

Report No.: SUAR/2021/C000308

Rev.: 01

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TEST REPORT

Application No.: AR/2021/C0003
Applicant: Xiaomi Communications Co., Ltd.
Address of Applicant: #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Manufacturer: Xiaomi Communications Co., Ltd.
Address of Manufacturer: #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
EUT Description: Mobile Phone
Model No.: 22021211RG
Brand Name: POCO
FCC ID: 2AFZZ211RG
Standards: 47 CFR Part 15, Subpart C 15.225
Date of Receipt: 2022/1/14
Date of Test: 2022/1/28 to 2022/2/17
Date of Issue: 2022/2/22

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

Authorized Signature:

Panta Sun

Panta Sun
Wireless Laboratory Manager



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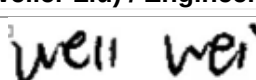
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1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2022/2/22		Original

Prepared By		 (Weller Liu) / Engineer
Checked By		 (Well Wei) / Reviewer



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2 Test Summary

Test Item	Test Requirement	Test Method	Test Result	Result
Antenna Requirement	15.203	--	Clause 4.1	PASS
AC Power Line Conducted Emission	15.207	ANSI C63.10 2013	Clause 4.2	PASS
20dB Spectrum Bandwidth	15.215(c)	ANSI C63.10 2013	Clause 4.3	PASS
Frequency Stability	15.225(e)	ANSI C63.10 2013	Clause 4.4	PASS
Field Strength of Fundamental Emissions	15.225(a)(b)(c)	ANSI C63.10 2013	Clause 4.5	PASS
Radiated Spurious Emissions	15.225(d)/15.209	ANSI C63.10 2013	Clause 4.6	PASS



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3 General Information

3.1 Details of Client

Applicant:	Xiaomi Communications Co., Ltd.
Address of Applicant:	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Manufacturer:	Xiaomi Communications Co., Ltd.
Address of Manufacturer:	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

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:	Weller Liu, King-p Li, Nature Shen, Tizzy Song

3.3 Test Facility

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

• **A2LA (Certificate No. 6336.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• **FCC –Designation Number: CN1312**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327



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3.4 General Description of EUT

EUT Description:	Mobile Phone
Model No.:	22021211RG
Brand Name:	POCO
Hardware Version:	P2
Software Version:	MIUI 13
Operation Frequency:	13.56MHz
Modulation Type:	ASK
Sample Type:	☒ Portable Device, ☐ Module
Antenna Type:	Coil Antenna



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3.5 Test Environment

Environment Parameter	101.0 KPa Selected Values During Tests	
Relative Humidity	44-46 % RH Ambient	
Value	Temperature(°C)	Voltage(V)
NTNV	22~23	3.87
LTLV	-20	3.6
LTHV	-20	4.45
HTLV	50	3.6
HTHV	50	4.45
Remark: NV: Normal Voltage NT: Normal Temperature LT: Low Extreme Test Temperature HT: High Extreme Test Temperature LV: Low Extreme Test Voltage HV: High Extreme Test Voltage		

3.6 Description of Support Units

The EUT has been tested independent unit.



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4 Test results and Measurement Data

4.1 Antenna Requirement

Standard requirement:	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.	



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4.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2013		
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:	1) The mains terminal disturbance voltage test was conducted in a shielded room. 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. 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. 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. 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.		

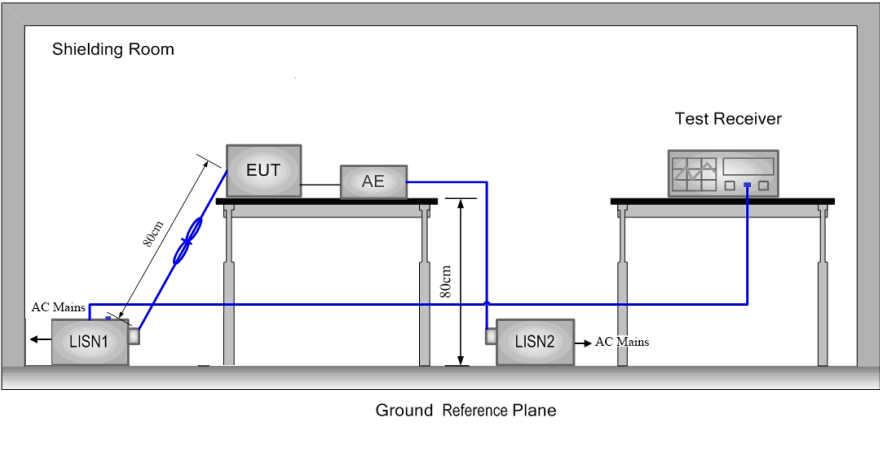


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Test Setup:	
Instruments Used:	Refer to section 6 for details.
Test Results:	Pass



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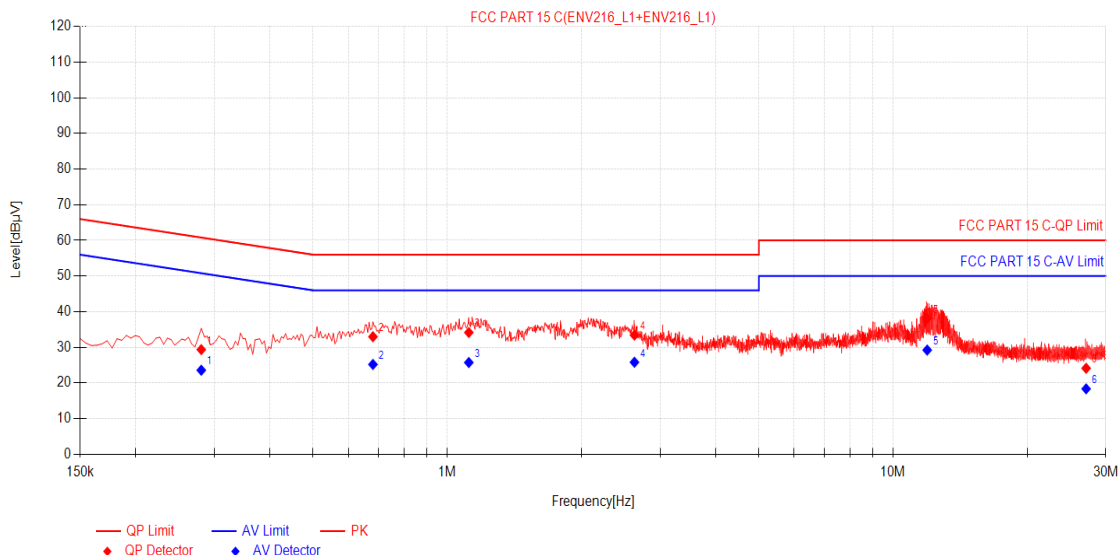
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Measurement Data

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.

Live Line:



Final Data List									
NO.	Frequency [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.2805	10.69	29.37	60.80	31.43	23.59	50.80	27.21	PASS
2	0.6810	10.57	32.99	56.00	23.01	25.21	46.00	20.79	PASS
3	1.1175	10.66	34.17	56.00	21.83	25.74	46.00	20.26	PASS
4	2.6295	10.66	33.44	56.00	22.56	25.82	46.00	20.18	PASS
5	11.9310	10.59	38.13	60.00	21.87	29.24	50.00	20.76	PASS
6	27.1185	10.30	24.14	60.00	35.86	18.36	50.00	31.64	PASS

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.



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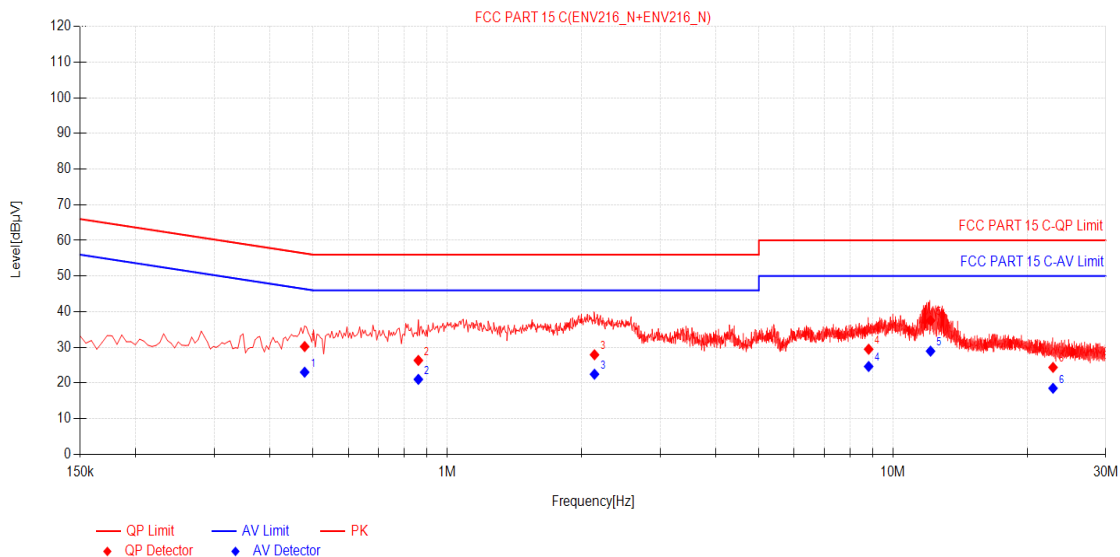
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Neutral Line:



Final Data List

NO.	Frequency [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.4785	10.81	30.23	56.37	26.14	23.03	46.37	23.34	PASS
2	0.8610	10.79	26.35	56.00	29.65	21.02	46.00	24.98	PASS
3	2.1390	10.78	27.92	56.00	28.08	22.47	46.00	23.53	PASS
4	8.8170	10.61	29.48	60.00	30.52	24.64	50.00	25.36	PASS
5	12.1380	10.65	37.52	60.00	22.48	28.93	50.00	21.07	PASS
6	22.8570	10.47	24.38	60.00	35.62	18.53	50.00	31.47	PASS

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.



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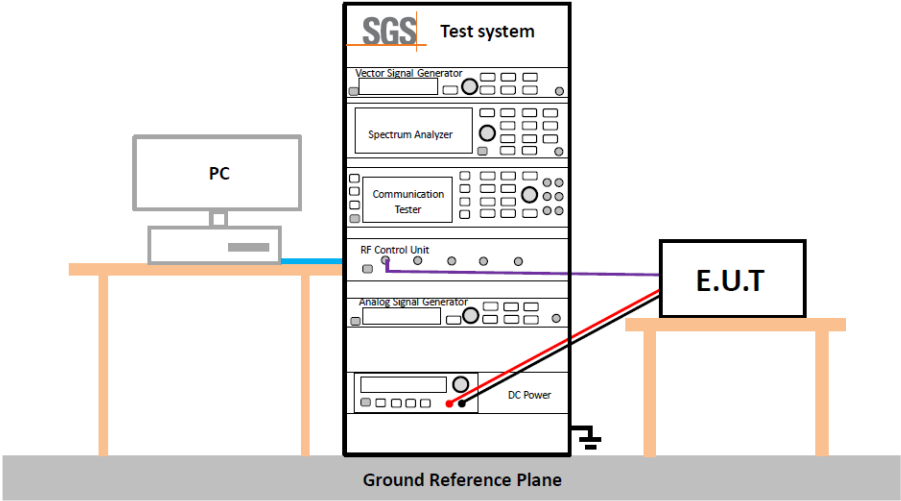
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4.3 20dB Spectrum Bandwidth

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 and 99% emission bandwidth in the specific band 13.553~13.567MHz.
Test Results:	Pass
The detailed test data see: Appendix	



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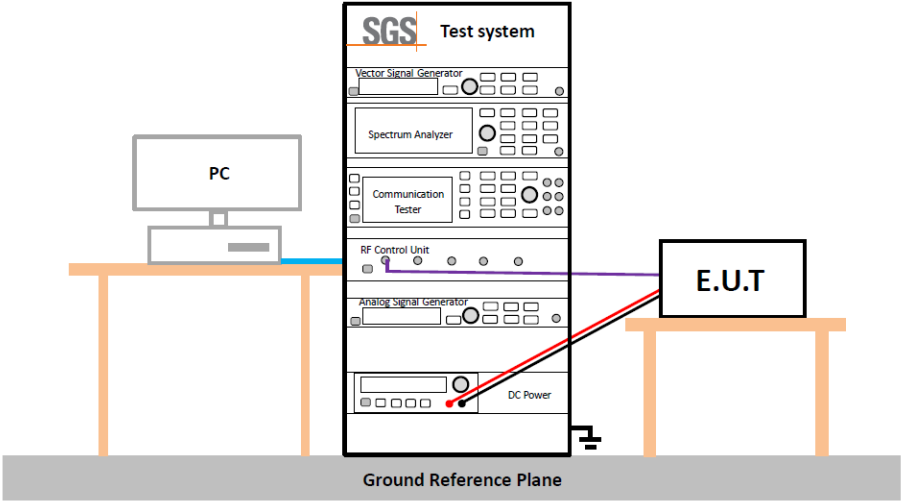
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4.4 Frequency Stability

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:	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.
Test Results:	Pass
The detailed test data see: Appendix	



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4.5 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 (μ V/m) at 30m	Field Strength (dB μ V/m) at 30m	Field Strength (dB μ V/m) at 10m	Field Strength (dB μ 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:

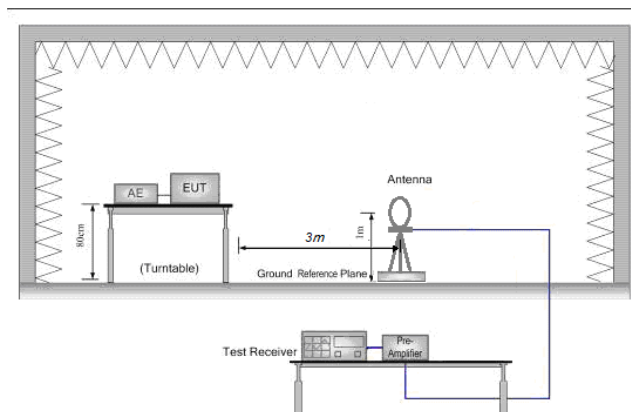


Figure 1. Below 30MHz

Test Procedure:	- 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 camber. The table was rotated 360 degrees to determine the position of the highest radiation. - 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. - 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. - 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. - The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
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	f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. g. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case. h. Repeat above procedures until all frequencies measured was complete. i. RBW set to 9kHz.
Exploratory Test Mode:	Transmitting with modulation. Charge + Transmitting mode.
Final Test Mode:	Charge + Transmitting mode.
Instruments Used:	Refer to section 6 for details
Test Results:	Pass
The detailed test data see: Appendix	



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4.6 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:

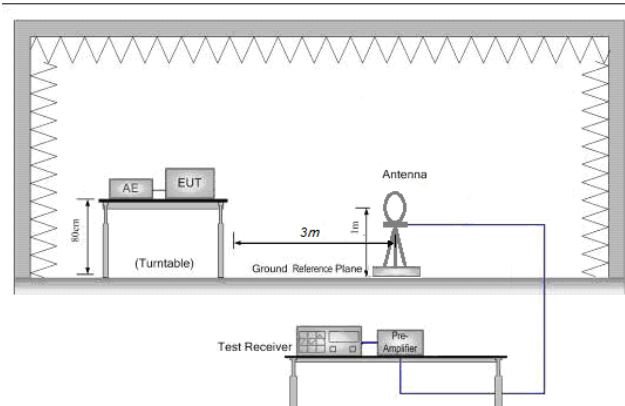


Figure 1. Below 30MHz

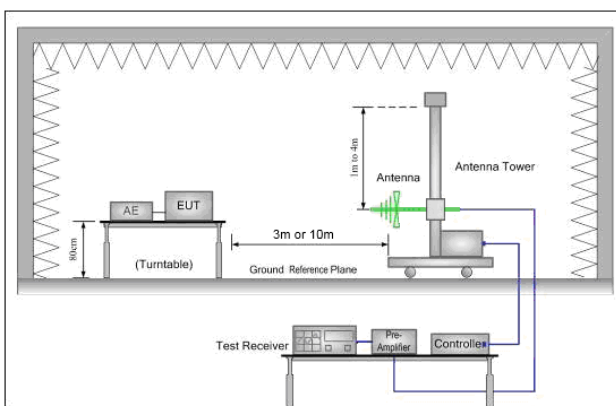


Figure 2. Above 30MHz

Test Procedure:

- 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.
- 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.
- 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.
- 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).



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	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. n. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. o. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. p. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case. q. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with modulation. Charge + Transmitting mode.
Final Test Mode:	Charge + Transmitting mode.
Instruments Used:	Refer to section 6 for details
Test Results:	Pass
The detailed test data see: Appendix	



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

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Occupied Bandwidth	$\pm 7.25 \times 10^{-8}$
3	Conduction Emission	$\pm 2.90\text{dB}$ (150kHz to 30MHz)
4	Radiated Emission	$\pm 3.13\text{dB}$ (9k-30MHz)
		$\pm 4.8\text{dB}$ (30MHz to 1GHz)



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6 Equipment List

RF Test Equipment					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	Brilliant-emc	N/A	SUWI-04-01-06	2021/5/8	2024/5/7
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-07	2021/2/20	2022/2/19
Signal Analyzer	ROHDE&SCHWARZ	FSV3030	SUWI-01-02-02	2021/2/20	2022/2/19
Pulse power Sensor	Anritsu	MA2411B	SUWI-01-32-01	2021/12/4	2022/12/3
Measurement Software	Tonscend	JS1120-3 Test System V3.1.51	SUWI-02-09-09	NCR	NCR
Temperature Chamber	ESPEC	SU-242	SUWI-01-13-01	2021/2/20	2022/2/19

CE Test Equipment					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	Brilliant-emc	N/A	SUWI-04-03-01	2021/5/8	2024/5/7
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-01	2021/2/20	2022/2/19
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-02	2021/2/20	2022/2/19
Measurement Software	Tonscend	JS32-CE V4.0.0.2	SUWI-02-09-05	NCR	NCR
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2021/2/20	2022/2/19
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2021/2/20	2022/2/19



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RSE Test Equipment					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	2021/5/8	2024/5/7
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2021/2/20	2022/2/19
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2021/5/28	2022/5/27
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2021/2/20	2022/2/19
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	VULB 9163	SUWI-01-11-01	2021/5/16	2022/5/15
Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	2021/2/20	2022/2/19
Active Loop Antenna	SCHWRZBECK MESS- ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2021/6/10	2022/6/9
Measurement Software	Tonscend	JS32-RE V3.0.0.3	SUWI-02-09-04	NCR	NCR



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7 Photographs - EUT Constructional Details

Refer to Appendix A.2 WLAN Setup Photos.



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Appendix



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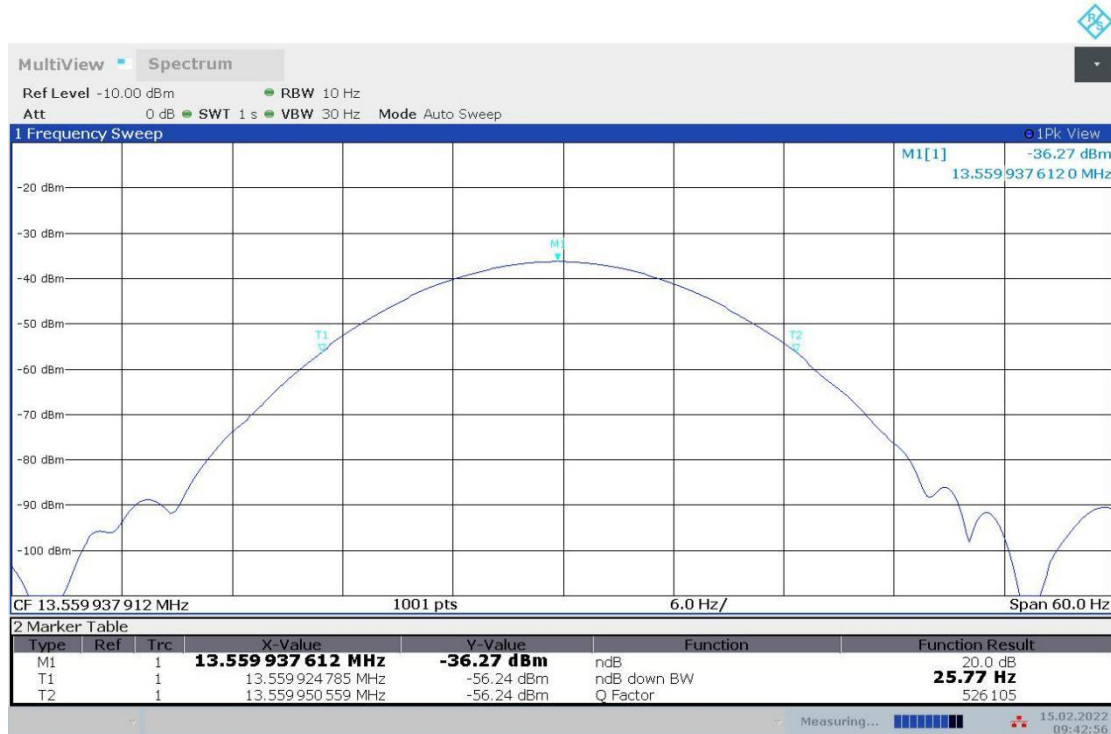
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20dB Spectrum Bandwidth



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Frequency Stability

Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Frequency Tolerance (%)	Limit (%)	Result
50	3.87	13.559937	0.0005	±0.01	Pass
40		13.559930	0.0005		Pass
30		13.559932	0.0005		Pass
20		13.559927	0.0005		Pass
10		13.559926	0.0005		Pass
0		13.559938	0.0005		Pass
-10		13.559941	0.0004		Pass
-20		13.559948	0.0004		Pass
20	4.45	13.559945	0.0004		Pass
	3.60	13.559943	0.0004		Pass



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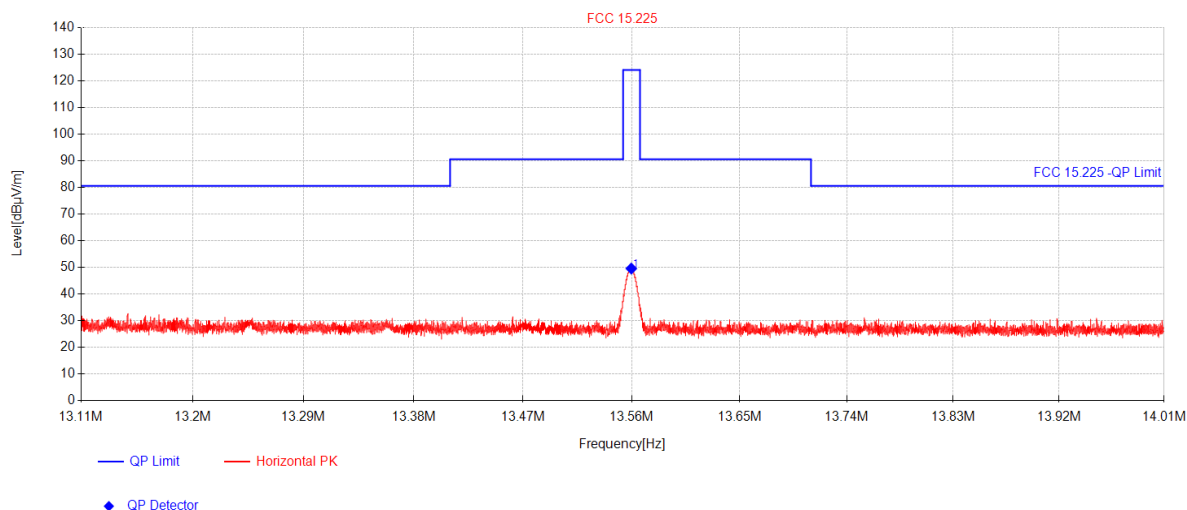
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Field Strength of Fundamental Emissions NFC_Emission Mask



Final Data List									
NO.	Frequency [MHz]	Reading [dBμV]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	13.5598	29.17	20.36	49.53	124.00	74.47	100	146	Horizontal



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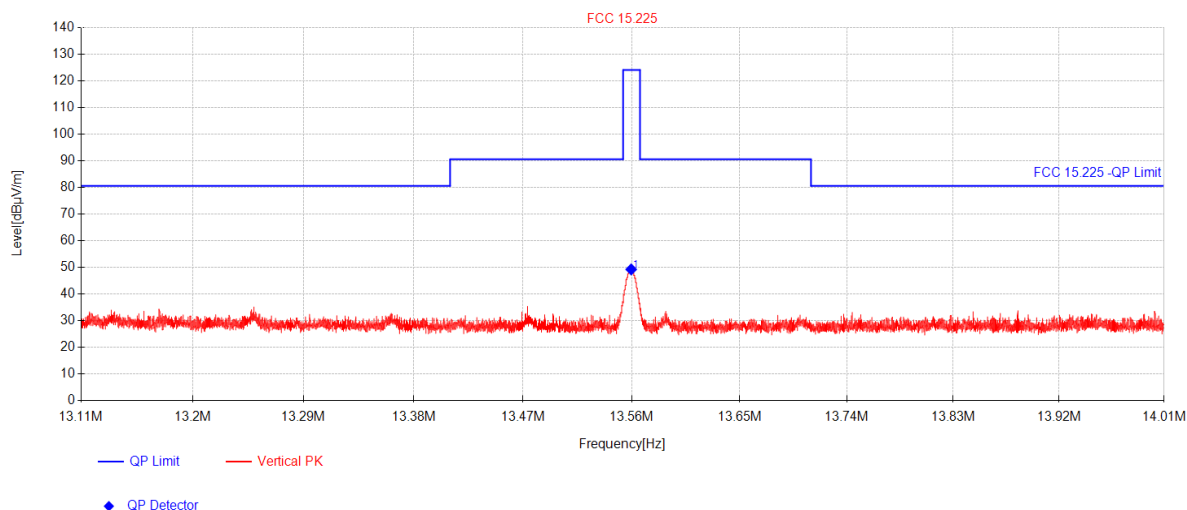
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NFC_Emission Mask



Final Data List

NO.	Frequency [MHz]	Reading [dBμV]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	13.5597	28.85	20.36	49.21	124.00	74.79	100	338	Vertical



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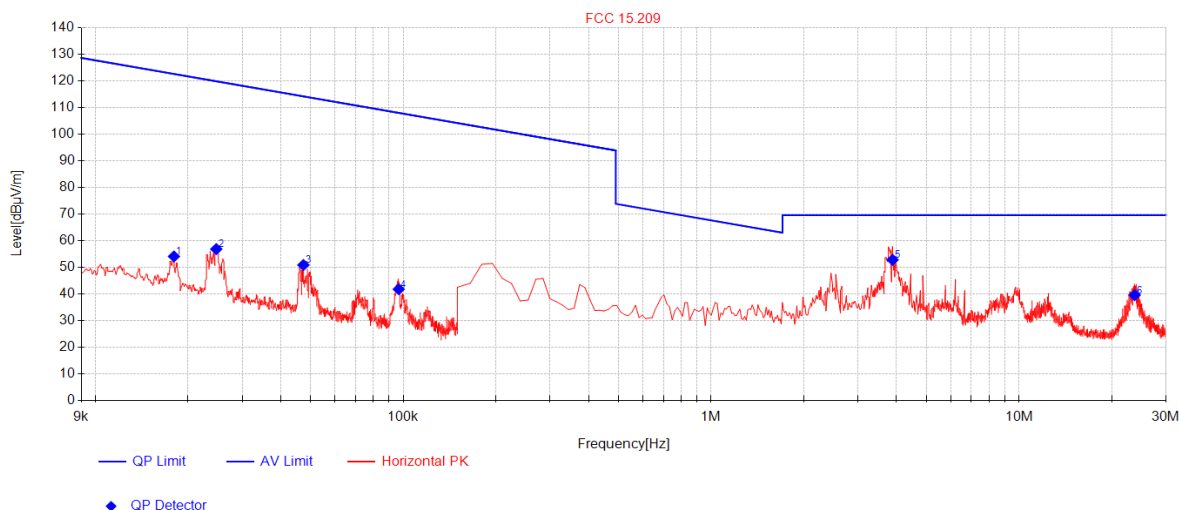
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Radiated Spurious Emissions

NFC_RSE



Final Data List

NO.	Frequency [MHz]	Reading [dBμV]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	0.018	33.81	20.27	54.08	122.49	68.41	100	327	Horizontal
2	0.0247	36.54	20.30	56.84	119.74	62.90	100	196	Horizontal
3	0.0474	30.63	20.24	50.87	114.08	63.21	100	196	Horizontal
4	0.0967	21.11	20.67	41.78	107.89	66.11	100	215	Horizontal
5	3.8831	32.44	20.35	52.79	69.54	16.75	100	41	Horizontal
6	23.7284	19.03	20.55	39.58	69.54	29.96	100	136	Horizontal



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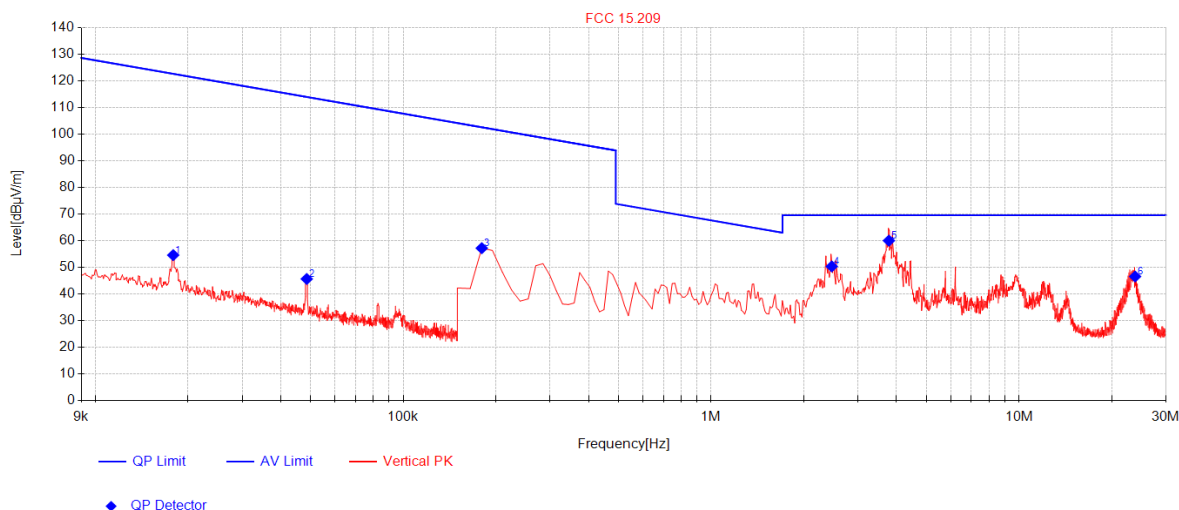
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NFC_RSE



Final Data List

NO.	Frequency [MHz]	Reading [dBμV]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	0.0179	34.3	20.27	54.57	122.54	67.97	100	111	Vertical
2	0.0486	25.39	20.24	45.63	113.87	68.24	100	354	Vertical
3	0.1799	36.44	20.73	57.17	102.50	45.33	100	15	Vertical
4	2.4645	30.11	20.22	50.33	69.54	19.21	100	1	Vertical
5	3.7786	39.66	20.34	60.00	69.54	9.54	100	258	Vertical
6	23.818	26	20.56	46.56	69.54	22.98	100	98	Vertical



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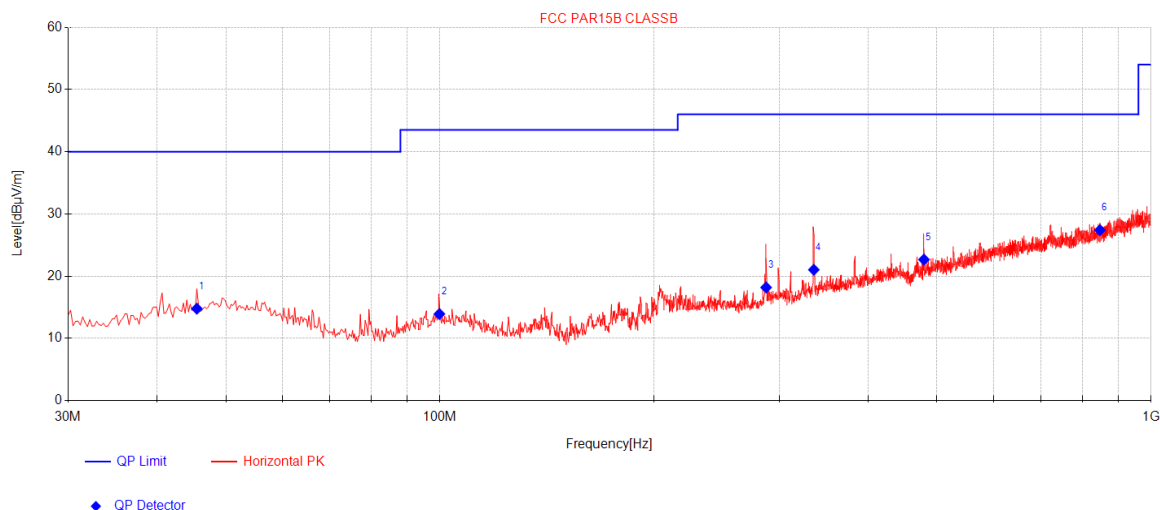
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NFC_RE



Final Data List

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1	45.52	29.65	-14.87	14.78	40.00	25.22	265	38	Horizontal
2	99.84	30.52	-16.59	13.93	43.50	29.57	185	355	Horizontal
3	287.535	31.52	-13.33	18.19	46.00	27.81	155	74	Horizontal
4	335.55	32.65	-11.62	21.03	46.00	24.97	211	280	Horizontal
5	479.3525	31.22	-8.55	22.67	46.00	23.33	155	125	Horizontal
6	847.4675	29.86	-2.46	27.40	46.00	18.60	185	137	Horizontal



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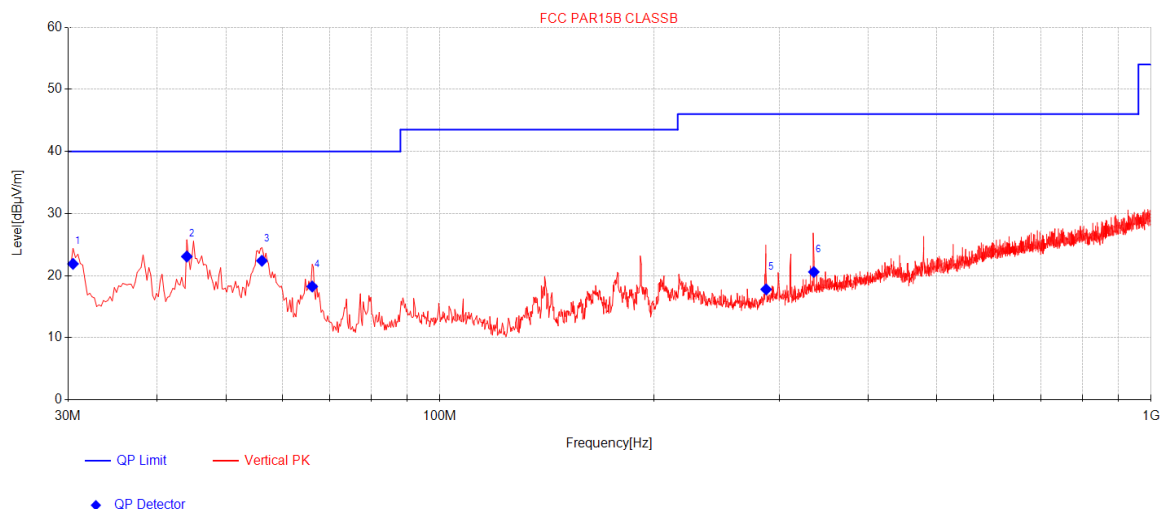
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NFC_RE



Final Data List									
NO.	Frequency [MHz]	Reading [dBµV]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.485	40.12	-18.22	21.90	40.00	18.10	162	136	Vertical
2	44.065	38.22	-15.14	23.08	40.00	16.92	185	87	Vertical
3	56.19	37.86	-15.46	22.40	40.00	17.60	196	352	Vertical
4	66.1325	36.2	-17.95	18.25	40.00	21.75	248	10	Vertical
5	287.535	31.12	-13.33	17.79	46.00	28.21	185	164	Vertical
6	335.55	32.22	-11.62	20.60	46.00	25.40	254	136	Vertical

The End



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