3.5.0 Spurious Emissions

Requirements : FCC 15.247 (2) (c). The harmonics and other signals must be at least 20 dB less than the highest emissions level within the operation band.

3.5.1 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.

3.5.2 Test Equipment

Hewlett Packard HP8566B Spectrum Analyzer
Hewlett Packard HP 7470A Plotter

3.5.3 Test Results

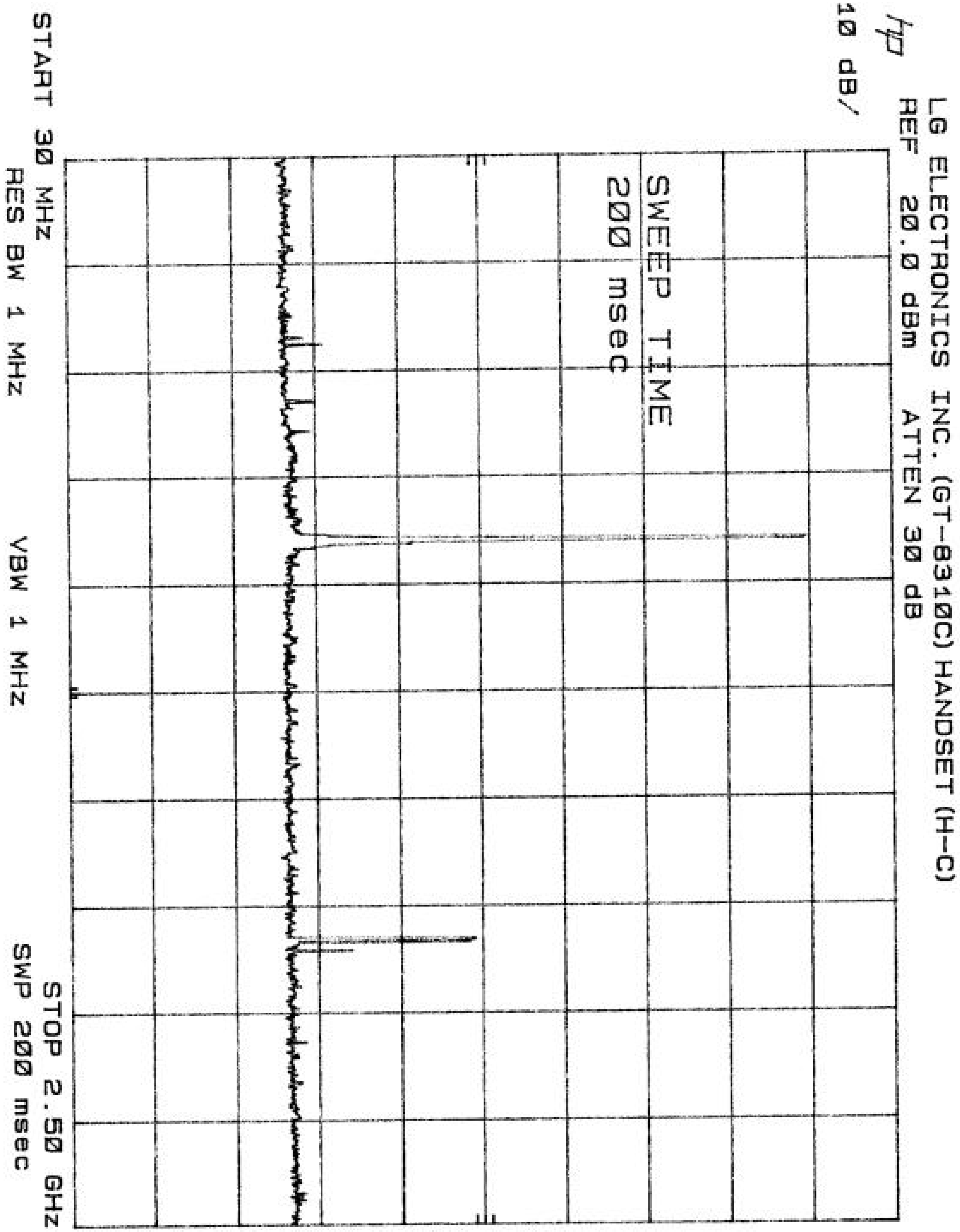
Refer to the attached plots.

BASE

Spurious Emission	
High Channel	Page 45, 46
Middle Channel	Page 47, 48
Low Channel	Page 49, 50

HANDSET

Spurious Emission	
High Channel	Page 39, 40
Middle Channel	Page 41, 42
Low Channel	Page 43, 44


LG ELECTRONICS INC. (GT-8310C) HANDSET (H-C)
REF 20.0 dBm ATTEN 30 dB
10 dB/
SWEEP TIME
200 msec
START 30 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 2.50 GHz
SWP 200 msec

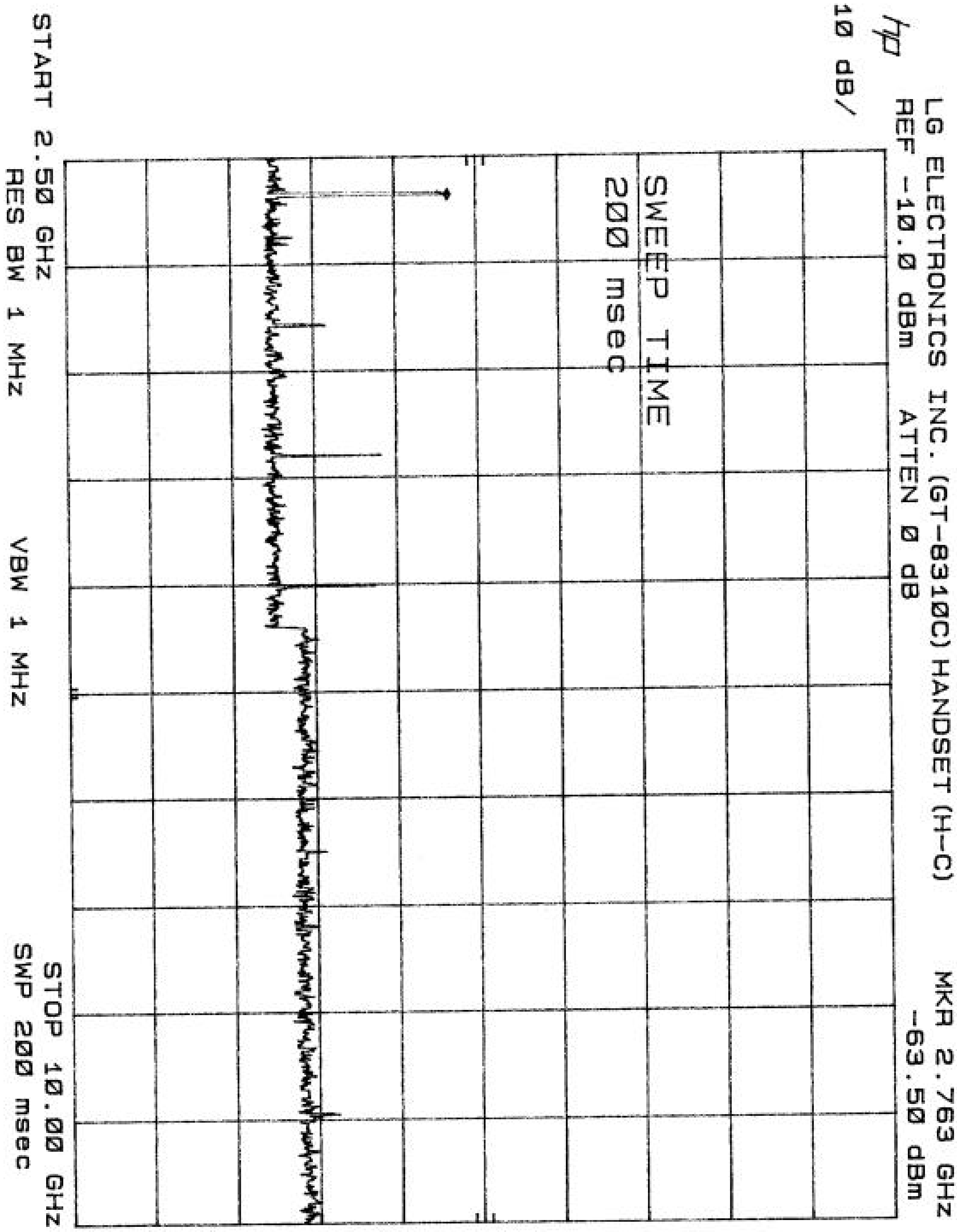
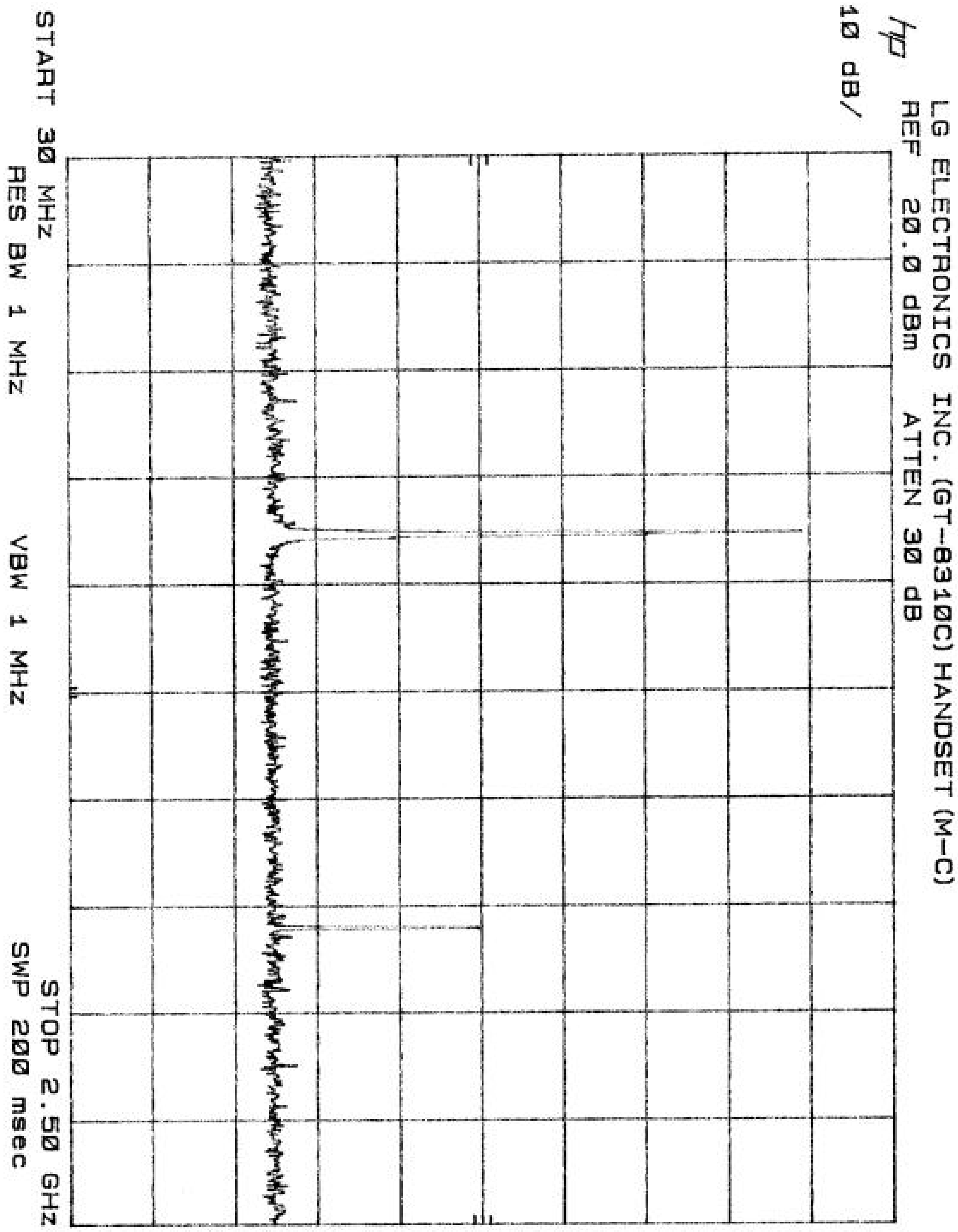
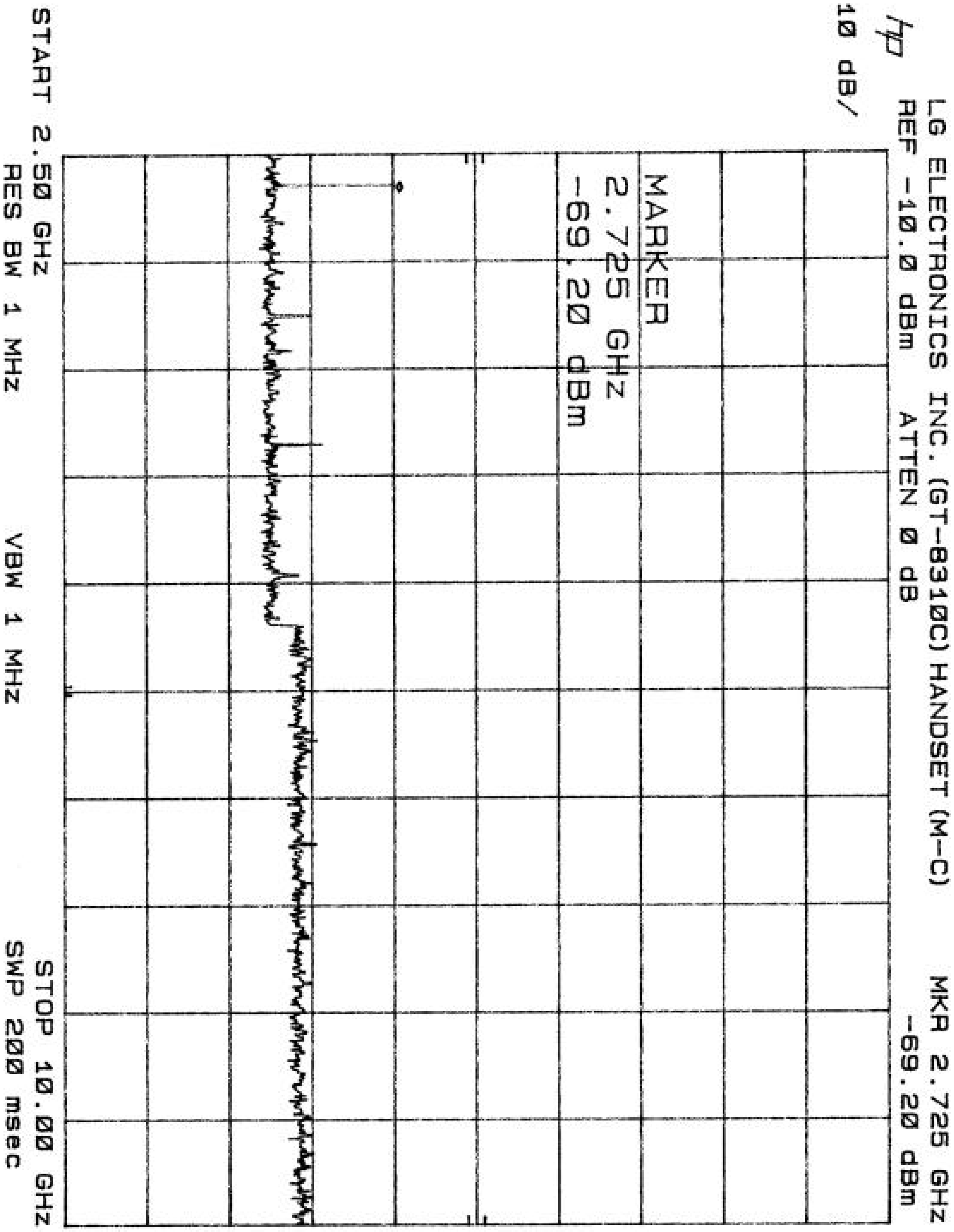
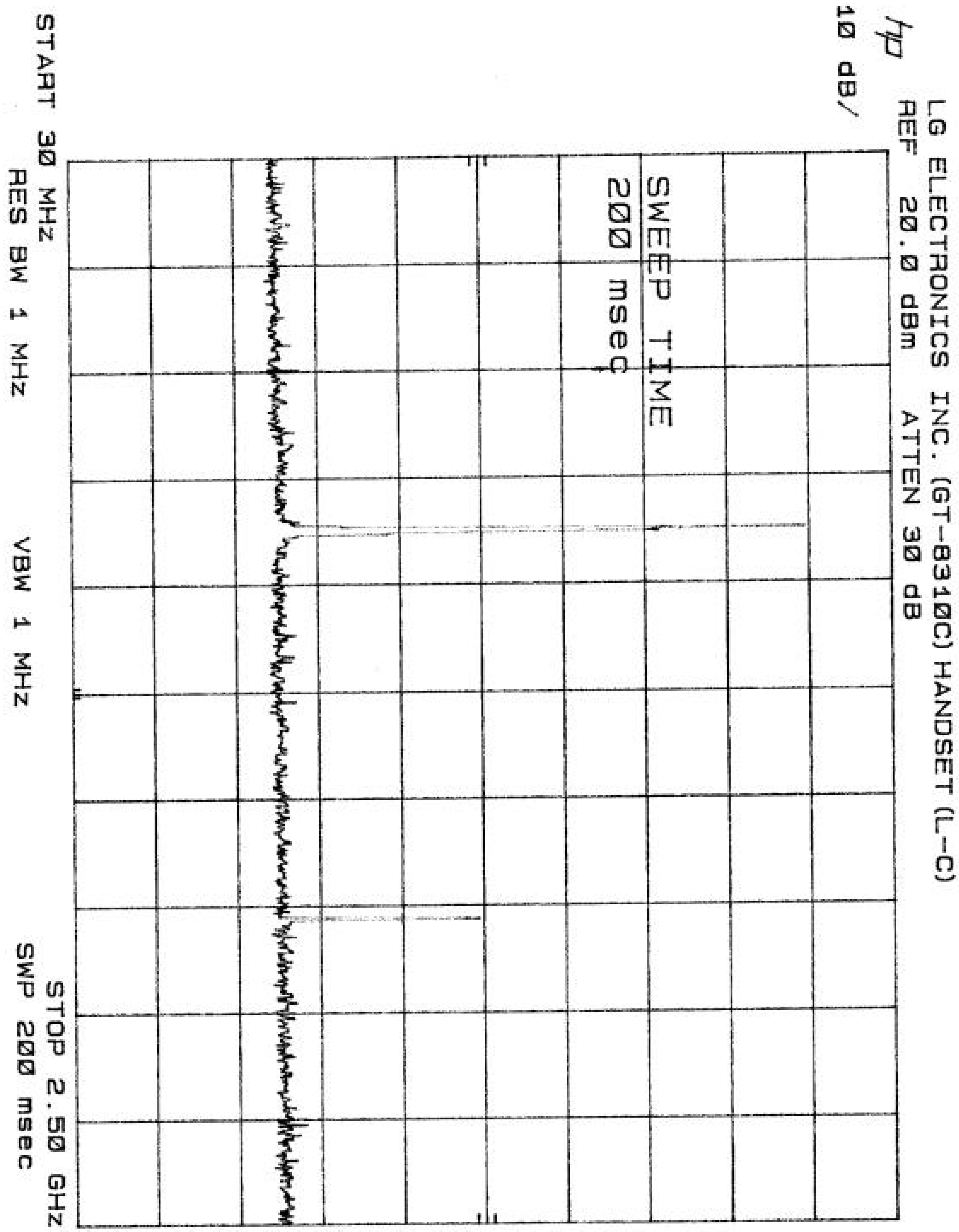
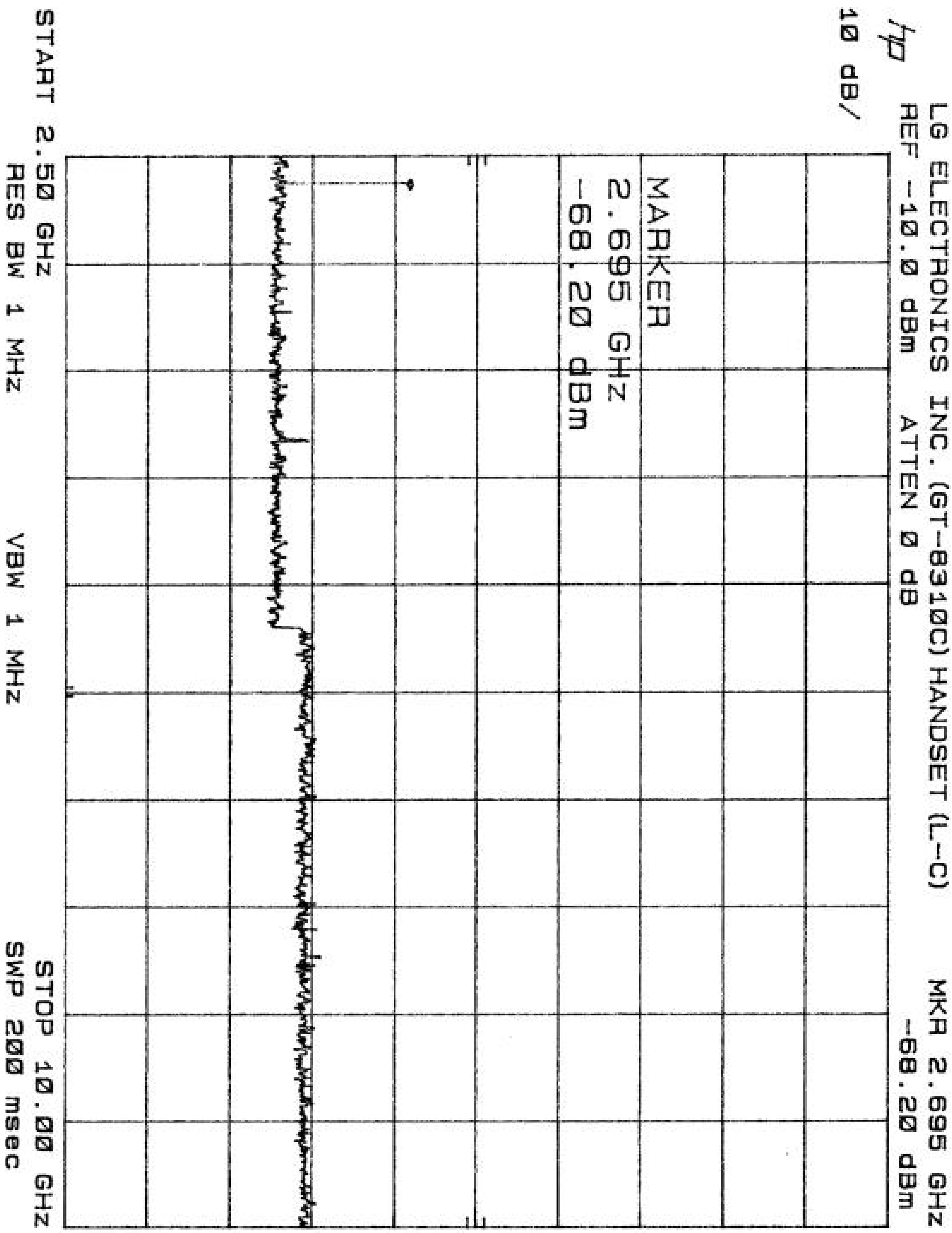

hp
LG ELECTRONICS INC. (GT-8310C) HANDSET (H-C)
REF -10.0 dBm ATTEN 0 dB
MKR 2.763 GHz
-63.50 dBm
10 dB/
SWEEP TIME
200 msec
START 2.50 GHz
RES BW 1 MHz
VBW 1 MHz
STOP 10.00 GHz
SWP 200 msec

Exhibit 6
0021




hp
LG ELECTRONICS INC. (GT-8310C) HANDSET (M-C)
REF -10.0 dBm ATTEN 0 dB
MKR 2.725 GHz
-69.20 dBm
10 dB/
MARKER
2.725 GHz
-69.20 dBm
START 2.50 GHz
STOP 10.00 GHz
RES BW 1 MHz
VBW 1 MHz
SWP 200 msec


hp
LG ELECTRONICS INC. (GT-8310C) HANDSET (L-C)
REF 20.0 dBm ATTEN 30 dB
10 dB/
SWEEP TIME
200 msec
START 30 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 2.50 GHz
SWP 200 msec


LG ELECTRONICS INC. (GT-8310C) HANDSET (L-C)
REF -10.0 dBm ATTEN 0 dB
MKR 2.695 GHz
-68.20 dBm
10 dB/
MARKER
2.695 GHz
-68.20 dBm
START 2.50 GHz
RES BW 1 MHz
VBW 1 MHz
STOP 10.00 GHz
SWP 200 msec

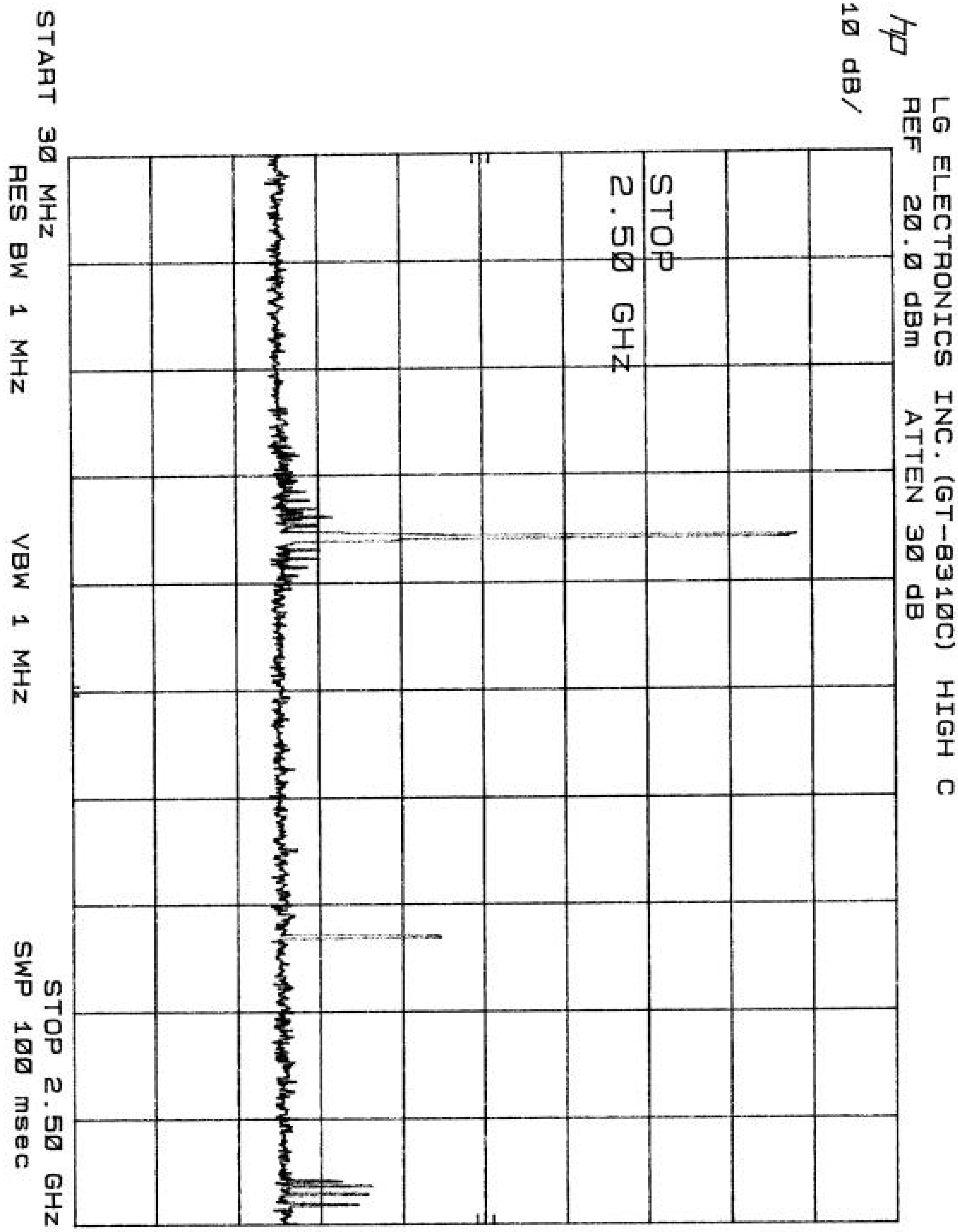
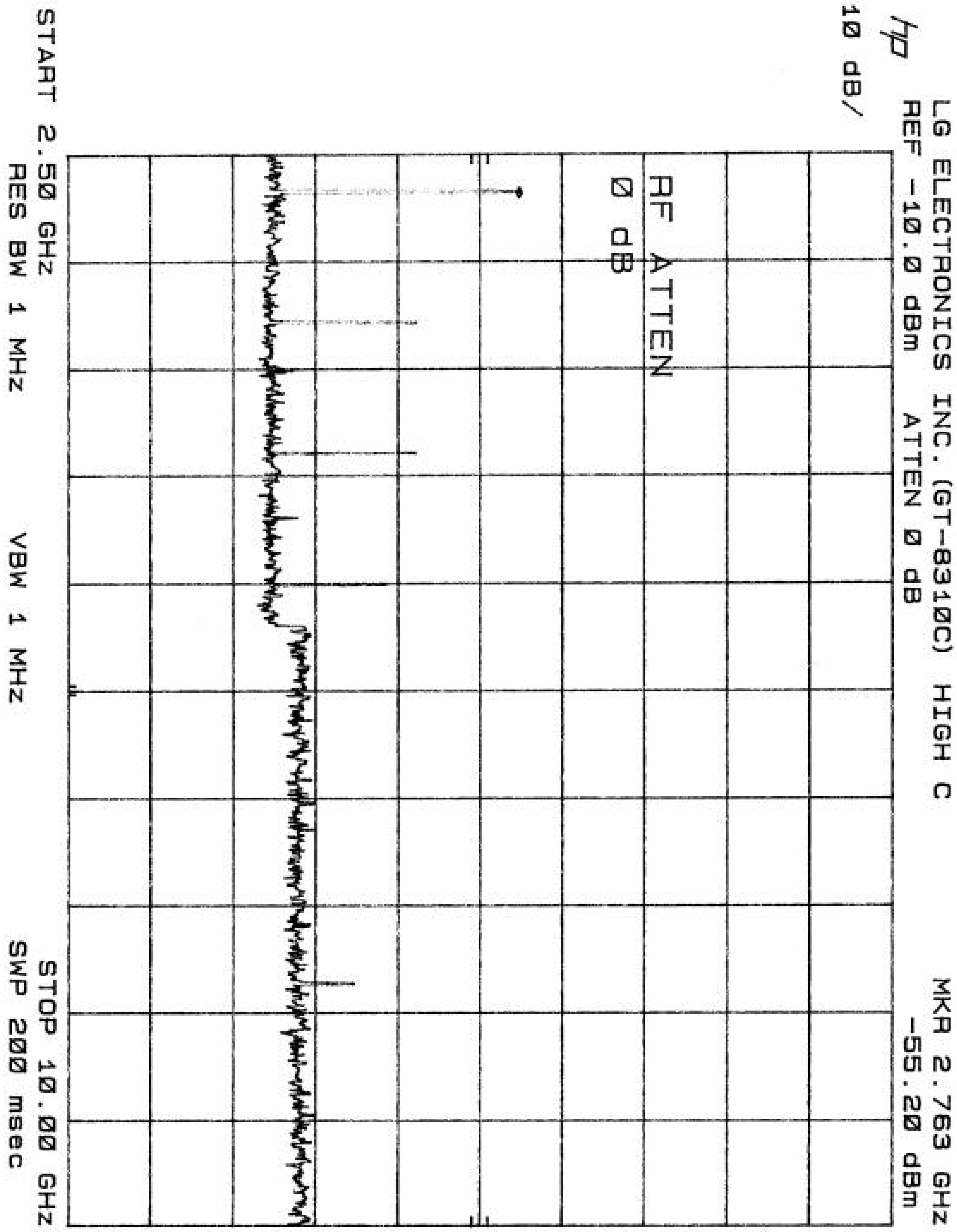

hp
LG ELECTRONICS INC. (GT-8310C) HIGH C
REF 20.0 dBm ATTEN 30 dB
10 dB/
STOP
2.50 GHz
START 30 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 2.50 GHz
SWP 100 msec

Exhibit 6
0021



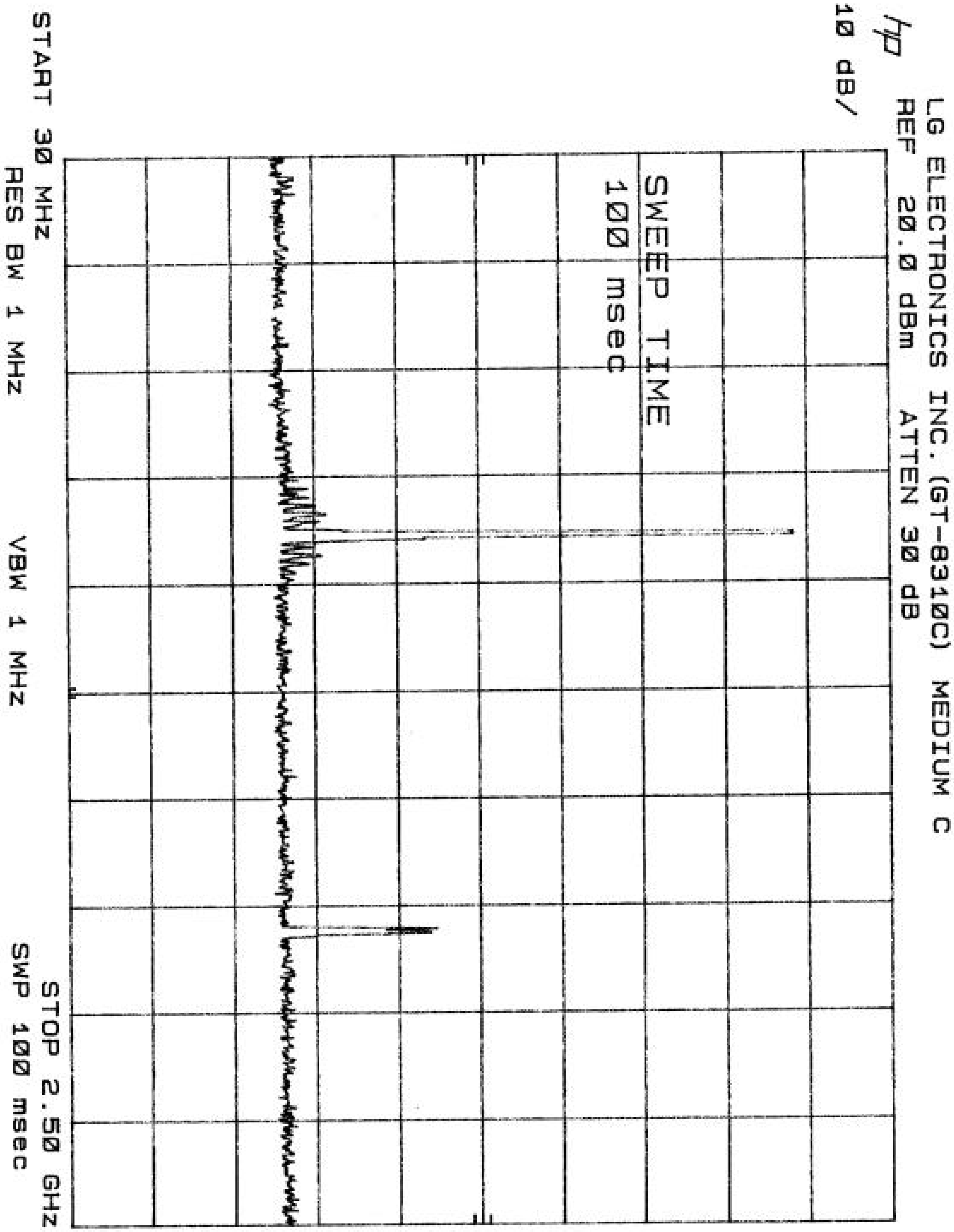
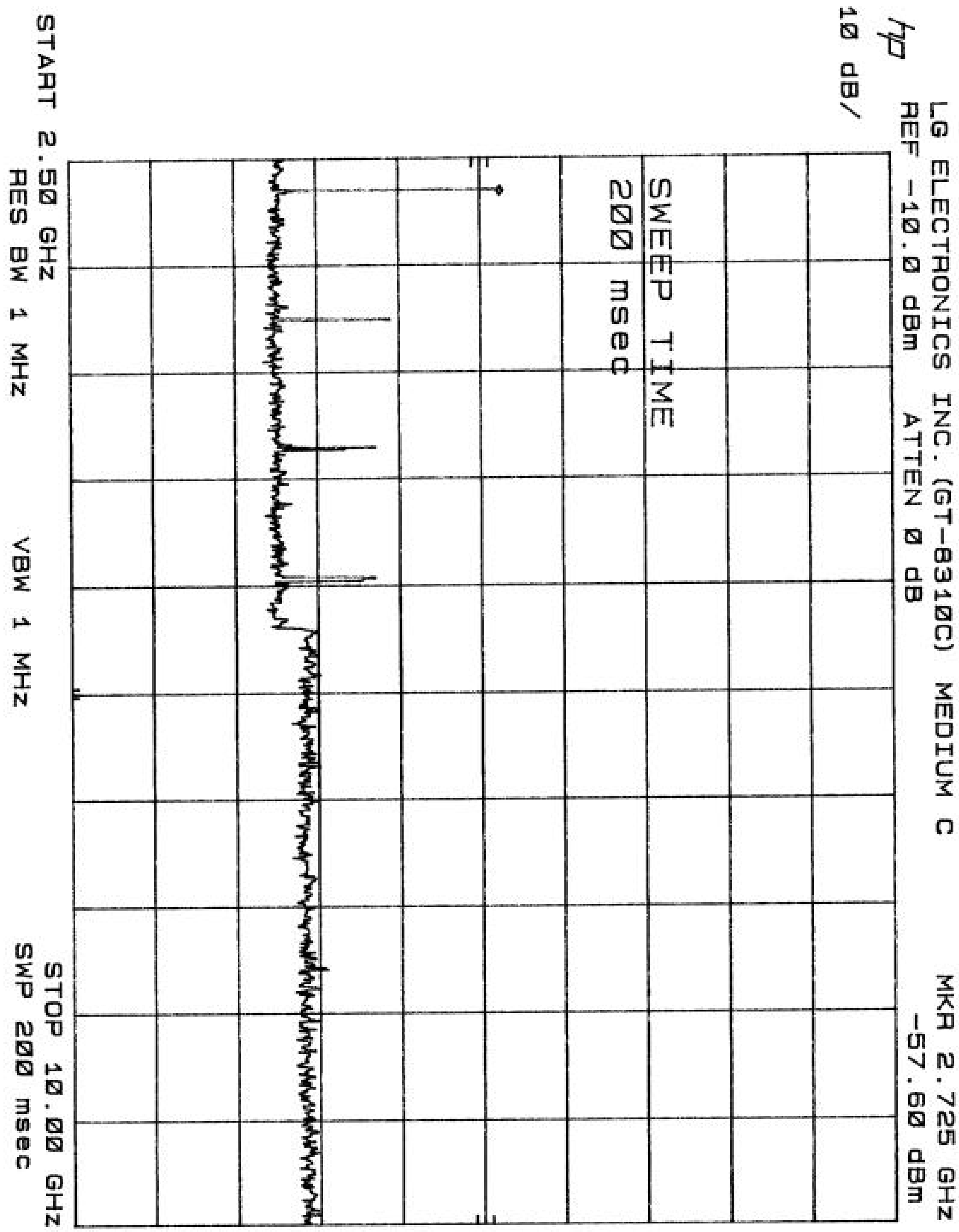
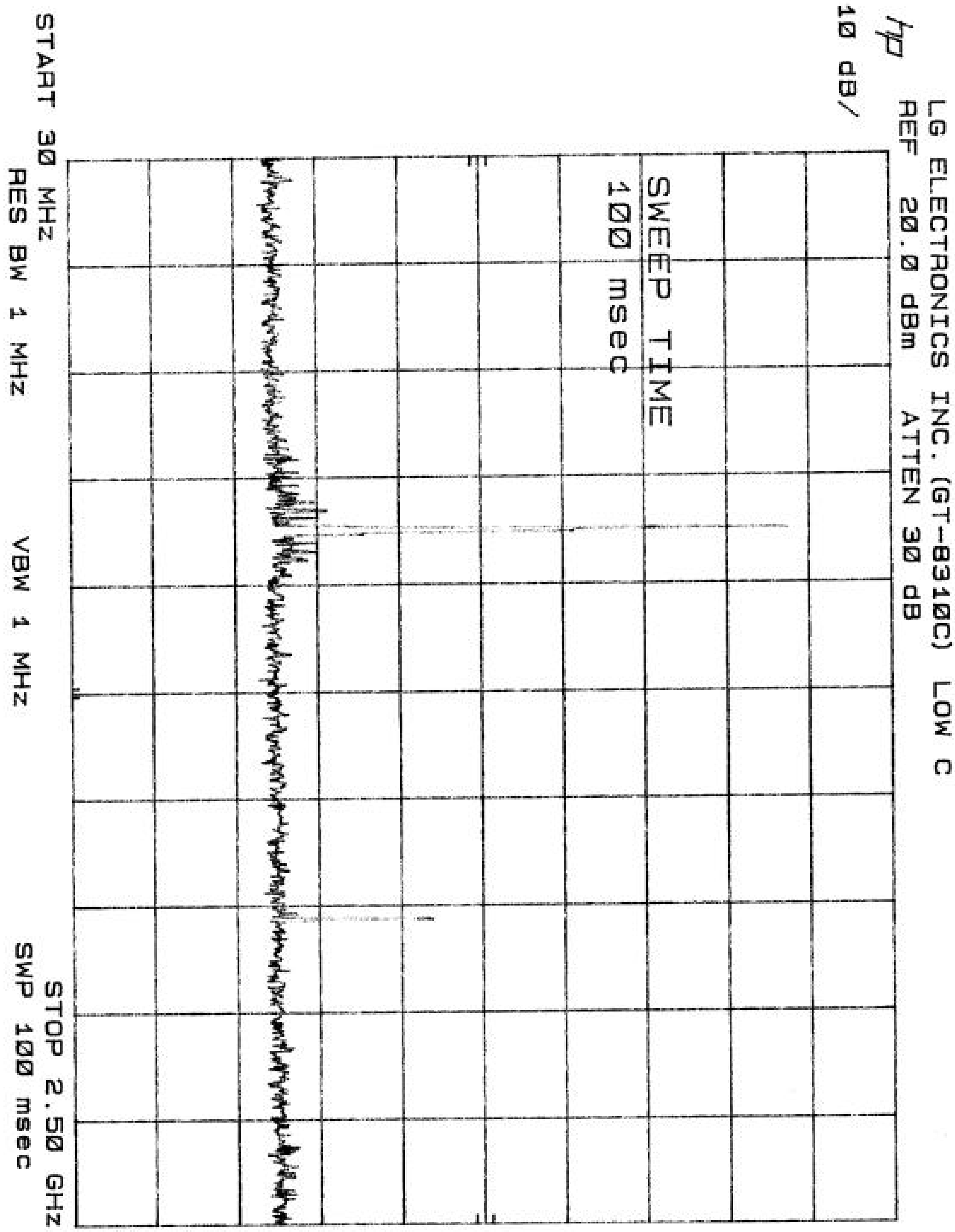
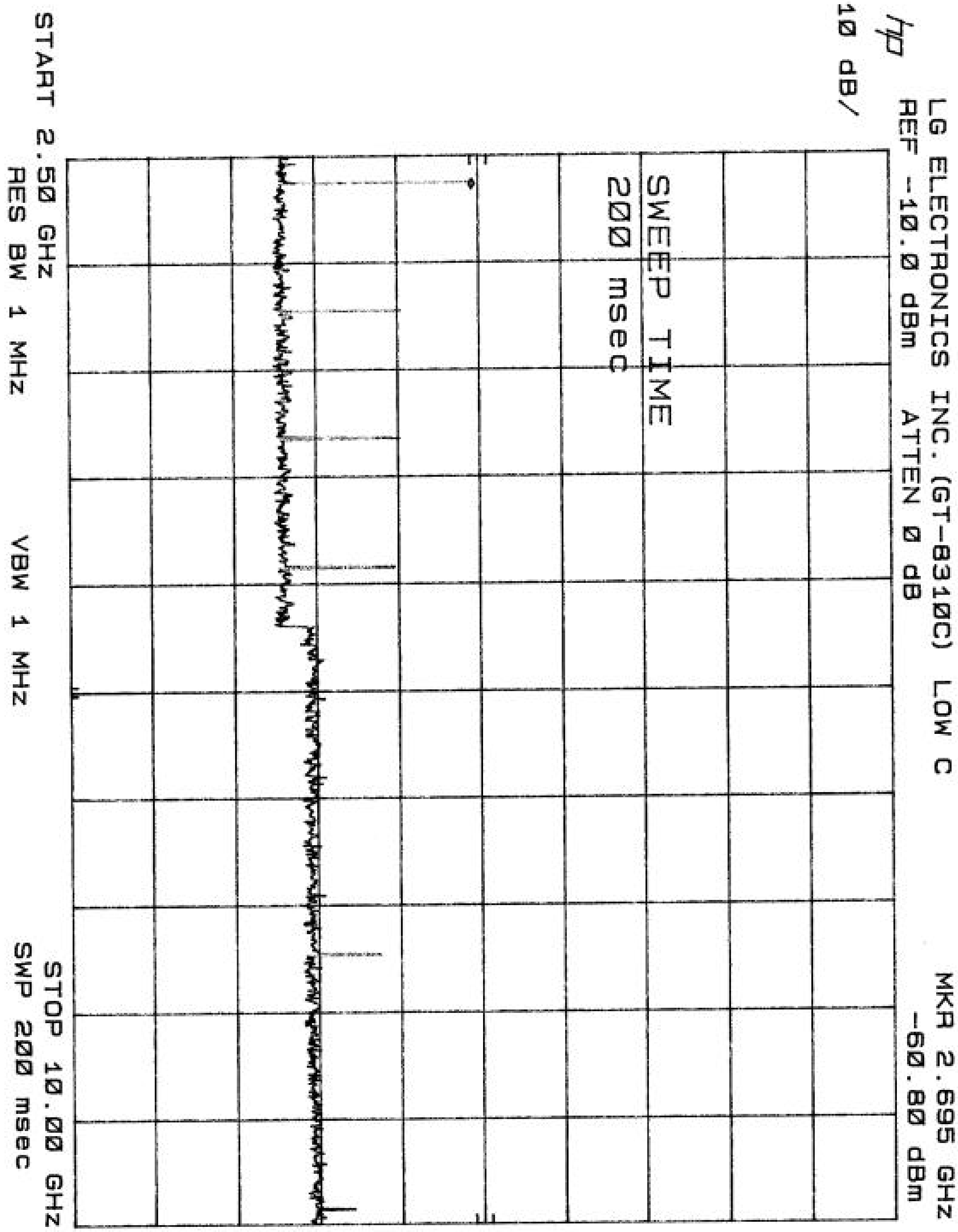

LG ELECTRONICS INC. (GT-8310C) MEDIUM C
REF 20.0 dBm ATTEN 30 dB
10 dB/
SWEEP TIME
100 msec
START 30 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 2.50 GHz
SWP 100 msec

Exhibit 6
0021




LG ELECTRONICS INC. (GT-8310C) LOW C
REF 20.0 dBm ATTEN 30 dB
10 dB/
SWEEP TIME
100 msec
START 30 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 2.50 GHz
SWP 100 msec


hp
LG ELECTRONICS INC. (GT-8310C) LOW C
REF -10.0 dBm ATTEN 0 dB
10 dB/
MKR 2.695 GHz
-60.80 dBm
SWEEP TIME
200 msec
START 2.50 GHz
RES BW 1 MHz
VBW 1 MHz
STOP 10.00 GHz
SWP 200 msec

3.6.0 Field Strength of Spurious Radiation (30 MHz-9000MHz)

Requirements: FCC15.247 (2) (c)

3.6.1 Test Procedure

The measurement antenna was placed at a distance of 3 meter from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT.

The frequency range up to tenth harmonics of each of the three fundamental frequency (low, middle, and high channels) was investigated.

The spurious emissions attenuation was calculated as the difference between EIRP in dB(pW) at the fundamental frequency and at the spurious emissions frequency.

3.6.2 Test Equipment

A.H. System Horn Antenna

High Pass Filter

Preamplifier

Hewlett Packard HP8566B Spectrum Analyzer

Hewlett Packard HP 7470A Plotter

3.6.3 Test Results

Refer to the attached data sheets.

3.6.3.a Final Scan, Base, High Channel.

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC CLASS B	
Frequency MHz	Ampl. dBµV/m	Angle Degree	Height Meter	Polar H/ V	Antenna dBµV/m	Cable dB	Amp. dB	Corr. Ampl. dBµV/m	Limit dBµV/m	Margin dB
926.09	90.0	145	1.2	V	24.7	4.4	20.2	98.9		
926.09	81.5	90	2.8	H	24.7	4.4	20.2	90.4		
1851.00	64.0	200	1.2	V	25.3	2.6	20.0	71.9	78.9	-7.0
3703.00	38.5(P)	180	1.2	V	30.3	4.3	20.0	53.1	74.0	-20.9
1851.00	50.0	180	2.2	H	25.3	2.6	20.0	57.9	78.9	-21.0
2777.00	39.6(P)	180	1.2	V	29.0	3.7	20.0	52.3	74.0	-21.7
3703.00	37.0(P)	270	2.2	H	30.3	4.3	20.0	51.6	74.0	-22.4
2777.00	39.8(P)	45	2.2	H	29.0	3.7	20.0	52.5	74.0	-21.5
2777.00	31.1(A)	45	2.2	H	29.0	3.7	20.0	43.8	54.0	-10.2
3703.00	28.9(A)	270	2.2	H	30.3	4.3	20.0	43.5	54.0	-10.5
3703.00	33.2(A)	180	1.2	V	30.3	4.3	20.0	47.8	54.0	-6.2
2777.00	32.1(A)	180	1.2	V	29.0	3.7	20.0	44.8	54.0	-9.2

3.6.3.b Final Scan, Base, Middle Channel.

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC CLASS B	
Frequency MHz	Ampl. dBμV/m	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
914.66	88.8	145	1.2	V	24.6	4.2	19.8	97.8		
914.66	81.6	90	2.8	H	24.6	4.2	19.8	90.6		
1828.00	64.2	145	1.1	V	25.3	2.6	20.0	72.1	77.8	-5.7
3657.00	35.7(P)	180	1.1	V	30.3	4.3	20.0	50.3	74.0	-23.7
1828.00	46.3	200	2.2	H	25.3	2.6	20.0	54.2	77.8	-23.6
2743.00	36.9(P)	180	1.1	V	29.0	3.7	20.0	49.6	74.0	-24.4
2743.00	38.0(P)	45	2.2	H	29.0	3.7	20.0	50.7	74.0	-23.3
3657.00	36.5(P)	245	2.2	H	30.3	4.3	20.0	51.1	74.0	-22.9
2743.00	29.5(A)	180	1.2	V	29.0	3.7	20.0	42.2	54.0	-11.8
3657.00	32.2(A)	340	1.2	V	30.3	4.3	20.0	46.8	54.0	-7.2
3657.00	26.6(A)	245	2.2	H	30.3	4.3	20.0	41.2	54.0	-12.8
2743.00	28.2(A)	45	2.2	H	29.0	3.7	20.0	40.9	54.0	-13.1

3.6.3.c Final Scan, Base, Low Channel.

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC CLASS B	
Frequency MHz	Ampl. dBμV/m	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
904.44	84.1	145	1.2	V	24.8	3.0	19.8	92.1		
904.44	82.9	100	2.8	H	24.8	3.0	19.8	90.9		
1808.00	61.0	90	1.4	V	25.3	2.6	20.0	68.9	72.1	-3.2
1808.00	49.2	270	1.2	H	25.3	2.6	20.0	57.1	72.1	-15.0
3616.00	36.7(P)	145	1.4	V	30.3	4.3	20.0	51.3	74.0	-22.7
2712.00	41.7(P)	180	1.4	V	29.0	3.7	20.0	54.4	74.0	-19.6
2712.00	39.7(P)	45	2.6	H	29.0	3.7	20.0	52.4	74.0	-21.6
3616.00	35.4(P)	45	1.8	H	30.3	4.3	20.0	50.0	74.0	-24.0
2712.00	37.3(A)	180	1.0	H	29.0	3.7	20.0	50.0	54.0	-4.0
3616.00	30.8(A)	145	1.4	H	30.3	4.3	20.0	45.4	54.0	-8.6
3616.00	31.8(A)	360	1.4	V	30.3	4.3	20.0	46.4	54.0	-7.6
3616.00	31.8(A)	360	1.4	V	30.3	4.3	20.0	46.4	54.0	-7.6

3.6.3.d Final Scan, Handset, High Channel.

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC CLASS B	
Frequency MHz	Ampl. dBµV/m	Angle Degree	Height Meter	Polar H/ V	Antenna dBµV/m	Cable dB	Amp. dB	Corr. Ampl. dBµV/m	Limit dBµV/m	Margin dB
926.10	66.6	145	3.0	V	24.7	4.4	20.2	75.5		
926.10	72.2	145	1.1	H	24.7	4.4	20.2	81.1		
1851.00	45.2	230	1.1	V	25.3	2.6	20.0	53.1	61.1	-8.0
1851.00	46.9	145	1.2	H	25.3	2.6	20.0	54.8	61.1	-6.3
2777.00	40.2(P)	360	1.5	V	29.0	3.7	20.0	52.9	74.0	-21.1
2777.00	32.9(A)	350	1.4	V	29.0	3.7	20.0	45.6	54.0	-8.4
3703.00	38.2(P)	190	1.4	V	30.3	4.3	20.0	52.8	74.0	-21.2
3703.00	28.9(A)	190	1.4	V	30.3	4.3	20.0	43.5	54.0	-10.5
5554.00	31.8(P)	200	1.4	V	34.1	5.4	20.0	51.3	74.0	-22.7
5554.00	23.9(A)	200	1.4	V	34.1	5.4	20.0	43.4	54.0	-10.6
2777.00	40.0(P)	70	1.2	H	29.0	3.7	20.0	52.7	74.0	-21.3
2777.00	32.8(A)	70	1.2	H	29.0	3.7	20.0	45.5	54.0	-8.5
3703.00	35.0(P)	180	1.2	H	30.3	4.3	20.0	49.6	74.0	-24.4
3703.00	28.0(A)	180	1.2	H	30.3	4.3	20.0	42.6	54.0	-11.4
5554.00	27.1(P)	245	1.2	H	34.1	5.4	20.0	46.6	74.0	-27.4
5554.00	18.0(A)	245	1.2	H	34.1	5.4	20.0	37.5	54.0	-16.5

3.6.3.e Final Scan, Handset, Middle Channel.

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC CLASS B	
Frequency MHz	Ampl. dBµV/m	Angle Degree	Height Meter	Polar H/V	Antenna dBµV/m	Cable dB	Amp. dB	Corr. Ampl. dBµV/m	Limit dBµV/m	Margin dB
914.69	65.3	160	2.9	V	24.6	4.2	19.8	74.3		
914.69	72.8	145	1.1	H	24.6	4.2	19.8	81.8		
1828.00	43.8	270	1.2	H	25.3	2.6	20.0	51.7	61.8	-10.1
1828.00	46.5	145	1.8	V	25.3	2.6	20.0	54.4	61.8	-7.4
2743.00	39.3(P)	260	1.2	H	29.0	3.7	20.0	52.0	74.0	-22.0
2743.00	29.7(A)	260	1.2	H	29.0	3.7	20.0	42.4	54.0	-11.6
3657.00	36.2(P)	30	1.5	H	30.3	4.3	20.0	50.8	74.0	-23.2
3657.00	27.6(A)	30	1.5	H	30.3	4.3	20.0	42.2	54.0	-11.8
5486.00	29.9(P)	100	1.5	H	33.9	5.2	20.0	49.0	74.0	-25.0
5486.00	23.2(A)	100	1.5	H	33.9	5.2	20.0	42.3	54.0	-11.7
5486.00	33.3(P)	120	1.8	V	33.9	5.2	20.0	52.4	74.0	-21.6
5486.00	24.6(A)	120	1.8	V	33.9	5.2	20.0	43.7	54.0	-10.3
3657.00	36.8(P)	90	1.8	V	30.3	4.3	20.0	51.4	74.0	-22.6
3657.00	29.8(A)	90	1.8	V	30.3	4.3	20.0	44.4	54.0	-9.6
2473.00	42.1(P)	200	1.8	V	28.1	3.4	20.0	53.6	74.0	-20.5
2473.00	33.9(A)	200	1.8	V	28.1	3.4	20.0	45.4	54.0	-8.7

3.6.3.f Final Scan, Handset, Low Channel.

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC CLASS B	
Frequency MHz	Ampl. dBµV/m	Angle Degree	Height Meter	Polar H/ V	Antenna dBµV/m	Cable dB	Amp. dB	Corr. Ampl. dBµV/m	Limit dBµV/m	Margin dB
904.50	66.2	340	2.9	V	24.8	3.0	19.8	74.2		
904.50	73.5	90	1.1	H	24.8	3.0	19.8	81.5		
1808.00	43.0	200	1.1	V	25.3	2.6	20.0	50.9	61.5	-10.6
1808.00	41.2	160	1.2	H	25.3	2.6	20.0	49.1	61.5	-12.4
2712.00	38.5(P)	270	1.2	H	29.0	3.7	20.0	51.2	74.0	-22.8
2712.00	28.3(A)	270	1.2	H	29.0	3.7	20.0	41.0	54.0	-13.0
3616.00	37.8(P)	360	1.9	H	30.3	4.3	20.0	52.4	74.0	-21.6
3616.00	26.5(A)	360	1.9	H	30.3	4.3	20.0	41.1	54.0	-12.9
5425.00	28.9(P)	180	1.8	H	33.9	5.2	20.0	48.0	74.0	-26.0
5425.00	22.7(A)	180	1.8	H	33.9	5.2	20.0	41.8	54.0	-12.2
2712.00	34.4(P)	180	1.4	V	29.0	3.7	20.0	47.1	74.0	-26.9
2712.00	24.0(A)	180	1.4	V	29.0	3.7	20.0	36.7	54.0	-17.3
3616.00	32.0(P)	270	1.4	V	30.3	4.3	20.0	46.6	74.0	-27.4
3616.00	26.5(A)	270	1.4	V	30.3	4.3	20.0	41.1	54.0	-12.9
5425.00	29.6(P)	145	1.4	V	33.9	5.2	20.0	48.7	74.0	-25.3
5425.00	23.3(A)	145	1.4	V	33.9	5.2	20.0	42.4	54.0	-11.6

3.7.0 Processing Gain

Processing Gain Measurements for GT-8310 DCT TEST report

3.7.1 Introduction

Scope

This document is a LG Engineering test report for GT-8310C basic DCT cordless phone.
This document details the results of measurement of the processing gain of a DCT (GT-8310C).

Reference Documents

This section lists documents that are referenced within or are materially relevant to this document.

Code of Federal Regulations, Title 47, Chapter 1, Part 15 Radio Frequency Devices (FCC)

Definitions

FCC	Federal Communications Commission
SNR	Signal to Noise Ratio
JSR	Jammer to Signal Ratio
CW	Continuous wave (jammer)
HS	Handset
BS	Basestation
DBPSK	Differential Binary Phase Shift Keying

Table 1: Definitions and Abbreviations

3.7.2 An Overview of the FCC Method for measuring Processing Gain

Two methods are specified for measuring processing gain by the FCC in 15.247 (e). The first method simply involves calculating the signal to ratio noise (SNR) with the spreading code switched on with the SNR when the spreading code is switched off. The difference between the two is the processing gain. The SNR is measured at the demodulated output of the receiver. In principle this an acceptable method to measure the processing gain of any direct sequence spread spectrum communication system, however, it does not take into consideration that the non-spread spectrum portion of the system may operate under the assumption that the signal being transmitted is a spread spectrum signal and when the spreading code is switched off the system may fail to operate or operate at greatly reduced efficiency, In either case the measurement of processing gain will be meaningless.

The second method specified by the FCC to measure processing gain is detailed in 15.247 (e)(1). This involves transmitting a CW jammer in the RF passband of the system and measuring the jammer to signal ratio (JSR) required to achieve a certain bit error rate. The choice of the actual value of the bit error rate is left up to the tester. The jammer is stepped in 50 kHz increments across the entire passband and in each case the JSR to achieve the desired bit error rate is measured. The JSR is measured at the RF input to the system under test. The lowest 20% of the JSR data (in dB) is discarded. The processing gain can then be calculated as follows:

$$G_p = \left(\frac{S}{N}\right)_{theory} + \left(\frac{J}{S}\right)_{measured} + L_{system}$$

where G_p is the processing gain, the SNR is that theoretically predicted for the system under the test to achieve the desired bit error rate, the JSR is the lowest value (in dB) in the remaining data set and L_{sys} adjusts for non-ideal system losses. L_{sys} can not be greater than 2 dB.

3.7.3 Processing Gain Measurement Results

The following parameters were used in the test setup.

HS Tx power (dBm)	-1.9	Measured @ 50-ohm SMA-antenna port
BS LNA gain (dB)	0	
Test system losses (signal)(dB)	-61.75	-50dB (channel attenuation)-5.7dB (attenuator & cables), -6dB (signal combiner)
Received signal strength (dBm) at combiner output	-63.65	Measured @ combiner output
Test system losses (jammer) (dB) upto the combiner output	-12.85	-6dB (attenuator), -6dB (signal combiner), -0.85 dB (cable)

Table 2: Test Setup Parameters

The following measurement results were taken at the base station. The desired bit error rate was set at 10^{-3}.

Jammer Frequency (MHz)	BER (BS)	Received jammer power (dBm)	Received signal power (dBm)	Jammer/Signal ratio (dB)
913.80	9.4×10^{-4}	-59.65	-63.65	4.4
913.85	9.6×10^{-4}	-57.95	-63.65	5.6
913.90	9.6×10^{-4}	-60.25	-63.65	3.4
913.95	9.6×10^{-4}	-64.25	-63.65	-0.3
914.00	1.1×10^{-3}	-61.55	-63.65	2.1
914.05	9.8×10^{-4}	-61.45	-63.65	2.2
914.10	1.1×10^{-3}	-61.95	-63.65	1.9
914.15	9.2×10^{-4}	-62.85	-63.65	0.8
914.20	1.0×10^{-3}	-59.85	-63.65	3.8
914.25	1.0×10^{-3}	-61.15	-63.65	2.5
914.30	1.1×10^{-3}	-62.05	-63.65	1.7
914.35	1.0×10^{-3}	-57.65	-63.65	6.1
914.40	1.1×10^{-3}	-55.65	-63.65	8.1
914.45	1.0×10^{-3}	-49.35	-63.65	14.3
914.50	1.1×10^{-3}	-59.25	-63.65	4.4
914.55	1.0×10^{-3}	-62.35	-63.65	1.4
914.60	9.7×10^{-4}	-59.05	-63.65	4.6
914.65	1.0×10^{-3}	-61.05	-63.65	2.6
914.70	1.1×10^{-3}	-62.55	-63.65	1.1
914.75	9.0×10^{-4}	-61.95	-63.65	1.7
914.80	1.0×10^{-3}	-61.05	-63.65	2.6
914.85	9.9×10^{-4}	-62.25	-63.65	1.4
914.90	1.1×10^{-3}	-64.05	-63.65	-0.3
914.95	9.2×10^{-4}	-56.25	-63.65	7.4
915.00	1.0×10^{-3}	-59.85	-63.65	3.9
915.05	1.1×10^{-3}	-57.25	-63.65	6.4
915.10	9.9×10^{-4}	-58.15	-63.65	5.4

Table 3: Test Results

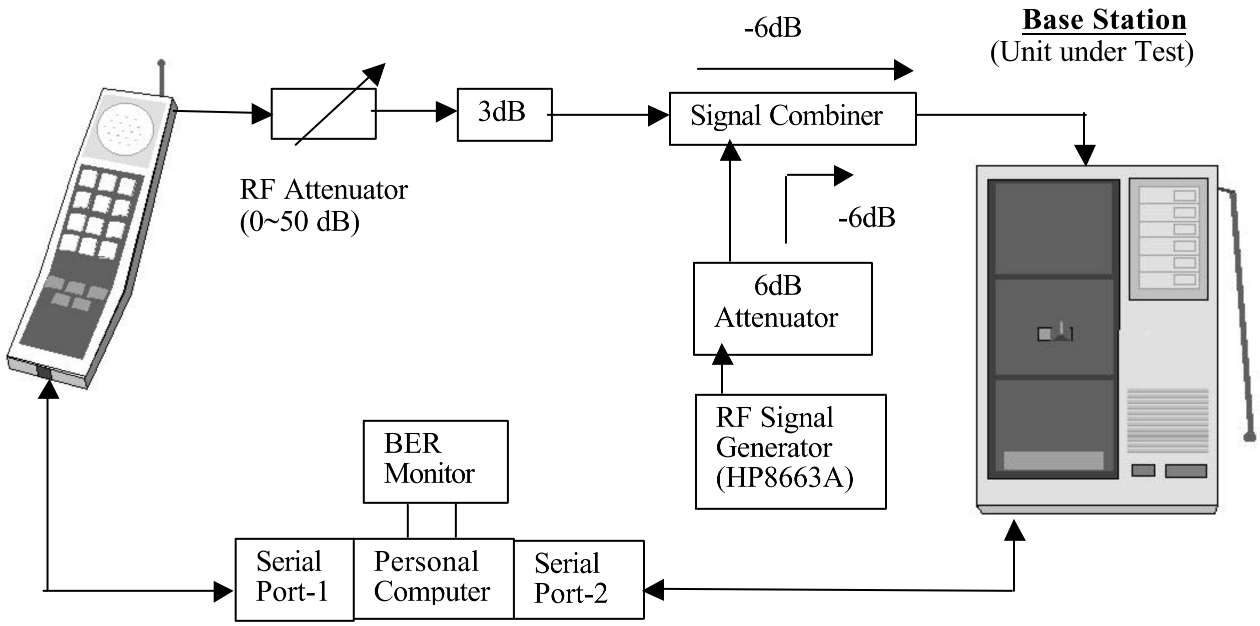


Figure 1: Bit Error Rate (BER) Test Setup

For DBPSK at 10^{-3} bit error rate the required SNR is 8.0 dB. Using the results above and the data in the table below the processing gain is calculated to be **11.3** dB.

required SNR (dB)	8.0
system losses (dB)	2.0
J/S ratio at 80% point (dB)	1.30
FCC Processing gain (dB)	**11.3**

Table 4: Processing Gain Calculation data

General Procedure

Step-1: Measure the output power of the base and handset units in LO power mode. Determine attenuation and signal losses in the path to calculate the received signal strength arriving at the base station antenna port.
Step-2: Connect the serial interface of the base and handset to the serial ports of a PC.
Step-3: Connect the base and handset through attenuator, signal combiner etc components using 50 ohm SMA connectors and cables as shown in Figure 1. Thus, the BER test set up establishes link through wired connection.Step-4;Using utility test software, select the channel frequency (921.6MHz), LOW power mode, LNA attenuation for base and handset units.
Step-5: Click on “ Start S7 HS Master” button ON. The two link is established and the BER results are displayed on monitor.
Step-6:Feed jamming signal from the signal generator.
Step-7: Increase the amplitude of the jamming while monitoring BER such that the BER is ≤10E-3. this signal power is recorded for computing received Jammer power level J.
Step-8: Increment the Jammer signal frequency in steps of 0kHZ and repeat step 7 and determine the minimum Jammer signal power to achieve BER of ≤10E-3. Calculate the processing gain.

3.7.4 Conclusions

The result measured for processing gain of **11.3** dB is close to the actual processing gain due to a 12 chip spreading code of

$$10 \times \log_{10}(12) = 10.8\ dB$$

4 - CONDUCTED EMISSIONS TEST DATA

4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is ±2.4 dB.

4.2 EUT Setup

The measurement was performed at the **O**pen **A**rea **T**est **S**ite, using the same setup per ANSI C63.4 - 1992 measurement procedure. The specification used was with FCC Class B limits.

4.3 Spectrum Analyzer Setup

The spectrum analyzer was set with the following configurations during the conduction test:

Start Frequency ....450 kHz
Stop Frequency ....30 MHz
Sweep Speed..Auto
IF Bandwidth..100 kHz
Video Bandwidth...100 kHz
Quasi-Peak Adapter Bandwidth...9 kHz
Quasi-Peak Adapter Mode ....Normal

4.4 Test Procedure

During the conducted emission test, the power cord of the host system was connected to the auxiliary outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of each modes tested to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (less than -4 dBµV). Quasi-peak readings are distinguished with a "**QP**".

4.5 Summary of Test Results

According to the data in section 3.6, the EUT complied with the FCC Conducted margin for a Class B device and these test results is deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations, with the *worst* margin reading of:

-5.2 dBµV at **0.630 MHz** in the **Line** mode power supply.

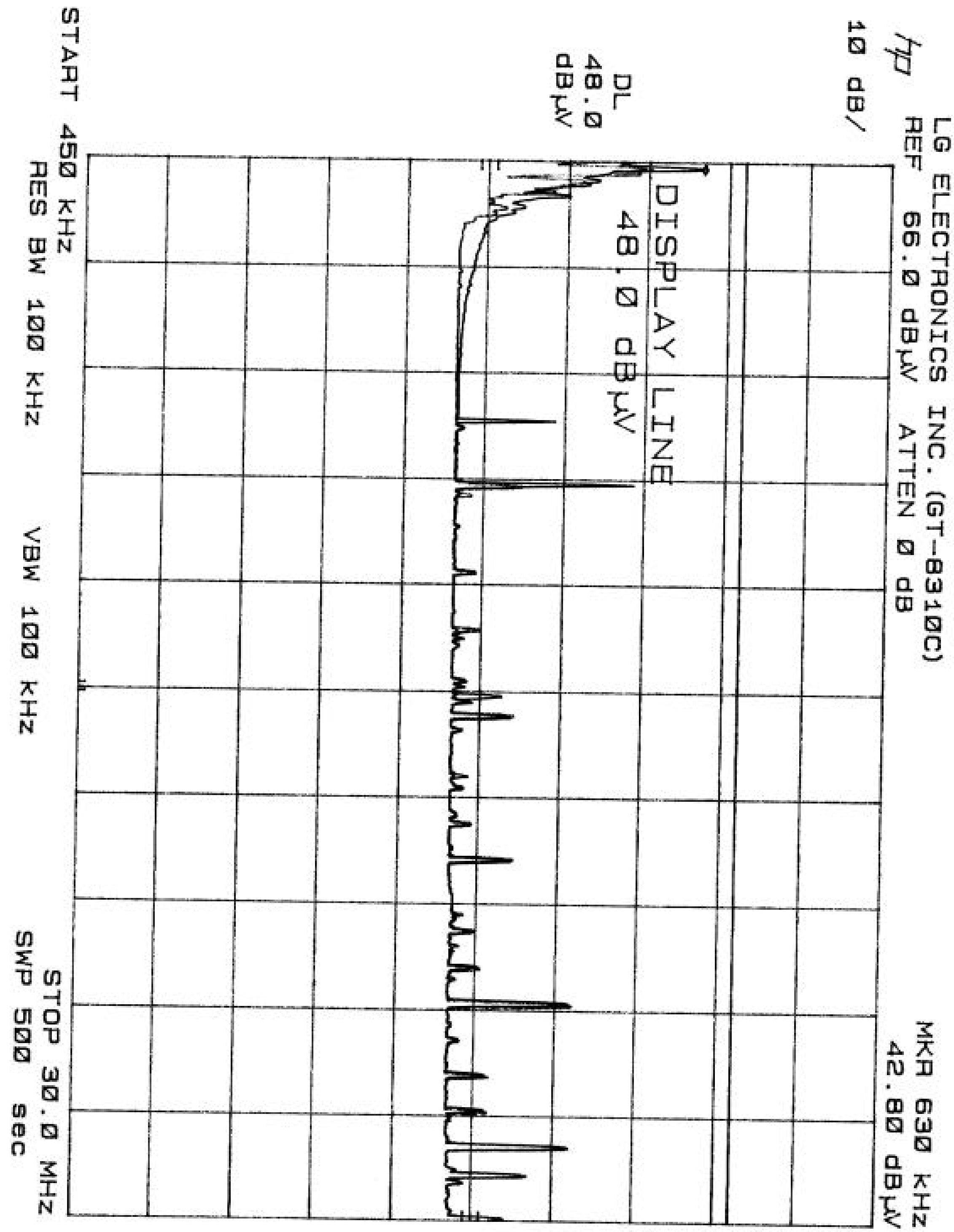
4.6 Conducted Emissions Test Data

4.6.1 Test Data, 0.45 - 30 MHz.

LINE CONDUCTED EMISSIONS				FCC CLASS B	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dBµV	QP/Ave/Peak	Line/Neutral	dBµV	DB
0.630	42.8	QP	Line	48	-5.2
0.660	36.4	QP	Neutral	48	-11.6
23.940	27.9	QP	Neutral	48	-20.1
27.930	27.8	QP	Neutral	48	-20.2
27.960	27.5	QP	Line	48	-20.5
23.970	27.3	QP	Line	48	-20.7

4.7 Plot of Conducted Emissions Test Data

Plot(s) of Conducted Emissions Test Data is presented in the following Appendix of this report as reference.


hp
LG ELECTRONICS INC. (GT-8310C)
10 dB/
REF 66.0 dBµV ATTEN 0 dB
MKR 630 kHz
42.80 dBµV
DL
48.0
dBµV
DISPLAY LINE
48.0 dBµV
START 450 kHz
STOP 30.0 MHz
RES BW 100 kHz
VBW 100 kHz
SWP 500 sec

Appendix A – AGENT AUTHORIZATION LETTER

LGIC
LG Information & Communications, Ltd.

LG Kangseo B/D 36, Munlae-Dong, 6-Ga,
Youngdungpo-Gu, Seoul, 150-096, Korea
Youngdungpo P.O Box101, Seoul, Korea
Telephone : 82-2-2630-3651~2
Fax : 82-2-2630-3669

Exhibit B

AUTHORITY TO ACT AS AGENT TO
THE FEDERAL COMMUNICATIONS COMMISSION

Date : February 21, 2000

Federal Communications Commission
Authorization and Evaluation Division
Equipment Authorization Branch
7435 Oakland Mills Road
Columbia, MID 21046 U.S.A.

Dear Sir:

We, the undersigned, hereby authorize Bay Area Compliance Laboratory Corp. to act on our behalf in all matters relating to applications for approval of Telecommunication apparatus, including the signing of all documents relating to this matters.
Any and all acts carried out by Bay Area Compliance Laboratory Corp., on our behalf shall have the same effect as acts of our own.
I further appoint Bay Area Compliance Laboratory Corp., to act as agent in preparation of this application for registration of LG Information & Communications, Ltd., Model GT-8110 as Exhibit C under Part 68 of the Rules and Regulations of the Federal Communications Commission.
I certify that the exhibits properly describe the device or system for which registration is sought, that Exhibit G represents the policies of the applicant which will be followed for all units manufactured and distributed under the provisions of Part 68, that the labels described in Exhibit H will be affixed to each unit, and that the information described in Exhibit J will be provided with each unit manufactured or distributed by the applicant.
We also certify that no party to the applications authorized hereunder is subject to benefits, including FCC benefits, Pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988,21 USC 853(a).

Sincerely yours,

D. S. Kim

D.S.KIM / Quality Engineering Dept.
LG Information & Communications, Ltd.

Sample Calculation

Take the data on Page 53 of BACL Test Report for GT-8310C.

The Corrected Amplitude is calculated by add the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor – Amplifier Gain

For example, when the frequency was 3703.00, the Indicated Reading Amli. was 38.5 MHz, Antenna Factor was 30.3 dBìV/M, the Cable Factor was 4.3dB, the Amplifier Gain was 20.0, so based on the above equation, the Corr. Ampl. was

38.5 + 30.3 + 4.3 – 20.0 = 53.1

The **"Margin"** column of the following data tables indicated the degree of compliance with the applicable limit. For example, a margin of –7dBì means the emission is 7dBì below the maximum limit for FCC Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Class B Limit.

The FCC Class B limit for Frequency 3703 MHz is 74 dBìV/ M, so the margin here was

53.1 – 74 = - 20.9

Bay Area Compliance Lab Corp.

230 Commercial St. Ste.
Sunnyvale, CA 94086
Tel: (408)732-9162
Fax: (408)732-9164
http://www.baclcorp.com

Antenna Gain and EIRP

Antenna Gain was zero under this report.

EIRP was calculated according to the following equation:

P = (E.D) ^{2}/30G   8 d Bì V/M = 10 mW.

Subject: Re: TCB Qestions
Date: Wed, 29 Nov 2000 11:55:23 -0800
From: "Rita Cai" <ritac@baclcorp.com>
To: "Roger J. Midgley" <rjm@cclab.com>

Exhibit 6
0021

----- Original Message -----
From: Roger J. Midgley <rjm@cclab.com>
To: <ritac@baclcorp.com>
Sent: Thursday, November 16, 2000 10:22 AM
Subject: TCB Qestions

Roger,

Thank you for the following message. My reply is in teal green color.

Rita:

Enclosed below are some questions regarding the applications CCL is reviewing for TCB certification on two cordless telephones:

1. The test setup block diagrams show that the handset and base station were tested separately; however, the test setup photos show both the base and handset on the table. Please resubmit photos that show each on the table separately.

Please see the attached files.

2. The test procedure for the peak output power and the power spectral density indicates that an Attenuator and cable were used during the testing, but the plots for these test does not show how the loss of the Attenuator and cable were accounted for. Please indicate how the loss was accounted for on the plots submitted.

We use HP internal attenuation and it was showed on the plot. The RF cable was very short and the loss was less than 0.5dB.

3. The RBW for the bandwidth test should be performed with a RBW of 100 kHz not the 1 MHz that was submitted. This test will not need to be repeated because it is clear that even with a RBW of 100 kHz the device will still meet the > 500 kHz requirement; however, in the future please perform with a RBW of 100 kHz.

In the future, we will perform the test using a RBW of 100KHz.

4. Please re-measure and submit data for the bandedge compliance and conducted spurious emissions using a RBW of 100 kHz as per section 15.247 (c).

When we did the test, we used 1MHz for RBW and VBW, and this data would be more stricted than 100MHz for RBW and VBW. Even with this setup, the data has
a lot of margin and it met the respective requirements. However, later we will use
100MHz in our future tests.

5. Please indicate what RBW and VBW settings were used for both Peak and Average measurements of Radiated spurious emissions that fall within the restricted bands of 15.205. Also there was not and data submitted for the 5th, 8th and 9th harmonics that fall within the restricted bands, if there were was not any emissions detected please submit the noise floor

reading of the spectrum analyzer to ensure that the noise floor of the measurement equipment capable of measurements below the specified limit. Above 1GHz, we used 1MHz for RBW and VBW (peak) while below 1GHz, we used 100KHz for RBW and VBW.

Exhibit 6
0021

The noise floor reading of the spectrum analyzer is 20dBuV for the 5th, 8th and 9th harmonics.

6. The frequency range that is listed in section 3.6.0 indicates "30 MHz - 90000 MHz" I believe this should be 9000 MHz.

The typo has already been modified and the updated will be sent to you in the form of PDF.

7. The data sheet for radiated spurious emissions indicates that the amplifier gain is 20 dB, and the amplifier that is listed in the test equipment used on page 4 of the report is a HP 8447E power amplifier. The specification for the HP 8447E is a 22 dB gain and a frequency range of 0.01 MHz - 1300 MHz, if this is was the amplifier used for these measurements it should not be used above 1300 MHz. Please indicate what pre-amplifier was used for the radiated emissions above 1 GHz. Please note that depending on what pre-amplifier you use the gain can vary depending on the frequency and is not always a flat gain across the frequency of operation. For instance the HP 8449B pre-amplifier that we use for measurements between 1 GHz to 26.5 GHz indicates that the typical gain is 30 dB; however, the measured gain is anywhere from 32.5 dB to 38.2 dB.

The amplifier which we used was HP8349B and the specification is 20dB gain from
2GHz to 20GHz. And also TEC, PA-102 amplifier covered from 1GHz to 2GHz. The gain is 20dB flat.

8. Please submit a block diagram for both the handset and base station.

Please see the attached files.

9. Please indicate how the antenna connectors comply with section 15.203.

The attenna was soldered in the main board and used a screw to screw in so that users
can not change the attenna by themselves.

10. Please indicate how the device complies with the RF Exposure of section 15.247 (b)(4).

Per FCC OET Bulletin 65 Supplement C, Evaluation Compliance with FCC Guidelines for Human Exposuer to Radiofrequency Electromagnetic Fields, Page 22
this device has output power less than 10dBuV which means less than 0.3W at 915MHz
by the guidelines, it met the RF exposure limits and the manufacturer does not mean to
put the special instruction or warning statement in the user manual.

11. Please submit a Theory of Operation that describes how the device operates to determine if it operates as a Direct Sequence Spread Spectrum device.

You could find the Theory of Operation in the user manual.

12. There was not a request for confidentiality filed with this application as per section 0.459. If this is not requested then all of the exhibits will become public access once they are uploaded to the FCC website. The following exhibits can be held confidential, Exhibit 4 (block diagram), Exhibit 5 (schematics) and Exhibit 12 (Theory of Operation). The fee for the request for confidentiality is $140.00 and we must have any official request from the applicant. I have enclosed a sample request for confidentially that can be used, this must be on the applicants letterhead and signed.

We do not require confidentiality for our application.

Exhibit 6
0021

--
Please let me know if I can be of further assistance

We appreciated your help very much.

Have a nice day.

Rita

Phone (408)732-9162x30

Roger J. Midgley
Communication Certification Laboratory
1940 W. Alexander Street
Salt Lake City, UT 84119

Phone (801) 972-6146 ext 1243
Fax (801) 972-8432
e-mail rjm@cclab.com

radiation setup for handset of GT-8320C- rear view.jpg

Name: radiation setup for handset of GT-8320C- rear view.jpg
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Encoding: base64

conduction setup for base of GT-8310C-side view.jpg

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conduction setup for base of GT-8320C-side view.jpg

Name: conduction setup for base of GT-8320C-side

Exhibit 6
0021

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radiation setup for baseof GT-8310C- rear view.jpg

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radiation setup for handset of GT-8310C- Front view.jpg

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radiation setup for handset of GT-8310C- rear view.jpg

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Exhibit 6
0021

radiation setup for handset of GT-8320C- Front view.jpg	Name: radiation setup for handset of GT-8320C- Front view.jpg Type: JPEG Image (image/jpeg) Encoding: base64
conduction setup for base of GT-8310C-front view.jpg	Name: conduction setup for base of GT-8310C-front view.jpg Type: JPEG Image (image/jpeg) Encoding: base64
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8310C_Base_Block.pdf	Name: 8310C_Base_Block.pdf Type: Portable Document Format (application/pdf) Encoding: base64
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8320C_Base_Block.pdf	Name: 8320C_Base_Block.pdf Type: Portable Document Format (application/pdf) Encoding: base64

Subject: Re: TCB Questions
Date: Wed, 6 Dec 2000 15:25:01 -0800
From: "John Chan" <johnc@baclcorp.com>
Organization: BACL
To: "Roger J. Midgley" <rjm@cclab.com>

Exhibit 6
0021

Hi Roger;
I like to response your questions as the following:
1) Please refer to the manual for the red portions.
2) Antenna gain is zero for both handset and base.
3) The manufactuer will provide a label stated that "Privacy of communications may not be ensured when using this phone". Also, please refer to the attached files for the digital security code requirements of 15.214d.

Best Regards;

John

----- Original Message -----
From: "Roger J. Midgley" <rjm@cclab.com>
To: "John Chan" <johnc@baclcorp.com>
Cc: "Rita Cai" <ritac@baclcorp.com>
Sent: Wednesday, December 06, 2000 11:01 AM
Subject: TCB Questions

> John:
>
> Upon further review the follow information will need to be supplied in
> order to certify this unit.
>
> 1. The RF Exposure statement that is in the users manual states the
> device operates as a low power (<10 dB), this does not indicated a unit
> such as 10 dBuV, etc. This statement would be better if the output
> power is stated in mW instead of dBuV. The end user would not know what
> dBuV actually means. Also the level stated should be the EIRP
> measurement and not the ERP measurement.
> 2. Please provide the antenna gain of both the handset and base station
> antennas.
> 3. Since this is a cordless telephone that connected to the public
> switched telephone network it must comply with the requirement of
> Section 15.214. Under this section both the handset and base station
> must be labeled with the same ID number, and the label must contain the
> following statement "Privacy of communications may not be ensured when
> using this phone". The phone must also meet the digital security code
> requirements of 15.214 (d).
>
> --
> Please let me know if I can be of further assistance
>
> Roger J. Midgley
> Communication Certification Laboratory
> 1940 W. Alexander Street
> Salt Lake City, UT 84119
>
> Phone (801) 972-6146 ext 1243
> Fax (801) 972-8432
> e-mail rjm@cclab.com
>
>

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                         Encoding: base64

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  Security_Code.ppt      Type: Microsoft PowerPoint Show
                               (application/vnd.ms-powerpoint)
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Exhibit 6
0021