

TEST REPORT

Applicant: Aoedi Technology (Huizhou) Co., Ltd.

Address of Applicant: 2-5F, AOEDI Industrial Park, Ganpi Village, Zhenlong Town, Huiyang District, Huizhou, China

Manufacturer/Factory: Aoedi Technology (Huizhou) Co., Ltd.

Address of Manufacturer/Factory: 2-5F, AOEDI Industrial Park, Ganpi Village, Zhenlong Town, Huiyang District, Huizhou, China

Equipment Under Test (EUT)

Product Name: car fm transmitter

Model No.: AD-920, CZ653, AD-926, AD-929, AD-901, AD-902, AD-903, AD-905, AD-906, AD-907, AD-908, AD-909, AD-910, AD-912, AD-913, AD-915, AD-916, AD-918, AD-919, AD-960, AD-961, AD-962, AD-963, AD-965, AD-968, AD-969, AD-990, AD-992, AD-993, AD-995, AD-996, AD-985, AD-986, AD-987, AD-988

FCC ID: 2A8H4-AD920

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.239

Date of sample receipt: August 04, 2022

Date of Test: August 05-18, 2022

Date of report issued: August 19, 2022

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Lo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	August 19, 2022	Original

Tested By: Tiger Chen **Date:** August 19, 2022
Project Engineer

Check By: Robinson Lu **Date:** August 19, 2022
Reviewer

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4 Test Summary

Test Item	Section	Result
Antenna requirement	47 CFR Part 15, Subpart C 15.203	Pass
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C 15.207	N/A
Field strength of the fundamental signal	47 CFR Part 15, Subpart C 15.239(b)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.209 & 15.239 (c)	Pass
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C 15.239(a)	Pass

Remarks:

1. *Test according to ANSI C63.10.*
2. *Pass: The EUT complies with the essential requirements in the standard.*
3. *N/A: Not applicable*

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	car fm transmitter
Model No.:	AD-920, CZ653, AD-926, AD-929, AD-901, AD-902, AD-903, AD-905, AD-906, AD-907, AD-908, AD-909, AD-910, AD-912, AD-913, AD-915, AD-916, AD-918, AD-919, AD-960, AD-961, AD-962, AD-963, AD-965, AD-968, AD-969, AD-990, AD-992, AD-993, AD-995, AD-996, AD-985, AD-986, AD-987, AD-988
Test Model No.:	AD-920
<i>Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The difference is model name for commercial purpose.</i>	
Test sample(s) ID:	GTS202208000044-1
Sample(s) Status:	Engineer sample
S/N:	TN220753268
Operation Frequency:	88.1MHz~107.9MHz
Channel numbers:	199
Channel Separation:	100KHz
Modulation Type:	FM
Antenna Type:	Integral antenna
Antenna Gain:	0dBi(declare by applicant)
Power Supply:	DC 12V

Operation Frequency each of Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	88.1MHz	46	92.6MHz	96	97.6MHz	146	102.6MHz
2	88.2MHz	47	92.7MHz	97	97.7MHz	147	102.7MHz
3	88.3MHz	48	92.8MHz	98	97.8MHz	148	102.8MHz
4	88.4MHz	49	92.9MHz	99	97.9MHz	149	102.9MHz
5	88.5MHz	50	93.0MHz	100	98.0MHz	150	103.0MHz
6	88.6MHz	51	93.1MHz	101	98.1MHz	151	103.1MHz
7	88.7MHz	52	93.2MHz	102	98.2MHz	152	103.2MHz
8	88.8MHz	53	93.3MHz	103	98.3MHz	153	103.3MHz
9	88.9MHz	54	93.4MHz	104	98.4MHz	154	103.4MHz
10	89.0MHz	55	93.5MHz	105	98.5MHz	155	103.5MHz
11	89.1MHz	56	93.6MHz	106	98.6MHz	156	103.6MHz
12	89.2MHz	57	93.7MHz	107	98.7MHz	157	103.7MHz
13	89.3MHz	58	93.8MHz	108	98.8MHz	158	103.8MHz
.....
45	92.5MHz	95	97.5MHz	145	102.5MHz	199	107.9MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test Channel:

Channel	Frequency
The lowest channel	88.1MHz
The middle channel	98.0MHz
The Highest channel	107.9MHz

5.2 Test mode

Mode 1	Keep transmit mode
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Per-test mode:

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	51.14	51.98	50.97

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
GS	Lead-acid battery	S5D26R-MFZ	9442804454
SanDisk	TF disk	16GB	N/A

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen 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 files.

- **IC —Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.6 Other Information Requested by the Customer

None.

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	April. 22 2022	April. 21 2023
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB918	GTS640	March. 21 2022	March. 20 2023
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 12 2022	June. 11 2023
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 23 2022	June. 22 2023
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	April. 22 2022	April. 21 2023
9	Coaxial Cable	GTS	N/A	GTS211	April. 22 2022	April. 21 2023
10	Coaxial cable	GTS	N/A	GTS210	April. 22 2022	April. 21 2023
11	Coaxial Cable	GTS	N/A	GTS212	April. 22 2022	April. 21 2023
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	April. 22 2022	April. 21 2023
13	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 23 2022	June. 22 2023
14	Band filter	Amindeon	82346	GTS219	June. 23 2022	June. 22 2023
15	Power Meter	Anritsu	ML2495A	GTS540	June. 23 2022	June. 22 2023
16	Power Sensor	Anritsu	MA2411B	GTS541	June. 23 2022	June. 22 2023
17	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April. 22 2022	April. 21 2023
18	Splitter	Agilent	11636B	GTS237	June. 23 2022	June. 22 2023
19	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 30 2021	Nov. 29 2022
20	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April. 22 2022	April. 21 2023
21	Breitband hornantenna	SCHWARZBECK	BBHA 9170	GTS579	Oct. 17 2021	Oct. 16 2022
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 17 2021	Oct. 16 2022
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 17 2021	Oct. 16 2022
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 23 2022	June. 22 2023
25	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April. 22 2022	April. 21 2023

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	April. 22 2022	April. 21 2023
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April. 24 2022	April. 23 2023
3	Spectrum Analyzer	Agilent	E4440A	GTS536	April. 22 2022	April. 21 2023
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	April. 22 2022	April. 21 2023
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	April. 22 2022	April. 21 2023
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	April. 22 2022	April. 21 2023
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	April. 22 2022	April. 21 2023
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	April. 22 2022	April. 21 2023

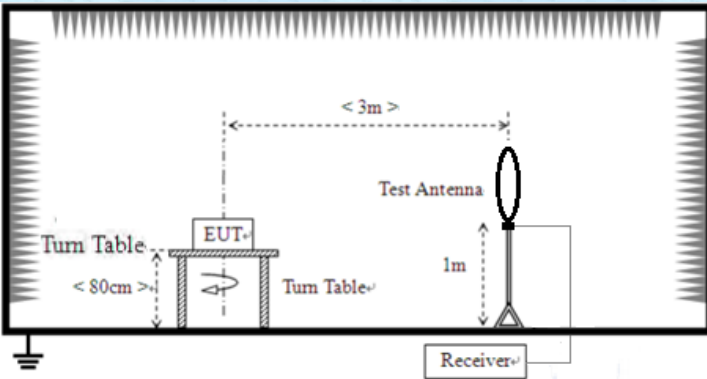
General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	April. 25 2022	April. 24 2023
2	Barometer	ChangChun	DYM3	GTS255	June. 23 2022	June. 22 2023

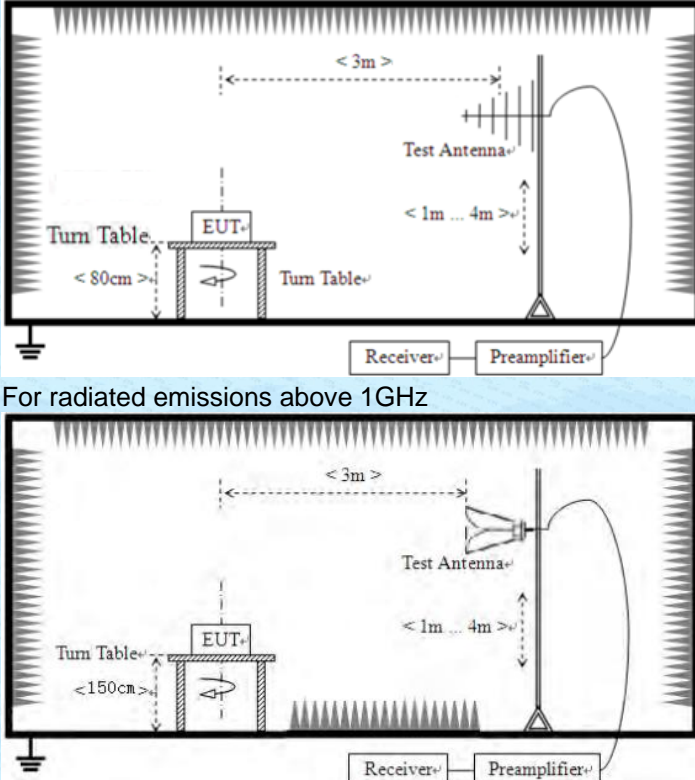
7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	47 CFR Part 15, Subpart C 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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
E.U.T Antenna:	
The antenna is Internal antenna, reference to the appendix II for details.	

7.2 Radiated Emission Method

Test Requirement:	47 CFR Part 15, Subpart C 15.209 & 15.239 (c)				
Test Method:	ANSI C63.10				
Test Frequency Range:	9kHz to 1000MHz				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz-150kHz	Quasi-peak	200Hz	300Hz	Quasi-peak Value
	150kHz-30MHz	Quasi-peak	9kHz	10kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit: (Field strength of the fundamental signal)	Frequency	Limit (dBuV/m @3m)		Remark	
	88.1MHz-107.9MHz	48.0		Average Value	
		68.0		Peak Value	
Limit: (Spurious Emissions)	Frequency	Limit (uV/m)		Remark	
	0.009MHz-0.490MHz	2400/F(kHz) @300m		Quasi-peak Value	
	0.490MHz-1.705MHz	24000/F(kHz) @30m		Quasi-peak Value	
	1.705MHz-30.0MHz	30 @30m		Quasi-peak Value	
	30MHz-88MHz	100 @3m		Quasi-peak Value	
	88MHz-216MHz	150 @3m		Quasi-peak Value	
	216MHz-960MHz	200 @3m		Quasi-peak Value	
	960MHz-1GHz	500 @3m		Quasi-peak Value	
	Above 1GHz	500 @3m		Average Value	
	5000 @3m		Peak Value		
Limit: (band edge)	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.				
Test setup:	<p>For radiated emissions from 9kHz to 30MHz</p>  <p>For radiated emissions from 30MHz to 1GHz</p>				

	 <p>For radiated emissions above 1GHz</p>
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height 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. 4. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>
<p>Test mode:</p>	<p>Refer to section 5.2 for details</p>
<p>Test voltage:</p>	<p>DC 12V</p>
<p>Test results:</p>	<p>Pass</p>

Measurement data:

7.2.1 Field Strength of The Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
88.10	75.33	8.65	1.10	36.01	49.07	68.00	-18.93	Horizontal
88.10	78.24	8.65	1.10	36.01	51.98	68.00	-16.02	Vertical
98.00	74.87	9.50	1.18	36.09	49.46	68.00	-18.54	Horizontal
98.00	77.12	9.50	1.18	36.09	51.71	68.00	-16.29	Vertical
107.90	77.60	9.76	1.26	36.78	51.84	68.00	-16.16	Horizontal
107.90	77.50	9.76	1.26	36.78	51.74	68.00	-16.26	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
88.10	62.87	8.65	1.10	36.01	36.61	48.00	-11.39	Horizontal
88.10	65.93	8.65	1.10	36.01	39.67	48.00	-8.33	Vertical
98.00	63.91	9.50	1.18	36.09	38.50	48.00	-9.50	Horizontal
98.00	64.28	9.50	1.18	36.09	38.87	48.00	-9.13	Vertical
107.90	61.75	10.30	1.26	36.15	37.16	48.00	-10.84	Horizontal
107.90	63.08	10.30	1.26	36.15	38.49	48.00	-9.51	Vertical

Note:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Pre-amplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Pre-amplifier Factor

7.2.2 Radiated Spurious Emissions

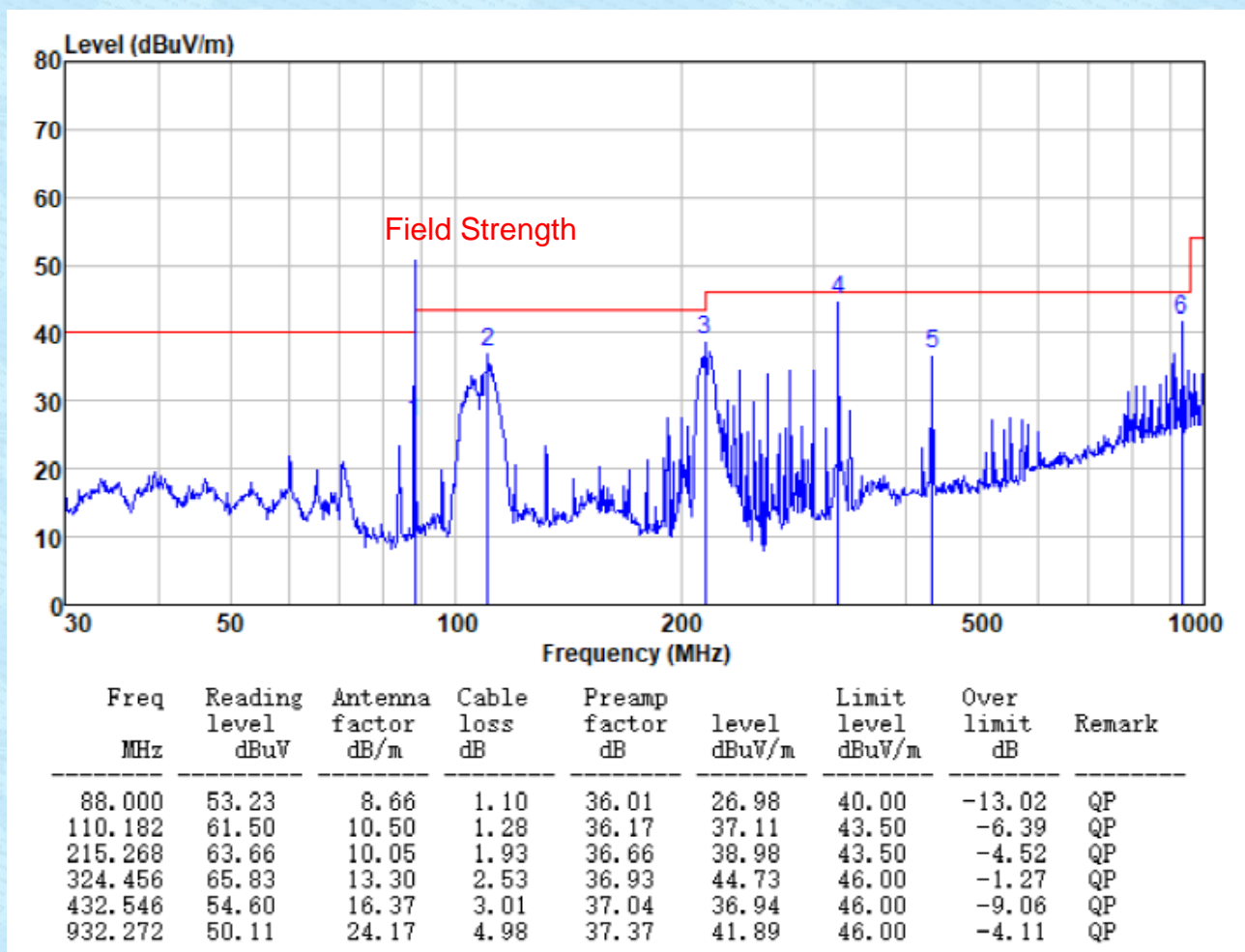
■ 9kHz~30MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

■ 30MHz~1GHz

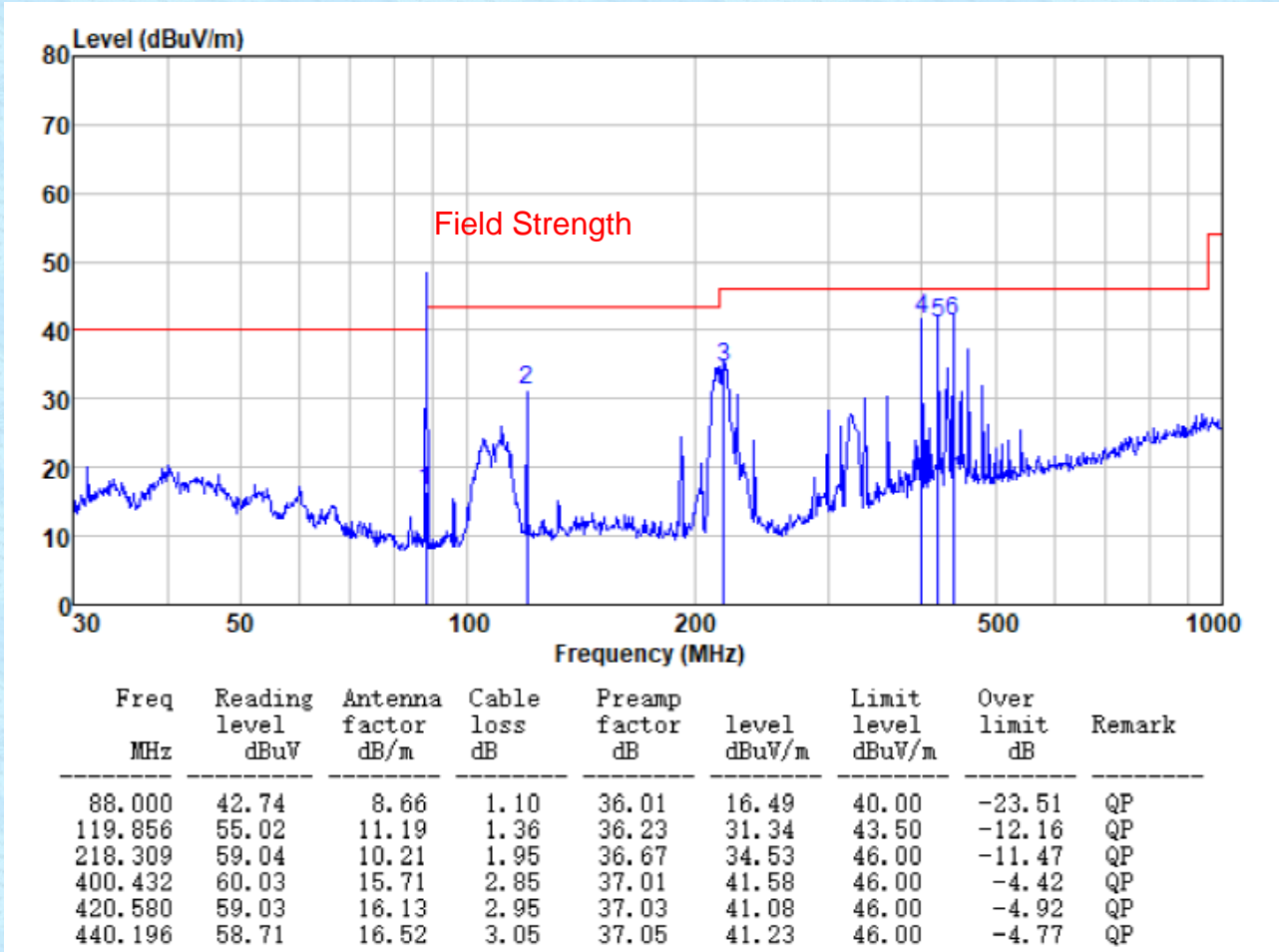
Test mode:	Transmitting	Test channel:	Lowest channel
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Vertical:



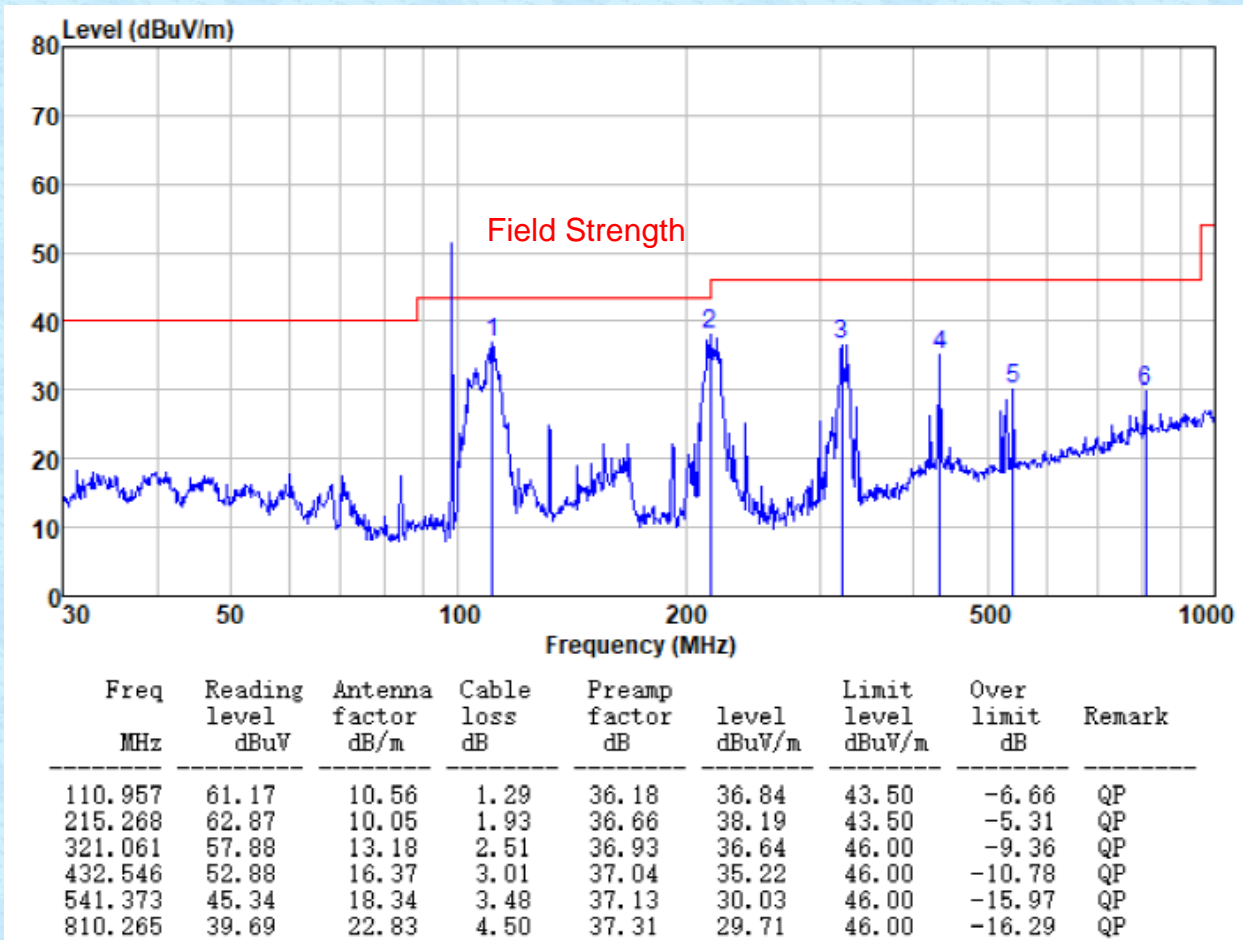
Test mode:	Transmitting	Test channel:	Lowest channel
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Horizontal:



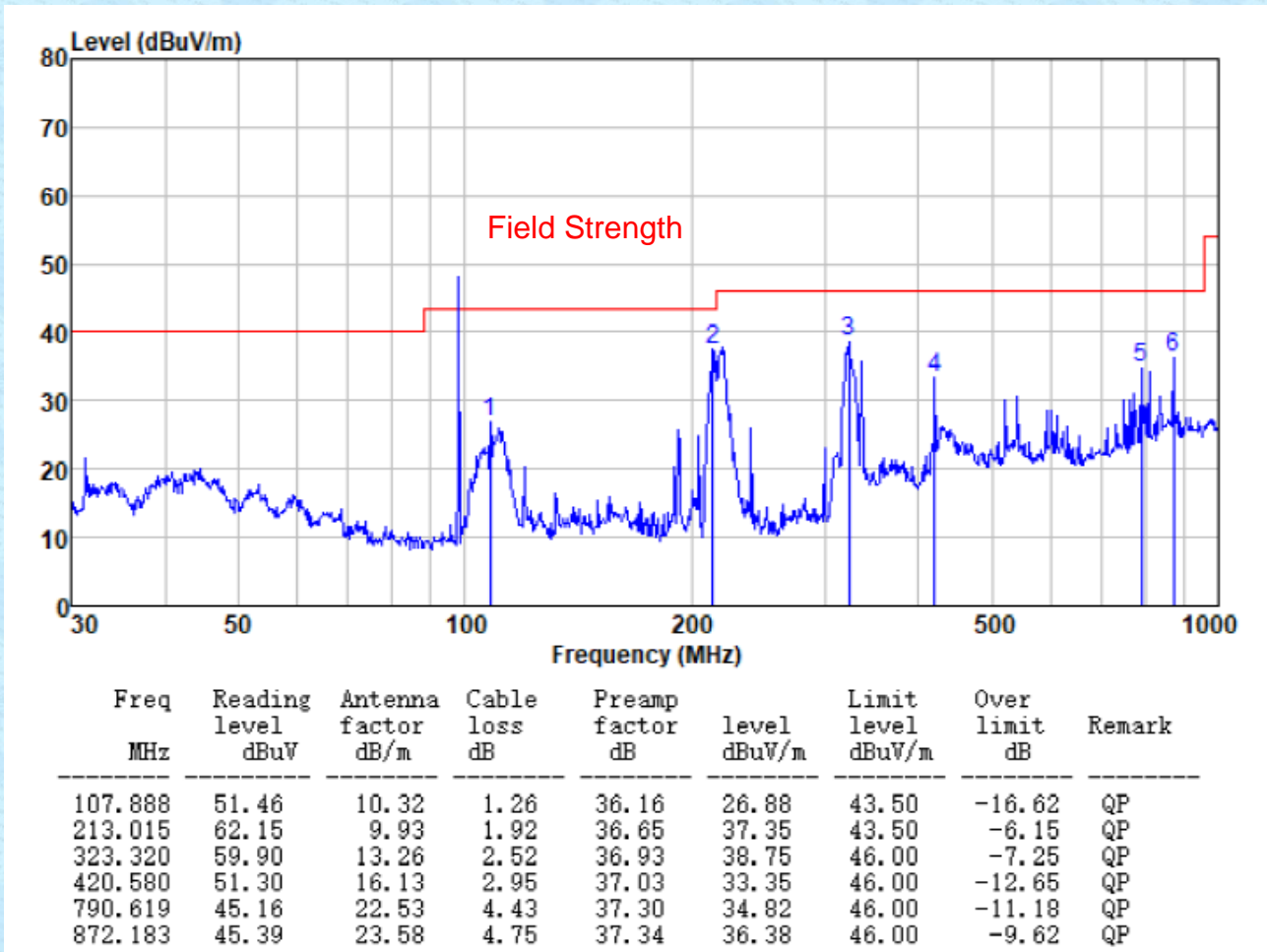
Test mode:	Transmitting	Test channel:	Middle channel
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Vertical:



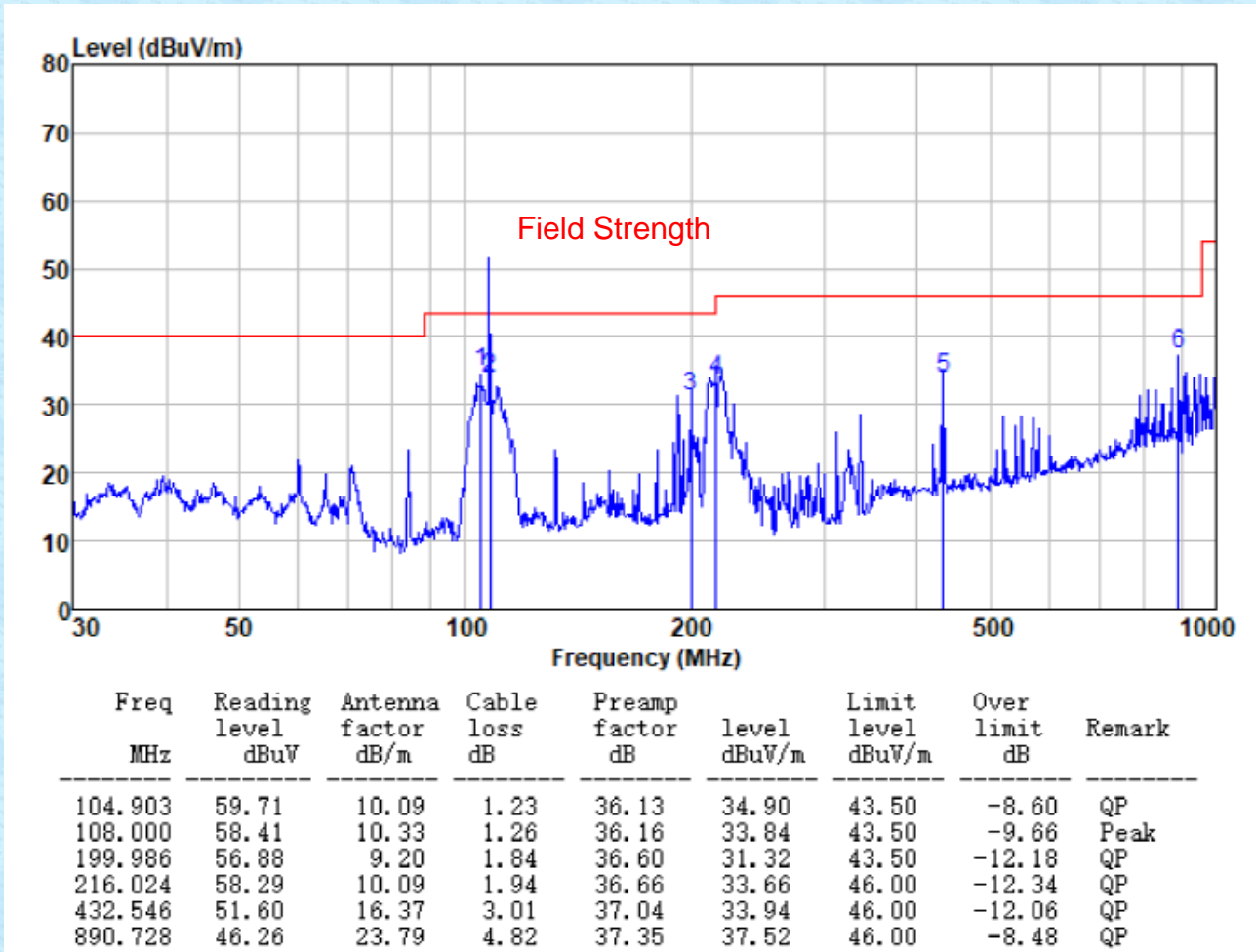
Test mode:	Transmitting	Test channel:	Middle channel
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Horizontal



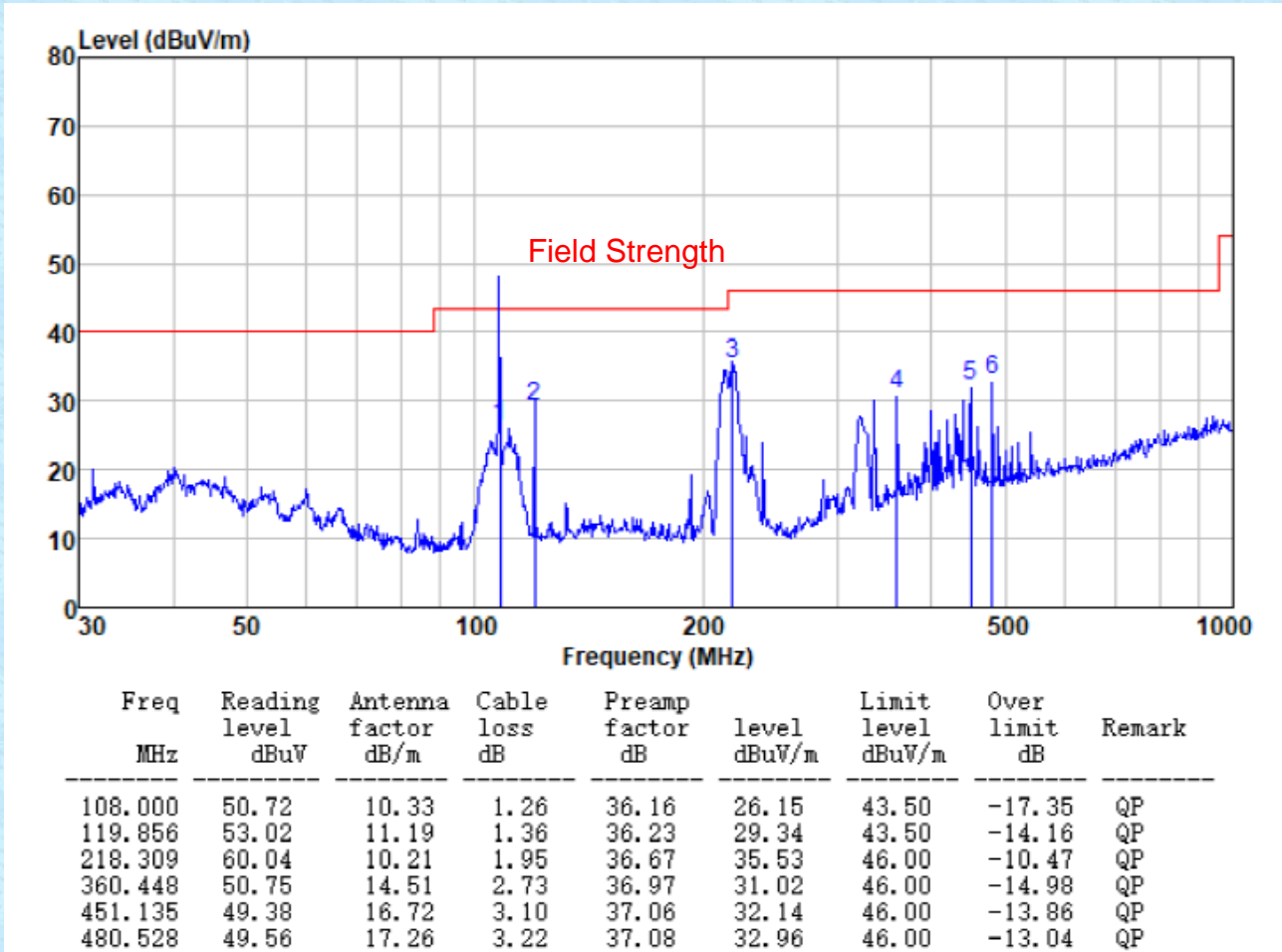
Test mode:	Transmitting	Test channel:	Highest channel
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Vertical:



Test mode:	Transmitting	Test channel:	Highest channel
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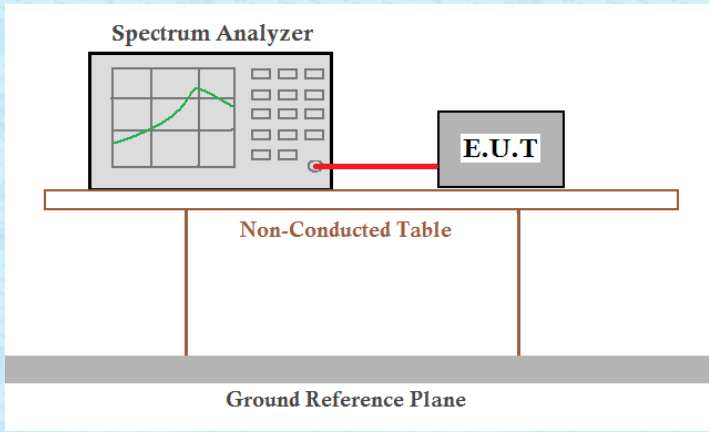
Horizontal



Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor

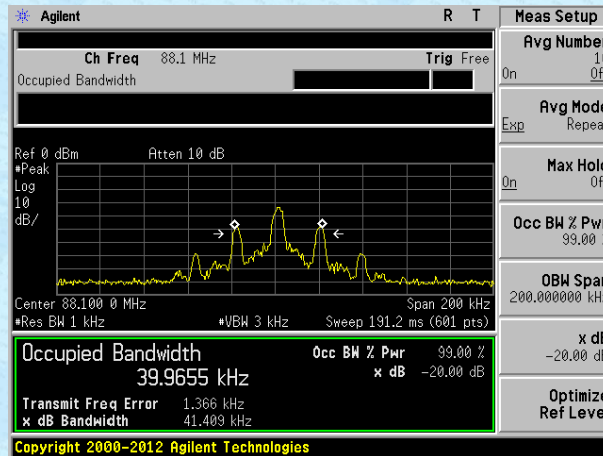
7.3 20dB Occupy Bandwidth

Test Requirement:	47 CFR Part 15, Subpart C 15.239(a)
Test Method:	ANSI C63.10
Receiver setup:	RBW=1KHz, VBW=3KHz, detector: Peak
Limit:	<200 kHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

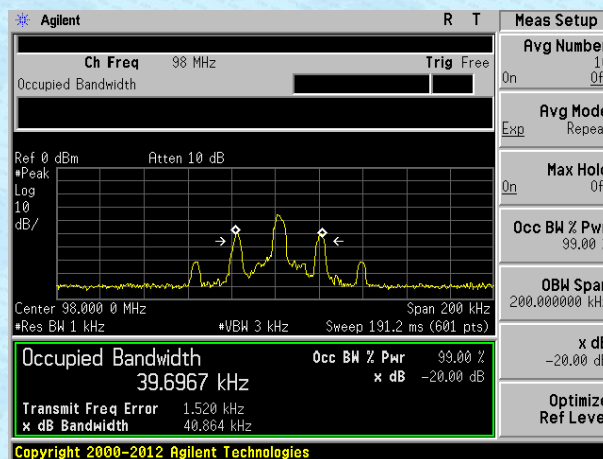
Measurement Data:

Test channel	20dB bandwidth(kHz)	Limit(kHz)
Lowest	41.409	200
Middle	40.864	
Highest	40.460	

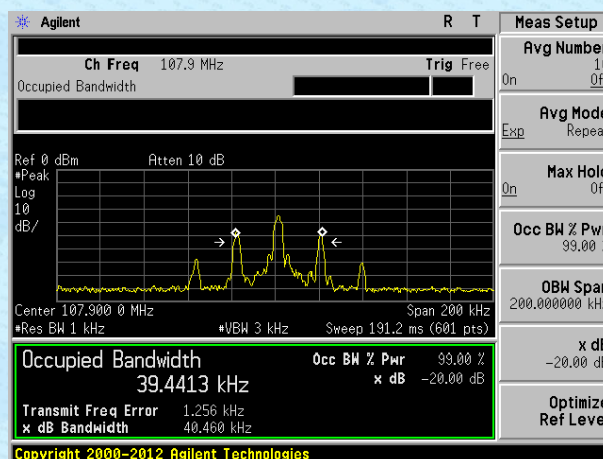
Test plot as follows:



Lowest channel



Middle channel



Highest channel

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

----- End -----