



FCC Test Report

APPLICANT : HMD Global Oy
EQUIPMENT : GSM/WCDMA/LTE Mobile Phone
BRAND NAME : NOKIA
MODEL NAME : TA-1496
FCC ID : 2AJOTTA-1496
STANDARD : 47 CFR Part 15 Subpart B
CLASSIFICATION : Certification
TEST DATE(S) : Jun. 15, 2022 ~ Jun. 28, 2022

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
FC241205	Rev. 01	Initial issue of report	Jul. 08, 2022
FC241205	Rev. 02	Update accessory information of section 2.3	Jul. 12, 2022

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 9.78 dB at 0.156 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 4.64 dB at 88.200 MHz

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1. General Description

1.1. Applicant

HMD Global Oy

Bertel Jungin aukio 9, 02600 Espoo, Finland

1.2. Manufacturer

HMD Global Oy

Bertel Jungin aukio 9, 02600 Espoo, Finland

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	GSM/WCDMA/LTE Mobile Phone
Brand Name	NOKIA
Model Name	TA-1496
FCC ID	2AJOTTA-1496
EUT supports Radios application	GSM/WCDMA/LTE/Bluetooth/FM
IMEI Code	Conduction: 359012910000555/359012910001553 Radiation: 359012910000100/359012910000101
HW Version	0207
SW Version	0.2221.15.10
EUT Stage	Identical Prototype

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

1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850MHz ~ 1910MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV : 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 7 : 2500 MHz ~ 2570 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Rx Frequency	GSM850: 869 MHz ~ 894 MHz GSM1900: 1930 MHz ~ 1990 MHz WCDMA Band II: 1930 MHz ~ 1990 MHz WCDMA Band IV : 2110 MHz ~ 2155 MHz WCDMA Band V: 869 MHz ~ 894 MHz

	LTE Band 2 : 1930 MHz ~ 1990 MHz LTE Band 4 : 2110 MHz ~ 2155 MHz LTE Band 5 : 869 MHz ~ 894 MHz LTE Band 7 : 2620 MHz ~ 2690 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz FM : 88 MHz ~ 108 MHz
Antenna Type	WWAN : PIFA Antenna Bluetooth : Line Antenna FM : Built-in Antenna
Type of Modulation	GSM/GPRS: GMSK WCDMA : BPSK HSPA : QPSK LTE: QPSK / 16QAM Bluetooth (1Mbps) : GFSK Bluetooth (2Mbps) : $\pi/4$ -DQPSK Bluetooth (3Mbps) : 8-DPSK

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 FAX : +86-512-57900958		
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	6.2009-8-24a
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

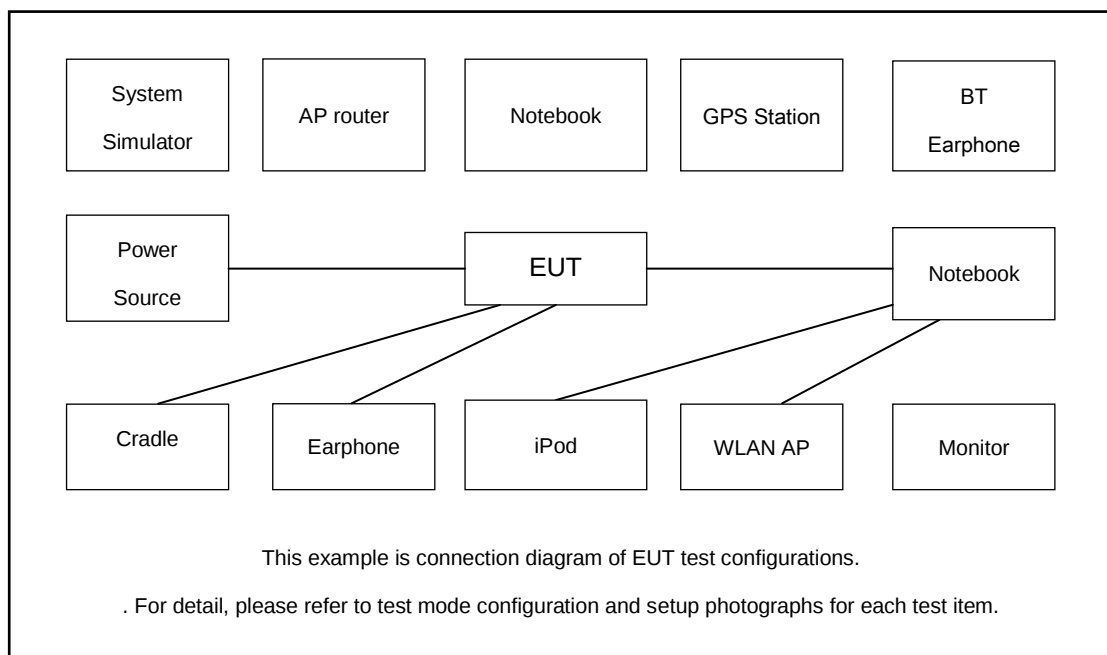
2.1. Test Mode

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: GSM 850 Idle(Low ch) + Bluetooth Idle + Camera(Rear) + BT Earphone (Charging from EUT) + USB Cable (Charging from Adapter1) + Battery + SIM 1
	Mode 2: WCDMA Band V Idle(High ch) + Bluetooth Idle + MPEG4(Run Color Bar) + BT Earphone (Charging from EUT) + USB Cable (Charging from Adapter2) + Battery + SIM 2
	Mode 3: GSM 850 Idle(Low ch) + Bluetooth Idle + FM Rx(98)MHz + BT Earphone (Charging from EUT + USB Cable (Charging from Adapter1) + Built-in Ant + Battery + SIM 1
	Mode 4: GSM 850 Idle(Low ch) + Bluetooth Idle + FM Rx(98)MHz + BT Earphone (Charging from EUT) + USB Cable (Data Link With NB) + Built-in Ant + Battery + SIM 1
Radiated Emissions	Mode 1: GSM 850 Idle(Low ch) + Bluetooth Idle + Camera(Rear) + BT Earphone (Charging from EUT) + USB Cable (Charging from Adapter1) + Battery + SIM 1
	Mode 2: WCDMA Band V Idle(High ch) + Bluetooth Idle + MPEG4(Run Color Bar) + BT Earphone (Charging from EUT) + USB Cable (Charging from Adapter2) + Battery + SIM 2
	Mode 3: GSM 850 Idle(Low ch) + Bluetooth Idle + FM Rx(88)MHz + BT Earphone (Charging from EUT + USB Cable (Charging from Adapter1) + Built-in Ant + Battery + SIM 1
	Mode 4: GSM 850 Idle(Low ch) + Bluetooth Idle + FM Rx(88)MHz + BT Earphone (Charging from EUT) + USB Cable (Data Link With NB) + Built-in Ant + Battery + SIM 1
Remark: - The worst case of AC is mode 4; only the test data of this mode is reported. - The worst case of RE is mode 1; only the test data of this mode is reported. - Data Link with Notebook means data application transferred mode between EUT and Notebook - Pre-scanned Low/Middle/High channel for GSM 850/WCDMA Band V and FM Rx, the worst channel was recorded in this report.	

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.	LTE Base Station	Anritus	MT8821C	N/A	N/A	Unshielded,1.8m
2.	Signal Generator	R&S	SMBV100A	N/A	N/A	N/A
3.	Hard disk	KINGSHARE	KSP6120G	Fcc DoC	N/A	Shielded, 1.2m
4.	WLAN AP	TP-Link	TL-WDR5600	N/A	N/A	N/A
5.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
6.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
7.	Notebook	Lenovo	S730-13IWL	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
8.	SD Card	SanDisk	Uitra	N/A	N/A	N/A
9.	SD Card	Kingston	8GB	N/A	N/A	N/A
10.	BT headset	NOKIA	TWS-XPR	2AJOTTW-SXPR	N/A	N/A



2.4. EUT Operation Test Setup

The EUT was in GSM or WCDMA or LTE idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

At the same time, the EUT was attached to the Bluetooth earphone, and the following programs installed in the EUT were programmed during the test.

1. Data application is transferred between notebook and EUT via USB cable.
2. Turn on camera to capture images.
3. Turn on MPEG4 function.
4. Turn on FM function to make the EUT receive continuous signals from FM station.

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.

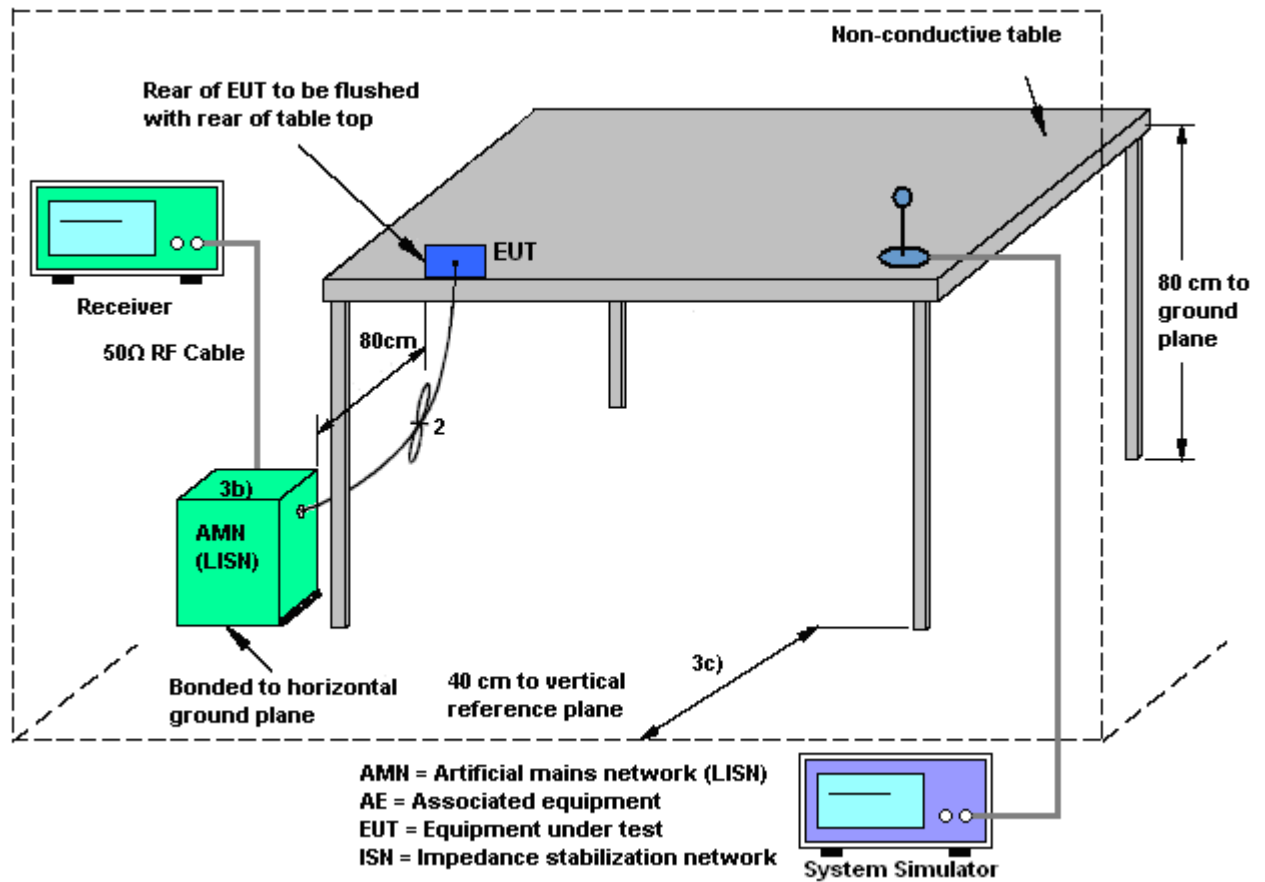
3.1.2 Measuring Instruments

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

3.1.3 Test Procedure

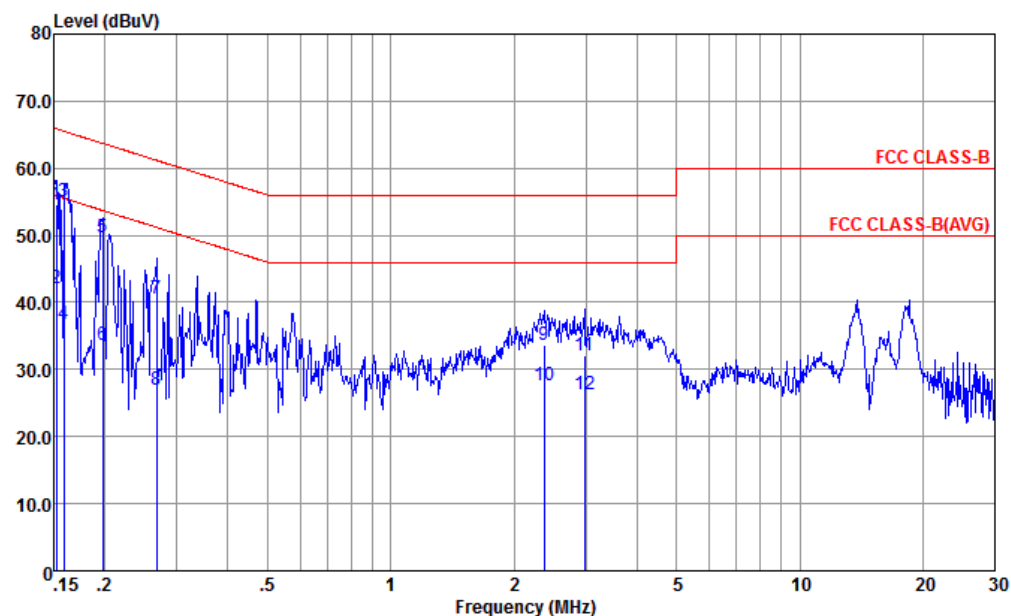
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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

Test Engineer :	Amos Zhao	Temperature :	25.3~26.2°C
		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.		

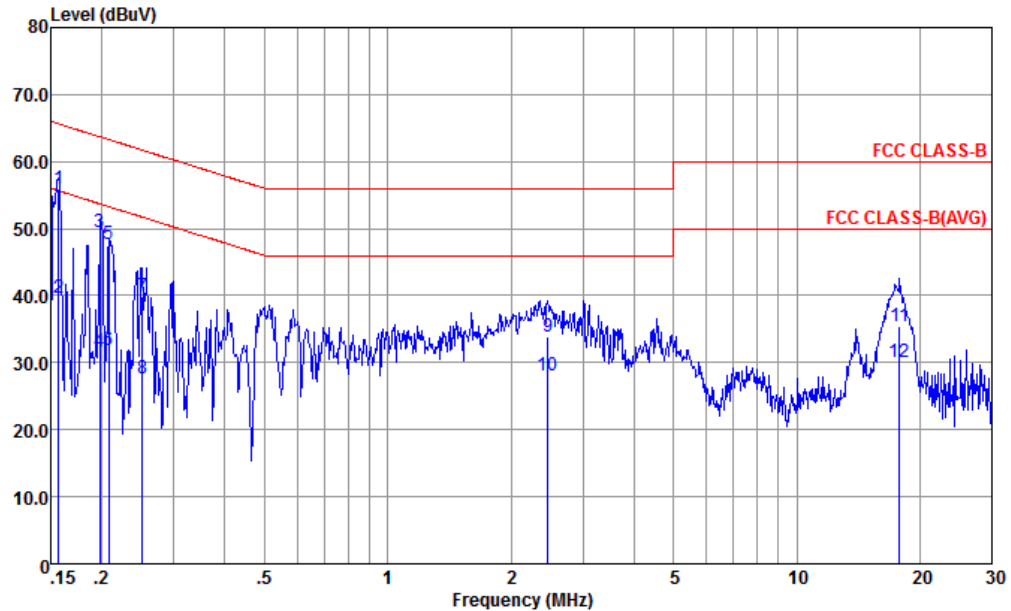


Site : CO01-KS
Condition : FCC CLASS-B LISN-060105-L LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.152	54.69	-11.18	65.87	44.20	0.02	10.47	QP
2	0.152	42.09	-13.78	55.87	31.60	0.02	10.47	Average
3 *	0.159	55.08	-10.44	65.52	44.60	0.02	10.46	QP
4	0.159	36.78	-18.74	55.52	26.30	0.02	10.46	Average
5	0.198	49.61	-14.10	63.71	39.20	0.04	10.37	QP
6	0.198	33.61	-20.10	53.71	23.20	0.04	10.37	Average
7	0.267	40.59	-20.61	61.20	30.21	0.06	10.32	QP
8	0.267	26.99	-24.21	51.20	16.61	0.06	10.32	Average
9	2.371	33.68	-22.42	56.00	23.21	0.14	10.23	QP
10	2.371	27.68	-18.32	46.00	17.31	0.14	10.23	Average
11	2.978	31.99	-24.01	56.00	21.60	0.15	10.24	QP
12	2.978	26.19	-19.81	46.00	15.80	0.15	10.24	Average



Test Engineer :	Amos Zhao	Temperature :	25.3~26.2°C
		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.		



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1 *	0.156	55.87	-9.78	65.65	45.30	0.11	10.46	QP
2	0.156	39.77	-15.88	55.65	29.20	0.11	10.46	Average
3	0.198	49.37	-14.34	63.71	38.90	0.10	10.37	QP
4	0.198	31.67	-22.04	53.71	21.20	0.10	10.37	Average
5	0.208	47.76	-15.51	63.27	37.30	0.10	10.36	QP
6	0.208	31.96	-21.31	53.27	21.50	0.10	10.36	Average
7	0.251	39.93	-21.80	61.73	29.50	0.10	10.33	QP
8	0.251	27.73	-24.00	51.73	17.30	0.10	10.33	Average
9	2.461	33.98	-22.02	56.00	23.60	0.15	10.23	QP
10	2.461	28.18	-17.82	46.00	17.80	0.15	10.23	Average
11	17.849	35.49	-24.51	60.00	24.60	0.44	10.45	QP
12	17.849	30.09	-19.91	50.00	19.20	0.44	10.45	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

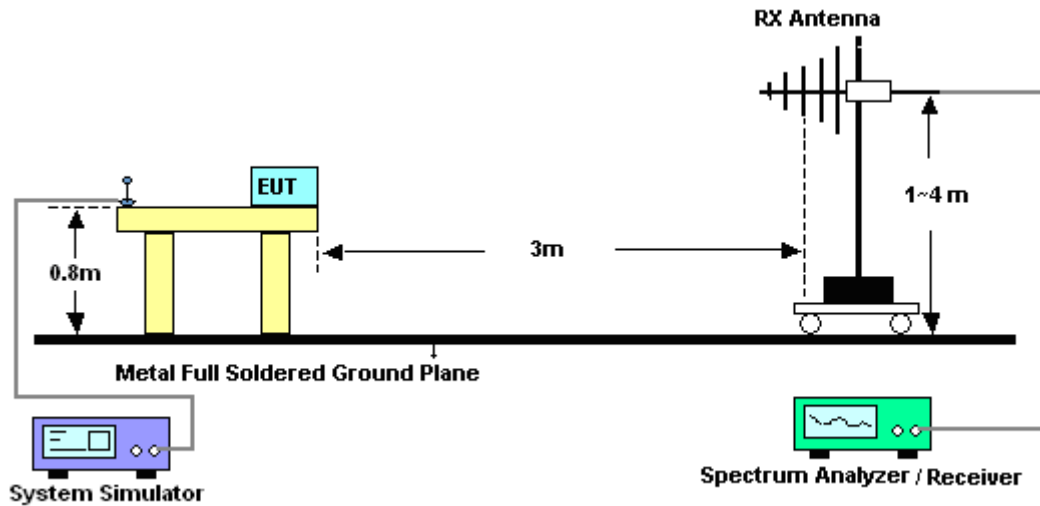
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

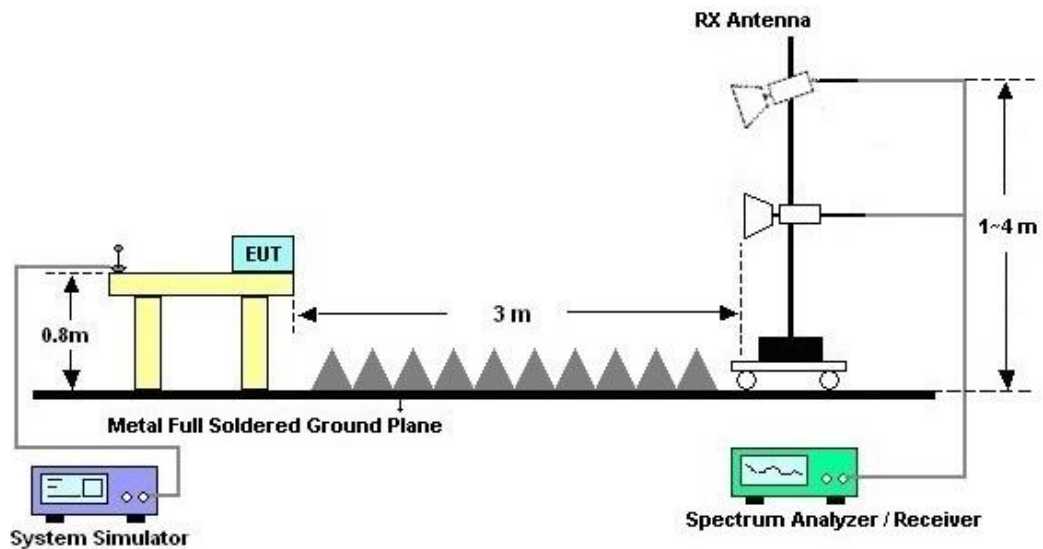
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna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

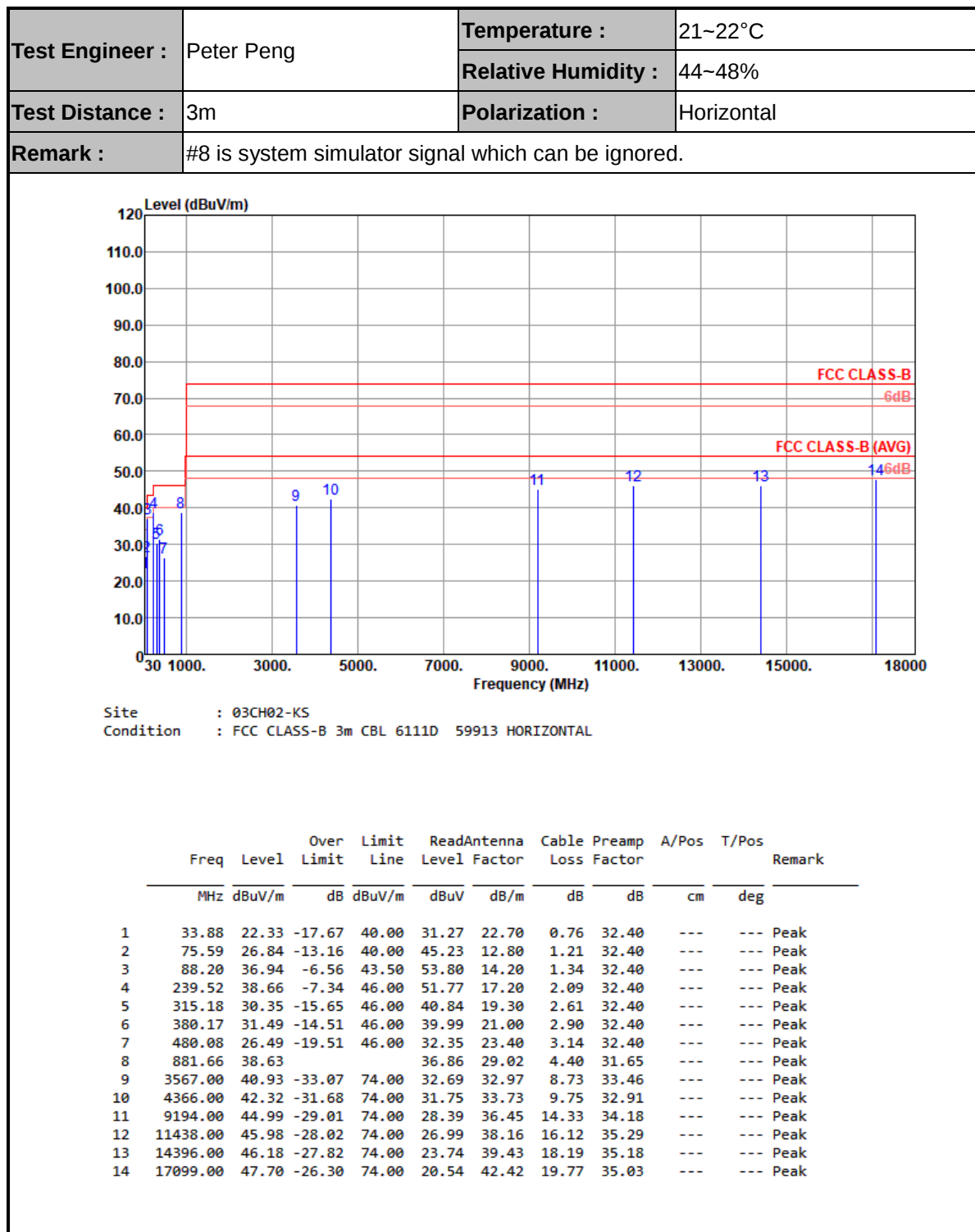


For radiated emissions above 1GHz



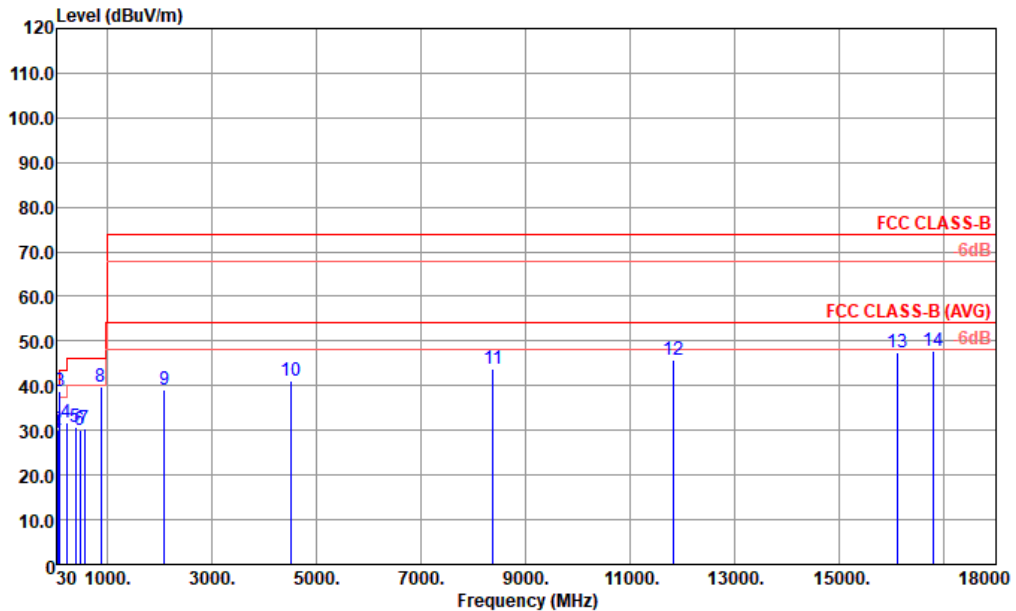


3.2.5. Test Result of Radiated Emission





Test Engineer :	Peter Peng	Temperature :	21~22°C
		Relative Humidity :	44~48%
Test Distance :	3m	Polarization :	Vertical
Remark :	#8 is system simulator signal which can be ignored.		



	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	cm	deg	
			dB	dBuV/m	dBuV	dB/m	dB	dB			
1	34.85	29.51	-10.49	40.00	38.85	22.30	0.76	32.40	---	---	Peak
2	48.43	29.97	-10.03	40.00	46.39	15.00	0.98	32.40	---	---	Peak
3	88.20	38.86	-4.64	43.50	55.72	14.20	1.34	32.40	---	---	Peak
4	229.82	31.62	-14.38	46.00	45.93	16.00	2.09	32.40	---	---	Peak
5	391.81	30.85	-15.15	46.00	38.81	21.48	2.96	32.40	---	---	Peak
6	480.08	30.18	-15.82	46.00	36.04	23.40	3.14	32.40	---	---	Peak
7	560.59	30.49	-15.51	46.00	33.58	26.02	3.29	32.40	---	---	Peak
8	881.66	39.74			37.97	29.02	4.40	31.65	---	---	Peak
9	2088.00	38.96	-35.04	74.00	36.73	30.59	6.66	35.02	---	---	Peak
10	4519.00	41.05	-32.95	74.00	28.01	35.89	9.92	32.77	---	---	Peak
11	8378.00	43.67	-30.33	74.00	29.09	35.12	13.86	34.40	---	---	Peak
12	11829.00	45.64	-28.36	74.00	25.20	39.63	16.32	35.51	---	---	Peak
13	16113.00	47.43	-26.57	74.00	23.03	40.58	19.08	35.26	---	---	Peak
14	16793.00	47.82	-26.18	74.00	22.24	41.06	19.56	35.04	---	---	Peak

Note:

- Level(dBμV/m) = Read Level(dBμV) + Antenna Factor(dB/m) + Cable Loss(dB) - Preamp Factor(dB)
- 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 Receiver	R&S	ESC17	100768	9kHz~7GHz;	May. 24, 2022	Jun. 18, 2022	May. 23, 2023	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 14, 2021	Jun. 18, 2022	Oct. 13, 2022	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	May. 24, 2022	Jun. 18, 2022	May. 23, 2023	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 14, 2021	Jun. 18, 2022	Oct. 13, 2022	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 16, 2021	Jun. 15, 2022 Jun. 28, 2022	Oct. 15, 2022	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz~44G,MAX 30dB	Oct. 16, 2021	Jun. 15, 2022 Jun. 28, 2022	Oct. 15, 2022	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz~1GHz	Dec. 22, 2021	Jun. 15, 2022 Jun. 28, 2022	Dec. 21, 2022	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 30, 2021	Jun. 15, 2022 Jun. 28, 2022	Oct. 29, 2022	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	413741	9KHz~1GHz	Jan. 05, 2022	Jun. 15, 2022 Jun. 28, 2022	Jan. 04, 2023	Radiation (03CH02-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5G Hz	Oct. 16, 2021	Jun. 15, 2022 Jun. 28, 2022	Oct. 15, 2022	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jun. 15, 2022 Jun. 28, 2022	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jun. 15, 2022 Jun. 28, 2022	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jun. 15, 2022 Jun. 28, 2022	NCR	Radiation (03CH02-KS)

NCR: No Calibration Required

5. Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.94dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.9dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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