



EMC TEST REPORT

Applicant Nokia ShangHai Bell Co., Ltd.
FCC ID 2ADZRXS2426GB
Product Nokia ONT
Brand Nokia
Model XS-2426G-B
Report No. R2109A0800-E1V1
Issue Date December 17, 2021

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2020)/ 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.

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Version	Revision description	Issue Date
Rev.0	Initial issue of report.	September 30, 2021
Rev.1	Update Applicant address	December 17, 2021
Note: This revised report (Report No. R2109A0800-E1V1) supersedes and replaces the previously issued report (Report No. R2109A0800-E1). Please discard or destroy the previously issued report and dispose of it accordingly.		

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: August 24, 2021 ~ August 25, 2021			
Date of Sample Received: August 24, 2021			
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 201206
Manufacturer	CIG SHANGHAI CO., LTD.
Manufacturer address	5F, BUILDING 8, 2388 CHENHANG ROAD, MINHANG DISTRICT, SHANGHAI

2.2 General information

EUT Description			
Device Type	Movable Device		
Model	XS-2426G-B		
Lab internal SN:	R2109A0800/S01		
HW Version	3FE49546AB		
SW Version	3FE49544FJIL98		
Power Rating	DC 12V from Adapter.		
Connecting I/O Port(s)	Please refer to the User's Manual.		
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
EUT Accessory			
Adapter 1	Manufacturer: Dongguan Shilong Fuhua Electronic Co., Ltd. Model: UES36WU-120300SPA Input: 100-240V, 1A Output: 12.0V $\overline{\text{---}}$ 3.0A		
Adapter 2	Manufacturer: Honor Device Co., Ltd. Model: ADS-40FKJ-12 12036EPCU Input: 100-240V, 1A Output: 12.0V $\overline{\text{---}}$ 3.0A		

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 (Adapter 1) will be recorded in this report.

Information of Configuration:

No.	Name	Model/Code No.	Edition	Serial No. or Quantity
1	EMA-XS-2426G-B	3FE49546AB	PEM2	PEM 1
4	Power adapter	UES36WU-120300SPA	A/0	UE191205GWZF2RI 1
5	Power adapter	ADS-40FKJ-12 12036EPCU	A/0	9040108111201202R 1

ONT Mnemonic	Kit Code	EMA Code	Part Description	Power Adapter	
XS-2426G-B	3FE49542A B	3FE49546A B	XS-2426G-B,US Plug,XGS PON,2xPOTS, 3xGE+1x2,5GE,4 x4 + 4x4 11ax,1xUSB3.0	UES36WU-120300S PA	ADS-40FKJ-12 12036EPCU

Auxiliary equipment details

No.	Name	Brand name	Model	ASB code	Valid Until
1	BIGTAO	Xinertel	N.A	-	No Cal. Required
2	MiniOLT	Nokia	N.A	-	No Cal. Required
3	PC	HP	N.A	-	No Cal. Required
4	PC	Thinkpad	N.A	-	No Cal. Required
5	PC	Thinkpad	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	3	Unshielded	/	/
3	2.5GE	1	Unshielded	/	/
4	POTS	2	Unshielded	/	/
5	USB	1	shielded	/	/

2.3 Applied Standards

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

Test standards

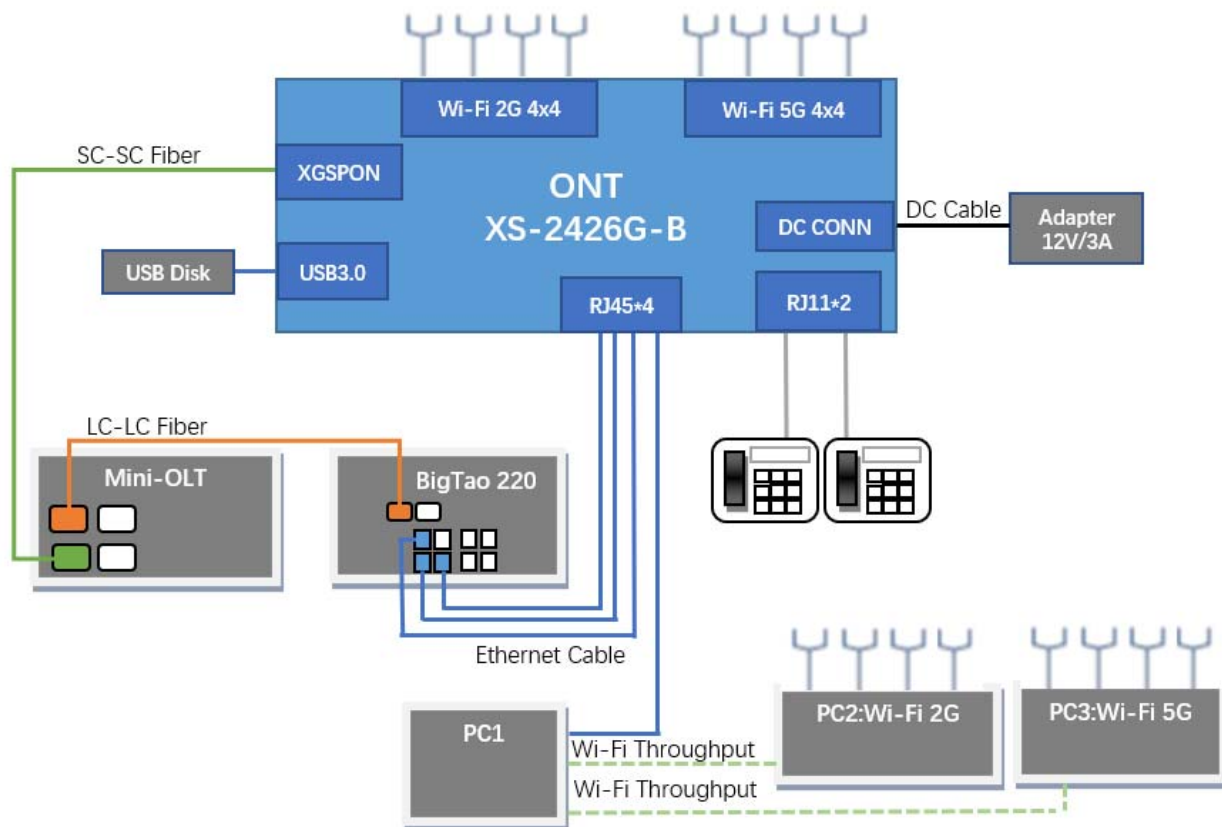
FCC Code CFR47 Part15B (2020)

ANSI C63.4 (2014)

2.4 Test Mode

Description: The XS-2426G-B is a XGSPON ONT which has 3 GE LAN ports, 1 2.5GE LAN port, 1 USB port and 2POTS ports. It support 2.4G&5G wi-fi.

The basic functional test in normal room conditions consists of the traffic test and POTs connection test. XS-2426G-B runs 5 traffics on each line with BIGTAO, the each upstream of 3 GE is 900Mbps, and downstream is 900Mbps.the upstream of 2.5GE is 2G Mbps, and downstream is 2G Mbps. Frame loss ratio less than $10e-7$. The POTs keep connecting though OFLT program.The WIFI keep connecting.



3 Test Case Results

3.1 Radiated Emission

Ambient condition

Temperature	Relative humidity	Pressure
15°C~35°C	30%~60%	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:

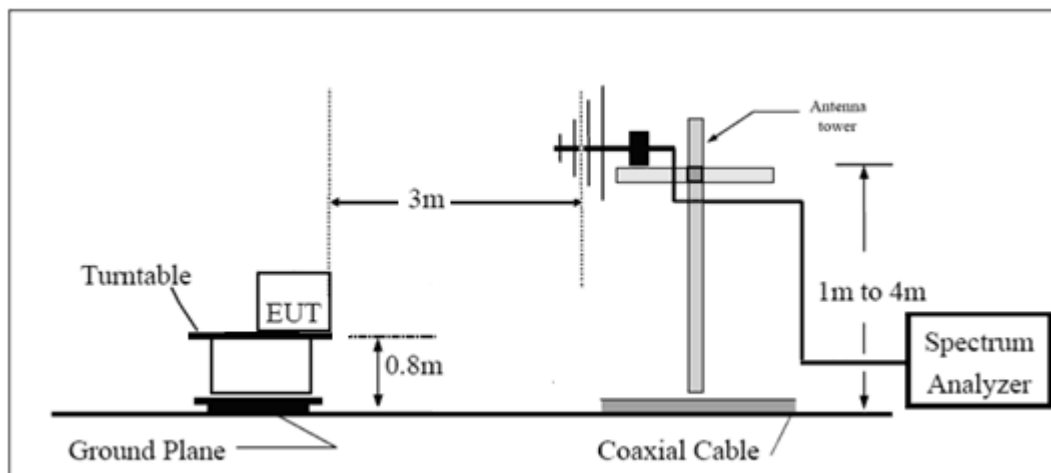
(a) PEAK Detector: RBW=1MHz / VBW=3MHz/ Sweep=AUTO

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

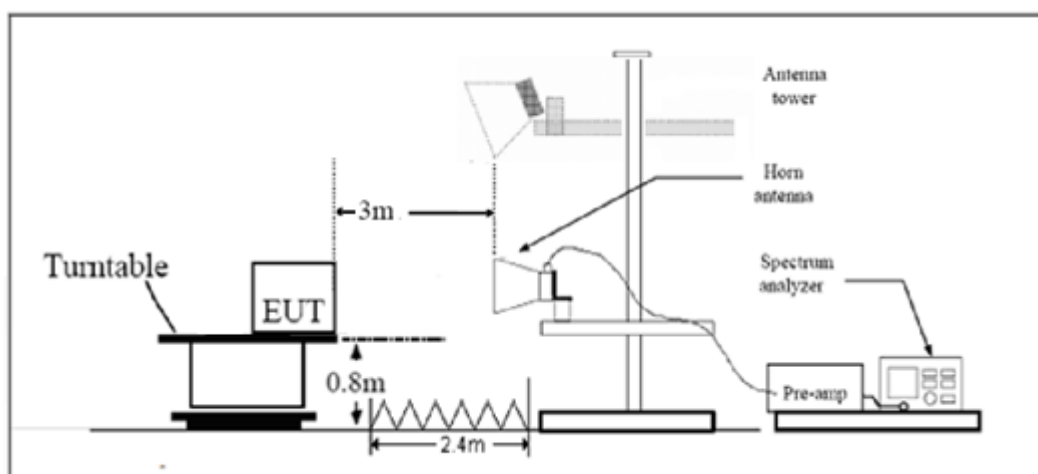
The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

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 (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 $k = 1.96$.

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

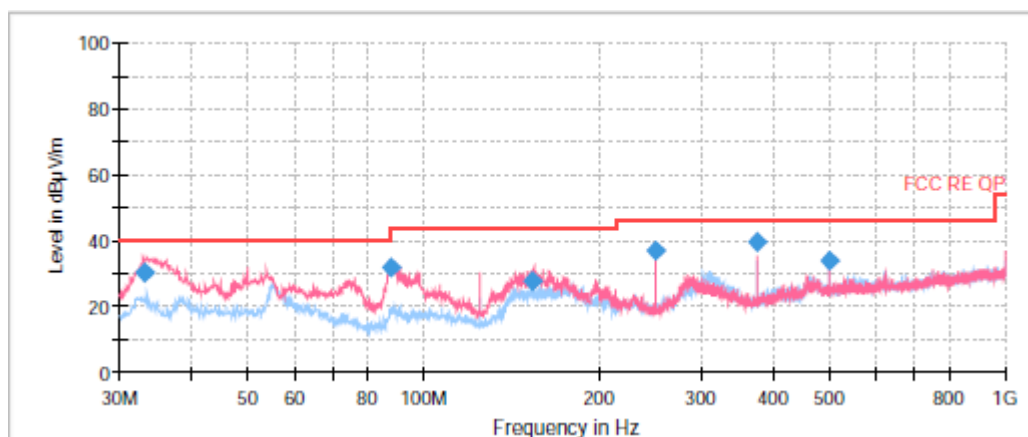
Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier, the Emissions in the frequency band 18GHz –40GHz is more than 20dB below the limit are not reported.

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.

A font (Level in dB μ V/)in the test plot =(level in dB μ V/m)

Adapter 1: UES36WU-120300SPA

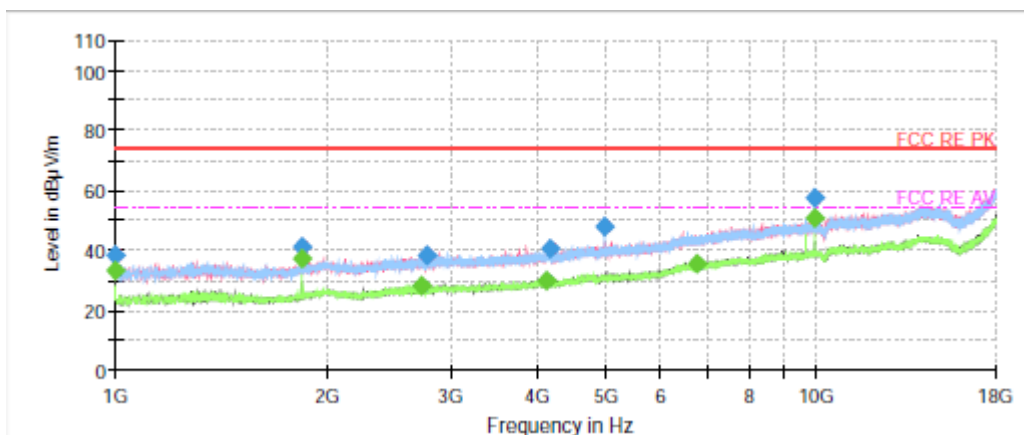


Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
33.236250	30.18	125.0	V	171.0	12.4	9.82	40.00
87.915000	31.82	125.0	V	60.0	10.4	8.18	40.00
154.403750	27.78	100.0	V	260.0	9.2	15.72	43.50
249.987500	36.98	202.0	H	160.0	13.8	9.02	46.00
374.996250	39.63	125.0	V	186.0	16.8	6.37	46.00
500.005000	34.06	100.0	V	123.0	19.6	11.94	46.00

Remark: 1. Correction Factor = Antenna factor + Insertion loss(cable loss+amplifier gain)

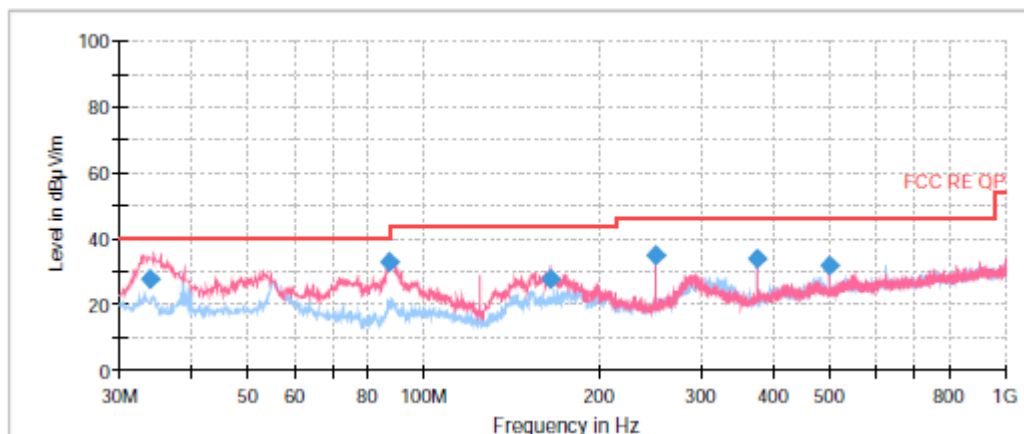
2. Margin = Limit – Quasi-Peak



Radiated Emission from 1GHz to 18GHz

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1000.055833	---	33.30	54.00	20.70	100.0	V	199.0	-21.4
1000.205500	38.24	---	74.00	35.76	100.0	V	199.0	-21.4
1849.948000	41.14	---	74.00	32.86	100.0	H	202.0	-18.6
1849.969333	---	37.46	54.00	16.54	100.0	H	202.0	-18.6
2735.639000	---	28.44	54.00	25.56	300.0	V	4.0	-16.1
2780.769667	38.56	---	74.00	35.44	200.0	V	0.0	-16.1
4111.185667	---	30.02	54.00	23.98	200.0	V	160.0	-12.6
4159.401666	40.46	---	74.00	33.54	100.0	V	21.0	-12.4
4976.638334	47.76	---	74.00	26.24	200.0	H	301.0	-9.8
6735.583333	---	35.64	54.00	18.36	100.0	H	161.0	-3.5
9953.297666	---	50.73	54.00	3.27	200.0	H	4.0	-1.2
9953.370666	57.78	---	74.00	16.22	200.0	H	4.0	-1.2

Adapter 2: ADS-40FKJ-12 12036EPCU

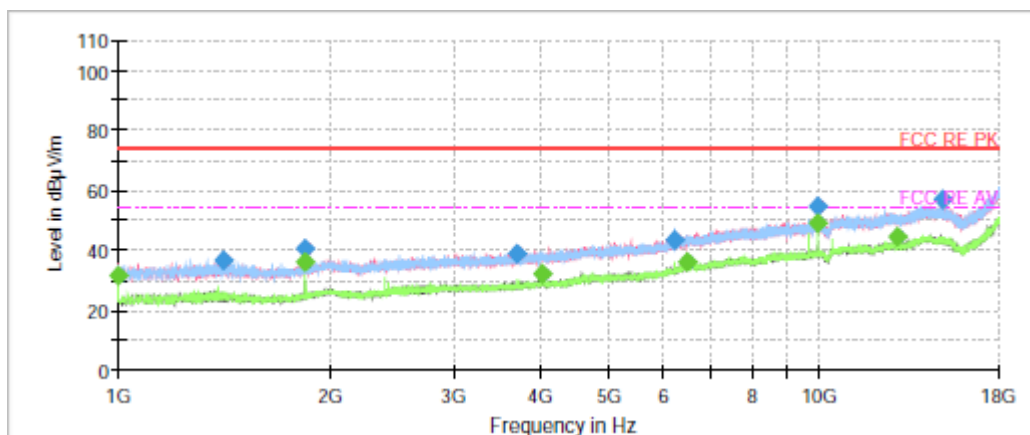


Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
33.926250	27.62	125.0	V	136.0	12.6	12.38	40.00
87.631250	33.03	125.0	V	101.0	10.3	6.97	40.00
165.355000	27.83	105.0	V	157.0	9.9	15.67	43.50
249.987500	34.99	100.0	V	147.0	13.8	11.01	46.00
374.996250	33.93	125.0	V	180.0	16.8	12.07	46.00
500.006250	32.02	186.0	H	66.0	19.6	13.98	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)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1000.030500	---	31.55	54.00	22.45	100.0	V	66.0	-21.4
1413.820666	36.50	---	74.00	37.50	100.0	H	349.0	-19.2
1850.019333	---	36.38	54.00	17.62	100.0	H	0.0	-18.6
1850.090666	40.67	---	74.00	33.33	100.0	H	0.0	-18.6
3706.791667	39.16	---	74.00	34.84	100.0	H	349.0	-14.2
4028.596666	---	32.42	54.00	21.58	100.0	V	155.0	-12.9
6220.704000	43.56	---	74.00	30.44	200.0	H	99.0	-5.6
6471.532333	---	36.04	54.00	17.96	100.0	V	66.0	-4.3
9953.183333	---	49.32	54.00	4.68	200.0	H	349.0	-1.2
9953.538666	54.82	---	74.00	19.18	200.0	H	349.0	-1.2
12864.099333	---	44.59	54.00	9.41	100.0	H	358.0	2.4
14929.555333	57.07	---	74.00	16.93	100.0	H	331.0	4.7

3.2 Conducted Emission

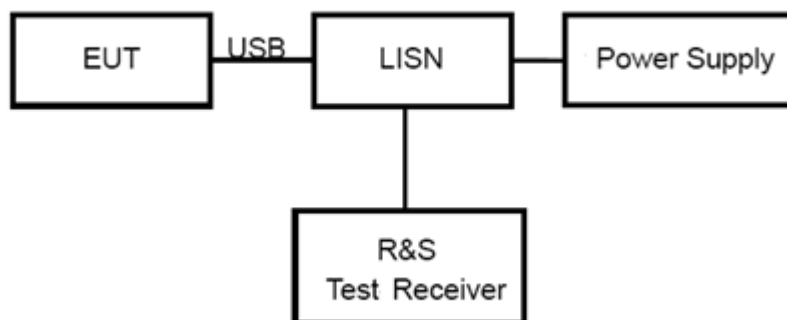
Ambient condition

Temperature	Relative humidity	Pressure
15°C~35°C	30%~60%	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.		

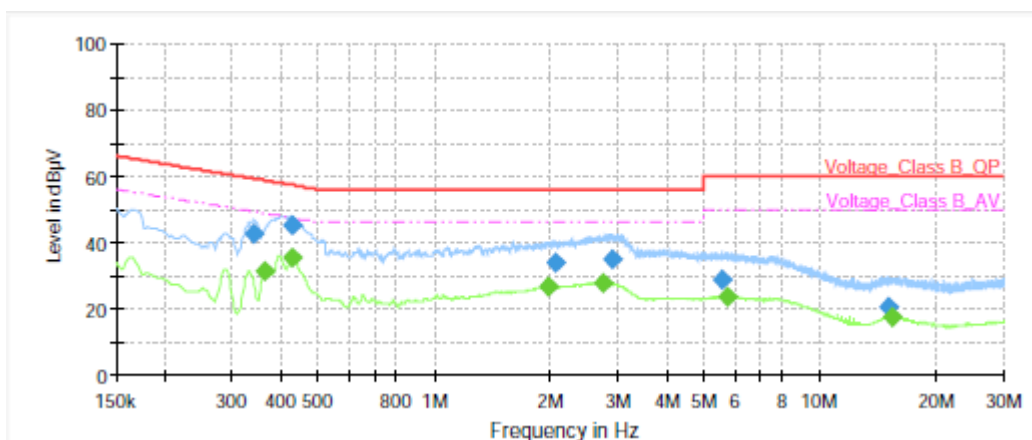
Measurement Uncertainty

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.

Adapter 1: UES36WU-120300SPA

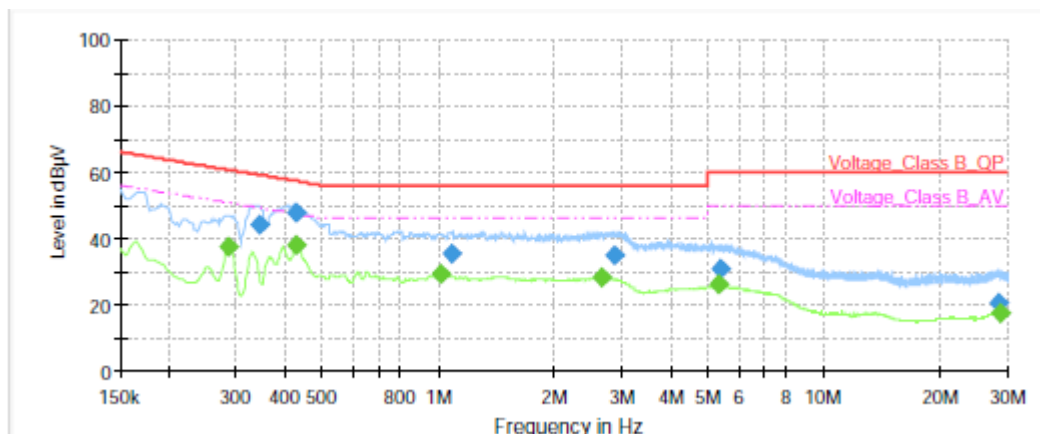


Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.34	42.48	---	59.17	16.69	70.0	9.000	L1	ON	21
0.36	---	31.27	48.69	17.42	70.0	9.000	L1	ON	21
0.43	45.24	---	57.32	12.08	70.0	9.000	L1	ON	20
0.43	---	35.43	47.27	11.84	70.0	9.000	L1	ON	20
1.98	---	26.43	46.00	19.57	70.0	9.000	L1	ON	20
2.07	33.72	---	56.00	22.28	70.0	9.000	L1	ON	20
2.73	---	27.76	46.00	18.24	70.0	9.000	L1	ON	19
2.90	34.73	---	56.00	21.27	70.0	9.000	L1	ON	19
5.55	28.61	---	60.00	31.39	70.0	9.000	L1	ON	19
5.76	---	23.49	50.00	26.51	70.0	9.000	L1	ON	19
15.10	20.31	---	60.00	39.69	70.0	9.000	L1	ON	20
15.40	---	17.39	50.00	32.61	70.0	9.000	L1	ON	20

Remark: Correct factor=cable loss + LISN factor

L line

Conducted Emission from 150 KHz to 30 MHz



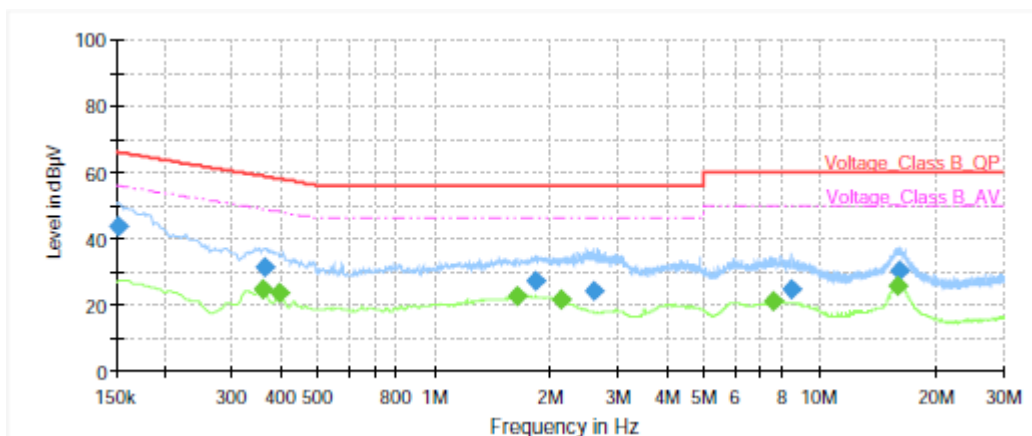
Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.29	---	37.44	50.60	13.16	70.0	9.000	N	ON	21
0.35	44.29	---	59.06	14.77	70.0	9.000	N	ON	21
0.43	47.82	---	57.32	9.50	70.0	9.000	N	ON	20
0.43	---	37.94	47.27	9.33	70.0	9.000	N	ON	20
1.01	---	29.02	46.00	16.98	70.0	9.000	N	ON	20
1.09	35.55	---	56.00	20.45	70.0	9.000	N	ON	20
2.65	---	27.98	46.00	18.02	70.0	9.000	N	ON	19
2.86	34.94	---	56.00	21.06	70.0	9.000	N	ON	19
5.34	---	26.06	50.00	23.94	70.0	9.000	N	ON	19
5.39	30.63	---	60.00	29.37	70.0	9.000	N	ON	19
28.32	20.66	---	60.00	39.34	70.0	9.000	N	ON	20
28.64	---	17.58	50.00	32.42	70.0	9.000	N	ON	20

Remark: Correct factor=cable loss + LISN factor

N line

Conducted Emission from 150 KHz to 30 MHz

Adapter 2: ADS-40FKJ-12 12036EPCU

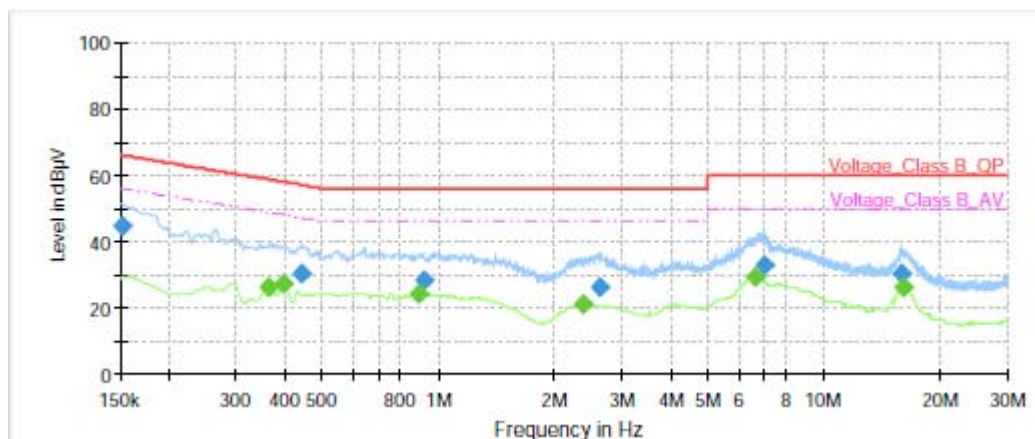


Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.15	43.70	---	65.88	22.18	70.0	9.000	L1	ON	21
0.36	---	24.65	48.75	24.10	70.0	9.000	L1	ON	21
0.36	31.43	---	58.64	27.21	70.0	9.000	L1	ON	21
0.40	---	23.57	47.95	24.38	70.0	9.000	L1	ON	20
1.64	---	22.40	46.00	23.60	70.0	9.000	L1	ON	20
1.83	27.12	---	56.00	28.88	70.0	9.000	L1	ON	20
2.13	---	21.44	46.00	24.56	70.0	9.000	L1	ON	20
2.60	24.21	---	56.00	31.79	70.0	9.000	L1	ON	19
7.60	---	21.20	50.00	28.80	70.0	9.000	L1	ON	20
8.41	24.39	---	60.00	35.61	70.0	9.000	L1	ON	20
15.99	---	25.71	50.00	24.29	70.0	9.000	L1	ON	20
16.09	30.20	---	60.00	29.80	70.0	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	44.54	---	65.88	21.34	70.0	9.000	N	ON	21
0.36	---	26.28	48.69	22.41	70.0	9.000	N	ON	21
0.40	---	27.30	47.95	20.65	70.0	9.000	N	ON	20
0.44	30.28	---	56.97	26.69	70.0	9.000	N	ON	20
0.89	---	24.21	46.00	21.79	70.0	9.000	N	ON	20
0.92	28.29	---	56.00	27.71	70.0	9.000	N	ON	20
2.37	---	21.06	46.00	24.94	70.0	9.000	N	ON	20
2.62	26.40	---	56.00	29.60	70.0	9.000	N	ON	19
6.63	---	29.48	50.00	20.52	70.0	9.000	N	ON	20
6.99	32.74	---	60.00	27.26	70.0	9.000	N	ON	20
16.00	30.37	---	60.00	29.63	70.0	9.000	N	ON	20
16.04	---	25.93	50.00	24.07	70.0	9.000	N	ON	20

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	2021-05-15	2022-05-14
EMI Test Receiver	R&S	ESCI	100948	2021-05-15	2022-05-14
Trilog Antenna	SCHWARZBECK	VULB 9163	391	2019-12-16	2022-12-15
Horn Antenna	R&S	HF907	102723	2020-08-11	2023-08-10
Horn Antenna	ETS-Lindgren	3160-09	00102644	2018-06-20	2023-06-19
Standard Gain Horn	STEATITE	QSH-SL-26-40-K-15	16779	2019-12-24	2021-12-23
EMI Test Receiver	R&S	ESR	101667	2021-05-16	2022-05-15
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.