Ke Mei Ou Lab Corp.

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FCC TEST REPORT

Under:
FCC Part 15 Subpart B, Class B
JBP-Part 15 Class B Computing Device Peripheral

Prepared For:

Grandstream Networks, Inc.

126 Brookline Ave, 3rd Floor Boston, MA 02215, USA

FCC ID: YZZGRP2612P
EUT: IP Phone
Model: GRP2612P, GRP2612

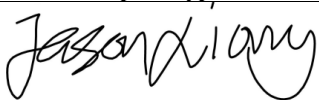
February 27, 2019 **Issue Date:**
Original Report **Report Type:**
 **Test Engineer:** Jason Xiong
 **Review By:** Apollo Liu / Manager

Table of Contents

Report Revision History

Report #	Version	Description	Issued Date
KSZ2019010701J	Rev.01	Initial issue of report	February 19, 2019
KSZ2019010701J	Rev.02	Update section 5&7	February 27, 2019

1. General Information

1. 1 Notes

The test results of this report relate exclusively to the test item specified in 1.6. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

1. 2 Testing Laboratory

Test Firm Name:	**Ke Mei Ou Lab Co., Ltd.**
Test Firm Address:	2013-2016, 20th Floor, Business Center, Jiahui Xin Cheng, No 3027, Shen Nan Road, Fu Tian, Shen Zhen, Guang Dong, P. R. China
FCC Designation Number:	CN1532
Test Firm Registration Number:	344480
Internet:	www.kmolab.com
Email:	kmo@kmolab.com
ANSI-ASQ National Accreditation Board/ACLASS ISO/IEC 17025 Accredited Lab for telecommunication standards. The Registration Number is AT-1532. The testing quality system meets with ISO/IEC-17025 requirements, This approval results is accepted by MRA of ILAC.	

1. 3 Details of Applicant

Name: **Grandstream Networks, Inc.**
Address: **126 Brookline Ave, 3rd Floor Boston, MA 02215, USA**

1. 4 Application Details

Date of Receipt of Application: January 7, 2019
Date of Receipt of Test Item: January 7, 2019
Date of Test : February 12 ~ February 19, 2019

1. 5 Details of Manufacturer

Name: **Grandstream Networks, Inc.**
Address: **126 Brookline Ave, 3rd Floor Boston, MA 02215, USA**

1. 6 Test Item

EUT Feature	
EUT Description:	IP Phone
Brand Name:	GRANDSTREAM
Model Name:	GRP2612P, GRP2612
HW Version:	V1.5A
SW Version:	0.2.20.50
EUT Stage:	Identical Prototype
Note: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description. This report was selected the worst model GRP2612P to issue report.	

Standard Product Specification	
EUT Type	Computing Device Peripheral
EUT Operational Condition	☐ AC
	☒ DC → ☐ From Battery ☒ External AC adapter ☒ POE

Additional Information

Specification of Accessory				
☒**AC/DC Adapter #1 (US)**	**Brand Name**	Frecom	**Model Name**	F05L5-050060SPAU
	Power Rating	INPUT:100~240VAC`50/60Hz 0.2A, OUTPUT:5VDC,0.6A		
☒**AC/DC Adapter #2 (US)**	**Brand Name**	MASS POWER	**Model Name**	NBS05B050060VU
	Power Rating	INPUT:100~240VAC`50/60Hz 0.2A, OUTPUT:5VDC,0.6A		
☒**AC/DC Adapter #3 (US)**	**Brand Name**	Sunlight	**Model Name**	F06US0500060A
	Power Rating	INPUT:100~240VAC`50/60Hz 0.2A, OUTPUT:5VDC,0.6A		
☒**Power over Ethernet (PoE)**	**Power Rating**	48VDC		

1. 7 Applicable Standards

Applicable Standards
According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards: FCC Part 15 Subpart B ANSI C63.4-2014
Note: All test items were verified and recorded according to the standards and without any deviation during the test.

2. Technical Test

2. 1 Summary of Test Results

The EUT has been tested according to the following specifications:

FCC Rules	Test Type	Limit	Result	Notes
FCC Part 15, Paragraph 15.107	AC Conducted Test	< 15.107 Limits	PASS	Complies.
FCC Part 15, Paragraph 15.109	Radiated Test	< 15.109 Limits	PASS	Complies.

2. 2 Measurement Uncertainty

Measurement	Frequency	Uncertainty
Conducted emissions	0.15MHz~30MHz	1.72
Radiated emissions	30MHz ~ 300MHz	3.88
Radiated emissions	300MHz ~1000MHz	3.86
Radiated emissions	>1000MHz	4.42

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. EUT Modifications

No modification by test lab.

4. Conducted Power Line Test

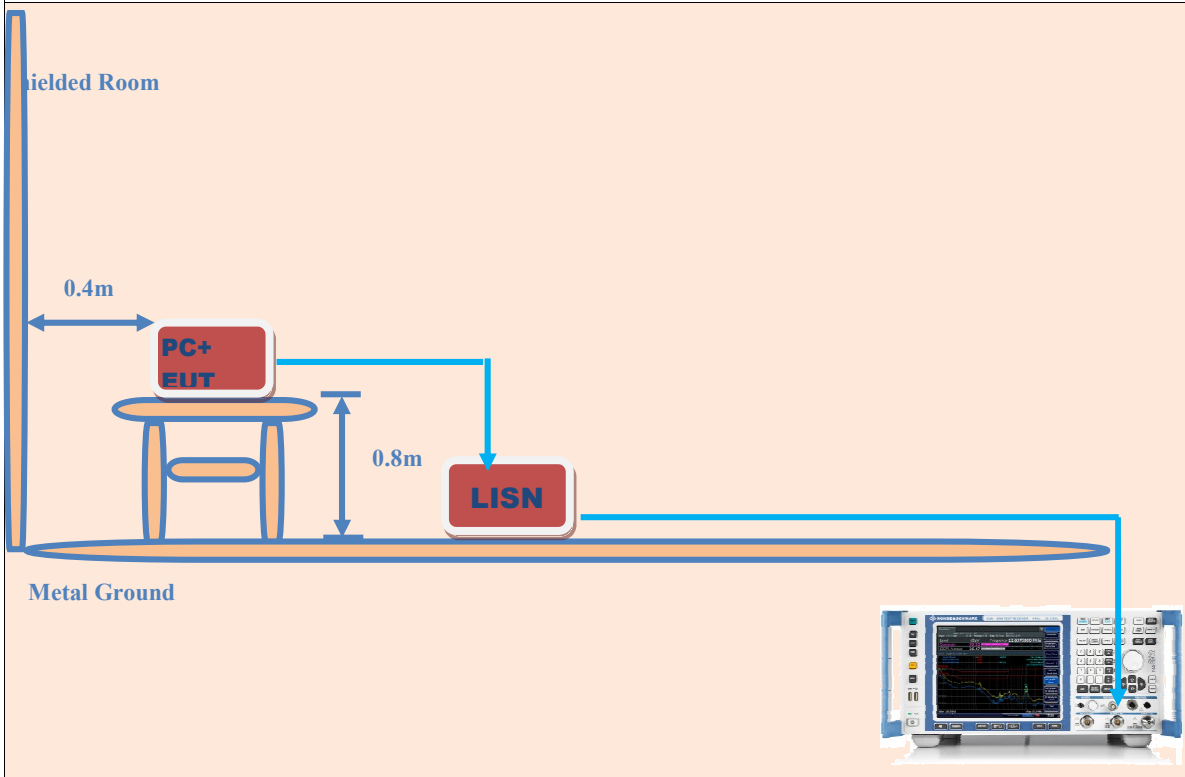
4. 1 Test Equipment

Please refer to Section 8 this report.

4. 2 Test Procedure

Test Method	
☒	The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission., the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:2014 on conducted measurement. Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

4. 3 Test Setup

Test Setup
AC Line Conducted Emissions

This test is applicable for radio equipment and/or ancillary equipment for fixed use powered by the AC mains. This test shall be performed on a representative configuration of the radio equipment, the associated ancillary equipment, or a representative configuration of the combination of radio and ancillary equipment. This test assesses the level of internally generated electrical noise present on the AC power input/output ports.

4. 4 Configuration of the EUT

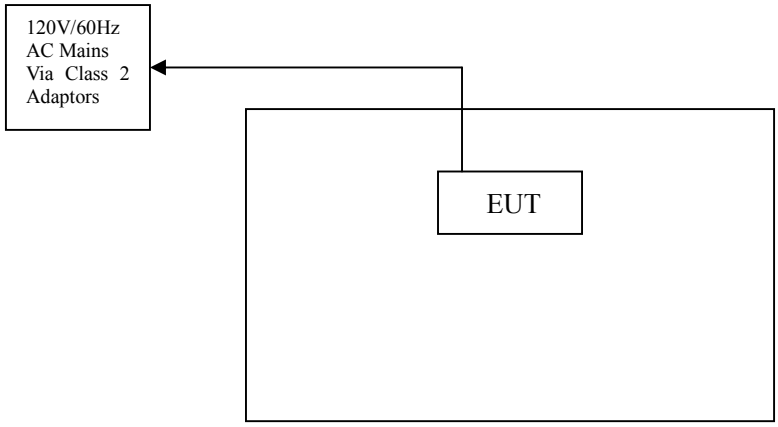
The EUT was configured according to ANSI C63.4:2014. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

EUT Operation Test Setup	
Pre-Scan has been conducted to determine the worst-case mode from all possible combinations. Only the worst test mode data was reported.	
Pre-Scan Mode	
Test Mode	**Operating Description**
1	EUT power by AC/DC Adapter #1 (LAN/WAN data transmission)
2	EUT power by AC/DC Adapter #2 (LAN/WAN data transmission)
3	EUT power by AC/DC Adapter #3 (LAN/WAN data transmission)
4	EUT power by PoE (LAN/WAN data transmission)
Conducted Emissions → Final	
Test Mode	**Operating Description**
1	EUT power by AC/DC Adapter #1 (LAN/WAN data transmission)
2	EUT power by AC/DC Adapter #2 (LAN/WAN data transmission)
3	EUT power by AC/DC Adapter #3 (LAN/WAN data transmission)
Radiated Emissions → Final	
Test Mode	Operating Description
1	EUT power by AC/DC Adapter #1 (LAN/WAN data transmission)
2	EUT power by AC/DC Adapter #2 (LAN/WAN data transmission)
3	EUT power by AC/DC Adapter #3 (LAN/WAN data transmission)
4	EUT power by PoE (LAN/WAN data transmission)
Note: The test modes were carried out for all operation modes (include link and idle). The final test mode of the EUT was the worst test mode for Mode 1, and its test data was reported.	

Support Unit				
Device	**Manufacturer**	**Model # Serial #**	**FCC ID**	**Cable**
Ideapad	Lenovo	20195	DoC	1.5m unshielded power cord
Keyboard	DELL	KB212-B	DoC	1.5m unshielded cable
Mouse	DELL	MS-111	DoC	1.5m unshielded cable

4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.4:2014.
Contect EUT to an IP phone and enable talking

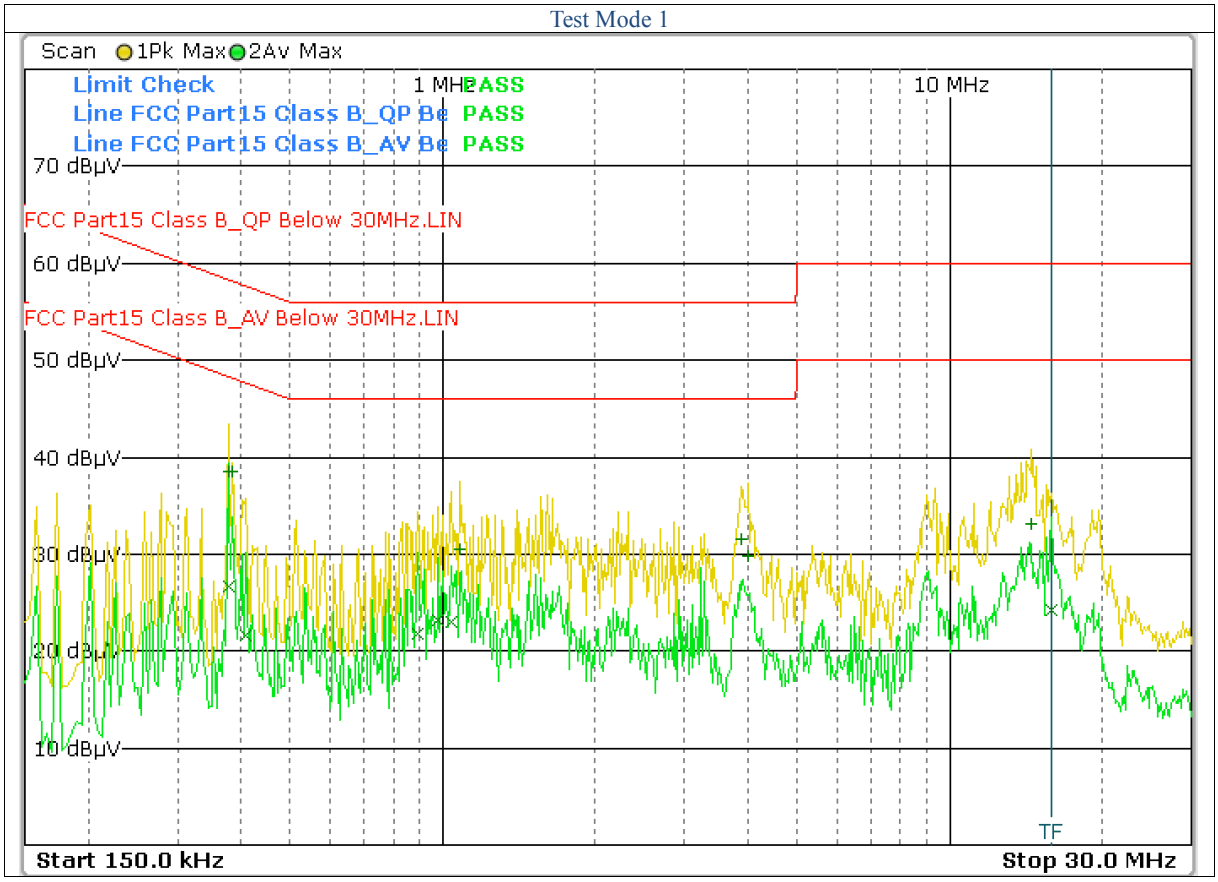


4. 6 Conducted Power Line Emission Limits

Frequency Range (MHz)	Class A QP/AV (dBuV)	Class B QP/AV (dBuV)
0.15 – 0.5	79/66	66 –56/56 –46
0.5 – 5.0	73/60	56/46
5.0 – 30	73/60	60/50

Note: In the above table, the tighter limit applies at the band edges.

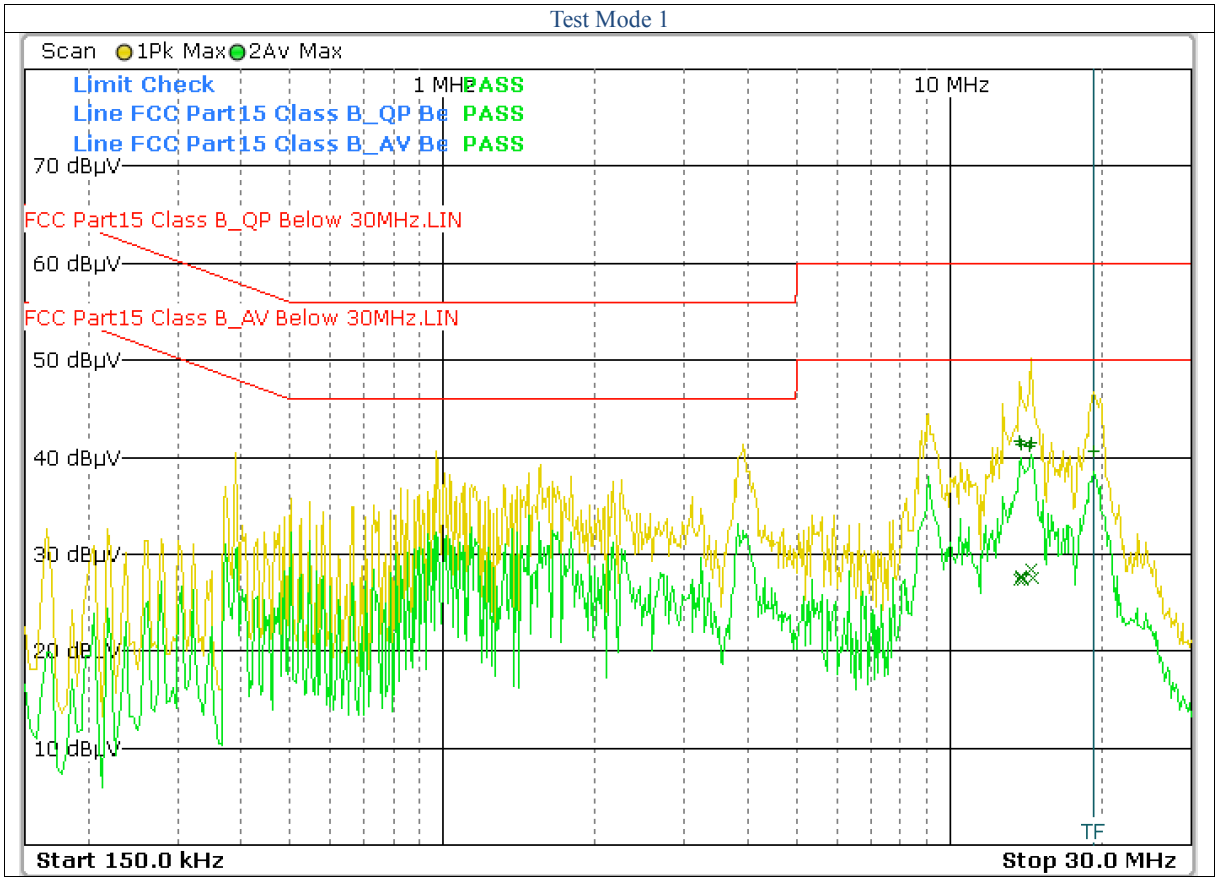
4. 7 Conducted Power Line Test Result



FCC15										
Frequency (MHz)	Read Level (dBuV) QP	AV	Factor (dB)	Emission (dBuV) QP	AV	Line/ Neutral	Limit (dBuV) QP	AV	Margin(dBuV) QP	AV
0.378	28.09	16.32	10.40	38.49	26.72	Line	58.32	48.32	-19.83	-21.60
0.386	28.30	16.23	10.30	38.60	26.53	Line	58.15	48.15	-19.55	-21.62
1.078	20.08	11.19	10.50	30.58	21.69	Line	56.00	46.00	-25.42	-24.31
3.890	20.97	11.35	10.50	31.47	21.85	Line	56.00	46.00	-24.53	-24.15
3.998	19.28	12.47	10.50	29.78	22.97	Line	56.00	46.00	-26.22	-23.03
14.522	22.27	13.40	10.80	33.07	24.20	Line	60.00	50.00	-26.93	-25.80
FCC15										

Note:
1.Uncertainty in conducted emission measured is <+/ -2dB.
2.The emission levels of other frequencies were very low against the limit.
3.All Reading Levels are Quasi-Peak and Average value.
4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.
5.Margin Value= Emission Level - Limit Value.

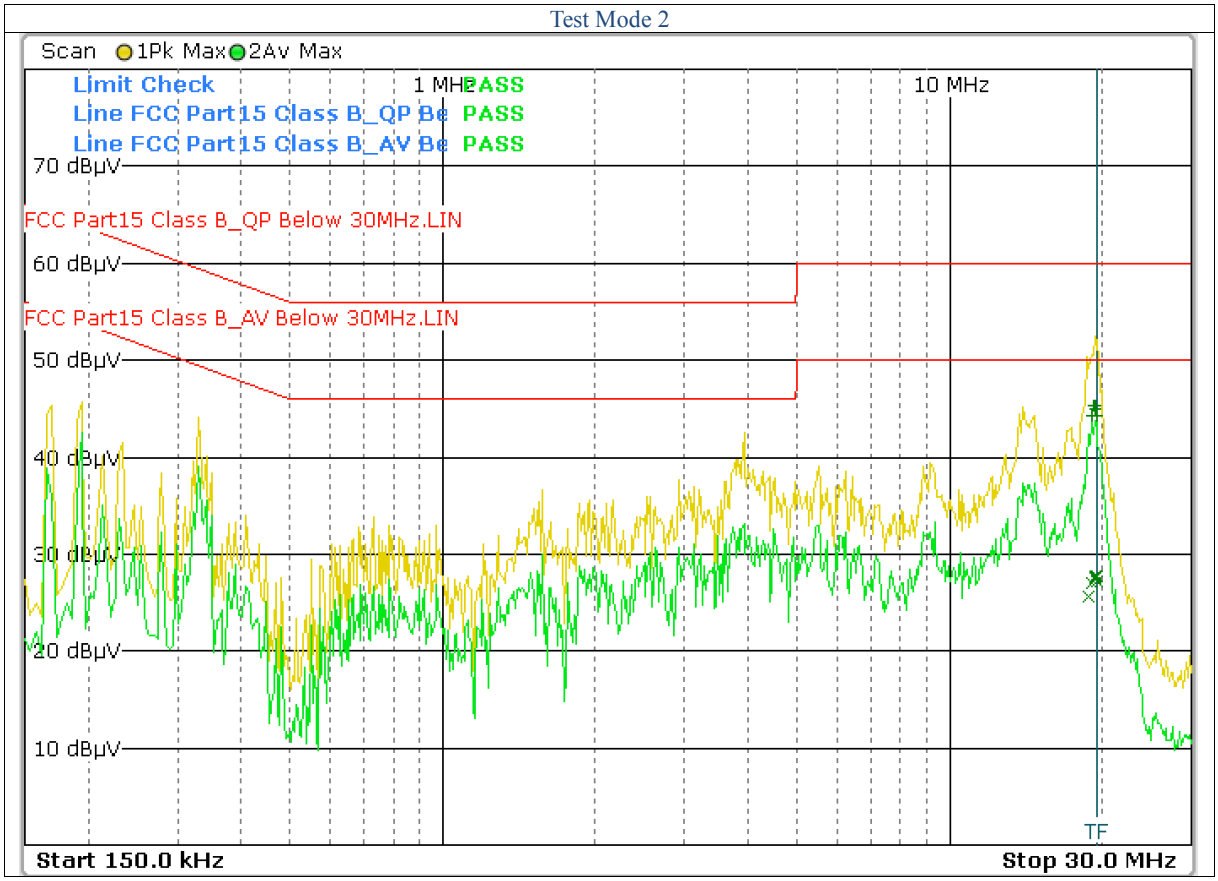
Test Mode 1



FCC15										
Frequency (MHz)	Read Level (dBuV) QP	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV) QP	Emission (dBuV) AV	Line/ Neutral	Limit (dBuV) QP	Limit (dBuV) AV	Margin(dBuV) QP	Margin(dBuV) AV
13.742	31.29	16.93	10.40	41.69	27.33	Neutral	60.00	50.00	-18.31	-22.67
13.846	30.99	17.25	10.30	41.29	27.55	Neutral	60.00	50.00	-18.71	-22.45
14.362	30.67	17.03	10.50	41.17	27.53	Neutral	60.00	50.00	-18.83	-22.47
14.466	31.02	17.89	10.50	41.52	28.39	Neutral	60.00	50.00	-18.48	-21.61
19.174	30.40	16.33	10.50	40.90	26.83	Neutral	60.00	50.00	-19.10	-23.17
19.190	29.83	15.47	10.80	40.63	26.27	Neutral	60.00	50.00	-19.37	-23.73
FCC15										

Note:
1.Uncertainty in conducted emission measured is <+/ -2dB.
2.The emission levels of other frequencies were very low against the limit.
3.All Reading Levels are Quasi-Peak and Average value.
4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.
5.Margin Value= Emission Level - Limit Value.

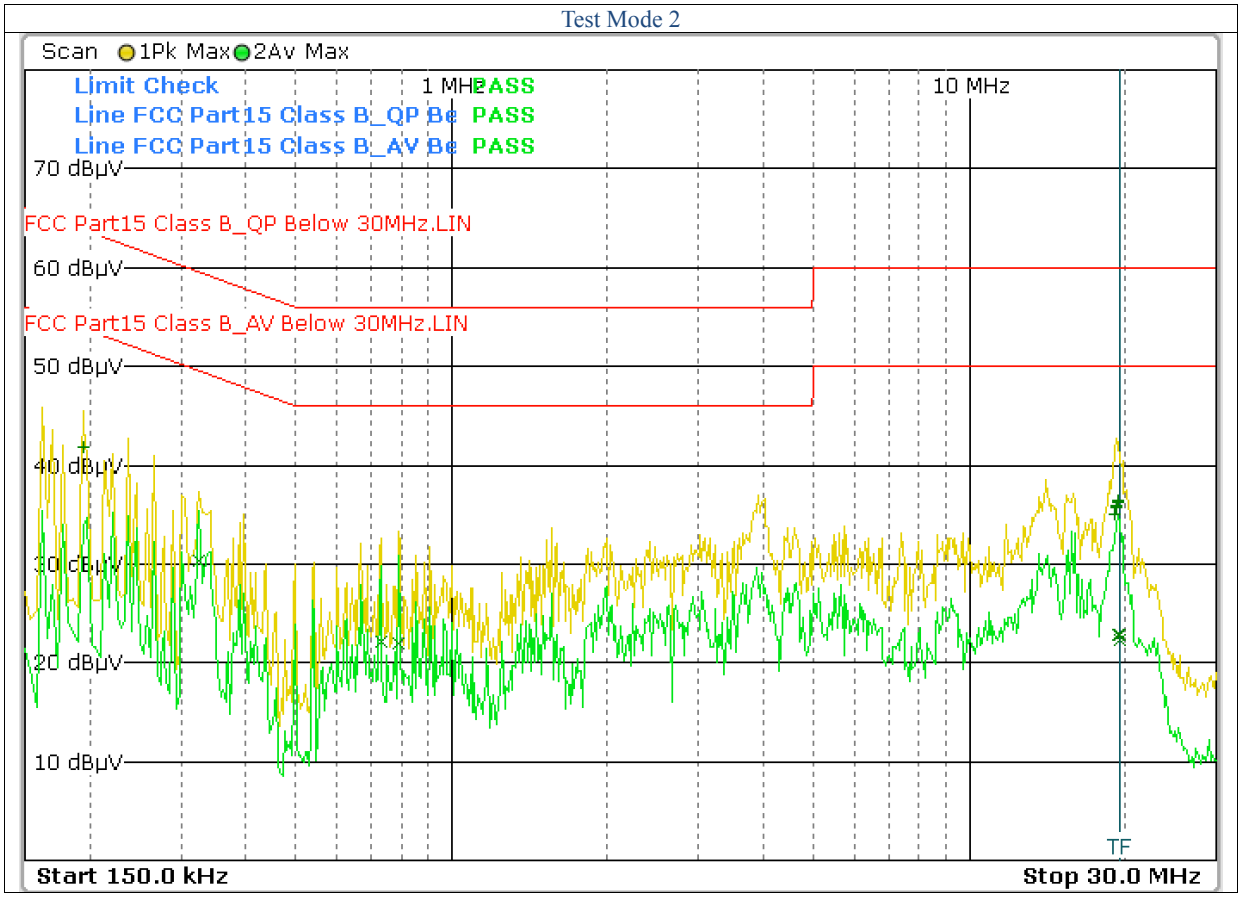
Test Mode 2



FCC15										
Frequency (MHz)	Read Level (dBuV) QP	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV) QP	Emission (dBuV) AV	Line/ Neutral	Limit (dBuV) QP	Limit (dBuV) AV	Margin(dBuV) QP	Margin(dBuV) AV
19.058	33.24	14.55	11.00	44.24	25.55	Line	60.00	50.00	-15.76	-24.45
19.290	34.36	16.03	10.90	45.26	26.93	Line	60.00	50.00	-14.74	-23.07
19.358	34.25	16.72	11.00	45.25	27.72	Line	60.00	50.00	-14.75	-22.28
19.426	34.37	16.72	10.90	45.27	27.62	Line	60.00	50.00	-14.73	-22.38
19.446	34.04	16.73	11.00	45.04	27.73	Line	60.00	50.00	-14.96	-22.27
19.550	33.32	16.33	10.90	44.22	27.23	Line	60.00	50.00	-15.78	-22.77
FCC15										

Note:
1.Uncertainty in conducted emission measured is <+/ -2dB.
2.The emission levels of other frequencies were very low against the limit.
3.All Reading Levels are Quasi-Peak and Average value.
4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.
5.Margin Value= Emission Level - Limit Value.

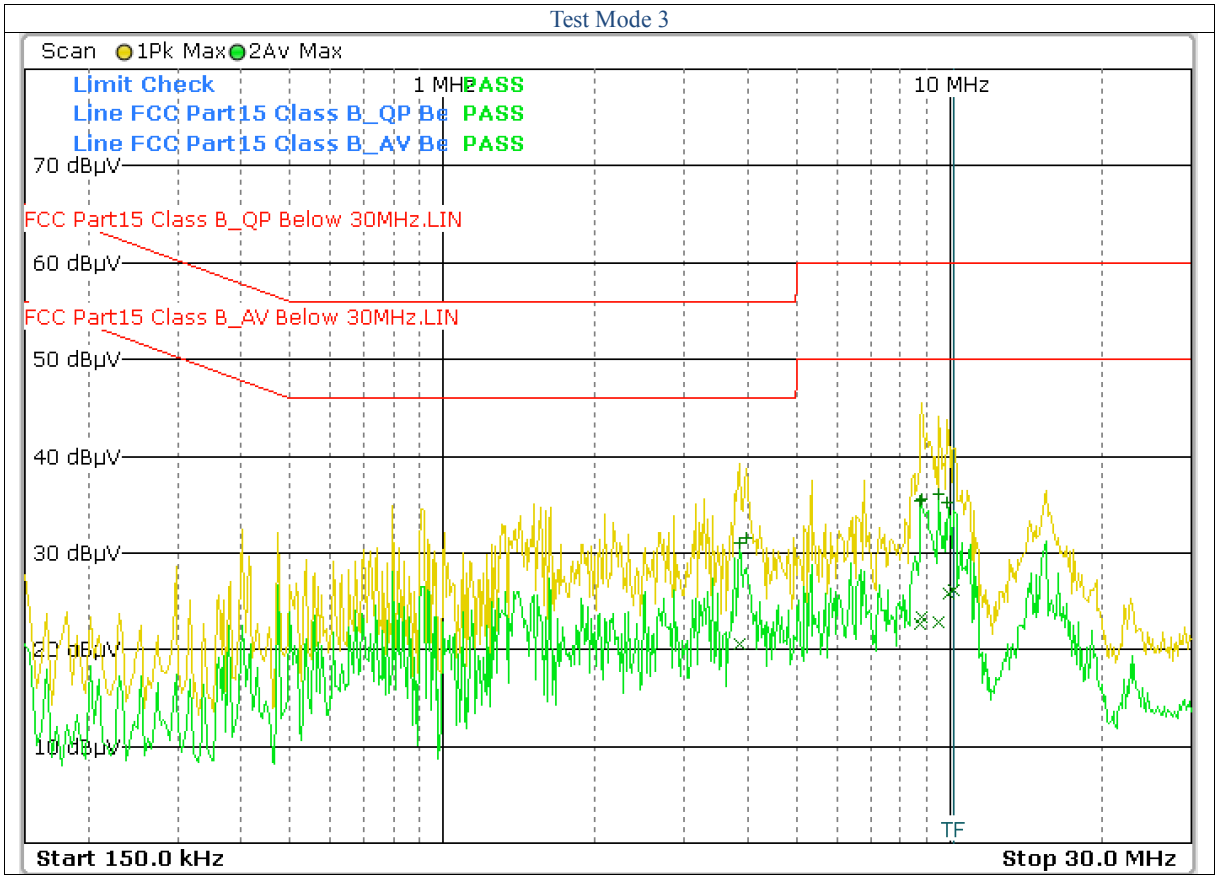
Test Mode 2



FCC15										
Frequency (MHz)	Read Level (dBuV) QP	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV) QP	Emission (dBuV) AV	Line/ Neutral	Limit (dBuV) QP	Limit (dBuV) AV	Margin(dBuV) QP	Margin(dBuV) AV
0.194	31.45	19.97	10.30	41.75	30.27	Neutral	63.86	53.86	-22.11	-23.59
19.074	24.81	11.81	10.30	35.11	22.11	Neutral	60.00	50.00	-24.89	-27.89
19.178	25.26	11.63	10.40	35.66	22.03	Neutral	60.00	50.00	-24.34	-27.97
19.270	25.48	12.41	10.40	35.88	22.81	Neutral	60.00	50.00	-24.12	-27.19
19.330	25.84	11.85	10.40	36.24	22.25	Neutral	60.00	50.00	-23.76	-27.75
19.406	26.10	12.41	10.40	36.50	22.81	Neutral	60.00	50.00	-23.50	-27.19
FCC15										

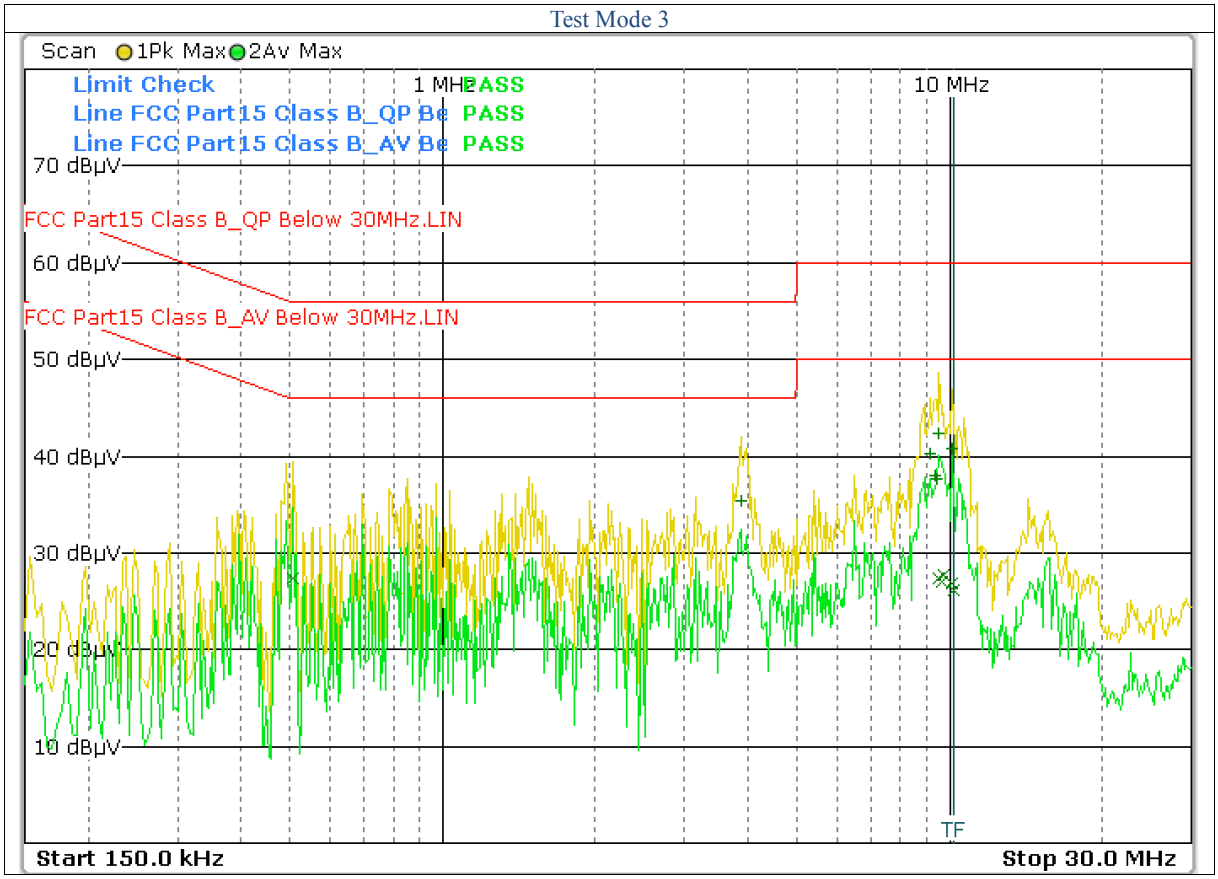
Note:
1.Uncertainty in conducted emission measured is <+/ -2dB.
2.The emission levels of other frequencies were very low against the limit.
3.All Reading Levels are Quasi-Peak and Average value.
4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.
5.Margin Value= Emission Level - Limit Value.

Test Mode 3



FCC15										
Frequency (MHz)	Read Level (dBuV) QP	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV) QP	Emission (dBuV) AV	Line/ Neutral	Limit (dBuV) QP	Limit (dBuV) AV	Margin(dBuV) QP	Margin(dBuV) AV
3.858	20.55	10.11	10.50	31.05	20.61	Line	56.00	46.00	-24.95	-25.39
3.982	20.96	10.84	10.50	31.46	21.34	Line	56.00	46.00	-24.54	-24.66
8.778	24.64	11.92	10.70	35.34	22.62	Line	60.00	50.00	-24.66	-27.38
8.822	24.88	12.57	10.70	35.58	23.27	Line	60.00	50.00	-24.42	-26.73
9.530	25.32	12.16	10.70	36.02	22.86	Line	60.00	50.00	-23.98	-27.14
9.894	24.47	15.01	10.70	35.17	25.71	Line	60.00	50.00	-24.83	-24.29
FCC15										

Note:
1.Uncertainty in conducted emission measured is <+/ -2dB.
2.The emission levels of other frequencies were very low against the limit.
3.All Reading Levels are Quasi-Peak and Average value.
4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.
5.Margin Value= Emission Level - Limit Value.



FCC15										
Frequency (MHz)	Read Level (dBuV) QP	Read Level (dBuV) AV	Factor (dB)	Emission (dBuV) QP	Emission (dBuV) AV	Line/ Neutral	Limit (dBuV) QP	Limit (dBuV) AV	Margin(dBuV) QP	Margin(dBuV) AV
3.874	25.13	15.88	10.30	35.43	26.18	Neutral	56.00	46.00	-20.57	-19.82
9.166	30.02	17.10	10.30	40.32	27.40	Neutral	60.00	50.00	-19.68	-22.60
9.382	27.66	16.53	10.40	38.06	26.93	Neutral	60.00	50.00	-21.94	-23.07
9.422	27.33	15.80	10.40	37.73	26.20	Neutral	60.00	50.00	-22.27	-23.80
9.526	31.94	17.00	10.40	42.34	27.40	Neutral	60.00	50.00	-17.66	-22.60
10.130	30.40	16.48	10.40	40.80	26.88	Neutral	60.00	50.00	-19.20	-23.12
FCC15										

Note:
1.Uncertainty in conducted emission measured is <+/ -2dB.
2.The emission levels of other frequencies were very low against the limit.
3.All Reading Levels are Quasi-Peak and Average value.
4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.
5.Margin Value= Emission Level - Limit Value.

5. Radiated Emission Test

5. 1 Test Equipment

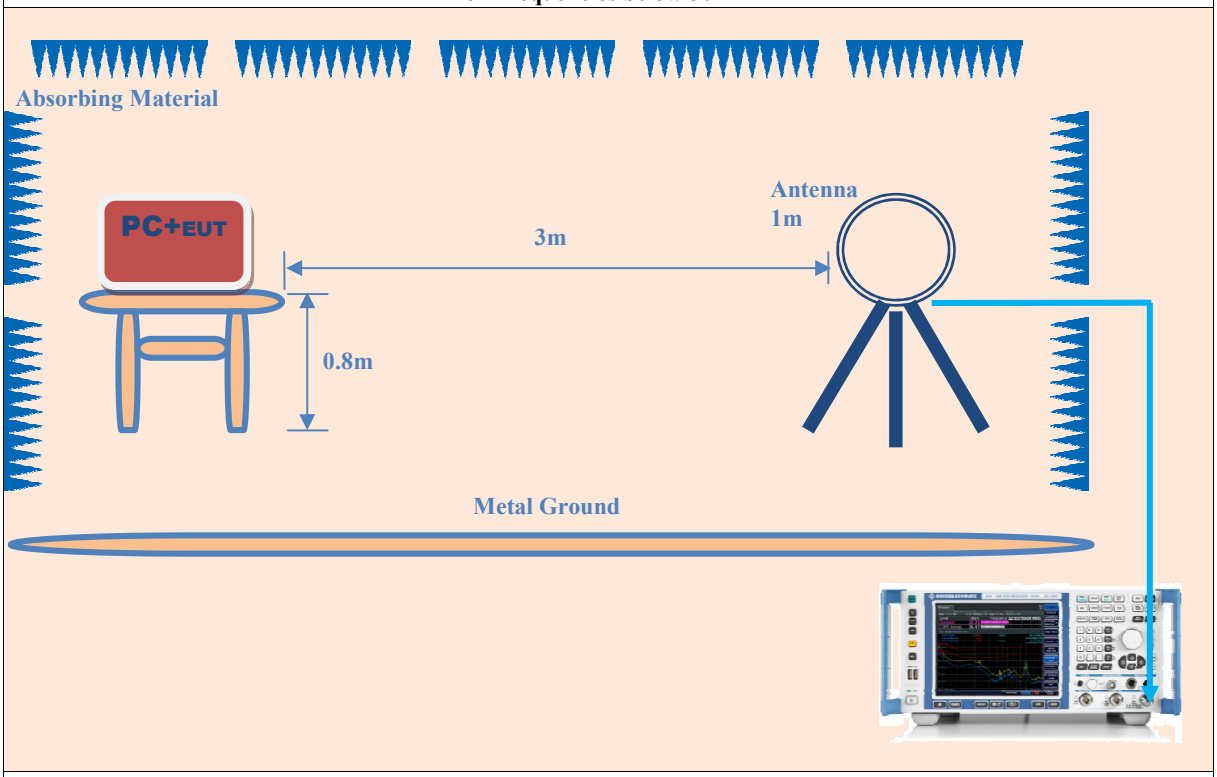
Please refer to Section 8 this report.

5. 2 Test Procedure

1. The EUT was tested according to ANSI C63.4:2014.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m, and which is 1.5 m high for above 1 GHz. All set up is according to ANSI C63.4:2014 .
3. The frequency spectrum from 9 kHz to 25 GHz was investigated. All readings from 9 kHz to 150 kHz are quasi-peak values with a resolution bandwidth of 200 Hz. All readings from 150 kHz to 30 MHz are quasi-peak values with a resolution bandwidth of 9 KHz. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. The Receiving antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency. Emissions below 30MHz were measured with a loop antenna while emission above 30MHz were measured using a broadband E-field antenna.
5. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4:2014

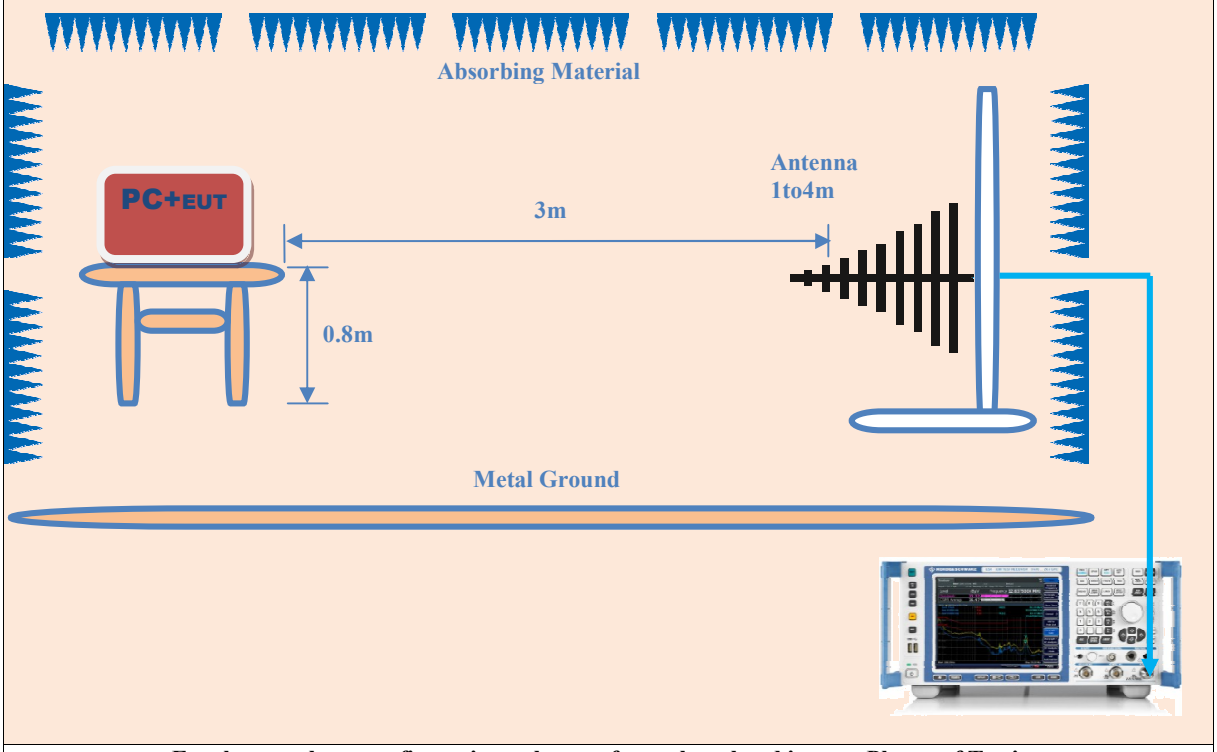
5. 3 Radiated Test Setup

For Frequencies below 30MHz



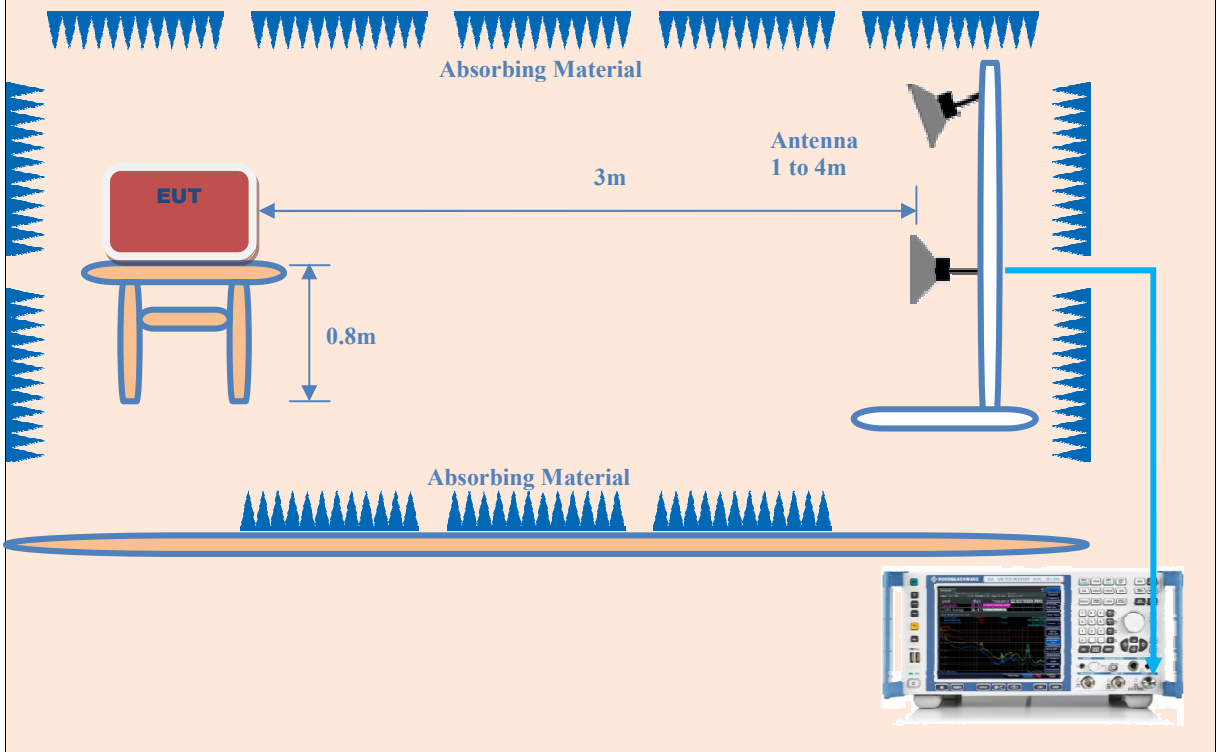
For the actual test configuration , please refer to the related items – Photos of Testing

For Frequencies below 1GHz



For the actual test configuration , please refer to the related items – Photos of Testing

For Frequencies above 1GHz



For the actual test configuration , please refer to the related items – Photos of Testing

5. 4 Configuration of The EUT

Same as section 4.4 of this report

5. 5 EUT Operating Condition

Same as section 4.5 of this report

5. 6 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.109.

Frequency (MHz)	Distance (m)	Field Strength (dBuV/m)
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
Above 960	3	54.0

Note:

1. In the emission tables above, the tighter limit applies at the band edges.
2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.
3. The lower limit shall apply at the transition frequencies.

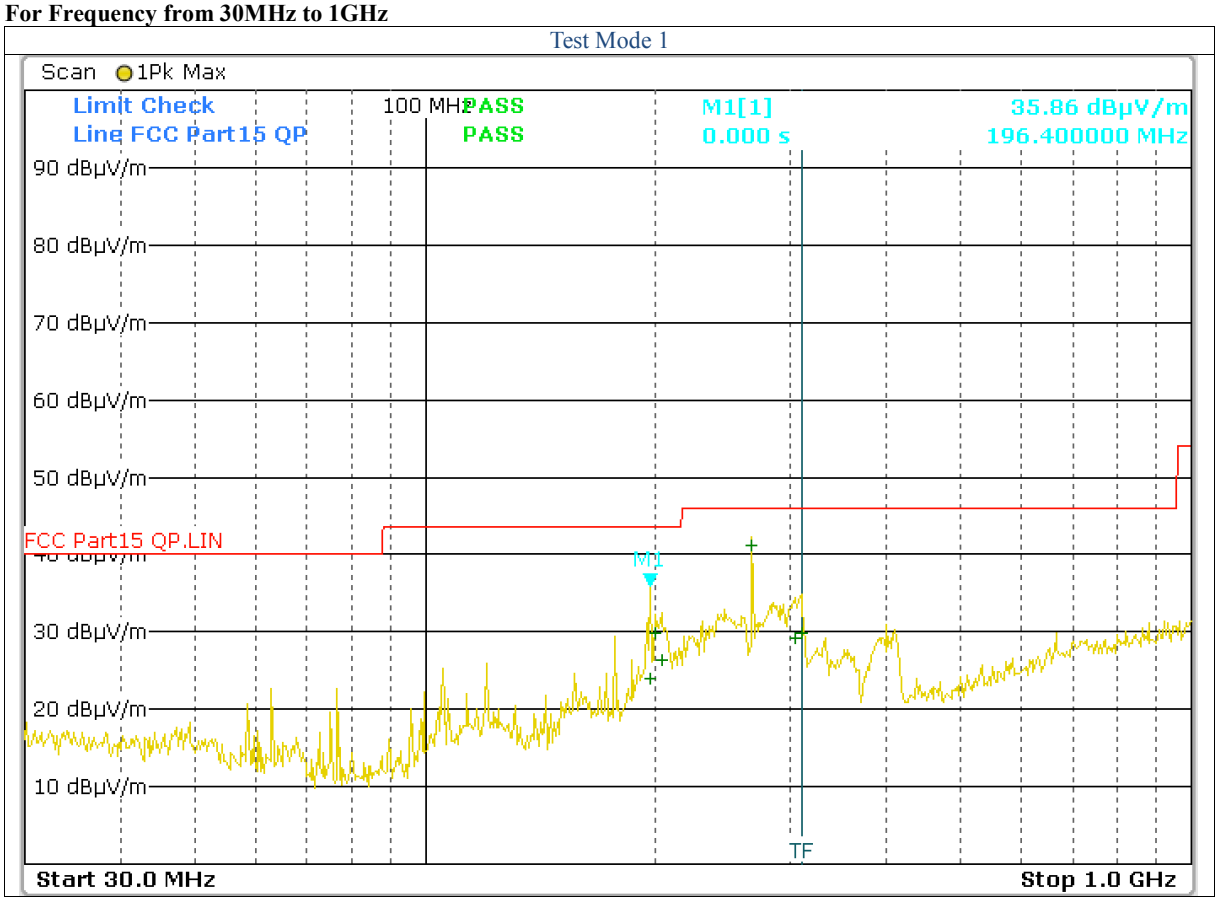
5. 7 Radiated Emission Test Result

For Frequency below 30MHz

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
N/A						
N/A						
N/A						
N/A						
N/A						
N/A						

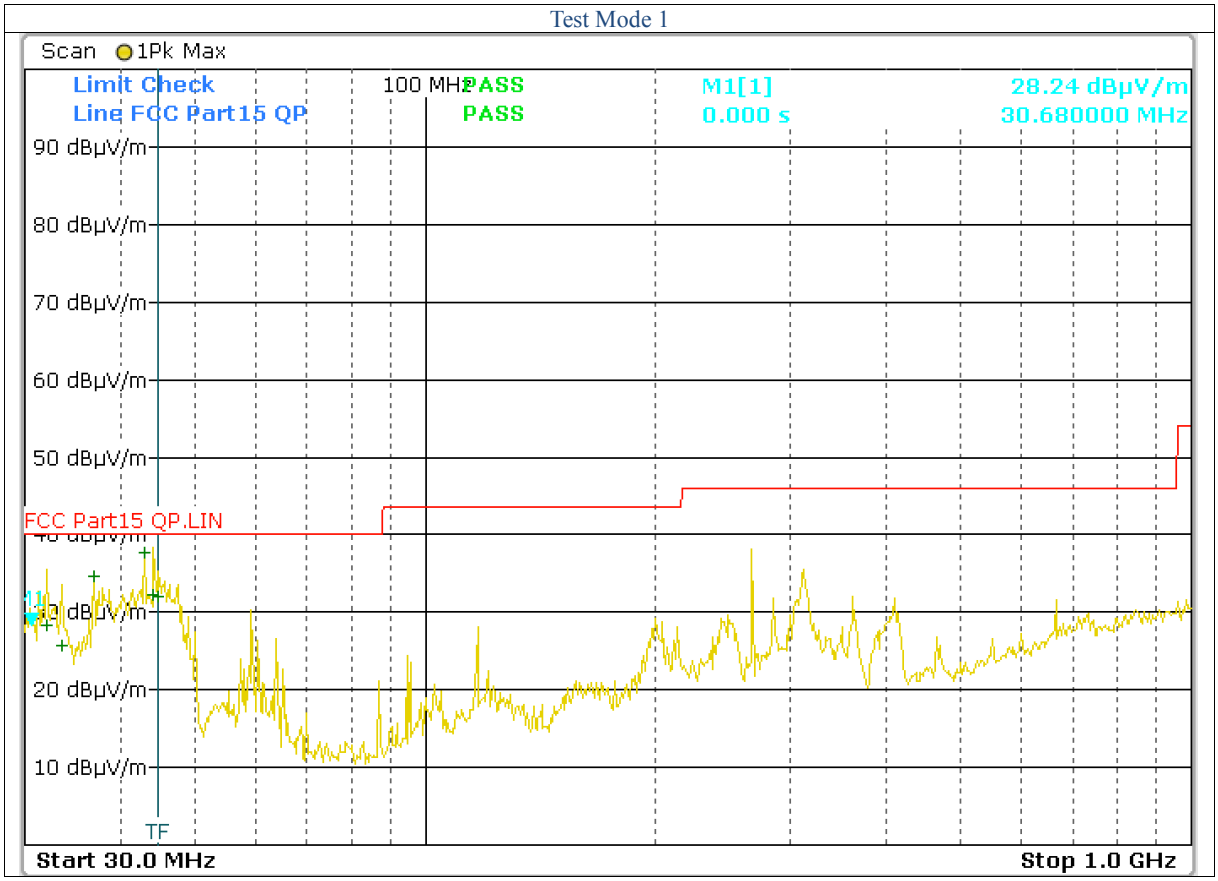
Note: (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
(2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
(3) Emission Level = Reading Level + Probe Factor + Cable Loss.

For Frequency from 30MHz to 1GHz



Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
196.400	10.18	13.87	24.05	Horiz./	43.5	-19.45
200.000	11.73	18.19	29.92	Horiz./	43.5	-13.58
203.240	8.12	18.19	26.31	Horiz./	43.5	-17.19
266.680	26.22	14.94	41.16	Horiz./	46.0	-4.84
303.720	8.26	20.91	29.17	Horiz./	46.0	-16.83
309.920	8.93	20.91	29.84	Horiz./	46.0	-16.16

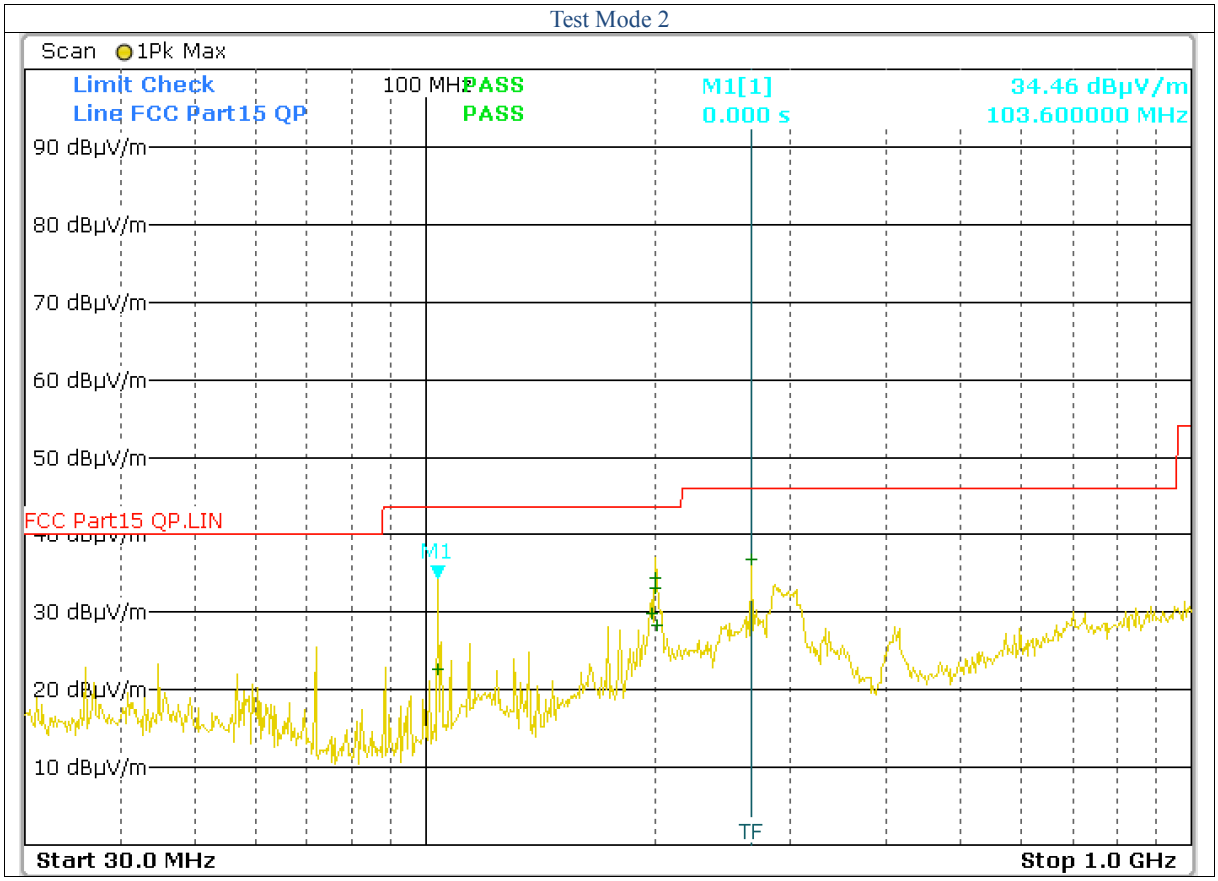
Test Mode 1



Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
32.000	14.48	13.87	28.35	Vert.	40.0	-11.65
33.480	7.56	18.19	25.75	Vert.	40.0	-14.25
36.880	16.38	18.19	34.57	Vert.	40.0	-5.43
43.000	22.83	14.94	37.77	Vert.	40.0	-2.23
44.040	11.39	20.91	32.3	Vert.	40.0	-7.70
44.720	11.10	20.91	32.01	Vert.	40.0	-7.99

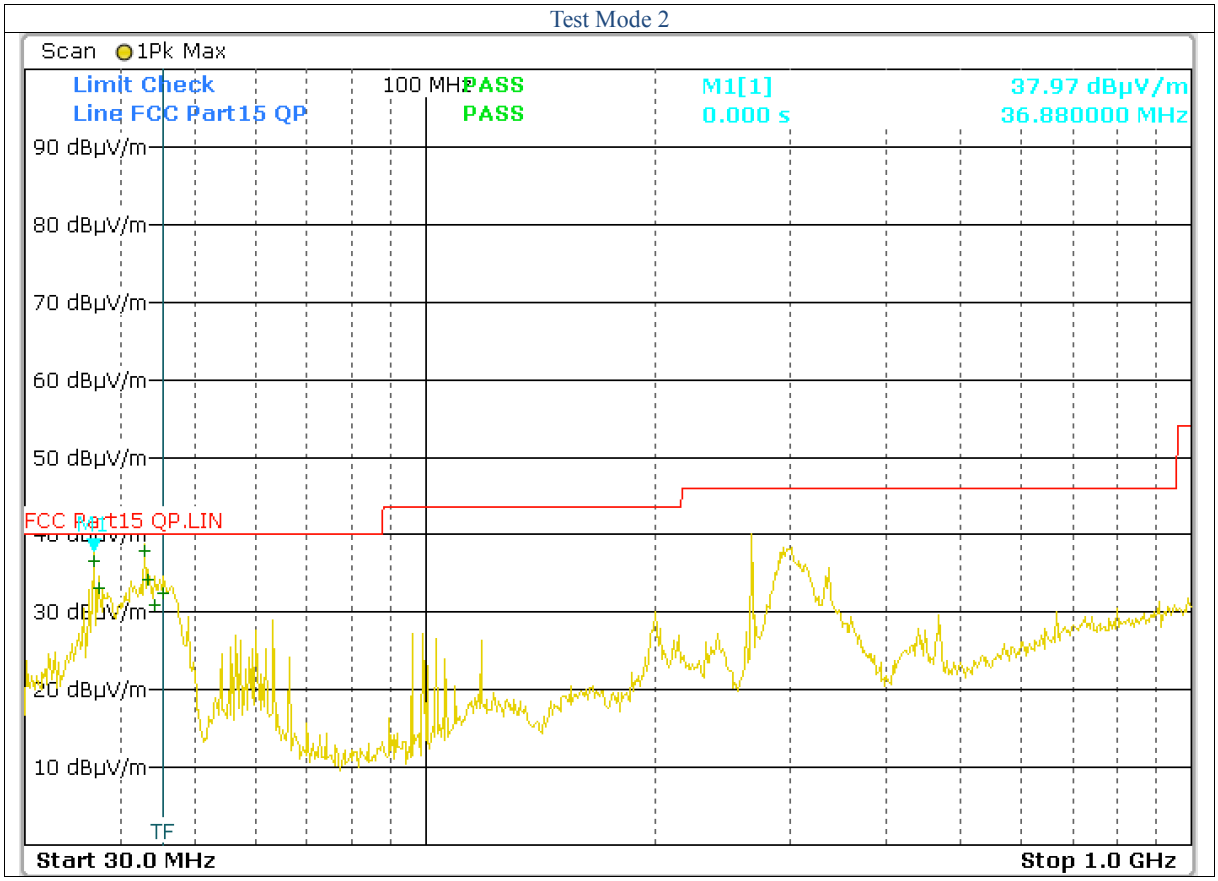
Note:
(1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
(2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
(3) Emission Level = Reading Level + Probe Factor + Cable Loss.

Test Mode 2



Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
103.600	13.88	8.67	22.55	Horiz./	43.5	-20.95
197.400	15.87	13.87	29.74	Horiz./	43.5	-13.76
199.840	19.19	13.87	33.06	Horiz./	43.5	-10.44
200.000	16.25	18.19	34.44	Horiz./	43.5	-9.06
200.920	10.23	18.19	28.42	Horiz./	43.5	-15.08
266.720	21.84	14.94	36.78	Horiz./	46.0	-9.22

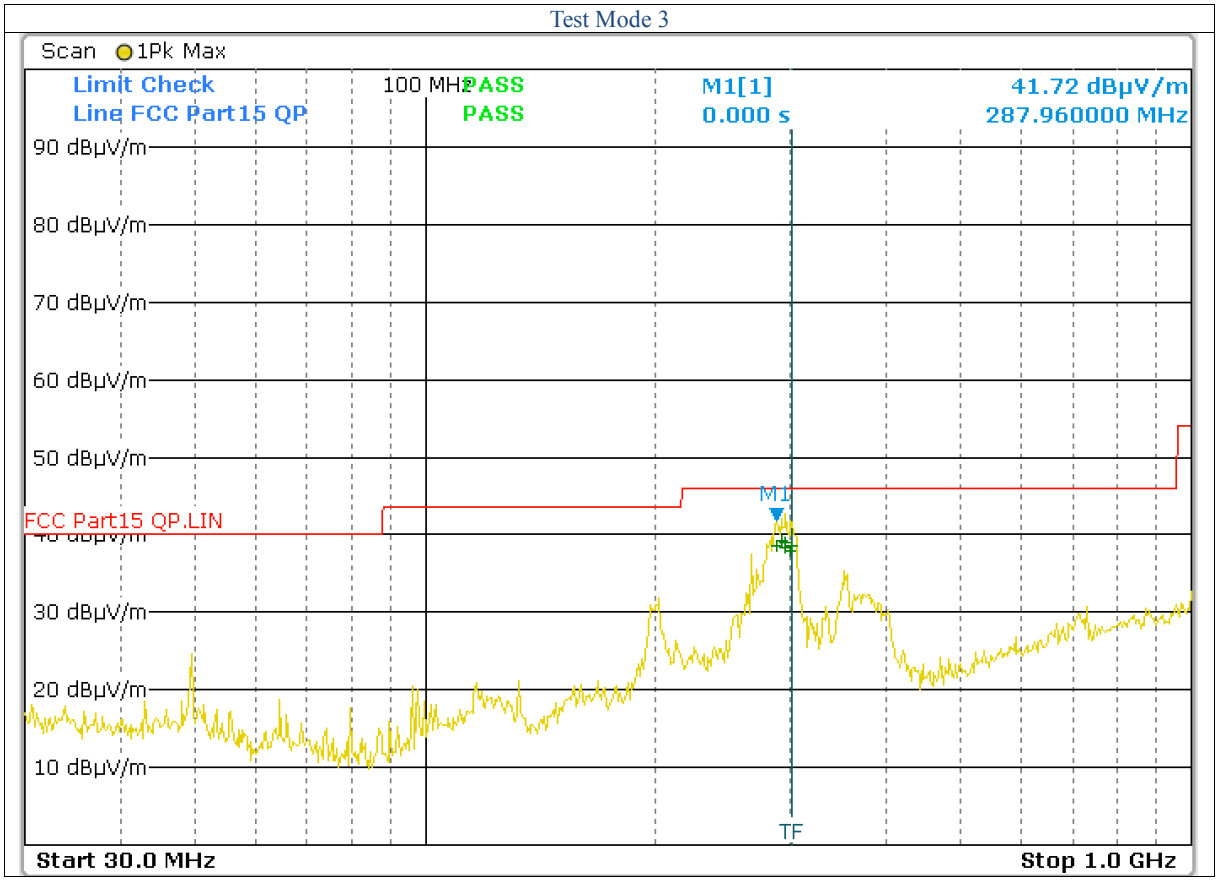
Test Mode 2



Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
36.880	27.99	8.67	36.66	Vert.	40.0	-3.34
37.400	19.29	13.87	33.16	Vert.	40.0	-6.84
43.000	24.04	13.87	37.91	Vert.	40.0	-2.09
43.520	16.06	18.19	34.25	Vert.	40.0	-5.75
44.240	12.85	18.19	31.04	Vert.	40.0	-8.96
45.520	17.53	14.94	32.47	Vert.	40.0	-7.53

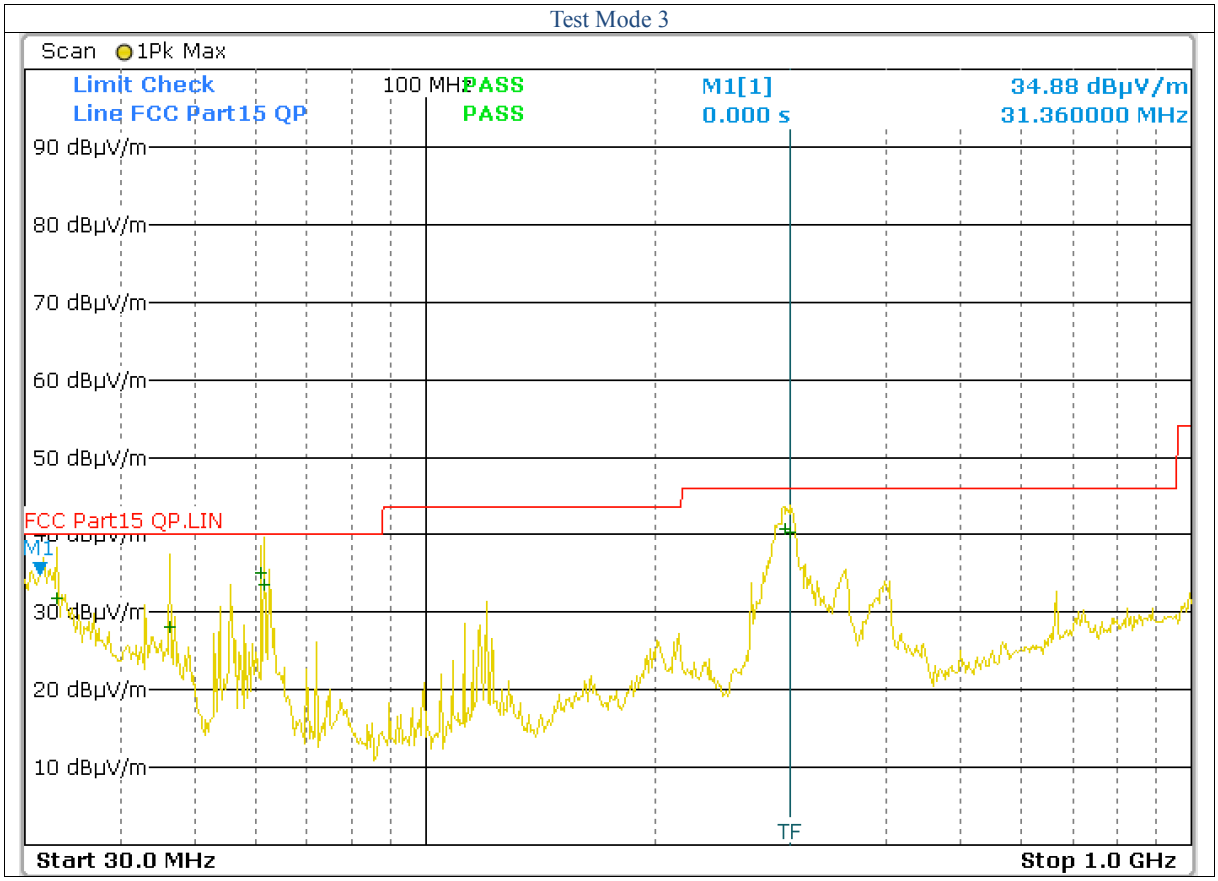
Note:
(1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
(2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
(3) Emission Level = Reading Level + Probe Factor + Cable Loss.

Test Mode 3



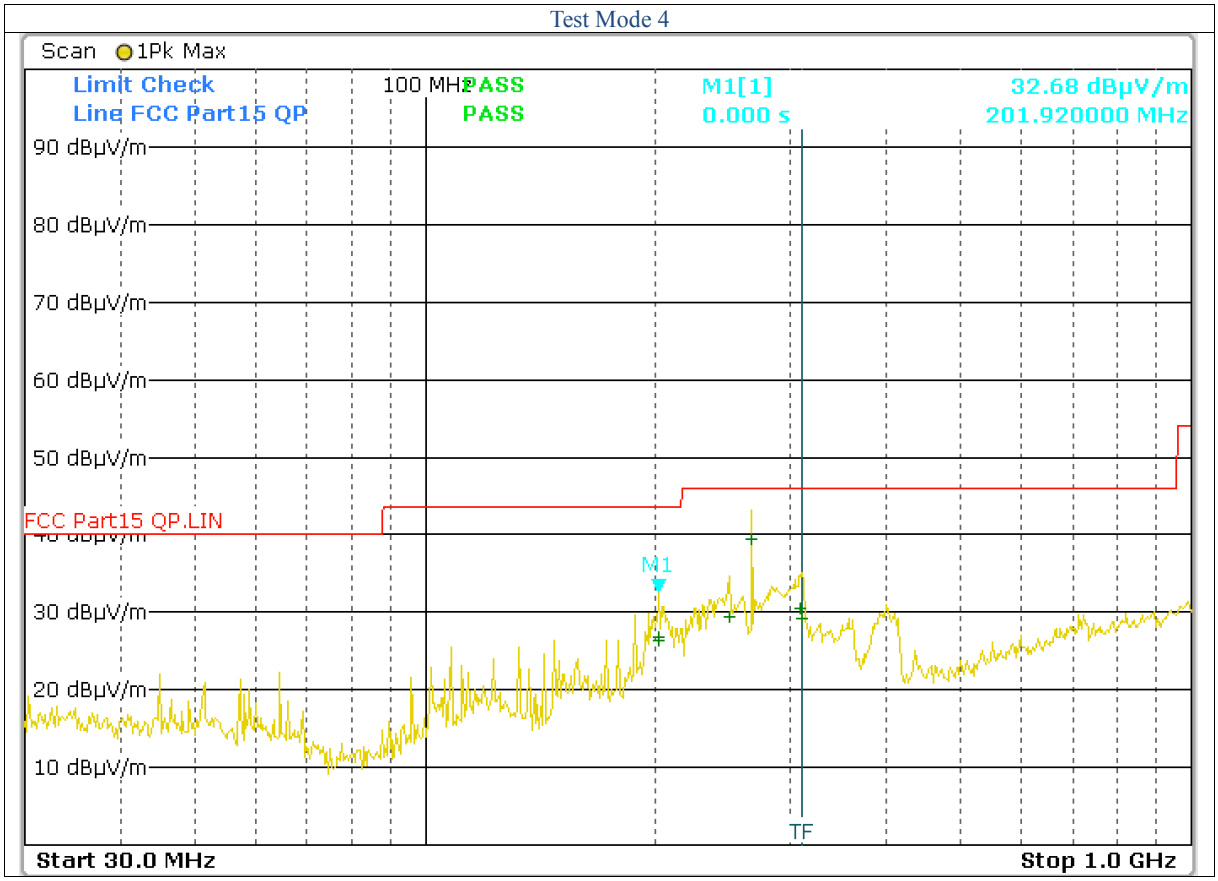
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
287.960	23.70	14.94	38.64	Horiz./	46.0	-7.36
291.200	24.22	14.94	39.16	Horiz./	46.0	-6.84
295.040	23.42	14.94	38.36	Horiz./	46.0	-7.64
295.560	24.07	14.94	39.01	Horiz./	46.0	-6.99
299.440	23.02	14.94	37.96	Horiz./	46.0	-8.04
301.280	17.65	20.91	38.56	Horiz./	46.0	-7.44

Test Mode 3



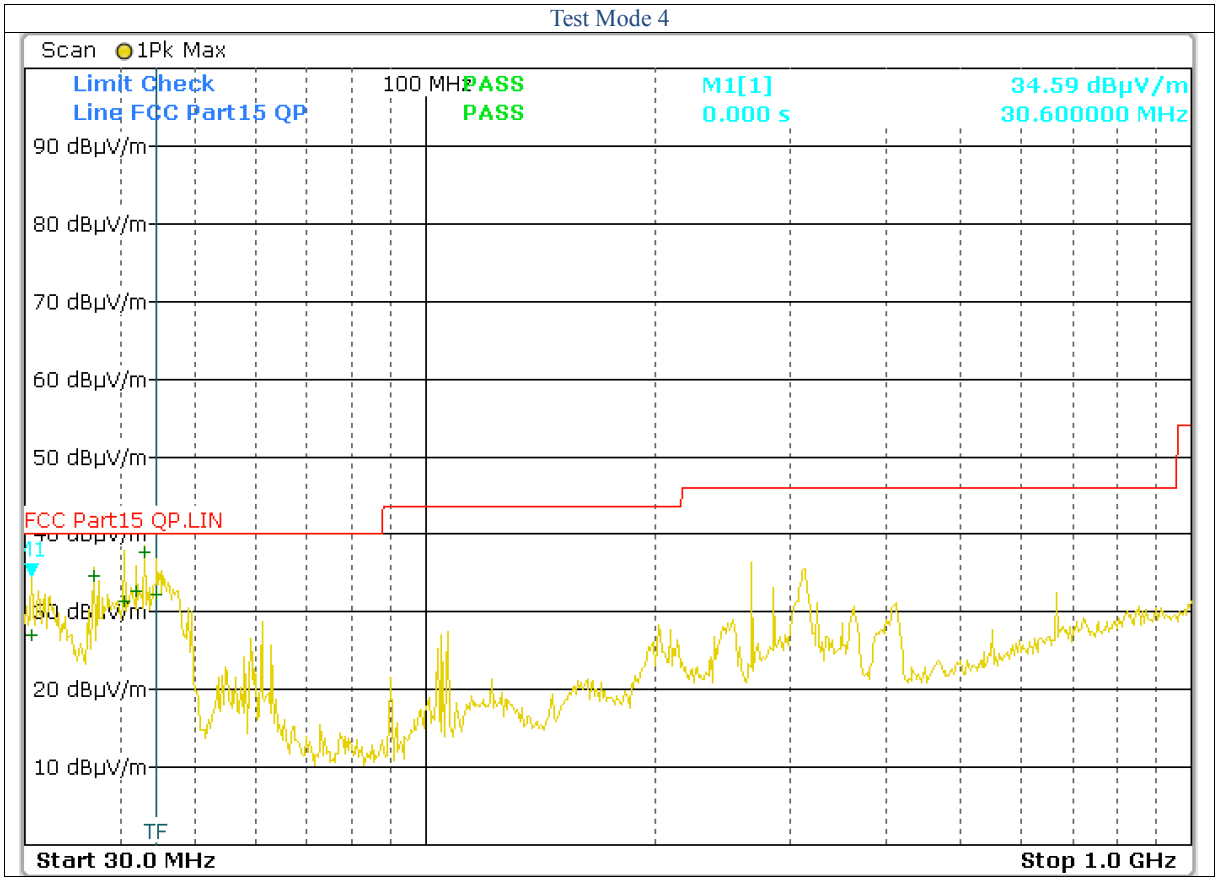
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
33.000	16.91	14.94	31.85	Vert.	40.0	-8.15
46.480	13.20	14.94	28.14	Vert.	40.0	-11.86
60.960	20.08	14.94	35.02	Vert.	40.0	-4.98
61.760	18.60	14.94	33.54	Vert.	40.0	-6.46
294.360	25.74	14.94	40.68	Vert.	46.0	-5.32
299.440	19.29	20.91	40.2	Vert.	46.0	-5.80

Test Mode 4



Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
201.360	8.27	18.19	26.46	Horiz./	43.5	-17.04
201.920	8.63	18.19	26.82	Horiz./	43.5	-16.68
250.040	14.43	14.94	29.37	Horiz./	46.0	-16.63
266.640	24.60	14.94	39.54	Horiz./	46.0	-6.46
309.120	9.65	20.91	30.56	Horiz./	46.0	-15.44
310.640	8.37	20.91	29.28	Horiz./	46.0	-16.72

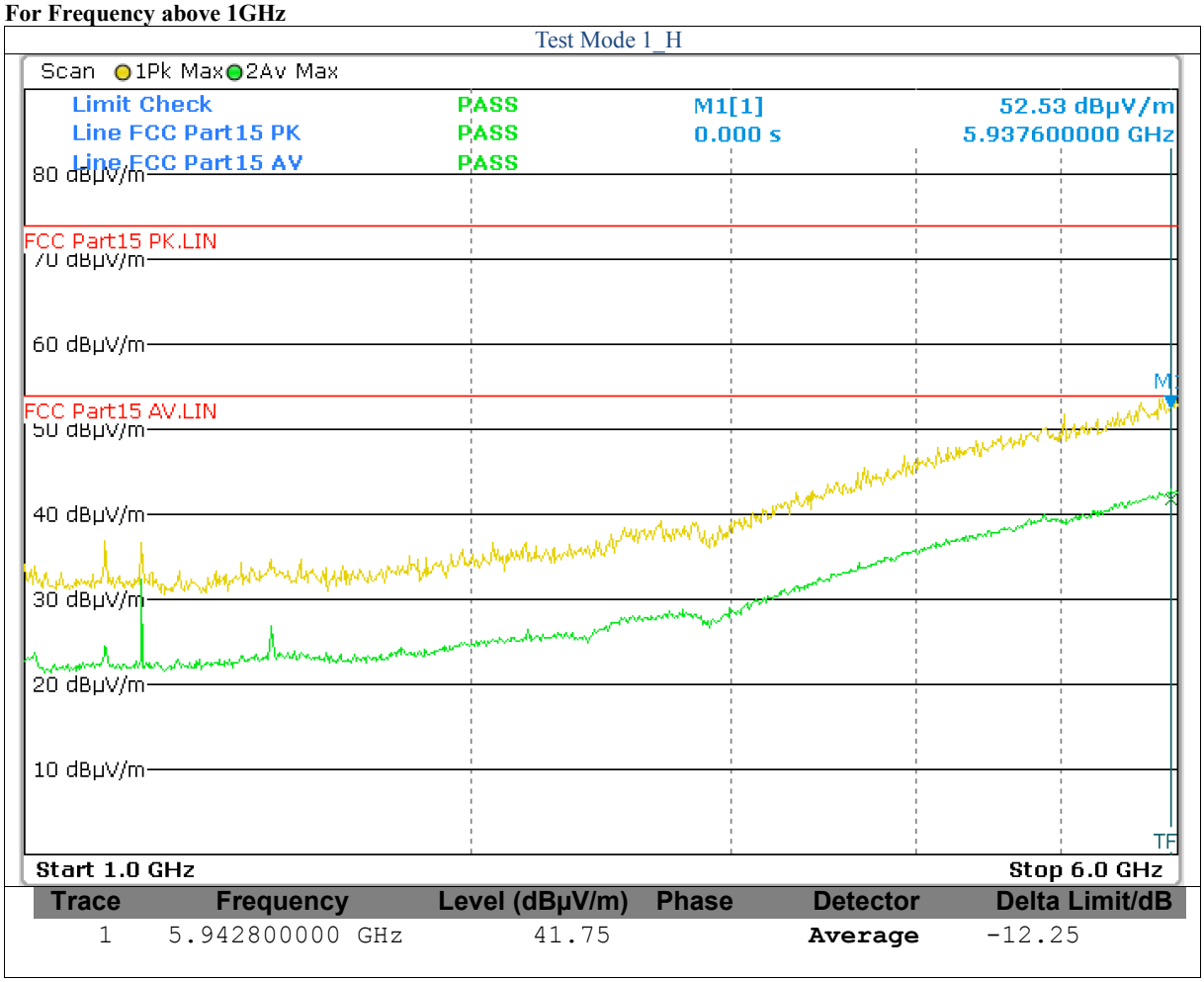
Test Mode 4



Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
30.600	8.80	18.19	26.99	Vert.	40.0	-13.01
34.880	16.37	18.19	34.56	Vert.	40.0	-5.44
40.480	16.44	14.94	31.38	Vert.	40.0	-8.62
41.920	17.73	14.94	32.67	Vert.	40.0	-7.33
43.000	16.85	20.91	37.76	Vert.	40.0	-2.24
44.640	11.28	20.91	32.19	Vert.	40.0	-7.81

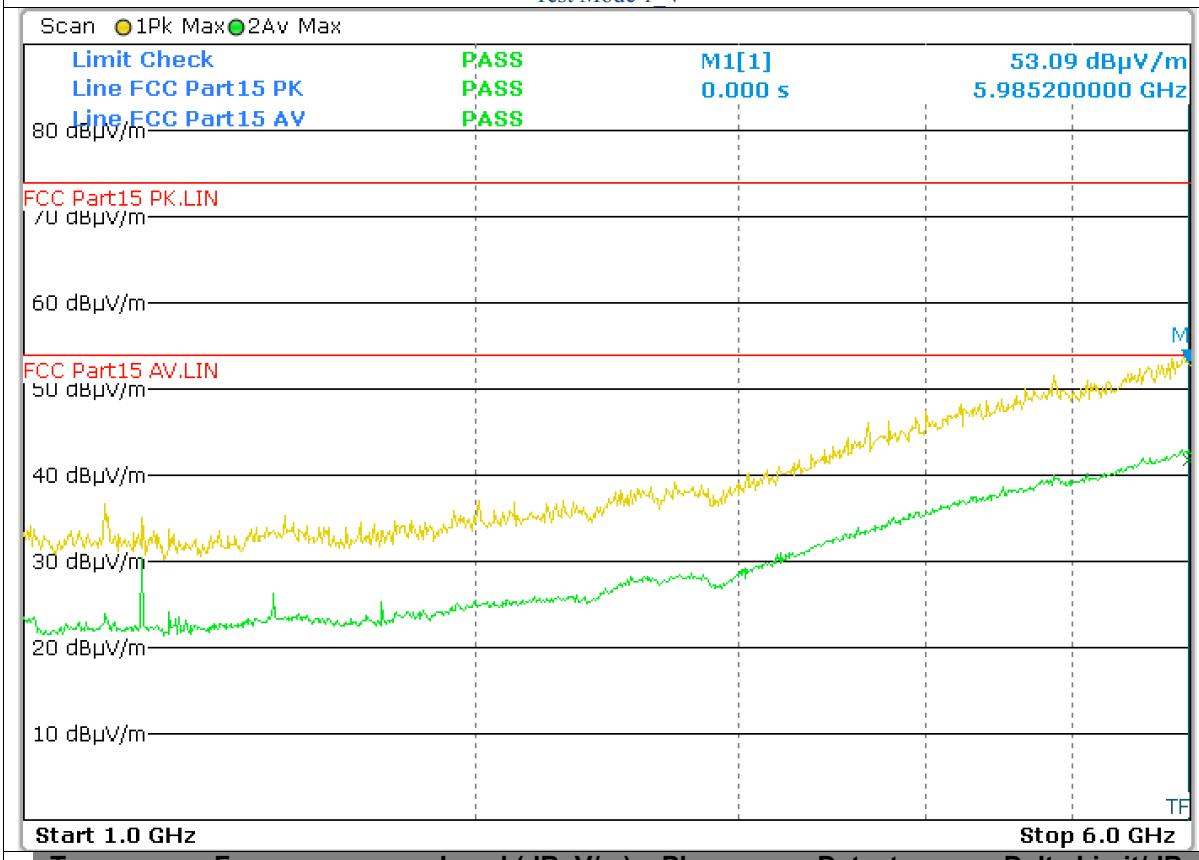
Note:
(4) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
(5) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
(6) Emission Level = Reading Level + Probe Factor + Cable Loss.

For Frequency above 1GHz



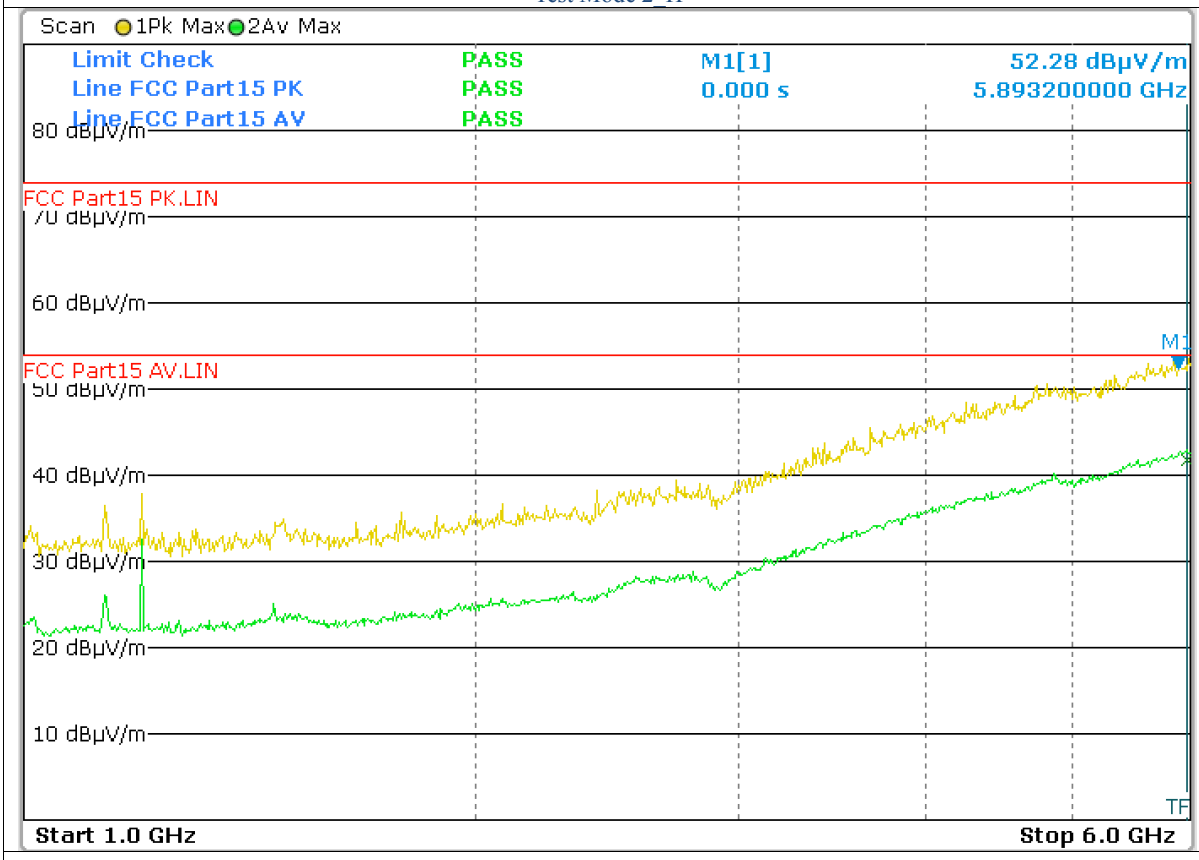
Trace	Frequency	Level (dBµV/m)	Phase	Detector	Delta Limit/dB
1	5.942800000 GHz	41.75		Average	-12.25

Test Mode 1_V



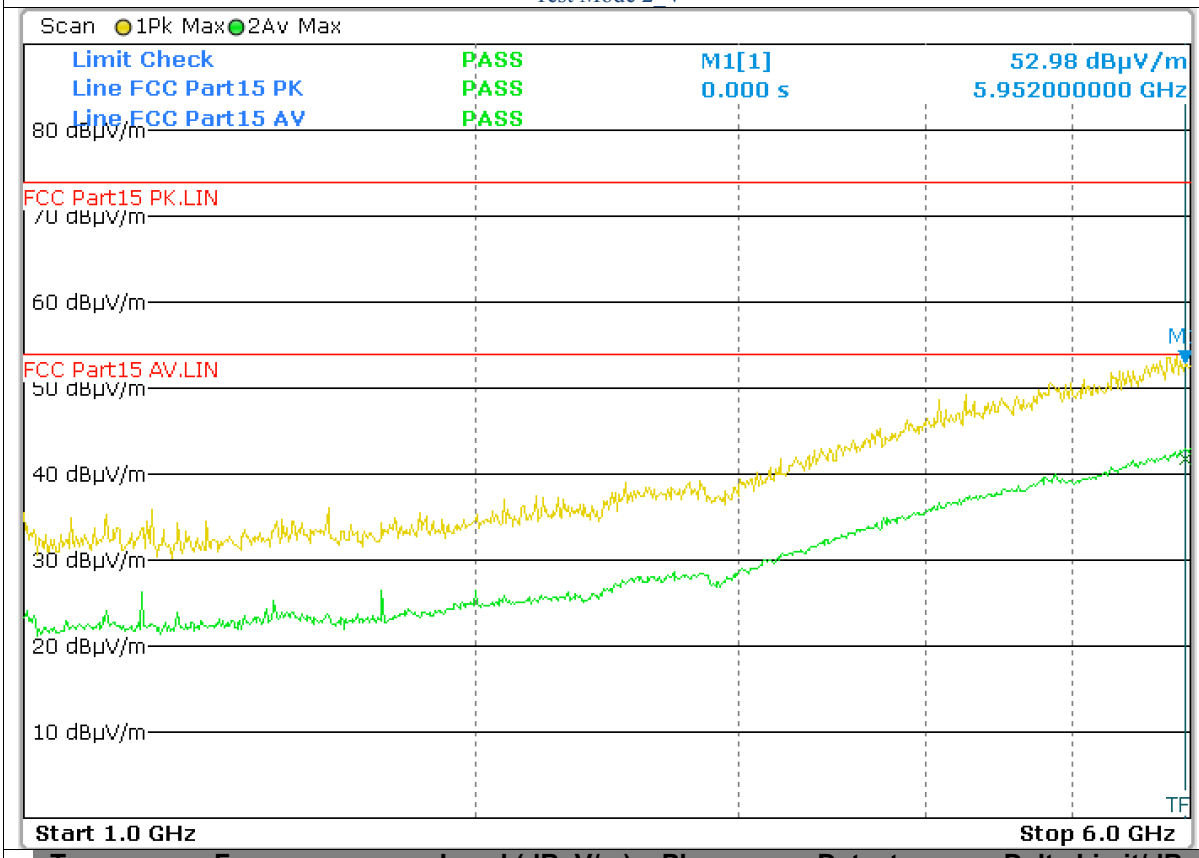
Trace	Frequency	Level (dBµV/m)	Phase	Detector	Delta Limit/dB
2	5.977600000 GHz	41.74		Average	-12.26

Test Mode 2_H



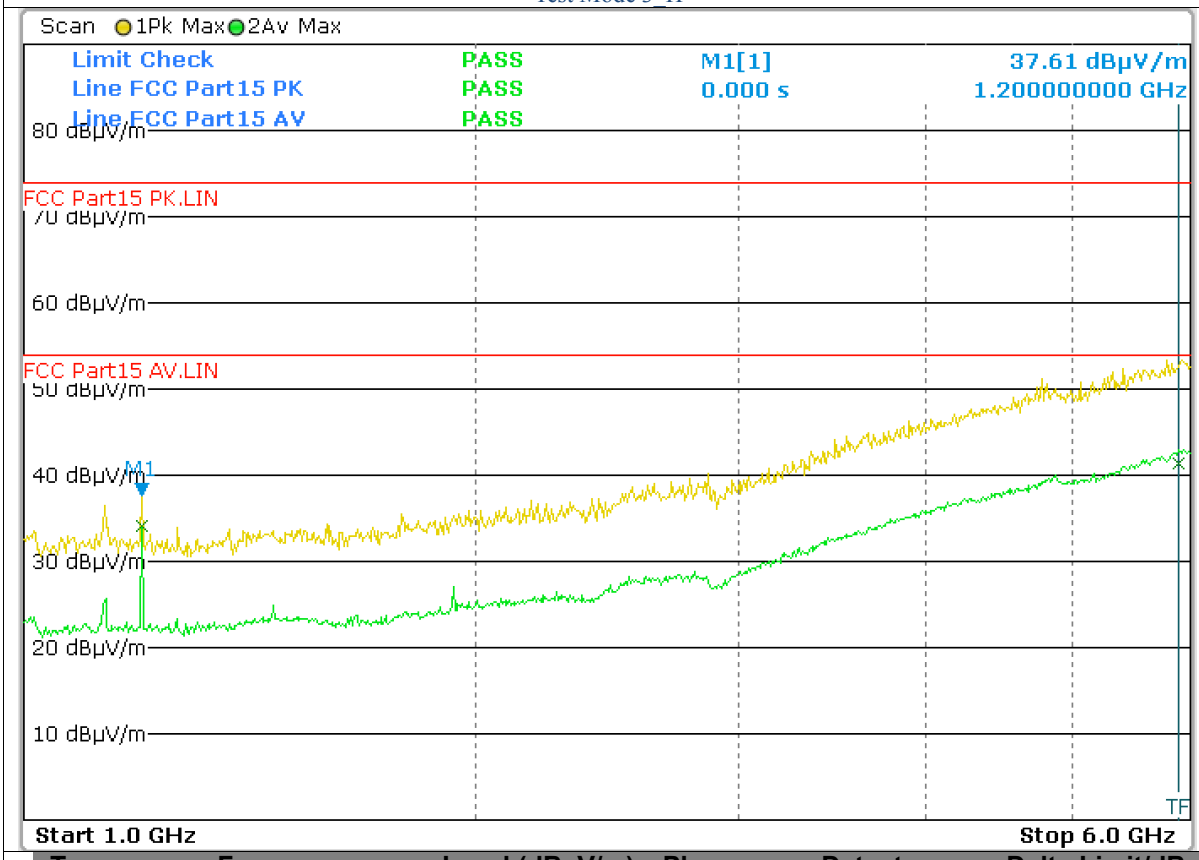
Trace	Frequency	Level (dBµV)	Phase	Detector	Delta Limit/dB
1	5.965600000 GHz	56.08		Average	-12.26

Test Mode 2_V



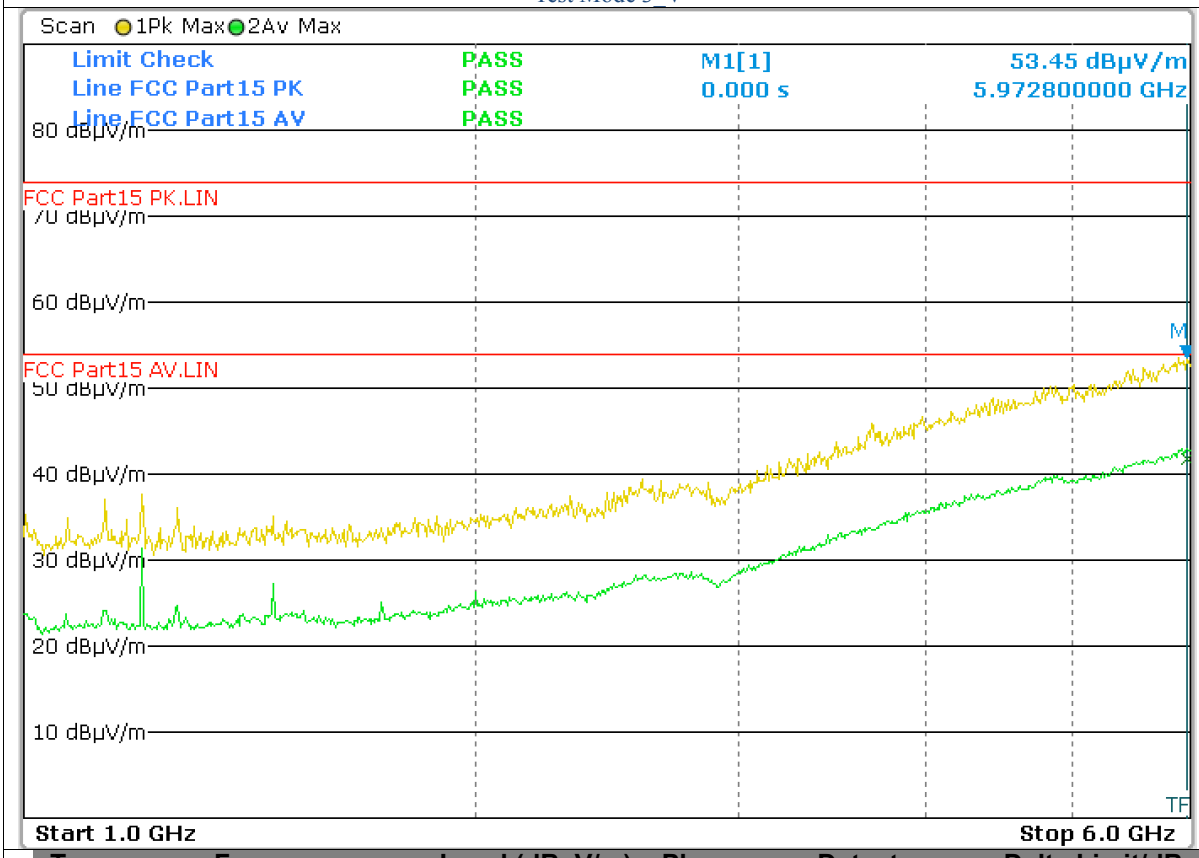
Trace	Frequency	Level (dBµV/m)	Phase	Detector	Delta Limit/dB
1	5.948800000 GHz	54.89		Positive Peak	-19.11

Test Mode 3_H



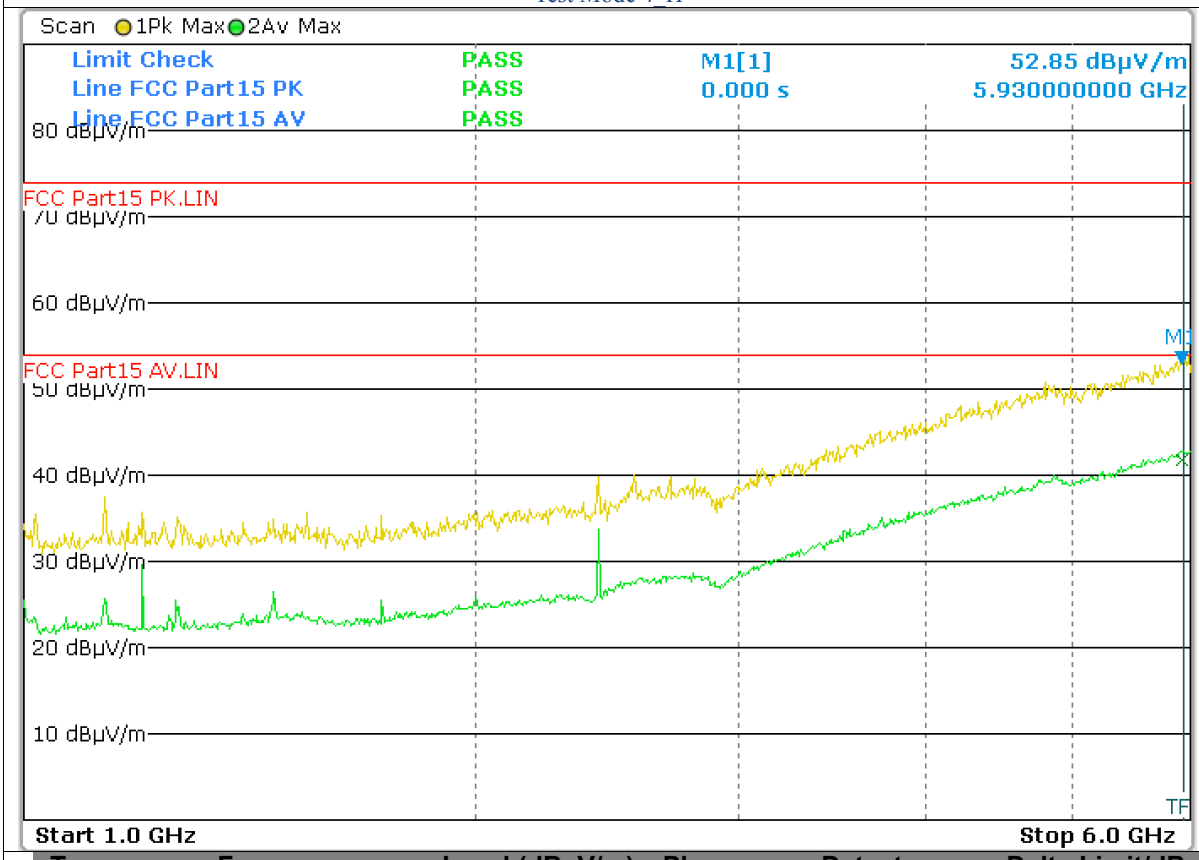
Trace	Frequency	Level (dBµV/m)	Phase	Detector	Delta Limit/dB
2	1.200000000 GHz	34.10		**Average**	-19.90
2	5.892400000 GHz	41.91		Average	-12.54

Test Mode 3_V



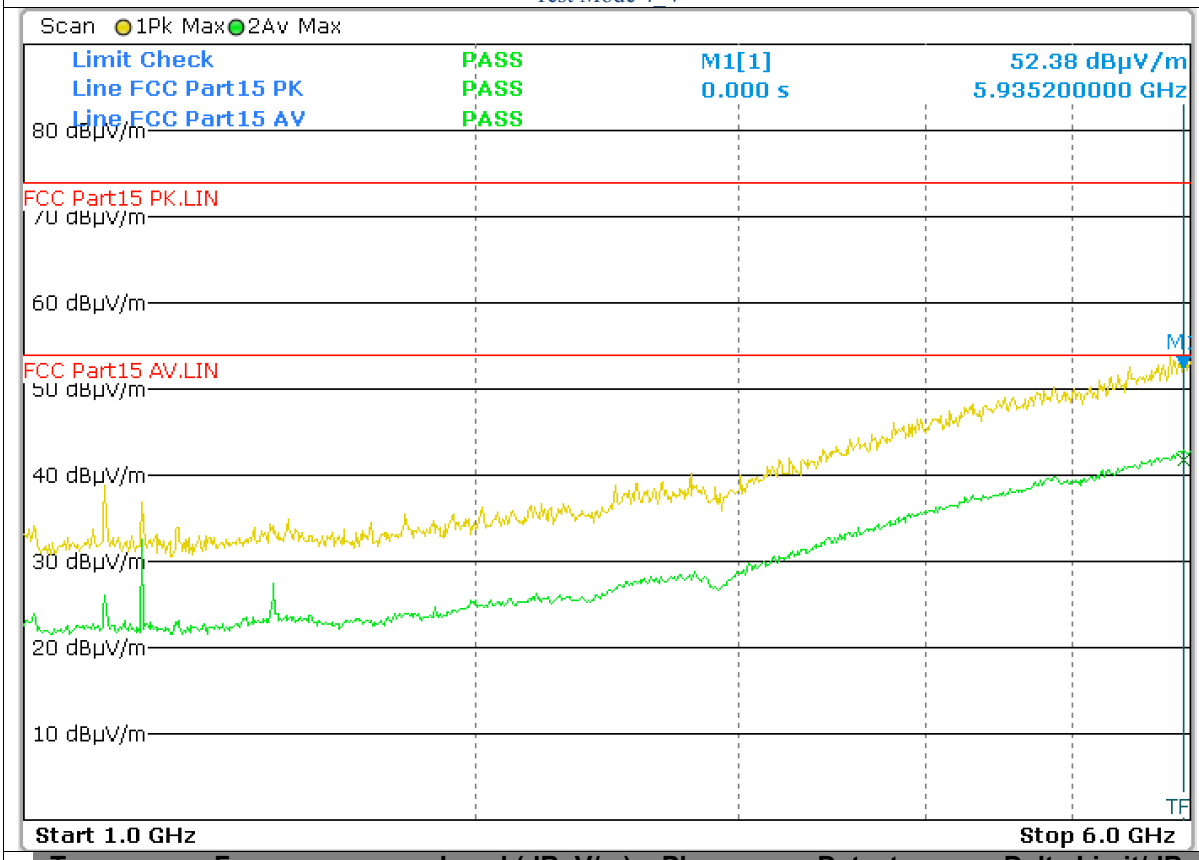
Trace	Frequency	Level (dBµV/m)	Phase	Detector	Delta Limit/dB
2	5.971200000 GHz	41.72		Average	-12.25

Test Mode 4_H



Trace	Frequency	Level (dBµV/m)	Phase	Detector	Delta Limit/dB
2	5.930000000 GHz	41.69		Average	-12.31
2	5.935600000 GHz	54.41		Positive Peak	-19.59

Test Mode 4_V

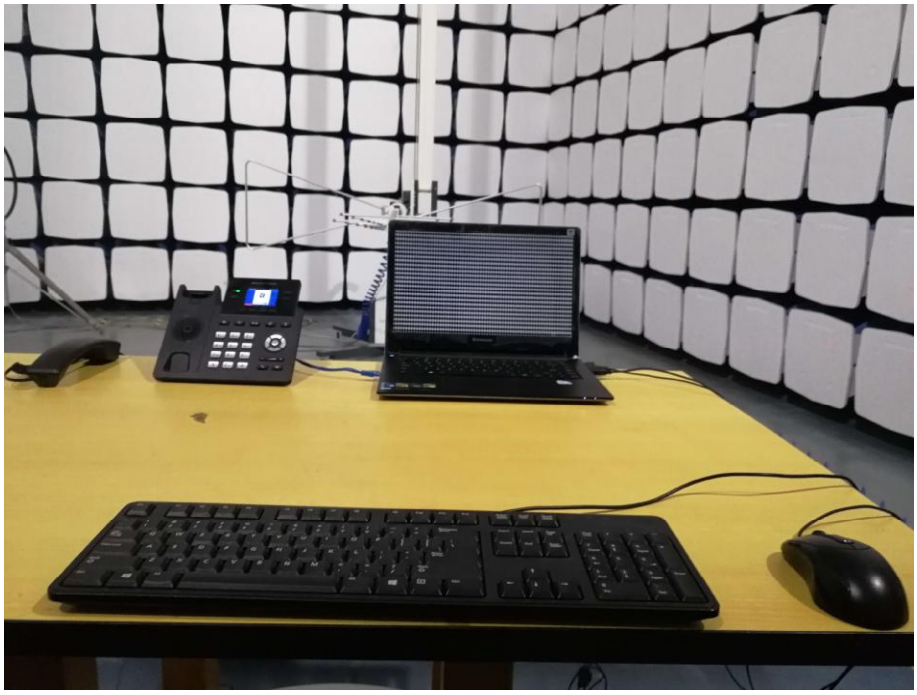


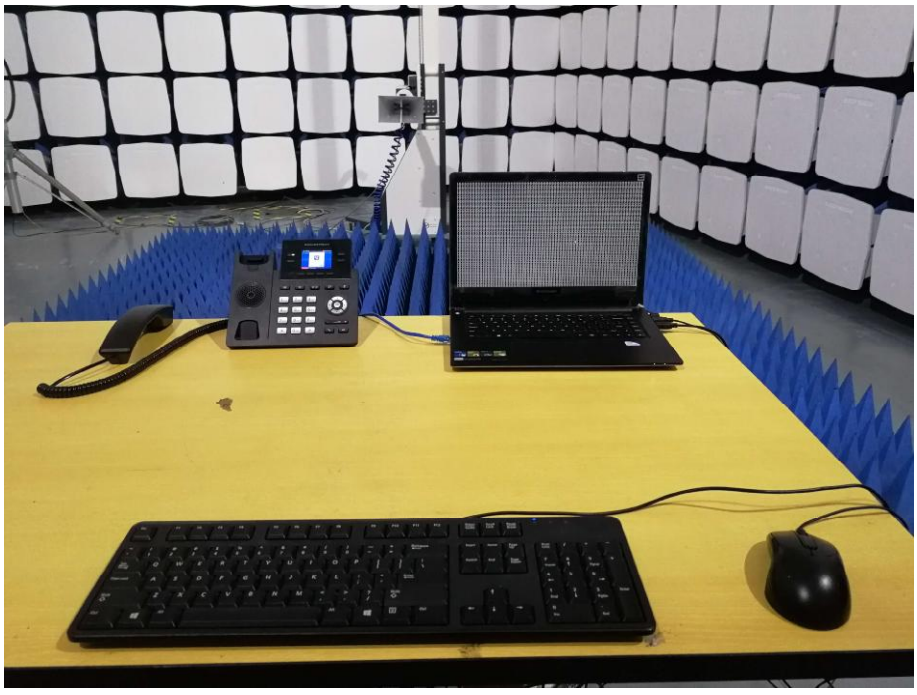
Trace	Frequency	Level (dBµV/m)	Phase	Detector	Delta Limit/dB
2	5.942800000 GHz	41.74		Average	-12.26

6. Photo of Testing

6.1 Emission test view

Conducted Emission test view

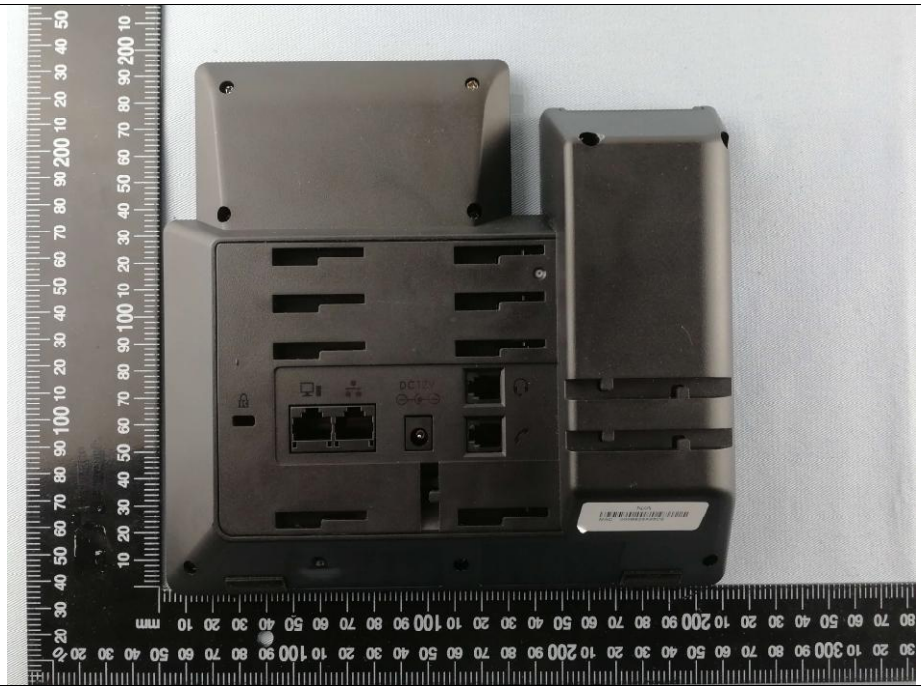
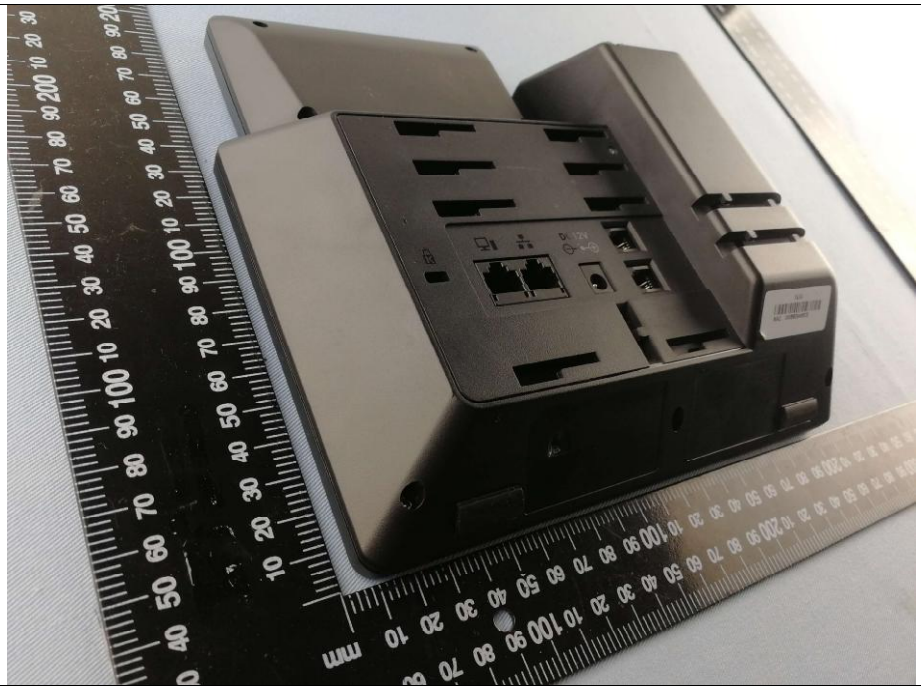

Radiated Emission test view (Below 1GHz)


Radiated Emission test view (Above 1GHz)


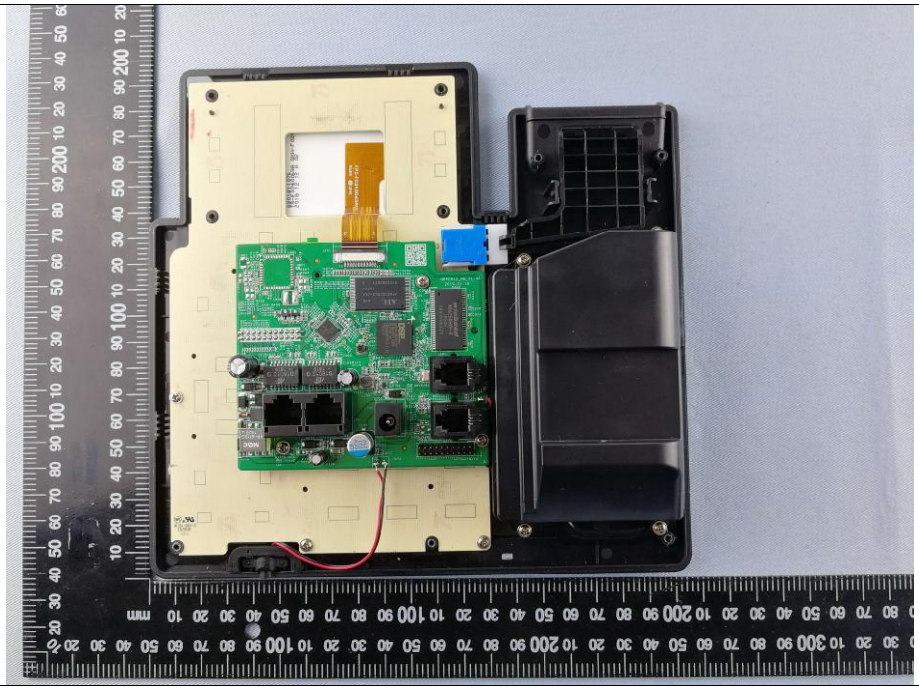
6.2 Photograph - EUT

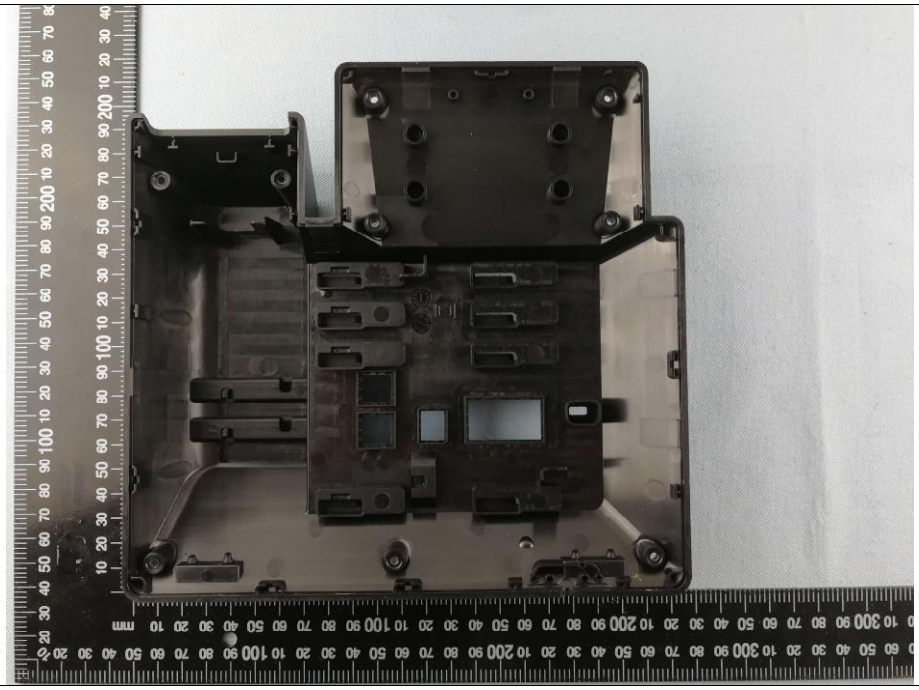
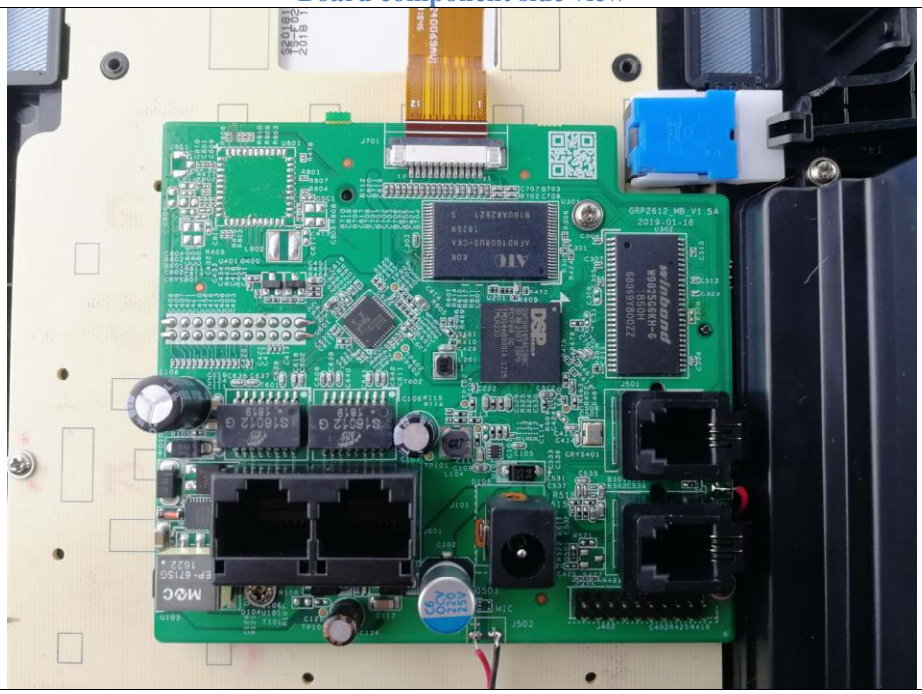
EUT top side view

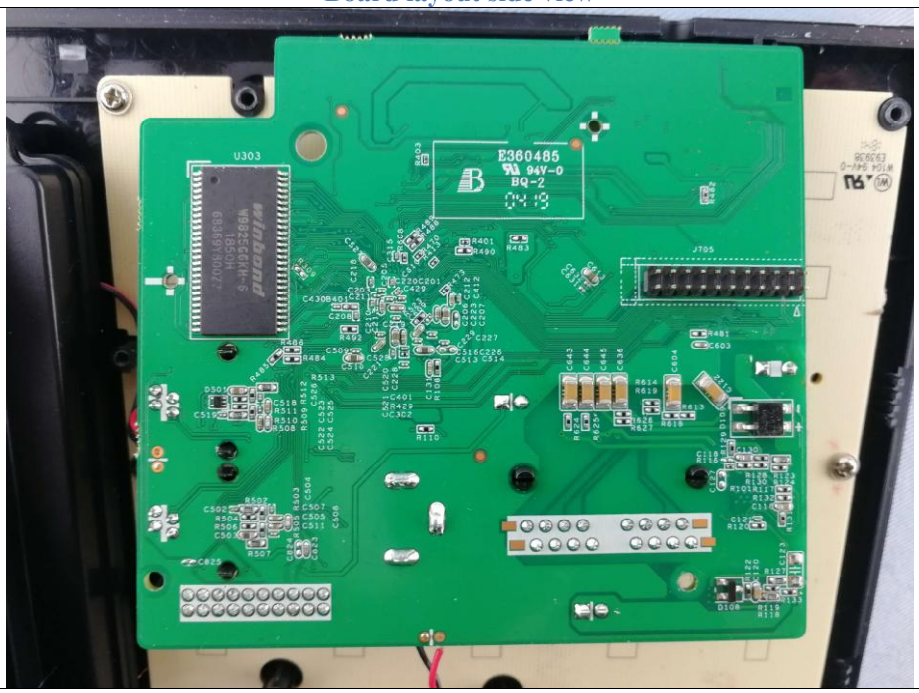
EUT top side view

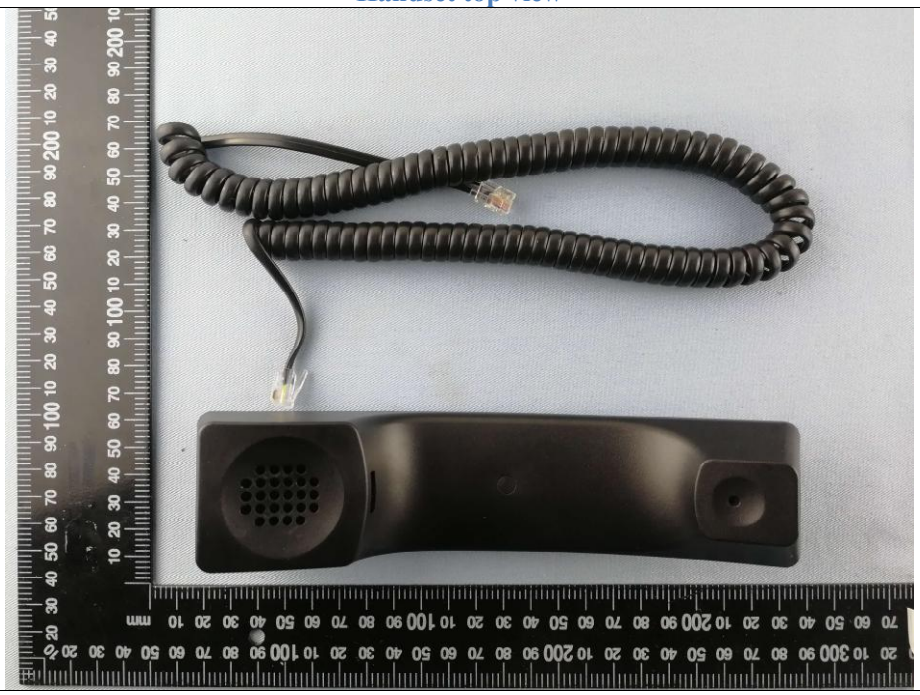
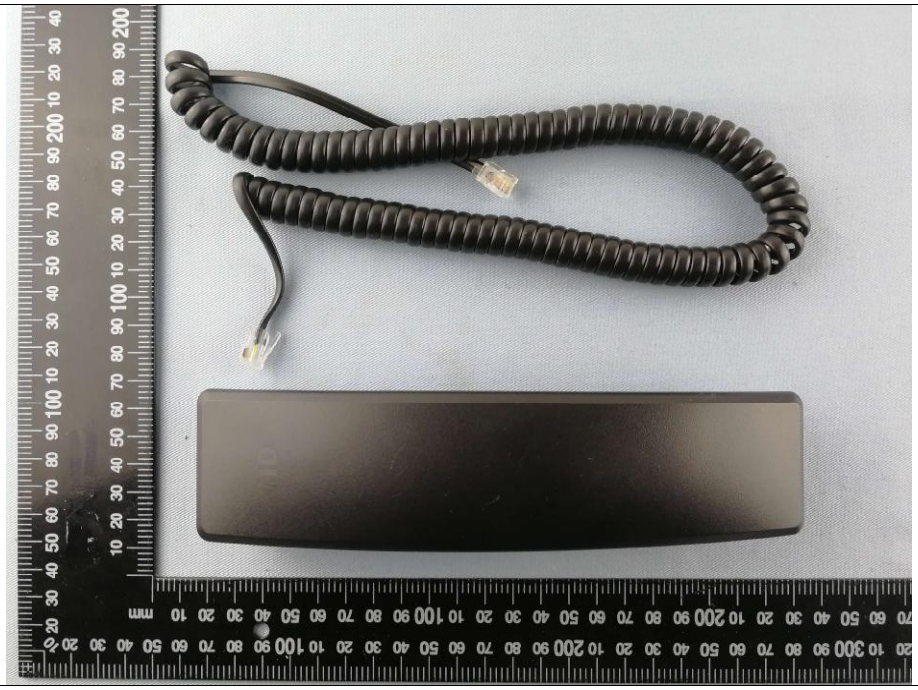

EUT bottom side view

EUT bottom side view


EUT interface view

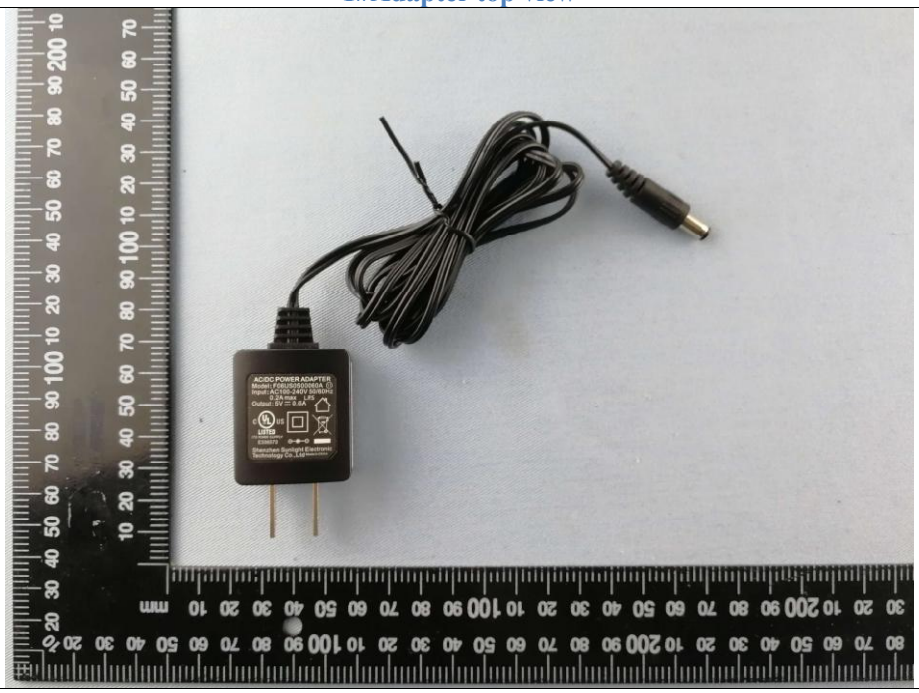
EUT inside whole view


EUT inside whole view

Board component side view


Board layout side view


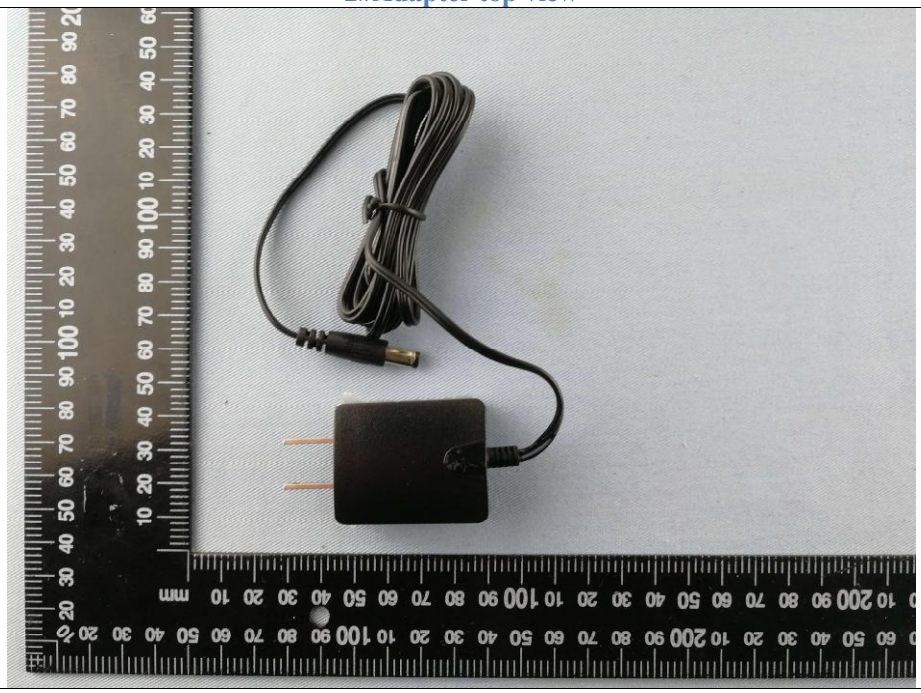
Handset top view

Handset side view


1#Adapter top view



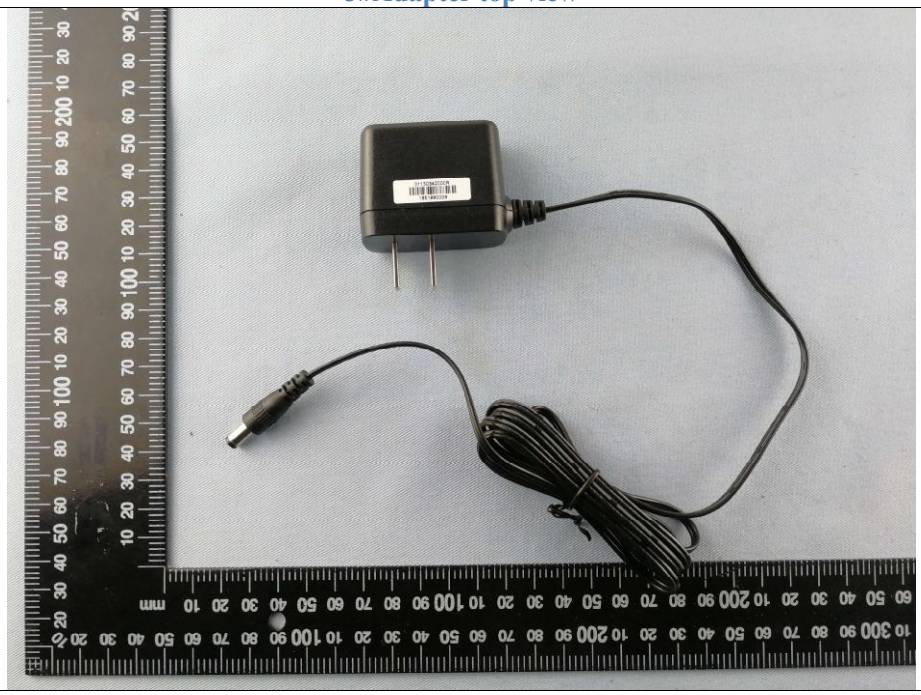
1#Adapter side view

2#Adapter top view



2#Adapter side view

3#Adapter top view



3#Adapter side view

7. FCC ID Label

The following note shall be conspicuously placed in the user manual: "**Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device.**"

The Label must not be a stick-on paper label. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT

8. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Cal/Char Date	Due Date
Turntable	Innco systems GmbH	CT-0801	N/A	NCR	NCR
Antenna Tower	Innco systems GmbH	MA-4640-XP-ET	N/A	NCR	NCR
Controller	Innco systems GmbH	CO3000	955/38850716L	NCR	NCR
EMI Test Receiver	Rohde & Schwarz	ESR7	101091	Nov. 21, 2018	Nov. 21, 2020
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	Dec.14, 2017	Dec.14, 2019
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100022	Feb.21, 2017	Feb.21, 2020
Pre-Amplifier	Agilent	87405C	MY47010722	Nov. 21, 2018	Nov. 21, 2020
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	KMO-SZ005	Nov. 27, 2018	Nov. 27, 2021
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-564	Nov. 29, 2018	Nov. 29, 2021
AMN	Rohde & Schwarz	ESH3-Z5	100197	Dec.25, 2017	Dec.25, 2020
AMN	CYBERTEK	EM5040A	E115040054	Nov. 21, 2018	Nov. 21, 2021
KMO Shielded Room	KMO	KMO-001	N/A	NCR	NCR
3m Anechoic Chamber	KMO	KMO-3AC	N/A	Dec.23, 2016	Dec.23, 2019