APPLICATION CERTIFICATION
On Behalf of
Hopeful Industrial Limited

Thermometer sensor
Model No.: XT200

FCC ID: R8G-XT200

Prepared for	:	Hopeful Industrial Limited
Address	:	Unit 12, 19/F, Trend Centre, 29-31 Cheung Lee Street, Chai Wan, Hong Kong
Prepared by	:	ACCURATE TECHNOLOGY CO., LTD
Address	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China Tel: (0755) 26503290 Fax: (0755) 26503396

Report Number	:	ATE20122551
Date of Test	:	Nov 9-Dec 3, 2012
Date of Report	:	Dec 3, 2012

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Description Page

Test Report Certification

Applicant	:	Hopeful Industrial Limited
Manufacturer	:	Hopeful Industrial Limited
EUT Description	:	Thermometer sensor

(A) MODEL NO.: XT200

(B) Trade Name.: n.a

(C) POWER SUPPLY: DC 3V ("AAA battery" 2×)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.231
ANSI 63.10: 2009

The device described above is tested by ACCURATE TECHNOLOGY CO., LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.231. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO., LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO., LTD.

Date of Test : Nov 9-Dec 3, 2012

Prepared by : Terry. Yang

(Engineer)

Approved & Authorized Signer :

(Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	Thermometer sensor
Model Number	:	XT200
Trade Name	:	n.a
Power Supply	:	DC 3V (“AAA battery” 2×)
Operation Frequency	:	433.92MHz
Applicant	:	Hopeful Industrial Limited
Address	:	Hopeful 12, 19/F, Trend Centre, 29-31 Cheung Lee Street, Chai Wan, Hong Kong
Manufacturer	:	Hopeful Industrial Limited
Address	:	Hopeful 12, 19/F, Trend Centre, 29-31 Cheung Lee Street, Chai Wan, Hong Kong
Date of sample received	:	Nov 9, 2012
Date of Test	:	Nov 9-Dec 3, 2012

1.2.Description of Test Facility

EMC Lab	:	Accredited by TUV Rheinland Shenzhen Listed by FCC The Registration Number is 752051 Listed by Industry Canada The Registration Number is 5077A-2 Accredited by China National Accreditation Committee for Laboratories The Certificate Registration Number is L3193
Name of Firm	:	ACCURATE TECHNOLOGY CO., LTD
Site Location	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

1.3.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. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated date	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 8, 2012	Jan. 7, 2013
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 8, 2012	Jan. 7, 2013
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 8, 2012	Jan. 7, 2013
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 8, 2012	Jan. 7, 2013
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 8, 2012	Jan. 7, 2013
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 8, 2012	Jan. 7, 2013
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 8, 2012	Jan. 7, 2013
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 8, 2012	Jan. 7, 2013
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 8, 2012	Jan. 7, 2013
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 8, 2012	Jan. 7, 2013

3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
Section 15.207	Conducted Emission	N/A
Section 15.231(e)	Radiated Emission	Compliant
Section 15.231(c)	20dB Bandwidth	Compliant
Section 15.231(e)	Release Time Measurement	Compliant
Section 15.203	Antenna Requirement	Compliant

The product is a automatically operated transmitter.
Section 15.231 (a) (2), (3), (4) and (5) are not applicable.

All normal using modes of the normal function were tested but only the worst test data of the worst mode is recorded by this report.

4. THE FIELD STRENGTH OF RADIATION EMISSION

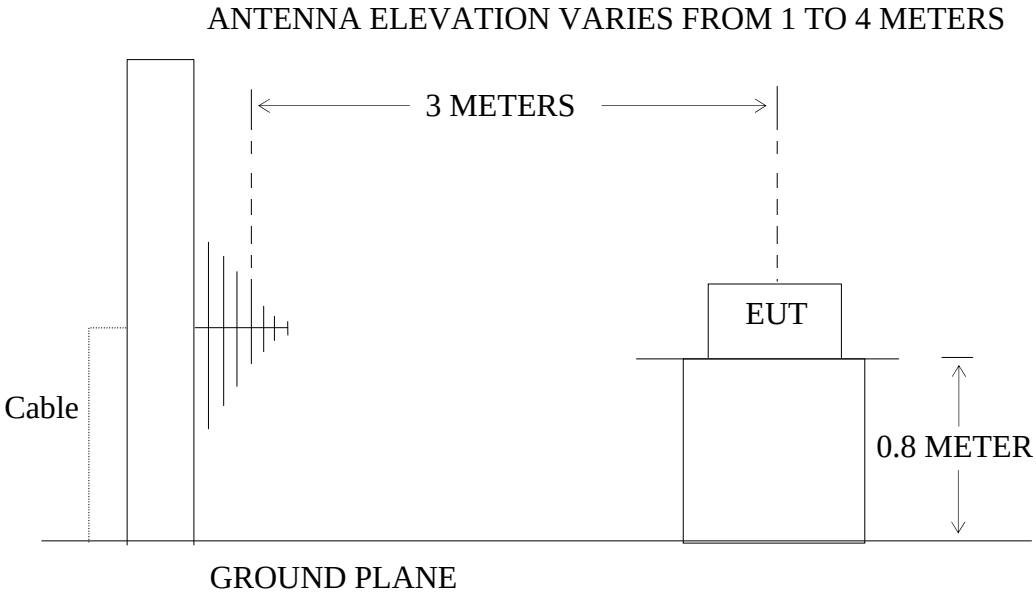
4.1.Block Diagram of Test Setup

4.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: Thermometer sensor)

4.1.2.Semi-Anechoic Chamber Test Setup Diagram



(EUT: Thermometer sensor)

4.2. The Field Strength of Radiation Emission Measurement Limits

4.2.1. Radiation Emission Measurement Limits According to FCC Part 15 Section 15.231(e)

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [μV/m]	Field Strength of Spurious Emission [μV/m]
40.66-40.70	1000	100
70-130	500	50
130-174	500 to 5000	50 to 150
174-260	1500	150
260-470	1500-5000	150-500
Above 470	5000	500

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters; for the band 260-470 MHz, uV/m at 3 meters. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

4.2.2. Restricted Band Radiation Emission Measurement Limits According to FCC part 15 Section 15.205 and Section15.209.

4.3. Configuration of EUT on Measurement

The following equipment is installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.3.1. Thermometer sensor (EUT)

Model Number	:	XT200
Serial Number	:	N/A
Manufacturer	:	Hopeful Industrial Limited

4.4. Operating Condition of EUT

4.4.1. Setup the EUT and simulator as shown as Section 4.1.

4.4.2. Turn on the power of all equipment.

4.4.3. Let the EUT work in TX mode measure it.

4.5. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI 63.10 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver is set at 120 kHz in 30-1000 MHz, and 1 MHz in 1000-5000 MHz.

The frequency range from 30 MHz to 5000 MHz is checked.

4.6. The Field Strength of Radiation Emission Measurement Results

PASS.

The frequency range 30MHz to 5000MHz is investigated.

Date of Test:	Nov 30, 2012	Temperature:	25°C
EUT:	Thermometer sensor	Humidity:	50%
Model No.:	XT200	Power Supply:	DC 3V
Test Mode:	TX	Test Engineer:	Ricky

For 30MHz-1000MHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading (dBμV/m)	Factor Corr. (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
433.9200	38.69	20.31	59.00	72.90	-13.10	Vertical
867.8400	23.59	27.64	51.23	52.90	-1.67	Vertical
433.9200	37.99	20.31	58.30	72.90	-14.60	Horizontal
867.8400	22.80	27.64	50.44	52.90	-2.46	Horizontal

For 1GHz-5GHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

AV =PK + duty cycle factor

Frequency (MHz)	Duty cycle factor	Reading (dBμV/m)	Factor Corr. (dB)	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
		PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
1301.760	-8.70	69.34	-12.20	48.44	57.14	52.90	72.90	-4.46	-15.76	Vertical
1735.680	-8.70	67.23	-10.40	48.14	56.84	52.90	72.90	-4.76	-16.06	Vertical
2169.600	-8.70	65.56	-8.38	48.48	57.18	52.90	72.90	-4.42	-15.72	Vertical
1301.760	-8.70	69.95	-12.20	49.05	57.75	52.90	72.90	-3.85	-15.15	Horizontal
1735.680	-8.70	68.01	-10.40	48.92	57.62	52.90	72.90	-3.98	-15.28	Horizontal
2169.600	-8.70	62.08	-8.38	45.00	53.70	52.90	72.90	-7.90	-19.20	Horizontal

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. *: Denotes restricted band of operation.

Measurements were made using a peak detector, the AV value computed by duty cycle factor. Any emission falling within the restricted bands of FCC Part 15 Section 15.205 were compliance with the emission limit of FCC Part 15 Section 15.209.

3. The field strength is calculated by adding the antenna factor, high pass filter loss (if used) and cable loss, and subtracting the amplifier gain (if any) from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor

   Where Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss – Amplifier Gain

FCC Limit for Fundamental Measurement =72.9 dBμV/m

FCC Limit for Sprious Measurement =52.9dBμV/m

Pulse Width (PW) =0.54ms*1= 0.54ms

1/PW=1/0.54ms=1.8519kHz

RBW(100 kHz) ＞1/PW (1.8519kHz)

Therefore PDCF is not needed.

Duty cycle = (Ton/ (Toff+Ton)) *100% = (0.54/1.47)*100%=36.73%

Duty cycle factor=20log (Duty cycle) = 20log (0.3673) = -8.70

5. 20DB OCCUPIED BANDWIDTH

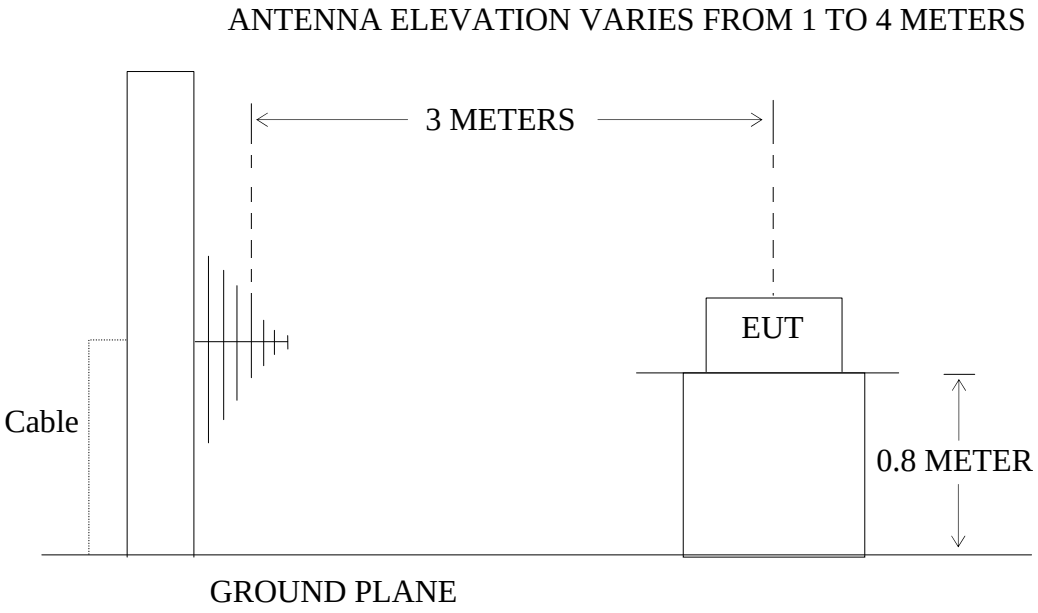
5.1.Block Diagram of Test Setup

5.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: Thermometer sensor)

5.1.2.Semi-Anechoic Chamber Test Setup Diagram



(EUT: Thermometer sensor)

5.2.The Bandwidth of Emission Limit According To FCC Part 15 Section

15.231(c)

The bandwidth of emission shall be no wider than 0.25% of the center frequency. Therefore, the bandwidth of the emission limit is 433.92 MHz×0.25% = 1.0848 MHz. Bandwidth is determined at the two points 20 dB down from the top of modulated carrier.

5.3.EUT Configuration on Measurement

The following equipment are installed on the bandwidth of emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.3.1.Thermometer sensor (EUT)

Model Number	**:**	XT200
Serial Number	**:**	N/A
Manufacturer	**:**	Hopeful Industrial Limited

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in TX mode measure it.

5.5.Test Procedure

5.5.1. Set SPA Center Frequency = Fundamental frequency, RBW = 10 kHz, VBW = 30 kHz, Span = 500 kHz.

5.5.2.Set SPA Max hold, Mark peak, -20 dB.

5.6.Measurement Result

The EUT does meet the FCC requirement.

-20 dB bandwidth = 42.0 kHz.
(42.0 kHz/433.92MHz)* 100%=0.0097 %< 0.25%
The spectral diagrams in appendix I.

6. RELEASE TIME MEASUREMENT

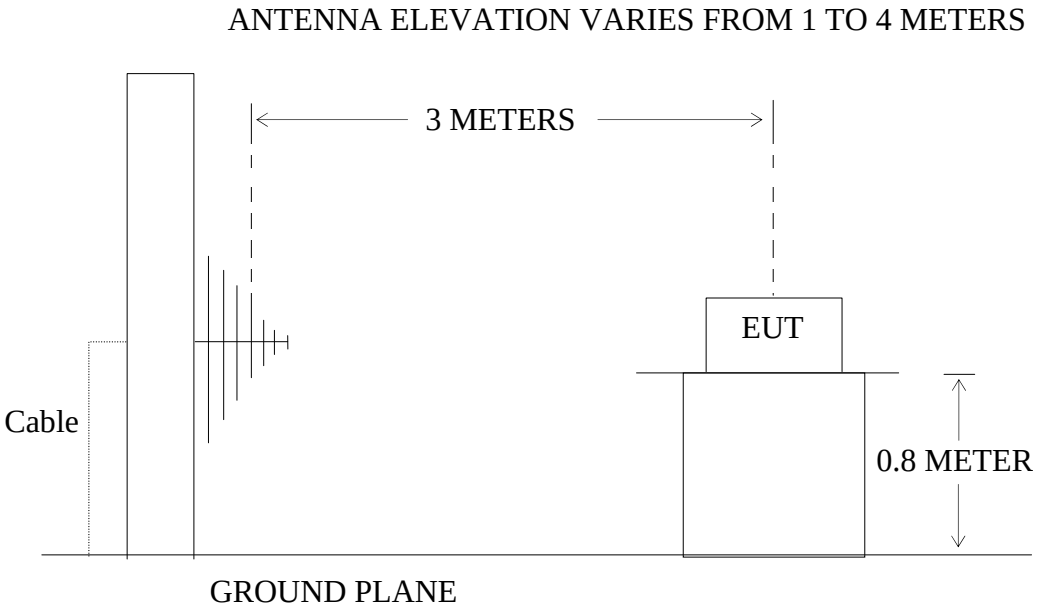
6.1.Block Diagram of Test Setup

6.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: Thermometer sensor)

6.1.2.Semi-Anechoic Chamber Test Setup Diagram



(EUT: Thermometer sensor)

6.2.Release Time Measurement According To FCC Part 15 Section 15.231(e)

Section 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

6.3.EUT Configuration on Measurement

The following equipment are installed on Release Time Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.3.1. Thermometer sensor (EUT)

Model Number	**:**	XT200
Serial Number	**:**	N/A
Manufacturer	**:**	Hopeful Industrial Limited

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX mode measure it.

6.5.Test Procedure

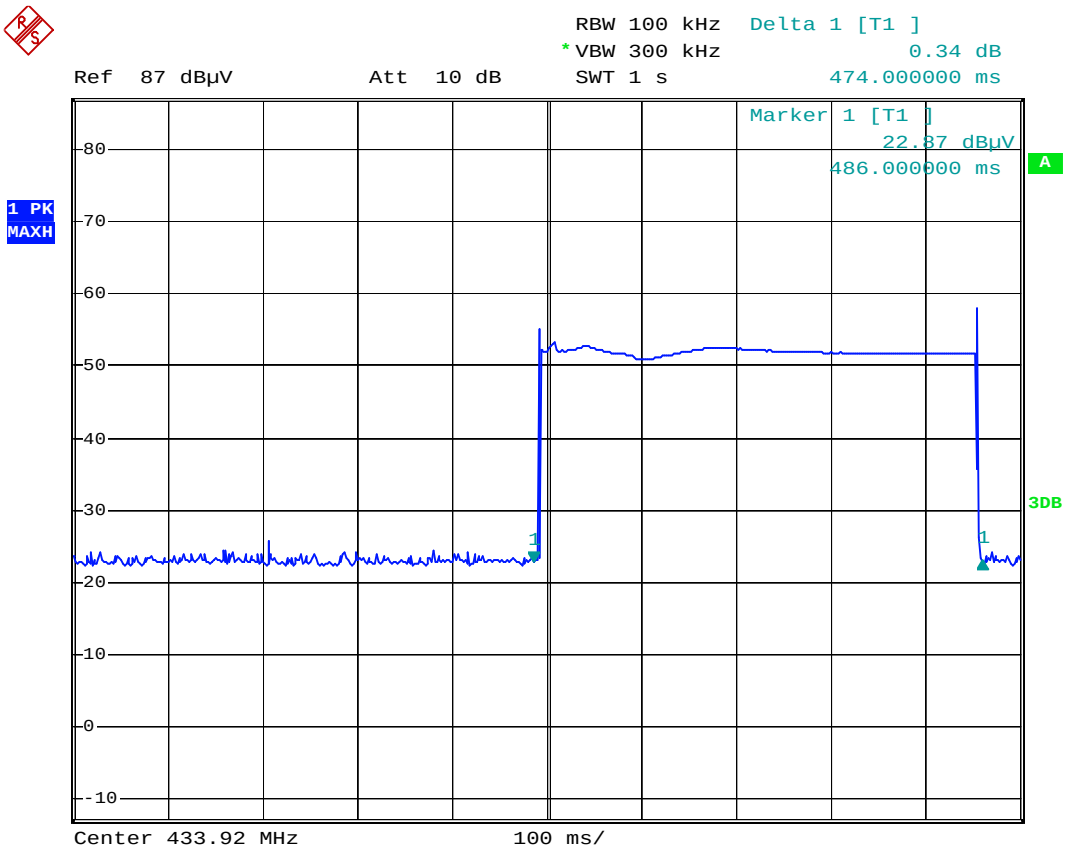
6.5.1. Set SPA Center Frequency = Fundamental frequency, RBW = 100 kHz, VBW = 300 kHz, Span = 0 Hz. Sweep time = 1s.

6.5.2.Set EUT as normal operation and press Transmitter button.

6.5.3.Set SPA View. Delta Mark time.

6.6. Measurement Result

Release Time = 0.474s
Silent Time= 56.84s
The space of transmitting time=56.840>0.474s*30 =14.22s>10s
The spectral diagrams in appendix I.



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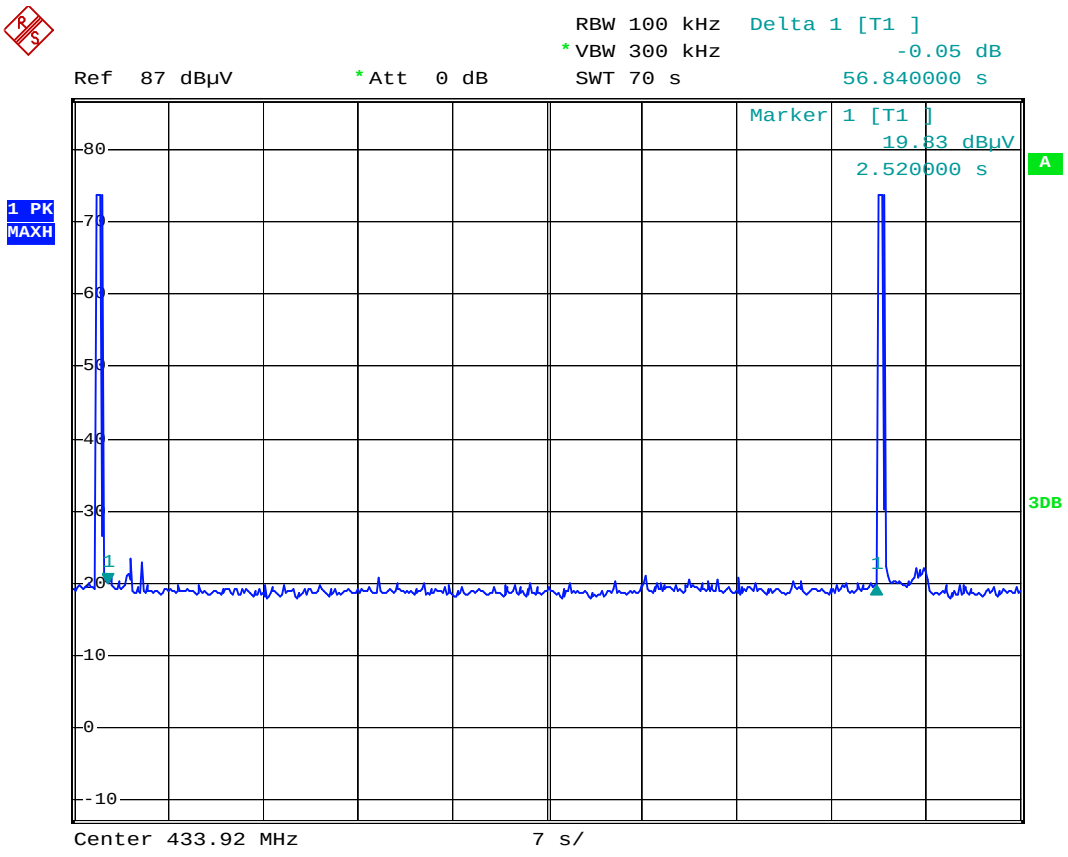

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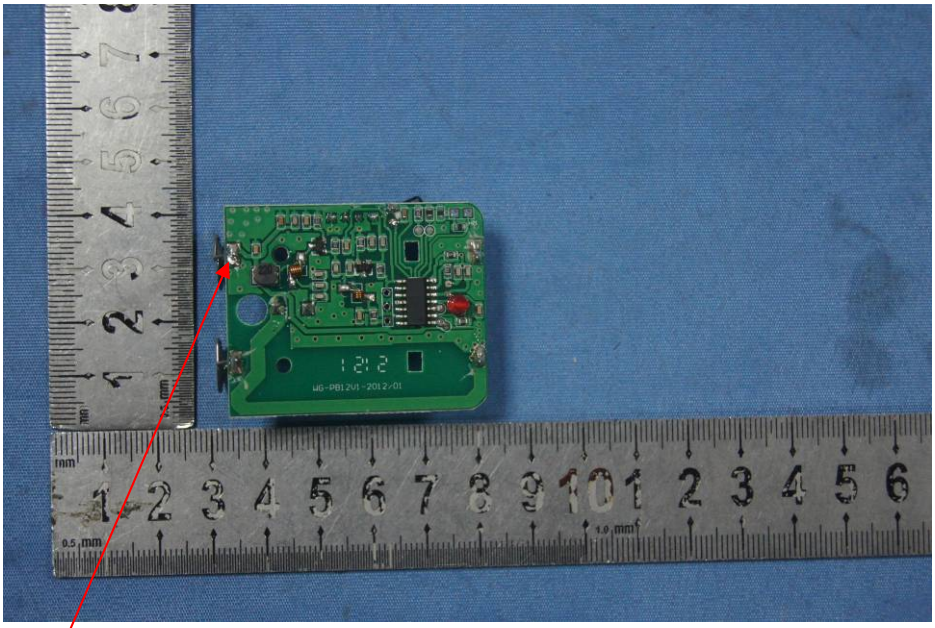
7. ANTENNA REQUIREMENT

7.1. The Requirement

According to 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.

7.2. Antenna Construction

Device is equipped with unique antenna, which isn't displaced by other antenna. Therefore, the equipment complies with the antenna requirement of Section 15.203.



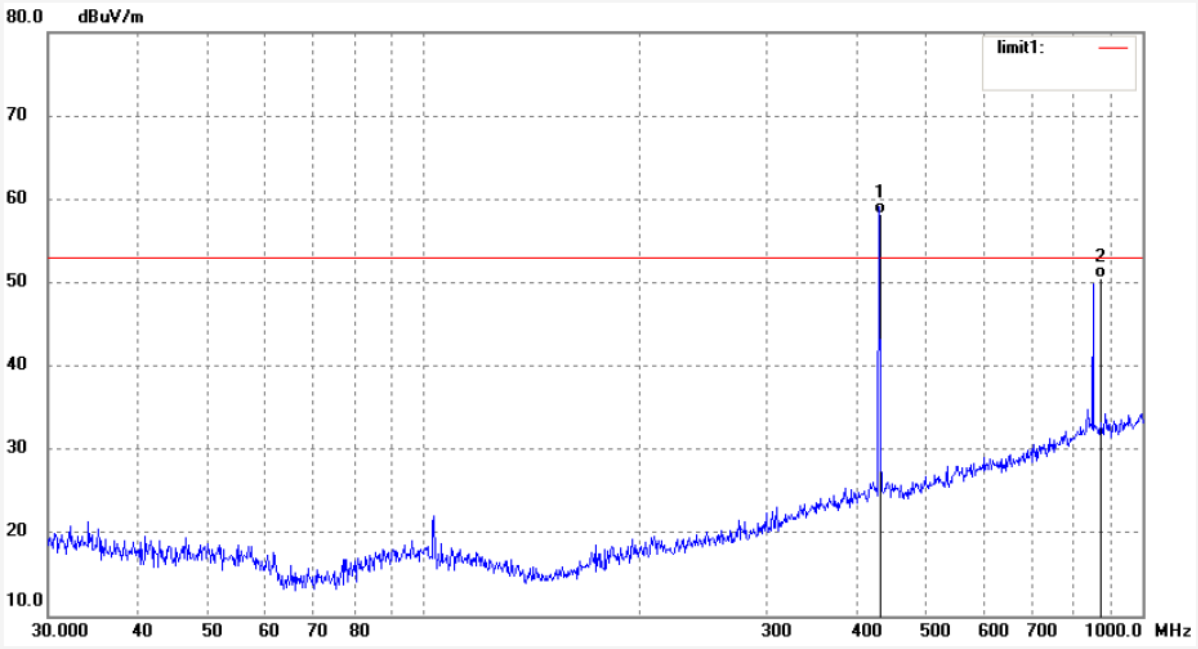
Antenna

APPENDIX I
(Test Curves)

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 966 chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: RUCKY2 #353	Polarization: Horizontal
Standard: 433M AUTO	Power Source: DC 3V
Test item: Radiation Test	Date: 12/11/30/
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 14/00/02
EUT: Thermometer sensor	Engineer Signature: Ricky
Mode: TX	Distance: 3m
Model: XT200	
Manufacturer:	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	433.9200	37.99	20.31	58.30	72.90	-14.60	QP			
2	867.8400	22.80	27.64	50.44	52.90	-2.46	QP			

ACCURATE TECHNOLOGY CO., LTD.
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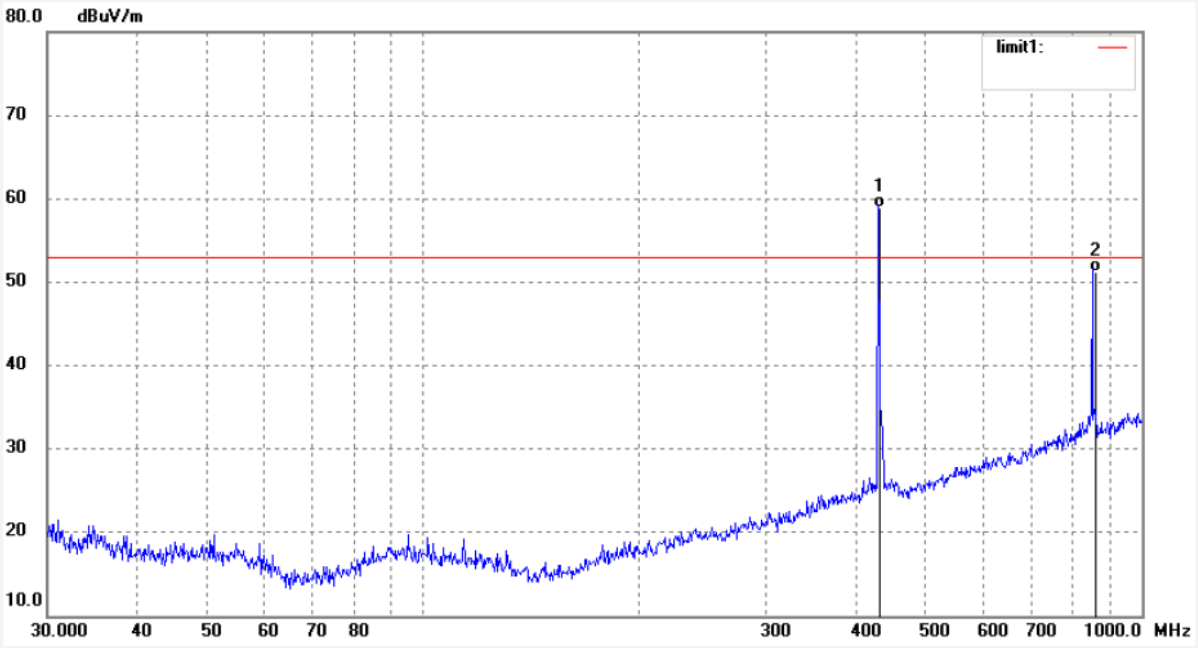
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 966 chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: RUCKY2 #354
Standard: 433M AUTO
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Thermometer sensor
Mode: TX
Model: XT200
Manufacturer:

Polarization: Vertical
Power Source: DC 3V
Date: 12/11/30/
Time: 14/02/11
Engineer Signature: Ricky
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	433.9200	38.69	20.31	59.00	72.90	-13.10	QP			
2	867.8400	23.59	27.64	51.23	52.90	-1.67	QP			

ACCURATE TECHNOLOGY CO., LTD.
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Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 966 chamber
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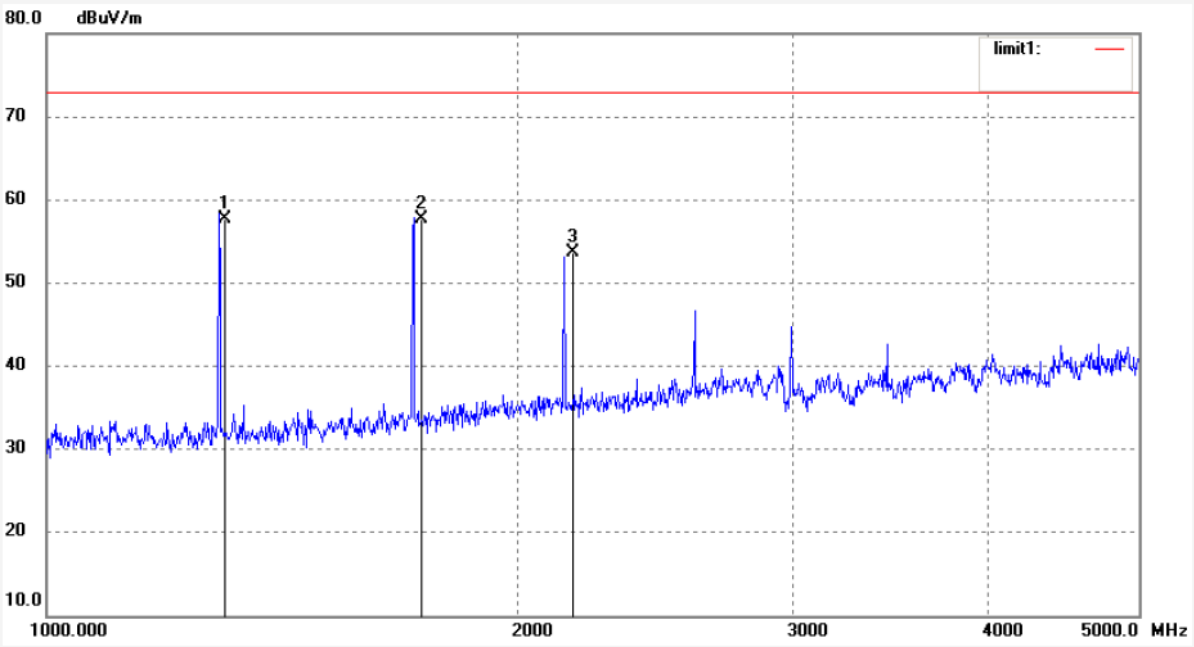
Fax:+86-0755-26503396

Job No.: RUCKY2 #355	Polarization: Horizontal
Standard: 433M AUTO ABOVE1G	Power Source: DC 3V
Test item: Radiation Test	Date: 12/11/30/
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 14/07/15
EUT: Thermometer sensor	Engineer Signature: Ricky
Mode: TX	Distance: 3m
Model: XT200	
Manufacturer:	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1301.357	69.95	-12.20	57.75	72.90	-15.15	peak			
2	1735.145	68.01	-10.39	57.62	72.90	-15.28	peak			
3	2168.946	62.08	-8.38	53.70	72.90	-19.20	peak			

ACCURATE TECHNOLOGY CO., LTD.
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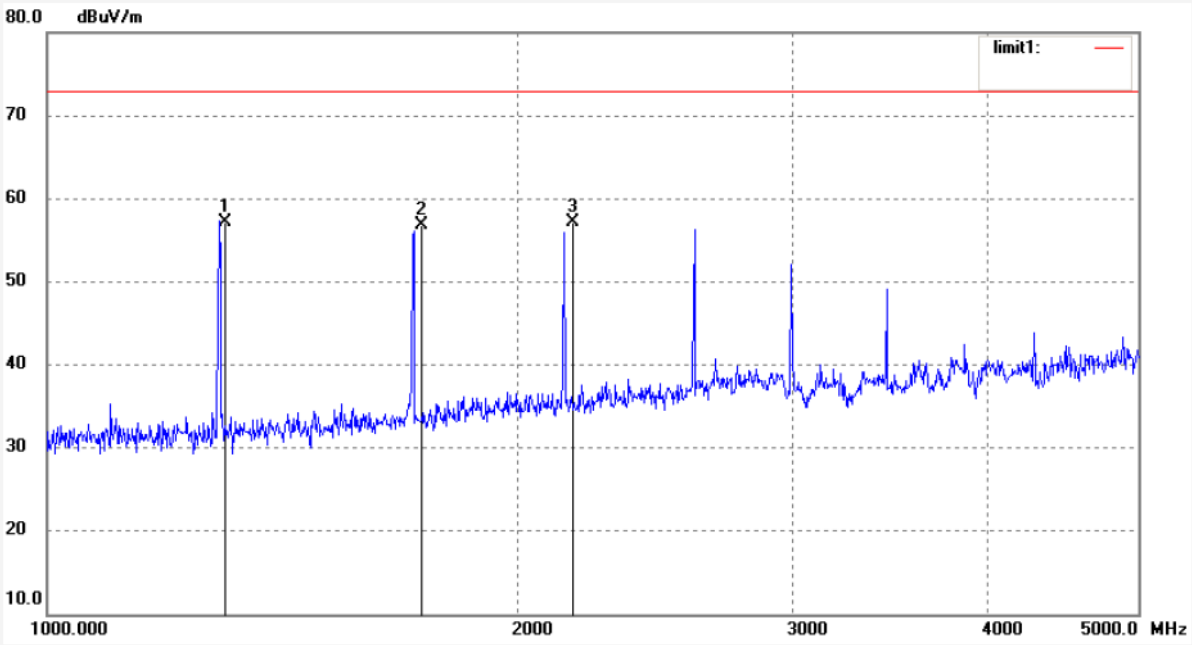
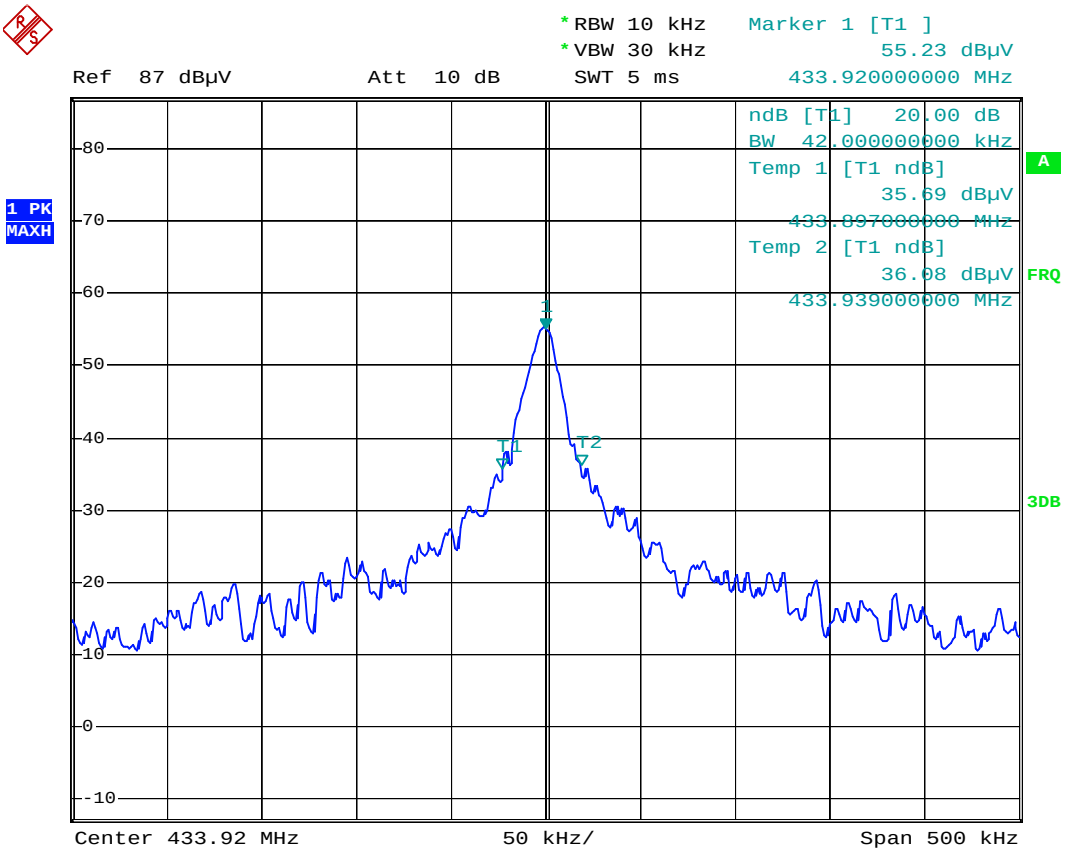
Site: 966 chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: RUCKY2 #356	Polarization: Vertical
Standard: 433M AUTO ABOVE1G	Power Source: DC 3V
Test item: Radiation Test	Date: 12/11/30/
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 14/10/52
EUT: Thermometer sensor	Engineer Signature: Ricky
Mode: TX	Distance: 3m
Model: XT200	
Manufacturer:	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1301.357	69.34	-12.20	57.14	72.90	-15.76	peak			
2	1735.145	67.23	-10.39	56.84	72.90	-16.06	peak			
3	2168.946	65.56	-8.38	57.18	72.90	-15.72	peak			



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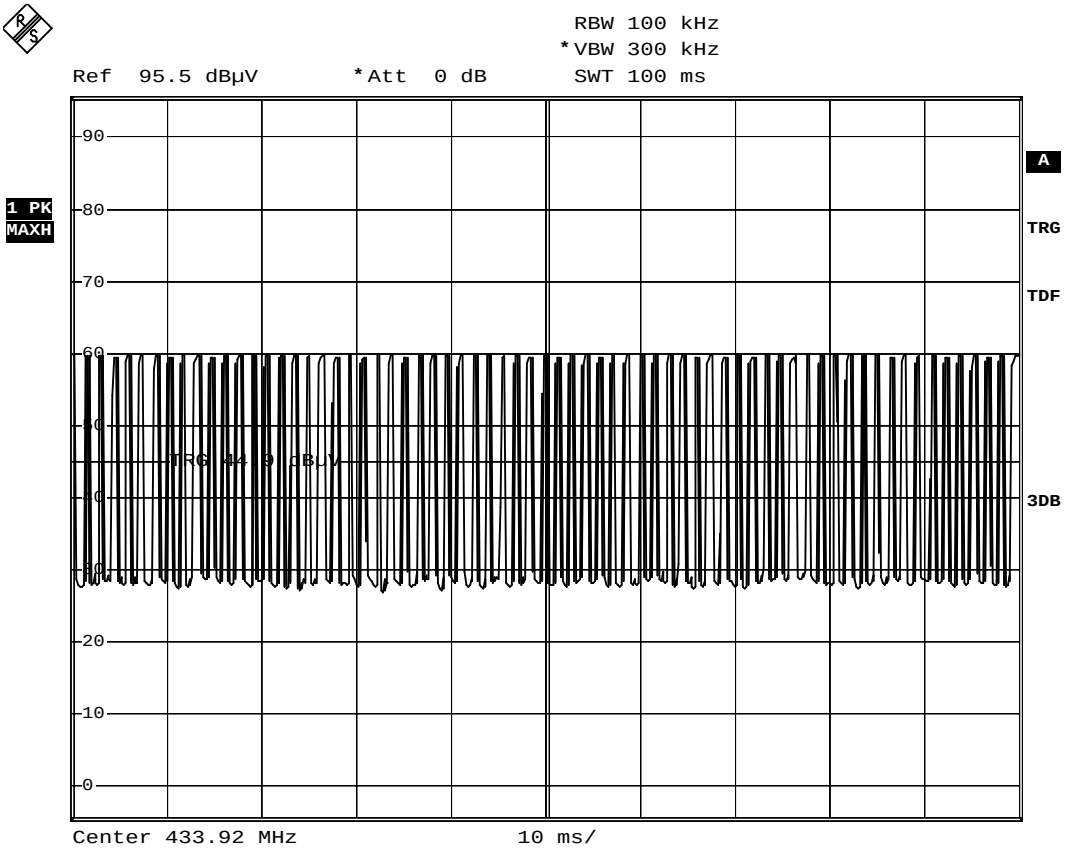

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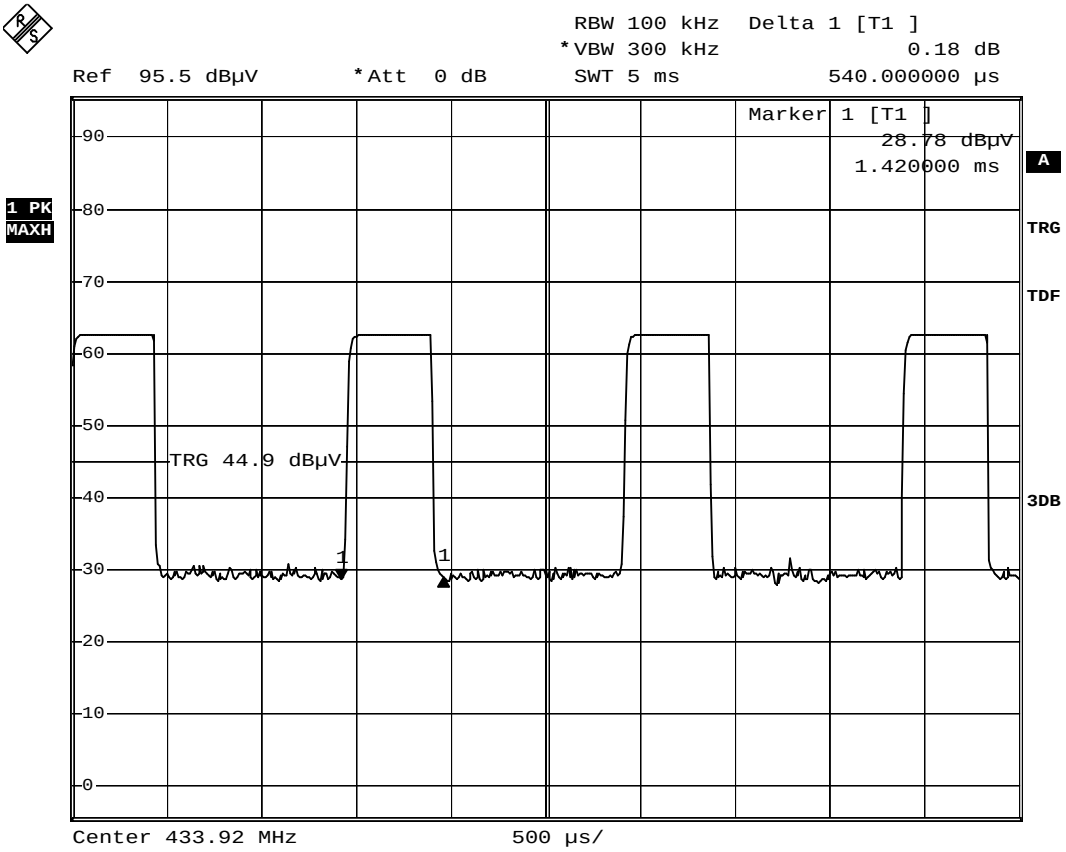

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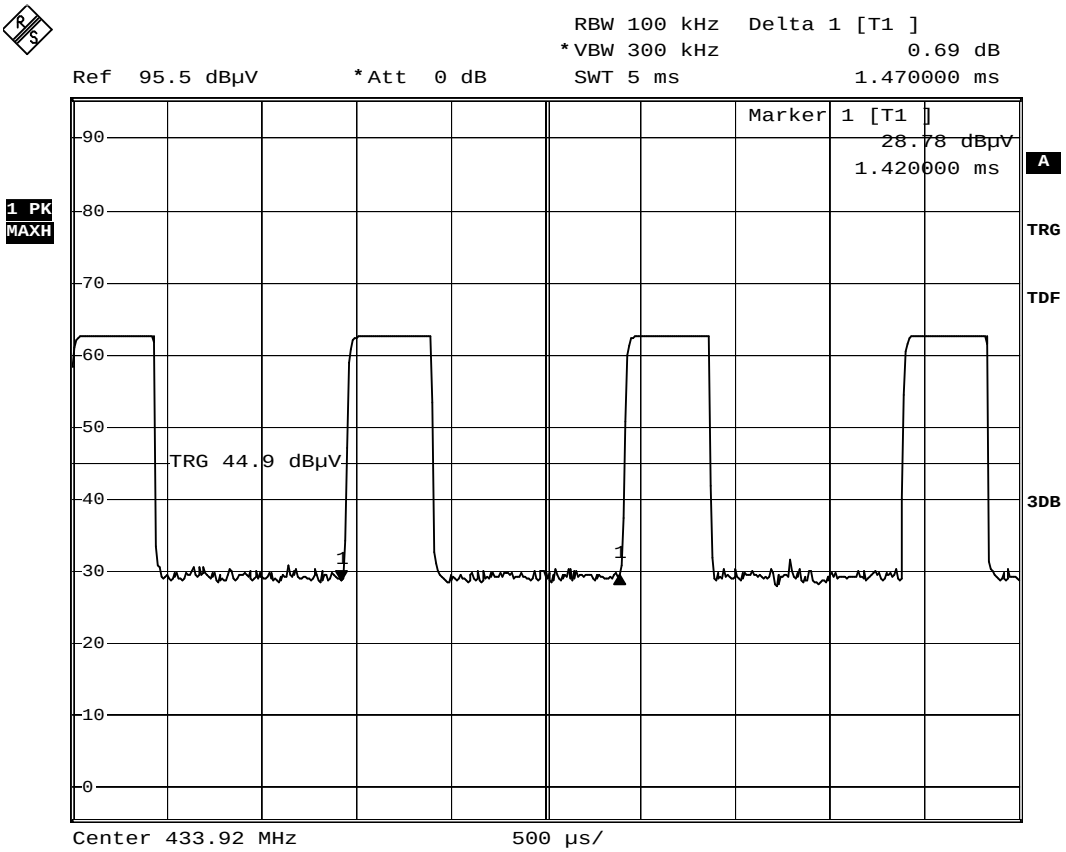

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