

FCC Test Report

Report No.: RF191002E01 R1

FCC ID: JNZPR0004

Test Model: PR0004

Received Date: Oct. 02, 2019

Test Date: Oct. 05 to Nov. 15, 2019

Issued Date: Dec. 13, 2019

Applicant: LOGITECH FAR EAST LTD.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

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Taiwan

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan.

**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF191002E01	Original release.	Dec. 02, 2019
RF191002E01 R1	Revised the radiated emission and page 13 note 3.	Dec. 13, 2019

1 Certificate of Conformity

Product: Powered Wireless Charging Pad

Brand: Logitech

Test Model: PR0004

Sample Status: ENGINEERING SAMPLE

Applicant: LOGITECH FAR EAST LTD.

Test Date: Oct. 05 to Nov. 15, 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 : Vivian Huang , **Date:** Dec. 13, 2019
Vivian Huang / Specialist

Approved by : Clark Lin , **Date:** Dec. 13, 2019
Clark Lin / 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	Pass	Meet the requirement of limit. Minimum passing margin is -10.38 dB at 0.15781MHz.
15.209	Radiated Emission Test	Pass	Meet the requirement of limit. Minimum passing margin is -5.8 dB at 578.44 MHz

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.8 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.0 dB
	30MHz ~ 1000MHz	4.9 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Powered Wireless Charging Pad
Brand	Logitech
Test Model	PR0004
Sample Status	ENGINEERING SAMPLE
Rating	DC 19V from power adapter
Operating Frequency	127.795 kHz
Antenna Type	Coil Antenna
Field Strength	0.14 dBuV/m
Dimensions	85*85*13 mm
Accessory Device	Adapter x1
Data Cable Supplied	N/A
Maximum Power Output from the Charging Coil	10W

Note:

1. The EUT may have a lot of colors for marketing requirement.
2. The EUT could be supplied with a power adapter as the following table:

Adapter No.	Brand	Model No.	Spec.	Color
1	logi	AD2103320	Input: 100-240V, 0.7A, 50/60Hz Output: 19V, 1.32A DC Cable: 1.5m	White
2	logi	AD2103320	Input: 100-240V, 0.7A, 50/60Hz Output: 19V, 1.32A DC Cable: 1.5m	Black

Note: From the above adapters, **Adapter 1** was selected as representative adapter for the test and its data was recorded in this report.

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

The following test frequency is provided to this EUT:

Operating Frequency (kHz)	Test Mode
127.795	Charging Mode
127.795	Standby Mode

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To		Description
	RE<1G	PLC	
1	√	√	Charging Mode
2	√	√	Standby Mode

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

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.

Operating Frequency (kHz)	Tested Frequency (kHz)
127.795	127.795

Power Line Conducted Emission Test:

- ☒ 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.

Operating Frequency (kHz)	Tested Frequency (kHz)
127.795	127.795

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE<1G	25 deg. C, 65% RH	120Vac, 60Hz	Nelson Teng
PLC	24 deg. C, 76% RH	120Vac, 60Hz	Andy Ho

3.3 Description of Support Units

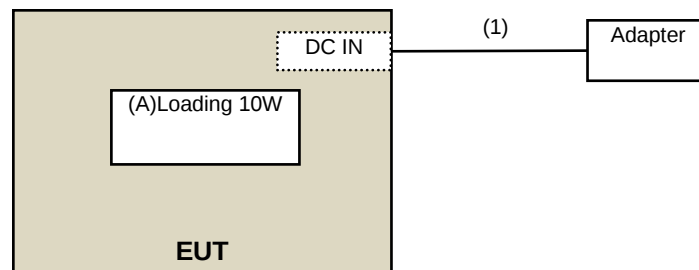
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Loading 10W	NA	NA	NA	NA	Supplied by client(for RF Setup)

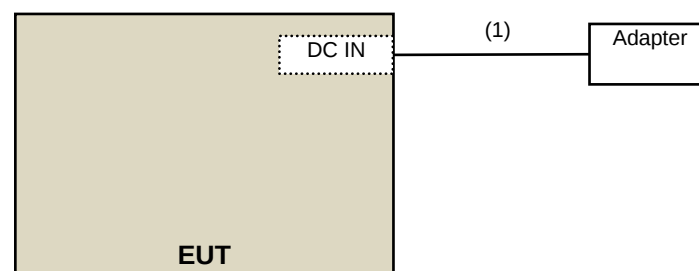
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.5	No	0	Supplied by client

3.3.1 Configuration of System under Test

Charging Mode



Standby Mode:



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		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)	Field Strength		Measurement Distance (meters)
	uV/m	dBuV/m	
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

4.1.2 Test Instruments

For Charging Mode:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCi	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 30, 2018	Oct. 29, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-4-1	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-2	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-3	Mar. 19, 2019	Mar. 18, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 26, 2019	Sep. 25, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Oct. 05, 2019

For Standby Mode:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 23, 2019	Oct. 22, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-4-1	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-2	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-3	Mar. 19, 2019	Mar. 18, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 26, 2019	Sep. 25, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Nov. 14, 2019

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.
3. KDB 414788 OATS and Chamber Correlation Justification
-Based on FCC 15.31(f)(2) : measurements may be performed at a distance closer than that specified in the regulations; however, an attempts should be made to avoid making measurements in the near field.
-OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

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.

Note:

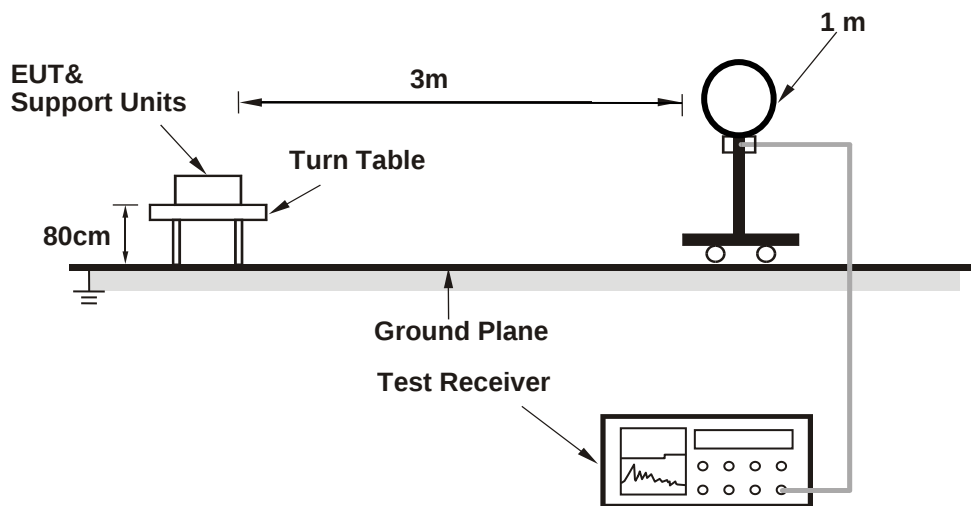
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (AV) at frequency below 1GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

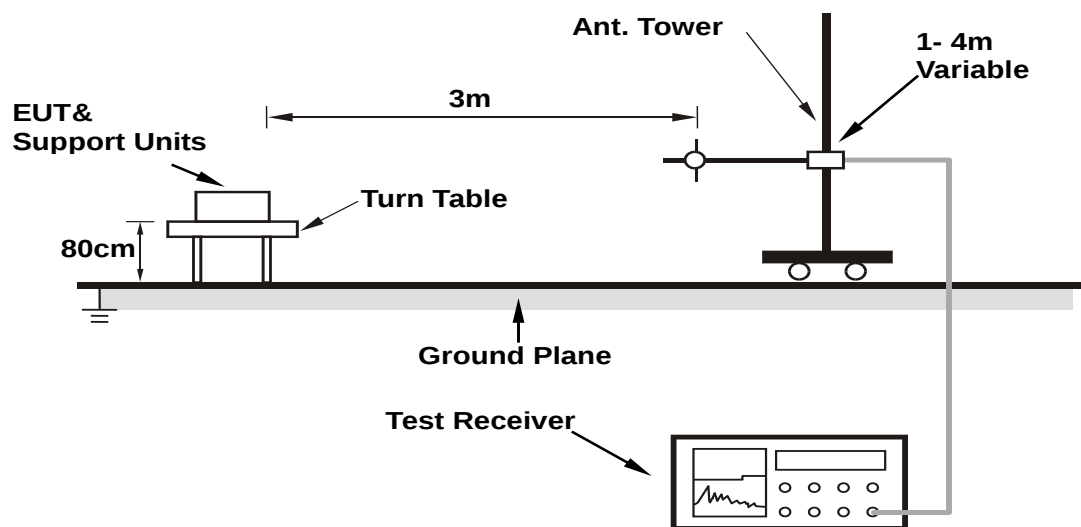
No deviation.

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 1:

- The EUT powered by adapter.
- The EUT is under the test mode when turn on the power.

Test Mode 2:

- The EUT powered by adapter.
- Set the EUT under standby condition.

4.1.7 Test Results

Below 30MHz Data:

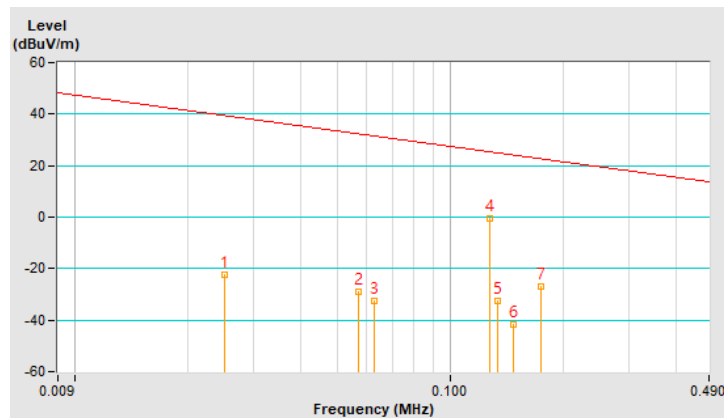
Charging Mode

TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Average (AV)
FREQUENCY RANGE	9kHz ~ 490kHz		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA PARALLEL AT 300 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	0.025	-22.37 AV	39.65	-62.02	1	121	27.8	29.83
2	0.057	-28.86 AV	32.49	-61.35	1	301	29.12	22.02
3	0.063	-32.58 AV	31.62	-64.2	1	360	26.18	21.24
4	0.128	-0.45 AV	25.46	-25.91	1	242	64.33	15.22
5	0.134	-32.29 AV	25.06	-57.35	1	21	32.75	14.96
6	0.148	-41.54 AV	24.2	-65.74	1	260	24.07	14.39
7	0.174	-27.09 AV	22.79	-49.88	1	262	39.6	13.31

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. Loop antenna was used for all radiated emission below 30MHz.
6. Data @300m=Data @3m-40log(300 / 3)=Data @3m-80

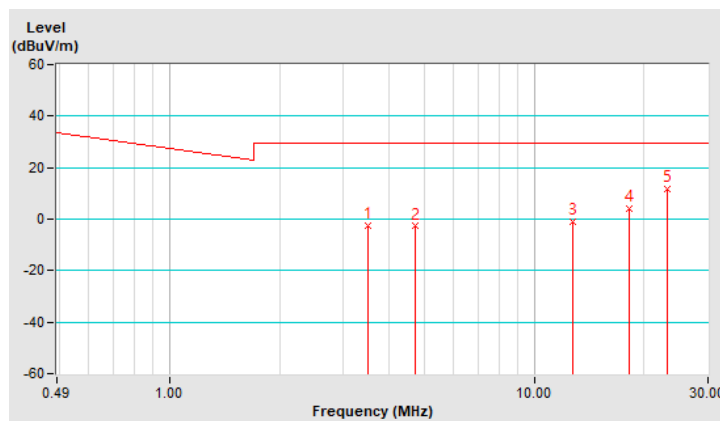


TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	490kHz ~ 30MHz		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA PARALLEL AT 30 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	3.504	-2.69 QP	29.54	-32.23	1	162	40.86	-3.55
2	4.735	-2.77 QP	29.54	-32.31	1	176	40.87	-3.64
3	12.807	-1.11 QP	29.54	-30.65	1	166	42.2	-3.31
4	18.244	3.96 QP	29.54	-25.58	1	18	48.21	-4.25
5	23.129	11.7 QP	29.54	-17.84	1	177	55.79	-4.09

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. Loop antenna was used for all radiated emission below 30MHz.
6. Limit @30m=Limit@3m-40log(30 / 3)=Limit@3m-40

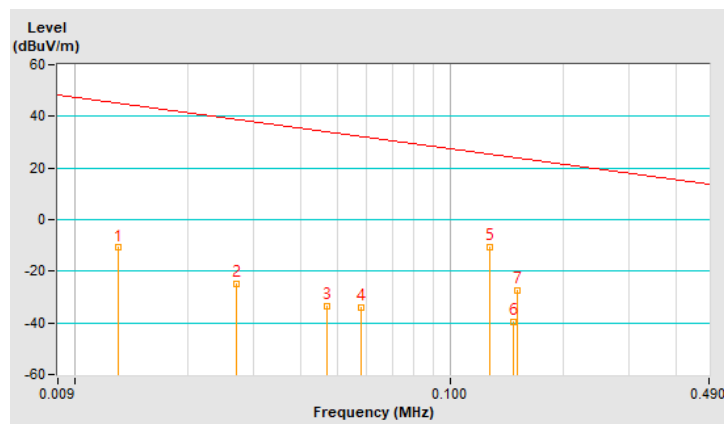


TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Average (AV)
FREQUENCY RANGE	9kHz ~ 490kHz		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA PERPENDICULAR AT 300 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	0.013	-10.9 AV	45.33	-56.23	1	360	33.63	35.47
2	0.027	-24.82 AV	38.98	-63.8	1	30	26.22	28.96
3	0.047	-33.32 AV	34.16	-67.48	1	121	23.04	23.64
4	0.058	-34.19 AV	32.34	-66.53	1	242	23.91	21.9
5	0.128	-10.45 AV	25.46	-35.91	1	331	54.33	15.22
6	0.148	-39.77 AV	24.2	-63.97	1	357	25.84	14.39
7	0.151	-27.23 AV	24.02	-51.25	1	254	38.5	14.27

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. Loop antenna was used for all radiated emission below 30MHz.
6. Data @300m=Data @3m-40log(300 / 3)=Data @3m-80

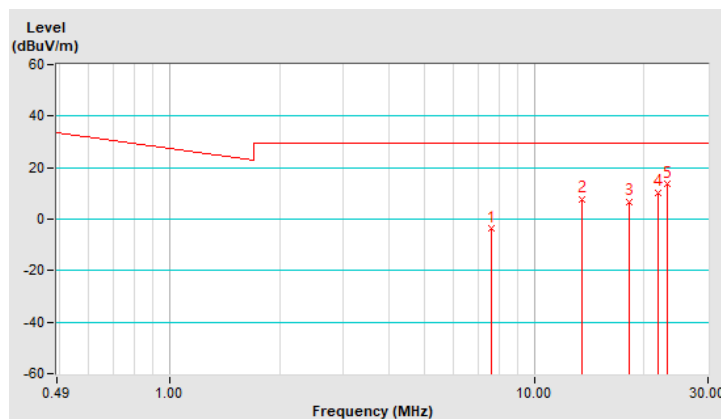


TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	490kHz ~ 30MHz		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA PERPENDICULAR AT 30 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	7.636	-3.76 QP	29.54	-33.3	1	246	39.45	-3.21
2	13.56	7.82 QP	29.54	-21.72	1	155	51.25	-3.43
3	18.244	6.57 QP	29.54	-22.97	1	41	50.82	-4.25
4	21.873	10.28 QP	29.54	-19.26	1	5	54.56	-4.28
5	23.128	13.49 QP	29.54	-16.05	1	360	57.58	-4.09

REMARKS:

1. E 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. Loop antenna was used for all radiated emission below 30MHz.
6. Limit @30m=Limit@3m-40log(30 / 3)=Limit@3m-40

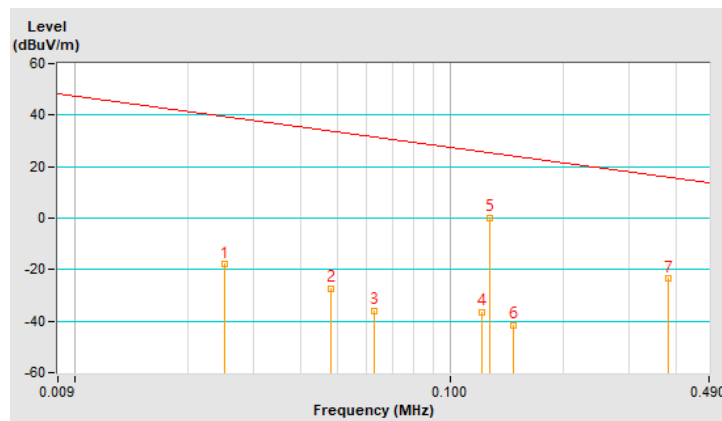


TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Average (AV)
FREQUENCY RANGE	9kHz ~ 490kHz		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA GROUND-PARALLEL AT 300 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	0.025	-17.98 AV	39.65	-57.63	1	357	32.19	29.83
2	0.048	-27.4 AV	33.98	-61.38	1	36	29.18	23.42
3	0.063	-35.99 AV	31.62	-67.61	1	342	22.77	21.24
4	0.122	-36.49 AV	25.88	-62.37	1	342	28.05	15.46
5	0.128	0.14 AV	25.46	-25.32	1	330	64.92	15.22
6	0.148	-41.77 AV	24.2	-65.97	1	15	23.84	14.39
7	0.383	-23.58 AV	15.94	-39.52	1	131	49.73	6.69

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.
5. Loop antenna was used for all radiated emission below 30MHz.
6. Data @300m=Data @3m-40log(300 / 3)=Data @3m-80

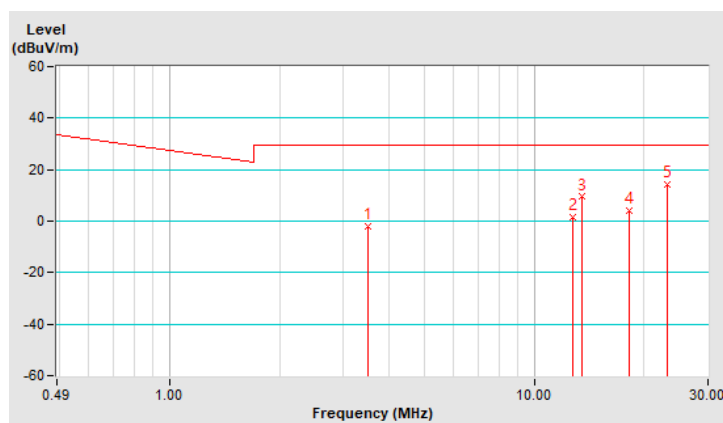


TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	490kHz ~ 30MHz		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA GROUND-PARALLEL AT 30 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	3.509	-1.84 QP	29.54	-31.38	1	35	41.71	-3.55
2	12.748	1.67 QP	29.54	-27.87	1	127	44.96	-3.29
3	13.56	9.43 QP	29.54	-20.11	1	235	52.86	-3.43
4	18.243	4.27 QP	29.54	-25.27	1	18	48.52	-4.25
5	23.128	14.31 QP	29.54	-15.23	1	31	58.4	-4.09

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. Loop antenna was used for all radiated emission below 30MHz.
6. Limit @30m=Limit@3m-40log(30 / 3)=Limit@3m-40



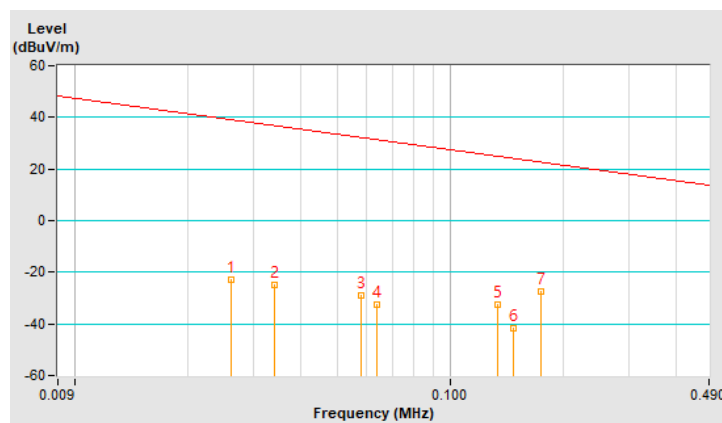
Standby Mode

TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Average (AV)
FREQUENCY RANGE	9kHz ~ 490kHz		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA PARALLEL AT 300 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	0.026	-22.76 AV	39.3	-62.06	1	128	27.84	29.4
2	0.034	-24.81 AV	36.97	-61.78	1	58	28.49	26.7
3	0.058	-28.98 AV	32.34	-61.32	1	299	29.12	21.9
4	0.064	-32.49 AV	31.48	-63.97	1	111	26.41	21.1
5	0.134	-32.31 AV	25.06	-57.37	1	25	32.73	14.96
6	0.148	-41.54 AV	24.2	-65.74	1	260	24.07	14.39
7	0.174	-27.33 AV	22.79	-50.12	1	315	39.36	13.31

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. Loop antenna was used for all radiated emission below 30MHz.
6. Data @300m=Data @3m-40log(300 / 3)=Data @3m-80

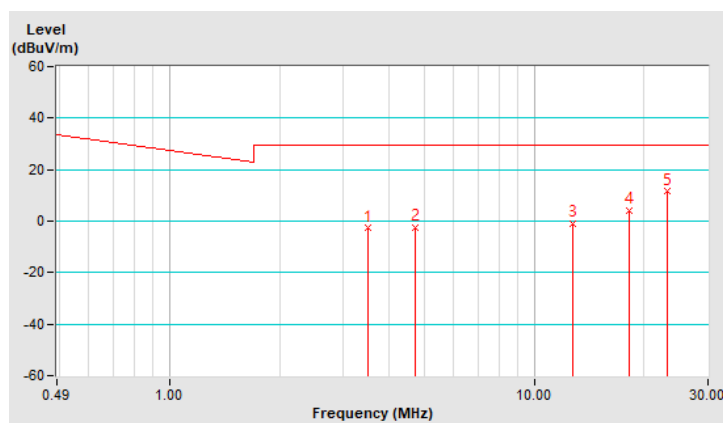


TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	490kHz ~ 30MHz		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA PARALLEL AT 30 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	3.502	-2.78 QP	29.54	-32.32	1	282	40.77	-3.55
2	4.736	-2.59 QP	29.54	-32.13	1	37	41.05	-3.64
3	12.805	-1.1 QP	29.54	-30.64	1	145	42.2	-3.3
4	18.235	4 QP	29.54	-25.54	1	242	48.25	-4.25
5	23.13	11.5 QP	29.54	-18.04	1	200	55.59	-4.09

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. Loop antenna was used for all radiated emission below 30MHz.
6. Limit @30m=Limit@3m-40log(30 / 3)=Limit@3m-40

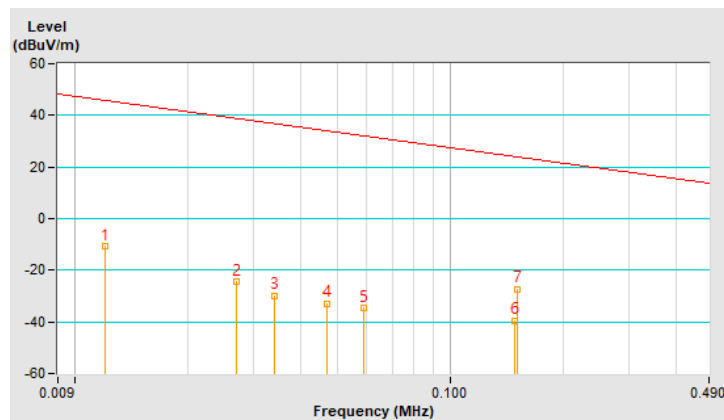


TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Average (AV)
FREQUENCY RANGE	9kHz ~ 490kHz		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA PERPENDICULAR AT 300 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	0.012	-10.88 AV	46.02	-56.9	1	360	33.16	35.96
2	0.027	-24.59 AV	38.98	-63.57	1	27	26.45	28.96
3	0.034	-29.89 AV	36.97	-66.86	1	241	23.41	26.7
4	0.047	-33.09 AV	34.16	-67.25	1	45	23.27	23.64
5	0.059	-34.83 AV	32.19	-67.02	1	265	23.41	21.76
6	0.149	-39.73 AV	24.14	-63.87	1	350	25.92	14.35
7	0.151	-27.5 AV	24.02	-51.52	1	215	38.23	14.27

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. Loop antenna was used for all radiated emission below 30MHz.
6. Data @300m=Data @3m-40log(300 / 3)=Data @3m-80

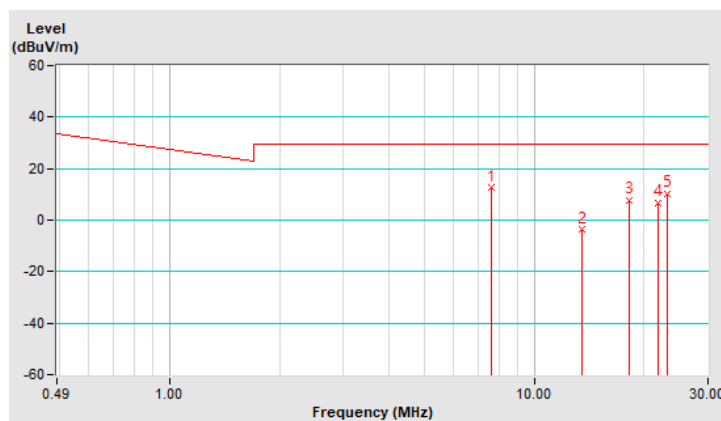


TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	490kHz ~ 30MHz		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA PERPENDICULAR AT 30 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	7.639	12.5 QP	29.54	-17.04	1	215	38.23	14.27
2	13.56	-3.78 QP	29.54	-33.32	1	360	39.43	-3.21
3	18.245	7.5 QP	29.54	-22.04	1	225	50.93	-3.43
4	21.875	6.6 QP	29.54	-22.94	1	142	50.85	-4.25
5	23.13	10.3 QP	29.54	-19.24	1	10	54.58	-4.28

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. Loop antenna was used for all radiated emission below 30MHz.
6. Limit @30m=Limit@3m-40log(30 / 3)=Limit@3m-40

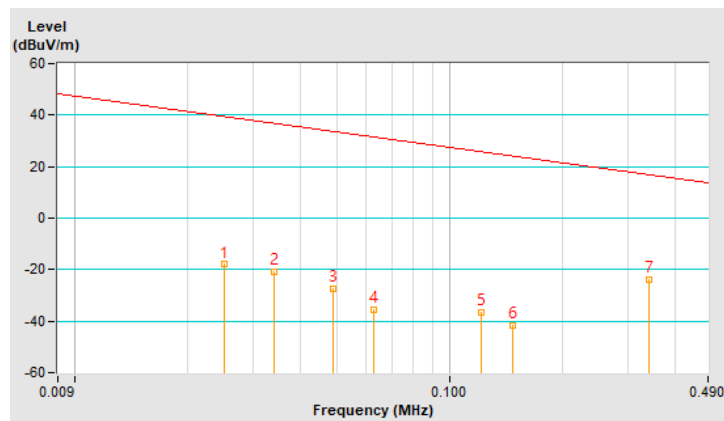


TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Average (AV)
FREQUENCY RANGE	9kHz ~ 490kHz		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA GROUND-PARALLEL AT 300 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	0.025	-18 AV	39.65	-57.65	1	360	32.17	29.83
2	0.034	-20.78 AV	36.97	-57.75	1	38	32.52	26.7
3	0.049	-27.51 AV	33.8	-61.31	1	227	29.31	23.18
4	0.063	-35.56 AV	31.62	-67.18	1	295	23.2	21.24
5	0.122	-36.51 AV	25.88	-62.39	1	137	28.03	15.46
6	0.148	-41.85 AV	24.2	-66.05	1	355	23.76	14.39
7	0.34	-23.75 AV	16.97	-40.72	1	125	48.84	7.41

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. Loop antenna was used for all radiated emission below 30MHz.
6. Data @300m=Data @3m-40log(300 / 3)=Data @3m-80

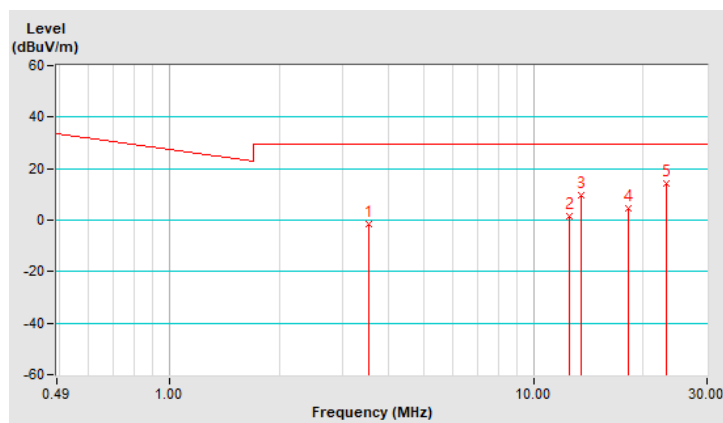


TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	490kHz ~ 30MHz		

ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA GROUND-PARALLEL AT 30 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	3.525	-1.42 QP	29.54	-30.96	1	77	42.14	-3.56
2	12.596	1.72 QP	29.54	-27.82	1	75	44.99	-3.27
3	13.558	9.58 QP	29.54	-19.96	1	241	53.01	-3.43
4	18.243	4.58 QP	29.54	-24.96	1	185	48.83	-4.25
5	23.128	14.3 QP	29.54	-15.24	1	25	58.39	-4.09

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. Loop antenna was used for all radiated emission below 30MHz.
6. Limit @30m=Limit@3m-40log(30 / 3)=Limit@3m-40



Above 30MHz Data:

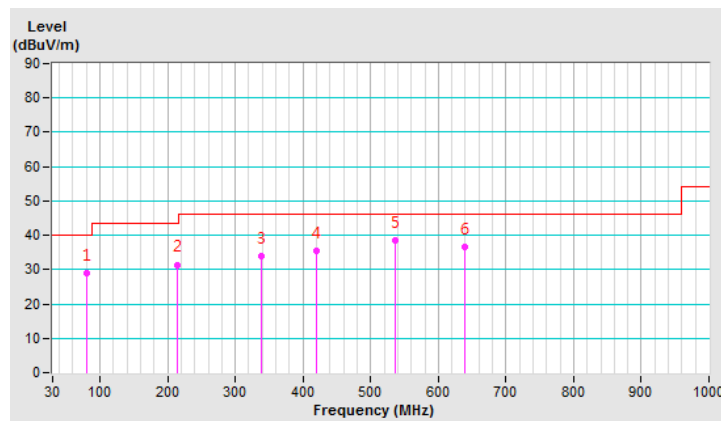
Charging Mode

TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	79.95	29.0 QP	40.0	-11.0	3.00 H	0	41.8	-12.8
2	213.94	31.5 QP	43.5	-12.0	1.00 H	290	41.8	-10.3
3	338.41	33.9 QP	46.0	-12.1	1.00 H	42	39.9	-6.0
4	420.79	35.5 QP	46.0	-10.5	2.00 H	314	39.0	-3.5
5	535.90	38.5 QP	46.0	-7.5	2.00 H	353	39.6	-1.1
6	638.46	36.5 QP	46.0	-9.5	2.00 H	360	35.0	1.5

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.

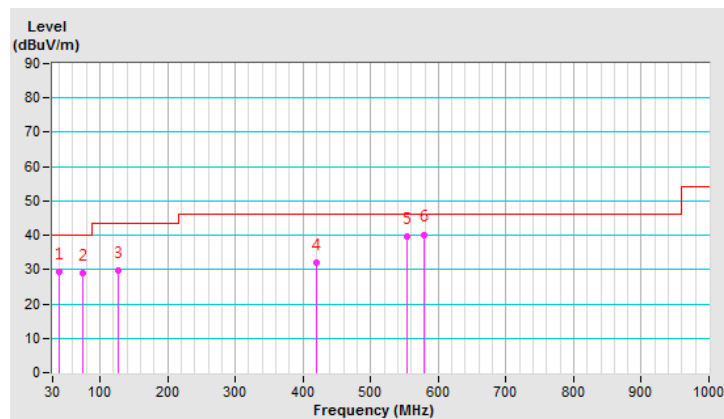


TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	38.80	29.3 QP	40.0	-10.7	1.00 V	312	37.9	-8.6
2	74.64	29.0 QP	40.0	-11.0	1.00 V	240	40.4	-11.4
3	126.83	29.8 QP	43.5	-13.7	1.00 V	336	39.2	-9.4
4	420.16	31.9 QP	46.0	-14.1	2.00 V	358	35.4	-3.5
5	553.39	39.8 QP	46.0	-6.2	1.00 V	209	40.6	-0.8
6	578.44	40.2 QP	46.0	-5.8	1.00 V	209	40.2	0.0

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.



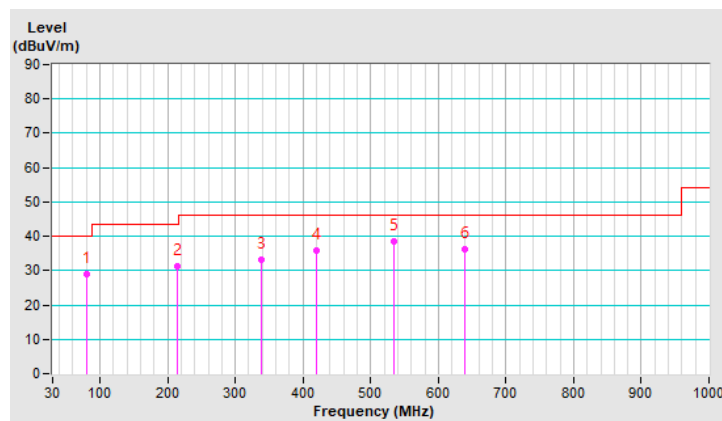
Standby Mode

TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	80.10	29.1 QP	40.0	-10.9	3.00 H	245	42.0	-12.9
2	214.01	31.2 QP	43.5	-12.3	1.00 H	162	41.5	-10.3
3	338.62	33.3 QP	46.0	-12.7	1.00 H	55	39.3	-6.0
4	420.80	35.7 QP	46.0	-10.3	2.00 H	305	39.2	-3.5
5	535.22	38.5 QP	46.0	-7.5	2.00 H	360	39.6	-1.1
6	638.43	36.2 QP	46.0	-9.8	2.00 H	360	34.7	1.5

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.

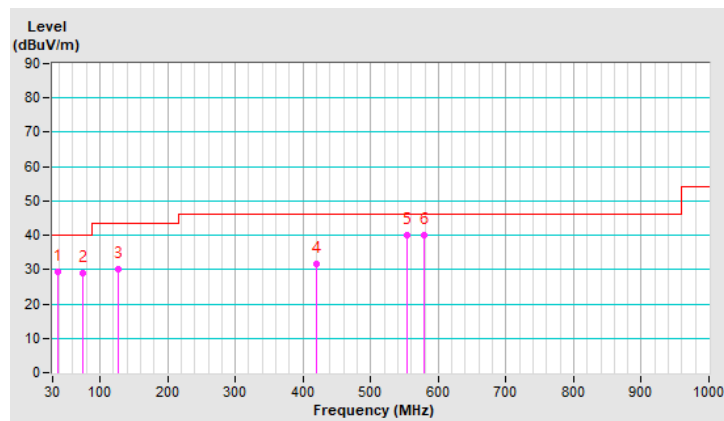


TEST FREQUENCY	127.795 kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	38.66	29.2 QP	40.0	-10.8	1.00 V	345	37.9	-8.7
2	74.72	29.1 QP	40.0	-10.9	1.00 V	210	40.6	-11.5
3	126.79	30.0 QP	43.5	-13.5	1.00 V	245	39.4	-9.4
4	420.89	31.6 QP	46.0	-14.4	2.00 V	52	35.1	-3.5
5	553.40	39.9 QP	46.0	-6.1	1.00 V	315	40.7	-0.8
6	578.86	40.0 QP	46.0	-6.0	1.00 V	222	40.0	0.0

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.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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.

4.2.2 Test Instruments

For Charging Mode

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
Software BVADT	BVADT_Cond_V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
- 3 Tested Date: Oct. 07, 2019

For Standby Mode

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	N/A	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
- 3 Tested Date: Nov. 15, 2019

4.2.3 Test Procedures

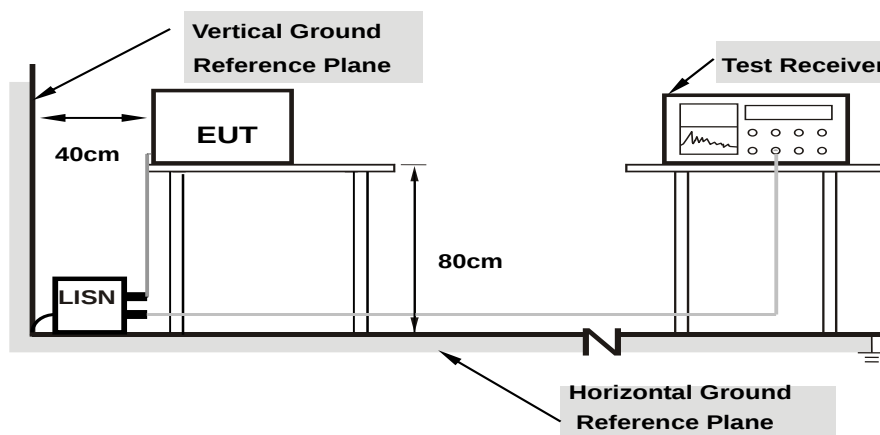
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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) were not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: Support units were connected to second LISN.

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

4.2.6 EUT Operating Conditions

Same as item 4.1.6.

4.2.7 Test Results

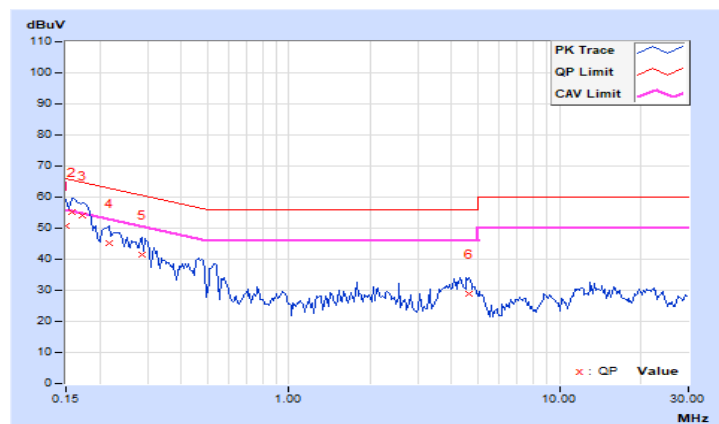
Charging Mode

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (AV) / Average (AV), 9kHz
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Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.97	40.83	25.07	50.80	35.04	66.00	56.00	-15.20	-20.96
2	0.15781	9.97	45.23	30.81	55.20	40.78	65.58	55.58	-10.38	-14.80
3	0.17344	9.97	44.01	31.75	53.98	41.72	64.79	54.79	-10.81	-13.07
4	0.21641	9.98	35.36	21.77	45.34	31.75	62.96	52.96	-17.62	-21.21
5	0.28672	9.98	31.53	21.69	41.51	31.67	60.62	50.62	-19.11	-18.95
6	4.63672	10.31	18.74	12.46	29.05	22.77	56.00	46.00	-26.95	-23.23

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 = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

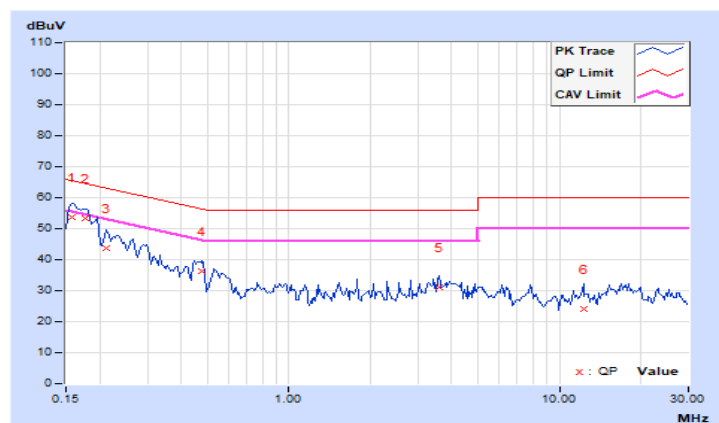


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (AV) / Average (AV), 9kHz
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	9.95	43.71	28.84	53.66	38.79	65.58	55.58	-11.92	-16.79
2	0.17734	9.96	43.34	31.36	53.30	41.32	64.61	54.61	-11.31	-13.29
3	0.21250	9.96	33.57	18.98	43.53	28.94	63.11	53.11	-19.58	-24.17
4	0.47813	9.99	26.33	18.00	36.32	27.99	56.37	46.37	-20.05	-18.38
5	3.57422	10.18	20.86	15.88	31.04	26.06	56.00	46.00	-24.96	-19.94
6	12.31641	10.69	13.54	5.92	24.23	16.61	60.00	50.00	-35.77	-33.39

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 = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



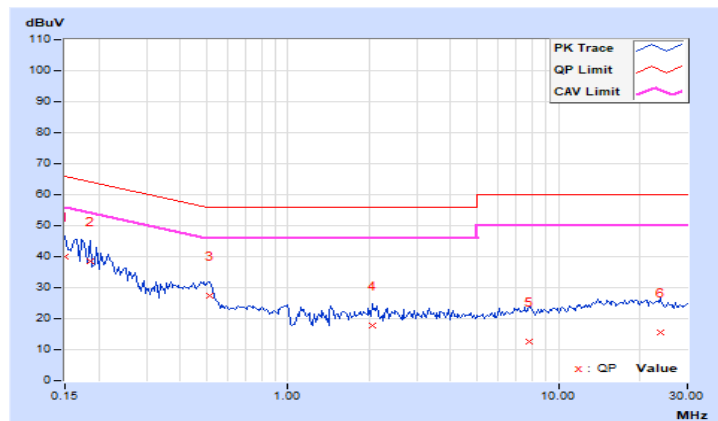
Standby Mode

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (AV) / Average (AV), 9kHz
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Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.97	30.10	9.30	40.07	19.27	66.00	56.00	-25.93	-36.73
2	0.18516	9.97	28.51	9.43	38.48	19.40	64.25	54.25	-25.77	-34.85
3	0.51719	9.99	17.53	10.23	27.52	20.22	56.00	46.00	-28.48	-25.78
4	2.04297	10.11	7.85	-4.57	17.96	5.54	56.00	46.00	-38.04	-40.46
5	7.79688	10.54	1.94	-4.86	12.48	5.68	60.00	50.00	-47.52	-44.32
6	23.73438	11.63	3.90	-6.24	15.53	5.39	60.00	50.00	-44.47	-44.61

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 = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

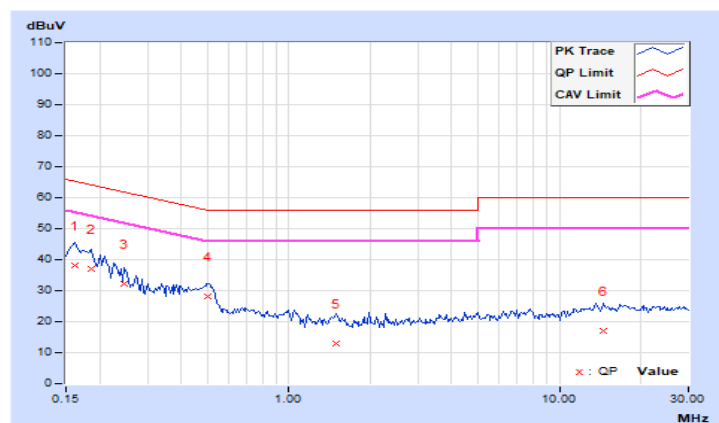


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (AV) / Average (AV), 9kHz
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	9.98	28.34	8.08	38.32	18.06	65.38	55.38	-27.06	-37.32
2	0.18516	9.98	27.22	8.70	37.20	18.68	64.25	54.25	-27.05	-35.57
3	0.24766	9.98	22.32	8.17	32.30	18.15	61.84	51.84	-29.54	-33.69
4	0.50156	10.01	18.24	9.10	28.25	19.11	56.00	46.00	-27.75	-26.89
5	1.50391	10.09	2.92	-7.10	13.01	2.99	56.00	46.00	-42.99	-43.01
6	14.62500	10.89	6.22	-6.36	17.11	4.53	60.00	50.00	-42.89	-45.47

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 = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



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.

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

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