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TEST REPORT

FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Applicant : RM ACQUISITION LLC

Address : 9855 Woods Drive Skokie. IL 60077 U.S.A

Product Name : GPS Device

Model Name : OD8Pro2

Brand Name :  RAND McNALLY

FCC ID : A4C-10014A

Report No. : CQASZ20200800850E-05

Date of Issue : 2020-08-28

Issued by : Shenzhen Huaxia Testing Technology Co., Ltd

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1. VERIFICATION OF CONFORMITY

Equipment Under Test: GPS Device

Brand Name:  RAND McNALLY

Model Number: OD8Pro2

FCC ID: A4C-10014A

Applicant: RM ACQUISITION LLC

Manufacturer: SHEN ZHEN APICAL TECHNOLOGY CO., LTD

Technical Standards: 47 CFR Part 15 Subpart C

File Number: CQASZ20200800850E-05

Date of test: 2020-08-14 to 2020-08-28

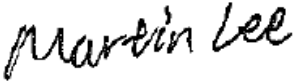
Deviation: None


Condition of Test Sample: Normal


Test Result: PASS

The above equipment was tested by Huaxia. for compliance with the requirements set forth in FCC rules and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Tested by (+ signature): 
(Martin Lee)


Review by (+ signature): 
(Sheek Luo)

Approved by (+ signature): 
(Jack Ai)



2. GENERAL INFORMATION

2.1 Product Information

Product	GPS Device
Brand Name	 RAND McNALLY
Model Number	OD8Pro2
Series Model Name:	N/A
Difference description:	N/A
Power Supply	lithium battery:DC3.7V, Charge by car charger(DC5V)
Frequency Range	88.1MHz – 107.9MHz
Antenna Type:	External antenna
Antenna Gain:	0dbi
Channel Number:	199CH
Channel Separation:	100 kHz
Modulation Technique	FM
Temperature Range	-20°C - 50°C

NOTE:

1. For a more detailed features description about the EUT, please refer to User's Manual.

2.2 Objective

Perform FCC Part 15 Subpart C tests for FCC Marking.

2.3 Test Standards and Results

Test items and the results are as bellow:

No.	Section	Description	Result	Date of Test
1	§15.239 (b) (c)/ §15.209	Spurious emissions	PASS	2020/8/28
2	§15.215 (c)	Occupied Bandwidth	PASS	2020/8/28
3	§15.239 (b)	Field strength of the fundamental signal	PASS	2020/8/28
4	§15.203	Antenna Requirement	PASS	2020/8/28

Note: 1. The test result judgment is decided by the limit of measurement standard
2. The information of measurement uncertainty is available upon the customer's request.

2.4 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

3. TEST METHODOLOGY

3.1 TEST FACILITY

Test Site: Shenzhen Huaxia Testing Technology Co., Ltd.
Location: 1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street,
Longhua New District, Shenzhen, Guangdong, China
Description: A2LA (Certificate No. 4742.01) · FCC Registration No.: 522263

3.2 GENERAL TEST PROCEDURES

EUT Function and Test Mode

The EUT has been tested under normal operating (TX) and standby (RX) condition.

The field strength of radiation emission was measured in the following position: EUT lie-down position (Y axis), stand-up position (X, Z axis).

The following data show only with the worst case setup.

The worst case of Y axis was reported.

Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report.

4 SETUP OF EQUIPMENT UNDER TEST

4.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

4.2 SUPPORT EQUIPMENT

Description	Manufacturer	Model	Series No.	Certification
PC	Lenovo	ThinkPad	E450c	FCC

4.3 Statement of the measurement uncertainty

No.	Item	Uncertainty	Notes
1	Radiated Emission (Below 1GHz)	±5.12dB	(1)
2	Radiated Emission (Above 1GHz)	±4.60dB	(1)
3	Conducted Disturbance (0.15~30MHz)	±3.34dB	(1)
4	Radio Frequency	3×10^{-8}	(1)
5	Duty cycle	0.6 %.	(1)
6	Occupied Bandwidth	1.1%	(1)
7	RF conducted power	0.86dB	(1)
8	RF power density	0.74	(1)
9	Conducted Spurious emissions	0.86dB	(1)
10	Temperature test	0.8°C	(1)
11	Humidity test	2.0%	(1)
12	Supply voltages	0.5 %.	(1)
13	time	0.6 %.	(1)
14	Frequency Error	5.5 Hz	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Remark:

All buttons of the EUT have been tested and only worst case reported. The EUT has been tested as an independent unit. And Continual Transmitting in maximum power (The new battery be used during Test) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 TEST EQUIPMENT LIST

Instrumentation: The following list contains equipment used at Most for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1.0 GHz or above.

Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2019/10/25	2020/10/24
Spectrum analyzer	R&S	FSU26	CQA-038	2019/10/25	2020/10/24
Preamplifier	MITEQ	AMF-6D-02001800-29-20P	CQA-036	2019/10/25	2020/10/24
Loop antenna	Schwarzbeck	FMZB1516	CQA-060	2019/10/21	2020/10/20
Bilog Antenna	R&S	HL562	CQA-011	2019/9/26	2020/9/25
Horn Antenna	R&S	HF906	CQA-012	2019/9/26	2020/9/25
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2019/9/25	2020/9/24
Coaxial Cable (Above 1GHz)	CQA	N/A	C007	2019/9/26	2020/9/25
Coaxial Cable (Below 1GHz)	CQA	N/A	C013	2019/9/26	2020/9/25
Antenna Connector	CQA	RFC-01	CQA-080	2019/9/26	2020/9/25
RF cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2019/9/26	2020/9/25
Power divider	MIDWEST	PWD-2533-02-SMA-79	CQA-067	2019/9/26	2020/9/25

NOTE: Equipments listed above have been calibrated and are in the period of validation.

5.1 Radiated Emission

5.1.1 Definition

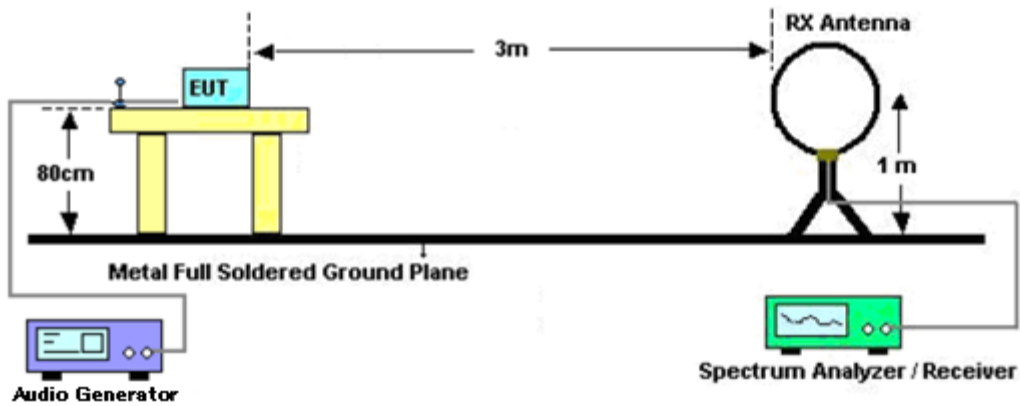
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground and opposite the horn antenna. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions below 1GHz, use 120KHz RBW and VBW \geq 3RBW for QP reading.
7. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.
8. Only the worst case is reported.

Frequency of Emission (MHz)	Field Strength		Measurement Distance (meters)
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
0.009-0.49	2400/F(kHz)		300
0.49-1.705	24000/F(kHz)		30
1.705-30	30		30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

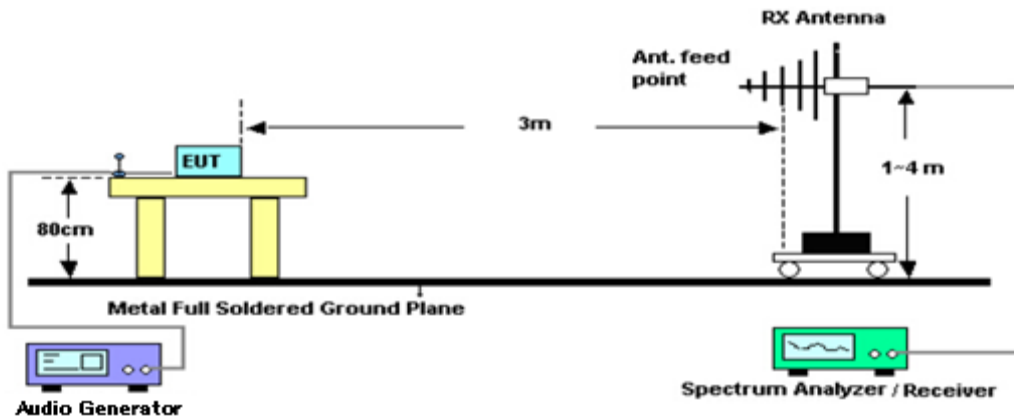
5.1.2 Test Configuration

Test Setup:

Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



5.1.3 Test Data

Field Strength of Fundamental

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission PK/AV (dBuV/m)	Horizontal /Vertical	Limits PK/AV (dBuV/m)	Margin (dB)
88.1	21.49	15.01	36.50 (AV)	H	48	-11.50
88.1	41.42	15.01	56.43 (PK)	H	68	-11.57
88.1	13.61	15.01	28.62 (AV)	V	48	-19.38
88.1	29.79	15.01	44.80 (PK)	V	68	-23.10

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission PK/AV (dBuV/m)	Horizontal /Vertical	Limits PK/AV (dBuV/m)	Margin (dB)
98.0	22.06	15.34	37.40 (AV)	H	48	-10.60
98.0	40.78	15.34	56.12 (PK)	H	68	-11.88
98.0	12.3	15.34	27.64 (AV)	V	48	-20.36
98.0	27.47	15.34	42.81 (PK)	V	68	-25.19

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission PK/AV (dBuV/m)	Horizontal /Vertical	Limits PK/AV (dBuV/m)	Margin (dB)
107.9	22.11	16.77	38.88 (AV)	H	48	-9.12
107.9	39.25	16.77	56.02 (PK)	H	68	-11.98
107.9	11.59	16.77	28.36 (AV)	V	48	-19.64
107.9	27.24	16.77	44.01 (PK)	V	68	-23.99

SPURIOUS EMISSION

9KHz-30MHz

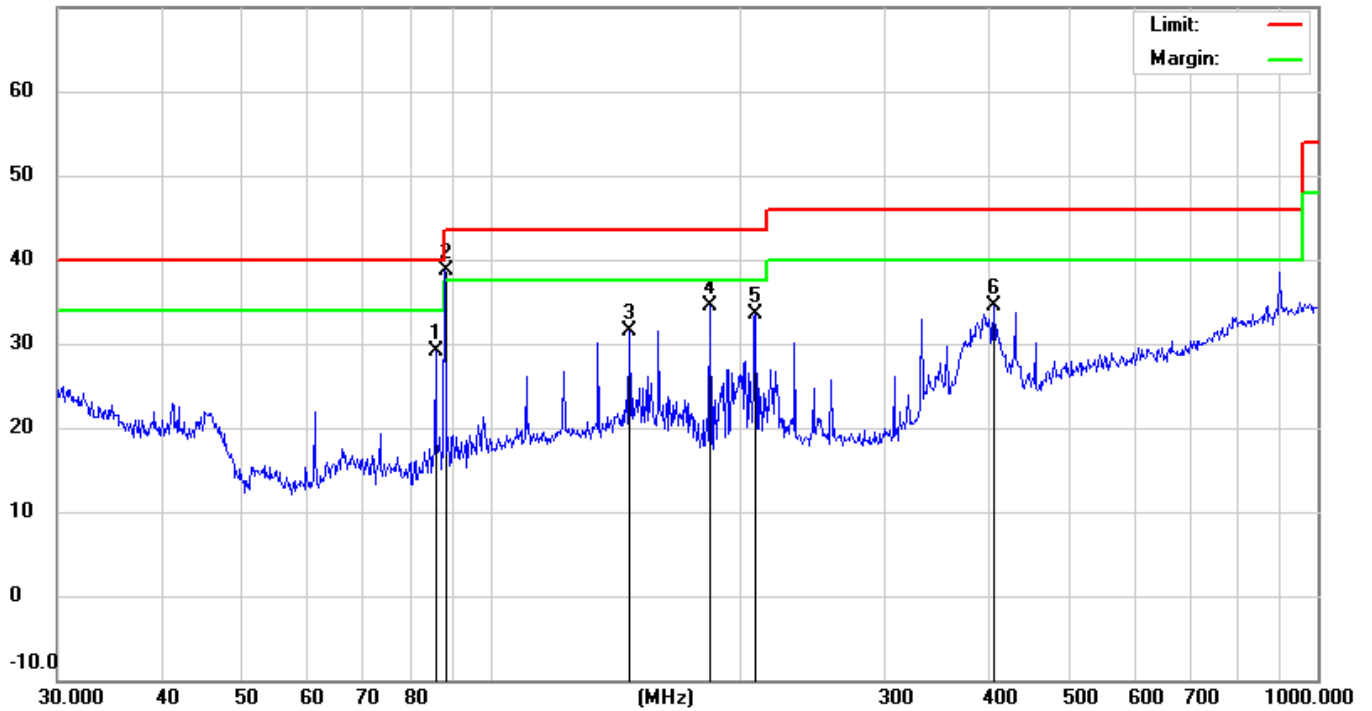
9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

Below 1GHz

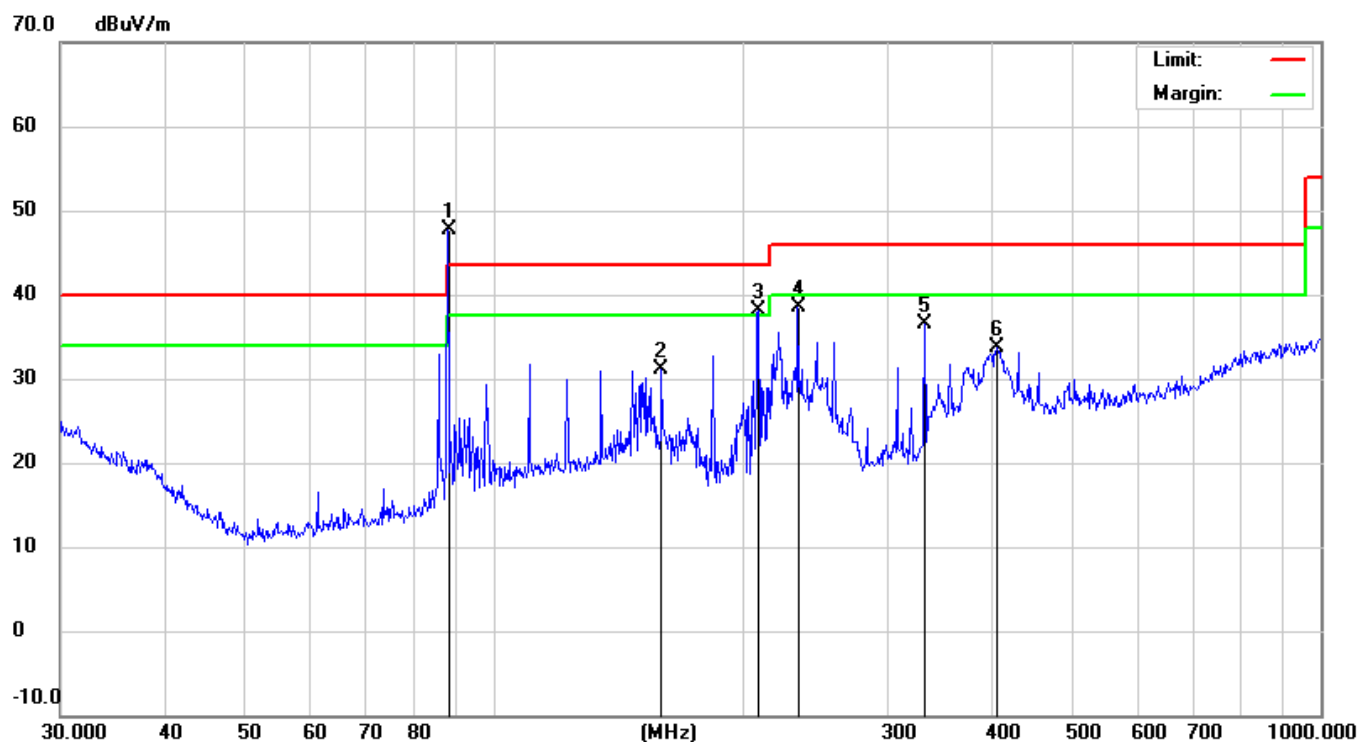
Vertical:

70.0 dBuV/m



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		85.8984	19.14	9.98	29.12	40.00	-10.88	100	268	
2	*	88.1000	28.73	9.94	38.67	43.50	-4.83	161	74	
3		147.4036	14.05	17.36	31.41	43.50	-12.09	200	111	
4		184.4898	19.76	14.73	34.49	43.50	-9.01	105	352	
5		209.3129	18.48	14.94	33.42	43.50	-10.08	222	360	
6		406.0880	16.79	17.72	34.51	46.00	-11.49	142	78	

Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	88.1000	37.77	9.94	47.71	43.50	4.21	121	350	
2		159.7844	13.76	17.31	31.07	43.50	-12.43	102	32	
3	!	209.3129	23.20	14.94	38.14	43.50	-5.36	200	120	
4		233.3487	24.23	14.27	38.50	46.00	-7.50	168	213	
5		332.5187	20.29	16.12	36.41	46.00	-9.59	198	180	
6		406.0880	15.98	17.72	33.70	46.00	-12.30	100	200	

Note : 1) QP= Quasi-peak

2) Emission Level = Reading Level + Antenna Factor + Cable Loss.

3) Measurements were conducted in all three channels (high, middle, low) and the worst case Mode (low channel) was submitted only.

Above 1GHz

Low channel: 88.1 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB μ V)	AV reading (dB μ V)	Correction Factor (dB/m)	Peak (dB) (dB μ V/m)	AV (dB μ V/m)	Peak limit (dB μ V/m)	AV limit (dB μ V/m)	Margin (dB)
1057.2	H	42.17	---	-4.2	37.97	---	74	54	-36.03
1057.2	V	43.86	---	-4.2	39.66	---	74	54	-14.34

Low channel: 98 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB μ V)	AV reading (dB μ V)	Correction Factor (dB/m)	Peak (dB) (dB μ V/m)	AV (dB μ V/m)	Peak limit (dB μ V/m)	AV limit (dB μ V/m)	Margin (dB)
1078.0	H	45.17	---	-3.98	41.19	---	74	54	-32.81
1078.0	V	43.33	---	-3.98	39.35	---	74	54	-14.65

Low channel: 107.9 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB μ V)	AV reading (dB μ V)	Correction Factor (dB/m)	Peak (dB) (dB μ V/m)	AV (dB μ V/m)	Peak limit (dB μ V/m)	AV limit (dB μ V/m)	Margin (dB)
1079.0	H	44.23	---	-3.98	40.25	---	74	54	-33.75
1079.0	V	40.77	---	-3.98	36.79	---	74	54	-17.21

Note:

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (Peak) (dB μ V/m)-Average limit (dB μ V/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
5. Data of measurement shown “---” in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5.2 20dB Bandwidth

5.2.1 MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:

Centre frequency = Operation Frequency

RBW=1KHz

VBW=3KHz

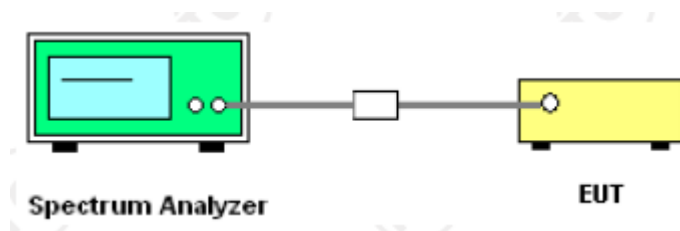
Span: 200kHz

Sweep time: Auto

2. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.

3. Record the plots and Reported.

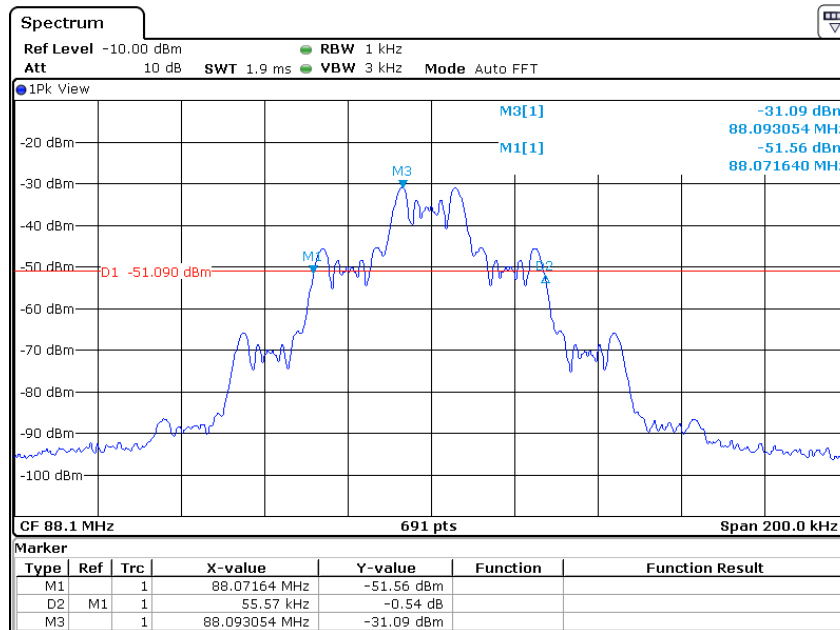
5.3.2 Test Description



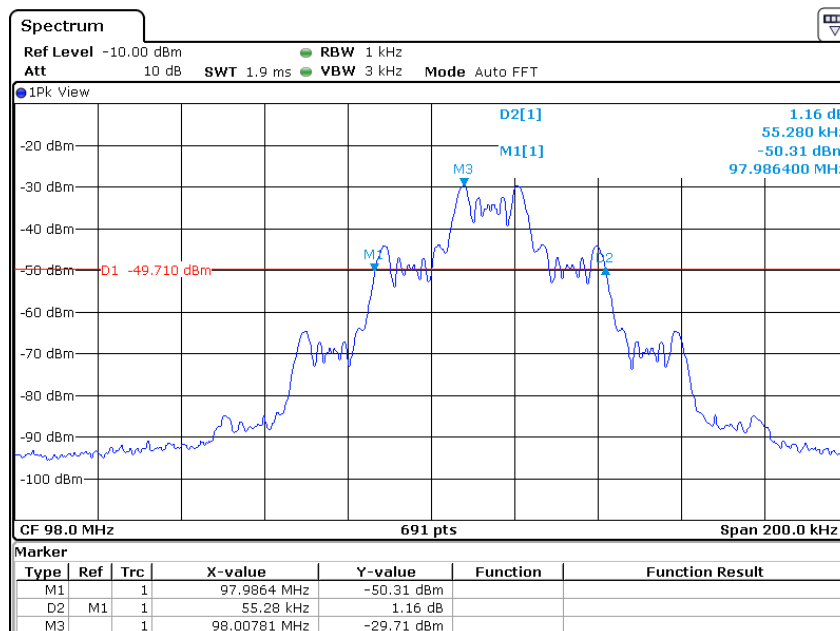
5.2.3 Test Result

Frequency	20dB Bandwidth(kHz)	Limit(kHz)	Result
88.1	55.57	200	PASS
98.0	55.28	200	PASS
107.9	55.28	200	PASS

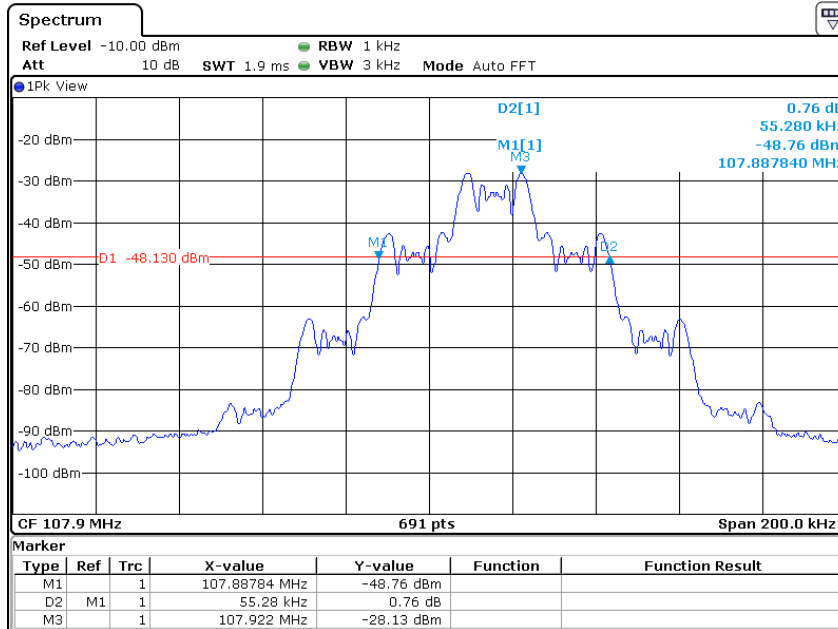
Test Plot:



Date: 31 AUG. 2020 08:18:00



Date: 31 AUG. 2020 08:24:48



Date: 31 AUG 2020 08:23:11

5.3 Antenna Requirement

5.3.1 Definition

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, An analysis of the EUT was performed to determine compliance with FCC Section 15.203. This section requires specific handling and control of antennas used for devices subject to regulations.

5.3.2 Evaluation Criteria

Section 15.203 of the rules states that the subject device must meet at least one of the following criteria:

- (a) Antenna must be permanently attached to the unit.
- (b) Antenna must use a unique type of connector to attach to the EUT.
- (c) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

5.3.3 Evaluation Results

The Antenna is a dedicated antenna.

-----END OF REPORT-----