

# FCC Test Report

APPLICANT : Nokia Shanghai Bell Co., Ltd.  
EQUIPMENT : NOKIA WiFi Beacon 19  
BRAND NAME : NOKIA  
MODEL NAME : Beacon 19  
FCC ID : 2ADZRBEACON19  
STANDARD : 47 CFR Part 15 Subpart B  
CLASSIFICATION : Certification  
TEST DATE(S) : May 27, 2024 ~ Jun. 06, 2024

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia



**Sporton International Inc. (Kunshan)**

**No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300  
People's Republic of China**



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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC452305	Rev. 01	Initial issue of report	Aug. 12, 2024

## SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	Under limit 11.88 dB at 0.156 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 4.20 dB at 250.190 MHz

**Conformity Assessment Condition:**

The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account. Please refer to each test results in the section "Measurement Uncertainty".

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.



## 1. General Description

### 1.1. Applicant

Nokia Shanghai Bell Co., Ltd.

No.388, Ningqiao Rd, Pilot Free Trade Zone, Shanghai, 201206 P.R. China

### 1.2. Manufacturer

Nokia of America Corporation

2301 Sugar Bush Rd. Raleigh, NC 27612

### 1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	NOKIA WiFi Beacon 19
Brand Name	NOKIA
Model Name	Beacon 19
FCC ID	2ADZRBEACON19
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n (HT20/HT40) WLAN 2.4GHz 802.11ax (HE20/HE40) WLAN 2.4GHz 802.11be (EHT20/ EHT40) WLAN 5GHz 802.11a/n (HT20/HT40) WLAN 5GHz 802.11ac (VHT20/VHT40/VHT80/VHT160) WLAN 5GHz 802.11ax (HE20/HE40/HE80/HE160) WLAN 5GHz 802.11be (EHT20/EHT40/EHT80/EHT160) WLAN 6GHz 802.11ax (HE20/HE40/HE80/HE160) WLAN 6GHz 802.11be (EHT20/EHT40/EHT80/EHT160/EHT320)
SN Code	Conduction: ALCLEB401AC1 for Sample 1 Radiation: ALCLEB401AC1 for Sample 1 ALCLEB401AC2 for Sample 2
EUT Stage	Production Unit

#### Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two samples under test, sample 1 is Inpaq antenna and sample 2 is AOT antenna. According to the difference, we choose sample 1 to full test and the sample 2 is verified for the difference for Radiation.

Power Adapter				
AC Adapter 1	Brand Name	HONOR	Model Name	ADS-40FKJ-12N 12036EPCU
	Power Rating	I/P: 100-240 Vac, 1000mA , O/P: 12Vdc,3000mA		
AC Adapter 2	Brand Name	KELI	Model Name	KL-WA120300-A1
	Power Rating	I/P: 100-240 Vac, 2000mA, O/P: 12Vdc,3000mA		

## 1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
<b>Tx Frequency</b>	WLAN 802.11b/g/n/ax/be: 2400 MHz – 2483.5 MHz WLAN 802.11a/n/ac/ax/be: 5150 MHz – 5250 MHz; 5250 MHz – 5350 MHz; 5470 MHz – 5725 MHz; 5725 MHz – 5850 MHz 802.11ax/be: 6105 MHz – 7125 MHz
<b>Rx Frequency</b>	WLAN 802.11b/g/n/ax/be: 2400 MHz – 2483.5 MHz WLAN 802.11a/n/ac/ax/be: 5150 MHz – 5250 MHz; 5250 MHz – 5350 MHz; 5470 MHz – 5725 MHz; 5725 MHz – 5850 MHz 802.11ax/be: 6105 MHz – 7125 MHz
<b>Antenna Type</b>	WLAN: Dipole Antenna
<b>Type of Modulation</b>	802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM) 802.11ax: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM) 802.11be: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM / 4096QAM)

## 1.5. Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6. Test Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

<b>Test Firm</b>	Sporton International Inc. (Kunshan)		
<b>Test Site Location</b>	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Designation No.</b>	<b>FCC Test Firm Registration No.</b>
	CO01-KS 03CH02-KS	CN1257	314309

## 1.7. Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH02-KS	AUDIX	E3	6.2009-8-24a1
2.	CO01-KS	AUDIX	E3	6.2009-8-24

## 1.8. Applicable Standards

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

- ♦ 47 CFR Part 15 Subpart B
- ♦ ANSI C63.4-2014

**Remark:** All test items were verified and recorded according to the standards and without any deviation during the test.

## 2. Test Configuration of Equipment Under Test

### 2.1. Test Mode

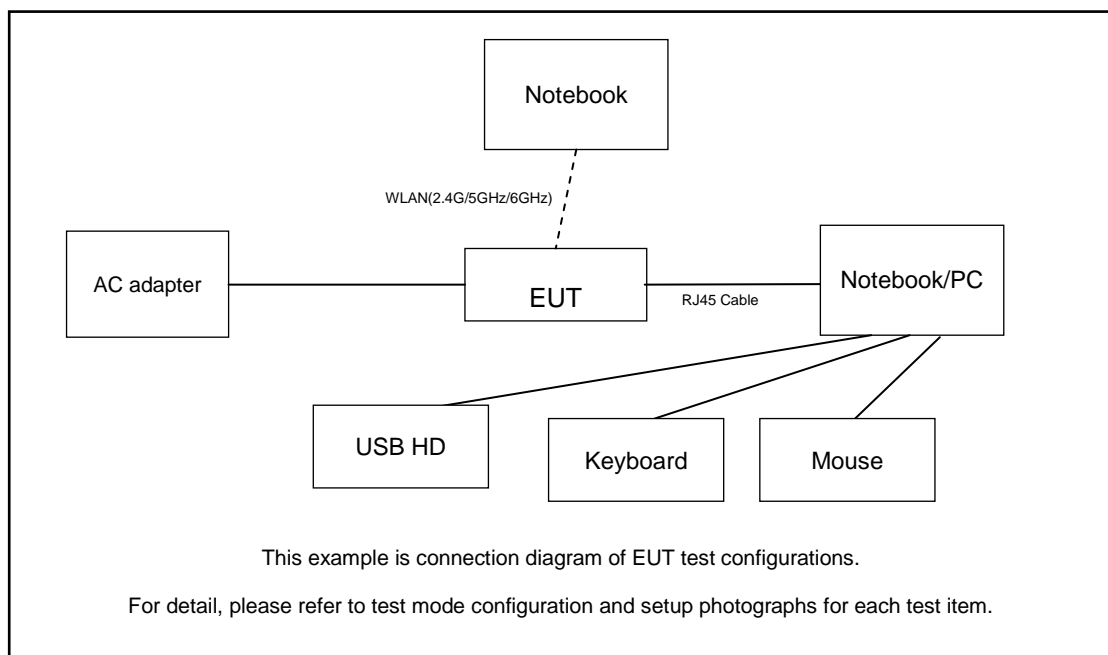
The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
AC Conducted Emission	Mode 1: WIFI IDLE + Lan1/LAN2/LAN3 Link With NB + WAN Link with NB + Power from Adapter1 for Sample1
	Mode 2: WIFI IDLE + Lan1/LAN2/LAN3 Link With NB + WAN Link with NB + Power from Adapter2 for Sample1
Radiated Emissions	Mode 1: WIFI IDLE + Lan1/LAN2/LAN3 Link With NB + WAN Link with NB + Power from Adapter1 for Sample1
	Mode 2: WIFI IDLE + Lan1/LAN2/LAN3 Link With NB + WAN Link with NB + Power from Adapter2 for Sample1
	Mode 3: WIFI IDLE + Lan1/LAN2/LAN3 Link With NB + WAN Link with NB + Power from Adapter2 for Sample2
<b>Remark:</b>  1. The worst case of AC is mode 2; only the test data of this mode is reported. 2. The worst case of RE is mode 2; only the test data of this mode is reported.	



## 2.2.Connection Diagram of Test System



The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application

## 2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
2.	PC	Adwantech	IPC-610MB-L	KA21R655B1	N/A	Unshielded,1.8m
3.	(USB)Mouse	Lenovo	OEJUOA	Fcc DoC	Shielded, 1.8m	N/A
4.	(USB)Keyboard	Lenovo	SK-8821	Fcc DoC	Shielded, 1.8m	N/A
5.	Notebook	Lenovo	G410	N/A	N/A	shielded cable DC O/P 1.80m , Unshielded AC I/P cable 0.9m
6.	Hard disk	WD	Elements	N/A	N/A	N/A
7.	Monitor	Lenovo	LS2033wA	Fcc DoC	N/A	Unshielded,1.8m
8.	RJ45 Cable	N/A	N/A	N/A	N/A	Unshielded
9.	RJ45 Cable	N/A	N/A	N/A	N/A	Shielded



## **2.4. EUT Operation Test Setup**

At the same time, the following programs installed in the EUT were programmed during the test.

The Notebook WLAN link the EUT via Wi-Fi network;

The Notebook LAN link the EUT via RJ-45 Cable;

The Notebook WAN link the EUT via RJ-45 Cable;

### 3. Test Result

#### 3.1. Test of AC Conducted Emission Measurement

##### 3.1.1. Limits of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

**<Class B Limit>**

Frequency of emission (MHz)	Conducted limit (dBuV)	
	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.

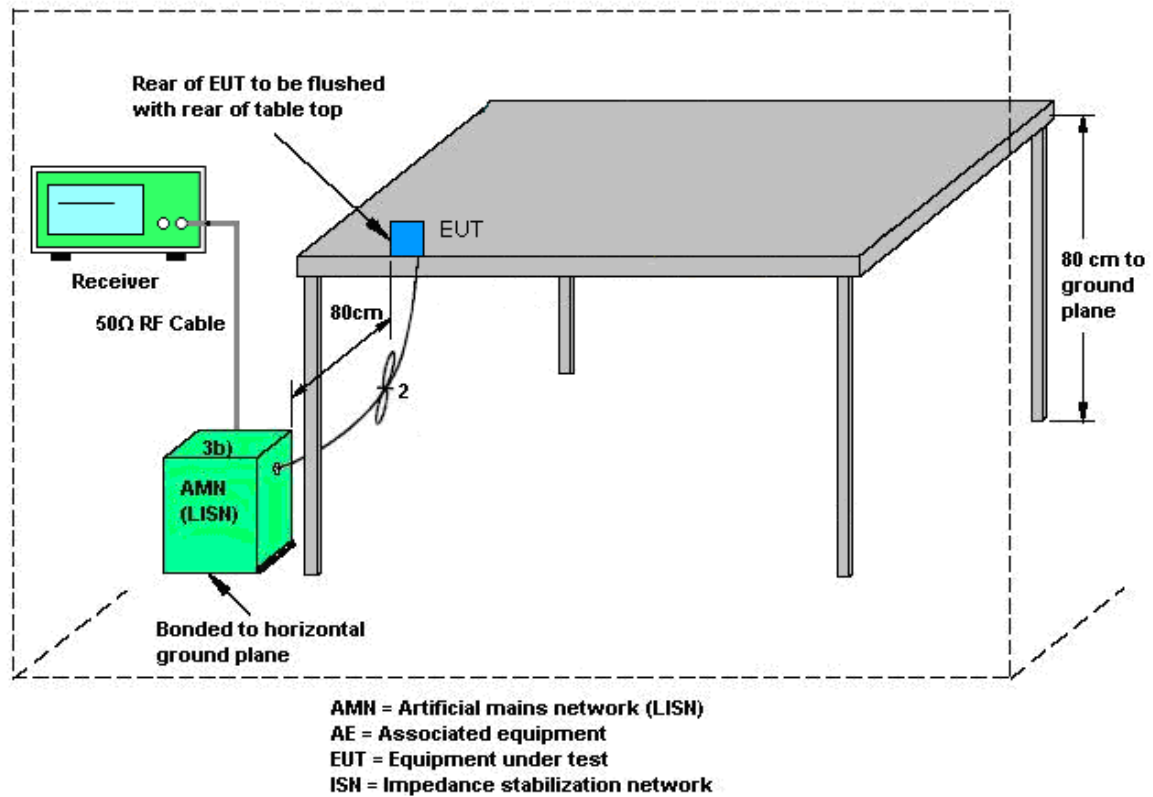
##### 3.1.2. Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3. Test Procedure

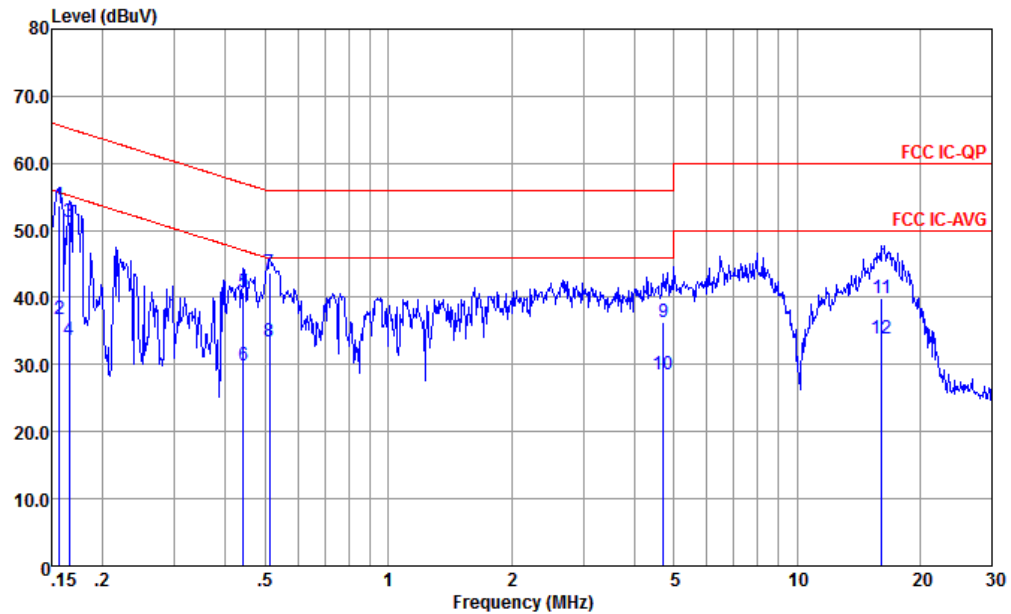
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

### 3.1.4. Test Setup



### 3.1.5. Test Result of AC Conducted Emission

<b>Test Engineer :</b>	Amos	<b>Temperature :</b>	25.3-26.2°C
		<b>Relative Humidity :</b>	38~40%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Line
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		

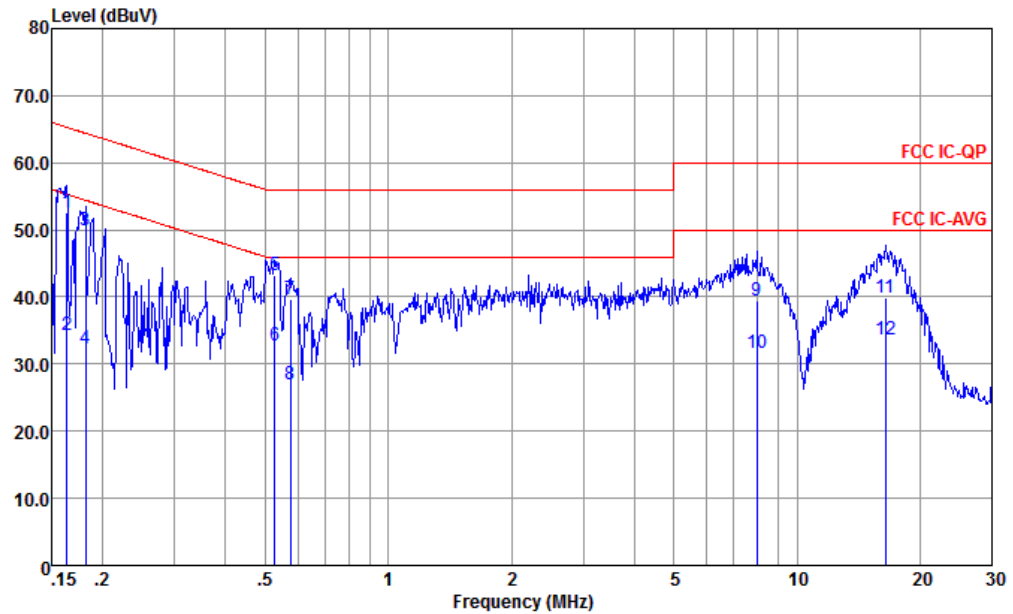


Site : CO01-KS  
Condition : FCC IC-QP LISN-060105-L 2023 LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1 *	0.156	53.77	-11.88	65.65	43.30	0.05	10.42	QP
2	0.156	36.67	-18.98	55.65	26.20	0.05	10.42	Average
3	0.166	51.26	-13.90	65.16	40.80	0.04	10.42	QP
4	0.166	33.66	-21.50	55.16	23.20	0.04	10.42	Average
5	0.442	40.74	-16.28	57.02	30.50	-0.01	10.25	QP
6	0.442	29.84	-17.18	47.02	19.60	-0.01	10.25	Average
7	0.513	43.68	-12.32	56.00	33.50	-0.03	10.21	QP
8	0.513	33.48	-12.52	46.00	23.30	-0.03	10.21	Average
9	4.721	36.43	-19.57	56.00	26.50	-0.13	10.06	QP
10	4.721	28.53	-17.47	46.00	18.60	-0.13	10.06	Average
11	16.140	39.86	-20.14	60.00	28.80	-0.18	11.24	QP
12	16.140	33.96	-16.04	50.00	22.90	-0.18	11.24	Average



<b>Test Engineer :</b>	Amos	<b>Temperature :</b>	25.3-26.2°C
		<b>Relative Humidity :</b>	38~40%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS  
Condition : FCC IC-QP LISN-060105-N 2023 NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.163	52.56	-12.74	65.30	42.10	0.04	10.42	QP
2	0.163	34.26	-21.04	55.30	23.80	0.04	10.42	Average
3	0.182	49.96	-14.46	64.42	39.50	0.05	10.41	QP
4	0.182	32.36	-22.06	54.42	21.90	0.05	10.41	Average
5 *	0.527	43.34	-12.66	56.00	33.20	-0.07	10.21	QP
6	0.527	32.74	-13.26	46.00	22.60	-0.07	10.21	Average
7	0.576	39.72	-16.28	56.00	29.60	-0.07	10.19	QP
8	0.576	27.02	-18.98	46.00	16.90	-0.07	10.19	Average
9	7.977	39.47	-20.53	60.00	29.21	-0.14	10.40	QP
10	7.977	31.57	-18.43	50.00	21.31	-0.14	10.40	Average
11	16.486	39.90	-20.10	60.00	28.80	-0.15	11.25	QP
12	16.486	33.70	-16.30	50.00	22.60	-0.15	11.25	Average

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)

## 3.2. Test of Radiated Emission Measurement

### 3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

**<Class B Limit>**

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

### 3.2.2. Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

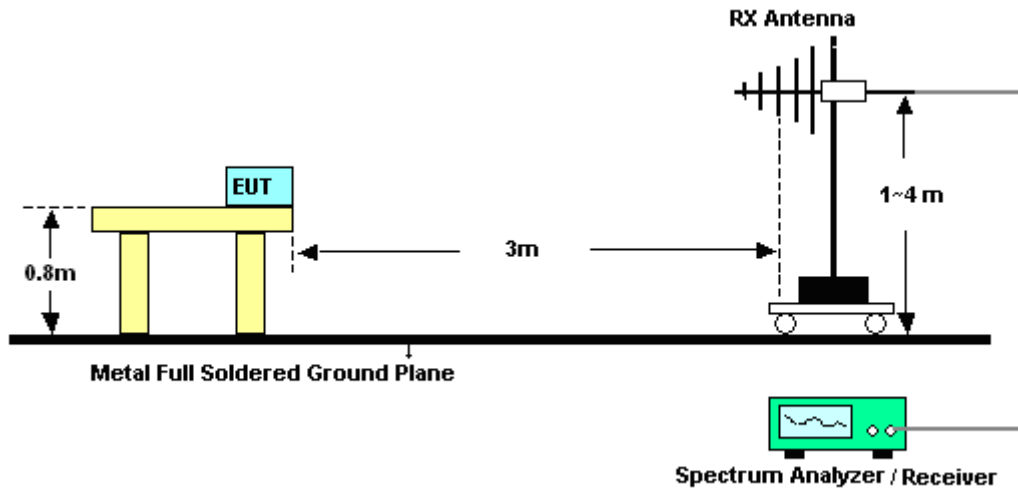
### 3.2.3. Test Procedures

1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dB $\mu$ V/m) = 20 log Emission level ( $\mu$ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
10. Exploratory radiated emissions testing of handheld and/or body-worn devices shall include rotation of the EUT through three orthogonal axes (X/Y/Z Plane) to determine the orientation (attitude) that maximizes the emissions.

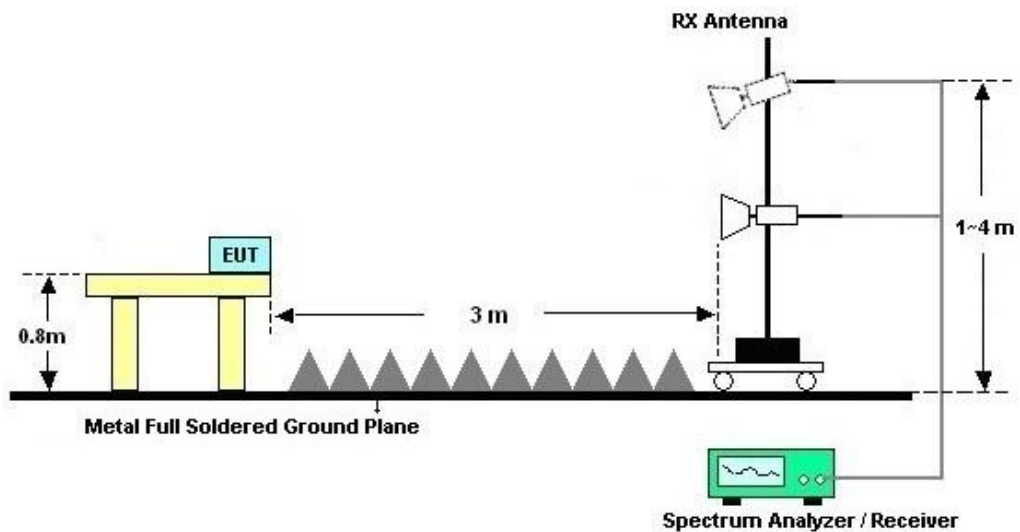


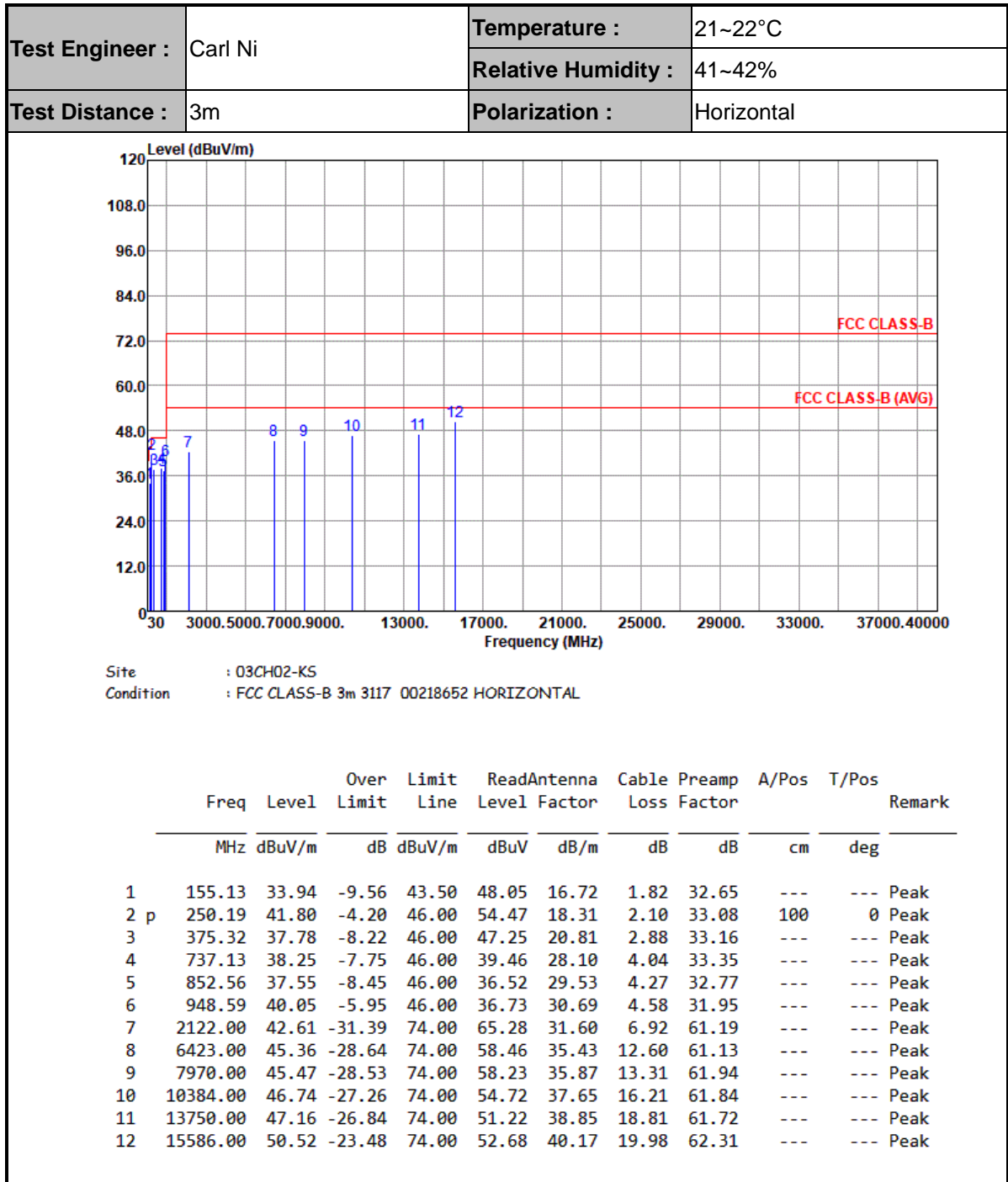
### 3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



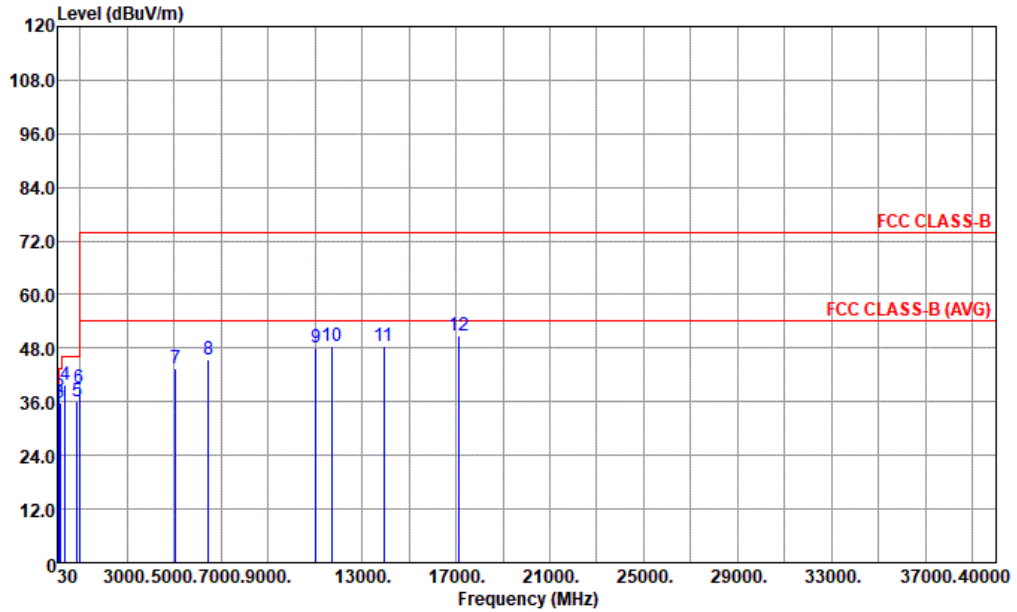
For radiated emissions above 1GHz



**3.2.5. Test Result of Radiated Emission**




Test Engineer :	Carl Ni	Temperature :	21~22°C
		Relative Humidity :	41~42%
Test Distance :	3m	Polarization :	Vertical



Site : 03CH02-KS  
Condition : FCC CLASS-B 3m 3117 00218652 VERTICAL

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 p	48.43	35.24	-4.76	40.00	51.95	15.24	0.98	32.93	100	0 Peak
2	125.06	37.14	-6.36	43.50	50.67	17.55	1.66	32.74	---	---
3	153.19	35.88	-7.62	43.50	49.86	16.85	1.81	32.64	---	---
4	375.32	39.69	-6.31	46.00	49.16	20.81	2.88	33.16	---	---
5	870.02	35.97	-10.03	46.00	35.13	29.21	4.35	32.72	---	---
6	954.41	39.11	-6.89	46.00	35.54	30.86	4.59	31.88	---	---
7	5080.00	43.52	-30.48	74.00	60.06	34.10	11.02	61.66	---	---
8	6474.00	45.55	-28.45	74.00	58.51	35.53	12.62	61.11	---	---
9	11047.00	48.15	-25.85	74.00	55.17	38.03	16.65	61.70	---	---
10	11710.00	48.58	-25.42	74.00	54.21	38.51	17.31	61.45	---	---
11	13937.00	48.40	-25.60	74.00	52.28	38.81	18.98	61.67	---	---
12	17133.00	50.72	-23.28	74.00	51.49	41.07	21.07	62.91	---	---

Note:

- Level(dBuV/m) = Read Level(dBuV) + Antenna Factor(dB/m) + Cable Loss(dB) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBuV/m) - Limit Line(dBuV/m)



## 4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 10, 2023	May 27, 2024	Oct. 09, 2024	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz~44G,MAX 30dB	Oct. 10, 2023	May 27, 2024	Oct. 09, 2024	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz~1GHz	Dec. 21, 2023	May 27, 2024	Dec. 20, 2024	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 23, 2023	May 27, 2024	Nov. 22, 2024	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2024	May 27, 2024	Jan. 04, 2025	Radiation (03CH02-KS)
Amplifier	EM	EM18G40GGA	060852	18~40GHz	Jan. 05, 2024	May 27, 2024	Jan. 04, 2025	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	380826	9KHz~1GHz	Jul. 06, 2023	May 27, 2024	Jul. 05, 2024	Radiation (03CH02-KS)
Amplifier	EM	EM01G18G	060806	1GHz~18GHz	Oct. 10, 2023	May 27, 2024	Oct. 09, 2024	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	May 27, 2024	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	May 27, 2024	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	May 27, 2024	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 18, 2024	Jun. 06, 2024	Apr. 17, 2025	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 11, 2023	Jun. 06, 2024	Oct. 10, 2024	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Apr. 18, 2024	Jun. 06, 2024	Apr. 17, 2025	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 11, 2023	Jun. 06, 2024	Oct. 10, 2024	Conduction (CO01-KS)

NCR: No Calibration Required

## 5. Measurement Uncertainty

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.84 dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	6.04 dB
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.12 dB
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.30 dB
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