

FCC PART 15B

TEST REPORT

For

CLC HONG KONG LIMITED

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FCC ID: 2AG4WE900

Report Type: Original Report	Product Type: Ram 9
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Report Number:	RDG201217021-00C
Report Date:	2021-01-22
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		Ram 9
EUT Model:		E900
Highest Operation Frequency:		2480 MHz
Rated Input Voltage:		DC 3.7V from battery or DC 5V from adapter
Adapter Information	Model:	PMC43
	Input:	100-240Vac 50/60Hz 0.2A
	Output:	5.0Vdc 1000mA
Serial Number:		RDG201217021-RF-S1
EUT Received Date:		2020.12.17
EUT Received Status:		Good

Objective

This report is prepared on behalf of **CLC HONG KONG LIMITED** 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.

Related Submittal(s)/Grant(s)

FCC Part 15C DSS, DTS submissions with FCC ID: 2AG4WE900

FCC Part 22H, 24E PCE submissions with FCC ID: 2AG4WE900

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: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~13GHz: 5.23 dB
Temperature	$\pm 1^{\circ}\text{C}$
Humidity	$\pm 5\%$
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.12, Pulong East 1st Road, Tangxia Town, 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 “▲”. 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.

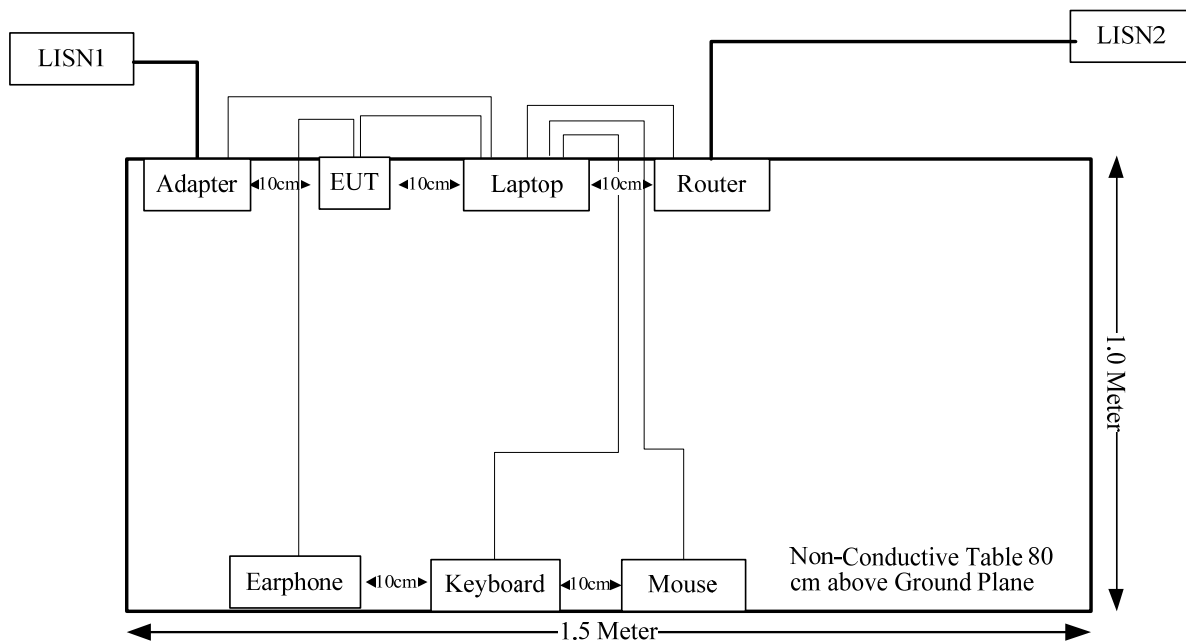
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
ThinkPad	Laptop	E450	PF-0MR8KV 16/08
DELL	Laptop	PP11L	QDS-BRCM1017
TOTO Link	Router	LR1200	190924004S1
DELL	Mouse	MO56UOA	F0Y02P7Y
DELL	Keyboard	L100	CNORH656658907BL05DC
zioncom	Router	A3700R	200622002S1

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	No	No	1.5	USB Port of Laptop	Keyboard
USB Cable	No	No	1.5	USB Port of Laptop	Mouse
RJ45 Cable	No	No	1.0	Router	Laptop
USB Cable	No	No	1.2	USB Port of Laptop	EUT
Earphone Cable	No	No	1.2	EUT	Earphone

Block Diagram of Test Setup



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emissions					
R&S	LISN	ENV 216	101614	2020-09-12	2021-09-12
R&S	EMI Test Receiver	ESCI	101121	2020-07-07	2021-07-07
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2020-09-05	2021-09-05
R&S	Test Software	EMC32	Version 9.10.00	N/A	N/A
Radiated emissions Below 1GHz					
Sunol Sciences	Antenna	JB3	A060611-1	2020-11-10	2023-11-10
R&S	EMI Test Receiver	ESR3	102453	2020-09-12	2021-09-12
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2020-05-06	2021-05-06
HP	Amplifier	8447D	2727A05902	2020-09-05	2021-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Radiated emissions Above 1GHz					
TDK RF	Horn Antenna	HRN-0118	130 084	2018-10-12	2021-10-12
R&S	Spectrum Analyzer	FSP 38	100478	2020-07-07	2021-07-07
HUBER+SUHNER	Coaxial Cable	SUCOFLEX 126EA	MY369/26/26EA	2020-09-25	2021-09-25
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2020-09-05	2021-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

* 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)
Temperature:	21.4 °C	22.5 °C	19.7°C
Relative Humidity:	51%	51%	32%
ATM Pressure:	101.4kPa	101.9kPa	101.2kPa
Tester:	Barry Yang	Jalon Liu	Jalon Liu
Test Date:	2020-12-25	2020-12-30	2021-01-04

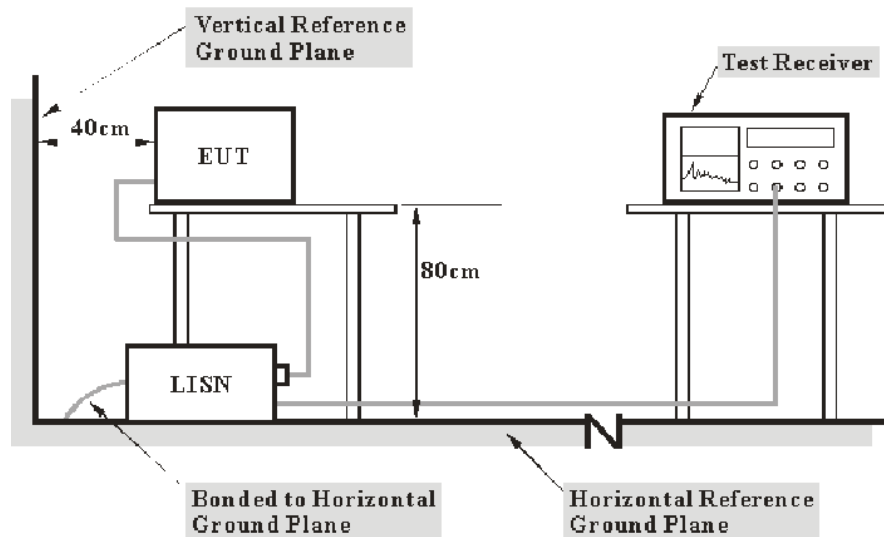
SUMMARY OF TEST RESULTS

FCC Part 15B

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

FCC PART 15B §15.107 – 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 a 120 V/60 Hz 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 or EUT was connected to the first LISN.

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase (“hot”) line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

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

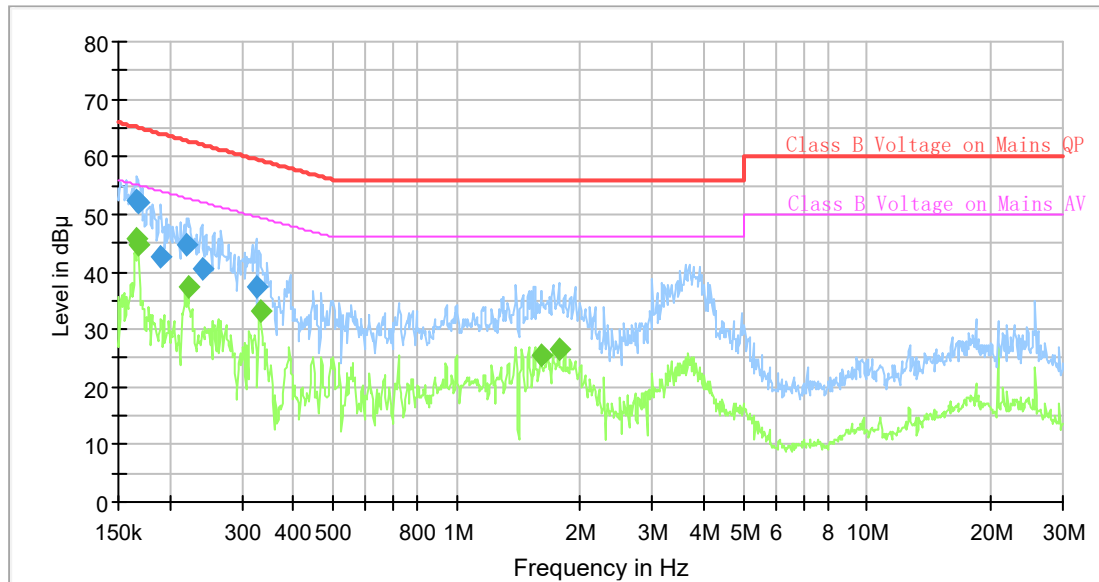
The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Result

Test Data

Please refer to following table and plots:

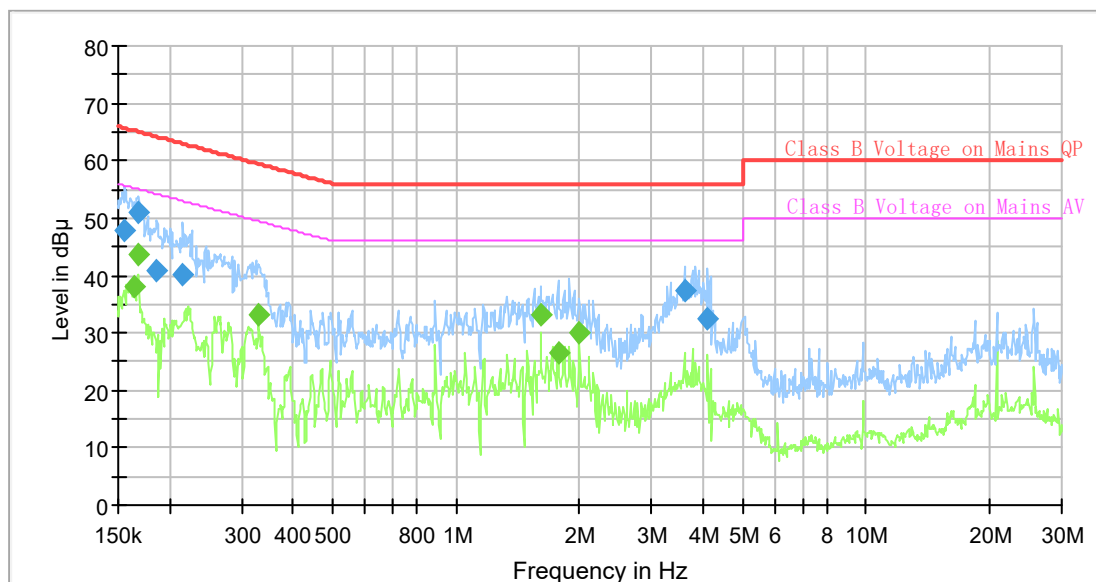
Port: L
 Test Mode: Downloading
 Power Source: AC 120V/60Hz



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.166563	---	45.62	55.13	9.51	9.000	L1	9.6
0.166563	52.52	---	65.13	12.61	9.000	L1	9.6
0.167396	---	44.72	55.09	10.37	9.000	L1	9.6
0.167396	51.95	---	65.09	13.14	9.000	L1	9.6
0.190573	42.47	---	64.01	21.54	9.000	L1	9.6
0.220231	44.71	---	62.81	18.10	9.000	L1	9.6
0.222439	---	37.54	52.73	15.19	9.000	L1	9.6
0.239718	40.50	---	62.11	21.61	9.000	L1	9.6
0.324961	37.38	---	59.58	22.20	9.000	L1	9.6
0.333166	---	33.28	49.37	16.09	9.000	L1	9.6
1.611153	---	25.62	46.00	20.38	9.000	L1	9.7
1.780155	---	26.47	46.00	19.53	9.000	L1	9.7

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



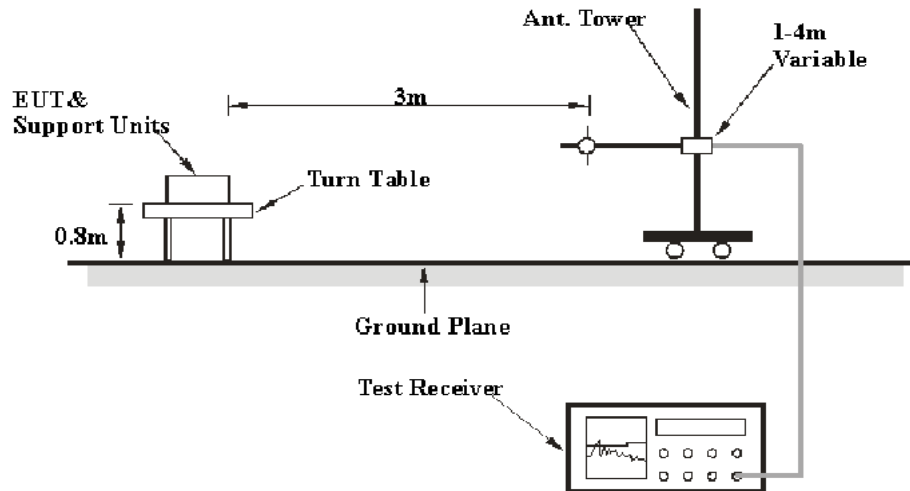
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.155329	47.99	---	65.71	17.72	9.000	N	9.6
0.164910	---	38.25	55.21	16.96	9.000	N	9.6
0.168233	---	43.55	55.05	11.50	9.000	N	9.6
0.168233	50.85	---	65.05	14.20	9.000	N	9.6
0.185880	40.72	---	64.22	23.50	9.000	N	9.6
0.215881	40.21	---	62.98	22.77	9.000	N	9.6
0.329860	---	33.18	49.45	16.27	9.000	N	9.6
1.611153	---	33.35	46.00	12.65	9.000	N	9.6
1.780155	---	26.52	46.00	19.48	9.000	N	9.6
1.996537	---	29.93	46.00	16.07	9.000	N	9.6
3.614420	37.21	---	56.00	18.79	9.000	N	9.6
4.114871	32.58	---	56.00	23.42	9.000	N	9.6

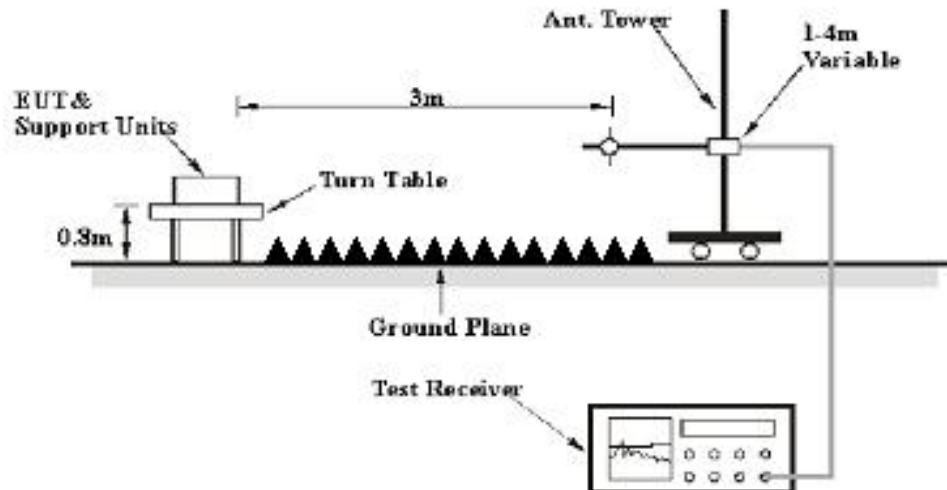
FCC PART 15B §15.109 – RADIATED EMISSIONS

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed at the 3 meters distance, above 1GHz were performed at the 3 meters, 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 13 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

Test Procedure

During the radiated emissions, the adapter was connected to the first 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.

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:

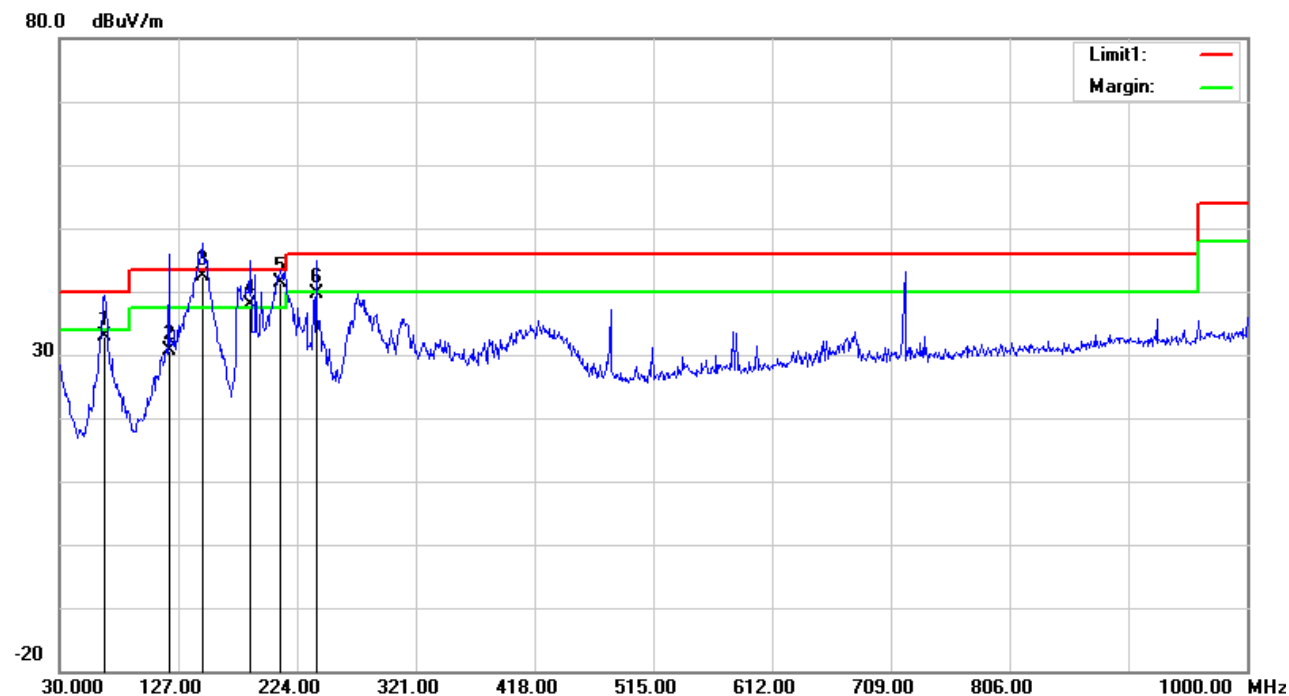
$$\text{Margin} = \text{Limit} - \text{Result}$$

Test Data

Please refer to following table and plots:

Condition: FCC Part 15B Class B
Model: E900
Test Mode: Downloading

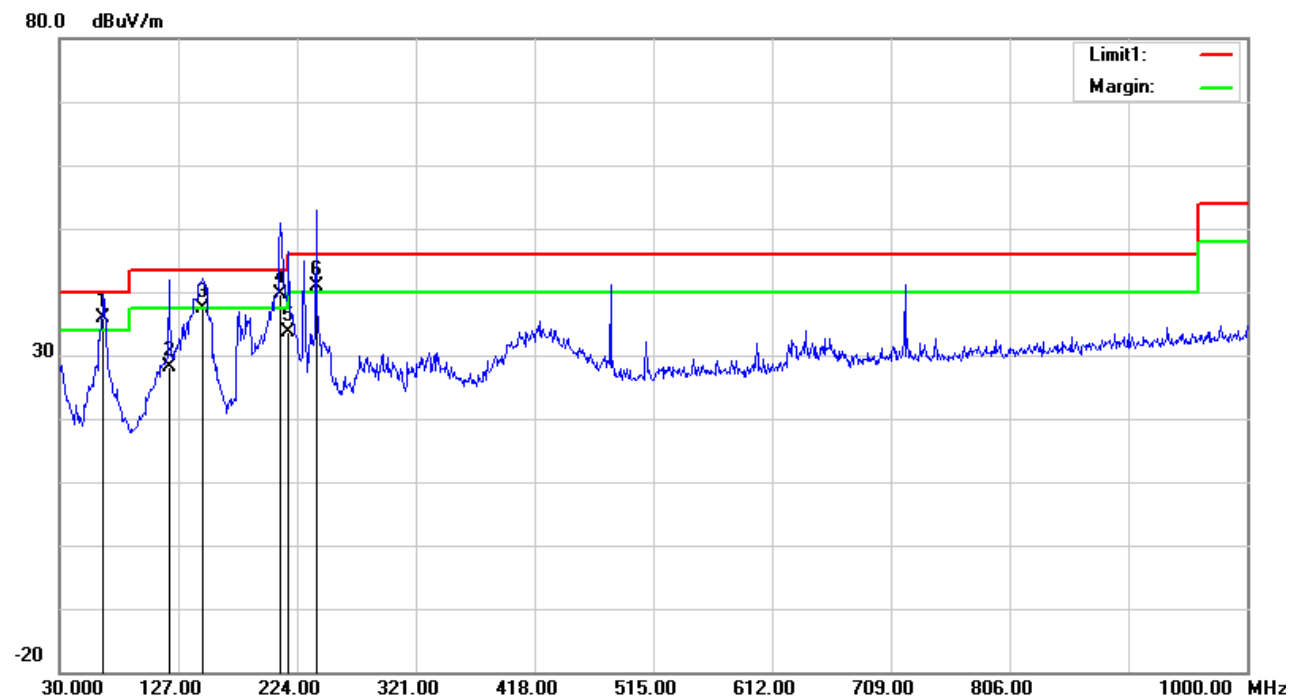
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	66.8600	44.60	QP	-11.65	32.95	40.00	7.05
2	119.2400	35.70	QP	-5.05	30.65	43.50	12.85
3	146.4000	48.60	QP	-6.22	42.38	43.50	1.12
4	186.1700	45.00	QP	-7.15	37.85	43.50	5.65
5	210.4200	48.70	QP	-7.34	41.36	43.50	2.14
6	239.5200	45.70	QP	-6.00	39.70	46.00	6.30

Condition: FCC Part 15B Class B
Model: E900
Test Mode: Downloading

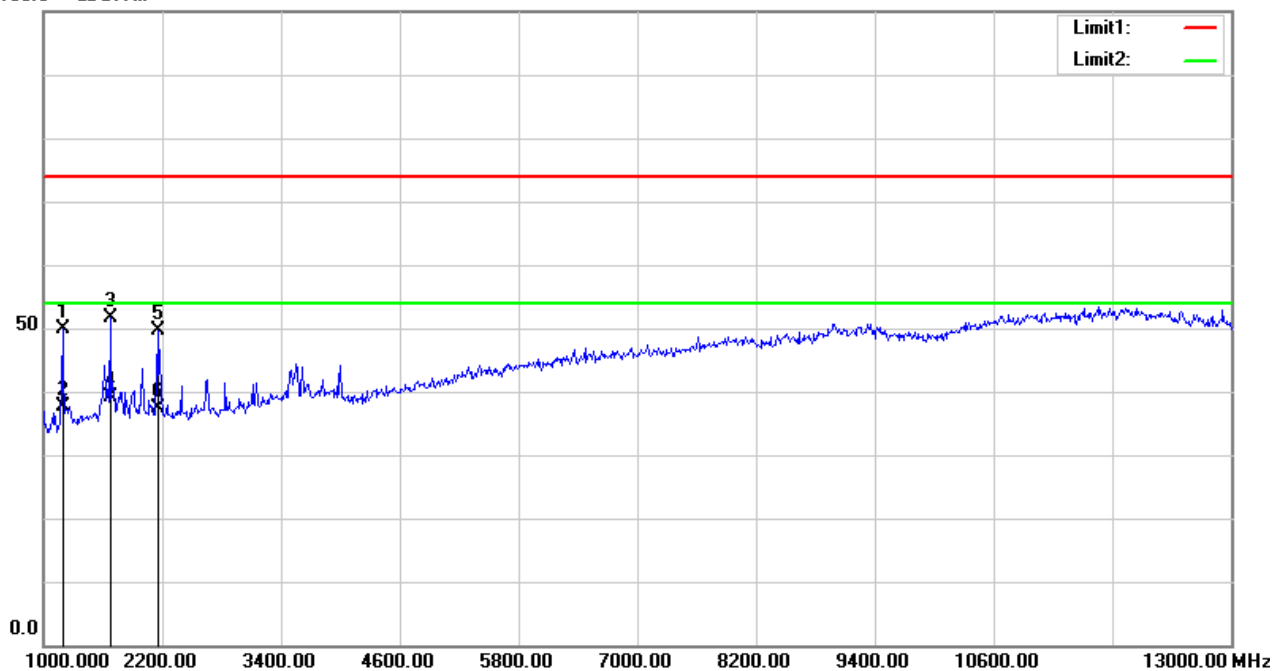
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	65.8900	47.60	QP	-11.77	35.83	40.00	4.17
2	119.2400	33.20	QP	-5.05	28.15	43.50	15.35
3	146.4000	43.70	QP	-6.22	37.48	43.50	6.02
4	210.4200	47.00	QP	-7.34	39.66	43.50	3.84
5	217.2100	40.70	QP	-7.08	33.62	46.00	12.38
6	239.5200	46.90	QP	-6.00	40.90	46.00	5.10

Condition: FCC Part 15B Class B Peak
Model: E900
Test Mode: Downloading

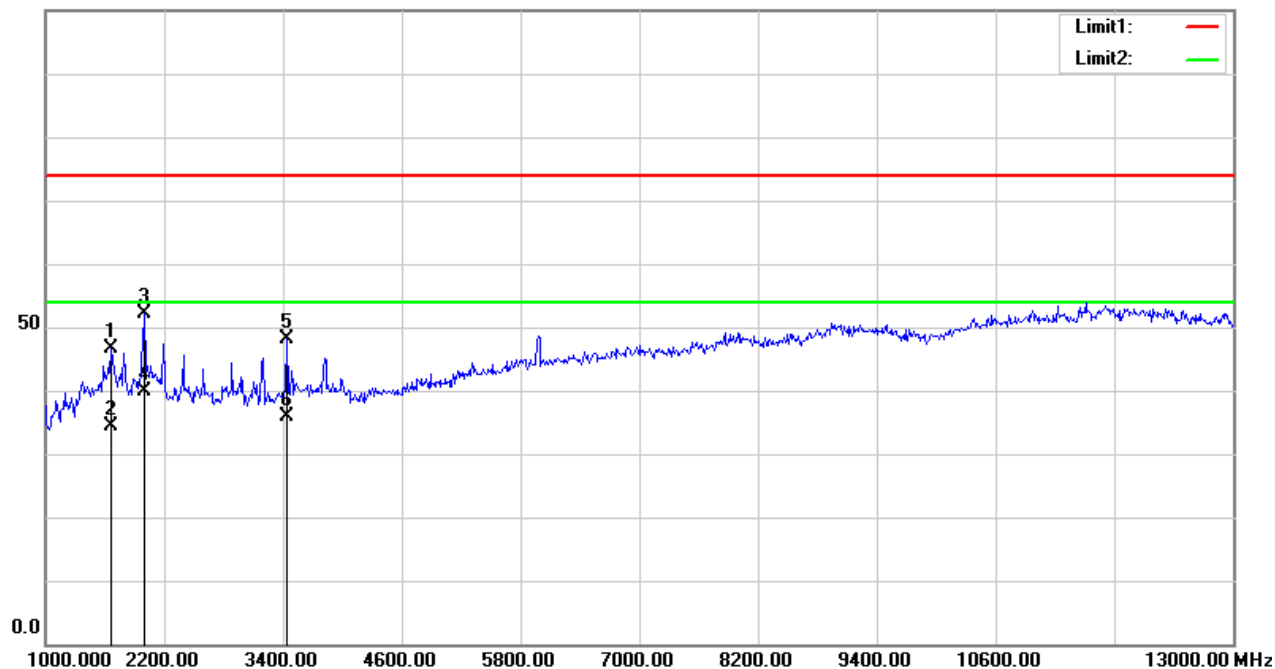
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m

100.0 dB μ V/m

No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	1198.000	52.93	peak	-3.08	49.85	74.00	24.15
2	1198.000	40.76	AVG	-3.08	37.68	54.00	16.32
3	1678.000	52.69	peak	-1.13	51.56	74.00	22.44
4	1678.000	40.35	AVG	-1.13	39.22	54.00	14.78
5	2158.000	50.63	peak	-1.09	49.54	74.00	24.46
6	2158.000	38.50	AVG	-1.09	37.41	54.00	16.59

Condition: FCC Part 15B Class B
 Model: E900
 Test Mode: Downloading

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

100.0 dB μ V/m

No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	1666.000	47.72	peak	-1.13	46.59	74.00	27.41
2	1666.000	35.61	AVG	-1.13	34.48	54.00	19.52
3	2002.000	53.61	peak	-1.51	52.10	74.00	21.90
4	2002.000	41.41	AVG	-1.51	39.90	54.00	14.10
5	3436.000	44.88	peak	3.31	48.19	74.00	25.81
6	3436.000	32.59	AVG	3.31	35.90	54.00	18.10

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