FCC RF Test Report

(DTS)

Applicant:	Nebra Ltd
Address of Applicant:	Unit 4 Bells Yew Green Business Court, Bells Yew Green, Tunbridge Wells, East Sussex, TN3 9BJ
Equipment Under Test (EUT)	
Product Name:	Nebra HNT 5G Gateway
Model No.:	NEBHNT-5G-915-1, NEBHNT-5G-915-2
FCC ID:	2AZDM-HNT5G
Applicable Standards:	FCC CFR Title 47 Part 15C (§15.247)
Date of Sample Receipt:	07 Feb., 2023
Date of Test:	08 Feb., to 23 Feb., 2023
Date of Report Issued:	24 Feb., 2023
Test Result:	PASS

Tested by:	Mike ou ***Test Engineer***	***Date:***	*24 Feb., 2023*
Reviewed by:	Winner Zhang ***Project Engineer***	***Date:***	*24 Feb., 2023*
Approved by:	Manager ***Manager***	***Date:***	*24 Feb., 2023*

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

1 Version

Version No.	Date	Description
00	*24 Feb., 2023*	*Original*

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3 General Information

3.1 Client Information

Applicant:	Nebra Ltd
Address:	Unit 4 Bells Yew Green Business Court, Bells Yew Green, Tunbridge Wells, East Sussex, TN3 9BJ
Manufacturer:	SUNSOAR TECH CO., LIMITED
Address:	4/F, Block E, Fengze Building, Huafeng No.2 Industrial Park, Hangkong Road, XiXiang Town, BaoAn District, Shenzhen, China
Factory:	EvrTech
Address:	No.44, Ying Tai Industry Area, Dalang South RD, Shenzen, China

3.2 General Description of E.U.T.

Product Name:	Nebra HNT 5G Gateway
Model No.:	NEBHNT-5G-915-1, NEBHNT-5G-915-2
Operation Frequency:	923.3 MHz – 927.5 MHz
Channel Numbers:	8
Modulation Technology:	LoRa
Antenna Type:	Internal Antenna
Antenna Gain:	3 dBi (declare by applicant)
AC Adapter:	Model: RC0653-1205000CI Input: AC100-240V, 50/60Hz, 1.5A Output: DC 12.0V, 5.0A 60.0W
Remark:	The difference between the models is that the LoRa Radio module used inside is different for each variant. Along with a respective antenna for each region / frequency. The -2 flag at the end of the model number relates to the specific chip part number for the main LoRa chip.
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

3.3 Test Mode and Test Environment

Test Mode:	
Transmitting mode	Keep the EUT in continuous transmitting with modulation
Operating Environment:	
Temperature:	15℃ ~ 35℃
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar

3.4 Description of Test Auxiliary Equipment

The EUT has been tested as an independent unit.

3.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Conducted Emission for LISN (9kHz ~ 10MHz)	1.9 dB
Conducted Emission for LISN (10MHz ~ 30MHz)	2.6 dB
Radiated Emission (30MHz ~ 1GHz) (3m SAC)	3.8 dB
Radiated Emission (1GHz ~ 18GHz) (3m SAC)	3.6 dB
Radiated Emission (18GHz ~ 40GHz) (3m SAC)	5.34 dB

Note: *All the measurement uncertainty value were shown with a coverage k=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.*

3.6 Additions to, Deviations, or Exclusions from the Method

No

3.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

3.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://jyt.lets.com

3.9 Test Instruments List

Radiated Emission(3m SAC):					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m SAC	ETS	9m*6m*6m	WXJ001-1	04-14-2021	04-13-2024
Loop Antenna	Schwarzbeck	FMZB 1519 B	WXJ002-4	03-07-2022	03-06-2023
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	03-08-2022	03-07-2023
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-2	03-08-2022	03-07-2023
Horn Antenna	Schwarzbeck	BBHA9170	WXJ002-5	04-07-2022	04-06-2023
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXJ001-2	01-10-2023	01-09-2024
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXJ001-3	01-10-2023	01-09-2024
Pre-amplifier (18GHz ~ 40GHz)	RF System	TRLA-180400G45B	WXJ002-7	03-30-2022	03-29-2023
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	03-05-2022	03-04-2023
Spectrum Analyzer	Rohde & Schwarz	FSP 30	WXJ004	01-10-2023	01-09-2024
Spectrum Analyzer	KEYSIGHT	N9010B	WXJ004-2	10-17-2022	10-16-2023
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	01-10-2023	01-09-2024
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG001-5	01-10-2023	01-09-2024
Coaxial Cable (18GHz ~ 40GHz)	JYTSZ	JYT3M-40G-SS-8M	WXG001-7	01-10-2023	01-09-2024
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		
EMI Test Software	AUDIX	E3	Version: 6.110919b		

Radiated Emission(10m SAC):					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
10m SAC	ETS	RFSD-100-F/A	WXJ090	04-28-2021	04-27-2024
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-1	04-01-2022	03-31-2023
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-2	03-31-2022	03-30-2023
EMI Test Receiver	R&S	ESR 3	WXJ090-3	03-30-2022	03-29-2023
EMI Test Receiver	R&S	ESR 3	WXJ090-4	03-30-2022	03-29-2023
Low Pre-amplifier	Bost	LNA 0920N	WXJ090-6	01-10-2023	01-09-2024
Low Pre-amplifier	Bost	LNA 0920N	WXJ090-7	01-10-2023	01-09-2024
Cable	Bost	JYT10M-1G-NN-10M	WXG002-7	01-10-2023	01-09-2024
Cable	Bost	JYT10M-1G-NN-10M	WXG002-8	01-10-2023	01-09-2024
Test Software	R&S	EMC32	Version: 10.50.40		

Conducted Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
EMI Test Receiver	Rohde & Schwarz	ESR3	WXJ003-2	07-12-2022	07-11-2023
LISN	Schwarzbeck	NSLK 8127	QCJ001-13	02-24-2022	02-23-2023
LISN	Rohde & Schwarz	ESH3-Z5	WXJ005-1	03-30-2022	03-29-2023
LISN Coaxial Cable (9kHz ~ 30MHz)	JYTSZ	JYTCE-1G-NN-2M	WXG003-1	02-24-2022	02-23-2023
RF Switch	TOP PRECISION	RSU0301	WXG003	N/A	
Test Software	AUDIX	E3	Version: 6.110919b		

Conducted Method:					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
Spectrum Analyzer	Rohde & Schwarz	FSP 30	WXJ004	10-17-2022 01-10-2023	10-16-2023 01-09-2024
EMI Test Receiver	Rohde & Schwarz	ESCI3	WXJ003	10-17-2022	10-16-2023
Spectrum Analyzer	Keysight	N9010B	WXJ004-3	10-17-2022	10-16-2023
DC Power Supply	Keysight	E3642A	WXJ025-2	10-17-2022	10-16-2023

4 Measurement Setup and Procedure

4.1 Test Channel

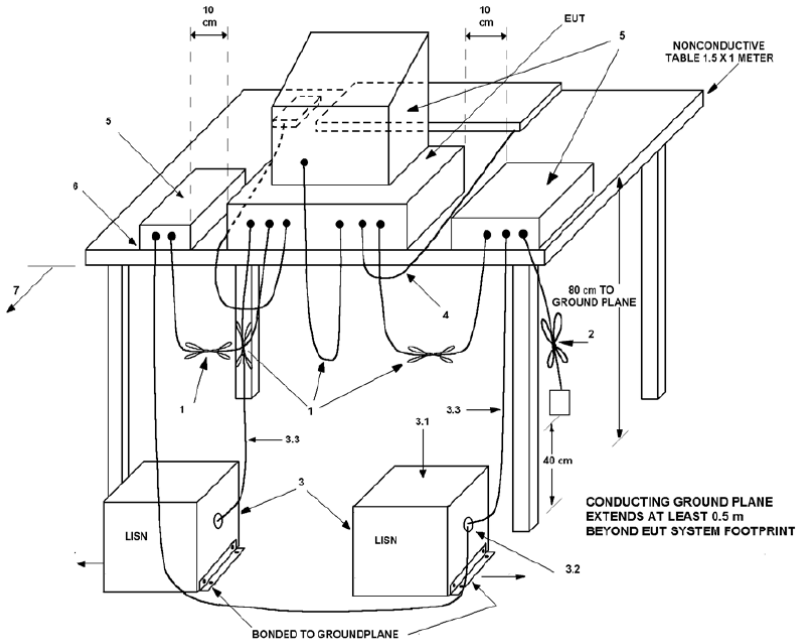
According to ANSI C63.10-2013 chapter 5.6.1 Table 4 requirement, select lowest channel, middle channel, and highest channel in the frequency range in which device operates for testing. The detailed frequency points are as follows:

Channel	Frequency	Channel	Frequency	Channel	Frequency
1	923.3MHz	4	925.1MHz	7	926.9MHz
2	923.9MHz	5	925.7MHz	8	927.5MHz
3	924.5MHz	6	926.3MHz		

Note:
Channel No. 1, 5 & 8 were selected as Lowest, Middle and Highest channel.

4.2 Test Setup

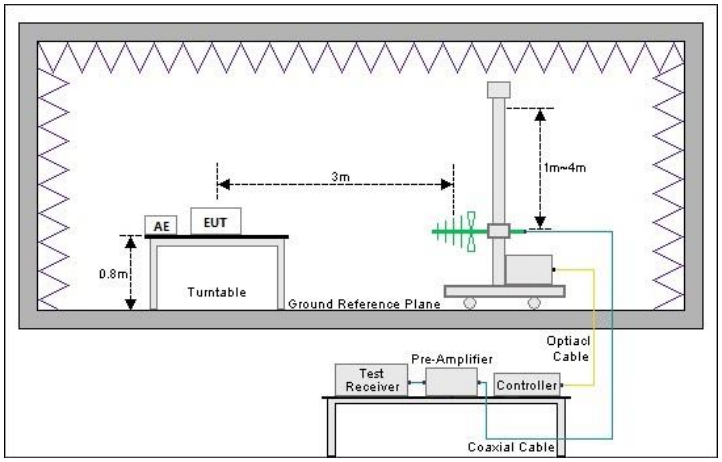
1) Conducted emission measurement:



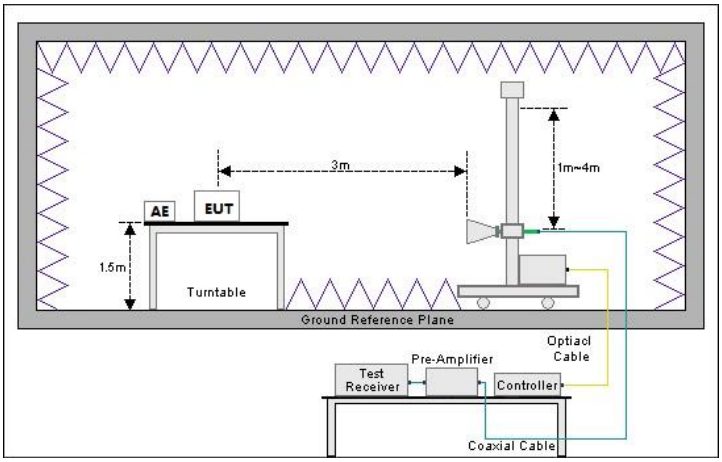
Note: The detailed descriptions please refer to Figure 8 of ANSI C63.4:2014.

2) Radiated emission measurement:

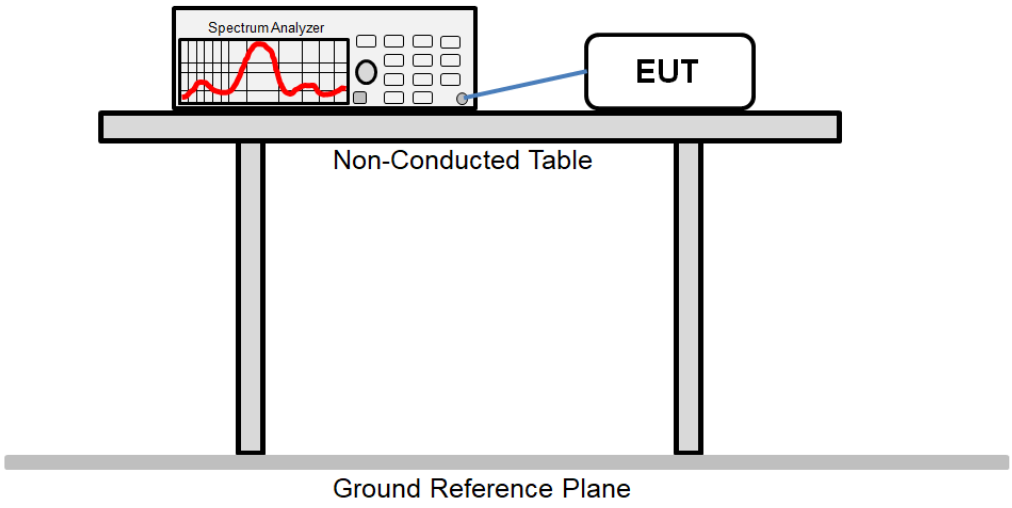
Below 1GHz (3m SAC)



Above 1GHz (3m SAC)



3) Conducted test method



4.3 Test Procedure

Test method	Test step
Conducted emission	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Radiated emission	**For below 1GHz:** 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data. **For above 1GHz:** 1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
Conducted test method	1. The antenna port of EUT was connected to the test port of the test system through an RF cable. 2. The EUT is keeping in continuous transmission mode and tested in all modulation modes. 3. Open the test software, prepare a test plan, and control the system through the software. After the test is completed, the test report is exported through the test software.

5 Test Results

5.1 Summary

5.1.1 Clause and Data Summary

Test items	Standard clause	Test data	Result
Antenna Requirement	15.203 15.247 (b)(4)	See Section 5.2	Pass
AC Power Line Conducted Emission	15.207	See Section 5.3	Pass
Conducted Output Power	15.247 (b)(3)	See Section 5.4	Pass
6dB Emission Bandwidth 99% Occupied Bandwidth	15.247 (a)(2)	See Section 5.5	Pass
Power Spectral Density	15.247 (e)	See Section 5.6	Pass
Spurious Emission	15.205 15.209 15.247 (d)	See Section 5.7	Pass
Remark: *1. Pass: The EUT complies with the essential requirements in the standard.* *2. N/A: Not Applicable.* *3. The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).*			
Test Method:	*ANSI C63.10-2013* *KDB 558074 D01 15.247 Meas Guidance v05r02*		

5.1.2 Test Limit

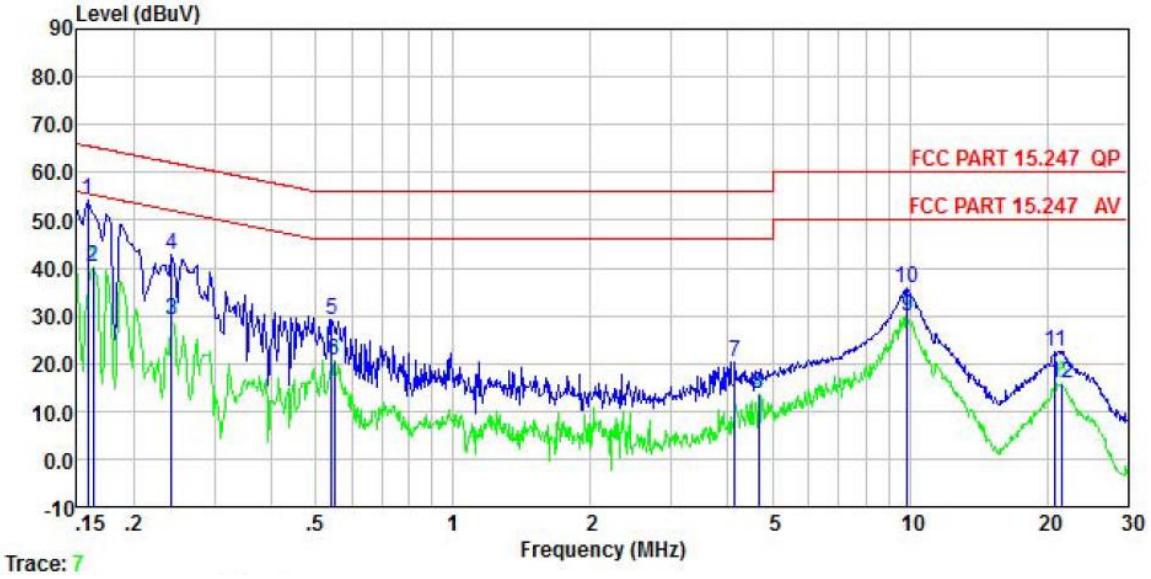
<table>
<tr><th>Test items</th><th>Limit</th></tr>
<tr><td>AC Power Line Conducted Emission</td><td>
<table>
<tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Limit (dBµV)</th></tr>
<tr><th>Quasi-Peak</th><th>Average</th></tr>
<tr><td>0.15 – 0.5</td><td>66 to 56 Note 1</td><td>56 to 46 Note 1</td></tr>
<tr><td>0.5 – 5</td><td>56</td><td>46</td></tr>
<tr><td>5 – 30</td><td>60</td><td>50</td></tr>
<tr><td colspan="3">Note 1: The limit level in dBµV decreases linearly with the logarithm of frequency.
Note 2: The more stringent limit applies at transition frequencies.</td></tr>
</table>
</td></tr>
<tr><td>Conducted Output Power</td><td>For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.</td></tr>
<tr><td>6dB Emission Bandwidth</td><td>The minimum 6 dB bandwidth shall be at least 500 kHz.</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>N/A</td></tr>
<tr><td>Power Spectral Density</td><td>For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.</td></tr>
<tr><td>Spurious Emission</td><td>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)):
<table>
<tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Limit (dBµV/m)</th><th rowspan="2">Detector</th></tr>
<tr><th>@ 3m</th><th>@ 10m</th></tr>
<tr><td>30 – 88</td><td>40.0</td><td>30.0</td><td>Quasi-peak</td></tr>
<tr><td>88 – 216</td><td>43.5</td><td>33.5</td><td>Quasi-peak</td></tr>
<tr><td>216 – 960</td><td>46.0</td><td>36.0</td><td>Quasi-peak</td></tr>
<tr><td>960 – 1000</td><td>54.0</td><td>44.0</td><td>Quasi-peak</td></tr>
<tr><td colspan="4">Note: The more stringent limit applies at transition frequencies.</td></tr>
<tr><th rowspan="2">Frequency</th><th colspan="3">Limit (dBµV/m) @ 3m</th></tr>
<tr><th colspan="2">Average</th><th>Peake</th></tr>
<tr><td>Above 1 GHz</td><td colspan="2">54.0</td><td>74.0</td></tr>
<tr><td colspan="4">Note: The measurement bandwidth shall be 1 MHz or greater.</td></tr>
</table>
</td></tr>
</table>

5.2 Antenna requirement

Standard requirement:	FCC Part 15 C Section 15.203 /247(b)(4)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
E.U.T Antenna:	
The EUT antenna is an External antenna which cannot replace by end-user, the best case gain of the antenna is 3 dBi. See product internal photos for details.	

5.3 AC Power Line Conducted Emission

Product name:	Nebra HNT 5G Gateway	**Product model:**	NEBHNT-5G-915-1
Test by:	Mike	**Test mode:**	Tx mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Line
Test voltage:	AC 120 V/60 Hz		

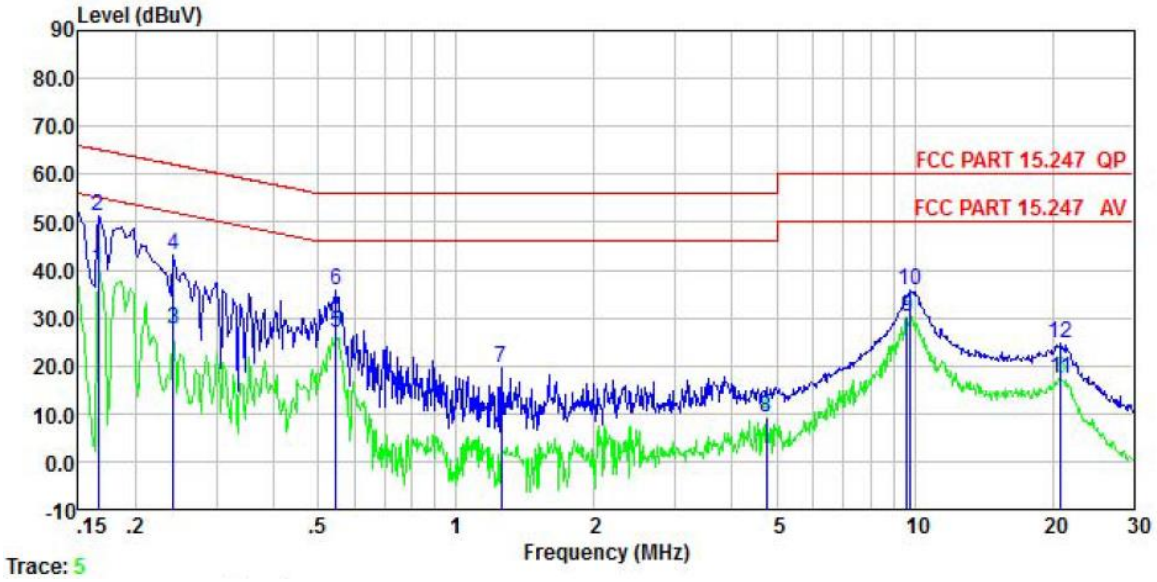


	Freq	Read Level	LISN Factor	Aux2 Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.158	43.49	0.04	10.50	0.01	54.04	65.56	-11.52	QP
2	0.162	29.52	0.04	10.50	0.01	40.07	55.34	-15.27	Average
3	0.242	18.57	0.05	10.50	0.01	29.13	52.04	-22.91	Average
4	0.242	32.32	0.05	10.50	0.01	42.88	62.04	-19.16	QP
5	0.541	18.61	0.05	10.50	0.03	29.19	56.00	-26.81	QP
6	0.549	9.99	0.06	10.50	0.02	20.57	46.00	-25.43	Average
7	4.136	9.42	0.11	10.50	0.08	20.11	56.00	-35.89	QP
8	4.672	2.86	0.12	10.50	0.09	13.57	46.00	-32.43	Average
9	9.861	18.94	0.22	10.50	0.13	29.79	50.00	-20.21	Average
10	9.861	24.98	0.22	10.50	0.13	35.83	60.00	-24.17	QP
11	20.814	11.52	0.35	10.50	0.18	22.55	60.00	-37.45	QP
12	21.600	4.95	0.35	10.50	0.16	15.96	50.00	-34.04	Average

Remark:

1. Level = Read level + LISN Factor + Cable Loss.

Product name:	Nebra HNT 5G Gateway	Product model:	NEBHNT-5G-915-1
Test by:	Mike	Test mode:	Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120 V/60 Hz		



	Freq	Read Level	LISN Factor	Aux2 Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.166	29.63	0.06	10.50	0.01	40.20	55.16	-14.96	Average
2	0.166	40.85	0.06	10.50	0.01	51.42	65.16	-13.74	QP
3	0.242	17.11	0.05	10.50	0.01	27.67	52.04	-24.37	Average
4	0.242	32.74	0.05	10.50	0.01	43.30	62.04	-18.74	QP
5	0.546	16.41	0.05	10.50	0.03	26.99	46.00	-19.01	Average
6	0.546	25.02	0.05	10.50	0.03	35.60	56.00	-20.40	QP
7	1.255	8.71	0.06	10.50	0.10	19.37	56.00	-36.63	QP
8	4.746	-1.40	0.11	10.50	0.09	9.30	46.00	-36.70	Average
9	9.603	19.46	0.20	10.50	0.12	30.28	50.00	-19.72	Average
10	9.809	24.75	0.21	10.50	0.13	35.59	60.00	-24.41	QP
11	20.814	6.41	0.34	10.50	0.18	17.43	50.00	-32.57	Average
12	20.814	13.68	0.34	10.50	0.18	24.70	60.00	-35.30	QP

Remark:

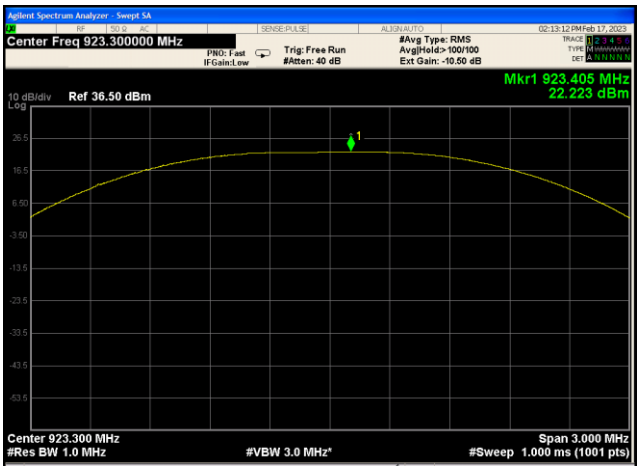
1. Level = Read level + LISN Factor + Cable Loss.

5.4 Conducted Output Power

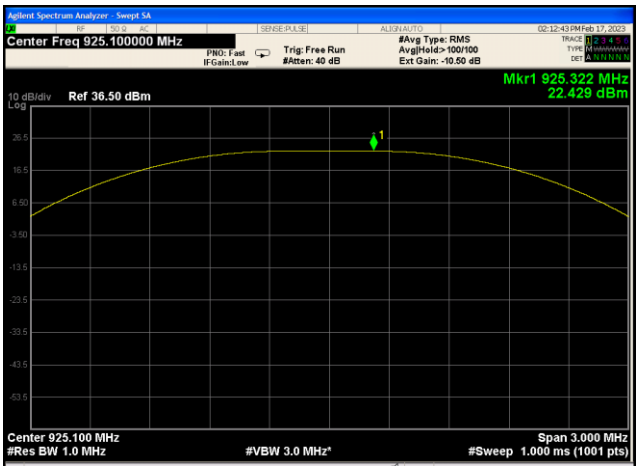
Test Channel	Maximum Output Power (dBm)	Limit(dBm)	Result
Lowest channel	22.223	30.00	Pass
Middle channel	22.429		
Highest channel	22.393		

Test plot as follows:

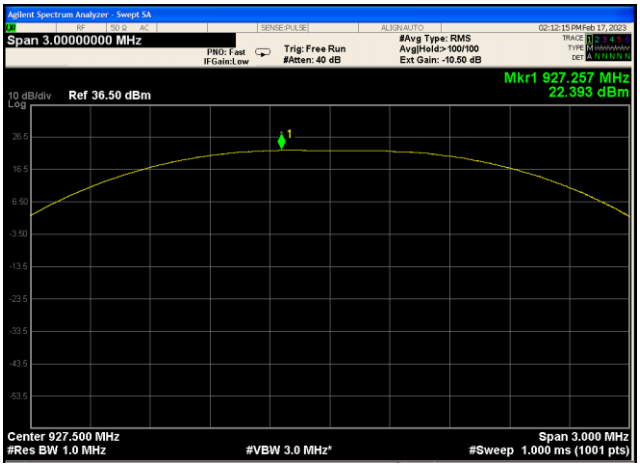
Lowest channel



Middle channel



Highest channel

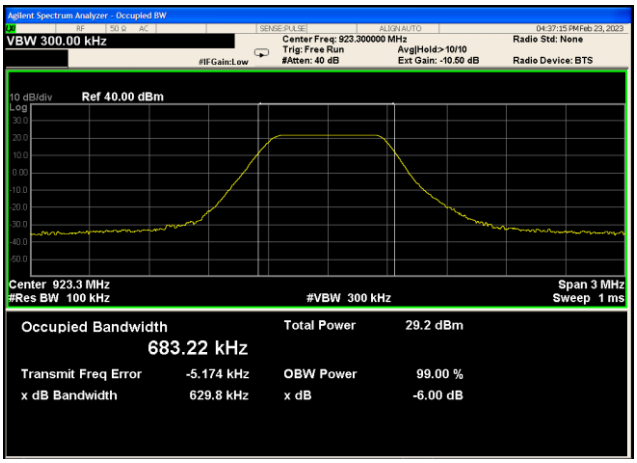


5.5 Emission Bandwidth

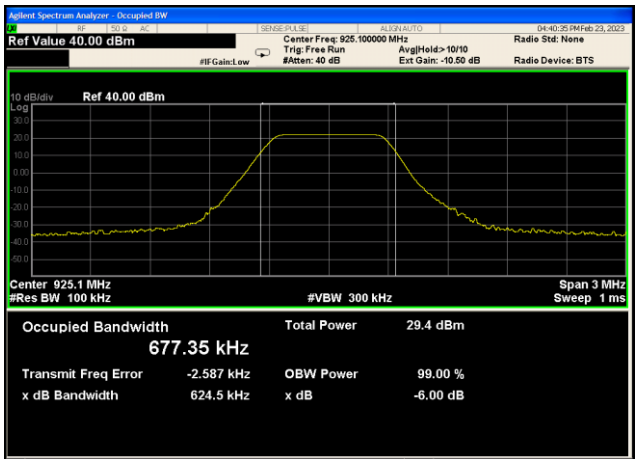
Test Channel	6dB Emission Bandwidth (kHz)	Limit (kHz)	Result
Lowest channel	629.8	>500	Pass
Middle channel	624.5		
Highest channel	682.0		
Test Channel	99% Occupy Bandwidth (MHz)	Limit (kHz)	Result
Lowest channel	683.22	N/A	N/A
Middle channel	677.35		
Highest channel	766.54		

Test plot as follows:

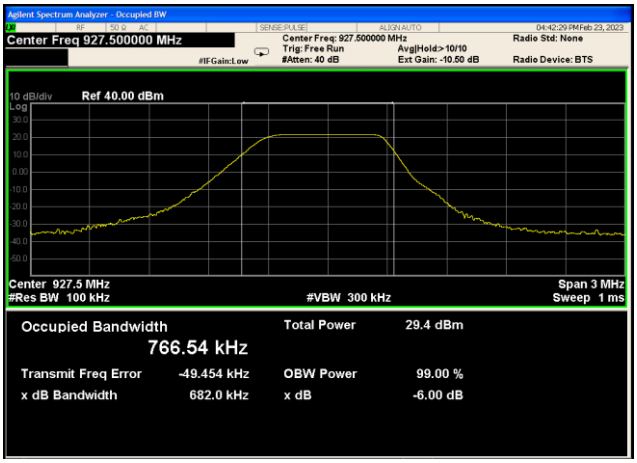
923.3MHz



925.1MHz



927.5MHz

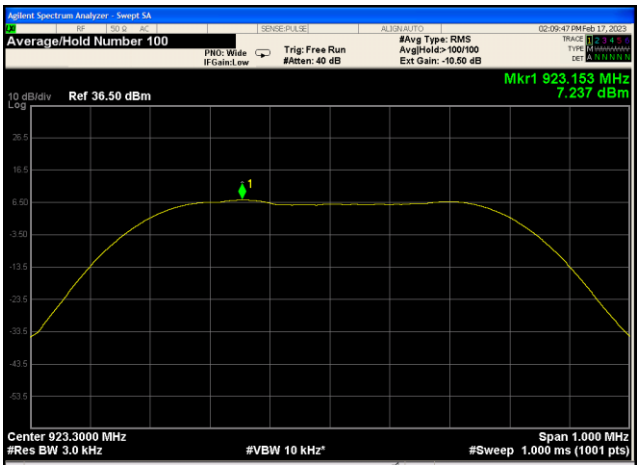


5.6 Power Spectral Density

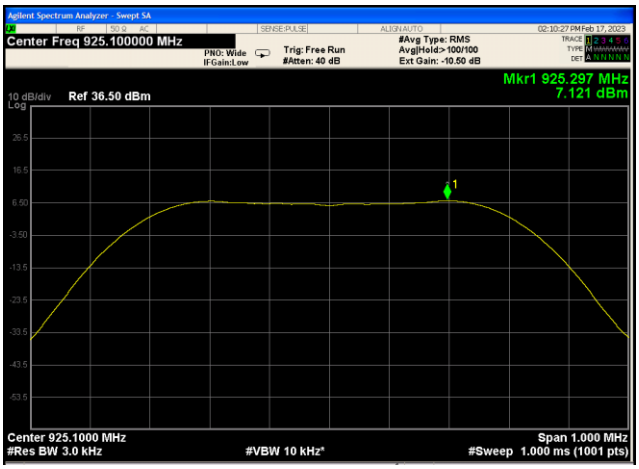
Test Channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest channel	7.237	8.00	Pass
Middle channel	7.121		
Highest channel	7.149		

Test plot as follows:

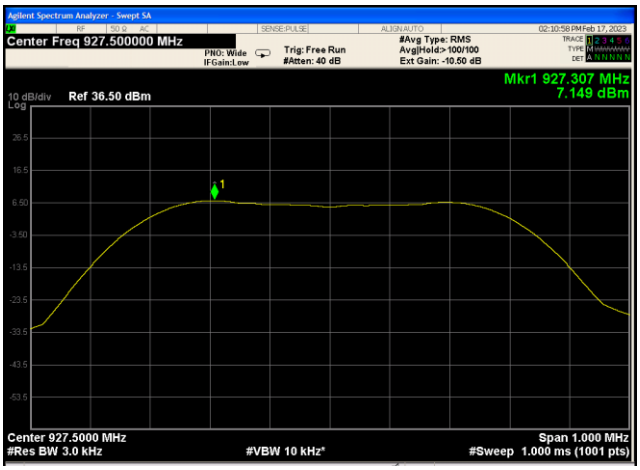
Lowest channel



Middle channel



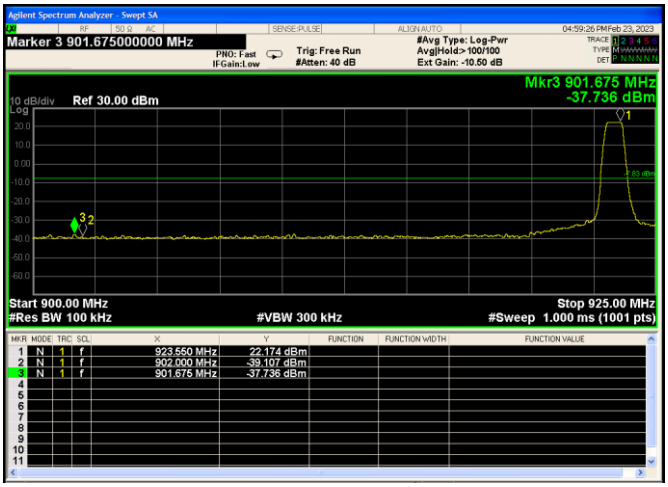
Highest channel



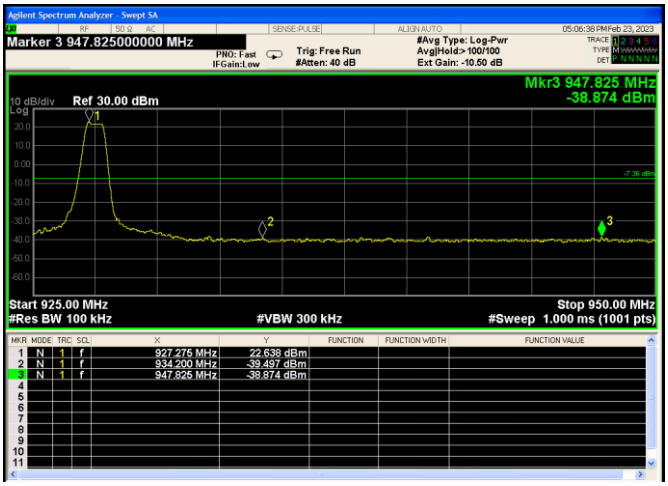
5.7 Spurious Emission

5.7.1 Band-edge Emission

Lowest Channel

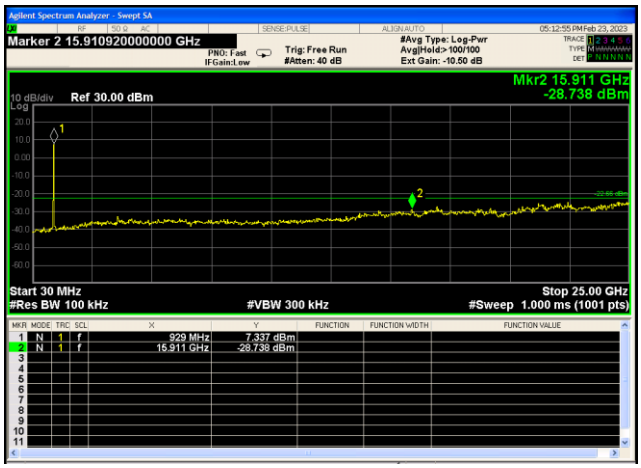


Highest Channel

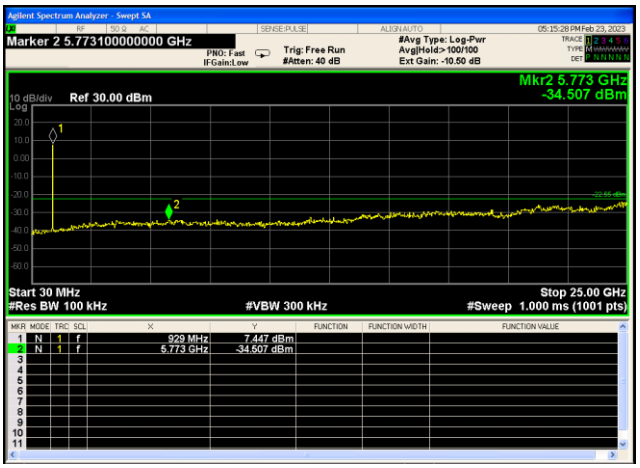


5.7.2 Conducted Spurious Emission

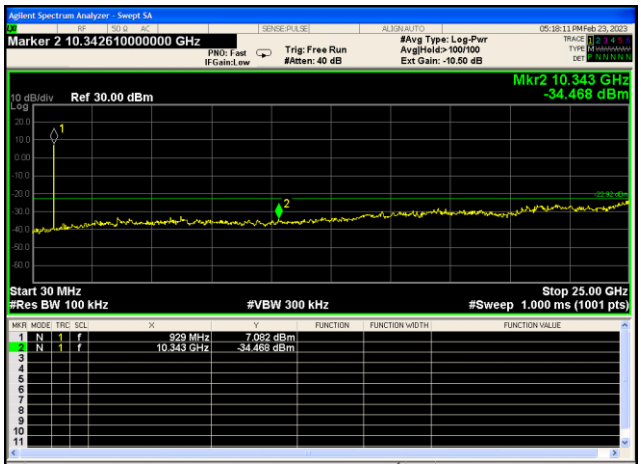
Lowest channel



Middle channel

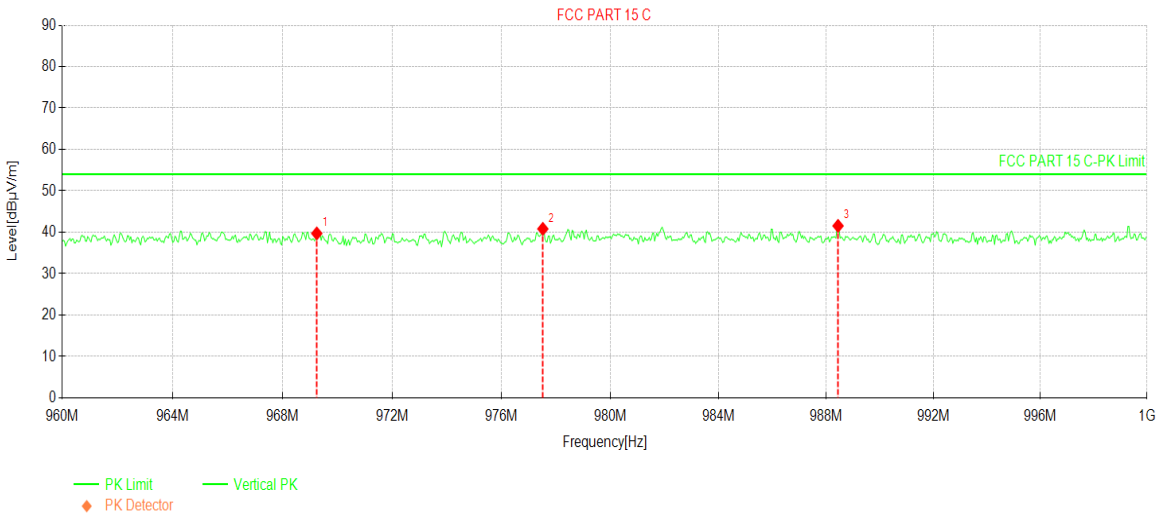


Highest channel



5.7.3 Emissions in Restricted Frequency Bands

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Channel:	Lowest channel	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		

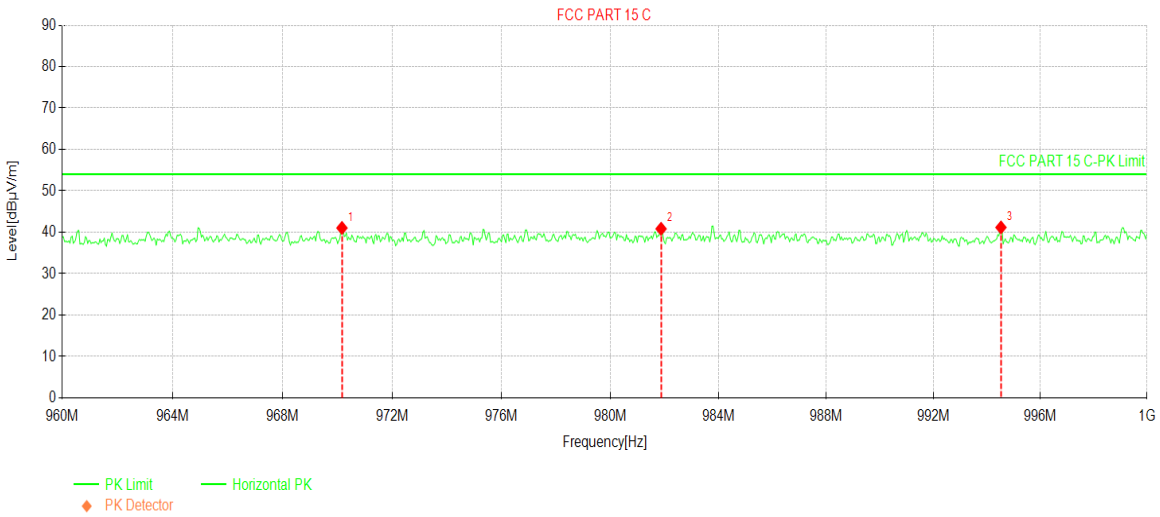


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	969.240	14.30	39.72	25.42	54.00	14.28	PK	Vertical
2	977.520	15.31	40.82	25.51	54.00	13.18	PK	Vertical
3	988.440	15.81	41.54	25.73	54.00	12.46	PK	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		

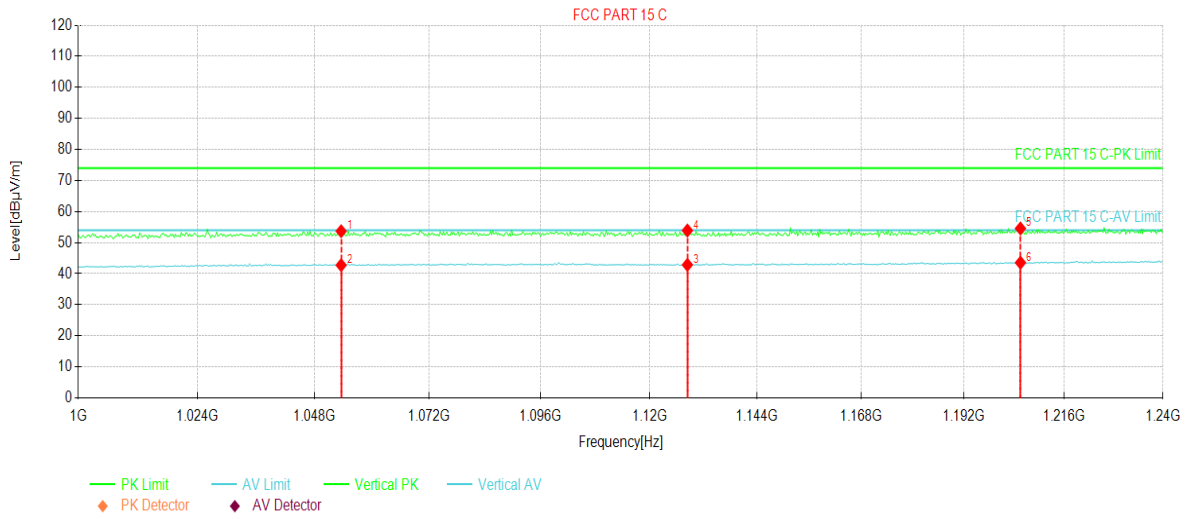


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	970.160	15.61	41.04	25.43	54.00	12.96	PK	Horizontal
2	981.880	15.26	40.84	25.58	54.00	13.16	PK	Horizontal
3	994.520	15.44	41.17	25.73	54.00	12.83	PK	Horizontal

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		



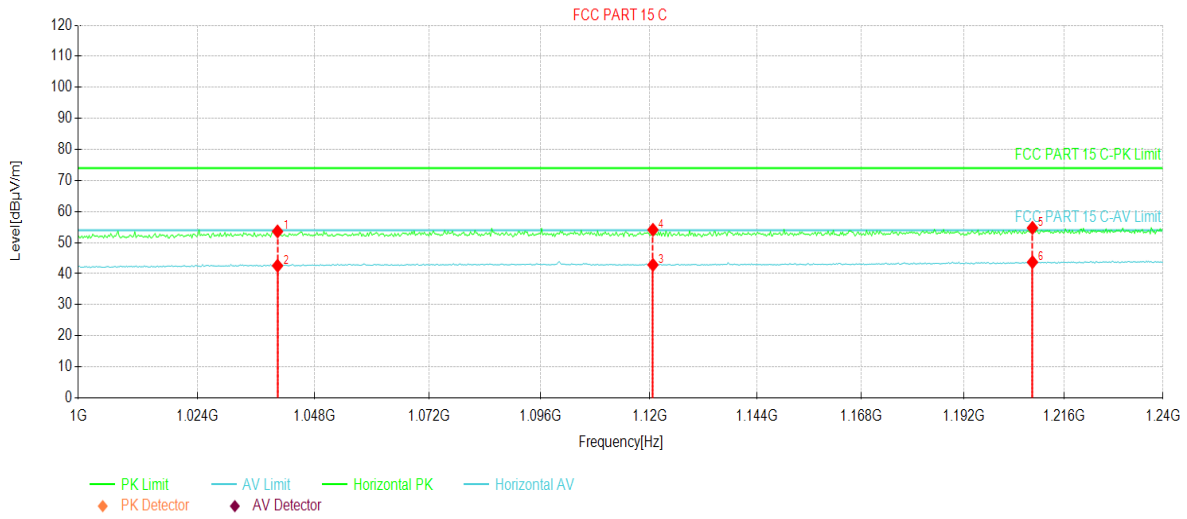
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1053.52	23.49	30.20	53.69	74.00	20.31	PK	Vertical
2	1053.52	12.54	30.20	42.74	54.00	11.26	AV	Vertical
3	1128.40	12.26	30.59	42.85	54.00	11.15	AV	Vertical
4	1128.40	23.30	30.59	53.89	74.00	20.11	PK	Vertical
5	1205.44	23.76	30.80	54.56	74.00	19.44	PK	Vertical
6	1205.44	12.74	30.80	43.54	54.00	10.46	AV	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1040.32	23.50	30.11	53.61	74.00	20.39	PK	Horizontal
2	1040.32	12.44	30.11	42.55	54.00	11.45	AV	Horizontal
3	1120.72	12.27	30.57	42.84	54.00	11.16	AV	Horizontal
4	1120.72	23.56	30.57	54.13	74.00	19.87	PK	Horizontal
5	1208.32	23.93	30.81	54.74	74.00	19.26	PK	Horizontal
6	1208.32	12.90	30.81	43.71	54.00	10.29	AV	Horizontal

Remark:

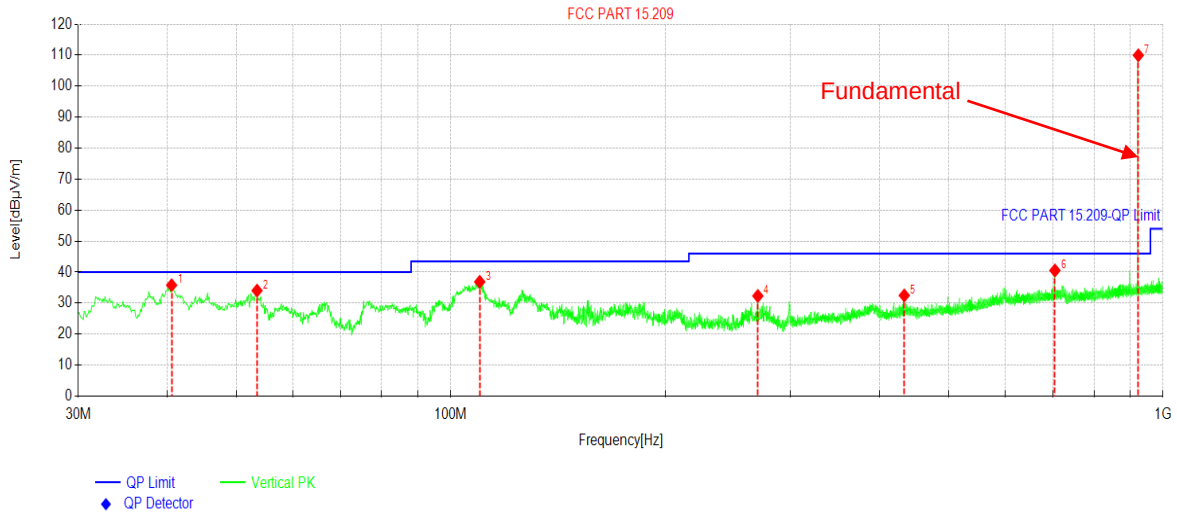
1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

5.7.4 Emissions in Non-restricted Frequency Bands

Below 1GHz:

923.3MHz:

Product Name:	Nebra HNT 5G Gateway	**Product Model:**	NEBHNT-5G-915-1
Test By:	Mike	**Test mode:**	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz		

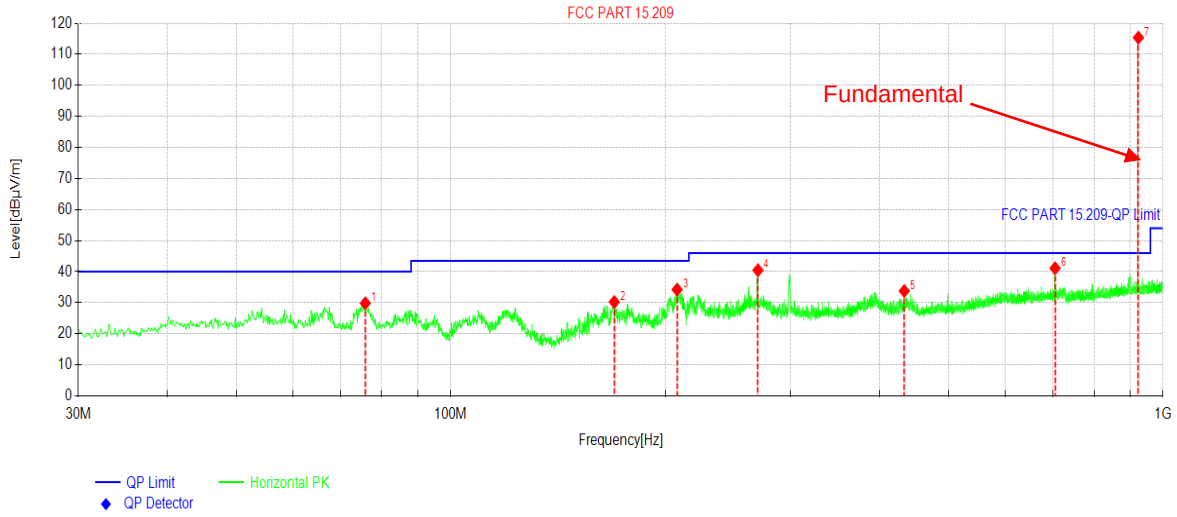


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	40.5741	49.46	35.80	-13.66	40.00	4.20	PK	Vertical
2	53.4763	47.11	34.04	-13.07	40.00	5.96	PK	Vertical
3	109.839	51.75	36.87	-14.88	43.50	6.63	PK	Vertical
4	269.905	46.07	32.32	-13.75	46.00	13.68	PK	Vertical
5	433.269	42.75	32.48	-10.27	46.00	13.52	PK	Vertical
6	705.187	46.03	40.55	-5.48	46.00	5.45	PK	Vertical
7	923.459	112.35	109.98	-2.37	46.00	-63.98	PK	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

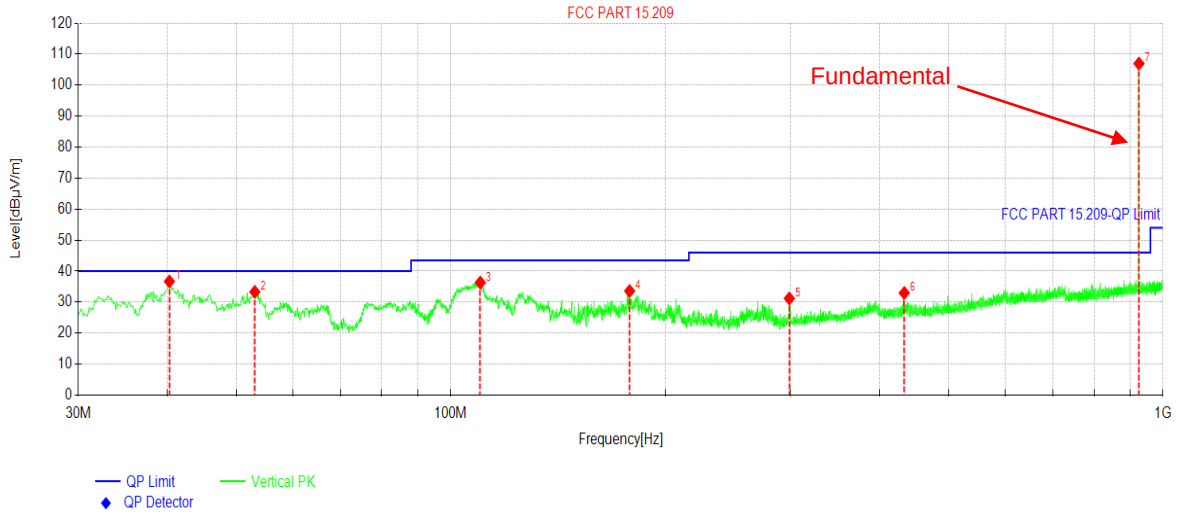
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	75.8856	48.37	29.83	-18.54	40.00	10.17	PK	Horizontal
2	169.694	47.81	30.24	-17.57	43.50	13.26	PK	Horizontal
3	207.915	49.20	34.22	-14.98	43.50	9.28	PK	Horizontal
4	270.002	54.22	40.47	-13.75	46.00	5.53	PK	Horizontal
5	433.269	44.05	33.78	-10.27	46.00	12.22	PK	Horizontal
6	705.575	46.56	41.10	-5.46	46.00	4.90	PK	Horizontal
7	923.556	117.73	115.36	-2.37	46.00	-69.36	PK	Horizontal

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

925.1MHz:

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		

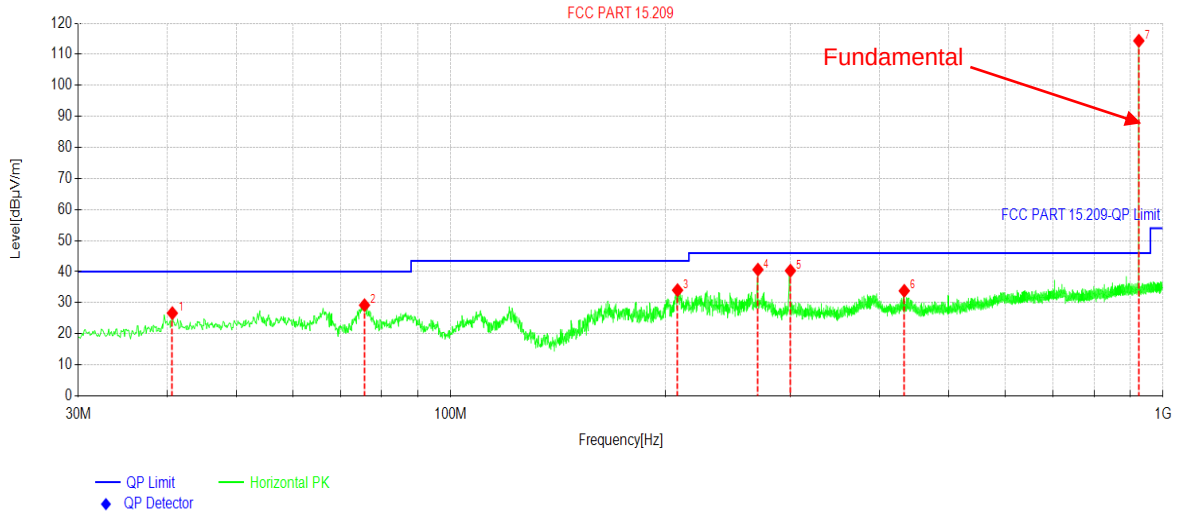


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	40.2830	50.38	36.67	-13.71	40.00	3.33	PK	Vertical
2	53.0883	46.36	33.33	-13.03	40.00	6.67	PK	Vertical
3	110.033	51.20	36.31	-14.89	43.50	7.19	PK	Vertical
4	178.327	50.74	33.60	-17.14	43.50	9.90	PK	Vertical
5	298.813	44.29	31.20	-13.09	46.00	14.80	PK	Vertical
6	433.269	43.23	32.96	-10.27	46.00	13.04	PK	Vertical
7	925.205	109.35	106.97	-2.38	46.00	-60.97	PK	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



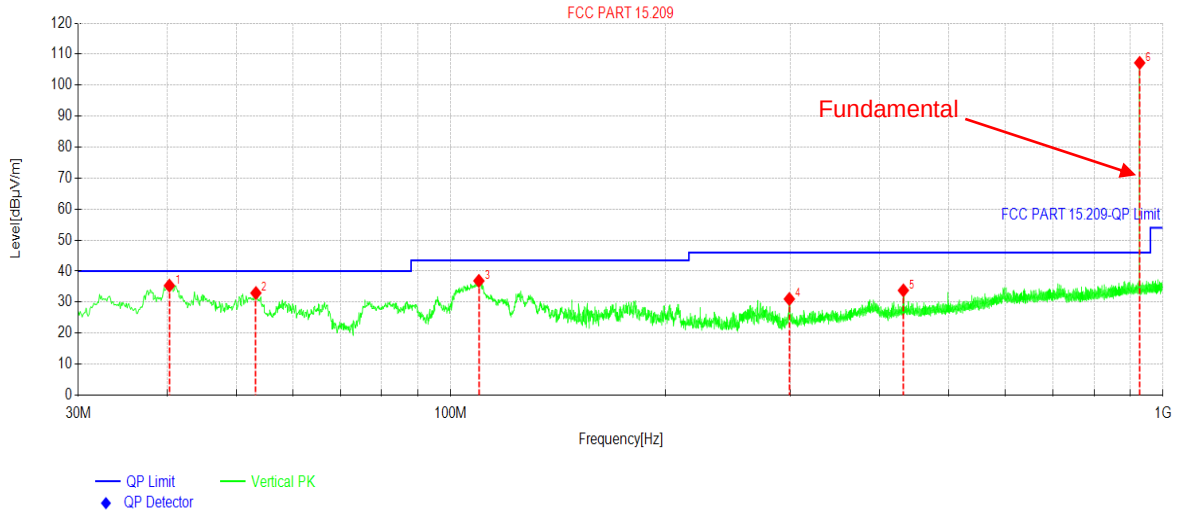
Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	40.6711	40.28	26.64	-13.64	40.00	13.36	PK	Horizontal
2	75.6916	47.73	29.20	-18.53	40.00	10.80	PK	Horizontal
3	208.206	49.02	34.04	-14.98	43.50	9.46	PK	Horizontal
4	270.002	54.41	40.66	-13.75	46.00	5.34	PK	Horizontal
5	299.881	53.38	40.31	-13.07	46.00	5.69	PK	Horizontal
6	433.269	44.09	33.82	-10.27	46.00	12.18	PK	Horizontal
7	924.914	116.72	114.34	-2.38	46.00	-68.34	PK	Horizontal

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

927.5MHz:

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		

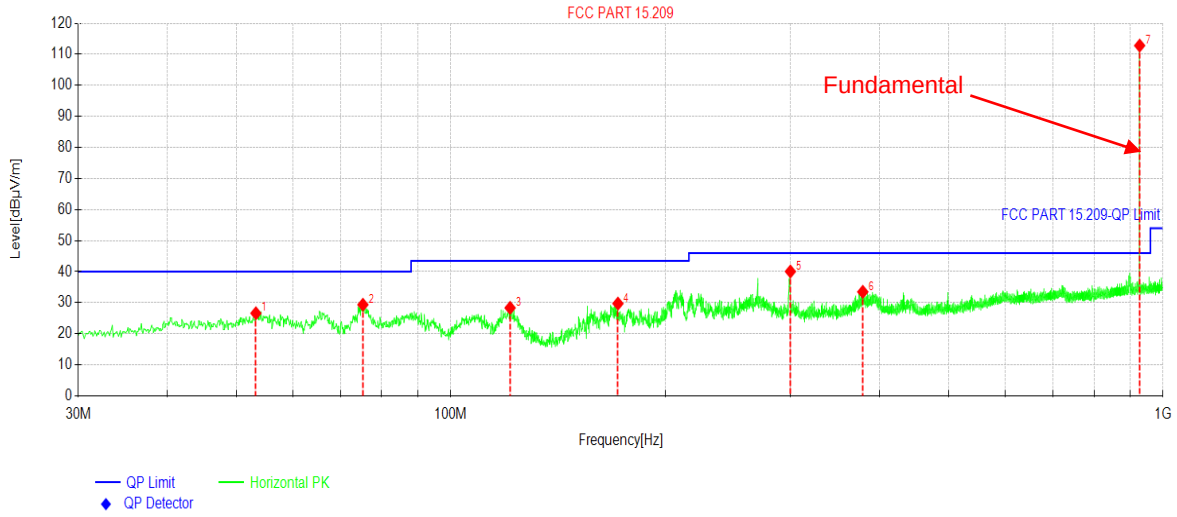


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	40.2830	49.04	35.33	-13.71	40.00	4.67	PK	Vertical
2	53.2823	45.99	32.94	-13.05	40.00	7.06	PK	Vertical
3	109.548	51.71	36.86	-14.85	43.50	6.64	PK	Vertical
4	298.813	44.10	31.01	-13.09	46.00	14.99	PK	Vertical
5	432.008	44.09	33.79	-10.30	46.00	12.21	PK	Vertical
6	927.533	109.59	107.20	-2.39	46.00	-61.20	PK	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List								
NO.	Freq. [MHz]	Reading[dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	53.2823	39.66	26.61	-13.05	40.00	13.39	PK	Horizontal
2	75.3035	47.87	29.37	-18.50	40.00	10.63	PK	Horizontal
3	121.189	45.09	28.34	-16.75	43.50	15.16	PK	Horizontal
4	171.731	47.22	29.73	-17.49	43.50	13.77	PK	Horizontal
5	299.881	53.13	40.06	-13.07	46.00	5.94	PK	Horizontal
6	378.943	44.51	33.49	-11.02	46.00	12.51	PK	Horizontal
7	927.339	115.20	112.81	-2.39	46.00	-66.81	PK	Horizontal

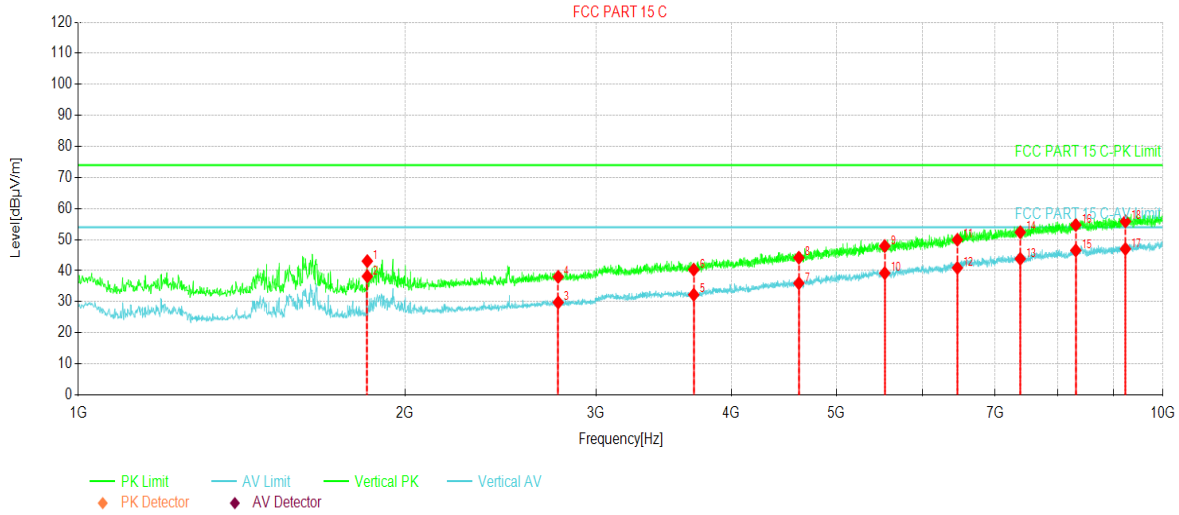
Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Above 1GHz:

923.3MHz:

Product Name:	Nebra HNT 5G Gateway	**Product Model:**	NEBHNT-5G-915-1
Test By:	Mike	**Test mode:**	Tx mode
Test Frequency:	1 GHz ~ 10 GHz	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz		



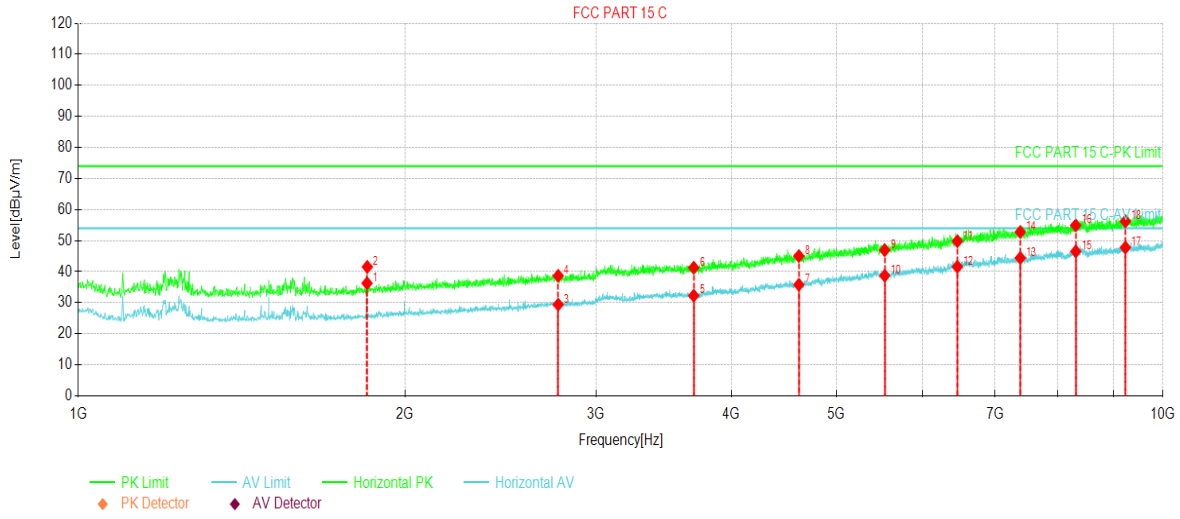
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1847.12	64.72	-21.64	43.08	74.00	30.92	PK	Vertical
2	1847.12	59.80	-21.64	38.16	54.00	15.84	AV	Vertical
3	2769.90	47.32	-17.54	29.78	54.00	24.22	AV	Vertical
4	2769.90	55.55	-17.54	38.01	74.00	35.99	PK	Vertical
5	3693.20	46.50	-14.23	32.27	54.00	21.73	AV	Vertical
6	3693.20	54.54	-14.23	40.31	74.00	33.69	PK	Vertical
7	4616.50	45.58	-9.62	35.96	54.00	18.04	AV	Vertical
8	4616.50	53.80	-9.62	44.18	74.00	29.82	PK	Vertical
9	5539.80	54.02	-6.11	47.91	74.00	26.09	PK	Vertical
10	5539.80	45.31	-6.11	39.20	54.00	14.80	AV	Vertical
11	6463.10	52.44	-2.49	49.95	74.00	24.05	PK	Vertical
12	6463.10	43.40	-2.49	40.91	54.00	13.09	AV	Vertical
13	7386.40	43.73	0.08	43.81	54.00	10.19	AV	Vertical
14	7386.40	52.29	0.08	52.37	74.00	21.63	PK	Vertical
15	8309.70	44.40	2.13	46.53	54.00	7.47	AV	Vertical
16	8309.70	52.60	2.13	54.73	74.00	19.27	PK	Vertical
17	9233.00	43.88	3.11	46.99	54.00	7.01	AV	Vertical
18	9233.00	52.75	3.11	55.86	74.00	18.14	PK	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Frequency:	1 GHz ~ 10 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

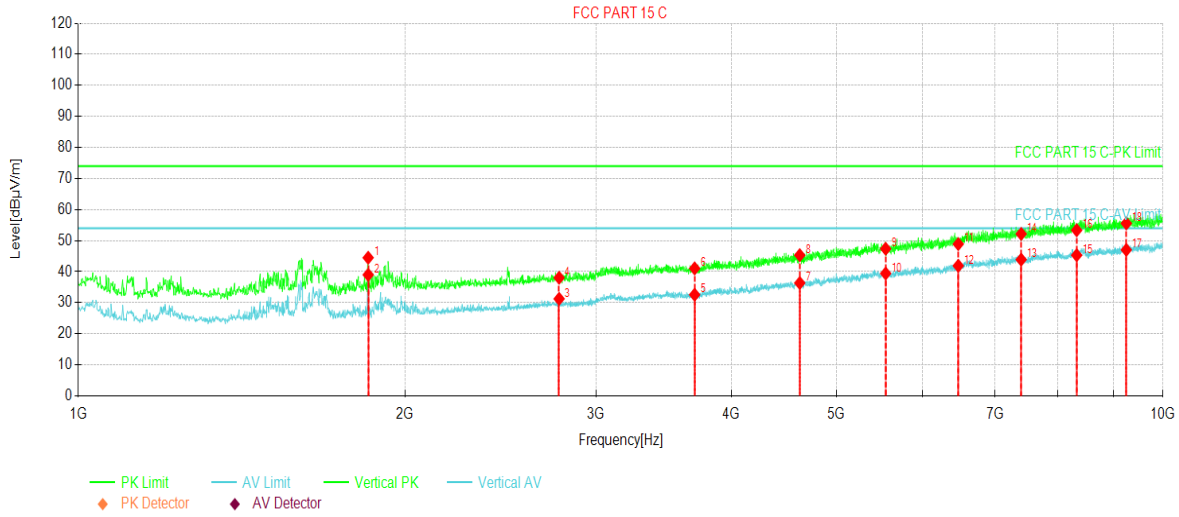
NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1846.00	57.93	-21.65	36.28	54.00	17.72	AV	Horizontal
2	1847.12	63.18	-21.64	41.54	74.00	32.46	PK	Horizontal
3	2769.90	46.94	-17.54	29.40	54.00	24.60	AV	Horizontal
4	2770.00	56.21	-17.54	38.67	74.00	35.33	PK	Horizontal
5	3693.20	46.51	-14.23	32.28	54.00	21.72	AV	Horizontal
6	3693.20	55.52	-14.23	41.29	74.00	32.71	PK	Horizontal
7	4616.50	45.42	-9.62	35.80	54.00	18.20	AV	Horizontal
8	4616.50	54.64	-9.62	45.02	74.00	28.98	PK	Horizontal
9	5539.80	53.04	-6.11	46.93	74.00	27.07	PK	Horizontal
10	5539.80	44.82	-6.11	38.71	54.00	15.29	AV	Horizontal
11	6463.10	52.29	-2.49	49.80	74.00	24.20	PK	Horizontal
12	6463.10	44.09	-2.49	41.60	54.00	12.40	AV	Horizontal
13	7386.40	44.33	0.08	44.41	54.00	9.59	AV	Horizontal
14	7386.40	52.70	0.08	52.78	74.00	21.22	PK	Horizontal
15	8309.70	44.41	2.13	46.54	54.00	7.46	AV	Horizontal
16	8309.70	52.81	2.13	54.94	74.00	19.06	PK	Horizontal
17	9233.00	44.67	3.11	47.78	54.00	6.22	AV	Horizontal
18	9233.00	53.10	3.11	56.21	74.00	17.79	PK	Horizontal

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

925.1MHz:

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Frequency:	1 GHz ~ 10 GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		

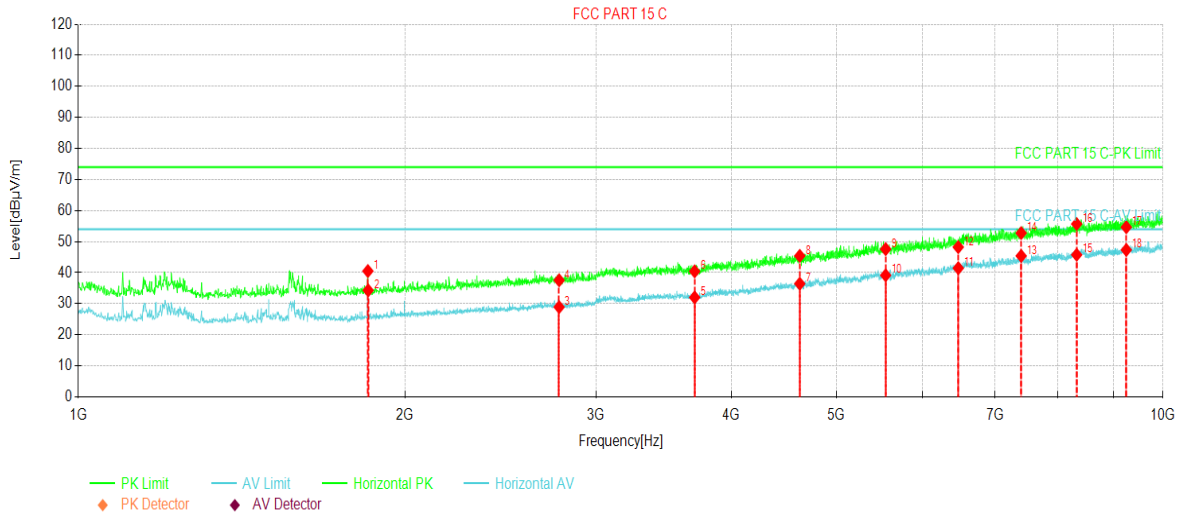


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1850.50	66.11	-21.62	44.49	74.00	29.51	PK	Vertical
2	1850.50	60.61	-21.62	38.99	54.00	15.01	AV	Vertical
3	2775.30	48.78	-17.53	31.25	54.00	22.75	AV	Vertical
4	2775.30	55.57	-17.53	38.04	74.00	35.96	PK	Vertical
5	3700.40	46.77	-14.19	32.58	54.00	21.42	AV	Vertical
6	3700.40	55.24	-14.19	41.05	74.00	32.95	PK	Vertical
7	4625.50	45.93	-9.57	36.36	54.00	17.64	AV	Vertical
8	4625.50	54.88	-9.57	45.31	74.00	28.69	PK	Vertical
9	5550.60	53.46	-6.09	47.37	74.00	26.63	PK	Vertical
10	5550.60	45.52	-6.09	39.43	54.00	14.57	AV	Vertical
11	6475.70	51.37	-2.48	48.89	74.00	25.11	PK	Vertical
12	6475.70	44.37	-2.48	41.89	54.00	12.11	AV	Vertical
13	7400.80	43.74	0.15	43.89	54.00	10.11	AV	Vertical
14	7400.80	52.01	0.15	52.16	74.00	21.84	PK	Vertical
15	8325.90	43.13	2.17	45.30	54.00	8.70	AV	Vertical
16	8325.90	51.17	2.17	53.34	74.00	20.66	PK	Vertical
17	9251.00	43.80	3.22	47.02	54.00	6.98	AV	Vertical
18	9251.00	52.32	3.22	55.54	74.00	18.46	PK	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Frequency:	1 GHz ~ 10 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

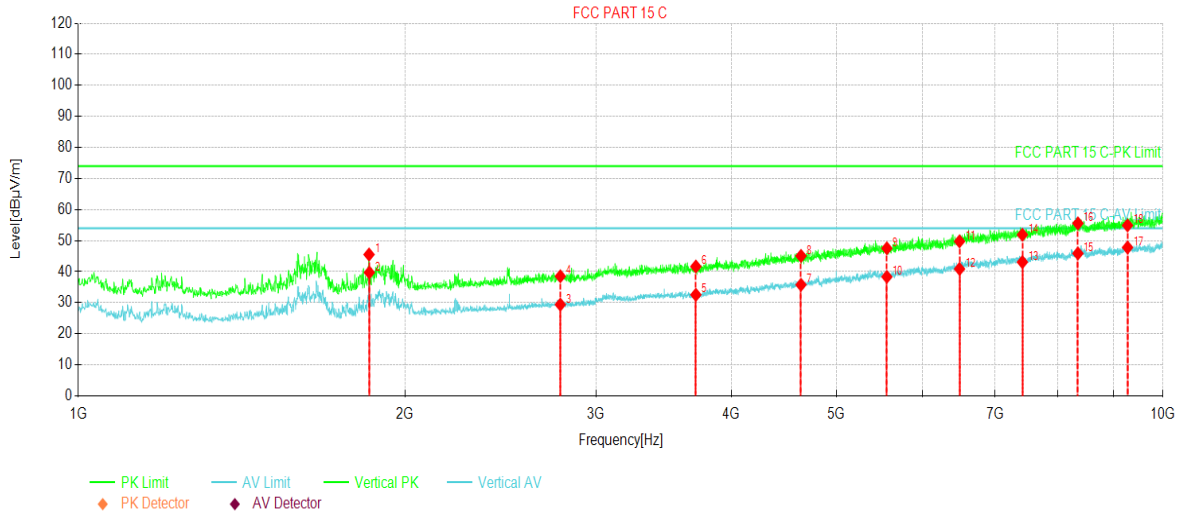
NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1849.37	62.15	-21.63	40.52	74.00	33.48	PK	Horizontal
2	1850.50	55.94	-21.62	34.32	54.00	19.68	AV	Horizontal
3	2775.30	46.45	-17.53	28.92	54.00	25.08	AV	Horizontal
4	2775.30	55.09	-17.53	37.56	74.00	36.44	PK	Horizontal
5	3700.40	46.22	-14.19	32.03	54.00	21.97	AV	Horizontal
6	3700.40	54.62	-14.19	40.43	74.00	33.57	PK	Horizontal
7	4625.50	46.02	-9.57	36.45	54.00	17.55	AV	Horizontal
8	4625.50	54.99	-9.57	45.42	74.00	28.58	PK	Horizontal
9	5550.60	53.68	-6.09	47.59	74.00	26.41	PK	Horizontal
10	5550.60	45.25	-6.09	39.16	54.00	14.84	AV	Horizontal
11	6475.70	43.95	-2.48	41.47	54.00	12.53	AV	Horizontal
12	6475.70	50.71	-2.48	48.23	74.00	25.77	PK	Horizontal
13	7400.80	45.25	0.15	45.40	54.00	8.60	AV	Horizontal
14	7400.80	52.60	0.15	52.75	74.00	21.25	PK	Horizontal
15	8325.90	43.59	2.17	45.76	54.00	8.24	AV	Horizontal
16	8325.90	53.51	2.17	55.68	74.00	18.32	PK	Horizontal
17	9251.00	51.43	3.22	54.65	74.00	19.35	PK	Horizontal
18	9251.00	44.10	3.22	47.32	54.00	6.68	AV	Horizontal

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

927.5MHz:

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Frequency:	1 GHz ~ 10 GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		

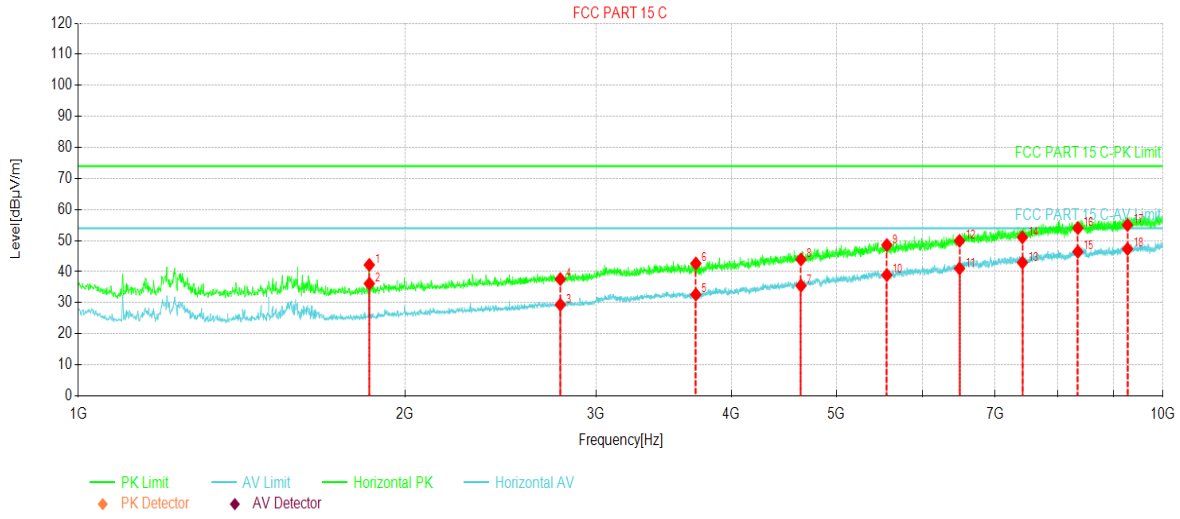


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1853.87	67.13	-21.60	45.53	74.00	28.47	PK	Vertical
2	1855.00	61.33	-21.60	39.73	54.00	14.27	AV	Vertical
3	2782.50	46.93	-17.52	29.41	54.00	24.59	AV	Vertical
4	2782.50	56.05	-17.52	38.53	74.00	35.47	PK	Vertical
5	3710.00	46.70	-14.14	32.56	54.00	21.44	AV	Vertical
6	3710.00	55.80	-14.14	41.66	74.00	32.34	PK	Vertical
7	4637.50	45.29	-9.50	35.79	54.00	18.21	AV	Vertical
8	4637.50	54.57	-9.50	45.07	74.00	28.93	PK	Vertical
9	5565.00	53.60	-6.07	47.53	74.00	26.47	PK	Vertical
10	5565.00	44.42	-6.07	38.35	54.00	15.65	AV	Vertical
11	6492.50	52.23	-2.46	49.77	74.00	24.23	PK	Vertical
12	6492.50	43.34	-2.46	40.88	54.00	13.12	AV	Vertical
13	7420.00	42.97	0.12	43.09	54.00	10.91	AV	Vertical
14	7420.00	51.78	0.12	51.90	74.00	22.10	PK	Vertical
15	8347.50	43.63	2.24	45.87	54.00	8.13	AV	Vertical
16	8347.50	53.33	2.24	55.57	74.00	18.43	PK	Vertical
17	9275.00	44.45	3.35	47.80	54.00	6.20	AV	Vertical
18	9275.00	51.56	3.35	54.91	74.00	19.09	PK	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	Nebra HNT 5G Gateway	Product Model:	NEBHNT-5G-915-1
Test By:	Mike	Test mode:	Tx mode
Test Frequency:	1 GHz ~ 10 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1855.00	63.77	-21.60	42.17	74.00	31.83	PK	Horizontal
2	1855.00	57.75	-21.60	36.15	54.00	17.85	AV	Horizontal
3	2782.50	46.89	-17.52	29.37	54.00	24.63	AV	Horizontal
4	2782.50	55.12	-17.52	37.60	74.00	36.40	PK	Horizontal
5	3710.00	46.78	-14.14	32.64	54.00	21.36	AV	Horizontal
6	3710.00	56.78	-14.14	42.64	74.00	31.36	PK	Horizontal
7	4637.50	44.98	-9.50	35.48	54.00	18.52	AV	Horizontal
8	4637.50	53.42	-9.50	43.92	74.00	30.08	PK	Horizontal
9	5565.00	54.63	-6.07	48.56	74.00	25.44	PK	Horizontal
10	5565.00	44.98	-6.07	38.91	54.00	15.09	AV	Horizontal
11	6492.50	43.48	-2.46	41.02	54.00	12.98	AV	Horizontal
12	6492.50	52.39	-2.46	49.93	74.00	24.07	PK	Horizontal
13	7420.00	42.79	0.12	42.91	54.00	11.09	AV	Horizontal
14	7420.00	50.93	0.12	51.05	74.00	22.95	PK	Horizontal
15	8347.50	44.17	2.24	46.41	54.00	7.59	AV	Horizontal
16	8347.50	51.80	2.24	54.04	74.00	19.96	PK	Horizontal
17	9275.00	51.68	3.35	55.03	74.00	18.97	PK	Horizontal
18	9275.00	43.96	3.35	47.31	54.00	6.69	AV	Horizontal

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

------End of report------