

FCC Part 15B

Measurement and Test Report

For

Beijing Hanshow Technology Co., Ltd.

Floor 18, Building C, Ruipu Plaza, No.15 Hongjunying South Rd, Chaoyang

District, Beijing, China

FCC ID: 2AD43- HS-C0955

Test Rule(s): FCC Part 15 Subpart B

Product Description: ESL Transmitter

Tested Model: HS-C09556 Senior

Report No.: STR14128170I-2

Tested Date: 2014-12-23 to 2015-02-05

Issued Date: 2015-02-05

Tested By: Mark Chen / Engineer

Mark Chen

Reviewed By: Lahm Peng / EMC Manager

Lahm peng

Approved & Authorized By: Jandy so / PSQ Manager

Jandyso

Prepared By:

Shenzhen SEM.Test Technology Co., Ltd.

1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,
Bao'an District, Shenzhen, P.R.C. (518101)

Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Beijing Hanshow Technology Co., Ltd.
Address of applicant: Floor 18, Building C, Ruipu Plaza, No.15
Hongjunying South Rd, Chaoyang District, Beijing,
China
Manufacturer: Zhejiang Hanshow Technology Co., Ltd.
Address of manufacturer: Shanghai jiao Tong University Jiaying Science Park,
No.321, Jiachuang Road, Xiuzhou District, Jiaying
City, Zhejiang Province

General Description of EUT	
Product Name:	ESL Transmitter
Trade Name:	/
Model No.:	HS-C09556 Senior
Adding Model(s):	HS-C09556 Junior
<i>Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model HS-C09556 Senior, but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	

Technical Characteristics of EUT	
Rated Voltage:	DC 5V from POE
Rated Current:	1A
Rated Power:	/
Power Adapter Model:	MU24-1480050-A2 Input: AC100-240V, 50/60Hz; Output: DC 48V
Highest Internal Frequency:	25MHz

1.2 Test Standards

The following report is prepared on behalf of the Beijing Hanshow Technology Co., Ltd. in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart B, and section 15.205, 15.107, and 15.109 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with 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.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Working	/
TM2		

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Reticle	1.2	Unshielded	Without Ferrite

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
AC Adapter	N/A	MU24-1480050-A2	/
POE	N/A	TL-POE150S	/
PC	DELL	OPTIPLEX 380	/
Display	LENOVO	L1950Wd	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.107 (a)	Conducted Emissions	Compliant
§ 15.109 (a)	Radiated Emissions	Compliant

N/A: not applicable

3. Conducted Emissions

3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

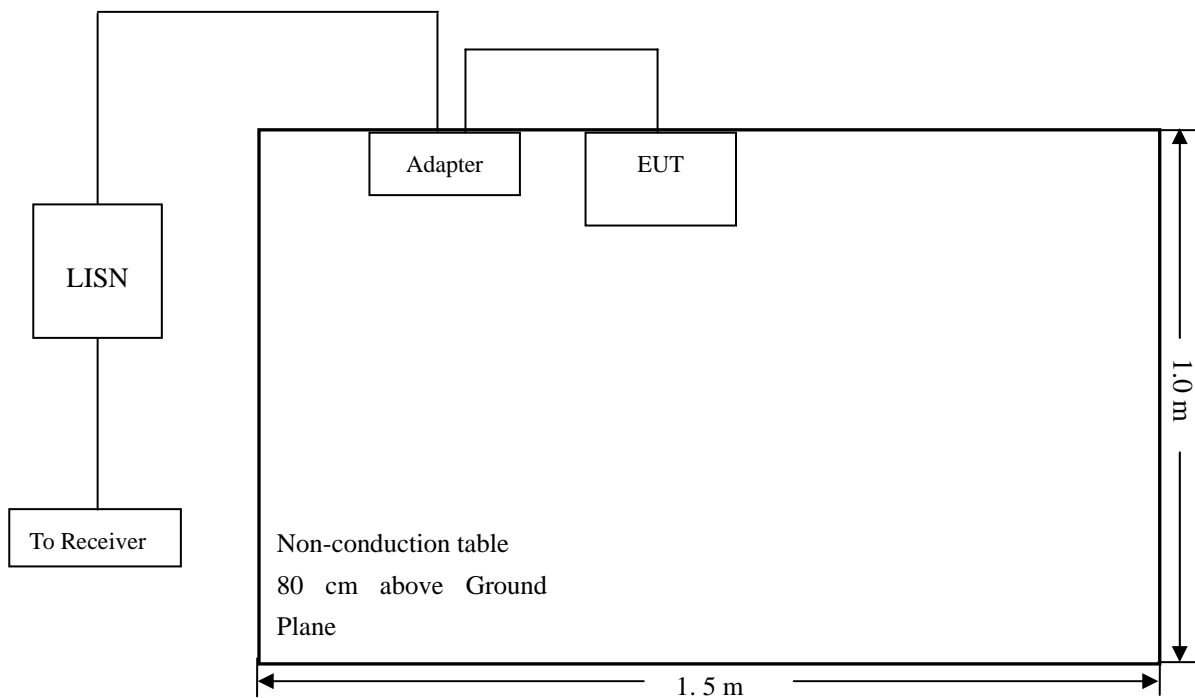
3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2014-05-28	2015-05-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2014-05-28	2015-05-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2014-05-28	2015-05-27

3.3 Test Procedure

Test is conducting under the description of 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.

3.4 Basic Test Setup Block Diagram



3.5 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

3.6 Summary of Test Results/Plots

According to the data in section 3.7, the EUT complied with the FCC Part 15.107(a) Conducted margin for a Class B device, with the *worst* margin reading of:

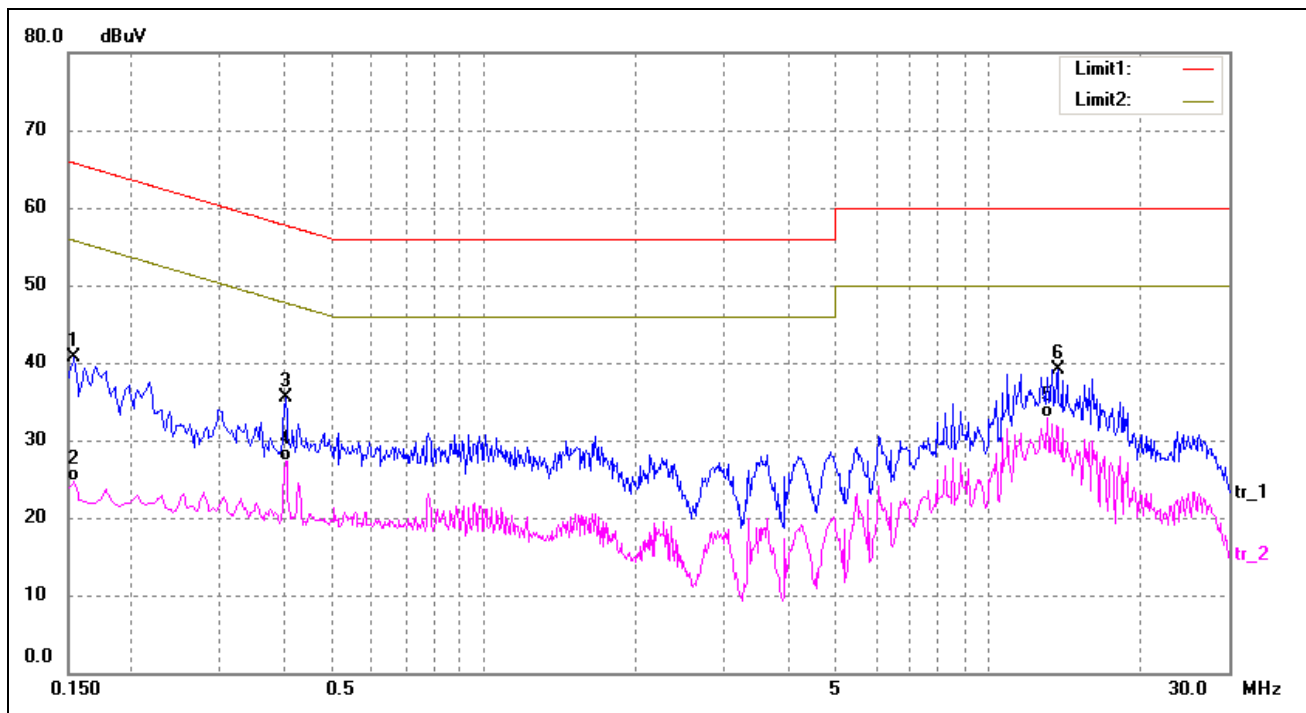
-16.79 dB at **0.4060 MHz** in the **Line, Peak** detector, 0.15-30MHz

3.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

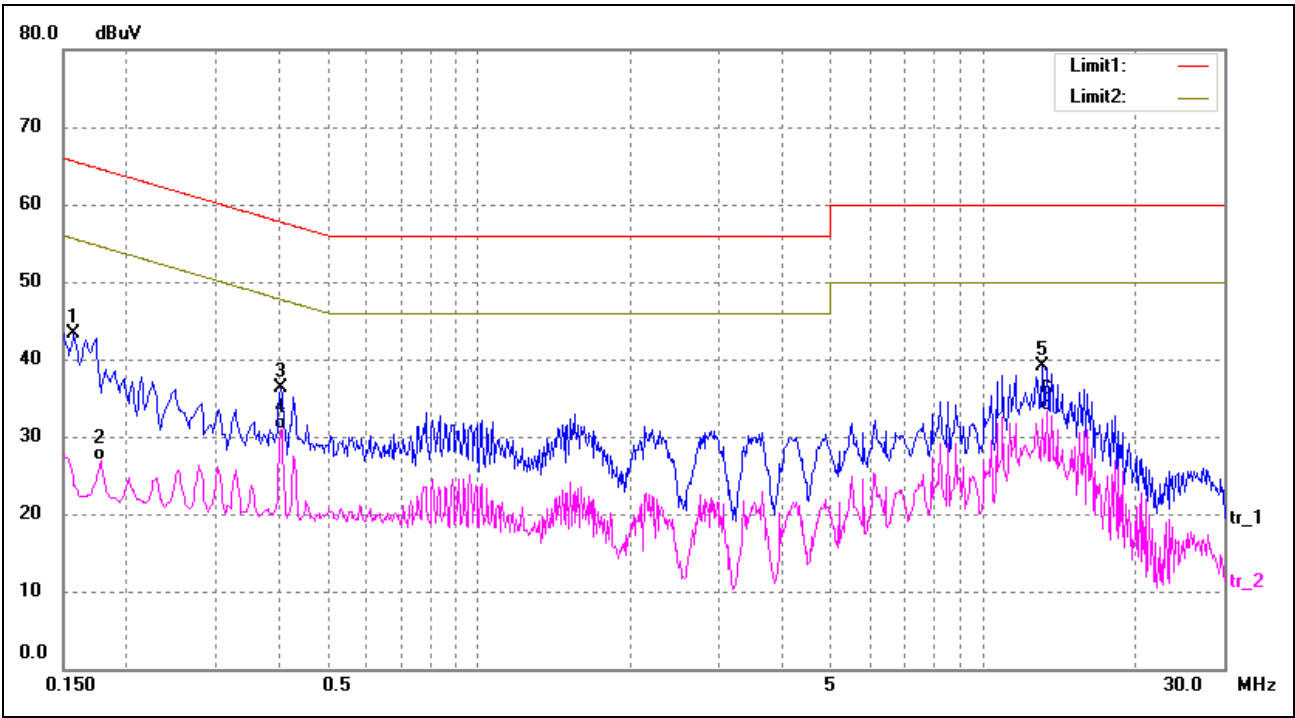
EUT: *ESL Transmitter*
 Tested Model: *HS-C09556 Senior*
 Operating Condition: *Working*
 Comment: *AC120V/60Hz; Adapter DC 48V*

Test Specification: *Neutral*



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1540	31.22	9.50	40.72	65.78	-25.06	peak
2	0.1540	15.24	9.50	24.74	55.78	-31.04	AVG
3	0.4060	26.03	9.50	35.53	57.73	-22.20	peak
4	0.4060	17.84	9.50	27.34	47.73	-20.39	AVG
5*	13.0860	22.20	10.62	32.82	50.00	-17.18	AVG
6	13.6980	28.45	10.74	39.19	60.00	-20.81	peak

Test Specification: Line



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1580	33.84	9.50	43.34	65.57	-22.23	peak
2	0.1780	17.36	9.50	26.86	54.58	-27.72	AVG
3	0.4060	26.85	9.50	36.35	57.73	-21.38	peak
4*	0.4060	21.44	9.50	30.94	47.73	-16.79	AVG
5	13.0820	28.52	10.62	39.14	60.00	-20.86	peak
6	13.3900	22.53	10.68	33.21	50.00	-16.79	AVG

4. Radiated Emissions

4.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 5.10 dB.

4.2 Test Equipment List and Details

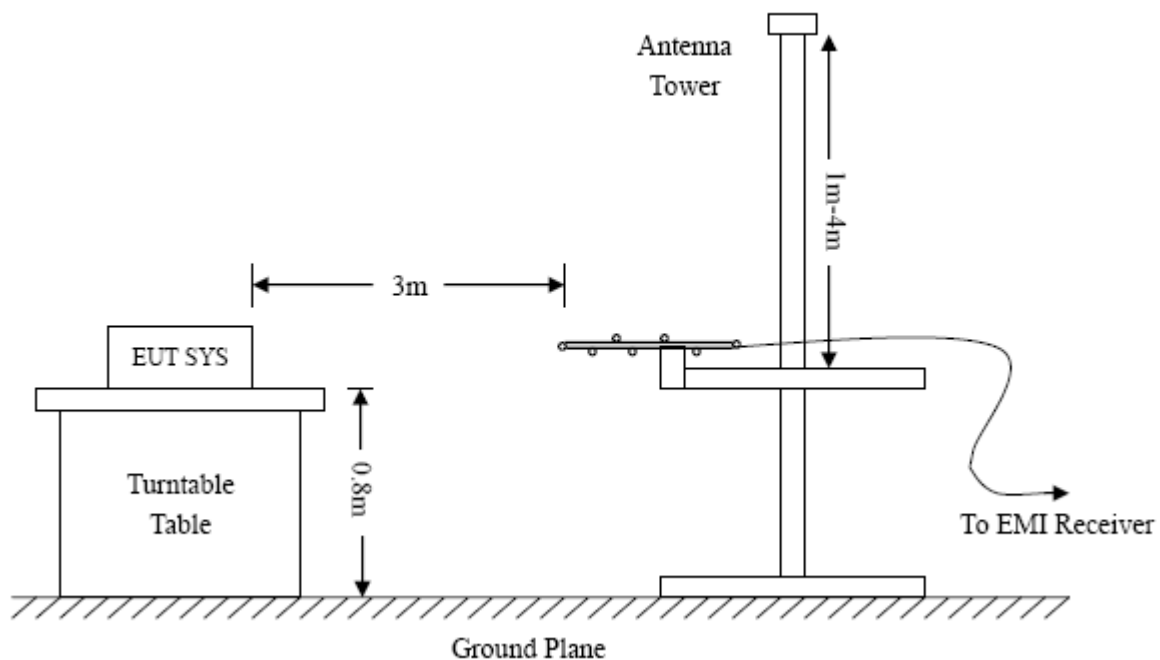
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2014-05-24	2015-05-23

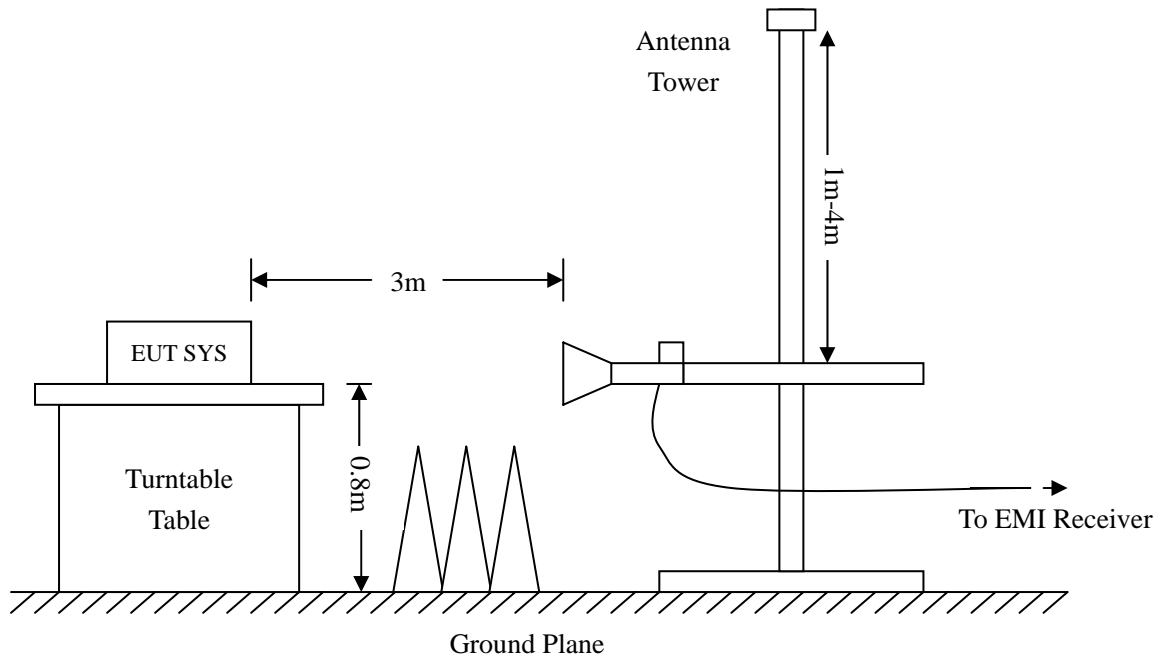
4.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.





4.4 Test Receiver Setup

Frequency :9kHz-30MHz

RBW=10KHz,

VBW =30KHz

Sweep time= Auto

Trace = max hold

Detector function = peak

Frequency :30MHz-1GHz

RBW=120KHz,

VBW=300KHz

Sweep time= Auto

Trace = max hold

Detector function = peak, QP

Frequency :Above 1GHz

RBW=1MHz,

VBW=3MHz(Peak), 10Hz(AV)

Sweep time= Auto

Trace = max hold

Detector function = peak, AV

4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for a Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.109(a) Limit}$$

4.6 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	1011 mbar

4.7 Summary of Test Results/Plots

According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-3.51 dB at 72.3376 MHz in the **Horizontal polarization, 9 kHz to 1 GHz, 3Meters**

Plot of Radiated Emissions Test Data

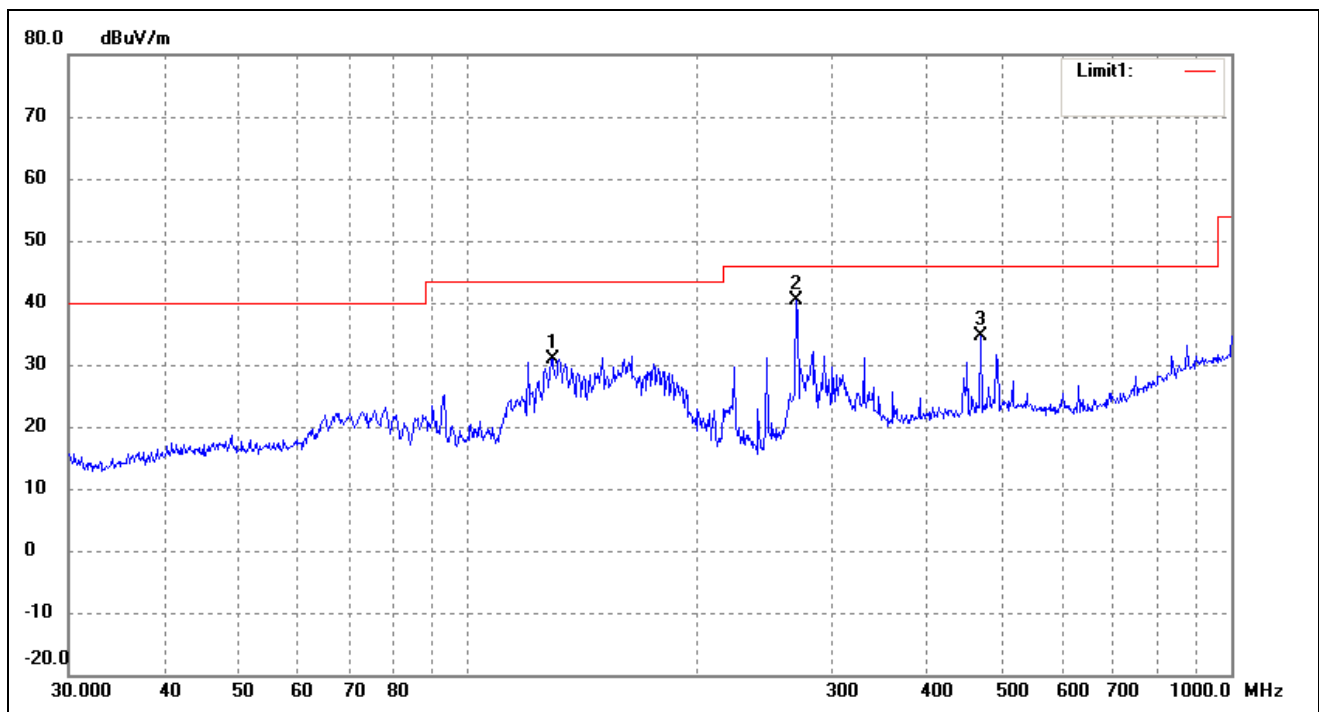
EUT: *ESL Transmitter*

Tested Model: *HS-C09556 Senior*

Operating Condition: *Working*

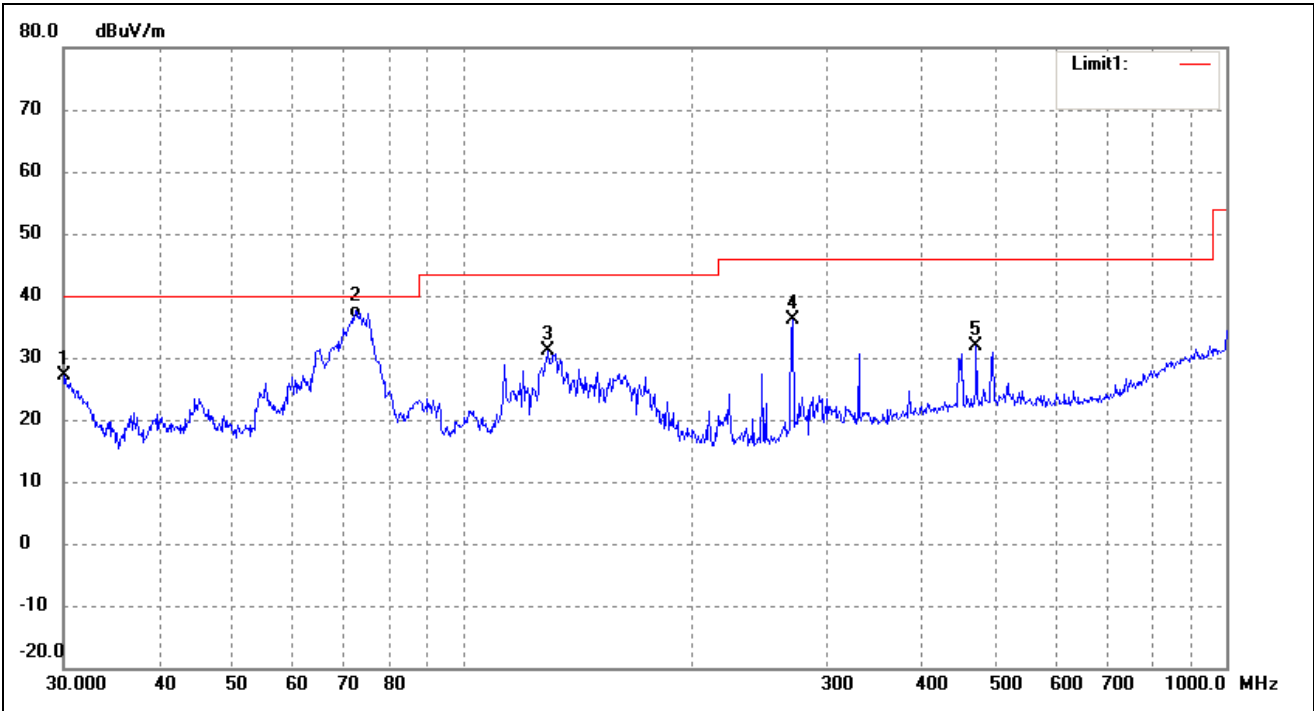
Comment: *AC120V/60Hz; Adapter DC 48V*

Test Specification: *Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	129.0146	43.56	-12.59	30.97	43.50	-12.53	102	100	peak
2*	269.4284	47.37	-6.96	40.41	46.00	-5.59	146	100	peak
3	470.5232	36.40	-1.80	34.60	46.00	-11.40	155	100	peak

Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	30.1054	37.39	-10.28	27.11	40.00	-12.89	51	100	peak
2	72.3376	48.90	-12.41	36.49	40.00	-3.51	308	100	QP
3	129.4678	43.75	-12.66	31.09	43.50	-12.41	120	100	peak
4	270.3748	43.10	-6.93	36.17	46.00	-9.83	359	100	peak
5	470.5232	33.60	-1.80	31.80	46.00	-14.20	359	100	peak

Note: Testing is carried out with frequency rang 9kHz to the 1GHz, which above 1GHz is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.
The measurements greater than 20dB below the limit from 9kHz to 30MHz and test data are not provided.

***** END OF REPORT *****