



# TEST REPORT

**APPLICANT** : Glory Horse Industries Limited  
**PRODUCT NAME** : Hilti NCP Radio  
**MODEL NAME** : R6-22  
**BRAND NAME** : HILTI  
**FCC ID** : 2ABL5WSR1901R6-22  
**STANDARD(S)** : 47 CFR Part 15 Subpart B  
**RECEIPT DATE** : 2020-06-01  
**TEST DATE** : 2020-06-05 to 2020-07-22  
**ISSUE DATE** : 2020-10-20

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# DIRECTORY

- 1. Technical Information..... 3
  - 1.1. Applicant and Manufacturer Information..... 3
  - 1.2. Equipment Under Test (EUT) Description ..... 3
- 2. Test Results ..... 4
  - 2.1. Applied Reference Documents ..... 4
  - 2.2. EUT Setup and Operating Conditions..... 5
- 3. 47 CFR Part 15B Requirements ..... 6
  - 3.1. Radiated Emission ..... 6
- Annex A Test Uncertainty ..... 25
- Annex B Testing Laboratory Information ..... 26

Change History		
Version	Date	Reason for Change
1.0	2020-10-20	First edition



# 1. Technical Information

**Note:** Provide by applicant

## 1.1. Applicant and Manufacturer Information

<b>Applicant:</b>	Glory Horse Industries Limited
<b>Applicant Address:</b>	No.8,4/F, World-Wide IND Centre, 43-47 Shan Mei ST., Fotan Shatin,NT,HKG
<b>Manufacturer:</b>	Glory Horse Industries Limited
<b>Manufacturer Address:</b>	No.8,4/F, World-Wide IND Centre, 43-47 Shan Mei ST., Fotan Shatin,NT,HKG

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	Hilti NCP Radio
<b>Serial No.:</b>	(N/A, marked #1 by test site)
<b>Hardware Version:</b>	REV04
<b>Software Version:</b>	r6-22_id00de_0400_bl_app_param
<b>Frequency Range:</b>	NFC: 13.56 MHz Bluetooth 5.0: 2402 MHz ~ 2480 MHz

**Note:**

1. For a more detailed description, please refer to specification or user's manual supplied by the applicant and/or manufacturer.

## 2. Test Results

### 2.1. Applied Reference Documents

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart B:

No.	Identity	Document Title
1	47 CFR Part 15	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Test Engineer	Result	Method Determination Remark
1	15.107	Conducted Emission	N/A	N/A	N/A <sup>Note 3</sup>	No deviation
2	15.109	Radiated Emission	2020.06.05 to 2020.07.22	Peng Xuewei	PASS	No deviation

**Note 1:** The tests were performed according to the method of measurements prescribed in ANSI C63.4-2014.

**Note 2:** Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

**Note 3:** The test item is not applicable to the EUT.



## 2.2. EUT Setup and Operating Conditions

Test Item	
<b>Radiated Emission</b>	
Mode 1	: EUT + Battery + AUX Cable + USB Cable + Phone Charged + FM Receiving
Mode 2	: EUT + Battery + AUX Cable + USB Cable + Phone Charged + AUX Media Playing
Mode 3	: EUT + Battery + AUX Cable + USB Cable + Phone Charged + NFC + Bluetooth Media Playing
Mode 4	: EUT + Battery + AUX Cable + USB Cable + Phone Charged + AM Receiving

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 - 60
Atmospheric Pressure (kPa):	86 - 106

### 3. 47 CFR Part 15B Requirements

#### 3.1. Radiated Emission

##### 3.1.1. Requirement

According to FCC section 15.109 (a), the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency Range (MHz)	Field Strength Limitation at 3m Measurement Dist	
	( $\mu\text{V/m}$ )	( $\text{dB}\mu\text{V/m}$ )
30.0 - 88.0	100	20log 100
88.0 - 216.0	150	20log 150
216.0 - 960.0	200	20log 200
Above 960.0	500	20log 500

As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

NOTE:

- 1) The tighter limit shall apply at the boundary between two frequency range.
- 2) Limitation expressed in  $\text{dB}\mu\text{V/m}$  is calculated by  $20\log$  Emission Level( $\mu\text{V/m}$ ).

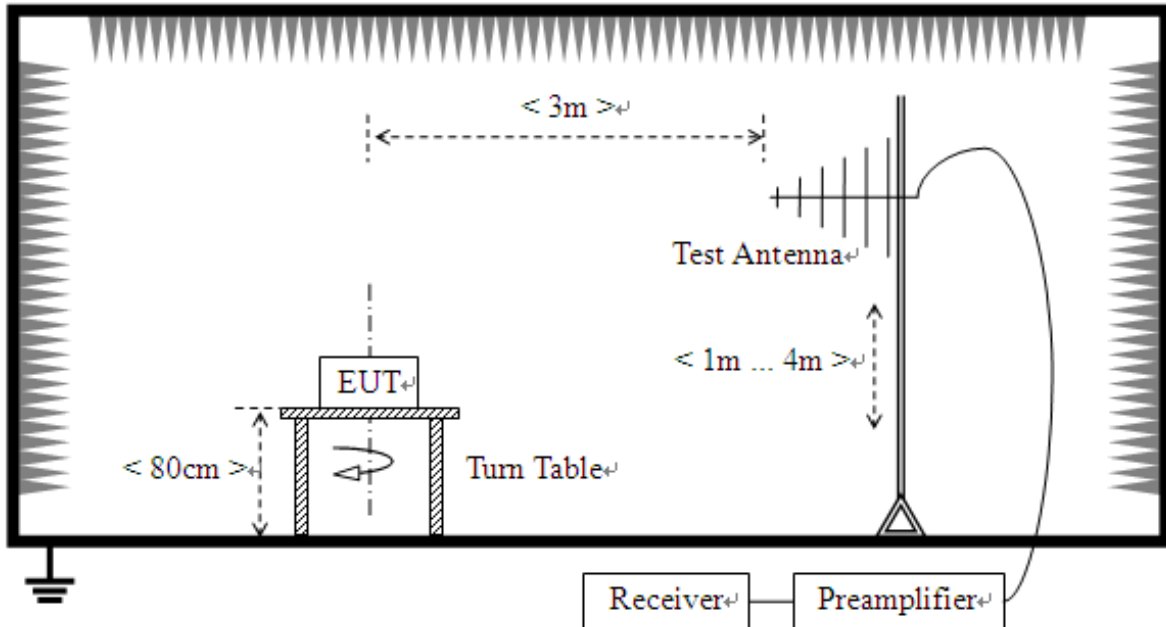
##### 3.1.2. Frequency Range of Measurement

According to 15.33(b)(1), the frequency range of radiated measurement for the EUT is listed in the following table:

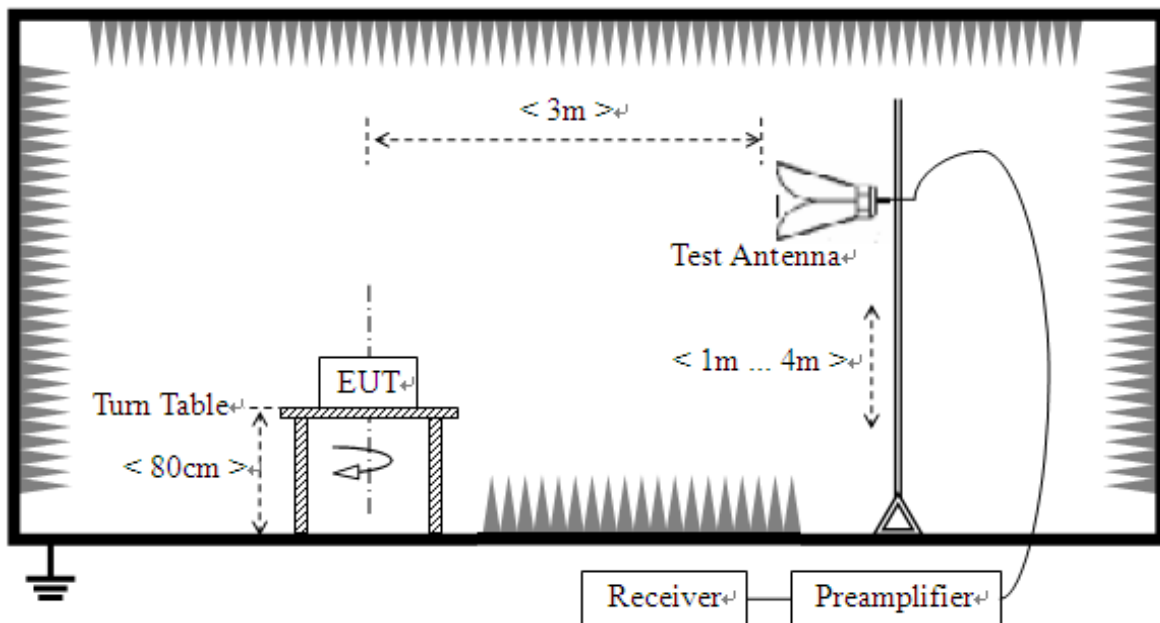
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705 .....	30.
1.705–108 .....	1000.
108–500 .....	2000.
500–1000 .....	5000.
Above 1000 .....	5th harmonic of the highest frequency or 40 GHz, whichever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

### 3.1.3. Test Setup

- 1) For radiated emissions from 30MHz to 1GHz



- 2) For radiated emissions above 1GHz





The test is performed in a 3m Semi-Anechoic Chamber; the antenna factor, cable loss and so on of the site (factors) is calculated to correct the reading. The EUT is placed on a 0.8m high insulating Turn Table, and keeps 3m away from the Test Antenna, which is mounted on a variable-height antenna master tower.

For the test Antenna:

In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

#### **3.1.4. Test Result**

The maximum radiated emission is searched using PK, QP detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform the tests. All test modes are considered, refer to recorded points and plots below.

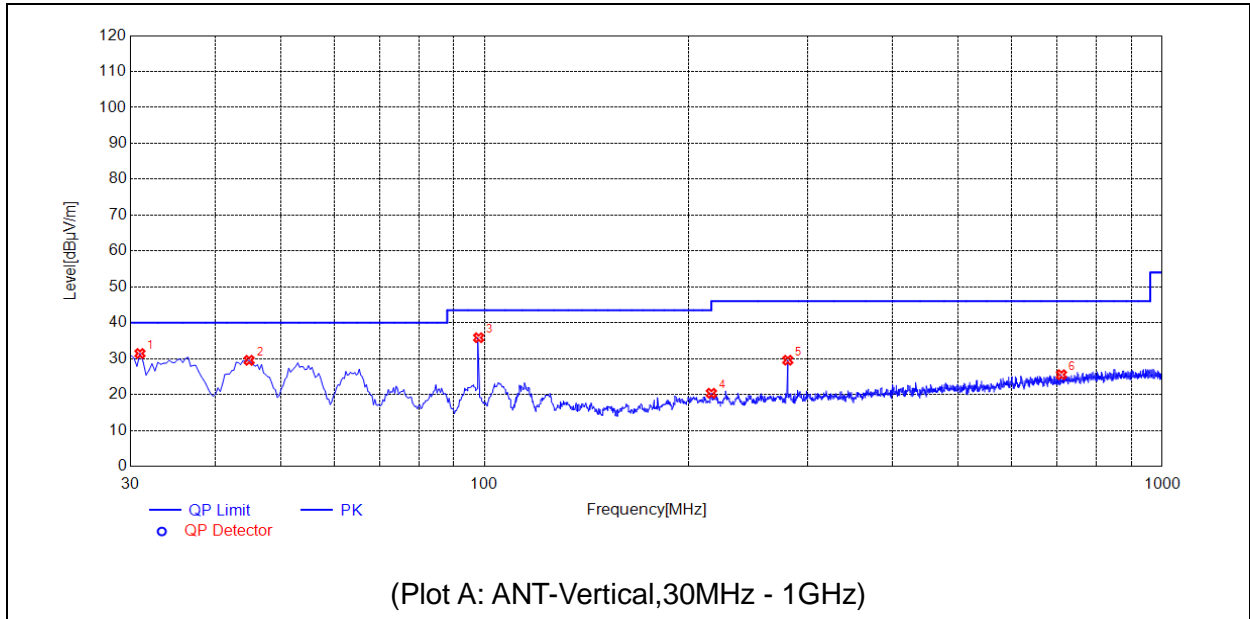
The amplitude of emissions which are attenuated more than 20 dB below the permissible value need not be reported.

Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.

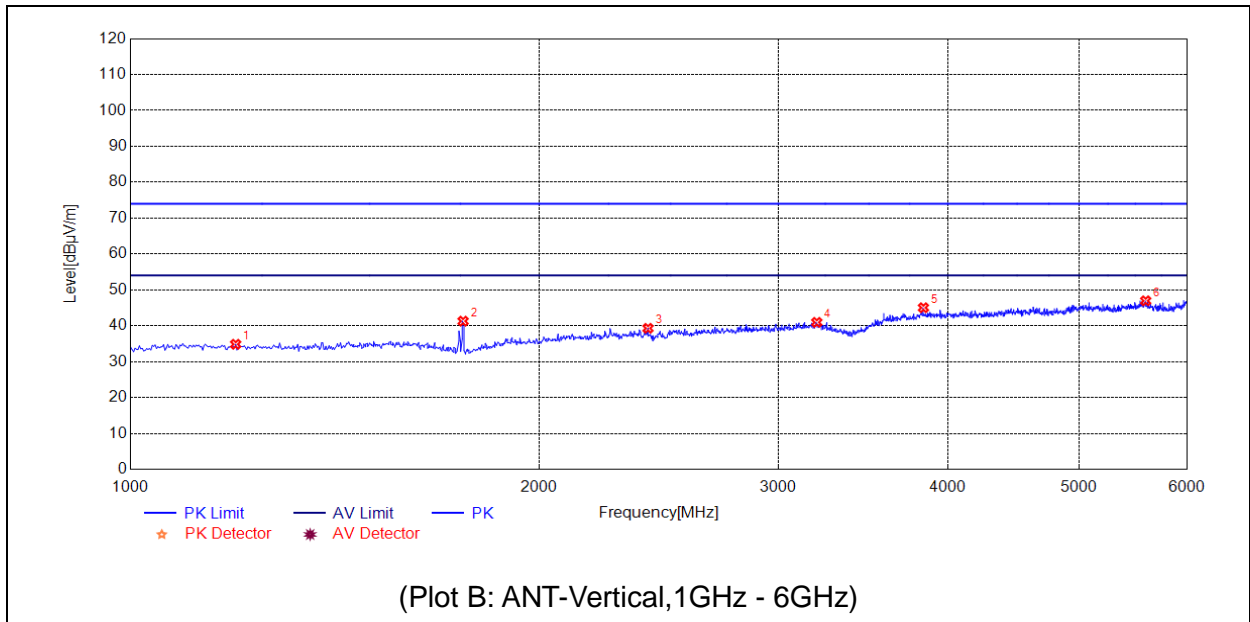




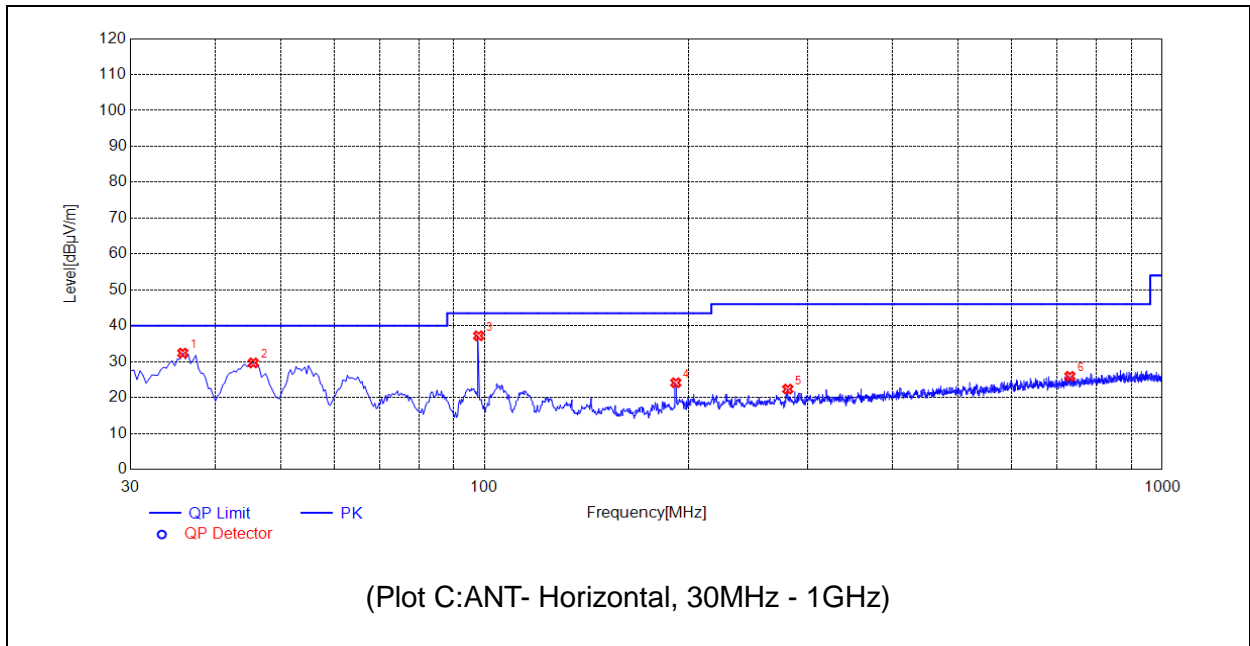
Mode 1



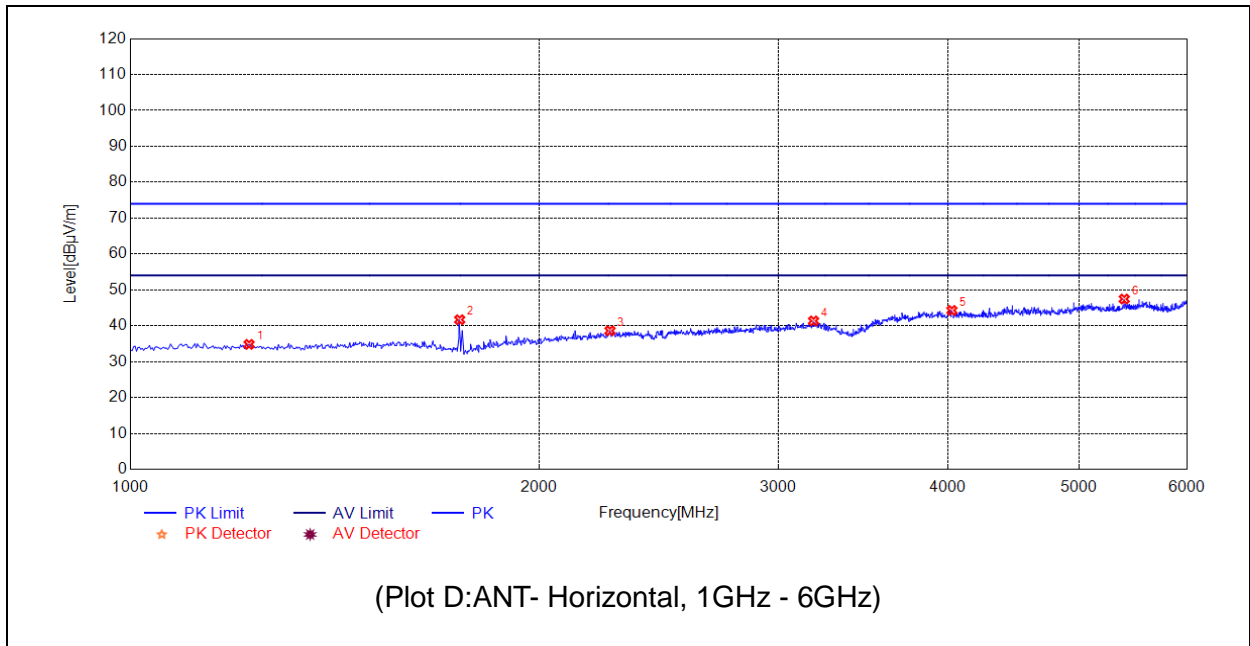
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	30.9703	31.44	N.A.	N.A.	N.A.	40.00	N.A.	V	PASS
2	44.8783	29.54	N.A.	N.A.	N.A.	40.00	N.A.	V	PASS
3	97.9226	35.83	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
4	215.9787	20.36	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
5	280.0200	29.56	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS
6	709.8733	25.53	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS



No.	Fre. MHz	PK dBμV/m	QP dBμV/m	AV dBμV/m	Limit-PK dBμV/m	Limit-QP dBμV/m	Limit-AV dBμV/m	ANT	Verdict
1	1195.0975	34.84	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
2	1757.8789	41.28	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
3	2405.7029	39.30	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
4	3203.6018	40.95	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
5	3838.9195	45.03	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
6	5597.2986	46.95	N.A.	N.A.	74.00	N.A.	54.00	V	PASS



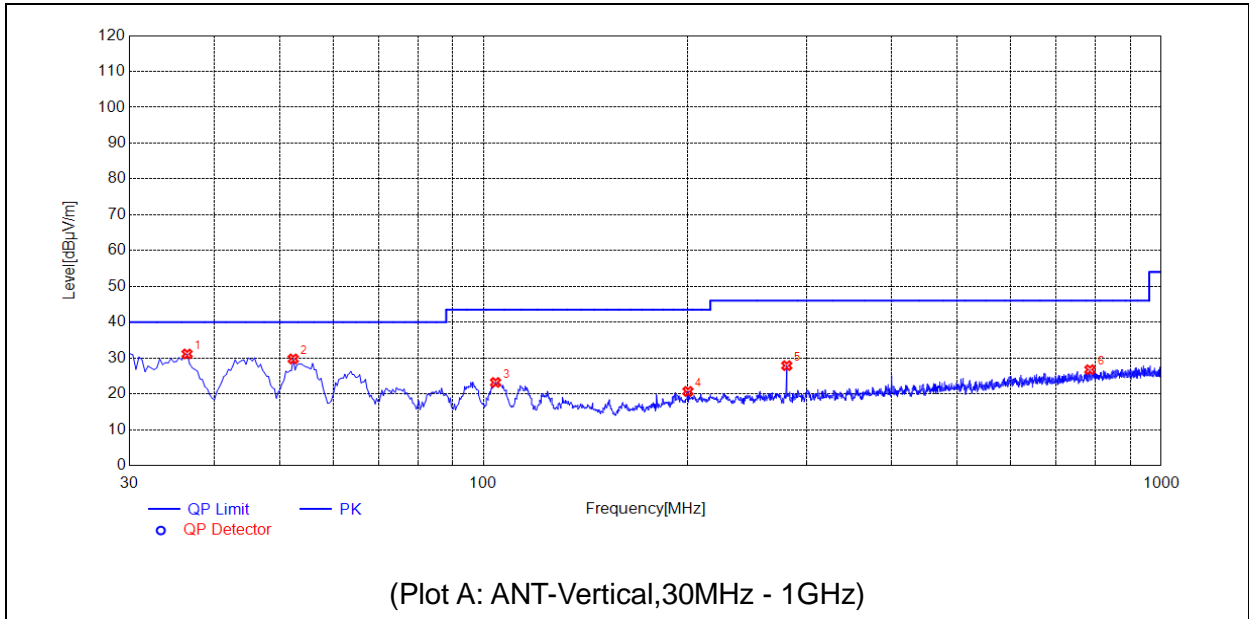
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	35.8219	32.39	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
2	45.5252	29.65	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
3	97.9226	37.21	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
4	191.3971	24.11	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
5	280.0200	22.36	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS
6	730.5735	25.92	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS



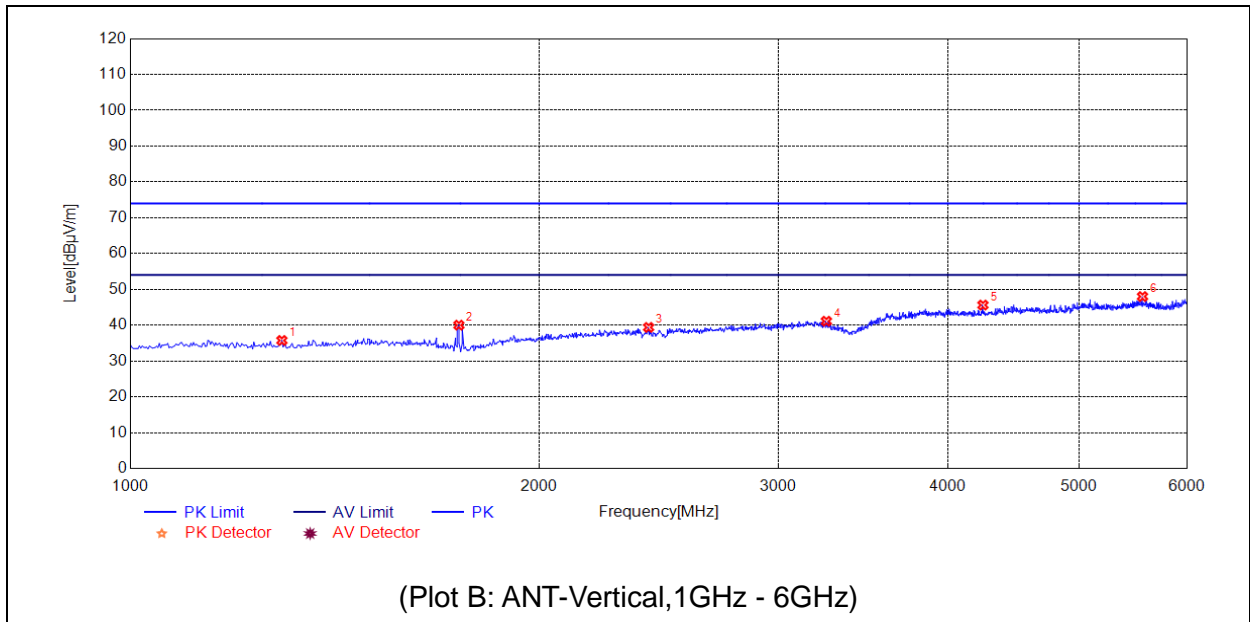
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1222.6113	34.81	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
2	1747.8739	41.69	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
3	2255.6278	38.62	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
4	3186.0930	41.35	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
5	4029.0145	44.27	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
6	5397.1986	47.45	N.A.	N.A.	74.00	N.A.	54.00	H	PASS



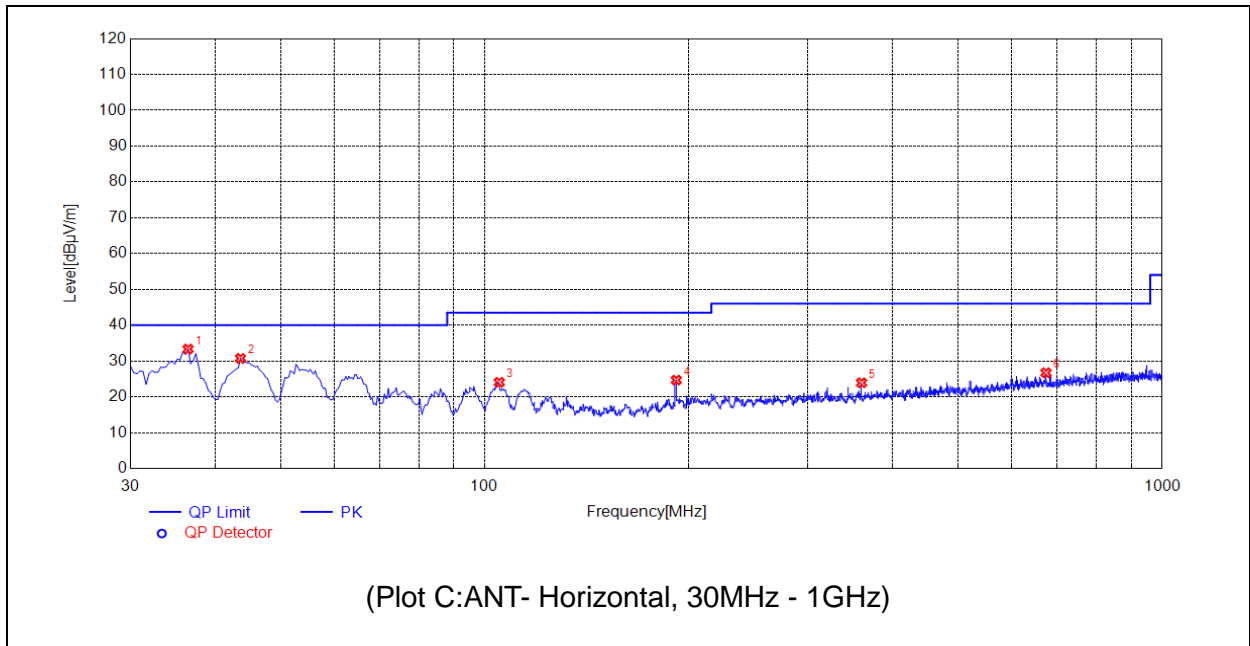
Mode 2



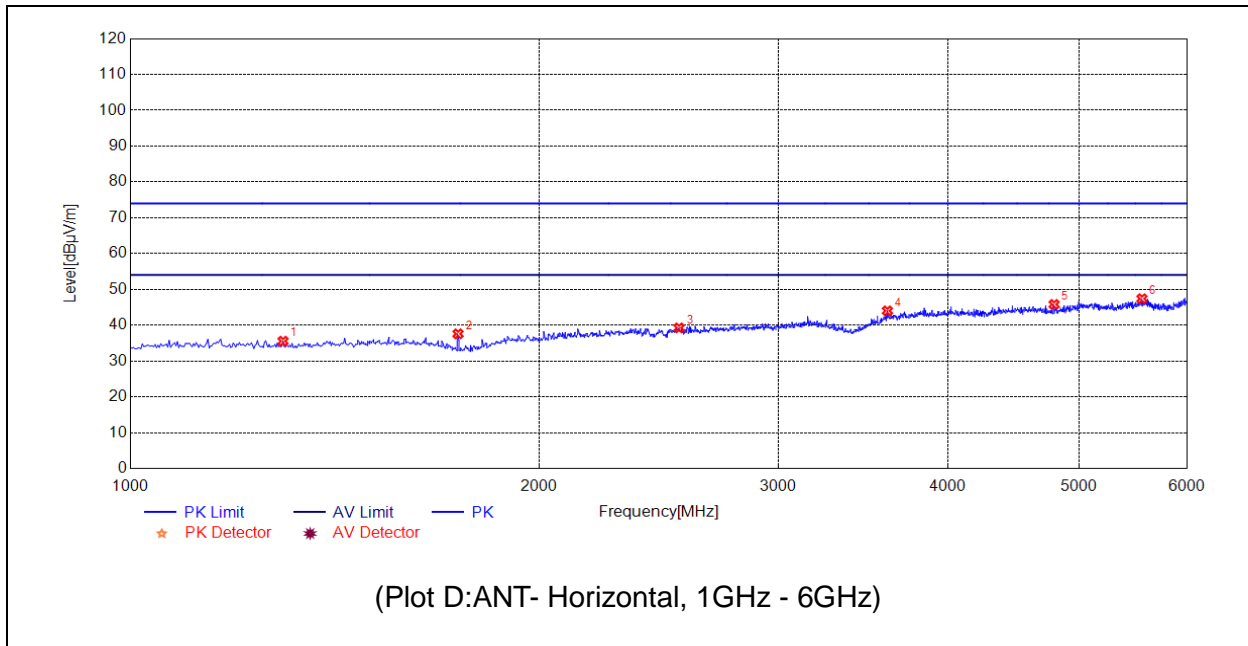
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	36.4688	31.13	N.A.	N.A.	N.A.	40.00	N.A.	V	PASS
2	52.3174	29.75	N.A.	N.A.	N.A.	40.00	N.A.	V	PASS
3	104.0680	23.18	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
4	200.1300	20.68	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
5	280.0200	27.87	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS
6	784.5882	26.75	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS



No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1292.6463	35.74	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
2	1745.3727	40.01	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
3	2408.2041	39.39	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
4	3256.1281	41.11	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
5	4246.6233	45.62	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
6	5567.2836	48.00	N.A.	N.A.	74.00	N.A.	54.00	V	PASS



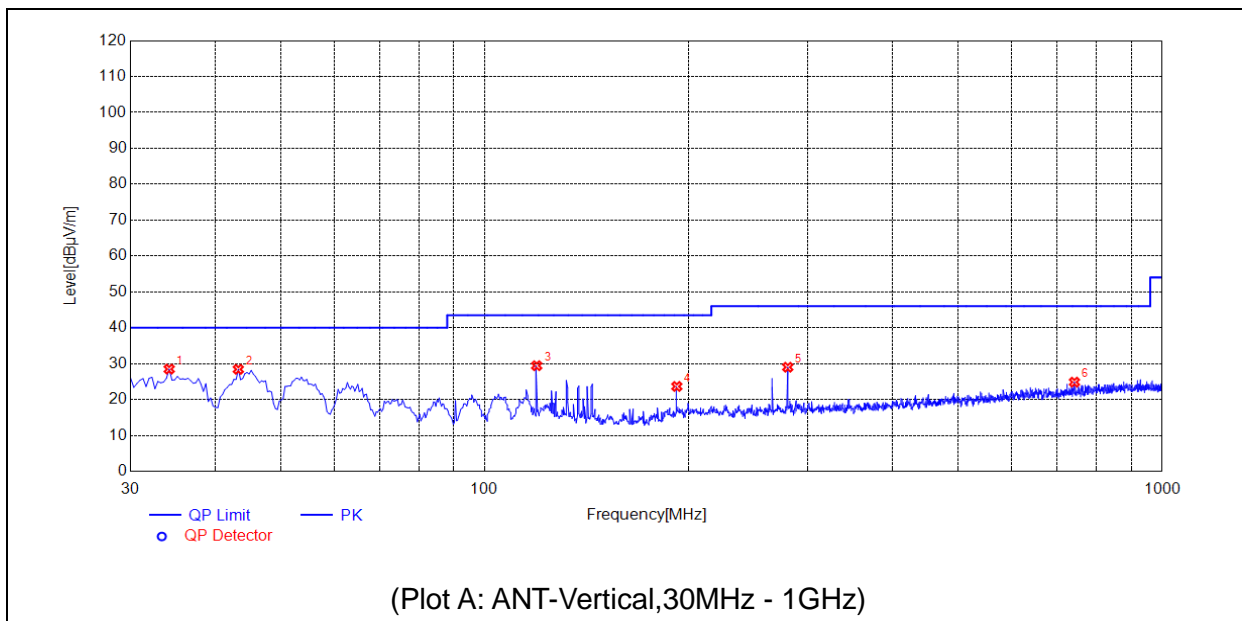
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	36.4688	33.34	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
2	43.5845	30.73	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
3	105.0383	24.07	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
4	191.7206	24.67	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
5	359.9100	23.93	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS
6	673.6479	26.72	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS



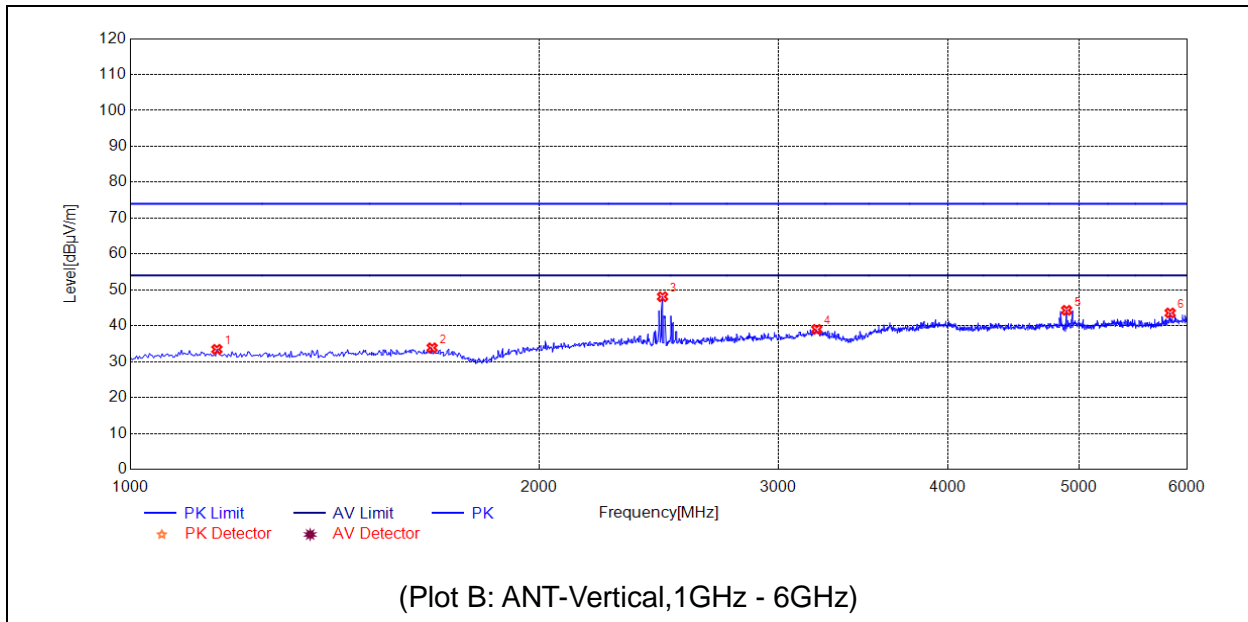
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1295.1476	35.55	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
2	1742.8714	37.59	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
3	2535.7679	39.25	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
4	3611.3057	44.01	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
5	4791.8959	45.81	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
6	5562.2811	47.40	N.A.	N.A.	74.00	N.A.	54.00	H	PASS



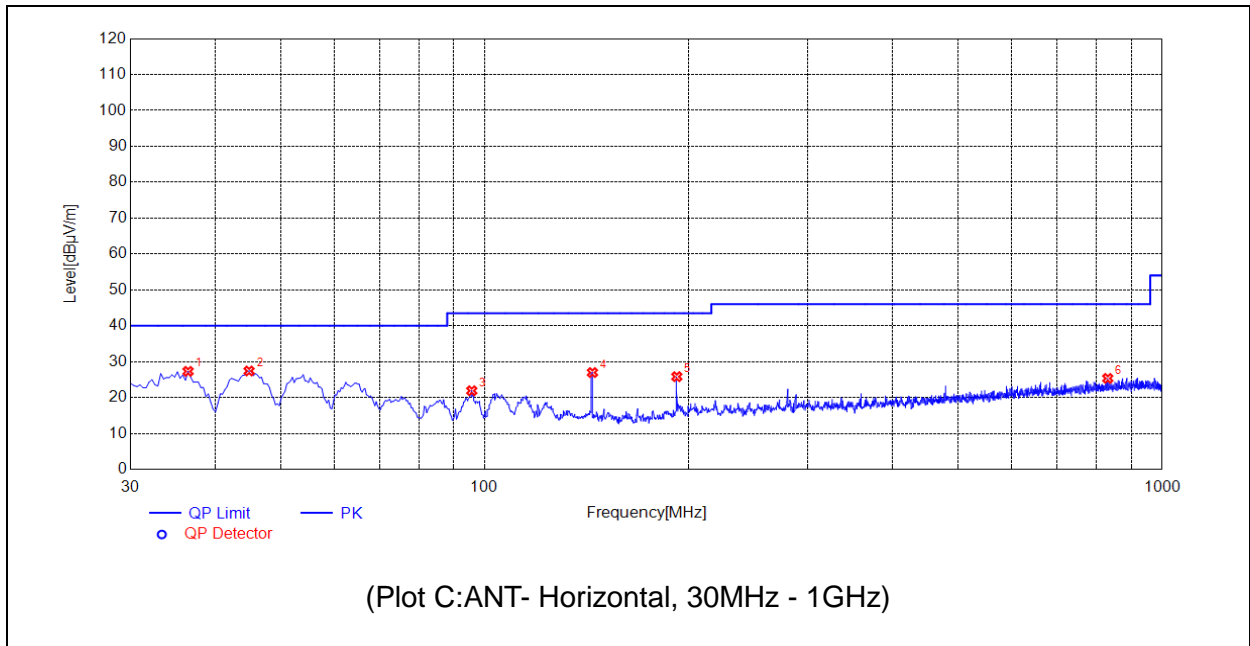
Mode 3



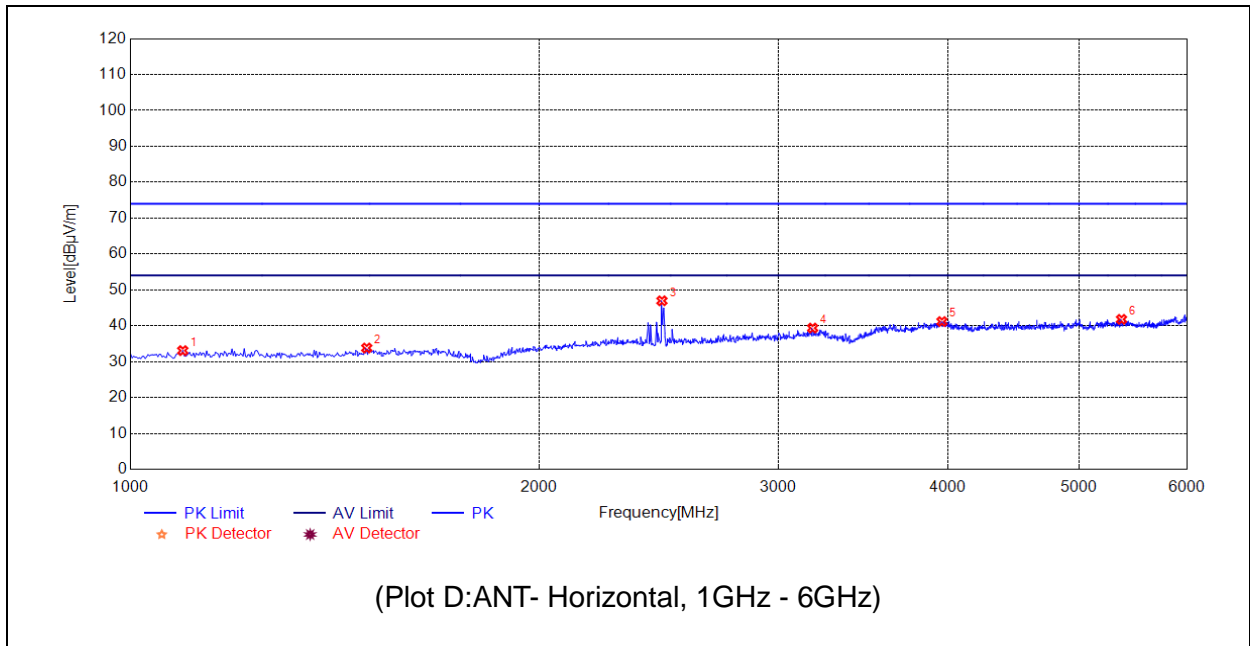
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	34.2047	28.48	N.A.	N.A.	N.A.	40.00	N.A.	V	PASS
2	43.2611	28.42	N.A.	N.A.	N.A.	40.00	N.A.	V	PASS
3	119.2698	29.43	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
4	192.0440	23.65	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
5	280.0200	29.01	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS
6	741.8940	24.85	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS



No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1157.5788	33.43	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
2	1667.8339	33.86	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
3	2465.7329	48.10	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
4	3203.6018	38.99	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
5	4894.4472	44.31	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
6	5834.9175	43.57	N.A.	N.A.	74.00	N.A.	54.00	V	PASS



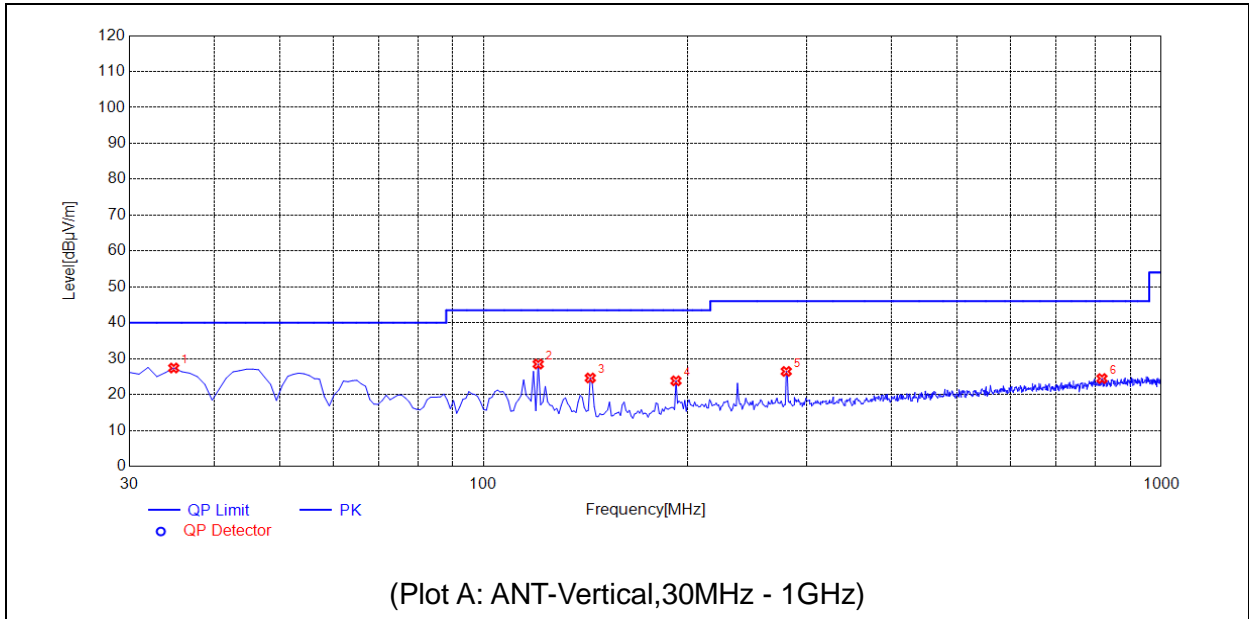
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	36.4688	27.30	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
2	44.8783	27.40	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
3	95.6586	21.89	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
4	144.1747	26.96	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
5	192.0440	25.82	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
6	830.8403	25.34	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS



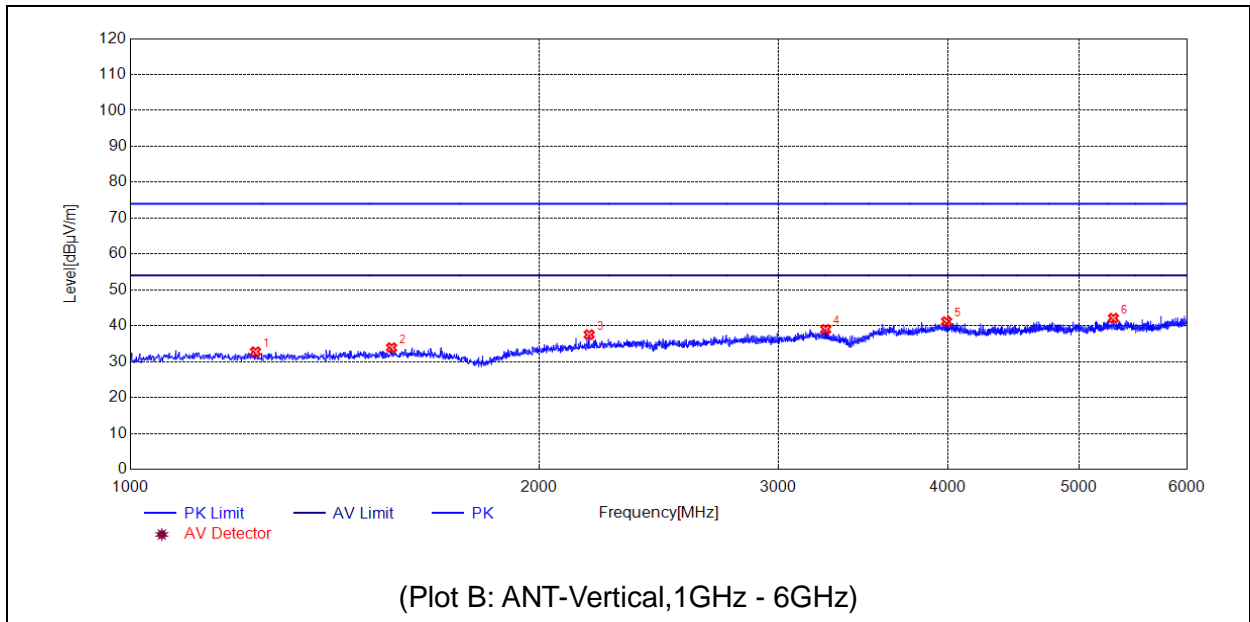
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1092.5463	33.07	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
2	1492.7464	33.80	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
3	2463.2316	46.95	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
4	3181.0905	39.36	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
5	3961.4807	41.17	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
6	5372.1861	41.79	N.A.	N.A.	74.00	N.A.	54.00	H	PASS



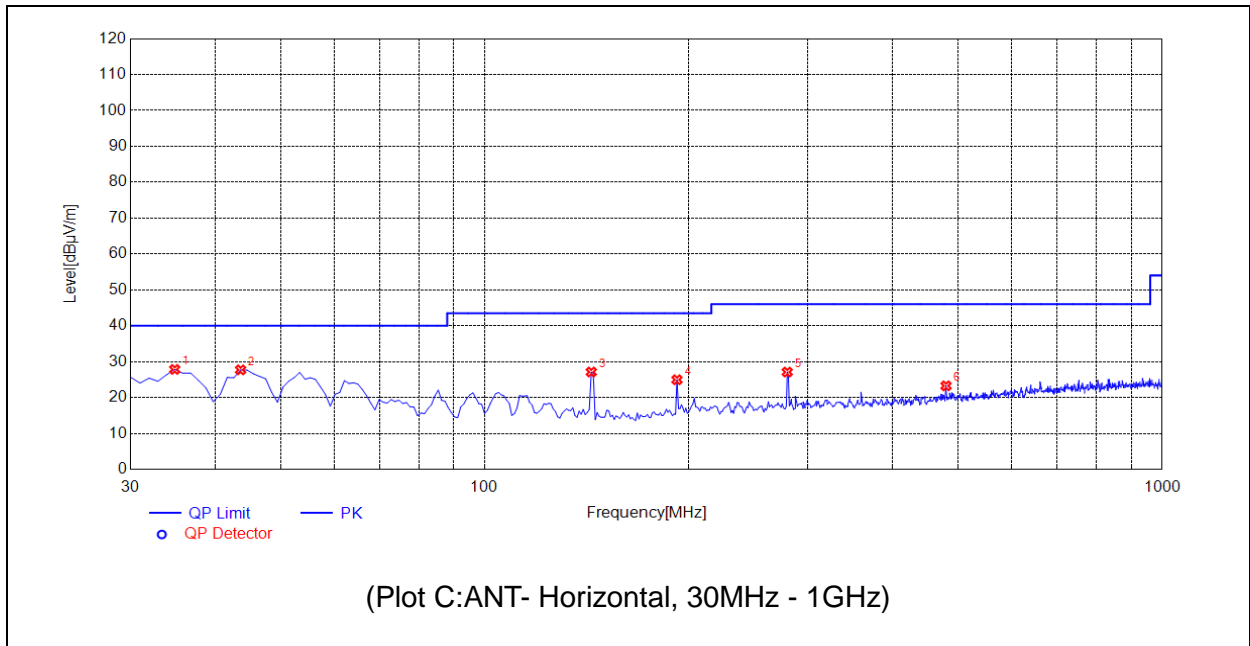
Mode 4



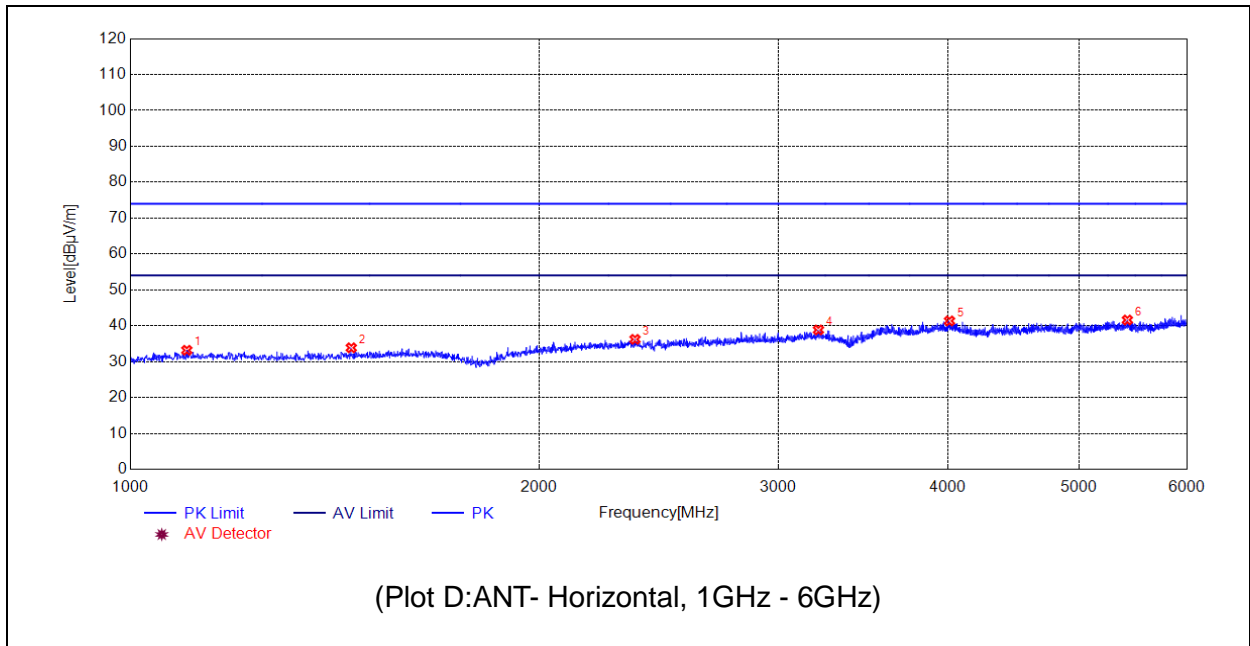
No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	34.8549	27.39	N.A.	N.A.	N.A.	40.00	N.A.	V	PASS
2	120.3003	28.48	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
3	143.6036	24.61	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
4	192.1522	23.82	N.A.	N.A.	N.A.	43.50	N.A.	V	PASS
5	279.5395	26.44	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS
6	817.4575	24.46	N.A.	N.A.	N.A.	46.00	N.A.	V	PASS



No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1236.0472	32.76	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
2	1557.1114	33.91	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
3	2177.2354	37.52	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
4	3252.4505	39.00	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
5	3992.5985	41.16	N.A.	N.A.	74.00	N.A.	54.00	V	PASS
6	5298.8598	42.11	N.A.	N.A.	74.00	N.A.	54.00	V	PASS



No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	34.8549	27.84	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
2	43.5936	27.71	N.A.	N.A.	N.A.	40.00	N.A.	H	PASS
3	143.6036	27.11	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
4	192.1522	24.96	N.A.	N.A.	N.A.	43.50	N.A.	H	PASS
5	279.5395	27.10	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS
6	479.5596	23.26	N.A.	N.A.	N.A.	46.00	N.A.	H	PASS



No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1100.0200	33.18	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
2	1454.0908	33.86	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
3	2353.2707	36.22	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
4	3212.4425	38.84	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
5	4012.6025	41.34	N.A.	N.A.	74.00	N.A.	54.00	H	PASS
6	5425.8852	41.61	N.A.	N.A.	74.00	N.A.	54.00	H	PASS





## Annex A Test Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

### Uncertainty of Radiated Emission Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	30MHz-200MHz	±5.06dB
	200MHz-1000MHz	±5.24dB
	1GHz-6GHz	±5.18dB
	6GHz-18GHz	±5.48dB



## Annex B Testing Laboratory Information

### 1. Identification of the Responsible Testing Laboratory

<b>Laboratory Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
<b>Laboratory Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
<b>Telephone:</b>	+86 755 36698555
<b>Facsimile:</b>	+86 755 36698525

### 2. Identification of the Responsible Testing Location

<b>Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
<b>Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

### 3. Accreditation Certificate

<b>Accredited Testing Laboratory:</b>	The FCC designation number is CN1192. Test firm registration number is 226174. (Shenzhen Morlab Communications Technology Co., Ltd.)
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### 4. Test Software Utilized

<b>Model</b>	<b>Version Number</b>	<b>Producer</b>
JS32-RE	Version 2.0.2.0	Tonscend

**5. Test Equipments Utilized**

Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
MXE EMI Receiver	Agilent	N9038A	MY54130016	2019.07.29	2020.07.28
Test Receiver	R&S	ESPI	101052	2019.07.29	2020.07.28
LISN	Schwarzbeck	NSLK 8127	8127449	2020.03.26	2021.03.25
Pulse Limiter (10dB)	Schwarzbeck	VTSD 9561-F	VTSD 9561 F-B #206	2019.08.13	2020.08.12
Radiated Disturbance Preamplifier	rflight	S020180L3 203	61171/61172	2019.07.29	2020.07.28
Radiated Disturbance Preamplifier	rflight	S10M100L 3802	46732	2019.07.29	2020.07.28
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	VULB 9163-519	2019.05.24	2022.05.23
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	9120D-963	2019.05.24	2022.05.23
Semi-Anechoic Chamber	CRT	9m*6m*6m	N/A	2020.01.06	2023.01.05

**6. Ancillary Equipment Utilized**

Description	Manufacturer	Model	Serial No.
Mobile phone	HUAWEI	PLK-AL10	PLK-AL10C00B389
Battery	HILTI	B22-12.0 Li-ion 01	930330040

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