

FCC Test Report

Report No.: RF191111D05

FCC ID: 2AEIM-WC1

Test Model: WC1

Received Date: Nov. 11, 2019

Test Date: Nov. 28, 2019

Issued Date: Nov. 29, 2019

Applicant: Tesla Motors, Inc

Address: 3500 Deer Creek Road Palo Alto California United States 94304

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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**FCC Registration /
Designation Number:** 198487 / TW2021



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Release Control Record

Issue No.	Description	Date Issued
RF191111D05	Original release.	Nov. 29, 2019

1 Certificate of Conformity

Product: Wireless Phone Charger
Brand: Tesla
Test Model: WC1
Sample Status: Engineering sample
Applicant: Tesla Motors, Inc
Test Date: Nov. 28, 2019
Standards: 47 CFR FCC Part 15, Subpart C (Section 15.209)
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, 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 RF characteristics under the conditions specified in this report.

Prepared by : Annie Chang, **Date:** Nov. 29, 2019
Annie Chang / Senior Specialist

Approved by : Rex Lai, **Date:** Nov. 29, 2019
Rex Lai / Associate Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.209)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	N/A	Without AC power port of the EUT
15.209	Radiated Emission Test	Pass	Meet the requirement of limit. Minimum passing margin is -6.02dB at 80.44MHz

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. N/A: Not Applicable

2.1 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	Expanded Uncertainty (k=2) (\pm)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.38 dB
	30MHz ~ 1000MHz	5.43 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless Phone Charger
Brand	Tesla
Test Model	WC1
Sample Status	Engineering sample
Power Supply Rating	I/P rating: 5Vdc O/P rating: 7.5W
Modulation Type	FSK
Operating Frequency	127.7 kHz
Antenna Type	Coil antenna
Field Strength	91.53dBuV/m
Dimensions	43.45cm ²
Accessory Device	N/A
Data Cable Supplied	Shielded USB cable (0.3m) attached on EUT
Maximum Power Output from the Charging Coil	7.5W

Note: The EUT is a Wireless Phone Charger with Qi function.

3.2 Description of Test Modes

The following test frequency is provided to this EUT:

Operating Frequency (kHz)	Test Mode
127.7	Charging Mode (Upper Coil Center)
127.7	Charging Mode (Lower Coil Center)
127.7	Standby Mode

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To		Description
	RE<1G	PLC	
A	√	Note 1	Charging Mode (Upper Coil Center)
B	√	Note 1	Charging Mode (Lower Coil Center)
C	√	Note 1	Standby Mode

Where **RE<1G**: Radiated Emission below 1GHz **PLC**: Power Line Conducted Emission

Note:

1. No need to concern of Conducted Emission due to the EUT is powered by DC battery.
2. The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **Z-plane**.

Radiated Emission Test (Below 1GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Operating Frequency (kHz)	Tested Frequency (kHz)
A	127.7	127.7
B	127.7	127.7
C	127.7	127.7

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE<1G	24 deg. C, 66% RH	12Vdc	Ian Chang

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Car Socket	SONY	CP-CADM2	N/A	N/A	Supplied by client
B.	LOAD	N/A	N/A	N/A	N/A	Supplied by client
C.	Battery	RISING	SMF NX120-7L	N/A	N/A	Provided by Lab

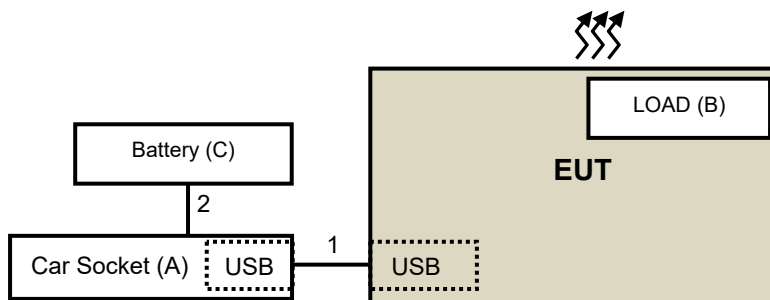
ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/ No)	Cores (Qty.)	Remarks
1.	USB cable	1	0.3	Y	0	Supplied by client
2.	DC cable	1	0.3	N	0	Supplied by client

Note: The core(s) is(are) originally attached to the cable(s).

3.3.1 Configuration of System under Test

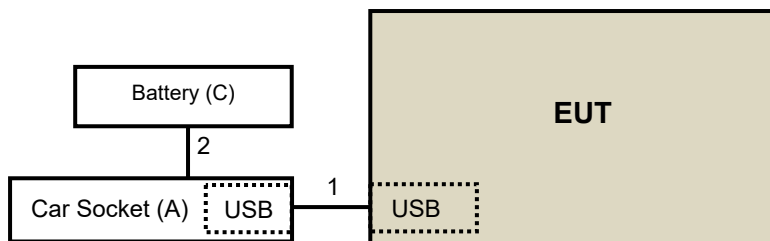
Charging Mode:

Mode A & B:



Standby Mode:

Mode C:



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 standards:

47 CFR FCC Part 15, Subpart C (Section 15.209)

ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

For Frequency Below 30MHz

Frequency (MHz)	Field Strength (dBuV/m)		Measurement Distance (meters)
	uV/m	dBuV/m	
0.009 – 0.490	2400 / F (kHz)	48.52-13.80	300
0.490 – 1.705	24000 / F (kHz)	33.80-22.97	30
1.705 – 30.0	30	29.54	30

For Frequency Between 30-1000MHz

Frequency (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
30-88	90	39.1	100	40.0
88-216	150	43.5	150	43.5
216-960	210	46.4	200	46.0
Above 960	300	49.5	500	54.0

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 20, 2019	Feb. 19, 2020
HP Preamplifier	8449B	3008A01201	Feb. 21, 2019	Feb. 20, 2020
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 20, 2019	Feb. 19, 2020
Agilent TEST RECEIVER	N9038A	MY51210129	Mar. 05, 2019	Mar. 04, 2020
Schwarzbeck Antenna	VULB 9168	139	Nov. 7, 2019	Nov. 6, 2020
Schwarzbeck Antenna	VHBA 9123	480	Jun. 3, 2019	Jun. 2, 2021
Schwarzbeck Horn Antenna	BBHA-9170	212	Nov. 24, 2019	Nov. 23, 2020
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Nov. 24, 2019	Nov. 23, 2020
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF102	Cable-CH6-01	Jul. 10, 2019	Jul. 9, 2020
SUHNER RF cable With 3/4dB PAD	SF102	Cable-CH8-3.6m	Jul. 10, 2019	Jul. 9, 2020
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	Jun. 11, 2019	Jun. 10, 2020
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 30, 2019	Jul. 29, 2020
Loop Antenna EMCI	LPA600	270	Aug. 23, 2019	Aug. 22, 2021

- NOTE:**
1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
 2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 3. The test was performed in Chamber No. 6.

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. 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 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200Hz at frequency range 9kHz to 150kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency range 150kHz to 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.
- d. 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.
- e. 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.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

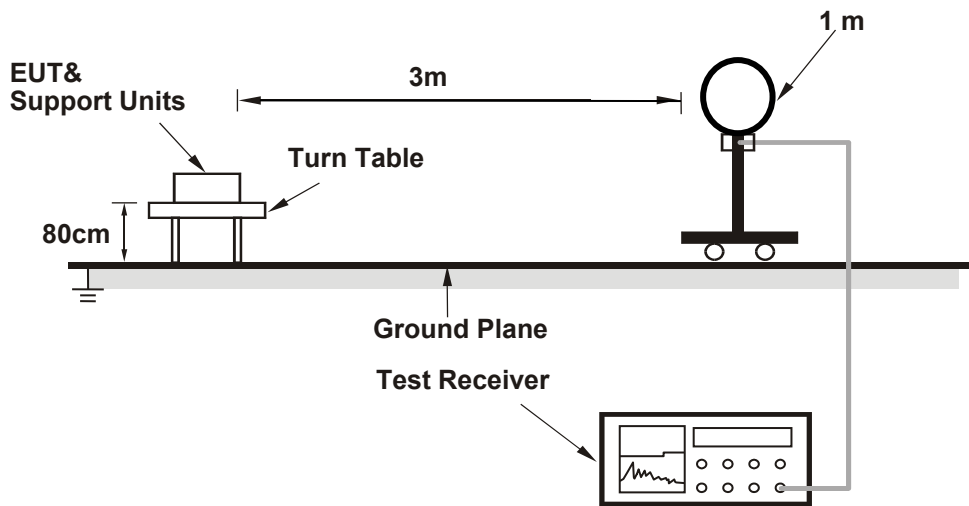
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

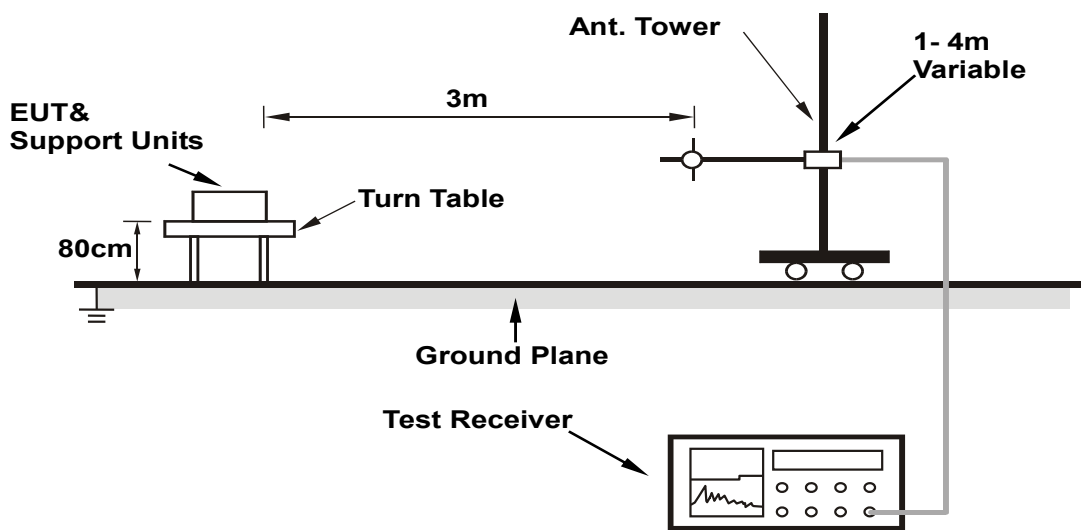
No deviation.

4.1.5 Test Set Up

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).

4.1.6 EUT Operating Conditions

Test Mode A & B:

Put the Load on the EUT (wireless charging) during the test.

Test Mode C:

Set the EUT under standby condition.

4.1.7 Test Results

Below 30MHz Data:

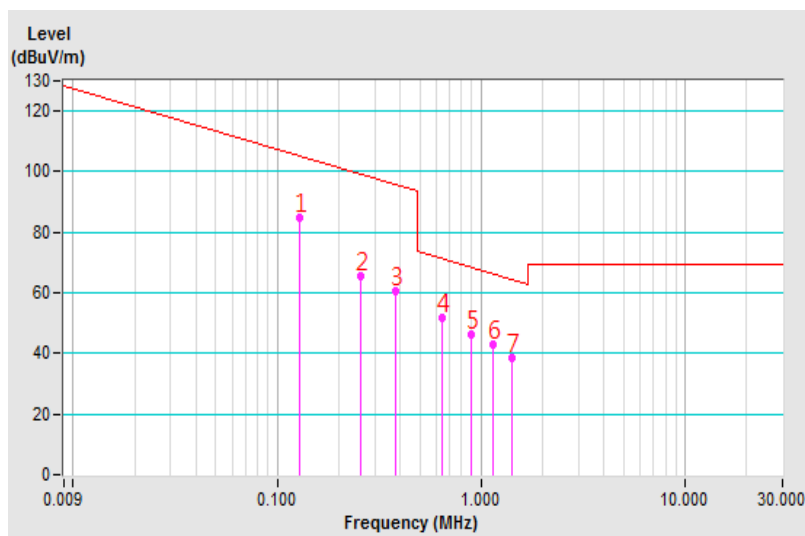
Charging Mode

Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 30MHz		
Test Mode	A		

Antenna Polarity & Test Distance: Loop Antenna Parallel At 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*0.1277	84.67 QP	105.48	-20.81	1.00	160	65.42	19.25
2	0.2554	65.64 QP	99.46	-33.82	1.00	233	51.56	14.08
3	0.3831	60.70 QP	95.94	-35.24	1.00	93	49.88	10.82
4	0.6385	51.71 QP	71.50	-19.79	1.00	202	44.05	7.66
5	0.8939	46.41 QP	68.58	-22.17	1.00	0	40.76	5.65
6	1.1493	42.86 QP	66.40	-23.54	1.00	179	38.31	4.55
7	1.4047	38.47 QP	64.65	-26.18	1.00	127	34.37	4.10

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

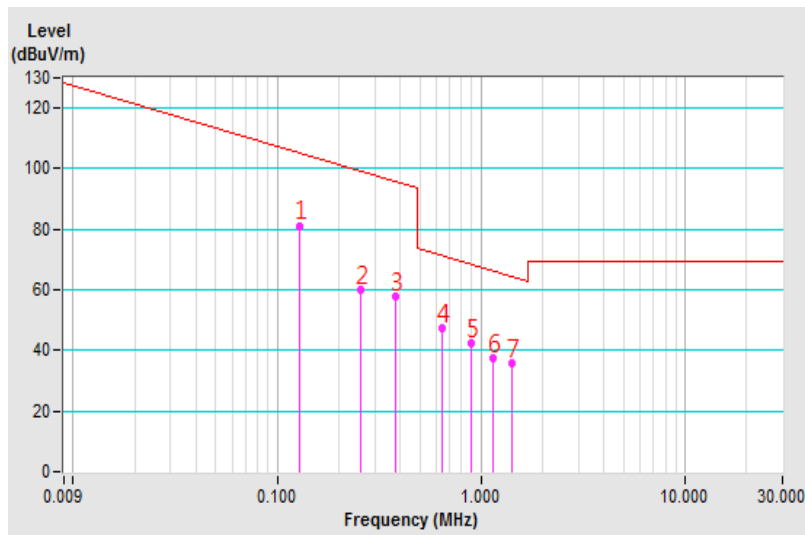


Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 30MHz		
Test Mode	A		

Antenna Polarity & Test Distance: Loop Antenna Perpendicular At 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*0.1277	81.25 QP	105.48	-24.23	1.00	360	62.00	19.25
2	0.2554	59.83 QP	99.46	-39.63	1.00	280	45.75	14.08
3	0.3831	57.67 QP	95.94	-38.27	1.00	241	46.85	10.82
4	0.6385	47.59 QP	71.50	-23.91	1.00	216	39.93	7.66
5	0.8939	42.49 QP	68.58	-26.09	1.00	185	36.84	5.65
6	1.1493	37.43 QP	66.40	-28.97	1.00	151	32.88	4.55
7	1.4047	35.66 QP	64.65	-28.99	1.00	126	31.56	4.10

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

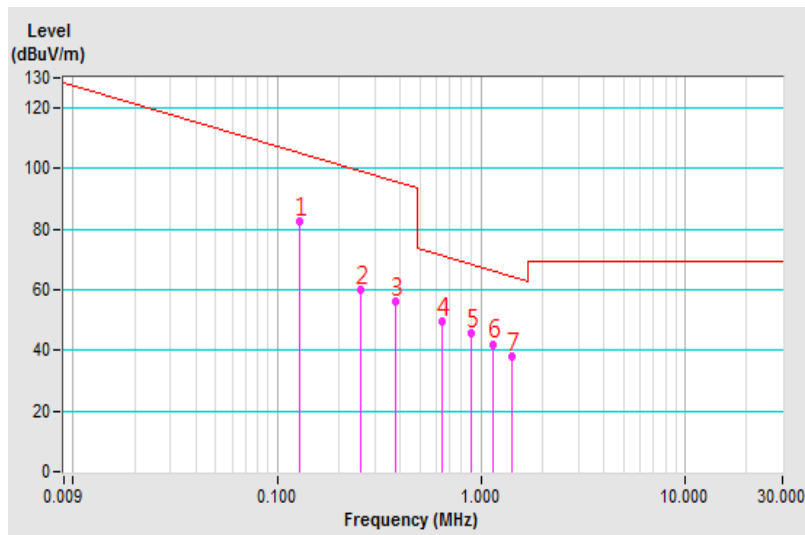


Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 30MHz		
Test Mode	A		

Antenna Polarity & Test Distance: Loop Antenna Ground-Parallel At 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*0.1277	82.69 QP	105.48	-22.79	1.00	15	63.44	19.25
2	0.2554	59.77 QP	99.46	-39.69	1.00	304	45.69	14.08
3	0.3831	56.07 QP	95.94	-39.87	1.00	260	45.25	10.82
4	0.6385	49.39 QP	71.50	-22.11	1.00	217	41.73	7.66
5	0.8939	45.81 QP	68.58	-22.77	1.00	204	40.16	5.65
6	1.1493	42.12 QP	66.40	-24.28	1.00	191	37.57	4.55
7	1.4047	38.11 QP	64.65	-26.54	1.00	181	34.01	4.10

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40



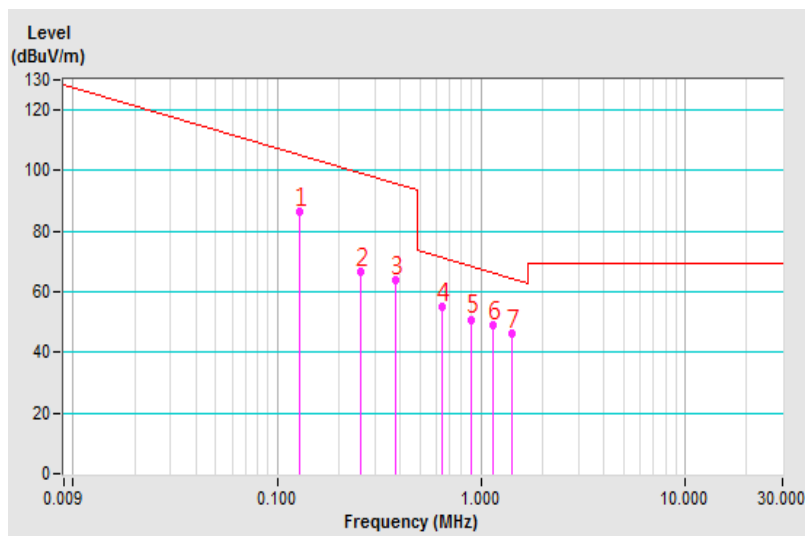
Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 30MHz		
Test Mode	B		

Antenna Polarity & Test Distance: Loop Antenna Parallel At 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*0.1277	86.44 QP	105.48	-19.04	1.00	240	67.19	19.25
2	0.2554	66.50 QP	99.46	-32.96	1.00	240	52.42	14.08
3	0.3831	63.88 QP	95.94	-32.06	1.00	287	53.06	10.82
4	0.6385	55.22 QP	71.50	-16.28	1.00	313	47.56	7.66
5	0.8939	50.94 QP	68.58	-17.64	1.00	360	45.29	5.65
6	1.1493	48.98 QP	66.40	-17.42	1.00	341	44.43	4.55
7	1.4047	46.09 QP	64.65	-18.56	1.00	356	41.99	4.10

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

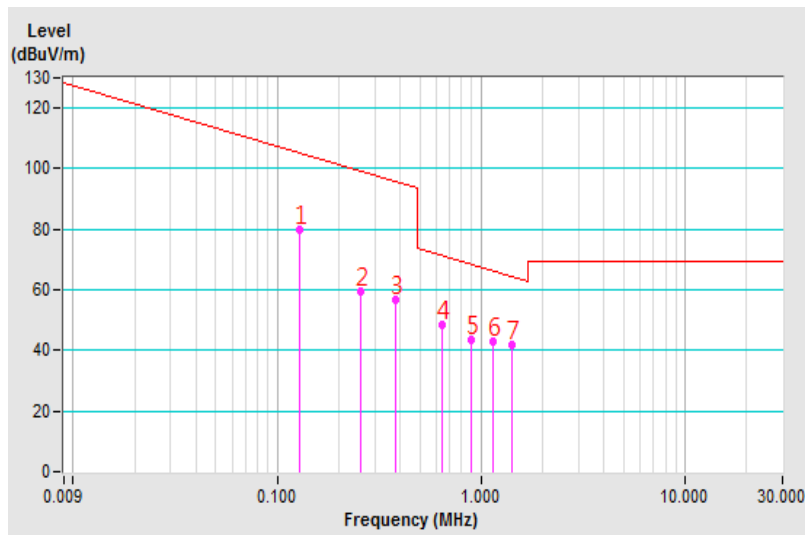


Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 30MHz		
Test Mode	B		

Antenna Polarity & Test Distance: Loop Antenna Perpendicular At 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*0.1277	79.97 QP	105.48	-25.51	1.00	331	60.72	19.25
2	0.2554	59.40 QP	99.46	-40.06	1.00	133	45.32	14.08
3	0.3831	56.81 QP	95.94	-39.13	1.00	165	45.99	10.82
4	0.6385	48.59 QP	71.50	-22.91	1.00	183	40.93	7.66
5	0.8939	43.66 QP	68.58	-24.92	1.00	196	38.01	5.65
6	1.1493	43.05 QP	66.40	-23.35	1.00	208	38.50	4.55
7	1.4047	41.72 QP	64.65	-22.93	1.00	220	37.62	4.10

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

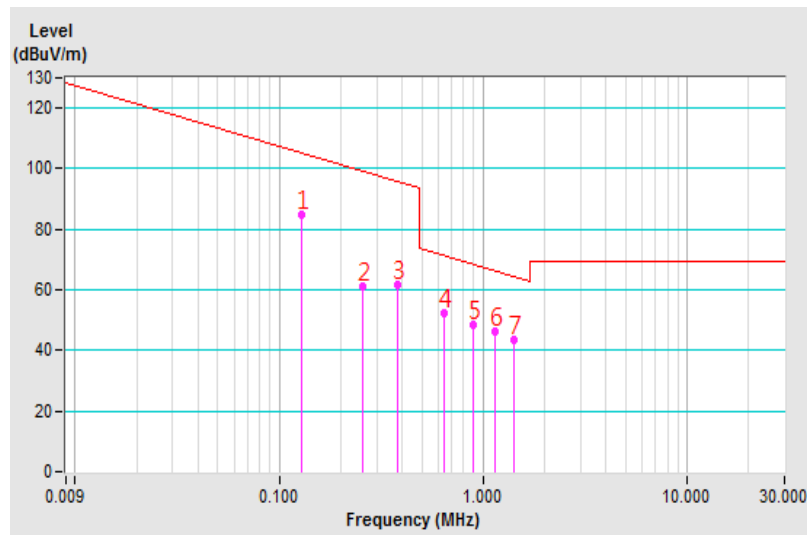


Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 30MHz		
Test Mode	B		

Antenna Polarity & Test Distance: Loop Antenna Ground-Parallel At 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*0.1277	84.64 QP	105.48	-20.84	1.00	332	65.39	19.25
2	0.2554	61.16 QP	99.46	-38.30	1.00	298	47.08	14.08
3	0.3831	61.58 QP	95.94	-34.36	1.00	238	50.76	10.82
4	0.6385	52.10 QP	71.50	-19.40	1.00	166	44.44	7.66
5	0.8939	48.52 QP	68.58	-20.06	1.00	135	42.87	5.65
6	1.1493	46.22 QP	66.40	-20.18	1.00	116	41.67	4.55
7	1.4047	43.42 QP	64.65	-21.23	1.00	104	39.32	4.10

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40



Standby Mode

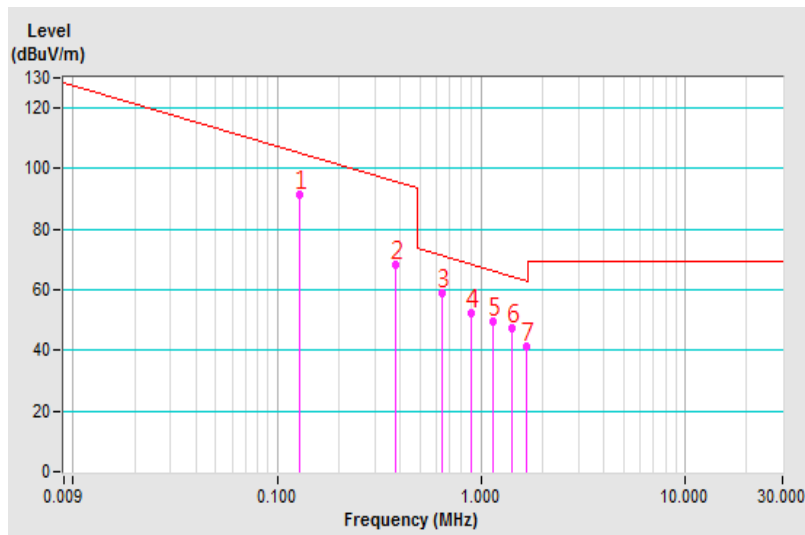
Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 30MHz		
Test Mode	C		

Antenna Polarity & Test Distance: Loop Antenna Parallel At 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*0.1277	91.53 QP	105.48	-13.95	1.00	14	72.28	19.25
2	0.3831	68.04 QP	95.94	-27.90	1.00	353	57.22	10.82
3	0.6385	59.04 QP	71.50	-12.46	1.00	281	51.38	7.66
4	0.8939	52.54 QP	68.58	-16.04	1.00	261	46.89	5.65
5	1.1493	49.39 QP	66.40	-17.01	1.00	251	44.84	4.55
6	1.4047	47.20 QP	64.65	-17.45	1.00	238	43.10	4.10
7	1.6601	41.32 QP	63.20	-21.88	1.00	217	37.66	3.66

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

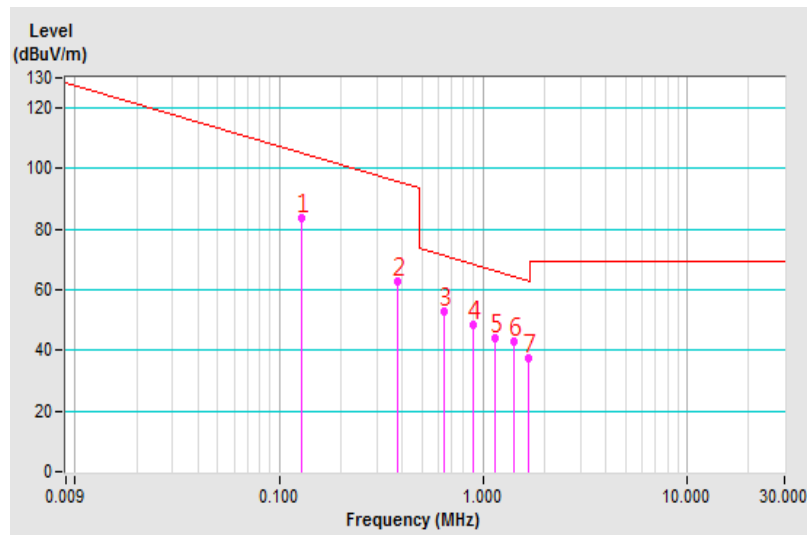


Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 30MHz		
Test Mode	C		

Antenna Polarity & Test Distance: Loop Antenna Perpendicular At 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*0.1277	83.86 QP	105.48	-21.62	1.00	283	64.61	19.25
2	0.3831	62.84 QP	95.94	-33.10	1.00	34	52.02	10.82
3	0.6385	52.81 QP	71.50	-18.69	1.00	95	45.15	7.66
4	0.8939	48.49 QP	68.58	-20.09	1.00	109	42.84	5.65
5	1.1493	44.19 QP	66.40	-22.21	1.00	124	39.64	4.55
6	1.4047	42.86 QP	64.65	-21.79	1.00	178	38.76	4.10
7	1.6601	37.22 QP	63.20	-25.98	1.00	296	33.56	3.66

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

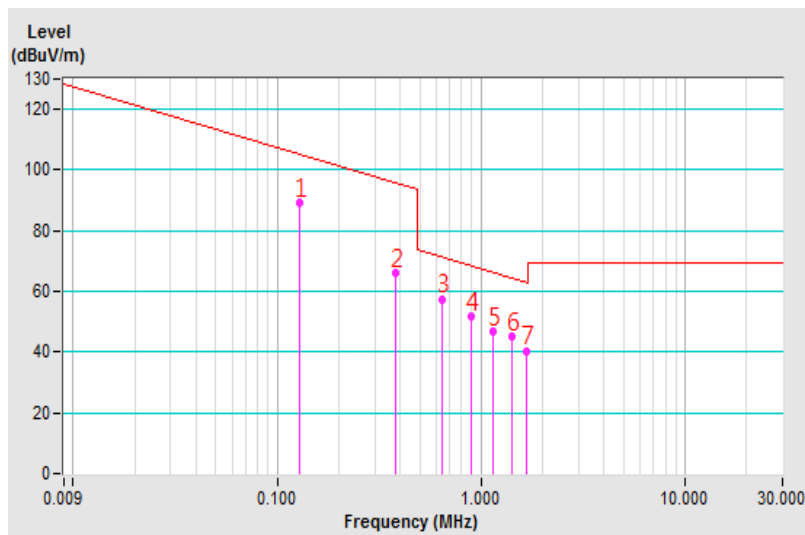


Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 30MHz		
Test Mode	C		

Antenna Polarity & Test Distance: Loop Antenna Ground-Parallel At 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*0.1277	89.47 QP	105.48	-16.01	1.00	0	70.22	19.25
2	0.3831	66.28 QP	95.94	-29.66	1.00	74	55.46	10.82
3	0.6385	57.53 QP	71.50	-13.97	1.00	96	49.87	7.66
4	0.8939	51.59 QP	68.58	-16.99	1.00	116	45.94	5.65
5	1.1493	47.03 QP	66.40	-19.37	1.00	130	42.48	4.55
6	1.4047	45.35 QP	64.65	-19.30	1.00	145	41.25	4.10
7	1.6601	40.45 QP	63.20	-22.75	1.00	213	36.79	3.66

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40



Above 30MHz Data:

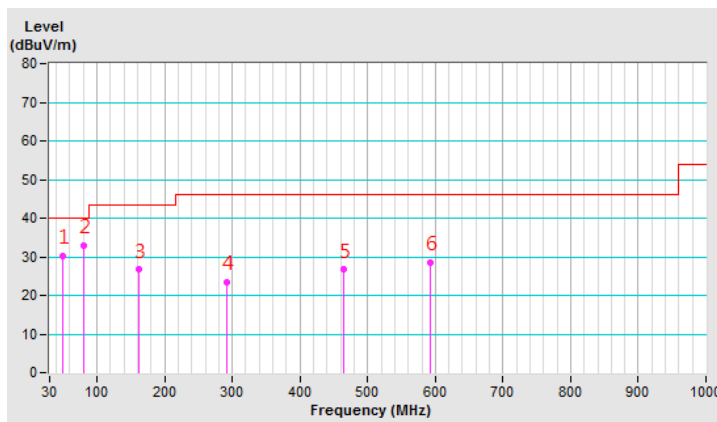
Charging Mode

Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		
Test Mode	A		

Antenna Polarity & Test Distance: Horizontal At 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	48.43	30.19 QP	40.00	-9.81	1.23 H	130	37.24	-7.05
2	80.44	32.98 QP	40.00	-7.02	1.00 H	73	44.56	-11.58
3	161.92	26.66 QP	43.50	-16.84	1.62 H	168	33.21	-6.55
4	291.90	23.47 QP	46.00	-22.53	2.03 H	209	28.57	-5.10
5	464.56	26.66 QP	46.00	-19.34	2.32 H	238	27.84	-1.18
6	592.60	28.60 QP	46.00	-17.40	2.59 H	264	26.91	1.69

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.



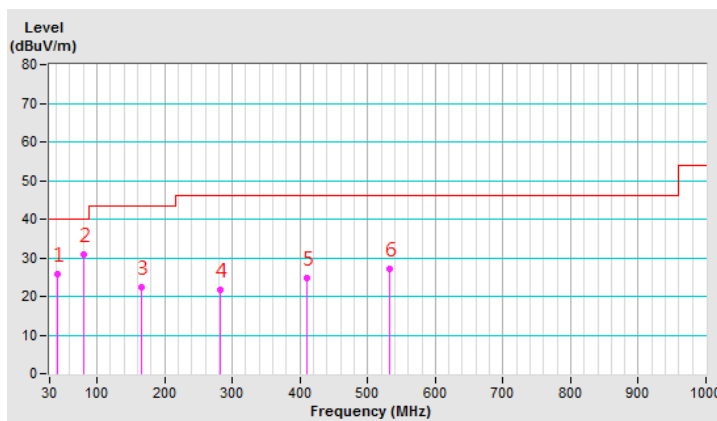
Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		
Test Mode	A		

Antenna Polarity & Test Distance: Vertical At 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	41.64	25.69 QP	40.00	-14.31	1.00 V	186	33.25	-7.56
2	79.47	30.99 QP	40.00	-9.01	1.00 V	223	42.29	-11.30
3	164.83	22.41 QP	43.50	-21.09	1.00 V	250	29.08	-6.67
4	281.23	21.70 QP	46.00	-24.30	1.20 V	298	27.09	-5.39
5	410.24	24.68 QP	46.00	-21.32	1.56 V	333	27.54	-2.86
6	531.49	27.27 QP	46.00	-18.73	1.86 V	360	27.34	-0.07

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.

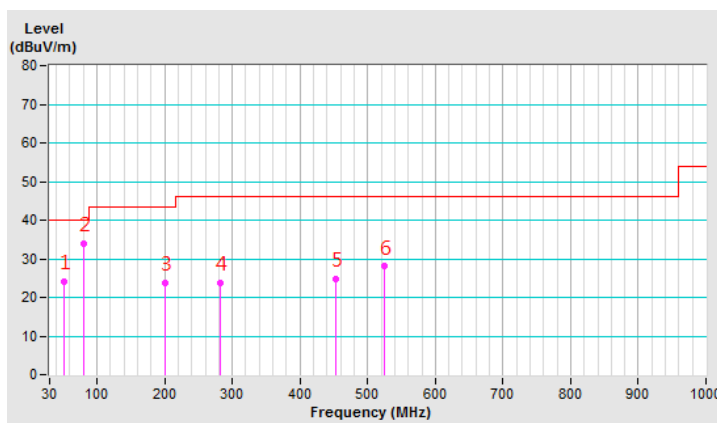


Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		
Test Mode	B		

Antenna Polarity & Test Distance: Horizontal At 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	51.34	24.19 QP	40.00	-15.81	1.00 H	56	31.30	-7.11
2	80.44	33.98 QP	40.00	-6.02	1.00 H	97	45.56	-11.58
3	199.75	23.81 QP	43.50	-19.69	2.18 H	229	33.22	-9.41
4	281.23	23.71 QP	46.00	-22.29	1.34 H	146	29.10	-5.39
5	452.92	24.90 QP	46.00	-21.10	1.65 H	177	26.32	-1.42
6	523.73	28.05 QP	46.00	-17.95	2.53 H	264	28.24	-0.19

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.



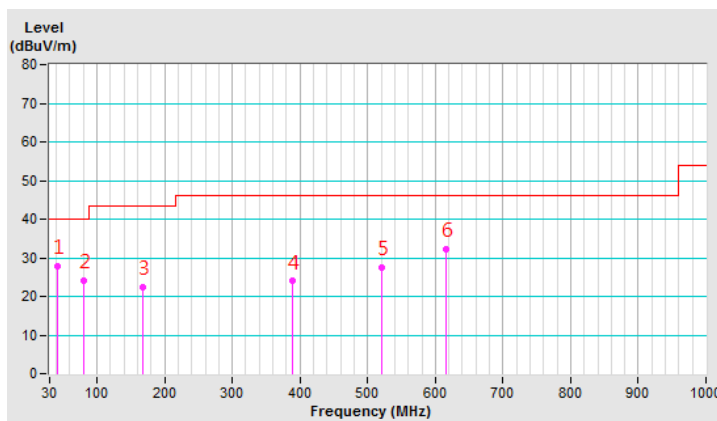
Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		
Test Mode	B		

Antenna Polarity & Test Distance: Vertical At 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	41.64	27.91 QP	40.00	-12.09	1.04 V	47	35.47	-7.56
2	80.44	24.07 QP	40.00	-15.93	1.27 V	72	35.65	-11.58
3	167.74	22.44 QP	43.50	-21.06	1.61 V	106	29.24	-6.80
4	388.90	23.93 QP	46.00	-22.07	1.94 V	139	27.04	-3.11
5	521.79	27.55 QP	46.00	-18.45	2.50 V	194	27.78	-0.23
6	615.88	32.35 QP	46.00	-13.65	2.23 V	167	30.16	2.19

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.



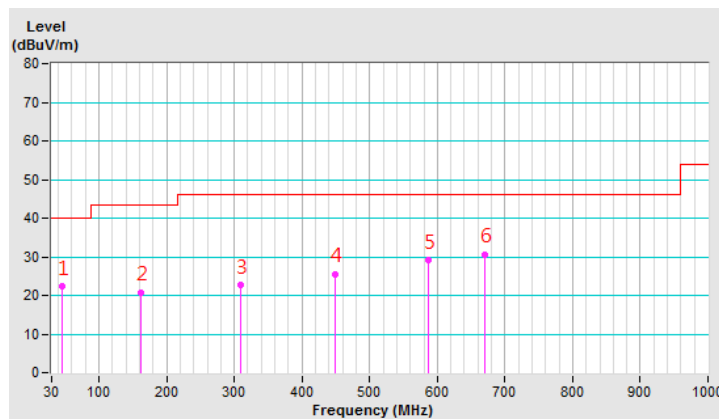
Standby Mode

Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		
Test Mode	C		

Antenna Polarity & Test Distance: Horizontal At 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	44.55	22.22 QP	40.00	-17.78	1.57 H	308	29.50	-7.28
2	161.92	20.62 QP	43.50	-22.88	1.95 H	270	27.17	-6.55
3	308.39	22.58 QP	46.00	-23.42	2.27 H	238	27.21	-4.63
4	449.04	25.59 QP	46.00	-20.41	2.84 H	182	27.13	-1.54
5	587.75	29.01 QP	46.00	-16.99	3.61 H	106	27.43	1.58
6	670.20	30.54 QP	46.00	-15.46	3.23 H	144	27.64	2.90

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.



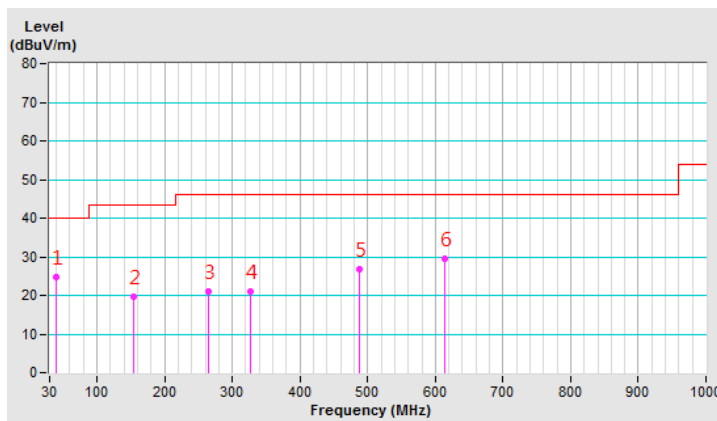
Test Frequency	127.7kHz	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		
Test Mode	C		

Antenna Polarity & Test Distance: Vertical At 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	38.73	24.73 QP	40.00	-15.27	1.41 V	56	32.73	-8.00
2	154.16	19.73 QP	43.50	-23.77	1.37 V	137	26.29	-6.56
3	264.74	21.08 QP	46.00	-24.92	2.55 V	355	27.34	-6.26
4	326.82	21.17 QP	46.00	-24.83	1.09 V	164	25.33	-4.16
5	486.87	26.77 QP	46.00	-19.23	1.39 V	241	27.64	-0.87
6	614.91	29.59 QP	46.00	-16.41	1.92 V	293	27.44	2.15

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.



5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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