FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

For

WisePOS 4G

MODEL NUMBER: WisePOS 4G

FCC ID: 2AB7X-WISEPOS4G

REPORT NUMBER: 4788704908.1-7

ISSUE DATE: Nov 28, 2018

Prepared for

BBPOS INTERNATIONAL LIMITED
Suite 1903-04, Tower 2, Nina Tower, 8 Yeung Uk Road, Tsuen Wan, NT, Hong Kong

Prepared by

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch
Room 101, Building 10, Innovation Technology Park,
Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
Tel: +86 769 33871725
Fax: +86 769 33871725
Website: www.ul.com

Revision History

Rev.	Issue Date	Revisions	Revised By
--	11/28/2018	Initial Issue	

Summary of Test Results			
Clause	Test Items	FCC Rules	Test Results
1	Transmitter AC Conducted Emissions	Part 15.207	PASS
2	Transmitter Fundamental Field Strength	Part 15.225(a)(b)(c)(d)	PASS
3	Transmitter Radiated Emissions	Part 15.209(a)/ 15.225(d)	PASS
5	Transmitter Band Edge Radiated Emissions	Part 15.209(a)/ 15.225(c)(d)	PASS
6	Transmitter 99% Emission Bandwidth / 20dB Bandwidth	Part 15.215 (c)	PASS
7	Transmitter Frequency Stability (Temperature & Voltage Variation)	Part 15.225(e)	PASS

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: BBPOS INTERNATIONAL LIMITED

Address: Suite 1903-04, Tower 2, Nina Tower, 8 Yeung Uk Road, Tsuen Wan, NT, Hong Kong

Manufacturer Information

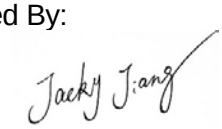
Company Name: BBPOS INTERNATIONAL LIMITED

Address: Suite 1903-04, Tower 2, Nina Tower, 8 Yeung Uk Road, Tsuen Wan, NT, Hong Kong

Product Name	WisePOS 4G
Brand Name	BBPOS
Model Name	WisePOS 4G
FCC ID	2AB7X-WISEPOS4G
Date Tested	October 9, 2018~ November 13, 2018

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	PASS

Tested By:



Jacky Jiang
Engineer Project Associate

Checked By:

Shawn Wen
Laboratory Leader

Approved By:

Stephen Guo

Laboratory Manager

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15 and KDB414788 D01 Radiated Test Site v01.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 4102.01)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. **IAS (Lab Code: TL-702)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has demonstrated compliance with ISO/IEC Standard 17025:2005, General requirements for the competence of testing and calibration laboratories **FCC (FCC Designation No.: CN1187)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Delcaration of Conformity (DoC) and Certification rules **IC(Company No.: 21320)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320. **VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B , the VCCI registration No. is C-20012 and T-20011

Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognize national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.90dB
Uncertainty for Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	2.2dB
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.52dB
Uncertainty for Radiation Emission test (1GHz to 26GHz)(include Fundamental emission)	5.04dB(1-6GHz)
	5.30dB (6GHz-18Gz)
	5.23dB (18GHz-26Gz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Equipment	WisePOS 4G
Model Name	WisePOS 4G
Power Input	5V/1A
Hardware Version	K960_MB_P2_V01
Software Version	960ABR9J1_BB_V001

5.2. MAXIMUM OUTPUT POWER

Frequency (MHz)	Number of Transmit Chains (NTX)	Frequency (MHz)	Channel Number	Max Power (dBμV/m)
13.56	1	13.56	1	10.34

5.3. CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	13.56						

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	13.56	FPCB Antenna	0

Frequency (MHz)	Transmit and Receive Mode	Description
13.56	☒1TX, 1RX	Chain 1 can be used as transmitting/receiving antenna.

5.5. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	52%	
Atmospheric Pressure:	1025Pa	
Temperature	TN	18 ~ 35°C
Voltage :	VL	3.23V
	VN	3.8V
	VH	4.35V

Note: VL= Lower Extreme Test Voltage
VN= Nominal Voltage
VH= Upper Extreme Test Voltage
TN= Normal Temperature

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
1	Laptop	ThinkPad	T460S	SL10K24796 JS
2	Test Card	N/A	N/A	N/A

I/O PORT

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB Port	/	/	0.5	/

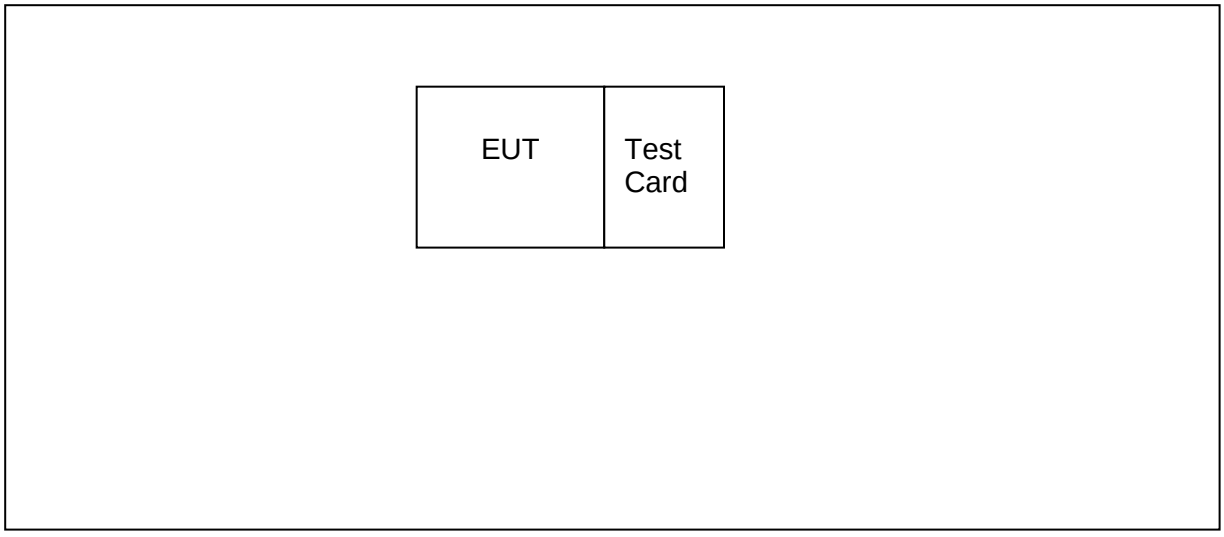
ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	Headphone	SONY	MDR-ZX310	/
2	Adapter	XIAOMI	MDY-08-EF	5V/1A

TEST SETUP

The EUT can continue work normally when a card touched.

SETUP DIAGRAM FOR TESTS



5.7. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	EMI Test Receiver	R&S	ESR3	101961	Dec.12, 2017	Dec.11, 2018
☑	Two-Line V-Network	R&S	ENV216	101983	Dec.12, 2017	Dec.11, 2018
☑	Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Dec.12, 2017	Dec.11, 2018
Radiated Emissions						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Dec.12, 2017	Dec.11, 2018
☑	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Dec.12, 2017	Dec.11, 2018
☑	Preamplifier	HP	8447D	2944A09099	Dec.12, 2017	Dec.11, 2018
☑	EMI Measurement Receiver	R&S	ESR26	101377	Dec.12, 2017	Dec.11, 2018
☑	Preamplifier	TDK	PA-02-0118	TRS-305-00066	Dec.12, 2017	Dec.11, 2018
☑	Preamplifier	TDK	PA-02-2	TRS-307-00003	Dec.12, 2017	Dec.11, 2018
☑	Loop antenna	Schwarzbeck	1519B	00008	Mar. 26, 2016	Mar. 26, 2019
Software						
Used	Description		Manufacturer	Name		Version
☑	Test Software for Radiated disturbance		Farad	EZ-EMC		Ver. UL-3A1

6. ANTENNA PORT TEST RESULTS

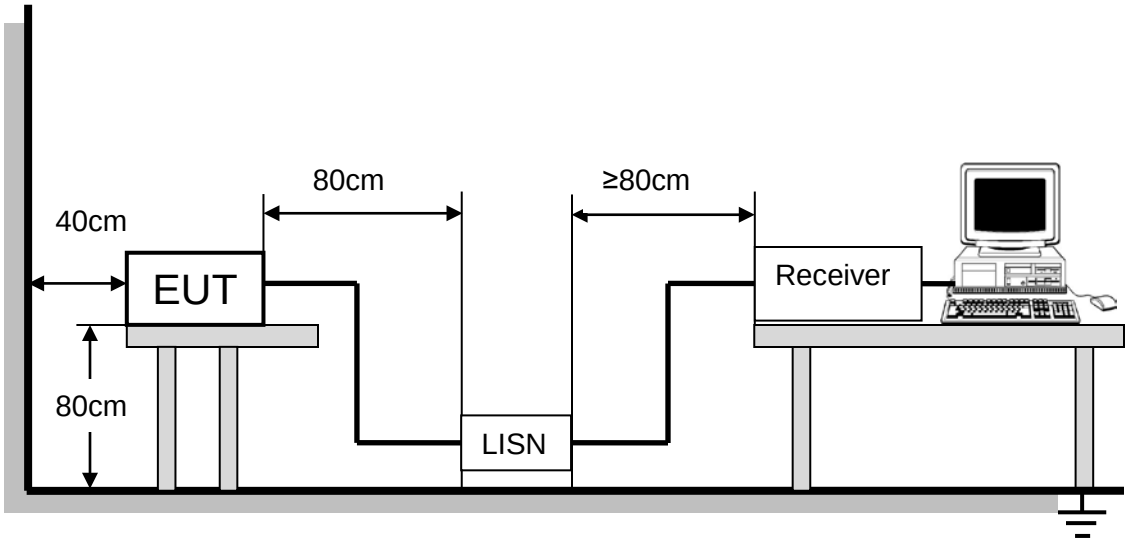
6.1. AC Conducted Spurious Emissions

LIMITS

FCC Reference:	Part 15.207
Test Method Used:	ANSI C63.10 Section 6.2 / FCC KDB 174176

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

TEST SETUP AND PROCEDURE

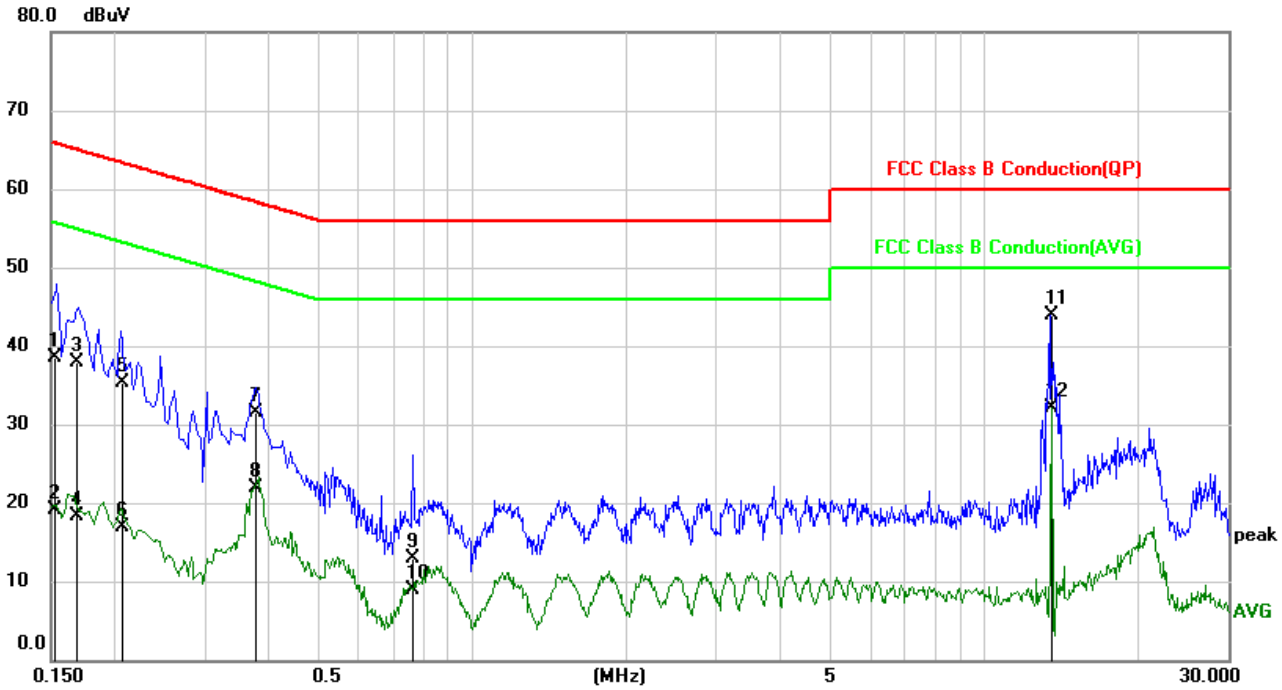


The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2003.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.
The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

TEST ENVIRONMENT

Temperature	24.2°C	Relative Humidity	62%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.8V

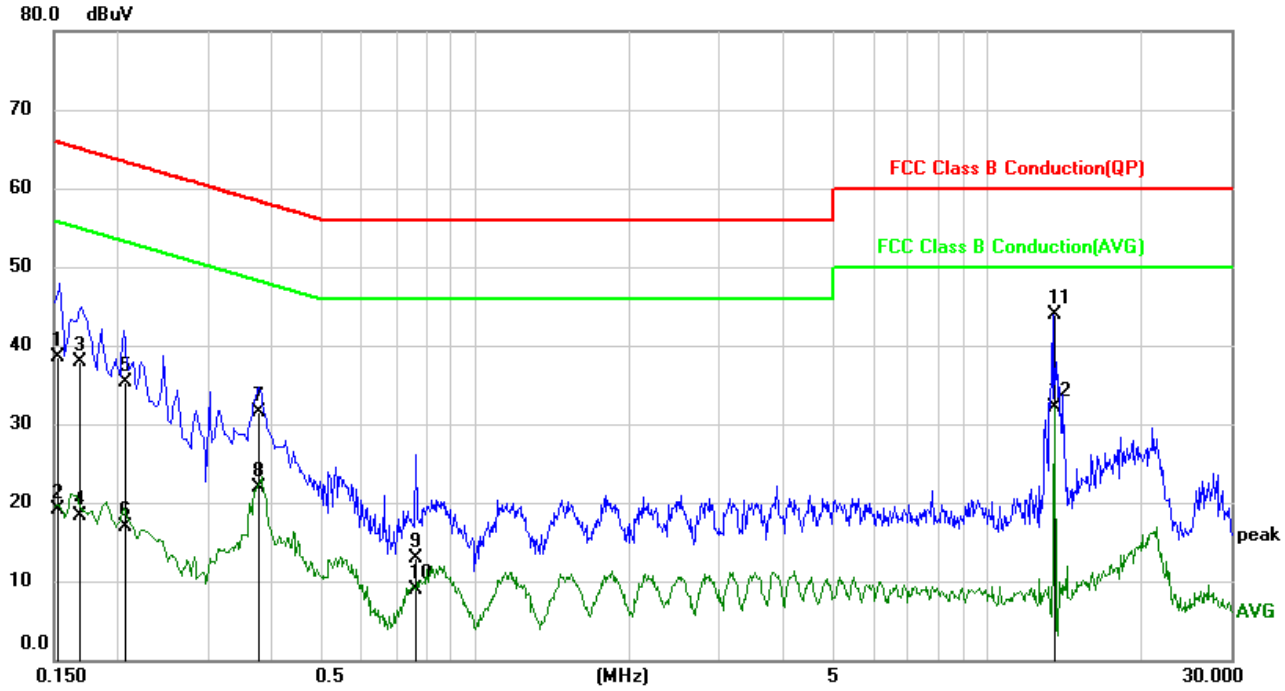
LINE N RESULTS (WORST-CASE CONFIGURATION)



No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1522	28.96	9.64	38.60	65.88	-27.28	QP
2	0.1522	9.39	9.64	19.03	55.88	-36.85	AVG
3	0.1677	28.32	9.63	37.95	65.07	-27.12	QP
4	0.1677	8.67	9.63	18.30	55.07	-36.77	AVG
5	0.2063	25.58	9.63	35.21	63.35	-28.14	QP
6	0.2063	7.26	9.63	16.89	53.35	-36.46	AVG
7	0.3763	21.96	9.63	31.59	58.36	-26.77	QP
8	0.3763	12.29	9.63	21.92	48.36	-26.44	AVG
9	0.7636	3.27	9.64	12.91	56.00	-43.09	QP
10	0.7636	-0.77	9.64	8.87	46.00	-37.13	AVG
11	13.5617	34.02	9.90	43.92	60.00	-16.08	QP
12	13.5617	22.27	9.90	32.17	50.00	-17.83	AVG

Note: 1. Result = Reading +Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

LINE L RESULTS (WORST-CASE CONFIGURATION)



No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1597	29.41	9.63	39.04	65.48	-26.44	QP
2	0.1597	12.04	9.63	21.67	55.48	-33.81	AVG
3	0.1833	27.50	9.63	37.13	64.33	-27.20	QP
4	0.1833	12.10	9.63	21.73	54.33	-32.60	AVG
5	0.2304	22.07	9.63	31.70	62.44	-30.74	QP
6	0.2304	8.87	9.63	18.50	52.44	-33.94	AVG
7	0.3765	25.45	9.63	35.08	58.36	-23.28	QP
8	0.3765	14.70	9.63	24.33	48.36	-24.03	AVG
9	0.8408	11.33	9.64	20.97	56.00	-35.03	QP
10	0.8408	2.26	9.64	11.90	46.00	-34.10	AVG
11	13.5617	29.19	9.90	39.09	60.00	-20.91	QP
12	13.5617	19.75	9.90	29.65	50.00	-20.35	AVG

Note: 1. Result = Reading +Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

Note: For the Transmitter Fundamental, we add the Field Strength test in cause 6.2.

6.2. RADIATED EMISSION

TEST PROCEDURE

Fundamental field strength

FCC Reference:	Part 15.225(a)(b)(c)(d) & 15.209(a)
Test Method Used:	ANSI C63.10 Sections 6.3, 6.4 and 6.5

Frequency (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m) at 30M	Field Strength (dBuV/m) at 3M
13.553-13.567	15848	84	123.90
13.410-13.553/13.567-13.710	334	50.47	90.47
13.110-13.410/13.710-14.010	106	40.51	80.51

Note(s):
1. The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

2. The limit is specified at a test distance of 30 meters. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40dB/decade).

Radiation Disturbance Test Limit for FCC (Class B)(9KHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Note: 1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

(2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.

Restricted bands of operation

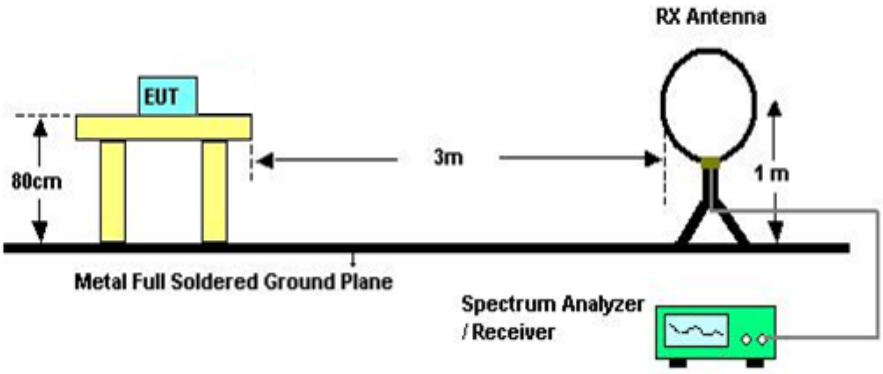
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

Note: [1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2]Above 38.6c

FCC Reference:	Parts 15.231(b) / 15.209
Test Method Used:	ANSI C63.10 Sections 6.3 and 6.5

TEST SETUP

Below 30MHz



The setting of the spectrum analyser

RBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
VBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
Sweep	Auto
Detector	Peak/QP/ Average
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013

2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

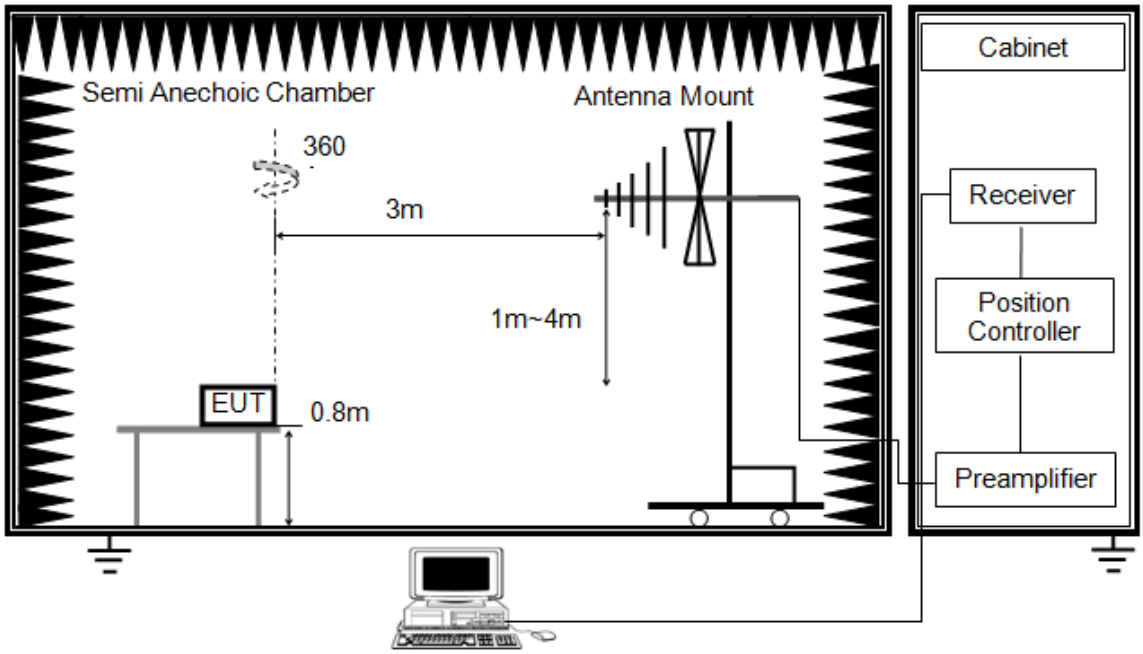
3. The EUT was placed on a turntable with 0.8 meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

6. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak and average detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak and average detector and reported.

Below 1G



The setting of the spectrum analyser

RBW	120K
VBW	300K
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

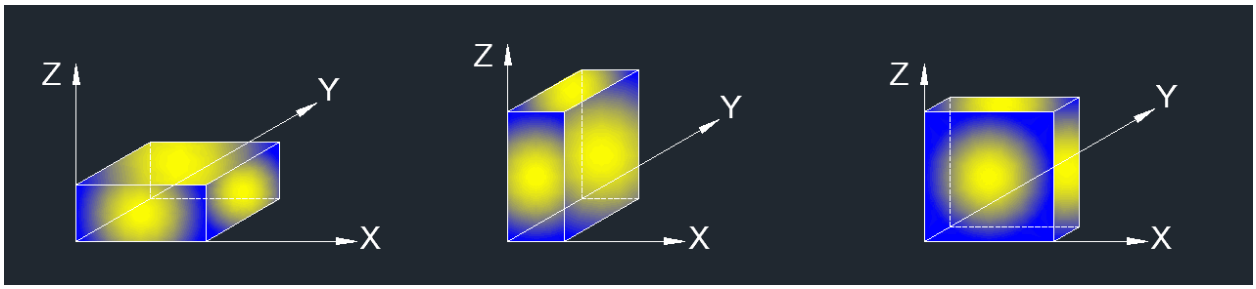
1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 0.8 meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

X axis, Y axis, Z axis positions:



Note: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (Y axis) data recorded in the report.

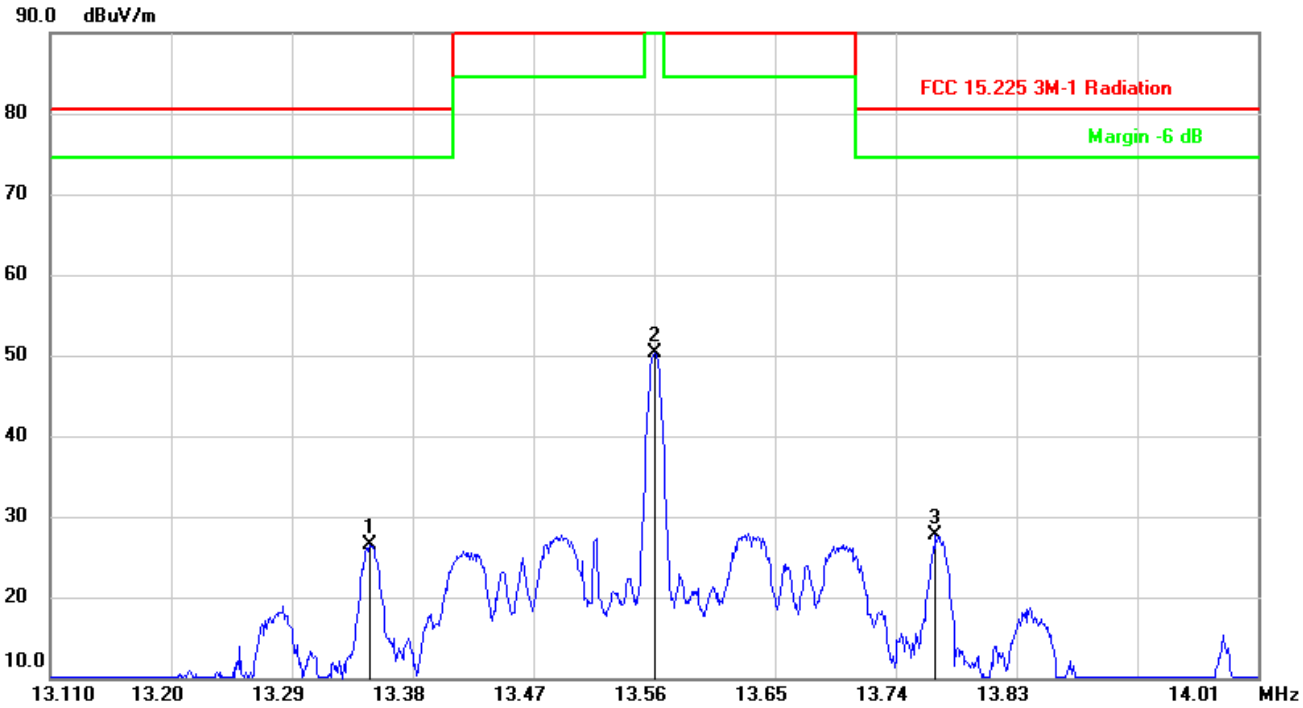
RESULTS

TEST ENVIRONMENT

Temperature	25.1°C	Relative Humidity	62%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.8V

6.2.1. FUNDAMENTAL FIELD STRENGTH

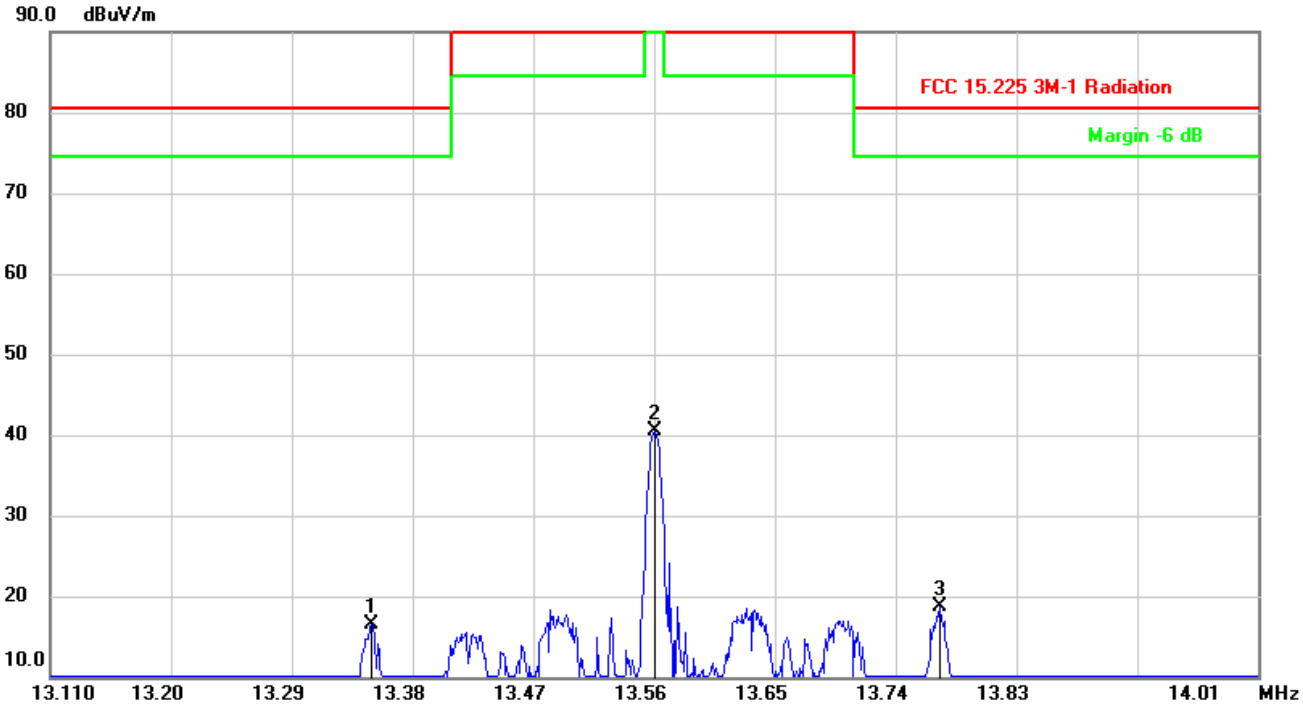
HORIZONTAL



No.	Frequency	Reading	Correct	Result 3m	Limit (3m)	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	13.3485	68.14	-41.62	26.52	80.51	-53.99	peak
2	13.5600	91.95	-41.61	50.34	123.9	-73.66	peak
3	13.7697	69.25	-41.60	27.65	80.51	-52.86	peak

Note: 1. Result 3m= Reading+ Correct Factor
2. Result 30m= Result 3m-40 dBuV/m

VERTICAL

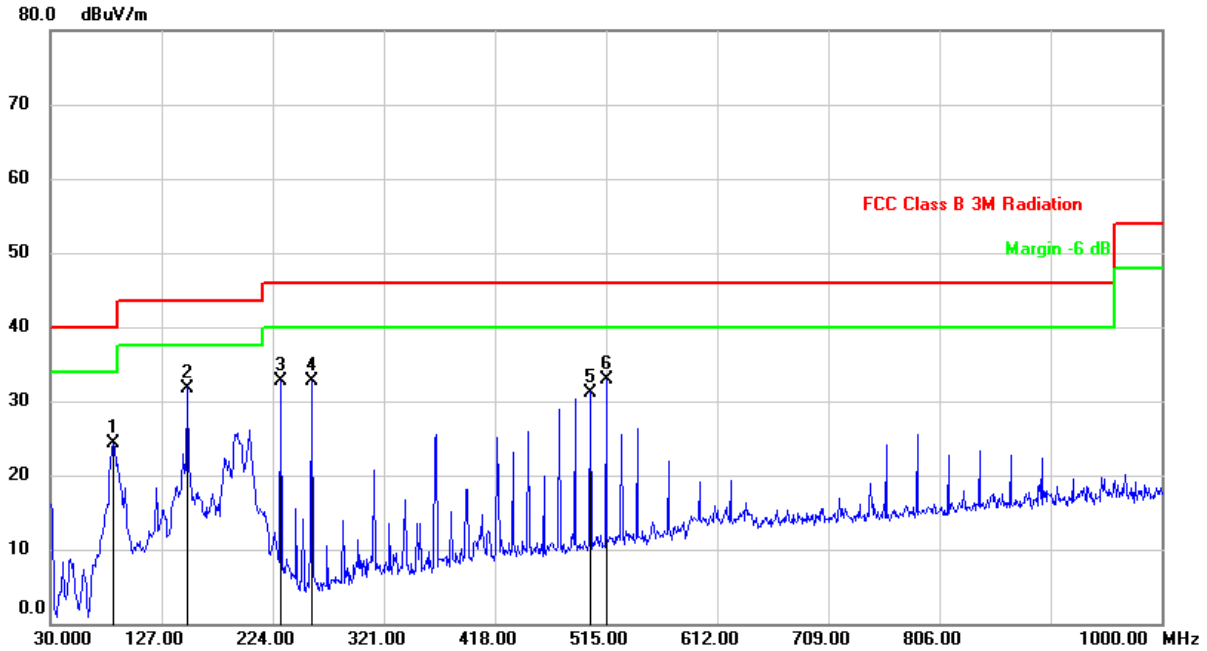


No.	Frequency	Reading	Correct	Result 3m	Limit (3m)	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	13.3493	58.04	-41.62	16.42	80.51	-64.09	peak
2	13.5609	82.13	-41.61	40.52	123.9	-84.52	peak
3	13.7723	60.38	-41.60	18.78	80.51	-61.73	peak

Note: 1. Result 3m= Reading+ Correct Factor
2. Result 30m= Result 3m-40 dBuV/m

6.2.2. SPURIOUS EMISSIONS BELOW 1G

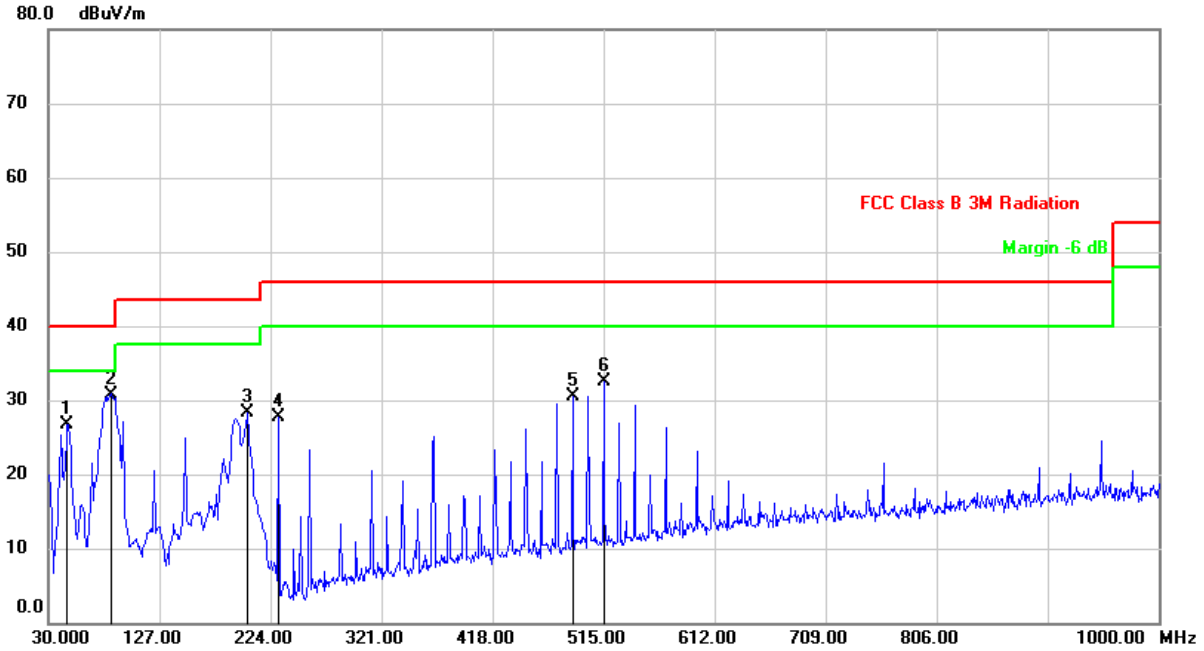
HORIZONTAL



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	84.3200	57.58	-33.21	24.37	40.00	-15.63	QP
2	149.3100	60.80	-29.00	31.80	43.50	-11.70	QP
3	230.7900	62.24	-29.57	32.67	46.00	-13.33	QP
4	257.9500	62.23	-29.52	32.71	46.00	-13.29	QP
5	501.4200	53.76	-22.56	31.20	46.00	-14.80	QP
6	515.0000	55.08	-22.16	32.92	46.00	-13.08	QP

Note: 1. Result Level = Read Level + Correct Factor.
2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

VERTICAL



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	46.4900	58.07	-31.35	26.72	40.00	-13.28	QP
2	85.2900	64.00	-33.20	30.80	40.00	-9.20	QP
3	203.6300	55.34	-27.03	28.31	43.50	-15.19	QP
4	230.7900	57.33	-29.57	27.76	46.00	-18.24	QP
5	487.8400	53.29	-22.79	30.50	46.00	-15.50	QP
6	515.0000	54.59	-22.16	32.43	46.00	-13.57	QP

Note: 1. Result Level = Read Level + Correct Factor.
2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

6.2.3. SPURIOUS EMISSIONS BELOW 30M

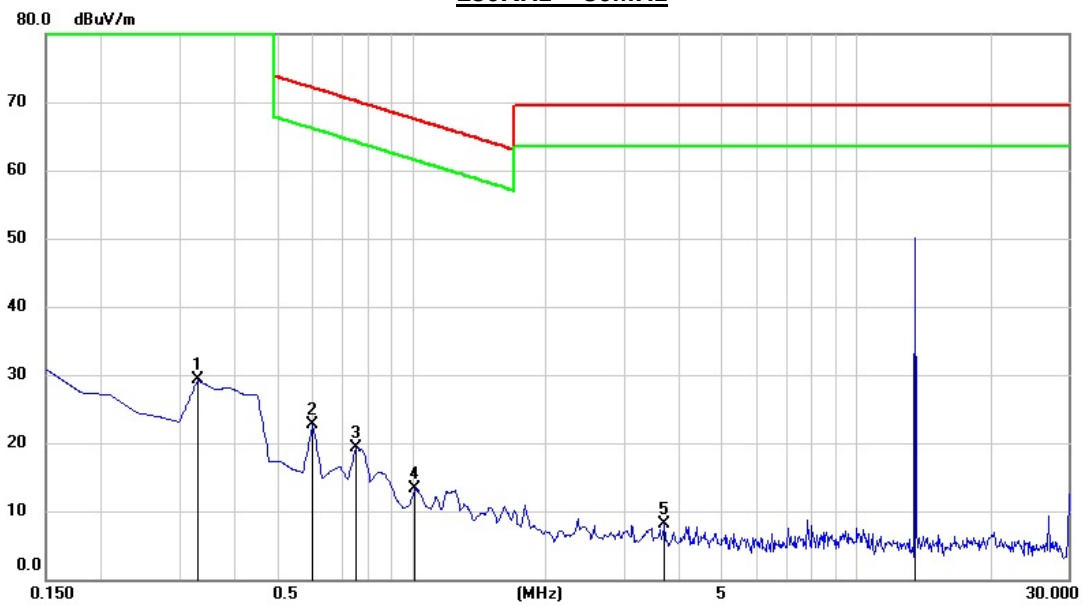
HORIZONTAL

9KHz~ 150KHz

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	0.0183	144.51	-41.59	102.92	122.60	-19.68	peak
2	0.0379	141.26	-41.67	99.59	116.09	-16.50	peak
3	0.0565	135.92	-41.76	94.16	112.59	-18.43	peak
4	0.0761	130.09	-41.84	88.25	109.99	-21.74	peak
5	0.0947	122.24	-41.93	80.31	108.09	-27.78	peak
6	0.1313	116.10	-41.97	74.13	105.25	-31.12	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

150KHz ~ 30MHz



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	0.3291	70.45	-41.21	29.24	97.33	-68.09	peak
2	0.5978	64.50	-41.77	22.73	72.08	-49.35	peak
3	0.7470	61.32	-42.01	19.31	70.15	-50.84	peak
4	1.0157	55.89	-42.54	13.35	67.47	-54.12	peak
5	3.7022	50.70	-42.50	8.20	69.54	-61.34	peak

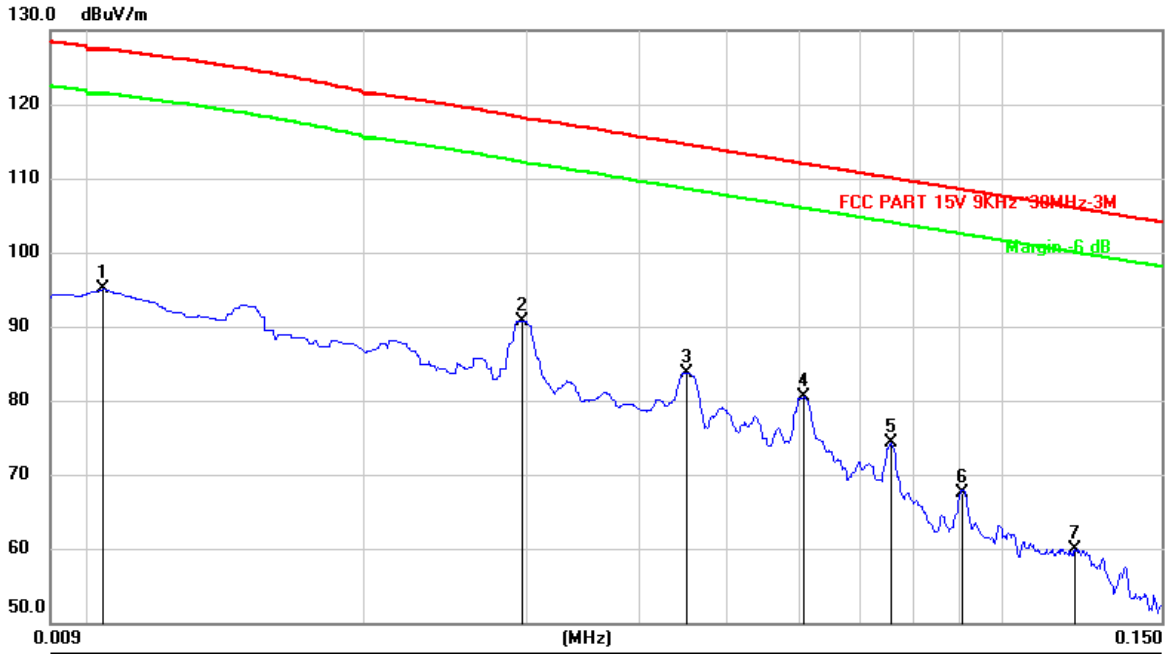
Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. The emissions 1-5 are unwanted emissions which are not the RF part. The highest wave is the fundament.

VERTICAL

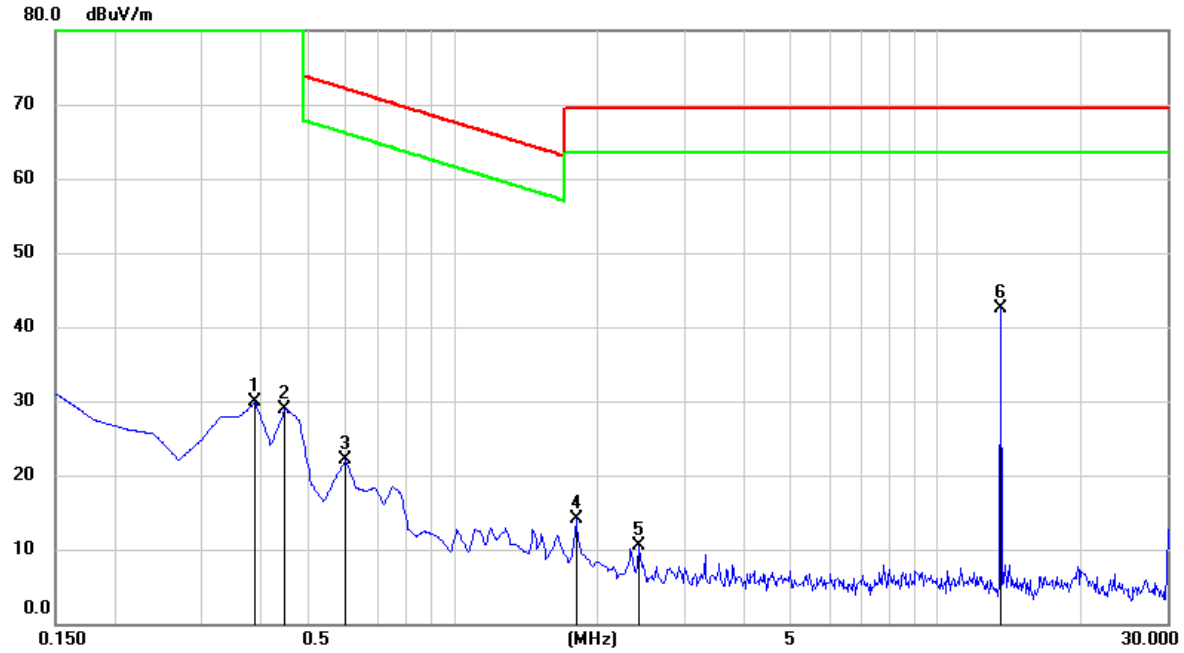
9KHz~ 150KHz



No.	Frequency (KHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0103	136.63	-41.55	95.08	127.42	-32.34	peak
2	0.0297	132.44	-41.64	90.80	118.17	-27.37	peak
3	0.0451	125.45	-41.71	83.74	114.57	-30.83	peak
4	0.0606	122.25	-41.77	80.48	111.96	-31.48	peak
5	0.0756	116.06	-41.84	74.22	110.05	-35.83	peak
6	0.0908	109.39	-41.91	67.48	108.45	-40.97	peak
7	0.1207	101.92	-41.96	59.96	105.97	-46.01	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

150KHz ~ 30MHz



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	0.3888	71.18	-41.31	29.87	95.84	-65.97	peak
2	0.4485	70.37	-41.42	28.95	94.61	-65.66	peak
3	0.5978	63.87	-41.77	22.10	72.08	-49.98	peak
4	1.7918	56.60	-42.55	14.05	69.54	-55.49	peak
5	2.4186	53.12	-42.55	10.57	69.54	-58.97	peak

Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. The emissions 1-5 are unwanted emissions which are not the RF part. The highest wave is the fundament.

6.3. 99%/20dB BANDWIDTH

LIMITS

FCC Part15 (15.247) Subpart C		
Section	Test Item	Limit
RSS-Gen Clause 6.6	99% Bandwidth	For reporting purposes only.

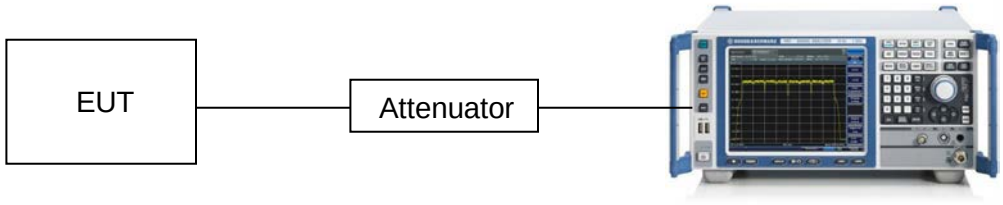
TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	1% to 5% of the occupied bandwidth
VBW	approximately 3×RBW
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 99% relative to the maximum level measured in the fundamental emission.

TEST SETUP



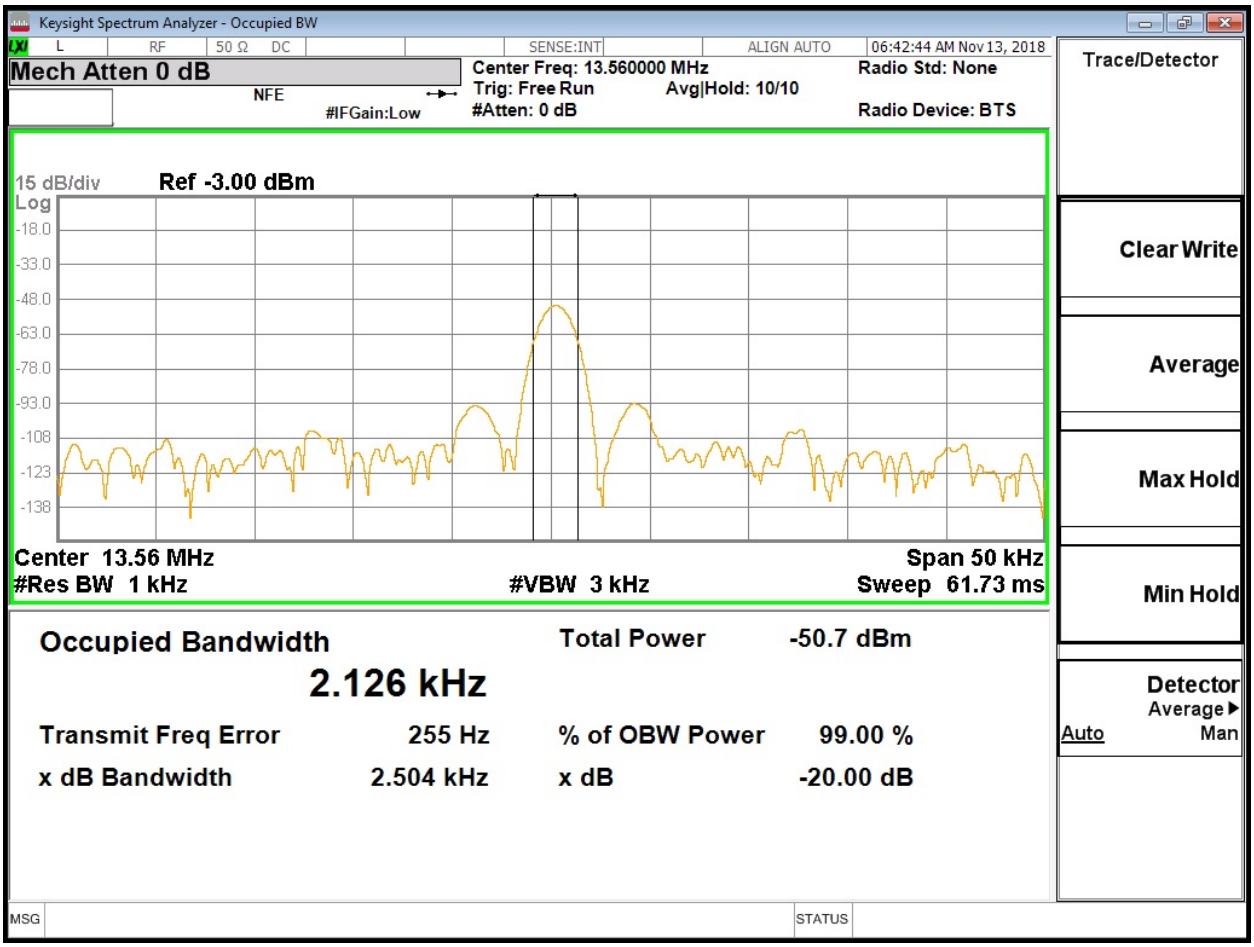
TEST ENVIRONMENT

Temperature	25.1°C	Relative Humidity	64%

Atmosphere Pressure	101kPa	Test Voltage	DC 3.8V

RESULTS

Frequency (MHz)	99% bandwidth (KHz)	20dB bandwidth (KHz)
13.56	2.126	2.504



6.4. TRANSMITTER FREQUENCY STABILITY

LIMITS

The frequency tolerance of the carrier signal shall be maintained within ±0.01% 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.

TEST SETUP AND PROCEDURE

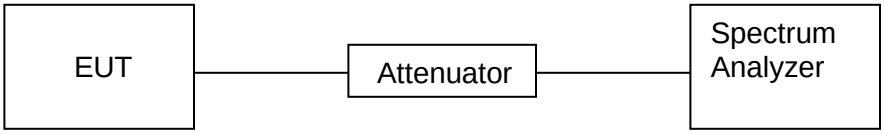
Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	PEAK
RBW	10KHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

Allow the trace to stabilize, find the peak value of the power envelope and record the frequency, then calculated the frequency drift.

The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.

TEST SETUP



TEST ENVIRONMENT

Temperature	25.1°C	Relative Humidity	64%
Atmosphere Pressure	101kPa	Test Voltage	/

TEST RESULTS

Maximum frequency error of the EUT with variations in ambient temperature

Temperature (°C)	Time after			
	0 minutes	2 minutes	5 minutes	10 minutes
-20	13.5606 MHz	13.5605 MHz	13.5606 MHz	13.5606 MHz
-10	13.5605 MHz	13.5606 MHz	13.5606 MHz	13.5605 MHz
0	13.5606 MHz	13.5606 MHz	13.5605 MHz	13.5606 MHz
10	13.5605 MHz	13.5605 MHz	13.5605 MHz	13.5606 MHz
20	13.5606 MHz	13.5605 MHz	13.5603 MHz	13.5605 MHz
30	13.5606 MHz	13.5606 MHz	13.5606 MHz	13.5606 MHz
40	13.5606 MHz	13.5605 MHz	13.5606 MHz	13.5605 MHz
50	13.5605 MHz	13.5606 MHz	13.5606 MHz	13.5606 MHz

Maximum frequency error of the EUT with variations in nominal operating voltage at an ambient

Normal temperature

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
VL	13.56	13.5608	800	0.006	0.01	0.004	Pass
VN	13.56	13.5606	600	0.004	0.01	0.006	Pass
VH	13.56	13.5607	700	0.005	0.01	0.005	Pass

7. ANTENNA REQUIREMENTS

PPLICABLE REQUIREMENTS

Please refer to FCC §15.203

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. 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 FCC rule.

ANTENNA CONNECTOR

EUT has an Integrated antenna without antenna connector.

ANTENNA GAIN

The antenna gain of EUT is less than 6 dBi.

END OF REPORT