EXHIBIT 2A

Test Report Provided by Nortel Networks

Applicant: Nortel Networks

For Class II Permissive Change Certification on:

AB6NT800MFRM

Test Report for FCC Equipment Authorization

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Publication History

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Revision History

Stream/issue	Revision Date	Reason for Change	Author
00/01	November 29, 2002	Initial test report	Peter Goussev
00/02	December 17, 2002	Changes recomended by Thomas Wong	Peter Goussev
01/00	February 07, 2003	Approved by Jadran Lokas	

Change bars are not used in this document.

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Acronyms and Abbreviations

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

Rx	Receive
SA	Spectrum Analyzer
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
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 Northern Telecom's (Nortel Networks) CDMA 800 MHz Multiple carrier Flexible Radio Module (MFRM).

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

- *CFR 47, Part 22, Subpart H, Cellular Radiotelephone Service [1]*
- *CFR 47, Part 2, Subpart J, Equipment Authorization Procedures - Equipment Authorization[2]*

1.1 Test Result Summary

Table 1 summarizes the measurement results[1] for the CDMA 800 MHz MFRM.

Table 1 : Test Results Summary

FCC Measurement Specification	FCC Limit Specification	Description	Results
2.1046	22.913	RF Power Output	Compliant
2.1047		Modulation Characteristics	Not Applicable
2.1049		Occupied Bandwidth	1.2719 MHz for 1 carrier 2.4649 MHz for 2 carriers 3.6974 MHz for 3 carriers
2.1051, 2.1057	22.901 22.917	Spurious Emissions at Antenna Terminals	Compliant
2.1055	22.355	Frequency Stability	Compliant

1. This report presents measurement results for tests performed by Nortel Networks. Field Strength of Spurious Emissions measurement results along with requirements specified in 2.1033 are covered in a separate test report from Sanmina Canada.

2 Engineering Declaration

The CDMA 800 MHz Multiple carrier Flexible Radio Module has been tested in accodance with the requirements contained in the Federal Communications Commission Rules and Regulations Part 2, Part 22, Part 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.

Tested by
Peter Goussev
Systems Designer
Nortel Networks
Ottawa, Canada

Signature

February 07, 2003
Date

Reviewed by
Thomas Wong
Regulatory Prime
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Feb 07, 2003
Date

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Feb. 7/2003
Date

3 Equipment Authorization Application Requirements

3.1 Standard Test Conditions and Test Equipment

The MFRM was 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 (nominal)

3.2 EUT Identification List

Table 2 shows the identification of the components tested in this report.

Table 2 : EUT Identification List

Equipment Description	Model / Part Number	Release Number	Serial Number
800 MHz Multiple carrier Flexible Radio Module (comprised of the main modules below)	N/A	N/A	N/A
a) 800 MTRM	NTGY10DA	P4	NNTM535XCHFJ
b) 800 MCPA	NTGY70AA	P8	NNTM533BQW7D
c) 800 Band DPM	NTGS89DB	06	CLWVPP201T58

3.3 Test Equipment List

Table 3 shows the identification of the test equipment used in this report.

Table 3 : Test Equipment List

Description	Manufacturer	Model	Serial Number	Cal. Due Date
9kHz to 26.5 GHz Spectrum Analyzer	Rohde&Schwarz	FSEM-30	830843/006	Feb-28-03
RF Power Meter	HP	438A	3513U04168	Feb-22-04
RF Power Sensor Head	HP	8481A	2349A40270	Apr-09-04
30dB Attenuator	Narda	776B-30	5280	Verified
6 dB Attenuator	Weinschel Corp.	1	BD3391	Verified
RF Cable	Huber+Suhner	Sucoflex 104PE	2972/4PE	Verified
RF Cable	Andrew	FSJ4-50B		Verified

4 Transmitter Test and Measurement Results

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 2.983(d)(5). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

FCC Limit (Part 22.913)

The maximum effective radiated power (ERP) of base transmitters and cellular transmitters must not exceed 500 Watts.

4.1.2 Test Method

The DE was setup via the BTS controller to enable the MFRM to transmit at maximum power. Measurements were made in one, two, and three carrier configurations. The RF output power was measured using the power meter.

4.1.3 Test Setup

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

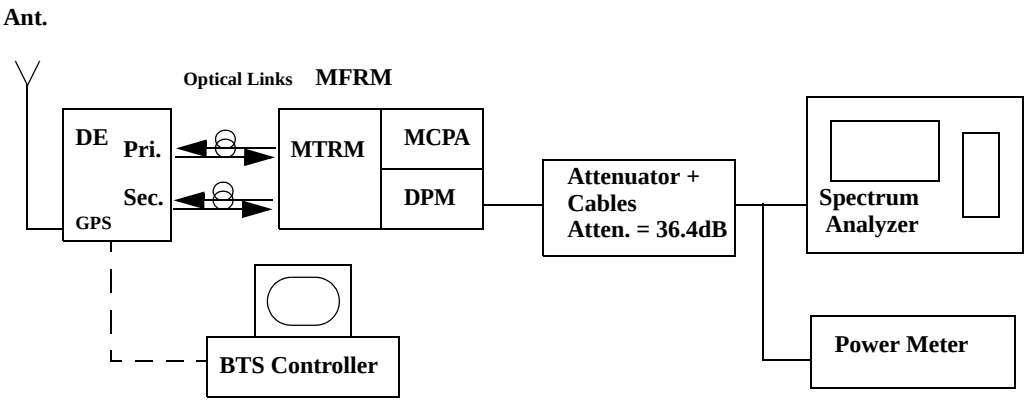


Figure 1 : Test Setup for RF Power Output Measurement

4.1.4 Test Results

The 800 MHz MFRM complies with the requirement. The maximum measured RF output power from the MFRM was 47.32 dBm.

Table 4 : RF Output Power of 800 MHz MFRM, 1 Carrier Mode

Channel Number (Band)	Frequency (MHz)	Measured Maximum RF Output Power (dBm)	Average Maximum Rated Power (dBm)	FCC Limit (dBm)
17 (A)	870.51	46.21	47.32	50
283 (A)	878.49	46.31	47.32	50
384 (B)	881.52	46.35	47.32	50
616 (B)	888.48	46.36	47.32	50

Table 5 : RF Output Power of 800 MFRM, 2 Carrier Mode

Channel Number (Band)	Frequency (MHz)	Measured Maximum RF Output Power (dBm)	Average Maximum Rated Power (dBm)	FCC Limit (dBm)
17, 58 (A)	870.51, 871.74	46.4	47.32	50
242, 283 (A)	877.26, 878.49	46.53	47.32	50
384, 425 (B)	881.52, 882.75	46.5	47.32	50
575, 616 (B)	887.25, 888.48	46.53	47.32	50

Table 6 : RF Output Power 800 MFRM, 3 Carrier Mode

Channel Number (Band)	Frequency (MHz) (centre channel)	Measured Maximum RF Output Power (dBm)	Average Maximum Rated Power (dBm)	FCC Limit (dBm)
17, 58, 99 (A)	871.74	47.3	47.32	50

Channel Number (Band)	Frequency (MHz) (centre channel)	Measured Maximum RF Output Power (dBm)	Average Maximum Rated Power (dBm)	FCC Limit (dBm)
201, 242, 283 (A)	877.26	47.31	47.32	50
384, 425, 466 (B)	882.75	47.3	47.32	50
534, 575, 616 (B)	887.25	47.32	47.32	50

4.2 Occupied Bandwidth

4.2.1 Occupied Bandwidth Requirements

FCC Part 2.1049

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

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

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

4.2.2 Test Method

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

4.2.3 Test Setup

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

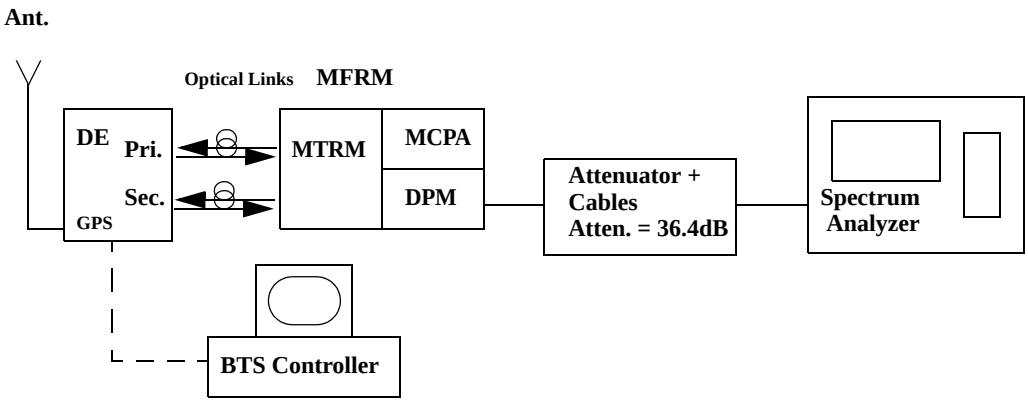


Figure 2 : Test Setup for Occupied Bandwidth Measurement

4.2.4 Test Results

The 800 MHz MFRM complies with the requirement. The occupied bandwidth measured in one, two, and three carrier configurations for each licensed band is shown in Table 7. 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 7 : Occupied Bandwidth, 800 MFRM, Single Carrier Mode

Channel Number (Band)	Frequency (MHz)	Measured Occupied Bandwidth (kHz)
17 (A)	870.51	1271.9
283 (A)	878.49	1271.9
384 (B)	881.52	1271.9
616 (B)	888.48	1271.9

Table 8 : Occupied Bandwidth, 800 MFRM 2 Carrier Mode

Channel Number (Band)	Frequency (MHz)	Measured Occupied Bandwidth (kHz)
17, 58 (A)	870.51, 871.74	2464.9
242, 283 (A)	877.26, 878.49	2464.9

Channel Number (Band)	Frequency (MHz)	Measured Occupied Bandwidth (kHz)
384, 425 (B)	881.52, 882.75	2464.9
575, 616 (B)	887.25, 888.48	2464.9

Table 9 : Occupied Bandwidth, 800 MFRM 3 Carrier Mode

Channel Number (Band)	Frequency (MHz) (centre channel)	Measured Occupied Bandwidth (kHz)
17, 58, 99 (A)	871.74	3697.4
201, 242, 283 (A)	877.26	3697.4
384, 425, 466 (B)	882.75	3697.4
534, 575, 616 (B)	887.25	3697.4

Figure 3 : Occupied Bandwidth - Single Carrier, Channel 283

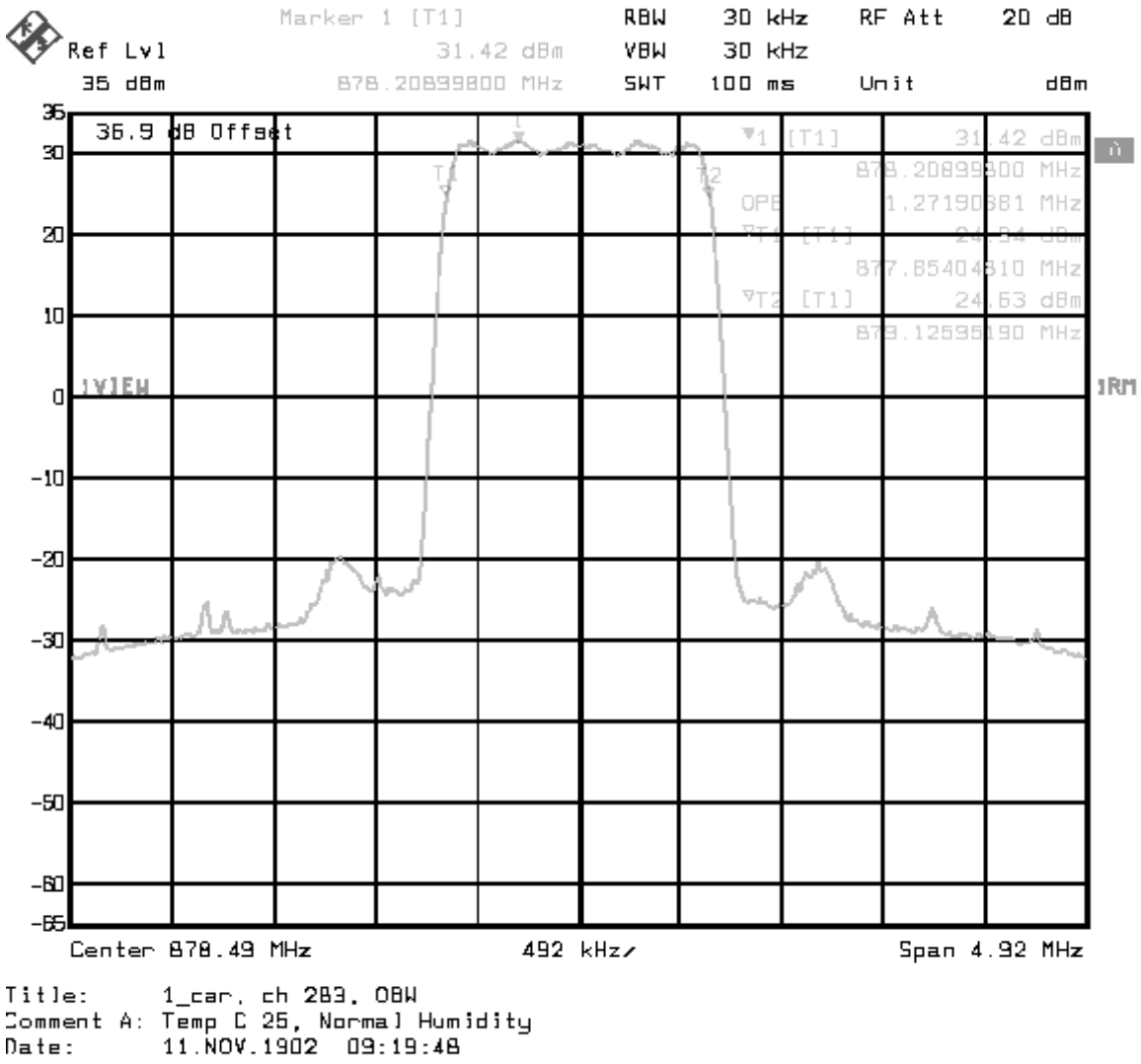


Figure 4 : Occupied Bandwidth - 2 Carrier, Channel 17, 58

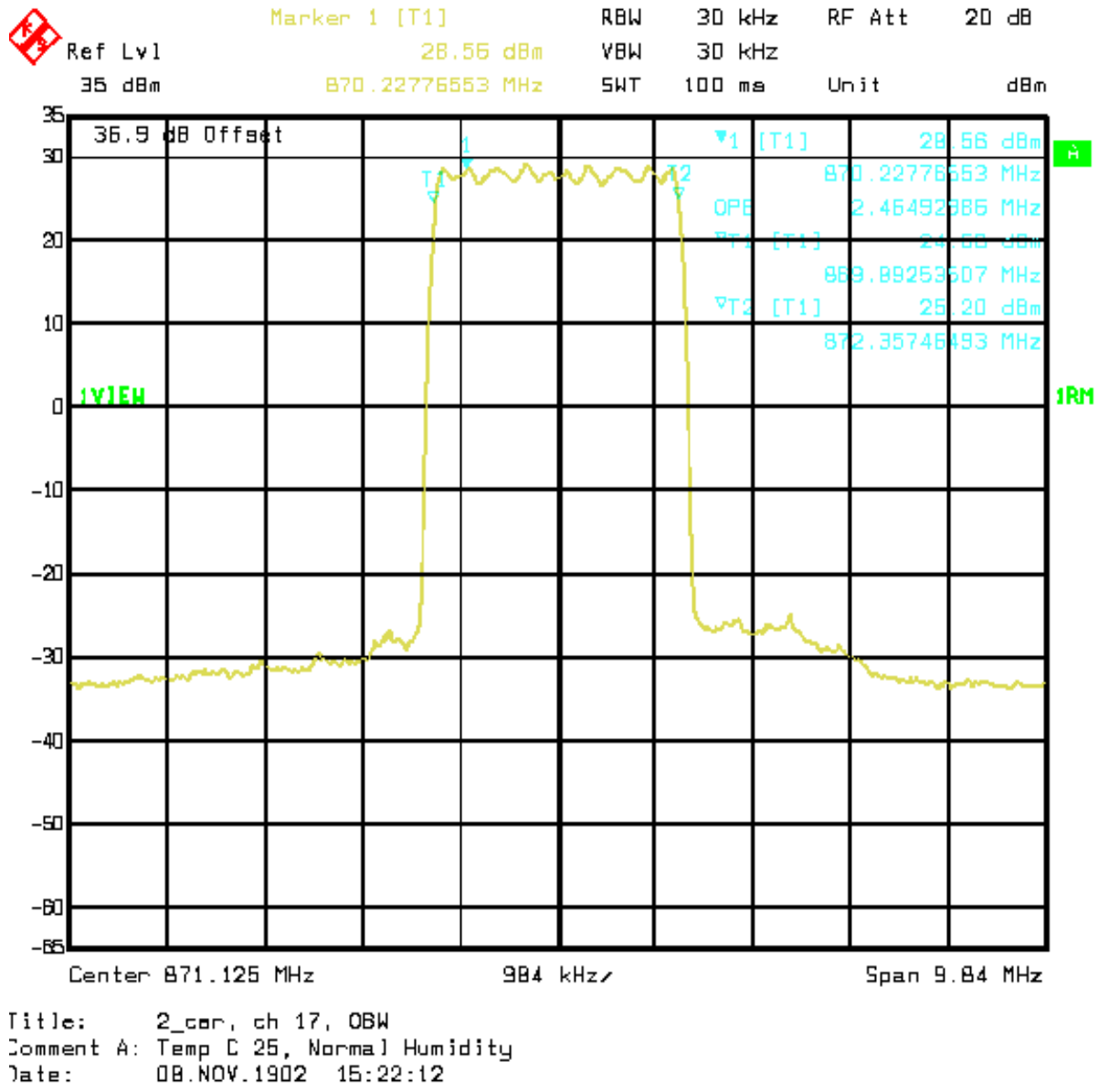
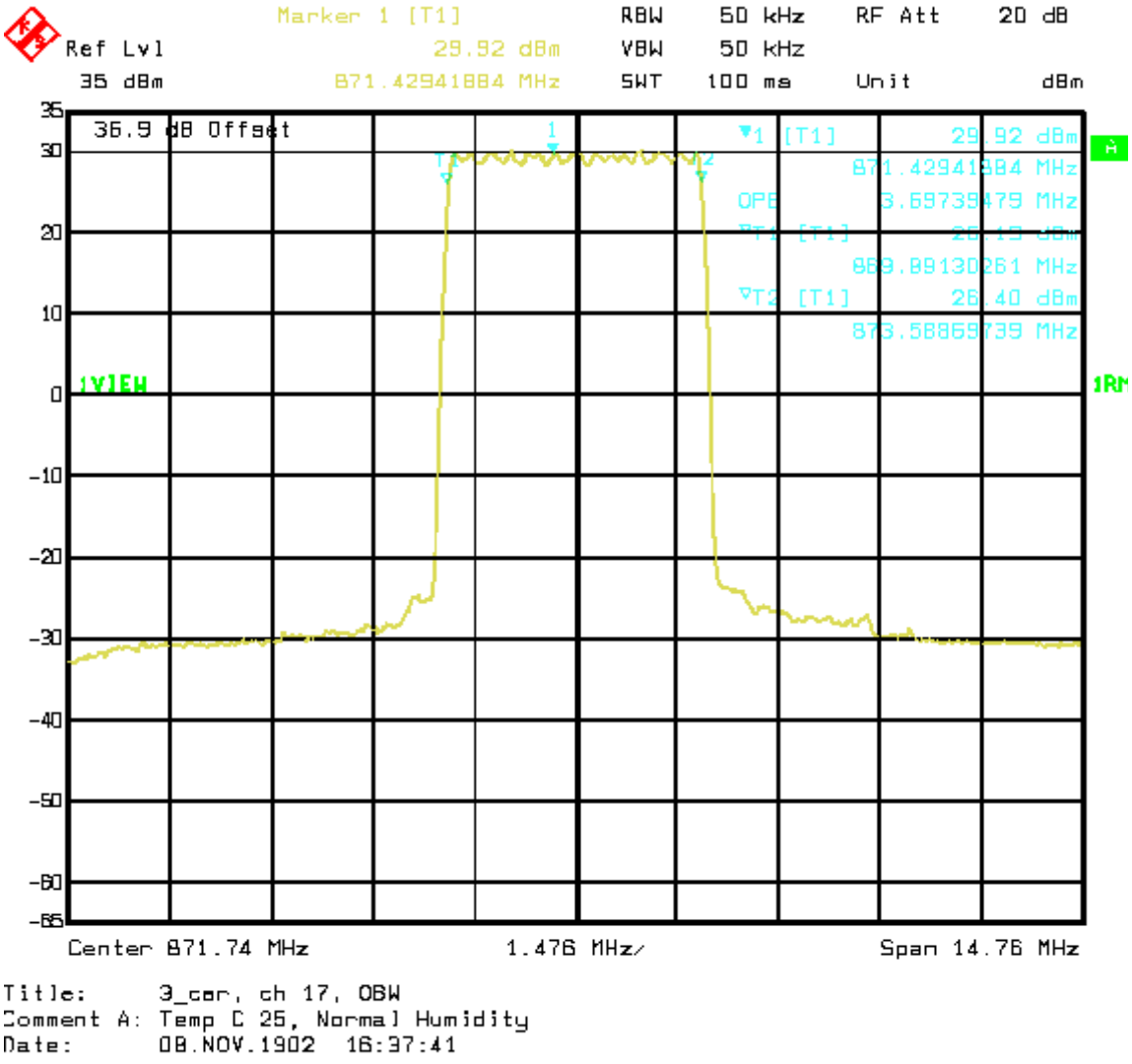


Figure 5 : Occupied Bandwidth - 3 Carrier, Channel 17, 58, 99



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 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

FCC Part 2.1057 - Frequency Spectrum to be investigated

The spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency or to the highest frequency practicable in the present state of the art of measuring techniques, whichever is lower. Particular attention should be paid to harmonics and subharmonics of the carrier frequency. Radiation at the frequencies of multiplier stages should be checked. The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

FCC Part 22.901 - Alternative Technologies and co-primary services

(d) Licensees of cellular may use alternative cellular technologies and/or provide fixed services on a co-primary basis with their mobile offerings, including personal communications services (as defined in Part 24 of this chapter) on the spectrum within their assigned block.

(d.2) Alternative technology and co-primary fixed services are exempt from the channeling requirements of 22.905, the modulation requirements of 22.915, the wave polarization requirements of 22.367, the compatibility specification in 22.933 and the emission limitations of 22.357 and 22.917, exept for emission limitations that apply to emissions outside the assigned channel block

FCC Part 22.917 Emission limitations for cellular

(b.2) On any frequency removed from the carrier frequency by more than 45 kHz, up to the first multiple of the carrier frequency:

at least 60 dB or 43 + 10 log(P) dB, whichever is the less attenuation.

(e) The mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency twice or more than twice the fundamental frequency by: at least 43 + 10 log(P) dB.

(h.2.ii) Measurement procedure. The following spectrum analyzer bandwidth settings should be used for measurement of spurious emissions: When operating in the wide-band data mode or signaling tone mode: For any emission more than 60 kHz removed from the carrier frequency: 30 kHz.

FCC Part 24.238 Limit

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

(b) Compliance with these provisions is based on the use of measurement instrumentation emploing 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 edjes, 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 exrpessed in the same parameters as the transmitter power.

4.3.2 Test Method

The BTS digital enclosure was configured via the BTS controller to enable the MFRM to transmit at maximum power. Measurements were made on channels at the bottom and top of the licensed sub-bands in one, two and three carrier configurations. The following spectrum analyzer settings were used for the measurement of the antenna port spurious emissions:

Adjacent 1MHz to indicated cellular band (Upper and Lower)

Resolution Bandwidth:	30 kHz (1 carrier, 2 carrier), 50 kHz (3 carrier)
Video Bandwidth:	30 kHz (1 carrier, 2 carrier), 50 kHz (3 carrier)
Video Average:	10 Averages
Span:	1.2 MHz
Attenuation:	20 dB
Ref. Level:	46.9 dBm
Ref. Level Offset:	36.9 dB

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

All other Spurious Emissions up to 9 GHz

To reduce the test time all measurements for frequency bands other than 1 MHz adjacent BW was done with 1 MHz resolution bandwidth ~~as worst case scenario for 30 kHz RBW requirements~~.

Resolution Bandwidth:	1 MHz (1 carrier, 2 carrier, 3 carrier)
Video Bandwidth:	1 MHz (1 carrier, 2 carrier, 3 carrier)
Video Average:	10 Averages
Span:	Set accordingly
Attenuation:	Set accordingly
Ref. Level:	Set accordingly
Ref. Level Offset:	Set accordingly

4.3.3 Test Setup

The set-up used for the MFRM Antenna Port Spurious Emission test is illustrated in Figure 6.

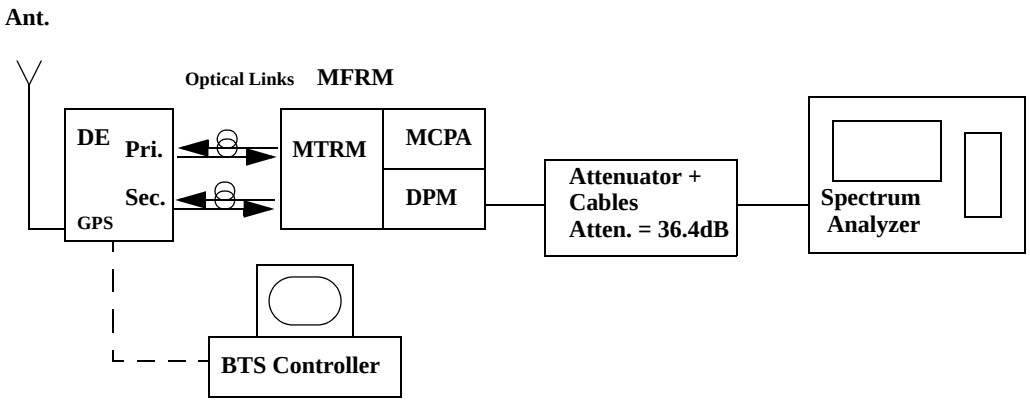


Figure 6 : Test Setup for Spurious Emissions Measurement

4.3.4 Test Results

The frequency spectrum from 1 MHz to 9 GHz was scanned for emissions using the spectrum analyzer settings outlined in the test method (Section 4.3.2). The MFRM complies with the limit of -13 dBm. Table 10 shows the spurious emissions at the antenna port of the MFRM for 1, 2 and 3 carrier modes. The plots that follow show the spurious emissions in one, two, and three carrier configuration. (For each configuration, only one sample is shown to reduce the number of figures).

Table 10 : Spurious Emissions at the 800 MHz MFRM Antenna Port - 1carrier. Worst case results

Frequency (MHz)	Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
	1 carrier	1 carrier
9 kHz to 769 MHz (low edge of band A-100 MHz), ch 17	Spectrum Analyzer Noise Floor	> 20
769 MHz to 868 MHz (low edge of band A - 1 MHz), ch 17	-32.18	19.18
868 to 869 MHz (lower edge of band A), Ch 17	-25.5	12.5
880 to 980 MHz (upper edge of band A), ch 304	- 28.1	15.1
880 MHz (lower edge of band B), ch 362	-30.45	17.45
894 (upper edge of band B), ch 758	-24.09	11.09
894 to 994 MHz (upper edge of band B + 100 MHz), Ch 616	Spectrum Analyzer Noise Floor	> 20
994 MHz to 2 GHz	Spectrum Analyzer Noise Floor	> 20
2000 - 3000 MHz	Spectrum Analyzer Noise Floor	> 20
3000 - 4000 MHz	Spectrum Analyzer Noise Floor	>20
4000 - 5000 MHz	Spectrum Analyzer Noise Floor	>20
5000 - 6000 MHz	Spectrum Analyzer Noise Floor	>20
6000 - 7000 MHz	Spectrum Analyzer Noise Floor	>20
7000 - 8000 MHz	Spectrum Analyzer Noise Floor	>20
8000 - 9000 MHz	Spectrum Analyzer Noise Floor	>20

Table 11 : Spurious Emissions at the 800 MHz MFRM Antenna Port -2 carriers. Worst case results.

Frequency (MHz)	Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
	2 carrier	2 carriers
9 kHz to 769 MHz (low edge of band A-100 MHz), ch 17, 58	- 35.0	> 20
769 MHz to 868 MHz (low edge of band A - 1 MHz), ch 17, 58	- 34.5	> 20

Frequency (MHz)	Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
	2 carrier	2 carriers
868 to 869 MHz (lower edge of band A), Ch 17, 58	- 30.1	17.1
880 to 980 MHz (upper edge of band A), ch 263, 304	-27.85	14.85
880 MHz (lower edge of band B), ch 362, 403	-29.7	16.7
894 to 895 MHz (upper edge of band B + 1 MHz), Ch 575, 616	-37.2	> 20
994 MHz to 2 GHz	Spectrum Analyzer Noise Floor	> 20
2000 - 3000 MHz	Spectrum Analyzer Noise Floor	> 20
3000 - 4000 MHz	Spectrum Analyzer Noise Floor	>20
4000 - 5000 MHz	Spectrum Analyzer Noise Floor	>20
5000 - 6000 MHz	Spectrum Analyzer Noise Floor	>20
6000 - 7000 MHz	Spectrum Analyzer Noise Floor	>20
7000 - 8000 MHz	Spectrum Analyzer Noise Floor	>20
8000 - 9000 MHz	Spectrum Analyzer Noise Floor	>20

Table 12 : Spurious Emissions at the 800 MHz MFRM Antenna Port -3 carriers. Worst case results.

Frequency (MHz)	Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
	3 carriers	3 carriers
9 kHz to 769 MHz (low edge of band A- 100 MHz), ch 17, 58, 99	-34.5	> 20
769 MHz to 868 MHz (low edge of band A - 1 MHz), ch 222, 263, 304	-33.34	> 20
869 (lower edge of band A) Ch 17, 58, 99	-28.6	15.6
880 (upper edge of band A + 100 MHz), Ch 222, 263, 304	-27.7	14.7
880 (lower edge of band B - 100 MHz), Ch 362, 403, 444	-29.79	16.8
890 (upper edge of band B) Ch 534, 575, 616	- 31.8	18.8

Frequency (MHz)	Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
	3 carriers	3 carriers
Upper Edge of band B- 2 GHz	Spectrum Analyzer Noise Floor	> 20
2000 - 3000 MHz	Spectrum Analyzer Noise Floor	> 20
3000 - 4000 MHz	Spectrum Analyzer Noise Floor	>20
4000 - 5000 MHz	Spectrum Analyzer Noise Floor	>20
5000 - 6000 MHz	Spectrum Analyzer Noise Floor	>20
6000 - 7000 MHz	Spectrum Analyzer Noise Floor	>20
7000 - 8000 MHz	Spectrum Analyzer Noise Floor	>20
8000 - 9000 MHz	Spectrum Analyzer Noise Floor	>20

The spurious that appear in the plots 1GHz - 2GHz and 2GHz - 3GHz are the second and third harmonic produced by the spectrum analyzer and not by the product. The second harmonic of the product at the duplexor transmit input port is lower than -10dBm and the duplexor has at least 40 dB of rejection at frequencies higher than 1GHz. Therefore the product second and third harmonics are lower than -50dBm at the duplexor antenna port.

To prove this, measurements have been performed with less input into the spectrum analyzer by increasing the external attenuation with 10dB. The level of harmonics have decreased below the thermal noise which even if it increased it was below what the levels of harmonics have been when the level of external attenuation was 10dB lower. This proves that the harmonics were coming from the spectrum analyzer.

Figure 7 : Conducted Spurious Emissions - 1 Carrier, Channel 17 (9kHz - 868 MHz)

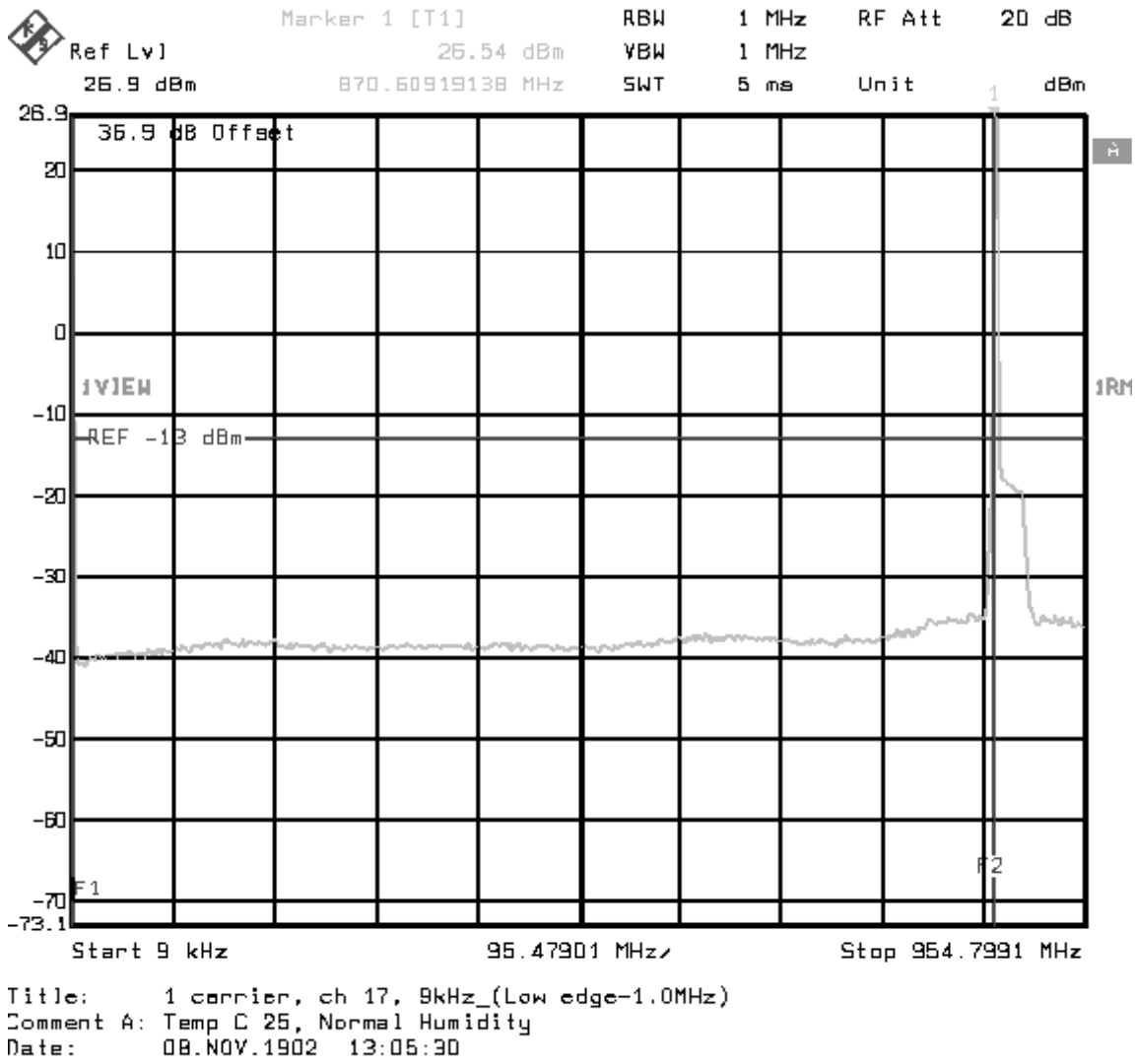


Figure 8 : Conducted Spurious Emissions - 1 Carrier, Channel 17 (Lower adjacent 1 MHz)

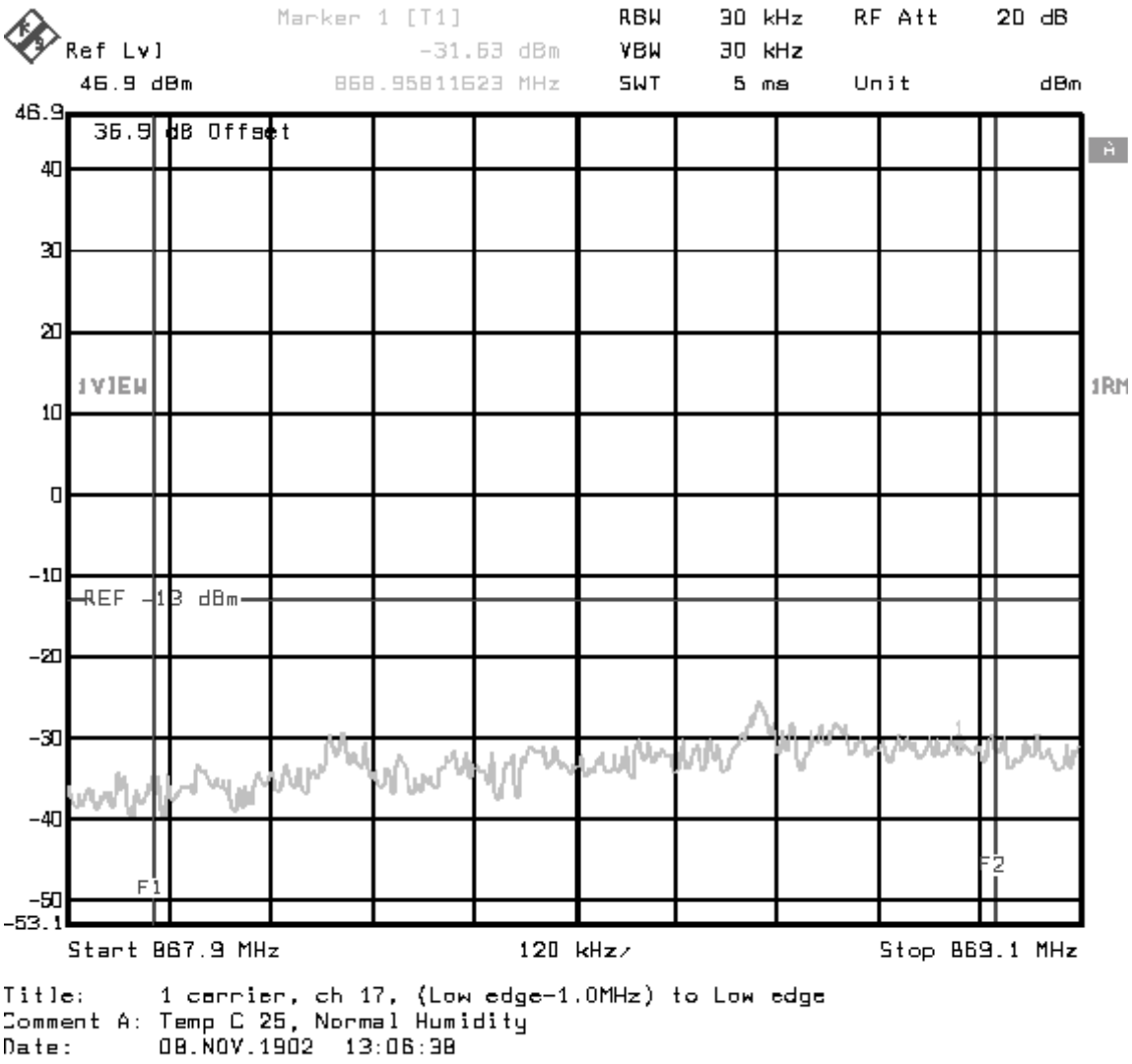


Figure 9 : Conducted Spurious Emissions - 1 Carrier, Channel 758 (Upper adjacent 100 MHz)

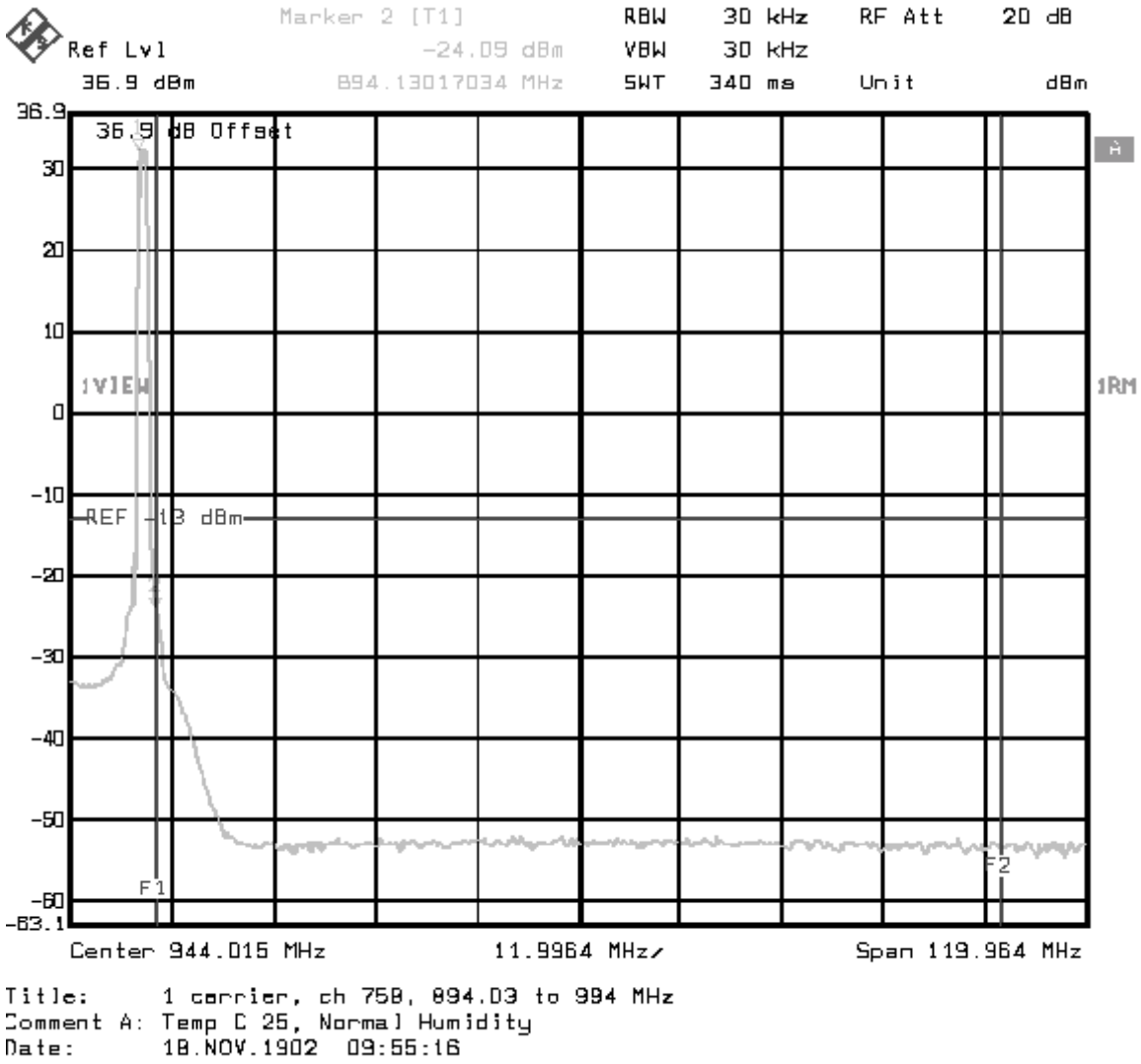


Figure 10 : Conducted Spurious Emissions - 1 Carrier, Channel 616 (994 MHz to 2.0 GHz)

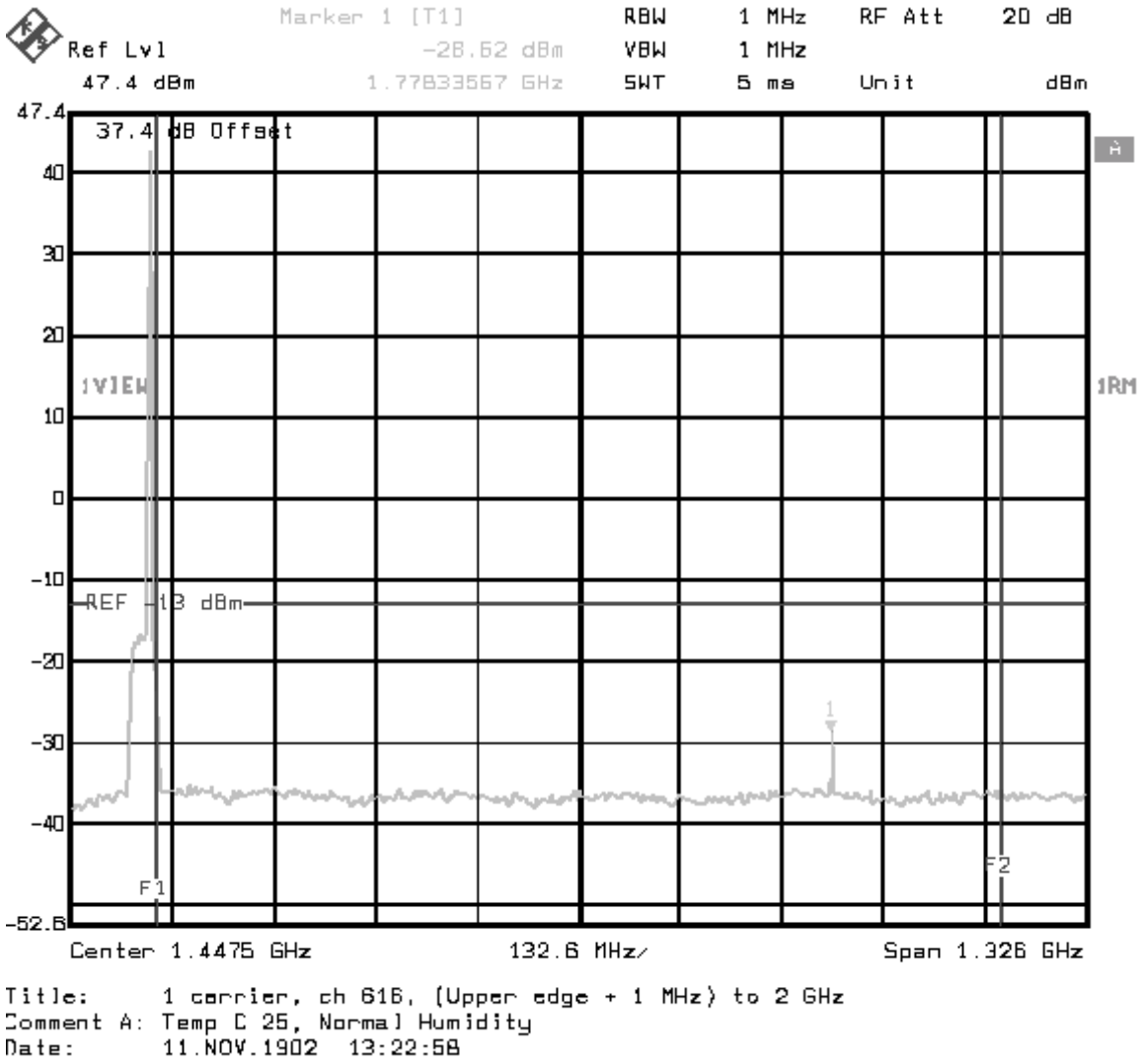


Figure 11 : Conducted Spurious Emissions - 1 Carrier, Channel 616 (2 to 3 GHz)

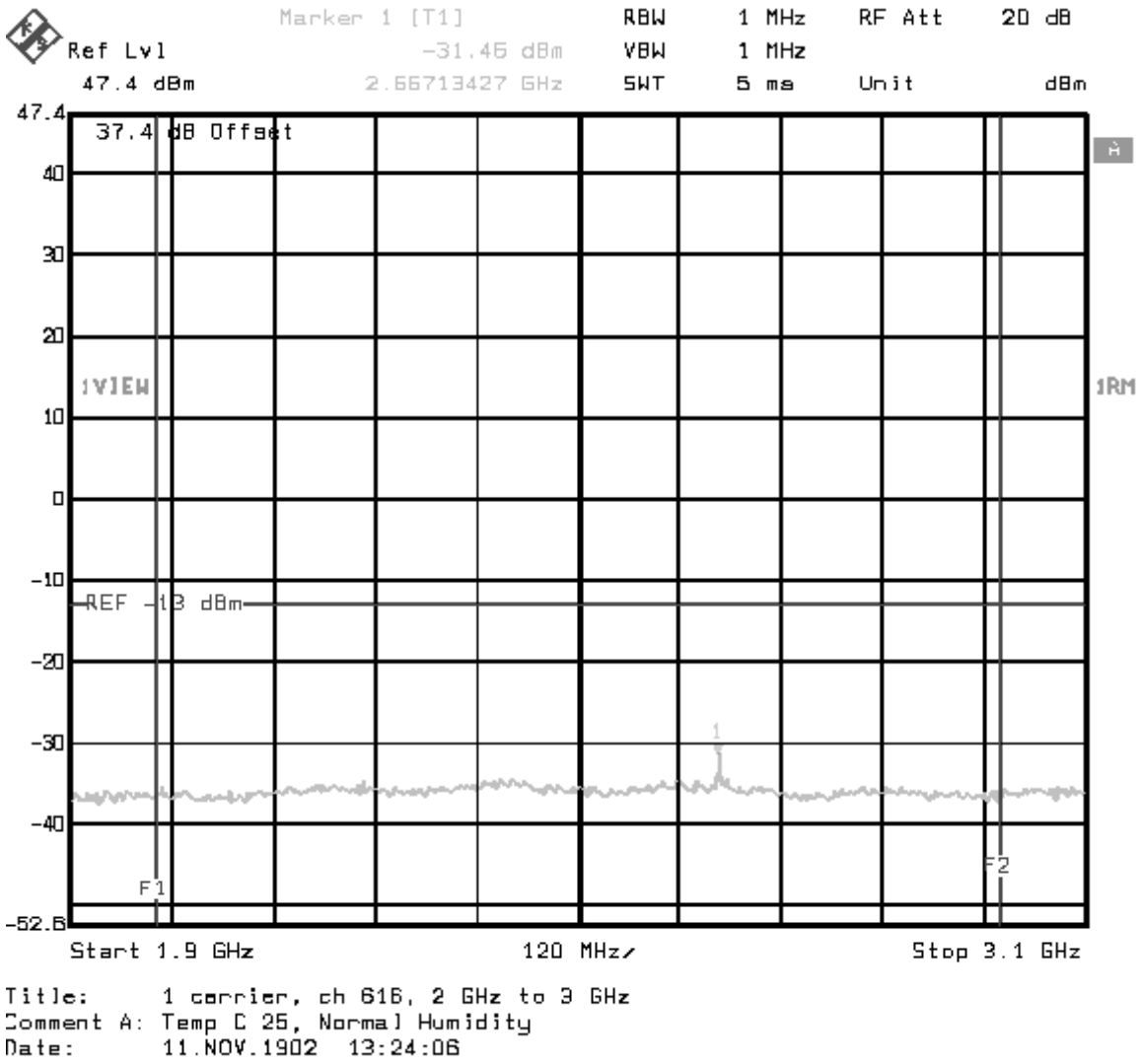


Figure 12 : Conducted Spurious Emissions - 1 Carrier, Channel 616 (3 GHz - 4 GHz)

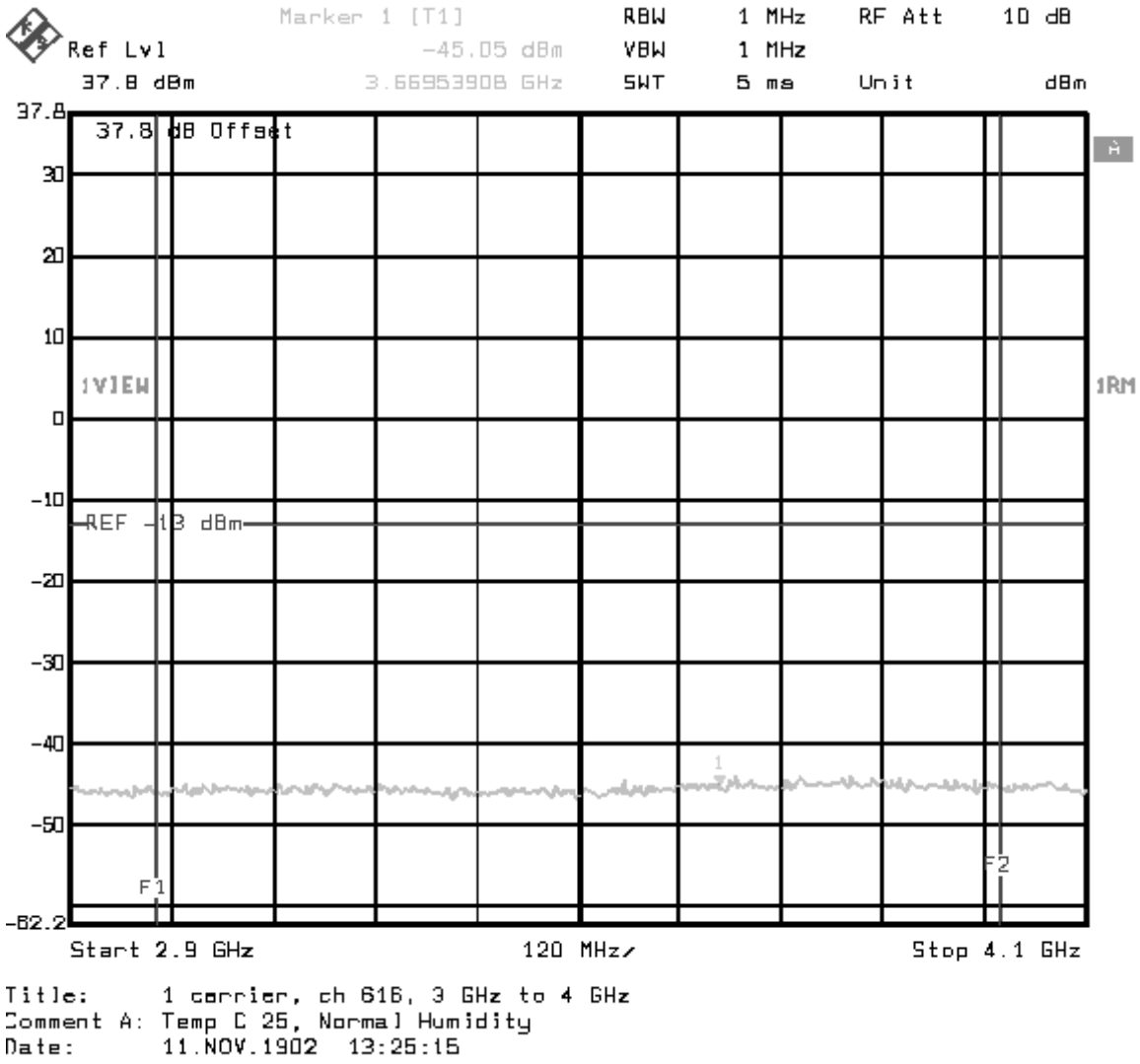


Figure 13 : Conducted Spurious Emissions - 1 Carrier, Channel 616 (4 GHz - 5 GHz)

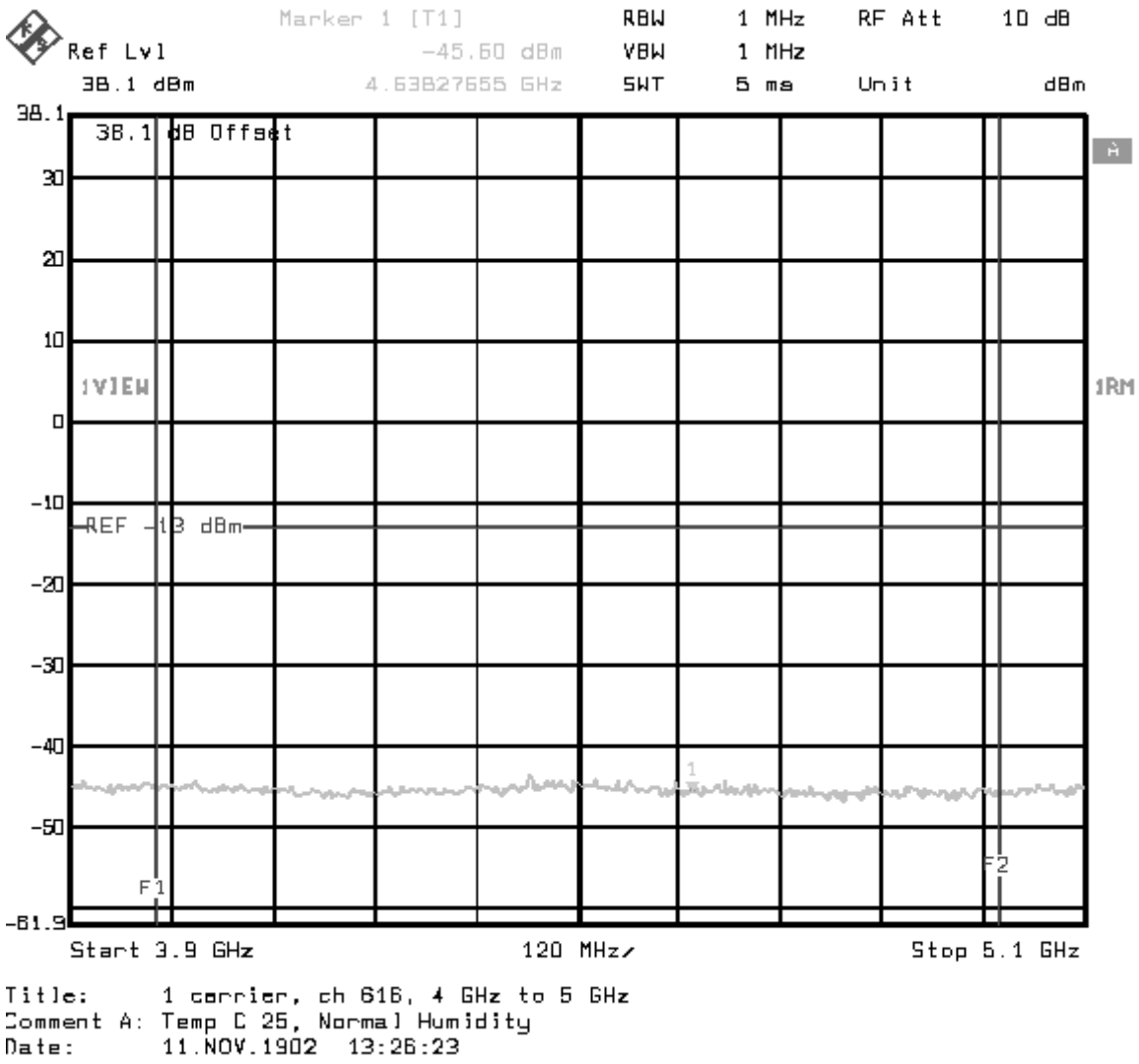


Figure 14 : Conducted Spurious Emissions - 1 Carrier, Channel 616 (5 GHz - 6 GHz)

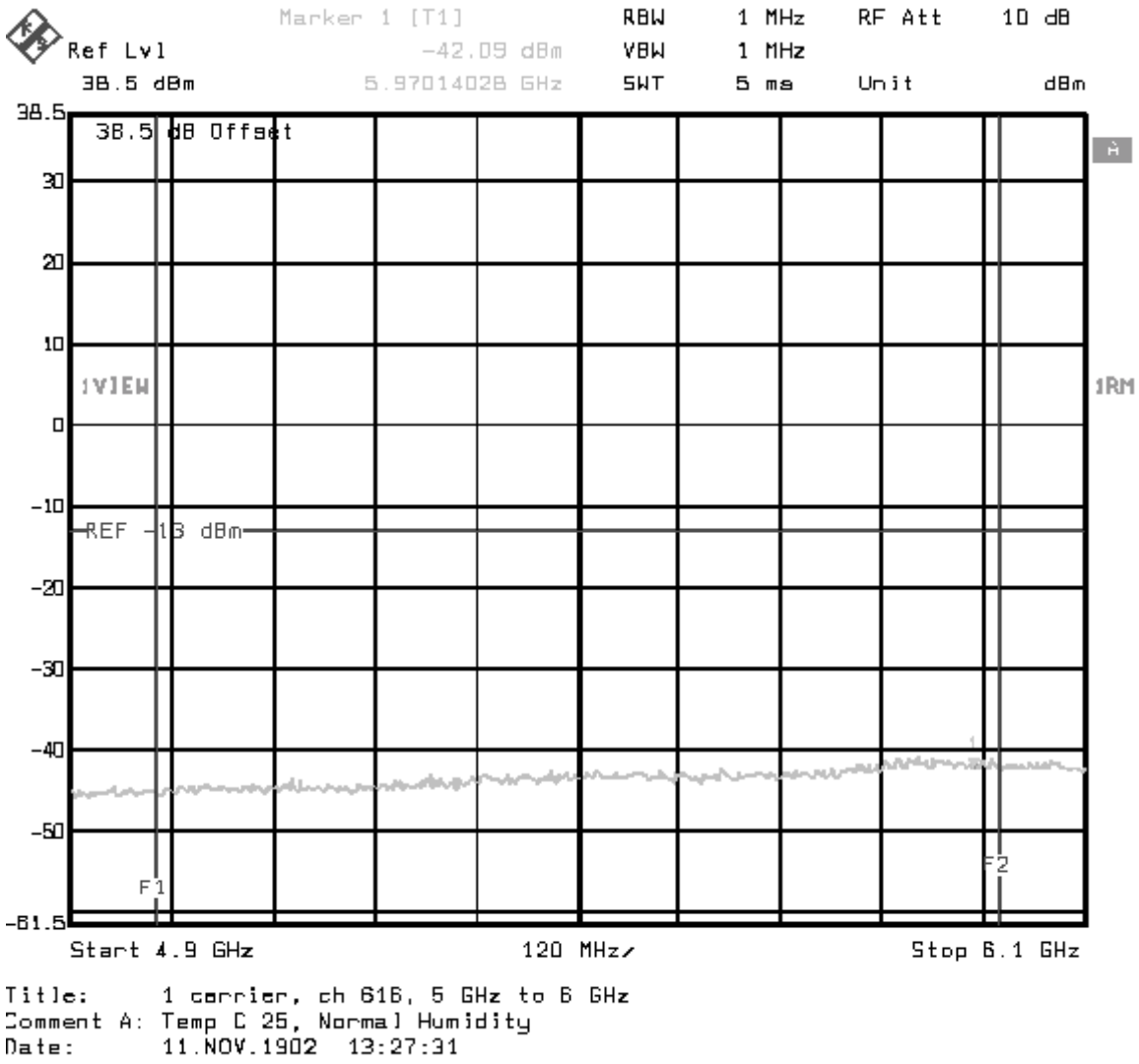


Figure 15 : Conducted Spurious Emissions - 1 Carrier, Channel 616 (6 GHz - 7 GHz)

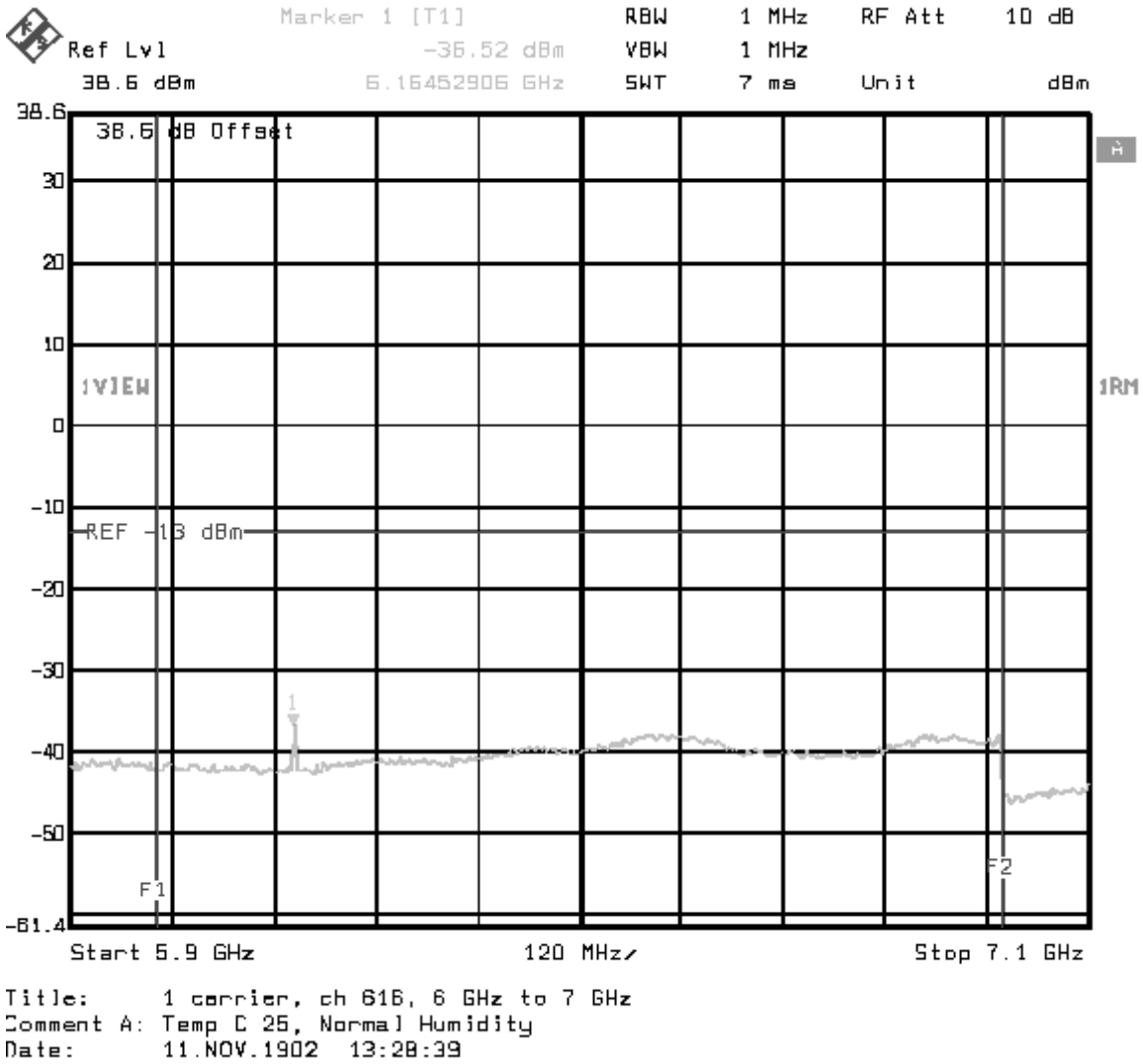


Figure 16 : Conducted Spurious Emissions - 1 Carrier, Channel 616 (7 GHz - 8 GHz)

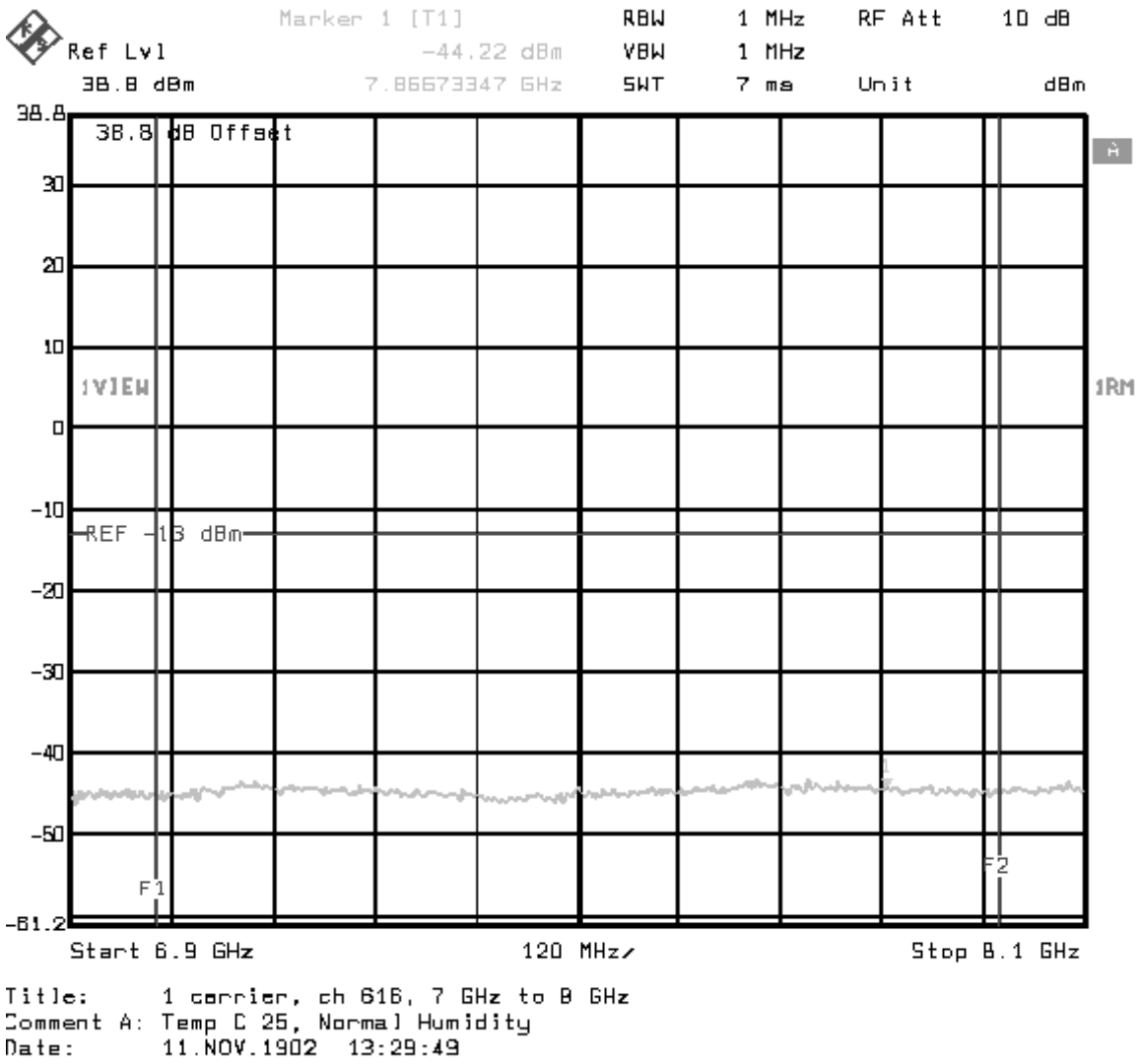


Figure 17 : Conducted Spurious Emissions - 1 Carrier, Channel 616 (8 GHz - 9 GHz)

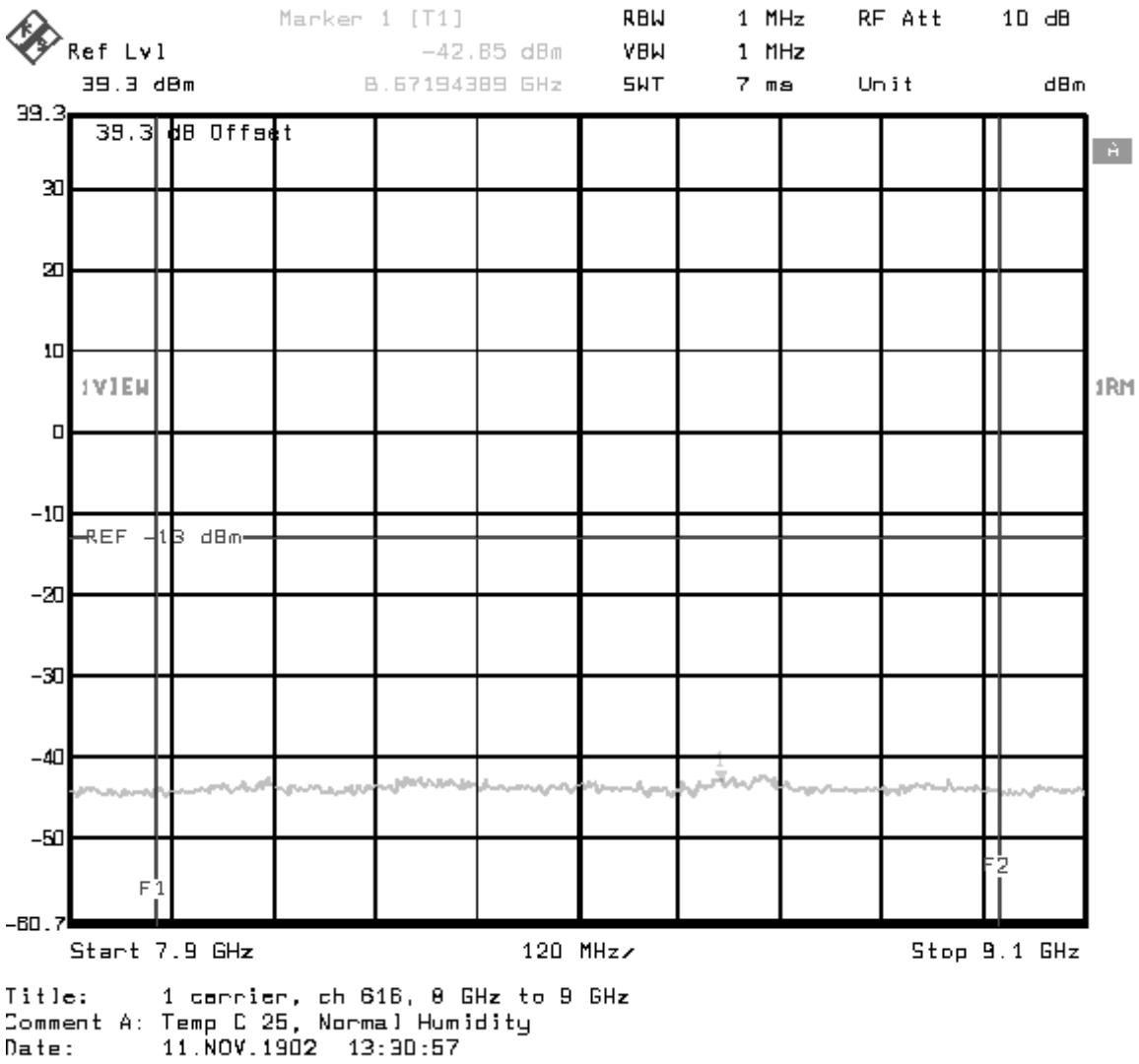


Figure 18 : Conducted Spurious Emissions - 3 Carrier, Channels 17, 58, 99 (9KHz - 769 MHz)

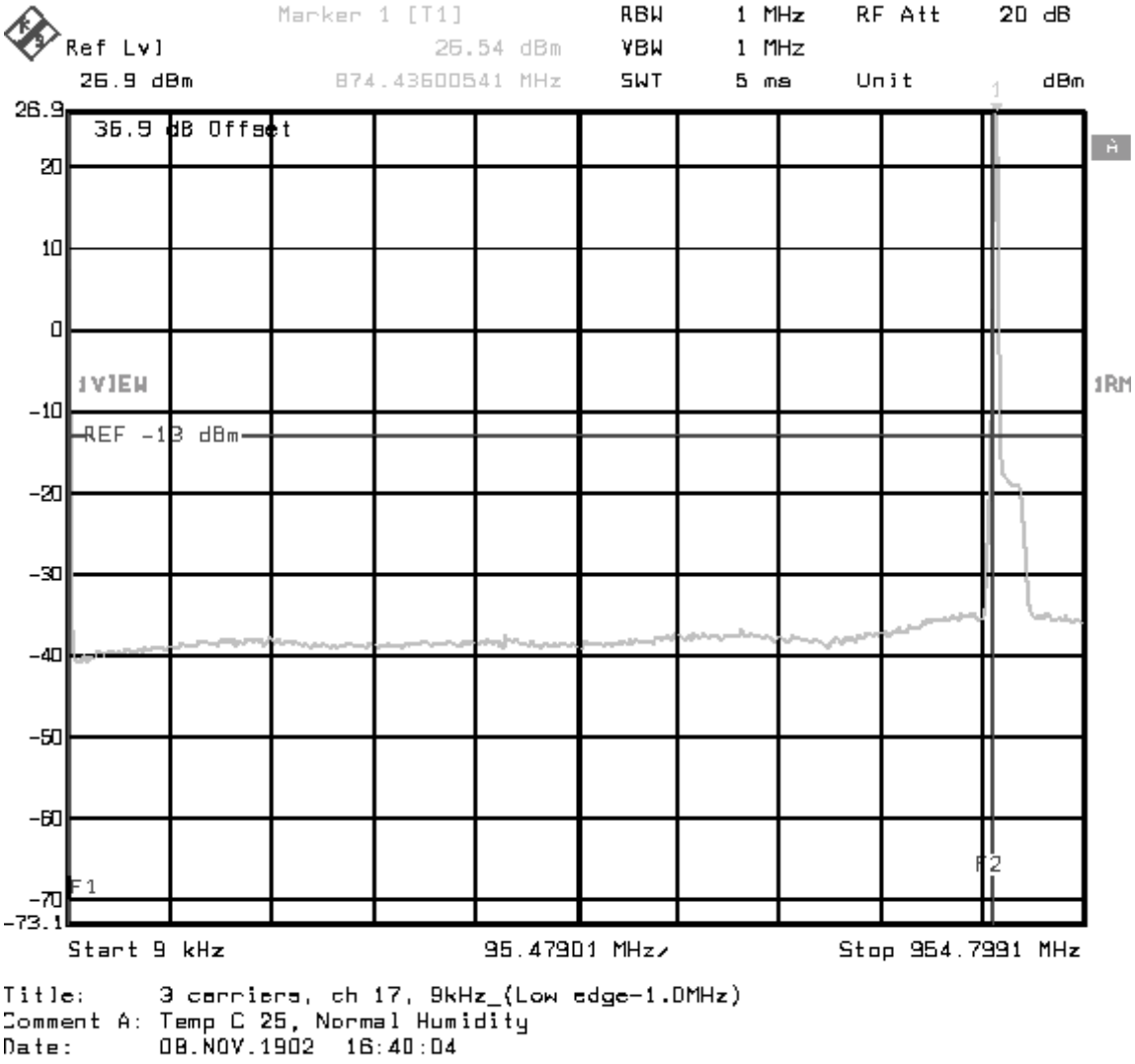


Figure 19 : Conducted Spurious Emissions - 3 Carrier, Channels 222, 263, 304 (Low edge A - 100 MHz)

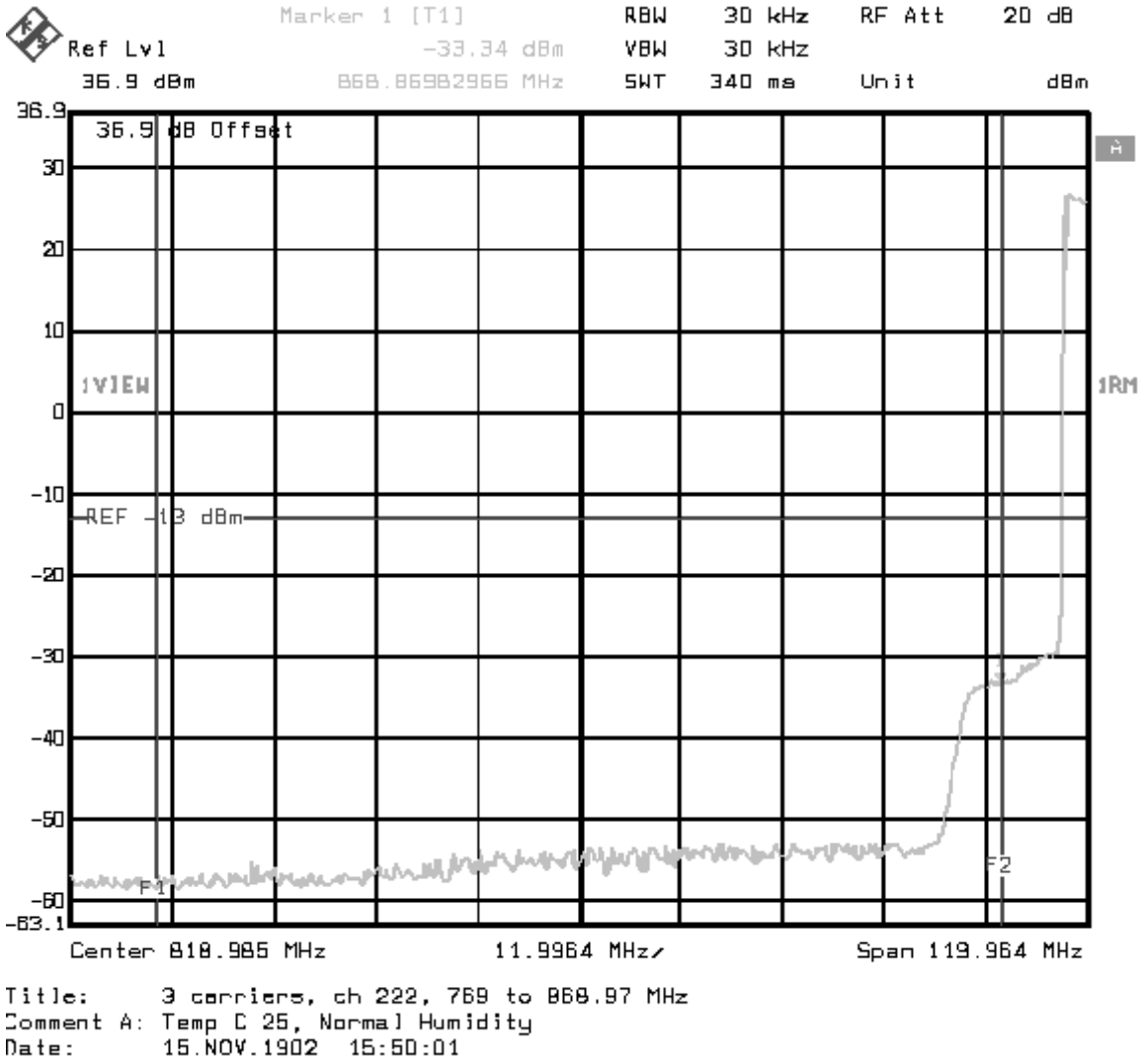


Figure 20 : Conducted Spurious Emissions - 3 Carrier, Channels 17, 58, 99 (Low adjacent 1 MHz)

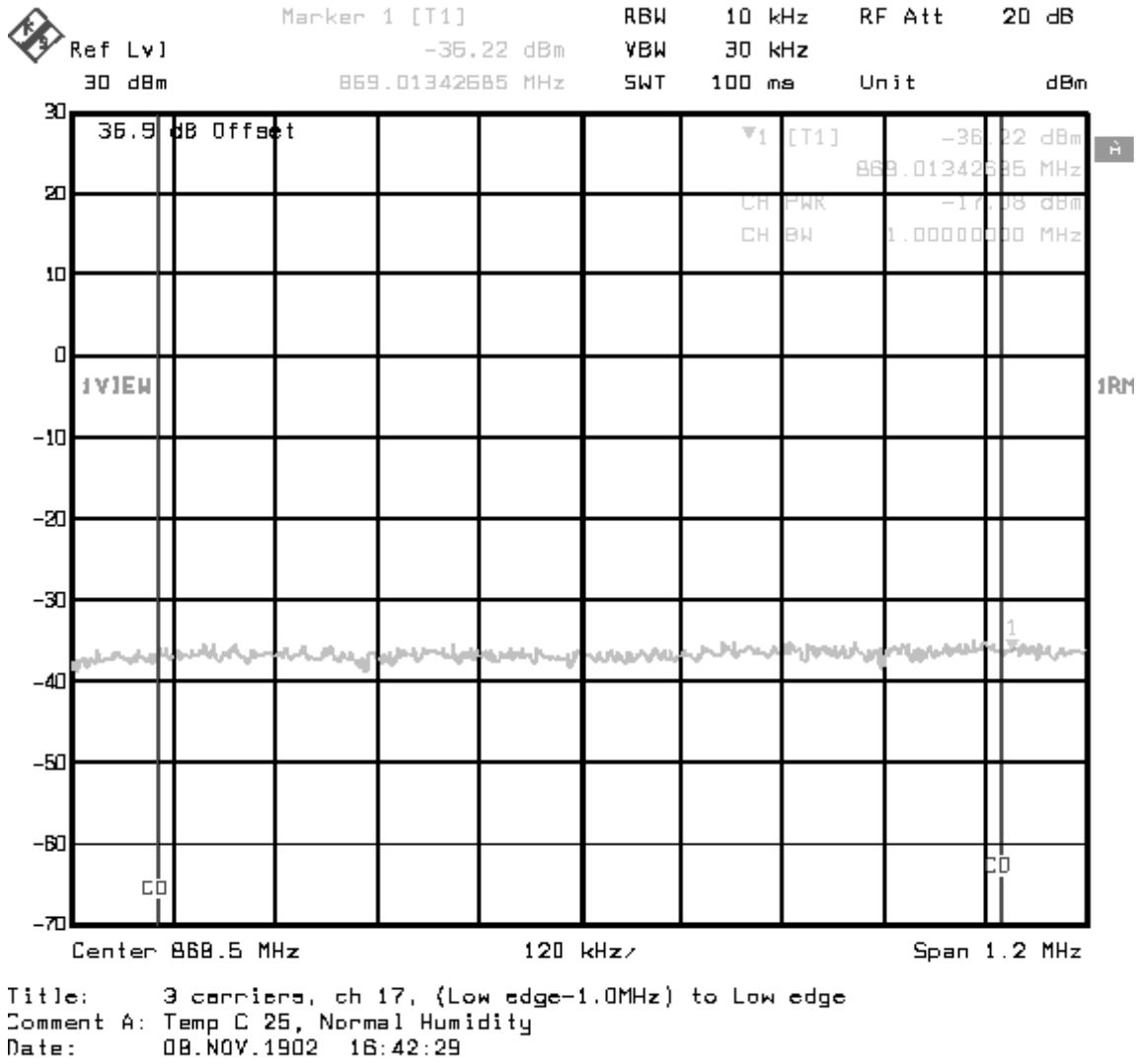


Figure 21 : Conducted Spurious Emissions - 3 Carrier, Channels 222, 263, 304 (Upper edge A + 100 MHz)

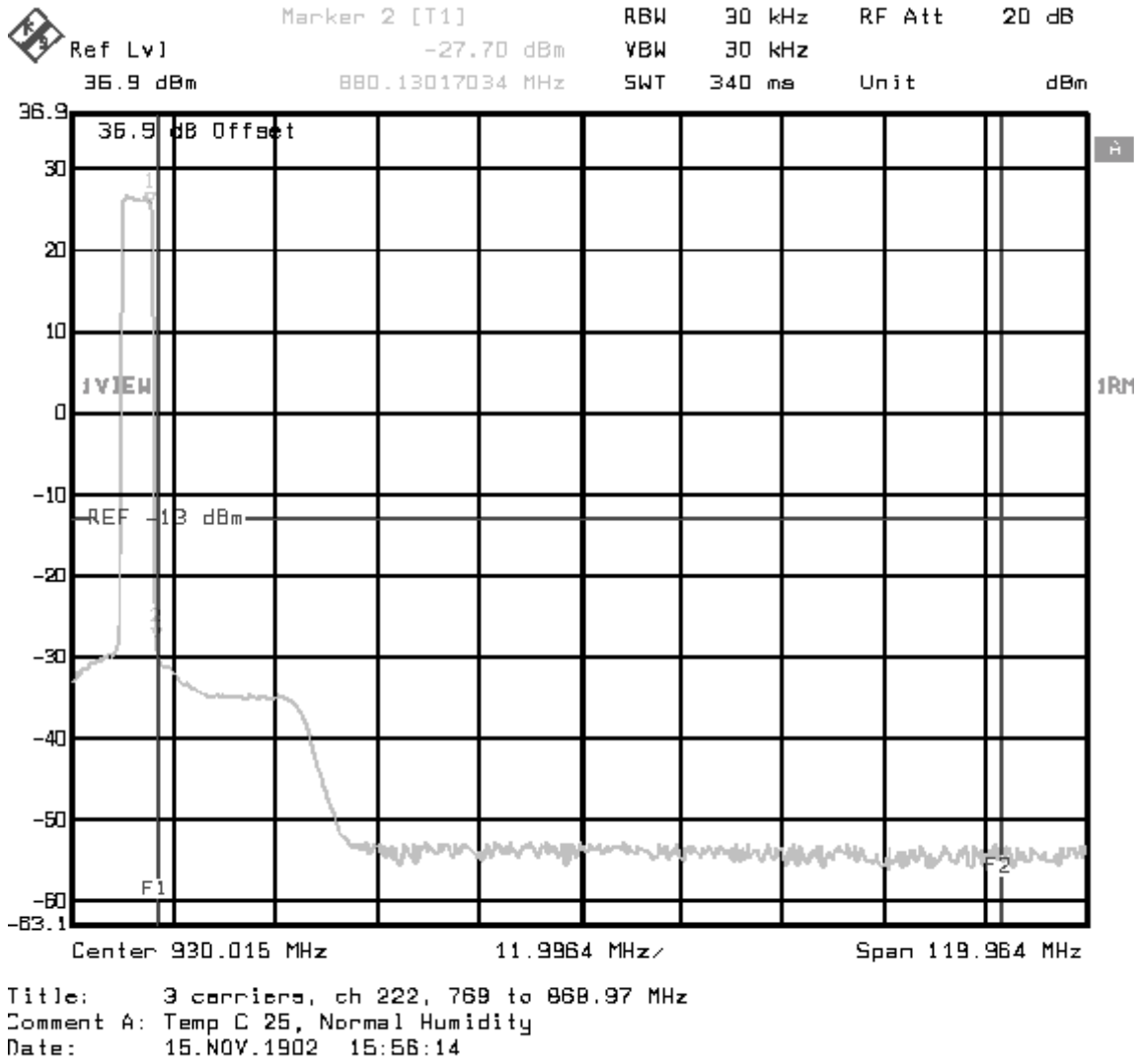


Figure 22 : Conducted Spurious Emissions - 3 Carrier, Channels 362, 403, 444 (Low edge B - 100 MHz)

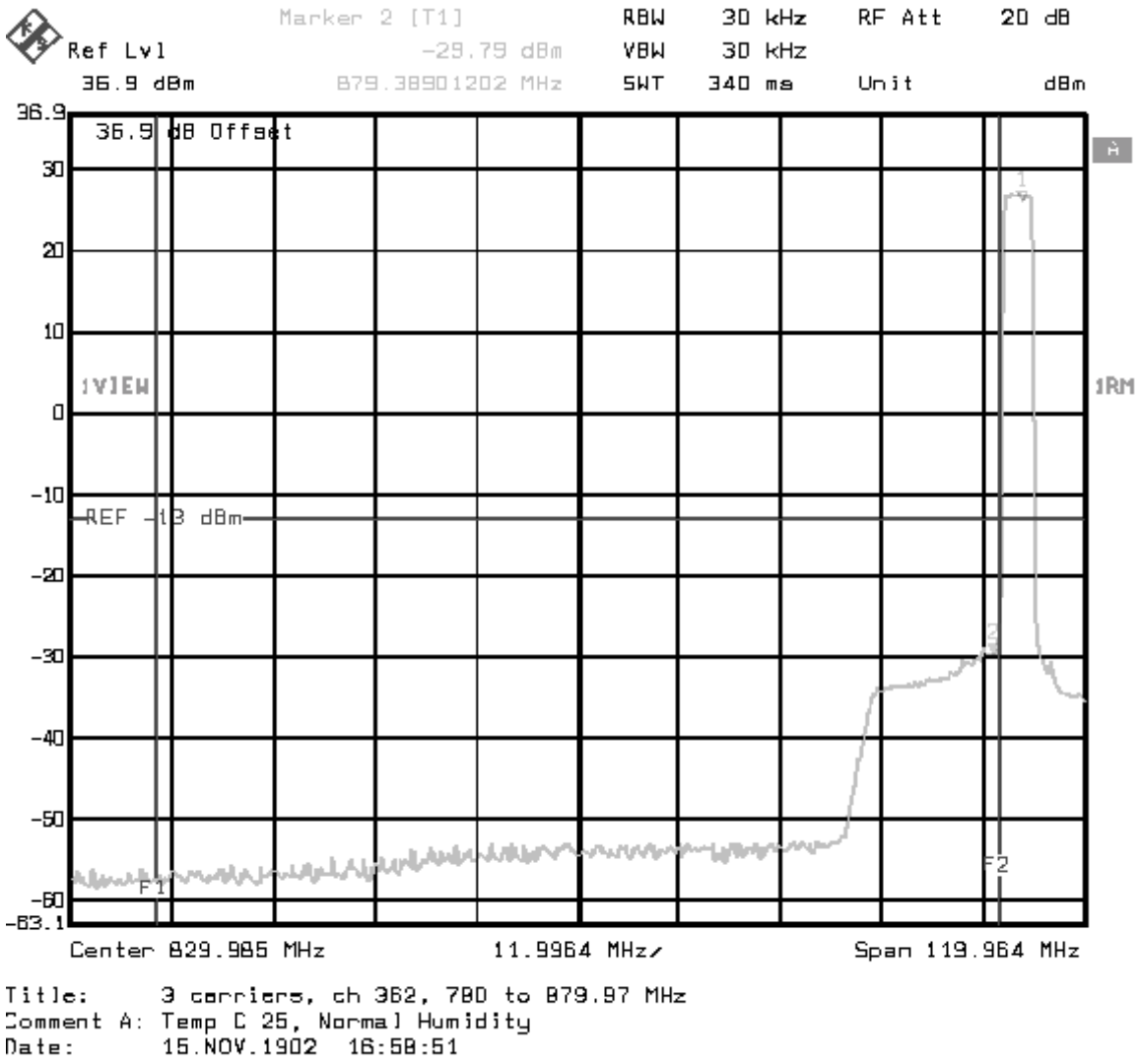


Figure 23 : Conducted Spurious Emissions - 3 Carrier, Channels 534, 575, 616 (Upper edge of band B)

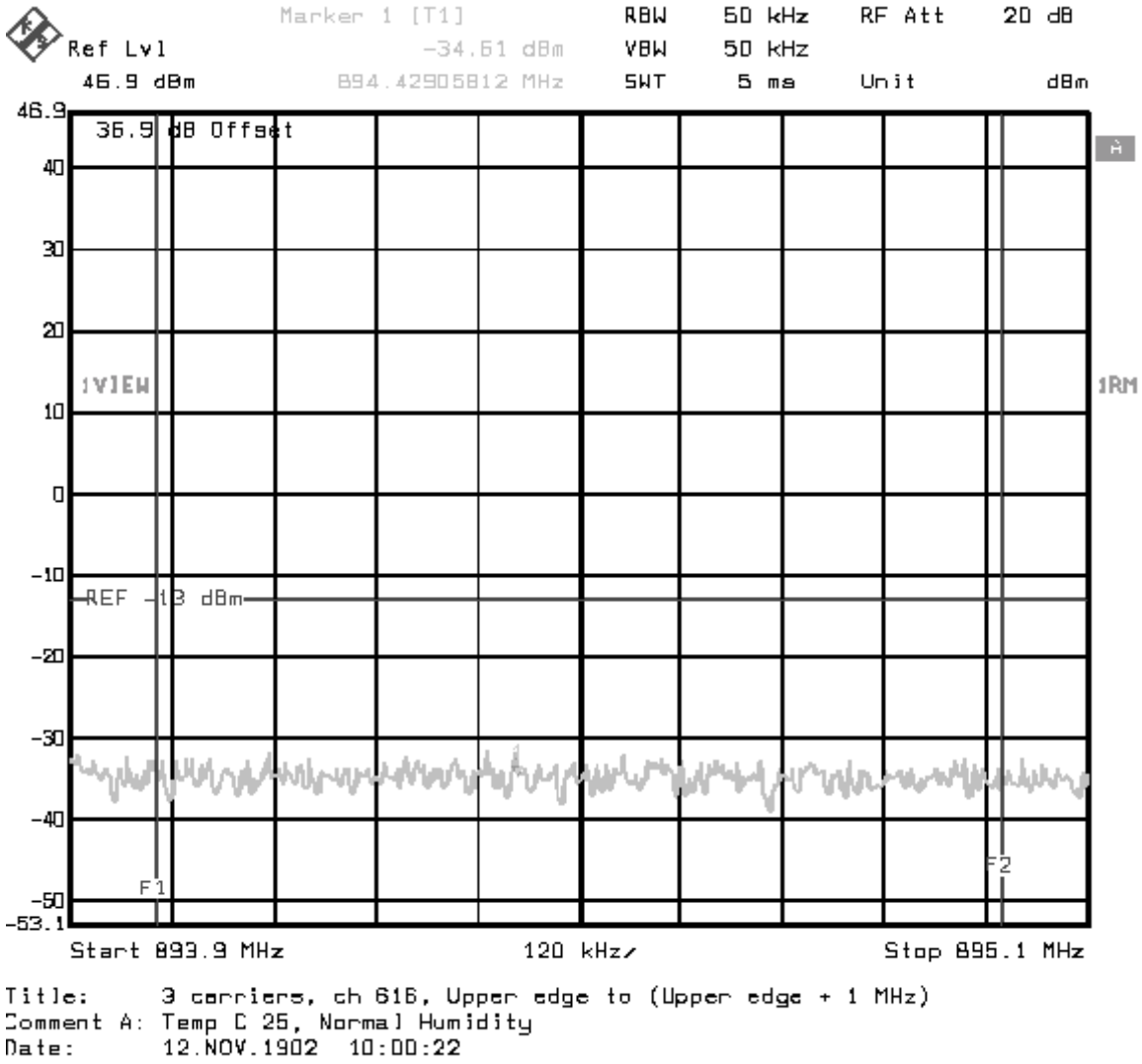


Figure 24 : Conducted Spurious Emissions - 3 Carrier, Channels 534, 575, 616 (Upper edge B to 2 GHz)

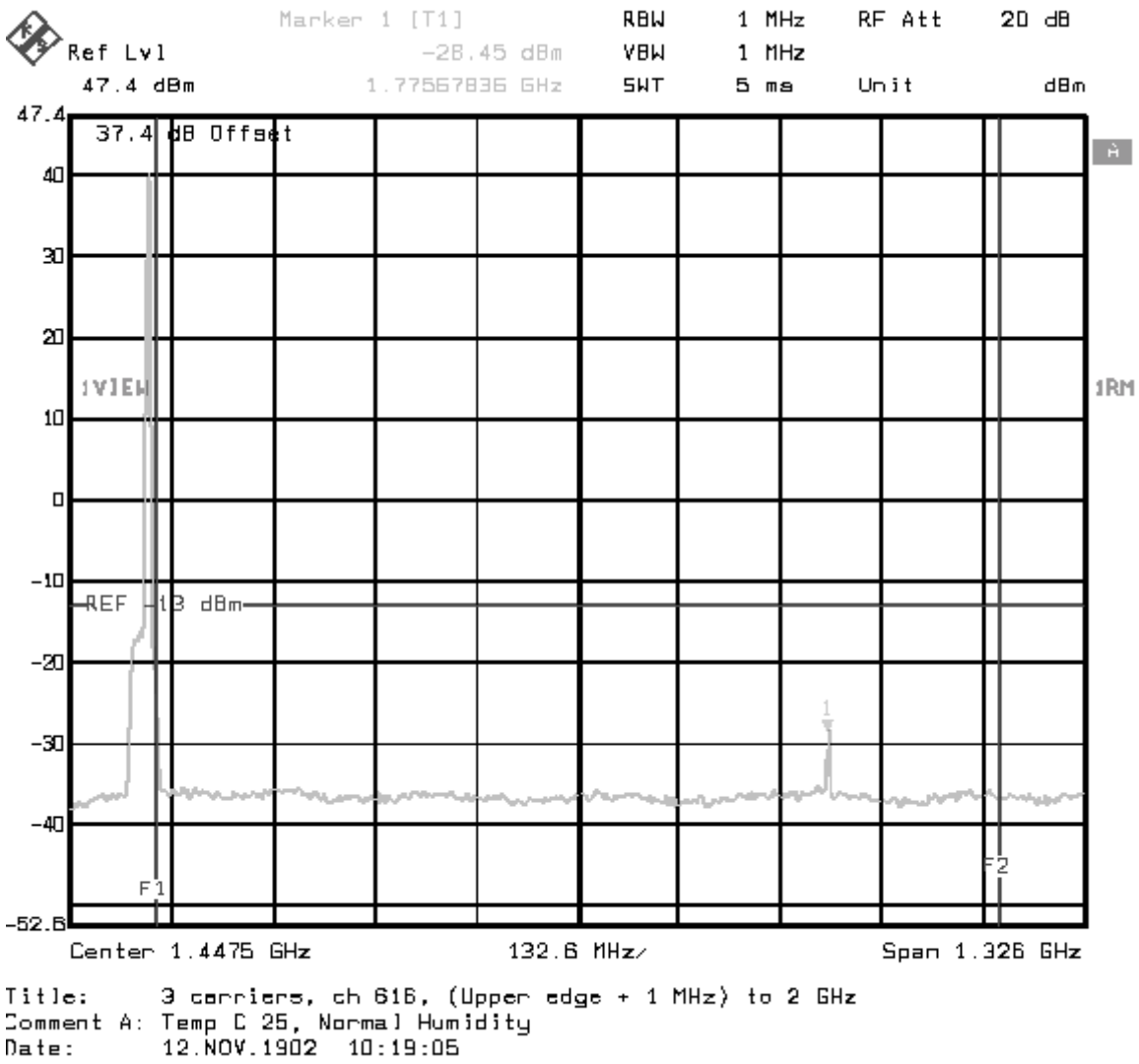
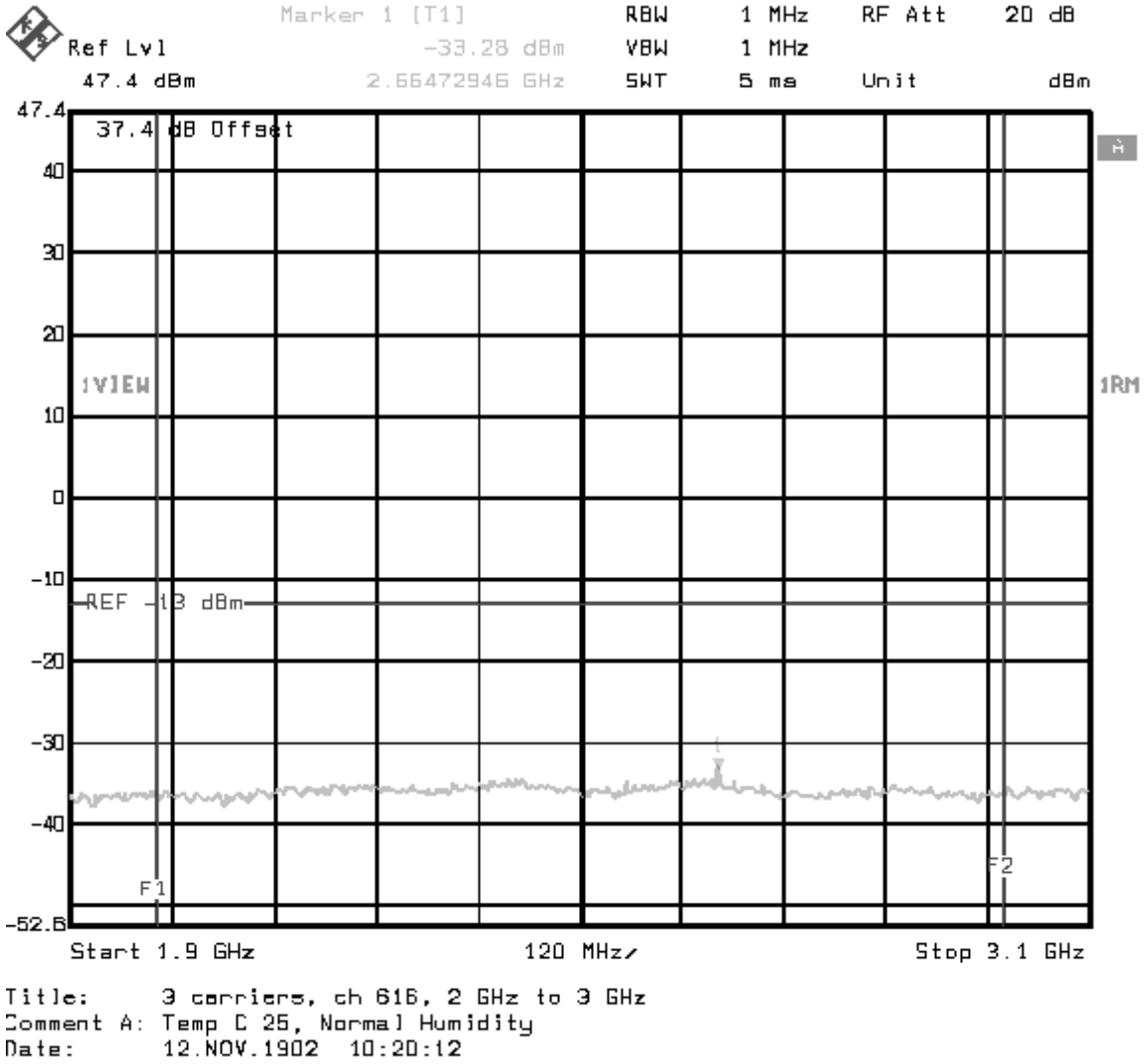


Figure 25 : Conducted Spurious Emissions - 3 Carrier, Channels 534, 575, 616 (2 GHz - 3 GHz)



The plots for 3 carrier Channels 534, 575, 616 for offsets higher than 3 GHz are the same with the ones for 1 carrier scenario and they represent the noise of the spectrum analyzer. Therefore they are not presented in the document.

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 to +50 centigrade for all equipment except that specified in subparagraphs (2) and (3) of this paragraph.

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

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

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

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

FCC Part 22.355 Limit

The frequency stability shall be better than +/-1.5ppm over a temperature range of -30 to +50 degrees C for frequency range 821 to 896 MHz.

4.4.2 Results

The DE incorporates a GPS module from Trimble Navigation. This 10MHz GPS reference is used to synchronize the entire Base Station. The GPS module has a frequency stability of 0.8 ppm over the range of -5C to 70C. The Base Station complies with the requirement as the GPS module is maintained at temperature higher than -5 degree C.

References

[1] FCC Part 22 Subpart H, “Cellular Radiotelephone Service”, http://www.access.gpo.gov/nara/cfr/waisidx_00/47cfr22_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] TIA/EIA-97-D “Recommended Minimum Performance Standards for Base Stations Supporting Dual Mode Spread Spectrum Systems”, June 2001

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