	Spencer Watson EMC Specialist
E	Radiated Emissions 30 MHz – 20 GHz FCC CFR 47 Part 22	July 19, 2007	August 20, 2007	Glen Moore, EMC Manager Deniz Demerci, EMC Technologist

The test outlined may not be inclusive of all testing required by the Base Standards or fulfill the applicable regulatory requirements for this product in their entirety.

Test Result: The product presented for testing complied with test requirements as shown above.

Prepared By: gmoore Digitally signed by gmoore DN: cn=gmoore, c=US, o=nts, email=glen.moore@ntscorp.com Date: 2007.09.18 11:07:08 -06'00'

Glen Moore,
EMC Manager

Reviewed By: Alex Mathews 2007.09.18 11:21:29 -06'00'

Alex Mathews,
Compliance Specialist

Approved By: Robyn Zuehlke 2007.09.18 11:18:17 -06'00'

Robyn Zuehlke
Quality Manager

Table of Contents

Register of Revisions

Revision	Date	Description of Revisions
0	August 10, 2007	Draft Release for customer review
1	September 14, 2007	Release with customer comments and internal review comments

1.0 INTRODUCTION

1.1.1 PURPOSE

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 the UTStarcom iCell 800 The Utstarcom BTS 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 Broadband Personal Communications Service [1]
- CFR 47, Part 2, Subpart J, Equipment Authorization Procedures - Equipment Authorization[2]

1.1.2 ABBREVIATIONS AND DEFINITIONS

The following are the abbreviations and definitions that may be relevant to this document.

Abbreviation	Explanation
A	Amps
AC	Alternating Current
AE	Ancillary Equipment
AF	Antenna Factor
ANSI	American National Standards Institute
AWG	American Wire Gauge
BTS	Base Transceiver Station
C	Celsius
CAM	Customer Alarm Module
CDMA	Code Division Multiple Access
CF	Correction Factor
CFR	Code of Federal Regulations
CH	Channel
CISPR	Comite International Special des Perturbations Radioelectriques (The International Special Committee on Radio Interference)
CL	Cable Loss
cm	centimetre
CM	Control Module
dB	Decibel
dBm	Decibel relative to 1 milliwatt
dBµV	Decibel relative to 1 uV
DC	Direct Current
DM	Digital Module
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EN	European Norms
EUT	Equipment UnderTest
FCC	Federal Communications Commission
FRU	Flexible Radio Unit
GHz	Gigahertz
GPS	Global Positioning System
GR	Generic Requirements

Hpol	Horizontal Polarization
HSSL	High Speed Serial Link
Hz	Hertz
IC	Industry Canada
kHz	kilohertz
LO	Local Oscillator
LNA	Low Noise Amplifier
m	Metre
MHz	Megahertz
ms	Milli Second
NTS	National Technical Systems
NA	Not Available
N/A	Not Applicable
PA	Power Amplifier
PI	Product Integrity
PK	Peak
PLL	Phase Lock Loop
P/N	Part Number
PS	Power Supply
PSU	Power Supply Unit
QP	Quasi-Peak
Qty	Quantity
RE	Radiated Emissions
RF	Radio Frequency
RM	Radio Module
Rx	Receive
TT	Turn Table
Tx	Transmit
V	Volts
VDC	Volts Direct Current
Vpol	Vertical Polarization
W	Watt
Zt	Transfer Impedance

Definitions:

Equipment Under Test (EUT): A representative ITE or functionally interactive group of ITE (that is a system), which includes one or more host units and is used for evaluation purposes.

Electromagnetic compatibility (EMC): The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

1.1.3 REFERENCES

US Code of Federal Regulations

- 47 CFR Part 22 Federal Communications Commission, Part 22

American National Standards Institute

- ANSI C63.4-2003 American National Standards for Methods of Measurements of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipments in the range of 9 kHz to 40 GHz, December 11, 2003
- TIA/EIA 603 C-2004 Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

NTS Documentation

- NTS Radiated Emissions 30 MHz – 1 GHz Automated Test Method E001R7
- NTS Radiated Emissions 1 GHz – 40 GHz Manual Test Method E006R4

2.0 EUT

CONFIGURATION

Description of EUT

	Name	Model	Revision	Serial Number
EUT	iCell 800 MHz CDMA2000 Pole mount BTS	Pole mount BTS	1	#2
Classification	Pole Mount			
Size (m)	NA			
Weight	Approx. 100 lbs			
Power	-48 VDC			
Transmit band	876.1 MHz – 885.4 MHz			
Receive band	831.1 MHz - 840.4 MHz			
General Functional Description	The iCell Pole Mount BTS provides one CDMA2000 1X carrier. The Pole Mount BTS contains one high power amplifier connected to one sector. The Pole Mount BTS can operate as a standalone Cellular transceiver. It requires a single external Ethernet interface for communication with a BSC server and a connection to an external -48 V DC. The iCell Pole Mount BTS is designed to comply with the IS-97D standard for base stations for Band Class 0 (Cellular Band).			

SET UP CONFIGURATION

EUT

Quantity	EUT Description	P/N	S/N	Rev
1	iCell 800 MHz CDMA2000 Pole mount BTS	1223115100	2	1

EUT POWER

Voltage	-48 VDC
Number of Feeds	1
Gauge of cable	10
Current Draw	12 amps
Current Draw in final amplifier stage	4 amps

CABLES

EUT Cable List

Qty	Model	Routing		Description	Cable Length (m)
		From	To		
1	n/a	UUT	Termination Load	RF Cable for Ant. Port	15
1	n/a	UUT	Termination Load	RF Cable for Rx Port	15
1	n/a	UUT	Termination Load	RF Cable for GPS Port	15
1	n/a	UUT	Termination Load	T1/E1 Cable	15
1	n/a	UUT	Power Supply	AC/DC Power Cables	15

APPENDICES

APPENDIX A: POWER OUTPUT

A.1. Base Standard & Test Basis

Base Standard	FCC Part 22.913
Test Basis	FCC 2.1046
Test Method	TIA/EIA 603

A.2. Specifications

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.

A.3. FCC Limit (Part 24.232)

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

A.4. Measurement Uncertainty

Expanded Uncertainty (K=2)
1.11/-1.22

A.5. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

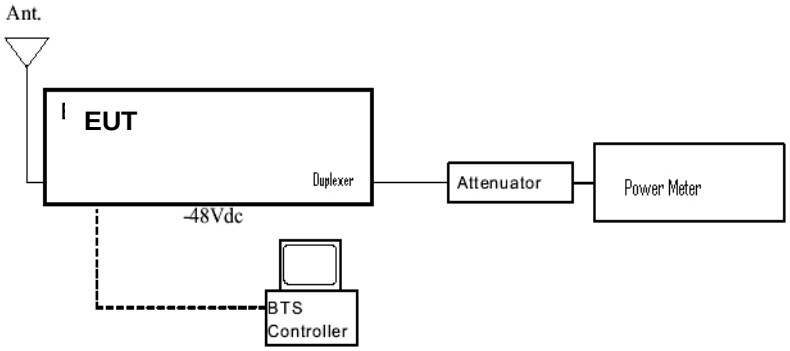
A.6. Test Method

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 power meter.

A.7. Test Setup

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

Figure 1: Power Output test setup



A.8. Test Results

Complies. The maximum RF output power is 45.6 dBm on channel 358. this 4.4 db below the FCC Limit of 50 dBm.

Table 1: RF Power Output

Channel Number (Block)	Modulation	Frequency (MHz)	Peak RF Output Power (dBm)	Average RF Output Power (dBm)	Typical Maximum Rated Power (dBm)	FCC Limit (dbm)
226	IS-97	876.8	54.1	45.6	46	50
267	IS-97	878.01	54.0	45.5	46	50
308	IS-97	879.24	53.7	45.5	46	50
358	IS-97	880.74	53.9	45.6	46	50
425	IS-97	882.75	54.2	45.3	46	50
492	IS-97	884.76	53.2	45.1	46	50

A.9. Tested By

This testing was conducted in accordance with the ISO 17025 scope of accreditation, table 1; Quality Manual.

Name: Andrew Gibson, RF Engineer

APPENDIX B: OCCUPIED BANDWIDTH

B.1. Base Standard & Test Basis

Base Standard	FCC PART 22.905
Test Basis	FCC PART 2.1049
Test Method	FCC PART 2.1049/24.238

B.2. Specifications

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.

B.3. Measurement Uncertainty

Expanded Uncertainty (K=2)
1.11/-1.22

B.4. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

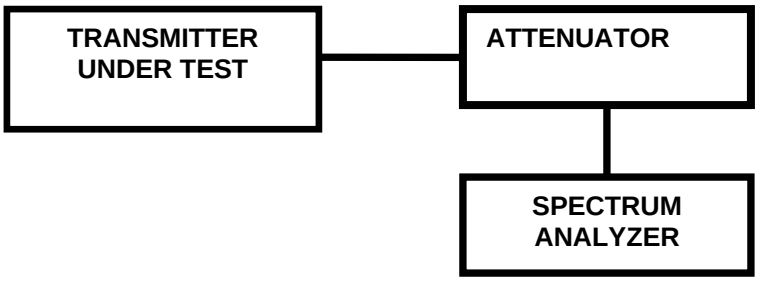
B.5. Test Method

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

B.6. Test Setup

The test setup for Occupied BW is as illustrated below

Figure 2: Occupied BW Setup



B.7. Test Results

Table 2: Occupied BW

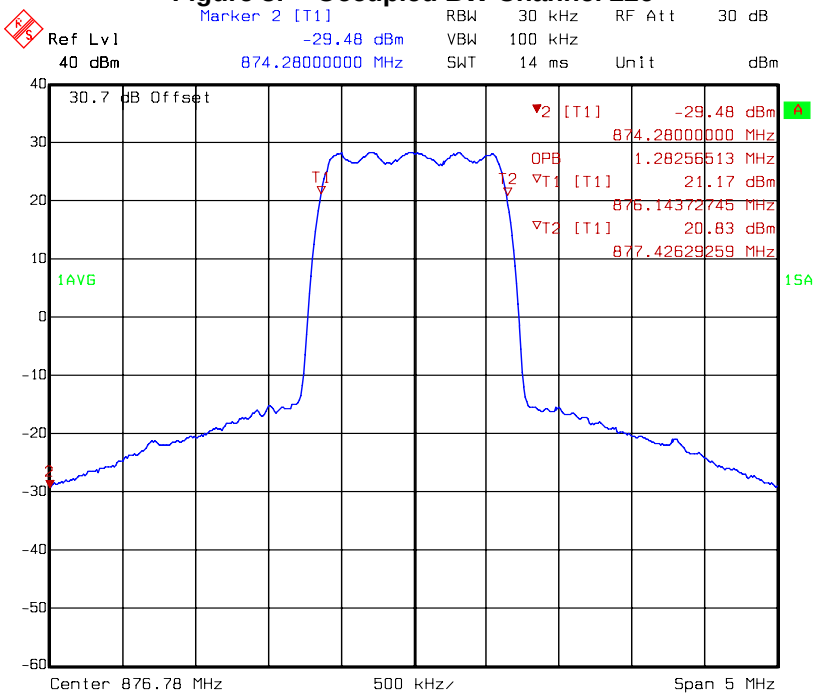
Channel Number (Band)	Modulation	Frequency (MHz)	Measured Occupied BW (MHz)
226	IS-97	876.80	1.283
267	IS-97	878.01	1.273
308	IS-97	879.24	1.273
358	IS-97	880.74	1.273
425	IS-97	882.75	1.273
492	IS-97	884.76	1.273

B.8. Tested By

This testing was conducted in accordance with the ISO 17025 scope of accreditation, table 1; Quality Manual.

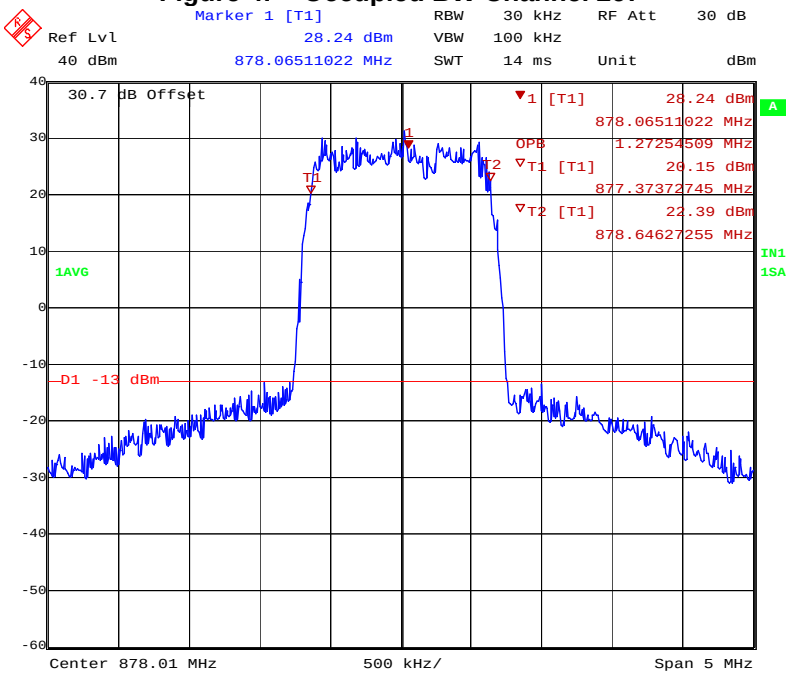
Name: Andrew Gibson, RF Engineer

Figure 3: Occupied BW Channel 226



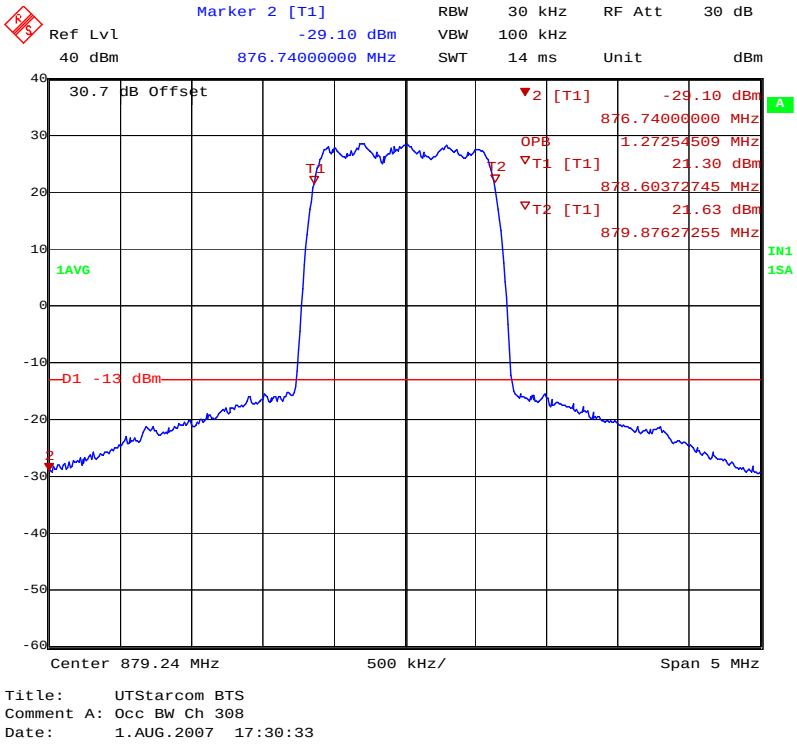
Comment A: UTStarcom Occ BW ch 226
Date: 27.JUL.2007 11:33:27

Figure 4: Occupied BW Channel 267



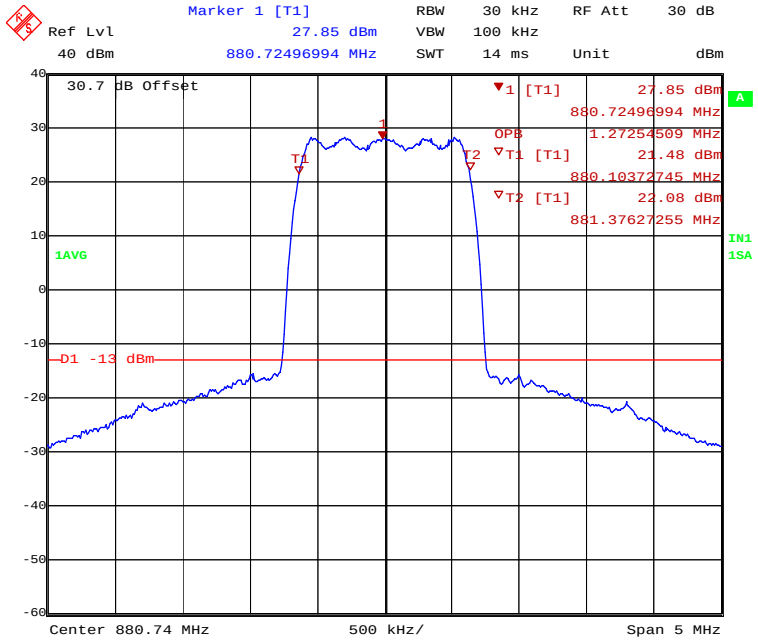
Title: UTStarcom BTS
Comment A: Occ BW ch 267
Date: 1.AUG.2007 16:47:06

Figure 5: Occupied BW Channel 308



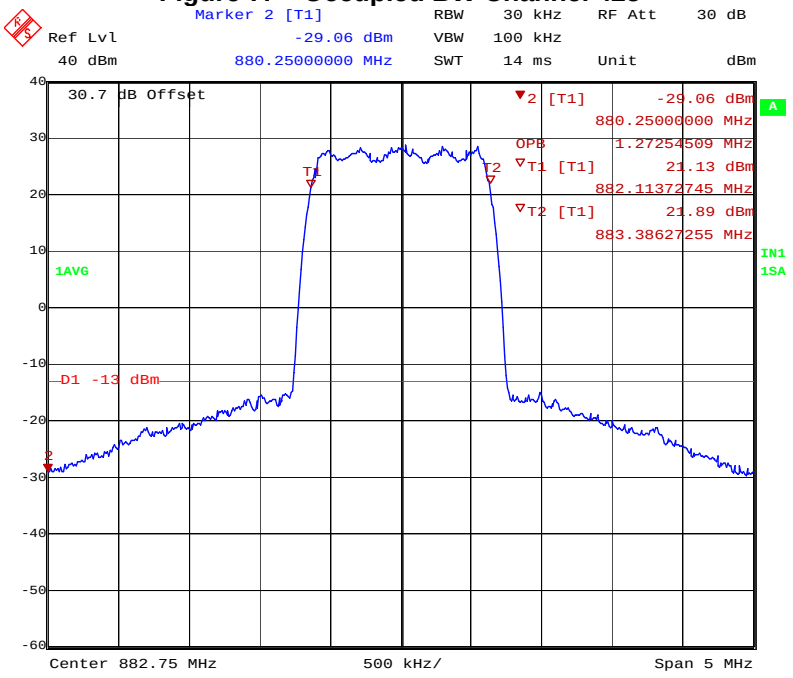
Title: UTStarcom BTS
Comment A: Occ BW Ch 308
Date: 1.AUG.2007 17:30:33

Figure 6: Occupied BW Channel 358



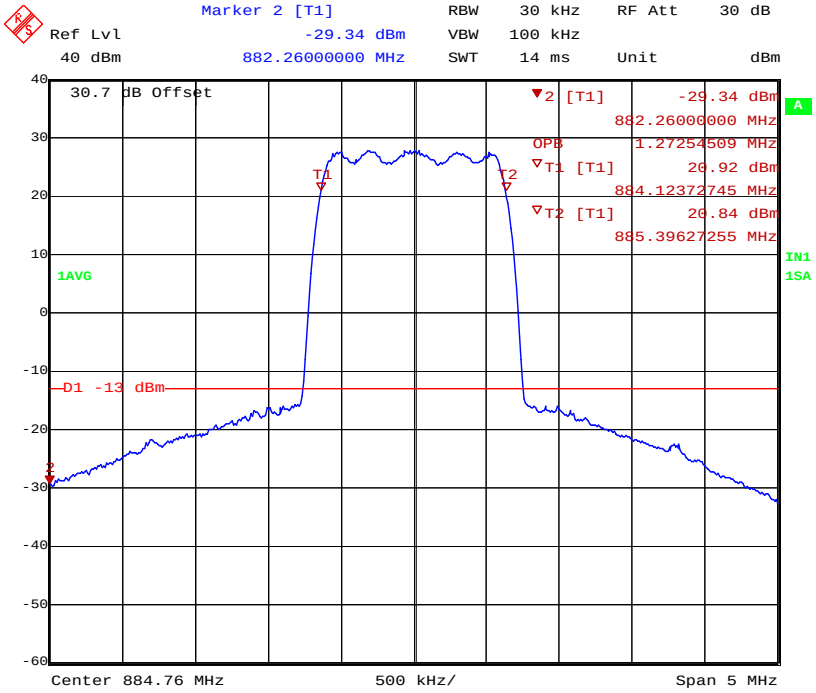
Title: UTStarcom BTS
Comment A: Occ BW Ch 358
Date: 2.AUG.2007 12:25:31

Figure 7: Occupied BW Channel 425



Title: UTStarcom BTS
Comment A: Occ BW Ch 425
Date: 2.AUG.2007 12:43:53

Figure 8: Occupied BW Channel 492



Title: UTStarcom BTS
Comment A: Occ BW Ch 492
Date: 2.AUG.2007 12:54:20

APPENDIX C: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

C.1. Base Standard & Test Basis

Base Standard	Cell Mode: FCC Part 22.917
Test Basis	FCC 2.1051
Test Method	FCC 2.1051

C.2. Specifications

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 at least 43 + 10 log (P) dB.

(b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the 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 emissions 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.

C.3. Measurement Uncertainty

Expanded Uncertainty (K=2)
1.11/-1.22

C.4. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

C.5. Test Procedure

The BTS was configured via the BTS controller to enable the to transmit at maximum power. Measurements were made on channels at the bottom and top of the licensed sub-bands. The following spectrum analyzer settings were used for the measurement of the antenna port spurious emissions:

Band/Block Edge Measurements

Method 1 – Integrated power measurement Adjacent 1MHz to indicated cellular band (Upper and Lower)

This measurement was performed using integrated power over a 14.4 kHz bandwidth (1% of emission bandwidth) using the channel power and adjacent channel power functions of the spectrum analyzer. The analyzer was set up with 7 channels at 14.4 KHz channels for a total of 100.8 KHz, this was repeat 10 times to cover the adjacent 1 MHz to each upper and lower block edge. This was also done using 100 Khz channels where less resolution was needed to speed up measurements.

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

Method 2 – Adjacent 1 Mhz to indicated cellular band (Upper and Lower)

Resolution Bandwidth: 20 KHz
Video Bandwidth: 100 KHz
Video Average: 10 Averages
Span: Set accordingly
Attenuation: 30 dB
Ref. Level: variable
Ref. Level Offset: variable
Sweep time : Auto

All other Spurious Emissions up to 20 GHz

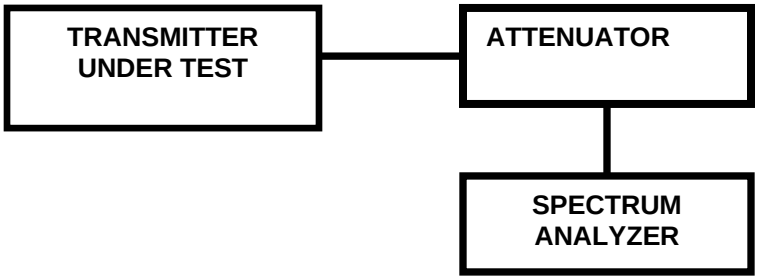
Resolution Bandwidth: 1 MHz
Video Bandwidth: 3 MHz
Video Average: 10 Averages
Span: Set accordingly
Attenuation: 30 dB
Ref. Level: variable
Ref. Level Offset: variable

Calibrated the cables and attenuator losses from 50MHz to 10GHz using a network analyzer with 401 sample points. The calibrated loss is the reference level offset on the spectrum analyzer.

C.6. Test Setup

The test setup for conducted spurious emissions is as shown in the figure below

Figure 9: Conducted Spurious Emission setup



C.7. Test Results

The frequency spectrum from 50 MHz to 10 GHz was scanned for emissions using the spectrum analyzer settings outlined in the test method (Section 4.4.2). The EUT complies with the limit of -13 dBm. The table below shows the spurious emissions at the antenna port of the EUT for IS-97 carrier mode. The plots that follow show the spurious emissions .

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C.8. Tested By

This testing was conducted in accordance with the ISO 17025 scope of accreditation, table 1; Quality Manual.

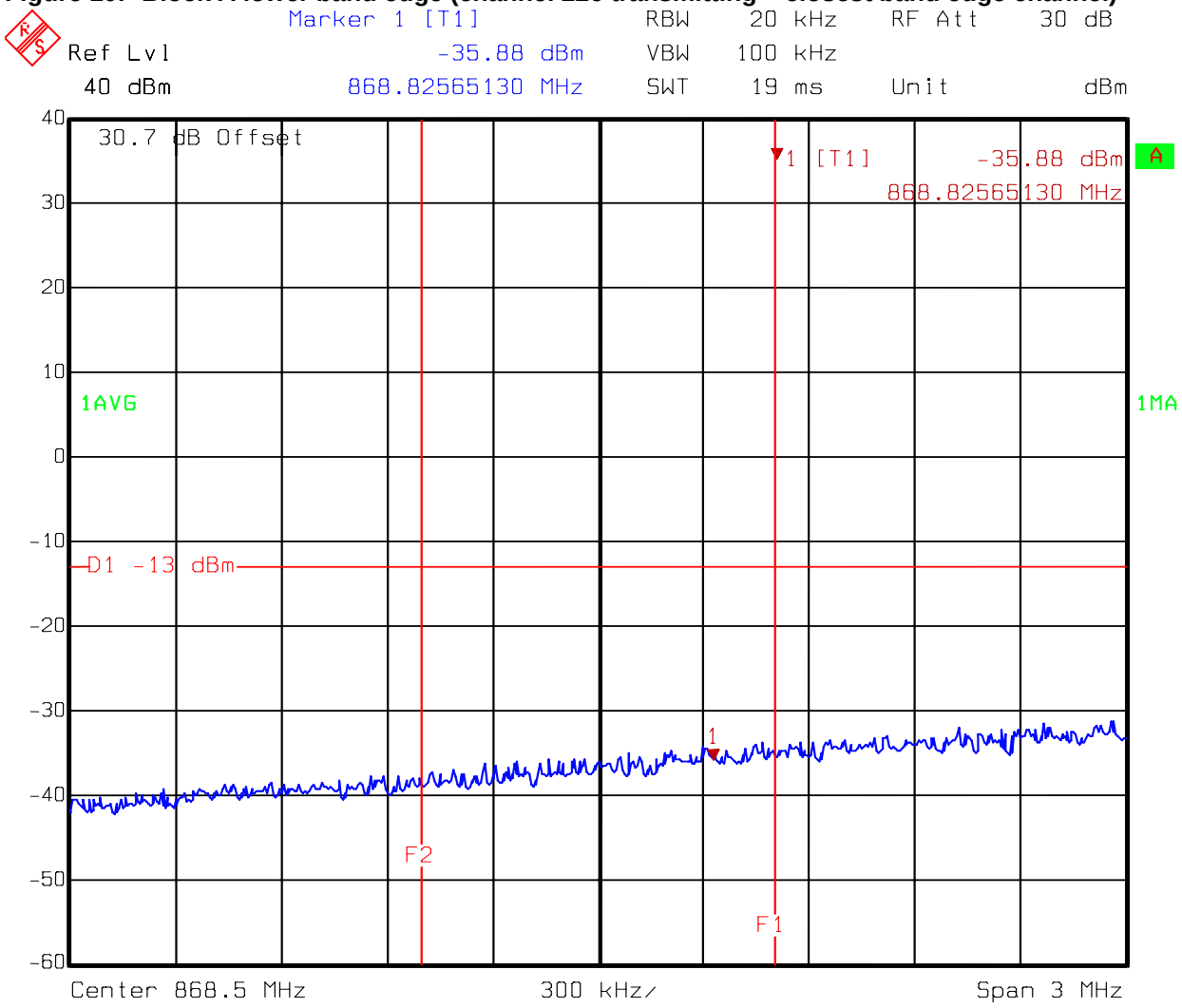
Name: Andrew Gibson, RF Engineer

Table 3: Block Edge and Spurious Emissions at the antenna port data summary

Frequency (MHz) and Measurement description	See Figure	Worst case Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm
Block A, Lower bandedge	Figure 10	-35.88	-22.88
Block A, Upper Bandedge first 100.8 KHz	Figure 11	-16.70	-3.7
Block A, Upper Bandedge 2nd 100.8 KHz	Figure 12	-17.39	-4.39
Block A, Upper Bandedge 3rd 100.8 KHz	Figure 13	-16.73	-3.73
Block A, Upper Bandedge 4th 100.8 KHz	Figure 14	-18.30	-5.3
Block A, Upper Bandedge 5th 100.8 KHz	Figure 15	-18.43	-5.43
Block A, Upper Bandedge 6th 100.8 KHz	Figure 16	-19.25	-6.25
Block A, Upper Bandedge 7th 100.8 KHz	Figure 17	-19.02	-6.02
Block A, Upper Bandedge 8th 100.8 KHz	Figure 18	-21.40	-8.4
Block A, Upper Bandedge 9th 100.8 KHz	Figure 19	-22.06	-9.06
Block A, Upper Bandedge 10th 100.8 KHz	Figure 20	-22.37	-9.37
Block B Lower block edge 1st 1MHz –	Figure 21	-14.52	-1.5
Block B, upper block edge	Figure 23	-41.4	-28.4
30 MHz – 2 GHz (no emissions detected – noise floor measurement for all bands)	Figure 24	-31.09	-18.09
2 GHz – 5 GHz (no emissions detected – noise floor measurement for all bands)	Figure 25	-27.53	-14.53
5GHz -10 GHz (no emissions detected – noise floor measurement for all bands)	Figure 26	-23.23	-10.23

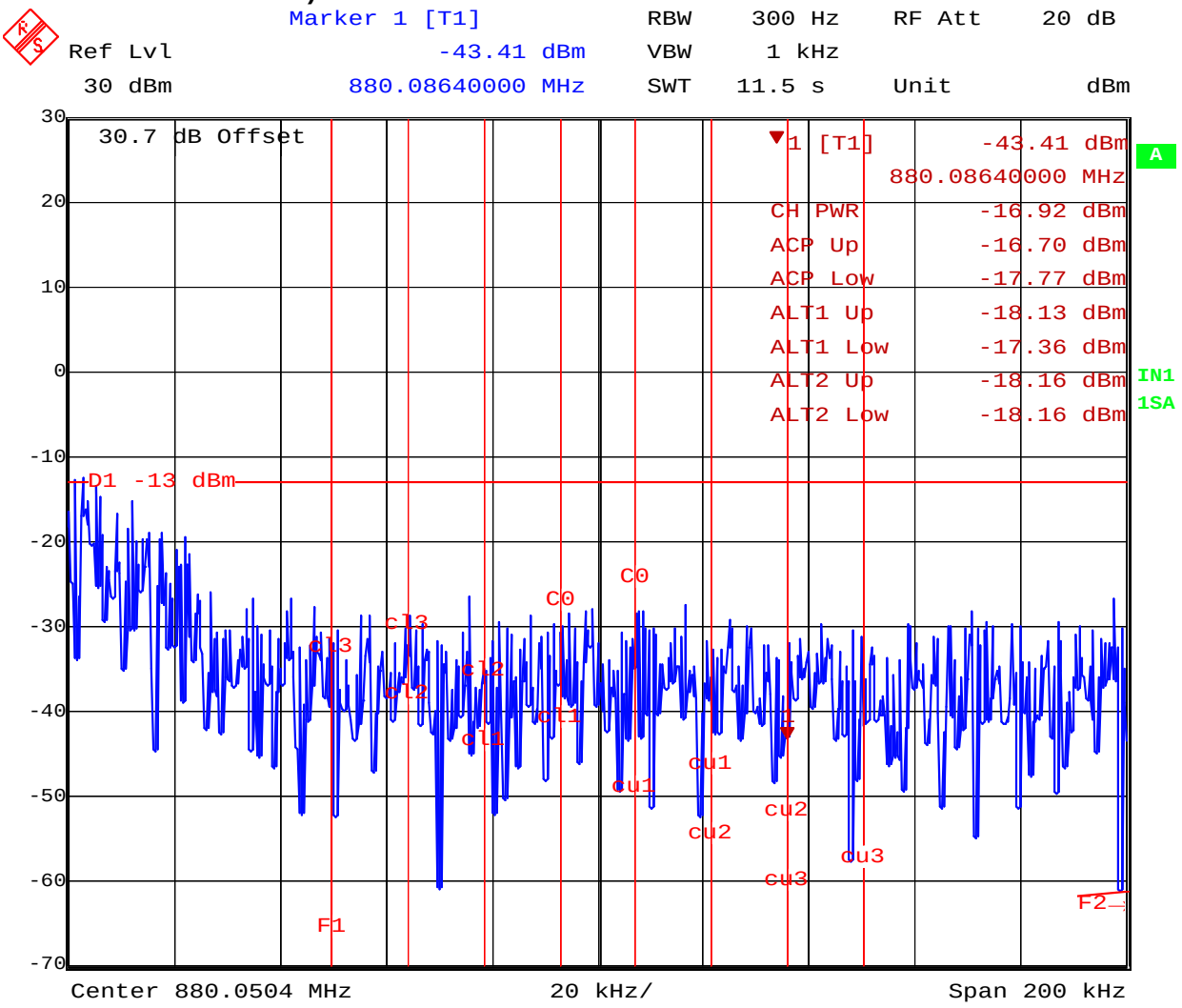
Notes: a Emission levels given in these ranges represents the worst case value over all the tested channels

Figure 10: Block A lower band edge (channel 226 transmitting – closest band edge channel)



Comment A: UTStarcom Band Edge Inner lower ch 226
Date: 27.JUL.2007 16:12:58

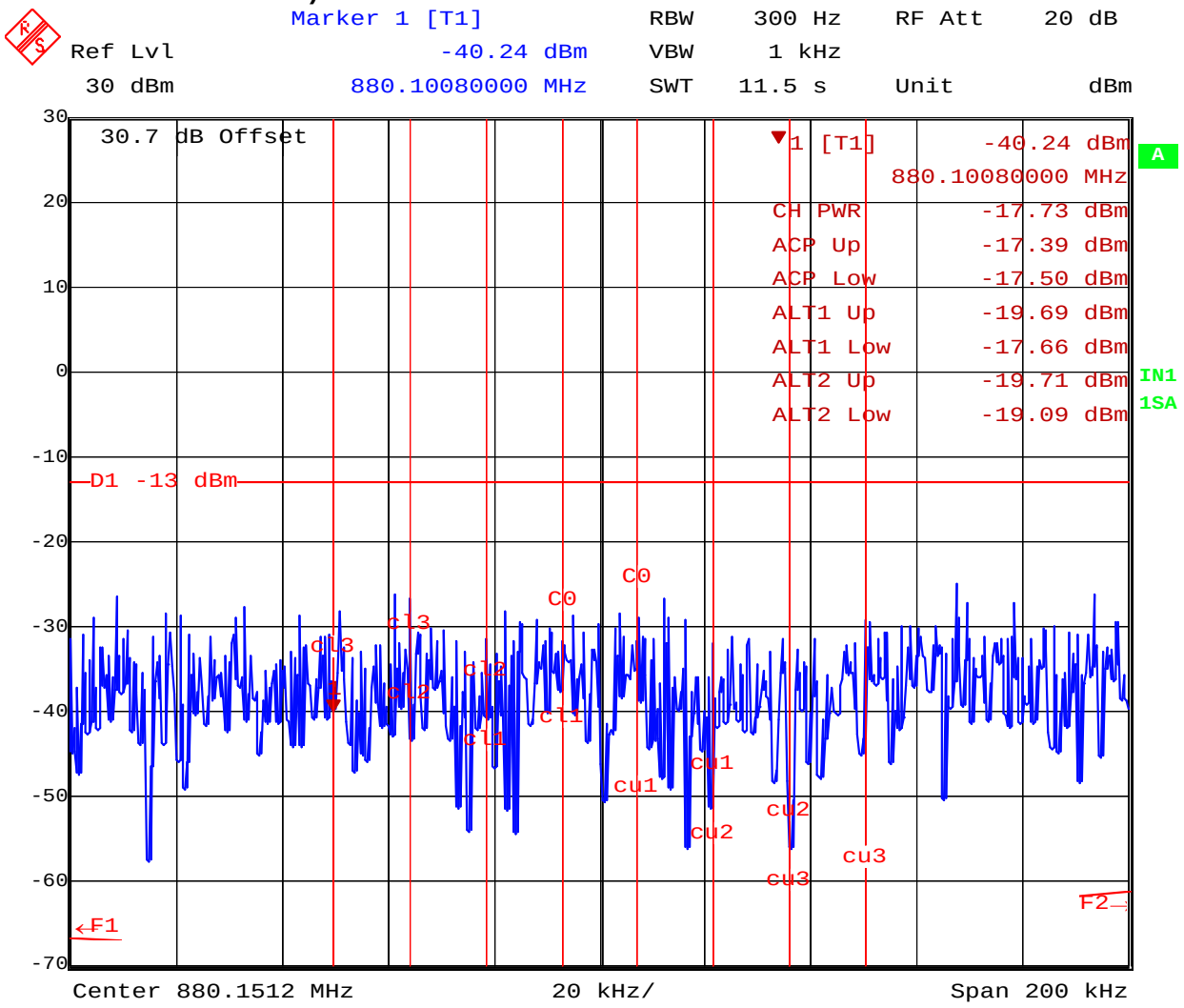
Figure 11: Block A upper band edge (channel 308 transmitting – first 100.8 KHz integrated over Seven 14.4 KHz channels)



Title: UTStarcom BTS
Comment A: Upper A Band Edge 1st
Date: 1.AUG.2007 13:55:40

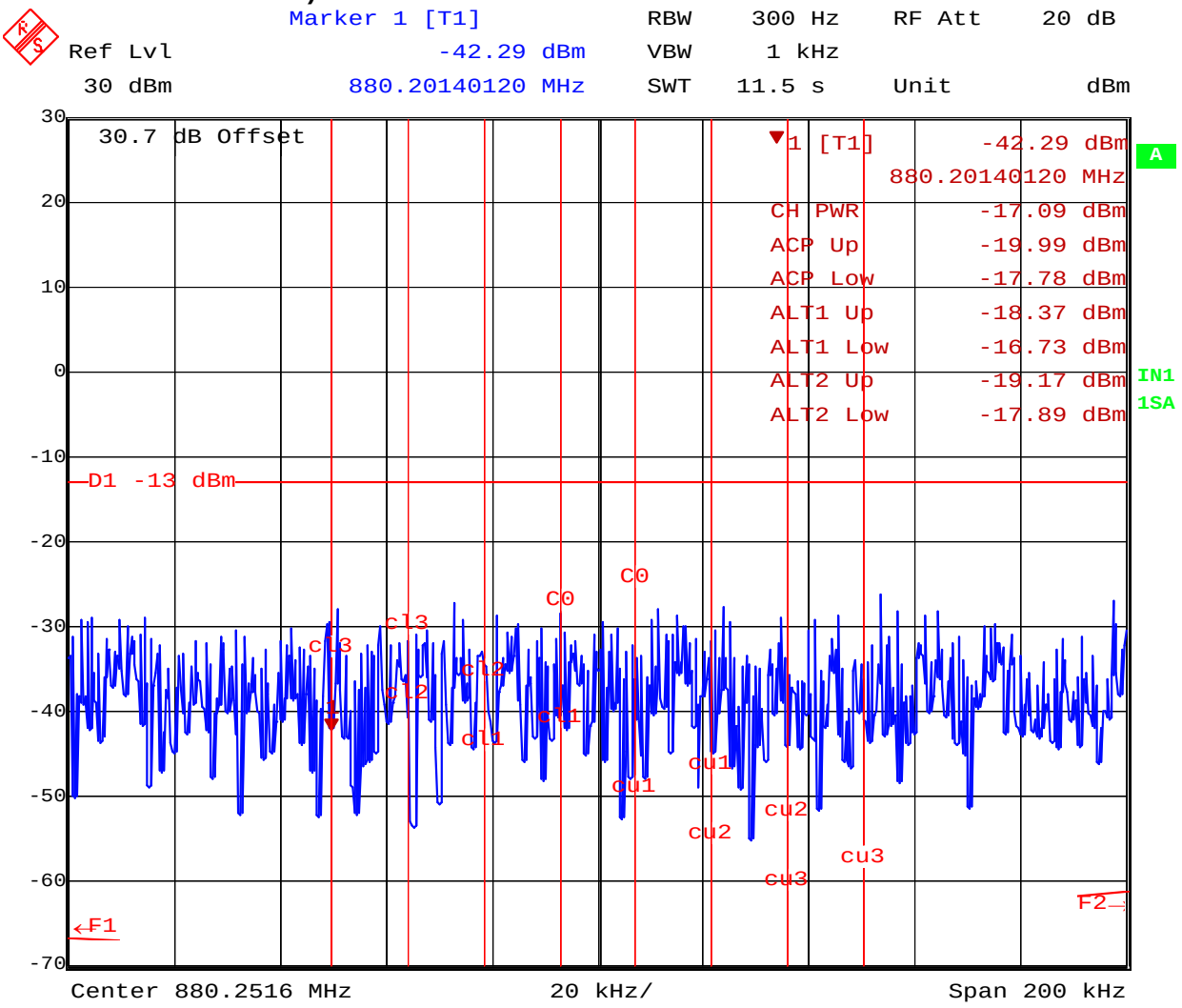
Fig 11- 20 explanation: This measurement was performed using integrated power over a 14.4 kHz bandwidth (1% of emission bandwidth) using the channel power and adjacent channel power functions of the spectrum analyzer. Results are shown in the plots Band_edge_upper_A_band_inner_ch_308_integrated_1.WMF to Band_edge_upper_A_band_inner_ch_308_integrated_10.WMF . The highest power in a 14.4 kHz (1%) BW was -16.7 dBm, in the frequency range from 880.0576 to 880.072 MHz.

Figure 12: Block A upper band edge (channel 308 transmitting – 2nd 100.8 KHz integrated over Seven 14.4 KHz channels)



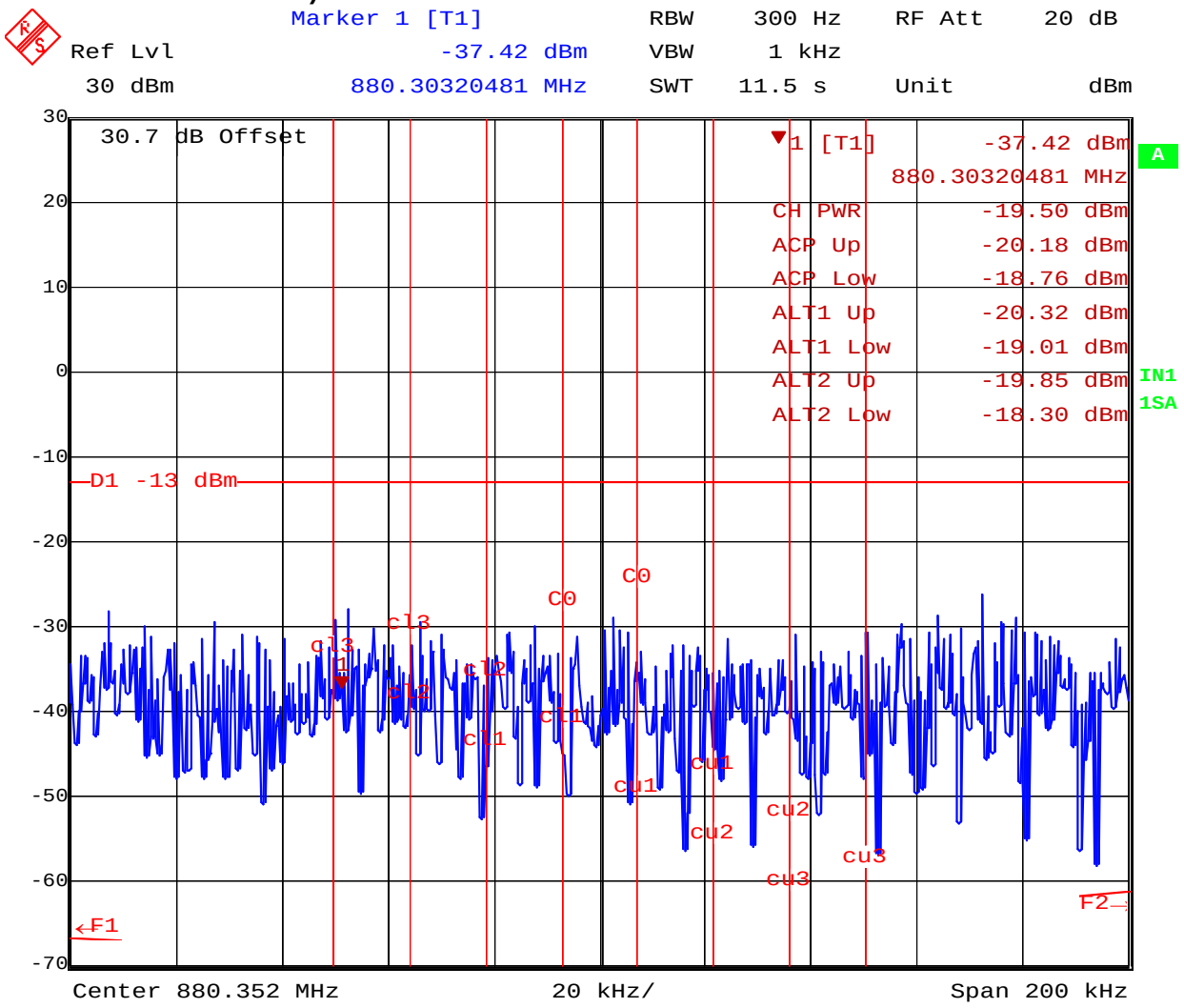
Title: UTStarcom BTS
Comment A: Upper A Band Edge 2nd
Date: 1.AUG.2007 14:00:25

Figure 13: Block A upper band edge (channel 308 transmitting – 3rd 100.8 KHz integrated over Seven 14.4 KHz channels)



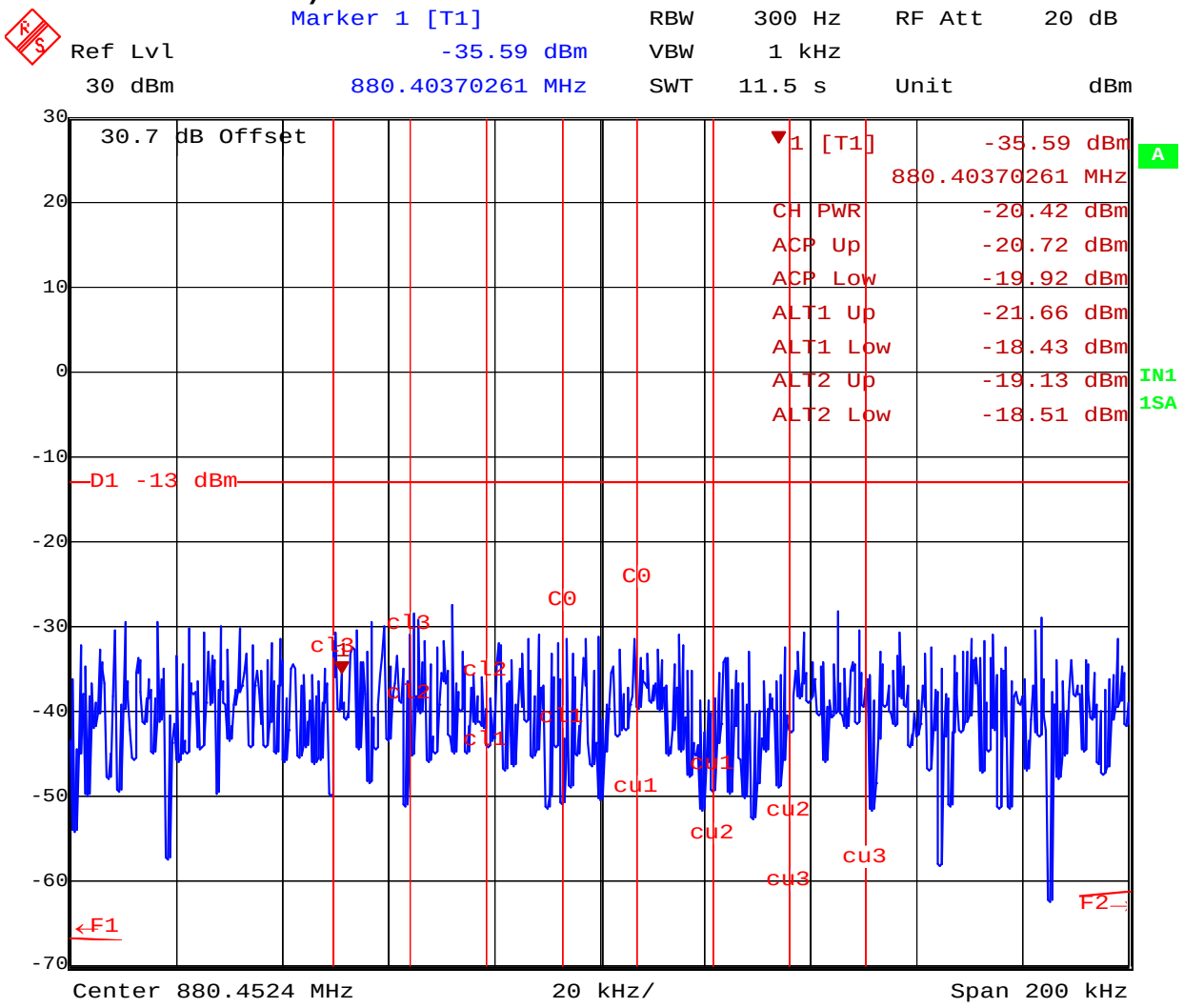
Title: UTStarcom BTS
Comment A: Upper A Band Edge 3rd
Date: 1.AUG.2007 14:03:27

Figure 14: Block A upper band edge (channel 308 transmitting – 4th 100.8 KHz integrated over Seven 14.4 KHz channels)



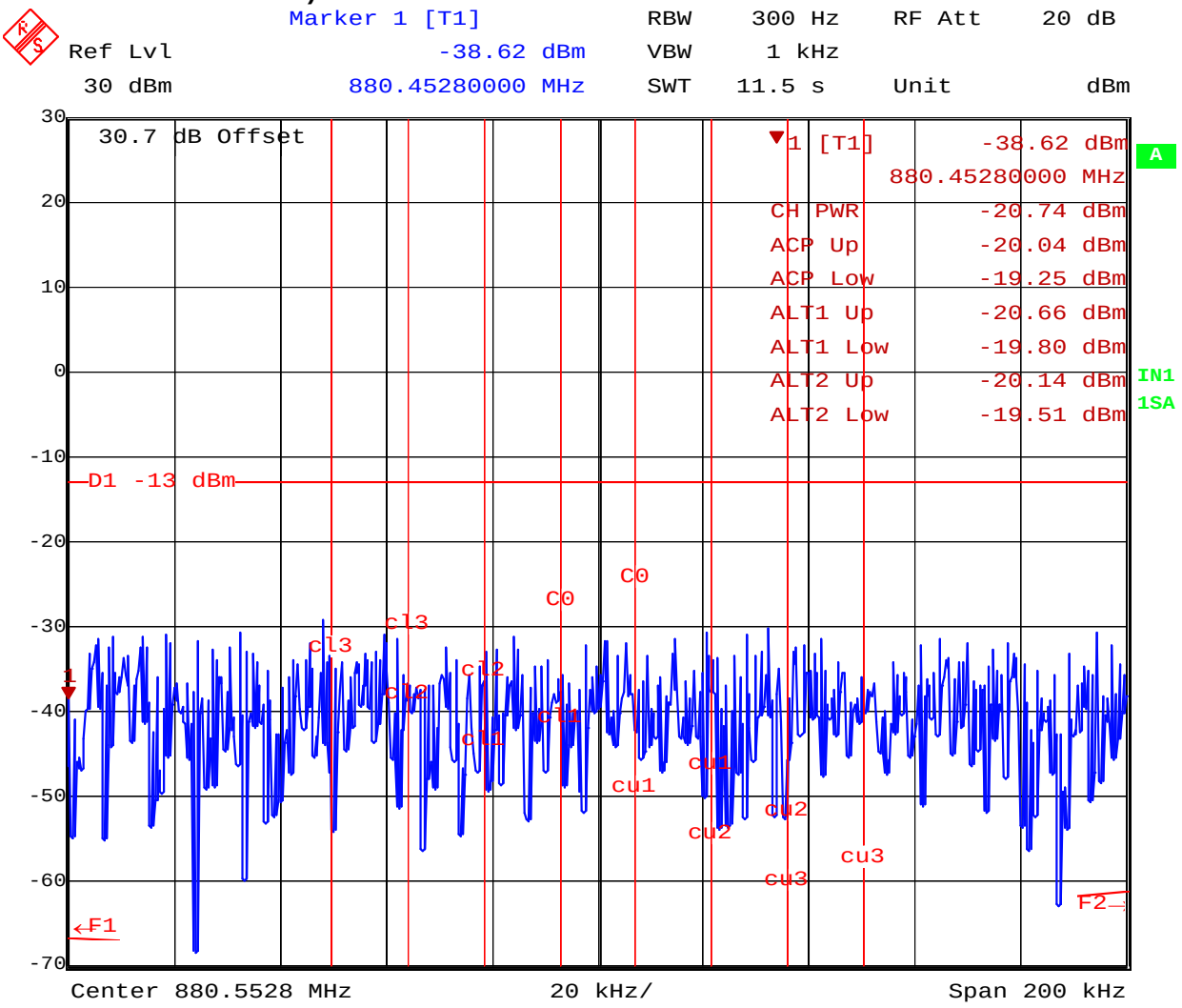
Title: UTStarcom BTS
Comment A: Upper A Band Edge 4th
Date: 1.AUG.2007 14:05:10

Figure 15: Block A upper band edge (channel 308 transmitting – 5th 100.8 KHz integrated over Seven 14.4 KHz channels)



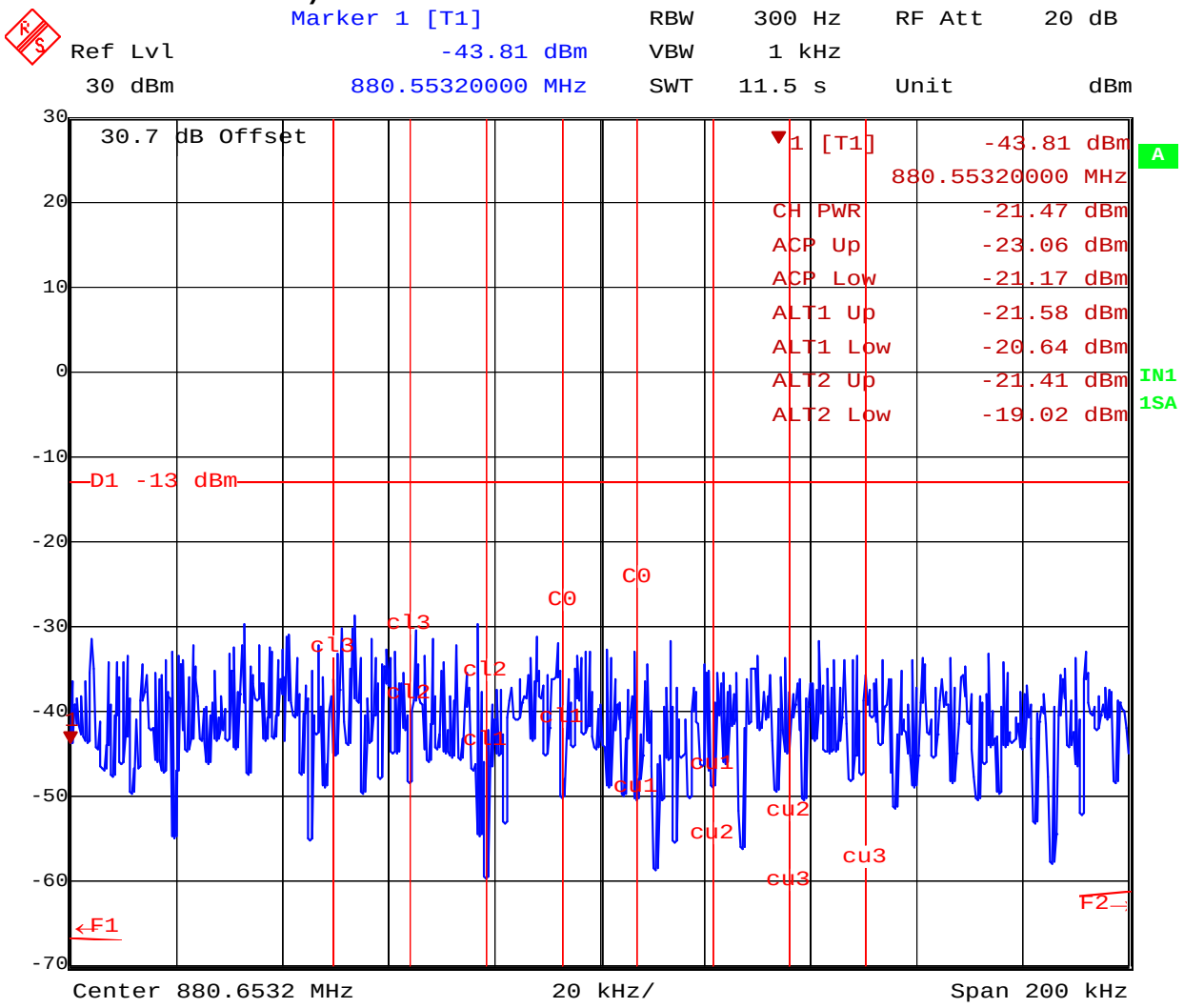
Title: UTStarcom BTS
Comment A: Upper A Band Edge 5th
Date: 1.AUG.2007 14:09:37

Figure 16: Block A upper band edge (channel 308 transmitting – 6th 100.8 KHz integrated over Seven 14.4 KHz channels)



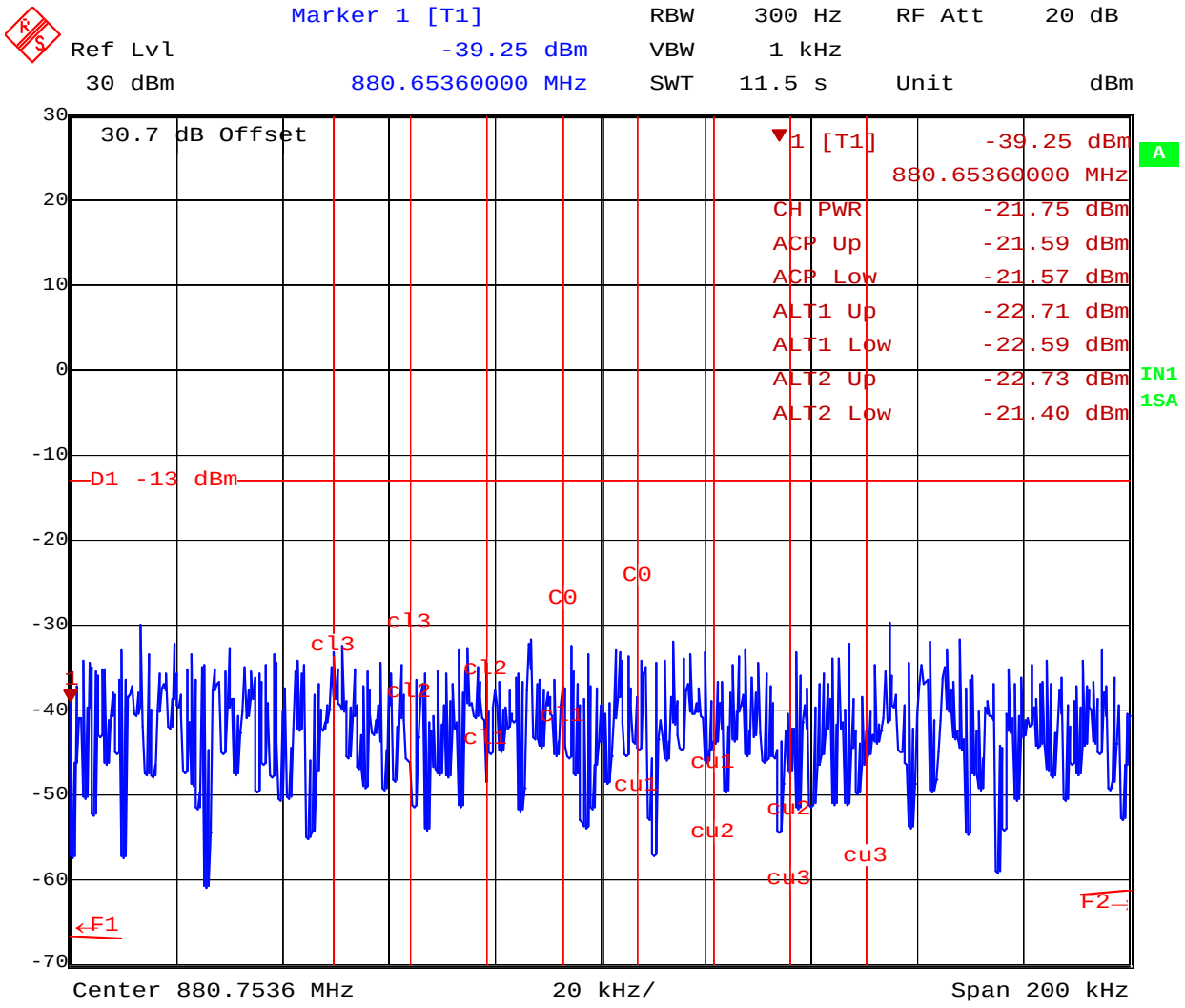
Title: UTStarcom BTS
Comment A: Upper A Band Edge 6th
Date: 1.AUG.2007 14:10:11

Figure 17: Block A upper band edge (channel 308 transmitting – 7th100.8 KHz integrated over Seven 14.4 KHz channels)



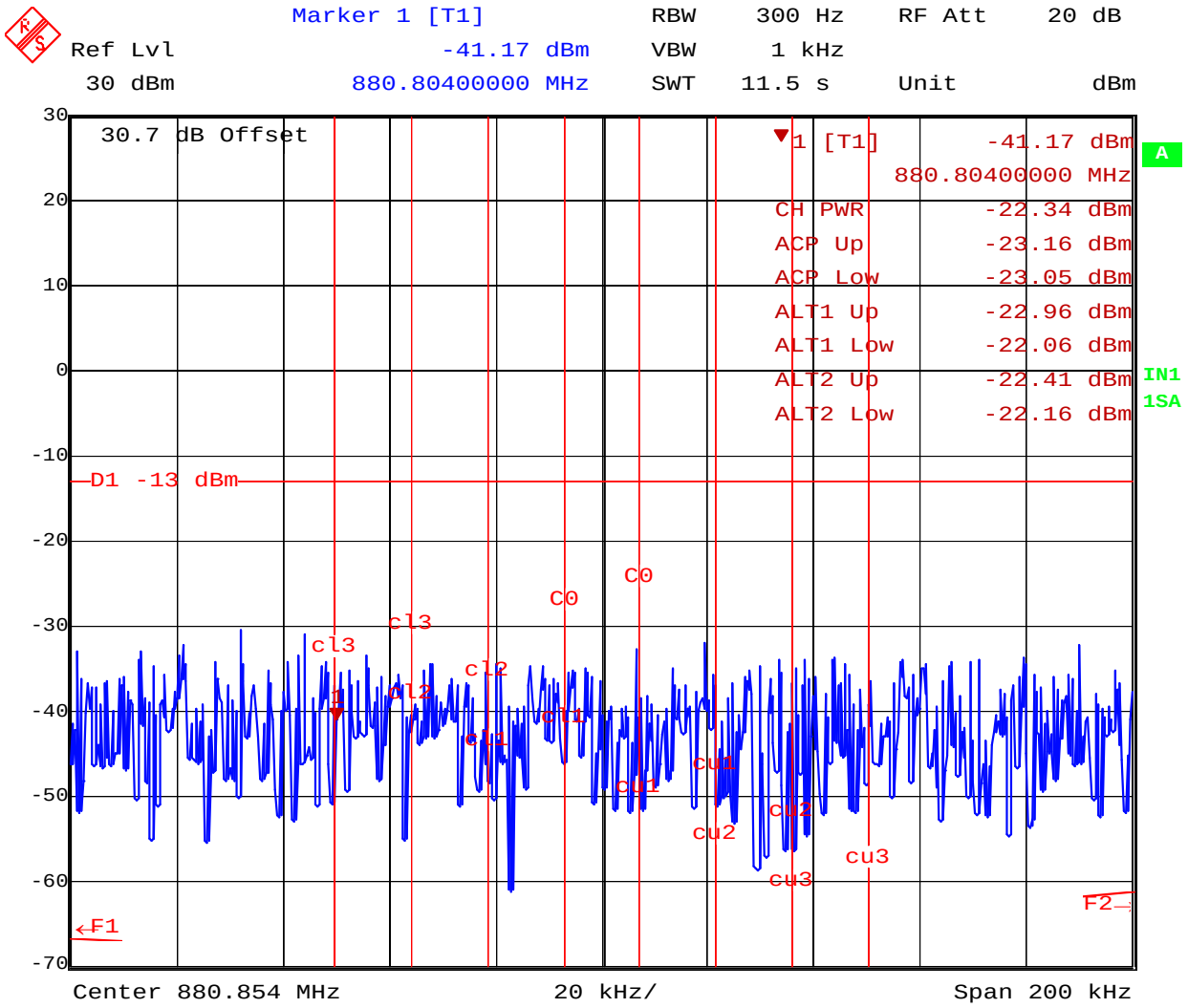
Title: UTStarcom BTS
Comment A: Upper A Band Edge 7th
Date: 1.AUG.2007 14:10:59

Figure 18: Block A upper band edge (channel 308 transmitting – 8th 100.8 KHz integrated over Seven 14.4 KHz channels)



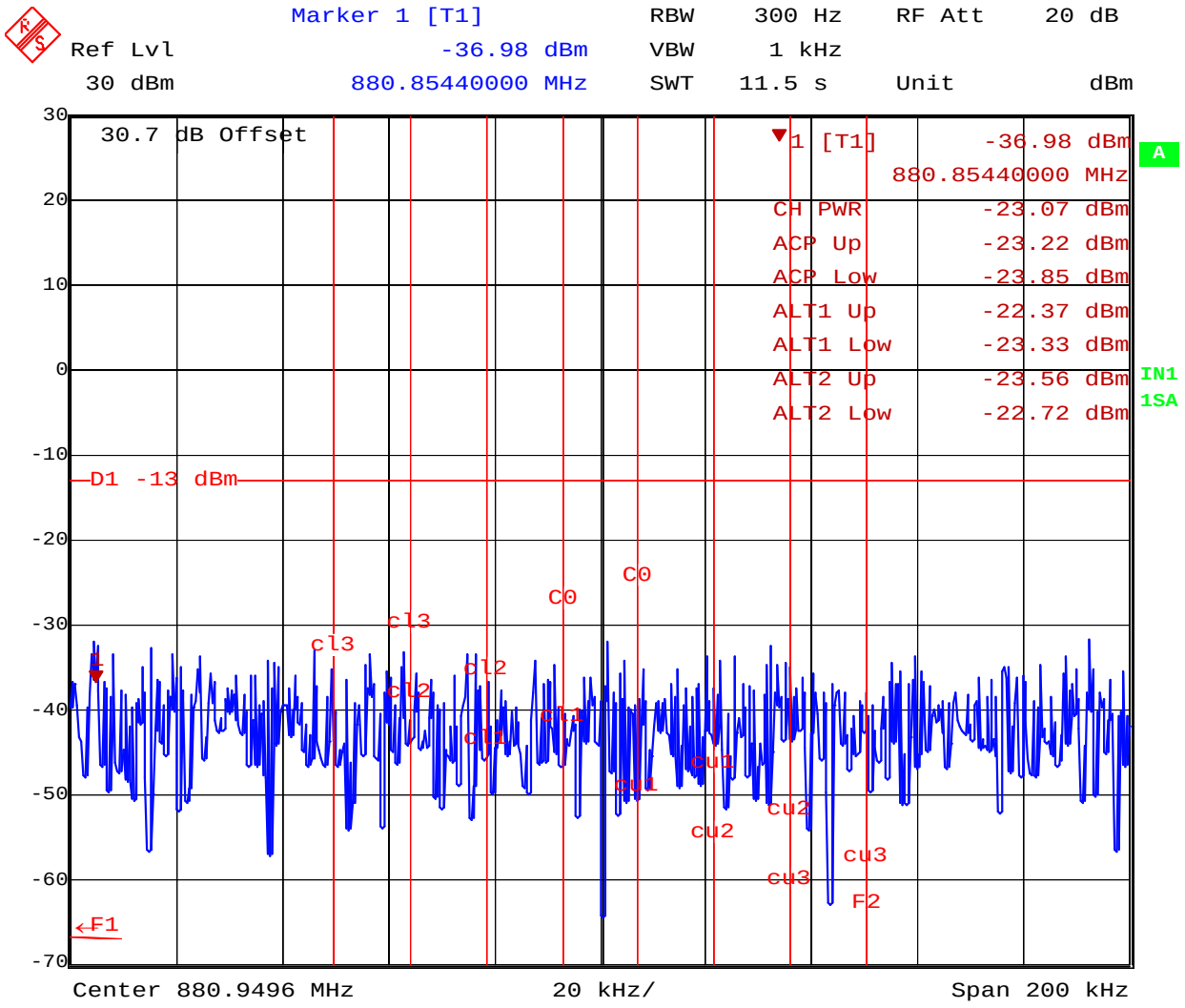
Title: UTStarcom BTS
Comment A: Upper A Band Edge 8th
Date: 1.AUG.2007 14:11:45

Figure 19: Block A upper band edge (channel 308 transmitting – 9th 100.8 KHz integrated over Seven 14.4 KHz channels)



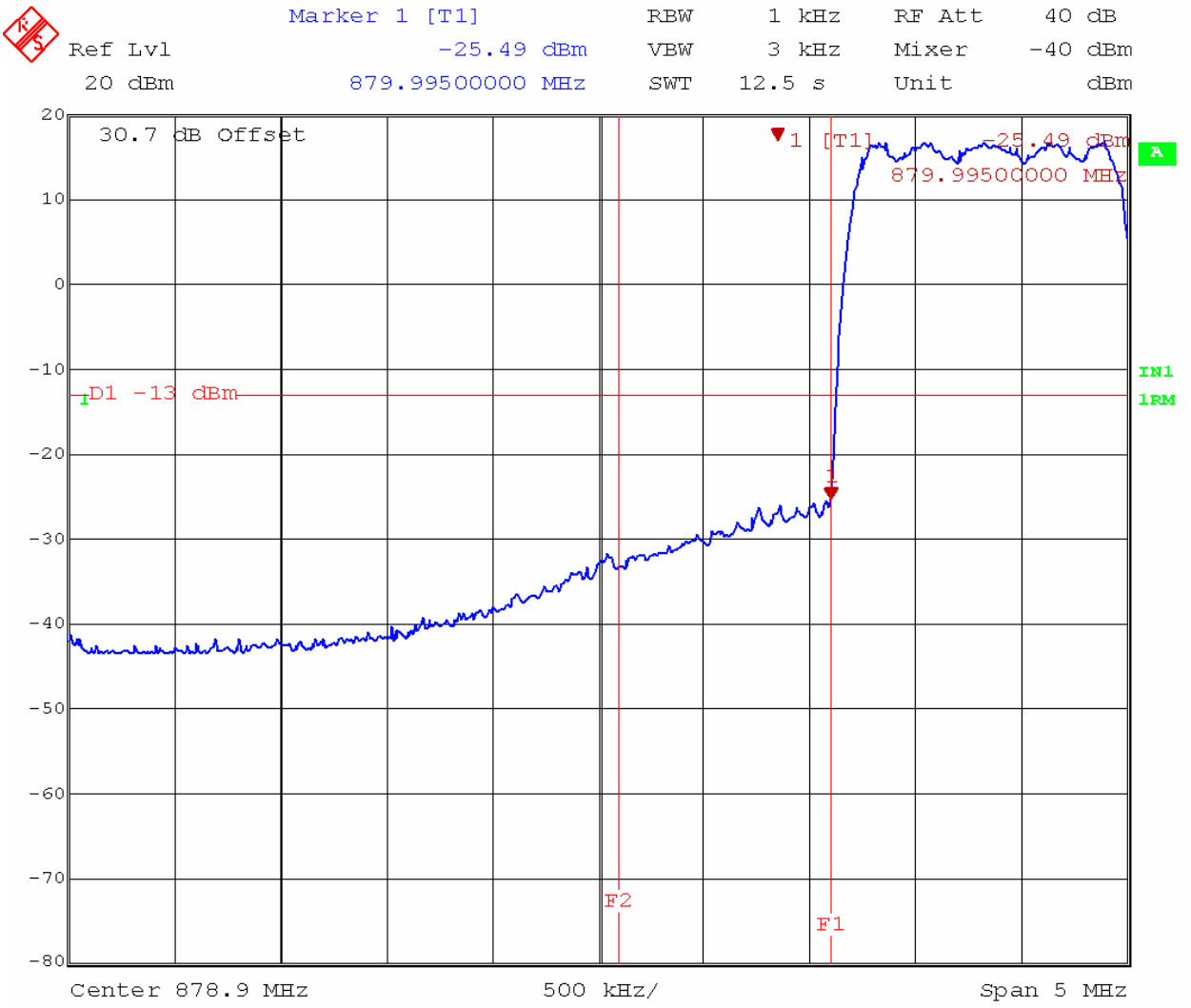
Title: UTStarcom BTS
Comment A: Upper A Band Edge 9th
Date: 1.AUG.2007 14:22:14

Figure 20: Block A upper band edge (channel 308 transmitting – 10th 100.8 KHz integrated over Seven 14.4 KHz channels)



Title: UTStarcom BTS
Comment A: Upper A Band Edge 10th
Date: 1.AUG.2007 14:24:00

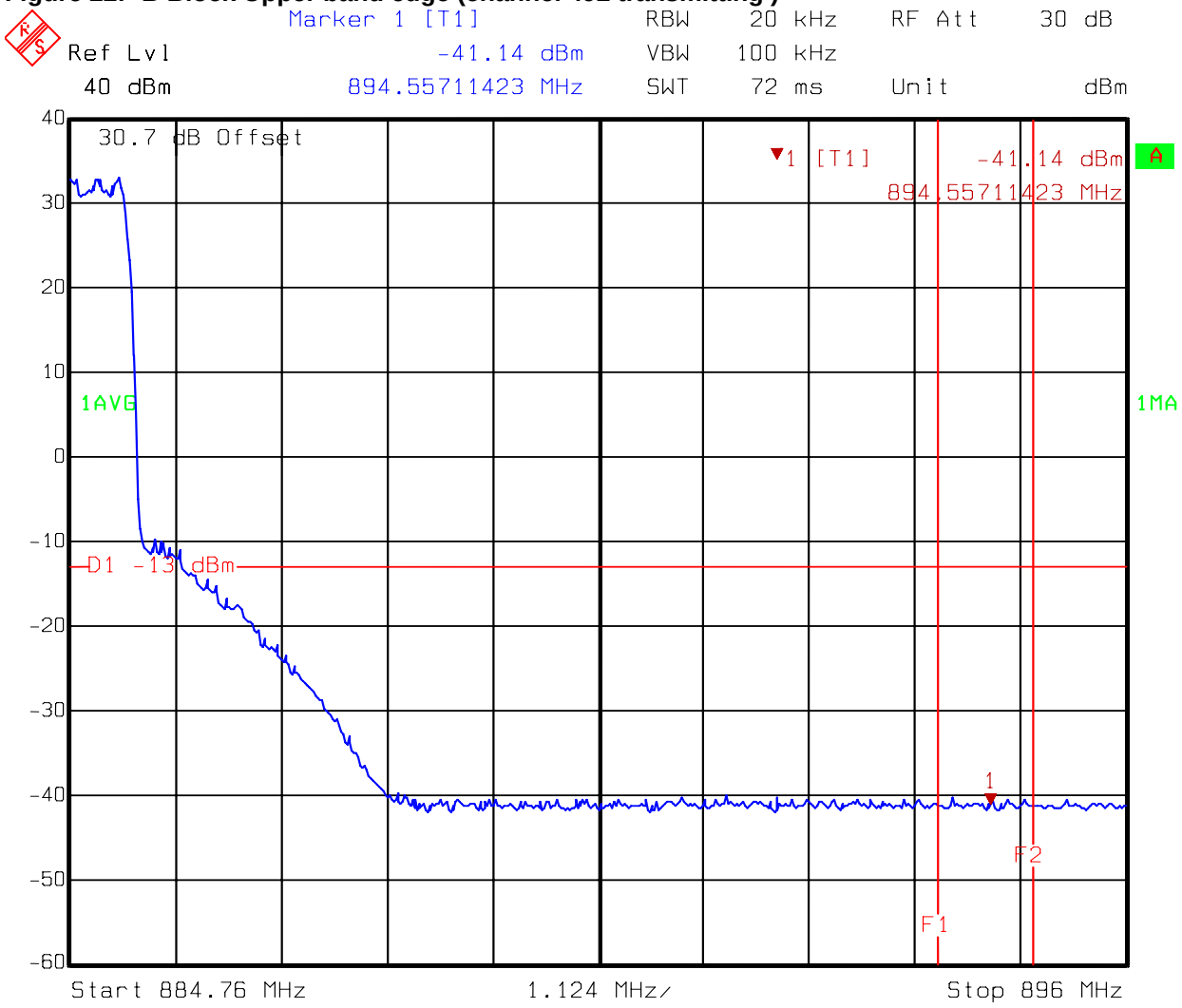
Figure 21: Block B lower band edge (channel 358 transmitting)



Note: Final level of -14.52 dBm was obtained by applying bandwidth correction factor (integrated power function not used). The measured level of – 25.49 as measured with 1 KHz RBW is corrected to 12.5 KHz BW reading by BWCF = 10 Log $\frac{12.5\ \text{KHz}}{1\text{KHz}}$ = 10.96dB.

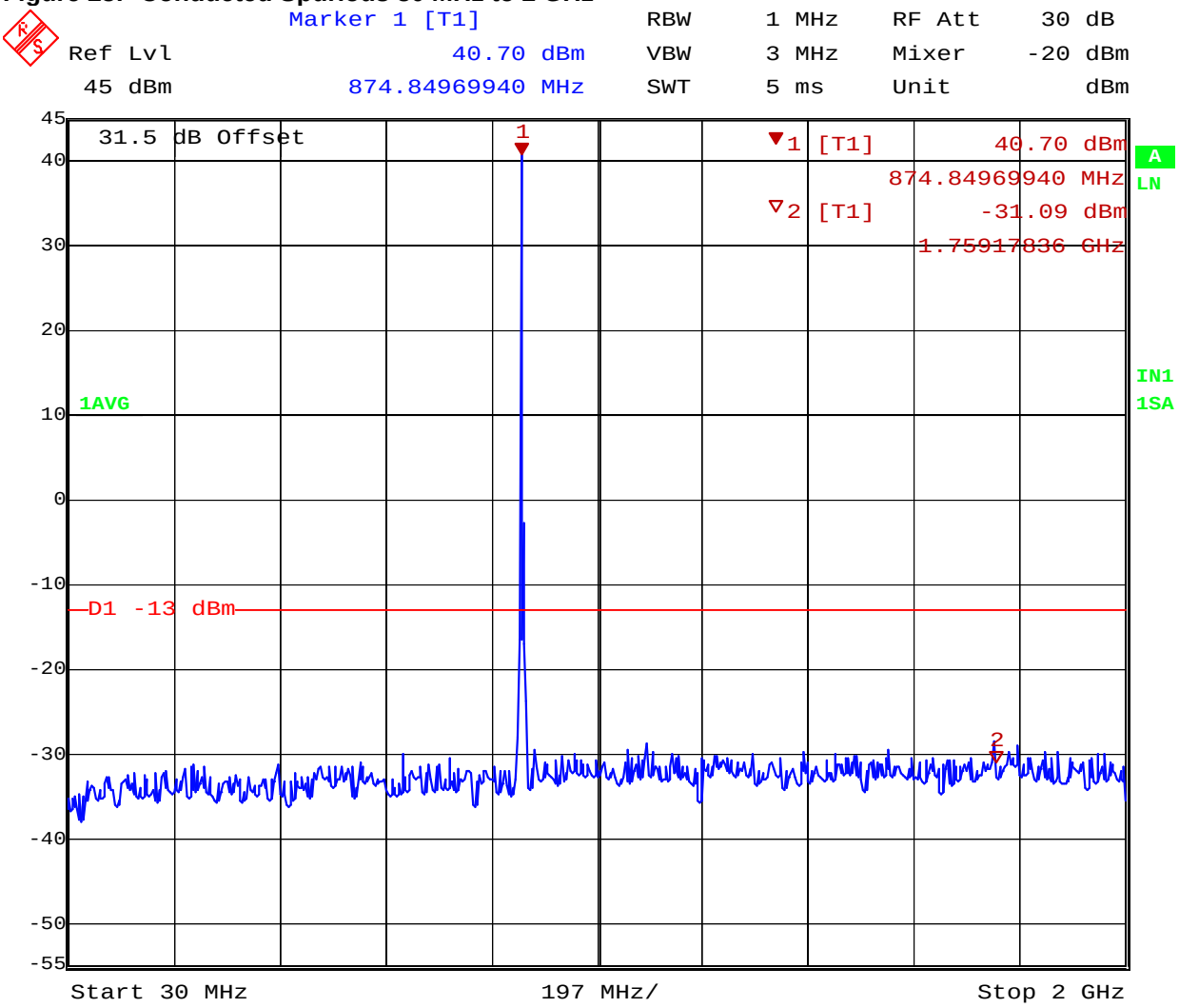
Therefore -25.49 dBm in 1 KHz BW = -14.52 dBm in a 12.5 KHz RBW

Figure 22: B Block Upper band edge (channel 492 transmitting)



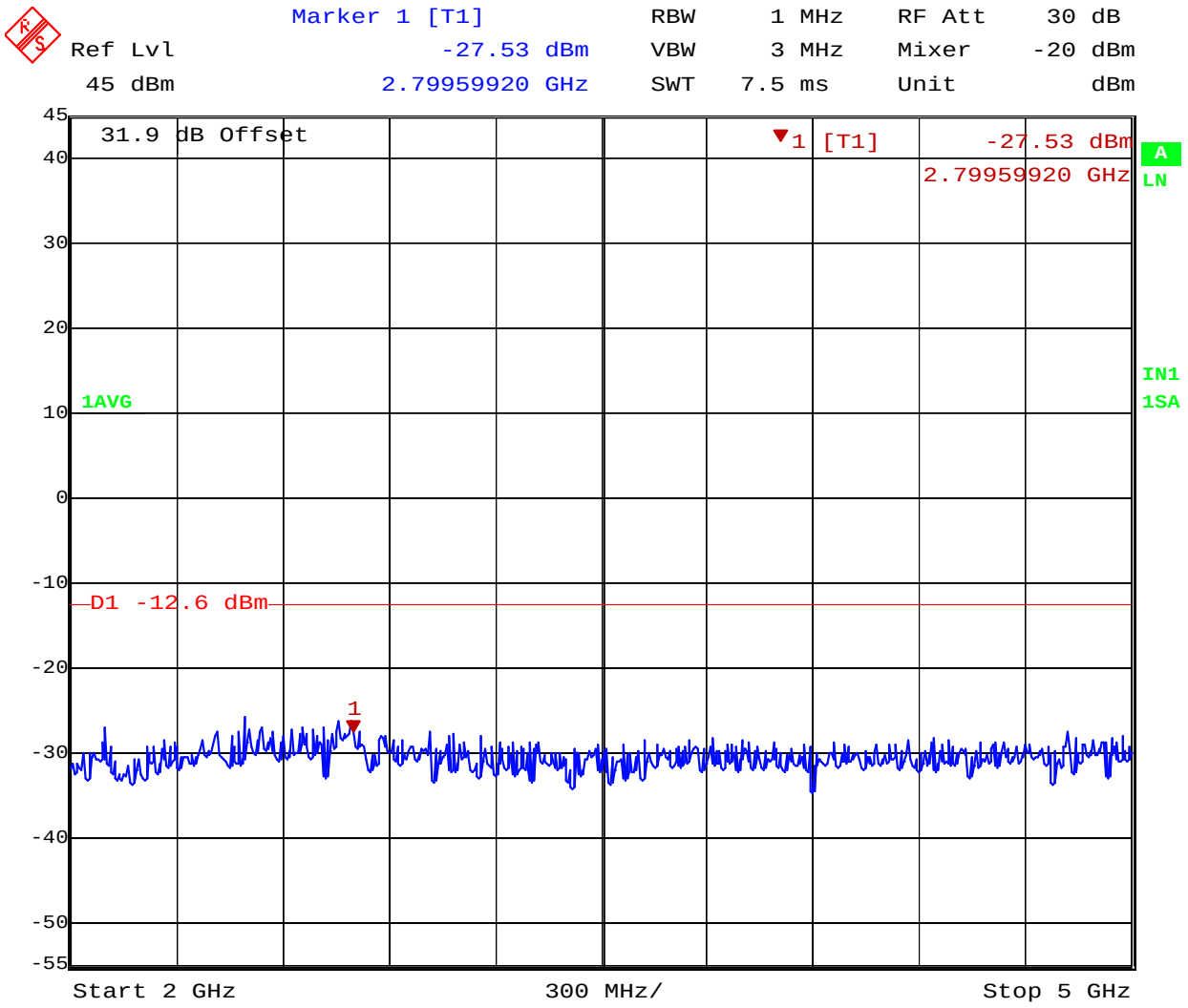
Comment A: UTStarcom Band Edge Inner upper ch 492
Date: 27.JUL.2007 16:27:57

Figure 23: Conducted Spurious 30 MHz to 2 GHz



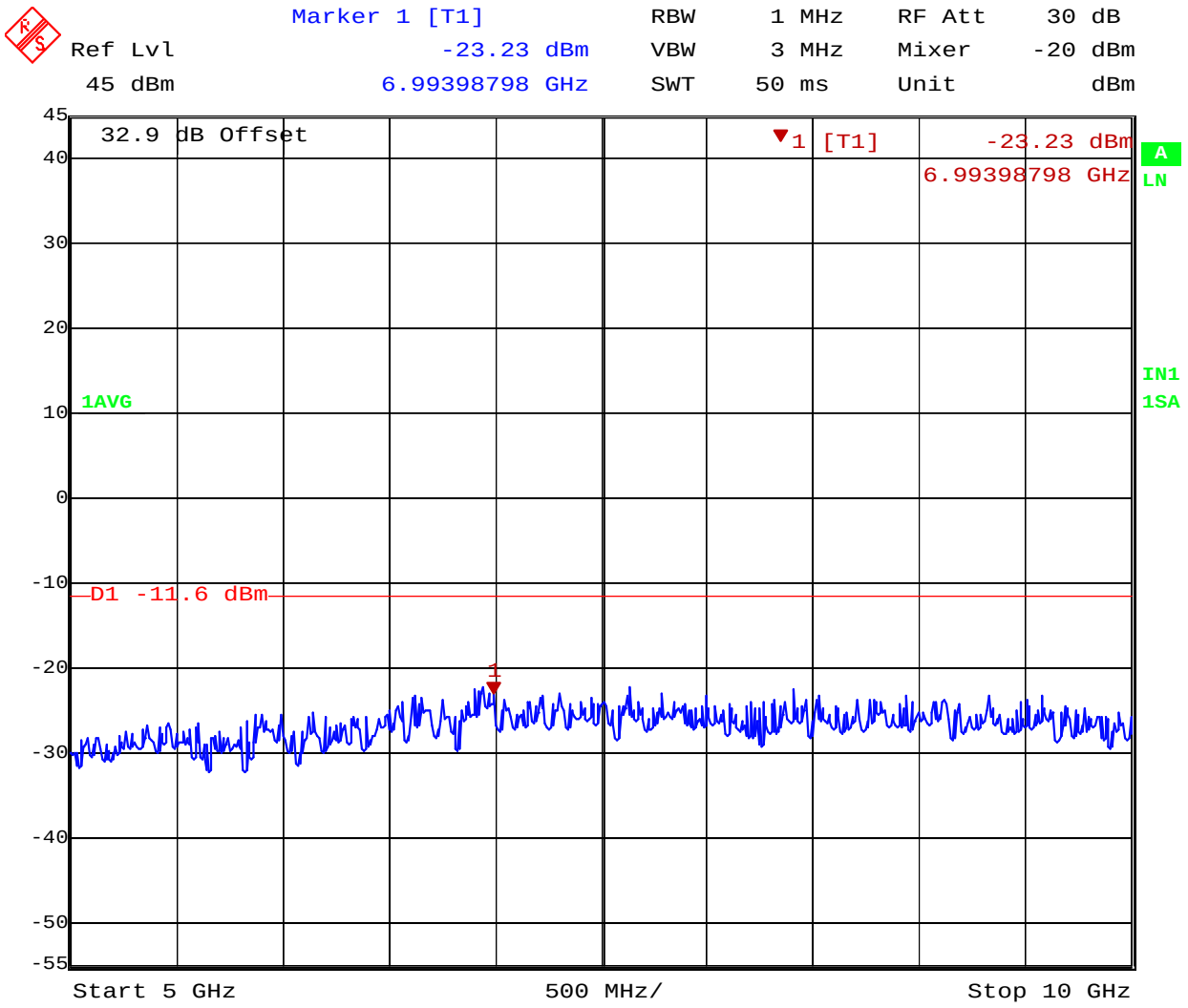
Title: UTStarcom BTS
Comment A: Conducted Spurious Ch 226
Date: 1.AUG.2007 15:02:03

Figure 24: Conducted Spurious 2 GHz – 5 GHz



Title: UTStarcom BTS
Comment A: Conducted Spurious Ch 226
Date: 1.AUG.2007 15:12:09

Figure 25: Conducted Spurious 5 GHz-10 GHz



Title: UTStarcom BTS
Comment A: Conducted Spurious Ch 226
Date: 1.AUG.2007 15:13:21

APPENDIX D: FREQUENCY STABILITY

D.1. Base Standard & Test Basis

Base Standard	FCC 22.355
Test Basis	FCC Part 2.1055
Test Method	FCC Part 2.1055/EIA/TIA 603

D.2. 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 temper ature 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 transmit ters) 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 equip ment.)

22.355

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.

Table C-1. - Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Base, fixed (ppm)	Mobile >3 watts (ppm)	Mobile <=3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.
450 to 512	2.5	5.0	5.0
821 to 896	**1.5**	**2.5**	**2.5**
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10.0	n/a	n/a

D.3. Measurement Uncertainty

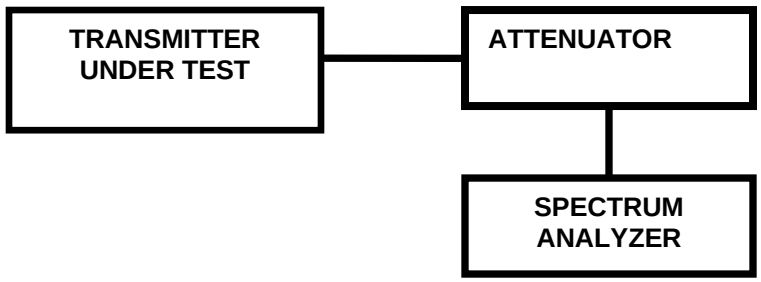
Expanded Uncertainty (K=2)
1.11/-1.22

D.4. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

D.5. Test Set Up

Figure 26: Frequency Stability setup



D.6. Test Results

Complies. The maximum frequency drift was 1.34 ppm.

Frequency stability data

Channel / Frequency (MHz)	Operating Conditions (degrees C)	Frequency Drift (ppm)
880.74	50	-0.86
880.74	40	0.03
880.74	30	-0.13
880.74	20	-1.34
880.74	20 (@ 55.2V)	-1.27
880.74	20 (@40.8 V)	-1.09
880.74	10	-0.92
880.74	0	-0.72
880.74	-10	-0.96
880.74	-20	-0.83
880.74	-30	-1.30

D.7. Tested By

This testing was conducted in accordance with the ISO 17025 scope of accreditation, table 1; Quality Manual.

Name: Spencer Watson
RF/EMC Specialist

APPENDIX E: TX RADIATED SPURIOUS EMISSIONS 30 MHZ – 10 GHZ

E.1. Base Standard & Test Basis

Base Standard	FCC Part 22.917
Test Basis	FCC 2.1053
Test Method	TIA/EIA 603 – B 2002

E.2. Specifications

TX Spurious emissions

Cell Mode:

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

(b) *Measurement procedure.* Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz or 1 percent of emission bandwidth, as specified). 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 emissions are attenuated at least 26 dB below the transmitter power.

E.3. Measurement Uncertainty

Radiated Emissions	Measurement Uncertainty	Expanded Uncertainty (K=2)
30 MHz – 1 GHz	+2.32/-2.36	+4.65/-4.72
1 GHz – 20 GHz	+3.48/-3.51	+6.96/-7.02

E.4. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

E.5. Test Results

No spurious emissions were detected within 20 dB of the limit in any operating mode

E.6. Observations

The EUT was operating in RX and TX mode during this test.

E.7. Deviations from Normal Operating Mode During Test

None.

E.8. Sample Calculation

Emission Level = Measured Level + Correction Factors.
Margin = Limit – Emission Level.

E.9. Test Data

Plots were not provided in order to reduce file size.

E.10. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name:	Glen Moore
Function:	EMC Manager

APPENDIX F: TEST EQUIPMENTS LIST

F.1. Radiated Emissions 30 MHz – 1 GHz Measurement Equipment

Description	Manufacturer	Type/Model	Asset #	Cal Due	Cal Date
10m ANECHOIC CHAMBER					
Bilog Antenna	Chase	CBL 6112B	CG0314	24AUG07	24AUG06
RF Cable	Suhner Sucoflex	Ferrite bead loaded cable	CG0398	13APR08	13APR06
CONTROL ROOM					
Test Receiver	Rohde & Schwarz	ESMI	CG0433/ CG0434	27FEB08	27FEB07
Mast Controller	EMCO	2090	CG0179	N/A	N/A
Multi Device Controller TT1 (Turntable)	EMCO	2090	CG0178	N/A	N/A
- Cable 1	Suhner Sucoflex	NA	CG0690	13APR08	13APR06
- Amplifier	Hewlett Packard	8447F	CG0177	13APR08	13APR06

F.2. Radiated Emissions 1 GHz – 20 GHz Measurement Equipment

Description	Manufacturer	Type/Model	Asset #	Cal Due	Cal Date
10m ANECHOIC CHAMBER					
Horn Antenna (Rx) 1 GHz – 18 GHz	☒ EMCO	3115	CG0103	30AUG07	30AUG06
Standard Gain Horn (Rx) 18 GHz – 26.5 GHz	☒ EMCO	3160-09	CG0075	N/A	27NOV01
High pass filter f >1000 MHz	☒ MicroTronics	HPM14576	CG0963	10AUG08	10AUG06
LNA 1 GHz < f < 18 GHz	☒ Miteq	JSD00121	CG0317	10AUG08	10AUG06
LNA 18 GHz < f < 26.5 GHz	☒ Miteq	JSD00119	CG0482	19JAN08	19JAN07
Cable from LNA's to SA	Sucoflex 100	115757-4	CG0686	10AUG08	10AUG06
Spectrum Analyzer 9 kHz – 40 GHz	Rohde & Schwarz	FSEK-20	CG0118	19JUN08	19JUN07
LNA DC Power Supply	Xantrex	LXO 30-2	CG0493	NA	NA
HPIB Extender	HP	37204	CG0110	N/A	N/A
CONTROL ROOM					
PC with FSEK Manual ctrl S/W	N/A	N/A	N/A	N/A	N/A
HPIB Extender	HP	37204	CG0181	N/A	N/A
Mast Controller	EMCO	2090	CG0179	N/A	N/A
Multi Device Controller TT1	EMCO	2090	CG0178	N/A	N/A

F.3. Radio Measurement Equipment

Descriptions		Manufacturer	Type/Model	Serial #	Cal Due	Cal Date
EMI Receiver 9 kHz – 40 GHz	☒	Rohde & Schwarz	ESI	CG0109	13SEP07	13SEP06
Power Meter	☒	Agilent	E4418B	CG0119	21MAY08	21MAY07
Power Meter Sensor	☒	Hewlett Packard	8481A	CG0264	21MAY08	21MAY07
Attenuator	☒	Weinschel	30 dB	BM6254	30APR09	30APR07
RF cable	☒	Sucoflex	104	263166	30APR09	30APR07
RF cable	☒	Sucoflex	104	115760	30APR09	30APR07
Temperature Chamber	☒	Thermotron	SM-8C	CG0836	NA	NA
Data Acquisition / Switch Unit	☒	Hewlett Packard	34970A	CG0016	27NOV07	27NOV06
20 Channel Multiplexer	☒	Agilent	34901A	CG0967	27NOV07	27NOV06
AC Power Source	☒	ELGAR	SS66-3 AV3	CG0145	NA	NA

END OF DOCUMENT