ENGINEERING TEST REPORT

Multi Channel RF Signal Booster
Model No.: MW-DCSB-40D95-700/800-24-AC-R
FCC ID: OIWDCSB40D95AC

Applicant:

Dekolink Wireless Ltd.
16 Bazel St. Quiyat-Arieh
Petah-Tikva 49001
ISRAEL

Tested in Accordance With

Federal Communications Commission (FCC)
47 CFR, Part 2 & 90

UltraTech's File No.: DEKO-003_FCC90

This Test report is Issued under the Authority of Tri M. Luu, Professional Engineer, Vice President of Engineering UltraTech Group of Labs Date: August 25, 2008	
Report Prepared by: JaeWook Choi Issued Date: August 25, 2008	Tested by: Hung Trinh, EMI/RFI Technician Test Dates: August 12 & 15, 2008, August 18 ~ 22, 2008

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

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ANSI	FC	VCCI	Industry Canada	NVLAP	BSMI	Korea MIC-RRL
0685	31040/SIT	C-1376	46390-2049	200093-0	SL2-IN-E-1119R	2005-82 & 83

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 2 & 90
Title:	Telecommunication - Code of Federal Regulations, CFR 47, Part 2 & 90
Purpose of Test:	To gain FCC Certification Authorization for Radio Amplifier operating in the Frequency Range 799-805 & 806-824 MHz (Up-link) and 769-775 & 851-869 MHz (Down-link)
Test Procedures:	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

1.2. RELATED SUBMITTAL(S)/GRANT(S)

None

1.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC CFR Parts 0-19, 80-End	2007	Code of Federal Regulations – Telecommunication
ANSI C63.4	2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
CISPR 16-1-1	2004	Specification for Radio Disturbance and Immunity measuring apparatus and methods
TIA/EIA 603, Edition C	2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT	
Name:	Dekolink Wireless Ltd.
Address:	16 Bazel St. Quiyat-Arieh Petah-Tikva 49001 ISRAEL
Contact Person:	Mr. Yaron Moas Phone #: 972-3.918. 0180 Fax #: 972-3.918.0190 Email Address: yaron@dekolink.com

MANUFACTURER	
Name:	Dekolink Wireless Ltd.
Address:	16 Bazel St. Quiyat-Arieh Petah-Tikva 49001 ISRAEL
Contact Person:	Mr. Yaron Moas Phone #: 972-3.918. 0180 Fax #: 972-3.918.0190 Email Address: yaron@dekolink.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name:	Dekolink Wireless Ltd.
Product Name:	Multi Channel RF Signal Booster
Model Name or Number:	MW-DCSB-40D95-700/800-24-AC-R
Type of Equipment:	Non-broadcast RF Bi-Directional Amplifier
Power Supply:	100-240 V, 50 / 60 Hz
Transmitting/Receiving Antenna Type:	Non-Integral
Application of EUT	Extends RF coverage area of radio communications indoor/outdoor environments.

2.3. EUT'S TECHNICAL SPECIFICATIONS

TRANSMITTER	
Equipment Type:	Base station (fixed use)
Intended Operating Environment:	Commercial, Light Industry & Heavy Industry
RF Output Power Rating:	**UpLink**: • Composite output power: 28.5 dBm or 0.708 Watts • Single input/output: 28.5 dBm or 0.708 Watts • 2 inputs/outputs: 25.1 dBm or 0.324 Watts • 3 inputs/outputs: 23.7 dBm or 0.234 Watts **DownLink**: • Composite output Power: 41.5 dBm or 14.125 Watts (two frequency bands) • Single input/output: 38.5 dBm or 7.079 Watts • 2 inputs/outputs: 34.9 dBm or 3.090 Watts • 3 inputs/outputs: 31.9 dBm or 1.549 Watts **Remark**: Composite output power is controlled by AGC per channel
Operating Frequency Range:	**Uplink**: 799-805 & 806-824 MHz (or 799-805, 806-809, 809-821 & 821-824 MHz) **DownLink**: 769-775 & 851-869 MHz (or 769-774, 851-854 & 854-869 MHz)
RF Input/Output Impedance:	50 Ohms
Isolation between Up/Down Link	110 dB min
Pass Band Gain @ min attenuation:	+95 dB maximum
Occupied Bandwidth (99%):	10.14 kHz (for 16K0F3E) 15.27 kHz (for 11K0F3E) 8.41 kHz (for 8K10F1E) 5.23 kHz (for 5K76G1E) 17.63 kHz (for 20K0GXW)
Emission Designation*:	16K0F3E, 11K0F3E, 8K10F1E, 5K76G1E, 20K0GXW
Antenna Connector Type:	N Type
Antenna Description:	▪ Donor Antenna (Outdoor, Uplink Output): Yagi or similar directional antenna with gain limit of 15 dBi. ▪ Service Antenna (Indoor, Downlink Output): Omni directional antenna with limit of 2.2 dBi typical gain.

* For an average case of commercial telephony, the Necessary Bandwidth is calculated as follows:

Channel Spacing = 25 KHz, D = 5 KHz max, K = 1, M = 3 KHz
B_n = 2M + 2DK = 2(3) + 2(5)(1) = **16 KHz**
Emission designation: 16K0F3E

Channel Spacing = 12.5 KHz, D = 2.5 KHz max, K = 1, M = 3 KHz
B_n = 2M + 2DK = 2(3) + 2(2.5)(1) = **11 KHz**
Emission designation: 11K0F3E

RECEIVER	
Equipment Type:	Base station (fixed use)
Intended Operating Environment:	Commercial, Light Industry & Heavy Industry
Power Supply Requirement:	100-240 V, 50/60 Hz
RF Input Power Rating:	**UpLink**: Max. -10 dBm without spec degradation **DownLink:** Max. -10 dBm without spec degradation
Operating Frequency Range:	• 799-805 and 806-824 MHz (Uplink) • 769-775 and 851-869 MHz (Downlink)

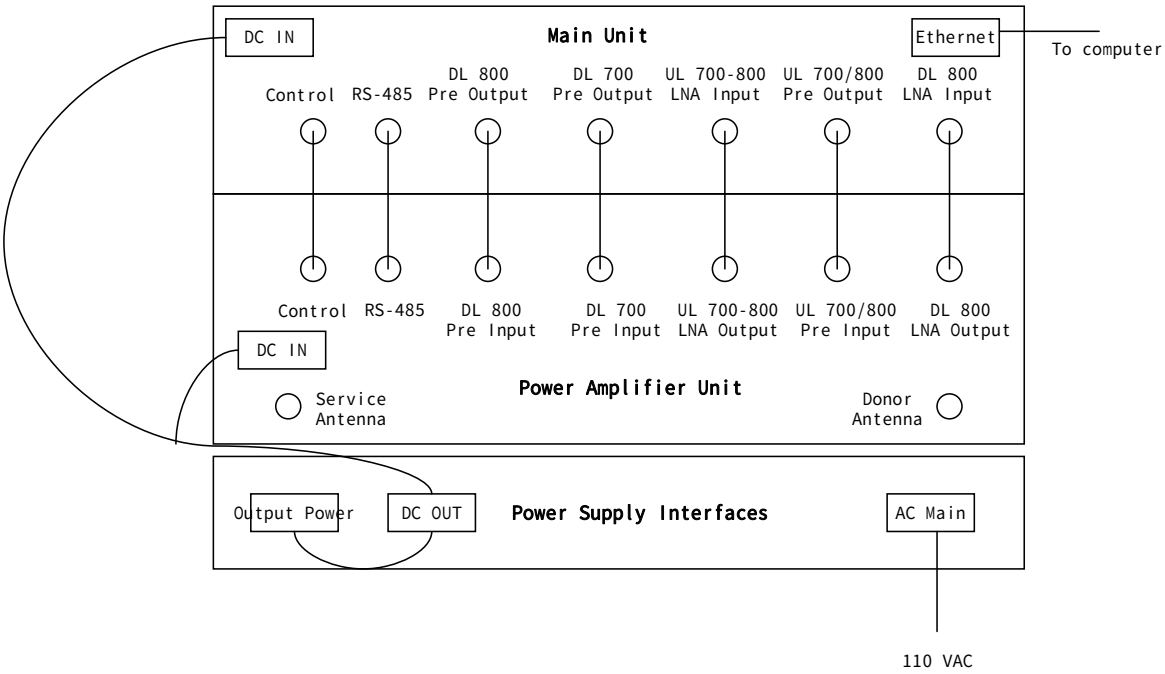
2.4. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
Main Unit				
1	Alarms	1	Nil.	Non-shielded
2	DC Power 28V	1	3 Pin DIN	Shielded
3	RS485 (service purpose only)	1	DB9	Shielded
4	Controls	1	DB25	Shielded
5	DL 800 Pre Output	1	SMA	Shielded
6	DL 700 Pre Output	1	SMA	Shielded
7	UL 700-800 LNA Input	1	SMA	Shielded
8	DL 700 LNA Input	1	SMA	Shielded
9	UL 700/800 Pre Output	1	SMA	Shielded
10	DL 800 LNA Input	1	SMA	Shielded
Power Amplifier Unit				
11	DC Power 28V	1	3 Pin DIN	Shielded
12	RS485 (service purpose only)	1	DB9	Shielded
13	Controls	1	DB25	Shielded
14	Service Antenna	1	N	Shielded
15	Donor Antenna	1	N	Shielded
16	UL 700/800 LNA Output	1	SMA	Shielded
17	DL 700 LNA Output	1	SMA	Shielded
18	DL 800 LNA Output	1	SMA	Shielded
19	DL 800 Pre Input	1	SMA	Shielded
20	DL 700 Pre Input	1	SMA	Shielded
21	UL 700/800 Pre Input	1	SMA	Shielded
Power Supply Interfaces				
22	Output Power	1	25 Pin	Shielded
23	+ VDC and –VDC (ref)	2	1 conductor	Non-shielded
24	AC Main (110/220 VAC)	3	3-prong male plug	Non-shielded

2.5. ANCILLARY EQUIPMENT

None

2.6. DRAWING OF TEST SETUP



(Downlink/Uplink Configuration)

EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	22°C
Humidity:	54%
Pressure:	100 kPa
Power input source:	120 V, 60 Hz

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TEST SIGNALS

Operating Modes:	The amplifier was operated in a continuous transmission mode with the carrier modulated as specified in the Test Data.
Special Test Software:	N/A
Special Hardware Used:	N/A
Transmitter Test Antenna:	The EUT is tested with the amplifier other antenna port terminated to a 50 Ohms RF Load.

Transmitter Test Signals	
Frequency Sub-band(s): **Uplink**: 799-805 & 806-824 MHz (or 799-805, 806-809, 809-821 & 821-824 MHz) **DownLink**: 769-775 & 851-869 MHz (or 769-774, 851-854 & 854-869 MHz)	 Uplink: 800.0, 808.0, 815.0 & 823.0 MHz DownLink: 770.0, 853.0 and 861.5 MHz
Transmitter Output Test Signals: Normal Test Modulation: Modulating signal source:	 F3E, F1E, G1E, GXW External

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- Powerline Conducted Emissions were performed in Ultratech's shielded room, 16'(L) by 12'(W) by 12'(H).

- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site has been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 31040/SIT 1300B3) and Industry Canada office (Industry Canada File No.: IC2049-1). Last Date of Site Calibration: May 17, 2007.

4.2. APPLICABILITY & SUMMARY OF EMISSION TEST RESULTS @ FCC PART 2 & 90

FCC PARAGRAPH.	TEST REQUIREMENTS	APPLICABILITY (YES/NO)
90.541, 90.635 & 2.1046	RF Power Output & Inter-modulation	Yes
1.1307, 1.1310, 2.1091, 2.1093,	RF Exposure Limit	Yes
90.213 & 2.1055	Frequency Stability	N/A for Amplifier
90.242(b)(8) & 2.1047(a)	Audio Frequency Response	N/A for Amplifier
90.210 & 2.1047(b)	Modulation Limiting	N/A for Amplifier
2.1049	Occupied Bandwidth	Yes
90.210, 90.543(c) & 2.1051	Emission Limits - Spurious Emissions at Antenna Terminal	Yes
90.210, 90.543(c) & 2.1051	Emission Limits - Field Strength of Spurious Emissions	Yes

NOTE: This product has been tested and found to comply with FCC Part 15, Subpart B, Class B – Unintentional Radiators and Radio Receivers, the test will be available upon request.

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None

4.4. DEVIATION OF STANDARD TEST PROCEDURES

None

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

5.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in EXHIBIT 8. of this report

5.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with requirements of UKAS Document NIS 81 with a confidence level of 95%. Please refer to EXHIBIT 6. for Measurement Uncertainties.

5.3. MEASUREMENT EQUIPMENT USED:

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C63.4:2003 and CISPR 16-1-1.

5.4. ESSENTIAL/PRIMARY FUNCTIONS AS DECLARED BY THE MANUFACTURER:

The essential function of the EUT is to amplify and transmit voice/data to and from radios over RF link.

5.5. RF POWER OUTPUT & INTERMODULATION @ FCC 2.1046, 90.541 & 90.635

5.5.1. Limits

FCC 90.635:- The effective radiated power (ERP) and antenna height for base station transmitters must not exceed the limits in this section as per below:

Base Station Transmitters	**Maximum ERP (Watts)**
Operating frequency range: (769-775, 794-806, 806-824, 851-869 MHz)	500 Watts and 152 meters (AAT) in Suburban Area 1 Kilowatts and 304 meters in Urban Area

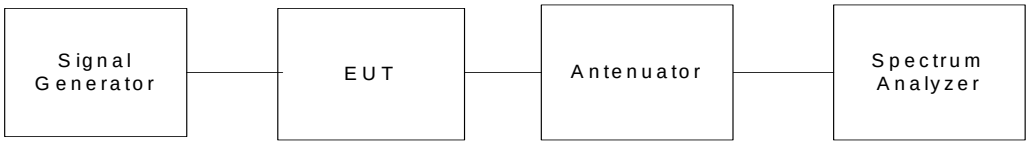
FCC 90.205:- Please refer to FCC CFR 47, Part 90, Subpart I, Para. 90.205 for specification details.

5.5.2. Method of Measurements

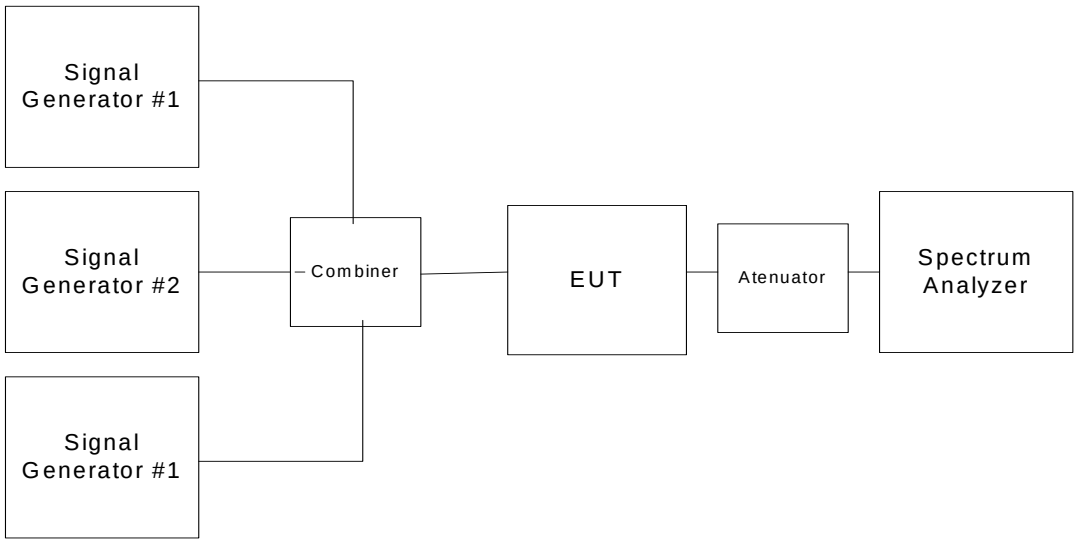
Refer to 8.1 of this report for measurement details

5.5.3. Test Arrangement

Single Channel Input:



Multiple Channel Inputs:



5.5.4. Test Data

5.5.4.1. RF Conducted Output Power

DownLink: Input Level: -10 dBm

FCC Allowable Bands (MHz)	Centre Test Frequency (MHz)	Input Signal Modulation									
		16K0F3E		11K0F3E		8K10F1E		5K76G1E		20K0GXW	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
769-774	770.0	38.53	7.129	38.17	6.561	38.11	6.471	38.23	6.653	38.11	6.471
851-854	853.0	38.28	6.730	37.92	6.194	38.37	6.871	38.25	6.683	38.00	6.310
854-869	861.5	38.47	7.031	38.10	6.457	38.06	6.397	38.03	6.353	38.01	6.324

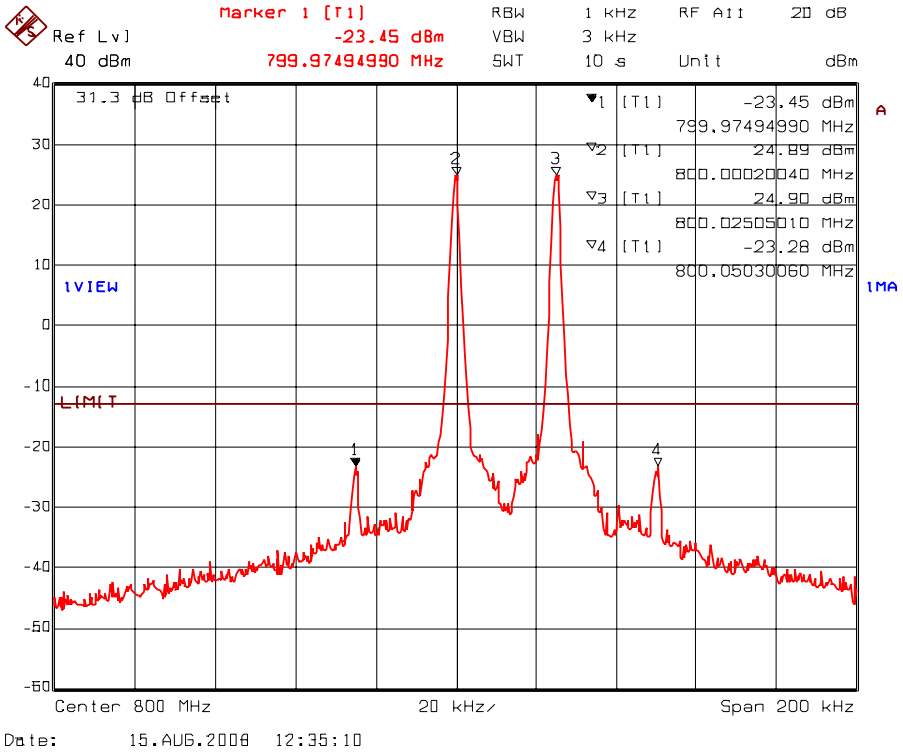
Uplink: Input Level: -10 dBm

FCC Allowable Bands (MHz)	Centre Test Frequency (MHz)	Input Signal Modulation									
		16K0F3E		11K0F3E		8K10F1E		5K76G1E		20K0GXW	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
799-805	800.0	28.10	0.646	28.15	0.653	28.03	0.635	28.40	0.692	28.03	0.635
806-809	808.0	28.15	0.653	28.39	0.690	28.03	0.635	28.41	0.693	28.17	0.656
809-821	815.0	28.03	0.635	28.64	0.731	28.09	0.644	28.40	0.692	28.03	0.635
821-824	823.0	28.17	0.656	28.15	0.653	28.10	0.646	28.40	0.692	28.15	0.653

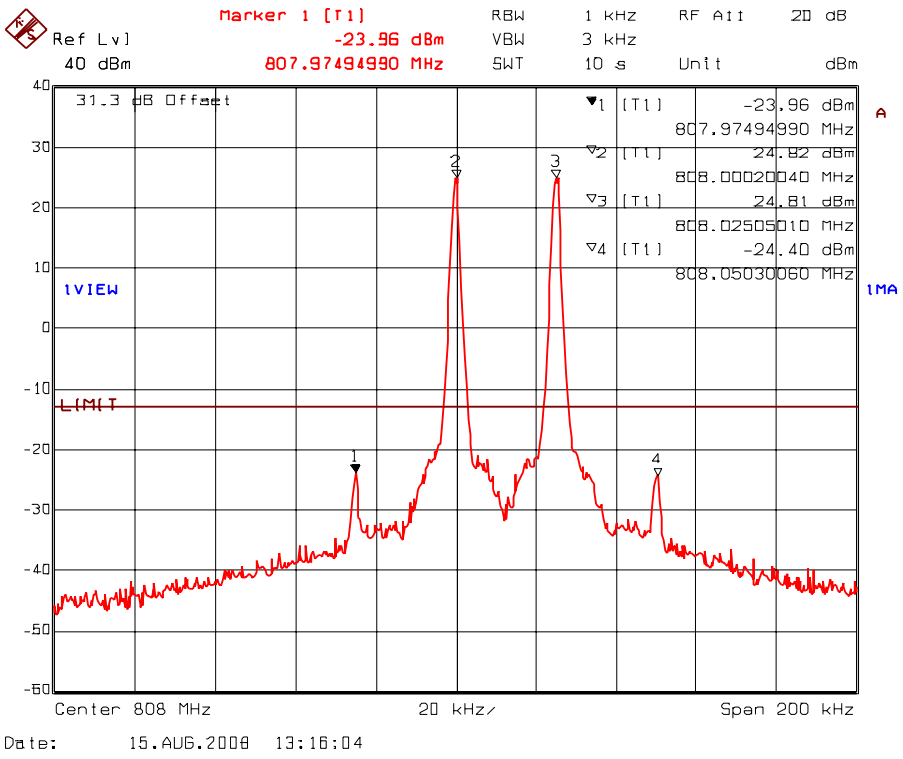
5.5.4.2. Inter-modulation Measurements

Please Refer to Plots 1-14 for Inter-modulation in the frequency DownLink & UpLinK bands.

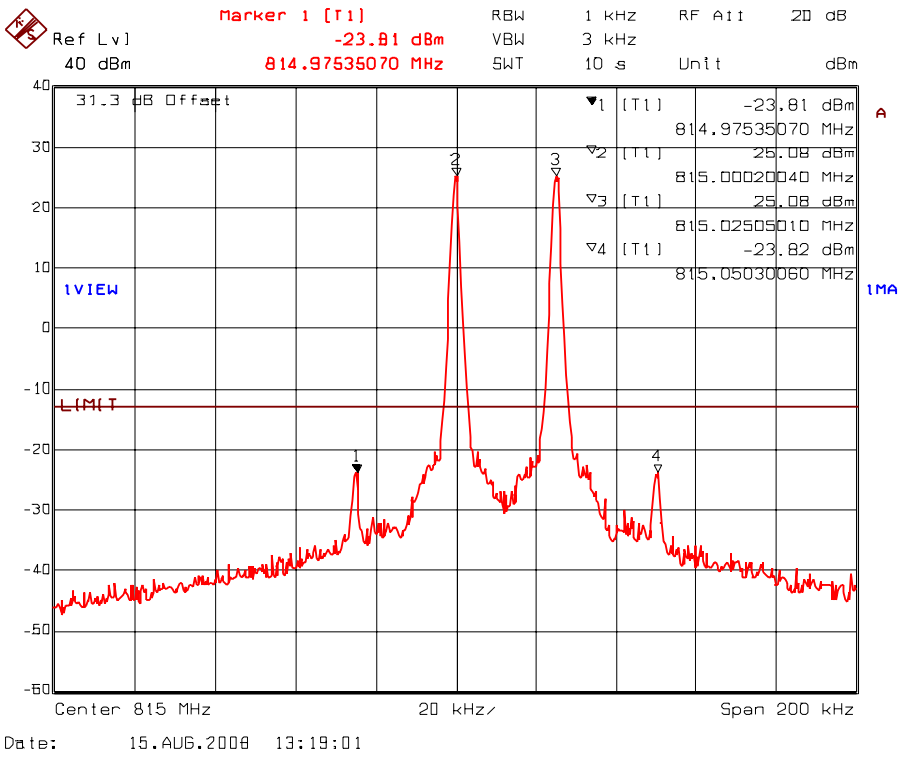
Plot 5.5.4.2.1.Intermodulation with 2 RF signal inputs/outputs
Uplink: Fc = 800MHz (-10 dBm), Fc + 25kHz (-10 dBm)



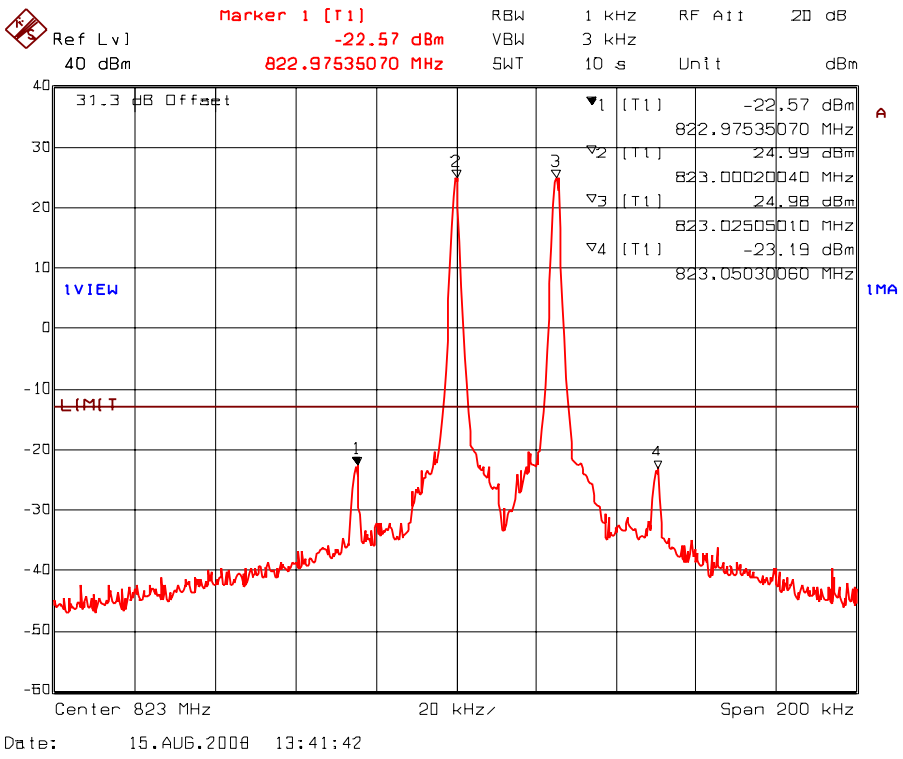
Plot 5.5.4.2.2.Intermodulation with 2 RF signal inputs/outputs
Uplink: Fc = 808MHz (-10 dBm), Fc + 25kHz (-10 dBm)



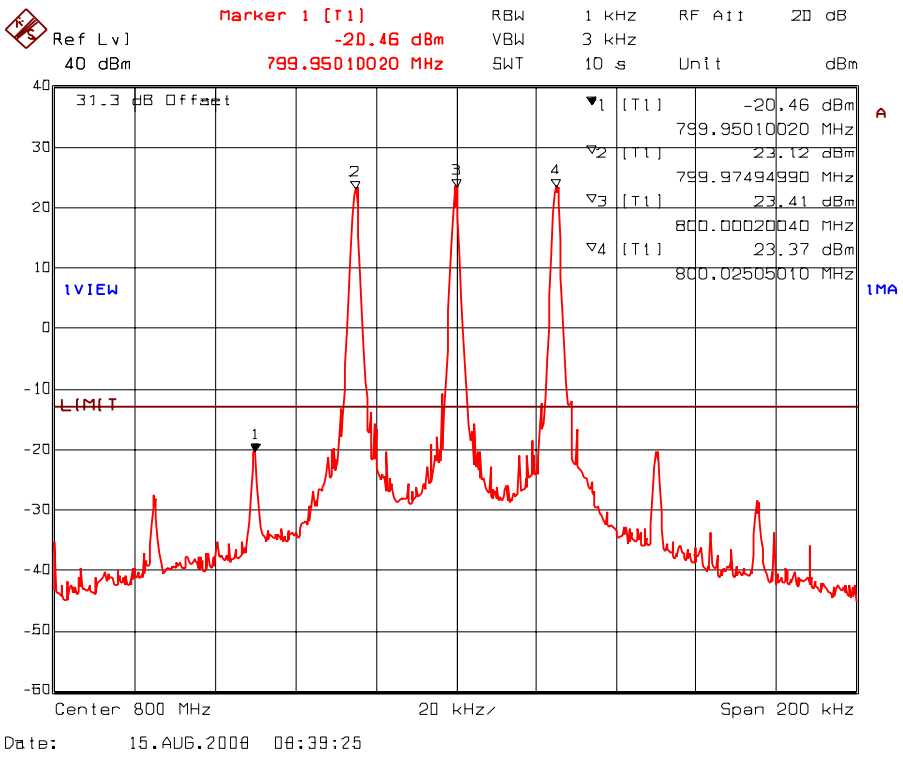
Plot 5.5.4.2.3.Intermodulation with 2 RF signal inputs/outputs
Uplink: Fc = 815MHz (-10 dBm), Fc + 25kHz (-10 dBm)



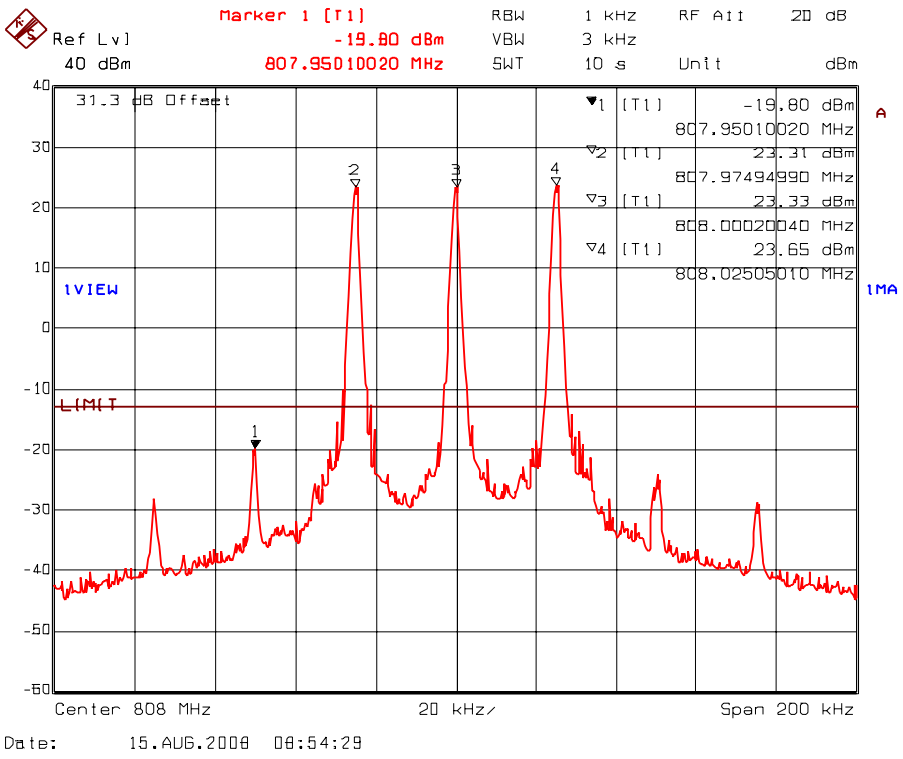
Plot 5.5.4.2.4.Intermodulation with 2 RF signal inputs/outputs
Uplink: Fc = 823MHz (-10 dBm), Fc + 25kHz (-10 dBm)



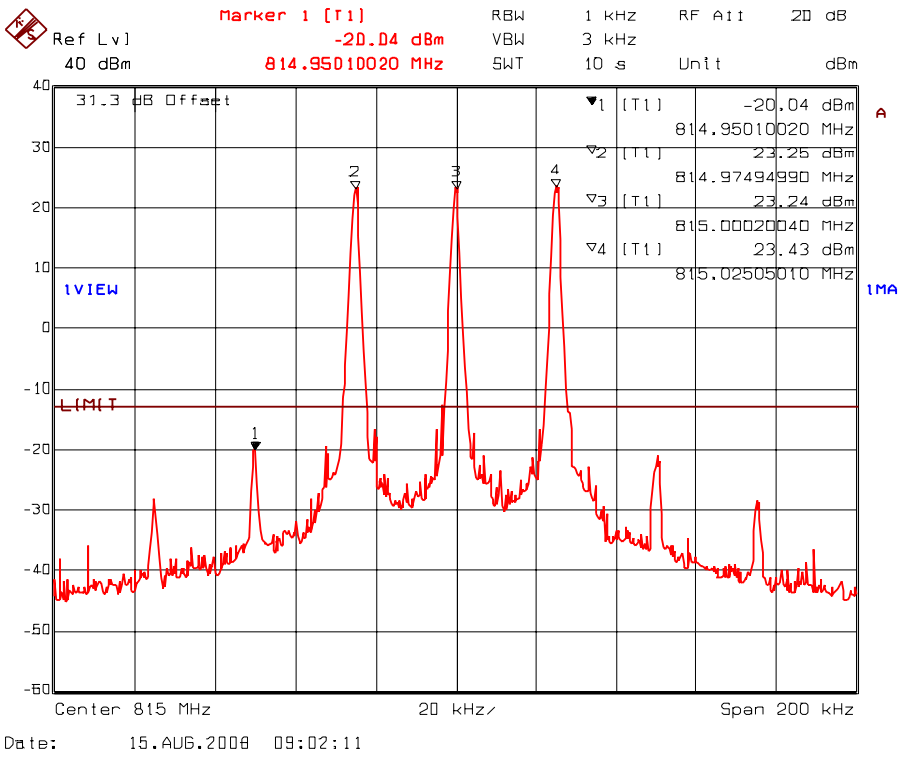
Plot 5.5.4.2.5.Intermodulation with 3 RF signal inputs/outputs
Uplink: Fc = 800MHz (-10 dBm), Fc - 25kHz (-10 dBm), Fc + 25kHz (-10 dBm)



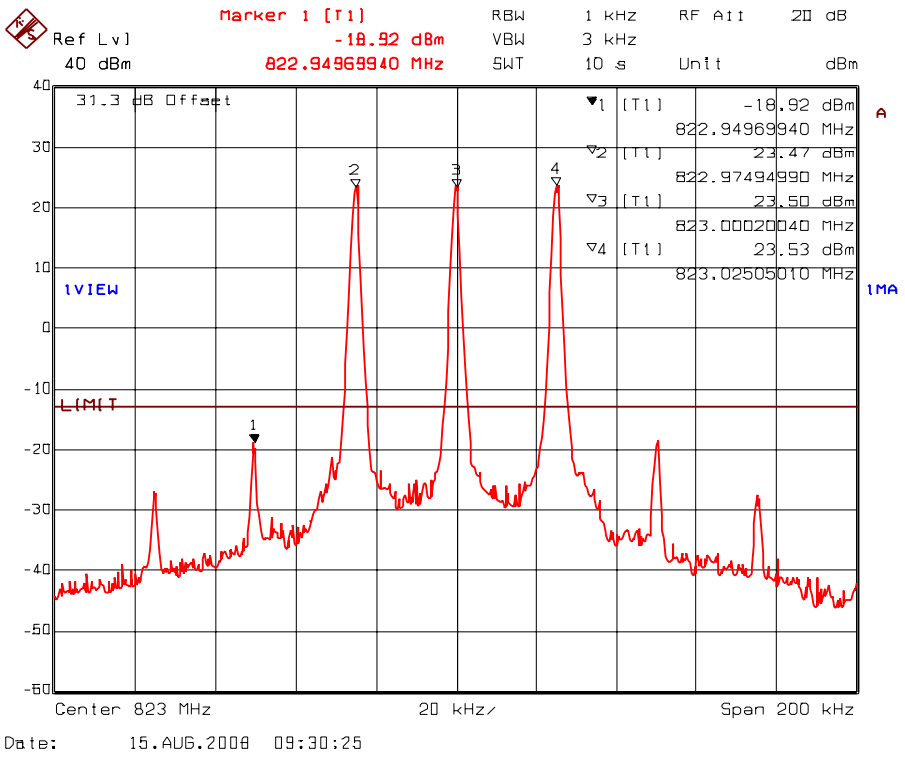
Plot 5.5.4.2.6.Intermodulation with 3 RF signal inputs/outputs
Uplink: Fc = 808MHz (-10 dBm), Fc - 25kHz (-10 dBm), Fc + 25kHz (-10 dBm)



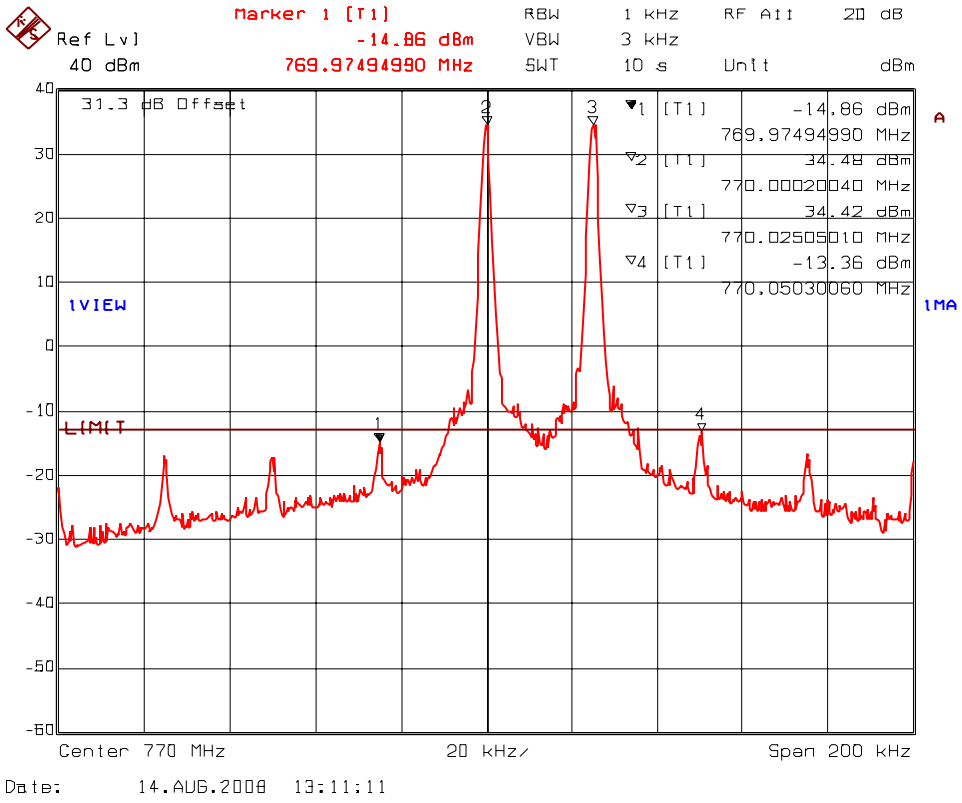
Plot 5.5.4.2.7.Intermodulation with 3 RF signal inputs/outputs
Uplink: Fc = 815MHz (-10 dBm), Fc - 25kHz (-10 dBm), Fc + 25kHz (-10 dBm)



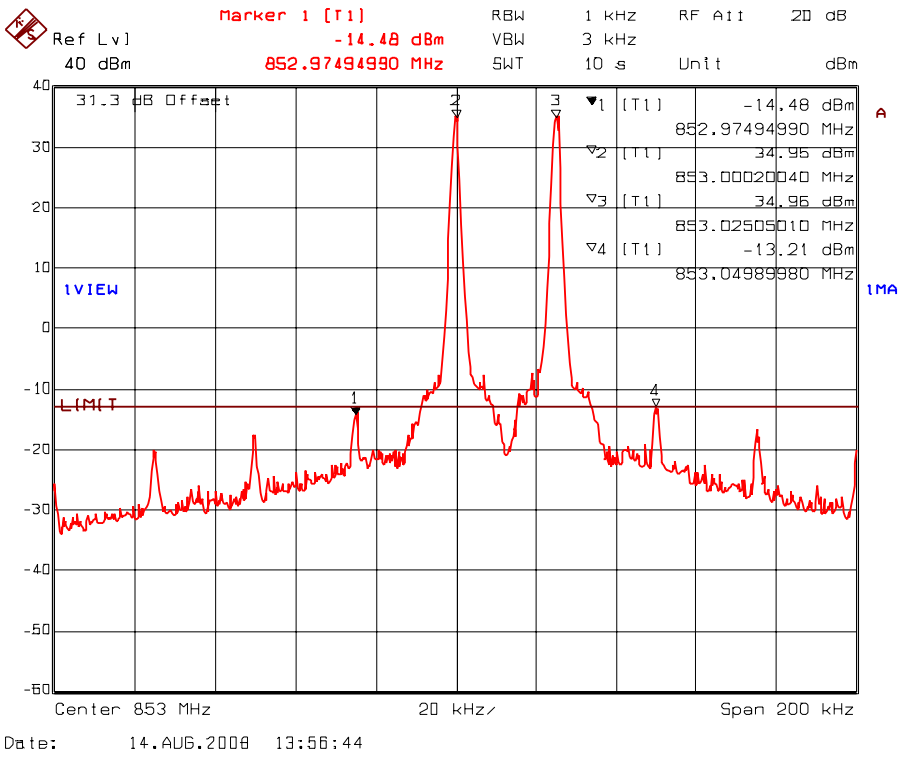
Plot 5.5.4.2.8.Intermodulation with 3 RF signal inputs/outputs
Uplink: Fc = 823MHz (-10 dBm), Fc - 25kHz (-10 dBm), Fc + 25kHz (-10 dBm)



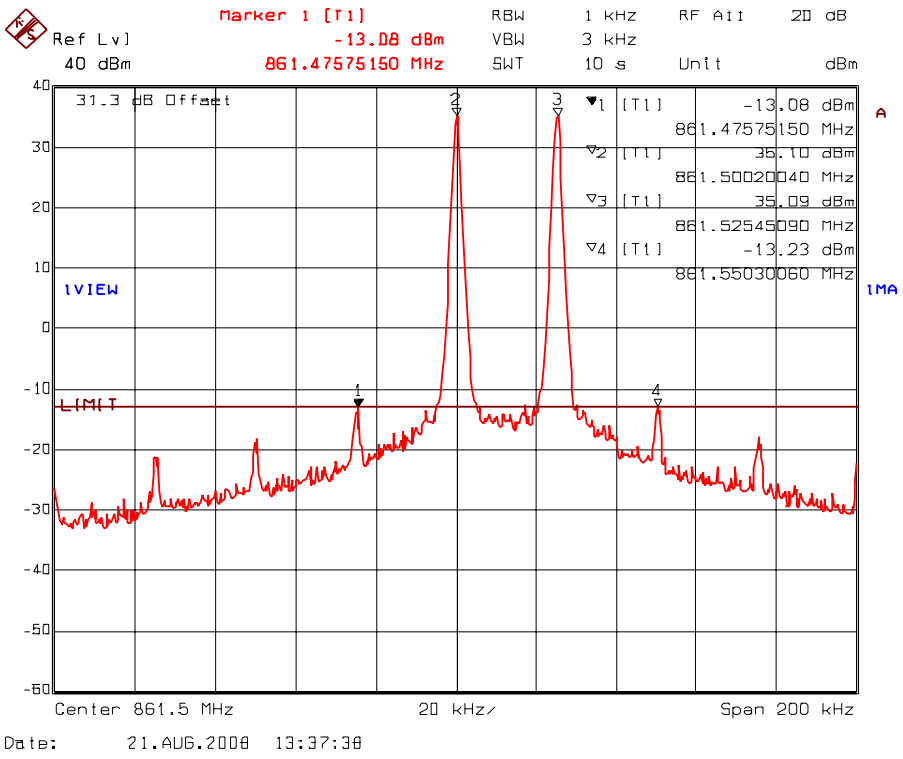
Plot 5.5.4.2.9.Intermodulation with 2 RF signal inputs/outputs
Downlink: Fc = 770MHz (-10 dBm), Fc + 25kHz (-10 dBm)



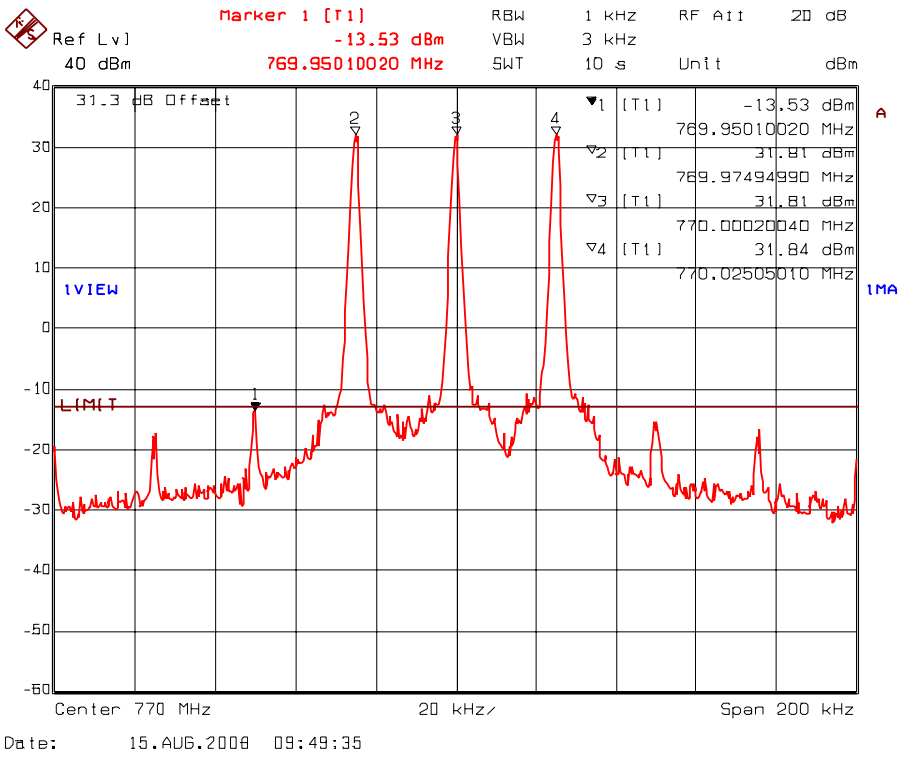
Plot 5.5.4.2.10.Intermodulation with 2 RF signal inputs/outputs
Downlink: Fc = 853MHz (-10 dBm), Fc + 25kHz (-10 dBm)



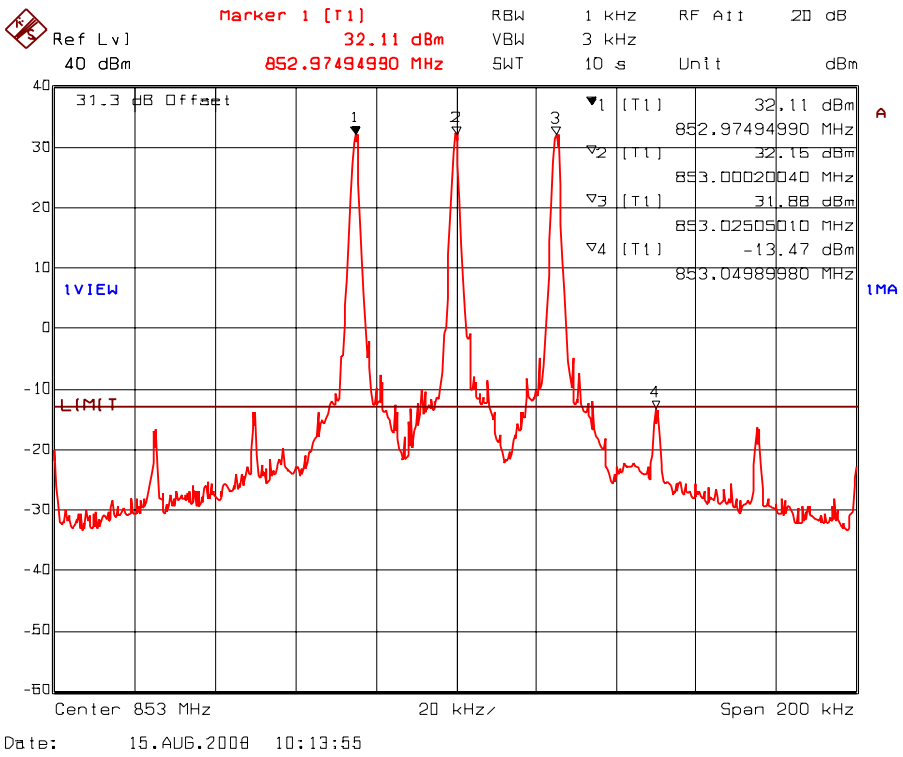
Plot 5.5.4.2.11.Intermodulation with 2 RF signal inputs/outputs
Downlink: Fc = 861.5MHz (-10 dBm), Fc + 25kHz (-10 dBm)



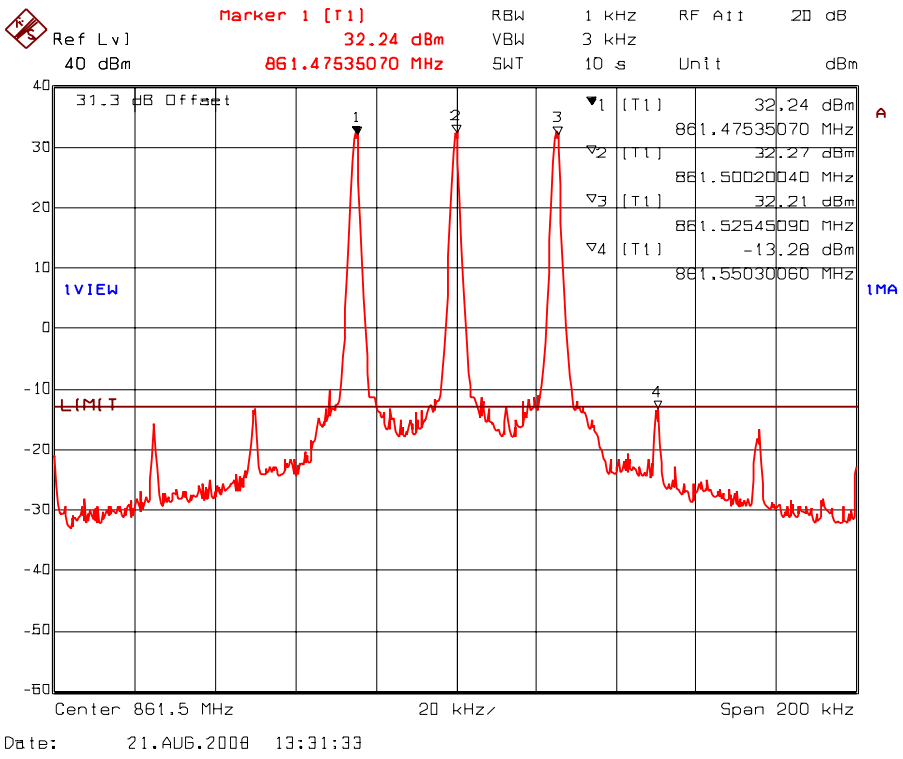
Plot 5.5.4.2.12.Intermodulation with 3 RF signal inputs/outputs
Downlink: Fc = 770MHz (-10 dBm), Fc - 25kHz (-10 dBm), Fc + 25kHz (-10 dBm)



Plot 5.5.4.2.13.Intermodulation with 3 RF signal inputs/outputs
Downlink: Fc = 853MHz (-10 dBm), Fc - 25kHz (-10 dBm), Fc + 25kHz (-10 dBm)



Plot 5.5.4.2.14.Intermodulation with 3 RF signal inputs/outputs
Downlink: Fc = 861.5MHz (-10 dBm), Fc - 25kHz (-10 dBm), Fc + 25kHz (-10 dBm)



5.6. RF EXPOSURE REQUIREMENTS @ 1.1310 & 2.1091

5.6.1. Limits

- **FCC 1.1310:**- The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b).

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (minutes)
(A) Limits for Occupational/Control Exposures				
300-1500	...	...	F/300	6
(B) Limits for General Population/Uncontrolled Exposure				
300-1500	...	...	F/1500	6

F = Frequency in MHz

5.6.2. Method of Measurements

Refer to FCC @ 1.1310 and 2.1091

- In order to demonstrate compliance with MPE requirements (see Section 2.1091), the following information is typically needed:

(1) Calculation that estimates the minimum separation distance (20 cm or more) between an antenna and persons required to satisfy power density limits defined for free space.
(2) Antenna installation and device operating instructions for installers (professional/unskilled users), and the parties responsible for ensuring compliance with the RF exposure requirement
(3) Any caution statements and/or warning labels that are necessary in order to comply with the exposure limits
(4) Any other RF exposure related issues that may affect MPE compliance

Calculation Method of RF Safety Distance:

$$S = \frac{PG}{4\pi \cdot r^2} = \frac{EIRP}{4\pi \cdot r^2}$$

Where: P: power input to the antenna in mW
EIRP: Equivalent (effective) isotropic radiated power.
S: power density mW/cm^2
G: numeric gain of antenna relative to isotropic radiator
r: distance to centre of radiation in cm

FCC radio frequency exposure limits may be exceeded at distances closer than r cm from the antenna of this device

$$r = \sqrt{\frac{PG}{4\pi \cdot S}} = \sqrt{\frac{EIRP}{4\pi \cdot S}}$$

FCC radio frequency exposure limits may not be exceeded at distances closer than r cm from the antenna of this device

5.6.3. Test Data

5.6.3.1. Outdoor Antenna - Uplink

Antenna Gain Limit specified by Manufactuer: 15 dBi

Minimum Frequency (MHz)	Maximum Composite Conducted Power (dBm)	Maximum EIRP (dBm)	Calculated RF Safety Distance r (cm)	Manufacturer' Specified Separation Distance (cm)	Compliance
799	28.5	43.5	58	100	Complies

Note: RF EXPOSURE DISTANCE LIMITS: $r = (PG/4\pi S)^{1/2} = (EIRP/4\pi S)^{1/2}$
$S = F/1500 = \text{lowest-f}/1500 = 799/1500\ mW/cm^2 = 0.533\ mW/cm^2$

5.6.3.2. Indoor Antenna - Downlink

Antenna Gain Limit specified by Manufactuer: 2.2 dBi

Minimum Frequency (MHz)	Maximum Composite Conducted Output Power (dBm)	Maximum EIRP (dBm)	Calculated RF Safety Distance r (cm)	Manufacturer' Specified Separation Distance (cm)	Compliance
769	41.5	43.7	60	100	Complies

Note: RF EXPOSURE DISTANCE LIMITS: $r = (PG/4\pi S)^{1/2} = (EIRP/4\pi S)^{1/2}$
$S = F/1500 = \text{lowest-f}/1500 = 769/1500\ mW/cm^2 = 0.513\ mW/cm^2$

Evaluation of RF Exposure Compliance Requirements	
RF Exposure Requirements	**Compliance with FCC Rules**
Minimum separation distance between antenna and persons, specified by the manufacturer, for	
• Indoor Antenna: 100 cm	Complies
• Outdoor Antenna: 100 cm	Complies

5.7. 99% OCCUPIED BANDWIDTH @ FCC 2.1049 & 90.209

5.7.1. Limits

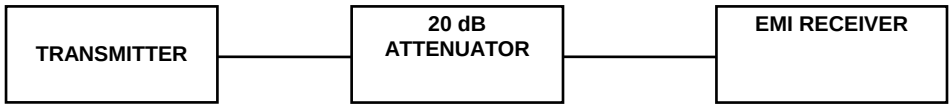
FCC 90.209 & 90.210: Emissions shall be attenuated below the mean output power of the transmitter as follows:

FREQUENCY RANGE (MHz)	Maximum Authorized BW (KHz)	CHANNEL SPACING (KHz)	Recommended Max. FREQ. DEVIATION (KHz)	FCC APPLICABLE MASK @ FCC 90.210
769-775/806-09/ 851-854	20	12.5	2.5	N/A For this Extender
809-824/854-869	20	25.0	5	N/A For this Extender

5.7.2. Method of Measurements

Refer to 8.4 of this report for measurement details

5.7.3. Test Arrangement



5.7.4. Test Data

Remark: 99% OBW of the RF input and RF output signals were measured for comparison.

UpLink:

Frequency	Modulation and Channel Spacing				
	11K0F3E	16K0F3E	8K10F1E	5K76G1E	20K0GXW
99% Occupied Bandwidth (kHz) – UpLink Input					
800	10.14	15.27	8.33	5.19	17.63
808	10.14	15.27	8.37	5.15	17.55
815	10.14	15.27	8.29	5.19	17.55
823	10.14	15.27	8.41	5.15	17.55
99% Occupied Bandwidth (kHz) – UpLink Output					
800	10.06	15.09	8.13	5.15	17.31
808	10.06	15.09	8.09	5.15	17.31
815	10.06	15.09	8.17	5.13	17.23
823	10.06	15.09	8.21	5.13	17.31

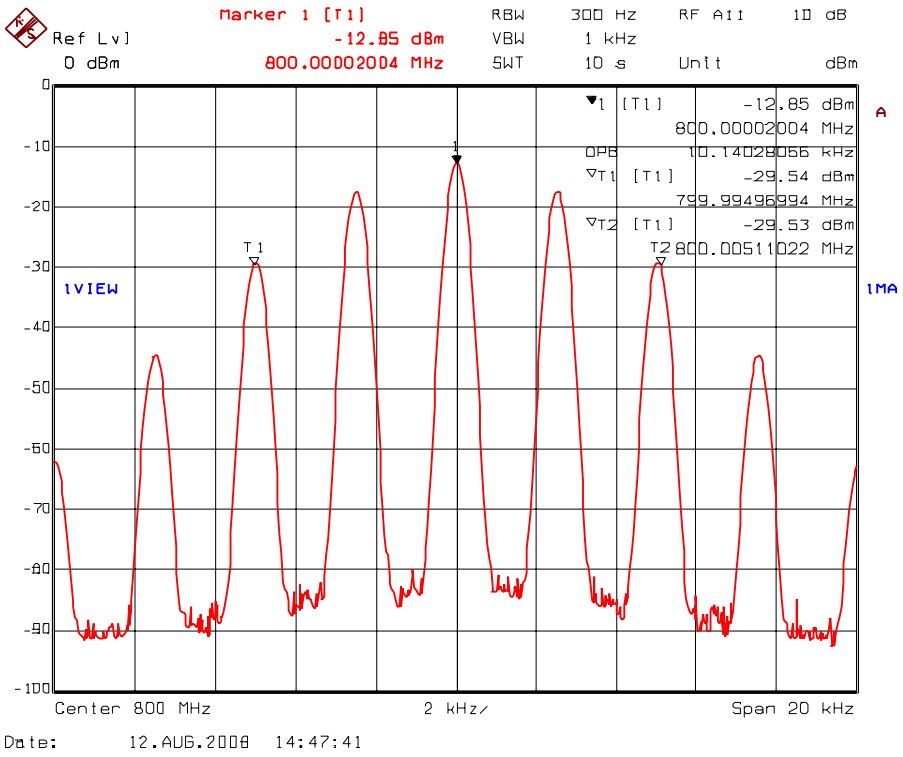
Remark: Refer to Plots 1 ~ 40 for 99% occupied bandwidth measurements.

DownLink:

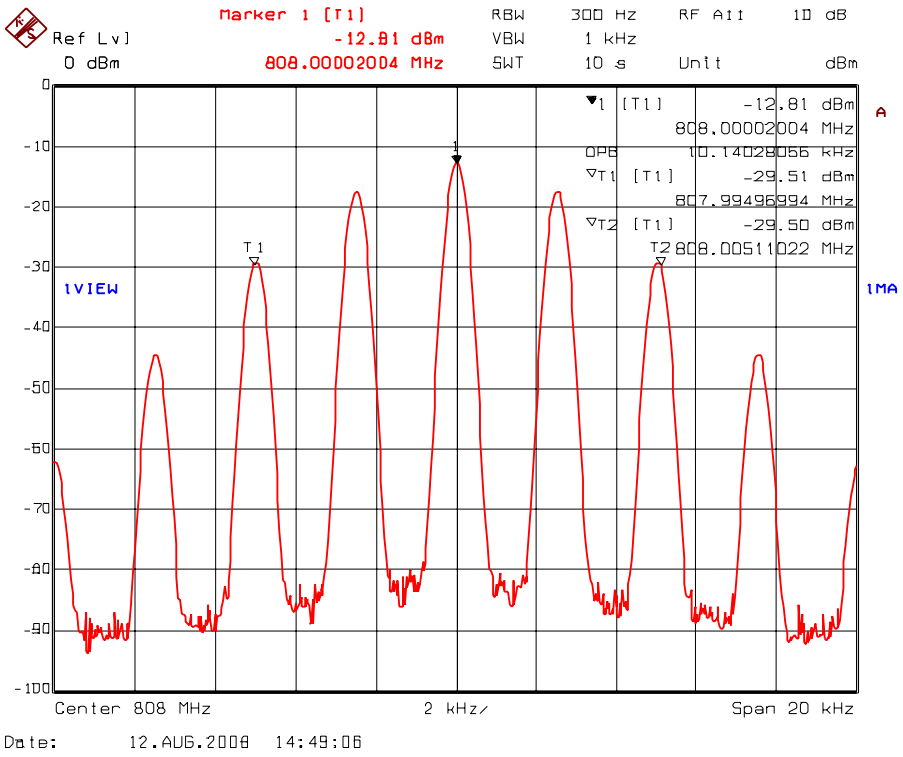
Frequency	Modulation and Channel Spacing				
	11K0F3E	16K0F3E	8K10F1E	5K76G1E	20K0GXW
99% Occupied Bandwidth (kHz) – DownLink Input					
770	10.14	15.27	8.41	5.13	17.55
853	10.14	15.21	8.33	5.13	17.55
861.5	10.14	15.21	8.29	5.23	17.55
99% Occupied Bandwidth (kHz) – DownLink Output					
770	10.06	15.09	8.01	5.17	17.31
853	10.06	15.09	8.06	5.17	17.31
861.5	10.06	15.09	8.05	5.17	17.31

Remark: Refer to Plots 41 ~ 70 for 99% occupied bandwidth measurements.

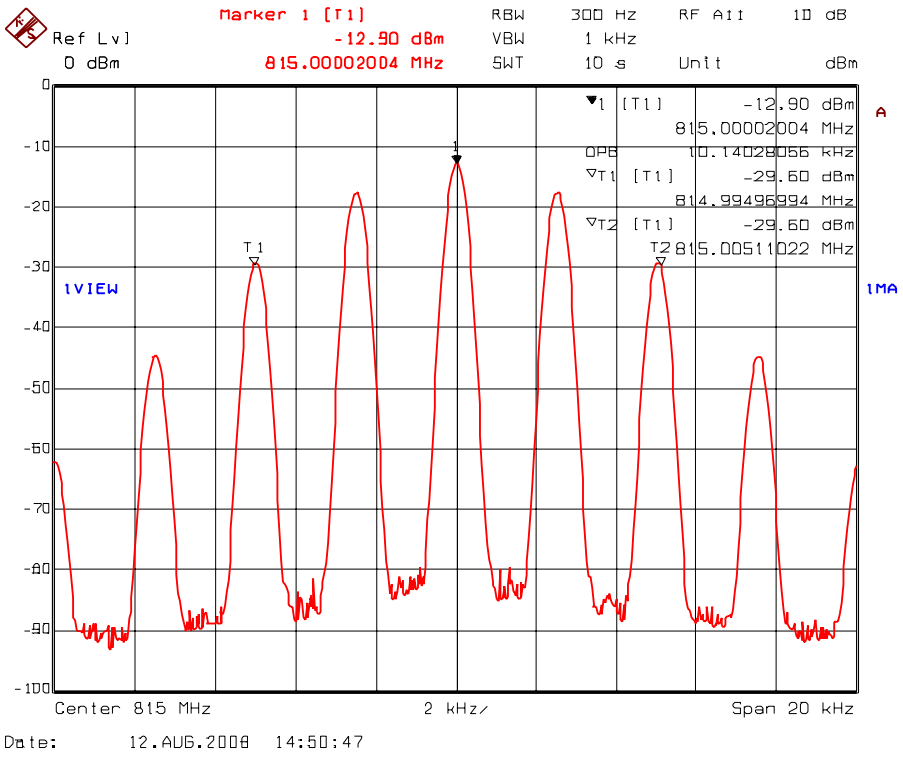
Plot 5.7.4.1.1. 99% Occupied Bandwidth – RF Input Signal
Frequency: 800 MHz (UpLink)
11K0F3E



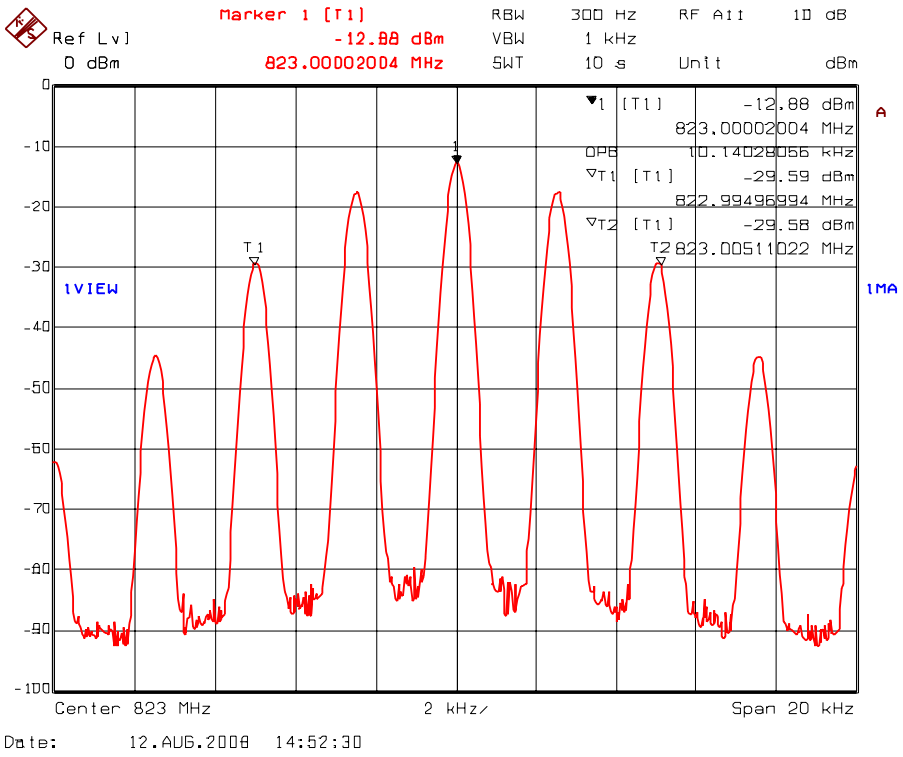
Plot 5.7.4.1.2. 99% Occupied Bandwidth – RF Input Signal
Frequency: 808 MHz (UpLink)
11K0F3E



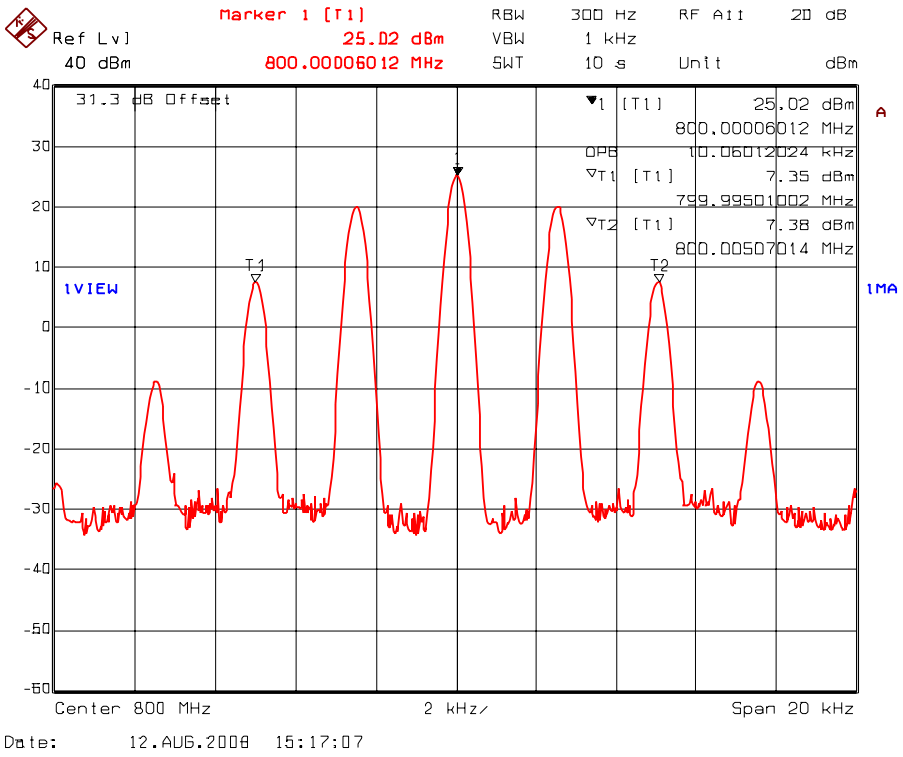
Plot 5.7.4.1.3. 99% Occupied Bandwidth – RF Input Signal
Frequency: 815 MHz (UpLink)
11K0F3E



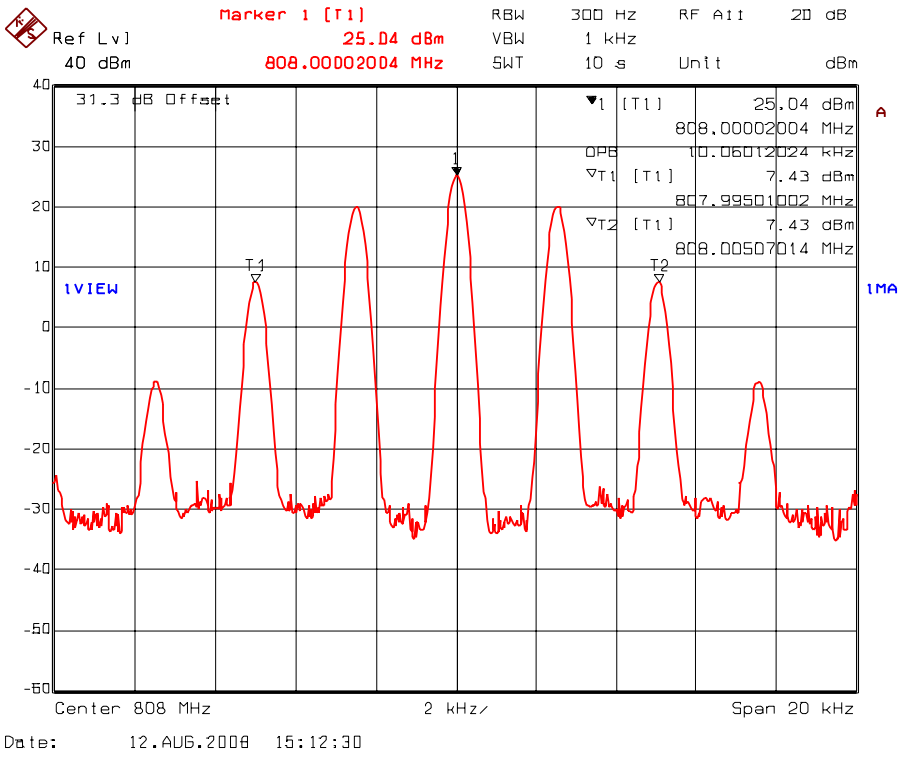
Plot 5.7.4.1.4. 99% Occupied Bandwidth – RF Input Signal
Frequency: 823 MHz (UpLink)
11K0F3E



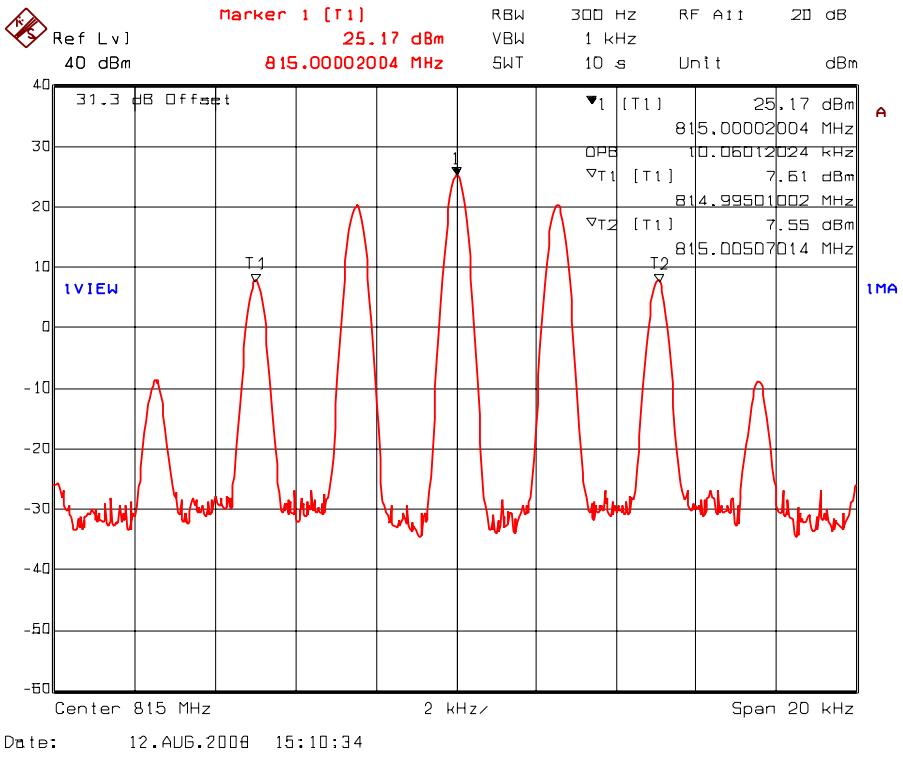
Plot 5.7.4.1.5. 99% Occupied Bandwidth – RF Output Signal
Frequency: 800 MHz (UpLink)
11K0F3E



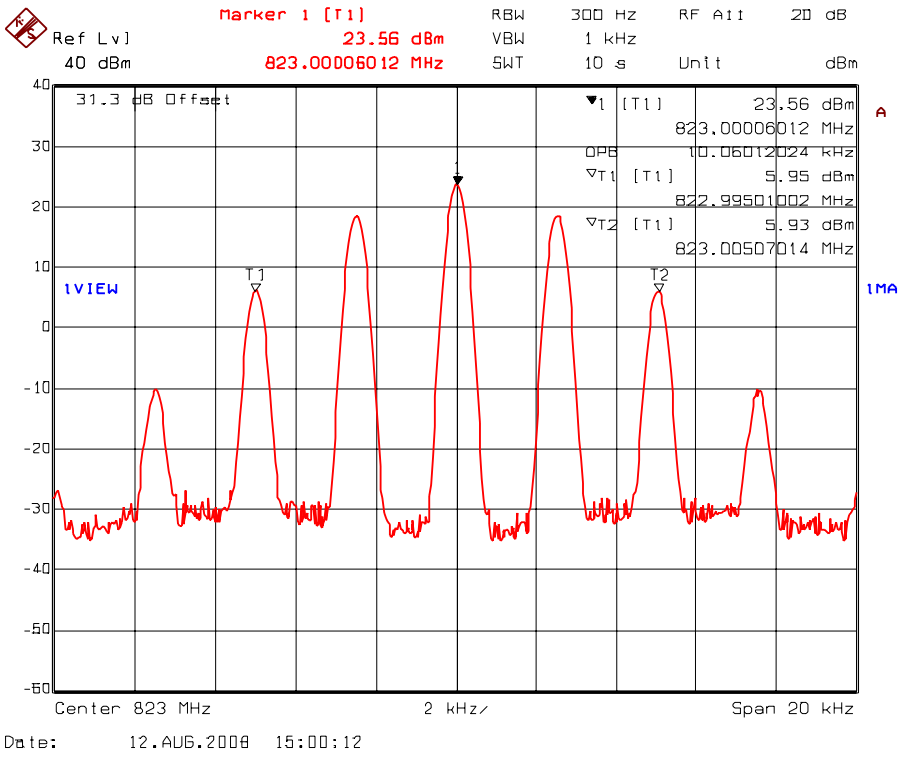
Plot 5.7.4.1.6. 99% Occupied Bandwidth – RF Output Signal
Frequency: 808 MHz (UpLink)
11K0F3E



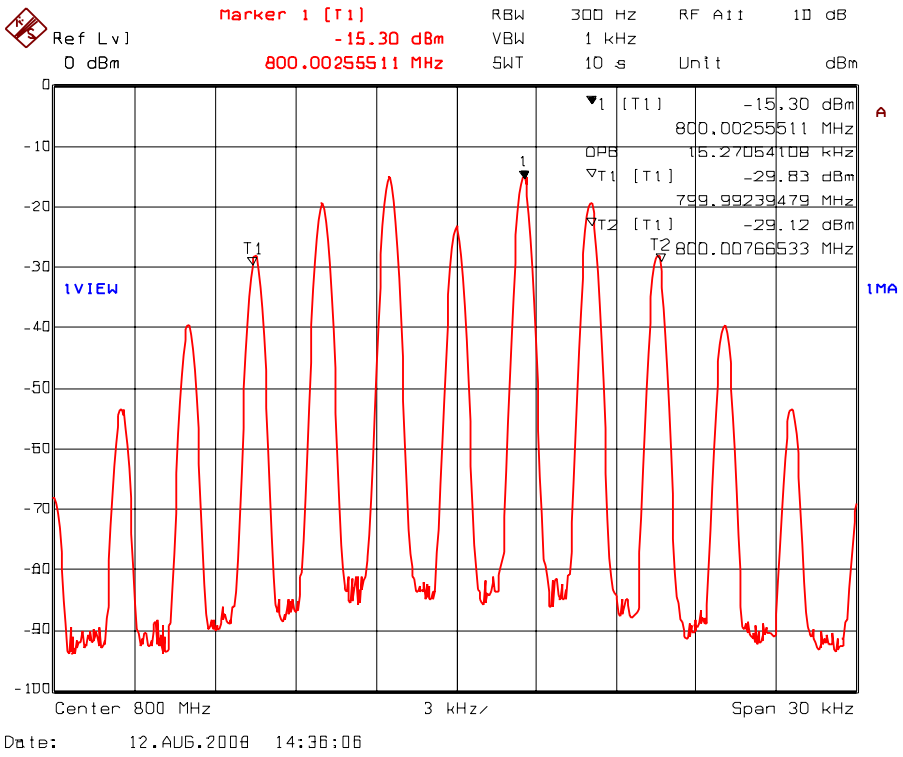
Plot 5.7.4.1.7. 99% Occupied Bandwidth – RF Output Signal
Frequency: 815 MHz (UpLink)
11K0F3E



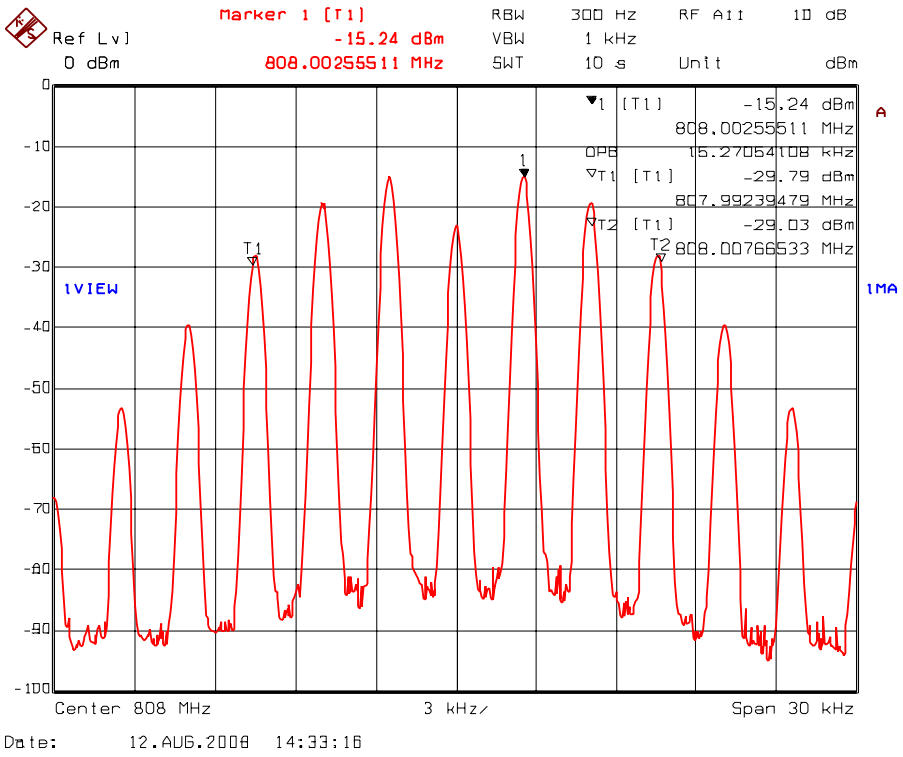
Plot 5.7.4.1.8. 99% Occupied Bandwidth – RF Output Signal
Frequency: 823 MHz (UpLink)
11K0F3E



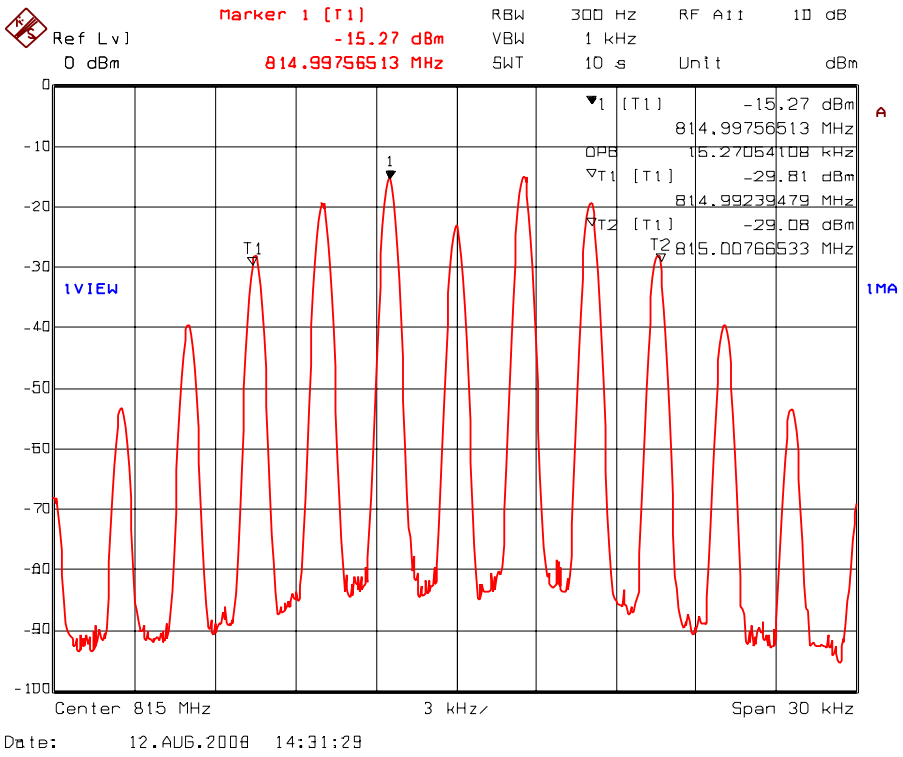
Plot 5.7.4.1.9. 99% Occupied Bandwidth – RF Input Signal
Frequency: 800 MHz (UpLink)
16K0F3E



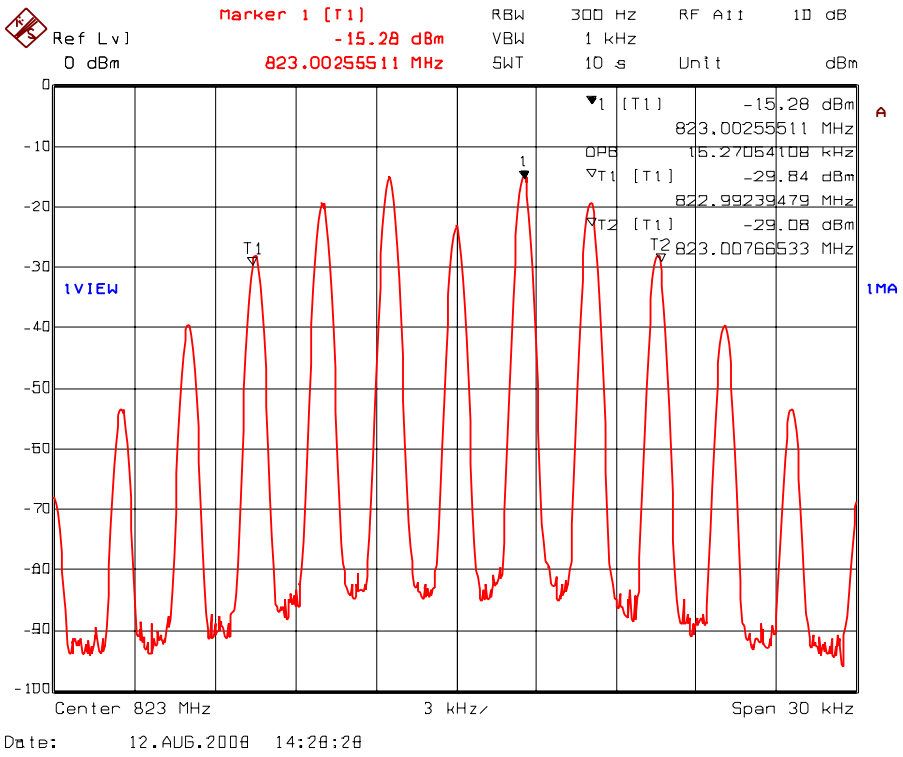
Plot 5.7.4.1.10. 99% Occupied Bandwidth – RF Input Signal
Frequency: 808 MHz (UpLink)
16K0F3E



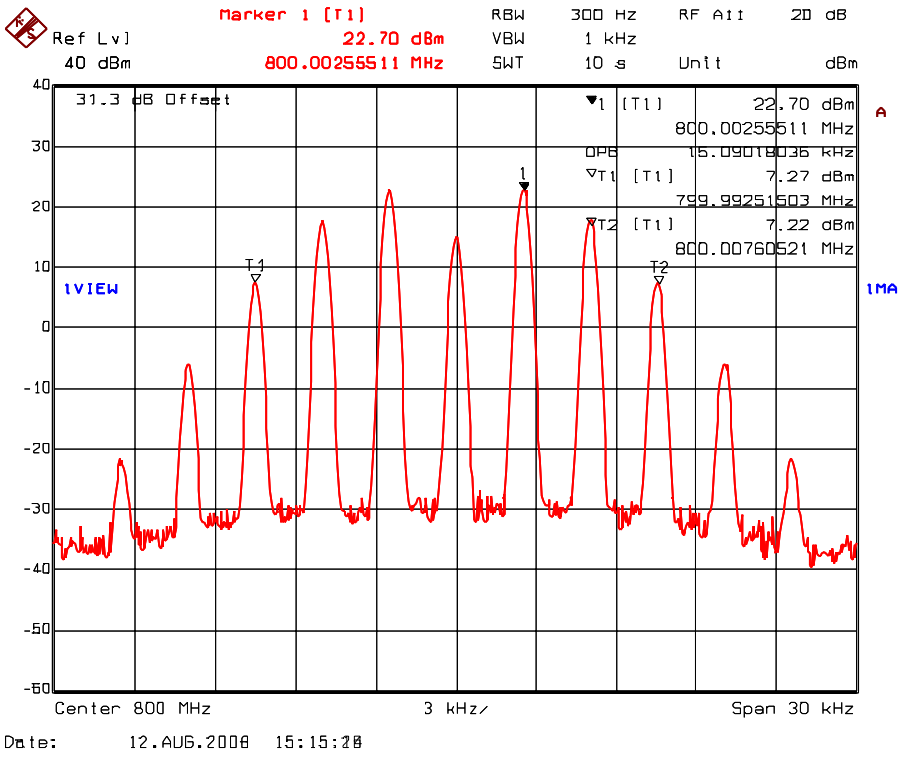
Plot 5.7.4.1.11. 99% Occupied Bandwidth – RF Input Signal
Frequency: 815 MHz (UpLink)
16K0F3E



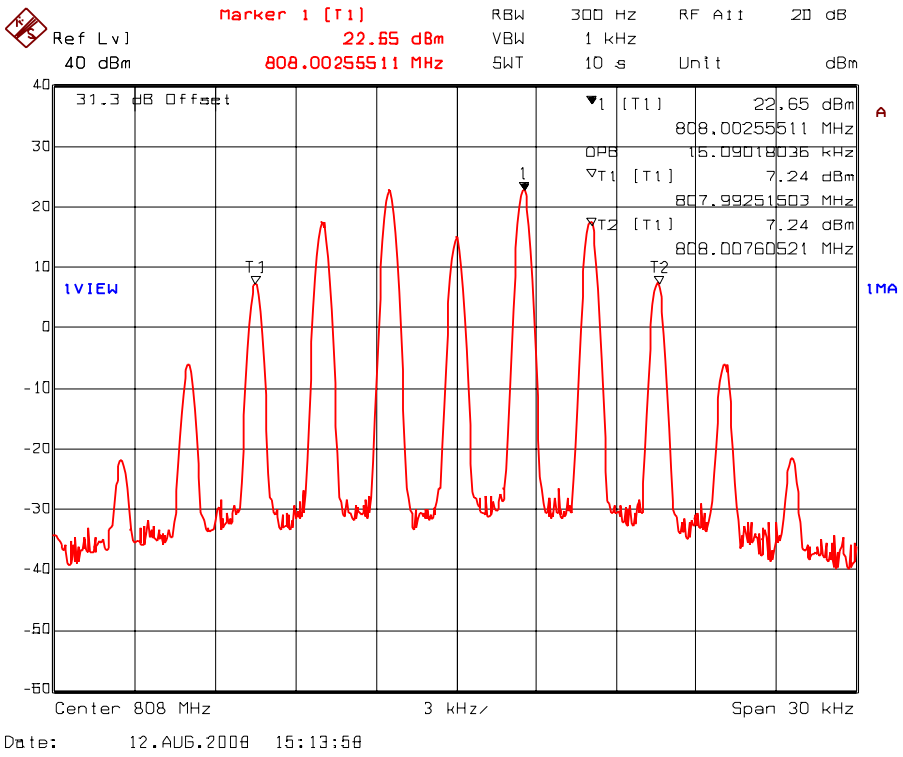
Plot 5.7.4.1.12. 99% Occupied Bandwidth – RF Input Signal
Frequency: 823 MHz (UpLink)
16K0F3E



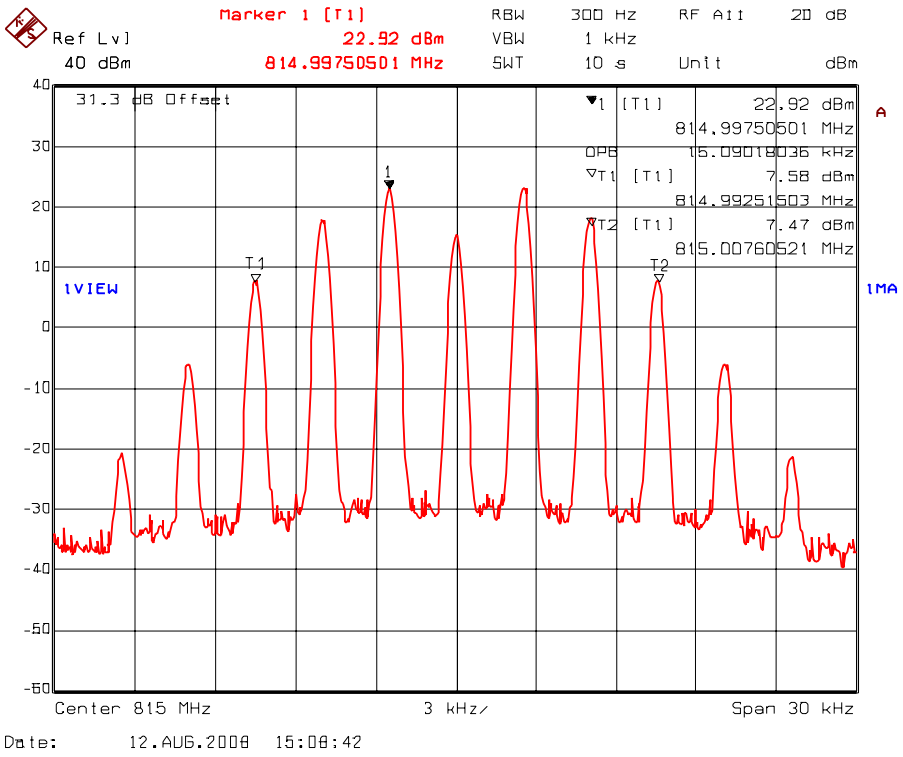
Plot 5.7.4.1.13. 99% Occupied Bandwidth – RF Output Signal
Frequency: 800 MHz (UpLink)
16K0F3E



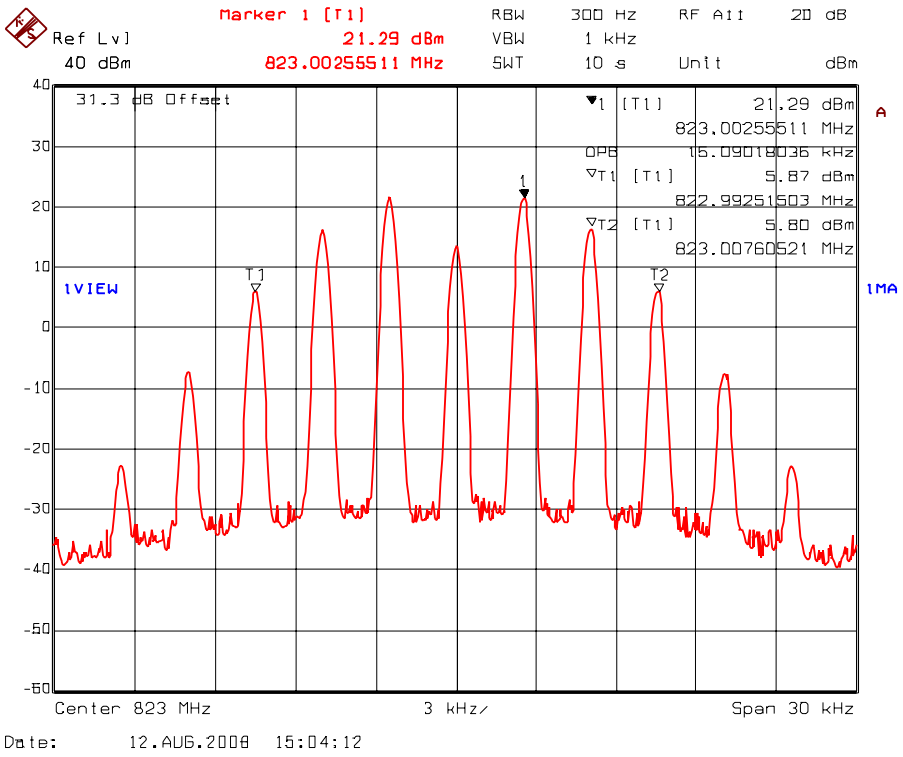
Plot 5.7.4.1.14. 99% Occupied Bandwidth – RF Output Signal
Frequency: 808 MHz (UpLink)
16K0F3E



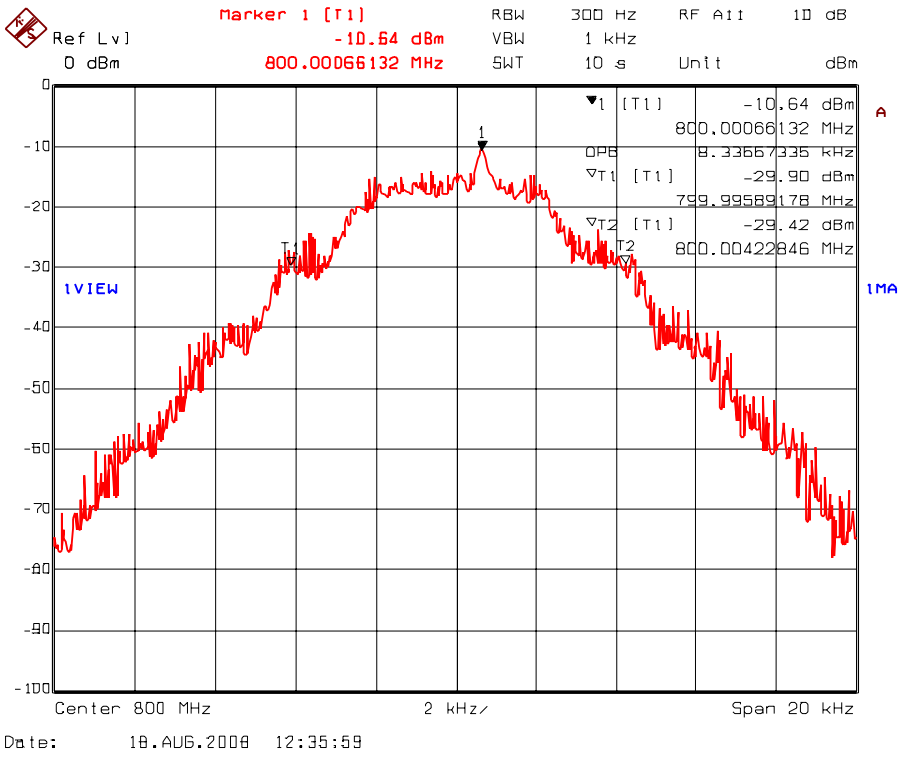
Plot 5.7.4.1.15. 99% Occupied Bandwidth – RF Output Signal
Frequency: 815 MHz (UpLink)
16K0F3E



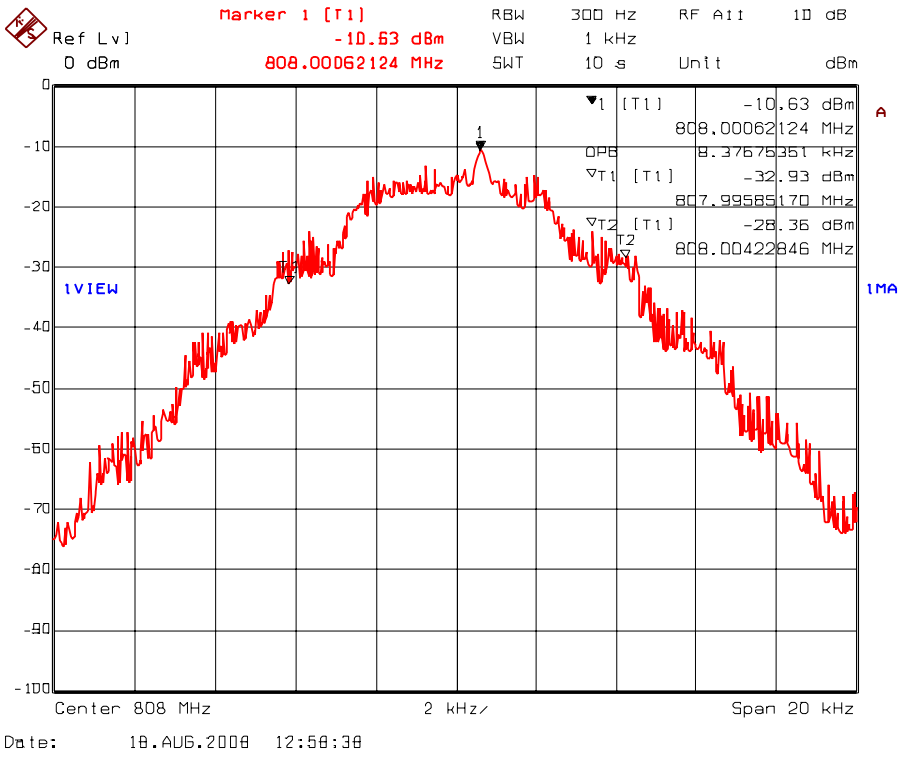
Plot 5.7.4.1.16. 99% Occupied Bandwidth – RF Output Signal
Frequency: 823 MHz (UpLink)
16K0F3E



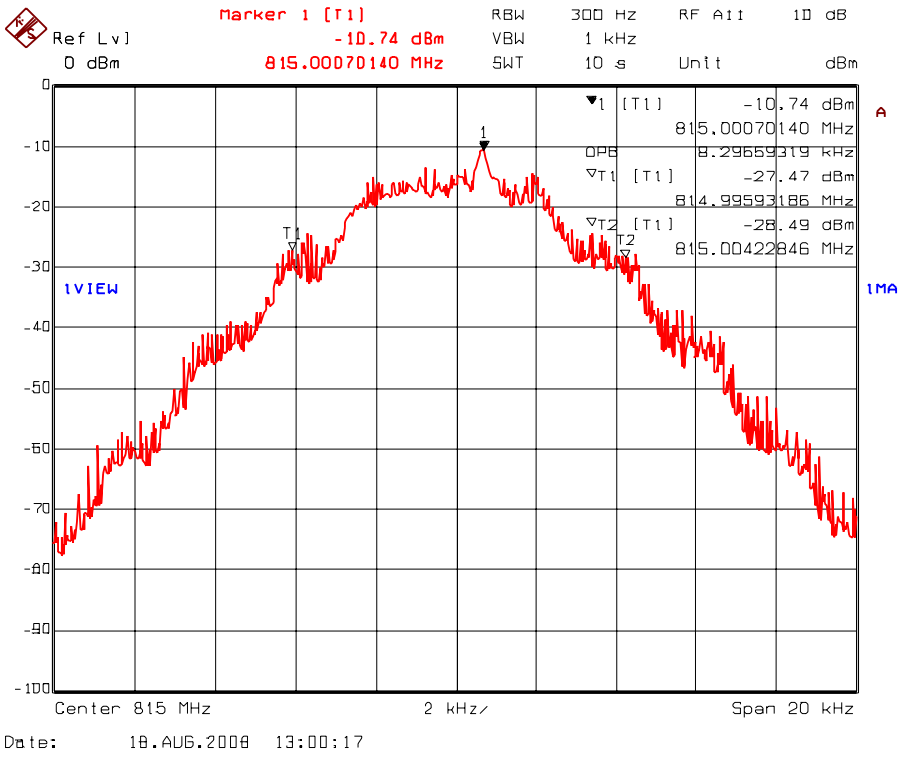
Plot 5.7.4.1.17. 99% Occupied Bandwidth – RF Input Signal
Frequency: 800 MHz (UpLink)
8K10F1E



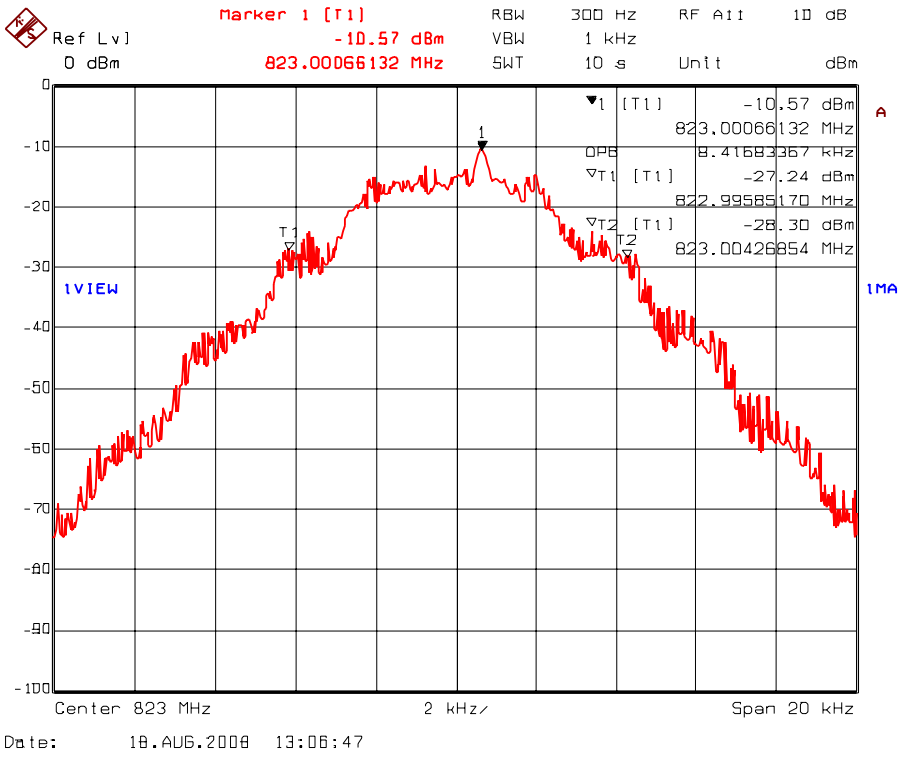
Plot 5.7.4.1.18. 99% Occupied Bandwidth – RF Input Signal
Frequency: 808 MHz (UpLink)
8K10F1E



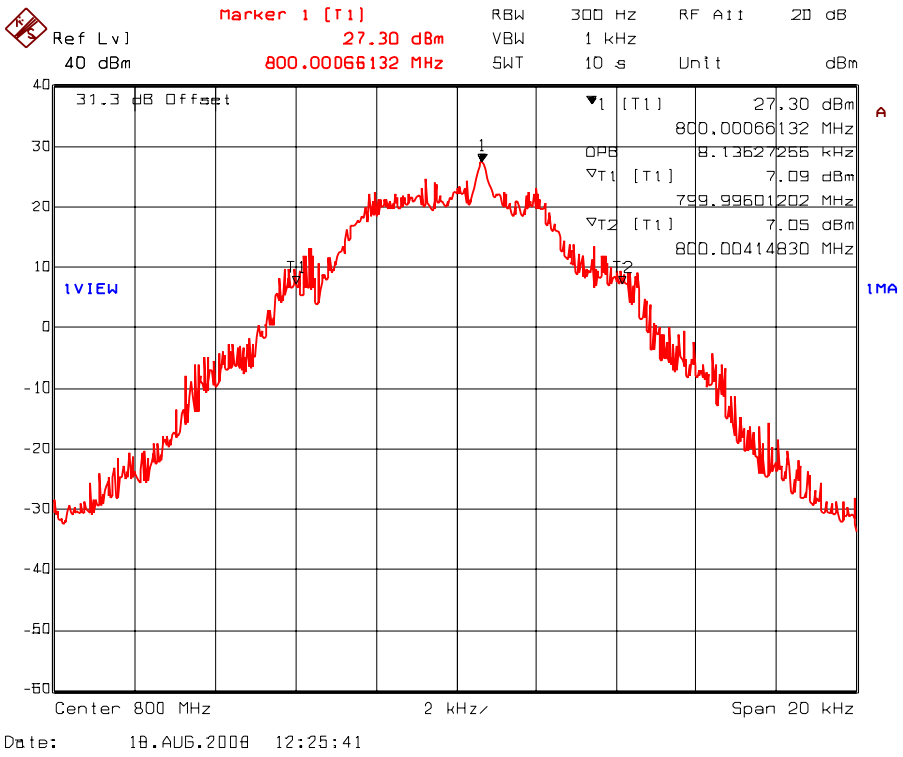
Plot 5.7.4.1.19. 99% Occupied Bandwidth – RF Input Signal
Frequency: 815 MHz (UpLink)
8K10F1E



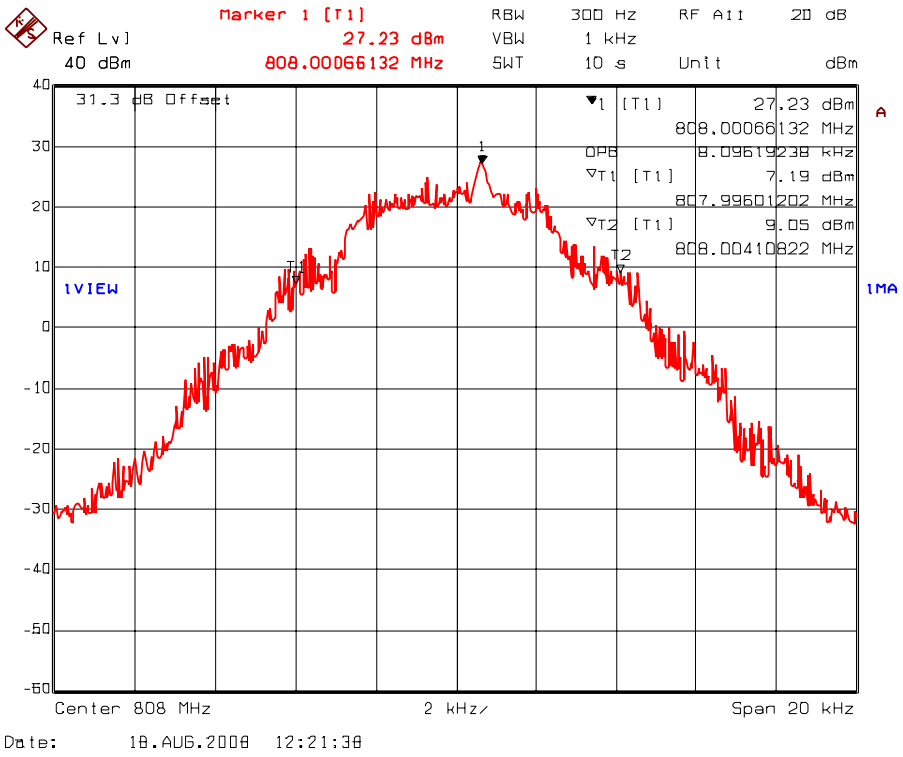
Plot 5.7.4.1.20. 99% Occupied Bandwidth – RF Input Signal
Frequency: 823 MHz (UpLink)
8K10F1E



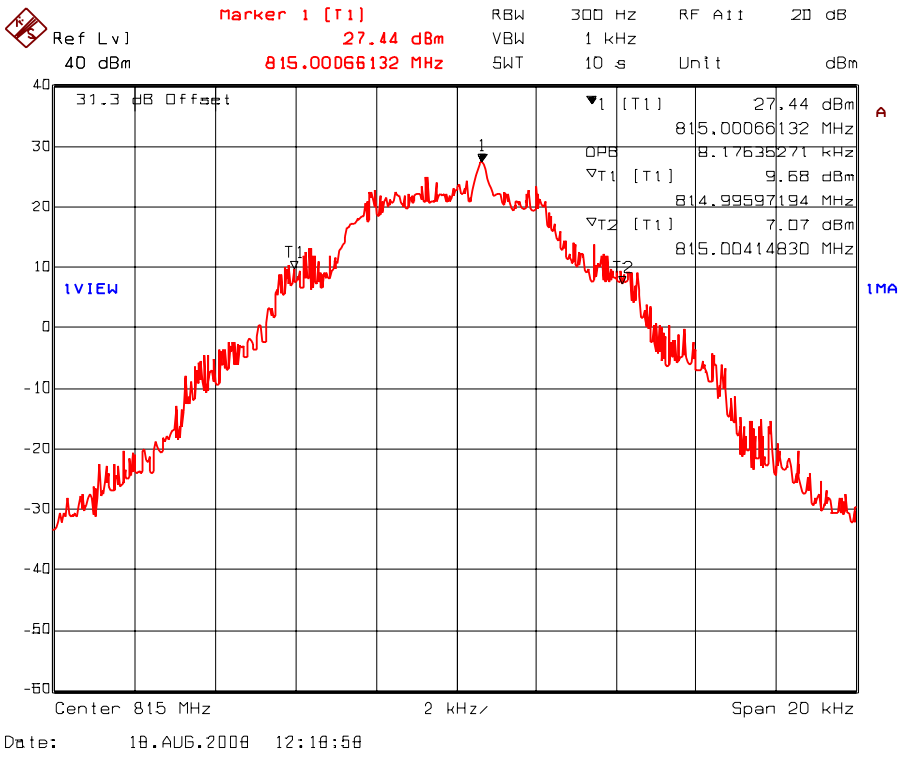
Plot 5.7.4.1.21. 99% Occupied Bandwidth – RF Output Signal
Frequency: 800 MHz (UpLink)
8K10F1E



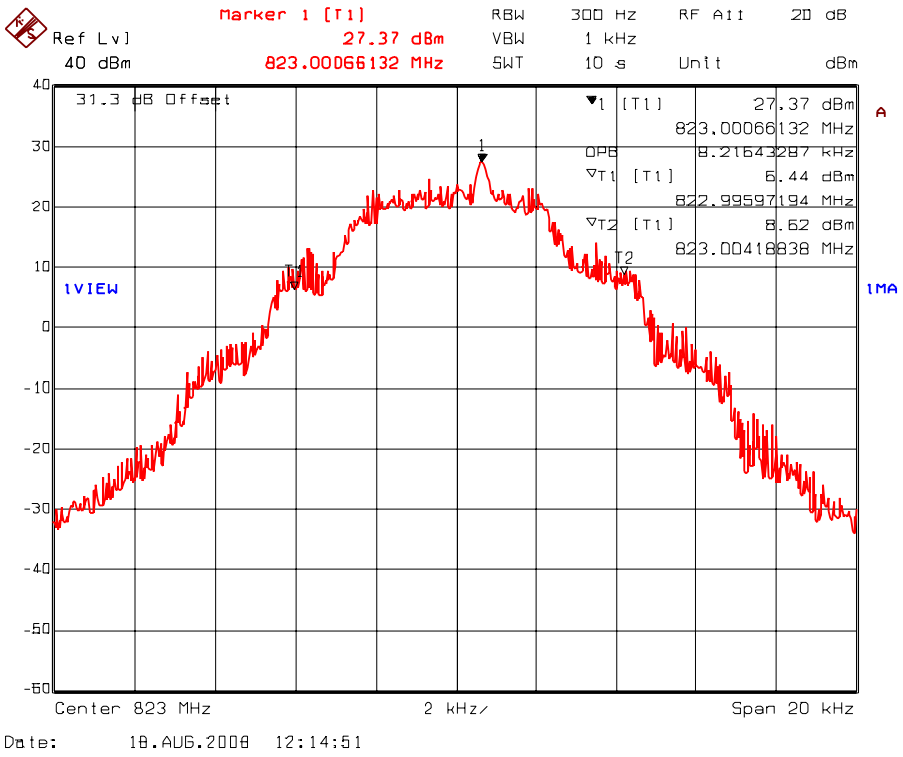
Plot 5.7.4.1.22. 99% Occupied Bandwidth – RF Output Signal
Frequency: 808 MHz (UpLink)
8K10F1E



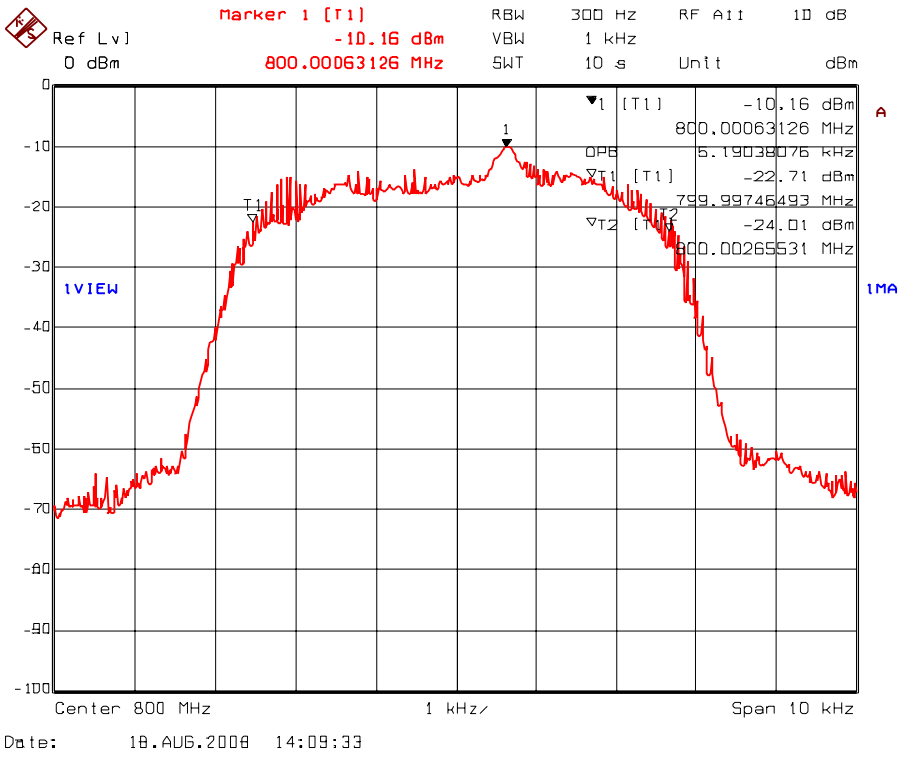
Plot 5.7.4.1.23. 99% Occupied Bandwidth – RF Output Signal
Frequency: 815 MHz (UpLink)
8K10F1E



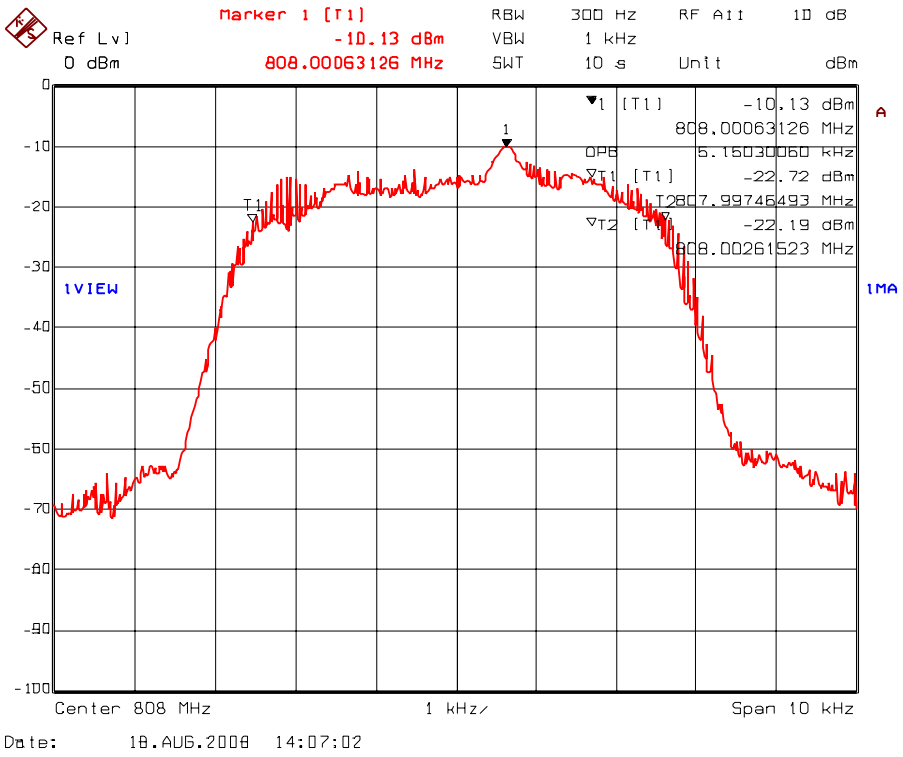
Plot 5.7.4.1.24. 99% Occupied Bandwidth – RF Output Signal
Frequency: 823 MHz (UpLink)
8K10F1E



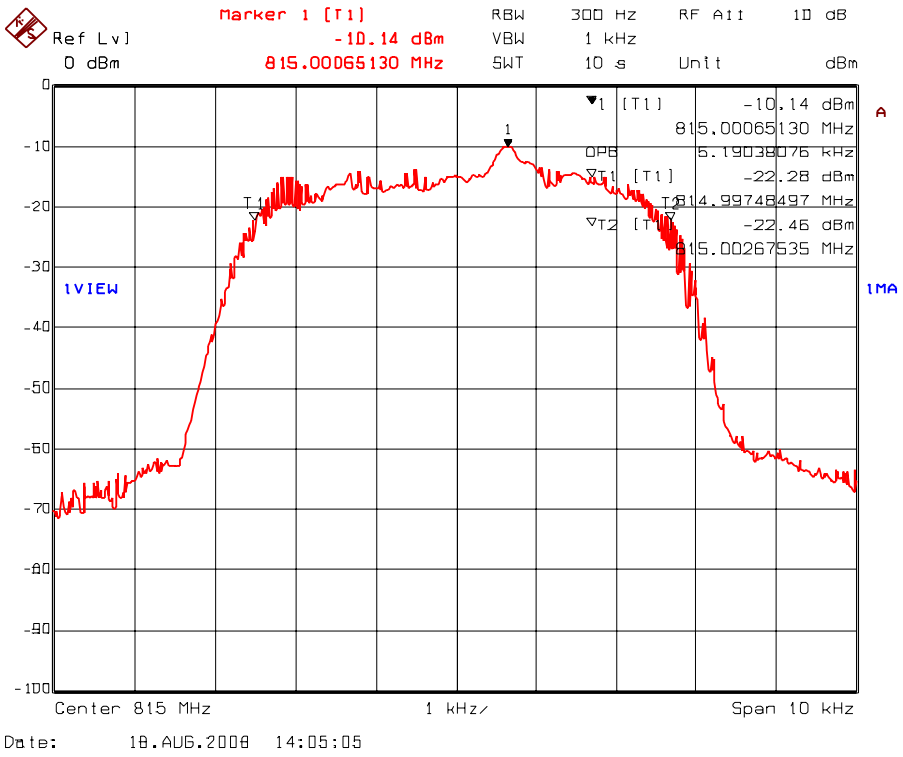
Plot 5.7.4.1.25. 99% Occupied Bandwidth – RF Input Signal
Frequency: 800 MHz (UpLink)
5K76G1E



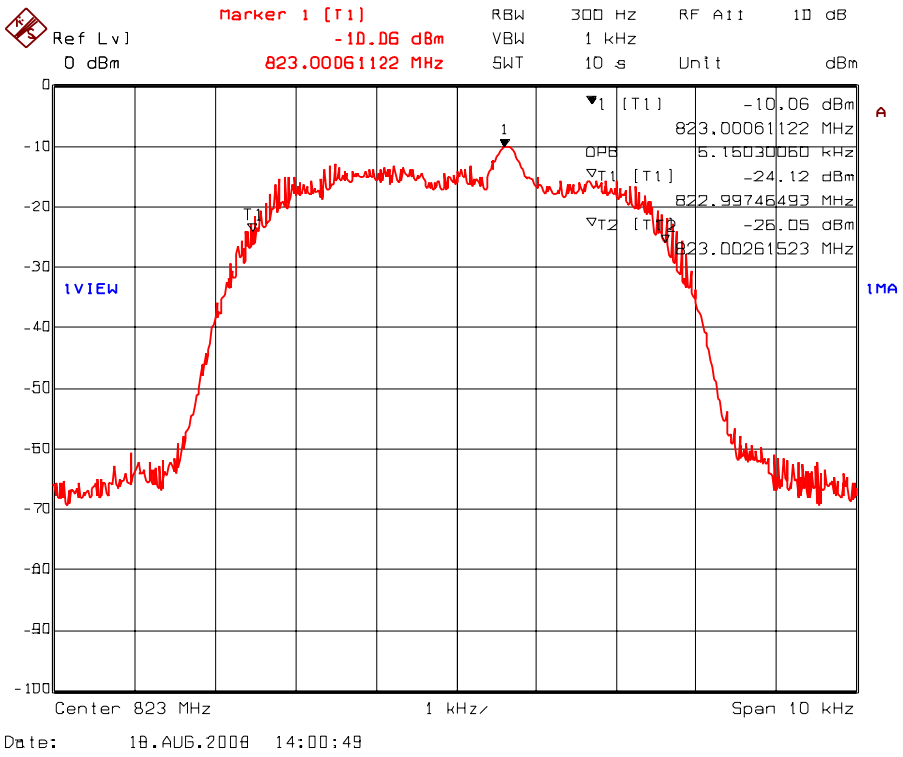
Plot 5.7.4.1.26. 99% Occupied Bandwidth – RF Input Signal
Frequency: 808 MHz (UpLink)
5K76G1E



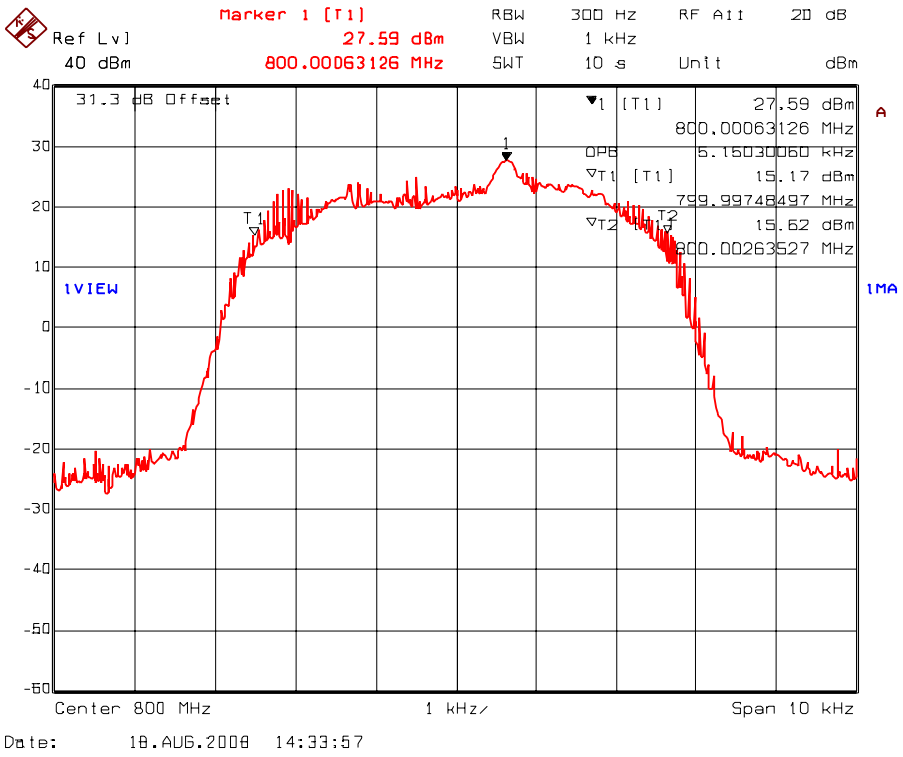
Plot 5.7.4.1.27. 99% Occupied Bandwidth – RF Input Signal
Frequency: 815 MHz (UpLink)
5K76G1E



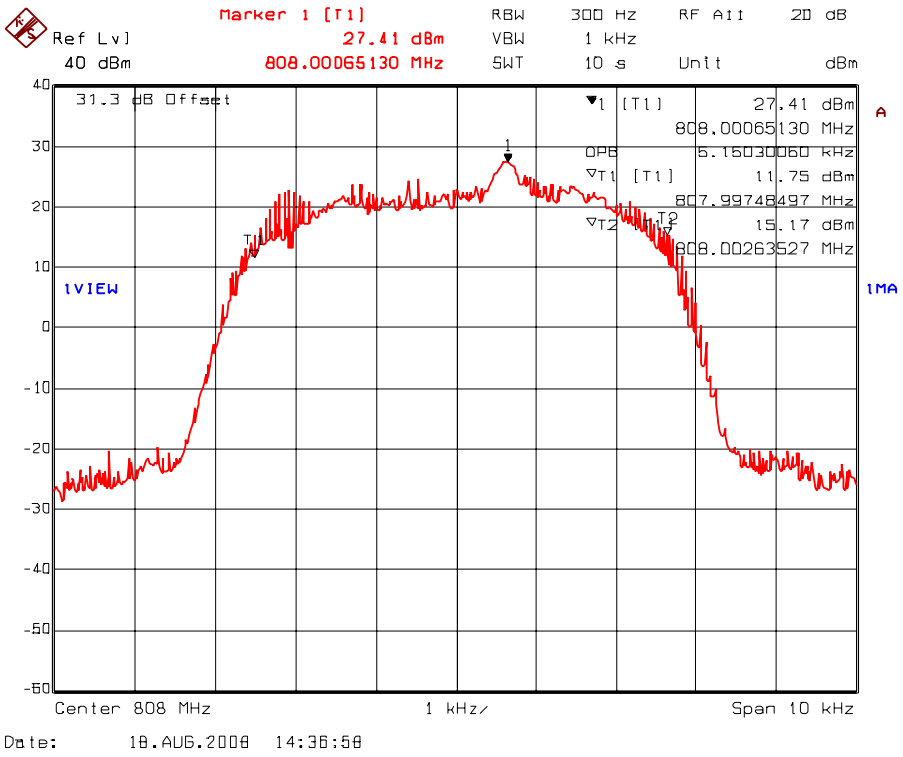
Plot 5.7.4.1.28. 99% Occupied Bandwidth – RF Input Signal
Frequency: 823 MHz (UpLink)
5K76G1E



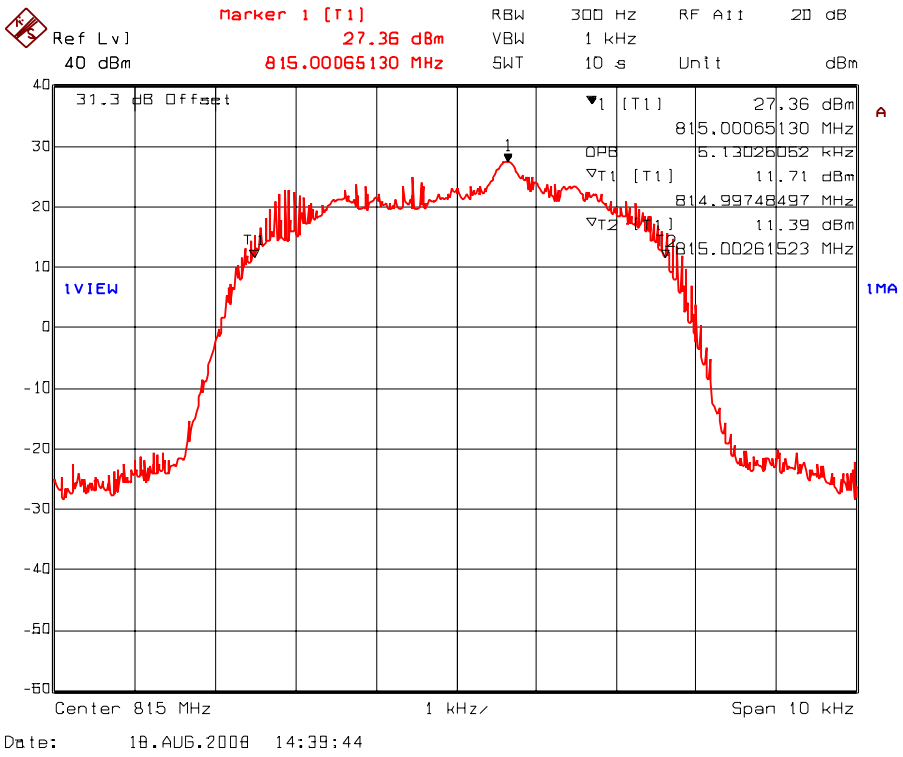
Plot 5.7.4.1.29. 99% Occupied Bandwidth – RF Output Signal
Frequency: 800 MHz (UpLink)
5K76G1E



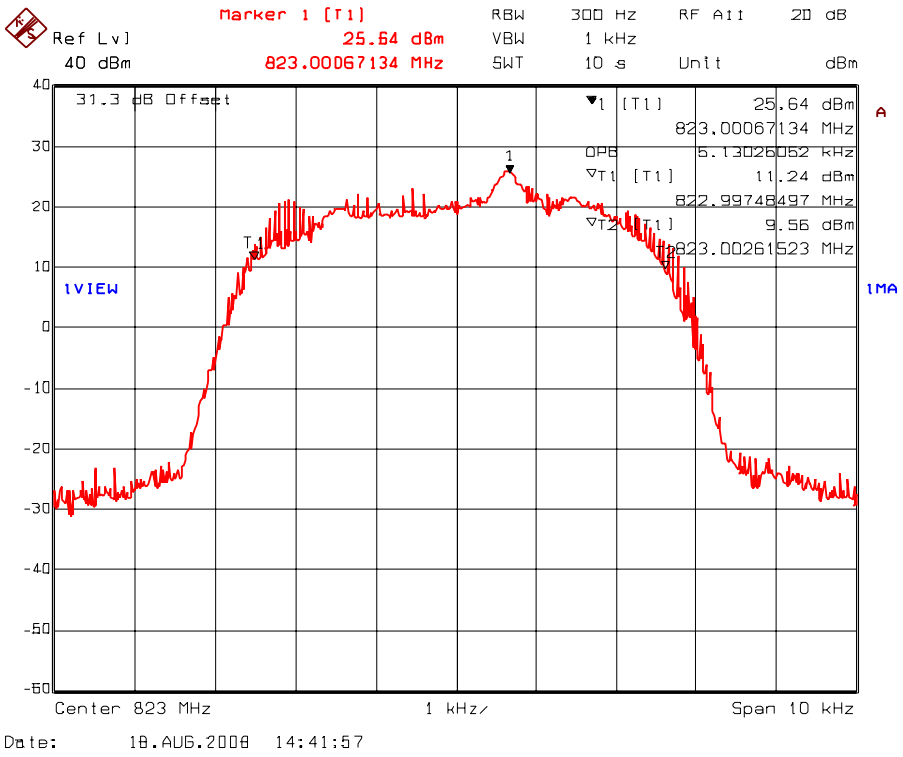
Plot 5.7.4.1.30. 99% Occupied Bandwidth – RF Output Signal
Frequency: 808 MHz (UpLink)
5K76G1E



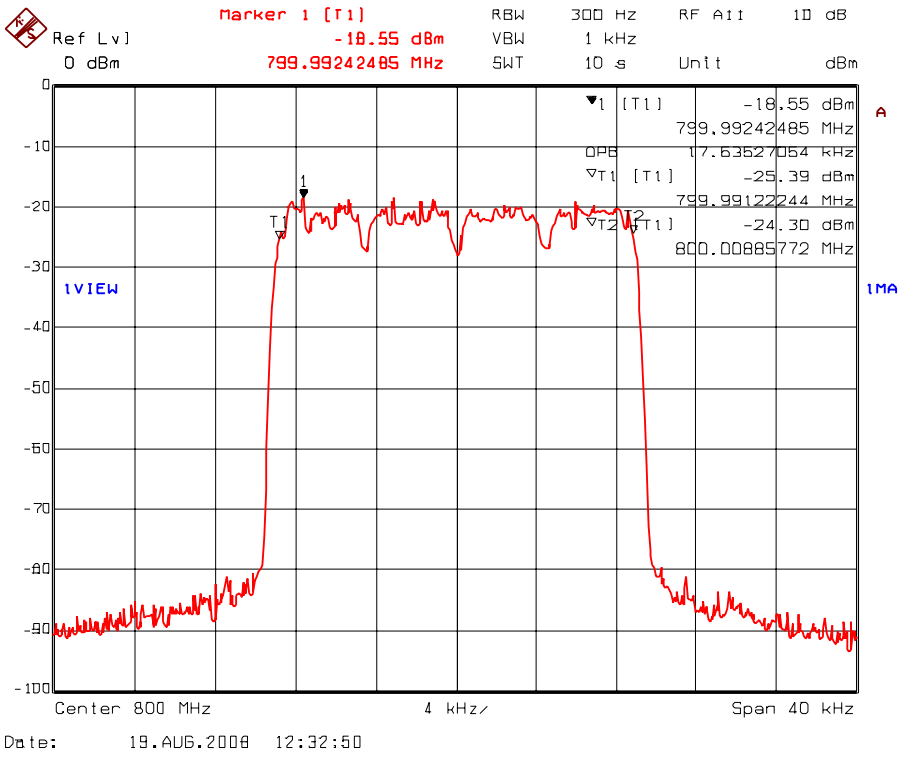
Plot 5.7.4.1.31. 99% Occupied Bandwidth – RF Output Signal
Frequency: 815 MHz (UpLink)
5K76G1E



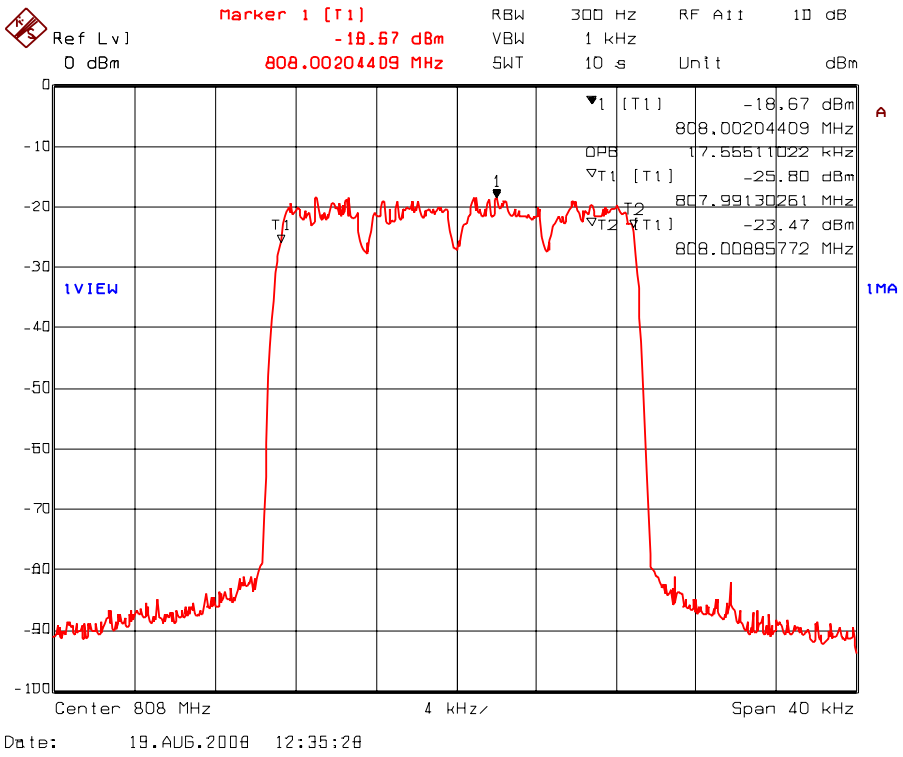
Plot 5.7.4.1.32. 99% Occupied Bandwidth – RF Output Signal
Frequency: 823 MHz (UpLink)
5K76G1E



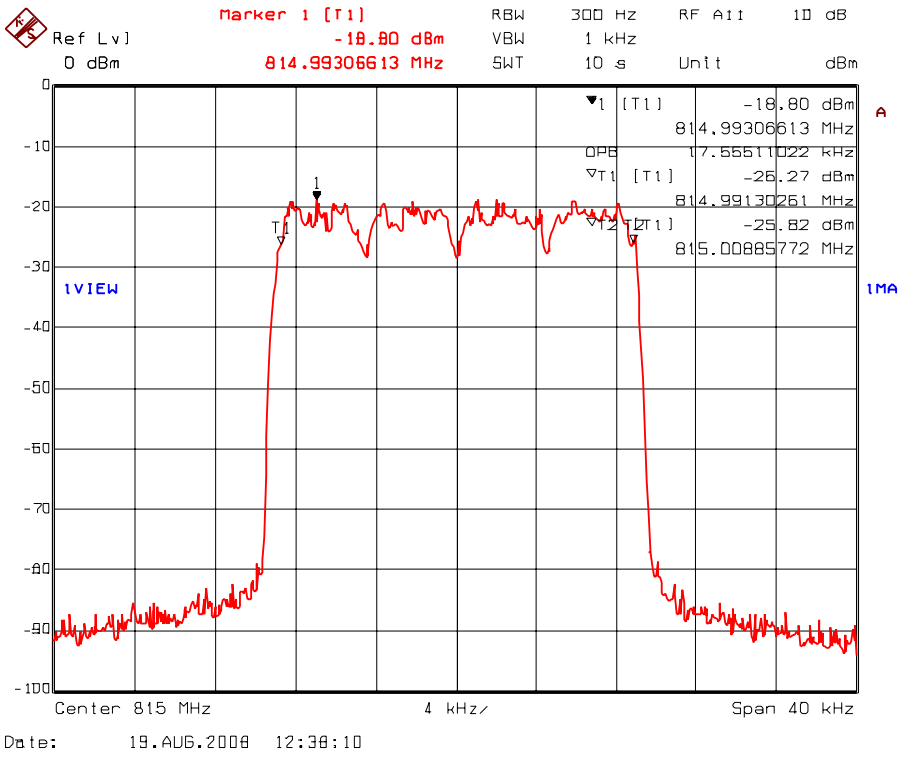
Plot 5.7.4.1.33. 99% Occupied Bandwidth – RF Input Signal
Frequency: 800 MHz (UpLink)
20K0GXW



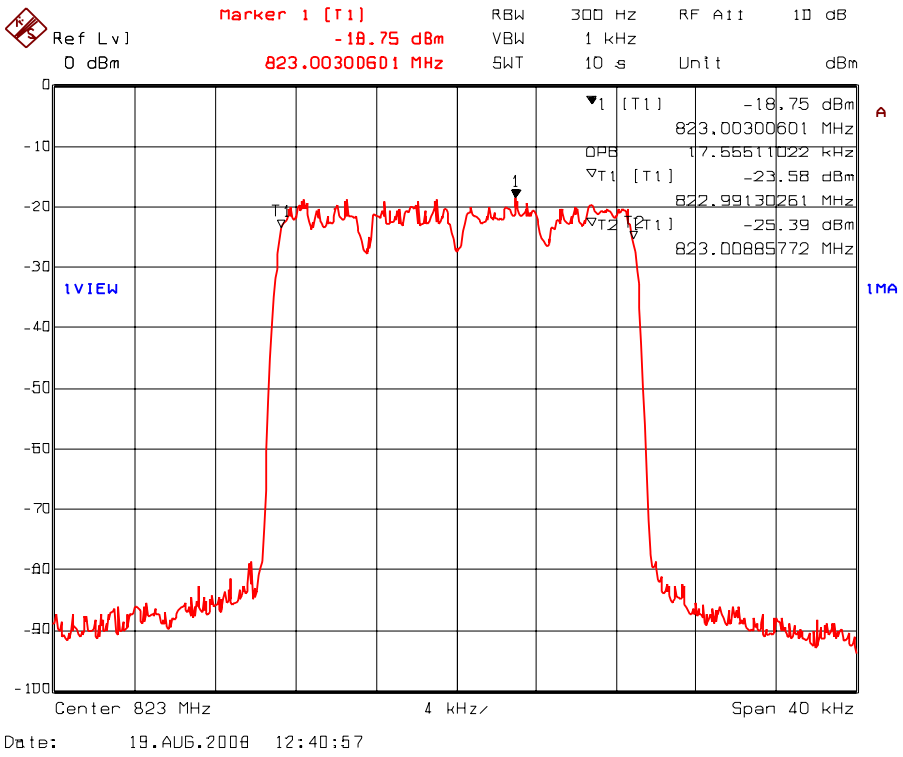
Plot 5.7.4.1.34. 99% Occupied Bandwidth – RF Input Signal
Frequency: 808 MHz (UpLink)
20K0GXW



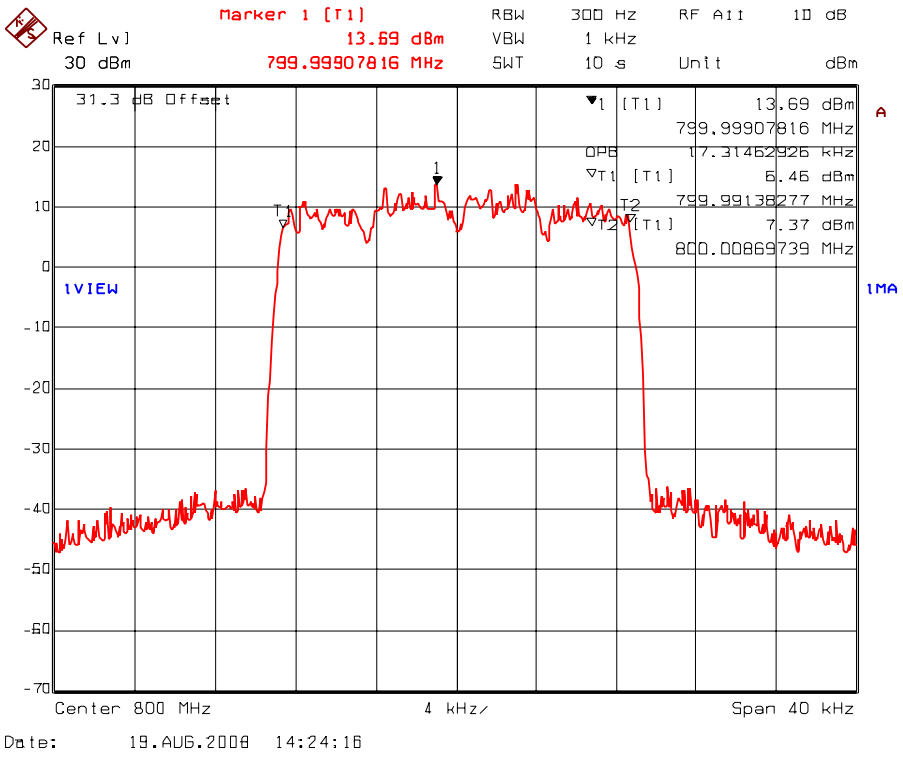
Plot 5.7.4.1.35. 99% Occupied Bandwidth – RF Input Signal
Frequency: 815 MHz (UpLink)
20K0GXW



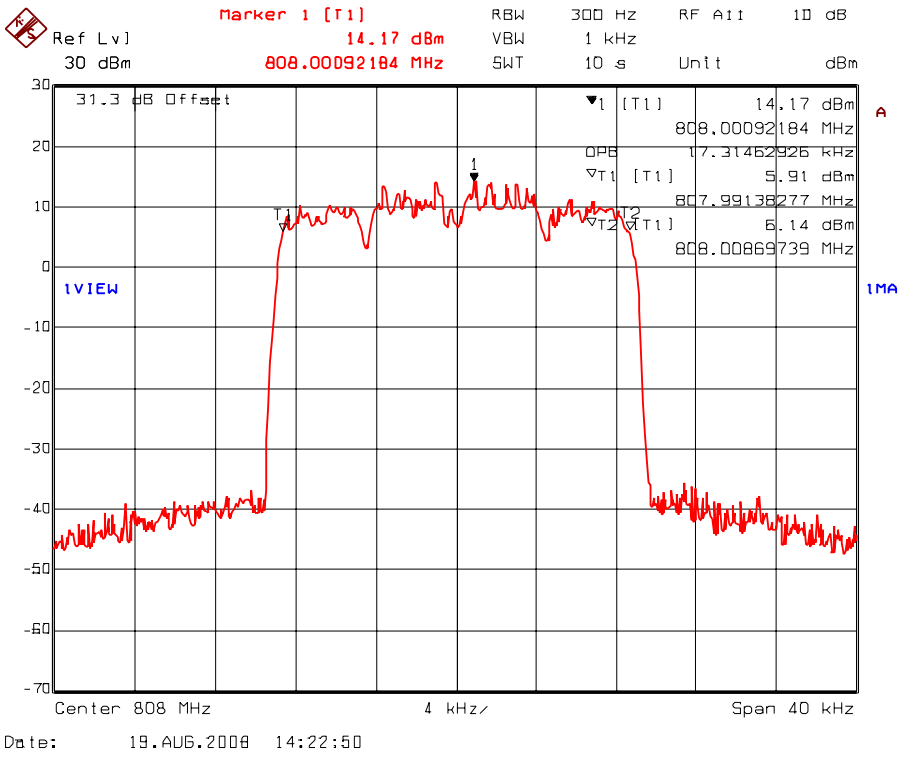
Plot 5.7.4.1.36. 99% Occupied Bandwidth – RF Input Signal
Frequency: 823 MHz (UpLink)
20K0GXW



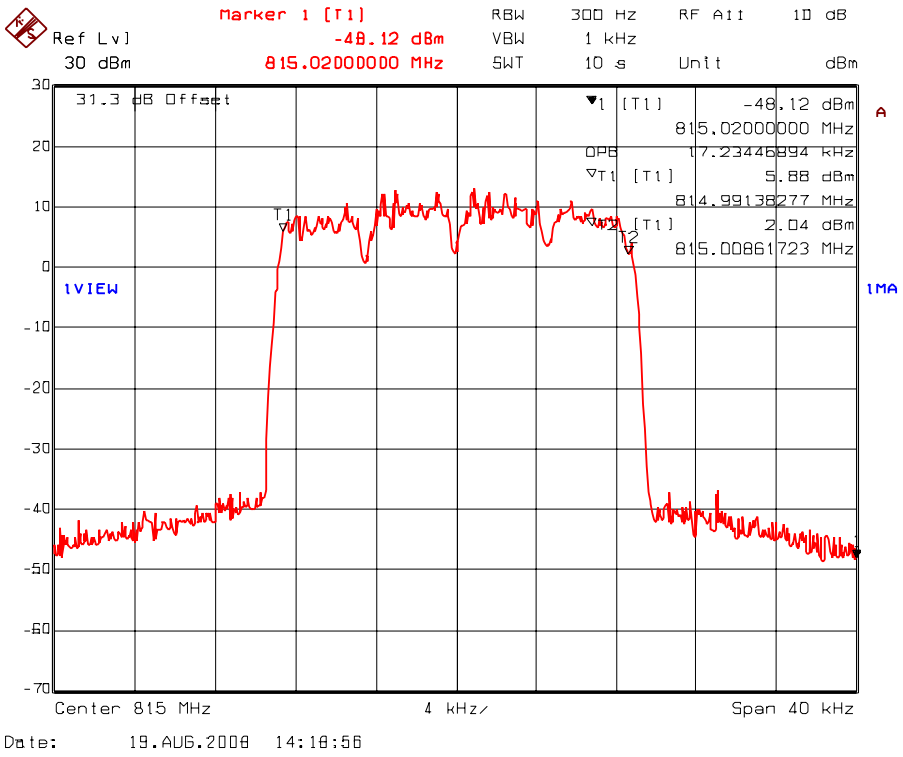
Plot 5.7.4.1.37. 99% Occupied Bandwidth – RF Output Signal
Frequency: 800 MHz (UpLink)
20K0GXW



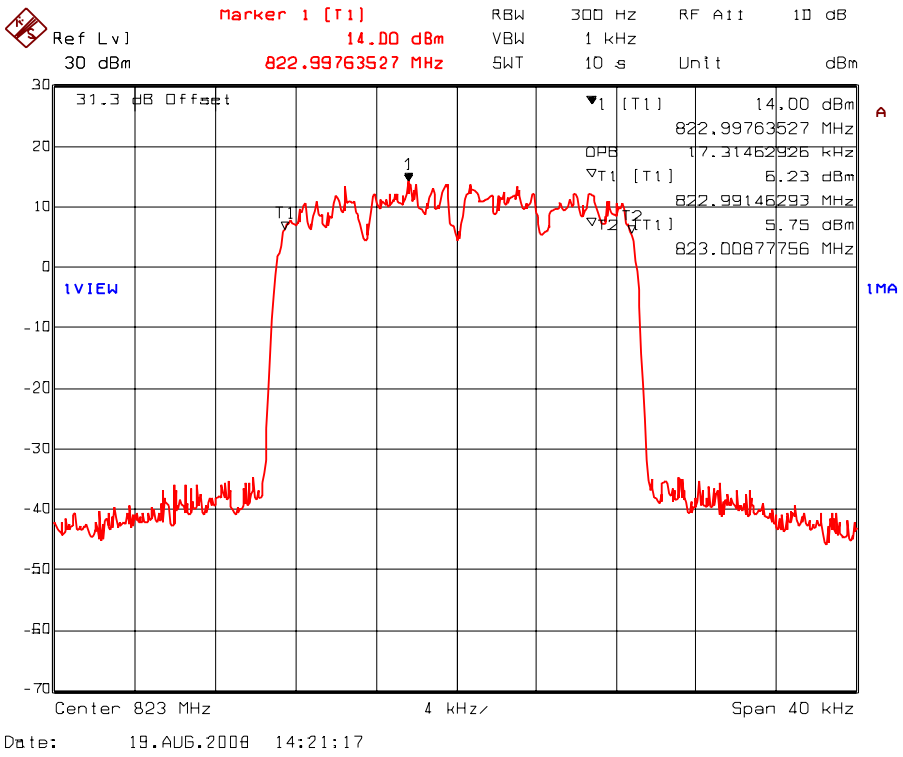
Plot 5.7.4.1.38. 99% Occupied Bandwidth – RF Output Signal
Frequency: 808 MHz (UpLink)
20K0GXW



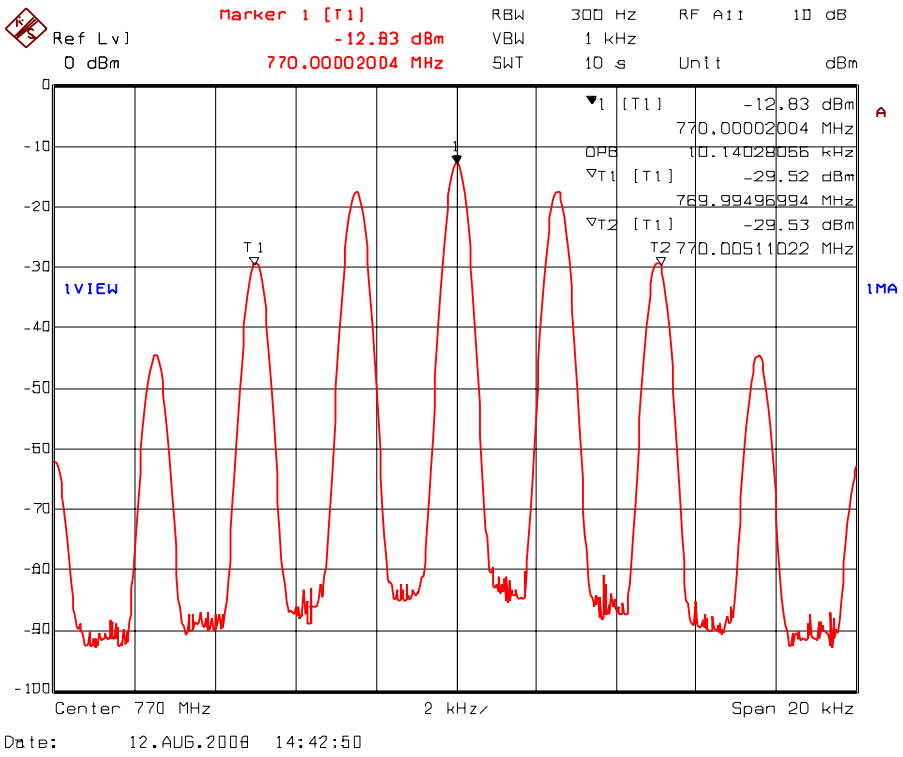
Plot 5.7.4.1.39. 99% Occupied Bandwidth – RF Output Signal
Frequency: 815 MHz (UpLink)
20K0GXW



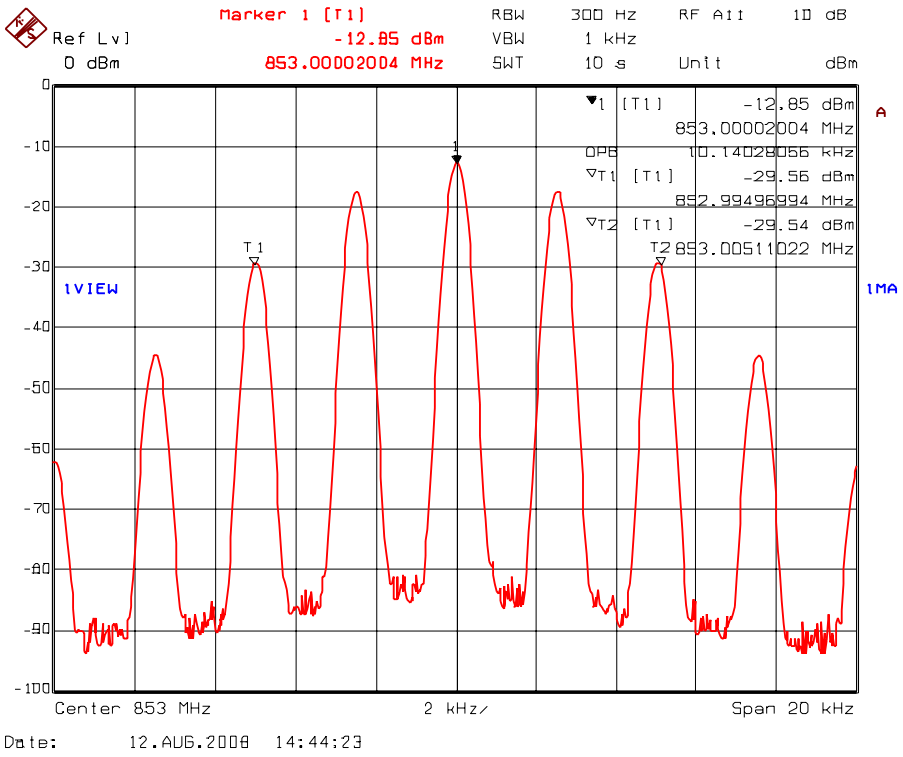
Plot 5.7.4.1.40. 99% Occupied Bandwidth – RF Output Signal
Frequency: 823 MHz (UpLink)
20K0GXW



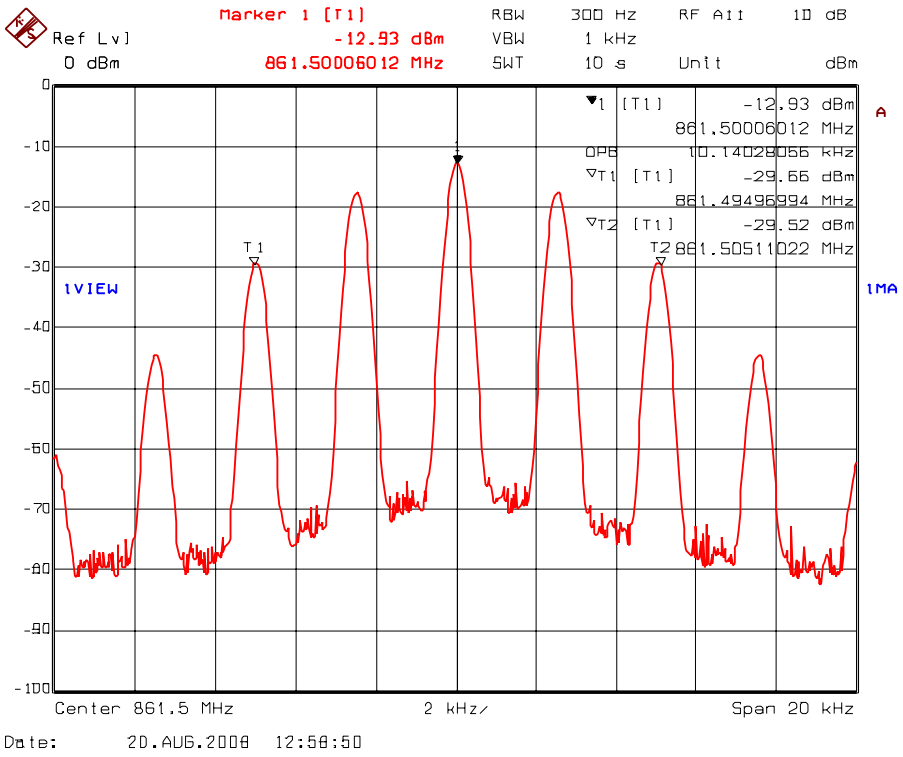
Plot 5.7.4.1.41. 99% Occupied Bandwidth – RF Input Signal
Frequency: 770 MHz (DownLink)
11K0F3E



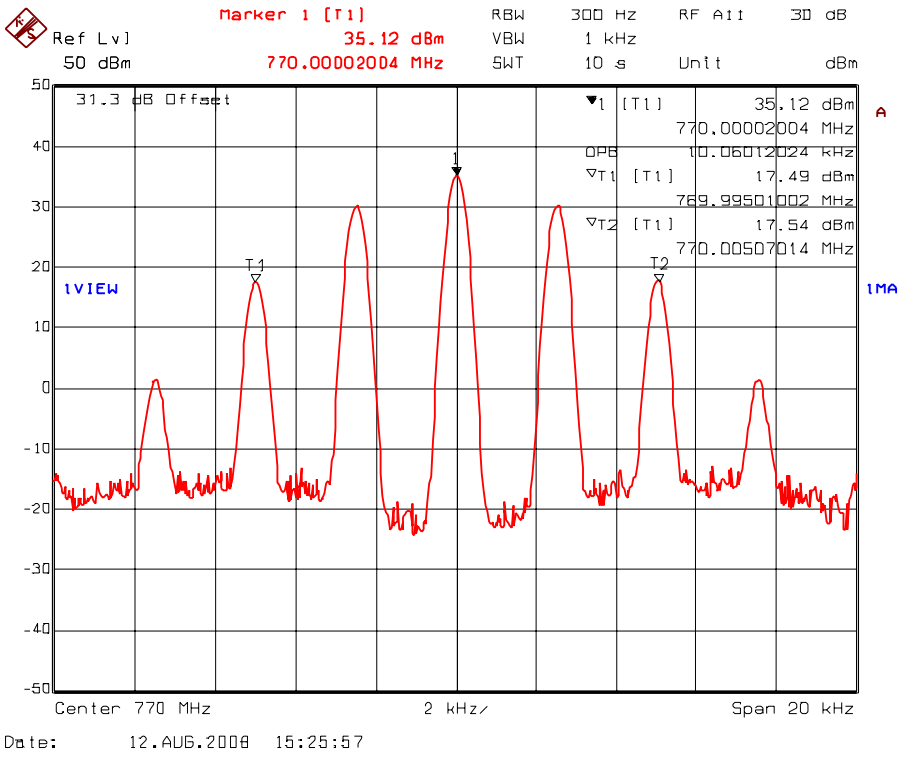
Plot 5.7.4.1.42. 99% Occupied Bandwidth – RF Input Signal
Frequency: 853 MHz (DownLink)
11K0F3E



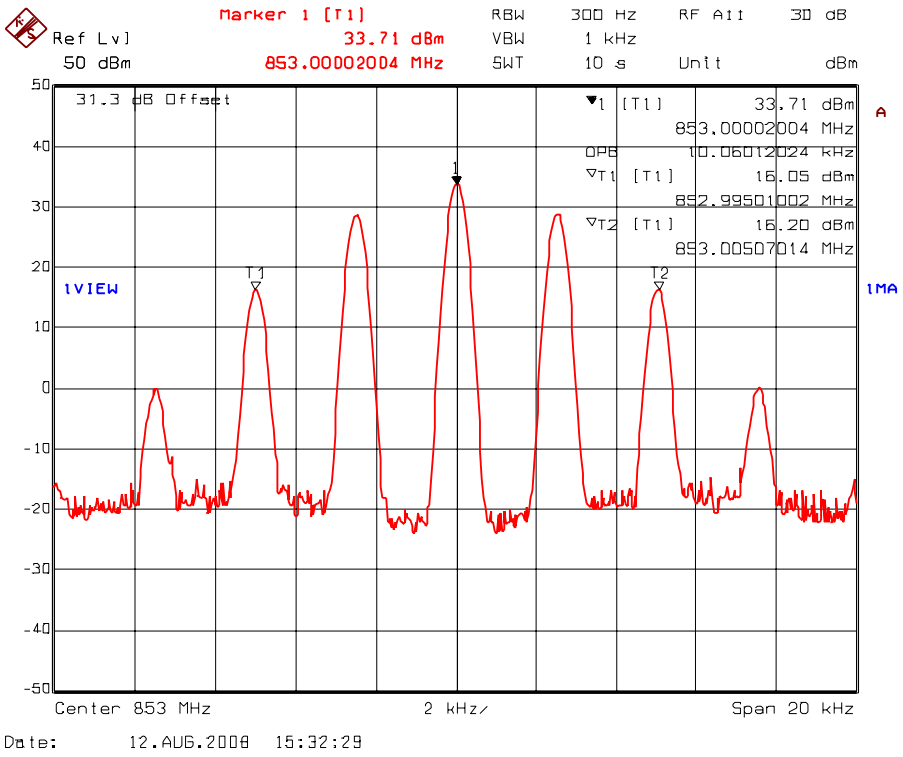
Plot 5.7.4.1.43. 99% Occupied Bandwidth – RF Input Signal
Frequency: 861.5 MHz (DownLink)
11K0F3E



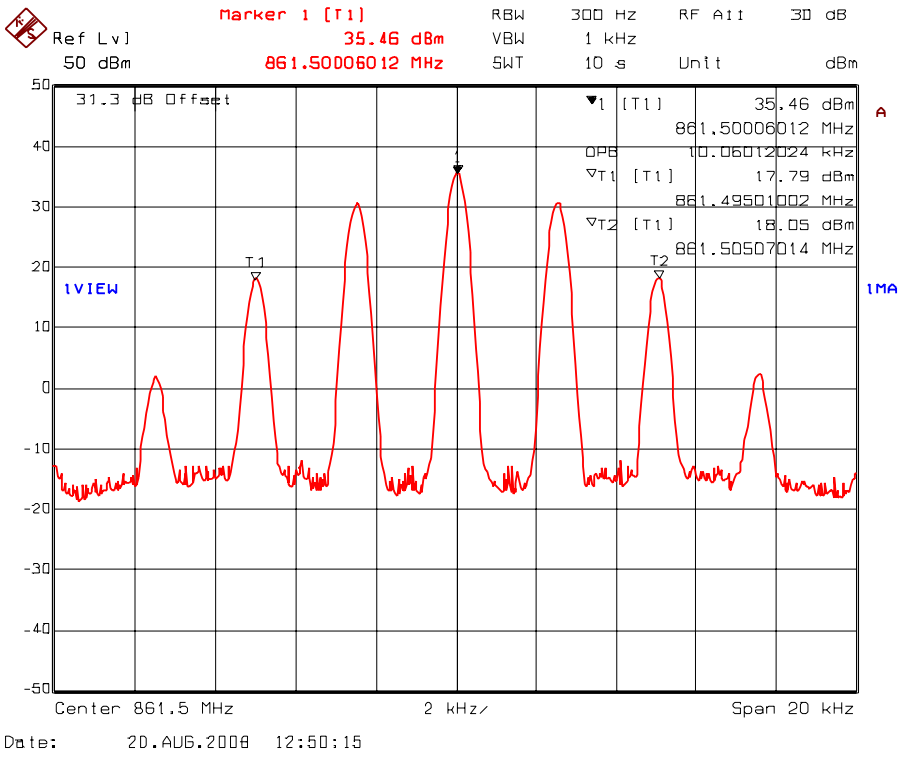
Plot 5.7.4.1.44. 99% Occupied Bandwidth – RF Output Signal
Frequency: 770 MHz (DownLink)
11K0F3E



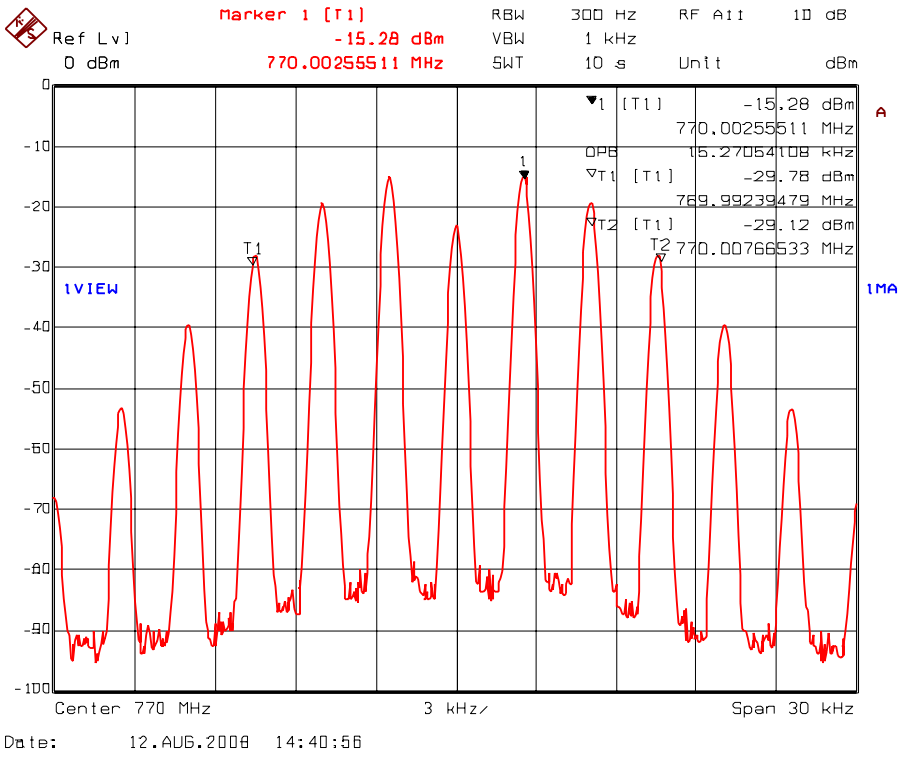
Plot 5.7.4.1.45. 99% Occupied Bandwidth – RF Output Signal
Frequency: 853 MHz (DownLink)
11K0F3E



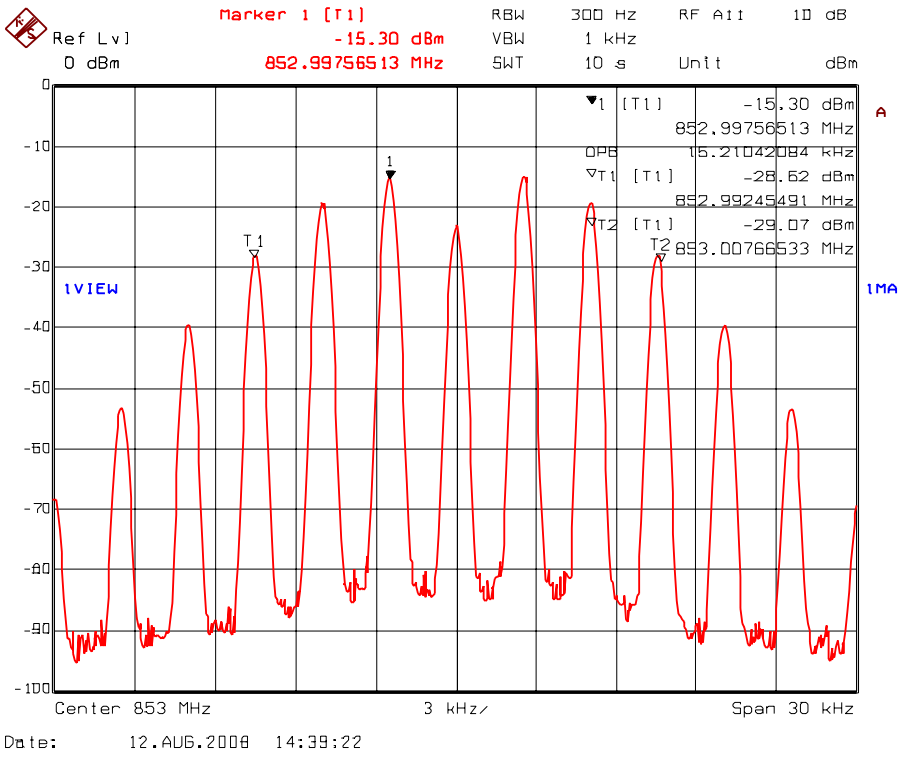
Plot 5.7.4.1.46. 99% Occupied Bandwidth – RF Output Signal
Frequency: 861.5 MHz (DownLink)
11K0F3E



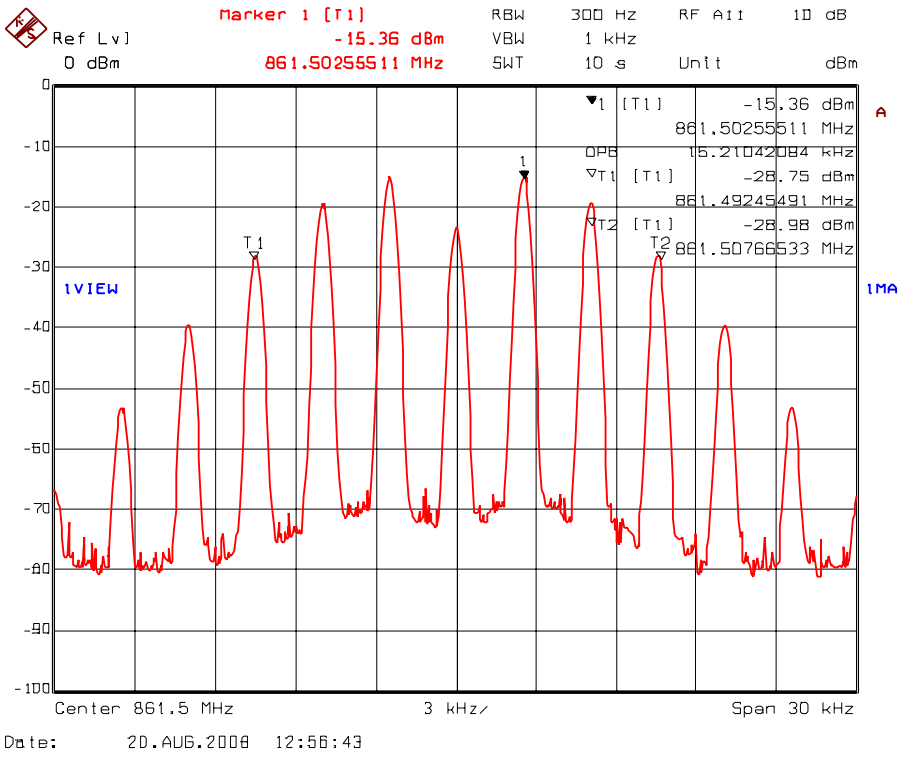
Plot 5.7.4.1.47. 99% Occupied Bandwidth – RF Input Signal
Frequency: 770 MHz (DownLink)
16K0F3E



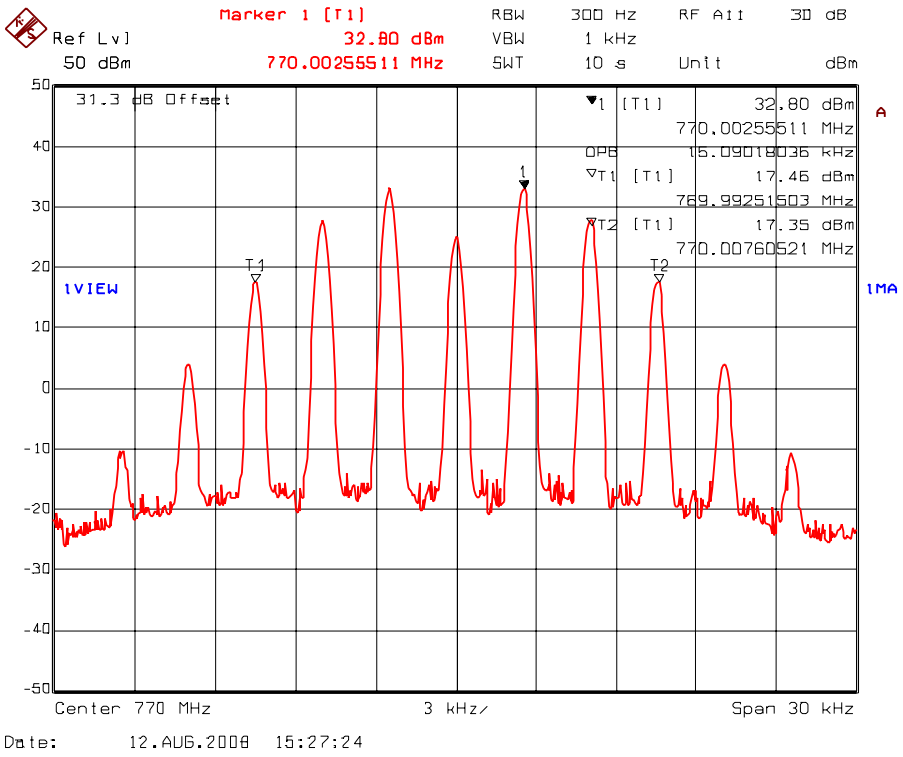
Plot 5.7.4.1.48. 99% Occupied Bandwidth – RF Input Signal
Frequency: 853 MHz (DownLink)
16K0F3E



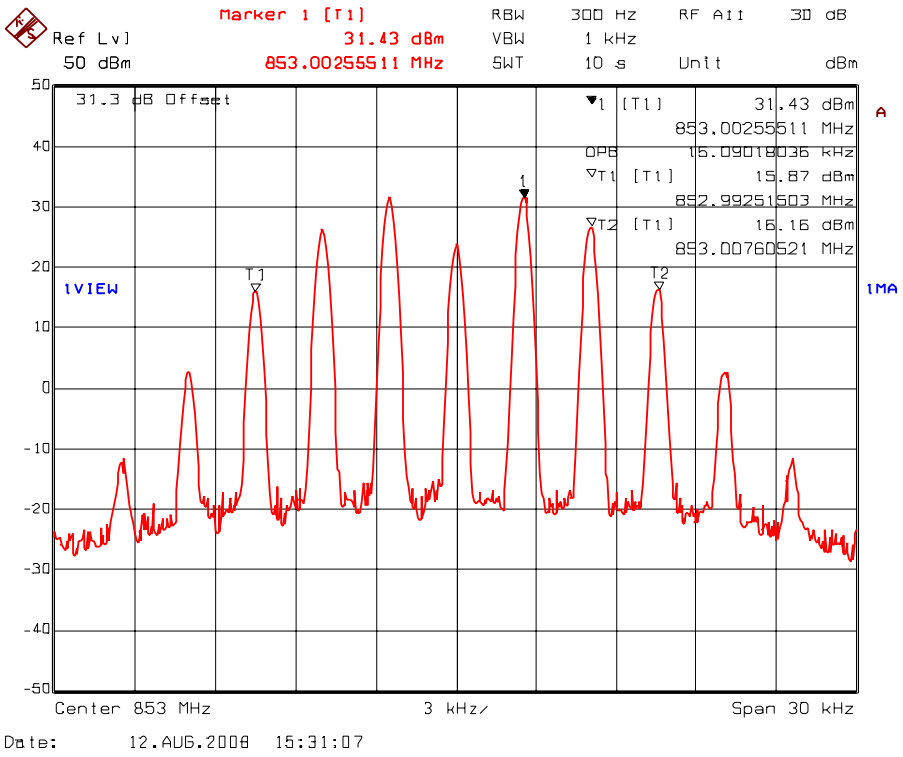
Plot 5.7.4.1.49. 99% Occupied Bandwidth – RF Input Signal
Frequency: 861.5 MHz (DownLink)
16K0F3E



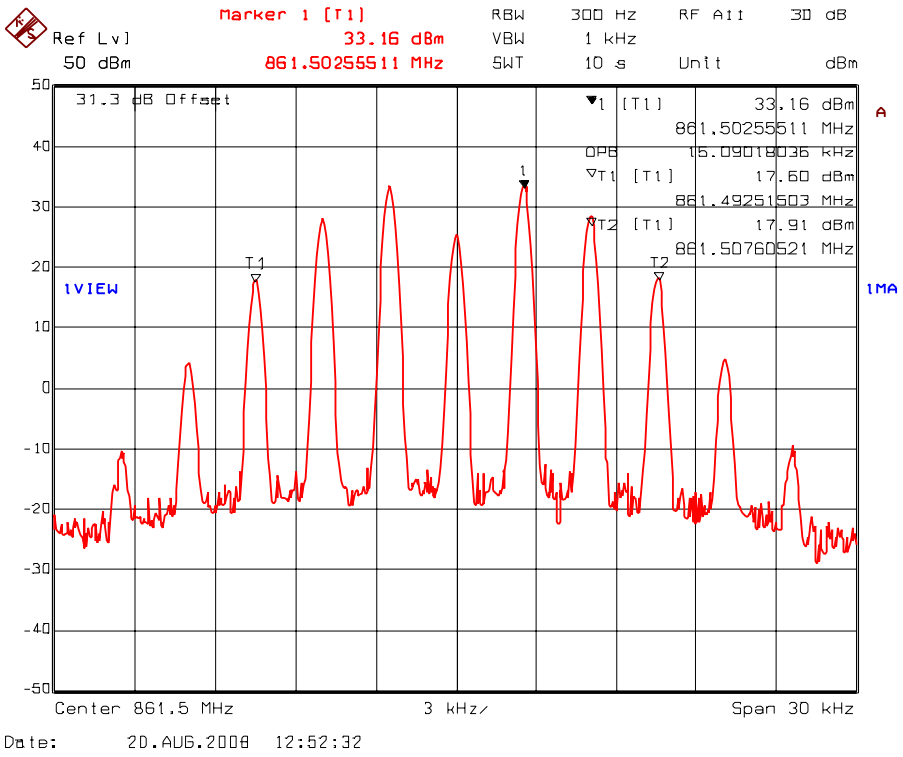
Plot 5.7.4.1.50. 99% Occupied Bandwidth – RF Output Signal
Frequency: 770 MHz (DownLink)
16K0F3E



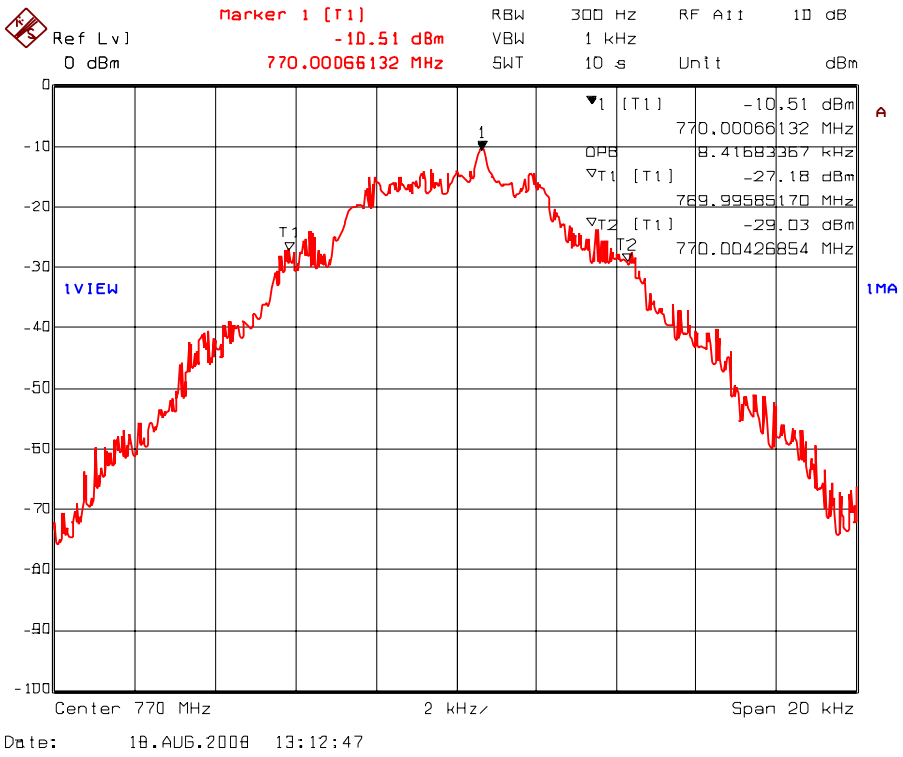
Plot 5.7.4.1.51. 99% Occupied Bandwidth – RF Output Signal
Frequency: 853 MHz (DownLink)
16K0F3E



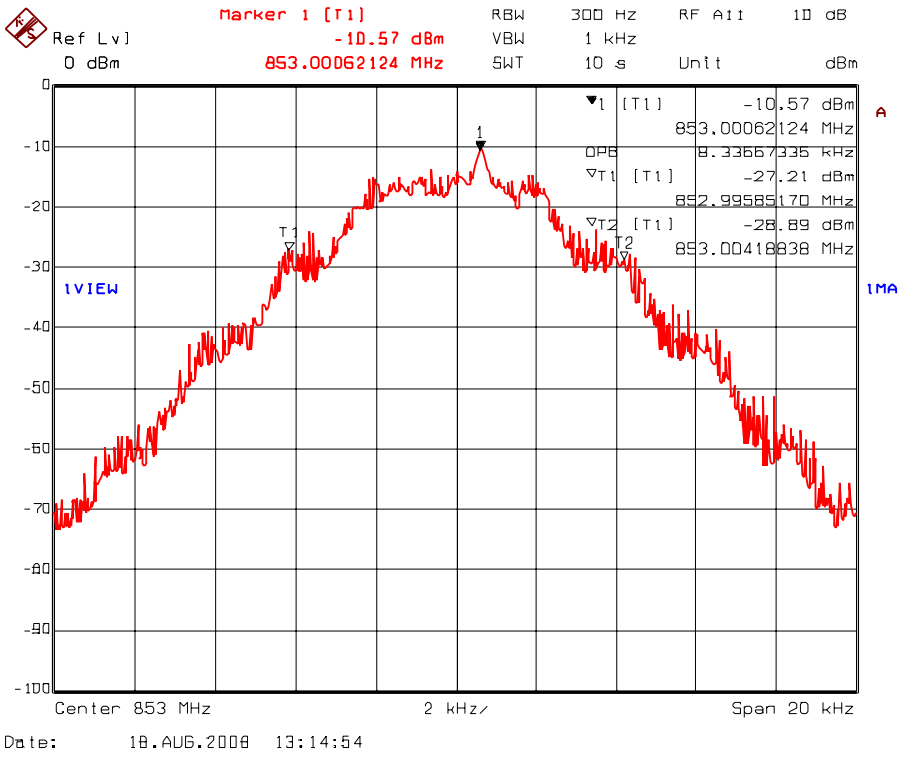
Plot 5.7.4.1.52. 99% Occupied Bandwidth – RF Output Signal
Frequency: 861.5 MHz (DownLink)
16K0F3E



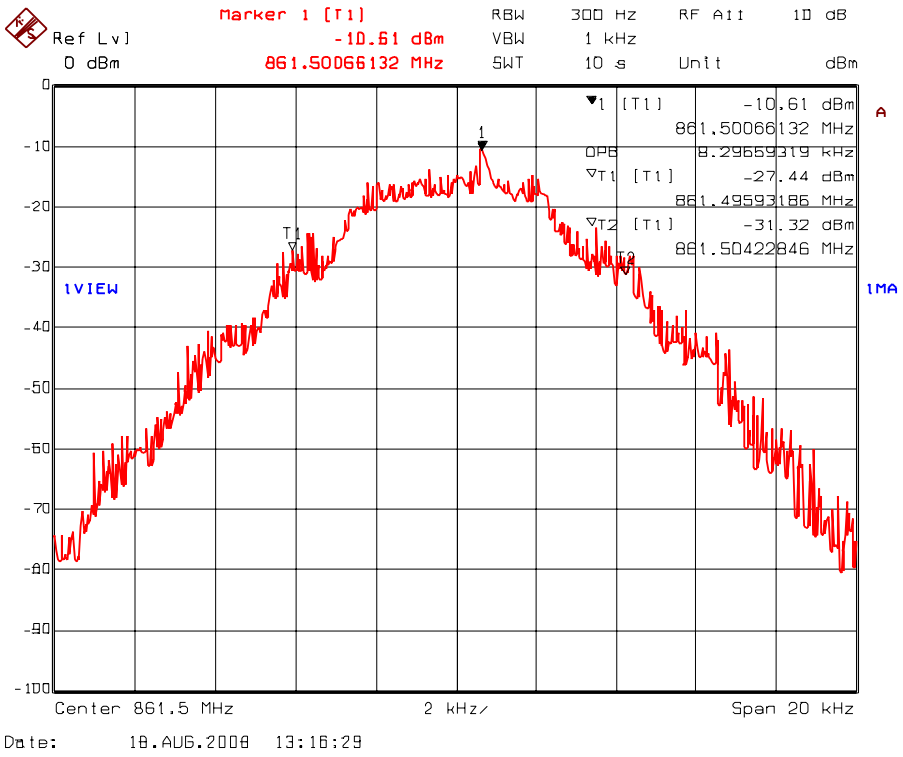
Plot 5.7.4.1.53. 99% Occupied Bandwidth – RF Input Signal
Frequency: 770 MHz (DownLink)
8K10F1E



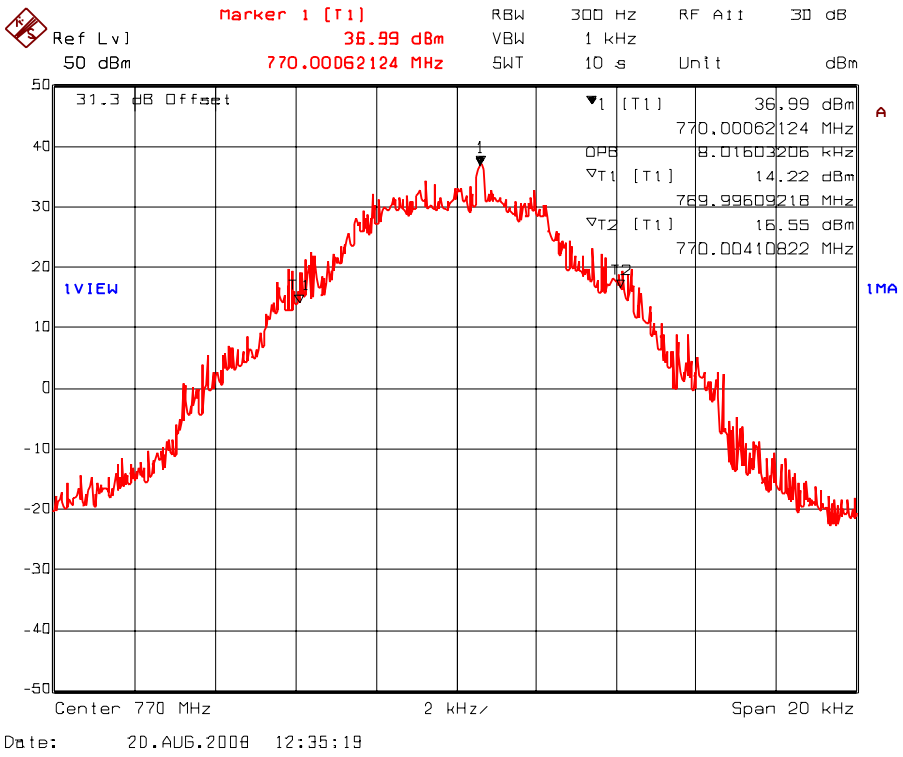
Plot 5.7.4.1.54. 99% Occupied Bandwidth – RF Input Signal
Frequency: 853 MHz (DownLink)
8K10F1E



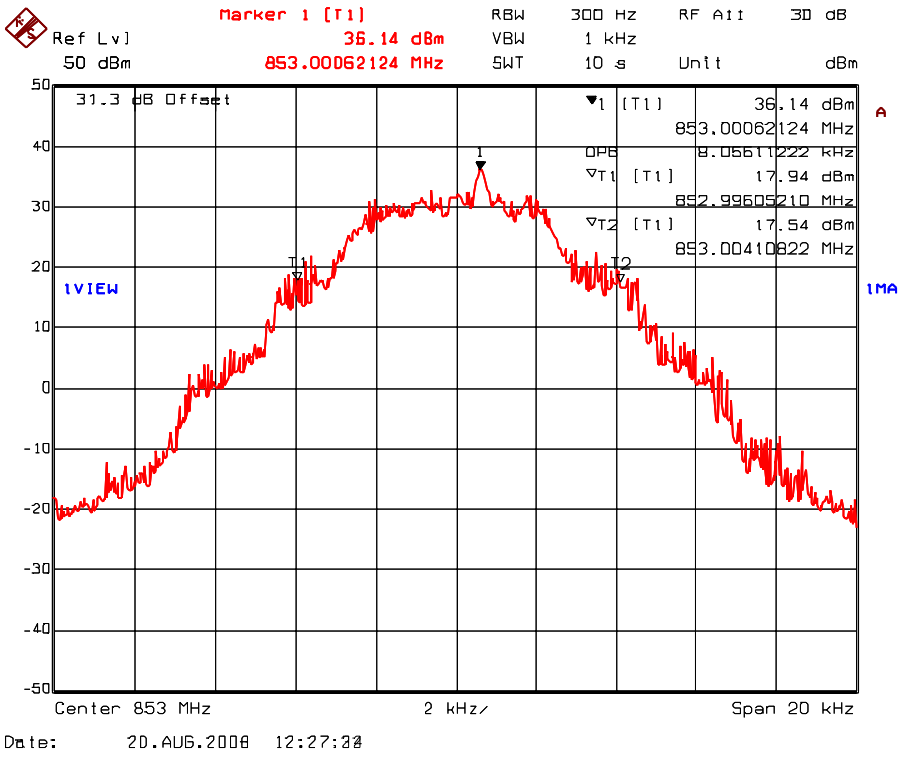
Plot 5.7.4.1.55. 99% Occupied Bandwidth – RF Input Signal
Frequency: 861.5 MHz (DownLink)
8K10F1E



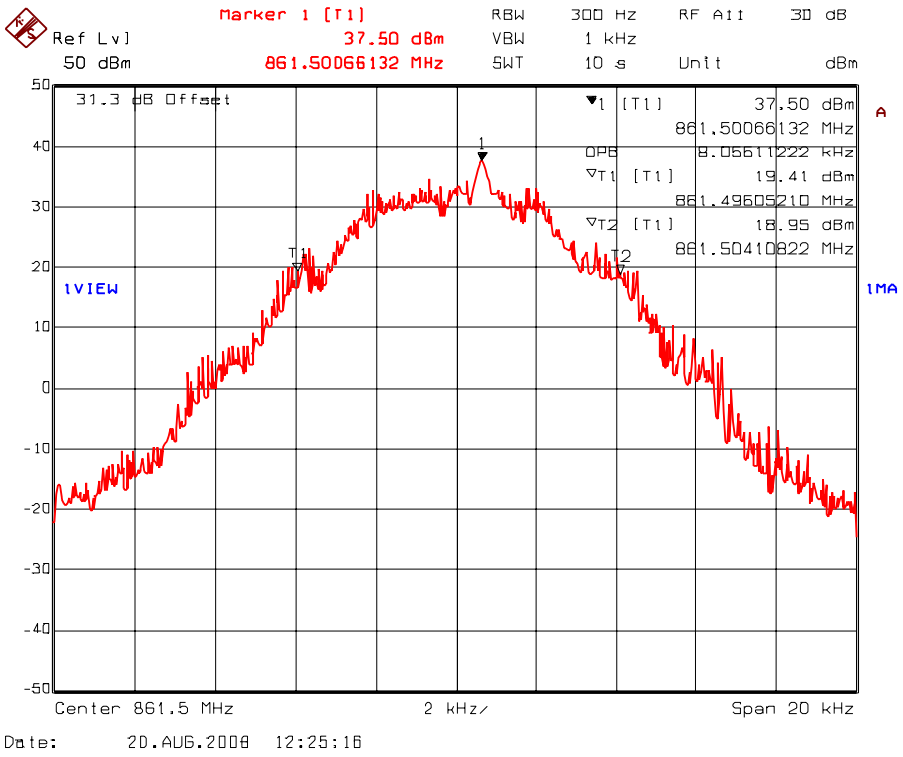
Plot 5.7.4.1.56. 99% Occupied Bandwidth – RF Output Signal
Frequency: 770 MHz (DownLink)
8K10F1E



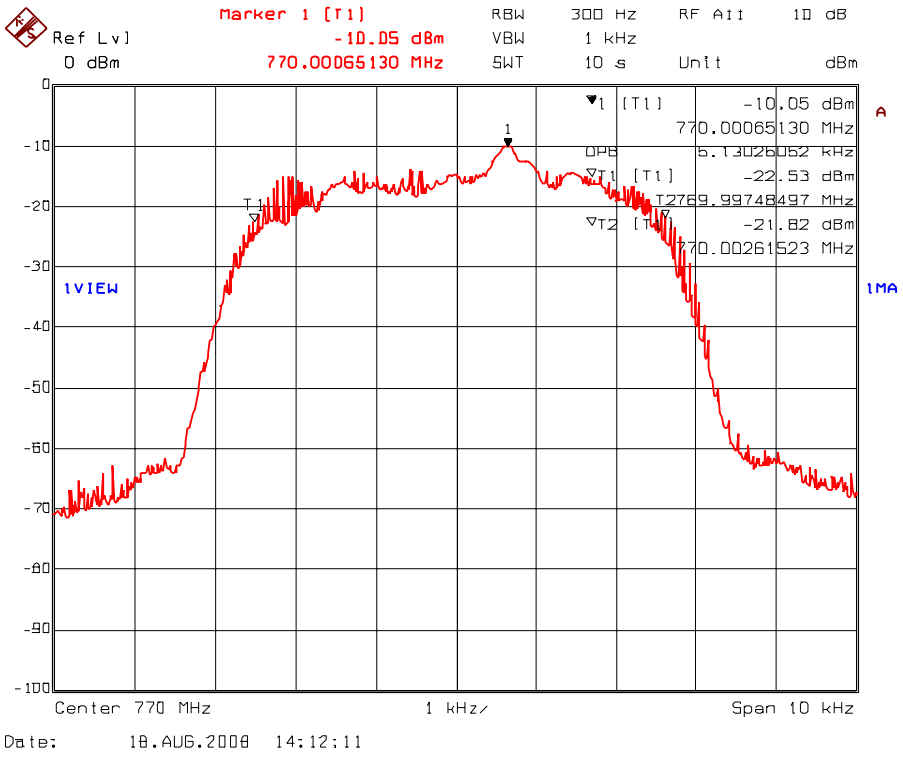
Plot 5.7.4.1.57. 99% Occupied Bandwidth – RF Output Signal
Frequency: 853 MHz (DownLink)
8K10F1E



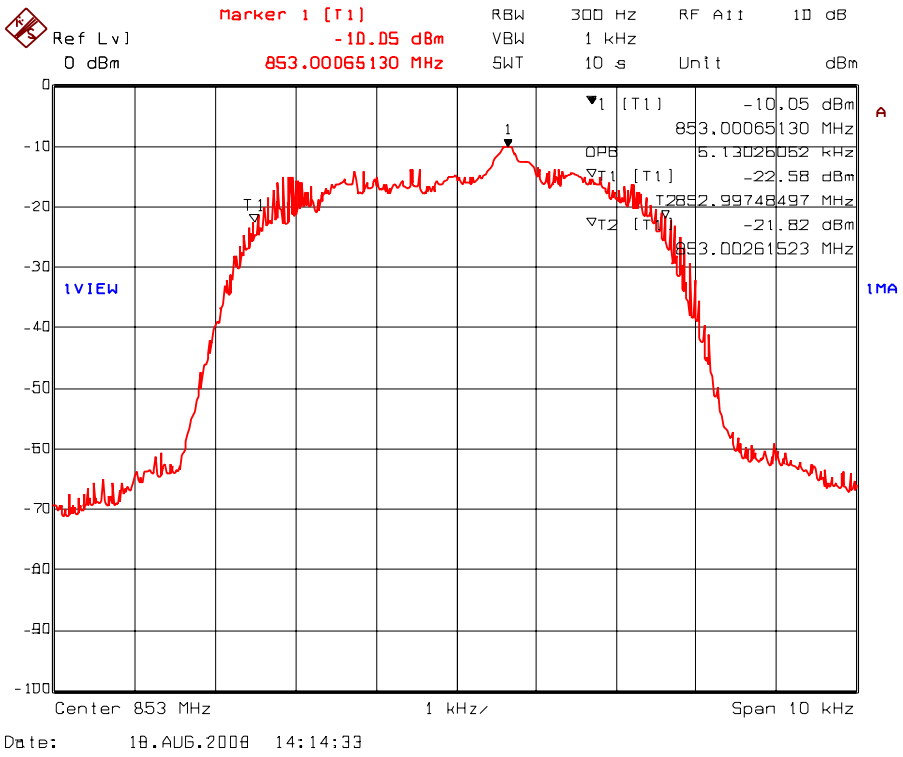
Plot 5.7.4.1.58. 99% Occupied Bandwidth – RF Output Signal
Frequency: 861.5 MHz (DownLink)
8K10F1E



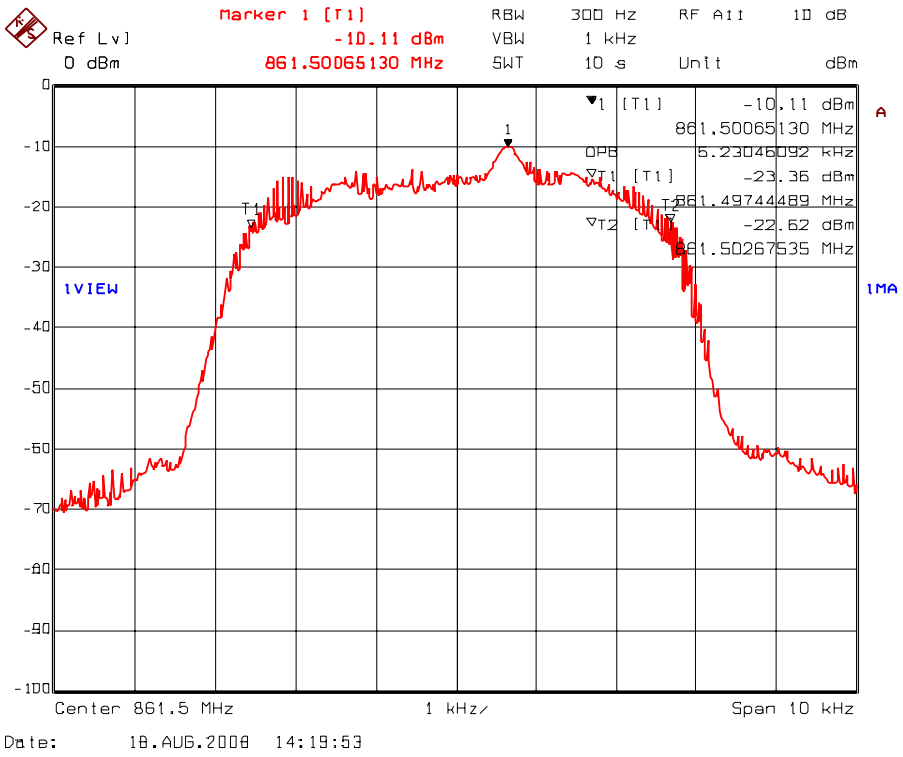
Plot 5.7.4.1.59. 99% Occupied Bandwidth – RF Input Signal
Frequency: 770 MHz (DownLink)
5K76G1E



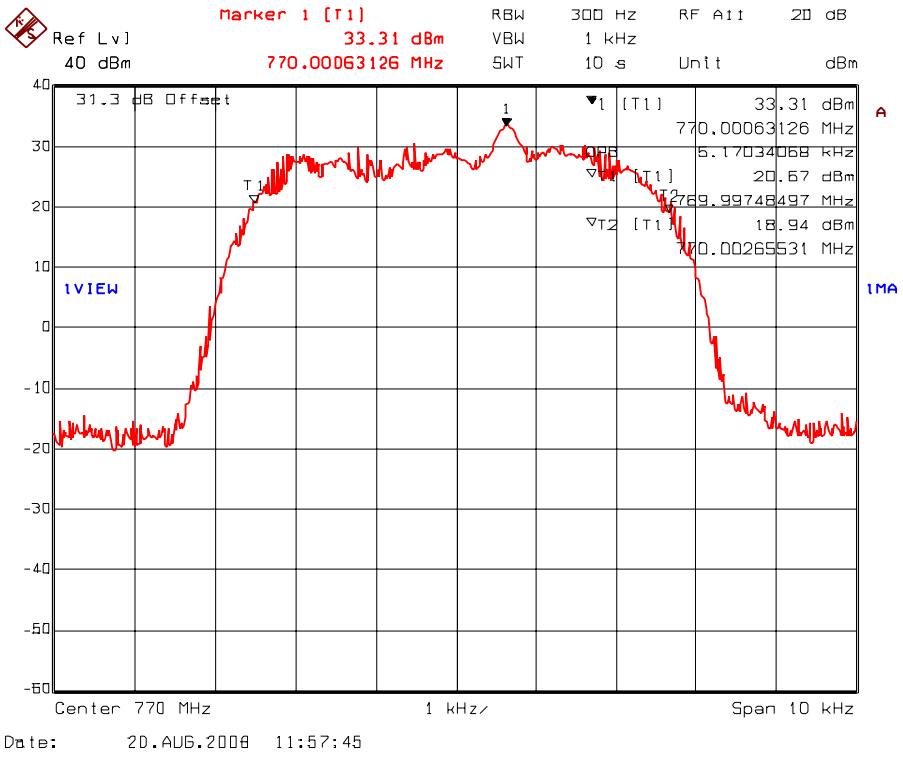
Plot 5.7.4.1.60. 99% Occupied Bandwidth – RF Input Signal
Frequency: 853 MHz (DownLink)
5K76G1E



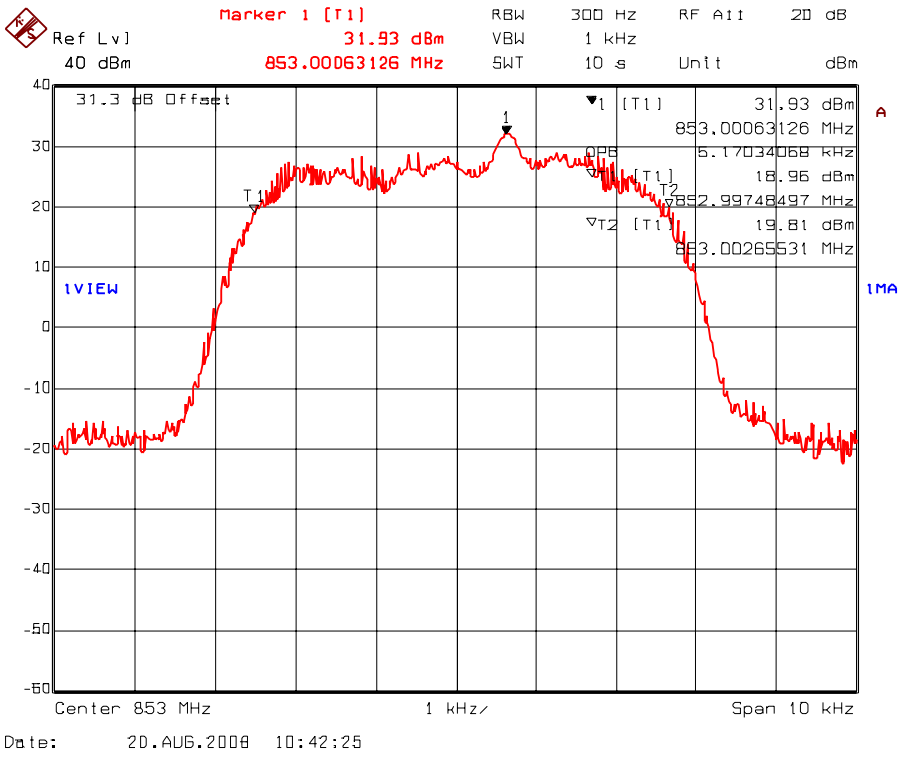
Plot 5.7.4.1.61. 99% Occupied Bandwidth – RF Input Signal
Frequency: 861.5 MHz (DownLink)
5K76G1E



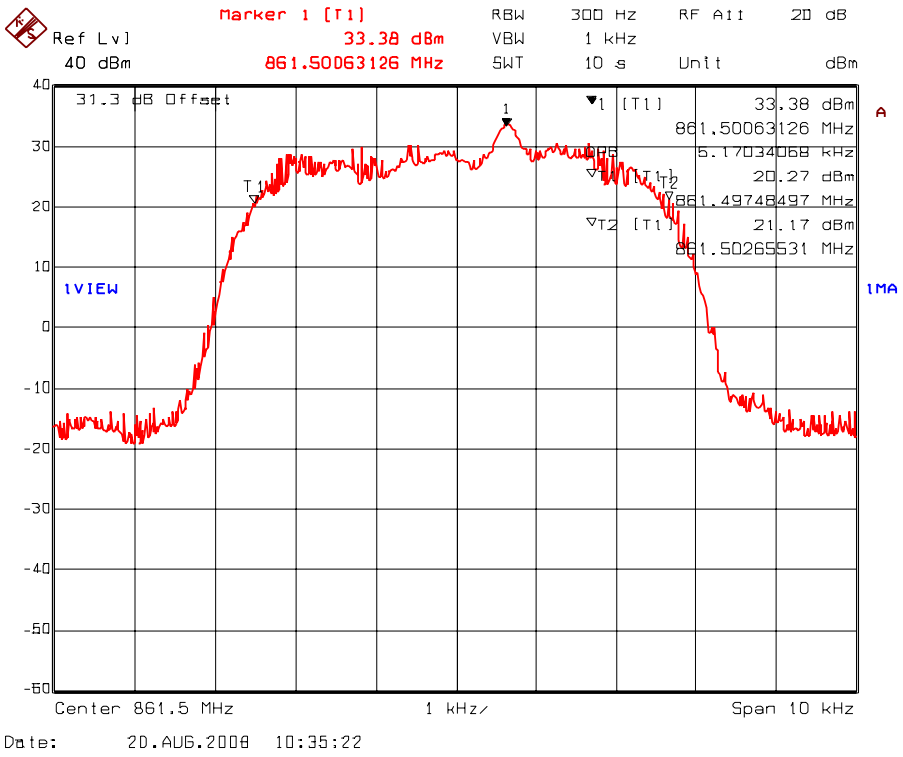
Plot 5.7.4.1.62. 99% Occupied Bandwidth – RF Output Signal
Frequency: 770 MHz (DownLink)
5K76G1E



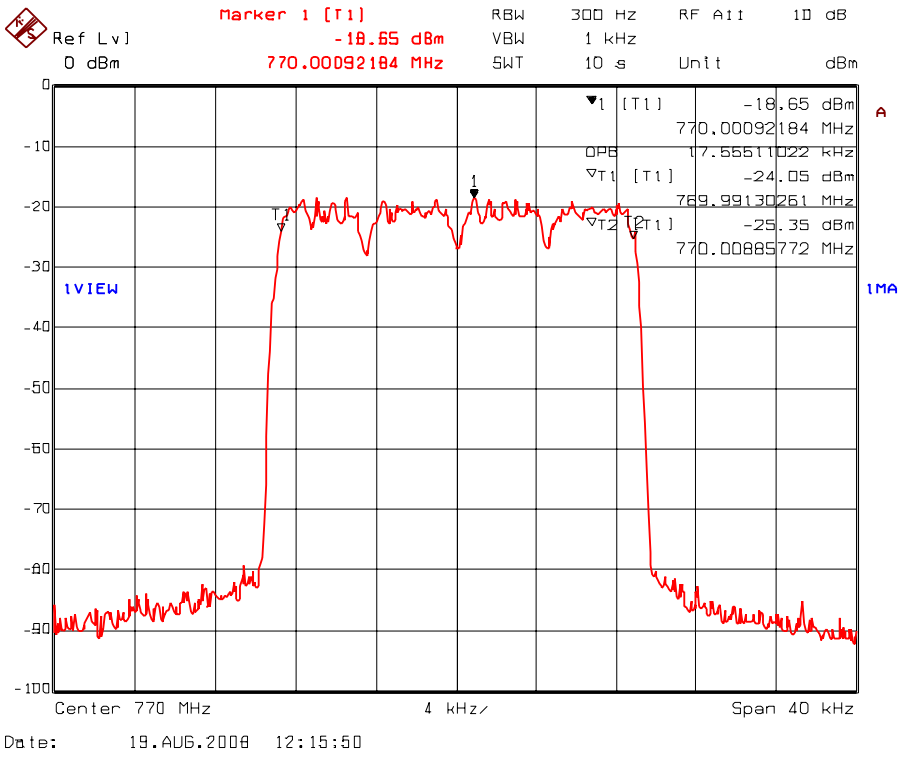
Plot 5.7.4.1.63. 99% Occupied Bandwidth – RF Output Signal
Frequency: 853 MHz (DownLink)
5K76G1E



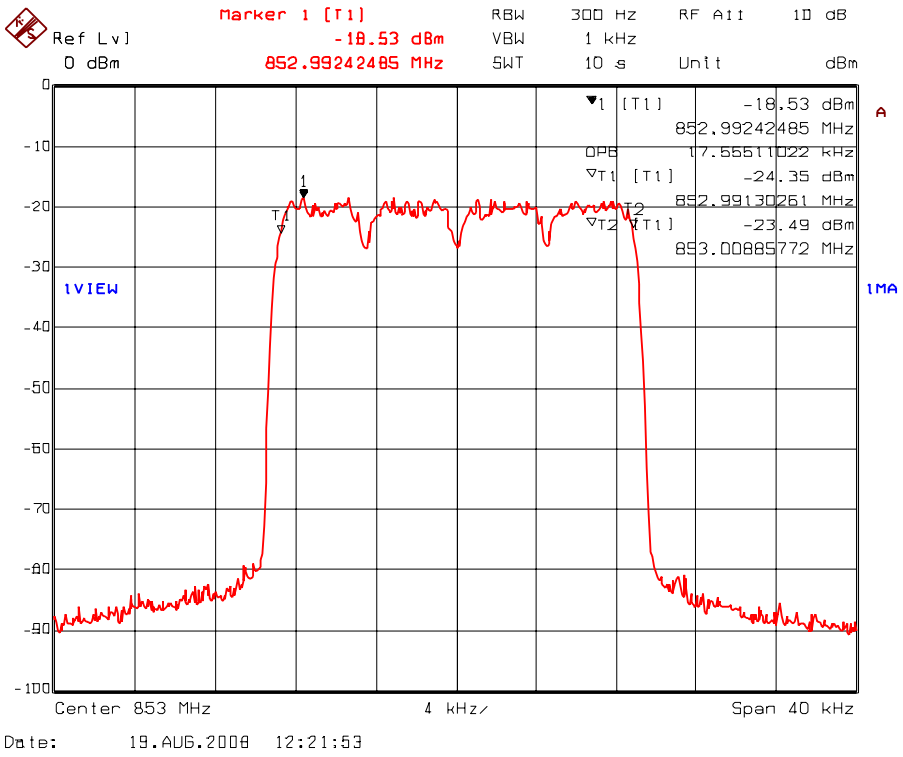
Plot 5.7.4.1.64. 99% Occupied Bandwidth – RF Output Signal
Frequency: 861.5 MHz (DownLink)
5K76G1E



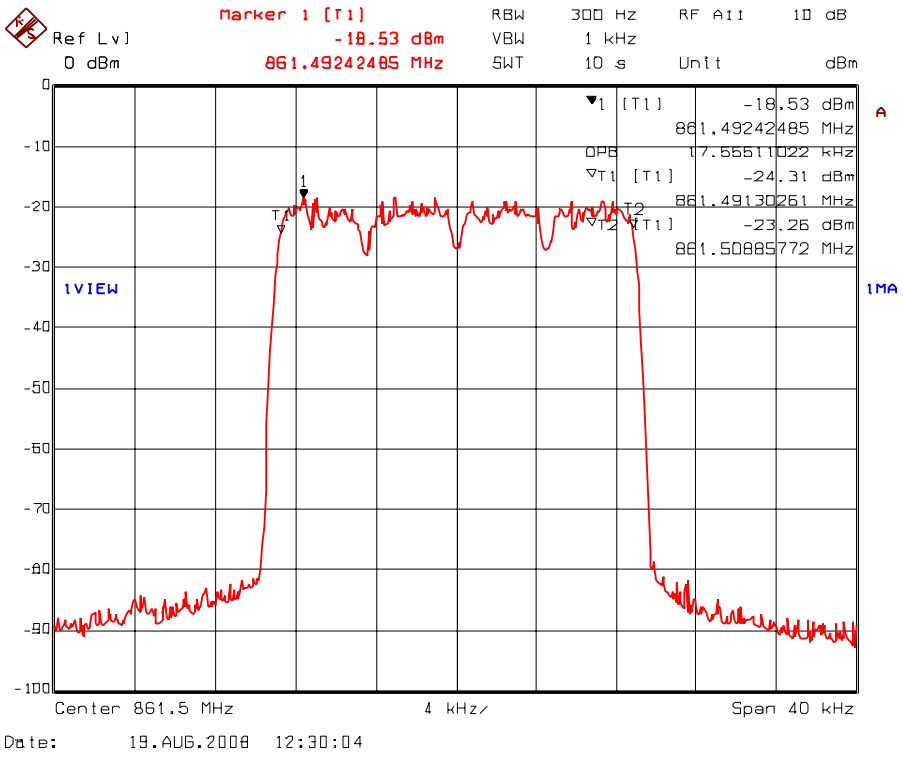
Plot 5.7.4.1.65. 99% Occupied Bandwidth – RF Input Signal
Frequency: 770 MHz (DownLink)
20K0GXW



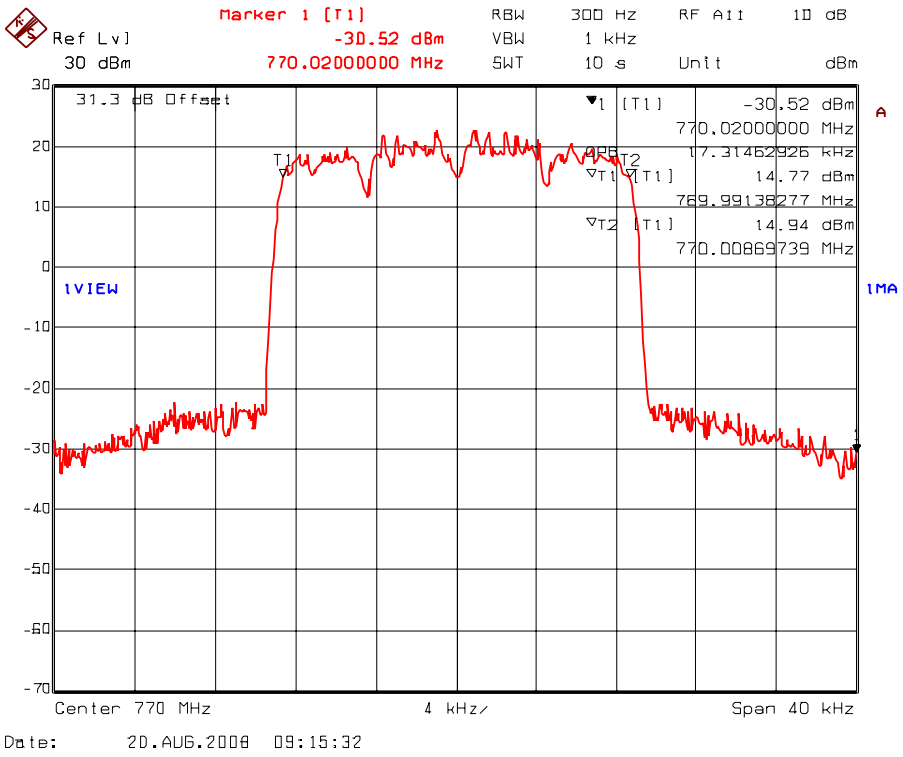
Plot 5.7.4.1.66. 99% Occupied Bandwidth – RF Input Signal
Frequency: 853 MHz (DownLink)
20K0GXW



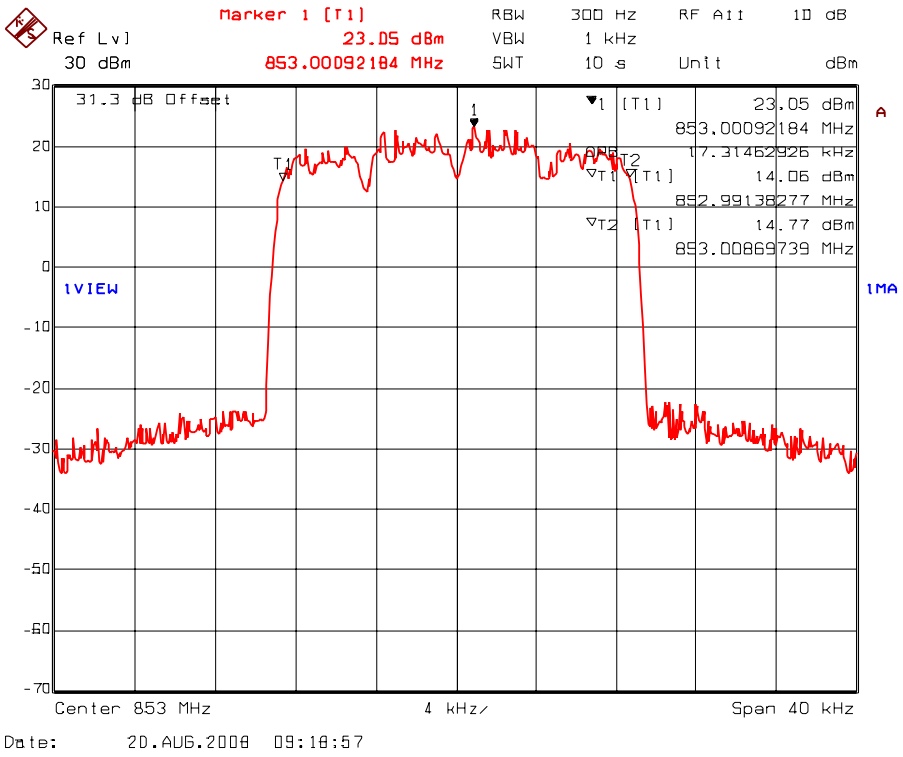
Plot 5.7.4.1.67. 99% Occupied Bandwidth – RF Input Signal
Frequency: 861.5 MHz (DownLink)
20K0GXW



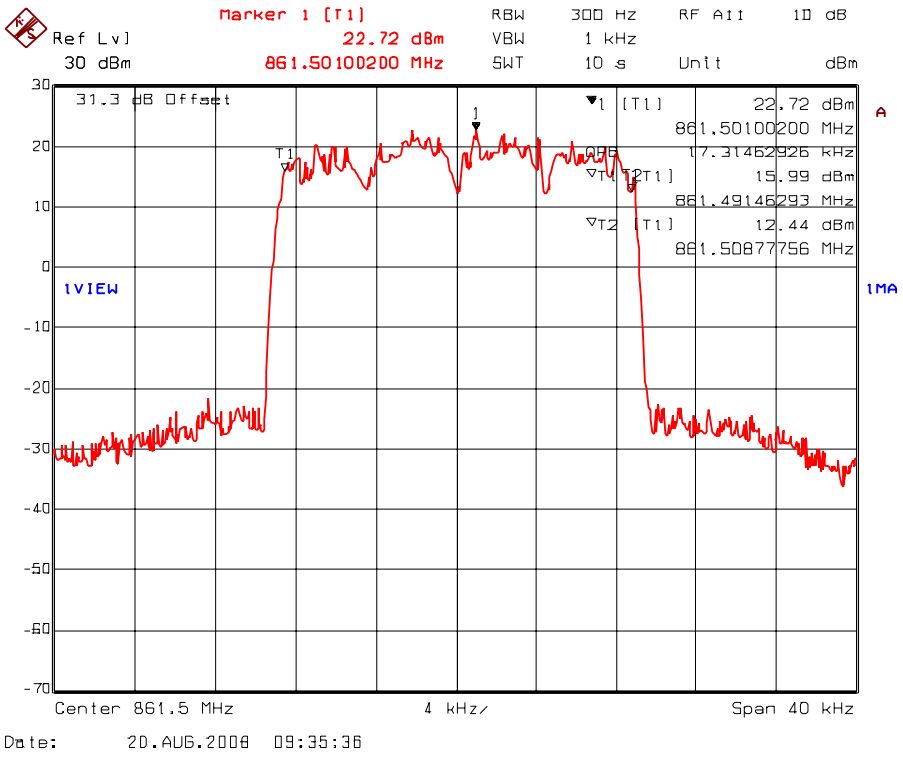
Plot 5.7.4.1.68. 99% Occupied Bandwidth – RF Output Signal
Frequency: 770 MHz (DownLink)
20K0GXW



Plot 5.7.4.1.69. 99% Occupied Bandwidth – RF Output Signal
Frequency: 853 MHz (DownLink)
20K0GXW



Plot 5.7.4.1.70. 99% Occupied Bandwidth – RF Output Signal
Frequency: 861.5 MHz (DownLink)
20K0GXW



5.8. ANTENNA POWER SPURIOUS/HARMONIC CONDUCTED EMISSIONS @ 90.210, 90.543(C), 2.1057 & 2.1051

5.8.1. Limits

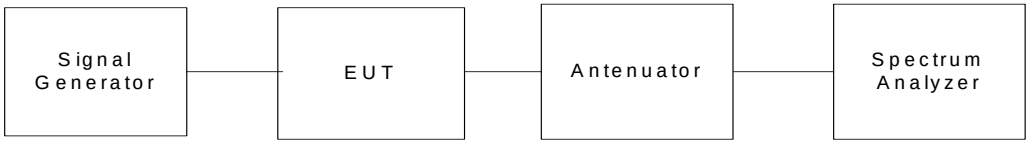
The most stringent limit of 43+10*log(P in Watts) dBc is applied for worst case.

5.8.2. Method of Measurements

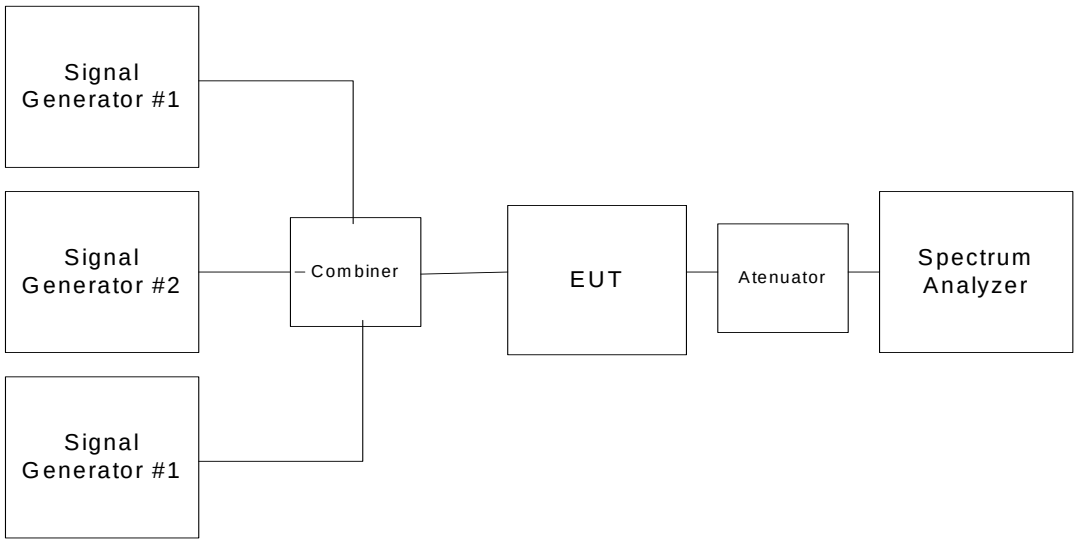
Refer to 8.5 of this report for measurement details

5.8.3. Test Arrangement

Single Channel Input:



Multiple Channel Inputs:



5.8.4. Method of Measurements

Refer to 8.5 of this report for measurement details

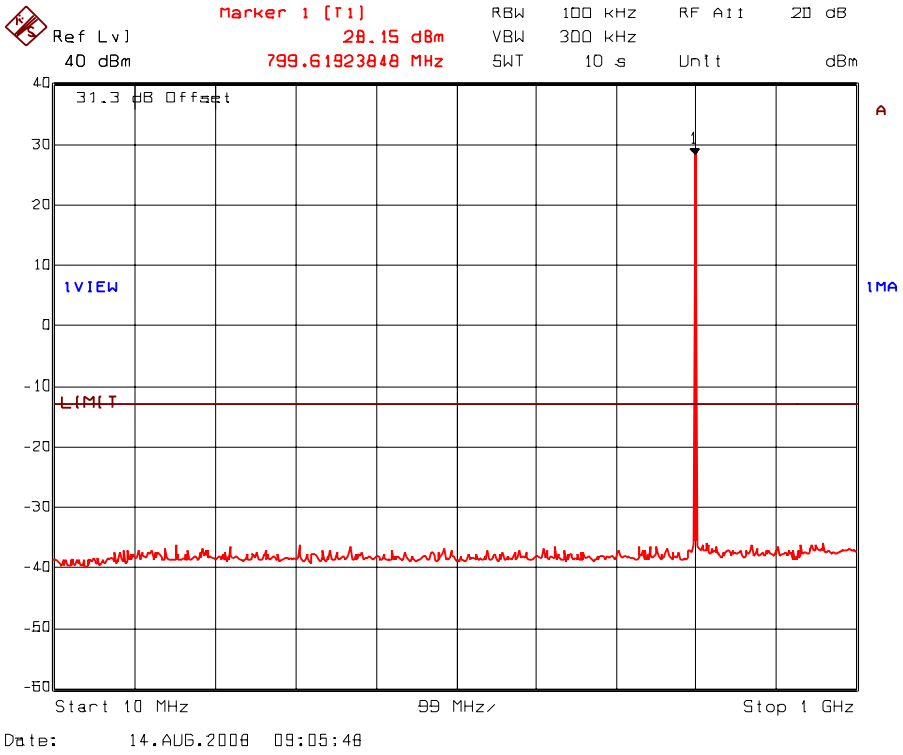
5.8.5. Test Data

All transmitter spurious radiated emissions were scanned from 30 MHz to 10 GHz and found to comply with FCC limits. Please refer to Plot 1 ~ Plot 42

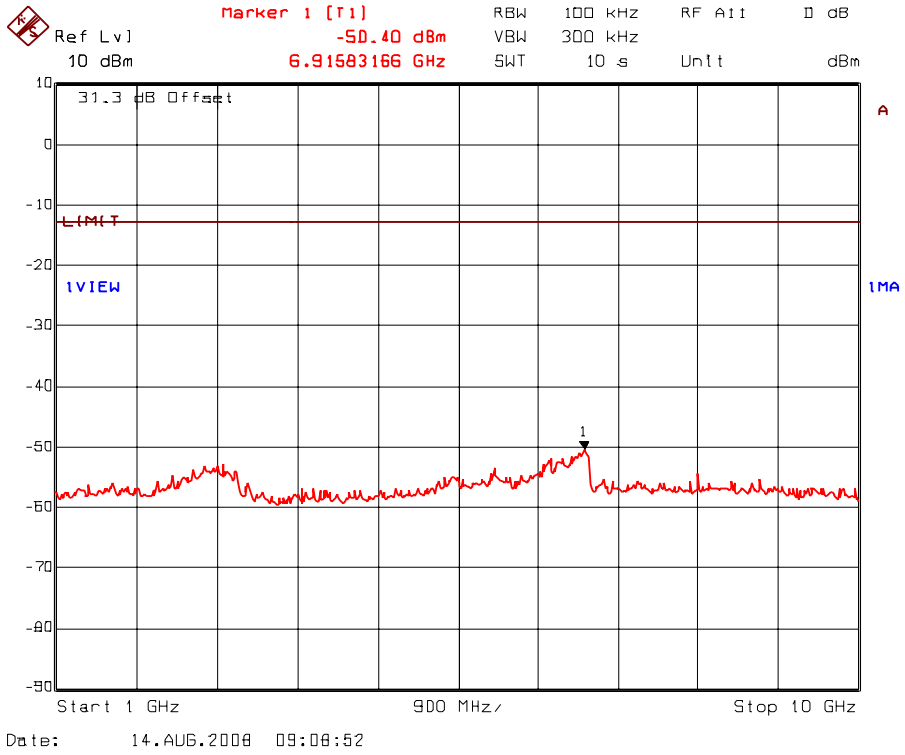
Notes:

1) The most stringent limit of 43+10*log(P in Watts) dBc is applied for all sub-bands for worst case.
2) The RF emissions were scanned with all different modulations and there are no difference emissions were found; therefore, the final tests were only performed without modulation at input power level of -10 dBm per input and it shall represent for all different modulations required.

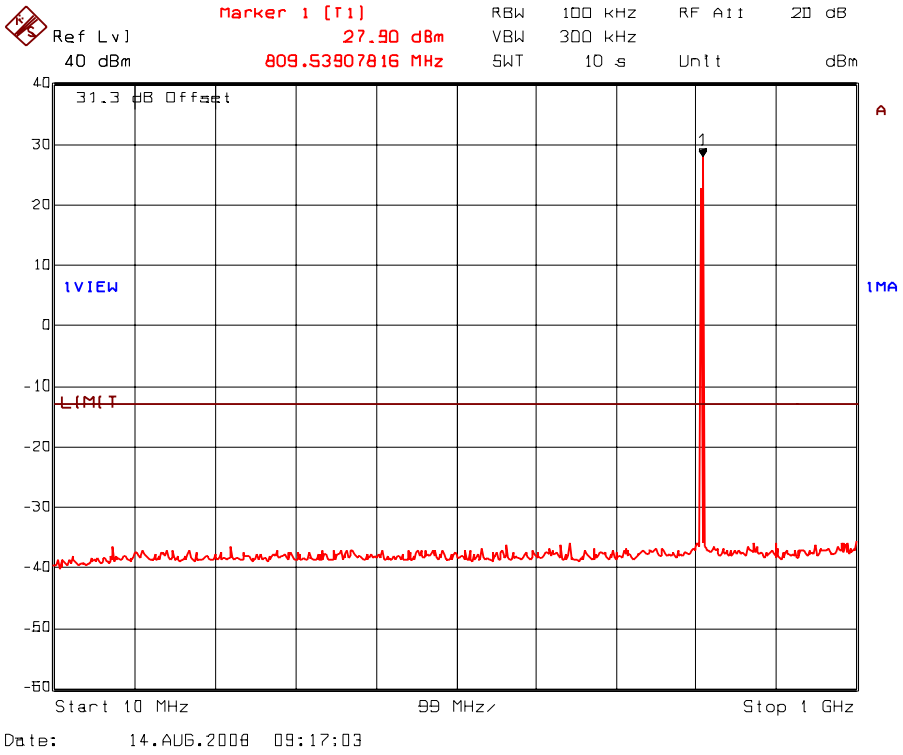
Plot 5.8.5.1.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 800 MHz (Uplink) below 1GHz – Single RF input



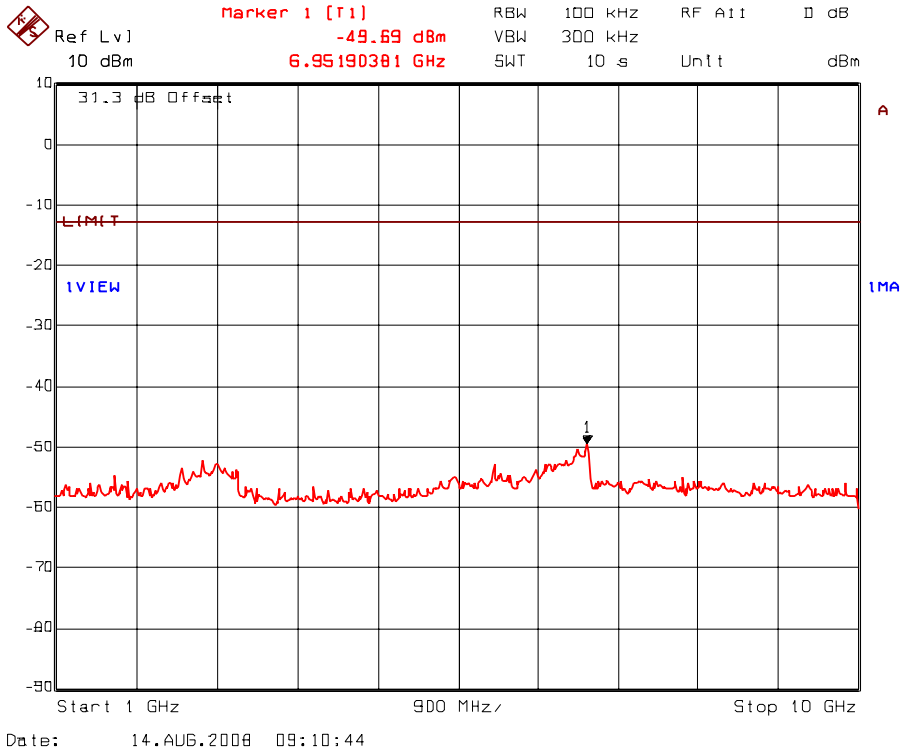
Plot 5.8.5.2.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 800 MHz (Uplink) above 1GHz – Single RF input



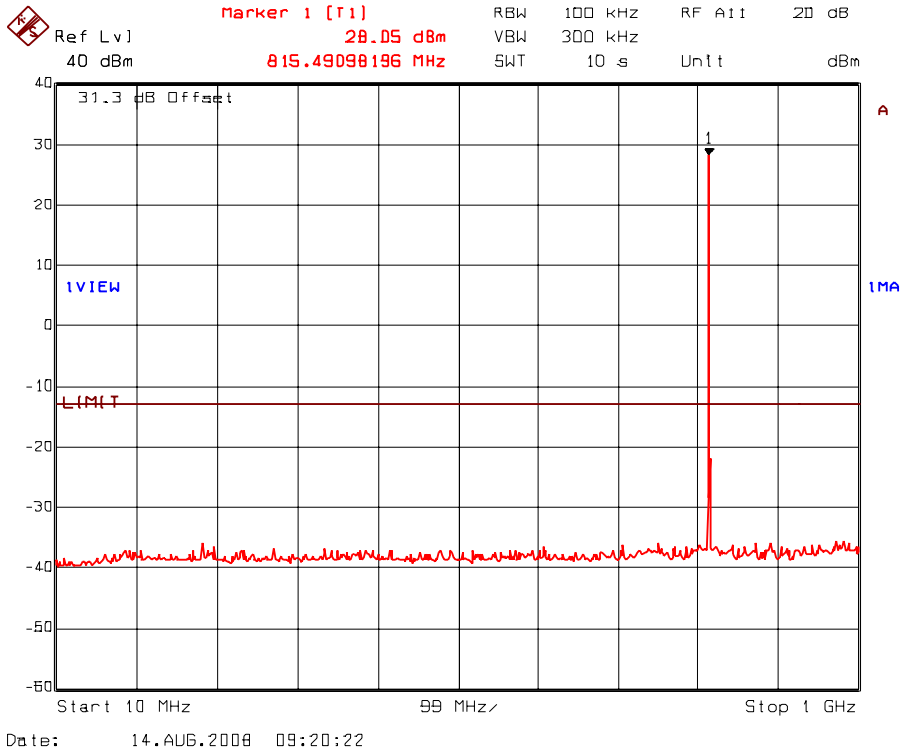
Plot 5.8.5.3.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 808 MHz (Uplink) below 1GHz – Single RF input



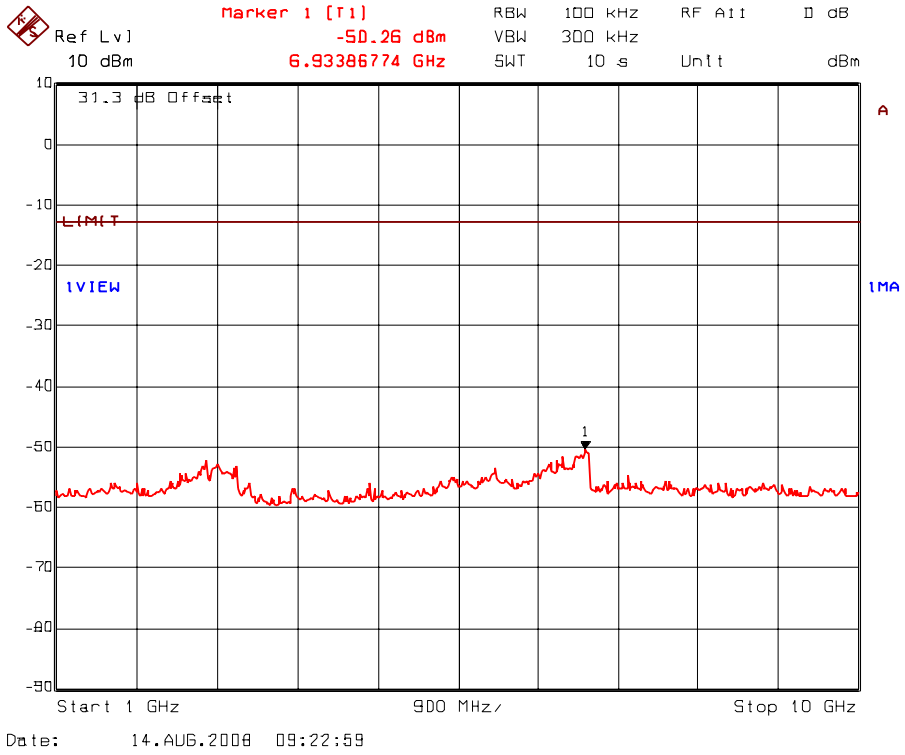
Plot 5.8.5.4.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 808 MHz (Uplink) above 1GHz – Single RF input



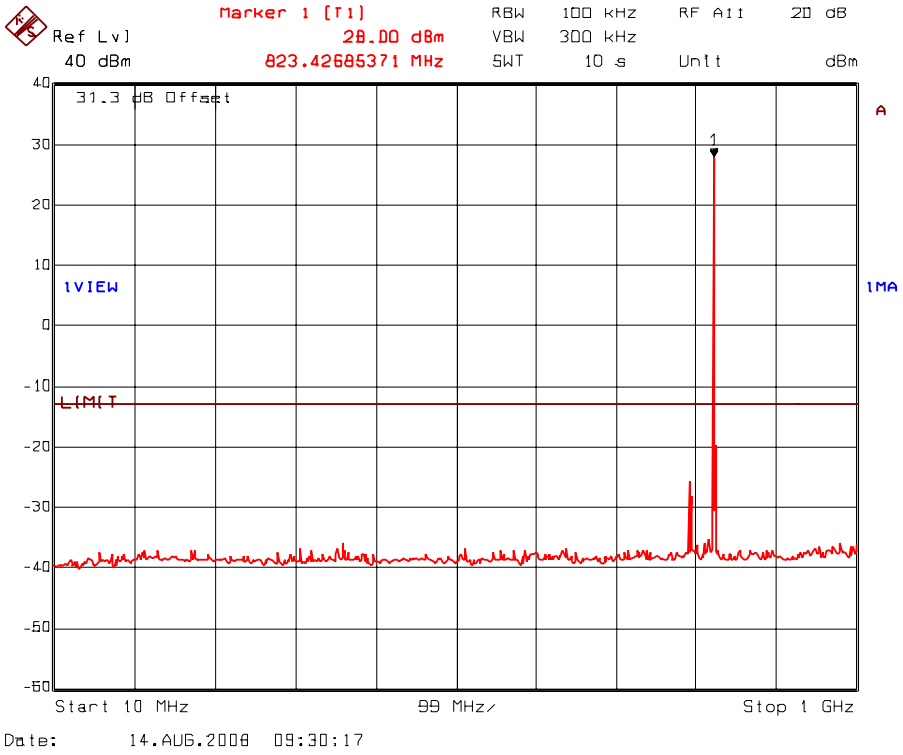
Plot 5.8.5.5.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 815 MHz (Uplink) below 1GHz – Single RF input



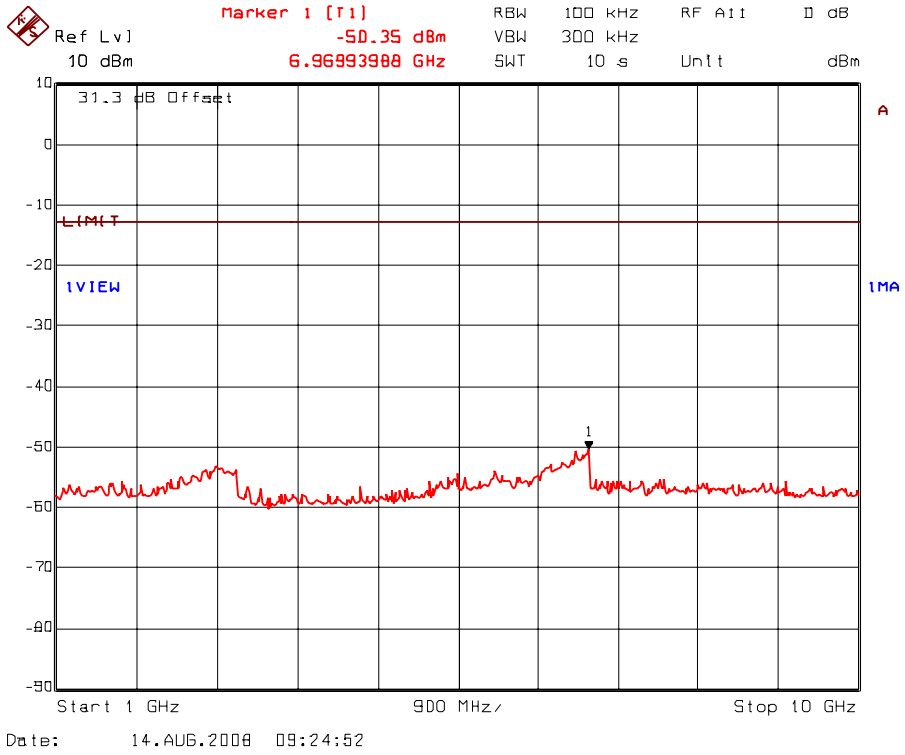
Plot 5.8.5.6.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 815 MHz (Uplink) above 1GHz – Single RF input



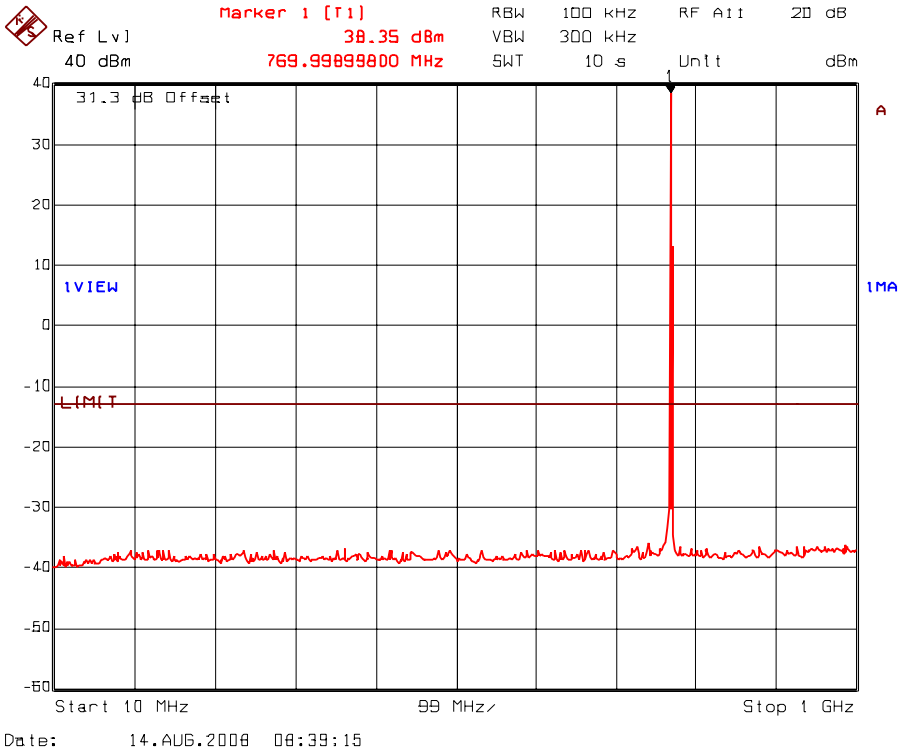
Plot 5.8.5.7.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 823 MHz (Uplink) below 1GHz – Single RF input



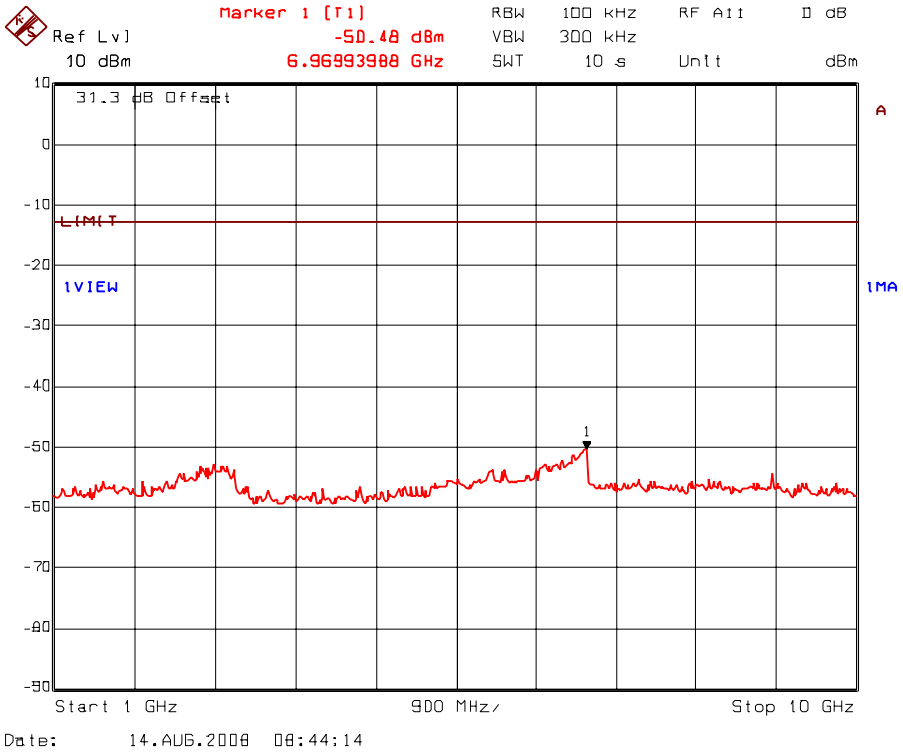
Plot 5.8.5.8.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 823 MHz (Uplink) above 1GHz – Single RF input



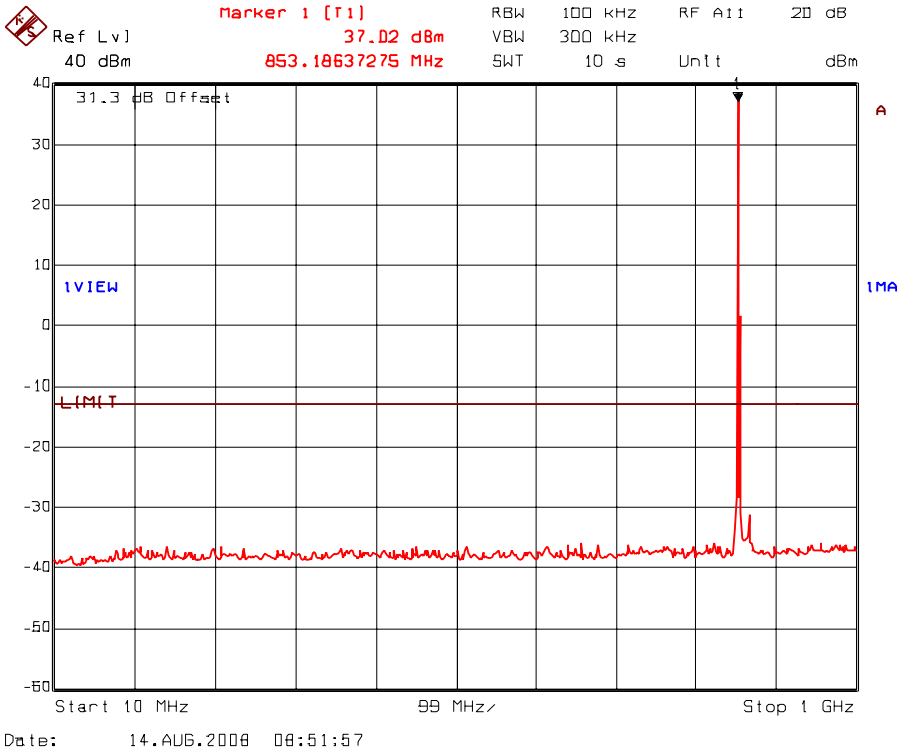
Plot 5.8.5.9.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 770 MHz (Downlink) below 1GHz – Single RF input



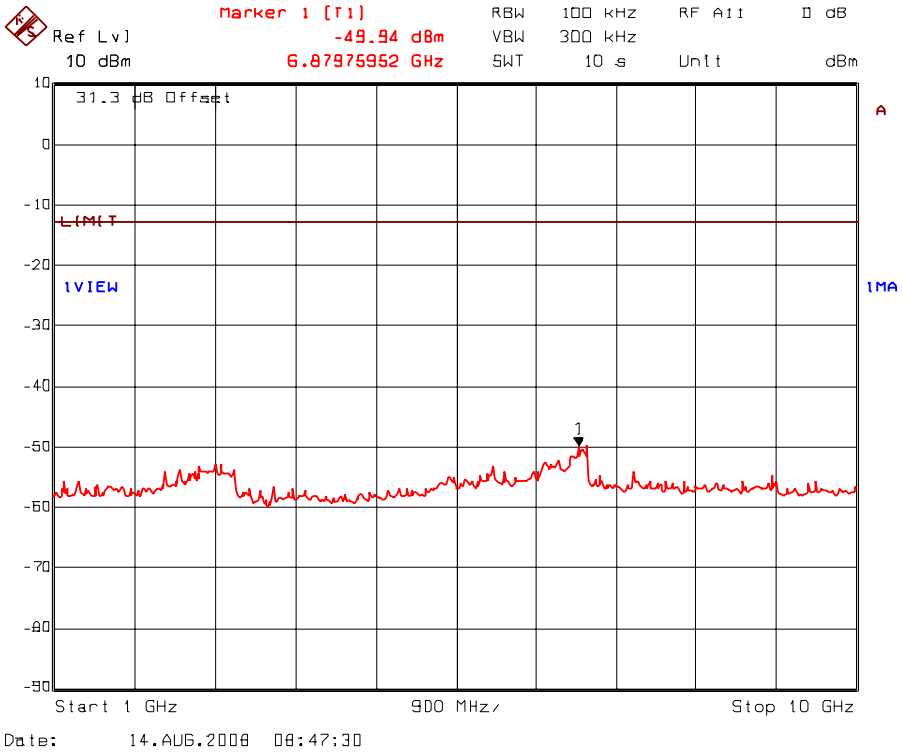
Plot 5.8.5.10.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 770 MHz (Downlink) above 1GHz – Single RF input



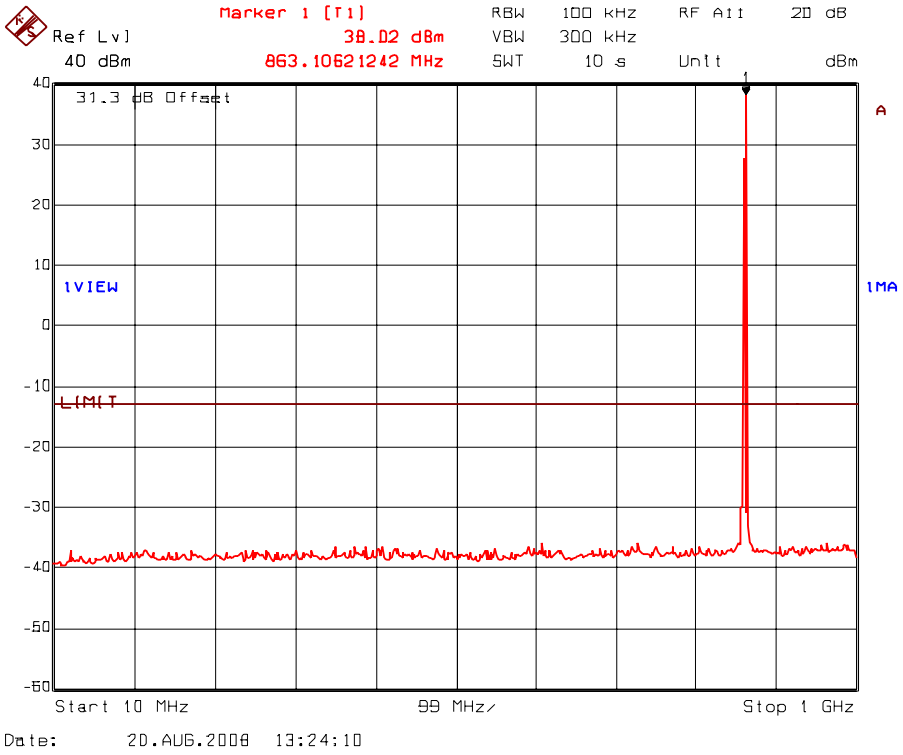
Plot 5.8.5.11.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 853 MHz (Downlink) below 1GHz – Single RF input



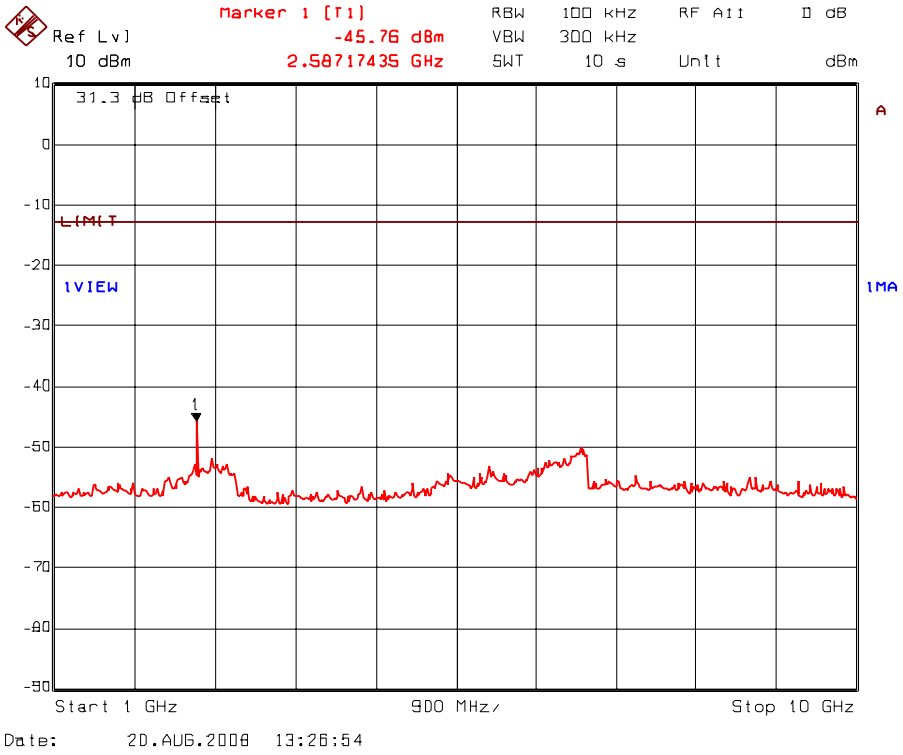
Plot 5.8.5.12.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 853 MHz (Downlink) above 1GHz – Single RF input



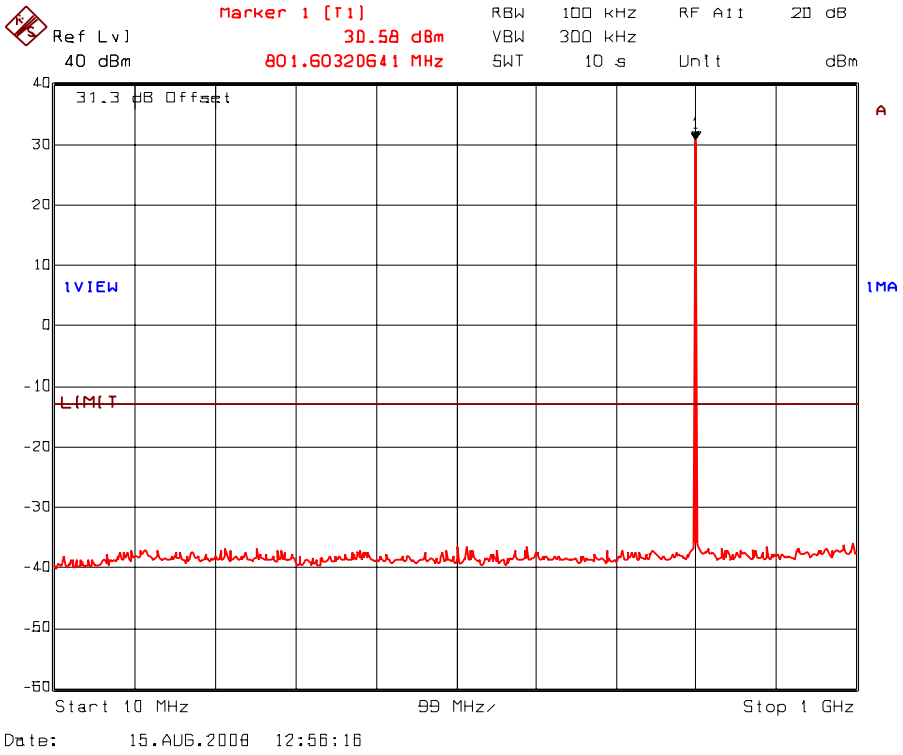
Plot 5.8.5.13.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 861.5 MHz (Downlink) below 1GHz – Single RF input



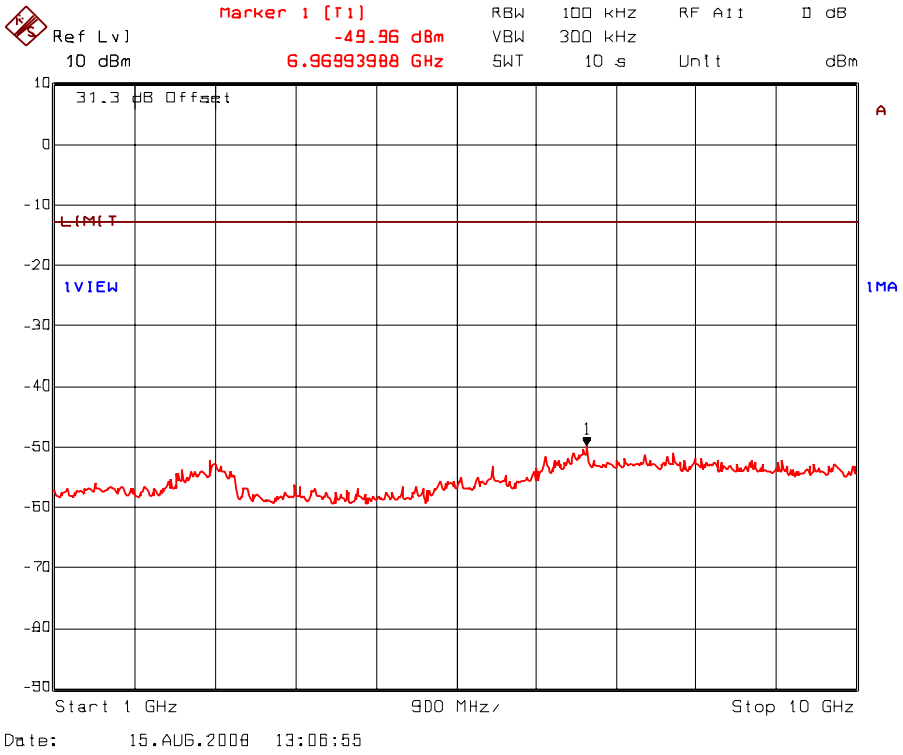
Plot 5.8.5.14.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 861.5 MHz (Downlink) above 1GHz – Single RF input



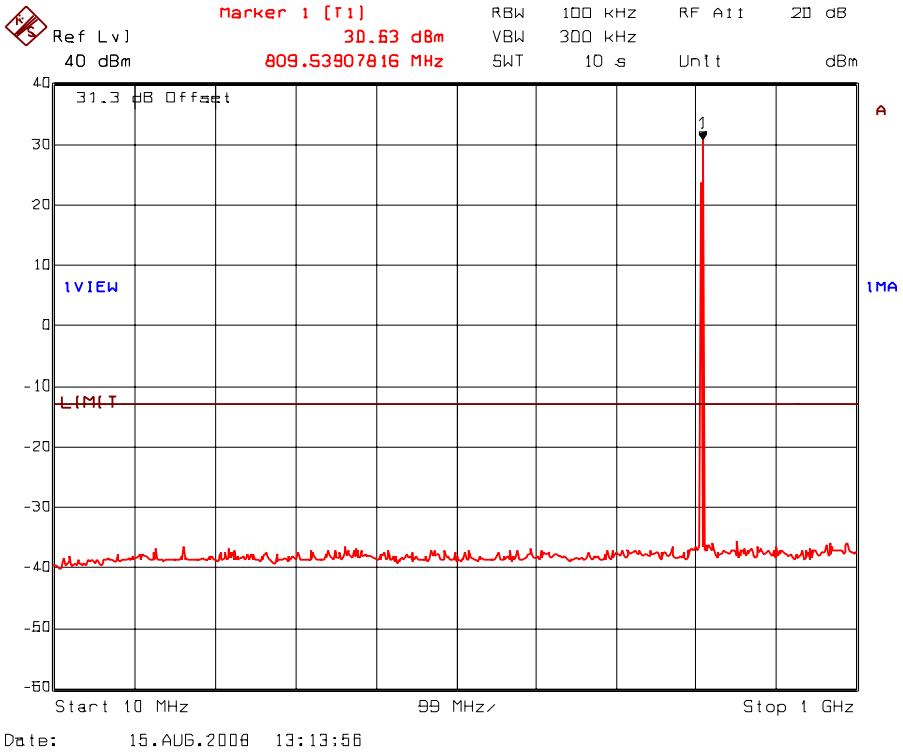
Plot 5.8.5.15.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 800 MHz (Uplink) below 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



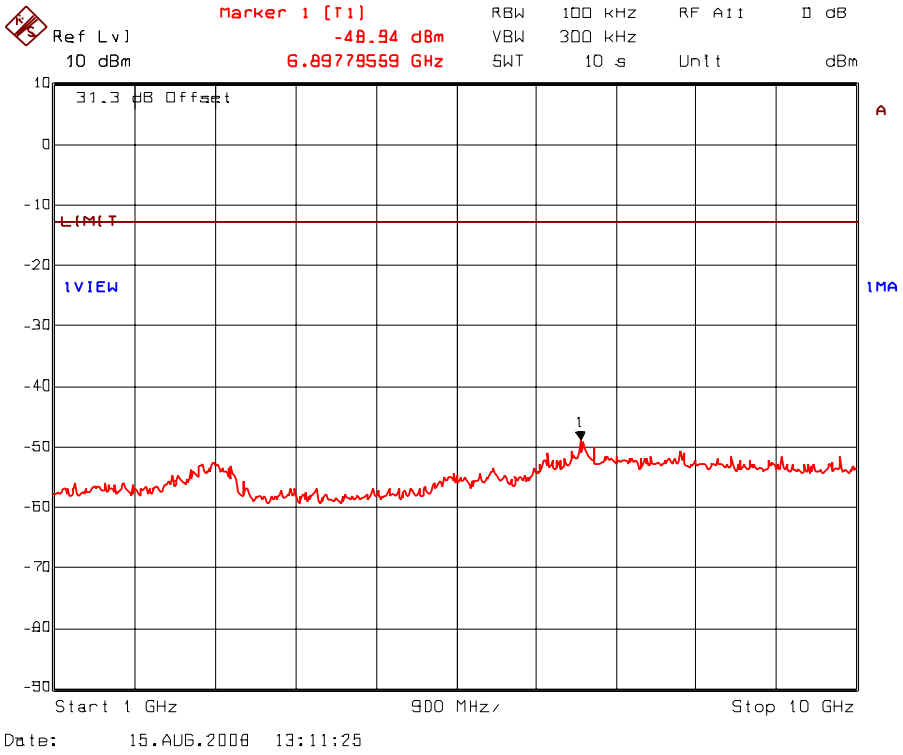
Plot 5.8.5.16.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 800 MHz (Uplink) above 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



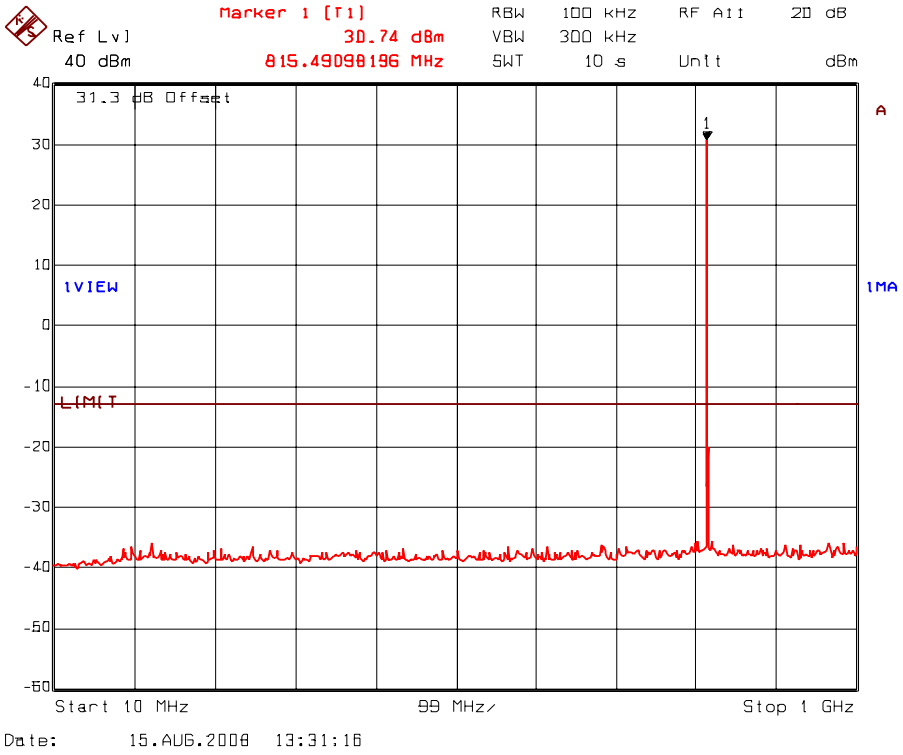
Plot 5.8.5.17.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 808 MHz (Uplink) below 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



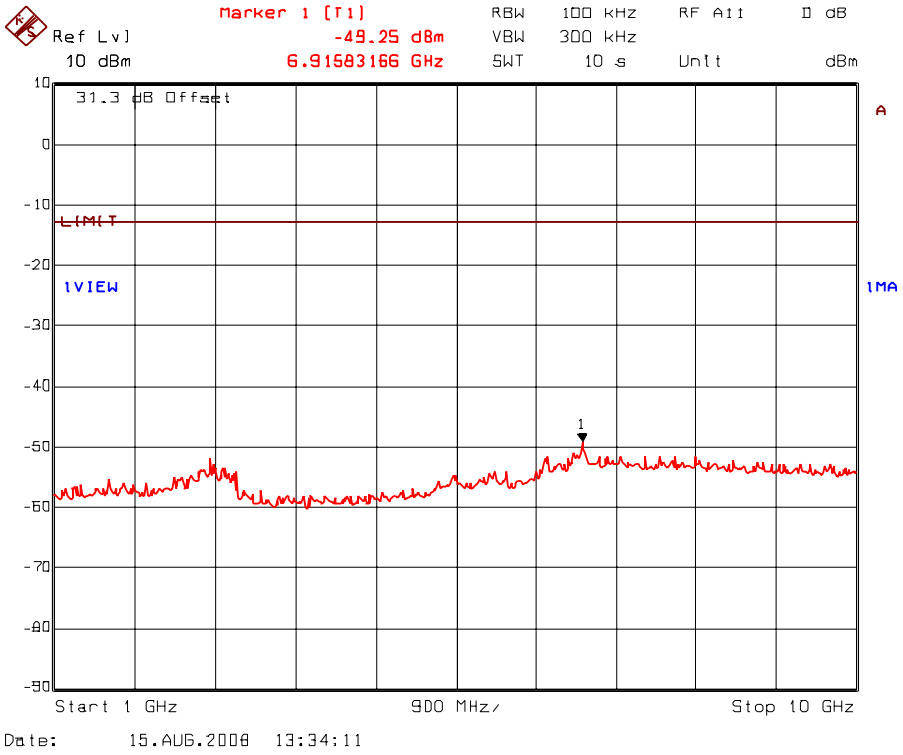
Plot 5.8.5.18.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 808 MHz (Uplink) above 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



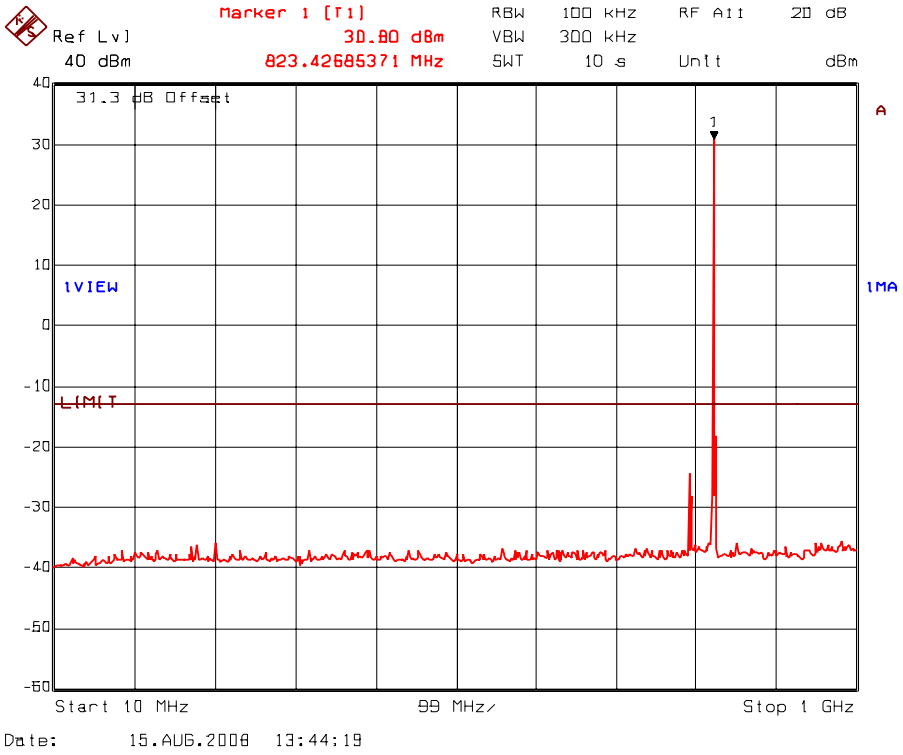
Plot 5.8.5.19.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 815 MHz (Uplink) below 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



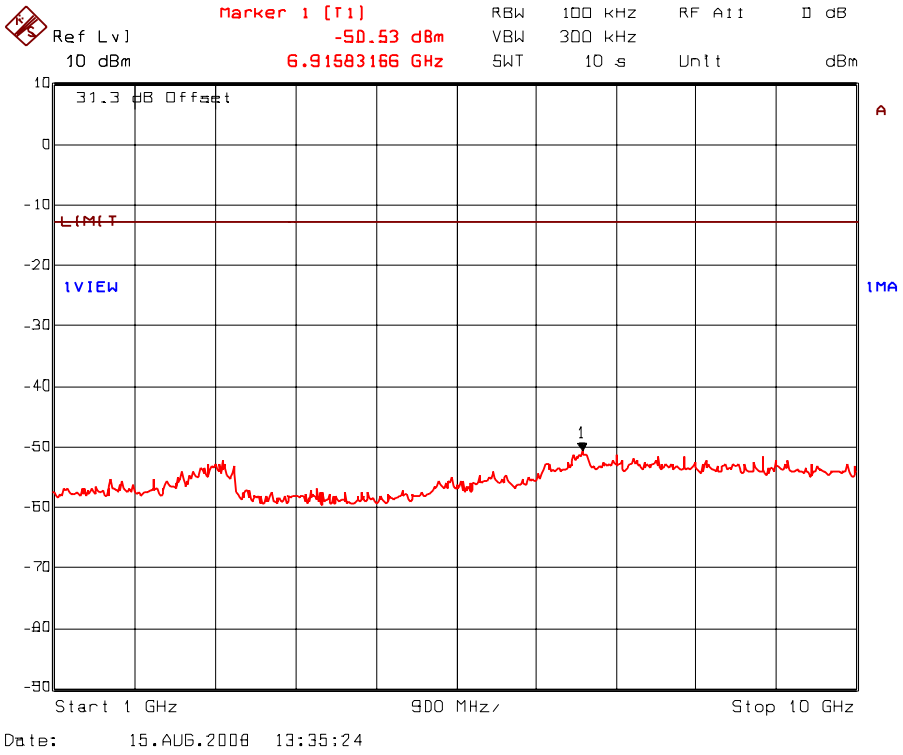
Plot 5.8.5.20.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 815 MHz (Uplink) above 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



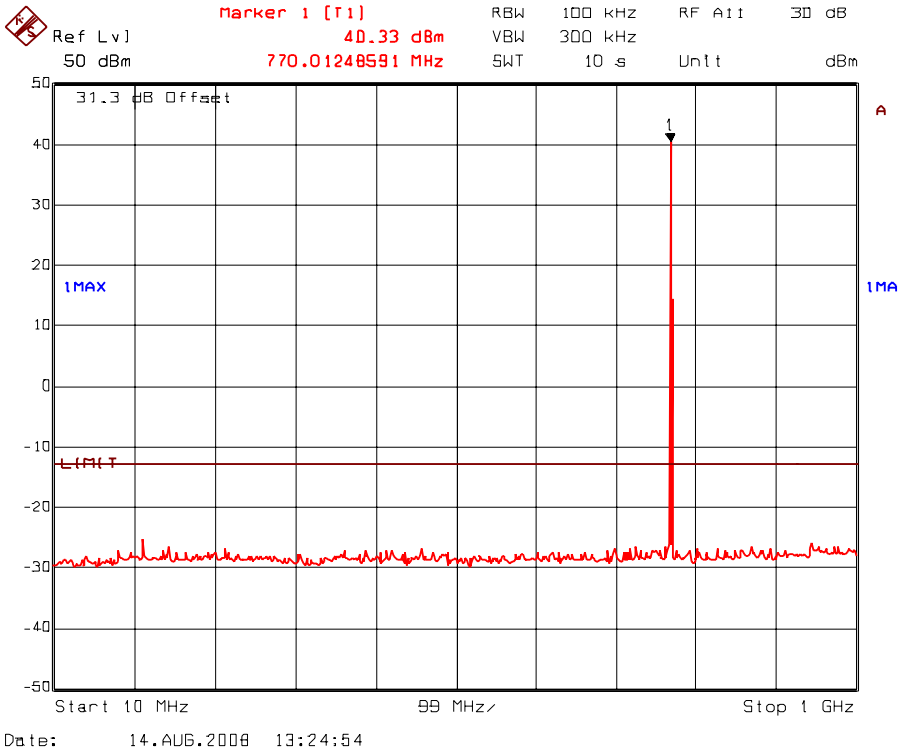
Plot 5.8.5.21.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 823 MHz (Uplink) below 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



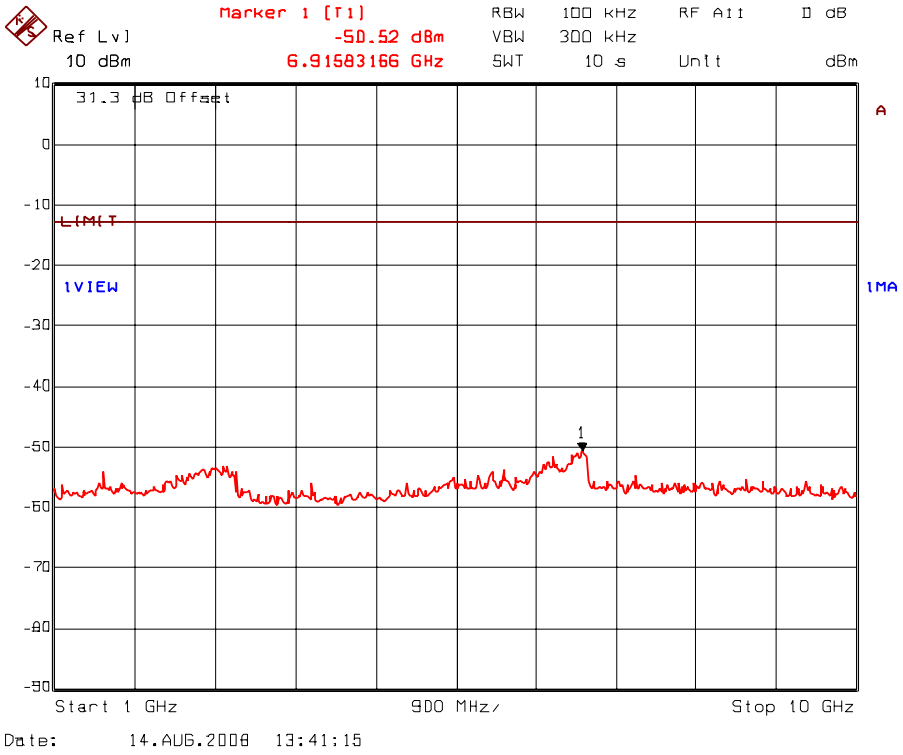
Plot 5.8.5.22.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 823 MHz (Uplink) above 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



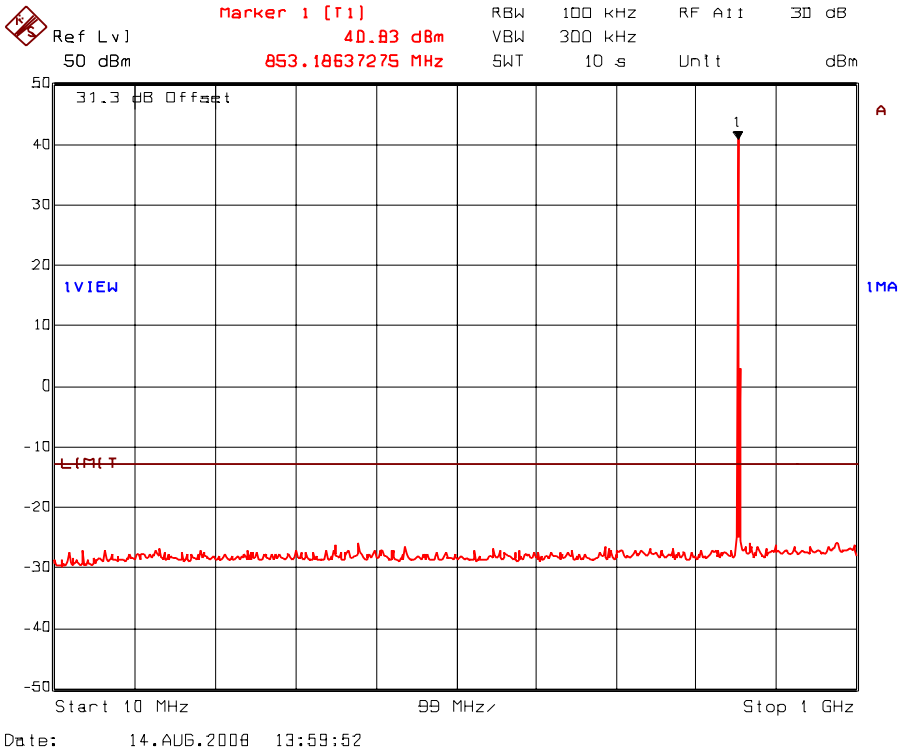
Plot 5.8.5.23.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 770 MHz (Downlink) below 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



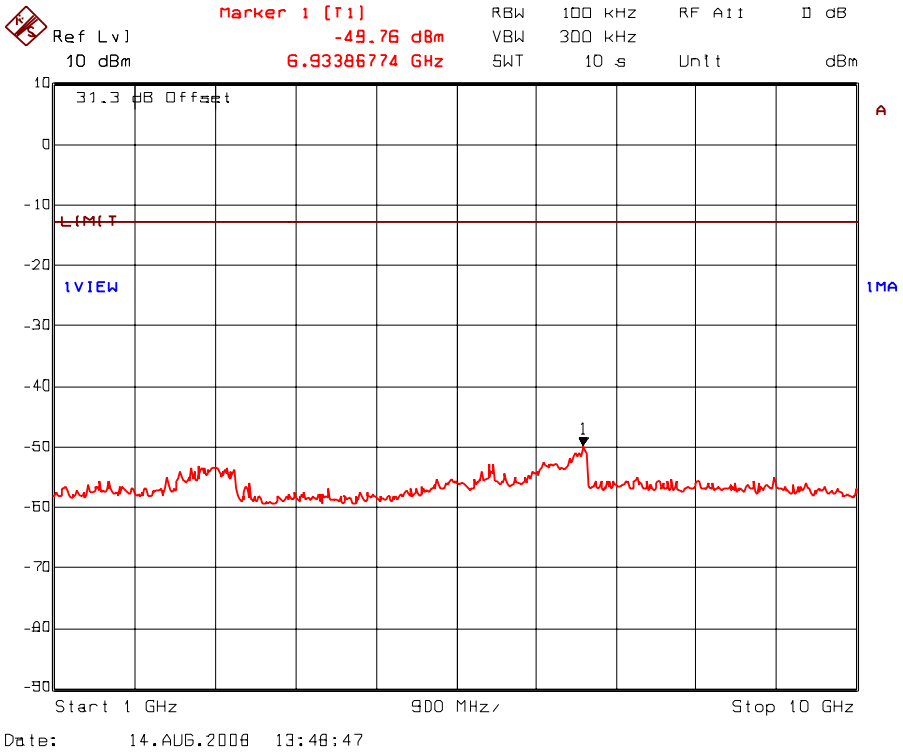
Plot 5.8.5.24.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 770 MHz (Downlink) above 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



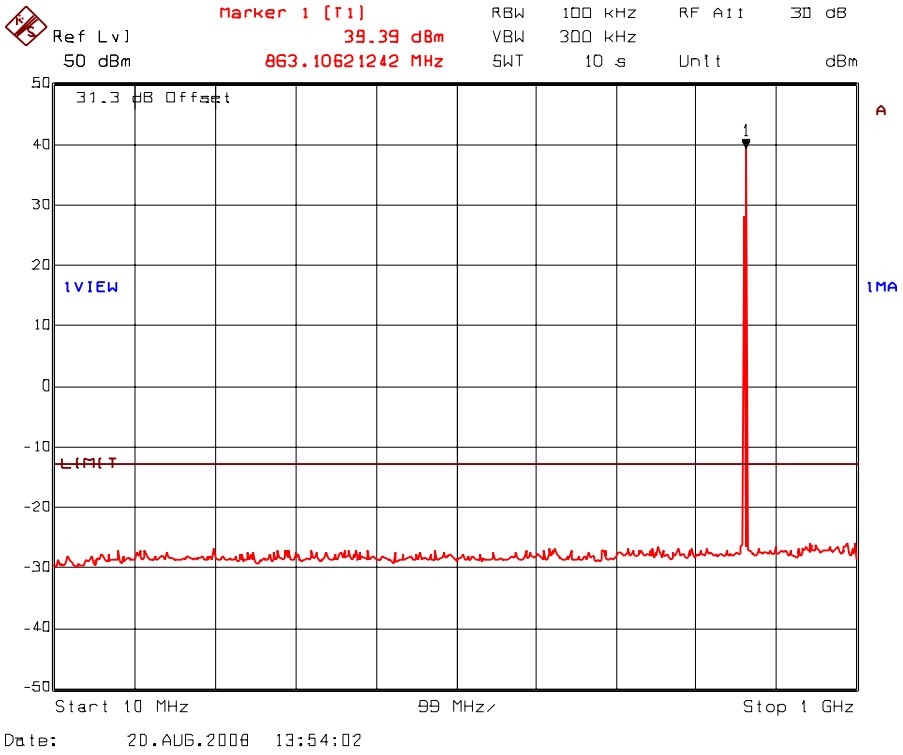
Plot 5.8.5.25.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 853 MHz (Downlink) below 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



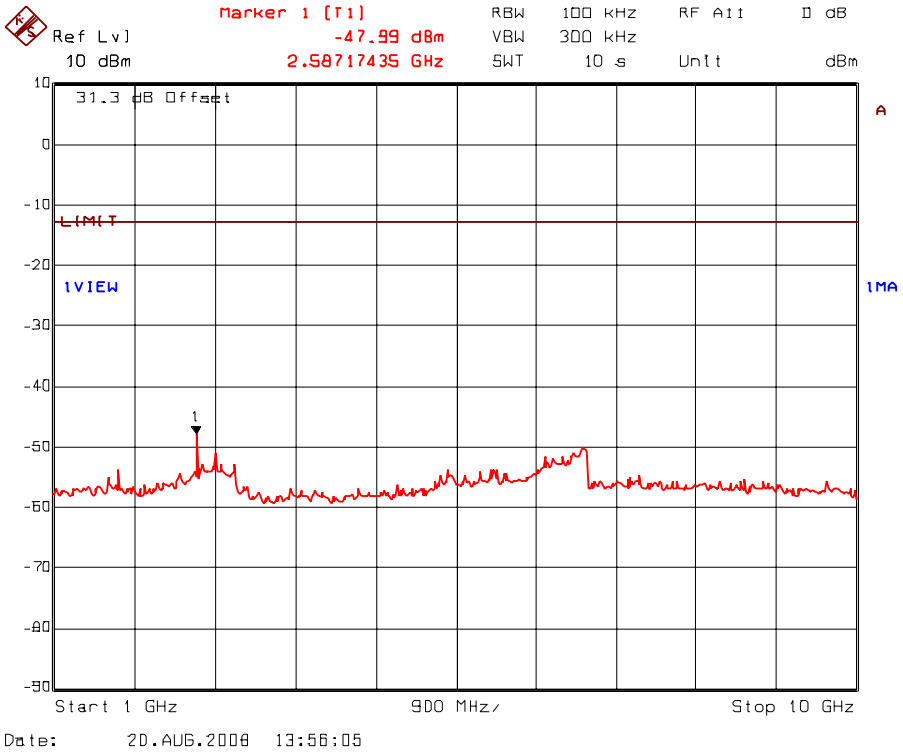
Plot 5.8.5.26.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 853 MHz (Downlink) above 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



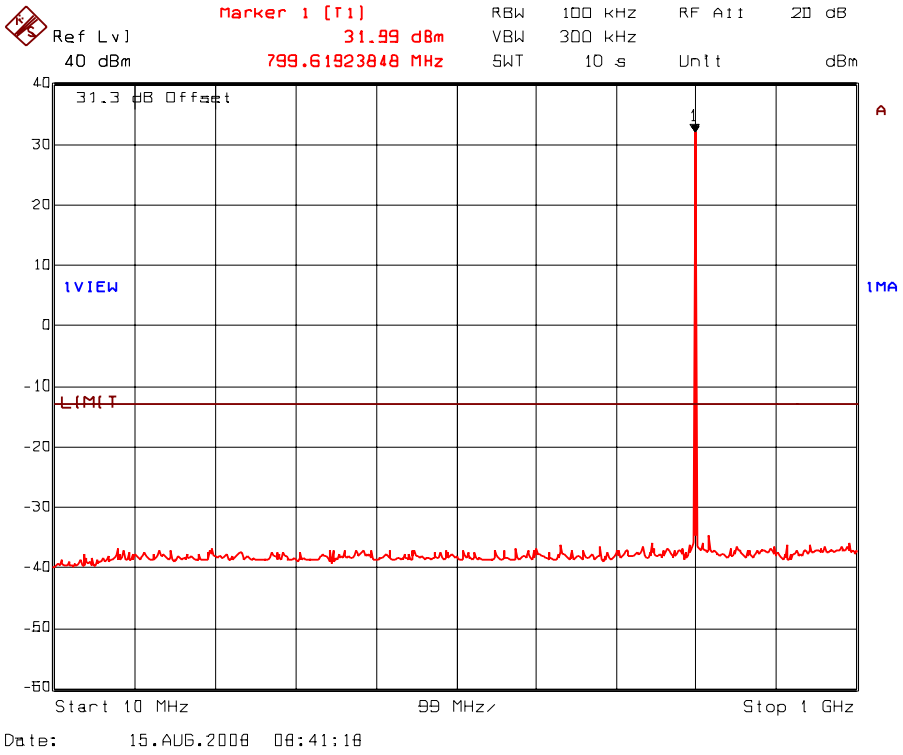
Plot 5.8.5.27.Transmitter antenna conducted RF spurious emissions at antenna port @Fc: 861.5 MHz (Downlink) below 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



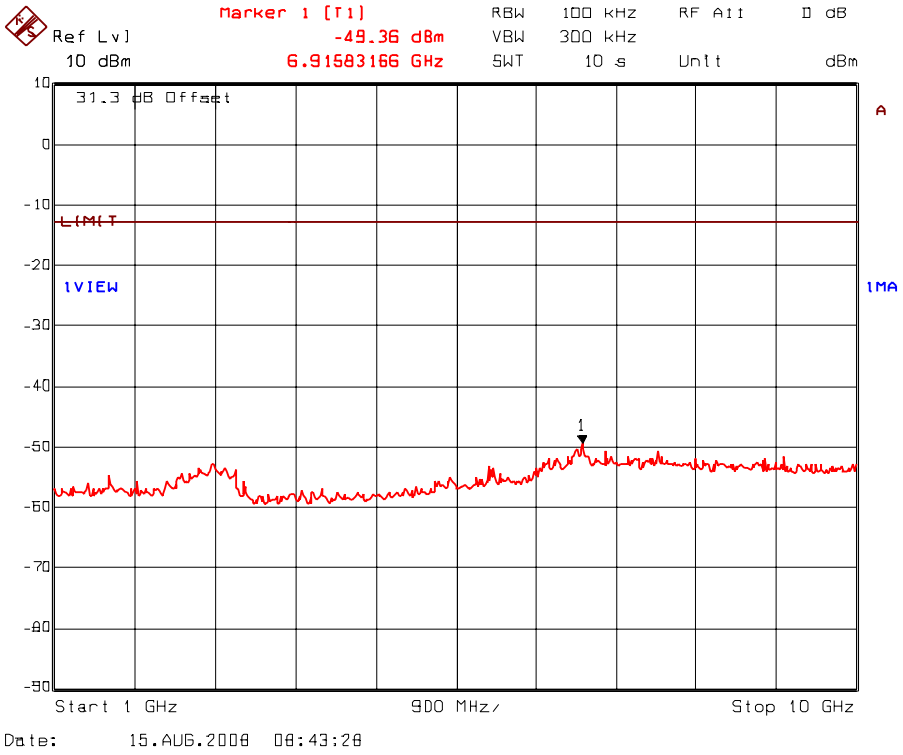
Plot 5.8.5.28.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 861.5 MHz (Downlink) above 1GHz – 2 RF inputs (Fc & Fc + 25kHz)



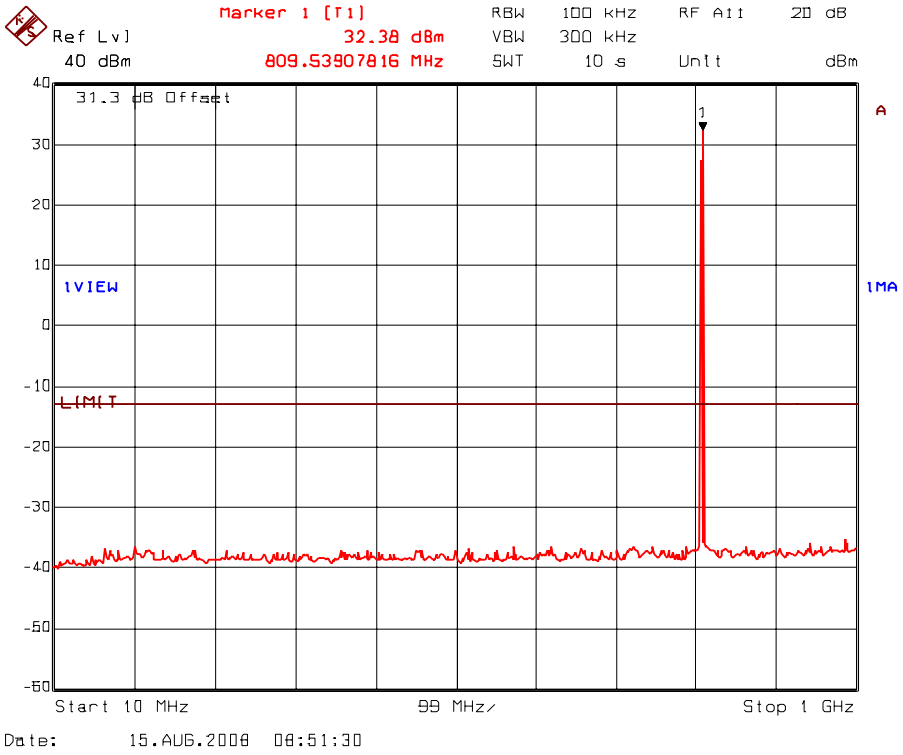
Plot 5.8.5.29.Transmitter antenna conducted RF spurious emissions at antenna port @Fc: 800 MHz (Uplink) below 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



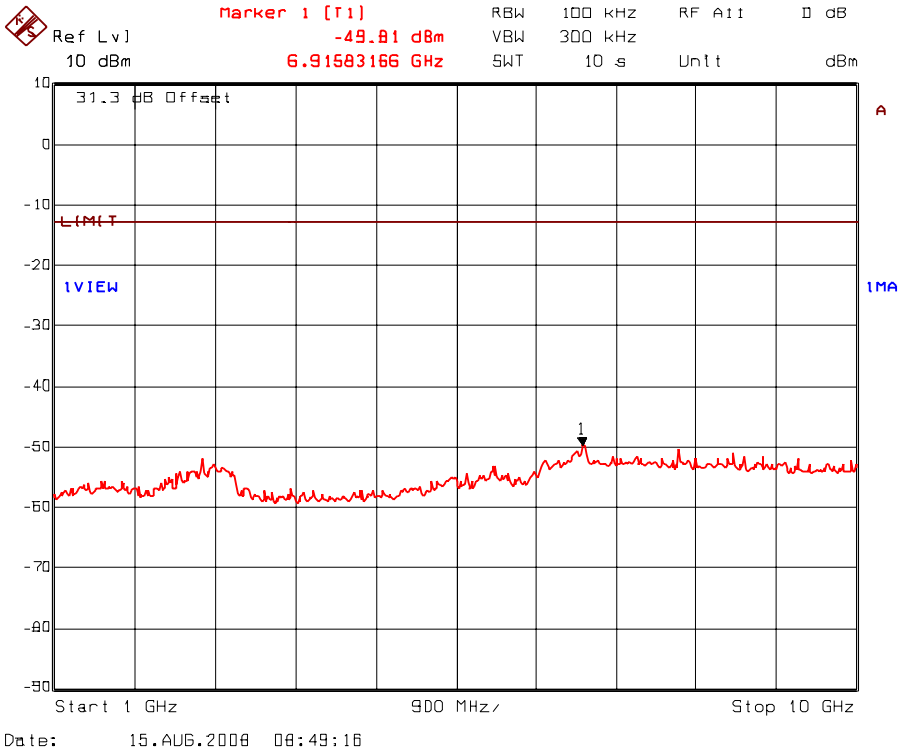
Plot 5.8.5.30.Transmitter antenna conducted RF spurious emissions at antenna port @Fc: 800 MHz (Uplink) above 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



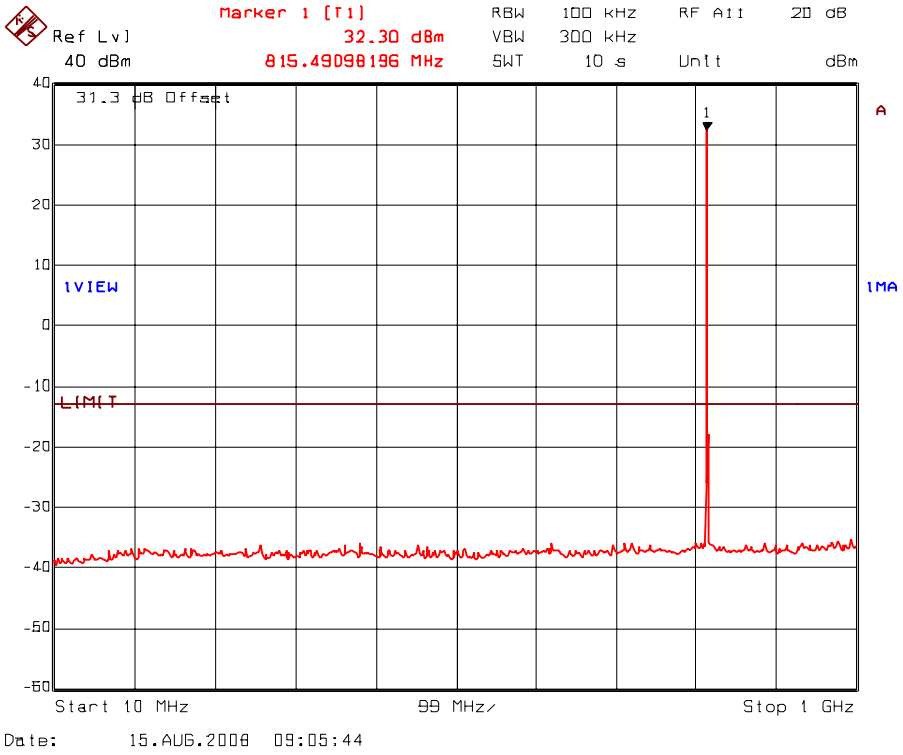
Plot 5.8.5.31.Transmitter antenna conducted RF spurious emissions at antenna port @Fc: 808 MHz (Uplink) below 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



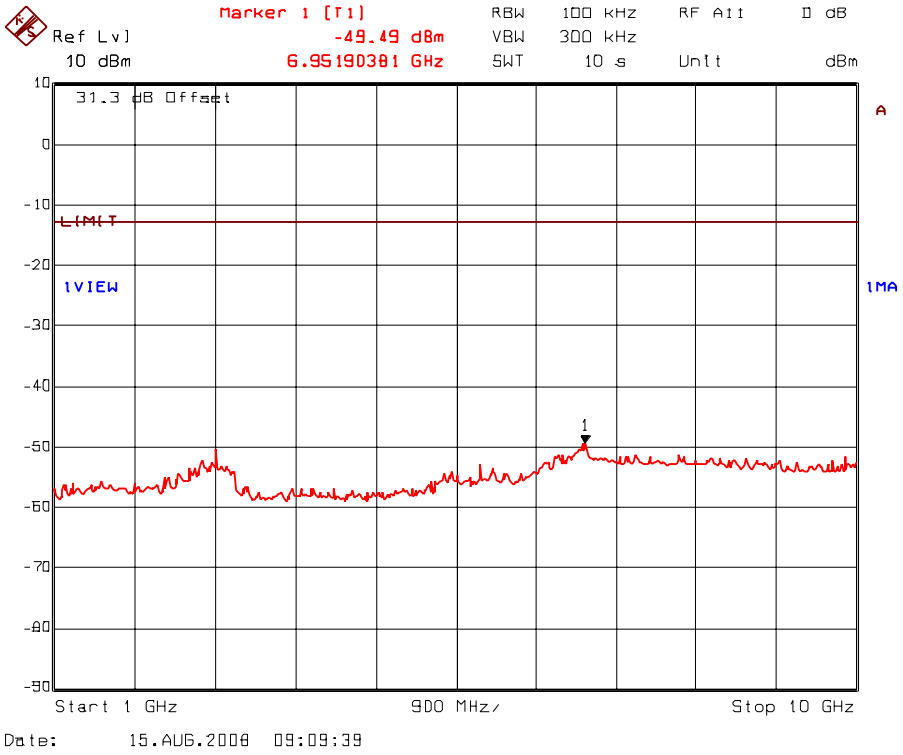
Plot 5.8.5.32.Transmitter antenna conducted RF spurious emissions at antenna port @Fc: 808 MHz (Uplink) above 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



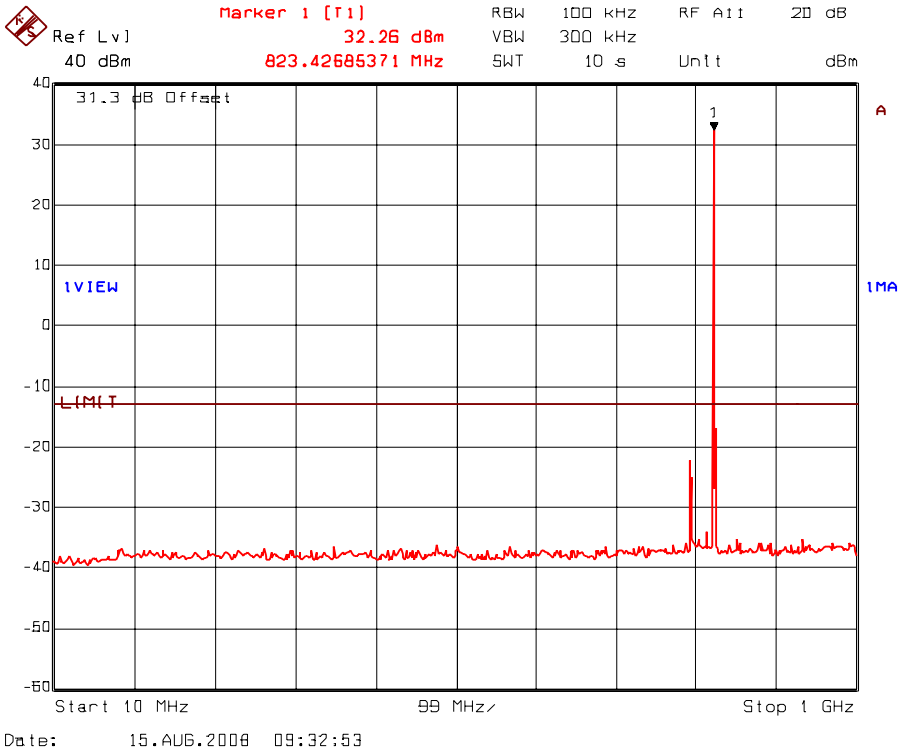
Plot 5.8.5.33.Transmitter antenna conducted RF spurious emissions at antenna port @Fc: 815 MHz (Uplink) below 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



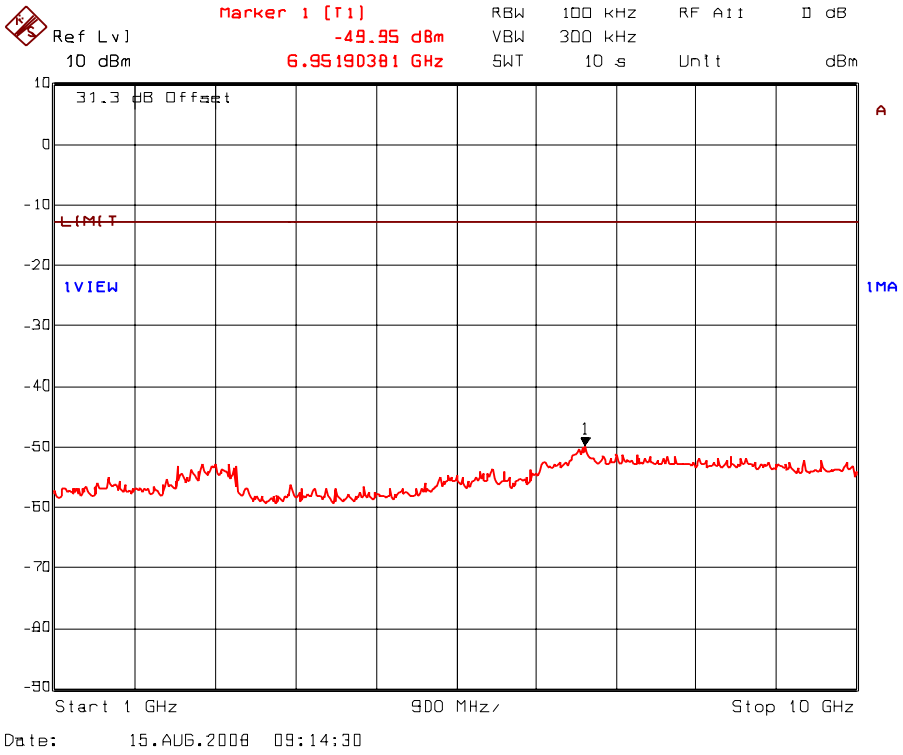
Plot 5.8.5.34.Transmitter antenna conducted RF spurious emissions at antenna port @Fc: 815 MHz (Uplink) above 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



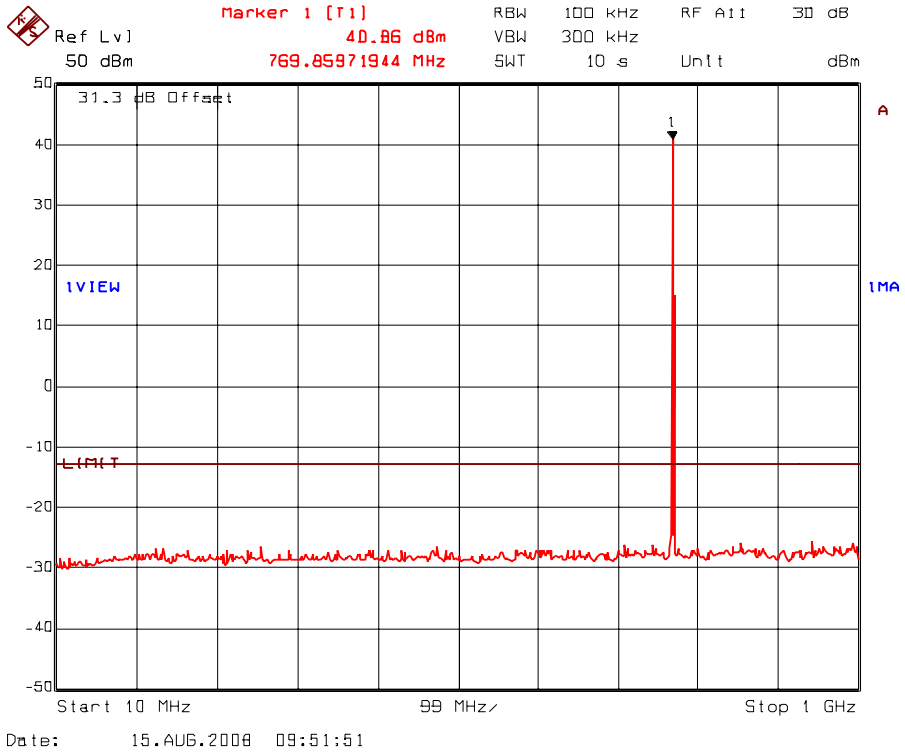
Plot 5.8.5.35.Transmitter antenna conducted RF spurious emissions at antenna port @Fc: 823 MHz (Uplink) below 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



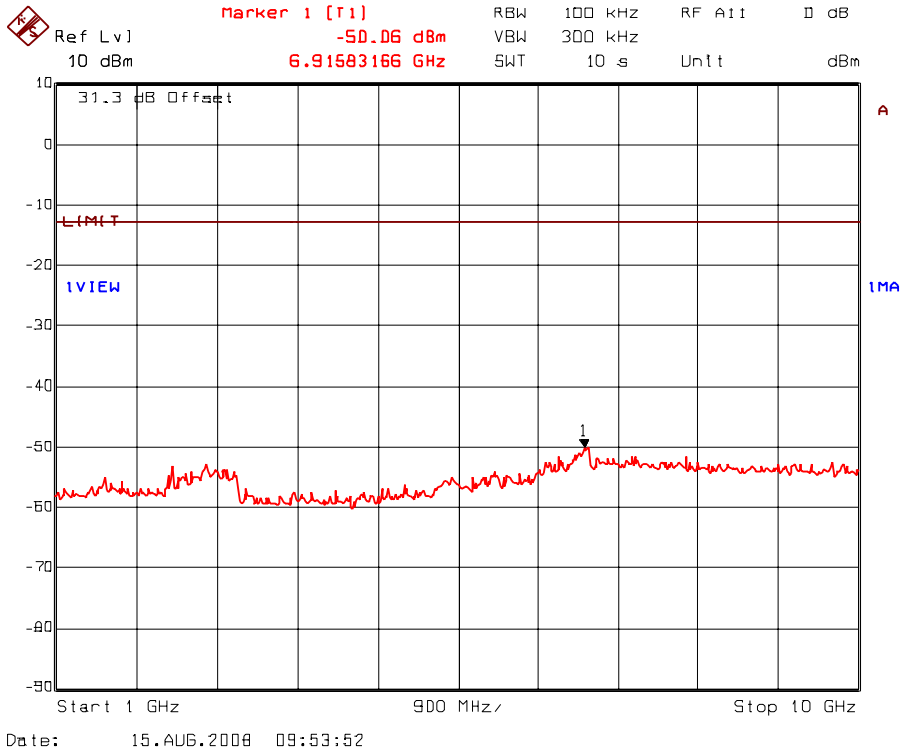
Plot 5.8.5.36.Transmitter antenna conducted RF spurious emissions at antenna port @Fc: 823 MHz (Uplink) above 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



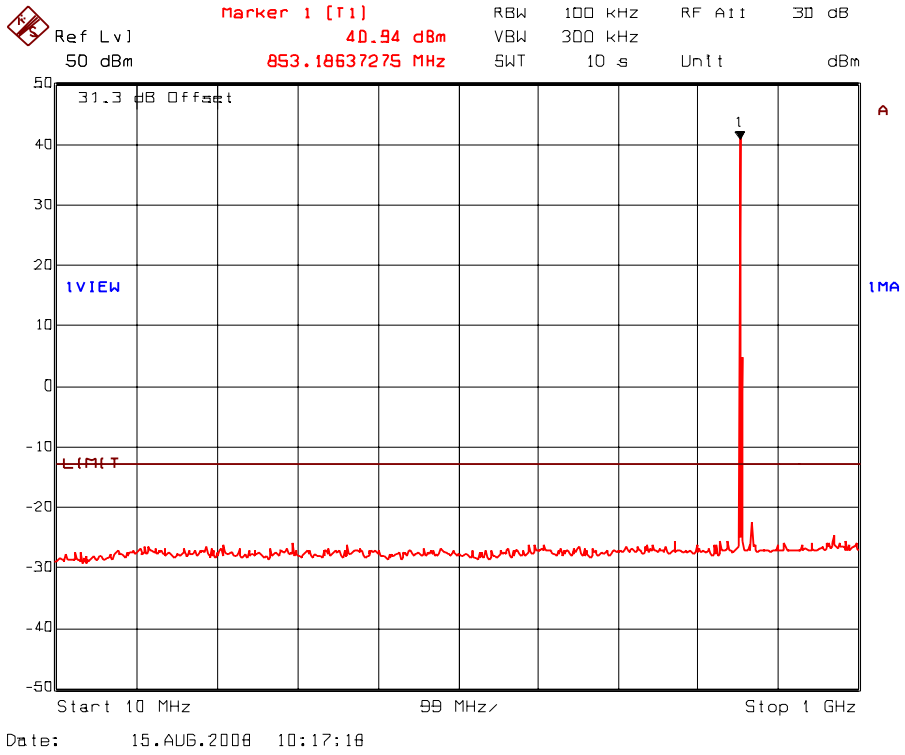
Plot 5.8.5.37.Transmitter antenna conducted RF spurious emissions at antenna port @Fc: 770 MHz (Downlink) below 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



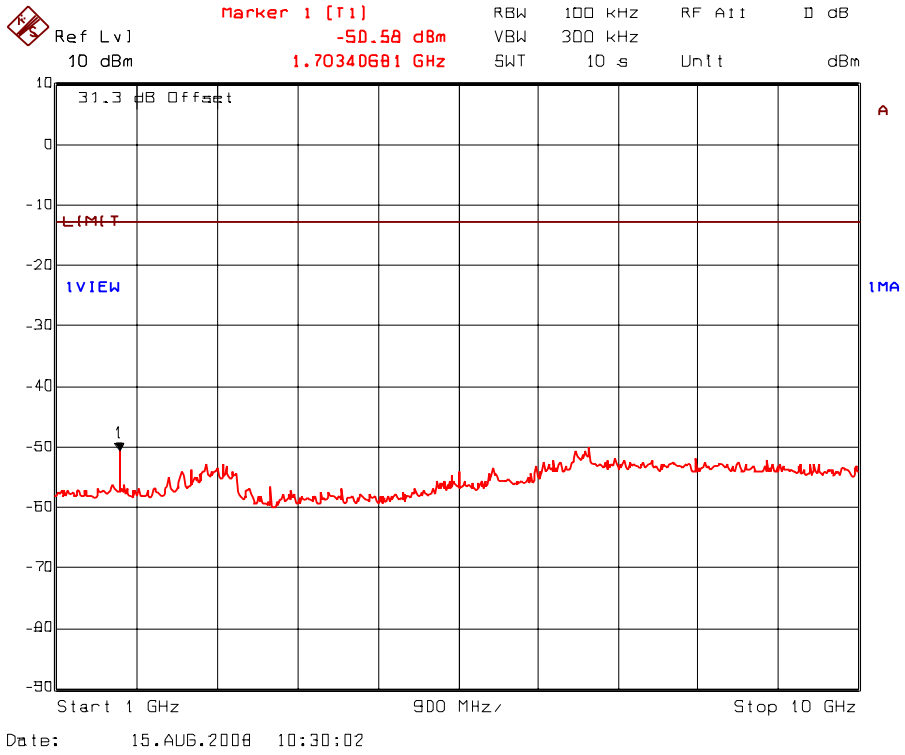
Plot 5.8.5.38.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 770 MHz (Downlink) above 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



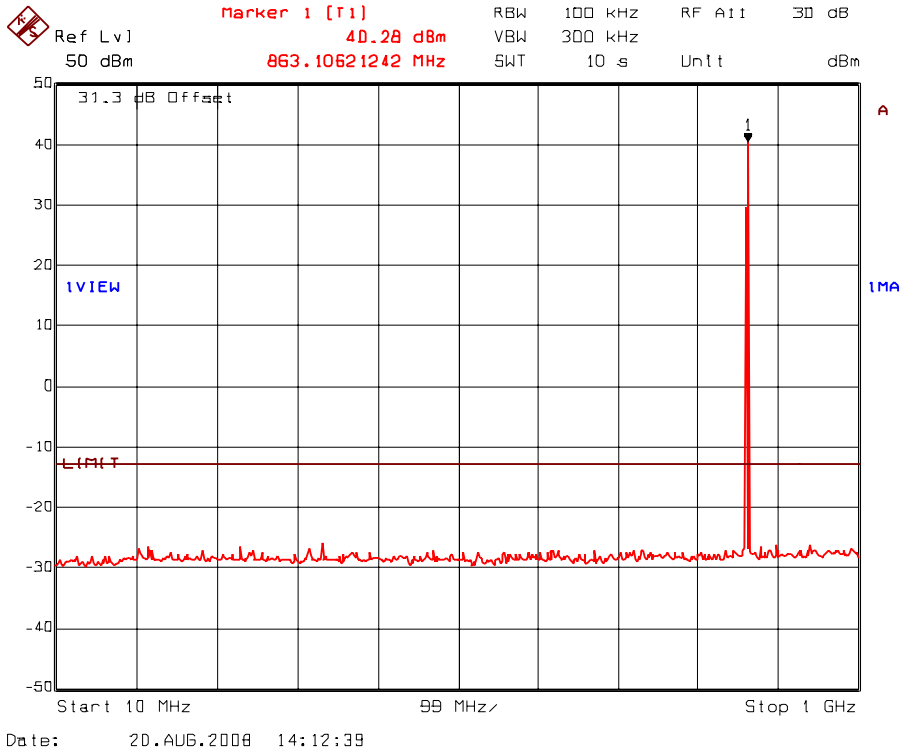
Plot 5.8.5.39.Transmitter antenna conducted RF spurious emissions at antenna port @Fc: 853 MHz (Downlink) below 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



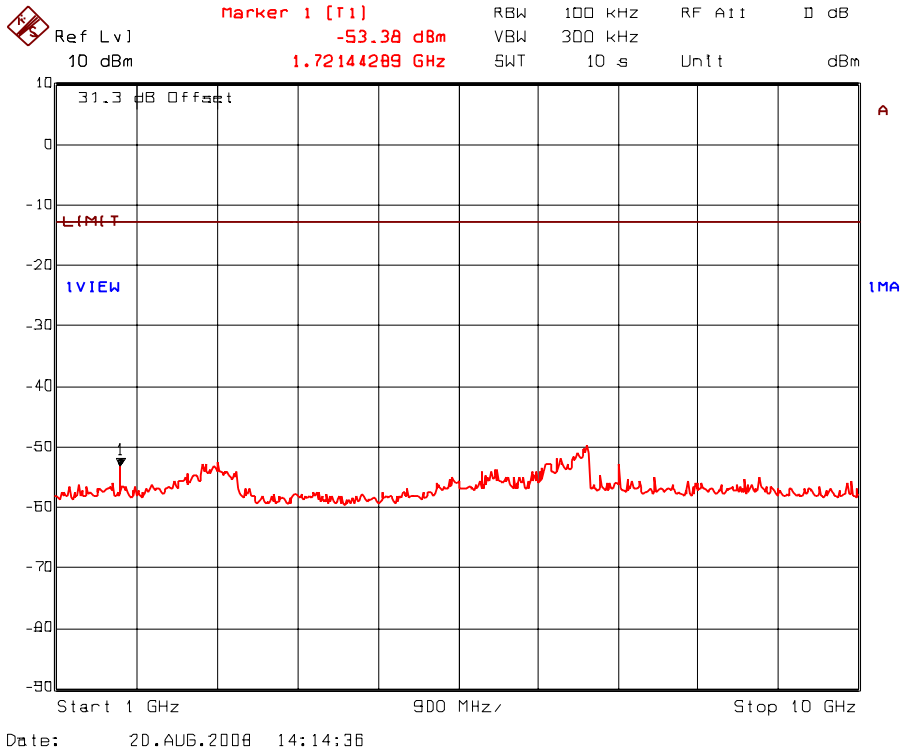
Plot 5.8.5.40.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 853 MHz (Downlink) above 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



Plot 5.8.5.41.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 861.5 MHz (Downlink) below 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



Plot 5.8.5.42.Transmitter antenna conducted RF spurious emissions at antenna port
@Fc: 861.5 MHz (Downlink) above 1GHz – 3 RF inputs (Fc - 25kHz, Fc & Fc + 25kHz)



5.9. TRANSMITTER SPURIOUS/HARMONIC RADIATED EMISSIONS @ 90.210, 90.543(C, 2.1057 & 2.1051

5.9.1. Limits

The most stringent limit of 43+10*log(P in Watts) dBc is applied for all sub-bands for worst case.

5.9.2. Method of Measurements

The spurious/harmonic ERP measurements are using substitution method specified in 8.2 of this report and its value in dBc is calculated as follows:

(1) If the transmitter's antenna is an integral part of the EUT, the ERP is measured using substitution method.
(2) If the transmitter's antenna is non-integral and diverse, the lowest ERP of the carrier with 0 dBi antenna gain is used for calculation of the spurious/harmonic emissions in dBc:
Lowest ERP of the carrier = EIRP – 2.15 dB = Pc + G - 2.15 dB = xxx dBm (conducted) + 0 dBi – 2.15 dB
(3) Spurious /harmonic emissions levels expressed in dBc (dB below carrier) are as follows:

ERP of spurious/harmonic (dBc) = ERP of carrier (dBm) – ERP of spurious/harmonic emission (dBm)

5.9.3. Test Setup

Please refer to Photo # 1 to 2 for detailed of test setup.

5.9.4. Test Data

Remark: The transmitter radiated emissions with single RF input signal was tested to represent for worst case

5.9.4.1. Frequency: 800 MHz (UpLink), Single Input/Output

- The emissions were scanned from 30 MHz to 10 GHz and no significant rf spurious/harmonic emissions were found to be less than 20 dB below the FCC Limits.

Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP measured (dBm)	Limit (dBm)	Margin (dB)
No signal found. All measurements are found to be at least 20 dB below the FCC limit.						

5.9.4.2. Frequency: 808 MHz (UpLink), Single Input/Output

- The emissions were scanned from 30 MHz to 10 GHz and no significant rf spurious/harmonic emissions were found to be less than 20 dB below the FCC Limits.

Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP measured (dBm)	Limit (dBm)	Margin (dB)
No signal found. All measurements are found to be at least 20 dB below the FCC limit.						

5.9.4.3. Frequency: 815 MHz (UpLink), Single Input/Output

- The emissions were scanned from 30 MHz to 10 GHz and no significant rf spurious/harmonic emissions were found to be less than 20 dB below the FCC Limits.

Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP measured (dBm)	Limit (dBm)	Margin (dB)
No signal found. All measurements are found to be at least 20 dB below the FCC limit.						

5.9.4.4. Frequency: 823 MHz (UpLink), Single Input/Output

- The emissions were scanned from 30 MHz to 10 GHz and no significant rf spurious/harmonic emissions were found to be less than 20 dB below the FCC Limits.

Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP measured (dBm)	Limit (dBm)	Margin (dB)
No signal found. All measurements are found to be at least 20 dB below the FCC limit.						

5.9.4.5. Frequency: 770 MHz (DownLink), Single Input/Output

The emissions were scanned from 30 MHz to 10 GHz and no significant rf spurious/harmonic emissions were found to be less than 20 dB below the FCC Limits.

Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP measured (dBm)	Limit (dBm)	Margin (dB)
1540	48.02	Peak	V	-50.1	-13	-37.1
1540	52.69	Peak	H	-45.43	-13	-32.4
2310	51.47	Peak	V	-45.82	-13	-32.8
2310	55.48	Peak	H	-41.81	-13	-28.8
3080	65.85	Peak	V	-30.94	-13	-17.9
3080	71.65	Peak	H	-25.14	-13	-12.1
5390	50.62	Peak	V	-45.72	-13	-32.7
5390	51.08	Peak	H	-45.26	-13	-32.3

5.9.4.6. Frequency: 853 MHz (DownLink), Single Input/Output

The emissions were scanned from 30 MHz to 10 GHz and no significant rf spurious/harmonic emissions were found to be less than 20 dB below the FCC Limits.

Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP measured (dBm)	Limit (dBm)	Margin (dB)
1706.000	47.93	Peak	V	-49.69	-13	-36.7
1706.000	53.26	Peak	H	-44.36	-13	-31.4

5.9.4.7. Frequency: 861.5 MHz (DownLink), Single Input/Output

The emissions were scanned from 30 MHz to 10 GHz and no significant rf spurious/harmonic emissions were found to be less than 20 dB below the FCC Limits.

Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP measured (dBm)	Limit (dBm)	Margin (dB)
1723.000	46.37	Peak	V	-51.25	-13	-38.3
1723.000	52.05	Peak	H	-45.57	-13	-32.6

EXHIBIT 6. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100077	20 Hz – 40 GHz
Spectrum Analyzer / EMI Receiver	Hewlett Packard	8546A	3650A00371	9 kHz- 6.5 GHz Built-in amplifier 30dB
Signal Generator	IFR	3416	341006	250kHz - 6GHz
Signal Generator	IFR	2975	598001437	250kHz - 2.7GHz
Signal Generator	Gigatronics	GT9000S	91026	10MHz - 26 GHz
Horn Antenna	Emco	3155	9701-5061	1 – 18 GHz
Horn Antenna	Emco	3155	9911-5955	1 – 18 GHz
Biconilog Anenna	Emco	3142	10005	0.03 – 2 GHz
Attenuator	Weinschel	46-30-34	BM5354	DC – 18 GHz
High Pass Filter	K & L	11SH10-1500/T8000	2	Cut of 1500MHz
RF Amplifier	Com-Power	PA-103A	161243	1 MHz – 1 GHz
RF Amplifier	Hewlett Packard	84498	3008A00769	1 – 26.5 GHz
Power Divider	Mini-Circuits	15542	105	1 MHz – 1 GHz
EMC Analyzer	Hewlett Packard	8593EM	...	9kHz–22GHz
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100077	20 Hz – 40 GHz

EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and NIS 81 (1994)

7.1. RADIATED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Radiated Emissions)	PROBABILITY DISTRIBUTION	UNCERTAINTY (± dB)	
		3 m	10 m
Antenna Factor Calibration	Normal (k=2)	±1.0	±1.0
Cable Loss Calibration	Normal (k=2)	±0.3	±0.5
EMI Receiver specification	Rectangular	±1.5	±1.5
Antenna Directivit	Rectangular	+0.5	+0.5
Antenna factor variation with height	Rectangular	±2.0	±0.5
Antenna phase center variation	Rectangular	0.0	±0.2
Antenna factor frequency interpolation	Rectangular	±0.25	±0.25
Measurement distance variation	Rectangular	±0.6	±0.4
Site imperfections	Rectangular	±2.0	±2.0
Mismatch: Receiver VRC $\Gamma_1 = 0.2$ Antenna VRC $\Gamma_R = 0.67$(Bi) 0.3 (Lp) Uncertainty limits $20\text{Log}(1\pm\Gamma_1\Gamma_R)$	U-Shaped	+1.1 -1.25	±0.5
System repeatability	Std. Deviation	±0.5	±0.5
Repeatability of EUT		-	-
Combined standard uncertainty	Normal	+2.19 / -2.21	+1.74 / -1.72
Expanded uncertainty U	Normal (k=2)	+4.38 / -4.42	+3.48 / -3.44

Calculation for maximum uncertainty when 3m biconical antenna including a factor of k=2 is used:

$U = 2u_c(y) = 2x(+2.19) = +4.38$ dB And $U = 2u_c(y) = 2x(-2.21) = -4.42$ dB

- *All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)*

EXHIBIT 8. MEASUREMENT METHODS

8.1. CONDUCTED POWER MEASUREMENTS

- The following shall be applied to the combination(s) of the radio device and its intended antenna(e).
- I f the RF level is user adjustable, all measurements shall be made with the highest power level available to the user for that combination.
- The following method of measurement shall apply to both conducted and radiated measurements.
- The radiated measurements are performed at the Ultratech Calibrated Open Field Test Site.
- The measurement shall be performed using normal operation of the equipment with modulation.

Test procedure shall be as follows:

Step 1: Duty Cycle measurements if the transmitter's transmission is transient

- Using a EMI Receiver with the frequency span set to 0 Hz and the sweep time set at a suitable value to capture the envelope peaks and the duty cycle of the transmitter output signal;
- The duty cycle of the transmitter, x = Tx on / (Tx on + Tx off) with $0<x<1$, is measure and recorded in the test report. For the purpose of testing, the equipment shall be operated with a duty cycle that is equal or more than 0.1.

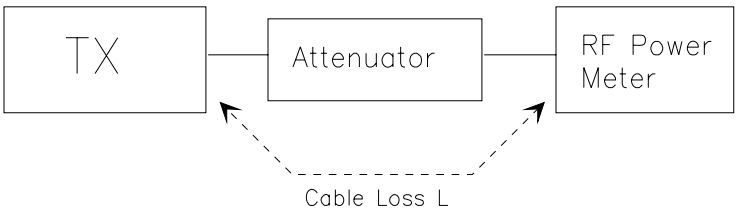
Step 2: Calculation of Average EIRP. See Figure 1

- The average output power of the transmitter shall be determined using a wideband, calibrated RF average power meter with the power sensor with an integration period that exceeds the repetition period of the transmitter by a factor 5 or more. The observed value shall be recorded as "A" (in dBm);
- The e.i.r.p. shall be calculated from the above measured power output "A", the observed duty cycle x, and the applicable antenna assembly gain "G" in dBi, according to the formula:

EIRP = A + G + 10log(1/x)

{ X = 1 for continuous transmission => 10log(1/x) = 0 dB }

Figure 1.



8.2. RADIATED POWER MEASUREMENTS (ERP & EIRP) USING SUBSTITUTION METHOD

8.2.1. Maximizing RF Emission Level (E-Field)

(a) The measurements was performed with full rf output power and modulation.
(b) Test was performed at listed 3m open area test site (listed with FCC, IC, ITI, NVLAP, ACA & VCCI).
(c) The transmitter under test was placed at the specified height on a non-conducting turntable (80 cm height)
(d) The BICONILOG antenna (20 MHz to 1 GHz) or HORN antenna (1 GHz to 18 GHz) was used for measuring.
(e) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level

Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)

(f) Set the EMI Receiver and #2 as follows:

Center Frequency:	test frequency
Resolution BW:	100 kHz
Video BW:	same
Detector Mode:	positive
Average:	off
Span:	3 x the signal bandwidth

(g) The test antenna was lowered or raised from 1 to 4 meters until the maximum signal level was detected.
(h) The transmitter was rotated through 360^{o} about a vertical axis until a higher maximum signal was received.
(i) The test antenna was lowered or raised again from 1 to 4 meters until a maximum was obtained. This level was recorded.
(j) The recorded reading was corrected to the true field strength level by adding the antenna factor, cable loss and subtracting the pre-amplifier gain.
(k) The above steps were repeated with both transmitters' antenna and test receiving antenna placed in vertical and horizontal polarization. Both readings with the antennas placed in vertical and horizontal polarization shall be recorded.
(l) Repeat for all different test signal frequencies

8.2.2. Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method

(a) Set the EMI Receiver (for measuring E-Field) and Receiver #2 (for measuring EIRP) as follows:

Center Frequency:	equal to the signal source
Resolution BW:	10 kHz
Video BW:	same
Detector Mode:	positive
Average:	off
Span:	3 x the signal bandwidth

(b) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level

Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)

(c) Select the frequency and E-field levels obtained in the Section 8.2.1 for ERP/EIRP measurements.
(d) Substitute the EUT by a signal generator and one of the following transmitting antenna (substitution antenna):
- DIPOLE antenna for frequency from 30-1000 MHz or
- HORN antenna for frequency above 1 GHz }.

(e) Mount the transmitting antenna at 1.5 meter high from the ground plane.
(f) Use one of the following antenna as a receiving antenna:
- DIPOLE antenna for frequency from 30-1000 MHz or
- HORN antenna for frequency above 1 GHz }.

(g) If the DIPOLE antenna is used, tune it's elements to the frequency as specified in the calibration manual.
(h) Adjust both transmitting and receiving antenna in a VERTICAL polarization.
(i) Tune the EMI Receivers to the test frequency.
(j) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.
(k) The transmitter was rotated through 360^{o} about a vertical axis until a higher maximum signal was received.
(l) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.
(m) Adjust input signal to the substitution antenna until an equal or a known related level to that detected from the transmitter was obtained in the test receiver.
(n) Record the power level read from the Average Power Meter and calculate the ERP/EIRP as follows:

P = P1 - L1 = (P2 + L2) – L1 = P3 + A + L2 - L1
EIRP = P + G1 = P3 + L2 - L1 + A + G1
ERP = EIRP – 2.15 dB
Total Correction factor in EMI Receiver # 2 = L2 – L1 + G1

Where: P: Actual RF Power fed into the substitution antenna port after corrected.
P1: Power output from the signal generator
P2: Power measured at attenuator A input
P3: Power reading on the Average Power Meter
EIRP: EIRP after correction
ERP: ERP after correction

(o) Adjust both transmitting and receiving antenna in a HORIZONTAL polarization, then repeat step (k) to (o)
(p) Repeat step (d) to (o) for different test frequency
(q) Repeat steps (c) to (j) with the substitution antenna oriented in horizontal polarization.
(r) Actual gain of the EUT's antenna is the difference of the measured EIRP and measured RF power at the RF port. Correct the antenna gain if necessary.:

Figure 2

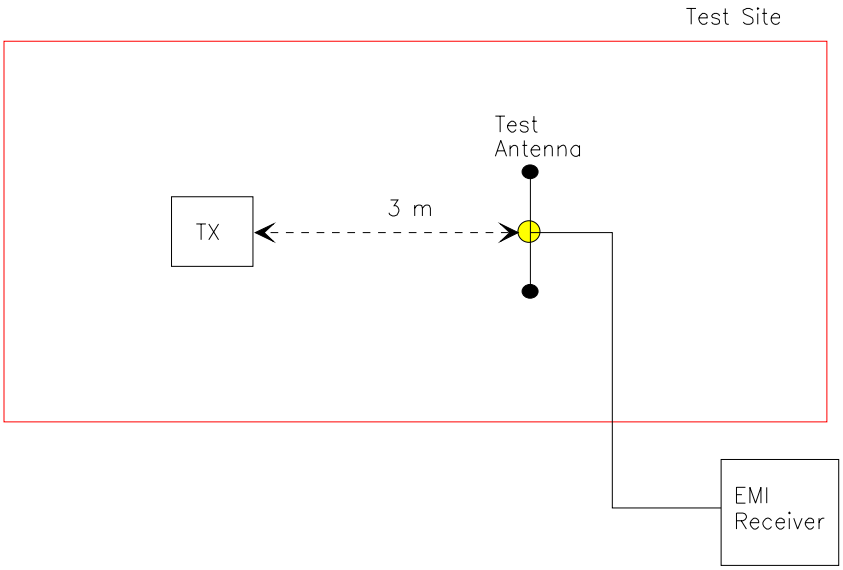
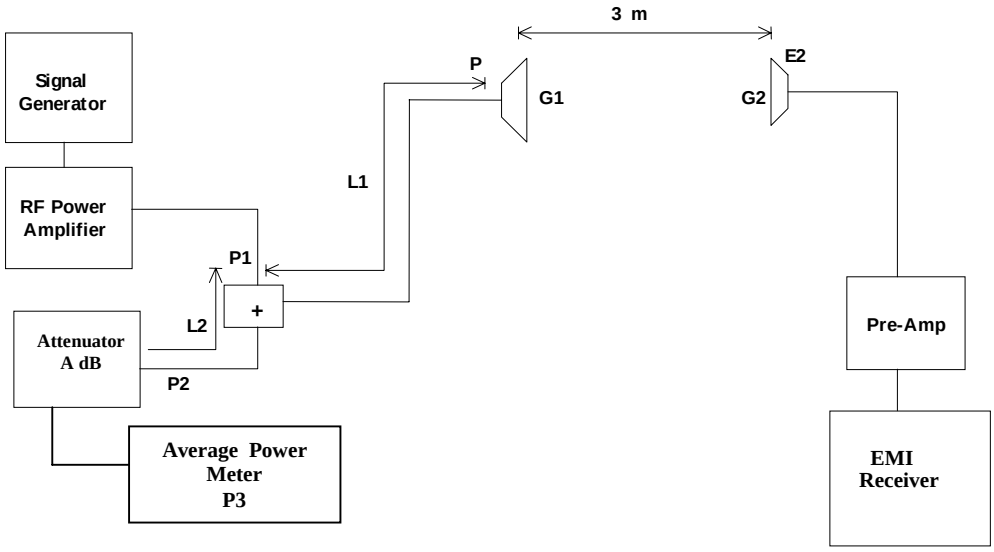


Figure 3



8.3. FREQUENCY STABILITY

Refer to FCC @ 2.1055.

(a) The frequency stability shall be measured with variation of ambient temperature as follows: From -30 to +50 centigrade except that specified in subparagraph (2) & (3) of this paragraph.

(b) Frequency measurements shall be made at 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 stability circuitry need be subjected to the temperature variation test.

(d) The frequency stability supply 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 provide 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).

8.4. EMISSION MASK

Voice or Digital Modulation Through a Voice Input Port @ 2.1049(c)(i):- The transmitter was modulated by a 2.5 KHz tone signal at an input level 16 dB greater than that required to produce 50% modulation (e.g.: ±2.5 KHz peak deviation at 1 KHz modulating frequency). The input level was established at the frequency of maximum response of the audio modulating circuit.

Digital Modulation Through a Data Input Port @ 2.1049(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 Emission Masks shall be shown for operation with any devices used for modifying the spectrum when such devices are operational at the discretion of the user.

The following EMI Receiver bandwidth shall be used for measurement of Emission Mask/Out-of-Band Emission Measurements:

(1) For 25 kHz Channel Spacing: RBW = 300 Hz
(2) For 12.5 kHz or 6.25 kHz Channel Spacings: RBW = 100 Hz

The all cases the Video Bandwidth shall be equal or greater than the measuring bandwidth.

8.5. SPURIOUS EMISSIONS (CONDUCTED)

With transmitter modulation characteristics described in Out-of-Band Emissions measurements @ 2.1049, the transmitter spurious and harmonic emissions were scanned. The spurious and harmonic emissions were measured with the EMI Receiver controls set as RBW = 30 kHz minimum , VBW ≥ RBW and SWEEP TIME = AUTO). The transmitter was operated at a full rated power output, and modulated as follows:

FCC CFR 47, Para. 2.1057 - Frequency spectrum to be investigated:- The spectrum was investigated from the lowest radio generated in the equipment up to at least the 10^{th} 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 CFR 47, Para. 2.1051 - Spurious Emissions at Antenna Terminal:- 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 the 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.