



# EMC TEST REPORT

**Applicant**      Nokia Shanghai Bell Co., Ltd.  
**FCC ID**          2ADZRG240WJ  
**Product**        7368 ISAM ONT  
**Model**          G-240W-J  
**Report No.**     Y1906B0084-E3V1  
**Issue Date**     September 27, 2019

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.**

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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
Test Date: May 30, 2019~ June 26, 2019			

## 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 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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## 2 General Description of Equipment under Test

### 2.1 Client Information

<b>Applicant</b>	Nokia Shanghai Bell Co., Ltd.
<b>Applicant address</b>	No. 388, Ningqiao Rd. Pilot Free Trade Zone, Shanghai, China
<b>Manufacturer 1</b>	TAICANG T&W ELECTRONICS CO.,LTD
<b>Manufacturer address 1</b>	89# Jiang Nan RD, Lu Du, Taicang, Jiangsu, China
<b>Manufacturer 2</b>	SHENZHEN TWOWING TECHNOLOGIES CO., LTD
<b>Manufacturer address 2</b>	1st-12th Floor, Nangang Industrial Building, Tangtuo Industrial Park, Shiyao, Baoan, Shenzhen, Guangdong 518108, China

### 2.2 General information

EUT Description			
Device Type:	Movable Device		
Model:	G-240W-J		
IMEI:	/		
HW Version:	PEM2		
SW Version:	3FE48164AGCA97		
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		
EUT Accessory			
Adapter 1	Manufacturer: Shenzhen SOY Technology Co., Ltd Model: SUN-1200300		
Adapter 2	Manufacturer: SHENZHEN RUIDE ELECTRONICAL INDUSTRIAL CO.,LTD Model: RD1203000-C55-20MG		
Note: The information of the EUT is declared by the manufacturer.			



	Kit Code	EMA	Part Description	Power Adaptor
G-240W-J	3FE48008AA	3FE48009AA	2 POTS, 4 GE, Dual band WIFI AC3000 802.11ac 4x4/802.11n 3x3 US Plug in, 2Pin, Wall Mounted, 12V	SUN-1200300 RD1203000-C55-20MG

**Auxiliary equipment details**

No.	Name	Brand name	Model	NSB code	Valid Until
1	Spirent	TestCenter	DE48E0	-	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

**Information of Ports**

No.	Port name	Number	Shielded or unshielded	Cable type (optic, twisted pair, etc.)	Max. Cable length
1	Power	1	unshielded	-	-
2	GE	4	unshielded	-	-
3	POTS	2	unshielded	-	-
4	USB	2	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 (2018)**

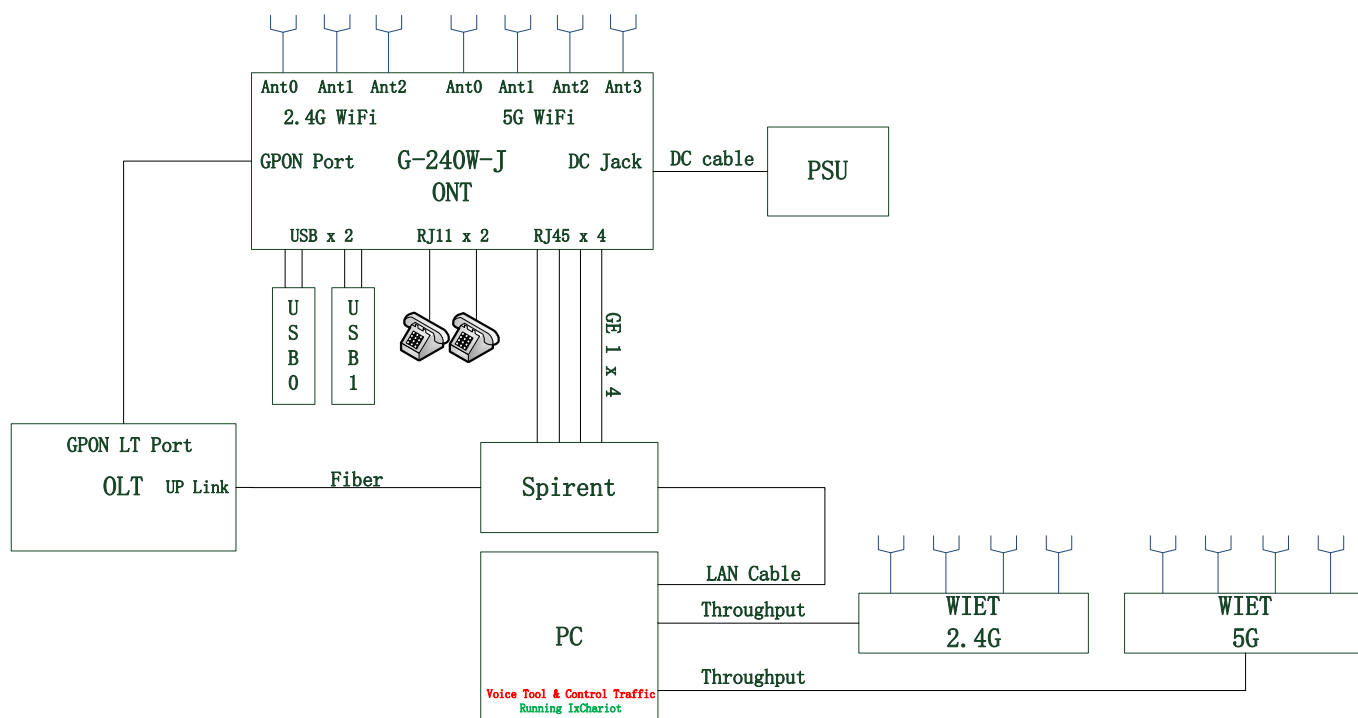
**ANSI C63.4 (2014)**



## 2.4 Test Mode

Description: The G-240W-J is a GPON ONT which has 2 POTs, 4 GE ports, 2 USB ports, 2.4G wi-fi and 5G wi-fi.

The basic functional test in normal room conditions consists of the traffic test and POTs connection test. G-240W-J runs 4 traffics on each line with DE48E0, the each upstream of 3 GE is 250Mbps, and downstream is 750Mbps. The POTs keep connecting though OFLT program.



### 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 Detector: RBW=1MHz / VBW=3MHz/ Sweep=AUTO

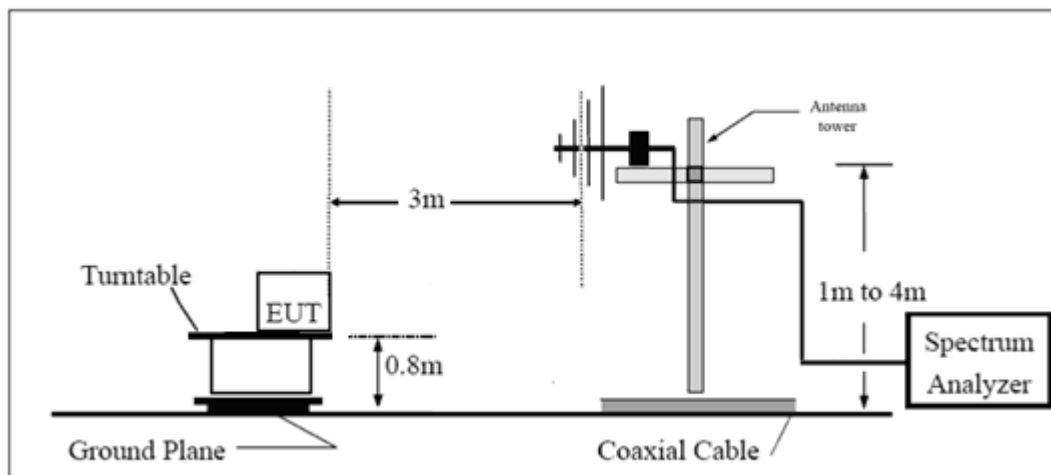
(b) AVERAGE Detector: RBW=1MHz / VBW=3MHz / Sweep=AUTO

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.

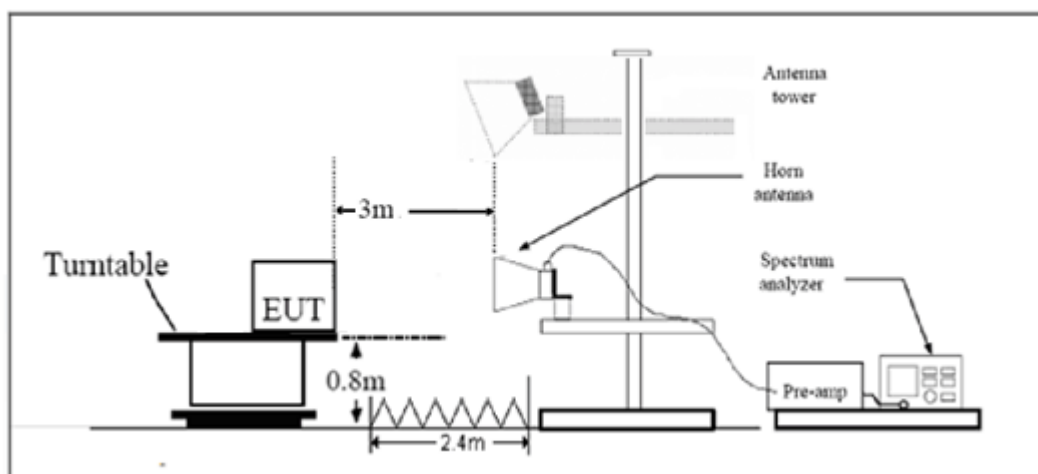
During the test, The basic functional test in normal room conditions consists of the traffic test and POTs connection test. G-240W-J runs 4 traffics on each line with DE48E0, the each upstream of 3 GE is 250Mbps, and downstream is 750Mbps. The POTs keep connecting though OFLT program.

## 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 $\mu$ 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 <sup>th</sup> 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  $k = 1.96$ .

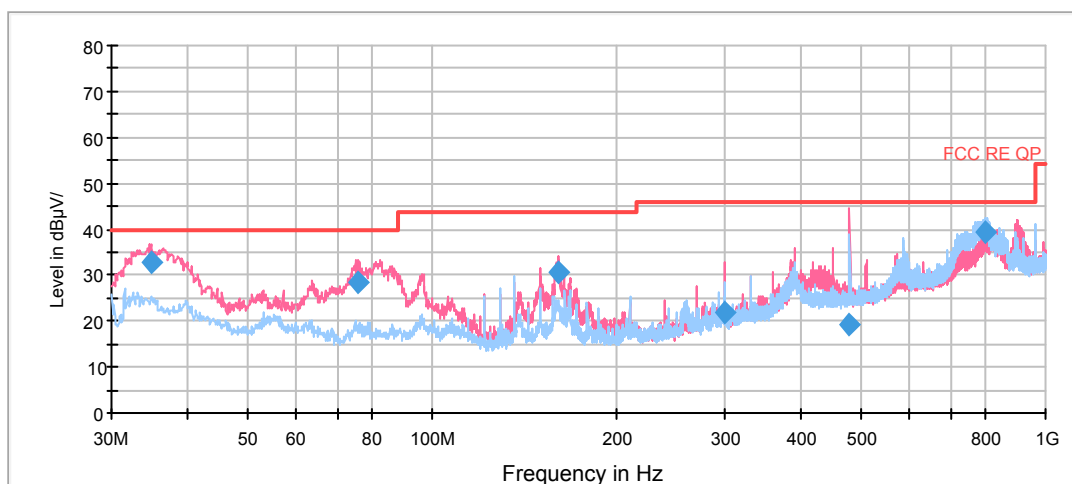
Frequency	Uncertainty
30MHz~200MHz	4.02 dB
200MHz~1000MHz	3.28 dB
1GHz~18GHz	3.70 dB
18GHz~26.5GHz	5.78 dB
26.5GHz~40GHz	5.82 dB

## 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.

FCC RE 0.03-1GHz QP Class B



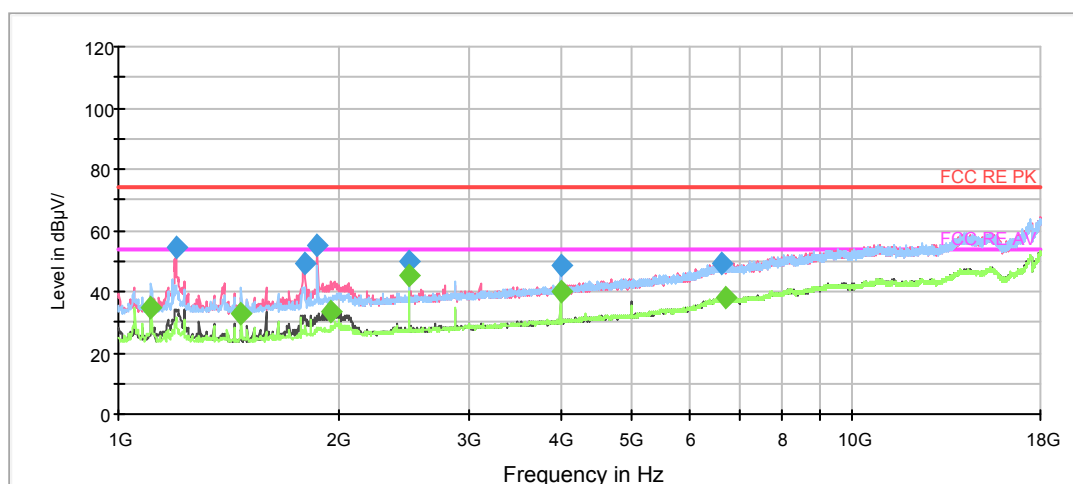
Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
34.927500	32.9	100.0	V	258.0	16.3	7.1	40.0
75.953750	28.6	125.0	V	22.0	10.2	11.4	40.0
160.305000	30.4	100.0	V	0.0	10.1	13.1	43.5
300.023750	22.0	175.0	V	6.0	15.3	24.0	46.0
479.920000	19.2	125.0	V	22.0	20.8	26.8	46.0
797.631250	39.2	100.0	H	31.0	24.9	6.8	46.0

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

2. Margin = Limit – Quasi-Peak

## FCC RE 1G-18GHz PK+AV Class B



## Radiated Emission from 1GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1197.625000	54.6	100.0	V	230.0	-11.2	19.4	74.0
1788.375000	49.2	100.0	V	186.0	-9.4	24.8	74.0
1864.875000	55.1	100.0	V	186.0	-9.2	18.9	74.0
2487.500000	50.0	100.0	V	186.0	-6.4	24.0	74.0
3998.375000	48.6	100.0	H	138.0	-2.7	25.4	74.0
6631.250000	48.9	200.0	H	327.0	5.0	25.1	74.0

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1108.375000	34.6	100.0	H	184.0	-11.4	19.4	54.0
1469.625000	32.8	100.0	H	194.0	-10.5	21.2	54.0
1945.625000	33.5	100.0	V	198.0	-9.0	20.5	54.0
2487.500000	45.1	100.0	V	186.0	-6.4	8.9	54.0
3998.375000	39.7	100.0	H	138.0	-2.7	14.3	54.0
6699.250000	37.7	100.0	V	326.0	5.0	16.3	54.0

## 3.2 Conducted Emission

### Ambient condition

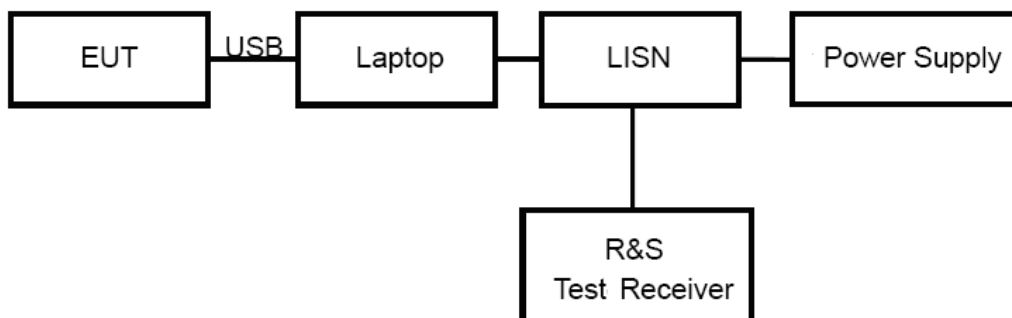
Temperature	Relative humidity	Pressure
24°C ~26°C	50%~55%	102.5kPa

### 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.

During the test, The basic functional test in normal room conditions consists of the traffic test and POTs connection test. G-240W-J runs 4 traffics on each line with DE48E0, the each upstream of 3 GE is 250Mbps, and downstream is 750Mbps. The POTs keep connecting though OFLT program.

### 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

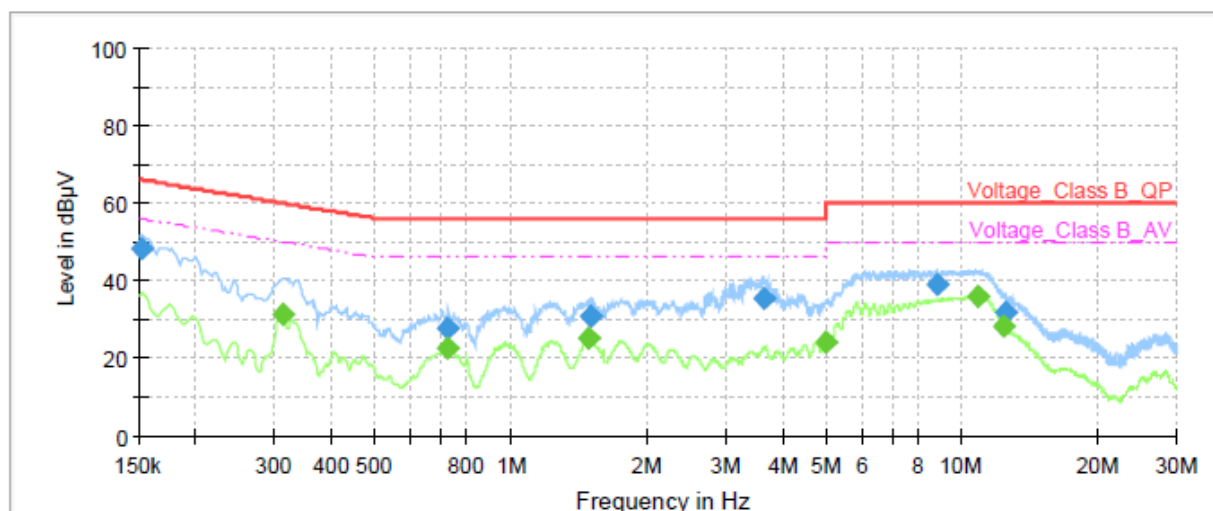


The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .  $U = 2.57$  dB.



## Test Results

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

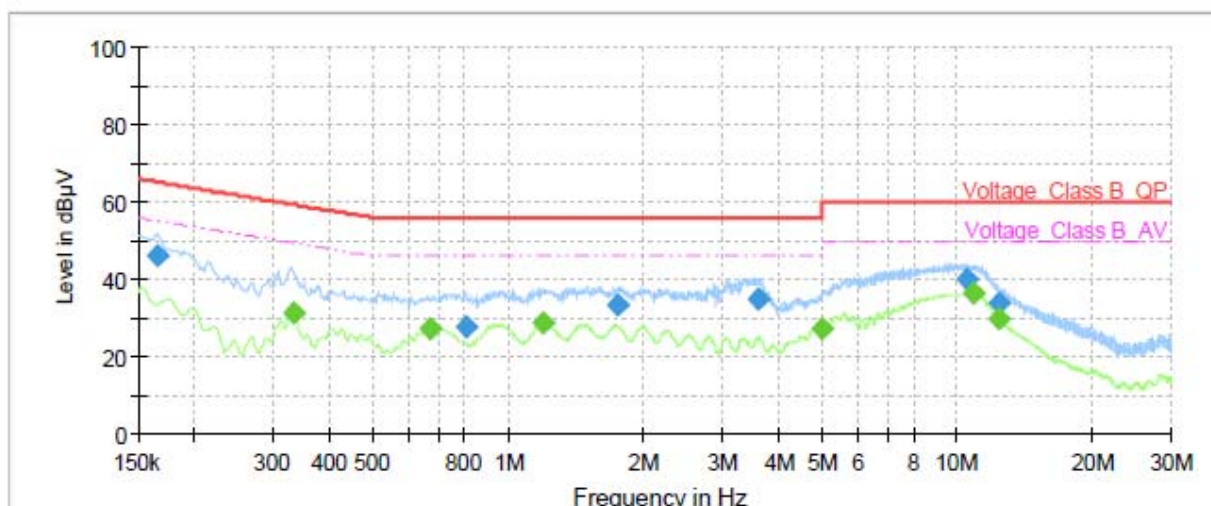


Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.15	48.39	---	65.88	17.49	1000.0	9.000	L1	ON	19.05
0.31	---	31.24	49.92	18.68	1000.0	9.000	L1	ON	19.18
0.72	27.74	---	56.00	28.26	1000.0	9.000	L1	ON	19.25
0.73	---	22.32	46.00	23.68	1000.0	9.000	L1	ON	19.24
1.49	---	25.13	46.00	20.87	1000.0	9.000	L1	ON	19.18
1.50	30.91	---	56.00	25.09	1000.0	9.000	L1	ON	19.18
3.63	35.27	---	56.00	20.73	1000.0	9.000	L1	ON	19.08
5.00	---	23.99	46.00	22.01	1000.0	9.000	L1	ON	19.08
8.83	38.94	---	60.00	21.06	1000.0	9.000	L1	ON	19.27
10.85	---	35.77	50.00	14.23	1000.0	9.000	L1	ON	19.36
12.41	---	28.44	50.00	21.56	1000.0	9.000	L1	ON	19.43
12.48	31.99	---	60.00	28.01	1000.0	9.000	L1	ON	19.44

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)
0.17	45.93	---	65.17	19.24	1000.0	9.000	N	ON	19.15
0.33	---	31.54	49.34	17.80	1000.0	9.000	N	ON	19.19
0.67	---	27.43	46.00	18.57	1000.0	9.000	N	ON	19.28
0.80	27.55	---	56.00	28.45	1000.0	9.000	N	ON	19.24
1.20	---	28.72	46.00	17.28	1000.0	9.000	N	ON	19.23
1.75	33.53	---	56.00	22.47	1000.0	9.000	N	ON	19.16
3.62	34.98	---	56.00	21.02	1000.0	9.000	N	ON	19.08
4.99	---	27.36	46.00	18.64	1000.0	9.000	N	ON	19.08
10.54	40.14	---	60.00	19.86	1000.0	9.000	N	ON	19.38
10.83	---	36.38	50.00	13.62	1000.0	9.000	N	ON	19.36
12.42	---	29.52	50.00	20.48	1000.0	9.000	N	ON	19.41
12.42	33.97	---	60.00	26.03	1000.0	9.000	N	ON	19.41

Remark: Correct factor=cable loss + LISN factor

N line

Conducted Emission from 150 KHz to 30 MHz

## 4 Main Test Instrument

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
Spectrum Analyzer	R&S	FSV40	15195-01-00	2019-05-19	2020-05-18
EMI Test Receiver	R&S	ESCI	100948	2019-05-19	2020-05-18
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
Standard Gain Horn	ETS-Lindgren	3160-09	00102643	2018-06-20	2020-06-19
Standard Gain Horn	STEATITE	QSH-SL-26-40-K-15	16779	2017-07-20	2019-07-19
EMI Test Receiver	R&S	ESR	101667	2019-05-19	2020-05-18
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

b: Adapter

Picture 1 EUT and Accessory