FCC Test Report

APPLICANT	:	Nokia Shanghai Bell Co., Ltd.
EQUIPMENT	:	NOKIA WiFi Beacon 3.1
BRAND NAME	:	NOKIA
MODEL NAME	:	Beacon 3.1
FCC ID	:	2ADZRBEACON311
STANDARD	:	47 CFR Part 15 Subpart B
CLASSIFICATION	:	Certification
TEST DATE(S)	:	Nov. 28, 2024 ~ Dec. 02, 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

ACCREDITED Cert #5145.02

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
FC4N0526	Rev. 01	Initial issue of report	Jan. 16, 2025

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 13.08 dB at 0.191 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 3.44 dB at 250.19 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/manufacturer 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 3.1
Brand Name	NOKIA
Model Name	Beacon 3.1
FCC ID	2ADZRBEACON311
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ax HE20/HE40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/VHT160 WLAN 5GHz 802.11ax HE20/HE40/HE80/HE160
SN Code	Radiation / Conduction: ALCLB45B57D4
HW Version	PEM1
SW Version	3TN00626
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Power Adapter				
AC Adapter 1	**Brand Name**	Ruide	**Model Name**	RD1201500-C55-198MG
AC Adapter 2	**Brand Name**	Fuhua	**Model Name**	UES18LU-120150SPA

1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	802.11b/g/n/ax: 2400 MHz ~ 2483.5 MHz 802.11a/n/ac/ax: 5150 MHz ~ 5250 MHz; 5250 MHz ~ 5350 MHz; 5470 MHz ~ 5725 MHz; 5725 MHz ~ 5850 MHz;
Rx Frequency	802.11b/g/n/ax: 2400 MHz ~ 2483.5 MHz 802.11a/n/ac/ax: 5150 MHz ~ 5250 MHz; 5250 MHz ~ 5350 MHz; 5470 MHz ~ 5725 MHz; 5725 MHz ~ 5850 MHz;
Antenna Type	Dipole Antenna
Type of Modulation	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: OFDMA (BPSK / QPSK / 16QAM / 64QAM / 256QAM /1024QAM)

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.

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

1.7. Test Software

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

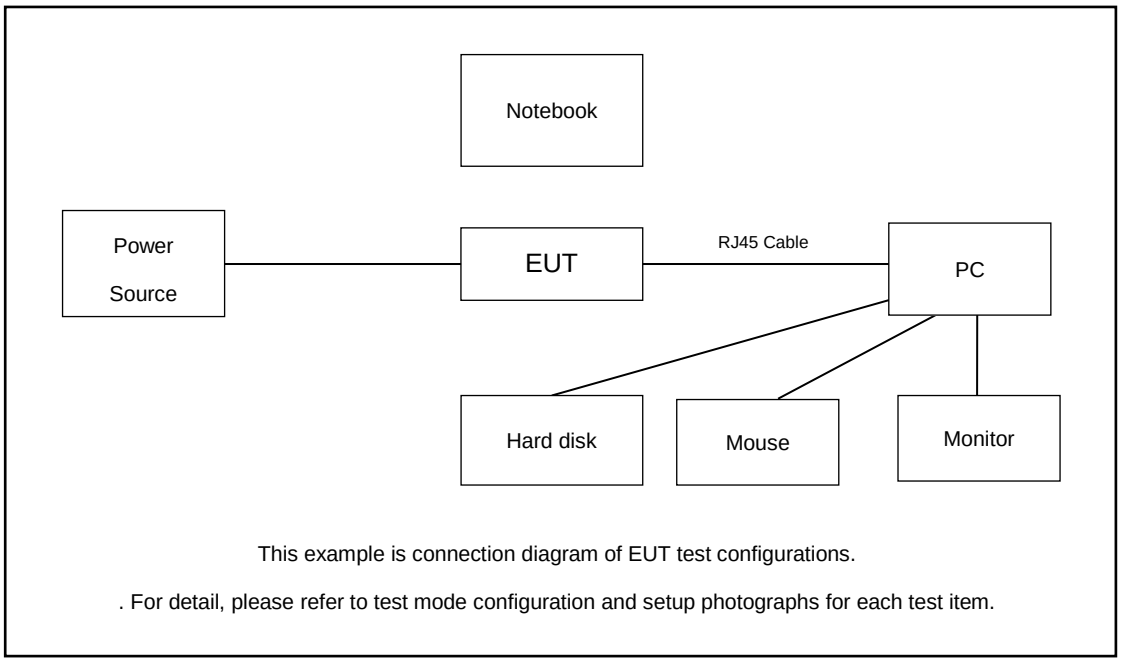
2.1. Test Mode

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: WLAN On + WAN Link(1Gbps) + LAN1 Link(1Gbps) + LAN2 Link(1Gbps) + Power from Adapter1 Mode 2: WLAN On + WAN Link(1Gbps) + LAN1 Link(1Gbps) + LAN2 Link(1Gbps) + Power from Adapter2
Radiated Emissions	Mode 1: WLAN On + WAN Link(1Gbps) + LAN1 Link(1Gbps) + LAN2 Link(1Gbps) + Power from Adapter1 Mode 2: WLAN On + WAN Link(1Gbps) + LAN1 Link(1Gbps) + LAN2 Link(1Gbps) + Power from Adapter2
Remark: **1.** The worst case of AC is mode 1; only the test data of this mode is reported. **2.** The worst case of RE is mode 1; only the test data of this mode is reported.	

2.2. Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

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.	Mouse	Dell	MS111-P	Fcc DoC	Shielded, 1.8m	N/A
4.	Hard disk	KINGSHARE	KSP6120G	N/A	N/A	N/A
5.	Monitor	Dell	N/A	N/A	N/A	Unshielded,1.8m

2.4. EUT Operation Test Setup

The following programs installed in the EUT were programmed during the test.

1. EUT is connected with notebook or PC via RJ-45 cable, execute “PING IP” function.
2. PC Server Ping IP with EUT via WAN/LAN1/LAN2(1Gbps).

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.

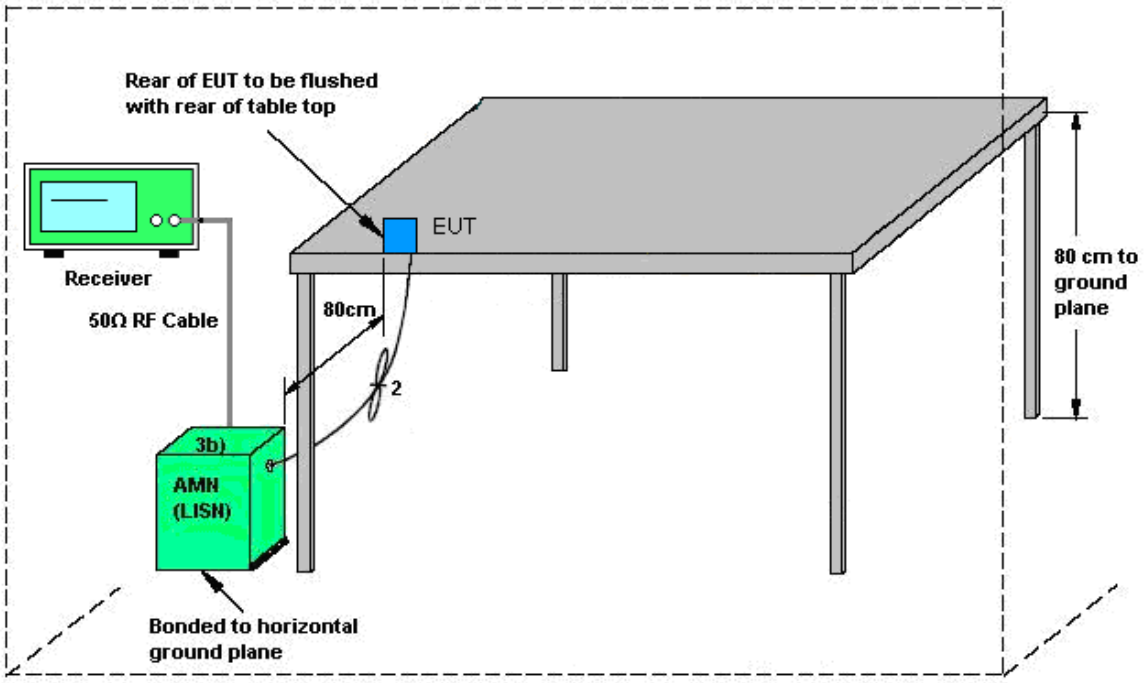
3.1.2 Measuring Instruments

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.

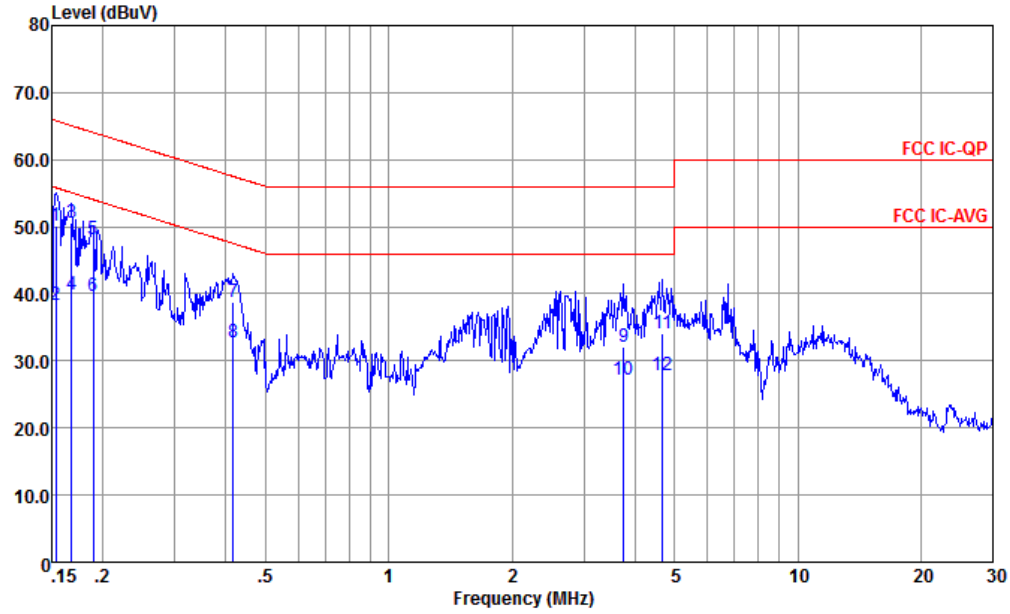
3.1.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.1.5 Test Result of AC Conducted Emission

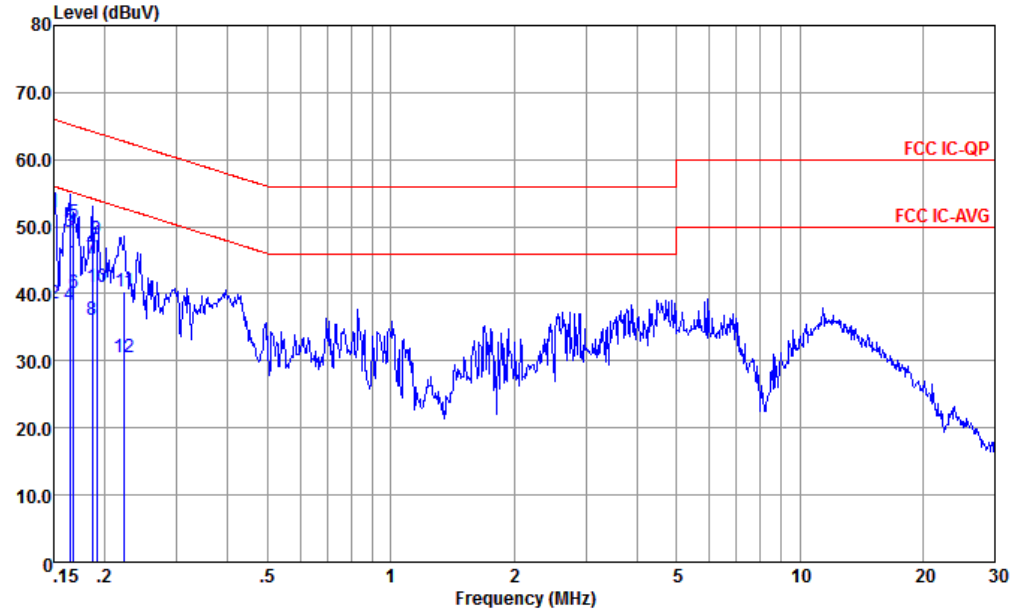
Test Engineer :	Amos Zhang	**Temperature :**	25.3 ~ 26.2℃
		Relative Humidity :	38 ~ 40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC IC-QP LISN-060105-L 2024 LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.153	50.04	-15.78	65.82	39.50	0.12	10.42	QP
2		0.153	38.44	-17.38	55.82	27.90	0.12	10.42	Average
3	*	0.168	50.62	-14.46	65.08	40.10	0.10	10.42	QP
4		0.168	39.82	-15.26	55.08	29.30	0.10	10.42	Average
5		0.189	48.10	-15.96	64.06	37.60	0.09	10.41	QP
6		0.189	39.60	-14.46	54.06	29.10	0.09	10.41	Average
7		0.417	38.73	-18.78	57.51	28.50	-0.04	10.27	QP
8		0.417	32.83	-14.68	47.51	22.60	-0.04	10.27	Average
9		3.759	32.18	-23.82	56.00	22.30	-0.19	10.07	QP
10		3.759	27.08	-18.92	46.00	17.20	-0.19	10.07	Average
11		4.672	34.05	-21.95	56.00	24.20	-0.21	10.06	QP
12		4.672	27.95	-18.05	46.00	18.10	-0.21	10.06	Average

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



Site : CO01-KS
Condition : FCC IC-QP LISN-060105-N 2024 NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	52.04	-13.96	66.00	41.50	0.12	10.42	QP
2	0.150	38.64	-17.36	56.00	28.10	0.12	10.42	Average
3	0.164	49.32	-15.93	65.25	38.78	0.12	10.42	QP
4	0.164	38.42	-16.83	55.25	27.88	0.12	10.42	Average
5	0.168	50.62	-14.46	65.08	40.08	0.12	10.42	QP
6	0.168	40.02	-15.06	55.08	29.48	0.12	10.42	Average
7	0.186	45.30	-18.90	64.20	34.76	0.13	10.41	QP
8	0.186	36.10	-18.10	54.20	25.56	0.13	10.41	Average
9	0.191	48.20	-15.78	63.98	37.66	0.13	10.41	QP
10 *	0.191	40.90	-13.08	53.98	30.36	0.13	10.41	Average
11	0.223	40.37	-22.33	62.70	29.92	0.06	10.39	QP
12	0.223	30.57	-22.13	52.70	20.12	0.06	10.39	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

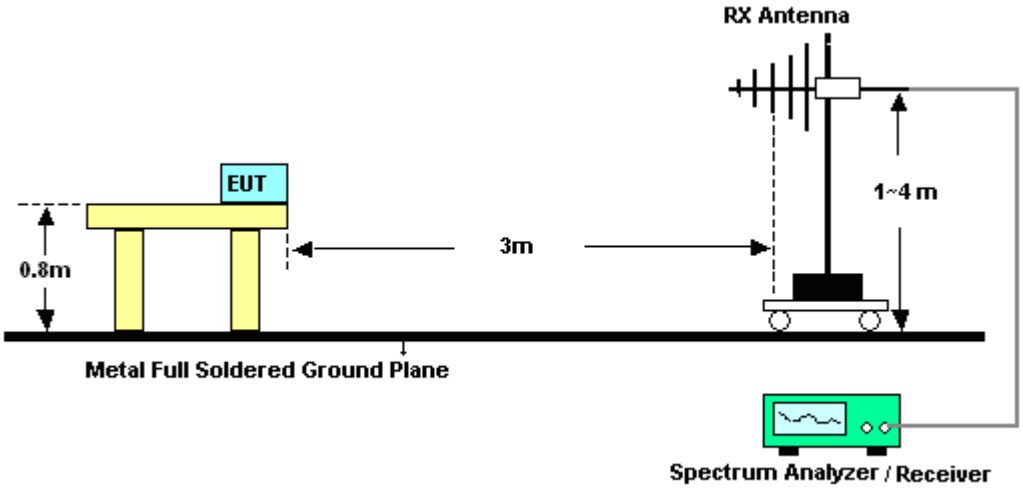
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

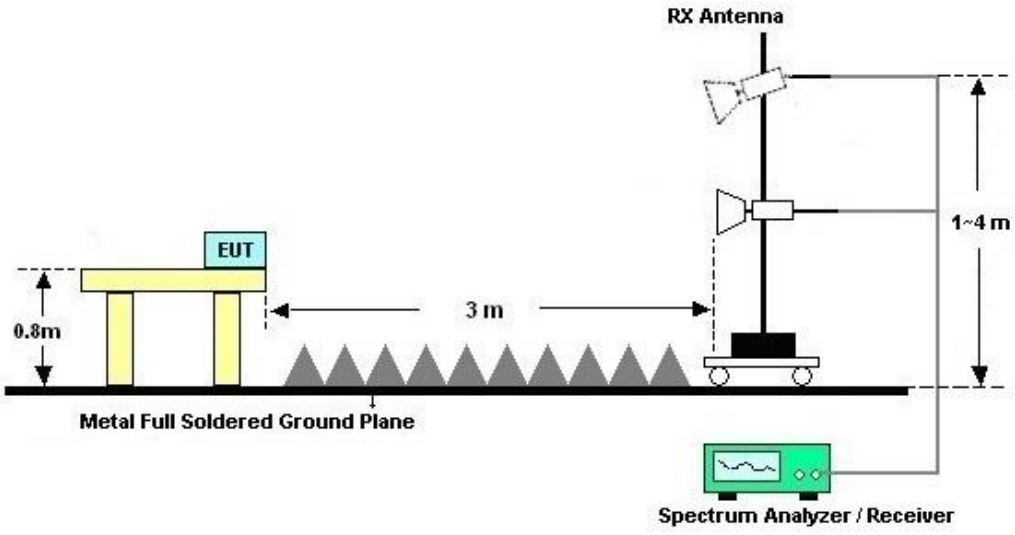
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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 (dBμV/m) = 20 log Emission level (μV/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

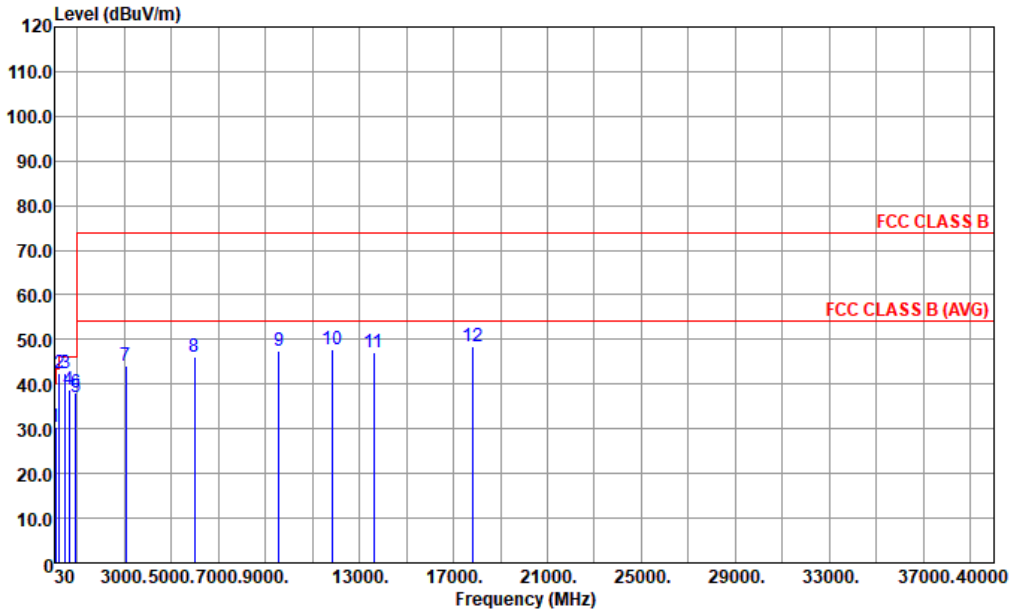


For radiated emissions above 1GHz



3.2.5. Test Result of Radiated Emission

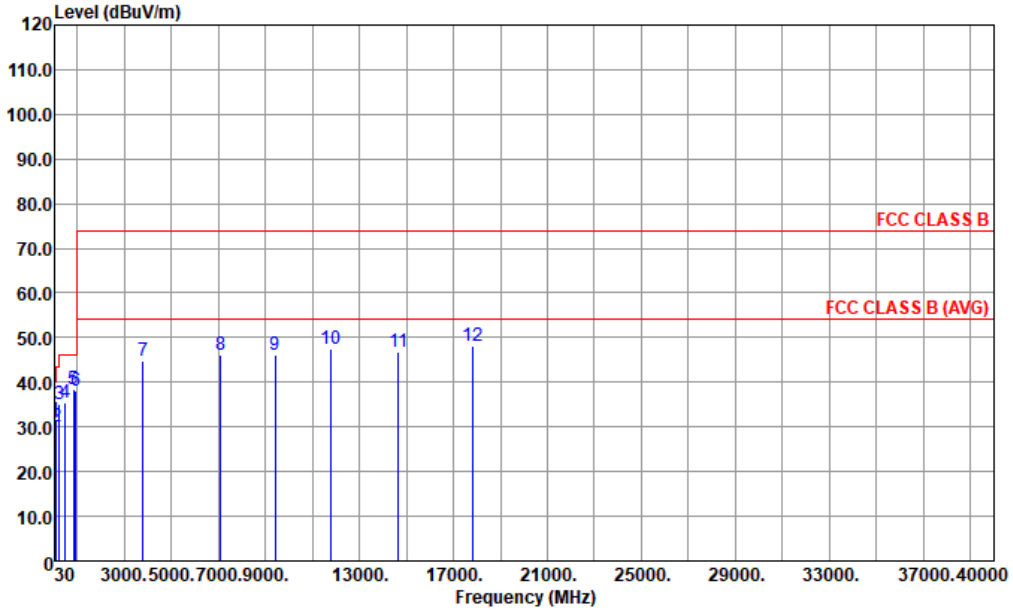
Test Engineer :	Moon	**Temperature :**	21 ~ 22°C
		Relative Humidity :	41 ~ 42%
Test Distance :	3m	**Polarization :**	Horizontal



Site : 03CH02-KS
Condition : FCC CLASS B 3m 59915 HORIZONTAL

		Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1		72.68	30.47	-9.53	40.00	49.44	12.73	1.02	32.72	---	---	Peak
2	p	250.19	42.56	-3.44	46.00	54.75	18.49	2.21	32.89	100	192	Peak
3		499.48	42.33	-3.67	46.00	48.40	23.93	3.15	33.15	---	---	Peak
4		649.83	38.73	-7.27	46.00	42.03	26.41	3.56	33.27	---	---	Peak
5		933.07	37.16	-8.84	46.00	34.50	30.30	4.25	31.89	---	---	Peak
6		949.56	38.10	-7.90	46.00	34.81	30.67	4.29	31.67	---	---	Peak
7		3057.00	44.27	-29.73	74.00	66.66	32.80	7.81	63.00	---	---	Peak
8		5981.00	46.00	-28.00	74.00	64.06	35.20	10.99	64.25	---	---	Peak
9		9585.00	47.60	-26.40	74.00	60.07	36.57	13.58	62.62	---	---	Peak
10		11829.00	47.64	-26.36	74.00	54.73	38.53	15.39	61.01	---	---	Peak
11		13614.00	47.19	-26.81	74.00	54.00	38.58	16.91	62.30	---	---	Peak
12		17830.00	48.56	-25.44	74.00	50.48	40.97	19.92	62.81	---	---	Peak

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



Site : 03CH02-KS
Condition : FCC CLASS B 3m 59915 VERTICAL

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	71.71	31.45	-8.55	40.00	50.53	12.62	1.01	32.71	---	---	Peak
2	125.06	30.00	-13.50	43.50	43.55	17.59	1.54	32.68	---	---	Peak
3	250.19	35.07	-10.93	46.00	47.26	18.49	2.21	32.89	---	---	Peak
4	499.48	35.28	-10.72	46.00	41.35	23.93	3.15	33.15	---	---	Peak
5 p	849.65	38.52	-7.48	46.00	37.98	29.06	4.06	32.58	---	---	Peak
6	949.56	37.96	-8.04	46.00	34.67	30.67	4.29	31.67	---	---	Peak
7	3788.00	44.84	-29.16	74.00	66.80	33.23	8.62	63.81	---	---	Peak
8	7103.00	46.00	-28.00	74.00	62.37	35.80	11.93	64.10	---	---	Peak
9	9415.00	46.22	-27.78	74.00	59.01	36.47	13.53	62.79	---	---	Peak
10	11795.00	47.57	-26.43	74.00	54.78	38.50	15.35	61.06	---	---	Peak
11	14651.00	46.66	-27.34	74.00	51.60	39.85	17.52	62.31	---	---	Peak
12	17847.00	48.18	-25.82	74.00	50.06	41.00	19.93	62.81	---	---	Peak

Note:

1. Level(dBμV/m) = Read Level(dBμV) + Antenna Factor(dB/m) + Cable Loss(dB) - Preamp Factor(dB)
2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/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. 11, 2024	Nov. 28, 2024	Oct. 10, 2025	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44G,MAX 30dB	Oct. 11, 2024	Nov. 28, 2024	Oct. 10, 2025	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 06, 2023	Nov. 28, 2024	Dec. 05, 2024	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Mar. 01, 2024	Nov. 28, 2024	Feb. 28, 2025	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 27, 2024	Nov. 28, 2024	Jan. 26, 2025	Radiation (03CH02-KS)
Amplifier	EM	EM18G40GGA	060852	18~40GHz	Jan. 02, 2024	Nov. 28, 2024	Jan. 01, 2025	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	413740	9KHz-1GHz	Jan. 03, 2024	Nov. 28, 2024	Jan. 02, 2025	Radiation (03CH02-KS)
Amplifier	EM	EM01G18G	060840	1Ghz-18Ghz	Oct. 09, 2024	Nov. 28, 2024	Oct. 08, 2025	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Nov. 28, 2024	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Nov. 28, 2024	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Nov. 28, 2024	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 18, 2024	Dec. 02, 2024	Apr. 17, 2025	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Aug. 20, 2024	Dec. 02, 2024	Aug. 19, 2025	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Apr. 18, 2024	Dec. 02, 2024	Apr. 17, 2025	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 09, 2024	Dec. 02, 2024	Oct. 08, 2025	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**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**6.04 dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.12 dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

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

---------- THE END ----------