Exhibit 6 Field Strength of Spurious Emissions – KTL Report: 2.993 (a)

KTL Dallas, Inc. was contracted to perform the testing on field strength of spurious emissions in accordance with 47 CFR 2.993 (a). Exhibit 6 includes the complete report submitted by KTL.

ENGINEERING TEST REPORT

ON:
MODEL KRE101 1823/2 Active Antenna Unit

IN ACCORDANCE WITH:
FCC PART 2.993

REPORT NO.: 8L0313EUS

TESTED FOR:

RAYTHEON TI SYSTEMS. INC.
17217 WATERVIEW PARKWAY
DALLAS,TX. 75252

TESTED BY:

KTL DALLAS, INC.
802 N. KEALY STREET
LEWISVILLE, TEXAS 75057-3136

NVLAP LAB CODE: 100426-0

DECEMBER 1998

This document contains 16 pages including this one.

Section 1. Summary of Test Results

General:

All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 2.993 Digital Devices.

These tests were conducted using measurement procedures of ANSI C63.4-1992.

The equipment was tested for field strength of spurious radiation measurements from 30 MHz to 1000 MHz with extension to the 10th harmonic of any fundamental clock frequency in accordance with the requirements of FCC Part 2.993. Frequencies were initially identified in a large shielded room. Amplitude measurements were made on an outdoor Open Area Test Site. Details of the outdoor site are on file with the FCC.

Abstract:

Name Of Test	Para. No.	Results
Field strength of spurious radiation emissions	2.993	Pass

THIS REPORT APPLIES ONLY TO THE ITEM(S) TESTED AND DOES NOT CONSTITUTE ENDORSEMENT BY THE UNITED STATES OF AMERICA.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE: **NONE**.

NVLAP Lab Code: 100426-0

TESTED BY:_____ DATE:_____
David Light

TESTED BY:_____ DATE:_____
Guy Story

APPROVED BY:_____ DATE:_____
Wes Atchison, Senior EMC Engineer

Section 2. Equipment Under Test (E.U.T.)

Manufacturer: RAYTHEON TI

Model No.: KRE101 1823/2 Active Antenna Unit

Serial No.: 001

☒ Production Unit ☐ Pre-Production Unit

The E.U.T. was received on November 30, 1998 in excellent condition.

Description of E.U.T.:

The EUT is an Active Phased Array Antenna which will be used in conjunction with a radio base station and a power supply to provide wide area radio coverage for GSM-1900 mobile radio telephone infrastructure. The Active Antenna functions as a power amplifier on transmit and as a low noise amplifier on receive with respect to the radio base station and has the necessary electronics integrated into the physical structure of the antenna assembly.

The EUT will typically be installed on supporting towers ranging from 100 to 300 feet height above average terrain. In normal operation, the peak EIRP (Effective Isotropic Radiated Power) is 61 dBm inclusive of antenna directive. Actual transmitter power from the electronics is 40 dBm maximum. Active components in the assembly include power amplifiers, low noise amplifiers, switching DC-DC converters and a microprocessor. The EUT does not contain any modulators or exciters.

Fundamental Operating Frequencies:

1.96 GHz

Modifications Incorporated in E.U.T.:

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

Justification:

The E.U.T. was configured for testing as per typical installation. Position and bundling of cables were investigated to establish maximum amplitude of emissions.

The following combinations were investigated to establish worst case configuration:

(1) Laying on edge on transport cart.

Exercise Program:

The E.U.T. exercise program used during radiated testing was designed to exercise the various system components in a manner similar to typical use.

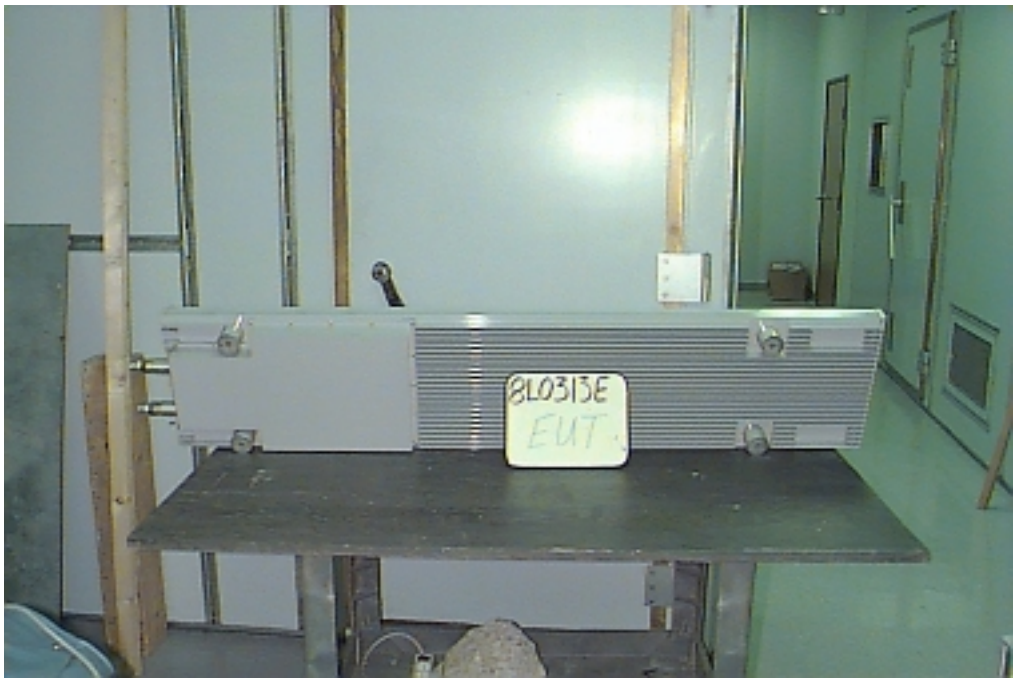
Exercise mode:

(1) CW operation into internal loads (panels bypassed)

E.U.T. PHOTOGRAPHS:

FRONT VIEW

REAR VIEW



Section 3. Equipment Configuration

Equipment Configuration List:

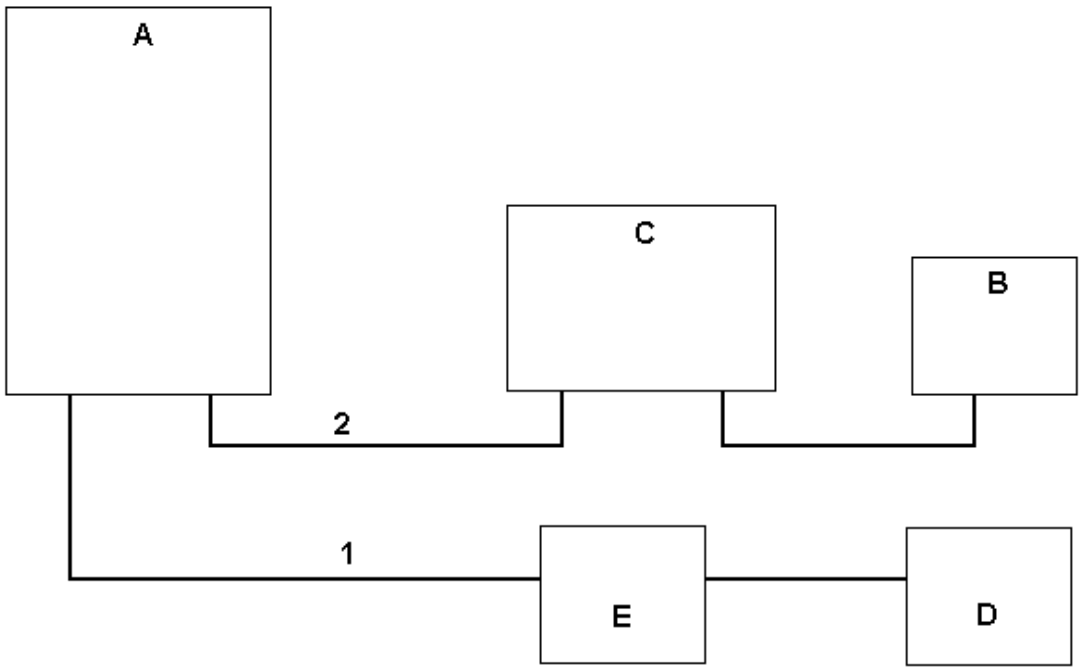
Item	Manufacturer	Description	FCC ID:	Model No.	Serial No.
(A)	RAYTHEON	ACTIVE ANTENNA UNIT	NONE	KRE101 1823/2	001
(B)	TOSHIBA	LAPTOP PC	CJ6JPN-31706-DT-E	PA1247U	X7297761
(C)	RAYTHEON (KEPCO MODULE)	48 Vdc POWER SUPPLY	NONE	RCW-48-15K	NONE
(D)	HP	RF SOURCE	NONE	E4421B	US38330220
(E)	RF AMPLIFIER	RAYTHEON	NONE	NONE	NONE

Inter-connection Cables:

Item	Description	Model No. / Manufacturer	Connectors	Length (m)	Shielded Yes	Shielded No
(1)	COAX	RG 142/U / PENSTOCK	SMA	10	Y	
(2)	POWER	8 COND. / ANIXTER	CIRCULAR	20	Y	

NOTE: Please see block diagram on next page.

Configuration of the Equipment Under Test (E.U.T)



Section 5. Radiated Emissions

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: FCC 2.993
TESTED BY: David Light / Guy Story	DATE: November 30, 1998

Test Conditions: Test Voltage: -48 VDC
Temperature and Humidity: 20°C, 45%
Temperature and Humidity: 27°C, 40 %

TEST CONDITIONS: Outdoor Range
Standard Test Voltage

TEST EQUIPMENT: As per block diagram and equipment list attached.

MINIMUM STANDARD: Para. No. 2.993 Mearurements were made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads or other intermediate circuit elements under normal conditions of installation and operation.

The measurements specified shall be required to be 60 dB or more below the mean power of the transmitter.

Minimum Standard:

Frequency(MHz)	**Maximum Field Strength**	
	($dBmW/m^2$)	**($dBuV/m^2$)**
30 - 1000	-29.45@ 3m	77.5
ABOVE 1000	-29.45@3m	77.5

Test Results:

The E.U.T. Complies.

The worst-case emission level is 38.6 dBµV/m @ 3m at 416 MHz in the Vertical polarization.
This is 38.9 dB below the specification limit of 77.5 $dBuV/m^2$. (See Table # 1)

The E.U.T Complies.

The worst-case emission level is -42.34 $dBmW/m^2$ @ 3m at 19.55 GHz. In the horizontal and vertical polarizations.
This is 12.89 dB below the specification limit of –29.45 dBm.
(See Table # 2)

Measurement Data: See attached tables.

Field Strength Spurious Emissions Table # 1, Test RE-1 (30-1000 MHz):

Emission Frequency (MHz)	Ant. Pol. (H/V)	Det. Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. Limit (dBuV/m)	CR/SL Delta (dB)	Pass Fail Marginal	Notes
196.6	V		29.4	14.4	2.8	24.6	22.0	77.5	-55.5	Pass	
256.0	V		29.3	16.8	4.2	24.6	25.7	77.5	-51.8	Pass	
112.0	V		43.0	10.5	2.5	24.6	31.5	77.5	-46.0	Pass	
176.0	V		28.3	13.0	2.8	24.6	19.5	77.5	-58.0	Pass	
176.0	H		28.9	13.0	2.8	24.6	20.1	77.5	-57.4	Pass	
112.0	H		49.1	10.5	2.5	24.6	37.6	77.5	-39.9	Pass	
108.6	H		46.6	10.5	2.5	24.6	35.1	77.5	-42.4	Pass	
209.7	H		38.0	15.2	3.7	24.6	32.3	77.5	-45.2	Pass	
304.0	V		35.5	15.0	4.6	24.7	30.4	77.5	-47.1	Pass	
336.0	V		30.0	14.3	4.6	24.7	24.2	77.5	-53.3	Pass	
368.0	V		33.4	14.3	4.6	24.7	27.6	77.5	-49.9	Pass	
384.0	V		38.6	14.6	4.6	24.7	33.1	77.5	-44.4	Pass	
416.0	V		42.4	15.6	5.5	24.9	38.6	77.5	-38.9	Pass	
304.0	H		38.0	15.0	4.6	24.7	32.9	77.5	-44.6	Pass	
336.0	H		27.1	14.3	4.6	24.7	21.3	77.5	-56.2	Pass	
352.0	H		31.3	14.0	4.6	24.7	25.3	77.5	-52.2	Pass	
368.0	H		32.8	14.3	4.6	24.7	27.0	77.5	-50.5	Pass	
384.0	H		32.0	14.6	4.6	24.7	26.5	77.5	-51.0	Pass	
416.0	H		35.1	15.6	5.5	24.9	31.3	77.5	-46.2	Pass	
											SCANNED 30 TO 1000 MHz

Radiated Photographs (Worst Case Configuration)

Table # 1 (Test # RE-1, Scan 30 –1000 MHz):

FRONT VIEW

SIDE VIEW

Field Strength Spurious Emissions Table # 2, Test RE-1 (Scan: 1-20 GHz):

Freq. (GHz)	Meter Reading (dBm)	Antenna Factor (dB)	Cable Loss (dB)	RF Gain (dB)	Corrected Reading (dBm)	Spec.limit (dBmW/m2) FCC	Pol.	Comments:
1.955	-11	28.2	7.35	30.9	-6.35	N/A	H	Fundamental
3.91	-70	31.8	4.66	31.6	-65.14	-29.45	H	2nd Harmonic Noise Floor
5.865	-70	35.3	6.21	30.5	-58.99	-29.45	H	3rd Harmonic Noise Floor
7.82	-68	37.4	7.61	31.1	-54.09	-29.45	H	4th Harmonic Noise Floor
9.775	-68	37.8	11.98	33.1	-51.32	-29.45	H	5th Harmonic Noise Floor
11.73	-68	39.7	10.42	34.6	-52.48	-29.45	H	6th Harmonic Noise Floor
13.685	-66	41.4	10.08	32.9	-47.42	-29.45	H	7th Harmonic Noise Floor
15.64	-66	40.8	10.12	32.1	-47.18	-29.45	H	8th Harmonic Noise Floor
17.595	-66	44.3	11.17	32.5	-43.03	-29.45	H	9th Harmonic Noise Floor
19.55	-66	40.3	14.16	30.8	-42.34	-29.45	H	10th Harmonic Noise Floor
1.955	-21	28.2	7.35	30.9	-16.35	N/A	V	Fundamental Noise Floor
3.91	-70	31.8	4.66	31.6	-65.14	-29.45	V	2nd Harmonic Noise Floor
5.865	-70	35.3	6.21	30.5	-58.99	-29.45	V	3rd Harmonic Noise Floor
7.82	-68	37.4	7.61	31.1	-54.09	-29.45	V	4th Harmonic Noise Floor
9.775	-68	37.8	11.98	33.1	-51.32	-29.45	V	5th Harmonic Noise Floor
11.73	-68	39.7	10.42	34.6	-52.48	-29.45	V	6th Harmonic Noise Floor
13.685	-66	41.4	10.08	32.9	-47.42	-29.45	V	7th Harmonic Noise Floor
15.64	-66	40.8	10.12	32.1	-47.18	-29.45	V	8th Harmonic Noise Floor
17.595	-66	44.3	11.17	32.5	-43.03	-29.45	V	9th Harmonic Noise Floor
19.55	-66	40.3	14.16	30.8	-42.34	-29.45	V	10th Harmonic Noise Floor
								Scanned 1-20 GHz

The equipment was prescanned in a shielded room using a spectrum analyzer and broadband antenna. A list of frequencies was compiled for investigation in the open field. The equipment was then moved to an open area test site where amplitude measurements were made at a distance of 3 meters. The bandwidth was set to 100 kHz and the detector function was CISPR Quasi-Peak. Any emission within 5 dB of the specification limit is remeasured using a reference tuned dipole antenna per ANSI C63.4.

Any emissions above 1 GHz were measured with a horn antenna and low noise pre-amplifier at a distance of 3 meters.

Radiated Photographs (Worst Case Configuration),
Table #2, Test # RE-1 (Scan: 1-20 GHz):

FRONT VIEW

REAR VIEW

Section 6. Sample Calculations

CALCULATION OF RADIATED POWER

All emissions below 1000 MHz are expressed in terms of the equivalent power that would have to be fed into a dipole antenna in order to produce the same electric field strength. All emissions above 1000 MHz are expressed in terms of equivalent isotropic power. The equivalent power was determined by using the following formula: $P_t = E^2R^2 / 30G$

Example: Electric field strength is E = 41.1 dBμV/m
Measured at a distance of R = 3m
The gain of a dipole antenna is 2.15

$P_t = [10^{(41.1/20)} \times 10^{-6}]^2 \times 3^2 / 30 \times 2.15 = 2.36 \times 10^{-9}$ watts = -56.3 dBm

When calculating equivalent isotropic radiated power for emissions above 1000 MHz the gain is G=1.

Example: If the mean output power of the transmitter is 3 watts.

The minimum attenuation is 43 + 10 Log 3 = 47.8 dB so the maximum power of any spurious must not exceed $3 \times 10^{-4.78} = 49.8 \times 10^{-6}$ W(-13 dBm).

Using the above relation we have $E = (30GP_t)^{0.5} / R$

For emissions which are less than or equal to 1000 MHz

G = 2.15 and $E = (30 \times 2.15 \times 49.8 \times 10^{-6})^{0.5} / 3 = 0..0189$ V/m
= 85.5 dBμV/m

Therefore the electric field strength of emissions must not exceed 85.5 dBμV/m @ 3m.

Similarly for emissions which are greater than 1000 MHz G=1 and the field strength must not exceed 82.2 dBμV/m @ 3m.

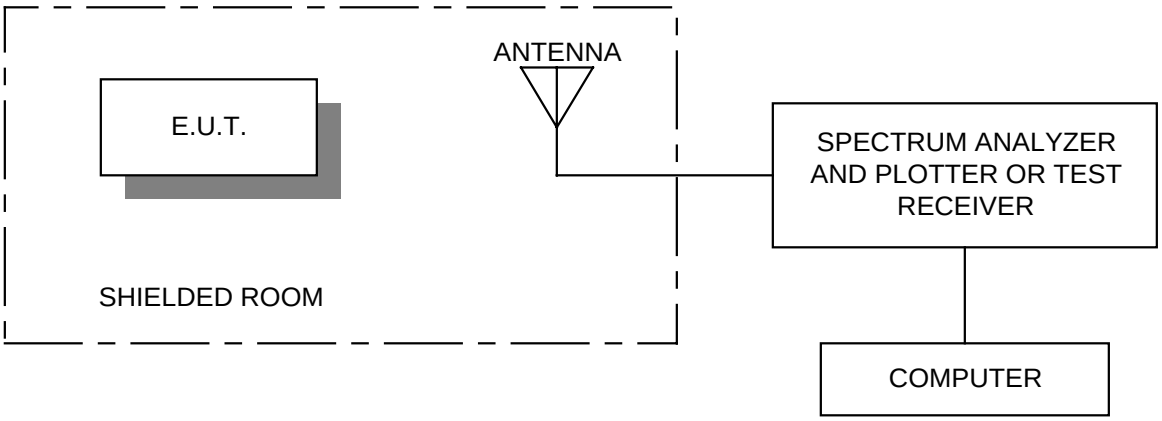
Radiated Emissions:

Emissions are measured at a distance of 3 meters and corrected for antenna factor and cable loss.

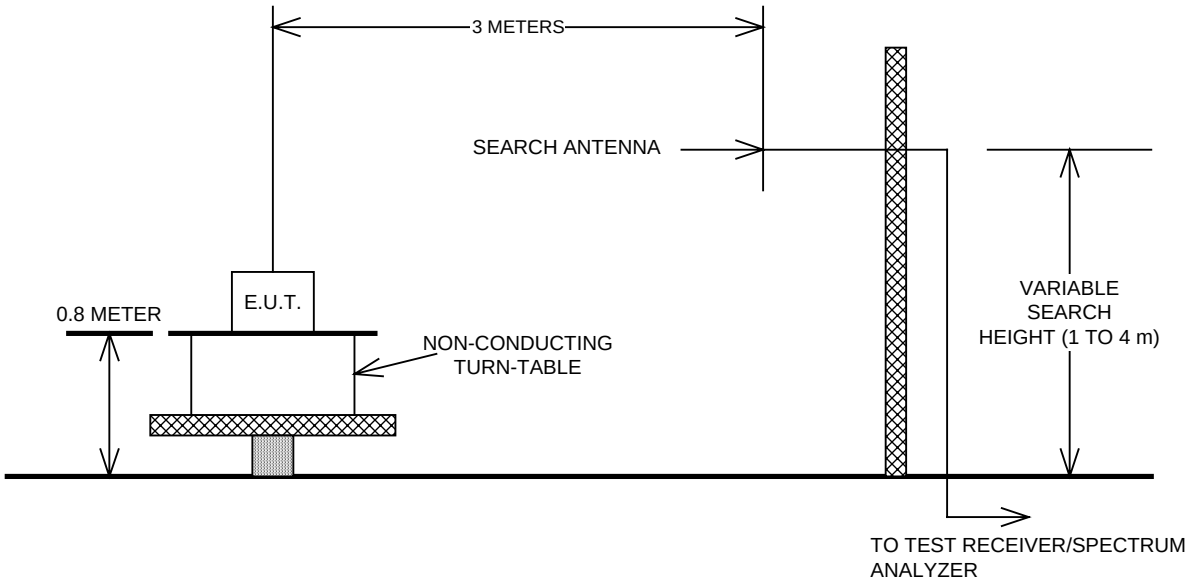
i.e. Received Signal = 25 dBµV @ 100 MHz
Antenna Factor & Cable Loss = 9.8 dB
Field Intensity = 25 + 9.8 = 34.8 dBµV/m @ 3 m

Section 7. Block Diagrams

Radiated Prescan



Outdoor Test Site For Radiated Emissions



The spectrum was searched up to the 10th harmonic of the fundamental frequency of operation.
Note: Testing was done at both 3 meters and 10 meters.

Section 8. Test Equipment List

The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items is typically 12 months from the calibration date shown.

KTL ID	Nomenclature	Manufacturer Model Number	Serial Number	Calibration Date
C2B	B O.A.T.S. Cable Set			12/07/98
CF26	Semi-Flex Cable 1 meter			12/02/97
CF31	Storm Cable (7.6 meters)	Semi Flex		11/11/98
181	Limiter	Fischer FCC-45013-1.2	NSN	02/12/98
201	Biconical Antenna (30 MHz - 300 MHz)	A.H. Systems SAS200/542	235	01/17/98
202	Log-Periodic Antenna (200-1000 MHz)	EMCO 3146	1349	01/24/98
401	Low Noise Preamplifer (1 MHz - 1 GHz)	RF Consultants LNA-14	020	08/13/98
494	Horn Antenna	A.H. Systems SAS-200/571	162	04/29/98
G2624	Spectrum Analyzer	Hewlett Packard 8563E	3551A04428	10/05/98
EM2200	Amplifier	Hewlett Packard 8449A	2749A00159	02/22/98
		SITE B O.A.T.S. (OPEN AREA TEST SITE) 10 Meter Site		
	Turntable Flush Mounted, Metal Covered, 8 Foot	RF Consultants Model AT-8 (Automated)		CNR
	Antenna Mast, 4 Meter	ICC (Automated)		CNR

LEGEND:

CNR = CALIBRATION NOT REQUIRED
N/A = NOT APPLICABLE
CBU CALIBRATE BEFORE USE