KTL Test Report:	9R01883
Applicant:	VTECH Engineering Canada Ltd. 200-7671 Alderbridge Way Richmond, BC V6X 1Z9
Equipment Under Test: (E.U.T.)	VTECH 2431 Cordless Telephone
FCC ID:	EW780-5001-00
In Accordance With:	**FCC Part 15, Subpart C** Frequency Hopping Transmitters 2400 - 2483.5 MHz
Tested By:	KTL Ottawa Inc. 3325 River Road, R.R. 5 Ottawa, Ontario K1V 1H2
Authorized By:	
	K. Carr, Technologist
Date:	
Total Number of Pages:	50

Table of Contents

Section 1. Summary of Test Results

Manufacturer: VTECH Engineering Canada Ltd.

Model No.: VTECH 2431

Serial No.: None

Date Received In Laboratory: November 2, 1999

KTL Identification No.: Item #12 & 13

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 Part 15, Subpart C, Paragraph 15.247 for Frequency Hopping Spread Spectrum devices. Radiated tests were conducted is accordance with ANSI C63.4-1992. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

☒	New Submission	☒	Production Unit
☐	Class II Permissive Change	☐	Pre-Production Unit
E T S	Equipment Code	☐	Family Listing

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.
See " Summary of Test Data".

NVLAP LAB CODE: 100351-0

TESTED BY: _____ DATE: _____
Glen Westwell, Technologist

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
Powerline Conducted Emissions	15.207(a)	48 dBµV	32.8 dBµV	Complies
Channel Separation	15.247(a)(1)	Greater of 25 kHz or 20 dB Bandwidth	843 kHz	Complies
Pseudorandom Hopping Algorithm	15.247(a)(1)	At Least 75 Channels	See Customer Supplied Data	Complies
Time of Occupancy	15.247(a)(1)(ii)	≤ 0.4 sec in 30 sec	32.5 mSec	Complies
20 dB Occupied Bandwidth	15.247(a)(1)	≤ 1 MHz	843 kHz	Complies
Peak Power Output	15.247(b)	1 Watt	0.131W	Complies
Spurious Emissions (Antenna Conducted)	15.247(c)	-20 dBc	N/A	Not Applicable
Spurious Emissions (Radiated)	15.247(c)	Table 15.209(a)	49.9 dBµV	Complies

Footnotes For N/A's:

Test Conditions:

Indoor Temperature: 22 °C
Humidity: 24 %

Outdoor Temperature: 10 °C
Humidity: 25 %

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

General Equipment Information

Frequency Range:	2401.056 MHz to 2481.408 MHz
Tunable Bands:	Not Applicable
Number of Channels:	94
Channel Spacing:	0.864 MHz
Emissions Designator:	843KF1D
User Frequency Adjustment:	Not Applicable

Theory of Operation

The CT2431 2.4 GHz cordless telephone uses frequency hopping spread spectrum in the 2400 to 2483.5 MHz ISM band. A maximum of four handsets can communicate with one base station simultaneously via time division multiple access (TDMA) multiplexing. Time division duplexing (TDD) is used for communication between the base station and any one handset.

Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a)
TESTED BY: Glen Westwell	DATE: October 26, 1999

Test Results: Complies. See attached graph.

Measurement Data: See attached graph.

INSERT POWERLINE CONDUCTED EMISSIONS GRAPHS

Powerline Conducted Emissions Photographs

Front View

Side View

Section 4. Channel Separation

NAME OF TEST: Channel Separation	PARA. NO.: 15.247(a)(1)
TESTED BY: Glen Westwell	DATE: November 2, 1999

Test Results: Complies.

Measurement Data:

Measured 20 dB bandwidth:	843 kHz @ Handset Channel #47
Channel Separation:	864 kHz

Section 5. Pseudorandom Hopping Algorithm

NAME OF TEST: Pseudorandom Hopping Algorithm	PARA. NO.: 15.247(a)(1)
TESTED BY: Glen Westwell	DATE: November 2, 1999

Test Results: Complies.

Measurement Data: Number of Hopping Frequencies: 94
Number of Hopping Patterns: 75

Customer Supplied Data: 2.4 GHz FHSS/TDMA System

The system will consist of a maximum of 4 Portable Parts (PP – i.e. handsets) and a single Fixed Part (FP-i.e. base station). It will use Frequency Hopping Spread Spectrum (FHSS) in the 2400 to 2483.5 MHz ISM band. Each of the handsets will have a radio transceiver. In order to reduce the cost, the base station will have only one radio transceiver. Therefore, the base station and the multiple handsets will be multiplexed using a Time Division Multiple Access (TDMA) method. Time Division Duplexing (TDD) is employed for exchanging information between the base station and the various handsets.

In order to avoid interference, the systems will include a dynamic channel allocation algorithm where they detect other users in the spectrum band and adapt their hopping pattern to avoid the occupied channels.

Separate systems will operate completely independently from one another. There will not be any co-ordination between them other than the dynamic channel allocation. The dynamic channel allocation will not distinguish between interference from another system and other types of interference. It will only recognize, either through corrupted receive data or by simply listening to a channel, that another user exists on the channel.

The basic frame architecture is very similar to that of DECT. A single frame is shown below in Figure 1.

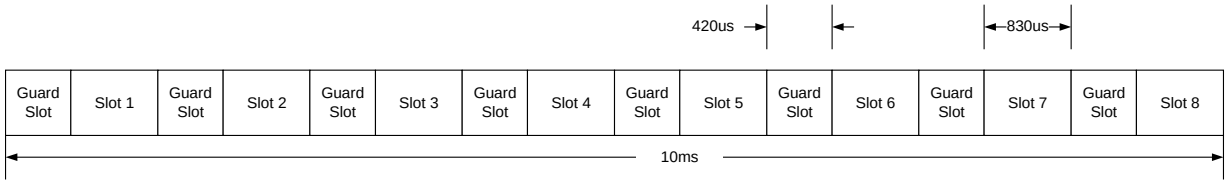


Figure 1: TDMA Frame

Each frame is 10ms long. A frame is divided into eight slots with a guard-slot inserted between each slot. The length of time for a slot and guard-slot are roughly 830 μs and 420 μs respectively. A packet of data is completely transmitted within a slot time. We are using a packet structure that is identical to a DECT packet except for changes in the message channel to exchange dynamic hop information between handset and base. The data rate is half that of DECT at 576 kbps and the 20 dB RF bandwidth is less than 864 kHz.

Slots 1 through 4 are only used by the base for transmitting to the handsets and slots 5 through 8 are only for the base to receive data from the handsets. When a link between the base and handset is active, the slot-pair used are spaced half a frame apart, that is slots 1 and 5, slots 2 and 6, slots 3 and 7 and slots 4 and 8 are the slot-pairs that are exclusively used for communication links; for example slot 1 and slot 7 would never be used for a link.

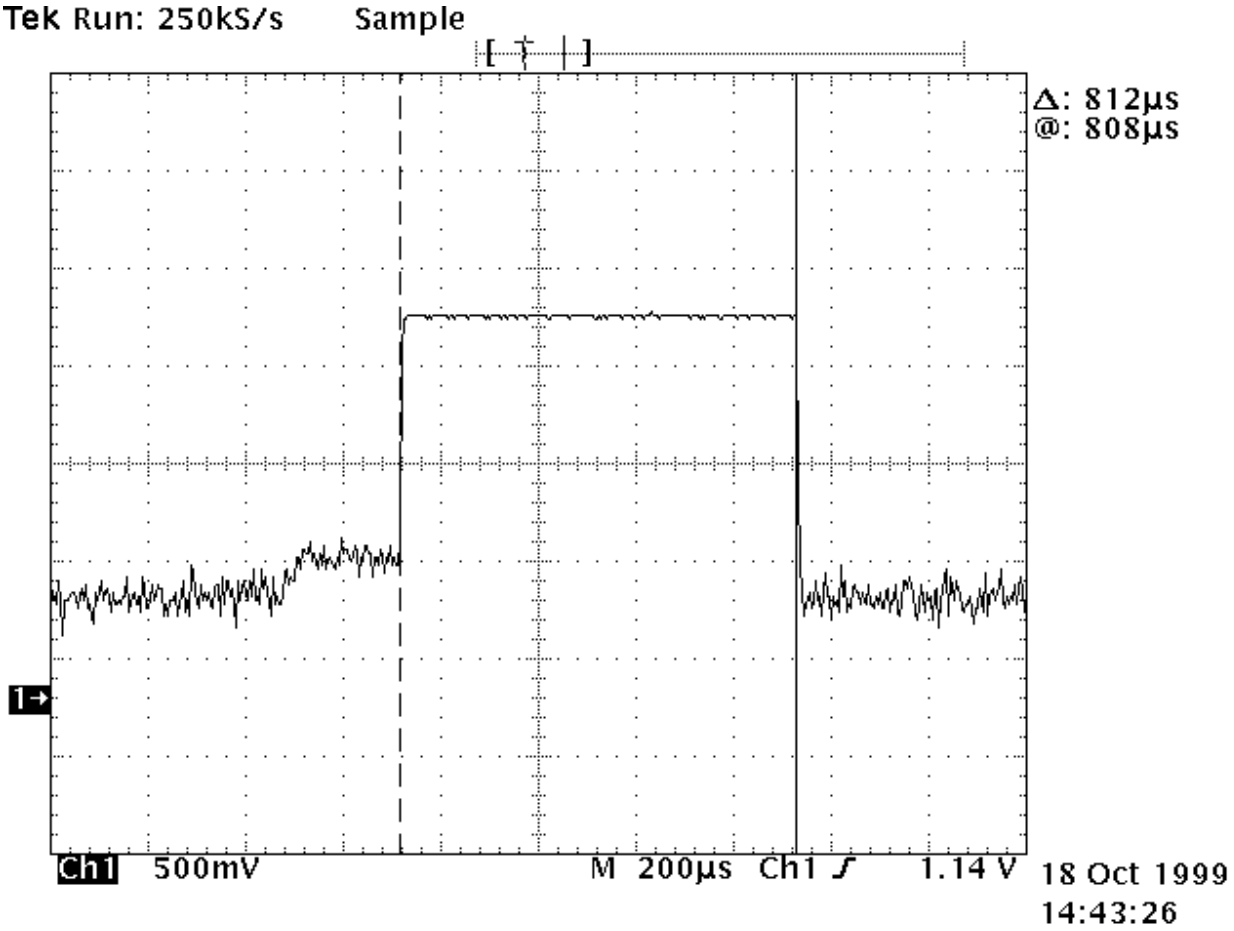
Section 6. Time of Occupancy

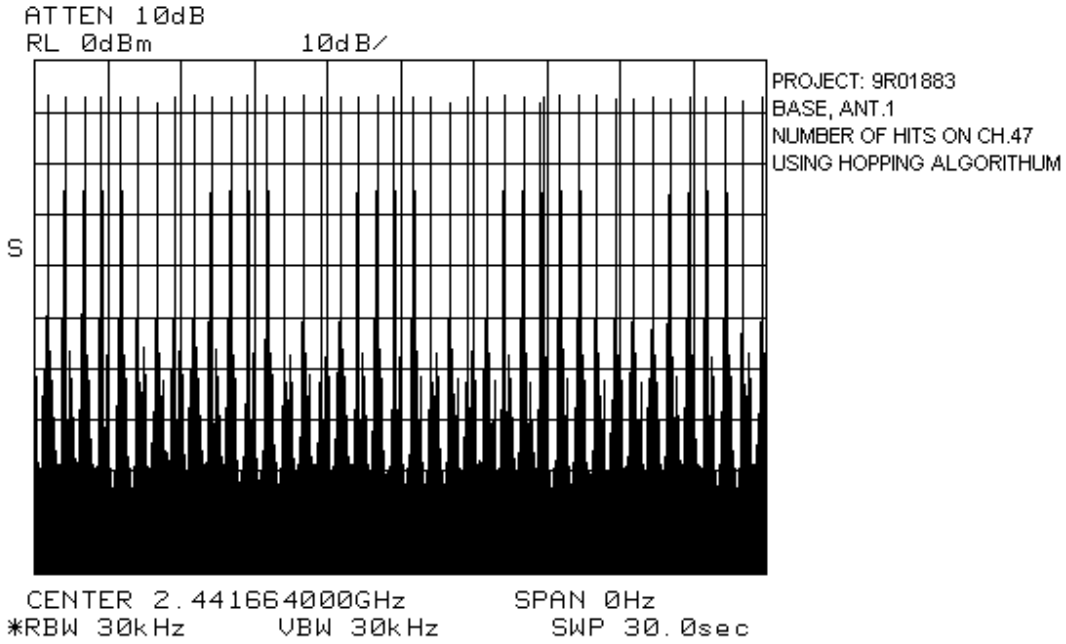
NAME OF TEST: Time of Occupancy	PARA. NO.: 15.247(a)(1)
TESTED BY: Glen Westwell	DATE: October 18, 1999

Test Results: Complies.

Measurement Data: Maximum Dwell Time On Any Channel:

40 channels hit in a 30 sec period @ 812 μSec = 32.5 mSec.


Tek Run: 250kS/s Sample
Δ: 812µs
@: 808µs
1→
Ch1 500mV
M 200µs Ch1 ƒ 1.14 V
18 Oct 1999
14:43:26

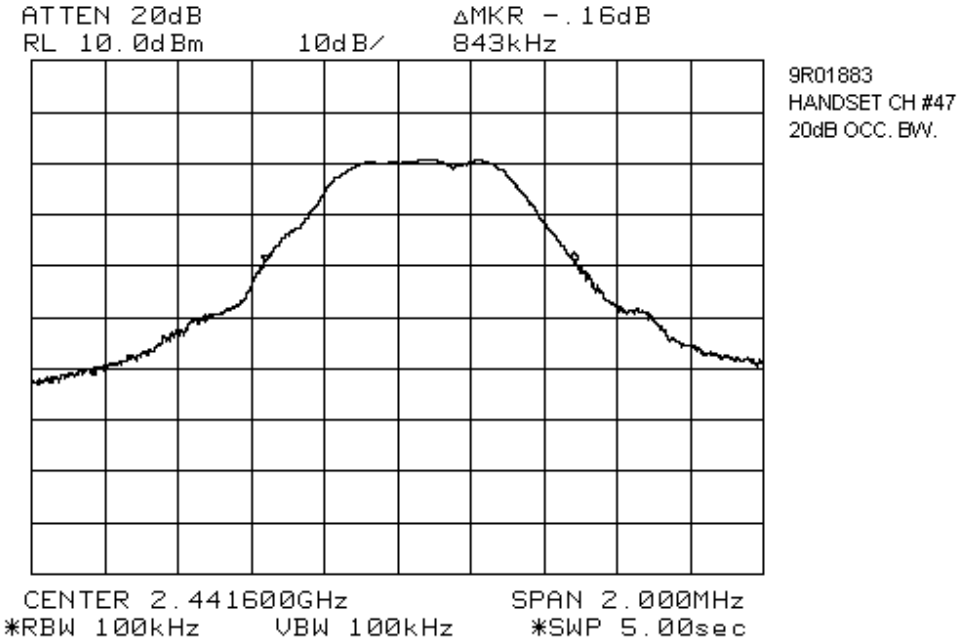

ATTEN 10dB
RL 0dBm
10dB/
PROJECT: 9R01883
BASE, ANT.1
NUMBER OF HITS ON CH.47
USING HOPPING ALGORITHUM
S
CENTER 2.441664000GHz
SPAN 0Hz
*RBW 30kHz
VBW 30kHz
SWP 30.0sec

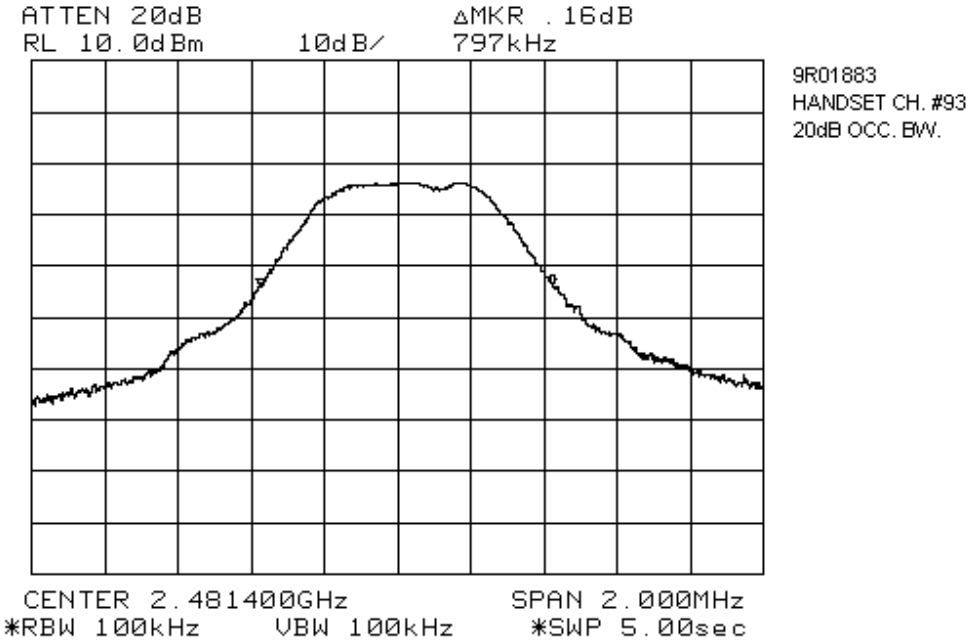
Section 7. Occupied Bandwidth

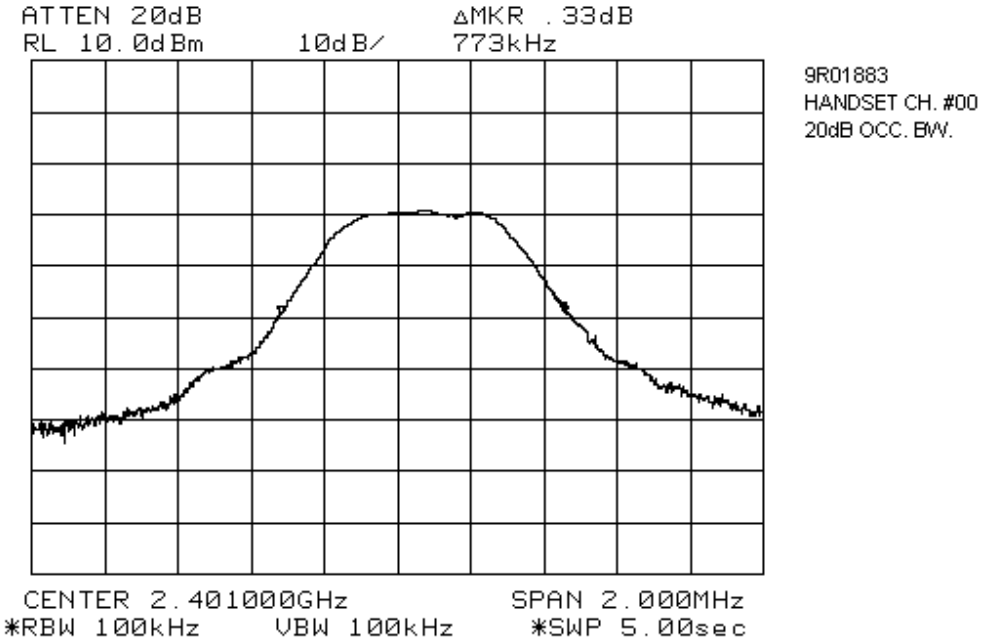
NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.247(a)(1)(i)
TESTED BY: Glen Westwell	DATE: November 2, 1999

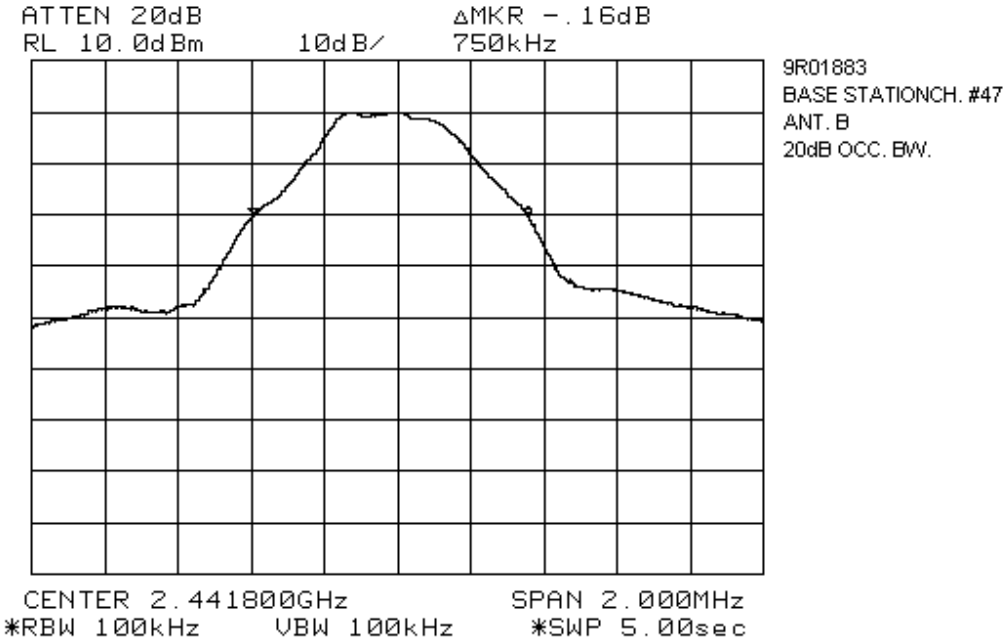
Test Results: Complies.

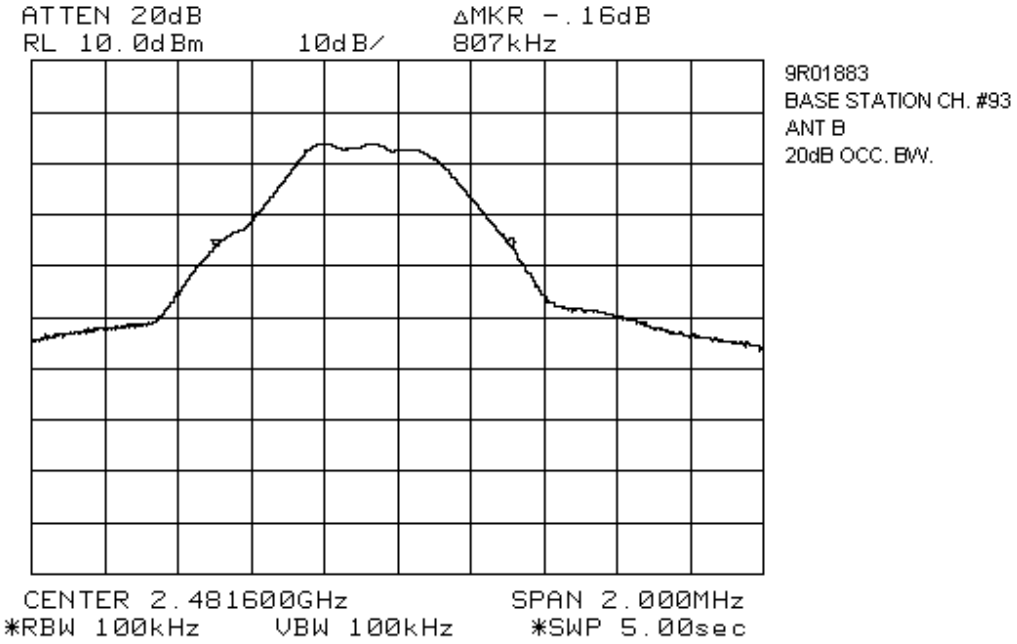
Measurement Data: 843 kHz occupied bandwidth was recorded on the handset channel #47.

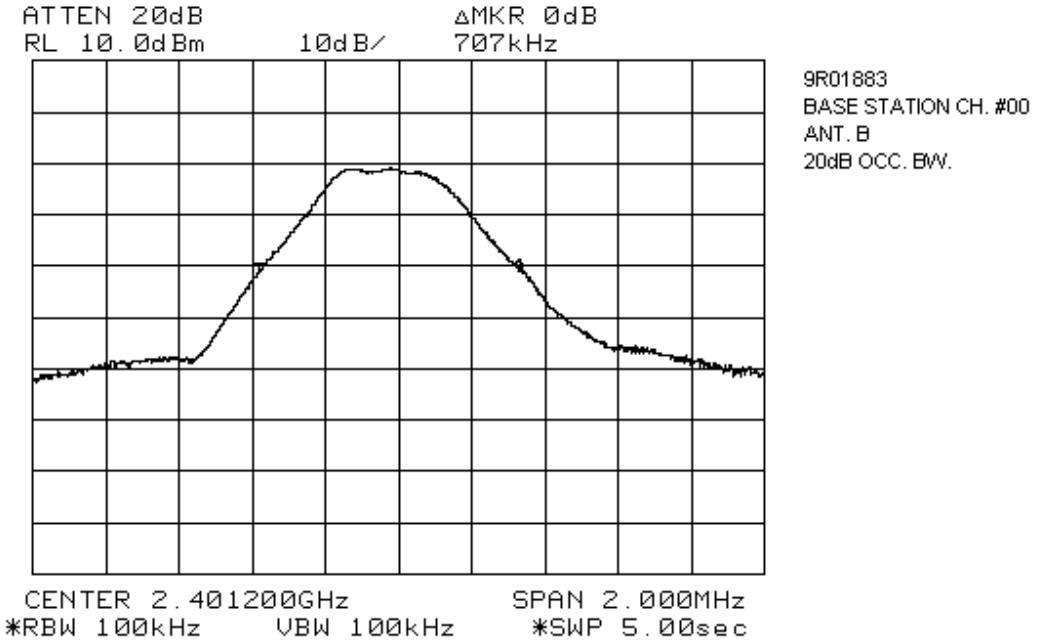

ATTEN 20dB
RL 10.0dBm
10dB/
ΔMKR -.16dB
843kHz
9R01883
HANDSET CH #47
20dB OCC. BW.
CENTER 2.441600GHz
SPAN 2.000MHz
*RBW 100kHz
VBW 100kHz
*SWP 5.00sec

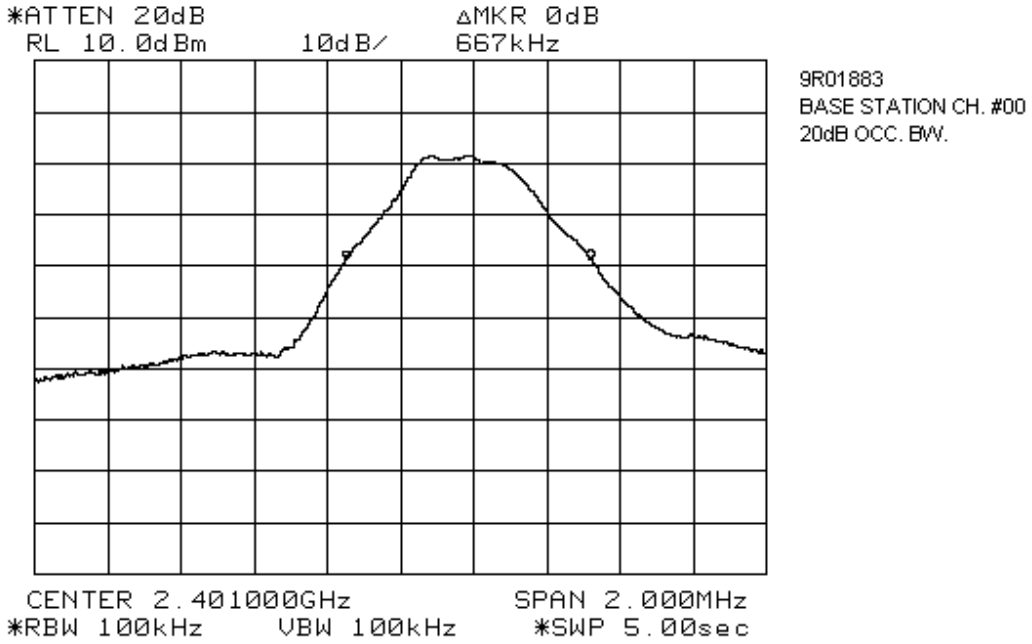

ATTEN 20dB
RL 10.0dBm
10dB/
ΔMKR .16dB
797kHz
9R01883
HANDSET CH. #93
20dB OCC. BW.
CENTER 2.481400GHz
SPAN 2.000MHz
*RBW 100kHz
VBW 100kHz
*SWP 5.00sec

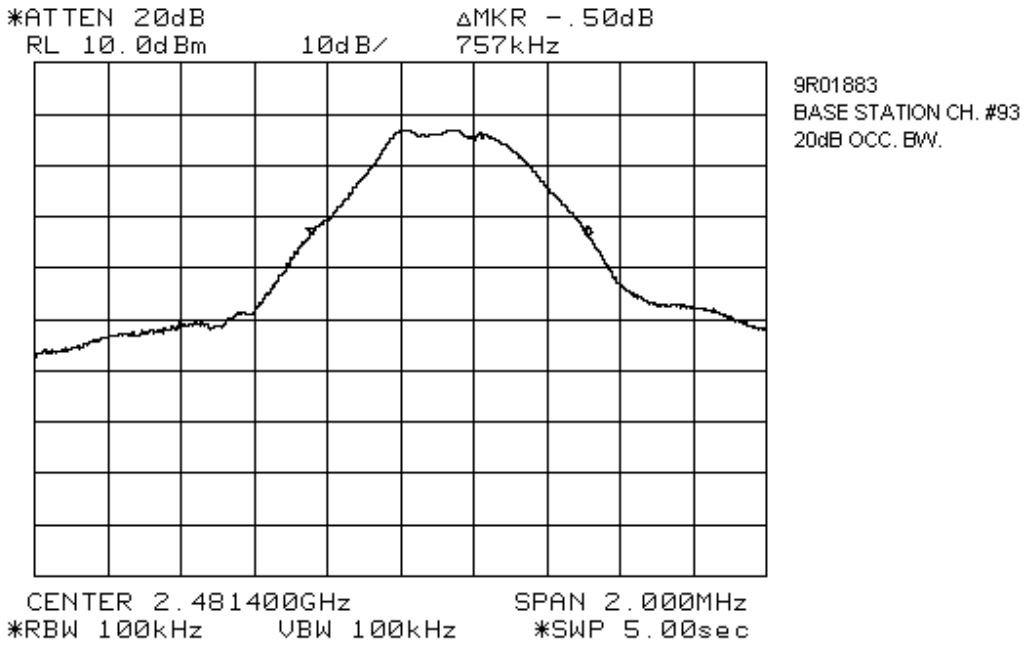

ATTEN 20dB
RL 10.0dBm
10dB/
ΔMKR .33dB
773kHz
9R01883
HANDSET CH. #00
20dB OCC. BW.
CENTER 2.401000GHz
SPAN 2.000MHz
*RBW 100kHz
VBW 100kHz
*SWP 5.00sec

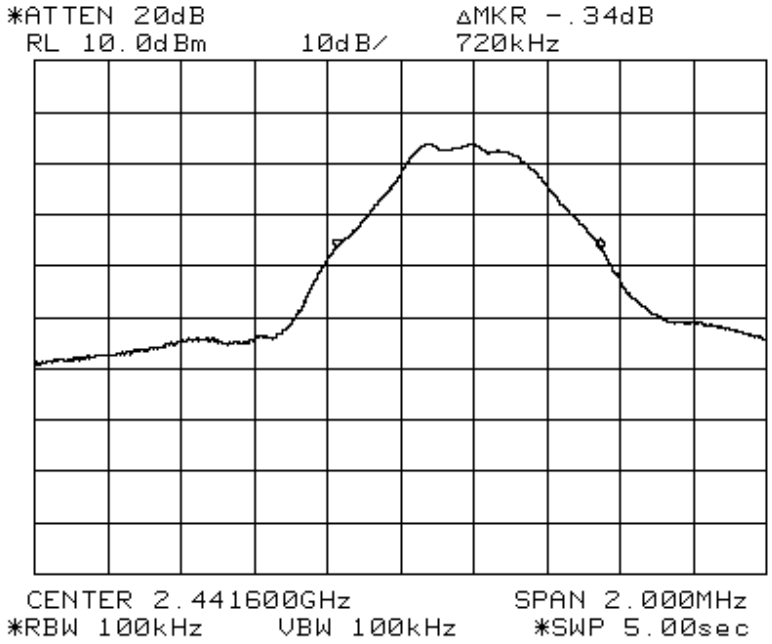

ATTEN 20dB
RL 10.0dBm
10dB/
ΔMKR -.16dB
750kHz
9R01883
BASE STATIONCH. #47
ANT. B
20dB OCC. BW.
CENTER 2.441800GHz
SPAN 2.000MHz
*RBW 100kHz
VBW 100kHz
*SWP 5.00sec

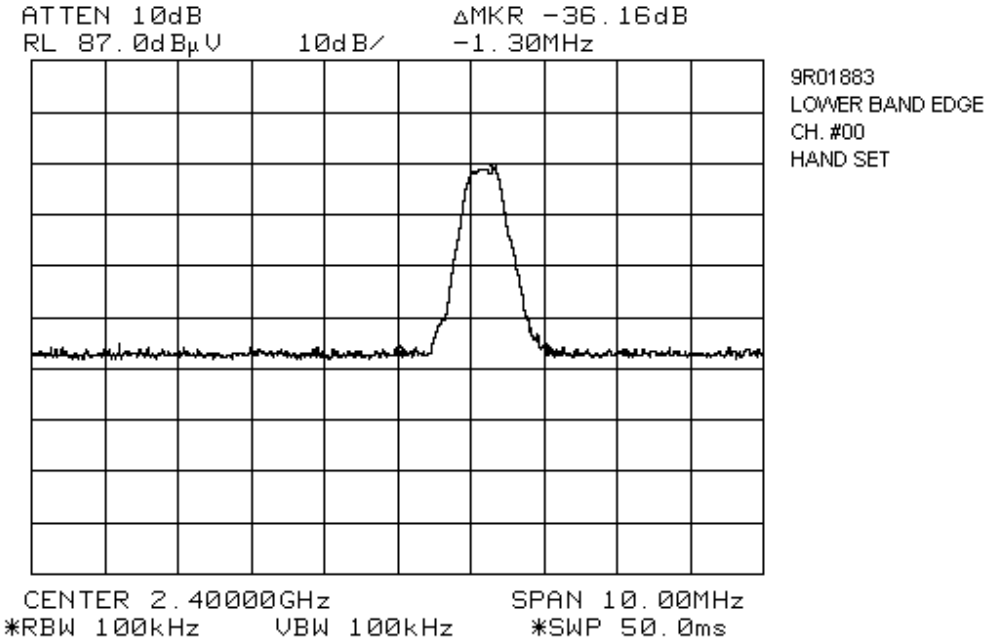

ATTEN 20dB
RL 10.0dBm
10dB/
ΔMKR -.16dB
807kHz
9R01883
BASE STATION CH. #93
ANT B
20dB OCC. BW.
CENTER 2.481600GHz
SPAN 2.000MHz
*RBW 100kHz
VBW 100kHz
*SWP 5.00sec

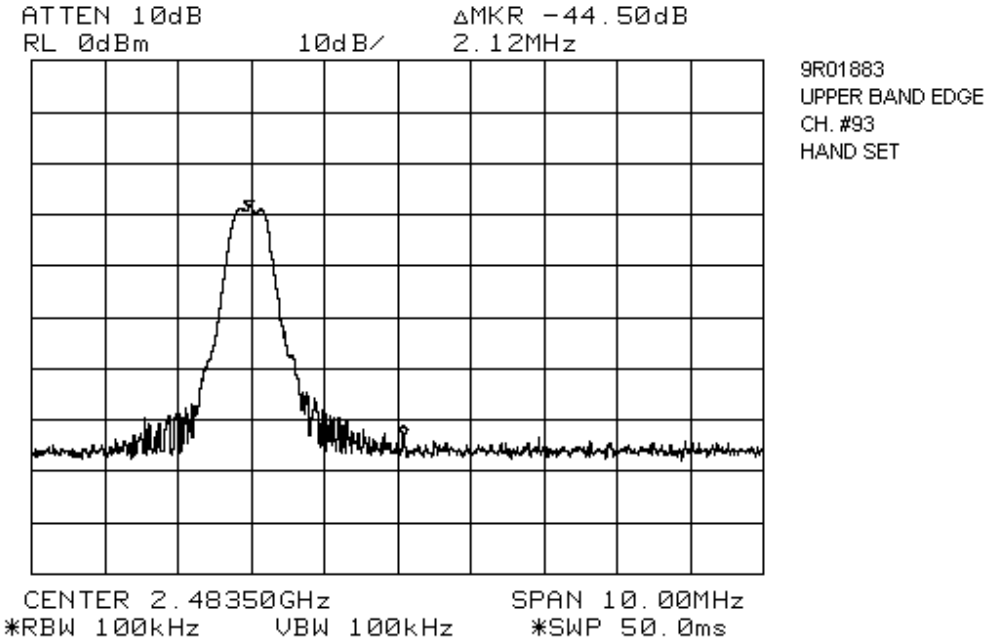

ATTEN 20dB
RL 10.0dBm
10dB/
ΔMKR 0dB
707kHz
9R01883
BASE STATION CH. #00
ANT. B
20dB OCC. BW.
CENTER 2.401200GHz
SPAN 2.000MHz
*RBW 100kHz
VBW 100kHz
*SWP 5.00sec

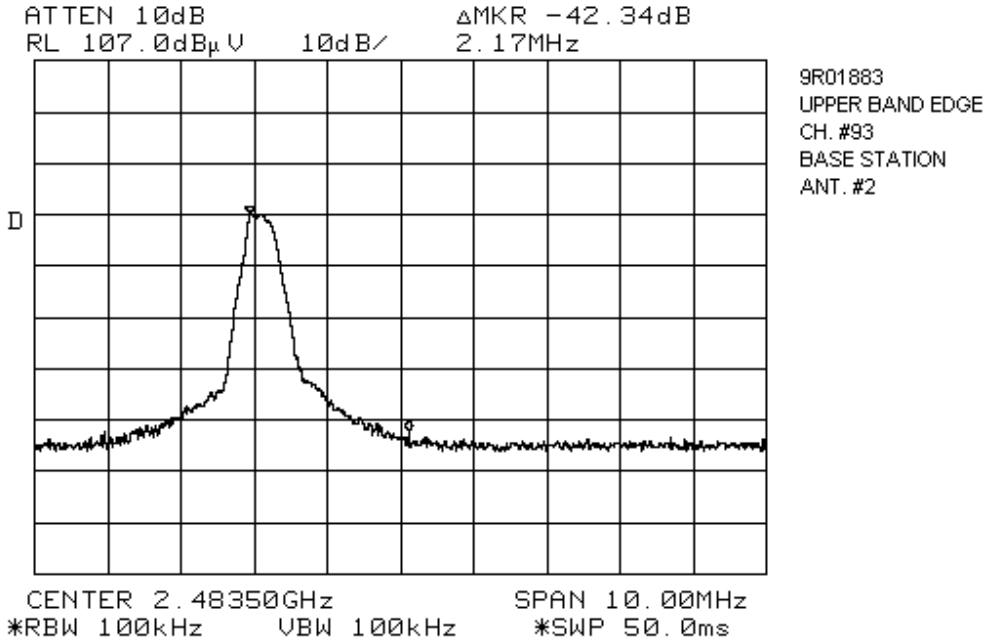

*ATTEN 20dB
RL 10.0dBm
10dB/
ΔMKR 0dB
667kHz
9R01883
BASE STATION CH. #00
20dB OCC. BW.
CENTER 2.401000GHz
SPAN 2.000MHz
*RBW 100kHz
VBW 100kHz
*SWP 5.00sec

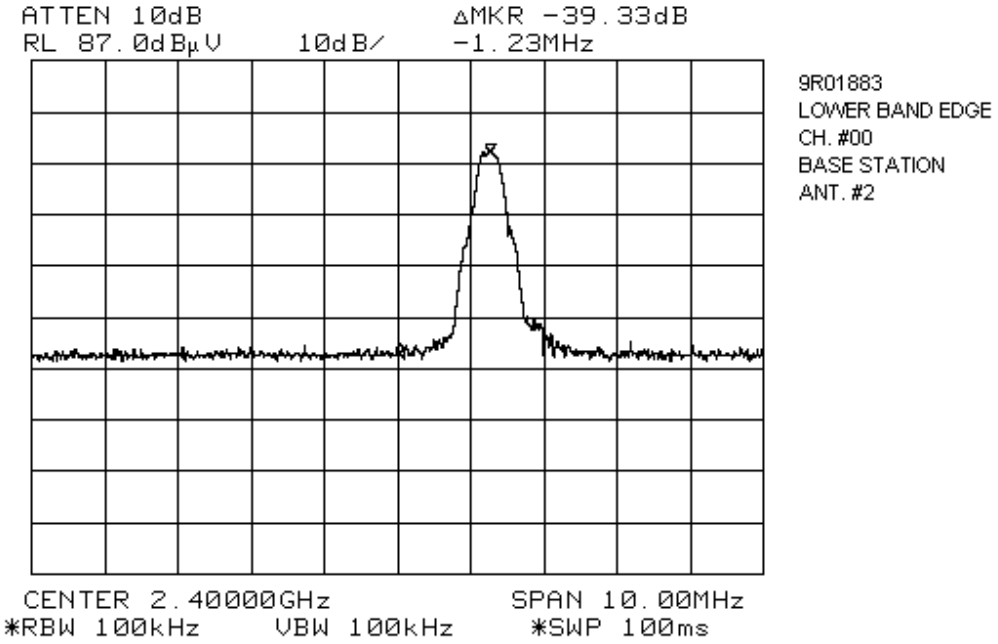

*ATTEN 20dB
RL 10.0dBm
10dB/
ΔMKR -.50dB
757kHz
9R01883
BASE STATION CH. #93
20dB OCC. BW.
CENTER 2.481400GHz
SPAN 2.000MHz
*RBW 100kHz
VBW 100kHz
*SWP 5.00sec

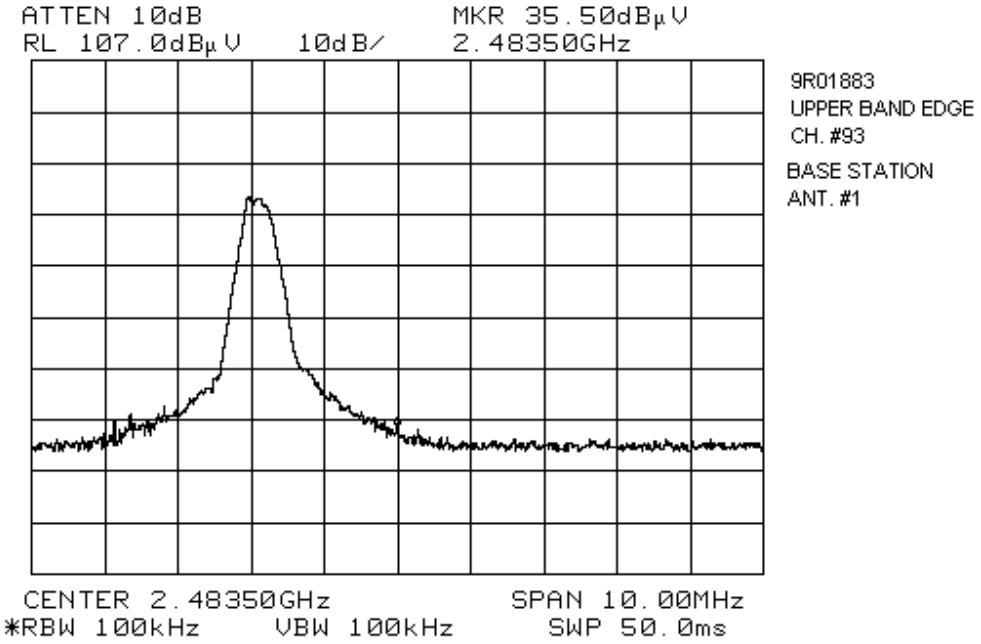

*ATTEN 20dB
RL 10.0dBm
10dB/
ΔMKR -.34dB
720kHz
CENTER 2.441600GHz
SPAN 2.000MHz
*RBW 100kHz
VBW 100kHz
*SWP 5.00sec
9R01883
BASE STATION CH. #47
20dB OCC. BW.

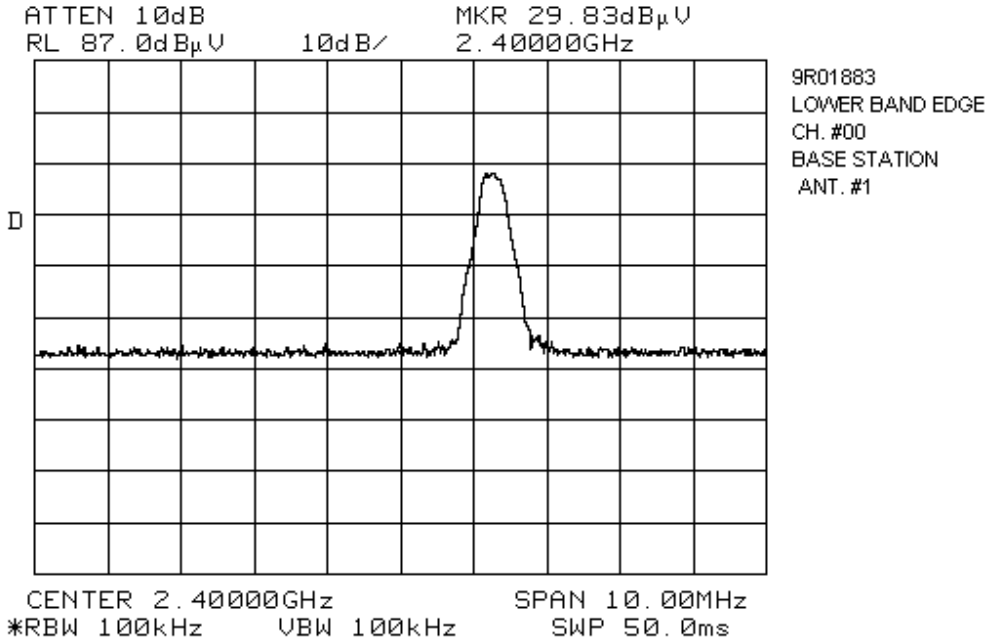

ATTEN 10dB
RL 87.0dBµV
10dB/
ΔMKR -36.16dB
-1.30MHz
9R01883
LOWER BAND EDGE
CH. #00
HAND SET
CENTER 2.40000GHz
SPAN 10.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 10dB
RL 0dBm
10dB/
ΔMKR -44.50dB
2.12MHz
9R01883
UPPER BAND EDGE
CH. #93
HAND SET
CENTER 2.48350GHz
SPAN 10.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 10dB
RL 107.0dBµV
10dB/
ΔMKR -42.34dB
2.17MHz
D
9R01883
UPPER BAND EDGE
CH. #93
BASE STATION
ANT. #2
CENTER 2.48350GHz
SPAN 10.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 10dB
RL 87.0dBµV
10dB/
ΔMKR -39.33dB
-1.23MHz
9R01883
LOWER BAND EDGE
CH. #00
BASE STATION
ANT. #2
CENTER 2.40000GHz
SPAN 10.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 100ms


ATTEN 10dB
RL 107.0dBµV
10dB/
MKR 35.50dBµV
2.48350GHz
9R01883
UPPER BAND EDGE
CH. #93
BASE STATION
ANT. #1
CENTER 2.48350GHz
SPAN 10.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms


ATTEN 10dB
RL 87.0dBµV
10dB/
MKR 29.83dBµV
2.40000GHz
D
9R01883
LOWER BAND EDGE
CH. #00
BASE STATION
ANT. #1
CENTER 2.40000GHz
SPAN 10.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

Section 8. Peak Power Output - Handset

NAME OF TEST: Peak Power Output	PARA. NO.: 15.247 (b)
TESTED BY: Glen Westwell	DATE: November 2, 1999

Test Results: Complies. The maximum peak power output of the transmitter is 0.066 watts

Measurement Data: Detachable antenna? ☐ Yes ☒ No
If yes, state the type of non-standard connector used at the antenna port:

Directional Gain of Antenna: -2.0 dBi or 0.63 Numeric.
Peak Power Output: 0.066 watts.
Field Strength: 111.4 dBµV/m @ 3m or 0.372 V/m @ 3m.

Antennas:

Model	Type	Manufacturer	Gain	E.I.R.P.

Section 8. Peak Power Output – Base Station Antenna #1

NAME OF TEST: Peak Power Output	PARA. NO.: 15.247 (b)
TESTED BY: Glen Westwell	DATE: November 2, 1999

Test Results: Complies. The maximum peak power output of the transmitter is 0.131 watts

Measurement Data: Detachable antenna? ☐ Yes ☒ No
If yes, state the type of non-standard connector used at the antenna port:

Directional Gain of Antenna: -5.0 dBi or 0.316 Numeric.
Peak Power Output: 0.131 watts.
Field Strength: 111.4 dBµV/m @ 3m or 0.372 V/m @ 3m.

Antennas:

Model	Type	Manufacturer	Gain	E.I.R.P.

Section 8. Peak Power Output – Base Station Antenna #2

NAME OF TEST: Peak Power Output	PARA. NO.: 15.247 (b)
TESTED BY: Glen Westwell	DATE: November 2, 1999

Test Results: Complies. The maximum peak power output of the transmitter is 0.128 watts

Measurement Data: Detachable antenna? ☐ Yes ☒ No
If yes, state the type of non-standard connector used at the antenna port:

Directional Gain of Antenna: -5.0 dBi or 0.316 Numeric.
Peak Power Output: 0.128 watts.
Field Strength: 111.3 dBµV/m @ 3m or 0.367 V/m @ 3m.

Antennas:

Model	Type	Manufacturer	Gain	E.I.R.P.

Section 9. Spurious Emissions (Antenna Conducted)

NAME OF TEST: Spurious Emissions (Antenna Conducted)	PARA. No.: 15.247(c)
TESTED BY:	DATE:

Test Results: Complies.

Measurement Data:

Section 10. Spurious Emissions (Radiated)

NAME OF TEST: Spurious Emissions (Radiated)	PARA. NO.: 15.247(c)
TESTED BY: Glen Westwell	DATE: November 2, 1999

Test Results: Complies. The worst case emission level is 49.9 dBμV/m @ 3m at 4962.8 MHz. This is 4.1 dB below the specification limit. (Handset – Vertical Orientation)

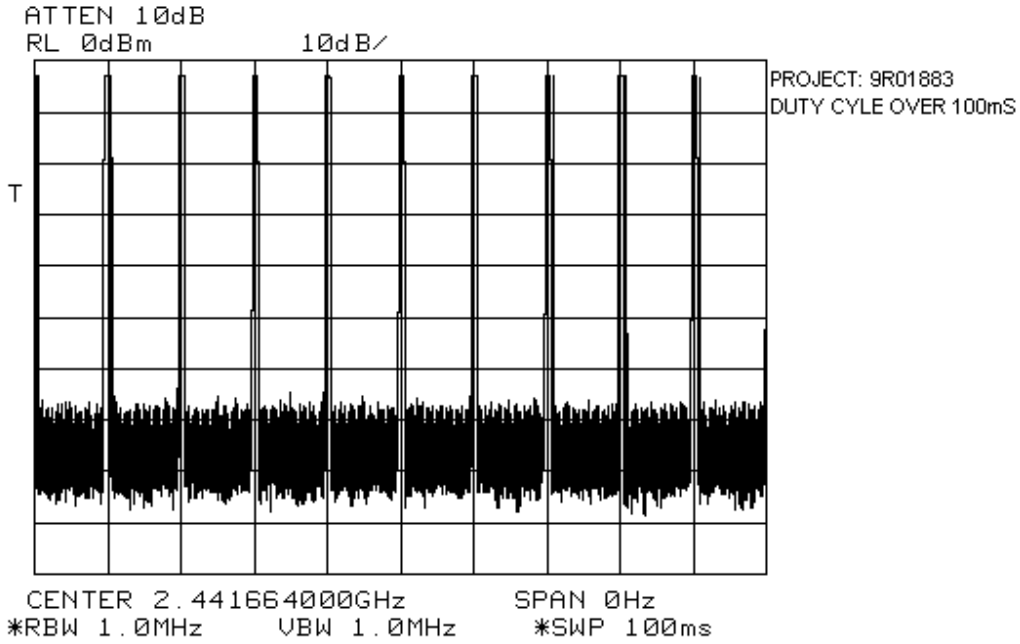
Measurement Data: See attached table.

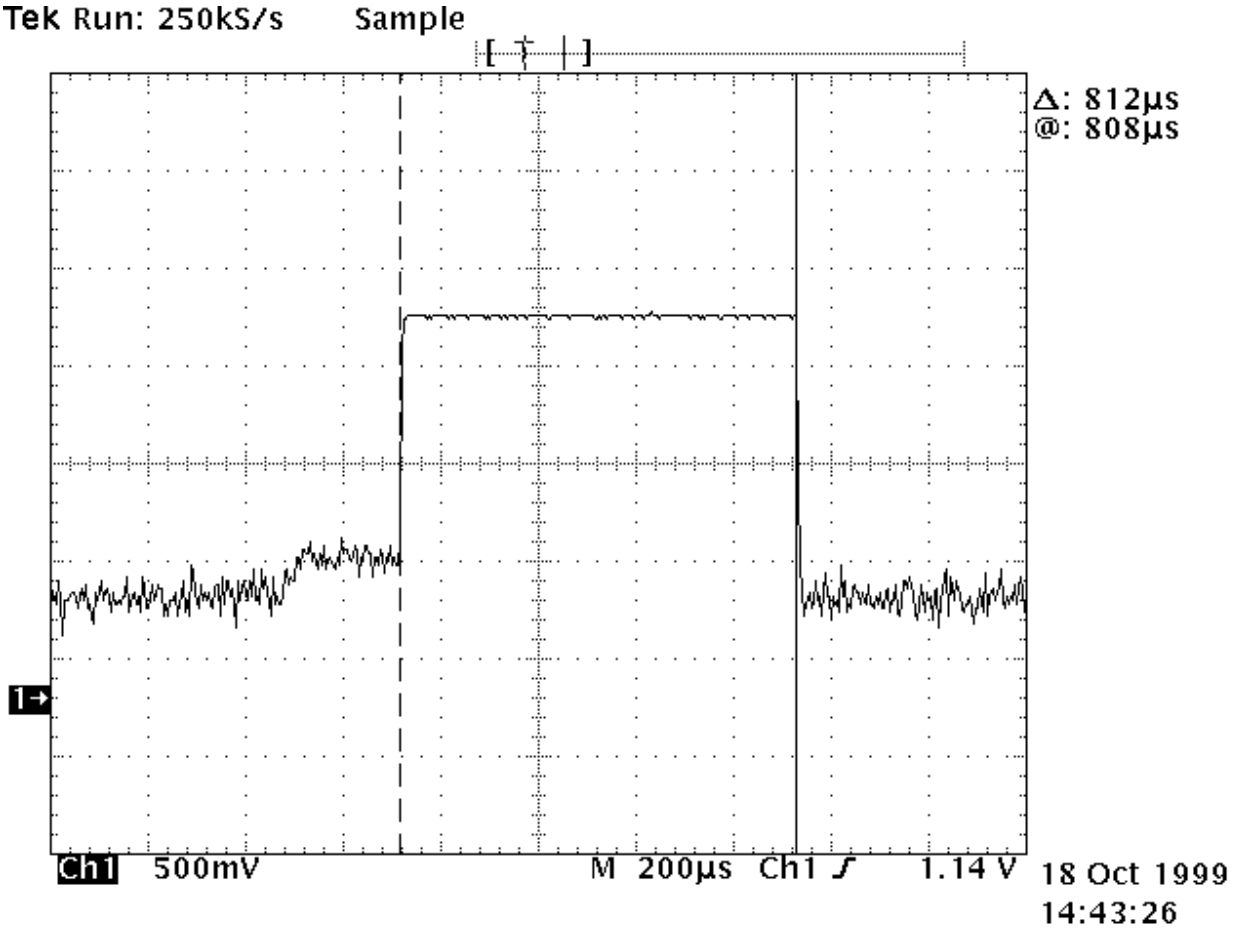
Duty Cycle Calculation:

(1) 10 pulses in a 100 ms period of 812 μS pulse width.

(2) 10 x 812 μSec = 8.12 mSec.

(3) $20 \text{ Log } \frac{8.12 mSec}{100 mSec} = -21.8 \text{ dB}$


ATTEN 10dB
RL 0dBm
10dB/
PROJECT: 9R01883
DUTY CYLE OVER 100mS
T
CENTER 2.441664000GHz
SPAN 0Hz
*RBW 1.0MHz
VBW 1.0MHz
*SWP 100ms


Tek Run: 250kS/s Sample
Δ: 812µs
@: 808µs
1→
Ch1 500mV
M 200µs Ch1 ƒ 1.14 V
18 Oct 1999
14:43:26

Test Data - Radiated Emissions

Test Distance (meters) : 3		Range: A Tower		Receiver: HP8565E		RBW: 1 MHz		Detector: Peak			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Duty Cycle Corr (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Handset Channel #00											
2401.0	Hrn2	V			70.2	31.2			101.4	131.0	29.6
2401.0	Hrn2	H			70.7	31.2			101.9	131.0	29.1
4802.1	Hrn2	V			65.7	38.4	-44.1	-20.0	40.0	54.0	14.0
4802.1	Hrn2	H			63.0	38.4	-44.1	-20.0	37.3	54.0	16.7
7203.2	Hrn2	V			47.2	44.4	-42.4		49.2	81.9	53.3
7203.2	Hrn2	H			47.3	44.4	-42.4		49.3	81.9	53.2
Handset Channel #47											
2441.6	Hrn2	V			74.0	31.1			105.1	131.0	25.9
2441.6	Hrn2	H			77.7	31.1			108.8	131.0	22.2
4883.3	Hrn2	V			69.5	38.8	-44.3	-20.0	44.0	54.0	10.0
4883.3	Hrn2	H			64.2	38.8	-44.3	-20.0	38.7	54.0	15.3
7324.9	Hrn2	V			49.5	44.6	-42.2	-20.0	31.9	54.0	22.1
7324.9	Hrn2	H			47.3	44.6	-42.2	-20.0	29.7	54.0	24.3
Handset Channel #93											
2481.4	Hrn2	V			78.3	31.2			109.5	131.0	21.5
2481.4	Hrn2	H			80.2	31.2			111.4	131.0	19.6
4962.8	Hrn2	V			75.3	39.1	-44.5	-20.0	49.9	54.0	4.1
4962.8	Hrn2	H			68.2	39.1	-44.5	-20.0	42.8	54.0	11.2
7444.2	Hrn2	V			53.7	44.8	-42.0	-20.0	36.5	54.0	17.5
7444.2	Hrn2	H			50.0	44.8	-42.0	-20.0	32.8	54.0	21.2

Notes:
B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole
* Re-measured using dipole antenna.
** Includes cable loss when amplifier is not used.
*** Includes cable loss.
( ) Denotes failing emission level.
All harmonics up to the 10^{th} have been checked for compliance.
Noise floor greater than 20 dB from limit.
Measurements above 8 GHz were conducted @ 1 meter, unreported measurements were >20 dB from the limit.

Test Data - Radiated Emissions, continued

Test Distance (meters) : 3		Range: A Tower		Receiver: HP8565E		RBW: 1 MHz		Detector: Peak			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Duty Cycle Corr (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Base Station Channel #93, Antenna #1											
2481.4	Hrn2	V			78.3	31.2			109.5	131.0	21.5
2481.4	Hrn2	H			79.2	31.2			110.4	131.0	20.6
4962.8	Hrn2	V			73.3	39.1	-44.5	-20.0	47.9	54.0	6.1
4962.8	Hrn2	H			72.3	39.1	-44.5	-20.0	46.9	54.0	7.1
7444.2	Hrn2	V			58.5	44.8	-42.0	-20.0	41.3	54.0	12.7
7444.2	Hrn2	H			55.0	44.8	-42.0	-20.0	37.8	54.0	16.2
Band Edge (Upper) 100 kHz RBW											
2483.5	Hrn2	V			33.3	31.2		-20.0	44.5	54.0	9.5
2483.5	Hrn2	H			35.5	31.2		-20.0	46.7	54.0	7.3
Base Station Channel #00, Antenna #1											
2401.1	Hrn2	V			64.3	31.2			95.5	131.0	35.5
2401.1	Hrn2	H			62.7	31.2			93.9	131.0	37.1
4802.1	Hrn2	V			56.2	38.4	-44.1	-20.0	30.5	54.0	23.5
4802.1	Hrn2	H			53.0	38.4	-44.1	-20.0	27.3	54.0	26.7
7203.1	Hrn2	V			48.7	44.4	-42.4		50.7	75.5	24.8
7203.1	Hrn2	H			47.0	44.4	-42.4		49.0	75.5	26.5
Base Station Channel #93, Antenna #2											
2481.4	Hrn2	V			77.8	31.2			109.0	131.0	22.0
2481.4	Hrn2	H			79.0	31.2			110.2	131.0	20.8
4962.8	Hrn2	V			74.1	39.1	-44.5	-20.0	48.7	54.0	5.3
4962.8	Hrn2	H			73.3	39.1	-44.5	-20.0	47.9	54.0	6.1
7444.2	Hrn2	V			57.7	44.8	-42.0	-20.0	40.5	54.0	13.5
7444.2	Hrn2	H			55.5	44.8	-42.0	-20.0	38.3	54.0	15.7

Notes:
B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole
* Re-measured using dipole antenna.
** Includes cable loss when amplifier is not used.
*** Includes cable loss.
( ) Denotes failing emission level.
All harmonics up to the 10th have been checked for compliance.
Noise floor greater than 20 dB from limit.
Measurements above 8 GHz were conducted @ 1 meter, unreported measurements were >20 dB from the limit.

Test Data - Radiated Emissions, continued

Test Distance (meters) : 3		Range: A Tower		Receiver: HP8565E		RBW: 1 MHz		Detector: Peak			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Duty Cycle Corr (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Base Station Channel #47, Antenna #2											
2441.6	Hrn2	V			78.5	31.1			109.6	131.0	21.4
2441.6	Hrn2	H			80.2	31.1			111.3	131.0	19.7
4883.3	Hrn2	V			70.1	38.8	-44.3	-20.0	44.6	54.0	9.4
4883.3	Hrn2	H			67.5	38.8	-44.3	-20.0	42.0	54.0	12.0
7324.9	Hrn2	V			58.0	44.6	-42.2	-20.0	40.4	54.0	13.6
7324.9	Hrn2	H			52.2	44.6	-42.2	-20.0	34.6	54.0	19.4
Base Station Channel #22, Antenna #2											
2401.1	Hrn2	V			63.6	31.2			94.8	131.0	36.2
2401.1	Hrn2	H			64.3	31.2			95.5	131.0	35.5
4802.1	Hrn2	V			57.3	38.4	-44.1	-20.0	31.6	54.0	22.4
4802.1	Hrn2	H			54.0	38.4	-44.1	-20.0	28.3	54.0	25.7
7203.1	Hrn2	V			49.2	44.4	-42.4		51.2	75.5	24.3
7203.1	Hrn2	H			48.2	44.4	-42.4		50.2	75.5	25.3

Notes:
B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole
* Re-measured using dipole antenna.
** Includes cable loss when amplifier is not used.
*** Includes cable loss.
( ) Denotes failing emission level.
All harmonics up to the 10^{th} have been checked for compliance.
Noise floor greater than 20 dB from limit.
Measurements above 8 GHz were conducted @ 1 meter, unreported measurements were >20 dB from the limit.

Radiated Photographs (Worst Case Configuration)

Front View

Radiated Photographs (Worst Case Configuration)

Front View

Section 11. Test Equipment List

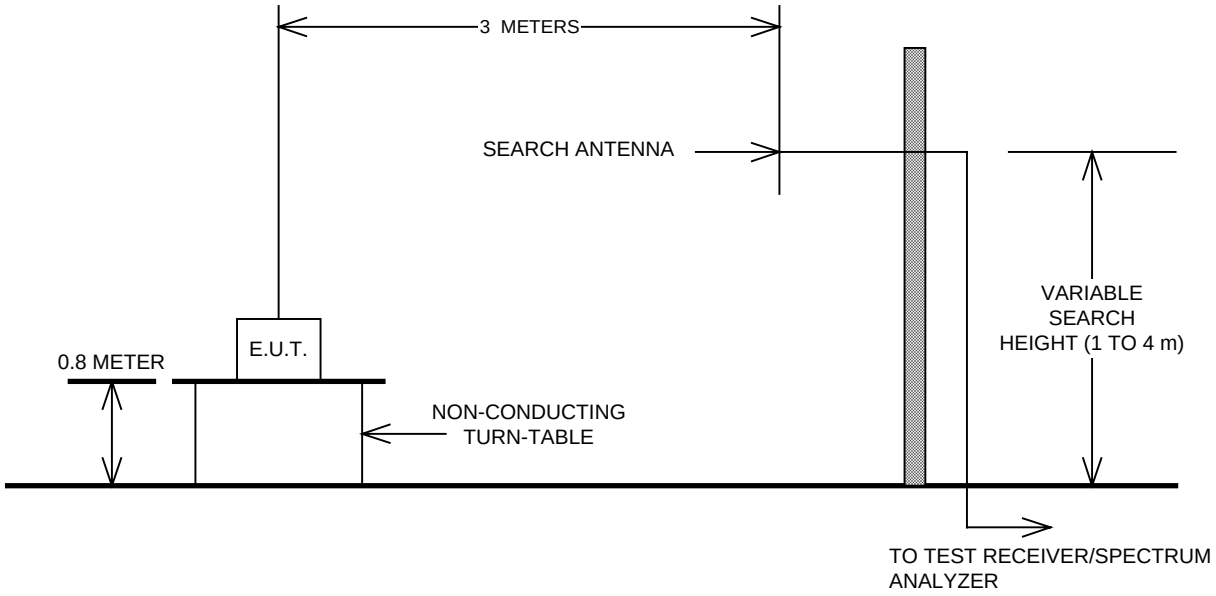
CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.
1 Year	Spectrum Analyzer	Hewlett Packard	8564E	3846A01407	May 31/99	May 31/00
1 Year	Spectrum Analyzer-**1**	Hewlett Packard	8566B	2311A02238	Oct. 22/98	Oct. 22/99
1 Year	Spectrum Analyzer Display-**1**	Hewlett Packard	8566B	2314A04759	Oct. 22/98	Oct. 22/99
1 Year	Quasi-peak adapter-**1**	Hewlett-Packard	85650A	2043A00302	Oct. 22/98	Oct. 22/99
1 Year	LISN	Tegam	95300-50	T-12855/56	Aug. 24/99	Aug. 24/00
2 Year	Horn Antenna	EMCO #2	3115	4336	Oct. 30/97	Oct. 30/99
1 Year	Low Noise Amplifier	Avantek	AWT-8035	1005	Sept. 20/99	Sept. 20/00
1 Year	Plotter	Hewlett Packard	7550A	FA001129	NCR	NCR
1 Year	Notch Filter	K&L	3TNF-250/400	75	Aug. 23/99	Aug. 23/00
	High Pass Filter	K&L	11SH10-4000	FA001340	COU	COU

NA: Not Applicable
NCR: No Cal Required
COU: CAL On Use

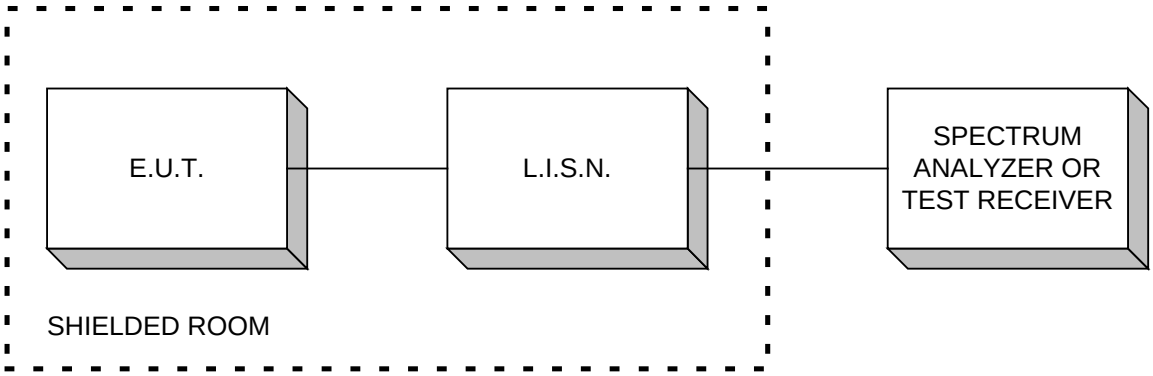
ANNEX A

BLOCK DIAGRAMS

Test Site For Radiated Emissions



Conducted Emissions



Peak Power At Antenna Terminals