Nemko Test Report:	30828RUS1
Applicant:	Sirit Corporation 1321 Valwood Parkway Carrollton, TX 75006
Equipment Under Test: (E.U.T.)	ID5200
FCC Identifier:	M4ZID5200
In Accordance With:	**FCC Part 90, Subpart I** Base Station Transmitter
Tested By:	Nemko USA Inc. 802 N. Kealy Lewisville, Texas 75057-3136

TESTED BY: _____ **DATE:** **3 October 2009**

Tom Tidwell, Telecom Direct

APPROVED BY: _____ **DATE:** **25 October 2009**

David Light, Senior Wireless Engineer

Total Number of Pages: 35

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Sirit Corporation

Model No.: ID5200

Serial No.: None

Software Rev.: 3.0

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	NA	NA
Transient Frequency Behavior	90.214	N/A	N/A

Footnotes For N/A's:

(1) Since the E.U.T. does not contain modulation circuitry modulation testing was not performed.
(2) Since the E.U.T. is not a keyed carrier system, Transient Frequency Behavior was not performed.
(3) The radio does not support audio modulation.
(4) 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:

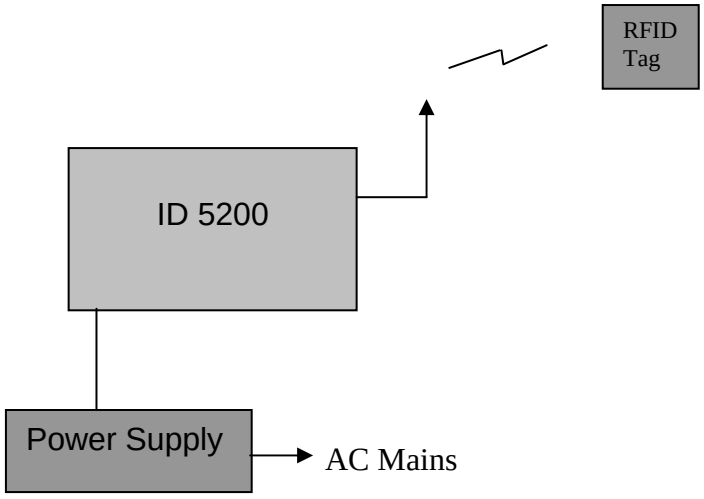
F3E (Voice)	F1D	F2D	D7W (QAM)	Other K1D
☐	☐	☐	☐	☒

Output Impedance:	50 ohms
RF Power Output (rated):	3 W Peak conducted
Operator Selection of Operating Frequency:	Software controlled
Power Output Adjustment Capability:	Software controlled

Description of EUT

ID5200 is a 900 MHz RFID reader operating in the non-multilateral services. The IDentity 5200 is equipped with two 50 Ohm RFID antenna ports. The two TX / RX ports are multiplexed, i.e. 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: Tom Tidwell	DATE: 24 Sept 2009

Test Results: Complies.

Measurement Data:

Frequency (MHz)	Measured Power (dBm)	Measured Power (Watts)
902.75	34.7	2.941
915.45	34.7	2.971
920.45	34.7	2.951

The rf power output is the same in both C1G2 and Title 21 mode.

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: 1036 -1627-1604-1474

Test Conditions:

Temperature: 23^{O}C

Relative Humidity: 36%

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 90.210
TESTED BY: Tom Tidwell	DATE: 24 Sept 2009

Test Results: Complies.

NOTE: Only C1G2 modulation mode is used in Band 1. Band 2 uses both C1G2 modulation mode and Title 21 modulation mode but uses the same channelization for both modes.

Test Data: See attached graph(s).

Test Equipment Used: 1036 -1627-1604-1474

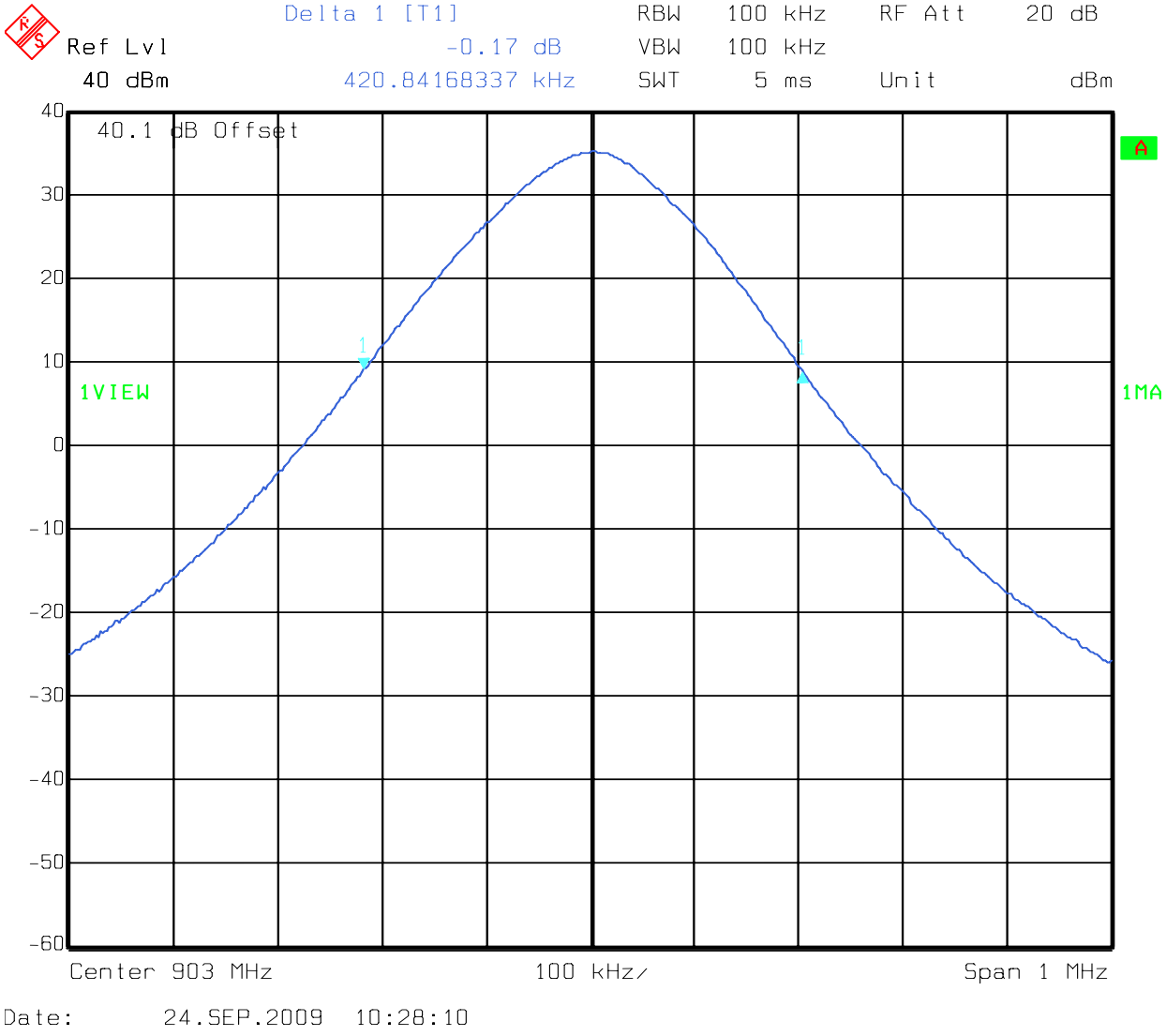
Test Conditions:

Temperature: 23^{O}C

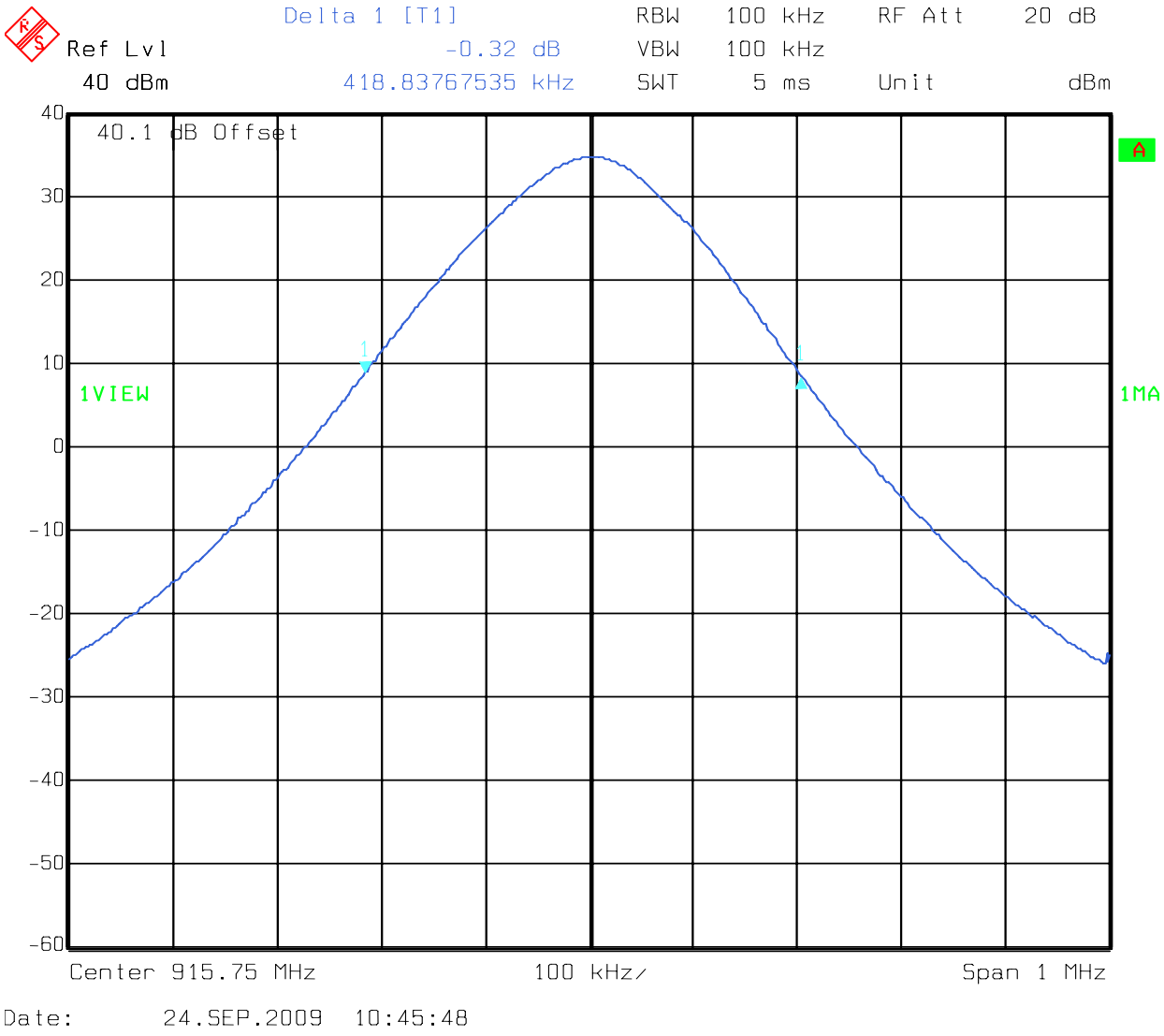
Relative Humidity: 36%

Test Data – Occupied Bandwidth

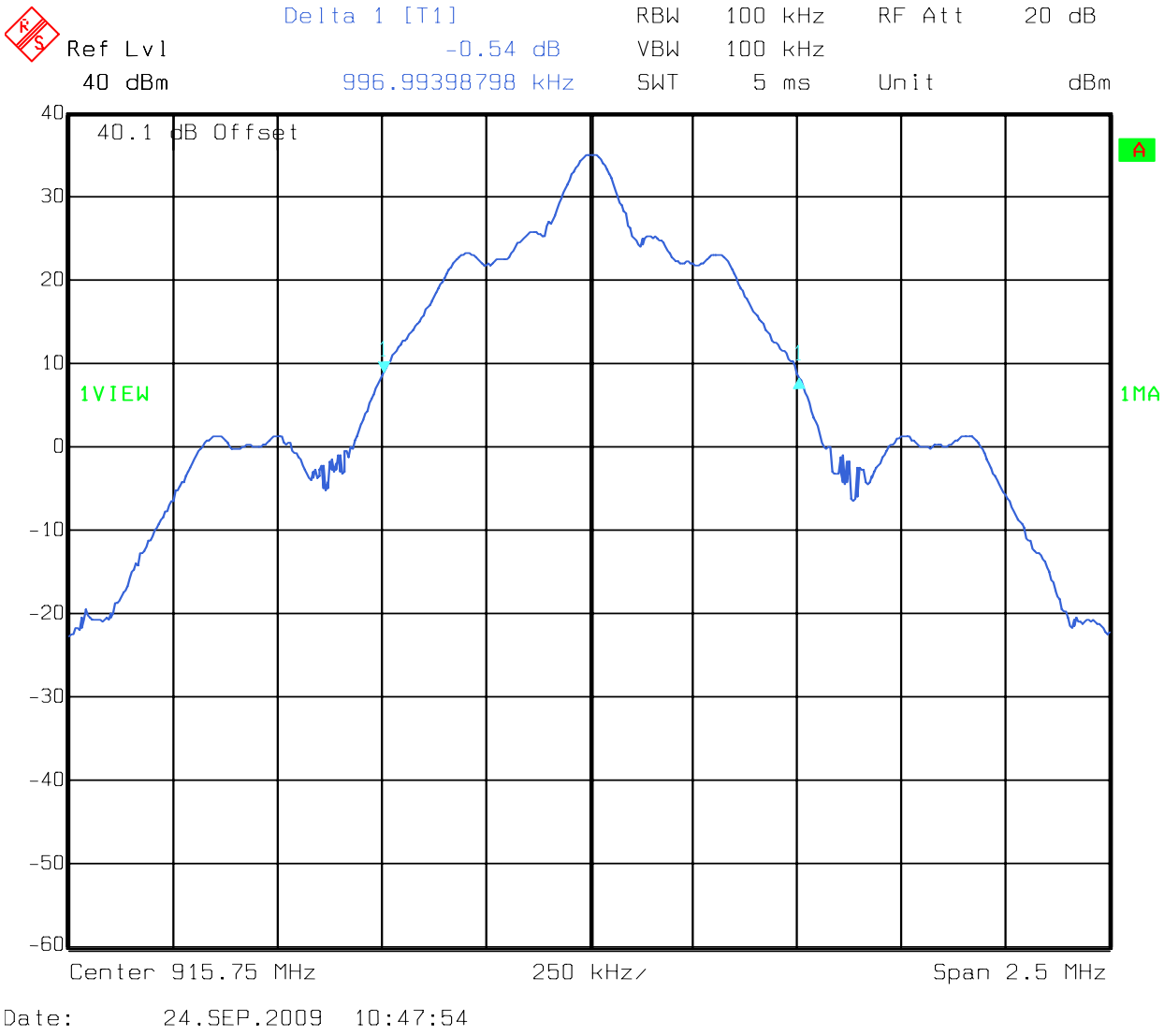
Band 1
26 dB Bandwidth
Modulation mode C1G2



Band 2
26 dB Bandwidth
Modulation mode C1G2



Band 2
26 dB Bandwidth
Modulation mode Title 21



Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 90.210
TESTED BY: Tom Tidwell	DATE: 24 Sept 2009

Test Results: Complies.

NOTE: Only C1G2 modulation mode is used in Band 1. Band 2 uses both C1G2 modulation mode and Title 21 modulation mode but uses the same channelization for both modulation modes.

Test Data: See attached graph(s).

Test Equipment Used: 1036 -1627-1604-1474

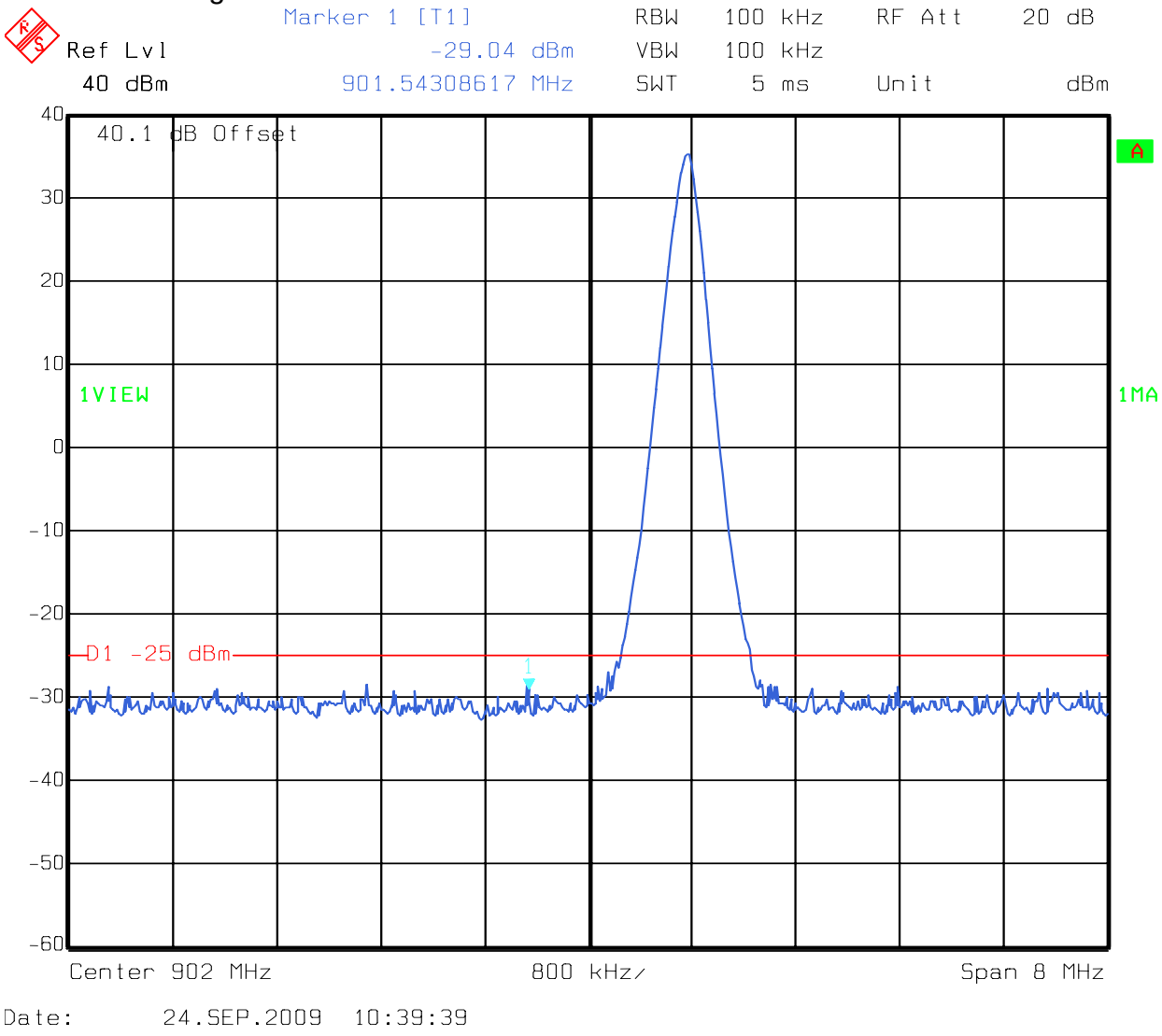
Test Conditions:

Temperature: 23^{O}C

Relative Humidity: 36%

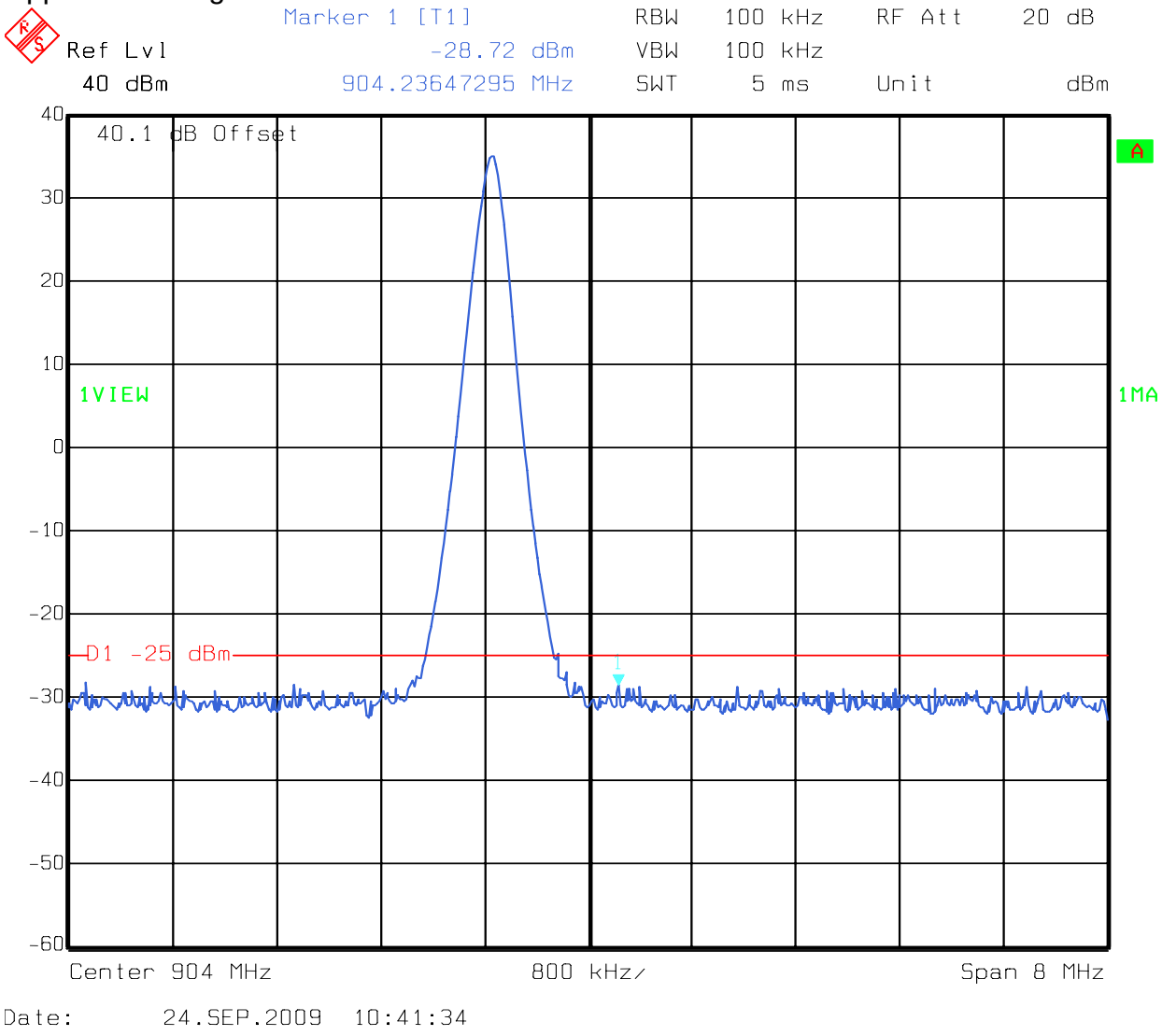
Test Data – Spurious Emissions at Antenna Terminals

Mask K(3)(ii)
Lowest Channel – Band 1
Lower Band Edge

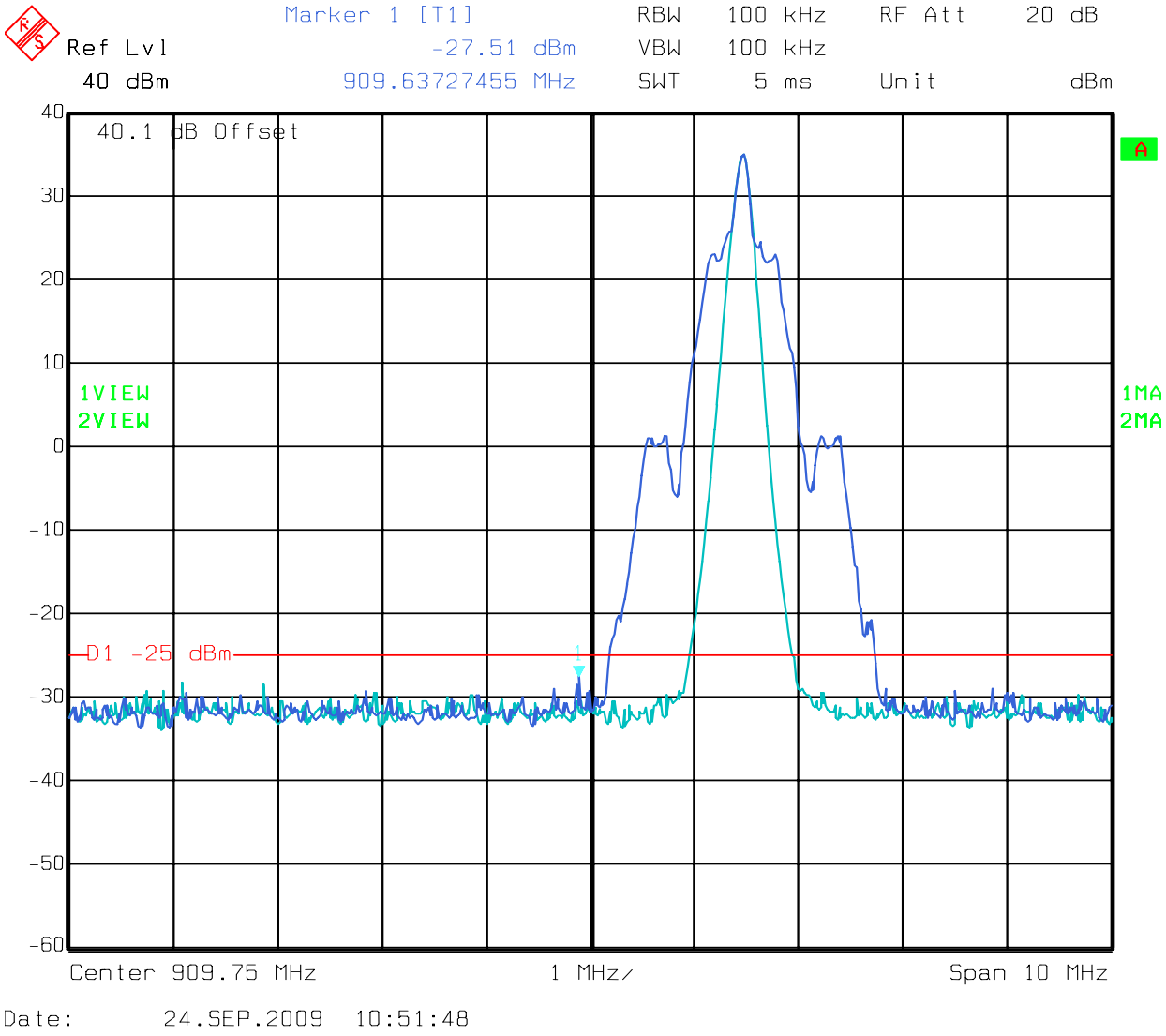


Test Data – Spurious Emissions at Antenna Terminals

Mask K(3)(ii)
Highest Channel – Band 1
Upper Band Edge

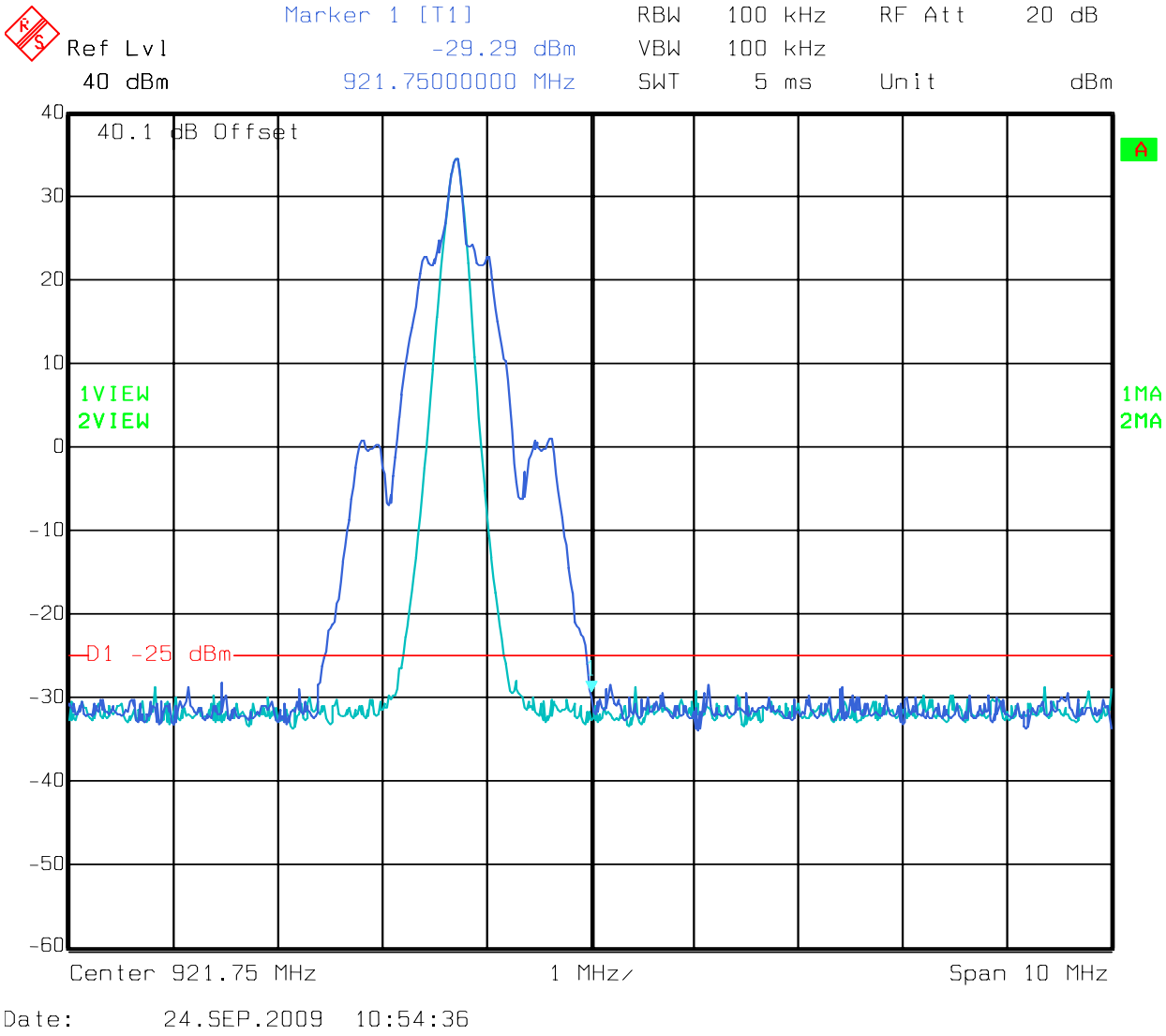


Lowest Channel – Band 2
Lower Band Edge
Light Blue = C1G2 modulation mode
Dark Blue = Title 21 modulation mode



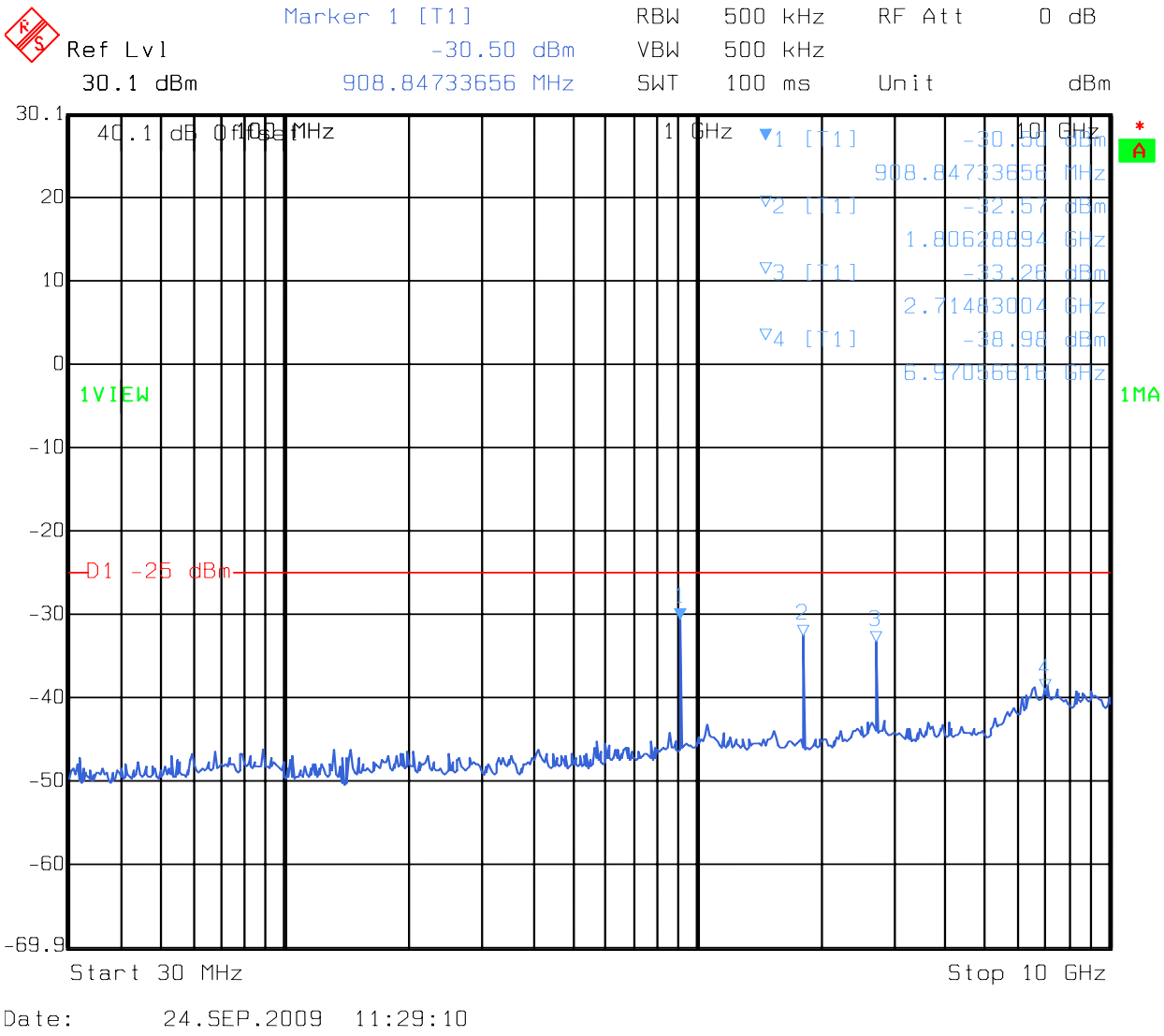
Test Data – Spurious Emissions at Antenna Terminals

Mask K(3)(ii)
Highest Channel – Band 2
Upper Band Edge
Light Blue = C1G2 modulation mode
Dark Blue = Title 21 modulation mode



Test Data – Spurious Emissions at Antenna Terminals

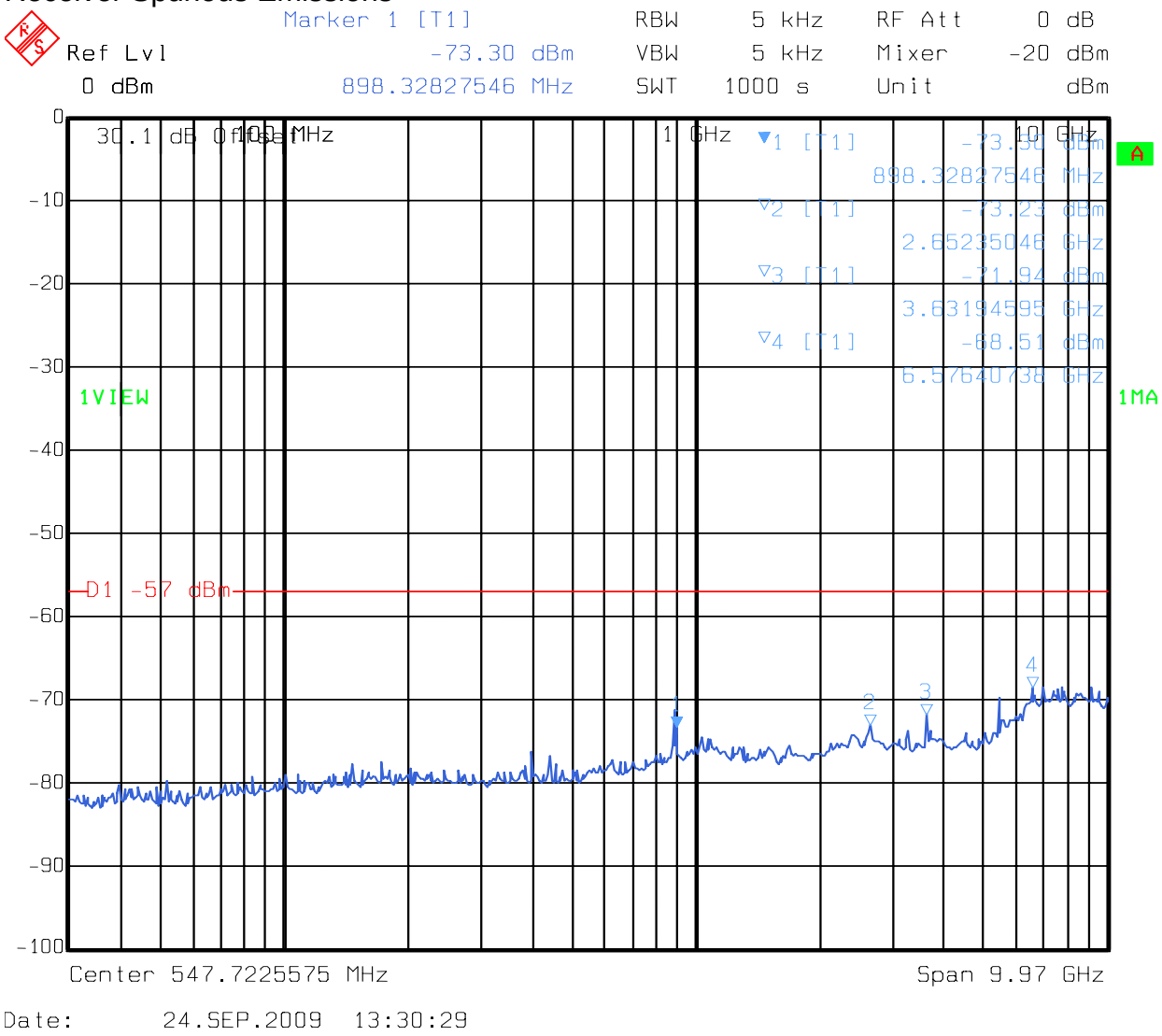
Mask K(3)(ii)



Marker 1 indicates carrier (notched). Marker 2 indicates highest spurious emission level.

Signal substitution measurement:
1806.28894 MHz: Measured substitution level = -27.5 dBm
2714.83004 MHz: Measured substitution level = -32.7 dBm
6970.56618 MHz: Measured substitution level = -37.9 dBm

Receiver Spurious Emissions



Section 6. Field Strength of Spurious Emissions

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 90.210
TESTED BY: T. Tidwell	DATE: 24 September 2009

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: 993-1484-1485-791-1016

Test Conditions:

Temperature: 23^{O}C

Relative Humidity: 36%

Test Data

ERP Substitution Method

Page 1 of 1 Complete X
Job No.: 30828 Date: 24 Sept. 2009 Preliminary
Specification: Temperature(°C): 23
Tested By: Tom Tidwell Relative Humidity(%) 36
E.U.T.:
Configuration: Transmit full power on center channel into a 50 ohm load
Sample No: 1
Location: AC 1 RBW: 1 MHz Measurement
Detector Type: Peak VBW: 1 MHz Distance: 3 m

Measurement Uncertainty: +/-3.6 dB

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.

Photographs of Test Setup

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 90.213
TESTED BY: David Light	DATE: 17 January 2008

Test Results: Complies.

Measurement Data: See attached table.

Test Equipment Used: 1036 -1065-1604-1082-283-619

Test Data – Frequency Stability

Frequency Stability

Page 1 of 1

Job No.: 10230 Date: 1/17/2008

Specification: 90.213 Temperature(°C): 20

Tested By: David Light Relative Humidity(%) 30

E.U.T.: 900 MHz Reader

Configuration: Tx center band

Sample Number: 1

Test Equipment Used

Antenna:

Pre-Amp:

Filter:

Receiver: 1036

Attenuator #1 1065

Attenuator #2: 1604

Thermometer 619

Cable #1: 1082

Cable #2:

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

Standard Test Frequency 915.467000 MHz

Temp (^{O}C)	Measured Frequency (MHz)		Tes Voltage	Freqeuncy Error (Hz)	Limit (+/-Hz)	Error (ppm)	Comment
20	915.467000		120	0	NA	0	
20	915.467000		102.0	0	NA	0.0	
20	915.467000		138.0	0	NA	0.0	
50	915.467480		120	480	NA	0.5	
40	915.467000		120	0	NA	0.0	
30	915.466120		120	-880	NA	-1.0	
10	915.466960		120.0	-40	NA	0.0	
0	915.466680		120.0	-320	NA	-0.3	
-10	915.466480		120.0	-520	NA	-0.6	
-20	915.466120		120	-880	NA	-1.0	
-30	915.465480		120	-1520	NA	-1.7	

Notes:

Section 8. Test Equipment List

Nemko ID	Description	Manufacturer Model	Serial	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	01/19/09	01/20/11
1627	CABLE, 5	MEGAPHASE 10312 1GVT4	N/A	CBU	N/A
1604	20 dB	NARDA 776B-20	NONE	CBU	N/A
1474	20dB Attenuator DC 18	MCL Inc. BW-S20W2	NONE	CBU	N/A
1763	Bilog Antenna	Schaffner CBL 6111D	22926	11/04/08	11/04/09
993	Horn antenna	A.H. Systems SAS-200/571	XXX	09/09/09	09/09/10
1484	Cable	Storm PR90-010-072	N/A	06/23/09	06/23/10
1485	Cable	Storm PR90-010-216	N/A	06/23/09	06/23/10
791	PREAMP, 25dB	Nemko USA, Inc. LNA2	398	05/28/09	05/28/10
1016	Pre-Amp	HEWLETT PACKARD 8449	2749A00159	06/23/09	06/23/10
1065	10 dB ATTENUATOR	NARDA 776B-10	NONE	CBU	N/A
1082	CABLE	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
283	Environmental Chamber with controller # 1189006	ENVIROTRONICS SH27 & 2030-	129010083	08/20/08	08/20/09
619	THERMOMETER	FLUKE 51	4520028	04/20/09	04/20/10
1404	Dipole	EMCO 3121	9701-1256	06/21/09	06/20/10
1033	Horn	EMCO 311	8812-3035	09/09/08	09/10/10

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**

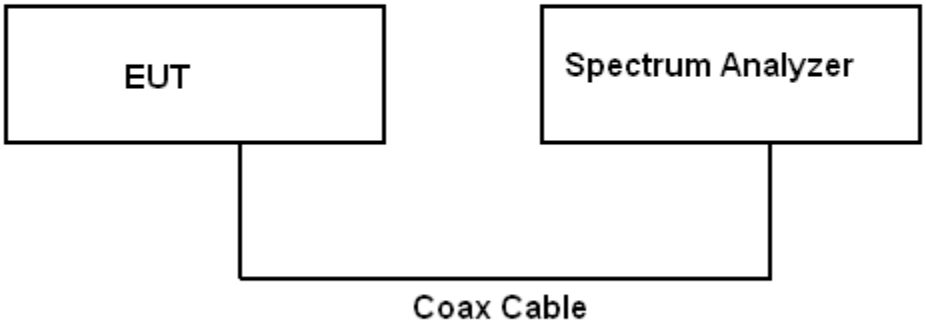
Minimum Standard: Para. No. 990.213. The transmitter carrier frequency shall remain within the assigned frequency below in ppm.

Table 2

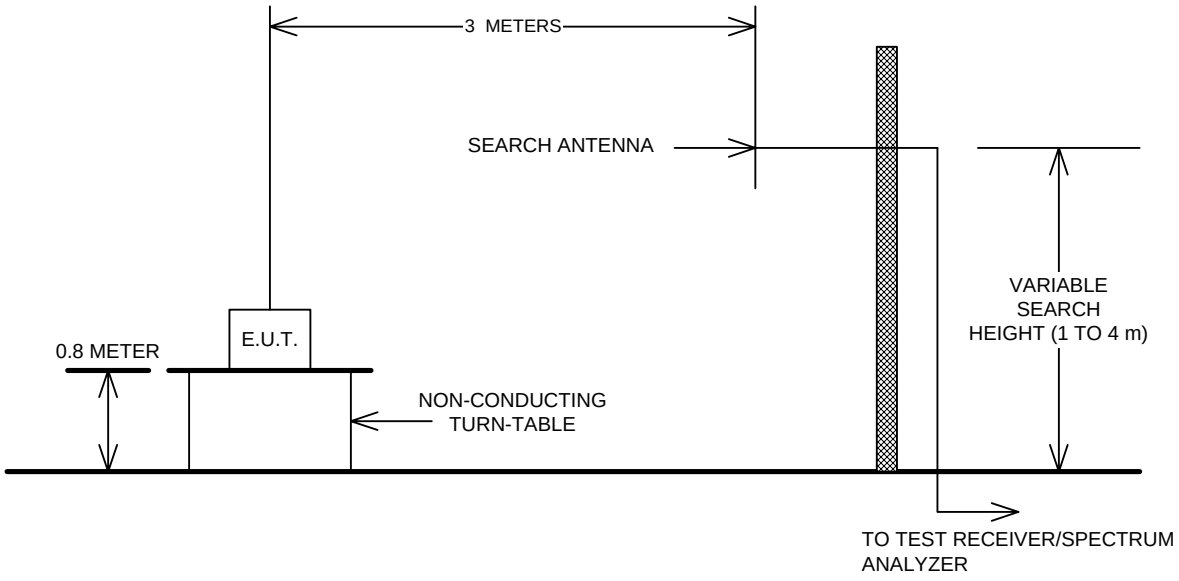
Frequency Band (MHz)	Fixed And Base Stations	Mobile Stations	
		> 2 Watts o/p pwr	< 2 Watts o/p pwr
Below 25	100	100	200
25 - 50	20	20	50
72 - 76	5	-	50
150 - 174	5	5	5
220 - 222	0.1	1.5	1.5
421 - 512	2.5	5	5
806 - 821	1.5	2.5	2.5
821 - 824	1.0	1.5	15
851 - 866	1.5	2.5	2.5
866 - 869	1.0	1.5	1.5
869 - 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