

FCC Test Report

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FCC ID: U2M-SP922PRO

Test Model: DuraFon PRO

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A D T

Release Control Record

Issue No.	Description	Date Issued
RF940314L15J	Original release	Dec. 08, 2015



A D T

1 Certificate of Conformity

Product: 4-Line Cordless Phone System

Brand: EnGenius

Test Model: DuraFon PRO

Sample Status: Engineering sample

Applicant: Senao Networks, Inc.

Test Date: Nov. 24 ~ Dec. 01, 2015

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2013

This report is issued as a supplementary report of RF940314L15H. This report shall be used combined together with its original report.

Prepared by :

Date: Dec. 08, 2015

Pettie Chen / Senior Specialist

Approved by :

Date: Dec. 08, 2015

Ken Liu / Senior Manager

NOTE: The radiated emission below 1GHz and conducted emission tests were performed for the addendum. Refer to original report for the other test data.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -1.27dB at 0.45078MHz.
15.247(a)(1)(i)	Number of Hopping Frequency Used	NA	Refer to Note
15.247(a)(1)(i)	Dwell Time on Each Channel	NA	Refer to Note
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	NA	Refer to Note
15.247(b)(2)	Maximum Peak Output Power	NA	Refer to Note
15.205 & 209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.6dB at 959.27MHz.
15.247(d)	Band Edge Measurement	NA	Refer to Note
15.247(d)	Antenna Port Emission	NA	Refer to Note
15.203	Antenna Requirement	NA	Refer to Note

NOTE: The radiated emission below 1GHz and conducted emission tests were performed for the addendum. Refer to original report for the other test data.

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	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.86 dB
	200MHz ~1000MHz	3.87 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	4-Line Cordless Phone System
Brand	EnGenius
Test Model	DuraFon PRO
Status of EUT	Engineering sample
Power Supply Rating	Base Station: 7.5Vdc (from adapter) Portable Handset: 3.7Vdc (from battery) 5.5Vdc (from adapter or charger)
Modulation Type	MSK
Operating Frequency	902.3840 ~ 927.4656MHz
Number of Channel	50
Channel Spacing	202.272kHz
Output Power	859.0mW
Antenna Type	Dipole antenna with 2dBi gain (Base Station) Dipole antenna with 1.5dBi gain (Portable Handset)
Antenna Connector	RTNC
Data Cable	1.8m non-shielded RJ11 cable without core*4 1.8m non-shielded audio cable without core*1
I/O Ports	Refer to user's manual
Accessory Device	Adapter, charger, Battery

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of BVADT report no.: RF940314L15H. Differences compared with the original report are adding 2 adapters and removing a model. The test result was worse than original results. Therefore, only the test item of radiated emission below 1GHz and conducted emission tests had been an addendum test to this report. Refer to original report for the other test data.
2. The EUT consumes power from the following adapters, battery & Charger adapter. (The new adapters are Adapter 4, 5)

Adapter 1 (for Base Station used)	
Brand	Powertron Electronics Corp.
Model	PA1024-2DUA
Input	100-240Vac, 50-60Hz, 0.6A
Output	7.5Vdc, 1.0A, 7.5W Max
Power Line	1.5m non-shielded cable without core

Adapter 2 (for Base Station used)	
Brand	DVE
Model	DSA-15P-05 US 075075
Input	100-240Vac, 50/60Hz, 0.5A
Output	7.5Vdc, 1A
Power Line	1.5m non-shielded cable without core

Battery (for Portable Handset used)	
Brand	EnGenius
Rating	3.7Vdc, 1700mAh

Charger (for Portable Handset Charger used)	
Brand	EnGenius
Model	SP-922PRO
Input	90-264Vac
Output	5.5Vdc, 1.5A

Adapter 3 (for Portable Handset & Portable Handset Charger used)	
Brand	Powertron Electronics Corp.
Model	PA1008-1HU
Input	100-240Vac, 50-60Hz, 0.3A
Output	5.5Vdc, 1.45A, 8W Max
Power Line	1.5m non-shielded cable without core

Adapter 4 (for Portable Handset & Portable Handset Charger used) (New)	
Brand	Powertron Electronics Corp.
Model	PS1012-055HUB150
Input	100-240Vac, 50-60Hz, 0.4A
Output	5.5Vdc, 1.5A, 8.25W Max
Power Line	1.5m non-shielded cable without core

Adapter 5 (for Portable Handset & Portable Handset Charger used) (New)	
Brand	Atech OEM
Model	ADS012T-W055150
Input	100-240Vac, 50-60Hz, 0.5A
Output	5.5Vdc, 1.5A
Power Line	1.5m non-shielded cable without core

3. A set of the EUT include Base station & Portable handset

4. 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

50 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	902.3840	26	915.3293
2	902.7885	27	915.7339
3	903.1930	28	916.5430
4	903.5976	29	917.3521
5	904.4067	30	917.7566
6	904.8112	31	918.1611
7	905.2158	32	918.9702
8	905.6203	33	919.3748
9	906.0248	34	919.7793
10	906.8339	35	920.1839
11	907.6430	36	920.5884
12	908.0476	37	921.3975
13	908.4521	38	921.8020
14	909.2612	39	922.2066
15	909.6657	40	922.6111
16	910.0703	41	923.0157
17	910.4748	42	923.8247
18	910.8797	43	924.2293
19	911.6885	44	924.6338
20	912.0930	45	925.0384
21	912.4975	46	925.4429
22	912.9021	47	926.2520
23	913.3066	48	926.6566
24	914.1157	49	927.0611
25	914.9248	50	927.4656

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO		DESCRIPTION
	RE<1G	PLC	
A	√	√	Handset mode with adapter 4
B	√	√	Handset mode with adapter 5

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

NOTE:

- The EUT had been pre-tested on the positioned of each 3 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
A, B	1 to 50	1, 25, 50	MSK

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.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
A, B	1 to 50	1, 25, 50	MSK

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE<1G	18deg. C, 70%RH	120Vac, 60Hz	Jones Chang
PLC	25deg. C, 60%RH	120Vac, 60Hz	Tank Wu

3.3 Description of Support Units

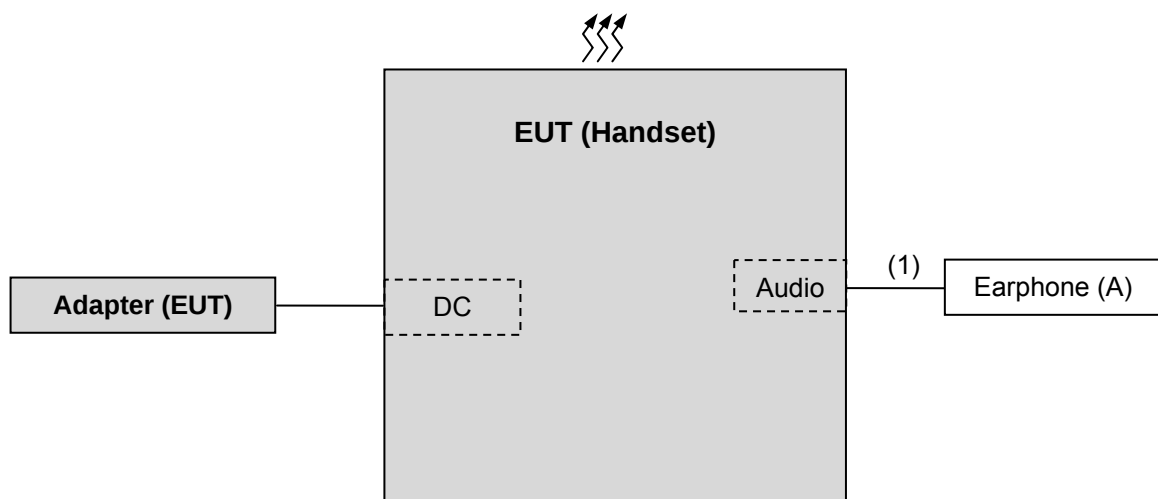
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Earphone	HTC	NA	NA	NA	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Audio cable	1	1.5	N	0	-

3.3.1 Configuration of System under Test



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:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2013

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	Apr. 10, 2015	Apr. 09, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Sep. 02, 2015	Sep. 01, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Feb. 05, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	9120D	209	Feb. 09, 2015	Feb. 08, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8447D	2944A10738	Oct.18, 2015	Oct. 17, 2016
Preamplifier Agilent	8449B	3008A01964	Aug. 22, 2015	Aug. 21, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (214378)	Aug. 22, 2015	Aug. 21, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 106	Cable-CH3-03 (309224+12738)	Aug. 22, 2015	Aug. 21, 2016
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	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 HwaYa Chamber 3.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 988962.
5. The IC Site Registration No. is IC 7450F-3.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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 detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

Note:

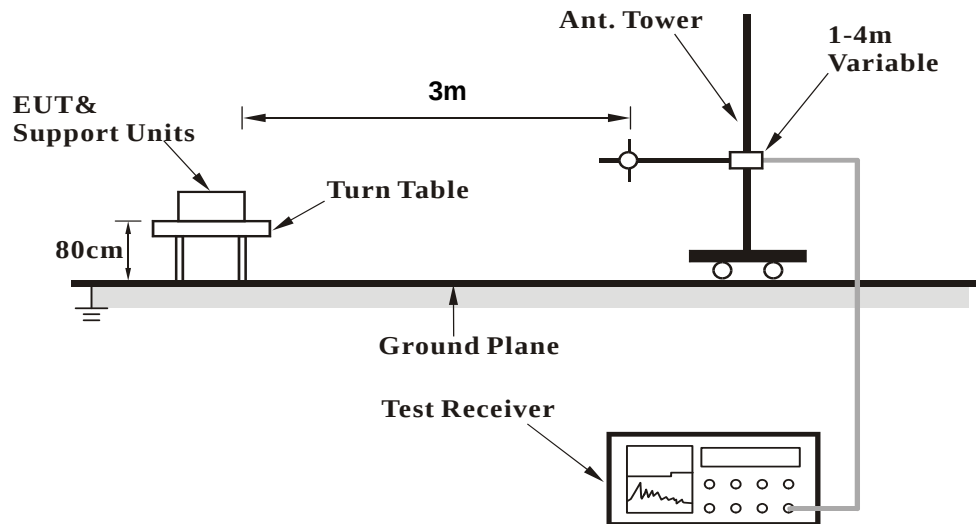
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. For Average measurement, due to the DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on $0.625 * 5$ per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: $20\log(3.125 / 100) = -30.1$ dB, therefore Average value = peak reading + $20\log(\text{duty cycle})$.
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

<Frequency Range below 1GHz>



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

4.1.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Set the EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the system in full functions.

4.1.7 Test Results

BELOW 1GHz WORST-CASE DATA:

Channel	TX Channel 1	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	66.84	24.6 QP	40.0	-15.4	1.00 H	172	40.20	-15.60
2	129.06	33.2 QP	43.5	-10.3	1.99 H	230	48.70	-15.50
3	292.38	26.7 QP	46.0	-19.3	1.00 H	158	39.10	-12.40
4	525.69	26.7 QP	46.0	-19.3	1.99 H	182	34.30	-7.60
5	745.40	31.9 QP	46.0	-14.1	1.00 H	61	34.90	-3.00
6	961.16	41.8 QP	54.0	-12.2	1.50 H	16	41.00	0.80
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	59.06	35.5 QP	40.0	-4.5	1.50 V	10	50.20	-14.70
2	66.84	34.0 QP	40.0	-6.0	1.00 V	206	49.60	-15.60
3	129.06	31.5 QP	43.5	-12.0	1.00 V	7	47.00	-15.50
4	389.59	25.6 QP	46.0	-20.4	1.50 V	87	36.00	-10.40
5	745.40	34.2 QP	46.0	-11.8	1.50 V	6	37.20	-3.00
6	961.21	43.0 QP	54.0	-11.0	1.00 V	282	42.20	0.80

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

Channel	TX Channel 25	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	129.06	33.1 QP	43.5	-10.4	2.00 H	229	48.60	-15.50
2	175.72	26.4 QP	43.5	-17.1	1.50 H	222	40.90	-14.50
3	294.32	27.1 QP	46.0	-18.9	1.00 H	175	39.50	-12.40
4	523.75	26.4 QP	46.0	-19.6	2.00 H	203	34.00	-7.60
5	745.40	30.2 QP	46.0	-15.8	1.00 H	251	33.20	-3.00
6	967.05	41.4 QP	54.0	-12.6	1.00 H	15	40.60	0.80
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	59.06	36.0 QP	40.0	-4.0	1.00 V	12	50.70	-14.70
2	129.06	31.3 QP	43.5	-12.2	1.00 V	5	46.80	-15.50
3	296.27	24.8 QP	46.0	-21.2	1.49 V	111	37.20	-12.40
4	535.42	26.0 QP	46.0	-20.0	1.00 V	264	33.50	-7.50
5	745.40	34.2 QP	46.0	-11.8	1.49 V	13	37.20	-3.00
6	959.27	43.4 QP	46.0	-2.6	1.00 V	26	42.70	0.70

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

Channel	TX Channel 50	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	129.06	30.6 QP	43.5	-12.9	1.50 H	85	46.10	-15.50
2	175.72	26.4 QP	43.5	-17.1	1.50 H	100	40.90	-14.50
3	294.32	24.9 QP	46.0	-21.1	1.00 H	173	37.30	-12.40
4	679.29	32.2 QP	46.0	-13.8	1.00 H	209	36.60	-4.40
5	745.40	29.7 QP	46.0	-16.3	1.00 H	209	32.70	-3.00
6	961.16	46.3 QP	54.0	-7.7	1.50 H	188	45.50	0.80
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	59.06	34.1 QP	40.0	-5.9	1.00 V	6	48.80	-14.70
2	129.06	31.8 QP	43.5	-11.7	1.00 V	285	47.30	-15.50
3	679.29	31.9 QP	46.0	-14.1	1.50 V	341	36.30	-4.40
4	745.40	29.1 QP	46.0	-16.9	1.50 V	16	32.10	-3.00
5	821.23	32.8 QP	46.0	-13.2	1.00 V	289	34.40	-1.60
6	961.16	50.6 QP	54.0	-3.4	1.00 V	244	49.80	0.80

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

Channel	TX Channel 1	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	57.12	21.0 QP	40.0	-19.0	2.00 H	302	35.70	-14.70
2	86.28	18.9 QP	40.0	-21.1	2.00 H	117	38.50	-19.60
3	142.67	25.5 QP	43.5	-18.0	2.00 H	268	39.70	-14.20
4	175.72	23.5 QP	43.5	-20.0	1.50 H	265	38.00	-14.50
5	745.40	35.3 QP	46.0	-10.7	1.00 H	202	38.30	-3.00
6	963.16	31.1 QP	54.0	-22.9	1.50 H	198	30.30	0.80
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	33.79	24.3 QP	40.0	-15.7	1.00 V	213	40.10	-15.80
2	134.89	27.4 QP	43.5	-16.1	1.00 V	302	42.30	-14.90
3	175.72	23.6 QP	43.5	-19.9	1.00 V	31	38.10	-14.50
4	745.40	32.2 QP	46.0	-13.8	1.50 V	5	35.20	-3.00
5	830.95	31.8 QP	46.0	-14.2	1.50 V	5	33.30	-1.50
6	970.94	32.5 QP	54.0	-21.5	1.00 V	329	31.50	1.00

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

Channel	TX Channel 25	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	57.12	19.0 QP	40.0	-21.0	2.00 H	280	33.70	-14.70
2	148.50	24.8 QP	43.5	-18.7	1.50 H	267	38.70	-13.90
3	175.72	22.6 QP	43.5	-20.9	1.50 H	267	37.10	-14.50
4	745.40	36.7 QP	46.0	-9.3	1.00 H	205	39.70	-3.00
5	836.78	33.3 QP	46.0	-12.7	1.00 H	194	34.80	-1.50
6	970.94	32.7 QP	54.0	-21.3	1.00 H	189	31.70	1.00
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	39.62	23.0 QP	40.0	-17.0	1.50 V	244	38.20	-15.20
2	134.89	28.3 QP	43.5	-15.2	1.50 V	280	43.20	-14.90
3	175.72	23.3 QP	43.5	-20.2	1.00 V	8	37.80	-14.50
4	745.40	31.1 QP	46.0	-14.9	1.00 V	8	34.10	-3.00
5	856.22	34.2 QP	46.0	-11.8	1.00 V	4	35.40	-1.20
6	961.21	34.5 QP	54.0	-19.5	1.00 V	313	33.70	0.80

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

Channel	TX Channel 50	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	57.12	20.6 QP	40.0	-19.4	1.99 H	183	35.30	-14.70
2	142.67	26.1 QP	43.5	-17.4	1.99 H	251	40.30	-14.20
3	181.55	22.6 QP	43.5	-20.9	1.99 H	297	37.80	-15.20
4	679.29	32.5 QP	46.0	-13.5	1.00 H	204	36.90	-4.40
5	745.40	31.1 QP	46.0	-14.9	1.00 H	209	34.10	-3.00
6	961.16	44.6 QP	54.0	-9.4	1.50 H	191	43.80	0.80
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	39.62	24.0 QP	40.0	-16.0	1.00 V	127	39.20	-15.20
2	134.89	27.3 QP	43.5	-16.2	1.00 V	266	42.20	-14.90
3	175.72	23.8 QP	43.5	-19.7	1.49 V	16	38.30	-14.50
4	679.29	31.6 QP	46.0	-14.4	1.49 V	345	36.00	-4.40
5	745.40	29.5 QP	46.0	-16.5	1.49 V	16	32.50	-3.00
6	961.67	46.9 QP	54.0	-7.1	1.00 V	294	46.10	0.80

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

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

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCS 30	100288	Apr. 27, 2015	Apr. 26, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 30, 2014	Dec. 29, 2015
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 21, 2015	Jul. 20, 2016
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	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 HwaYa Shielded Room 2.

3. The VCCI Site Registration No. is C-2047.

4.2.3 Test Procedures

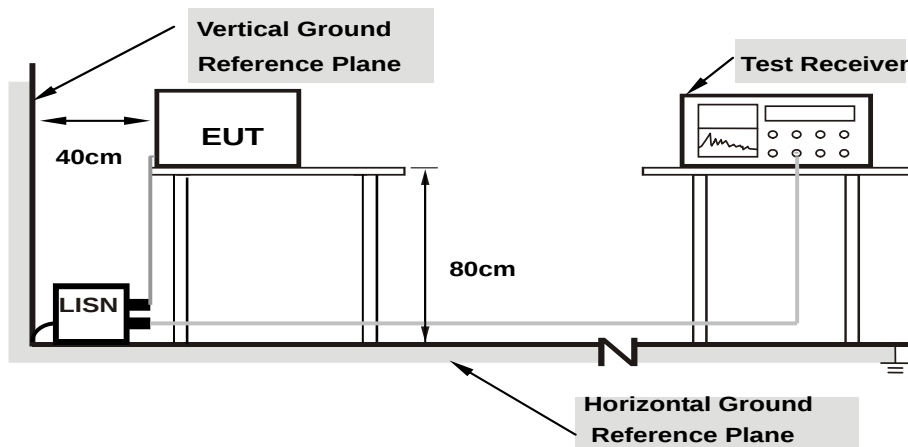
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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) 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.

4.2.4 Deviation From Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

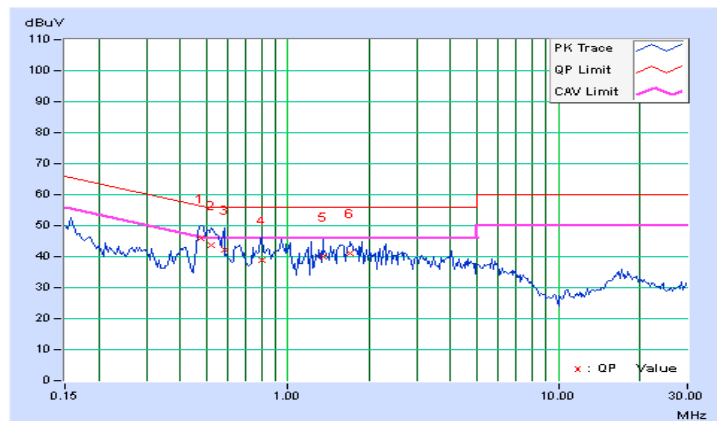
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 1	Test Mode	A

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.47814	9.97	36.08	26.67	46.05	36.64	56.37	46.37	-10.33	-9.74
2	0.52109	9.97	33.77	22.55	43.74	32.52	56.00	46.00	-12.26	-13.48
3	0.58359	9.99	32.11	17.69	42.10	27.68	56.00	46.00	-13.90	-18.32
4	0.79844	10.03	28.68	18.00	38.71	28.03	56.00	46.00	-17.29	-17.97
5	1.35156	10.10	29.88	19.77	39.98	29.87	56.00	46.00	-16.02	-16.13
6	1.69531	10.13	31.01	20.53	41.14	30.66	56.00	46.00	-14.86	-15.34

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.

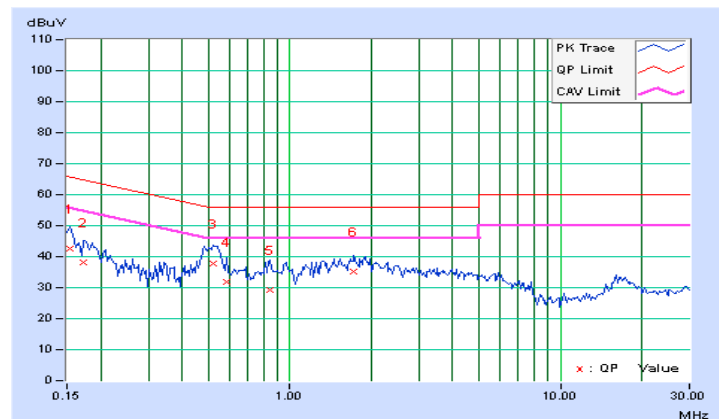


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 1	Test Mode	A

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.95	32.47	19.73	42.42	29.68	65.79	55.79	-23.37	-26.11
2	0.17344	9.96	28.07	14.74	38.03	24.70	64.79	54.79	-26.77	-30.10
3	0.52109	10.02	27.92	18.55	37.94	28.57	56.00	46.00	-18.06	-17.43
4	0.58750	10.02	21.94	9.10	31.96	19.12	56.00	46.00	-24.04	-26.88
5	0.84141	10.06	19.20	7.79	29.26	17.85	56.00	46.00	-26.74	-28.15
6	1.71875	10.16	24.96	15.02	35.12	25.18	56.00	46.00	-20.88	-20.82

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.

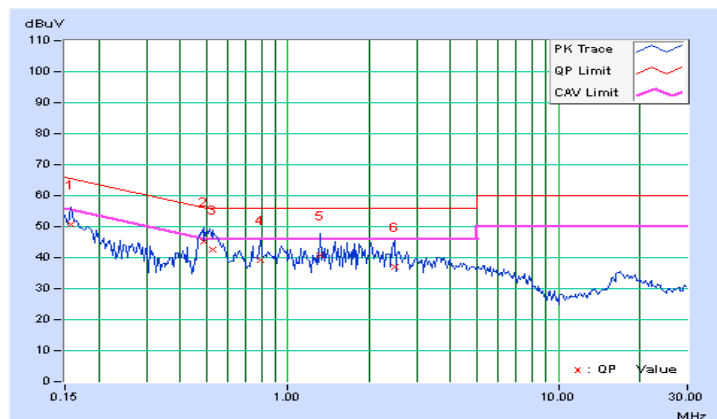


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 25	Test Mode	A

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	9.94	40.81	25.42	50.75	35.36	65.58	55.58	-14.83	-20.22
2	0.48594	9.97	35.06	26.39	45.03	36.36	56.24	46.24	-11.21	-9.88
3	0.52891	9.98	32.70	22.18	42.68	32.16	56.00	46.00	-13.32	-13.84
4	0.79453	10.03	29.19	17.97	39.22	28.00	56.00	46.00	-16.78	-18.00
5	1.32054	10.10	30.53	19.89	40.63	29.99	56.00	46.00	-15.37	-16.01
6	2.48047	10.18	26.71	16.50	36.89	26.68	56.00	46.00	-19.11	-19.32

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.

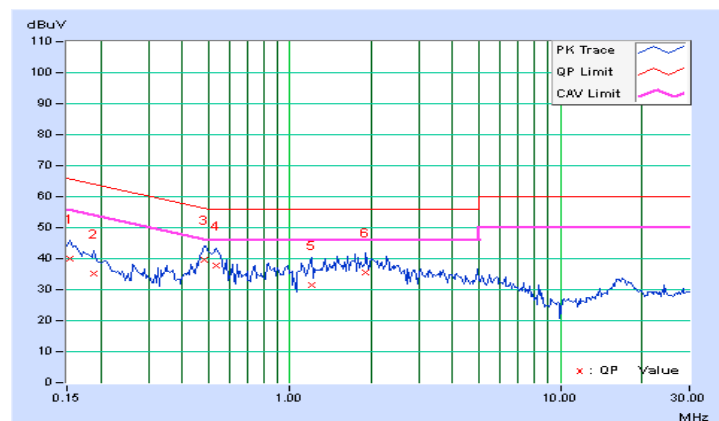


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 25	Test Mode	A

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.95	30.08	17.49	40.03	27.44	65.79	55.79	-25.76	-28.35
2	0.18906	9.96	25.23	12.20	35.19	22.16	64.08	54.08	-28.89	-31.92
3	0.48203	10.01	29.75	21.67	39.76	31.68	56.30	46.30	-16.54	-14.62
4	0.53672	10.02	27.80	18.19	37.82	28.21	56.00	46.00	-18.18	-17.79
5	1.19922	10.10	21.33	11.71	31.43	21.81	56.00	46.00	-24.57	-24.19
6	1.91016	10.18	25.52	15.07	35.70	25.25	56.00	46.00	-20.30	-20.75

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.

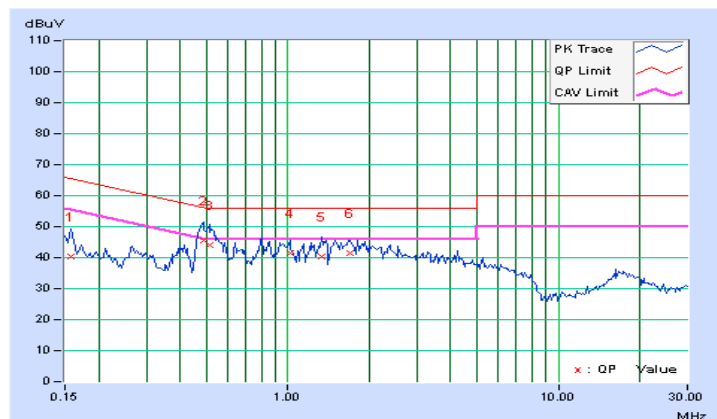


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 50	Test Mode	A

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	9.94	30.32	18.34	40.26	28.28	65.58	55.58	-25.32	-27.30
2	0.48594	9.97	35.77	27.38	45.74	37.35	56.24	46.24	-10.50	-8.89
3	0.51328	9.97	33.96	23.77	43.93	33.74	56.00	46.00	-12.07	-12.26
4	1.02344	10.07	31.47	19.07	41.54	29.14	56.00	46.00	-14.46	-16.86
5	1.33984	10.10	30.20	20.65	40.30	30.75	56.00	46.00	-15.70	-15.25
6	1.70313	10.13	31.44	21.09	41.57	31.22	56.00	46.00	-14.43	-14.78

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.

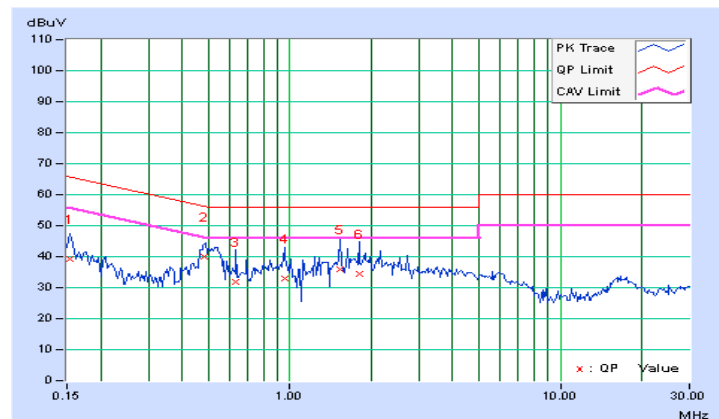


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 50	Test Mode	A

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.95	29.27	16.58	39.22	26.53	65.79	55.79	-26.57	-29.26
2	0.48203	10.01	29.99	21.81	40.00	31.82	56.30	46.30	-16.30	-14.48
3	0.63438	10.03	21.83	9.26	31.86	19.29	56.00	46.00	-24.14	-26.71
4	0.95469	10.07	22.89	12.03	32.96	22.10	56.00	46.00	-23.04	-23.90
5	1.53906	10.14	25.92	15.70	36.06	25.84	56.00	46.00	-19.94	-20.16
6	1.80078	10.17	24.25	14.01	34.42	24.18	56.00	46.00	-21.58	-21.82

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.

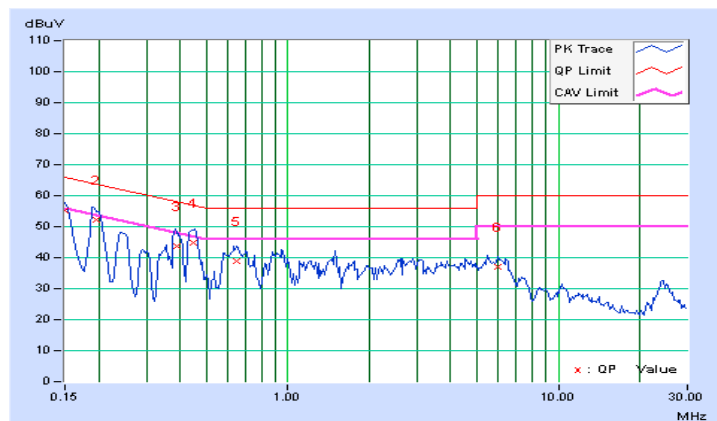


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 1	Test Mode	B

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.94	45.31	37.28	55.25	47.22	66.00	56.00	-10.75	-8.78
2	0.19542	9.95	42.11	34.59	52.06	44.54	63.80	53.80	-11.75	-9.27
3	0.39093	9.95	33.88	29.88	43.83	39.83	58.04	48.04	-14.21	-8.21
4	0.44553	9.96	34.95	31.61	44.91	41.57	56.96	46.96	-12.05	-5.39
5	0.65000	10.00	28.85	23.91	38.85	33.91	56.00	46.00	-17.15	-12.09
6	6.00391	10.32	26.57	21.45	36.89	31.77	60.00	50.00	-23.11	-18.23

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.

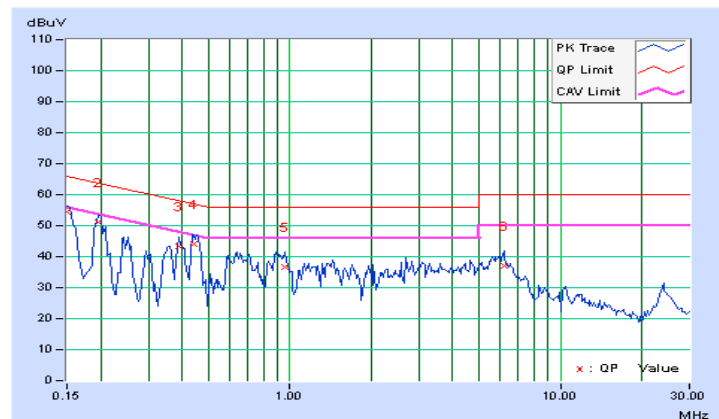


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 1	Test Mode	B

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.95	44.63	36.24	54.58	46.19	66.00	56.00	-11.42	-9.81
2	0.19687	9.96	41.31	34.40	51.27	44.36	63.74	53.74	-12.47	-9.38
3	0.38828	10.00	33.23	28.25	43.23	38.25	58.10	48.10	-14.87	-9.85
4	0.43906	10.01	34.01	29.81	44.02	39.82	57.08	47.08	-13.06	-7.26
5	0.96250	10.07	26.63	21.57	36.70	31.64	56.00	46.00	-19.30	-14.36
6	6.19531	10.37	26.79	21.69	37.16	32.06	60.00	50.00	-22.84	-17.94

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.

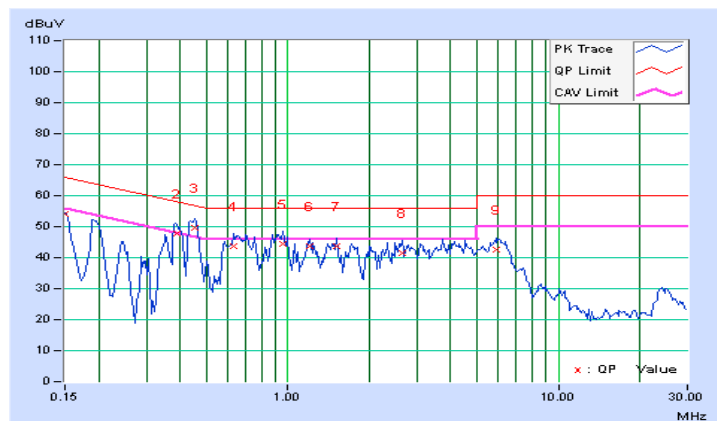


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 25	Test Mode	B

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.94	44.16	37.85	54.10	47.79	66.00	56.00	-11.90	-8.21
2	0.39131	9.95	37.90	34.39	47.85	44.34	58.04	48.04	-10.19	-3.70
3	0.45078	9.96	39.61	35.63	49.57	45.59	56.86	46.86	-7.29	-1.27
4	0.63438	10.00	33.79	29.28	43.79	39.28	56.00	46.00	-12.21	-6.72
5	0.95469	10.06	34.21	29.41	44.27	39.47	56.00	46.00	-11.73	-6.53
6	1.20703	10.09	33.77	29.75	43.86	39.84	56.00	46.00	-12.14	-6.16
7	1.50781	10.11	33.70	28.04	43.81	38.15	56.00	46.00	-12.19	-7.85
8	2.65234	10.19	31.11	24.64	41.30	34.83	56.00	46.00	-14.70	-11.17
9	5.86719	10.32	32.22	27.13	42.54	37.45	60.00	50.00	-17.46	-12.55

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.

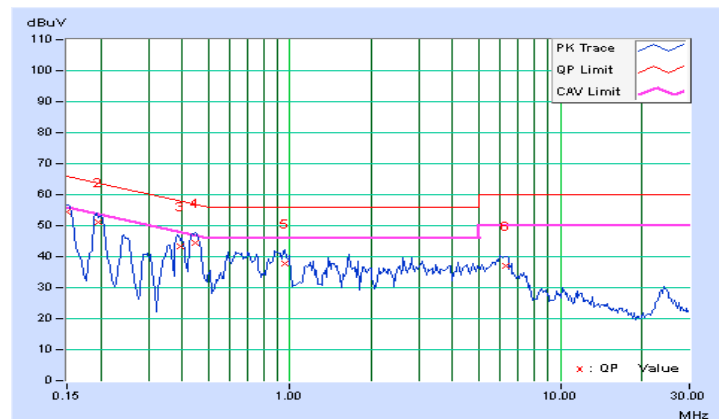


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 25	Test Mode	B

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.95	44.40	36.45	54.35	46.40	66.00	56.00	-11.65	-9.60
2	0.19602	9.96	41.13	34.14	51.09	44.10	63.78	53.78	-12.68	-9.67
3	0.39206	10.00	33.27	29.44	43.27	39.44	58.02	48.02	-14.75	-8.58
4	0.44688	10.01	34.47	31.16	44.48	41.17	56.93	46.93	-12.46	-5.77
5	0.95859	10.07	27.56	22.48	37.63	32.55	56.00	46.00	-18.37	-13.45
6	6.32422	10.38	26.83	21.73	37.21	32.11	60.00	50.00	-22.79	-17.89

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.

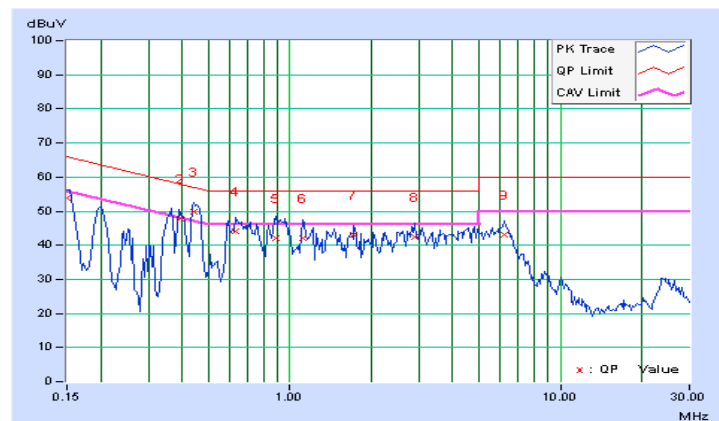


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 50	Test Mode	B

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.94	43.94	37.91	53.88	47.85	66.00	56.00	-12.12	-8.15
2	0.39241	9.95	38.02	34.74	47.97	44.69	58.01	48.01	-10.04	-3.32
3	0.44435	9.96	39.81	35.53	49.77	45.49	56.98	46.98	-7.21	-1.49
4	0.63438	10.00	34.01	29.45	44.01	39.45	56.00	46.00	-11.99	-6.55
5	0.88438	10.04	32.16	28.00	42.20	38.04	56.00	46.00	-13.80	-7.96
6	1.12109	10.08	31.92	24.76	42.00	34.84	56.00	46.00	-14.00	-11.16
7	1.73047	10.13	32.80	28.19	42.93	38.32	56.00	46.00	-13.07	-7.68
8	2.87891	10.21	32.37	26.68	42.58	36.89	56.00	46.00	-13.42	-9.11
9	6.20703	10.33	32.63	27.71	42.96	38.04	60.00	50.00	-17.04	-11.96

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.

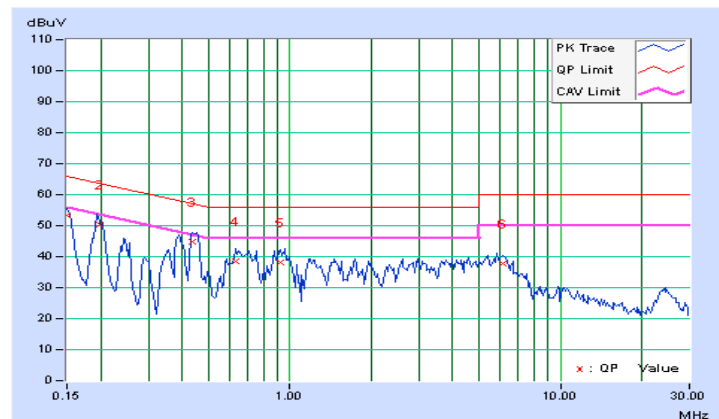


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 50	Test Mode	B

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.95	43.35	36.14	53.30	46.09	66.00	56.00	-12.70	-9.91
2	0.19715	9.97	40.48	34.40	50.45	44.37	63.73	53.73	-13.28	-9.36
3	0.43664	10.01	34.84	29.37	44.85	39.38	57.13	47.13	-12.28	-7.75
4	0.63047	10.03	28.54	22.54	38.57	32.57	56.00	46.00	-17.43	-13.43
5	0.92734	10.07	27.92	23.43	37.99	33.50	56.00	46.00	-18.01	-12.50
6	6.10547	10.37	27.58	22.44	37.95	32.81	60.00	50.00	-22.05	-17.19

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 on 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 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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