

Report No.: SEWM2309000365RG01  
 Rev.: 01  
 Page: 1 of 32

# TEST REPORT

**Application No.:** SEWM2309000365RG  
**Applicant:** Gen2Wave USA LLC  
**Address of Applicant:** 980 N. Federal Hwy, Suite 110, Boca Raton, Florida, 33432 United States  
**Manufacturer:** Gen2wave  
**Address of Manufacturer:** 7th fl., Point town B/D, Gumi-ro 11, Bundang-gu, Seongnam-si, Gyeonggi-do, #13637, Rep of Korea  
**EUT Description:** Rugged mobile computer  
**Model No.:** Prime RS01  
**FCC ID:** 2BCW4-RS01  
**Standards:** FCC 47 CFR Part 15, Subpart C 15.225  
**Date of Receipt:** 2023/10/07  
**Date of Test:** 2023/10/07 to 2024/01/03  
**Date of Issue:** 2024/01/03

<b>Test Result :</b>	<b>PASS *</b>
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\* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Well Wei  
 Wireless Laboratory Manager



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# 1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2024/01/03		Original

<b>Prepared By</b>		 <hr/> <b>(King-p Li) / Test Engineer</b>
<b>Checked By</b>		 <hr/> <b>(Stone Gu) / Reviewer</b>



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## 2 Test Summary

Test Item	FCC Rules No.	Test Method	Test Result	Result
Antenna Requirement	15.203	--	Clause 4.1	PASS
AC Power Line Conducted Emission	15.207	ANSI C63.10 2013 Section 6.2	Clause 4.3	PASS
20dB Spectrum Bandwidth	15.215(c)	ANSI C63.10 2013 Section 6.9.3	Clause 4.4	PASS
Frequency Stability	15.225(e)	ANSI C63.10 2013 Section 6.8	Clause 4.5	PASS
Field Strength of Fundamental Emissions	15.225(a)(b)(c)	ANSI C63.10 2013 Section 6.4.7	Clause 4.6	PASS
Radiated Spurious Emissions	15.225(d)/15.209	ANSI C63.10 2013 Section 6.4/6.5	Clause 4.7	PASS



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### 3 General Information

#### 3.1 Details of Client

Applicant:	Gen2wave
Address of Applicant:	7th fl., Point town B/D, Gumi-ro 11, Bundang-gu, Seongnam-si, Gyeonggi-do, #13637, Rep of Korea
Manufacturer:	Gen2wave
Address of Manufacturer:	7th fl., Point town B/D, Gumi-ro 11, Bundang-gu, Seongnam-si, Gyeonggi-do, #13637, Rep of Korea

#### 3.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test engineer:	King-p Li, Ives Cheng

#### 3.3 Test Facility

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

<ul style="list-style-type: none"> <li> <b>• A2LA (Certificate No. 6336.01)</b>            SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.         </li> <li> <b>• Innovation, Science and Economic Development Canada</b>            SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.            CAB identifier: CN0120.            IC#: 27594.         </li> <li> <b>• FCC –Designation Number: CN1312</b>            SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.            Designation Number: CN1312.            Test Firm Registration Number: 717327         </li> </ul>
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### 3.4 General Description of EUT

EUT Description:	Rugged mobile computer	
Model No.:	Prime RS01	
Hardware Version:	1.02	
Software Version:	MT918_EQ000_2774.3A84745.A0F816C.84C1BFC_231106_100_V01_T01	
IMEI/SN:	RF Conducted	SN: AWM70886
	RSE	IMEI1: 860284060012401 IMEI2: 860284060012464
Operation Frequency:	13.56MHz	
Modulation Type:	ASK	
NFC Type:	Type A	
Remark:	As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.	



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### 3.5 Test Environment

Environment Parameter	101.0kPa Selected Values During Tests	
Relative Humidity	44-46 % RH Ambient	
Value	Temperature(°C)	Voltage(V)
NTNV	22~23	3.8
Remark: The extreme Voltage and extreme Temperature are refer to the test data of Frequency Stability.		

### 3.6 Description of Support Units

The EUT has been tested as an independent unit.



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## 4 Test results and Measurement Data

### 4.1 Antenna Requirement

<b>Standard requirement:</b>	47 CFR Part 15C Section 15.203
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 shall be considered sufficient to comply with the provisions of this section. 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.	
The antenna of the EUT are permanently attached.	

### 4.2 Worst-case configuration and mode

<p>The fundamental of the EUT was investigated under three orthogonal orientations X, Y, and Z. The Z orientation was determined to be the worst-case orientation.</p> <p>Although these tests were performed ther than open area test site, adequate comparison measurements were confirmed against 30m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site prduces results that correlate with the ones of tests made in an ope field based on KDB 414788.</p>
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### 4.3 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2013 Section 6.2		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Frequency range(MHz)	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.			
Test Procedure:	<ol style="list-style-type: none"> <li>1) The mains terminal disturbance voltage test was conducted in a shielded room.</li> <li>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</li> <li>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.</li> <li>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.</li> <li>5) 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: 2013 on conducted measurement.</li> </ol>		



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<p>Test Setup:</p>	
<p>Instruments Used:</p>	<p>Refer to section 6 for details.</p>
<p>Test Results:</p>	<p>Pass</p>



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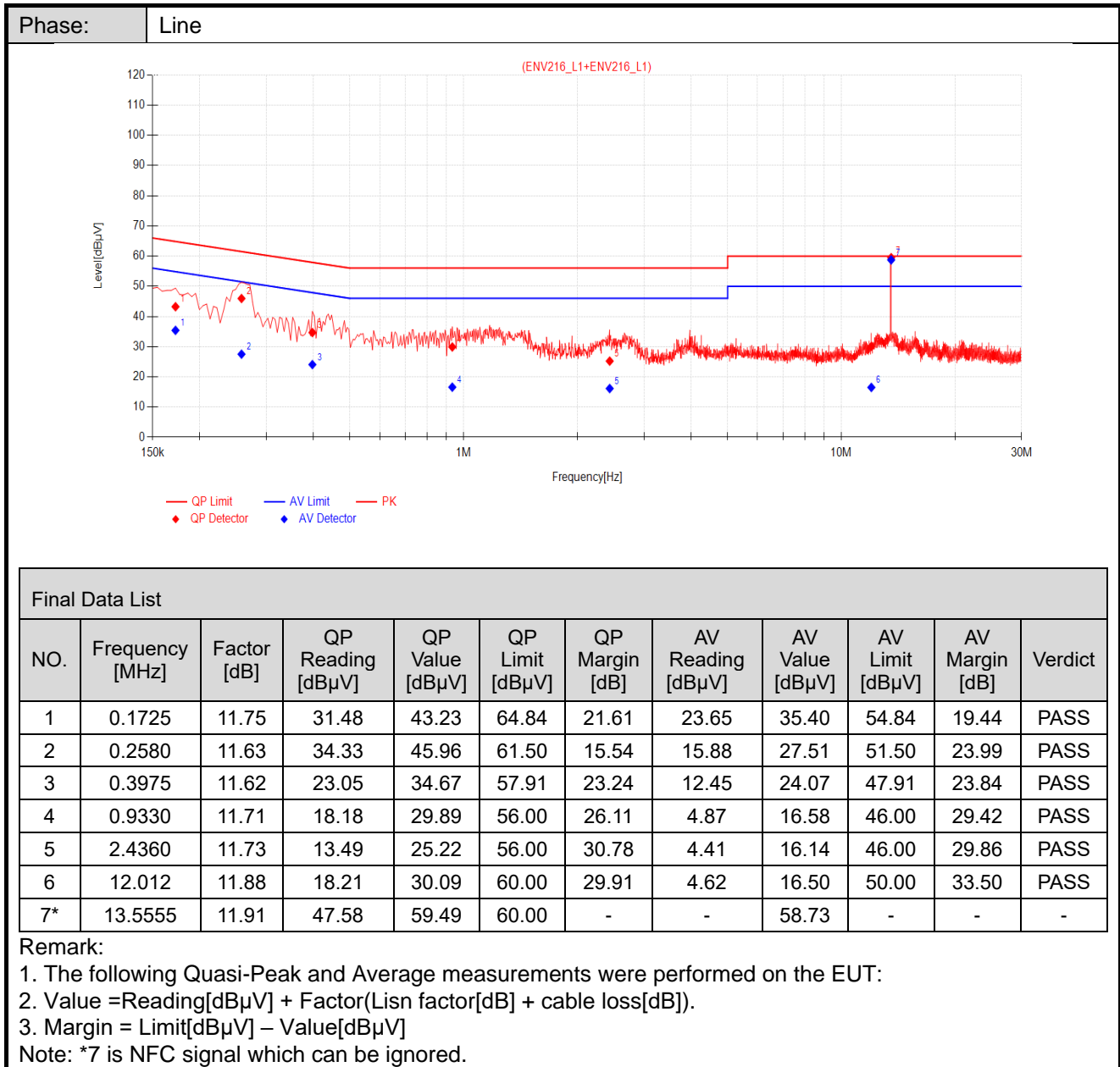
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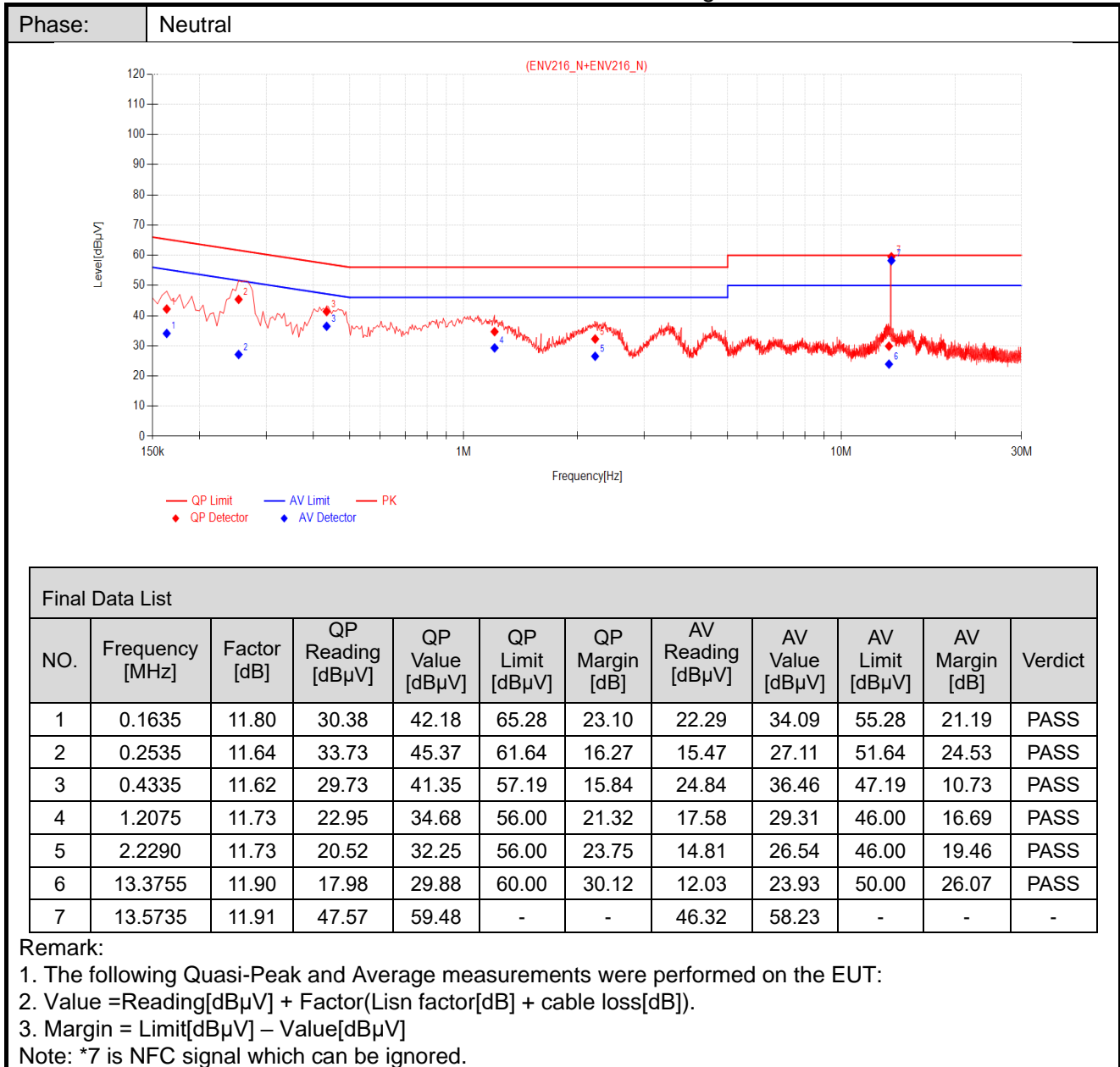
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**Measurement Data**

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.





### 4.4 20dB Spectrum Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.215(c)
Test Method:	ANSI C63.10: 2013 Section 6.9.3
Test Setup:	
Instruments Used:	Refer to section 6 for details
Limit:	Intentional radiators must be designed to ensure that the 20dB in the specific band 13.553~13.567MHz.
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	



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### 4.5 Frequency Stability

Test Requirement:	47 CFR Part 15C Section 15.225(e)
Test Method:	ANSI C63.10: 2013 Section 6.8
Test Setup:	
Instruments Used:	Refer to section 6 for details
Limit:	<p>The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.</p> <p>While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.</p>
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	



### 4.6 Field Strength of Fundamental Emissions

Test Requirement:	47 CFR Part 15C Section 15.225				
Test Method:	ANSI C63.10 :2013 Section 6.4.7				
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Limit:	Frequency	Field Strength ( $\mu\text{V/m}$ ) at 30m	Field Strength (dB $\mu\text{V/m}$ ) at 30m	Field Strength (dB $\mu\text{V/m}$ ) at 10m	Field Strength (dB $\mu\text{V/m}$ ) at 3m
	1.705~13.110 MHz	30	29.5	48.58	69.5
	13.110~13.410 MHz	106	40.5	59.58	80.5
	13.410~13.553 MHz	334	50.5	69.58	90.5
	13.553~13.567 MHz	15,848	84.0	103.08	124.0
	13.567~13.710 MHz	334	50.5	69.58	90.5
	13.710~14.010 MHz	106	40.5	59.58	80.5
	14.010~30.000 MHz	30	29.5	48.58	69.5

Test Setup:

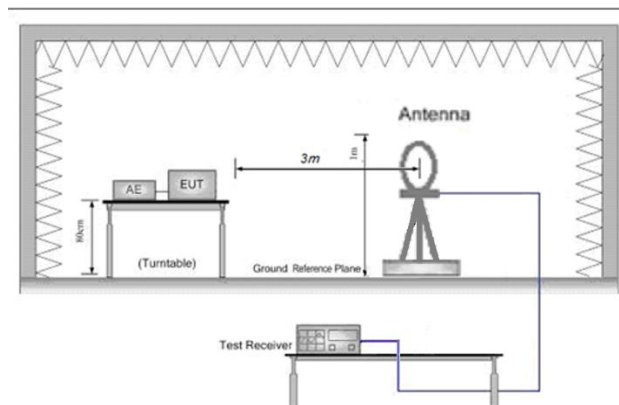


Figure 1. Below 30MHz

Test Procedure:	<ol style="list-style-type: none"> <li>The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>The antenna 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.</li> <li>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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>The test-receiver system was set to Peak Detect Function and Specified</li> </ol>
-----------------	--



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	<p>Bandwidth with Maximum Hold Mode.</p> <p>f. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the <b>Z</b> axis positioning which it is worse case.</p> <p>g. Repeat above procedures until all frequencies measured was complete.</p> <p>h. RBW set to 9kHz.</p>
Exploratory Test Mode:	<p>Transmitting with modulation.</p> <p>Charge + Transmitting mode.</p>
Final Test Mode:	<p><b>Transmitting with modulation.</b></p> <p>Pretest the EUT at Charge + Transmitting mode. Only the worst case is recorded in the report.</p>
Instruments Used:	Refer to section 6 for details
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	



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### 4.7 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.225				
Test Method:	ANSI C63.10 :2013 Section 6.4&6.5				
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	Above 960MHz	500	54.0	Quasi-peak	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.					

Test Setup:

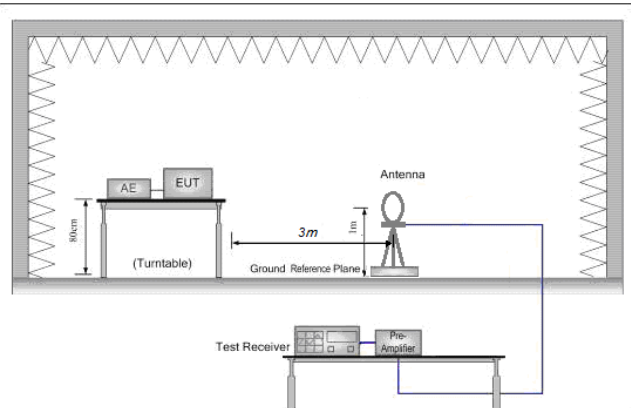


Figure 1. Below 30MHz

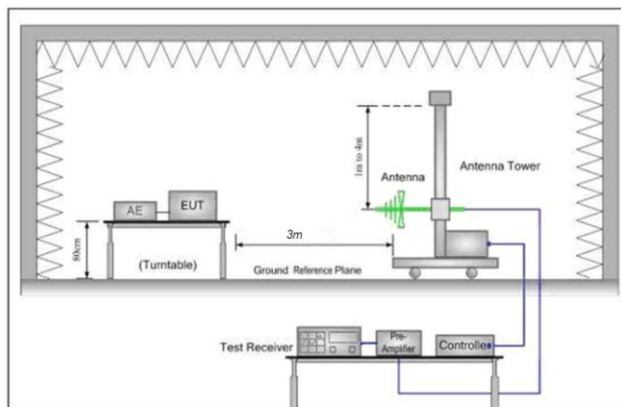


Figure 2. Above 30MHz

Test Procedure:

- i. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- j. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- k. The antenna 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.
- l. For each suspected emission, the EUT was arranged to its worst case and then



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	<p>the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>m. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>n. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the <b>Z</b> axis positioning which it is worse case.</p> <p>o. Repeat above procedures until all frequencies measured was complete.</p>
Exploratory Test Mode:	<p>Transmitting with modulation.</p> <p>Charge + Transmitting mode.</p>
Final Test Mode:	<p>Transmitting with modulation.</p> <p>Pretest the EUT at Charge + Transmitting mode.Only the worst case is recorded in the report.</p>
Instruments Used:	Refer to section 6 for details
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	



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## 5 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	±1.0 %
2	Occupied Bandwidth	±1.0 %
3	Conduction Emission	± 2.90dB (150kHz to 30MHz)
4	Radiated Emission	± 3.13dB (9k -30MHz)
		± 4.80dB (30M -1GHz)

**Remark:**

The  $U_{lab}$  (lab Uncertainty) is less than  $U_{CISPR/ETSI}$  (CISPR/ETSI Uncertainty), so the test results  
 – compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;  
 – non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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## 6 Equipment List

RF Test Equipment					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Shielding Room	Brilliant-emc	N/A	SUWI-04-01-06	2021/05/08	2024/05/07
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-07	2023/02/06	2024/02/05
Signal Analyzer	ROHDE & SCHWARZ	FSV3030	SUWI-01-02-02	2023/05/11	2024/05/10
Measurement Software	Tonscend	JS1120-3 Test System V 3.3.20	SUWI-02-09-09	NCR	NCR
Signal Analyzer	ROHDE & SCHWARZ	FSW43	SUWI-01-02-04	2023/05/11	2024/05/10
Temperature Chamber	ESPEC	SU-242	SUWI-01-13-01	2023/02/06	2024/02/05
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2023/02/06	2024/02/05

CE Test Equipment					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Test receiver	ROHDE & SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2023/02/07	2024/02/06
Artificial network	ROHDE & SCHWARZ	ENV216	SUWI-01-19-03	2023/02/08	2024/02/07
Artificial network	ROHDE & SCHWARZ	ENV216	SUWI-01-19-04	2023/02/08	2024/02/07
Measurement Software	Tonscend	JS32-CE 4.0.0.2	SUWI-02-09-05	NCR	NCR



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RSE Test Equipment					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal. Due date (yyyy/mm/dd)
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	2021/05/08	2024/05/07
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2023/02/07	2024/02/06
Test receiver	ROHDE & SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	VULB 9163	SUWI-01-11-01	2023/05/13	2024/05/12
Active Loop Antenna	SCHWRZBECK MESS-ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2023/05/13	2024/05/12
Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	2023/02/06	2024/02/05
Measurement Software	Tonscend	JS32-RE V3.0.0.3	SUWI-02-09-04	NCR	NCR



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## 7 Photographs - Setup Photos

Refer to Appendix A.1 NFC Setup Photos.



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# Appendix

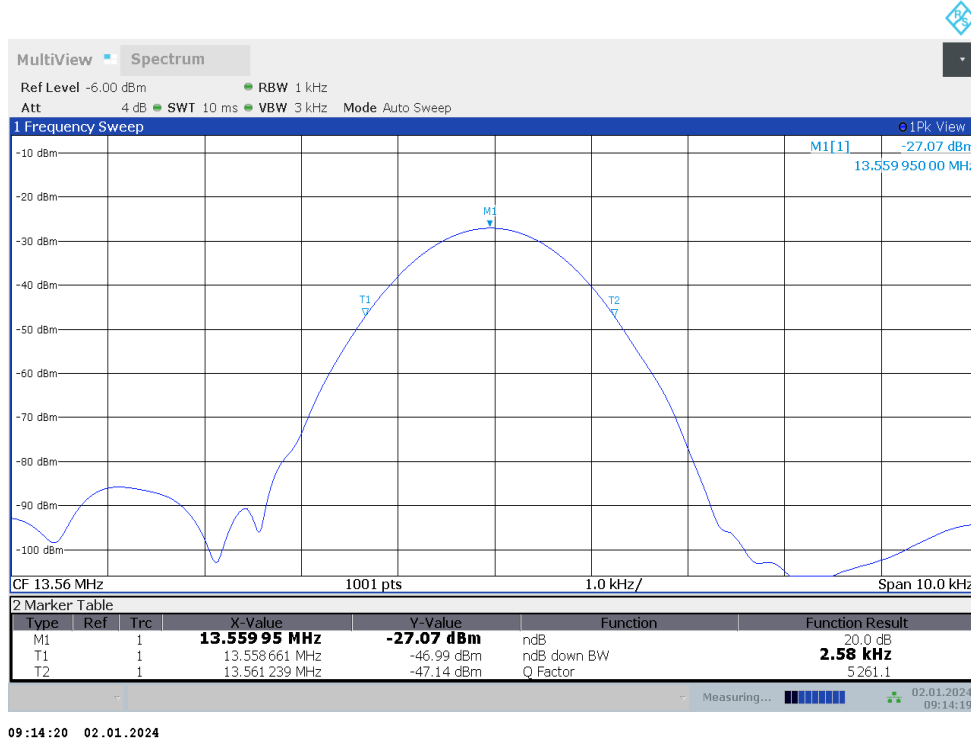


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## 20dB Bandwidth



**Note:**

Because the measured signal is CW or CW-like adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.



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**Frequency tolerance**

Declared Frequency (MHz)		13.56MHz			
Startup					
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Frequency Tolerance (%)	Limit (%)	Result
50	3.8	13.55994	0.0004	±0.01	Pass
40		13.55995	0.0004		Pass
30		13.55995	0.0004		Pass
20		13.55995	0.0004		Pass
10		13.55995	0.0004		Pass
0		13.55995	0.0004		Pass
-10		13.55995	0.0004		Pass
-20		13.55995	0.0004		Pass
20	4.45	13.55996	0.0003		Pass
	3.40	13.55995	0.0004		Pass

Declared Frequency (MHz)		13.56MHz			
2mins					
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Frequency Tolerance (%)	Limit (%)	Result
50	3.8	13.55994	0.0004	±0.01	Pass
40		13.55995	0.0004		Pass
30		13.55995	0.0004		Pass
20		13.55995	0.0004		Pass
10		13.55995	0.0004		Pass
0		13.55995	0.0004		Pass
-10		13.55995	0.0004		Pass
-20		13.55993	0.0005		Pass
20	4.45	13.55996	0.0003		Pass
	3.40	13.55995	0.0004		Pass



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Declared Frequency (MHz)		13.56MHz				
5mins						
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Frequency Tolerance (%)	Limit (%)	Result	
50	3.8	13.55995	0.0004	±0.01	Pass	
40		13.55995	0.0004		Pass	
30		13.55995	0.0004		Pass	
20		13.55995	0.0004		Pass	
10		13.55995	0.0004		Pass	
0		13.55995	0.0004		Pass	
-10		13.55994	0.0005		Pass	
-20		13.55996	0.0003		Pass	
20		4.45	13.55995		0.0004	Pass
		3.40	13.55995		0.0004	Pass

Declared Frequency (MHz)		13.56MHz				
10mins						
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Frequency Tolerance (%)	Limit (%)	Result	
50	3.8	13.55996	0.0003	±0.01	Pass	
40		13.55995	0.0004		Pass	
30		13.55995	0.0004		Pass	
20		13.55995	0.0004		Pass	
10		13.55995	0.0004		Pass	
0		13.55995	0.0004		Pass	
-10		13.55995	0.0004		Pass	
-20		13.55995	0.0004		Pass	
20		4.45	13.55995		0.0004	Pass
		3.40	13.55995		0.0004	Pass



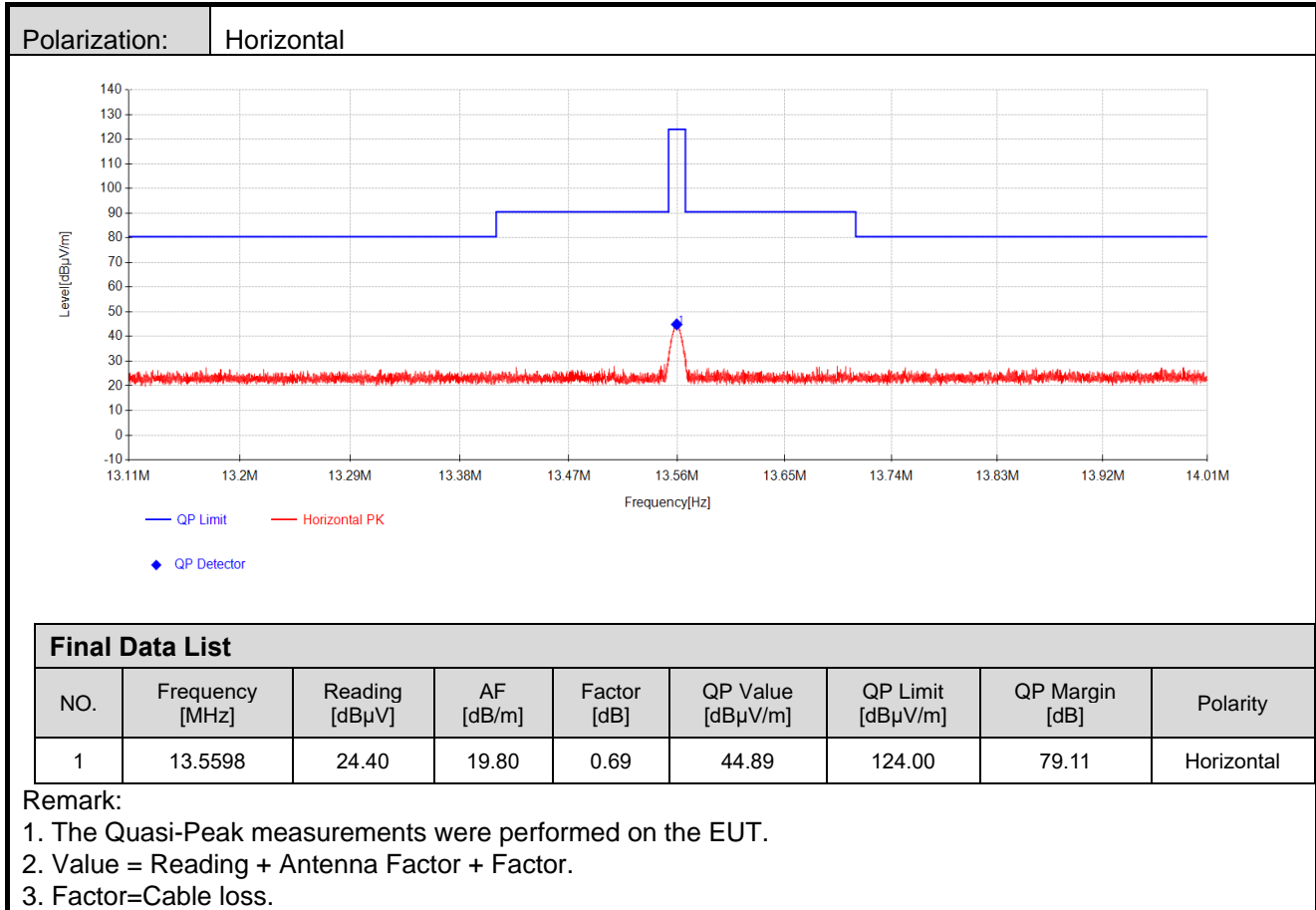
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 t (86-512) 62992980 sgs.china@sgs.com

## Field Strength of Fundamental Emissions

### NFC Emission Mask

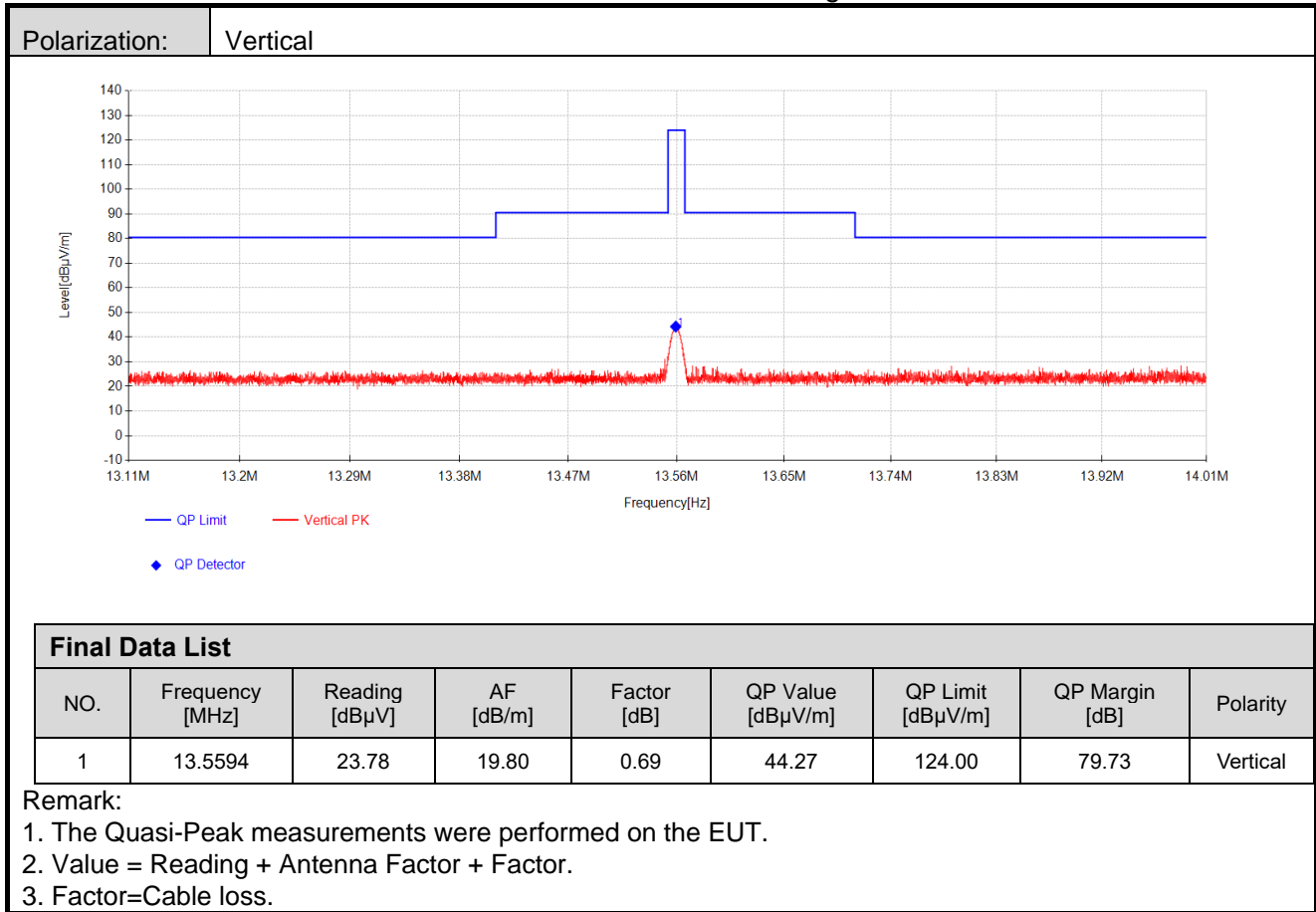


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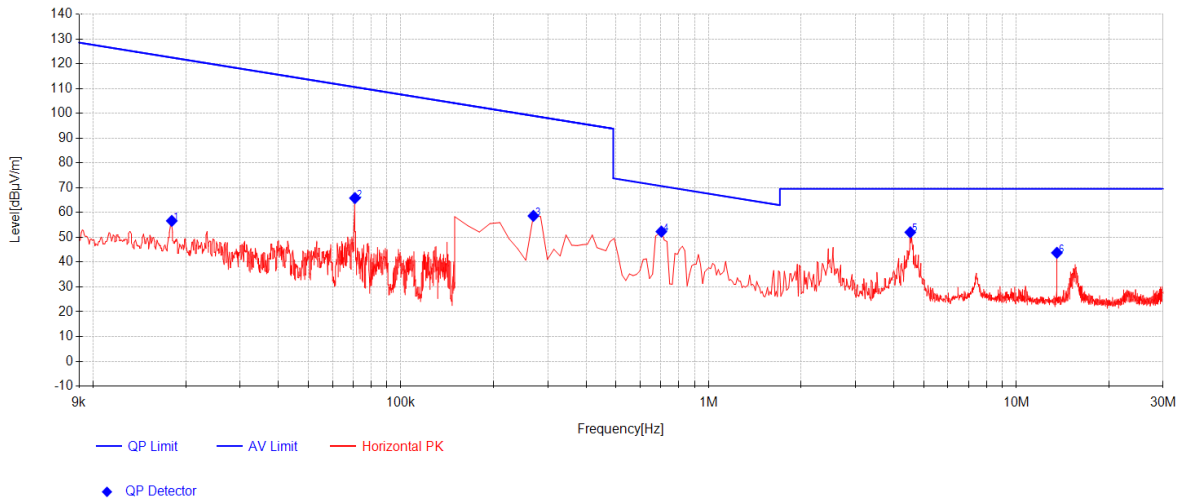
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## Radiated Spurious Emissions

### NFC\_RSE

Polarization: Horizontal



#### Final Data List

NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Polarity
4	0.7025	31.79	20.08	0.44	52.31	70.67	18.36	Horizontal
5	4.5252	31.71	19.80	0.52	52.03	69.54	17.51	Horizontal
6	13.5594	23.27	19.80	0.69	43.76	69.54	25.78	Horizontal
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Polarity
1	0.018	36.22	19.98	0.43	56.63	122.49	65.86	Horizontal
3	0.2695	37.95	20.27	0.43	58.65	98.99	40.34	Horizontal
2	0.0709	45.20	20.20	0.43	65.83	110.59	44.76	Horizontal

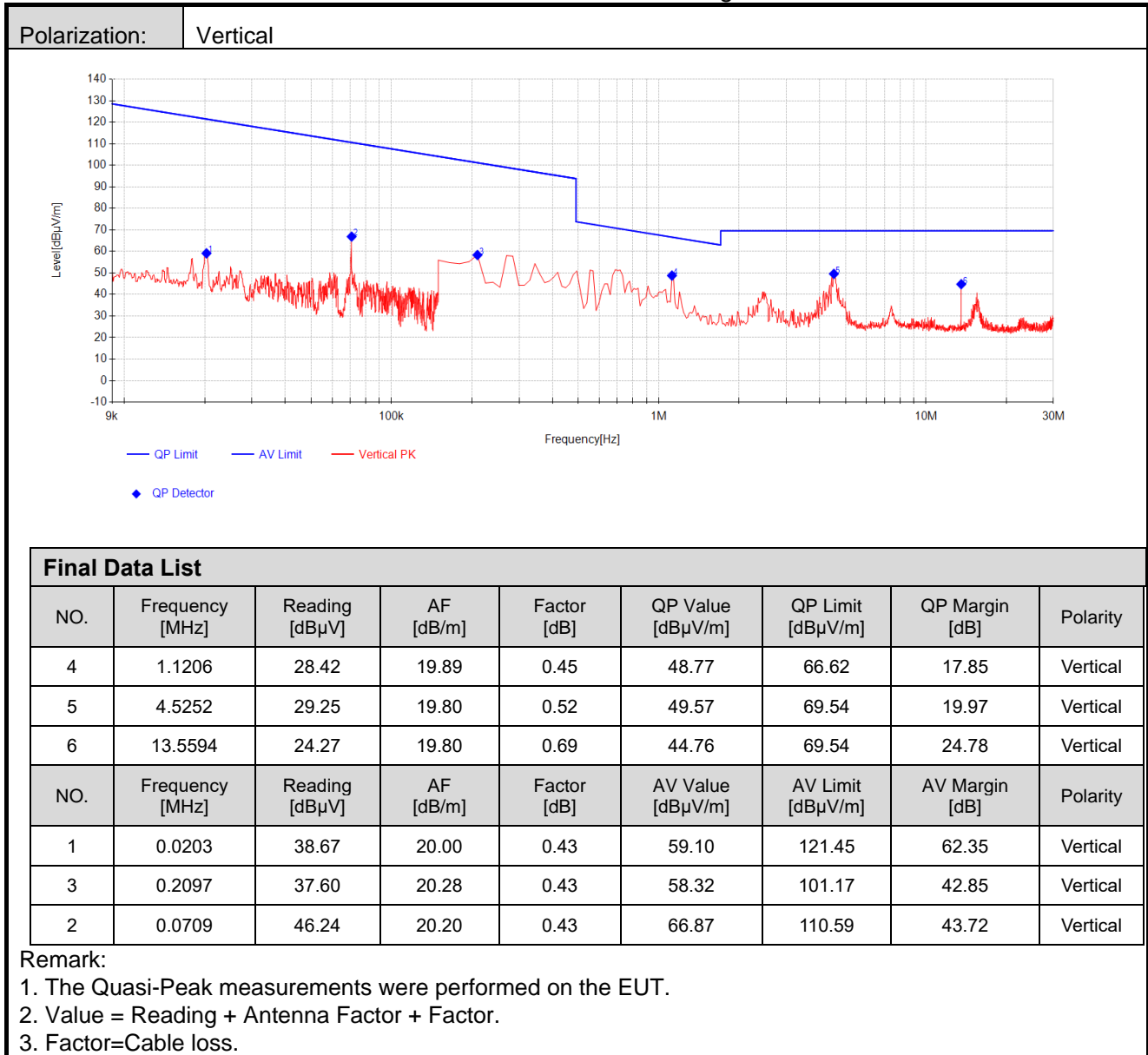
Remark:

1. The Quasi-Peak measurements were performed on the EUT.
2. Value = Reading + Antenna Factor + Factor.
3. Factor=Cable loss.

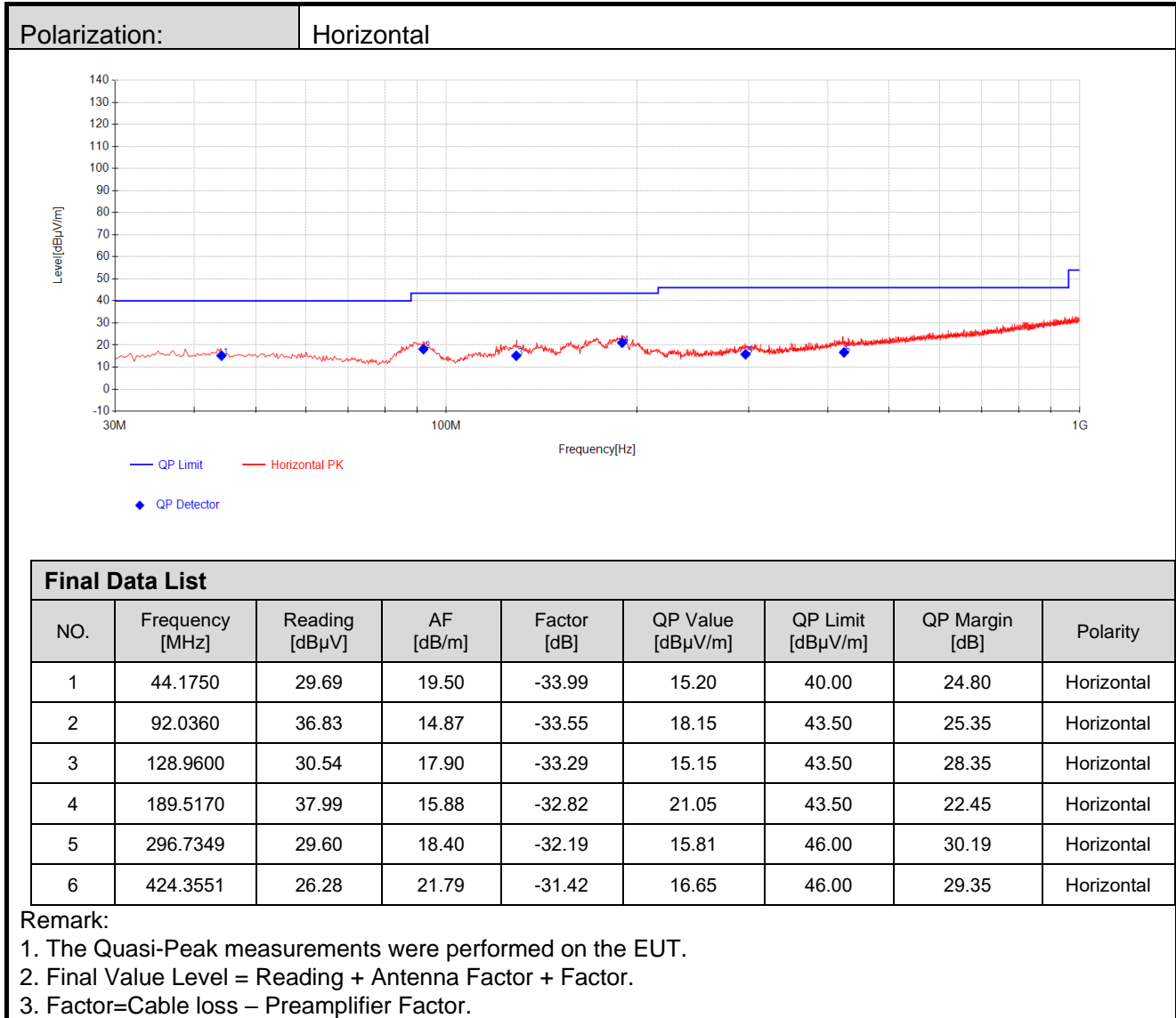


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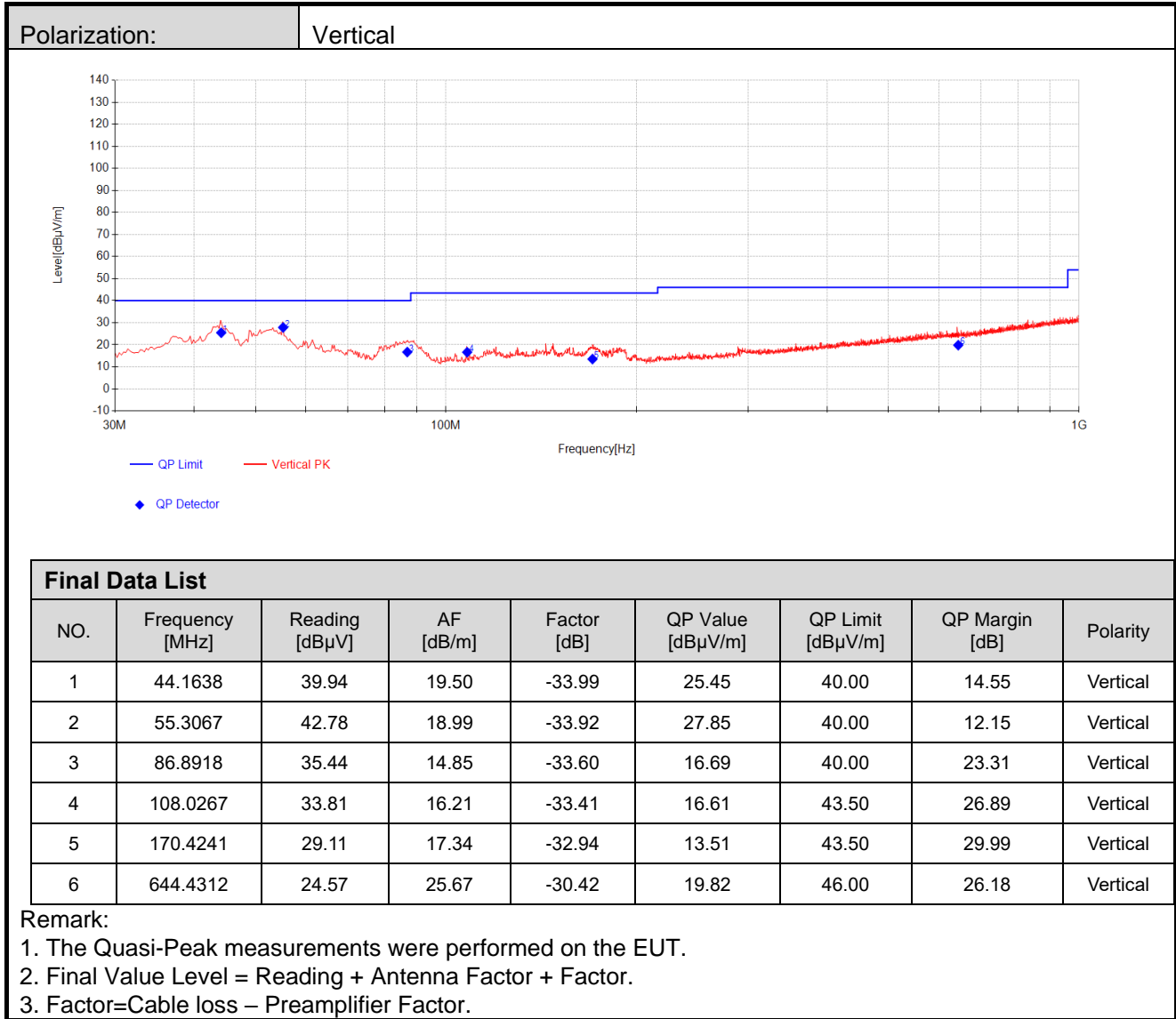
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---End of Report---



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