



Nemko Test Report: 32941RUS2

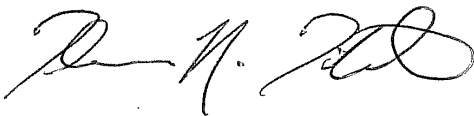
Applicant: Sirit Technologies, Inc.
1321 Valwood Parkway
Suite 620
Carrollton, Texas 75006

Equipment Under Test: ID6300 PCMCIA RFID Reader Card
(E.U.T.)

In Accordance With: **FCC Part 15, Subpart C, 15.247 and Industry
Canada RSS 210, Issue 7**

Frequency Hopping Transmitters

Tested By: Nemko USA Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

TESTED BY: 
Tom Tidwell, Telecom Direct

DATE: 30 September 2009

APPROVED BY: 
David Light, Senior Wireless Engineer

DATE: 01 October 2009

Total Number of Pages: 44

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Section 1. Summary of Test Results

Applicant: Sirit Technologies, Inc.

Model No.: ID6300

Serial No.: 53035080448

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 and RSS 210, Issue 7 for Frequency Hopping Spread Spectrum devices. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC and with Industry Canada.



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.

See "Summary of Test Data".



NVLAP Lab Code 100426-0

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Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207(a), RSS GEN	Complies
Channel Separation	15.247(a)(1), RSS 210 A8.1	Complies
Time of Occupancy	15.247(a)(1), RSS 210 A8.1	Complies
20 dB Occupied Bandwidth	15.247(a)(1), RSS 210 A8.1	Complies
Peak Power Output	15.247(b), RSS 210 A8.4	Complies
Spurious Emissions (Conducted)	15.247(d), RSS 210 A8.5	Complies
Spurious Emissions (Radiated)	15.247(d), RSS 210 2.1	Complies
Receiver Spurious Emissions	RSS GEN	Complies

Footnotes:

Section 2. Equipment Under Test (E.U.T.)**General Equipment Information**

Frequency Band:	☒ 902 – 928 MHz
Operating Frequency Range:	902.75 – 927.25 MHz
Number of Channels:	50 in both C1G2 mode and Title 21 mode
Channel Spacing:	500 kHz
User Frequency Adjustment:	Software controlled

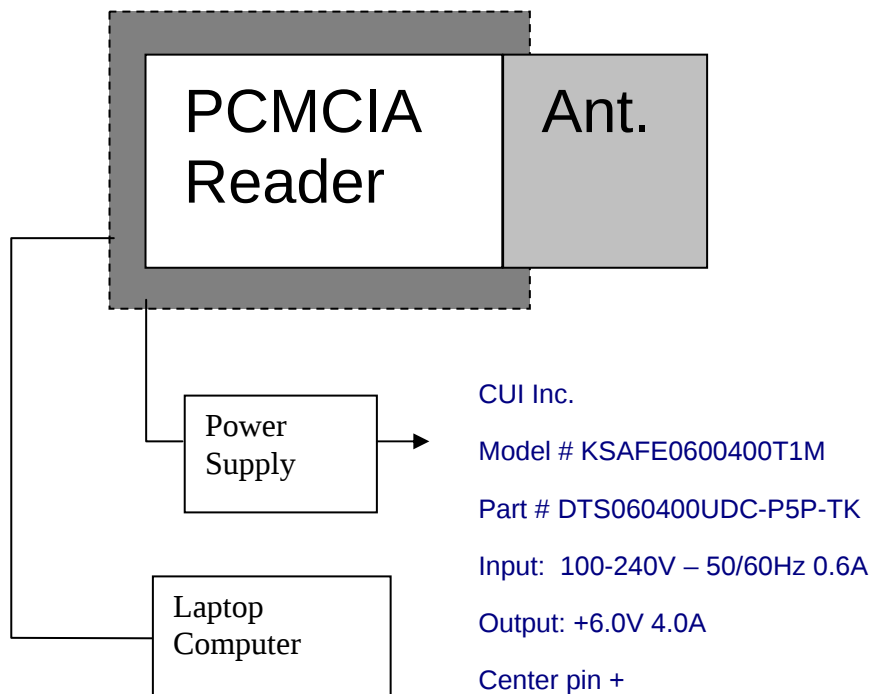
The radio operates in either C1G2 mode or Title 21 mode, depending on the type of tag that has been deployed. The difference between these two modes is the modulation bandwidth.

Description of EUT

The ID6300 UHF RFID reader module operating at 902-928 MHz frequency band is designed to operate in compliance with the FCC Part 15 regulations and offers superior RFID performance for both EPC Class1 Generation 2 (C1G2, ISO18000-6C) and CalTrans Title 21 toll tags. The PCMCIA frequency hopping spectrum device completes RFID transactions in a localized zone typically less than 2M. A low, 50mA (0.25W), quiescent current ensures minimal battery consumption, and a frugal transmit-chain design allows the ID6300 to remain battery efficient while reading tags.

The reader includes the RFID radio and digital circuitry and is ready to integrate with a host processor. The host communicates with the ID6300 by a high-level API command set, enabling customers to control RF output power and antenna selection per command according to their application requirements. The EUT was tested in a standalone PCMCIA interface jig.

System Diagram



Section 3. Channel Separation and Occupied BW

NAME OF TEST: Channel Separation	15.247(a)(1) RSS 210, A8.1
TESTED BY: T. Tidwell	DATE: 27 August 2009

Test Results: Complies.

Measurement Data: See 20 dB BW plot

Measured 20 dB bandwidth: 178 kHz for C1G2 mode
309.6 kHz for Title 21 mode
Channel Separation: 500 kHz

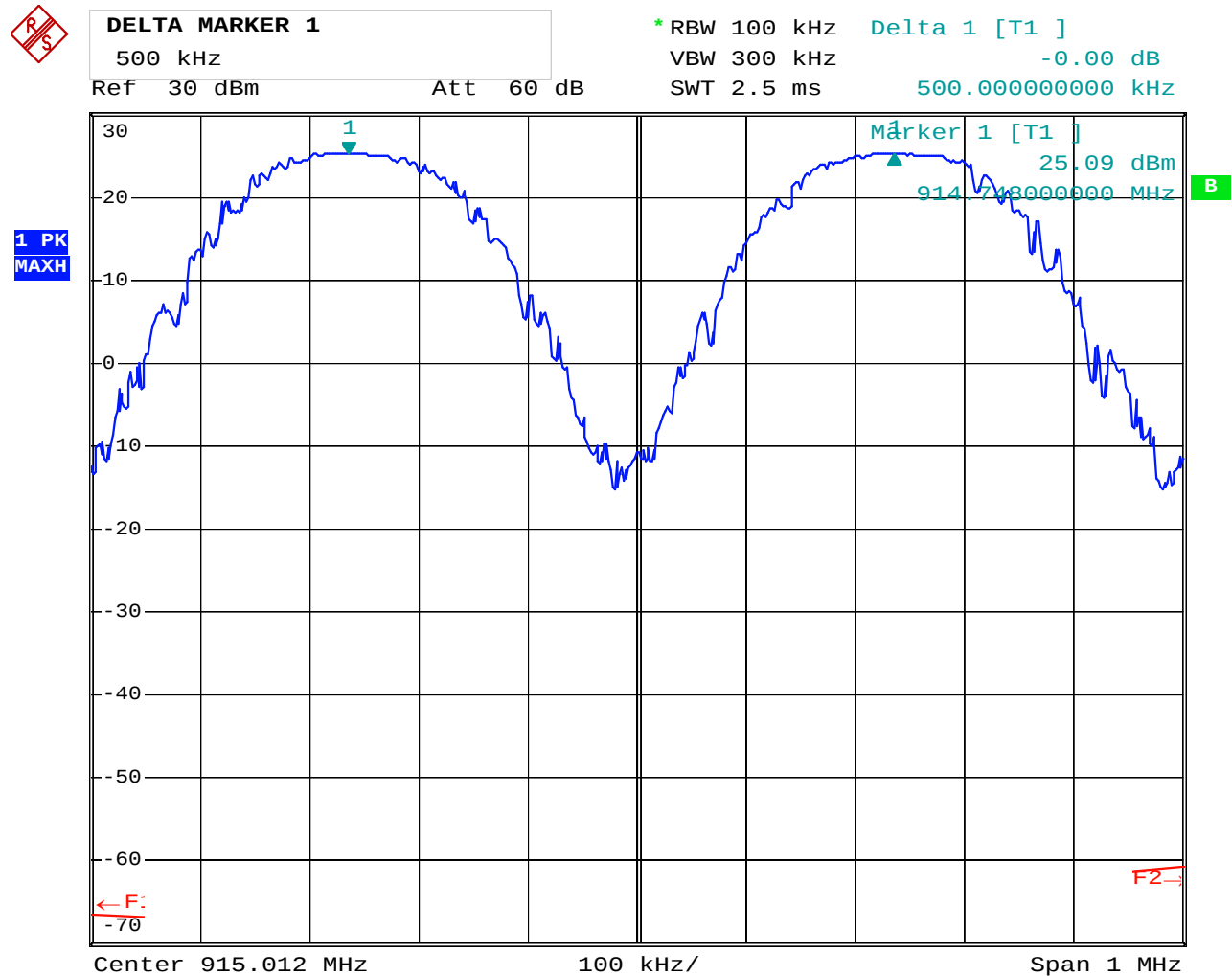
Equipment Used: 1659, 1036, 1627, 1064

Measurement Uncertainty: 1×10^{-7} ppm

Temperature: 23 °C

Relative Humidity: 32 %

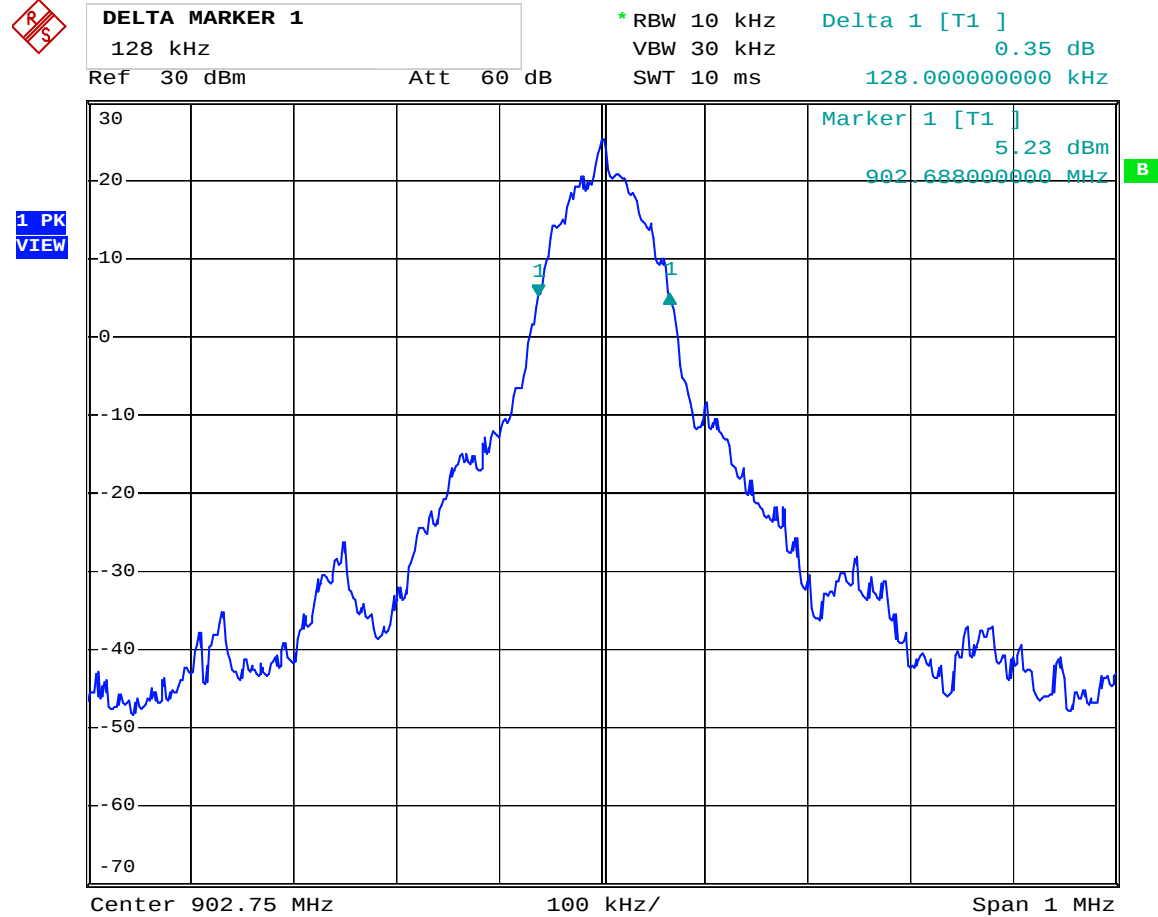
Test Data – Channel Separation



Date: 27.AUG.2009 12:16:45

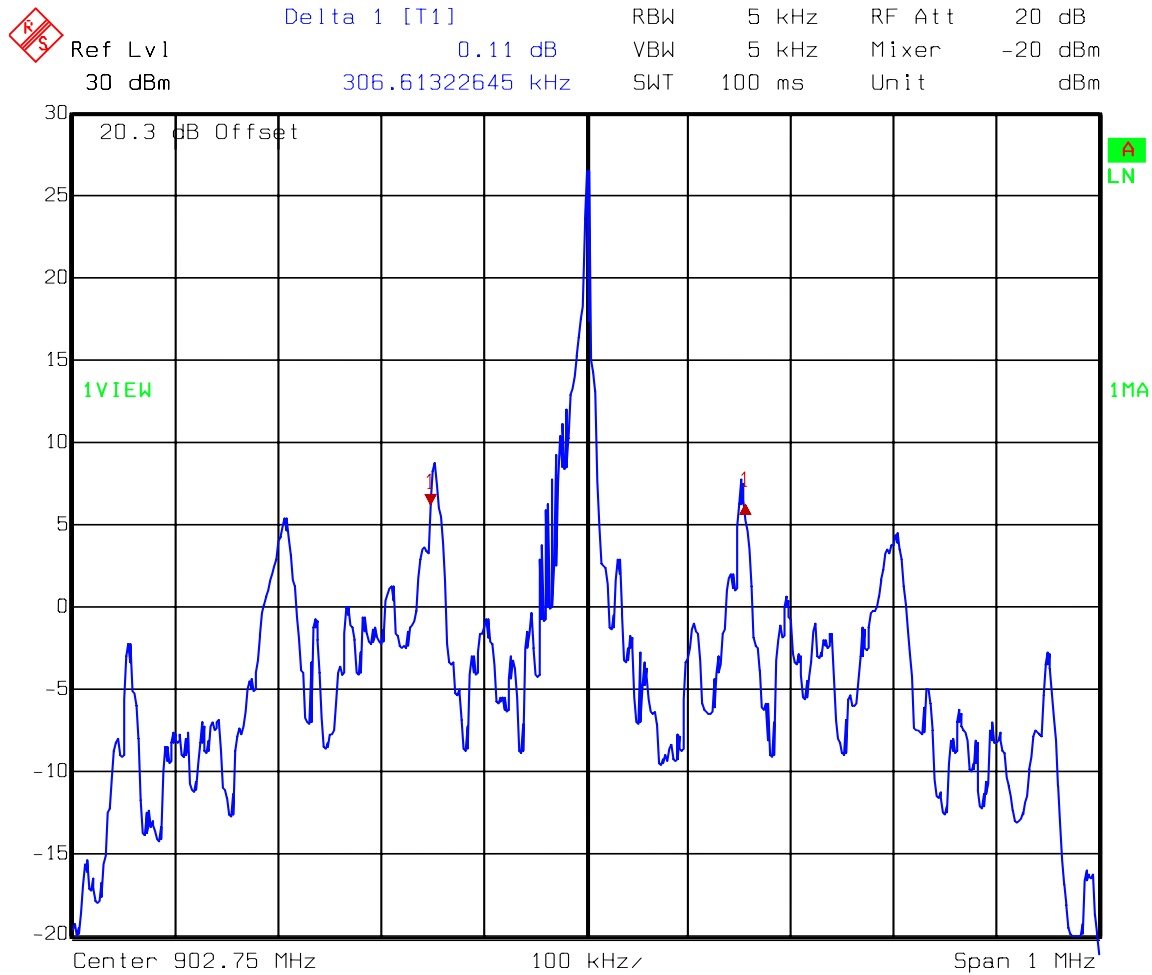
Test Data – 20 dB Bandwidth

Low Channel



Date: 27.AUG.2009 12:42:28

C1G2 mode

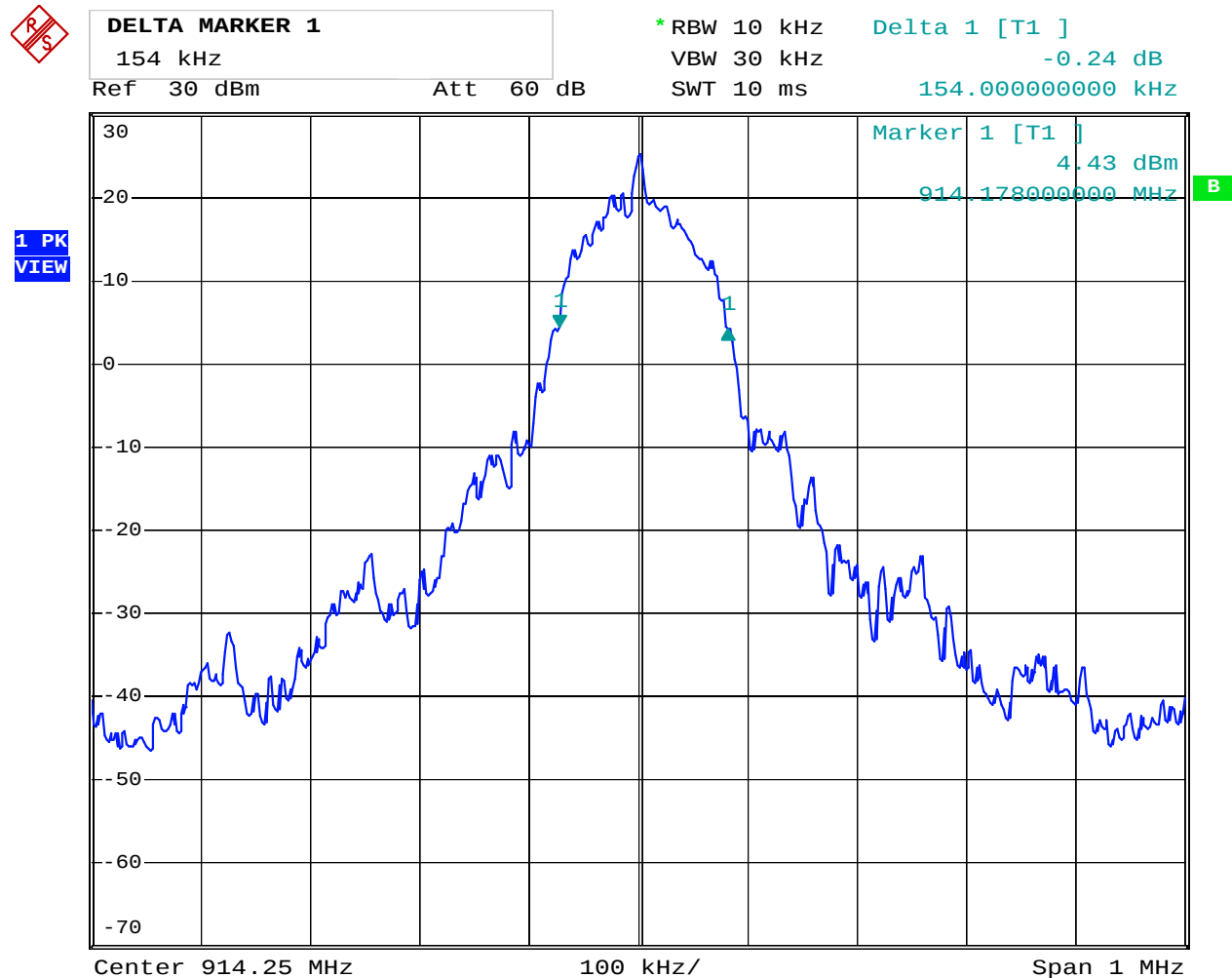


Date: 18.SEP.2009 10:37:08

Title 21 mode

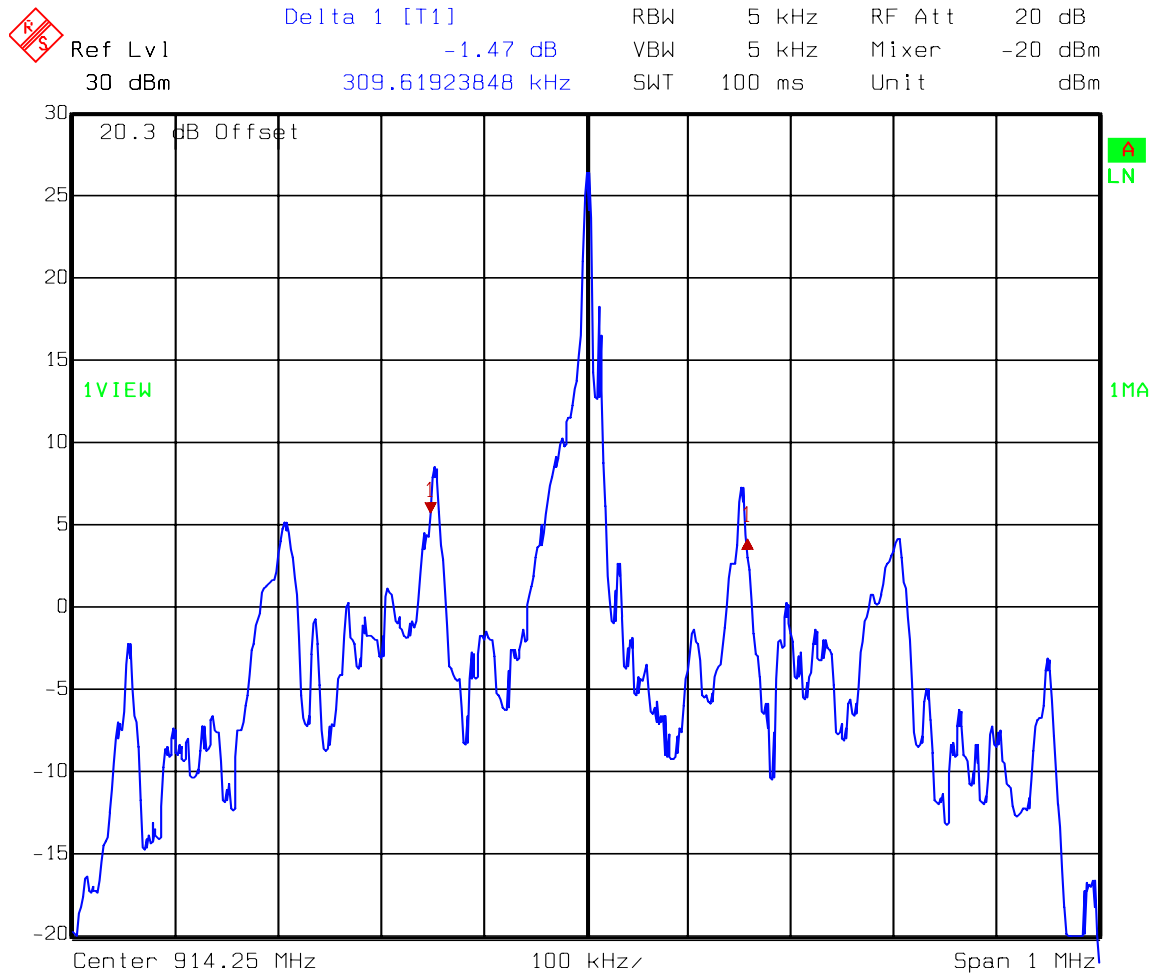
Test Data – 20 dB Bandwidth

Mid Channel



Date: 27.AUG.2009 12:46:29

C1G2 mode



Date: 18.SEP.2009 10:32:24

Title 21 mode

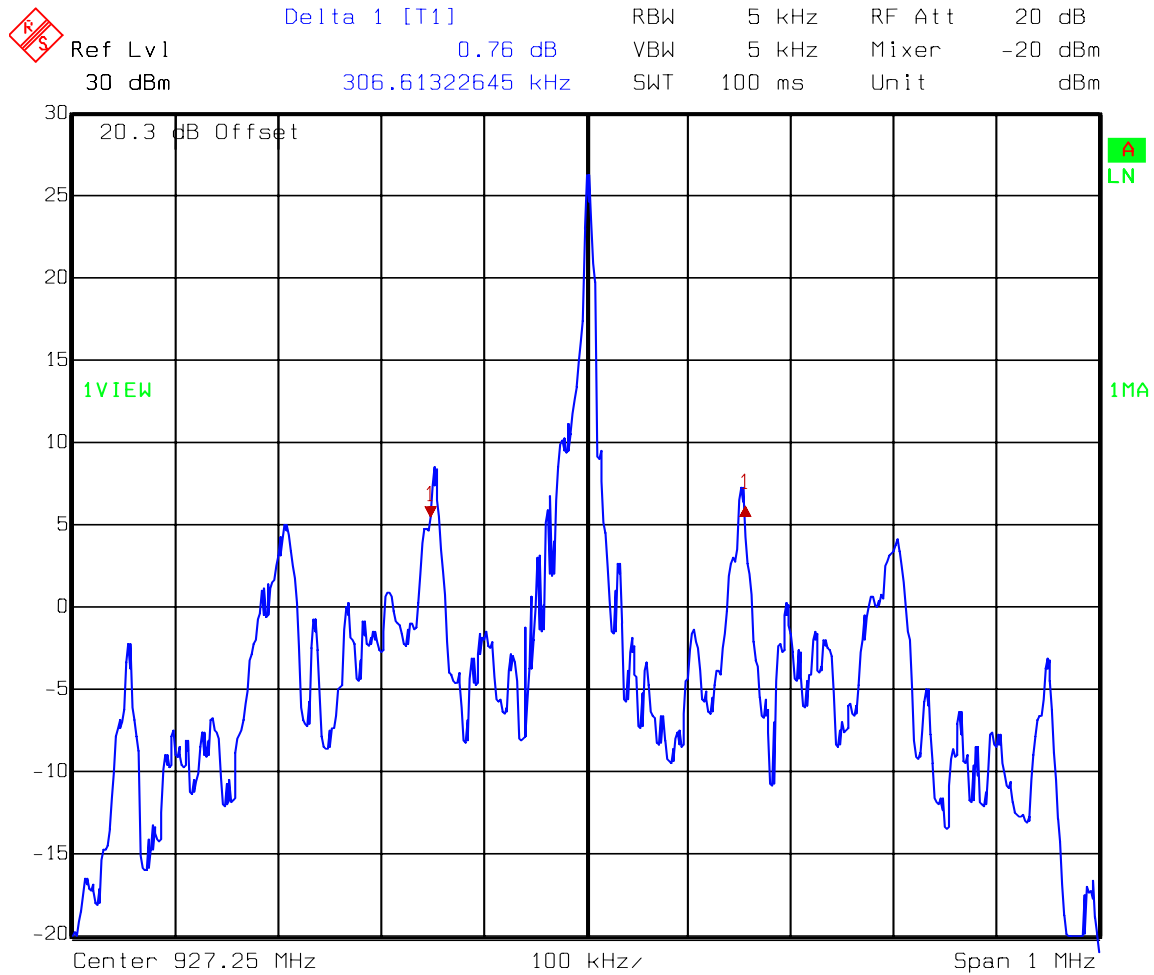
Test Data – 20 dB Bandwidth

High Channel



Date: 27.AUG.2009 12:47:35

C1G2 mode



Date: 18.SEP.2009 10:38:55

Title 21 mode

Section 4. Time of Occupancy

NAME OF TEST: Time of Occupancy	15.247(a)(1) RSS 210, A8.1
TESTED BY: T. Tidwell	DATE: 18 September 2009

Test Results: Complies.

Measurement Data:

Maximum Dwell Time On Any Channel: 211.82 msec. in 20 sec.

Equipment Used: 1659, 1036, 1627, 1064

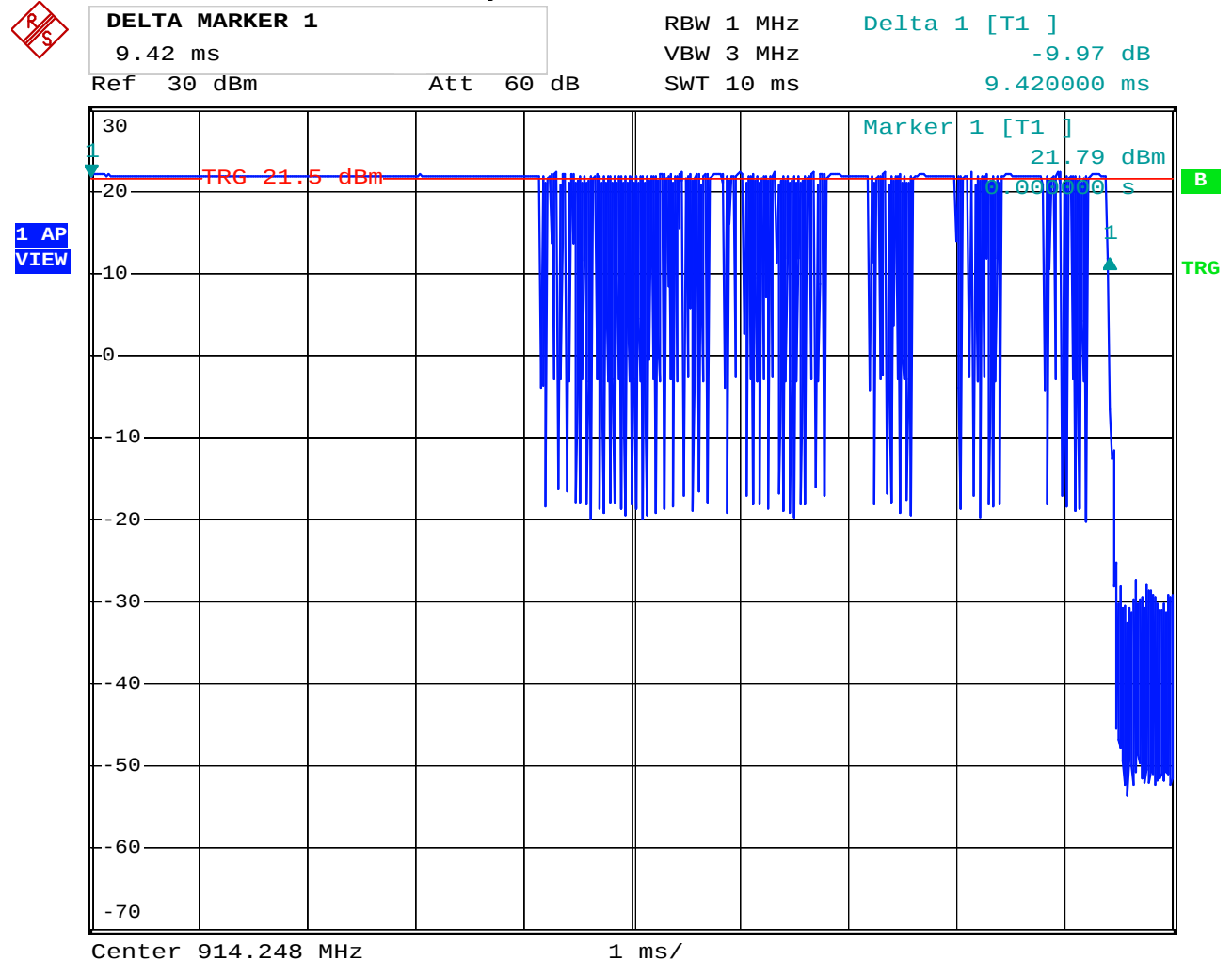
Measurement Uncertainty: 1×10^{-7} ppm

Temperature: 23 °C

Relative Humidity: 32 %

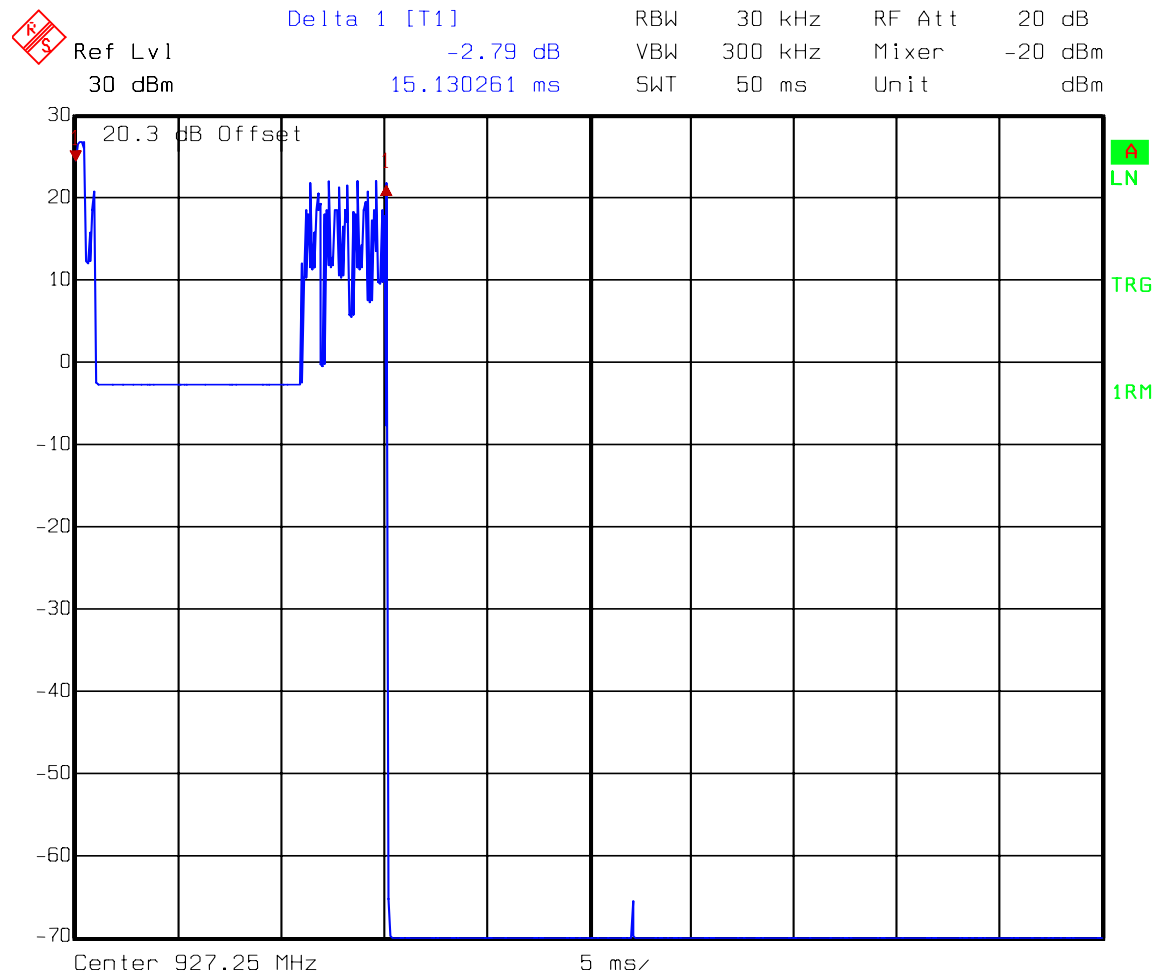
Test Data – Time of Occupancy

Transmit duration for one transmit cycle



Date: 27.AUG.2009 12:28:06

C1G2 mode – duration of one channel dwell



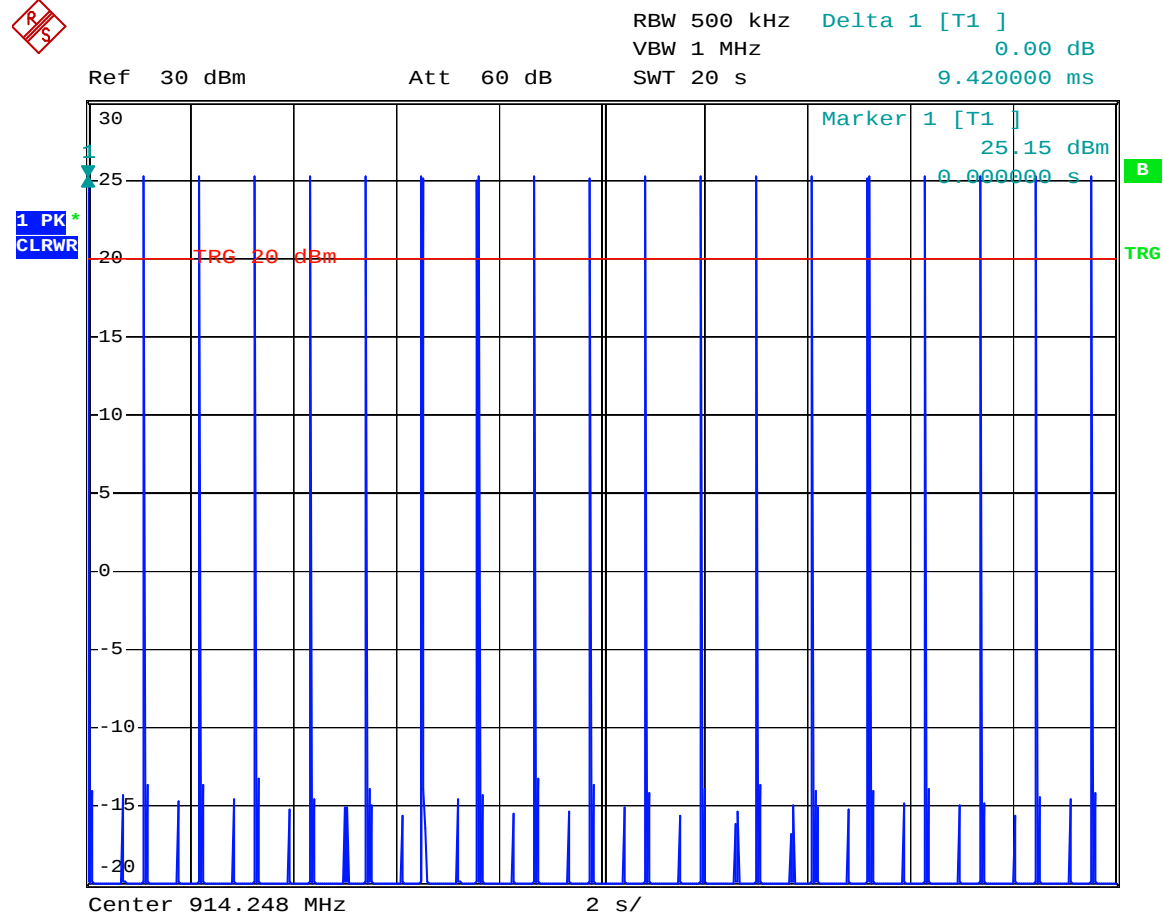
Date: 18.SEP.2009 10:44:31

Title 21 mode – duration of one channel dwell

15.13 msec. x 14 = 211.82 msec. in 20 sec.

Test Data – Time of Occupancy

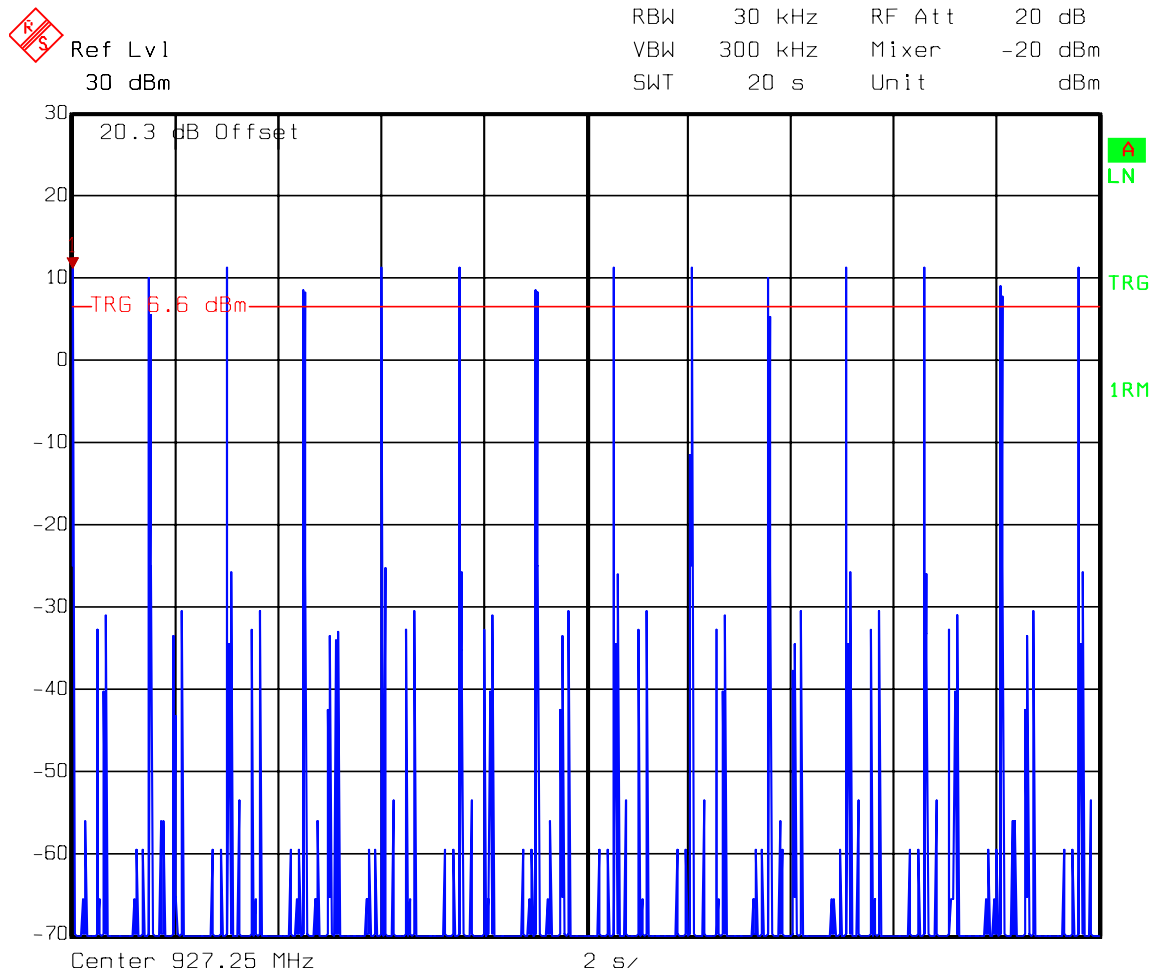
Number of transmissions in 20 seconds



Date: 27.AUG.2009 12:36:17

C1G2 mode

 $9.42 \text{ msec.} \times 19 = 179 \text{ msec. in 20 sec.}$



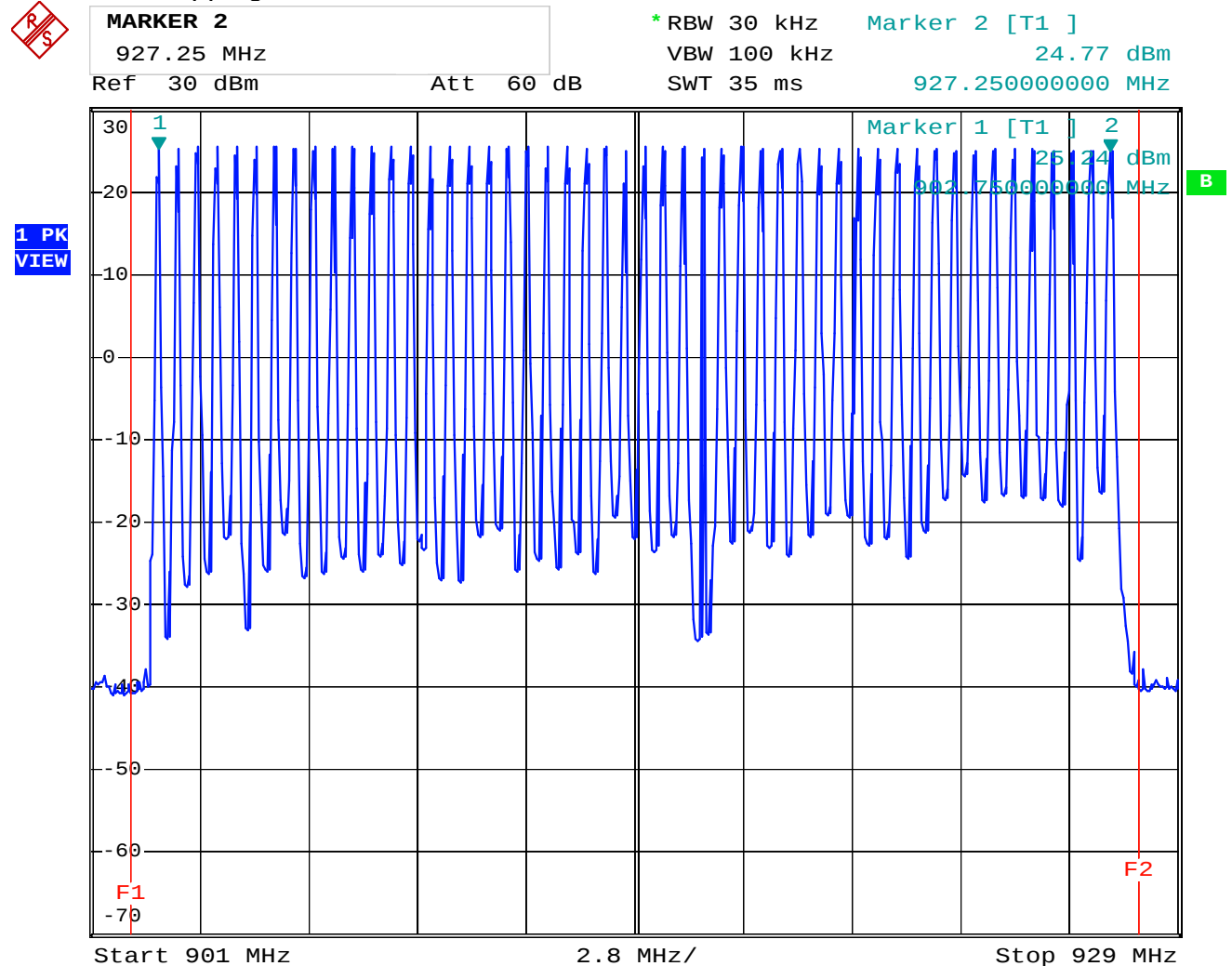
Date: 18.SEP.2009 10:51:11

Title 21 mode

 $15.13 \text{ msec.} \times 14 = 211.82 \text{ msec. in 20 sec.}$

Test Data –

Number of hopping channels = 50



Date: 27.AUG.2009 12:11:37

Note: C1G2 and Title 21 modes use the same number of channels

Section 6. Peak Power Output

NAME OF TEST: Peak Power Output	15.247 (b) RSS 210, A8.4
TESTED BY: T. Tidwell	DATE: 27 August 2009

Test Results: Complies.

Measurement Data: Spectrum analyzer RBW = 1 MHz, VBW = 1 MHz, Detector = Max. Peak

Detachable antenna? ☒ Yes ☐ No

If yes, state the type of non-standard connector used: MMCX

Additional antenna information: The antenna is constructed on a PCB and is attached with MMCX connectors to the PCMCIA card.

Frequency (MHz)	Peak Power (dBm)	Peak Power (W)	Antenna Type	Gain (dBi)	E.I.R.P. (dBm)	E.I.R.P. (W)
902.75 (C1G2)	26.9	.493	¼ wave dipole	2.14	29.04	.802
914.25 (C1G2)	26.8	.479	¼ wave dipole	2.14	28.94	.783
927.25 (C1G2)	26.8	.479	¼ wave dipole	2.14	28.94	.783
902.75 (Title 21)	26.9	.493	¼ wave dipole	2.14	29.04	.802
914.25 (Title 21)	26.8	.479	¼ wave dipole	2.14	28.94	.783
927.25 (Title 21)	26.8	.479	¼ wave dipole	2.14	28.94	.783
Maximum Conducted Power (W): .493						

☒ This device was tested at +/- 15% input power per 15.31(e), with no variation in output power.

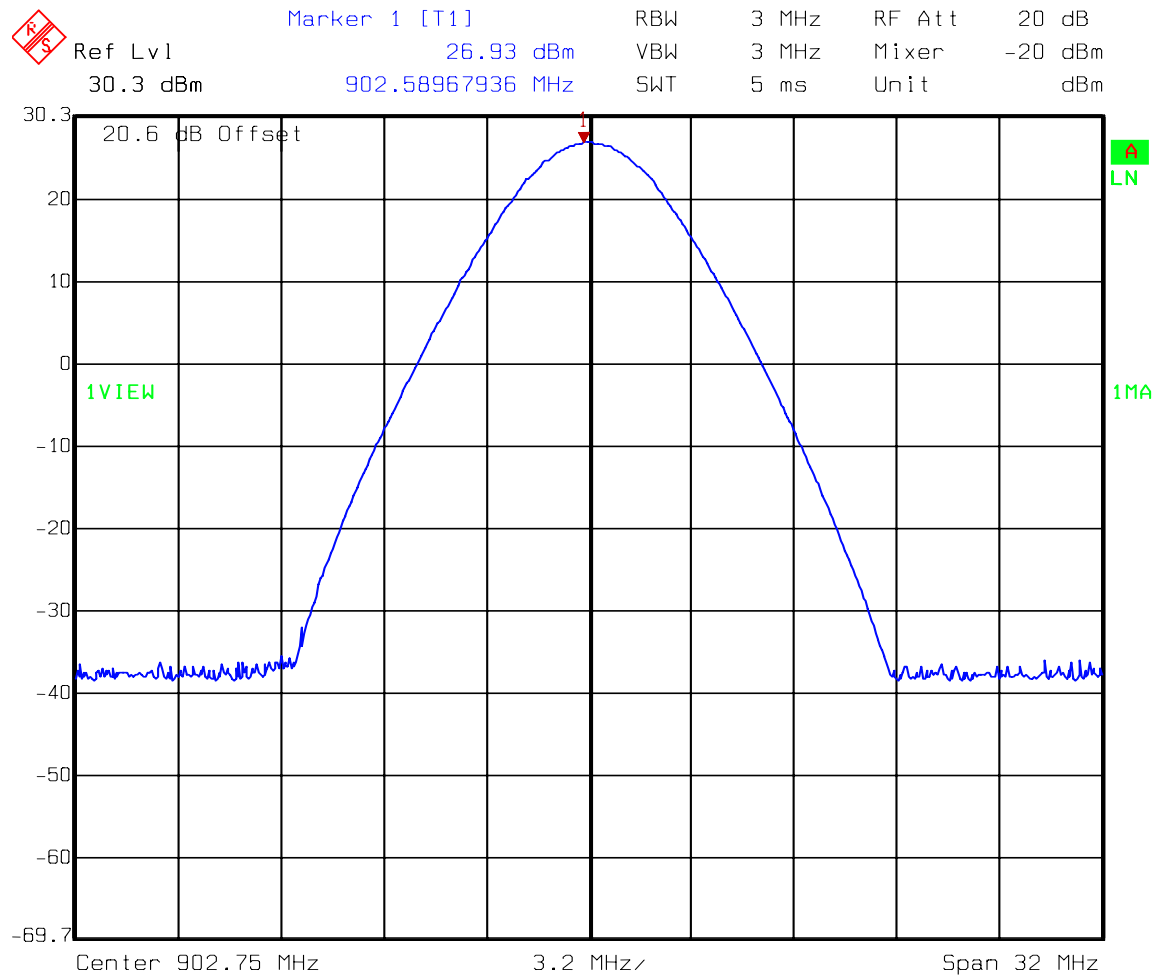
☒ The device was tested on three channels per 15.31(l).

Equipment Used: 1036, 1627, 1064

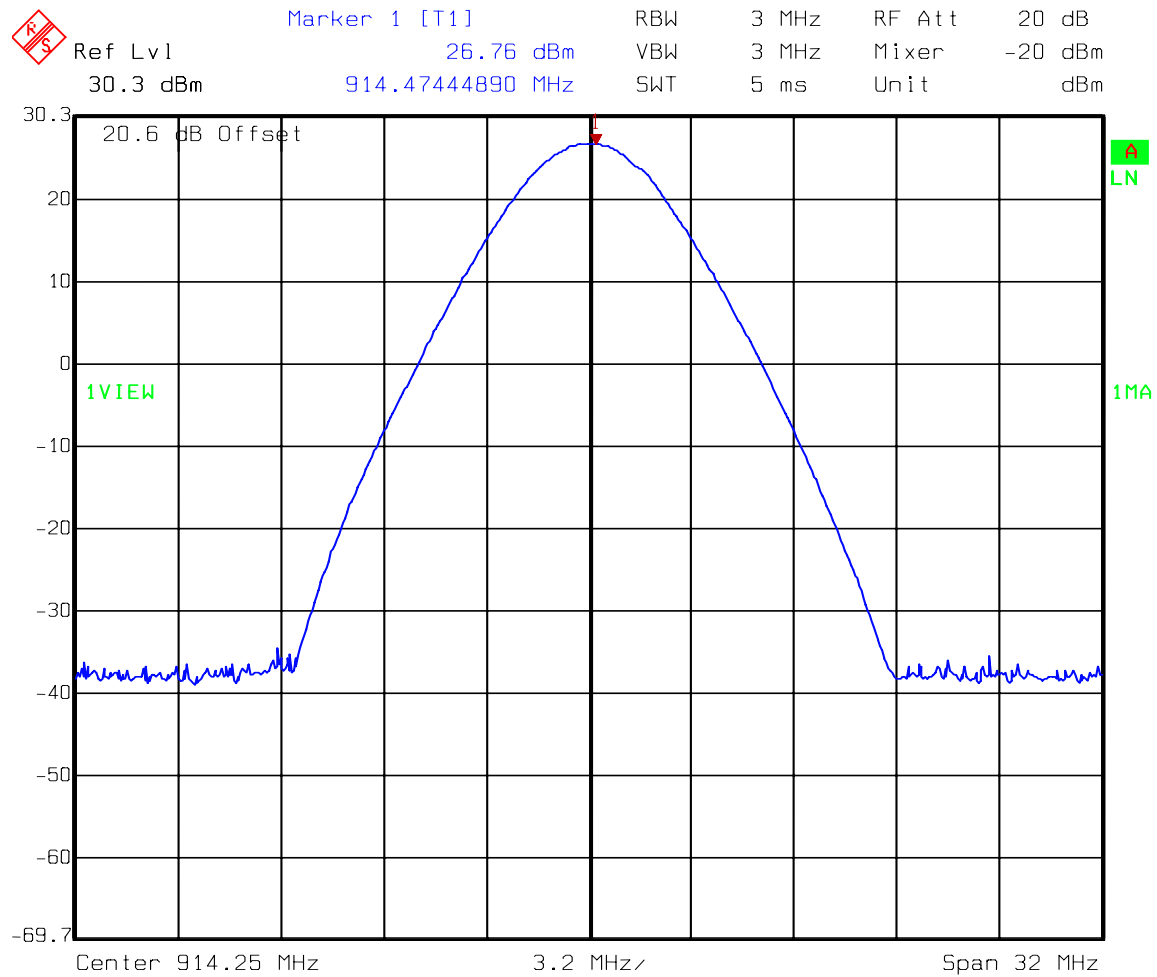
Measurement Uncertainty: 1.7 dB

Temperature: 23 °C

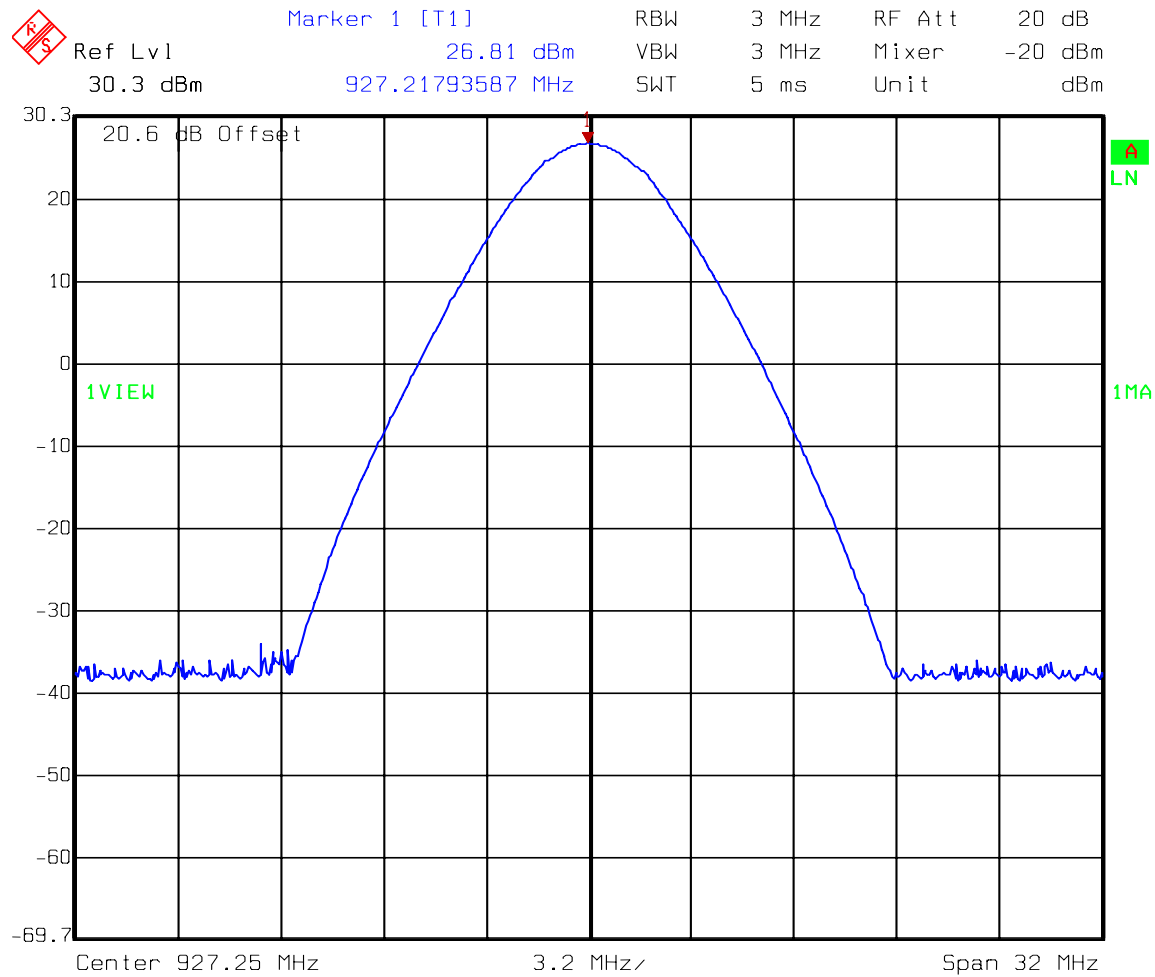
Relative Humidity: 32 %



Date: 18.SEP.2009 11:02:07



Date: 18.SEP.2009 11:00:18



Date: 18.SEP.2009 10:59:11

Section 6. Spurious Emissions (Antenna Conducted)

NAME OF TEST: Spurious Emissions (Antenna Conducted)	15.247(d) RSS 210, A8.5
TESTED BY: T. Tidwell	DATE: 27 August 2009

Test Results: Complies.

Measurement Data: See attached plots.

Equipment Used: 1464, 1627, 1064

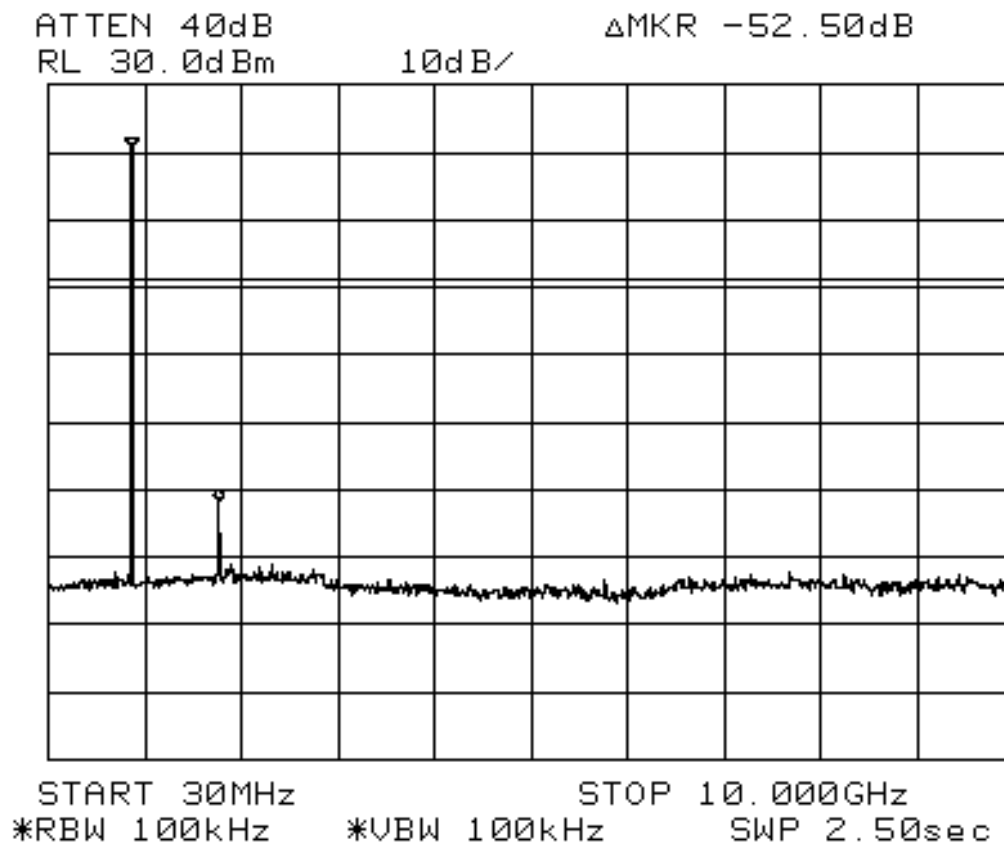
Measurement Uncertainty: 1X10⁻⁷ppm

Temperature: 23 °C

Relative Humidity: 36 %

Test Data – Spurious Emissions at Antenna Terminals

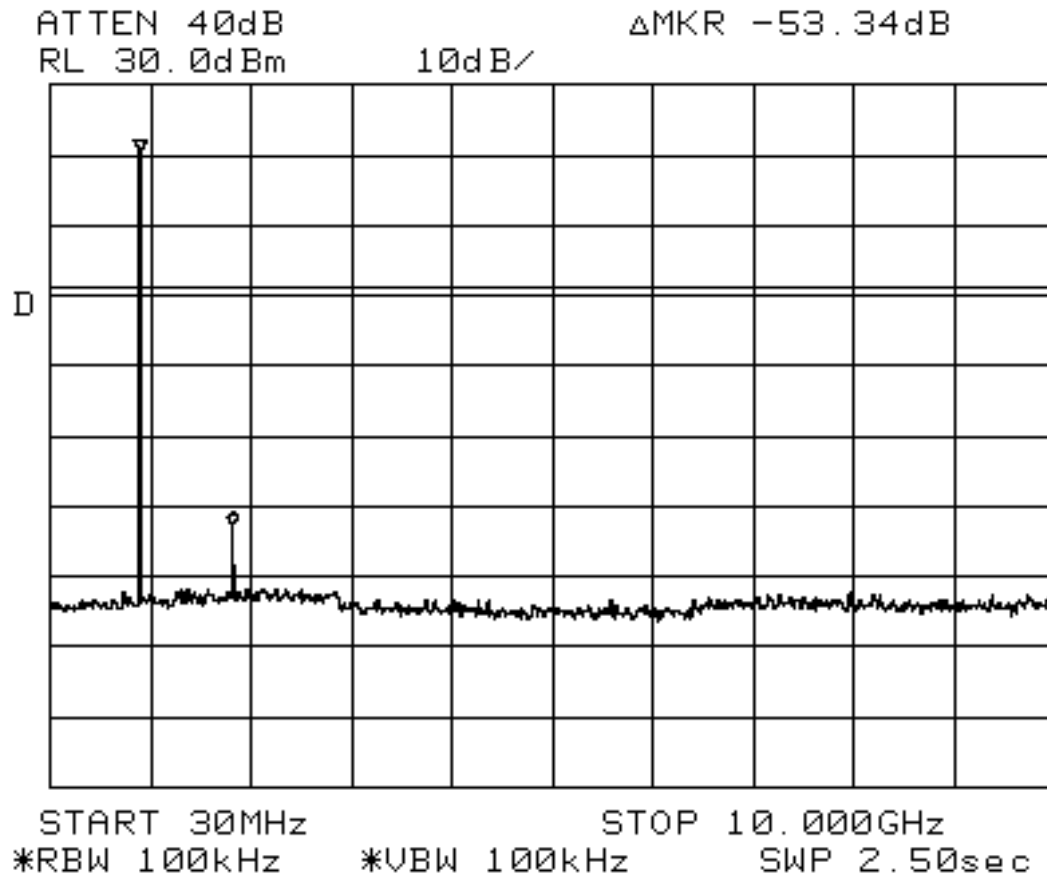
Spurs – Low Channel



902.75 MHz

Test Data – Spurious Emissions at Antenna Terminals

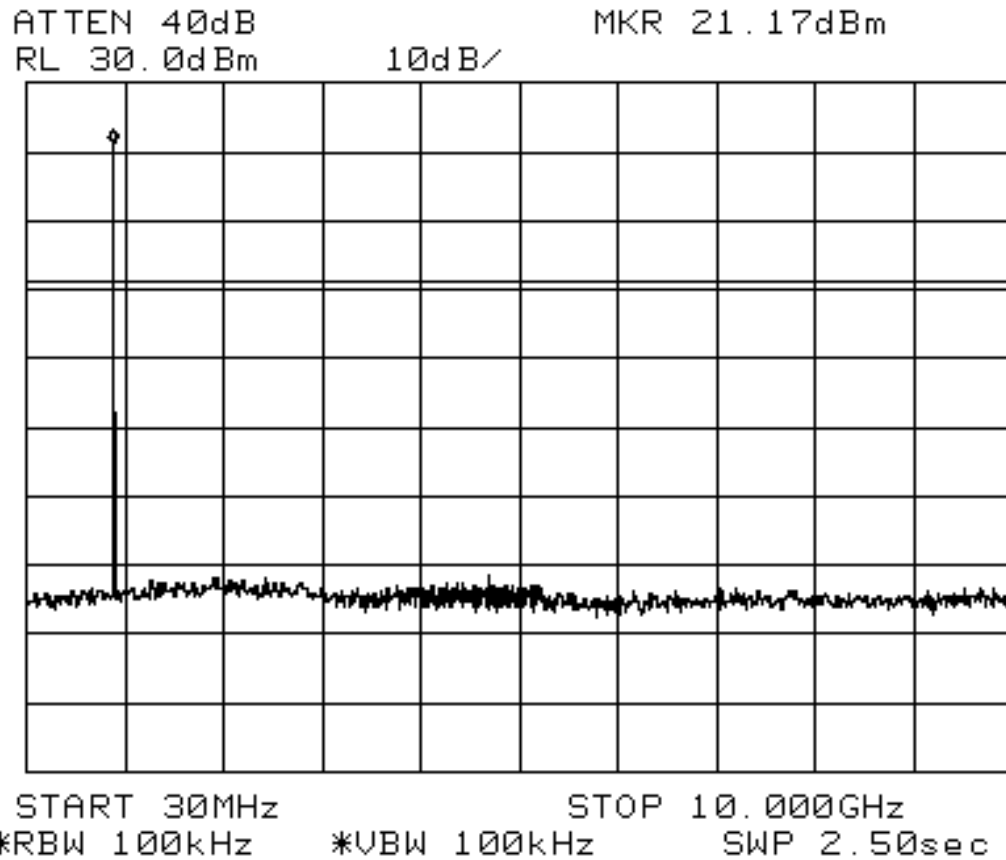
Spurs – Mid Channel



914.25 MHz

Test Data – Spurious Emissions at Antenna Terminals

Spurs – High Channel



927.25 MHz

Section 7. Spurious Emissions (Radiated)

NAME OF TEST: Spurious Emissions (Radiated)	15.247(d) RSS 210, para. 2.1
TESTED BY: T. Tidwell	DATE: 27 August 2009

Test Results: Complies. The worst case emission was 45.7 dB μ V/m at 3 m at 4514 MHz. This is 9.3 dB below the specification limit of 54 dB μ V/m.

Measurement Data: See attached table.

Duty Cycle Calculation: No duty cycle correction was used.

Notes:

- ☒ For handheld devices, the EUT was tested on three orthogonal axis'
- ☒ The device was tested from 30 MHz to the tenth harmonic of the highest fundamental frequency per 15.33
- ☒ The device was tested on three channels per 15.31(l).

Spectrum analyzer settings:

30 MHz to 1 GHz: RBW:100 kHz, VBW:100 kHz, Detector:Peak
Above 1 GHz (Peak): RBW:1 MHz, VBW:1 MHz, Detector:Peak
Above 1 GHz (Avg.): RBW:1 MHz, VBW 10 Hz, Detector: Peak

Equipment Used: 1016, 1464, 1484, 1485, 1480, 0993

Measurement Uncertainty: +/-3.6 dB

Temperature: 23 °C

Relative Humidity: 36 %

Test Data - Radiated Emissions

Low Channel

Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector / Polarity
1.806	33.0	28.5	2.2	31.5	32.2	74	54	Peak/Vertical
1.806	32.7	28.5	2.2	31.5	31.9		54	Peak/Horizontal
2.708	33.3	29.0	2.6	30.8	34.1	74		Peak/Vertical
2.708	32.2	29.0	2.6	30.8	33.0		54	Avg/Vertical
3.611	45.7	29.8	3.1	31.7	46.9	74		Peak/Vertical
3.611	38.5	29.8	3.1	31.7	39.7		54	Avg/Vertical
3.611	45.0	29.8	3.1	31.7	46.2	74		Peak/Horizontal
3.611	39.0	29.8	3.1	31.7	40.2		54	Avg/Horizontal
4.514	44.7	32.2	3.5	30.7	49.7	74		Peak/Vertical
4.514	35.2	32.2	3.5	30.7	40.2		54	Avg/Vertical
4.514	45.0	32.2	3.5	30.7	50.0	74		Peak/Horizontal
4.514	40.7	32.2	3.5	30.7	45.7		54	Avg/Horizontal
5.417	34.0	33.8	3.8	30.3	41.3	74		Peak/Vertical
5.417	33.0	33.8	3.8	30.3	40.3		54	Avg/Vertical
5.417	38.7	33.8	3.8	30.3	46.0			Peak/Horizontal
5.417	33.7	33.8	3.8	30.3	41.0			Avg/Horizontal
9.928	34.0	37.4	5.7	33.2	43.9	74		Peak/Vertical
9.928	30.5	37.4	5.7	33.2	40.4		54	Avg/Vertical

Test Data - Radiated Emissions

Mid Channel

Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector / Polarity
1.830	33.0	28.5	2.2	31.5	32.2	74	54	Peak/Vertical
1.830	32.7	28.5	2.2	31.5	31.9		54	Peak/Horizontal
2.744	33.3	29.0	2.6	30.8	34.1	74		Peak/Vertical
2.744	32.2	29.0	2.6	30.8	33.0		54	Avg/Vertical
3.659	45.7	29.8	3.1	31.7	46.9	74		Peak/Vertical
3.659	38.5	29.8	3.1	31.7	39.7		54	Avg/Vertical
3.659	45.0	29.8	3.1	31.7	46.2	74		Peak/Horizontal
3.659	39.0	29.8	3.1	31.7	40.2		54	Avg/Horizontal
4.574	44.7	32.2	3.5	30.7	49.7	74		Peak/Vertical
4.574	35.2	32.2	3.5	30.7	40.2		54	Avg/Vertical
4.574	45.0	32.2	3.5	30.7	50.0	74		Peak/Horizontal
4.574	40.7	32.2	3.5	30.7	45.7		54	Avg/Horizontal
5.489	34.0	33.8	3.8	30.3	41.3	74		Peak/Vertical
5.489	33.0	33.8	3.8	30.3	40.3		54	Avg/Vertical
5.489	38.7	33.8	3.8	30.3	46.0			Peak/Horizontal
5.489	33.7	33.8	3.8	30.3	41.0			Avg/Horizontal
9.148	34.0	37.4	5.5	33.2	43.7	74		Peak/Vertical
9.148	30.5	37.4	5.5	33.2	40.2		54	Avg/Vertical

Test Data - Radiated Emissions

High Channel

Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector / Polarity
1.855	33.0	28.5	2.2	31.5	32.2	74	54	Peak/Vertical
1.855	32.7	28.5	2.2	31.5	31.9		54	Peak/Horizontal
2.782	33.3	29.0	2.6	30.8	34.1	74		Peak/Vertical
2.782	32.2	29.0	2.6	30.8	33.0		54	Avg/Vertical
3.709	45.7	29.8	3.1	31.7	46.9	74		Peak/Vertical
3.709	38.5	29.8	3.1	31.7	39.7		54	Avg/Vertical
3.709	45.0	29.8	3.1	31.7	46.2	74		Peak/Horizontal
3.709	39.0	29.8	3.1	31.7	40.2		54	Avg/Horizontal
4.636	41.7	32.2	3.6	30.7	46.8	74		Peak/Vertical
4.636	35.2	32.2	3.6	30.7	40.3		54	Avg/Vertical
4.636	43.8	32.2	3.6	30.7	48.9	74		Peak/Horizontal
4.636	40.1	32.2	3.6	30.7	45.2		54	Avg/Horizontal
5.564	34.0	33.8	3.7	30.3	41.2	74		Peak/Vertical
5.564	33.0	33.8	3.7	30.3	40.2		54	Avg/Vertical
5.564	38.7	33.8	3.7	30.3	45.9			Peak/Horizontal
5.564	33.7	33.8	3.7	30.3	40.9			Avg/Horizontal
9.273	34.0	37.4	6.1	33.2	44.3	74		Peak/Vertical
9.273	30.5	37.4	6.1	33.2	40.8		54	Avg/Vertical

Radiated Photographs



Section 8. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	15.207(a) RSS GEN
TESTED BY: T. Tidwell	DATE: 27 August 2009

Test Results: Complies. The peak emission levels are below the average limit.

Test Data: Refer to attached plots

Equipment Used: 0969, 1627, 761

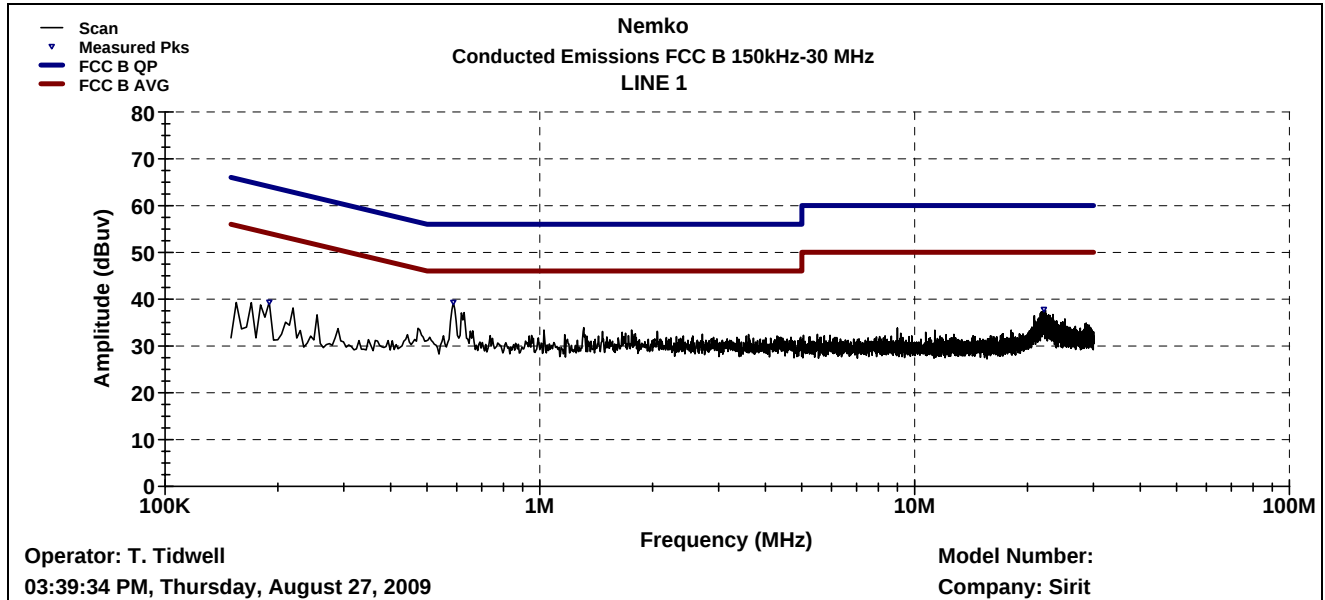
Measurement Uncertainty: +/- 1.7 dB

Temperature: 23 °C

Relative Humidity: 36 %

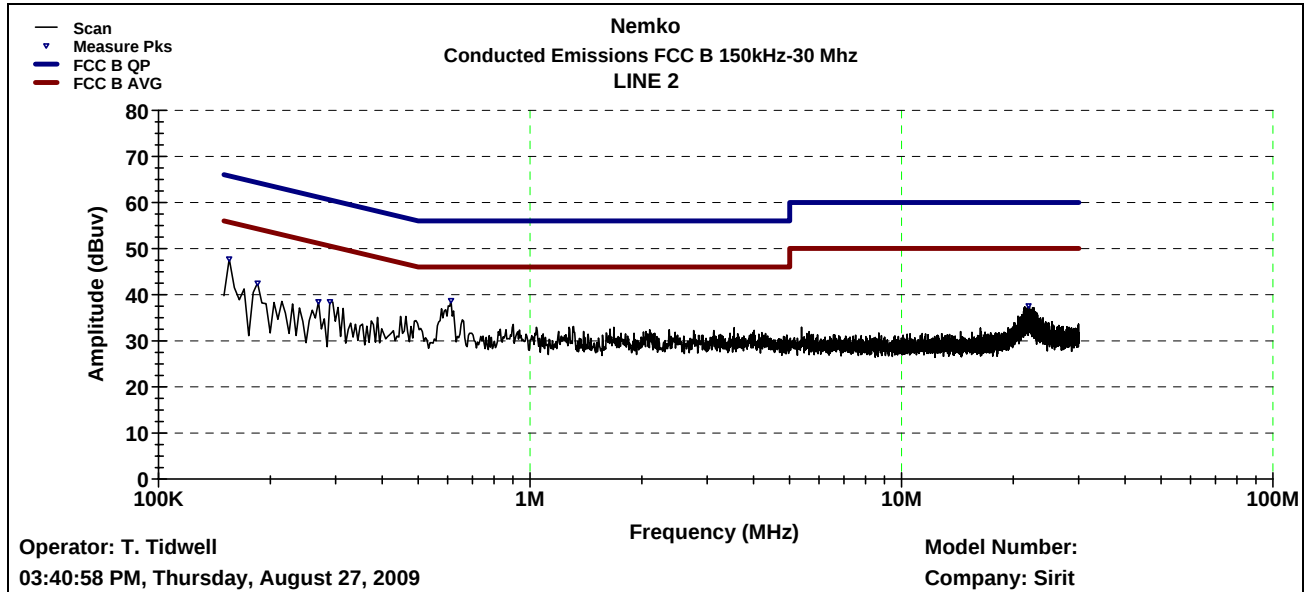
Test Data – Powerline Conducted Emissions

Line side



Test Data – Powerline Conducted Emissions

Neutral side



Test Setup Photos – Powerline Conducted Emissions





Section 9. Receiver Spurious Emissions

NAME OF TEST: Receiver Spurious Emissions

RSS-GEN 6.0

TESTED BY: T. Tidwell

DATE: 18 September 2009

Test Results: Complies.**Test Data:** Refer to attached plots

(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 1.

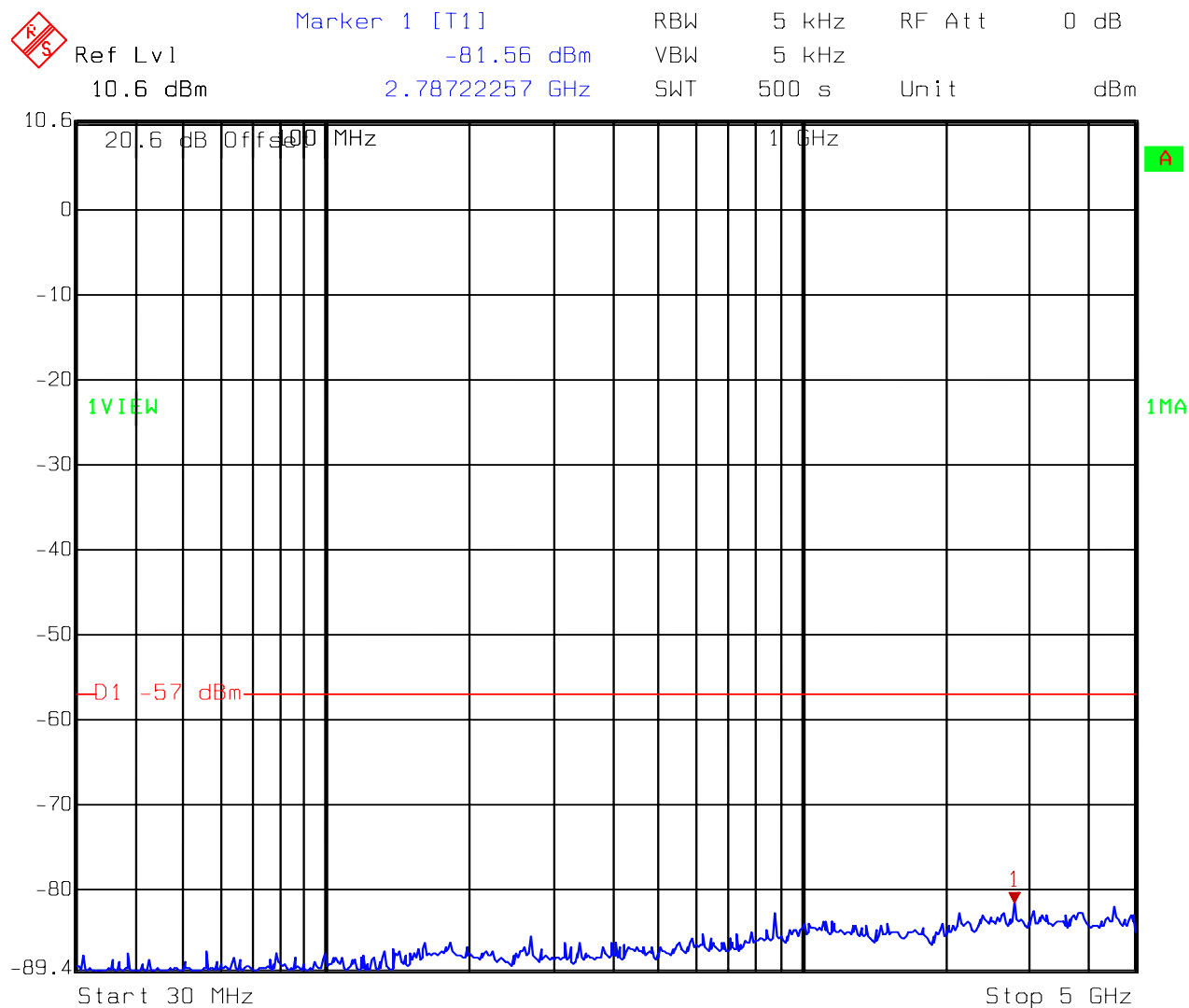
Table 1 - Spurious Emission Limits for Receivers

Spurious Frequency (MHz)	Field Strength (microvolt/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960	500

(b) If a conducted measurement is made, no spurious output signals appearing at the antenna terminals shall exceed 2 nanowatts per any 4 kHz spurious frequency in the band 30-1000 MHz, or 5 nanowatts above 1 GHz.

Equipment Used: 1036, 1627**Measurement Uncertainty:** +/- 1.7 dB**Temperature:** 23 °C**Relative Humidity:** 32 %

Receiver Spurious Emissions



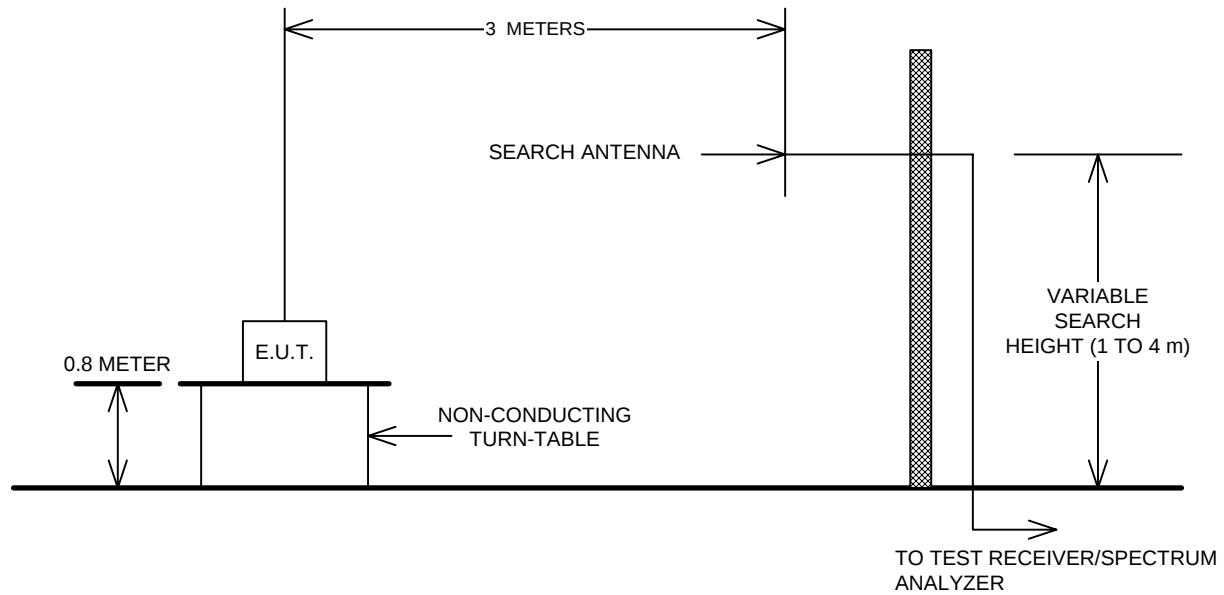
Date: 18.SEP.2009 11:20:00

Section 10. Test Equipment List

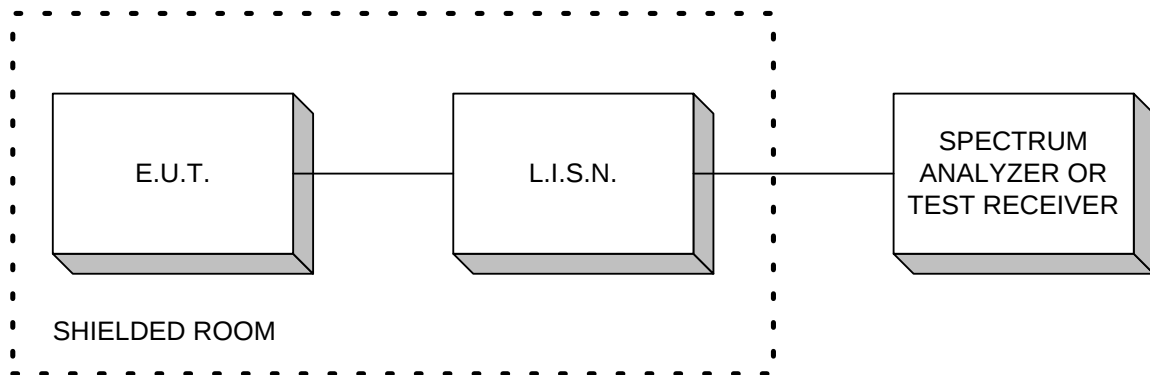
Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	01/19/09	01/20/11
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/27/09	02/28/11
1627	CABLE, 5 ft	MEGAPHASE 10312 1GVT4	N/A	CBU	N/A
1659	Spectrum Analyzer	Rhode & Schwarz FSP	973353	05/28/08	05/29/10
969	LISN	Schwarzbeck NNLA 8120	8120281	08/05/08	09/05/09
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	06/23/09	06/23/10
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
1480	Bilog Antenna	Schaffner-Chase CBL6111C	2572	10/17/08	10/17/09
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/31/07	08/31/09
1064	ATTENUATOR	NARDA 776B-20	NONE	CBU	N/A
761	3 module HP stack(Anal/Displ/Q-Peak Adapt)	Hewlett Packard 8567A/Disp/85650A	09/2542A10537/28	06/03/09	06/03/10

ANNEX A - TEST DIAGRAMS

Test Site For Radiated Emissions



Conducted Emissions



Peak Power at Antenna Terminals

Spurious Emissions at Antenna Terminals

