

FCC PART 15B

TEST REPORT

For

Green Packet Berhad, Taiwan

2F, NO.23, LANE 583 RUEIGUANG RD, NEIHU DISTRICT, Taipei City, Taiwan

FCC ID: W9V-OAB48-GP

Report Type: Original Report	Product Type: LTE CPE
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Report Number:	RDG201104005-00A
Report Date:	2020-12-15
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		LTE CPE
EUT Model:		OA-B48
Adapter Information	Model:	G0720-240-100
	Input:	100-240Vac 50/60Hz 0.75A MAX
	Output:	24Vdc 1A
Rated Input Voltage:		24Vdc from Adapter
Serial Number:		RDG201104005-RF-S1
EUT Received Date:		2020.11.04
EUT Received Status:		Good

Objective

This report is prepared on behalf of *Green Packet Berhad, Taiwan* in accordance with 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 96 CBD submissions with FCC ID: W9V-OAB48-GP

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)

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 “△”. 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 typical fashion (as normally used by a typical user)

Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

No Software was used in test.

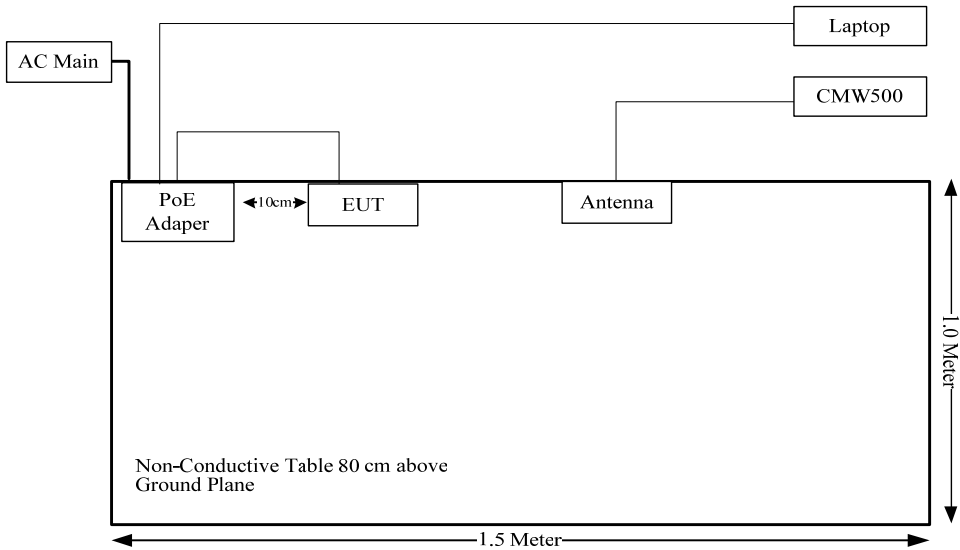
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Lenovo	Laptop	G510	CB04060626
R&S	Wideband Radio Communication Tester	CMW500	147473
Un-Known	ANTENNA	Un-Known	Un-Known

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	No	No	10	PoE Adapter	Laptop
RJ45 Cable	No	No	1.0	PoE Adapter	EUT

Block Diagram of Test Setup



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conducted emission					
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
Radiation Below 1GHz Test					
Sunol Sciences	Antenna	JB3	A060611-2	2020-08-25	2023-08-25
R&S	EMI Test Receiver	ESCI	100224	2020-09-12	2021-09-12
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2020-09-24	2021-09-24
Sonoma	Amplifier	310N	185914	2020-10-13	2021-10-13
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Radiation Above 1GHz Test					
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
Agilent	Spectrum Analyzer	E4440A	SG43360054	2020-07-07	2021-07-07
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2020-06-27	2021-06-27
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2020-09-05	2021-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2020-06-27	2021-06-27
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

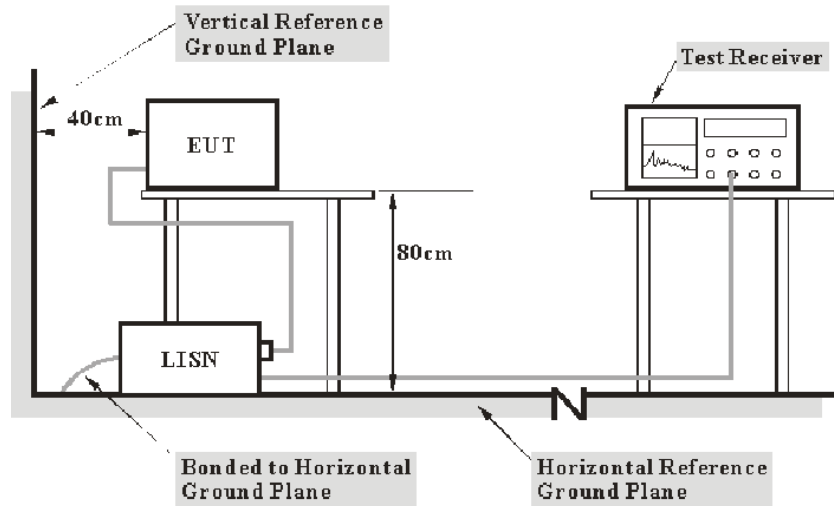
Test Items	Conducted emissions	Radiated emissions (Below 1GHz)	Radiated emissions (Above 1GHz)
Temperature:	20.2°C	27.4°C	24.1°C
Relative Humidity:	41 %	41%	40%
ATM Pressure:	101.8kPa	102.2kPa	101.6 kPa
Tester:	Barry Yang	Asa Chen	Felix Wang
Test Date:	2020-12-04	2020-12-07	2020-12-01

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

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 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, the report shall list the six emissions with the smallest margin relative to the limit, unless the margin is greater than 20 dB.

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

The report shall list the six emissions with the smallest margin relative to the limit, unless the margin is greater than 20 dB.

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

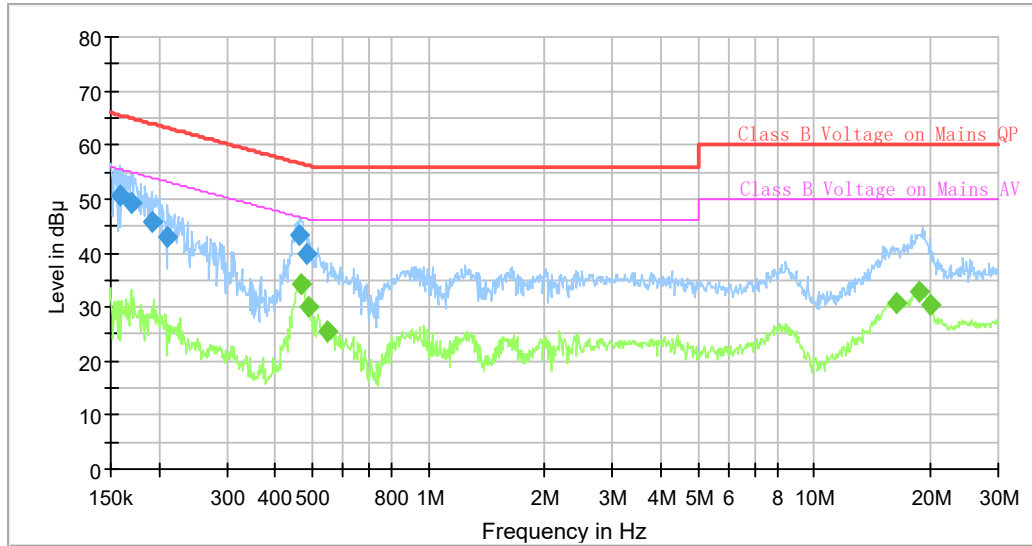
The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit – Result

Test Data

Please refer to following table and plots:

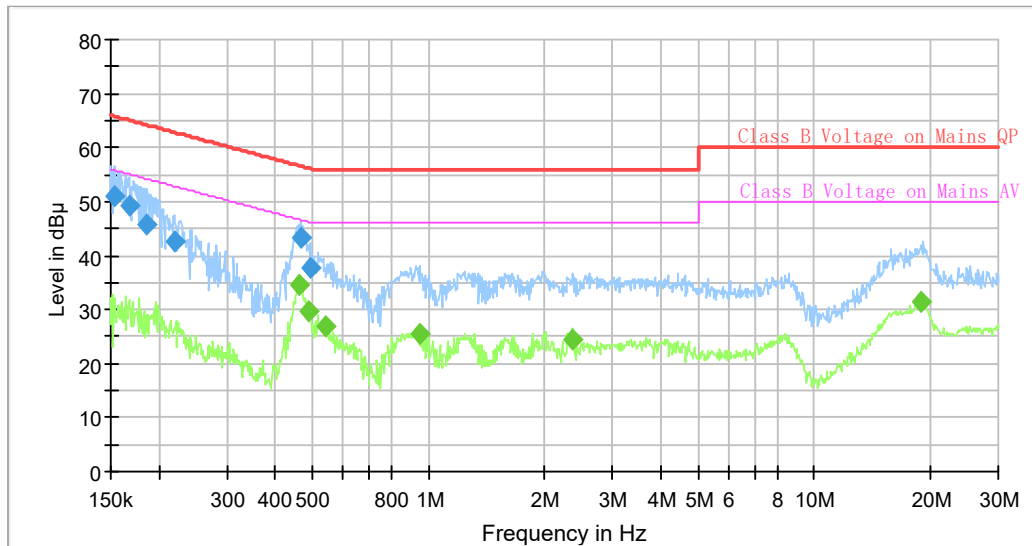
Port: L
 Test Mode: Operating
 Power Source: AC 120V/60Hz



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.158459	50.52	---	65.54	15.02	9.000	L1	9.6
0.169074	49.31	---	65.01	15.70	9.000	L1	9.6
0.191526	45.73	---	63.97	18.24	9.000	L1	9.6
0.210564	42.82	---	63.18	20.36	9.000	L1	9.6
0.463043	43.48	---	56.64	13.16	9.000	L1	9.6
0.465358	---	34.34	46.60	12.26	9.000	L1	9.6
0.481892	39.77	---	56.31	16.54	9.000	L1	9.6
0.486723	---	29.96	46.22	16.26	9.000	L1	9.6
0.545885	---	25.52	46.00	20.48	9.000	L1	9.6
16.300064	---	30.82	50.00	19.18	9.000	L1	10.1
18.742997	---	32.84	50.00	17.16	9.000	L1	10.0
19.899024	---	30.40	50.00	19.60	9.000	L1	10.0

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



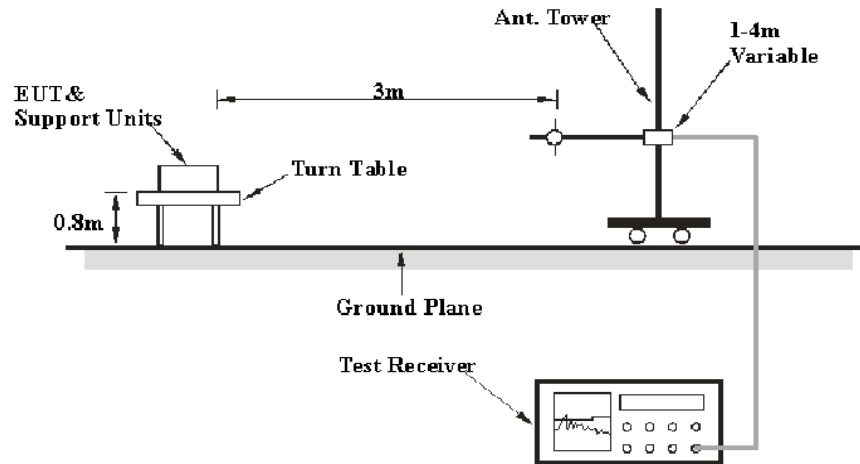
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.153023	51.09	---	65.83	14.74	9.000	N	9.6
0.167396	49.12	---	65.09	15.97	9.000	N	9.6
0.185880	45.93	---	64.22	18.29	9.000	N	9.6
0.219135	42.57	---	62.85	20.28	9.000	N	9.6
0.460739	---	34.54	46.68	12.14	9.000	N	9.6
0.465358	43.17	---	56.60	13.43	9.000	N	9.6
0.489157	---	29.82	46.18	16.36	9.000	N	9.6
0.494060	37.73	---	56.10	18.37	9.000	N	9.6
0.540467	---	27.05	46.00	18.95	9.000	N	9.6
0.949586	---	25.38	46.00	20.62	9.000	N	9.6
2.365502	---	24.43	46.00	21.57	9.000	N	9.6
18.930896	---	31.36	50.00	18.64	9.000	N	9.9

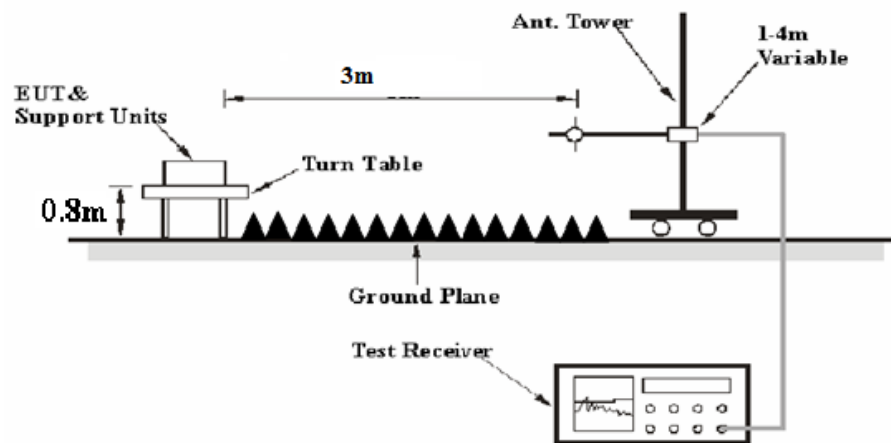
RADIATED EMISSIONS

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission below 1GHz tests were performed in the 10 meters chamber test site, above 1GHz tests were performed in the 3 meters chamber test site B, 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 26.5 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 VBW	/	AVG

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

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.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Meter Reading+ Corrected

Note:

Corrected = Antenna Factor + Cable Loss - 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:

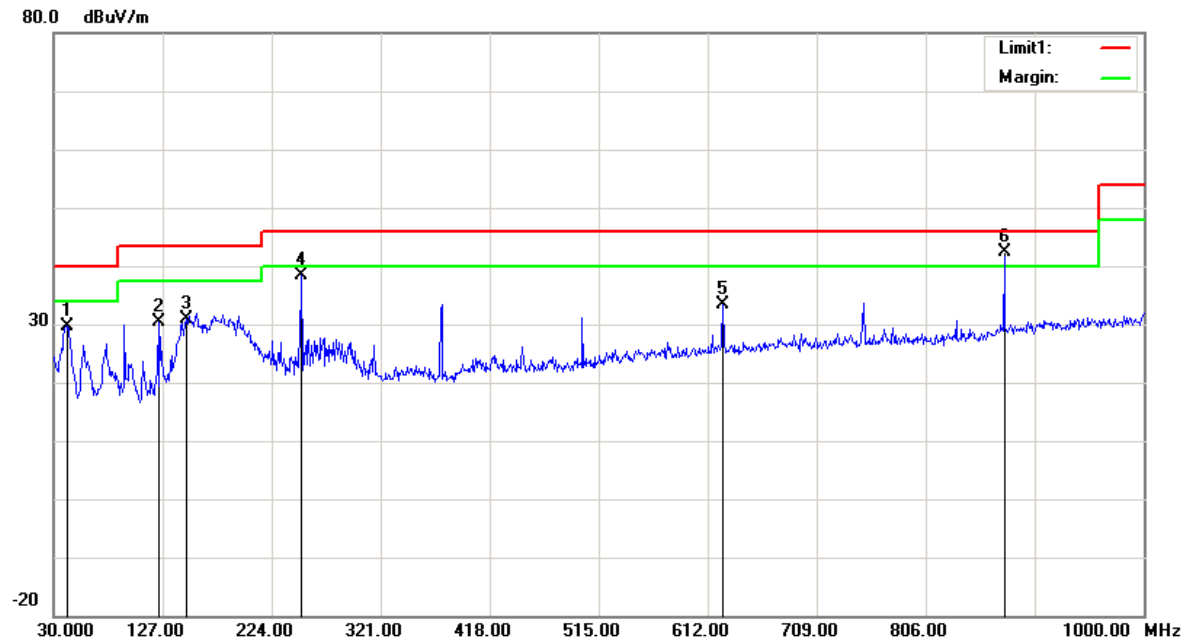
$$\text{Margin} = \text{Limit} - \text{Result}$$

Test Data

Please refer to following table and plots:

Condition: FCC Part 15B Class B
EUT: LTE CPE
Model: OA-B48
Test Mode: Operating

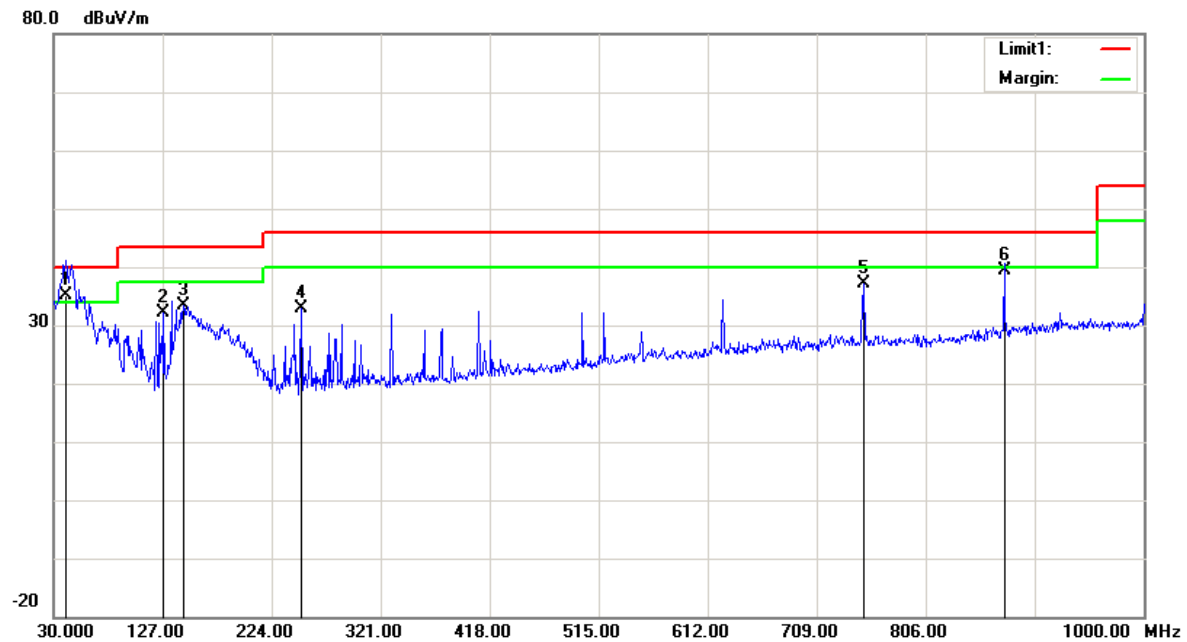
Polarization: Horizontal
Power: DC 24V
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	41.6400	40.08	peak	-10.37	29.71	40.00	10.29
2	123.1200	42.29	peak	-11.82	30.47	43.50	13.03
3	148.3400	40.17	peak	-9.22	30.95	43.50	12.55
4	250.1900	48.20	peak	-9.73	38.47	46.00	7.53
5	625.5800	34.18	peak	-0.87	33.31	46.00	12.69
6	875.8400	39.63	QP	2.67	42.30	46.00	3.70

Condition: FCC Part 15B Class B
EUT: LTE CPE
Model: OA-B48
Test Mode: Operating

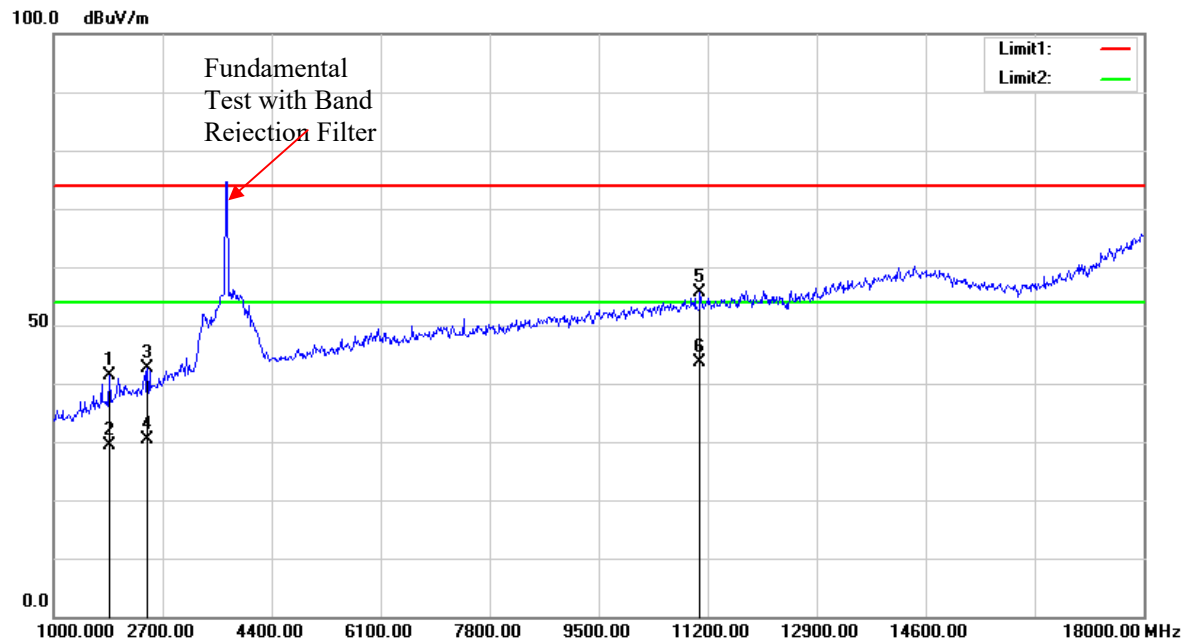
Polarization: Vertical
Power: DC 24V
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	40.6700	44.77	QP	-9.67	35.10	40.00	4.90
2	127.9700	42.47	peak	-10.37	32.10	43.50	11.40
3	145.4300	42.50	peak	-9.11	33.39	43.50	10.11
4	250.1900	42.65	peak	-9.73	32.92	46.00	13.08
5	750.7100	36.61	peak	0.56	37.17	46.00	8.83
6	875.8400	36.73	QP	2.67	39.40	46.00	6.60

Condition: FCC Part 15B Class B
EUT: LTE CPE
Model: OA-B48
Test Mode: Operating

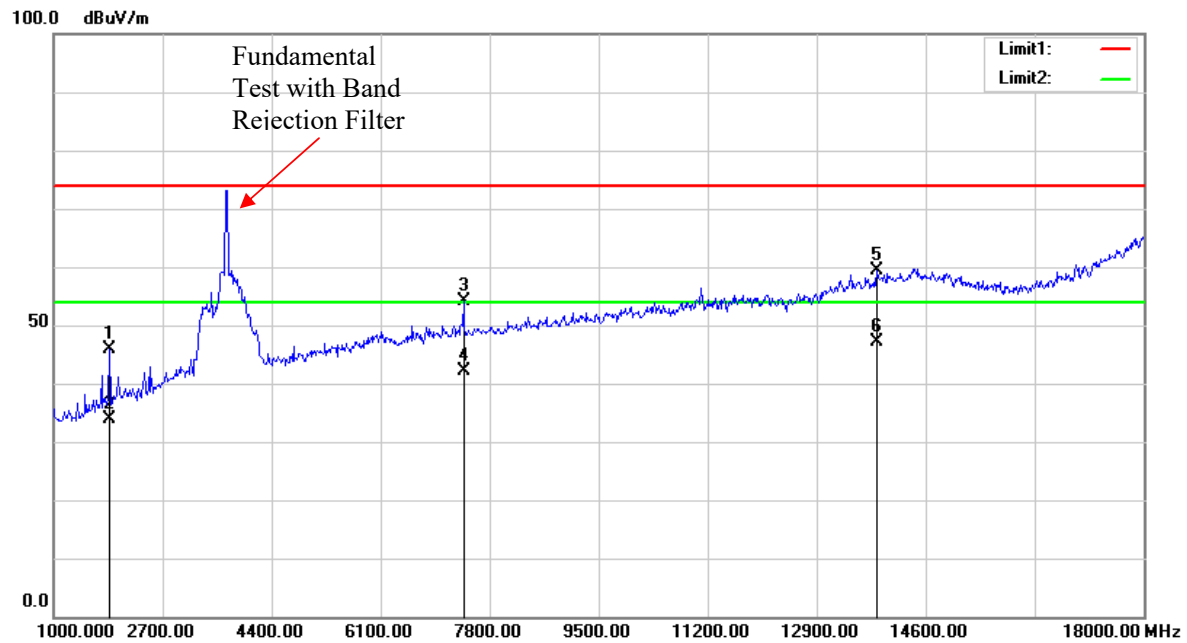
Polarization: Horizontal
Power: DC 24V
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	1875.500	39.15	peak	2.34	41.49	74.00	32.51
2	1875.500	27.06	AVG	2.34	29.40	54.00	24.60
3	2462.000	38.77	peak	3.78	42.55	74.00	31.45
4	2462.000	26.59	AVG	3.78	30.37	54.00	23.63
5	11089.500	36.00	peak	19.70	55.70	74.00	18.30
6	11089.500	23.87	AVG	19.70	43.57	54.00	10.43

Condition: FCC Part 15B Class B
EUT: LTE CPE
Model: OA-B48
Test Mode: Operating

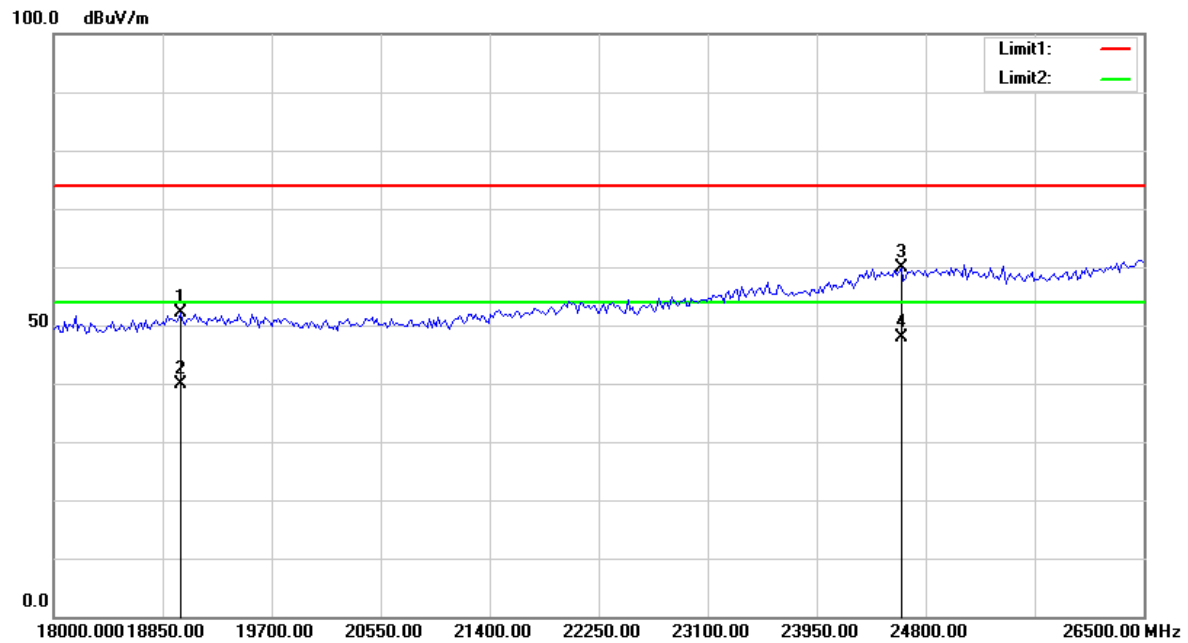
Polarization: Vertical
Power: DC 24V
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	1875.500	43.66	peak	2.34	46.00	74.00	28.00
2	1875.500	31.55	AVG	2.34	33.89	54.00	20.11
3	7392.000	39.18	peak	14.92	54.10	74.00	19.90
4	7392.000	27.09	AVG	14.92	42.01	54.00	11.99
5	13843.500	35.66	peak	23.61	59.27	74.00	14.73
6	13843.500	23.57	AVG	23.61	47.18	54.00	6.82

Condition: FCC Part 15B Class B
EUT: LTE CPE
Model: OA-B48
Test Mode: Operating

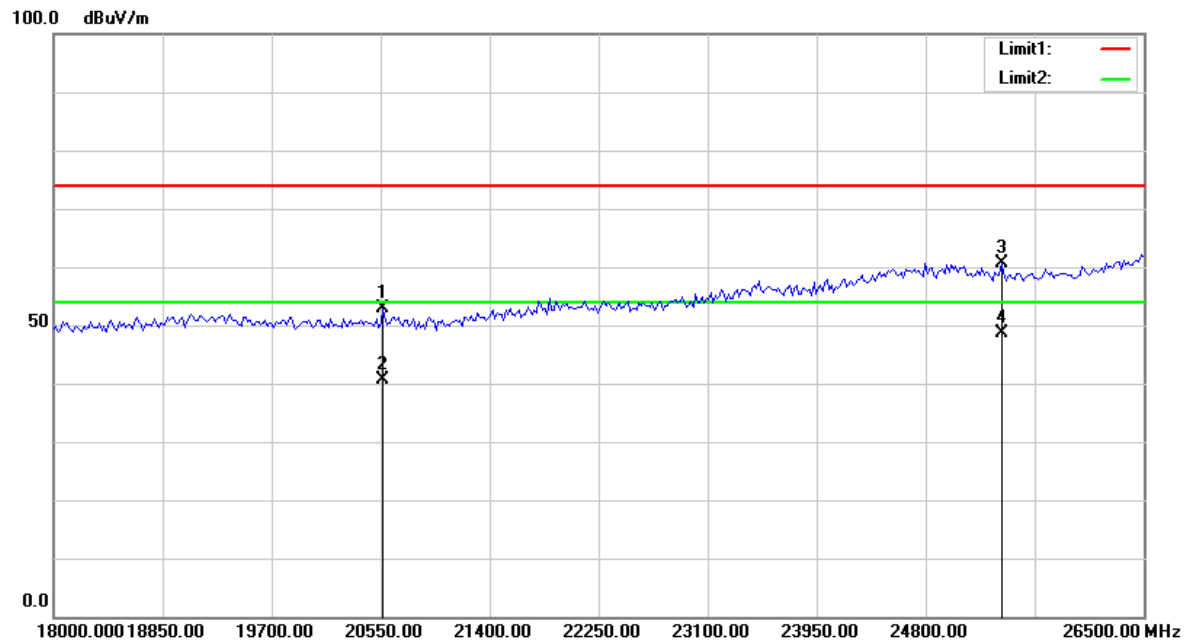
Polarization: Horizontal
Power: DC 24V
Distance: 3m



No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	18987.976	40.66	peak	11.46	52.12	74.00	21.88
2	18987.976	28.53	AVG	11.46	39.99	54.00	14.01
3	24609.218	39.94	peak	19.94	59.88	74.00	14.12
4	24609.218	27.85	AVG	19.94	47.79	54.00	6.21

Condition: FCC Part 15B Class B
EUT: LTE CPE
Model: OA-B48
Test Mode: Operating

Polarization: Vertical
Power: DC 24V
Distance: 3m



No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	20572.144	40.95	peak	11.83	52.78	74.00	21.22
2	20572.144	28.87	AVG	11.83	40.70	54.00	13.30
3	25392.786	41.09	peak	19.65	60.74	74.00	13.26
4	25392.786	29.03	AVG	19.65	48.68	54.00	5.32

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