Marstech Limited

[redacted]
11 Kelfield Street, Etobicoke, Ontario, Canada, M9W 5A1
Telephone (416) 246-1116, Fax (416) 246-1020

Authorized by: Professional Engineers Ontario

Engineering & Administrative

CERTIFICATED UL AGENCY

Testing For FCC Submissions/Verifications

Approved Test Facility

Qualified SP Facility

TEST REPORT

REPORT DATE:	06 February 2003	REPORT NO:	22389D
CONTENTS:	See Table of Contents		
SUBMITTOR:	ATLINKS USA, Inc. 101 West 103rd Street Indianapolis, IN 46290-1102 USA		
SUBJECT:	Model No:	**27958XXX-A**	
	FCC ID:	G9H2-7958A	
TEST SPECIFICATION	FCC 47 CFR Part 15 NOTE: Tests Conducted Are "Type" Tests.		
DATE SAMPLE RECEIVED:	16 December 2002 and 20 January 2003	DATE TESTED:	04, 09, 20, 24 and 28 January 2003
RESULTS:	Equipment tested complies with referenced specification. Also, the Model 27958XXX-A meets the new rules (150kHz to 30MHz) FCC Power Line Conducted Limits.		
ALTERATIONS	None		
Tested by:	Ed. Chang	Approved by:	Robert Marshall
	Edward Chang	Date:	Robert G. Marshall, P. Eng. Feb 12/03

REGISTERED PROFESSIONAL ENGINEER R. G. MARSHALL

TECHNICAL REPORT - FCC 2.1033(b)

Applicant

ATLINKS USA, Inc.
101 West 103rd Street
Indianapolis, IN
46290-1102 USA

FCC Identifier

G9H2-7958A

Manufacturer

Huiyang CCT Telecommunications Products Co. Ltd.
CCT Technology Park, San He Economic Experimental Zone
Huiyang City, Guangdong Province
P. R. of China

TABLE OF CONTENTS

EXHIBIT D

[FCC Ref. 2.1033(b)(6)]

"Report of Measurements"

Exhibit D(1)-1 to D(1)-18 - Test Data/Measurements
Exhibit D(2)-1 to D(2)-3 - Test Equipment List and Measurement Facility (3 Meter Site)
Exhibit D(3)-1 to D(3)-2 - Test Set-Up Photo
Exhibit D(4) - Test Setup Diagram for AC Conducted Line Testing

TABLE OF CONTENTS

TEST REPORT CONTAINING:

PRODUCT DESCRIPTION

The Model 27958XXX-A is a single-line corded speakerphone with answering machine, caller ID and 2.4GHz cordless handset with caller ID and charging station, that operates from 2402.3 to 2480.55 MHz. The antenna used for the base and the handset is permanently attached to the EUT. Its actual frequency range is:

Base:	2402.30 MHz to 2408.15 MHz
Handset:	2474.71 MHz to 2480.55 MHz

A complete frequency list is shown on the following pages.

27958A Frequency Table

Handset

Channel No.	Tx Freq	Tx VCO Freq	Rx Freq	Rx VCO Freq
1	2474.700	824.900	2402.300	797.200
2	2474.850	824.950	2402.450	797.250
3	2475.000	825.000	2402.600	797.300
4	2475.150	825.050	2402.750	797.350
5	2475.300	825.100	2402.900	797.400
6	2475.450	825.150	2403.050	797.450
7	2475.600	825.200	2403.200	797.500
8	2475.750	825.250	2403.350	797.550
9	2475.900	825.300	2403.500	797.600
10	2476.050	825.350	2403.650	797.650
11	2476.200	825.400	2403.800	797.700
12	2476.350	825.450	2403.950	797.750
13	2476.500	825.500	2404.100	797.800
14	2476.650	825.550	2404.250	797.850
15	2476.800	825.600	2404.400	797.900
16	2476.950	825.650	2404.550	797.950
17	2477.100	825.700	2404.700	798.000
18	2477.250	825.750	2404.850	798.050
19	2477.400	825.800	2405.000	798.100
20	2477.550	825.850	2405.150	798.150
21	2477.700	825.900	2405.300	798.200
22	2477.850	825.950	2405.450	798.250
23	2478.000	826.000	2405.600	798.300
24	2478.150	826.050	2405.750	798.350
25	2478.300	826.100	2405.900	798.400
26	2478.450	826.150	2406.050	798.450
27	2478.600	826.200	2406.200	798.500
28	2478.750	826.250	2406.350	798.550
29	2478.900	826.300	2406.500	798.600
30	2479.050	826.350	2406.650	798.650
31	2479.200	826.400	2406.800	798.700
32	2479.350	826.450	2406.950	798.750
33	2479.500	826.500	2407.100	798.800
34	2479.650	826.550	2407.250	798.850
35	2479.800	826.600	2407.400	798.900
36	2479.950	826.650	2407.550	798.950
37	2480.100	826.700	2407.700	799.000
38	2480.250	826.750	2407.850	799.050
39	2480.400	826.800	2408.000	799.100
40	2480.550	826.850	2408.150	799.150

Base

Channel No.	Tx Freq	Tx VCO Freq	Rx Freq	Rx VCO Freq
1	2402.300	800.7667	2474.700	828.4667
2	2402.450	800.8167	2474.850	828.5167
3	2402.600	800.8667	2475.000	828.5667
4	2402.750	800.9167	2475.150	828.6167
5	2402.900	800.9667	2475.300	828.6667
6	2403.050	801.0167	2475.450	828.7167
7	2403.200	801.0667	2475.600	828.7667
8	2403.350	801.1167	2475.750	828.8167
9	2403.500	801.1667	2475.900	828.8667
10	2403.650	801.2167	2476.050	828.9167
11	2403.800	801.2667	2476.200	828.9667
12	2403.950	801.3167	2476.350	829.0167
13	2404.100	801.3667	2476.500	829.0667
14	2404.250	801.4167	2476.650	829.1167
15	2404.400	801.4667	2476.800	829.1667
16	2404.550	801.5167	2476.950	829.2167
17	2404.700	801.5667	2477.100	829.2667
18	2404.850	801.6167	2477.250	829.3167
19	2405.000	801.6667	2477.400	829.3667
20	2405.150	801.7167	2477.550	829.4167
21	2405.300	801.7667	2477.700	829.4667
22	2405.450	801.8167	2477.850	829.5167
23	2405.600	801.8667	2478.000	829.5667
24	2405.750	801.9167	2478.150	829.6167
25	2405.900	801.9667	2478.300	829.6667
26	2406.050	802.0167	2478.450	829.7167
27	2406.200	802.0667	2478.600	829.7667
28	2406.350	802.1167	2478.750	829.8167
29	2406.500	802.1667	2478.900	829.8667
30	2406.650	802.2167	2479.050	829.9167
31	2406.800	802.2667	2479.200	829.9667
32	2406.950	802.3167	2479.350	830.0167
33	2407.100	802.3667	2479.500	830.0667
34	2407.250	802.4167	2479.650	830.1167
35	2407.400	802.4667	2479.800	830.1667
36	2407.550	802.5167	2479.950	830.2167
37	2407.700	802.5667	2480.100	830.2667
38	2407.850	802.6167	2480.250	830.3167
39	2408.000	802.6667	2480.400	830.3667
40	2408.150	802.7167	2480.550	830.4167

15.107 (a) POWER LINE CONDUCTED INTERFERENCE

Requirements:

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 KHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Test Procedure:

ANSI STANDARD C63.4-1992. using a 50μH LISN. Both lines were observed with the EUT transmitting. The bandwidth of the spectrum analyzer was 9KHz QP with an appropriate sweep speed. The ambient temperature of the EUT was 24˚C with a humidity of 60%.

The spectrum was scanned from 0.15 to 30MHz.

Test Data:

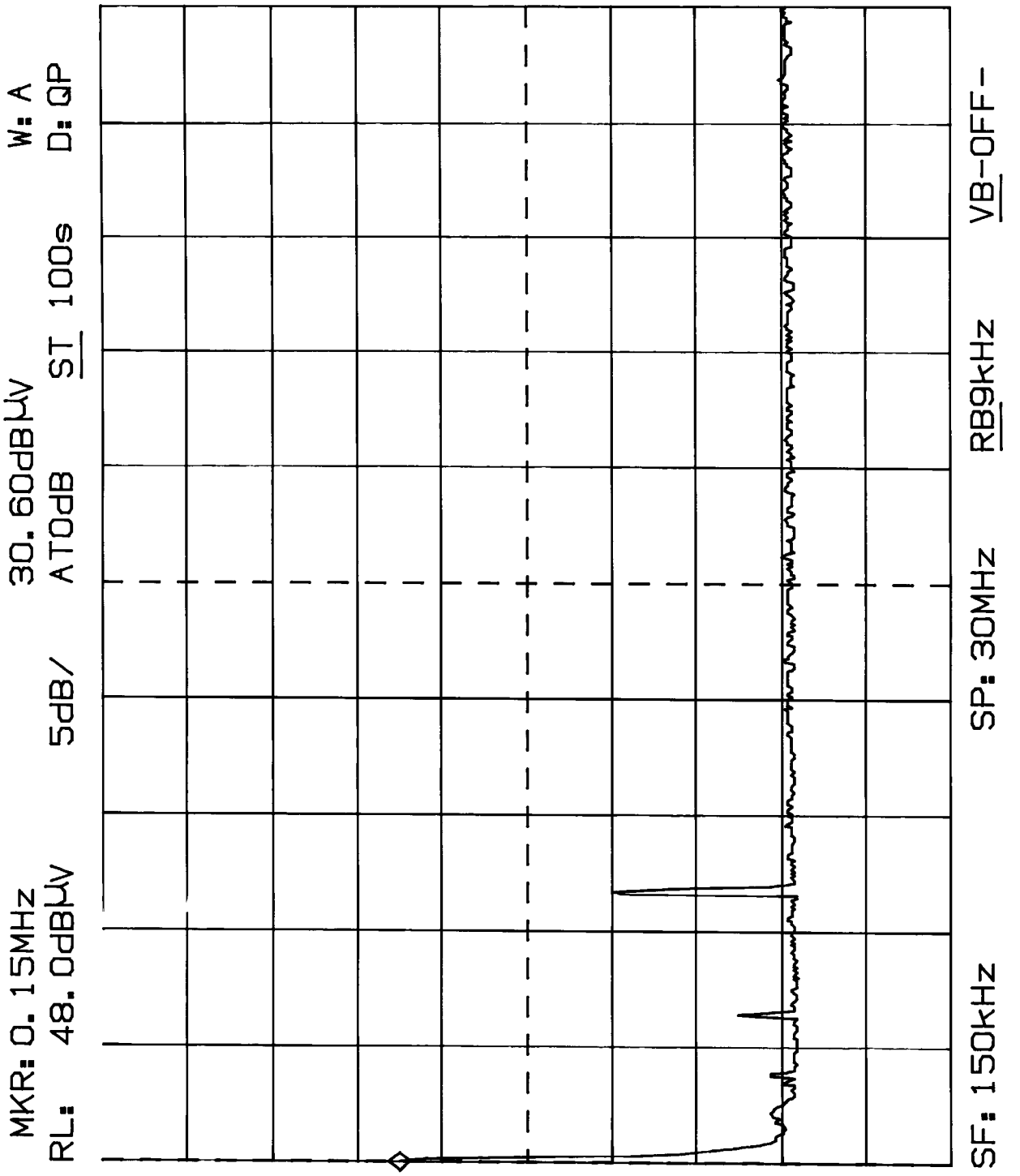
The highest emission read for LINE was 30.60 dBμV@ 0.15 MHz.
The highest emission read for NEUTRAL was 31.17 dBμV@ 0.15 MHz.

The graphs on Exhibit D(1)-6 to -7 represent the emissions taken for this device.

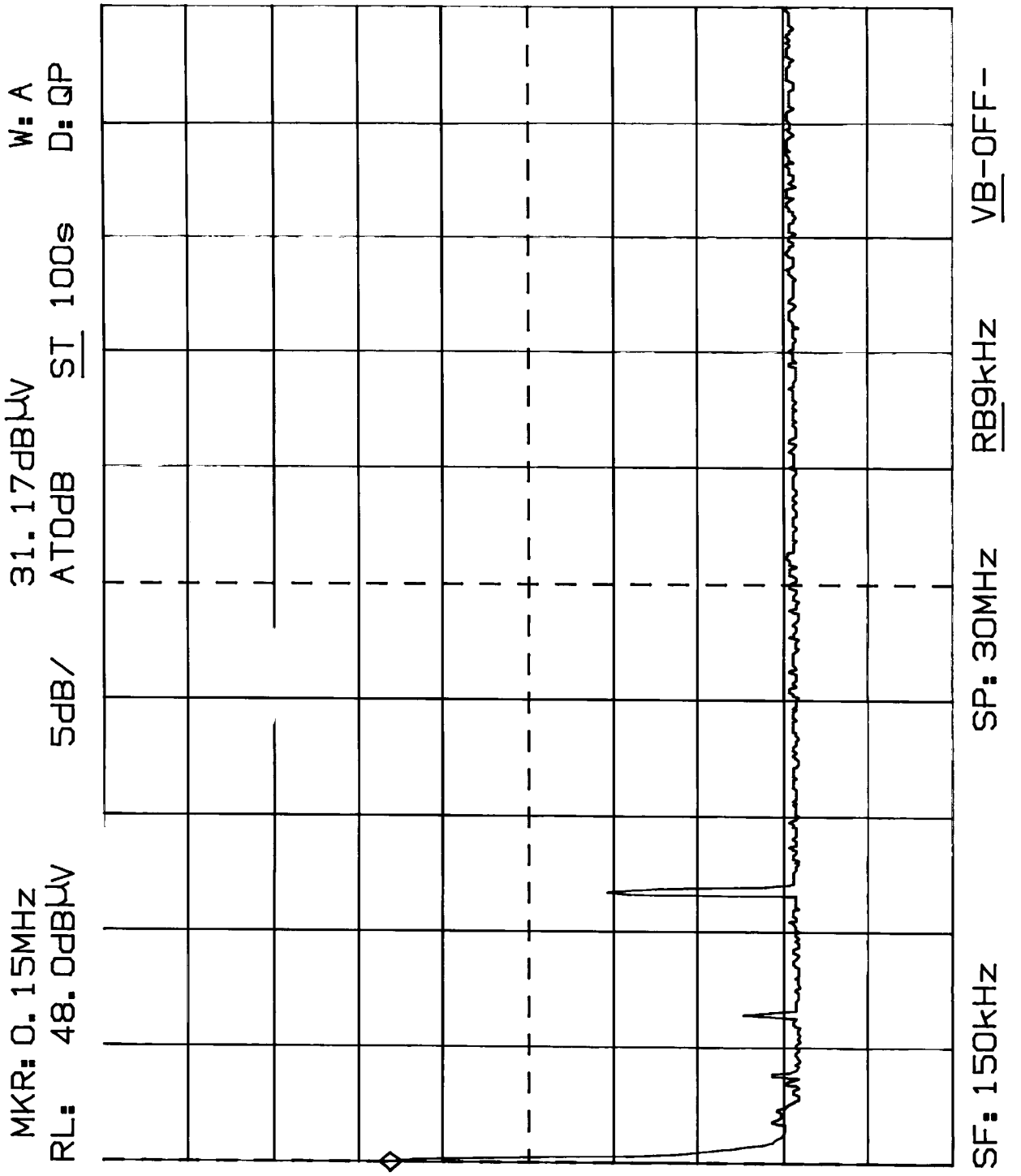
Test Results:

Both lines were observed. The measurements indicate that the unit DOES appear to meet the FCC requirements for this class of equipment.

POWER LINE CONDUCTED EMISSIONS
MODEL 27958XXX-A (Base)
LINE



POWER LINE CONDUCTED EMISSIONS
MODEL 27958XXX-A (Base)
NEUTRAL



15.249 (a), (b) and (c) FIELD STRENGTH OF EMISSIONS

Requirements:

Fundamental Frequency	Field Strength of Harmonics	15.209	
		30-88 MHz	40 dBμV/m@ 3m
2.400-2.4835 GHZ 94dBμV	54 dBμV/m@ 3m	88-216 MHz	43.5
		216-960 MHz	46
		Above 960 MHz	54

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation.

Emissions that fall in the restricted bands (15.205) must be less than 54dBμV/m

Procedure

The test procedure used was ANSI STANDARD C63.4-1992 and DA-00-705 using an appropriate spectrum analyzer, as listed in the Test Equipment List. The bandwidth (RBW) of the spectrum analyzer was 100KHz/120KHz up to 1GHz with an appropriate sweep speed. The RBW above 1.0GHz was = 1.0MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the EUT was 24°C with a humidity of 60%.

Test Data:

Refer to Exhibit D(1)-9 to -10

FIELD STRENGTH OF EMISSIONS

Test Data:

BASE UNIT

Emission Frequency MHz	Meter Reading @3m dBμV/M	Antenna	Cable and ACF dB	Field Strength dBμV/M	FCC Limit dBμV/M	Margin dBμV/M	Detector & BW KHz
Channel 1							
2402.30	**51**	**Horn V**	**33.08**	**84.08**	**94**	**-9.92**	**PK 1000**
4804.60	---						
7206.90	---						
9609.20	---						
Channel 40							
2408.15	**50**	**Horn V**	**33.08**	**83.08**	**94**	**-10.92**	**PK 1000**
4816.40	---						
7224.60	---						
9632.80	---						

FIELD STRENGTH OF EMISSIONS

Test Data:

HANDSET UNIT

Emission Frequency MHz	Meter Reading @3m dBμV/M	Antenna	Cable and ACF dB	Field Strength dBμV/M	FCC Limit dBμV/M	Margin dBμV/M	Detector & BW KHz
Channel 1							
2474.71	**57**	**Horn V**	**33.23**	**90.23**	**94**	**-3.77**	**PK 1000**
4949.42	9	Horn V	38.23	47.23	54	-6.77	PK 1000
7424.25	---						
9899.00	---						
Channel 40							
2480.57	**59**	**Horn V**	**33.23**	**92.23**	**94**	**-1.77**	**PK 1000**
4961.14	9	Horn V	38.24	47.24	54	-6.76	PK 1000
7441.71	---						

15.249 (d) BAND EDGES

Requirements:

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

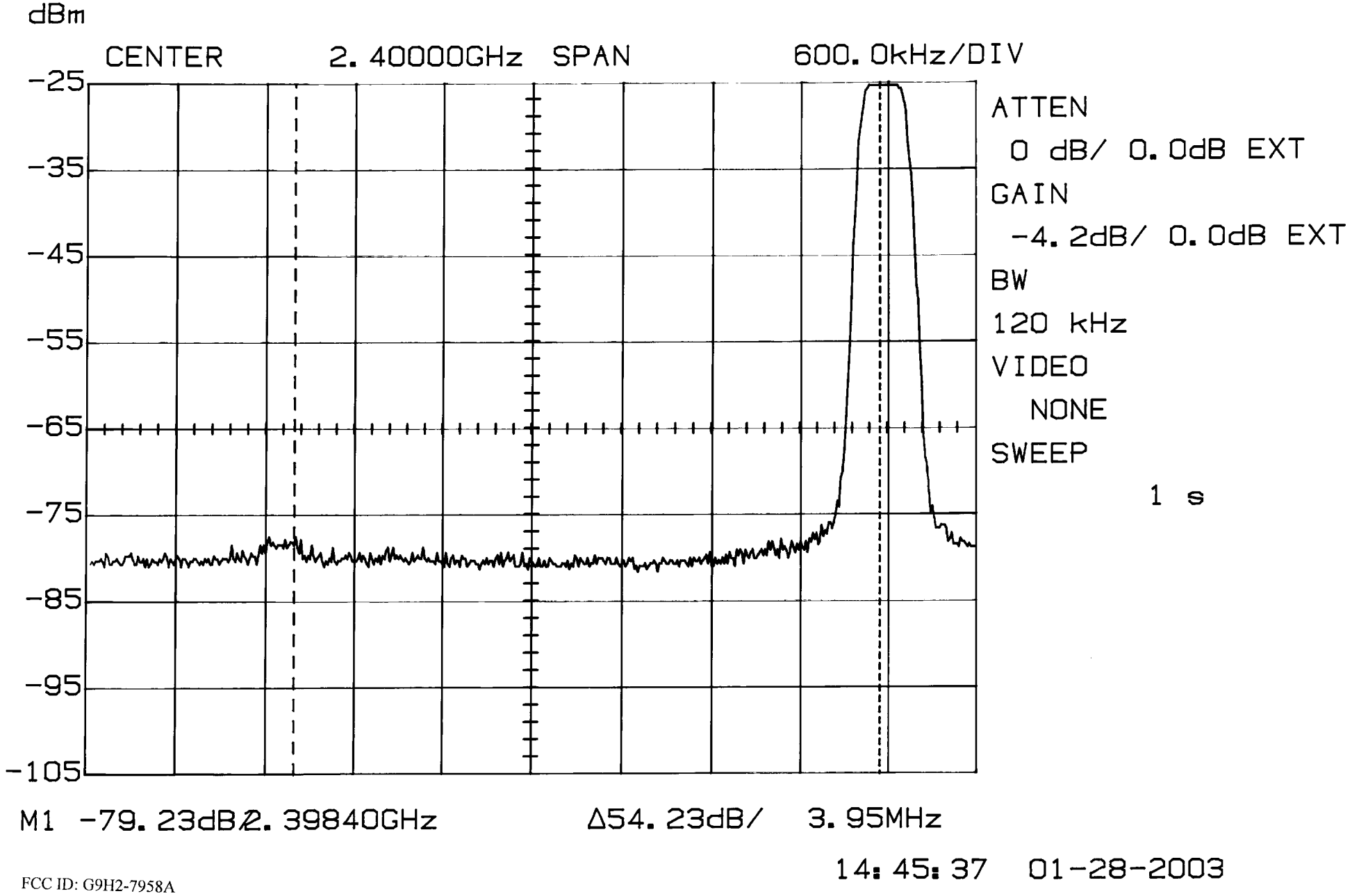
Measurement:

The base was attenuated by 50 dB. The handset was attenuated by 50 dB.

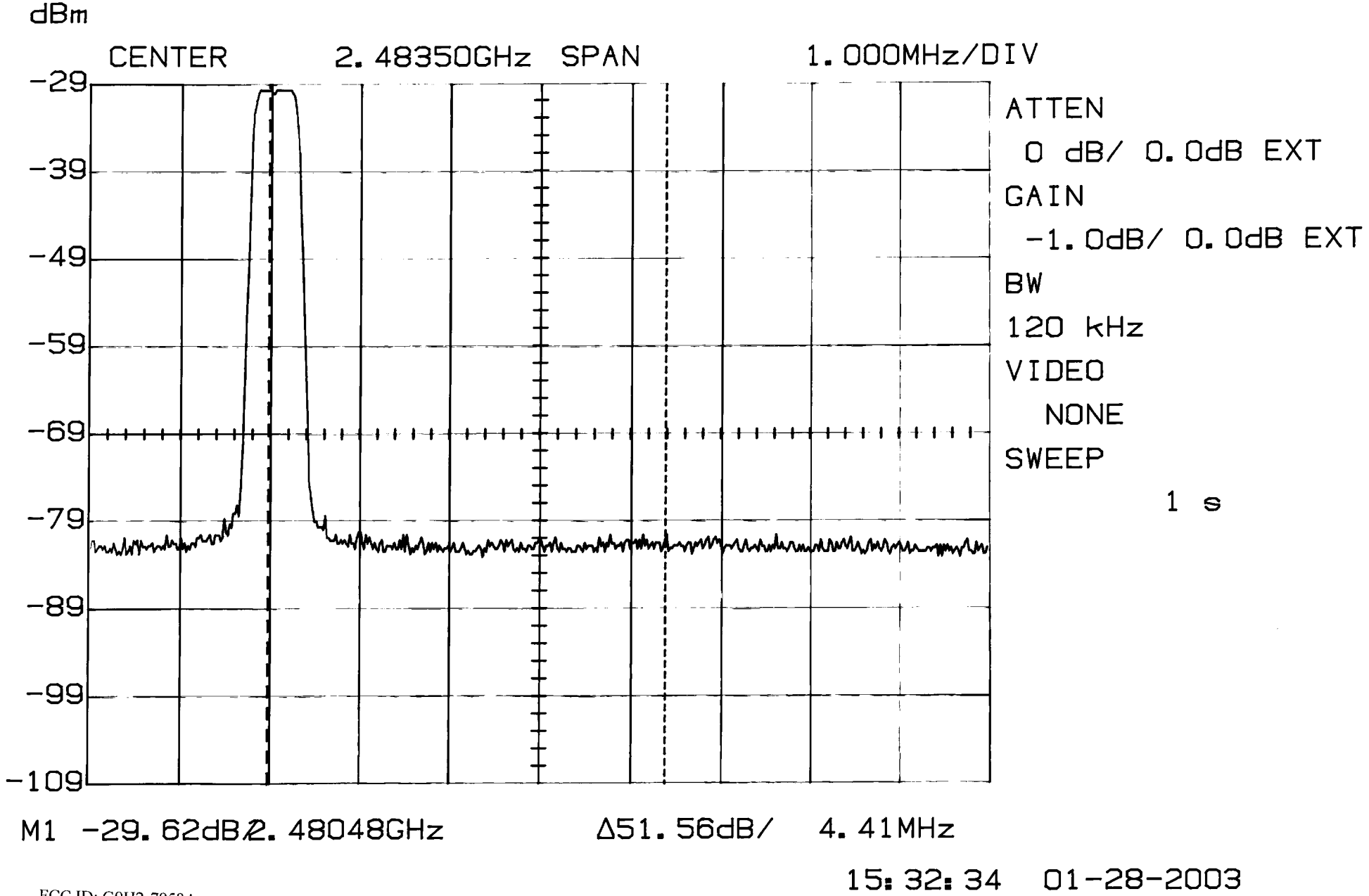
Test Data:

The Bandedge was measured at the Low end of the band for the base, and the High end of the band for the handset. See Plots [Exhibits D(1)-12 to -13].

BAND EDGE - Base (CH1)
MODEL 27958XXX-A



BAND EDGE - Handset (CH40)
MODEL 27958XXX-A



2.202 BANDWIDTH

Measurement:

The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 30KHz (Base), 120KHz (Handset) and the video bandwidth (VBW) = NONE and the span set as shown on plot.

Test Data:

Base:

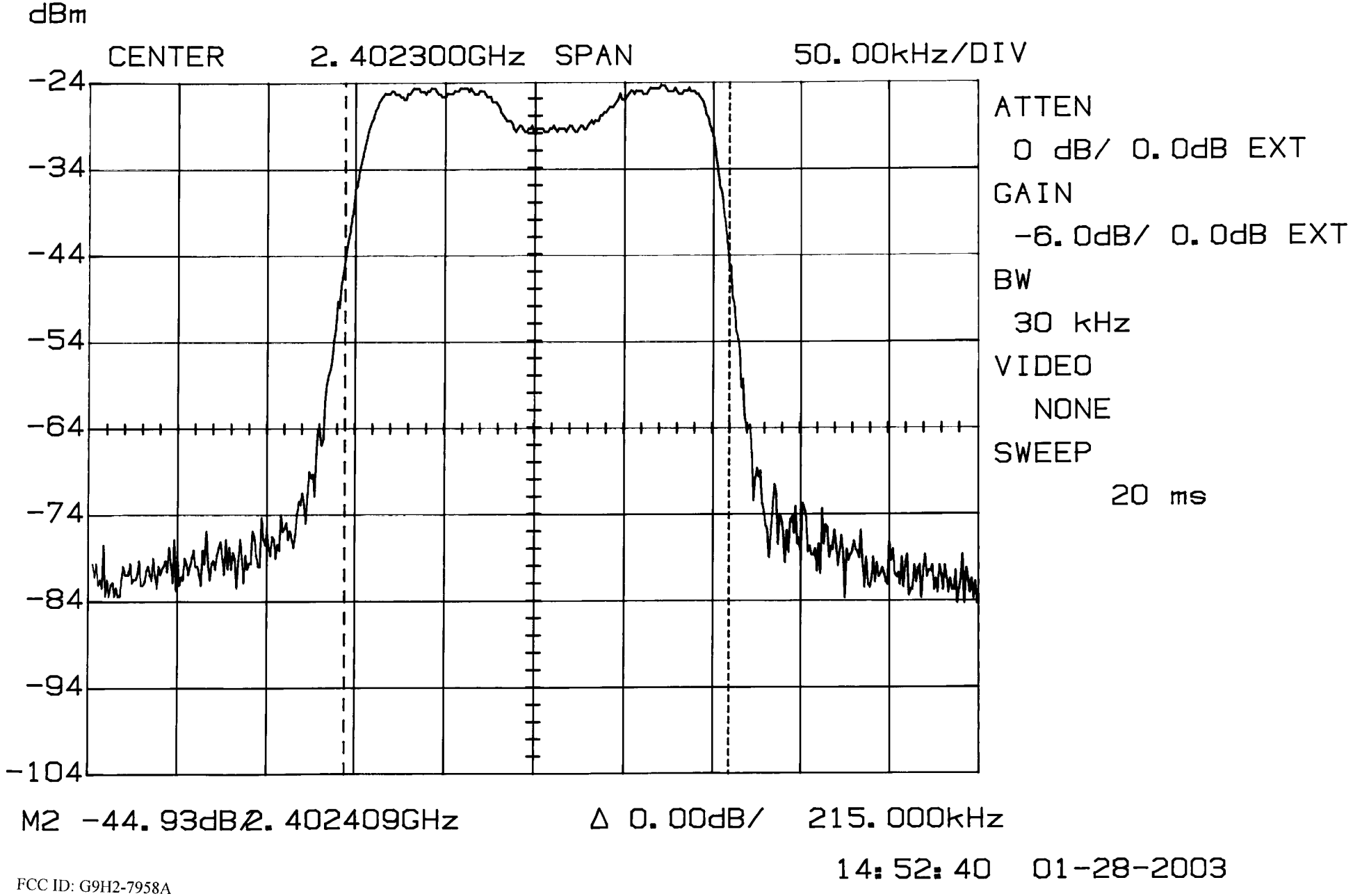
Channel 1: **0.215 MHz** [Refer to Exhibit D(1)-15]
Channel 40: **0.198 MHz** [Refer to Exhibit D(1)-16]

Handset:

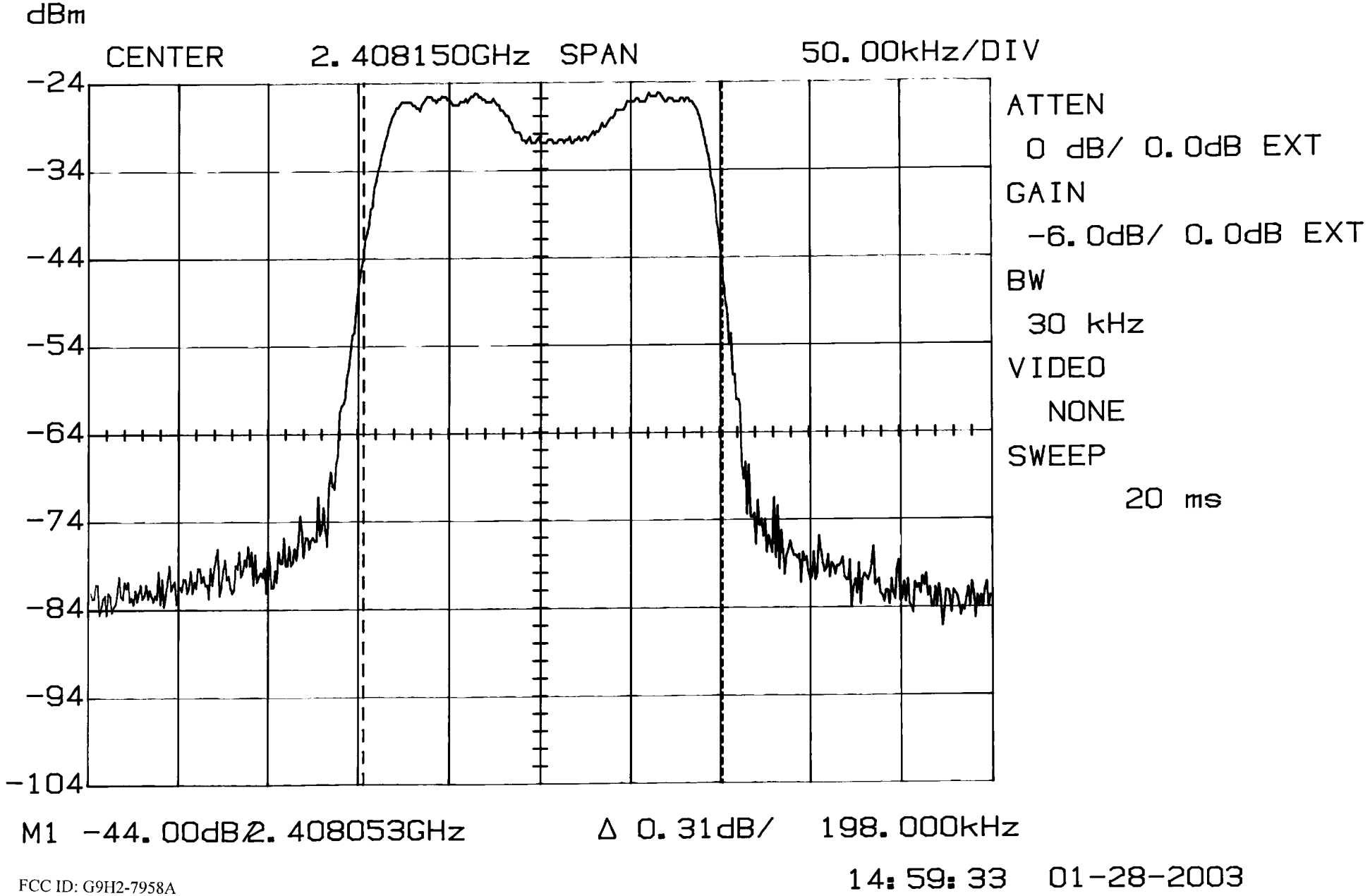
Channel 1: **0.555 MHz** [Refer to Exhibit D(1)-17]
Channel 40: **0.563 MHz** [Refer to Exhibit D(1)-18]

BANDWIDTH = **0.215 MHz** (Base)
0.563 MHz (Handset)

20dB BANDWIDTH
Channel 1 - Base
MODEL 27958XXX-A

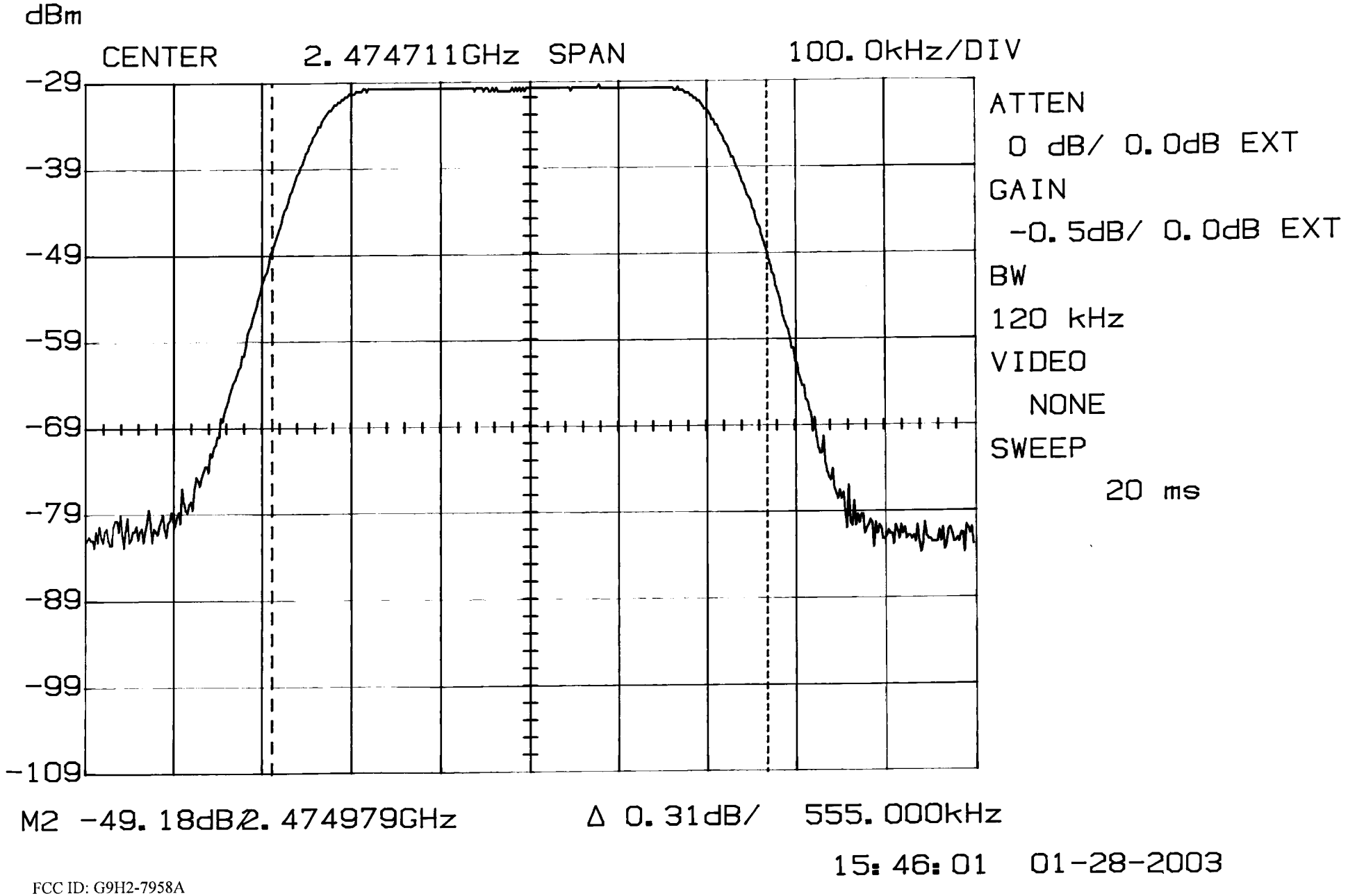


20dB BANDWIDTH
Channel 40 - Base
MODEL 27958XXX-A



FCC ID: G9H2-7958A
Marstech Report No. 22389D
EXHIBIT D(1)-16

20dB BANDWIDTH
Channel 1 - Handset
MODEL 27958XXX-A



20dB BANDWIDTH
Channel 40 - Handset
MODEL 27958XXX-A