Nemko Test Report:	27043RUS1
Applicant:	Andrew Corporation 620 N. Greenfield Parkway Garner, NC 27529 USA
Equipment Under Test: (E.U.T.)	AF7037
FCC Identifier:	**BCR-AF7037**
In Accordance With:	**CFR 47 Part 90, Subpart I** Private Land Mobile Repeater
Tested By:	Nemko USA Inc. 802 N. Kealy Lewisville, TX 75057-3136

TESTED BY: _____ **DATE:** **23 March 2009**

David Light, Senior Wireless Engineer

APPROVED BY: _____ **DATE:** **23 March 2009**

Tom Tidwell, Telecom Direct

Number of Pages: 41

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Andrew Corporation

Model No.: AF7037

Serial No.: 12

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with CFR Part 90, Subpart I.

☒	New Submission	☒	Production Unit
☐	Class II Permissive Change	☐	Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.
See " Summary of Test Data".

NVLAP®
LAB CODE: 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	90.635	1 kW ERP	Complies
Occupied Bandwidth	90.210	Input/Output	Complies
Spurious Emissions at Antenna Terminals	90.210	Plots	Complies
Field Strength of Spurious Emissions	90.210		Complies
Frequency Stability	90.213		NA

Footnotes For N/A's:

(1) Since the E.U.T. does not contain modulation circuitry modulation testing was not performed.
(2) Since the E.U.T. is not a keyed carrier system, Transient Frequency Behavior was not performed.

Section 2. General Equipment Specification

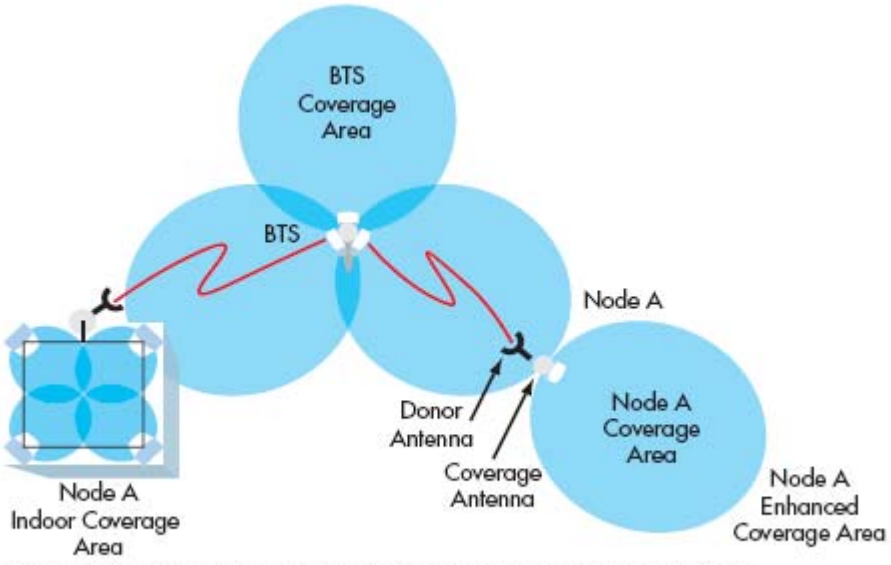
Transmitter

Supply Voltage Input:	120 Vac
Frequency Range:	763 to 775 MHz and 793 to 805 MHz
Type(s) of Modulation:	**F3E (Voice)** ☒ **F1D** ☒ **F2D** ☒ **DXW (TDMA)** ☐
Gain:	94 dB
Output Impedance:	50 ohms
RF Power Output (rated):	5 W 37 dBm
Operator Selection of Operating Frequency:	Software controlled
Power Output Adjustment Capability:	Software controlled
Frequency Translation:	**F1-F1** ☒ **F1-F2** ☐ **N/A** ☐
Band Selection:	**Software** ☒ **Duplexer Change** ☐ **Fullband Coverage** ☐

Description of EUT

The Node A is an RF enhancer which is capable of filtering and amplifying a multitude of distinct sub-bands up to 120 MHz in total anywhere within multiple frequency bands. It is designed to be part of the primary infrastructure.

System Diagram



Scenario: Extending Coverage for buildings and small coverage holes

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.985
TESTED BY: David Light	DATE: 19 March 2009

Test Results: Complies.

Measurement Data:

Direction	Modulation	Output per Channel (dBm)	Composite Power (dBm)	Composite Power (W)
Uplink	Analog	24	27	0.5
Downlink	Analog	34	37	5.0
Uplink	TDMA	24	27	0.5
Downlink	TDMA	34	37	5.0

Equipment Used: 1036-1082-1469-1472

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 35 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.989
TESTED BY: David Light	DATE: 19 March 2009

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1082-1469-1472

Measurement Uncertainty: $1X10^{-7}$ ppm

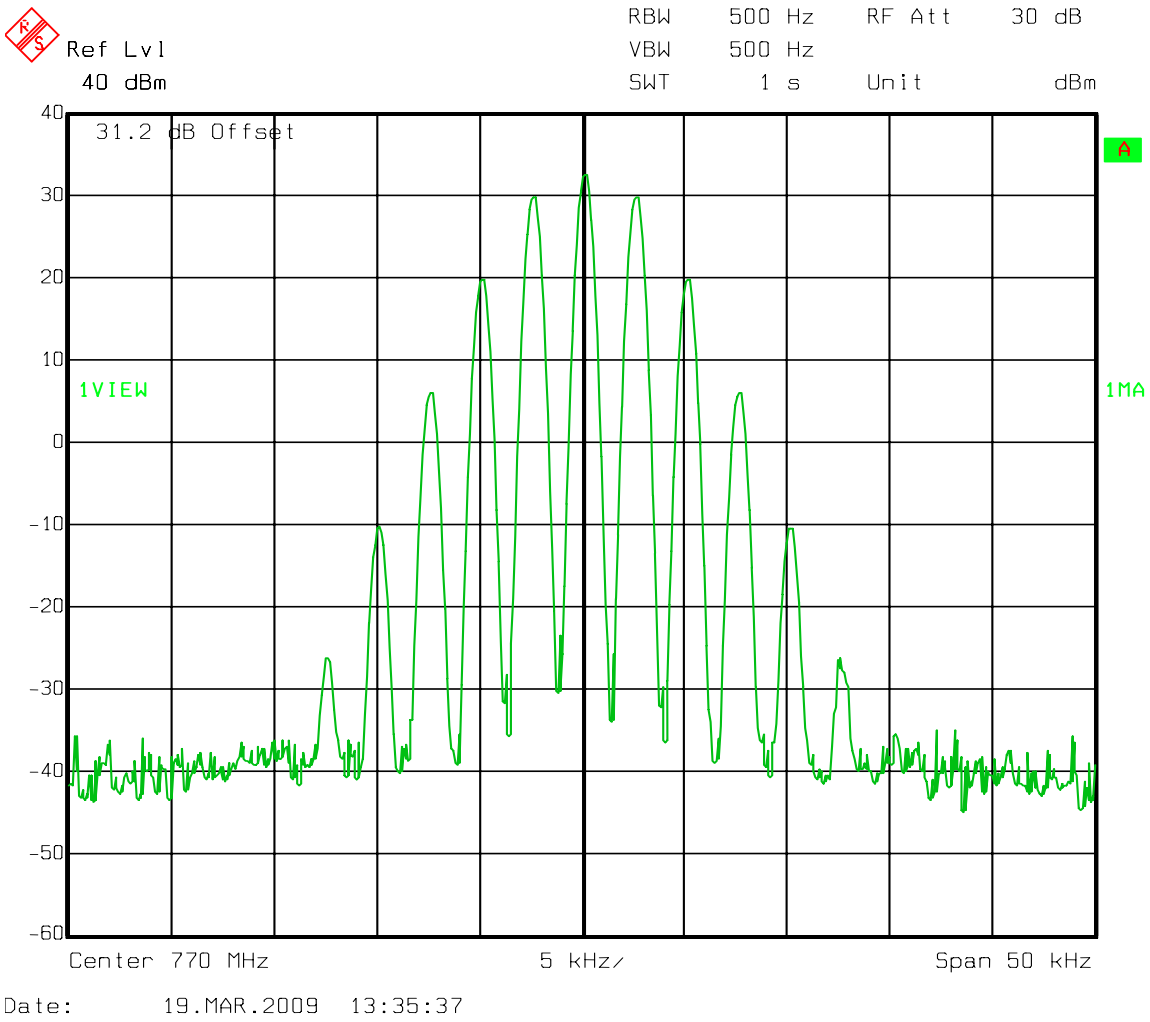
Temperature: 22 °C

Relative Humidity: 35 %

Test Data – Occupied Bandwidth

Analog – Output

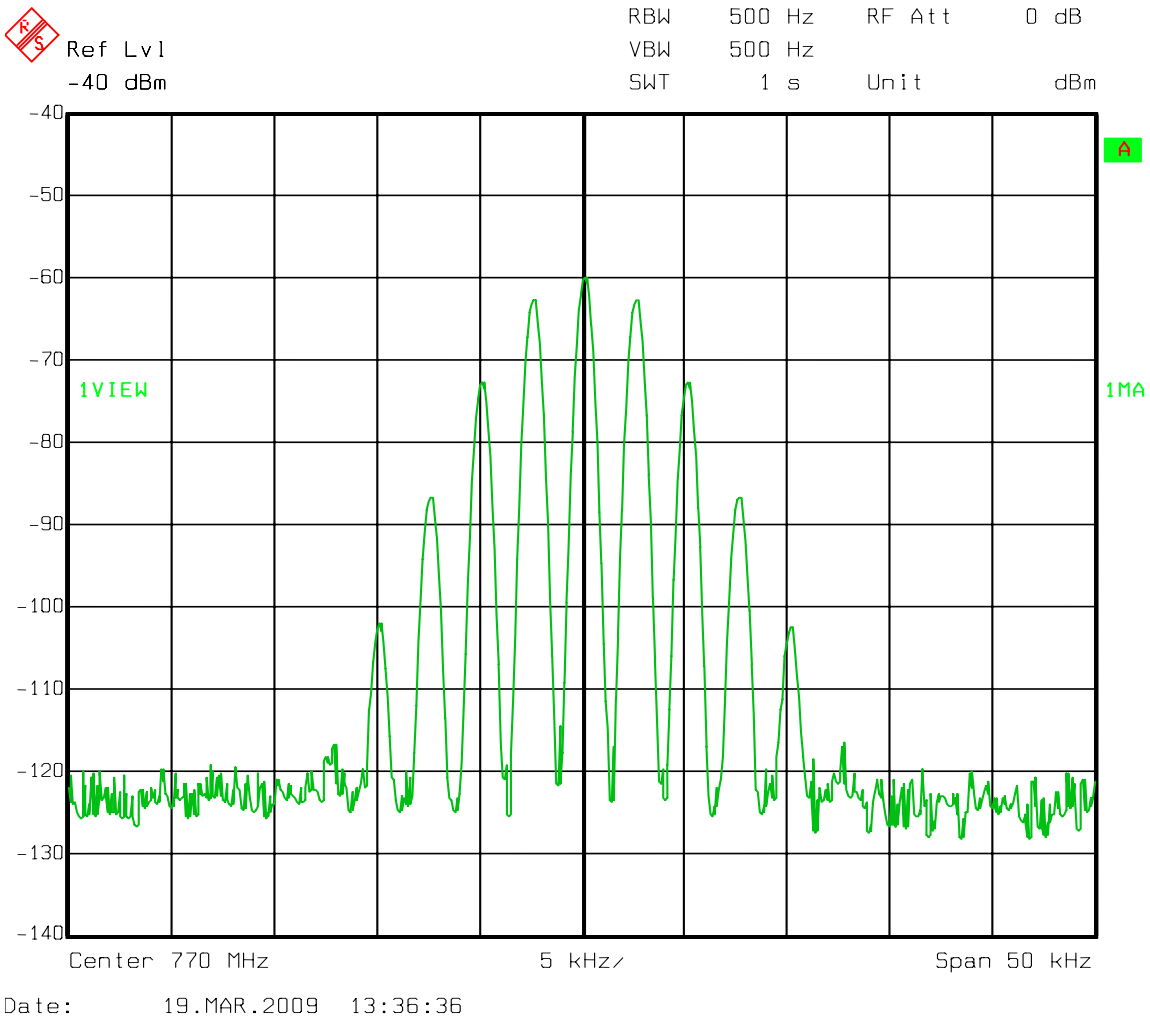
Downlink



2.5 kHz ton / 3 kHz deviation

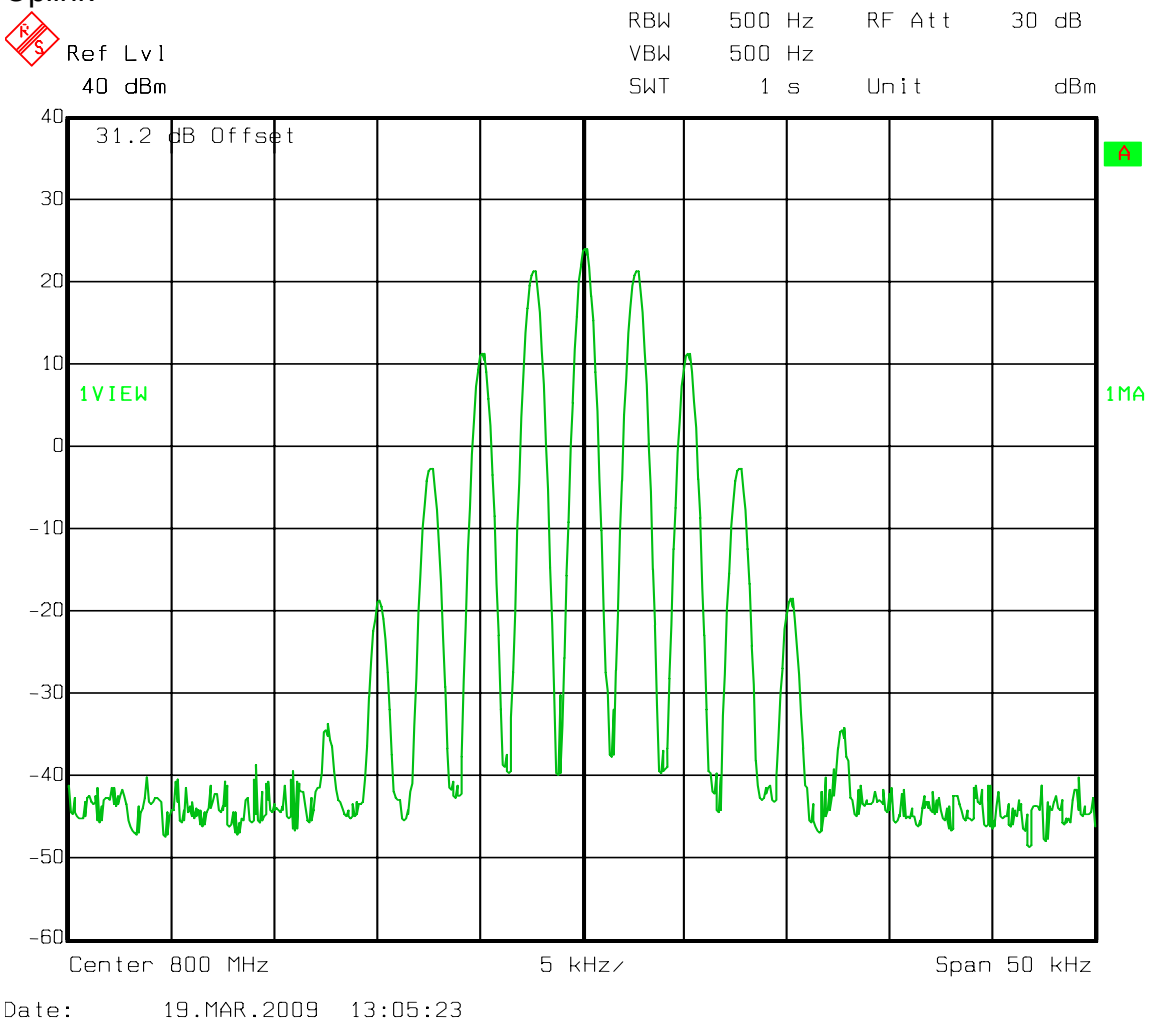
Test Data – Occupied Bandwidth

Analog - Input
Downlink



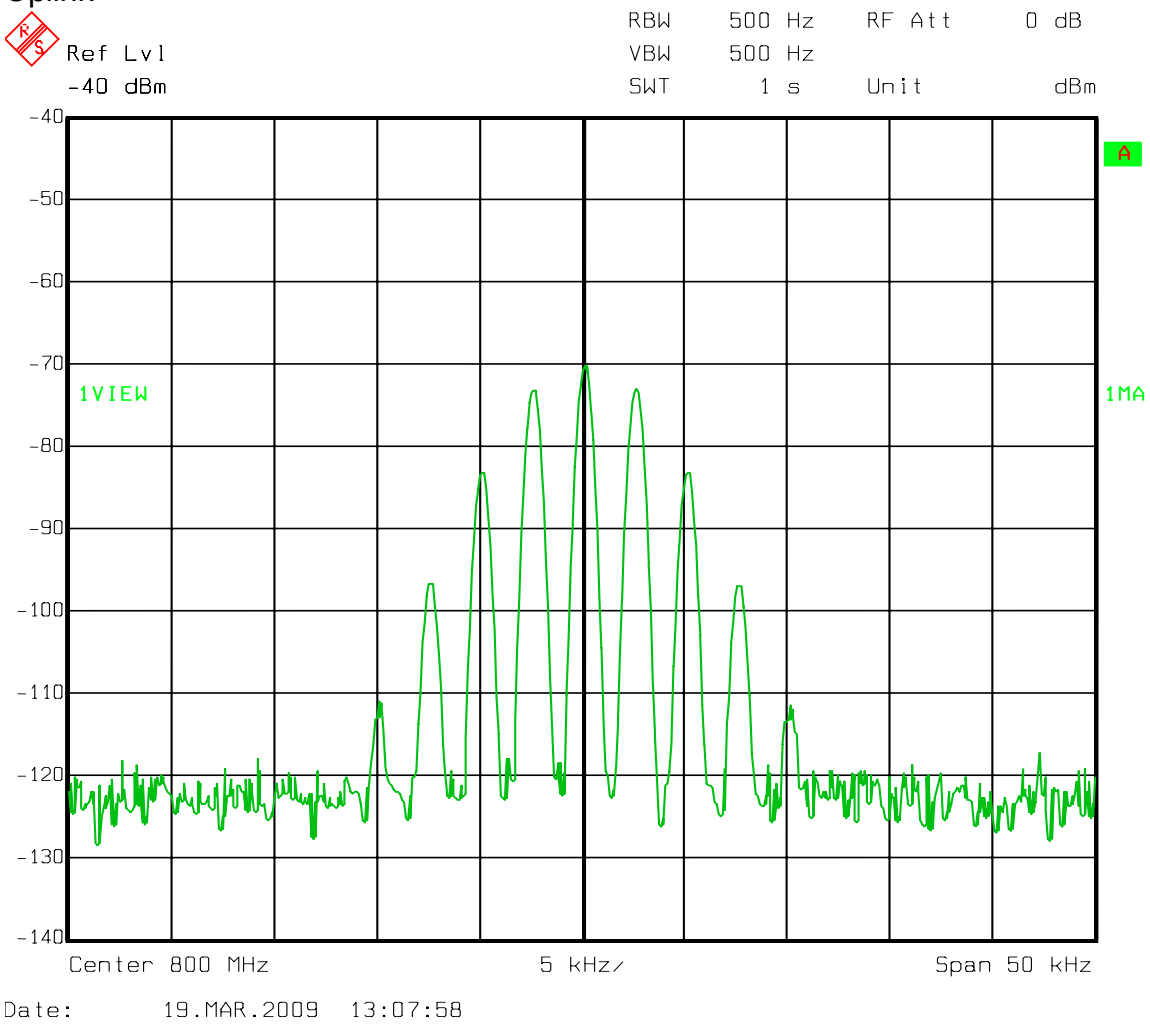
Test Data – Occupied Bandwidth

Analog - Output
Uplink



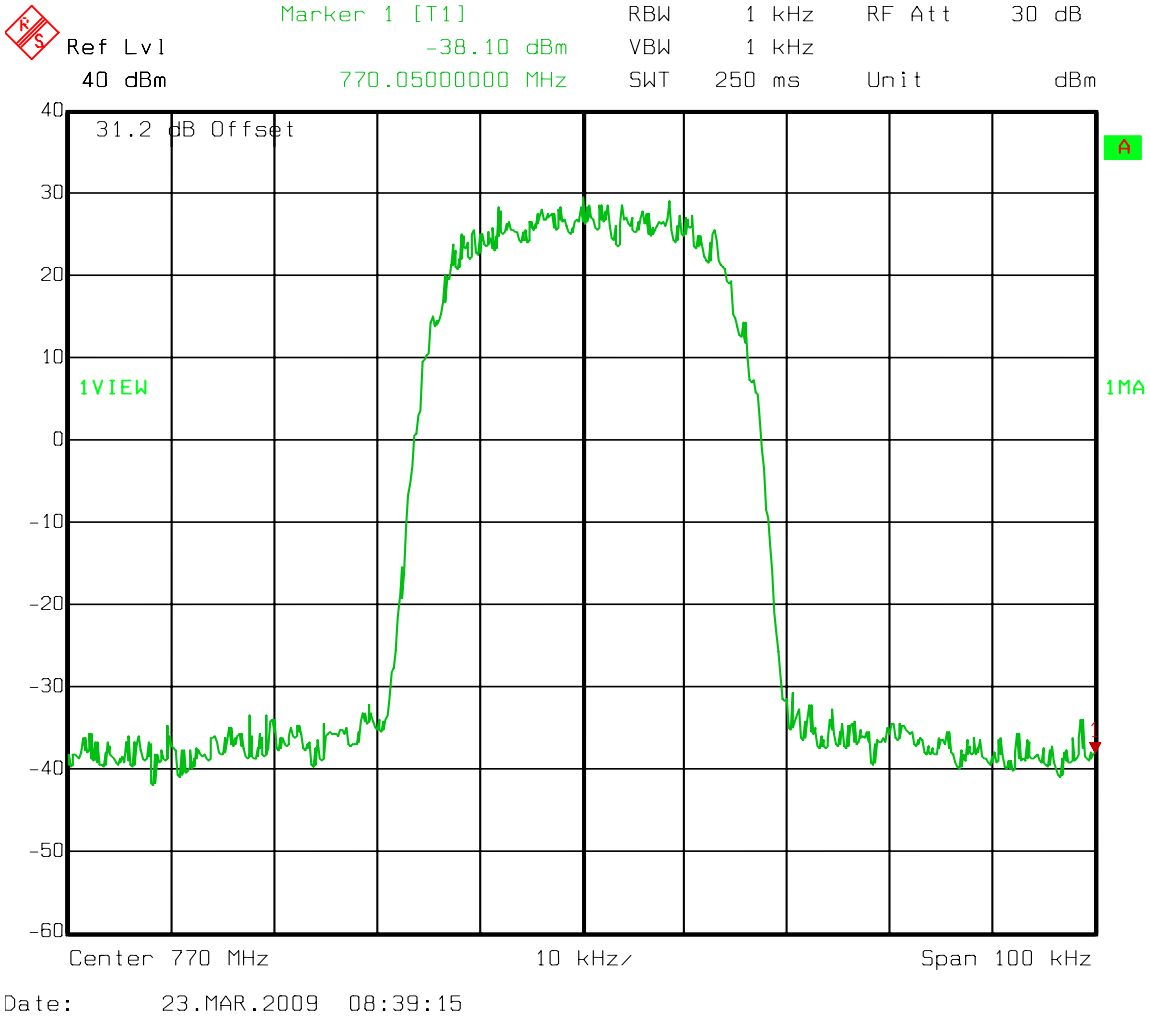
Test Data – Occupied Bandwidth

Analog - Input
Uplink



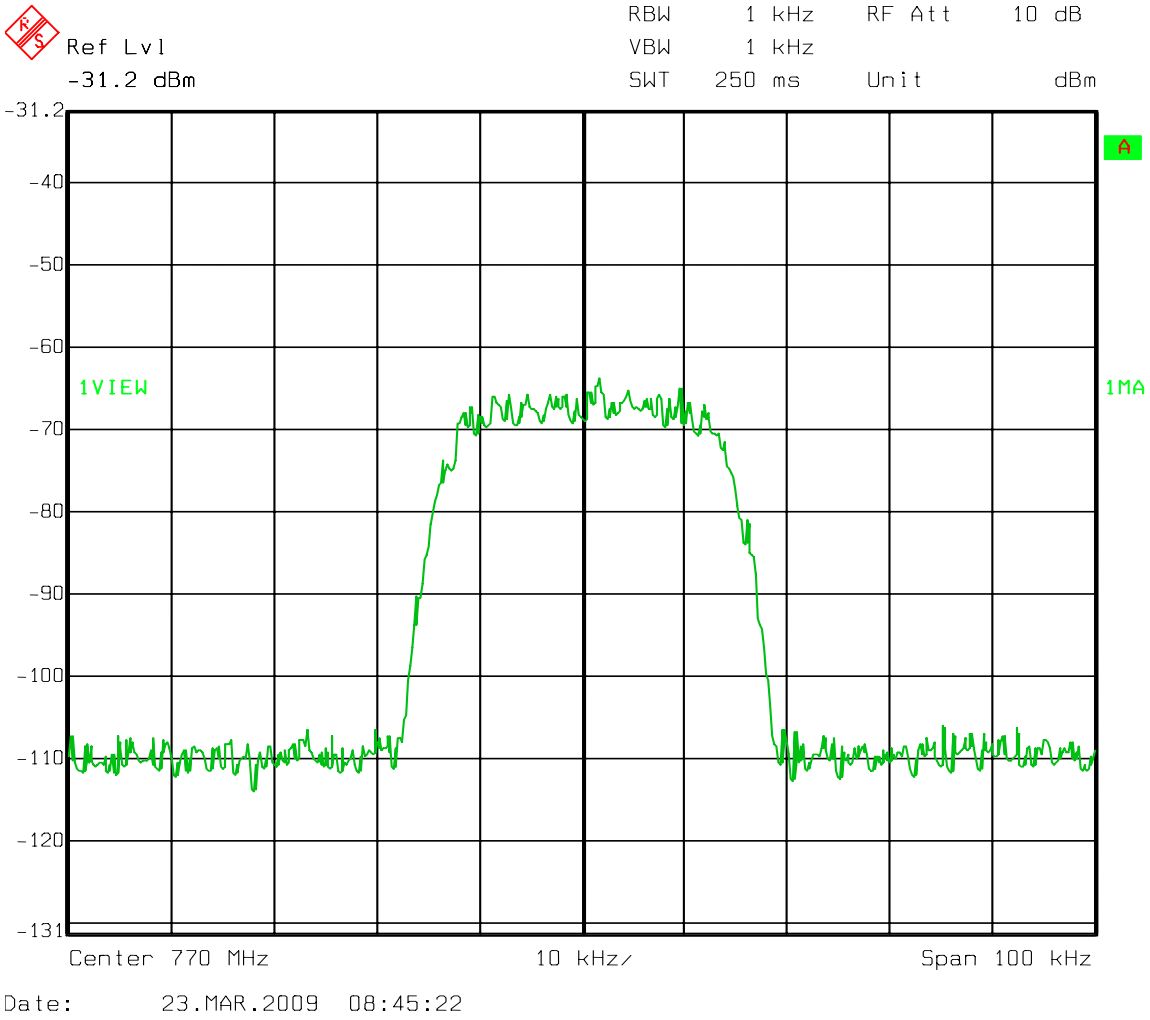
Test Data

Occupied Bandwidth
Output
TDMA
Downlink



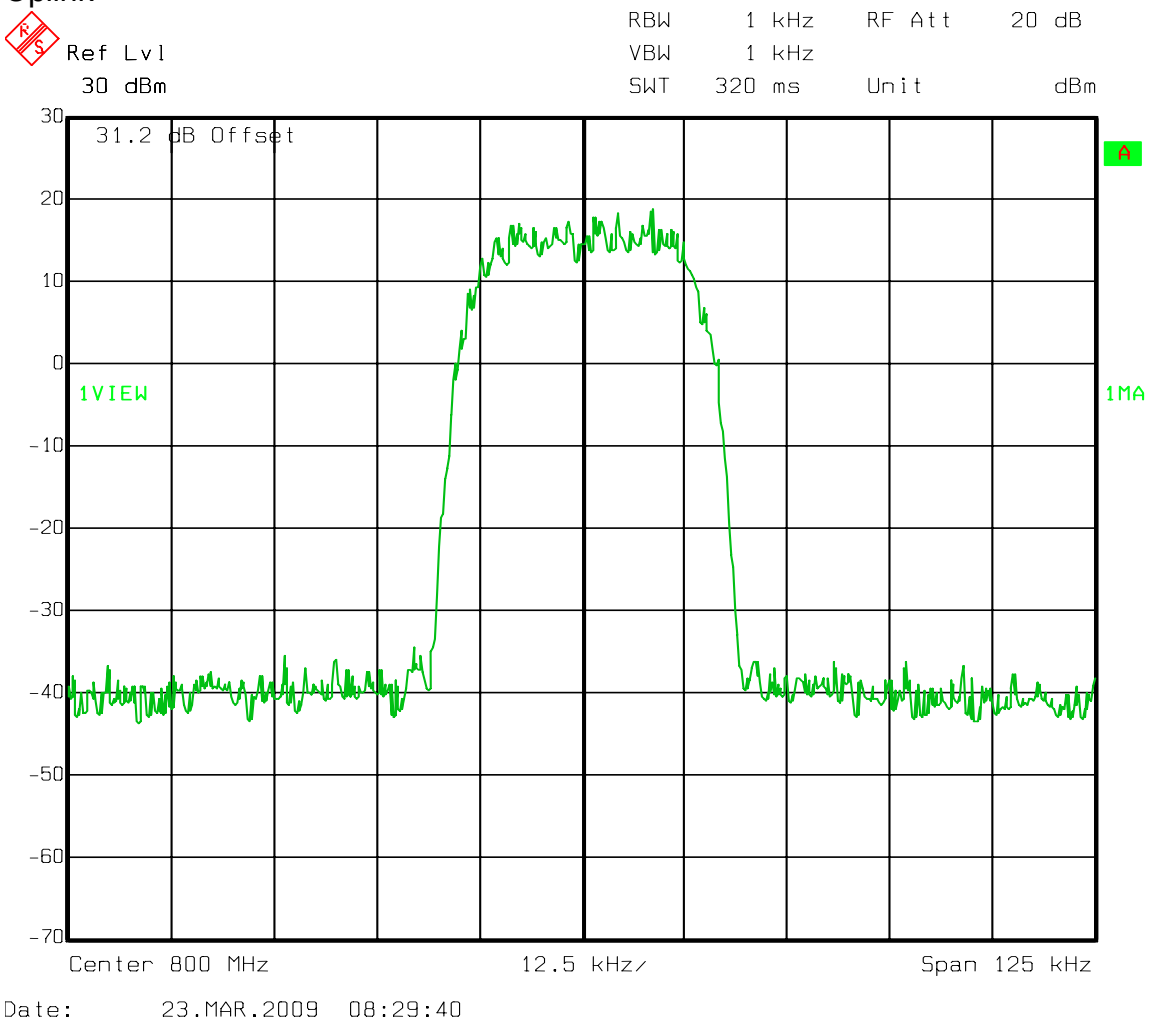
Test Data

Occupied Bandwidth
Input
TDMA
Downlink



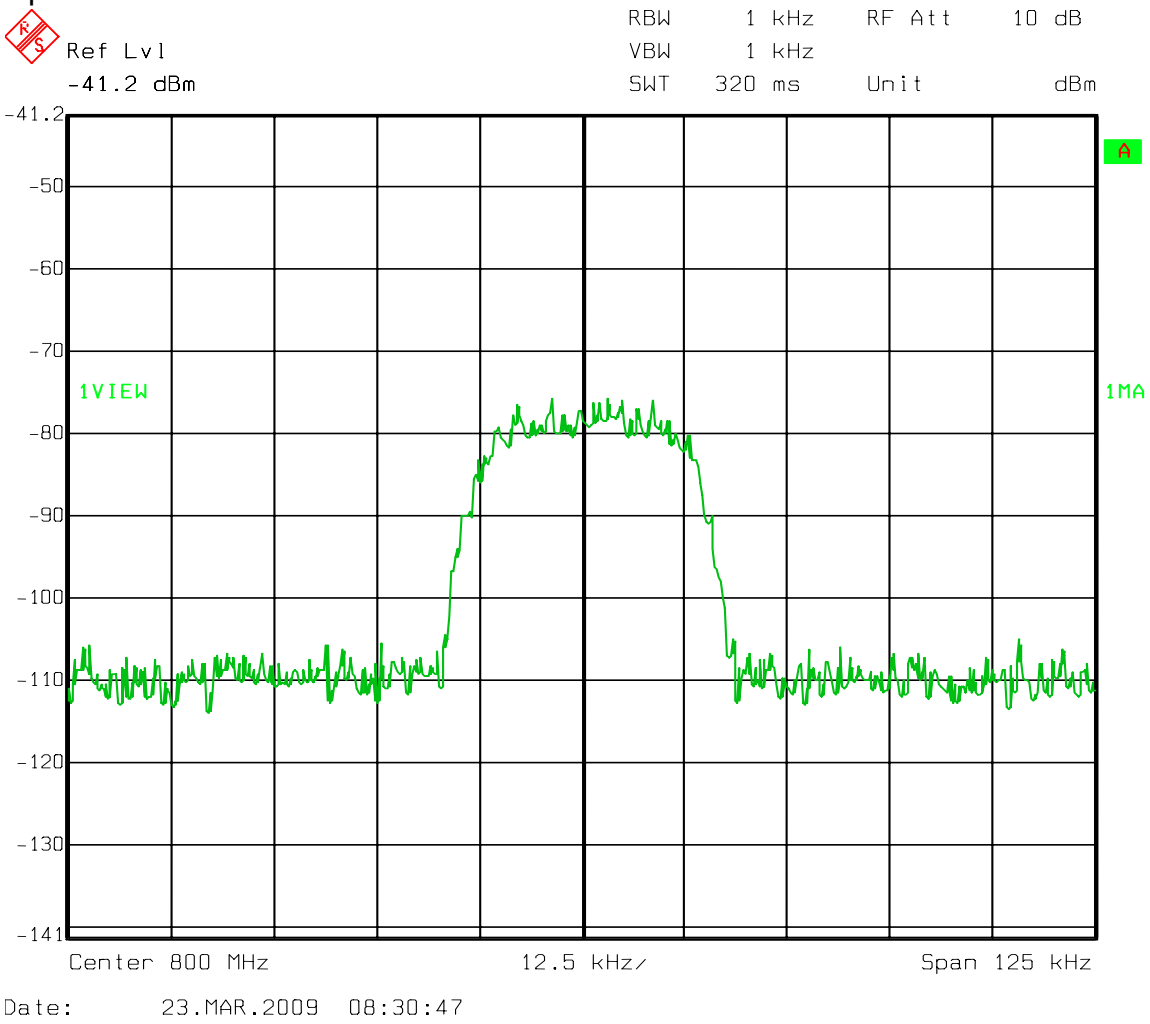
Test Data

Occupied Bandwidth
Output
TDMA
Uplink



Test Data

Occupied Bandwidth
Input
TDMA
Uplink



Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.991
TESTED BY: David Light	DATE: 19 March 2009

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1082-1472-1469

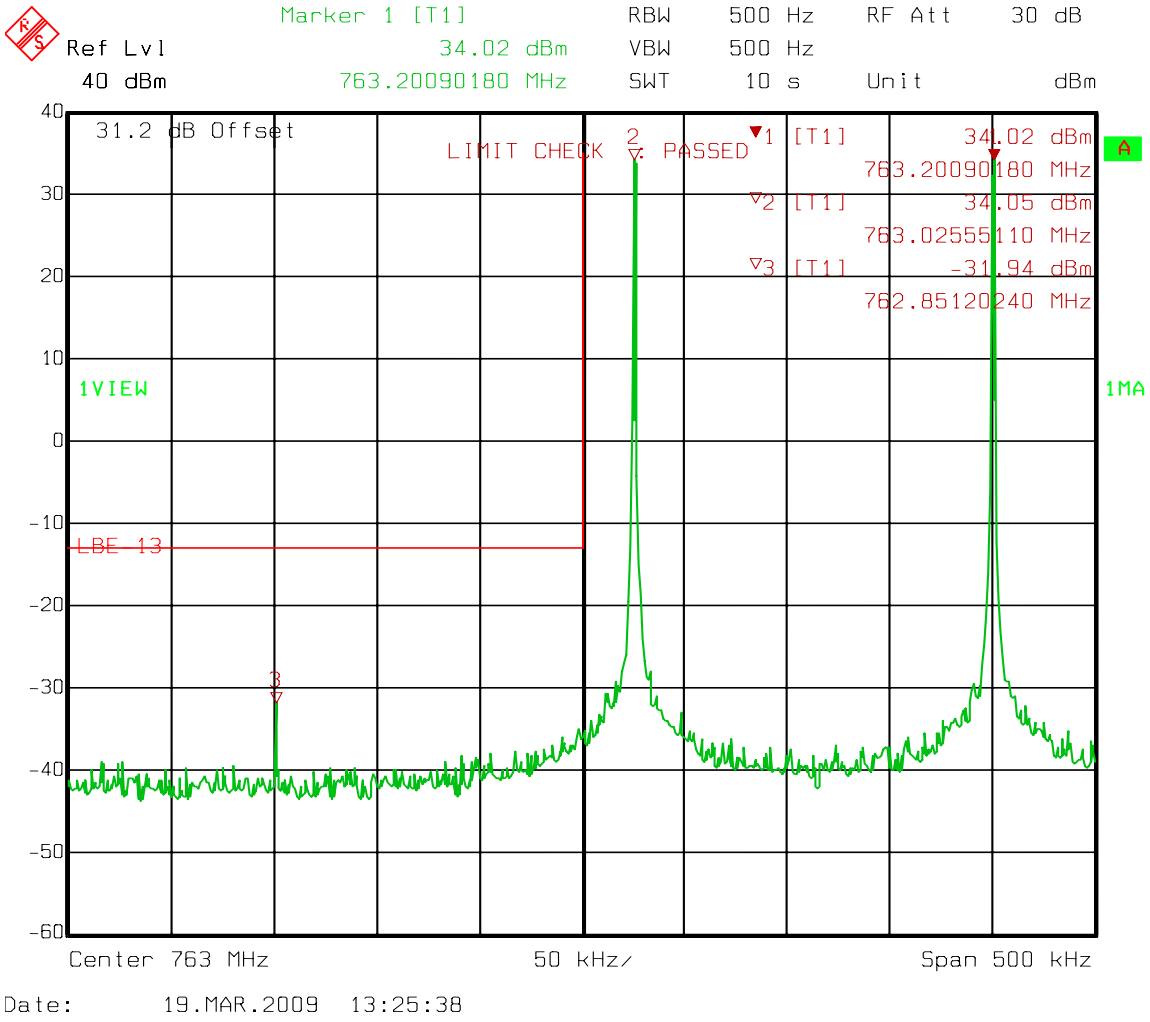
Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 35 %

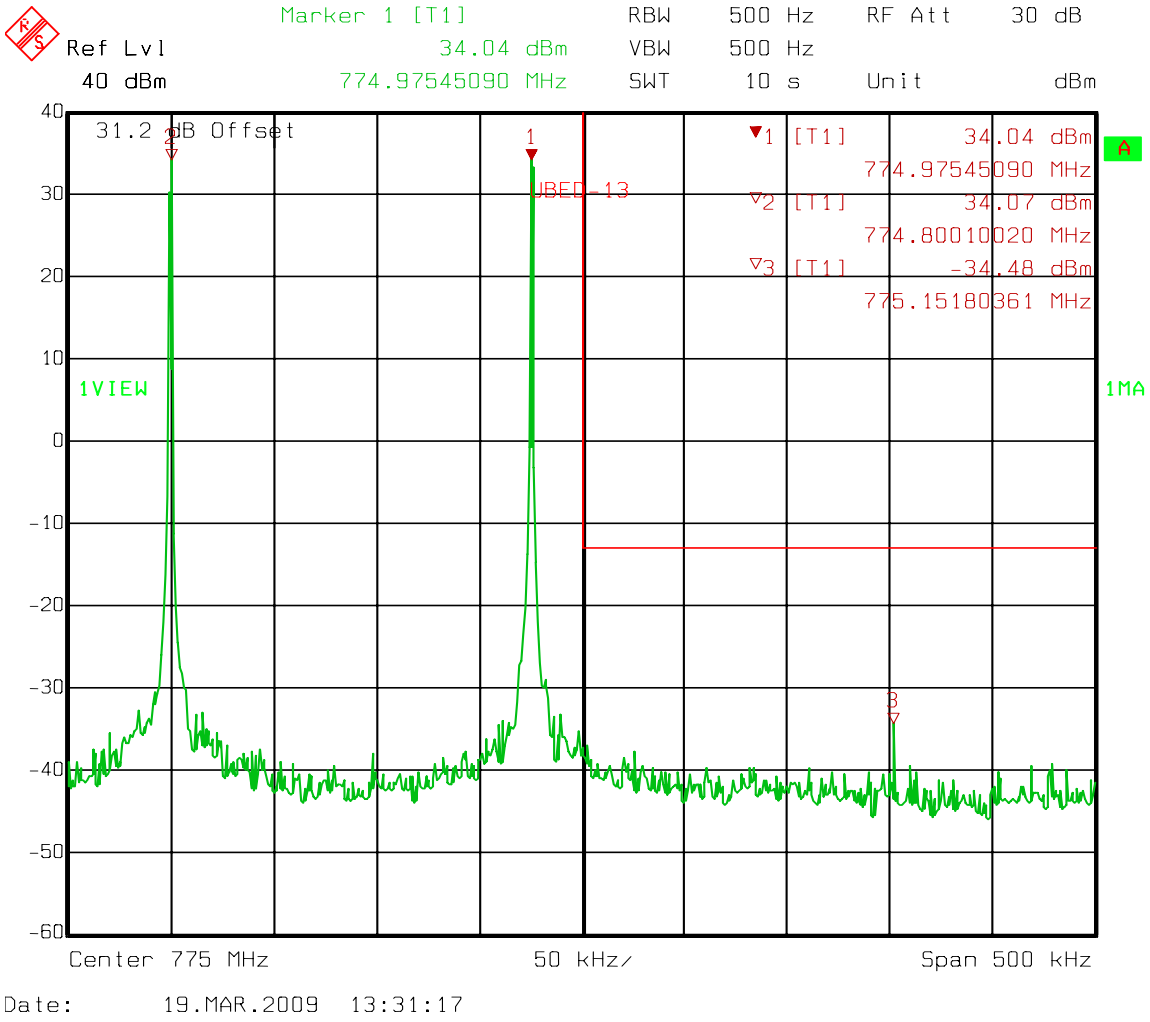
Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation
Analog
Downlink



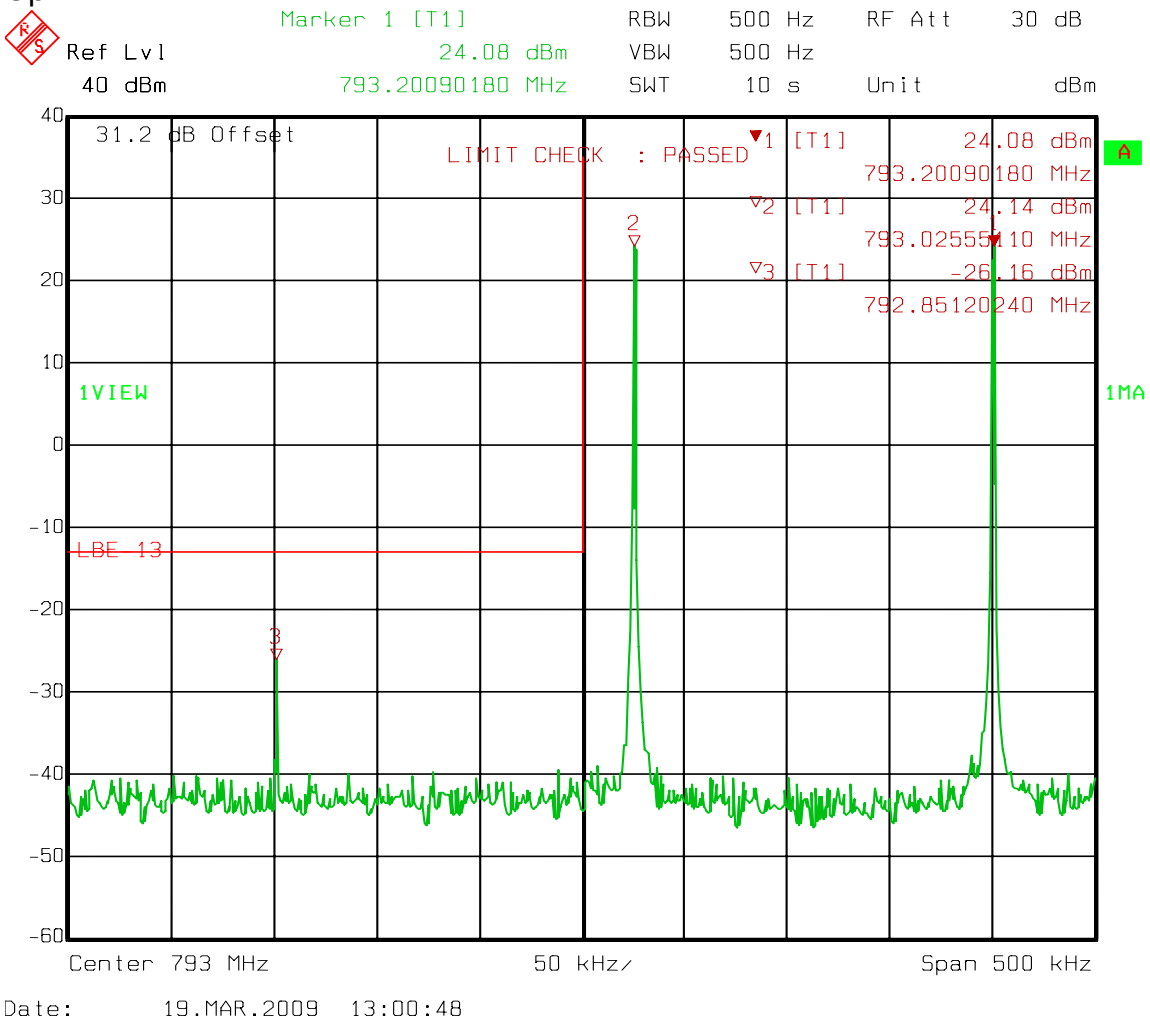
Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation
Analog
Downlink



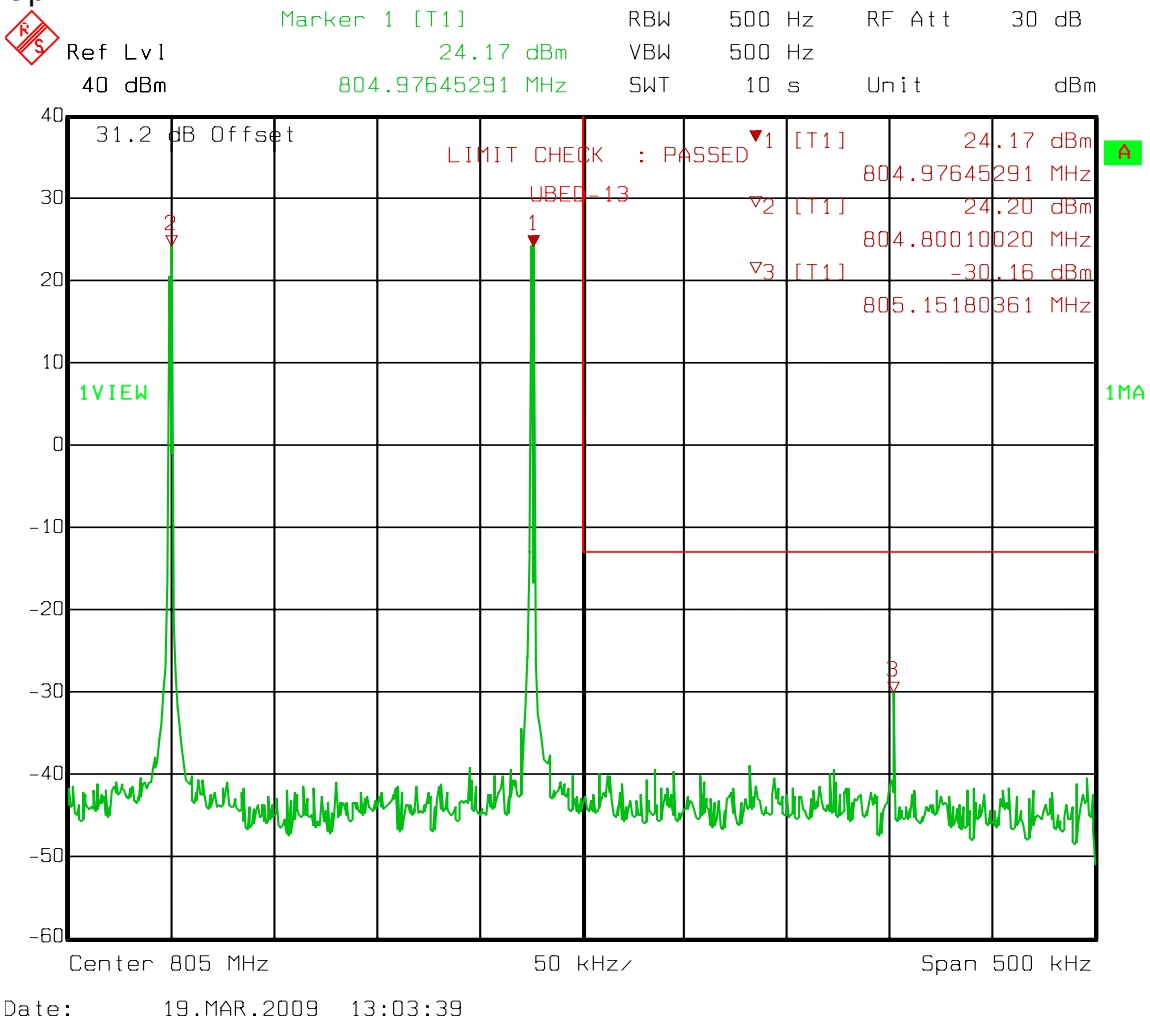
Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation
Analog
Uplink



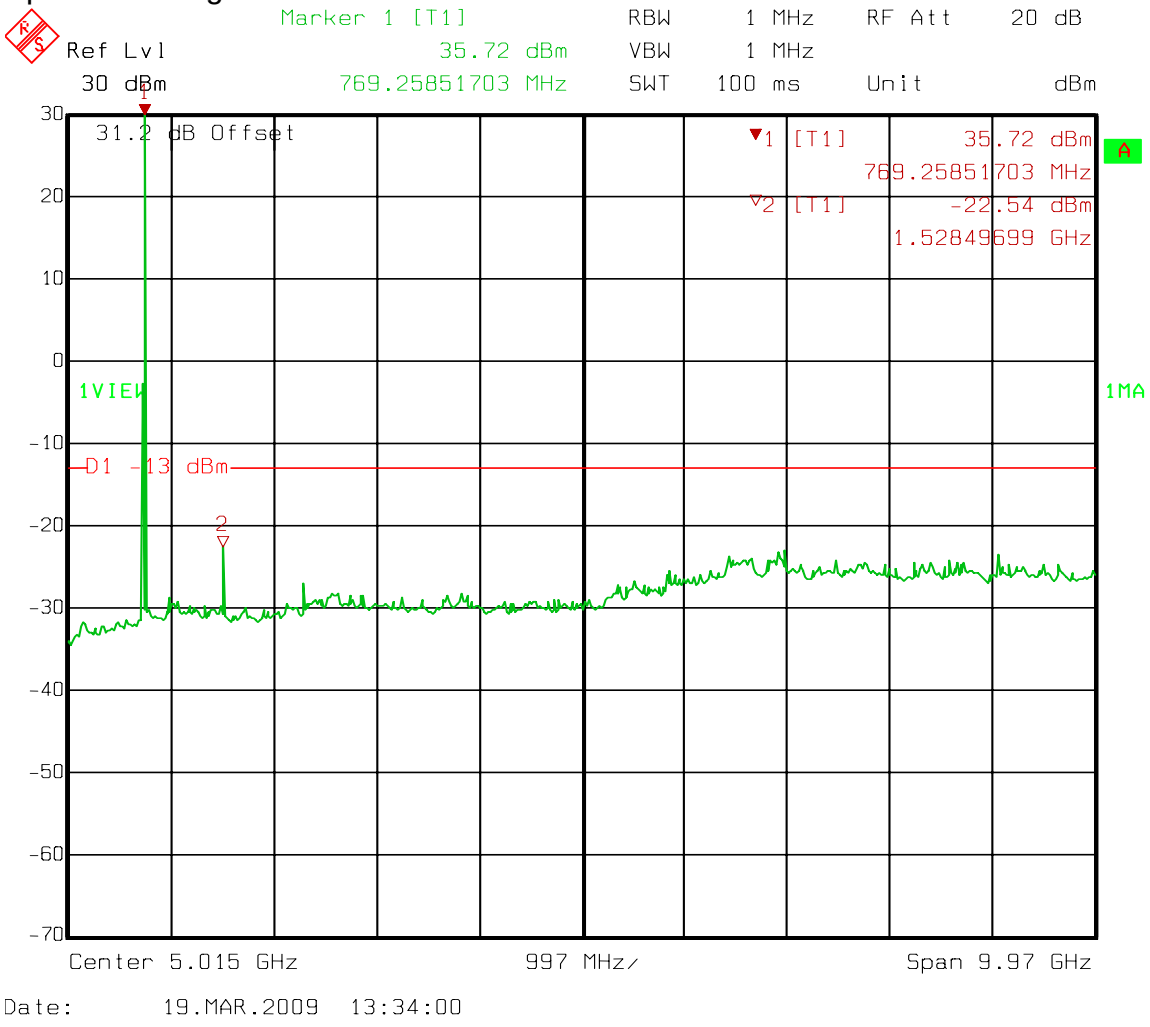
Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation
Analog
Uplink



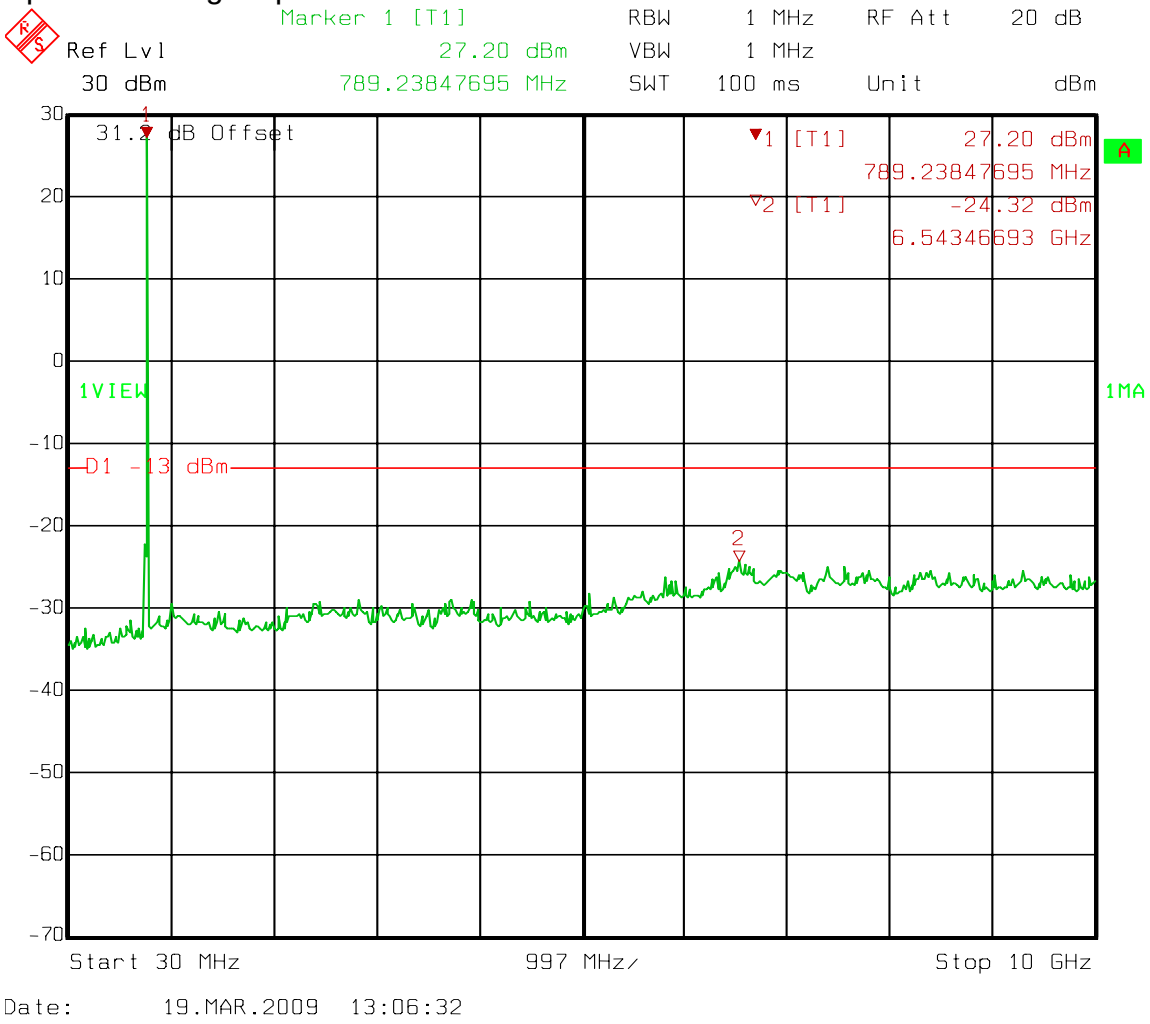
Test Data – Spurious Emissions at Antenna Terminals

Spurs – Analog - Downlink



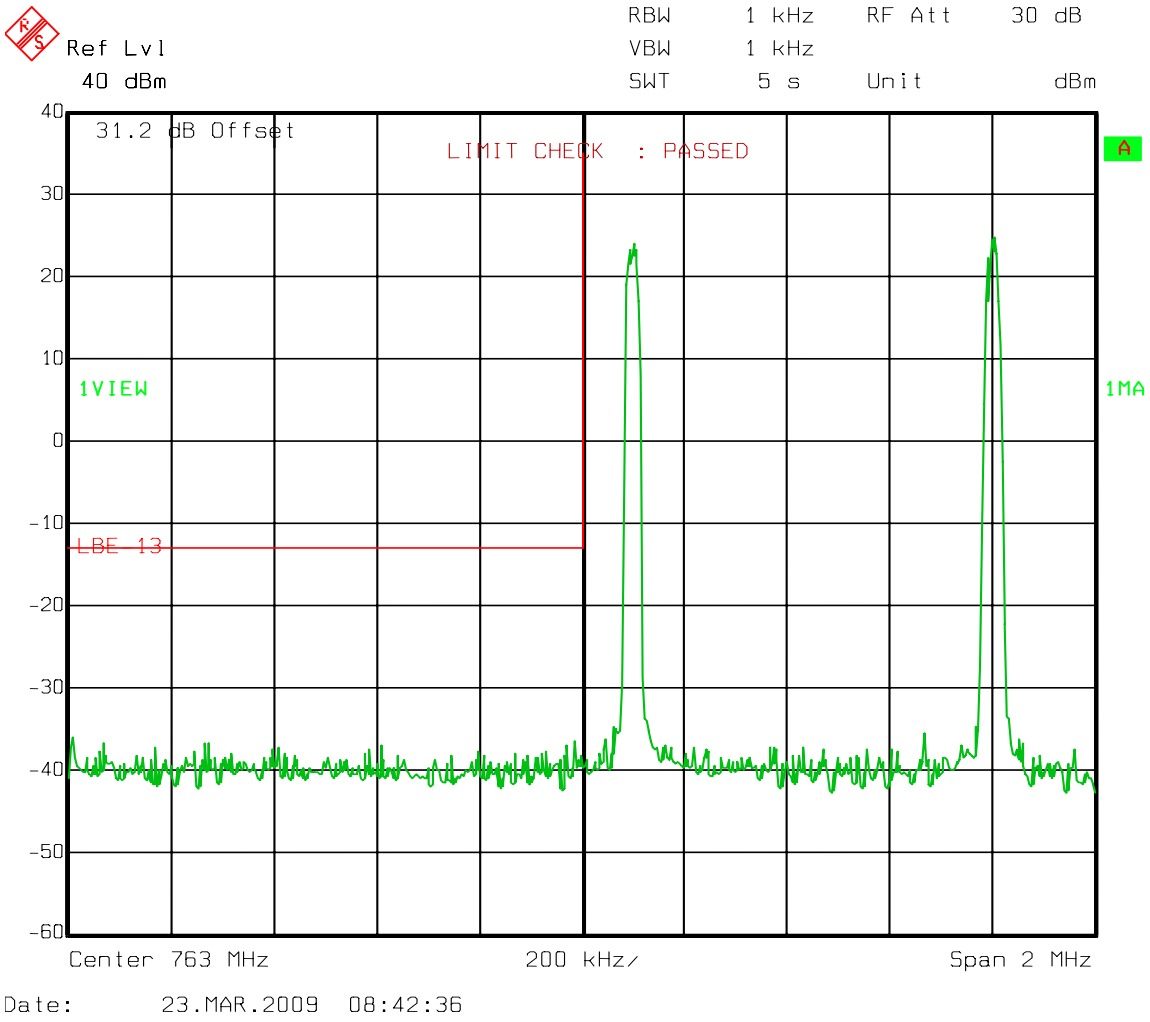
Test Data – Spurious Emissions at Antenna Terminals

Spurs – Analog - Uplink



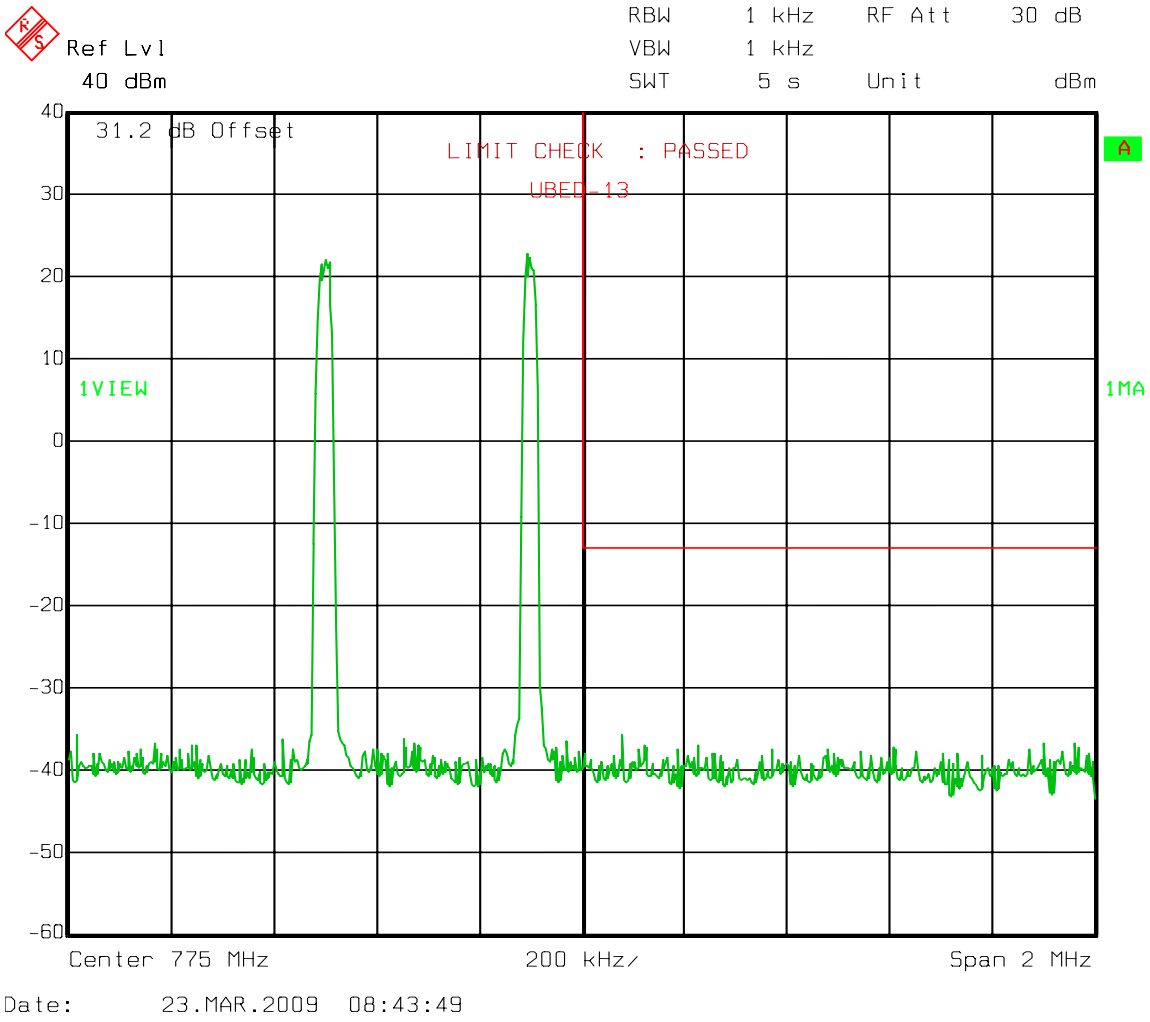
Test Data – Spurious Emissions at Antenna Terminals

Low Band Edge
TDMA
Downlink



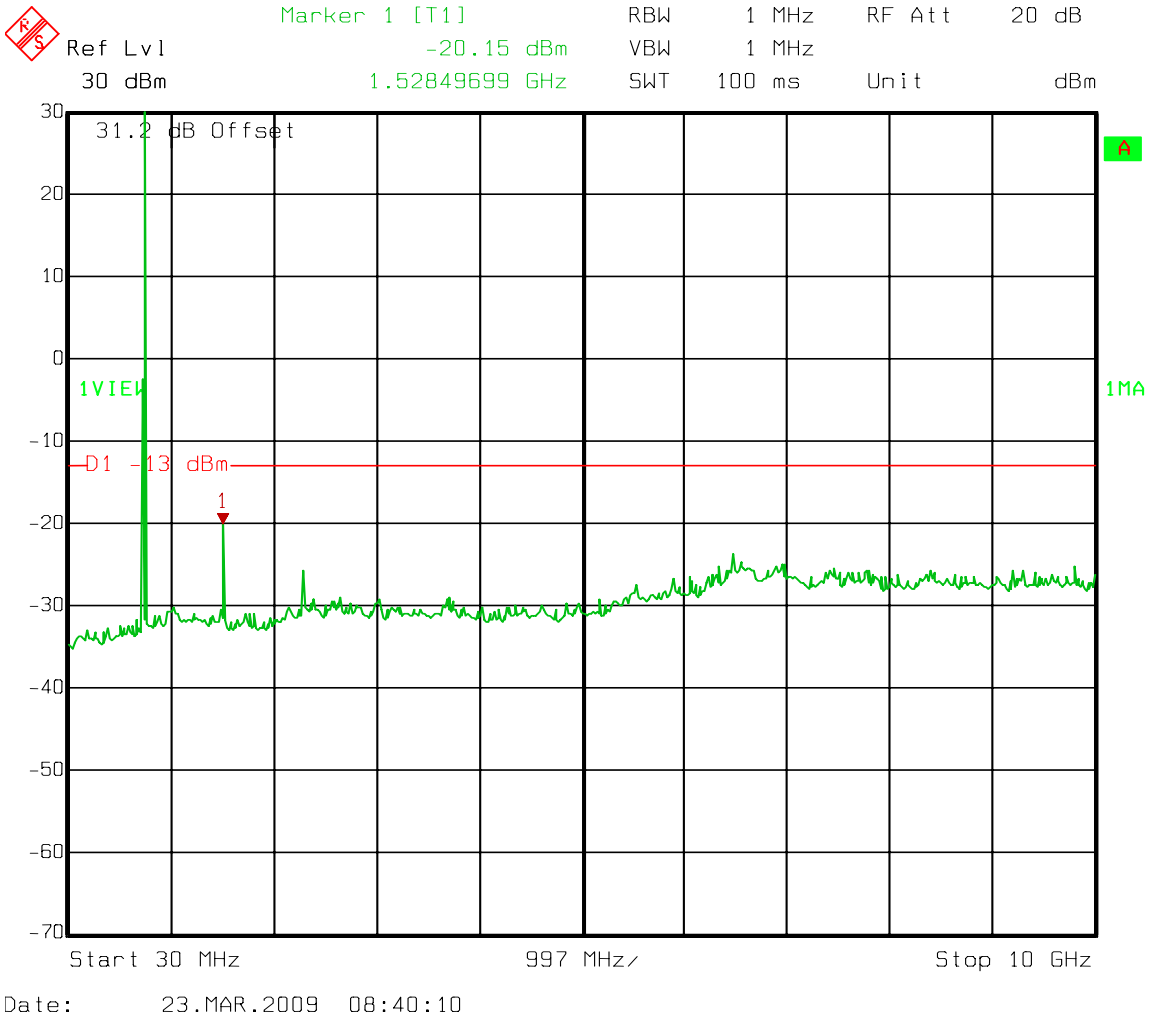
Test Data – Spurious Emissions at Antenna Terminals

Upper Band Edge
Downlink
TDMA



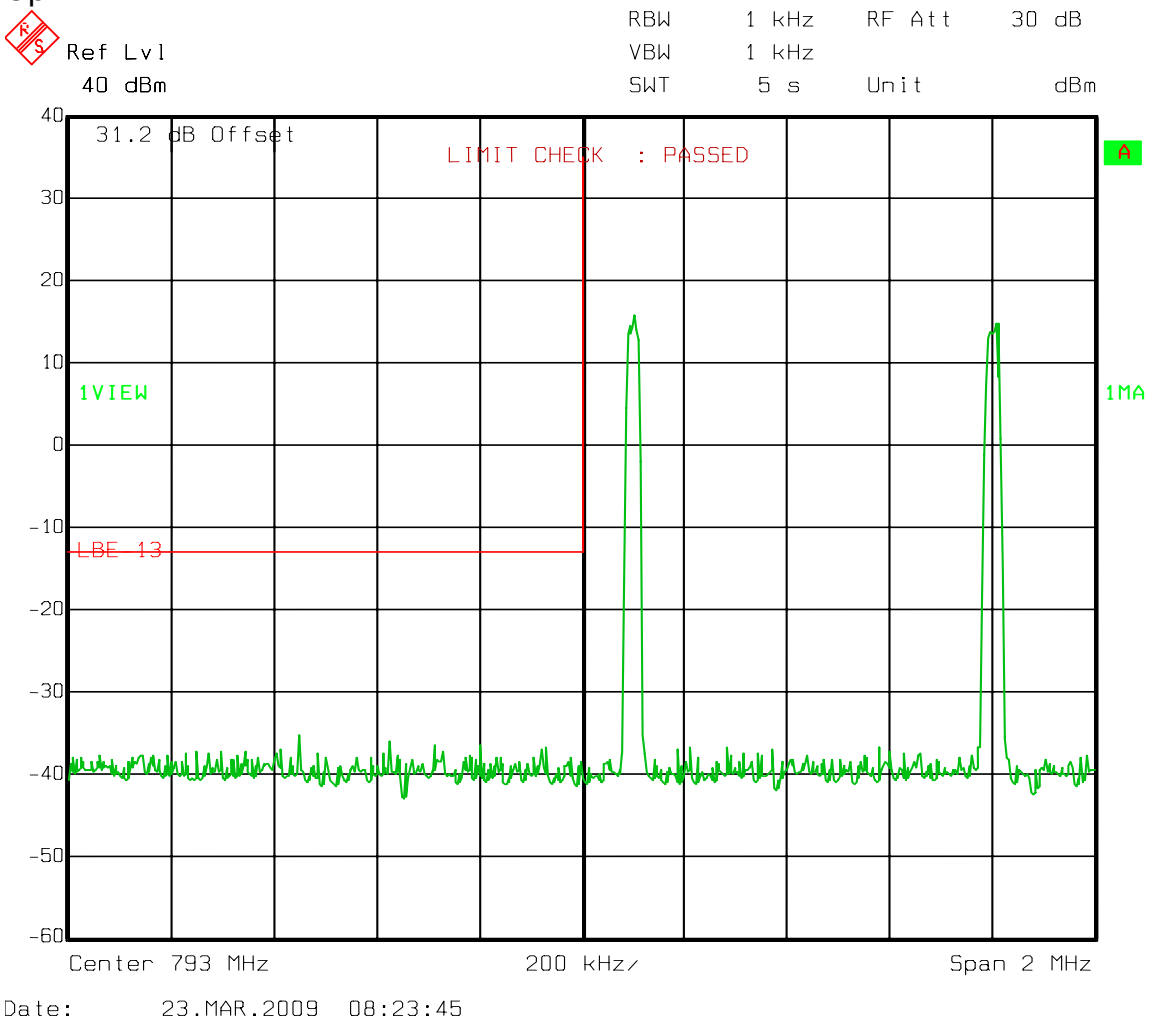
Test Data – Spurious Emissions at Antenna Terminals

Spurs
Downlink
TDMA



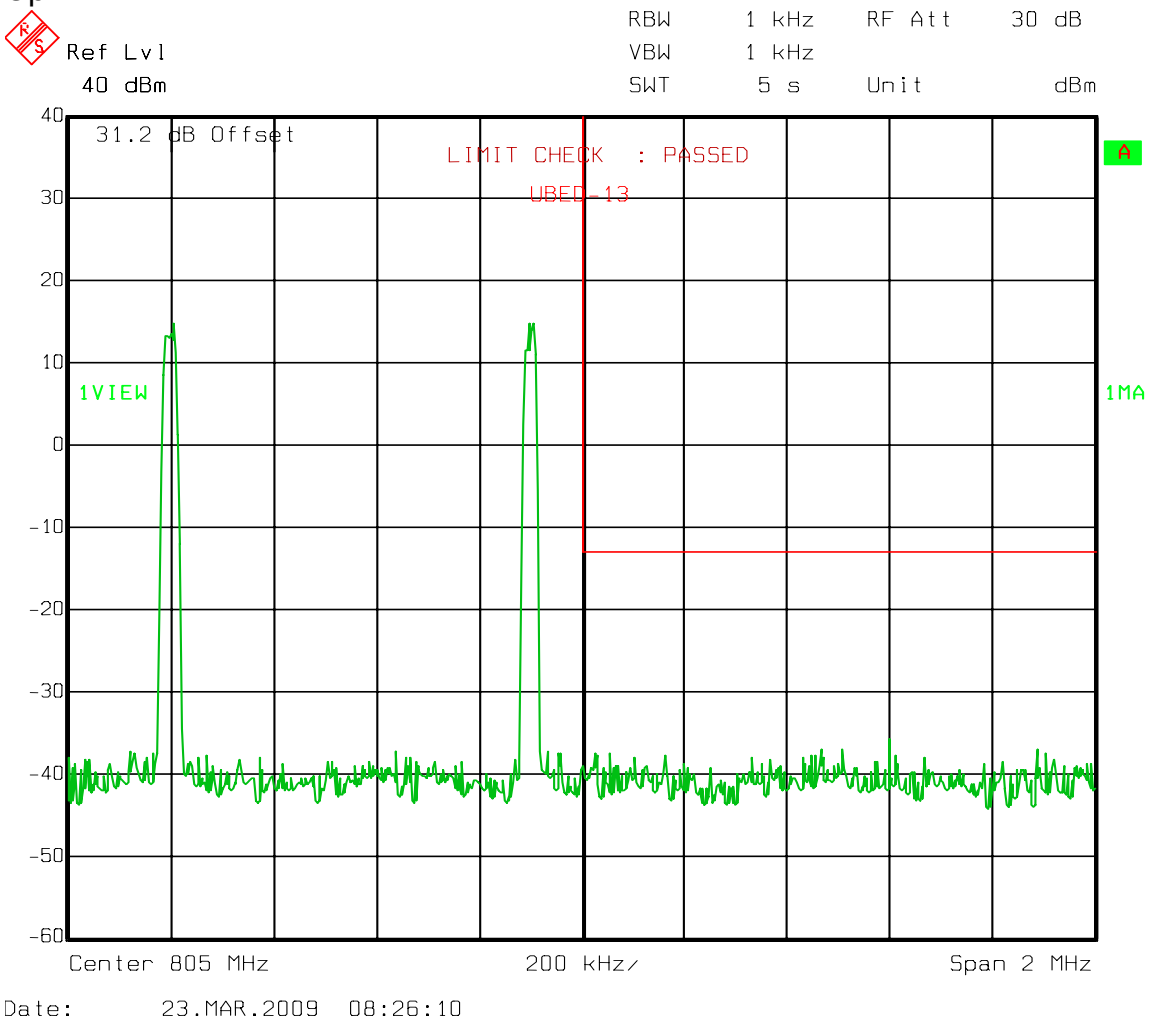
Test Data – Spurious Emissions at Antenna Terminals

Lower Band Edge
TDMA
Uplink



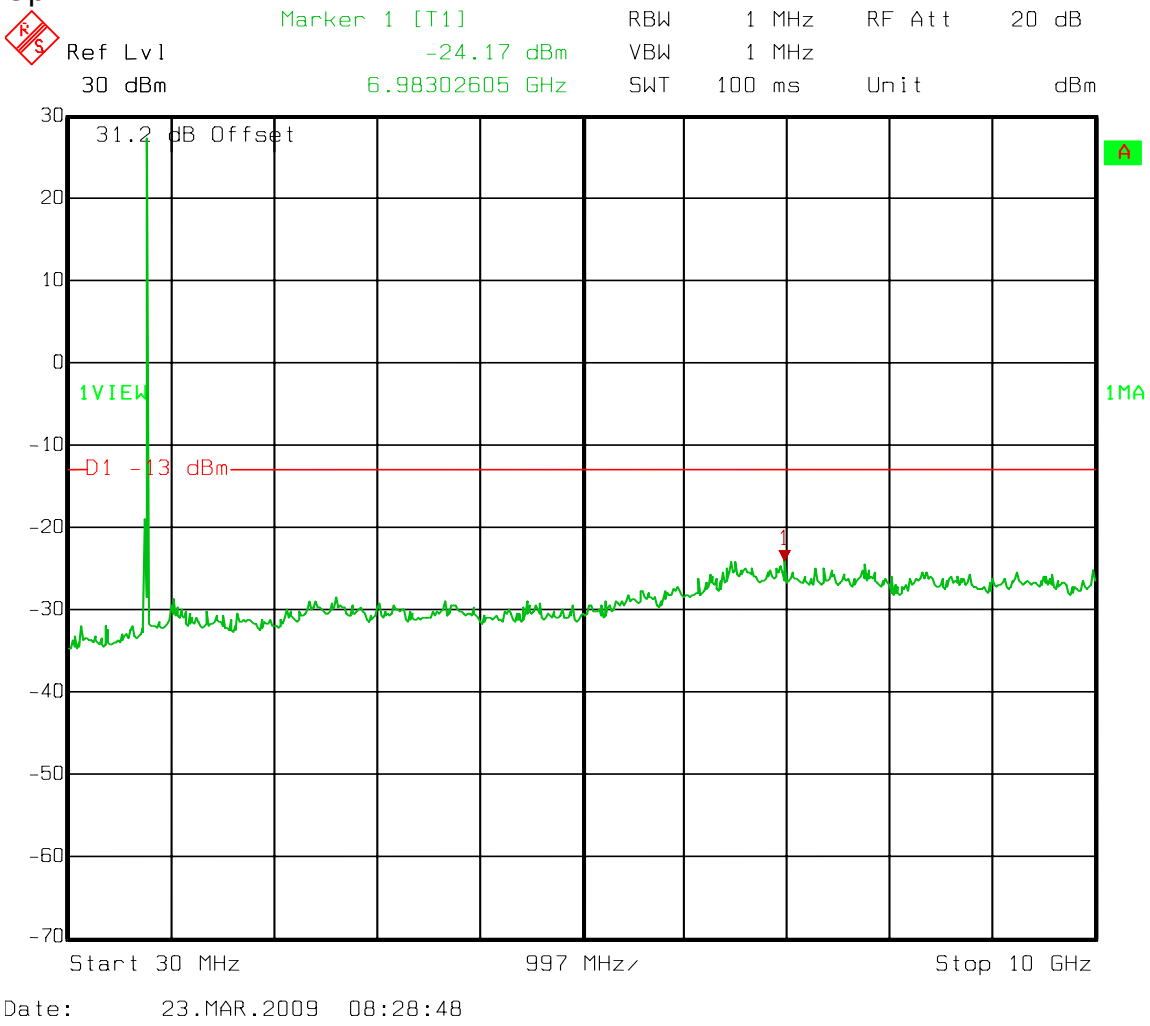
Test Data – Spurious Emissions at Antenna Terminals

Upper Band Edge
TDMA
Uplink



Test Data – Spurious Emissions at Antenna Terminals

Spurs
TDMA
Uplink



Section 6. Field Strength of Spurious Emissions

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.993
TESTED BY: David Light	DATE: 19 March 2009

Test Results: Complies.

Test Data: There were no emissions above the noise floor, which was at least 20 dB below the specification limit of –13 dBm.

The spectrum was searched from 30 MHz to the 10th harmonic of the highest carrier frequency.

Analyzer settings:

<1000 MHz: RBW/VBW = 100 kHz Peak detector
>1000 MHz: RBW/VBW = 1 MHz Peak detector

Equipment Used: 1464-1484-1485-1016-791-993-1480

Measurement Uncertainty: +/-1.7 dB

Temperature: 22 °C

Relative Humidity: 35 %

Section 7. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/27/09	02/28/11
1484	Cable	Storm PR90-010-072	N/A	05/07/08	05/07/09
1484	Cable	Storm PR90-010-072	N/A	05/07/08	05/07/09
1480	Bilog Antenna	Schaffner-Chase CBL6111C	2572	10/17/08	10/17/09
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/07/08	05/07/09
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	05/07/08	05/07/09
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/31/07	08/31/09
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	01/19/09	01/20/11
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1469	10 db Attenuator DC 18 Ghz	MCL Inc. BW-S10W2 10db-2WDC	NONE	CBU	N/A
1472	20db Attenuator DC 18 Ghz	Omni Spectra 20600-20db	NONE	CBU	N/A

ANNEX A - TEST METHODOLOGIES

NAME OF TEST: RF Power Output	**PARA. NO.: 2.985**

Minimum Standard: Para. No. 90.205(a). The maximum allowable station ERP is dependent upon the stations HAAT and required service area and will be authorized in accordance with Table 1 of 90.205(d).

Method Of Measurement:

Detachable Antenna:
The peak power at antenna terminals is measured using an in-line peak power meter. Power output is measured with the maximum rated input level.

Integral Antenna:
The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator. This antenna is fed with a signal at the spurious frequency. The level of the signal is adjusted to repeat the previously measured level. The resulting eirp is the signal level fed to the reference antenna corrected for gain referenced to an isotropic radiator.

NAME OF TEST: Spurious Emissions at Antenna Terminals **PARA. NO.: 2.991**

Minimum Standard: 90.210, Table 1

Table 1

Frequency Band (MHz)	Mask for equipment with Low Pass Filter	Mask for equipment without Low Pass Filter
Below 25	A or B	A or C
25 - 50	B	C
72 - 76	B	C
150 - 174	B, D or E	C, D or E
150 Paging only	B	C
220 - 222	F	F
421 - 512	B, D or E	C, D or E
450 paging only	B	H
806 - 821/ 851 - 866	B	G
821 - 824/ 866 - 869	B	H
896 - 901/ 935 - 940	I	J
902 - 928	K	K
929 - 930	B	G
Above 940	B	C
All other bands	B	C

MASK	Spurious Limit	FS Limit Below 1 GHz	FS Limit Above 1 GHz
A,B,C,G,H,I	-13dBm	84.4 dBμV/m@3m	82.2 dBμV/m@3m
D,J	-20dBm	77.4 dBμV/m@3m	75.2 dBμV/m@3m
E,F,K	-25dBm	72.4 dBμV/m@3m	70.2 dBμV/m@3m

Test Method: RBW: 1% of emission bandwidth in the 0 - 1 GHz range.
1 MHz at frequencies above 1 GHz.
VBW: $\Rightarrow$ RBW

The spectrum is searched up to 10 times the fundamental frequency.

NAME OF TEST: Occupied Bandwidth **PARA. NO.: 2.989**

Minimum Standard: Not defined. Input/Output

Method Of Measurement:

Analog

Spectrum analyzer settings:
RBW=VBW=300 Hz
Span: 100 kHz
Sweep: Auto

iDEN

RBW=VBW= 300 Hz
Span: 100 kHz
Sweep: Auto

NAME OF TEST: Field Strength of Spurious **PARA. NO.: 2.993**

Minimum Standard: Para. No. 90.210, see table 1 for applicable mask.

Method Of Measurement: TIA/EIA-603-1992

The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator. This antenna is fed with a signal at the spurious frequency. The level of the signal is adjusted to repeat the previously measured level. The resulting eirp is the signal level fed to the reference antenna corrected for gain referenced to an isotropic radiator.

MASK	Spurious Limit	FS Limit Below 1 GHz	FS Limit Above 1 GHz
A,B,C,G,H,I	-13dBm	84.4 dBμV/m@3m	82.2 dBμV/m@3m
D,J	-20dBm	77.4 dBμV/m@3m	75.2 dBμV/m@3m
E,F,K	-25dBm	72.4 dBμV/m@3m	70.2 dBμV/m@3m

NAME OF TEST: Frequency Stability **PARA. NO.: 2.995**

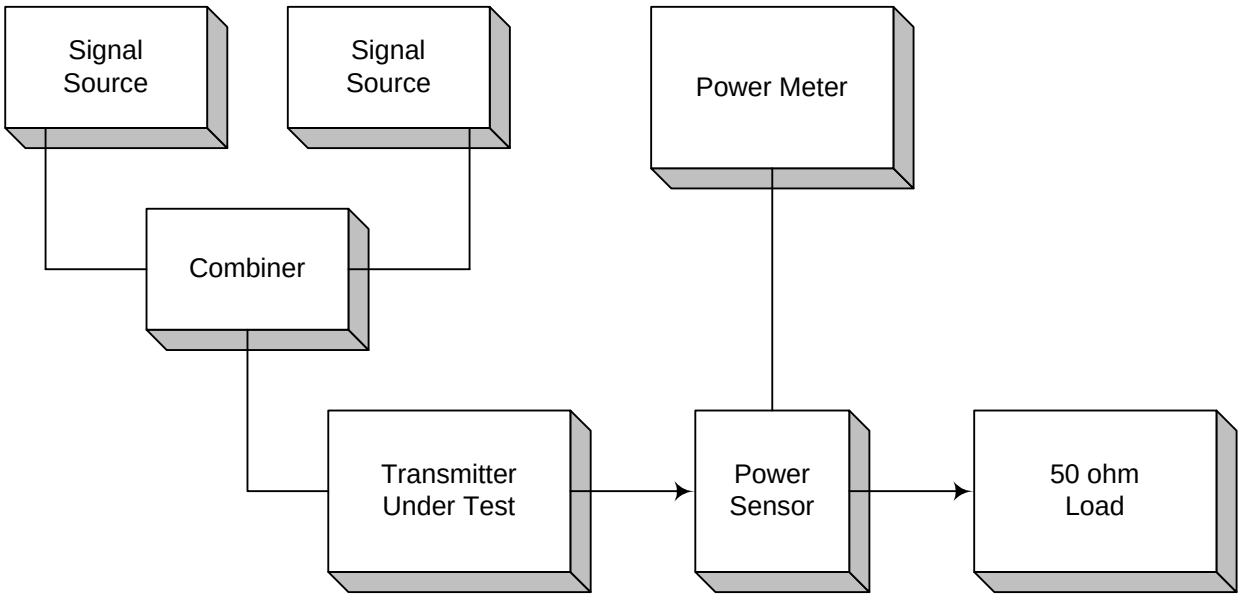
Minimum Standard: Para. No. 990.213. The transmitter carrier frequency shall remain within the assigned frequency below in ppm.

Table 2

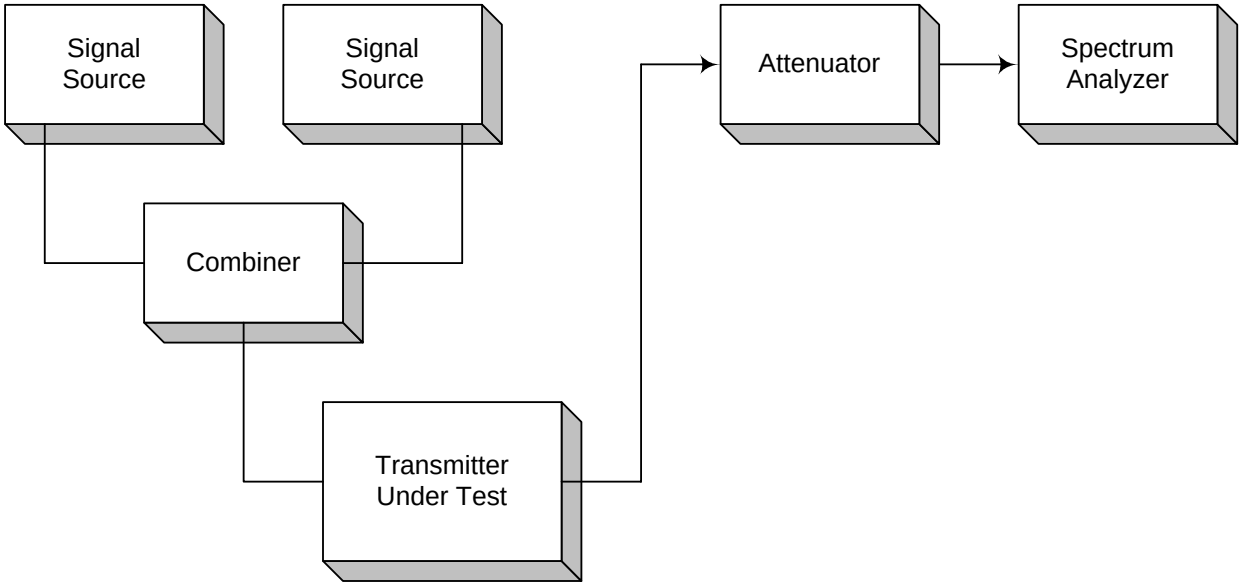
Frequency Band (MHz)	Fixed And Base Stations	Mobile Stations	
		> 2 Watts o/p pwr	< 2 Watts o/p pwr
Below 25	100	100	200
25 - 50	20	20	50
72 - 76	5	-	50
150 - 174	5	5	5
220 - 222	0.1	1.5	1.5
421 - 512	2.5	5	5
806 - 821	1.5	2.5	2.5
821 - 824	1.0	1.5	15
851 - 866	1.5	2.5	2.5
866 - 869	1.0	1.5	1.5
869 - 901	0.1	1.5	1.5
902 - 928	2.5	2.5	2.5
929 - 930	1.5	-	-
935 - 940	0.1	1.5	1.5
1427 - 1435	300	300	300
Above 2450	-	-	-

ANNEX B - TEST DIAGRAMS

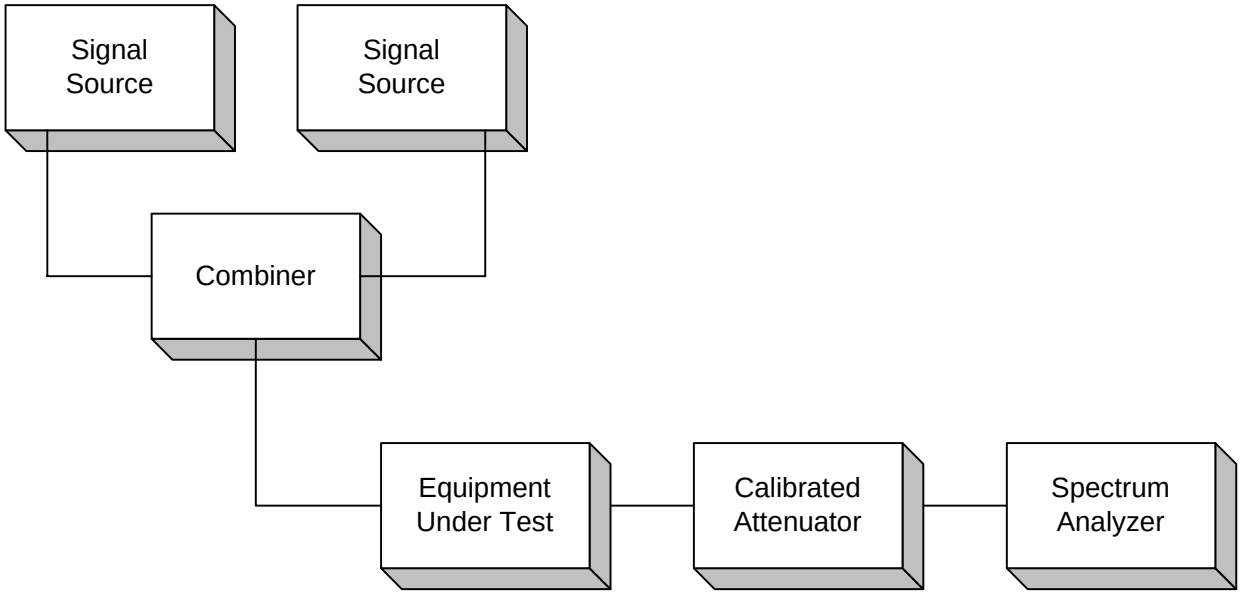
Para. No. 2.985 - R.F. Power Output



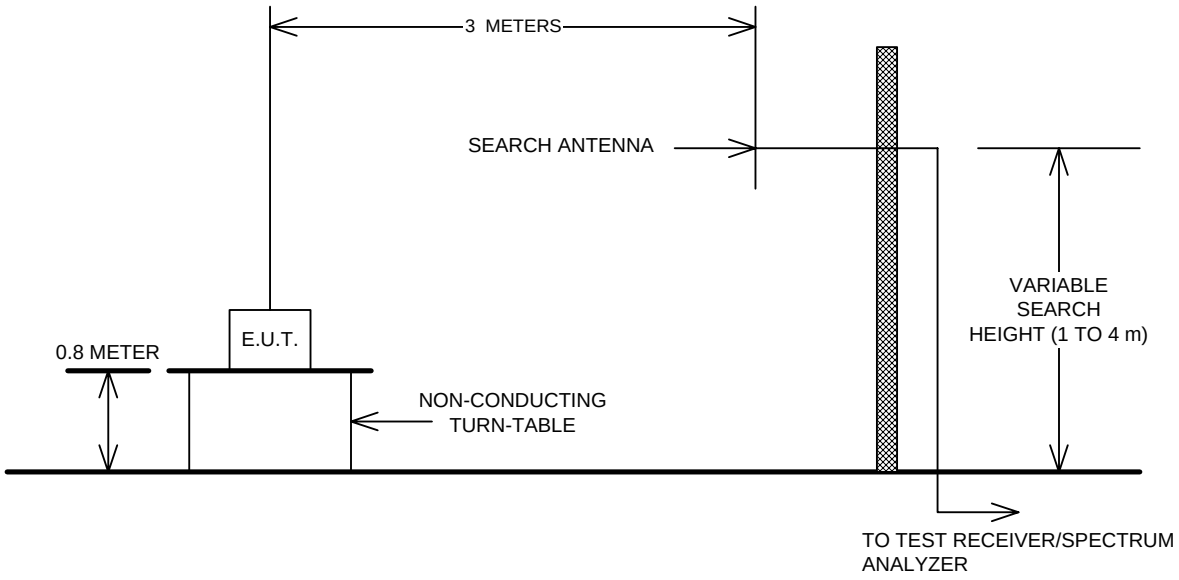
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 - Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability