

FCC PART 15B

TEST REPORT

For

Beijing ULINK Technology Co., Ltd

No.9-161, Fuqian street, Niulanshan town, Shunyi District, Beijing, China

FCC ID:2AMIWUZ211

Report Type: Original Report	Product Type: Mobile WiFi
Report Number:	RBJ190927050-00D
Report Date:	2020-02-19
Reviewed By:	Ivan Cao Assistant Manager 
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	Mobile WiFi
EUT Model:	UZ-211-1
Multiple Models:	UZ-200,UZ-201
Highest Operation Frequency:	5825MHz
Rated Input Voltage:	DC 3.63V from Battery or DC 5V from USB port
Serial Number:	RBJ190927050-RF-S1
EUT Received Date:	2019/10/9
EUT Received Status:	Good

Notes: Model UZ-211-1 was selected for fully testing, the detailed information about the difference among UZ-200,UZ-201and model UZ-211-1 can be referred to the declaration letter which was stated and guaranteed by the manufacturer.

Objective

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

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

Related Submittal(s)/Grant(s)

FCC Part 22H, 24E, 27 PCB submissions with FCC ID: 2AMIWUZ211
FCC Part 15C DSS submissions with FCC ID: 2AMIWUZ211
FCC Part 15C DTS submissions with FCC ID: 2AMIWUZ211
FCC Part 15E NII submissions with FCC ID: 2AMIWUZ211

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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Dongguan).

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)

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

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 lab has been recognized as the FCC accredited lab 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 lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol “Δ”. Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk “★”.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in downloading mode.

Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

The software "Winthrax.exe" was used during test.

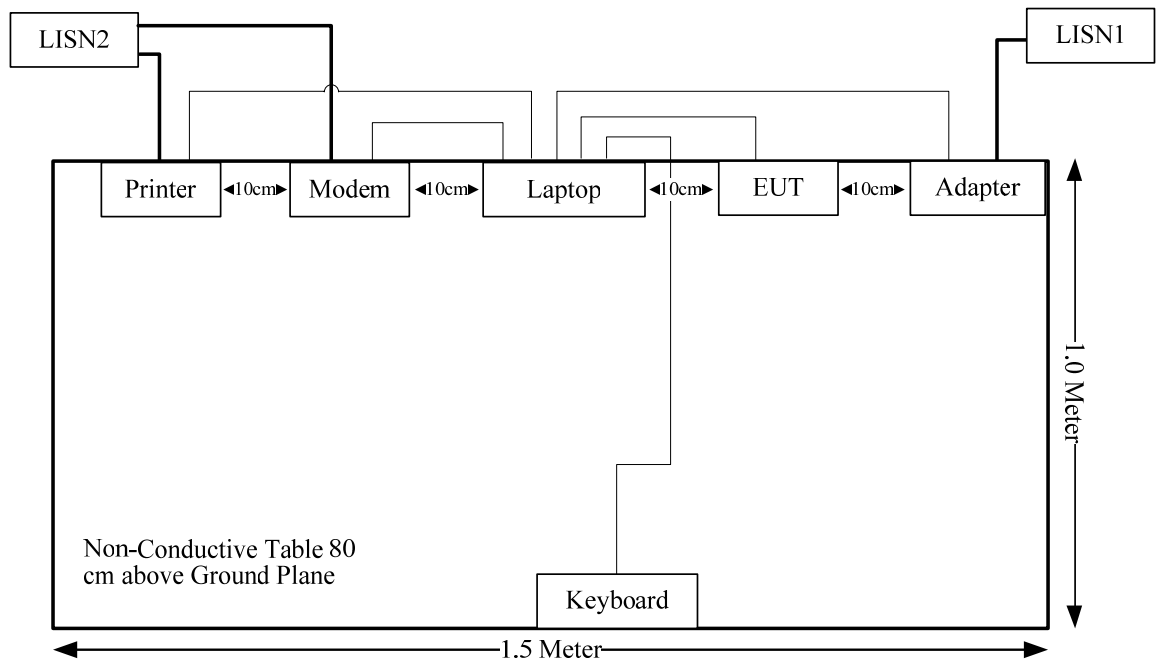
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
HP	Printer	C3941A	JPTVOB2337
DELL	Keyboard	L100	CNORH656658907BL05DC
SAST	Modem	AEM-2100	293

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Serial Cable	yes	No	1.2	Serial Port of Laptop	Modem
Parallel Cable	yes	No	1.2	Parallel Port of Laptop	Printer
Keyboard Cable	yes	No	1.8	USB Port of Laptop	Keyboard
USB Cable	Yes	No	1.0	Adapter	EUT

Block Diagram of Test Setup



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emissions					
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2019-09-05	2020-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2018-12-10	2019-12-10
R&S	L.I.S.N	ESH2-Z5	892107/021	2019-09-19	2020-09-19
R&S	EMI Test Receiver	ESPI	100120	2019-05-09	2020-05-09
Radiated emissions Below 1GHz					
R&S	EMI Test Receiver	ESR3	102453	2019-09-12	2020-09-12
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2019-05-06	2020-05-06
HP	Amplifier	8447D	2727A05902	2019-09-05	2020-09-05
Radiated emissions Above 1GHz					
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-05-09	2020-05-09
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2017-12-06	2020-12-05
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-01 1302	2017-12-06	2020-12-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2019-06-27	2020-06-27
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2019-09-05	2020-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2019-06-27	2020-06-27
E-Microwave	Band-stop Filters	OBSF-2400-2483.5-S	OE01601525	2019-06-16	2020-06-16
Micro-tronics	High Pass Filter	HPM50111	S/N-G217	2019-06-16	2020-06-16

* 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

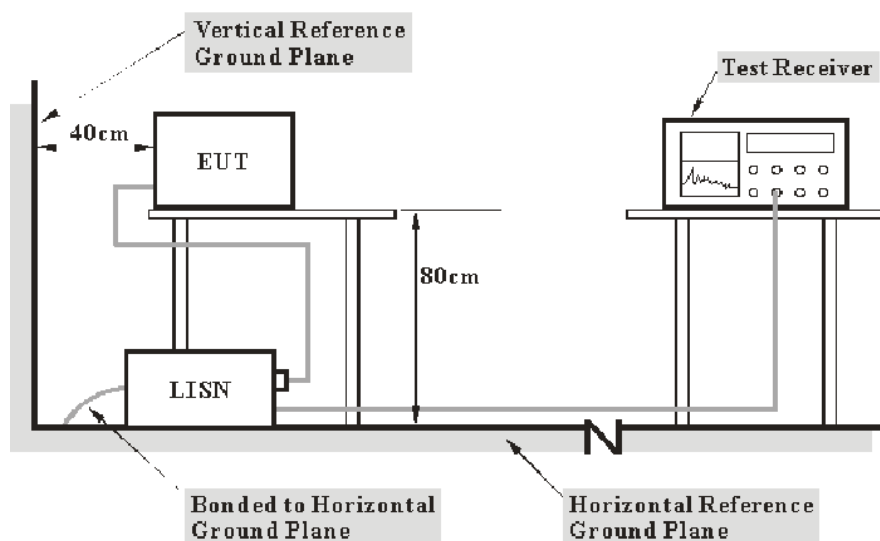
Test Item:	Conducted emissions	Radiated emissions Below 1GHz	Radiated emissions Above 1GHz
Test Date:	2019-10-14	2019-12-18	2019-12-20
Tester:	Sem Xiang	Tyler Pan	Lucy Lu
Temperature:	27.1 °C	24.5°C	24.6°C
Relative Humidity:	60%	43%	40%
ATM Pressure:	101kPa	102.1kPa	101.8kPa

SUMMARY OF TEST RESULTS

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

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.

The adapter was connected to the Main LISN with 120V/60Hz AC power source.

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 Laptop 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:

$$V_C = V_R + A_C + VDF$$

Herein,

V_C : corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF: voltage division factor of AMN or ISN

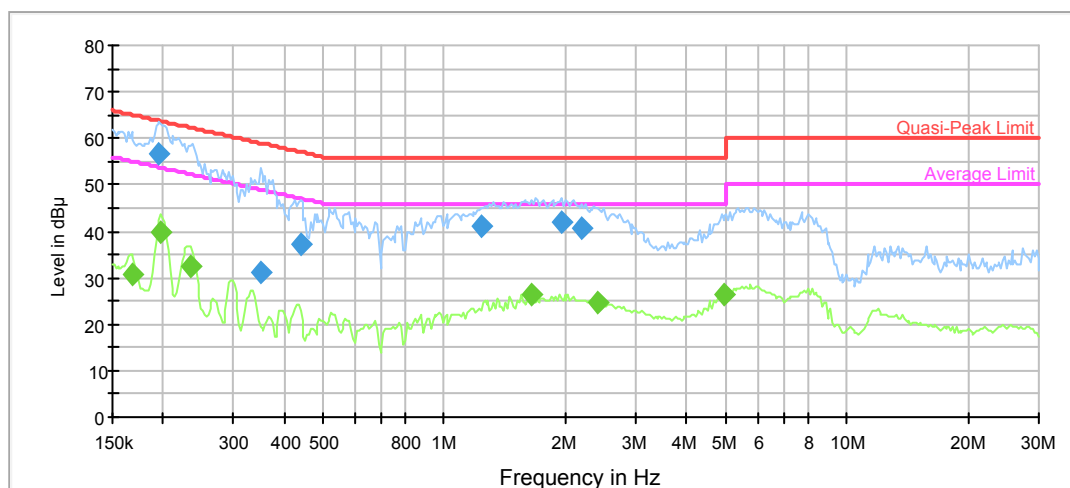
The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Data

Please refer to following table and plots:

Port: L
 Test Mode: Downloading
 Power Source: AC 120/60Hz
 Note:



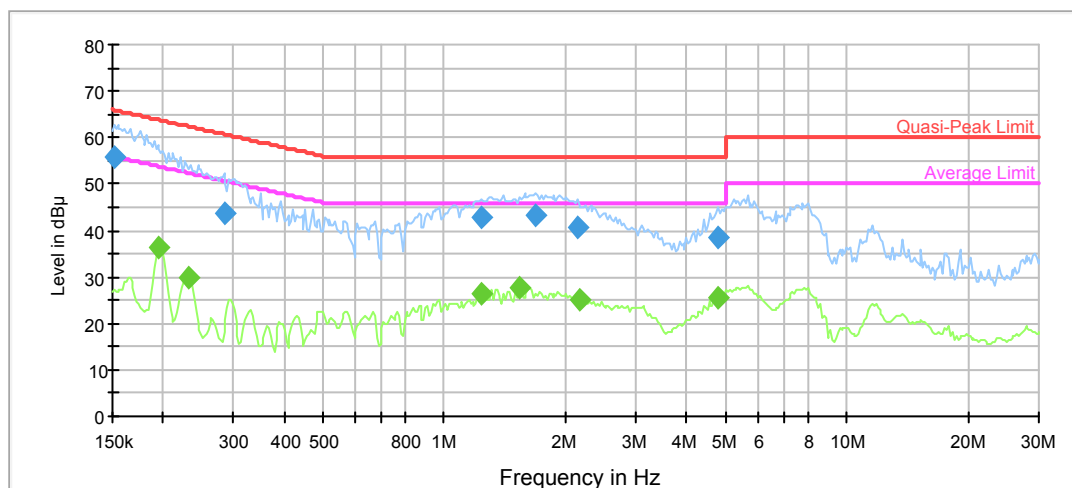
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.196231	56.7	9.000	L1	10.6	7.1	63.8
0.349469	31.2	9.000	L1	10.0	27.8	59.0
0.439339	37.4	9.000	L1	9.9	19.7	57.1
1.236582	41.0	9.000	L1	9.8	15.0	56.0
1.954366	41.9	9.000	L1	9.7	14.1	56.0
2.202229	40.5	9.000	L1	9.7	15.5	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.167350	30.8	9.000	L1	10.9	24.3	55.1
0.198194	39.7	9.000	L1	10.6	14.0	53.7
0.234722	32.5	9.000	L1	10.4	19.8	52.3
1.650223	26.6	9.000	L1	9.7	19.4	46.0
2.408545	24.8	9.000	L1	9.8	21.2	46.0
4.930532	26.2	9.000	L1	9.8	19.8	46.0

Port: N
 Test Mode: Downloading
 Power Source: AC 120/60Hz
 Note:



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.151500	55.8	9.000	N	11.1	10.1	65.9
0.283569	43.7	9.000	N	10.2	17.0	60.7
1.236582	42.7	9.000	N	9.8	13.3	56.0
1.683392	43.2	9.000	N	9.8	12.8	56.0
2.137462	40.6	9.000	N	9.8	15.4	56.0
4.785525	38.5	9.000	N	9.8	17.5	56.0

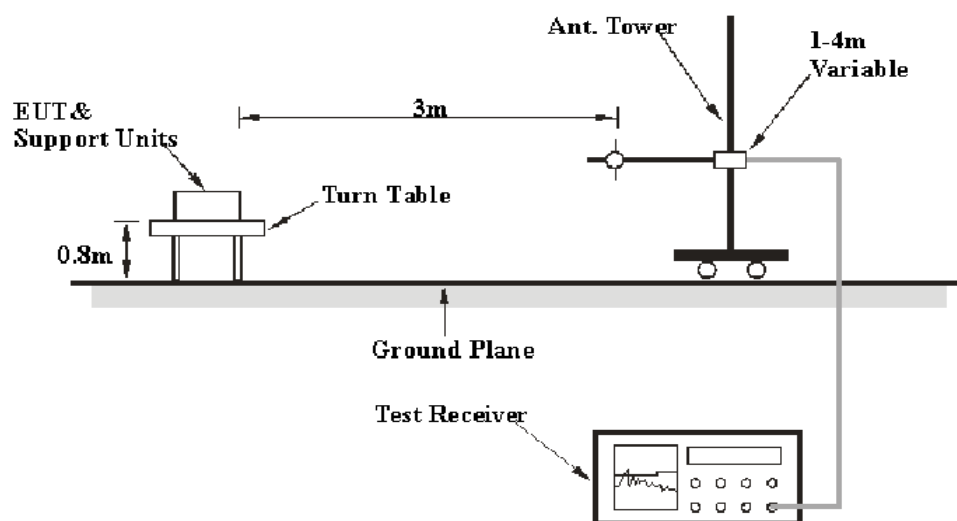
Final Result 2

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.196231	36.1	9.000	N	10.6	17.7	53.8
0.232398	30.0	9.000	N	10.4	22.4	52.4
1.236582	26.2	9.000	N	9.8	19.8	46.0
1.539193	27.7	9.000	N	9.8	18.3	46.0
2.158836	25.2	9.000	N	9.8	20.8	46.0
4.785525	25.4	9.000	N	9.8	20.6	46.0

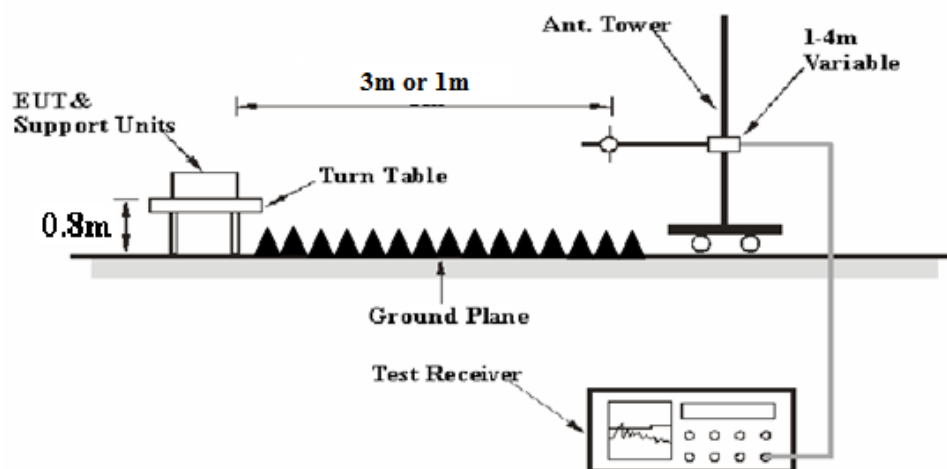
RADIATED EMISSIONS

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission below 1GHz tests were performed in the 3 meters chamber test site A, above 1GHz tests were performed in the 3 meters chamber test site B, 1GHz-26.5GHz were performed at the 3 m distance and 26.5-30 GHz was performed at 1 m distance, using the setup accordance with the ANSI C63.4-2014. The specification used was with the FCC Part 15 B Class B limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 30 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	Measurement
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	Reduced video bandwidth	/	AVG

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

Test Procedure

During the radiated emissions, the adapter of laptop 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

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:

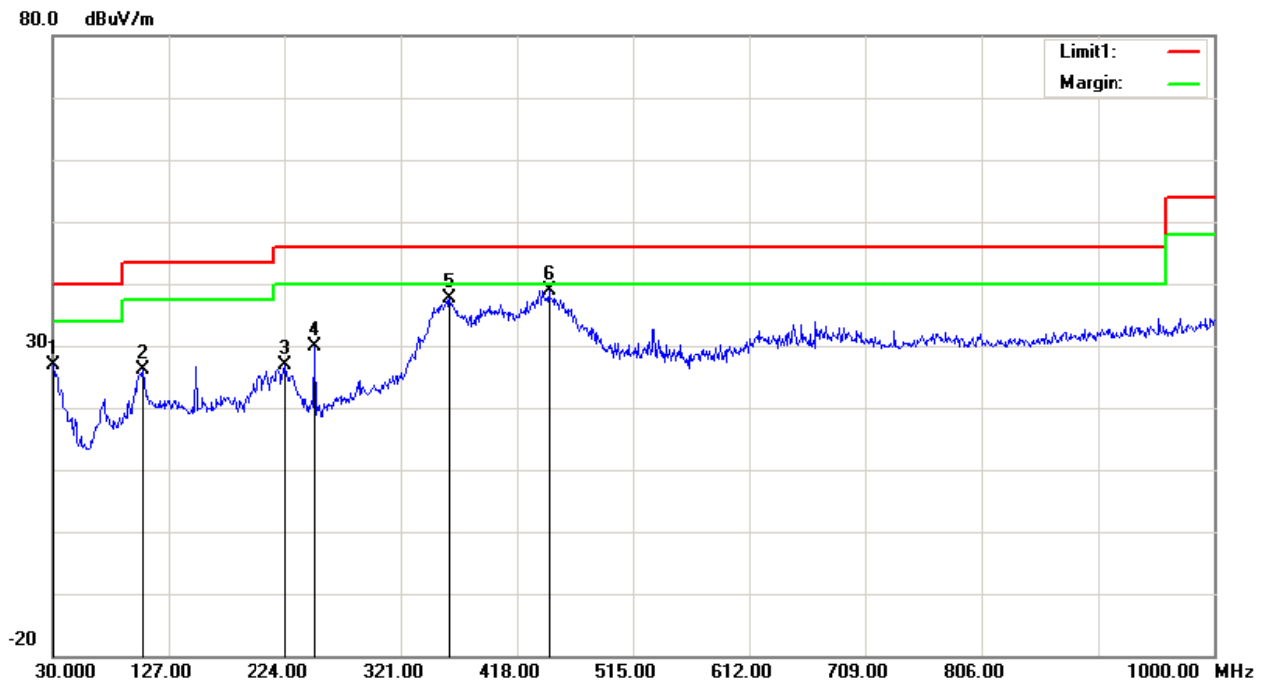
$$\text{Margin} = \text{Limit} - \text{Result}$$

Test Data

Please refer to following table and plots:

Condition: FCC Part 15B Class B
Test Mode: Downloading

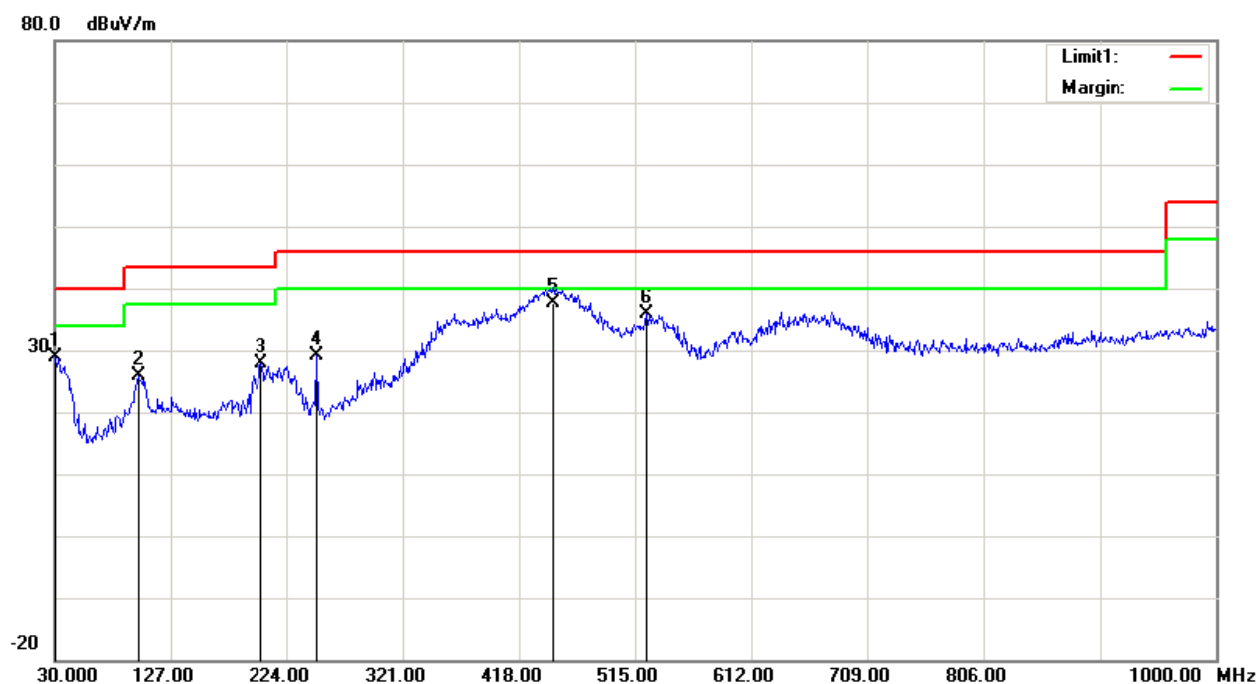
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	30.9700	25.93	peak	0.91	26.84	40.00	13.16
2	105.6600	33.43	peak	-7.32	26.11	43.50	17.39
3	224.0000	33.69	peak	-6.79	26.90	46.00	19.10
4	249.2200	35.84	peak	-5.98	29.86	46.00	16.14
5	361.7400	40.35	peak	-2.80	37.55	46.00	8.45
6	445.1600	40.06	peak	-1.14	38.92	46.00	7.08

Condition: FCC Part 15B Class B
Test Mode: Downloading

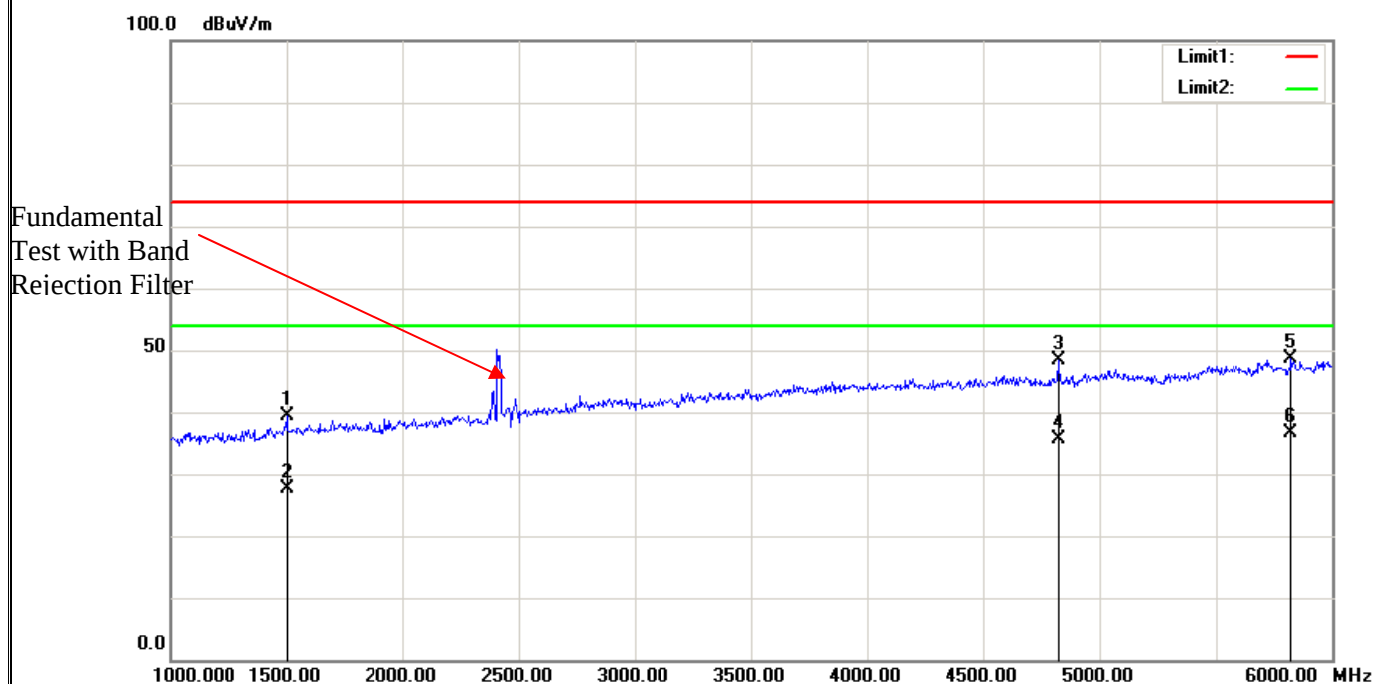
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	30.9700	28.07	peak	0.91	28.98	40.00	11.02
2	99.8400	34.81	peak	-8.87	25.94	43.50	17.56
3	202.6600	34.03	peak	-6.04	27.99	43.50	15.51
4	249.2200	35.22	peak	-5.98	29.24	46.00	16.76
5	447.1000	38.77	QP	-1.16	37.61	46.00	8.39
6	524.7000	35.69	peak	0.15	35.84	46.00	10.16

Condition: FCC Part 15B Class B
Test Mode: Downloading

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

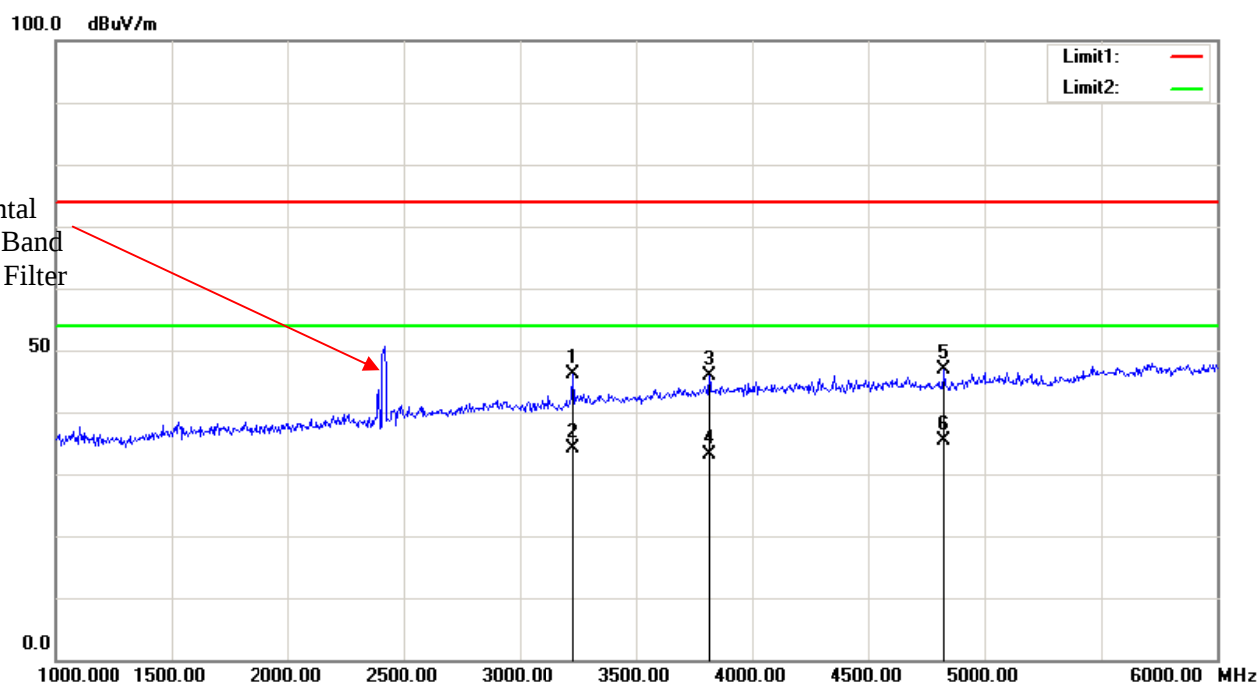


No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	1500.000	38.27	peak	1.23	39.50	74.00	34.50
2	1500.000	26.45	AVG	1.23	27.68	54.00	26.32
3	4822.500	37.78	peak	10.52	48.30	74.00	25.70
4	4822.500	25.12	AVG	10.52	35.64	54.00	18.36
5	5827.500	35.13	peak	13.58	48.71	74.00	25.29
6	5827.500	23.07	AVG	13.58	36.65	54.00	17.35

Condition: FCC Part 15B Class B
Test Mode: Downloading

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

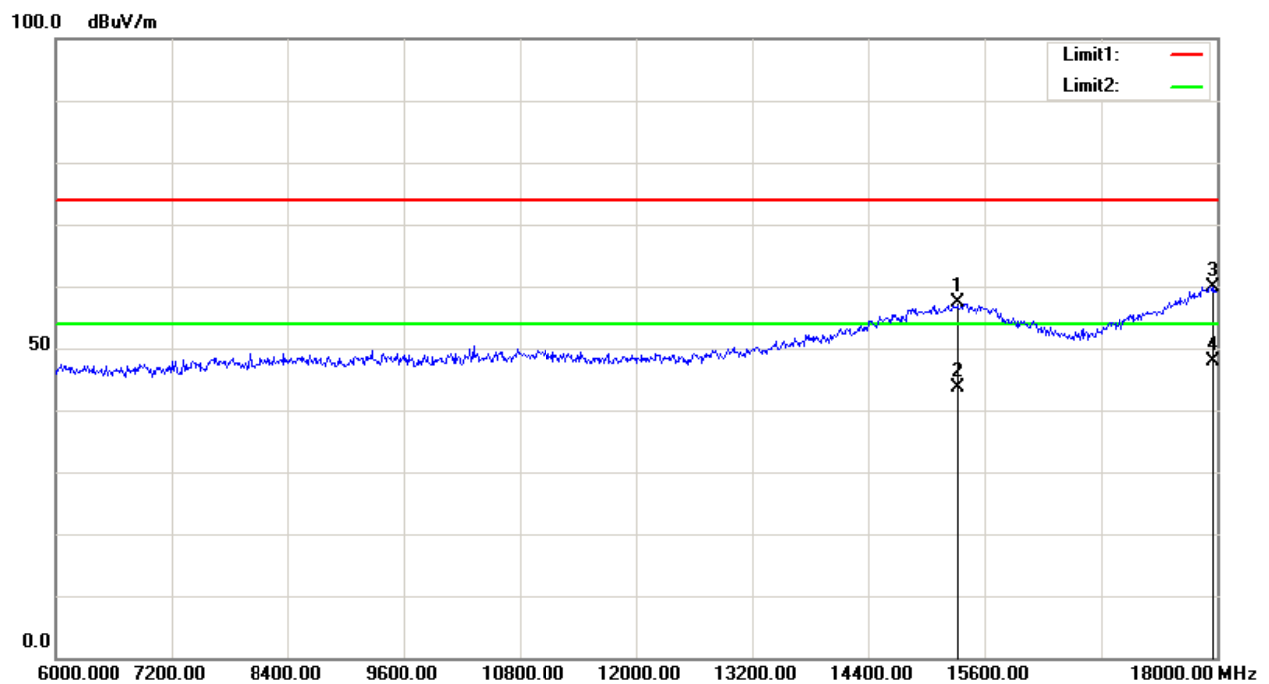
Fundamental
Test with Band
Rejection Filter



No.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	3230.000	39.20	peak	6.92	46.12	74.00	27.88
2	3230.000	27.12	AVG	6.92	34.04	54.00	19.96
3	3815.000	37.06	peak	8.70	45.76	74.00	28.24
4	3815.000	24.33	AVG	8.70	33.03	54.00	20.97
5	4825.000	36.32	peak	10.53	46.85	74.00	27.15
6	4825.000	24.78	AVG	10.53	35.31	54.00	18.69

Condition: FCC Part 15B Class B
Test Mode: Downloading

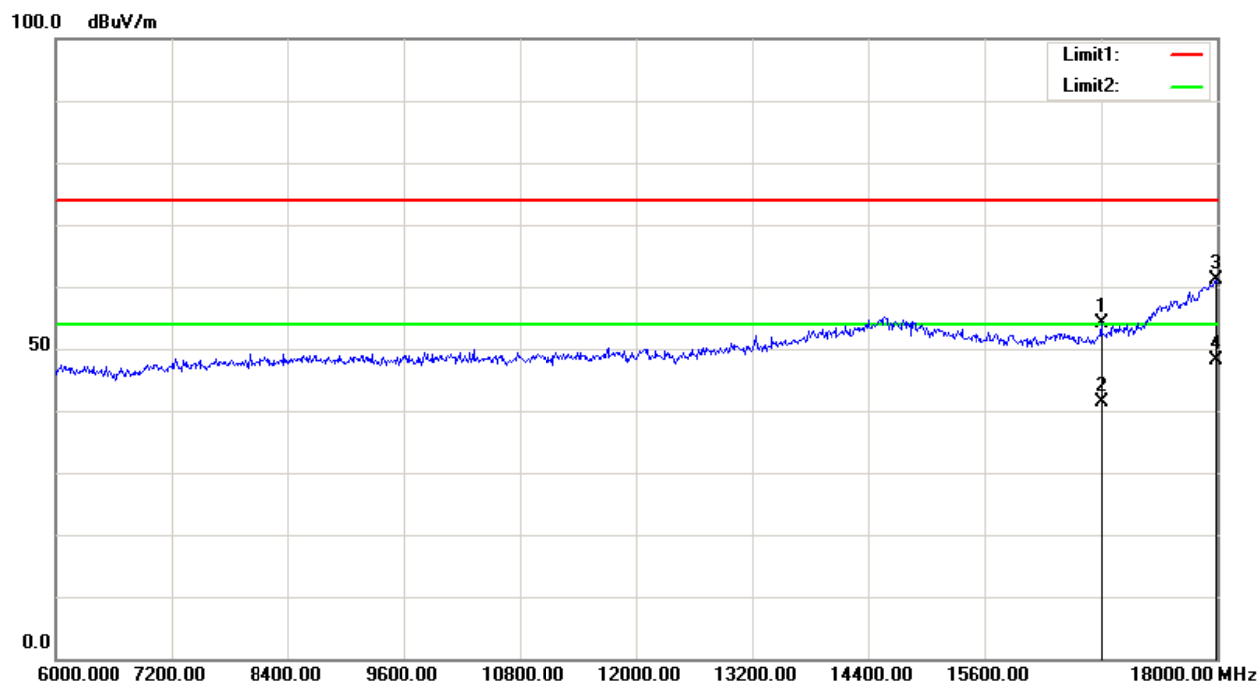
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	15324.000	34.17	peak	23.25	57.42	74.00	16.58
2	15324.000	20.45	AVG	23.25	43.70	54.00	10.30
3	17970.000	28.35	peak	31.65	60.00	74.00	14.00
4	17970.000	16.20	AVG	31.65	47.85	54.00	6.15

Condition: FCC Part 15B Class B
Test Mode: Downloading

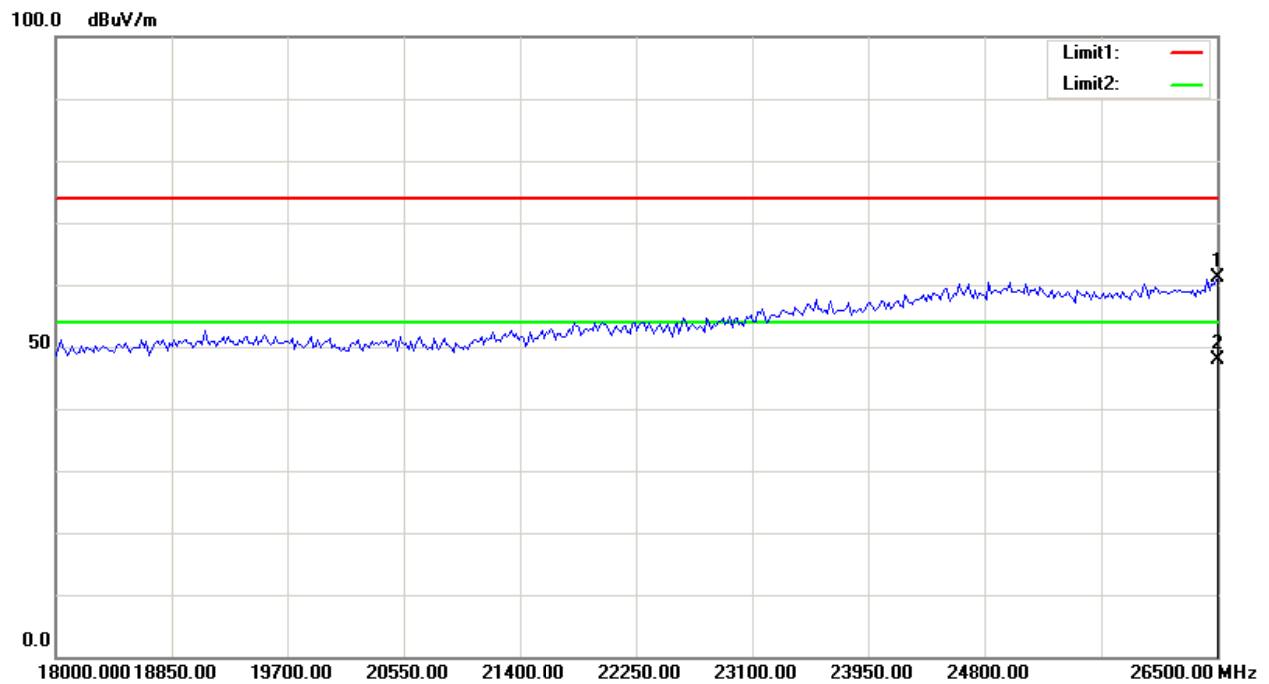
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	16806.000	29.99	peak	24.04	54.03	74.00	19.97
2	16806.000	17.35	AVG	24.04	41.39	54.00	12.61
3	17988.000	29.36	peak	31.77	61.13	74.00	12.87
4	17988.000	16.44	AVG	31.77	48.21	54.00	5.79

Condition: FCC Part 15B Class B
Test Mode: Downloading

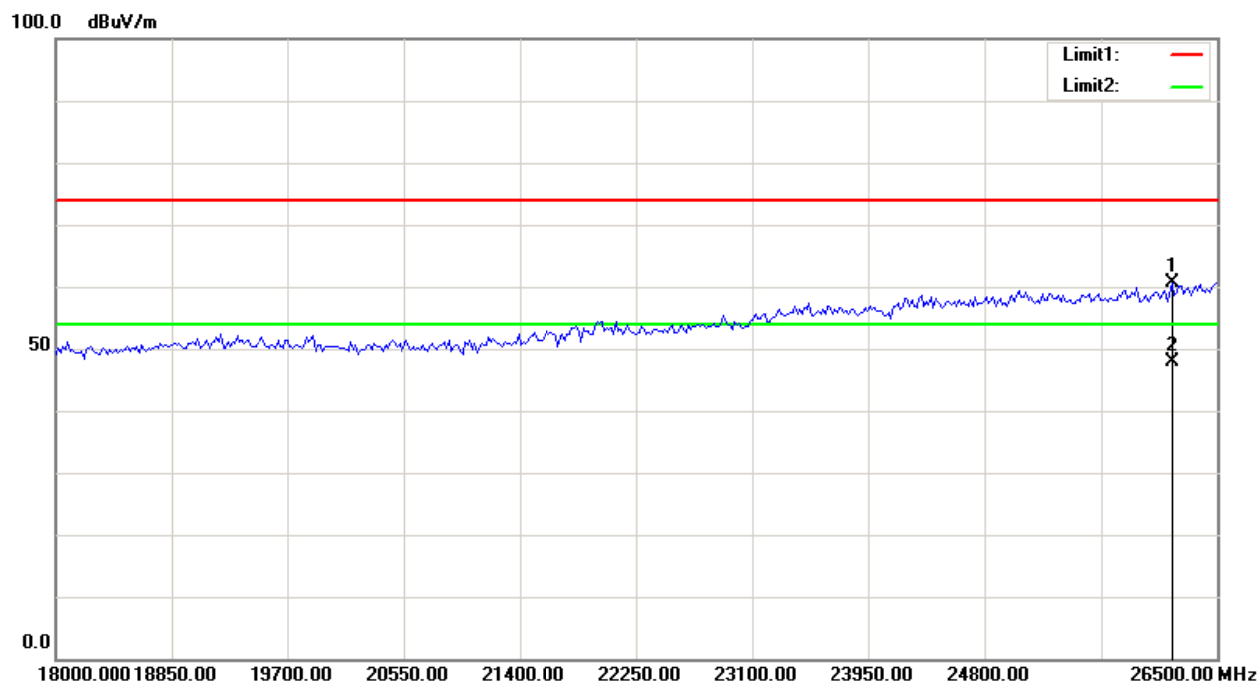
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	26500.000	39.27	peak	21.84	61.11	74.00	12.89
2	26500.000	26.04	AVG	21.84	47.88	54.00	6.12

Condition: FCC Part 15B Class B
Test Mode: Downloading

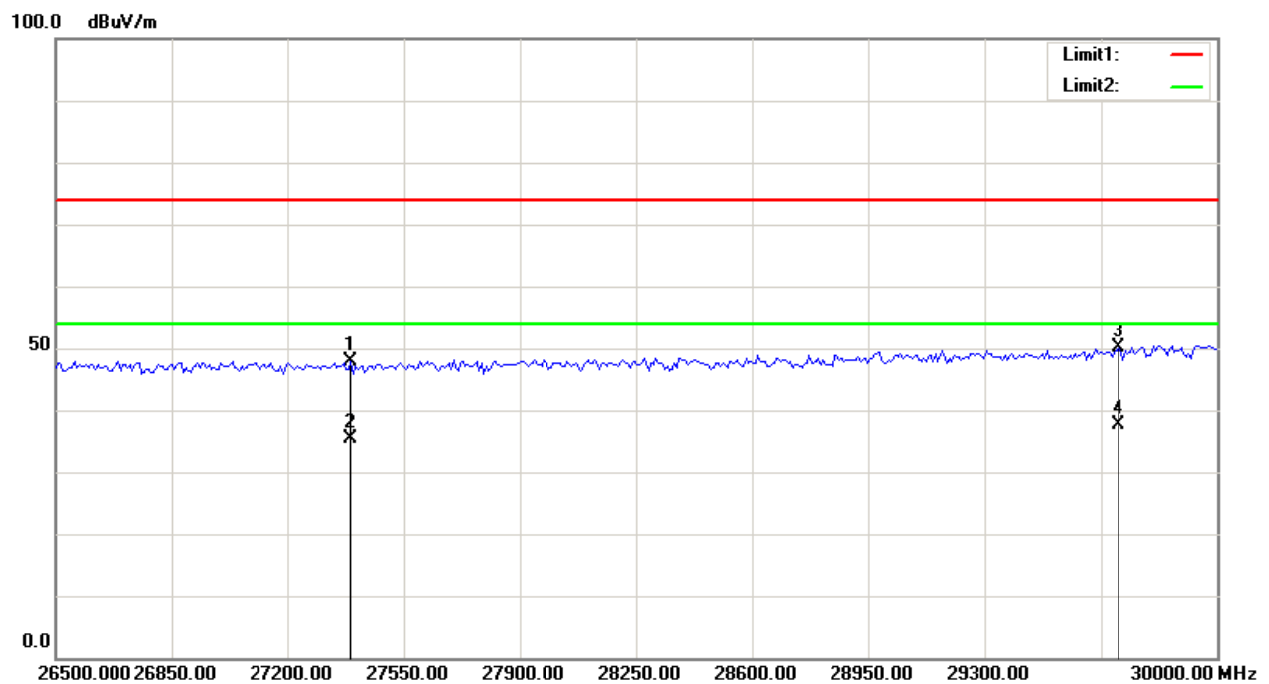
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	26176.353	40.23	peak	20.43	60.66	74.00	13.34
2	26176.353	27.33	AVG	20.43	47.76	54.00	6.24

Condition: FCC Part 15B Class B
Test Mode: Downloading

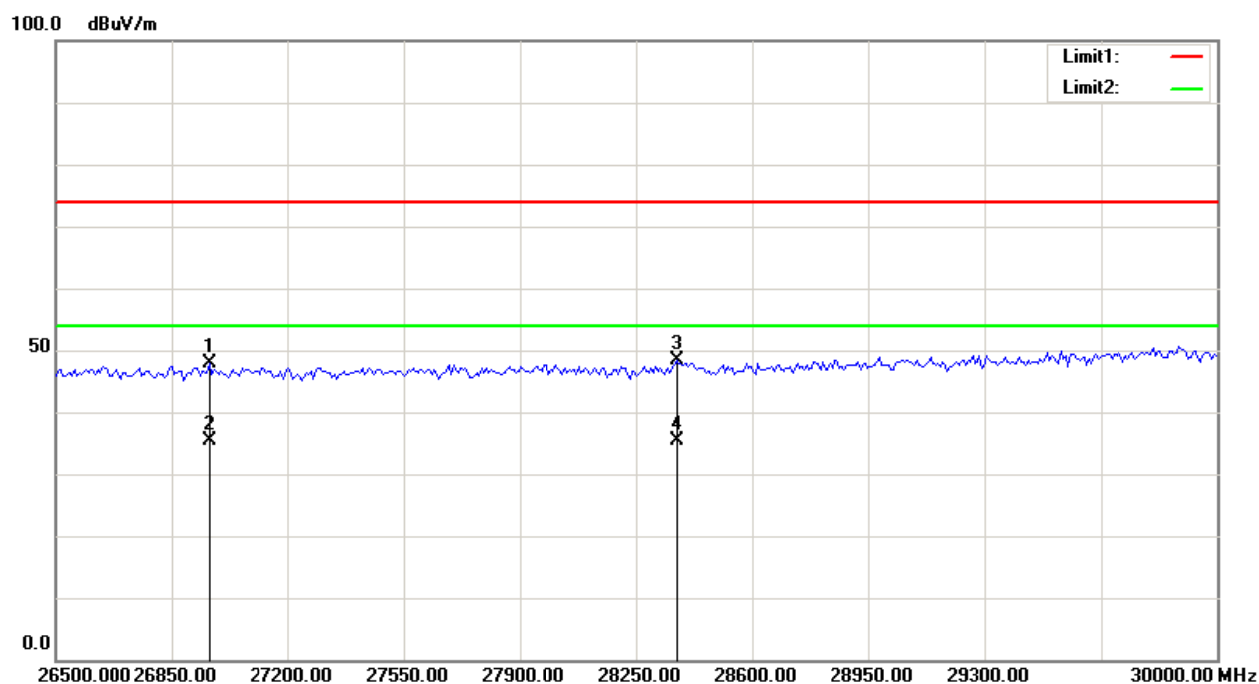
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 1m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	27390.782	45.55	peak	2.22	47.77	74.00	26.23
2	27390.782	33.10	AVG	2.22	35.32	54.00	18.68
3	29705.411	45.85	peak	4.28	50.13	74.00	23.87
4	29705.411	33.45	AVG	4.28	37.73	54.00	16.27

Condition: FCC Part 15B Class B
Test Mode: Downloading
Model: UZ-211-1

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



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	26962.926	45.27	peak	2.54	47.81	74.00	26.19
2	26962.926	32.87	AVG	2.54	35.41	54.00	18.59
3	28372.746	46.22	peak	2.17	48.39	74.00	25.61
4	28372.746	33.12	AVG	2.17	35.29	54.00	18.71

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