VARIANT EMC TEST REPORT

Applicant:	HMD Global Oy
Address:	Bertel Jungin aukio 9, 02600 Espoo, Finland

Manufacturer or Supplier:	HMD Global Oy
Address:	Bertel Jungin aukio 9, 02600 Espoo, Finland
Product:	Multi-band GSM/WCDMA/LTE phone with Bluetooth&WLAN
Brand Name:	NOKIA
Model Name:	TA-1404
FCC ID:	2AJOTTA-1404
Date of tests:	Nov. 25, 2021 ~ Oct. 10, 2022

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

☐ **FCC Part 15, Subpart B, Class A**
☒ **FCC Part 15, Subpart B, Class B**
☒ **ANSI C63.4:2014**

CONCLUSION: The submitted sample was found to <u>COMPLY</u> with the test requirement

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Simon Wang Date: Oct. 10, 2022	Luke Lu Date: Oct. 10, 2022

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/ and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P21100018-1EM01	Original release	Dec. 13, 2021
W7L-P22090015-4EM01	Based on the original product changing the packaging factory of the chip and software version, removed Aohai_A829US adapter ,BRL_ CB - 36A USB cable, Saibao_ CB - 12A USB cable, LEADER_ HS-34 earphone, added Saibao_AC-2A USB cable. The new sample verify CE, RE data	Oct. 10, 2022

1 GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Multi-band GSM/WCDMA/LTE phone with Bluetooth&WLAN	
BRAND NAME	NOKIA	
MODEL NAME	TA-1404	
NOMINAL VOLTAGE	5.0Vdc(adapter or host equipment) 3.85Vdc (Li-ion, battery)	
MODULATION TYPE	**BT_LE**	GFSK
	Bluetooth	GFSK, π/4-DQPSK, 8DPSK
	FM	FM
	WLAN	DSSS, OFDM
	GNSS	BPSK
	GSM/GPRS/EDGE	GMSK, 8PSK
	WCDMA	QPSK
	LTE	QPSK/16QAM/64QAM
OPERATING FREQUENCY **OPERATING FREQUENCY**	**Bluetooth/BT_LE**	2402MHz ~ 2480MHz
	FM	87.5MHz ~ 108MHz
	WLAN	2412 ~ 2472MHz for 11b/g/n(HT20)/n(HT40) 5180 ~ 5240MHz, 5260 ~ 5320 MHz, 5500 ~ 5700MHz, 5745 ~ 5825 MHz for 11a/ n(HT20)/ n(HT40) / ac(VHT20)/ ac(VHT40) / ac(VHT80)
	GPS/BDS/ GALILEO	1559MHz ~ 1610MHz
	GSM	824.2MHz ~ 848.8MHz (FOR GSM 850) 1850.2MHz ~ 1909.8MHz (FOR GSM 1900)
	WCDMA	1852.4MHz ~ 1907.6MHz(FOR WCDMA Band 2) 1712.4MHz ~ 1752.6MHz(FOR WCDMA Band 4) 826.4MHz ~ 846.6MHz (FOR WCDMA Band 5)
	LTE	1850.7MHz ~ 1909.3MHz (FOR LTE Band2) 1710.7MHz ~ 1754.3MHz (FOR LTE Band4) 824.7MHz ~ 848.3MHz (FOR LTE Band5) 2502.5MHz ~ 2567.5MHz (FOR LTE Band7) 699.7MHz ~ 715.3MHz (FOR LTE Band12) 779.5MHz ~ 784.5MHz (FOR LTE Band13) 706.5MHz ~ 713.5MHz (FOR LTE Band17) 1710.7MHz ~ 1779.3MHz (FOR LTE Band66)

HW VERSION	19655-1-11M12
SW VERSION	00WW_1_520
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	USB1 cable: unshielded without ferrite, 1.0meter USB2 cable: unshielded without ferrite, 1.0meter Earphone1: non-shielded cable, with w/o ferrite core, 1.2 meter
ACCESSORY DEVICES	Refer to note as below

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

List of Accessory:

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
Battery	Nokia	Hunan Gaoyuan Battery Co., Ltd.	WT341	Capacity：3.85 Vdc, 4900mAh
AC Adapter 1	Nokia	ShenZhenBaiJunDa ElectronicCO.,LTD.	AD-010U	I/P: 100-240Vac, 0.35A, O/P: 5.0Vdc, 2.0A
AC Adapter 2	Nokia	SHENZHEN TIANYIN ELECTRONICS CO., LTD.	CH-21U	I/P: 100-240Vac, 0.3A, O/P: 5.0Vdc, 2.0A
AC Adapter 3	Nokia	YuTong Electronics(HuiZhou) Co.,Ltd	PA-US5V2A-03 6	I/P: 100-240Vac, 0.5A, O/P: 5.0Vdc, 2.0A
Earphone 1	Nokia	Guangdong Wivtak Technology Co., Ltd.	HS-34	Signal Line, 1.2meter
USB Cable 1	Nokia	HUIZHOU WASHIN ELECTRONICS CO.,LTD	CB-36A	Signal Line, 1.0meter
USB Cable 2	Nokia	Saibao(Jiangi) Communication Industial Co.,Ltd	AC-2A	Signal Line, 1.0meter

1.2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart B		
Standard Section	**Test Item**	**Result**
FCC Part 15, Subpart B, Class B ANSI C63.4:2014	Conducted Test	Compliance
	Radiated Emission Test (30MHz ~ 1GHz)	Compliance
	Radiated Emission Test (Above 1GHz)	Compliance

1.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz ~ 30MHz	±2.70dB
Radiated emissions	30MHz~1GMHz	±4.98dB
	1GMHz ~6GMHz	±4.70dB
	6GMHz ~18GMHz	±4.60dB

1.4 DESCRIPTION OF TEST MODES

Test Mode	Test Condition
Radiated emission test	
1	GSM850 Idle + Adapter1 + SIM1 + USB cable 1 + Earphone1 + BT Idle + WIFI Idle + Front Camera On
2	GSM1900 Idle + Adapter2 + SIM2 + USB cable 1+ Earphone1 + BT Idle + WIFI Idle + Back Camera On
3	WCDMA B2 Idle + Adapter3 + SIM1 + USB cable 1+ Earphone1 + BT Idle + WIFI Idle + Front Camera On
4	WCDMA B4 Idle + Adapter1 + SIM2 + USB cable 1 + Earphone1 + BT Idle + WIFI Idle + Back Camera On
5	WCDMA B5 Idle + Adapter1 + SIM1 + USB cable 1 + Earphone1 + BT Idle + WIFI Idle
6	LTE B2 Idle + Adapter2 + SIM2 + USB cable 1+ Earphone1 + BT Idle + WIFI Idle
7	LTE B4 Idle + Adapter3 + SIM1 + USB cable 1+ Earphone1 + BT Idle + WIFI Idle
8	LTE B5 Idle + Adapter1 + SIM1 + USB cable 1 + Earphone1 + BT Idle + WIFI Idle+ MPG4
9	LTE B7 Idle + Adapter1 + SIM2 + USB cable 1+ Earphone1 + BT Idle + WIFI Idle+ Front Camera On
10	LTE B12 Idle + USB Link + Data Transmission + SIM2 + BT Idle + WIFI Idle+ EUT to Notebook + USB cable 1+ Earphone1
11	LTE B13 Idle + USB Link + Data Transmission + SIM1 + BT Idle + WIFI Idle+ Notebook to EUT+ USB cable 1 + Earphone1
12	LTE B17 Idle + USB Link + Data Transmission + SIM2 + BT Idle + WIFI Idle+ SD to Notebook + USB cable 1 + Earphone1
13	LTE B66 Idle + USB Link + Data Transmission + SIM1 + BT Idle + WIFI Idle+ Notebook to SD + USB cable 1 + Earphone1
14	Worst case of 1-13(mode 10)+ USB cable 2

Conducted emission test	
1	GSM850 Idle + Adapter1 + SIM1 + USB cable 1 + Earphone1 + BT Idle + WIFI Idle + Front Camera On
2	GSM1900 Idle + Adapter2 + SIM2 + USB cable 1+ Earphone1 + BT Idle + WIFI Idle + Back Camera On
3	WCDMA B2 Idle + Adapter3 + SIM1 + USB cable 1+ Earphone1 + BT Idle + WIFI Idle + Front Camera On
4	WCDMA B4 Idle + Adapter1 + SIM2 + USB cable 1 + Earphone1 + BT Idle + WIFI Idle + Back Camera On
5	WCDMA B5 Idle + Adapter1 + SIM1 + USB cable 1 + Earphone1 + BT Idle + WIFI Idle
6	LTE B2 Idle + Adapter2 + SIM2 + USB cable 1+ Earphone1 + BT Idle + WIFI Idle
7	LTE B4 Idle + Adapter3 + SIM1 + USB cable 1+ Earphone1 + BT Idle + WIFI Idle
8	LTE B5 Idle + Adapter1 + SIM1 + USB cable 1 + Earphone1 + BT Idle + WIFI Idle+ MPG4
9	LTE B7 Idle + Adapter1 + SIM2 + USB cable 1+ Earphone1 + BT Idle + WIFI Idle+ Front Camera On

10	LTE B12 Idle + USB Link + Data Transmission + SIM2 + BT Idle + WIFI Idle+ EUT to Notebook + USB cable 1+ Earphone1
11	LTE B13 Idle + USB Link + Data Transmission + SIM1 + BT Idle + WIFI Idle+ Notebook to EUT+ USB cable 1 + Earphone1
12	LTE B17 Idle + USB Link + Data Transmission + SIM2 + BT Idle + WIFI Idle+ SD to Notebook + USB cable 1 + Earphone1
13	LTE B66 Idle + USB Link + Data Transmission + SIM1 + BT Idle + WIFI Idle+ Notebook to SD + USB cable 1 + Earphone1
14	Worst case of 1-13(mode 3)+ USB cable 2

NOTE:

1. For conducted emission test, Pre-scan all mode, mode 14 was the worst case and only this mode was presented in this report.
2. For radiated emission test, Pre-scan all mode, test mode 14 was the worst case and only this mode was presented in this report

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

FOR All TESTS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Laptop	Lenovo	Thnikpad L440	R90FTFKP	N/A
2	Micro SD	SAM SUNG	N/A	N/A	N/A
3	FM signal generator	Rohde&Schwarz	SMB 100A	109279	N/A
4	GPS Simulator+Antenna	TOJOIN	GNSS-5000A	E1-010-010119	N/A
5	Universal radio communication tester	Rohde&Schwarz	CMW500	N/A	N/A
6	Printer	HP	hp LaserJet 1300	CNSJF75989	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	USB Line: Shielded, Detachable 1m;
2	N/A
3	N/A

2 EMISSION TEST

2.1 CONDUCTED EMISSION MEASUREMENT

2.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107 a CLASS B)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107 b CLASS A)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

NOTE: 1.The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

2.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Mar. 03,21	Mar. 02, 22
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Mar. 02, 22	Mar. 01, 23
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 25,21	Feb. 24, 22
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 24, 22	Feb. 23, 23

NOTE: 1. The test was performed in CE shielded room.

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2.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

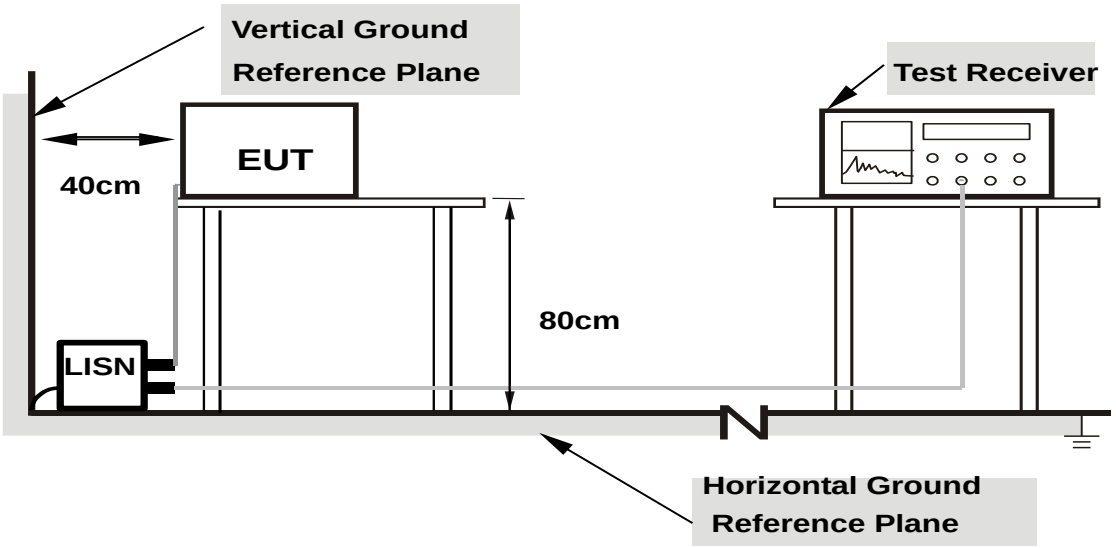
c. The frequency range from 150 kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

2.1.4 DEVIATION FROM TEST STANDARD

No deviation.

2.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

2.1.6 EUT OPERATING CONDITIONS

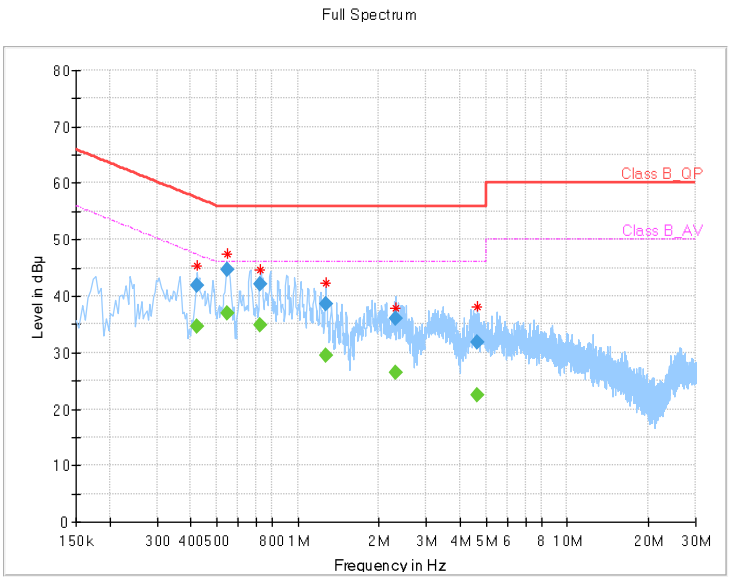
a. Turned on the power and connected of all equipment.
b. EUT was operated according to the use type described in the manufacturer's specifications or the user's manual.

2.1.7 TEST RESULTS

TEST VOLTAGE	Input 120 Vac, 60 Hz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	**TESTED BY**	Carl xie

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.424000	---	34.56	47.37	12.81	L1	ON	9.7
0.424000	41.91	---	57.37	15.46	L1	ON	9.7
0.548000	---	37.03	46.00	8.97	L1	ON	9.7
0.548000	44.57	---	56.00	11.43	L1	ON	9.7
0.728000	---	34.88	46.00	11.12	L1	ON	9.7
0.728000	42.11	---	56.00	13.89	L1	ON	9.7
1.268000	---	29.44	46.00	16.56	L1	ON	9.7
1.268000	38.61	---	56.00	17.39	L1	ON	9.7
2.296000	---	26.52	46.00	19.48	L1	ON	9.7
2.296000	36.11	---	56.00	19.89	L1	ON	9.7
4.644000	---	22.54	46.00	23.46	L1	ON	9.7
4.644000	31.86	---	56.00	24.14	L1	ON	9.7

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value - Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

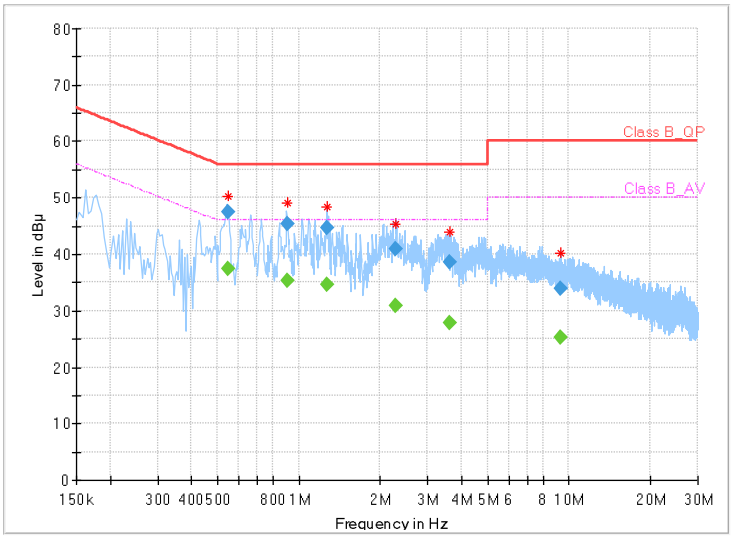


TEST VOLTAGE	Input 120 Vac, 60 Hz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	**TESTED BY**	Carl xie

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.544000	---	37.46	46.00	8.54	N	ON	9.7
0.544000	47.51	---	56.00	8.49	N	ON	9.7
0.904000	---	35.32	46.00	10.68	N	ON	9.7
0.904000	45.38	---	56.00	10.62	N	ON	9.7
1.268000	---	34.53	46.00	11.47	N	ON	9.8
1.268000	44.69	---	56.00	11.31	N	ON	9.8
2.292000	---	30.97	46.00	15.03	N	ON	9.8
2.292000	41.01	---	56.00	14.99	N	ON	9.8
3.616000	---	27.89	46.00	18.11	N	ON	9.8
3.616000	38.61	---	56.00	17.39	N	ON	9.8
9.264000	---	25.29	50.00	24.71	N	ON	9.8
9.264000	33.86	---	60.00	26.14	N	ON	9.8

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value - Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

Full Spectrum



2.2 RADIATED EMISSION MEASUREMENT

2.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.109)
Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 3 meters (dBμV/m)		
Frequencies (MHz)	**FCC 15B / ICES-003, Class A**	**FCC 15B / ICES-003, Class B**
30-88	49	40
88-216	53.5	43.5
216-960	56	46
960-1000	59.5	54
Above 1000	Avg: 59.5 Peak: 79.5	Avg: 54 Peak: 74

Frequency Range (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40GHz, whichever is lower

NOTE:
1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
4. QP detector shall be applied if not specified.

2.2.2 TEST INSTRUMENTS

Frequency range below1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 05,21	Mar. 04,22
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 04,22	Mar. 03,23
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 22,21	Apr. 21,22
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 21,22	Apr. 20,23
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 01,22	May. 31,23
Test Software	ADT	ADT_Radiated _V8.7.07	N/A	N/A	N/A

Frequency range above 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Horn Antenna	ETS-LINDGREN	3117	00168728	May. 19,20	May. 18,23
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 22,21	Apr. 21,22
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 21,22	Apr. 20,23
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 03,21	Jun. 02,22
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 02,22	Jun. 01,23

NOTE: 1. The test was performed in 3m chamber.
2. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

2.2.3 TEST PROCEDURE

<Frequency Range below 1GHz>

The basic test procedure was in accordance with ANSI C63.4:2014 (section 12).

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
5. Margin value = Emission level – Limit value.

<Frequency Range above 1GHz>

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter fully-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. The bore sight should be used during the test above 1GHz.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz

NOTE:

. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth of test receiver/spectrum analyzer is 1Hz for Average detection (AV) at frequency above 1GHz.

. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.

. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)

. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);

. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier)

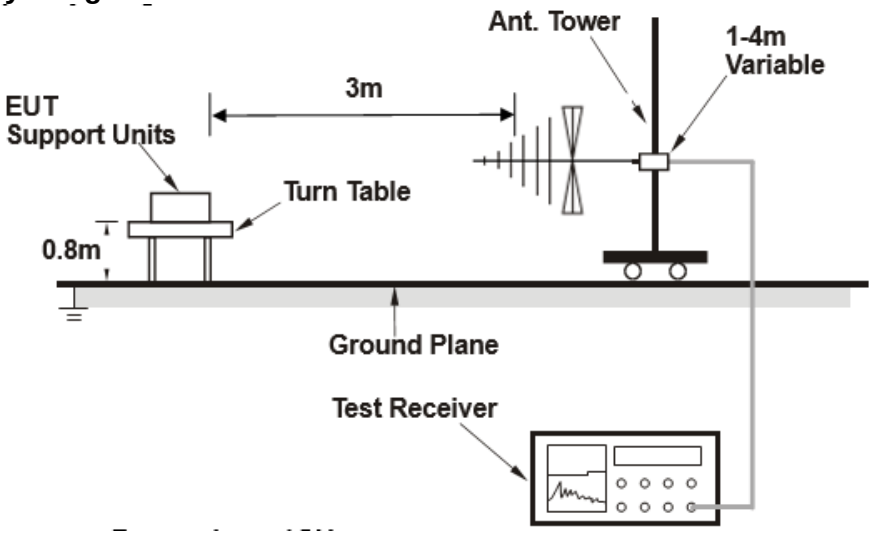
. Margin value = Emission level – Limit value.

2.2.4 DEVIATION FROM TEST STANDARD

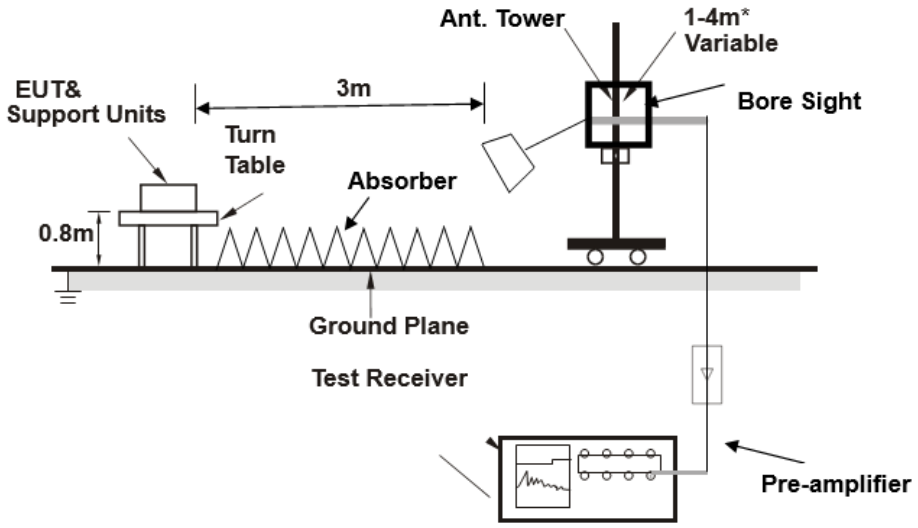
No deviation.

2.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

depends on the EUT height and the antenna 3dB bandwidth both, refer to section 7.3 of CISPR 16-2-3.

2.2.6 EUT OPERATING CONDITIONS

Same as item 2.1.6.

2.2.7 TEST RESULTS

Acceleromete alternative worst case:

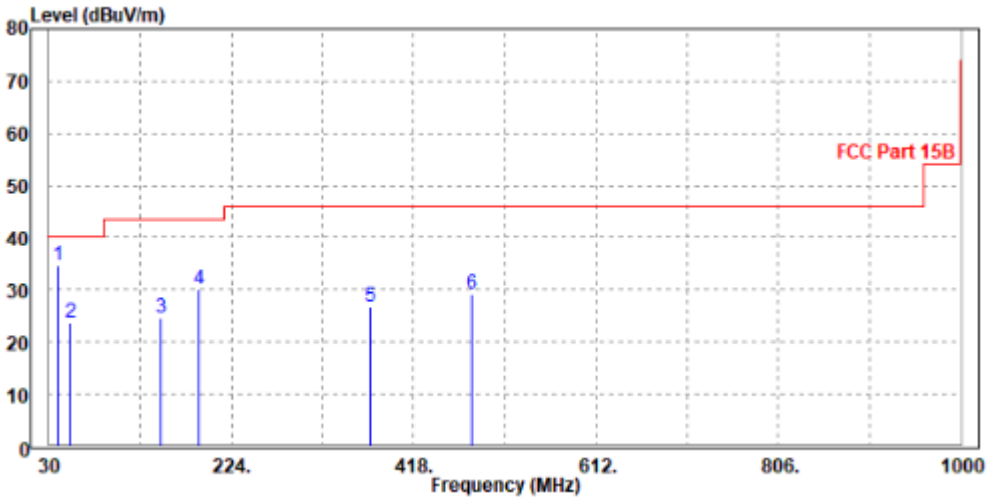
TEST VOLTAGE	Data Transmission Input 120 Vac, 60 Hz	**FREQUENCY RANGE**	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Quasi-Peak, 120 kHz
TESTED BY	Jace Hu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1	PP	38.730	34.80	57.19	40.00	-5.20	-22.39	Peak	Horizontal
2		52.310	23.75	50.36	40.00	-16.25	-26.61	Peak	Horizontal
3		149.310	24.66	50.90	43.50	-18.84	-26.24	Peak	Horizontal
4		190.050	30.15	54.42	43.50	-13.35	-24.27	Peak	Horizontal
5		371.440	26.65	46.42	46.00	-19.35	-19.77	Peak	Horizontal
6		480.080	29.33	47.00	46.00	-16.67	-17.67	Peak	Horizontal

REMARKS: 1. Emission level(dBuV/m)=Read Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)- Amplifier Gain
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

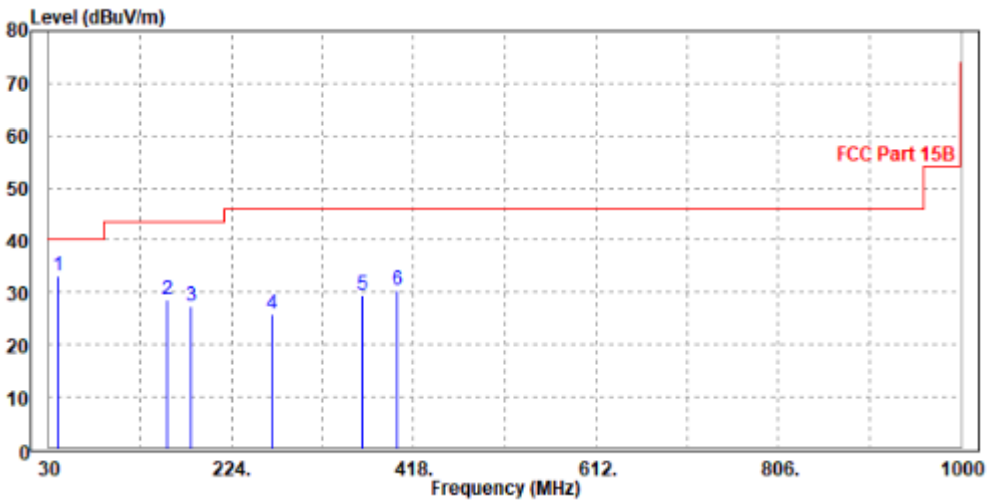


TEST VOLTAGE	Data Transmission Input 120 Vac, 60 Hz	**FREQUENCY RANGE**	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70% RH	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Quasi-Peak , 120 kHz
TESTED BY	Jace Hu		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1 PP	38.730	33.22	56.49	40.00	-6.78	-23.27	Peak	Vertical
2	155.130	28.73	53.88	43.50	-14.77	-25.15	Peak	Vertical
3	181.320	27.53	51.99	43.50	-15.97	-24.46	Peak	Vertical
4	266.680	25.96	48.30	46.00	-20.04	-22.34	Peak	Vertical
5	362.710	29.47	49.38	46.00	-16.53	-19.91	Peak	Vertical
6	399.570	30.32	49.38	46.00	-15.68	-19.06	Peak	Vertical

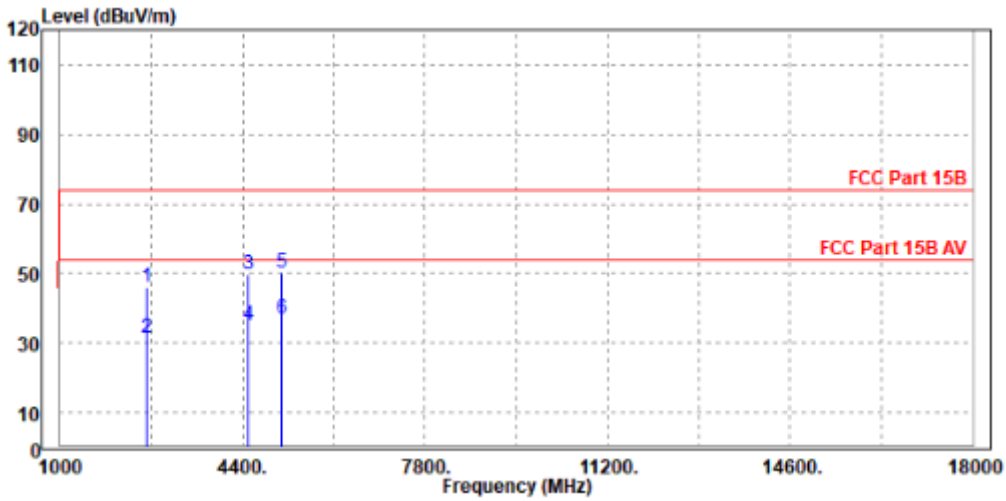
REMARKS:
1. Emission level(dBuV/m)=Read Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) -Amplifier Gain
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



TEST VOLTAGE	Data Transmission Input 120 Vac, 60 Hz	**FREQUENCY RANGE**	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Peak/Average, 1 MHz
TESTED BY	Jace Hu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2598	46.13	49.95	74	-27.87	35.6	6.46	45.88	100	180	Peak
2598	31.48	35.3	54	-22.52	35.6	6.46	45.88	100	180	Average
4502	49.75	48.76	74	-24.25	36.5	9.93	45.44	100	330	Peak
4502	35.25	34.26	54	-18.75	36.5	9.93	45.44	100	330	Average
5131	50.32	48.82	74	-23.68	37.08	9.93	45.51	100	15	Peak
5131	36.79	35.29	54	-17.21	37.08	9.93	45.51	100	15	Average

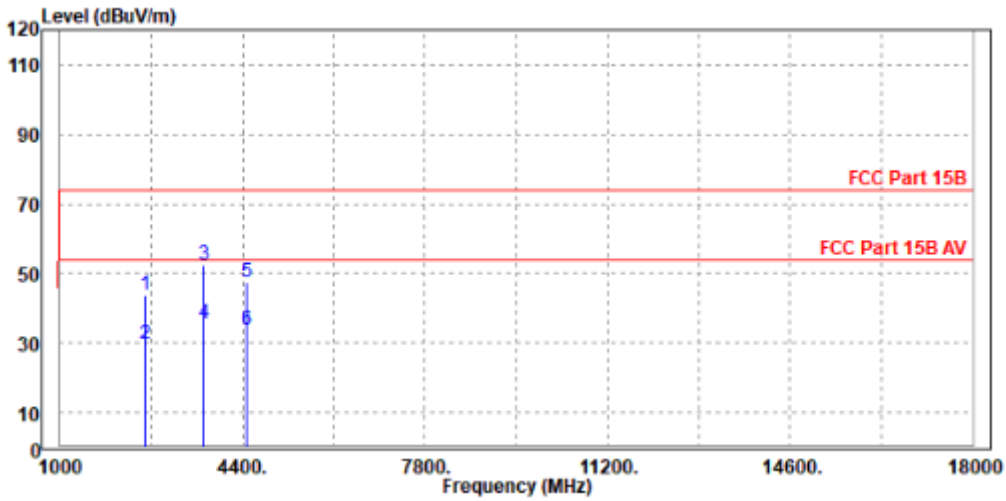
REMARKS:
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 1GHz to 30GHz. For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet..
4. Only emissions significantly above equipment noise floor are reported.



TEST VOLTAGE	Data Transmission Input 120 Vac, 60 Hz	**FREQUENCY RANGE**	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Peak/Average, 1 MHz
TESTED BY	Jace Hu		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2581	43.74	49.99	74	-30.26	33.2	6.44	45.89	100	345	Peak
2581	29.64	35.89	54	-24.36	33.2	6.44	45.89	100	345	Average
3686	52.35	55.73	74	-21.65	34.29	7.81	45.48	100	350	Peak
3686	35.54	38.92	54	-18.46	34.29	7.81	45.48	100	350	Average
4485	47.55	48.02	74	-26.45	35.08	9.89	45.44	100	90	Peak
4485	33.81	34.28	54	-20.19	35.08	9.89	45.44	100	90	Average

REMARKS:
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 1GHz to 30GHz. For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet..
4. Only emissions significantly above equipment noise floor are reported.



3 APPENDIX A –MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END---