



EMC TEST REPORT

Applicant Nokia ShangHai Bell Co., Ltd
FCC ID 2ADZRG240WG
Product 7368 ISAM ONT
Brand NOKIA
Marketing G-240W-G
Model G-240W-G
Report No. R1807B0070-E1V2
Issue Date October 19, 2018

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2018)/ ANSI C63.4 (2014)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Wei Liu

Guangchang Fan

Performed by: Wei Liu/ Manager

Approved by: Guangchang Fan/ Director

TA Technology (Shanghai) Co., Ltd.

No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000

Table of Contents

1	Test Laboratory.....	4
1.1	Notes of the Test Report.....	4
1.2	Test facility.....	4
1.3	Testing Location.....	5
2	General Description of Equipment under Test.....	6
2.1	Client Information.....	6
2.2	General information.....	6
2.3	Applied Standards.....	9
2.4	Test Mode.....	10
3	Test Case Results.....	11
3.1	Radiated Emission.....	11
3.2	Conducted Emission.....	17
4	Main Test Instrument.....	19
	ANNEX A: The EUT Appearance and Test Configuration.....	20
	A.1 EUT Appearance.....	20
	A.2 Test Setup.....	24



Summary of measurement results

Number	Test Case	Clause in FCC Rules	Conclusion
1	Radiated Emission	15.109, ANSI C63.4-2014	PASS
2	Conducted Emission	15.107, ANSI C63.4-2014	PASS
Test Date: July 9, 2018~ August 24, 2018			

1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2 Test facility

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.



1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City: Shanghai
Post code: 201201
Country: P. R. China
Contact: Xu Kai
Telephone: +86-021-50791141/2/3
Fax: +86-021-50791141/2/3-8000
Website: <http://www.ta-shanghai.com>
E-mail: xukai@ta-shanghai.com

2 General Description of Equipment under Test

2.1 Client Information

Applicant	Nokia Shanghai Bell CO., Ltd.
Applicant address	No. 388, Ningqiao Rd. Pilot Free Trade Zone, Shanghai, China
Manufacturer	Nokia Shanghai Bell CO., Ltd.
Manufacturer address	No. 388, Ningqiao Rd. Pilot Free Trade Zone, Shanghai, China

2.2 General information

EUT Description			
Device Type:	Movable Device		
Model Number:	G-240W-G		
IMEI:	/		
HW Version:	PEM2		
SW Version:	Null		
Antenna Type:	Internal Antenna		
Frequency:	Band	Tx (MHz)	Rx (MHz)
	WIFI 2.4G:	2412 ~ 2462	2412 ~ 2462
	WIFI 5G(U-NII-1):	5150~ 5250	5150 ~ 5250
	WIFI 5G(U-NII-3):	5725 ~ 5850	5725 ~ 5850
Modulation:	WLAN 802.11b: DSSS WLAN 802.11a/g/n/ac: OFDM		
Test Mode:	Transfer Data Mode		
EUT Accessory			
Adapter 1	Manufacturer: MOSO POWER SUPPLY TECHNOLOGY CO.,LTD Model: MSA-C3000CS12.0-40W-US		
Adapter 2	Manufacturer: SHENZHEN RUIDE ELECTRONICAL INDUSTRIAL CO.,LTD Model: RD1203000-C55-20MG		
Adapter 3	Manufacturer: MOSO POWER SUPPLY TECHNOLOGY CO.,LTD Model: MSA-C3000CS12.0-40W-DE		
Adapter 4	Manufacturer: SHENZHEN RUIDE ELECTRONICAL INDUSTRIAL CO.,LTD Model: RD1203000-C55-20OG		
Adapter 5	Manufacturer: LUCENT TRANS ELECTRONICS CO., LTD		



	Model: 1L43-US1230
Adapter 6	Manufacturer: Shenzhen Mass Power Electronic Limited Model: NBS40C120300M2
Adapter 7	Manufacturer: ShenZhen SOY Technology Co., Ltd. Model: SOY-1200300
Auxiliary test equipment	
PC	PC Manufacturer: Dell Model: E5450 (SN : P48G001)
Note: The information of the EUT is declared by the manufacturer.	

Information of Configuration:

No.	Name	Model/Code No.	Edition	Serial No. or Quantity
1.1	G-240W-G	3FE47555BB	PEM2	PEM
1.2	G-240W-G	3FE47555AB	PEM2	PEM
1.3	G-240W-G	3FE47555AE	PEM2	PEM
2.1	Power adapter	RD1203000-C55-20MG	A/0	PEM
2.2	Power adapter	MSA-C3000CS12.0-40W-US	A/0	PEM
2.3	Power adapter	1L43-US1230	A/0	PEM
2.4	Power adapter	MSA-C3000CS12.0-40W-DE	A/0	PEM
2.5	Power adapter	RD1203000-C55-20OG	A/0	PEM
2.6	Power adapter	NBS40C120300M2	A/0	PEM
2.7	Power adapter	SOY-1200300	A/0	PEM

Kit Code	EMA	Part Description	Power Adaptor
3FE47536DA	3FE 47555 BB	2POTS,4GE,WIFI 802.11ac 3x3/802.11n 2x2, Emcore BOSA,AR Plug, 2PIN	NBS40C120300M2/ SOY-1200300
3FE47536BA	3FE 47555 AB	2POTS,4GE,WIFI 802.11ac 3x3/802.11n 2x2, Emcore BOSA,EU Plug Type C, 2PIN	RD1203000-C55-20OG/ MSA-C3000CS12.0-40W-DE
3FE47536BB	3FE 47555 BB	2POTS,4GE,WIFI 802.11ac 3x3/802.11n 2x2, Emcore BOSA,EU Plug Type C, 2PIN	RD1203000-C55-20OG/ MSA-C3000CS12.0-40W-DE
3FE47536AE	3FE 47555 AE	2POTS,4GE,WIFI 802.11ac 3x3/802.11n 2x2, Emcore BOSA,US Plug, 2PIN	RD1203000-C55-20MG/ MSAC3000CS12.0-40W-US/ 1L43-US1230

**Accessory equipment**

No.	Name	Brand name	Model	NSB code	Valid Until
1	BigTao220	XINERTEL	DE8709	-	No Cal. Required
2	OLT	Alcatel-Lucent	N.A	-	No Cal. Required
3	PC	HP	N.A	-	No Cal. Required
4	Phone	N.A	N.A	-	No Cal. Required



2.3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards

FCC Code CFR47 Part15B (2018)

ANSI C63.4 (2014)



2.4 Test Mode

Test Mode	
Mode 1	Adapter + EUT + Telephone + Idle

3 Test Case Results

3.1 Radiated Emission

Ambient condition

Temperature	Relative humidity	Pressure
24°C~26°C	45%~50%	102.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The distance between EUT and receive antenna should be 3 meters. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier. During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated signal level.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. During the test, the EUT is worked at maximum output power.

Set the spectrum analyzer in the following:

Below 1GHz:

RBW=100 kHz / VBW=300 kHz / Sweep=AUTO

Above 1GHz:

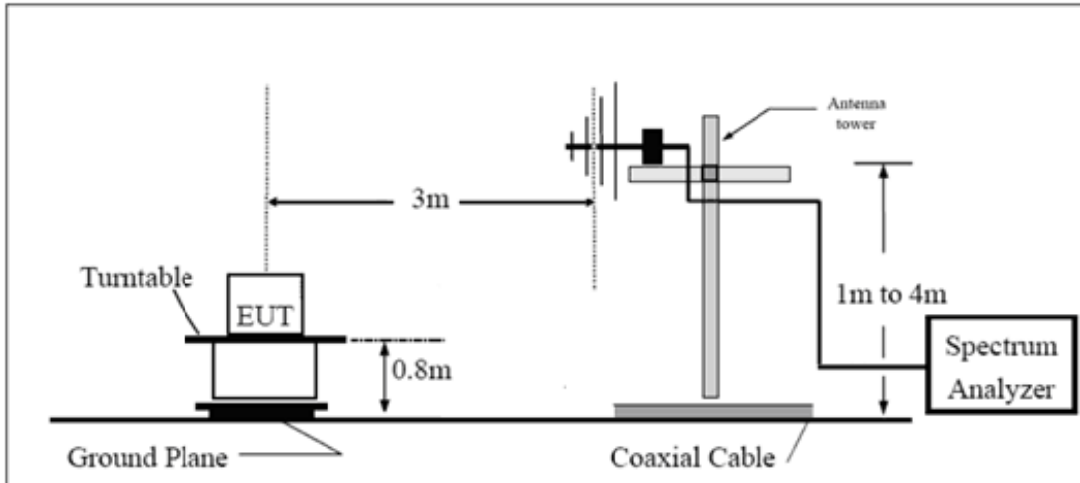
(a) PEAK: RBW=1MHz / VBW=3MHz/ Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=1Hz / Sweep=AUTO

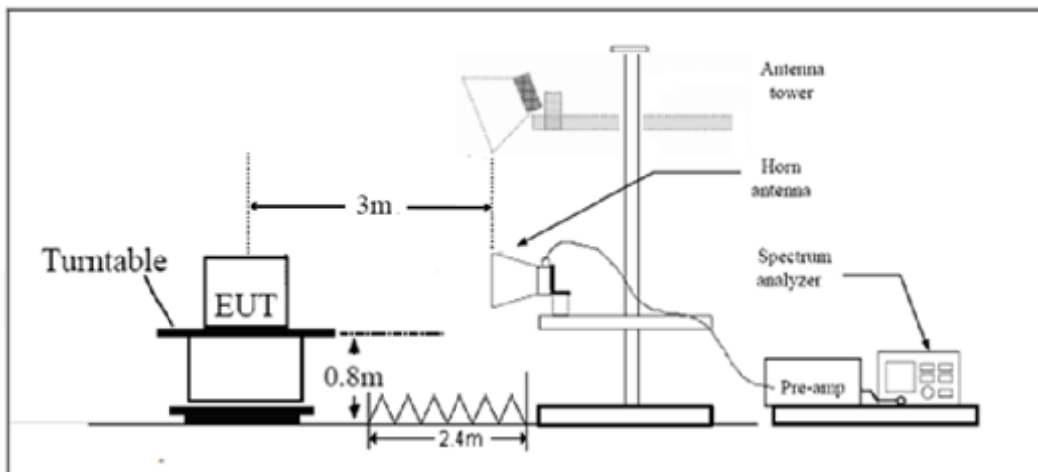
The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

Test Setup

Below 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

Antenna Tower meets ANSI C63.4 requirements for measurements above 1 GHz by keeping the antenna aimed at the EUT during the antenna's ascent/ descent along the antenna mast.

Limits

Frequency (MHz)	Field Strength (dB μ V/m)	Detector
30 -88	40.0	Quasi-peak
88-216	43.5	Quasi-peak
216 – 960	46.0	Quasi-peak
960-1000	54.0	Quasi-peak
1000-5 th harmonic of the highest frequency or 40GHz, which is lower	54 74	Average Peak

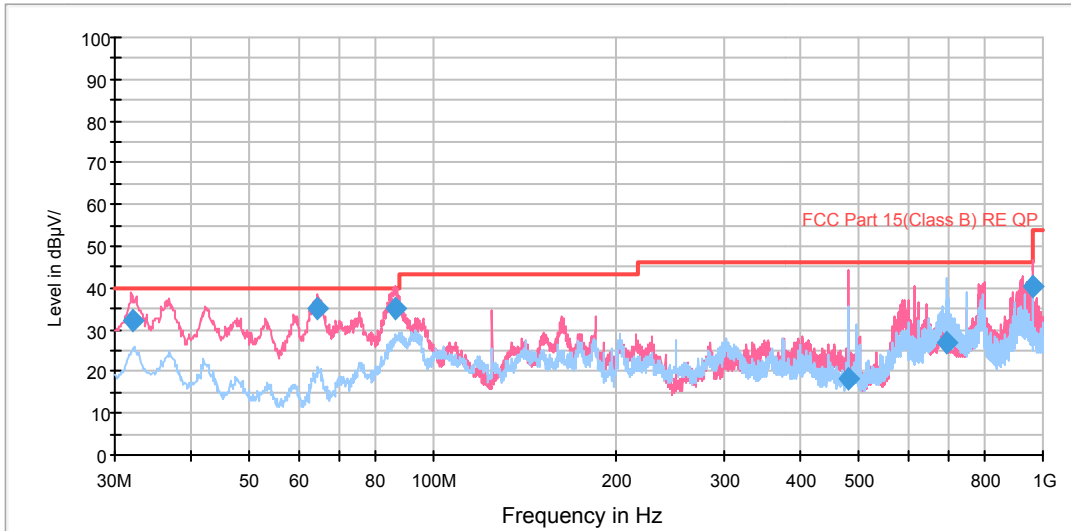
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$. $U = 3.704$ dB.

Test Results

The following graphs display the maximum values of horizontal and vertical by software.
 For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.

RE 30M-1GHz QP

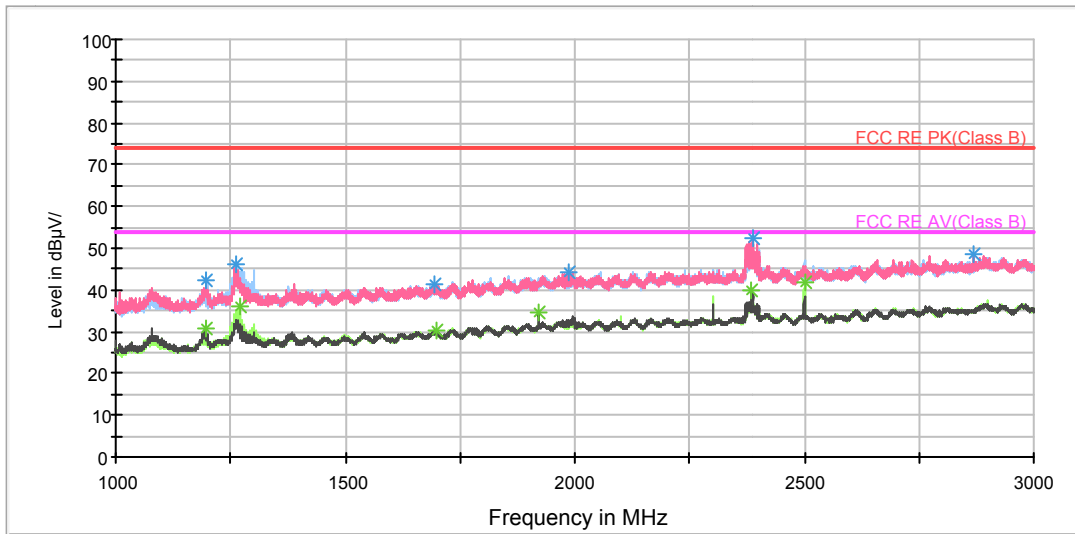


Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
32.019850	32.3	51.3	100.0	V	132.0	-19.0	7.7	40.0
64.596088	35.0	59.4	125.0	V	15.0	-24.4	5.0	40.0
86.568138	35.0	59.5	175.0	V	232.0	-24.5	5.0	40.0
480.000000	18.2	37.9	120.0	V	170.0	-19.7	27.8	46.0
693.954000	26.8	41.6	325.0	H	217.0	-14.8	19.2	46.0
959.984750	40.3	51.0	120.0	V	270.0	-10.7	5.7	46.0

- Remark:**
1. Quasi-Peak = Reading value + Correction factor
 2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)
 3. Margin = Limit – Quasi-Peak

RE 1G-3GHz PK+AV

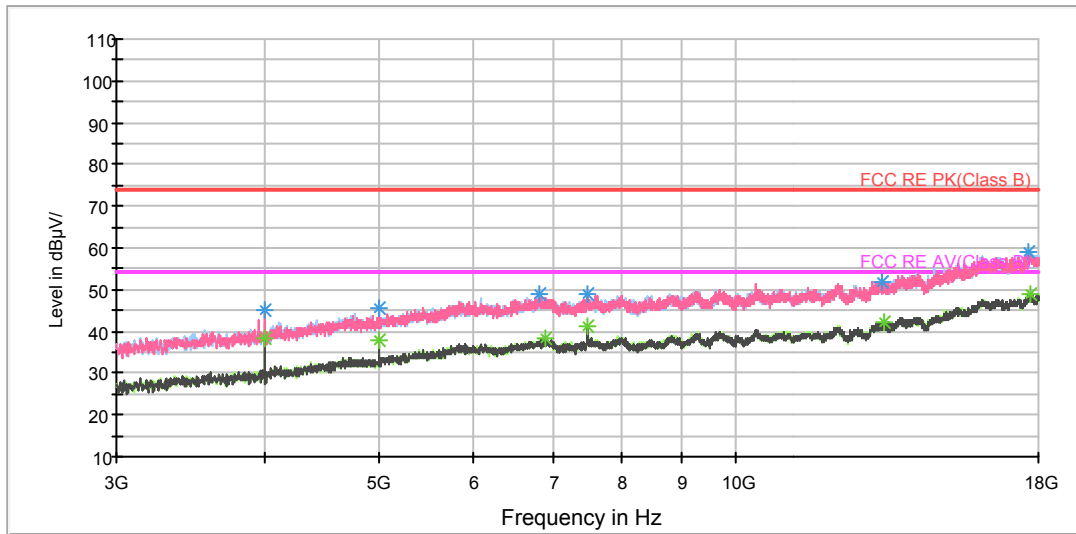


Radiated Emission from 1GHz to 3GHz

Frequency (MHz)	Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1194.750000	42.2	51.2	100.0	V	232.0	-9.0	31.8	74
1261.750000	46.2	54.7	100.0	H	226.0	-8.5	27.8	74
1693.500000	41.5	46.6	100.0	H	219.0	-5.1	32.5	74
1987.250000	44.1	47.3	100.0	V	174.0	-3.2	29.9	74
2386.500000	52.3	54.1	100.0	V	191.0	-1.8	21.7	74
2869.250000	48.4	47.1	200.0	V	228.0	1.3	25.6	74

Frequency (MHz)	Average (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1197.250000	31.0	40.0	100.0	V	232.0	-9.0	23.0	54
1269.000000	35.9	44.3	100.0	H	155.0	-8.4	18.1	54
1700.250000	30.3	35.4	100.0	V	33.0	-5.1	23.7	54
1919.750000	34.5	38.3	100.0	V	191.0	-3.8	19.5	54
2385.750000	39.9	41.7	100.0	V	191.0	-1.8	14.1	54
2500.250000	41.6	42.5	100.0	H	173.0	-0.9	12.4	54

RE 3-18GHz PK+AV



Radiated Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3999.375000	45.0	45.6	100.0	V	1.0	-0.6	29.0	74
4998.750000	45.5	43.6	100.0	H	144.0	1.9	28.5	74
6821.250000	48.9	42.6	100.0	V	1.0	6.3	25.1	74
7498.125000	48.8	42.4	200.0	H	2.0	6.4	25.2	74
13263.750000	51.8	39.3	100.0	H	349.0	12.5	22.2	74
17645.625000	59.1	39.8	100.0	H	187.0	19.3	14.9	74

Frequency (MHz)	Average (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3999.375000	38.2	38.8	100.0	V	1.0	-0.6	15.8	54
4998.750000	37.7	35.8	100.0	H	144.0	1.9	16.3	54
6903.750000	38.2	31.8	100.0	H	242.0	6.4	15.8	54
7500.000000	41.2	34.8	200.0	V	139.0	6.4	12.8	54
13336.875000	42.4	29.9	200.0	H	67.0	12.5	11.6	54
17718.750000	48.9	29.5	200.0	V	326.0	19.4	5.1	54

3.2 Conducted Emission

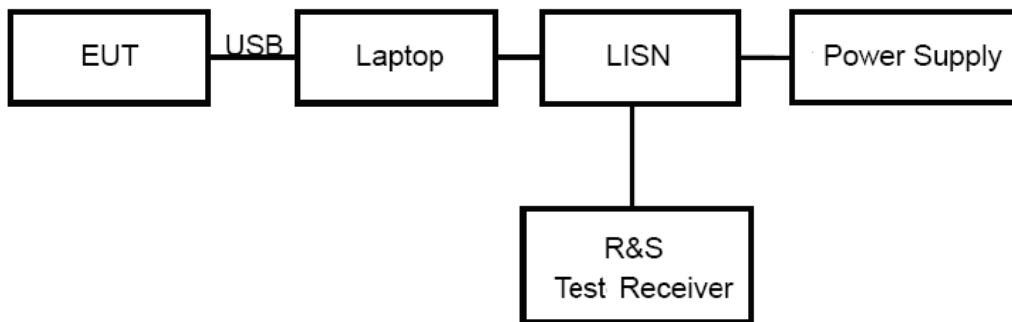
Ambient condition

Temperature	Relative humidity	Pressure
24°C ~26°C	50%~55%	102.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line.

Test Setup



Note: Power Supply is AC Power source and it is used to change the voltage 120V/60Hz.

Limits

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46 *
0.5 - 5	56	46
5 - 30	60	50

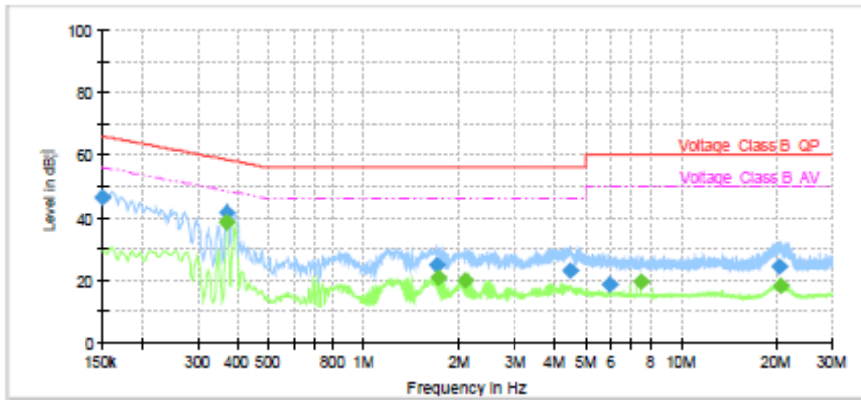
*: Decreases with the logarithm of the frequency.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$. $U = 2.57$ dB.

Test Results

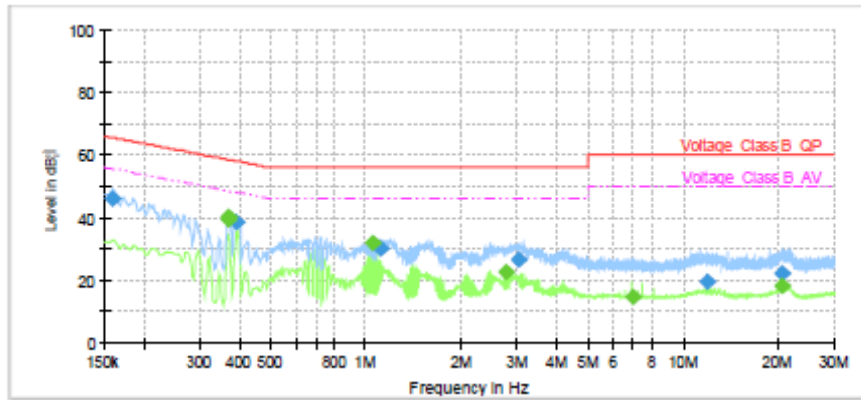
Following plots, Blue trace uses the peak detection; Green trace uses the average detection.



Frequency (MHz)	QuasiPeak (dB V)	Average (dB V)	Limit (dB V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	46.33	---	66.00	19.67	1000.0	9.000	L1	ON	19.1
0.368250	---	38.65	48.54	9.89	1000.0	9.000	L1	ON	19.2
0.370500	---	38.68	48.49	9.81	1000.0	9.000	L1	ON	19.2
0.370500	41.50	---	58.49	16.99	1000.0	9.000	L1	ON	19.2
1.698000	24.82	---	56.00	31.18	1000.0	9.000	L1	ON	19.2
1.727250	---	20.69	46.00	25.31	1000.0	9.000	L1	ON	19.2
2.096250	---	20.02	46.00	25.98	1000.0	9.000	L1	ON	19.1
4.494750	23.15	---	56.00	32.85	1000.0	9.000	L1	ON	19.1
5.928000	18.43	---	60.00	41.57	1000.0	9.000	L1	ON	19.1
7.491750	---	19.38	50.00	30.62	1000.0	9.000	L1	ON	19.2
20.292000	24.41	---	60.00	35.59	1000.0	9.000	L1	ON	19.7
20.553000	---	18.08	50.00	31.92	1000.0	9.000	L1	ON	19.7

L line

Conducted Emission from 150 KHz to 30 MHz



Frequency (MHz)	QuasiPeak (dB V)	Average (dB V)	Limit (dB V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.159000	46.09	---	65.52	19.43	1000.0	9.000	N	ON	19.1
0.368248	---	40.05	48.54	8.49	1000.0	9.000	N	ON	19.2
0.370500	---	39.29	48.49	9.20	1000.0	9.000	N	ON	19.2
0.390750	38.36	---	58.05	19.69	1000.0	9.000	N	ON	19.2
1.052250	---	31.91	46.00	14.09	1000.0	9.000	N	ON	19.2
1.113000	30.04	---	56.00	25.96	1000.0	9.000	N	ON	19.2
2.786988	---	22.35	46.00	23.65	1000.0	9.000	N	ON	19.0
3.038992	26.56	---	56.00	29.44	1000.0	9.000	N	ON	19.1
6.949500	---	14.46	50.00	35.54	1000.0	9.000	N	ON	19.2
11.867980	19.38	---	60.00	40.62	1000.0	9.000	N	ON	19.4
20.583165	21.95	---	60.00	38.05	1000.0	9.000	N	ON	19.5
20.603876	---	18.25	50.00	31.75	1000.0	9.000	N	ON	19.5

N line

Conducted Emission from 150 KHz to 30 MHz



4 Main Test Instrument

Name	Manufacturer	Type	Serial Number	Last Cal.	Cal. Due Date
Signal Analyzer	R&S	FSV30	100815	2017-12-17	2018-12-16
EMI Test Receiver	R&S	ESCI	100948	2018-05-20	2019-05-19
Trilog Antenna	SCHWARZBECK	VULB 9163	9163-201	2017-11-18	2019-11-17
Horn Antenna	R&S	HF907	100126	2018-07-07	2020-07-06
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2020-06-19
EMI Test Receiver	R&S	ESR	101667	2018-05-20	2019-05-19
LISN	R&S	ENV216	101171	2016-12-16	2019-12-15
Bore Sight Antenna mast	ETS	2171B	00058752	/	/
Test software	EMC32	R&S	9.26.0	/	/

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

ANNEX A: The EUT Appearance and Test Configuration

A.1 EUT Appearance



Front Side



Back Side

a: EUT



Adapter 1



Adapter 2



Adapter 3





Adapter 4



Adapter 5



Adapter 6

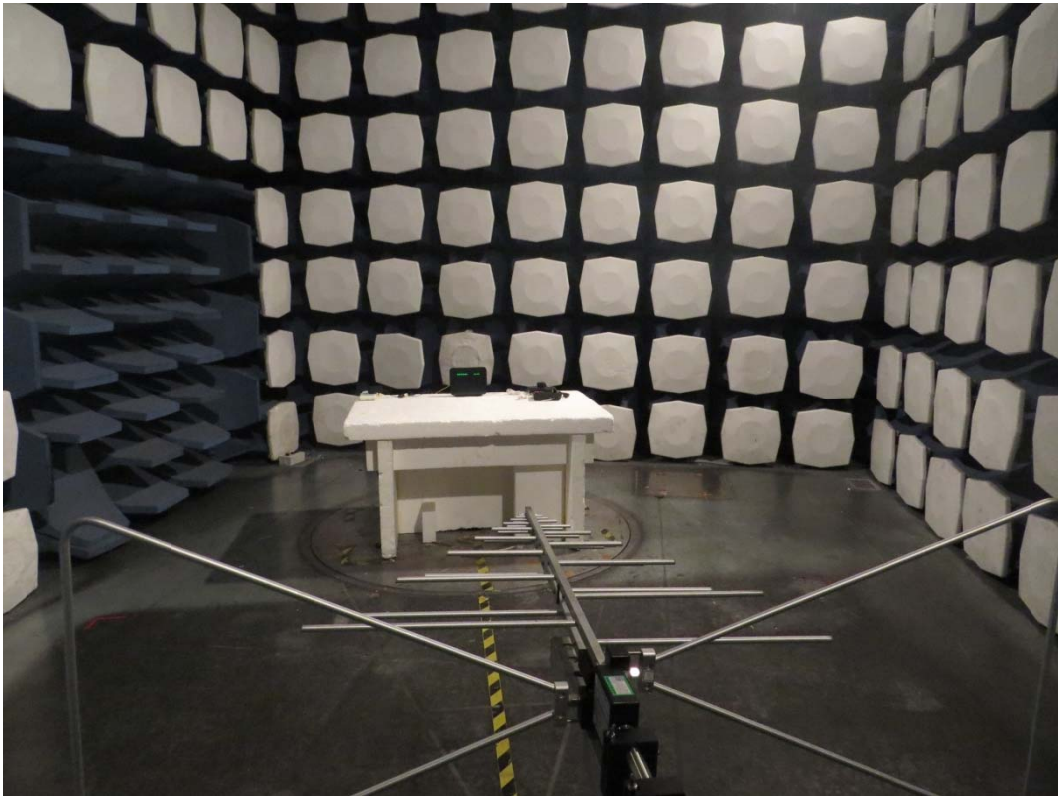


Adapter 7

b: Adapter

Picture 1 EUT and Accessory

A.2 Test Setup



a: Below 1GHz



b: Above 1GHz

Picture 2 Radiated Emission Test Setup



Picture 3 Conducted Emission Test Setup