

THRU Lab & Engineering.

477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do, 469-803, Korea
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THRU

Test Report

Product Name: SLIM CHARGER TRANSMITTER

FCC ID: QBTLTK-1700CT

Applicant:
LEE TECHNOLOGY KOREA CO.,LTD.

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

Date Receipt: 15/Dec/2007

Date Tested: 17/Dec/2007

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APPLICANT: LEE TECHNOLOGY KOREA CO., LTD.

FCC ID: QBTLTK-1700CT

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APPLICANT: LEE TECHNOLOGY KOREA CO., LTD.

FCC ID: QBTLTK-1700CT

REPORT #: THRU-71007

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GENERAL INFORMATION REQUIRED FOR TYPE ACCEPTANCE

2.1033 (c)(1)(2) LEE TECHNOLOGY KOREA CO., LTD.. will sell the FCC ID: QBTLTK-1700CT 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 = $2(1,200\text{bps}/2) + 2(4500)(1) = 10.2\text{k}$

ALLOWED AUTHORIZED BANDWIDTH = 10.2 kHz.

90.209(b) (5)

2.1033 (5) Frequency Range: 450.3250 ~ 467,8500 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 = 5 Volts
IC = 450 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)		
Low	Mid	High
1.0965 W	1.1482 W	1.1749 W
30.4 dBm	30.6 dBm	30.7 dBm

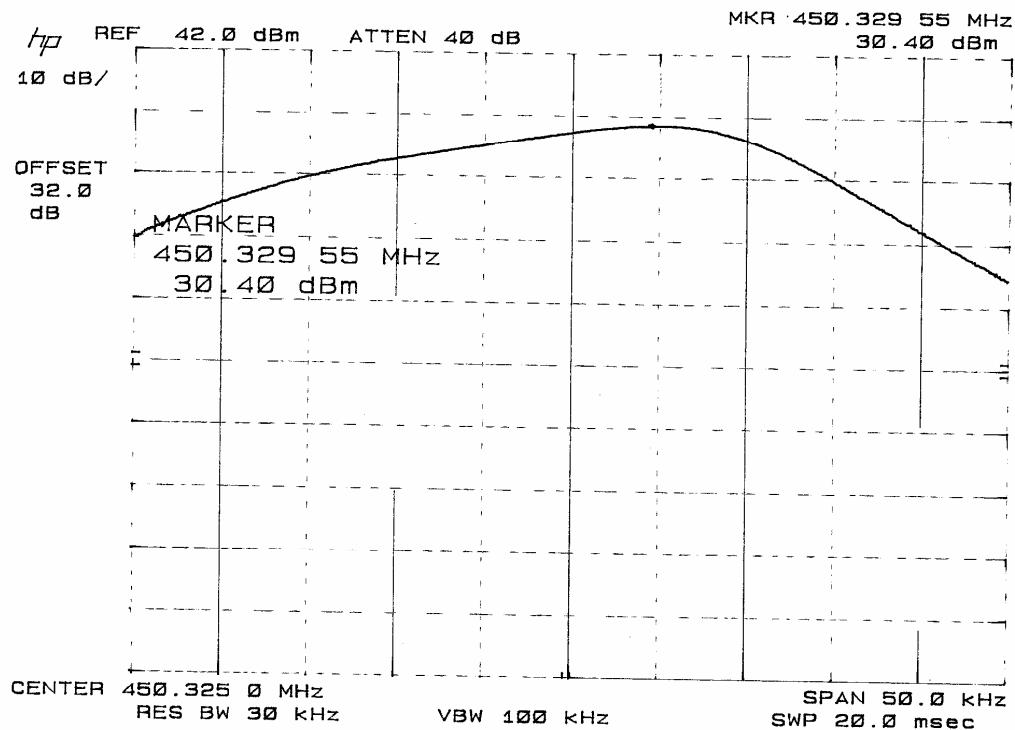
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PLOT

LOW

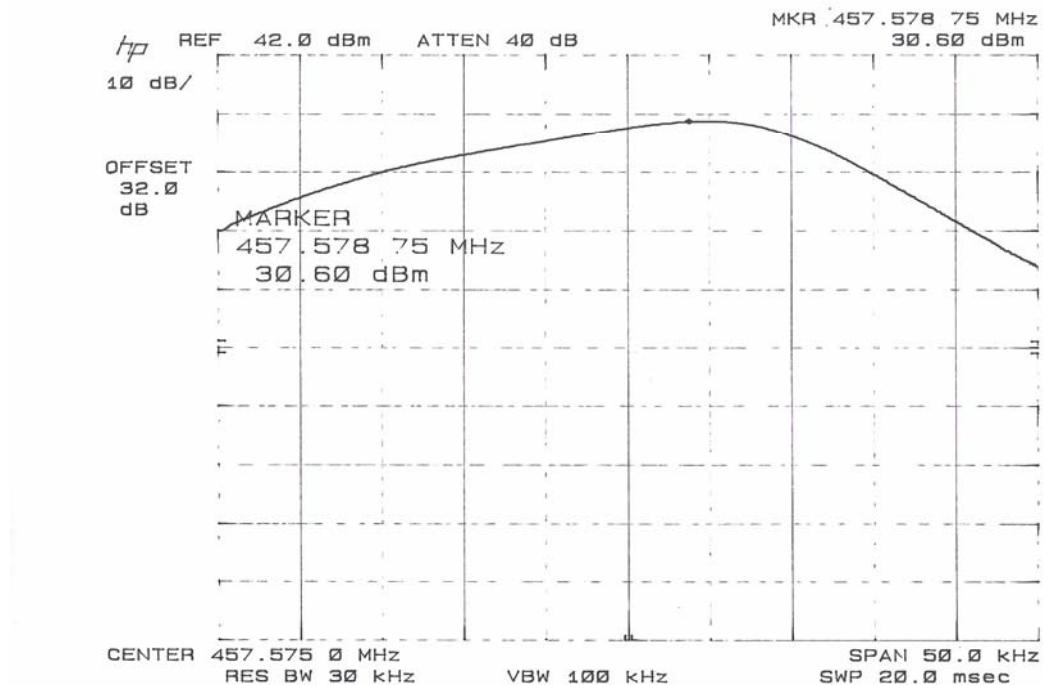


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Mid

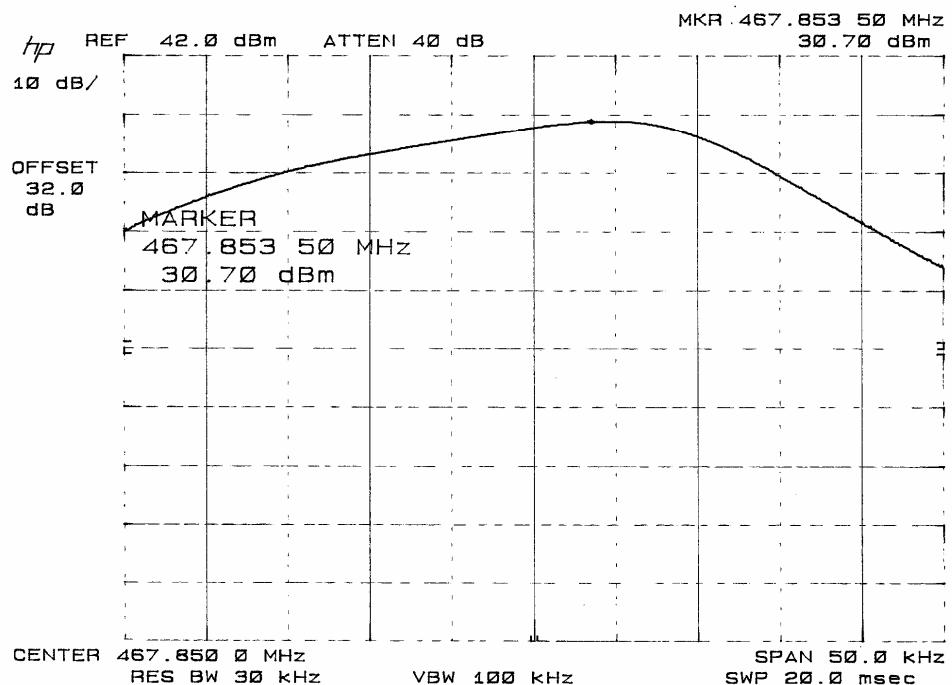


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High



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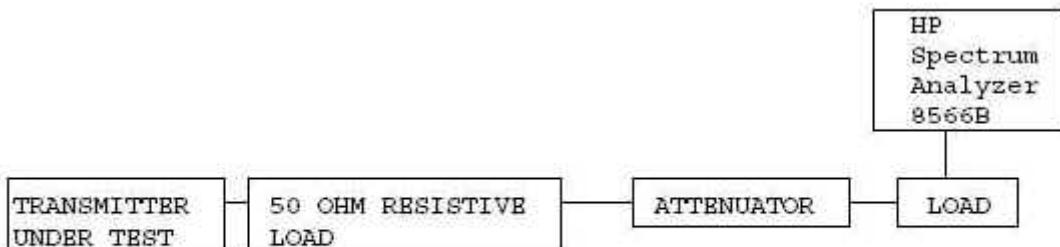
SPURIOUS EMISSIONS (Conducted)

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 100GHz, 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 Spurious Emissions



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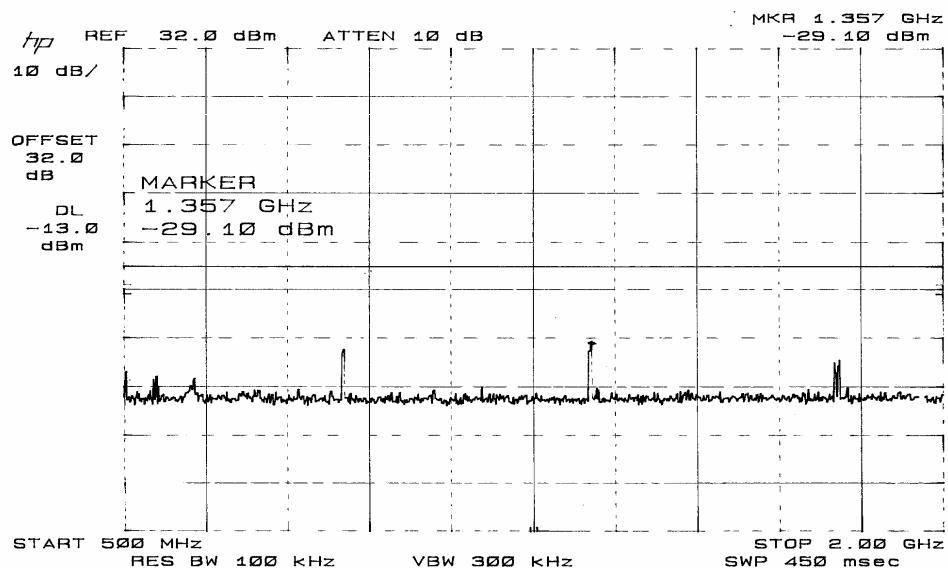
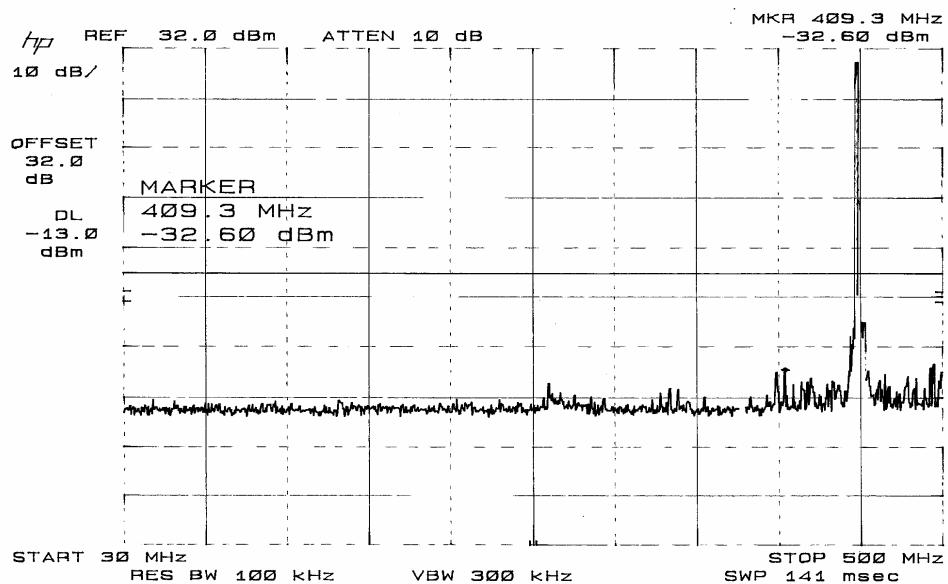
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PLOT

REQUIREMENTS : $43 + 10\log(1.0965) = 43.40 \text{ dB}$

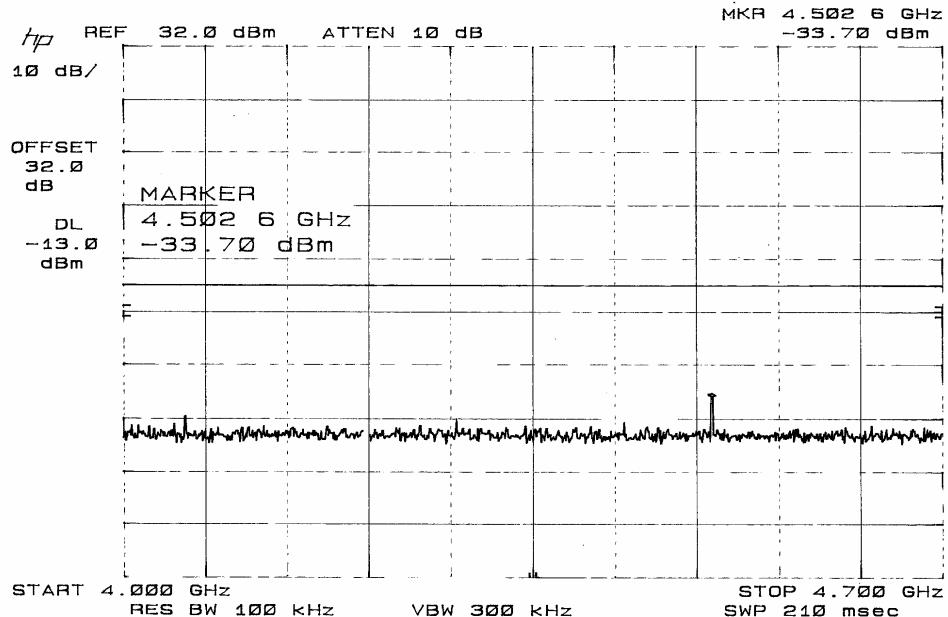
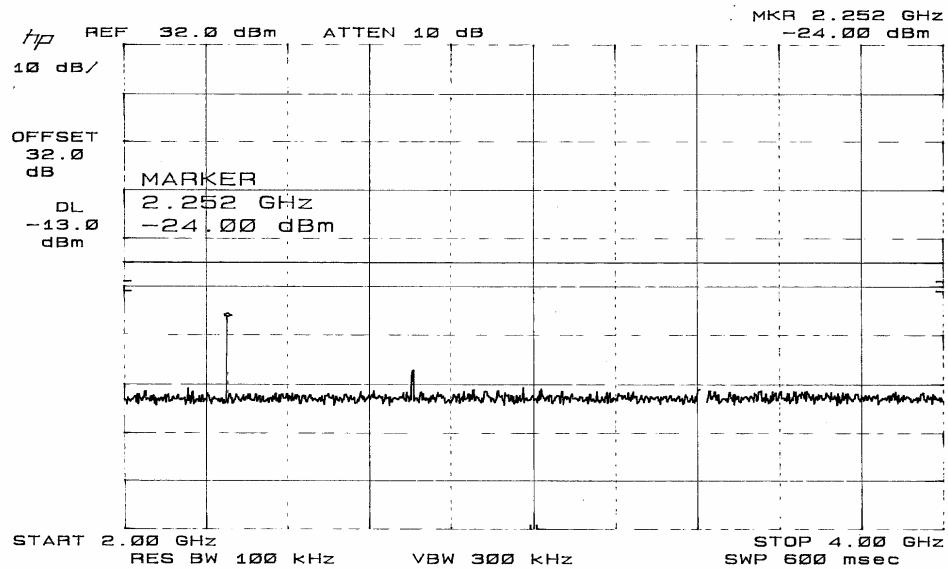
LOW



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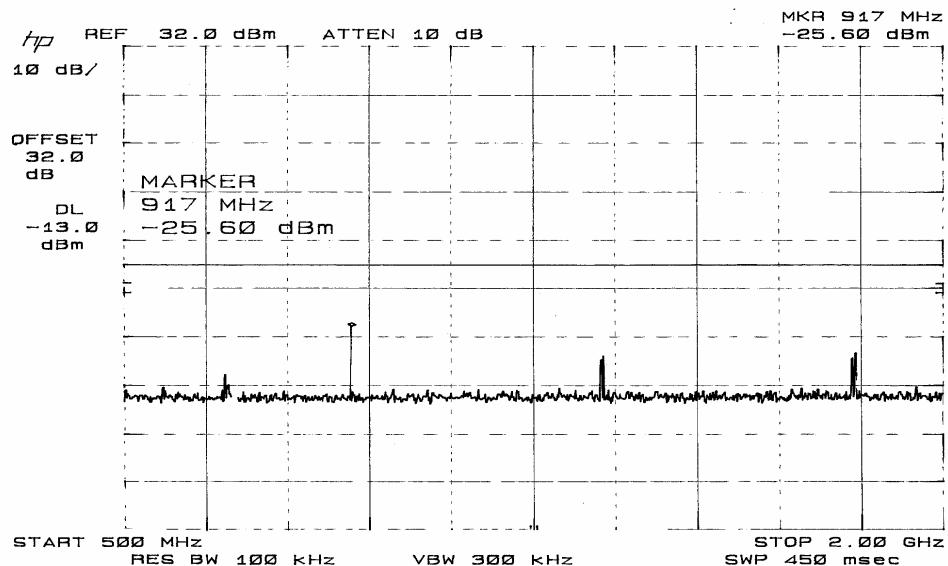
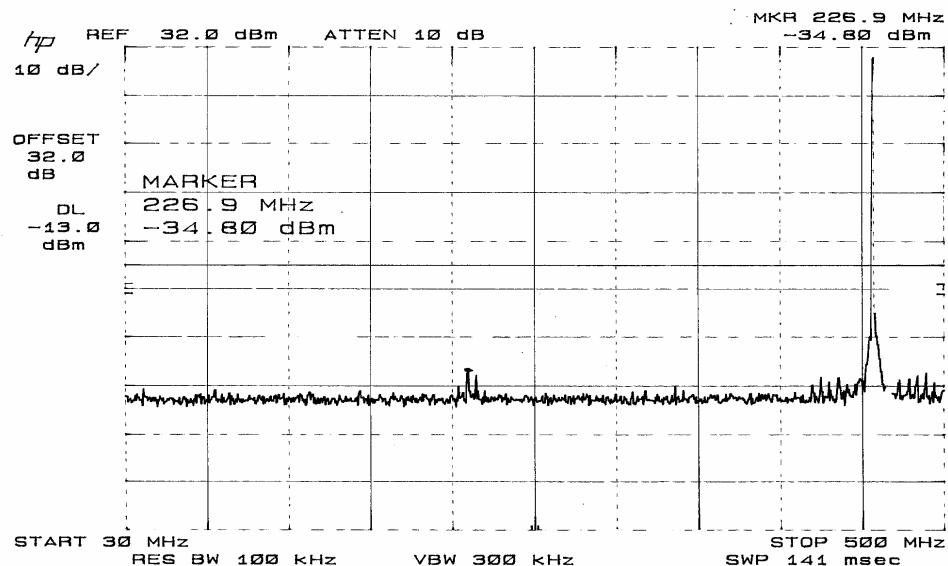
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Mid

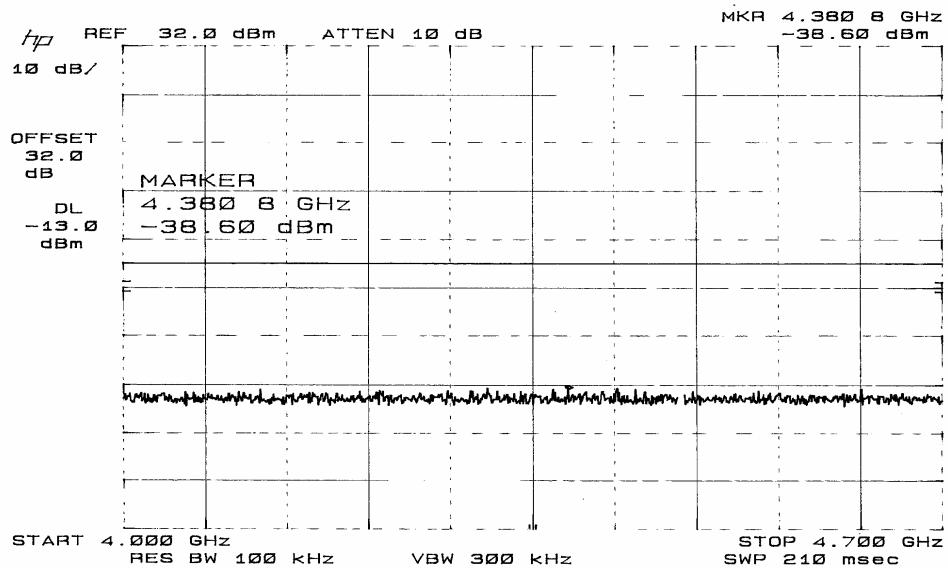
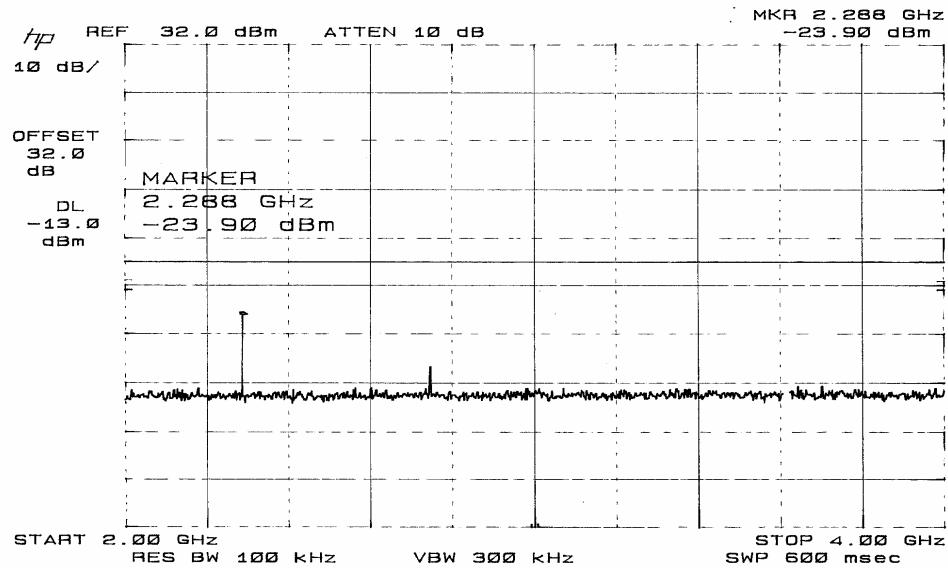
REQUIREMENTS : $43 + 10\log(1.1482) = 43.60$ dB



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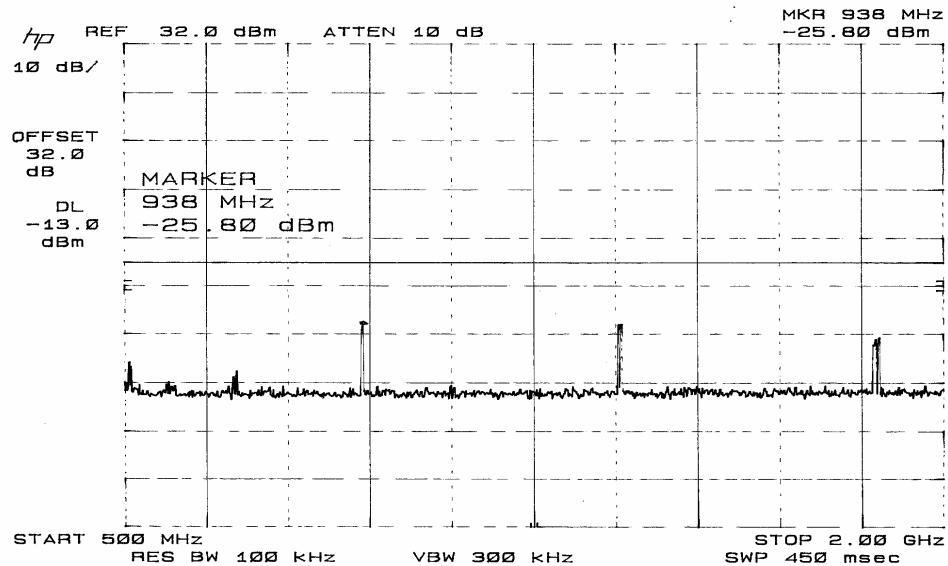
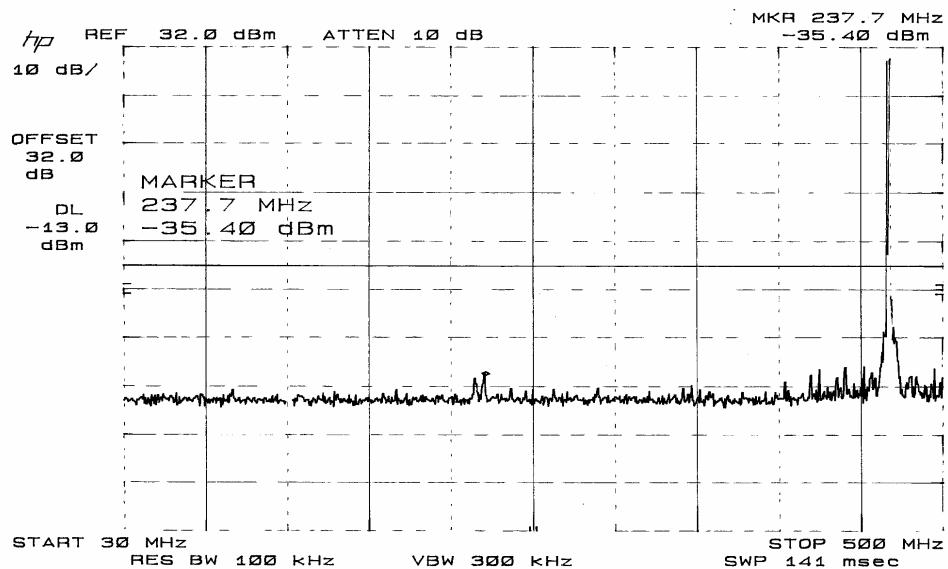
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HIGH

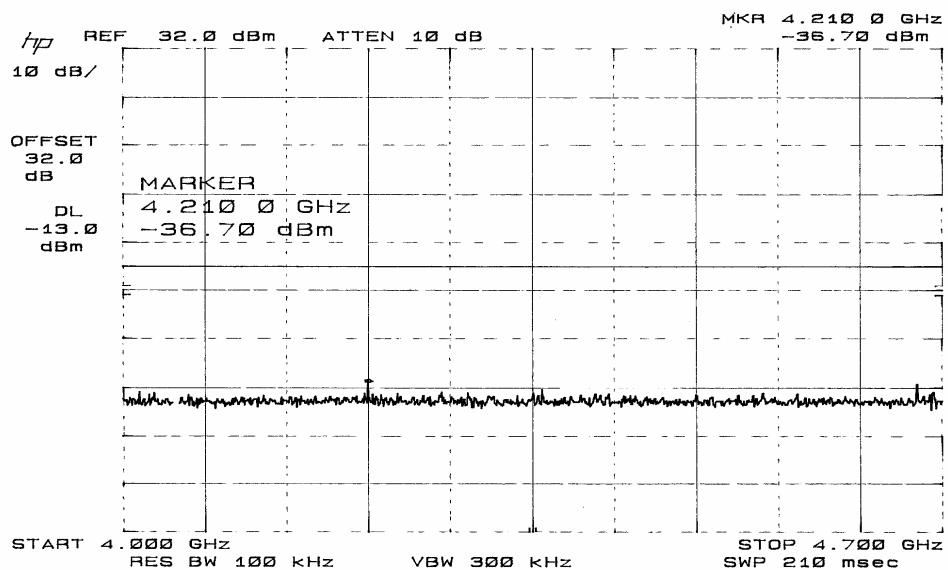
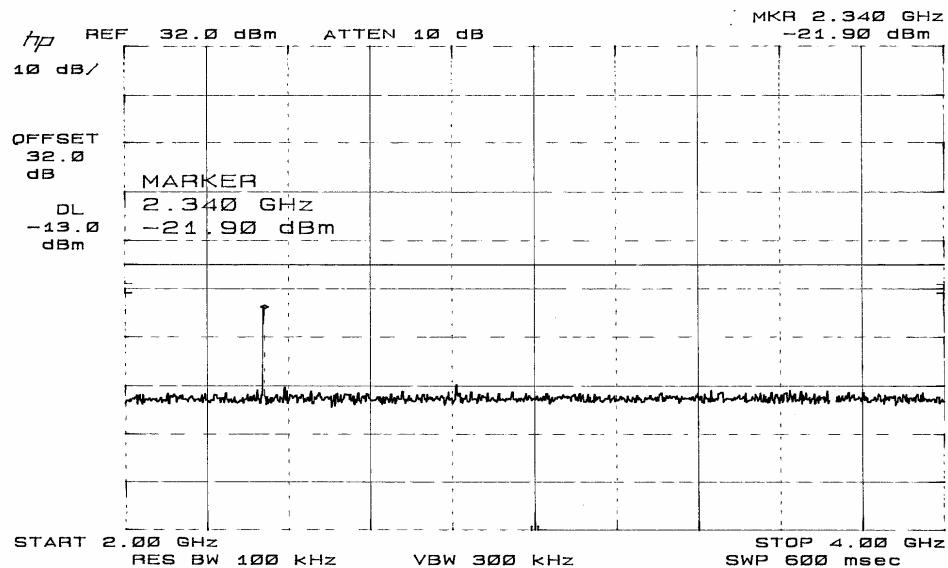
REQUIREMENTS : $43 + 10\log(1.1749) = 43.70 \text{ dB}$



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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: $43 + 10\log(1.0965) = 43.40$ dB

Test result : LOW

Horizontal				Vertical			
Frequency	dBc	Margin	dBm	Frequency	dBc	Margin	dBm
450.3250	0	0	0	450.3250	0	0	0
900.6500	62.98	19.58	-32.58	900.6500	47.08	3.68	-16.68
1350.9750	60.29	16.89	-29.89	1350.9750	63.39	19.99	-32.99
1801.3000	67.10	23.70	-36.70	1801.3000	63.80	20.40	-33.40
2251.6250	60.24	16.84	-29.84	2251.6250	57.84	14.44	-27.44
2701.9500	52.47	9.07	-22.07	2701.9500	47.97	4.57	-17.57
3152.2750	57.56	14.16	-27.16	3152.2750	58.06	14.66	-27.66
3602.6000	58.34	14.94	-27.94	3602.6000	58.24	14.84	-27.84
4052.9250	56.94	13.54	-26.54	4052.9250	56.04	12.64	-25.64
4503.2500	58.68	15.28	-28.28	4503.2500	54.08	10.68	-23.68

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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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(1.1482) = 43.60 dB

Test result : Mid

Horizontal

Vertical

Frequency	dBc	Margin	dBm	Frequency	dBc	Margin	dBm
457.5750	0	0	0	457.5750	0	0	0
915.1500	67.77	24.17	-37.17	915.1500	65.97	22.37	-35.37
1372.7250	63.38	19.78	-32.78	1372.7250	59.58	15.98	-28.98
1830.3000	68.63	25.03	-38.03	1830.3000	63.83	20.23	-33.23
2287.8750	59.53	15.93	-28.93	2287.8750	54.93	11.33	-24.33
2745.4500	52.55	8.95	-21.95	2745.4500	46.65	3.05	-16.05
3203.0250	59.75	16.15	-29.15	3203.0250	60.05	16.45	-29.45
3660.6000	58.74	15.14	-28.14	3660.6000	55.44	11.84	-24.84
4118.1750	55.76	12.16	-25.16	4118.1750	59.66	16.06	-29.06
4575.7500	54.77	11.17	-24.17	4575.7500	54.37	10.77	-23.77

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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(1.1749) = 43.70 dB

Test result :HIGH

Horizontal

Vertical

Frequency	dbc	Margin	dBm	Frequency	dbc	Margin	dBm
467.8500	0	0	0	467.8500	0	0	0
935.7000	60.86	17.16	-30.16	935.7000	60.26	16.56	-29.56
1403.5500	66.34	22.64	-35.64	1403.5500	58.44	14.74	-27.74
1871.4000	67.21	23.51	-36.51	1871.4000	62.61	18.91	-31.91
2339.2500	55.01	11.31	-24.31	2339.2500	54.31	10.61	-23.61
2807.1000	55.54	11.84	-24.84	2807.1000	53.24	9.54	-22.54
3274.9500	59.60	15.90	-28.90	3274.9500	58.90	15.20	-28.20
3742.8000	61.00	17.30	-30.30	3742.8000	56.20	12.50	-25.50
4210.6500	59.66	15.96	-28.96	4210.6500	58.86	15.16	-28.16
4678.5000	56.01	12.31	-25.31	4678.5000	55.51	11.81	-24.81

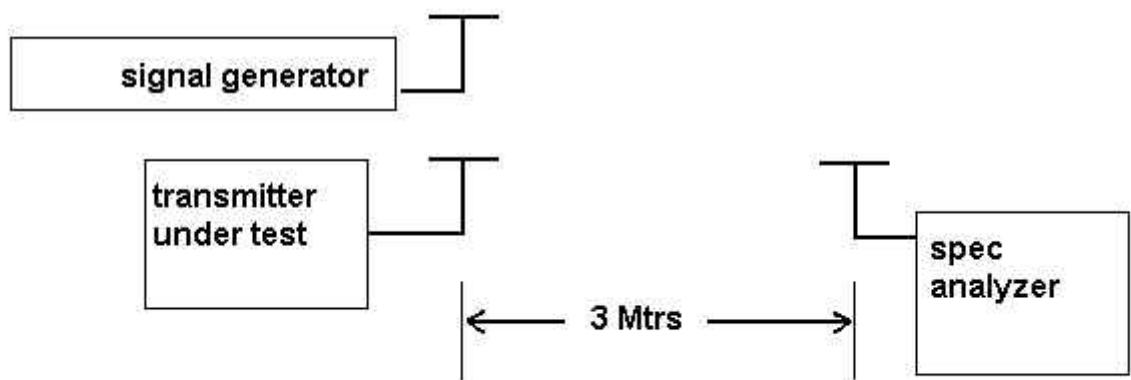
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Method of Measuring Radiated Spurious Emissions



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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)	spacing (KHz)	Channel Bandwidth(kHz)
<hr/>		
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.....		
<hr/>		

- 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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2.1049 Audio Low Pass Filter
This UUT does not have a low pass filter

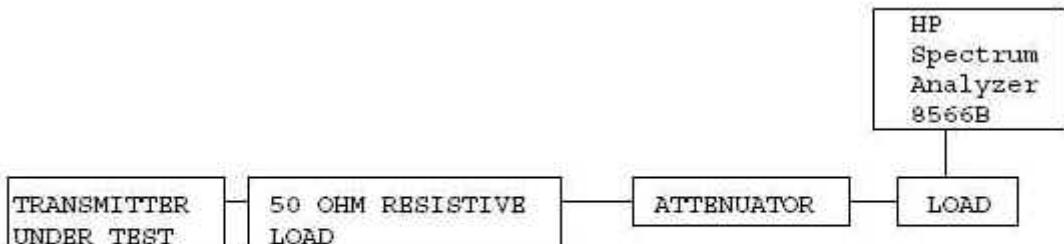
2.1049 Occupied bandwidth:

90.210(g) Emission Mask G.

For transmitters that are not equipped with an audio low-pass filter, 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 10 kHz, but no more than 250 percent of the authorized bandwidth: At least $116 \log(fd/6.1)$ dB, or $50 + 10 \log(P)$ dB, or 70 dB, whichever is the lesser attenuation; (2) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log(P)$ dB.

Method of Measuring Occupied Bandwidth



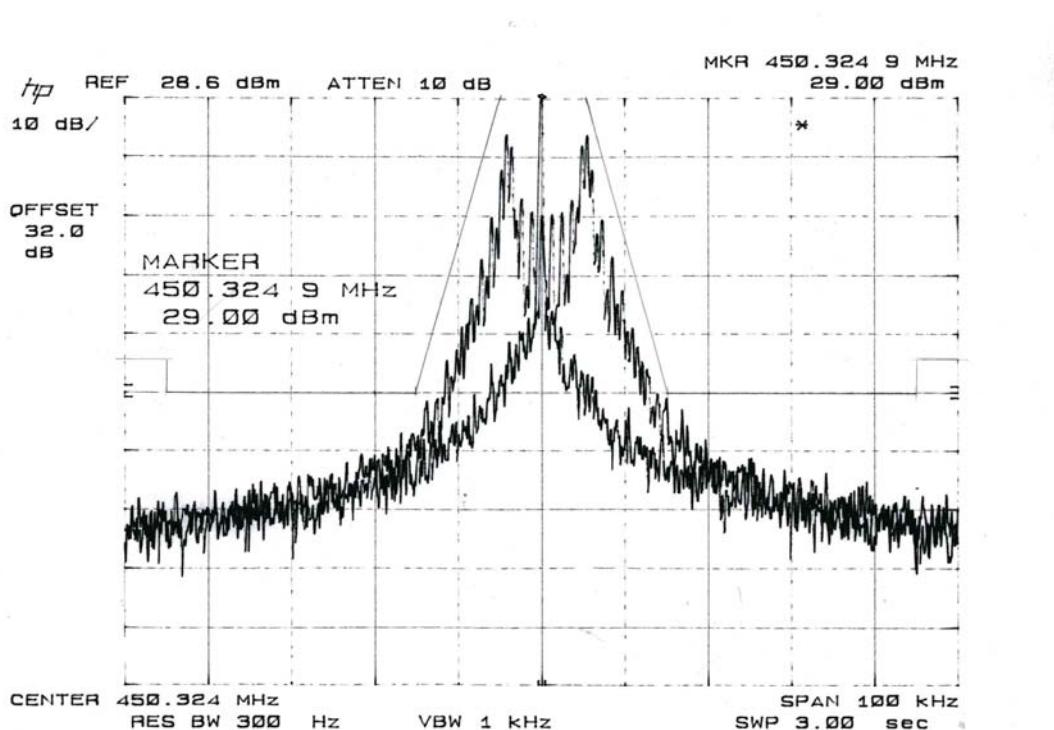
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EMISSIONS MASK(G) PLOT

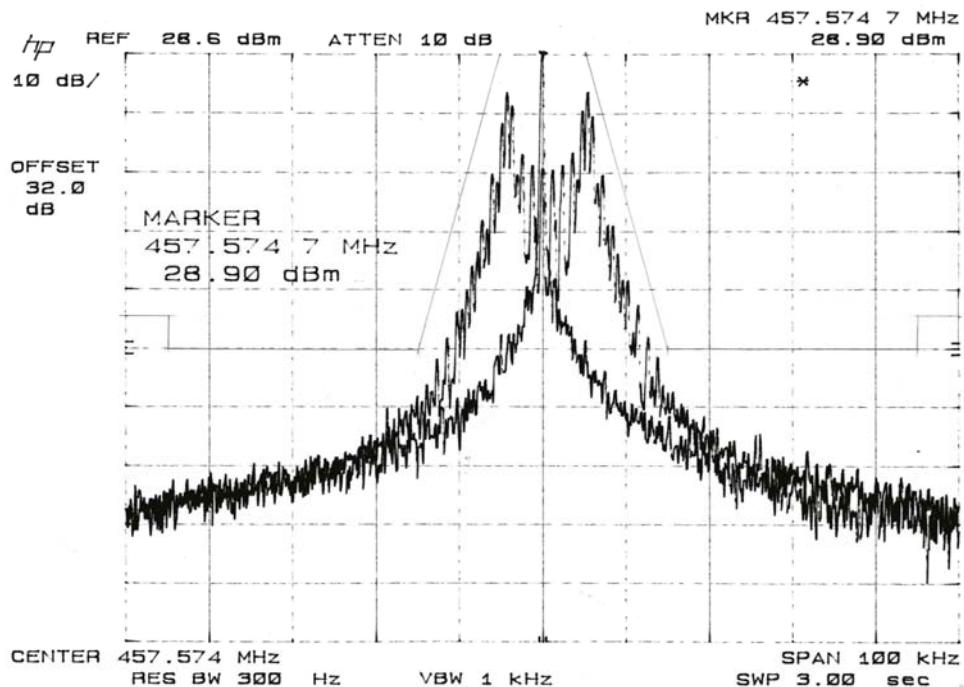
LOW



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T820318835092F820318835169 email thrukang@kornet.net
Mid

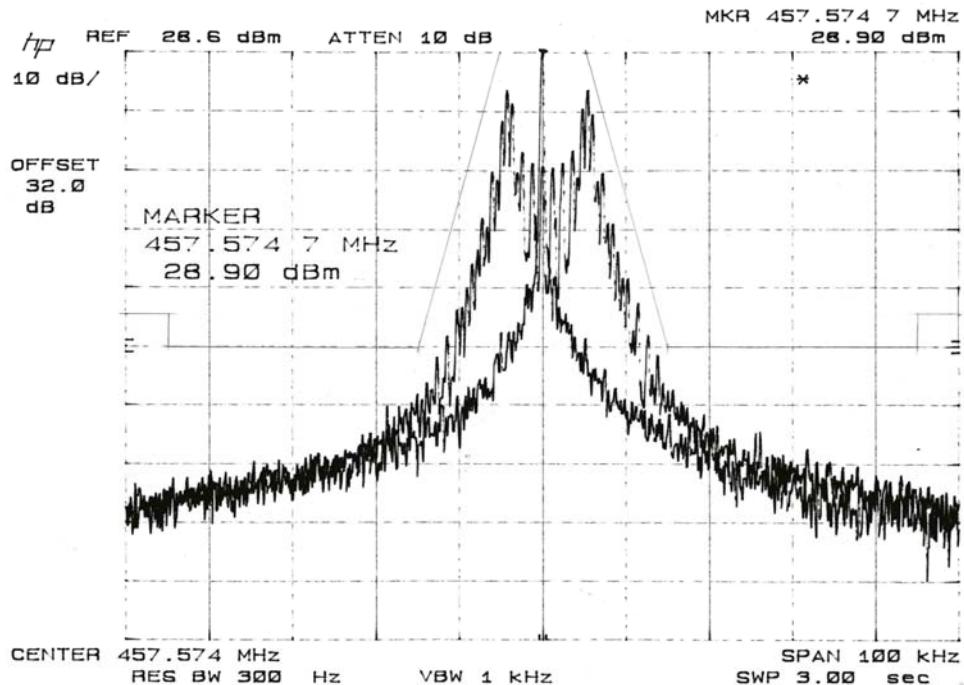


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High



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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) : 457.57500 MHz

REFERENCE VOTAGE (V DC)	12.0	REFERENCE FREQUENCY (MHz)	457.57500
TEMPERATURE	FREQUENCY(MHz)	PPM	LIMIT(ppm)
-30	457.57566	1.45	2.5
-20	457.57527	0.59	2.5
-10	457.57516	0.35	2.5
0	457.57516	0.34	2.5
10	457.57526	0.56	2.5
20	457.57510	0.22	2.5
30	457.57487	-0.28	2.5
40	457.57477	-0.49	2.5
50	457.57491	-0.19	2.5
+15% Voltage : 13.8V	457.57494	-0.13	2.5
-15% Voltage : 10.2V	457.57495	-0.10	2.5

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APPLICANT: LEE TECHNOLOGY KOREA CO., LTD.

FCC ID: QBTLTK-1700CT

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.

Stand by Mode

The highest emission read for Line 1 was 0.195 MHz @ 26.0 dBuv/m

The highest emission read for Line 2 was 0.186 MHz @ 26.2 dbuv/m

Operating Mode

The highest emission read for Line 1 was 0.176 MHz @ 44.5 dBuv/m

The highest emission read for Line 2 was 0.183 MHz @ 44.8 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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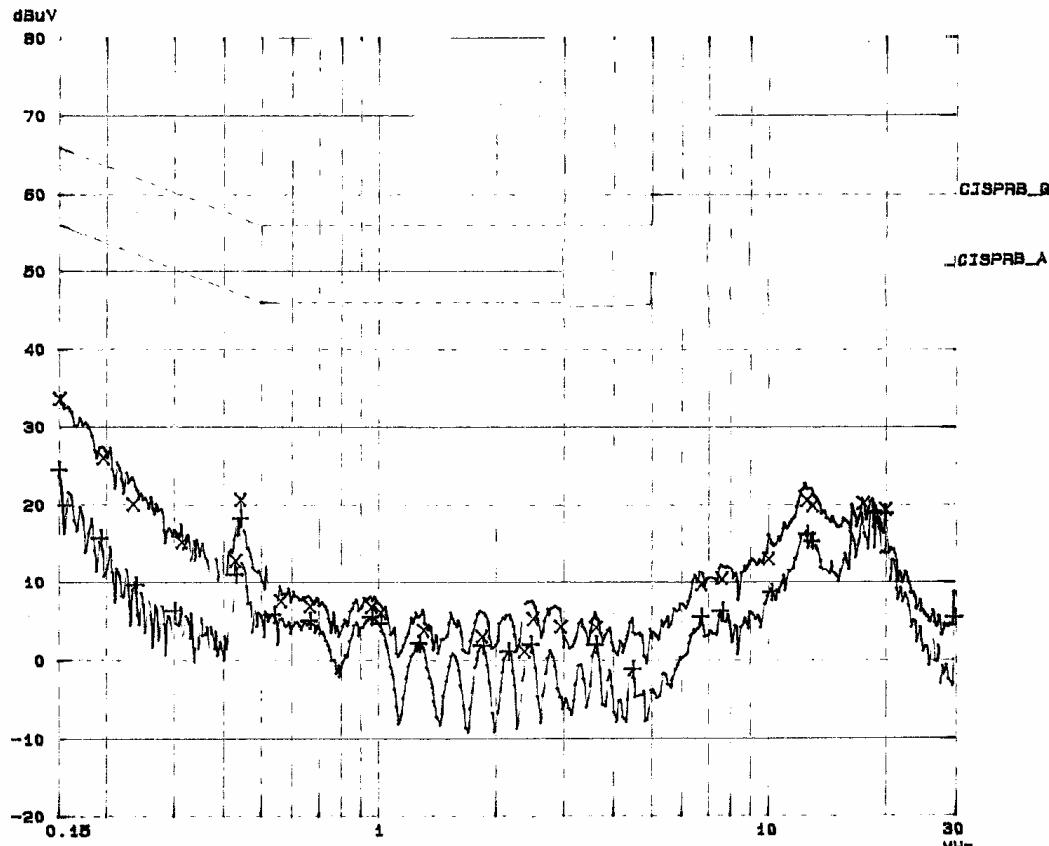
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Line1(H) Stand by Mode

EUT: L7K1700CT
Op Cond: H
Operator: THRU
Test Spec: KN22B

Scan Settings (2 Ranges)
----- Frequencies -----|----- Receiver Settings -----|
Start Stop Step IF BW Detector M-Time Atten Preamp OpRange
150k 3M 3k 10k PK+AV 10ms AUTO LN ON 60dB
3M 30M 9k 10k PK+AV 10ms AUTO LN ON 60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 25
Acc Margin: 50dB



PAGE 1

APPLICANT: LEE TECHNOLOGY KOREA CO., LTD.
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Line2(N) Stand by Mode

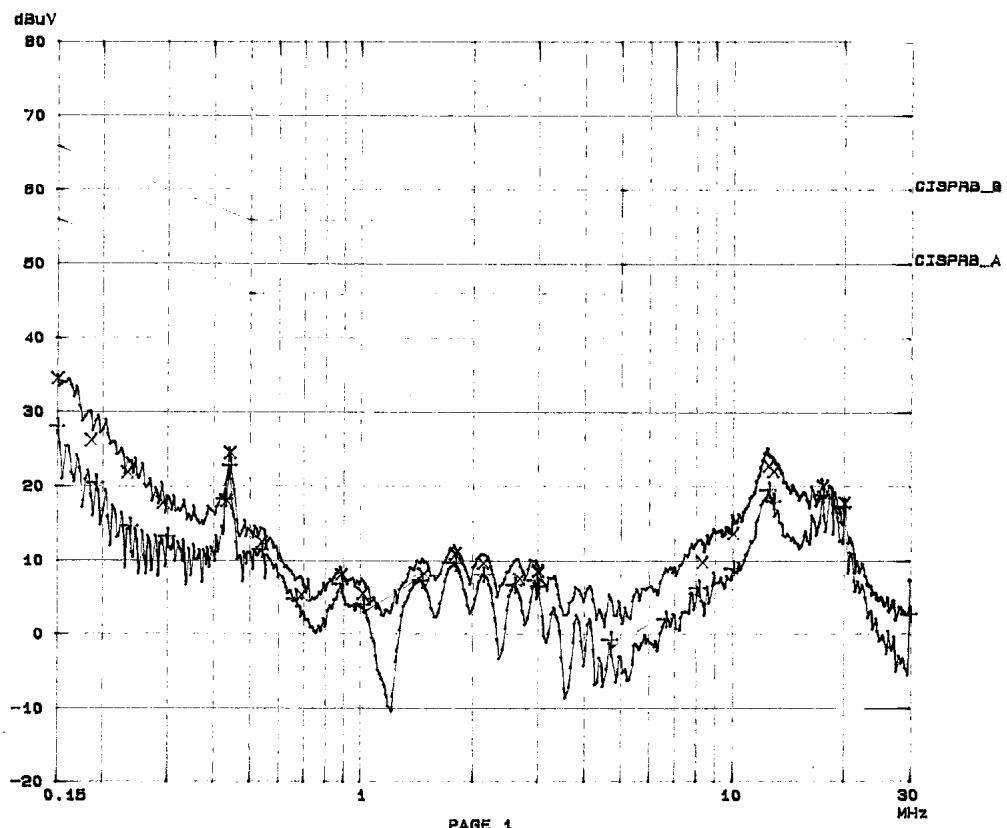
CONDUCTED EMISSION

EUT: LTK1700CT
Op Cond: N
Operator: THRU
Test Spec: KN22B

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRgs
150K	3M	3K	—10K	PK+AV	10ms	AUTO	LN ON	60dB
3M	30M	9K	—10K	PK+AV	10ms	AUTO	LN ON	60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 25
Acc Margin: 60dB



PAGE 1

APPLICANT: LEE TECHNOLOGY KOREA CO., LTD.
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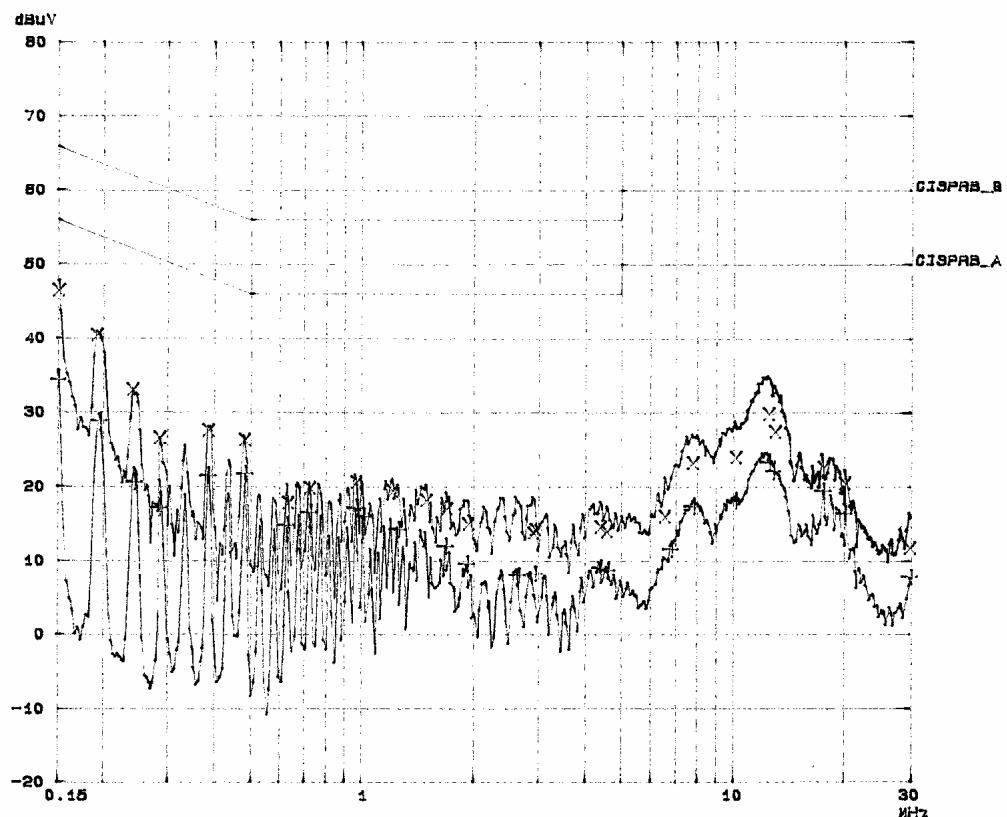
Line1(H) Operating Mode

CONDUCTED EMISSION

EUT: LTK1700CT
Op Cond: H
Operator: THRU
Test Spec: KN22B

Scan Settings (2 Ranges)
Frequencies Receiver Settings
Start Stop Step IF BN Detector M-Time Atten Preamp DpRge
180K 3M 3K 10K PK+AV 10ms AUTO LN ON 60dB
3M 30M 9K 10K PK+AV 10ms AUTO LN ON 60dB

Final Measurement: x QP / + AV
Hesa Time: 1 s
Subranges: 25
Acc Margin: 50dB



PAGE 1

APPLICANT: LEE TECHNOLOGY KOREA CO., LTD.
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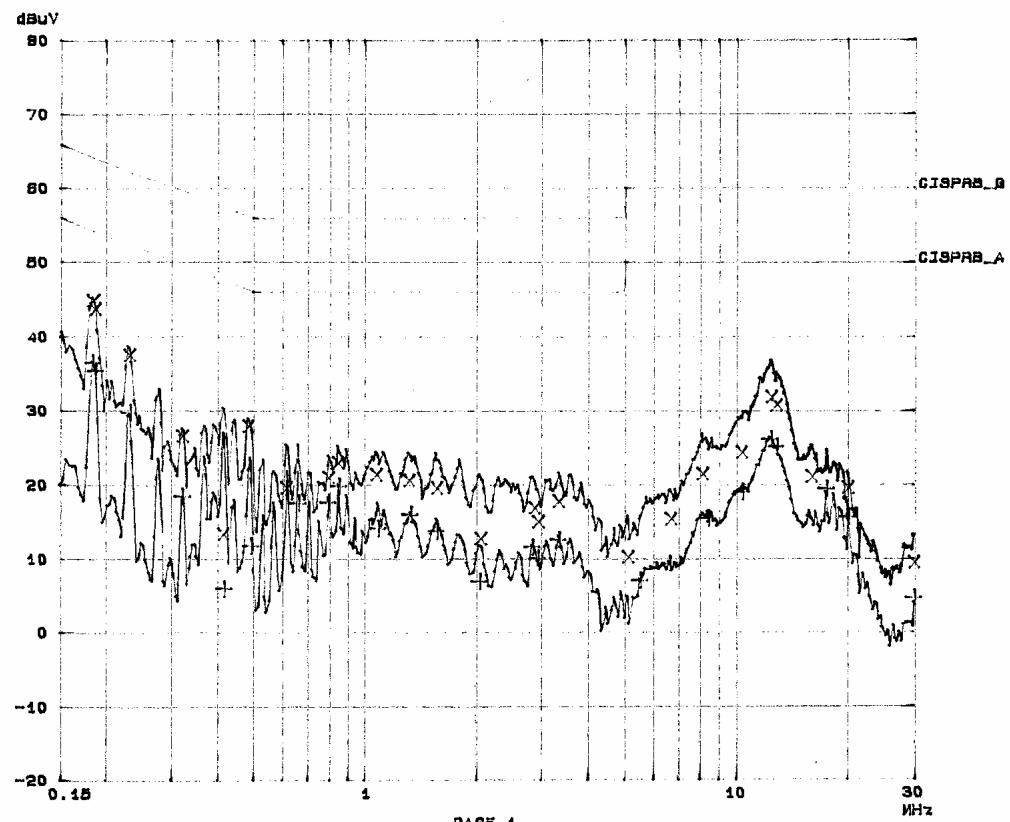
Line2(N) Operating Mode

CONDUCTED EMISSION

EUT: LTK1700CT
Op Cond: N
Operator: THRU
Test Spec: KN22B

Scan Settings (2 Ranges)
Frequencies Receiver Settings
Start Stop Step IF BW Detector M-Time Atten Preamp OpRange
150K 3M 1K 10K PK+AV 10ms AUTO LN ON 60dB
3M 30M 1K 10K PK+AV 10ms AUTO LN ON 60dB

Final Measurement: X GP / + AV
Meas Time: 1 s
Subranges: 28
Acc Margin: 50dB



PAGE 1

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

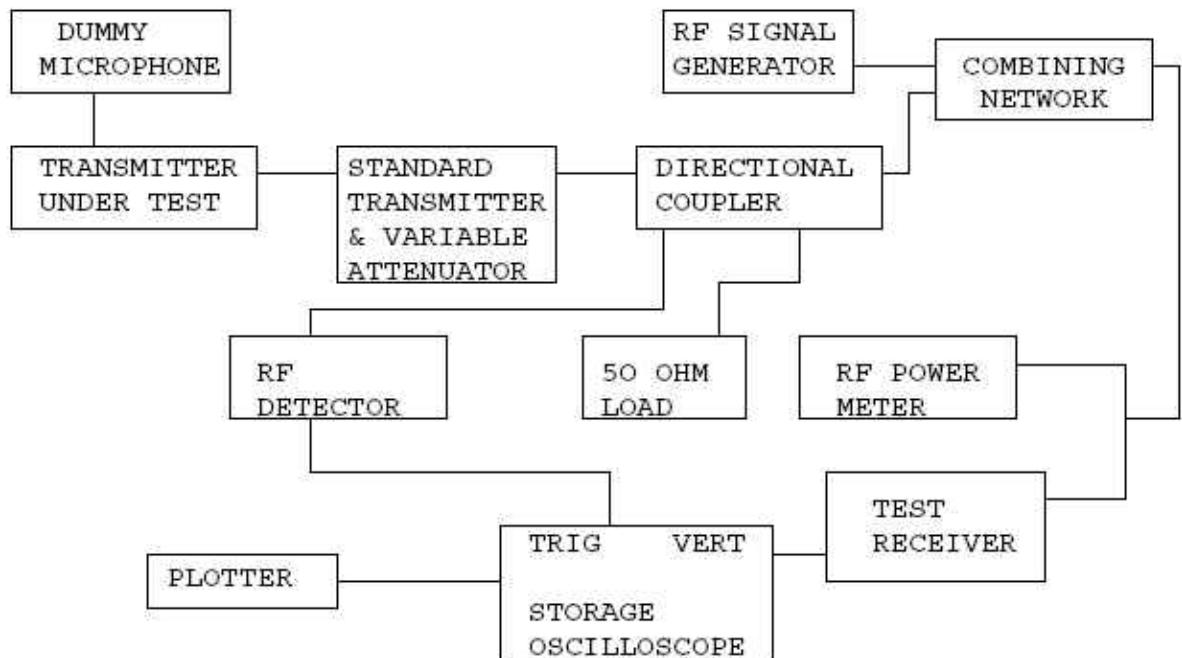
1. Using the variable attenuator the transmitter level was set to 40 dB below the test receivers maximum input level, then the transmitter was turned off.
2. With the transmitter off the signal generator was set 20dB below the level of the transmitter in the above step, this level will be maintained 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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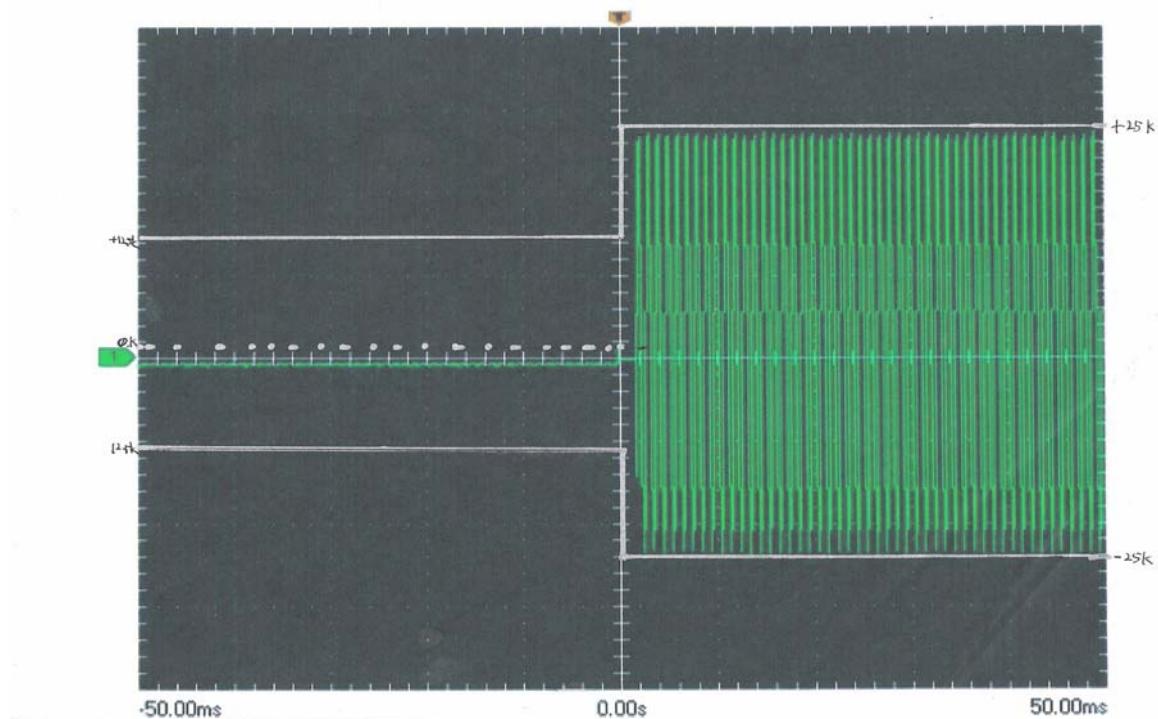
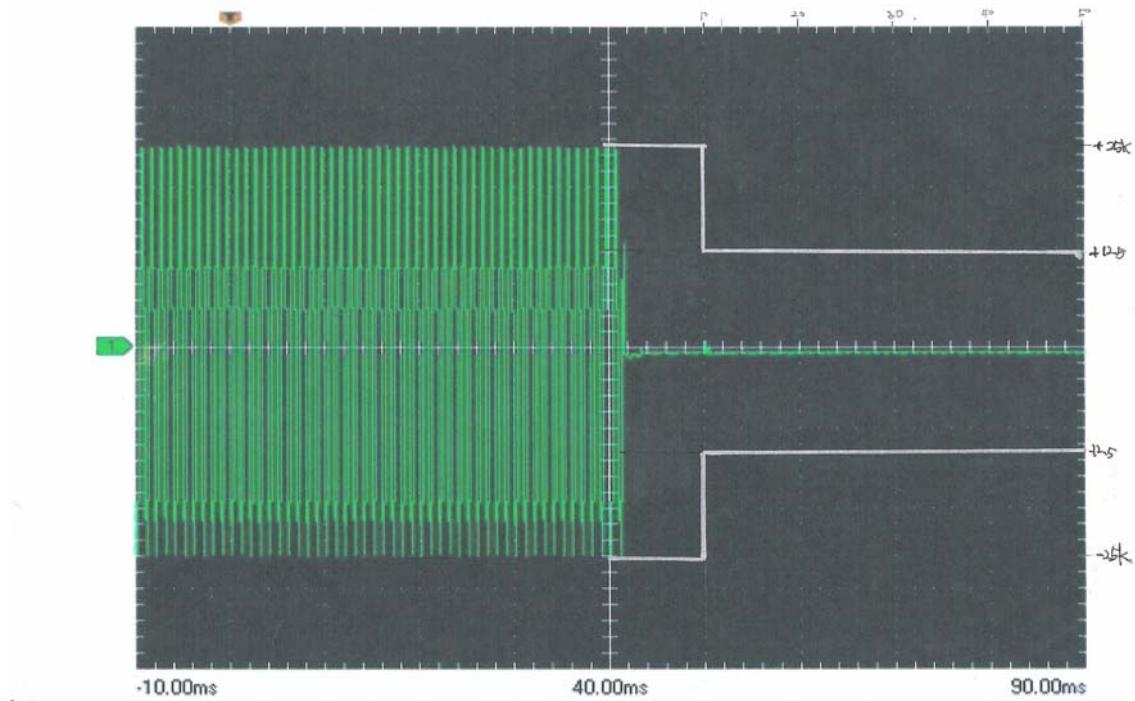
2.1055 Frequency stability:
90.214 Transient Frequency Behavior
(Continued)



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TEST Equipment List

No	Description	Manufacturer	Model No.	Serial No.	Due Cal.	Used
1	Test Receiver	Rohde & Schwarz	ESHS 10	862970/018	2008.05.01	<input checked="" type="checkbox"/>
2	Test Receiver	Rohde & Schwarz	ESVS 10	826008/014	2008.06.12	<input checked="" type="checkbox"/>
3	Spectrum Analyzer	Hewlett Packard	8566B	2311A02394	2008.06.13	<input checked="" type="checkbox"/>
4	Spectrum Display	Hewlett Packard	85662A	2542A12429	2008.06.13	<input checked="" type="checkbox"/>
5	Quasi-peak Adapter	Hewlett Packard	85650A	2521A00887	2008.06.13	<input type="checkbox"/>
6	RF Preselector	Hewlett Packard	85685A	2648A00504	2008.06.13	<input type="checkbox"/>
7	Preamplifier	Hewlett Packard	8447F	2805A02570	2008.05.28	<input type="checkbox"/>
8	Preamplifier	A.H. Systems	PAM-0118	164	2008.05.08	<input checked="" type="checkbox"/>
9	Biconical Antenna	Eaton Corp.	94455-1	0977	2008.04.01	<input checked="" type="checkbox"/>
10	Biconical Antenna	EMCO	3104C	9111-2468	2008.06.07	<input checked="" type="checkbox"/>
11	Log Periodic Antenn	EMCO	3146	2051	2008.05.11	<input checked="" type="checkbox"/>
12	Horn Antenna	A.H. Systems	SAS-571	414	2008.03.17	<input checked="" type="checkbox"/>
13	Loop Antenna	Rohde & Schwarz	HFH2-Z2.335.4711.5	826532/006	2009.01.31	<input type="checkbox"/>
14	Dipole Antenna	Rohde & Schwarz	VHAP	574	2008.12.12	<input type="checkbox"/>
15	Dipole Antenna	Rohde & Schwarz	VHAP	575	2008.12.12	<input type="checkbox"/>
16	Dipole Antenna	Rohde & Schwarz	UHAP	546	2008.12.12	<input type="checkbox"/>
17	Dipole Antenna	Rohde & Schwarz	UHAP	547	2008.12.12	<input type="checkbox"/>
18	Signal Generator	Hewlett Packard	8673D	2708A00448	2008.06.12	<input checked="" type="checkbox"/>
19	Spectrum Analyzer	Advantest Corp.	R3261C	61720208	2008.06.12	<input checked="" type="checkbox"/>
20	LISN	EMCO	3825/2	9111-1912	2008.12.12	<input type="checkbox"/>
21	LISN	Kyoritsu	KNW-242	8-923-2	2009.05.23	<input checked="" type="checkbox"/>
22	Modulation Analyzer	Hewlett Packard	8901B	3438A05094	2008.05.25	<input type="checkbox"/>
23	Waveform Generato	Hewlett Packard	33120A	US34001190	2008.05.21	<input type="checkbox"/>
24	Audio analyzer	Hewlett Packard	8903B	3011A12915	2008.05.21	<input type="checkbox"/>

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25	Digital Oscilloscope	Tektronix	TDS 340A	B012287	2008.06.13	<input checked="" type="checkbox"/>
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