

FCC Test Report

Report No.: OKA-ESH-P22120819B-3

FCC ID: 2AYF8-YBES800

Product: Electric Scooter

Test Model: ES800

Received Date: Dec.14, 2022

Test Date: Dec.14, 2022 to Jan.16, 2023

Issued Date: Feb.15, 2023

Applicant: Zhejiang Okai Vehicle Co., Ltd.

Address: No. 9, Xinxing Road, Xinbi Town, Jinyun County, Zhejiang, China

Manufacturer: Zhejiang Okai Vehicle Co., Ltd.

Address: No. 9, Xinxing Road, Xinbi Town, Jinyun County, Zhejiang, China

Issued By: BUREAU VERITAS ADT (Shanghai) Corporation

Lab Address: No. 829, Xinzhuang Road, Shanghai, P.R.China (201612)

**FCC Registration /
Designation Number:** 176467/ CN1213



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Release Control Record

Issue No.	Description	Date Issued
OKA-ESH-P22120819B-3	Original release	Feb.15, 2023

1 Certificate of Conformity

Product: Electric Scooter

Brand: OKAI

Test Model: ES800

Applicant: Zhejiang Okai Vehicle Co., Ltd.

Test Date: Dec.14, 2022 to Jan.16, 2023

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.225)
ANSI C63.10:2020

The above equipment has been tested by **BUREAU VERITAS ADT (Shanghai) Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :


Yuan ZHANG

, **Date:**

Feb.15, 2023

Project Engineer

Approved by :



, **Date:**

Feb.15, 2023

2 Summary of Test Results

The EUT has been tested according to the following specifications:

47 CFR FCC Part 15, Subpart C			
FCC Clause	Test Item	Result	Remarks
15.203	Antenna Requirement	PASS	No antenna connector is used.
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.215(c)	20dB Spectrum Bandwidth	PASS	Meet the requirement of limit.
15.225(e)	Frequency Stability	PASS	Meet the requirement of limit.
15.225(a)(b)(c)	Field Strength of Fundamental Emissions	PASS	Meet the requirement of limit.
15.225 / 15.209 /	Radiated Emissions Measurement	PASS	Meet the requirement of limit.

2.1 Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Loop Antenna	ETS-LINDGREN	6502	E1A1039	Jul.23,22	Jul.22,23
Hybrid Antenna(25MHz-1.5GHz)	Schwarzbeck	VULB9168	E1A1012	Jul.26, 21	Jul.25, 23
Horn Antenna(1GHz -18GHz)	Schwarzbeck	BBHA9120D	E1A1017	Jul.25, 22	Jul.24, 24
Double Ridge Horn Antenna(18G-40G)	COM-POWER	AH-840	E1A1040	Jul.25, 22	Jul.24, 24
Pre-Amplifier(100kHz-1.3GHz)	Agilent	8447D	E1A2001	Mar.03, 22	Mar.02, 23
Pre-Amplifier(0.5GHz-18GHz)	EMCI	EMC184045SE	E1A2009	Aug.04, 22	Aug.03, 23
Pre-Amplifier(18GHz-40GHz)	EMCI	EMC051845SE	E1A2008	Aug.04, 22	Aug.03, 23
EMI test receiver	R&S	ESR7	E1R1005	Mar.03, 22	Mar.02, 23
Spectrum Analyzer	Keysight	N9030B	E1S1003	Sep.14, 22	Sep.13, 23
Spectrum Analyzer	Keysight	N9020A	E1S1004	Mar.03, 22	Mar.02, 23
EMI test receiver	R&S	ESR3	E1R1008	Jun.20, 22	Jun.19, 23
LISN	R&S	ENV216	E1L1011	Jun.20, 22	Jun.19, 23
Humidity&Temp Tester	Baolima	WS508	E1H1011	Apr. 01, 22	Mar.31, 23
RF Control Unit	Toscend	JS0806-2	E1C5003	N/A	N/A
Test Software	Toscend	JS32-CE	N/A	N/A	N/A
Test Software	Toscend	JS32-RE	N/A	N/A	N/A
Test Software	Toscend	JS1120-3	N/A	N/A	N/A

2.2 Measurement Uncertainty

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

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

Measurement	Frequency	Expanded Uncertainty ($k=2$) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.36 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.47 dB
	6GHz ~ 18GHz	3.75 dB
	18GHz ~ 40GHz	3.30 dB

2.3 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Electric Scooter
Brand	OKAI
Test Model	ES800
Power Rating	Powered by battery; AC Adaptor: Input: 100-240VAC, 50/60Hz, 2,5A (Max.) Output: 58.8VDC, 4.0A
Modulation Type	ASK
Modulation Technology	NFC
Operating Frequency	13.56MHz
Number of Channel	1
Antenna Type	PCB Antenna
Antenna Connector	--

Note:

1. For more details, please refer to the User's manual of the EUT.

3.2 Description of Test Modes

CHANNEL	FREQUENCY	MODULATION TYPE
1	13.56 MHz	ASK

3.2.1 Test Mode Applicability:

EUT Configure Mode	Applicable to				Description
	RE (9 kHz~30MHz)	RE (30MHz~1GHz)	PLC	BW	
-	√	√	√	√	-

Where **RE≥1G**: Radiated Emission above 1GHz **RE< 1G**: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission **BW**: 20dB Spectrum Bandwidth

NOTE:

Pre-scanned tests, X, Y, Z in three orthogonal panels to determine the final configuration (Z plane as worst plane) from all possible combinations.

Radiated Emission Test RE (9 kHz~30MHz):

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
-	NFC TX	13.56MHz	13.56MHz	ASK

Radiated Emission Test RE (30MHz~1GHz):

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
-	NFC TX	13.56MHz	13.56MHz	ASK

Power Line Conducted Emission Test:

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
-	NFC TX	13.56MHz	13.56MHz	ASK

20dB Spectrum Bandwidth

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
-	NFC TX	13.56MHz	13.56MHz	ASK

3.2.2 Test Condition:

Applicable to	Normal Environmental Conditions	Normal Input Power
RE (9 kHz~30MHz)	23deg. C, 58%RH	Working mode: Powered by battery
RE (30MHz~1GHz)	23deg. C, 58%RH	Working mode: Powered by battery
PLC	23deg. C, 58%RH	Charging mode: 100-240Vac,50/60Hz
BW	25deg. C, 60%RH	Working mode: Powered by battery

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standard:

FCC Part 15, Subpart C (15.225)

ANSI C63.10:2020

All relaxed test items have been performed and recorded as per the above standard.

4 Test Procedure and Results

4.1 AC Power Conducted Emission

4.1.1 Limits

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.1.2 Test Procedures

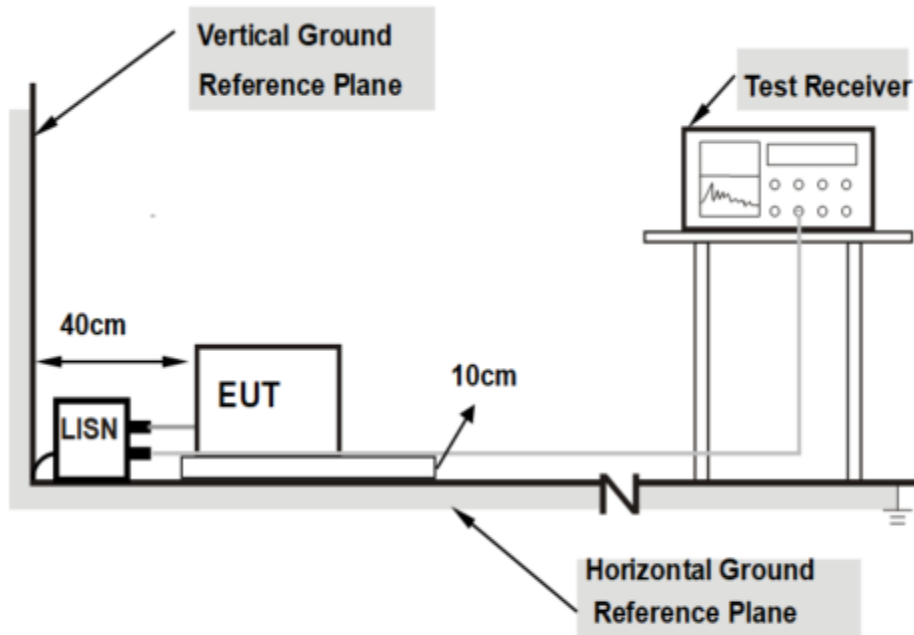
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.1.3 Deviation from Test Standard

No deviation.

4.1.4 Test Setup



Note: 1.Support units were connected to second LISN.

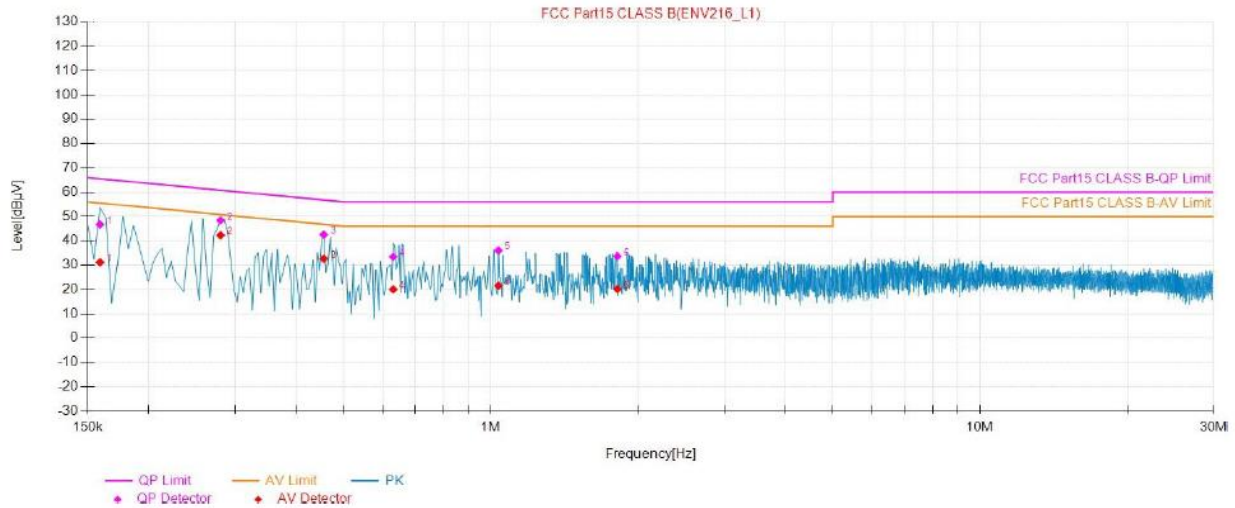
For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.5 EUT Operating Conditions

Same as 4.1.6.

4.1.6 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 120V, 60Hz		
Test Mode	Charging		



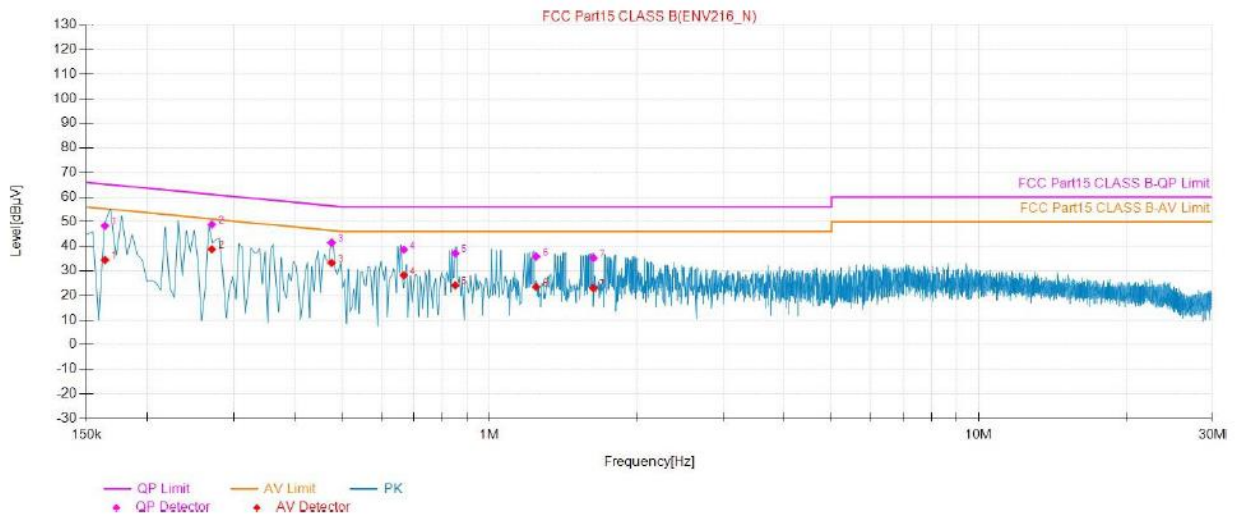
Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading Value [dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading Value [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type	Verdict
1	0.1590	9.77	36.95	46.72	65.52	18.80	21.40	31.17	55.52	24.35	L1	PASS
2	0.2805	9.64	38.78	48.42	60.80	12.38	32.61	42.25	50.80	8.55	L1	PASS
3	0.4560	9.59	32.91	42.50	56.77	14.27	23.04	32.63	46.77	14.14	L1	PASS
4	0.6315	9.52	23.92	33.44	56.00	22.56	10.52	20.04	46.00	25.96	L1	PASS
5	1.0365	9.49	26.53	36.02	56.00	19.98	12.02	21.51	46.00	24.49	L1	PASS
6	1.8150	9.63	24.02	33.65	56.00	22.35	10.55	20.18	46.00	25.82	L1	PASS

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Limit value - Emission level
4. Correction factor = Insertion loss + Cable loss
5. QP/AV Value= QP/AV Reading Value+ Correction factor

Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 120V, 60Hz		
Test Mode	Charging		



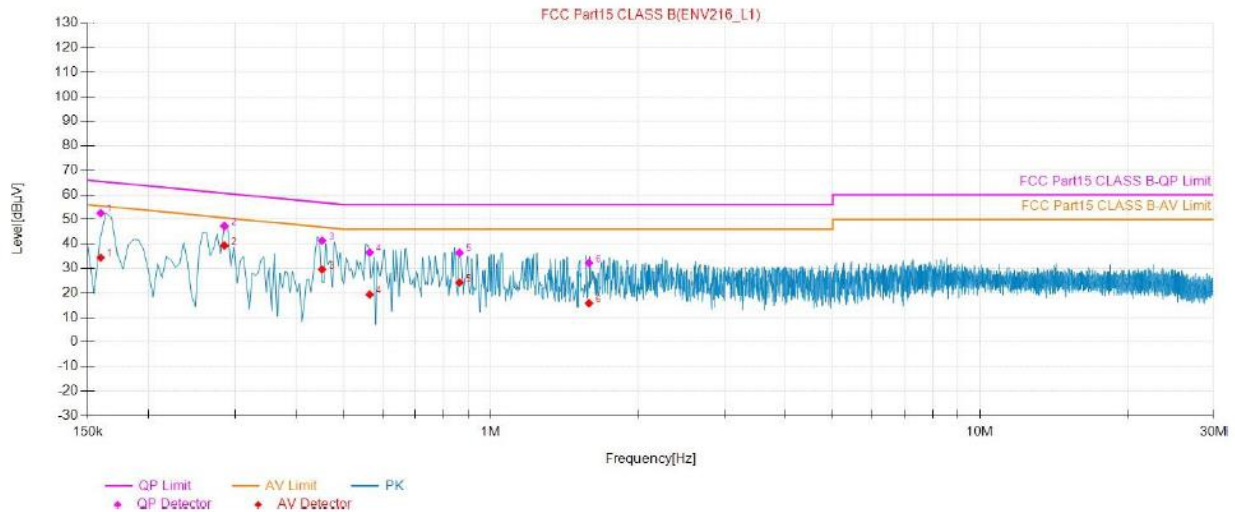
Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading Value [dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading Value [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type	Verdict
1	0.1638	9.76	38.56	48.32	65.27	16.95	24.65	34.41	55.27	20.86	N	PASS
2	0.2708	9.61	39.26	48.87	61.09	12.22	29.16	38.77	51.09	12.32	N	PASS
3	0.4754	9.59	31.87	41.46	56.42	14.96	23.65	33.24	46.42	13.18	N	PASS
4	0.6684	9.48	29.14	38.62	56.00	17.38	18.68	28.16	46.00	17.84	N	PASS
5	0.8512	9.51	27.60	37.11	56.00	18.89	14.58	24.09	46.00	21.91	N	PASS
6	1.2454	9.53	26.31	35.84	56.00	20.16	13.97	23.50	46.00	22.50	N	PASS
7	1.6305	9.57	25.66	35.23	56.00	20.77	13.48	23.05	46.00	22.95	N	PASS

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Limit value - Emission level
4. Correction factor = Insertion loss + Cable loss
5. QP/AV Value= QP/AV Reading Value+ Correction factor

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 230V, 50Hz		
Test Mode	Charging		



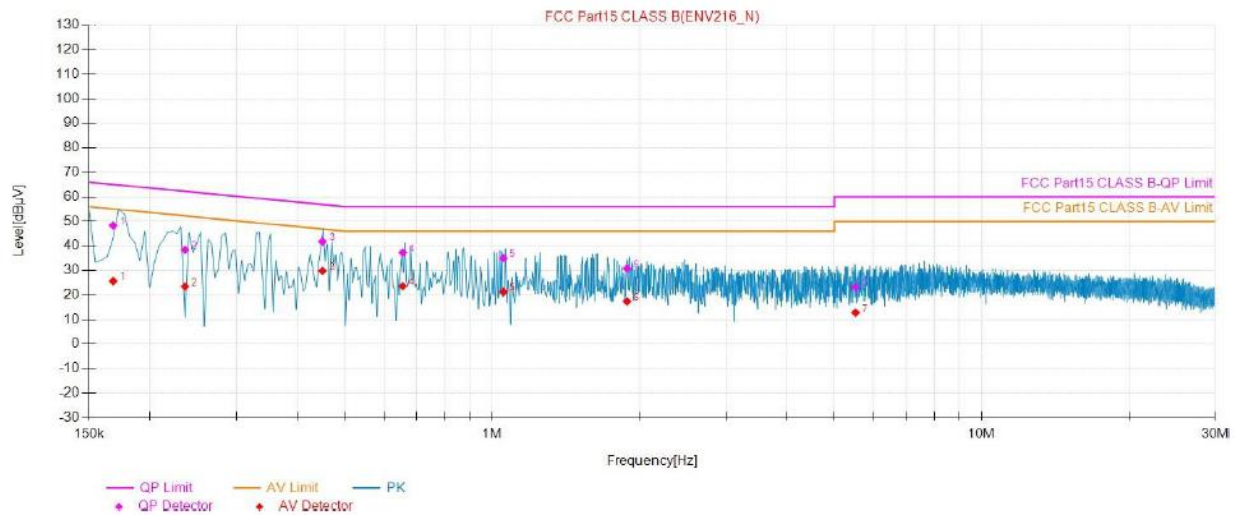
Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading Value [dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading Value [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type	Verdict
1	0.1595	9.77	42.74	52.51	65.49	12.98	24.57	34.34	55.49	21.15	L1	PASS
2	0.2854	9.63	37.62	47.25	60.66	13.41	29.69	39.32	50.66	11.34	L1	PASS
3	0.4524	9.59	31.72	41.31	56.83	15.52	19.98	29.57	46.83	17.26	L1	PASS
4	0.5658	9.55	26.92	36.47	56.00	19.53	9.77	19.32	46.00	26.68	L1	PASS
5	0.8633	9.46	26.90	36.36	56.00	19.64	14.75	24.21	46.00	21.79	L1	PASS
6	1.5889	9.59	22.63	32.22	56.00	23.78	6.22	15.81	46.00	30.19	L1	PASS

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Limit value - Emission level
4. Correction factor = Insertion loss + Cable loss
5. QP/AV Value= QP/AV Reading Value+ Correction factor

Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 230V, 50Hz		
Test Mode	Charging		



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading Value [dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading Value [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type	Verdict
1	0.1682	9.76	38.58	48.34	65.05	16.71	15.90	25.66	55.05	29.39	N	PASS
2	0.2355	9.69	28.71	38.40	62.25	23.85	13.79	23.48	52.25	28.77	N	PASS
3	0.4503	9.58	32.19	41.77	56.87	15.10	20.21	29.79	46.87	17.08	N	PASS
4	0.6563	9.49	27.78	37.27	56.00	18.73	14.10	23.59	46.00	22.41	N	PASS
5	1.0535	9.51	25.51	35.02	56.00	20.98	11.73	21.24	46.00	24.76	N	PASS
6	1.8862	9.60	21.20	30.80	56.00	25.20	7.78	17.38	46.00	28.62	N	PASS
7	5.5320	9.73	13.48	23.21	60.00	36.79	3.04	12.77	50.00	37.23	N	PASS

REMARKS:

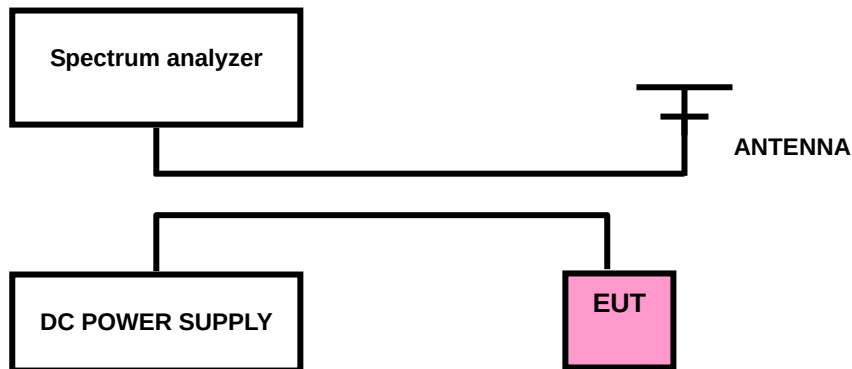
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Limit value - Emission level
4. Correction factor = Insertion loss + Cable loss
5. QP/AV Value= QP/AV Reading Value+ Correction factor

4.2 20dB Spectrum Bandwidth Measurement

4.2.1 Limit

Intentional radiators must be designed to ensure that the 20dB emission bandwidth in the specific band 13.553 ~ 13.567MHz.

4.2.2 Test Setup



4.2.3 Test Procedures

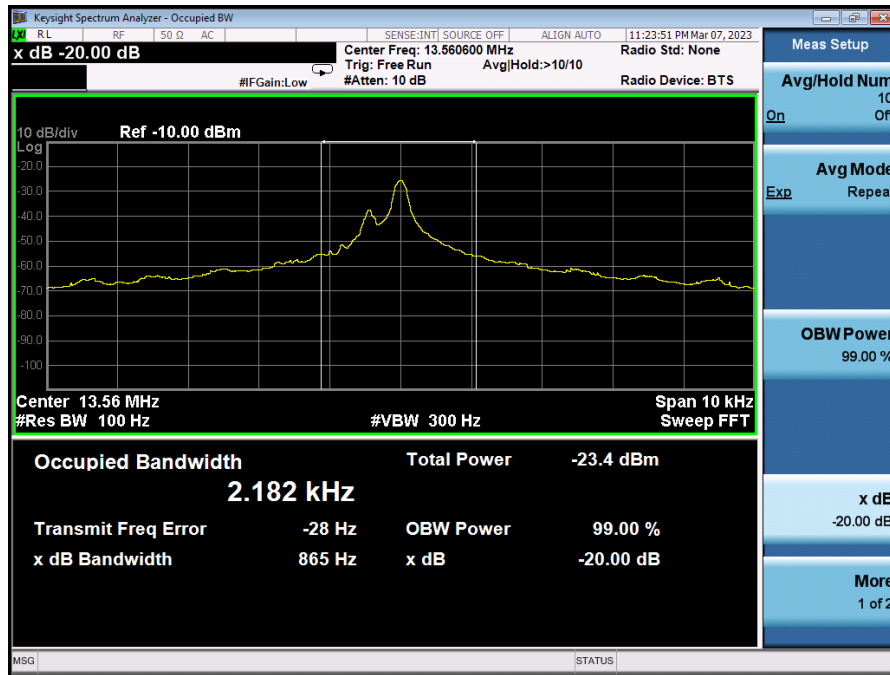
1. The resolution bandwidth of 100 Hz and the video bandwidth of 300 Hz were used.
2. EUT in peak Max hold mode.
3. Measured the spectrum width with power higher than 20dB below carrier.

4.2.4 Deviation of Test Standard

No deviation.

4.2.5 Test Results

20dB bandwidth (kHz)	F _L (MHz)	F _H (MHz)	Limit(MHz)	Result
0.865	13.5596	13.5604	13.553 ~ 13.567MHz	Pass

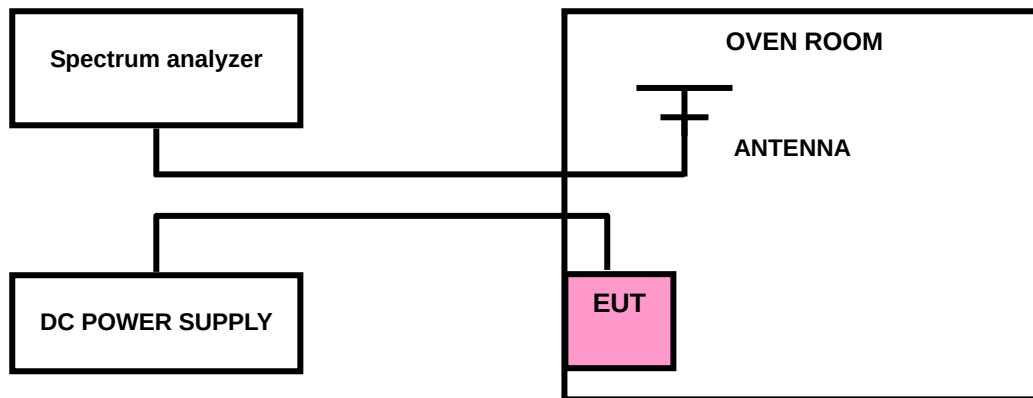


4.3 Frequency Stability Measurement

4.3.1 Limit

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

4.3.2 Test Setup



4.3.3 Test Procedures

1. The spectrum analyzer connected via a receive antenna placed near the EUT.
2. Set RBW = 1 kHz, VBW = 3 kHz with peak detector and maxhold settings.
3. The f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and the limit is less than ± 100 ppm.
4. Extreme temperature rule is -20°C~50°C

4.3.4 Deviation of Test Standard

No deviation.

4.3.5 Test Results

Nominal Operation Frequency: 13.56MHz

Test Conditions		Test Result (MHz)	Deviation (kHz)	Limit (kHz)	Result
Temp (°C)	Volt (V DC)				
T _{nom} (-20)	V _{nom} (36)	13.56004	0.04	±0.01% (1.3560kHz)	Pass
T _{nom} (-10)	V _{nom} (36)	13.56002	0.02		Pass
T _{nom} (0)	V _{nom} (36)	13.56003	0.03		Pass
T _{nom} (10)	V _{nom} (36)	13.56002	0.02		Pass
T _{nom} (20)	V _{nom} (36)	13.56004	0.04		Pass
T _{nom} (30)	V _{nom} (36)	13.56002	0.02		Pass
T _{nom} (40)	V _{nom} (36)	13.56003	0.03		Pass
T _{nom} (50)	V _{nom} (36)	13.56001	0.01		Pass
T _{nom} (20)	V _{min} (30.6)	13.56002	0.02		Pass
	V _{max} (41.4)	13.56003	0.03		Pass

Note: Deviation (kHz) = (Test Result-13.56MHz)*1000

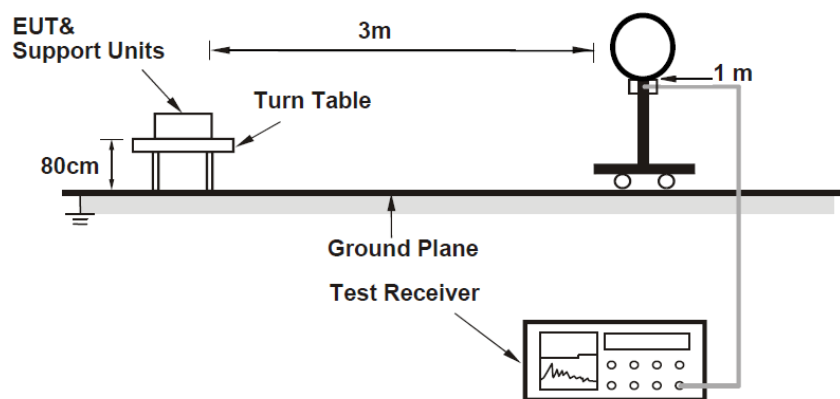
4.4 Field Strength of Fundamental Emissions and Mask Measurement

4.4.1 Test Limit

Rules and specifications	FCC CFR 47 Part 15 section 15.225			
Description	Compliance with the spectrum mask is tested with RBW set to 9kHz.			
Freq. of Emission (MHz)	Field Strength ($\mu\text{V/m}$) at 30m	Field Strength (dB $\mu\text{V/m}$) at 30m	Field Strength (dB $\mu\text{V/m}$) at 10m	Field Strength (dB $\mu\text{V/m}$) at 3m
1.705~13.110	30	29.5	48.58	69.5
13.110~13.410	106	40.5	59.58	80.5
13.410~13.553	334	50.5	69.58	90.5
13.553~13.567	15848	84.0	103.08	124.0
13.567~13.710	334	50.5	69.58	90.5
13.710~14.010	106	40.5	59.58	80.5
14.010~30.000	30	29.5	48.58	69.5

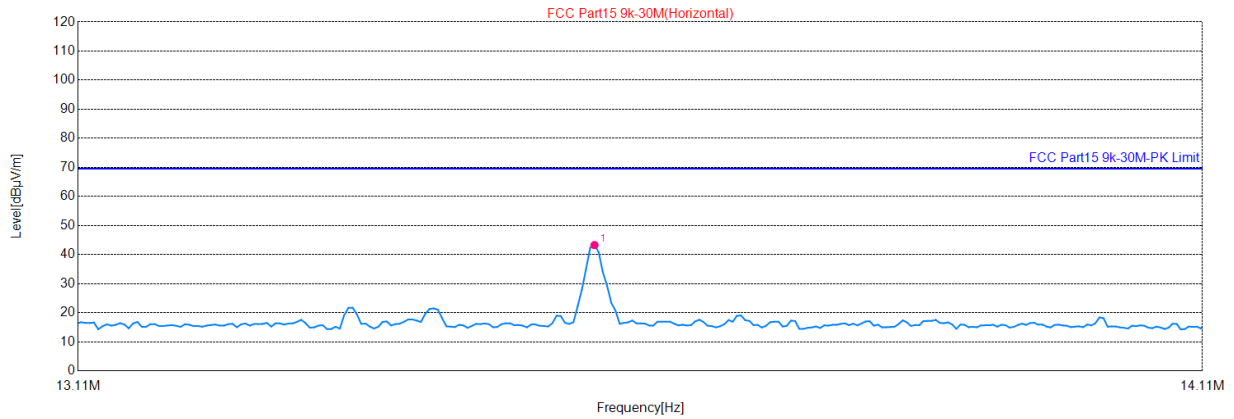
4.4.2 Test Setup

For Radiated emission below 30MHz

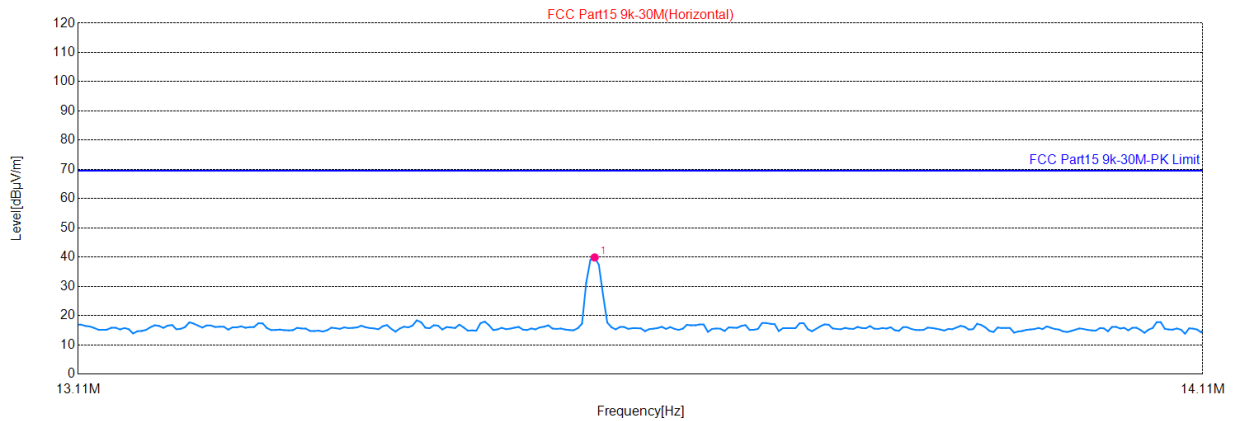


4.4.3 Test Results

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
13.56	34.29	9.00	43.29	124	80.71	V



Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
13.56	30.91	9.00	39.91	124	84.09	H



Margin [dB] = Limit [dBμV/m] – Level [dBμV/m]

4.5 Radiated Emissions Measurement

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (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 - 156.525	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	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209

Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

4.5.1 Test Procedure Reference

ANSI C63.10 Section 6.3 (General Requirements)

4.5.2 Test Procedures

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

Receiver Parameter	Setting
Frequency Range: 9kHz~150kHz	RBW 200Hz for QP
Frequency Range: 150kHz~30MHz	RBW 9kHz for QP
Frequency Range: 30MHz~1000MHz	RBW 120kHz for Peak

For Radiated emission below 30MHz

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degree to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- Both X and Y axes of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and the rotate table was turned from 0 degree to 360 degree to find the maximum reading.
- The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

For Radiated emission above 30MHz

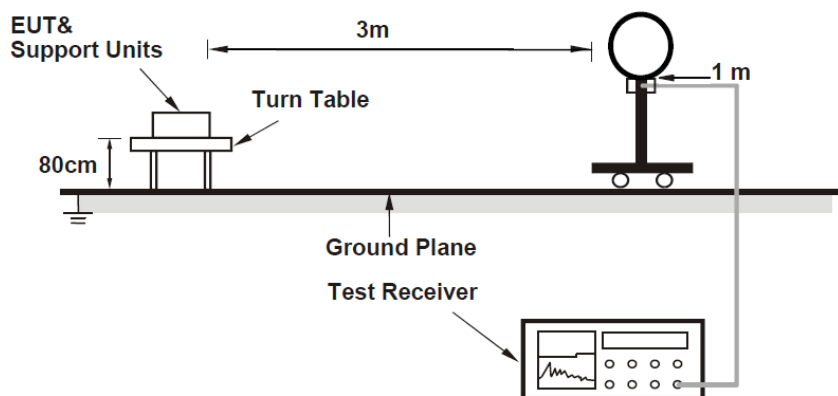
- The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

4.5.3 Deviation from Test Standard

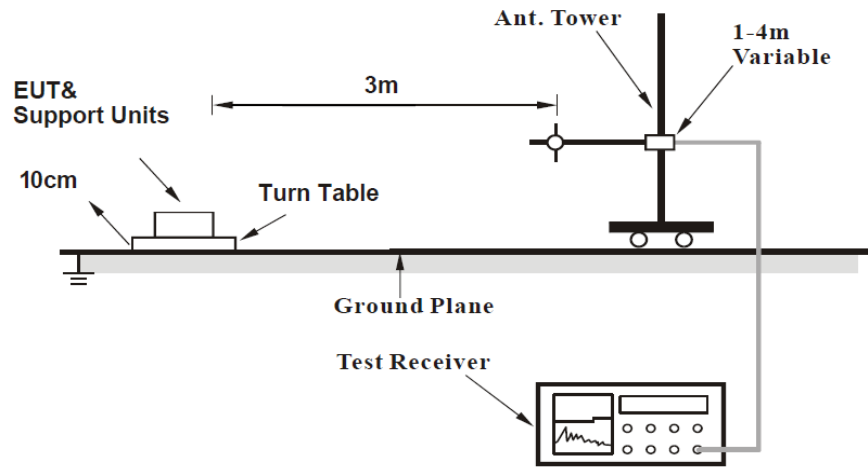
No deviation.

4.5.4 Test Setup

For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz

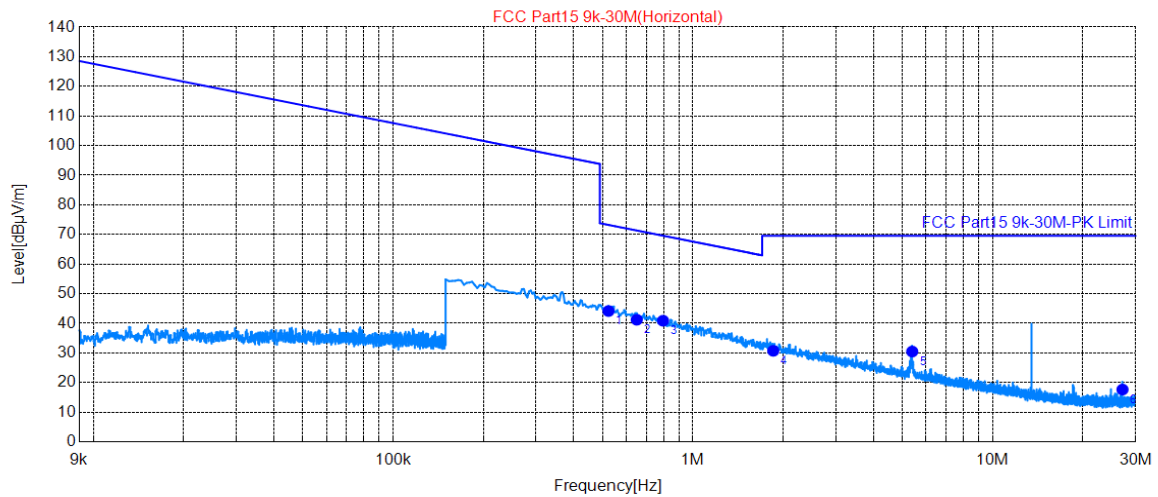


For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.5.5 Test Results

Radiated Emissions Range 9kHz~30MHz

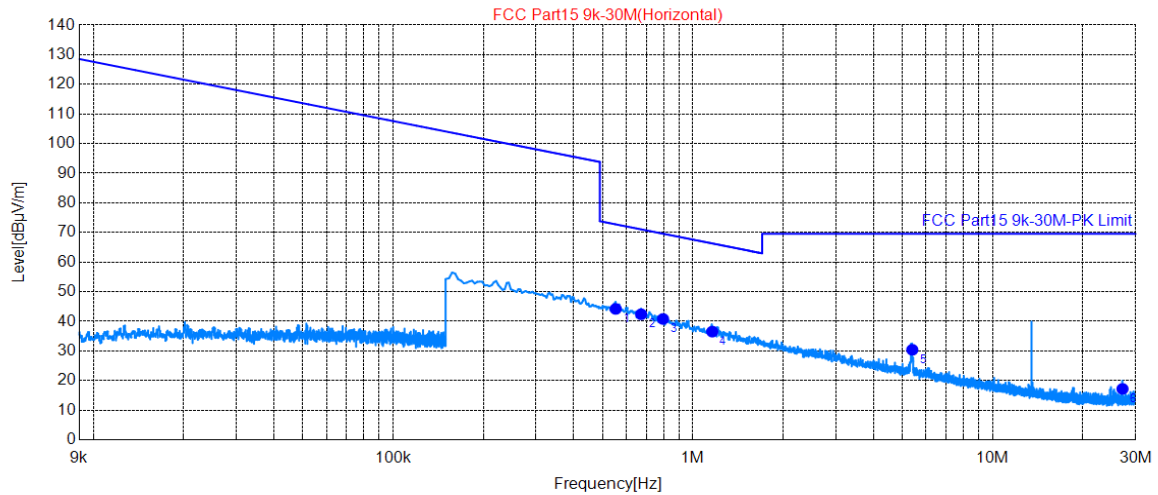
Channel	NFC	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 30MHz	Antenna Polarity	Horizontal



Final Data List

NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height[c m]	Angle [°]
1	0.5231	33.46	10.71	44.17	73.23	29.06	100	226
2	0.6500	30.51	10.71	41.22	71.35	30.13	100	242
3	0.7955	30.2	10.71	40.91	69.59	28.68	100	134
4	1.8552	19.95	10.80	30.75	69.54	38.79	100	134
5	5.3924	20.16	10.33	30.49	69.54	39.05	100	217
6	27.123	11.03	6.64	17.67	69.54	51.87	100	262

Channel	NFC	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 30MHz	Antenna Polarity	Vertical



Final Data List

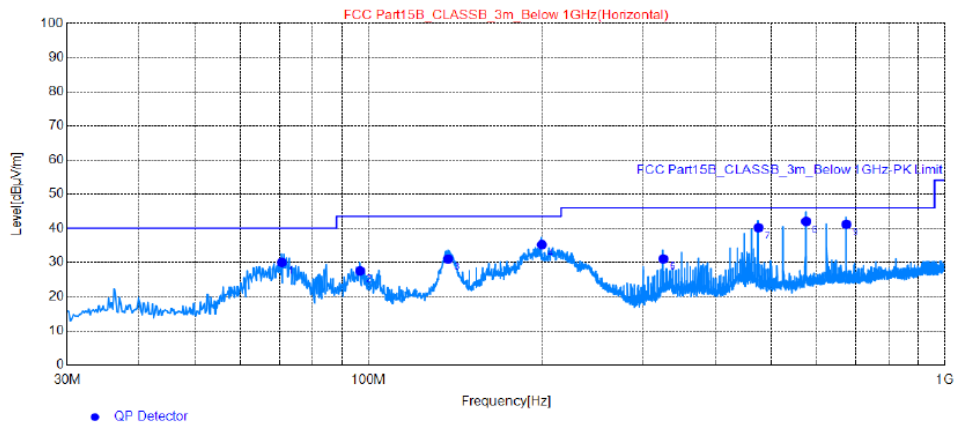
NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height[c m]	Angle [°]
1	0.5530	33.5	10.71	44.21	72.75	28.54	100	226
2	0.6724	31.69	10.71	42.40	71.05	28.65	100	242
3	0.7955	30.11	10.71	40.82	69.59	28.77	100	134
4	1.1612	25.82	10.73	36.55	66.31	29.76	100	134
5	5.3961	20.09	10.33	30.42	69.54	39.12	100	217
6	27.123	10.58	6.64	17.22	69.54	52.32	100	262

Radiated Emissions Range 30MHz~1GHz

Below is the worst test data

Channel	NFC	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz	Antenna Polarity	Horizontal

Test Plot:



Final Data List

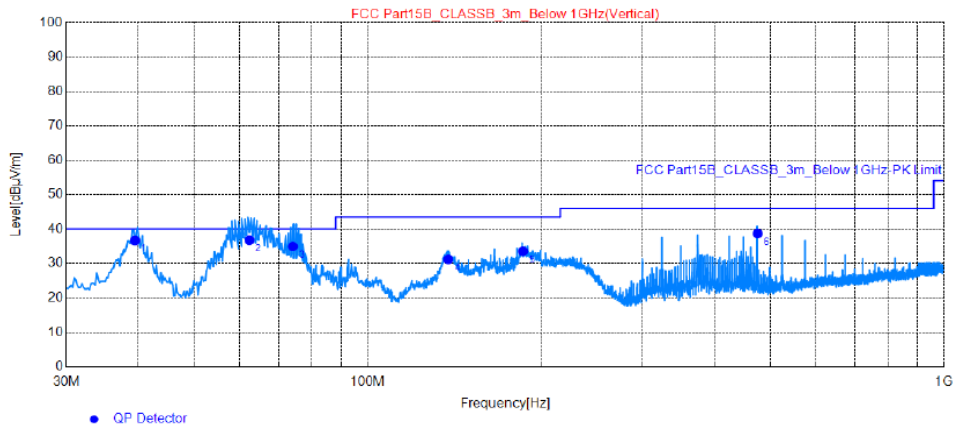
NO.	Freq. [MHz]	QP Reading [dB μ V/m]	Factor [dB]	QP Value [dB μ V/m]	QP Limit [dB μ V/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	70.74	42.77	-12.78	29.99	40.00	10.01	200	76	Horizontal
2	96.73	42.6	-15.07	27.53	43.50	15.97	200	290	Horizontal
3	137.4	41.32	-10.32	31.00	43.50	12.50	200	146	Horizontal
4	199.9	47.38	-12.19	35.19	43.50	8.31	200	148	Horizontal
5	324.8	38.32	-7.28	31.04	46.00	14.96	200	74	Horizontal
6	324.8	38.69	-7.28	31.41	46.00	14.59	200	74	Horizontal
7	475.0	44.23	-4.02	40.21	46.00	5.79	200	341	Horizontal
8	574.9	43.89	-1.89	42.00	46.00	4.00	200	226	Horizontal
9	675.0	41.7	-0.56	41.14	46.00	4.86	200	344	Horizontal

REMARKS:

1. Emission Level(dBuV/m) = Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Channel	NFC	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz	Antenna Polarity	Vertical

Test Plot:



Final Data List

NO.	Freq. [MHz]	QP Reading [dB μ V/m]	Factor [dB]	QP Value [dB μ V/m]	QP Limit [dB μ V/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	39.47	47.11	-10.43	36.68	40.00	3.32	106.1	338	Vertical
2	62.34	48.27	-11.49	36.78	40.00	3.22	122.1	2.4	Vertical
3	74.15	48.49	-13.56	34.93	40.00	5.07	100	360	Vertical
4	138.0	41.46	-10.27	31.19	43.50	12.31	100	97	Vertical
5	185.9	44.9	-11.35	33.55	43.50	9.95	100	341	Vertical
6	475.0	42.72	-4.02	38.70	46.00	7.30	100	148	Vertical

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

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