



TESTING LABORATORY
CERTIFICATE #4820.01



FCC PART 15B

TEST REPORT

For

Xiamen Ursalink Technology Co., Ltd.

4/F,NO. 63-2 Wanghai Road, 2nd Software Park,Xiamen ,China

FCC ID: 2AOSV-UR51

Report Type: Original Report	Product Type: Industrial Cellular Router
Report Number:	RXM180313051-00A
Report Date:	2018-06-05
Reviewed By:	Jerry Zhang EMC Manager <i>Jerry Zhang</i>
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan). This report must not be used by the customer to claim product certification, approval, or endorsement by A2LA* or any agency of the Federal Government. * This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk “*”.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

	EUT Name:	Industrial Cellular Router
	EUT Model:	UR51
	FCC ID:	2AOSV-UR51
	Rated Input Voltage:	DC 12V from Adapter
Adapter Information	Model:	OH-1015A1201000U1-UL
	Input:	100-240V~50/60Hz 350mA
	Output:	DC 12V/1A
	The Highest Operating Frequency:	5850MHz
	External Dimension:	100mm(L)*96.1mm(W)*30mm(H)
	Serial Number:	180313051
	EUT Received Date:	2018.05.30

Objective

This report is prepared on behalf of *Xiamen Ursalink Technology Co., Ltd.* in accordance with FCC Part 15B Part 2, Part J, and Part 15, Subpart A and B of the Federal Communications Commission's rules..

The objective is to determine the compliance of EUT with:
FCC Part 15B Class B.

Related Submittal(s)/Grant(s)

FCC Part 15E NII submissions with FCC ID: 2AOSV-UR51.
FCC Part 15B DTS submissions with FCC ID: 2AOSV-UR51.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

Measurement Uncertainty

Parameter	Measurement Uncertainty
Unwanted Emissions, radiated	30M~200MHz: 4.55 dB, 200M~1GHz: 5.92 dB, 1G~6GHz: 4.98 dB, 6G~18GHz: 5.89 dB, 18G~26.5G: 5.47 dB, 26.5G~40G: 5.63 dB
Temperature	±1 °C
Humidity	±5%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

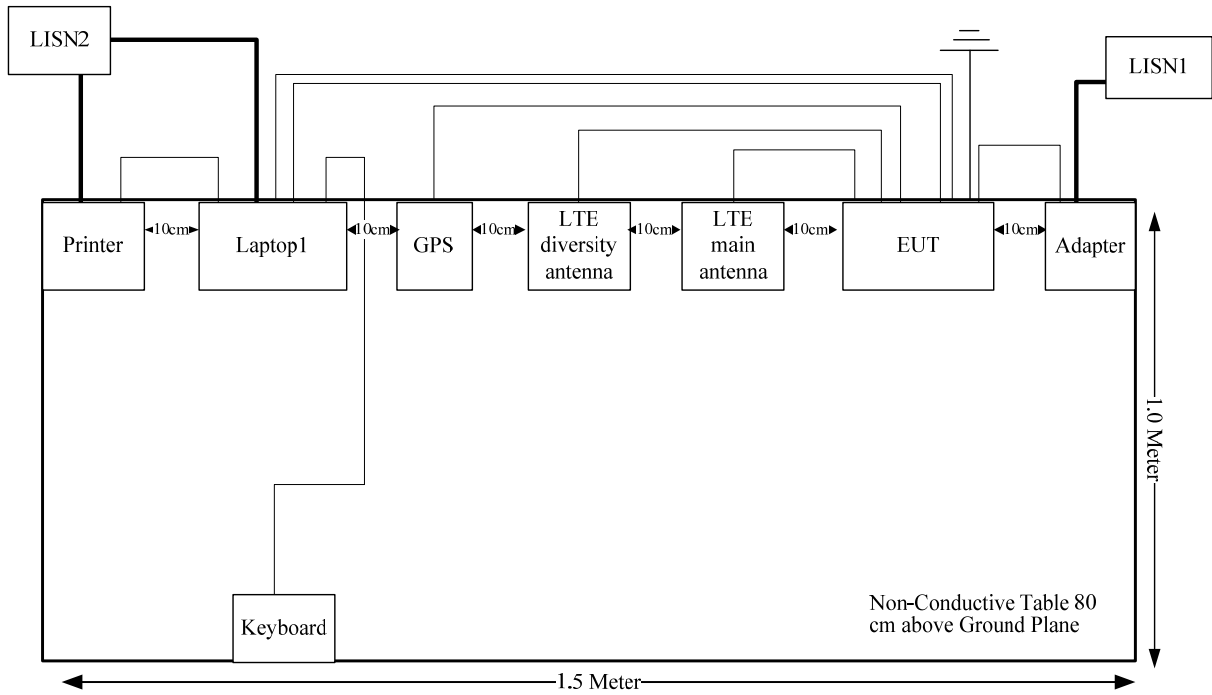
Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

No EUT software for testing.

Block Diagram of Test Setup



Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	HLKYGB1
HP	Printer	C3990A	JPZW030603
DELL	Keyboard	SK-8115	CN-0DJ313-71616-05A-0DSO

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length(m)	From Port	To
RJ45 Cable	No	No	0.8	RJ45 Port of EUT	Laptop
Ground Cable	No	No	1.0	EUT	Earth
Serial Cable	No	No	1.4	Serial Port of Laptop	Laptop
USB Cable	No	No	2	USB Port of Laptop	Keyboard
Parallel Cable	No	No	1.4	Parallel Port of Laptop	Printer
Antenna Cable	No	No	1.5	Antenna Port of EUT	LTE main antenna
Antenna Cable	No	No	1.5	Antenna Port of EUT	LTE diversity antenna
GPS Antenna Cable	No	No	1.5	GPS Port of EUT	GPS Antenna
Power Cable	No	Yes	1.5	Power Port of EUT	Adapter

Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2017-12-11	2018-12-11
N/A	Coaxial Cable	C-NJNJ-50	C-0200-01	2017-09-05	2018-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2017-12-08	2018-12-08
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Agilent	Spectrum Analyzer	E4440A	SG43360054	2018-01-04	2019-01-04
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-01 1302	2016-11-18	2019-11-18
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2017-06-27	2018-06-27
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2017-06-27	2018-06-27
Sinoscite	Bandstop Filters	BSF5150-5850MN-0899-003	0899003	2018-05-06	2019-05-06
E-Microwave	Band-stop Filters	OBSF-2400-2483.5-S	OE01601525	2017-06-16	2018-06-16

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

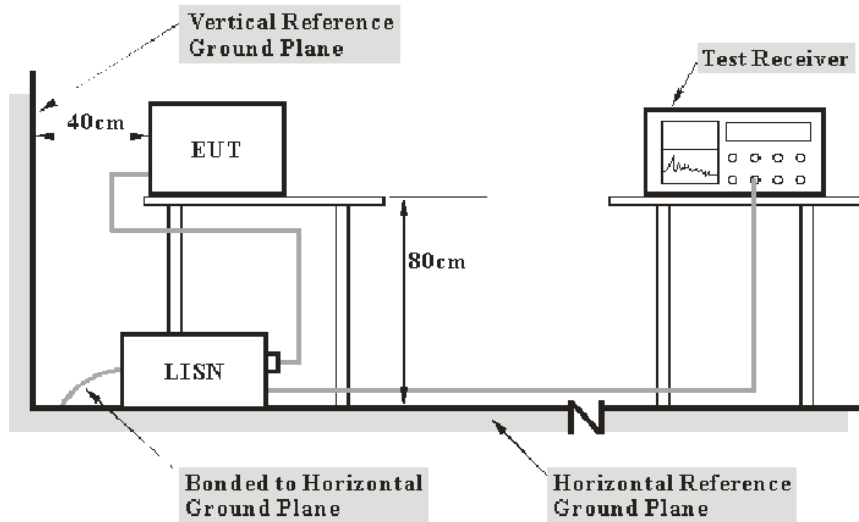
Temperature:	27~30.8 °C
Relative Humidity:	35~51%
ATM Pressure:	101.3~ 101.4kPa
Tester:	Sider Huang,Blake Yang
Test Date:	2018.05.31-2018.06.01

SUMMARY OF TEST RESULTS

SN	Rule and Clause	Description of Test	Test Result
1	FCC §15.107	Conducted emissions	Compliance
2	FCC §15.109	Radiated emissions	Compliance

1 - CONDUCTED EMISSIONS

EUT Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15 B Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter of EUT was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result (QuasiPeak or Average) = Meter Reading + Corr.

Note:

Corr. = Cable loss + Factor of coupling device

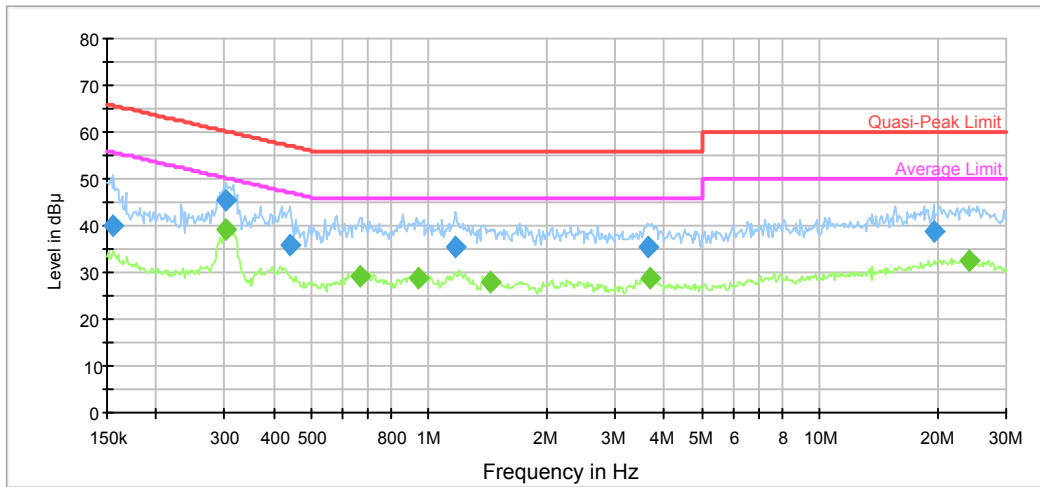
The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit – Result

Test Data

Please refer to following table and plots:

Model Number: UR51
 Port: L
 Test Mode: Data Communication
 Power Source: AC 120V/60Hz



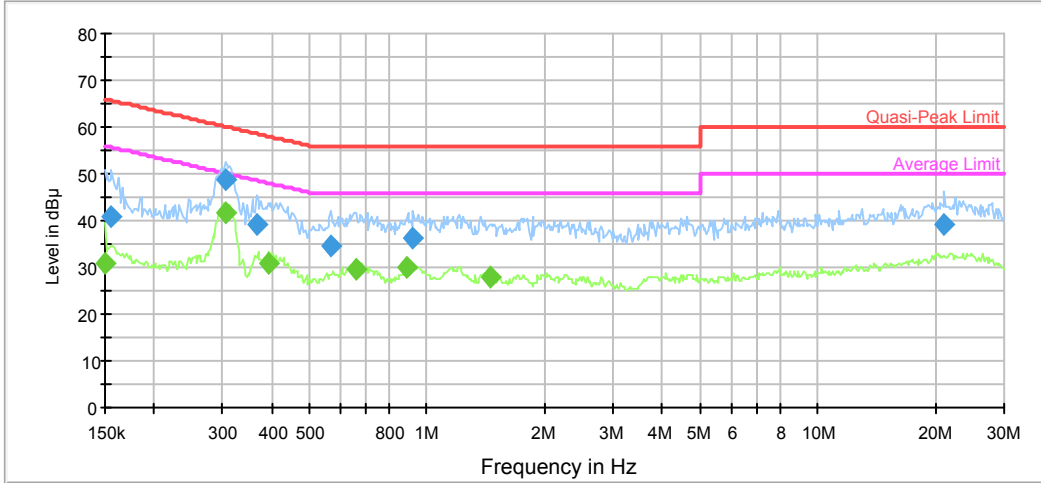
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.156097	40.0	9.000	L1	11.1	25.7	65.7
0.302425	45.3	9.000	L1	10.1	14.9	60.2
0.443327	35.7	9.000	L1	9.9	21.3	57.0
1.171949	35.5	9.000	L1	9.8	20.5	56.0
3.633326	35.2	9.000	L1	9.8	20.8	56.0
19.519859	38.9	9.000	L1	10.1	21.1	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.302425	39.2	9.000	L1	10.1	11.0	50.2
0.665597	29.0	9.000	L1	9.8	17.0	46.0
0.937592	28.9	9.000	L1	9.8	17.1	46.0
1.430284	27.8	9.000	L1	9.7	18.2	46.0
3.662393	28.6	9.000	L1	9.8	17.4	46.0
24.205331	32.7	9.000	L1	10.1	17.3	50.0

Model Number: UR51
 Port: N
 Test Mode: Data Communication
 Power Source: AC 120V/60Hz



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.156097	40.7	9.000	N	11.1	25.0	65.7
0.304845	48.9	9.000	N	10.1	11.2	60.1
0.366160	39.0	9.000	N	10.0	19.6	58.6
0.567545	34.5	9.000	N	9.8	21.5	56.0
0.922769	36.4	9.000	N	9.8	19.6	56.0
21.138881	39.3	9.000	N	10.0	20.7	60.0

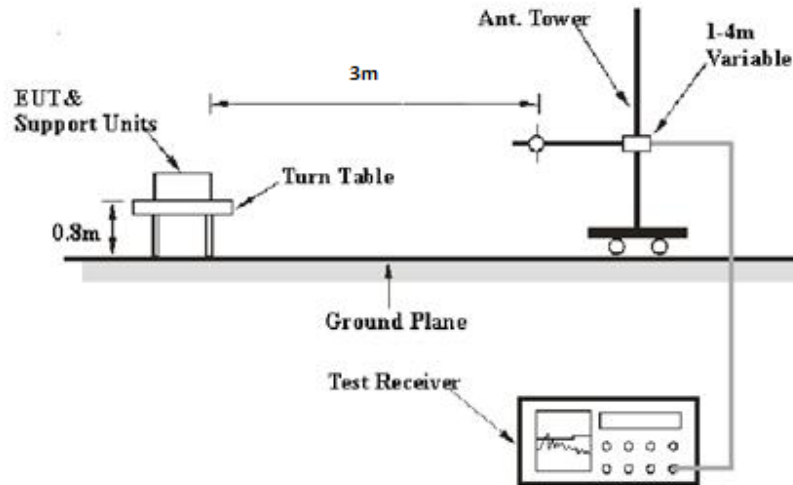
Final Result 2

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	30.7	9.000	N	11.2	25.3	56.0
0.304845	41.6	9.000	N	10.1	8.5	50.1
0.393383	30.8	9.000	N	10.0	17.2	48.0
0.655073	29.7	9.000	N	9.8	16.3	46.0
0.886728	29.9	9.000	N	9.8	16.1	46.0
1.453260	27.7	9.000	N	9.7	18.3	46.0

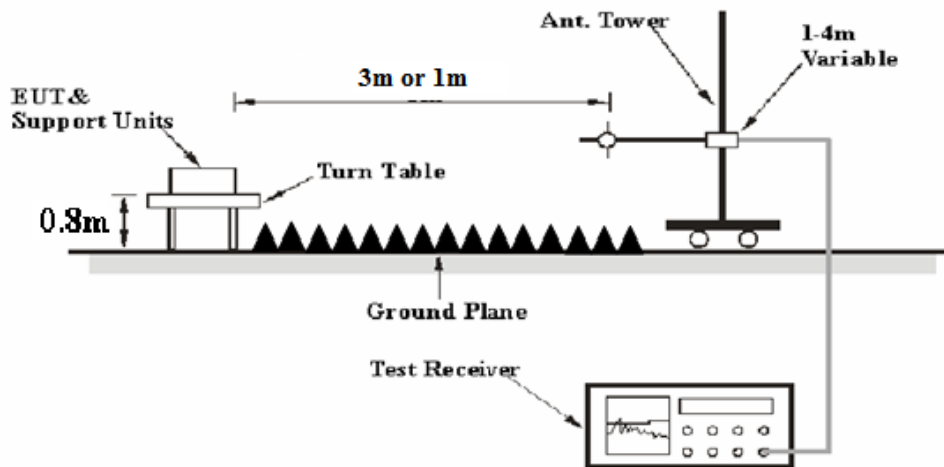
2 - RADIATED EMISSIONS

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed at the 3 meters Test Site A and B, 1GHz-26.5GHz were performed at the 3 m distance and 26.5-40GHz was performed at 1 m distance, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 Class B limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	10Hz	/	Peak

Test Procedure

During the radiated emissions, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in the Quasi-peak detection mode for below 1 GHz, peak and average detection mode above 1 GHz.

According to C63.4, the above 1G test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1 m

Distance extrapolation factor = $20 \log(\text{specific distance [3m]}/\text{test distance [1m]})$ dB = 9.54 dB

All emissions under the average limit and under the noise floor have not recorded in the report.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Meter Reading + Corrected

Note:

Corrected = Antenna Factor + Cable Loss - Amplifier Gain

or

Corrected = Antenna Factor + Cable Loss + Insertion loss of attenuator - Amplifier Gain

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation

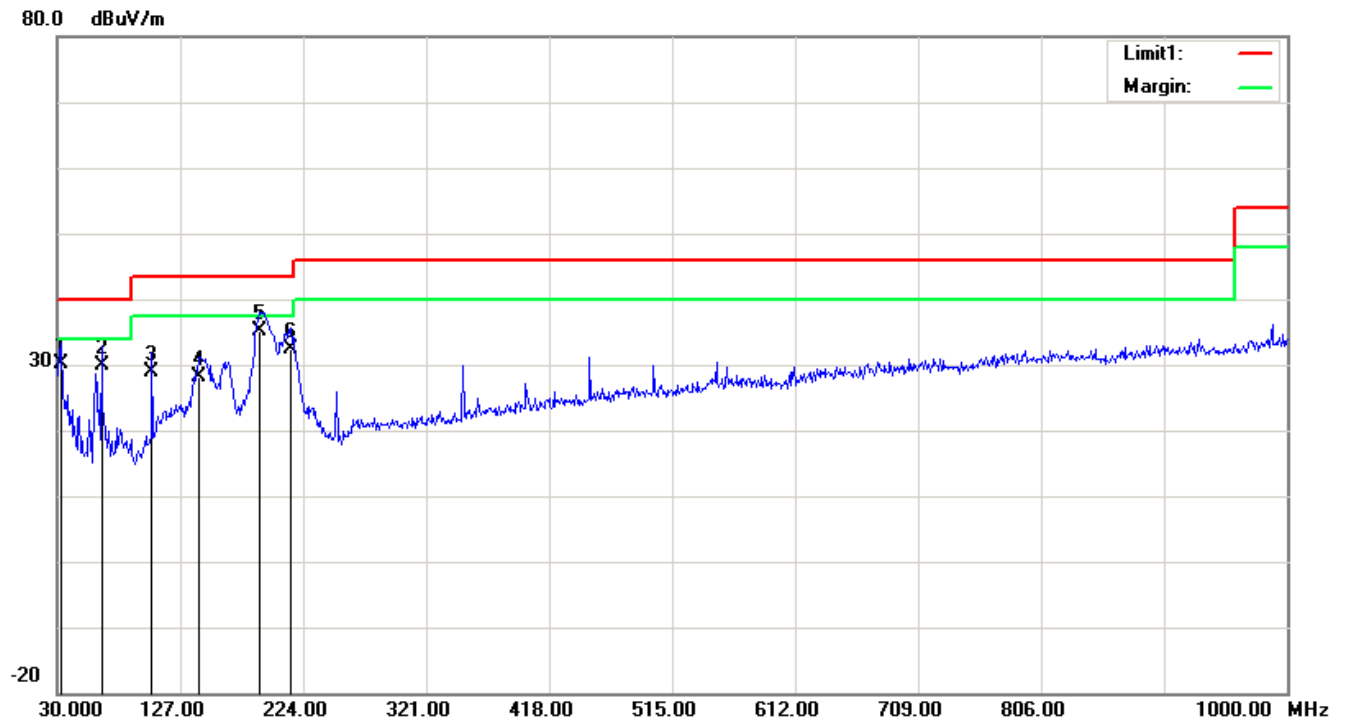
is as follows:

$$\text{Margin} = \text{Limit} - \text{Result}$$

Test Data

Please refer to following table and plots:

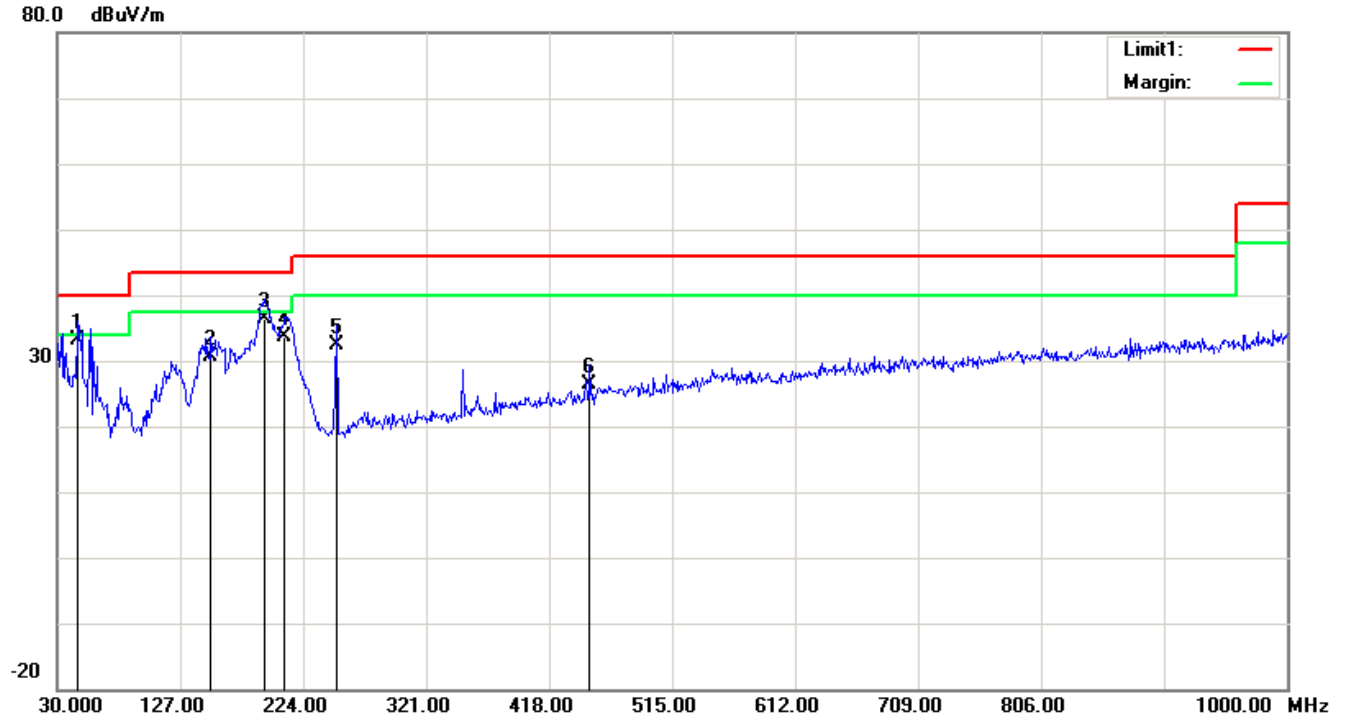
Condition:	FCC Class B 3M Radiation	Polarization:	Horizontal
EUT:	Industrial Cellular Router	Power:	AC 120V/60Hz
Model:	UR51	Distance:	3m
Test Mode:	Data Communication		
Note:			



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected dB/m	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	32.9100	30.85	QP	-0.65	30.20	40.00	9.80
2	64.9200	41.62	QP	-11.82	29.80	40.00	10.20
3	104.6900	36.47	QP	-7.67	28.80	43.50	14.70
4	141.5500	34.13	QP	-5.93	28.20	43.50	15.30
5	189.0800	42.56	QP	-7.36	35.20	43.50	8.30
6	214.3000	39.69	QP	-7.19	32.50	43.50	11.00

Condition: FCC Class B 3M Radiation
EUT: Industrial Cellular Router
Model: UR51
Test Mode: Data Communication
Note:

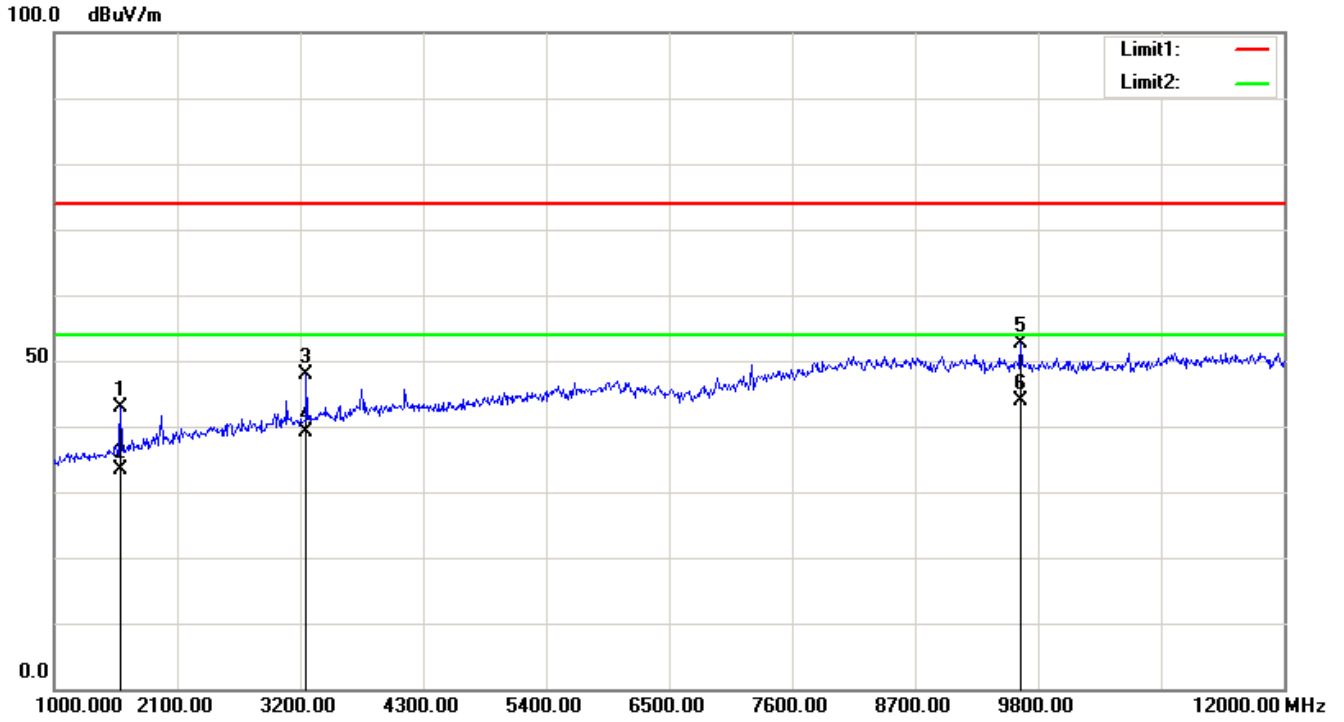
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected dB/m	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	46.4900	43.03	QP	-9.93	33.10	40.00	6.90
2	151.2500	36.60	QP	-6.00	30.60	43.50	12.90
3	192.9600	43.47	QP	-7.07	36.40	43.50	7.10
4	209.4500	41.13	QP	-7.43	33.70	43.50	9.80
5	250.1900	38.48	QP	-6.18	32.30	46.00	13.70
6	450.0100	27.49	QP	-1.19	26.30	46.00	19.70

Condition: FCC Part 15 Class B
EUT: Industrial Cellular Router
Model: UR51
Test Mode: Data Communication
Note:

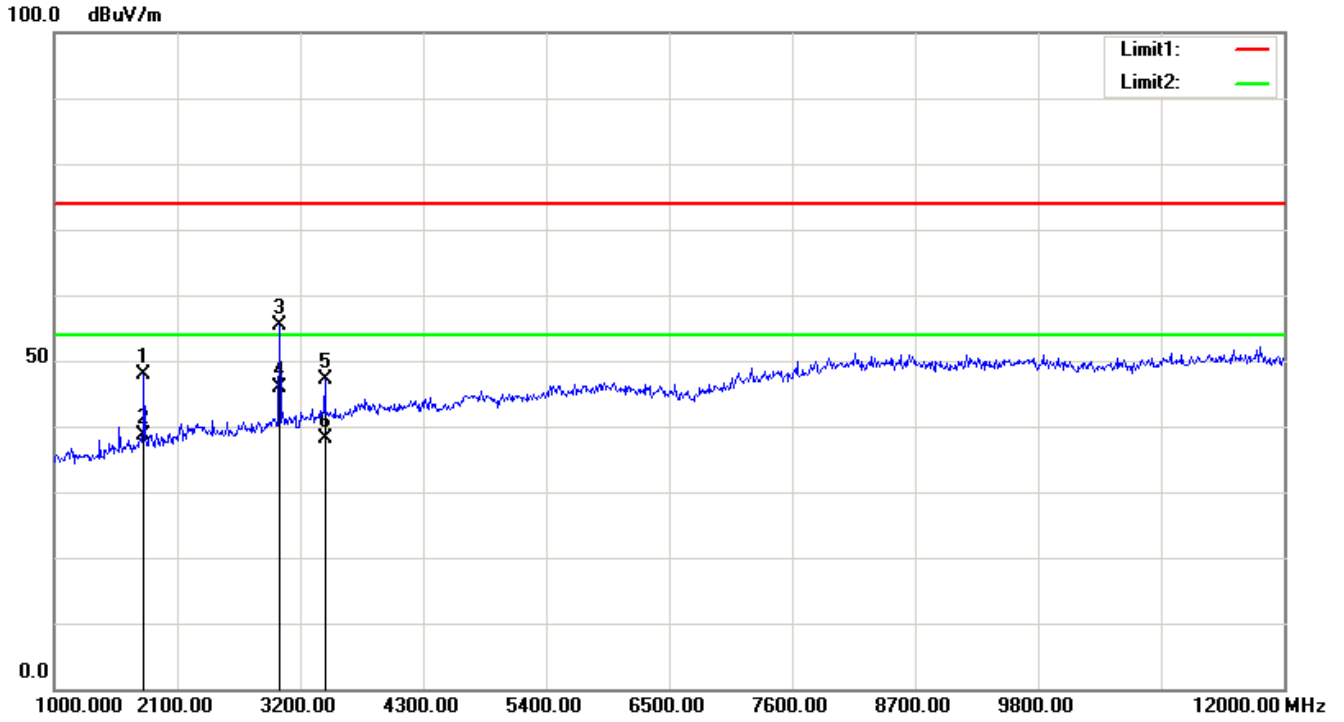
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected dB/m	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	1594.000	51.58	peak	-8.74	42.84	74.00	31.16
2	1594.000	42.14	AVG	-8.74	33.40	54.00	20.60
3	3255.000	52.00	peak	-4.06	47.94	74.00	26.06
4	3255.000	43.12	AVG	-4.06	39.06	54.00	14.94
5	9646.000	45.48	peak	7.14	52.62	74.00	21.38
6	9646.000	36.85	AVG	7.14	43.99	54.00	10.01

Condition: FCC Part 15 Class B
EUT: Industrial Cellular Router
Model: UR51
Test Mode: Data Communication
Note:

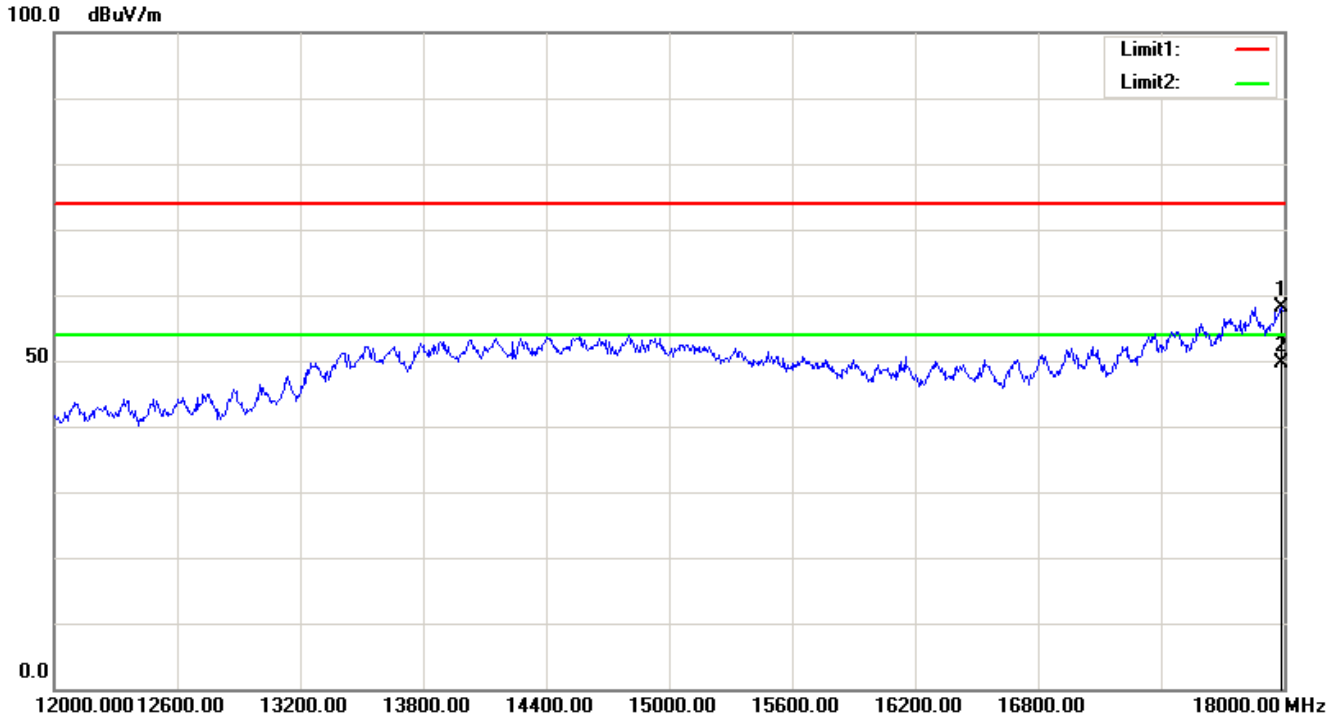
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected dB/m	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	1803.000	55.66	peak	-7.77	47.89	74.00	26.11
2	1803.000	46.32	AVG	-7.77	38.55	54.00	15.45
3	3013.000	60.16	peak	-4.76	55.40	74.00	18.60
4	3013.000	50.74	AVG	-4.76	45.98	54.00	8.02
5	3420.000	50.52	peak	-3.41	47.11	74.00	26.89
6	3420.000	41.57	AVG	-3.41	38.16	54.00	15.84

Condition: FCC Part 15 Class B
EUT: Industrial Cellular Router
Model: UR51
Test Mode: Data Communication
Note:

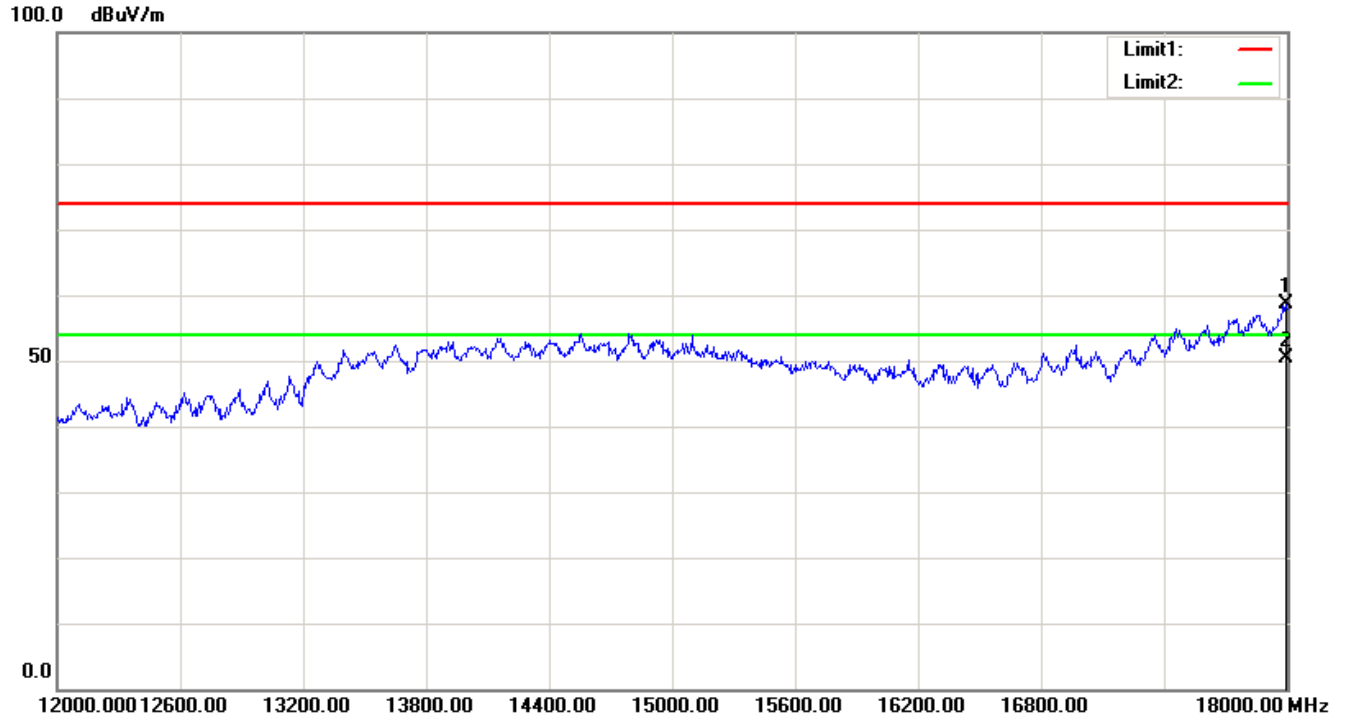
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected dB/m	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	17991.000	41.14	peak	17.08	58.22	74.00	15.78
2	17991.000	32.54	AVG	17.08	49.62	54.00	4.38

Condition: FCC Part 15 Class B
EUT: Industrial Cellular Router
Model: UR51
Test Mode: Data Communication
Note:

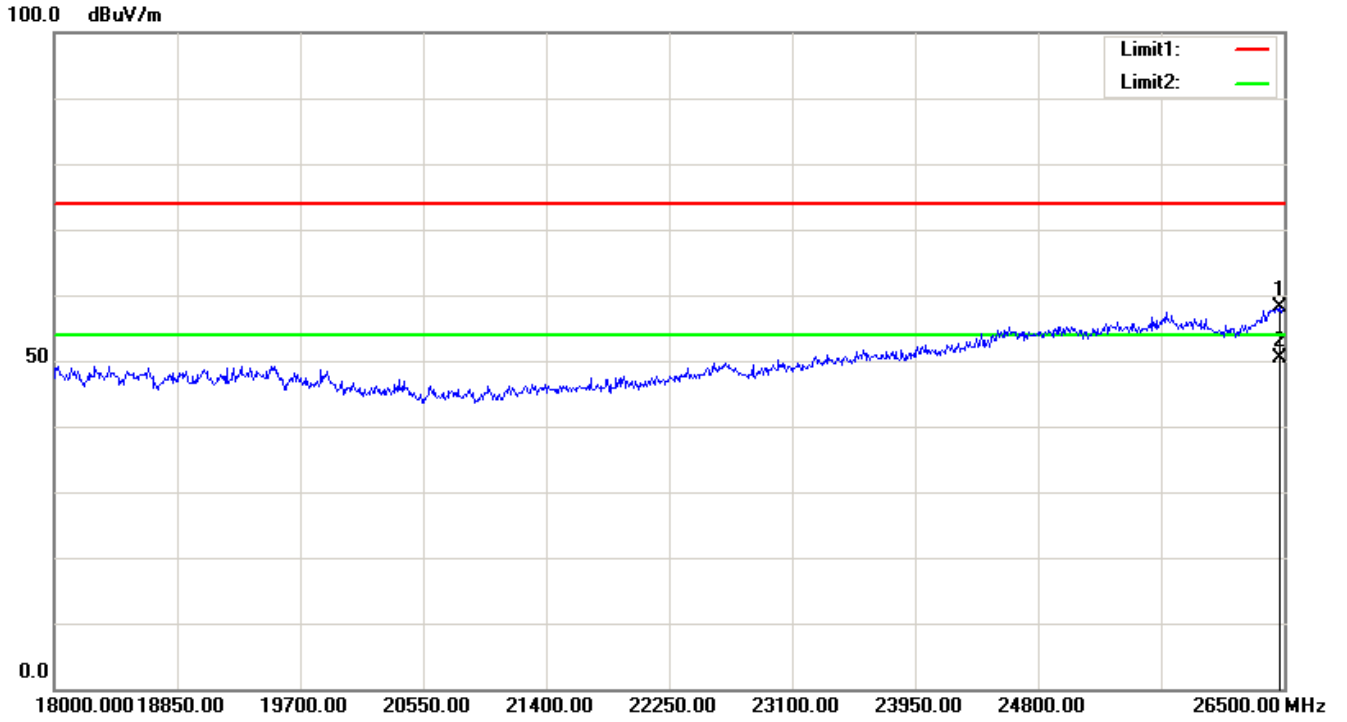
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected dB/m	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	17994.000	41.41	peak	17.10	58.51	74.00	15.49
2	17994.000	33.28	AVG	17.10	50.38	54.00	3.62

Condition: FCC Part 15 Class B
EUT: Industrial Cellular Router
Model: UR51
Test Mode: Data Communication
Note:

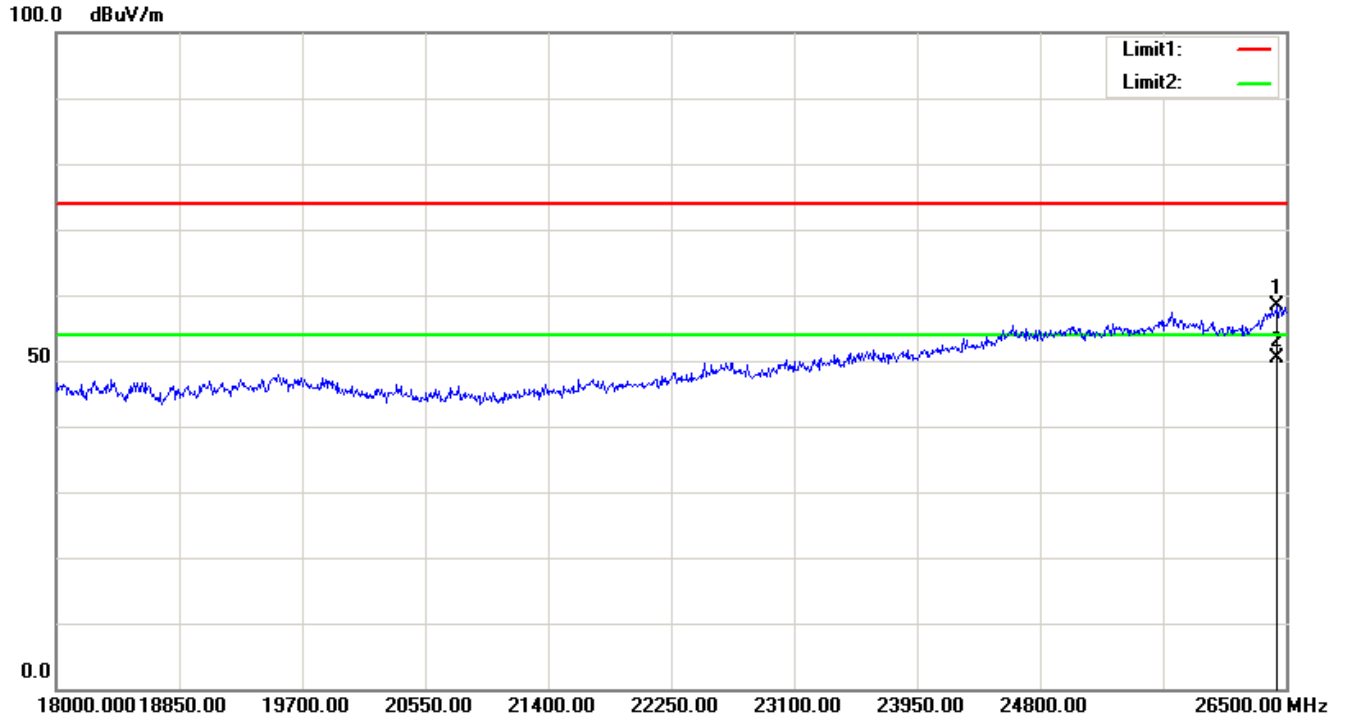
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected dB/m	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	26470.250	36.34	peak	21.71	58.05	74.00	15.95
2	26470.250	28.73	AVG	21.71	50.44	54.00	3.56

Condition: FCC Part 15 Class B
EUT: Industrial Cellular Router
Model: UR51
Test Mode: Data Communication
Note:

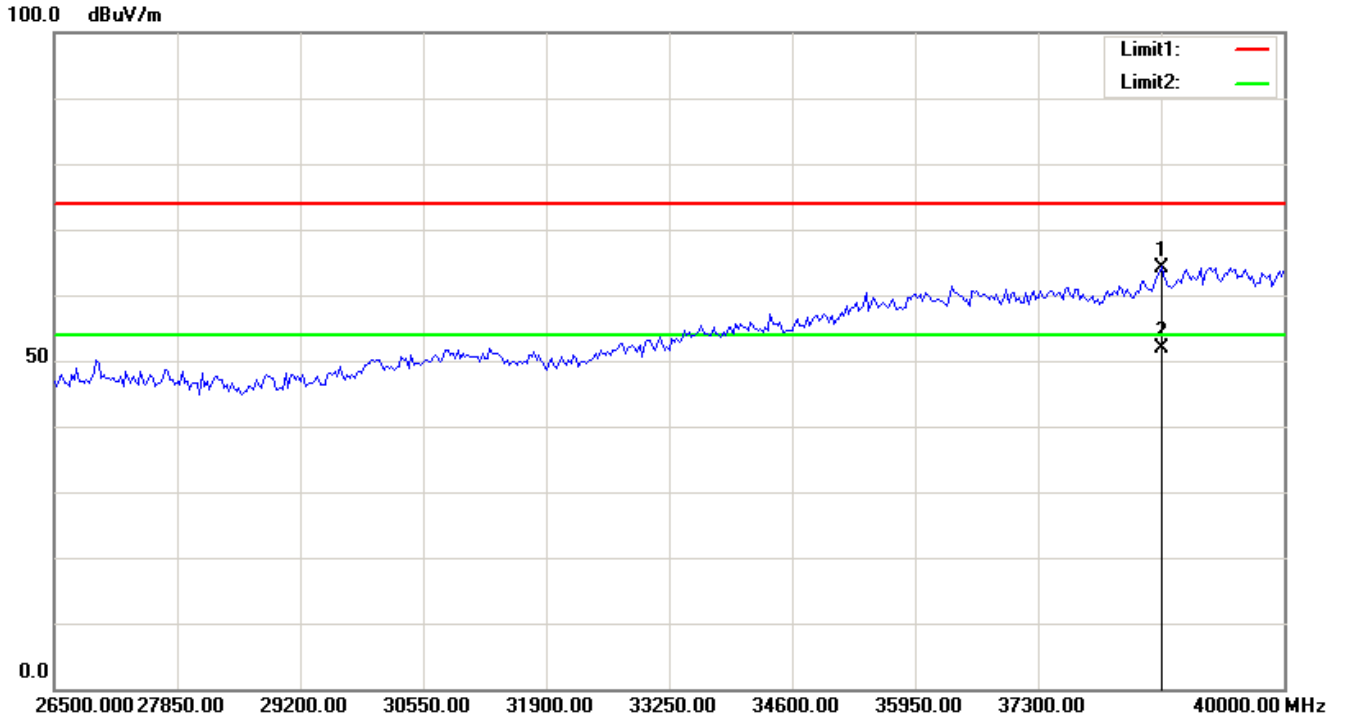
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected dB/m	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	26444.750	36.85	peak	21.60	58.45	74.00	15.55
2	26444.750	28.76	AVG	21.60	50.36	54.00	3.64

Condition: FCC Part 15 Class B
EUT: Industrial Cellular Router
Model: UR51
Test Mode: Data Communication
Note:

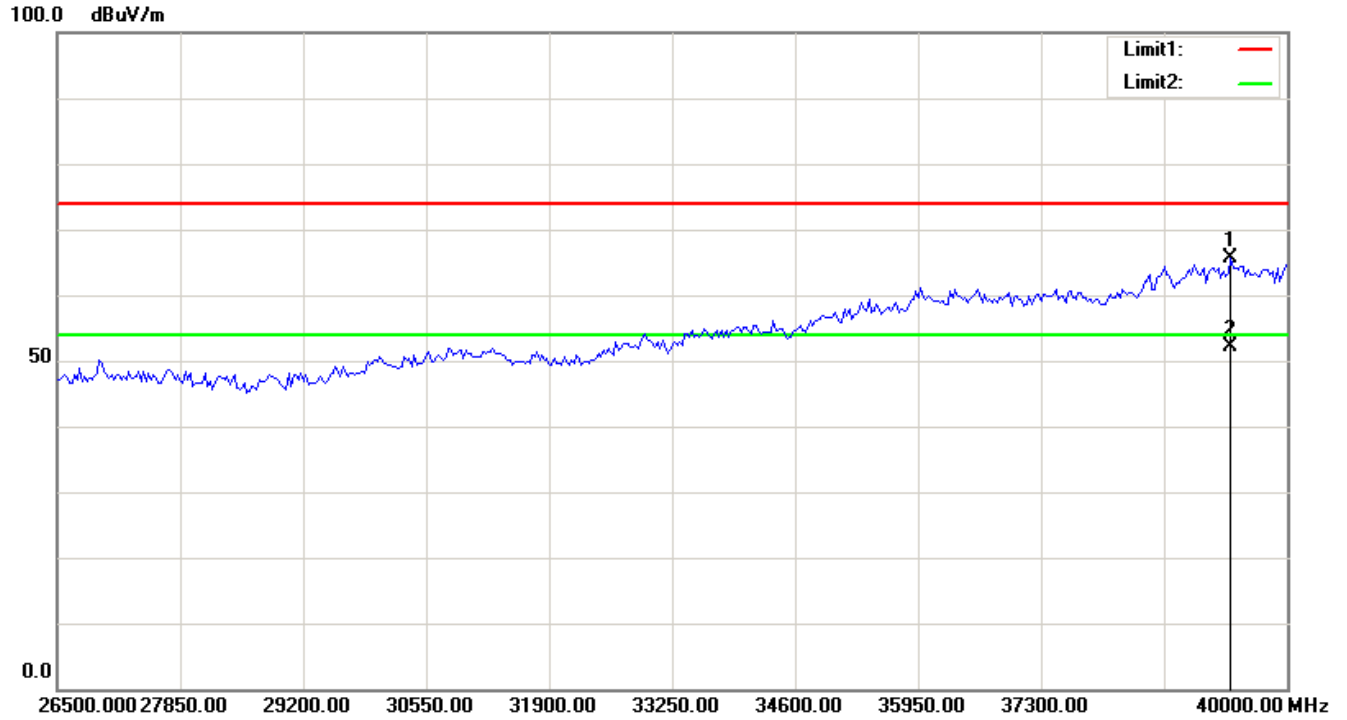
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 1m



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected dB/m	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	38650.000	48.03	peak	16.22	64.25	74.00	9.75
2	38650.000	35.68	AVG	16.22	51.90	54.00	2.10

Condition: FCC Part 15 Class B
EUT: Industrial Cellular Router
Model: UR51
Test Mode: Data Communication
Note:

Polarization: Vertical
Power: AC 120V/60Hz
Distance: 1m



No.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected dB/m	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	39379.000	49.64	peak	16.02	65.66	74.00	8.34
2	39379.000	36.16	AVG	16.02	52.18	54.00	1.82

*****END OF REPORT*****