EMC TEST REPORT

Applicant	Nokia Shanghai Bell Co., Ltd.
FCC ID	2ADZRXS2426GA
Product	Nokia ONT
Model	XS-2426G-A
Report No.	R2011B0188-E1
Issue Date	January 22, 2021

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2019)/ 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

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Guangchang Fan

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Summary of measurement results

Number	Test Case	Clause in FCC Rules	Conclusion
1	Radiated Emission	FCC Part15.109, ANSI C63.4-2014	PASS
2	Conducted Emission	FCC Part15.107, ANSI C63.4-2014	PASS
Date of Testing: November 6, 2020~December 9, 2020 and December 917, 2020 Date of Sample Received: November 5, 2020			
Note: All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			

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

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 measurements.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform 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
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E-mail:	fanguangchang@ta-shanghai.com

2 General Description of Equipment under Test

2.1 Applicant and Manufacturer Information

Applicant	Nokia Shanghai Bell Co., Ltd.
Applicant address	No. 388, Ningqiao Rd. Pilot Free Trade Zone, Shanghai, China
Manufacturer	T&W
Manufacturer address	89# Jiang Nan Road, Loudong Street,Taicang , Shanghai, China

2.2 General information

EUT Description			
Device Type:	Movable Device		
Model:	XS-2426G-A		
SN:	1#		
HW Version:	PEM2		
SW Version:	FJH.L48p139		
Antenna Type:	Internal Antenna		
Frequency:	Band	Tx (MHz)	Rx (MHz)
	WIFI 2.4G:	2400 ~ 2483.5	2400 ~ 2483.5
	WIFI 5G(U-NII-1):	5150 ~ 5250	5150 ~ 5250
	WIFI 5G(U-NII-2A):	5250 ~ 5350	5250 ~ 5350
	WIFI 5G(U-NII-2C):	5470 ~ 5725	5470 ~ 5725
	WIFI 5G(U-NII-3):	5725 ~ 5850	5725 ~ 5850
Modulation:	WLAN 802.11b: DSSS WLAN 802.11a/g/n/ac: OFDM WLAN 802.11ax: OFDMA		
EUT Accessory			
Adapter 1	Manufacturer: Dongguan Shilong Fuhua Electronic Co., Ltd. Model: UES36WU-120300SPA		
Adapter 2	Manufacturer: ShenZhen SOY Technology Co.,Ltd Model: SOY-1200300US-050		
Antenna Type #1	Antenna 1:RFDPA051106IM5B9C4 Antenna 2:RFDPA051118IM5B9C2 Antenna 3:RFPCA400814IMAB9C1 Antenna 4:RFPCA400822IMAB9C1		
Antenna Type #2	Antenna 1: 6011F00211		

	Antenna 2: 6011F00212 Antenna 3: 6011F00209 Antenna 4: 6011F00210
Note:1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant. 2. There are more than one Adapter, each one should be applied throughout the compliance test respectively, however, only the worst case will be recorded in this report.	

Information of Configuration:

No.	Name	Model/Code No.	Edition	Serial No. or Quantity
1	EMA-XS-2426G-A	3FE49348AA	PEM2	PEM
2	Power adapter	FUHUA: UES36WU-120300SPA	A/0	--
3	Power adapter	SOY: SOY-1200300US-050	A/0	--

ONT Mnemonic	Kit Code	EMA Code	Part Description	Power Adaptor and UPS
XS-2426G-A	3FE49351AA	3FE49348AA	XS-2426G-A, XGS-PON ONT, 2 POTS, 4xGE, 2x2 11n + 2x2 11ax.1 USB 3.0, US	FUHUA:UES36WU-12030 SPA SOY:SOY-1200300US-050

Auxiliary equipment details:

No.	Name	Brand name	Model	NSB code	Valid Until
1	Test Center	Spirent	DE48E0	DC2228	No Cal. Required
2	PC	Lenovo	T61	7661MC4L3KW965	No Cal. Required
3	PC	Lenovo	T61	7661MC4L3KW959	No Cal. Required
4	OLT	NOKIA	7360	N.A	No Cal. Required

Information of Ports:

No.	Port name	Number	Shielded or unshielded	Cable type (optic, twisted pair, etc.)	Max. Cable length
1	AC port	1	Unshielded	--	--
2	GE	4	Unshielded	--	--
3	USB	1	shielded	--	--
4	POTS	2	Unshielded	--	--

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 (2019)
ANSI C63.4 (2014)

3 Test Case Results

3.1 Radiated Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C~26°C	45%~50%	101.5kPa

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:

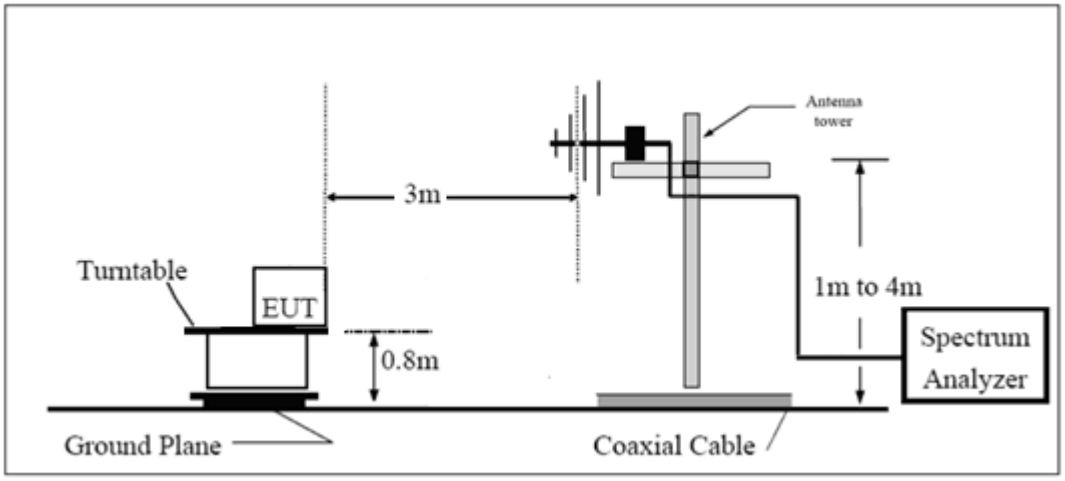
Below 1GHz:
RBW=100 kHz / VBW=300 kHz / Sweep=AUTO
Above 1GHz:

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

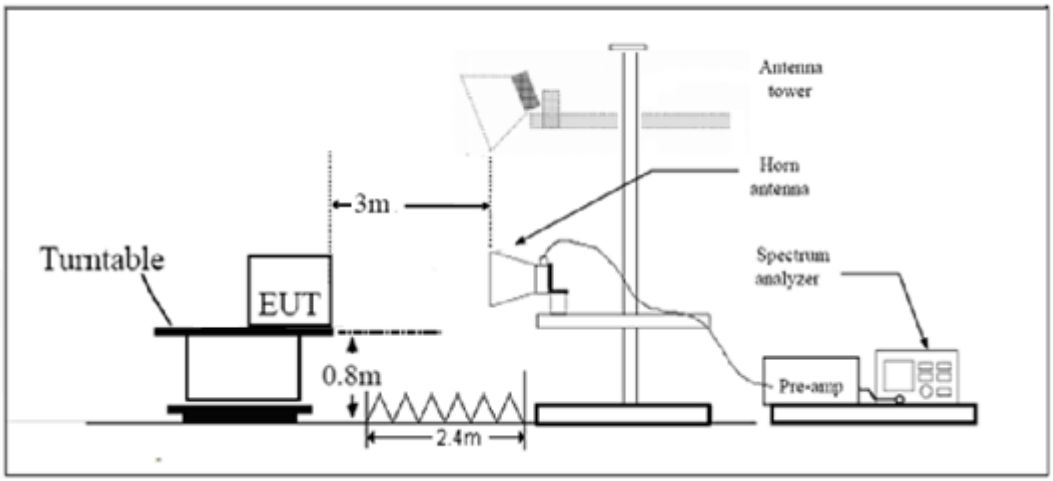
The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

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

Class B

Frequency (MHz)	Field Strength (dBμV/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
1000-5th 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.

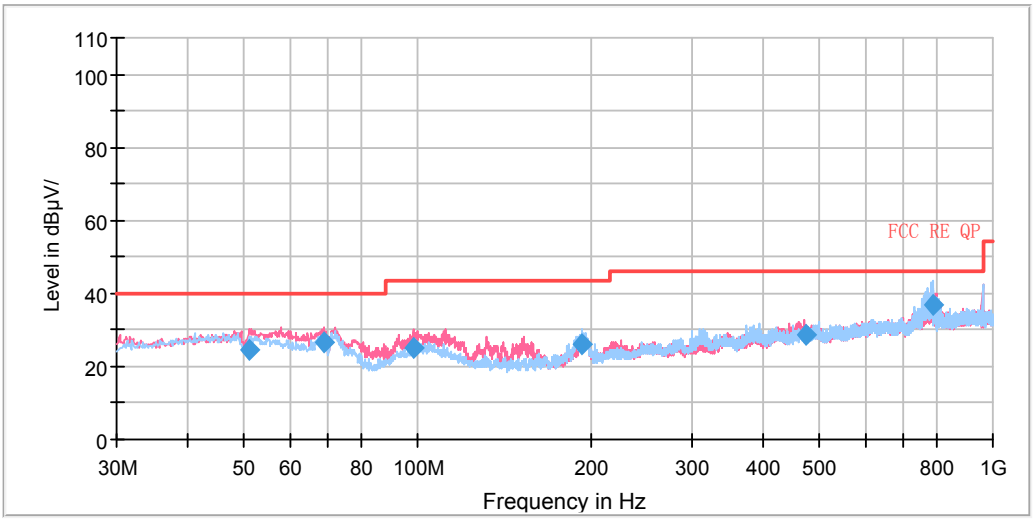
Frequency	Uncertainty
30MHz~200MHz	4.17 dB
200MHz~1000MHz	4.84 dB
1GHz~18GHz	4.35 dB
18GHz~26.5GHz	5.90 dB
26.5GHz~40GHz	5.92 dB

Test Results

Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier, the Emissions in the frequency band 18GHz –40GHz is more than 20dB below the limit are not reported.

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.

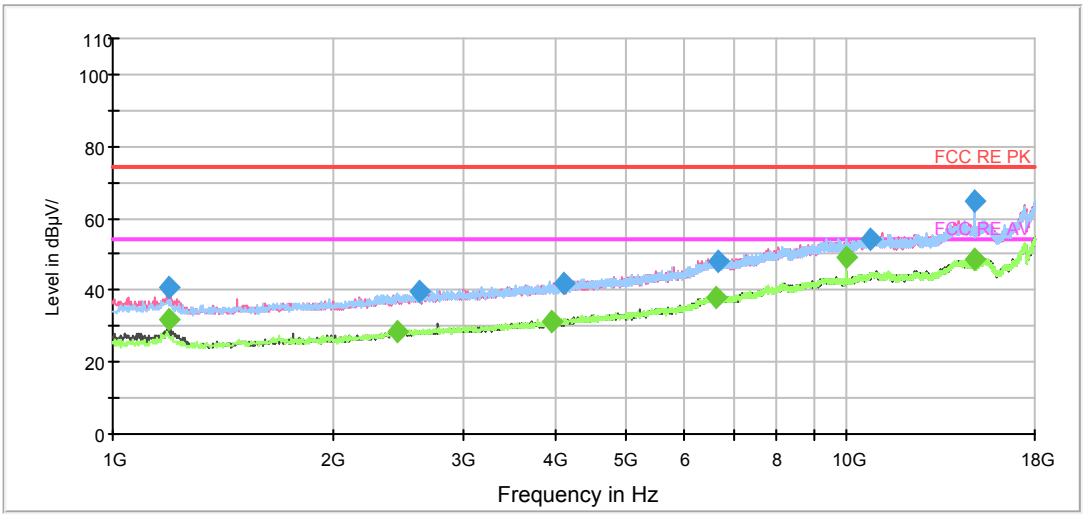
Antenna Type #1
Adapter 2:



Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
51.016250	24.79	100.0	V	2.0	-1.0	15.21	40.00
68.560000	26.47	100.0	V	76.0	-6.0	13.53	40.00
98.742500	25.01	100.0	V	241.0	-5.2	18.49	43.50
192.998750	26.23	100.0	H	124.0	-6.2	17.27	43.50
471.830000	28.45	100.0	V	184.0	-1.1	17.55	46.00
787.161250	36.74	100.0	H	155.0	3.4	9.26	46.00

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

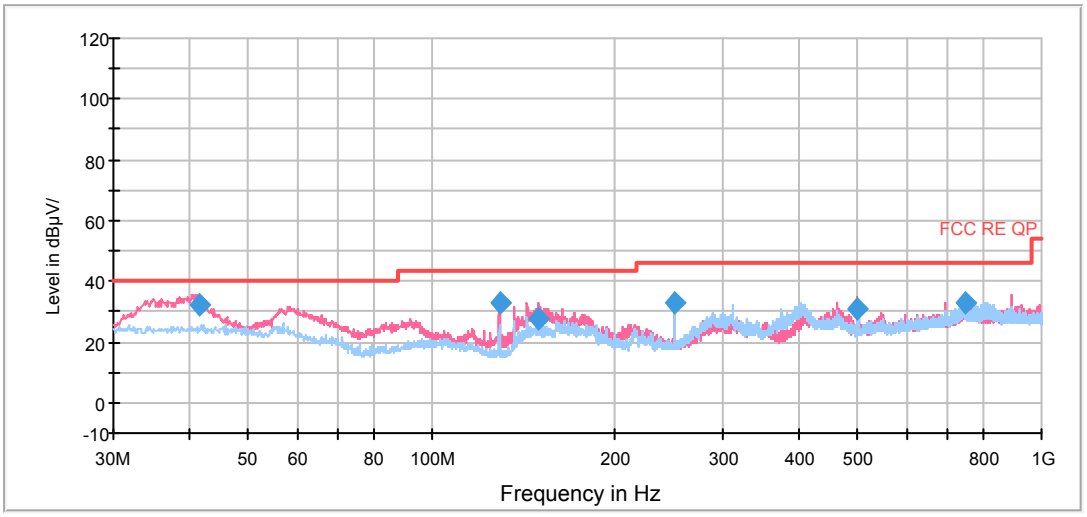


Radiated Emission from 1GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1193.361250	40.9	100.0	V	170.0	-11.2	33.1	74.0
2607.456875	39.7	100.0	H	14.0	-6.2	34.3	74.0
4119.525000	41.9	400.0	V	148.0	-2.3	32.1	74.0
6663.115000	48.0	100.0	V	267.0	5.0	26.0	74.0
10734.483750	54.0	200.0	H	47.0	13.3	20.0	74.0
14929.759375	64.7	100.0	H	234.0	15.8	9.3	74.0

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1190.940000	32.0	100.0	V	157.0	-11.2	22.0	54.0
2439.188125	28.4	100.0	H	351.0	-6.6	25.6	54.0
3952.689375	31.4	100.0	H	125.0	-2.9	22.6	54.0
6637.615000	38.2	400.0	V	148.0	5.0	15.8	54.0
9953.225000	48.9	100.0	V	315.0	12.0	5.1	54.0
14929.935625	48.8	100.0	H	234.0	15.8	5.2	54.0

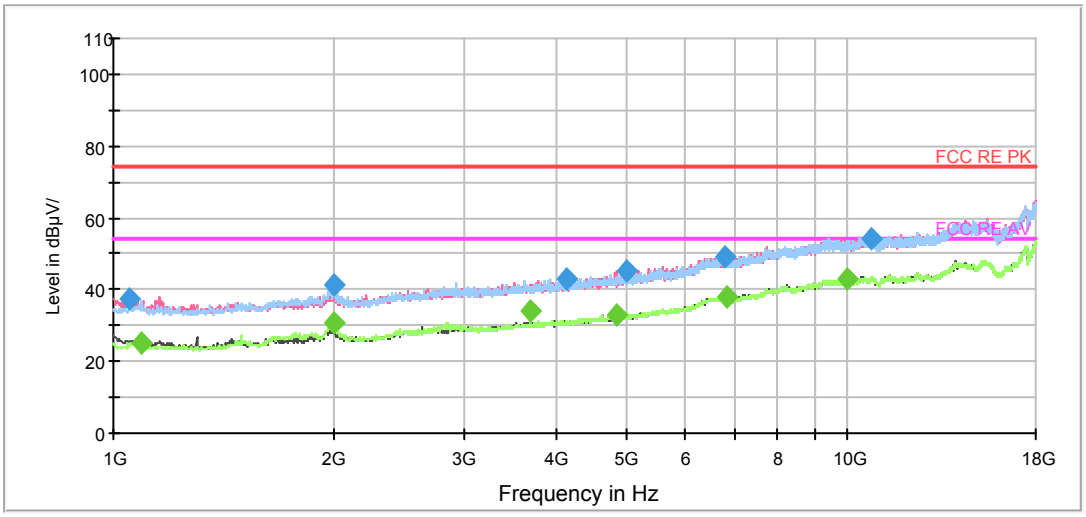
Antenna Type #2
Adapter 1:



Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
41.432500	32.1	100.0	V	253.0	-13.0	7.9	40.0
128.980000	32.7	100.0	V	282.0	-20.3	10.8	43.5
148.868750	27.9	100.0	V	65.0	-21.3	15.6	43.5
249.987500	33.0	100.0	V	327.0	-17.3	13.0	46.0
497.256250	31.0	100.0	V	353.0	-11.9	15.0	46.0
749.982500	33.0	114.0	V	87.0	-7.3	13.0	46.0

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



Radiated Emission from 1GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1051.692500	37.4	200.0	V	12.0	-11.6	36.6	74.0
1996.688750	41.5	100.0	H	107.0	-8.9	32.5	74.0
4137.125000	43.2	200.0	V	0.0	-2.3	30.8	74.0
4984.560000	45.0	100.0	H	98.0	-0.5	29.0	74.0
6787.811250	49.0	100.0	H	25.0	5.1	25.0	74.0
10785.485000	54.4	100.0	V	0.0	13.4	19.6	74.0

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1089.132500	25.1	100.0	V	359.0	-11.4	19.9	54.0
2001.422500	30.8	100.0	H	107.0	-8.9	13.2	54.0
3699.995000	34.3	100.0	H	19.0	-3.5	19.7	54.0
4849.441250	32.8	100.0	V	59.0	-0.6	21.2	54.0
6861.091250	37.8	200.0	H	0.0	5.0	16.2	54.0
9953.675000	43.0	100.0	V	0.0	12.0	11.0	54.0

3.2 Conducted Emission

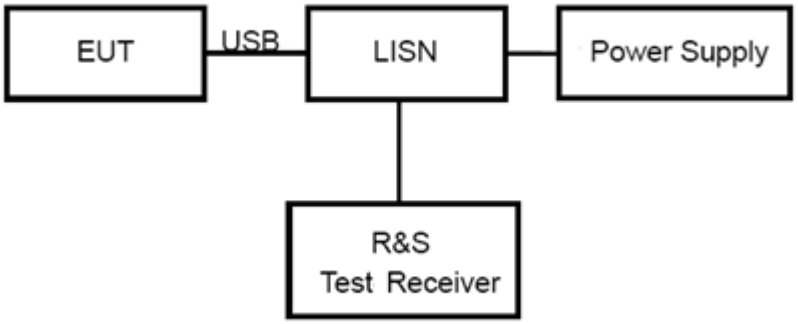
Ambient condition

Temperature	Relative humidity	Pressure
23°C~26°C	45%~50%	101.5kPa

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

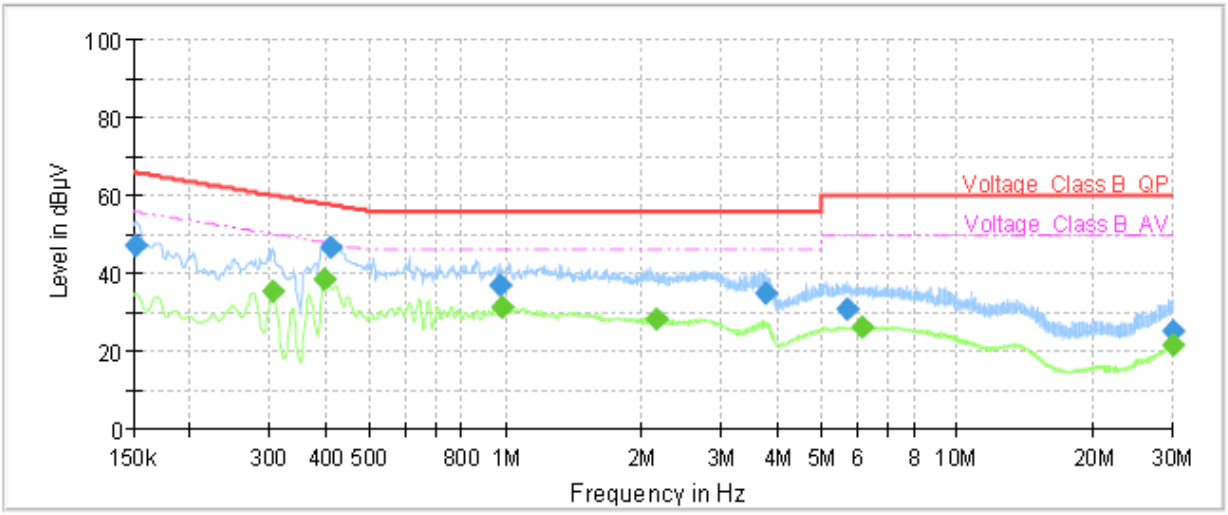
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor *k* = 1.96. U= 2.57 dB.

Test Results

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

Antenna Type #1

Adapter 1:

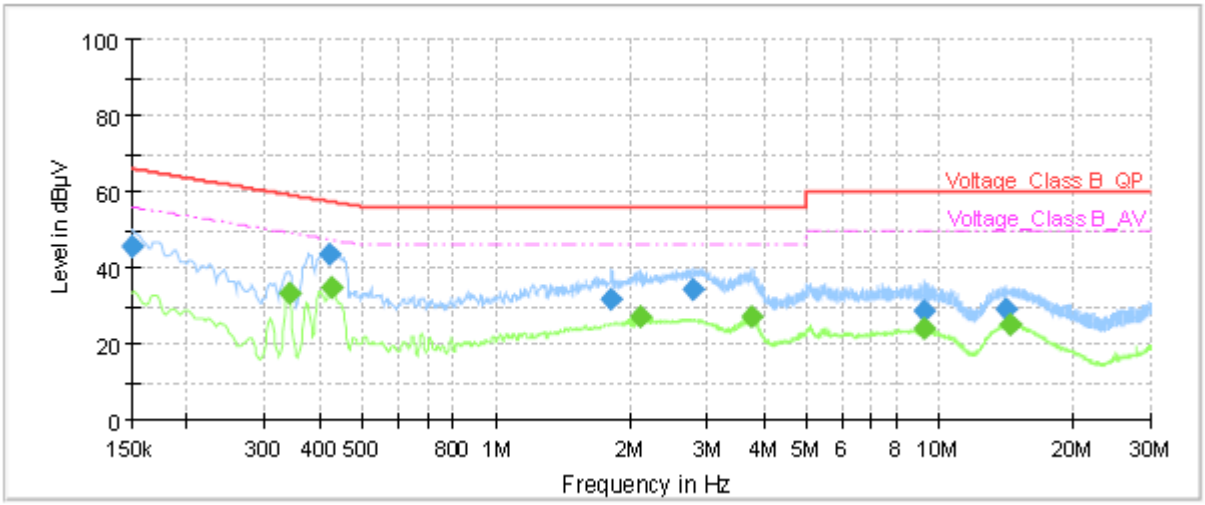


Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.15	46.95	---	65.88	18.93	1000.0	9.000	L1	ON	19
0.31	---	35.58	50.10	14.52	1000.0	9.000	L1	ON	19
0.40	---	38.44	47.91	9.47	1000.0	9.000	L1	ON	19
0.41	46.90	---	57.63	10.73	1000.0	9.000	L1	ON	19
0.97	36.71	---	56.00	19.29	1000.0	9.000	L1	ON	19
0.98	---	31.28	46.00	14.72	1000.0	9.000	L1	ON	19
2.15	---	28.38	46.00	17.62	1000.0	9.000	L1	ON	19
3.75	34.90	---	56.00	21.10	1000.0	9.000	L1	ON	19
5.72	31.01	---	60.00	28.99	1000.0	9.000	L1	ON	19
6.17	---	26.08	50.00	23.92	1000.0	9.000	L1	ON	19
29.97	25.10	---	60.00	34.90	1000.0	9.000	L1	ON	20
29.98	---	21.58	50.00	28.42	1000.0	9.000	L1	ON	20

Remark: Correct factor=cable loss + LISN factor

L line

Conducted Emission from 150 KHz to 30 MHz



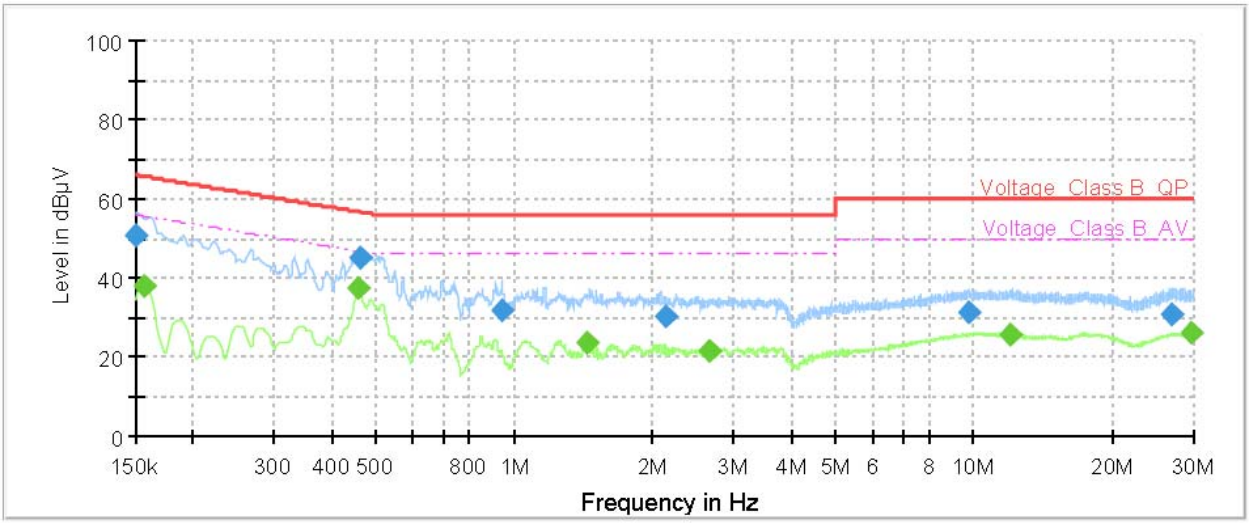
Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.15	45.66	---	66.00	20.34	1000.0	9.000	N	ON	19
0.34	---	33.09	49.23	16.14	1000.0	9.000	N	ON	19
0.42	43.42	---	57.45	14.03	1000.0	9.000	N	ON	19
0.42	---	34.96	47.40	12.45	1000.0	9.000	N	ON	19
1.82	31.58	---	56.00	24.42	1000.0	9.000	N	ON	19
2.12	---	27.40	46.00	18.60	1000.0	9.000	N	ON	19
2.77	34.27	---	56.00	21.73	1000.0	9.000	N	ON	19
3.75	---	27.41	46.00	18.59	1000.0	9.000	N	ON	19
9.26	---	24.03	50.00	25.97	1000.0	9.000	N	ON	19
9.26	28.64	---	60.00	31.36	1000.0	9.000	N	ON	19
14.14	29.25	---	60.00	30.75	1000.0	9.000	N	ON	19
14.43	---	25.09	50.00	24.91	1000.0	9.000	N	ON	19

Remark: Correct factor=cable loss + LISN factor

N line

Conducted Emission from 150 KHz to 30 MHz

Adapter 2:

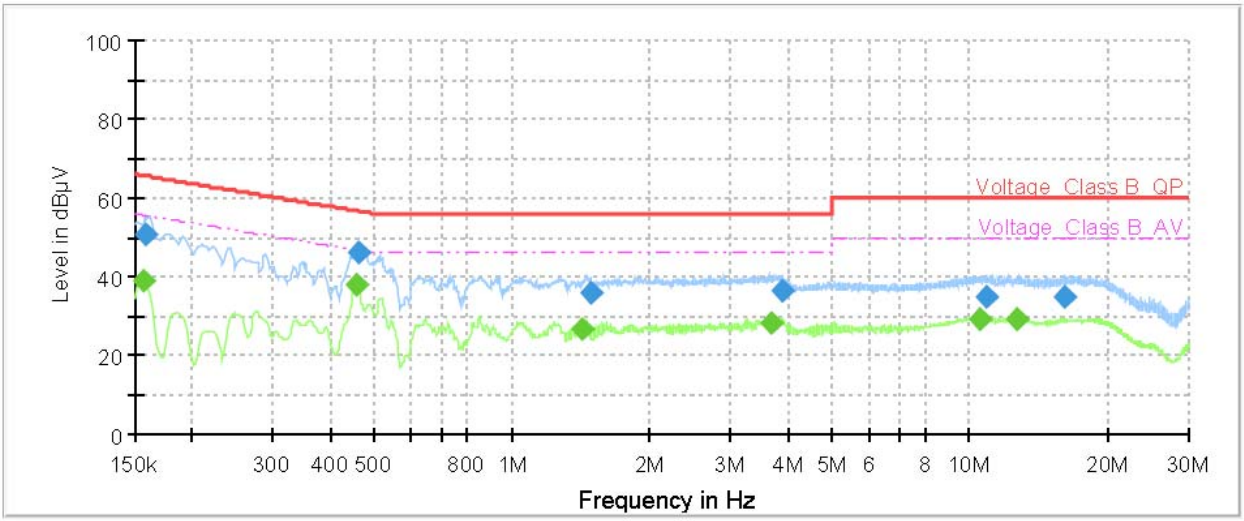


Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.15	50.85	---	66.00	15.15	1000.0	9.000	L1	ON	19
0.16	---	37.82	55.63	17.81	1000.0	9.000	L1	ON	19
0.46	---	37.53	46.72	9.19	1000.0	9.000	L1	ON	19
0.46	44.98	---	56.64	11.66	1000.0	9.000	L1	ON	19
0.94	32.04	---	56.00	23.96	1000.0	9.000	L1	ON	19
1.45	---	23.39	46.00	22.61	1000.0	9.000	L1	ON	19
2.13	30.36	---	56.00	25.64	1000.0	9.000	L1	ON	19
2.65	---	21.65	46.00	24.35	1000.0	9.000	L1	ON	19
9.75	31.08	---	60.00	28.92	1000.0	9.000	L1	ON	19
12.02	---	25.84	50.00	24.16	1000.0	9.000	L1	ON	19
26.87	31.02	---	60.00	28.98	1000.0	9.000	L1	ON	20
29.80	---	26.00	50.00	24.00	1000.0	9.000	L1	ON	20

Remark: Correct factor=cable loss + LISN factor

L line

Conducted Emission from 150 KHz to 30 MHz



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.16	---	38.96	55.63	16.67	1000.0	9.000	N	ON	19
0.16	50.75	---	65.52	14.77	1000.0	9.000	N	ON	19
0.46	---	37.71	46.77	9.06	1000.0	9.000	N	ON	19
0.46	46.16	---	56.64	10.48	1000.0	9.000	N	ON	19
1.42	---	26.86	46.00	19.14	1000.0	9.000	N	ON	19
1.48	35.79	---	56.00	20.21	1000.0	9.000	N	ON	19
3.68	---	28.37	46.00	17.63	1000.0	9.000	N	ON	19
3.87	36.28	---	56.00	19.72	1000.0	9.000	N	ON	19
10.46	---	29.48	50.00	20.52	1000.0	9.000	N	ON	19
10.86	35.13	---	60.00	24.87	1000.0	9.000	N	ON	19
12.69	---	29.25	50.00	20.75	1000.0	9.000	N	ON	19
16.03	34.81	---	60.00	25.19	1000.0	9.000	N	ON	19

Remark: Correct factor=cable loss + LISN factor

N line

Conducted Emission from 150 KHz to 30 MHz

4 Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
Spectrum Analyzer	R&S	FSV40	15195-01-00	2020-05-17	2021-05-16
EMI Test Receiver	R&S	ESCI	100948	2020-05-17	2021-05-16
Trilog Antenna	SCHWARZBECK	VULB 9163	391	2019-12-16	2021-12-15
Horn Antenna	R&S	HF907	102723	2018-08-11	2021-08-10
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2021-06-19
Standard Gain Horn	STEATITE	QSH-SL-26-40-K-15	16779	2019-12-24	2021-12-23
EMI Test Receiver	R&S	ESR	101667	2020-05-17	2021-05-16
LISN	R&S	ENV216	101171	2018-12-15	2021-12-14
Bore Sight Antenna mast	ETS	2171B	00058752	/	/
Test software	EMC32	R&S	9.26.0	/	/

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

ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.

ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.