Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104,Building 7 and 8,DCC Cultural and Creative Garden No.98,Pingxin North Road,Shangmugu,Pinghu Street, Longgang District,Shenzhen,Guangdong,China

TEST REPORT

FCC Rules and Regulations Part 15 Subpart C (Section 15.209), ANSI C63.10: 2013

Report Reference No.....:	**GTS20190924016-1-1**
FCC ID.....:	2ASPB-UNWREQ13
Compiled by (position+printed name+signature)..:	File administrators Peter Xiao
Supervised by (position+printed name+signature)..:	Test Engineer Moon Tan
Approved by (position+printed name+signature)..:	Manager Simon Hu
Date of issue.....:	Oct.14, 2019

Representative Laboratory Name .:	**Shenzhen Global Test Service Co.,Ltd.**
Address.....:	No.7-101 and 8A-104,Building 7 and 8,DCC Cultural and Creative Garden No.98,Pingxin North Road,Shangmugu,Pinghu Street,Longgang District,Shenzhen,Guangdong,China

Applicant's name.....:	**GOGOTORO LLC**
Address .....:	60 Broadway 10M Brooklyn NY 11249 USA

Test specification.....**:**	
Standard .....:	FCC Rules and Regulations Part 15 Subpart C (Section 15.209), ANSI C63.10: 2013

Test item description .....:	**Unravel 3+1**
Trade Mark .....:	AMPERE
Manufacturer .....:	Ampere LLC
Model/Type reference.....:	UNWBKQ13
List Model .....:	UNWREQ13,UNWBLQ13,UNWGLQ13,UNWPUQ13,UNWGNQ13, UNWCOQ13,UNWNAQ13
Modulation Type .....:	Load modulation
Operation Frequency.....:	110-205KHz
Ratings .....:	Input: DC 20V3.0A From adapter Output(wireless):DC 10V/1A*3
Result .....:	**PASS**

T E S T R E P O R T

Test Report No. :	**GTS20190924016-1-1**	Oct.14, 2019 Date of issue

Equipment under Test	:	Unravel 3+1
Model /Type	:	UNWBKQ13
Listed Models	:	UNWREQ13,UNWBLQ13,UNWGLQ13,UNWPUQ13,UNWGNQ13, UNWCOQ13,UNWNAQ13
Applicant	:	**GOGOTORO LLC**
Address	:	60 Broadway 10M Brooklyn NY 11249 USA
Manufacturer		**Ampere LLC**
Address	:	8 the Green, Suite A, Dover DE USA 19901

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15 Subpart C (Section 15.209): Radiated emission limits; general requirements.

ANSI C63.10: 2013: American National Standard for Testing Unlicensed Wireless Devices

2 . SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Sep.29, 2019
Testing commenced on	:	Aug.29, 2019
Testing concluded on	:	Oct.14, 2019

2.2. Product Description

Product Name:	Unravel 3+1
Trade Mark:	AMPERE
Model/Type reference:	UNWBKQ13
List Model:	UNWREQ13,UNWBLQ13,UNWGLQ13,UNWPUQ13,UNWGNQ13, UNWCOQ13,UNWNAQ13
Model Declaration	PCB board, structure and internal of these model(s) are the same, So no additional models were tested.
Power supply:	Input: DC 20V3.0A From adapter Output(wireless): DC 10V/1A*3
Adapter information	Mode: ZT-XM-03 Input:AC110-240V-50/60Hz,2.0A Output:DC 20V,3.0A
Mobile phone information	Samsung Galaxy S7 Samsung Galaxy S7 edge
Hardware version	N/A
Software version	N/A
WPT	
Operation frequency	110-205KHz
Modulation Type	Load modulation
Antenna Type	Coil Antenna
Antenna Gain	0dBi

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	○	120V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 20.0V From adapter

Description of the test mode

Operation Frequency each of channel	
Channel	Frequency
1	112KHz

Operating Mode
The mode is used:
Mode 1:Transmitting mode
Mode 2: Full load mode
Mode 3: Half load mode
Mode 4: Idle mode
Note:
All test modes were tested, but we only recorded the worst case in this report.

2.4. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104,Building 7 and 8,DCC Cultural and Creative Garden No.98,Pingxin North Road,Shangmugu,Pinghu Street,Longgang District,Shenzhen,Guangdong,China

3.2. Test Description

DESCRIPTION OF TEST	RESULT
CONDUCTED EMISSIONS TEST	COMPLIANT
RADIATED EMISSION TEST	COMPLIANT
OCCUPIED BANDWIDTH MEASUREMENT	COMPLIANT
ANTENNA REQUIREMENT	COMPLIANT

3.3. Statement of the measurement uncertainty

Measurement Uncertainty		
Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2

3.4. Equipments Used during the Test

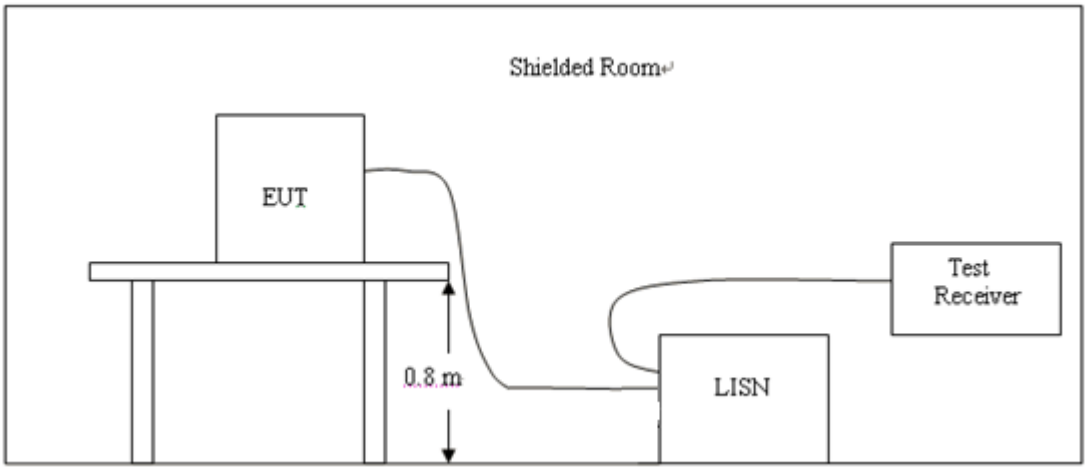
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	ULTRA-BROADBAND ANTENNA	Schwarzbeck	VULB9163	000976	2019/09/20	2020/09/19
2	EMI Test Receiver	R&S	ESCI 3	101841-cd	2019/09/20	2020/09/19
3	Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2019/09/20	2020/09/19
4	Pre-Amplifier	Agilent	8349B	3008A02306	2019/09/20	2020/09/19
5	Pre-Amplifier	Agilent	8447D	2944A10176	2019/09/20	2020/09/19
6	Loop Antenna	Beijing Da Ze Technology Co.,Ltd.	ZN30900C	15006	2019/09/20	2020/09/19
7	RS SPECTRUM ANALYZER	R&S	FSP40-N	101800	2019/09/20	2020/09/19
8	EMI Test software	Tonscend	JS32-RE	Version 2.0.1.5	/	/
9	EMI Test Receiver	ROHDE & SCHWARZ	ESCI 7	101102	2019/09/20	2020/09/19
10	Artificial Mains	ROHDE & SCHWARZ	ESH2-Z5	893606/008	2019/09/20	2020/09/19
11	Artificial Mains	CYBERTEK	EM5040A	E1850400105	2019/09/20	2020/09/19
12	Pulse Limiter	Agilent	11947A	3107A04120	2019/09/20	2020/09/19
13	Impedance Stabilization Network	Schwarzbeck	CAT5 8158	102	2019/09/20	2020/09/19
14	Transient Limiter	CYBERTEK	EM5010A	E1950100106	2019/09/20	2020/09/19
15	Spectrum Analyzer	Agilent	N9020A	MY48010425	2019/09/20	2020/09/19

The calibration interval is 1 year.

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2, Support equipment, if needed, was placed as per ANSI C63.10.
3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4, If a EUT received DC power from the USB Port of adapter, the adapter adapter received power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5, All support equipments received AC power from a second LISN, if any.
6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following:

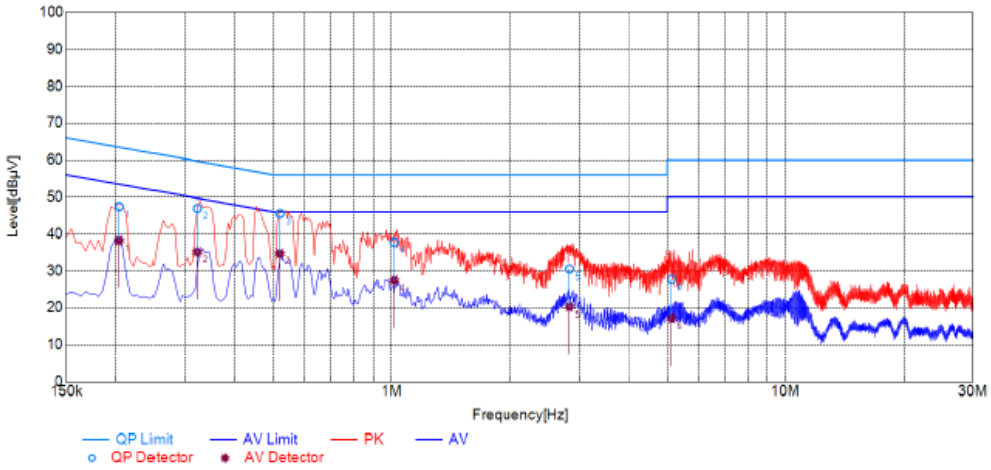
Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

TEST RESULTS

1. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:.

Power supply:	AC 120V/60Hz	Polarization	L

Test Graph



Final Data List

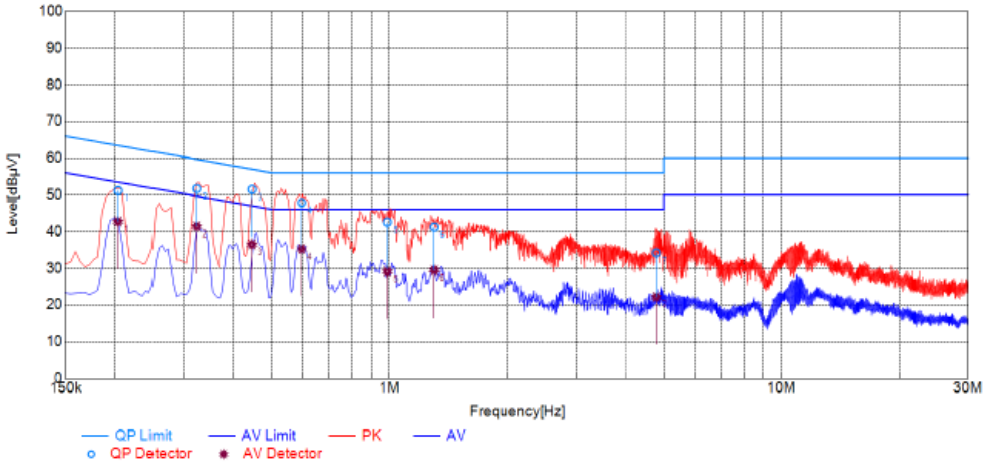
NO.	Frequency [MHz]	QP Reading [dBµV]	AVG. Reading [dBµV]	Factor [dB]	QP Result [dBµV]	AVG. Result [dBµV]	QP Limit [dBµV]	AVG. Limit [dBµV]	QP Margin [dB]	AVG. Margin [dB]	Line	Remark
1	0.2045	37.28	28.10	10.15	47.43	38.25	63.42	53.42	15.99	15.17	L1	PASS
2	0.3205	36.81	25.02	10.12	46.93	35.14	59.69	49.69	12.76	14.55	L1	PASS
3	0.5194	35.31	24.48	10.24	45.55	34.72	56.00	46.00	10.45	11.28	L1	PASS
4	1.0149	27.53	17.29	10.20	37.73	27.49	56.00	46.00	18.27	18.51	L1	PASS
5	2.8265	20.13	9.96	10.33	30.46	20.29	56.00	46.00	25.54	25.71	L1	PASS
6	5.1397	17.41	6.87	10.37	27.78	17.24	60.00	50.00	32.22	32.76	L1	PASS

Note: 1. Result (dBµV) = Reading (dBµV) + Factor (dB).

2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

Power supply:	AC 120V/60Hz	Polarization	N

Test Graph



Final Data List

NO.	Frequency [MHz]	QP Reading [dBµV]	AVG. Reading [dBµV]	Factor [dB]	QP Result [dBµV]	AVG. Result [dBµV]	QP Limit [dBµV]	AVG. Limit [dBµV]	QP Margin [dB]	AVG. Margin [dB]	Line	Remark
1	0.2041	41.01	32.54	10.15	51.16	42.69	63.44	53.44	12.28	10.75	N	PASS
2	0.3215	41.58	31.28	10.12	51.70	41.40	59.67	49.67	7.97	8.27	N	PASS
3	0.4443	41.27	26.28	10.21	51.48	36.49	56.98	46.98	5.50	10.49	N	PASS
4	0.5959	37.66	25.10	10.19	47.85	35.29	56.00	46.00	8.15	10.71	N	PASS
5	0.9868	32.35	18.95	10.19	42.54	29.14	56.00	46.00	13.46	16.86	N	PASS
6	1.2996	30.97	19.26	10.22	41.19	29.48	56.00	46.00	14.81	16.52	N	PASS
7	4.7870	23.86	11.82	10.35	34.21	22.17	56.00	46.00	21.79	23.83	N	PASS

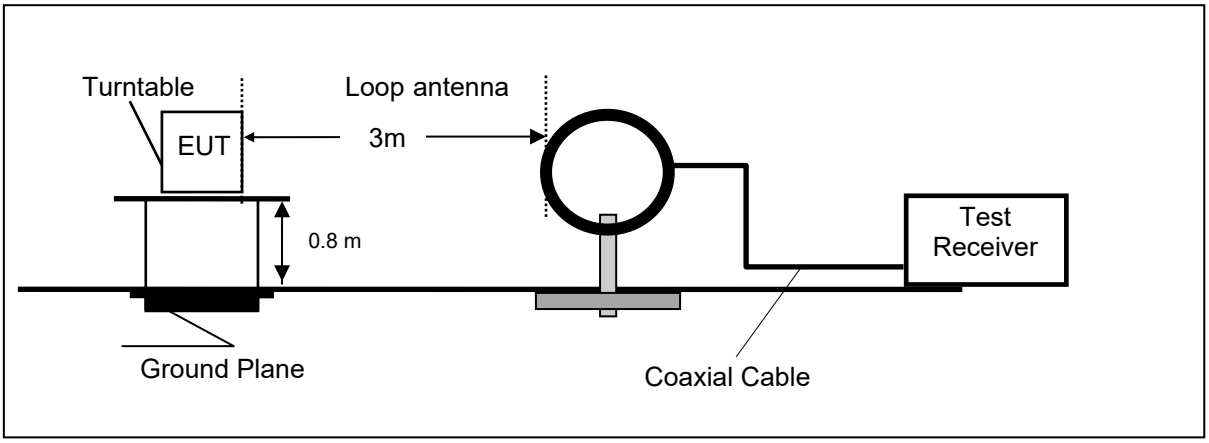
Note: 1. Result (dBµV) = Reading (dBµV) + Factor (dB).

2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

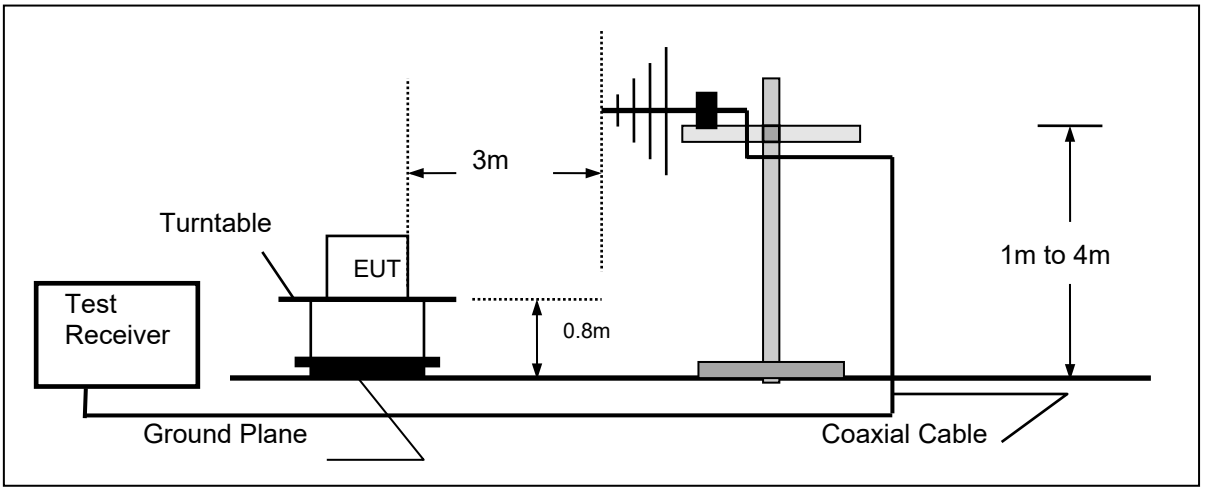
4.2. Radiated Emission

TEST CONFIGURATION

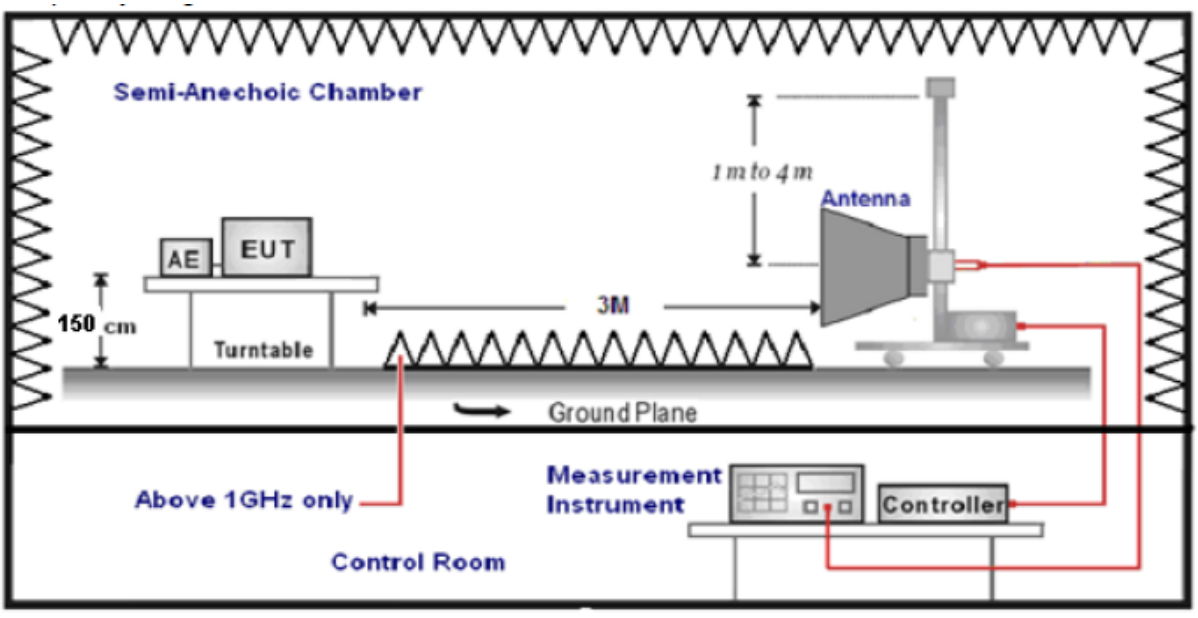
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 12mm above ground plane when testing frequency range 9 KHz –25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 32.768KHz and maximum operation frequency was 2480MHz.so radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

Transd=AF +CL-AG

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.
The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

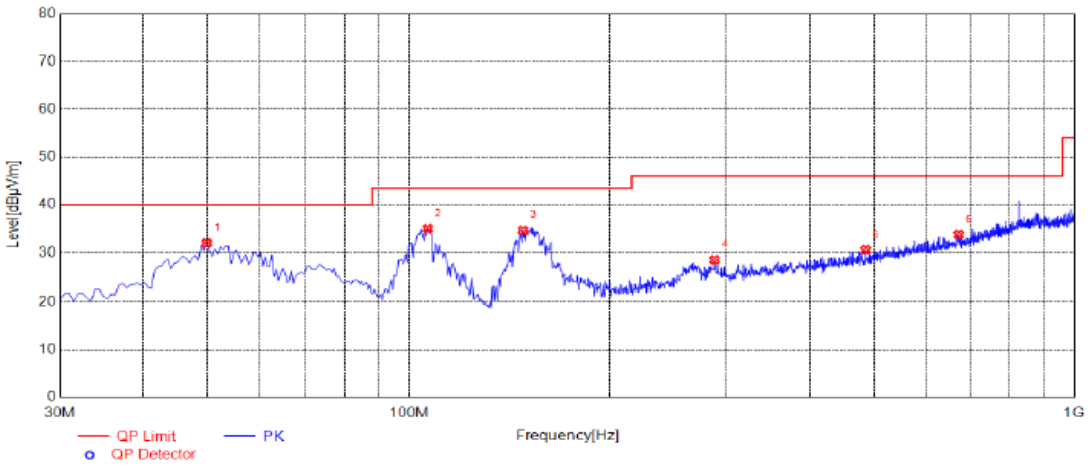
For 9 KHz-30MHz

Frequency (MHz)	Corrected Reading (dBuV/m)@3m	FCC Limit (dBuV/m) @3m	Margin (dB)	Detector	Result
0.073	68.25	110.34	42.09	QP	PASS
0.112	79.34	106.62	27.28	QP	PASS
1.832	50.12	69.54	19.42	QP	PASS
5.735	47.36	69.54	22.18	QP	PASS
10.251	48.53	69.54	21.01	QP	PASS

For 30MHz-1GHz

Horizontal

Test Graph



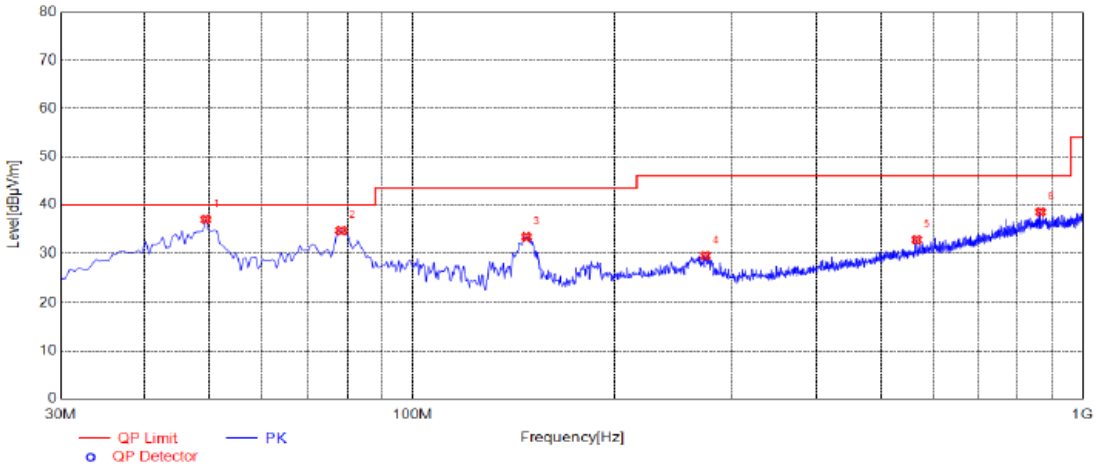
Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	49.8850	46.82	-14.85	31.97	40.00	8.03	100	63	PK	Horizonta	PASS
2	106.6300	51.94	-16.96	34.98	43.50	8.52	100	355	PK	Horizonta	PASS
3	148.3400	54.43	-19.78	34.65	43.50	8.85	100	199	PK	Horizonta	PASS
4	288.0200	42.83	-14.39	28.44	46.00	17.56	100	308	PK	Horizonta	PASS
5	485.9000	40.85	-10.30	30.55	46.00	15.45	100	298	PK	Horizonta	PASS
6	670.6850	40.46	-6.74	33.72	46.00	12.28	100	178	PK	Horizonta	PASS

Note: 1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	49.4000	51.77	-14.84	36.93	40.00	3.07	100	316	PK	Vertical	PASS
2	78.5000	55.28	-20.61	34.67	40.00	5.33	100	149	PK	Vertical	PASS
3	147.8550	53.16	-19.81	33.35	43.50	10.15	100	223	PK	Vertical	PASS
4	273.4700	43.91	-14.49	29.42	46.00	16.58	100	162	PK	Vertical	PASS
5	565.4400	41.27	-8.53	32.74	46.00	13.26	100	246	PK	Vertical	PASS
6	865.6550	42.60	-4.13	38.47	46.00	7.53	100	133	PK	Vertical	PASS

Note: 1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

4.3. Occupied Bandwidth

TEST CONFIGURATION

TEST PROCEDURE

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equip compliance with the 20dB attenuation specification may base on measurement at the intentional radiator's antenna output terminal unless the intentional radiator uses a permanently attached antenna, in which case compliance shall be.deomonstrated by measuring the radiated emissions.

LIMIT

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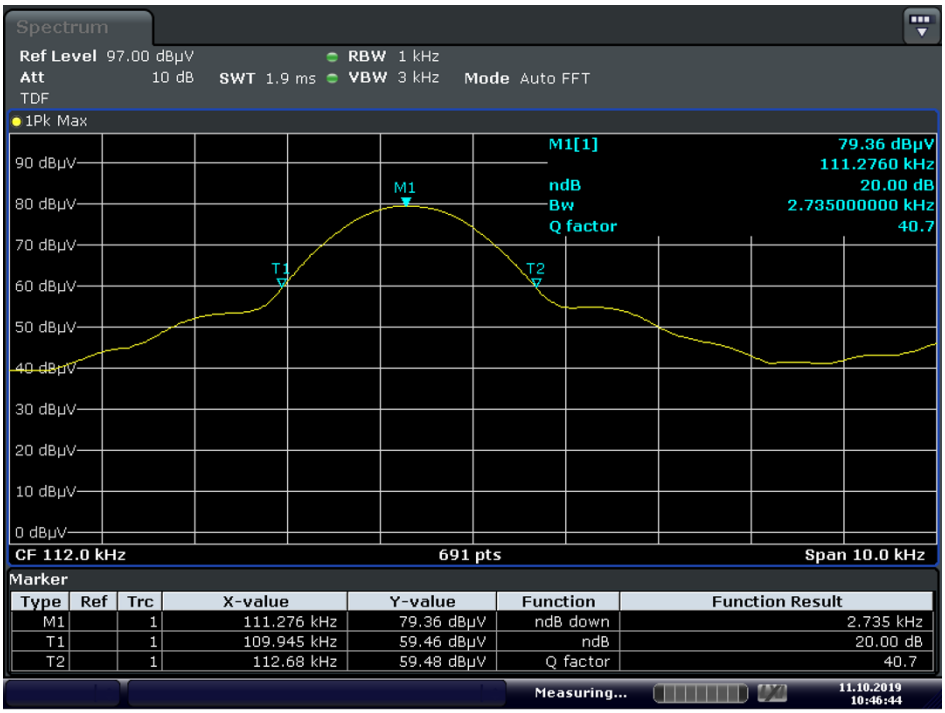
TEST RESULTS

Mode	Freq (KHz)	20dB Bandwidth (KHz)	Limit (kHz)	Conclusion
Tx Mode	112	2.735	/	PASS



Date: 11.OCT.2019 10:46:44

4.4. Antenna Requirement

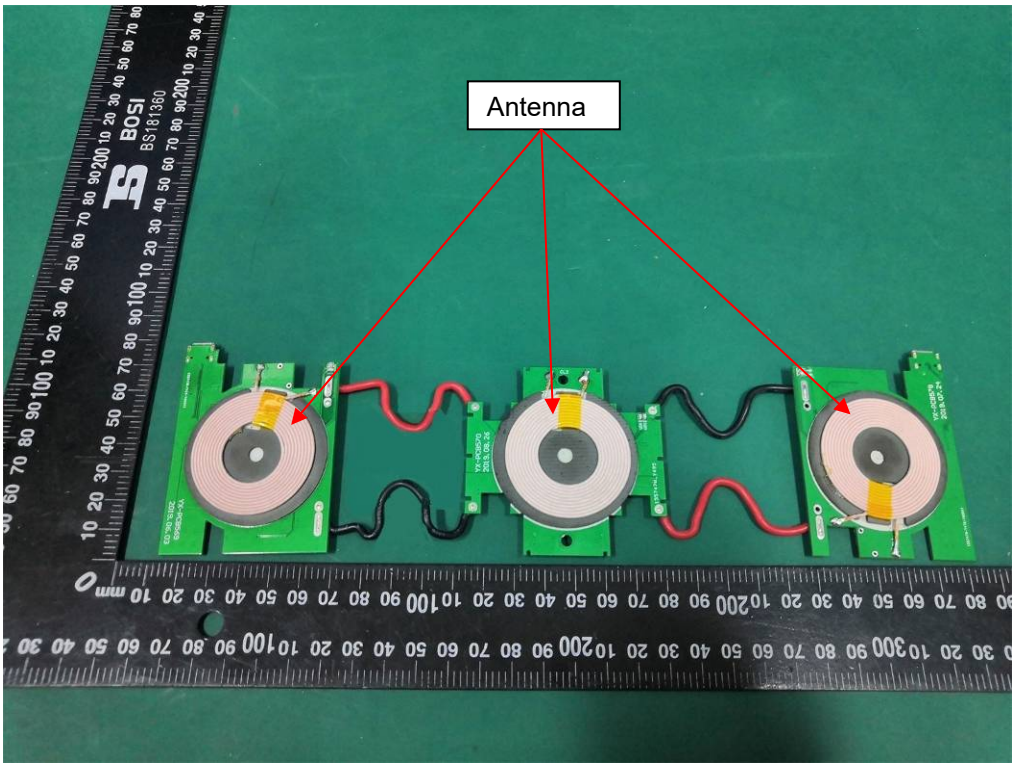
Standard Applicable

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, 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.

Antenna Information

The antenna used in this product is a Coil Antenna, The directional gains of antenna used for transmitting is 0dBi.



5. Test Setup Photos of the EUT

Reference to the **Test Setup Photos**

6. External and Internal Photos of the EUT

Reference to the **External and Internal Photos**

.....End of Report.....