

FCC PART 15B
ICES-003, ISSUE 6, JANUARY 2016

TEST REPORT

For

SZ DJI Osmo Technology Co.,Ltd.

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District, Shenzhen, China

Model: AC001
FCC ID: 2ANDR-AC0011807

Report Type: Original Report	Product Type: OSMO ACTION
Report Number:	RDG190117002-00A
Report Date:	2019-01-29
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	OSMO ACTION
EUT Model:	AC001
Rated Input Voltage:	DC3.85V from Battery
The Highest Operating Frequency:	5825MHz
External Dimension:	65mm(L)* 42mm(W)*35mm(H)
Serial Number:	190117002
EUT Received Date:	2019.01.17

Objective

This report is prepared on behalf of **SZ DJI Osmo 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, and ICES-003, Issue 6, January 2016 Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement.

The objective of the manufacturer is to determine the compliance of EUT with FCC Part 15 B Class B, and ICES-003, Issue 6, January 2016.

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: 2ANDR-AC0011807.

FCC Part 15E NII submissions with FCC ID: 2ANDR-AC0011807.

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)

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.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in operating and downloading mode.

Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

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

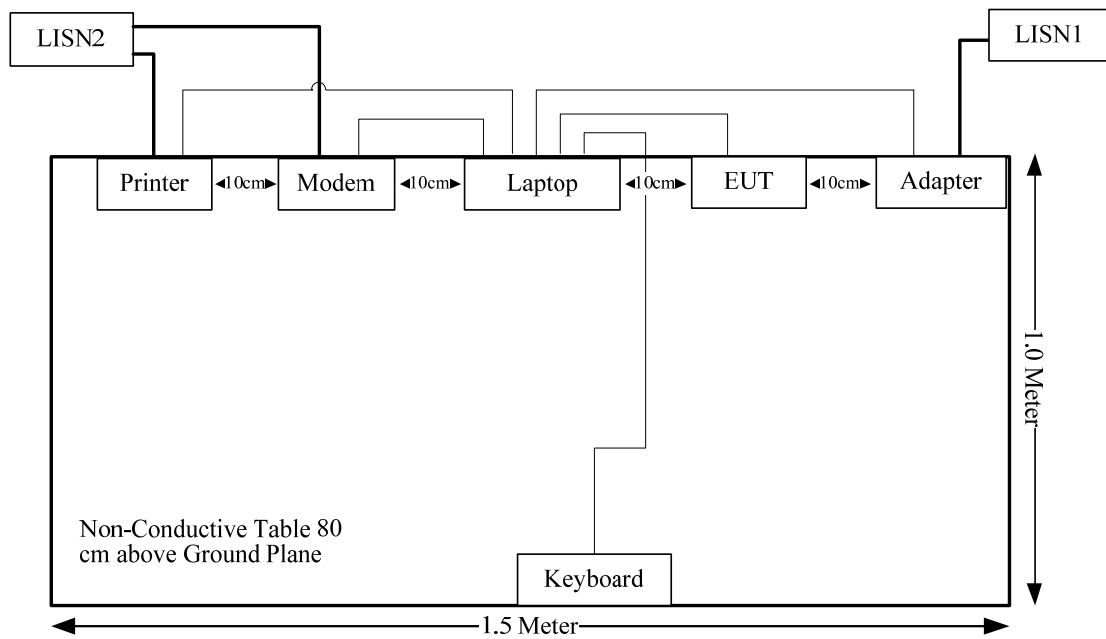
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
HP	Printer	C3941A	JPTVOB2337
DELL	Keyboard	L100	CNORH656658907BL05DC
SAST	Modem	AEM-2100	293
SanDisk	Micro SD card	4G	/

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
Keyboard Cable	Yes	Yes	1.2	Keyboard	USB Port of Laptop
Parallel Cable	Yes	No	1.2	Parallel Port of Laptop	Pribter
USB Cable	Yes	No	0.5	EUT	Laptop

Block Diagram of Test Setup



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emissions					
R&S	EMI Test Receiver	ESCS 30	830245/006	2018-12-10	2019-12-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2018-09-05	2019-09-05
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	2018-09-19	2019-09-19
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
Radiated emissions Below 1GHz					
R&S	EMI Test Receiver	ESCI	100224	2018-12-10	2019-12-10
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2018-05-06	2019-05-06
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Radiated emissions Above 1GHz					
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-01-04	2020-01-04
R&S	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
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	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2018-06-27	2019-06-27
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2018-09-05	2019-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2018-06-27	2019-06-27
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

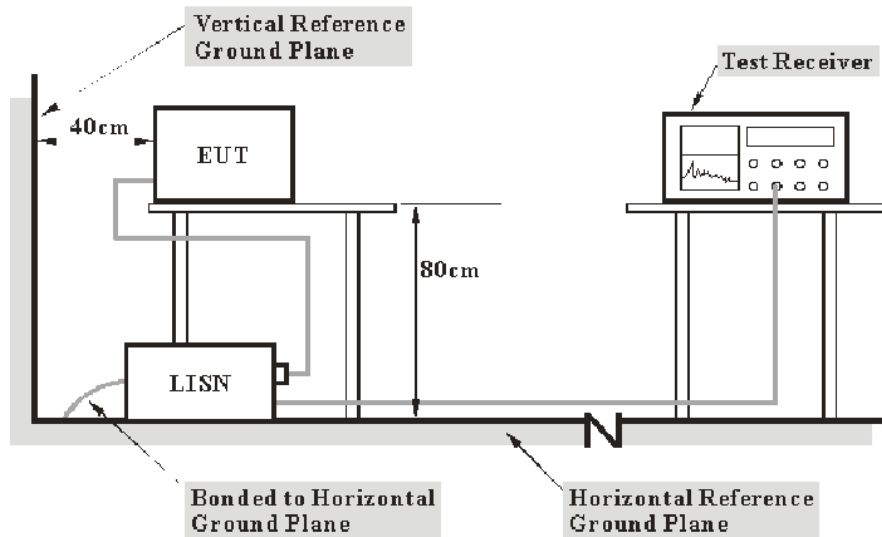
Test Item:	Conducted emissions	Radiated emissions Below 1GHz	Radiated emissions Above 1GHz
Test Date:	2019-01-25	2019-01-27	2019-01-23
Tester:	Lily Xie	Neil Liao	Tyler Pan
Temperature:	22.9°C	24°C	21.2°C
Relative Humidity:	33%	32 %	35 %
ATM Pressure:	100.5kPa	101kPa	100.6kPa

SUMMARY OF TEST RESULTS

Rule and Clause	Description of Test	Test Result
FCC §15.107 ICES-003 Clause 6.1	Conducted emissions	Compliance
FCC §15.109 ICES-003 Clause 6.2	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 and Innovation, Science and Economic Development Canada ICES-003 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

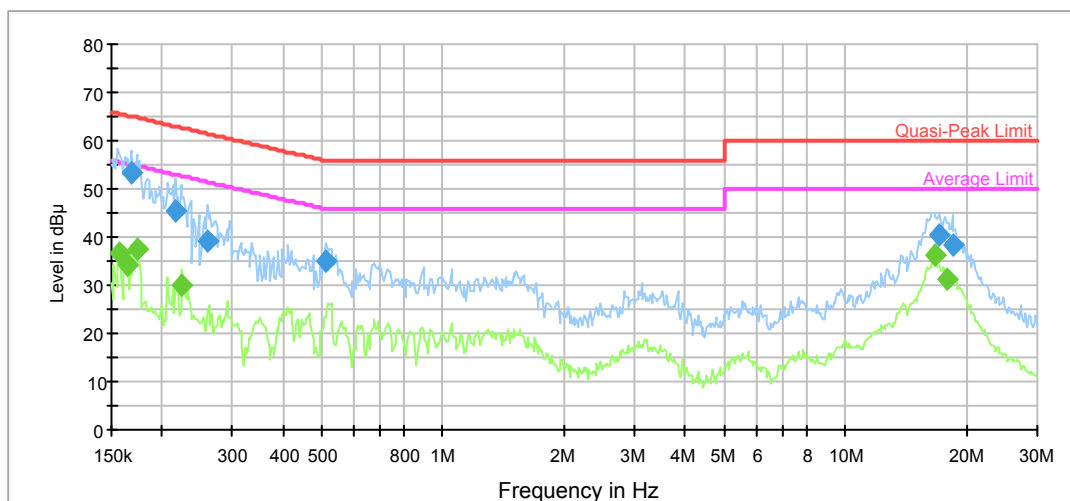
The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

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

Test Data

Please refer to following table and plots:

Model Number: AC001
 Port: L
 Test Mode: Downloading
 Power Source: AC120V/60Hz



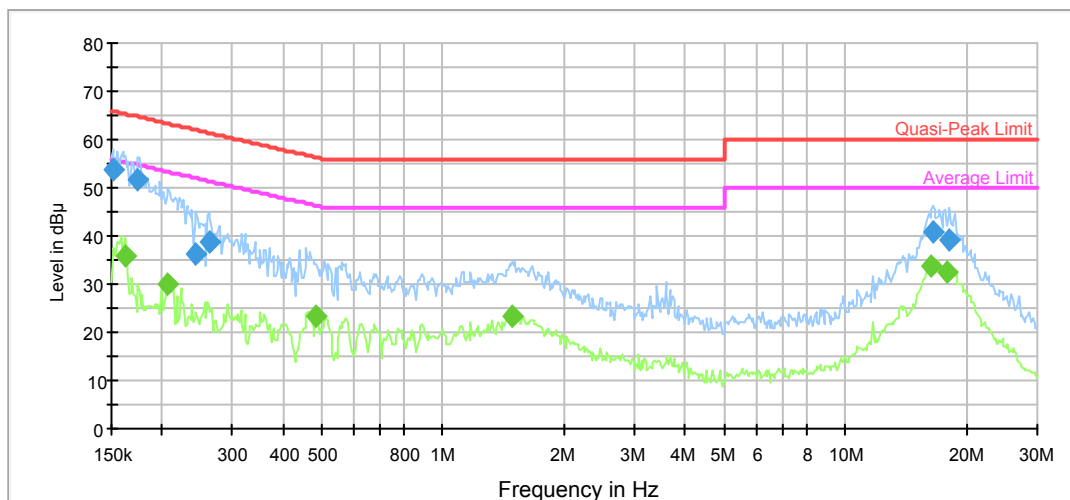
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.167702	53.3	9.000	L1	10.9	11.8	65.1
0.216409	45.3	9.000	L1	10.5	17.7	63.0
0.259937	39.1	9.000	L1	10.3	22.3	61.4
0.511698	34.8	9.000	L1	9.9	21.2	56.0
17.183363	40.5	9.000	L1	10.0	19.5	60.0
18.460903	38.4	9.000	L1	10.0	21.6	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.157346	36.5	9.000	L1	11.1	19.1	55.6
0.163741	34.3	9.000	L1	11.0	21.0	55.3
0.173134	37.7	9.000	L1	10.9	17.1	54.8
0.225205	29.9	9.000	L1	10.5	22.7	52.6
16.644319	36.1	9.000	L1	10.0	13.9	50.0
17.881783	31.4	9.000	L1	10.0	18.6	50.0

Model Number: AC001
Port: N
Test Mode: Downloading
Power Source: AC120V/60Hz



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.151200	53.9	9.000	N	11.1	12.0	65.9
0.174519	51.7	9.000	N	10.8	13.0	64.7
0.243884	36.2	9.000	N	10.3	25.8	62.0
0.262017	38.7	9.000	N	10.3	22.7	61.4
16.512221	41.0	9.000	N	9.9	19.0	60.0
18.169036	39.2	9.000	N	10.0	20.8	60.0

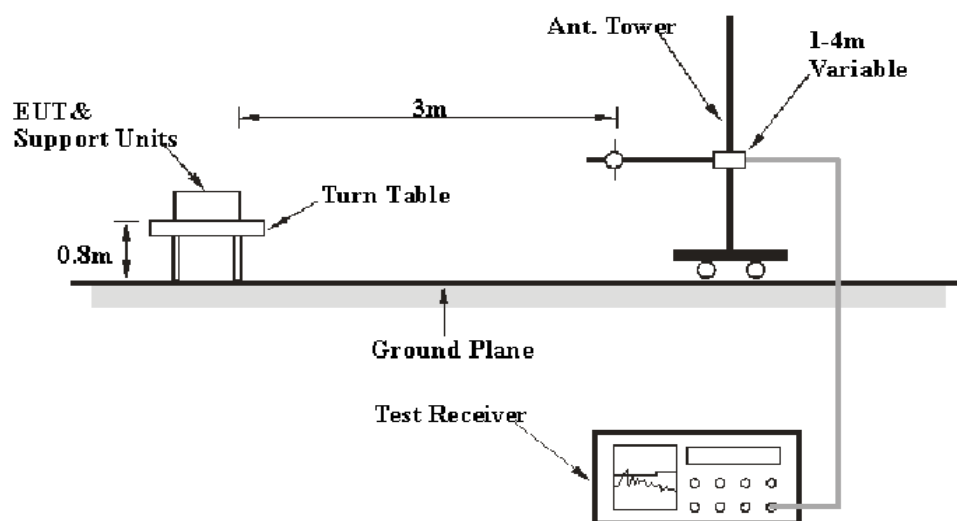
Final Result 2

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.162441	35.9	9.000	N	11.0	19.4	55.3
0.207957	29.9	9.000	N	10.6	23.4	53.3
0.483938	23.2	9.000	N	9.9	23.1	46.3
1.488418	23.4	9.000	N	9.8	22.6	46.0
16.381172	33.6	9.000	N	9.9	16.4	50.0
17.881783	32.7	9.000	N	10.0	17.3	50.0

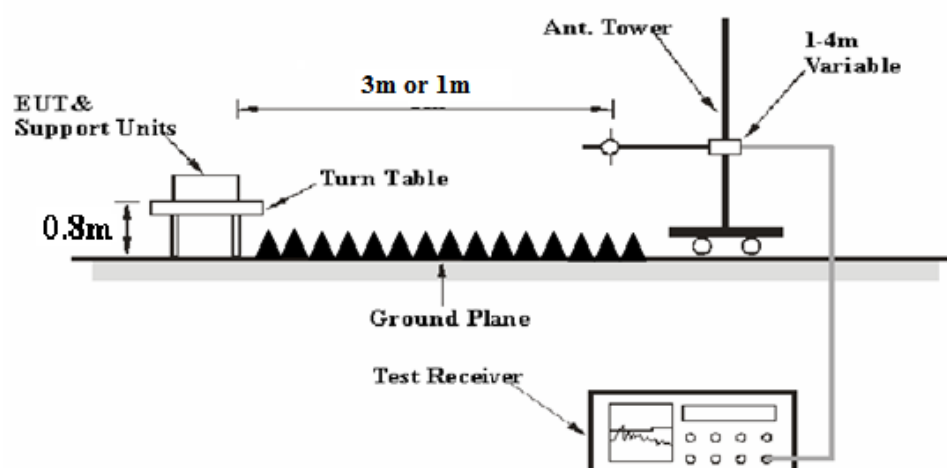
RADIATED EMISSIONS

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 and Innovation, Science and Economic Development Canada ICES-003 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 + Distance extrapolation factor - 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:

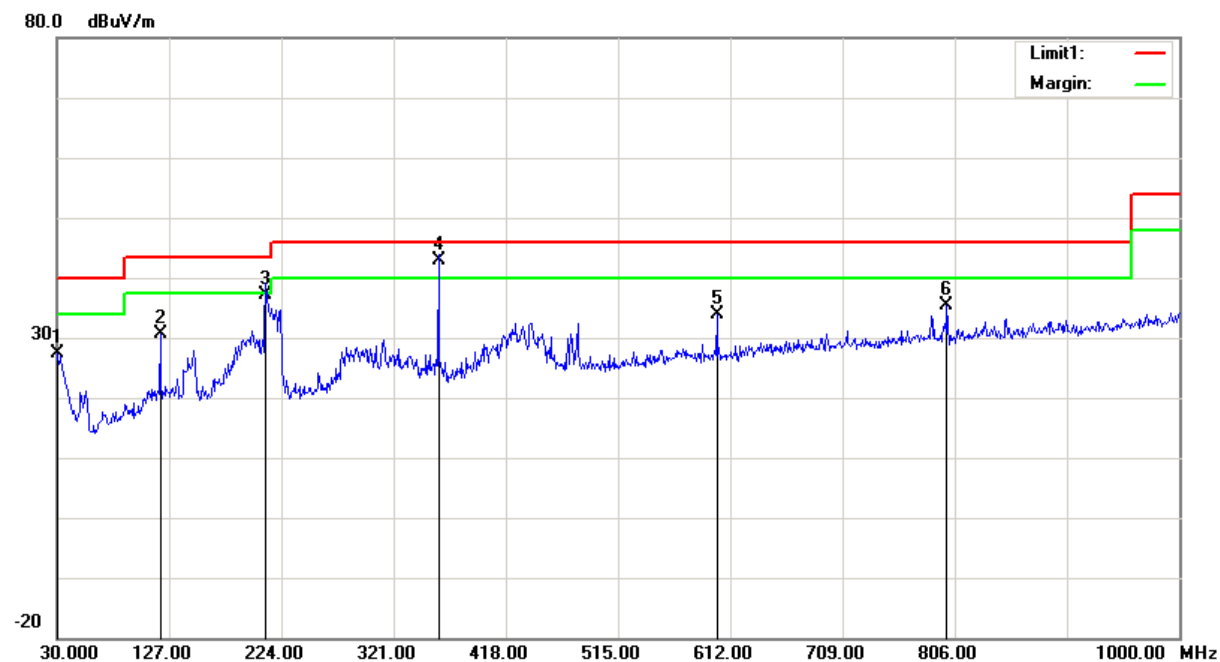
$$\text{Margin} = \text{Limit} - \text{Result}$$

Test Data

Please refer to following table and plots:

Condition: FCC Part 15B Class B
EUT: OSMO ACTION
Model: AC001
Test Mode: Downloading

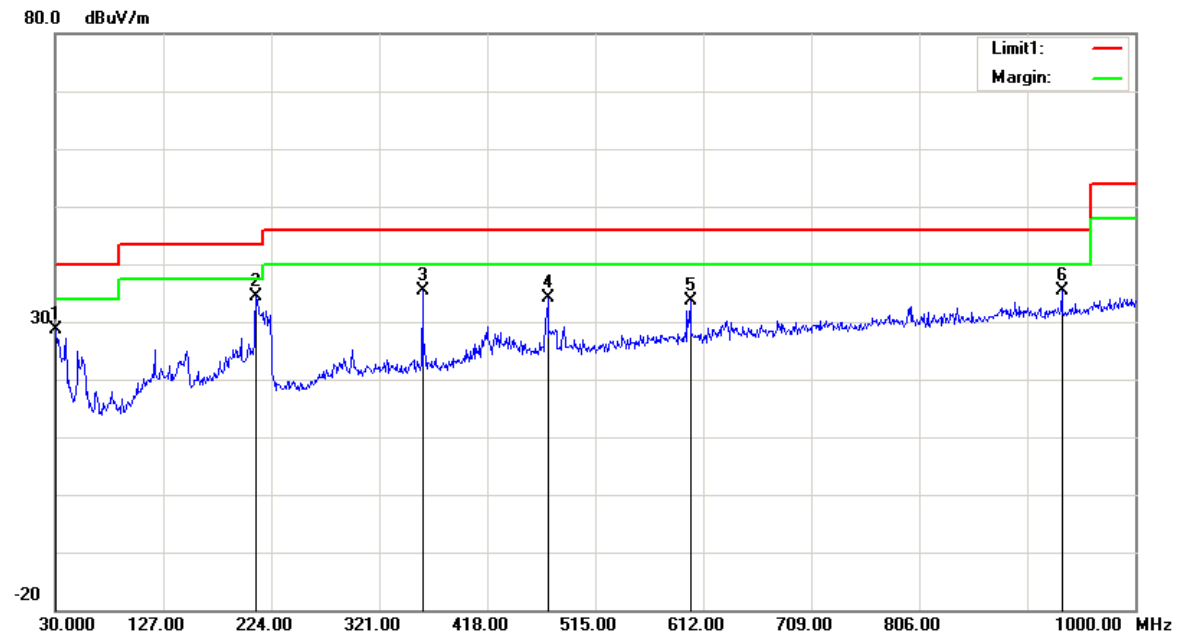
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
30.0000	25.76	peak	1.72	27.48	40.00	12.52
119.2400	35.44	peak	-4.84	30.60	43.50	12.90
210.4200	44.47	QP	-7.37	37.10	43.50	6.40
359.8000	45.60	QP	-2.80	42.80	46.00	3.20
600.3600	32.88	peak	1.03	33.91	46.00	12.09
799.2100	31.02	peak	4.40	35.42	46.00	10.58

Condition: FCC Part 15B Class B
EUT: OSMO ACTION
Model: AC001
Test Mode: Downloading

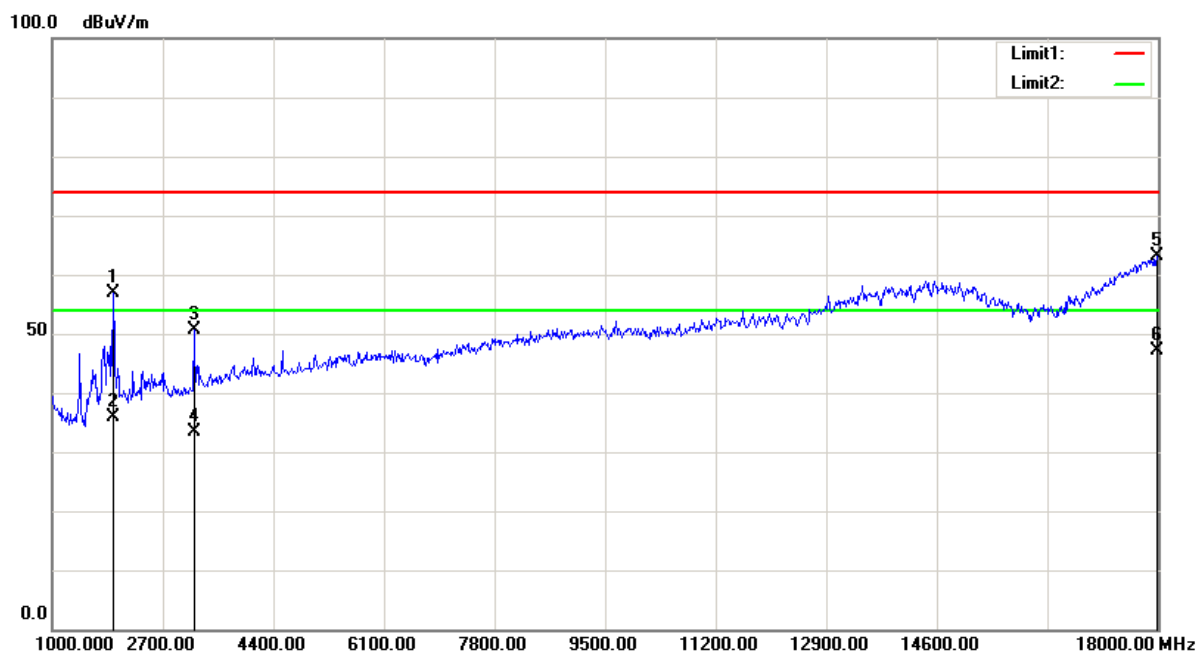
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
30.0000	26.93	peak	1.72	28.65	40.00	11.35
210.4200	41.73	peak	-7.37	34.36	43.50	9.14
359.8000	38.15	peak	-2.80	35.35	46.00	10.65
472.3200	34.50	peak	-0.40	34.10	46.00	11.90
600.3600	32.54	peak	1.03	33.57	46.00	12.43
934.0400	38.71	peak	-3.43	35.28	46.00	10.72

Condition: FCC Part 15 Class B
EUT: OSMO ACTION
Model: AC001
Test Mode: Downloading

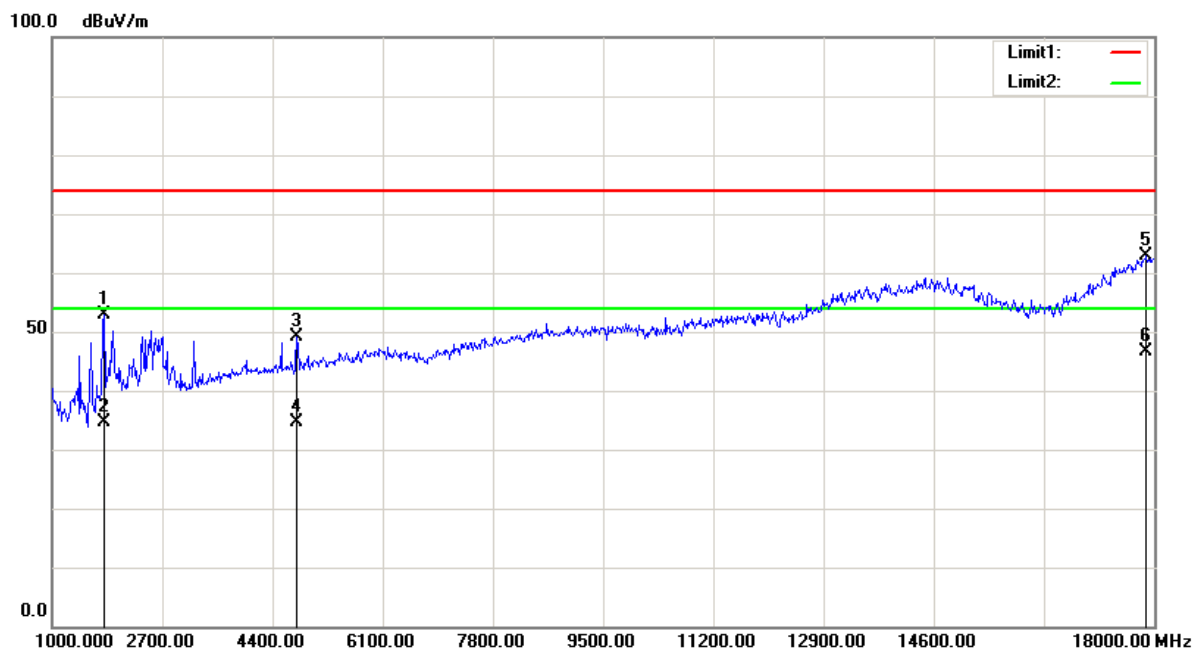
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1943.500	64.30	peak	-7.39	56.91	74.00	17.09
1943.500	43.15	AVG	-7.39	35.76	54.00	18.24
3184.500	54.93	peak	-4.24	50.69	74.00	23.31
3184.500	37.52	AVG	-4.24	33.28	54.00	20.72
17983.000	46.06	peak	17.02	63.08	74.00	10.92
17983.000	30.10	AVG	17.02	47.12	54.00	6.88

Condition: FCC Part 15 Class B
EUT: OSMO ACTION
Model: AC001
Test Mode: Downloading

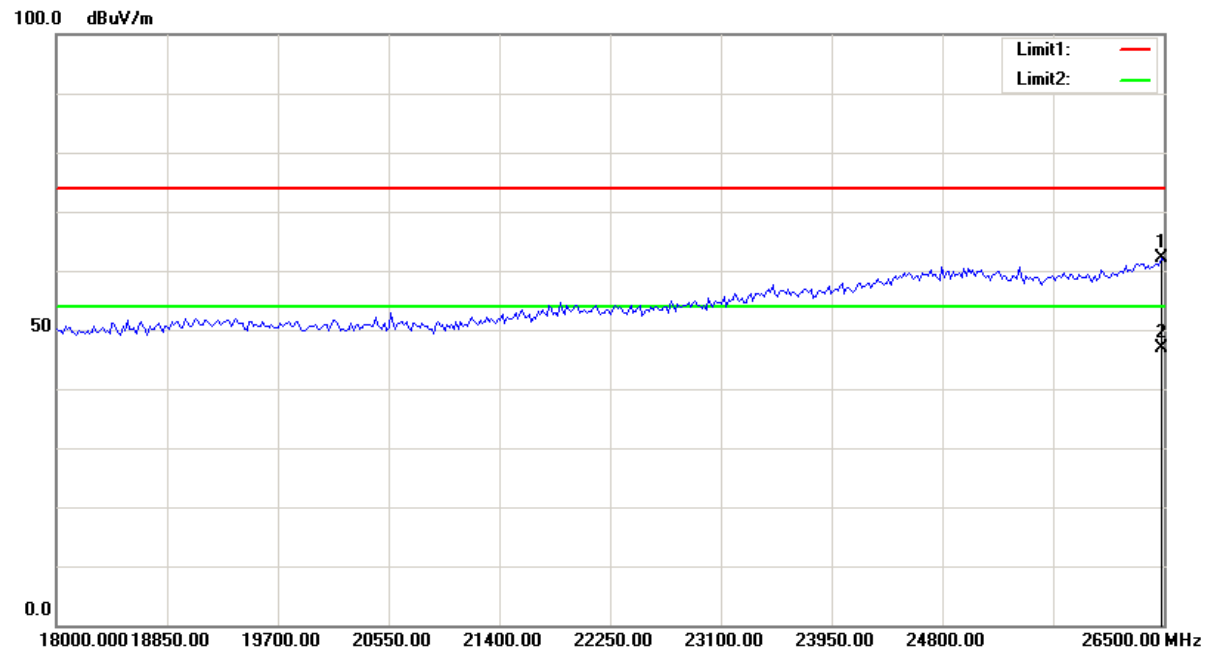
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1799.000	60.71	peak	-7.77	52.94	74.00	21.06
1799.000	42.36	AVG	-7.77	34.59	54.00	19.41
4782.500	50.38	peak	-1.18	49.20	74.00	24.80
4782.500	35.69	AVG	-1.18	34.51	54.00	19.49
17889.500	46.52	peak	16.34	62.86	74.00	11.14
17889.500	30.21	AVG	16.34	46.55	54.00	7.45

Condition: FCC Part 15 Class B
EUT: OSMO ACTION
Model: AC001
Test Mode: Downloading

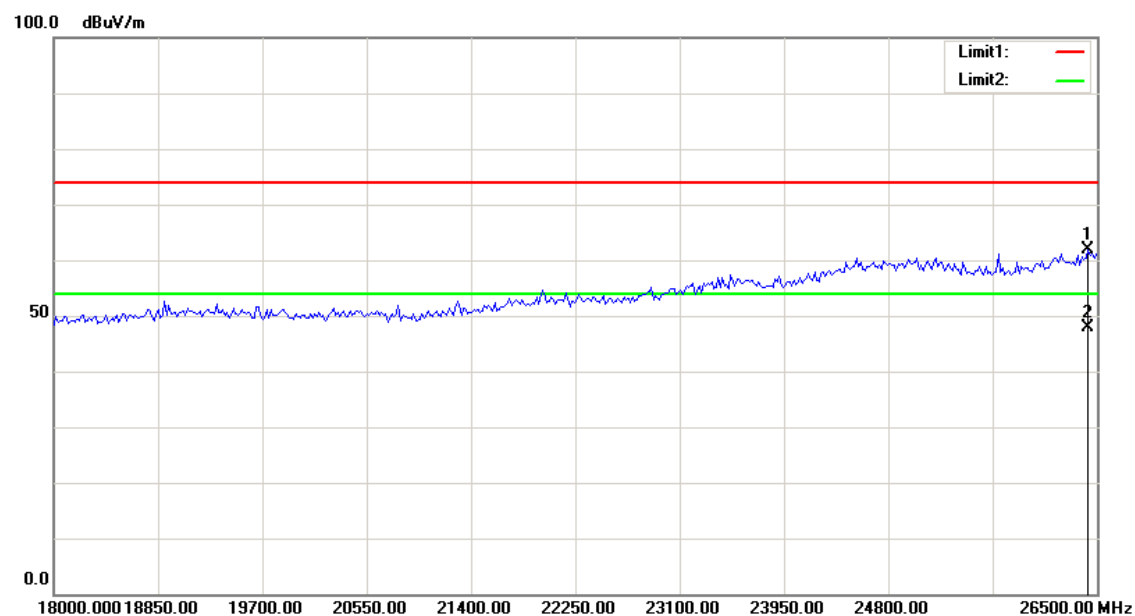
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
26482.966	40.36	peak	21.76	62.12	74.00	11.88
26482.966	25.19	AVG	21.76	46.95	54.00	7.05

Condition: FCC Part 15 Class B
EUT: OSMO ACTION
Model: AC001
Test Mode: Downloading

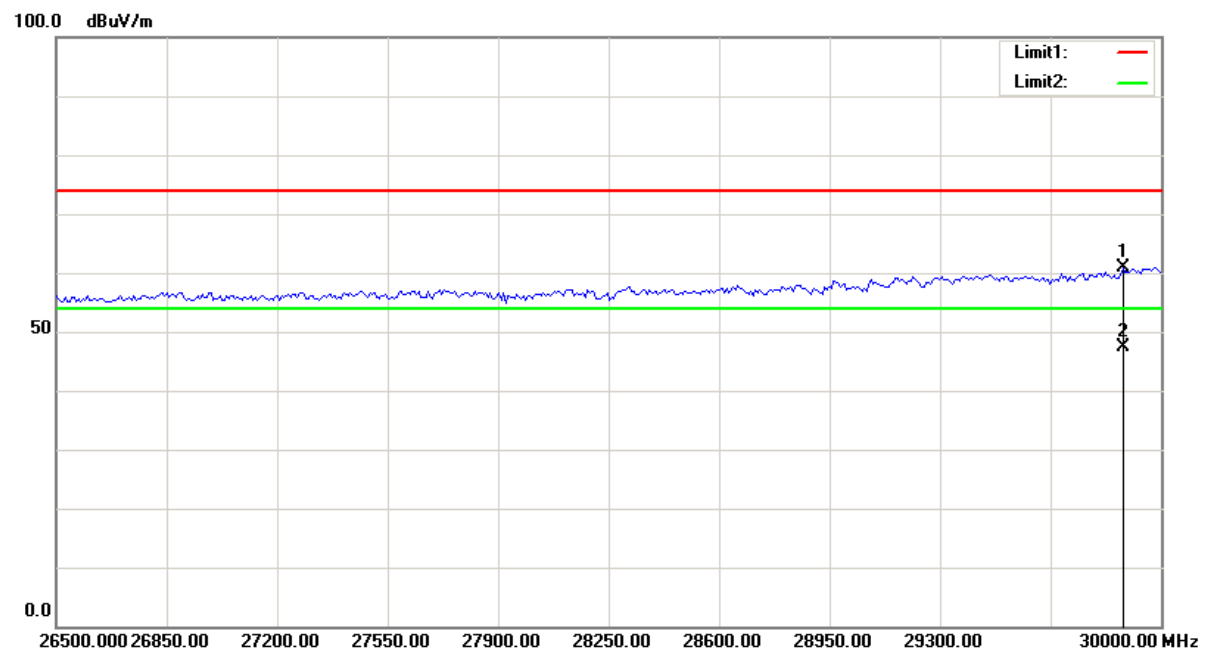
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
26431.864	40.40	peak	21.54	61.94	74.00	12.06
26431.864	26.41	AVG	21.54	47.95	54.00	6.05

Condition: FCC Part 15 Class B
EUT: OSMO ACTION
Model: AC001
Test Mode: Downloading

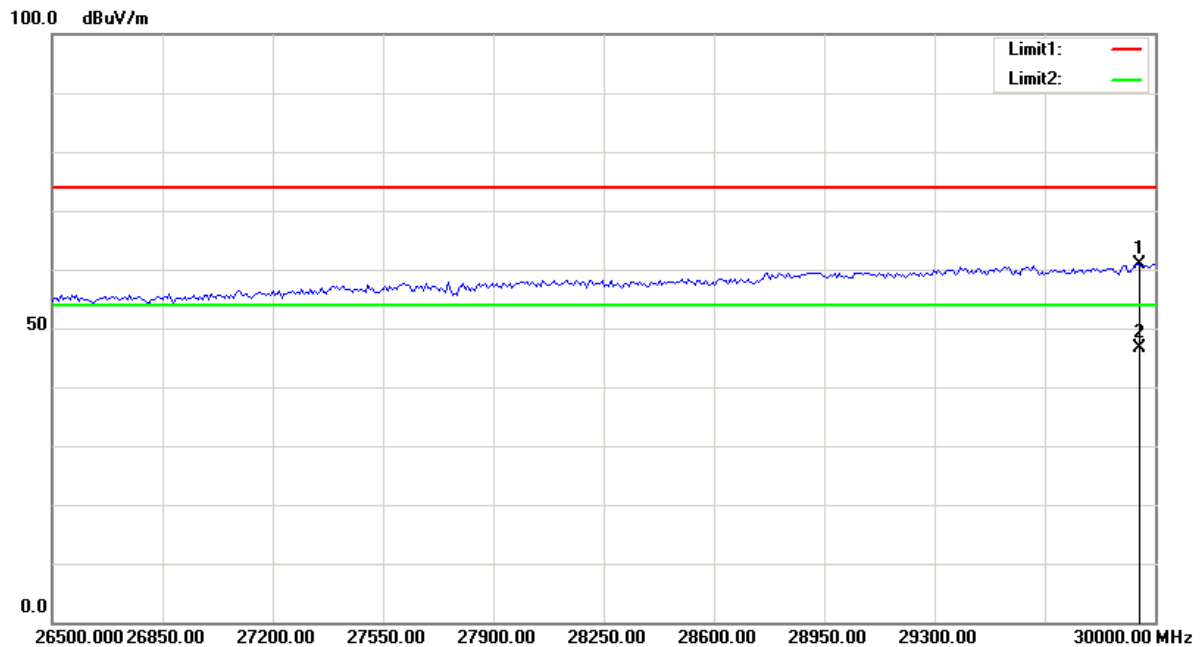
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 1m



Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
29880.762	45.12	peak	15.87	60.99	74.00	13.01
29880.762	31.52	AVG	15.87	47.39	54.00	6.61

Condition: FCC Part 15 Class B
EUT: OSMO ACTION
Model: AC001
Test Mode: Downloading

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



Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
29950.902	44.55	peak	16.37	60.92	74.00	13.08
29950.902	30.21	AVG	16.37	46.58	54.00	7.42

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