



TESTING LABORATORY
CERTIFICATE #4820.01



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

FCC ID: 2ANDR-R181902
Model:R18

Report Type: Original Report	Product Name: Ronin-SC
Report Number:	RDG190316002-00A
Report Date:	2019-04-16
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	Ronin-SC
EUT Model:	R18
Highest Operation Frequency:	2480MHz
Rated Input Voltage:	7.2 Vdc from Ronin-SC BG18 Grip
External Dimension:	200mm(L)*58 mm(W)* 214mm(H)
Serial Number:	190316002
EUT Received Date:	2019/3/12

Objective

This report is prepared on behalf of *SZ DJI Osmo Technology Co.,Ltd.* in accordance with Part 2, Subpart J, and Part 15-Subparts 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 is to determine the compliance of EUT with: FCC Part 15B Class B and ICES-003, Issue 6, January 2016, Class B.

Related Submittal(s)/Grant(s)

No related submittal.

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℃
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 typical fashion (as normally used by a typical user) as below:

Test mode: Charging and Operating

Charging the EUT and controlled the EUT by mobile phone recording video.

Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

No

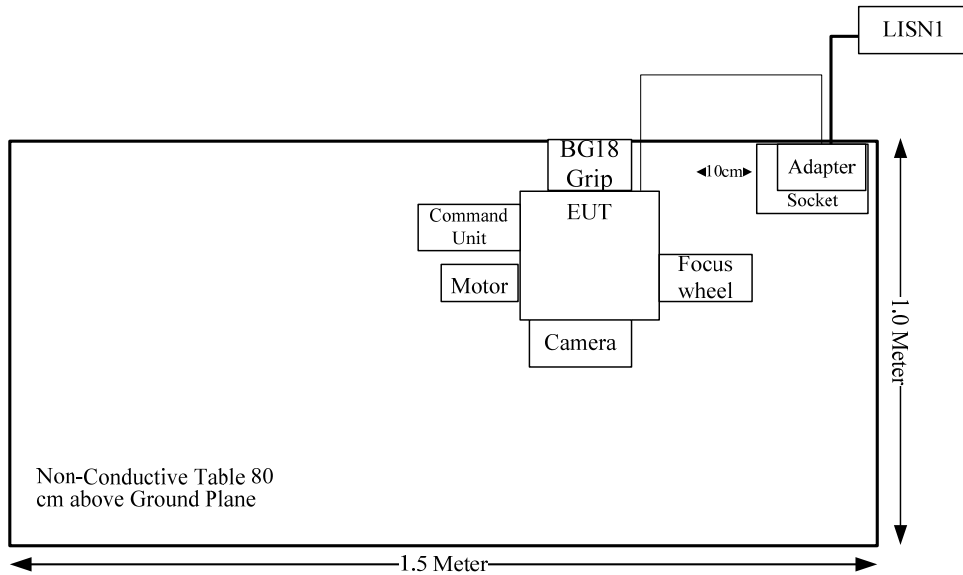
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Huawei	Adapter	HW050200C01	/
DJI	Focus Wheel	RSFW	/
DJI	Ronin-SC BG18 Grip	BG18 Grip	/
DJI	Ronin-S Command Unit	RSCMD	/
DJI	Ronin-SC Focus Motor	RSCFM	/
Cannon	Camera		/

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Control Line	Yes	No	0.3	EUT	Ronin-SC Focus Motor
USB-C Cable	Yes	No	1.2	Adapter	EUT

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	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	2018-09-19	2019-09-19
Radiated emissions Below 1GHz					
R&S	EMI Test Receiver	ESCI	100224	2018-12-10	2019-12-10
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	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
Radiated emissions Above 1GHz					
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-01-04	2020-01-04
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
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2018-09-05	2019-09-05
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2018-09-05	2019-09-05

* 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

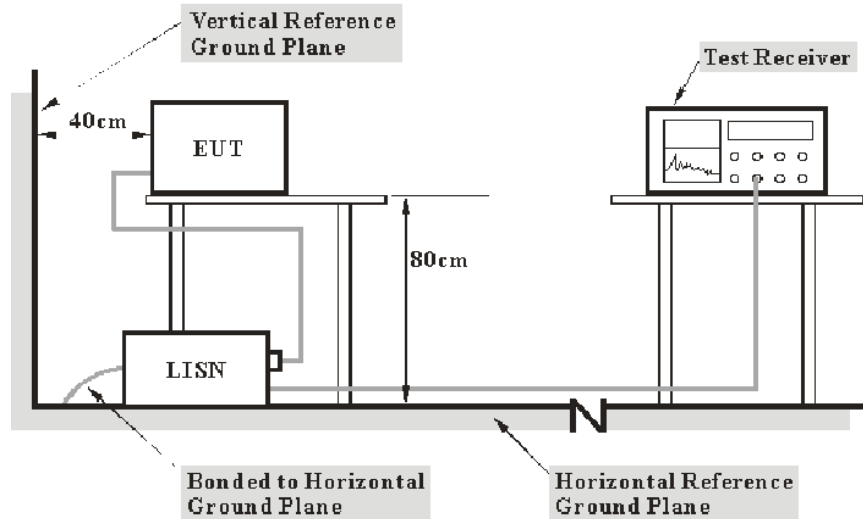
Test Item:	Conducted emissions	Radiated emissions Below 1GHz	Radiated emissions Above 1GHz
Test Date:	2019-03-16	2019-04-16	2019-04-16
Tester:	Lily Xie	Neil Liao	Neil Liao
Temperature:	24.3°C	23.8°C	23.8°C
Relative Humidity:	53%	52%	52%
ATM Pressure:	100.1kPa	100.5kPa	100.5kPa

SUMMARY OF TEST RESULTS

Rule and Clause	Description of Test	Test Result
FCC §15.107 ICES-003 §6.1	Conducted emissions	Compliance
FCC §15.109 ICES-003 §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 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.

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.

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

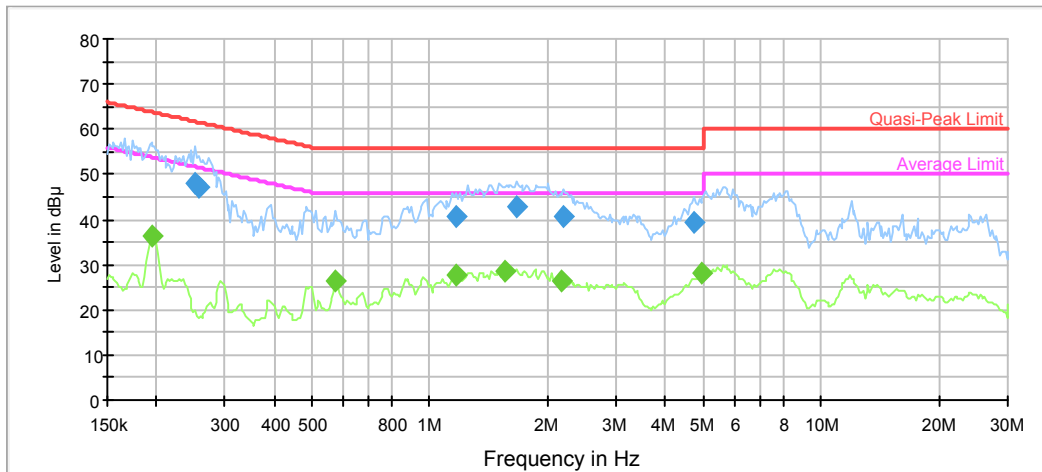
The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit – Result

Test Data

Please refer to following table and plots:

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



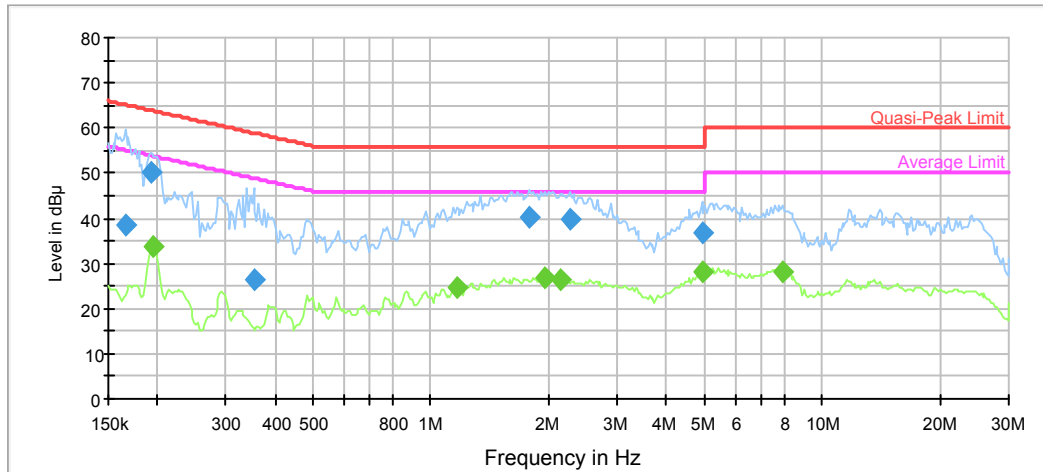
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.251654	48.2	9.000	L1	10.3	13.5	61.7
0.256712	47.0	9.000	L1	10.3	14.5	61.5
1.164916	40.7	9.000	L1	9.8	15.3	56.0
1.666725	42.7	9.000	L1	9.7	13.3	56.0
2.202229	40.8	9.000	L1	9.7	15.2	56.0
4.738144	39.2	9.000	L1	9.8	16.8	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.196231	36.2	9.000	L1	10.6	17.6	53.8
0.574747	26.4	9.000	L1	9.8	19.6	46.0
1.164916	27.7	9.000	L1	9.8	18.3	46.0
1.554585	28.6	9.000	L1	9.7	17.4	46.0
2.158836	26.2	9.000	L1	9.7	19.8	46.0
4.979837	27.9	9.000	L1	9.8	18.1	46.0

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



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.165693	38.3	9.000	N	10.9	26.9	65.2
0.192365	50.2	9.000	N	10.7	13.7	63.9
0.352963	26.3	9.000	N	10.0	32.6	58.9
1.786955	40.0	9.000	N	9.8	16.0	56.0
2.268959	39.7	9.000	N	9.8	16.3	56.0
4.930532	36.9	9.000	N	9.8	19.1	56.0

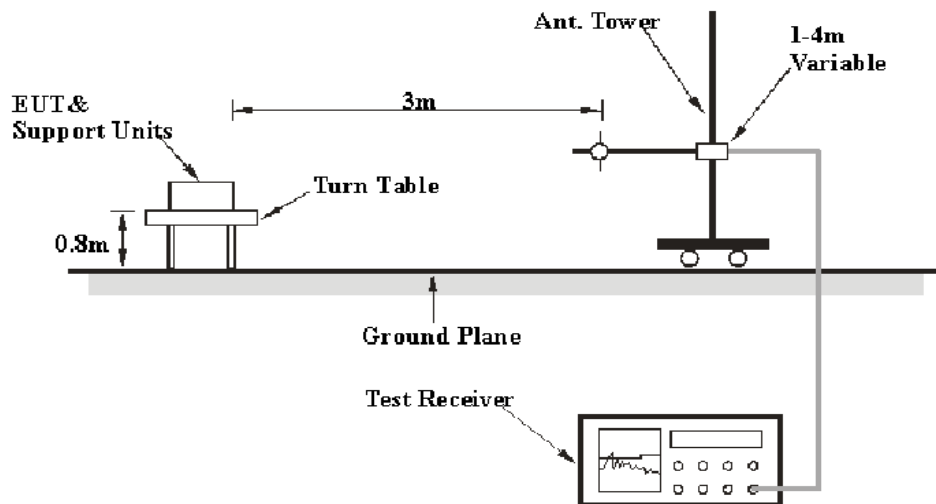
Final Result 2

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.196231	33.9	9.000	N	10.6	19.9	53.8
1.164916	24.6	9.000	N	9.8	21.4	46.0
1.954366	26.7	9.000	N	9.8	19.3	46.0
2.137462	26.4	9.000	N	9.8	19.6	46.0
4.979837	28.1	9.000	N	9.8	17.9	46.0
7.949132	28.2	9.000	N	9.8	21.8	50.0

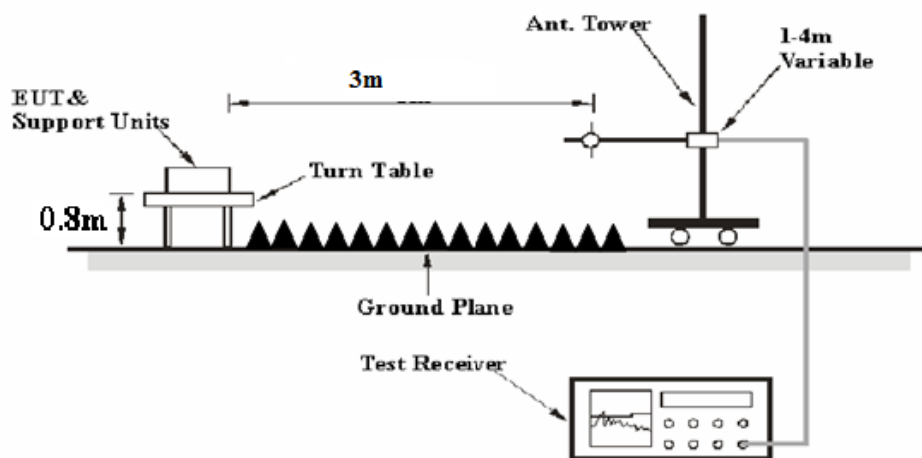
RADIATED EMISSIONS

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 A, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109, ICES-003 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	10Hz	/	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 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:

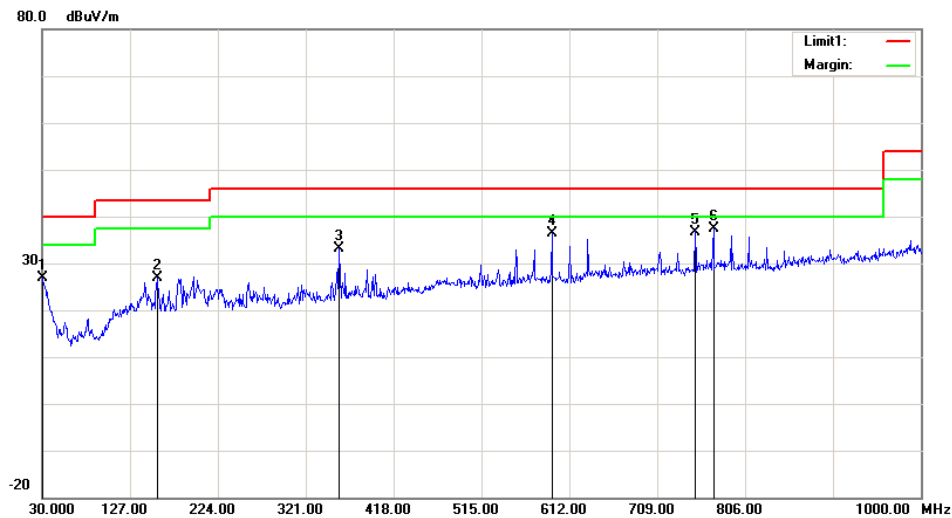
$$\text{Margin} = \text{Limit} - \text{Result}$$

Test Data

Please refer to following table and plots:

Condition: FCC Class B 3M Radiation
EUT: Ronin-SC
Model: R18
Test Mode: Charging&Operating
Note:

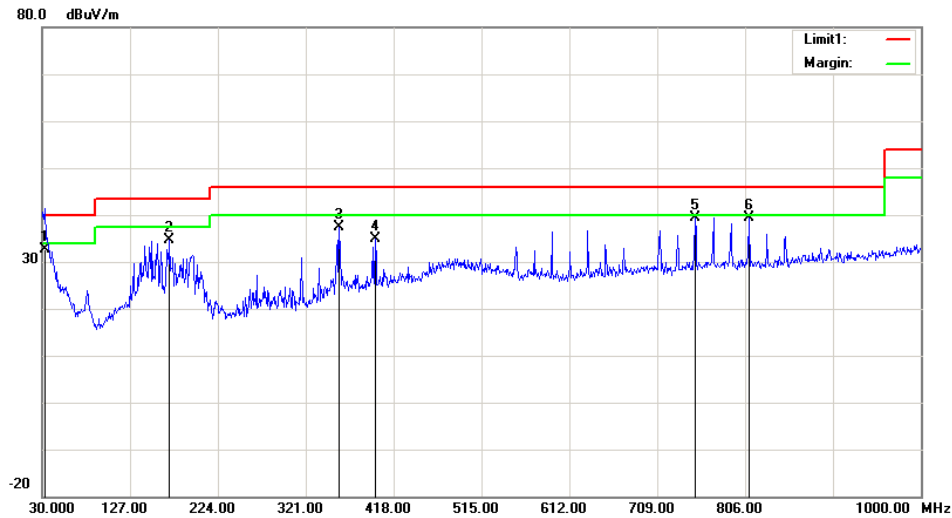
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



Frequency (MHz)	Reading (dBμV)	Detector	Corrected dB/m	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
30.0000	25.25	peak	1.72	26.97	40.00	13.03
157.0700	32.69	peak	-5.80	26.89	43.50	16.61
357.8600	35.89	peak	-2.82	33.07	46.00	12.93
592.6000	35.56	peak	0.85	36.41	46.00	9.59
750.7100	33.09	peak	3.66	36.75	46.00	9.25
771.0800	32.93	peak	4.33	37.26	46.00	8.74

Condition: FCC Class B 3M Radiation
EUT: Ronin-SC
Model: R18
Test Mode: Charging&Operating
Note:

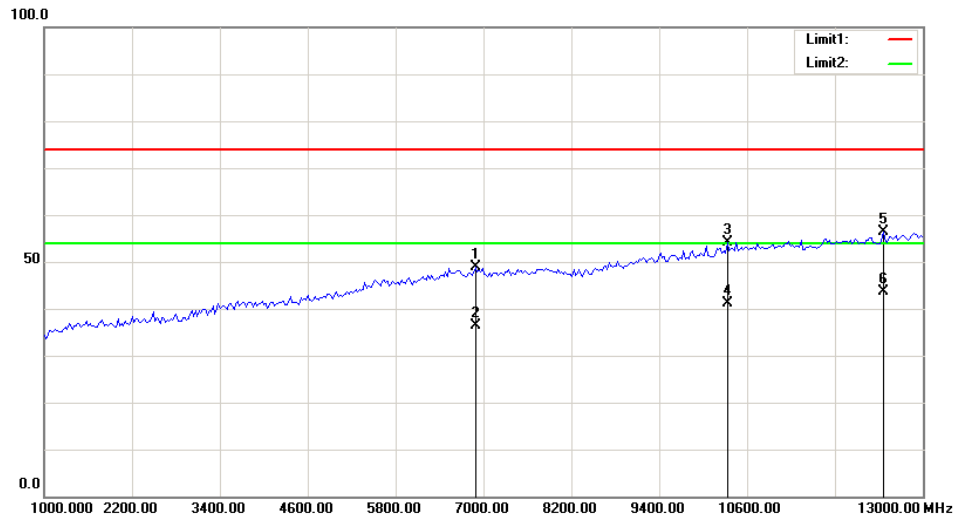
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



Frequency (MHz)	Reading (dBμV)	Detector	Corrected dB/m	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
32.9100	33.10	QP	-0.56	32.54	40.00	7.46
170.6500	41.27	peak	-6.63	34.64	43.50	8.86
357.8600	40.19	peak	-2.82	37.37	46.00	8.63
397.6300	36.95	peak	-2.04	34.91	46.00	11.09
750.7100	35.83	peak	3.66	39.49	46.00	6.51
809.8800	34.65	peak	4.80	39.45	46.00	6.55

Condition: FCC Part 15B Class B
EUT: Ronin-SC
Model: R18
Test Mode: Charging&Operating
Note:

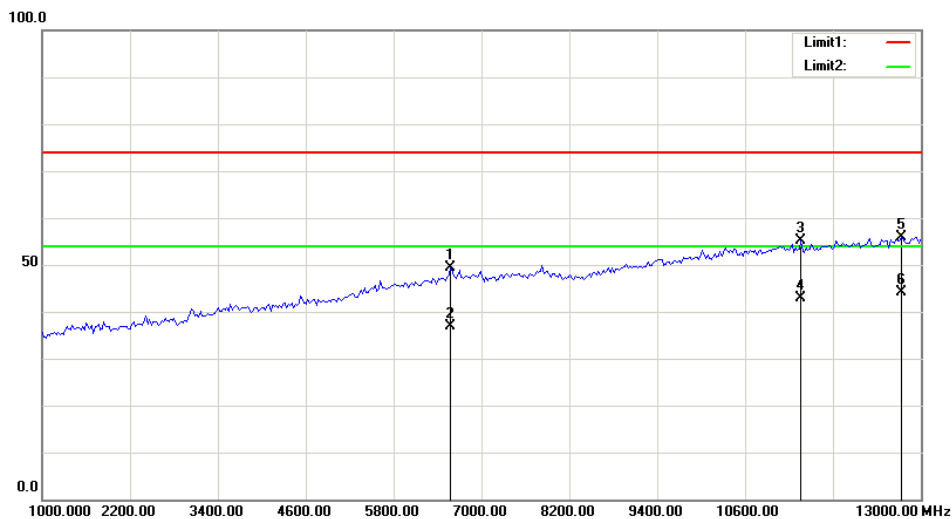
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



Frequency (MHz)	Reading (dBμV)	Detector	Corrected dB/m	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
6891.784	36.98	peak	11.96	48.94	74.00	25.06
6891.784	24.36	AVG	11.96	36.32	54.00	17.68
10330.661	36.98	peak	17.09	54.07	74.00	19.93
10330.661	23.93	AVG	17.09	41.02	54.00	12.98
12470.942	36.95	peak	19.47	56.42	74.00	17.58
12470.942	24.10	AVG	19.47	43.57	54.00	10.43

Condition: FCC Part 15B Class B
EUT: Ronin-SC
Model: R18
Test Mode: Charging&Operating
Note:

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



Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
6579.158	37.75	peak	11.53	49.28	74.00	24.72
6579.158	25.41	AVG	11.53	36.94	54.00	17.06
11364.730	36.86	peak	18.20	55.06	74.00	18.94
11364.730	24.69	AVG	18.20	42.89	54.00	11.11
12735.471	35.68	peak	20.16	55.84	74.00	18.16
12735.471	23.93	AVG	20.16	44.09	54.00	9.91

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