FCC RADIO TEST REPORT

The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results, data evaluation, test procedures, and equipment of configurations shown in this report were made in accordance with the procedures in ANSI C63.10(2013).

Applicant	:	Halo 2Cloud,LLC
Address	:	6 CENTRAL ROW HARTFORD CT 06103, Hartford city, Connecticut State, United States
Manufacturer/ Factory	:	Dongguan Zhongkang Technology Electronics Co., Ltd.
Address	:	No.12 Yansha Road, TianXin, Tangxia Town, Dongguan City, Guangdong Province 523718, China
E.U.T.	:	JUMP STARTER, Portable Power Jump Starter, mophie powerstation go
Brand Name	:	HALO, mophie
Model No.	:	HALO BOLT ACDC WIRELESS, PWRSTION-GO-WRLS (For model difference refer to section 1)
FCC ID	:	2AV3U-00001
Measurement Standard	:	FCC PART 15 Subpart C
Date of Receiver	:	April 02, 2020
Date of Test	:	April 02, 2020 to April 18, 2020
Date of Report	:	May 20, 2020

This Test Report is Issued Under the Authority of :

Prepared by

Sundiy Jiang / Engineer

Approved & Authorized Signer

Tom Fan / Authorized Signatory

This test report is for the customer shown above and their specific product only. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.

Table of Contents

Revision History of This Test Report

Report Number	Description	Issued Date
NTC2004022FV00	Initial Issue	2020-05-20

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

Product name : JUMP STARTER, Portable Power Jump Starter, mophie powerstation go

Main model : HALO BOLT ACDC WIRELESS

Additional model : PWRSTION-GO-WRLS

Brand name : HALO, mophie

Rating :

Input	Output Port	
DC 14V 0.85A (From External adapter) DC 12V (From Start Switch Port)	AC Port	USB Port
	AC 115V 60Hz, 65W max	USB 1 5V 2.4A USB 2 5V 2.4A
Note1: Built-in DC 11.1V battery, 44400mWh Note2: Wireless Charging 5V 1A, 5W max		

Test voltage : AC 120V 60Hz, AC 240V 50Hz, DC 11.1V
(Only the worst case was recorded in this report)

Adapter : Manufacturer: HALO
M/N: HALO-1201
Input: AC100V-240V, 50Hz/60Hz, 500mA
Output:DC14V 0.85A

Cable : DC Line: 1.05m unshielded.

Description of Model Difference :
1. Both of modes have the same circuit schematic, construction, PCB Layout and critical components. The difference in model number, brand name, product name due to trading purpose.
2. This product has two different appearance, please refer to the product photo for details

Note : According to the model difference, all tests were performed on model HALO BOLT ACDC WIRELESS.

Technical Specification (Wireless Charging):

Frequency Range	:	110.5-205KHz
Test Channel	:	115KHz
Type of Modulation	:	ASK
Type of Antenna	:	induction coil
Antenna Gain	:	0 dBi

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AV3U-00001** filing to comply with FCC Part 15, Subpart C Rule.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

Wireless Charging Load	:	Manufacturer: Consumer Electronics M/N: 001

1.6 Test Facility and Location

Site Description

EMC Lab : Listed by CNAS, August 13, 2018
The certificate is valid until August 13, 2024
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01
The Certificate Registration Number is L5795.

Listed by A2LA, November 01, 2017
The certificate is valid until December 31, 2019
The Laboratory has been assessed and proved to be in compliance with ISO17025
The Certificate Registration Number is 4429.01

Listed by FCC, November 06, 2017
The Designation Number is CN1214
Test Firm Registration Number: 907417

Listed by Industry Canada, June 08, 2017
The Certificate Registration Number is 46405-9743A

Name of Firm : Dongguan Nore Testing Center Co., Ltd.
(Dongguan NTC Co., Ltd.)

Site Location : Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China

1.7 Summary of Test Results

FCC Rules	Description Of Test	Uncertainty	Result
§15.35	20dB Bandwidth	±1.42 x10^{-4}%	Compliant
§15.207 (a)	AC Power Conducted Emission	±1.06dB	Compliant
§15.209	Radiated Emission	±4.60dB	Compliant

1.8 Deviations and Abnormalities from Standard Conditions

No additions, deviations and exclusions from the standard.

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 Special Accessories

Not available for this EUT intended for grant.

2.3 Description of test modes

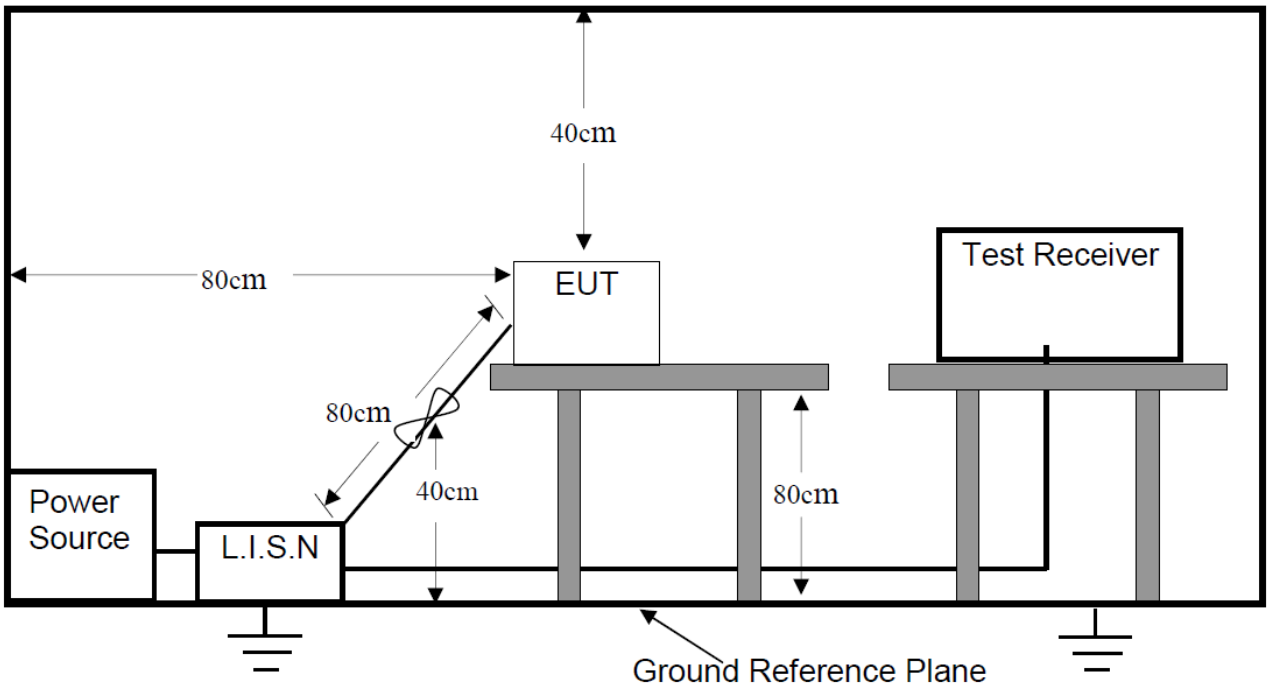
The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and normal mode is programmed. The Lowest, middle and highest channel were chosen for testing.

2.4 EUT Exercise

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

3. Conducted Emissions Test

3.1 Test SET-UP (Block Diagram of Configuration)



3.2 Test Condition

Test Requirement: FCC Part 15.207

Frequency Range: 150KHz ~ 30MHz

Detector: RBW 9KHz, VBW 30KHz

Operation Mode: TX (Full Load, Half Load, Empty Load)

3.3 Measurement Results

Please refer to following plots of the worst case: TX (Full Load)

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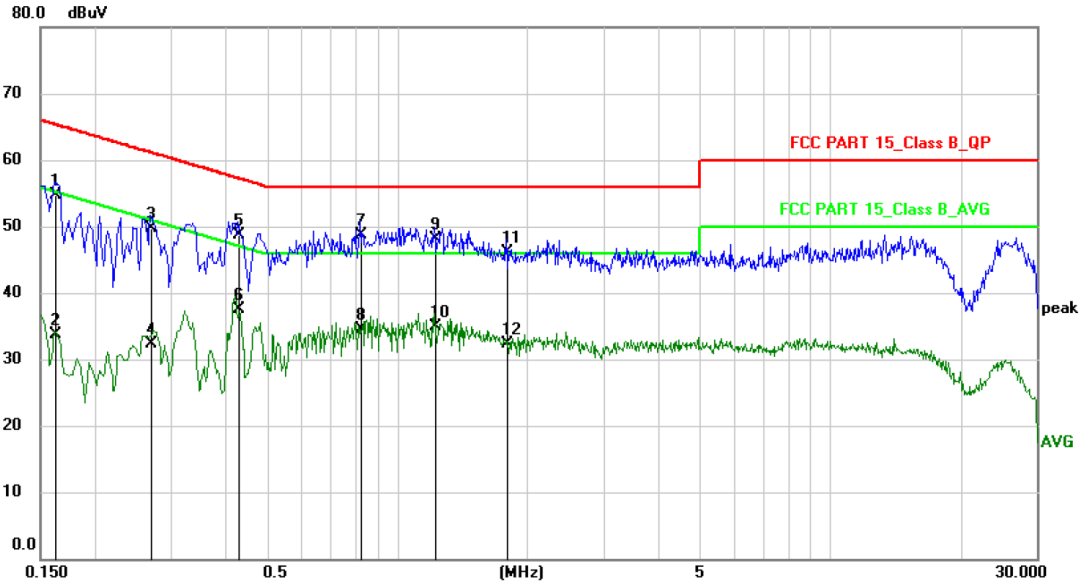
Web: Http://www.ntc-c.com

Conducted Emission Measurement

File :HALO BOLT ACDC WIRELESS Data :#7 Date: 2020/4/14 Time: 9:00:51



Site
Limit: FCC PART 15_Class B_QP
EUT: JUMP STARTER
M/N: HALO BOLT ACDC WIRELESS
Mode: TX
Note:

Phase: L1
Power: AC120V/60Hz

Temperature: 26
Humidity: 50 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	44.10	10.60	54.70	65.36	-10.66	QP	
2		0.1620	23.20	10.60	33.80	55.36	-21.56	AVG	
3		0.2700	39.10	10.60	49.70	61.12	-11.42	QP	
4		0.2700	21.80	10.60	32.40	51.12	-18.72	AVG	
5		0.4300	38.08	10.62	48.70	57.25	-8.55	QP	
6		0.4300	26.88	10.62	37.50	47.25	-9.75	AVG	
7	*	0.8220	38.03	10.67	48.70	56.00	-7.30	QP	
8		0.8220	23.83	10.67	34.50	46.00	-11.50	AVG	
9		1.2220	37.40	10.70	48.10	56.00	-7.90	QP	
10		1.2220	24.20	10.70	34.90	46.00	-11.10	AVG	
11		1.7900	35.50	10.70	46.20	56.00	-9.80	QP	
12		1.7900	21.60	10.70	32.30	46.00	-13.70	AVG	

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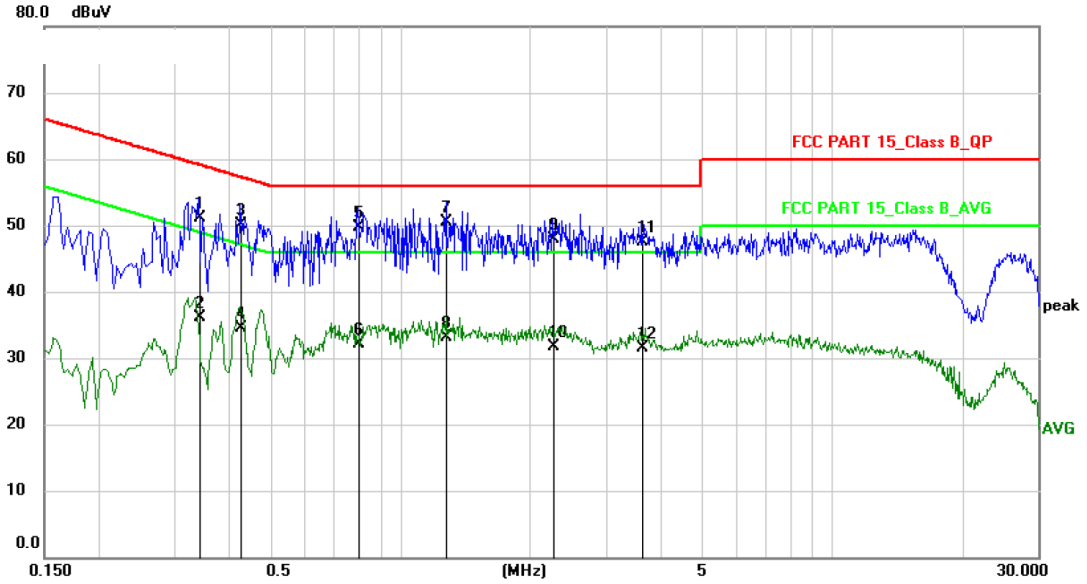
Conducted Emission Measurement

File :HALO BOLT ACDC WIRELESS Data :#8 Date: 2020/4/14 Time: 9:08:35



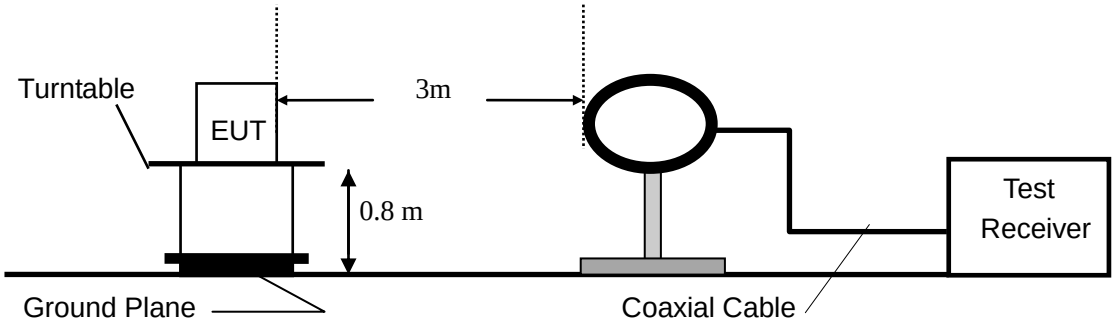
Site Phase: N Temperature: 26
Limit: FCC PART 15_Class B_QP Power: AC120V/60Hz Humidity: 50 %
EUT: JUMP STARTER
M/N: HALO BOLT ACDC WIRELESS
Mode: TX
Note:

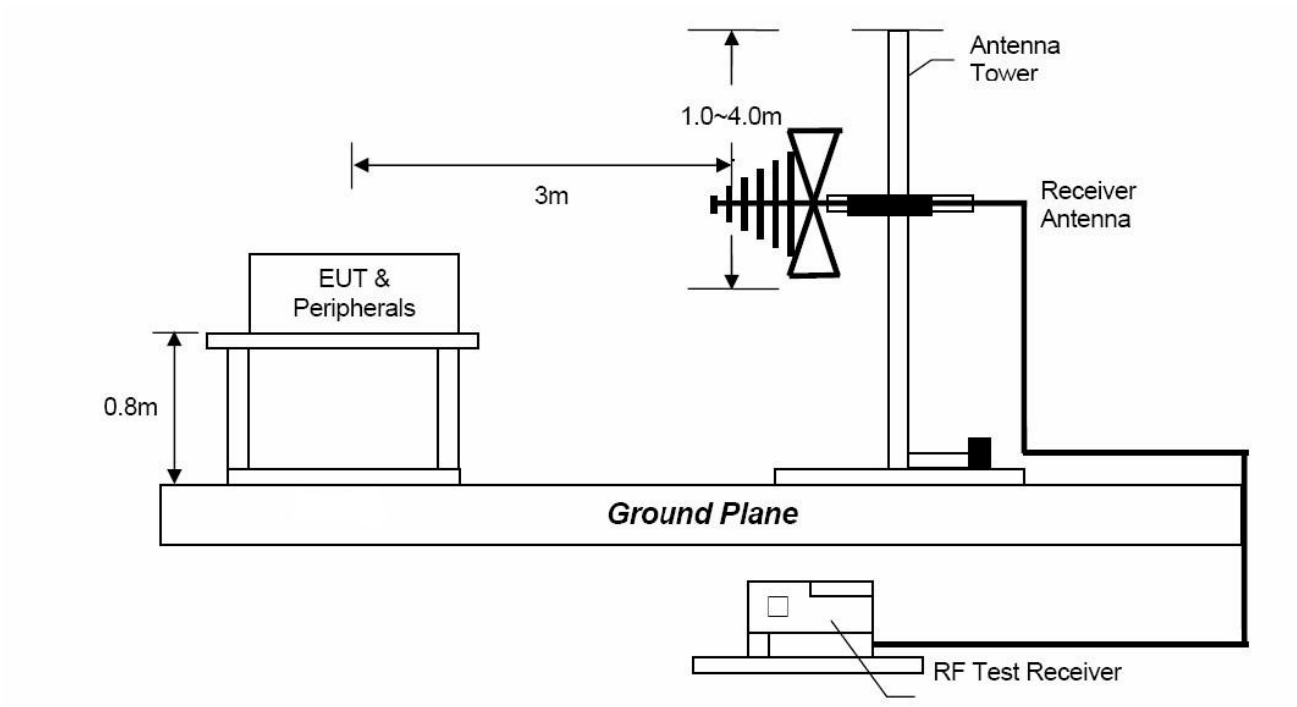
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3420	40.59	10.61	51.20	59.15	-7.95	QP	
2		0.3420	25.49	10.61	36.10	49.15	-13.05	AVG	
3		0.4260	39.58	10.62	50.20	57.33	-7.13	QP	
4		0.4260	23.98	10.62	34.60	47.33	-12.73	AVG	
5		0.7980	39.03	10.67	49.70	56.00	-6.30	QP	
6		0.7980	21.43	10.67	32.10	46.00	-13.90	AVG	
7	*	1.2780	39.80	10.70	50.50	56.00	-5.50	QP	
8		1.2780	22.40	10.70	33.10	46.00	-12.90	AVG	
9		2.2540	37.20	10.70	47.90	56.00	-8.10	QP	
10		2.2540	21.10	10.70	31.80	46.00	-14.20	AVG	
11		3.6300	36.79	10.71	47.50	56.00	-8.50	QP	
12		3.6300	20.79	10.71	31.50	46.00	-14.50	AVG	

4. Radiated Emission Test

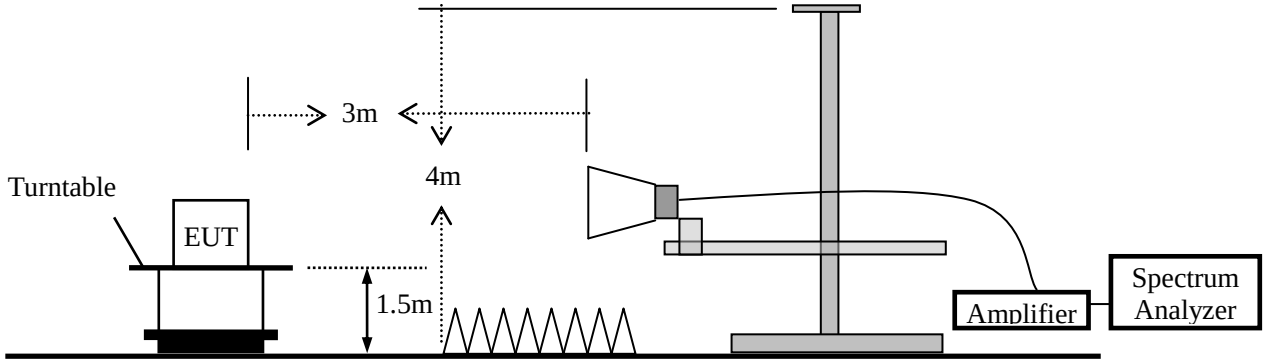
4.1 Test SET-UP (Block Diagram of Configuration)

4.1.1 Radiated Emission Test Set-Up, Frequency below 30MHz and 30-1000MHz.





4.1.2 Radiated Emission Test Set-Up, Frequency above 1GHz



4.2 Measurement Procedure

a. Blow 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.
b. For the radiated emission test above 1GHz:
   The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.
f. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Level	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

4.3 Limit

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209)
		μV/m
0.009 ~ 0.490	300	2400/F(kHz)
0.490 ~ 1.705	30	24000/F(kHz)
1.705 ~ 30	30	30
30 ~ 88	3	100
88 ~ 216	3	150
216 ~ 960	3	200
Above 960	3	500

Remark : (1) Emission level (dB)μV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

(4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

4.4 Measurement Results

Please refer to following plots of the worst case: TX (Full Load)

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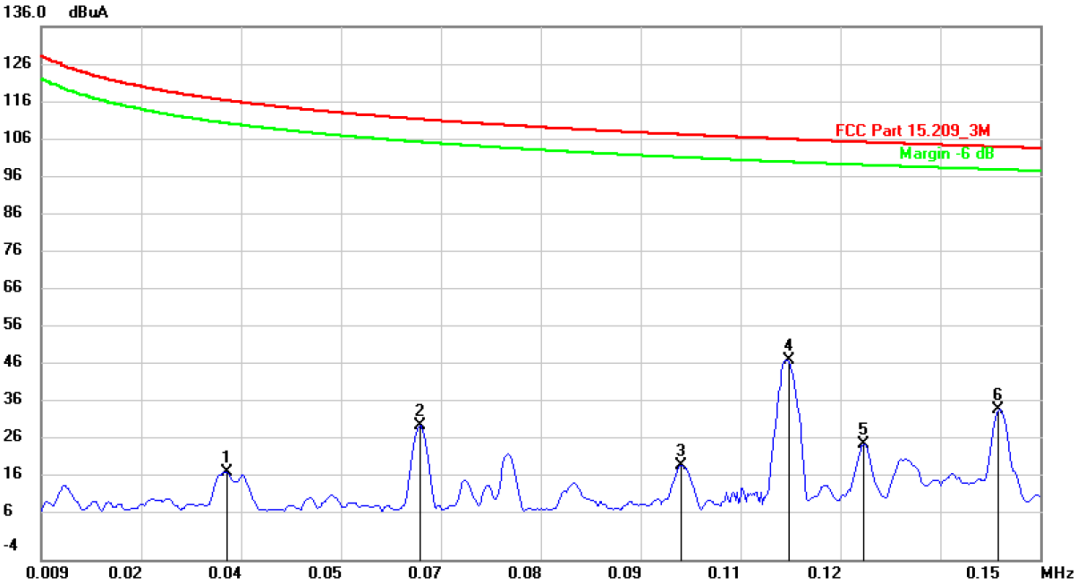
Radiated Emission Measurement

File :HALO BOLT ACDC WIRELESS Data :#14 Date: 2020/4/13 Time: 18:35:30



Site
Limit: FCC Part 15.209_3M
EUT: JUMP STARTER
M/N: HALO BOLT ACDC WIRELESS
Mode: TX
Note:

Polarization: ***Horizontal***
Power: AC120V/60Hz
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuA	dBuA	dB	Detector	cm	degree	Comment
1		0.0352	-13.53	32.31	18.78	116.55	-97.77	Peak			
2		0.0623	-1.12	32.30	31.18	111.61	-80.43	Peak			
3		0.0994	-11.47	32.31	20.84	107.58	-86.74	Peak			
4	*	0.1145	15.98	32.30	48.28	106.36	-58.08	Peak			
5		0.1250	-6.07	32.30	26.23	105.60	-79.37	Peak			
6		0.1440	3.18	32.30	35.48	104.38	-68.90	Peak			

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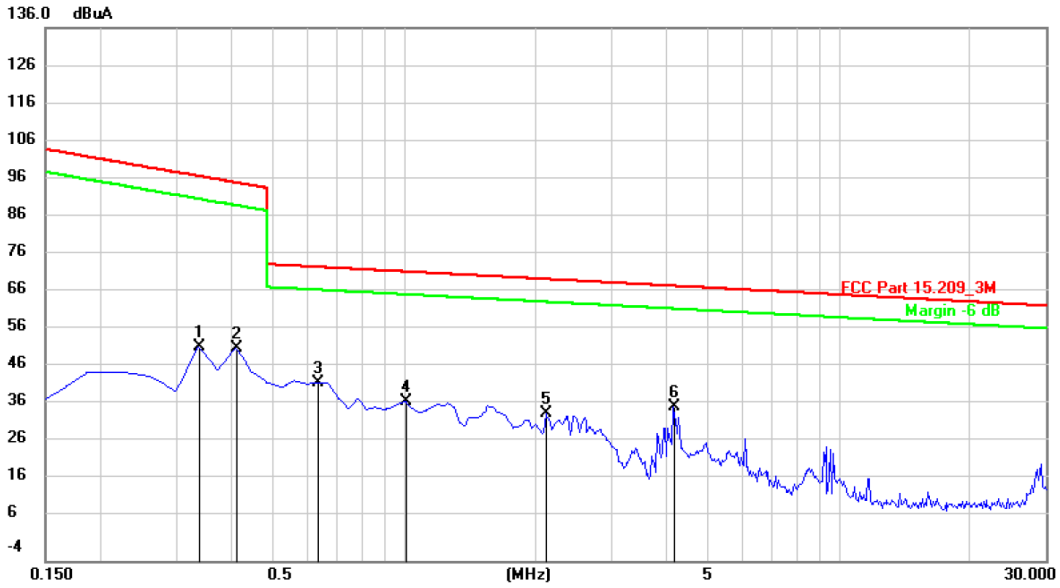
Radiated Emission Measurement

File :HALO BOLT ACDC WIRELESS Data :#11 Date: 2020/4/13 Time: 18:14:38



Site: 3m Chamber
Limit: FCC Part 15.209_3M
EUT: JUMP STARTER
M/N: HALO BOLT ACDC WIRELESS
Mode: TX
Note:

Polarization: *Horizontal*
Power: AC120V/60Hz
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuA	dBuA	dB	Detector	cm	degree	Comment
1		0.3366	19.87	32.25	52.12	97.04	-44.92	Peak			
2		0.4112	19.71	32.23	51.94	95.31	-43.37	Peak			
3	*	0.6350	10.52	32.20	42.72	73.12	-30.40	Peak			
4		1.0079	5.74	32.17	37.91	71.90	-33.99	Peak			
5		2.1276	2.36	32.17	34.53	69.93	-35.40	Peak			
6		4.1797	4.33	32.21	36.54	68.16	-31.62	Peak			

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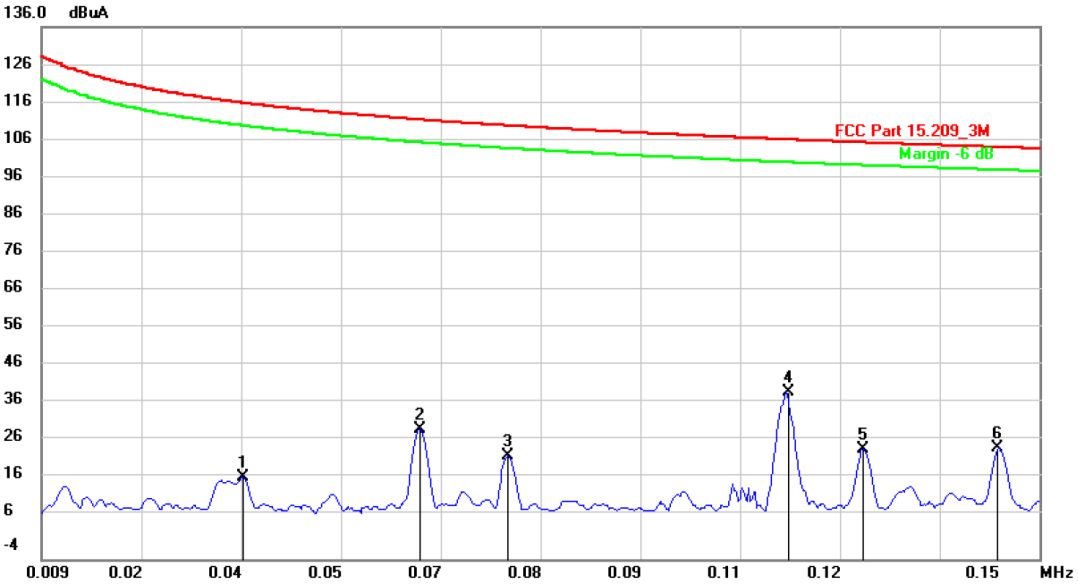
Radiated Emission Measurement

File :HALO BOLT ACDC WIRELESS Data :#13 Date: 2020/4/13 Time: 18:29:26



Site
Limit: FCC Part 15.209_3M
EUT: JUMP STARTER
M/N: HALO BOLT ACDC WIRELESS
Mode: TX
Note:

Polarization: *Vertical*
Power: AC120V/60Hz
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuA	dBuA	dB	Detector	cm	degree	Comment
1		0.0374	-14.69	32.32	17.63	116.02	-98.39	Peak			
2		0.0624	-2.05	32.30	30.25	111.60	-81.35	Peak			
3		0.0748	-9.32	32.30	22.98	110.03	-87.05	Peak			
4	*	0.1145	7.62	32.30	39.92	106.36	-66.44	Peak			
5		0.1251	-7.49	32.30	24.81	105.59	-80.78	Peak			
6		0.1440	-7.15	32.30	25.15	104.38	-79.23	Peak			

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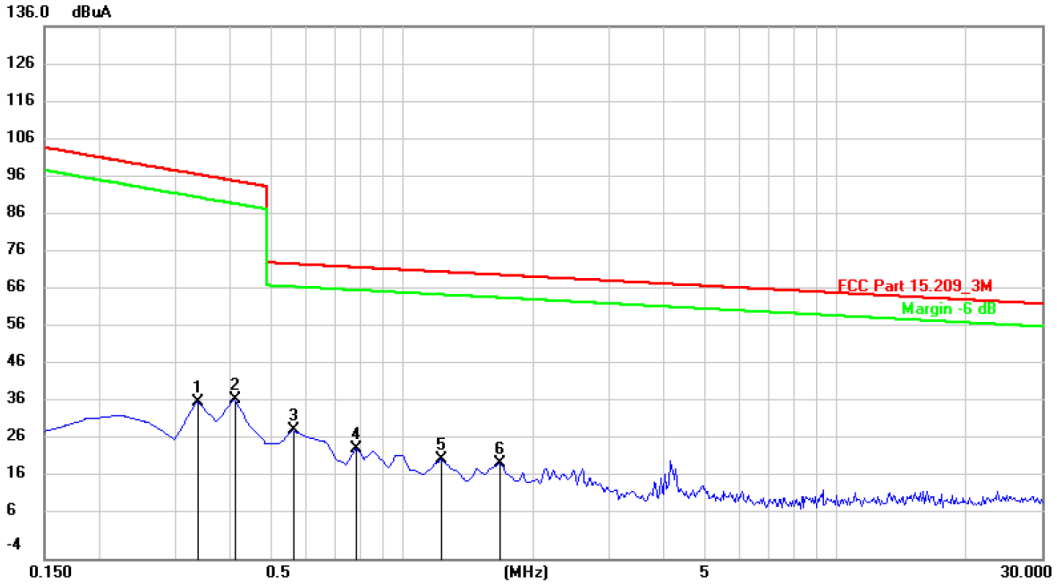
Radiated Emission Measurement

File :HALO BOLT ACDC WIRELESS Data :#12 Date: 2020/4/13 Time: 18:22:20



Site: 3m Chamber
Limit: FCC Part 15.209_3M
EUT: JUMP STARTER
M/N: HALO BOLT ACDC WIRELESS
Mode: TX
Note:

Polarization: *Vertical*
Power: AC120V/60Hz
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuA	dBuA	dB	Detector	cm	degree	Comment
1		0.3366	5.03	32.25	37.28	97.04	-59.76	Peak			
2		0.4112	5.67	32.23	37.90	95.31	-57.41	Peak			
3	*	0.5604	-2.60	32.21	29.61	73.45	-43.84	Peak			
4		0.7842	-7.27	32.18	24.91	72.56	-47.65	Peak			
5		1.2319	-10.21	32.17	21.96	71.37	-49.41	Peak			
6		1.6796	-11.04	32.17	21.13	70.56	-49.43	Peak			

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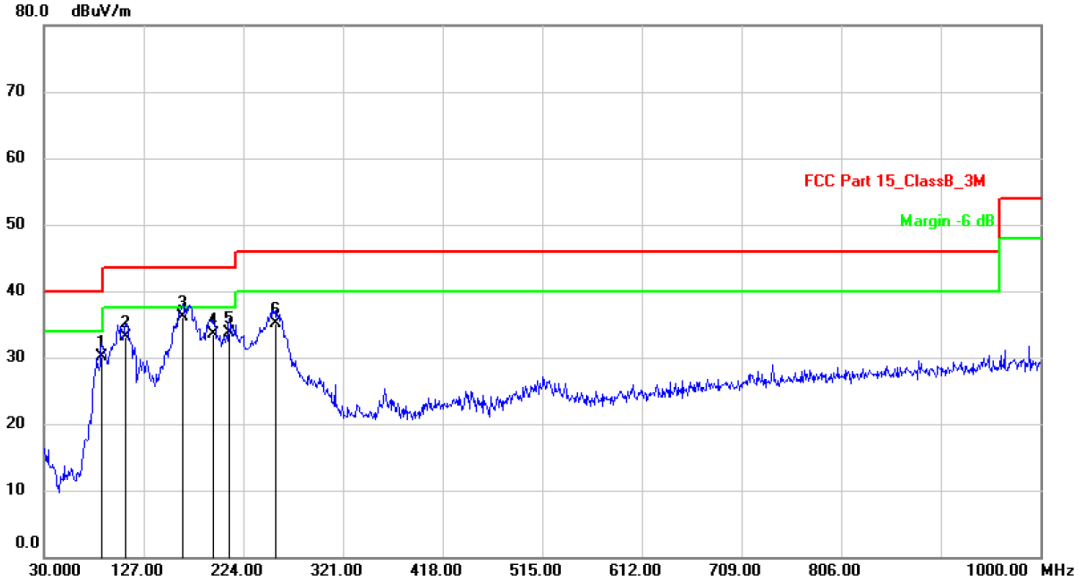
Radiated Emission Measurement

File :HALO BOLT ACDC WIRELESS Data :#10 Date: 2020/4/13 Time: 18:08:16



Site: 3m Chamber
Limit: FCC Part 15_ClassB_3M
EUT: JUMP STARTER
M/N: HALO BOLT ACDC WIRELESS
Mode: TX
Note:

Polarization: ***Horizontal***
Power: AC120V/60Hz
Distance: 3m

Temperature: 26
Humidity: 47 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		86.2600	45.07	-14.87	30.20	40.00	-9.80	QP			
2		109.5400	45.27	-12.17	33.10	43.50	-10.40	QP			
3	*	164.8300	51.18	-14.98	36.20	43.50	-7.30	QP			
4		194.9000	47.02	-13.42	33.60	43.50	-9.90	QP			
5		210.4200	47.03	-13.23	33.80	43.50	-9.70	QP			
6		255.0400	46.65	-11.55	35.10	46.00	-10.90	QP			

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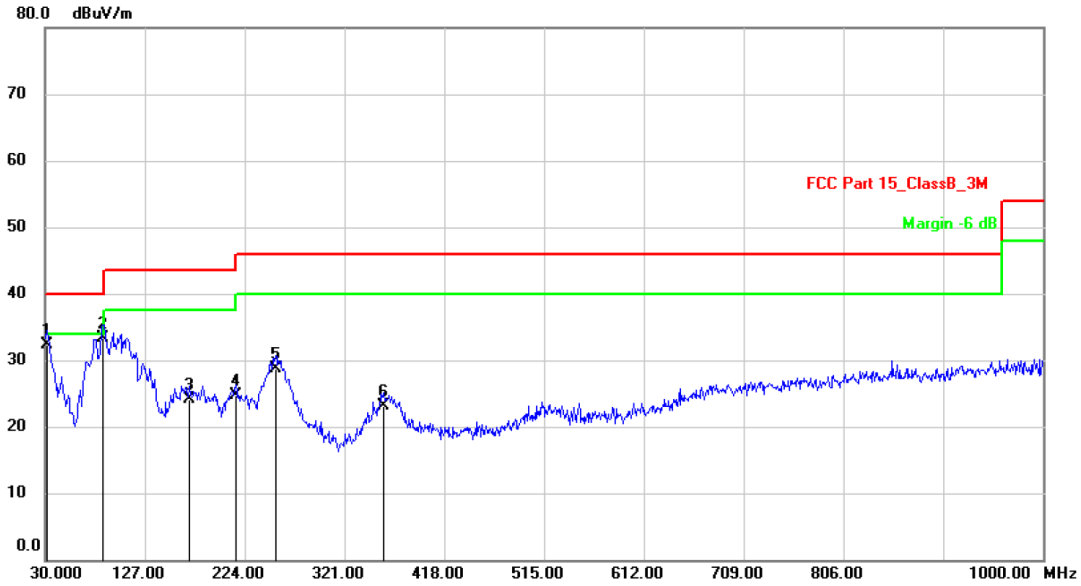
Radiated Emission Measurement

File :HALO BOLT ACDC WIRELESS Data :#9 Date: 2020/4/13 Time: 18:01:35



Site: 3m Chamber
Limit: FCC Part 15_ClassB_3M
EUT: JUMP STARTER
M/N: HALO BOLT ACDC WIRELESS
Mode: TX
Note:

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26
Humidity: 47 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		31.9400	48.17	-15.77	32.40	40.00	-7.60	QP			
2	*	86.2600	51.27	-17.87	33.40	40.00	-6.60	QP			
3		170.6500	41.96	-17.76	24.20	43.50	-19.30	QP			
4		215.2700	40.81	-16.11	24.70	43.50	-18.80	QP			
5		254.0700	42.29	-13.59	28.70	46.00	-17.30	QP			
6		358.8299	34.24	-11.14	23.10	46.00	-22.90	QP			

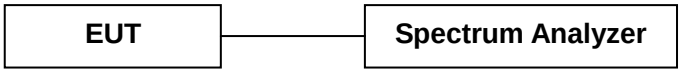
5. 20dB Bandwidth

5.1 Measurement Procedure

Maximum 20dB RF Bandwidth, FCC Rule 15.35:

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was chosen so that the display was a result of the hopping channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Use the spectrum 20dB down delta function to measure the bandwidth.

5.2 Test SET-UP (Block Diagram of Configuration)



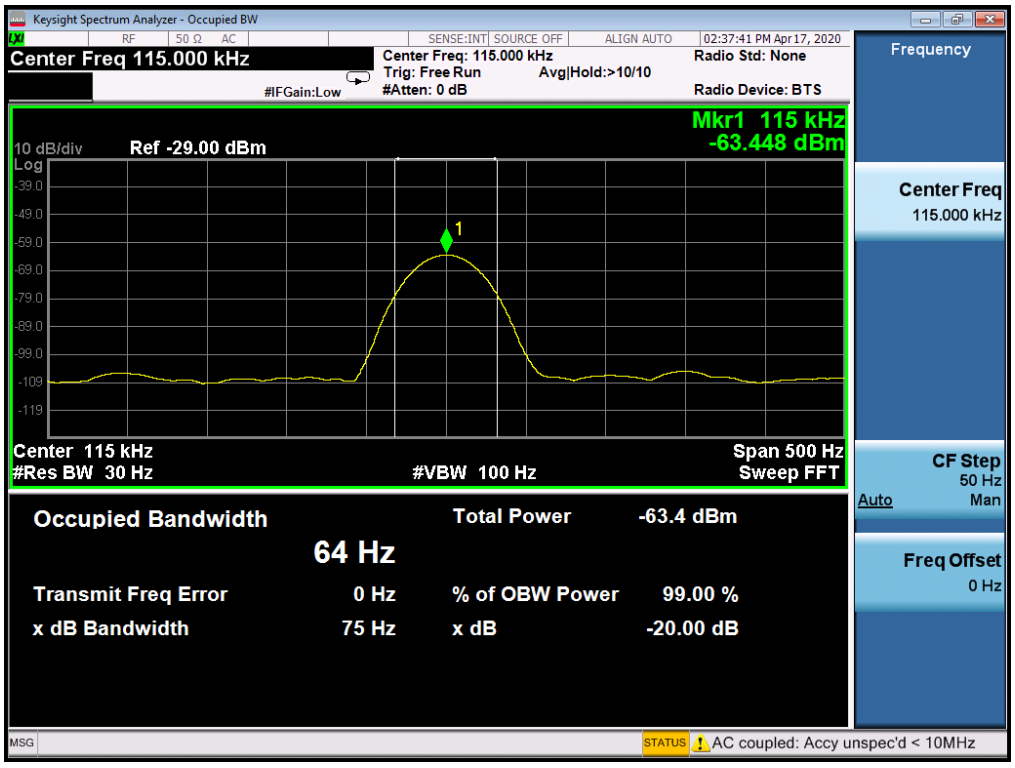
5.3 Measurement Results

Refer to attached data chart.

RBW:	30Hz	VBW:	100Hz
Test By:	Lee	Spectrum Detector:	PK
Temperature :	24 ℃	Test Date :	April 17, 2020
Test Result:	PASS	Humidity :	50 %

Channel frequency (KHz)	20dB Down BW(Hz)
115.0	75

Test Channel



6. Antenna Application

6.1 Antenna requirement

According to of FCC part 15C section 15.203 and 15.240:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

6.2 Measurement Results

The antenna is coil antenna that no antenna other than furnished by the responsible party shall be used with the device, and the best case gain of the antenna is 0dBi, Therefore, the antenna is consider meet the requirement.

7. Test Equipment List

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 13, 2020	1 Year
Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 23, 2020	1 Year
Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Mar. 13, 2020	1 Year
Spectrum Analyzer	Keysight	N9020A	MY54200831	Mar. 13, 2020	1 Year
Spectrum Analyzer	Rohde & Schwarz	FSV40	101094	Mar. 13, 2020	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-172	Mar. 22, 2019	2 Year
Power Sensor	DARE	RPR3006W	15I00041SNO64	Mar. 13, 2020	1 Year
Communication Tester	Rohde & Schwarz	CMW500	149004	Mar. 13, 2020	1 Year
Horn Antenna	COM-Power	AH-118	071078	Mar. 23, 2020	1 Year
Pre-Amplifier	HP	HP 8449B	3008A00964	Mar. 13, 2020	1 Year
Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 13, 2020	1 Year
Loop Antenna	Schwarzbeck	FMZB 1513	1513-272	Mar. 23, 2020	1 Year
Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 14, 2020	1 Year
L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 13, 2020	1 Year
L.I.S.N	Rohde & Schwarz	ESH2-Z5	893606/014	Mar. 13, 2020	1 Year
RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar.13, 2020	1 Year
Temperature & Humidity Chamber	REMAFEE	SYHR225L	N/A	Mar. 13, 2020	1 Year
DC Source	Maynuo	MY8811	N/A	Mar. 13, 2020	1 Year
Temporary antenna connector	TESCOM	SS402	N/A	N/A	N/A
Chamber	SAEMC	9*7*7m	N/A	Jun. 20, 2019	2 Year
Test Software	EZ	EZ_EMC	N/A	N/A	N/A

---End---