CERTIFICATION TEST REPORT

Report Number	BWTR-1813-FCC15C
FCC ID	Y2SLTA100
Applicant	Libratone A/S
Product Name	Wireless Charger
Marketing Name	LIBRATONE COIL
Brand Name	LIBRATONE
Model Name	LTA100
Serial Number	C15
Test Standard	FCC 47 CFR Part 15 Subpart C
Tested Date	Dec. 25, 2018 - Jan. 24, 2019

Beijing Boomwave Test Service Co. Ltd.

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Beijing, P.R. China 100102

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Revision History

Revision	Description	ISSUED DATE
A	Initial issue of report	2019/01/21
B	1. Add Rationale for field strength measurement site per KDB 414788 D01 2. Modify 4.1.3 about the height requirement of receiving antenna (9KHz~30MHz). 3. Re-test radiated emission from 9KHz~1GHz with correct configuration 4. Add magnetic emission for parallel to the ground of antenna 5. Change the correct test setup photo of radiated emission test	2019/01/24
C	Add Loop Antenna in Instrument List	2019/01/25

1 Summary of Test Result

Report Section	FCC Section	Description	Result
4.1	15.209	Radiated Emission	Pass
4.2	15.207	AC Power Line Conducted Emission	Pass

We, Beijing Boomwave Test Service Co. Ltd., would like to declare that the tested sample has been evaluated and in compliance with the requirements of applicable standards.

Prepared by:	李国栋	2019.01.25 23:25:59 +09'00'
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Approved by:	赵利	2019.01.25 23:08:50 +08'00'

Rationale:
The test results in this report apply exclusively to the tested model / sample.
The electrical copy of test report is invalid without the signatures. The hard copy is invalid without seal.
The test report shall not be modified, republished or copied without the written authorization of the laboratory.

2 General Information

2.1 Applicant

Libratone A/S
Sundkaj 9, 2150 Nordhavn, Denmark

2.2 Manufacturer

Libratone A/S
Sundkaj 9, 2150 Nordhavn, Denmark

2.3 Product Feature of Equipment Under Test

Product Name	Wireless Charger
Marketing Name	LIBRATONE COIL
Model Name	LTA100
Sample Status	Prototype
Power Supply Rating	5V, 2A / 12V, 1.5A
Modulation Type	ASK
Operating Frequency	127.7 kHz
Antenna Type	Coil Antenna
Dimension for EUT	63.585 cm^2 (diameter = 90.0mm)
Dimension for iPhone	245.38 cm^2 (diameter = 176.8mm)
Maximum Power Output from the charging coil	10W
Maximum Power Output for iPhone from the charging coil	7.5W
Hardware Version	R2
Firmware Version	0.1.0.21

2.4 Ancillary Equipment

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following ancillary equipment were used to form a representative test configuration during the tests.

Accessory	Adapter
Manufacturer	Dongguan Aohai Power Technology Co., Ltd.
Model Name	A121A-120150U-US2
Input Power	100-240Vac, 50/60Hz, 0.5A
Output Power	5V, 2.5A / 9V, 2A / 12V, 1.5A
Power Line	1m non-shielded DC cable without core attached on
Serial Number	---

Support Unit	Smart Phone
Manufacturer	Apple
Model Name	iPhone 8 plus
Serial Number	F17VGQ7VJCM1

2.5 Applicable Standards

Standard	Version	Title
FCC 47 CFR Part 15 Subpart C	2018	Requirements for Intentional Radiators
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices - Electromagnetic Compatibility

2.6 Test Facilities

FCC Test Firm Registration Number: 613197

Test Site	Description	Dimension	Ground Plane Size
☒ SAC10	10m semi-anechoic chamber	19.5m×12.9m×8.6m	4m×4m
☐ FAR3	3m fully-anechoic chamber	9.6m×6.4m×6.0m	---
☒ Shielding Room#1	Shielding Room for EMS test	8.1m×4.05m×2.755m	8.1m×4.05m
☐ Shielding Room#2	Shielding Room for RF test	8.1m×4.05m×2.755m	---

2.7 Test Environmental Condition

Refer to the detailed information in each test.

2.8 Test Uncertainty

The expanded uncertainties are showed in following table, the approximate confidence level is 95%.

Radiated Test			
Frequency	**Antenna Polarization**	**Distance**	**U_{lab}**
9KHz-30MHz	---	10m	3.93
30MHz-200MHz	Horizontal	3m	3.95
	Vertical	3m	4.08
200MHz-1GHz	Horizontal	3m	4.26
	Vertical	3m	4.25

Conducted Test			
Frequency	**Antenna Polarization**	**Distance**	**U_{lab}**
9KHz-30MHz	-	-	2.38

3 EUT Operational Mode

Mode No.	Mode	Description
Mode 1	Idle	1. The transmitting part (EUT) connects with adapter 2. No receiving part (Smart Phone) placed on the top of EUT
Mode 2	Power Transmission Arrangement with iPhone (as 7.5W load)	1. The transmitting part (EUT) connects with adapter 2. The receiving part (Smart Phone) is placed at the center of EUT and wireless charged
Mode 3	Power Transmission Arrangement with 10W load	1. The transmitting part (EUT) connects with adapter 2. The receiving part (10W load) is placed at the center of EUT and wireless charged

4 Test Result

4.1 Radiated Emission

4.1.1. Limit

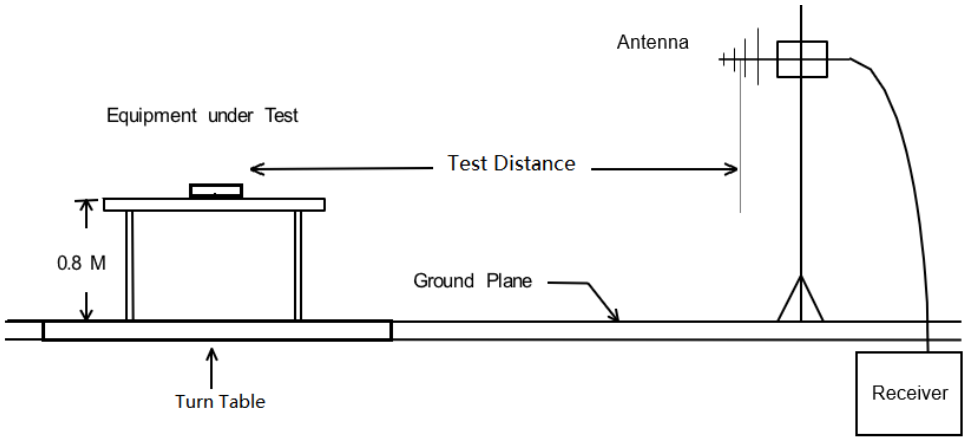
FCC 47 CFR Part 15 Subpart C - §15.209 (a)

Frequency (MHz)	Field Strength		Measurement Distance (meters)
	uV/m	dBuV/m	
0.009 - 0.490	2400 / F (kHz)	128.52-93.80*note1	300
0.490 - 1.705	24000 / F (kHz)	73.80-62.97*note2	30
1.705 - 30.0	30	69.54*note2	30
30 - 88	100	40.0	3
88 - 216	150	43.5	3
216 - 960	200	46.0	3
Above 960	500	54.0	3

Note:
1. The test is performed at 3m distance. The Limit @3m = Limit @300m + 40log(300/3) = Limit @300m + 80
2. The test is performed at 3m distance. The Limit @3m = Limit @30m + 40log(30/3) = Limit @30m + 40

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 300 m open area test site. Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788 D01.

4.1.2. Typical Test Setup Layout



4.1.3. Test Procedures

9KHz - 30MHz:

1) The EUT was placed on a rotatable table top 0.8 meter above ground.
2) The EUT was set 3 meters from the interference-receiving antenna.
3) When perpendicular to the ground plane, the lowest height of the magnetic antenna shall be 1m above the ground.
4) The table was rotated 360 degrees to determine the position of the highest radiation.
5) The antenna is a ring and its height is fixed at 1 meter above ground with horizontal polarization, vertical polarization and parallel polarization of the antenna are set to make the measurement.
6) For each suspected emission the EUT was arranged to its worst case and then turn table (from 0 degree to 360 degrees) to find the maximum reading.

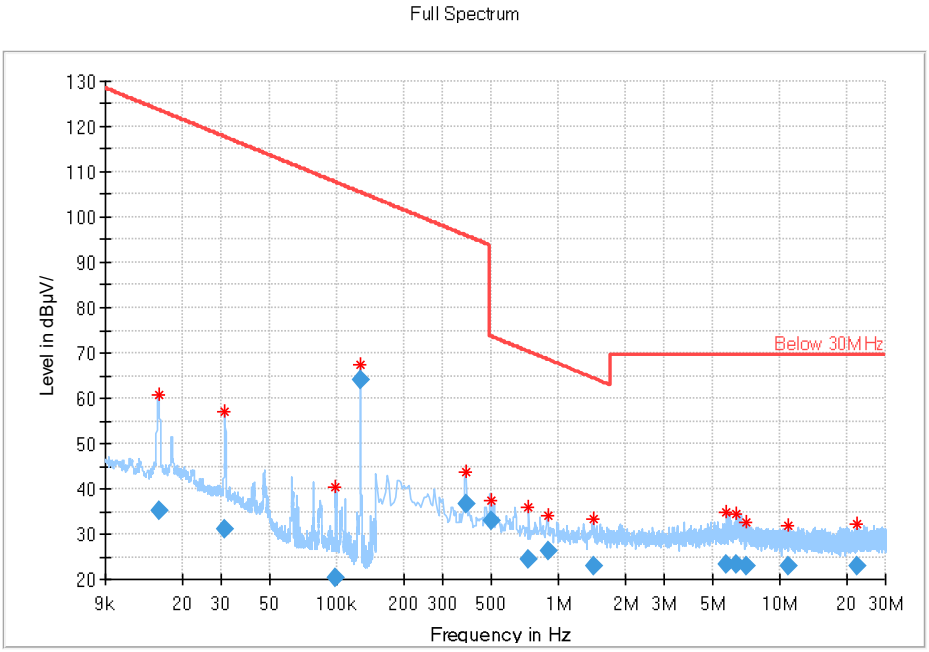
7) Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode; Then the quasi-peak scan is carried out at points with relatively high peak value.

30MHz - 1GHz:

1) The EUT was placed on a rotatable table top 0.8 meter above ground.
2) The EUT was set 3 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
3) The table was rotated 360 degrees to determine the position of the highest radiation.
4) The antenna is hybrid antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
5) For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
6) Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode; Then the quasi-peak scan is carried out at points with relatively high peak value.

4.1.4. Test Result

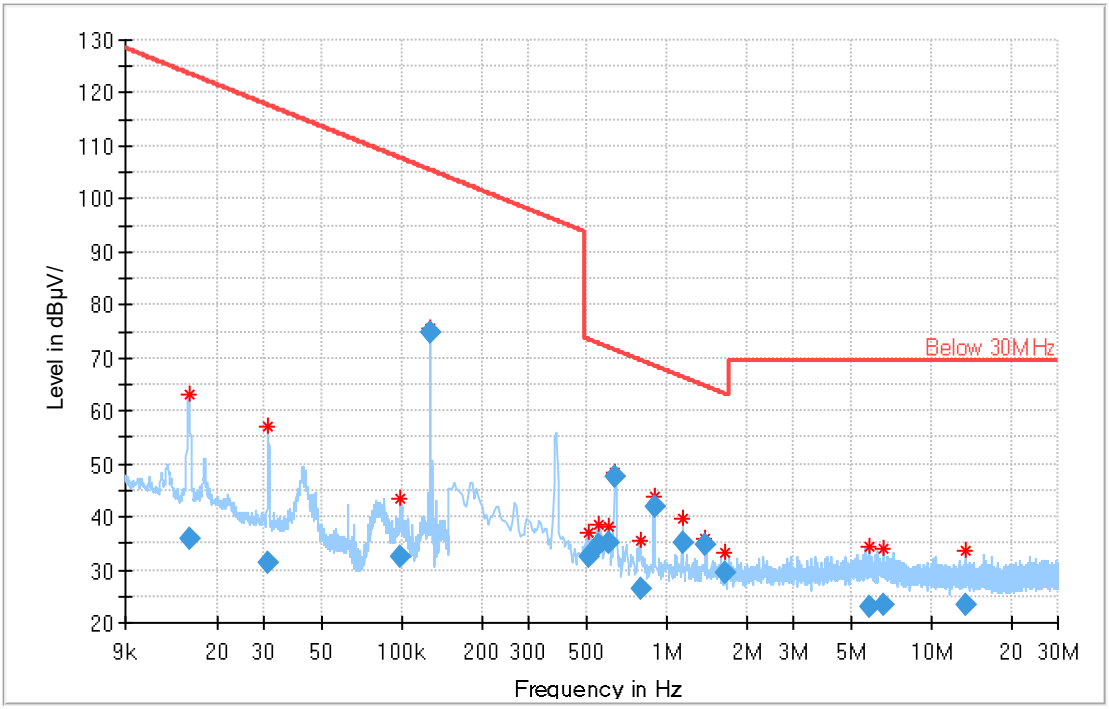
Test mode	Mode 1	**Test Date**	2019.01.24
Test frequency	0.15 MHz ~ 30 MHz	**Test Engineer**	Mengjiao Liu
Temperature	22.7℃	**Relative Humidity**	43.8 %



Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
0.015627	34.25	123.73	89.48	100	V	0	19.6
0.031243	31.11	117.71	86.6	100	V	342	19.6
0.098658	21.45	107.72	86.27	100	P	318	19.6
0.127704	64.11	105.48	41.37	100	H	16	19.6
0.381338	36.53	95.98	59.45	100	P	12	19.5
0.493275	33.09	73.74	40.65	100	H	33	19.5
0.732075	24.62	70.31	45.69	100	H	26	19.5
0.892519	26.38	68.59	42.21	100	H	36	19.5
1.437281	23.08	64.45	41.37	100	H	2	19.6
5.769263	23.26	69.54	46.28	100	P	36	20
6.351338	23.14	69.54	46.4	100	H	14	20
7.049081	23.07	69.54	46.47	100	P	19	20
10.907194	22.95	69.54	46.59	100	H	25	20
22.261388	22.31	69.54	47.23	100	V	51	20.6

Test mode	Mode 2	**Test Date**	2019.01.24
Test frequency	0.15 MHz ~ 30 MHz	**Test Engineer**	Mengjiao Liu
Temperature	22.7℃	**Relative Humidity**	43.8 %

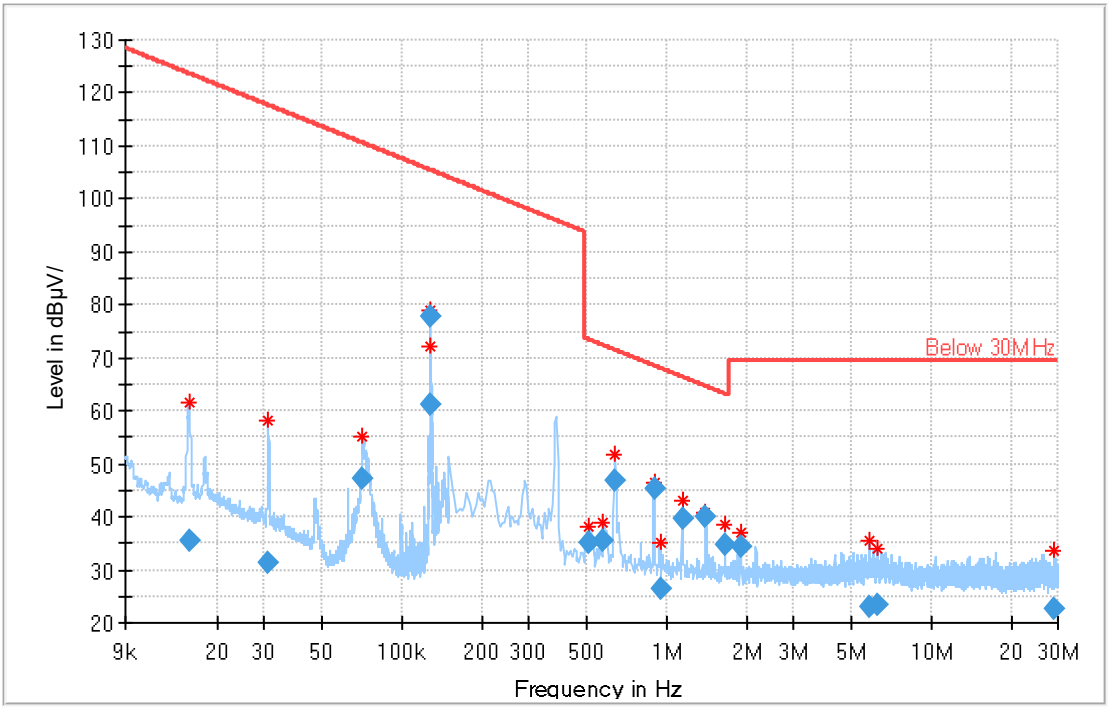
Full Spectrum



Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
0.015609	35.67	123.74	88.07	100	V	347	19.6
0.031243	31.33	117.71	86.38	100	P	353	19.6
0.098888	32.26	107.7	75.44	100	H	14	19.6
0.127704	74.26	105.48	31.22	100	H	20	19.6
0.504469	32.33	73.55	41.22	100	P	52	19.5
0.556706	34.53	72.69	38.16	100	H	34	19.5
0.605213	34.17	71.97	37.8	100	H	5	19.5
0.638794	47.47	71.5	24.03	100	P	0	19.5
0.795506	26.45	69.59	43.14	100	H	5	19.5
0.892519	42.23	68.59	26.36	100	H	12	19.5
1.146244	35.43	66.42	30.99	100	P	34	19.6
1.4037	34.54	64.66	30.12	100	P	16	19.6
1.657425	29.35	63.22	33.87	100	H	0	19.6
5.840156	23.28	69.54	46.26	100	H	34	20
6.582675	23.24	69.54	46.3	100	V	35	20
13.515338	23.46	69.54	46.08	100	V	18	19.9

Test mode	Mode 3	**Test Date**	2019.01.24
Test frequency	0.15 MHz ~ 30 MHz	**Test Engineer**	Mengjiao Liu
Temperature	22.7℃	**Relative Humidity**	43.8 %

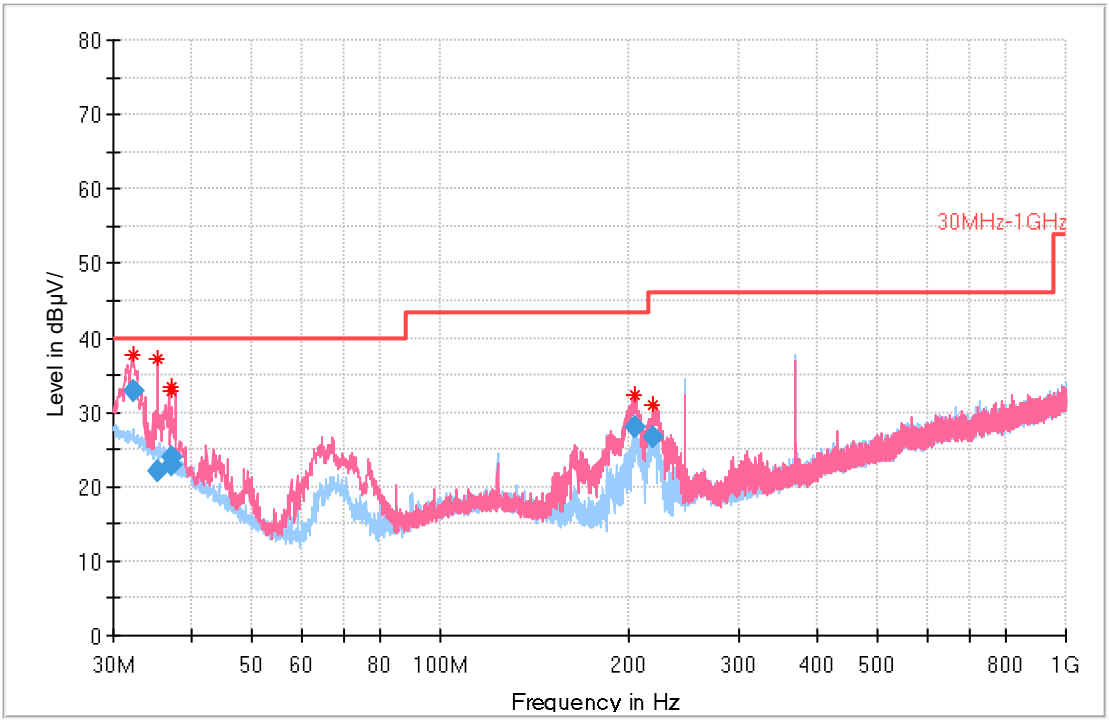
Full Spectrum



Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
0.015609	35.38	123.74	88.36	100	V	8	19.6
0.031243	31.42	117.71	86.29	100	V	89	19.6
0.070917	47.56	110.59	63.03	100	H	46	19.5
0.127704	77.44	105.48	28.04	100	H	7	19.6
0.128356	61.76	105.44	43.68	100	H	45	19.6
0.50821	34.45	73.48	39.03	100	P	79	19.5
0.575363	35.86	72.41	36.55	100	H	23	19.5
0.635063	46.84	71.55	24.71	100	H	33	19.5
0.892519	45.21	68.59	23.38	100	P	25	19.5
0.944756	26.53	68.1	41.57	100	P	54	19.5
1.146244	39.63	66.42	26.79	100	H	45	19.6
1.40372	39.82	64.66	24.84	100	P	86	19.6
1.657425	34.73	63.22	28.49	100	H	56	19.6
1.914881	34.43	69.54	35.11	100	H	43	19.6
5.862544	23.21	69.54	46.33	100	H	32	20
6.198356	23.49	69.54	46.05	100	H	76	20
29.000025	22.56	69.54	46.98	100	H	35	20.3

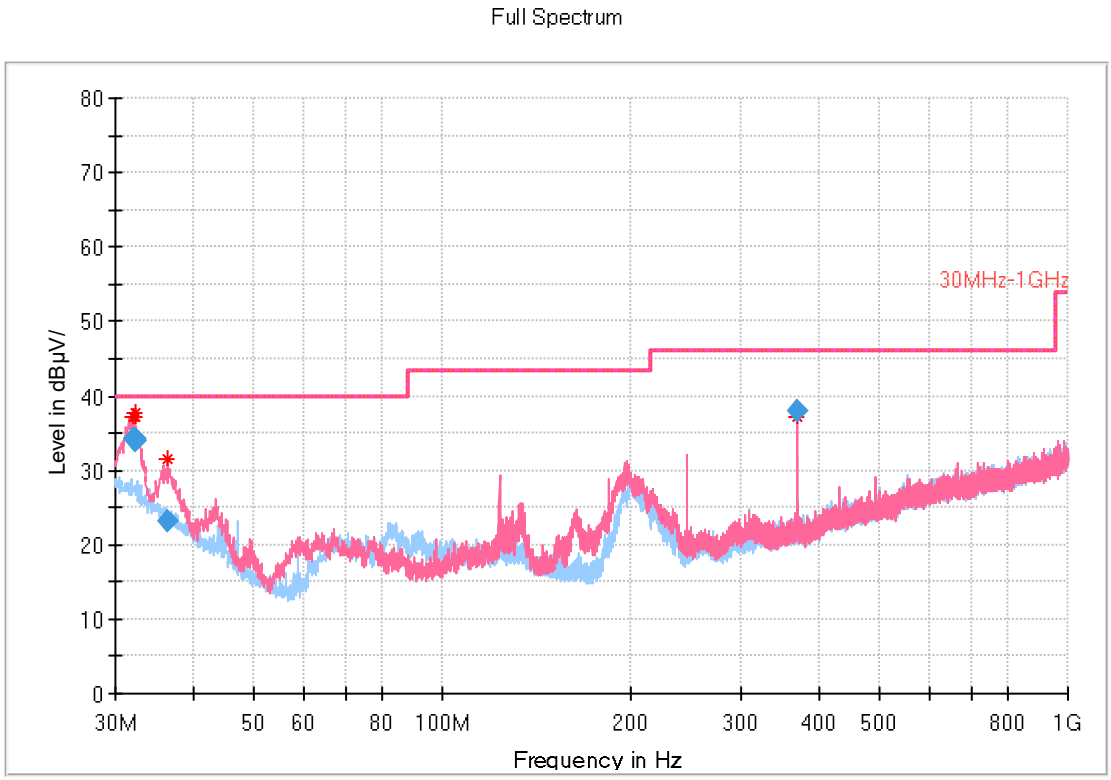
Test mode	Mode 1	**Test Date**	2019.01.24
Test frequency	0.15 MHz ~ 30 MHz	**Test Engineer**	Mengjiao Liu
Temperature	22.7℃	**Relative Humidity**	43.8 %

Full Spectrum



Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.23556	32.79	40	7.21	103	V	102	-6
35.41500	22.23	40	17.77	167	V	24	-7.6
37.15000	22.43	40	17.57	137	V	76	-8.5
37.29222	23.87	40	16.13	136	V	234	-8.6
203.99167	28.97	43.5	14.53	126	V	12	-11.7
219.15500	26.36	46	19.64	137	V	315	-12

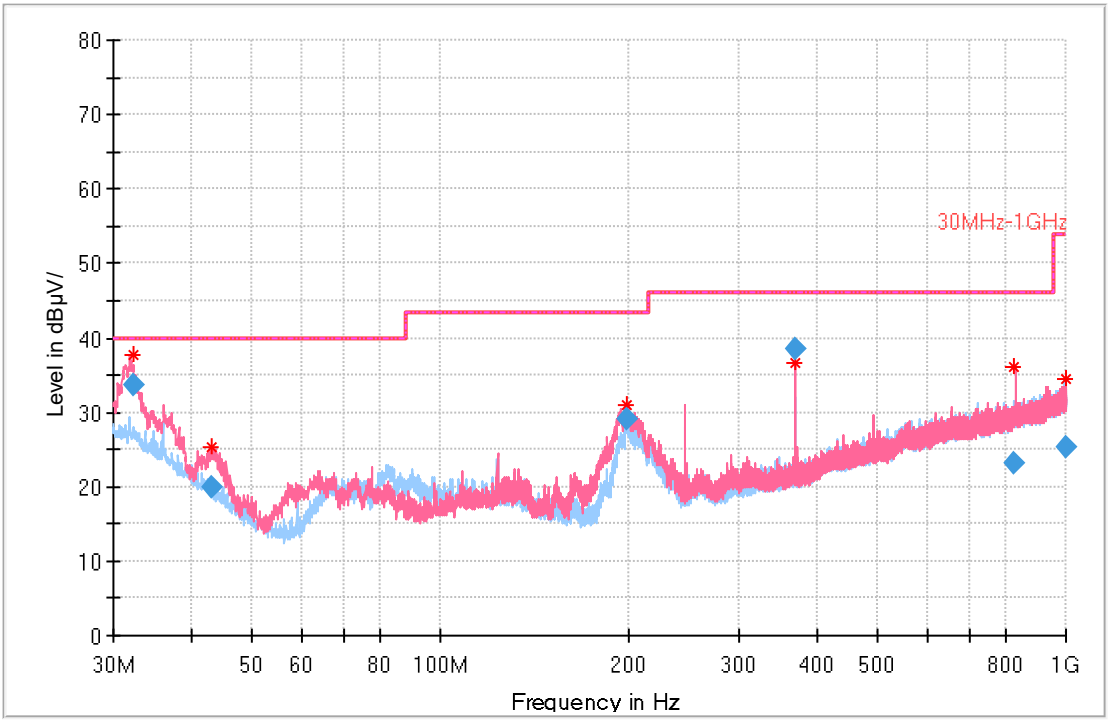
Test mode	Mode 2	**Test Date**	2019.01.24
Test frequency	0.15 MHz ~ 30 MHz	**Test Engineer**	Mengjiao Liu
Temperature	22.7℃	**Relative Humidity**	43.8 %



Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.129444	34.26	40	5.74	125	V	222	-6
32.209444	33.37	40	6.63	108	V	217	-6
32.218333	34.18	40	5.82	105	V	226	-6
36.252778	23.27	40	16.73	327	V	318	-8
370.092778	38.85	46	7.15	186	V	326	-4.9

Test mode	Mode 3	**Test Date**	2019.01.24
Test frequency	0.15 MHz ~ 30 MHz	**Test Engineer**	Mengjiao Liu
Temperature	22.7℃	**Relative Humidity**	43.8 %

Full Spectrum



Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.260000	33.73	40.00	6.27	102	V	228.0	-6.0
43.042778	19.93	40.00	20.07	106	V	359.0	-11.8
198.441111	29.03	43.50	14.47	105	V	192.0	-11.9
370.078889	38.62	46.00	7.38	178	V	321.0	-4.9
828.339444	23.21	46.00	22.79	126	V	143.0	4.3
997.354444	25.20	54.00	28.80	225	V	153.0	6.7

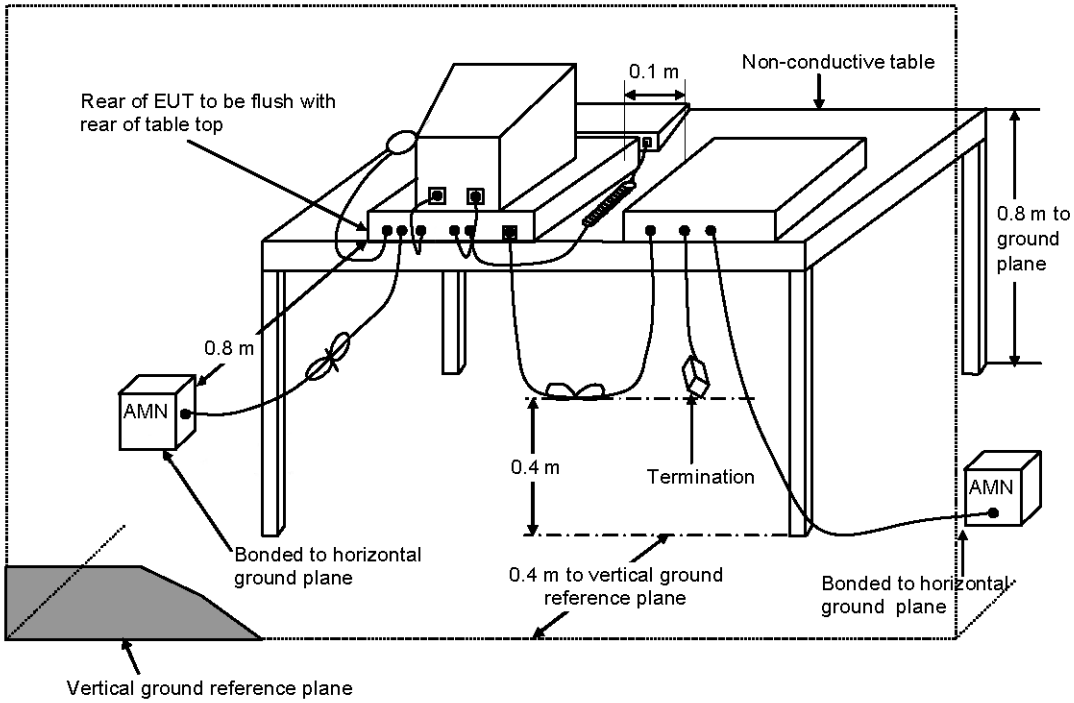
4.1 AC Power Line Conducted Emission

4.2.1. Limit

FCC 47 CFR Part 15 Subpart C - §15.207 (a)

Frequency range (MHz)	Class B Limits dB(μV)	
	Quasi-peak	Average
0.15 to 0.50	66 - 56	56 - 46
0.50 to 5	56	46
5 to 30	60	50
Note: The limits decrease linearly with the logarithm of the frequency in the range of 0.15 MHz to 0.5 MHz		

4.2.2. Typical Test Setup Layout

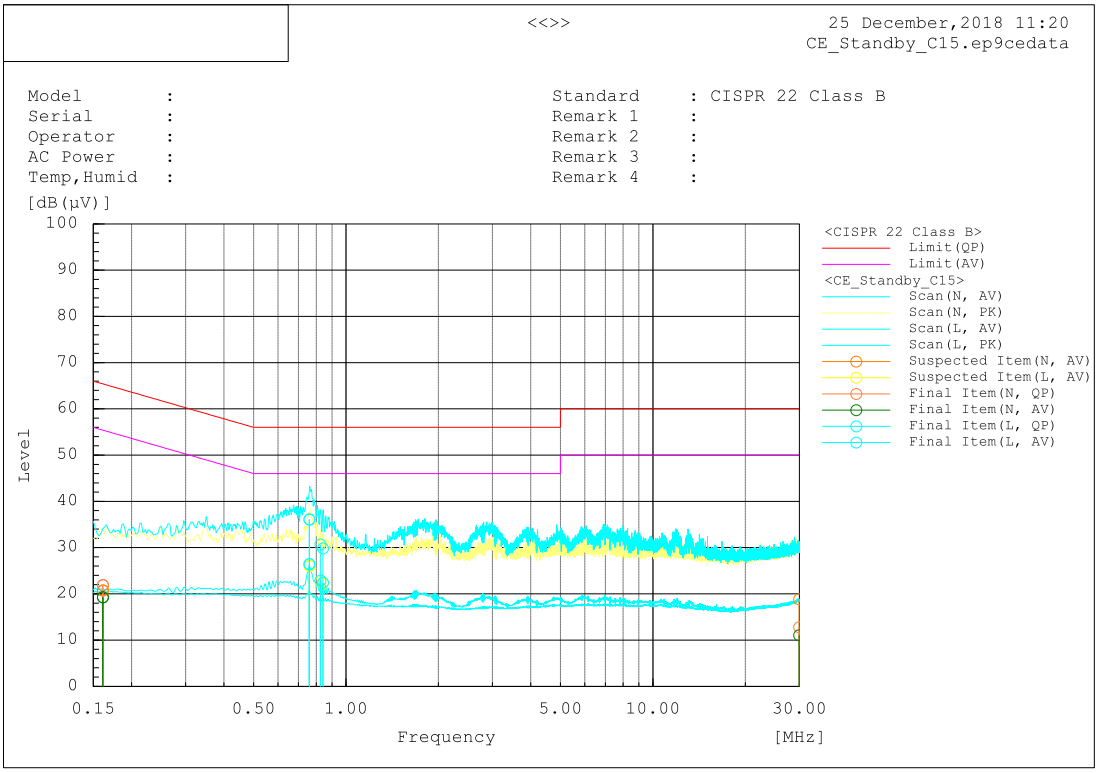


4.2.3. Test Procedures

1) The EUT was warmed up for 15 minutes before testing started.
2) The EUT was placed on a desk 0.8 meter height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meter from any other grounded conducting surface.
3) Connect EUT to the power mains through a line impedance stabilization network (LISN).
4) All the support units are connect to the other LISN.
5) The LISN provides 50 ohm, coupling impedance for the measuring instrument.
6) Both sides of AC line were checked for maximum conducted interference.
7) The frequency range from 150 kHz to 30 MHz was searched.
8) Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

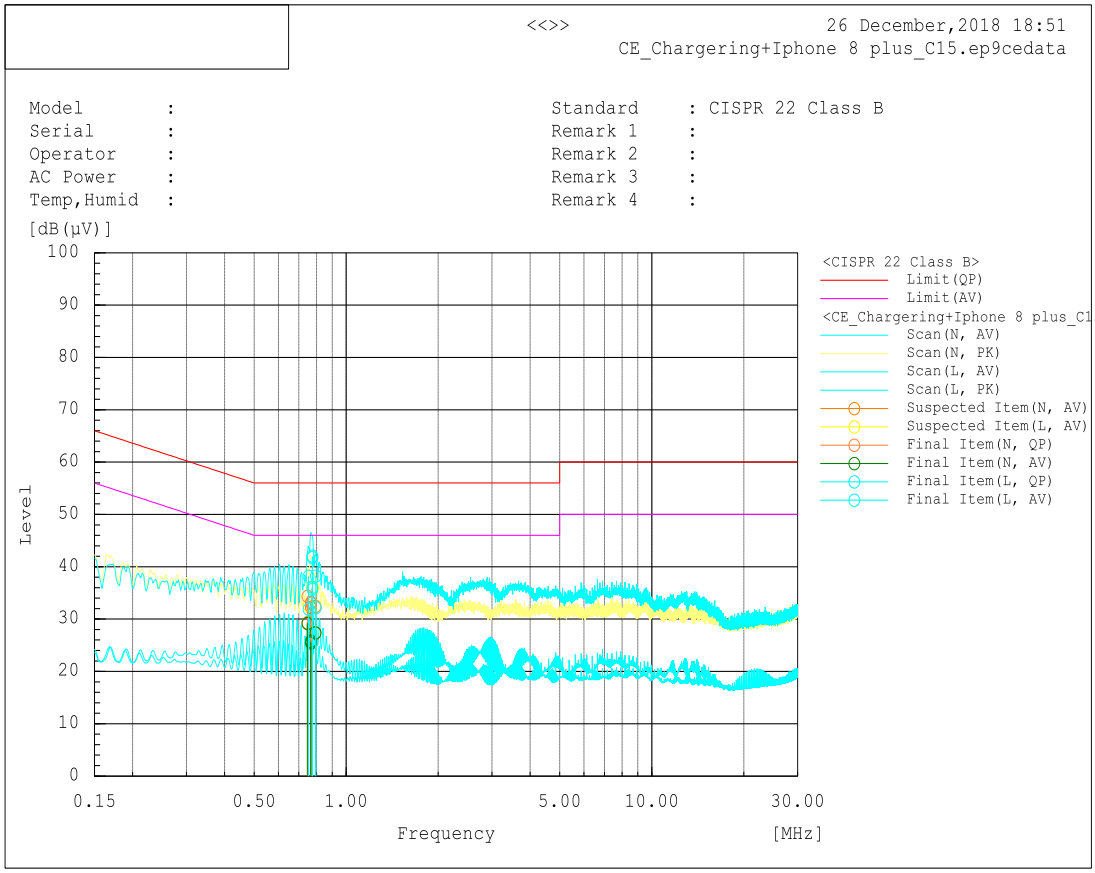
4.2.4. Test Result

Test mode	Mode 1	**Test Date**	2018.12.25
Test frequency	0.15 MHz ~ 30 MHz	**Test Engineer**	Mengjiao Liu
Temperature	23.5℃	**Relative Humidity**	45.5 %



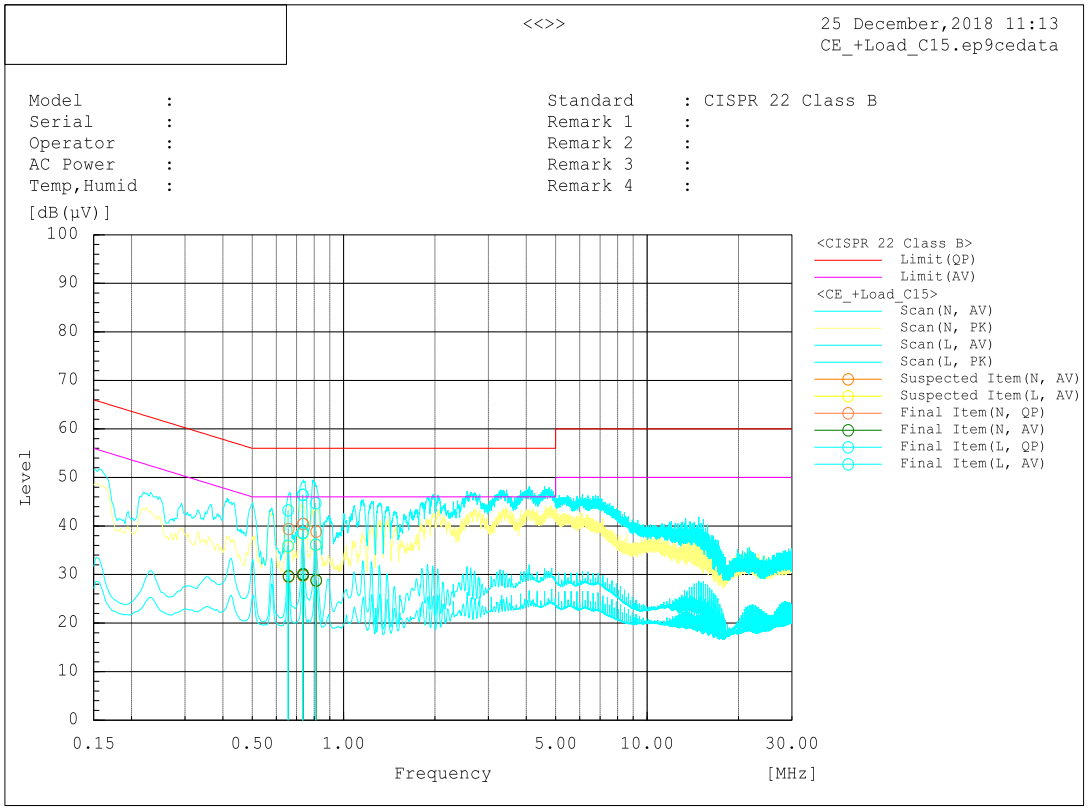
Range	**Frequency**	**Line**	**Reading**		**Factor**	**Level**		**Limit**		**Margin**		**Pass/Fail**
	MHz		**dB(µV)**		**dB**	**dB(µV)**		**dB(µV)**		**dB**		
			QP	**AV**		**QP**	**AV**	**QP**	**AV**	**QP**	**AV**	
Band1	0.16	N	2.00	-0.60	19.90	21.90	19.30	65.40	55.40	43.50	36.10	Pass
Band1	29.93	N	-8.20	-10.00	21.00	12.80	11.00	60.00	50.00	47.20	39.00	Pass
Band1	0.16	N	2.00	-0.60	19.90	21.90	19.30	65.40	55.40	43.50	36.10	Pass
Band1	0.76	L	16.00	6.30	20.10	36.10	26.40	56.00	46.00	19.90	19.60	Pass
Band1	0.83	L	10.70	2.90	20.00	30.70	22.90	56.00	46.00	25.30	23.10	Pass
Band1	0.84	L	9.80	2.40	20.00	29.80	22.40	56.00	46.00	26.20	23.60	Pass
Band1	0.76	L	16.00	6.40	20.10	36.10	26.50	56.00	46.00	19.90	19.50	Pass

Test mode	Mode 2	**Test Date**	2018.12.25
Test frequency	0.15 MHz ~ 30 MHz	**Test Engineer**	Mengjiao Liu
Temperature	23.5℃	**Relative Humidity**	45.5 %



Range	Frequency	Line	Reading		Factor	Level		Limit		Margin		Pass/Fail
	MHz		dB(µV)		dB	dB(µV)		dB(µV)		dB		
			QP	AV		QP	AV	QP	AV	QP	AV	
Band1	0.75	N	14.50	9.30	19.90	34.40	29.20	56.00	46.00	21.60	16.80	Pass
Band1	0.77	N	13.40	6.00	19.80	33.20	25.80	56.00	46.00	22.80	20.20	Pass
Band1	0.79	N	12.60	7.60	19.80	32.40	27.40	56.00	46.00	23.60	18.60	Pass
Band1	0.77	N	13.20	5.60	19.80	33.00	25.40	56.00	46.00	23.00	20.60	Pass
Band1	0.75	L	18.10	11.80	20.10	38.20	31.90	56.00	46.00	17.80	14.10	Pass
Band1	0.78	L	21.70	15.60	20.10	41.80	35.70	56.00	46.00	14.20	10.30	Pass
Band1	0.80	L	18.10	12.10	20.10	38.20	32.20	56.00	46.00	17.80	13.80	Pass
Band1	0.78	L	22.00	16.00	20.10	42.10	36.10	56.00	46.00	13.90	9.90	Pass

Test mode	Mode 3	**Test Date**	2018.12.25
Test frequency	0.15 MHz ~ 30 MHz	**Test Engineer**	Mengjiao Liu
Temperature	23.5℃	**Relative Humidity**	45.5 %



Range	Frequency	Line	Reading		Factor	Level		Limit		Margin		Pass/Fail
	MHz		dB(µV)		dB	dB(µV)		dB(µV)		dB		
			QP	AV		QP	AV	QP	AV	QP	AV	
Band1	0.66	L	23.10	15.80	20.10	43.20	35.90	56.00	46.00	12.80	10.10	Pass
Band1	0.73	L	26.30	18.60	20.10	46.40	38.70	56.00	46.00	9.60	7.30	Pass
Band1	0.81	L	24.60	16.10	20.10	44.70	36.20	56.00	46.00	11.30	9.80	Pass
Band1	0.73	L	26.30	18.40	20.10	46.40	38.50	56.00	46.00	9.60	7.50	Pass
Band1	0.66	N	19.50	9.80	19.90	39.40	29.70	56.00	46.00	16.60	16.30	Pass
Band1	0.74	N	20.60	10.10	19.90	40.50	30.00	56.00	46.00	15.50	16.00	Pass
Band1	0.81	N	19.00	9.00	19.80	38.80	28.80	56.00	46.00	17.20	17.20	Pass
Band1	0.74	N	20.50	10.20	19.90	40.40	30.10	56.00	46.00	15.60	15.90	Pass

5 Test Instruments

Test Item	Description	Model Name	S / N	Manufacture	Next Cal Date
Radiated Emission	EMI TEST RECERVER	ESR26	101320	R&S	2019.12.31
	Pre-amplifier	SCU08	2017947	R&S	2019.12.31
	Hybrid antenna	CBL6112B	2873	SCHAFFNER	2019.12.31
	Active Loop Antenna	HFH2-Z2	100533	R&S	2019.12.31
Conduct emission	16 A 2-Line V-Network	ENV216	102328	R&S	2019.07.24
	EMI TEST RECERVER	ESR26	101320	R&S	2019.12.31
	Pulse Limiter	ESH3-Z2	102457	R&S	2019.12.31

--- End of Test Report ---