FCC Test Report

Application No.:	HKES130600134001
Applicant:	Captial Prospect Ltd.
Address	Room 03, 13/F., Block B, Veristrong Ind. Centre, 34-36 Au Pui Wan Street, Fo Tan, N.T.
Product Information:	
Product Description:	Remote Transmitter
Model:	G7M
Product Class :	Low Power Communication Device – Transmitter 300-318MHz & 390-433.92MHz (300MHz, 310MHz, 315MHz, 317.5MHz, 318MHz, 390MHz & 433.9MHz)
FCC ID	KUTG7M
Requirement:	CFR 47 FCC PART 15 SUBPART C, 2012 - Intentional Radiators.
Date of Receipt:	13-06-2013
Date of Test:	14-06-2013 to 29-07-2013
Date of Issue:	29-07-2013

Test Result :	**PASS***

* In the configuration tested, the EUT complied with the requirements for the relevant clauses of Federal Communications Commission Rules as specified above.

Authorized Signature:

LOKE Sai Kit, Wilson
Senior Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of International Electrical Certification Centre Ltd. or testing done by International Electrical Certification Centre Ltd. in connection with, distribution or use of the product described in this report must be approved by International Electrical Certification Centre Ltd. in writing.

2 Test Summary

Test	Test Requirement	Test Method	Result
Antenna Requirement	FCC PART 15, SUBPART C: 2012	ANSI C63.4:2003	PASS
Radiated Emission	FCC PART 15, SUBPART C: 2012	ANSI C63.4:2003	PASS
Bandwidth	FCC PART 15, SUBPART C: 2012	ANSI C63.4:2003	PASS
Provision of Momentary operation	FCC PART 15, SUBPART C: 2012	ANSI C63.4:2003	PASS
Remark : 1) Please refer to section 6.1 of this report for explanation			

3 Contents

4 General Information

4.1 General Description of EUT

EUT Name:	Remote Transmitter
Model:	G7M
Serial No.:	--
Type of modification:	OOK
Operating frequency:	Frequency range: 300-318MHz, (The number of frequencies are 300MHz, 310MHz, 315MHz, 317.5MHz & 318MHz) Frequency range: 390-433.92MHz (The number of frequencies are 390MHz & 433.9MHz)
Antenna type:	Integral antenna

4.2 Details of EUT

Power Supply:	DC 3V (Button cell CR2032 x1)
Power Cord:	--

4.3 Conditions of EUT

The received sample was under good condition. The operating frequenies are selectable from 300MHz to 433.9MHz and the operating frequency of 300MHz, 310MHz, 318MHz, 390MHz and 433.9MHz were tested.

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Standards Applicable for Testing

CFR 47, FCC Part 15, Oct 2012
ANSI C63.4:2003

4.6 Test Location

All tests were performed at: -

SGS IECC Limited (Member of the SGS Group (SGS SA))

Units 303-305, 3/F., 31 Lok Yip Road, On Lok Tsuen, Fanling, N.T., Hong Kong

Tel: +852 2305 2570 Fax: +852 2756 4480.

No tests were sub-contracted.

4.7 Test Facility

Measurement facility located at Fanling (Hong Kong), placed on file with the FCC Pursuant to Section 2.948 of the FCC Rules **(FCC Registration No. : 97774)**.

The test facility is recognized, certified, or accredited by the following organizations:

FCC – CAB Registration No.: 446297

Measurement facility located at Fanling (Hong Kong), accredited as a Conformity Assessment Body (CAB) and was designated by FCC to perform compliance testing on equipment subject to Declaration Of Conformity (DOC) and Certification under Part 15 and 18 of the Commission's Rules.

4.8 Deviation from Standards

None.

4.9 Abnormalities from Standard Conditions

None.

4.10 Declaration of Family Grouping

None.

4.11 Abbreviations

N/A: Not Applicable
EUT: Equipment Under Test

5 Equipments Used during Test

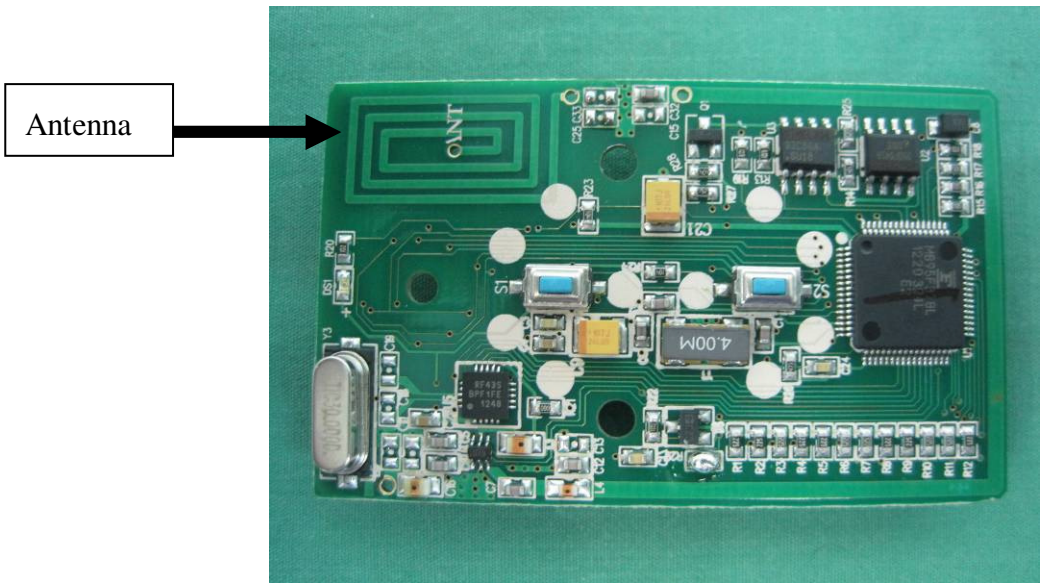
Radiated Emission				
Equipment	**Manufacturer**	**Model / Serial No.**	**Cal. Date**	**Cal. Due Date**
3m Semi-Anechoic Chamber (pre-test)	--	--	--	--
3m / 10m Open Aera Test Site	--	--	2012-02-24	2015-02-23
Test Receiver	Rohde & Schwarz	ESCS 30 / 100388	2012-11-19	2013-11-18
Spectrum Analyzer	Rohde & Schwarz	FSP 30 / 101474	2012-08-16	2013-08-15
Antenna 30-1000MHz	Schaffner	CBL6111C / 2791	2012-10-11	2014-10-10
Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D / 9120D-1070	2012-11-13	2014-11-12
Preamplifier 10MHz – 6GHz	Schwarzbeck	BBV9743 / 9743-052	2012-11-13	2014-11-12
Preamplifier 1-18GHz	Schwarzbeck	BBV9718 / 9718-223	2012-11-13	2014-11-12
Coaxial Cable	--	E167	2012-08-01	2013-07-31
RF Cable	HUBER+SUHNER	E207	2012-11-14	2013-11-13
Antenna Mast System	Schwarzbeck	AM9104 / -	--	--
Turntable with Controller	Drehtisch	DT312 / -	--	--
General Use Equipment				
Equipment	**Manufacturer**	**Model / Serial No.**	**Cal. Date**	**Cal. Due Date**
Digital Multimeter	Fluke	189 / 83640020	2013-04-10	2014-04-09
Temperature / Humidity meter	-	E158	2012-10-15	2013-10-14

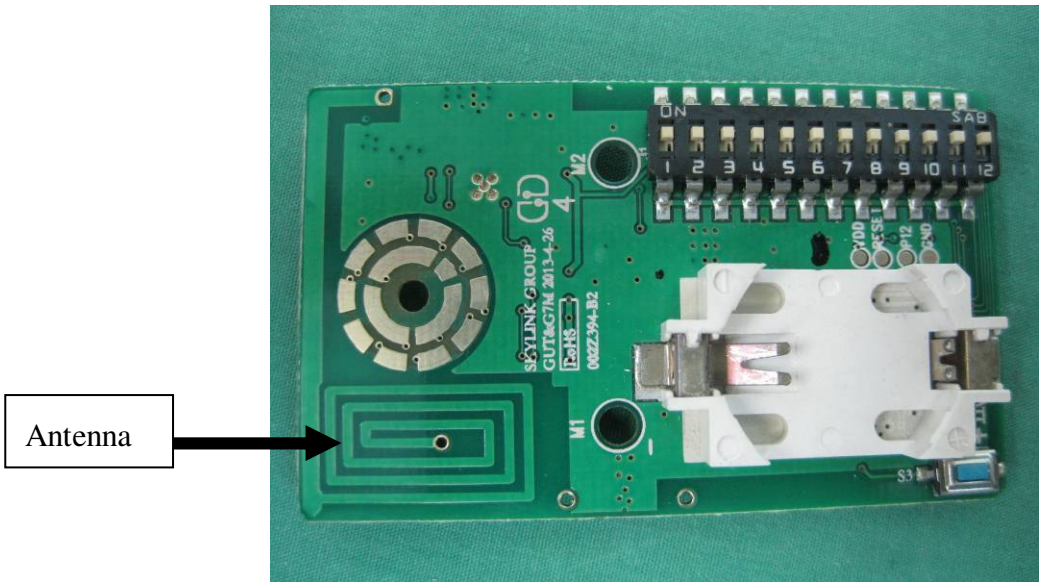
6 Test Results

6.1 Antenna Requirment

According to 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 EuT has component antenna, which accordance to the above sections, is considered sufficient to comply with the provisions of these sections.



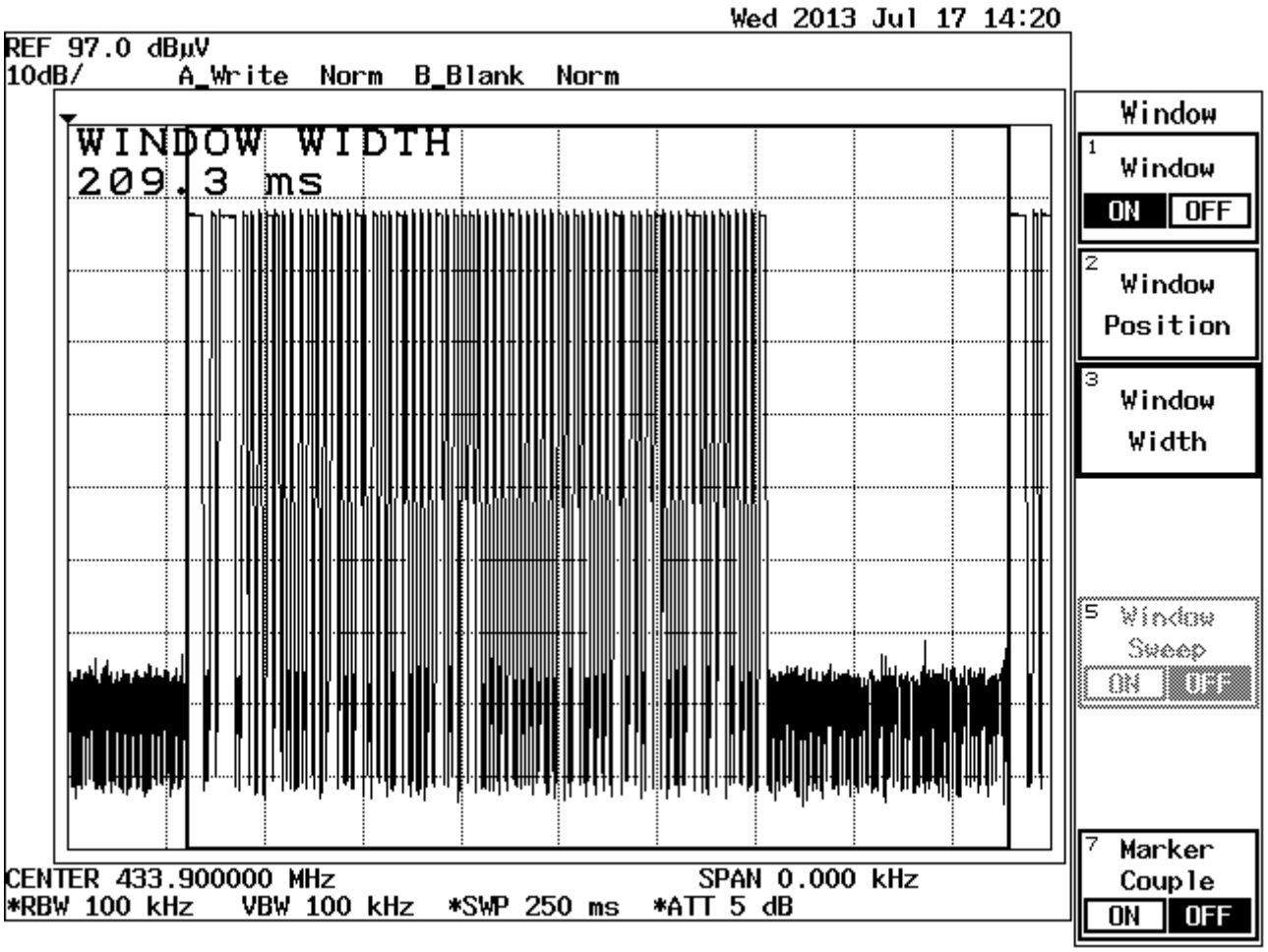


6.2 Average Factor

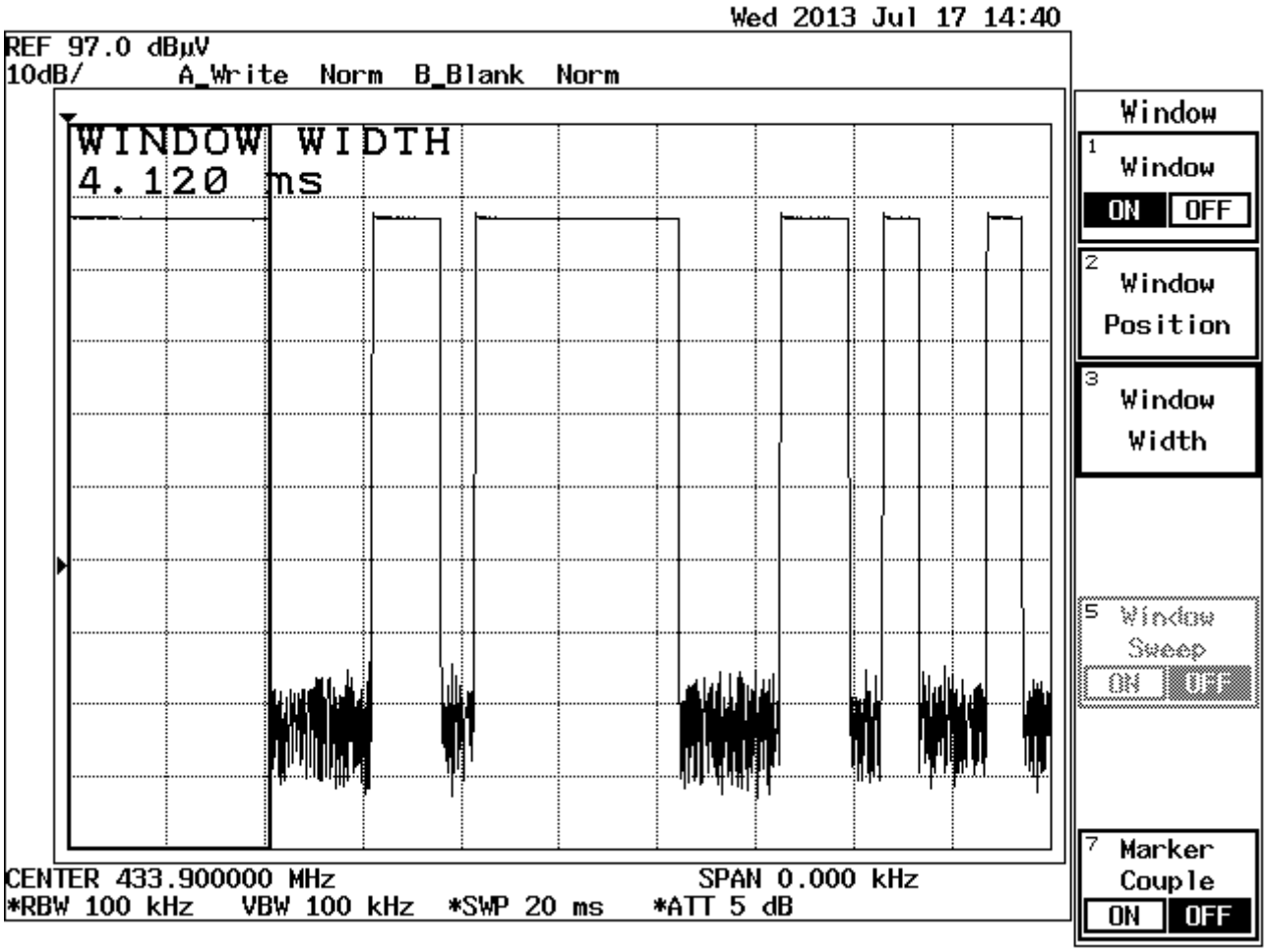
6.2.1 Measurement Data

Time Domain Plots (Fundamental frequency of Transmitter at 433.9MHz, worst case):

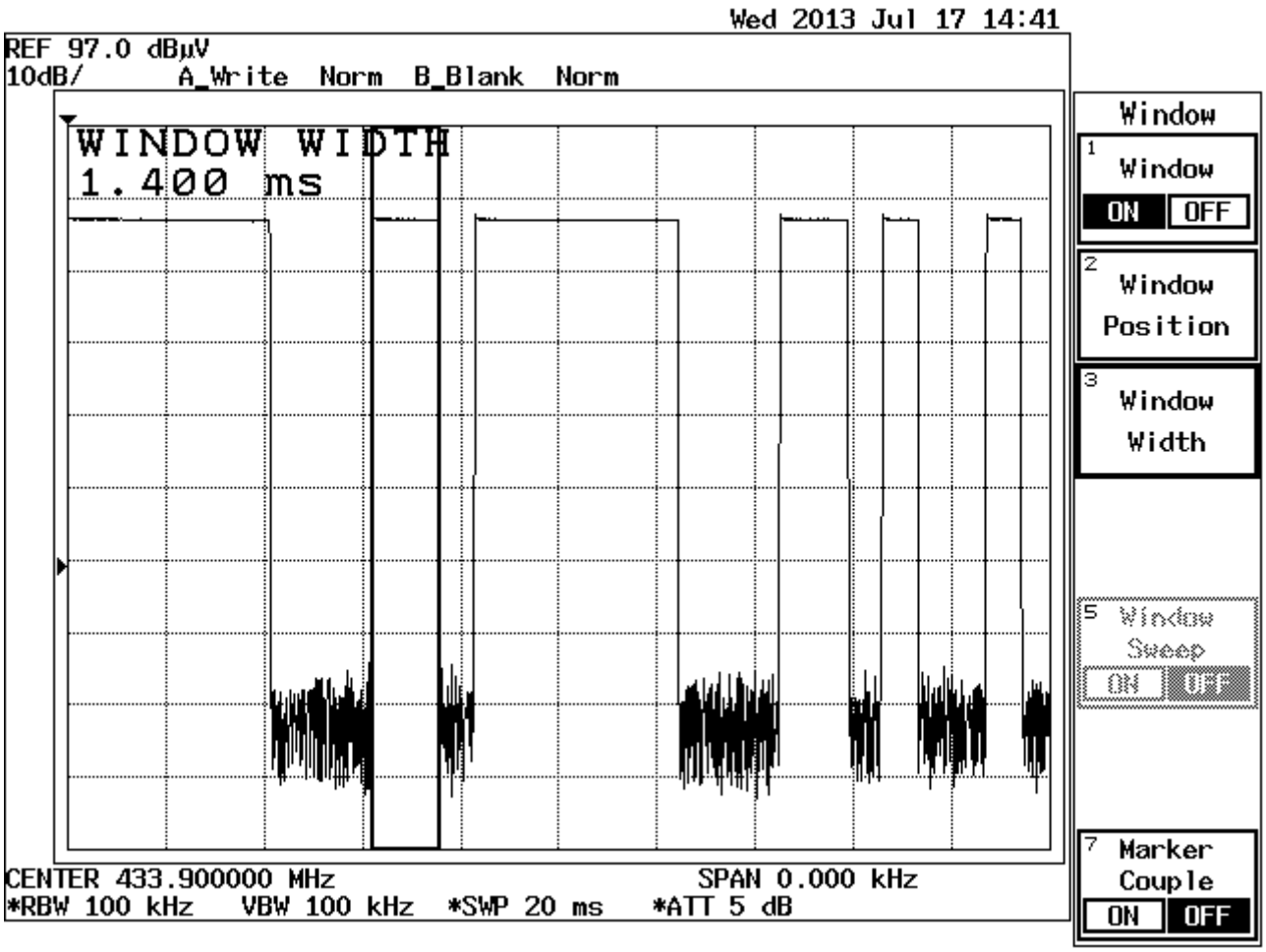
Test results on operation with control for transmition mode :



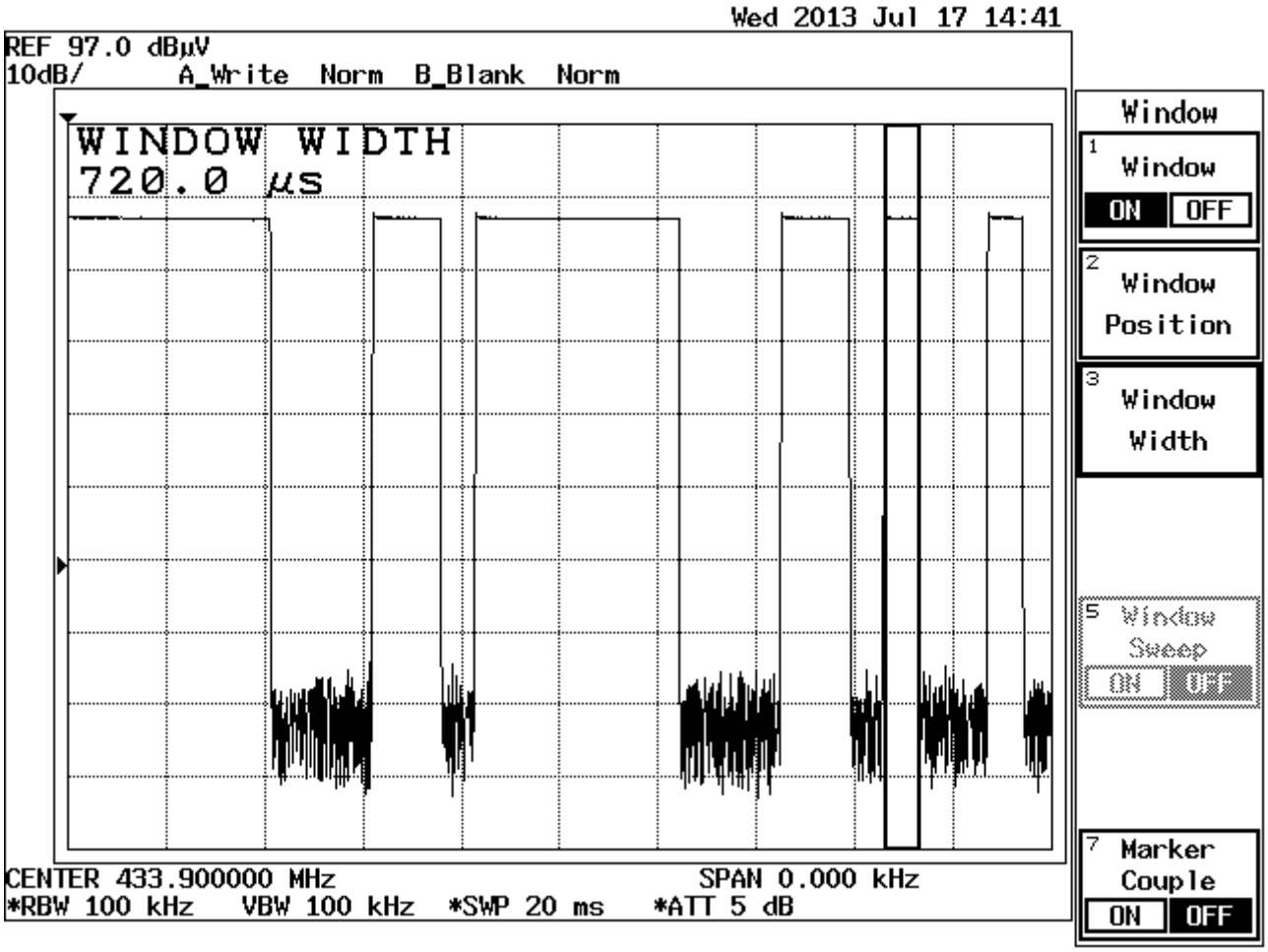
Pulse cycle period > 100ms



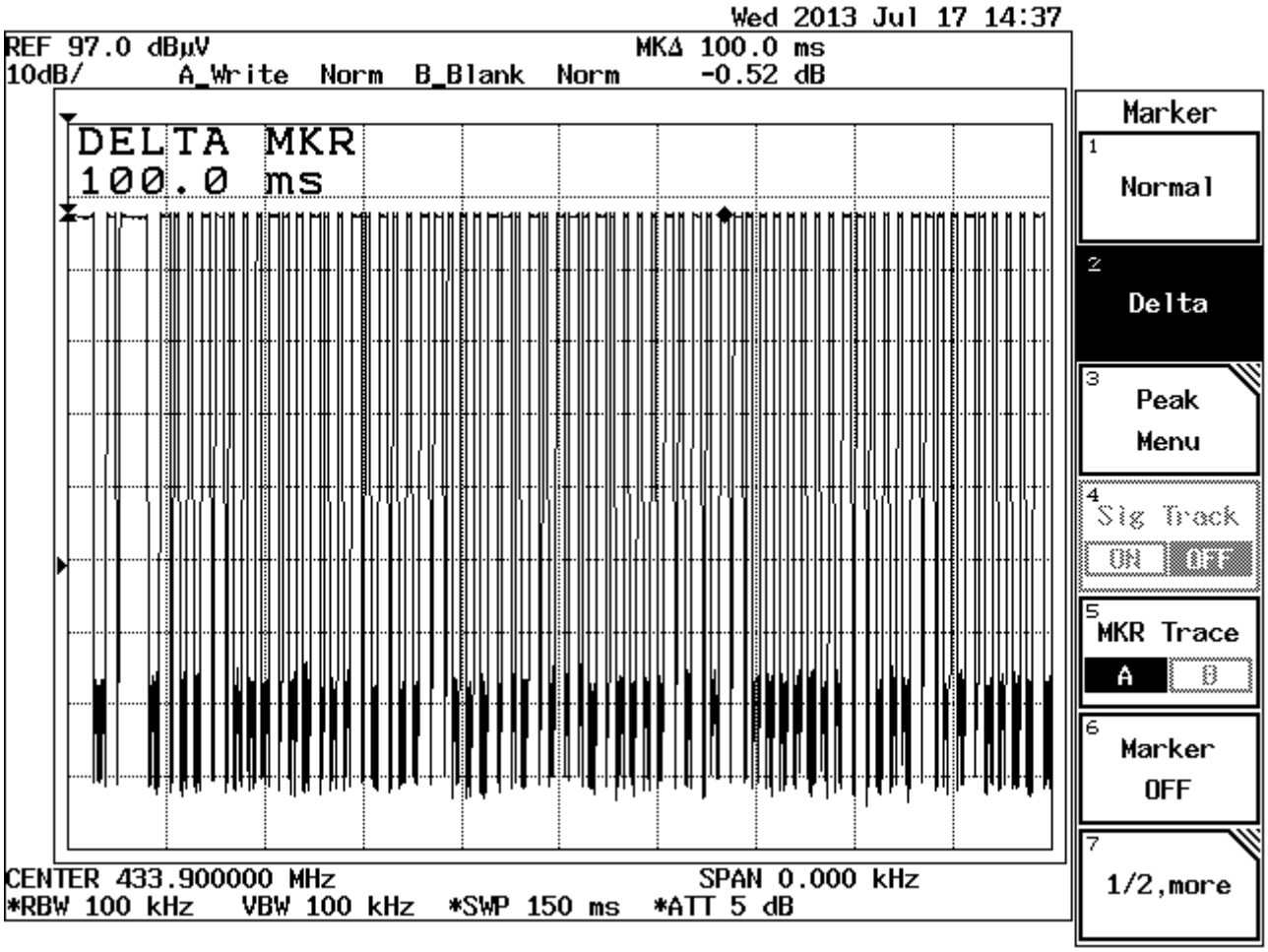
Pulse width = 4.12 ms (total no. of pulse : 2)



Pulse width = 1.4 ms (total no. of pulse : 19)



Pulse width = 0.72 ms (total no. of pulse : 24)



Pulse width = 4.12 ms (total no. of pulse : 2)

Pulse width = 1.4 ms (total no. of pulse : 19)

Pulse width = 0.72 ms (total no. of pulse : 24)

Calculation for radiation (average) :

Formula :

Duty cycle = (N1L1 + N2L2 + … + Nn-1Ln-1 + NnLn) / 100 or T

where

N1 is the number of type 1 pulse, L1 is length of type 1 pulse, etc.

T is the period of the pulse train (if less than 100ms)

According to the time domain plots shown on the next two pages :

Duty cycle of the EUT = (2 x 4.12 + 19 x 1.4 + 24x 0.72) / 100 = 0.52

Av correction factor = 20 x log(0.52) dB

= - 5.7 dB

Remarks:

Average factor of two buttons are measured and the wrost case average factor is shown above.

6.3 Radiated Emissions

Test Requirement: FCC Part15 Subpart C Section 15.231(b)
Test Method: ANSI C63.4
Test Date: 17-07-2013 to 29-07-2013
Frequency Range: 30MHz to 4340MHz
Measurement Distance: 3m
Detector: Peak for pre-scan (120kHz resolution bandwidth)
Quasi-Peak if maximised peak within 6dB of limit

Start frequency (MHz)	Stop frequency (MHz)	Resolution bandwidth	Video bandwidth	Step size	Measurement time	Detector
30	1000	120 kHz	1 MHz	40 kHz	100ms	Peak
1000	4340	1 MHz	3 MHz	400 kHz	100ms	Peak

6.3.1 Measurement Data

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. The EUT was measured by Bilog antenna with 2 orthogonal polarities and frequencies of peak emissions from the EUT were detected within 6dB of the limit line. Final measurement was conducted in the open area test site with data as follows:

Test results on operation with control for transmittion mode (Fundamental frequency of Transmitter at 300MHz):

Frequency (MHz)	Antenna Polarization	Correction Factor (dB/m)	Receiver Reading (dBµV)	Emission Level (dBµV/m)	PK Limit (dBµV/m)	Over Limit (dB)
300.02	V	14.1	61.4	75.5	94.7	-19.2
300.02	H	14.1	65.0	79.1	94.7	-15.6
600.04	H	19.7	26.2	45.9	74.7	-28.8
900.05	H	22.2	30.7	52.9	74.7	-21.8
*1200.00	H	9.6	38.1	47.7	74.0	-26.3
*1500.00	H	9.9	34.8	44.7	74.0	-29.3
1802.00	H	9.7	40.9	50.6	74.7	-24.1

Frequency (MHz)	Antenna Polarization	Detector	Emission Level (dBμV/m)	Average Factor (dB)	Calculated Average Value (dBμV/m)	AV Limit (dBμV/m)	Over Limit (dB)
300.02	V	Peak	75.5	-5.7	69.8	74.7	-4.9
300.02	H	Peak	79.1	-5.7	73.4	74.7	-1.3
600.04	H	Peak	45.9	-5.7	40.2	54.7	-14.5
900.05	H	Peak	52.9	-5.7	47.2	54.7	-7.5
*1200.00	H	Peak	47.7	-5.7	42.0	54.0	-12.0
*1500.00	H	Peak	44.7	-5.7	39.0	54.0	-15.0
1802.00	H	Peak	50.6	-5.7	44.9	54.7	-9.8

Note:

1) Correction Factor = Antenna Factor + Cable Loss.

2) The above results were the worst case results with the EUT positioned in all 3 axis during the test. The EUT was positioned vertically and horizontally on the table for vertical and horizontal measurement respectively.

3) * Emission frequencies is falling in the restricted band in section 15.205, the general limit of the section 15.209 is applied.

4) Other emission more than 20dB below is not recorded.

6.3.2 Measurement Data

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. The EUT was measured by Bilog antenna with 2 orthogonal polarities and frequencies of peak emissions from the EUT were detected within 6dB of the limit line. Final measurement was conducted in the open area test site with data as follows:

Test results on operation with control for transmittion mode (Fundamental frequency of Transmitter at 310MHz):

Frequency (MHz)	Antenna Polarization	Correction Factor (dB/m)	Receiver Reading (dBµV)	Emission Level (dBµV/m)	PK Limit (dBµV/m)	Over Limit (dB)
310.00	V	14.1	61.0	75.1	95.3	-20.2
310.00	H	14.1	64.6	78.7	95.3	-16.6
620.00	H	19.7	26.0	45.7	75.3	-29.6
930.00	H	22.2	30.6	52.8	75.3	-22.5
*1240.00	H	9.7	37.9	47.6	74.0	-26.4
*1550.00	H	9.9	34.5	44.4	74.0	-29.6
1860.00	H	9.7	40.7	50.4	75.3	-24.9

Frequency (MHz)	Antenna Polarization	Detector	Emission Level (dBμV/m)	Average Factor (dB)	Calculated Average Value (dBμV/m)	AV Limit (dBμV/m)	Over Limit (dB)
310.00	V	Peak	75.1	-5.7	69.4	75.3	-5.9
310.00	H	Peak	78.7	-5.7	73.0	75.3	-2.3
620.00	H	Peak	45.7	-5.7	40.0	55.3	-15.3
930.00	H	Peak	52.8	-5.7	47.1	55.3	-8.2
*1240.00	H	Peak	47.6	-5.7	41.9	54.0	-12.1
*1550.00	H	Peak	44.4	-5.7	38.7	54.0	-15.3
1860.00	H	Peak	50.4	-5.7	44.7	55.3	-10.6

Note:

1) Correction Factor = Antenna Factor + Cable Loss.

2) The above results were the worst case results with the EUT positioned in all 3 axis during the test. The EUT was positioned vertically and horizontally on the table for vertical and horizontal measurement respectively.

3) * Emission frequencies is falling in the restricted band in section 15.205, the general limit of the section 15.209 is applied.

4) Other emission more than 20dB below is not recorded.

6.3.3 Measurement Data

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. The EUT was measured by Bilog antenna with 2 orthogonal polarities and frequencies of peak emissions from the EUT were detected within 6dB of the limit line. Final measurement was conducted in the open area test site with data as follows:

Test results on operation with control for transmittion mode (Fundamental frequency of Transmitter at 318MHz):

Frequency (MHz)	Antenna Polarization	Correction Factor (dB/m)	Receiver Reading (dBµV)	Emission Level (dBµV/m)	PK Limit (dBµV/m)	Over Limit (dB)
318.00	V	14.1	61.2	75.3	95.8	-20.5
318.00	H	14.1	64.8	78.9	95.8	-16.9
636.00	H	19.7	25.9	45.6	75.8	-30.2
954.00	H	22.2	30.4	52.6	75.8	-23.2
1272.00	H	9.7	37.7	47.4	75.8	-28.4
*1590.00	H	9.9	34.6	44.5	74.0	-29.5
1908.00	H	8.3	42.2	50.5	75.8	-25.3

Frequency (MHz)	Antenna Polarization	Detector	Emission Level (dBμV/m)	Average Factor (dB)	Calculated Average Value (dBμV/m)	AV Limit (dBμV/m)	Over Limit (dB)
318.00	V	Peak	75.3	-5.7	69.6	75.8	-6.2
318.00	H	Peak	78.9	-5.7	73.2	75.8	-2.6
636.00	H	Peak	45.6	-5.7	39.9	55.8	-15.9
954.00	H	Peak	52.6	-5.7	46.9	55.8	-8.9
1272.00	H	Peak	47.4	-5.7	41.7	55.8	-14.1
*1590.00	H	Peak	44.5	-5.7	38.8	54.0	-15.2
1908.00	H	Peak	50.5	-5.7	44.8	55.8	-11.0

Note:

1) Correction Factor = Antenna Factor + Cable Loss.

2) The above results were the worst case results with the EUT positioned in all 3 axis during the test. The EUT was positioned vertically and horizontally on the table for vertical and horizontal measurement respectively.

3) * Emission frequencies is falling in the restricted band in section 15.205, the general limit of the section 15.209 is applied.

4) Other emission more than 20dB below is not recorded.

6.3.4 Measurement Data

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. The EUT was measured by Bilog antenna with 2 orthogonal polarities and frequencies of peak emissions from the EUT were detected within 6dB of the limit line. Final measurement was conducted in the open area test site with data as follows:

Test results on operation with control for transmittion mode (Fundamental frequency of Transmitter at 390MHz):

Frequency (MHz)	Antenna Polarization	Correction Factor (dB/m)	Receiver Reading (dBµV)	Emission Level (dBµV/m)	PK Limit (dBµV/m)	Over Limit (dB)
390.00	V	16.3	63.8	80.1	99.2	-19.1
390.00	H	16.3	67.7	84.0	99.2	-15.2
780.00	H	21.3	33.6	54.9	79.2	-24.3
*1170.00	H	10.0	48.0	58.0	74.0	-16.0
*1560.00	H	9.8	38.6	48.4	74.0	-25.6
*1700.00	H	9.7	23.4	33.1	74.0	-40.9
1952.00	H	9.0	41.8	50.8	79.2	-28.4

Frequency (MHz)	Antenna Polarization	Detector	Emission Level (dBμV/m)	Average Factor (dB)	Calculated Average Value (dBμV/m)	AV Limit (dBμV/m)	Over Limit (dB)
390.00	V	Peak	80.1	-5.7	74.4	79.2	-4.8
390.00	H	Peak	84.0	-5.7	78.3	79.2	-0.9
780.00	H	Peak	54.9	-5.7	49.2	59.2	-10.0
*1170.00	H	Peak	58.0	-5.7	52.3	54.0	-1.7
*1560.00	H	Peak	48.4	-5.7	42.7	54.0	-11.3
*1700.00	H	Peak	33.1	-5.7	27.4	54.0	-26.6
1952.00	H	Peak	50.8	-5.7	45.1	59.2	-14.1

Note:

1) Correction Factor = Antenna Factor + Cable Loss.

2) The above results were the worst case results with the EUT positioned in all 3 axis during the test. The EUT was positioned vertically and horizontally on the table for vertical and horizontal measurement respectively.

3) * Emission frequencies is falling in the restricted band in section 15.205, the general limit of the section 15.209 is applied.

4) Other emission more than 20dB below is not recorded.

Measurement Data

An initial pre-scan was performed in the 3m chamber using the spectrum nalyzer in peak detection mode. The EUT was measured by Bilog antenna with 2 orthogonal polarities and frequencies of peak emissions from the EUT were detected within 6dB of the limit line. Final measurement was conducted in the open area test site with data as follows:

Test results on operation with control for transmittion mode (Fundamental frequency of Transmitter at 433MHz):

Frequency (MHz)	Antenna Polarization	Correction Factor (dB/m)	Receiver Reading (dBµV)	Emission Level (dBµV/m)	PK Limit (dBµV/m)	Over Limit (dB)
433.90	V	17.7	66.6	84.3	100.8	-16.5
433.90	H	17.7	66.5	84.2	100.8	-16.6
867.87	H	22.0	27.9	49.9	80.8	-30.9
*1301.80	H	9.7	48.3	58.0	74.0	-16.0
*1350.00	H	9.8	21.2	31.0	74.0	-43.0
1735.6	H	9.7	40.3	50.0	80.8	-30.8
1900.00	H	9.0	23.0	32.0	80.8	-48.8

Frequency (MHz)	Antenna Polarization	Detector	Emission Level (dBμV/m)	Average Factor (dB)	Calculated Average Value (dBμV/m)	AV Limit (dBμV/m)	Over Limit (dB)
433.90	V	Peak	84.3	-5.7	78.6	80.8	-2.2
433.90	H	Peak	84.2	-5.7	78.5	80.8	-2.3
867.87	H	Peak	49.9	-5.7	44.2	60.8	-16.6
*1301.80	H	Peak	58.0	-5.7	52.3	54.0	-1.7
*1350.00	H	Peak	31.0	-5.7	25.3	54.0	-35.5
1735.6	H	Peak	50.0	-5.7	44.3	60.8	-16.5
1900.00	H	Peak	32.0	-5.7	26.3	60.8	-34.5

Note:

1) Correction Factor = Antenna Factor + Cable Loss.

2) The above results were the worst case results with the EUT positioned in all 3 axis during the test. The EUT was positioned vertically and horizontally on the table for vertical and horizontal measurement respectively.

3) * Emission frequencies is falling in the restricted band in section 15.205, the general limit of the section 15.209 is applied.

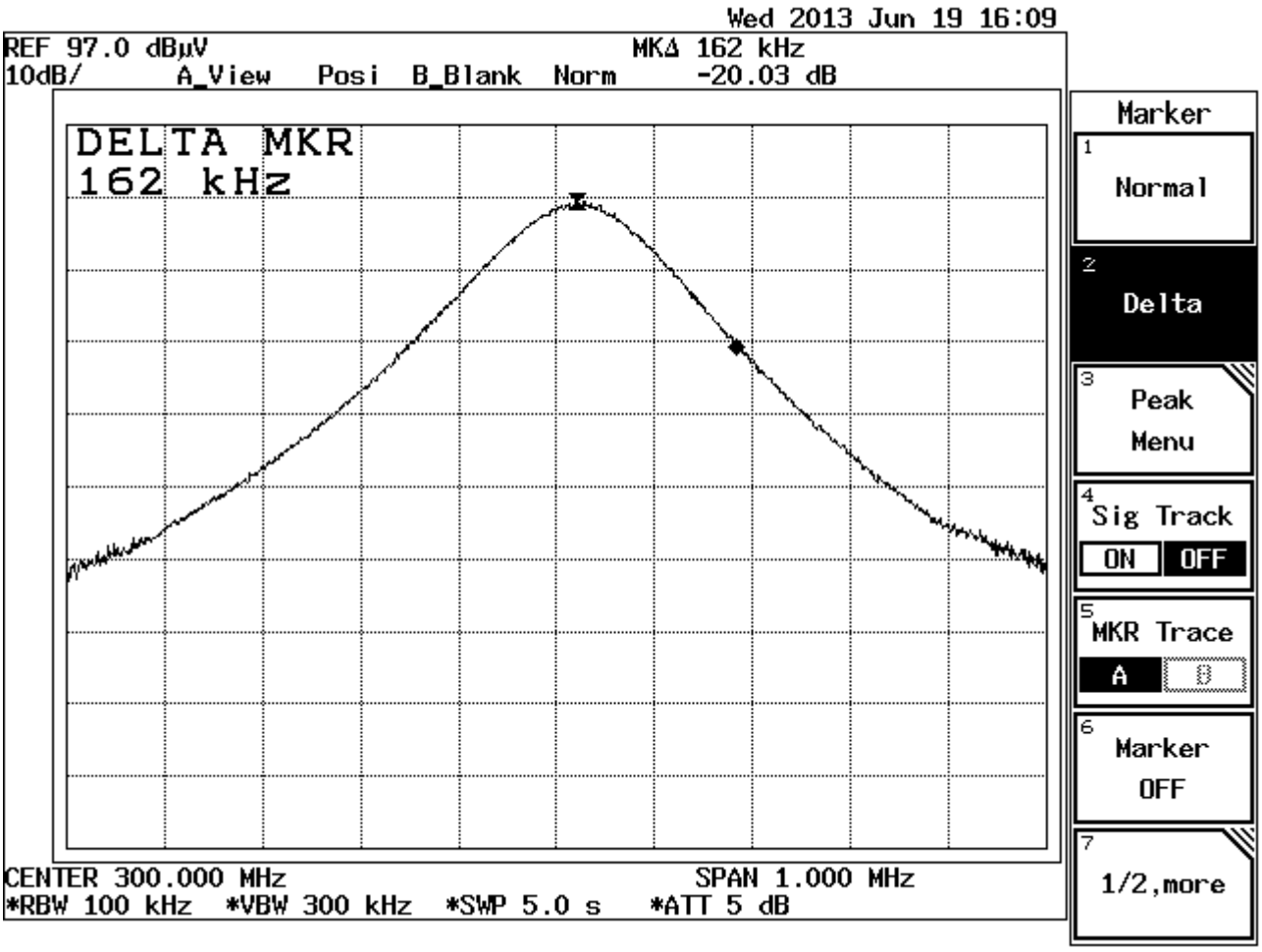
4) Other emission more than 20dB below is not recorded.

6.4 Bandwidth

Test Requirement: FCC Part15 Subpart C Section 15.231(C)
Test Method: ANSI C63.4
Test Date: 18-07-2013 to 29-07-2013

6.4.1 Measurement data

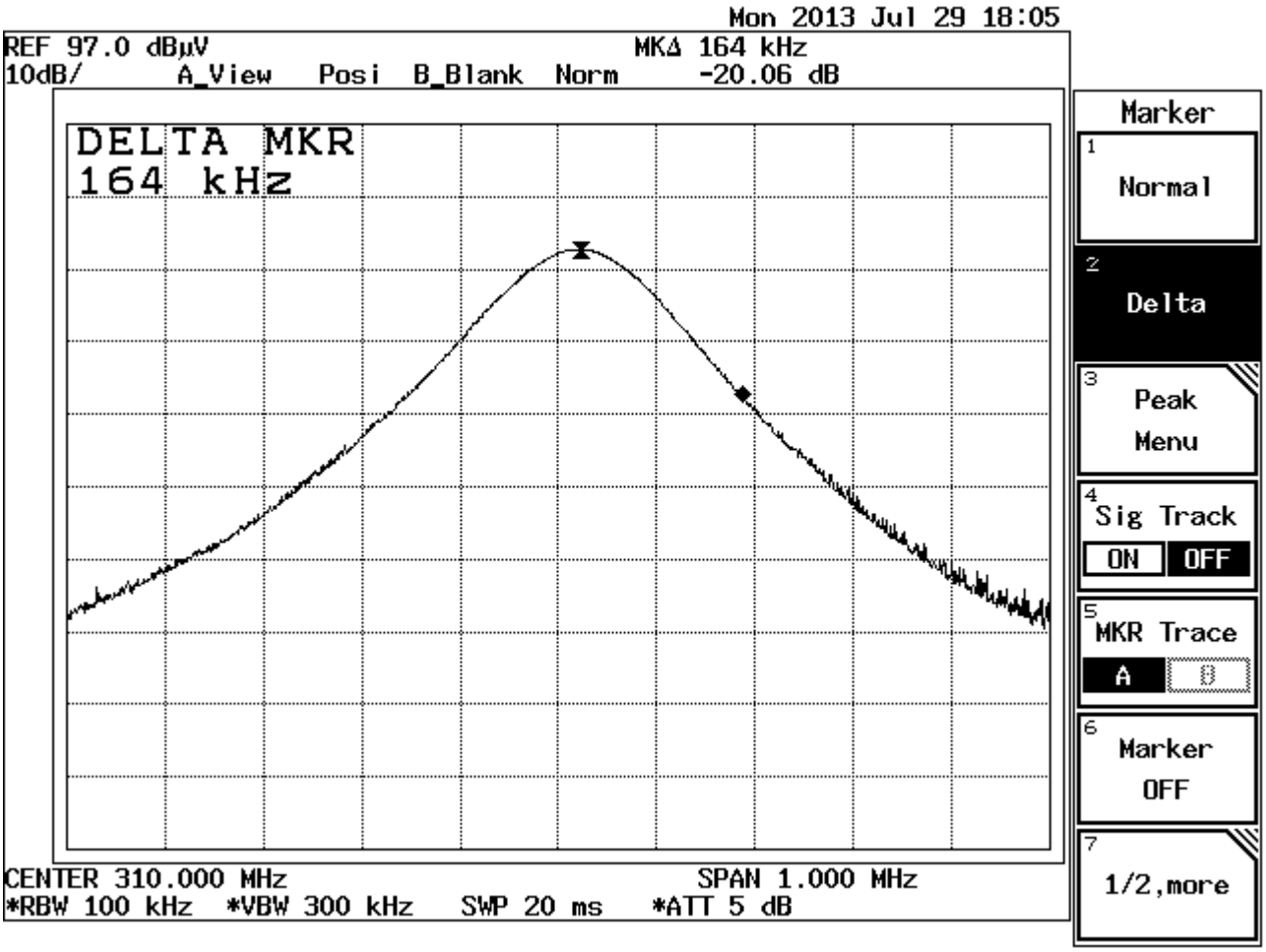
Frequency Domain Plots (Fundamental frequency of Transmitter at 300MHz):
Test results on operation with control for transmittion mode :



Measured Occupied Bandwidth (kHz)	Limit (KHz)
320	750

6.4.2 Measurement data

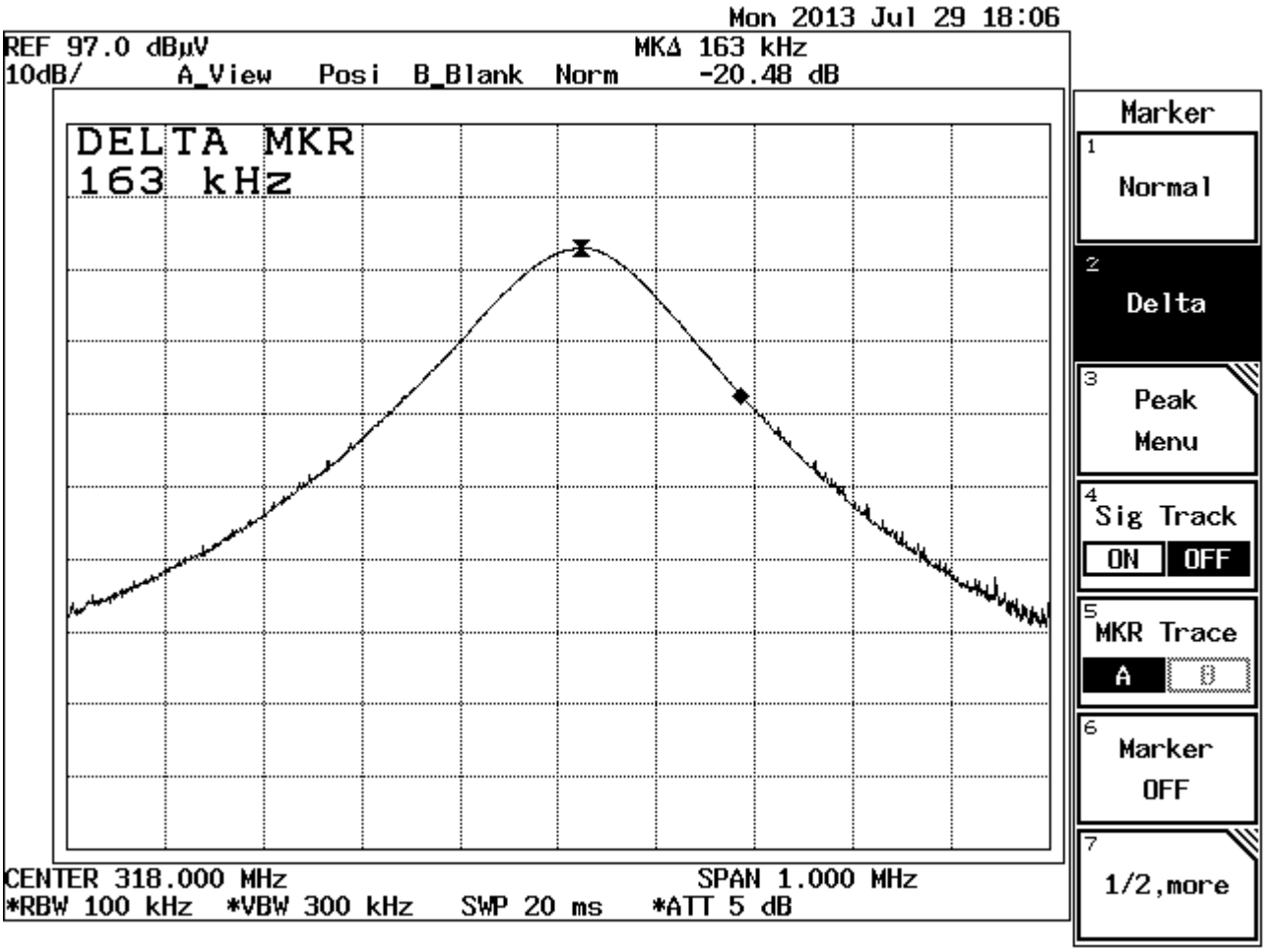
Frequency Domain Plots (Fundamental frequency of Transmitter at 310MHz):
Test results on operation with control for transmittion mode :



Measured Occupied Bandwidth (kHz)	Limit (KHz)
328	775

6.4.3 Measurement data

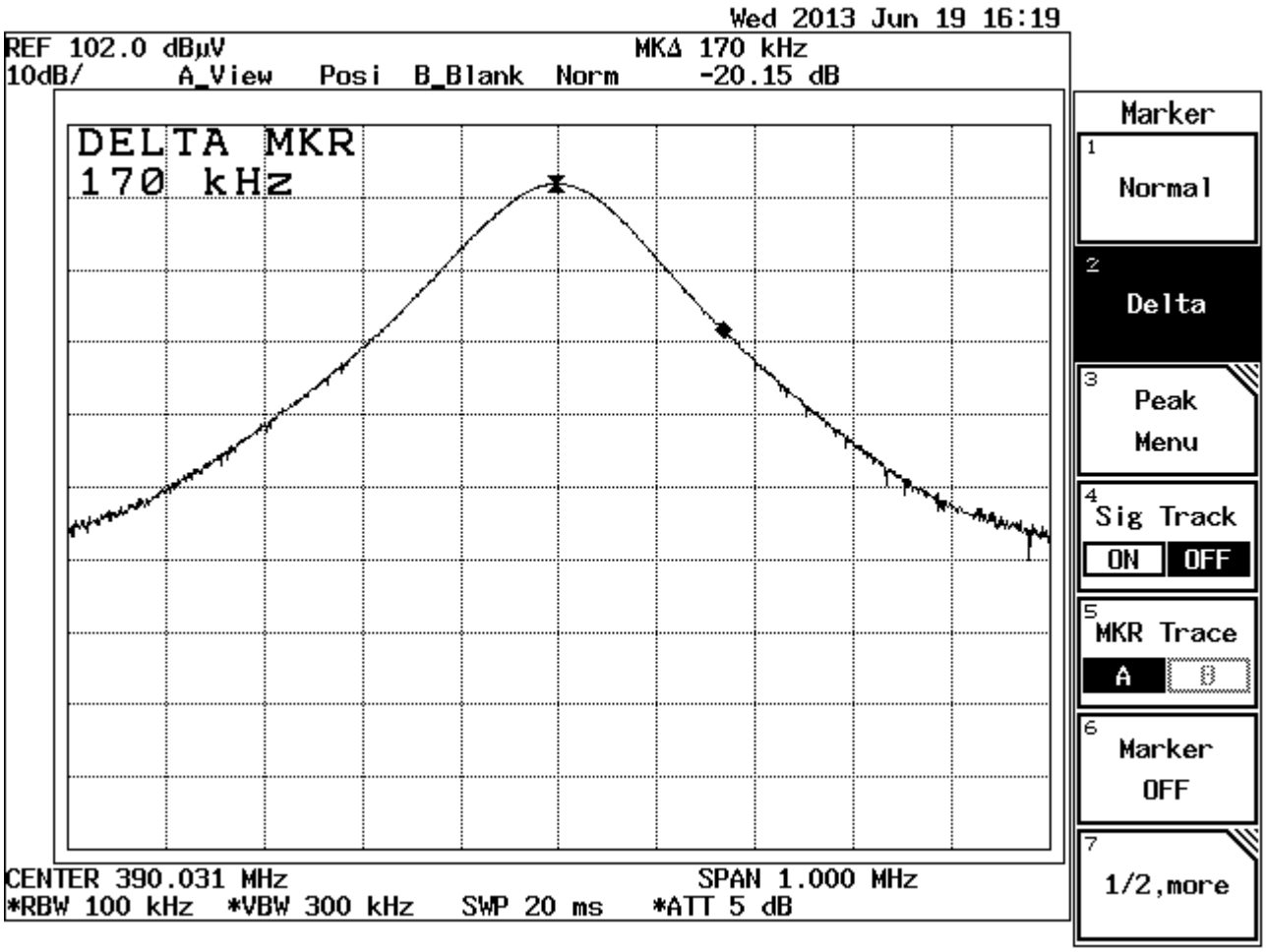
Frequency Domain Plots (Fundamental frequency of Transmitter at 318MHz):
Test results on operation with control for transmittion mode :



Measured Occupied Bandwidth (kHz)	Limit (KHz)
326	795

6.4.4 Measurement data

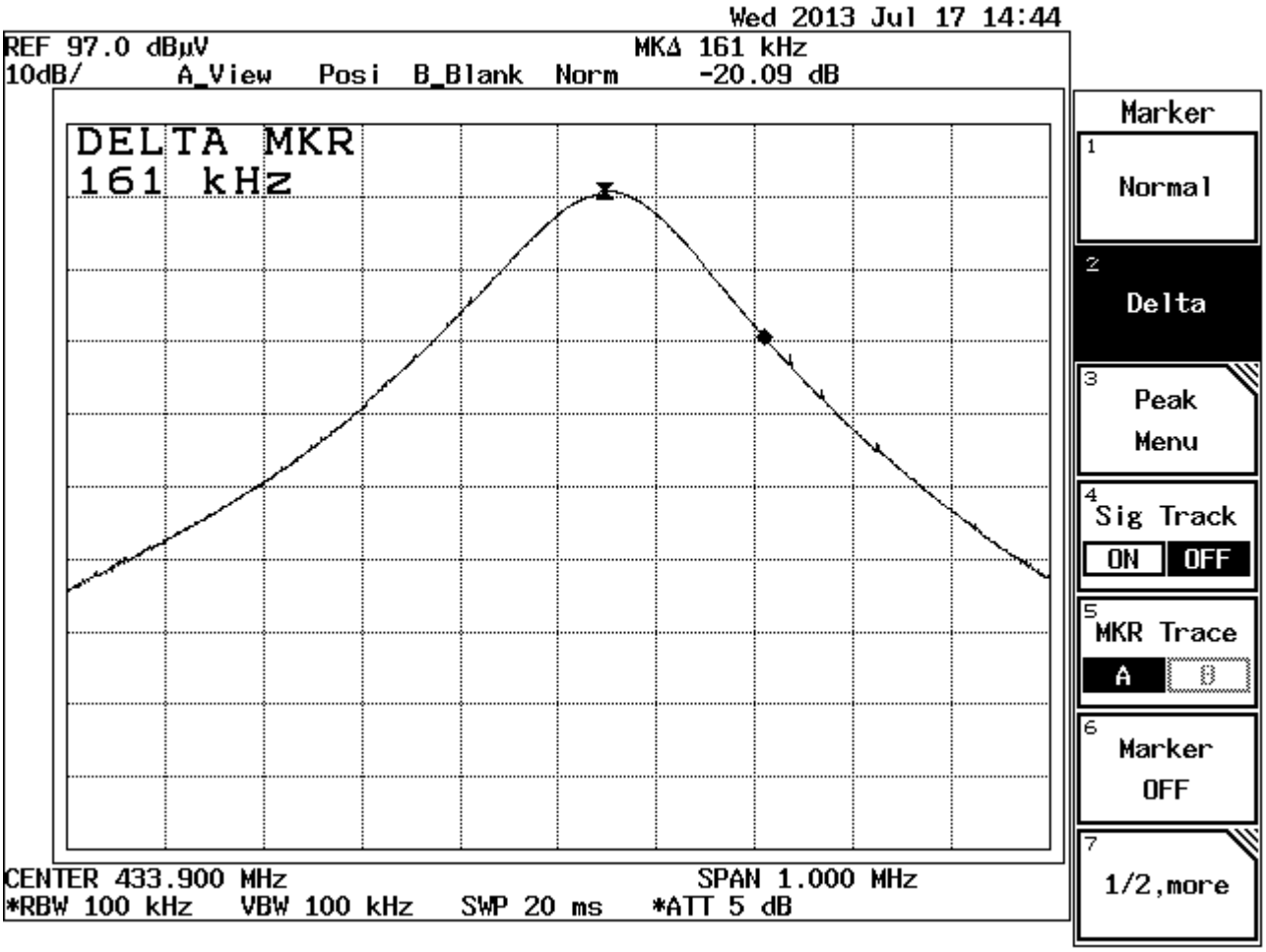
Frequency Domain Plots (Fundamental frequency of Transmitter at 390MHz):
Test results on operation with control for transmittion mode :



Measured Occupied Bandwidth (kHz)	Limit (KHz)
340	975

6.4.5 Measurement data

Frequency Domain Plots (Fundamental frequency of Transmitter at 433MHz):
Test results on operation with control for transmittion mode :



Measured Occupied Bandwidth (kHz)	Limit (KHz)
320	1080

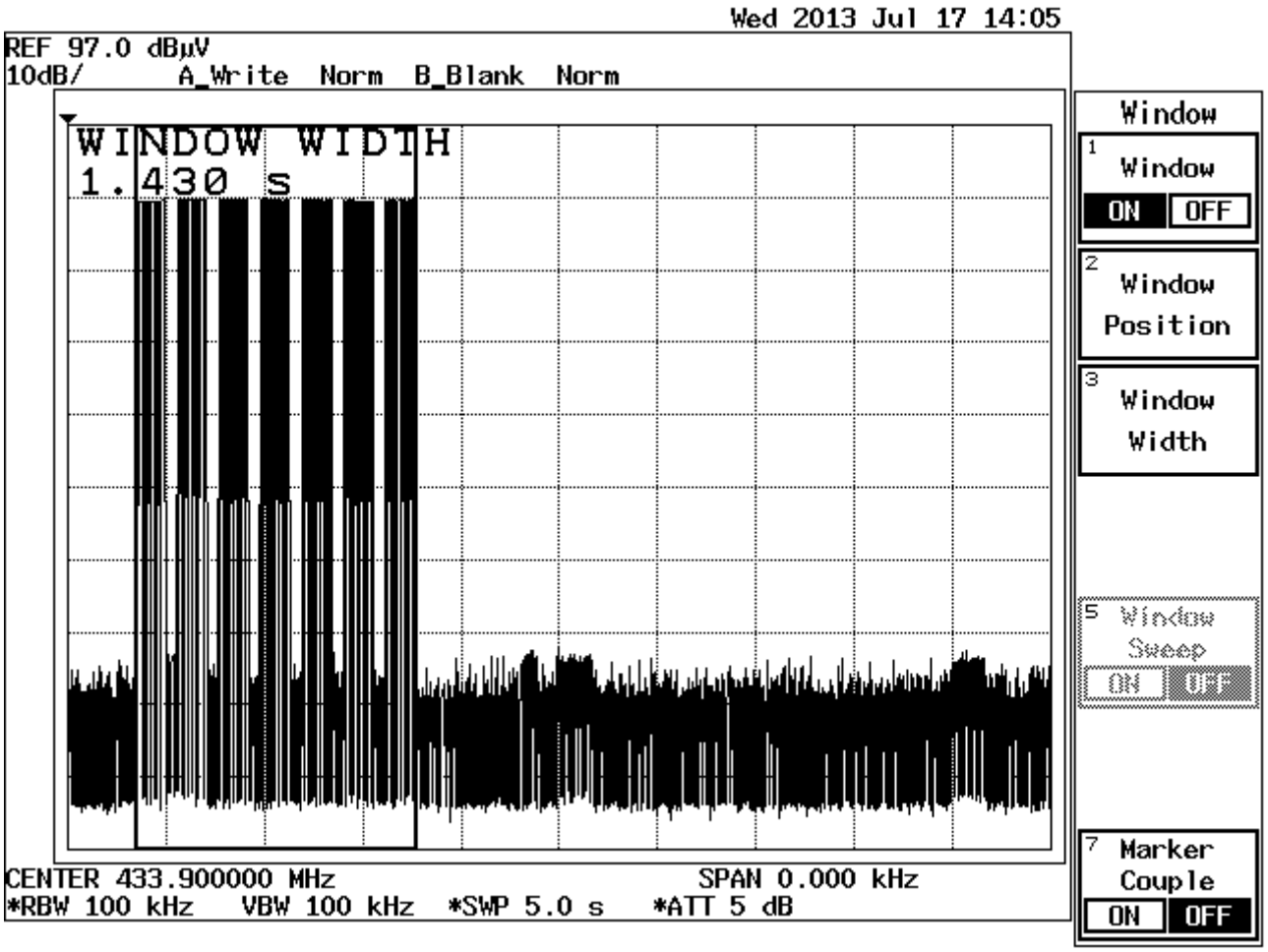
6.5 Provision of Momentary operation

Test Requirement: FCC Part15 Subpart C Section 15.231(a) (1)
Test Method: ANSI C63.4
Test Date: 19-06-2013

6.5.1 Measurement data

6.5.2 Measurement data

Time Domain Plots (Fundamental frequency of Transmitter at 433MHz, worst case):
Test results on operation with control for transmittion mode :



The time of stopping transmission after switch releasing (s)	Limit (s)
1.23s	5.00

Photographs

6.6 EUT Constructional Details

- END -