

FCC TEST REPORT

Test report
On Behalf of
SHENZHEN GROUND ENTERPRISES CO., LTD.
For
Fm transmitter and Car charge
Model No.: IA8238-BKA , CT-001

FCC ID: 2ANRS-GROUND150

Prepared for : SHENZHEN GROUND ENTERPRISES CO., LTD.
Room 607-608 Building F MingYueHuaDu Gonghe Industrial Rd XiXiang BaoAn
District Shenzhen China

Prepared By : Laboratory of Shenzhen United Testing Technology Co., Ltd
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Date of Test: Jun. 28, 2017 ~ Jul. 05, 2017

Date of Report: Jul. 05, 2017

Report Number: UNI170628147-E

TEST RESULT CERTIFICATION

Applicant's name : SHENZHEN GROUND ENTERPRISES CO., LTD.
 Address : Room 607-608 Building F MingYueHuaDu Gonghe Industrial Rd
 XiXiang BaoAn District Shenzhen China
Manufacture's Name..... : SHENZHEN GROUND ENTERPRISES CO., LTD.
 Address : Room 607-608 Building F MingYueHuaDu Gonghe Industrial Rd
 XiXiang BaoAn District Shenzhen China

Product description

Trade Mark: MVMT
 Product name : Fm transmitter and Car charge
 Model and/or type reference : IA8238-BKA , CT-001

Standards : FCC Rules and Regulations Part 15 Subpart C Section 15.239
 ANSI C63.10: 2013

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Date of Test :
 Date (s) of performance of tests : Jun. 28, 2017 ~ Jul. 05, 2017
 Date of Issue..... : Jul. 05, 2017
 Test Result..... : **Pass**

Testing Engineer : Eric Xie
 (Eric Xie)

Technical Manager : Dora Qin
 (Dora Qin)

Authorized Signatory : Kait Chen
 (Kait Chen)

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1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

DESCRIPTION OF TEST	RESULT
CONDUCTED EMISSIONS TEST	N/A
RADIATED EMISSION TEST	COMPLIANT
BAND EDGE	COMPLIANT
OCCUPIED BANDWIDTH MEASUREMENT	COMPLIANT
ANTENNA REQUIREMENT	COMPLIANT

1.2 TEST FACILITY

Test Firm : QTC Certification & Testing Co., Ltd.
Certificated by FCC, Registration No.: 588523

Address : 2nd Floor,B1 Building,Fengyeyuan Industrial Plant, Liuxian 2st. Road,
Xin'an Street, Bao'an District, Shenzhen, China

1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty	
Conducted Emission Expanded Uncertainty	= 2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	= 3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	= 4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	= 4.06dB, k=2

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Fm transmitter and Car charge
Model Name	IA8238-BKA
Serial model	CT-001
Model Difference	All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: IA8238-BKA.
FCC ID	2ANRS-GROUND150
Antenna Type	Integral Antenna
Antenna Gain	0dBi
Operation frequency	88.1-107.9MHz
Number of Channels	199CH
Modulation Type	FM
Power Source	DC Voltage
Power Rating	DC 12V

2.1.1 Carrier Frequency of Channels

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	88.1	95	97.3	189	106.9
01	88.2	96	97.4	190	107.0
02	88.3	97	97.5	191	107.1
03	88.4	98	97.6	192	107.2
04	88.5	99	97.9	193	107.3
05	88.6	100	98.0	194	107.4
06	88.7	101	98.1	195	107.5
07	88.8	102	98.2	196	107.6
08	88.9	103	98.3	197	107.7
09	89.0	104	98.4	198	107.8
10	89.1	105	98.5	199	107.9
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Operation of EUT during testing

Operating Mode

The mode is used: **Transmitting mode**

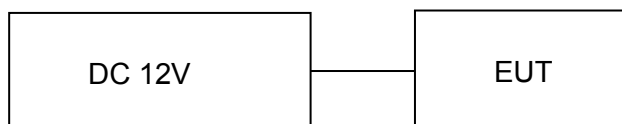
Low Channel: 88.1MHz

Middle Channel: 98.1MHz

High Channel: 107.9MHz

2.2 DESCRIPTION OF TEST SETUP

Operation of EUT during testing



2.3 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4407B	MY451080 40	May. 06, 2017	1 Year
2.	Test Receiver	R&S	ESCI	101318	May. 06, 2017	1 Year
3.	Bilog Antenna	TESEQ	CBL6111D	31216	May. 22, 2017	1 Year
4.	50Ω Coaxial Switch	Anritsu	MP59B	620026441 6	N/A	N/A
5.	Spectrum Analyzer	ADVANTEST	R3132	150900201	May. 06, 2017	1 Year
6.	Horn Antenna	EM	EM-AH-1018 0	201107140 2	May. 22, 2017	1 Year
7.	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	May. 22, 2017	1 Year
8.	Amplifier	EM	EM-30180	060538	May. 06, 2017	N/A
9.	Loop Antenna	ARA	PLA-1030/B	1029	May. 22, 2017	1 Year
10.	Power Meter	R&S	NRVS	100696	May. 06, 2017	1 Year
11.	Power Sensor	R&S	URV5-Z4	0395.1619. 05	May. 06, 2017	1 Year
12.	Cable	Resenberger	SUCOFLEX 104	314683/2	May. 06, 2017	N/A
13.	Cable	Resenberger	SUCOFLEX 104	325762/2	May. 06, 2017	1 Year
14.	Test Receiver	R&S	ESCI	101160	May. 06, 2017	1 Year
15.	LISN	R&S	ENV216	101313	May. 06, 2017	1 Year
16.	LISN	EMCO	3816/2	000429 90	May. 06, 2017	1 Year
17.	50Ω Coaxial Switch	Anritsu	MP59B	620026 4417	N/A	N/A
18.	Passive Voltage Probe	R&S	ESH2-Z3	100196	May. 06, 2017	1 Year
19.	Absorbing clamp	R&S	MOS-21	100423	May. 06, 2017	1 Year
20.	Cable	Resenberger	SUCOFL EX 104	314296 /2	May. 06, 2017	1 Year
21.	Spectrum analyzer	Agilent	N9020A	MY499110 032	May. 06, 2017	1 Year

3. CONDUCTED EMISSIONS TEST

3.1 Conducted Power Line Emission Limit

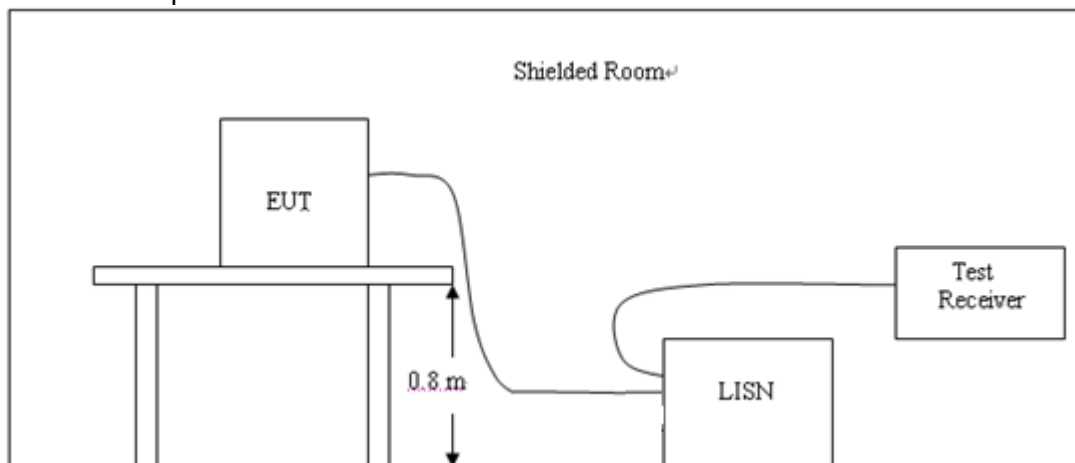
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

Frequency (MHz)	Maximum RF Line Voltage (dBµV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

3.2 Test Setup



3.3 Test Procedure

- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
- 2, Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

3.4 Test Result

Not applicable.

Note: EUT power supply by DC Power, so this test not applicable.

4 RADIATED EMISSION TEST

4.1 Radiation Limit

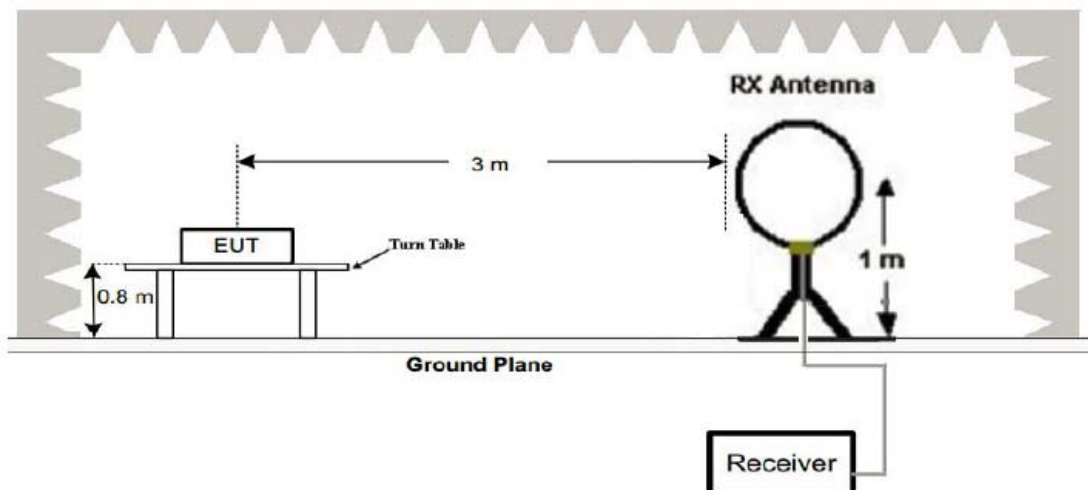
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
30-88	3	40	100
88-216	3	43.5	150
216-960	3	46	200
Above 960	3	54	500

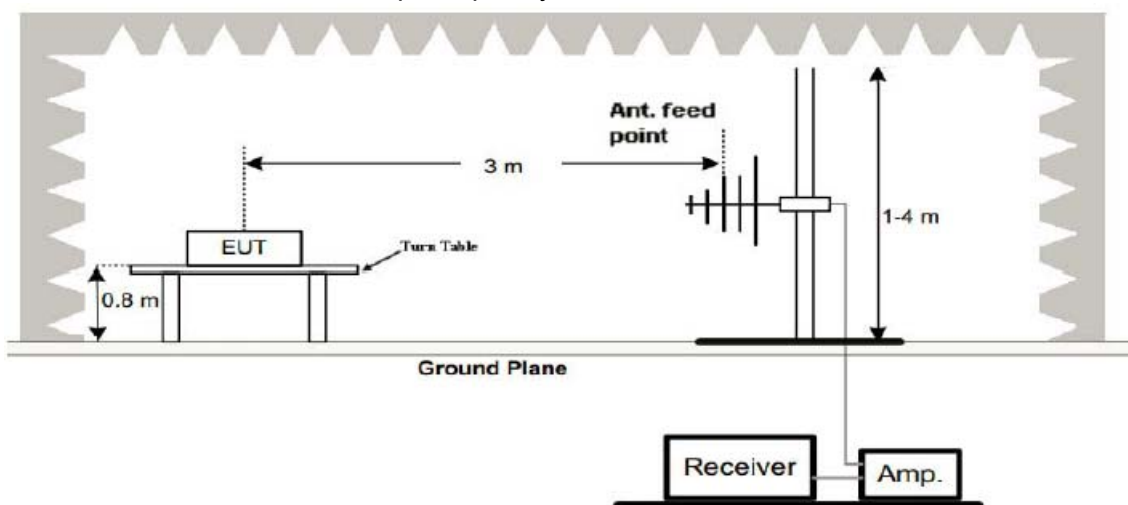
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

4.2 Test Setup

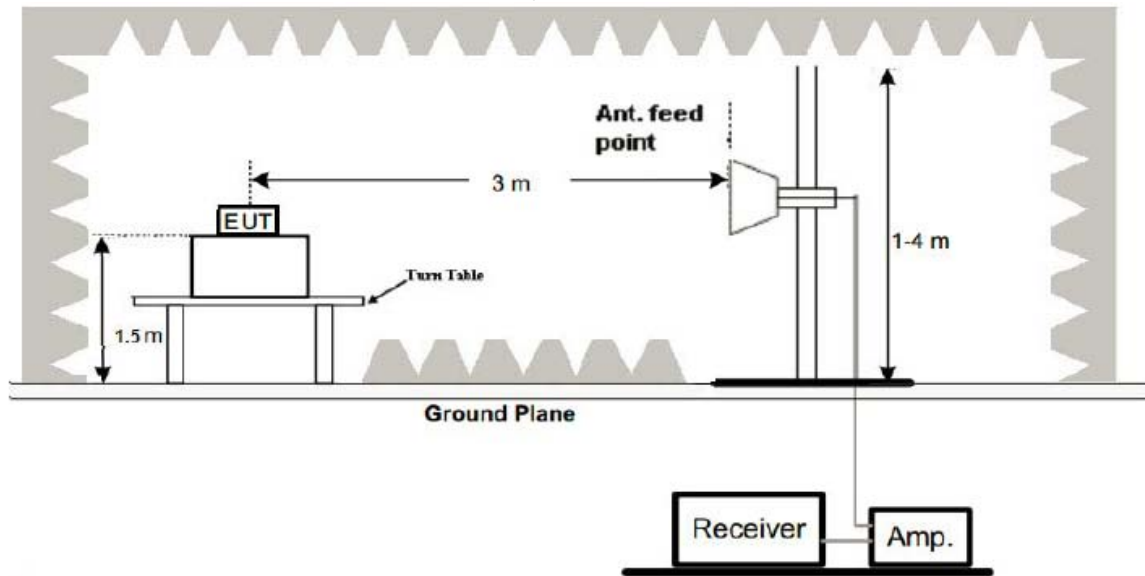
(1) Radiated Emission Test-Up Frequency Below 30MHz



(2) Radiated Emission Test-Up Frequency 30MHz~1GHz



(3) Radiated Emission Test-Up Frequency Above 1GHz



4.3 Test Procedure

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9KHz to 25GHz per FCC PART 15.33(a).

Note:

For battery operated equipment, the equipment tests shall be performed using a new battery.

4.4 Test Result

PASS

All the test modes completed for test.

CH Low (88.1MHz):

Antenna polarity: H

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
88.1	72.39	-16.28	56.11	68	-11.89	peak
88.1	55.63	-16.28	39.35	48	-8.65	AVG
73.65	43.57	-16.32	27.25	40	-12.75	peak
279.29	46.81	-14.22	32.59	46	-13.41	peak
408.3	42.54	-11.49	31.05	46	-14.95	peak
651.77	38.28	-7.53	30.75	46	-15.25	peak
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Antenna polarity: V

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
88.1	71.62	-16.28	55.34	68	-12.66	peak
88.1	54.35	-16.28	38.07	48	-9.93	AVG
70.74	45.74	-16.09	29.65	40	-10.35	peak
268.62	45.86	-14.35	31.51	46	-14.49	peak
568.35	38.13	-8.59	29.54	46	-16.46	peak
635.28	40.77	-7.65	33.12	46	-12.88	peak
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Remark:

- (1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
- (2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

CH Low (98.1MHz):
Antenna polarity: H

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
98.1	71.85	-16.17	55.68	68	-12.32	peak
98.1	55.43	-16.17	39.26	48	-8.74	AVG
73.65	41.69	-16.32	25.37	40	-14.63	peak
279.29	44.27	-14.22	30.05	46	-15.95	peak
408.3	43.82	-11.49	32.33	46	-13.67	peak
651.77	38.56	-7.53	31.03	46	-14.97	peak
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Antenna polarity: V

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
98.1	70.66	-16.17	54.49	68	-13.51	peak
98.1	53.84	-16.17	37.67	48	-10.33	AVG
70.74	43.72	-16.09	27.63	40	-12.37	peak
268.62	42.95	-14.35	28.6	46	-17.4	peak
568.35	37.41	-8.59	28.82	46	-17.18	peak
635.28	37.58	-7.65	29.93	46	-16.07	peak
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Remark:

- (1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
- (2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

CH Low (107.9MHz):
Antenna polarity: H

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
107.9	74.38	-16.03	58.35	68	-9.65	peak
107.9	57.44	-16.03	41.41	48	-6.59	AVG
73.65	43.67	-16.32	27.35	40	-12.65	peak
279.29	45.92	-14.22	31.7	46	-14.3	peak
408.3	43.18	-11.49	31.69	46	-14.31	peak
651.77	38.55	-7.53	31.02	46	-14.98	peak
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Antenna polarity: V

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
107.9	73.05	-16.03	57.02	68	-10.98	peak
107.9	54.58	-16.03	38.55	48	-9.45	AVG
70.74	42.61	-16.09	26.52	40	-13.48	peak
268.62	45.26	-14.35	30.91	46	-15.09	peak
568.35	41.74	-8.59	33.15	46	-12.85	peak
635.28	39.98	-7.65	32.33	46	-13.67	peak
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Remark:

- (1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
- (2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

5 BAND EDGE

5.1 Limits

FCC PART 15.249(d) 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 §15.209, whichever is the lesser attenuation.

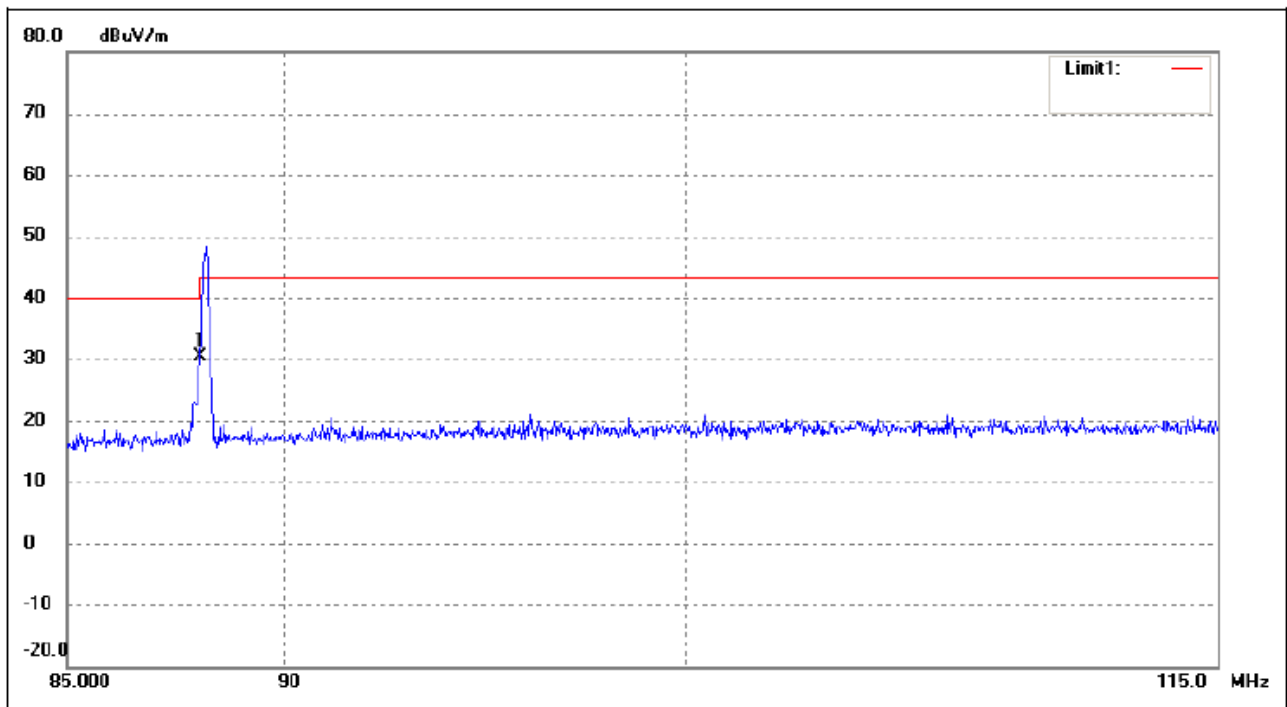
5.2 Test Procedure

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW to 100KHz and VBM to 300KHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength. The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW to 100 KHz and VBW to 300 KHz, to measure the conducted peak band edge.

5.3 Test Result

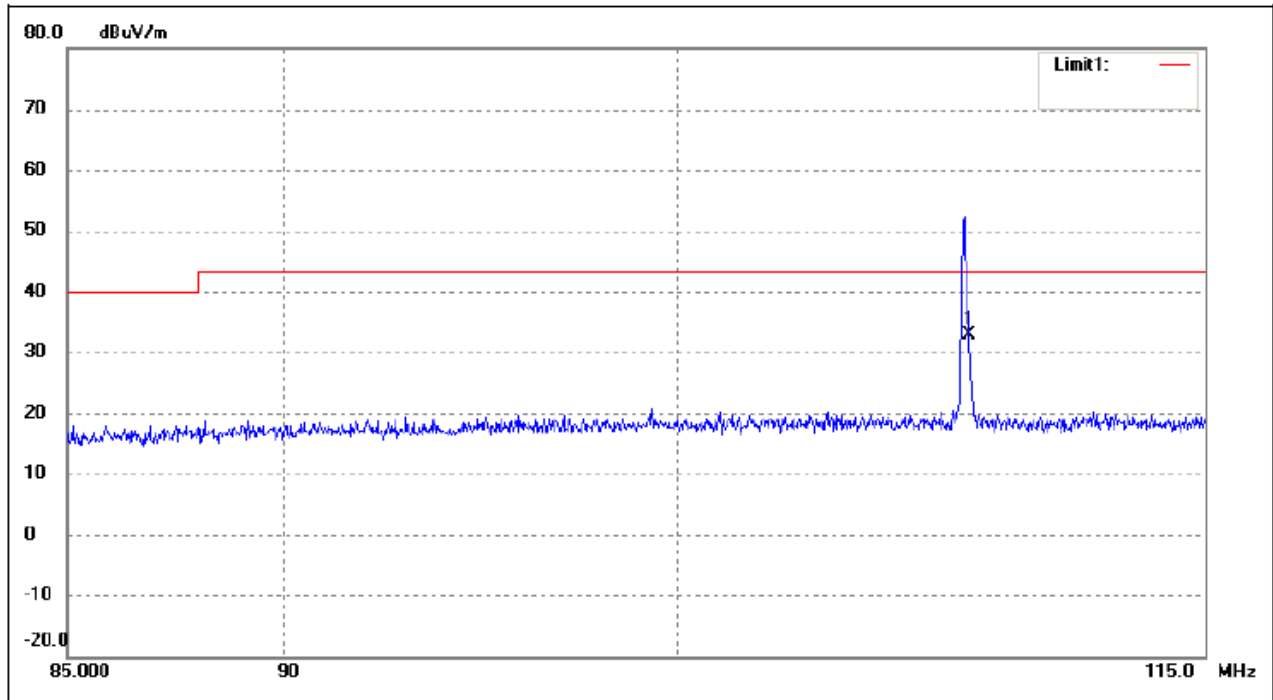
PASS

Radiated Band Edge Test:
 Operation Mode: TX CH Low (88 MHz)
 Lower Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	88.0000	27.24	3.06	30.30	40.00	-9.70	157	100	peak

Operation Mode: TX CH High (108 MHz)
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	28.00	4.88	32.88	43.50	-10.62	279	100	peak

6 OCCUPIED BANDWIDTH MEASUREMENT

6.1 Test Setup

Same as Radiated Emission Measurement

6.2 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Based on FCC Part15 C Section 15.239(a): RBW= 10KHz. VBW= 30 KHz, Span=1MHz.
4. The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector.

6.3 Measurement Equipment Used

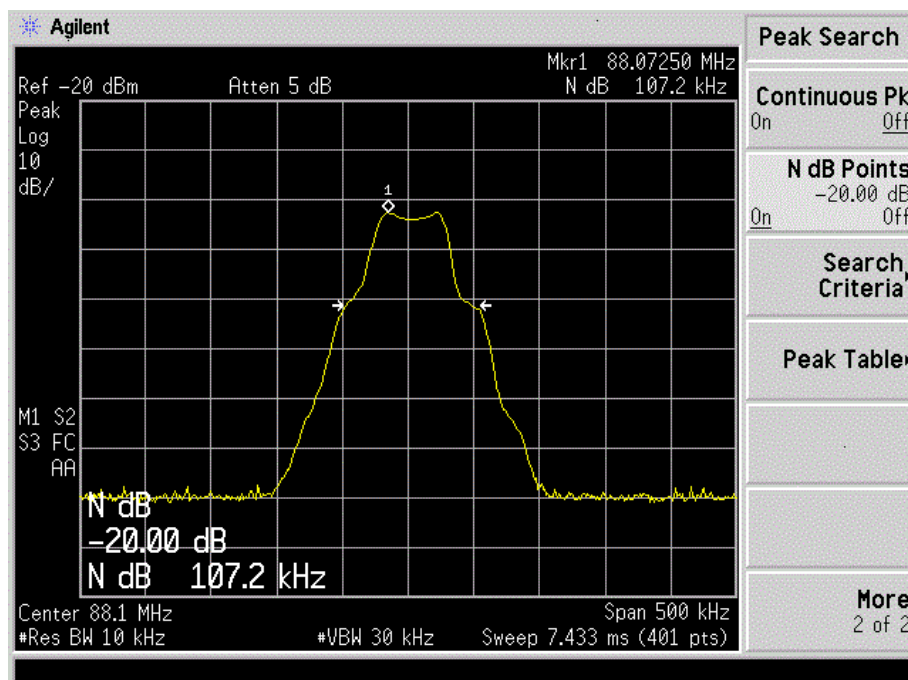
Same as Radiated Emission Measurement

6.4 Test Result

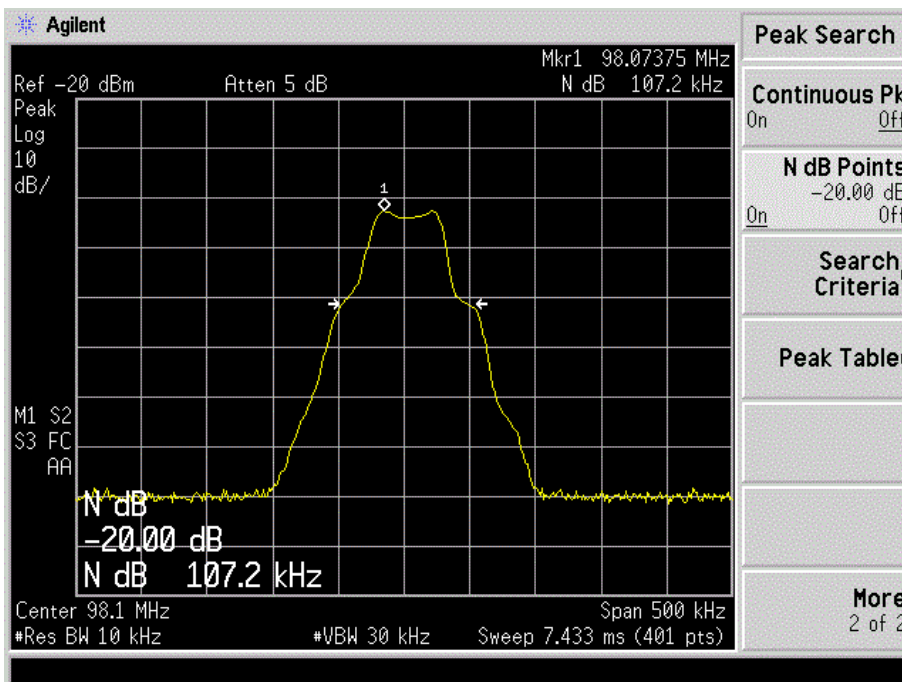
PASS

Frequency	20dB Bandwidth (kHz)	Result
88.1 MHz	107.2	PASS
98.1 MHz	107.2	PASS
107.9 MHz	106	PASS

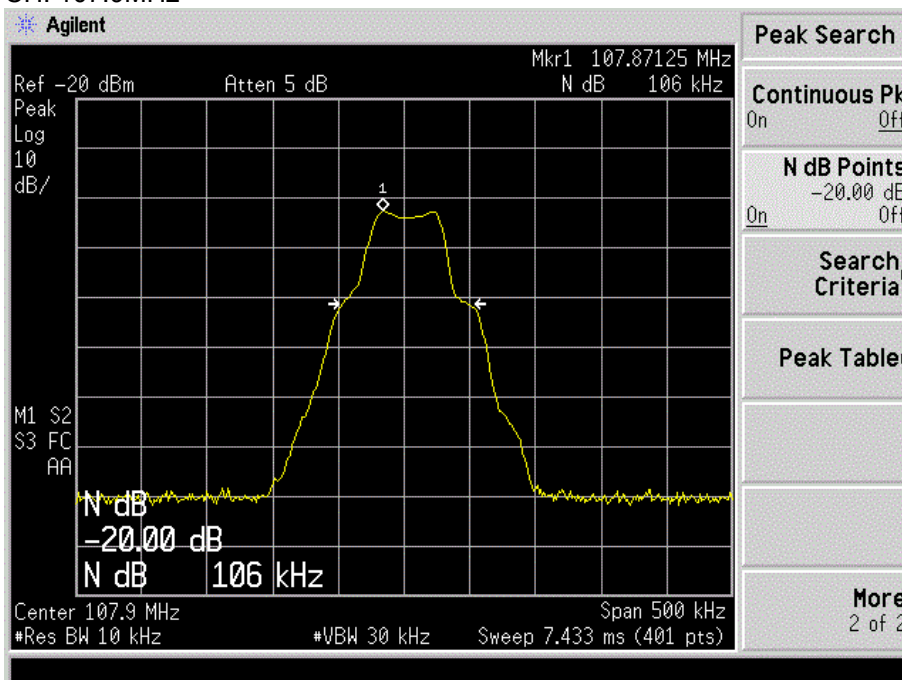
CH: 88.1MHz



CH: 98.1MHz



CH: 107.9MHz



7 ANTENNA REQUIREMENT

Standard Applicable

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.249, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

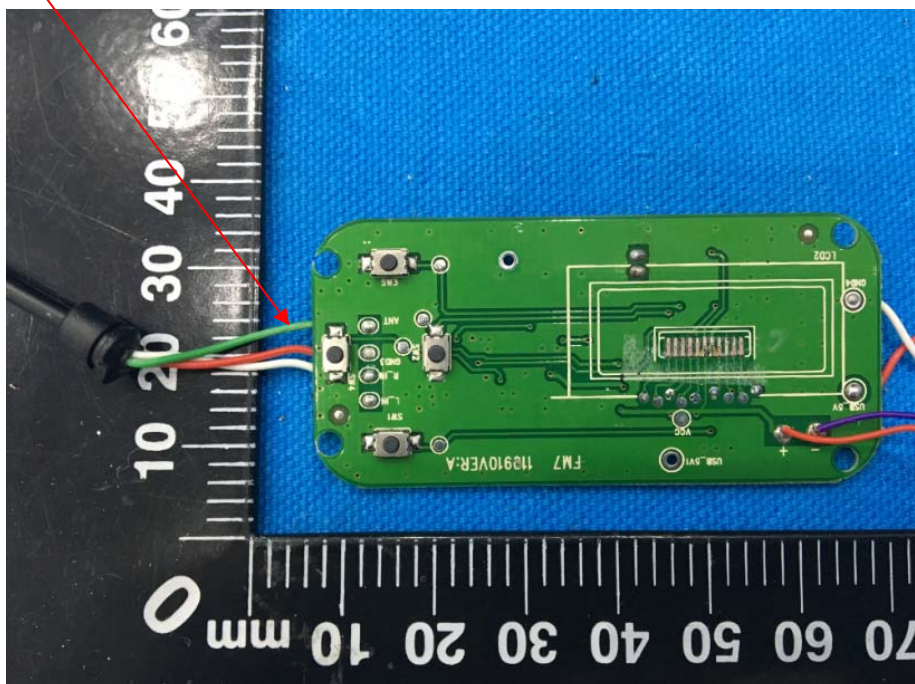
Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is a Integral Antenna, The directional gains of antenna used for transmitting is 0dBi.

ANTENNA



8 PHOTOGRAPH OF TEST

8.1 Radiated Emission

