



FCC Test Report

APPLICANT : HMD Global Oy
EQUIPMENT : GSM/WCDMA/LTE Mobile Phone
BRAND NAME : NOKIA
MODEL NAME : TA-1386
FCC ID : 2AJOTTA-1386
STANDARD : 47 CFR Part 15 Subpart B
CLASSIFICATION : Certification
TEST DATE(S) : Jul. 29, 2021

We, Sporton International (Kunshan) Inc., 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 (Kunshan) Inc., the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

Alex Wang

Approved by: Alex Wang / Manager



Sporton International (Kunshan) Inc.

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC170505	Rev. 01	Initial issue of report	Aug. 12, 2021

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 9.02 dB at 2.121 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 7.27 dB at 191.990 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-1386
FCC ID	2AJOTTA-1386
EUT supports Radios application	GSM/WCDMA/LTE FM Receiver
IMEI Code	Conduction/Radiation: 004402972549558/004402972551554
HW Version	HW0112
SW Version	0.2105.11.10
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 WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 7 : 2500 MHz ~ 2570 MHz
Rx Frequency	GSM850: 869 MHz ~ 894 MHz WCDMA Band V: 869 MHz ~ 894 MHz LTE Band 5 : 869 MHz ~ 894 MHz LTE Band 7 : 2620 MHz ~ 2690 MHz FM : 88 MHz ~ 108 MHz
Antenna Type	WWAN : PIFA Antenna FM : External Earphone Antenna
Type of Modulation	GSM/GPRS: GMSK WCDMA : BPSK (Uplink) HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink) HSPA+ : 16QAM (uplink is not supported) LTE: QPSK / 16QAM FM

1.5. Modification of EUT

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

1.6. Test Location

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

Test Firm	Sporton International (Kunshan) Inc.		
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

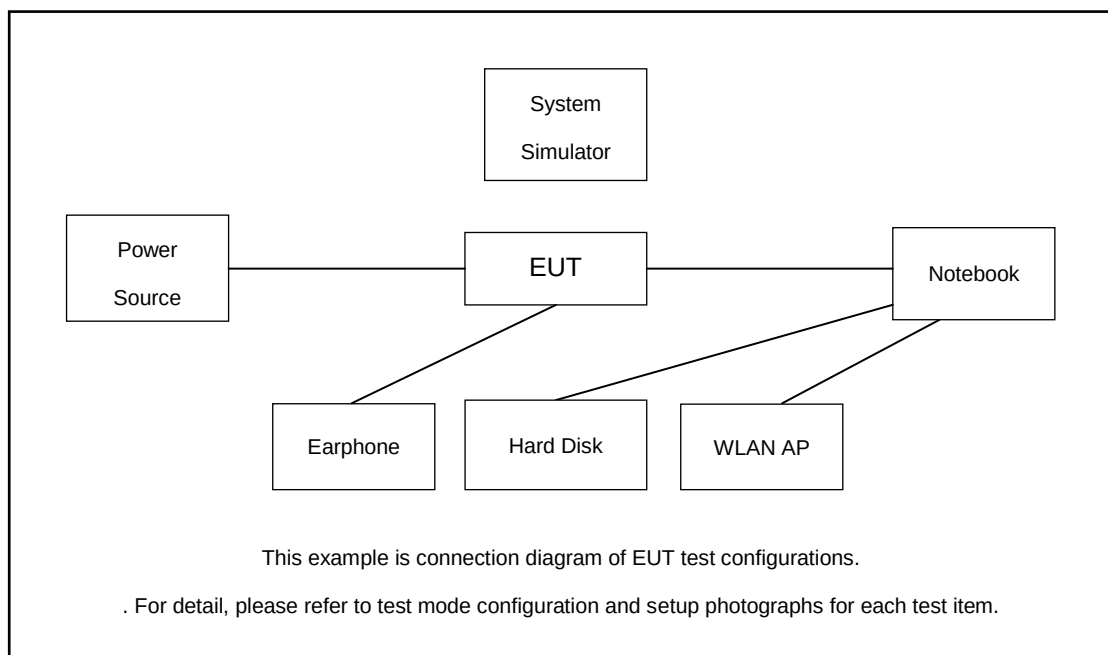
2.1. Test Mode

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 fundamental frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
AC Conducted Emission	Mode 1: GSM850 Rx(Middle) + Camera + Earphone + Adapter 1 + Battery 1 Mode 2: WCDMA Band V Rx(Low) + MPEG4 + Earphone + Adapter 2 + Battery 2 Mode 3: LTE Band 5 Rx(High) + FM Rx(98Mhz) + Earphone + Adapter 2 + + Battery 2 Mode 4: LTE Band 7 Rx + Earphone + USB Cable 1(Data Link with Notebook)+ + Battery 2 Mode 5: LTE Band 7 Rx + Earphone + USB Cable 2(Data Link with Notebook) + Battery 2
Radiated Emissions	Mode 1: GSM850 Rx(Middle) + Camera + Earphone + Adapter 1 + Battery 1 Mode 2: WCDMA Band V Rx(Low) + MPEG4 + Earphone + Adapter 2 + Battery 2 Mode 3: LTE Band 5 Rx(High) + FM Rx(88Mhz) + Earphone + Adapter 1 + Battery 1 Mode 4: LTE Band 7 Rx + Earphone + USB Cable 1(Data Link with Notebook) + Battery 1 Mode 5: LTE Band 7 Rx + Earphone + USB Cable 2(Data Link with Notebook) + Battery 1
Remark: 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 4; only the test data of this mode is reported. 3. Data Link with Notebook means data application transferred mode between EUT and Notebook. 4. Pre-scanned Low/Middle/High channel, 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.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8821C	N/A	N/A	Unshielded,1.8m
3.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
4.	WLAN AP	TP-Link	TL-WDR5600	N/A	N/A	Unshielded,1.8m
5.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
6.	Notebook	Lenovo	S730-13IWL	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
7.	Hard Disk	Lenovo	F310	DoC	Shielded, 1.2m	N/A
8.	Hard disk	KINGSHARE	KSP6120G	Fcc DoC	Shielded, 1.2m	N/A
9.	SD Card	Kingston	8GB	N/A	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.

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 MPEG4 function.
3. Turn on camera to capture images.
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.

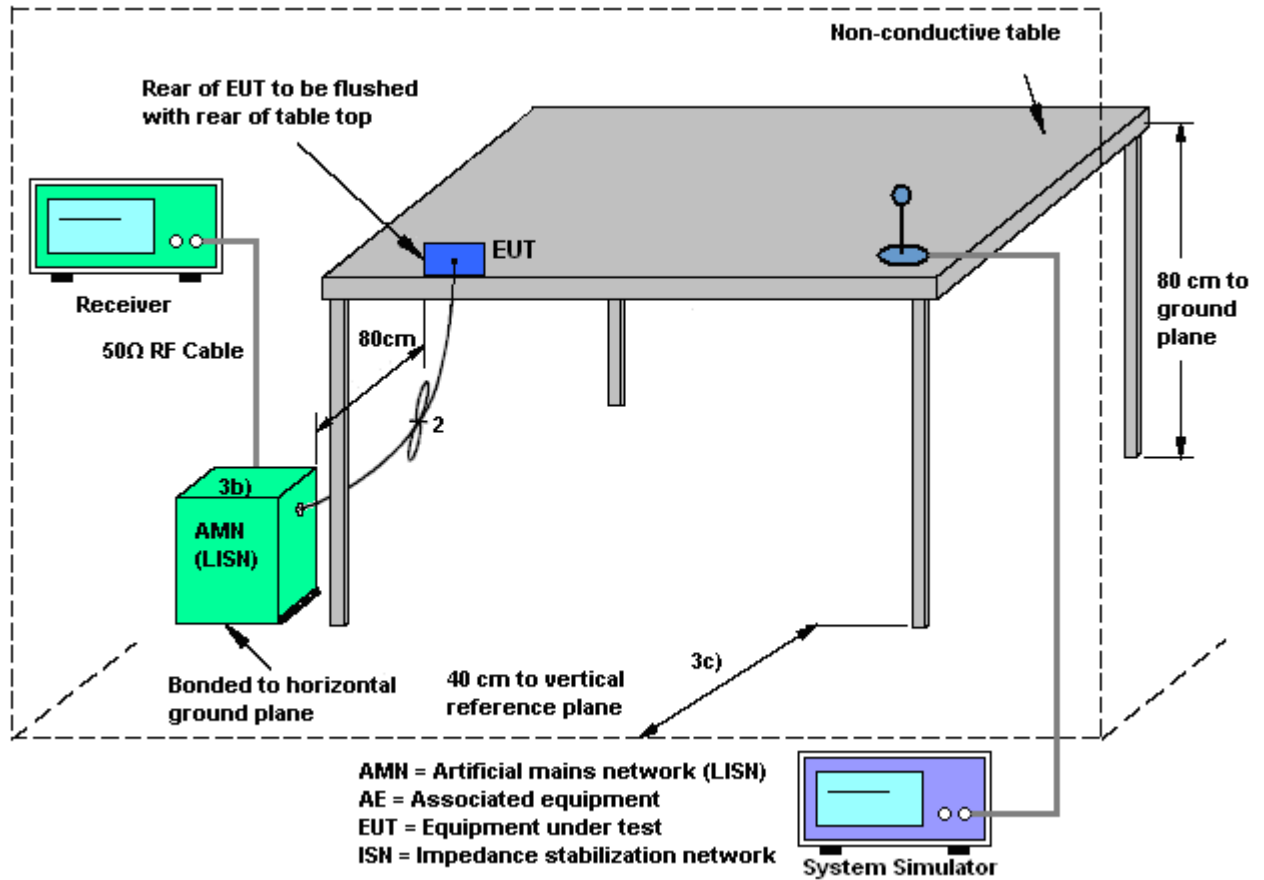
3.1.2 Measuring Instruments

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.

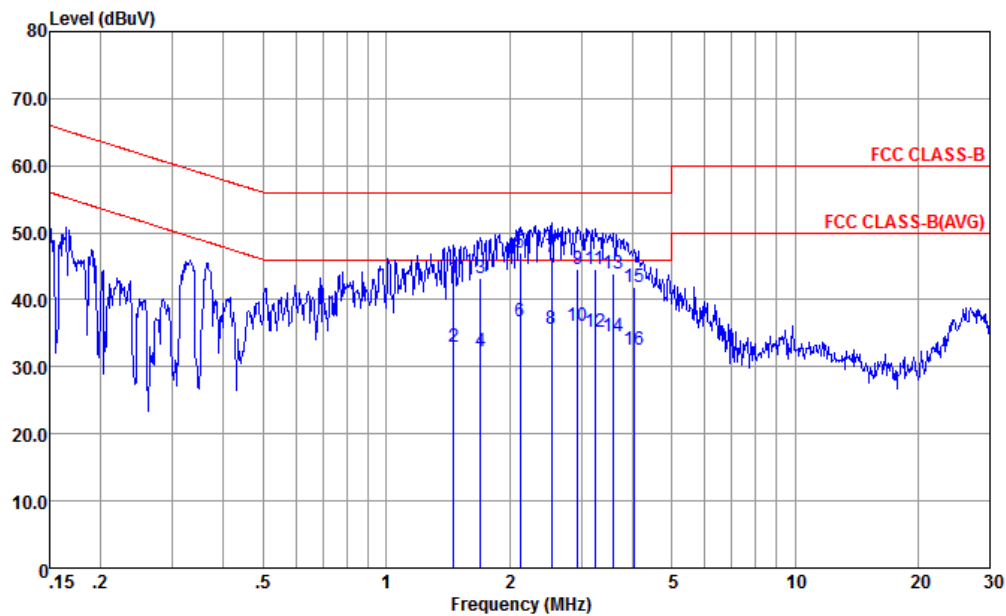
3.1.4 Test Setup





3.1.5 Test Result of AC Conducted Emission

Test Engineer :	Amos 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.		

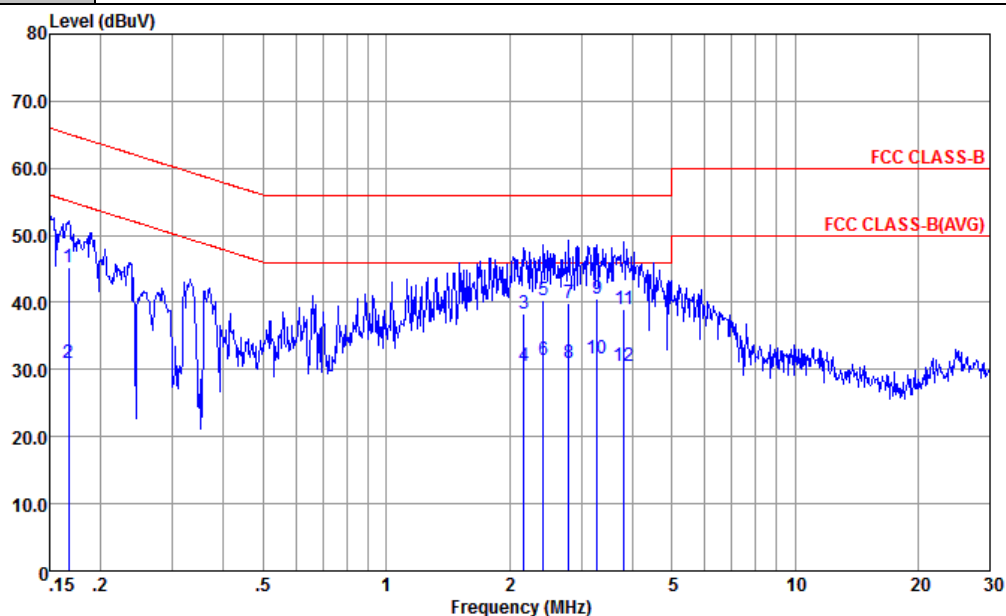


Site : CO01-KS
Condition : FCC CLASS-B TWO-LISN-CN02-L LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	1.464	43.26	-12.74	56.00	23.20	9.83	10.23	QP
2	1.464	32.96	-13.04	46.00	12.90	9.83	10.23	Average
3	1.698	43.31	-12.69	56.00	23.20	9.88	10.23	QP
4	1.698	32.31	-13.69	46.00	12.20	9.88	10.23	Average
5 *	2.121	46.98	-9.02	56.00	26.80	9.95	10.23	QP
6	2.121	36.78	-9.22	46.00	16.60	9.95	10.23	Average
7	2.540	46.35	-9.65	56.00	26.10	10.01	10.24	QP
8	2.540	35.55	-10.45	46.00	15.30	10.01	10.24	Average
9	2.946	44.50	-11.50	56.00	24.20	10.06	10.24	QP
10	2.946	36.10	-9.90	46.00	15.80	10.06	10.24	Average
11	3.241	44.54	-11.46	56.00	24.21	10.09	10.24	QP
12	3.241	35.24	-10.76	46.00	14.91	10.09	10.24	Average
13	3.603	43.98	-12.02	56.00	23.60	10.13	10.25	QP
14	3.603	34.58	-11.42	46.00	14.20	10.13	10.25	Average
15	4.049	41.92	-14.08	56.00	21.50	10.17	10.25	QP
16	4.049	32.62	-13.38	46.00	12.20	10.17	10.25	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 CLASS-B TWO-LISN-CN02-N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.167	45.17	-19.95	65.12	24.90	9.83	10.44	QP
2	0.167	30.87	-24.25	55.12	10.60	9.83	10.44	Average
3	2.167	38.38	-17.62	56.00	18.20	9.95	10.23	QP
4	2.167	30.48	-15.52	46.00	10.30	9.95	10.23	Average
5	2.422	40.33	-15.67	56.00	20.10	10.00	10.23	QP
6	2.422	31.43	-14.57	46.00	11.20	10.00	10.23	Average
7	2.794	39.88	-16.12	56.00	19.59	10.05	10.24	QP
8	2.794	30.88	-15.12	46.00	10.59	10.05	10.24	Average
9	3.276	40.65	-15.45	56.00	20.21	10.10	10.24	QP
10 *	3.276	31.65	-14.35	46.00	11.31	10.10	10.24	Average
11	3.820	39.01	-16.99	56.00	18.60	10.16	10.25	QP
12	3.820	30.51	-15.49	46.00	10.10	10.16	10.25	Average

Note:

- Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
- 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

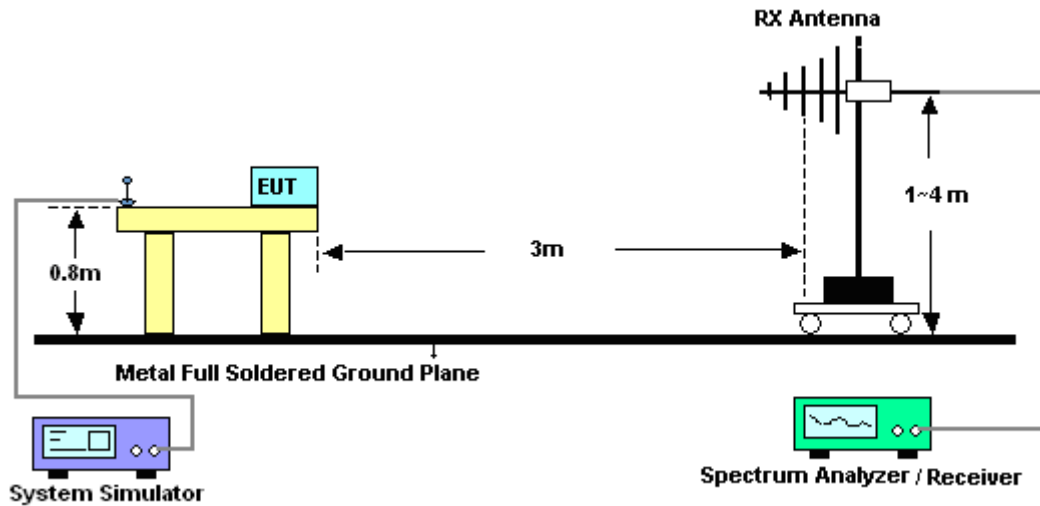
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

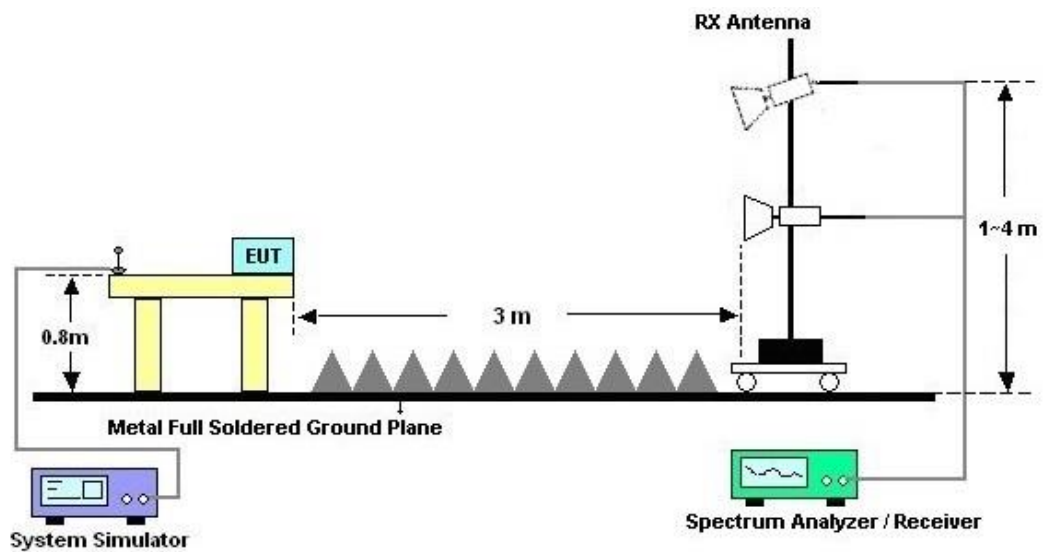
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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

3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz

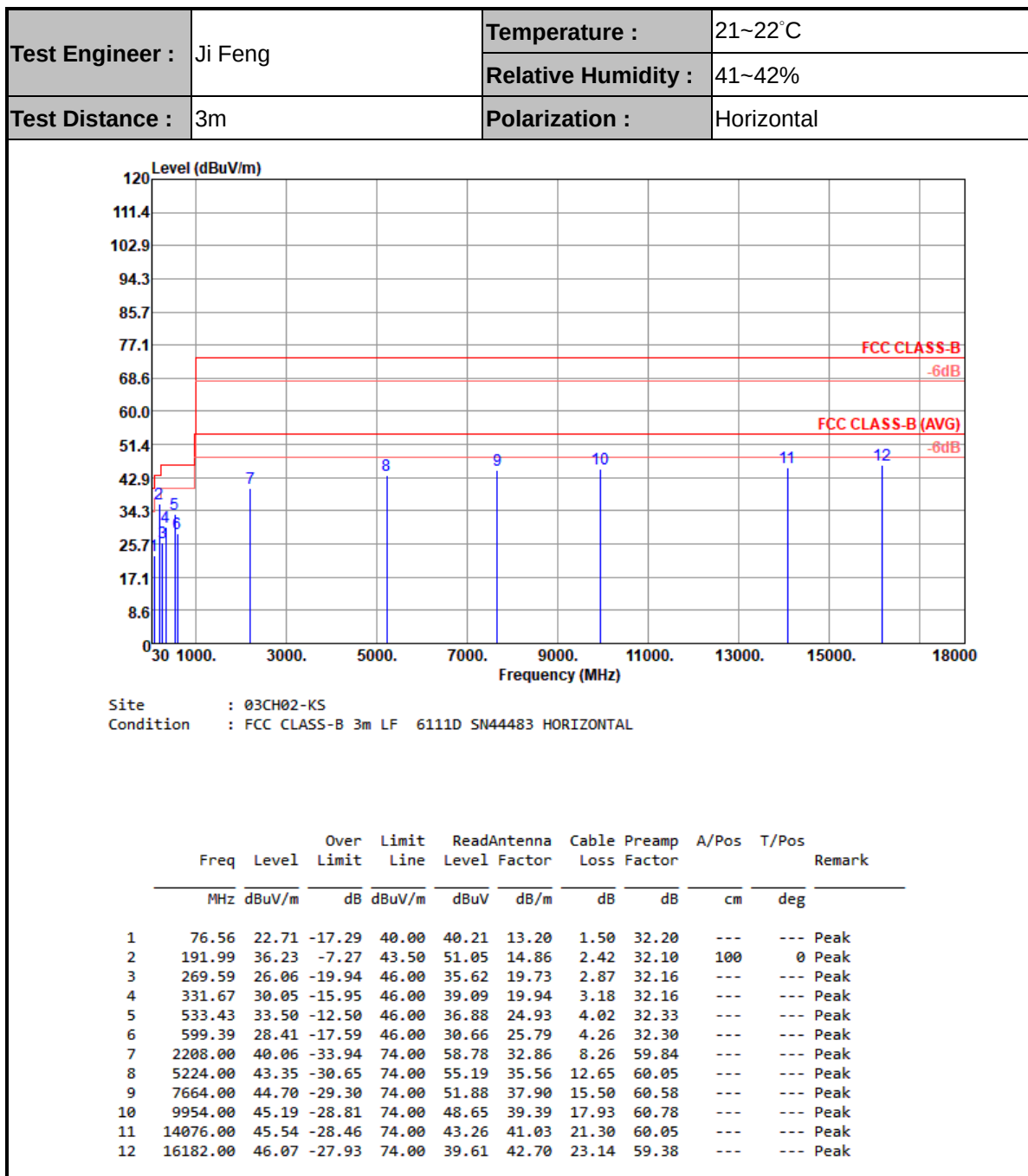


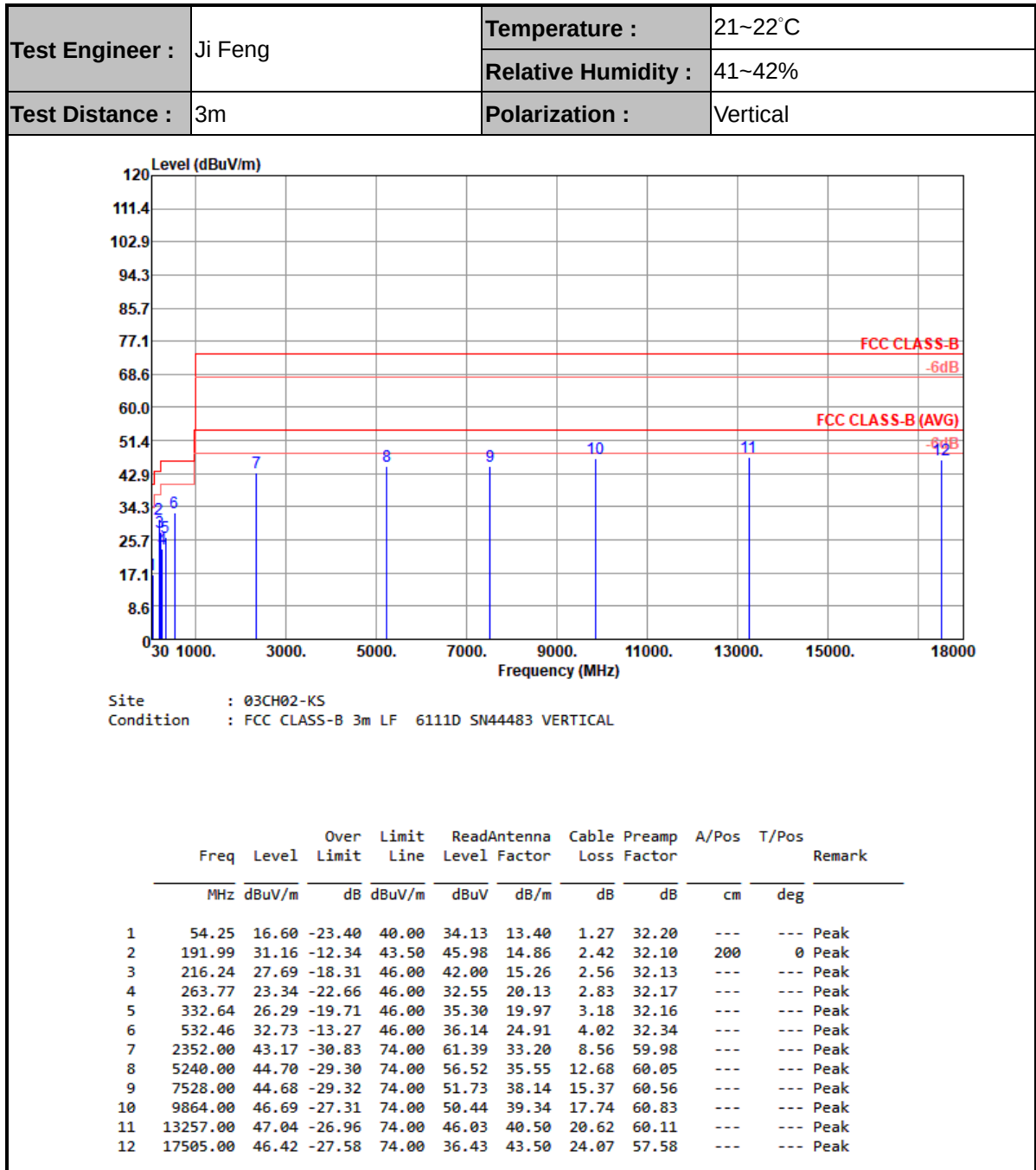
For radiated emissions above 1GHz





3.2.5. Test Result of Radiated Emission





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 Receiver	R&S	ESC17	100768	9kHz~7GHz;	Apr. 21, 2021	Jul. 29, 2021	Apr. 20, 2022	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 17, 2020	Jul. 29, 2021	Oct. 16, 2021	Conduction (CO01-KS)
AC LISN	R&S	ENV216	100334	9kHz~30MHz	Oct. 17, 2020	Jul. 29, 2021	Oct. 16, 2021	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 17, 2020	Jul. 29, 2021	Oct. 16, 2021	Conduction (CO01-KS)
Thermometer & hygrometer	SHENTUO	HTC-1	KS100807JCGS04	HTC-106	Apr. 14, 2021	Jul. 29, 2021	Apr. 13, 2022	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 17, 2020	Jul. 29, 2021	Oct. 16, 2021	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz~44G,MAX 30dB	Oct. 17, 2020	Jul. 29, 2021	Oct. 16, 2021	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz~1GHz	Jan. 26, 2021	Jul. 29, 2021	Jan. 25, 2022	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 01, 2020	Jul. 29, 2021	Oct. 31, 2021	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 06, 2020	Jul. 29, 2021	Nov. 05, 2021	Radiation (03CH02-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 06, 2021	Jul. 29, 2021	Jan. 05, 2022	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz~1GHz	Apr. 12, 2021	Jul. 29, 2021	Apr. 11, 2022	Radiation (03CH02-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Oct. 17, 2020	Jul. 29, 2021	Oct. 16, 2021	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jul. 29, 2021	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jul. 29, 2021	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jul. 29, 2021	NCR	Radiation (03CH02-KS)
Thermometer & hygrometer	SHENTUO	HTC-1	KS150428JCGS01	HTC-109	Apr. 14, 2021	Jul. 29, 2021	Apr. 13, 2022	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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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
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