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## TEST REPORT PER FCC PT 15.247 AND IC RSS-210 ISSUE 8 FHSS

APPLICANT	MURANDI COMMUNICATIONS LTD.
ADDRESS	106, 4715 - 13 ST. N.E. CALGARY ALBERTA T2E 6M3 CANADA
FCC ID	KQNMLINK900
IC	2361A-MLINK900
MODELS	MLINK G 900A FW MLINK G 900C FW
PRODUCT DESCRIPTION	FREQUENCY HOPPING TRANSCEIVER WITH GPS
DATE SAMPLE RECEIVED	April 24 <sup>th</sup> 2014
DATE TESTED	April 24 <sup>th</sup> - 28 <sup>th</sup> , 2014
TESTED BY	Mario de Aranzeta
APPROVED BY	Mario de Aranzeta
REPORT ISSUE DATE	May 1 <sup>st</sup> 2014
TOTAL PAGES	46
TIMCO REPORT NO.	254AUT14TestReport
TEST RESULTS	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL

**THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL  
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.**

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## ATTESTATION

This equipment has been tested in accordance with the standards identified in the referenced test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report and demonstrate that the equipment complies with the appropriate standards.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025: 2005 requirements.

I attest that the necessary measurements were made by me or under my supervision, at Timco Engineering, Inc. located at 849 N.W. State Road 45, Newberry, Florida 32669 USA.

**AUTHORIZED BY:** Mario de Aranzeta

A circular purple ink stamp containing the text "TIMCO ENGINEERING INC." around the perimeter and a small star at the bottom. Overlaid on the stamp is a handwritten signature in purple ink.

**SIGNATURE:**

**FUNCTION:** Project Manager

**DATE:** May 1<sup>th</sup>, 2014

APPLICANT: MURANDI COMMUNICATIONS LTD.

FCC ID: KQNMLINK900

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REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

## REPORT SUMMARY

<b>Disclaimer:</b>	The test results relate only to the items tested.
<b>Purpose of Test:</b>	To demonstrate that the DUT is compliant with FCC Pt 15.247 requirements for a FHSS radio.
<b>Applicable Standards:</b>	FCC Pt 15.247, ANSI C63.4: 2003, ANSI TIA-603-D: 2010, FCC Pt 15.109, IC RSS-210, RSS-GEN
<b>Related Reports:</b>	N/A

## TEST ENVIRONMENT AND TEST SETUP

<b>Test Facilities:</b>	All measurements were made at one or more of the test sites of: TIMCO ENGINEERING INC. 849 N.W. State Road 45 Newberry, FL 32669.
<b>Laboratory Test Conditions:</b>	Temperature: 26°C Humidity: 55%
<b>Test Exercise:</b>	The DUT was set in continuous transmit mode of operation.
<b>Deviation to the Standards:</b>	There was no deviation from the standard.
<b>Modification to the DUT:</b>	No modification was made.
<b>Supporting Accessories:</b>	None

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## DUT DESCRIPTION

<b>DUT Description</b>	FREQUENCY HOPPING TRANSCEIVER WITH GPS
<b>FCC ID</b>	KQNMLINK900
<b>IC</b>	2361A-MLINK900
<b>Model Numbers</b>	MLINK G 900A FW, MLINK G 900C FW
<b>Maximum Output Power</b>	29 dBm
<b>Operating Frequency</b>	903 to 927 MHz
<b>Type of Modulation</b>	GFSK
<b>DUT Power Source</b>	<input type="checkbox"/> 110–120Vac/50– 60Hz
	<input type="checkbox"/> DC Power
	<input checked="" type="checkbox"/> Battery Operated Exclusively
<b>Test Item</b>	<input type="checkbox"/> Prototype
	<input checked="" type="checkbox"/> Pre-Production
	<input type="checkbox"/> Production
<b>Type of Equipment</b>	<input type="checkbox"/> Fixed
	<input checked="" type="checkbox"/> Mobile
	<input type="checkbox"/> Portable
<b>Antenna</b>	One integrated and one external External is a 4 element Yagi - Uda.
<b>Antenna Connector</b>	MMCX

Product details: The device under test is a 902 to 928 MHz frequency hopper data transmitter and GPS receiver. The device has 2 form factors 1 with an integral antenna and one capable of external antenna. The device has 3 data rates summarized in the table below.

Data rate	kbits
Low	1.2
Mid	38.4
High	76.8

The external antenna is:

Manufacturer	Model	Type	Gain
MaxStream Inc or Laird Technologies	A09-Y8NF or PC904	4 Element Yagi	6 dBd

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## EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	12/31/13	12/31/2015
EMI Test Receiver	Rhode & Schwarz	ESU 40	100320	03/21/13	03/21/2015
Software: Field Strength Program	Timco	N/A	Version 4.0	NR	NR
EMI Test Receiver	Rhode & Schwarz	ESIB 40	100274	02/15/13	02/15/15
Power Meter	Boonton	4531	11793	1/19/13	1/19/2015
Power meter Sensor	Boonton	51072A	34647	1/19/13	1/19/2015
Firmware ESU40	Rohde & Schwarz	ESU 40	Version 4.43 SP3	NA	NA
Firmware ESIB40	Rohde & Schwarz	ESIB 40	Version 4.34.3	NA	NA
Antenna Log-Periodic	Electro-metrics	LPA-25	1122	5/09/13	5/09/2015
Antenna Bi-conical	Eaton	94455-1	1096	5/10/13	5/10/2015
Antenna Loop	EMCO	6512	9706-1211	6/14/12	6/14/2014
Antenna DR Horn	ETS Lindgren	3117	62529	10/09/13	10/09/2015
Software: Field Strength Program	Timco	N/A	Version 4.0	NA	NA

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## TEST PROCEDURES

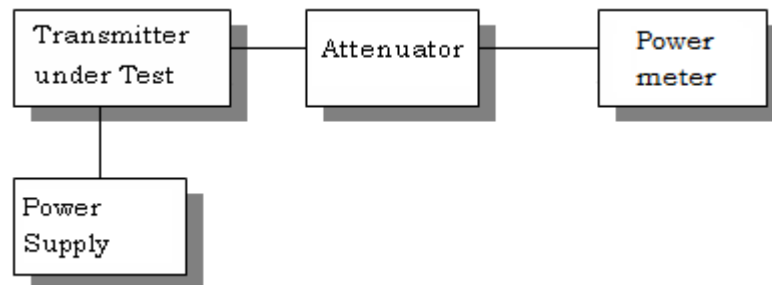
The procedures of DA-00-705 were used as applicable.

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI C63.4-2003 using a 50uH LISN. Both lines were observed with the DUT transmitting. The resolution bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

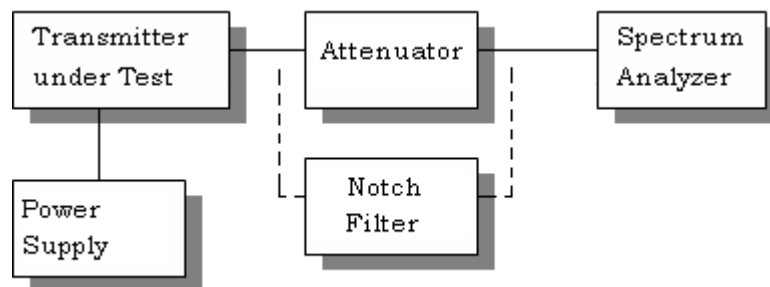
**BANDWIDTH 20 dB:** The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 1 MHz and the video bandwidth (VBW) = 3 MHz and the span set as shown on plot.

**RF Power Output:** Power was measured by disconnecting the antennas and measuring across a 50 ohm load as recommended by the manufacturer using a RF power meter.

Output Power Test Setup Diagram



**ANTENNA CONDUCTED EMISSIONS:** The RBW = 100 kHz, VBW = 100 kHz and the spectrum scanned from 9 kHz or the lowest frequency generated to the 10<sup>th</sup> Harmonic of the fundamental.



**RADIATION INTERFERENCE:** The test procedure used was ANSI C63.4-2003 using an Rohde & Schwarz EMI/EMC receiver. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz when peak detection is used. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

**RADIATED SPURIOUS EMISSIONS INTO THE ADJACENT RESTRICTED BANDS:** An in-band field strength measurement of the fundamental emission was made at the band edges. The RBW and detector function as required by ANSI C63.4-2003 and the FCC procedure DA-00-705 was used.

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## POWER LINE CONDUCTED INTERFERENCE

**RULES PART NO.:** 15.207, RSS-GEN

### REQUIREMENTS:

Emission Frequency (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak (QP)	Average (Ave)
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50
* Decreases with the logarithm of the frequency.		

**TEST DATA:** The following plots represent the emissions read for power line conducted.  
Both lines were observed

The product is a module and was DC powered as tested.

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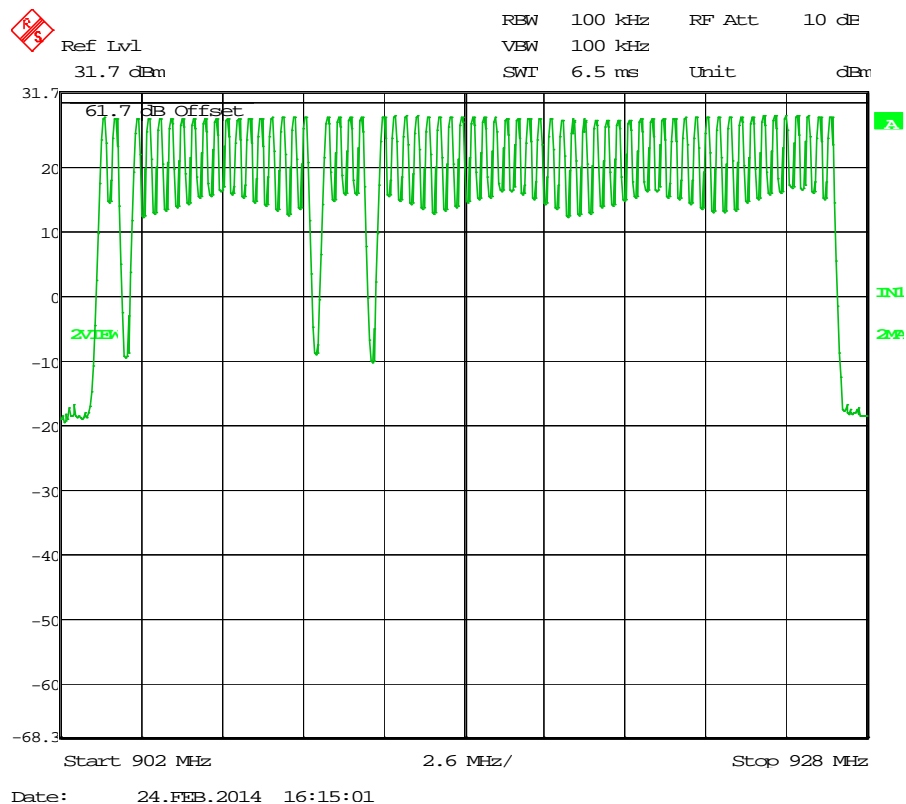
## NUMBER OF HOPPING CHANNELS

**Rules Part No.:** 15.247(a)(1), RSS-210, Annex 8

### Requirements:

902-928 MHz	If the 20 dB bandwidth is < 250 kHz, the system shall use at least 50 hopping frequencies.
	If the 20 dB bandwidth is 250 kHz or greater, the system shall use at least 25 hopping frequencies.
2400-2483.5 MHz	At least 15 channels
5725-5850 MHz	At least 75 channels

**Test Data:** For frequency hopping operation the 902 to 928 MHz band is divided into 288 channels with 90 kHz separation. The top 8 channels and bottom 8 channels are not used to avoid the edges of the 902 to 928 MHz band, and a few channels are avoided due to interference concerns, leaving a minimum of 249 channels. Using these 249 channels multiple approximately orthogonal pseudorandom hopping sequences are implemented each using 53 - 63 non overlapping channels. The pseudorandom sequences are generated using a LFSR polynomial which guarantees that no frequency is repeated twice within the sequence. The fastest hopping rate is 5 Hz maximum with a dwell time of 0.4 ms maximum on any one channel in a 20 second period



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## DWELL TIME OF A HOPPING CHANNEL

**RULES PART NO.:** 15.247(a)(1)(i), RSS-210, ANNEX 8

### REQUIREMENTS:

902-928 MHz	If 20 dB bandwidth is < 250 kHz, average time of occupancy of any frequency shall not exceed 0.4 sec in 20 seconds.
	If 20 dB bandwidth is 250 kHz or greater, dwell time < = 0.4 seconds in a 10 second period.
2400-2483.5 MHz	< = 0.4 seconds in a 0.4 seconds multiplied the number of hopping channels employed.
5725-5850 MHz	< = 0.4 seconds in a 30 second period.

**TEST DATA:** The device has 3 data rates with different dwell times.

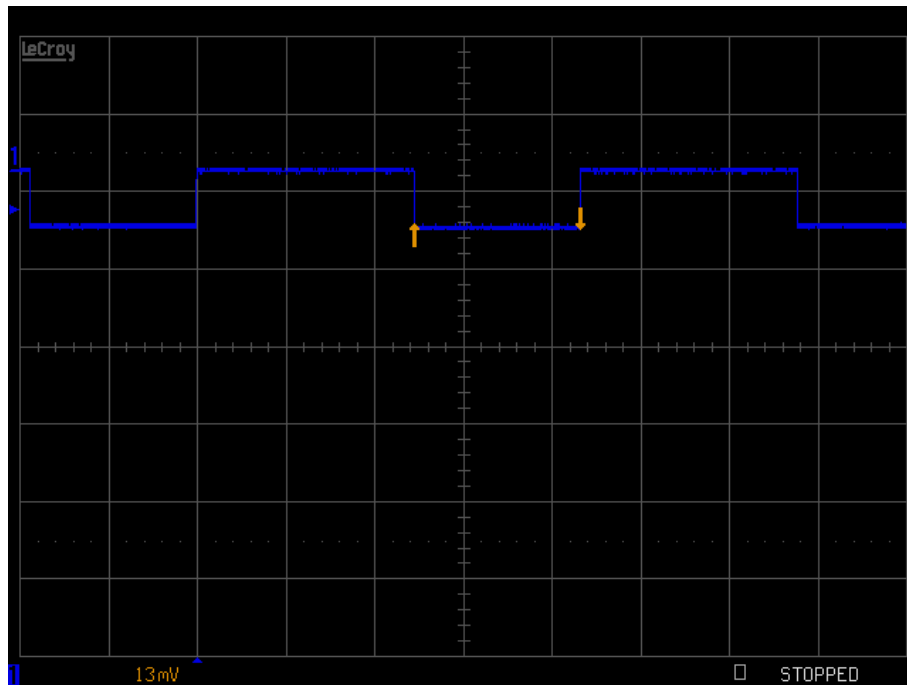
Data Rates	Dwell time
1.2k bits (low)	93.5 ms
38.4k bits (mid)	3.0 ms
76.8k bits (high)	1.5 ms

APPLICANT: MURANDI COMMUNICATIONS LTD.

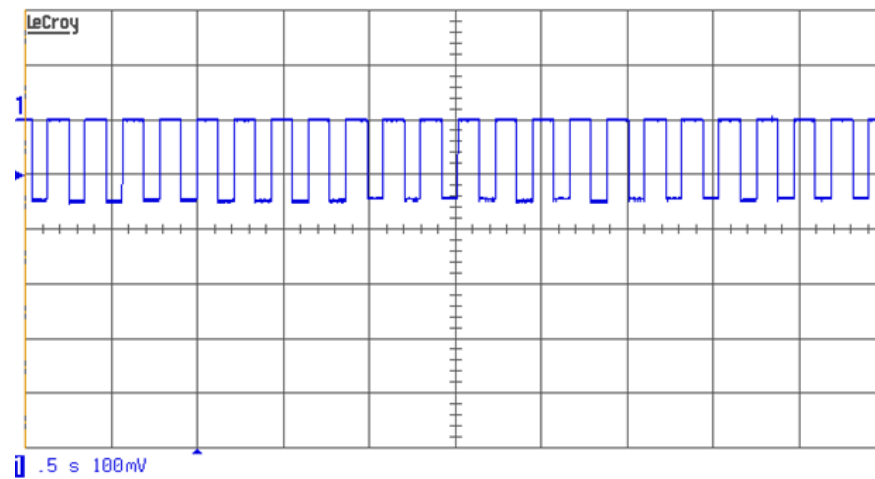
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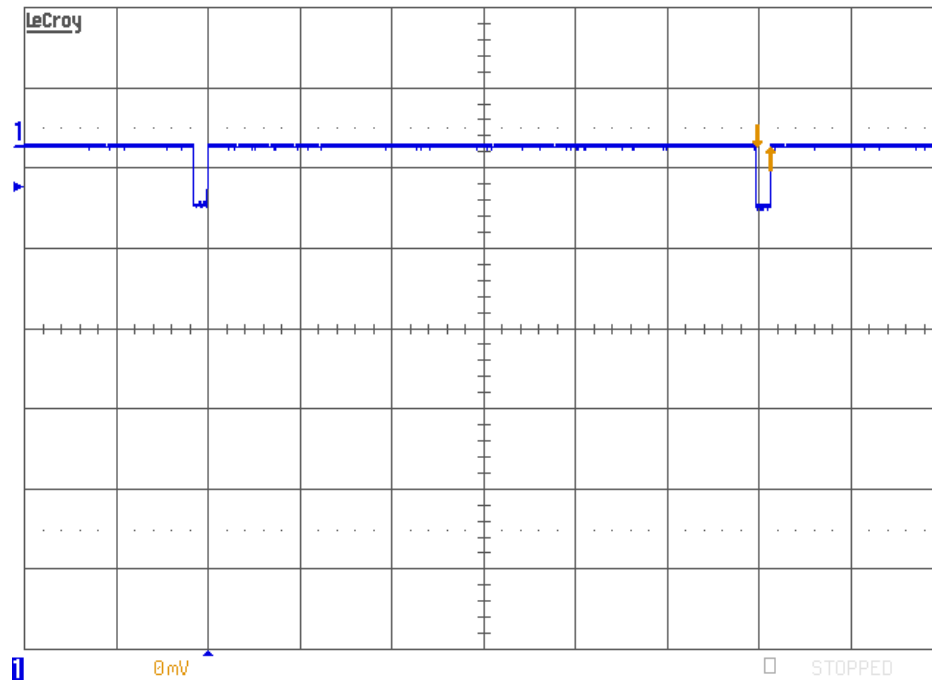


Low data rate dwell time 93.5 ms/hop

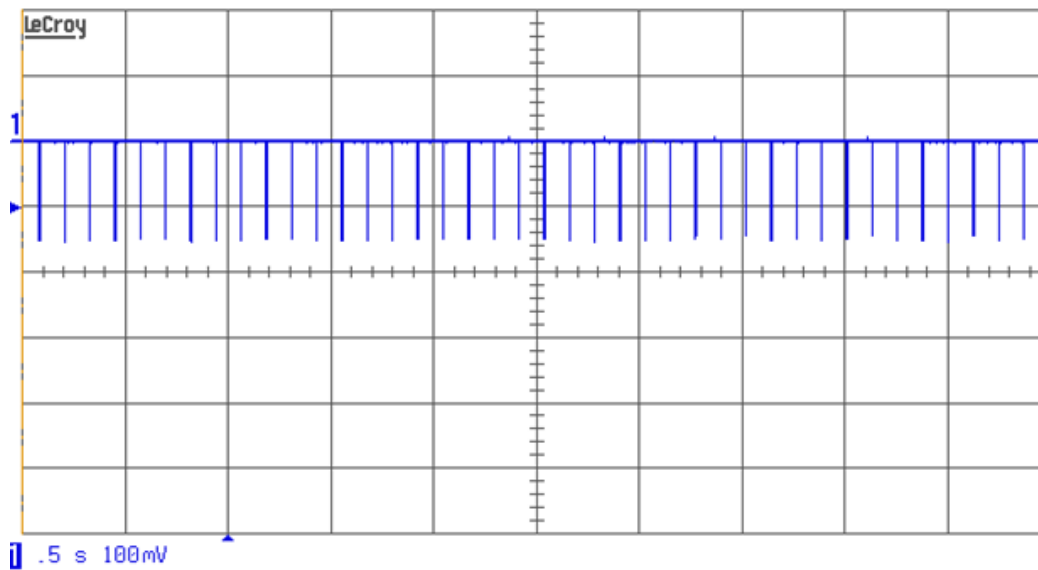


Low data rate/number of hops in 0.5 seconds

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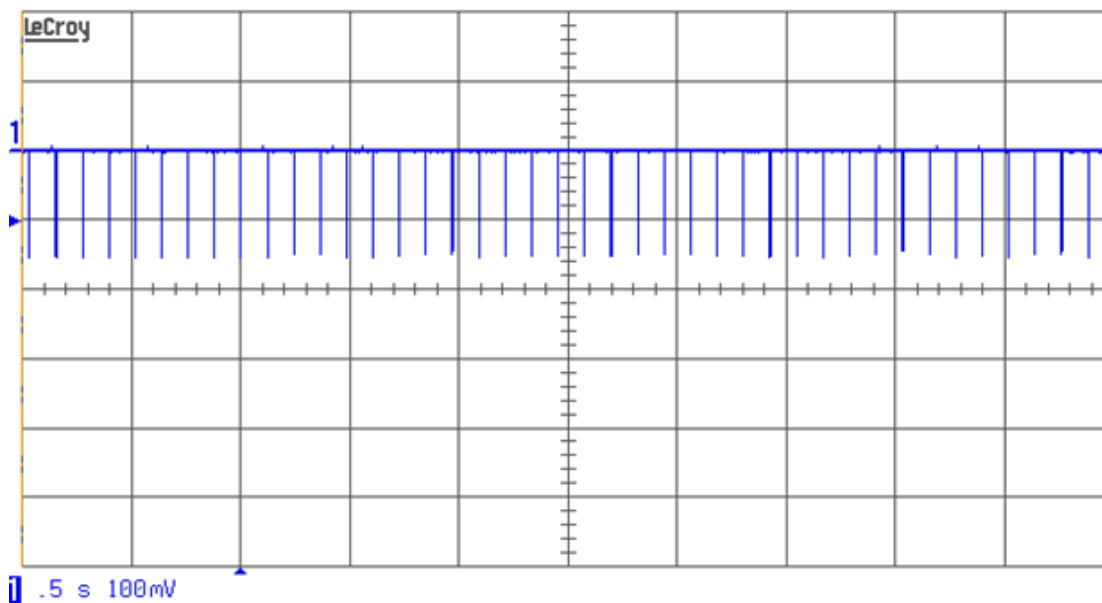
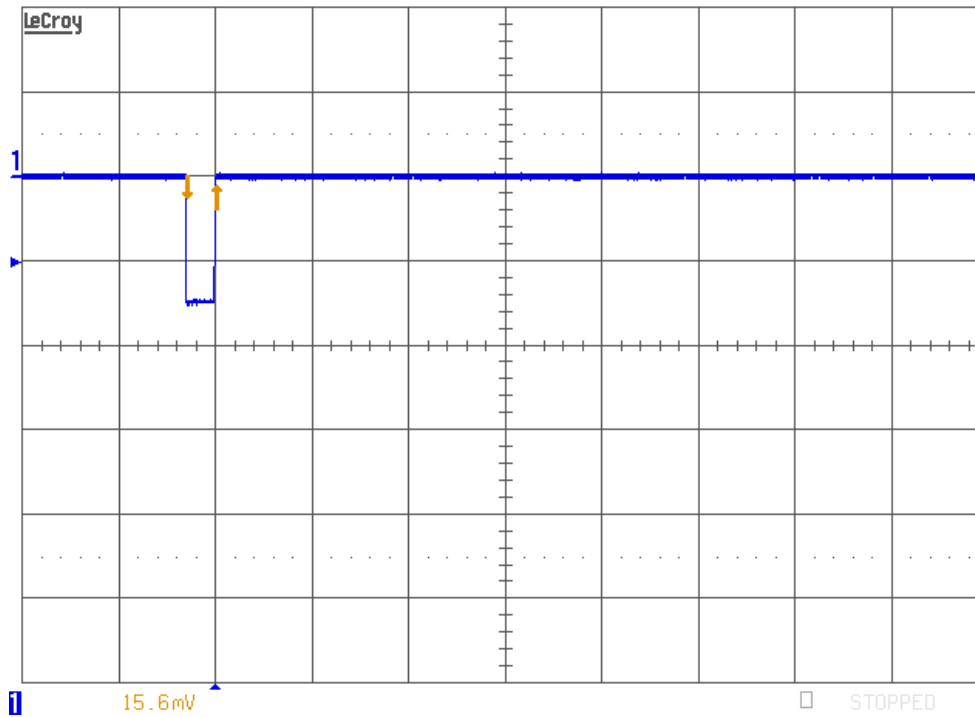


Medium Data rate 3.0 msec/hop



Number of hops in 0.5 sec

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Number of hops in 0.5 sec

Three places in the band were measured and the worst case presented.

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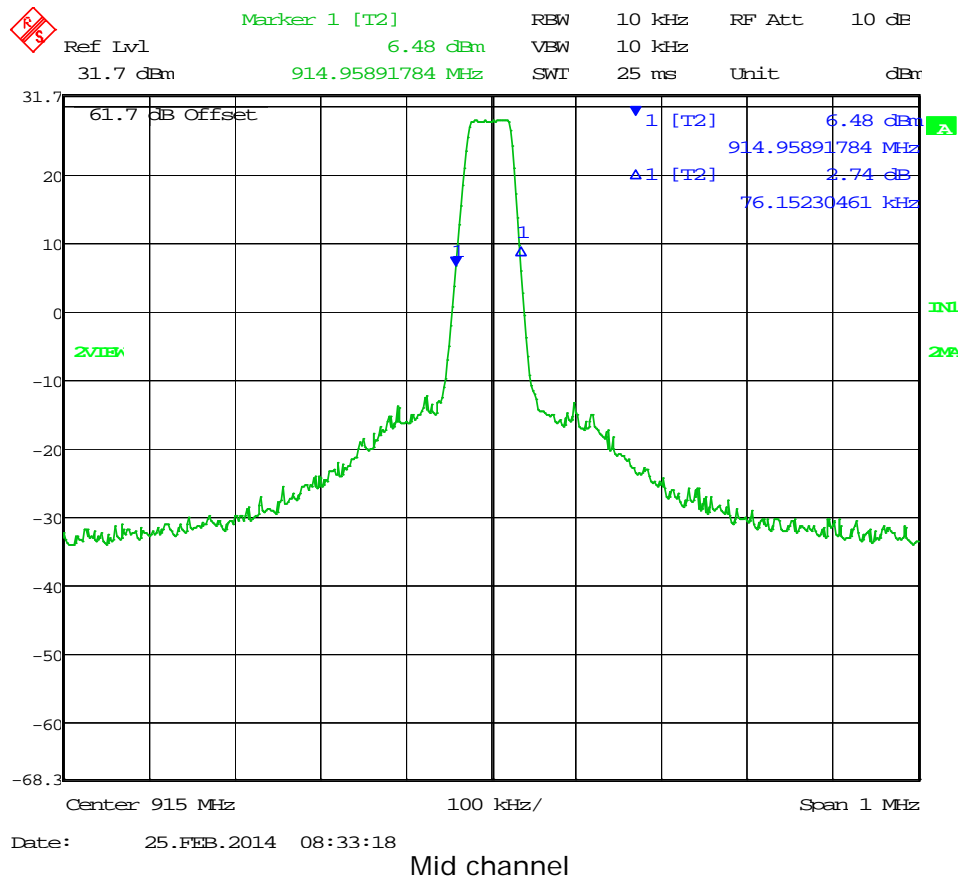
## 20 dB BANDWIDTH

**RULES PART NO.:** 15.247(a)(2), RSS-210, ANNEX 8

**REQUIREMENTS:** The 20 dB bandwidth must be less than 500 kHz.

### TEST DATA:

1.2 kb data rate 76 kHz



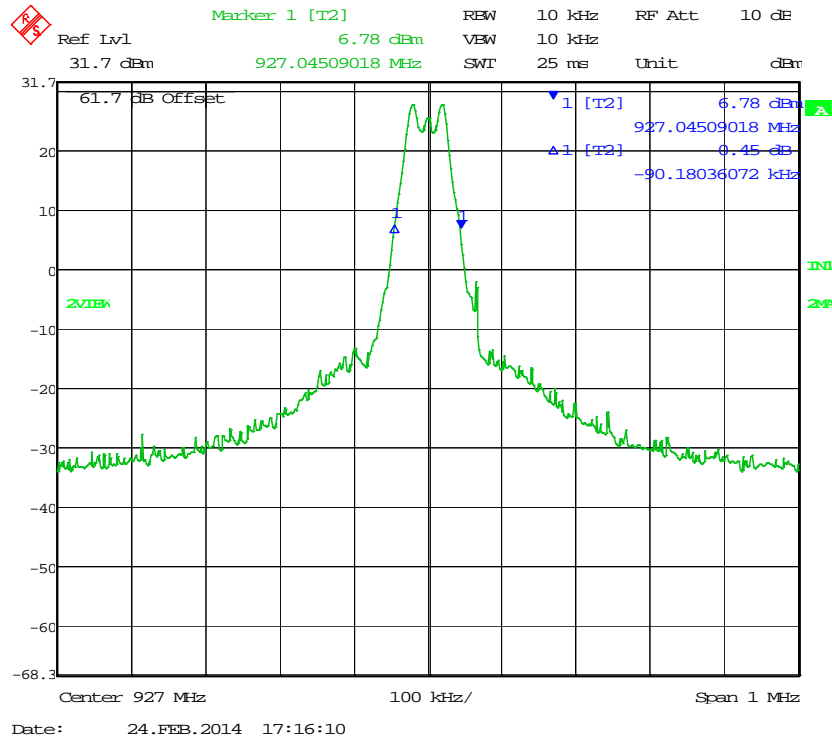
APPLICANT: MURANDI COMMUNICATIONS LTD.

FCC ID: KQNMLINK900

IC: 2361A-MLINK900

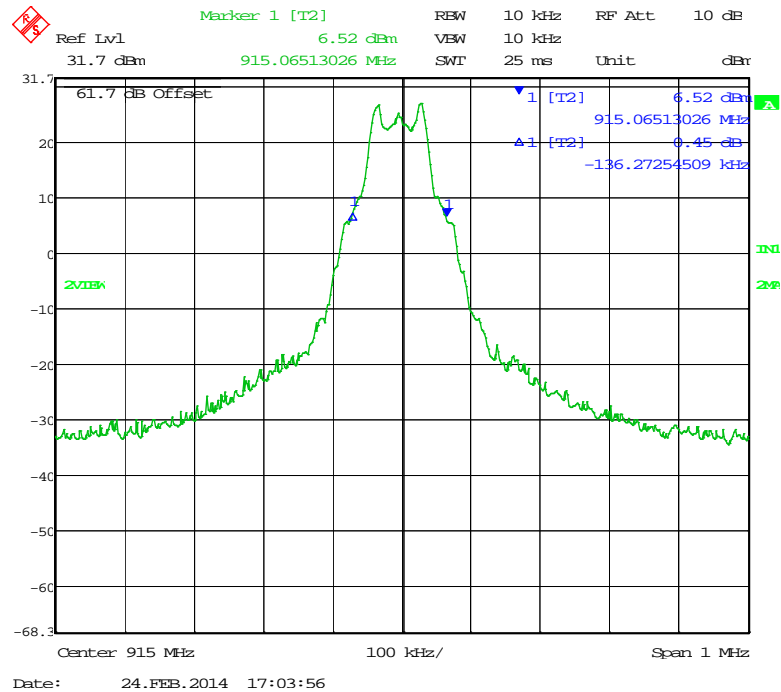
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

### 38.4 kbit channel 90 kHz



High channel

### 76.8 kbit channel/ 136 kHz



Mid channel

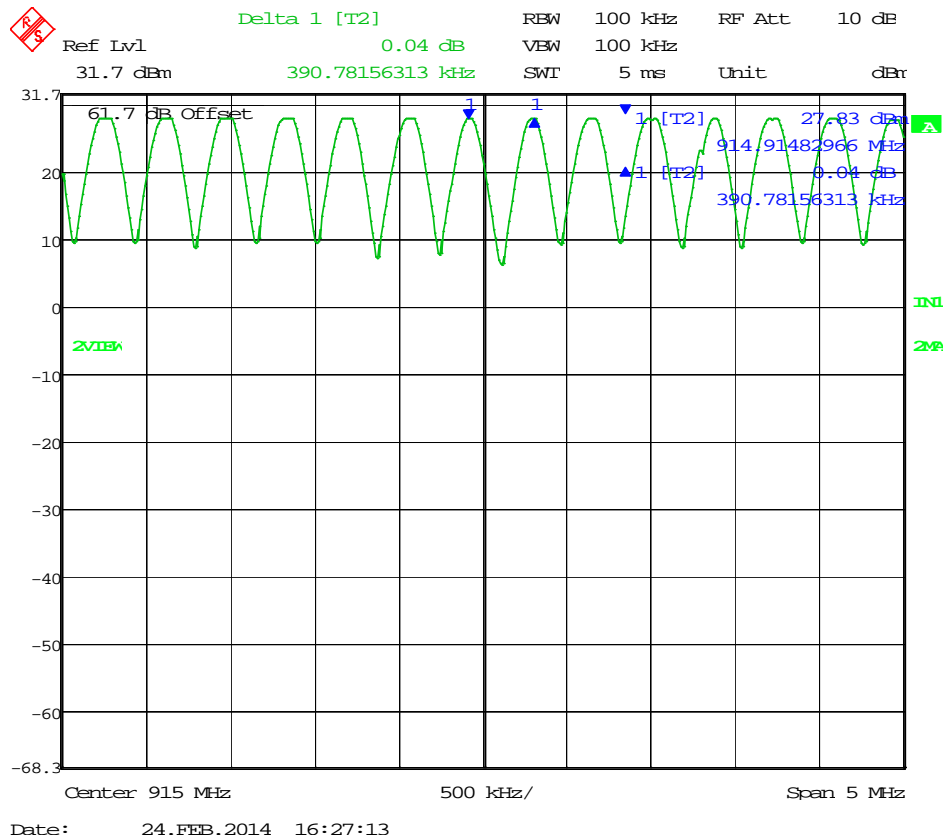
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## CARRIER FREQUENCY SEPARATION

**RULES PART NO.:** 15.247(a)(2), RSS-210, ANNEX 8

**REQUIREMENTS:** The hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

**TEST DATA:** The channel separation is 390 kHz regardless of the data rate selected.



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## POWER OUTPUT

**Rules Part No.:** 15.247(b), RSS-210, ANNEX A8.4

**Requirements:** The maximum peak output power shall not exceed 1 watt (30 dBm). If directional transmitting antennas with a gain of more than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### Test Data:

**Conducted RF power:** maximum power output is 29 dBm or 0.8 Watts

Low data rate

Frequency MHz	Power dBm
903	28.5
915	28.6
927	28.8

Medium data rate

Frequency MHz	Power dBm
903	28.6
915	28.6
927	28.9

High data rate

Frequency MHz	Power dBm
903	28.5
915	28.6
927	29.0

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## SPURIOUS EMISSIONS AT ANTENNA TERMINALS

**RULES PART NO.:** 15.247(c), RSS-210, ANNEX 8, RSS-GEN

**REQUIREMENTS:** Emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

**Note:** The spectrum was scanned from 9 kHz or the lowest frequency generated to the 10<sup>th</sup> harmonic of the fundamental. Harmonics not represented in the table were > 20dB below the FCC limit and not represented.

The data rate with the worst case emission profile as identified in pre-scans is the highest data rate of 76.8 kb. This data rate was used throughout the emissions testing.

### TEST DATA

Summary Table

Tuned frequency MHz	Emission frequency MHz	Level dBm	Limit dBm
903	200	-31.24	+9 (20 dBc)
	756.9	-27.33	+9
	900	-29.88	+9
	1806	-19.74	+9
915	200	-31.24	+9
	756.9	-27.33	+9
	900	-29.88	+9
	1830	-20.40	+9
927	200	-31.24	+9
	756.9	-27.33	+9
	900	-29.88	+9
	1854	-18.29	+9
	2552	-25.29	+9

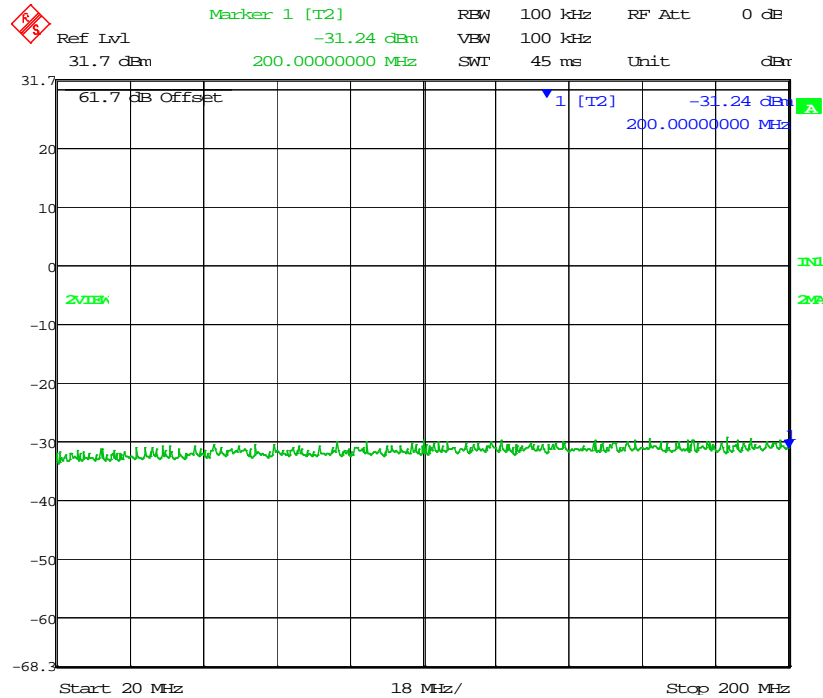
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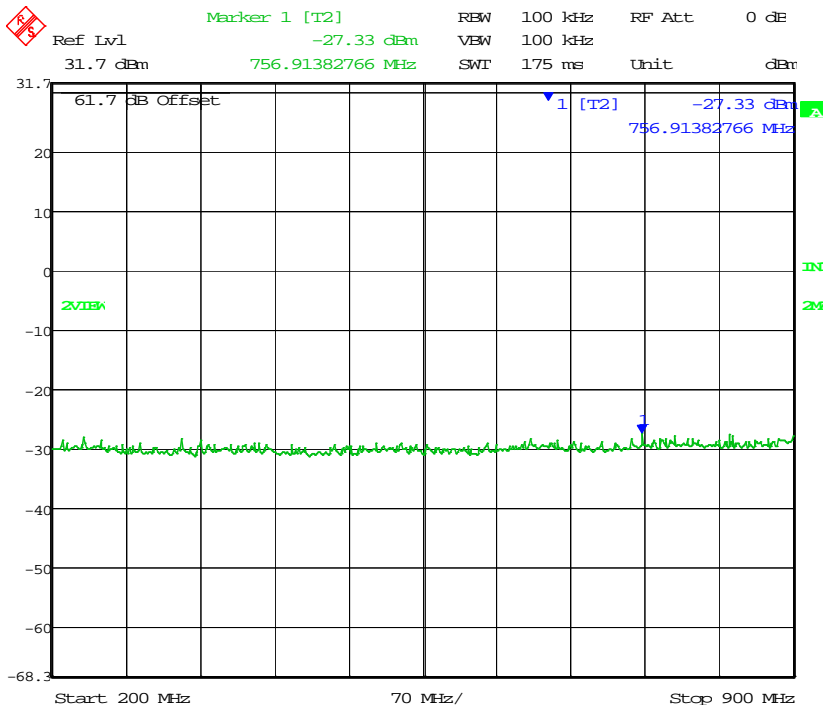
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Three channels in the band were tested and the emissions from the lowest frequency generated to 200 MHz were the same for all three channels.



Date: 25.FEB.2014 14:12:16

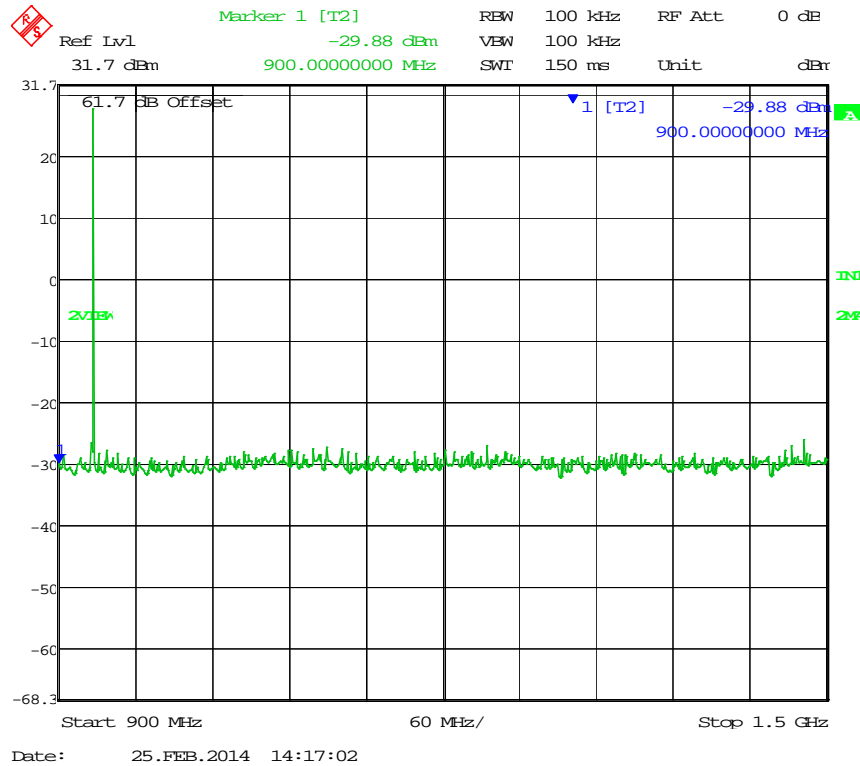
Three channels in the band were tested and the emissions from 200 to 900 MHz were the same for all three channels.



Date: 25.FEB.2014 14:14:31

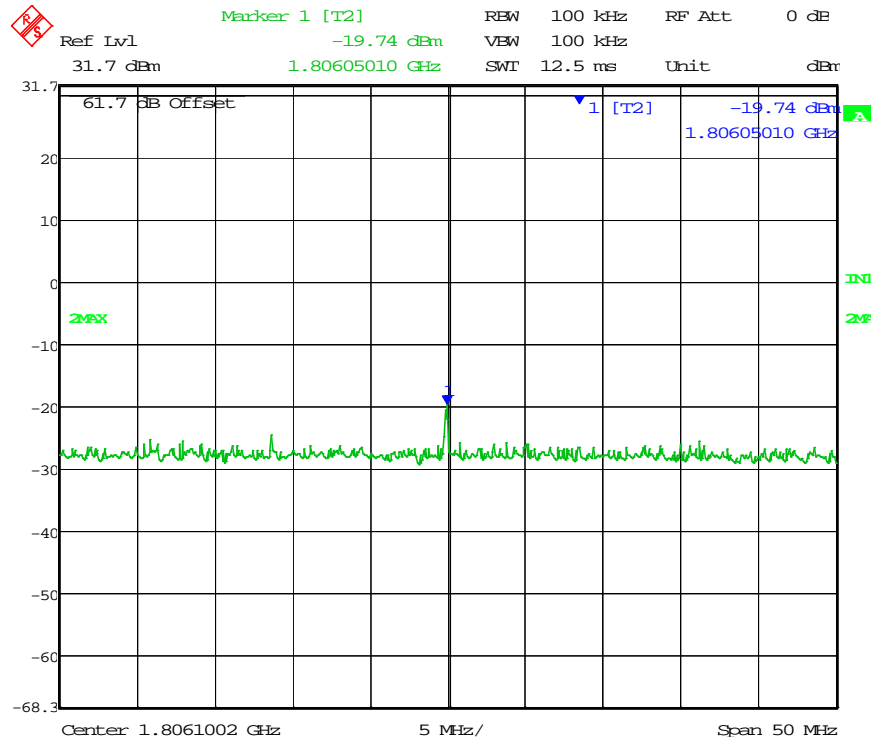
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Three channels in the band were tested and the emissions from 900 to 1500 MHz were the same for all three channels excluding the desired).



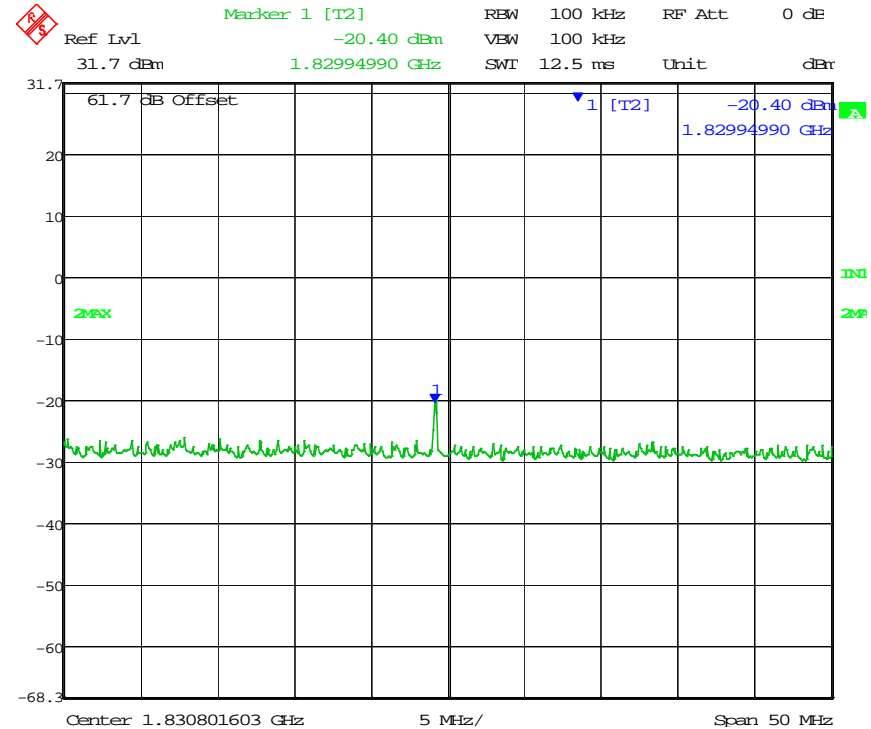
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## 903 MHz 2<sup>nd</sup> Harmonic



Date: 25.FEB.2014 13:56:30

## 915 MHz 2<sup>nd</sup> Harmonic



Date: 25.FEB.2014 13:50:20

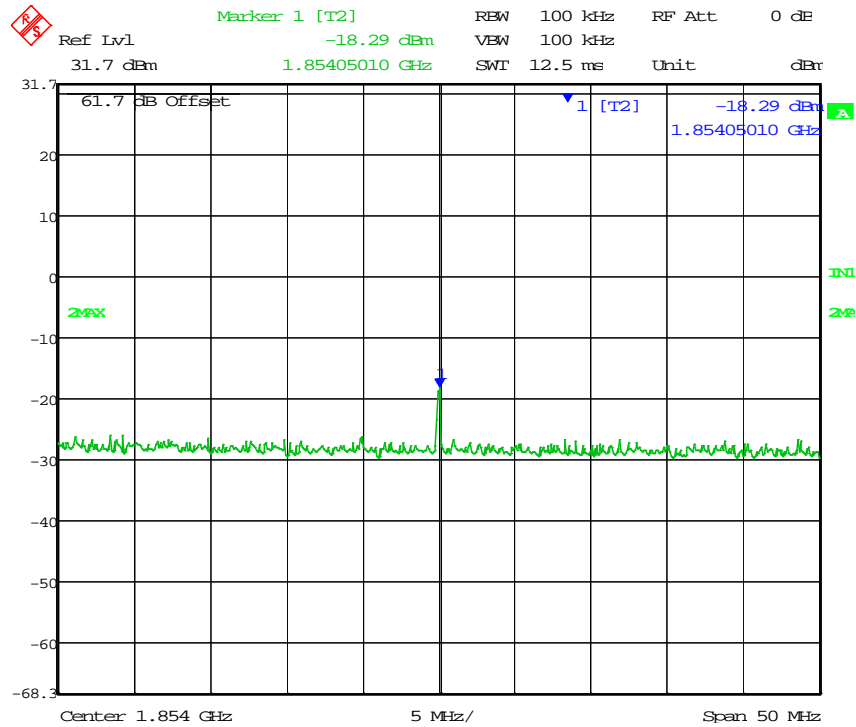
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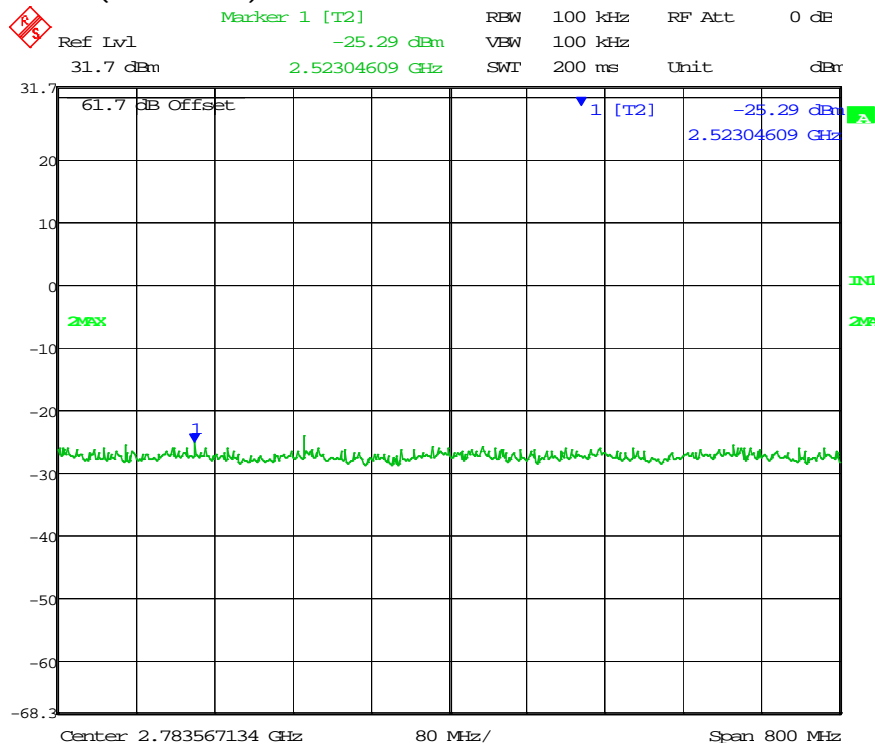
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## 927 MHz 2<sup>nd</sup> Harmonic



Date: 25.FEB.2014 13:52:42

## 927 MHz 3<sup>rd</sup> Harmonic (noise floor)



Date: 25.FEB.2014 13:44:21

APPLICANT: MURANDI COMMUNICATIONS LTD.

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## FIELD STRENGTH OF SPURIOUS EMISSIONS

**RULES PART NO.:** 15.247(c), 15.205 & 15.209(b), RSS-210 ANNEX 8, RSS-GEN

### REQUIREMENTS:

§15.247(c)& §15.205	
(Fundamental) Frequency	(Field Strength) Limits
902 – 928 MHz 2.4 – 2.4835 GHz	127.37 dB $\mu$ V/m
§15.209	
30 - 88 MHz	40 dB $\mu$ V/m @3M
88 -216 MHz	43.5 dB $\mu$ V/m @3M
216 -960 MHz	46 dB $\mu$ V/m @3M
ABOVE 960 MHz	54dBuV/m

Emissions that fall in the restricted bands (15.205) must be less than or equal to 500  $\mu$ V/m (54 dB $\mu$ V/m). Spurious not in a restricted band must be 20 dBc.

Emissions were measured from 9 kHz or the lowest frequency generated to the 10<sup>th</sup> harmonic.

All readings are average above 1 GHz and peak below 1 GHz.

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**Test Data:**

Data for integral vertical dipole antenna

Tuned Frequency MHz	Emission Frequency MHz	Antenna Polarity V/ H	Field strength dBμV/m	Margin dB
903	903	V	115.13	
	1807.7	V	61.52	36.08
	2709	V	41.81	12.19
903	903	H	101.41	25.95
	1807.7	H	61.12	36.48
	2709	H	43.13	10.87
	4515	H	41.71	12.29
915	915	V	115.86	
	1822.1	V	66.05	31.55
	2745.2	V	44.27	9.73
	4575	V	43.43	10.57
915	915	H	103.6	
	1822.1	H	67.58	30.02
	2745.2	H	42.48	11.52
	4575	H	44.42	9.58
927	927	V	117.6	
	1854	V	69.65	27.95
	2781	V	44.99	9.01
	4635	V	49.16	4.84
	9278	V	48.78	5.22
927	927	H	104.45	
	1854	H	69.59	28.01
	2781	H	42.01	11.99
	3708.	H	50.36	3.64
	9278	H	49.79	47.81

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REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

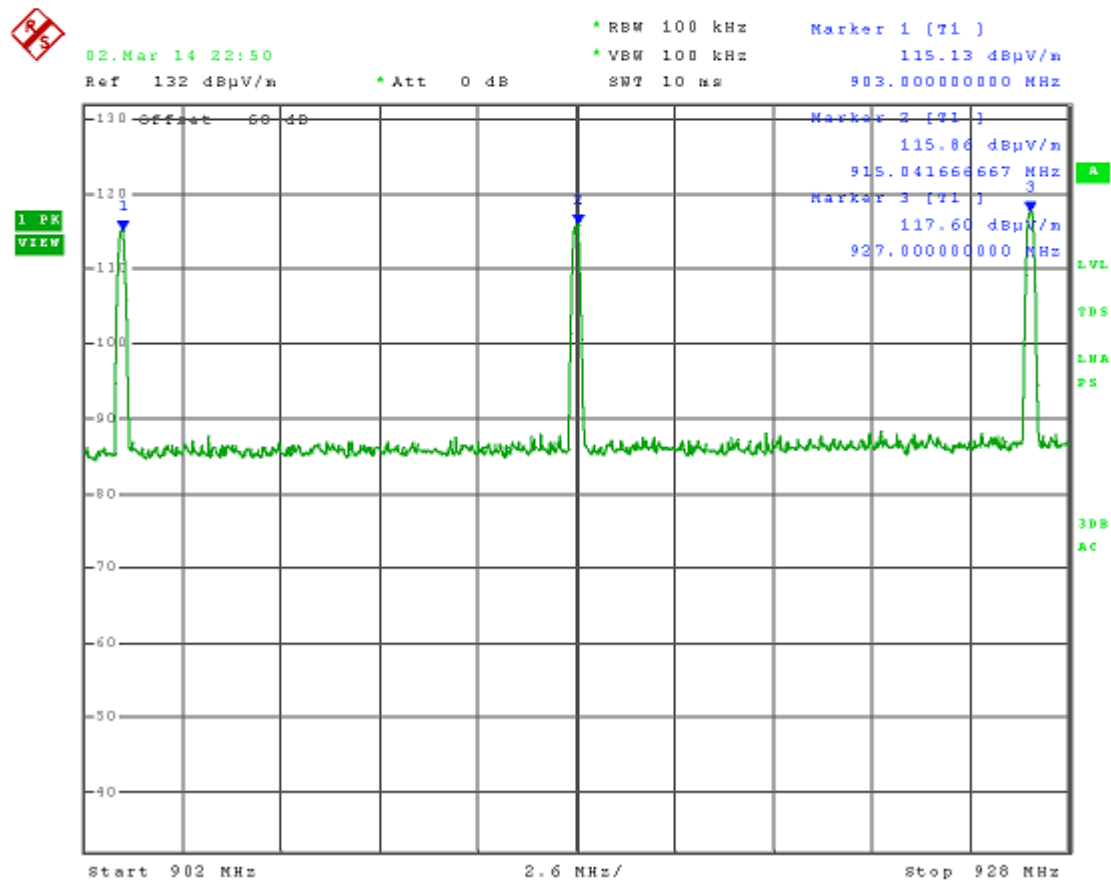


Plot of the integral dipole antenna's radiated emissions (Vertical) at the fundamental.



## Radiated Emissions

Equipment Under Test Frequency Hopper  
Test Mode Transmit  
Antenna Polarity Vertical  
Detectors Used Max Peak  
Test Operator Mario de Aranzeta  
Test Specification 15.247



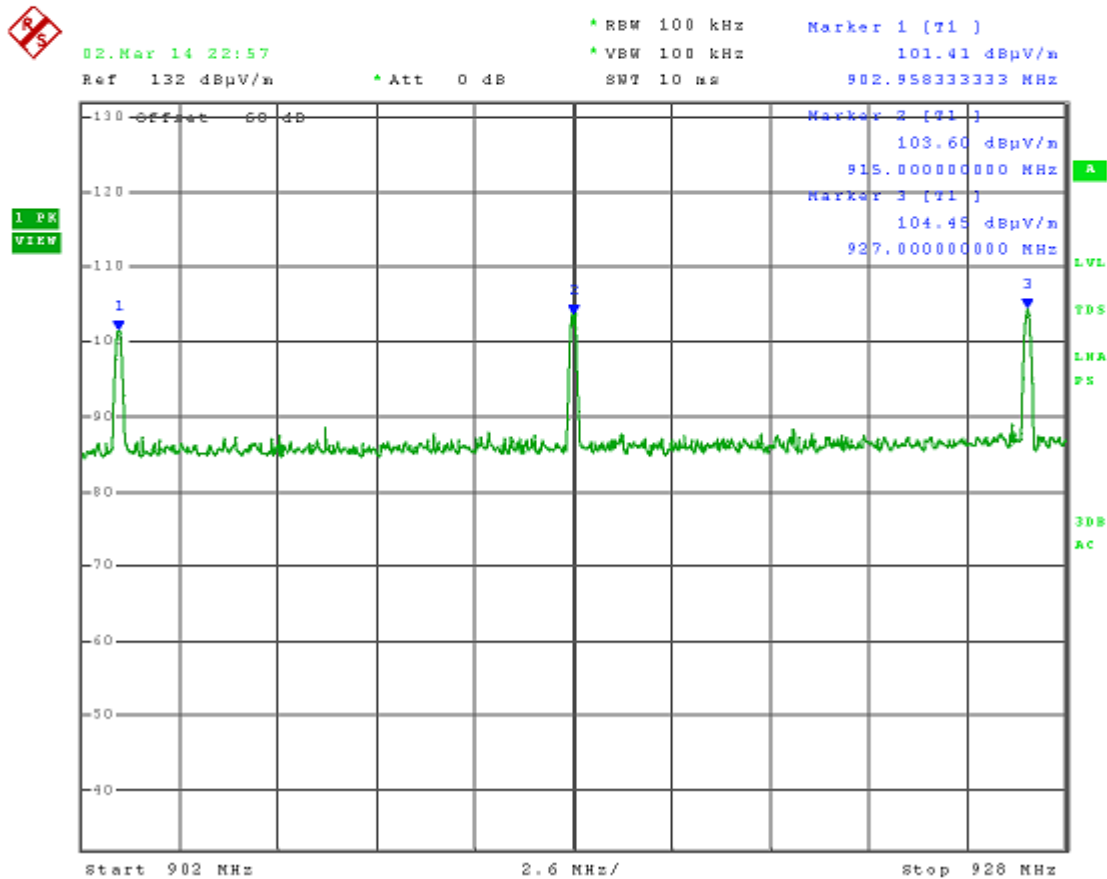
APPLICANT: MURANDI COMMUNICATIONS LTD.  
FCC ID: KQNLINK900  
IC: 2361A-MLINK900  
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

Plot of the integral dipole antenna's radiated emissions (Horizontal) at the fundamental.



## Radiated Emissions

Equipment Under Test Frequency Hopper  
Test Mode Transmit  
Antenna Polarity Horizontal  
Detectors Used Max Peak  
Test Operator Mario de Aranzeta  
Test Specification 15.247



APPLICANT: MURANDI COMMUNICATIONS LTD.  
FCC ID: KQNMLINK900  
IC: 2361A-MLINK900  
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

903 MHz Vertical



## Radiated Emissions

Equipment Under Test      Frequency Hopper  
Test Mode                      Transmit  
Antenna Polarity              Vertical  
Detectors Used  
Test Operator                  Mario de Aranzeta  
Test Specification              15.247



29.Apr 14 00:57

Ref 72 dBμV/m

\* Att 0 dB

\* RBW 1 MHz

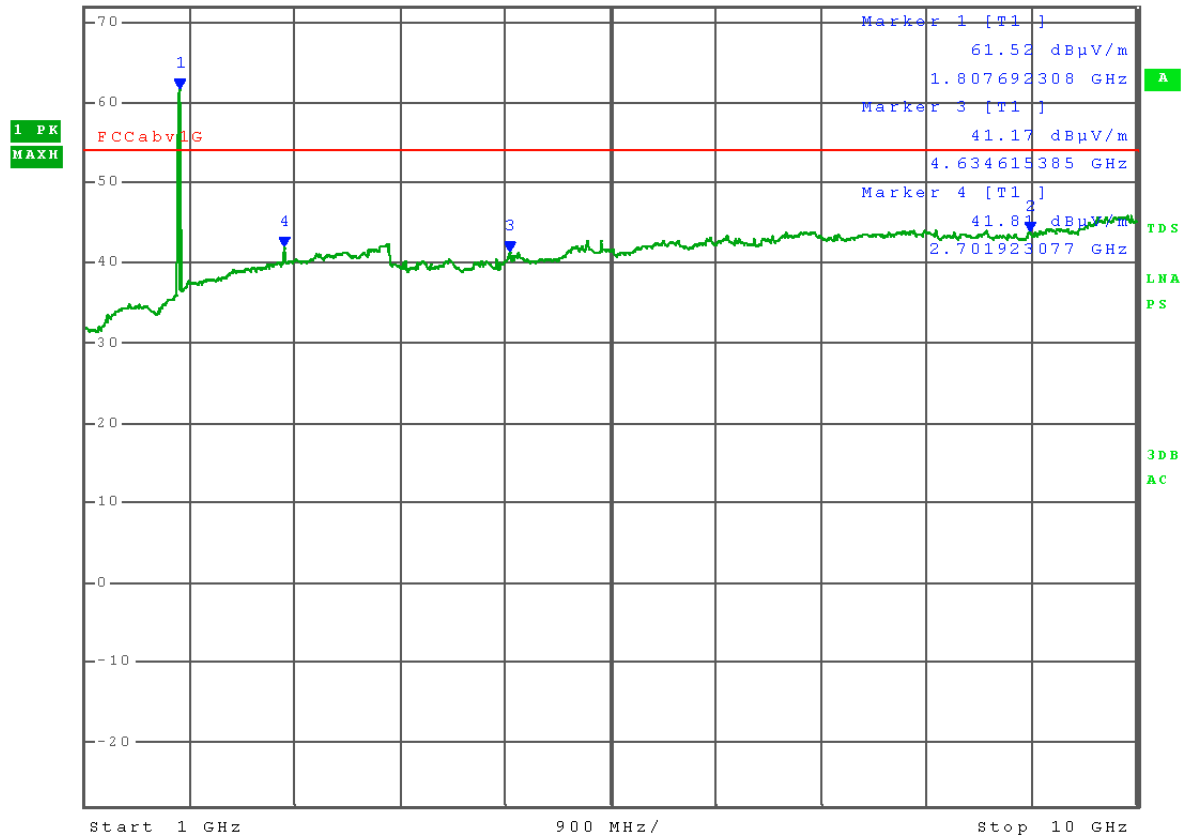
\* VBW 10 kHz

SWT 720 ms

Marker 2 [T1]

43.69 dBμV/m

9.091346154 GHz



APPLICANT: MURANDI COMMUNICATIONS LTD.

FCC ID: KQNMLINK900

IC: 2361A-MLINK900

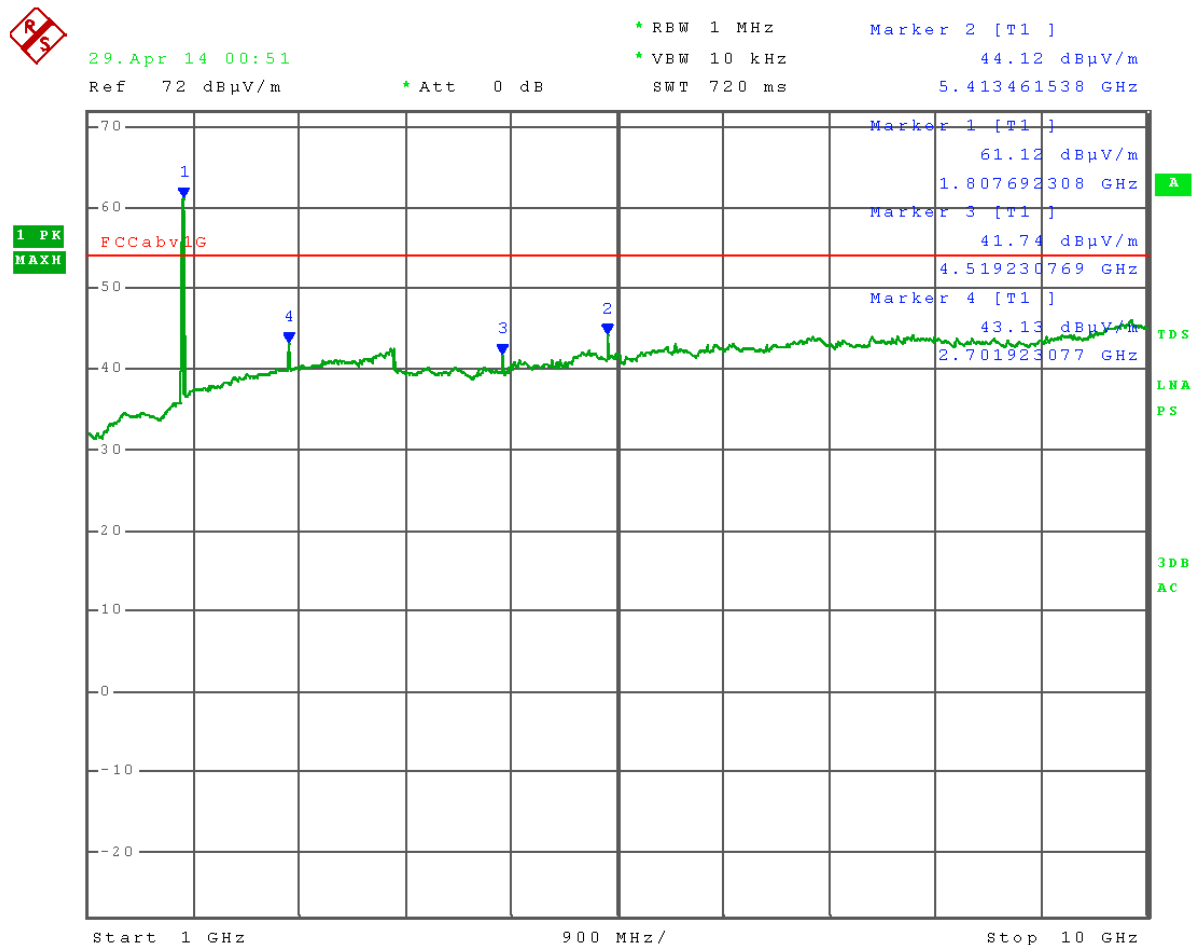
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

903 MHz Horizontal



## Radiated Emissions

Equipment Under Test      Frequency Hopper  
Test Mode                      Transmit  
Antenna Polarity              Horizontal  
Detectors Used  
Test Operator                  Mario de Aranzeta  
Test Specification              15.247



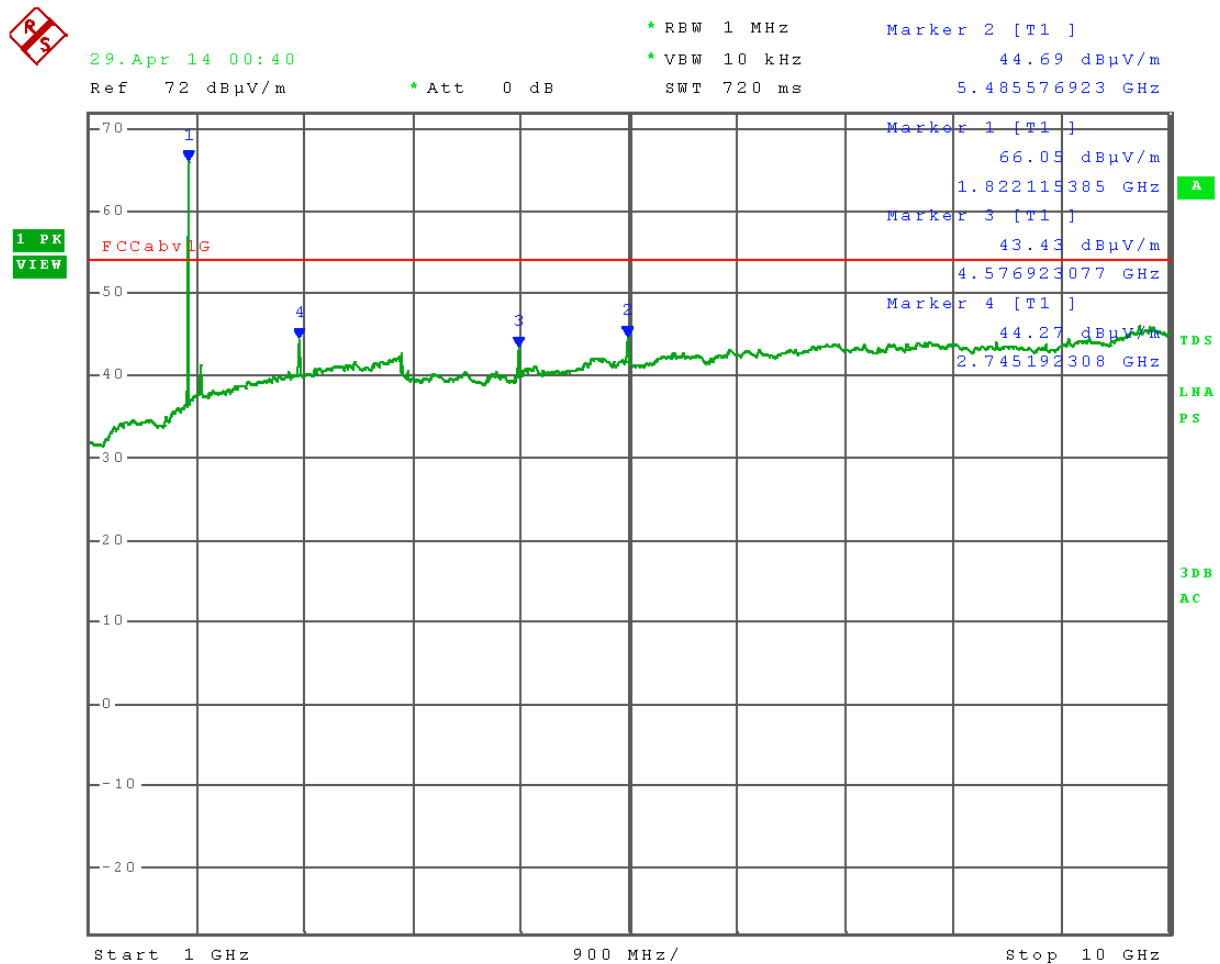
APPLICANT: MURANDI COMMUNICATIONS LTD.  
FCC ID:      KQNMLINK900  
IC:            2361A-MLINK900  
REPORT:      V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

915 MHz Vertical



## Radiated Emissions

**Equipment Under Test** Frequency Hopper  
**Test Mode** Transmit  
**Antenna Polarity** Vertical  
**Detectors Used**  
**Test Operator** Mario de Aranzeta  
**Test Specification** 15.247



APPLICANT: MURANDI COMMUNICATIONS LTD.  
 FCC ID: KQNMLINK900  
 IC: 2361A-MLINK900  
 REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

915 MHz Horizontal



## Radiated Emissions

**Equipment Under Test** Frequency Hopper  
**Test Mode** Transmit  
**Antenna Polarity** Horizontal  
**Detectors Used**  
**Test Operator** Mario de Aranzeta  
**Test Specification** 15.247



29. Apr 14 00:45

Ref 72 dBμV/m

\* Att 0 dB

\* RBW 1 MHz

\* VBW 10 kHz

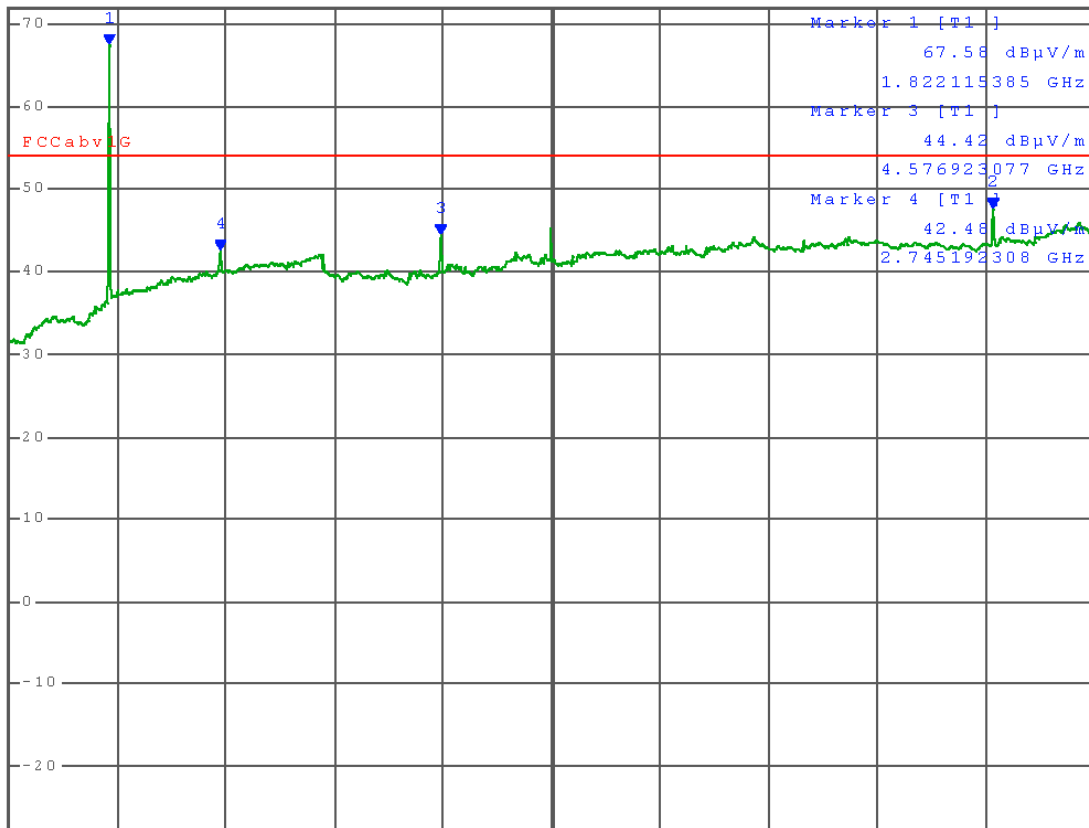
SWT 720 ms

Marker 2 [T1]

47.55 dBμV/m

9.163461538 GHz

1 PK  
VIEW



Start 1 GHz

900 MHz/

Stop 10 GHz

APPLICANT: MURANDI COMMUNICATIONS LTD.

FCC ID: KQNMLINK900

IC: 2361A-MLINK900

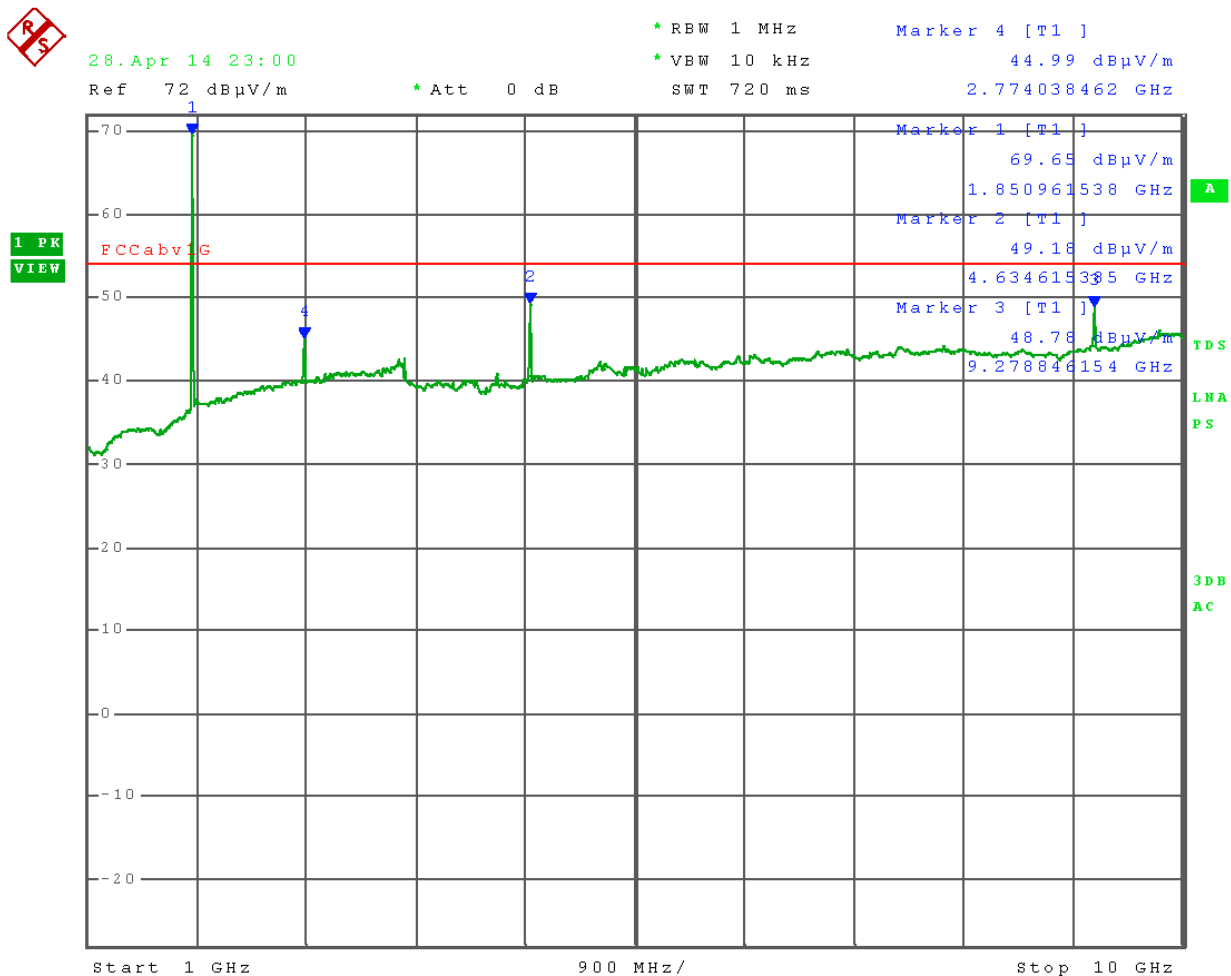
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

927 MHz Vertical



## Radiated Emissions

**Equipment Under Test** Frequency Hopper  
**Test Mode** Transmit  
**Antenna Polarity** Vertical  
**Detectors Used**  
**Test Operator** Mario de Aranzeta  
**Test Specification** 15.247



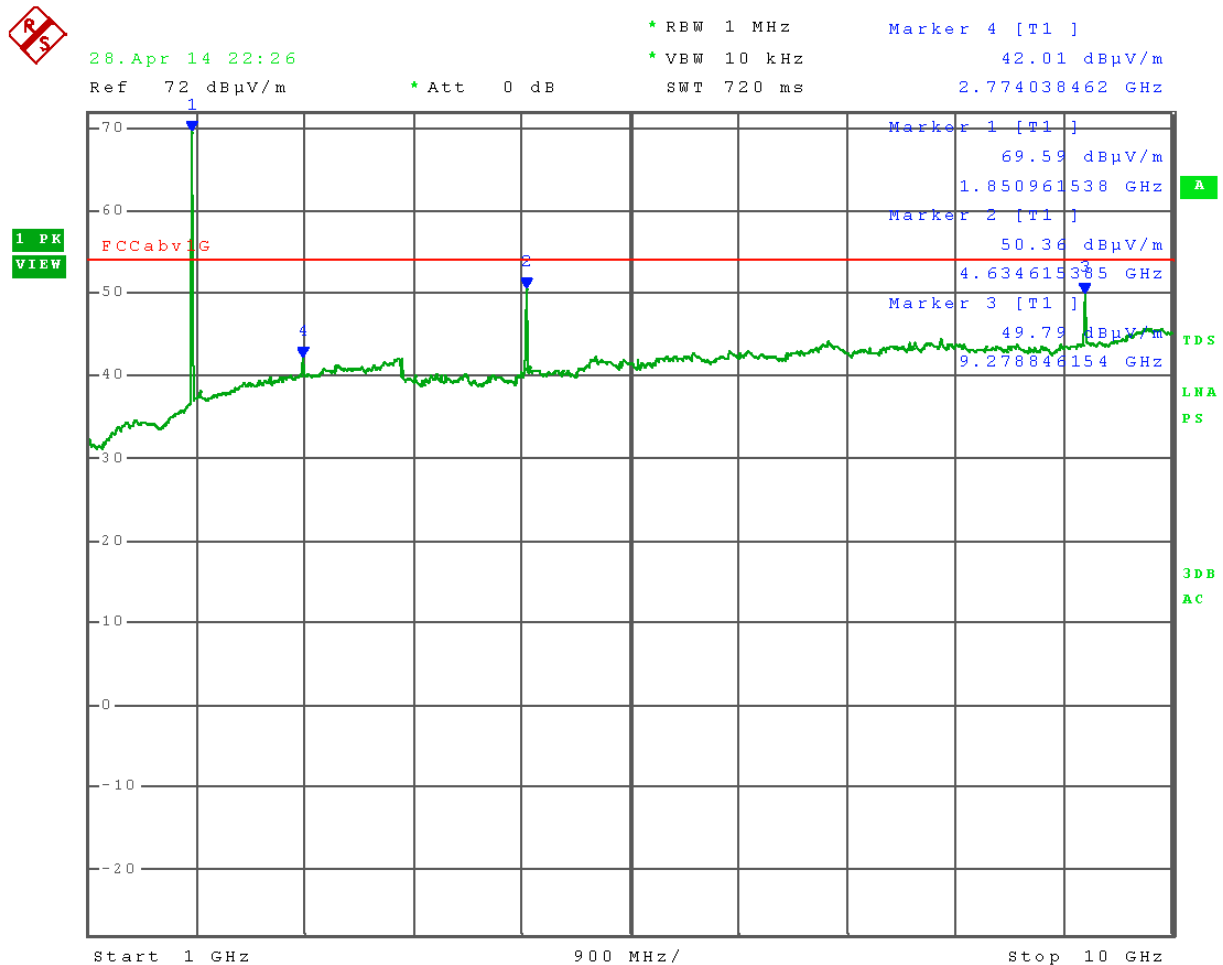
APPLICANT: MURANDI COMMUNICATIONS LTD.  
 FCC ID: KQNLINK900  
 IC: 2361A-MLINK900  
 REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

927 MHz Horizontal



## Radiated Emissions

**Equipment Under Test** Frequency Hopper  
**Test Mode** Transmit  
**Antenna Polarity** Horizontal  
**Detectors Used**  
**Test Operator** Mario de Aranzeta  
**Test Specification** 15.247



APPLICANT: MURANDI COMMUNICATIONS LTD.  
 FCC ID: KQNMLINK900  
 IC: 2361A-MLINK900  
 REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx



**Test Data:**

Data for Yagi antenna

Tuned Frequency MHz	Emission Frequency MHz	Antenna Polarity V/ H	Field strength dBμV/m	Margin dB
903	903	V	122.81	
	1807.7	V	61.59	42.49
	2701.9	V	45.96	8.04
903	903	H	97.28	30.08
	1807.7	H	56.14	47.94
	2875	H	39.89	14.11
915	915	V	122.97	
	1822.1	V	57.58	46.5
	2745.2	V	49.36	4.64
915	915	H	99.85	27.51
	1822.1	H	51.02	53.06
927	927	V	124.08	
	1854	V	51.57	52.51
	2781	V	41.13	12.87
927	927	H	102.52	

APPLICANT: MURANDI COMMUNICATIONS LTD.

FCC ID: KQNMLINK900

IC: 2361A-MLINK900

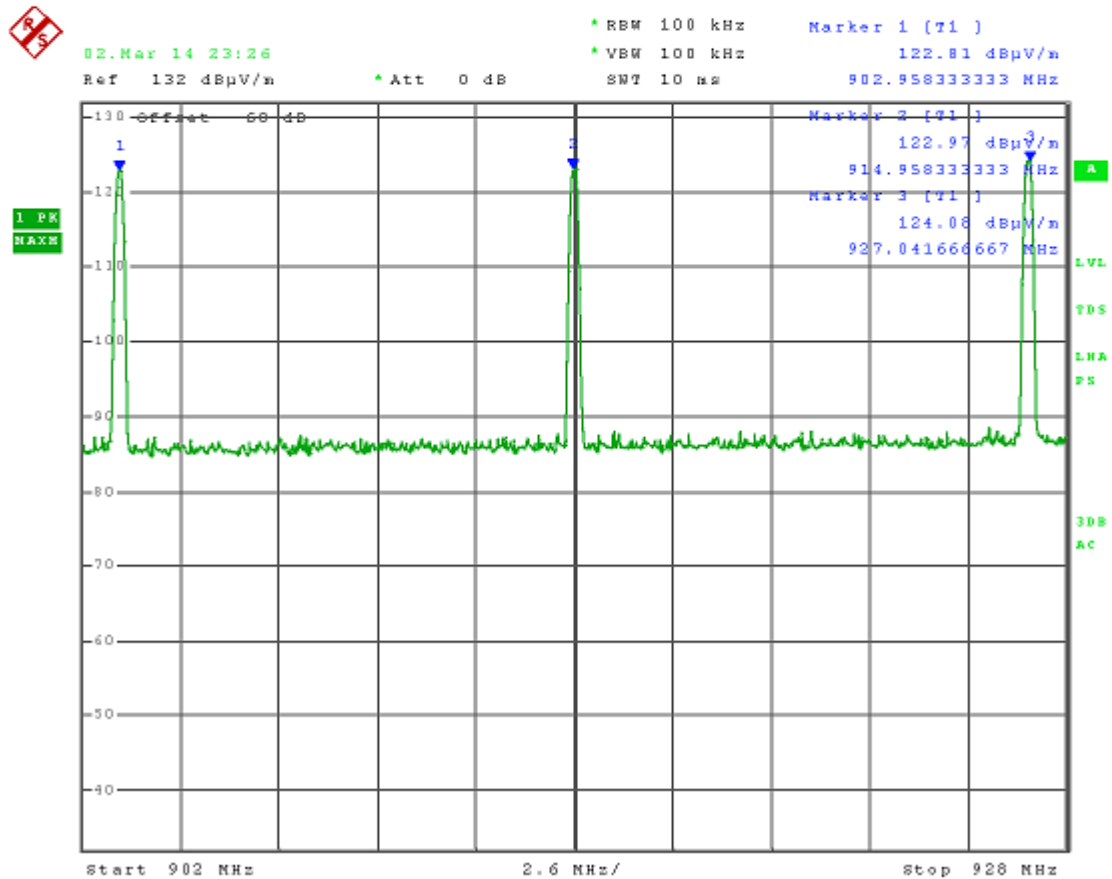
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

Plot of the Yagi antenna's radiated emissions (Vertical) at the fundamental.



## Radiated Emissions

Equipment Under Test Frequency Hopper  
Test Mode Transmit  
Antenna Polarity Vertical  
Detectors Used Max Peak  
Test Operator Mario de Aranzeta  
Test Specification 15.247



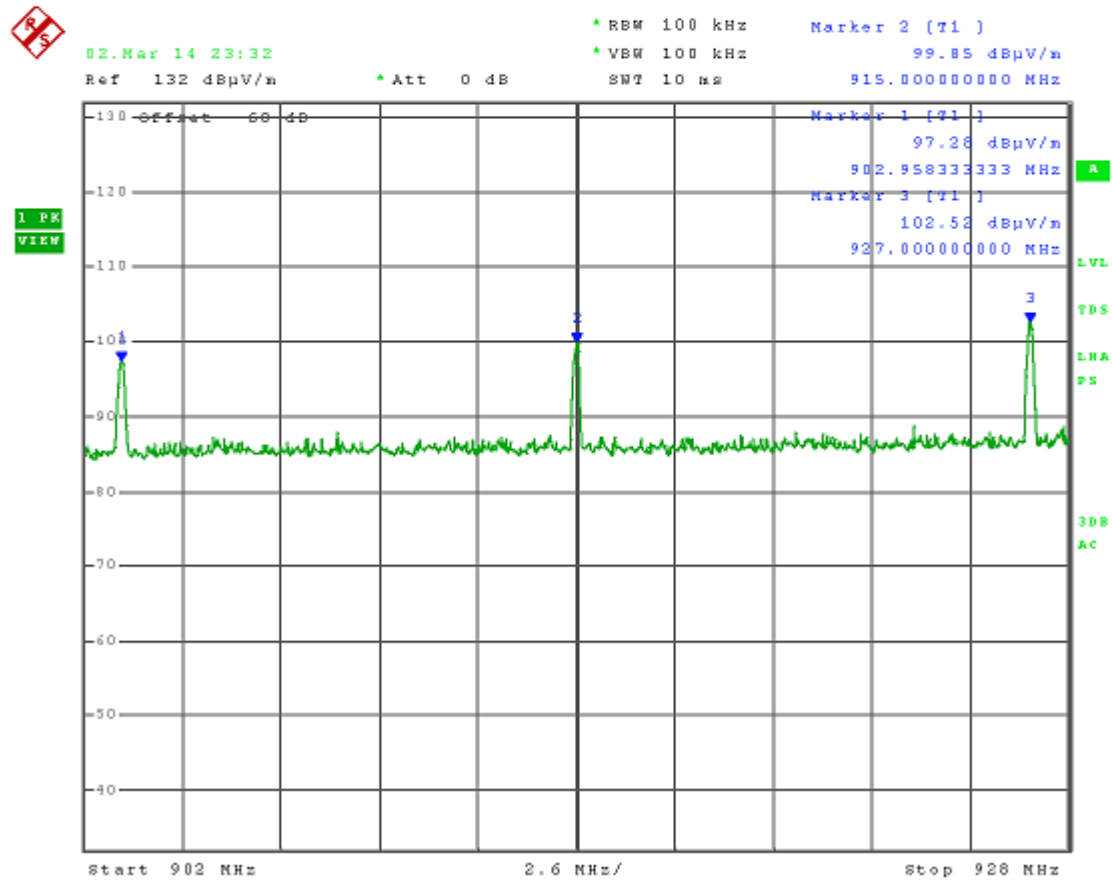
APPLICANT: MURANDI COMMUNICATIONS LTD.  
FCC ID: KQNMLINK900  
IC: 2361A-MLINK900  
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

Plot of the Yagi antenna's radiated emissions (Horizontal) at the fundamental.



## Radiated Emissions

Equipment Under Test Frequency Hopper  
Test Mode Transmit  
Antenna Polarity Horizontal  
Detectors Used Max Peak  
Test Operator Mario de Aranzeta  
Test Specification 15.247



APPLICANT: MURANDI COMMUNICATIONS LTD.  
FCC ID: KQNMLINK900  
IC: 2361A-MLINK900  
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

903 MHz Vertical



## Radiated Emissions

**Equipment Under Test** Frequency Hopper  
**Test Mode** Transmit  
**Antenna Polarity** Vertical  
**Detectors Used**  
**Test Operator** Mario de Aranzeta  
**Test Specification** 15.247



29.Apr 14 02:30

Ref 72 dBμV/m

\* Att 0 dB

\* RBW 1 MHz

\* VBW 10 kHz

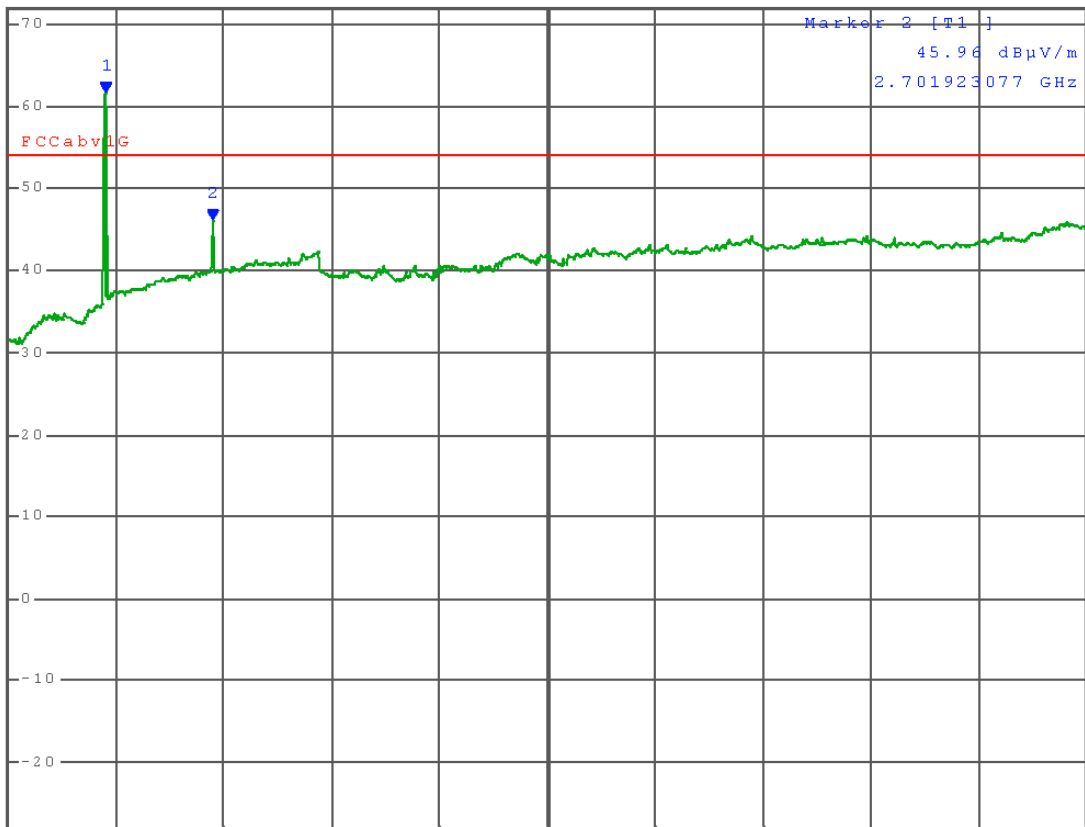
SWT 720 ms

Marker 1 [T1]

61.59 dBμV/m

1.807692308 GHz

1 PK  
MAXH



Start 1 GHz

900 MHz/

Stop 10 GHz

APPLICANT: MURANDI COMMUNICATIONS LTD.

FCC ID: KQNMLINK900

IC: 2361A-MLINK900

REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

903 MHz Horizontal



## Radiated Emissions

**Equipment Under Test** Frequency Hopper  
**Test Mode** Transmit  
**Antenna Polarity** Horizontal  
**Detectors Used**  
**Test Operator** Mario de Aranzeta  
**Test Specification** 15.247



29. Apr 14 02:32

Ref 72 dB $\mu$ V/m

\* Att 0 dB

\* RBW 1 MHz

\* VBW 10 kHz

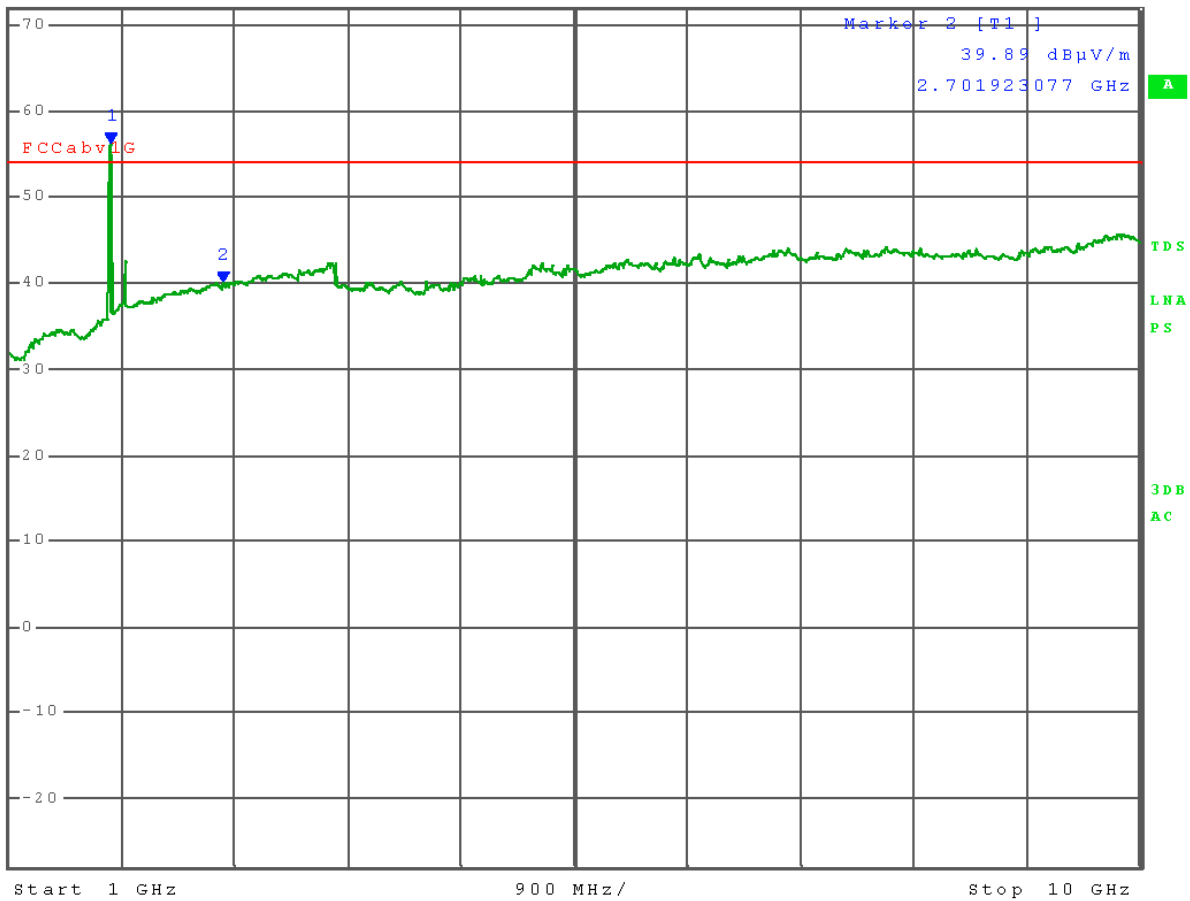
SWT 720 ms

Marker 1 [T1 ]

56.14 dB $\mu$ V/m

1.807692308 GHz

1 PK  
MAXH



APPLICANT: MURANDI COMMUNICATIONS LTD.

FCC ID: KQNMLINK900

IC: 2361A-MLINK900

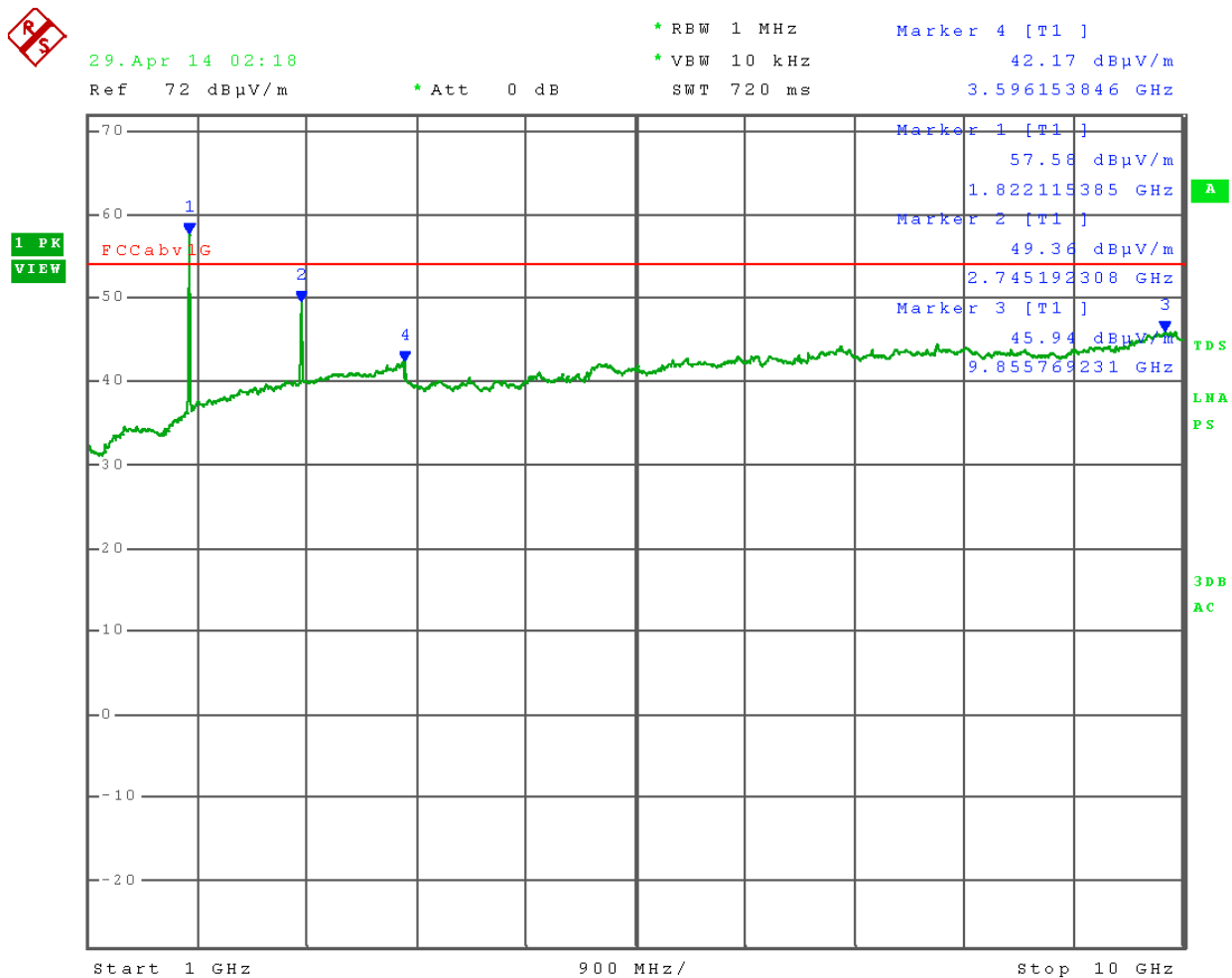
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

915 MHz Vertical



## Radiated Emissions

**Equipment Under Test** Frequency Hopper  
**Test Mode** Transmit  
**Antenna Polarity** Vertical  
**Detectors Used**  
**Test Operator** Mario de Aranzeta  
**Test Specification** 15.247



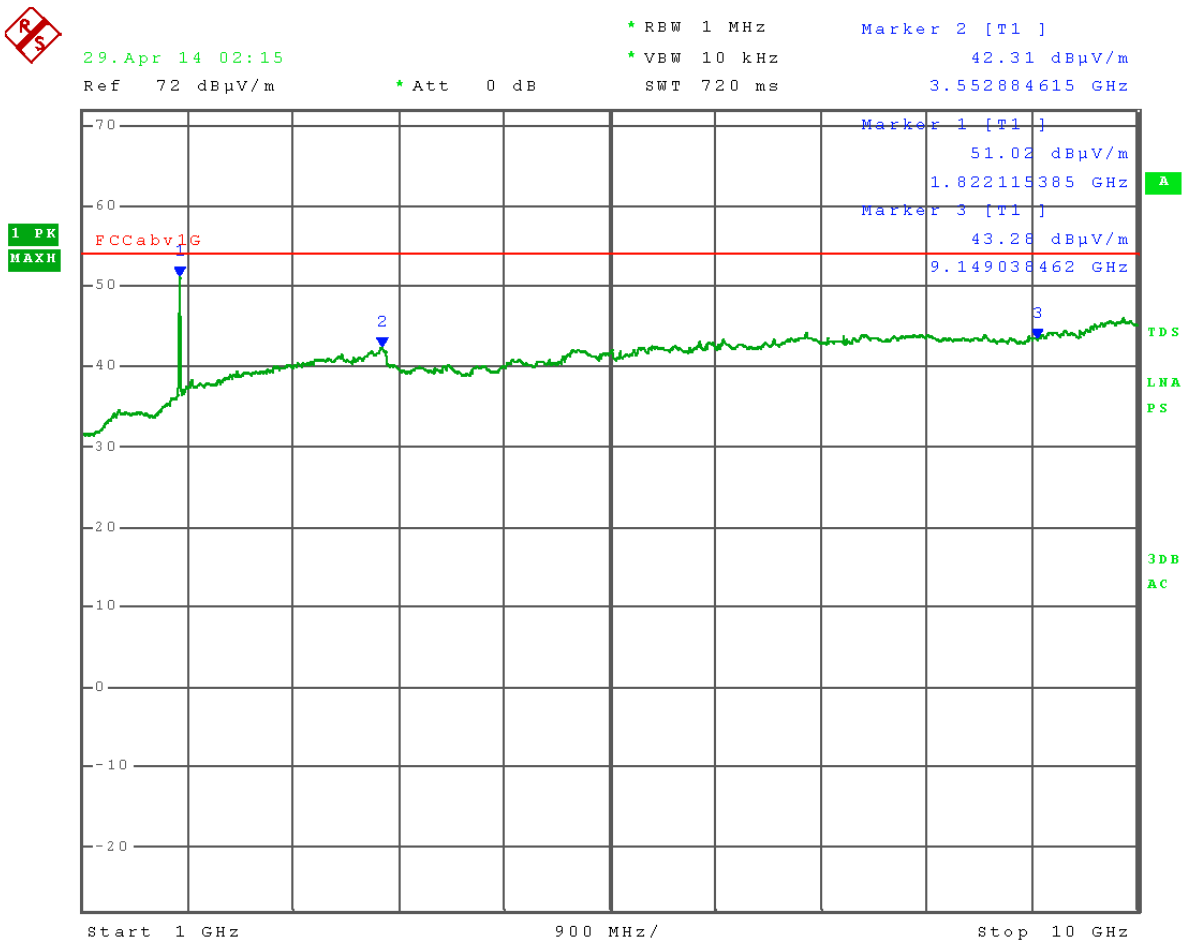
APPLICANT: MURANDI COMMUNICATIONS LTD.  
 FCC ID: KQNMLINK900  
 IC: 2361A-MLINK900  
 REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

915 MHz Horizontal



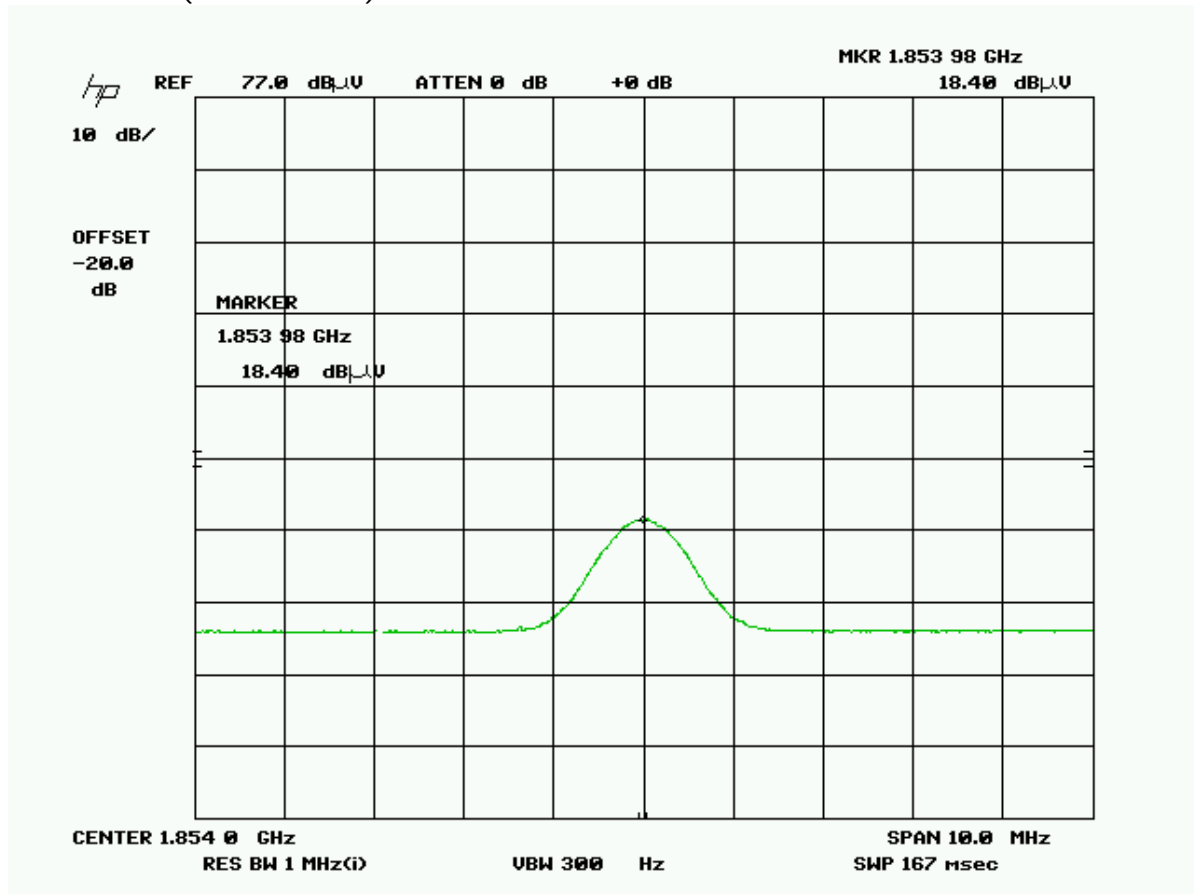
## Radiated Emissions

**Equipment Under Test** Frequency Hopper  
**Test Mode** Transmit  
**Antenna Polarity** Horizontal  
**Detectors Used**  
**Test Operator** Mario de Aranzeta  
**Test Specification** 15.247



APPLICANT: MURANDI COMMUNICATIONS LTD.  
 FCC ID: KQNMLINK900  
 IC: 2361A-MLINK900  
 REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

927 MHz Vertical (2<sup>nd</sup> harmonic)



APPLICANT: MURANDI COMMUNICATIONS LTD.

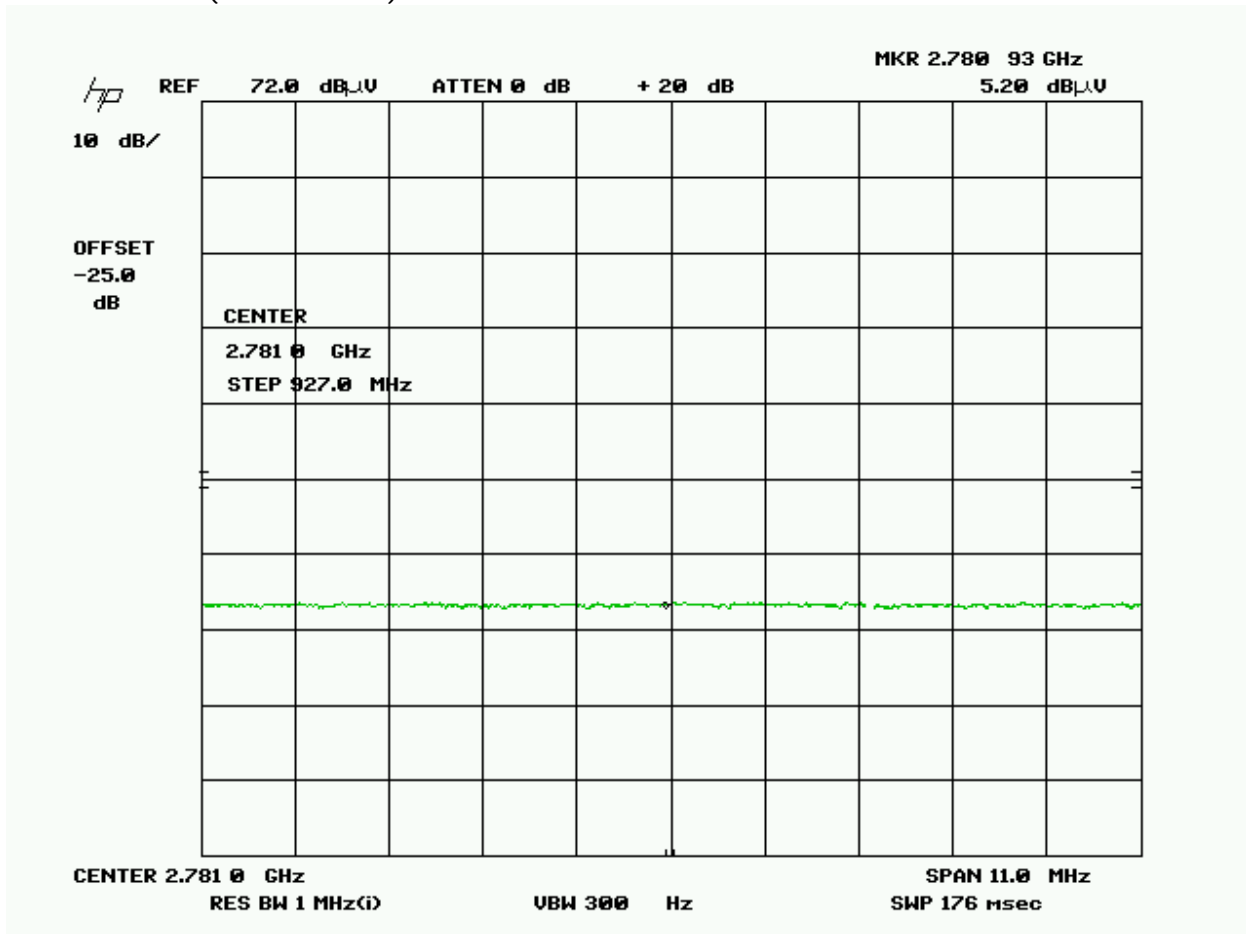
FCC ID: KQNMLINK900

IC: 2361A-MLINK900

REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx



927 MHz Vertical (3<sup>rd</sup> harmonic)



Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dB $\mu$ V	Ant. Polarity	Coax Loss dB	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Margin dB
927	1854	18.4	V	2.22	30.81	51.57	52.51
927	2781	5.2	V	2.78	33.15	41.13	12.87

APPLICANT: MURANDI COMMUNICATIONS LTD.

FCC ID: KQNMLINK900

IC: 2361A-MLINK900

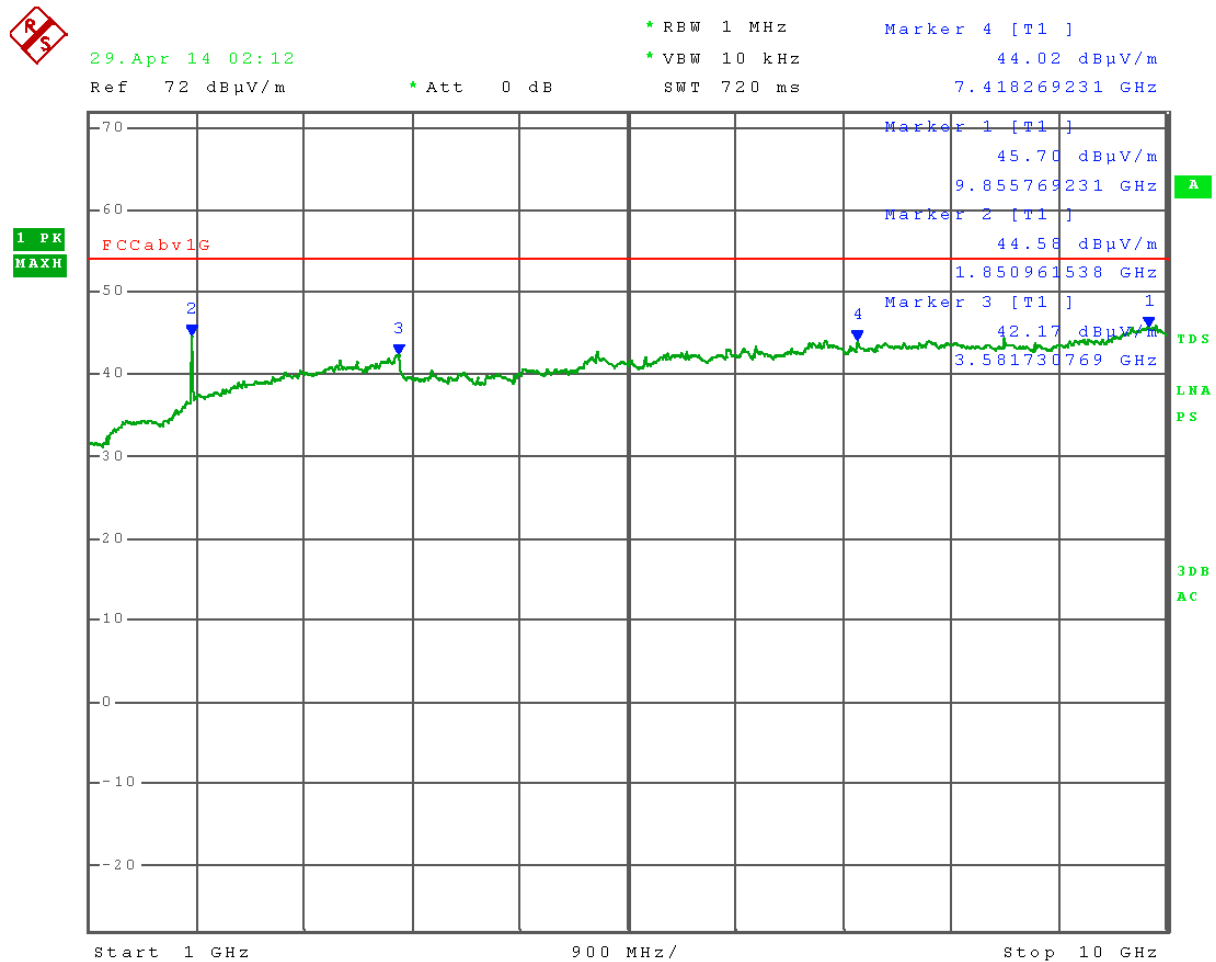
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

927 MHz Horizontal



## Radiated Emissions

**Equipment Under Test** Frequency Hopper  
**Test Mode** Transmit  
**Antenna Polarity** Horizontal  
**Detectors Used**  
**Test Operator** Mario de Aranzeta  
**Test Specification** 15.247



APPLICANT: MURANDI COMMUNICATIONS LTD.  
 FCC ID: KQNMLINK900  
 IC: 2361A-MLINK900  
 REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx



## **RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND**

**RULES PART NO.:** 15.247(c), 15.205 RSS-210 ANNEX 8, RSS-GEN

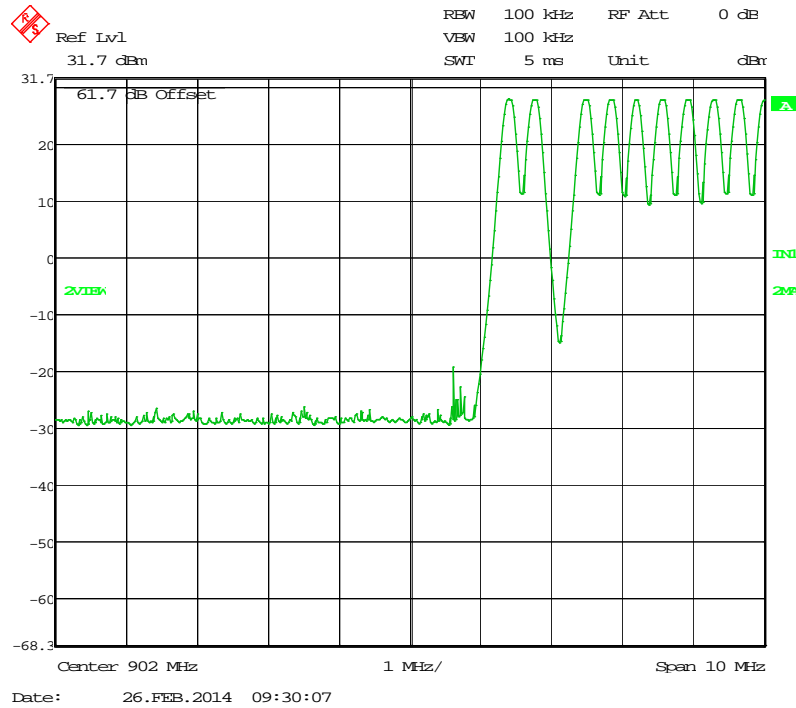
**REQUIREMENTS:** Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500  $\mu\text{V/m}$  (54  $\text{dB}\mu\text{V/m}$ ). Emissions not in the restricted band must be 20 dBc.

**TEST DATA:** In the 902 to 928 MHz band the emissions need only meet 20 dBc in the adjacent bands as they are not in a restricted band.

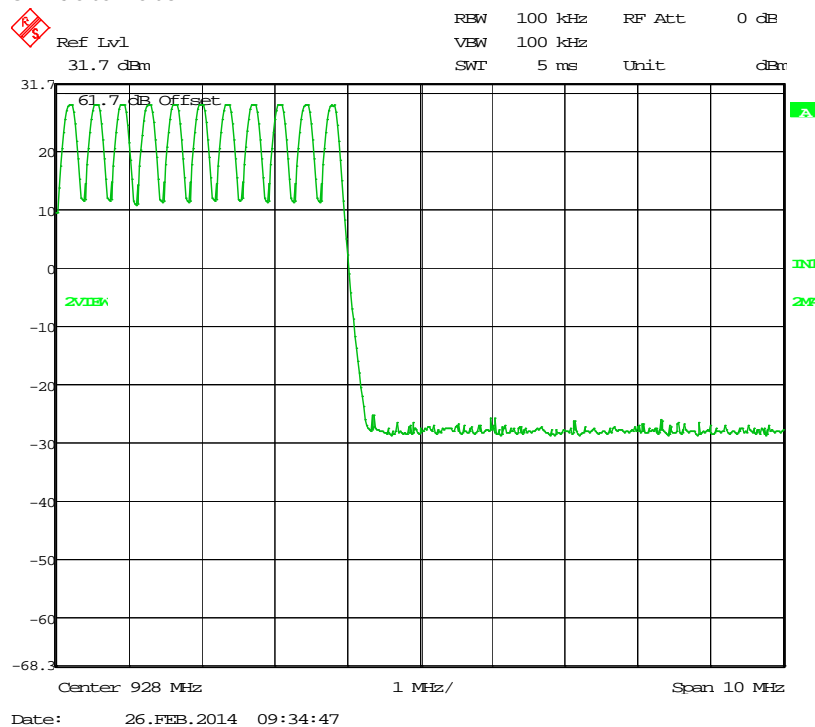
See plots on the following pages.

APPLICANT: MURANDI COMMUNICATIONS LTD.  
FCC ID: KQNMLINK900  
IC: 2361A-MLINK900  
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

### Lower bandedge/ Low data rate



### Upper bandedge/ low data rate



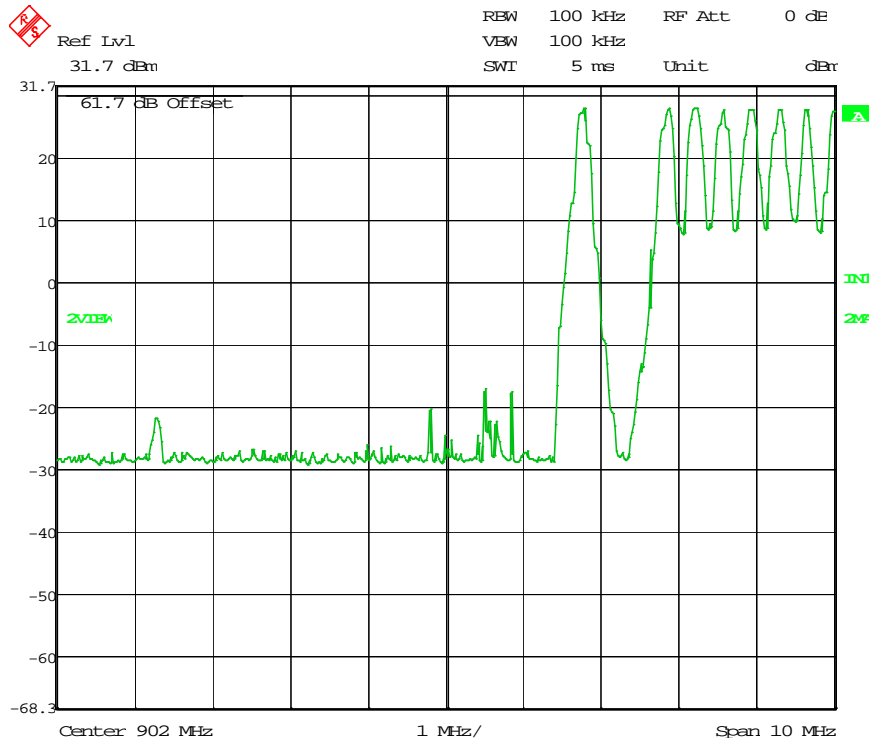
APPLICANT: MURANDI COMMUNICATIONS LTD.

FCC ID: KQNMLINK900

IC: 2361A-MLINK900

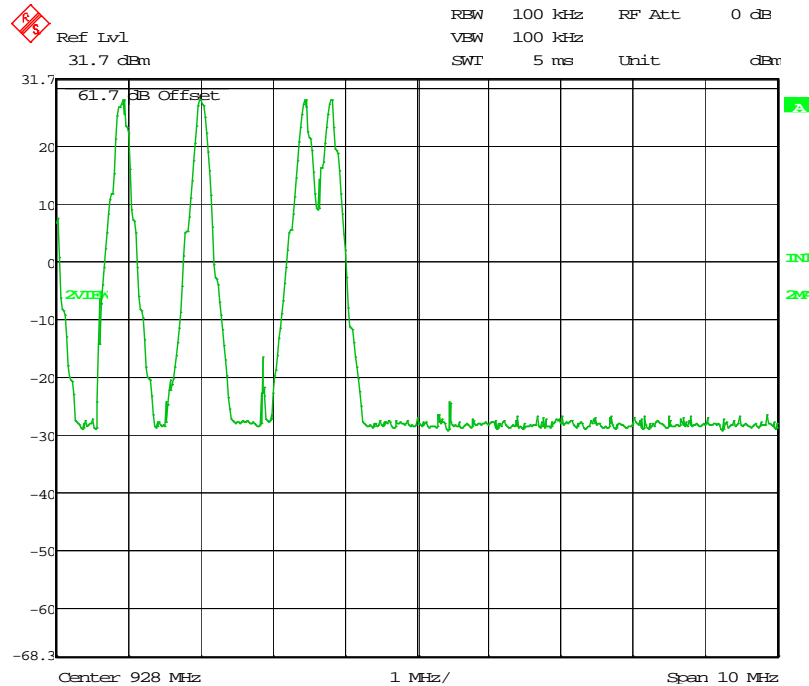
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

# Lower bandedge/ mid data rate



Date: 26.FEB.2014 09:48:12

# Upper bandedge/ mid data rate



Date: 26.FEB.2014 09:41:33

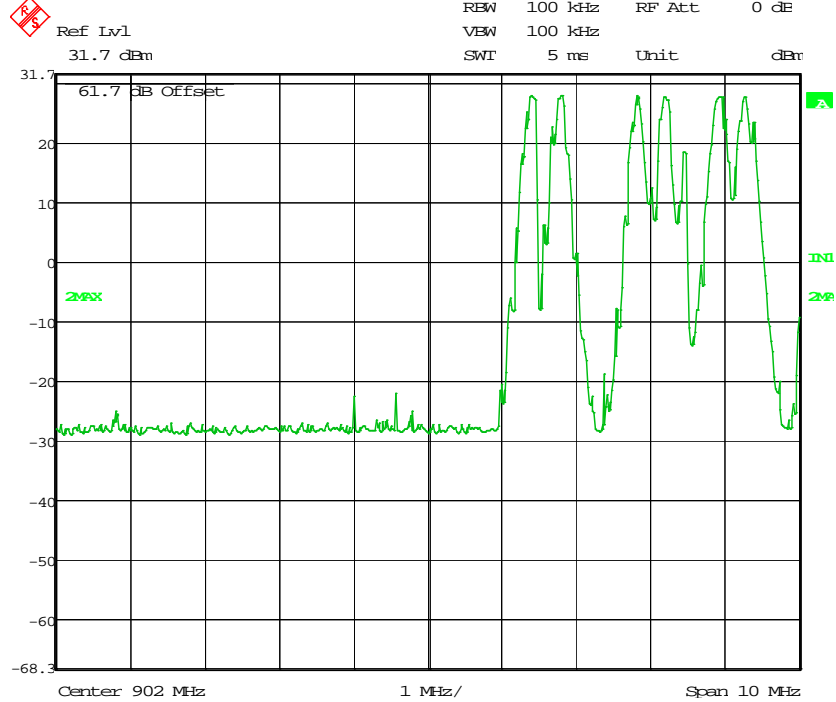
APPLICANT: MURANDI COMMUNICATIONS LTD.

FCC ID: KQNMLINK900

IC: 2361A-MLINK900

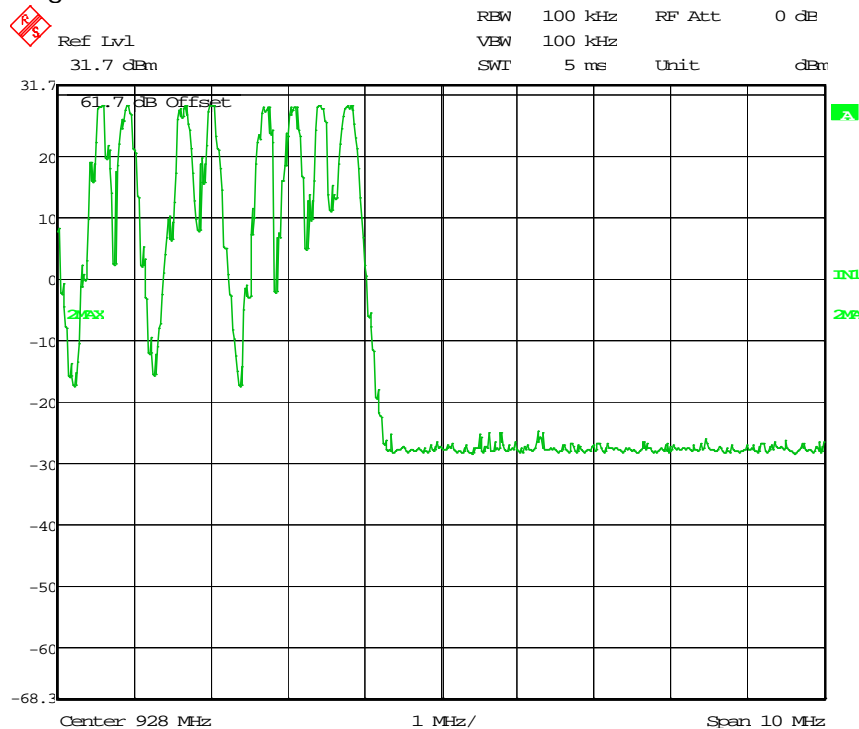
REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx

### Lower bandedge/ high data rate



Date: 26.FEB.2014 09:57:38

### Upper bandedge/ high data rate



Date: 26.FEB.2014 10:07:42

APPLICANT: MURANDI COMMUNICATIONS LTD.

FCC ID: KQNMLINK900

IC: 2361A-MLINK900

REPORT: V:\M\MURANDI\254AZUT14\254ZAUT14TestReport.docx