THRU Lab & Engineering.

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Kyunggi-Do,469-803, Korea
T820318835092F820318835169 email thrukang@kornet.net

Test Report

Product Name: Paging transmitter

FCC ID: QBTLTK-SCT

Applicant:
LEE TECHNOLOGY KOREA CO.,LTD.

3rd FL #499-2, Sang 3-dong, Wonmi-gu,
Bucheon-city, Kyungki-do,
KOREA

Date Receipt:03/10/2006

Date Tested: 03/23/2006

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Kyunggi-Do,469-803, Korea
T820318835092F820318835169 email thrukang@kornet.net

TABLE OF CONTENTS LIST FOR PART 90 UHF DEVICE

APPLICANT: LEE TECHNOLOGY KOREA CO.,LTD.

FCC ID: QBTLTK-SCT

TEST REPORT CONTAINING:

EXHIBITS CONTAINING:

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T820318835092F820318835169 email thrukang@kornet.net

GENERAL INFORMATION REQUIRED FOR TYPE ACCEPTANCE

2.1033 (c)(1)(2) LEE TECHNOLOGY KOREA CO.,LTD.. will sell the FCC ID: QBTLTK-SCT UHF transceiver in quantity, for use under FCC RULES PART 90 .

2.1033 (C) TECHNICAL DESCRIPTION
2.1033 (3) User Manual See Exhibit 6

2.1033 (4) Type of Emission: 10K2F1D
FOR 25kHz

Bn = 2M + 2DK
M = 1,200 Bits per second
D = 4.5 kHz (Peak Deviation)
K = 1
Bn = 2(1,200bps/2) + 2(4500)(1) = 10.2k

ALLOWED AUTHORIZED BANDWIDTH = 10.2 kHz.

90.209(b) (5)

2.1033 (5) Frequency Range: 457.5750 MHz
2.1034

(6) Power Range and Controls: There are NO user Power controls.

(7) Maximum Output Power Rating:
see Next Page.

(8) DC Voltages and Current into Final Amplifier:

POWER INPUT
FIANL AMPLIFIER ONLY
Vce = 4.8 Volts
IC = 320 mA

(9) Tune-up procedure. The tune-up procedure is given in EXHIBIT 9.

2.1033 (10) Complete Circuit Diagrams: The circuit diagram is included as EXHIBIT 2. The block diagram is included as EXHIBIT 3.

(11) Function of each electron tube or semiconductor device or other active circuit device:
- SEE EXHIBIT 8.

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(8) Instruction book. The instruction manual is included as EXHIBIT 6.

(10) Description of all circuitry and devices provided for determining and stabilizing frequency is included in the circuit description in Exhibit #7.

2.1033(c)(11) A photograph or drawing of the equipment identification label is shown in Exhibit 1.

2.1033(c)(12) Photographs of the equipment of sufficient clarity to reveal equipment construction and layout and label location are shown in Exhibit 4-5.

2.1033(c)(13) For equipment employing digital modulation, a detail description of the modulation technique. This UUT uses FSK to modulate the transmitter.

2.1033(c)(14) Data required for 2.1046 to 2.1057 See Below

2.1046(a) & 90.205 RF power output.

MAXIMUM PEAK OUTPUT POWER(CONDUCTED)

Maximum peak output power(W)
457.575MHz
(0.331W) 25.2 dBm

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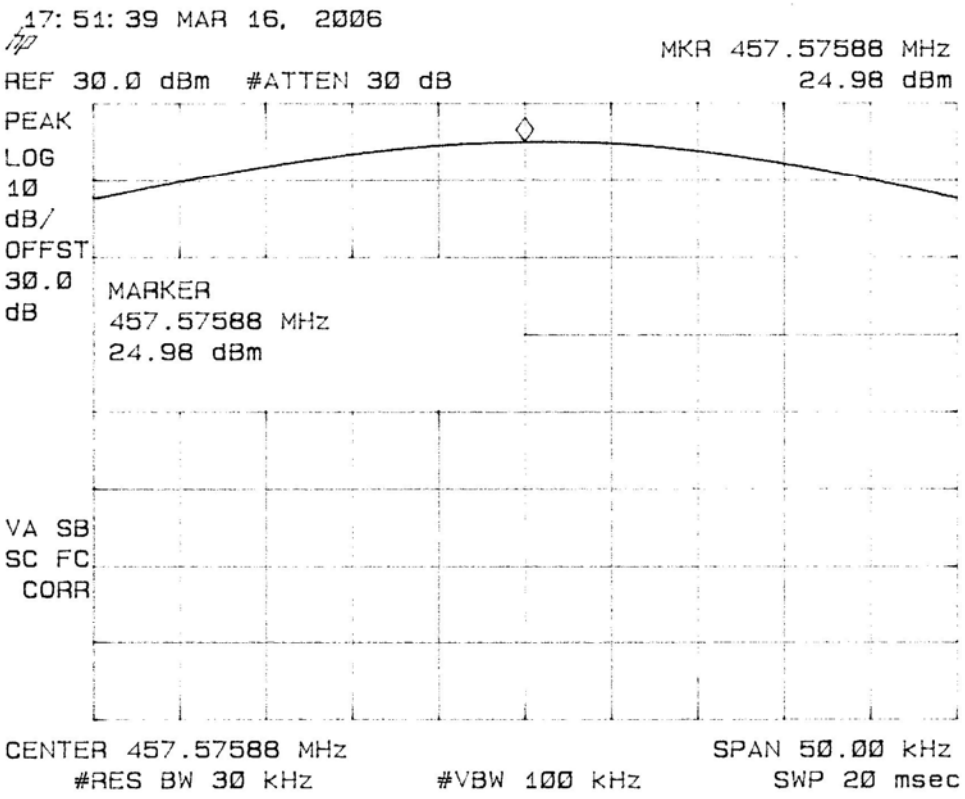
PLOT



C-factor : 0.3dB ; (C-factor = Cable Loss)

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SPURIOUS EMISSIONS (Conducted)

2.1057 SPECTRUM RANGE TO BE INVESTIGATED

Lowest radio frequency signal generated in the equipment, without going below 9kHz, up to at least the frequency shown below:

(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

(2) If the equipment operates at or above 10GHz and below 30GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

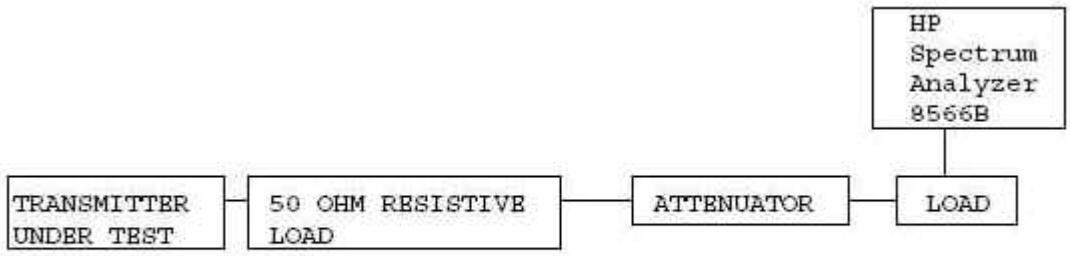
(3) If the equipment operates at or above 30GHz: to the fifth harmonic of the highest fundamental frequency or to 200GHz, whichever is lower.

(b) Particular attention should be paid to harmonics and sub-harmonics 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 20dB below the permissible value, need not be reported.

(d) Unless otherwise specified,measurements above 40GHz shall be performed using a minimum resolution bandwidth of 1MHz.

Method of Measuring Conducted Sprious Emissions



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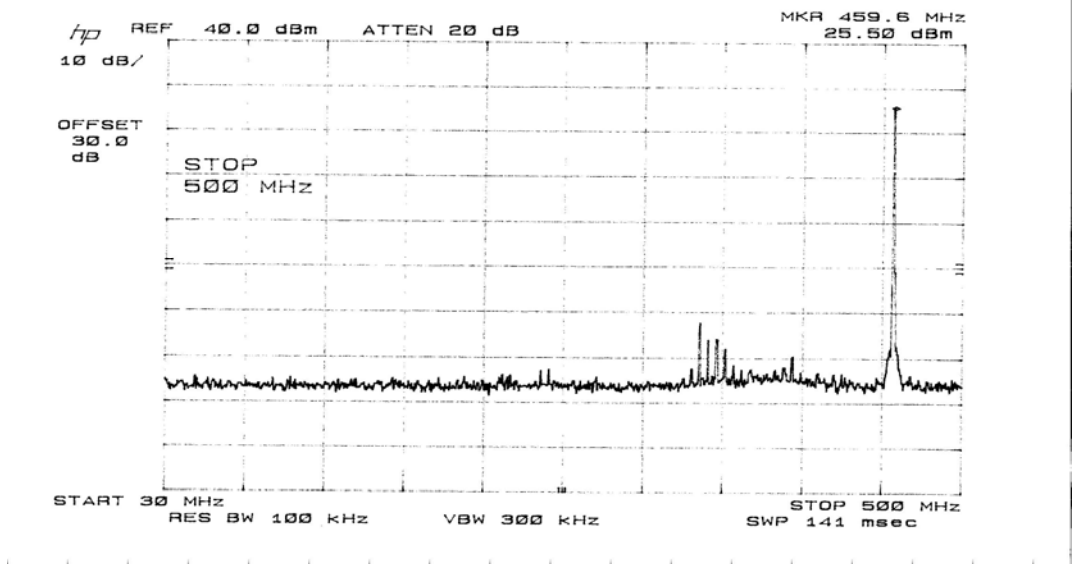
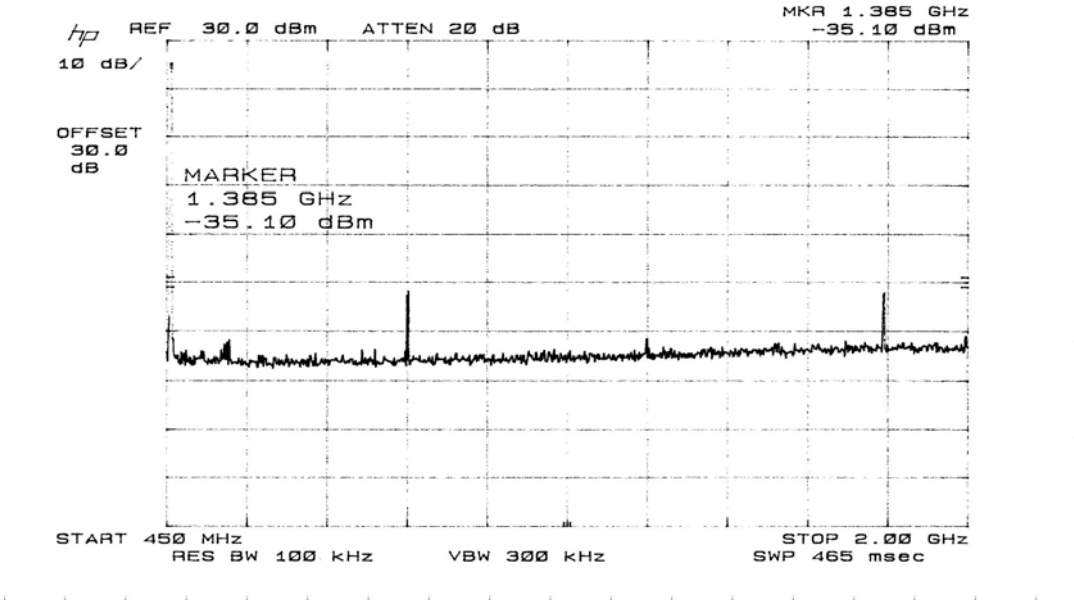
PLOT
REQUIREMENTS : 43 + 10log(0.331) = 38.1982 dB





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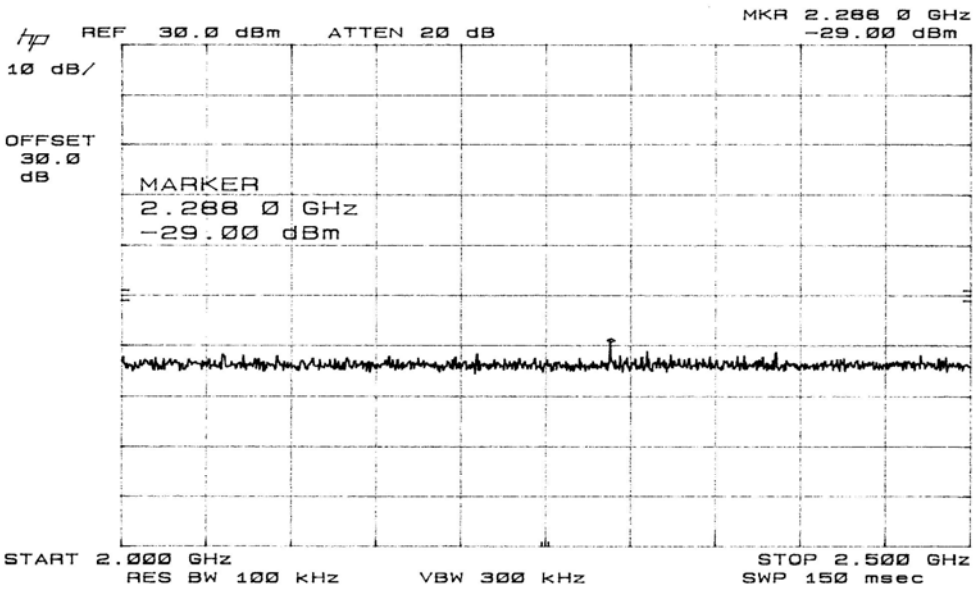

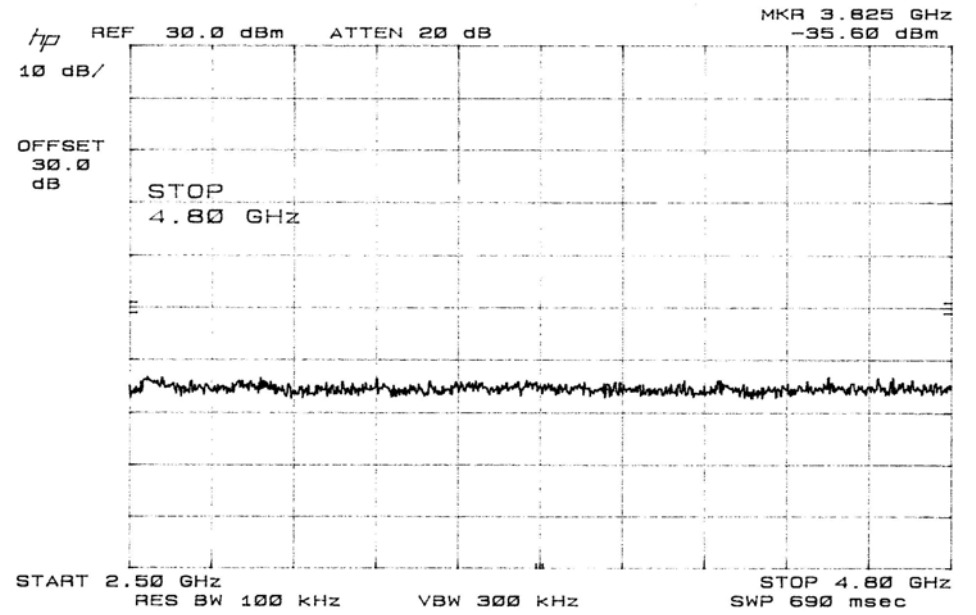

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Kyunggi-Do,469-803, Korea
T820318835092F820318835169 email thrukang@kornet.net

2.1053 **UNWANTED RADIATION**

90.210 (g) (3) The tabulated Data shows the results of the radiated Field strength emissions test. The spectrum was Scanned from 30 MHz to at least the 10th harmonic of The fundamental.

REQUIREMENTS: 43 + 10log(0.331) = 38.1982 dB

test result

Horizontal					Vertical			
frequency	**dBc**	**Margin**	**dBm**		**frequency**	**dBc**	**Margin**	**dBm**
457.5750	0	0			457.5750	0	0	
925.1000	49.18	10.98	-23.98		925.1000	40.18	1.98	-14.98
1387.6500	58.36	20.16	-33.16		1387.6500	60.66	22.46	-35.46
1850.2000	53.38	15.18	-28.18		1850.2000	56.48	18.28	-31.28
2312.7500	47.36	9.16	-22.16		2312.7500	42.66	4.46	-17.46
2775.3000	60.32	22.12	-35.12		2775.3000	60.42	22.22	-35.22
3237.8500	60.13	21.93	-34.93		3237.8500	61.23	23.03	-36.03
3700.4000	62.00	23.80	-36.80		3700.4000	63.50	25.30	-38.30
4162.9500	62.88	24.68	-37.68		4162.9500	53.78	15.58	-28.58
4625.5000	61.70	23.50	-36.50		4625.5000	61.80	23.60	-36.60

METHOD OF MEASUREMENT : The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental. This test was conducted per TIA/EIA STANDARD 603 using the substitution method. Measurements were made at the open field test site of ThruLab & ENGINEERING. located at 477-6, Hager-Ri, Yoju-Up, Yoju-Gun, Kyunggi-Do,469-803, Korea

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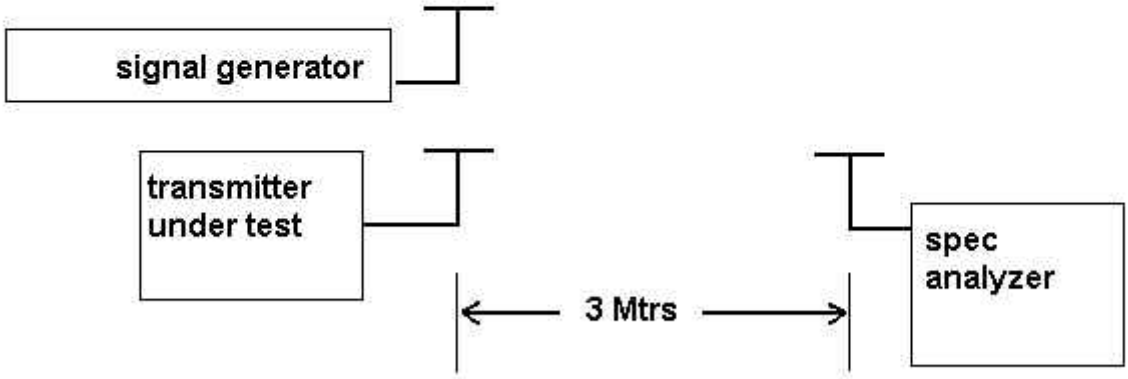
477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092F820318835169 email thrukang@kornet.net

Method of Measuring Radiated Spurious Emissions



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Kyunggi-Do,469-803, Korea
T820318835092F820318835169 email thrukang@kornet.net

BANDWIDTH LIMITATION

90.209 According to 90.203(3) For all other types of emissions, the maximum authorized bandwidth shall not be more than that normally authorized for voice operations.
According to 90.200(5), Unless specified elsewhere, channel spacing and bandwidths that will be authorized in the following frequency bands are given in the following"STANDARD CHANNEL SPACING/BANDWIDTH" table.

Standard Channel Spacing/Bandwidth

Frequency band (MHz)	Channel spacing (KHz)	Authorized Bandwidth(kHz)
Below 25 ……		
25-50.	20	20
72-76	20	20
150-174	1)7.5	1,3)20/11.25/6
220-222	5	4
421-512	1)6.25	1,3)20/11.25/6
806-821/851-866	25	20
821-824/866-869	12.5	20
896-901/935-940	12.5	13.6
902-928……		
929-930	25	20
1427-1435……		
2450-2483.52……		
Above 2500……		

1) For stations authorized on or after August 18,1995.
3) Operations using equipment designed to operate with a 25kHz channel bandwidth will be authorized a 20kHz bandwidth. Operations using equipment designed to operate with a 12.5kHz channel bandwidth will be authorized an 11.25kHz bandwidth. Operations using equipment designed to operate with a 6.25kHz channel bandwidth will be authorized a 6kHz bandwidth.

Specification Limit: 20kHz

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Kyunggi-Do,469-803, Korea
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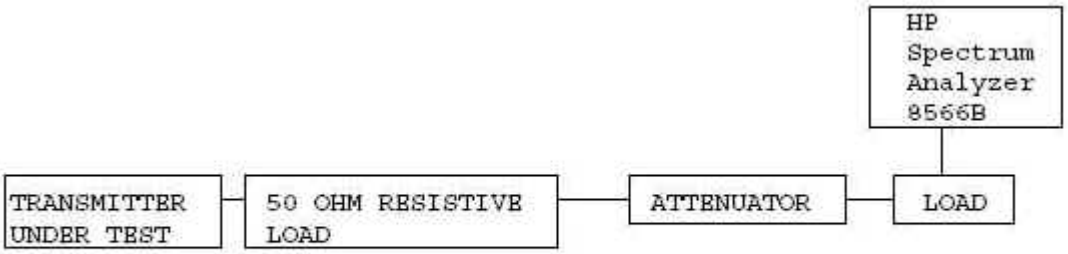
2.1049 Audio Low Pass Filter
This UUT does not have a low pass filter

2.1049 Occupied bandwidth:
90.210(g)Emission Mask G.
For transmitters that are not equipped with an audio low pass filter pursuant to S90.211(b), the power of any emission must be attenuated below the unmodulated carrier power(P) as follows; (1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency(fd in kHz) of more than 5 kHz but no more than 10kHz: At least 83log(fd/5)dB; (2) ON any frequency removed from the center of the authorized bandwidth by a displacement frequency(fd in kHz) of more than 10 kHz, but no more than 250% of the authorized bandwidth: At least 116log(fd/6.1)dB or 50+10log(P), or 70dB, whichever is the lesser attenuation; (3) On any frequency removed from the center of the authorized bandwidth by more than 250% of the authorized bandwidth: At least 43+10log(P)dB.

Method of Measuring Occupied Bandwidth



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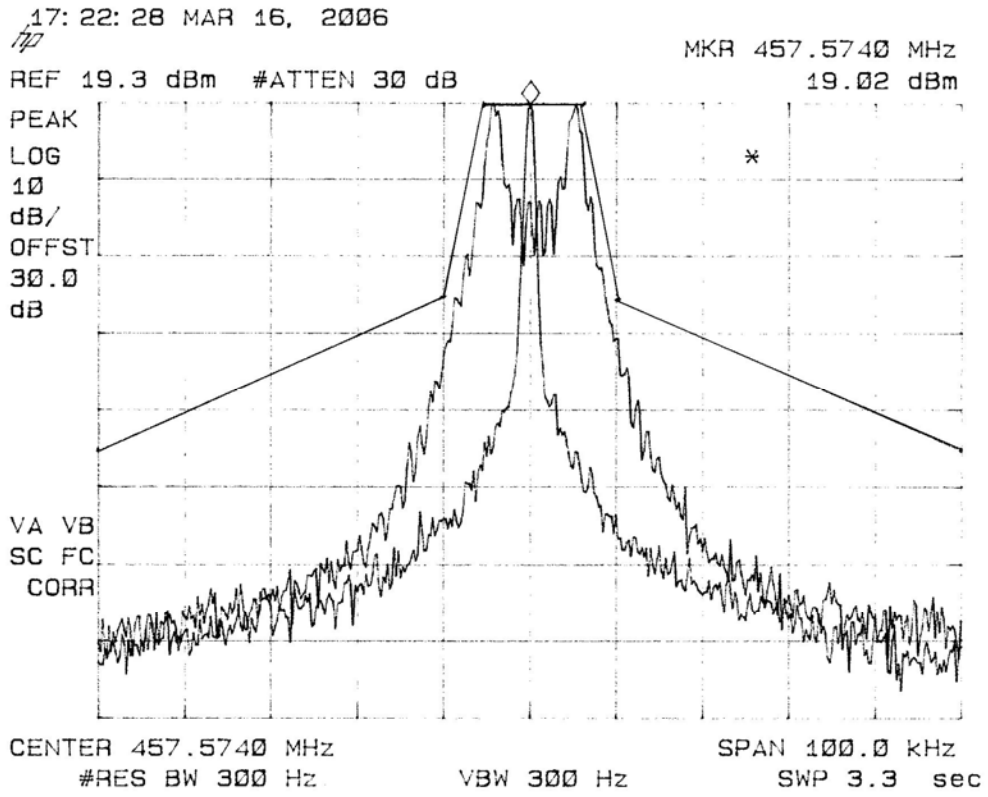
EMISSIONS MASK(G) PLOT



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2.1055 Frequency stability:
90.213 (a)(11)

Temperature and voltage tests were performed to verify that the frequency remains within the .00025%, 2.5 ppm specification limit, for 25 kHz spacing. The test was conducted as follows: The transmitter was placed in the temperature chamber at 25 degrees C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15 second intervals. The worse case number was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30 degrees C after which the transmitter was again allowed to stabilize for one hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15 second intervals. The worst case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to +50 degrees C.

MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency) :457.5750

TEMPERATURE	FREQUENCY(MHz)	ppm	LIMIT(ppm)
REFERENCE	**457.575**	**0**	
-30	457.57476	-0.52	2.5
-20	457.57489	-0.24	2.5
-10	457.57494	-0.13	2.5
0	457.57482	-0.39	2.5
10	457.57480	-0.44	2.5
20	457.57484	-0.35	2.5
30	457.57488	-0.26	2.5
40	457.57497	-0.07	2.5
50	457.57511	0.24	2.5
END POINT OF BATTERY:5.5V	457.57470	-0.66	2.5

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Kyunggi-Do,469-803, Korea
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APPLICANT: LEE TECHNOLOGY KOREA CO.,LTD.

FCC ID: QBTLTK-SCT

NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE

RULES PART NO.: 15.207

REQUIREMENTS:

	QUASI-PEAK	**AVERAGE**
.15 – 0.5 MHz	66-56 dBuV	56-46 dBuV
0.5 – 5.0	56	46
5.0 – 30.	60	50

TEST PROCEDURE: ANSI STANDARD C63.4-2003. The spectrum was scanned from .15 to 30 MHz.

The highest emission read for Line 1 was 0.25MHz @ 32.5 dBuv/m

The highest emission read for Line 2 was 2.55MHz @ 33.5 dbuv/m

THE GRAPHS ON THE FOLLOWING PAGES REPRESENT THE EMISSIONS READ FOR POWER LINE CONDUCTED 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.

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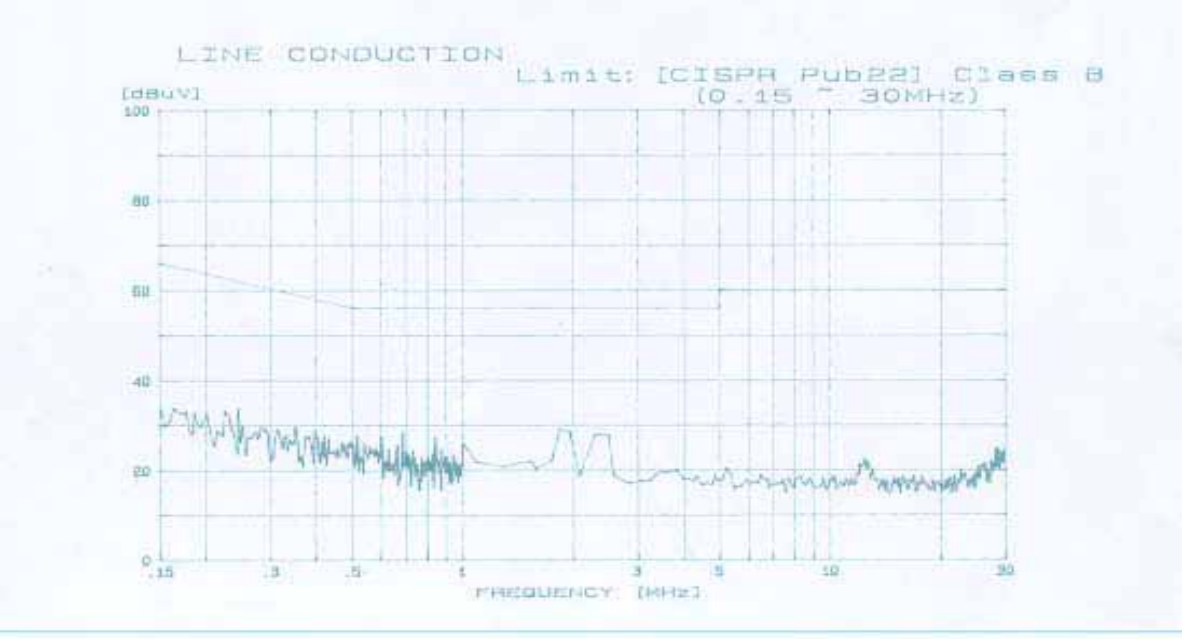
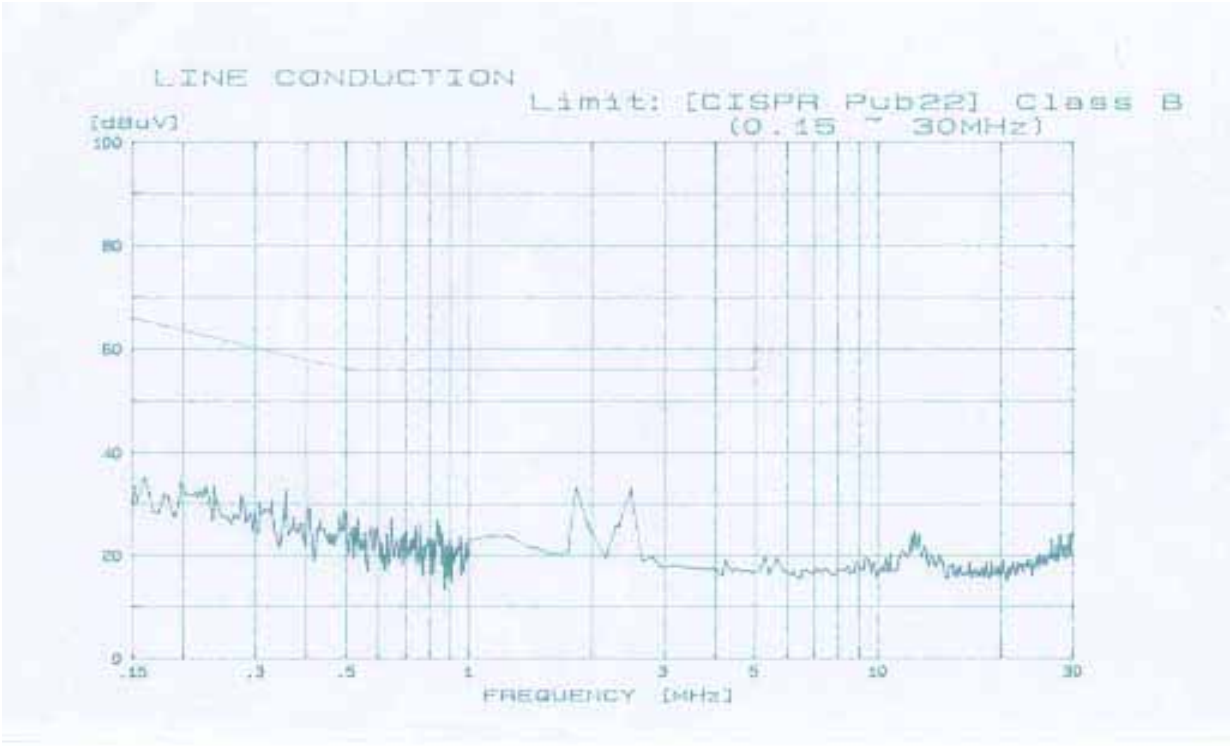
Line1



Line2



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2.1055(a)(1) Frequency stability:
90.214 Transient Frequency Behavior

REQUIREMENTS: In the 450-500MHz frequency band, transient frequencies must be within the maximum frequency difference limits during the time interval indicated below for 25kHz Channels:

Time Interval	Maximum Frequency	Portable Radios 450-500 MHz
t 1	+25 kHz	10.0 ms
t 2	+12.5 kHz	25.0 ms
t 3	+25 kHz	10.0 ms

TEST PROCEEDURE: TIA/EIA TS603 PARA 2.2.19, the levels were set as follows;

1. Using the variable attenuator the transmitter level was set to 40 dB below the test receivers maximum input level, then the transmitter was turned off.

2. With the transmitter off the signal generator was set 20dB below the level of the transmitter in the above step, this level will be maintained with the signal generator through -out the test.

3. Reduce the attenuation between the transmitter and the RF detector by 30 dB.

4. With the levels set as above the transient frequency behavior was observed & recorded

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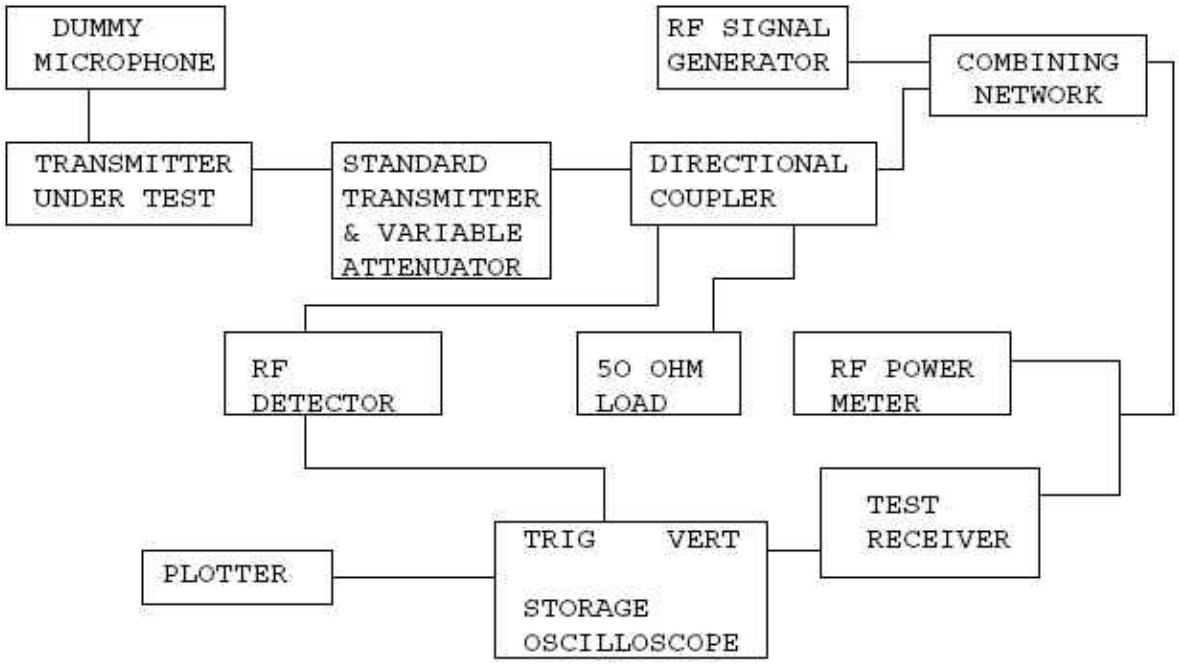
2.1055 Frequency stability:
90.214 Transient Frequency Behavior
(Continued)



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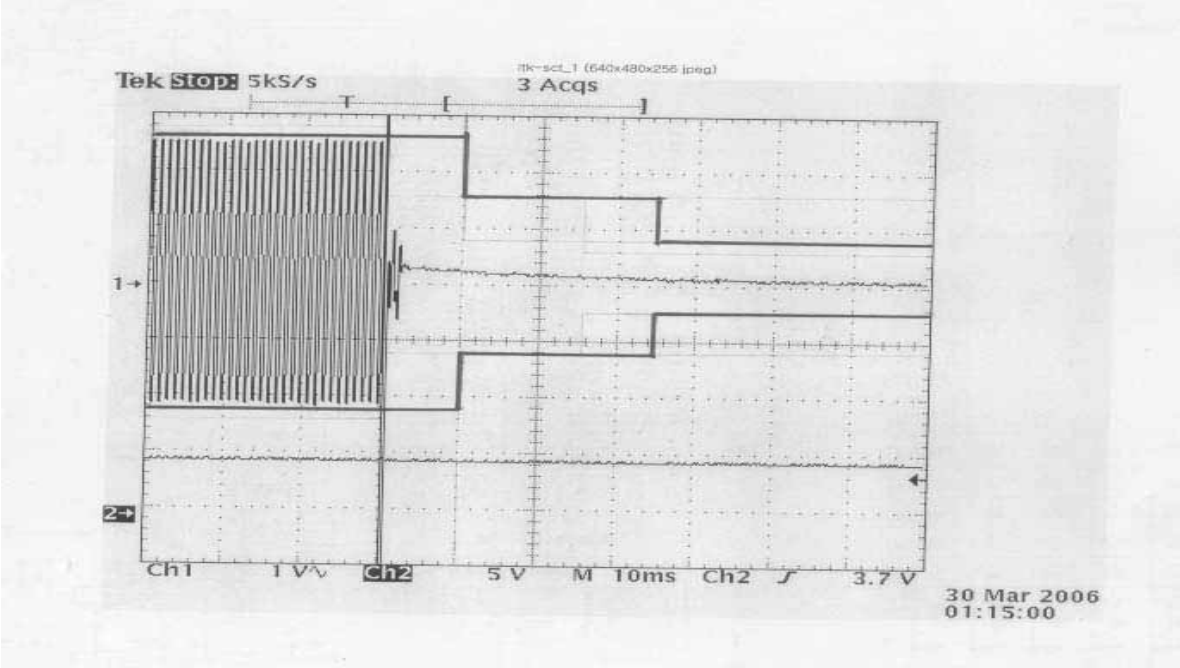

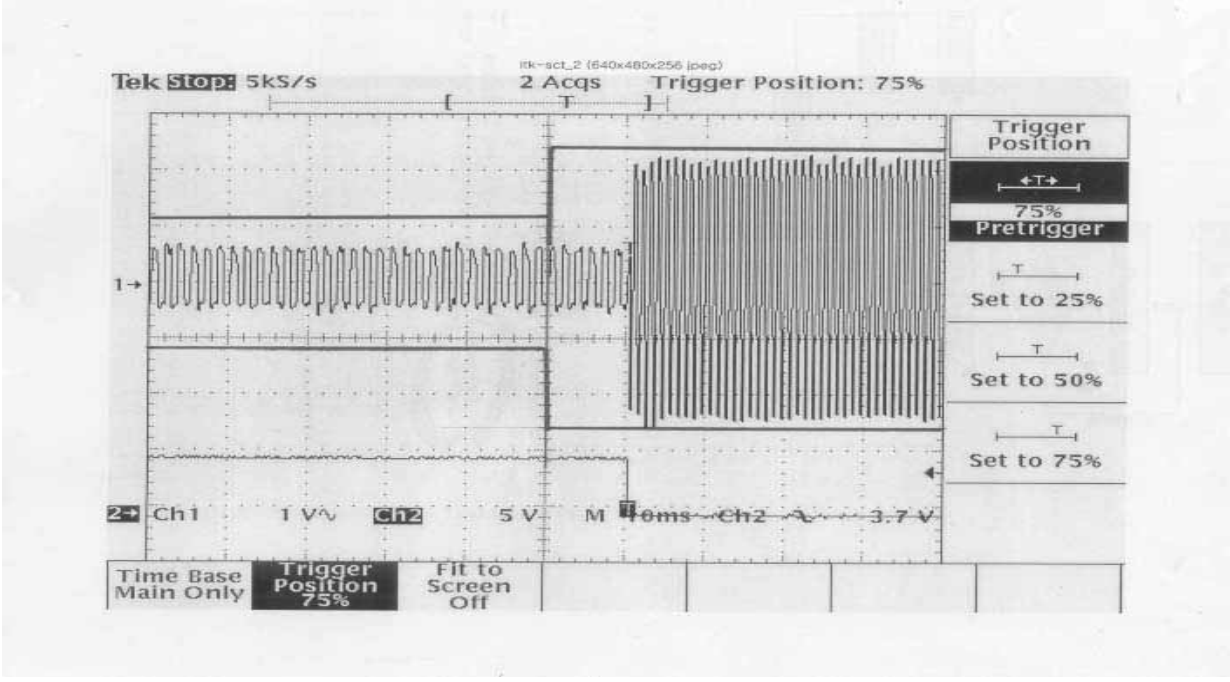

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Test Equipment List

No	Description	Manufacturer	Model No.	Serial No.	Due Cal.
1	Test Receiver	Rohde & Schwarz	ESVS10	830489/001	2006.04.23
2	Test Receiver	Rohde & Schwarz	ESHS 10	825832/014	2006.08.25
3	Test Receiver	Rohde & Schwarz	ESVS 10	826008/014	2006.05.24
4	Spectrum Analyzer	Hewlett Packard	8566B	2311A02394	2006.04.23
5	Spectrum Display	Hewlett Packard	85662A	2542A12429	2006.04.23
6	Quasi-peak Adapter	Hewlett Packard	85650A	2521A00887	2006.04.23
7	RF Preselector	Hewlett Packard	85685A	2648A00504	2006.04.23
8	Preamplifer	Hewlett Packard	8449B	3008A00375	2006.04.23
9	Preamplifer	Hewlett Packard	8447F	3113A05367	2006.04.23
10	Preamplifer	Hewlett Packard	8447F	2805A02570	2006.12.12
	Preamplifer	A.H. Systems	PAM-0118	164	2007.01.17
11	Biconical Antenna	Eaton Corp.	94455-1	0977	2006.04.01
12	Biconical Antenna	EMCO	3104C	9111-2468	2006.06.07
13	Log Periodic Antenna	EMCO	3146	2051	2006.04.01
14	Log Periodic Antenna	EMCO	3146	8901-2320	2006.03.28
15	Horn Antenna	A.H. Systems	SAS-571	414	2006.03.17
	Horn Antenna	A.H. Systems	SAS-571	781	2007.01.07
16	Loop Antenna	Rohde & Schwarz	HFH2-Z2.335.4711.52	826532/006	2006.01.31
17	Dipole Antenna	Rohde & Schwarz	VHAP	574	2006.12.12
18	Dipole Antenna	Rohde & Schwarz	VHAP	575	2006.12.12
19	Dipole Antenna	Rohde & Schwarz	UHAP	546	2006.12.12
20	Dipole Antenna	Rohde & Schwarz	UHAP	547	2006.12.12
21	Signal Generator	Rohde & Schwarz	SMS	872165/100	2006.04.23
22	Signal Generator	Rohde & Schwarz	SMX	825459/030	2006.05.20
23	Spectrum Monitor	Rohde & Schwarz	EZM	862304/007	None
24	Panorama Monitor	Rohde & Schwarz	EPN	883707/207	None
25	Spectrum Analyzer	Advantest Corp.	R3261C	61720208	2006.04.23
26	Spcetrum Analyzer	Hewlett Packard	8591A	3205A02641	2007.01.27
27	LISN	EMCO	3825/2	9111-1912	2006.12.12
28	LISN	Solar	8012-50-R-24	8379121	2006.04.25

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Kyunggi-Do,469-803, Korea
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29	LISN	Kyoritsu	KNW-242	8-923-2	2006.04.25
30	Plotter	Hewlett Packard	7475A	2210A02802	None
31	Modulation Analyzer	Hewlett Packard	8901B	3438A05094	2006.04.23
32	Frequency Counter	Tektronic	CMC251	TW52489	2006.04.23
33	Temperature & Humidity Chamber	TABAI EZPEC CORP.	MC711P	112000492	2006.0827
34	Antenna Mast	EMCO	1070-3	9109-1617	None
35	Turn Table	EMCO	1080-1,2	9203-1762	None
36	Positioning Controller	EMCO	1090	9111-1054	
37	Antenna Power Supply	Rohde & Schwarz	HZ-9	920127	None
38	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	881052	None
39	Coaxial Take-up Reel	EMCO	100817	9109-1684	None