



中国认可
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检测
TESTING
CNAS L2264

EMC TEST REPORT

Applicant NOKIA Shanghai Bell Co. Ltd.
FCC ID 2ADZRG240WV2
Product 7368 ISAM GPON ONU
Brand NOKIA
Model G-240W-F
Report No. YBA1707-0068EMC01R2
Issue Date October 19, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2016)/ 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

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Approved by: Guangchang Fan/ Director

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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	Information of configuration.....	7
2.4	Applied Standards.....	8
3	Test Case Results.....	9
3.1	Radiated Emission.....	9
3.2	Conducted Emission.....	15
4	Main Test Instrument.....	18
	ANNEX A: The EUT Appearance and Test Configuration.....	19
	A.1 EUT Appearance.....	19
	A.2 Test Setup.....	21
	A.3 Auxiliary test equipment.....	23



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
Date of Testing: July 13, 2017 ~ August 3, 2017			

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. This report must not be used by the client to claim product certification, approval, or endorsement by any government agencies.

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 (recognition number is 428261)

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.
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City: Shanghai
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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	388, Ningqiao Road, Pudong, Shanghai, China
Manufacturer	NOKIA Shanghai Bell Co. Ltd.
Manufacturer address	388, Ningqiao Road, Pudong, Shanghai, China

2.2 General information

EUT Description	
Device Type:	Portable Device
Model Number:	G-240W-F
HW Version:	PEM 1
SW Version:	3FE46606AFE40
Test mode	EUT+PC+telephone+adapter
Antenna Type:	External Antenna
EUT Accessory	
Adapter	Manufacturer: DONGGUAN SHILONG FUHUA ELECTRONIC CO., LTD Model: UES18W3-120150SPAU
Auxiliary test equipment	
PC	Manufacturer: lenovo PC Model: Thinkpad T540p SN : SL10E37685
Telephone 1	Manufacturer: TCL Model: HCD868(79)TSD SN: A000100
Telephone 2	Manufacturer: TCL Model: HCD868(79)TSD SN: A000101
Remark: The information of the EUT is declared by the manufacturer.	

2.3 Information of configuration

Configuration NO.:	Kit Code	EMA Code	Part Description	Power Adaptor
1	3FE47245AA	3FE47087AA	GPON indoor ONT, 2POTS, 4GE, WIFI 200mW, SC/APC, Nokia Logo, 5dBi antenna. 1.5m CAT-5E Ethernet cable with RJ-45 endpoint, 1.5m RJ-11 cable, AC/DC power adapter	UES18W3-120150SPAU
2	3FE47245AB	3FE47087AB	GPON indoor ONT, 2POTS, 4GE, WIFI 200mW, SC/APC, ETB Logo, 5dBi antenna. 1.5m CAT-5E Ethernet cable with RJ-45 endpoint, 1.5m RJ-11 cable, AC/DC power adapter	UES18W3-120150SPAU
Note: During the test, the test was performed in two configurations; only the worst case (configuration 1) will be recorded in this report.				



2.4 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 (2016)

ANSI C63.4 (2014)

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:

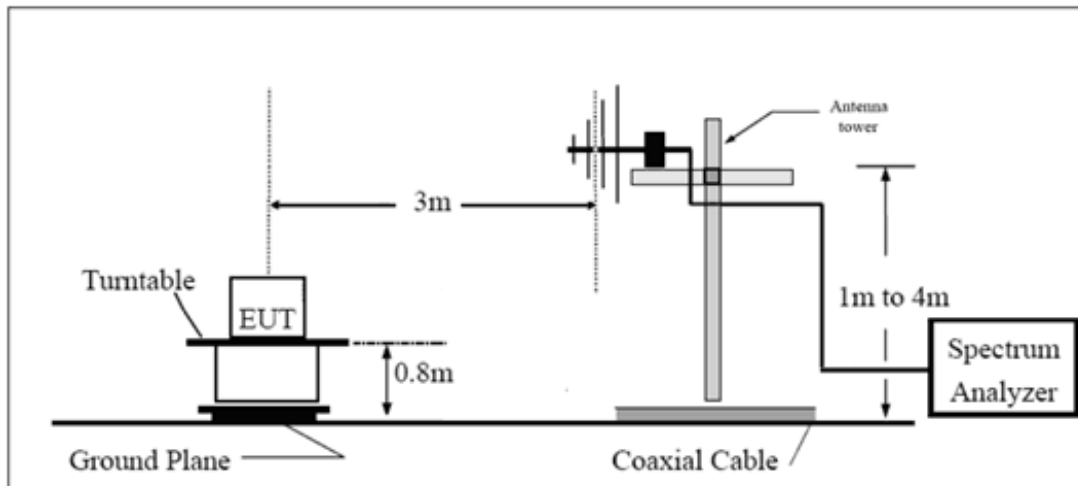
(a) PEAK: RBW=1MHz / VBW=3MHz/ Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO

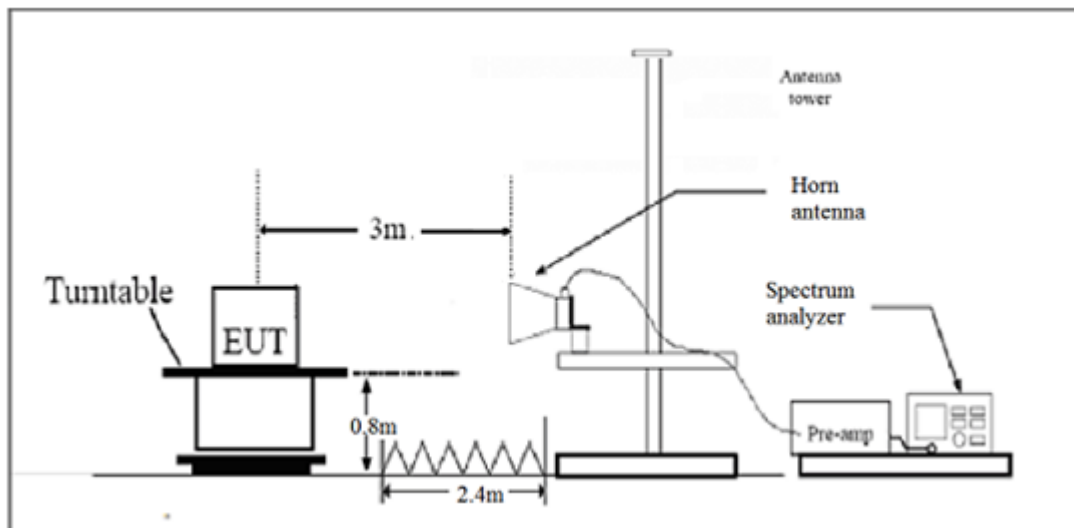
The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

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

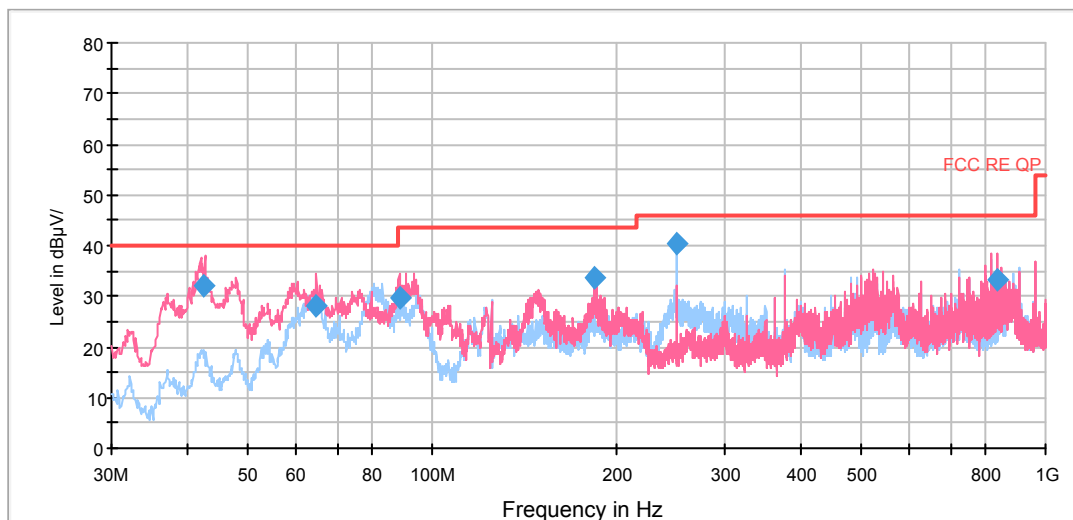
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$. $U = 3.92$ 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 0.03-1GHz QP Class B

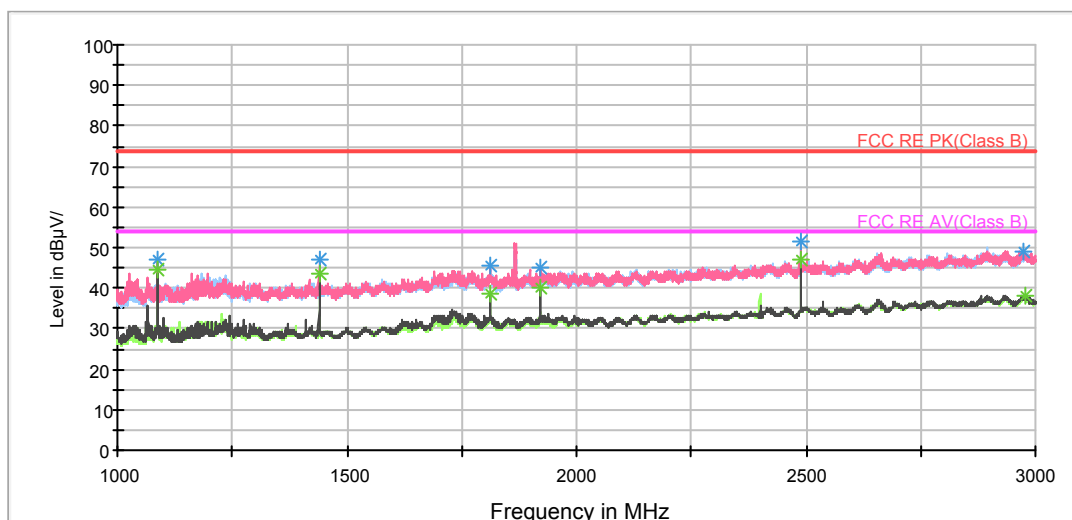


Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
42.550000	32.0	52.5	102.0	V	247.0	-20.5	8.0	40.0
64.738750	28.1	51.8	121.0	V	67.0	-23.7	11.9	40.0
88.502500	29.6	56.7	120.0	V	158.0	-27.1	13.9	43.5
184.250000	33.8	61.4	100.0	V	202.0	-27.6	9.7	43.5
250.008750	40.5	65.2	101.0	H	180.0	-24.7	5.5	46.0
837.505000	33.3	46.9	127.0	V	112.0	-13.6	12.7	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

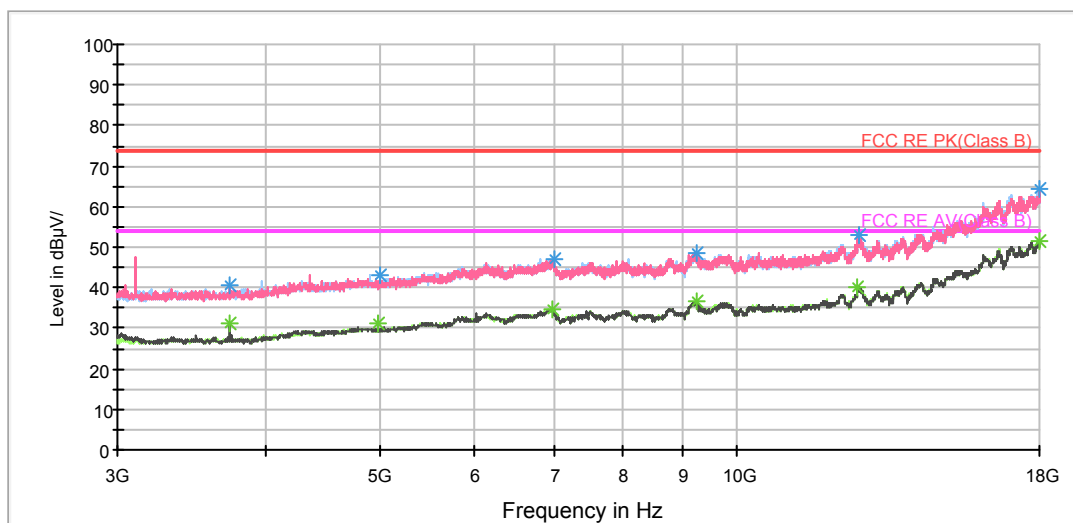


Radiated Emission from 1GHz to 3GHz

Frequency (MHz)	Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1087.500000	46.9	55.8	102.0	H	212.0	-8.9	27.1	74
1439.750000	46.8	53.7	102.0	V	298.0	-6.9	27.2	74
1812.500000	45.5	49.8	202.0	V	185.0	-4.3	28.5	74
1920.000000	45.2	49.3	302.0	V	309.0	-4.1	28.8	74
2488.250000	51.3	51.1	202.0	V	194.0	0.2	22.7	74
2971.750000	48.9	46.7	302.0	H	331.0	2.2	25.1	74

Frequency (MHz)	Average (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1087.500000	44.5	53.4	102.0	H	212.0	-8.9	9.5	54
1440.000000	43.4	50.3	102.0	V	298.0	-6.9	10.6	54
1812.500000	38.8	43.1	102.0	V	160.0	-4.3	15.2	54
1920.000000	40.2	44.3	302.0	V	309.0	-4.1	13.8	54
2488.500000	47.0	46.8	202.0	V	185.0	0.2	7.0	54
2979.750000	38.2	36.0	302.0	V	30.0	2.2	15.8	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)
3731.250000	40.6	42.3	102.0	V	154.0	-1.7	33.4	74
4995.000000	42.9	41.3	302.0	H	138.0	1.6	31.1	74
6999.375000	47.1	40.6	202.0	H	0.0	6.5	26.9	74
9234.375000	48.7	38.8	102.0	V	63.0	9.9	25.3	74
12678.750000	52.8	38.6	202.0	H	269.0	14.2	21.2	74
17998.125000	64.3	38.9	302.0	V	130.0	25.4	9.7	74

Frequency (MHz)	Average (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3731.250000	31.3	33.0	202.0	V	209.0	-1.7	22.7	54
4976.250000	31.3	29.6	202.0	V	277.0	1.7	22.7	54
6995.625000	34.7	28.2	400.0	V	0.0	6.5	19.3	54
9230.625000	36.4	26.5	400.0	H	105.0	9.9	17.6	54
12641.250000	40.3	25.8	400.0	H	15.0	14.5	13.7	54
18000.000000	51.3	25.8	202.0	V	345.0	25.5	2.7	54

3.2 Conducted Emission

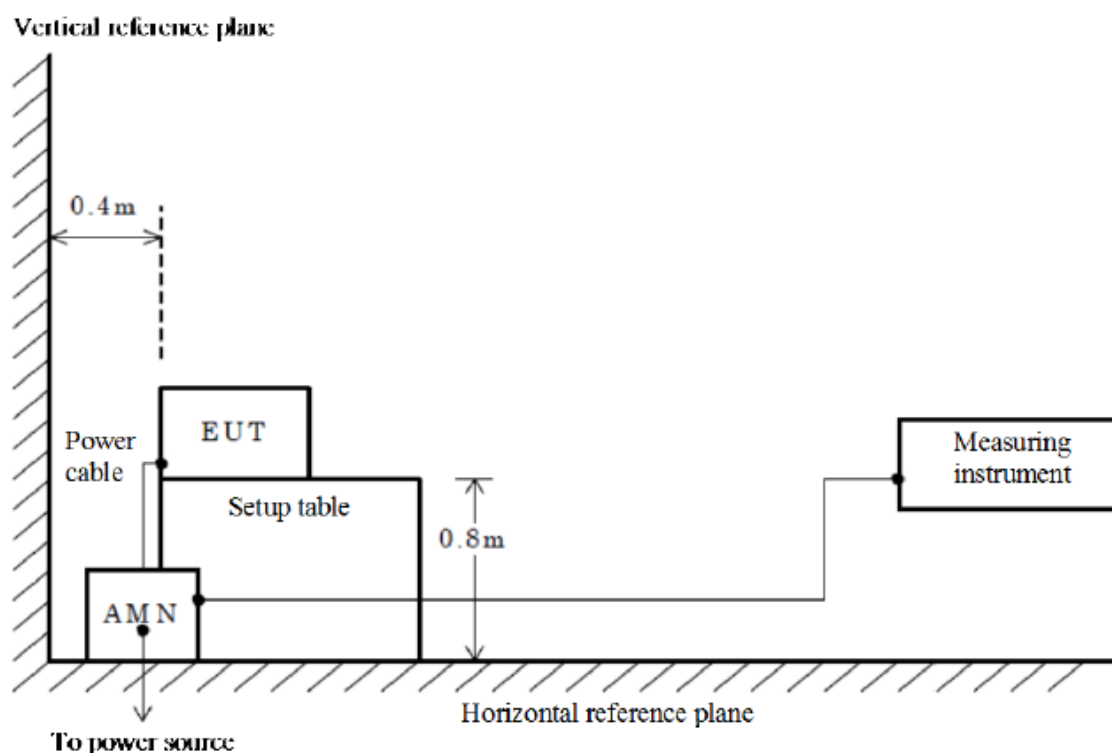
Ambient condition

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

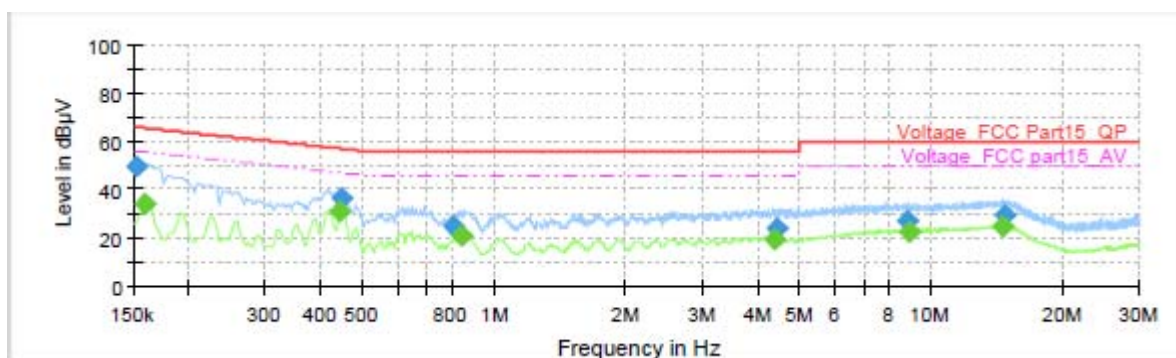
*: Decreases with the logarithm of the frequency.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$. $U = 2.69$ dB.

Test Results

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

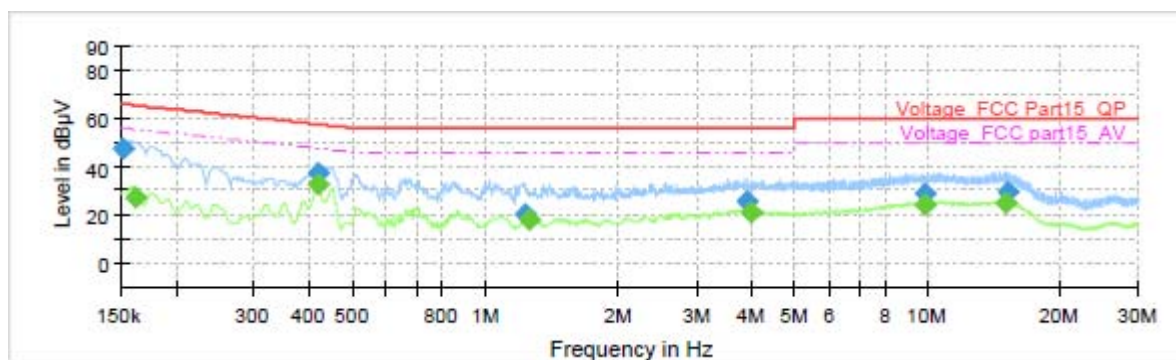


Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.152250	49.26	---	65.88	16.62	1000.0	9.000	L1	ON	19.0
0.159000	---	34.12	55.52	21.40	1000.0	9.000	L1	ON	19.1
0.444750	---	30.67	46.97	16.30	1000.0	9.000	L1	ON	19.2
0.449250	36.77	---	56.89	20.12	1000.0	9.000	L1	ON	19.2
0.802500	24.77	---	56.00	31.23	1000.0	9.000	L1	ON	19.2
0.845250	---	20.78	46.00	25.22	1000.0	9.000	L1	ON	19.2
4.373250	---	19.37	46.00	26.63	1000.0	9.000	L1	ON	19.1
4.436250	24.00	---	56.00	32.00	1000.0	9.000	L1	ON	19.1
8.864250	27.44	---	60.00	32.56	1000.0	9.000	L1	ON	19.3
8.902500	---	22.76	50.00	27.24	1000.0	9.000	L1	ON	19.3
14.619750	---	24.87	50.00	25.13	1000.0	9.000	L1	ON	19.5
14.680500	29.63	---	60.00	30.37	1000.0	9.000	L1	ON	19.5

L line

Conducted Emission from 150 KHz to 30 MHz



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.152250	47.02	---	65.88	18.85	1000.0	9.000	N	ON	19.1
0.161250	---	26.86	55.40	28.54	1000.0	9.000	N	ON	19.1
0.420000	---	32.48	47.45	14.97	1000.0	9.000	N	ON	19.2
0.420000	37.53	---	57.45	19.92	1000.0	9.000	N	ON	19.2
1.225500	20.40	---	56.00	35.60	1000.0	9.000	N	ON	19.2
1.254750	---	17.93	46.00	28.07	1000.0	9.000	N	ON	19.2
3.905250	25.75	---	56.00	30.25	1000.0	9.000	N	ON	19.0
3.968250	---	20.98	46.00	25.02	1000.0	9.000	N	ON	19.0
9.825000	28.77	---	60.00	31.23	1000.0	9.000	N	ON	19.4
9.870000	---	23.98	50.00	26.02	1000.0	9.000	N	ON	19.4
15.056250	---	24.55	50.00	25.45	1000.0	9.000	N	ON	19.5
15.132750	29.43	---	60.00	30.57	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	2016-12-16	2017-12-15
EMI Test Receiver	R&S	ESCI	100948	2017-05-20	2018-05-19
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-02-18	2019-02-17
Trilog Antenna	SCHWARZBECK	VULB 9163	9163-201	2014-12-06	2017-12-05
Horn Antenna	R&S	HF907	100126	2014-12-06	2017-12-05
Horn Antenna	ETS-Lindgren	3160-09	00102643	2015-01-30	2018-01-29
EMI Test Receiver	R&S	ESCS30	100138	2016-12-16	2017-12-15
LISN	R&S	ENV216	101171	2016-12-16	2019-12-15
Bore Sight Antenna mast	ETS	2171B	00058752	NA	NA

ANNEX A: The EUT Appearance and Test Configuration

A.1 EUT Appearance



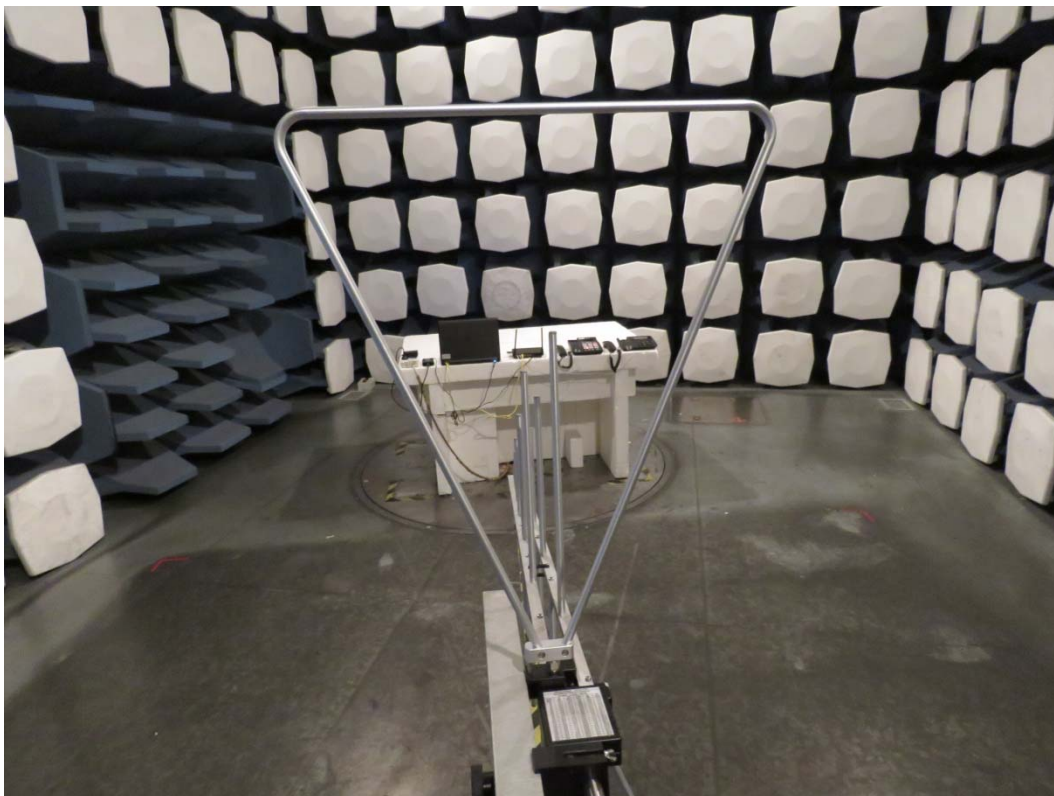
Picture 1-1: EUT



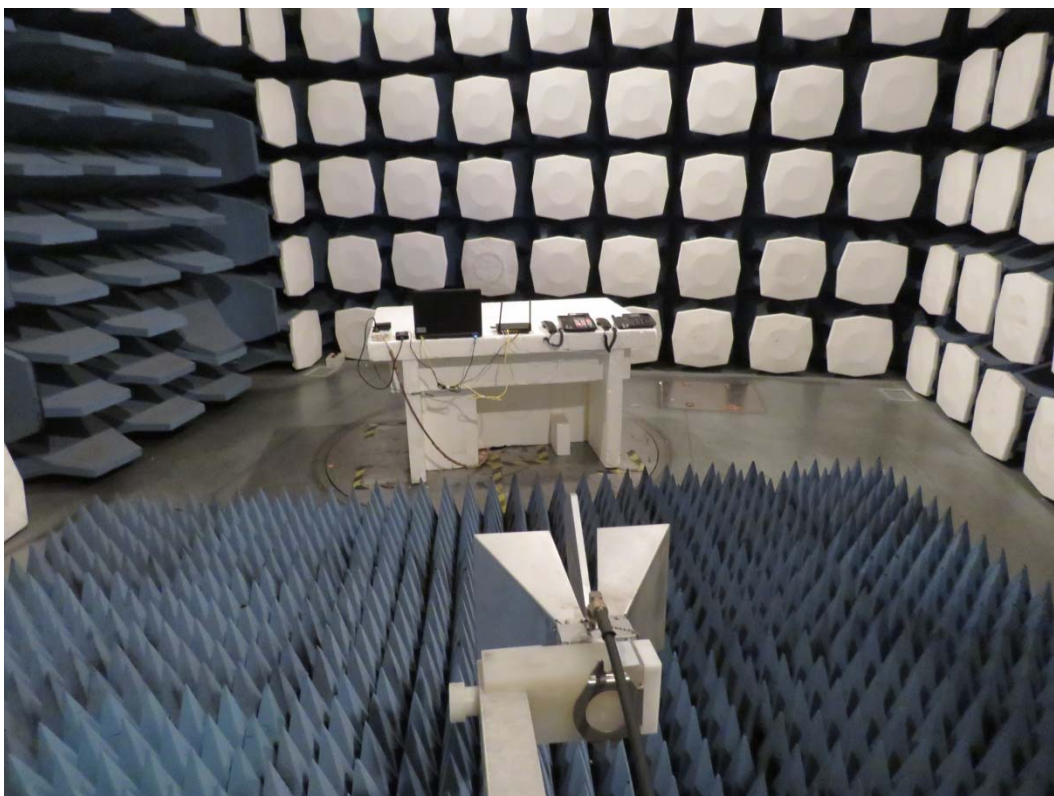
Picture 1-2: Adapter

Picture 1 EUT

A.2 Test Setup



a: Below 1GHz



b: Above 1GHz

Picture 2 Radiated Emission Test Setup



Picture 3 Conducted Emission Test Setup

A.3 Auxiliary test equipment

