

## FCC TEST REPORT

Verified code: 206956

<b>Report No.:</b>	E20200313466601-5	<b>Application No.:</b>	E20200313466601
<b>Client:</b>	TianJin HuaLai Technology Co., Ltd.		
<b>Address:</b>	No.10 JinPing Road, Ya An Street, Nankai District Tianjin, China		
<b>Sample Description:</b>	Neos Smart Leak Sensor		
<b>Model:</b>	NS-SLS-US1		
<b>FCC ID:</b>	2ANJHNS-SLS-US1		
<b>Test Location:</b>	Guangzhou GRG Metrology & Test Co., Ltd.		
<b>Test Specification:</b>	CFR 47 FCC Part 15 Subpart C 10-1-2019 Edition ANSI C63.10:2013		
<b>Issue Date:</b>	2020/06/11		
<b>Test Result:</b>	<b>PASS</b>		
<b>Prepared By:</b> Test Engineer  Wu Haoting	<b>Reviewed By:</b> Technical Manager  Wu Chengrong	<b>Approved By:</b> Manager  Zhu Yan	
<b>Other Aspects:</b>			
Note: /			
<b>Abbreviations:</b> <i>ok / P = passed; fail / F = failed; n.a. / N = not applicable;</i>			
<b>The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT.</b>			



## **DIRECTIONS OF TEST**

1. This company carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.
2. The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.
3. If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.

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**1. TEST RESULT SUMMARY**

<b>CFR 47 FCC Part 15 Subpart C 10-1-2019 Edition ANSI C63.10:2013</b>		
Standard	Test Item	Result
15.207	Conducted emission AC power port	N/A see Note 1
§15.205(a), §15.209(a), §15.249(a), §15.249(c)	Field strength of emissions and Restricted bands	P
§15.215(c)	20dB bandwidth	P
§15.249(d)	Out of band emissions	P
§15.203	Antenna Requirement	P, see Note 2

Remark: P = Pass, N/A = Not Applicable.

Note 1: The EUT was powered by 2\*1.5V dc type “AAA” type batteries.

Note 2: The max gain of antenna is -3.46dBi which accordance 15.203.is considered sufficient to comply with the provisions of this section.

## 2. GENERAL DESCRIPTION OF EUT

### 2.1 APPLICANT

Name: TianJin HuaLai Technology Co., Ltd.  
Address: No.10 JinPing Road, Ya An Street, Nankai District Tianjin, China

### 2.2 MANUFACTURER

Name: TianJin HuaLai Technology Co., Ltd.  
Address: No.10 JinPing Road, Ya An Street, Nankai District Tianjin, China

### 2.3 FACTORY

Name: TianJin HuaLai Technology Co., Ltd.  
Address: No.10 JinPing Road, Ya An Street, Nankai District Tianjin, China

### 2.4 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: Neos Smart Leak Sensor

Model No.: NS-SLS-US1

Adding Model /

Trade Name:



Power supply 3.0V dc supplied by 2\*1.5V dc type "AAA" type batteries.

Frequency List: 906MHz, 906.6MHz, 906.8MHz, 907MHz, 907.4MHz, 909.6MHz, 909.8MHz, 915MHz

Transmit Peak: 106.27dBuV/m (Max.)  
Power: Average: 89.99dBuV/m (Max.)

Type of Modulation: GFSK

Modulation:

Antenna Specification: Integrated Antenna, -3.46dBi

Temperature Range: -10 °C ~ +50 °C

Hardware Version: 1.20

Software Version: 2.0.0.13

Software Version:

Note: N/A

**2.5 TEST OPERATION MODE**

Test Item	Mode No.	Description of the modes
Radiated Emission	1	Continuously Transmitting (906MHz, 907MHz, 915MHz)

**2.6 LOCAL SUPPORTIVE**

Name of Equipment	Manufacturer	Model	Serial Number	Note
/	/	/	/	/
<b>Cable</b>				
/	/	/	/	/

**2.7 TEST SOFTWARE:**

Software version	Test level
N/A	N/A

**2.8 MONITORING OF EUT FOR THE IMMUNITY TEST**

- 1 Press the button to enter the fixed frequency continuous transmission state.
- 2 Use buttons to switch between high, medium and low channels.

### 3. LABORATORY AND ACCREDITATIONS

#### 3.1 LABORATORY

The tests and measurements refer to this report were performed by Shenzhen EMC Laboratory of Guangzhou GRG Metrology & Test Co., Ltd.

Add. : No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District Shenzhen, 518110, People's Republic of China

P.C. : 518000

Telephone : 0755-61180008

Fax : 0755-61180008

#### 3.2 ACCREDITATIONS

A2LA	Certificate Number 2861.01
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#### 3.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement		Frequency	Uncertainty
Radiated Emission	Horizontal	30MHz~1000MHz	4.3dB
		1GHz~18GHz	5.6dB
	Vertical	30MHz~1000MHz	4.3dB
		1GHz~18GHz	5.6dB

This uncertainty represents an expanded uncertainty factor of  $k=2$ .

**4. LIST OF USED TEST EQUIPMENT AT GRGT**

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
<b>Radiated Spurious Emission&amp;Restricted bands of operation</b>				
ESPI Test Receiver	R&S	ESU26	EMC26-G260	2020/07/17
Horn antenna	Schwarzbeck	BBHA9170	BBHA9170-497	2020/11/30
Bilog Antenna	Schwarzbeck	VULB 9160	9160-3401	2020/11/27
Horn Antenna	Schwarzbeck	BBHA9120	D286	2020/11/27
Preamplifier	Agilent	8449B	3008A02060	2020/11/18
Loop antenna	TESEQ	HLA6121	52599	2021/05/21
RF automation swiching switch	Tonscend	JS0806-F	19K8060203	/
Test SW	Tonscend	JS36-RSE/2.5.2.2		
Test SW	Tonscend	JS36-RSE/2.5.1.5		
<b>20dB Bandwidth</b>				
EXA signal analyzer	Agilent	N9010A	MY52221469	2020/11/18



## 5. CONDUCTED EMISSIONS

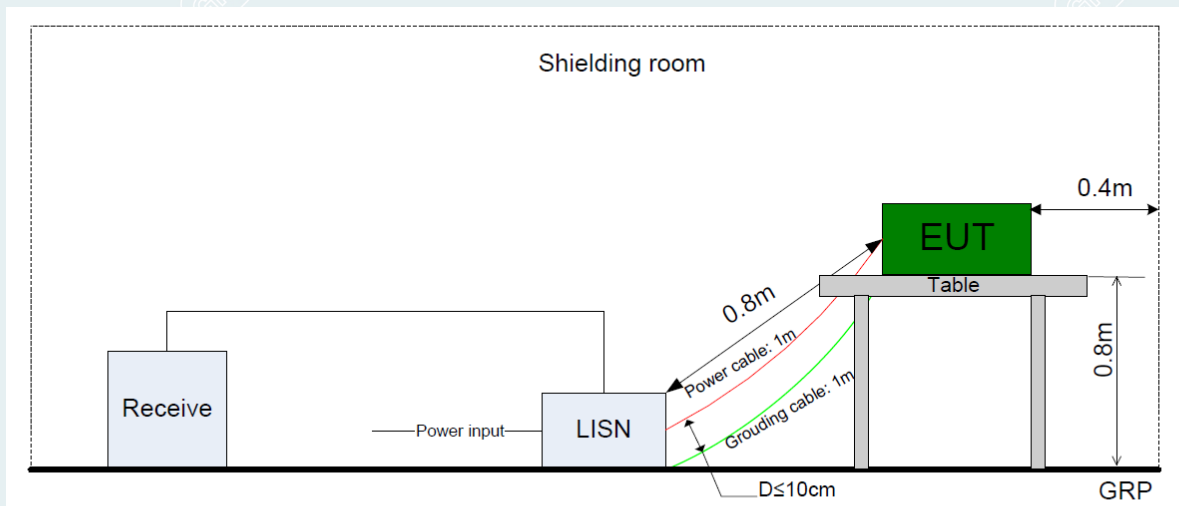
### 5.1. TEST METHOD:

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI testreceiver is used to test the emissions from both sides of ACline

### 5.2. TEST SETUP:

The mains cable of the EUT (per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.



Limit:

Frequency MHz	QP Limit dB $\mu$ V	AV Limit dB $\mu$ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linear.

Test Result: Not Applicable.

## 6. RADIATED SPURIOUS EMISSIONS

### 6.1. LIMITS

The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively.

Fundamental Frequency	Field Strength of Fundamental Field Strength (mV/m)	Field Strength of Harmonics ( $\mu\text{V/m}$ )
902-928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500

Except where otherwise indicated in the applicable FCC, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

Table 5

Frequency (MHz)	Magnetic field strength (HField) ( $\mu\text{A/m}$ )	Measurement Distance (m)
0.009-0.490	$6.37/F$ (F in kHz)	300
0.490-1.705	$63.7/F$ (F in kHz)	30
1.705-30.0	0.08	30

Table 6

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

## Restricted band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	1435 - 1626.5	9.0 - 9.2
0.495 - 0.505	16.69475 - 16.69525	1645.5 - 1646.5	9.3 - 9.5
2.1735 - 2.1905	16.80425 - 16.80475	1660 - 1710	10.6 - 12.7
3.020 - 3.026	25.5 - 25.67	1718.8 - 1722.2	13.25 - 13.4
4.125 - 4.128	37.5 - 38.25	2200 - 2300	14.47 - 14.5
4.17725 - 4.17775	73 - 74.6	2310 - 2390	15.35 - 16.2
4.20725 - 4.20775	74.8 - 75.2	2483.5 - 2500	17.7 - 21.4
5.677 - 5.683	108 - 138	2655 - 2900	22.01 - 23.12
6.215 - 6.218	149.9 - 150.05	3260 - 3267	23.6 - 24.0
6.26775 - 6.26825	156.52475 - 156.52525	3332 - 3339	31.2 - 31.8
6.31175 - 6.31225	156.7 - 156.9	3345.8 - 3358	36.43 - 36.5
8.291 - 8.294	162.0125 - 167.17	3500 - 4400	Above 38.6
8.362 - 8.366	167.72 - 173.2	4500 - 5150	
8.37625 - 8.38675	240 - 285	5350 - 5460	
8.41425 - 8.41475	322 - 335.4	7250 - 7750	
12.29 - 12.293	399.9 - 410	8025 - 8500	
12.51975 - 12.52025	608 - 614	--	
12.57675 - 12.57725	960 - 1427		
13.36 - 13.41			

## 6.2. TEST PROCEDURES

### 1) Sequence of testing 9 kHz to 30 MHz

#### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

#### Pre measurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 0.8 meter.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

**Final measurement:**

- Identified emissions during the pre measurement the software maximizes by rotating the turntable position ( $0^{\circ}$  to  $360^{\circ}$ ) and by rotating the elevation axes ( $0^{\circ}$  to  $360^{\circ}$ ).
- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

**2) Sequence of testing 30 MHz to 1 GHz****Setup:**

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

**Pre measurement:**

- The turntable rotates from  $0^{\circ}$  to  $315^{\circ}$  using  $45^{\circ}$  steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 to 3 meter.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

**Final measurement:**

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ( $\pm 45^{\circ}$ ) and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP detector with an EMI receiver.
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

### 3) Sequence of testing 1 GHz to 18 GHz

#### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

#### Pre measurement:

- The turntable rotates from 0 ° to 315 ° using 45 ° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 2.5 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

#### Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ( $\pm 45^\circ$ ) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

### 4) Sequence of testing above 18 GHz

#### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the

turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

#### Pre measurement:

--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

#### Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

NOTE: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ( $10 \log(1/\text{duty cycle})$ ).

### 6.3. TEST SETUP

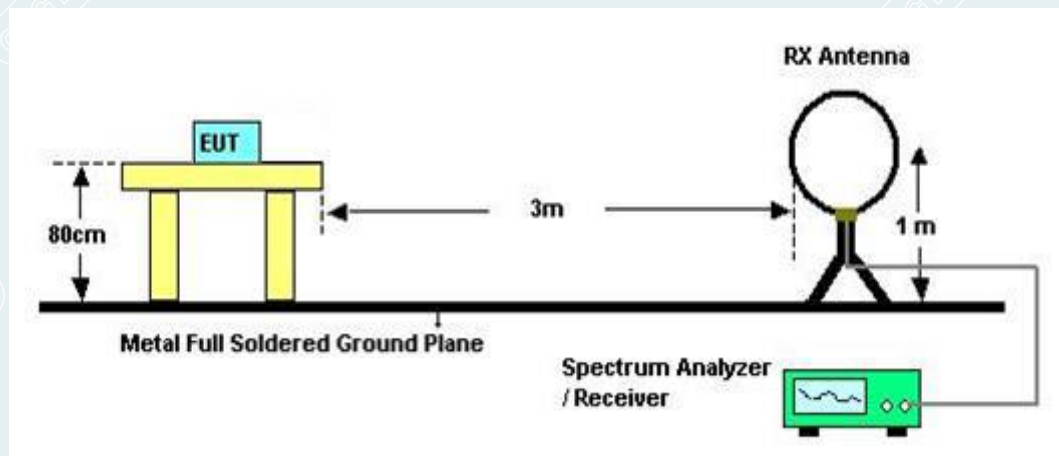
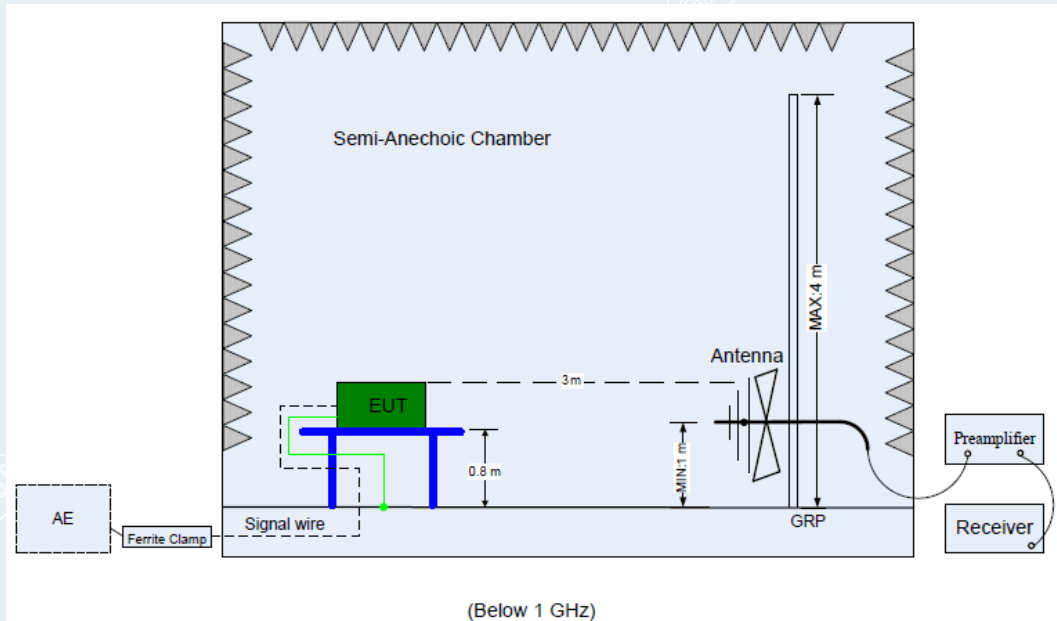
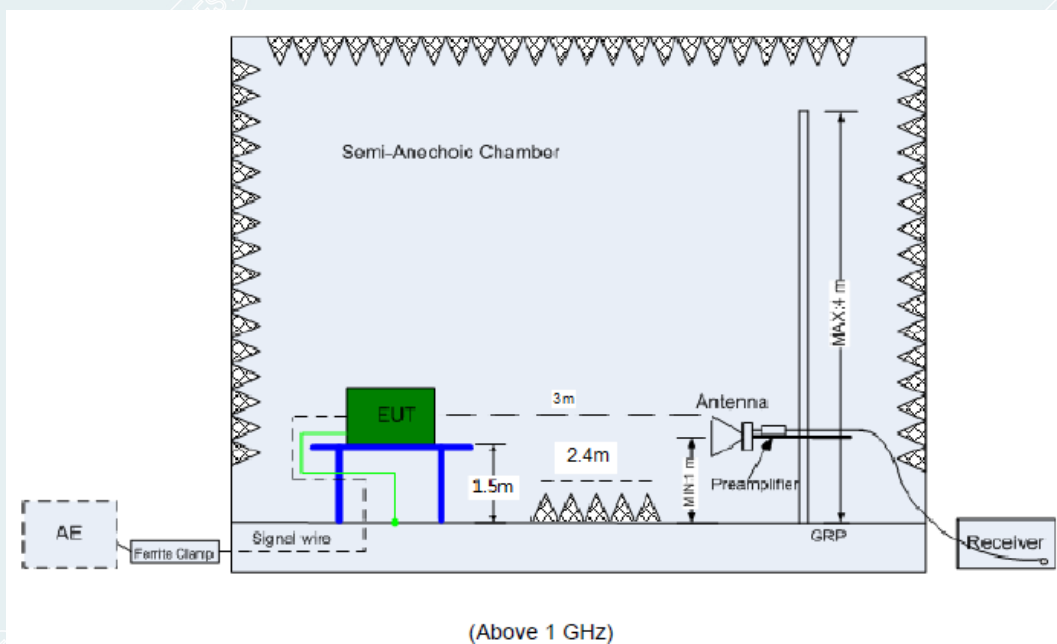


Figure 1.9KHz to 30MHz radiated emissions test configuration



**Figure 2. 30MHz to 1GHz radiated emissions test configuration**



**Figure 3. Above 1GHz radiated emissions test configuration**

#### 6.4. TEST RESULT

The field strength of fundamental  
TX 906MHz

Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
906	120.02	-14.14	105.88	114.00	8.12	Peak	Horizontal
906	104.00	-14.14	89.86	94.00	4.14	AV	Horizontal

Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
906	107.16	-13.53	93.63	114.00	20.37	Peak	Vertical
906	92.00	-13.53	78.47	94.00	15.53	AV	Vertical

TX 907MHz

Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
907	119.52	-14.13	105.39	114.00	8.61	Peak	Horizontal
907	99.53	-14.13	85.40	94.00	8.60	AV	Horizontal

Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
907	116.72	-13.51	103.21	114.00	10.79	Peak	Vertical
907	94.59	-13.51	81.08	94.00	12.92	AV	Vertical

TX 915MHz

Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
915	120.15	-13.88	106.27	114.00	7.73	Peak	Horizontal
915	103.87	-13.88	89.99	94.00	4.01	AV	Horizontal

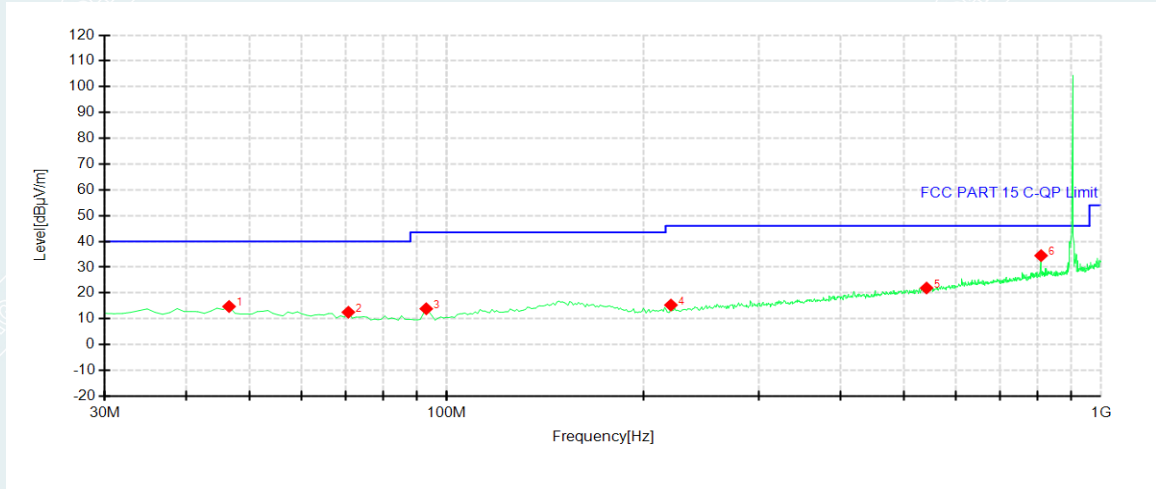
Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
915	107.21	-13.25	93.96	114.00	20.04	Peak	Vertical
915	94.28	-13.25	81.03	94.00	12.97	AV	Vertical



**Radiated Spurious Emission**

**Test Frequency 30MHz – 1GHz**

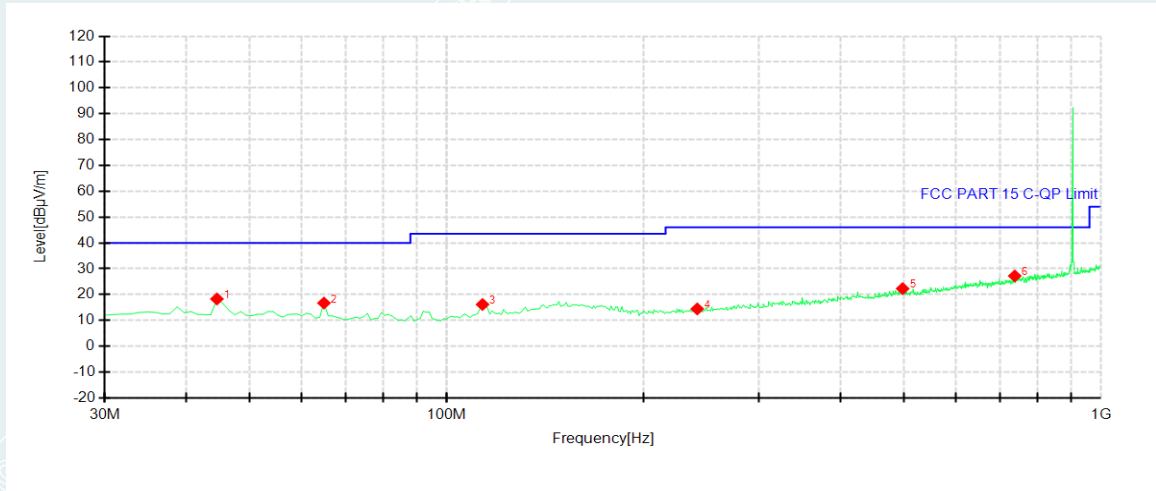
Lowest channel 906MHz



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	46.4900	14.75	-29.85	40.00	25.25	100	2	QP	Horizontal
2	70.7400	12.55	-31.60	40.00	27.45	200	100	QP	Horizontal
3	93.0500	13.89	-32.04	43.50	29.61	100	325	QP	Horizontal
4	220.1200	15.32	-28.87	46.00	30.68	100	204	QP	Horizontal
5	541.1900	21.93	-20.62	46.00	24.07	100	306	QP	Horizontal
6	809.8800	34.50	-14.97	46.00	11.50	100	204	QP	Horizontal

**Remark:**

- 1 No emission found between lowest internal used/generated frequency to 30MHz.
- 2 Radiated emissions measured in frequency range from 30MHz to 1GHz were made with an instrument using Quasi-peak detector mode.
- 3 The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.
- 4 Below 1GHz: factor = Antenna Factor + Cable Loss.

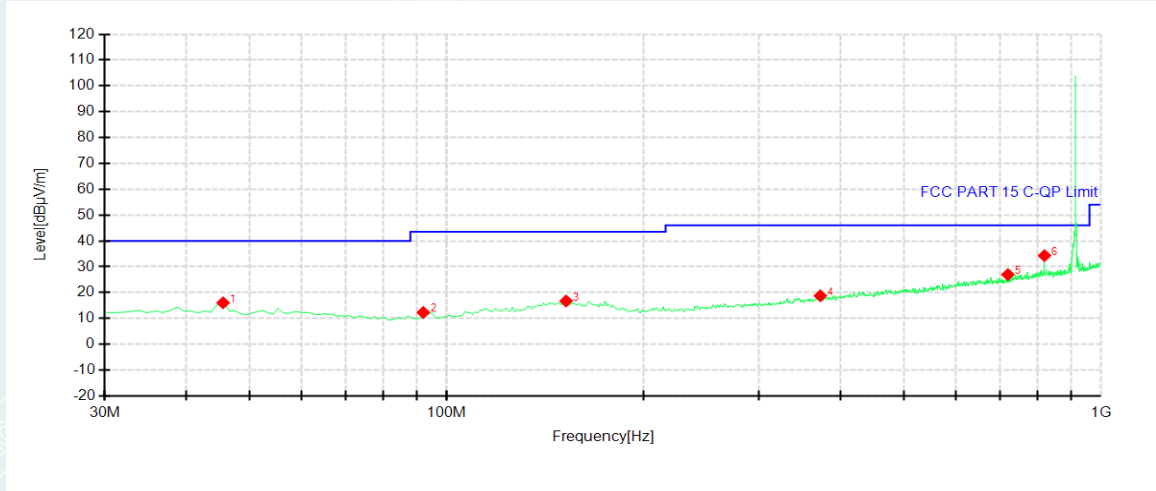


NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	44.5500	18.31	-29.78	40.00	21.69	100	301	QP	Vertical
2	64.9200	16.73	-31.06	40.00	23.27	100	357	QP	Vertical
3	113.4200	16.18	-29.98	43.50	27.32	100	70	QP	Vertical
4	241.4600	14.46	-28.29	46.00	31.54	200	268	QP	Vertical
5	497.5400	22.30	-21.26	46.00	23.70	100	338	QP	Vertical
6	738.1000	27.23	-16.33	46.00	18.77	100	121	QP	Vertical

**Remark:**

- 1 No emission found between lowest internal used/generated frequency to 30MHz.
- 2 Radiated emissions measured in frequency range from 30MHz to 1GHz were made with an instrument using Quasi-peak detector mode.
- 3 The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.
- 4 Below 1GHz: factor = Antenna Factor + Cable Loss.

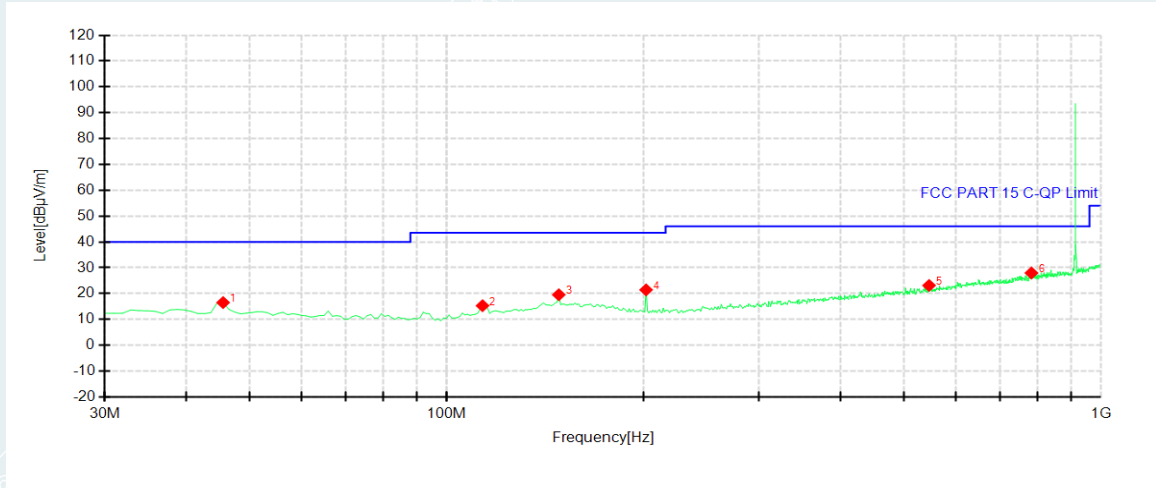
Middle channel 907MHz



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	45.5200	16.04	-29.82	40.00	23.96	100	32	QP	Horizontal
2	92.0800	12.29	-32.08	43.50	31.21	100	215	QP	Horizontal
3	152.2200	16.74	-26.37	43.50	26.76	100	212	QP	Horizontal
4	372.4100	18.77	-24.40	46.00	27.23	100	180	QP	Horizontal
5	720.6400	26.97	-16.95	46.00	19.03	200	130	QP	Horizontal
6	819.5800	34.31	-14.78	46.00	11.69	100	30	QP	Horizontal

**Remark:**

- 1 No emission found between lowest internal used/generated frequency to 30MHz.
- 2 Radiated emissions measured in frequency range from 30MHz to 1GHz were made with an instrument using Quasi-peak detector mode.
- 3 The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.
- 4 Below 1GHz: factor = Antenna Factor + Cable Loss.

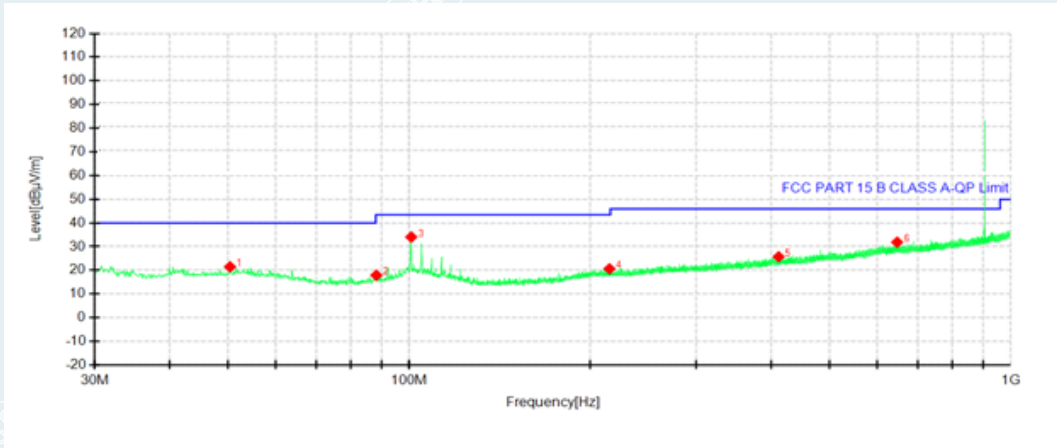


NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	45.5200	16.53	-29.82	40.00	23.47	200	332	QP	Vertical
2	113.4200	15.32	-29.98	43.50	28.18	100	226	QP	Vertical
3	148.3400	19.55	-26.43	43.50	23.95	100	128	QP	Vertical
4	201.6900	21.44	-29.19	43.50	22.06	100	357	QP	Vertical
5	546.0400	23.15	-20.44	46.00	22.85	100	158	QP	Vertical
6	782.7200	27.98	-15.43	46.00	18.02	200	38	QP	Vertical

**Remark:**

- 1 No emission found between lowest internal used/generated frequency to 30MHz.
- 2 Radiated emissions measured in frequency range from 30MHz to 1GHz were made with an instrument using Quasi-peak detector mode.
- 3 The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.
- 4 Below 1GHz: factor = Antenna Factor + Cable Loss.

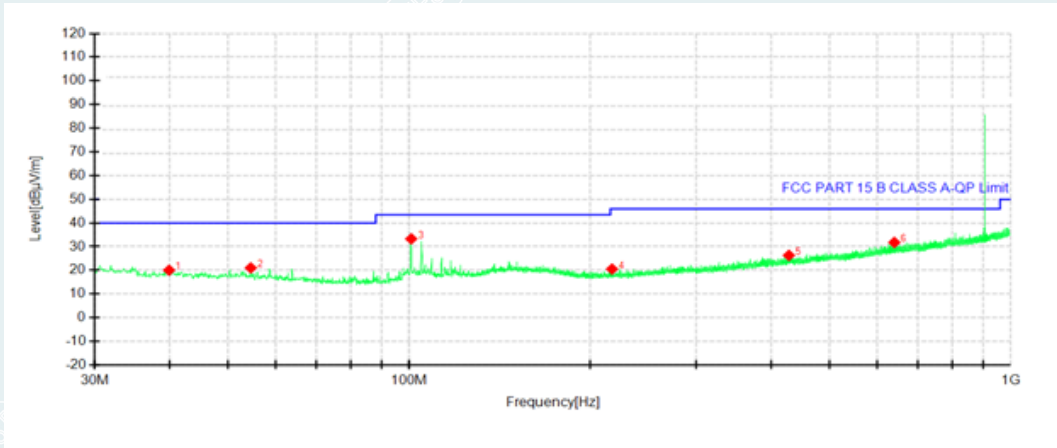
Highest channel 915MHz



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	50.3700	21.45	-28.63	40.00	18.55	150	14	QP	Horizontal
2	88.2000	17.88	-31.70	43.50	25.62	100	270	QP	Horizontal
3	100.8100	34.05	-29.89	43.50	9.45	100	262	QP	Horizontal
4	215.2700	20.61	-28.31	43.50	22.89	150	183	QP	Horizontal
5	411.4040	25.70	-23.08	46.00	20.3	100	127	QP	Horizontal
6	647.5020	31.85	-17.87	46.00	14.15	150	202	QP	Horizontal

**Remark:**

- 1 No emission found between lowest internal used/generated frequency to 30MHz.
- 2 Radiated emissions measured in frequency range from 30MHz to 1GHz were made with an instrument using Quasi-peak detector mode.
- 3 The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.
- 4 Below 1GHz: factor = Antenna Factor + Cable Loss.



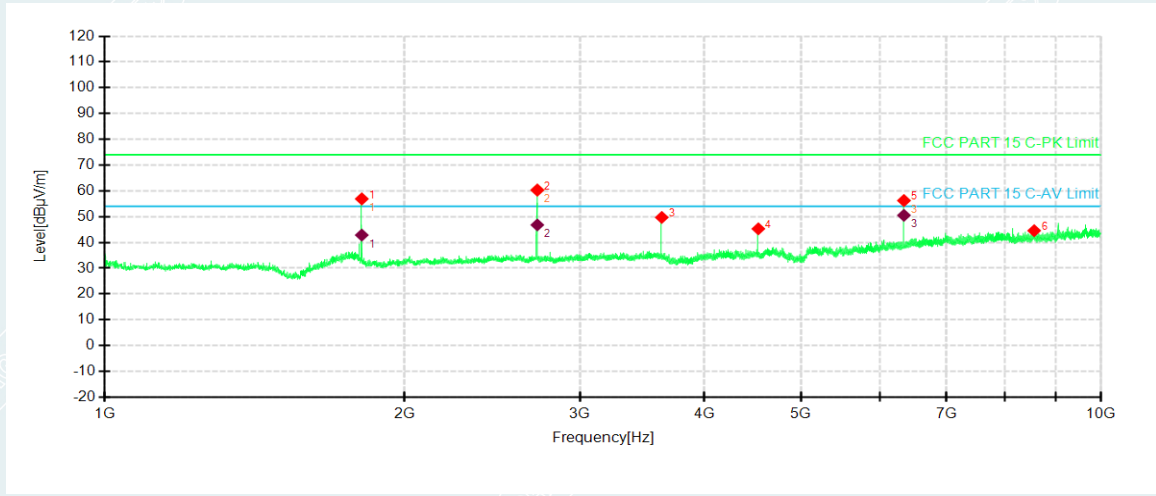
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	39.8940	20.01	-29.61	40.00	19.99	100	154	QP	Vertical
2	54.5410	21.02	-30.27	40.00	18.98	100	158	QP	Vertical
3	100.8100	33.28	-31.67	43.50	10.22	150	34	QP	Vertical
4	217.4040	20.51	-28.90	46.00	25.49	150	210	QP	Vertical
5	427.8940	26.29	-22.64	46.00	19.71	150	168	QP	Vertical
6	640.6150	31.75	-17.97	46.00	14.25	100	349	QP	Vertical

**Remark:**

- 1 No emission found between lowest internal used/generated frequency to 30MHz.
- 2 Radiated emissions measured in frequency range from 30MHz to 1GHz were made with an instrument using Quasi-peak detector mode.
- 3 The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.
- 4 Below 1GHz: factor = Antenna Factor + Cable Loss.

**Above 1 GHz**

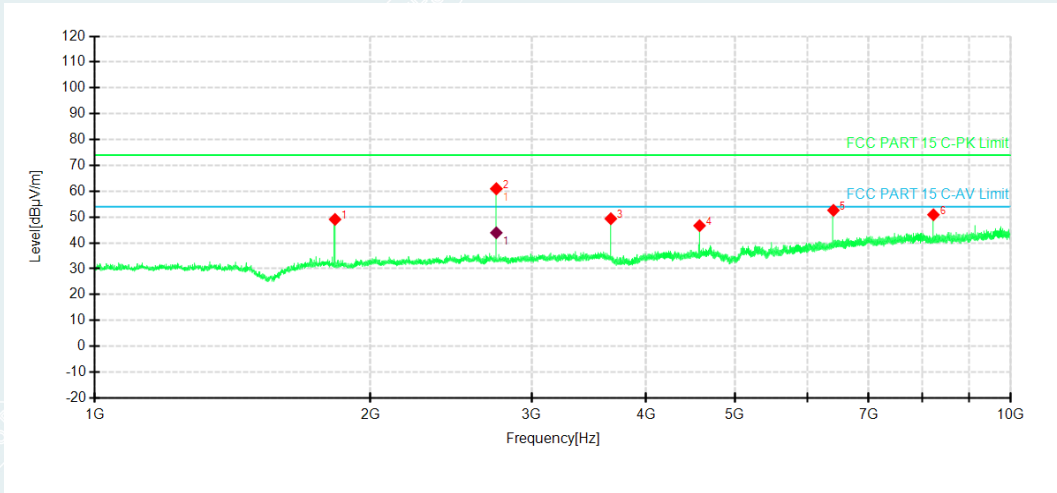
**Lowest Channel 906MHz**



NO.	Freq. [MHz]	PK Level [dBµV/m]	AV Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	1811.800	56.89		-21.36	74.00	17.11	200	359	Peak	Horizontal
3	1811.800		42.85	-21.36	54.00	11.15	200	359	AV	Horizontal
4	2718.100	60.32		-18.10	74.00	13.68	100	191	Peak	Horizontal
5	2718.100		46.79	-18.10	54.00	7.21	100	191	AV	Horizontal
6	3623.950	49.70		-14.89	74.00	24.30	100	150	Peak	Horizontal
7	4529.800	45.29		-12.67	74.00	28.71	100	211	Peak	Horizontal
8	6341.950	56.24		-6.71	74.00	17.76	100	317	Peak	Horizontal
9	6341.950		50.51	-6.71	54.00	3.49	100	317	AV	Horizontal
10	8568.550	44.57		-0.51	74.00	29.43	100	156	Peak	Horizontal

**Remark:**

- 1 Radiated emissions measured in frequency range from 1GHz – 10GHz were made with an instrument using Peak/AV detector mode.
- 2 According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it's unnecessary to perform an average measurement.
- 3 The IF bandwidth of Receiver between above was 1MHz
- 4 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain.



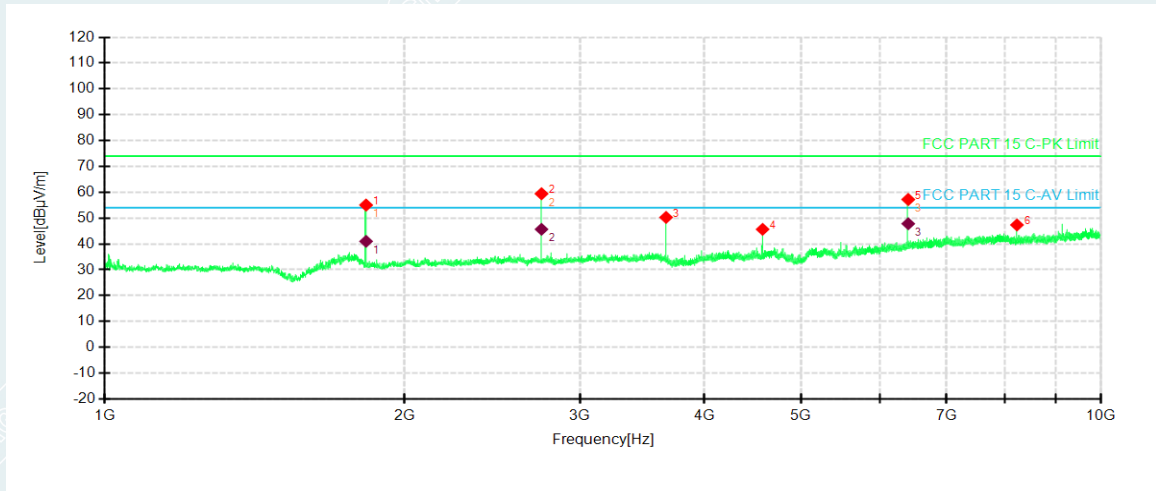
NO.	Freq. [MHz]	Level [dBµV/m]	AV Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	1829.800	49.12		-21.41	74.00	24.88	100	188	Peak	Vertical
2	2744.650	60.96		-18.22	74.00	13.04	100	312	Peak	Vertical
3	2744.650		43.93	-18.22	54.00	10.07	100	312	AV	Vertical
4	3659.950	49.36		-14.97	74.00	24.64	100	108	Peak	Vertical
5	4574.800	46.66		-12.63	74.00	27.34	100	212	Peak	Vertical
6	6404.950	52.62		-6.40	74.00	21.38	100	144	Peak	Vertical
7	8235.100	50.91		-1.32	74.00	23.09	100	222	Peak	Vertical

**Remark:**

- 1 Radiated emissions measured in frequency range from 1GHz – 10GHz were made with an instrument using Peak/AV detector mode.
- 2 According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it's unnecessary to perform an average measurement.
- 3 The IF bandwidth of Receiver between above was 1MHz
- 4 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain.



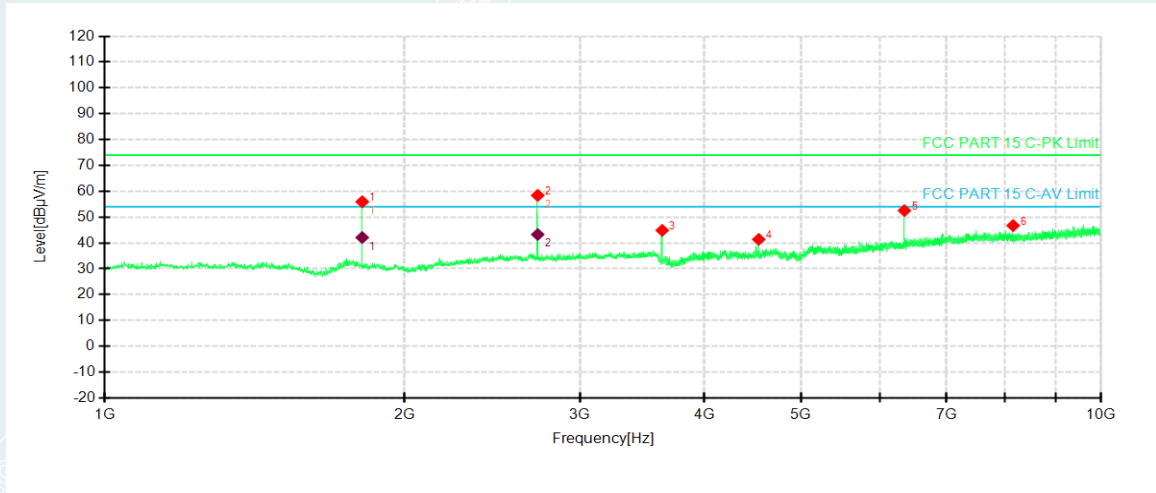
Middle channel 907MHz



NO.	Freq. [MHz]	Level [dBµV/m]	AV Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	1829.800	55.04		-21.41	74.00	18.96	100	129	Peak	Horizontal
2	1829.800		41.00	-21.41	54.00	13.00	100	129	AV	Horizontal
3	2744.650	59.42		-18.22	74.00	14.58	100	183	Peak	Horizontal
4	2744.650		45.67	-18.22	54.00	8.33	100	183	AV	Horizontal
5	3659.950	50.28		-14.97	74.00	23.72	100	52	Peak	Horizontal
6	4574.800	45.65		-12.63	74.00	28.35	100	296	Peak	Horizontal
7	6404.950	57.21		-6.40	74.00	16.79	100	312	Peak	Horizontal
8	6404.950		47.81	-6.40	54.00	6.19	100	312	AV	Horizontal
9	8235.100	47.35		-1.32	74.00	26.65	100	78	Peak	Horizontal

**Remark:**

- 1 Radiated emissions measured in frequency range from 1GHz – 10GHz were made with an instrument using Peak/AV detector mode.
- 2 According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it's unnecessary to perform an average measurement.
- 3 The IF bandwidth of Receiver between above was 1MHz
- 4 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain.

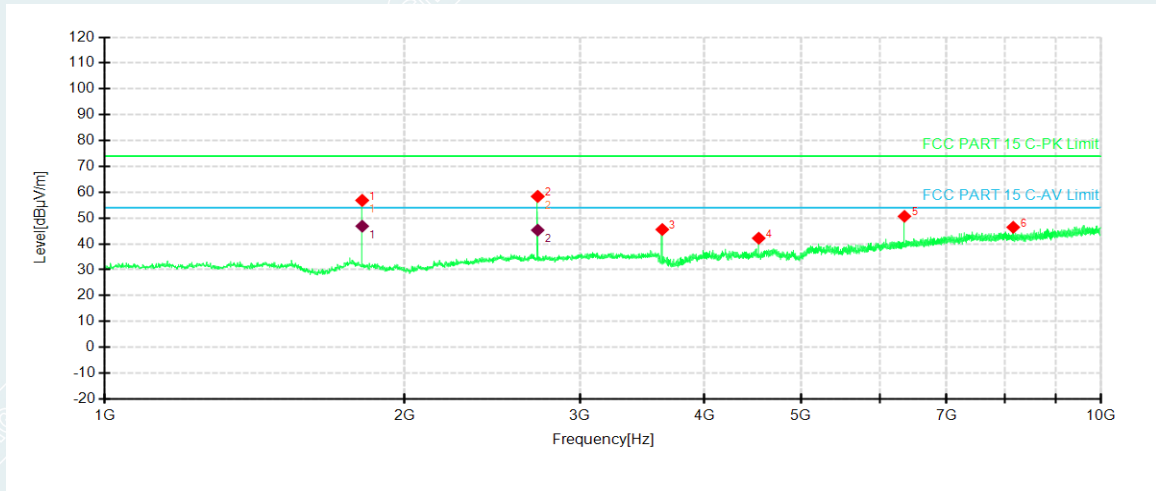


NO.	Freq. [MHz]	Level [dBµV/m]	AV Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	1813.600	55.92		-21.36	74.00	18.08	100	240	Peak	Vertical
2	1813.600		42.09	-21.36	54.00	11.91	100	240	AV	Vertical
3	2720.800	58.40		-18.11	74.00	15.60	100	172	Peak	Vertical
4	2720.800		43.25	-18.11	54.00	10.75	100	172	AV	Vertical
5	3628.000	44.86		-14.89	74.00	29.14	100	308	Peak	Vertical
6	4534.300	41.36		-12.66	74.00	32.64	100	357	Peak	Vertical
7	6348.700	52.51		-6.68	74.00	21.49	100	116	Peak	Vertical
8	8163.100	46.72		-1.33	74.00	27.28	100	18	Peak	Vertical

**Remark:**

- 1 Radiated emissions measured in frequency range from 1GHz – 10GHz were made with an instrument using Peak/AV detector mode.
- 2 According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it's unnecessary to perform an average measurement.
- 3 The IF bandwidth of Receiver between above was 1MHz
- 4 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain.

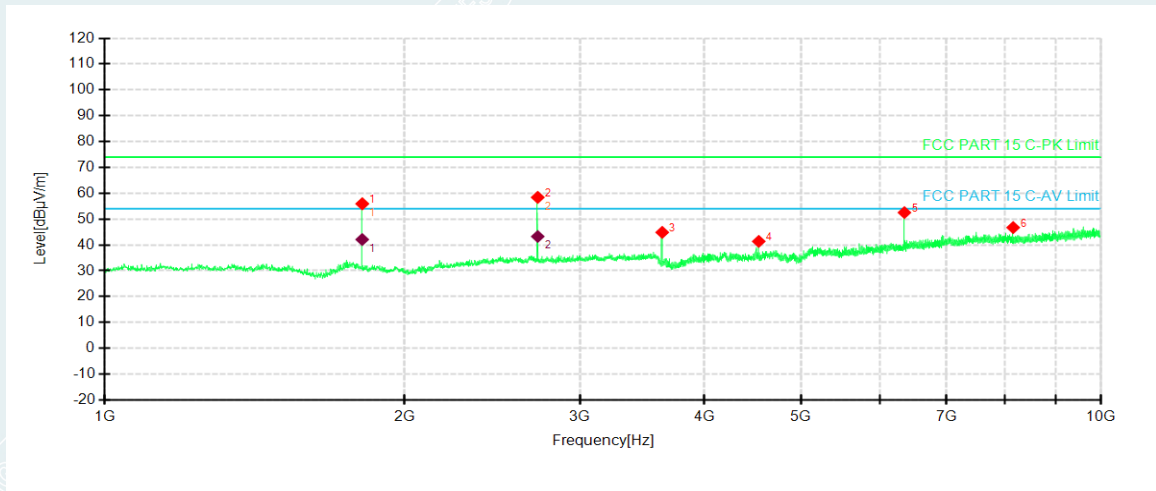
Highest channel 915MHz



NO.	Freq. [MHz]	Level [dBµV/m]	AV Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	1813.600	56.85		-21.36	74.00	17.15	100	201	Peak	Horizontal
2	1813.600		46.86	-21.36	54.00	7.14	100	201	AV	Horizontal
3	2720.800	58.38		-18.11	74.00	15.62	100	118	Peak	Horizontal
4	2720.800		45.34	-18.11	54.00	8.66	100	118	AV	Horizontal
5	3628.000	45.58		-14.89	74.00	28.42	100	305	Peak	Horizontal
6	4534.300	42.20		-12.66	74.00	31.80	100	305	Peak	Horizontal
7	6349.600	50.69		-6.68	74.00	23.31	200	114	Peak	Horizontal
8	8163.100	46.44		-1.33	74.00	27.56	100	272	Peak	Horizontal

**Remark:**

- 1 Radiated emissions measured in frequency range from 1GHz – 10GHz were made with an instrument using Peak/AV detector mode.
- 2 According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it's unnecessary to perform an average measurement.
- 3 The IF bandwidth of Receiver between above was 1MHz
- 4 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain.



NO.	Freq. [MHz]	Level [dBµV/m]	AV Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	1813.600	55.92		-21.36	74.00	18.08	100	240	Peak	Vertical
2	1813.600		42.09	-21.36	54.00	11.91	100	240	AV	Vertical
3	2720.800	58.40		-18.11	74.00	15.60	100	172	Peak	Vertical
4	2720.800		43.25	-18.11	54.00	10.75	100	172	AV	Vertical
5	3628.000	44.86		-14.89	74.00	29.14	100	308	Peak	Vertical
6	4534.300	41.36		-12.66	74.00	32.64	100	357	Peak	Vertical
7	6348.700	52.51		-6.68	74.00	21.49	100	116	Peak	Vertical
8	8163.100	46.72		-1.33	74.00	27.28	100	18	Peak	Vertical

**Remark:**

- 1 Radiated emissions measured in frequency range from 1GHz – 10GHz were made with an instrument using Peak/AV detector mode.
- 2 According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it's unnecessary to perform an average measurement.
- 3 The IF bandwidth of Receiver between above was 1MHz
- 4 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain.

**BANDEDGE****Lowest channel 906MHz**

NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	902.0100	43.97	-14.21	46.00	2.03	100	180	QP	Horizontal
2	928.0200	33.72	-13.37	46.00	12.28	200	271	QP	Horizontal

NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	902.0100	33.26	-13.60	46.00	12.74	100	286	QP	Vertical
2	928.0200	32.82	-12.71	46.00	13.18	100	259	QP	Vertical

**Highest channel 915MHz**

NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	902.0100	32.33	-14.21	46.00	13.67	100	31	QP	Horizontal
5	928.0200	33.08	-13.37	46.00	12.92	100	67	QP	Horizontal

NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity
1	902.0100	32.04	-13.60	46.00	13.96	200	187	QP	Vertical
2	928.0200	33.43	-12.71	46.00	12.57	100	137	QP	Vertical

**Remark:**

- 1 The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.
- 2 Below 1GHz: factor = Antenna Factor + Cable Loss.

## 7. 20DB BANDWIDTH

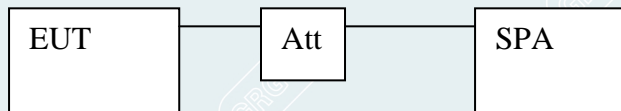
### 7.1. LIMITS

The test of the item was performed in accordance with the standards §15.215(c).

### 7.2. TEST PROCEDURES

- 1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer.
- 2) Set the spectrum analyzer as RBW=1% to 3% OBW, VBW=3RBW, Span>Declare bandwidth, Sweep = auto.
- 3) Record 20dB of the bandwidth value.
- 4) Repeat above procedures until all frequencies measured were complete.

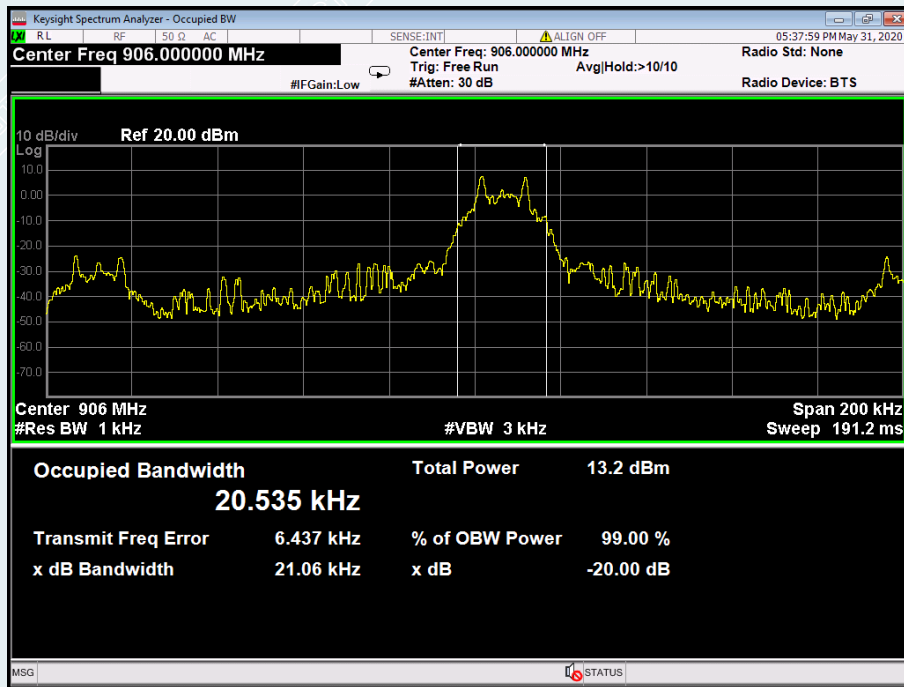
### 7.3. TEST SETUP



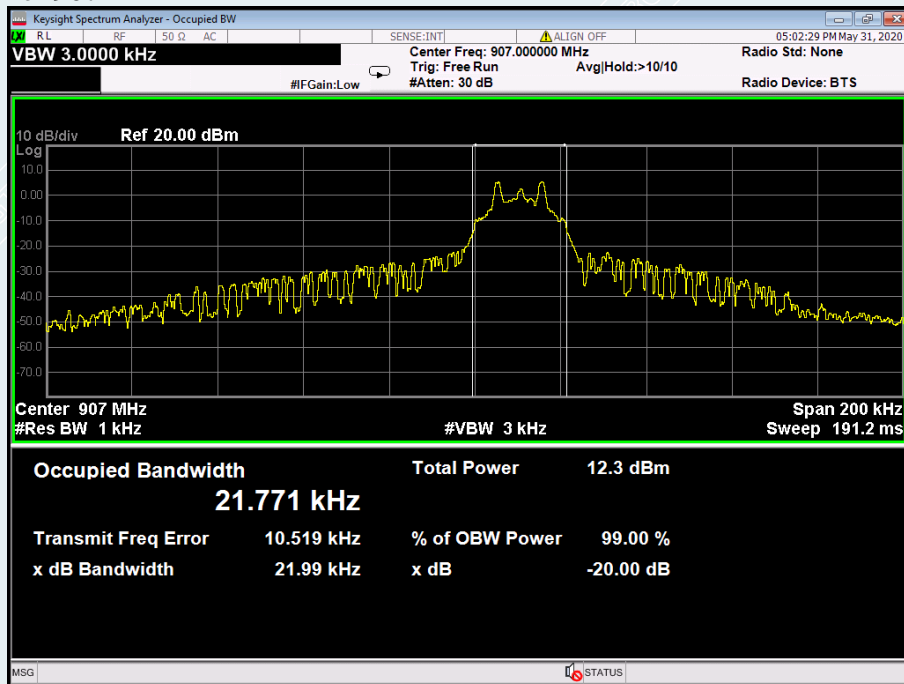
### 7.4. TEST RESULTS

Channel	Frequency (MHz)	20dB Bandwidth (KHz)	Test Result
Low	906	21.06	PASS
Mid	907	21.99	PASS
High	915	22.02	PASS

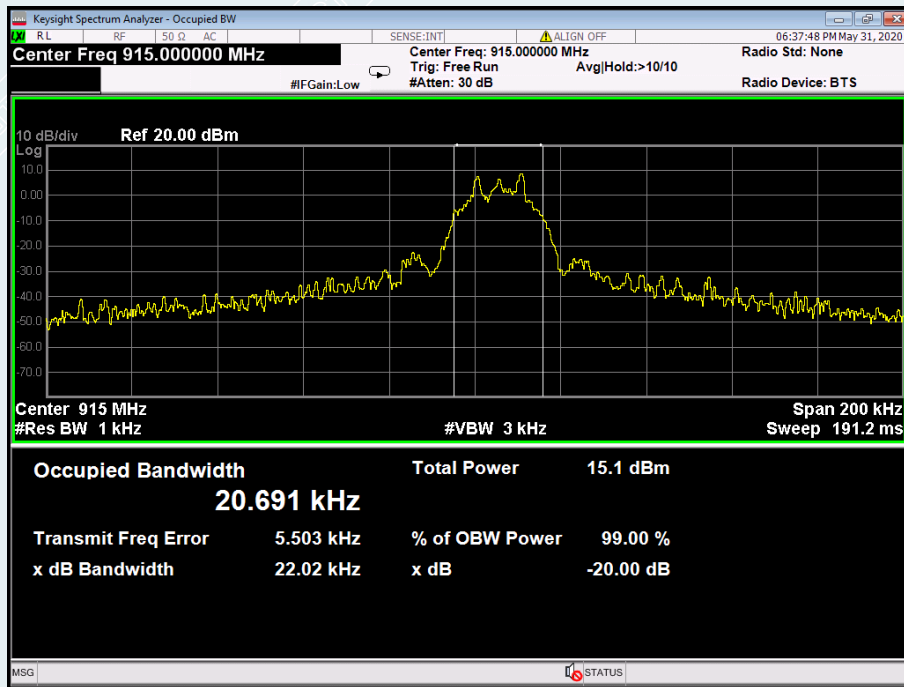
Lowest Channel 906MHz



Middle Channel 907MHz



Lowest Channel 915MHz



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