EXHIBIT 2B

Test Report Provided by Nortel

Applicant: Nortel Networks

For Class II Permissive Change on:

AB6NT1900MFRM2

Test Report for FCC Equipment Authorization

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Publication History

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Ratifier's Name	Signature	Date
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Revision History

Stream/ issue	Revision Date	Reason for Change	Author
00/01	31/10/2002	Initial Test Plan	Borislav Todorov
00/02	04/11/2002	The following changes have been included as per reviewer comments: 1). Added Thomas Wong as the reviewer of the Test Plan/Report in the Engineering Declaration. 2). Added detailed description of the test setup for Spurious Emissions, including calibration and measurement equipment requirements. 3). Added channels and configurations to be tested for Spurious Emissions at Antenna Terminals 4). Added Section on Frequency stability Testing	Borislav Todorov
00/03	03/02/2003 10/02/2003	The following changes have been included as per reviewer comments: 1). Converted document from Test Plan to Test Report 2). Revised Test Equipment List 3). Revised section 4.1.2 Test Method due to using the SA Channel Power feature to make RF Power Output Measurements instead of the Power Meter. 4). Filled in all Test Results and added Figures with SA screen captures as per the FCC requirements 5). Changed “Maximum Rated Power” to “Average Maximum Rated Power” in Tables 4, 6 & 7 as per T.W. review comments. 6). Updated all OBW and CE plots as per T.W. review comments. 7). Updated CE results for the 5000 - 20000 (RBW=1 MHz) range.	Borislav Todorov

Stream/ issue	Revision Date	Reason for Change	Author
00/04	08/04/2003	Modified Test Plan to reflect/include XCEM & DOM requirements	Borislav Todorov
00/05	06/05/2003	Update after E-mail review	Borislav Todorov
00/06	25/09/2003	Modified Test Plan to reflect/include AW 05/04 regression testing coverage	Borislav Todorov
00/07	12/12/2003	Converted Test Plan to Test Report Generated draft Test Report to include AW 05/04 regression testing coverage test results	Borislav Todorov
00/08	17/12/2003	Test Report Approved	Borislav Todorov

Change bars are not used in this document.

Acronyms and Abbreviations

ASIC	Application Specific Integrated Circuit
BBW	Breathing, Blossoming and Wilting
BPF	Bandpass Filter
BTS	Base Station Transceiver Subsystem
BW	Bandwidth
CDMA	Code Division Multiple Access
CR	Cost Reduced
dBFS	dB relative to Full Scale
DDS	Direct Digital Synthesizer
DPM	Duplexer Preselector Module
EEPROM	Electrically Erasable and Programmable ROM
EC	Engineering Change
ERLCE	Excess Reverse Link Capacity Estimate
HSSPC	High-Speed Serial Protocol Controller
HW	Hardware
IF	Intermediate Frequency
IIC	Inter-Integrated Circuit Bus
IS	Interim Standard
LO	Local Oscillator
LPF	Lowpass Filter
MCPA	Multi-Carrier Power Amplifier
MFRM	Multi-carrier Flexible Radio Module
MFRM2	Multi-carrier Flexible Radio Module 2
NF	Noise Figure
OCNS	Orthogonal Channel Noise Source
OH	OverHead
PA	Power Amplifier
PC	Personal Computer
PPR	Peak Power Reduction
PSA	Product Specification Agreement

RBW	Resolution BandWidth
RF	Radio Frequency
Rx	Receive
SA	Spectrum Analyzer
SFRM	Single Carrier Flexible Radio Module
SW	Software
TBD	To Be Determined
TM	Triplexer Module
TPTL	Transmit Power Tracking Loop
TRM	Transmitter Receiver Module
Tx	Transmit
uP	Microprocessor
VSA	Vector Signal Analyzer
XCVR	Transceiver

1 Introduction

This test report is submitted in accordance with the FCC Rules and Regulations, Part 2, Subpart J, Sections 2.1046 through 2.1057 for equipment authorization of Nortel Networks's CDMA 1900 MHz Multiple carrier Flexible Radio Module 2 (MFRM2).

The 1900 MHz MFRM2 is intended for use in the Domestic Public Personal Communications Service area and is designed in accordance with the following standards:

- *CFR 47, Part 24, Subpart E, Broadband Personal Communications Service [1]*
- *CFR 47, Part 2, Subpart J, Equipment Authorization Procedures - Equipment Authorization [2]*
- *IC RSS-133, Issue 2, 2 GHz Personal Communication Services [3]*
- *ANSI-97-E, Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations [4]*

1.1 Required Tests

Table 1 summarizes the required tests[1] for the CDMA 1900 MHz MFRM2.

Table 1 : Required Tests

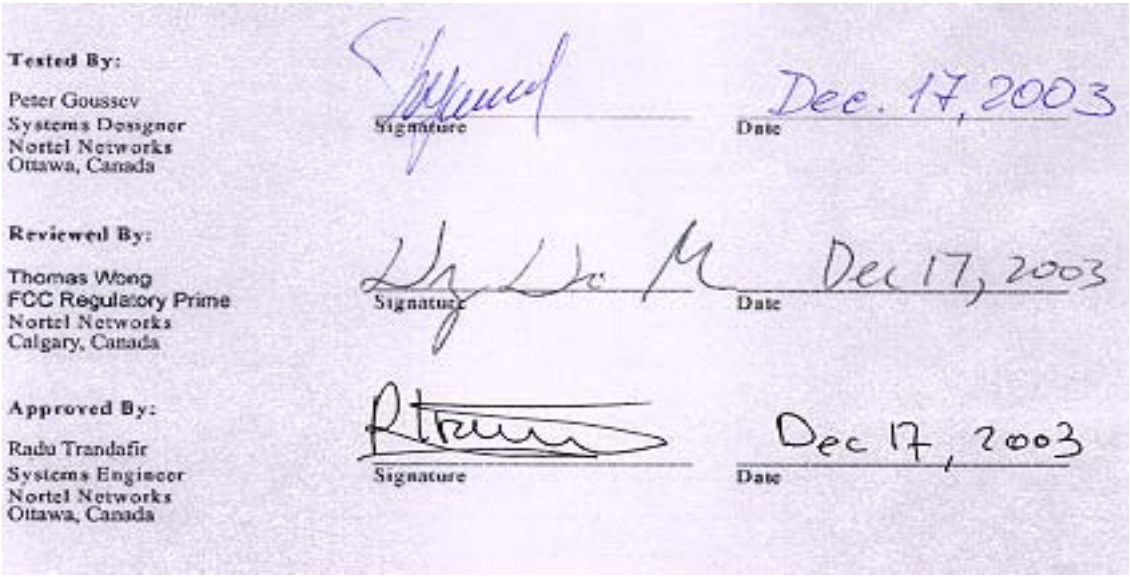
FCC Measurement Specification	FCC Limit Specification	Description	Test to be Performed?
2.1046	24.232	RF Power Output	Yes
2.1049		Occupied Bandwidth	Yes
2.1051, 2.1057	24.238	Spurious Emissions at Antenna Terminals	Yes
2.1055	24.235	Frequency Stability	Yes

1. This test report presents FCC part 24 results tested in Nortel Labs. Field Strength of Spurious Emissions test measurements along with requirements specified in 2.1033 are covered in a separate Product Integrity test plan from C-MAC Engineering Canada.

2 Engineering Declaration

The CDMA 1900MHz Multiple Carrier Flexible Radio Module 2 has been tested in accordance with the requirements contained in the Federal Communications Commission Rules and Regulations Part 2 and 24.

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



3 Equipment Authorization Application Requirements

3.1 Standard Test Conditions and Test Equipment

The MFRM2 will be tested under the following standard test conditions unless otherwise noted:

- Ambient Temperature: 20 to 35 degrees C
- Ambient Humidity: 20 to 40%
- DC Supply Voltage: -48 Vdc and +24 Vdc (nominal)
- Supported Modulations: IS-95 (dual BPSK) IS-2000 (true QPSK) and IS-856 (QPSK, 8-PSK, 16-QAM)

3.2 EUT Identification List

Table 2 shows the identification of the components required for testing.

Table 2 : EUT Identification List

Equipment Description	Model / Part Number	Release Number	Serial Number
1900 MHz Multiple Carrier Flexible Radio Module 2 System (comprised of the modules below)	N/A	N/A	N/A
a) 1900 MFRM2 Radio Module	NTGY32BA	05/04[a]	NNTM533GRLEH NNTM533GRWKY
c) A/D Band DPM	NTGS53JA	05	CLWVCC100898
d) B/E Band DPM	NTGS53KA	05	CLWVMM1009WH
e) C/F Band DPM	NTGS53LA	06	CLWVPP2058E8

a. Radio Card and PA Pallet respectively

3.3 Test Equipment List

Table 3 shows the identification of the test equipment required for testing.

Table 3 : Test Equipment List

Description	Manufacturer	Model	Serial/Batch Number	Cal. Due Date
20 Hz to 26.5 GHz Spectrum Analyzer	Rohde&Schwarz	FSEM-30	846821/029	19/06/2004
RF Power Meter	HP	438A	L0044910	24/02/2004
RF Power Sensor Head	HP	8482A	US37293538	29/04/2005
30dB Attenuator	NARDA	776B-30	N/A	Verified
20 dB Attenuator	NARDA	4778-20	N/A	Verified
6 dB Attenuator	NARDA	4778-6	N/A	Verified
RF Cable	N/A	N/A	N/A	Verified

4 Transmitter Tests

4.1 RF Power Output

4.1.1 RF Power Output Requirements

FCC Part 2.1046

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in Sec. 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

FCC Limit (Subpart E--Broadband PCS, Sec. 24.232 Power and antenna height limits.)

In no case may the peak output power of a base station transmitter exceed 100 watts.

4.1.2 Test Method

The DE is setup via the BTS controller to enable the MFRM2 to transmit at maximum rated output power level. Measurements are made on channels at the bottom and top of the licensed subbands in one, two and three carrier configurations and for each of the supported modulation formats. The RF power output is measured using the Channel Power feature of the SA.

4.1.3 Test Setup

The set-up used for the MFRM2 RF power output test is illustrated in Figure 1. RF power output measurements are referenced to the antenna port of the DPM.

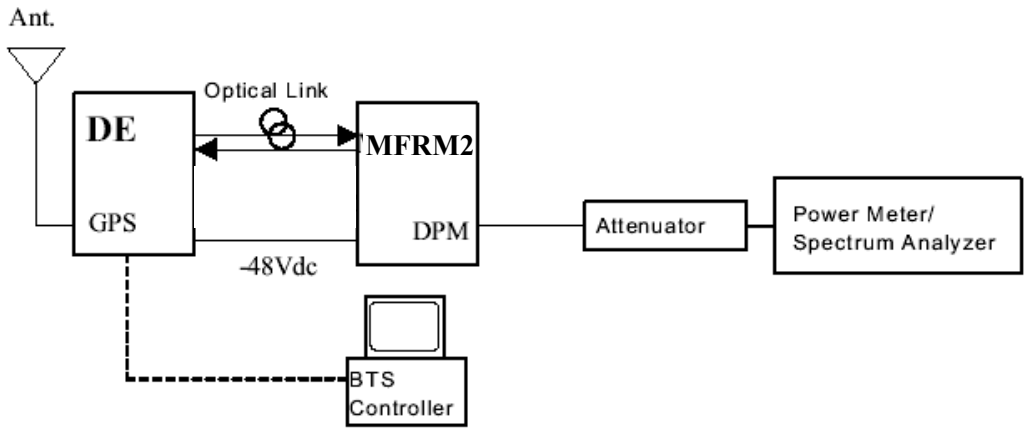


Figure 1 : Test Setup for RF Power Output Measurement

4.1.4 DOM

The RF Power Output requirements of the MFRM-2, with IS-856 (1xEV DO) waveforms were tested at reduced power. The power was backed off by at least 1.0 dB per IS-856 carrier relative to the full rated output power of the radio. This back off was based on a Nortel Networks specified setting to ensure overall network performance. The outlined above per IS-856 carrier back off specification will be clearly stated in customer documentation at the time of 1xEV DO product introduction, and operation within this reduced power rating will be controlled via standardized system parameter datafill at that time.

4.1.5 Test Results

The 1900 MHz MFRM2 complies with the requirement. The RF power output measured in one, two and three carrier configurations for each of the licensed subbands and supported modulation formats is shown in Table 4 through Table 8. The maximum measured RF output power from the MFRM2 was 46.18 dBm.

Table 4 : RF Output Power of 1900 MHz MFRM2, 1 Carrier, IS-95 Mode

Channel Number (Band)	Frequency (MHz)	Measured RF Output Power (dBm)	Average Maximum Rated Power (dBm)	FCC Limit (dBm)
25 (A)	1931.25	45.90	46.0	50
1175 (C)	1988.75	46.07	46.0	50

Table 5 : RF Output Power of 1900 MHz MFRM2, 1 Carrier, IS-856, 16-QAM Mode

Channel Number (Band)	Frequency (MHz)	Measured RF Output Power (dBm)	Average Maximum Rated Power (dBm)	FCC Limit (dBm)
425 (B)	1951.25	45.17	45.0	50
825 (F)	1971.25	45.24	45.0	50

Table 6 : RF Output Power of 1900 MHz MFRM2, 2 Carrier, IS-95 Mode

Channel Number (Band)	Frequency (MHz)	Measured RF Output Power (dBm)	Average Maximum Rated Power (dBm)	FCC Limit (dBm)
25, 50 (A)	1931.25, 1932.5	45.99	46.0	50
1150, 1175 (C)	1987.5, 1988.75	46.18	46.0	50

Table 7 : RF Output Power of 1900 MHz MFRM2, 3 Carrier, IS-95 Mode

Channel Number (Band)	Frequency (MHz) (centre channel)	Measured RF Output Power (dBm)	Average Maximum Rated Power (dBm)	FCC Limit (dBm)
25, 50, 75 (A)	1932.5	46.14	46.0	50
325, 350, 375 (D)	1947.5	45.88	46.0	50
425, 450, 475 (B)	1952.5	45.95	46.0	50
725, 750, 775 (E)	1967.5	45.87	46.0	50
825, 850, 875 (F)	1972.5	46.08	46.0	50
1125, 1150, 1175 (C)	1987.5	46.11	46.0	50

Table 8 : RF Output Power of 1900 MHz MFRM2, 2 Carrier IS-95 & 1 Carrier IS-856, 16-QAM Mode

Channel Number (Band)	Frequency (MHz) (centre channel)	Measured RF Output Power (dBm)	Average Maximum Rated Power (dBm)	FCC Limit (dBm)
425, 450, 475 (B)	1952.5	45.71	45.7	50
725, 750, 775 (E)	1967.5	45.50	45.7	50
825, 850, 875 (F)	1972.5	45.99	45.7	50
1125, 1150, 1175 (C)	1987.5	45.81	45.7	50

4.2 Occupied Bandwidth

4.2.1 Occupied Bandwidth Requirements

FCC Part 2.1049

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

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

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

4.2.2 Test Method

The DE is setup via the BTS controller to enable the MFRM2 to transmit at maximum rated output power level. Measurements are made on channels at the bottom and top of the licensed sub-bands in one, two and three carrier configurations and for each of the supported modulation formats. The occupied bandwidth is measured using the 99% Channel Power feature of the SA.

4.2.3 Test Setup

The set-up used for the MFRM2 Occupied bandwidth test is illustrated in Figure 2.

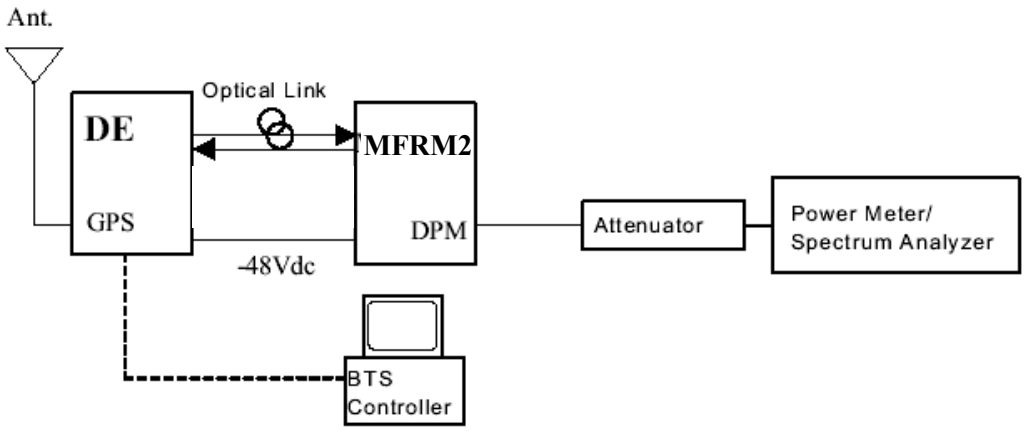


Figure 2 : Test Setup for Occupied Bandwidth Measurement

4.2.4 Test Results

The 1900 MHz MFRM2 complies with the requirement. The occupied bandwidth measured in one, two and three carrier configurations for each of the licensed subbands and supported modulation formats is shown in Table 9 through Table 13. The plots that follow show the occupied bandwidth in one, two and three carrier configurations. Although plots were recorded for all channels tested, only one sample plot per carrier configuration is provided to reduce the number of figures.

Table 9 : Occupied Bandwidth, 1900 MHz MFRM2, 1 Carrier, IS-95 Mode

Channel Number (Band)	Frequency (MHz)	Measured Occupied Bandwidth (kHz)
25 (A)	1931.25	1267.54
1175 (C)	1988.75	1267.54

Table 10 : Occupied Bandwidth, 1900 MHz MFRM2, 1 Carrier, IS-856, 16-QAM Mode

Channel Number (Band)	Frequency (MHz)	Measured Occupied Bandwidth (kHz)
425 (B)	1951.25	1262.52
825 (F)	1971.25	1262.52

Table 11 : Occupied Bandwidth, 1900 MHz MFRM2, 2 Carrier, IS-95 Mode

Channel Number (Band)	Frequency (MHz)	Measured Occupied Bandwidth (kHz)
25, 50 (A)	1931.25, 1932.5	2494.99
1150, 1175 (C)	1987.5, 1988.75	2494.99

Table 12 : Occupied Bandwidth, 1900 MHz MFRM2, 3 Carrier, IS-95 Mode

Channel Number (Band)	Frequency (MHz) (centre channel)	Measured Occupied Bandwidth (kHz)
25, 50, 75 (A)	1932.5	3712.425
325, 350, 375 (D)	1947.5	3712.425
425, 450, 475 (B)	1952.5	3712.425
725, 750, 775 (E)	1967.5	3712.425
825, 850, 875 (F)	1972.5	3712.425
1125, 1150, 1175 (C)	1987.5	3712.425

Table 13 : Occupied Bandwidth, 1900 MHz MFRM2, 2 Carrier IS-95 & 1 Carrier IS-856, 16-QAM Mode

Channel Number (Band)	Frequency (MHz) (centre channel)	Measured Occupied Bandwidth (kHz)
425, 450, 475 (B)	1952.5	3712.425
725, 750, 775 (E)	1967.5	3712.425
825, 850, 875 (F)	1972.5	3712.425
1125, 1150, 1175 (C)	1987.5	3712.425

Figure 3 : Occupied Bandwidth - Single Carrier, Channel 25, IS-95 Mode

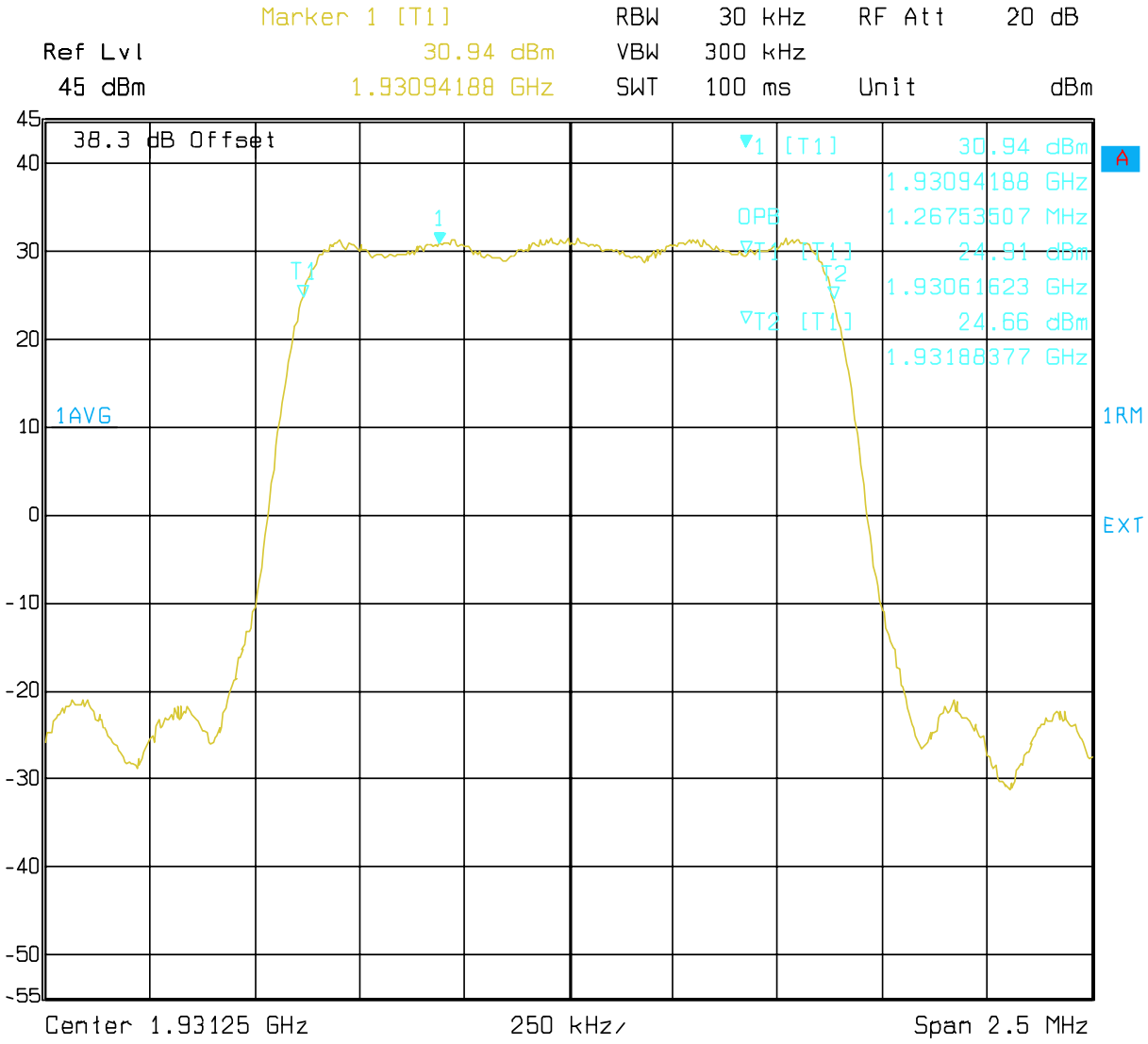
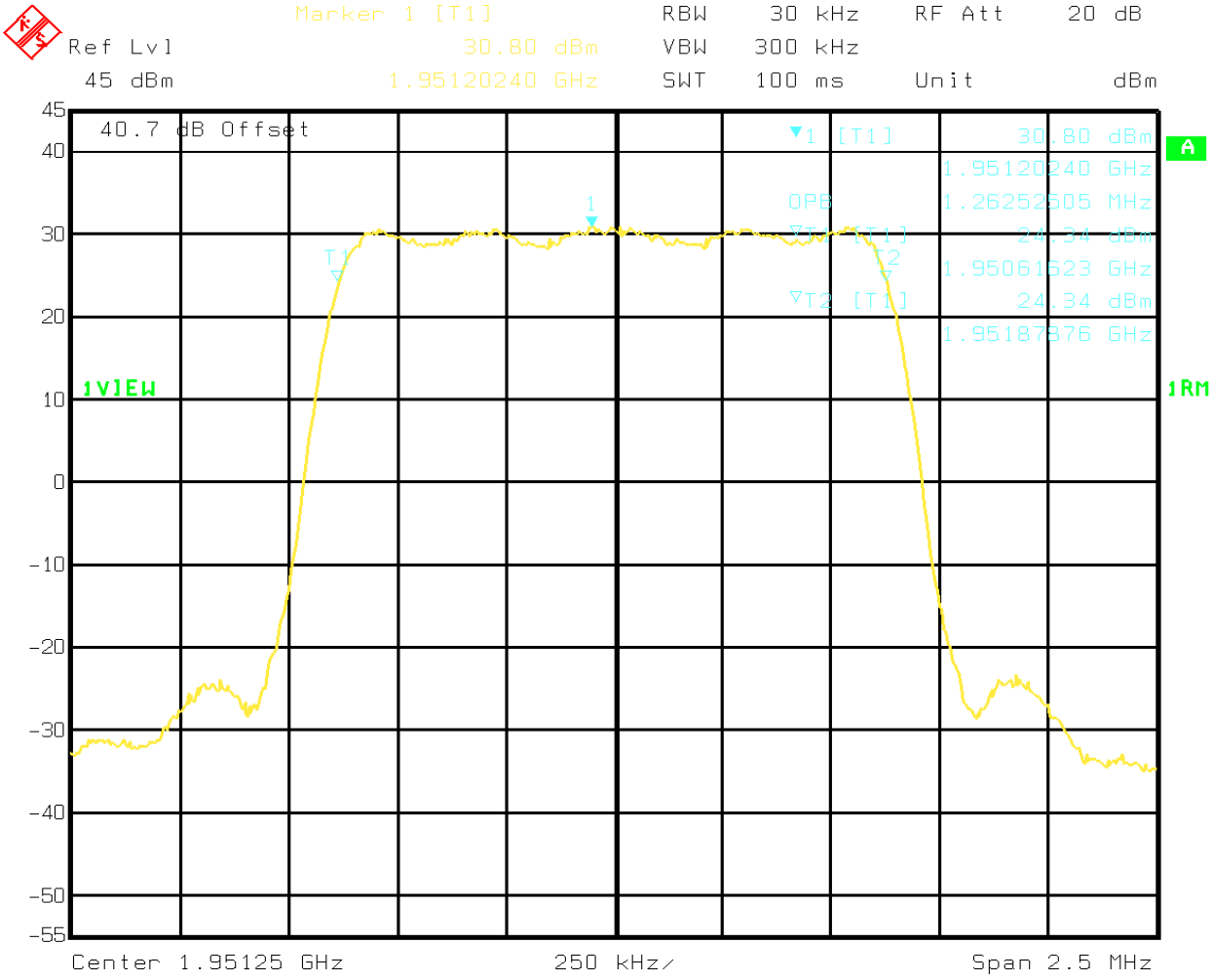


Figure 4 : Occupied Bandwidth - Single Carrier, Channel 425, IS-856, 16-QAM Mode



Title: 1_car, ch 425, OBW
Comment A: Temp C 25, Normal Humidity

Figure 5 : Occupied Bandwidth - 2 Carrier, Channels 1150 & 1175

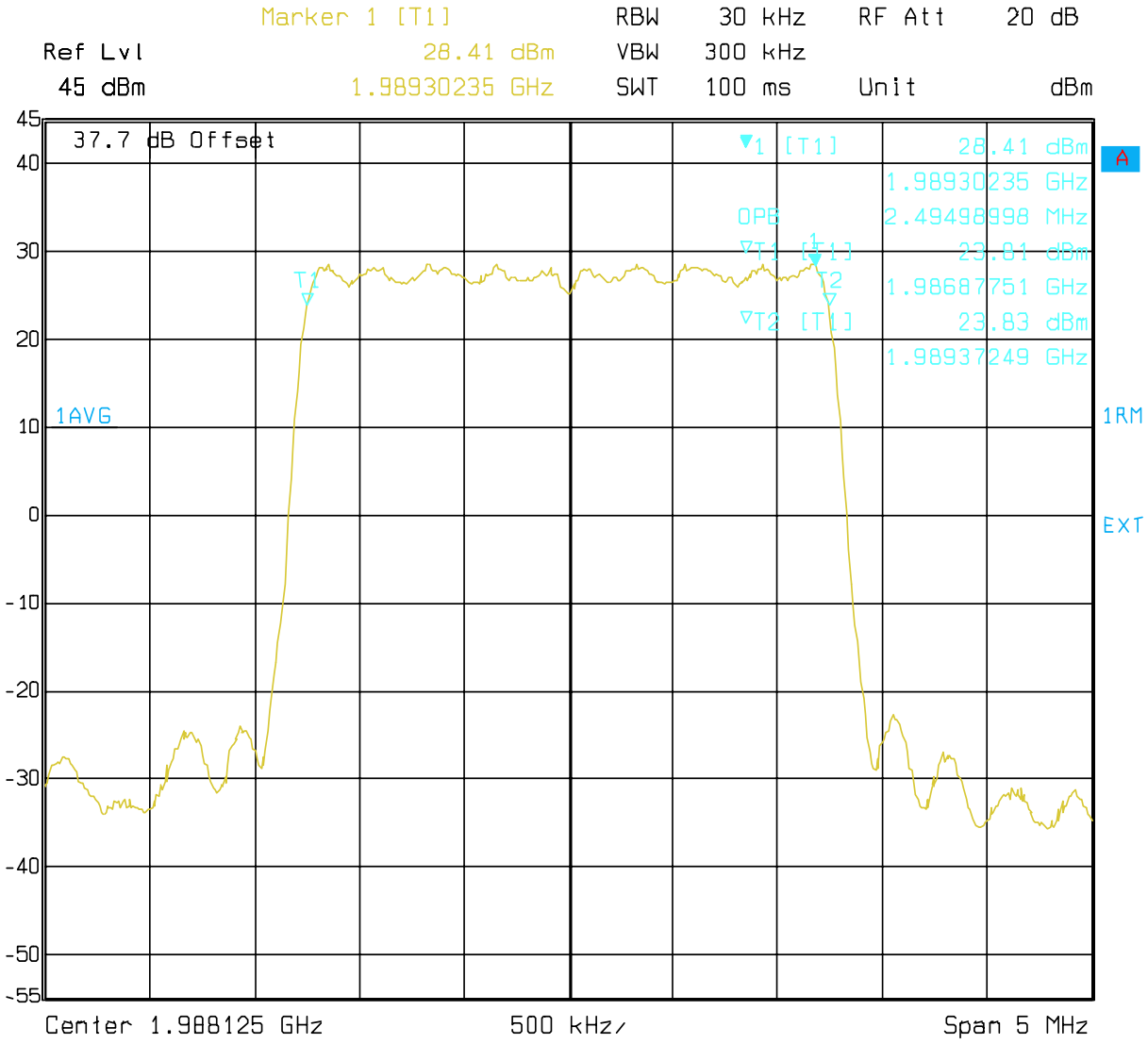


Figure 6 : Occupied Bandwidth - 3 Carrier, Channels 725, 750 & 775

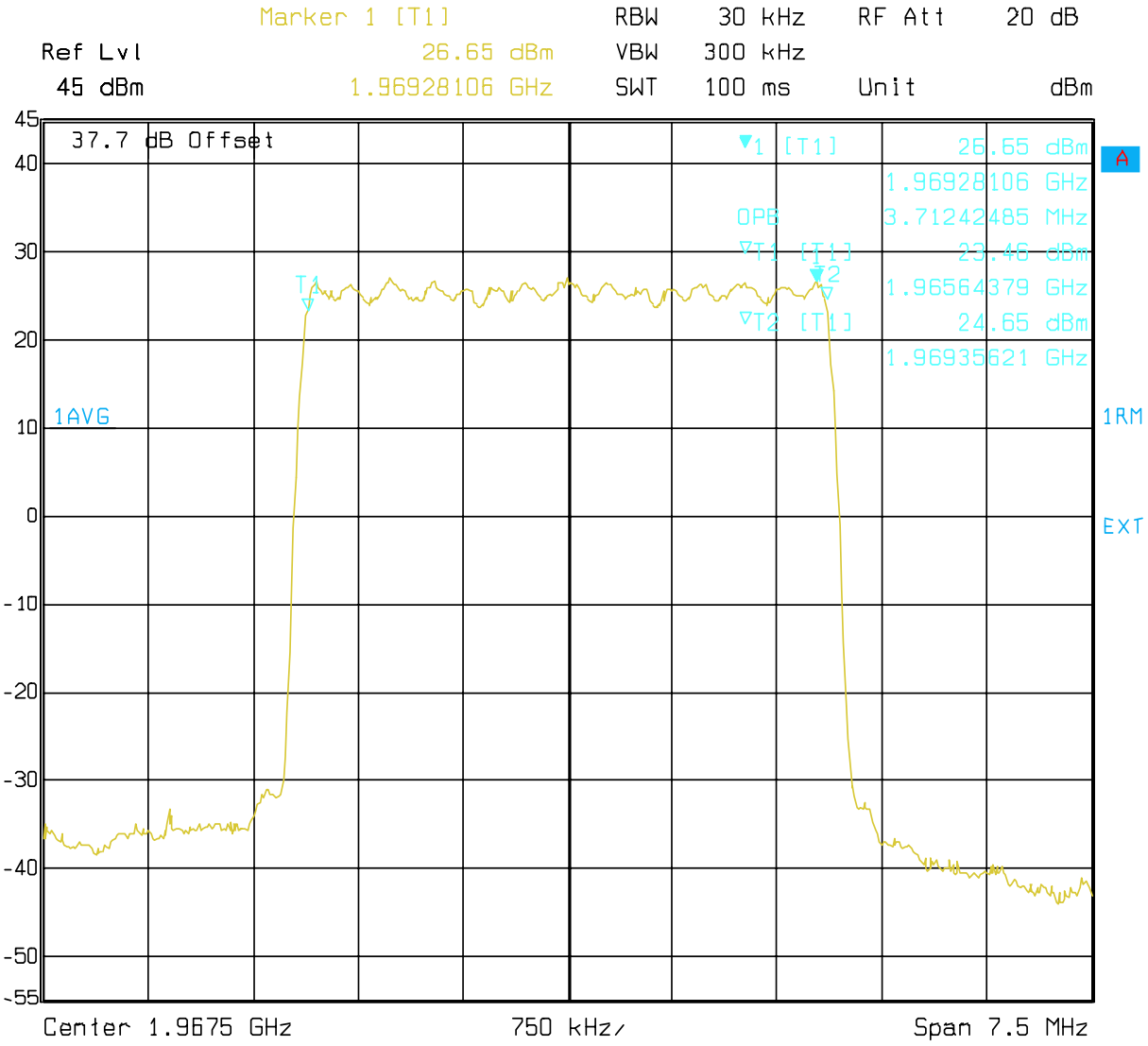
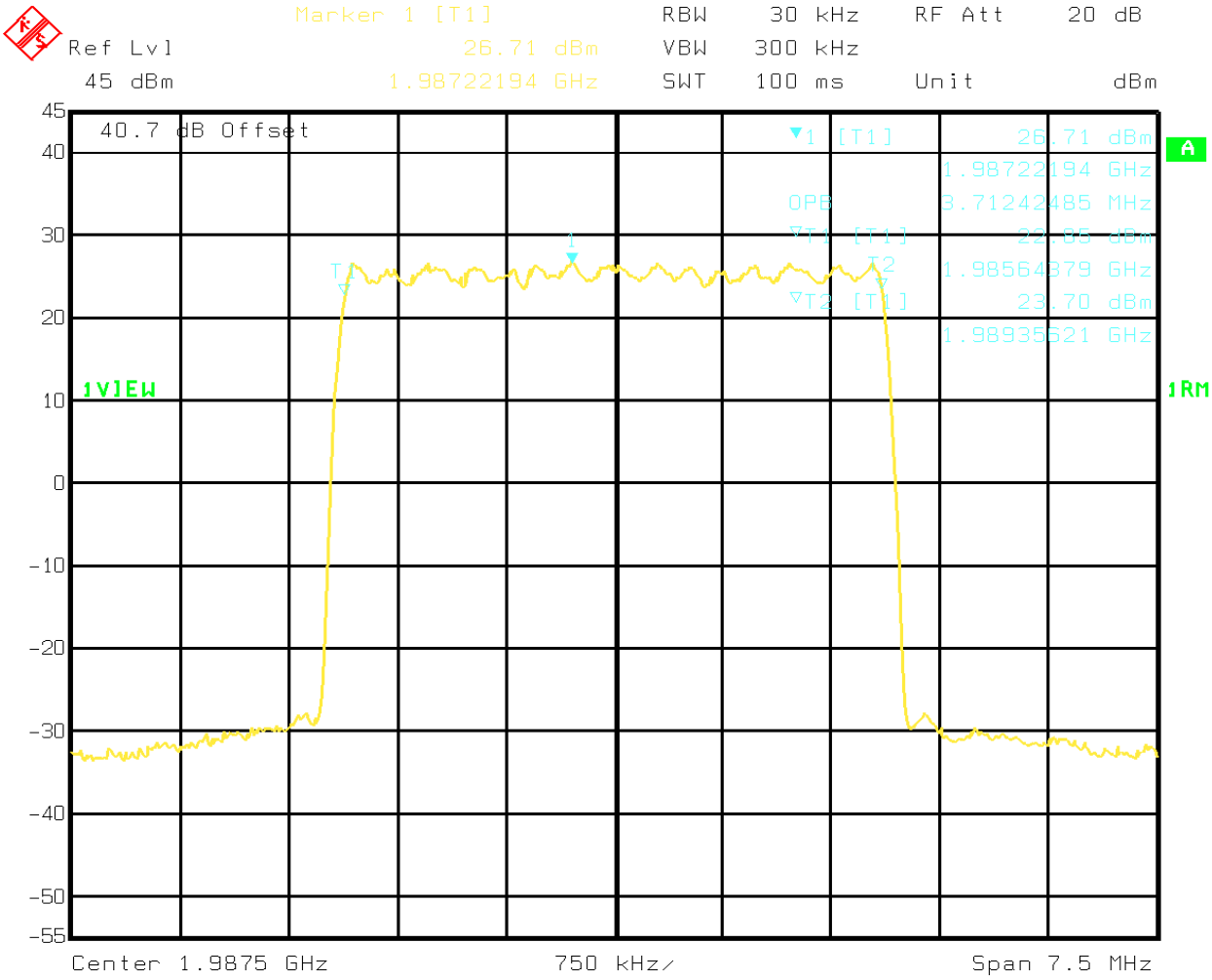


Figure 7 : Occupied Bandwidth - 3 Carrier, Channels 1125, 1150 & 1175, 2 Carrier IS-95 & 1 Carrier IS-856, 16-QAM Mode



Title: 3_car, ch 1175, OBW
Comment A: Temp C 25, Low Humidity

4.3 Spurious Emissions at Antenna Terminals

4.3.1 Spurious Emissions Requirements

FCC Part 2.1051

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

FCC Part 2.1057 - Frequency Spectrum to be investigated

(a) In all of the measurements set forth in Sec. 2.1051, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

FCC Part 24.238 Limit

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

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

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

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

4.3.2 Test Method

The DE is setup via the BTS controller to enable the MFRM2 to transmit at maximum rated output power level. Measurements are made on channels at the bottom and top of the licensed subbands in one, two and three carrier configurations and for each of the supported modulation formats. The following spectrum analyzer settings are used for the measurement of the antenna port spurious emissions:

Adjacent 1MHz to indicated subband (Upper and Lower)

Table 14 : Adjacent 1 MHz Spectrum Analyzer Settings

Setting	1 Carrier	2 Carrier	3 Carrier
Resolution Bandwidth[a]	12.5 kHz	25 kHz	37.5 kHz
Video Bandwidth[b]	125 kHz	250 kHz	375 kHz
Video Average	10 Averages	10 Averages	10 Averages
Span	1 MHz	1 MHz	1 MHz
Attenuation	20 dB	20 dB	20 dB
Ref. Level	set accordingly dBm	set accordingly dBm	set accordingly dBm
Ref. Level Offset	set accordingly dB	set accordingly dB	set accordingly dB

a. If the spectrum analyzer can not be set to the specified RBW, the next highest RBW should be used and all measurements corrected to the specified RBW
b. If the spectrum analyzer can not be set to the specified VBW, the next highest VBW should be used

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

All other Spurious Emissions up to 20 GHz

Table 15 : All other Emissions Spectrum Analyzer Settings

Setting	1 Carrier	2 Carrier	3 Carrier
Resolution Bandwidth	1 MHz	1 MHz	1 MHz
Video Bandwidth	10 MHz	10 MHz	10 MHz
Video Average	10 Averages	10 Averages	10 Averages
Span	set accordingly	set accordingly	set accordingly
Attenuation	20 dB	20 dB	20 dB
Ref. Level	set accordingly dBm	set accordingly dBm	set accordingly dBm

Setting	1 Carrier	2 Carrier	3 Carrier
Ref. Level Offset	set accordingly dB	set accordingly dB	set accordingly dB

4.3.3 Test Setup

The set-up used for the MFRM2 Antenna Port Spurious Emission test is illustrated in Figure 8 and consist of:

- Metro Cell Digital Enclosure shelf
- MFRM2 system --> MFRM2 Radio Module, DPM module, FAM module and cabling
- High power (100W), high frequency range (DC to 18 GHz) attenuator as per Table 3
- High frequency range (20 Hz to 26.5 GHz) Spectrum Analyzer as per Table 3
- High frequency range, low loss RF cabling
- Control PC

Spurious Emissions are measured on the SA, which for the purpose of filing the test report for FCC compliance, needs to be calibrated and meet to or exceed the FCC Part 2.1057 - Frequency Spectrum to be investigated requirements.

The high power, high frequency range attenuator will be verified for flatness across the frequency range specified in FCC Part 2.1057 - Frequency Spectrum to be investigated. Namely, for the 1900MHz MFRM2 the range is DC to 20 GHz.

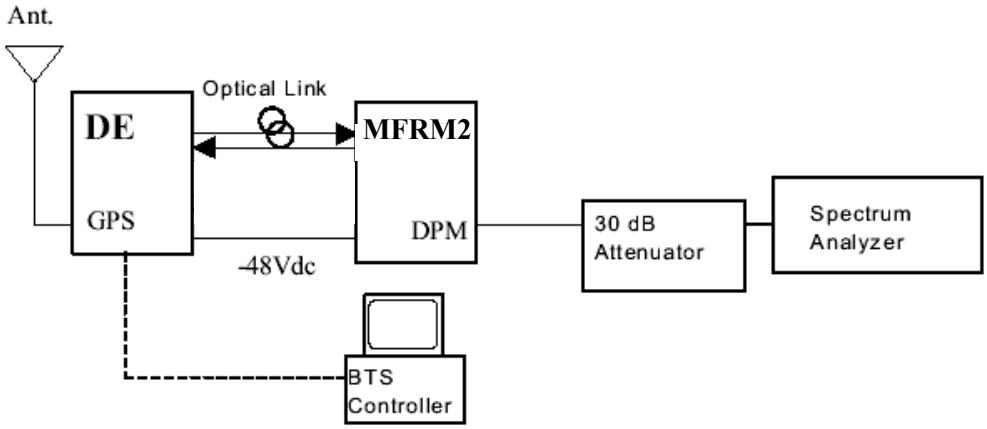


Figure 8 : Test Setup for Spurious Emissions Measurement

4.3.4 DOM

The conducted spurious emissions of the MFRM-2, with IS-856 (1xEV DO) waveforms were tested at reduced power. The power was backed off by at least 1.0 dB per IS-856 carrier relative to the full rated output power of the radio. This back off was based on a Nortel Networks specified setting to ensure overall network performance. The outlined above per IS-856 carrier back off specification will be clearly stated in customer documentation at the time of 1xEV DO product

introduction, and operation within this reduced power rating will be controlled via standardized system parameter datafill at that time.

4.3.5 Test Results

The frequency spectrum from 1 MHz to 20 GHz is scanned for emissions using the spectrum analyzer settings outlined in 4.3.2. Measurements are made over temperature on channels at the bottom and top of the licensed sub-bands in one, two and three carrier configurations and for each of the supported modulation formats. The MFRM2 complies with the limit of -13 dBm per 1 MHz of BW. Table 16 through Table 20 show the spurious emissions at the antenna port of the MFRM2 for 1, 2 and 3 carrier configurations and for each of the supported modulation formats. The plots that follow show the spurious emissions in one, two and three carrier configurations. Although plots were recorded for all channels tested, only one sample plot per carrier configuration is provided to reduce the number of figures.

Table 16 : Spurious Emissions at the 1900 MHz MFRM2 Antenna Port, 1 Carrier, IS-95 Mode

Channel Number (Band)	Frequency (MHz)	Worst Case Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
25 (A)	1929 -:- 1930 (lower adjacent MHz)	-28.91	15.91
	1950 -:- 1951 (upper adjacent MHz)	-46.53	33.53
1175 (C)	1969 -:- 1970 (lower adjacent MHz)	-46.10	33.10
	1990 -:- 1991 (upper adjacent MHz)	-30.62	17.62
N/A	0 -:- lower adjacent MHz[a] (RBW=1 MHz)	-26.37	13.37[b]
N/A	upper adjacent MHz -:- 5000[a] (RBW=1 MHz)	-26.46	13.46[b]
N/A	5000 - 20000[a] (RBW=1 MHz)	-21.02	8.02

a. Emission levels given in these ranges represents the worst case value over all the tested channels
b. Worst Case margin values determined by the emissions performance in the 1 MHz band immediately outside the lower/upper adjacent MHz

Table 17 : Spurious Emissions at the 1900 MHz MFRM2 Antenna Port, 1 Carrier, IS-856, 16-QAM Mode

Channel Number (Band)	Frequency (MHz)	Worst Case Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
425 (B)	1949 -:- 1950 (lower adjacent MHz)	-32.10	19.1
	1970 -:- 1971 (upper adjacent MHz)	-45.13	32.13
825 (F)	1969 -:- 1970 (lower adjacent MHz)	-31.66	18.66
	1990 -:- 1991 (upper adjacent MHz)	-45.65	32.65
N/A	0 -:- lower adjacent MHz[a] (RBW=1 MHz)	-26.84	13.84[b]
N/A	upper adjacent MHz -:- 5000[a] (RBW=1 MHz)	-30.13	17.13[b]
N/A	5000 - 20000[a] (RBW=1 MHz)	-25.85	12.85

a. Emission levels given in these ranges represents the worst case value over all the tested channels
b. Worst Case margin values determined by the emissions performance in the 1 MHz band immediately outside the lower/upper adjacent MHz

Table 18 : Spurious Emissions at the 1900 MHz MFRM2 Antenna Port, 2 Carrier, IS-95 Mode

Channel Numbers (Band)	Frequency (MHz)	Worst Case Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
25, 50 (A)	1929 -:- 1930 (lower adjacent MHz)	-27.85	14.85
	1950 -:- 1951 (upper adjacent MHz)	-44.80	31.80
1150, 1175 (C)	1969 -:- 1970 (lower adjacent MHz)	-45.55	32.55
	1990 -:- 1991 (upper adjacent MHz)	-30.85	17.85
N/A	0 -:- lower adjacent MHz[a] (RBW=1 MHz)	-21.51	8.51[b]
N/A	upper adjacent MHz -:- 5000[a] (RBW=1 MHz)	-22.75	9.75[b]
N/A	5000 - 20000[a] (RBW=1 MHz)	-20.91	7.91

a. Emission levels given in these ranges represents the worst case value over all the tested channels
b. Worst Case margin values determined by the emissions performance in the 1 MHz band immediately outside the lower/upper adjacent MHz

Table 19 : Spurious Emissions at the 1900 MHz MFRM2 Antenna Port, 3 Carrier, IS-95 Mode

Channel Numbers (Band)	Frequency (MHz)	Worst Case Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
25, 50, 75 (A)	1929 -:- 1930 (lower adjacent MHz)	-29.36	16.36
	1950 -:- 1951 (upper adjacent MHz)	-39.19	26.19
325, 350, 375 (D)	1929 -:- 1930 (lower adjacent MHz)	-40.70	27.70
	1950 -:- 1951 (upper adjacent MHz)	-30.12	17.12
425, 450, 475 (B)	1949 -:- 1950 (lower adjacent MHz)	-31.35	18.35
	1970 -:- 1971 (upper adjacent MHz)	-40.75	27.75
725, 750, 775 (E)	1949 -:- 1950 (lower adjacent MHz)	-40.26	27.26
	1970 -:- 1971 (upper adjacent MHz)	-30.70	17.70
825, 850, 875 (F)	1969 -:- 1970 (lower adjacent MHz)	-32.02	19.02
	1990 -:- 1991 (upper adjacent MHz)	-41.60	28.60
1125, 1150, 1175 (C)	1969 -:- 1970 (lower adjacent MHz)	-39.98	26.98
	1990 -:- 1991 (upper adjacent MHz)	-28.36	15.36
N/A	0 -:- lower adjacent MHz[a] (RBW=1 MHz)	-18.09	5.09[b]
N/A	upper adjacent MHz -:- 5000[a] (RBW=1 MHz)	-18.52	5.52[b]
N/A	5000 - 20000[a] (RBW=1 MHz)	-20.98	7.98

a. Emission levels given in these ranges represents the worst case value over all the tested channels
b. Worst Case margin values determined by the emissions performance in the 1 MHz band immediately outside the lower/upper adjacent MHz

Table 20 : Spurious Emissions at the 1900 MHz MFRM2 Antenna Port, 2 Carrier IS-95 & 1 Carrier IS-856, 16-QAM Mode

Channel Numbers (Band)	Frequency (MHz)	Worst Case Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
425, 450, 475 (B)	1949 -:- 1950 (lower adjacent MHz)	-28.01	15.01
	1970 -:- 1971 (upper adjacent MHz)	-37.20	24.20
725, 750, 775 (E)	1949 -:- 1950 (lower adjacent MHz)	-37.21	24.21
	1970 -:- 1971 (upper adjacent MHz)	-26.39	13.39
825, 850, 875 (F)	1969 -:- 1970 (lower adjacent MHz)	-27.16	14.16
	1990 -:- 1991 (upper adjacent MHz)	-37.28	24.28
1125, 1150, 1175 (C)	1969 -:- 1970 (lower adjacent MHz)	-36.94	23.94
	1990 -:- 1991 (upper adjacent MHz)	-25.92	12.92
N/A	0 -:- lower adjacent MHz[a] (RBW=1 MHz)	-19.16	6.16[b]
N/A	upper adjacent MHz -:- 5000[a] (RBW=1 MHz)	-18.37	5.37[b]
N/A	5000 - 20000[a] (RBW=1 MHz)	-24.45	11.45

a. Emission levels given in these ranges represents the worst case value over all the tested channels
b. Worst Case margin values determined by the emissions performance in the 1 MHz band immediately outside the lower/upper adjacent MHz

Figure 9 : Conducted Spurious Emissions - 1 Carrier, Channel 25, IS-95 (Lower Adjacent 1 MHz)

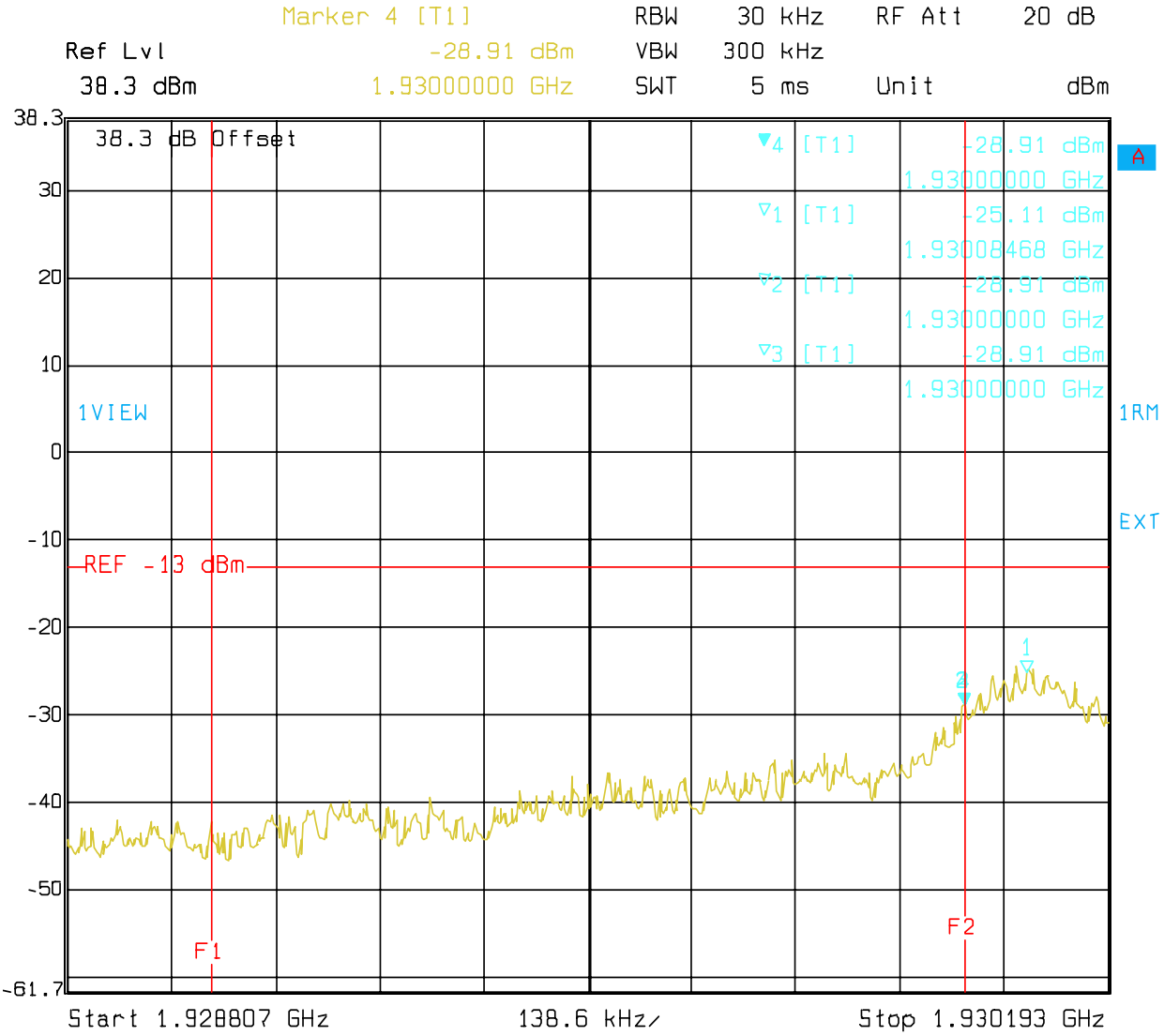


Figure 10 : Conducted Spurious Emissions - 1 Carrier, Channel 25, IS-95 (Upper Adjacent 1 MHz)

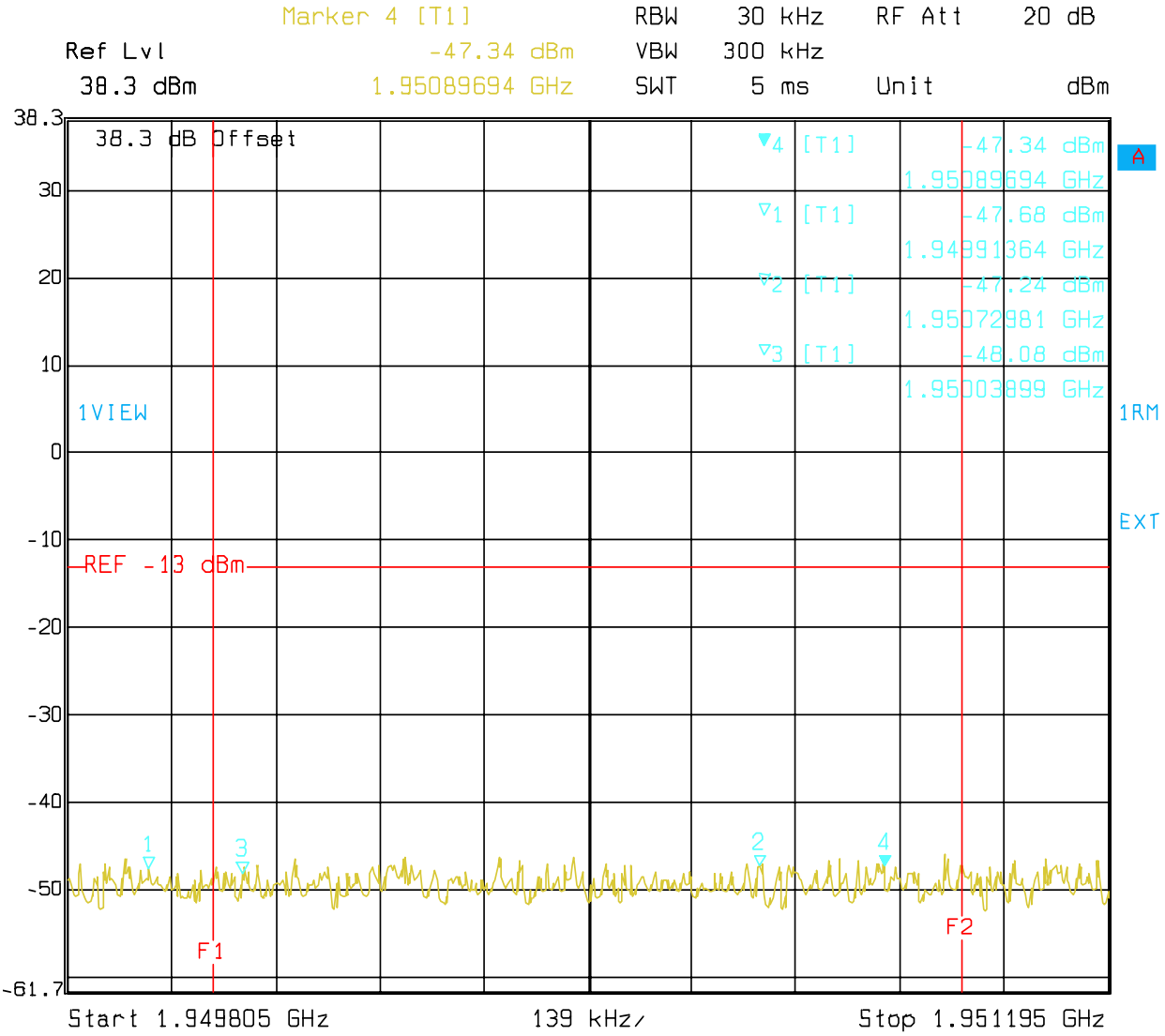


Figure 11 : Conducted Spurious Emissions - 1 Carrier, Channel 25, IS-95 (9kHz -:- Lower Adjacent 1 MHz)

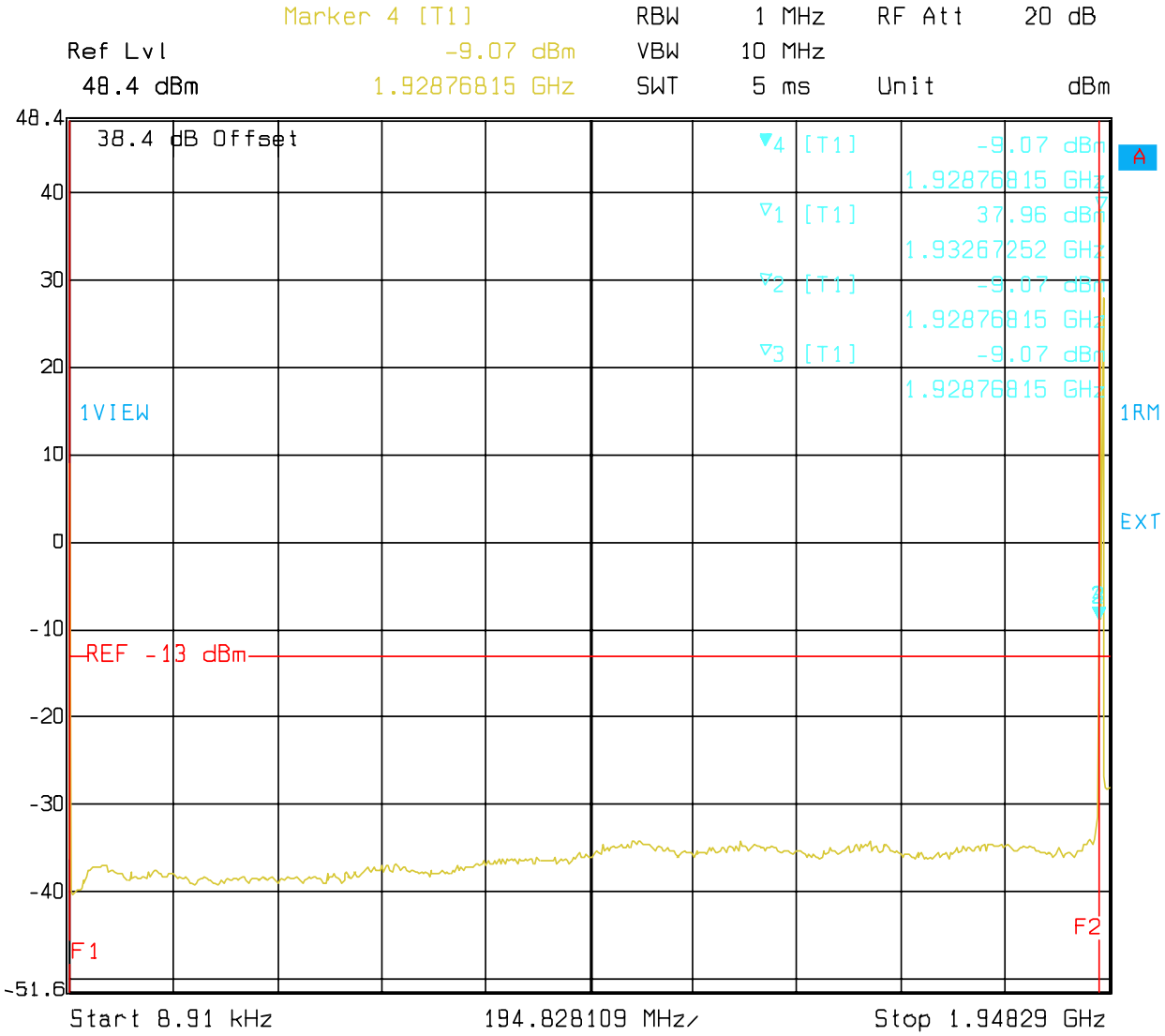


Figure 12 : Conducted Spurious Emissions - 1 Carrier, Channel 25, IS-95 (Upper Adjacent 1 MHz -:- 5 GHz)

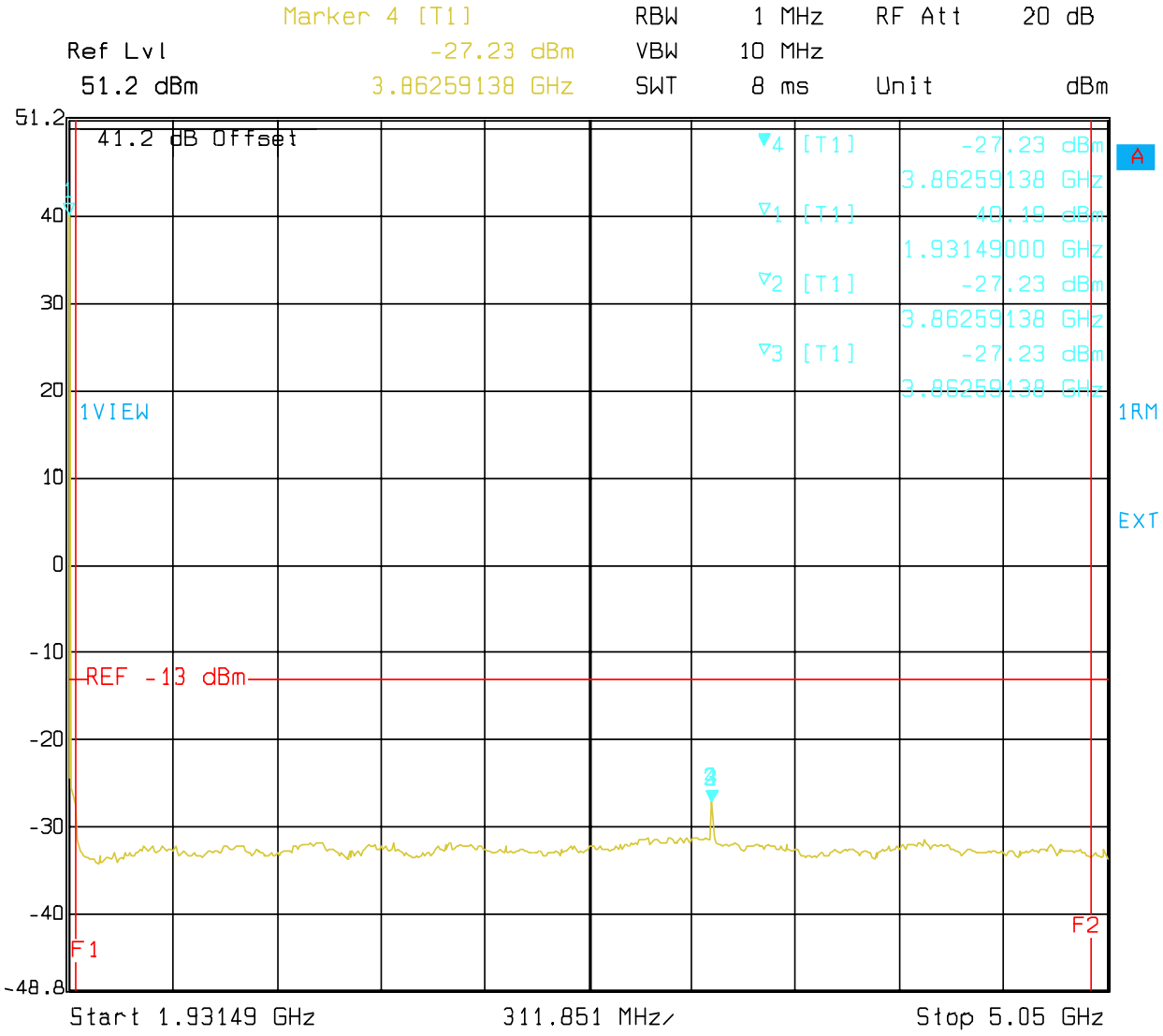


Figure 13 : Conducted Spurious Emissions - 1 Carrier, Channel 25, IS-95 (5 GHz -:- 20 GHz)

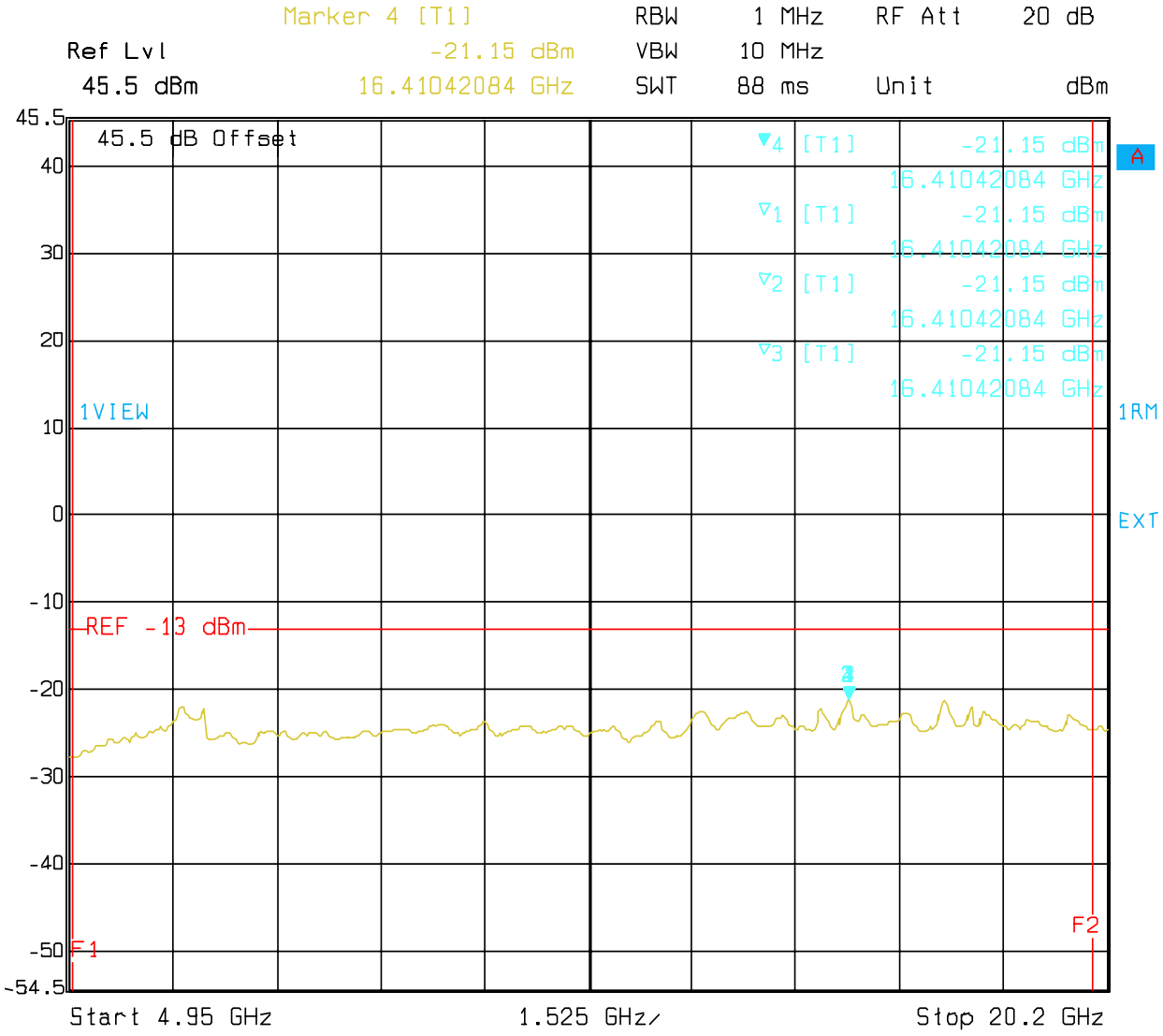
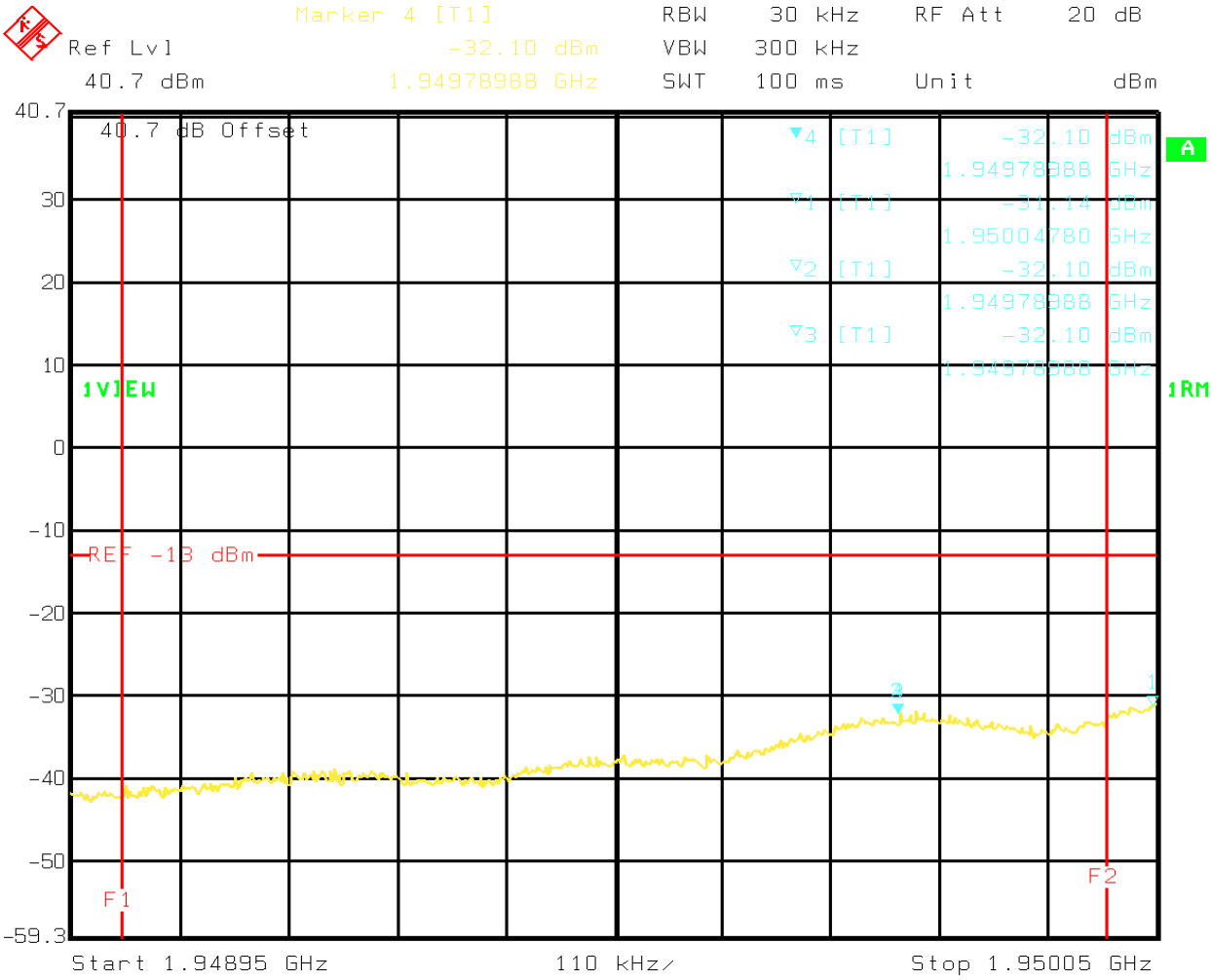
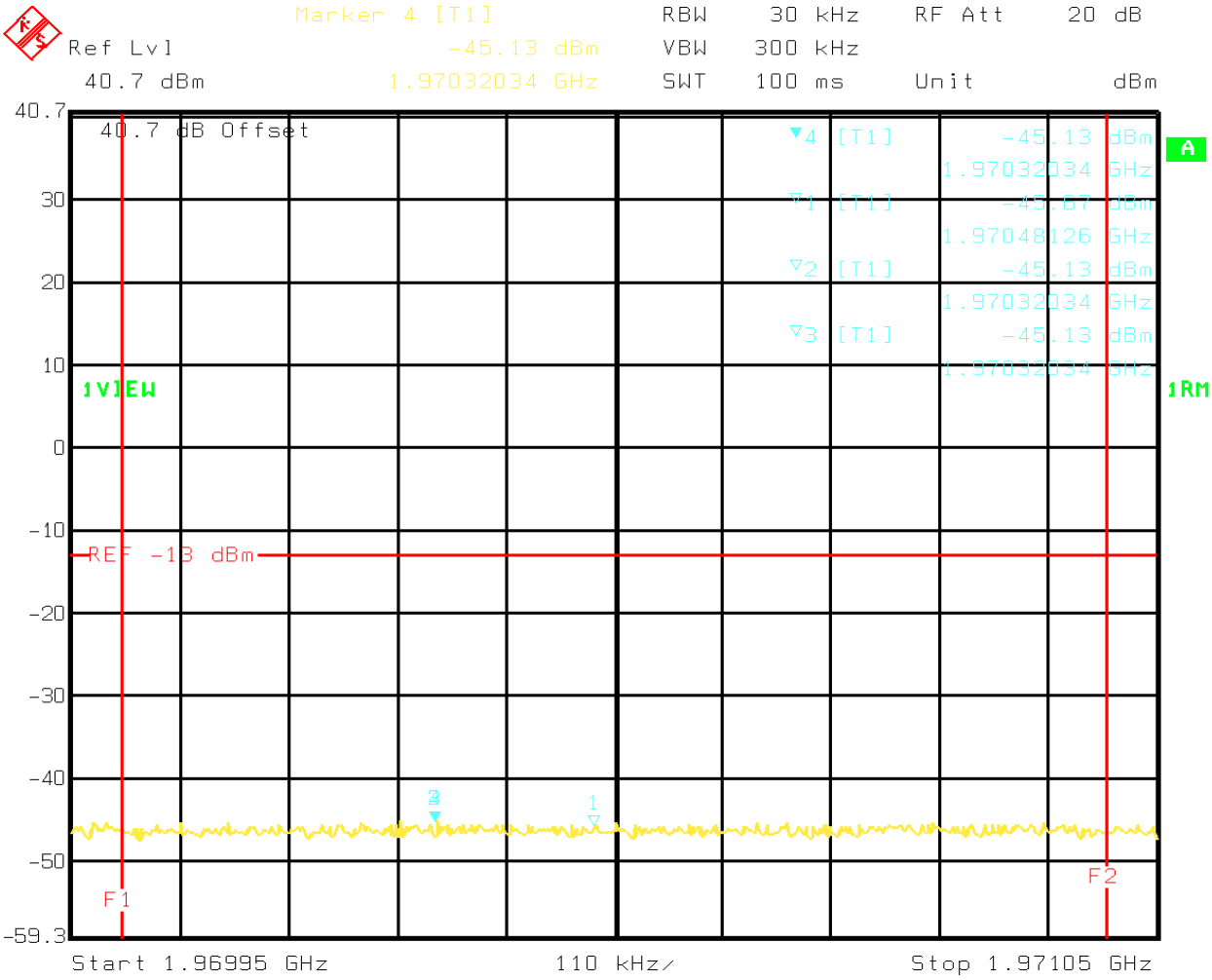


Figure 14 : Conducted Spurious Emissions - 1 Carrier, Channel 425, IS-856, 16-QAM Mode (Lower Adjacent 1 MHz)



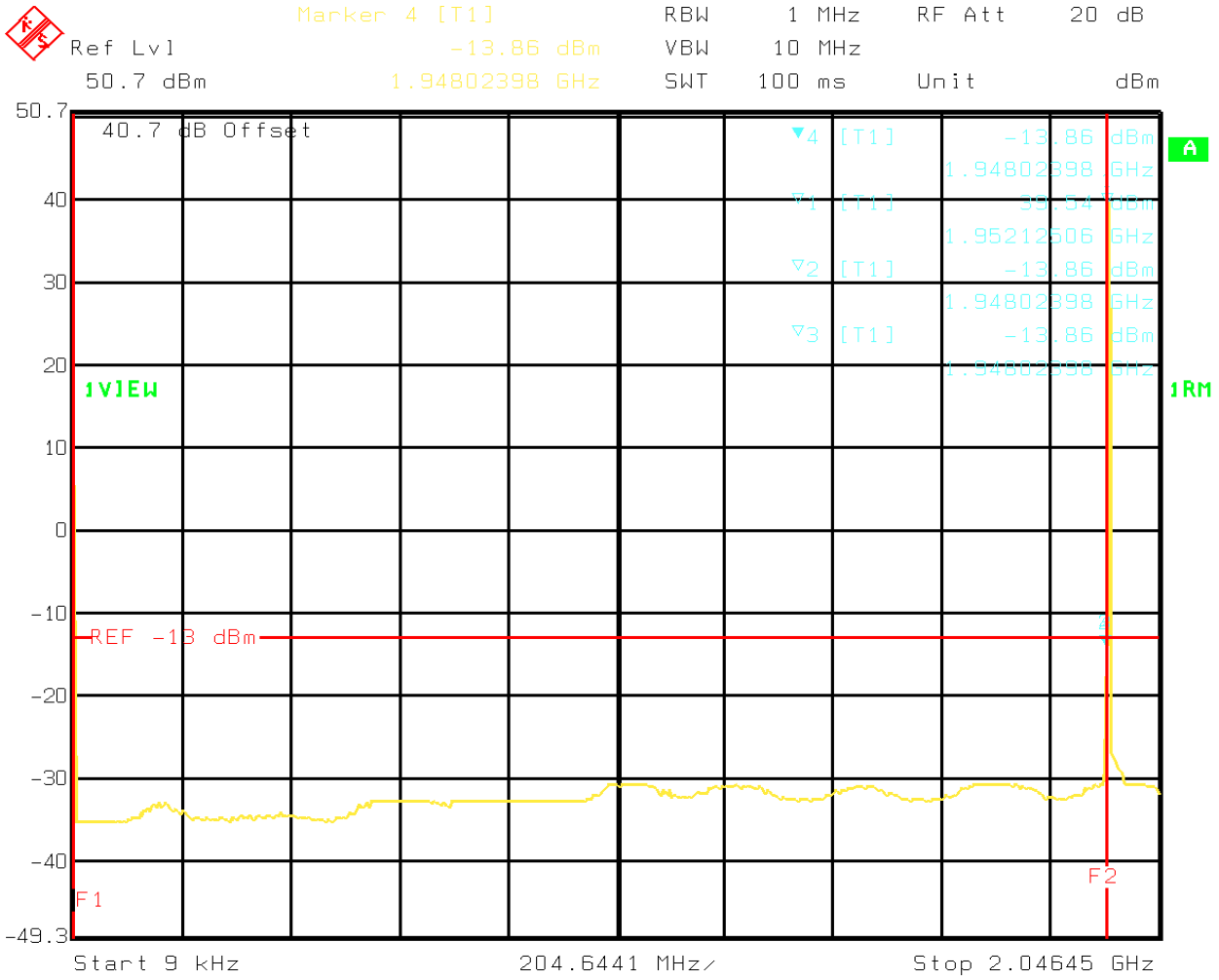
Title: 1 carrier, ch 425, (Low edge-1.0MHz) to Low edge
Comment A: Temp C 25, Normal Humidity

Figure 15 : Conducted Spurious Emissions - 1 Carrier, Channel 425, IS-856, 16-QAM Mode (Upper Adjacent 1 MHz)



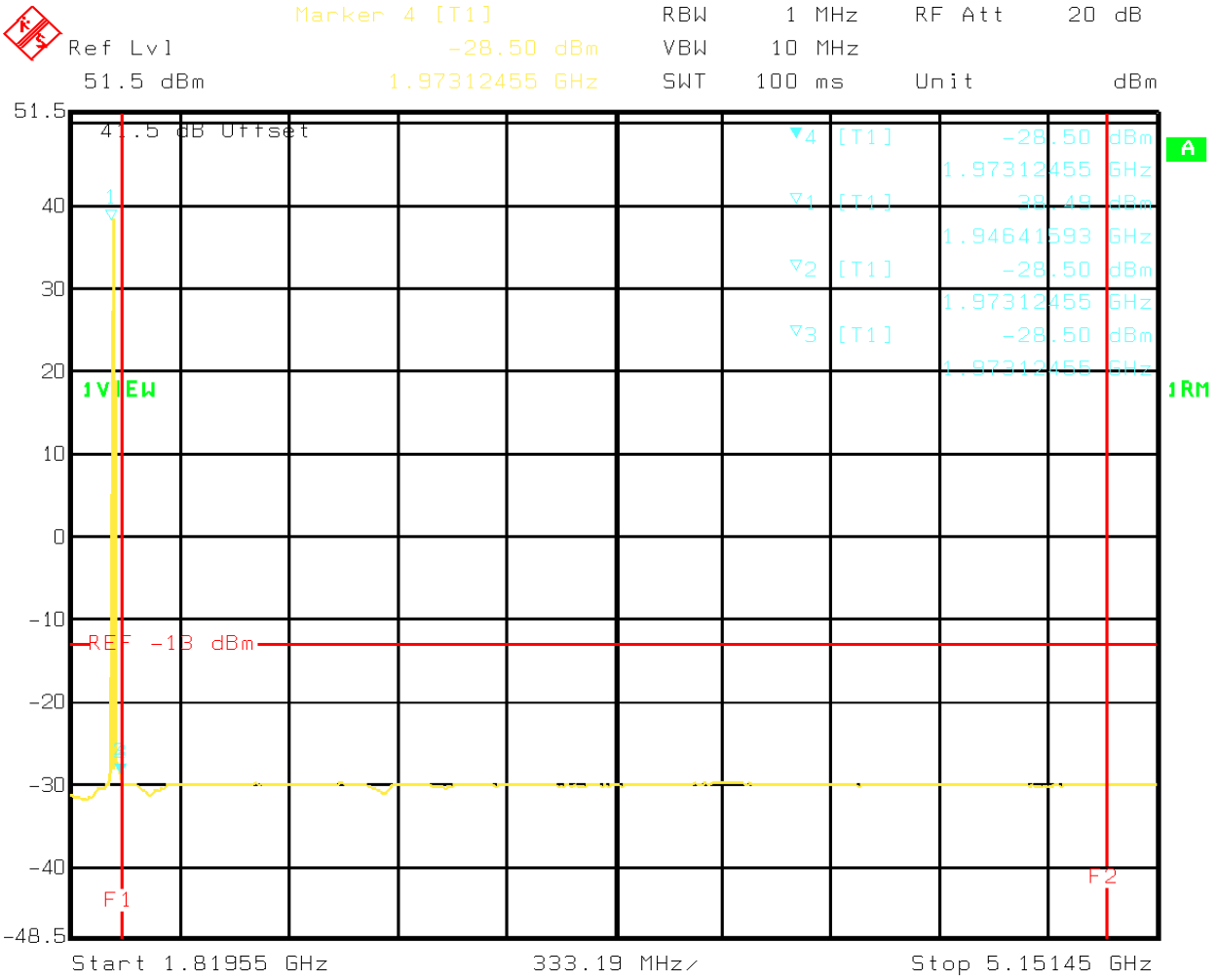
Title: 1 carrier, ch 425, Upper edge to (Upper edge + 1 MHz)
Comment A: Temp C 25, Normal Humidity

Figure 16 : Conducted Spurious Emissions - 1 Carrier, Channel 425, IS-856, 16-QAM Mode (9kHz -:- Lower Adjacent 1 MHz)



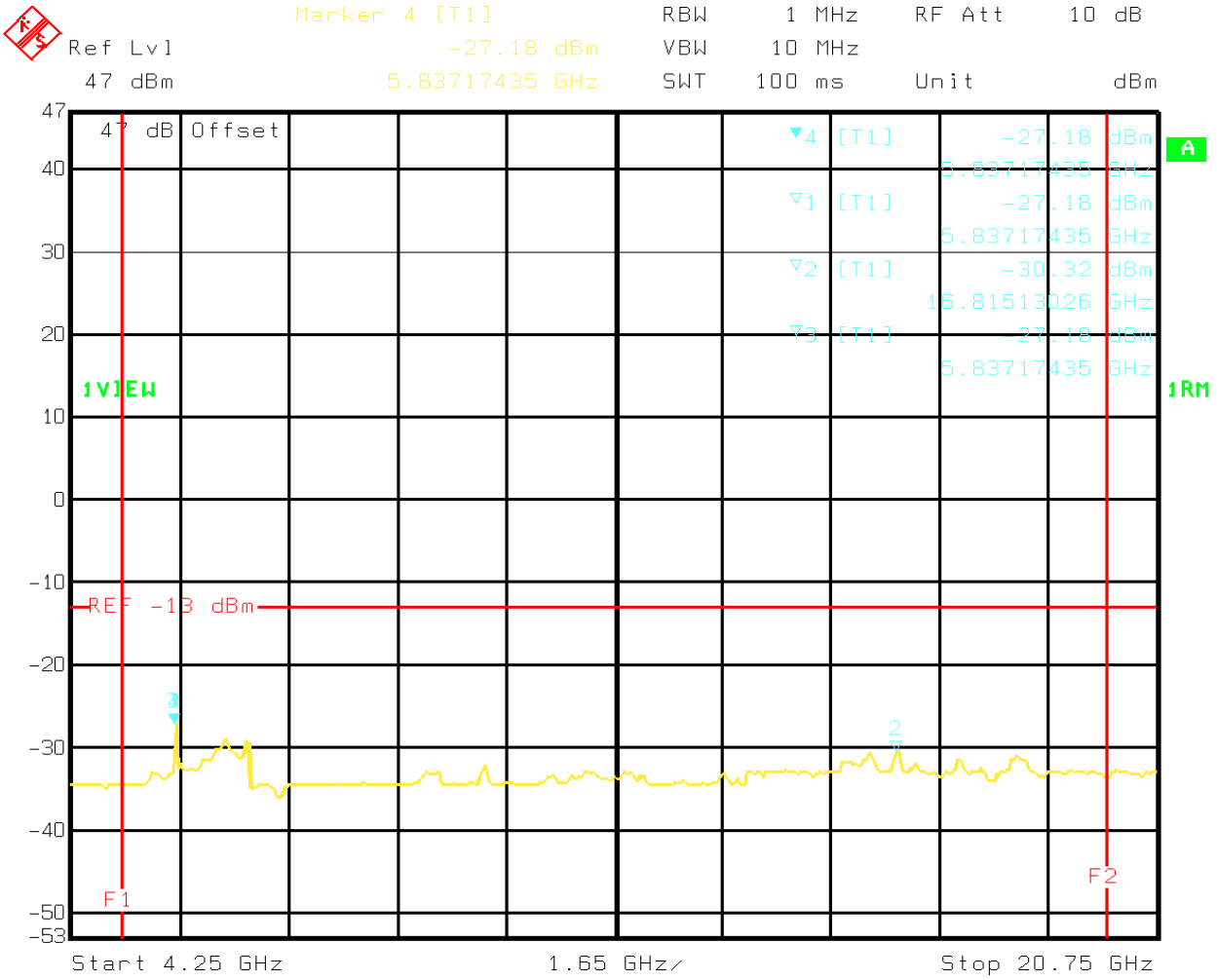
Title: 1 carrier, ch 425, 9kHz_(Low edge-1.0MHz)
Comment A: Temp C 25, Normal Humidity

Figure 17 : Conducted Spurious Emissions - 1 Carrier, Channel 425, IS-856, 16-QAM Mode (Upper Adjacent 1 MHz -:- 5 GHz)



Title: 1 carrier, ch 425, (Upper edge + 1 MHz) to 5 GHz
Comment A: Temp C 25, Normal Humidity

Figure 18 : Conducted Spurious Emissions - 1 Carrier, Channel 425, IS-856, 16-QAM Mode (5 GHz -:- 20 GHz)



Title: 1 carrier, ch 425, 5 GHz to 20 GHz
Comment A: Temp C 25, Normal Humidity

Figure 19 : Conducted Spurious Emissions - 2 Carrier, Channels 25, 50, IS-95 (Lower Adjacent 1 MHz)

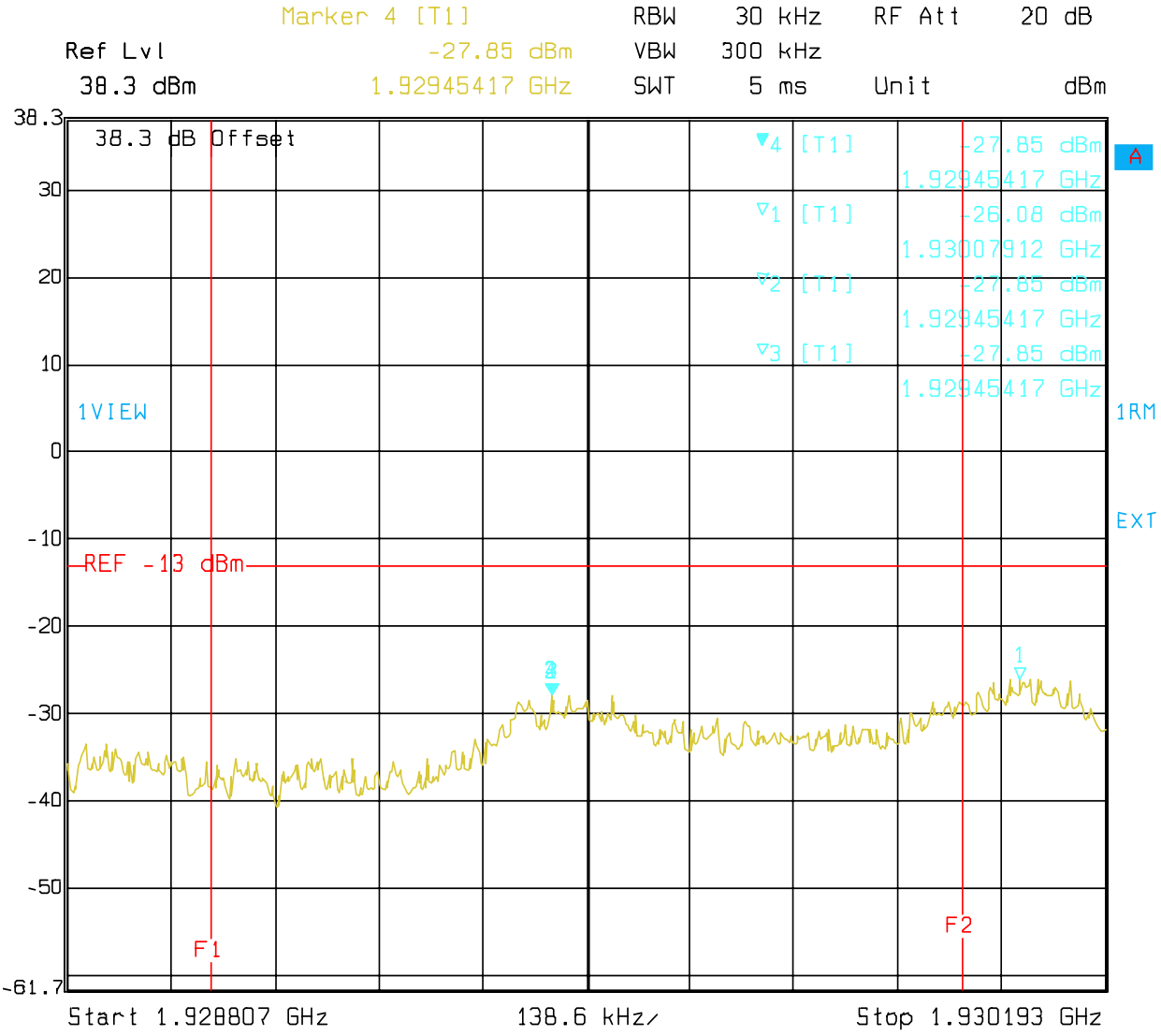


Figure 20 : Conducted Spurious Emissions - 2 Carrier, Channels 25, 50, IS-95 (Upper Adjacent 1 MHz)

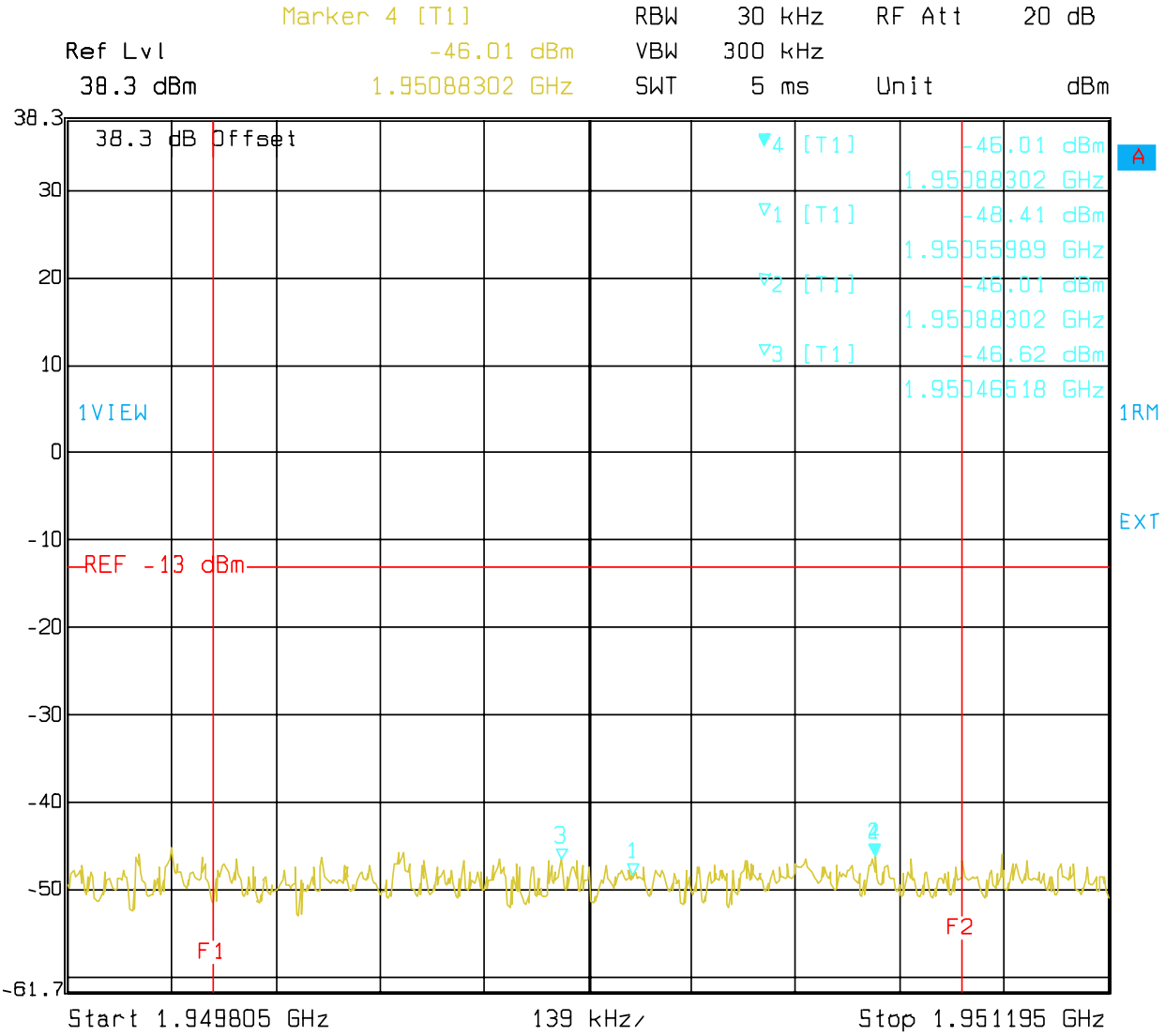


Figure 21 : Conducted Spurious Emissions - 2 Carrier, Channels 25, 50, IS-95 (9kHz -:- Lower Adjacent 1 MHz)

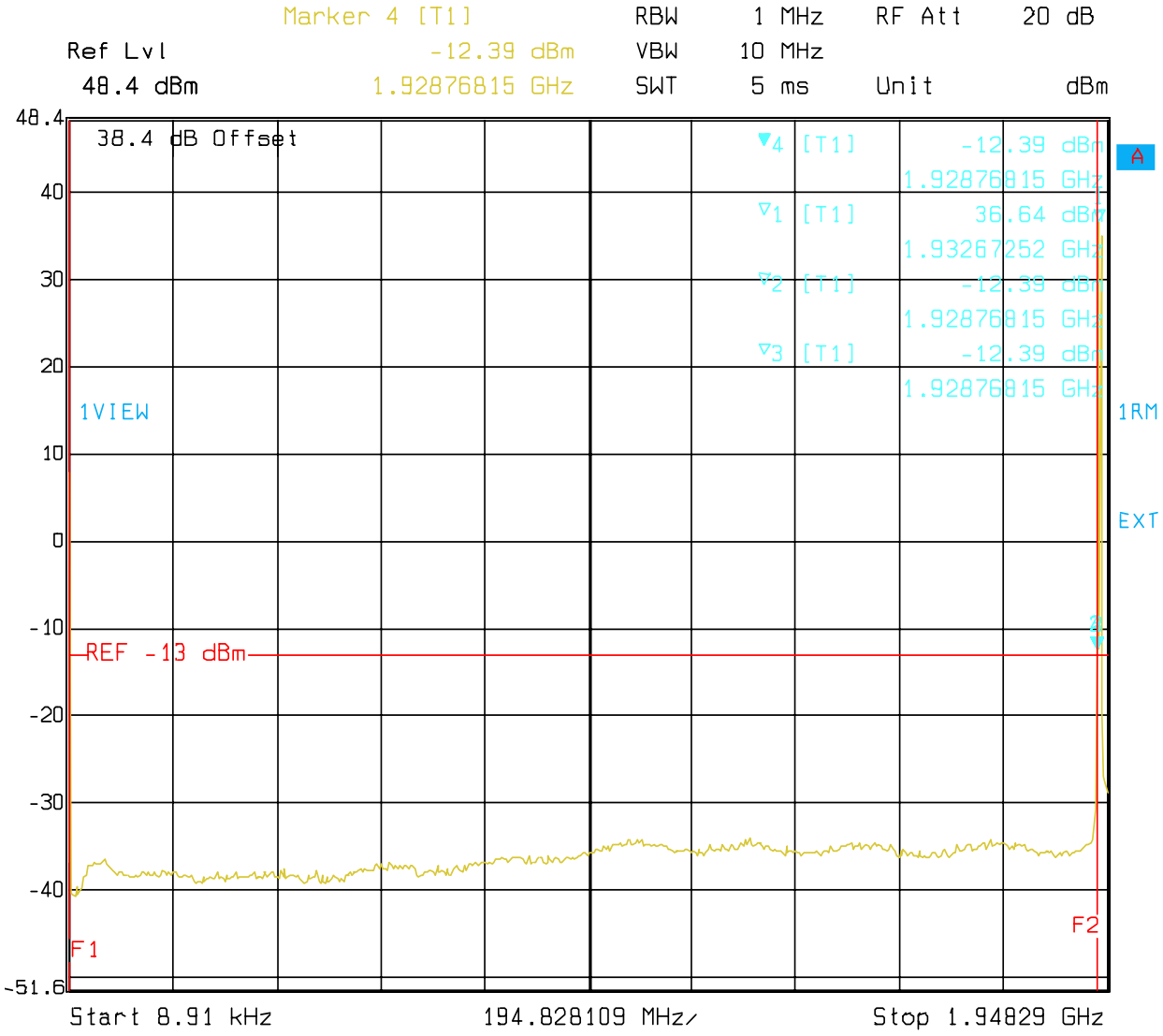


Figure 22 : Conducted Spurious Emissions - 2 Carrier, Channels 25, 50, IS-95 (Upper Adjacent 1 MHz -:- 5 GHz)

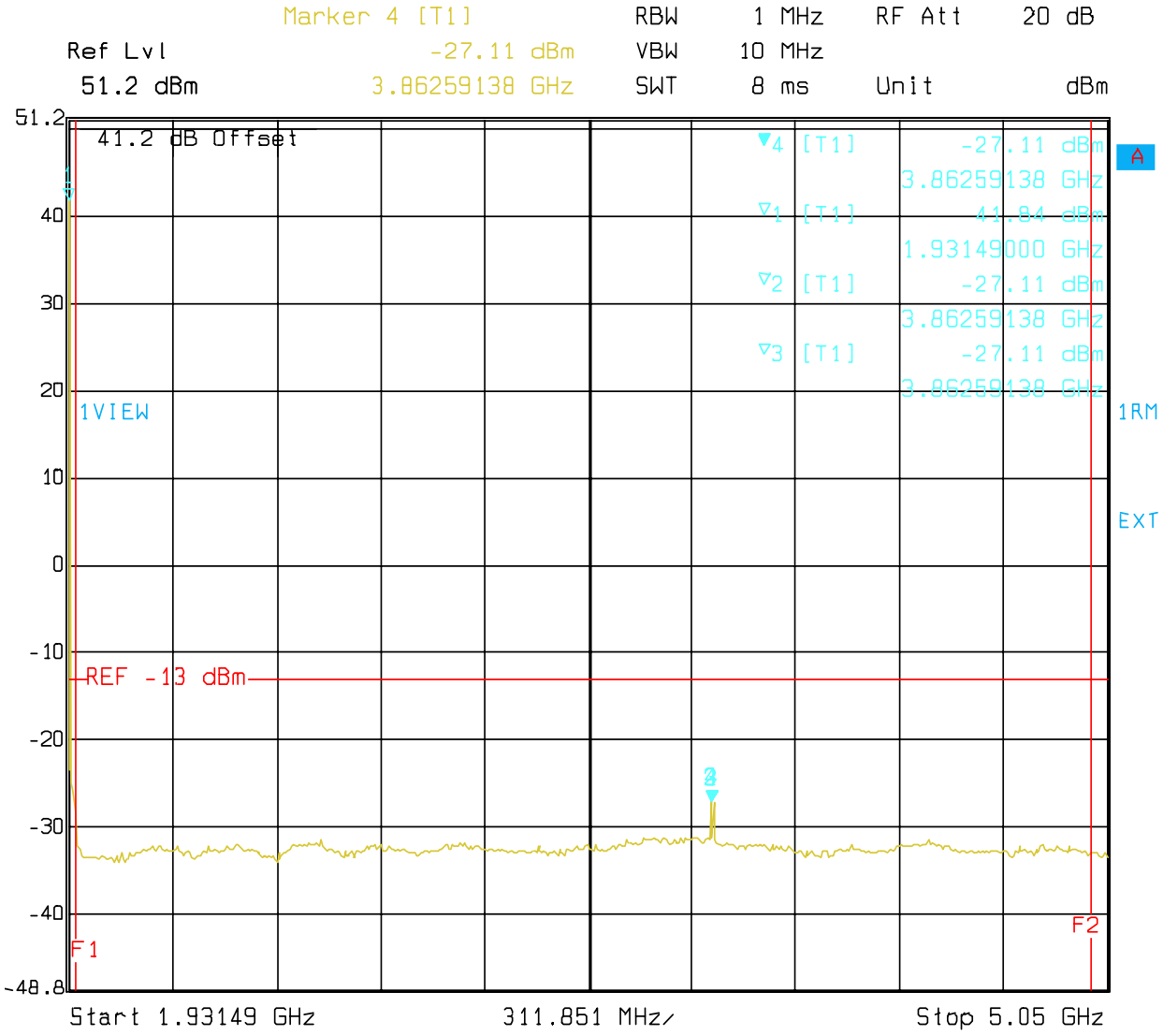


Figure 23 : Conducted Spurious Emissions - 2 Carrier, Channels 25, 50, IS-95 (5 GHz -:- 20 GHz)

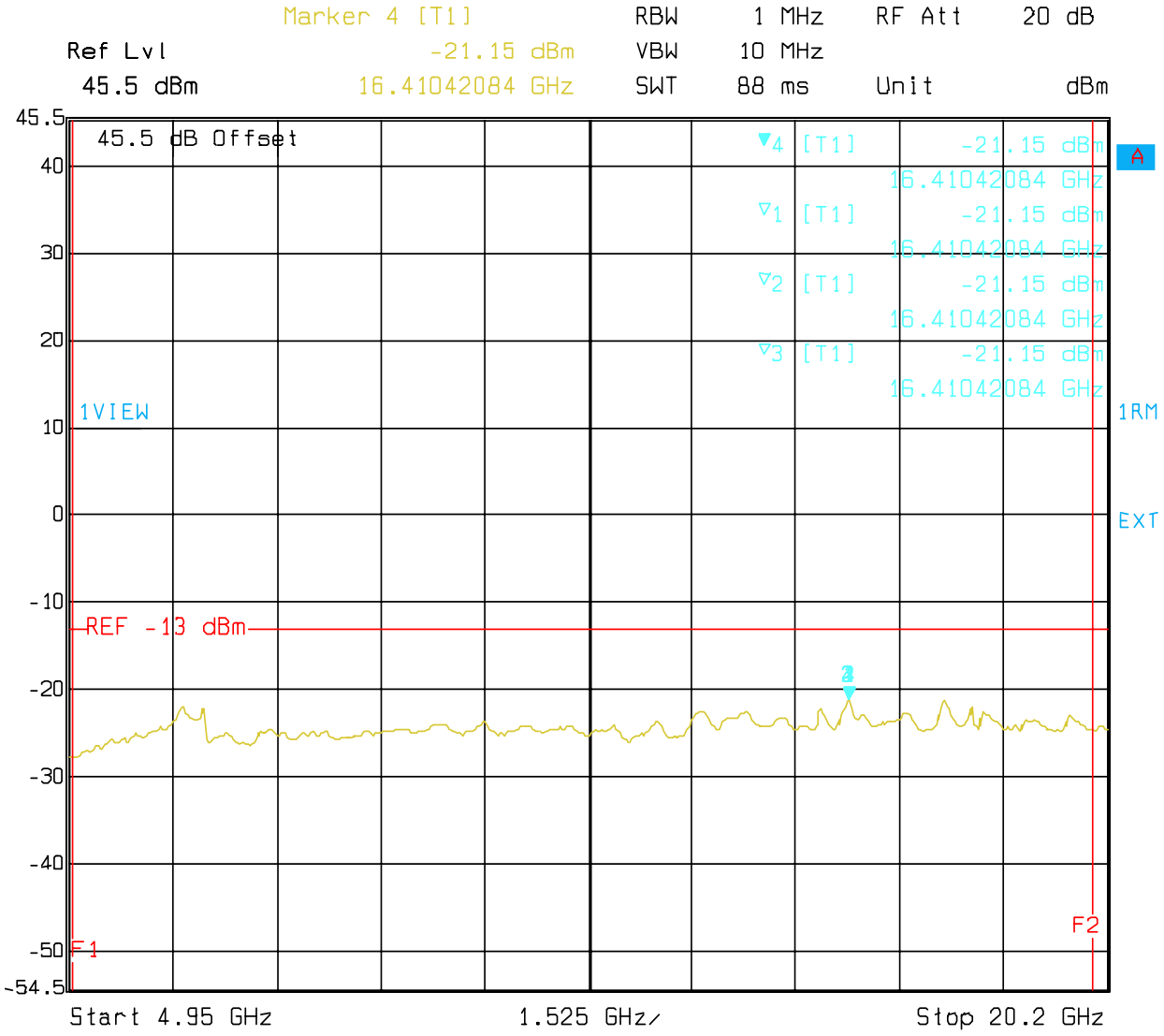


Figure 24 : Conducted Spurious Emissions - 3 Carrier, Channels 1125, 1150, 1175, IS-95 (Lower Adjacent 1 MHz)

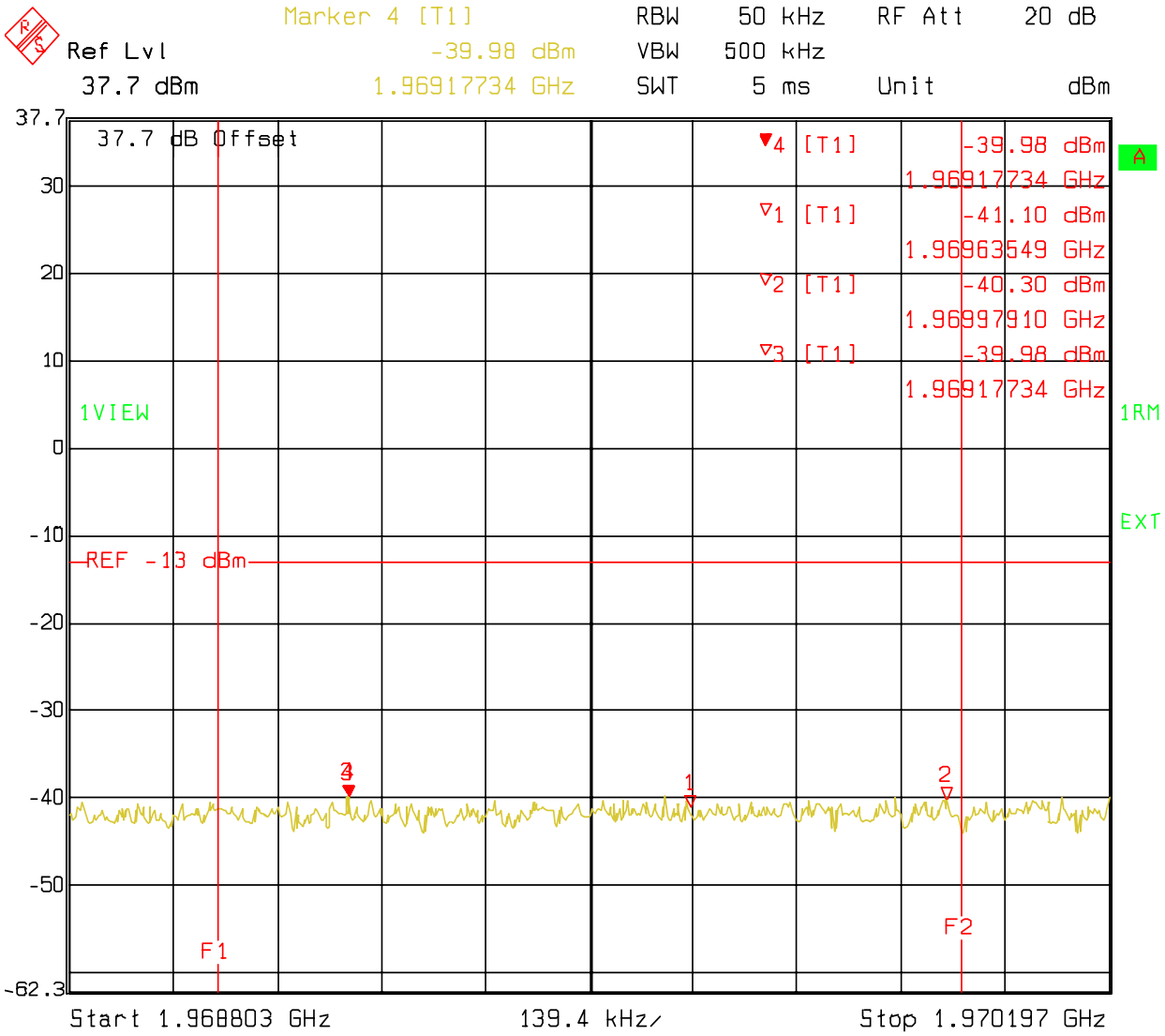


Figure 25 : Conducted Spurious Emissions - 3 Carrier, Channels 1125, 1150, 1175, IS-95 (Upper Adjacent 1 MHz)

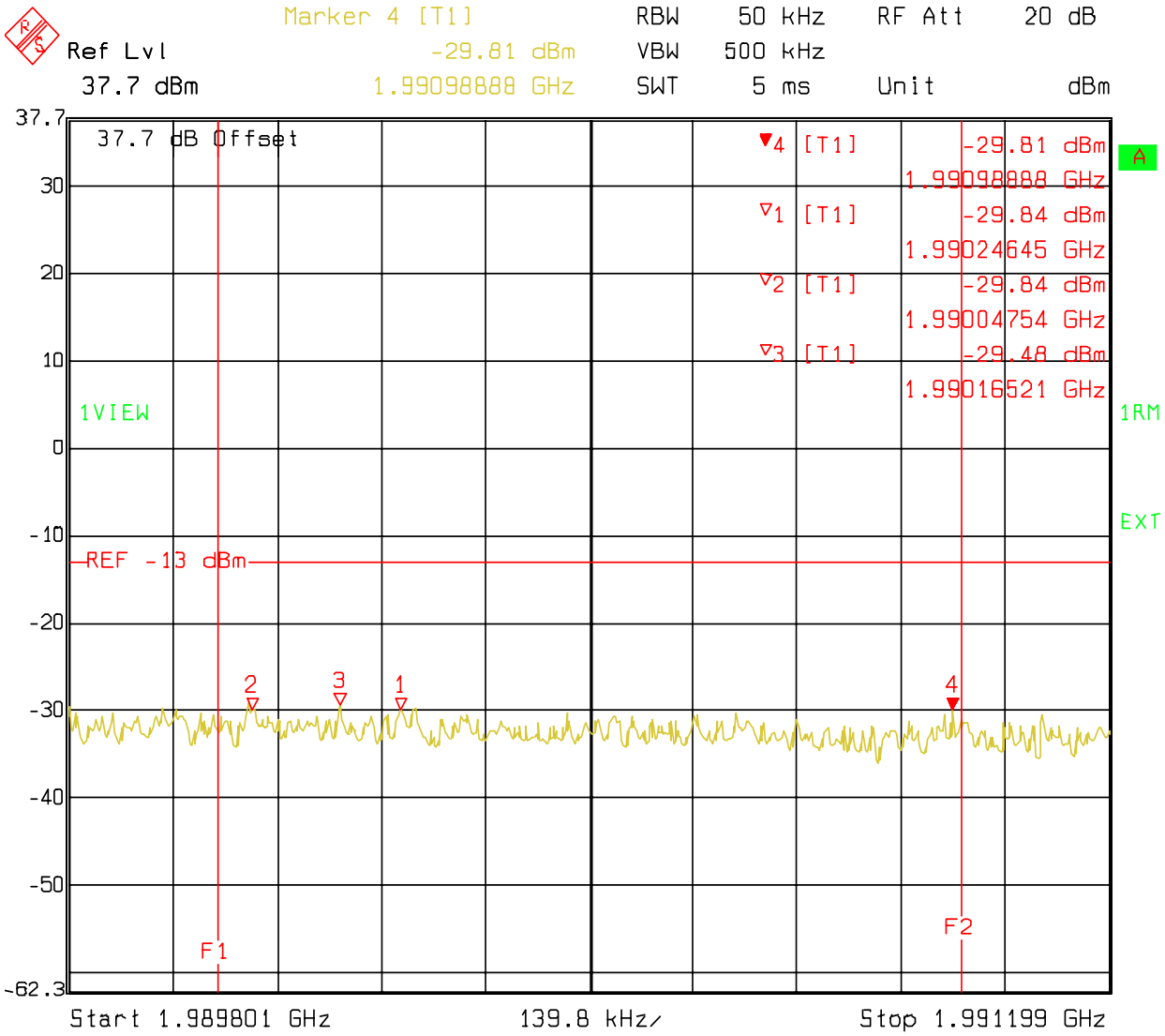


Figure 26 : Conducted Spurious Emissions - 3 Carrier, Channels 1125, 1150, 1175, IS-95 (9kHz -:- Lower Adjacent 1 MHz)

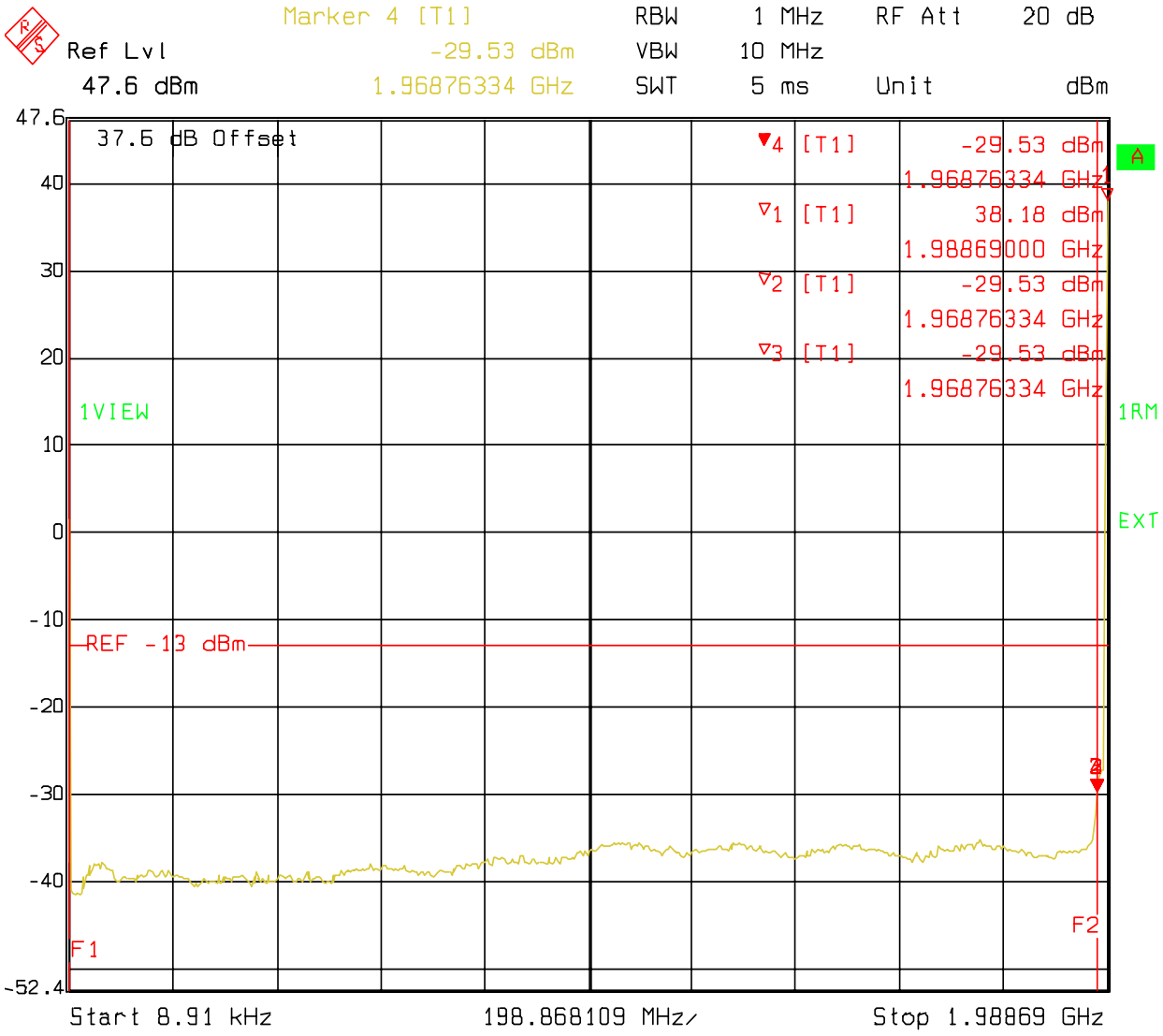


Figure 27 : Conducted Spurious Emissions - 3 Carrier, Channels 1125, 1150, 1175, IS-95 (Upper Adjacent 1 MHz -:- 5 GHz)

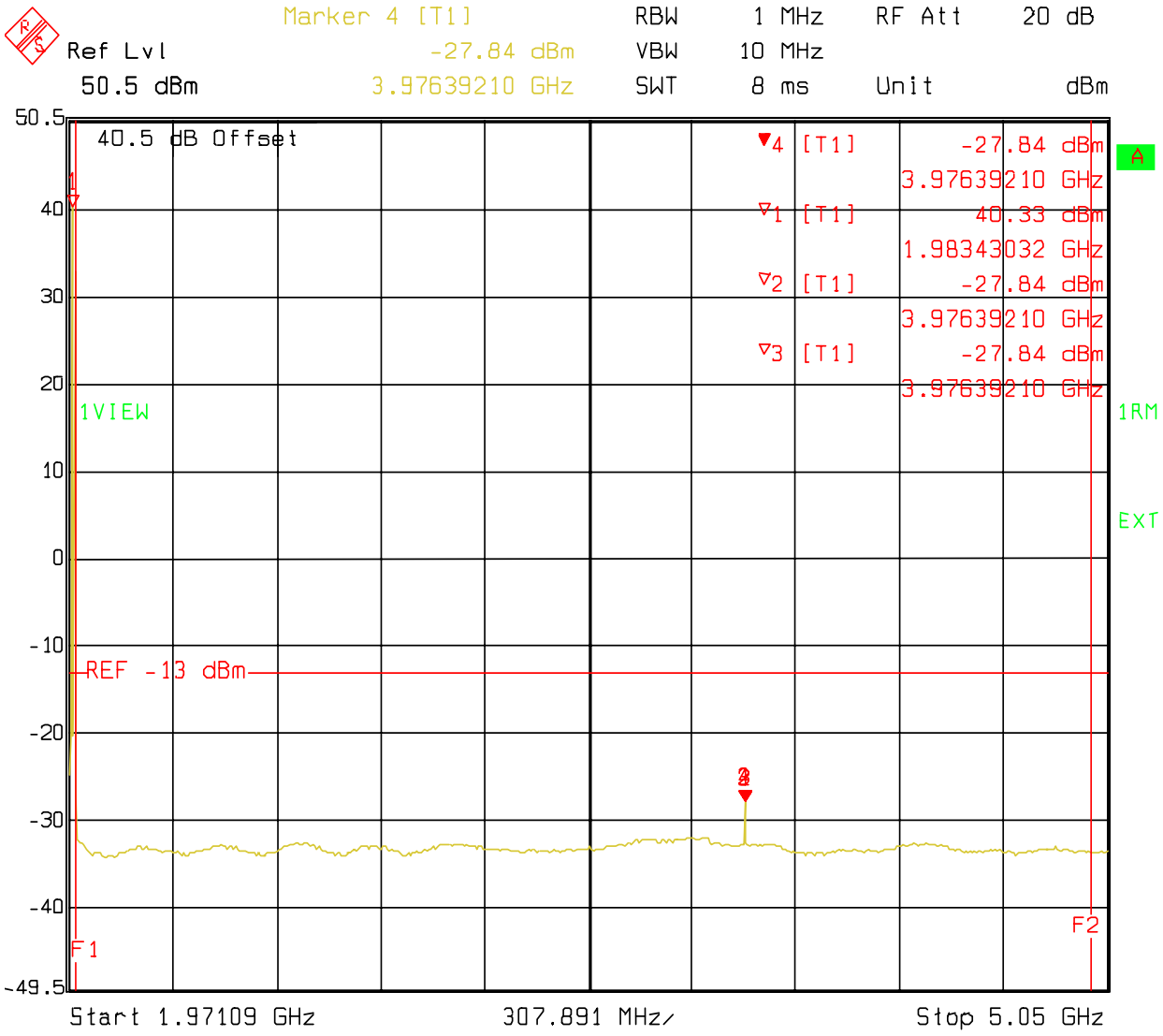
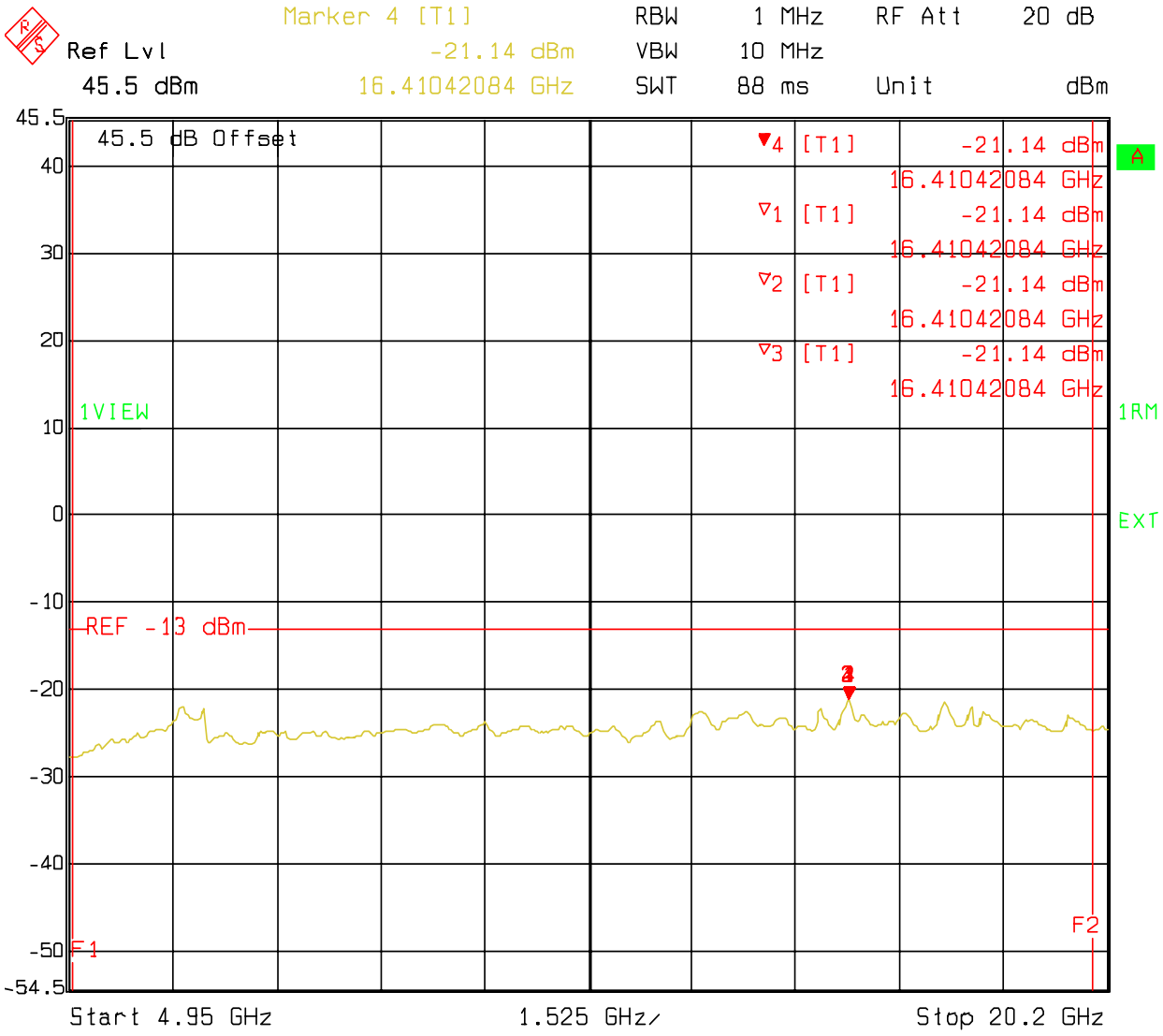


Figure 28 : Conducted Spurious Emissions - 3 Carrier, Channels 1125, 1150, 1175, IS-95 (5 GHz -:- 20 GHz)



4.4 Frequency Stability

4.4.1 Frequency Stability Requirements

FCC Part 2.1055

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

(1) From -30 deg. to +50 deg. centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

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

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

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

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

FCC Part 24.235 Limit

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

4.4.2 Test Method

The DE is configured via the BTS controller to enable the MFRM2 to transmit at nominal output power level. Measurements are made for three carrier configuration, channels 575, 600 & 625.

The MFRM2 System is subjected to ambient temperatures from -30° to +50° C at intervals of 10° C. A period of at least 2 hours is allowed prior to taking measurement to ensure that all of the oscillator circuit components have stabilized.

At each of the above specified temperatures, the average and maximum carrier deviation is recorded from the time the transmitter is keyed-on for a period of fifteen minutes using the HP 4406A VSA measurement system. Recorded data is based on processing 100 samples with 10 averages/sample.

At 25° C ambient temperature, measurements are made with the primary supply voltage set to 85%, 100% and 115% of the nominal value. The nominal primary supply voltage for the MFRM2 is -48 VDC. The same measurements will also be made for nominal primary supply voltage of +24 VDC.

4.4.3 Test Setup

The set-up used for the MFRM2 Frequency Stability test is illustrated in Figure 29. Frequency Stability measurements are referenced to the antenna port of the DPM.

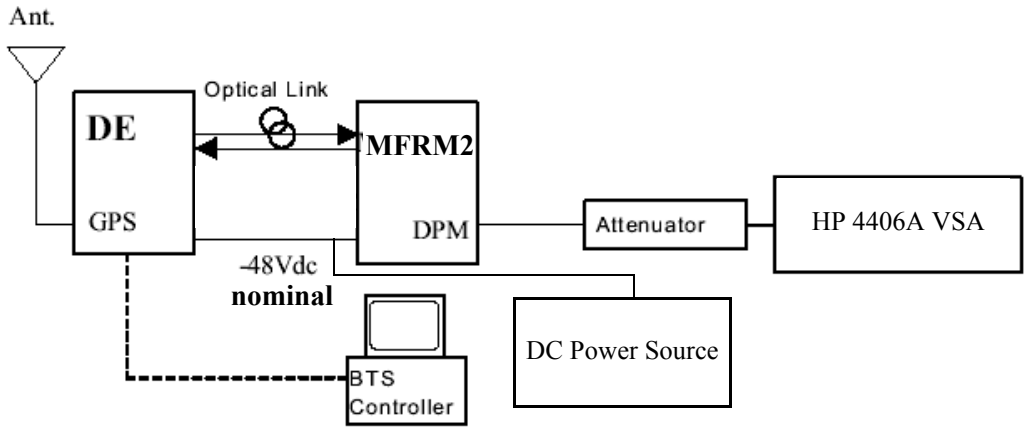


Figure 29 : Test Setup for Frequency Stability Measurement

4.4.4 Results

The MFRM2 System complies with the requirements. Table 21 shows the results for Frequency Stability versus Temperature Variation of the MFRM2 for 3 carrier configuration, channels 575, 600 & 625. Table 22 and Table 23 show the results for Frequency Stability versus Power Supply Voltage of the MFRM2 for 3 carrier configuration, channels 575, 600 & 625.

Table 21 : Frequency Stability versus Temperature Variation, 3 Carrier Mode

Temperature (°C)	Carrier Frequency Deviation (Hz)	
	Average	Maximum
-30	+0.96	+7.40
-20	-0.40	-5.673
-10	-0.19	+7.08
0	+0.53	+9.06
10	+0.37	-7.46
20	-0.57	-3.60
30	+0.93	+8.37
40	-1.40	-10.54
50	+1.14	-13.87

Table 22 : Frequency Stability versus Power Supply Voltage, 3 Carrier Mode, -48 VDC

Power Supply Voltage	Carrier Frequency Deviation (Hz)	
	Average	Maximum
-40.8 VDC	+0.35	+15.76
-48.0 VDC	+0.68	+7.40
-55.2 VDC	+1.07	+10.35

Table 23 : Frequency Stability versus Power Supply Voltage, 3 Carrier Mode, +24 VDC

Power Supply Voltage	Carrier Frequency Deviation (Hz)	
	Average	Maximum
+20.4 VDC	+1.13	+13.56
+24.0 VDC	+0.52	+9.23
+27.6 VDC	+0.33	+7.47

References

[1] FCC Part 24 Subpart E, “Personal Communication Services”, http://www.access.gpo.gov/nara/cfr/waisidx_00/47cfr24_00.html

[2] FCC Part 2 Subpart J, “Frequency allocations and radio treaty matters; general rules and regulations”, http://www.access.gpo.gov/nara/cfr/waisidx_00/47cfr2_00.html

[3] Industry Canada RSS-133, “2 GHz Personal Communication Services”, http://strategis.ic.gc.ca/SSG/sf01520e.html

[4] ANSI-97-E “Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations”, December 2002

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