Nemko Test Report:	10215672 Part 90 trf
Applicant:	Sirit Corporation 1321 Valwood Parkway Carrollton, TX 75006
Equipment Under Test: (E.U.T.)	ID6204
FCC Identifier:	M4ZID6200
In Accordance With:	**FCC Part 90, Subpart I** LMS Transmitter
Tested By:	Nemko USA Inc. 802 N. Kealy Lewisville, Texas 75057-3136

TESTED BY: _____ **DATE:** **3-5 December 2011**

David Light, Senior Wireless Engineer

APPROVED BY: _____ **DATE:** **5-Jan-2011**

Mike Cantwell, GM

Total Number of Pages: 40

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Sirit Corporation

Model No.: ID6204

Serial No.: 96FC8402008C0C4B

Firmware Rev.: 0.2.19003

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 90, Subpart I.

☒ New Submission ☒ Production Unit

☐ Class II Permissive Change ☐ Pre-Production Unit

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. NONE
See “Summary of Test Data”.

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	90.205	30 Watts ERP	Complies
Audio Frequency Response	TIA EIA-603.3.2.6	N/A	N/A
Audio Low-Pass Filter Response	TIA EIA-603.3.2.6	N/A	N/A
Modulation Limiting	TIA EIA-603.3.2.6	N/A	N/A
Occupied Bandwidth	90.210	Plots	Complies
Spurious Emissions at Antenna Terminals	90.210	Plots	Complies
Field Strength of Spurious Emissions	90.210	-25 dBm	Complies
Frequency Stability	90.213		
Transient Frequency Behavior	90.214	N/A	N/A

Footnotes:

(1) The radio does not support audio modulation.
(2) Fixed non-multilateration transmitters with an authorized bandwidth that is more than 40 kHz from the band edge are not subject to frequency stability restrictions. The device however was measured to show compliance to Part 2 requirements.

Section 2. General Equipment Specification

Transmitter

Supply Voltage Input:	120 Vac
Frequency Range:	902.00 to 904.00 MHz Band 1 909.75 to 921.75 MHz Band 2
Tunable Bands:	902.75 to 903.25 MHz Band 1 911.20 to 920.45 MHz Band 2

Type(s) of Modulation:

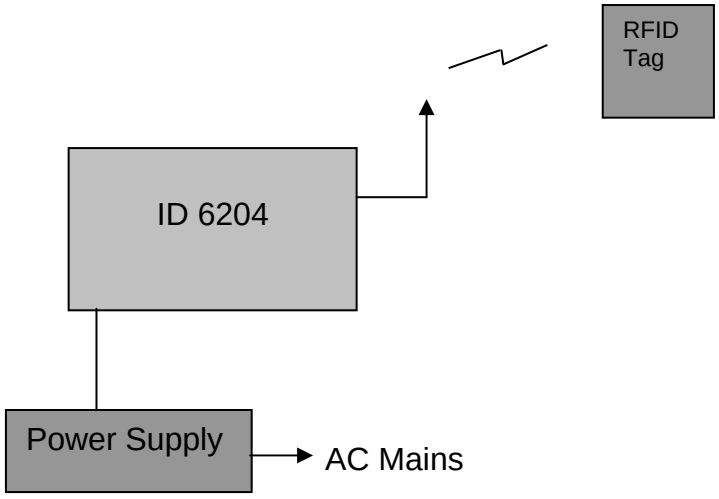
F3E (Voice)	F1D	F2D	D7W (QAM)	Other K1D
☐	☐	☐	☐	☒

Output Impedance:	50 ohms
Operator Selection of Operating Frequency:	Software controlled
Power Output Adjustment Capability:	Software controlled

Description of EUT

ID6204 is a 900 MHz RFID reader operating in the non-multilateral services. The IDentity 6204 is equipped with four 50 Ohm RFID antenna ports. Only one port is active at any given time.

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 90.205
TESTED BY: D. Light	DATE: 3 December 2011

Test Results: Complies.

Measurement Data:

C1G2 modulation 902.75 – 903.25 MHz

Frequency (MHz)	Measured Power (dBm)	Measured Power (Watts)
902.75	34.8	3.0
903.25	34.9	3.1

C1G2 modulation 911.2 – 920.45 MHz

Frequency (MHz)	Measured Power (dBm)	Measured Power (Watts)
911.20	35.0	3.2
920.45	35.0	3.2

Title 21 modulation 911.7 – 919.95 MHz

Frequency (MHz)	Measured Power (dBm)	Measured Power (Watts)
911.70	32.9	2.0
919.95	33.0	2.0

PS111 modulation 914.25 – 915.75 MHz

Frequency (MHz)	Measured Power (dBm)	Measured Power (Watts)
914.25	35.0	3.2
915.75	34.9	3.1

The rf power output level must be adjusted when using antennas with gain in order to insure that the radio does not transmit above the 30 watt erp limit. The installer is advised in the User Guide to set the antenna gain and cable loss in the installation software. The reader is then automatically set to the appropriate power output level. As supplied the reader can only achieve a maximum of 2 watts rf power at the reader output port. For the purposes of this testing a special manufacturer access code was

used to adjust the power to the absolute maximum as this gives the worst-case measurement results.

Test Equipment Used: 1464 -1627-1474

Test Conditions:

Temperature: 23^{O}C

Relative Humidity: 36%

Spectrum analyzer settings:

RBW: 3 MHz
VBW 3 MHz
Detector: Peak
Sweep time: Auto

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 90.210
TESTED BY: D. Light	DATE: 3 December 2011

Test Results: Complies.

Test Data: See attached graph(s).

Test Equipment Used: 1464 -1627-1474

Test Conditions:

Temperature: 23^{O}C

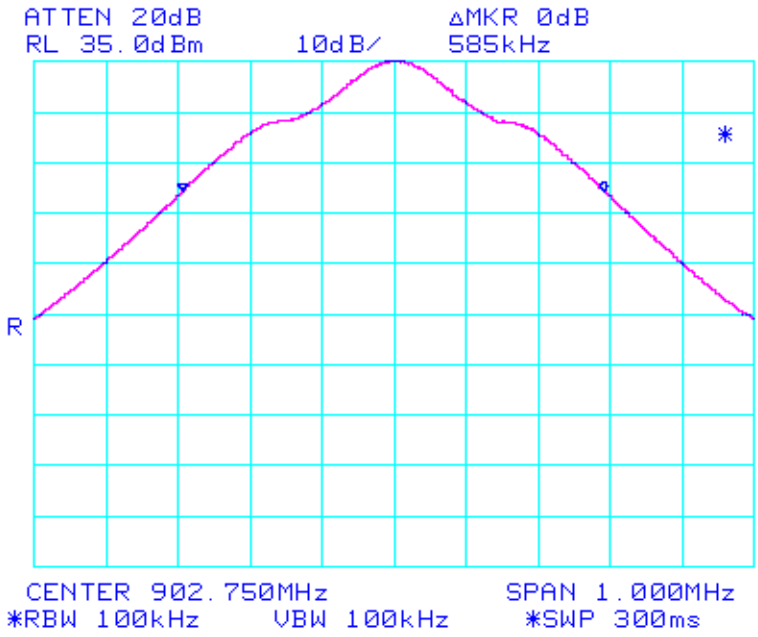
Relative Humidity: 36%

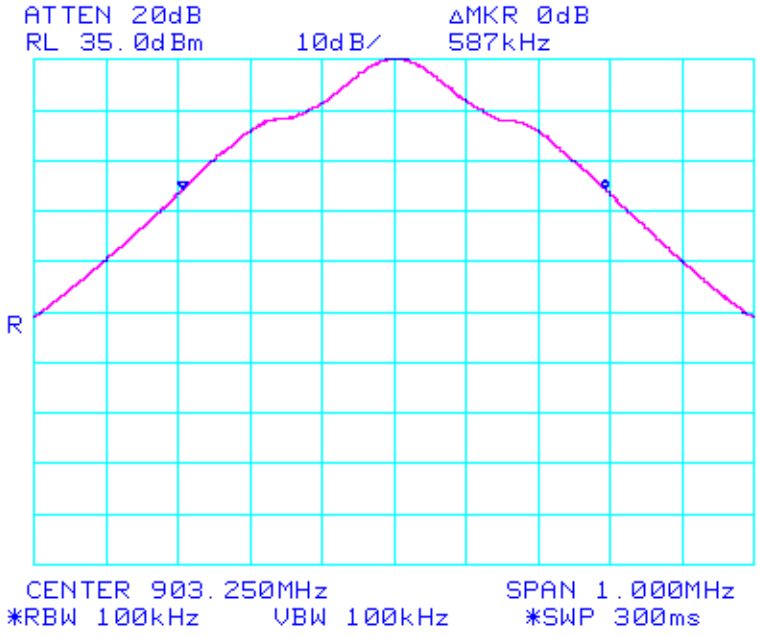
Spectrum analyzer settings:

RBW: 100 kHz
VBW 100 kHz
Detector: Peak
Sweep time: Auto

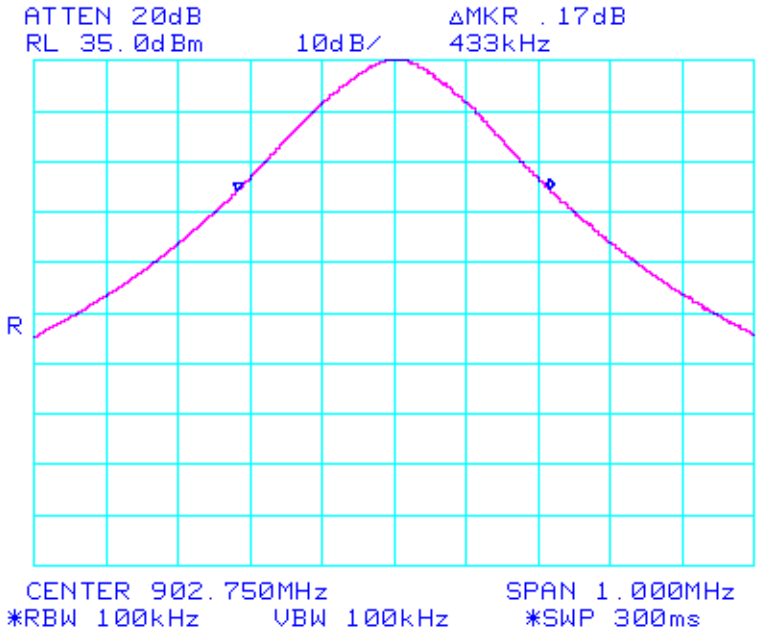
Test Data – Occupied Bandwidth

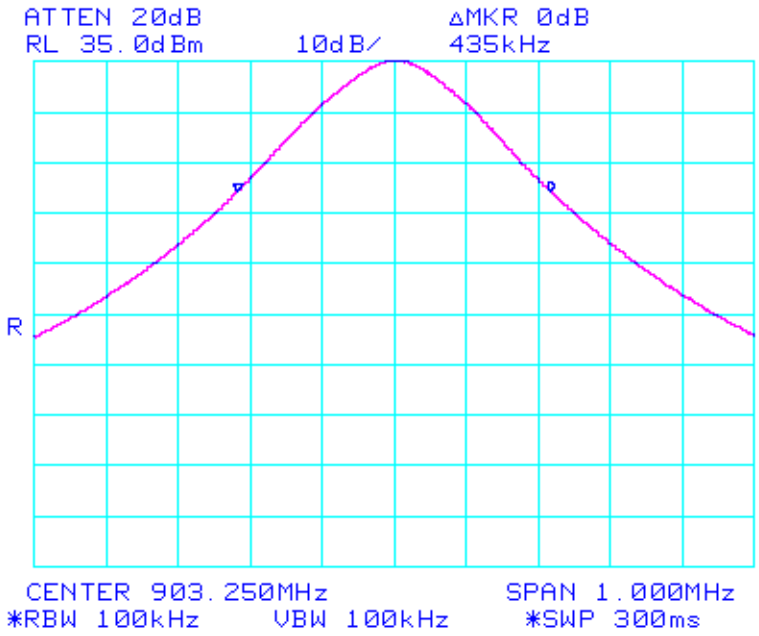
26 dB Bandwidth
Modulation mode C1G2
160 kbps data rate
6.25 kHz channel



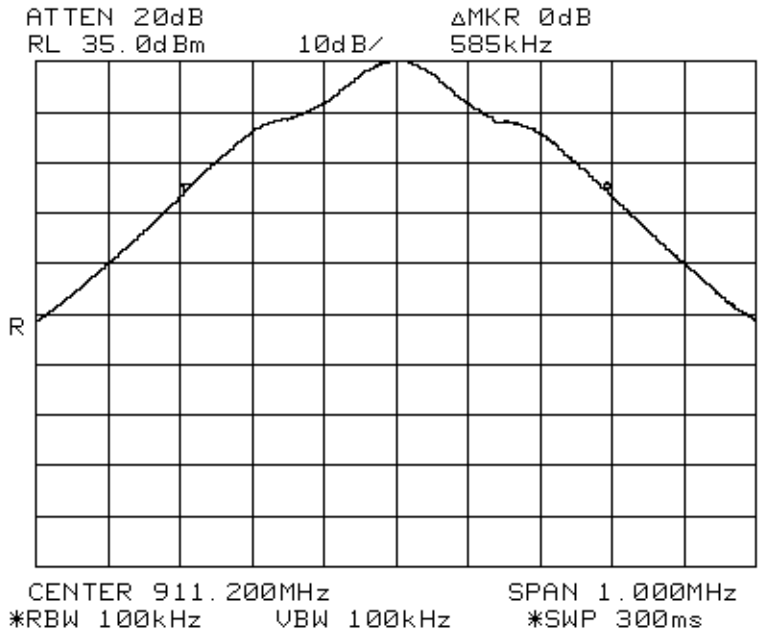


26 dB Bandwidth
Modulation mode C1G2
80 kbps data rate

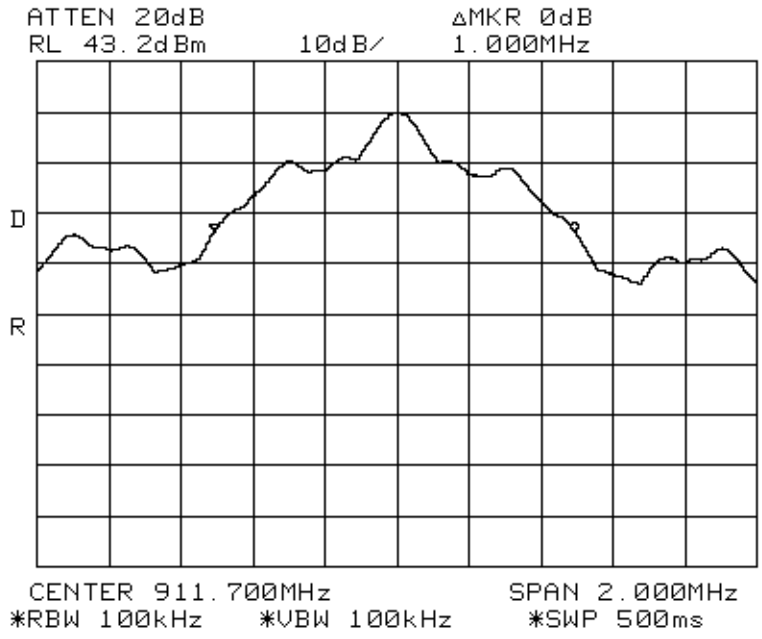


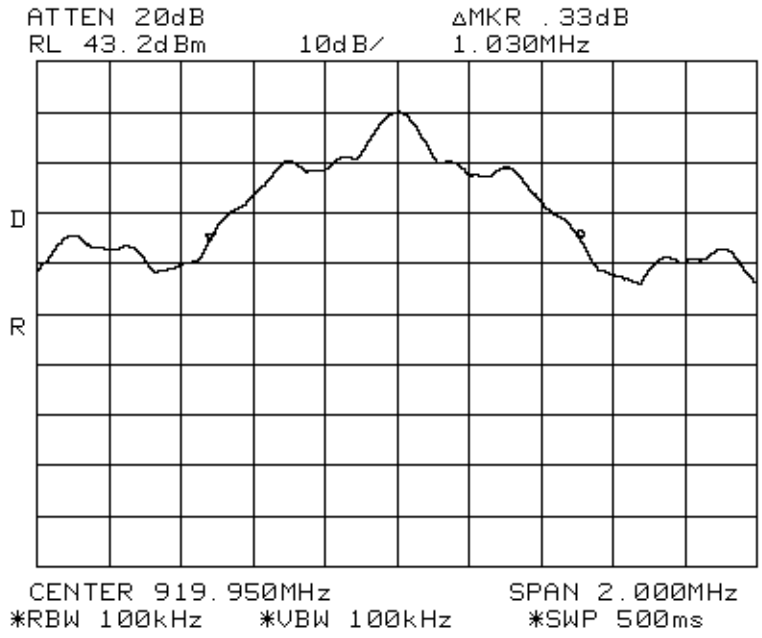


Band 2
26 dB Bandwidth
Modulation mode C1G2

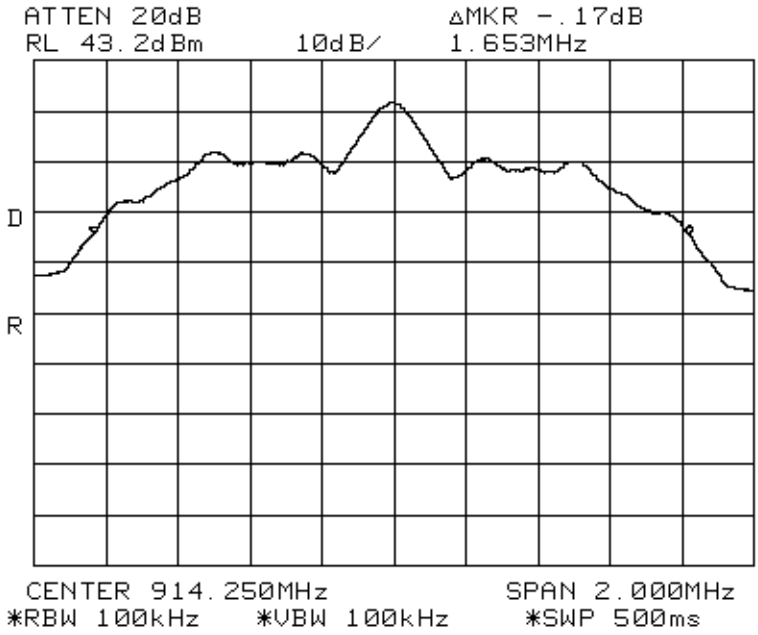


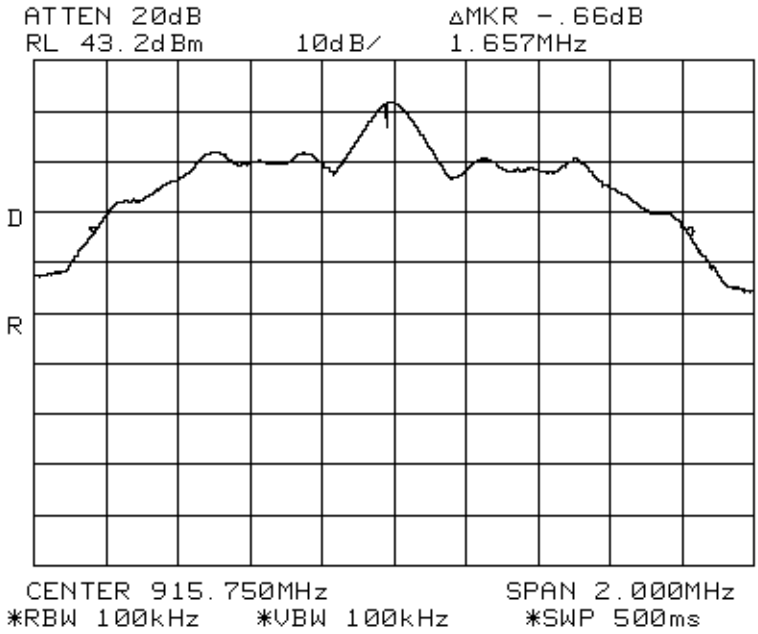
Band 2
26 dB Bandwidth
Modulation mode Title 21





PS111 modulation
914.25 MHz





Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 90.210
TESTED BY: D. Light	DATE: 3 December 2011

Test Results: Complies.

Test Data: See attached graph(s).

Test Equipment Used: 1464 -1627-1474

Test Conditions:

Temperature: 23^{O}C

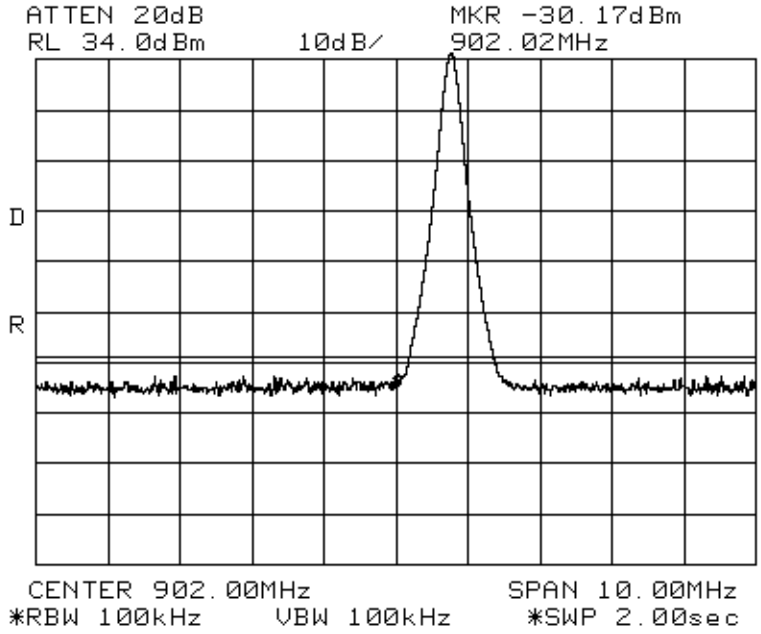
Relative Humidity: 36%

Spectrum analyzer settings:

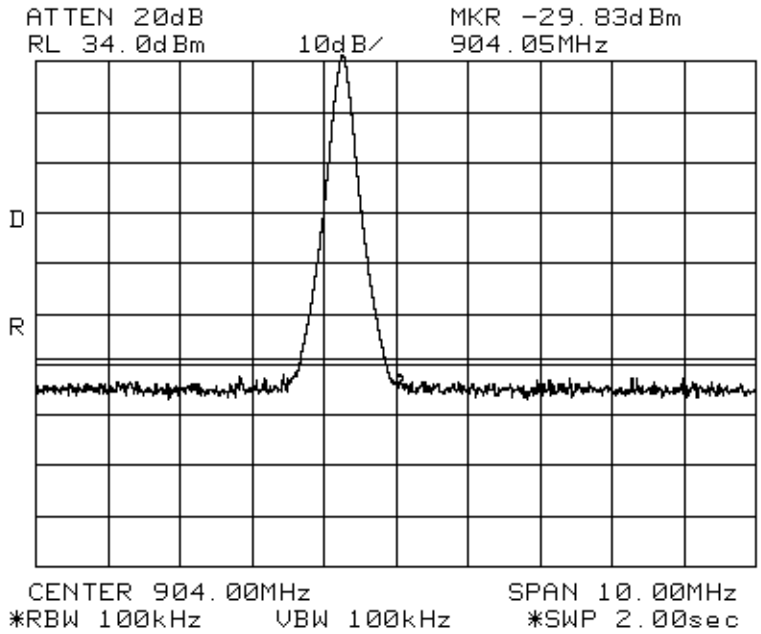
RBW: 100 kHz
VBW 100 kHz
Detector: Peak
Sweep time: Auto

Test Data – Spurious Emissions at Antenna Terminals

C1G2 modulation
902.75 MHz

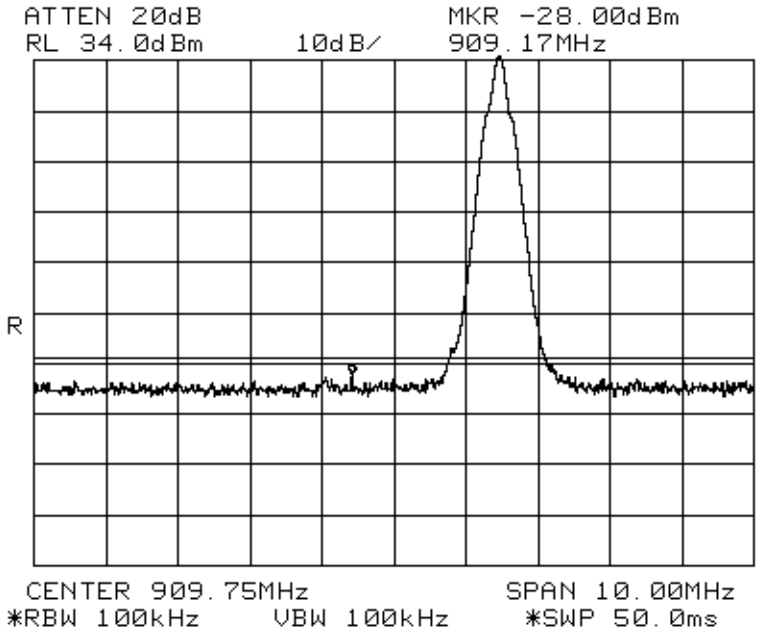


C1G2 modulation
903.25 MHz

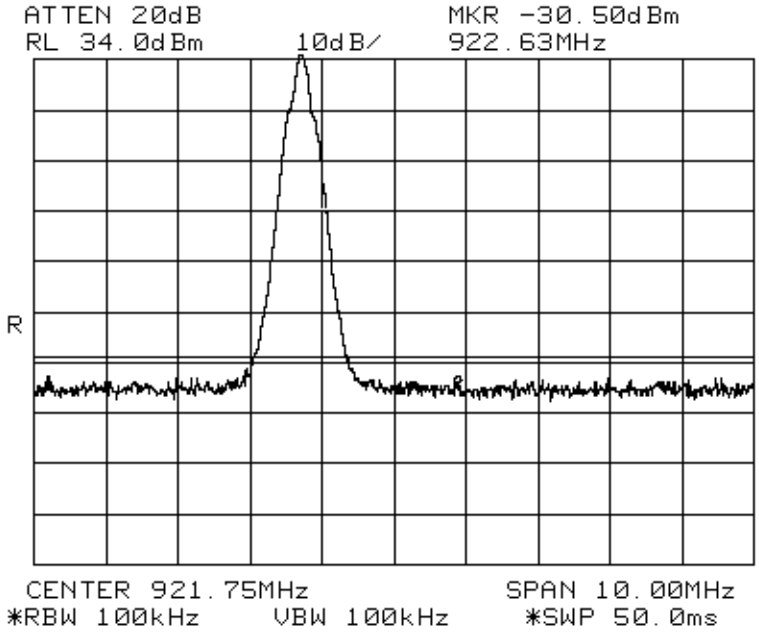


Test Data – Spurious Emissions at Antenna Terminals

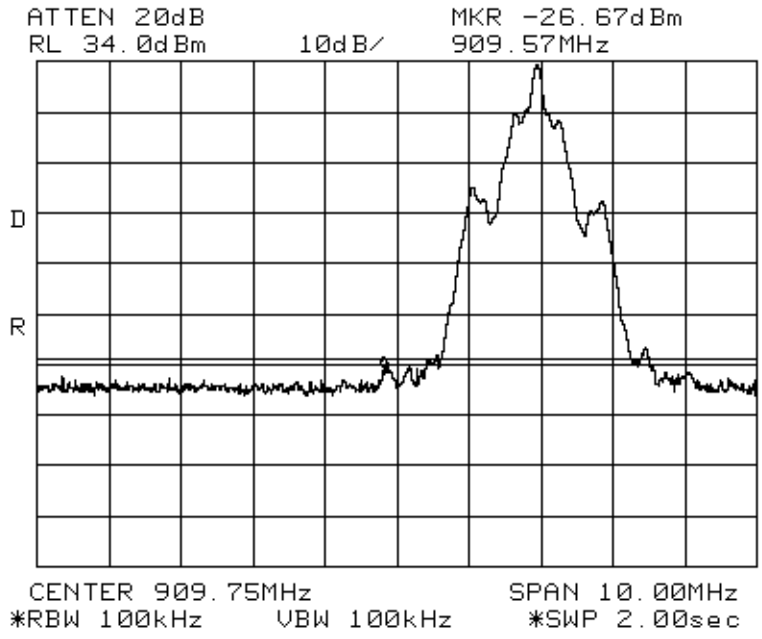
Lower Band Edge
C1G2 modulation mode
911.2 MHz



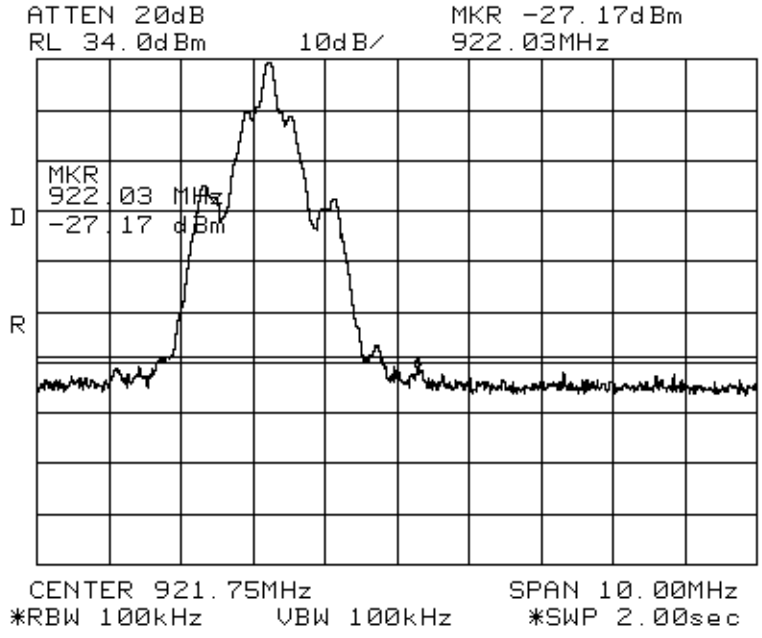
Upper Band Edge
C1G2 modulation mode
920.45 MHz



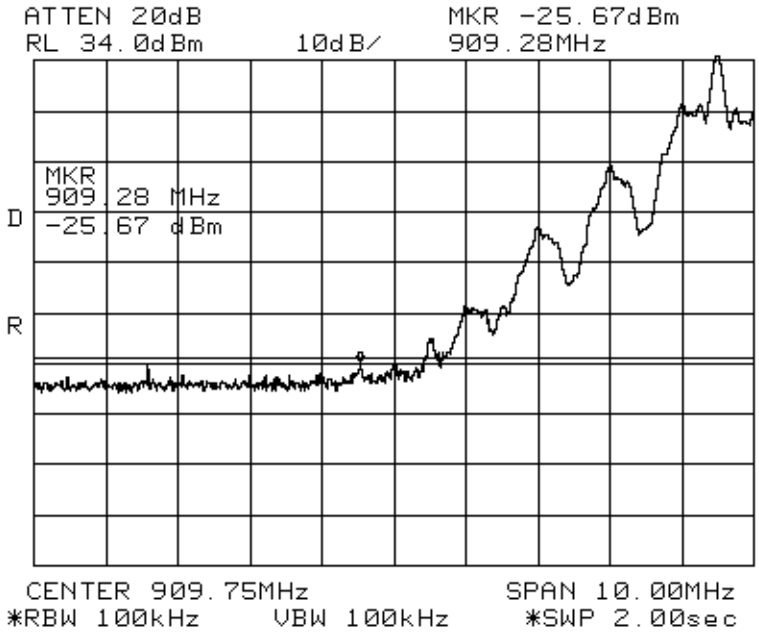
Lower Band Edge
Title 21 modulation mode
911.7 MHz



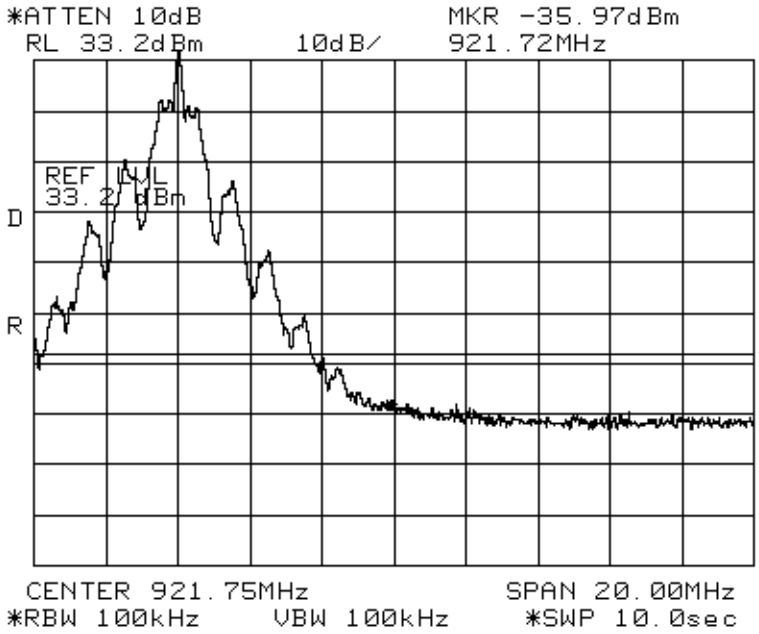
Upper Band Edge
Title 21 modulation mode
919.95 MHz



PS111 modulation mode
914.25 MHz



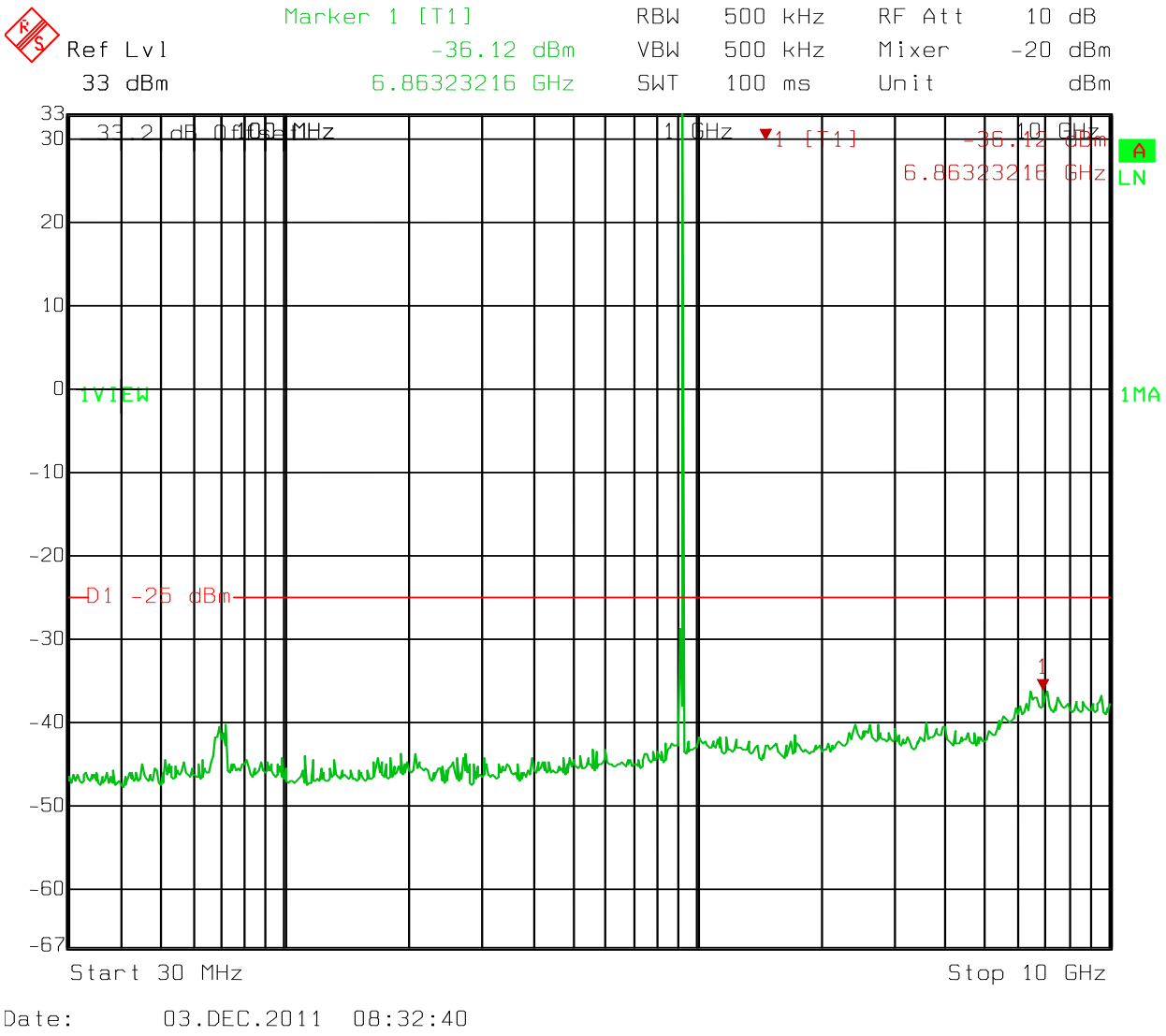
PS111 modulation mode
915.75 MHz



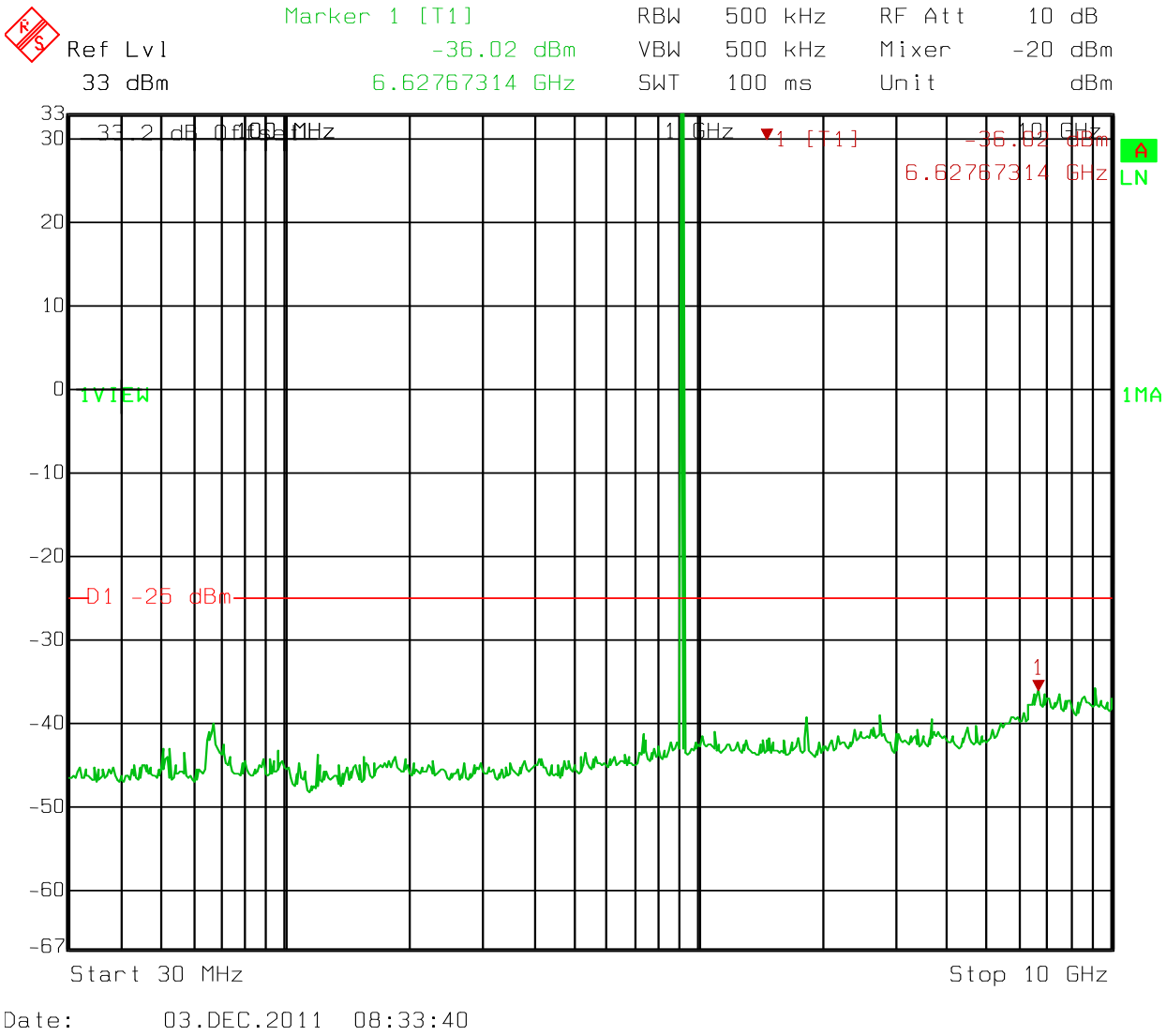
Test Data – Spurious Emissions at Antenna Terminals

Mask K(3)(ii)

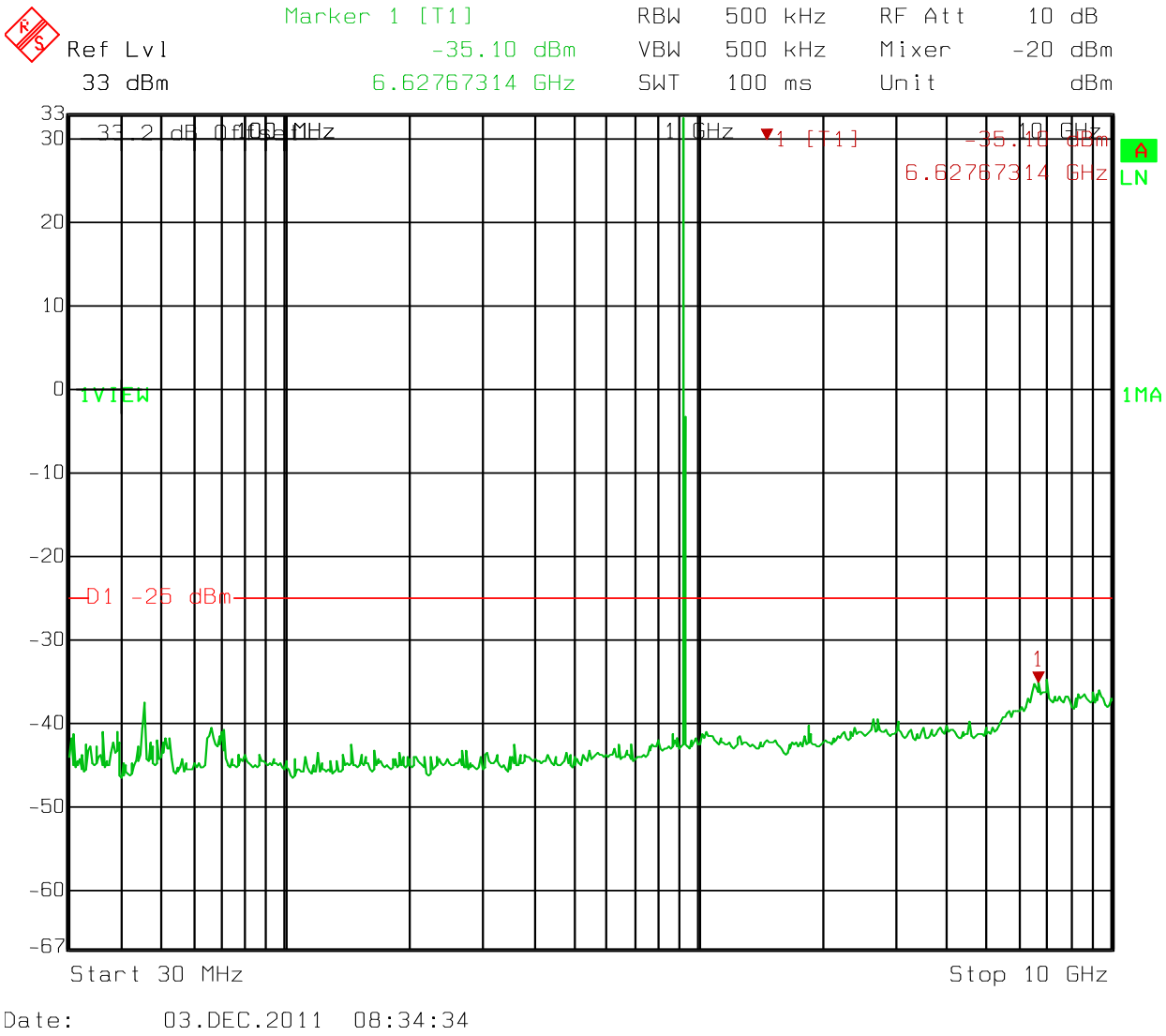
PS111



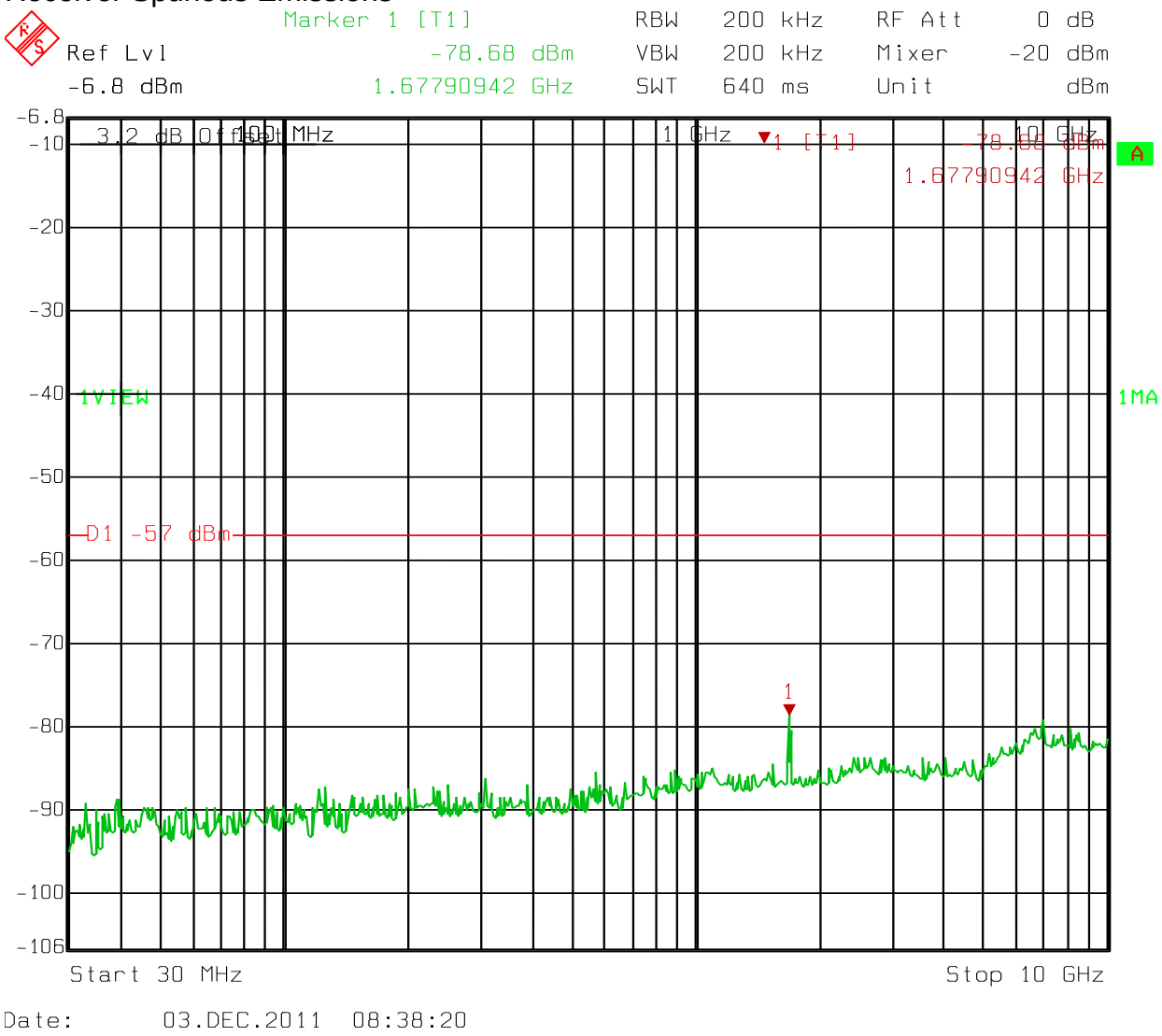
C1G2


Marker 1 [T1]
Ref Lvl
33 dBm
-36.02 dBm
6.62767314 GHz
RBW 500 kHz
VBW 500 kHz
SWT 100 ms
RF Att 10 dB
Mixer -20 dBm
Unit dBm
33
30
20
10
0
-10
-20
-30
-40
-50
-60
-67
1 GHz
1 [T1]
-36.02 dBm
6.62767314 GHz
A
LN
1MA
D1 -25 dBm
Start 30 MHz
Stop 10 GHz
Date: 03.DEC.2011 08:33:40

Title 21


Marker 1 [T1]
RBW 500 kHz
RF Att 10 dB
Ref Lvl
-35.10 dBm
VBW 500 kHz
Mixer -20 dBm
33 dBm
6.62767314 GHz
SWT 100 ms
Unit dBm
33
30
20
10
0
-10
-20
-30
-40
-50
-60
-67
1 GHz
1 [T1]
-35.10 dBm
6.62767314 GHz
A
LN
1MA
VIEW
D1 -25 dBm
1
Start 30 MHz
Stop 10 GHz
Date: 03.DEC.2011 08:34:34

Receiver Spurious Emissions



Section 6. Field Strength of Spurious Emissions

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 90.210
TESTED BY: D. Light	DATE: 3 December 2011

Test Results: Complies.

Test Data: There were no emissions detected. The ambient threshold of sensitivity is sufficient to measure emissions within 13.6 dB of the specification limit of -25 dBm.

Note: Limit applied was 90.210 Mask K(3)(ii).

Test Equipment Used: 1464-993-1783-791-1016

Test Conditions:

Temperature: 23^{O}C

Relative Humidity: 36%

Spectrum analyzer settings:

RBW: 1 MHz
VBW 1 MHz
Detector: Peak
Sweep time: Auto

Test Data

Frequency (MHz)	Meter Reading (dBm)	Substitution Level (dBm)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarity	Comments
1831.50	-91.3	-57.8		0	6.2	-51.6	-25.0	-26.6	H	Ambient
1831.50	-90.9	-59.8		0	6.2	-53.6	-25.0	-28.6	V	Ambient
2747.25	-91.8	-58.2		0	7.1	-51.1	-25.0	-26.1	H	Ambient
2747.25	-92.0	-55.1		0	7.1	-48.0	-25.0	-23.0	V	Ambient
3663.00	-91.9	-58.0		0	8.0	-50.1	-25.0	-25.1	H	Ambient
3663.00	-92.3	-49.8		0	8.0	-41.9	-25.0	-16.9	V	Ambient
4578.80	-92.0	-57.0		0	9.1	-47.9	-25.0	-22.9	H	Ambient
4578.80	-91.9	-50.5		0	9.1	-41.4	-25.0	-16.4	V	Ambient
5494.5	-89.8	-51.7		0	8.5	-43.2	-25.0	-18.2	H	Ambient
5494.5	-89.2	-47.2		0	8.5	-38.7	-25.0	-13.7	V	Ambient
6410.25	-89.0	-51.6		0	9.1	-42.5	-25.0	-17.5	H	Ambient
6410.25	-88.7	-48.5		0	9.1	-39.4	-25.0	-14.4	V	Ambient
7326	-90.5	-51.1		0	9.5	-41.7	-25.0	-16.7	H	Ambient
7326	-90.0	-49.2		0	9.5	-39.8	-25.0	-14.8	V	Ambient
8241.75	-90.5	-48.4		0	9.5	-38.9	-25.0	-13.9	H	Ambient
8241.75	-90.5	-48.1		0	9.5	-38.6	-25.0	-13.6	V	Ambient
9157.5	-90.5	-48.9		0	9.8	-39.1	-25.0	-14.1	H	Ambient
9157.5	-90.5	-49.3		0	9.8	-39.5	-25.0	-14.5	V	Ambient

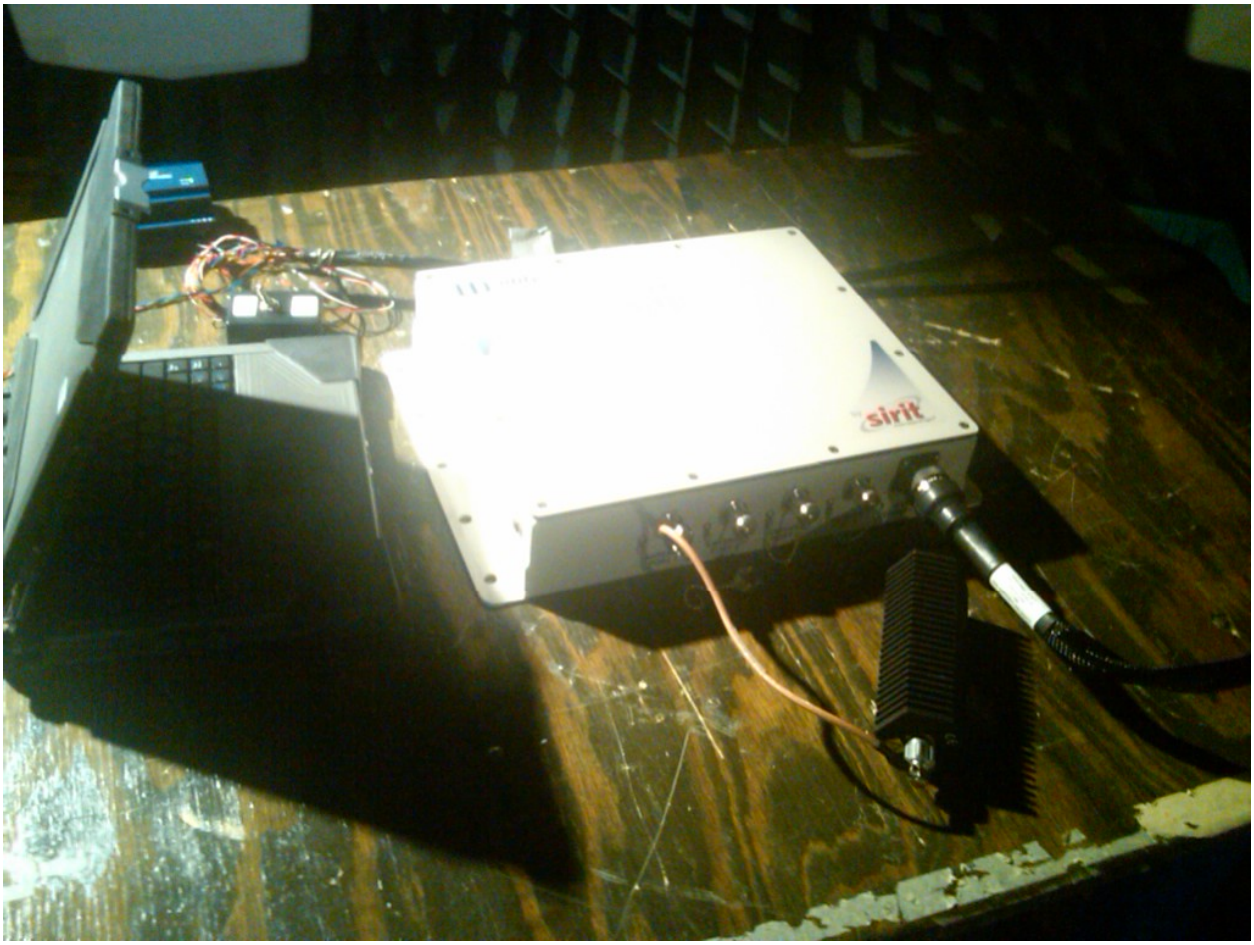
Notes:

There were no emissions detected. The ambient threshold of sensitivity is sufficient to measure emissions within 13.6 dB of the specification limit of -25 dBm.

Spectrum analyzer settings:

RBW: 1 MHz
VBW 1 MHz
Detector: Peak
Sweep time: Auto

Photographs of Test Setup


sirit

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 90.213
TESTED BY: David Light	DATE: 5 December 2011

Test Results: Complies.

Measurement Data: See attached table.

Test Equipment Used: 1464 -1627-1474-1893-619

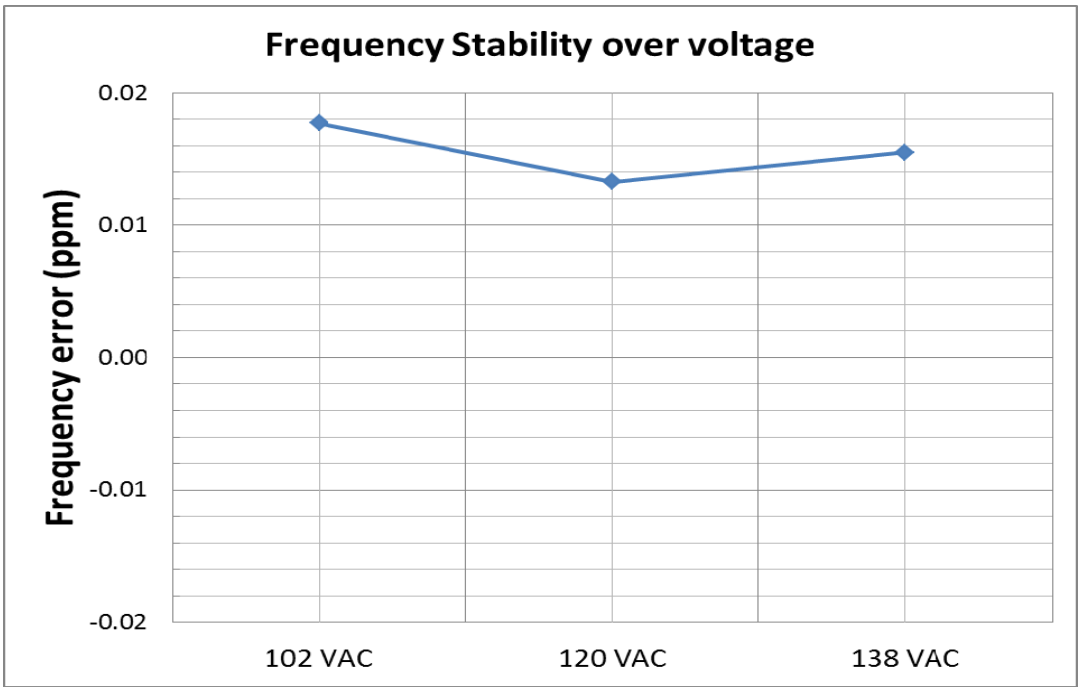
Test Data – Frequency Stability

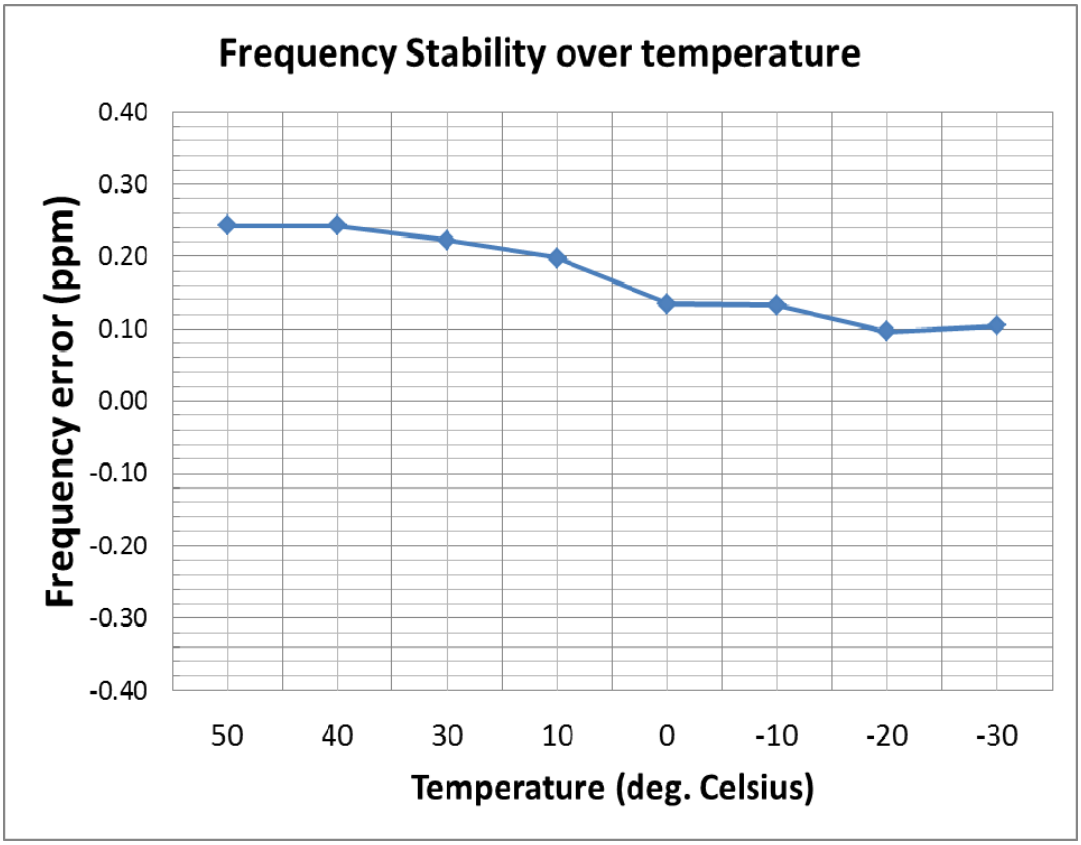
Measurement Uncertainty: $1x10^{-17}$ ppm

Standard Test Frequency: 902.750000 MHz

Temp (°C)	Measured Frequency (MHz)		Test Voltage	Frequency Error (Hz)	Limit (+/-Hz)	Error (ppm)	Comment
20	902.750016		102 VAC	0	902.8	0.02	
20	902.750012		120 VAC	12	902.8	0.01	
20	902.750014		138 VAC	14	902.8	0.02	
50	902.750219		120 VAC	219	902.8	0.24	
40	902.750219		120 VAC	219	902.8	0.24	
30	902.750201		120 VAC	201	902.8	0.22	
10	902.750179		120 VAC	179	902.8	0.20	
0	902.750121		120 VAC	121	902.8	0.13	
-10	902.750120		120 VAC	120	902.8	0.13	
-20	902.750087		120 VAC	87	902.8	0.10	
-30	902.750094		120 VAC	94	902.8	0.10	

Notes:


Frequency Stability over voltage
Frequency error (ppm)
0.02
0.01
0.00
-0.01
-0.02
102 VAC
120 VAC
138 VAC


Frequency Stability over temperature
Frequency error (ppm)
0.40
0.30
0.20
0.10
0.00
-0.10
-0.20
-0.30
-0.40
50
40
30
10
0
-10
-20
-30
Temperature (deg. Celsius)

Section 8. Test Equipment List

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
993	Antenna, Horn	A.H. Systems	SAS-200/571	162	22-Sep-2011	22-Sep-2013
1016	Preamplifier	Hewlett Packard	8449A	2749A00159	20-Jul-2011	20-Jul-2012
1033	Antenna, Horn	EMCO	3115	8812-3035	28-Mar-2011	28-Mar-2013
1065	Attenuator	Narda	776B-10		N/R	
1082	Cable, 2m	Astrolab	32027-2-29094-72TC		N/R	
1464	Spectrum Analyzer	Hewlett Packard	8563E	3551A04428	16-May-2011	16-May-2013
1474	Attenuator, 20dB, DC 18 Ghz	MCL Inc.	BW-S20W2		N/R	
1627	Cable, 5 ft	Megaphase	10312 1GVT4		N/R	
1763	Antenna, Bilog	Schaffner	CBL 6111D	22926	11-Feb-2011	11-Feb-2012
1783	Cable Assy, 3m Chamber	Nemko	Chamber		26-Sep-2011	26-Sep-2012
1839	Environmental Chamber (Temperature only)	Tenney	T-14	14	N/R	
791	Watkins Johnson 30MHz to 1GHz Pre Amplifier	Nemko, USA	CRA69 321003 9605	119	19-May-2011	19-May-2012
619	Digital Thermometer	Fluke	51	4520028	29-Sep-2011	29-Sep-2012

ANNEX A - TEST METHODOLOGIES

NAME OF TEST: RF Power Output	**PARA. NO.:** 90.205

Minimum Standard: Para. No. 90.205(l). *902–928 MHz.* LMS systems operating pursuant to subpart M of this part in the 902–927.25 MHz band will be authorized a maximum of 30 watts ERP. LMS equipment operating in the 927.25–928 MHz band will be authorized a maximum of 300 watts ERP

Method Of Measurement:

The peak power at antenna terminals is measured using an in-line peak power meter or spectrum analyzer set with sufficient RBW (RBW > 20 dB bandwidth of measured waveform). Power output is measured with the maximum rated input level.

NAME OF TEST: Spurious Emissions at Antenna Terminals	**PARA. NO.: 90.210**

Test Method:

RBW: As specified by applicable FCC rule part or 1% of emission bandwidth in the 0 - 1 GHz range, 1 MHz at frequencies above 1 GHz.

VBW: ≥ RBW

The spectrum is searched up to 10 times the fundamental frequency.

NAME OF TEST: Occupied Bandwidth **PARA. NO.: 90.210**

Minimum Standard: Para. No. 90.210, see table 1 below for applicable mask.

Table 1

Frequency Band (MHz)	Mask for equipment with Low Pass Filter	Mask for equipment without Low Pass Filter
Below 25	A or B	A or C
25 - 50	B	C
72 - 76	B	C
150 - 174	B, D or E	C, D or E
150 Paging only	B	C
220 - 222	F	F
421 - 512	B, D or E	C, D or E
450 paging only	B	H
806 - 821/ 851 - 866	B	G
821 - 824/ 866 - 869	B	H
896 - 901/ 935 - 940	I	J
902 - 928	K	K
929 - 930	B	G
Above 940	B	C
All other bands	B	C

NAME OF TEST: Field Strength of Spurious **PARA. NO.: 90.210**

Minimum Standard: Para. No. 90.210, see table 1 for applicable mask.

The field strength of spurious emissions is measured using the reference antenna method as described in EIA/TIA 603C. The detected emission is maximized by rotating the turntable and adjusting the height of the receive antenna. The EUT is then replaced by a signal generator and a reference antenna. The rf level fed from the signal generator to the reference antenna is adjusted until the previously measured field strength level is reached. The erp is the rf level required from the signal generator plus the gain of the reference antenna relative to a dipole.

NAME OF TEST: Frequency Stability **PARA. NO.: 90.213**

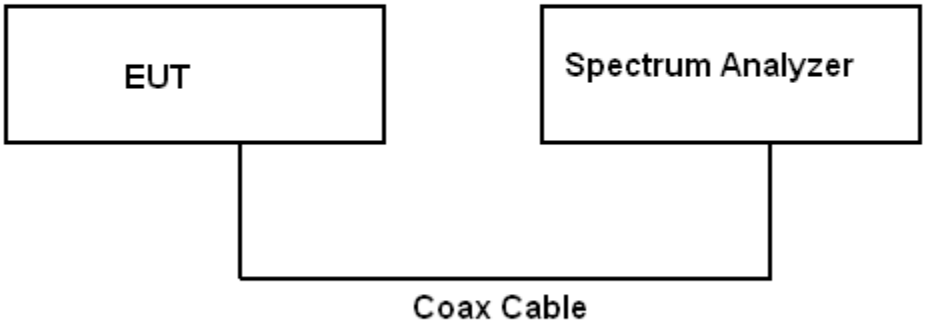
Minimum Standard: Para. No. 990.213. The transmitter carrier frequency shall remain within the assigned frequency below in ppm.

Table 2

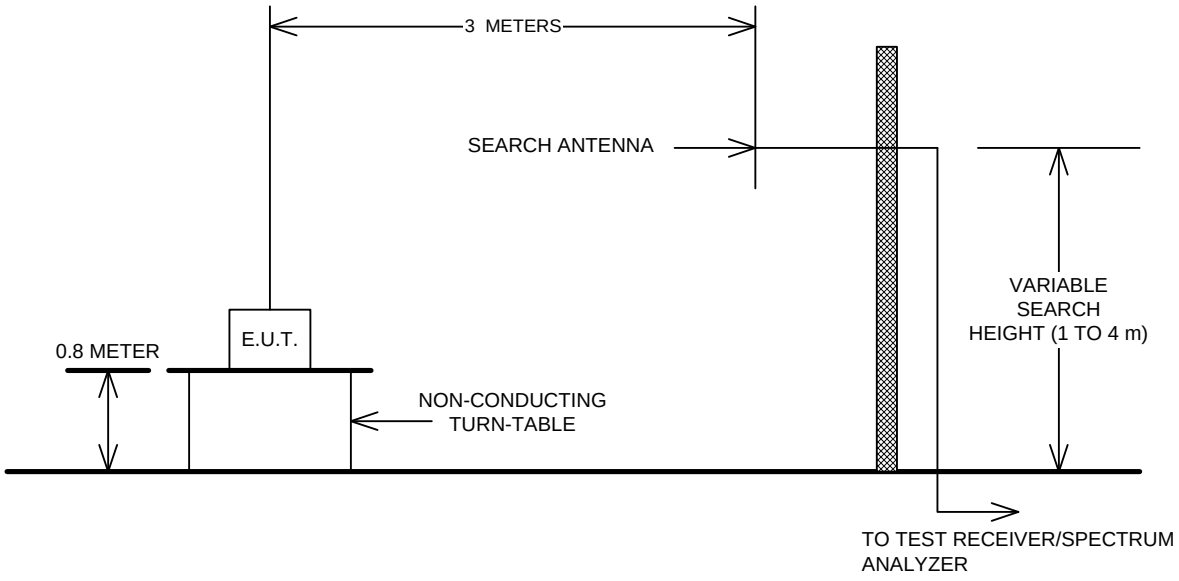
Frequency Band (MHz)	Fixed And Base Stations	Mobile Stations	
		> 2 Watts o/p pwr	< 2 Watts o/p pwr
Below 25	100	100	200
25 - 50	20	20	50
72 - 76	5	-	50
150 - 174	5	5	5
220 - 222	0.1	1.5	1.5
421 - 512	2.5	5	5
806 - 821	1.5	2.5	2.5
821 - 824	1.0	1.5	15
851 - 866	1.5	2.5	2.5
866 - 869	1.0	1.5	1.5
869 - 901	0.1	1.5	1.5
902 - 928	2.5	2.5	2.5
929 - 930	1.5	-	-
935 - 940	0.1	1.5	1.5
1427 - 1435	300	300	300
Above 2450	-	-	-

ANNEX B - TEST DIAGRAMS

R.F. Power Output
Occupied Bandwidth
Spurious Emissions



Para. No. 2.993 - Field Strength of Spurious Radiation



Frequency Stability