

FCC Test Report

FCC ID: 2AOKUNOTE13P

Product: Smartphone

Trade Mark: HOTWAV

Model No.: Note 13 Pro

Family Model: Note 13, Note, T1, T1-S1L, Note 11, Note 12, iHunt S24 Xtreme, HT02, HT03, Note 15, Note 15 Pro, Note 16, Note 16 Pro, Note 12E, Note 13e, Note 13 Plus, Note 15e, Note 15 Plus

Report No.: S23112101803007

Issue Date: Dec 12, 2023

Prepared for

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TEST RESULT CERTIFICATION

Applicant's name.....: SHENZHEN TUGAO INTELLIGENT CO.,LTD
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Manufacturer's Name: SHENZHEN TUGAO INTELLIGENT CO.,LTD
Address.....: 8th Floor, Bldg A, Jinggang Science&Technology Park, Fuyong, Bao'an District, Shenzhen, China
Product description
Product name.....: Smartphone
Trade Mark.....: HOTWAV
Model and/or type reference : Note 13 Pro
Family Model.....: Note 13, Note, T1, T1-S1L, Note 11, Note 12, iHunt S24 Xtreme, HT02, HT03, Note 15, Note 15 Pro, Note 16, Note 16 Pro, Note 12E, Note 13e, Note 13 Plus, Note 15e, Note 15 Plus
Test Sample number.....: S231121018001
Date of Test.....: Nov 21, 2023 ~ Dec 12, 2023
Standards: FCC Part 15B ANSI C63.4:2014

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with Part 15 of FCC Rules. And it is applicable only to the tested sample identified in the report.

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1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
FCC Part15B ANSI C63.4: 2014	Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report
- (2) For client's request and manual description, the test will not be executed.

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Smartphone	
Trade Mark	HOTWAV	
Model Name	Note 13 Pro	
Family Model	Note 13, Note, T1, T1-S1L, Note 11, Note 12, iHunt S24 Xtreme, HT02, HT03, Note 15, Note 15 Pro, Note 16, Note 16 Pro, Note 12E, Note 13e, Note 13 Plus, Note 15e, Note 15 Plus	
Model Difference	All the model are the same circuit and RF module, except the model names.	
Product Description	Connecting I/O port:	Micro USB, Earphone
	Operation Frequency:	5.8GHz
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Adapter	Model: QZ-02002AC00 Input: 100-240V~50/60Hz 0.5A Output USB-C: 5.0V---3.0A or 9.0V---2.22A or 12.0V---1.67A(20.0W)	
Battery	DC 3.87V, 5160mAh, 19.97Wh	
Power supply	DC 3.87V from battery or DC 5V from adapter	
HW Version	V1.0	
SW Version	N/A	

2.1.1 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

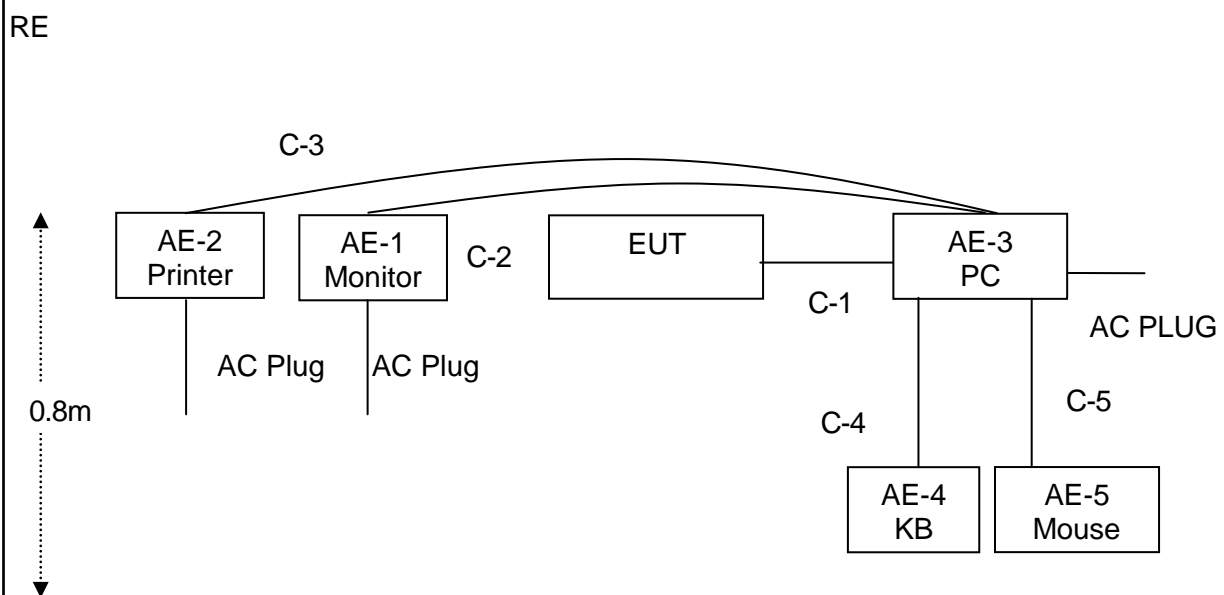
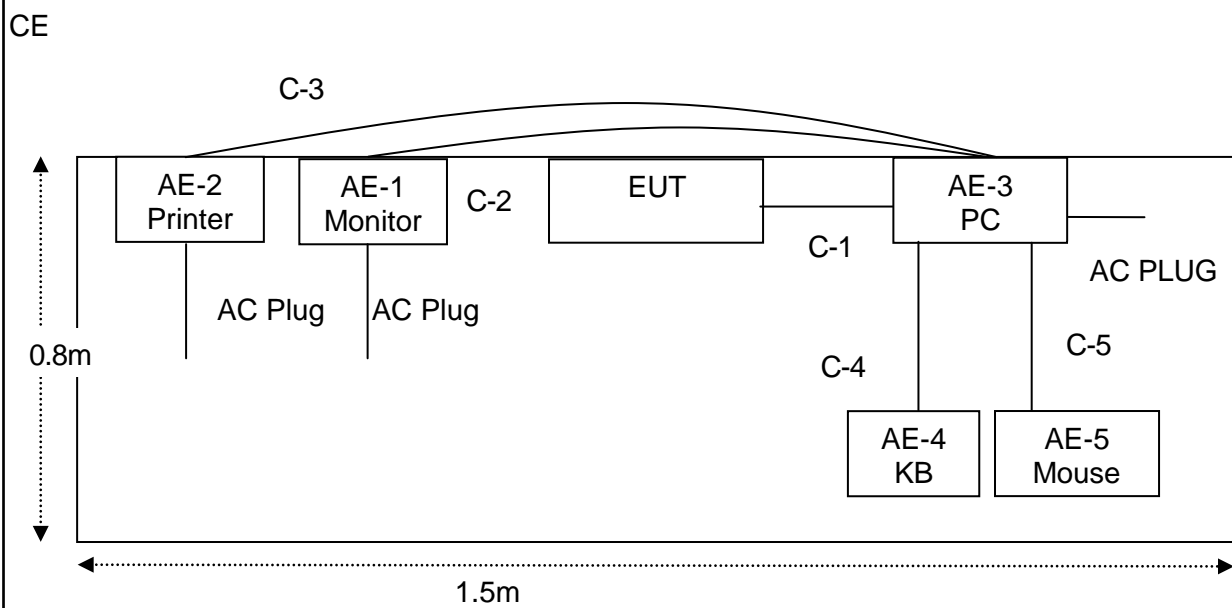
Pretest Mode	Description
Model 1	USB Data Transmission
Model 2	TF card Playing
Model 3	REC
Model 4	FM
Model 5	GPS

For Conducted Test	
Final Test Mode	Description
Model 1	USB Data Transmission
Model 2	TF card Playing
Model 3	REC
Model 4	FM
Model 5	GPS

For Radiated Test	
Final Test Mode	Description
Model 1	USB Data Transmission
Model 2	TF card Playing
Model 3	REC
Model 4	FM
Model 5	GPS

Note: Final Test Mode: Through Pre-scan, find the model 1 is the worst case. Only the worst case mode is recorded in the report.

2.2 DESCRIPTION OF TEST SETUP



2.3 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

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.

Item	Equipment	Model/Type No.	Series No.	Note
AE-1	Monitor	N/A	N/A	Peripherals
AE-2	Printer	N/A	N/A	Peripherals
AE-3	PC	N/A	N/A	Peripherals
AE-4	KB	N/A	N/A	Peripherals
AE-5	Mouse	N/A	N/A	Peripherals

Item	Cable Type	Shielded Type	Ferrite Core	Length	Note
C-1	USB Cable	YES	NO	1.0m	
C-2	HDMI Cable	YES	NO	1.0m	
C-3	Power Cable	YES	NO	1.5m	
C-4	KB Cable	NO	NO	1.0m	
C-5	Mouse Cable	NO	NO	1.0m	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 「Length」 column.
- (3) “YES” means “shielded” “with core”; “NO” means “unshielded” “without core”.

2.4 MEASUREMENT INSTRUMENTS LIST

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Aglient	E4440A	MY41000130	2023.03.27	2024.03.26	1 year
2	Test Receiver	R&S	ESPI	101318	2023.03.27	2024.03.26	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2023.03.16	2024.03.15	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2023.05.06	2026.05.05	3 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2023.03.27	2024.03.26	1 year
6	Horn Antenna	SCHWARZBECK	BBHA 9120D	2816	2023.01.12	2024.01.11	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2022.11.07	2025.11.06	3 year
8	Amplifier	EMC	EMC051835SE	980246	2023.05.29	2024.05.28	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2023.05.29	2024.05.28	1 year
10	Power Meter	DARE	RPR3006W	15I00041SNO84	2023.05.29	2024.05.28	1 year
11	Power Sensor	R&S	URV4-Z4	0395.1619.05	2023.05.29	2024.05.28	1 year
12	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2022.06.17	2025.06.16	3 year
13	High Test Cable(1G-40GHz)	N/A	R-03	N/A	2022.06.17	2025.06.16	3 year
14	High Test Cable(1G-40GHz)	N/A	R-04	N/A	2022.06.17	2025.06.16	3 year
15	Test Receiver	R&S	ESCI	101160	2023.03.27	2024.03.26	1 year

AC Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2023.03.27	2024.03.26	1 year
2	LISN	R&S	ENV216	101313	2023.03.27	2024.03.26	1 year
3	LISN	SCHWARZBECK	NNLK 8129	8129245	2023.03.27	2024.03.26	1 year
4	50Ω Coaxial Switch	ANRITSU CORP	MP59B	6200983704	2023.05.06	2026.05.05	3 year
5	Test Cable (9KHz-30MHz)	N/A	C01	N/A	2023.05.06	2026.05.05	3 year
6	Test Cable (9KHz-30MHz)	N/A	C02	N/A	2023.05.06	2026.05.05	3 year
7	Test Cable (9KHz-30MHz)	N/A	C03	N/A	2023.05.06	2026.05.05	3 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable which is scheduled for calibration every 3 years.

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

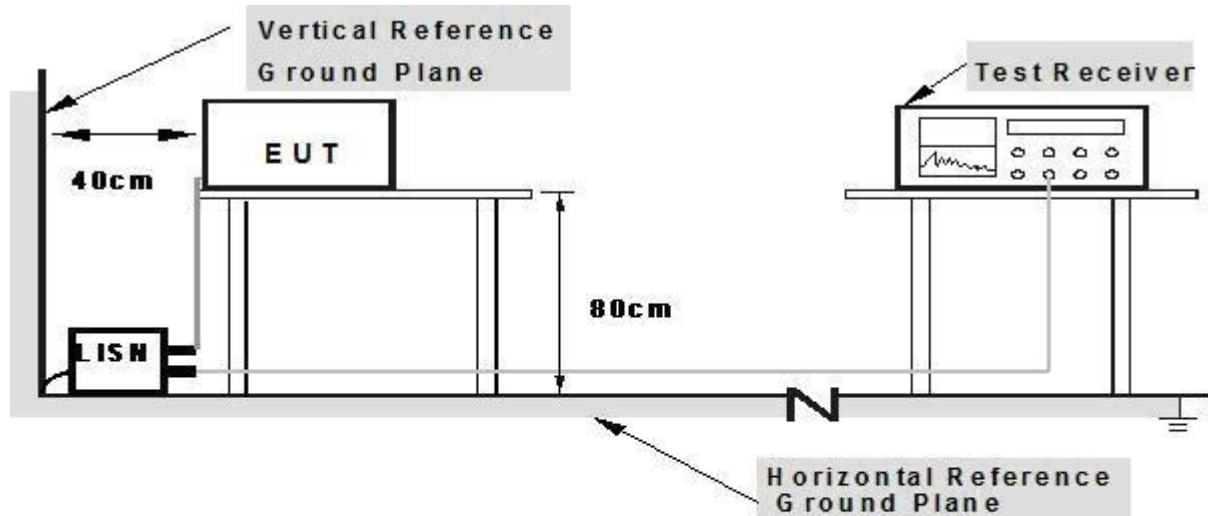
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 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 cm from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

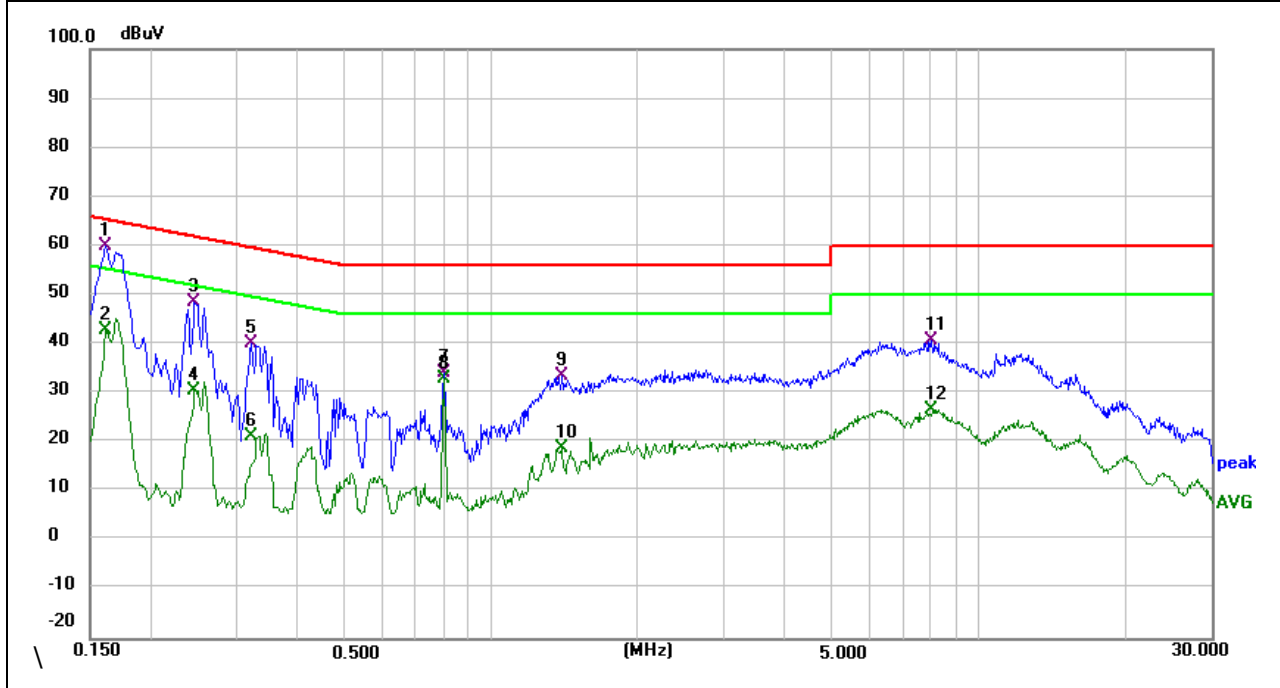
3.1.5 TEST RESULTS

EUT:	Smartphone	Model Name. :	Note 13 Pro
Temperature:	24.5 °C	Relative Humidity:	52%
Pressure:	1010hPa	Test Date:	2023-11-22
Test Mode:	Mode 1	Phase :	L
Test Voltage:	DC 5V from PC AC 120V/60Hz		

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1620	50.04	9.95	59.99	65.36	-5.37	QP
0.1620	32.84	9.95	42.79	55.36	-12.57	AVG
0.2460	38.35	10.14	48.49	61.89	-13.40	QP
0.2460	20.41	10.14	30.55	51.89	-21.34	AVG
0.3220	29.81	10.28	40.09	59.66	-19.57	QP
0.3220	10.85	10.28	21.13	49.66	-28.53	AVG
0.7980	22.83	11.26	34.09	56.00	-21.91	QP
0.7980	21.65	11.26	32.91	46.00	-13.09	AVG
1.3940	21.13	12.44	33.57	56.00	-22.43	QP
1.3940	6.45	12.44	18.89	46.00	-27.11	AVG
8.0140	31.19	9.68	40.87	60.00	-19.13	QP
8.0140	17.05	9.68	26.73	50.00	-23.27	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

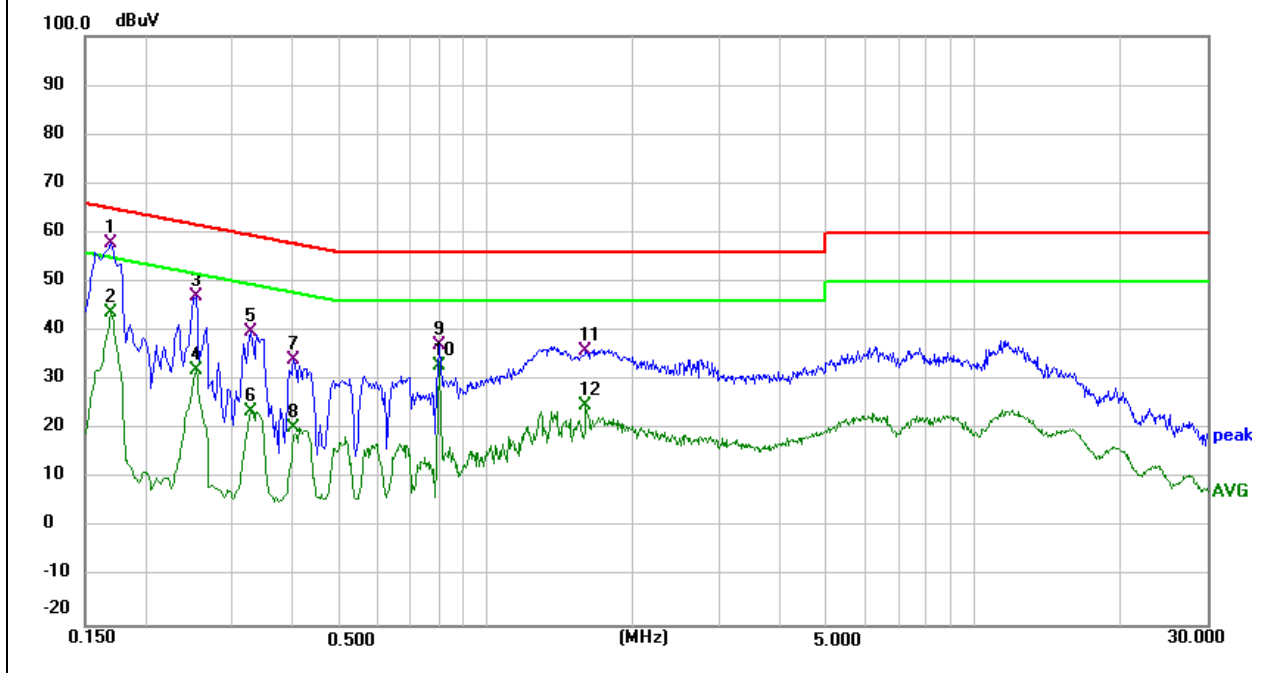


EUT:	Smartphone	Model Name. :	Note 13 Pro
Temperature:	24.5 °C	Relative Humidity:	52%
Pressure:	1010hPa	Test Date:	2023-11-22
Test Mode:	Mode 1	Phase :	N
Test Voltage:	DC 5V from PC AC 120V/60Hz		

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1700	47.76	9.97	57.73	64.96	-7.23	QP
0.1700	33.78	9.97	43.75	54.96	-11.21	AVG
0.2540	36.84	10.14	46.98	61.63	-14.65	QP
0.2540	22.03	10.14	32.17	51.63	-19.46	AVG
0.3300	29.41	10.30	39.71	59.45	-19.74	QP
0.3300	13.43	10.30	23.73	49.45	-25.72	AVG
0.4020	23.74	10.45	34.19	57.81	-23.62	QP
0.4020	9.76	10.45	20.21	47.81	-27.60	AVG
0.7980	26.03	11.26	37.29	56.00	-18.71	QP
0.7980	21.72	11.26	32.98	46.00	-13.02	AVG
1.5980	23.08	12.86	35.94	56.00	-20.06	QP
1.5980	12.01	12.86	24.87	46.00	-21.13	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 ~ 88	39.0	40.0
88 ~ 216	43.5	43.5
216 ~ 960	46.5	46.0
Above 960	49.5	54.0

Notes:

- (1) The limit for radiated test was performed according to as following:
FCC PART 15B /ICES-003.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.2 TEST PROCEDURE

Test Arrangement for Radiated Emissions up to 1 GHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. 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 antenna is a broadband antenna, and its height 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.
- 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.

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

Test Arrangement for Radiated Emissions above 1 GHz.

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited 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 can be varied from one meter to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

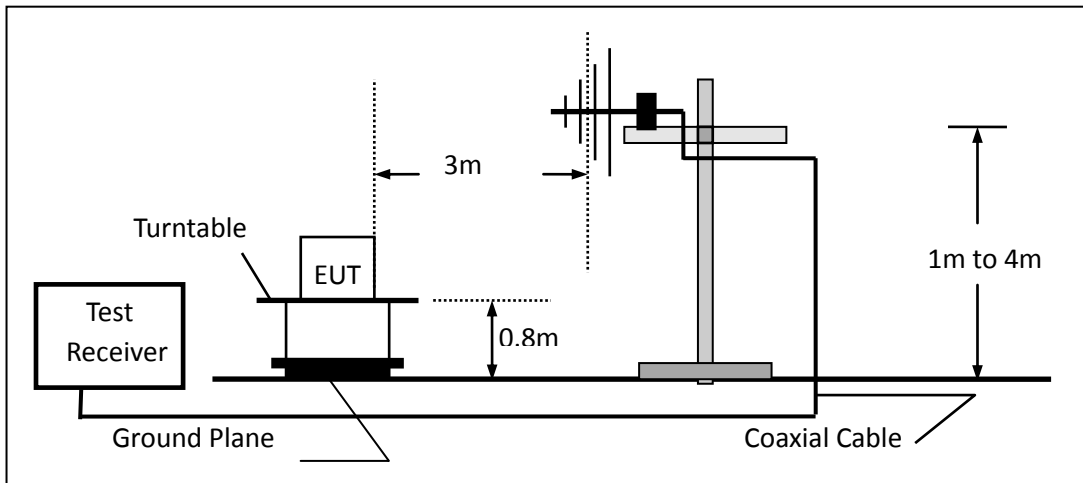
Note: For the hand-held device, the EUT should be measured for all 3 axes and only the worst case is recorded in the report

During the radiated emission test, according to ANSI C63.4-2014(4.2), the Spectrum Analyzer was set with the following configurations:

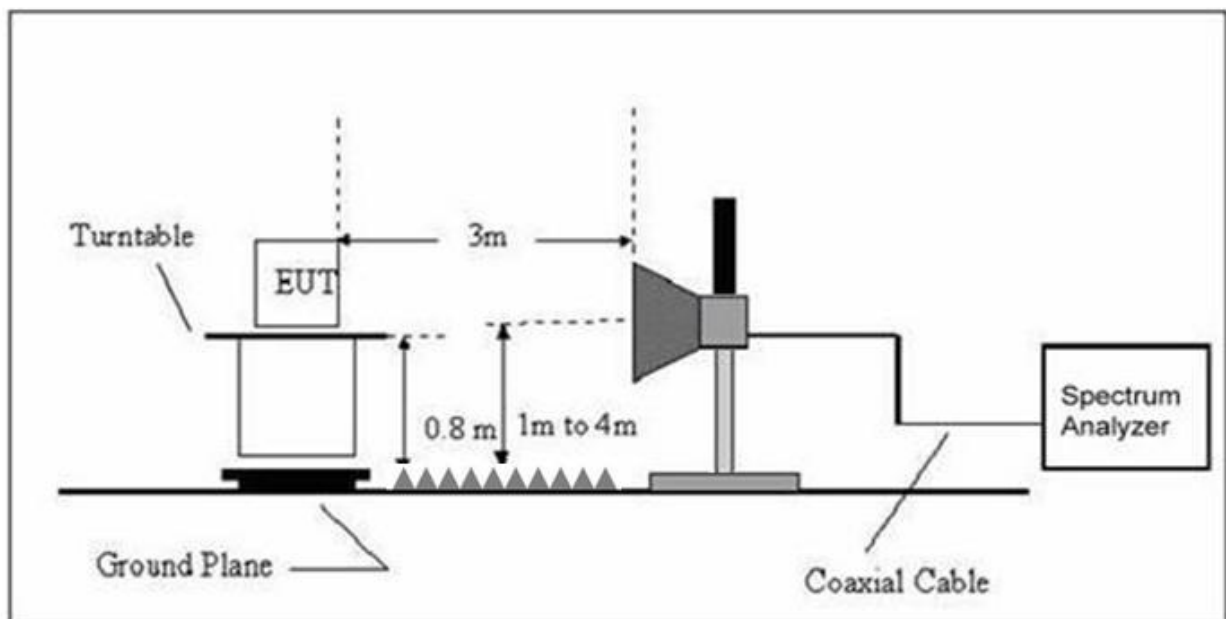
Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Avg	1 MHz	10 Hz

3.2.3 TEST SETUP

For Radiated Emission 30~1000MHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz



3.2.4 TEST RESULTS

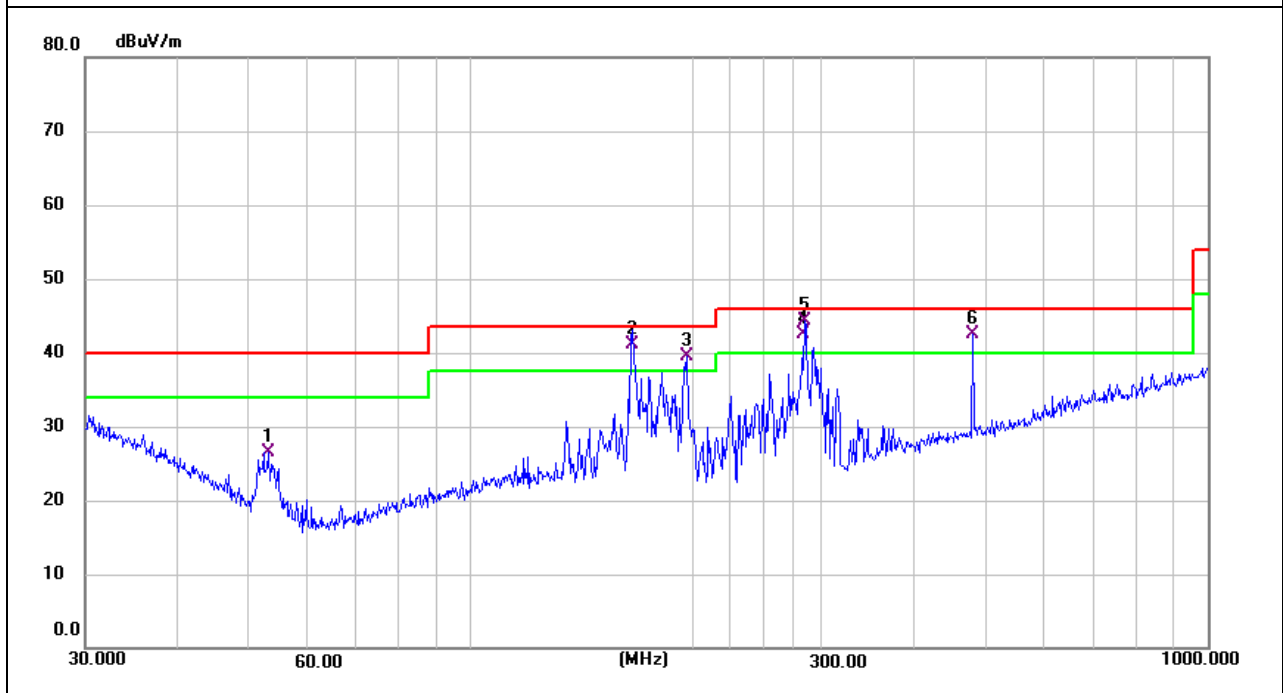
TEST RESULTS (30~1000 MHz)

EUT:	Smartphone	Model Name:	Note 13 Pro
Temperature:	24.5 °C	Relative Humidity:	55%
Pressure:	1010 hPa	Test Date :	2023-11-23
Test Mode :	Mode 1	Polarization :	Horizontal
Test Power :	DC 5V from PC AC 120V/60Hz		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	53.1313	12.76	13.70	26.46	40.00	-13.54	QP
H	165.9167	23.58	17.57	41.15	43.50	-2.35	QP
H	196.5098	23.35	16.21	39.56	43.50	-3.94	QP
H	283.7242	22.63	19.88	42.51	46.00	-3.49	QP
H	283.9791	24.39	19.88	44.27	46.00	-1.73	QP
H	480.5276	18.00	24.54	42.54	46.00	-3.46	QP

Remark:

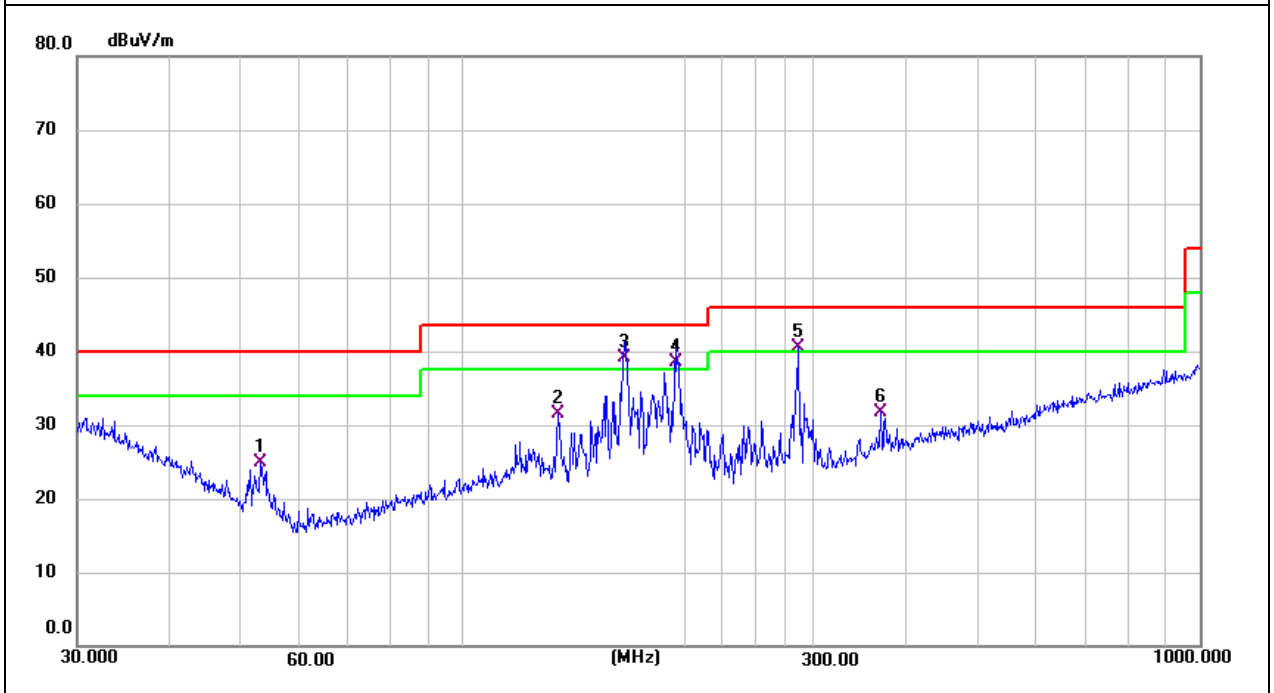
Factor = Antenna Factor + Cable Loss - Amplifier.



EUT:	Smartphone	Model Name :	Note 13 Pro
Temperature:	24.5 °C	Relative Humidity:	55%
Pressure:	1010 hPa	Test Date :	2023-11-23
Test Mode :	Mode 1	Polarization :	Vertical
Test Power :	DC 5V from PC AC 120V/60Hz		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	53.1313	11.24	13.70	24.94	40.00	-15.06	QP
V	134.5592	12.88	18.67	31.55	43.50	-11.95	QP
V	165.7917	21.54	17.58	39.12	43.50	-4.38	QP
V	194.4534	22.38	16.22	38.60	43.50	-4.90	QP
V	285.9778	20.63	19.90	40.53	46.00	-5.47	QP
V	369.4047	9.31	22.46	31.77	46.00	-14.23	QP

Remark:
Factor = Antenna Factor + Cable Loss - Amplifier.



3.2.5 TEST RESULTS(1000~18000MHz)

EUT:	Smartphone	Model Name :	Note 13 Pro
Temperature:	24.5 °C	Relative Humidity:	55%
Pressure:	1010 hPa	Test Date :	2023-11-23
Test Mode :	Mode 1		
Test Power :	DC 5V from PC AC 120V/60Hz		

All the modulation modes have been tested, and the worst result was report as below:

Polar (H/V)	Frequency	Reading	Correct	Result	Limit	Over Limit	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
V	10826.000	52.73	0.43	53.16	74.00	-20.84	peak
V	10826.000	42.78	0.43	43.21	54.00	-10.79	AVG
V	14498.000	51.98	4.33	56.31	74.00	-17.69	peak
V	14498.000	43.39	4.33	47.72	54.00	-6.28	AVG
V	17441.000	43.62	5.69	49.31	54.00	-4.69	AVG
V	17541.000	54.10	6.26	60.36	74.00	-13.64	peak
H	11472.000	52.22	2.47	54.69	74.00	-19.31	peak
H	11472.000	39.96	2.47	42.43	54.00	-11.57	AVG
H	14345.000	53.21	3.36	56.57	74.00	-17.43	peak
H	14345.000	42.62	3.36	45.98	54.00	-8.02	AVG
H	17490.000	54.55	6.27	60.82	74.00	-13.18	peak
H	17500.000	43.31	6.38	49.69	54.00	-4.31	AVG

Remark:

Result = Reading + Correct, Over Limit= Result - Limit

Note: Only the worst results data points are reported in the report.

Other emissions are attenuated 20dB below the limit that does not recorded in the report.

END OF REPORT