

FCC Part 15C Measurement and Test Report

For

NSV TRADING LLC

#8-16 Street, Al Quoz, Dubai. UAE

FCC ID: 2AHRMUSA08

FCC Rule(s):	<u>FCC Part 15.239</u>
Product Description:	<u>Rear Seat Entertainment System</u> <u>8 " Main Screen (Part No.: RSETY- USA08-IV</u> <u>& RSETY-USA08-BK)</u>
Tested Model:	
Report No.:	<u>STR16048114I-2</u>
Tested Date:	<u>2016-04-13 to 2016-04-22</u>
Issued Date:	<u>2016-04-22</u>
Tested By:	<u>Leo Lee / Engineer</u> <i>Leo Lee</i>
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Prepared By:	

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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: NSV TRADING LLC
Address of applicant: #8-16 Street, Al Quoz, Dubai. UAE

Manufacturer: HANHWA HIGHTECH CO.,LTD
Address of manufacturer: (Samsan-dong,5th Floor)14 Cheyukgwan-ro, Bupyeong-gu, Incheon,403-866,Korea

General Description of EUT	
Product Name:	Rear Seat Entertainment System
Trade Name:	
Model No.:	8 " Main Screen (Part No.: RSETY- USA08-IV & RSETY-USA08-BK)
Adding Model(s):	/
Rated Voltage:	DC 12V
Power Adapter Model:	/
<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 8 " Main Screen (Part No.: RSETY-USA08-IV & RSETY-USA08-BK), but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	

Technical Characteristics of EUT	
Frequency Range:	88.1-107.9 MHz
Max. Field Strength:	48.93dBuV(Distance: 3 meter)
Modulation:	FM
Quantity of Channels:	199
Channel Separation:	100kHz
Antenna Type:	PCB Antenna
Lowest Internal Frequency of EUT:	32.768kHz

1.2 Test Standards

The following report of is prepared on behalf of the NSV TRADING LLC in accordance with FCC Part 15, Subpart C, and section 15.239, 15.203 and 15.209 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.239, 15.203 and 15.209 of the Federal Communication Commissions rules.

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

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices, and 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.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions. The EUT was tested in all three orthogonal planes and the worse case was showed.

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 Test Mode

The EUT was operated at continuous transmitting mode that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Low Channel	88.1MHz
TM2	Middle Channel	98.1MHz
TM3	High Channel	107.9MHz

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
DC power	/	/	/
Earphone	Sony	/	/
HDMI cable	/	/	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Transmitter Spurious Emissions	Radiated	$\pm 5.1\text{dB}$

1.6 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2015-06-17	2016-06-16
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2015-06-17	2016-06-16
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2015-06-17	2016-06-16
Amplifier	Agilent	8447F	3113A06717	2015-06-17	2016-06-16
Amplifier	C&D	PAP-1G18	2002	2015-06-17	2016-06-16
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2015-06-17	2016-06-16
Horn Antenna	ETS	3117	00086197	2015-06-17	2016-06-16
Loop Antenna	Schwarz beck	FMZB 1516	9773	2015-06-17	2016-06-16
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2015-06-17	2016-06-16
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2015-06-17	2016-06-16
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2015-06-17	2016-06-16

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.203	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§ 15.207(a)	Conducted Emission	N/A
§ 15.209	Radiated Emissions	Compliant
§15.239(c)	Out of band emission	Compliant
§15.239(a)	Emission Bandwidth	Compliant
§15.239(b)	Radiated Emissions	Compliant

3. ANTENNA REQUIREMENT

3.1 Standard Applicable

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2 Test Result

This product has a permanent antenna, fulfill the requirement of this section.

4. RADIATED EMISSION

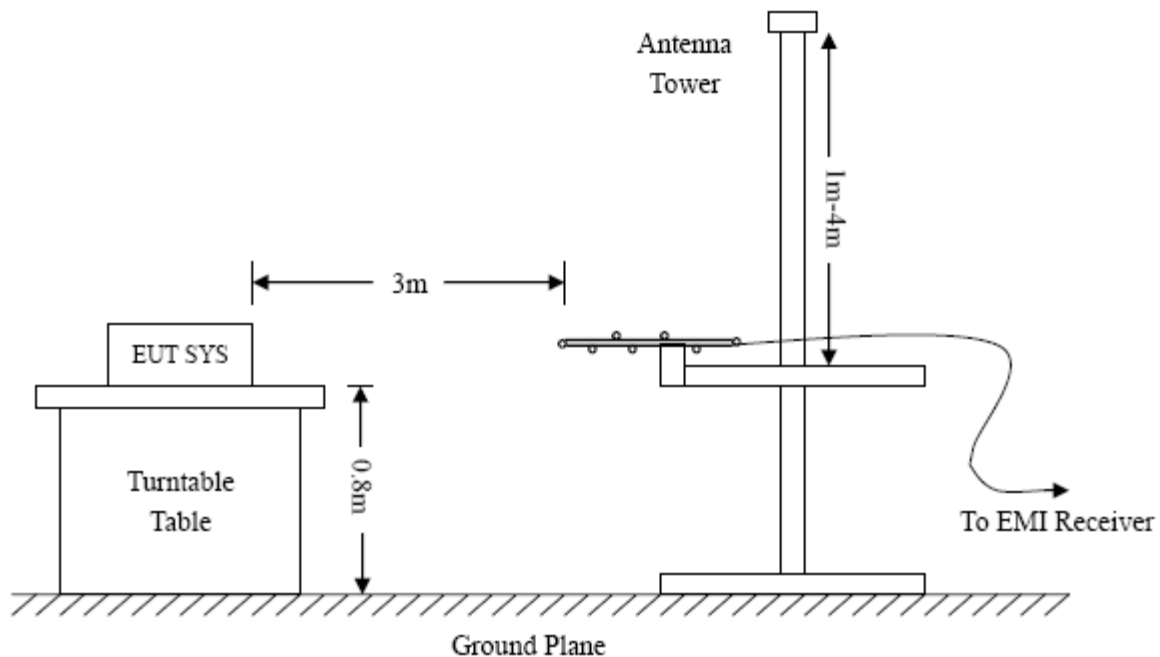
4.1 Standard Applicable

According to §15.239(b), The field strength of any emissions within the permitted 200 kHz band shall not exceed 250 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

According to §15.239(c), The field strength of any emissions radiated on any frequency outside of the specified 200 kHz band shall not exceed the general radiated emission limits in §15.209.

4.2 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.239(b) and FCC Part 15.209 Limit.



4.3 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:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Loss} + \text{Cab. Loss} - \text{Ampl. Gain}$$

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. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.239 Limit}$$

4.4 Environmental Conditions

Temperature:	21° C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

4.5 Summary of Test Results/Plots

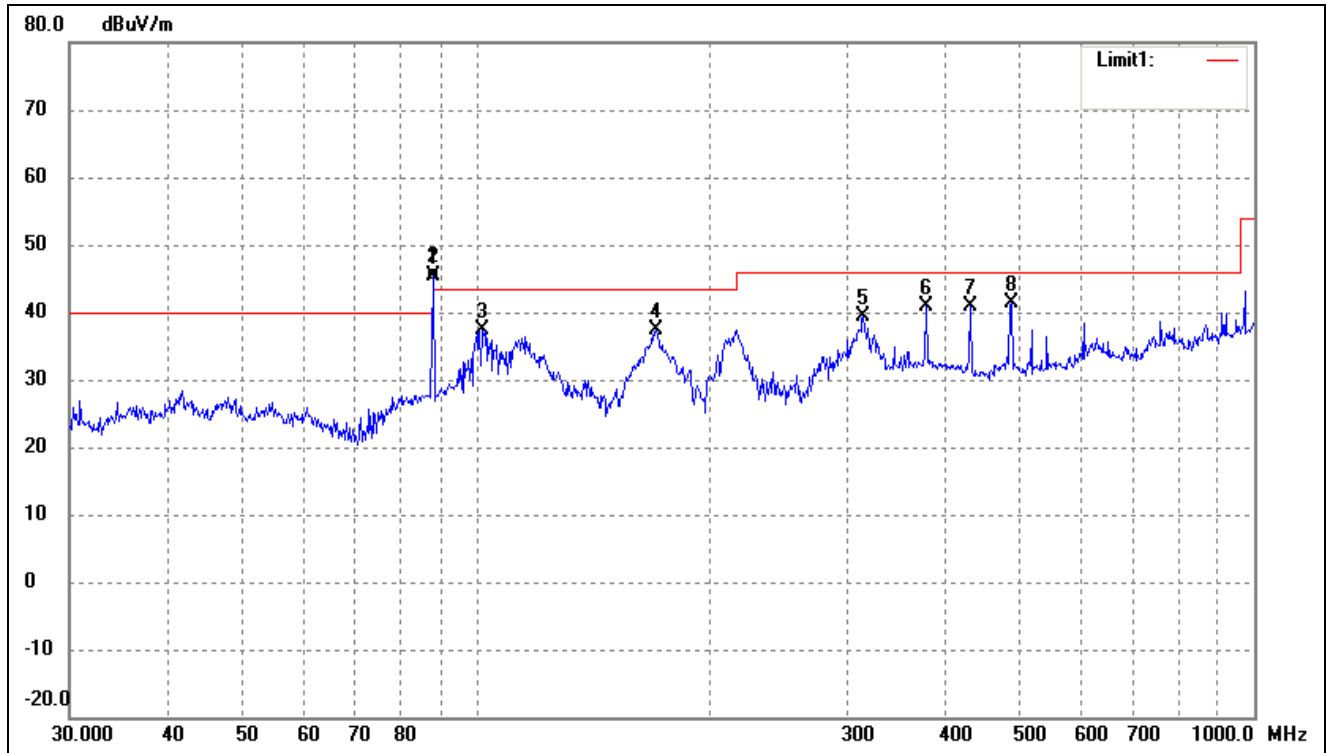
According to the data below, the FCC Part 15.209 and 15.239 standards, and had the worst margin of:

-0.61 dB at 107.900 MHz in the Horizontal polarization, High Channel, 9 kHz to 2 GHz, 3Meters

***Note:** this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

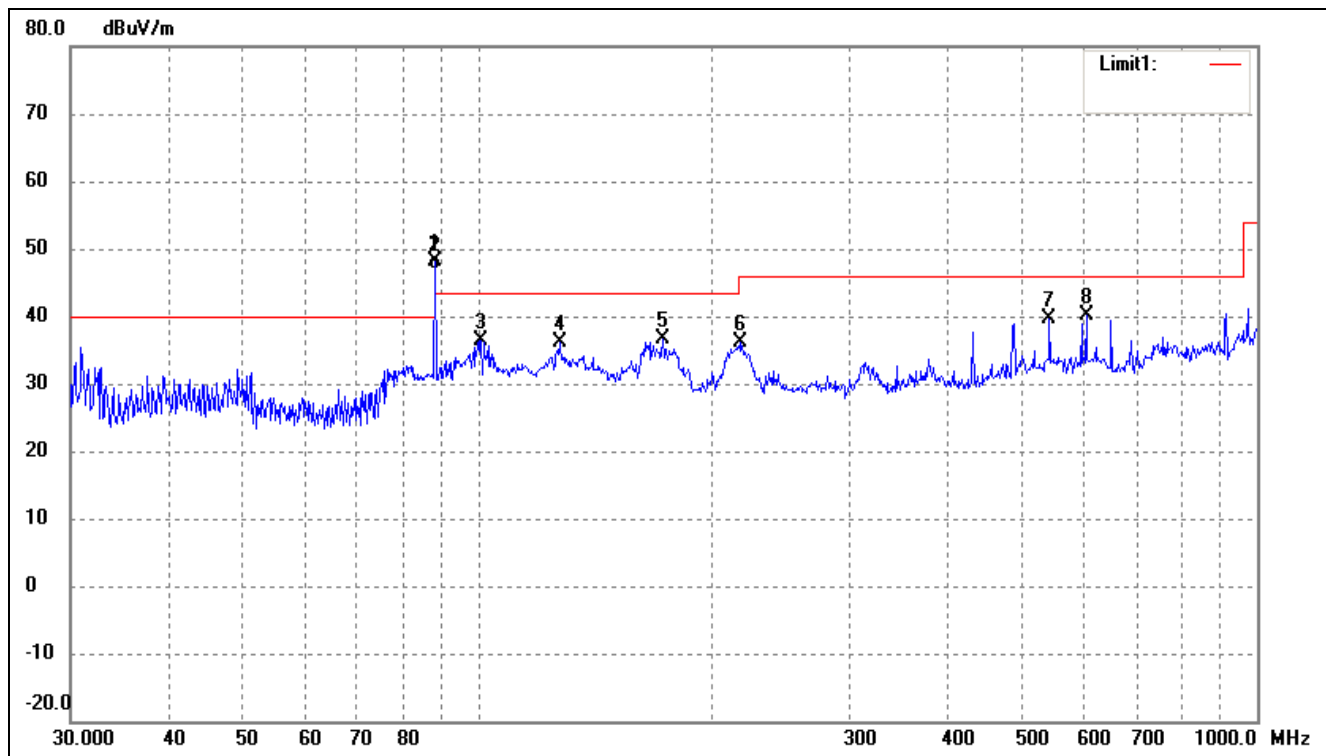
Plot of Radiated Emissions Test Data

EUT: Rear Seat Entertainment System
 Tested Model: 8" Main Screen (Part NO.: RSETY-USA08-IV & RSETY-USA08-BK)
 Operating Condition: Transmitting Low Channel (88.1MHz)
 Comment: DC 12V
 Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	88.1000	58.11	-12.76	45.35	68.00	-22.65	129	100	peak
2	88.1000	57.33	-12.76	44.57	48.00	-3.43	167	100	AVG
3	101.6443	48.31	-10.94	37.37	43.50	-6.13	157	100	peak
4	170.1947	49.08	-11.81	37.27	43.50	-6.23	35	100	peak
5	314.3765	44.23	-4.92	39.31	46.00	-6.69	114	100	peak
6	378.5842	43.05	-2.17	40.88	46.00	-5.12	16	100	peak
7	431.0316	44.18	-3.19	40.99	46.00	-5.01	58	100	peak
8	487.3149	42.82	-1.47	41.35	46.00	-4.65	25	100	peak

Test Specification: Vertical

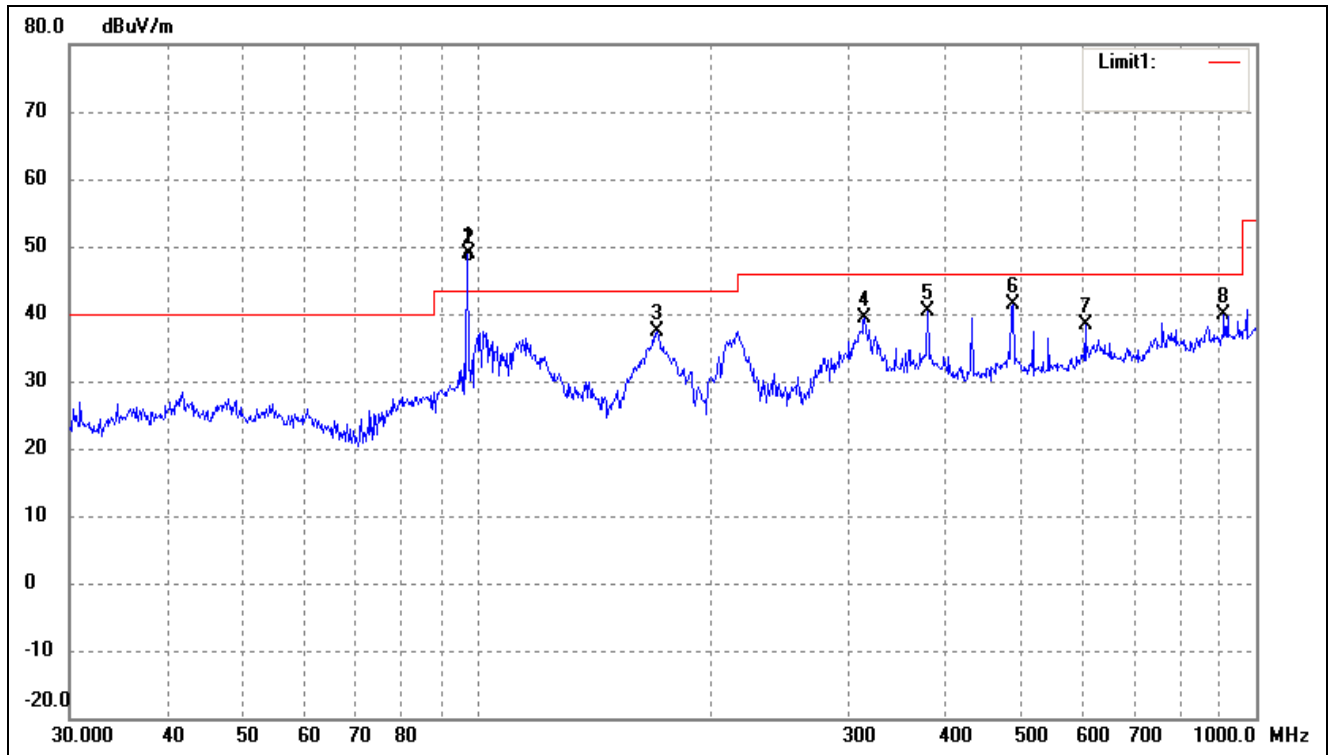


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	88.1000	60.92	-12.76	48.16	68.00	-19.84	97	100	peak
2	88.1000	59.69	-12.76	46.93	48.00	-1.07	154	100	AVG
3	100.9338	47.25	-10.93	36.32	43.50	-7.18	147	100	peak
4	127.2176	48.04	-11.84	36.20	43.50	-7.30	36	100	peak
5	172.5988	48.37	-11.70	36.67	43.50	-6.83	96	100	peak
6	217.5440	44.88	-8.81	36.07	46.00	-9.93	58	100	peak
7	541.3722	41.42	-1.76	39.66	46.00	-6.34	47	100	peak
8	603.5392	40.03	0.10	40.13	46.00	-5.87	256	100	peak

Operating Condition: Transmitting Middle Channel (98.1MHz)

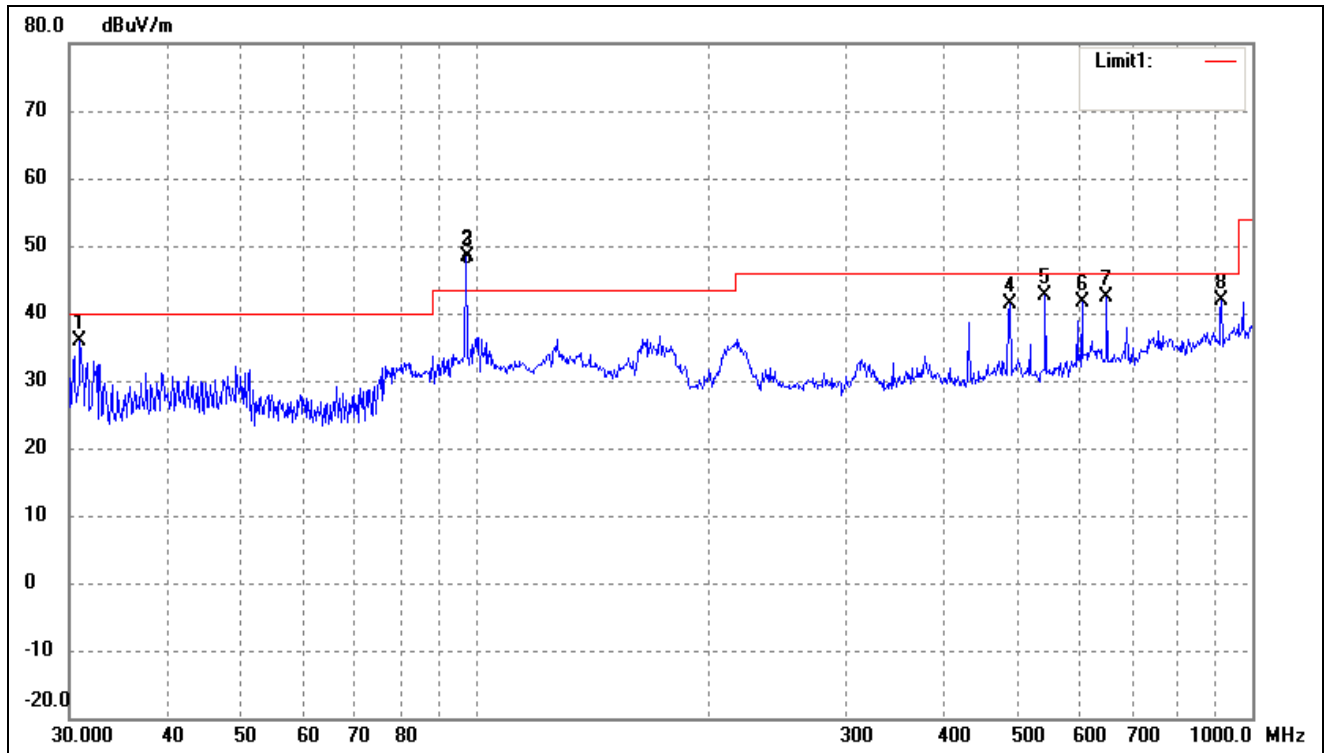
Comment: DC 12V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	98.1000	60.22	-11.29	48.93	68.00	-19.07	249	100	peak
2	98.1000	58.90	-11.29	47.17	48.00	-0.83	133	100	AVG
3	170.1947	49.08	-11.81	37.27	43.50	-6.23	360	100	peak
4	314.3765	44.23	-4.92	39.31	46.00	-6.69	214	100	peak
5	378.5842	42.55	-2.17	40.38	46.00	-5.62	55	100	peak
6	487.3149	42.82	-1.47	41.35	46.00	-4.65	267	100	peak
7	603.5392	38.17	0.10	38.27	46.00	-7.73	45	100	peak
8	909.6666	36.52	3.39	39.91	46.00	-6.09	52	100	peak

Test Specification: Vertical

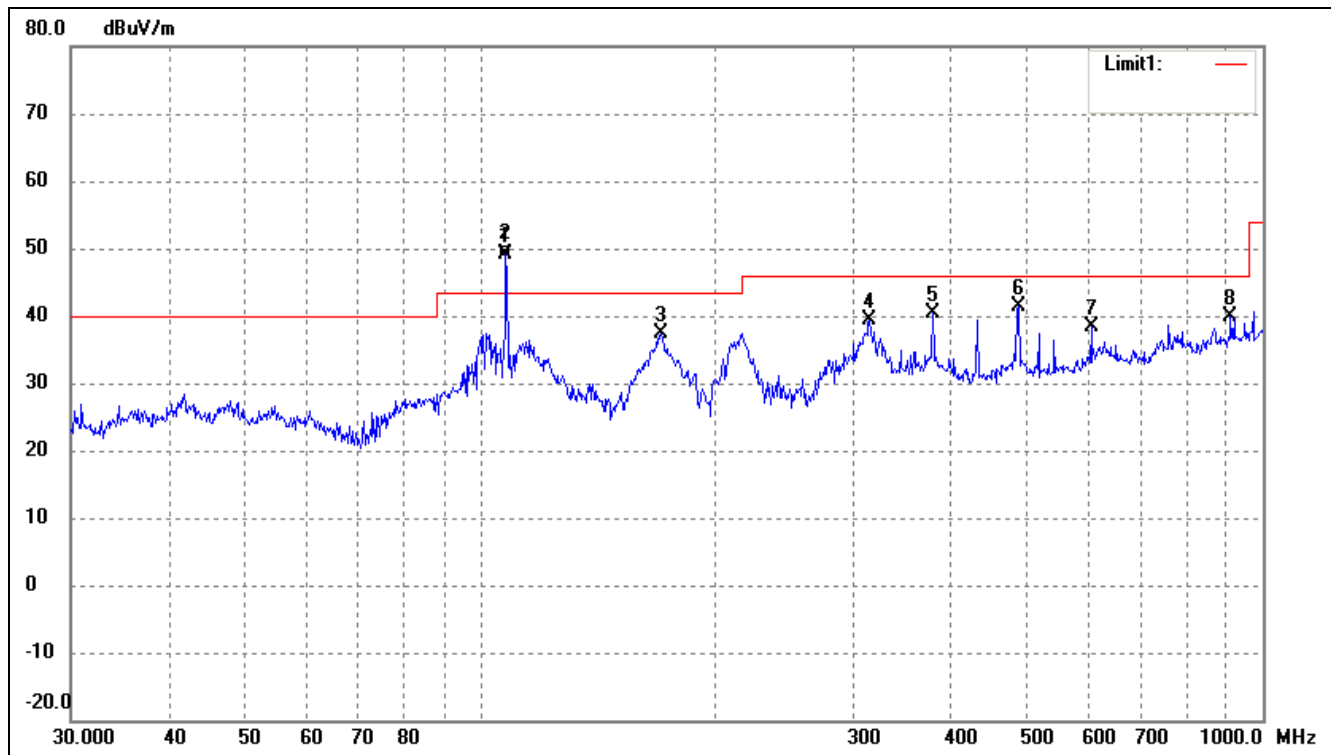


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	30.9618	45.84	-10.07	35.77	40.00	-4.23	142	100	peak
2	98.1000	59.67	-11.29	48.38	68.00	-19.62	153	100	peak
3	98.1000	58.48	-11.29	47.19	48.00	-0.81	181	100	AVG
4	487.3149	42.96	-1.47	41.49	46.00	-4.51	163	100	peak
5	541.3722	44.42	-1.76	42.66	46.00	-3.34	253	100	peak
6	603.5392	41.53	0.10	41.63	46.00	-4.37	241	100	peak
7	649.6597	41.78	0.52	42.30	46.00	-3.70	51	100	peak
8	912.8618	38.49	3.49	41.98	46.00	-4.02	254	100	peak

Operating Condition: Transmitting High Channel (107.9MHz)

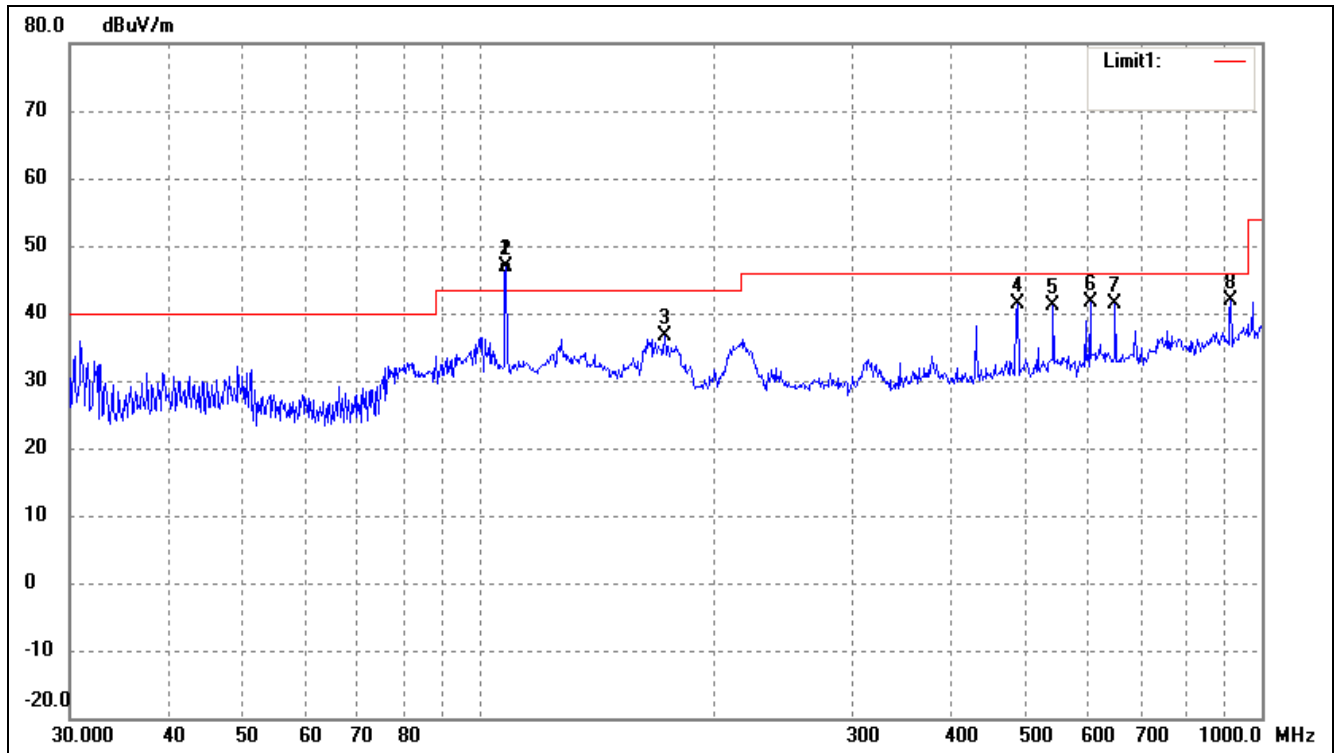
Comment: DC 12V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	107.9000	60.16	-11.11	48.74	68.00	-19.26	187	100	peak
2	107.9000	59.68	-11.11	47.39	48.00	-0.61	162	100	AVG
3	170.1947	49.08	-11.81	37.27	43.50	-6.23	135	100	peak
4	314.3765	44.23	-4.92	39.31	46.00	-6.69	47	100	peak
5	378.5842	42.55	-2.17	40.38	46.00	-5.62	126	100	peak
6	487.3149	42.82	-1.47	41.35	46.00	-4.65	57	100	peak
7	603.5392	38.17	0.10	38.27	46.00	-7.73	125	100	peak
8	909.6666	36.52	3.39	39.91	46.00	-6.09	45	100	peak

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	107.9000	58.00	-11.11	46.89	68.00	-21.11	127	100	peak
2	107.9000	57.08	-11.11	45.97	48.00	-2.03	169	100	AVG
3	172.5988	48.37	-11.70	36.67	43.50	-6.83	147	100	peak
4	487.3149	42.96	-1.47	41.49	46.00	-4.51	56	100	peak
5	541.3722	42.92	-1.76	41.16	46.00	-4.84	325	100	peak
6	603.5392	41.53	0.10	41.63	46.00	-4.37	98	100	peak
7	649.6597	40.78	0.52	41.30	46.00	-4.70	74	100	peak
8	912.8618	38.49	3.49	41.98	46.00	-4.02	163	100	peak

Note: Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 1GHz are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
The measurements greater than 20dB below the limit from 9kHz to 30MHz.

5. EMISSION BANDWIDTH

5.1 Standard Applicable

According to FCC 15.239(a), Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88–108 MHz.

5.2 Test Procedure

With the EUT's antenna attached, the EUT's 26dB Bandwidth power was received by the test antenna, which was connected to the spectrum analyzer with the START, and STOP frequencies set to the EUT's operation band.

5.3 Environmental Conditions

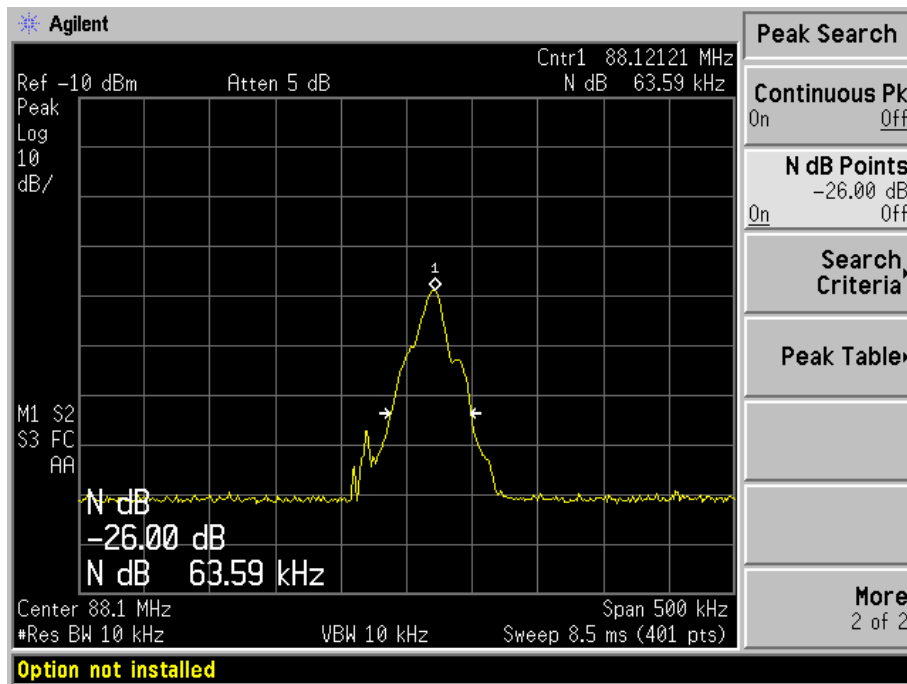
Temperature:	21° C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

5.4 Summary of Test Results/Plots

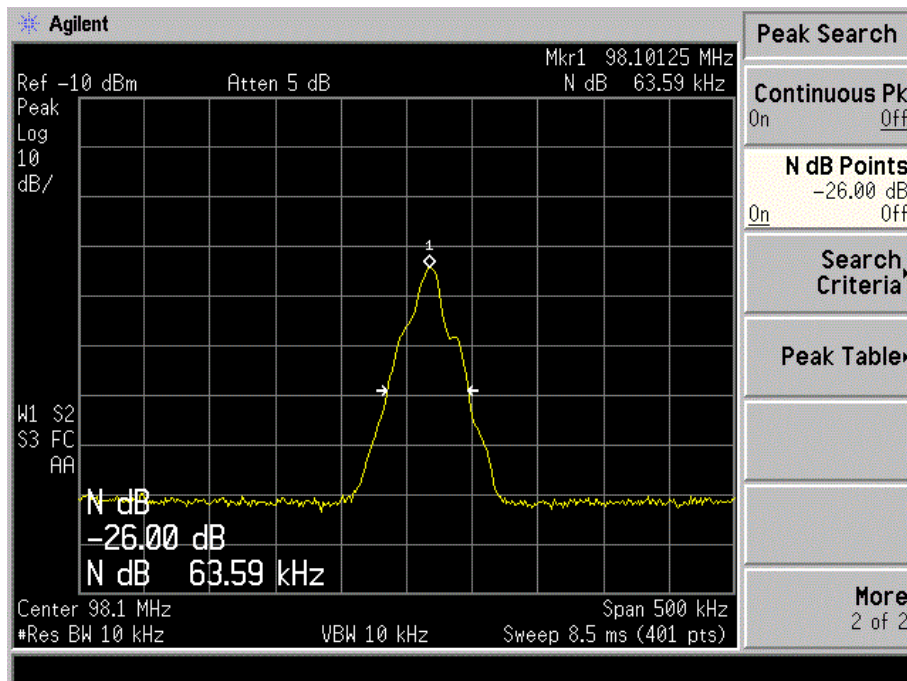
Test Frequency MHz	26dB Bandwidth kHz	Limit kHz	Result
88.1	63.59	200	Pass
98.1	63.59	200	Pass
107.9	63.59	200	Pass

Refer to the attached plots.

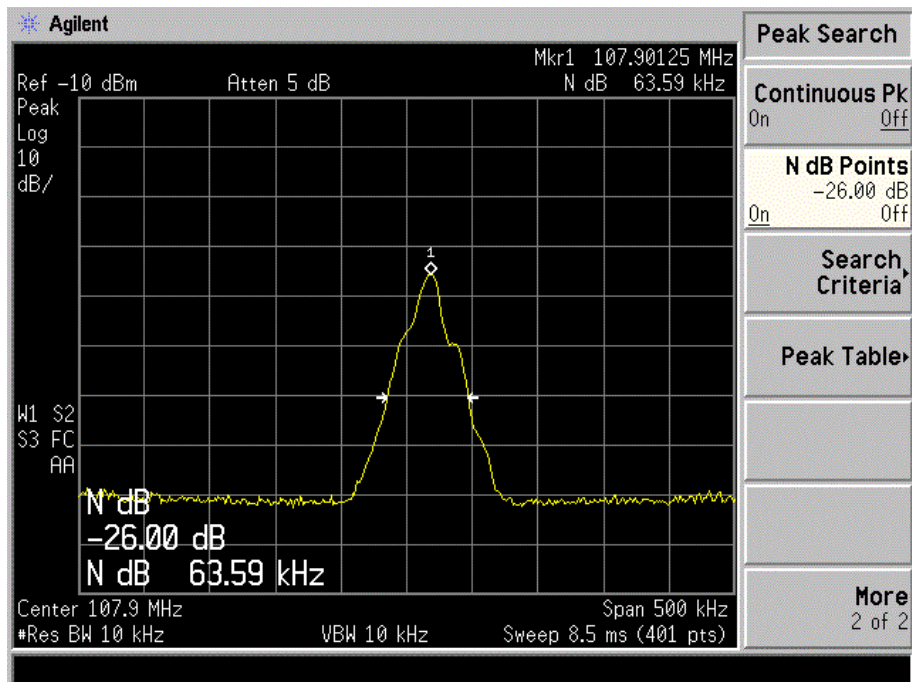
Low Channel



Middle Channel



High Channel



6. OUT OF BAND EMISSIONS

6.1 Standard Applicable

According to §15.239(c), The field strength of any emissions radiated on any frequency outside of the specified 200 kHz band shall not exceed the general radiated emission limits in §15.209.

6.2 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 88MHz to 108MHz, than mark the higher-level emission for comparing with the FCC rules.

6.3 Environmental Conditions

Temperature:	22° C
Relative Humidity:	54%
ATM Pressure:	1012 mbar

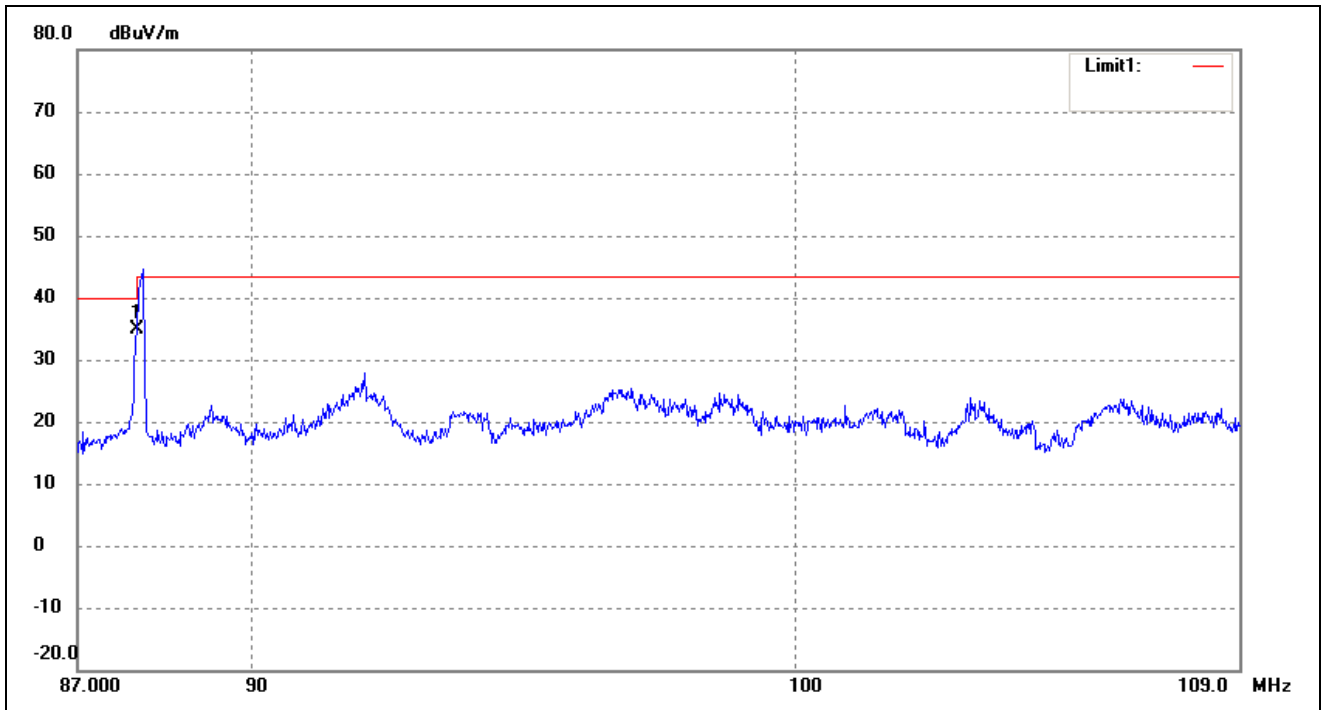
6.4 Summary of Test Results/Plots

Test mode	Frequency	Limit	Result
	MHz	dBuV / dBc	
Lowest	88	<40 dBuV	Pass
Highest	108	<40 dBuV	Pass

The edge emissions are below the FCC Part 15.209 Limits or complies with the 15.247(d) requirements.

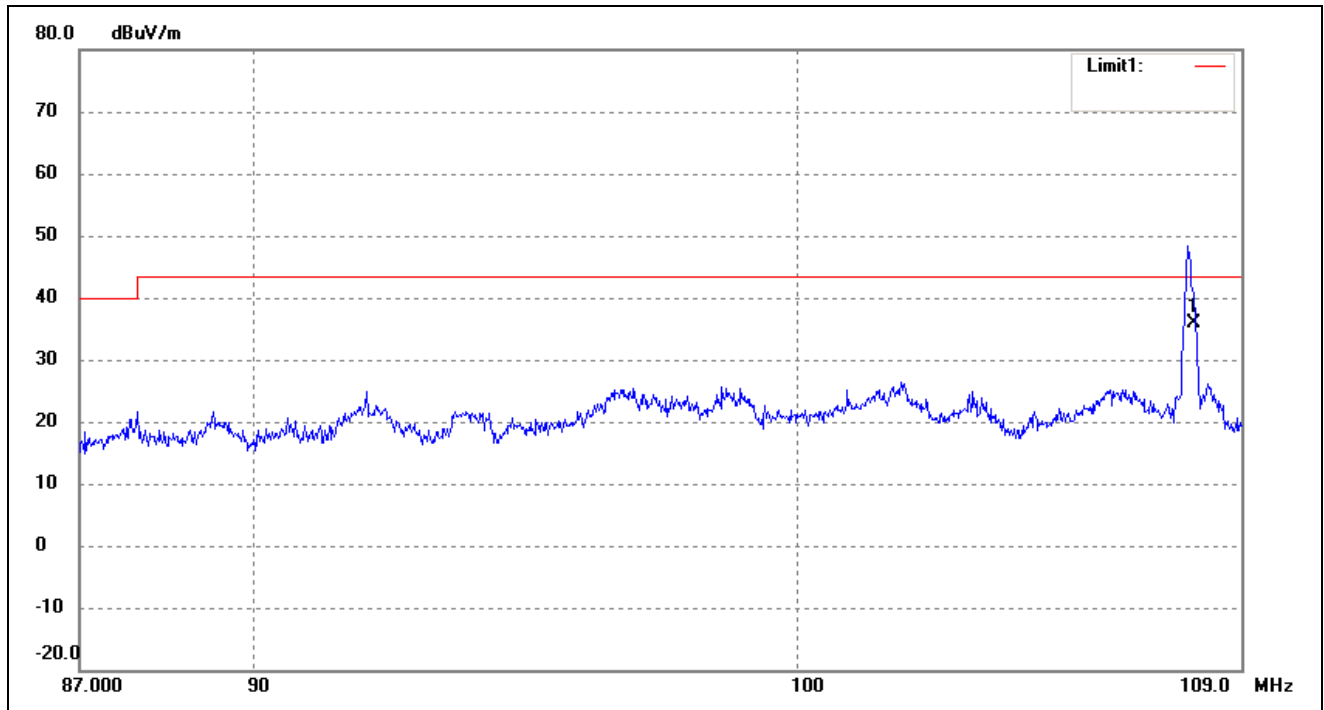
Refer to the attached plots.

Lower Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	()	(cm)	
1	88.0000	47.68	-12.75	34.93	40.00	-5.07	179	100	peak

Upper Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	108.0000	46.91	-11.11	35.80	43.50	-7.70	176	100	peak

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