



# FCC&IC Radio Test Report

**FCC ID: OMOTX141-BV2  
IC: 5049A-TX141BV2**

This report concerns (check one):  Original Grant  Class I Change

**Project No.** : 1405C214  
**Equipment** : REMOTE SENSOR TEMPERATURE  
**Model Name** : TX141V2 ;TX141-BV2  
**Applicant** : La Crosse Technology Ltd.  
**Address** : 2809 Losey Blvd. South La Crosse WI  
United States 54601

**Tested by:** Neutron Engineering Inc. EMC Laboratory

**Date of Receipt:** May. 28, 2014

**Date of Test:** May.28 2014 ~ Jun. 06, 2014

**Date of Issued:** Jun. 09, 2014

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## Declaration

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**REPORT ISSUED HISTORY**

Issued No.	Description	Issued Date
NEI-FICP-1-1405C214	Original Issue.	Jun. 09, 2014



## 1. CERTIFICATION

Equipment : REMOTE SENSOR TEMPERATURE  
Trade Name : La Crosse  
Model Name : TX141V2 ;TX141-BV2  
Applicant : La Crosse Technology Ltd.  
Manufacturer : La Crosse Technology  
Address : 2809 Losey BLVD,so La Crosse WI 54601  
Factory : La Crosse Technology  
Address : 2809 Losey BLVD,so La Crosse WI 54601  
Date of Test : May.28 2014 ~ Jun. 06, 2014  
Test Item : ENGINEERING SAMPLE  
Standard(s) : FCC Part15, Subpart C(15.231)/ ANSI C63.4-2009  
Canada RSS-210:2010

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FICP-1-1405C214) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

**2. SUMMARY OF TEST RESULTS**

Test procedures according to the technical standard(s):

<b>FCC Part15, Subpart C (15.231)</b>				
Standard(s) Section		Test Item	Judgment	Remark
	15.207	Conducted Emission	-	N/A
RSS-210 A1.1 Table B	15.209 & 15.231(e)	Radiated Spurious Emission	PASS	
RSS-210 A1.1.3	15.231(c)	20dB Occupied Bandwidth Measurement	PASS	

**NOTE:**

(1)" N/A" denotes test is not applicable in this test report.  
(2) EUT is used new battery.



## 2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **DG-CB03** at the location of No.3,Jinshagang 1st Road, ShiXia, Dalang Town, Dong Guan, China.523792

Neutron's test firm number for FCC 319330

Neutron's test firm number for IC 4428B-1

## 2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95 %**.

A. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U , (dB)	NOTE
DG-CB03	CISPR	9KHz~30MHz	V	3.79	
		9KHz~30MHz	H	3.57	
		30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	
		1GHz~18GHz	V	3.12	
		1GHz~18GHz	H	3.68	
		18GHz~40GHz	V	4.15	
		18GHz~40GHz	H	4.14	



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

Equipment	REMOTE SENSOR TEMPERATURE	
Trade Name	La Crosse	
Model Name	TX141V2 ;TX141-BV2	
Model Difference	Only differ in the short circuit way, the rest are the same.	
Product Description	Product Type	Low Power Communication Device
	Operation Frequency	433.92 MHz
	Modulation Type	ASK
	Number Of Channel	1CH, please see note 2.
	Antenna Designation	Integral antenna
	Field Strength	TX141V2: 60.25 dBuV/m (AV Max.) TX141-BV2: 62.83 dBuV/m (AV Max.)
Power Source	Supplied from 2*AA size battery.	
Power Rating	DC 3V	

**Note:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel	Frequency (MHz)
01	433.92



## 3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX CH 433.92MHz

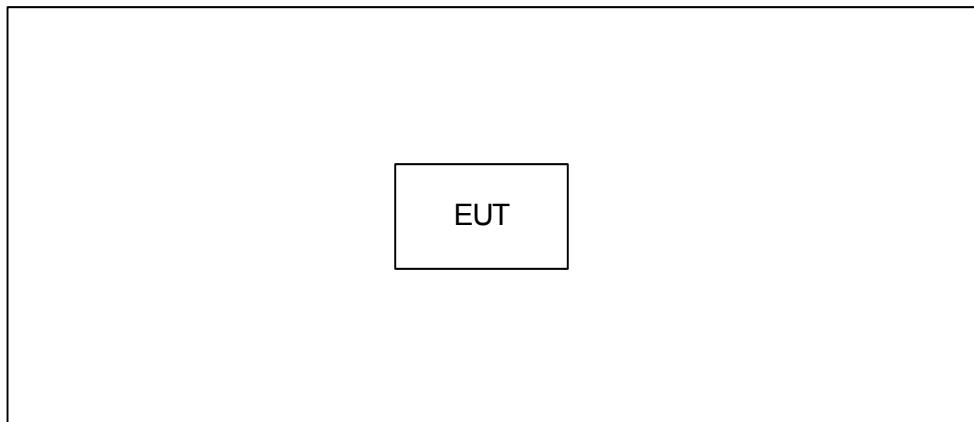
<b>For Conducted Test</b>	
Final Test Mode	Description
-	"N/A" denotes test is not applicable in this test report

<b>For Radiated Test</b>	
Final Test Mode	Description
Mode 1	TX CH 433.92MHz

Note: EUT is used new battery.



**3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED**



**3.4 DESCRIPTION OF SUPPORT UNITS**

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID/IC	Series No.	Note
-	-	-	-	-	-	

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	-

Note:

(1) For detachable type I/O cable should be specified the length in m in 『Length』 column.



## 4. EMC EMISSION TEST

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 POWER LINE CONDUCTED EMISSION LIMITS (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

#### 4.1.2 TEST PROCEDURE

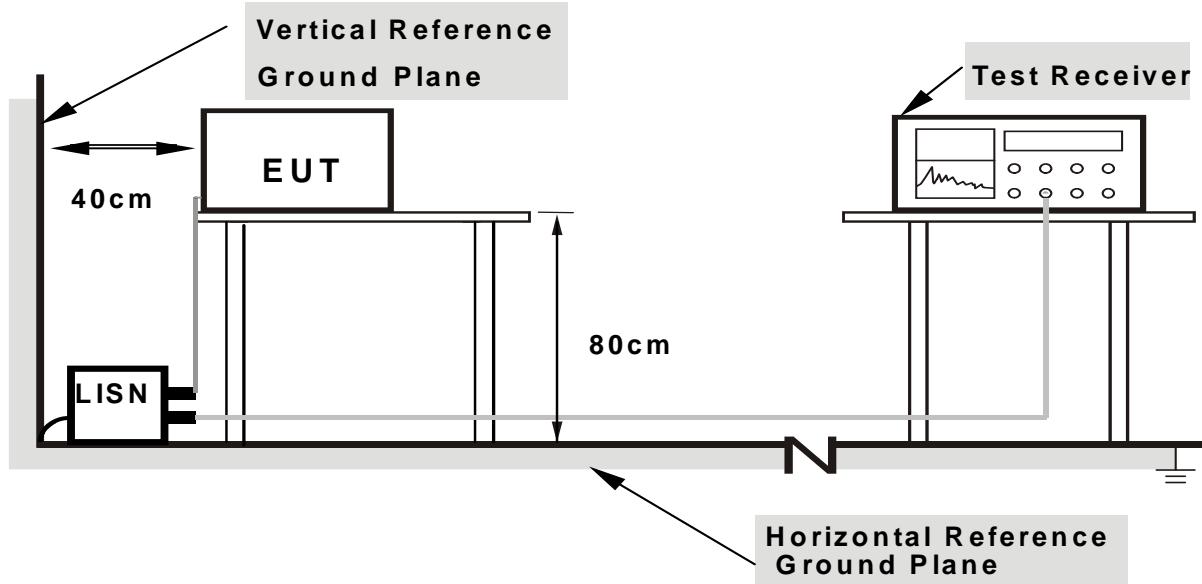
- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation



#### 4.1.4 TEST SETUP



**Note:**

1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

#### 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

#### 4.1.6 EUT TEST CONDITIONS

Temperature: N/A

Relative Humidity: N/A

Test Voltage: N/A

#### 4.1.7 TEST RESULTS

Please refer to the Attachment A.

Remark:

- (1) All readings are QP Mode value unless otherwise stated AVG in column of **Note**. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “\*” marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.
- (3) “N/A” denotes test is not applicable in this test report.



#### 4.2 RADIATED EMISSION MEASUREMENT

##### 4.2.1. FIELD STRENGTH OF FUNDAMENTAL EMISSIONS MEASUREMENT LIMIT

Frequency Band (MHz)	Fundamental Emissions Limit (uV/m) at 3m
40.66-40.70	1000
70-130	500
130-174	500-1500(**)
174-260	1500
260-470	1500-5000(**)
Above 470	5000

\*\*1. Linear interpolations, the formulas for calculating the maximum permitted fundamental field strengths are as follows:

(1) for the band 130 - 174 MHz,  $\mu\text{V/m}$  at 3 meters =  $22.72727 \times (\text{operating frequency, MHz}) - 2454.545$ ;

(2) for the band 260 - 470 MHz,  $\mu\text{V/m}$  at 3 meters =  $16.6667 \times (\text{operating frequency, MHz}) - 2833.333$ .

So the field strength of emission limits have been calculated in below table.

Carrier Frequency (MHz)	Fundamental Emissions Limit (dBuV/m) at 3m
433.92 MHz	72.87 (Average)
433.92 MHz	92.87 (Peak)

##### 4.2.2. MEASURING INSTRUMENTS AND SETTING (FIELD STRENGTH OF FUNDAMENTAL EMISSIONS)

Receiver Parameter	Setting
Attenuation	Auto
Center Frequency	Fundamental Frequency
RBW	120 kHz
Detector	Peak / Average



#### 4.2.3 RADIATED EMISSIONS MEASUREMENT

Devices complying with 47 CFR FCC part 15 subpart C, section 15.231(e). The field strength of emissions from intentional radiators at 3 meters operated under this Section shall not exceed the following:

Frequency Band (MHz)	Spurious Emissions Limit (uV/m) at 3m
40.66-40.70	100
70-130	50
130-174	50-150(**)
174-260	150
260-470	150-500(**)
Above 470	500

\*\*1. Linear interpolations, the formulas for calculating the maximum permitted fundamental field strengths are as follows:

- (1) for the band 130 - 174 MHz,  $\mu\text{V/m}$  at 3 meters =  $22.72727 \times (\text{operating frequency, MHz}) - 2454.545$ ;
- (2) for the band 260 - 470 MHz,  $\mu\text{V/m}$  at 3 meters =  $16.6667 \times (\text{operating frequency, MHz}) - 2833.3333$ .
- (3) The maximum permitted unwanted emissions level is 20 dB below the maximum permitted fundamental level. In addition field strength of any emissions which appear inside of the restriction band shall not exceed the general radiated emissions limits in Section 15.209(a).

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz for PK/AVG detector
Start ~ Stop Frequency	90kHz~110kHz for QP detector
Start ~ Stop Frequency	110kHz~490kHz for PK/AVG detector
Start ~ Stop Frequency	490kHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector



Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, AV Mode with Dwell time
RB / VB (other emission)	100KHz / 100KHz for peak

#### 4.2.4. DWELL TIME OF PERIODIC OPERATION MEASUREMENT

Model: TX141V2

$$\text{Duty Cycle} = T_{\text{ON}} / (T_{\text{ON}} + T_{\text{OFF}})$$

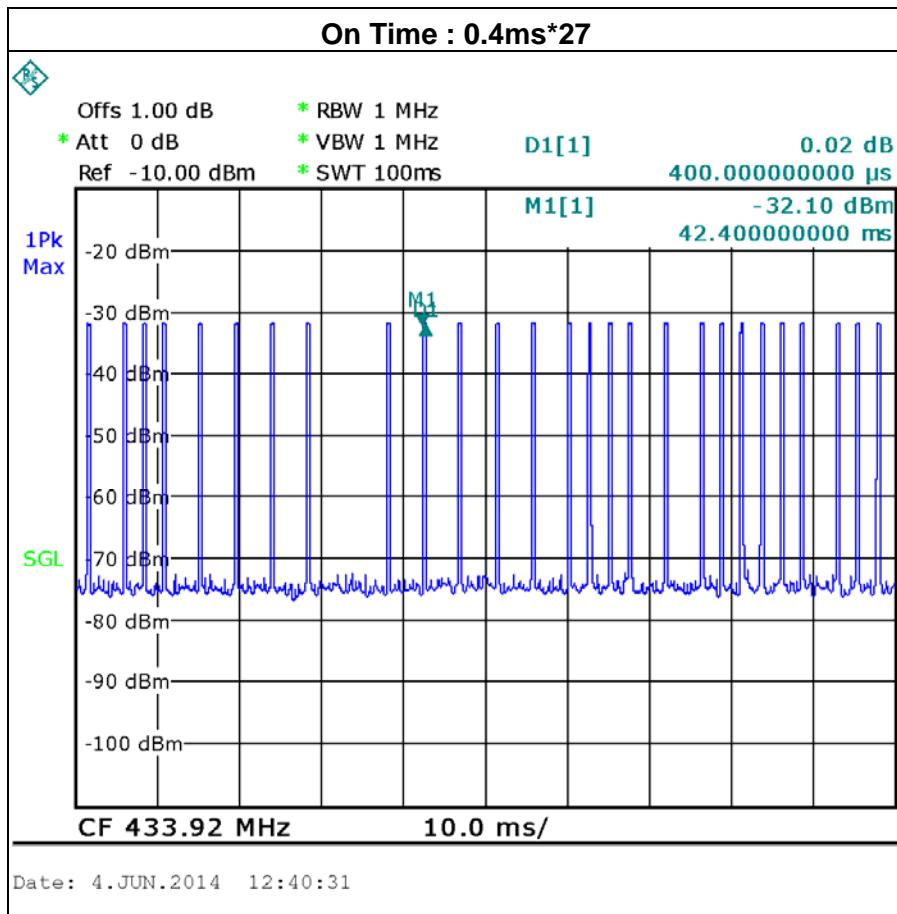
$$T_{ON}: 0.4 \cdot 27 = 10.80\text{ms}$$

$$T_{ON} + T_{OFF} = (\text{total time}) = 100 \text{ ms}$$

Duty Cycle = 10.80/100 ms = 10.80%

$$AV = PK + 20 \log(\text{Duty Cycle})$$

AV=PK-19.33





Model: TX141-BV2

Duty Cycle =  $T_{ON} / (T_{ON} + T_{OFF})$

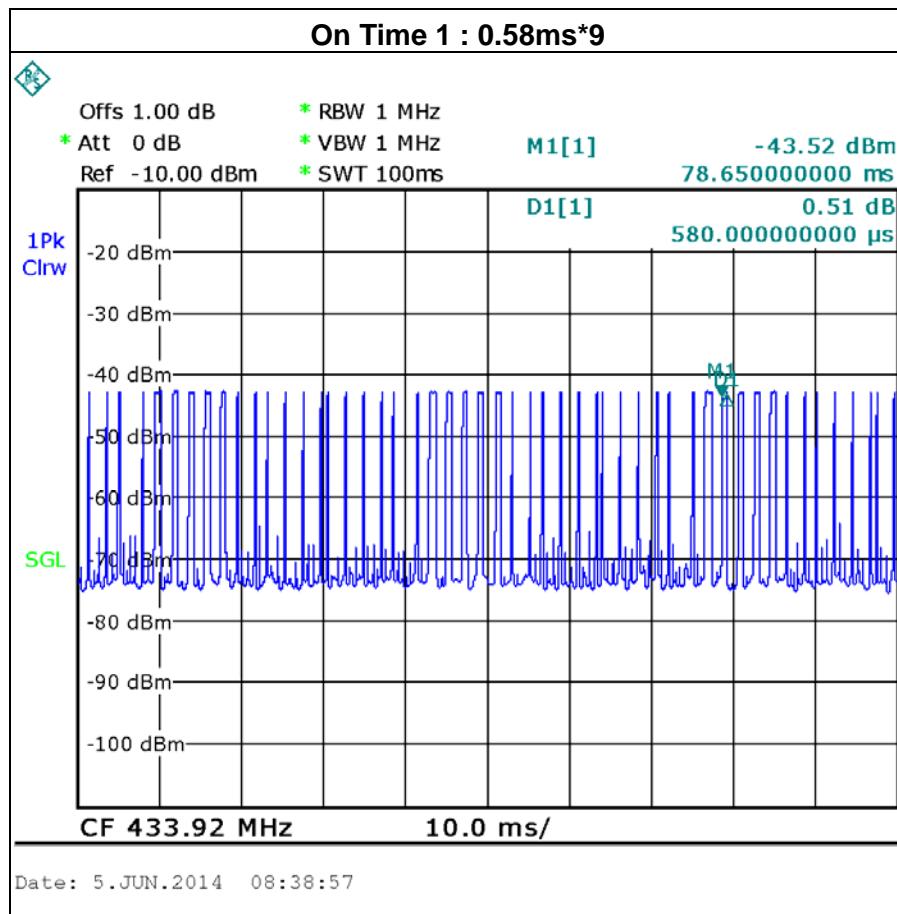
$T_{ON}$ :  $0.58*9+0.18*33+0.78*6 = 48.84$  ms

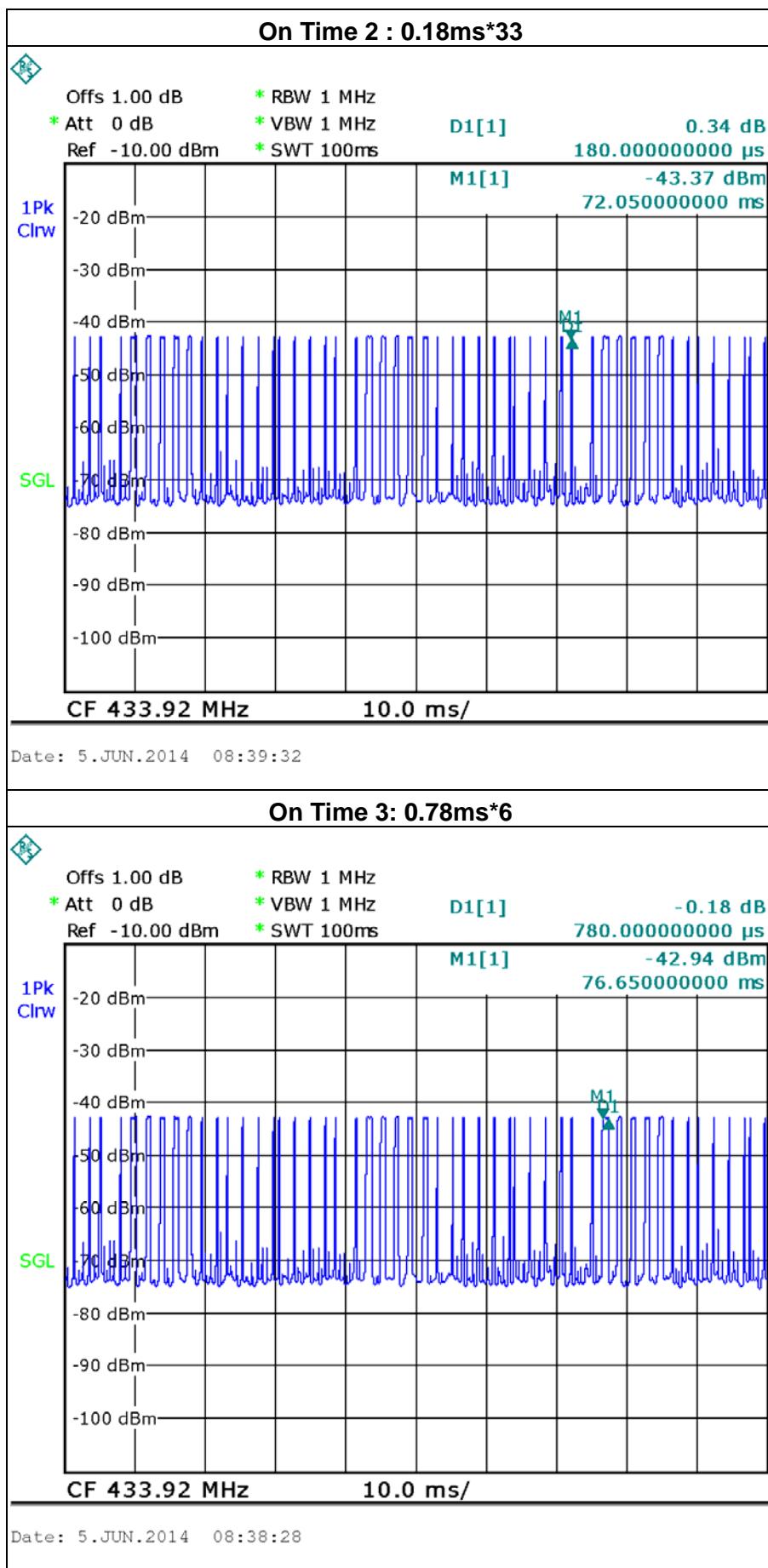
$T_{ON} + T_{OFF}$  = (total time) = 100 ms

Duty Cycle =  $48.84/100$  ms = 48.84%

AV=PK+20 log(Duty Cycle)

AV=PK-16.01







## 4.2.5. TEST PROCEDURE

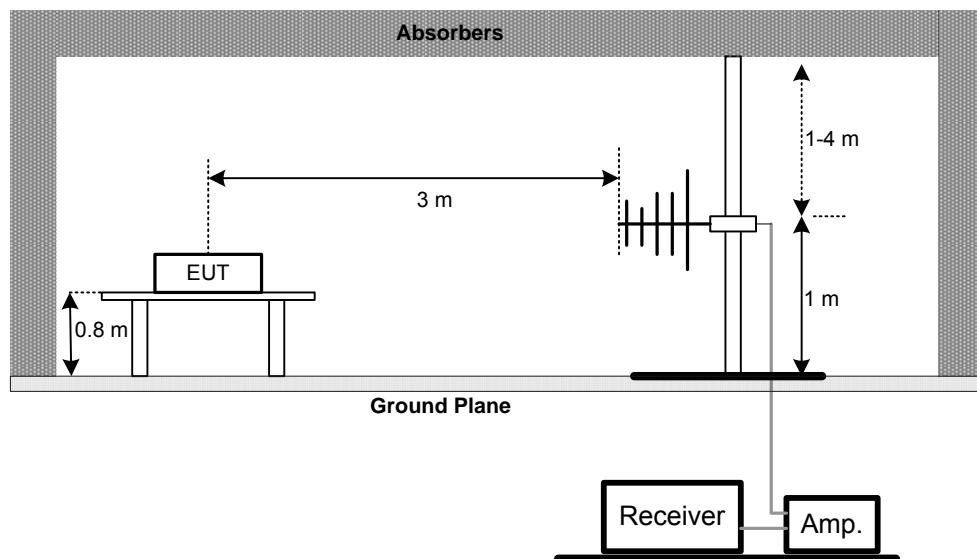
- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

## 4.2.6. DEVIATION FROM TEST STANDARD

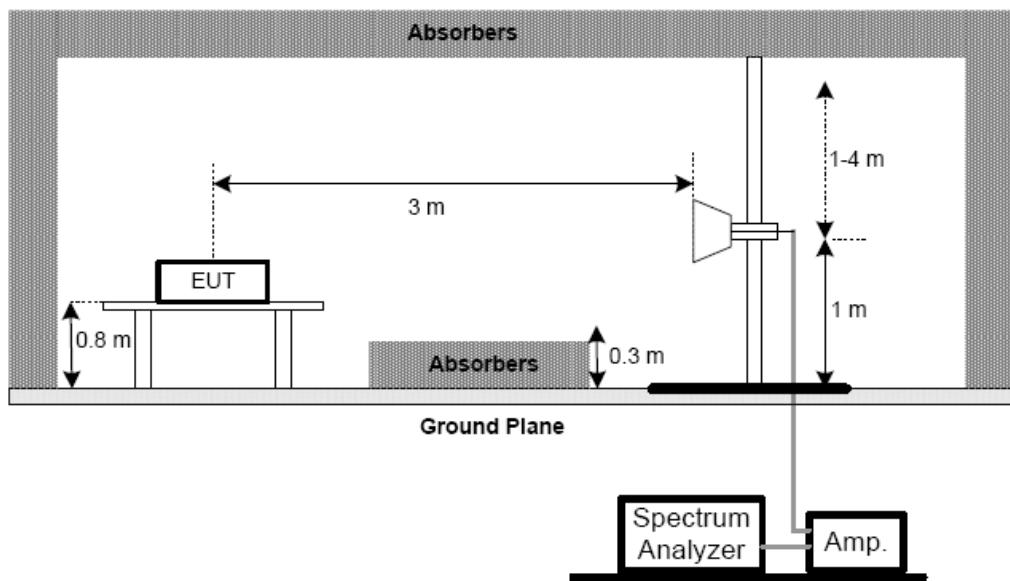
No deviation

## 4.2.7. TEST SETUP

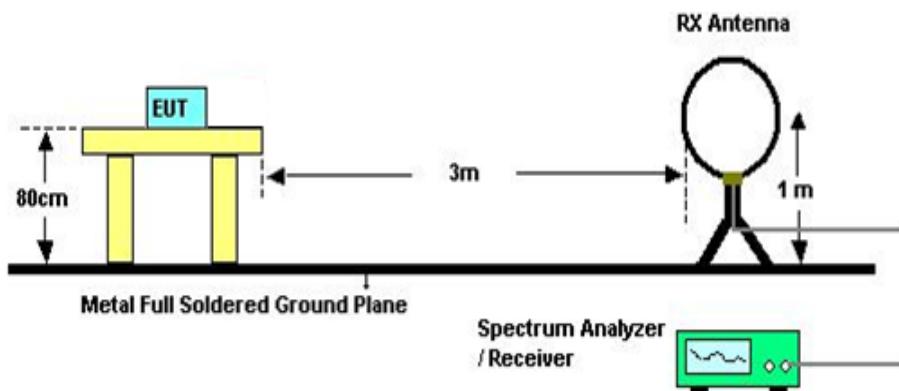
### (A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



(C) For radiated emissions below 30MHz



#### 4.2.8. EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

#### 4.2.9. EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: DC 3V



## 4.2.7 TEST RESULTS (9KHz to 30MHz)

Please refer to the Attachment B.

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
- (2) Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);.
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor..

## 4.2.8 TEST RESULTS (30MHZ to 1000MHZ)

Please refer to the Attachment C.

Remark:

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (2) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission
- (3) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (4) EUT Orthogonal Axis:  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (5) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

## 4.2.8 TEST RESULTS (Above 1000 MHz)

Please refer to the Attachment D.

Remark:

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (2) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission
- (3) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (4) EUT Orthogonal Axis:  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (5) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna



## 5. 20dB SPECTRUM BANDWIDTH MEASUREMENT

### Limit

The bandwidth of the emissions shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. So the emission bandwidth limits have been calculated in below table.

Fundamental Frequency	20dB Bandwidth Limits (MHz)
433.92 MHz	1.0848

### 5.1. MEASURING INSTRUMENTS AND SETTING

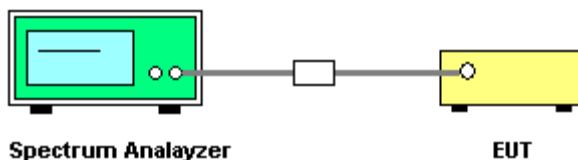
Please refer to section 5 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 20dB Bandwidth
RB	10 kHz
VB	10 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

### 5.2. TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 10 kHz and the video bandwidth of 10 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.

### 5.3. TEST SETUP LAYOUT



### 5.4. TEST DEVIATION

There is no deviation with the original standard.



**5.5. EUT OPERATION DURING TEST**

The EUT was programmed to be in continuously transmitting mode.

**5.6. EUT TEST CONDITIONS**

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: DC3V

**5.7. TEST RESULTS**

Please refer to the Attachment E.



## 6. TIMING TESTING

### Limit

In addition, 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.

### 6.1. MEASURING INSTRUMENTS AND SETTING

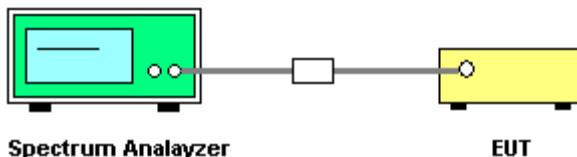
Please refer to section 6 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	Zero Span
RB	1MHz
VB	1MHz
Detector	Peak
Trace	Max Hold
Sweep Time	300 seconds

### 6.2. TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 1MHz and the video bandwidth of 1MHz were used.

### 6.3. TEST SETUP LAYOUT



### 6.4. TEST DEVIATION

There is no deviation with the original standard.

### 6.5. EUT OPERATION DURING TEST

The EUT was programmed to be in normal mode.



#### **6.6. EUT OPERATION DURING TEST**

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: DC 3V

#### **6.7 TEST RESULTS**

Please refer to the Attachment F.

- 
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**7. MEASUREMENT INSTRUMENTS LIST AND SETTING****Radiated Emission Measurement**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 29, 2015
2	Amplifier	HP	8447D	2944A09673	Mar. 29, 2015
3	Receiver	AGILENT	N9038A	MY52130039	Aug. 24, 2014
4	Test Cable	N/A	C-01_CB03	N/A	Jul. 02, 2014
5	Antenna	ETS	3115	00075789	Mar. 29, 2015
6	Amplifier	Agilent	8449B	3008A02274	Mar. 29, 2015
7	Receiver	AGILENT	N9038A	MY52130039	Aug. 24, 2014
8	Test Cable	HUBER+SUHNER	C-48	N/A	Apr. 30, 2015
9	Controller	CT	SC100	N/A	N/A
10	Horn Antenna	EMCO	3115	9605-4803	Mar. 29, 2015
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Feb. 22, 2015
12	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Mar. 29, 2015

**20dB Spectrum Bandwidth Measurement**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 11, 2014

**Timing Testing**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 11, 2014

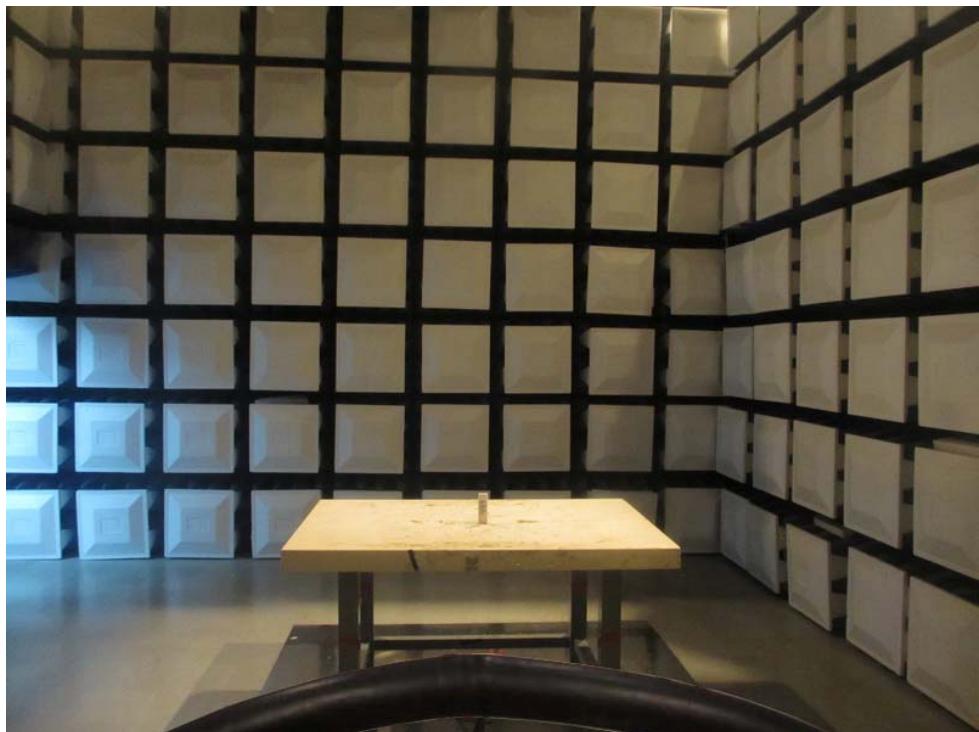
Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of equipment list is one year.



**8. EUT TEST PHOTO**

**Radiated Measurement Photos  
9K~30MHz**





**Radiated Measurement Photos**  
**30~1000MHz**





**Radiated Measurement Photos  
Above 1000MHz**





## **ATTACHMENT A - CONDUCTED EMISSION**

**Test Mode: N/A**

Note: "N/A" denotes test is not applicable in this test report.



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**ATTACHMENT B - RADIATED EMISSION (9KHz to 30MHZ)**



Test Mode:

TX Mode

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Over (dB)	Note
0.0095	0°	20.11	24.30	44.41	128.01	-83.60	AVG
0.0094	0°	21.52	24.30	45.82	148.01	-102.19	PEAK
0.0239	0°	19.54	24.06	43.60	120.05	-76.46	AVG
0.0239	0°	21.45	24.06	45.51	140.05	-94.55	PEAK
0.0373	0°	19.44	23.20	42.64	116.17	-73.52	AVG
0.0371	0°	22.34	23.20	45.54	136.17	-90.62	PEAK
0.0659	0°	18.36	22.08	40.44	111.23	-70.78	AVG
0.0626	0°	24.37	22.08	46.45	131.23	-84.77	PEAK
0.2564	0°	24.33	20.38	44.71	99.43	-54.71	AVG
0.2531	0°	24.78	20.38	45.16	119.43	-74.26	PEAK
1.2519	0°	20.32	19.57	39.89	65.65	-25.76	QP

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Over (dB)	Note
0.0091	90°	17.37	24.30	41.67	128.40	-86.73	AVG
0.0096	90°	21.28	24.30	45.58	148.40	-102.82	PEAK
0.0254	90°	16.27	23.96	40.23	119.52	-79.29	AVG
0.0256	90°	20.42	23.96	44.38	139.52	-95.14	PEAK
0.0345	90°	19.33	23.38	42.71	116.86	-74.15	AVG
0.0346	90°	21.78	23.38	45.16	136.86	-91.70	PEAK
0.0649	90°	21.07	22.10	43.17	111.35	-68.18	AVG
0.0644	90°	23.55	22.10	45.65	131.35	-85.70	PEAK
0.2361	90°	21.65	20.43	42.08	100.14	-58.06	AVG
0.2316	90°	23.75	20.43	44.18	120.14	-75.96	PEAK
1.2597	90°	19.36	19.57	38.94	65.60	-26.66	QP



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## **ATTACHMENT C - RADIATED EMISSION (30MHZ to 1000MHZ)**



Test Mode : TX Mode\_ TX141V2

**About the duty cycle correction factor calculated, please refer to the page 16~18**

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Result
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
433.52	V	88.58	69.25	-9.00	79.58	60.25	92.87	72.87	X/F
868.08	V	39.98	20.65	-2.66	37.32	17.99	72.87	52.87	X/H

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Result
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
433.52	H	79.30	59.97	-9.00	70.30	50.97	92.87	72.87	X/F
868.81	H	37.34	18.01	-2.63	34.71	15.38	72.87	52.87	X/H

Test Mode : TX Mode\_ TX141-BV2

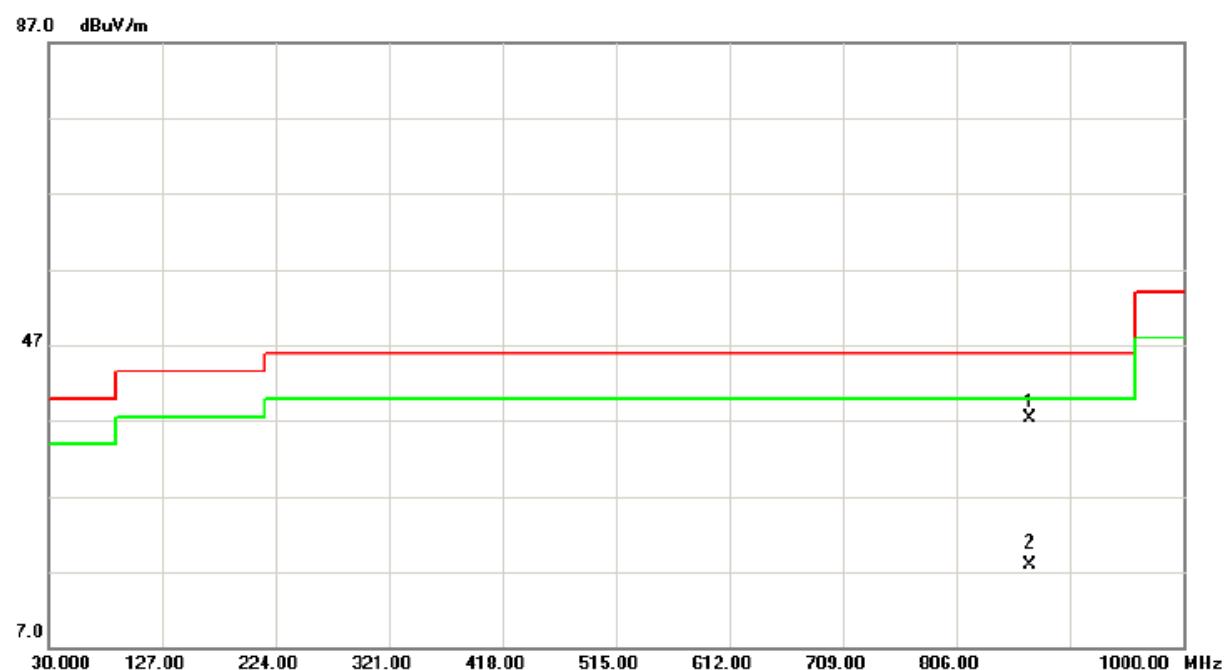
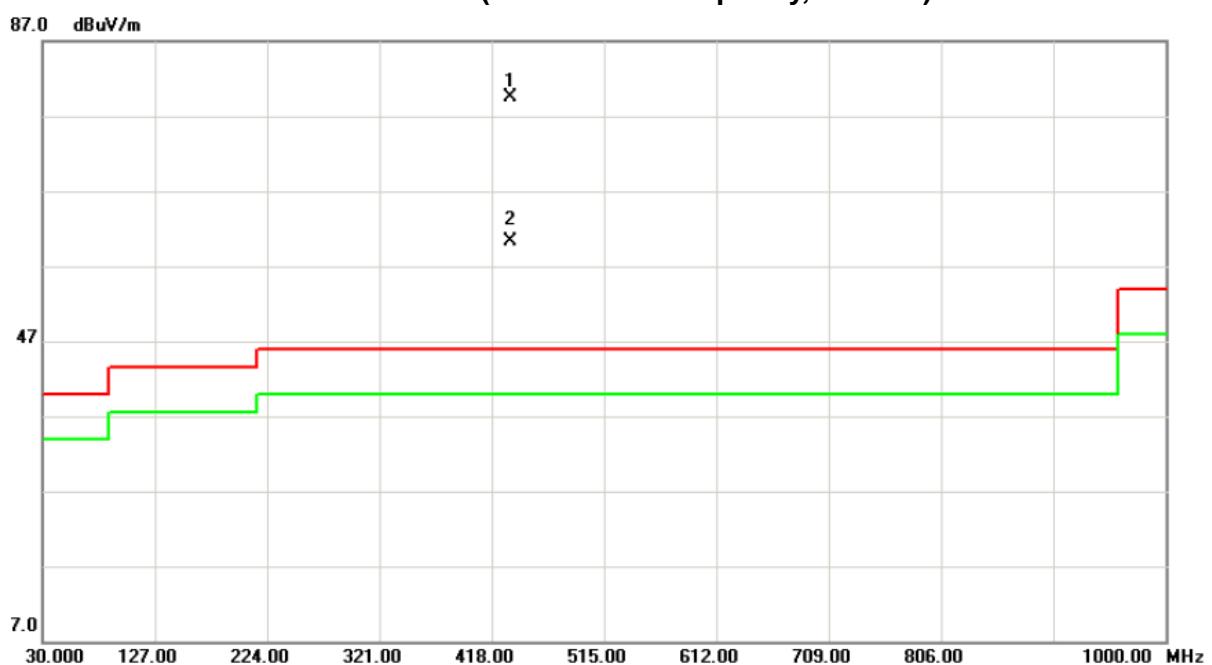
**About the duty cycle correction factor calculated, please refer to the page 16~18**

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Result
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
433.52	V	87.84	71.83	-9.00	78.84	62.83	92.87	72.87	X/F
868.82	V	37.23	21.22	-2.63	34.60	18.59	72.87	52.87	X/H

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Result
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
433.52	H	78.77	62.76	-9.00	69.77	53.76	92.87	72.87	X/F
868.82	H	35.63	19.62	-2.63	33.00	16.99	72.87	52.87	X/H

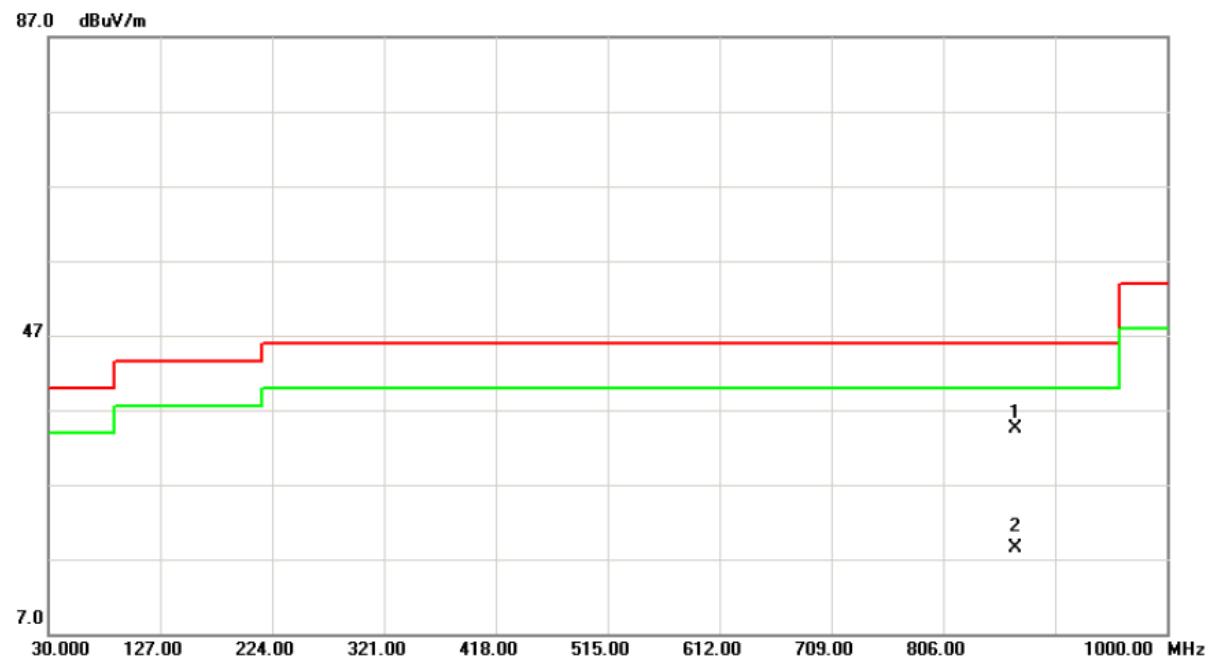
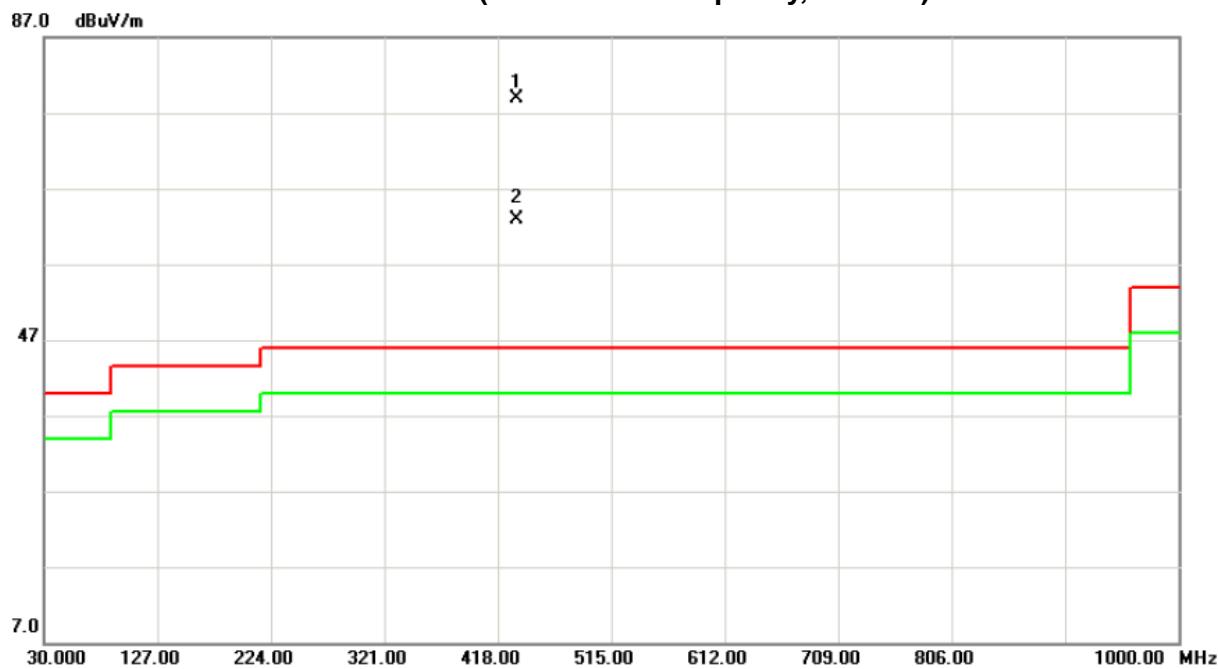


Orthogonal Axis:X\_ TX141V2  
TX 433.92 MHz (Fundamental frequency, Vertical)



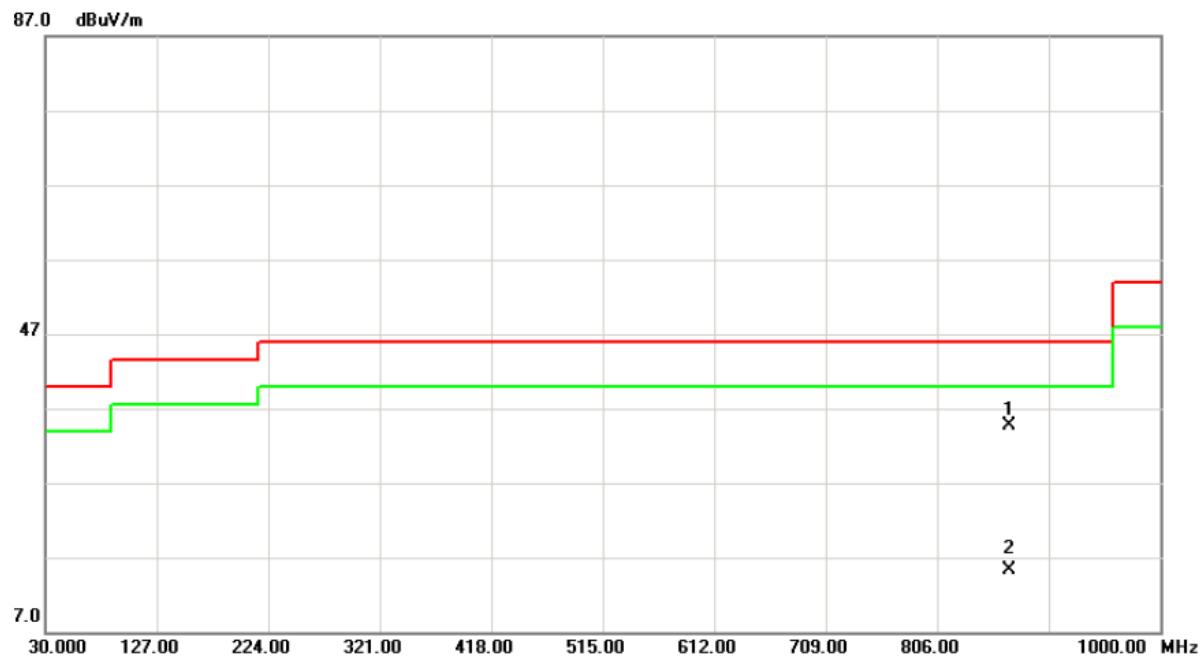
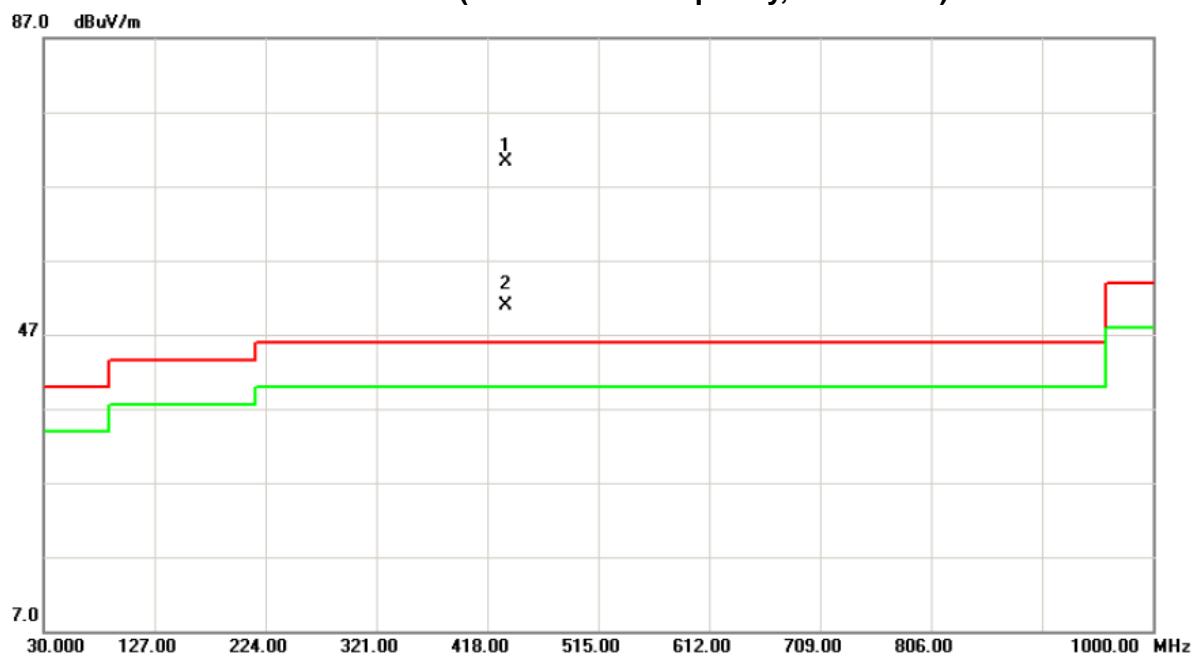


Orthogonal Axis:X\_ TX141-BV2  
TX 433.92 MHz (Fundamental frequency, Vertical)



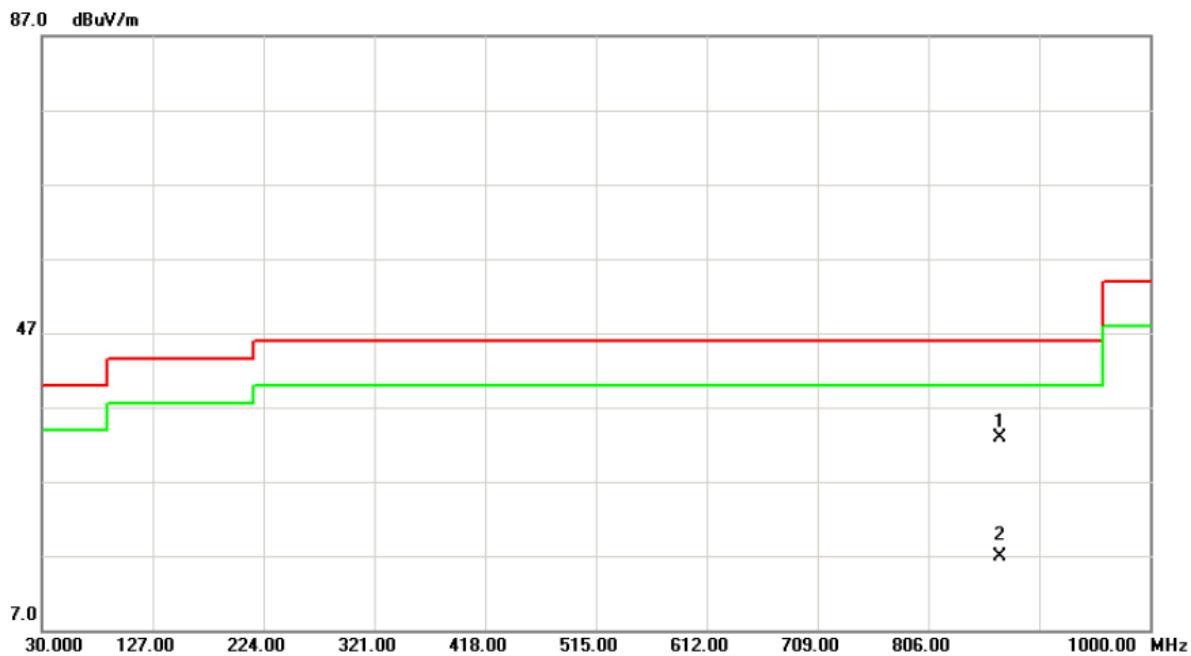
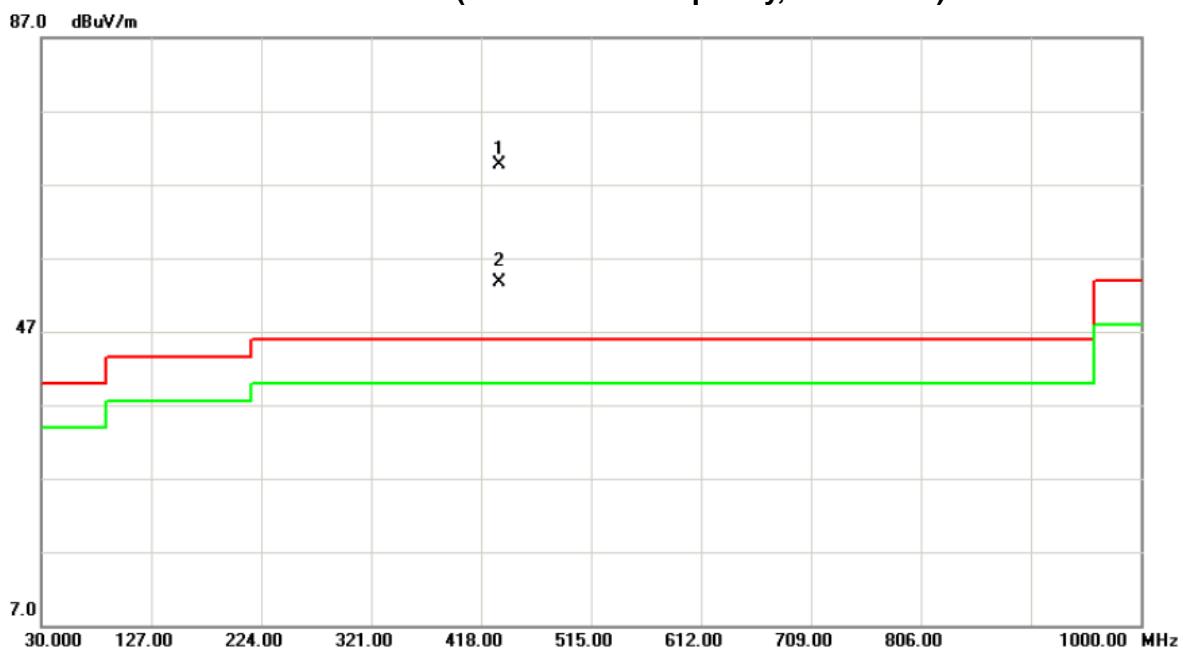


**Orthogonal Axis:X\_ TX141V2**  
**TX 433.92 MHz (Fundamental frequency,Horizontal)**





**Orthogonal Axis:X\_ TX141-BV2  
TX 433.92 MHz (Fundamental frequency,Horizontal)**





**Neutron Engineering Inc.**

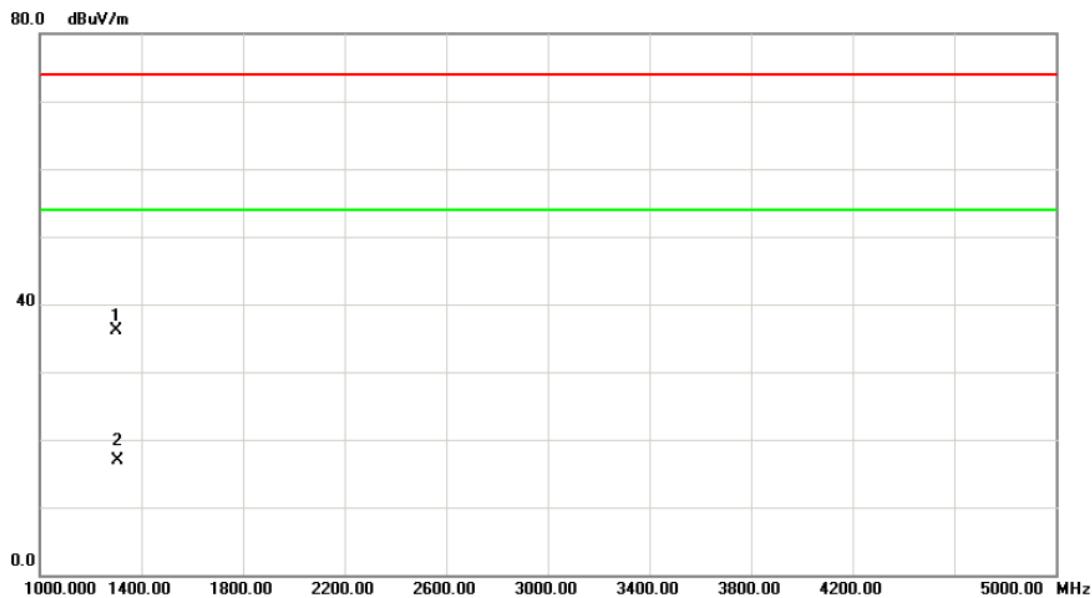
## **ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)**



Test Mode : TX CH 433.92 MHz\_ TX141V2

**About the duty cycle correction factor calculated, please refer to the page 16~18**

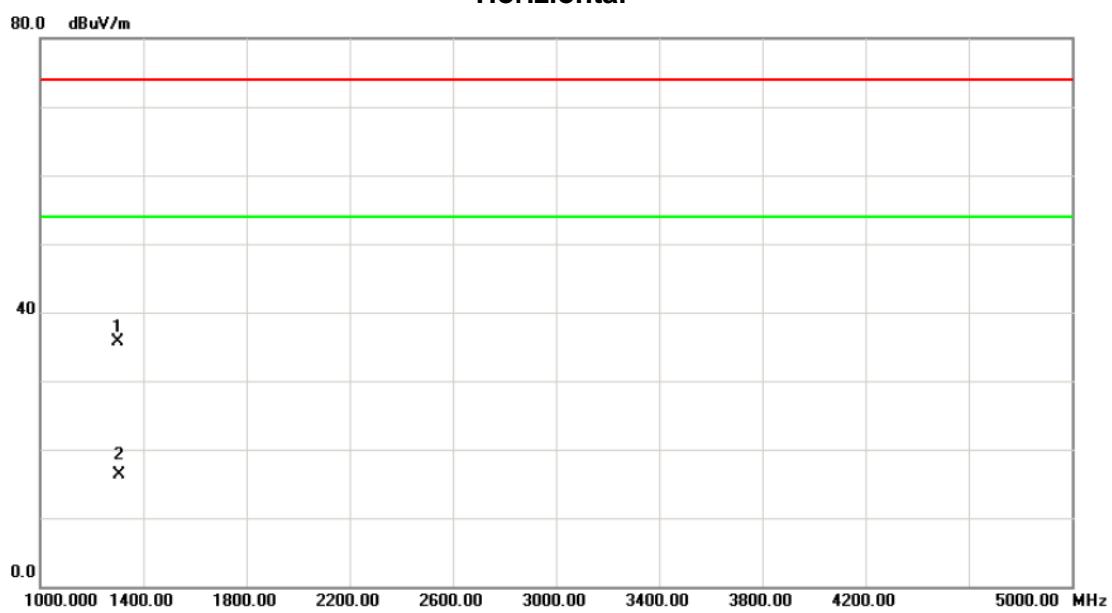
### Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector Comment
1		1301.760	42.39	-6.24	36.15	74.00	-37.85	peak
2	*	1301.760	23.06	-6.24	16.82	54.00	-37.18	AVG



**Horizontal**



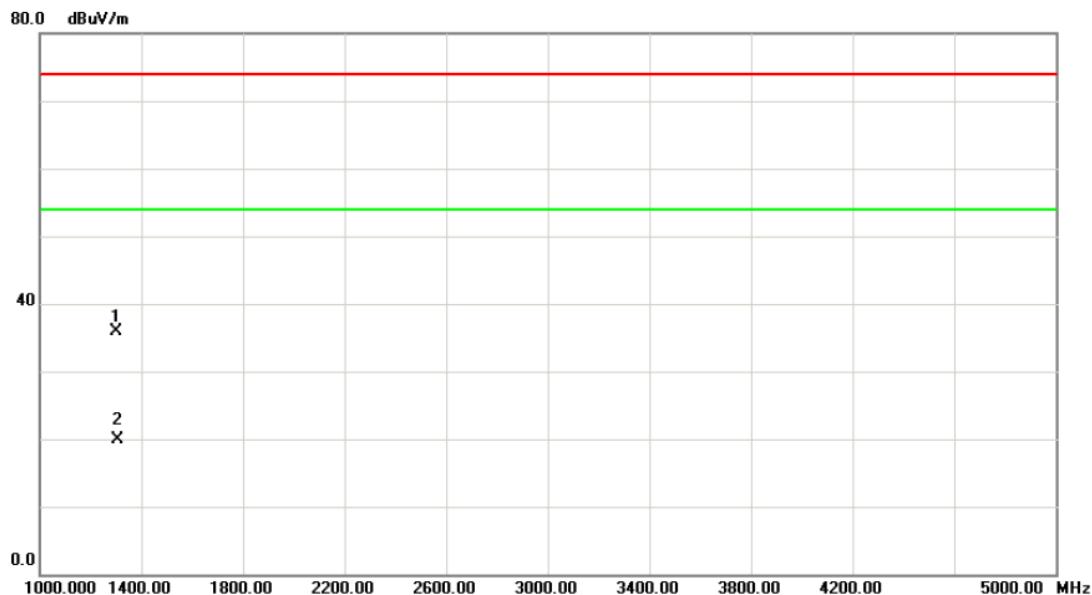
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1		1301.760	41.97	-6.24	35.73	74.00	-38.27	peak
2	*	1301.760	22.64	-6.24	16.40	54.00	-37.60	AVG



Test Mode : TX CH 433.92 MHz\_ TX141-BV2

**About the duty cycle correction factor calculated, please refer to the page 16~18**

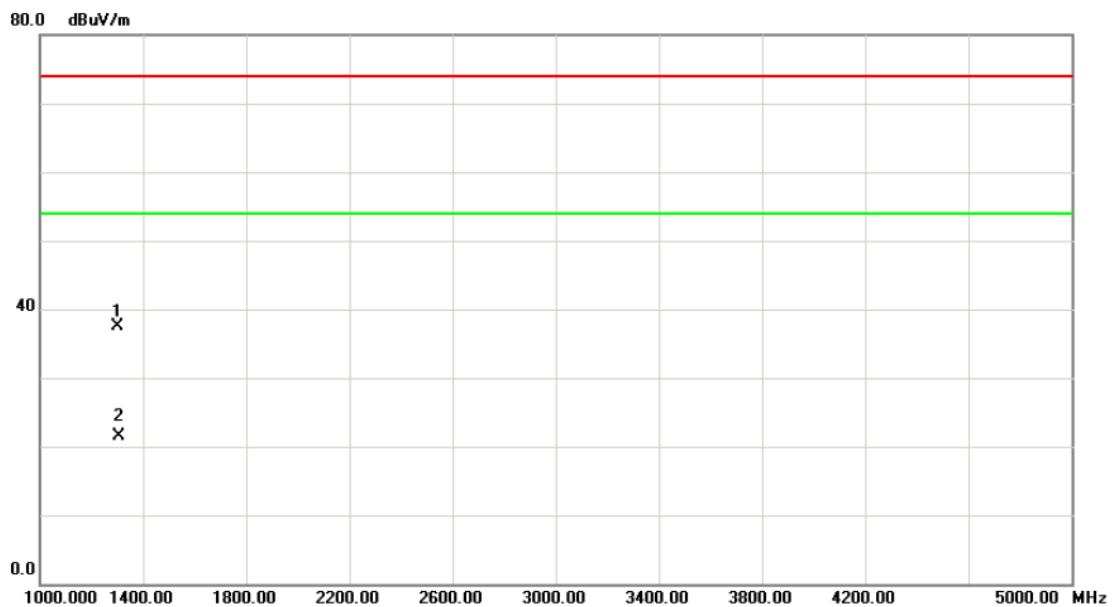
### Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1		1301.760	42.16	-6.24	35.92	74.00	-38.08	peak
2	*	1301.760	26.15	-6.24	19.91	54.00	-34.09	AVG



**Horizontal**



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB	Detector	Comment
1		1301.760	43.73	-6.24	37.49	74.00	-36.51	peak
2	*	1301.760	27.72	-6.24	21.48	54.00	-32.52	AVG

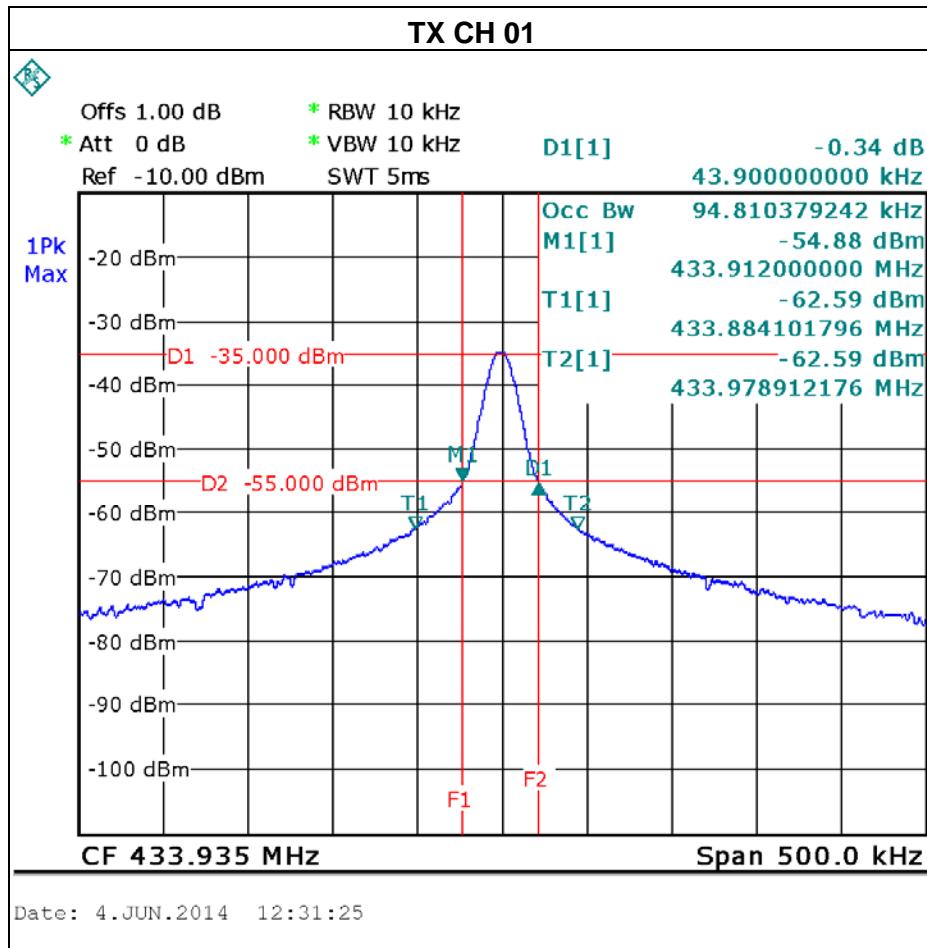


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## **ATTACHMENT E - 20dB SPECTRUM BANDWIDTH**



Test Mode : TX CH 01\_ TX141V2



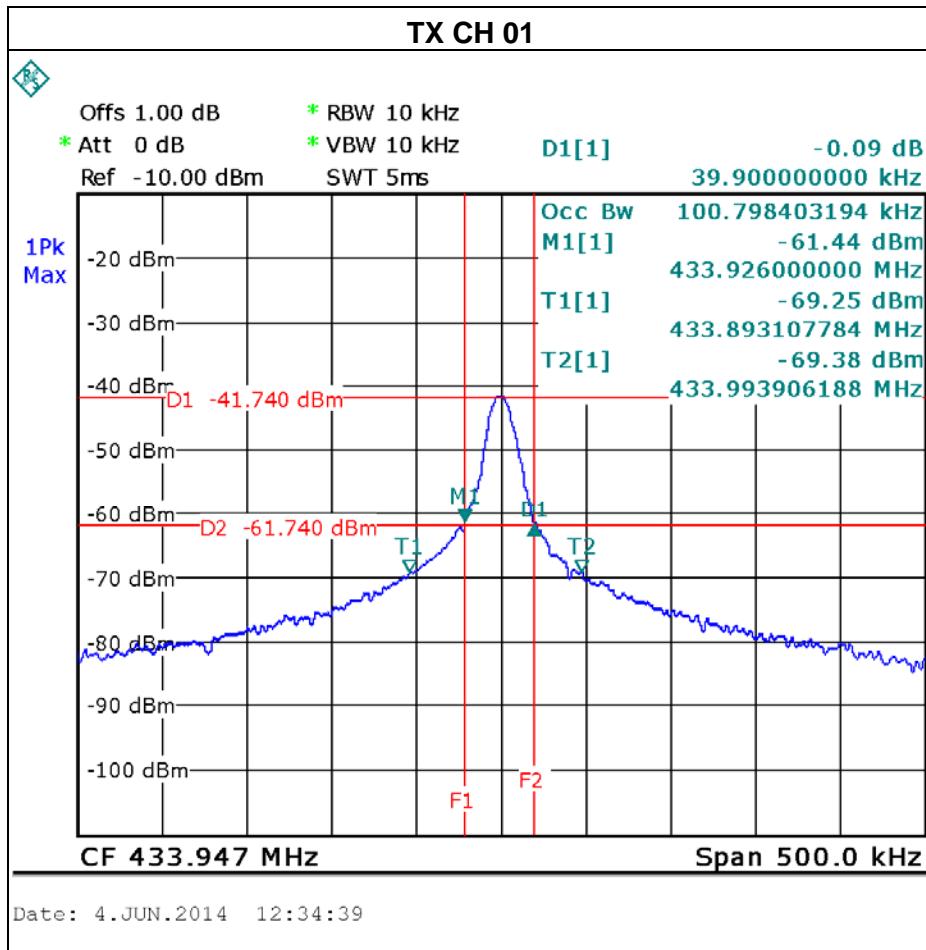
Result: 20dB Bandwidth 43.90kHz<1.0848MHz Pass

99% bandwidth is 94.81kHz



Test Mode :

TX CH 01\_TX141-BV2



Result: 20dB Bandwidth 39.90kHz<1.0848MHz Pass

99% bandwidth is 100.79kHz



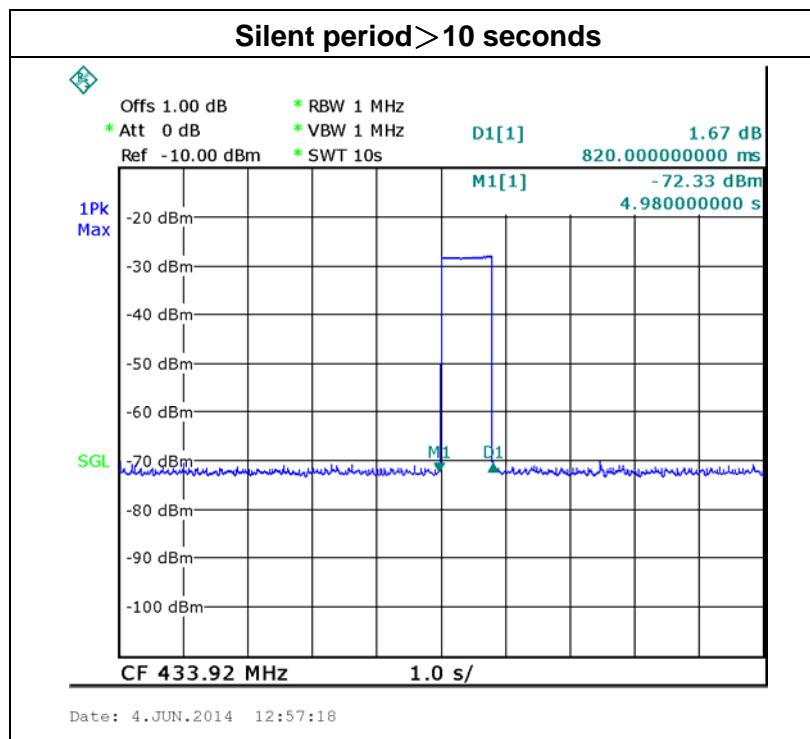
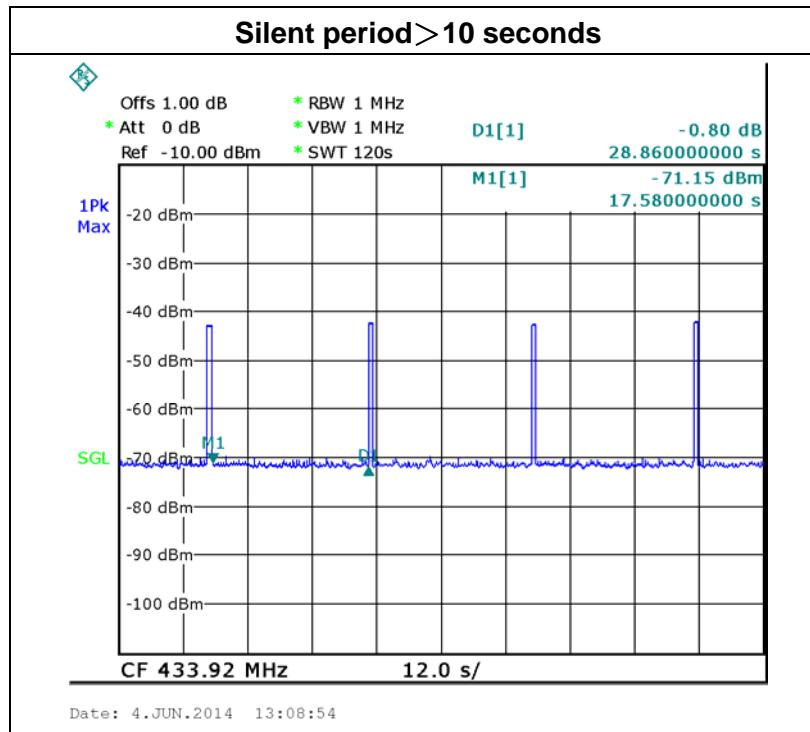
## ATTACHMENT F - TIMING TESTING



Test Mode : TX Mode\_TX141V2

Test Channel	Frequency (MHz)	Silent period (seconds)	Silent period limit (seconds)	Result
CH01	433.92	28.86	> 10	PASS

Silent period = 28.86 s > 30 \* 0.82 s = 24.6 s





Test Mode : TX Mode\_ TX141-BV2

Test Channel	Frequency (MHz)	Silent period (seconds)	Silent period limit (seconds)	Result
CH01	433.92	29.34	> 10	PASS

Silent period = 29.34 s > 30 \* 0.54 s = 16.2 s

