TEST REPORT

No. I18D00236-EMC01

For

Client :	**Shanghai Sunmi Technology Co.,Ltd.**
Production :	**Wireless data POS System**
Model Name :	**T5930**
Brand Name:	**SUNMI**
Hardware Version:	**V3**
Software Version:	**ZAP1522_769_DEV_dailybuild_20181205071714_userdebug_DCC**
FCC ID:	**2AH25V2**
Issued date:	**2019-01-28**

NOTE

1. The test results in this test report relate only to the devices specified in this report.
2. This report shall not be reproduced except in full without the written approval of East China Institute of Telecommunications
3. The measurement uncertainty is not taken into account when deciding conformity, and the results of measurement (or the average of measurement results) are directly used as the criterion for the stating conformity.

Test Laboratory:
East China Institute of Telecommunications
Add: 7-8F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Tel: +862163843300
FAX: +862163843301
E-Mail: welcome@ecit.org.cn

Revision Version

Report Number	Revision	Date	Memo
I18D00236-EMC01	00	2019-01-28	Initial creation of test report

CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	86-21-63843300
Fax:	86-21-63843301
FCC registration No:	958356

1.2. Testing Environment

Normal Temperature:	15-35℃
Relative Humidity:	30-60%RH

1.3. Project data

Project Leader:	Zhou Yan
Testing Start Date:	2019-01-05
Testing End Date:	2019-01-23

1.4. Signature

Qin Yabin
(Prepared this test report)

You Jinjun
(Reviewed this test report)

Zheng Zhongbin
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address:	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Telephone:	86-18721763396
Postcode:	200433

2.2. Manufacturer Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address:	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Telephone:	86-18721763396
Postcode:	200433

3. Equipment under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

ProductName	Wireless data POS System
Model name	T5930
GSM Frequency Band	GSM850/GSM1900/GSM900/GSM1800
UMTS Frequency Band	WCDMA Band Ⅰ/Ⅱ/Ⅳ/Ⅴ
LTE Frequency Band	LTE 2/3/4/7/17/28
Additional Communication Function	BT4.0;WIFI 802.11a,b,g,n;GPS;

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N08(Main Supply)	861741040017284	V3	ZAP1522_769_DEV_dailybuild_20181205071714_userdebug_DCC	2019-01-03
N09(Secondary Supply)	861741040017409	V3	ZAP1522_769_DEV_dailybuild_20181205071714_userdebug_DCC	2019-01-03

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN
CA06	Adapter	TPA-23A050200UU01	NA
UA05	USB Cable	NA	NA
AE1	Desktop PC	OptiPlex 790 DT	X8RP1 A01 APCC
AE2	Notebook PC	DELL Latitude E5250	/
AE3	LAN Cable	/	/
AE4	VGA Cable	/	/
AE5	RS232 Cable	/	/
AE6	Keyboard	KB212-B	CN-0Y88XT-65890-12I-005Q-A00
AE7	Mouse	MS111-P	CN-011D3V-71581-19J-1A64
AE8	Monitor	Dell E1709Wc	/

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15, Subpart B	Radio frequency devices	10-1-17 Edition
ANSI C63.4	Method of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

5. Test Results

5.1. Summary of Test Results

Items	Test List	Clause in FCC rules	Verdict
1	Radiated Emission	15.109(a)	Pass
2	AC Conducted Emission	15.107(a)	Pass

5.2. Statements

The Wireless data POS System, manufactured by Shanghai Sunmi Technology Co.,Ltd. is a new product for testing. ECIT only performed test cases which identified with Pass/Fail/Inc result in section 5.1.

ECIT has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

Note: This project has main supply (N08) and secondary supply (N09). We mainly test N08 and N09 test the worst mode of N08.

6. Test Equipments Utilized

6.1 Radiated Emission Equipments list

No.	Name	Type	Series Number	Producer	Cal. Date	Cal. interval
1	Universal Radio Communication	CMU200	123126	R&S	2018-05-11	1 Year
2	Test Receiver	ESU40	100307	R&S	2018-05-11	1 Year
3	Trilog Antenna	VULB9163	VULB9163-515	Schwarzbeck	2017-02-25	3 Year
4	Double Ridged Guide	ETS-3117	00135885	ETS	2017-01-11	3 Year
5	EMI Test Software	EMC32 V9.15	NA	R&S	NA	NA
6	GPS Simulator	GSS 4200	1182	SPIRENT	2018-12-17	1 Year

6.2 AC Conducted Emission Equipments list

No.	Name	Type	Series Number	Producer	Cal. Date	Cal. interval
1	Universal Radio	CMU200	123123	R&S	2018-05-11	1 Year
2	Test Receiver	ESCI	101235	R&S	2018-05-11	1 Year
3	2-Line V-Network	ENV216	101380	R&S	2018-05-11	1 Year
4	EMI Test Software	EMC32 V10.35.02	NA	R&S	NA	NA
5	GPS Simulator	GSS 4200	1182	SPIRENT	2018-12-17	1 Year

7. System Configuration during Test

7.1 Test Mode

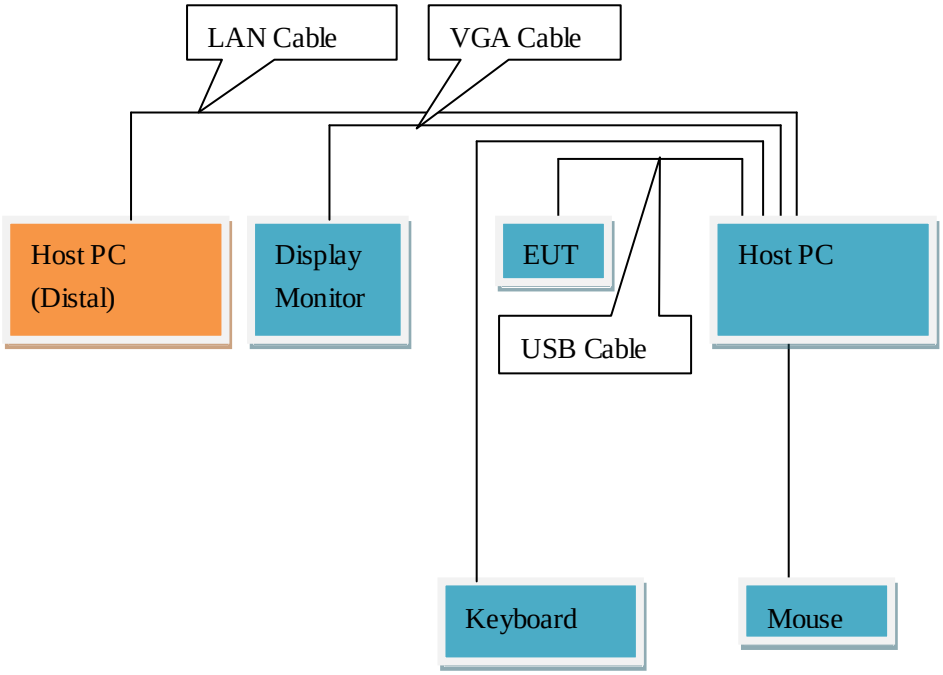
N08 Sample (Main Supply)

Test Item	Function Type
Radiated emission	Mode 1: USB cable (Data Link with PC) <Figure 1> Mode 2: Adapter charging <Figure 2> Mode 3:GPS mode <Figure 2>
AC Conducted emission	Mode 1: USB cable (Data Link with PC) <Figure 1> Mode 2: Adapter charging <Figure 2> Mode 3:GPS mode <Figure 2>
Remark: 1. All test modes are performed, only the worst cases test data are recorded in this report. 2. Data Link with PC means data application transferred mode between EUT and PC.	

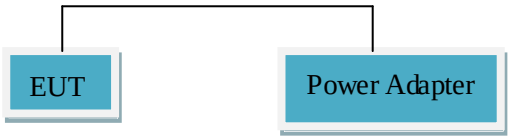
N09 Sample (Secondary Supply)

Test Item	Function Type
Radiated emission	Mode 1: USB cable (Data Link with PC) <Figure 1>
AC Conducted emission	Mode 2: Adapter charging <Figure 2>
Remark: 3. All test modes are performed, only the worst cases test data are recorded in this report. 4. Data Link with PC means data application transferred mode between EUT and PC.	

7.2 Connection Diagram of Test System



<Figure 1>



<Figure 2>

8. Measurement Results

Only the worst test result was shown in this report.

8.1 Radiated Emission 30MHz-18GHz

Method of Measurement

For 30-1000MHz, the EUT was placed on the top of a rotating 0.8-m table above the ground at a semi-anechoic chamber. The distance between the EUT and the received antenna was 3 meters. The table was rotated 360 degree and the received antenna mounted on a variable-height antenna tower was varied from 1m to 4m to find the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement. Tested in accordance with the procedures of ANSI C63.4-2014, section 8.3.

For 1000-18000MHz,The maximal emission value was acquired by adjusting the antenna height, The table was rotated 360 degree to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement.

Limits for Radiated Emission at a measuring distance of 3m

Frequency Range (MHz)	Quasi-Peak (dBuV/m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Frequency Range (MHz)	Peak (dBuV/m)	Average (dBuV/m)
Above 1000	74	54

Test conditions

Frequency Range (MHz)	RBW/VBW	Sweep Time (s)
30-1000	120kHz/300kHz	Auto
1000-18000	1MHz/3MHz	Auto

Uncertainty Measurement

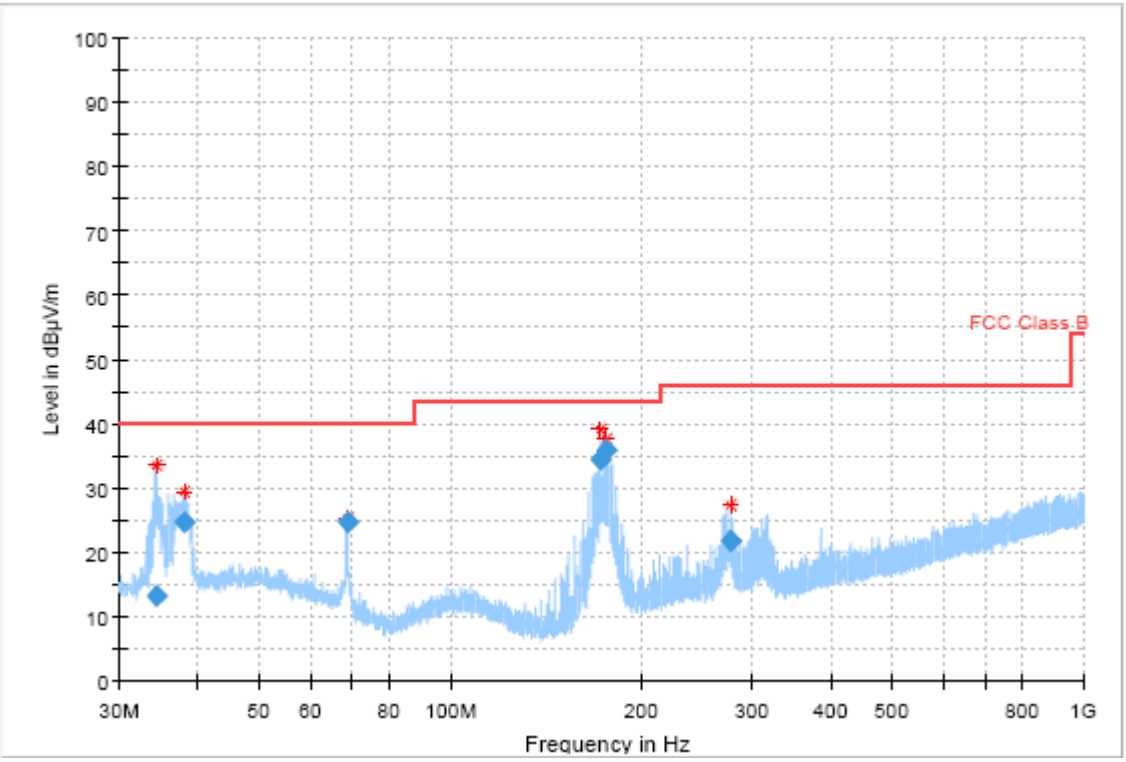
The measurement uncertainty (30MHz-1000MHz) is 4.98 dB (k=2).

The measurement uncertainty (1000MHz-18000MHz) is 5.06 dB (k=2).

Test Results

N08 Sample Mode 1: USB cable (Data Link with PC)

Frequency Range:	30MHz – 1GHz



Final_Result

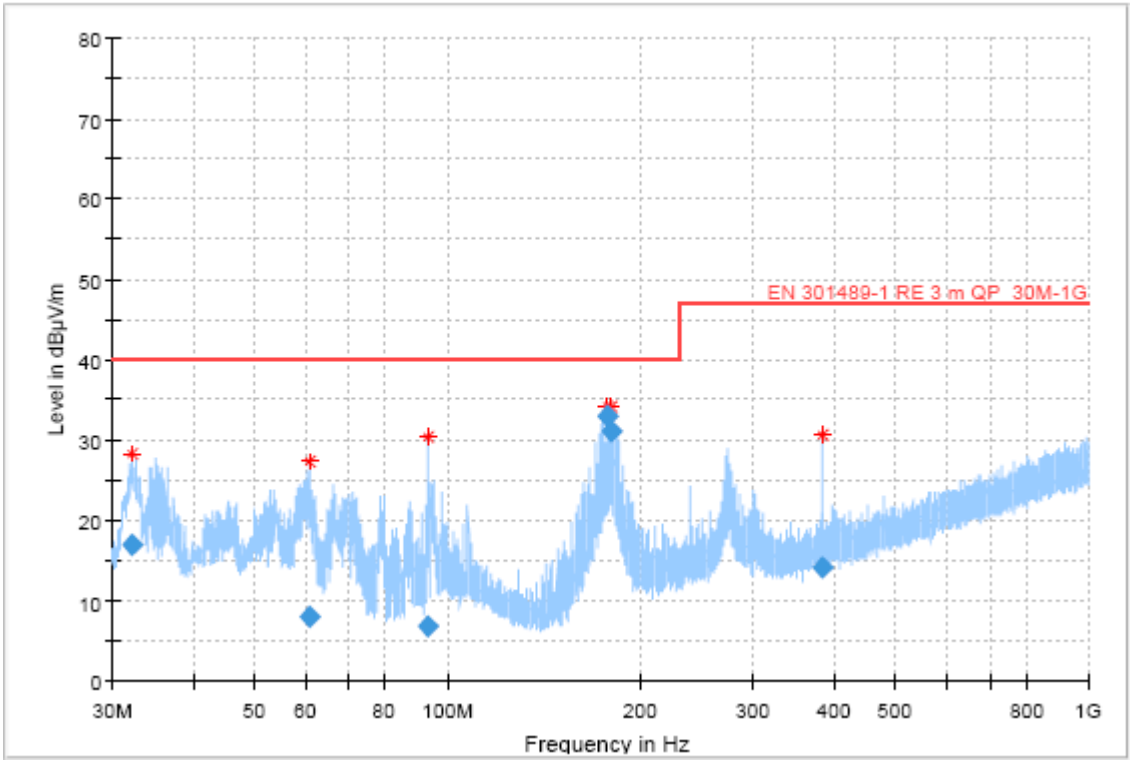
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
34.286811	13.29	40.00	26.71	1000.0	120.000	100.0	V	129.0	-22.0
37.976741	24.84	40.00	15.16	1000.0	120.000	100.0	H	337.0	-21.3
68.714677	24.59	40.00	15.41	1000.0	120.000	225.0	H	309.0	-24.6
172.505016	34.40	43.50	9.10	1000.0	120.000	173.0	H	306.0	-26.3
175.738371	35.86	43.50	7.64	1000.0	120.000	174.0	H	291.0	-26.0
276.628301	21.67	46.00	24.33	1000.0	120.000	105.0	H	269.0	-22.6

Note:

1. Emission level(QP)=Raw value by receiver + Corr(Antenna factor + cable loss - preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

N09 Sample Mode 1: USB cable (Data Link with PC)

Frequency Range:	30MHz – 1GHz



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.254000	16.91	40.00	23.09	1000.0	120.000	100.0	H	43.0	-18.1
61.127667	7.93	40.00	32.07	1000.0	120.000	100.0	V	299.0	-16.9
93.373333	6.71	40.00	33.29	1000.0	120.000	102.0	V	299.0	-17.3
177.430667	32.86	40.00	7.14	1000.0	120.000	175.0	H	74.0	-17.3
180.608667	30.98	40.00	9.02	1000.0	120.000	192.0	H	69.0	-17.1
384.025333	14.05	47.00	32.95	1000.0	120.000	125.0	H	24.0	-9.5

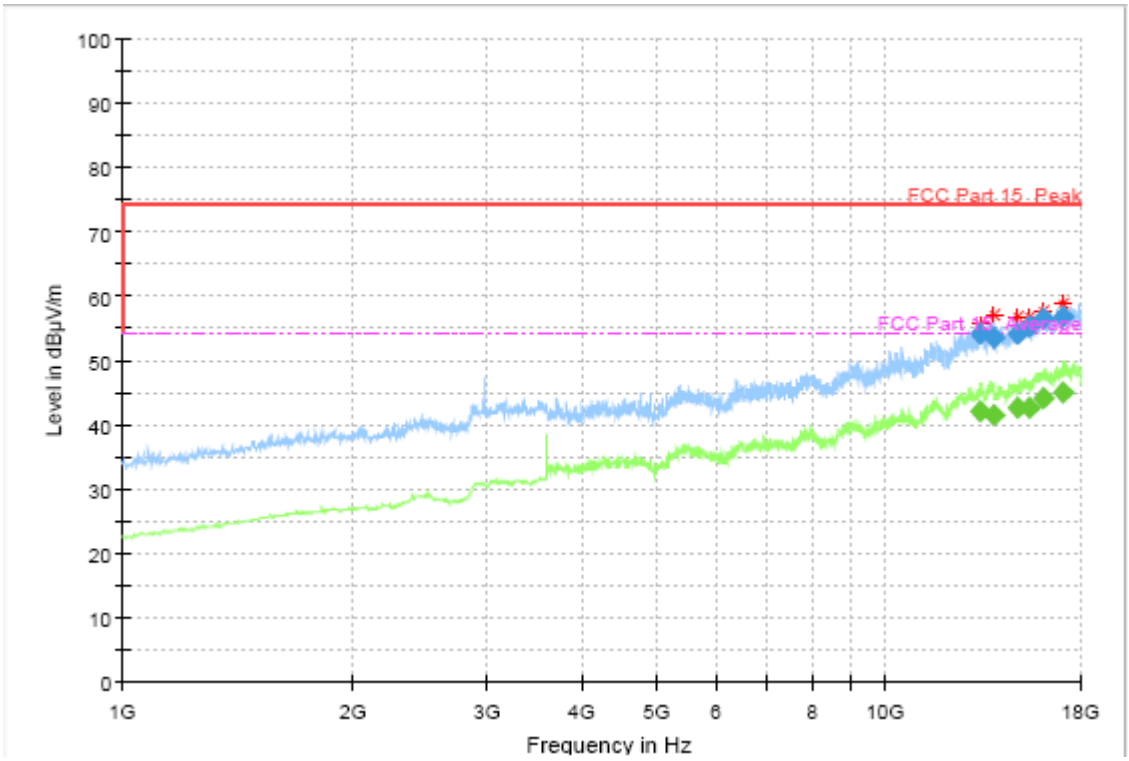
Note:

1.Emission level(QP)=Raw value by receiver + Corr(Antenna factor + cable loss - preamplifier gain)

2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

N08 Sample Mode 1: USB cable (Data Link with PC)

Frequency Range:	1GHz –18GHz, Horizontal



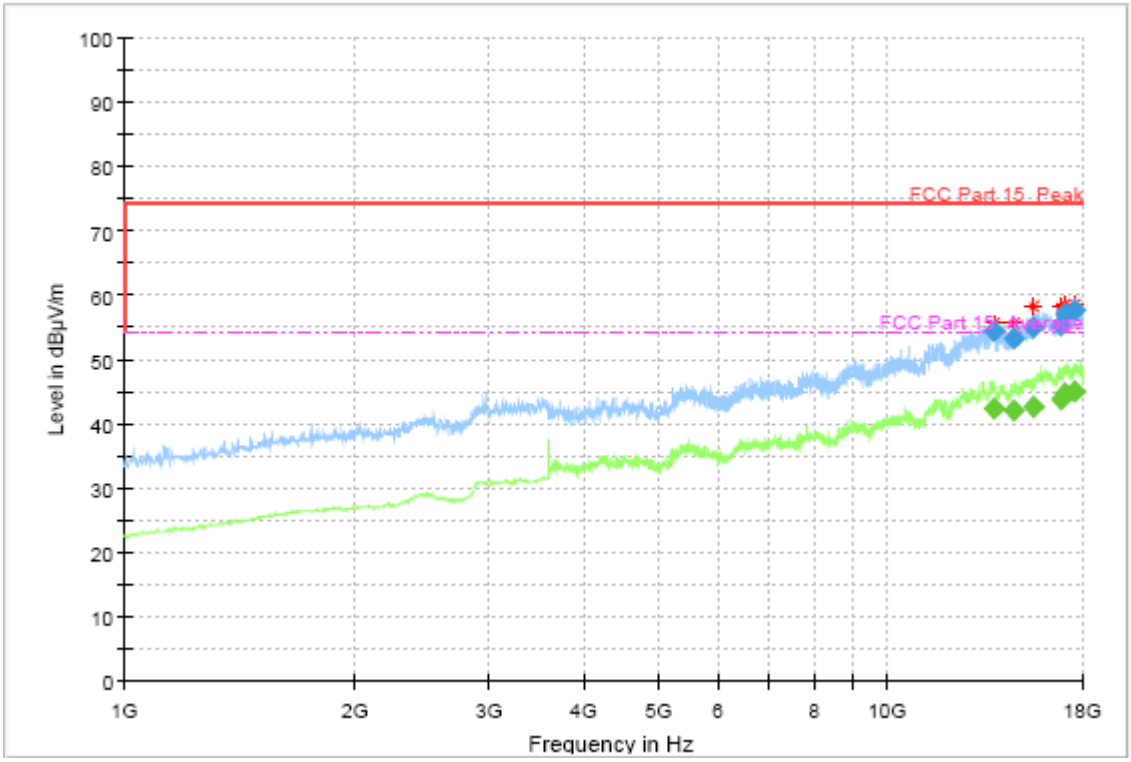
Final Result

Frequency (MHz)	MaxPeak (dBuV/m	Average (dBuV/m	Limit (dBuV/m	Margin (dB)	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr. (dB)
13328.600000	54.07	---	74.00	19.93	100.0	1000.000	200.0	H	190.0	18.1
13328.600000	---	42.16	54.00	11.84	100.0	1000.000	200.0	H	190.0	18.1
13832.000000	---	41.47	54.00	12.53	100.0	1000.000	200.0	H	0.0	18.7
13832.000000	53.64	---	74.00	20.36	100.0	1000.000	200.0	H	0.0	18.7
14854.800000	---	42.55	54.00	11.45	100.0	1000.000	100.0	H	305.0	20.0
14854.800000	54.01	---	74.00	19.99	100.0	1000.000	100.0	H	305.0	20.0
15416.600000	---	42.54	54.00	11.46	100.0	1000.000	200.0	H	242.0	21.1
15416.600000	55.23	---	74.00	18.77	100.0	1000.000	200.0	H	242.0	21.1
16099.800000	56.46	---	74.00	17.54	100.0	1000.000	100.0	H	34.0	22.5
16099.800000	---	44.24	54.00	9.76	100.0	1000.000	100.0	H	34.0	22.5
17103.400000	---	44.88	54.00	9.12	100.0	1000.000	200.0	H	344.0	24.0
17103.400000	56.78	---	74.00	17.22	100.0	1000.000	200.0	H	344.0	24.0

Note:

1. Emission level(peak or average)=Raw value by receiver + Corr(Antenna factor+ cable loss - preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

Frequency Range:	1GHz –18GHz, Vertical



Final Result

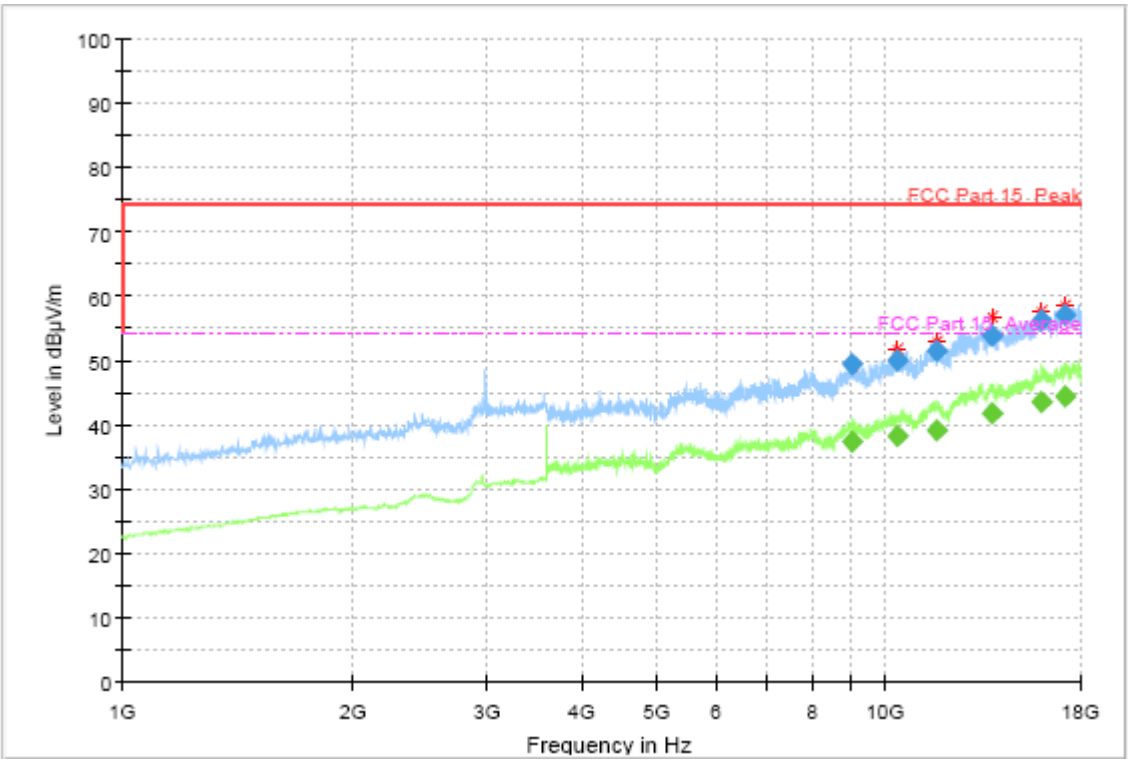
Frequency (MHz)	MaxPeak (dBuV/m	Average (dBuV/m	Limit (dBuV/m	Margin (dB)	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr. (dB)
13767.000000	54.44	---	74.00	19.56	100.0	1000.000	200.0	V	214.0	18.8
13767.000000	---	42.43	54.00	11.57	100.0	1000.000	200.0	V	214.0	18.8
14617.000000	53.38	---	74.00	20.62	100.0	1000.000	100.0	V	153.0	19.5
14617.000000	---	41.92	54.00	12.08	100.0	1000.000	100.0	V	153.0	19.5
15559.200000	54.90	---	74.00	19.10	100.0	1000.000	100.0	V	123.0	21.2
15559.200000	---	42.62	54.00	11.38	100.0	1000.000	100.0	V	123.0	21.2
16826.600000	55.38	---	74.00	18.62	100.0	1000.000	100.0	V	70.0	23.4
16826.600000	---	43.72	54.00	10.28	100.0	1000.000	100.0	V	70.0	23.4
17088.800000	---	44.75	54.00	9.25	100.0	1000.000	200.0	V	214.0	24.0
17088.800000	57.07	---	74.00	16.93	100.0	1000.000	200.0	V	214.0	24.0
17615.800000	---	44.86	54.00	9.14	100.0	1000.000	200.0	V	336.0	24.5
17615.800000	57.66	---	74.00	16.34	100.0	1000.000	200.0	V	336.0	24.5

Note:

1. Emission level(peak or average)=Raw value by receiver + Corr(Antenna factor+ cable loss - preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

N09 Sample Mode 1: USB cable (Data Link with PC)

Frequency Range:	1GHz –18GHz, Horizontal



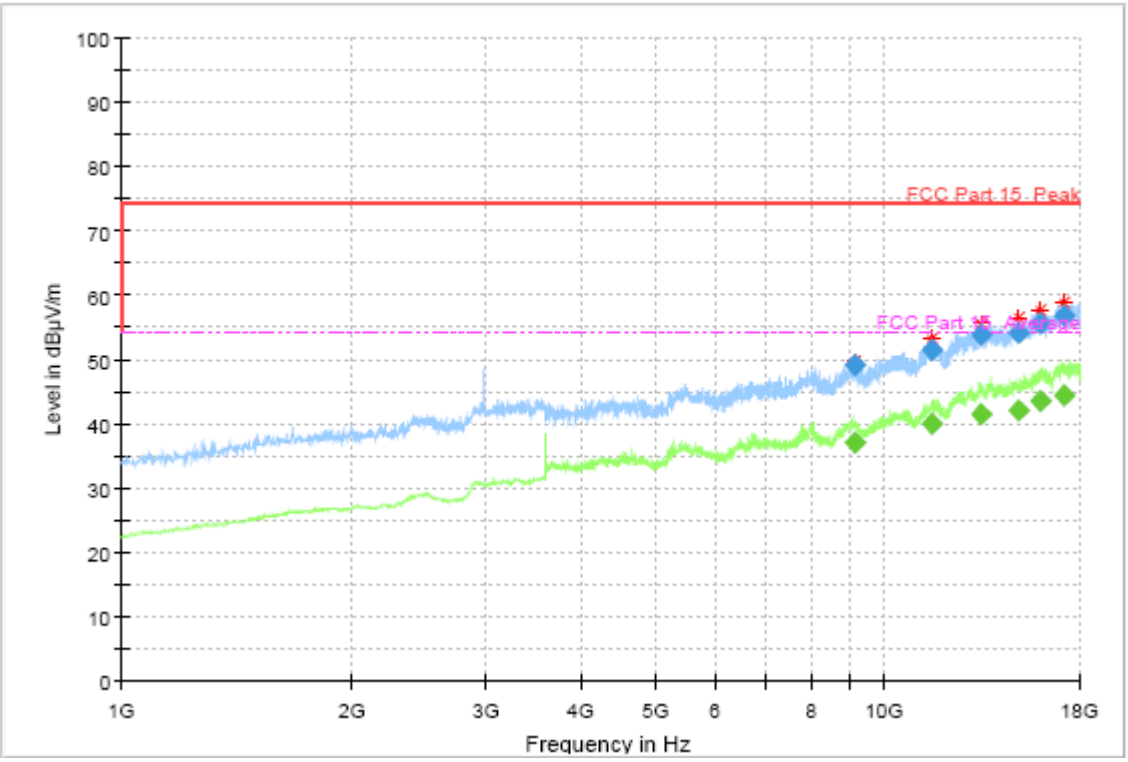
Final Result

Frequency (MHz)	MaxPeak (dBuV/m	Average (dBuV/m	Limit (dBuV/m	Margin (dB)	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr. (dB)
9004.000000	49.35	---	74.00	24.65	100.0	1000.000	100.0	H	8.0	10.3
9004.000000	---	37.47	54.00	16.53	100.0	1000.000	100.0	H	8.0	10.3
10346.600000	---	38.15	54.00	15.85	100.0	1000.000	100.0	H	0.0	12.5
10346.600000	50.04	---	74.00	23.96	100.0	1000.000	100.0	H	0.0	12.5
11652.400000	51.37	---	74.00	22.63	100.0	1000.000	200.0	H	0.0	15.2
11652.400000	---	39.12	54.00	14.88	100.0	1000.000	200.0	H	0.0	15.2
13776.400000	---	41.91	54.00	12.09	100.0	1000.000	100.0	H	111.0	18.8
13776.400000	53.74	---	74.00	20.26	100.0	1000.000	100.0	H	111.0	18.8
15945.600000	56.19	---	74.00	17.81	100.0	1000.000	100.0	H	152.0	22.1
15945.600000	---	43.53	54.00	10.47	100.0	1000.000	100.0	H	152.0	22.1
17166.000000	57.17	---	74.00	16.83	100.0	1000.000	100.0	H	142.0	24.1
17166.000000	---	44.55	54.00	9.45	100.0	1000.000	100.0	H	142.0	24.1

Note:

1. Emission level(peak or average)=Raw value by receiver + Corr(Antenna factor+ cable loss - preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

Frequency Range:	1GHz –18GHz, Vertical



Final Result

Frequency (MHz)	MaxPeak (dBuV/m	Average (dBuV/m	Limit (dBuV/m	Margin (dB)	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr. (dB)
9126.000000	49.26	---	74.00	24.74	100.0	1000.000	100.0	V	121.0	10.4
9126.000000	---	36.99	54.00	17.01	100.0	1000.000	100.0	V	121.0	10.4
11518.600000	---	39.98	54.00	14.02	100.0	1000.000	200.0	V	319.0	15.2
11518.600000	51.59	---	74.00	22.41	100.0	1000.000	200.0	V	319.0	15.2
13342.600000	---	41.51	54.00	12.49	100.0	1000.000	200.0	V	288.0	18.0
13342.600000	53.71	---	74.00	20.29	100.0	1000.000	200.0	V	288.0	18.0
14935.600000	54.12	---	74.00	19.88	100.0	1000.000	100.0	V	10.0	20.1
14935.600000	---	41.95	54.00	12.05	100.0	1000.000	100.0	V	10.0	20.1
15949.200000	---	43.62	54.00	10.38	100.0	1000.000	200.0	V	215.0	22.1
15949.200000	55.53	---	74.00	18.47	100.0	1000.000	200.0	V	215.0	22.1
17147.200000	---	44.37	54.00	9.63	100.0	1000.000	200.0	V	267.0	24.1
17147.200000	56.74	---	74.00	17.26	100.0	1000.000	200.0	V	267.0	24.1

Note:

1. Emission level(peak or average)=Raw value by receiver + Corr(Antenna factor+ cable loss - preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

8.2 AC Conducted Emission

Method of Measurement

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies with the band 150 kHz to 30MHz shall not exceed the limits. Both lines of the power mains connected to the EUT were checked for maximum conducted interference. Tested in accordance with the procedures of ANSI C63.4-2014, section 7.3

Limit of AC Conducted Emission

Frequency Range (MHz)	Conducted 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 Condition in Charging Mode

Voltage (V)	Frequency (Hz)	RBW	Sweep Time (s)
120	60	9 kHz	Auto

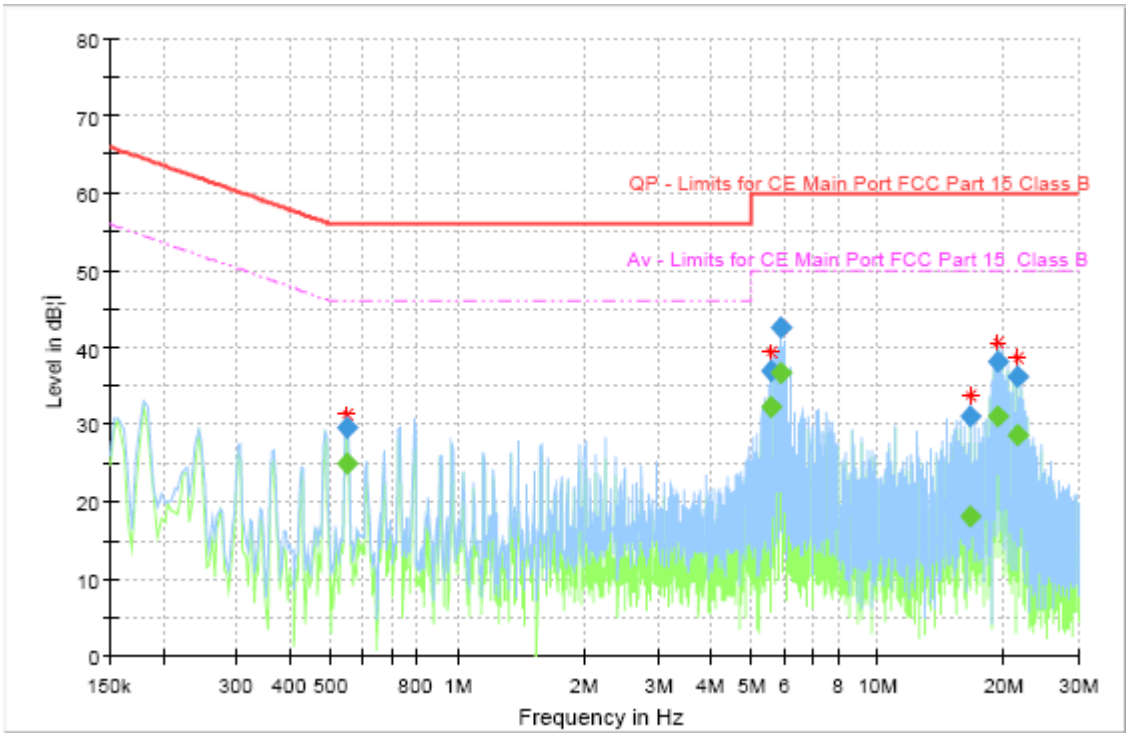
Uncertainty Measurement

The measurement uncertainty is 3.66dB (k=2).

Test Results

N08 Mode 2: Adapter charging

Frequency Range:	150kHz – 30MHz



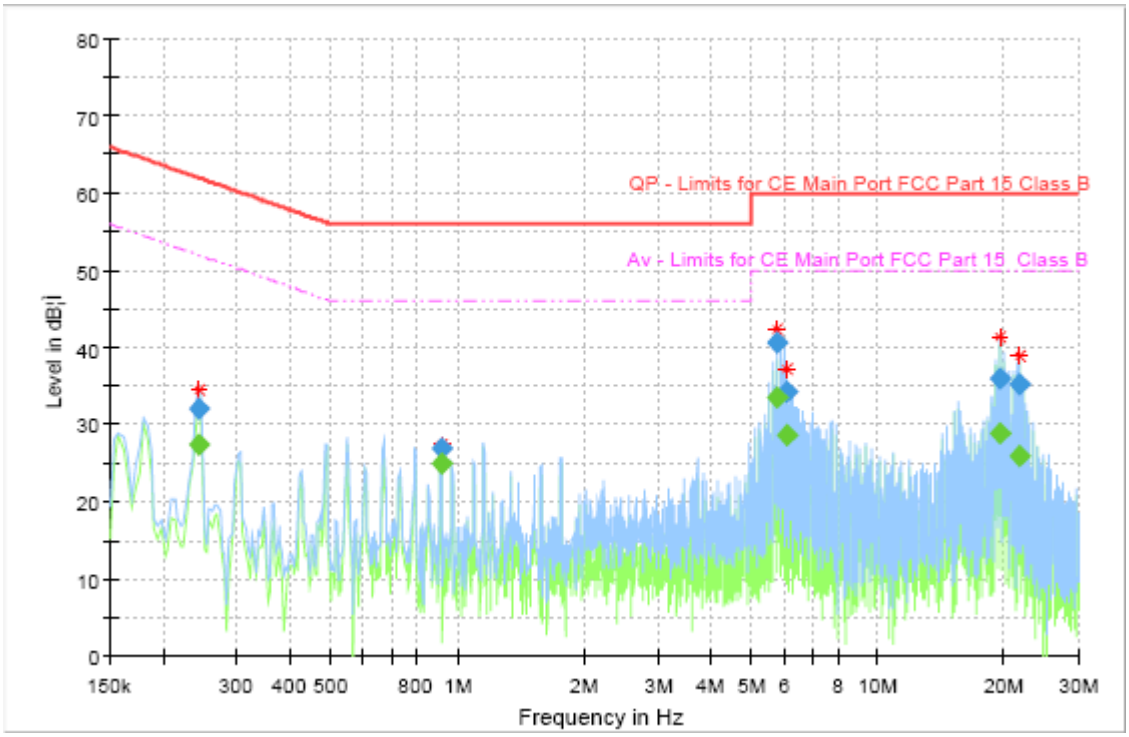
Frequency (MHz)	QuasiPeak (dBµ V)	Average (dBµ V)	Limit (dBµ V)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.545513	---	24.90	46.00	21.10	1000.0	9.000	L1	ON	9.7
0.545513	29.52	---	56.00	26.48	1000.0	9.000	L1	ON	9.7
5.552850	---	32.40	50.00	17.60	1000.0	9.000	N	ON	9.8
5.552850	37.00	---	60.00	23.00	1000.0	9.000	N	ON	9.8
5.855081	42.48	---	60.00	17.52	1000.0	9.000	N	ON	9.8
5.855081	---	36.68	50.00	13.32	1000.0	9.000	N	ON	9.8
16.518994	30.99	---	60.00	29.01	1000.0	9.000	L1	ON	9.9
16.518994	---	17.98	50.00	32.02	1000.0	9.000	L1	ON	9.9
19.220419	---	31.01	50.00	18.99	1000.0	9.000	L1	ON	9.9
19.220419	38.23	---	60.00	21.77	1000.0	9.000	L1	ON	9.9
21.477825	---	28.68	50.00	21.32	1000.0	9.000	L1	ON	9.9
21.477825	36.10	---	60.00	23.90	1000.0	9.000	L1	ON	9.9

Note:

1. Emission level(quasi-peak or Average peak)=Raw value by receiver + Corr(Insertion loss+ cable loss)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.
4. L1 and N line is all have been tested, the result of them is synthesized in the above data diagram.

N09 Mode 2: Adapter charging

Frequency Range:	150kHz – 30MHz



Frequency (MHz)	QuasiPeak (dBµ V)	Average (dBµ V)	Limit (dBµ V)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.243281	---	27.39	51.98	24.59	1000.0	9.000	L1	ON	9.7
0.243281	31.93	---	61.98	30.05	1000.0	9.000	L1	ON	9.7
0.914906	---	24.89	46.00	21.11	1000.0	9.000	L1	ON	9.7
0.914906	26.87	---	56.00	29.13	1000.0	9.000	L1	ON	9.7
5.739413	40.57	---	60.00	19.43	1000.0	9.000	N	ON	9.8
5.739413	---	33.48	50.00	16.52	1000.0	9.000	N	ON	9.8
6.101344	34.31	---	60.00	25.69	1000.0	9.000	L1	ON	9.8
6.101344	---	28.58	50.00	21.42	1000.0	9.000	L1	ON	9.8
19.466681	35.87	---	60.00	24.13	1000.0	9.000	L1	ON	9.9
19.466681	---	28.93	50.00	21.07	1000.0	9.000	L1	ON	9.9
21.724088	35.18	---	60.00	24.82	1000.0	9.000	L1	ON	9.9
21.724088	---	25.86	50.00	24.14	1000.0	9.000	L1	ON	9.9

Note:

1. Emission level(quasi-peak or Average peak)=Raw value by receiver + Corr(Insertion loss+ cable loss)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.
4. L1 and N line is all have been tested, the result of them is synthesized in the above data diagram.

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