

Huawei Technologies Co.,Ltd

TEST REPORT

Report Type:
FCC Part 15G report

Model:
SUN2000-40KTL-NAM3, SUN2000-36KTL-NAM3,
SUN2000-33KTL-NAM3, SUN2000-30KTL-NAM3,
SUN2000-25KTL-NAM3

REPORT NUMBER
210402870SHA-001

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May 25, 2021

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Applicant : Huawei Technologies Co.,Ltd
Administration Building, Headquarters of Huawei Technologies Co.,
Ltd., Bantian, Longgang District, Shenzhen, China

Manufacturer : Same as the Applicant

FCC ID : QISSUN2000

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 15 (2020): Radio Frequency Devices (Subpart G)

ANSI C63.4 (2014): American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

PREPARED BY:

REVIEWED BY:

Stephanie

Project Engineer
Stephanie Zhang

Reviewer
Wakeyou Wang

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Revision History

Report No.	Version	Description	Issued Date
210402870SHA-001	Rev. 01	Initial issue of report	May 25, 2021

Measurement result summary

TEST ITEM	FCC REFERENCE	RESULT	NOTE
Conducted emission	15.611(a), 15.107	NA	Not applied to Access BPL.
Radiated emission	15.611(b), 15.109	Pass	/

Notes: 1: NA =Not Applicable

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1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Solar Inverter
Type/Model:	SUN2000-40KTL-NAM3, SUN2000-36KTL-NAM3, SUN2000-33KTL-NAM3, SUN2000-30KTL-NAM3, SUN2000-25KTL-NAM3
Description of EUT:	There are 5 models. They are electrically identically except for different rating powers. Here the model SUN2000-40KTL-NAM3 with the highest power was chosen to perform test as representative.
Rating:	Max input Voltage: 1000V DC, Max input Current: 26A/26A/26A/26A, Nominal output Voltage: 480V AC, 60Hz, Output rated Power: 40 kW;
EUT type:	<input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing
Software Version:	/
Hardware Version:	/
Sample No:	0210425-03
Sample received date:	April 25, 2021
Date of test:	April 25, 2021 ~ May 10, 2021

1.2 Technical Specification

Frequency Band:	2.5MHz – 5.7MHz
Type of Modulation:	OFDM
Number of carriers:	143
Carrier spacing:	24.414kHz
Channel bandwidth:	200kHz
Notch capability/control:	Without such function
Power settings/control:	-5~7 (7 is the highest power and tested as the worst mode)
Duty factor of signal injection:	50%
Category of EUT:	Class A
Power line type:	<input type="checkbox"/> Medium-voltage <input checked="" type="checkbox"/> low -voltage

Total Quality. Assured.

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1.3 Description of Test Facility

Name:	Intertek Testing Services Shanghai
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353
Onsite test location:	Xinyuan Road and Hexiang Road, Minghang District, Shanghai

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L0139
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0051
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

2 TEST SPECIFICATIONS

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2.1 Standards or specification

47CFR Part 15 (2020)
 ANSI C63.4 (2014)
 FCC-11-160A1

2.2 Mode of operation during the test

Within this test report, EUT was tested with modulation and tested under its rating voltage and frequency.

2.3 Test software list

Test Items	Software	Manufacturer	Version
Radiated emission	ES-K1	R&S	V1.71

2.4 Test peripherals list

Item No.	Name	Band and Model	Description
1	-	-	-

2.5 Test environment condition:

Test items	Temperature	Humidity
Radiated Emissions	21°C	56%RH

2.6 Instrument list

Radiated Emission					
Used	Instrument	Model	Manufactory	EC no.	Valid until date
<input checked="" type="checkbox"/>	Bilog Antenna	CBL6112B	SCHAFFNER	2587	2022-7-18
<input checked="" type="checkbox"/>	Loop Antenna	HLA6121	TESEQ	55278	2022-7-18
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESCI 7	EC 4501	2021-09-15

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

Test item	Measurement uncertainty
Radiated Emissions	± 4.90dB

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3 Radiated Emissions

Test result: Pass

3.1 Limit

Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 30m
0.009–0.490	107.6-20lg (F _{KHz})
0.490–1.705	87.6-20lg (F _{KHz})
1.705–30.0	29.5
Note: for the measurement distance other than 30m, the limit is varied according to 40dB/10 decades.	

Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 3m
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
Above 960	54.0
Note: for the measurement distance other than 3m, the limit is varied according to 20dB/10 decades.	

3.2 Measurement Procedure

Measurement Principles for Access BPL on Overhead Line Installations

(1) Measurements should normally be performed at the horizontal reference distance as specified in Sections 15.209 and 15.109 of the rules (i.e., 30 meters for frequencies below 30 MHz and 10 meters for frequencies 30-88MHz.) If necessary, due to ambient emissions, for frequencies below 30 MHz, measurements may be performed at a closer distance such as 10 meters (or 3 meters if necessary for safety or because measurements cannot practically be performed at 30 meters or 10 meters) from the overhead line. Distance corrections are to be made in accordance with paragraph (4), below.

(2) Testing shall be performed at distances of 0, 1/4, 1/2, 3/4 and 1 wavelength down the line from the BPL injection point on the power line. Wavelength spacing is based on the mid-band frequency used by the EUT. In addition, if the mid-band frequency exceeds the lowest frequency injected onto the power line by more than a factor of two, testing shall be extended in steps of 1/2 wavelength of the mid-band frequency until the distance equals or exceeds 1/2 wavelength of the lowest frequency injected. (For example, if the device injects frequencies from 3 to 27 MHz, the wavelength corresponding to the mid-band frequency of 15 MHz is 20 meters, and wavelength corresponding to the lowest injected frequency is 100 meters. Measurements are to be performed at 0, 5, 10, 15, and 20 meters down line— corresponding to zero to one wavelength at the mid-band frequency. Because the mid-band frequency

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exceeds the minimum frequency by more than a factor of two, additional measurements are required at 10-meter intervals until the distance down-line from the injection point equals or exceeds 1/2 of 100 meters. Thus, additional measurement points are required at 30, 40, and 50 meters down line from the injection point.)

(3) Testing shall be repeated for each Access BPL component (injector, extractor, repeater, booster, concentrator, etc.)

(4) The distance correction used to calculate the applicable extrapolated emission levels for the measurements that are closer than the specified reference distance in Section 15.209 of the rules shall be based on the slant-range distance, which is the diagonal distance from the center of the measurement antenna to the nearest point of the overhead power line carrying the BPL signals being measured, as defined in Section 15.3(hh) of the rules. Calculations of the slant-range distance and the applicable extrapolated emission levels are made according to Equations (1) and (2) in Section 6, below.

(5) For Access BPL devices operating below 30 MHz, if the site-specific alternative extrapolation method is selected, the extrapolation factor is determined by fitting a straight line to measurements of field strength in dB μ V/m vs. logarithmic distance in meters from the nearest conductor carrying BPL emissions. Site-specific determination of the extrapolation factor is not permitted for BPL devices that inject signals on the neutral/grounded line of a power system if a grounding conductor (typically located at each pole) is located within 30 meters of any of the measurement locations.

a. Measurements shall be made for at least four horizontal distances from the overhead line, at no less than 3 meters from the lateral plane and differing from each other by at least 3 meters. If these measurements allow a straight line with a negative slope to be calculated or drawn with reasonable fit (the minimum regression coefficient of multiple correlation would be 0.9), the best straight line fit would be used to calculate field strength at the 30-meter standard measurement distance in the rules.

b. If the four measurements do not satisfy the regression coefficient requirement specified above, measurements at one or more additional distances shall be added until the regression coefficient is satisfied. If the regression coefficient is not satisfied, a site-specific extrapolation rate may not be used.

Measurement Principles for Access BPL in Underground Line Installations

(1) Underground line installations are those in which the BPL device is mounted in, or attached to a padmounted transformer housing or a ground-mounted junction box and couples directly only to underground cables.

(2) Measurements should normally be performed at the horizontal reference distance as specified in Section 15.209 of the rules (i.e., 30 meters for frequencies below 30 MHz and 10 meters for frequencies 30-88MHz.) If necessary, due to ambient emissions, for frequencies below 30 MHz, measurements may be performed at a closer distance such as 3 meters or 10 meters from the in-ground transformer. Distance corrections are to be made in accordance with Section 15.31(f) in the rules.

(3) Measurements shall be made at positions around the perimeter of the in-ground power transformer where the maximum emissions occur. ANSI C63.4, section 8.1, specifies a minimum of 16 radial angles surrounding the EUT (in-ground transformer that contains the BPL device(s)). If directional radiation patterns are suspected, additional azimuth angles shall be examined.

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3.3 Test Configuration

Overhead Line Installation Locations:

The device injects frequencies at 2.5MHz-5.7MHz;

The wavelength of mid-band frequency is 73.2m;

The wavelength corresponding to the lowest injected frequency is 120m and no extended test should be conducted.

Location 1: See below



Test Point	Test Distance down the line from the BPL injection point (m)
0	0
$1/4 * \lambda$	18.3
$1/2 * \lambda$	36.6
$3/4 * \lambda$	54.9
λ	73.2

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Location 2: See below



Test Point	Test Distance down the line from the BPL injection point (m)
0	0
$1/4 * \lambda$	18.3
$1/2 * \lambda$	36.6
$3/4 * \lambda$	54.9
λ	73.2

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Location 3: See below

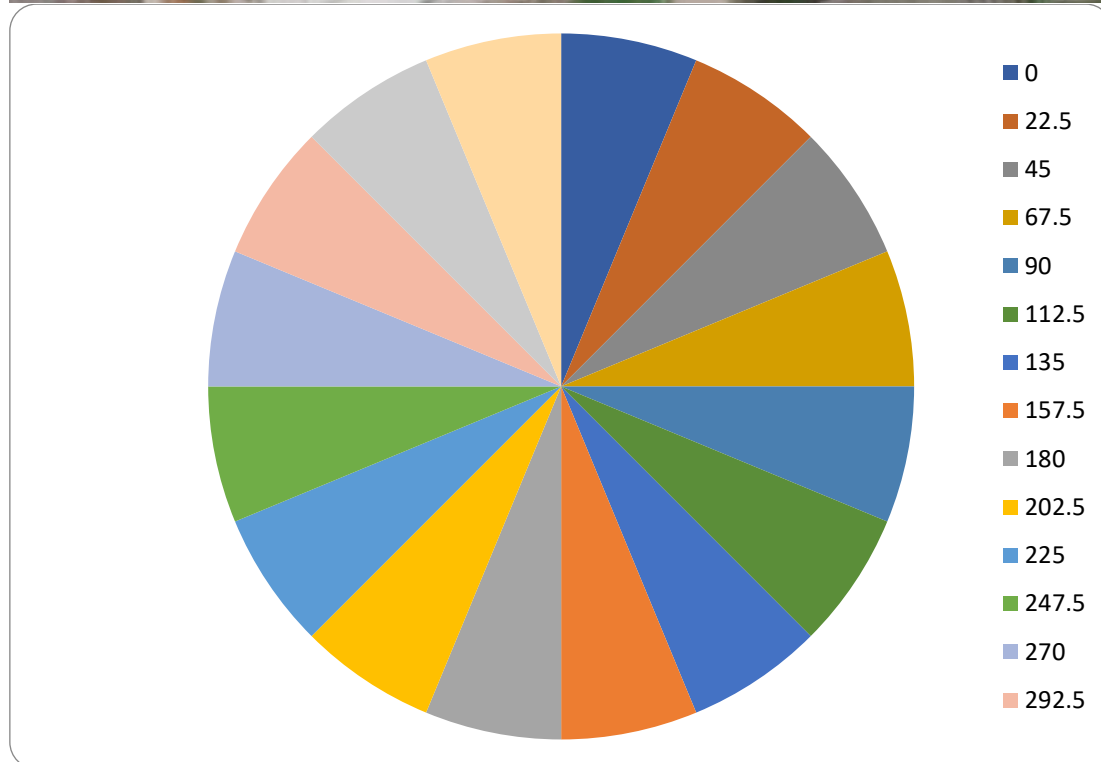


Test Point	Test Distance down the line from the BPL injection point (m)
0	0
$1/4 * \lambda$	18.3
$1/2 * \lambda$	36.6
$3/4 * \lambda$	54.9
λ	73.2

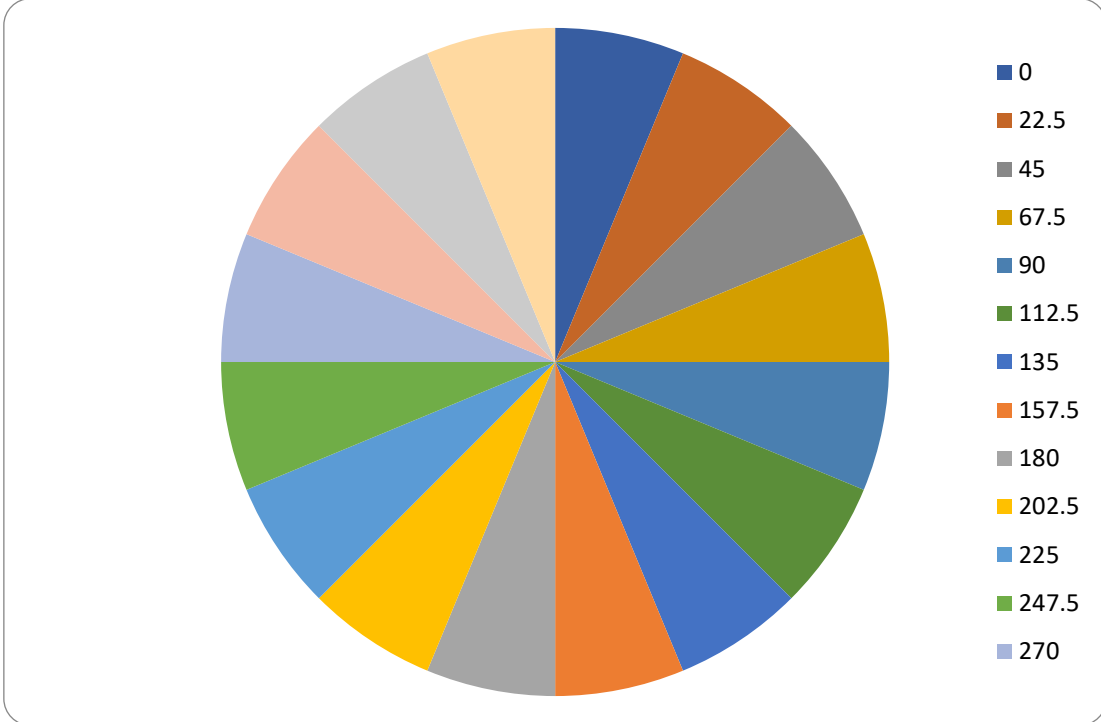
Underground Line Installation Locations:

Measurements shall be made at positions of minimum of 16 radial angles surrounding the EUT, namely 0, 22.5°, 45°...337.5°.

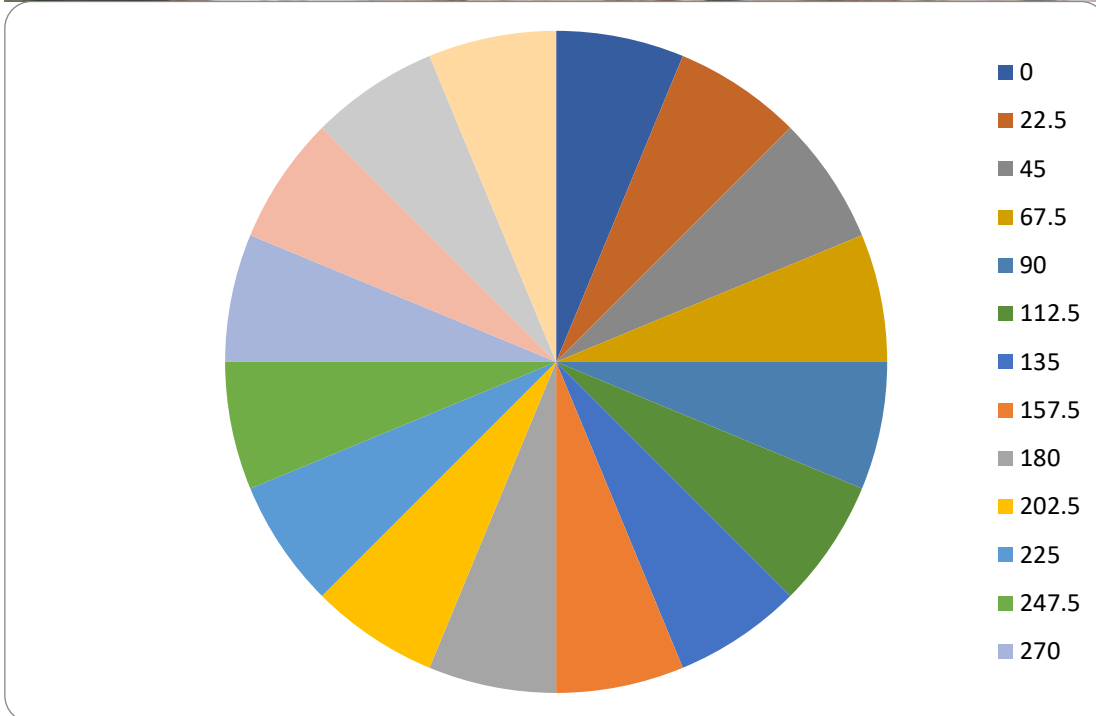
Location 1: See below



Location 2: See below



Location 3: See below



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3.4 Test Setup

The measurement was performed onsite.

The horizontal distance between EUT and receiving antenna is **3** meter for both overhead & underground installation.

The required measurement frequency range was checked.

The radiated emission was measured using the R&S Test Receiver / Spectrum Analyzer with the resolutions bandwidth set as:

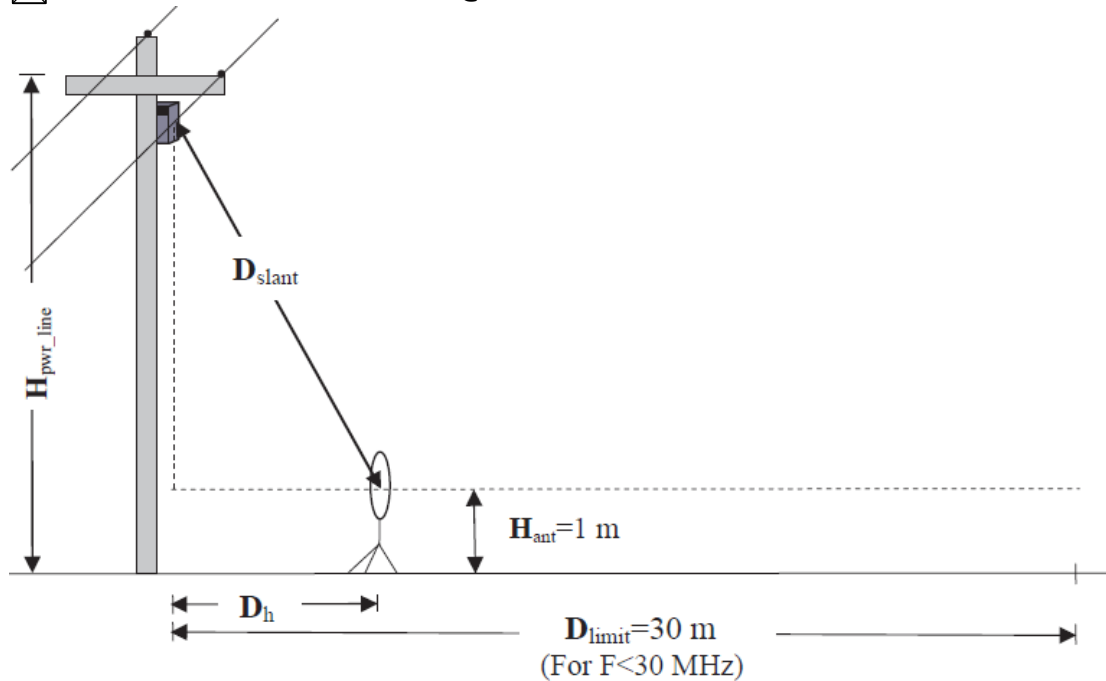
RBW =9kHz @ receiver mode (9kHz~30MHz)

RBW = 120kHz @ receiver mode (30MHz~1GHz)

RBW / VBW = 1MHz / 3MHz @ spectrum mode (>1GHz for PK) if applied;

RBW / VBW = 1MHz / 10Hz @ spectrum mode (>1GHz for AV) if applied;

Slant factor for lower than 30MHz @ overhead installation:



Here $H_{ant} = 1\text{ m}$, $H_{power_line} = 2\text{ m}$, $D_h = 3\text{ m}$;

Therefore $D_{slant} = \sqrt{3^2 + (2.3-1)^2} = 3.27\text{ m}$;

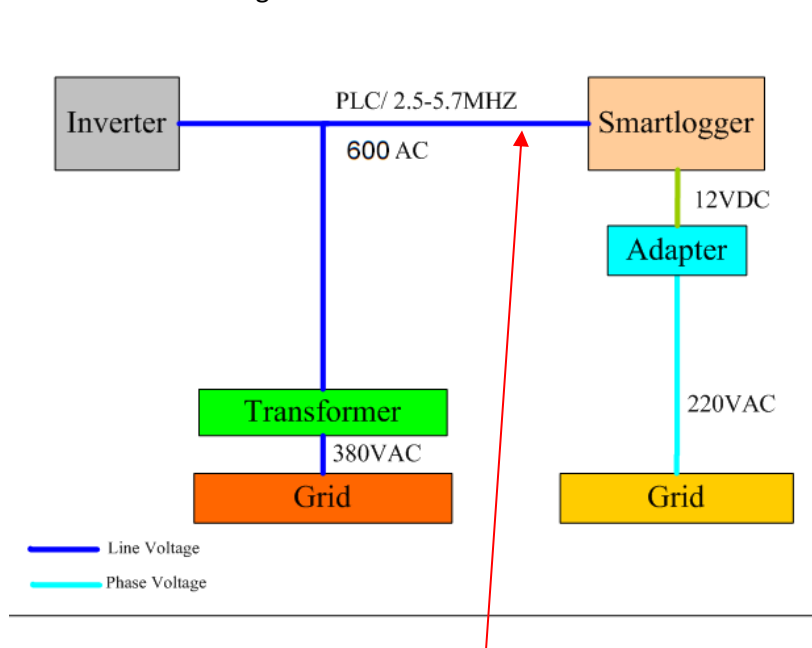
Slant factor = $40\lg(30 / 3.27) = 38.50\text{ dB}$

Measurement distance factor for lower than 30MHz @ underground installation:

Distance factor = $40\lg(30 / 3) = 40\text{ dB}$

Antenna height factor for higher than 30MHz @ overhead and underground installation (the antenna height is fixed at 1m but not varied from 1m to 4 m): **Antenna height factor = -5dB**

Here is the test configuration for the EUT.



Overhead power line / Underground power line

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3.5 Test Results

Overhead location 1									
A	B	C	D	E	F	G	H	I	J
Test Point (m)	Ant. Pol.	Freq. (MHz)	Reading (dBuV/m)	Ant. Factor (dB)	Cable loss (dB)	Slant Factor / Ant height Factor (dB)	Net (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
0	X	4.21	38.58	19.20	0.09	38.50	19.37	29.50	10.13
0	X	6.40	23.45	19.20	0.11	38.50	4.26	29.50	25.24
18.3	X	3.78	24.59	19.20	0.08	38.50	5.37	29.50	24.13
36.6	X	3.51	33.64	19.20	0.08	38.50	14.42	29.50	15.08
54.9	X	4.45	33.70	19.20	0.09	38.50	14.49	29.50	15.01
54.9	X	5.27	33.14	19.20	0.1	38.50	13.94	29.50	15.56
73.2	X	2.83	40.60	19.20	0.07	38.50	21.37	29.50	8.13
73.2	X	4.17	34.30	19.20	0.09	38.50	15.09	29.50	14.41
73.2	X	7.62	37.36	19.20	0.12	38.50	18.18	29.50	11.32
0	Y	2.59	30.51	19.20	0.06	38.50	11.27	29.50	18.23
0	Y	2.76	33.60	19.20	0.07	38.50	14.37	29.50	15.13
0	Y	3.90	36.07	19.20	0.08	38.50	16.85	29.50	12.65
0	Y	4.32	29.58	19.20	0.09	38.50	10.37	29.50	19.13
18.3	Y	2.37	37.55	19.20	0.06	38.50	18.31	29.50	11.19
18.3	Y	6.40	35.46	19.20	0.11	38.50	16.27	29.50	13.23
36.6	Y	6.25	40.48	19.20	0.11	38.50	21.29	29.50	8.21
54.9	Y	3.75	42.79	19.20	1.18	38.50	24.67	29.50	4.83
73.2	Y	4.32	39.68	19.20	0.09	38.50	20.47	29.50	9.03
73.2	Y	5.67	37.57	19.20	0.1	38.50	18.37	29.50	11.13
0	H	33.20	18.24	11.79	0.26	-5.00	35.29	40.00	4.71
0	H	146.52	23.45	8.33	0.59	-5.00	37.37	43.50	6.13
18.3	H	56.20	14.46	12.66	0.35	-5.00	32.47	40.00	7.53
18.3	H	237.04	12.98	11.91	0.74	-5.00	30.63	46.00	15.37
36.6	H	48.32	15.05	13.90	0.32	-5.00	34.27	40.00	5.73
54.9	H	317.40	11.74	13.74	0.91	-5.00	31.39	46.00	14.61
73.2	H	31.52	16.84	11.27	0.26	-5.00	33.37	40.00	6.63
73.2	H	141.04	22.30	8.31	0.58	-5.00	36.19	43.50	7.31
0	V	34.44	17.63	12.18	0.27	-5.00	35.08	40.00	4.92
18.3	V	50.76	14.19	13.75	0.33	-5.00	33.27	40.00	6.73
18.3	V	146.52	23.27	8.33	0.59	-5.00	37.19	43.50	6.31
36.6	V	32.52	16.63	11.58	0.26	-5.00	33.47	40.00	6.53
36.6	V	57.52	14.77	12.40	0.35	-5.00	32.52	40.00	7.48
36.6	V	72.04	15.66	9.45	0.4	-5.00	30.51	40.00	9.49
54.9	V	32.72	16.46	11.64	0.26	-5.00	33.36	40.00	6.64
73.2	V	290.60	13.59	13.03	0.87	-5.00	32.49	46.00	13.51

Note 1: H = D + E + F - G; J = I - H

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Note 2: the QP detector is applied based on that the pulse-repetition frequency of assessed signal is higher than 20 Hz.

Overhead location 2									
A	B	C	D	E	F	G	H	I	J
Test Point (m)	Ant. Pol.	Freq. (MHz)	Reading (dBuV/m)	Ant. Factor (dB)	Cable loss (dB)	Slant factor / Ant height Factor(dB)	Net (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
0	X	3.98	39.27	19.20	0.08	38.50	20.05	29.50	9.45
0	X	4.46	23.99	19.20	0.09	38.50	4.78	29.50	24.72
18.3	X	4.45	26.40	19.20	0.09	38.50	7.19	29.50	22.31
18.3	X	4.36	37.29	19.20	0.09	38.50	18.08	29.50	11.42
36.6	X	2.83	38.09	19.20	0.07	38.50	18.86	29.50	10.64
36.6	X	4.45	36.04	19.20	0.09	38.50	16.83	29.50	12.67
54.9	X	4.50	40.18	19.20	0.09	38.50	20.97	29.50	8.53
54.9	X	6.60	33.88	19.20	0.11	38.50	14.69	29.50	14.81
73.2	X	2.83	37.12	19.20	0.07	38.50	17.89	29.50	11.61
73.2	X	3.48	28.10	19.20	0.08	38.50	8.88	29.50	20.62
0	Y	6.01	27.28	19.20	0.11	38.50	8.09	29.50	21.41
0	Y	7.28	32.28	19.20	0.11	38.50	13.09	29.50	16.41
18.3	Y	2.87	30.09	19.20	0.07	38.50	10.86	29.50	18.64
18.3	Y	3.49	34.03	19.20	0.08	38.50	14.81	29.50	14.69
18.3	Y	3.94	31.20	19.20	0.08	38.50	11.98	29.50	17.52
18.3	Y	4.46	38.97	19.20	0.09	38.50	19.76	29.50	9.74
36.6	Y	6.58	41.18	19.20	1.11	38.50	22.99	29.50	6.51
54.9	Y	4.83	34.85	19.20	0.10	38.50	15.65	29.50	13.85
73.2	Y	4.96	33.97	19.20	0.10	38.50	14.77	29.50	14.73
0	H	153.88	24.11	8.37	0.61	-5.00	38.09	43.50	5.41
0	H	269.79	19.05	12.65	0.81	-5.00	37.51	46.00	8.49
0	H	287.94	17.45	13.00	0.86	-5.00	36.31	46.00	9.69
0	H	342.71	10.14	14.51	0.93	-5.00	30.58	46.00	15.42
18.3	H	36.73	16.06	12.42	0.27	-5.00	33.75	40.00	6.25
18.3	H	61.74	9.48	11.63	0.37	-5.00	26.48	40.00	13.52
36.6	H	42.59	13.45	13.90	0.30	-5.00	32.65	40.00	7.35
36.6	H	248.49	17.44	12.28	0.76	-5.00	35.48	46.00	10.52
54.9	H	35.59	16.29	11.80	0.26	-5.00	33.35	40.00	6.65
54.9	H	251.85	20.92	12.30	0.76	-5.00	38.98	46.00	7.02
73.2	H	147.83	20.05	8.33	0.59	-5.00	33.97	43.50	9.53
0	Y	113.83	18.90	10.36	0.52	-5.00	34.78	43.50	8.72

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36.6	Y	45.71	14.36	13.90	0.31	-5.00	33.57	40.00	6.43
36.6	Y	68.71	15.42	10.35	0.39	-5.00	31.16	40.00	8.84
54.9	Y	38.95	13.67	13.12	0.28	-5.00	32.07	40.00	7.93
54.9	Y	129.18	8.60	10.40	0.39	-5.00	24.39	40.00	15.61
54.9	Y	130.94	23.13	8.98	0.55	-5.00	37.66	43.50	5.84
54.9	Y	253.75	20.79	12.30	0.76	-5.00	38.85	46.00	7.15

Note 1: $H = D + E + F - G$; $J = I - H$

Note 2: the QP detector is applied based on that the pulse-repetition frequency of assessed signal is higher than 20 Hz.

Overhead location 3

A	B	C	D	E	F	G	H	I	J
Test Point (m)	Ant. Pol.	Freq. (MHz)	Reading (dBuV/m)	Ant. Factor (dB)	Cable loss (dB)	Slant factor / Ant height Factor (dB)	Net (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
0	X	4.38	38.78	19.20	0.08	38.50	19.56	29.50	9.94
18.3	X	6.93	31.41	19.20	0.09	38.50	12.20	29.50	17.30
18.3	X	7.25	27.94	19.20	0.09	38.50	8.73	29.50	20.77
36.6	X	5.58	26.19	19.20	0.09	38.50	6.98	29.50	22.52
54.9	X	2.99	32.28	19.20	0.07	38.50	13.05	29.50	16.45
73.2	X	4.08	30.87	19.20	0.09	38.50	11.66	29.50	17.84
73.2	X	4.62	35.72	19.20	0.09	38.50	16.51	29.50	12.99
73.2	X	4.95	38.10	19.20	0.11	38.50	18.91	29.50	10.59
73.2	X	9.68	45.63	19.20	0.07	38.50	26.40	29.50	3.10
0	Y	5.28	32.22	19.20	0.08	38.50	13.00	29.50	16.50
18.3	Y	6.92	42.40	19.20	0.11	38.50	23.21	29.50	6.29
36.6	Y	7.26	22.84	19.20	0.09	38.50	3.63	29.50	25.87
54.9	Y	3.58	29.37	19.20	0.11	38.50	10.18	29.50	19.32
54.9	Y	6.62	30.44	19.20	0.11	38.50	11.25	29.50	18.25
54.9	Y	7.31	30.58	19.20	0.10	38.50	11.38	29.50	18.12
73.2	Y	1.88	40.22	19.20	0.07	38.50	20.99	29.50	8.51
73.2	Y	2.39	36.73	19.20	1.18	38.50	18.61	29.50	10.89
0	H	33.26	19.08	11.80	0.09	-5.00	35.97	40.00	4.03
0	H	37.98	18.45	12.99	0.10	-5.00	36.54	40.00	3.46
0	H	47.82	17.50	13.90	0.13	-5.00	36.53	40.00	3.47
18.3	H	33.91	20.07	11.05	0.10	-5.00	36.22	40.00	3.78
18.3	H	47.85	17.52	13.90	0.11	-5.00	36.53	40.00	3.47
18.3	H	62.71	20.69	11.70	0.11	-5.00	37.50	40.00	2.50
36.6	H	39.58	18.14	13.24	0.08	-5.00	36.46	40.00	3.54

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36.6	H	204.71	18.53	10.90	0.68	-5.00	35.11	43.50	8.39
54.9	H	166.91	21.86	8.65	0.62	-5.00	36.13	43.50	7.37
54.9	H	245.81	21.31	12.00	0.74	-5.00	39.05	46.00	6.95
73.2	H	35.19	20.14	12.39	0.27	-5.00	37.80	40.00	2.20
73.2	H	167.81	22.29	8.65	0.62	-5.00	36.56	43.50	6.94
0	V	44.81	17.08	13.90	0.30	-5.00	36.28	40.00	3.72
0	V	205.81	18.55	10.90	0.68	-5.00	35.13	43.50	8.37
18.3	V	73.84	21.25	9.33	0.40	-5.00	35.98	40.00	4.02
18.3	V	319.53	15.90	13.72	0.91	-5.00	35.53	46.00	10.47
36.6	V	117.71	21.70	9.82	0.53	-5.00	37.05	43.50	6.45
36.6	V	129.85	24.77	8.98	0.55	-5.00	39.30	43.50	4.20
36.6	V	170.62	17.87	9.01	0.63	-5.00	32.51	43.50	10.99
54.9	V	145.83	25.45	8.33	0.59	-5.00	39.37	43.50	4.13
73.2	V	65.53	21.70	11.19	0.37	-5.00	38.26	40.00	1.74

Note 1: $H = D + E + F - G$; $J = I - H$

Note 2: the QP detector is applied based on that the pulse-repetition frequency of assessed signal is higher than 20 Hz.

Underground location 1

A	B	C	D	E	F	G	H	I	J
Test Angle (degree)	Ant. Pol.	Freq. (MHz)	Reading (dBuV/m)	Ant. Factor (dB)	Cable loss (dB)	Ant height / Distance Factor(dB)	Net (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
22.5	X	3.42	39.71	19.20	0.07	40.00	18.98	29.50	10.52
45	X	4.67	42.68	19.20	0.09	40.00	21.97	29.50	7.53
67.5	X	3.87	41.69	19.20	0.08	40.00	20.97	29.50	8.53
90	X	3.36	39.61	19.20	0.07	40.00	18.88	29.50	10.62
112.5	X	4.56	42.90	19.20	0.09	40.00	22.19	29.50	7.31
135	X	3.47	40.69	19.20	0.08	40.00	19.97	29.50	9.53
135	X	7.11	41.60	19.20	0.11	40.00	20.91	29.50	8.59
157.5	X	3.95	42.59	19.20	0.08	40.00	21.87	29.50	7.63
180	X	3.01	40.29	19.20	0.07	40.00	19.56	29.50	9.94
225	X	3.38	40.19	19.20	0.08	40.00	19.47	29.50	10.03
247.5	X	9.70	42.86	19.20	0.13	40.00	22.19	29.50	7.31
0	Y	6.16	38.27	19.20	0.11	40.00	17.58	29.50	11.92
22.5	Y	4.53	41.50	19.20	0.09	40.00	20.79	29.50	8.71
45	Y	3.99	43.16	19.20	0.08	40.00	22.44	29.50	7.06
45	Y	4.48	41.14	19.20	0.09	40.00	20.43	29.50	9.07
112.5	Y	5.94	43.24	19.20	0.11	40.00	22.55	29.50	6.95

TEST REPORT

135	Y	6.20	41.87	19.20	1.11	40.00	22.18	29.50	7.32
135	Y	7.39	40.38	19.20	0.11	40.00	19.69	29.50	9.81
180	Y	9.67	41.66	19.20	0.13	40.00	20.99	29.50	8.51
202.5	Y	12.00	43.54	18.91	0.15	40.00	22.60	29.50	6.90
270	Y	9.51	40.58	19.20	0.13	40.00	19.91	29.50	9.59
0	H	41.95	12.87	13.90	0.30	-5.00	32.07	40.00	7.93
22.5	H	49.43	13.73	13.90	0.33	-5.00	32.96	40.00	7.04
45	H	45.35	13.83	13.90	0.31	-5.00	33.04	40.00	6.96
67.5	H	126.31	17.87	9.14	0.55	-5.00	32.56	43.50	10.94
247.5	H	30.61	17.50	10.89	0.25	-5.00	33.64	40.00	6.36
247.5	H	57.79	13.77	12.35	0.35	-5.00	31.47	40.00	8.53
292.5	H	154.62	21.59	8.37	0.61	-5.00	35.57	43.50	7.93
315	H	33.51	16.99	11.83	0.26	-5.00	34.08	40.00	5.92
0	V	61.79	16.32	11.89	0.36	-5.00	33.57	40.00	6.43
45	V	42.51	12.39	13.90	0.30	-5.00	31.59	40.00	8.41
67.5	V	232.41	15.67	11.79	0.73	-5.00	33.19	46.00	12.81
90	V	118.53	21.26	9.65	0.53	-5.00	36.44	43.50	7.06
135	V	147.21	21.22	8.34	0.59	-5.00	35.15	43.50	8.35
157.5	V	128.56	19.55	8.98	0.55	-5.00	34.08	43.50	9.42
225	V	37.22	14.02	13.11	0.28	-5.00	32.41	40.00	7.59
315	V	120.53	15.18	9.48	0.53	-5.00	30.19	43.50	13.31
337.5	V	51.34	13.62	13.61	1.41	-5.00	33.64	40.00	6.36

Note 1: $H = D + E + F - G$; $J = I - H$

Note 2: the QP detector is applied based on that the pulse-repetition frequency of assessed signal is higher than 20 Hz.

Underground location 2

A	B	C	D	E	F	G	H	I	J
Test Angle (degree)	Ant. Pol.	Freq. (MHz)	Reading (dBuV/m)	Ant. Factor (dB)	Cable loss (dB)	Ant height / Distance Factor (dB)	Net (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
0	X	1.30	43.42	19.20	0.04	40.00	22.66	29.50	6.84
0	X	7.27	39.76	19.20	0.11	40.00	19.07	29.50	10.43
22.5	X	2.87	41.59	19.20	0.07	40.00	20.86	29.50	8.64
22.5	X	4.49	42.69	19.20	0.09	40.00	21.98	29.50	7.52
45	X	2.83	42.10	19.20	0.07	40.00	21.37	29.50	8.13
67.5	X	6.61	42.58	19.20	0.11	40.00	21.89	29.50	7.61
90	X	6.15	33.67	19.20	0.11	40.00	12.98	29.50	16.52

TEST REPORT

225	X	1.85	34.83	19.20	0.05	40.00	14.08	29.50	15.42
270	X	7.25	33.26	19.20	0.11	40.00	12.57	29.50	16.93
315	X	9.68	39.23	19.20	0.13	40.00	18.56	29.50	10.94
22.5	Y	6.03	41.62	19.20	0.11	40.00	20.93	29.50	8.57
22.5	Y	7.27	43.26	19.20	0.11	40.00	22.57	29.50	6.93
45	Y	4.43	42.39	19.20	0.09	40.00	21.68	29.50	7.82
67.5	Y	4.57	40.86	19.20	0.09	40.00	20.15	29.50	9.35
90	Y	10.69	38.43	19.10	0.14	40.00	17.67	29.50	11.83
337.5	Y	1.30	39.73	19.20	0.04	40.00	18.97	29.50	10.53
337.5	Y	11.97	41.81	18.91	1.17	40.00	21.89	29.50	7.61
0	H	39.40	12.81	13.57	0.29	-5.00	31.67	40.00	8.33
22.5	H	46.12	13.26	13.90	0.31	-5.00	32.47	40.00	7.53
45	H	57.25	15.24	12.49	0.35	-5.00	33.08	40.00	6.92
67.5	H	146.51	22.14	8.33	0.59	-5.00	36.06	43.50	7.44
90	H	171.23	20.17	8.97	0.63	-5.00	34.77	43.50	8.73
112.5	H	207.51	17.08	11.03	0.68	-5.00	33.79	43.50	9.71
112.5	H	244.13	17.39	12.12	0.75	-5.00	35.26	46.00	10.74
135	H	334.08	13.38	14.28	0.92	-5.00	33.58	46.00	12.42
247.5	H	33.63	15.41	11.80	0.26	-5.00	32.47	40.00	7.53
315	H	307.73	14.12	13.44	0.90	-5.00	33.46	46.00	12.54
337.5	H	32.15	15.46	11.37	0.26	-5.00	32.09	40.00	7.91
0	V	45.81	13.24	13.90	0.31	-5.00	32.45	40.00	7.55
22.5	V	43.71	14.06	13.90	0.30	-5.00	33.26	40.00	6.74
45	V	120.64	19.01	9.48	0.53	-5.00	34.02	43.50	9.48
90	V	243.31	17.70	12.09	0.75	-5.00	35.54	46.00	10.46
90	V	274.43	13.63	12.72	0.82	-5.00	32.17	46.00	13.83
135	V	38.81	15.06	13.14	1.37	-5.00	34.57	40.00	5.43
180	V	54.43	13.38	13.27	0.34	-5.00	31.99	40.00	8.01
292.5	V	333.81	14.28	14.24	0.92	-5.00	34.44	46.00	11.56
315	V	116.64	18.03	9.85	0.53	-5.00	33.41	43.50	10.09
315	V	279.94	16.80	12.83	0.84	-5.00	35.47	46.00	10.53
337.5	V	33.39	17.65	11.79	0.26	-5.00	34.70	40.00	5.30

Note 1: $H = D + E + F - G$; $J = I - H$

Note 2: the QP detector is applied based on that the pulse-repetition frequency of assessed signal is higher than 20 Hz.

TEST REPORT

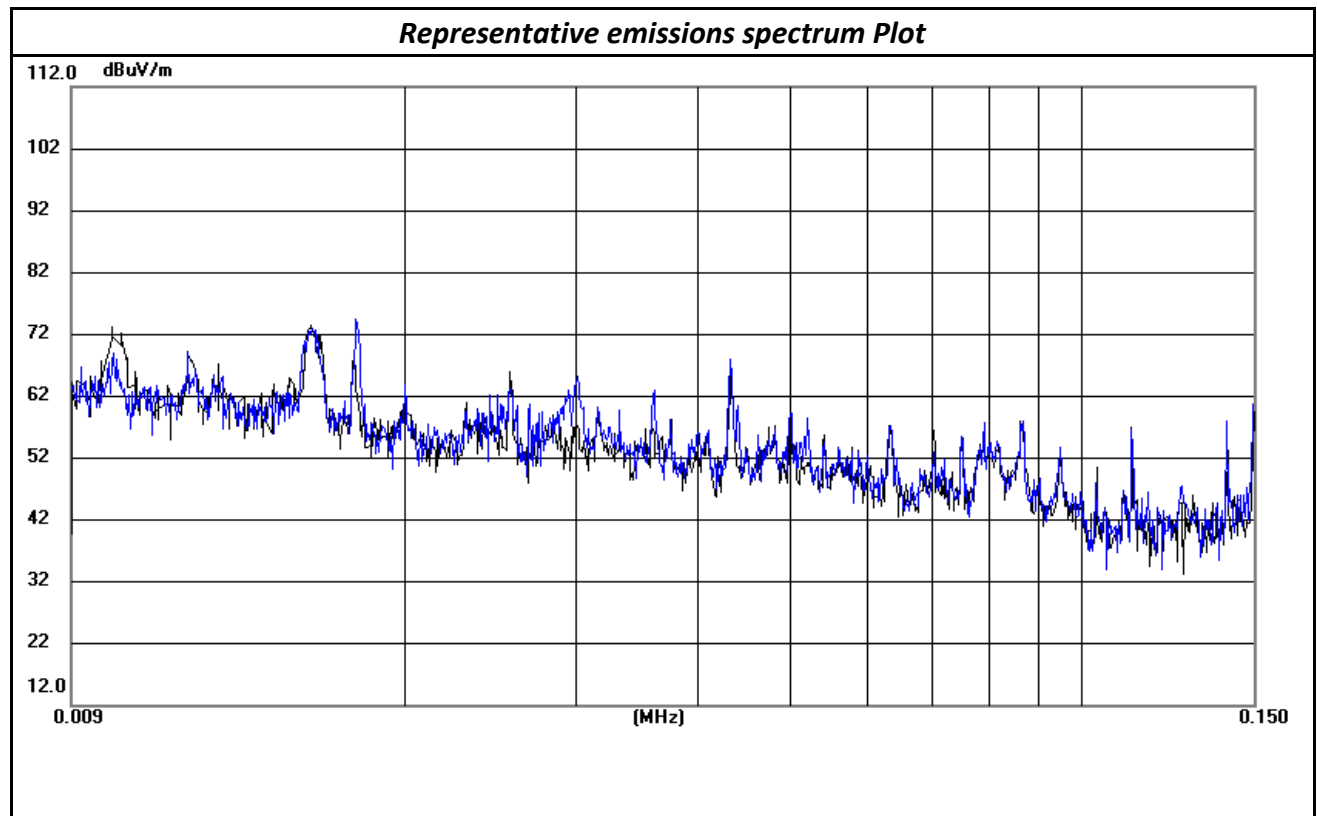
<i>Underground location 3</i>									
A	B	C	D	E	F	G	H	I	J
Test Angle (degree)	Ant. Pol.	Freq. (MHz)	Reading (dBuV/m)	Ant. Factor (dB)	Cable loss (dB)	Ant height / Distance Factor(dB)	Net (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
0	X	4.03	42.67	19.20	0.09	40.00	21.96	29.50	7.54
0	X	5.06	40.88	19.20	0.10	40.00	20.18	29.50	9.32
45	X	4.59	43.07	19.20	0.09	40.00	22.36	29.50	7.14
45	X	4.89	43.78	19.20	0.10	40.00	23.08	29.50	6.42
90	X	4.61	44.07	19.20	0.10	40.00	23.37	29.50	6.13
157.5	X	5.17	43.28	19.20	0.10	40.00	22.58	29.50	6.92
180	X	1.29	44.35	19.20	0.04	40.00	23.59	29.50	5.91
202.5	X	2.79	44.19	19.20	0.07	40.00	23.46	29.50	6.04
315	X	2.81	39.75	19.20	0.07	40.00	19.02	29.50	10.48
337.5	X	9.68	38.85	19.20	0.13	40.00	18.18	29.50	11.32
0	Y	1.23	36.72	19.20	0.04	40.00	15.96	29.50	13.54
22.5	Y	5.51	41.78	19.20	0.10	40.00	21.08	29.50	8.42
45	Y	4.17	40.60	19.20	0.09	40.00	19.89	29.50	9.61
90	Y	9.68	41.76	19.20	0.13	40.00	21.09	29.50	8.41
112.5	Y	2.83	40.31	19.20	0.07	40.00	19.58	29.50	9.92
157.5	Y	2.19	44.82	19.20	0.06	40.00	24.08	29.50	5.42
202.5	Y	5.35	40.38	19.20	1.10	40.00	20.68	29.50	8.82
225	Y	5.36	44.05	19.20	0.10	40.00	23.35	29.50	6.15
247.5	Y	2.17	42.62	19.20	0.07	40.00	21.89	29.50	7.61
270	Y	1.91	43.76	19.20	0.05	40.00	23.01	29.50	6.49
292.5	Y	2.57	42.43	19.20	0.06	40.00	21.69	29.50	7.81
337.5	Y	2.62	43.86	19.20	0.06	40.00	23.12	29.50	6.38
0	H	63.42	16.00	11.49	0.37	-5.00	32.86	40.00	7.14
22.5	H	33.81	16.11	12.11	0.27	-5.00	33.49	40.00	6.51
45	H	229.13	18.30	11.71	0.72	-5.00	35.73	46.00	10.27
67.5	H	31.41	17.24	10.94	0.25	-5.00	33.43	40.00	6.57
67.5	H	73.25	17.20	9.57	0.40	-5.00	32.17	40.00	7.83
112.5	H	53.51	15.69	13.55	0.34	-5.00	34.58	40.00	5.42
247.5	H	334.82	15.92	14.32	0.93	-5.00	36.17	46.00	9.83
270	H	58.35	17.37	12.36	0.35	-5.00	35.08	40.00	4.92
315	H	316.49	14.53	13.63	0.90	-5.00	34.06	46.00	11.94
337.5	H	334.71	14.52	14.19	0.92	-5.00	34.63	46.00	11.37
67.5	V	37.81	16.85	12.85	0.28	-5.00	34.98	40.00	5.02
157.5	V	46.31	14.98	13.90	0.31	-5.00	34.19	40.00	5.81

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180	V	54.81	14.53	13.14	0.34	-5.00	33.01	40.00	6.99
202.5	V	62.71	14.44	11.67	0.37	-5.00	31.48	40.00	8.52
225	V	53.81	15.10	13.64	0.33	-5.00	34.07	40.00	5.93
247.5	V	321.45	15.78	13.82	0.91	-5.00	35.51	46.00	10.49
292.5	V	58.51	15.69	12.48	1.51	-5.00	34.68	40.00	5.32

Note 1: $H = D + E + F - G$; $J = I - H$

Note 2: the QP detector is applied based on that the pulse-repetition frequency of assessed signal is higher than 20 Hz.



4 Power line conducted emission

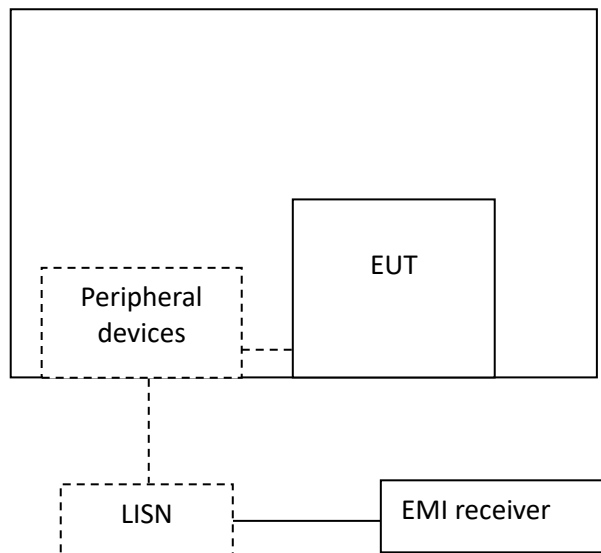
Test result: NA

4.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
0.15-0.5	66 to 56*	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

4.2 Test Configuration



TEST REPORT**4.3 Measurement Procedure**

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

TEST REPORT

4.4 Test Results

Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)
/	/	/	/	/	/	/
/	/	/	/	/	/	/
/	/	/	/	/	/	/
/	/	/	/	/	/	/
/	/	/	/	/	/	/

- Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.*
 2. *Corrected Reading = Original Receiver Reading + Correct Factor*
 3. *Margin = Limit - Corrected Reading*
 4. *If the PK Corrected Reading is lower than AV limit, the AV test can be elided.*

Example: Assuming LISN Factor = 10.00dB, Cable Loss = 2.00dB,
 Original Receiver Reading = 10.00dBuV, Limit = 66.00dBuV.
 Then Correct Factor = 10.00 + 2.00 = 12.00dB;
 Corrected Reading = 10dBuV + 12.00dB = 22.00dBuV;
 Margin = 66.00dBuV – 22.00dBuV = 44.00dB.

***** END *****