

FCC PART 15.231
MEASUREMENT AND TEST REPORT
For

EUT Name: Digital Meat Probe with RF monitor
Item No.: 23100111, 20100111, 20100311
FCC ID: YHXMPRFB-T
Serial No.: Not supplied by client

Prepared for : Masterbuilt Manufacturing, Inc.
1 Masterbuilt Court • Columbus, Georgia 31907, USA

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TEST REPORT DECLARATION

Applicant : Masterbuilt Manufacturing, Inc.
Manufacturer : San Yan Electronic Co., Ltd
EUT Description : Digital Meat Probe with RF monitor
Model No. : 23100111, 20100111, 20100311

The device described above is tested by Bontek Compliance Testing Laboratory Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits for both radiation and conduction emissions.

The measurement results are contained in this test report and Shenzhen Toby Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC official limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Shenzhen Toby Technology Co., Ltd.

Reported by: Erin Date: June 03, 2010
(Erin)

Reviewer: Jacky Wang Date: June 03, 2010
(Jacky Wang)

Approved by: Justin Zhang Date: June 03, 2010
(Justin Zhang)

1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

Client Information

Applicant : Masterbuilt Manufacturing, Inc.
 Address : 1 Masterbuilt Court • Columbus, Georgia 31907, USA
 Manufacturer : San Yan Electronic Co., Ltd
 Address : No.2, 7th South of Street, Qinggong Road 3, Foshan City, Guangdong, P.R.China.

General Description of E.U.T

Items	Description
EUT Description:	Digital Meat Probe with RF monitor
Model No.:	23100111, 20100111, 20100311 (Note: The samples are the same except only color is different. We take 23100111 for test.)
Rated Voltage:	DC 3V Batteries
Out Power:	<10 mW
Frequency Range:	433.92MHz
Tape of Antenna:	Integral Antenna
Comment:	Auto Operation Device

For more information refer to the circuit diagram form and the user's manual.

The test data is gathered from a production sample, provided by the manufacturer.

1.2. Test Standards

The following report is prepared on behalf of the Masterbuilt Manufacturing, Inc. in accordance with FCC Part 15, Subpart C, and section 15.231, 15.203, 15.205 and 15.209 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.231, 15.203, 15.205 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.

1.3. Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4. Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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 set to keep transmitting during the test.

1.5. Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

1.6. EUT Cable List and Details

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

1.7. Test Location

FCC – Registration No.: 338263

BONTEK ELECTRONIC 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. Registration 338263, March, 2008.

Bontek Compliance Testing Laboratory Ltd

Address: 1/F, Block East H-3, OCT Eastern Ind. ZoneQiaocheng East Road, Nanshan,
Shenzhen, 518055 China

2. SUMMARY OF TEST RESULTS

DESCRIPTION OF TEST	RESULT
§15.203 Antenna Requirement	Compliant
§15.205 Restricted Band	Compliant
§15.209 General Requirement	Compliant
§15.231 (e) Deactivation Testing	Compliant
§15.231 (c) 20dB Band Width Testing	Compliant
§15.231 (e) Radiated Emission	Compliant

3. §15.203 - ANTENNA REQUIREMENT

3.1. Standard Applicable

According to FCC 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. §15. 205, §15.209, §15.231 (E) RADIATED EMISSION

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 ± 3.0 dB.

4.2. Standard Applicable

According to §15.231(e), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emission (microvolts/meter)
40.66-40.70	1000	100
70-130	500	50
130-174	500 to 1500**	50-150**
174-260	1500	150
260-470	1500 to 5000**	150 to 500**
Above 470	5000	500

** linear interpolations

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

4.3. Test Equipment List and Details

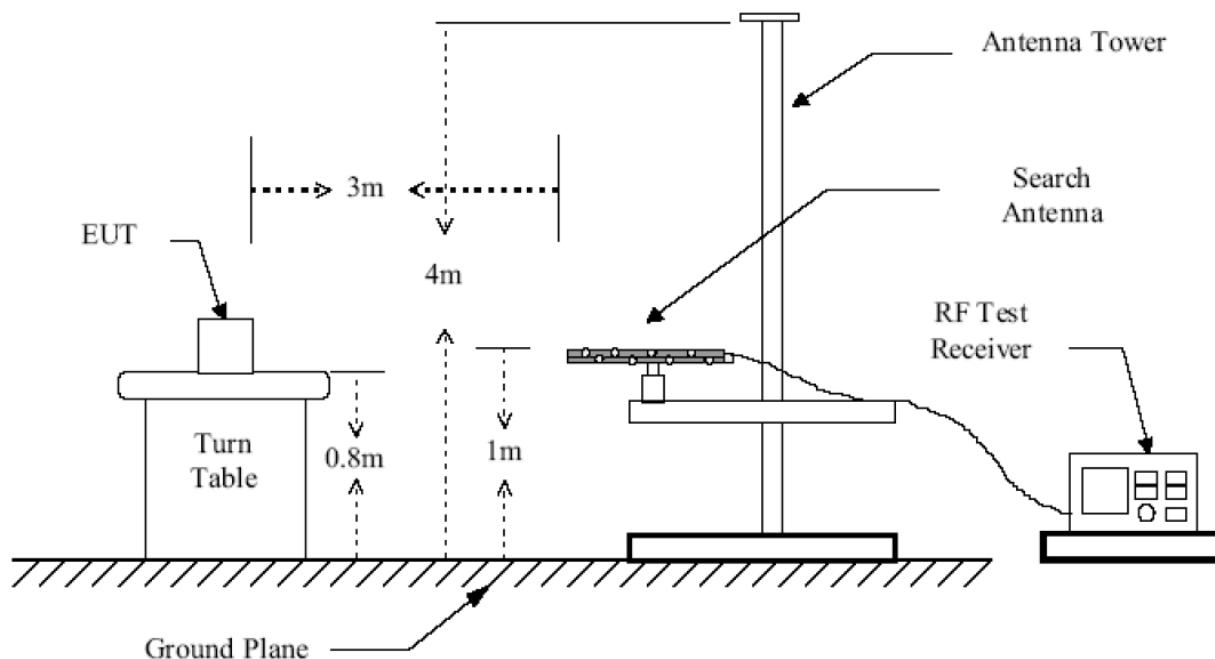
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
Spectrum Analyzer	ROHDE& SCHWARZ	FSEA20	DE25181	2009-08-12	2010-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2009-08-12	2010-08-11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009-07-21	2010-07-20
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2009-07-21	2010-07-20
RF Switch	EM	EMSW18	SW060023	2009-08-12	2010-08-11
Amplifier	Agilent	8447F	3113A06717	2009-08-12	2010-08-11
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2009-08-12	2010-08-11
EMI Test Receiver	ROHDE& SCHWARZ	ESPI	25498514	2009-08-12	2010-08-11
EMI Test Receiver	ROHDE& SCHWARZ	ESI26	838786/103	2009-08-12	2010-08-11
Receiver Horn Antenna	ROHDE& SCHWARZ	HF906	100013	2009-08-12	2010-08-11

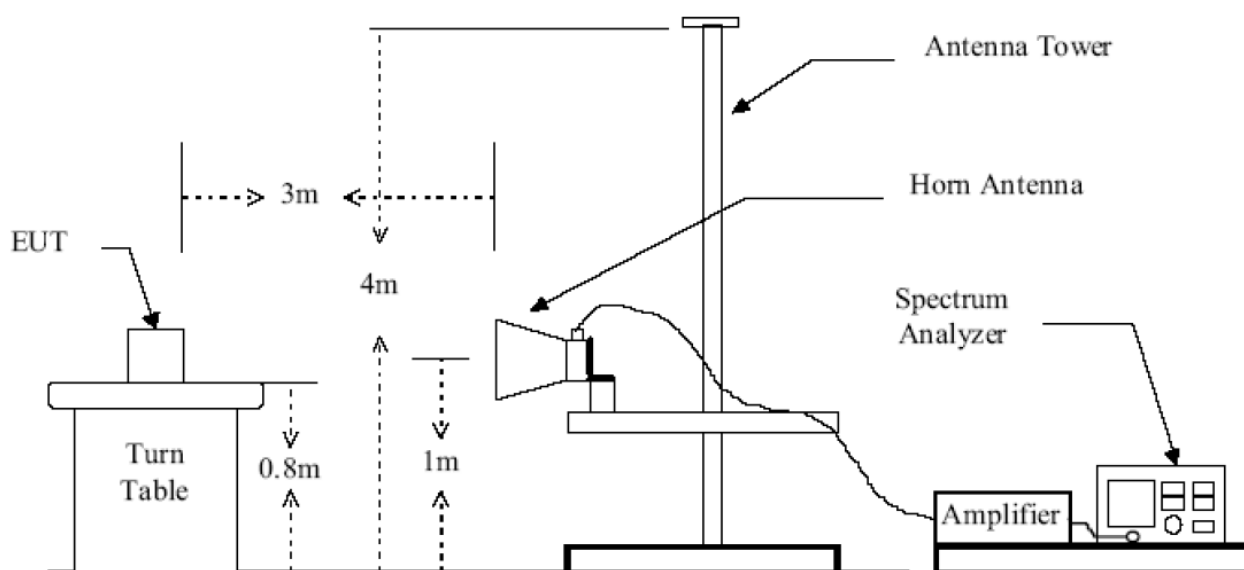
Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

4.4. Test Procedure

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.205 15.231(e) and FCC Part 15.209 Limit.

Figure 1: Frequencies measured below 1GHz configuration.





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:

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

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 for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.231 Limit}$$

Limit Calculation for Fundamental (Xf):

$$(20\text{Log}X_f - 1500) / (434 - 260) = (5000 - 1500) / (470 - 260)$$

$$\text{Limit } X_f = 72.87 \text{ dB}\mu\text{V/m}$$

Limit Calculation for Spurious Emission (Xs):

$$(20\text{Log}X_s - 150) / (434 - 260) = (500 - 150) / (470 - 260)$$

$$\text{Limit } X_s = 52.87 \text{ dB}\mu\text{V/m}$$

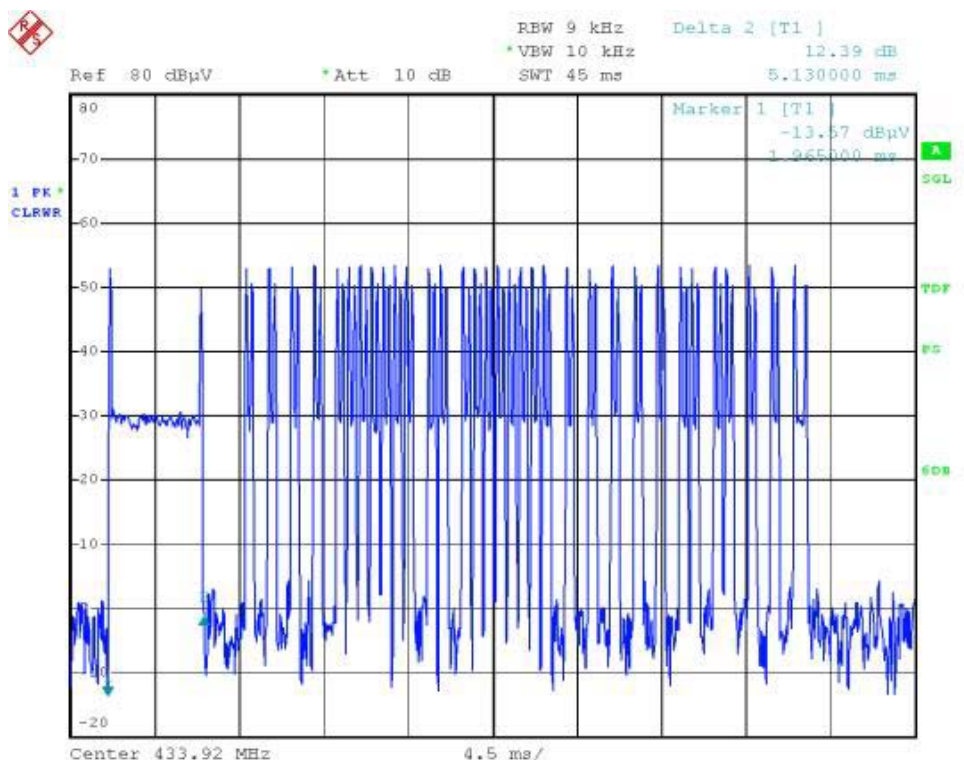
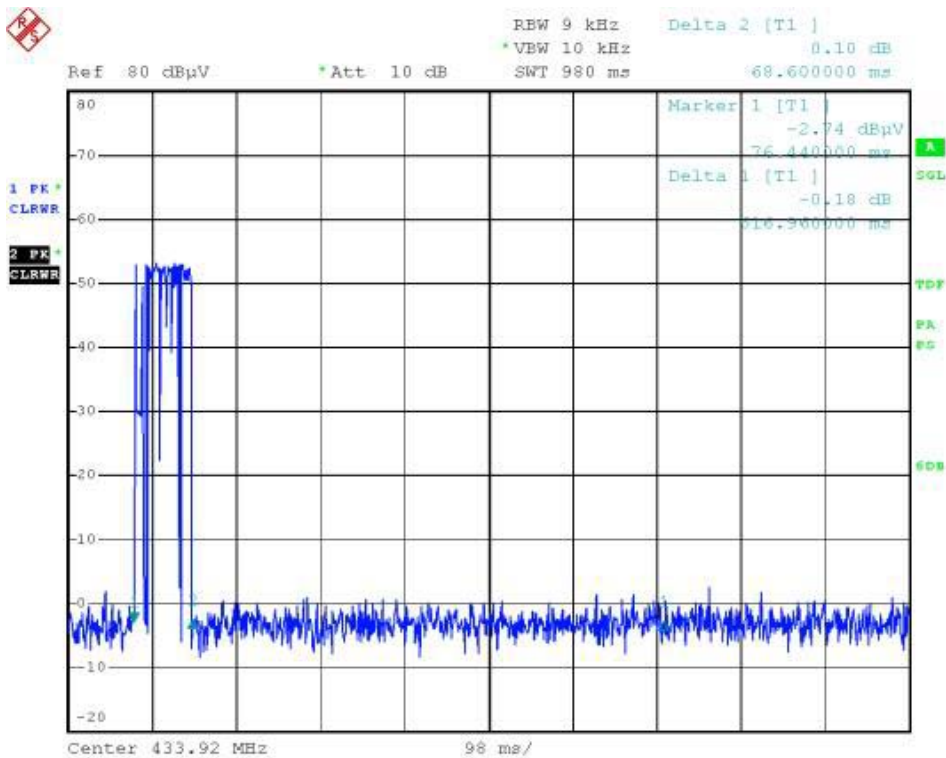
Duty Cycle:

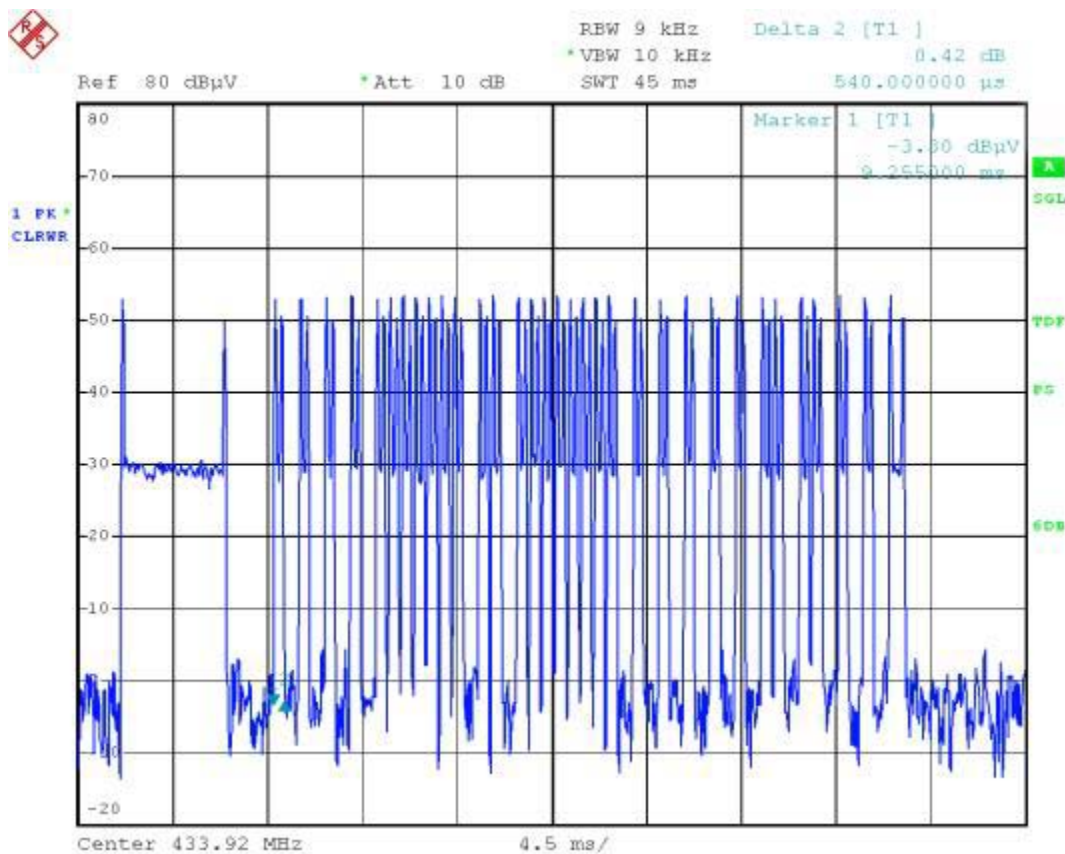
Time On/ Total= $(5.13+540*33*10^{-3})/68.6=20.79/68.6=0.334548$

$20\log(\text{On/ Total})=-9.51$

Average= Peak+ $20\log(\text{On/ Total})$ =Peak-9.51

Dell Time of operation measurement.





4.6. Environmental Conditions

Temperature:	21° C
Relative Humidity:	56 %
ATM Pressure:	1011 mbar

4.7. Summary of Test Results/ Plots

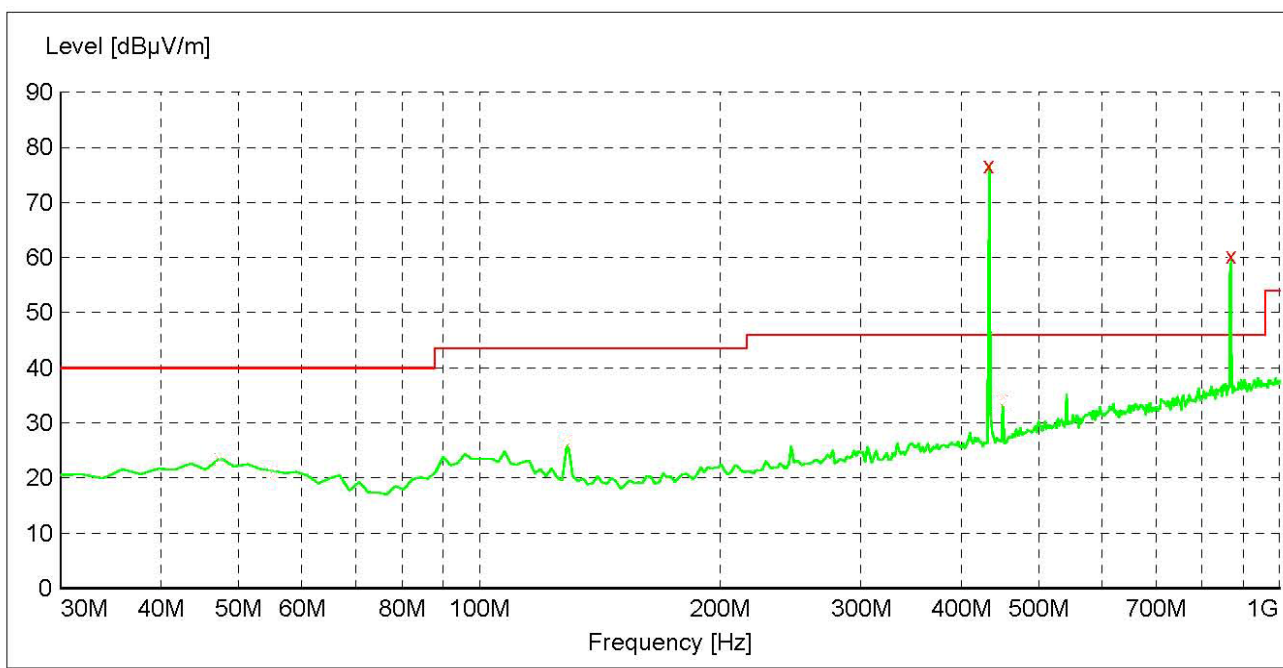
According to the data below, the FCC Part15.205, 15.209 and 15.231 standards, and had the worst margin of:

-13.22 dBμV/m at 1302 MHz in the Vertical polarization, 30 MHz to 5 GHz, 3Meters

Plot of Radiation Emissions Test Data

Radiated Disturbance
 EUT: Digital Meat Probe with RF monitor
 M/N: 23100111
 Operating Condition: TX
 Test Specification: Horizontal & Vertical
 Comment: DC3V

Horizontal

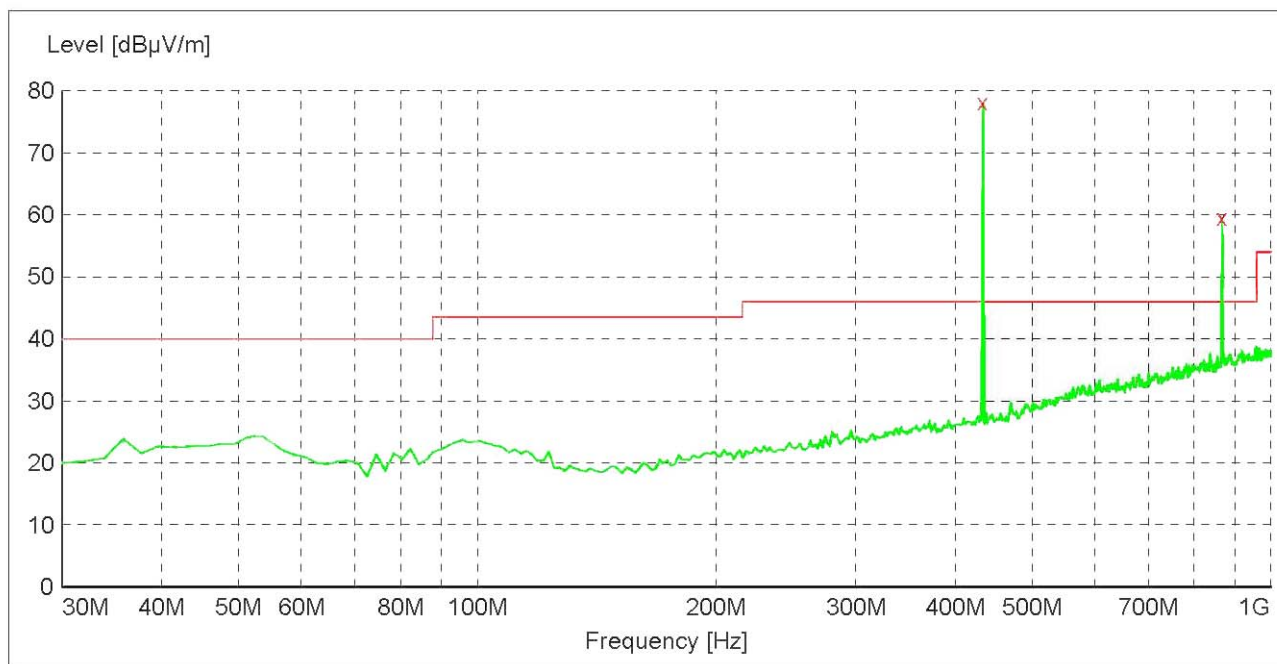


No.	Frequency (MHz)	Correct Factor (dB)	Result (dBµVm)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Remark
1	433.78	12.65	76.53	92.87	16.34	100	PEAK
2	433.78	12.65	67.02	72.87	5.85	100	AVG
3	867.62	20.06	59.08	72.87	13.79	100	PEAK
4	867.62	20.06	49.57	52.87	3.30	100	AVG

Above 1GHz

No.	Frequency (MHz)	Correct Factor (dB)	Result (dBµVm)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Remark
1	1302	20.80	57.61	74.00	16.39	100	PEAK
2	1302	20.80	48.10	54.00	5.9	100	AVG
3	1736	22.52	55.83	74.00	18.17	100	PEAK
4	1736	22.52	46.32	54.00	7.68	100	AVG

Vertical



No.	Frequency (MHz)	Correct Factor (dB)	Result (dBuVm)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Remark
1	434.0650	12.65	76.70	92.87	16.17	100	PEAK
2	434.0651	12.65	67.14	72.87	5.73	100	AVG
3	869.1301	20.06	58.49	72.87	14.38	100	PEAK
4	869.1302	20.06	48.98	52.87	3.89	100	AVG

Above 1GHz

No.	Frequency (MHz)	Correct Factor (dB)	Result (dBuVm)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Remark
1	1302	20.80	57.34	74.00	16.66	100	PEAK
2	1302	20.80	47.83	54.00	6.17	100	AVG
3	1736	22.52	56.15	74.00	17.85	100	PEAK
4	1736	22.52	46.64	54.00	7.36	100	AVG

Note: The EUT was tested in all three orthogonal planes and frequency rang 30MHz to the tenth harmonics. Emissions attenuated closely to the noise base are not reported.

5. §15. 231(C) 20DB BANDWIDTH TESTING

5.1. Standard Applicable

According to FCC 15.231(c), The bandwidth of the emission shall be no wider than 0.25 % of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

5.2. Test Equipment List and Details

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2009-11-12	2010-11-11
EMI Test Receiver	Rohde & Schwarz	ESPI 7	100097	2009-11-12	2010-11-11
Receiver Antenna	ETS	2175	57337	2009-11-12	2010-11-11
50 ohm Coaxial Cable	ETS	SUCOFLEX 104	25498514	2009-11-12	2010-11-11

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.3. Test Procedure

With the EUT's antenna attached, the EUT's 20dB 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.

5.4. Environmental Conditions

Temperature:	20° C
Relative Humidity:	54 %
ATM Pressure:	1011 mbar

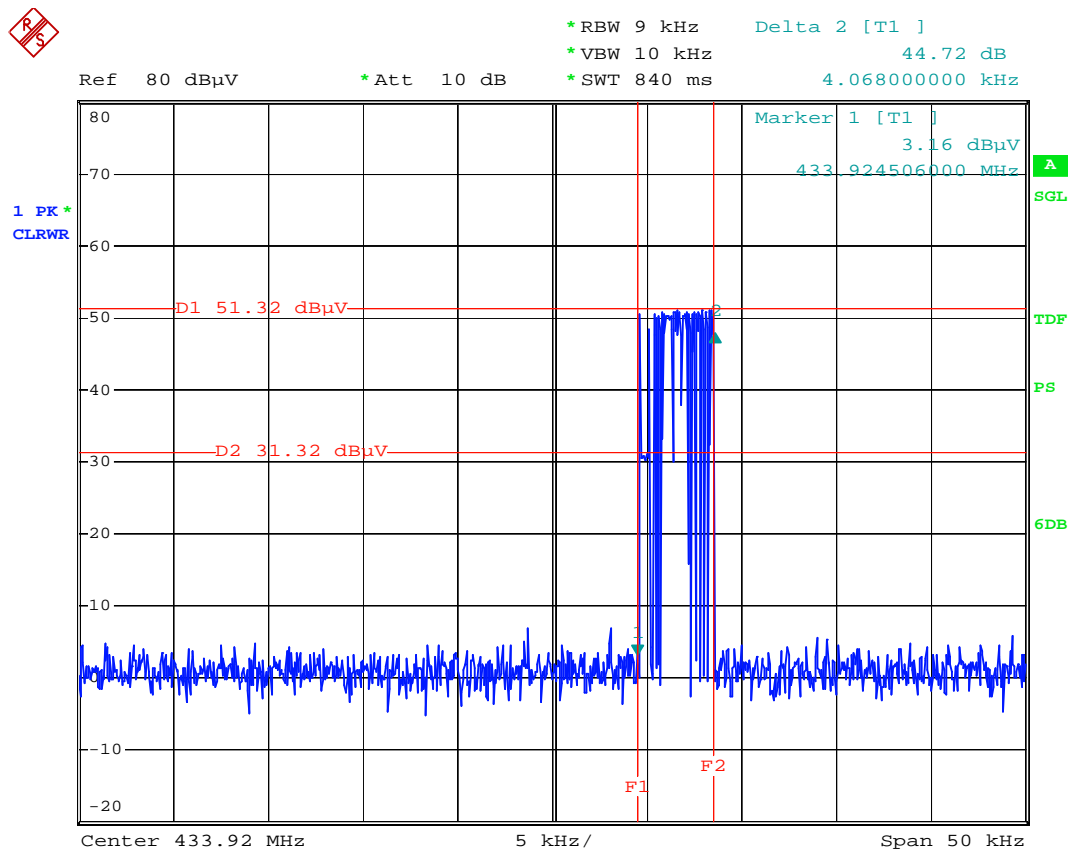
5.5. Summary of Test Results/Plots

Frequency 20dB MHz	Bandwidth kHz	Limit kHz	Result
433.92	4.068	1084.77	Pass

Limit=Fundamental Frequency×0.25%=433.908×0.25%=1084.77 kHz

Test Result: Pass

Refer to the attached plots.



SLTG

Date: 3.JUN.2010 11:20:53

6. §15. 231(E) DEACTIVATION TESTING

6.1. Standard Applicable

According to FCC 15.231 (a)(3) there is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

According to FCC 15.231 (e) devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

6.2. Test Equipment List and Details

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2009-11-12	2010-11-11
EMI Test Receiver	Rohde & Schwarz	ESPI 7	100097	2009-11-12	2010-11-11
Receiver Antenna	ETS	2175	57337	2009-11-12	2010-11-11
50 ohm Coaxial Cable	ETS	SUCOFLEX 104	25498514	2009-11-12	2010-11-11

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

6.3. Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.908MHz, then set the spectrum analyzer to Zero Span for the release time reading.

6.4. Environmental Conditions

Temperature:	21° C
Relative Humidity:	55 %
ATM Pressure:	1011 mbar

6.5. Summary of Test Results/Plots

Refer to the attached plots.

The total transmission time = Transmission time * 3600s / Silent time

$$= 0.0686 \text{ s} * 3600 \text{ s} / 266.4 \text{ s}$$

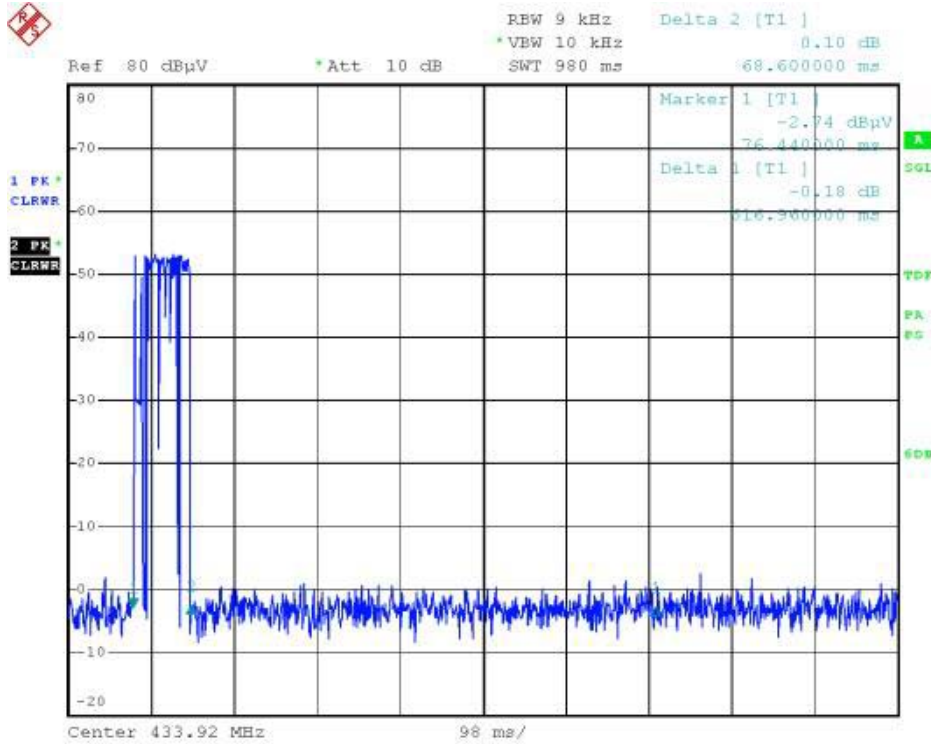
$$= 0.927 \text{ s} < 2 \text{ s}$$

Transmission time = 0.0686s < 1 s

Silent time = 266.4 s > 10 s and Silent time = 266.4 s > 30 * 0.0686 s = 2.058 s

Test Result: Pass

Transmission Time:



Silent Time:

