CONFORMANCE TEST REPORT
FOR
FCC 47 CFR, Part 15 Subpart C

Report No.: 12-04-MAS-120-08

Client:	Orange Electronic Co., Ltd.
Product:	TPMS Sensor
Model:	P418TX
FCC ID:	TH9P418TX
Manufacturer/supplier:	Orange Electronic Co., Ltd.

Date test item received:	2012/04/16
Date test campaign completed:	2012/07/17
Date of issue:	2012/08/16

Total number of pages of this test report: 45 pages

Total number of pages of photos: External photos 2 pages
Internal photos 3 pages
Setup photos 2 pages

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Manufacturer	: Orange Electronic Co., Ltd.
Address	: No. 15, Lane 81, Sec 2, Tanfu Rd., Tanzih, Taichung, Taiwan
EUT	: TPMS Sensor
Trade name	: TIRE VITALS
Model No.	: P418TX
Power Source	: 3.3V DC
Regulations applied	: FCC 47 CFR, Part 15 Subpart C

The testing described in this report has been carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. This certification is not intended to believe the sellers from their legal and/or contractual obligations.

The compliance test is only certified for the test equipment and the results of the testing report relate only to the item tested. The compliance test of this report was conducted in accordance with the appropriate standards. It's not intention to assure the quality and performance of the product. This report shall not be reproduced except in full, without the approval of ETC. This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

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① ISO9001: TüV Product Service

② ISO/IEC 17025: BSMI, TAF, NCC, NVLAP, ILAC MRA, UL, Compliance

③ Filing: FCC, Industry Canada, VCCI

④ MRA: Australia, Hong Kong, New Zealand, Singapore, USA, Japan, Korea, China, APLAC through TAF

⑤ FCC Registration Number: 91095, 392735, 278818

⑥ Industry Canada Site Regisitation number: IC 2949A-2

NVLAP Lab Code 200133-0

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1. GENERAL INFORMATION

1.1 Product Description

a) Type of EUT : TPMS Sensor
b) Model No. : P418TX
c) Serial No. : ----
d) FCC ID : TH9P418TX
e) Working Frequency : 433.92 MHz

1.2 Characteristics of Device:

The TPMS sensor can be operated by FSK modulation are easy and convenient. TPM sensor mainly consists of pressure sensor, temperature sensor, MCU, RF circuit and battery. When the TPM sensor be installed into the tire and inflating the air pressure, the sensor will automatically measure and transmits the tire pressure and temperature using RF signal to receiver unit. Each sensor contains a ID code in it's RF data that receiver can use to identify tire position.

1.3 Test Methodology

Both Conducted and radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4 (2003).
The equipment under test was operated continuously in its normal operating mode for the purpose of the measurements. In order to secure the continuous operation of the device under test, the circuit rewired by the manufacturer to affect its intended operation. The receiving antenna was varied from 1 to 4 meters and the wooden turntable was rotated through 360 degrees to obtain the highest reading on the field strength meter or on the display of the spectrum analyzer. And also, each emission was to be maximized by changing the orientation of the equipment transmitter under test.

1.4 Test Facility

The semi-anechoic chamber and conducted measurement facility used to collect the radiated and conducted data are located inside the Building at No.8, Lane 29, Wen-ming Road, Lo-shan Tsun, Kweishan Hsiang, Taoyuan, Taiwan, R.O.C.
This site has been accreditation as a FCC filing site.

1.5 Test Summary

Requirement	FCC Paragraph #	Test Pass
Radiated Emission	15.231(b)(e)&15.209	☒
Bandwidth of Emission	15.231(c)	N/A
Conducted Emission	15.207	☒
Limit of Transmission Time	15.231(a)(1)&15.231(e)	☒

2. DEFINITION AND LIMITS

2.1 Definition

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.25
0.495 - 0.505 **	16.69475 - 16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425 - 16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475 - 156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

Remark "**" : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

2.3 Limitation

(1) Conducted Emission Limits :

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the conducted limit is the following:

Frequency MHz	**Quasi Peak dB μ V**	**Average dB μ V**
0.15 - 0.5	66-56	56-46
0.5 - 5.0	56	46
5.0 - 30.0	60	50

(2) Radiated Emission Limits :

According to 15.231 (b) , in addition to the provisions of section 15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Frequency Band (MHz)	Field strength of Fundamental (uV/m)	Field strength of Spurious (uV/m)
40.66-40.70	2250	225
70-130	1250	125
130-174	*1,250 to 3,750	*125 to 375
174-260	3750	375
260-470	*3,750 to 12,500	*375 to 1250
Above 470	12500	1250

* Linear interpolations.

According to 15.231(e) ,Periodic operation in the band 40.66-40.70 MHz and above 70 MHz, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Frequency Band (MHz)	Field strength of Fundamental (uV/m)	Field strength of Spurious (uV/m)
40.66-40.70	1000	100
70-130	500	50
130-174	*500-1500	*50-150
174-260	1500	150
260-470	*1500-5000	*150-500
Above 470	5000	500

* Linear interpolations.

According to 15.205 (b), the field strength of emissions appearing within the Restricted Bands shield not exceed. The general radiated limits in 15.209, as following table:

Frequenciey (MHz)	Field Strength μV/meter	dBμV/meter	Measurement Distance (meters)
30 - 88	100	40.0	3
88 - 216	150	43.5	3
216 - 960	200	46.0	3
Above 960	500	54.0	3

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

(3) Limit of transmission time

According to 15.231(a)(1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

According to 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.

2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To comply with the FCC RF exposure compliance requirement, this device and its antenna must not be co-located or operating to conjunction with any other antenna or transmitter.

3. RADIATED EMISSION MEASUREMENT

3.1 Applicable Standard

For periodic operation intentional radiator, the radiated emission shall comply with § 15.231 (e) .

3.2 Measurement Procedure

A.Preliminary Measurement For Portable Devices.

For portable devices, the following procedure was performed to determine the maximum emission axis of EUT:

1. With the receiving antenna is H polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
2. With the receiving antennna is V polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
3. Compare the results derived from above two steps. So, the axis of maximum emission from EUT was determined and the configuration was used to perform the final measurement.

B. Final Measurement

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively. Turn on EUT and make sure that it is in continuous operating function.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a semi-anechoic chamber to determine the accurate frequencies of higher emissions and then each selected frequency is precisely measured. As the same purpose, for emission measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission measured below and above 1 GHz, set the spectrum analyzer on a 120 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.

Figure 1 : Frequencies measured below 1 GHz configuration

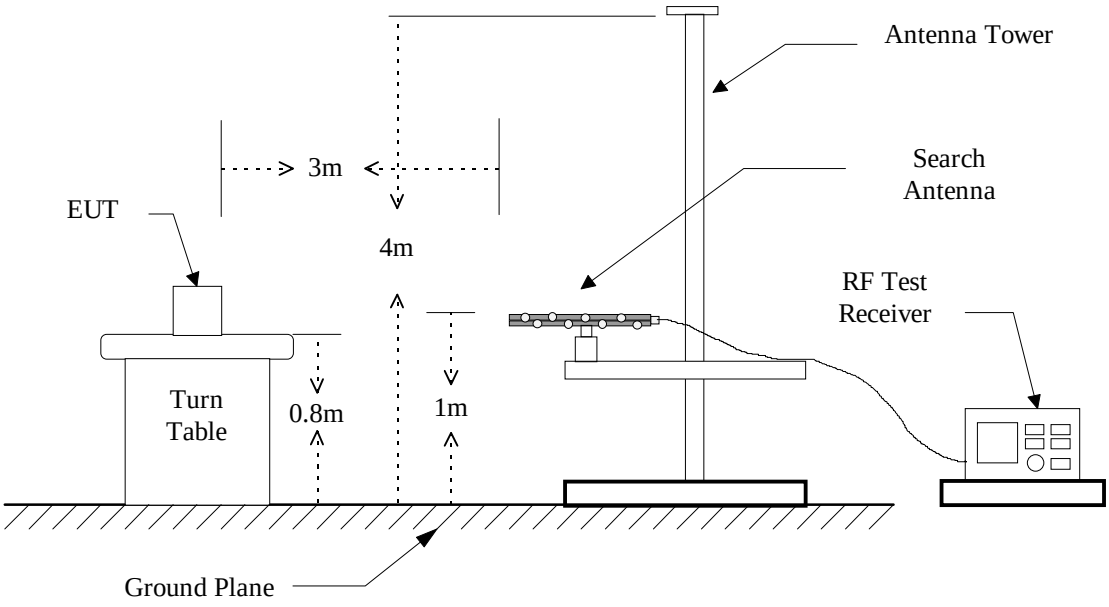
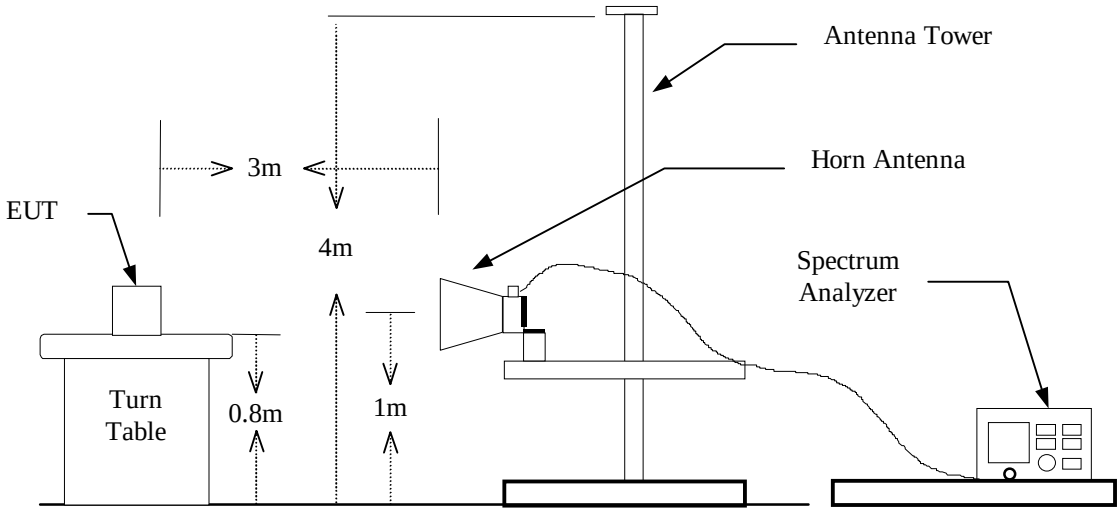


Figure 2 : Frequencies measured above 1 GHz configuration



3.3 Test Data

3.3.1 Fundamental and Harmonic

3.3.1.1 Operated mode : Transmitting
Test Date : Jun. 27, 2012 Temperature : 24 ℃ Humidity : 63%

Frequency (MHz)	Ant Pol H/V	Reading (dBuV) @3m Peak	QP	AVG	Correct Factor (dB/m)	Duty cycle (dB)	Result (dBuV) @3m Peak	QP	AVG	Limit (dBuV/m) @3m Peak	QP	AVG	Margin (dB)
Fundamental													
433.8176	H	58.9	----	----	19.58	-9.72	78.5	----	68.8	92.9	----	72.9	-4.1
433.8176	V	48.3	----	----	19.58	-9.72	67.9	----	58.2	92.9	----	72.9	-14.7
Harmonic													
*867.6352	H	19.1	18.2	----	25.30	-9.72	44.4	43.5	34.7	72.9	46.0	52.9	-2.5
*867.6352	V	10.7	----	----	25.30	-9.72	36.0	----	26.3	72.9	46.0	52.9	-10.0
*1301.4528	H	65.0	----	----	-13.00	-9.72	52.0	----	42.3	74.0	----	54.0	-11.7
*1301.4528	V	65.0	----	----	-13.00	-9.72	52.0	----	42.3	74.0	----	54.0	-11.7
*1735.2704	H	66.2	----	----	-10.78	-9.72	55.4	----	45.7	74.0	----	54.0	-8.3
*1735.2704	V	66.2	----	----	-10.78	-9.72	55.4	----	45.7	74.0	----	54.0	-8.3
2169.0880	H	56.6	----	----	-8.93	-9.72	47.7	----	38.0	74.0	----	54.0	-16.0
2169.0880	V	56.6	----	----	-8.93	-9.72	47.7	----	38.0	74.0	----	54.0	-16.0
2602.9056	H	53.9	----	----	-7.63	-9.72	46.3	----	36.6	74.0	----	54.0	-17.4
2602.9056	V	63.9	----	----	-7.63	-9.72	56.3	----	46.6	74.0	----	54.0	-7.4
3036.7232	H	63.1	----	----	-6.11	-9.72	57.0	----	47.3	74.0	----	54.0	-6.7
3036.7232	V	63.1	----	----	-6.11	-9.72	57.0	----	47.3	74.0	----	54.0	-6.7
3470.5408	H	51.5	----	----	-4.98	-9.72	46.5	----	36.8	74.0	----	54.0	-17.2
3470.5408	V	61.5	----	----	-4.98	-9.72	56.5	----	46.8	74.0	----	54.0	-7.2
*3904.3584	H	60.3	----	----	-3.29	-9.72	57.0	----	47.3	74.0	----	54.0	-6.7
*3904.3584	V	60.3	----	----	-3.29	-9.72	57.0	----	47.3	74.0	----	54.0	-6.7
*4338.1760	H	49.9	----	----	-3.03	-9.72	46.9	----	37.2	74.0	----	54.0	-16.8
*4338.1760	V	49.9	----	----	-3.03	-9.72	46.9	----	37.2	74.0	----	54.0	-16.8

Note:

1. Peak Result =Peak Reading + Correct Factor

2. AVG Result = Peak Result + Duty Factor

3. If the result of peak value is under the limit of average, the average value doesn't need to be measured.

4. "" means the frequency is in the Restricted Bands.*

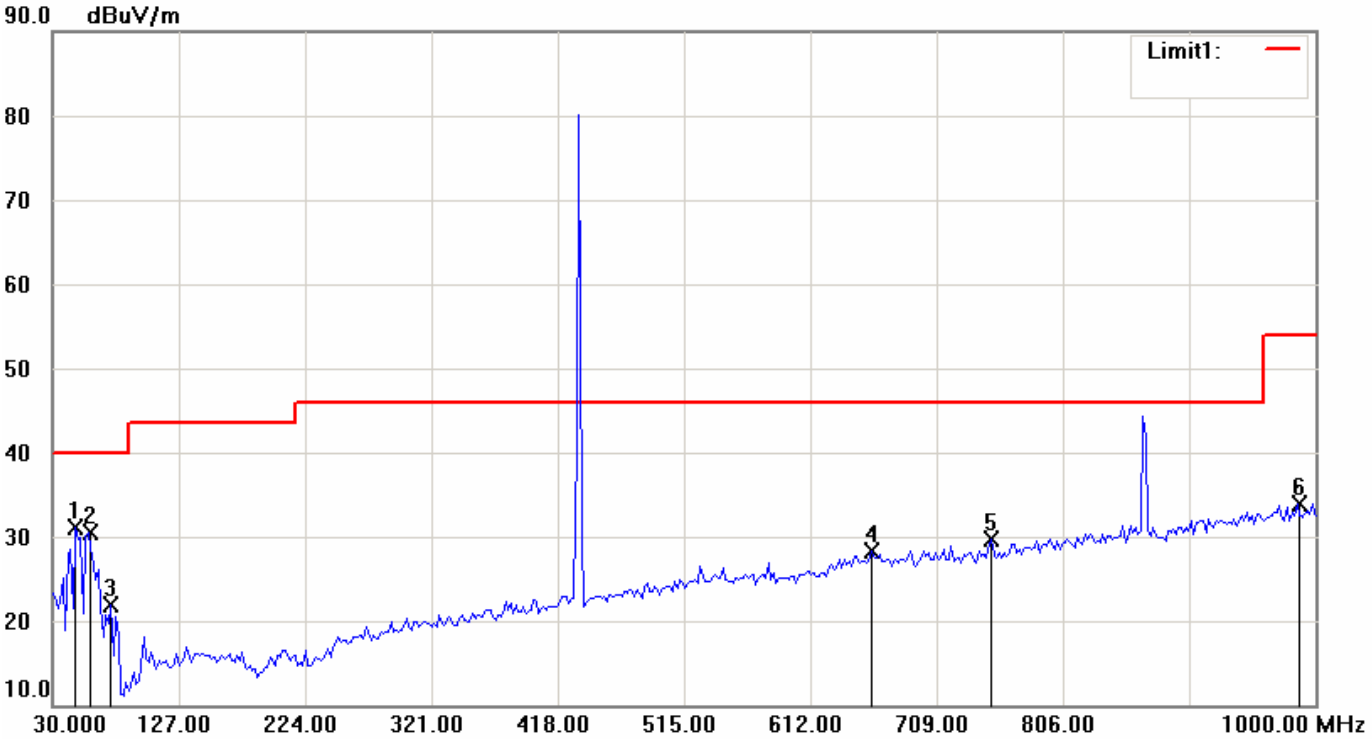
3.3.2 Other Emission

Operated mode : Transmitting

A. below 1GHz

File: FCC 433_TX Data: #21 Date: 2012/6/27 Temperature: 24 ℃

Time: 上午 09:34:18 Humidity: 63 %



Condition: NCC_LP0002_30-1000MHz **Polarization:** Horizontal

EUT: **Distance:** 3m

Model:

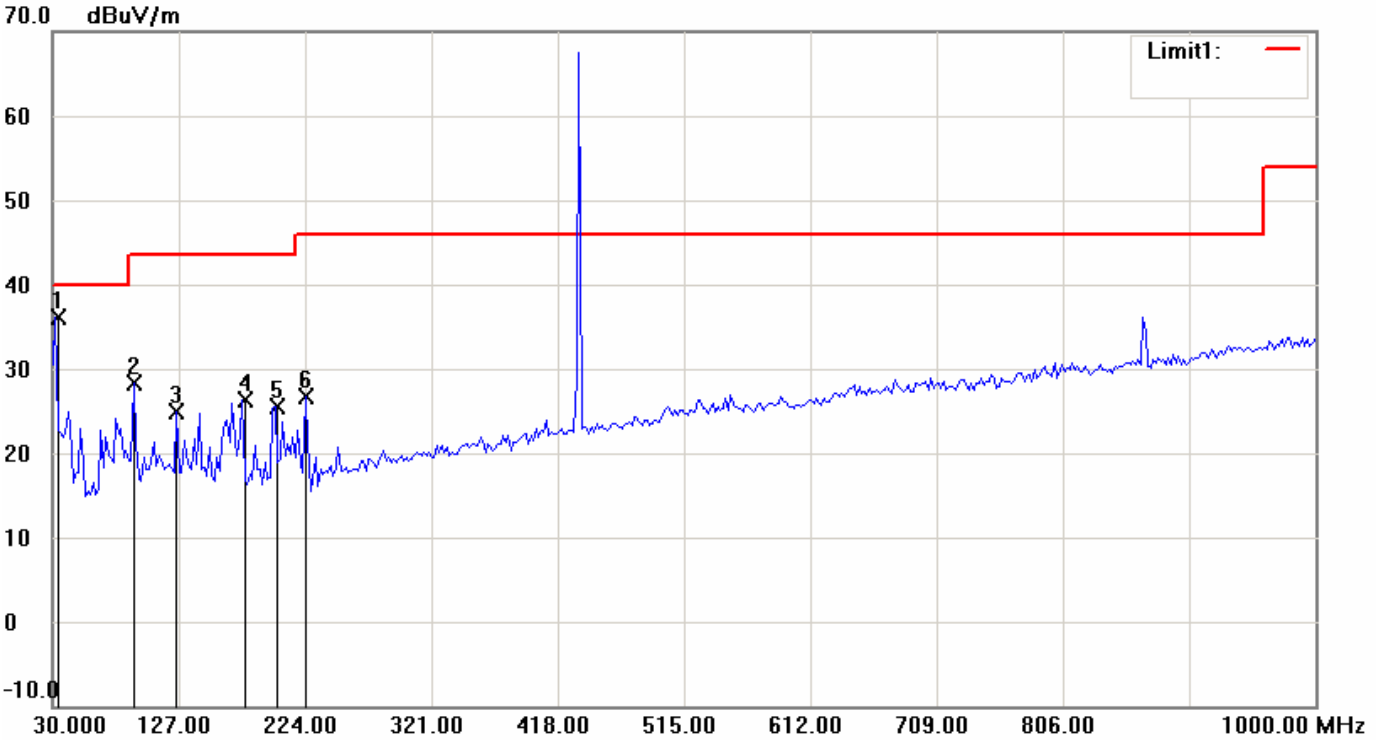
Test Mode:

Note: X(NEW)6/27

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	47.4950	19.36	peak	11.74	31.10	40.00	-8.90
2	57.2144	22.36	peak	8.17	30.53	40.00	-9.47
3	74.7094	13.64	peak	8.17	21.81	40.00	-18.19
4	659.8196	2.84	peak	25.39	28.23	46.00	-17.77
5	751.1824	3.87	peak	25.87	29.74	46.00	-16.26
6	986.3928	3.88	peak	30.10	33.98	54.00	-20.02

File: **FCC 433_TX** **Data :** **#22** **Date:** **2012/6/27** **Temperature:** **24 ℃**

Time: **上午 09:57:35** **Humidity:** **63 %**



Condition: **NCC_LP0002_30-1000MHz** **Polarization:** **Vertical**

EUT: **Distance:** **3m**

Model:

Test Mode:

Note: **X(NEW)6/27**

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	31.9440	16.77	peak	19.40	36.17	40.00	-3.83
2	92.2044	17.45	peak	10.78	28.23	43.50	-15.27
3	125.2505	11.50	peak	13.32	24.82	43.50	-18.68
4	175.7916	13.14	peak	13.07	26.21	43.50	-17.29
5	201.0621	11.53	peak	13.92	25.45	43.50	-18.05
6	224.3888	12.63	peak	14.10	26.73	46.00	-19.27

B. above 1GHz

Frequency (MHz)	Ant Pol H / V	Reading (dBuV) Peak	Correct Factor (dB)	Duty Factor (dB)	Result @3m (dBuV/m) Peak	Result @3m (dBuV/m) AVG	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) AVG	Margins (dB)
Radiated emission frequencies above 1 GHz to 4.5 GHz were too low to be measured.									

Note:

1. Place of Measurement: Measuring site of the ETC.
2. If the data table appeared symbol of "***" means the value was too low to be measured.
3. The estimated measurement uncertainty of the result measurement is
   ±4.6dB (30MHz≦f<300MHz).
   ±4.4dB (300MHz≦f<1000MHz).
   ±4.1dB (1GHz≦f≦18GHz).

3.4 Field Strength Calculation

(a) Field Strength:

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + CORR. FACTOR

where CORR. FACTOR = Antenna FACTOR + Cable FACTOR

(b) Duty Factor:

① Drive Alert mode

$$= 20\log\frac{8.1667(ms)\times 4}{100(ms)}\ \text{dB}$$

$$= -9.72\text{dB}$$

The plotted graph of Duty Factor please see page 16 ~ 17

② Drive mode

$$= 20\log\frac{8.1667(ms)\times 3}{100(ms)}\ \text{dB}$$

$$= -12.22\text{dB}$$

The plotted graph of Duty Factor please see page 18 ~ 19

③ Park Alert mode

$$= 20\log\frac{8.1666(ms)\times 4}{100(ms)}\ \text{dB}$$

$$= -9.72\text{dB}$$

The plotted graph of Duty Factor please see page 20 ~ 21

④ Park mode

$$= 20\log\frac{8.1667(ms)\times 3}{100(ms)}\ \text{dB}$$

$$= -12.22\text{dB}$$

The plotted graph of Duty Factor please see page 22 ~ 23

⑤ Sleep Alert mode

$$= 20\log\frac{8.1666(ms)\times 4}{100(ms)}\ \text{dB}$$

$$= -9.72\text{dB}$$

The plotted graph of Duty Factor please see page 24 ~ 25

⑥ Sleep mode

$$= 20\log\frac{8.1667(ms)\times 1}{100(ms)}\ \text{dB}$$

$$= -21.76\text{dB}$$

The plotted graph of Duty Factor please see page 26 ~ 27

This Duty Factor of Drive Alert mode is the worst case of the EUT and confirmed by the test engineer.

3.5 Radiated Test Equipment

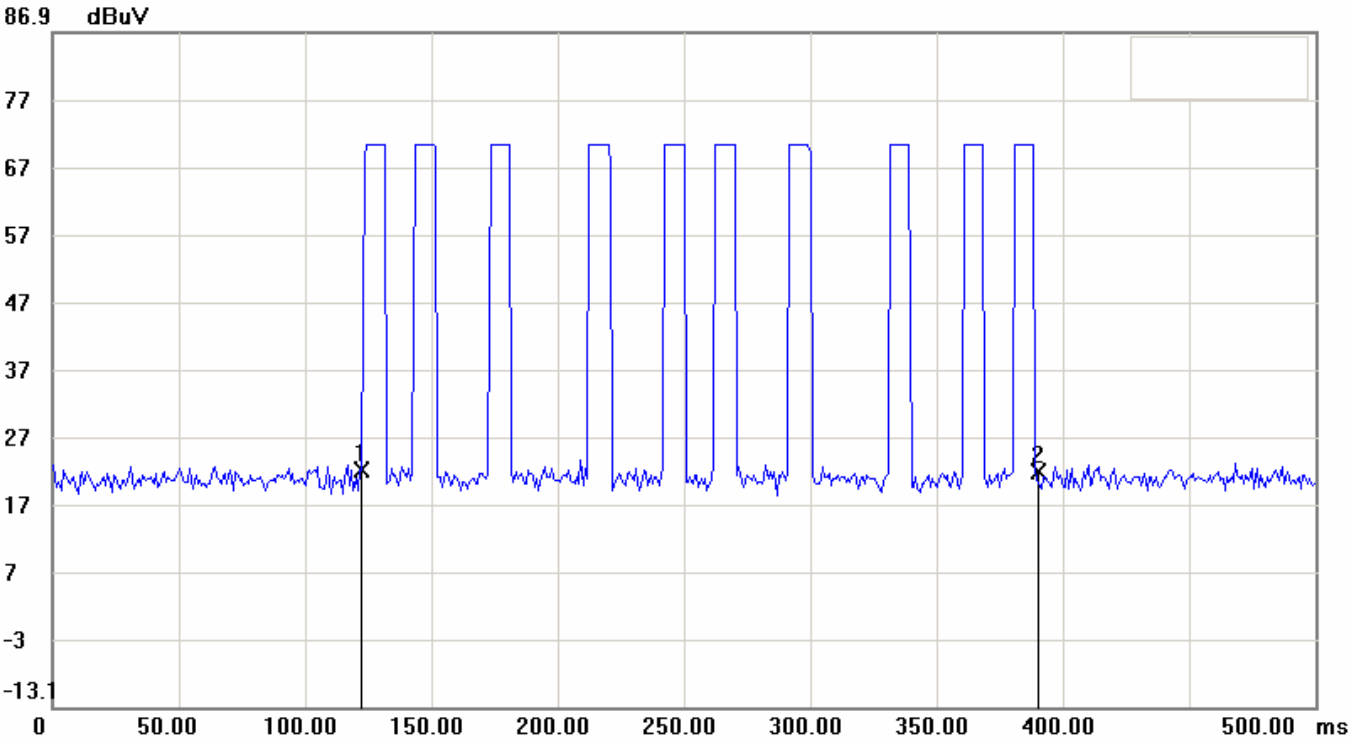
The following instrument are used for radiated emissions measurement :

Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
EMI Receiver	R&S	ESIB7	13054414-001	07/25/2012
BiLog Antenna	ETC	MCTD2986	----	11/24/2012
Horn Antenna	EMCO	3115	9107-3729	07/21/2012
PRE-Amplifier	Agilent	8449B	----	10/25/2012
Spectrum Analyzer	Rohde & Schwarz	FSU46	13040904-001	01/08/2013

Note: The standards used to perform this calibration are traceable to NML/ROC, NIST/USA and NPL.

Drive Alert mode

File: **sensor 1** **Data:** **#4** **Date:** **2012/5/11** **Temperature:** **20 ℃**
Time: **PM 07:44:33** **Humidity:** **54 %**

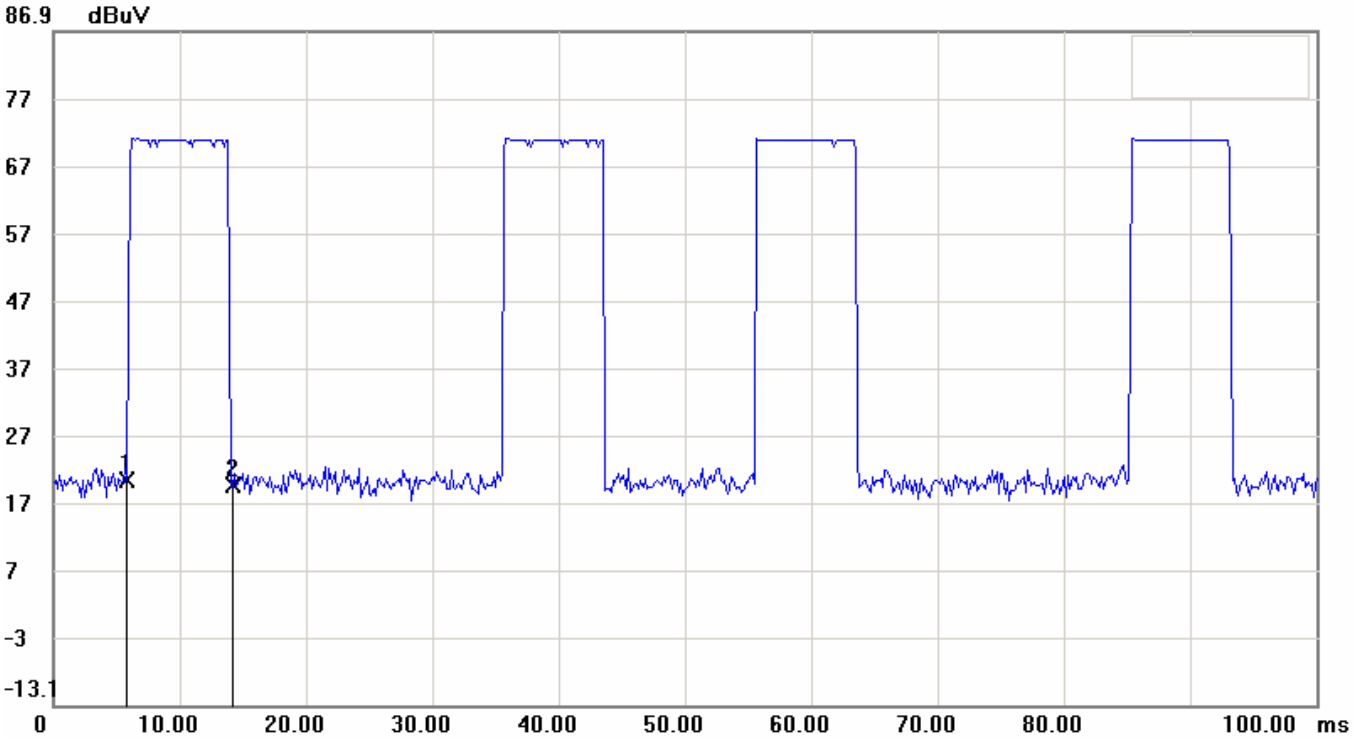


Condition: **RF Conducted**
EUT: **Sweep Time: 500ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **Duty cycle(Drive Alert)-1**

No.	Sweep time(ms)	Level(dBm)
1	121.6667	21.95
2	389.1667	21.68

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	267.5	-0.27

File: **sensor 1** **Data:** **#8** **Date:** **2012/5/11** **Temperature:** **20 ℃**
Time: **PM 08:15:43** **Humidity:** **54 %**



Condition: **RF Conducted**
EUT:
Model:
Test Mode:
Note: **Duty cycle(Drive Alert)-2**

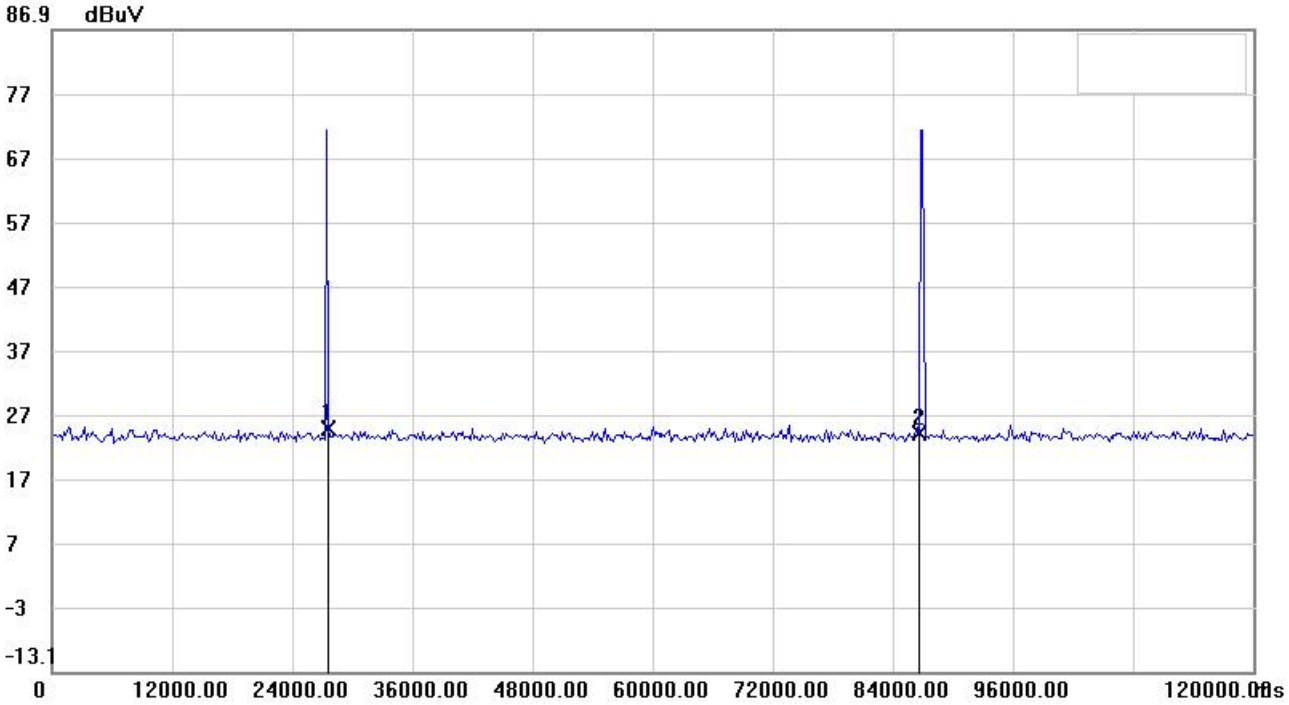
Sweep Time: 100ms **Att.: 10dB**
RBW: 100 KHz **VBW: 300 KHz**

No.	Sweep time(ms)	Level(dBm)
1	5.8333	20.30
2	14.0000	19.56

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	8.1667	-0.74

Drive mode

File: sensor 1 **Data: #6** **Date: 2012/5/11** **Temperature: 20 ℃**
Time: PM 07:59:25 **Humidity: 54 %**

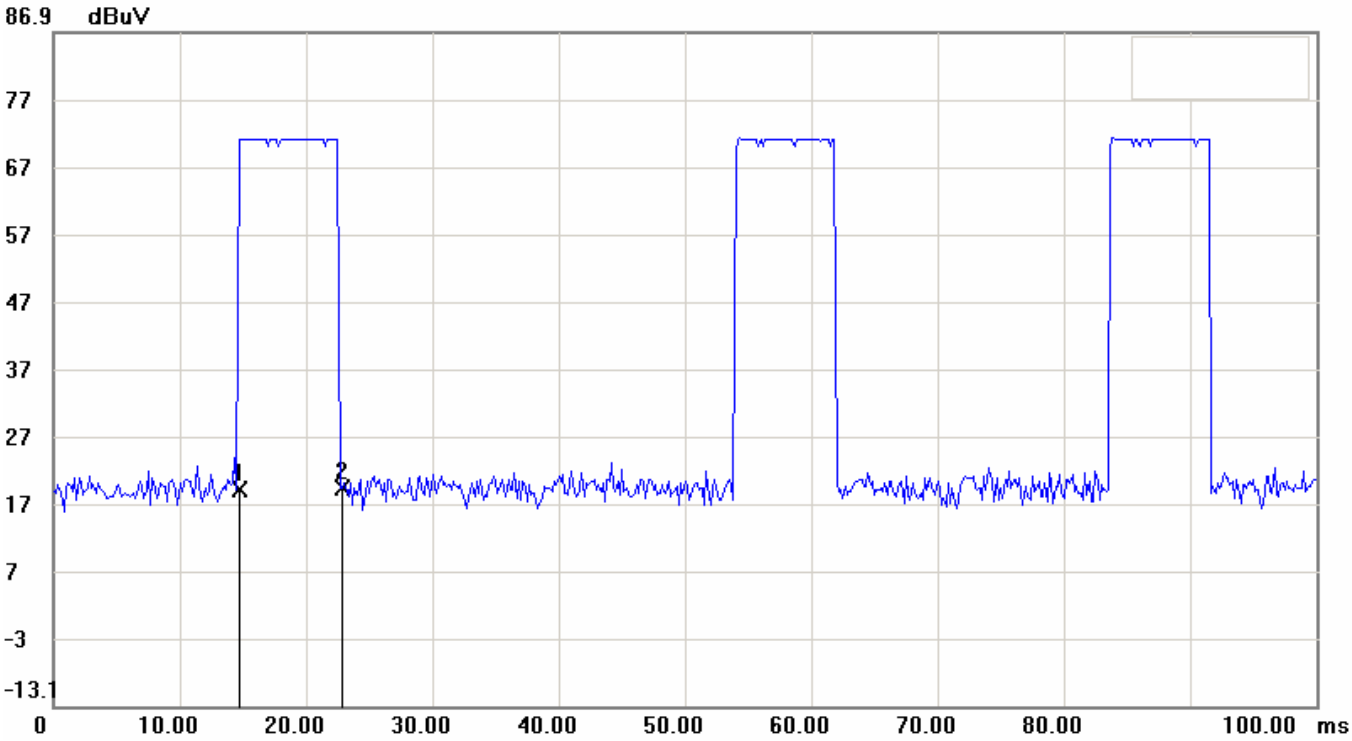


Condition: **RF Conducted**
EUT: **Sweep Time: 120000ms Att.: 10dB**
Model: **RBW: 100 KHz VBW: 300 KHz**
Test Mode:
Note: **Duty cycle(Drive)-1**

No.	Sweep time(ms)	Level(dBm)
1	27600.0000	24.82
2	86600.0000	24.12

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	59000	-0.7

File: **sensor 1** **Data:** **#7** **Date:** **2012/5/11** **Temperature:** **20 ℃**
Time: **PM 08:06:44** **Humidity:** **54 %**



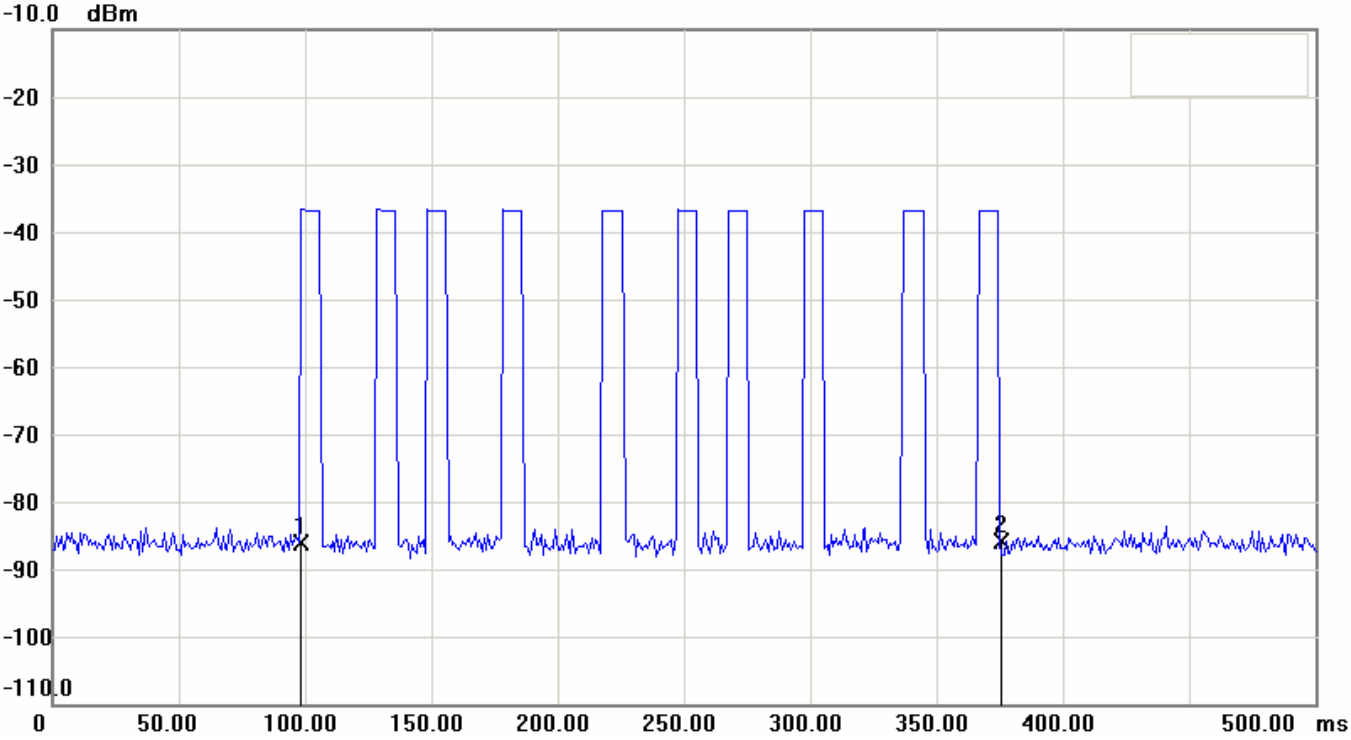
Condition: **RF Conducted**
EUT: **Sweep Time: 100ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **Duty cycle(Drive)-2**

No.	Sweep time(ms)	Level(dBm)
1	14.5000	19.09
2	22.6667	19.27

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	8.1667	0.18

Park Alert mode

File: sensor 2 **Data: #4** **Date: 2012/5/15** **Temperature: 20 ℃**
Time: PM 03:04:01 **Humidity: 54 %**

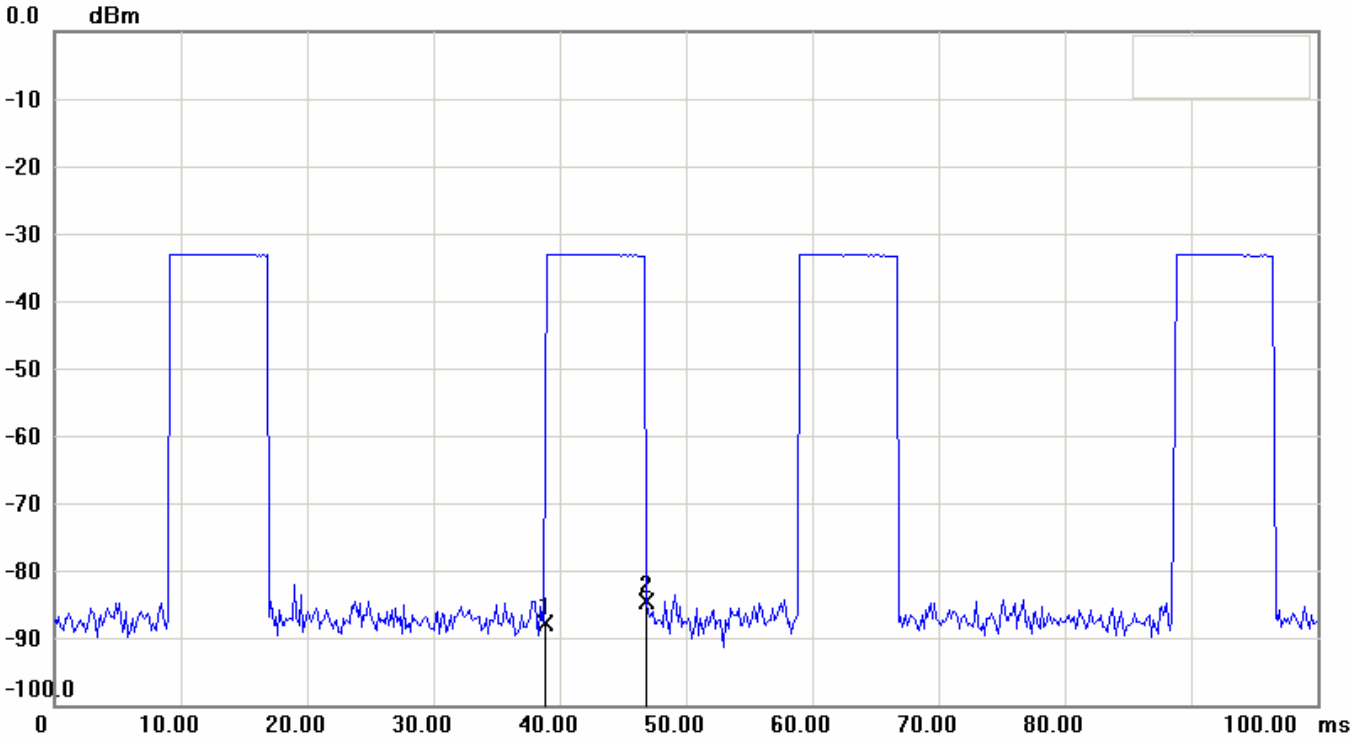


Condition: **RF Conducted**
EUT: **Sweep Time: 500ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **Duty cycle(Part Alert)-1**

No.	Sweep time(ms)	Level(dBm)
1	97.5000	-86.02
2	375.0000	-85.99

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	277.5	0.03

File: sensor 2 **Data: #8** **Date: 2012/5/16** **Temperature: 20 ℃**
Time: AM 11:45:53 **Humidity: 54 %**



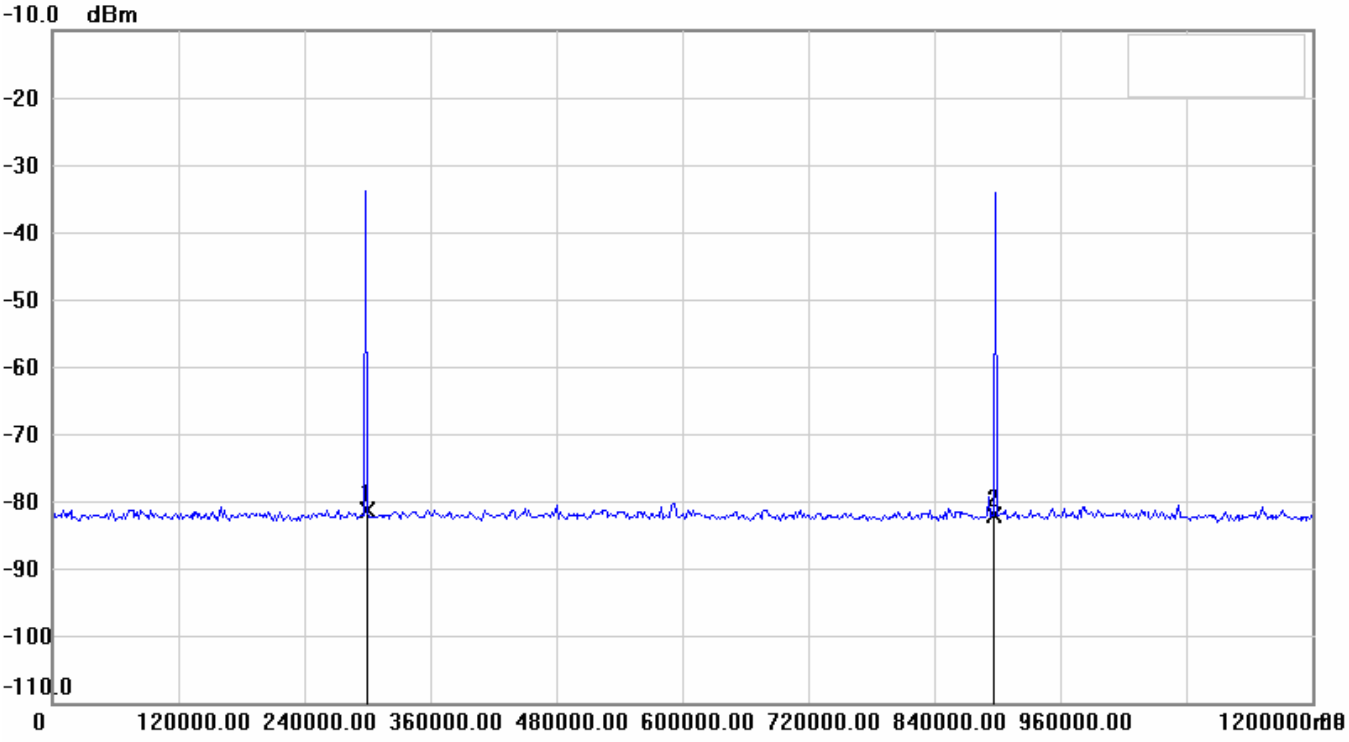
Condition: **RF Conducted**
EUT: **Sweep Time: 100ms Att.: 10dB**
Model: **RBW: 100 KHz VBW: 300 KHz**
Test Mode:
Note: **Duty cycle(Park Alert)-2**

No.	Sweep time(ms)	Level(dBm)
1	38.6667	-87.96
2	46.8333	-84.64

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	8.1666	3.32

Park mode

File: sensor 2 **Data: #3** **Date: 2012/5/15** **Temperature: 20 ℃**
Time: PM 02:48:30 **Humidity: 54 %**

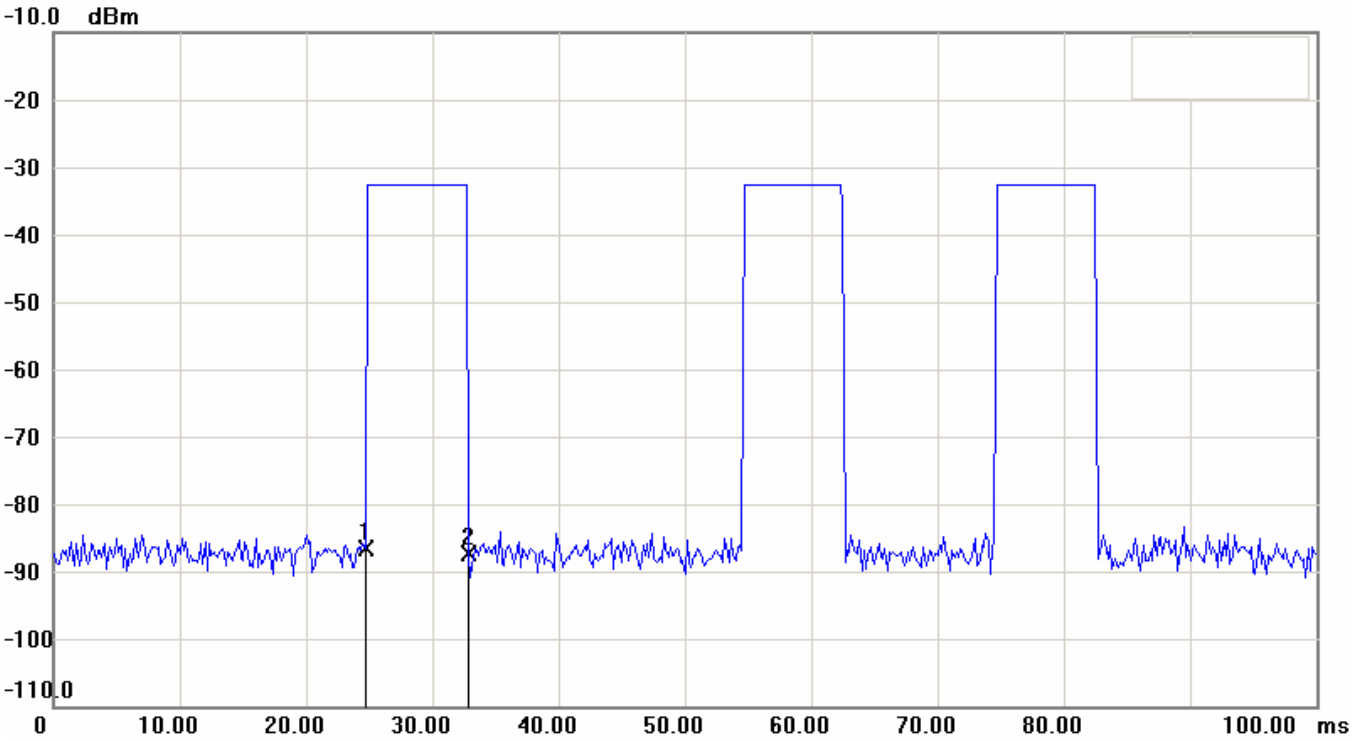


Condition: **RF Conducted**
EUT: **Sweep Time: 1200000ms Att.: 10dB**
Model: **RBW: 100 KHz VBW: 300 KHz**
Test Mode:
Note: **Duty cycle(Park)-1**

No.	Sweep time(ms)	Level(dBm)
1	300000.0000	-81.41
2	896000.0000	-82.15

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	596000	-0.74

File: **sensor 2** **Data:** **#7** **Date:** **2012/5/15** **Temperature:** **20 ℃**
Time: **PM 04:34:09** **Humidity:** **54 %**



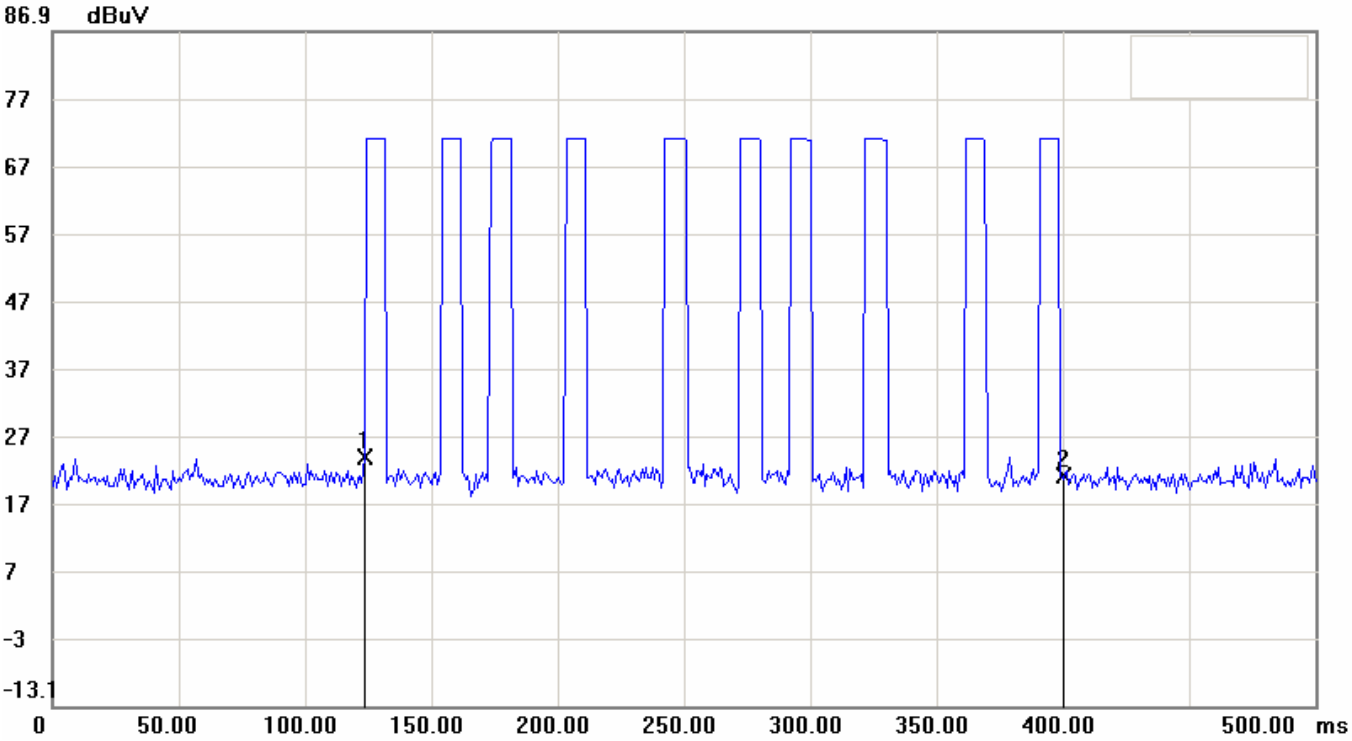
Condition: **RF Conducted**
EUT: **Sweep Time: 100ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **Duty cycle(Park)-2**

No.	Sweep time(ms)	Level(dBm)
1	24.6666	-86.56
2	32.8333	-87.42

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	8.1667	-0.86

Sleep Alert mode

File: sensor 1 **Data: #5** **Date: 2012/5/11** **Temperature: 20 ℃**
Time: PM 07:48:12 **Humidity: 54 %**

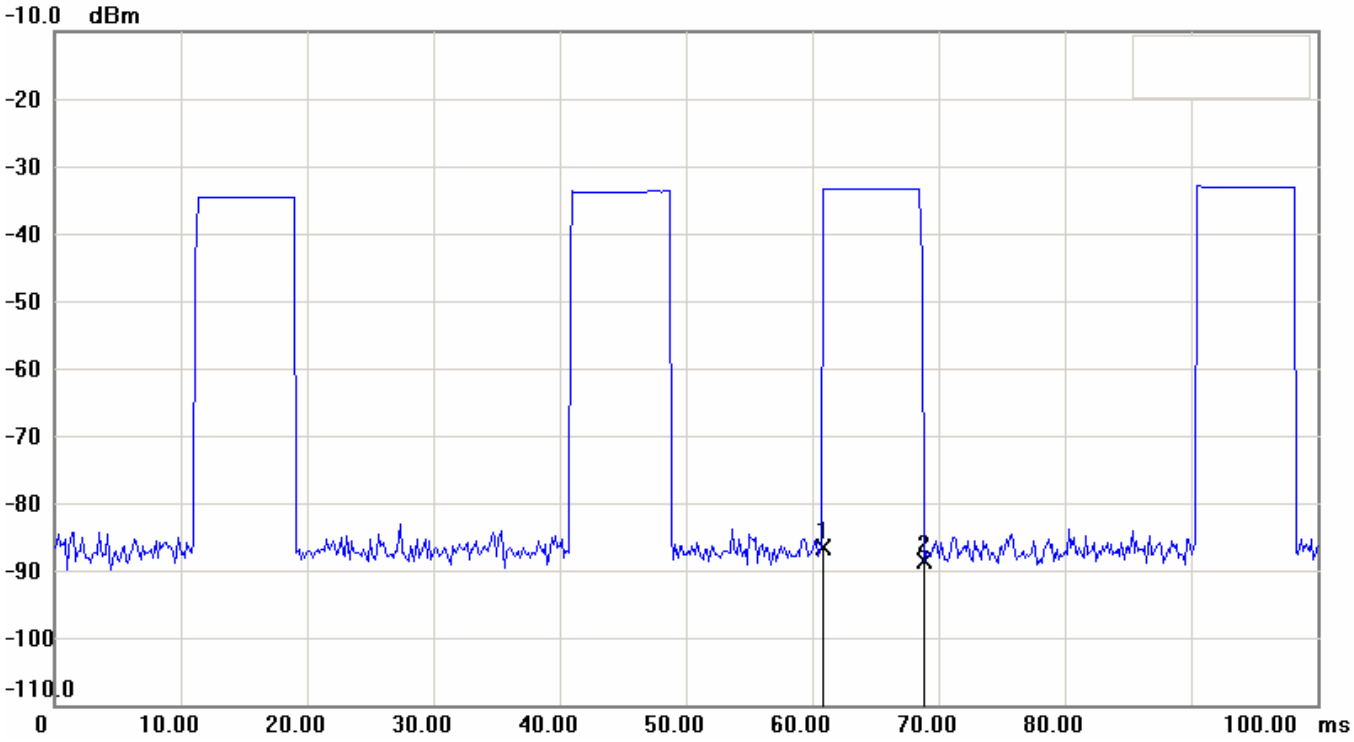


Condition: **RF Conducted**
EUT: **Sweep Time: 500ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **Duty cycle(Sleep Alert)-1**

No.	Sweep time(ms)	Level(dBm)
1	123.3333	23.75
2	399.1667	21.02

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	275.8334	-2.73

File: **sensor 1** **Data:** **#10** **Date:** **2012/5/15** **Temperature:** **20 ℃**
Time: **AM 10:32:26** **Humidity:** **54 %**



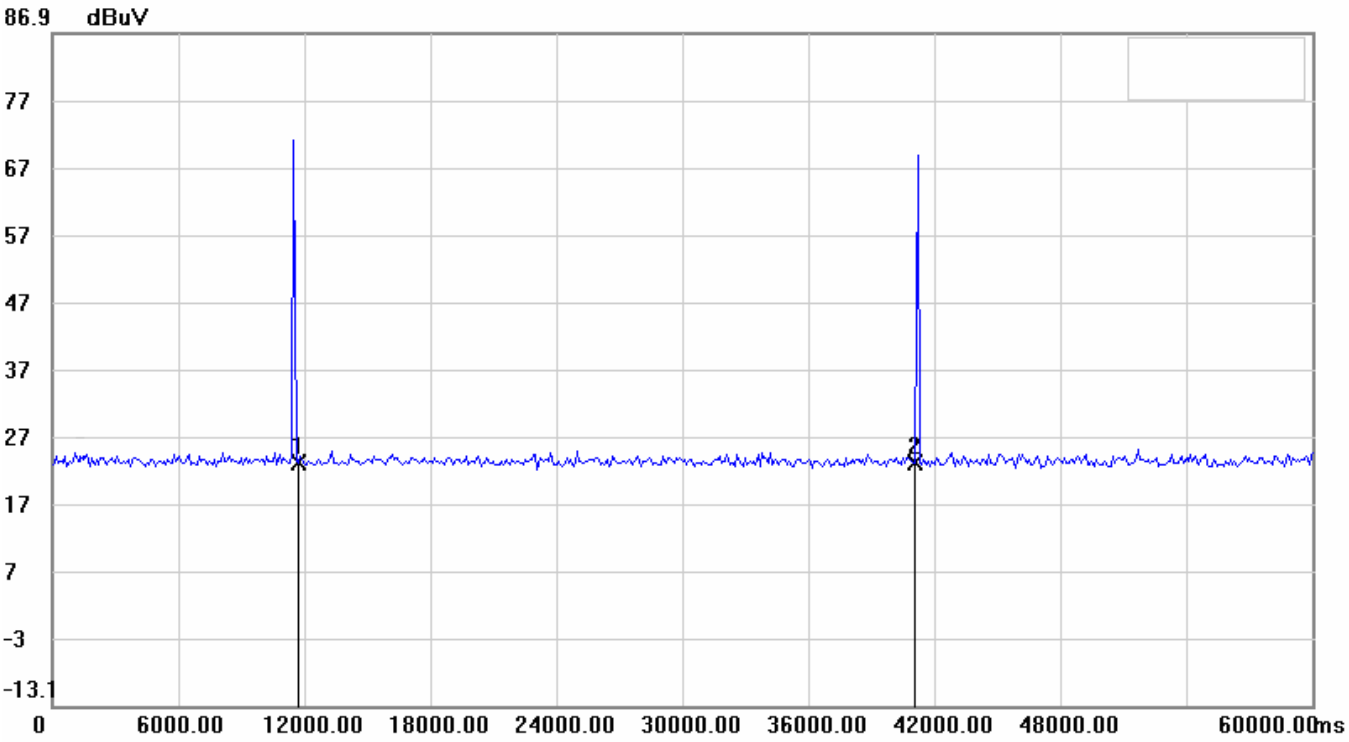
Condition: **RF Conducted**
EUT: **Sweep Time: 100ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **Duty cycle(Sleep Alert)-2**

No.	Sweep time(ms)	Level(dBm)
1	60.6667	-86.50
2	68.8333	-88.65

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	8.1666	-2.15

Sleep mode

File: sensor 1 **Data: #9** **Date: 2012/5/11** **Temperature: 20 ℃**
Time: PM 08:26:48 **Humidity: 54 %**

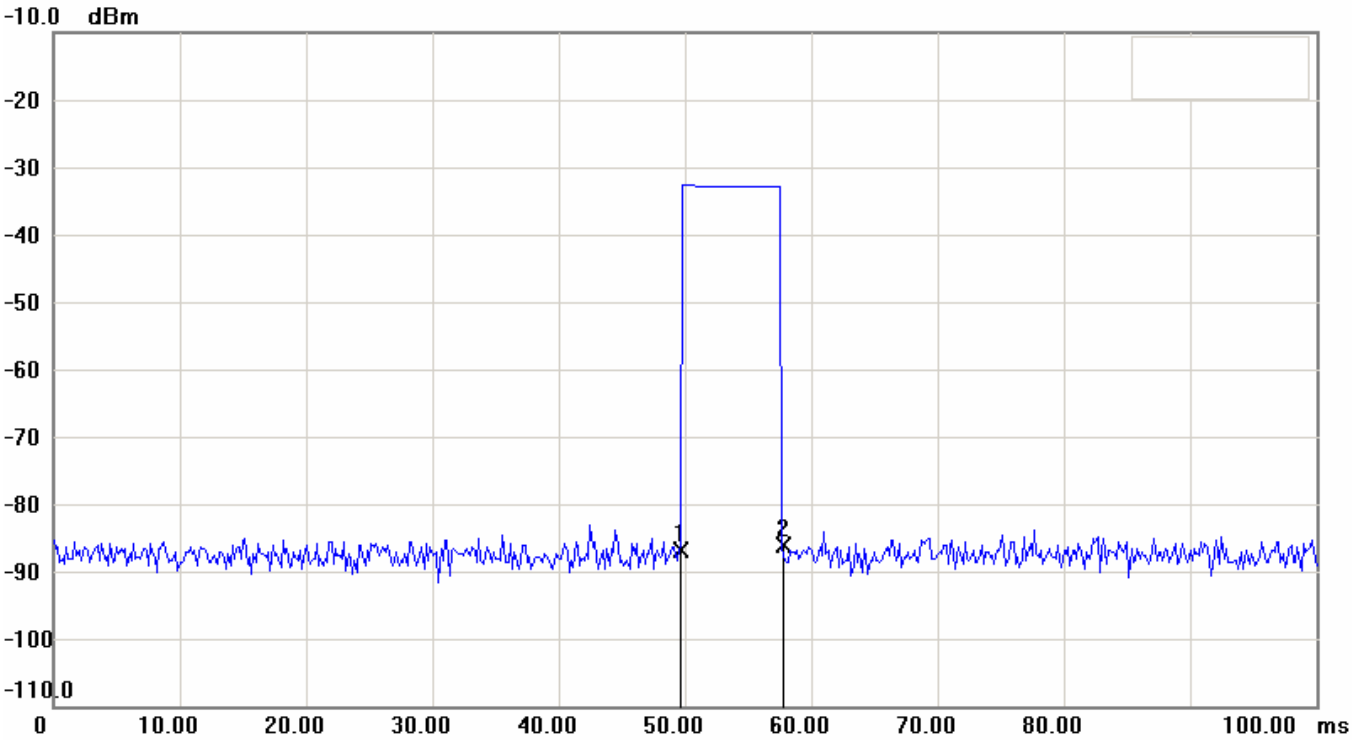


Condition: **RF Conducted**
EUT: **Sweep Time: 60000ms Att.: 10dB**
Model: **RBW: 100 KHz VBW: 300 KHz**
Test Mode:
Note: **Duty cycle(Sleep)-1**

No.	Sweep time(ms)	Level(dBm)
1	11700.0000	22.99
2	41100.0000	23.08

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	29400	0.09

File: **sensor 1** **Data:** **#13** **Date:** **2012/5/15** **Temperature:** **20 ℃**
Time: **PM 12:27:26** **Humidity:** **54 %**



Condition: **RF Conducted**
EUT: **Sweep Time: 100ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **Duty cycle(Sleep)-2**

No.	Sweep time(ms)	Level(dBm)
1	49.5000	-86.79
2	57.6667	-86.23

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	8.1667	0.56

3.6 Measuring Instrument Setup

Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band (MHz)	Instrument	Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	EMI Test Receiver	Peak	120 kHz	300 kHz
1000 to 4500	EMI Test Receiver	Peak	1 MHz	1 MHz

4. BANDWIDTH OF EMISSION

4.1 Applicable Standard Plot Graphic of Bandwidth

Per FCC rule §15.231(c), the permitted emission bandwidth is no wider than 0.25%of the center frequency for devices operating above 70 MHz and below 900 MHz.

4.2 Test Equipment

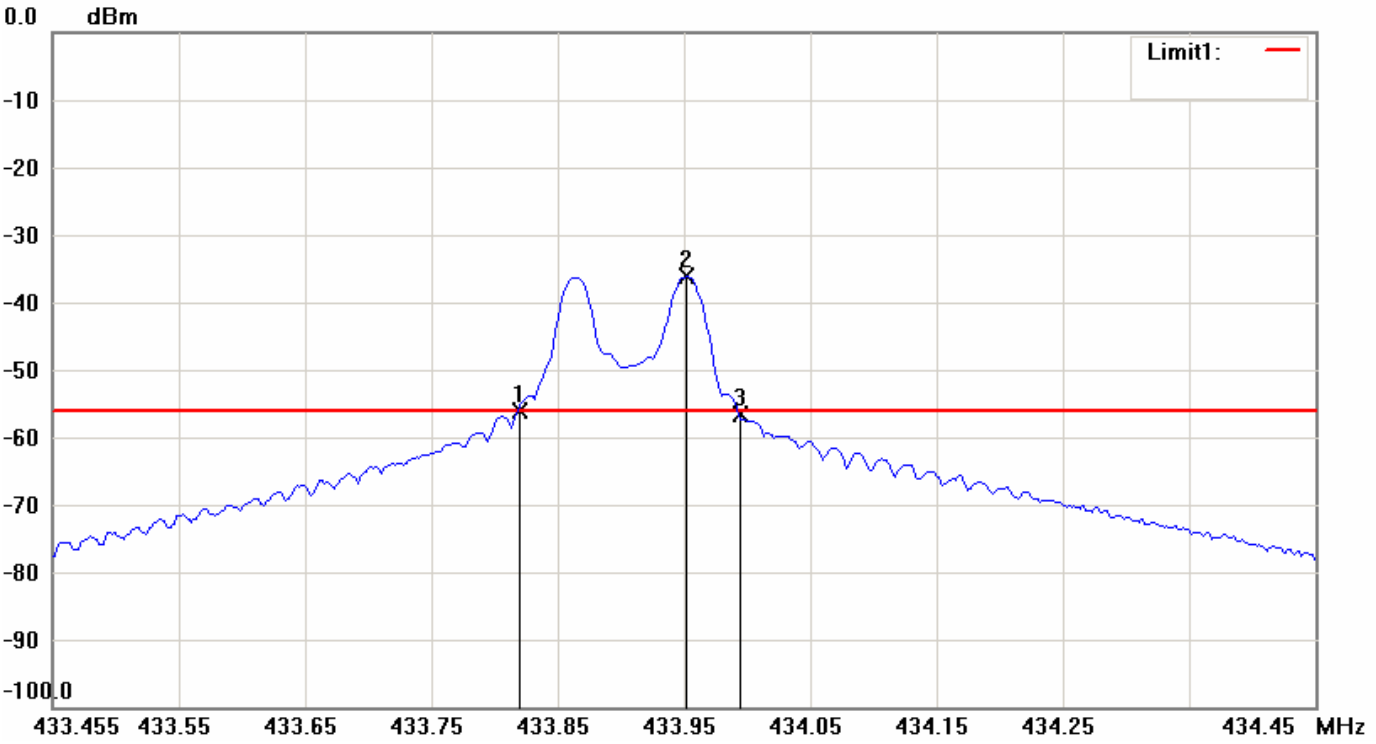
Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Agilent	E4446A	09/18/2012

4.3 Test Result

Test Date :Jul. 18, 2012 Temperature : 20 ℃ Humidity : 54%

Center Frequency	433.8176 MHz
FCC Limit	433.8176 MHz ×0.25% = 1084.54 kHz
Bandwidth of Emission	175 kHz
Chart	Page 30
Result	PASS

File: sensor 1 **Data: #17** **Date: 2012/7/18** **Temperature: 20 ℃**
Time: AM 11:17:10 **Humidity: 54 %**



Condition:
EUT:
Model:
Test Mode:
Note:

RF Conducted
Sweep Time: 9.24ms Att.: 10dB
RBW: 10 KHz VBW: 100 KHz

No.	Frequency(MHz)	Level(dBm)
1	433.8233	-56.16
2	433.9566	-36.08
3	433.9983	-56.65

No.		△Frequency(MHz)	△Level(dB)
1	mk3-mk1	0.175	-0.49

5. CONDUCTED EMISSION MEASUREMENT

This EUT is excused from investigation of conducted emission, for it is powered by battery only. According to §15.207 (d), measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

6. LIMIT OF TRANSMISSION TIME

6.1 Applicable Standard

According to 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

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Agilent	E4446A	09/18/2012

6.3 Test Result

Test Date :May 11, 2012 Temperature : 22℃ Humidity : 53%
Test Date :May 15, 2012 Temperature : 20℃ Humidity : 54%
Test Date :Jul. 16, 2012 Temperature : 24℃ Humidity : 58%

6.3.1 Drive Alert mode

The Signal is operated automatically and the duration of transmission is 0.2675 sec. The silent period between transmissions is 63.6 sec. Meet the requirement.

Note : Please refer to page 34-35 for chart

6.3.2 Drive mode

The Signal is operated automatically and the duration of transmission is 0.08 sec. The silent period between transmissions is 59 sec. Meet the requirement.

Note : Please refer to page 36-37 for chart

6.3.3 Park Alert mode

The Signal is operated automatically and the duration of transmission is 0.2775 sec. The silent period between transmissions is 60 sec. Meet the requirement.

Note : Please refer to page 38-39 for chart

6.3.4 Park mode

The Signal is operated automatically and the duration of transmission is 0.0608 sec. The silent period between transmissions is 59.6 sec. Meet the requirement.

Note : Please refer to page 40-41 for chart

6.3.5 Sleep Alert mode

The Signal is operated automatically and the duration of transmission is 0.2758 sec. The silent period between transmissions is 34.2 sec. Meet the requirement.

Note : Please refer to page 42-43 for chart

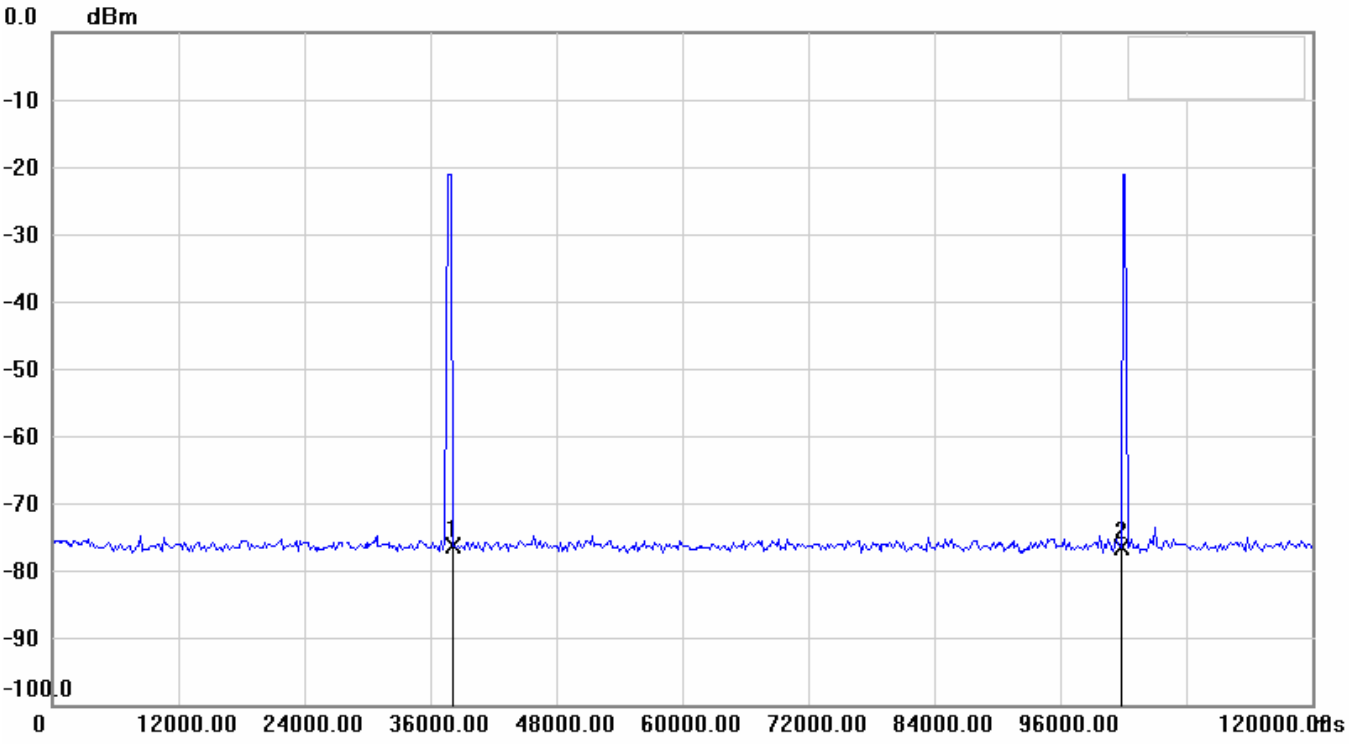
6.3.6 Sleep mode

The Signal is operated automatically and the duration of transmission is 0.0108 sec. The silent period between transmissions is 29.4 sec. Meet the requirement.

Note : Please refer to page 44-45 for chart

Drive Alert mode

File: sensor 1 **Data: #15** **Date: 2012/7/16** **Temperature: 24 ℃**
Time: PM 09:14:55 **Humidity: 58 %**

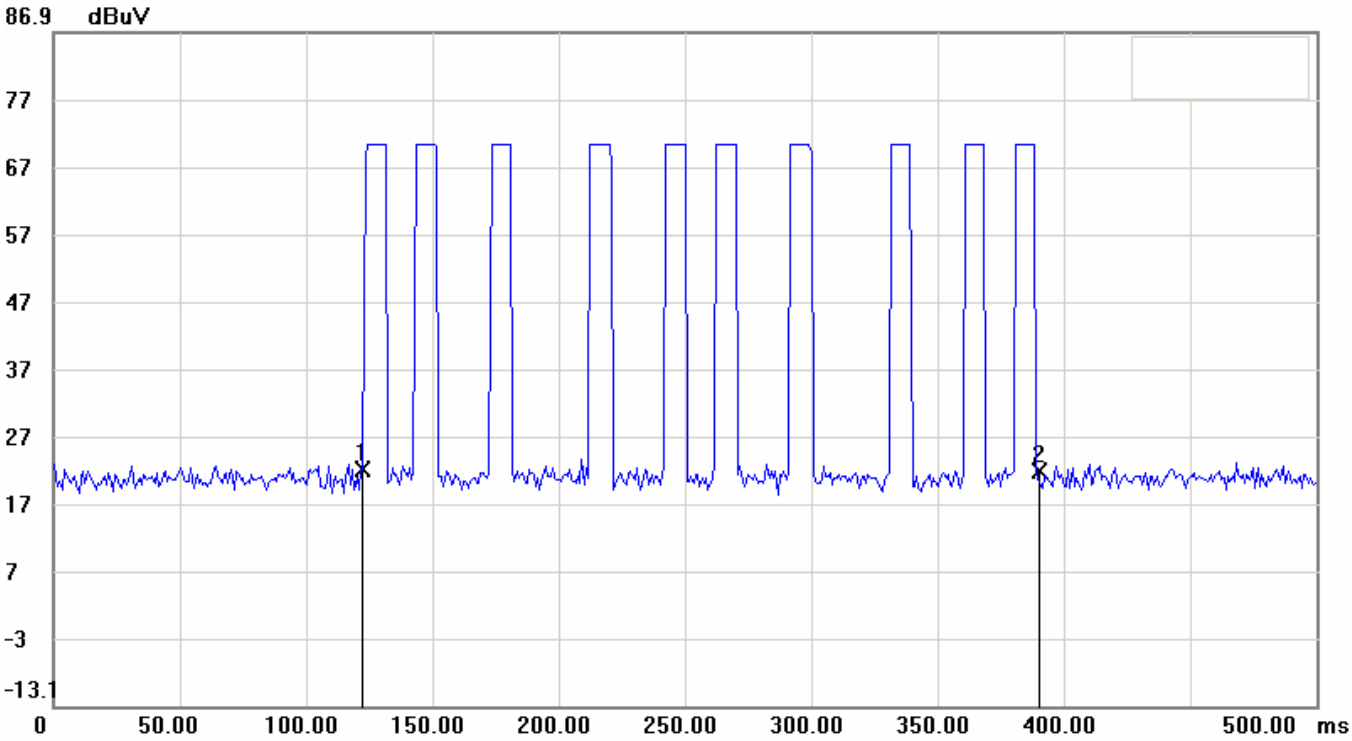


Condition: **RF Conducted**
EUT: **Sweep Time: 120000ms Att.: 10dB**
Model: **RBW: 100 KHz VBW: 300 KHz**
Test Mode:
Note: **realease time(Drive Alert)-1**

No.	Sweep time(ms)	Level(dBm)
1	38200.0000	-76.31
2	101800.0000	-76.74

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	63600	-0.43

File: **sensor 1** **Data:** **#4** **Date:** **2012/5/11** **Temperature:** **22 ℃**
Time: **PM 07:44:33** **Humidity:** **53 %**



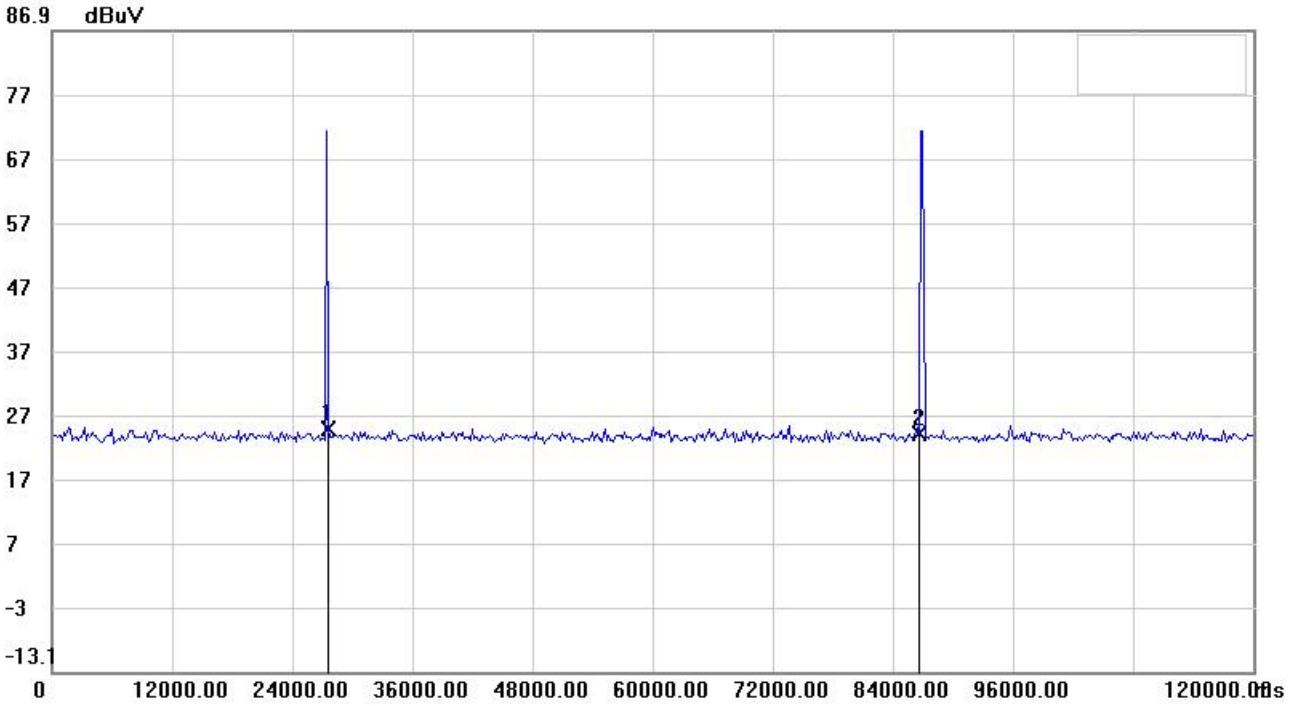
Condition: **RF Conducted**
EUT: **Sweep Time: 500ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **realease time(Drive Alert)-2**

No.	Sweep time(ms)	Level(dBm)
1	121.6667	21.95
2	389.1667	21.68

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	267.5	-0.27

Drive mode

File: sensor 1 **Data: #6** **Date: 2012/5/11** **Temperature: 22 ℃**
Time: PM 07:59:25 **Humidity: 53 %**

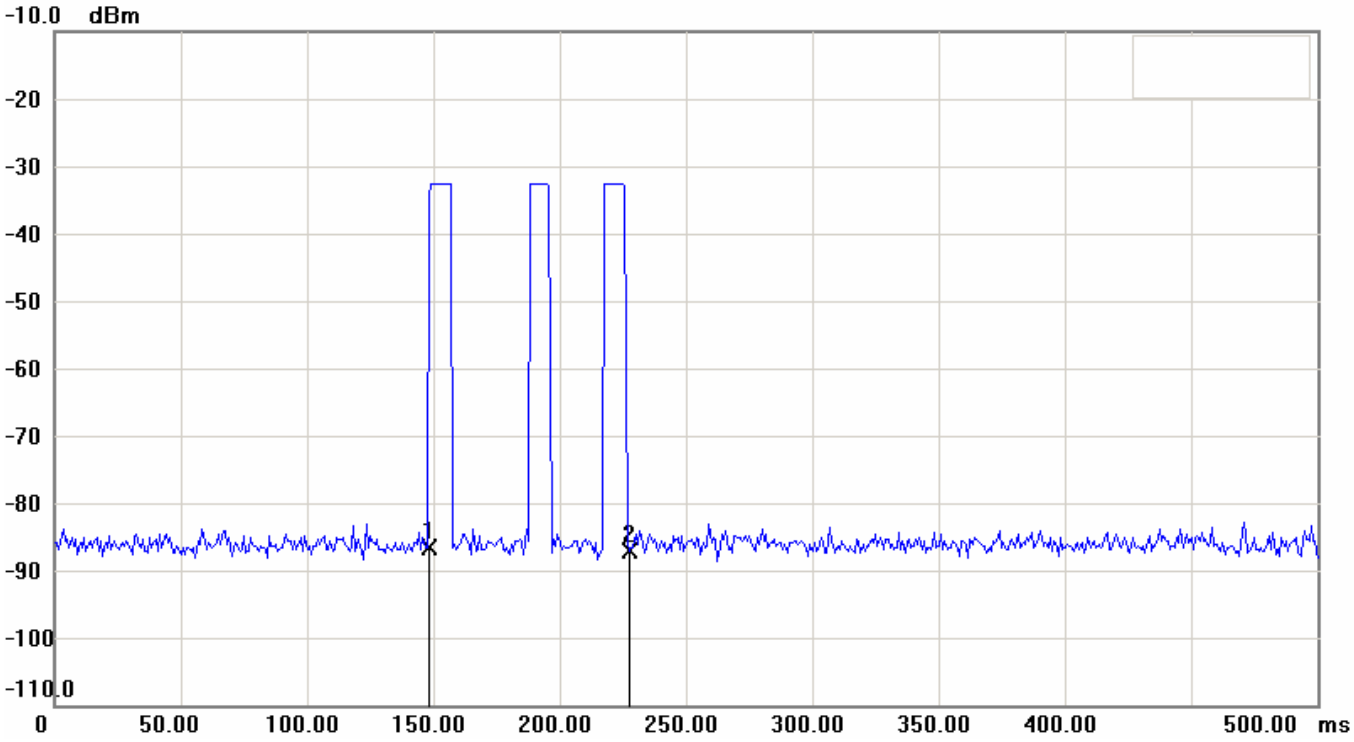


Condition: **RF Conducted**
EUT: **Sweep Time: 120000ms Att.: 10dB**
Model: **RBW: 100 KHz VBW: 300 KHz**
Test Mode:
Note: **realease time(Drive)-1**

No.	Sweep time(ms)	Level(dBm)
1	27600.0000	24.82
2	86600.0000	24.12

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	59000	-0.7

File: **sensor 1** **Data:** **#12** **Date:** **2012/5/15** **Temperature:** **20 ℃**
Time: **PM 12:23:19** **Humidity:** **54 %**



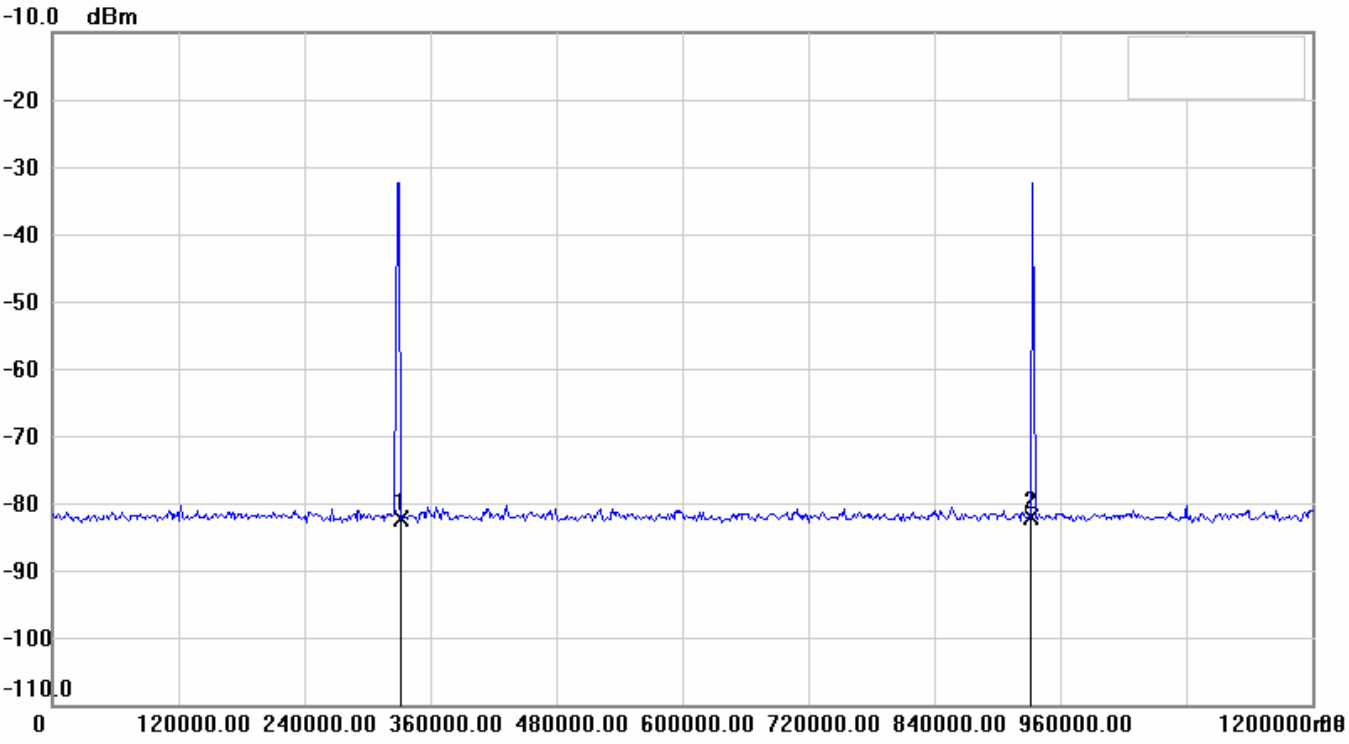
Condition: **RF Conducted**
EUT: **Sweep Time: 500ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **realease time(Drive)-2**

No.	Sweep time(ms)	Level(dBm)
1	147.5000	-86.66
2	227.5000	-87.14

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	80	-0.48

Park Alert mode

File: sensor 2 **Data: #6** **Date: 2012/5/15** **Temperature: 20 ℃**
Time: PM 03:48:31 **Humidity: 54 %**

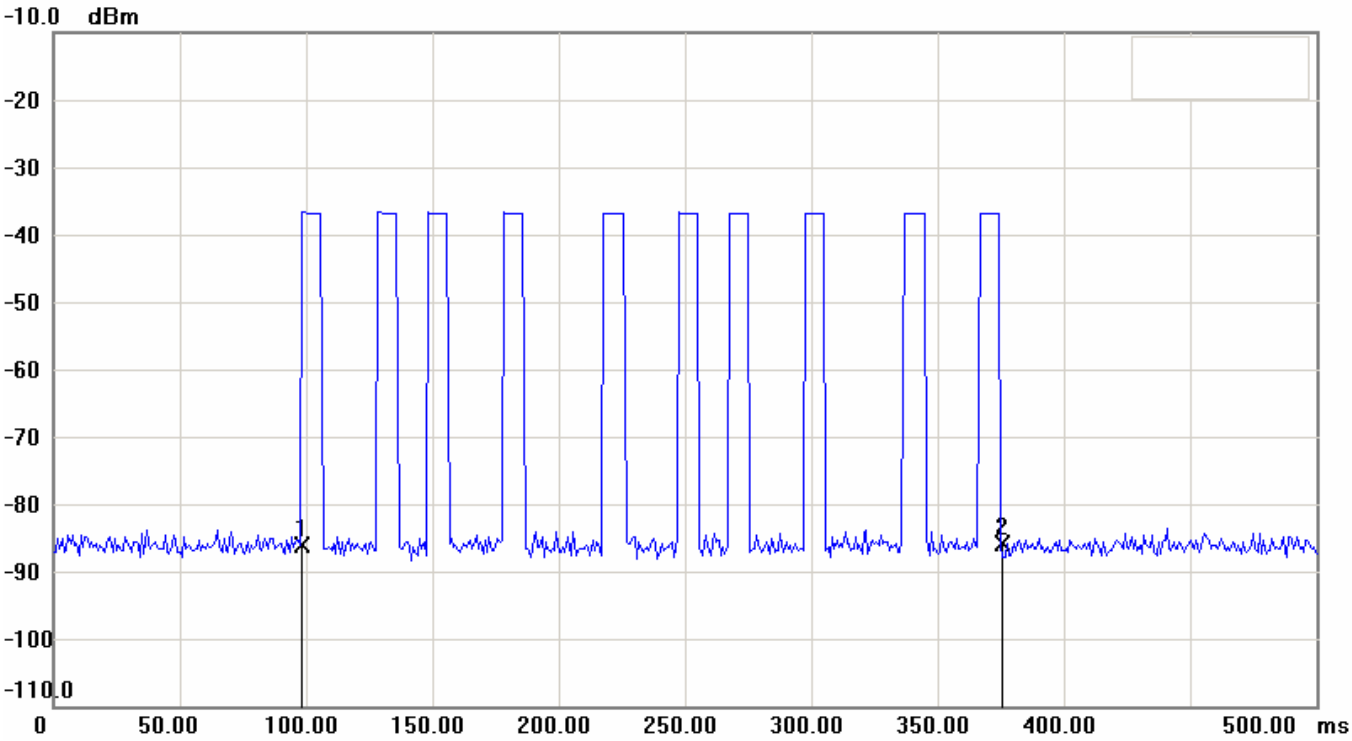


Condition: **RF Conducted**
EUT: **Sweep Time: 1200000ms Att.: 10dB**
Model: **RBW: 100 KHz VBW: 300 KHz**
Test Mode:
Note: **realease time(Park Alert)-1**

No.	Sweep time(ms)	Level(dBm)
1	332000.0000	-82.26
2	932000.0000	-82.10

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	600000	0.16

File: **sensor 2** **Data:** **#4** **Date:** **2012/5/15** **Temperature:** **20 ℃**
Time: **PM 03:04:01** **Humidity:** **54 %**



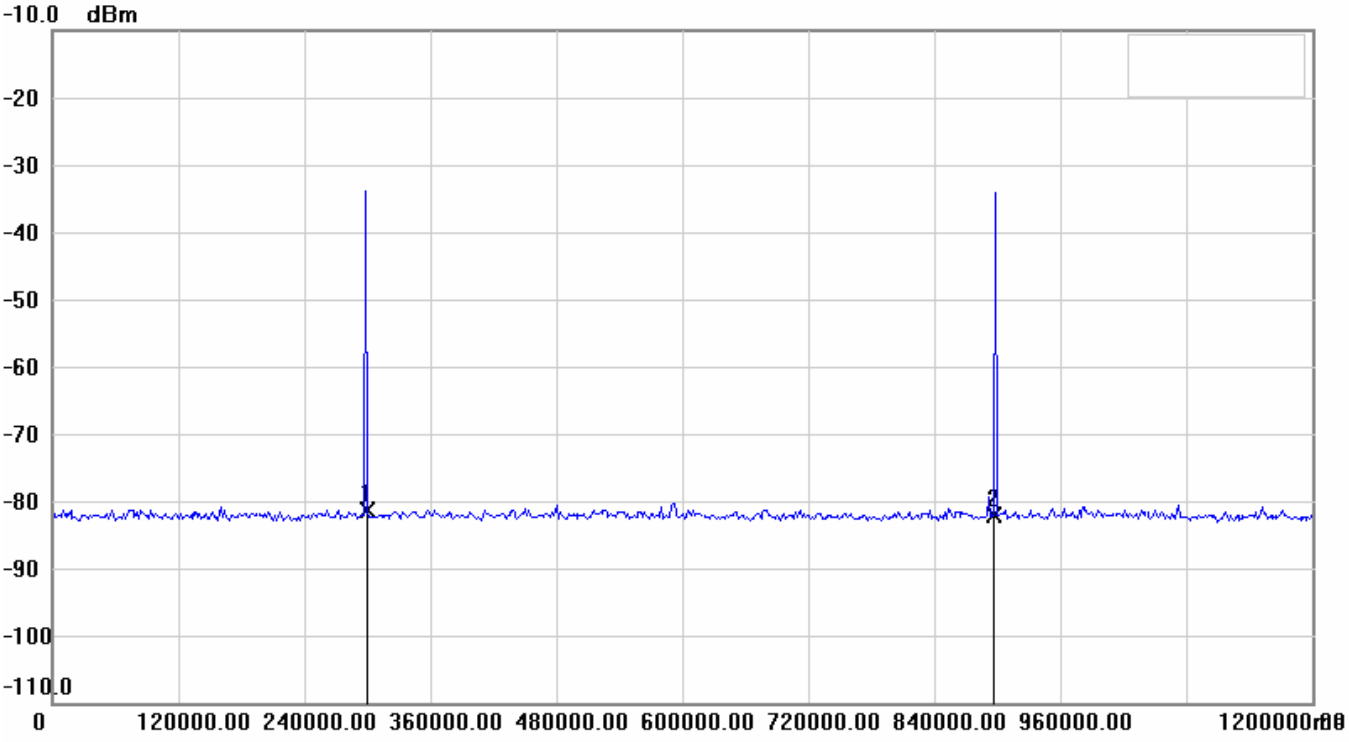
Condition: **RF Conducted**
EUT: **Sweep Time: 500ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **realease time(Park Alert)-2**

No.	Sweep time(ms)	Level(dBm)
1	97.5000	-86.02
2	375.0000	-85.99

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	277.5	0.03

Park mode

File: sensor 2 **Data: #3** **Date: 2012/5/15** **Temperature: 20 ℃**
Time: PM 02:48:30 **Humidity: 54 %**

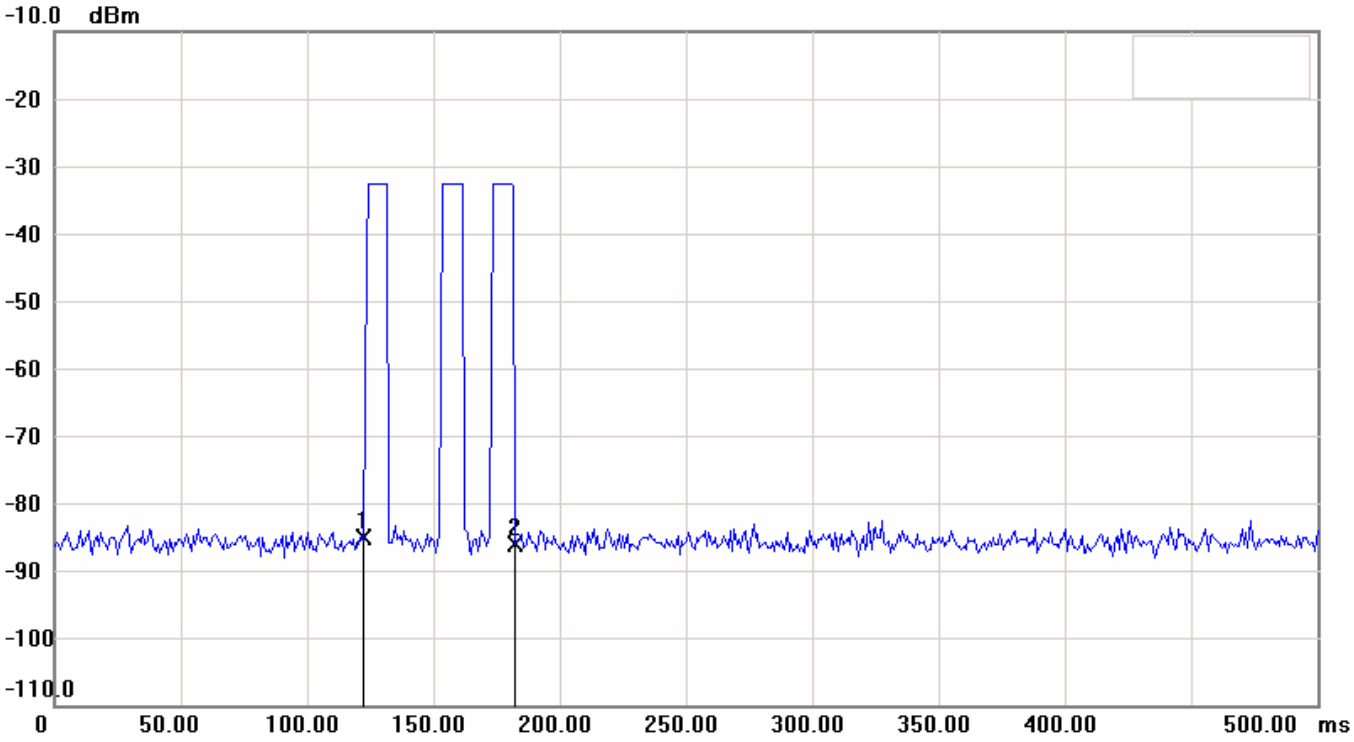


Condition: **RF Conducted**
EUT: **Sweep Time: 1200000ms Att.: 10dB**
Model: **RBW: 100 KHz VBW: 300 KHz**
Test Mode:
Note: **realease time(Park)-1**

No.	Sweep time(ms)	Level(dBm)
1	300000.0000	-81.41
2	896000.0000	-82.15

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	596000	-0.74

File: **sensor 2** **Data:** **#5** **Date:** **2012/5/15** **Temperature:** **20 ℃**
Time: **PM 03:13:42** **Humidity:** **54 %**



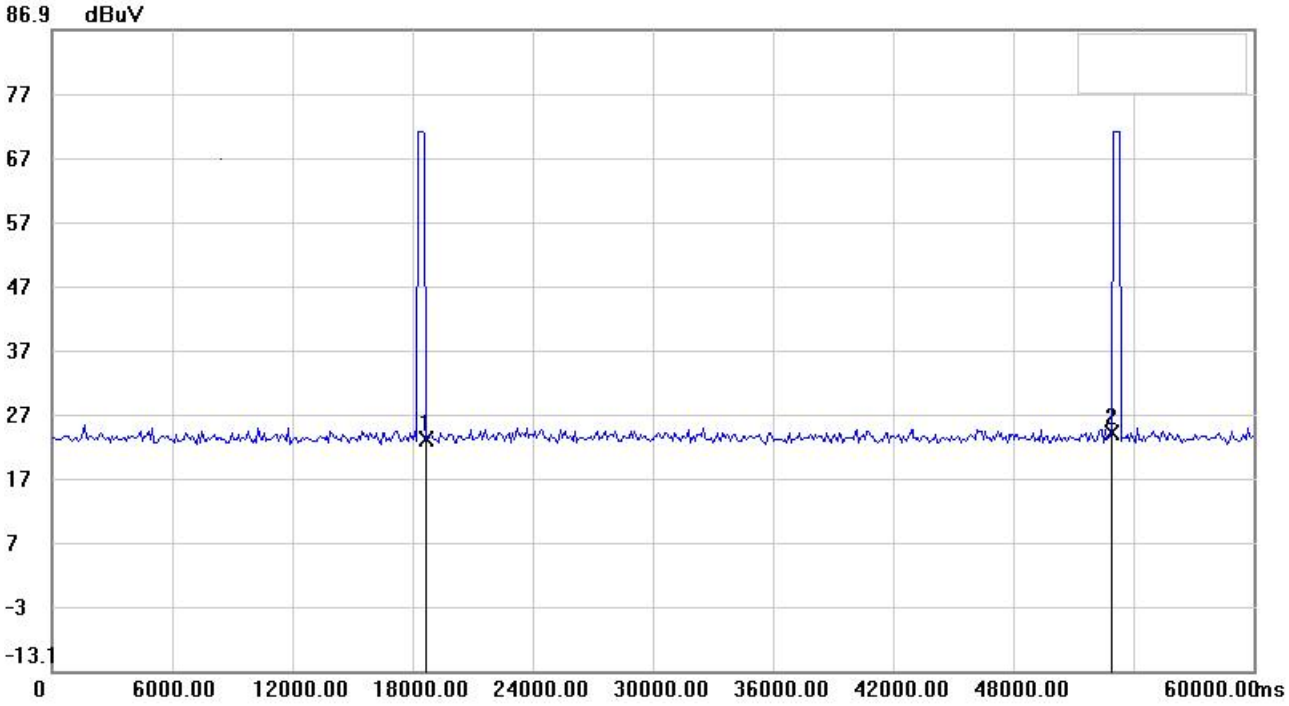
Condition: **RF Conducted**
EUT: **Sweep Time: 500ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **realease time(Park)-2**

No.	Sweep time(ms)	Level(dBm)
1	121.6667	-85.16
2	182.5000	-86.09

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	60.8333	-0.93

Sleep Alert mode

File: sensor 1 **Data: #2** **Date: 2012/5/11** **Temperature: 22 ℃**
Time: PM 07:03:02 **Humidity: 53 %**

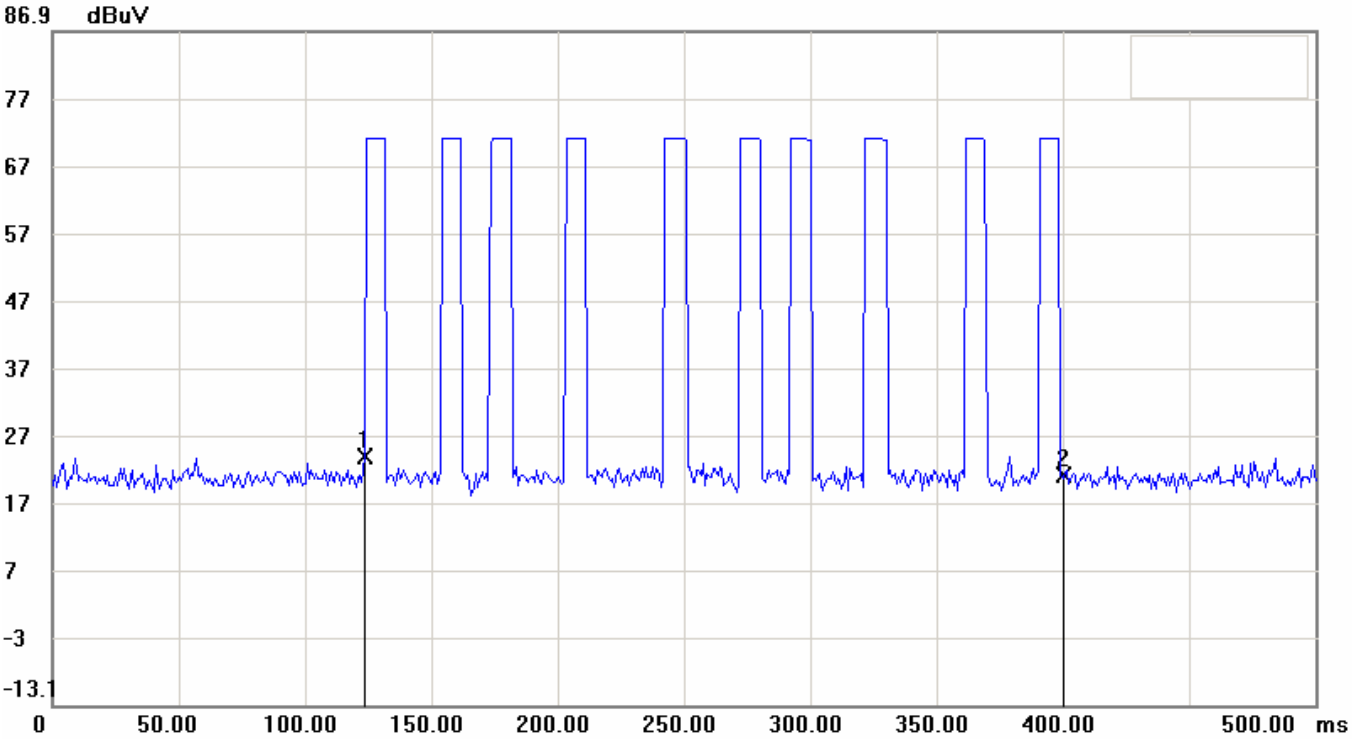


Condition: **RF Conducted**
EUT: **Sweep Time: 60000ms Att.: 10dB**
Model: **RBW: 100 KHz VBW: 300 KHz**
Test Mode:
Note: **realease time(Sleep Alert)-1**

No.	Sweep time(ms)	Level(dBm)
1	18700.0000	23.07
2	52900.0000	24.03

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	34200	0.96

File: **sensor 1** **Data:** **#5** **Date:** **2012/5/11** **Temperature:** **20 ℃**
Time: **PM 07:48:12** **Humidity:** **54 %**



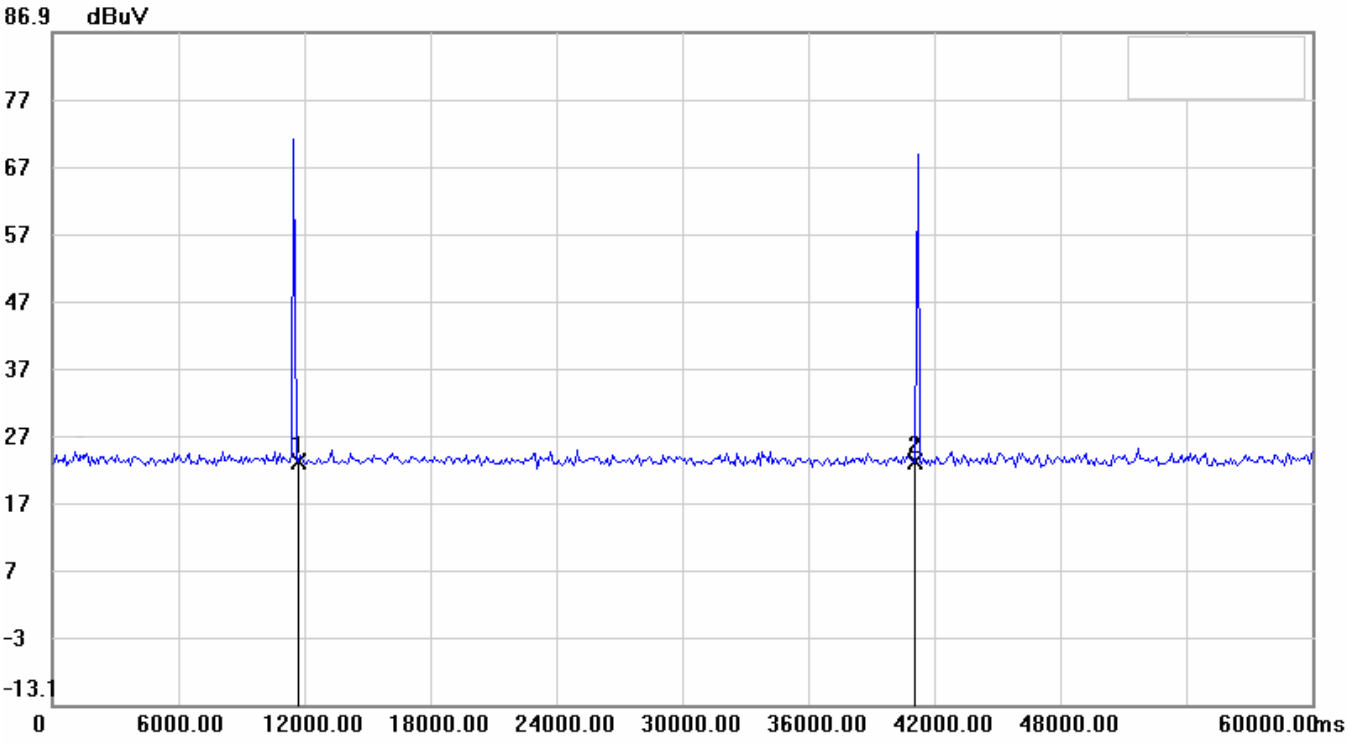
Condition: **RF Conducted**
EUT: **Sweep Time: 500ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **realease time(Sleep Alert)-2**

No.	Sweep time(ms)	Level(dBm)
1	123.3333	23.75
2	399.1667	21.02

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	275.8334	-2.73

Sleep mode

File: sensor 1 **Data: #9** **Date: 2012/5/11** **Temperature: 22 ℃**
Time: PM 08:26:48 **Humidity: 53%**

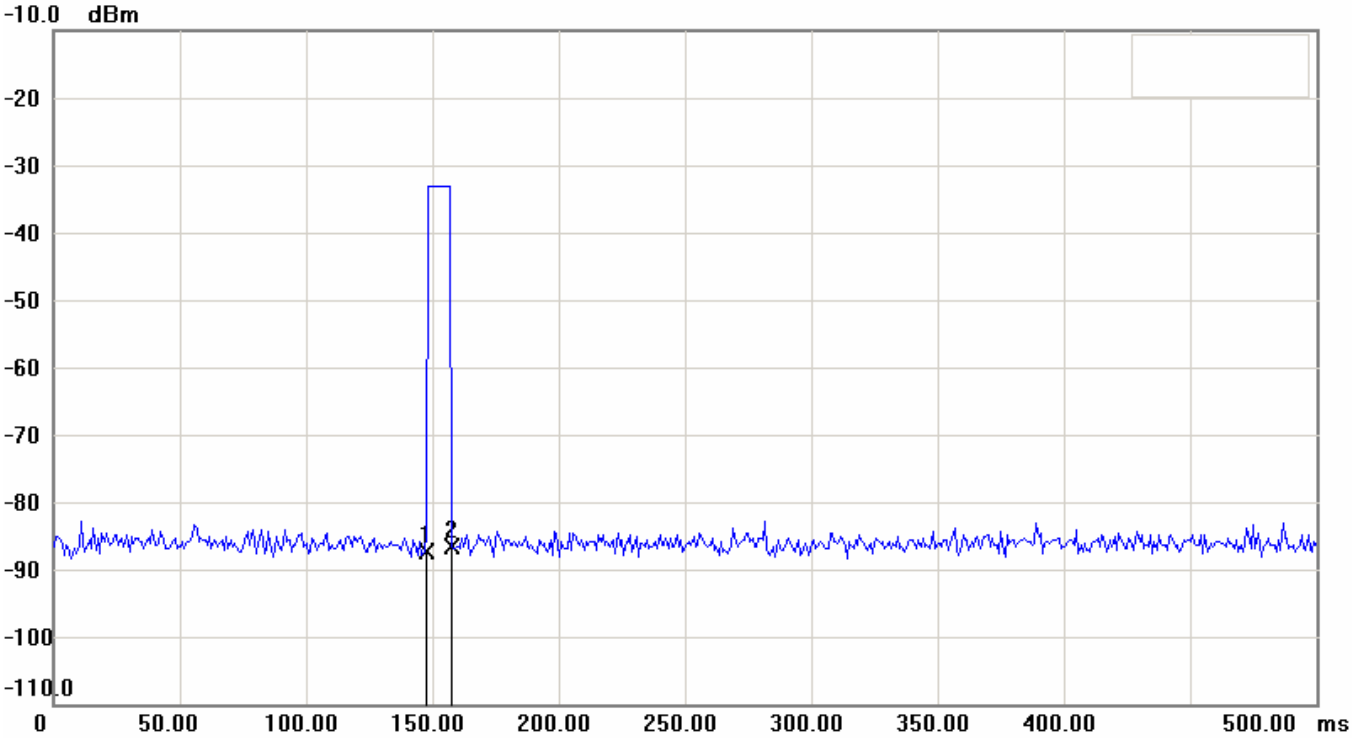


Condition: **RF Conducted**
EUT: **Sweep Time: 60000ms Att.: 10dB**
Model: **RBW: 100 KHz VBW: 300 KHz**
Test Mode:
Note: **realease time(Sleep)-1**

No.	Sweep time(ms)	Level(dBm)
1	11700.0000	22.99
2	41100.0000	23.08

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	29400	0.09

File: **sensor 1** **Data:** **#11** **Date:** **2012/5/15** **Temperature:** **20 ℃**
Time: **AM 11:56:28** **Humidity:** **54 %**



Condition: **RF Conducted**
EUT: **Sweep Time: 500ms** **Att.: 10dB**
Model: **RBW: 100 KHz** **VBW: 300 KHz**
Test Mode:
Note: **realease time(Sleep)-2**

No.	Sweep time(ms)	Level(dBm)
1	146.6667	-87.28
2	157.5000	-86.71

No.		△Time(ms)	△Level(dB)
1	mk2-mk1	10.8333	0.57