EMC TEST REPORT TO FCC REQUIREMENT

Product Name	**:**	RF remote
Model Number	**:**	JX-1210
Trade Name	**:**	N/A
Report Number	**:**	SZEE090619262102
Date	**:**	Aug. 10, 2009
FCC ID	**:**	XJZJX-1210

Standards	Results
☒ FCC Part 15	PASS

Prepared for:

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Prepared by:

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N/A means not applicable.

1. CERTIFICATION OF CONFORMITY

Applicant & Address:	SHENZHEN GOLDSTAR EXACT SCIENCE CO., LTD. Goldstar Industrial, Jinan West Road, new & Hi-Tech Development Zone, Fuyong Town, Baoan
Manufacturer & Address:	SHENZHEN GOLDSTAR EXACT SCIENCE CO., LTD. Goldstar Industrial, Jinan West Road, new & Hi-Tech Development Zone, Fuyong Town, Baoan
Equipment Under Test:	RF remote
Trade Name:	N/A
Model Number:	JX-1210
Serial Number:	N/A
Date of test:	June 19, 2009 to Aug. 10, 2009
Condition of Test Sample:	Normal

The above equipment was tested by Centre Testing International for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, Subpart B and the measurement procedure according to ANSI C63.4.
The test results of this report relate only to the tested sample identified in this report.

Prepared by : Lily Yan

Reviewed by : Christy Chen

Approved by : Jim Zhang
Manager

Date : Aug. 10, 2009

2. TEST SUMMARY

Clause	Rule / Test Item	Result	Clause in Report
15.231（a）(1)	Duration after release	Pass	6
15.231(c)	The bandwidth of the emission	Pass	7
15.209 15.231(b)	Radiation Emission Test	Pass	8

3. 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. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement items	Value
Radiated emission	4.6 dB

4. PRODUCT INFORMATION AND TEST SETUP

4.1 PRODUCT INFORMATION

The Model: JX-1210

The major technical descriptions are described as following: (It's an short range, low power, remote control designed as an " Input Device".)

A). Operation Frequency: 418 MHz, one channel.

B). Modulation: FSK

C). Transmitting Antenna Designation: internal antenna (undetachable)

D). Power supply: DC 3V by battery

4.2 TEST SETUP CONFIGURATION

See test photographs attached in APPENDIX 1 PHOTOGRAPHS OF TEST SETUP for the actual connections between EUT and support equipment.

4.3 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	Data Cable	Power Cord
1.	---	---	---	---	---	---

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

5. FACILITIES AND ACCREDITATIONS

5.1 TEST FACILITY

All measurement facilities used to collect the measurement data are located at Building C, Hongwei Industrial Zone, Baoan 70 District, Shenzhen, Guangdong, China. The sites are constructed in conformance with the requirements of ANSI C63.4, and CISPR 16-1-1.

5.2 TEST EQUIPMENT LIST

Instrumentation: The following list contains equipments used at CTI for testing.
The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

Equipment used during the tests:

3M Semi-anechoic Chamber - RE Test Site				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
Spectrum Analyzer	Agilent	E4443A	MY46185649	01/29/2010
Biconilog Antenna	A.H.System	SAS-521-2	487	06/05/2010
Horn Antenna	ETS-LINGREN	3117	00057407	06/27/2010
Loop Antenna	ETS-LINGREN	6502	00071730	09/22/2009
Multi device Controller	ETS-LINGREN	2090	00057230	01/29/2010
Microwave Preamplifier	Agilent	8449B	3008A02425	12/21/2009

5.3 LABORATORY ACCREDITATIONS AND LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by China National Accreditation Board for Laboratories (CNAS). Electromagnetic Interference tests according to ANSI C63.4 and CISPR 16 requirements.

6. DURATION AFTER RELEASE

6.1 SPECIFICATION

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

6.2 BLOCK DIAGRAM OF TEST SETUP

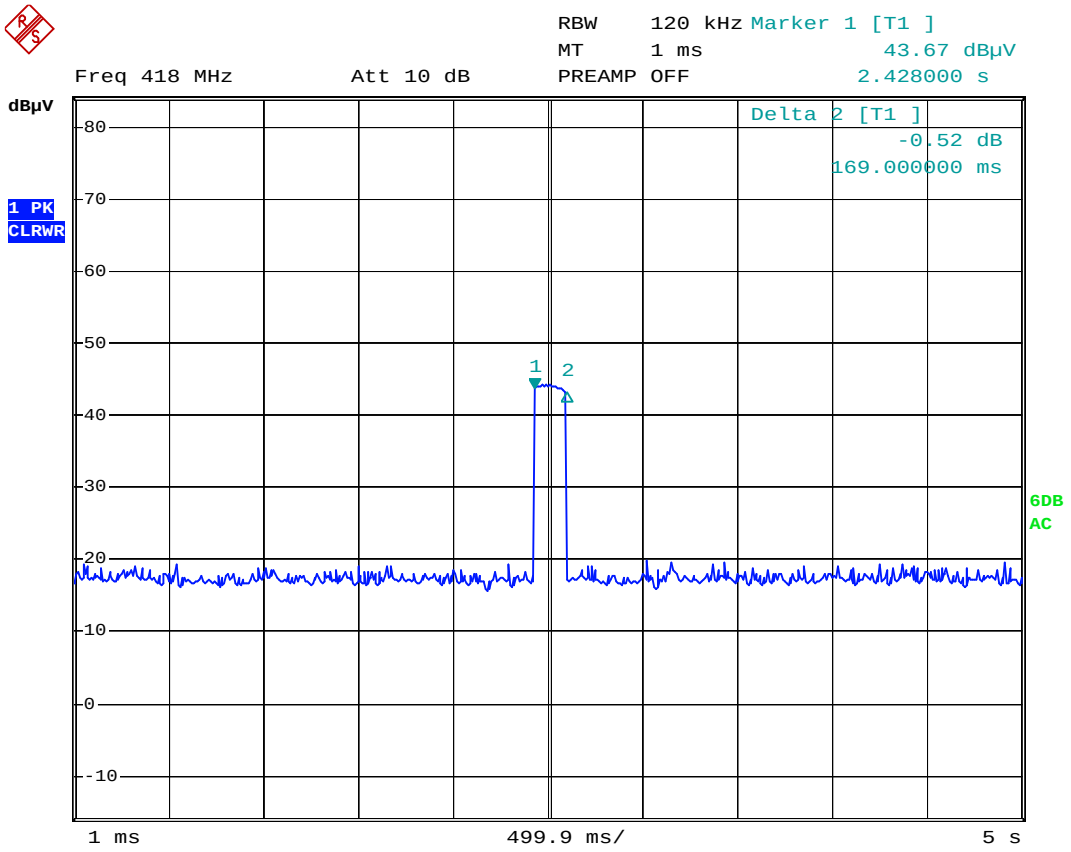
6.3 TEST PROCEDURE

1. The transmitter's output signal was coupling to the spectrum analyzer when the transmitter was set in maximum emission..
2. The analyzer was set to TIME mode, with RBW 10 kHz and VBW 30 kHz.
3. Record the duty cycle during the press and release of any key.

6.4 TEST RESULTS

Duration after release: smaller than 169 ms

Test Result: Pass



7. THE BANDWIDTH OF THE EMISSION

7.1 LIMITS

15.229(c): The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.
Thus, limit = 1.045MHz for CF=418 MHz.

7.2 BLOCK DIAGRAM OF TEST SETUP

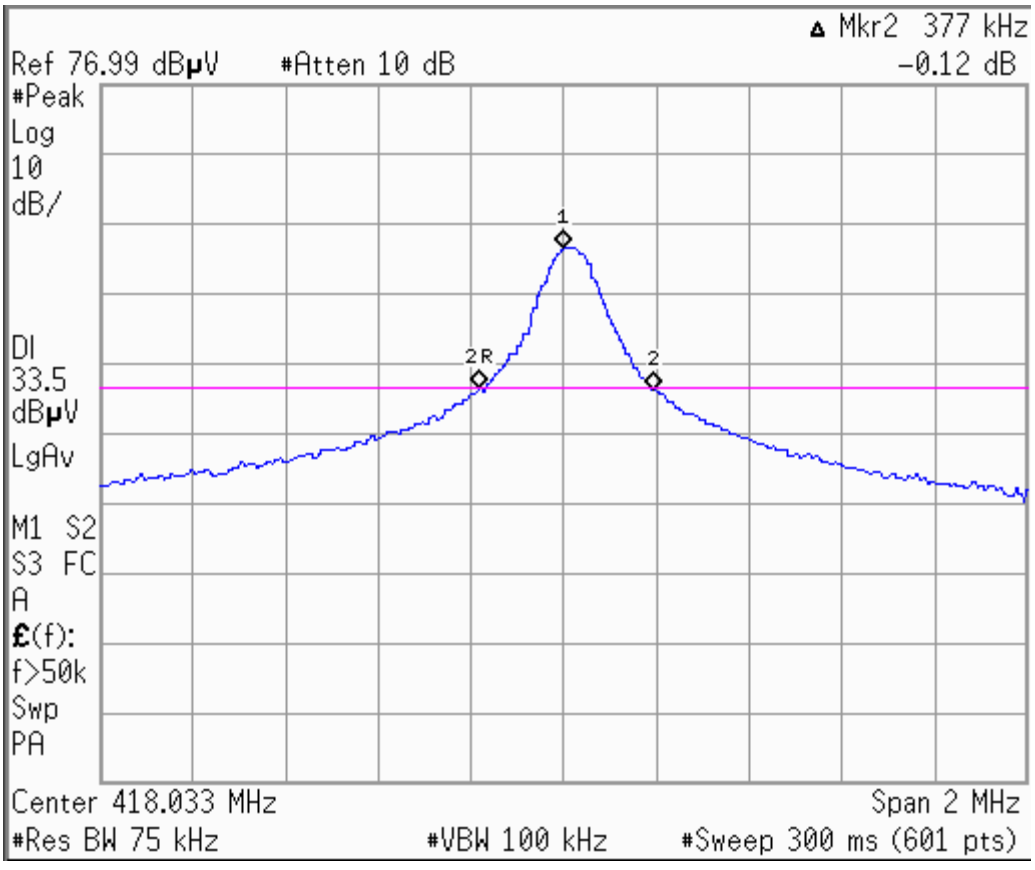
7.3 TEST PROCEDURE

1. The transmitter's output signal was coupling to the spectrum analyzer when the transmitter was set in maximum emission..
2. The span of the analyzer was set to 300 kHz, with RBW 10 kHz and VBW 30 kHz.
3. Measured 20dB Bandwidth.

7.4 TEST RESULTS

Transmitting Frequency: 418 MHz
20dB Bandwidth: 377 kHz

Graphs:



8. RADIATED EMISSION TEST (RE)

8.1 LIMITS

FCC Part 15.231(b)

The field strength of fundamental and spurious emissions from intentional radiators shall not exceed the following (at a distance of 3 meters):

Fundamental Frequency (MHz)	Field Strength of Fundamental	Field Strength of Spurious Emissions
260-470	3750 to 12500 μV/m	375 to 1250 μV/m
Thus,		
418	80.28 dBμV/m	60.28 dBμV/m

FCC Part 15.209:

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 3.9 (Intentional Radiators general limit) as below.

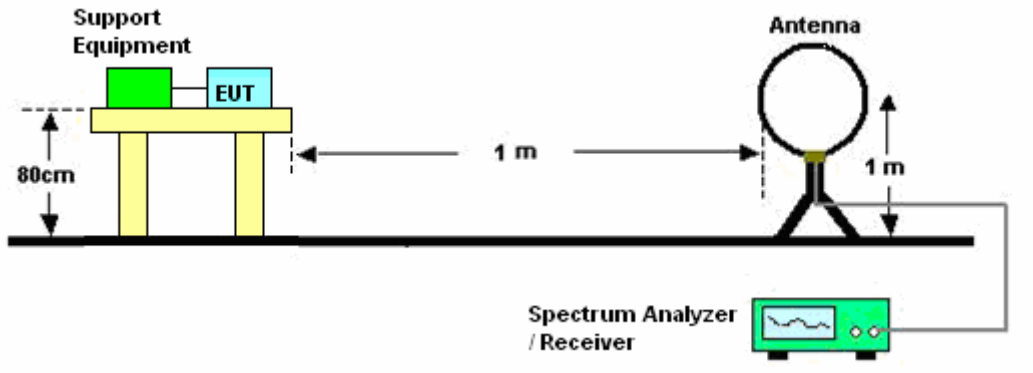
Frequency (MHz)	Field strength (μV/m)	Distance(m)	Field strength at 3m (dBμV/m)
1.705-30	30	30	29.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Note: 1. The tighter limit applies at the band edges.

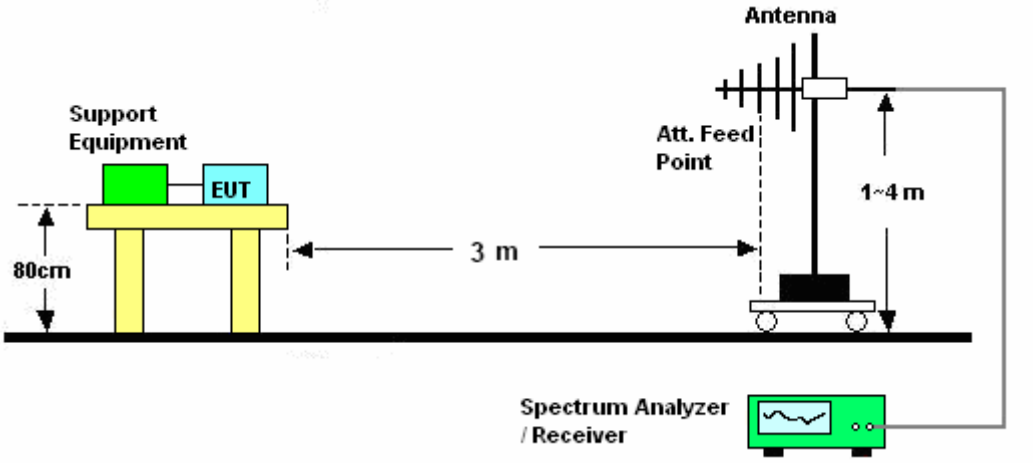
2. The emission limits for the bands 9-90 kHz and 110-490 kHz are for an average detector.

8.2 BLOCK DIAGRAM OF TEST SETUP

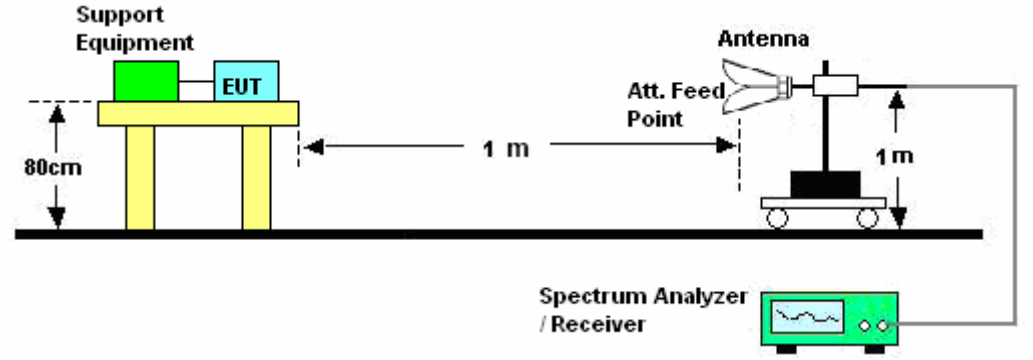
For radiated emissions from 9 kHz to 30 MHz



For radiated emissions from 30 - 1000 MHz



For radiated emissions above 1GHz



8.3 TEST PROCEDURE

A. Above 30MHz

a. The EUT was placed on the top of a turntable 0.8 meters above the ground in the chamber, 3 meters away from the antenna (wideband antenna), which was mounted on the top of a variable-height antenna tower. The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.

b. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.

c. The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

B. Below 30MHz

a. The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 1 meter away from the antenna (loop antenna). The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.

b. For each suspected emission, the EUT was arranged to its worst case and then turn table was turned from 0 degrees to 360 degrees to find the maximum reading.

c. The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

8.4 DUTY CYCLE

Duty cycle = on time/100 milliseconds or period, whichever is less

On time = N1L1+N2L2+...+NN-1LN-1+NNLN

Where N1 is number of type 1 pulses, L1 is length of type 1 pulses, etc.

Restating the basic formula

Duty cycle = (N1L1+N2L2+...+NN-1LN-1+NNLN)/100 or T, whichever is less

Where T is the period of the pulse train

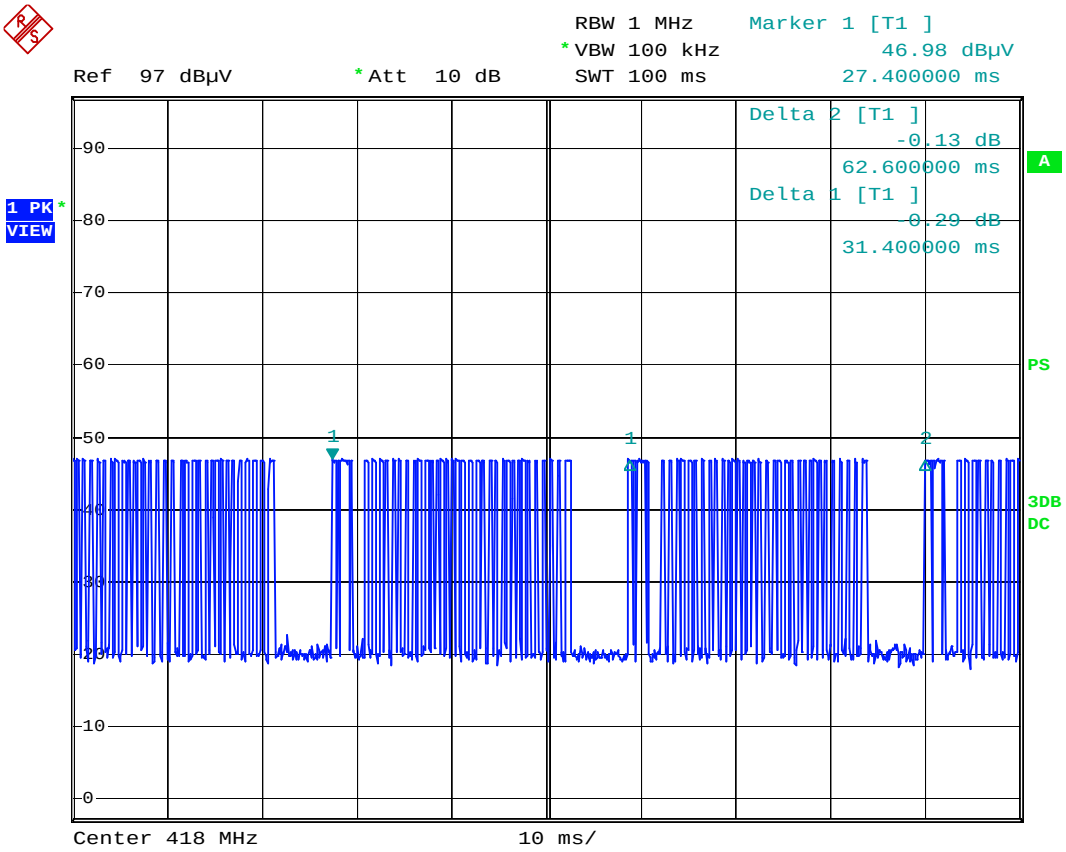
Test Result:

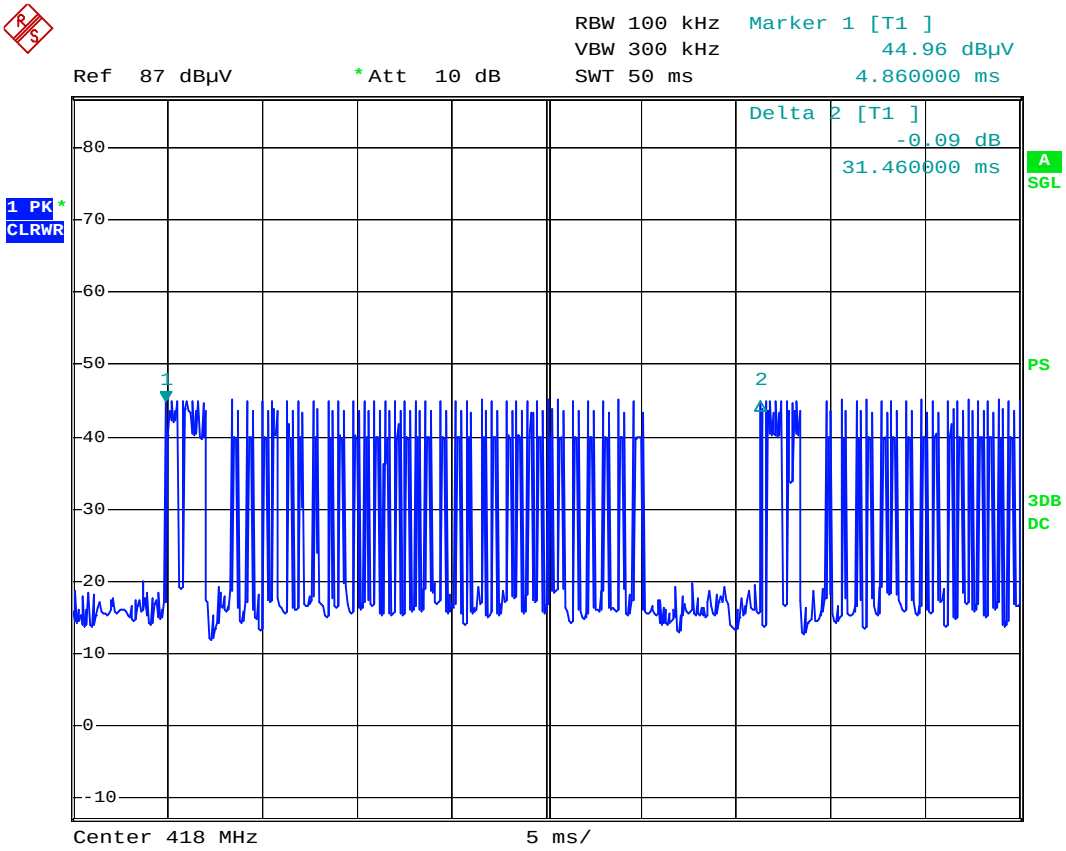
Duty cycle (max @ Button 12) = DCmax= 0.332223702

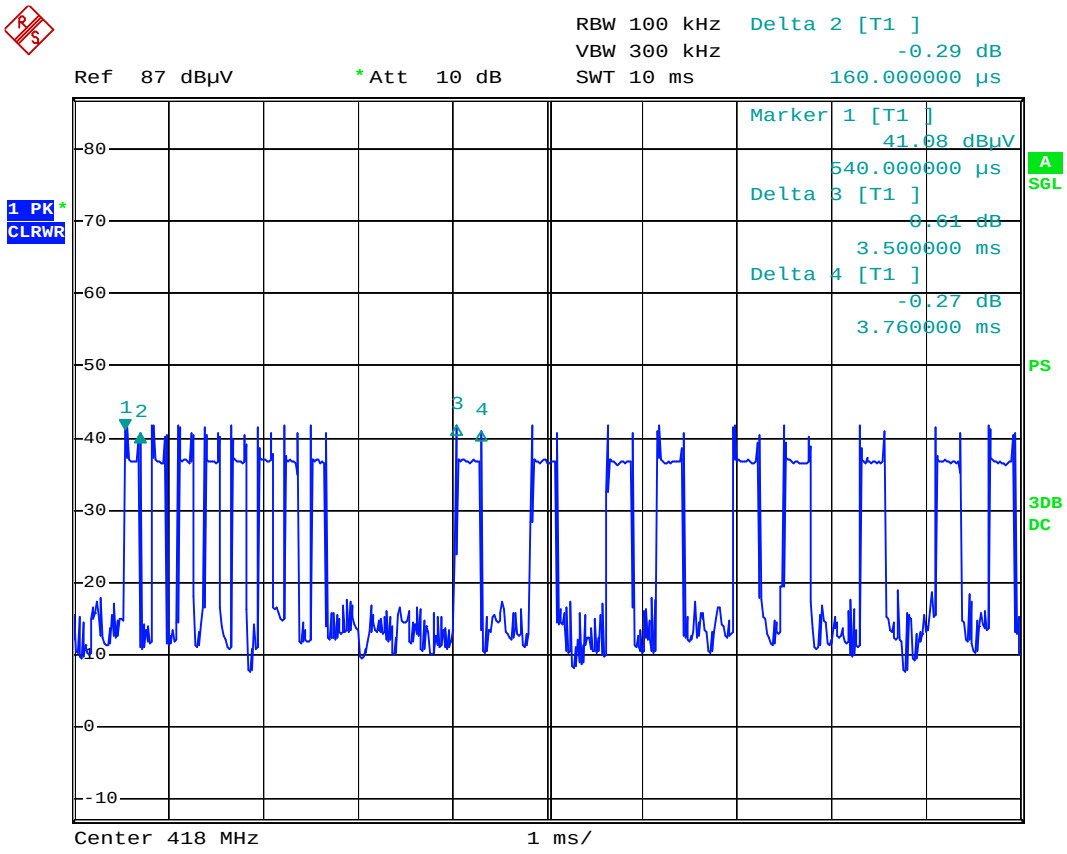
20*log (DCmax) = -9.571387741

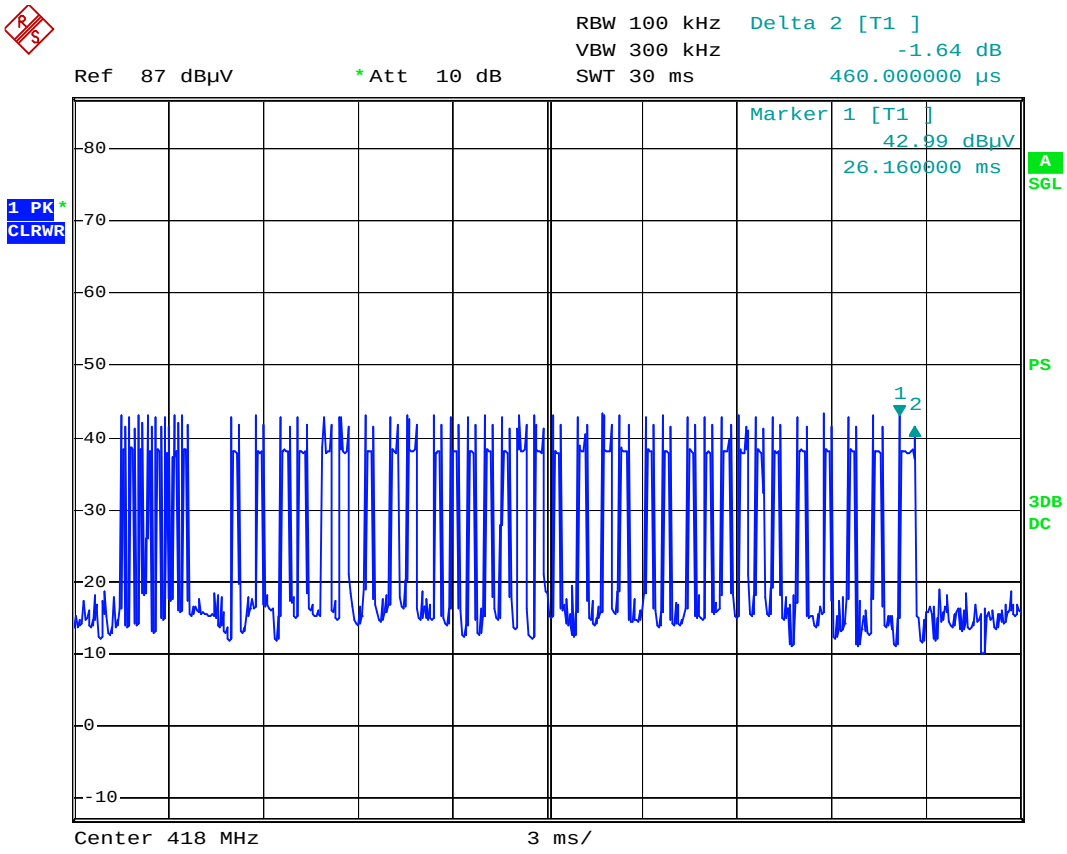
See more information in following plots:

For Button 1 – SLIDE SHOW:





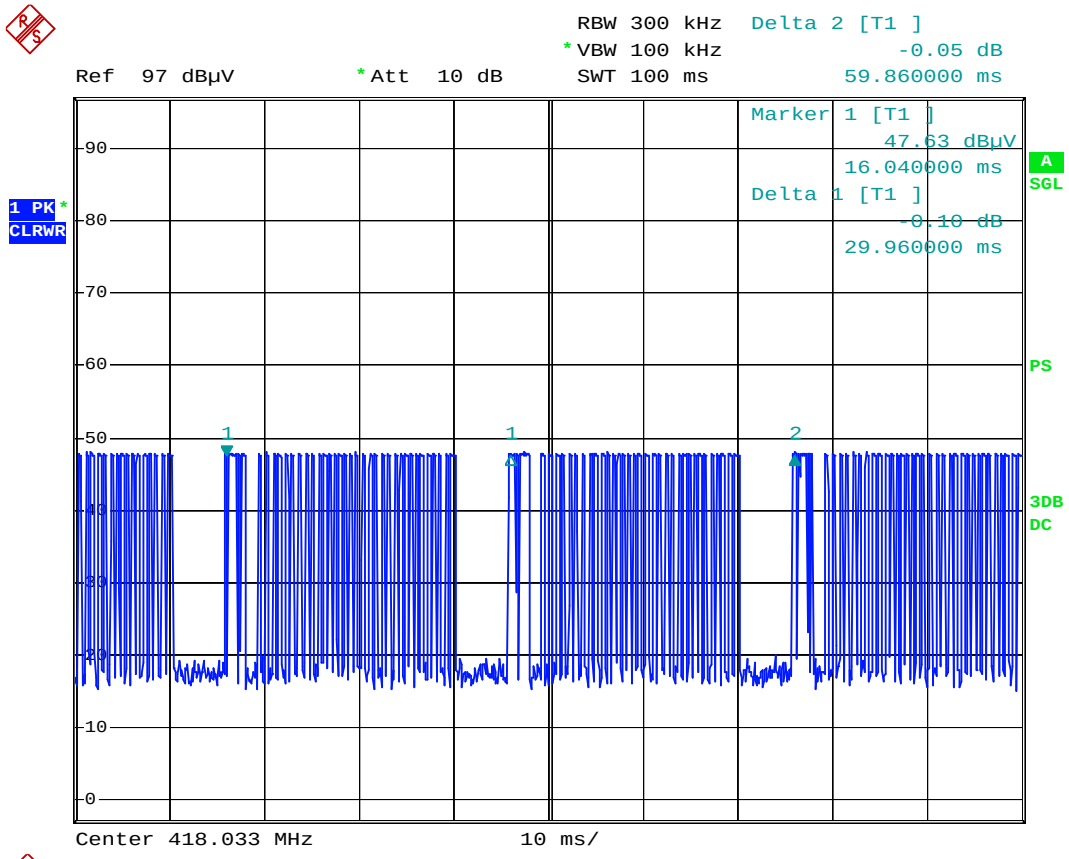


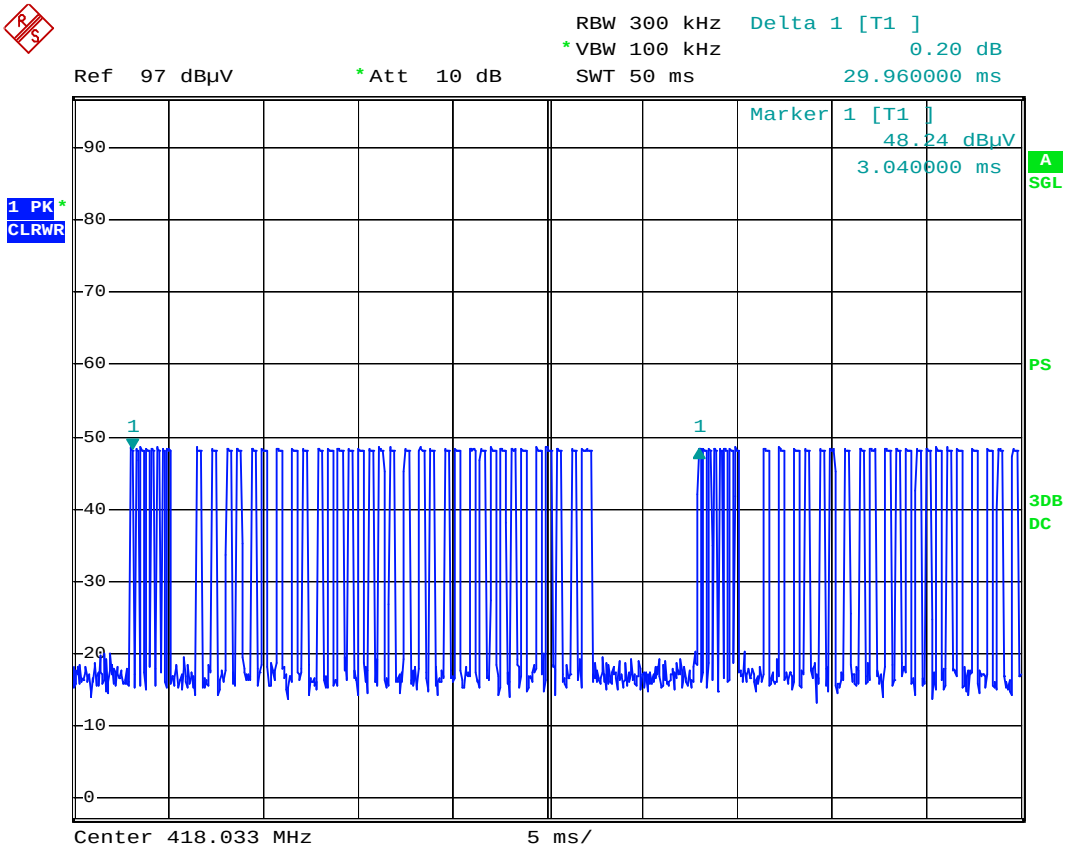


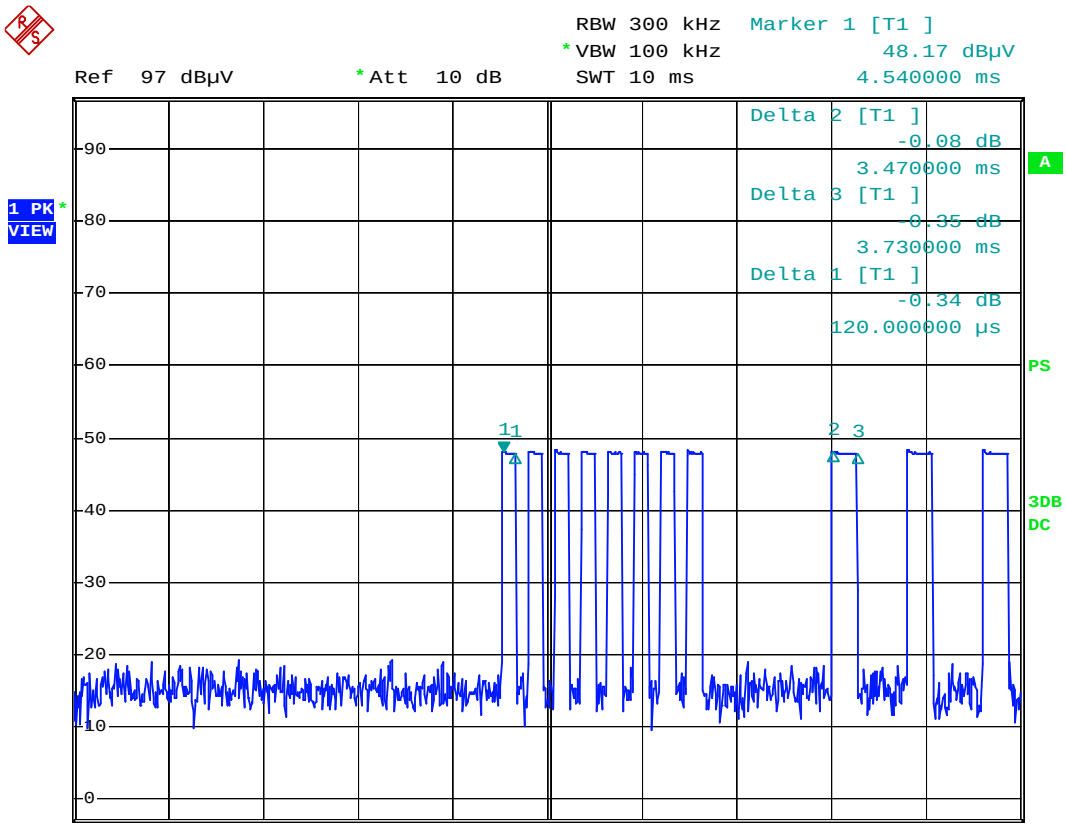
T=31.46 ms; N1=160 us, L1=8; N2=260 us, L2=32; N3=460 us, L3=1

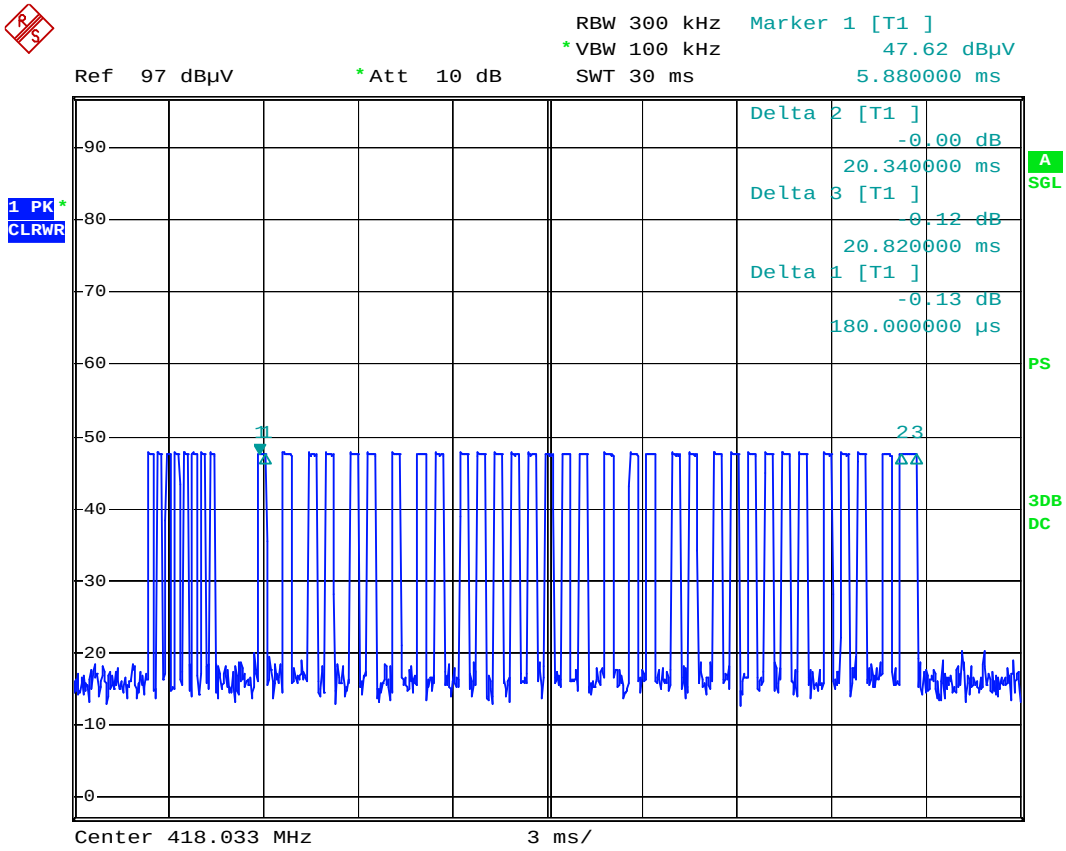
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.319771

For Button 2 – MENU:





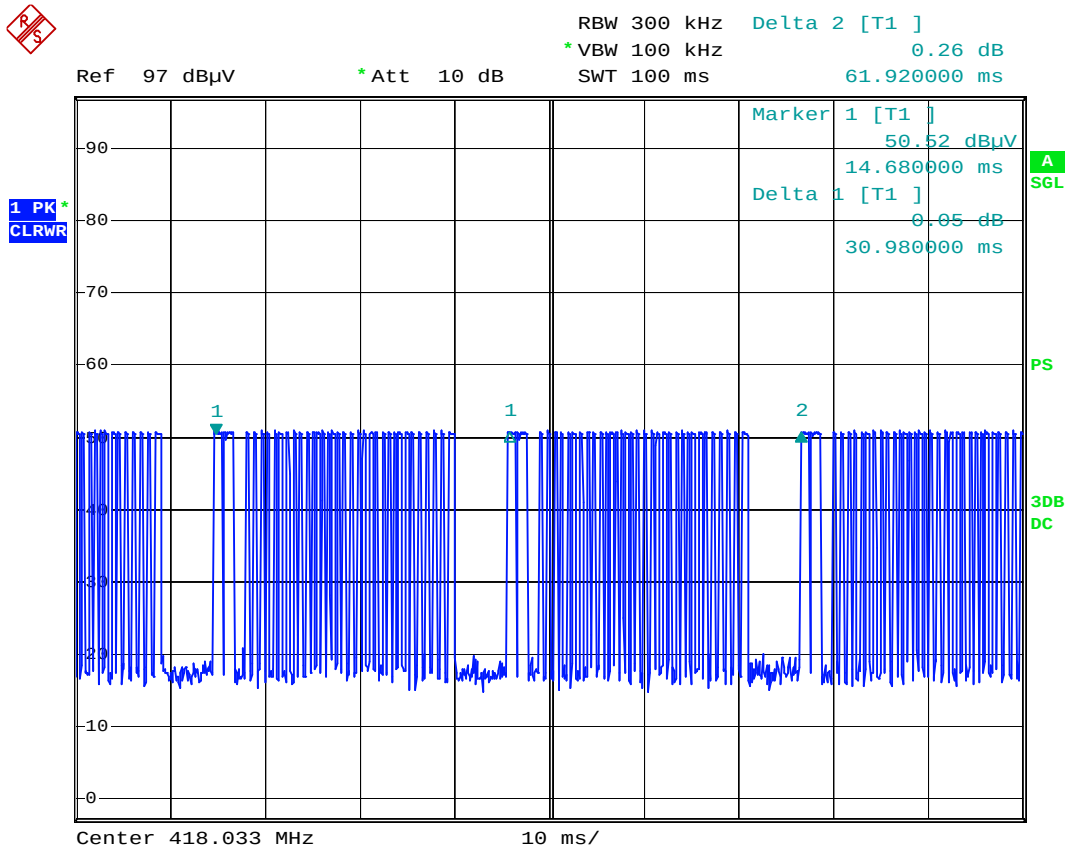


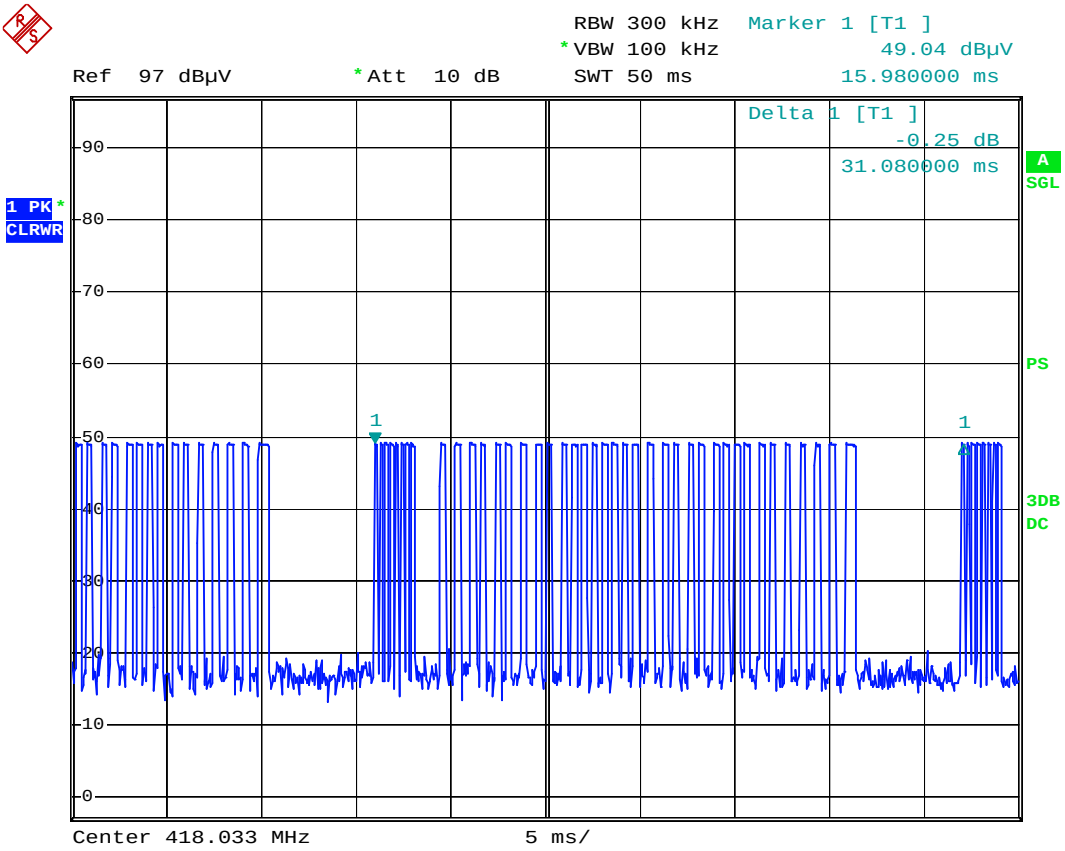


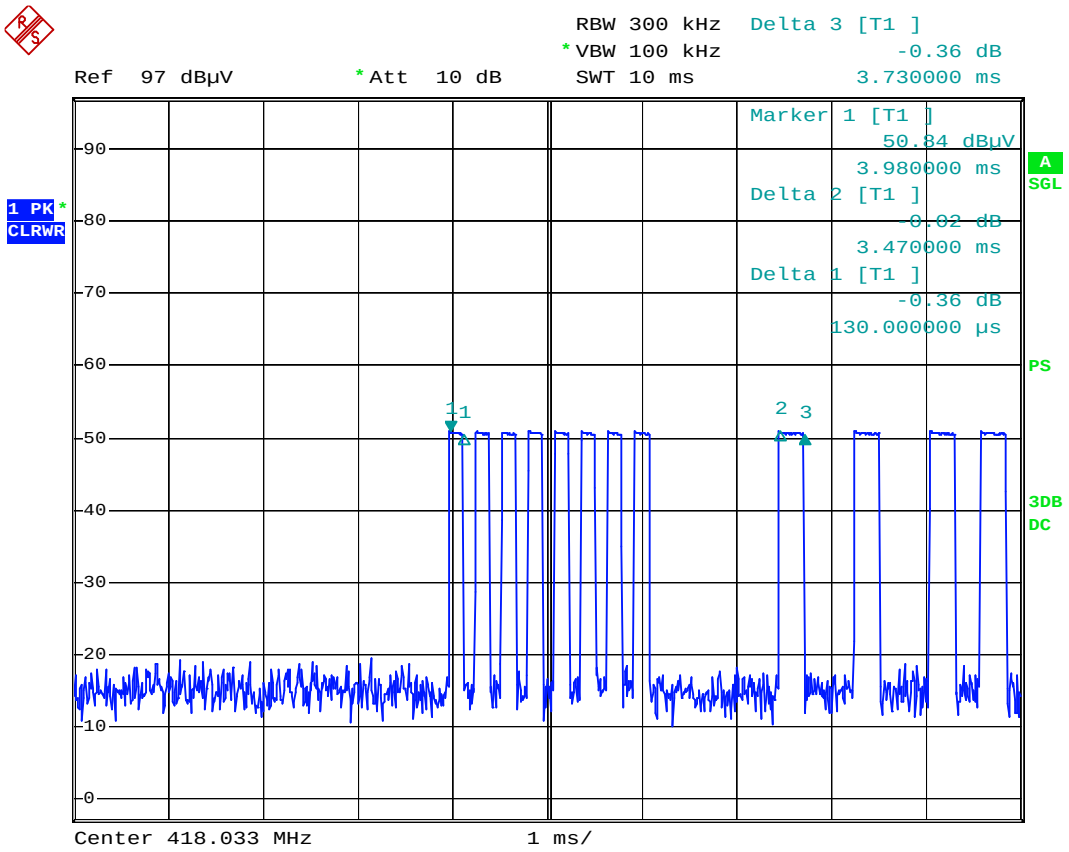
T=29.96 ms; N1=120 us, L1=8; N2=260 us, L2=32; N3=480 us, L3=1

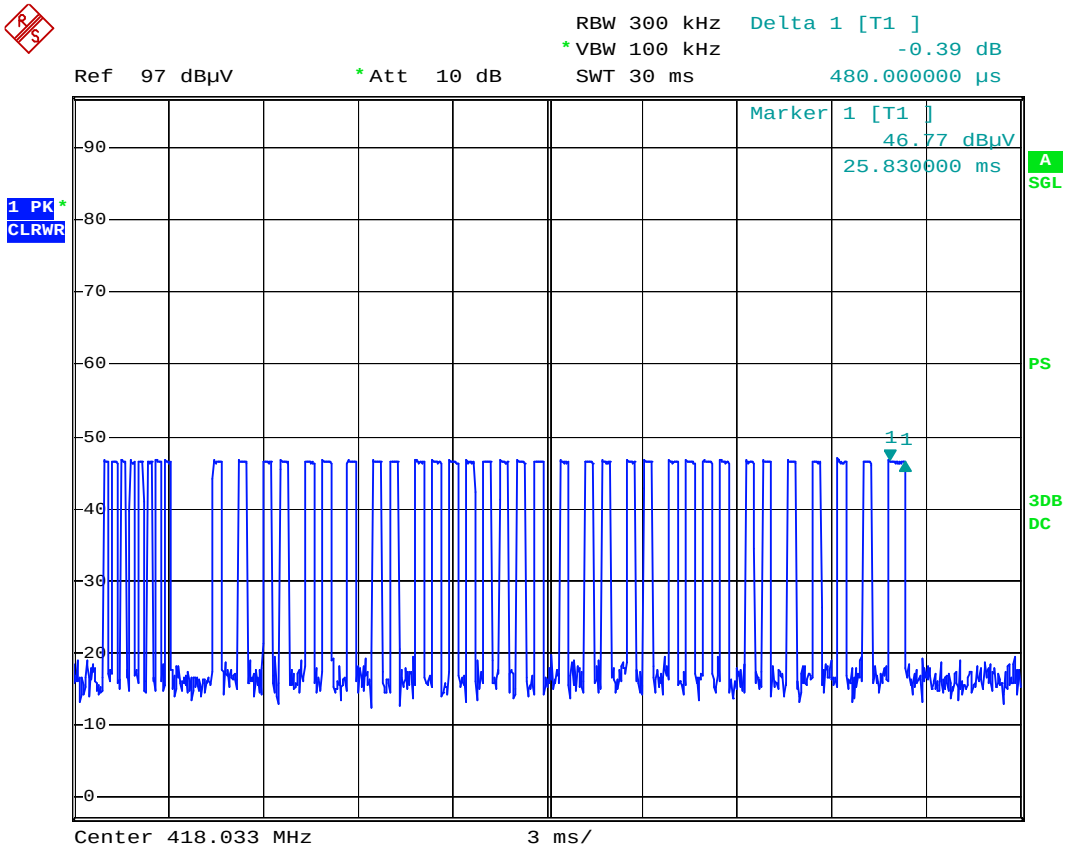
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.325768

For Button 3 – Picture and Music:





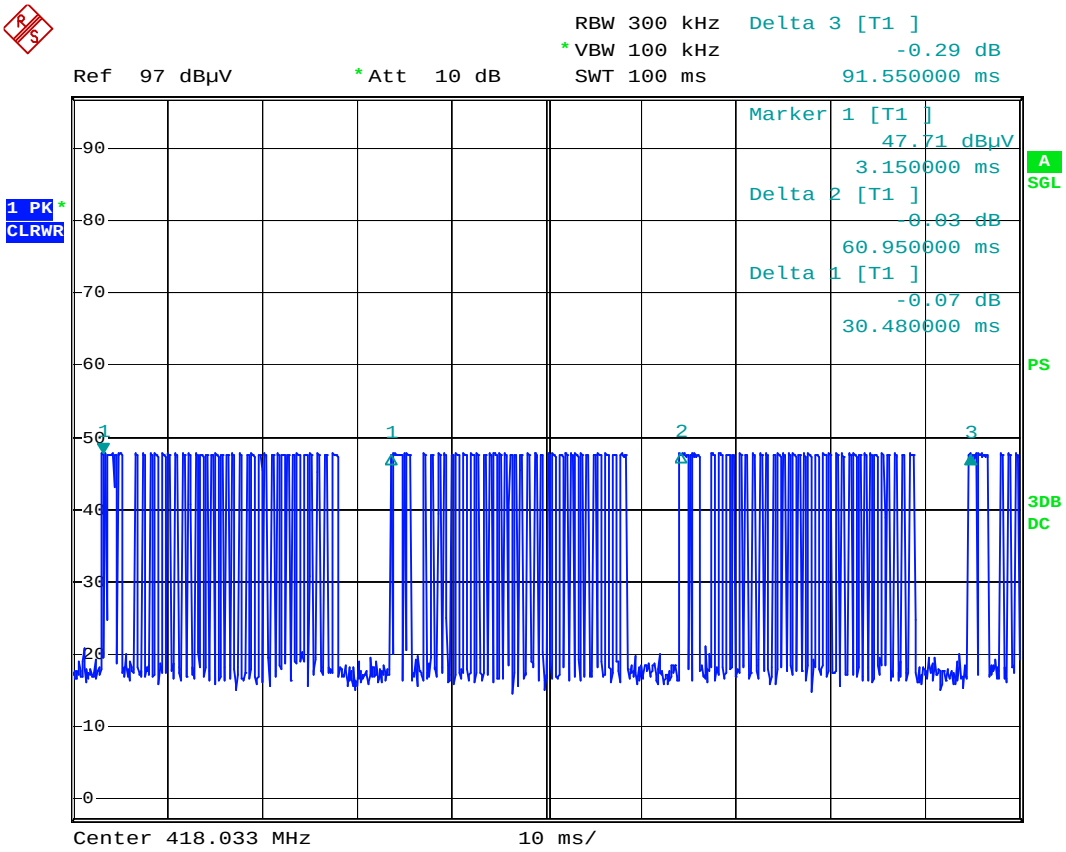


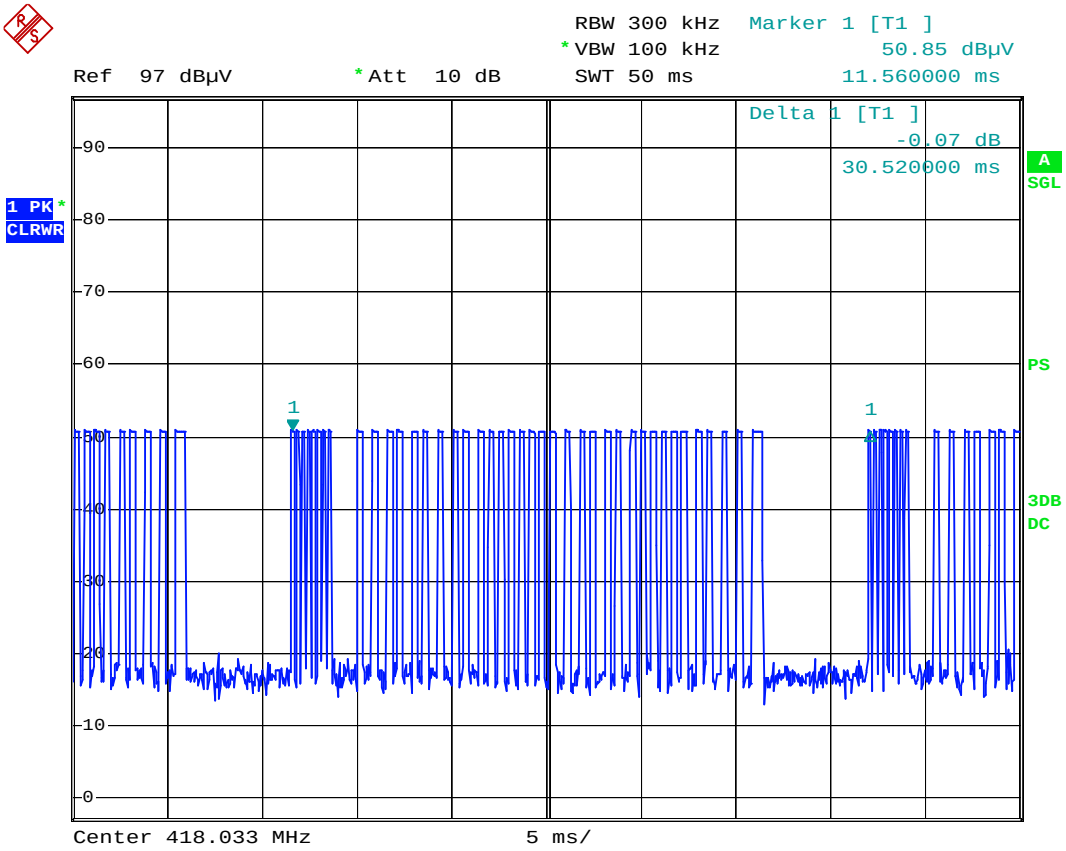


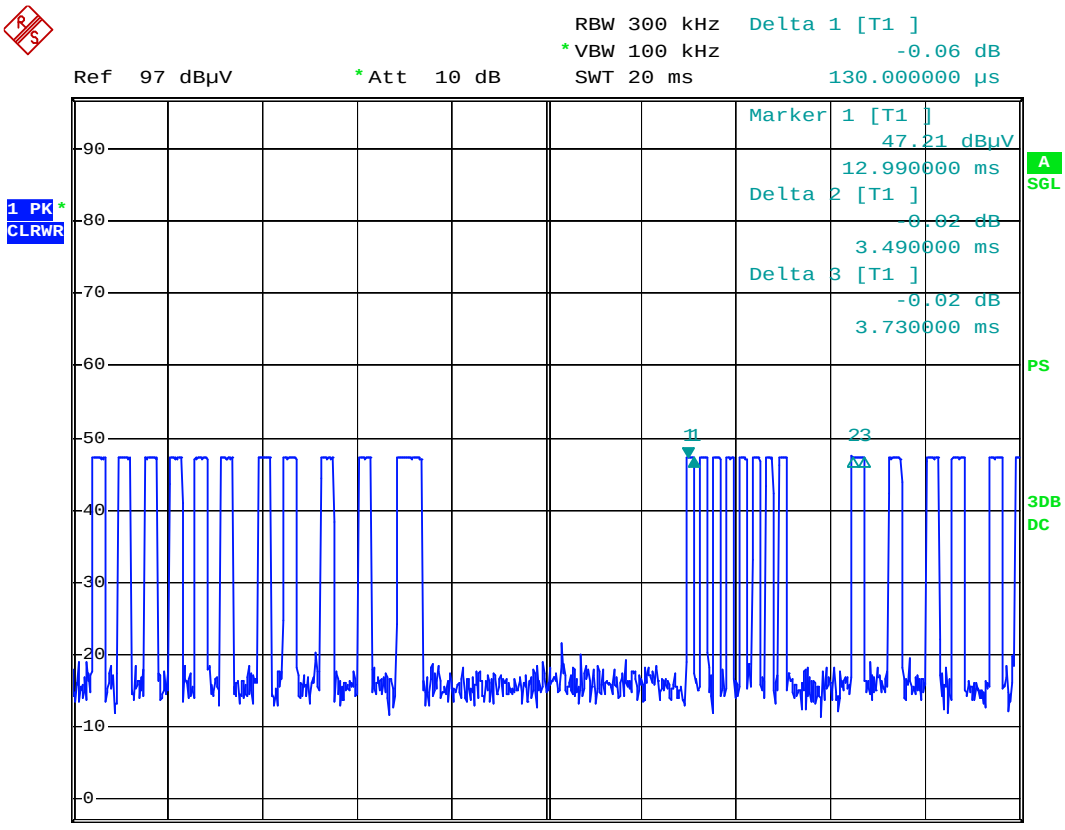
T=31.08 ms; N1=130 us, L1=8; N2=260 us, L2=32; N3=480 us, L3=1

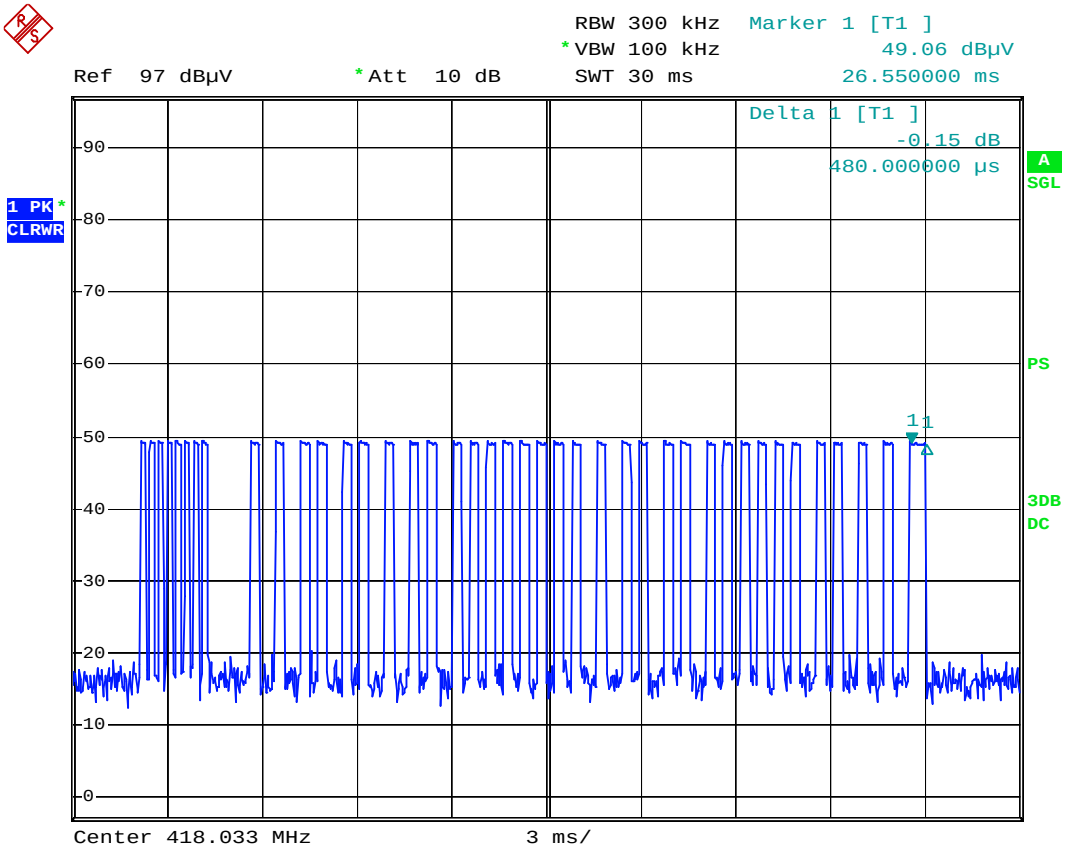
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.316602

For Button 4 – Clock/Calendar





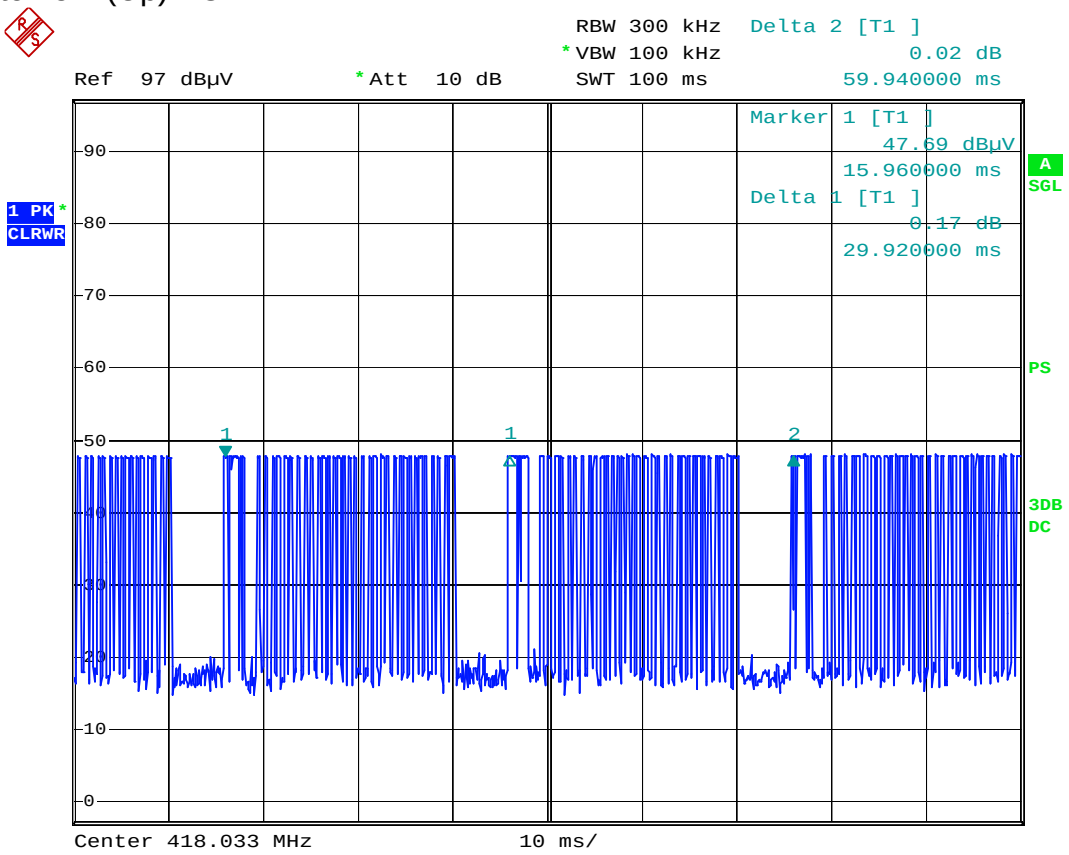


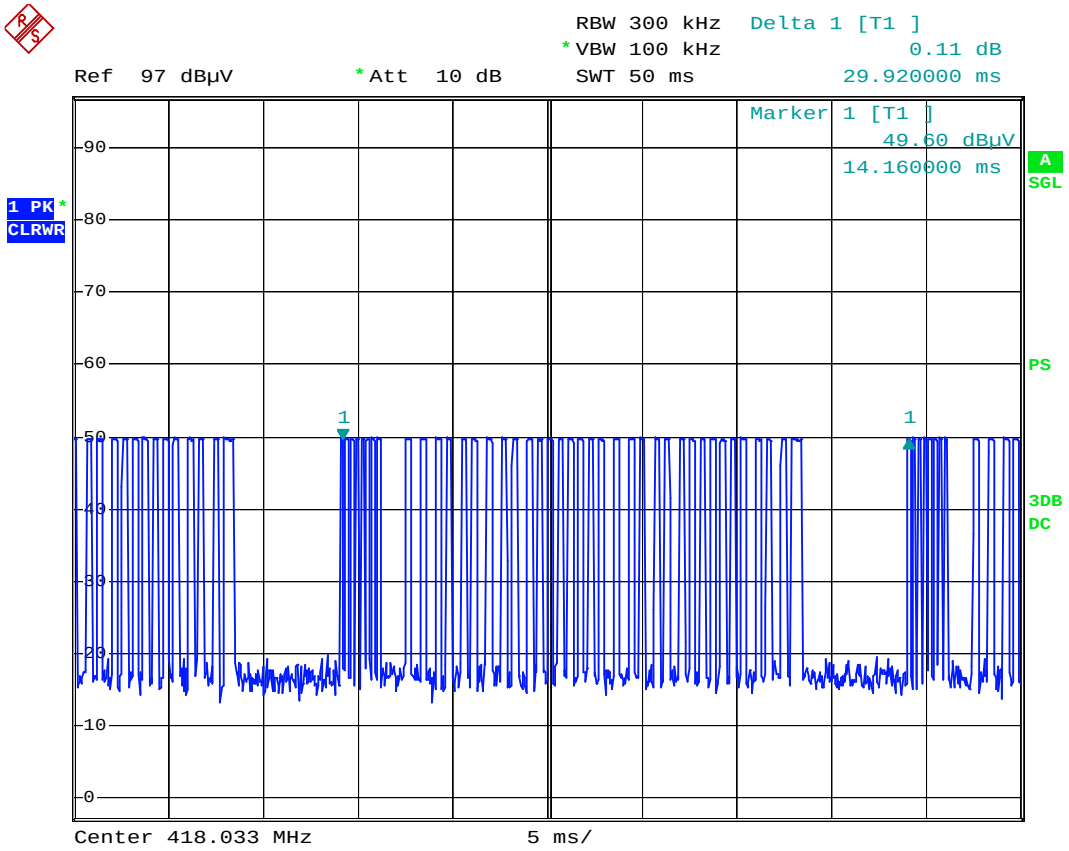


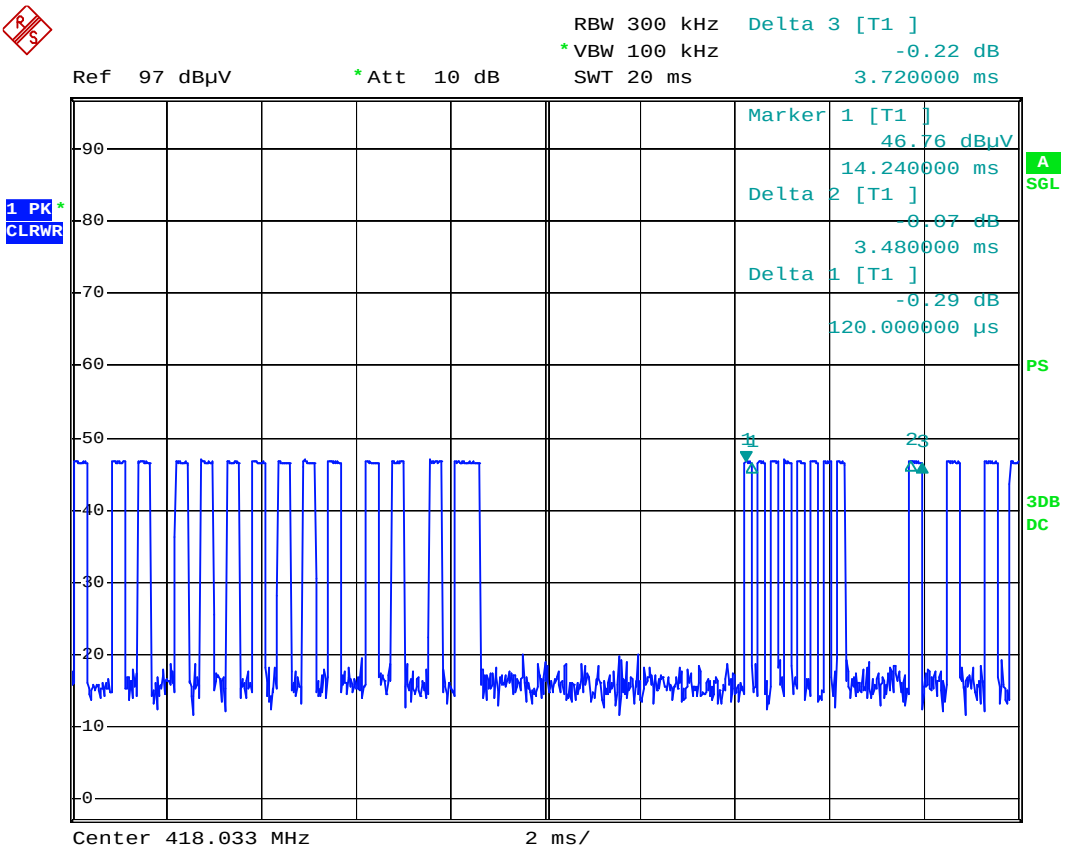
T=31.52 ms; N1=130 us, L1=8; N2=240 us, L2=32; N3=480 us, L3=1

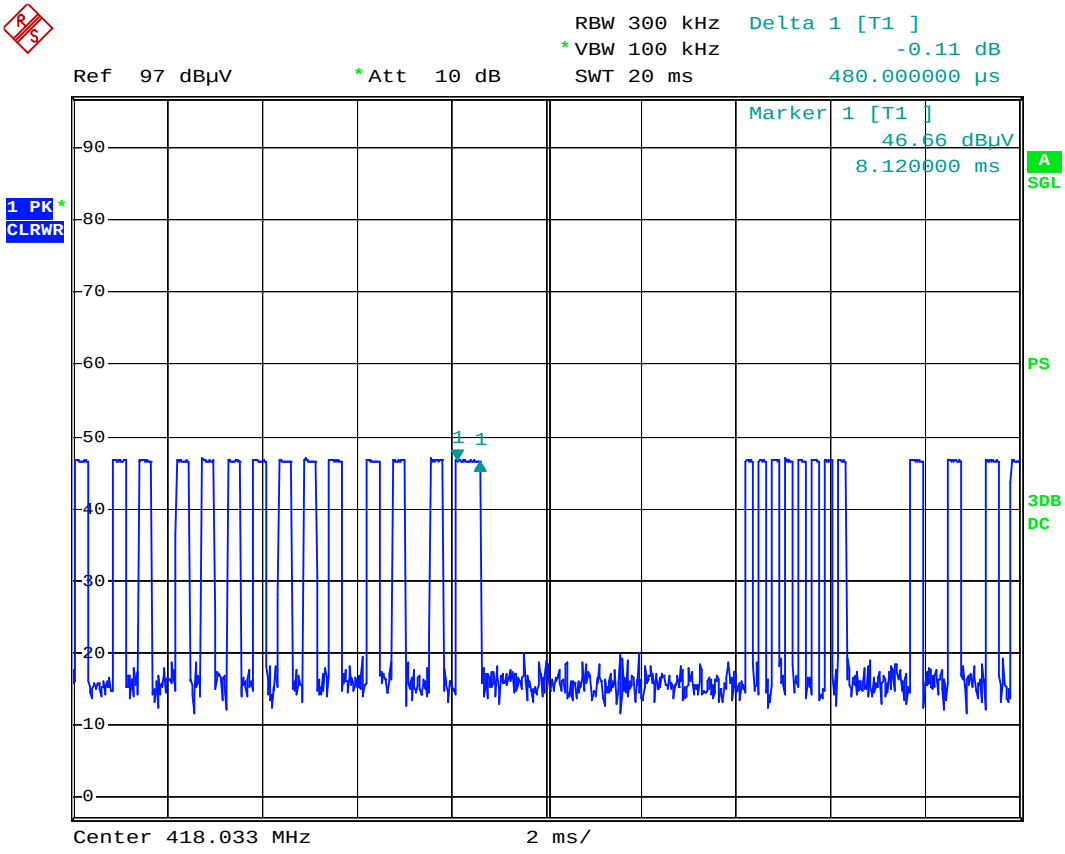
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.291878

For Button 5 – (Up) VOL+:





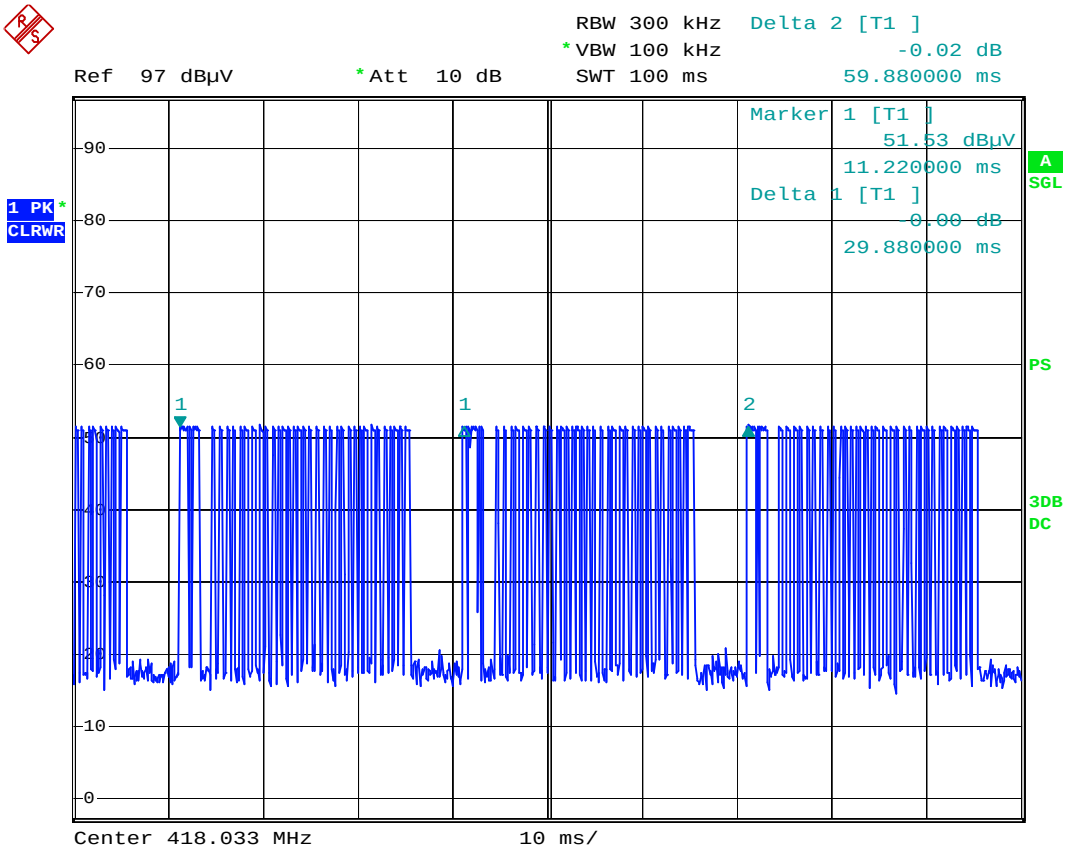


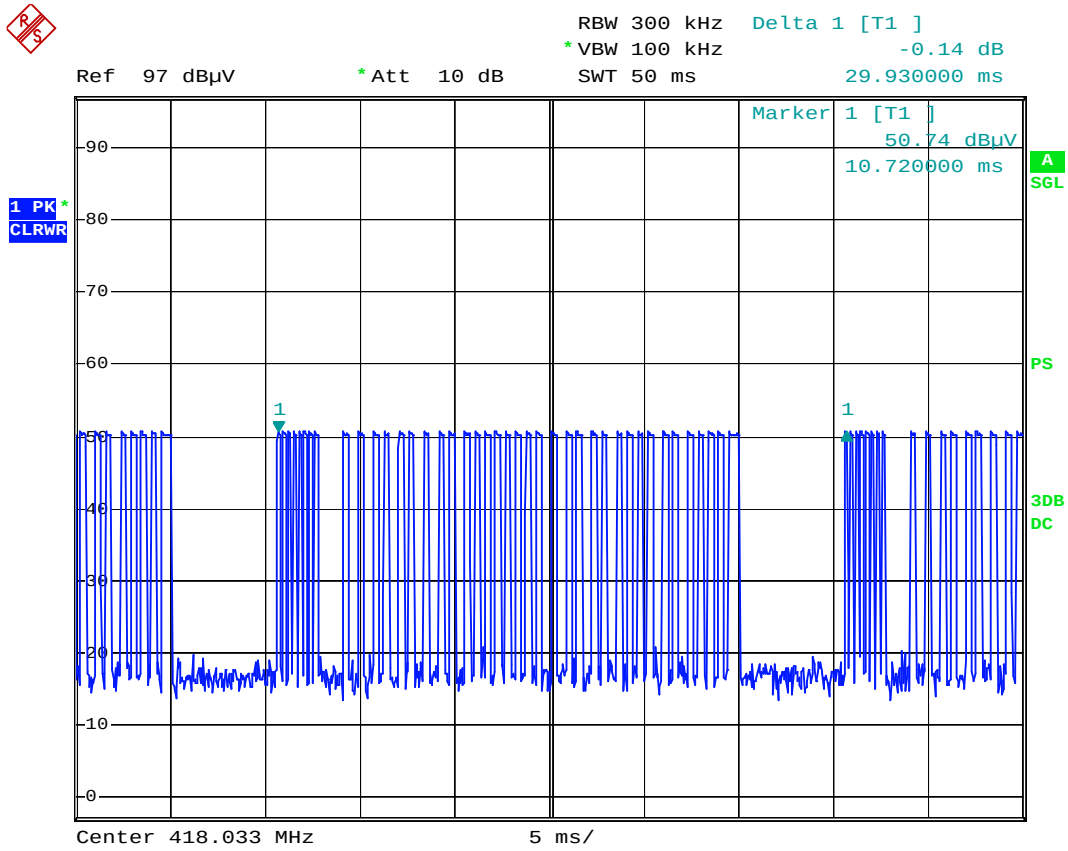


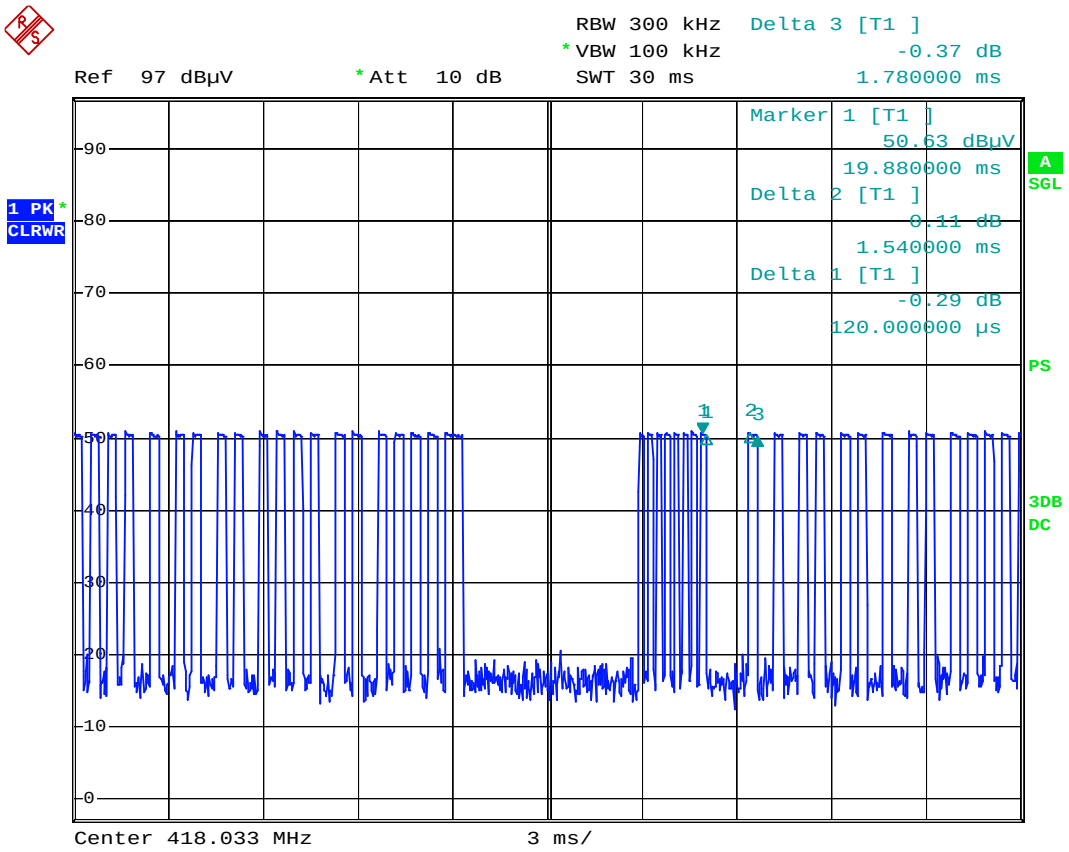
T=29.92 ms; N1=120 us, L1=8; N2=240 us, L2=32; N3=480 us, L3=1

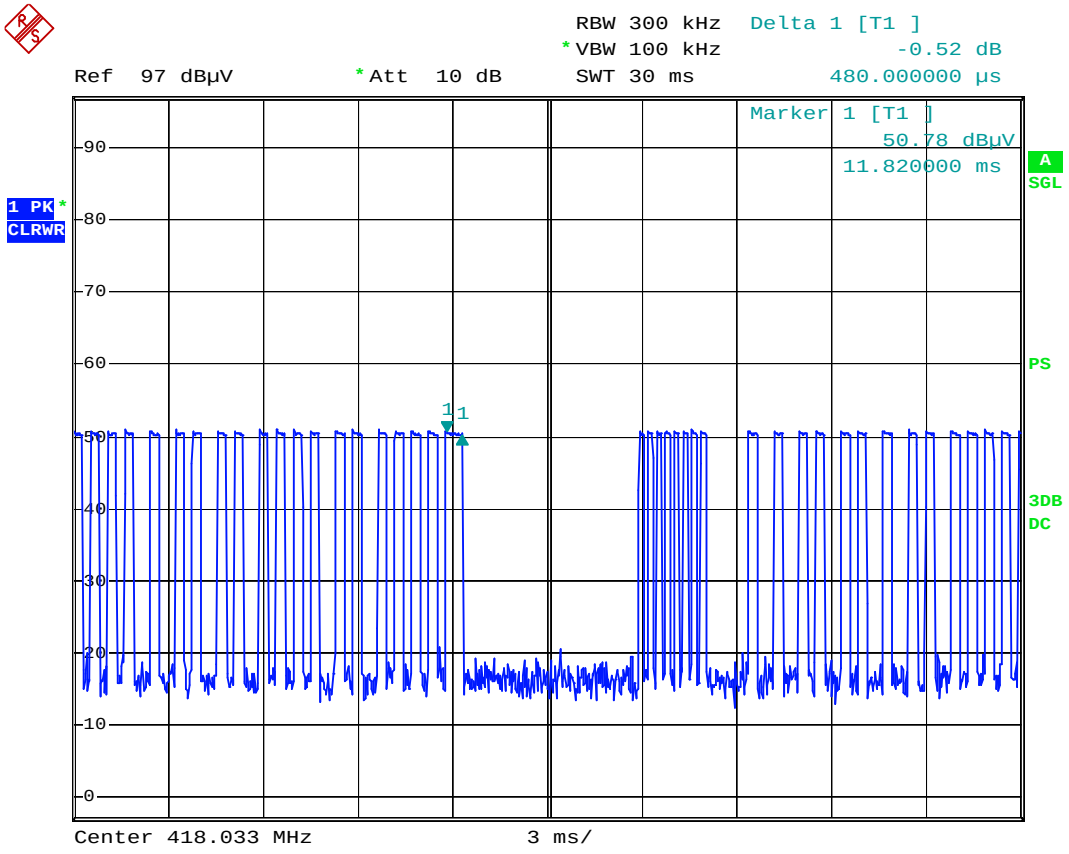
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.304813

For Button 6 – Video:





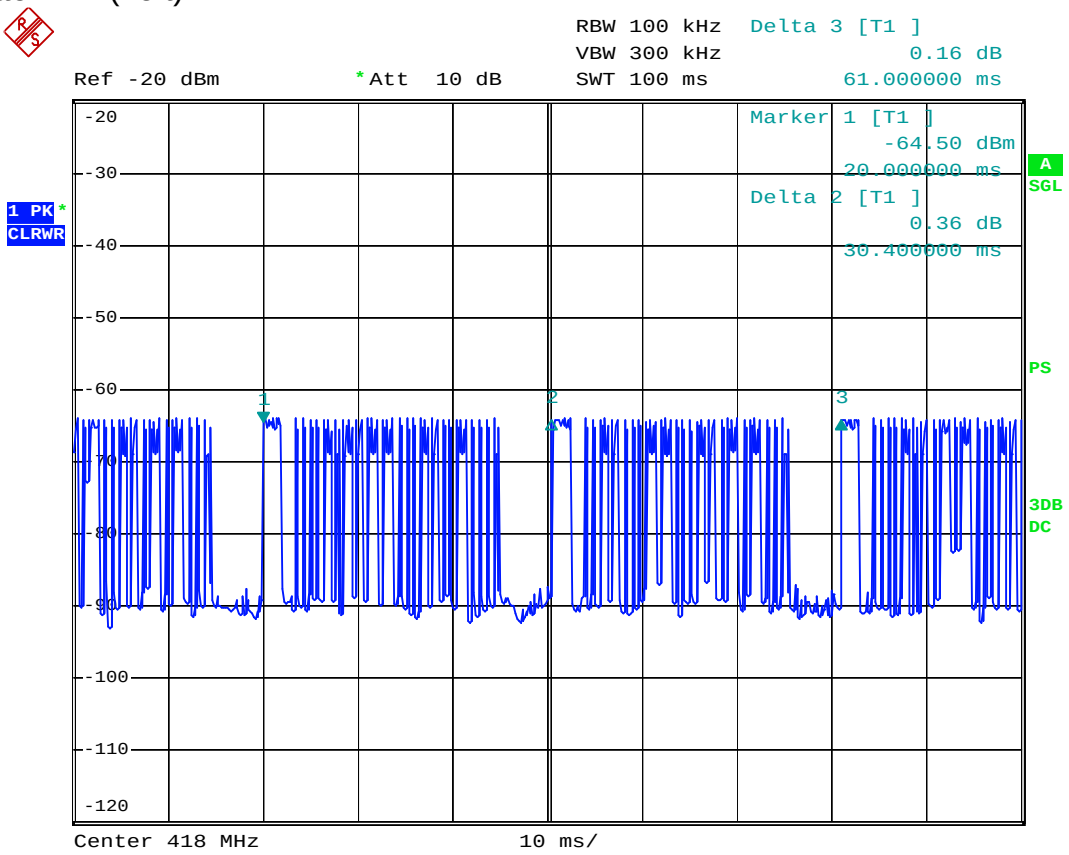


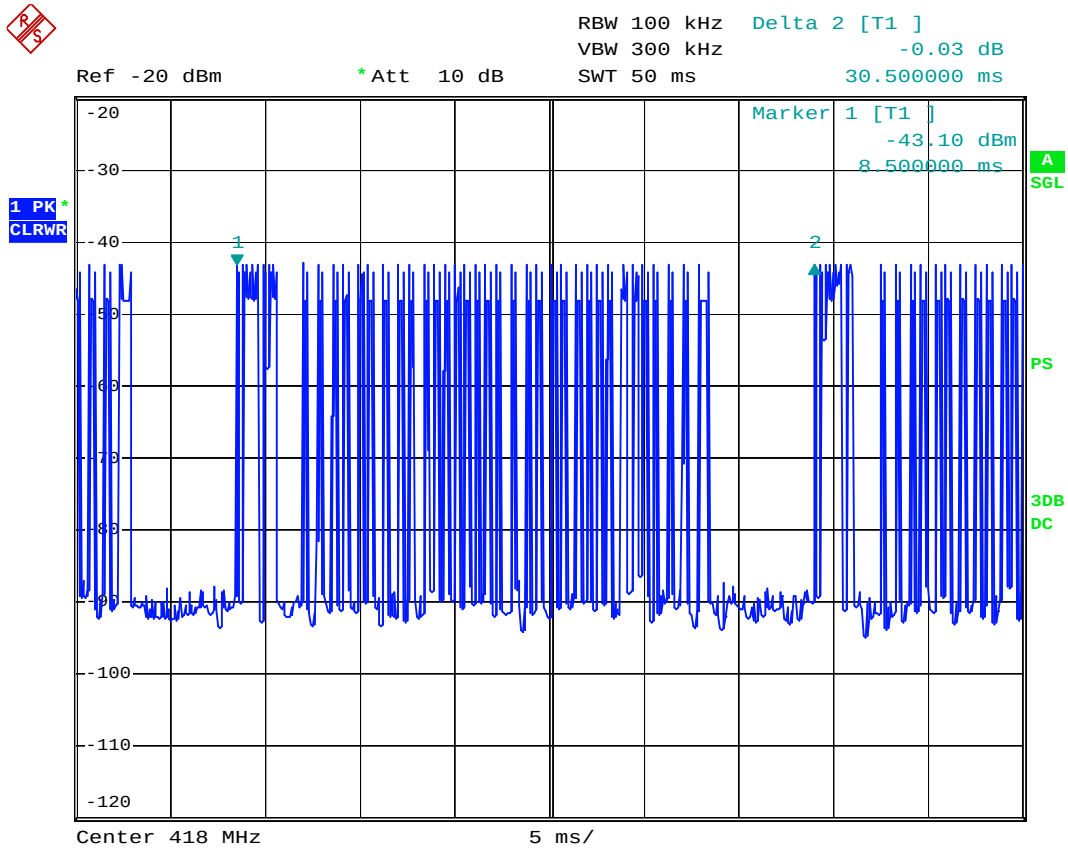


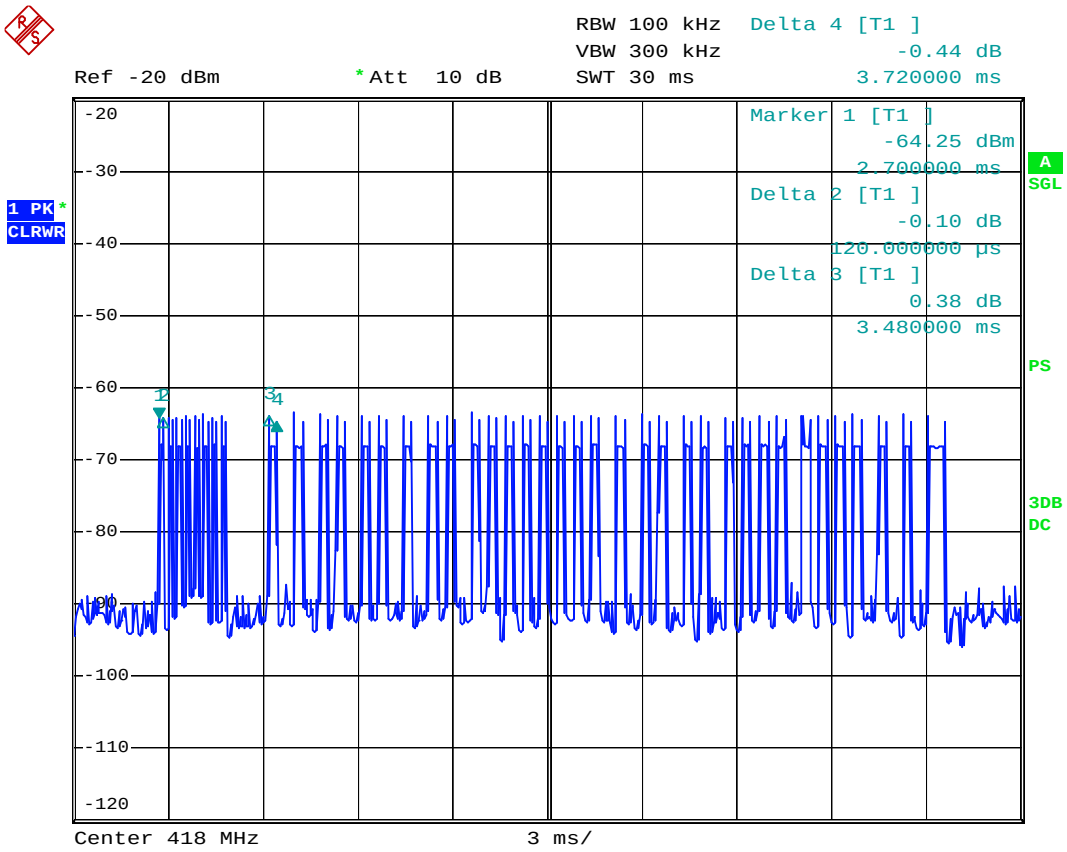
T=29.93 ms; N1=120 us, L1=8; N2=240 us, L2=32; N3=480 us, L3=1

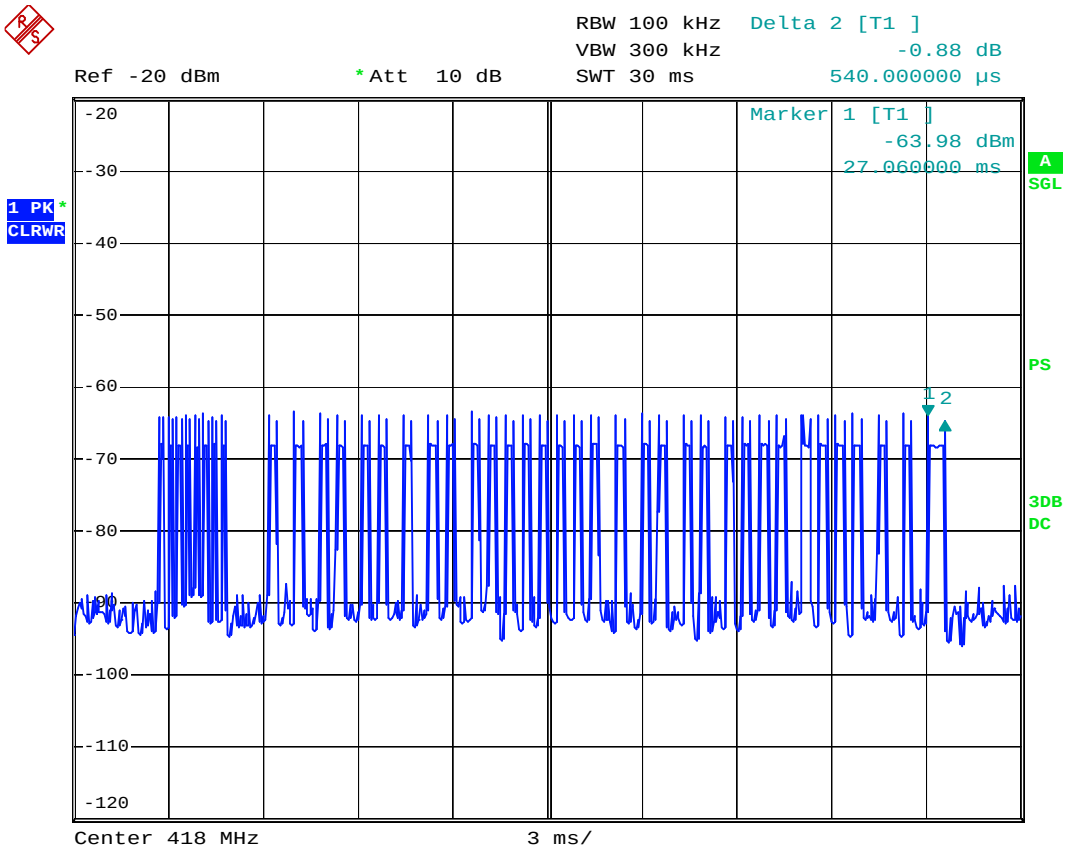
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.304711

For Button 7 – (Left) PREV:





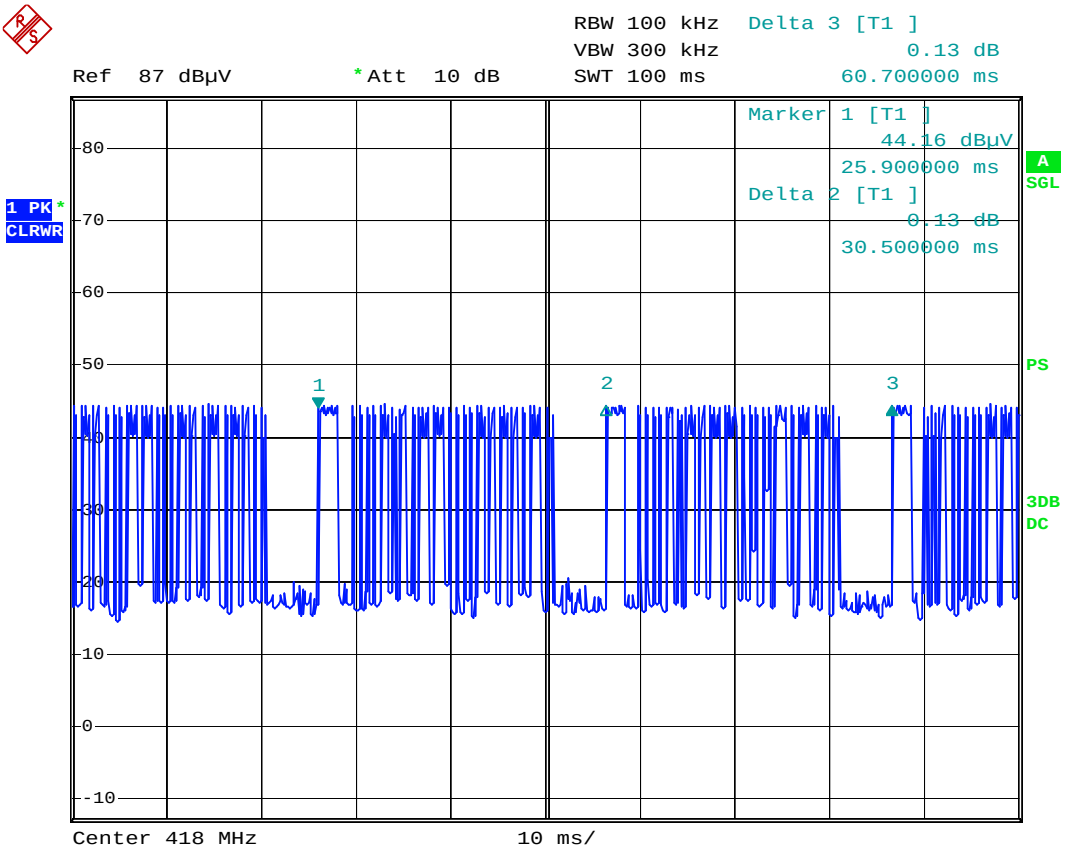


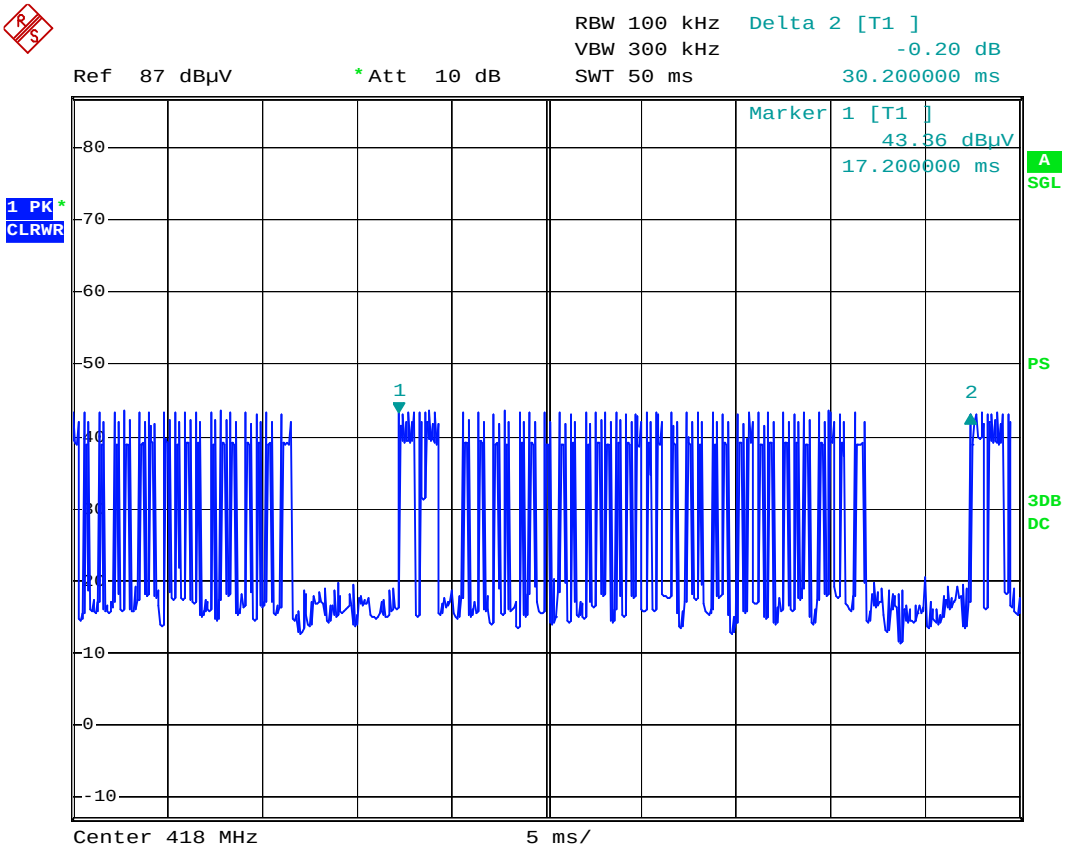


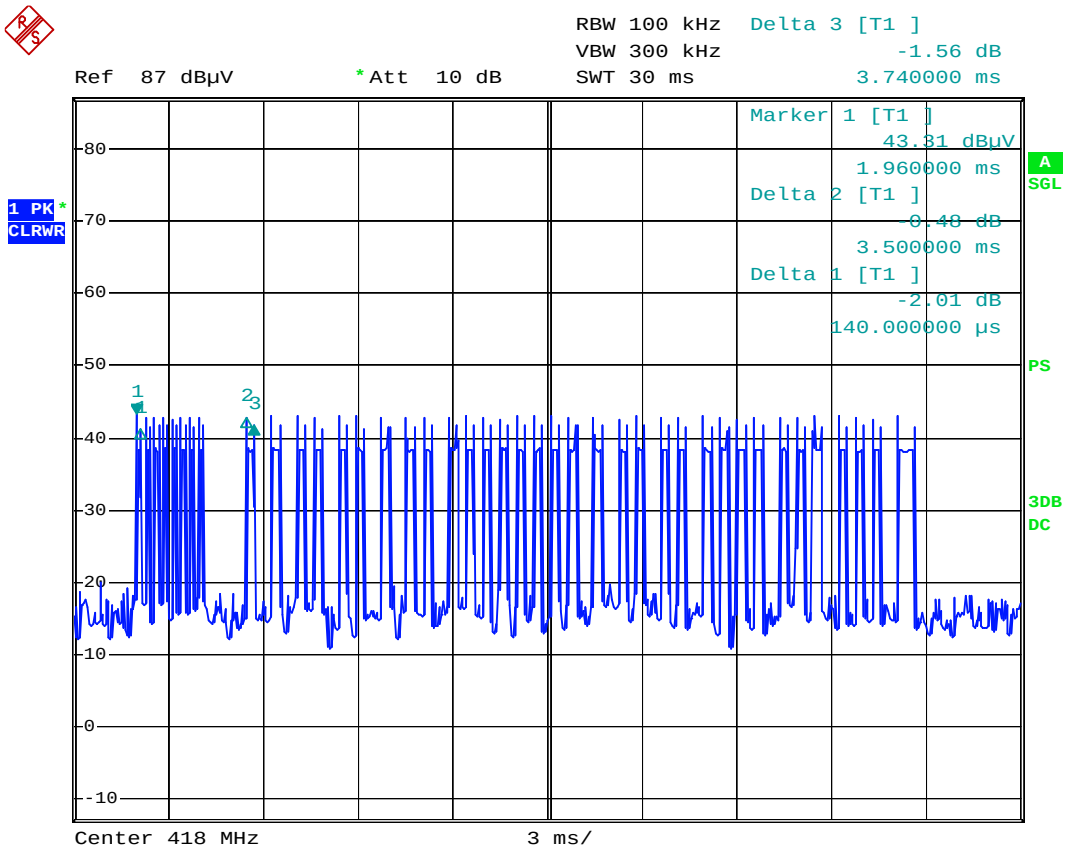
T=30.50 ms; N1=120 us, L1=8; N2=240 us, L2=32; N3=540 us, L3=1

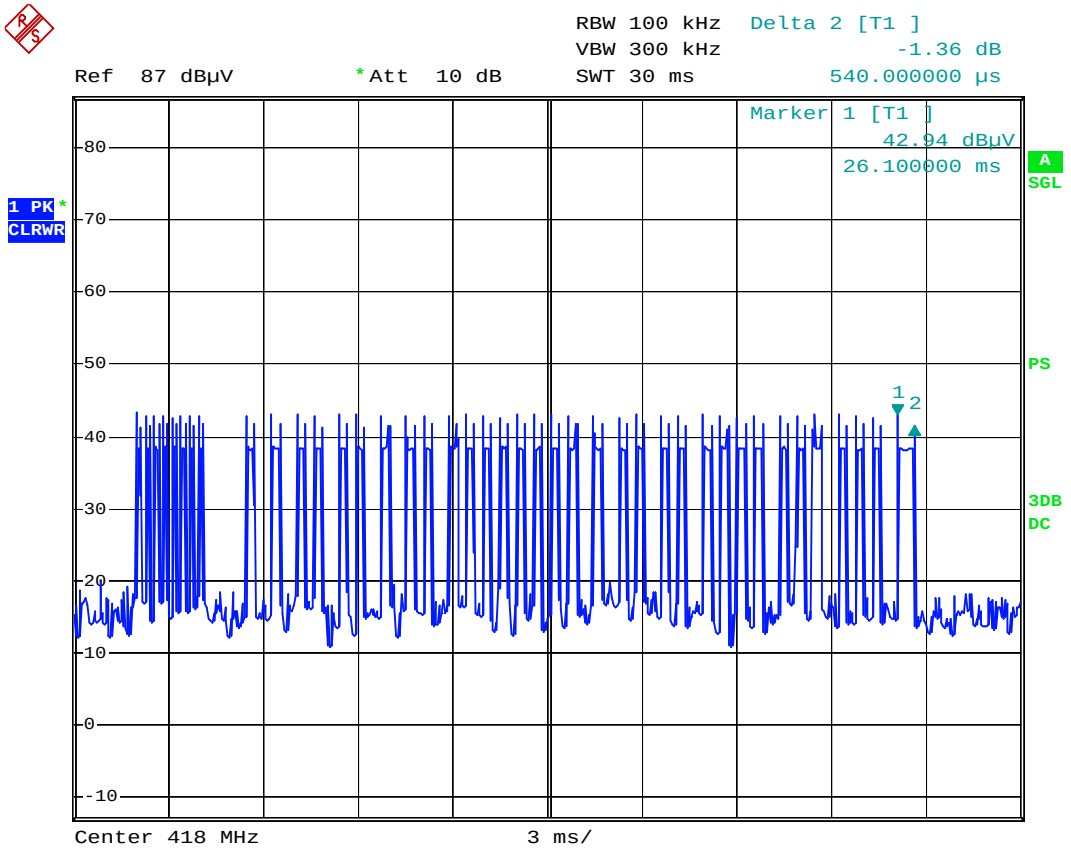
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.300984

For Button 8 – ENTER/PLAY/PAUSE:





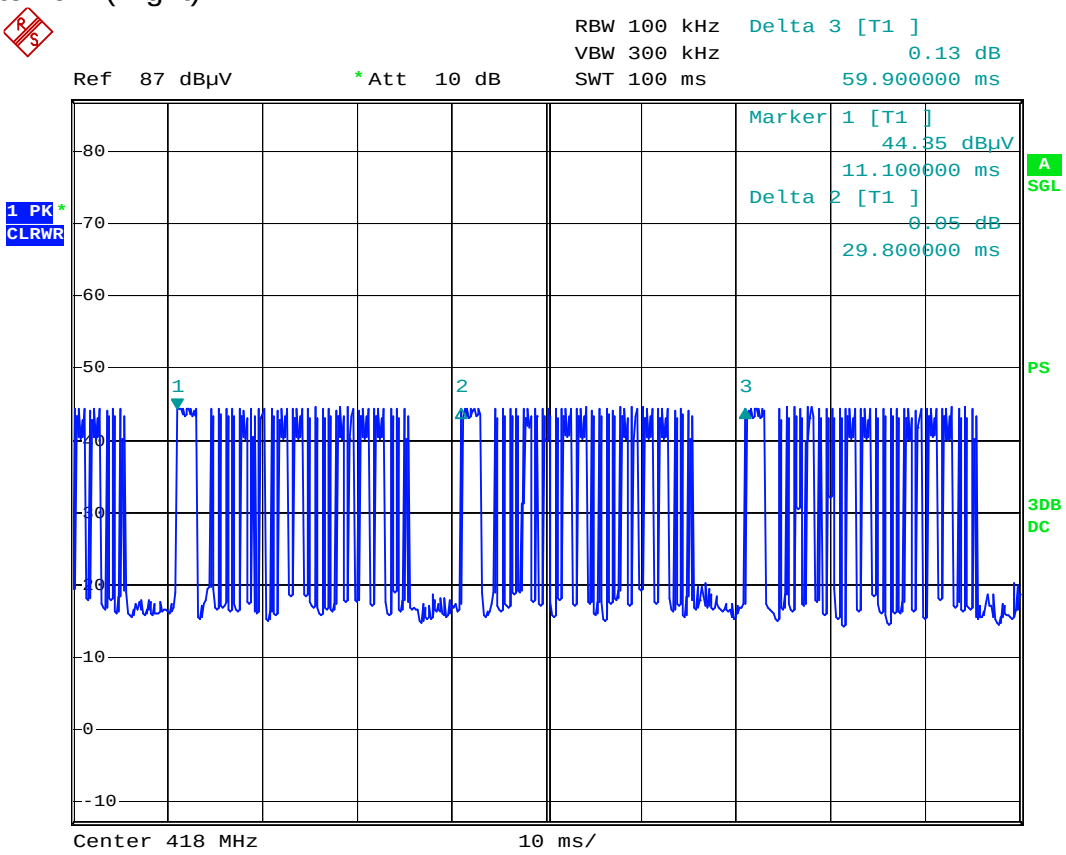


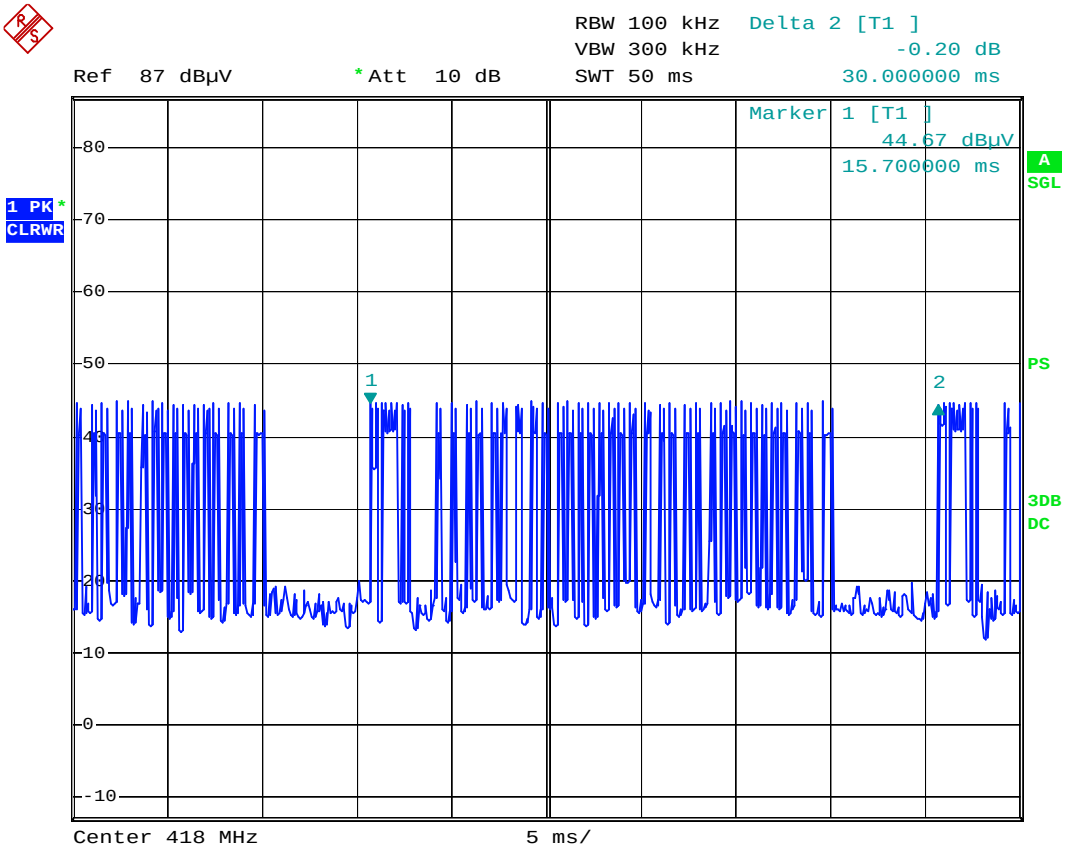


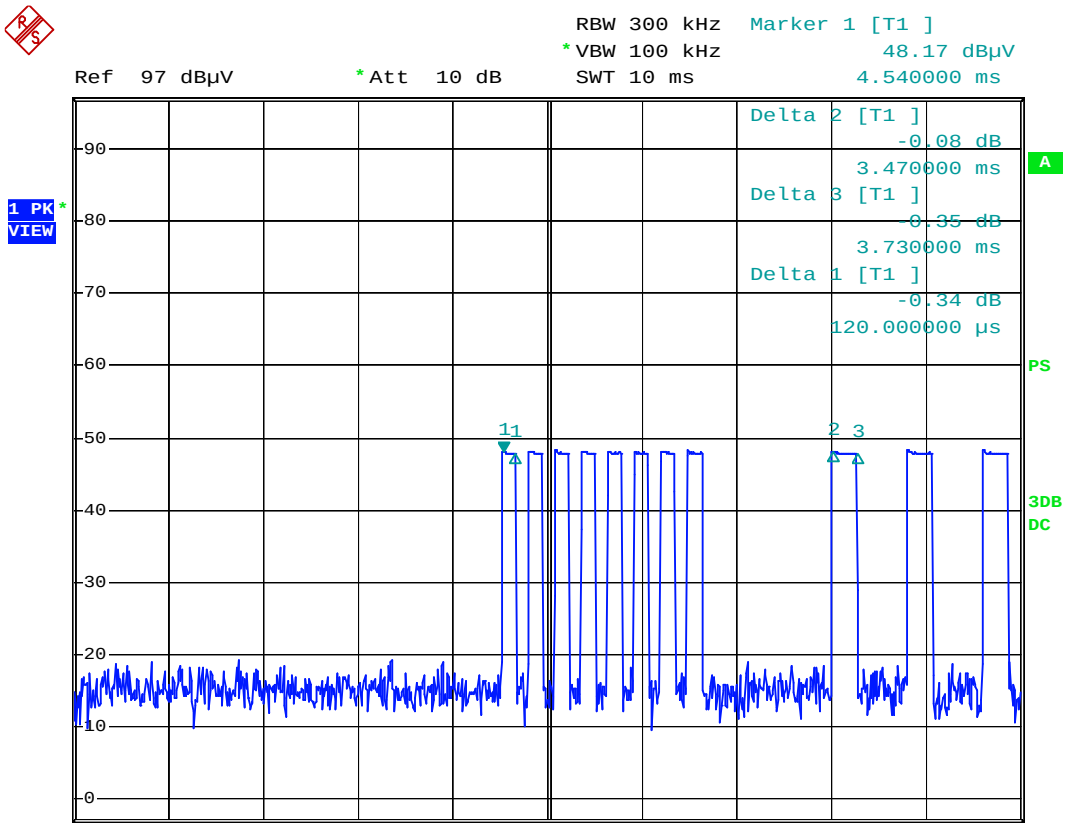
T=30.20 ms; N1=140 us, L1=8; N2=240 us, L2=32; N3=540 us, L3=1

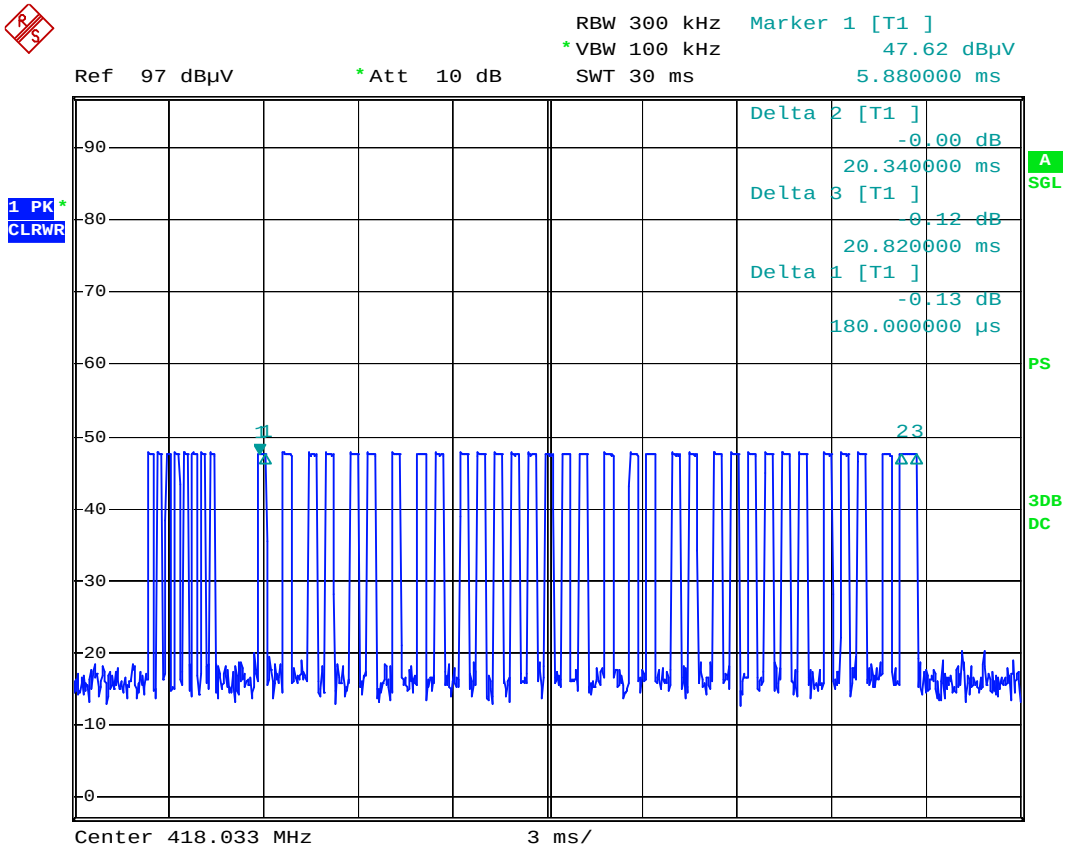
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.309272

For Button 9 – (Right) NEXT:





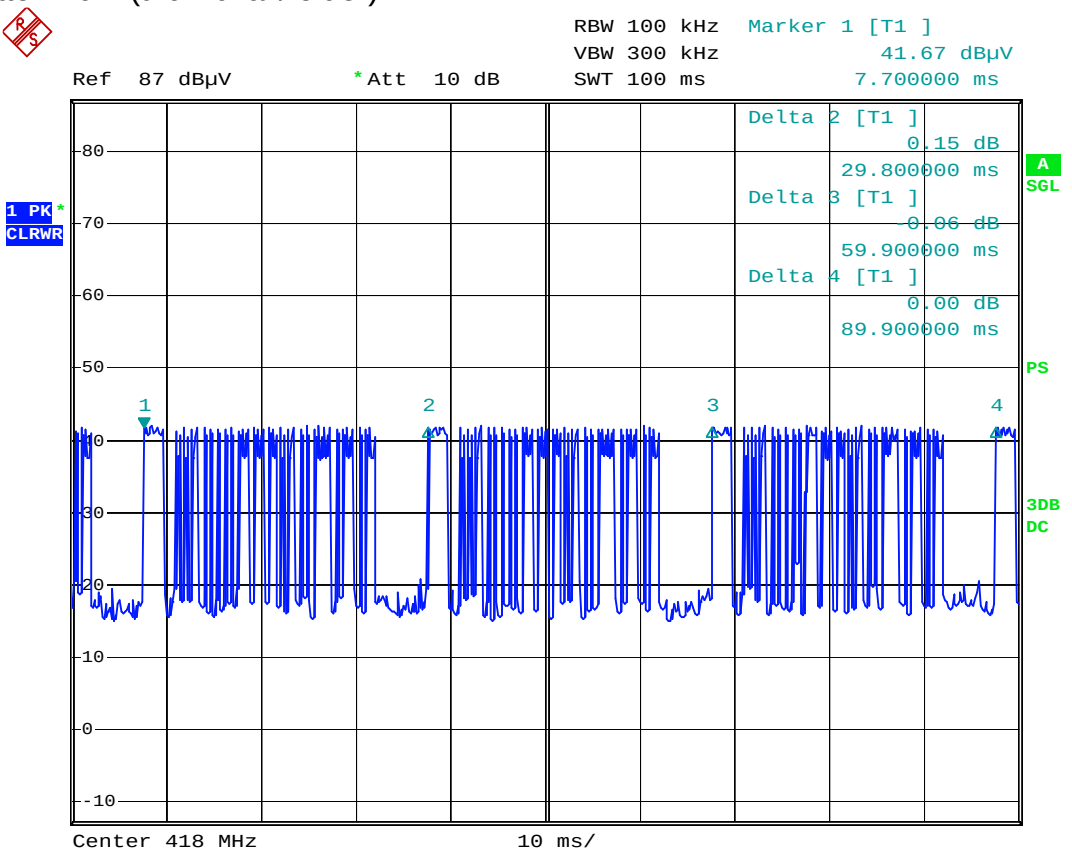


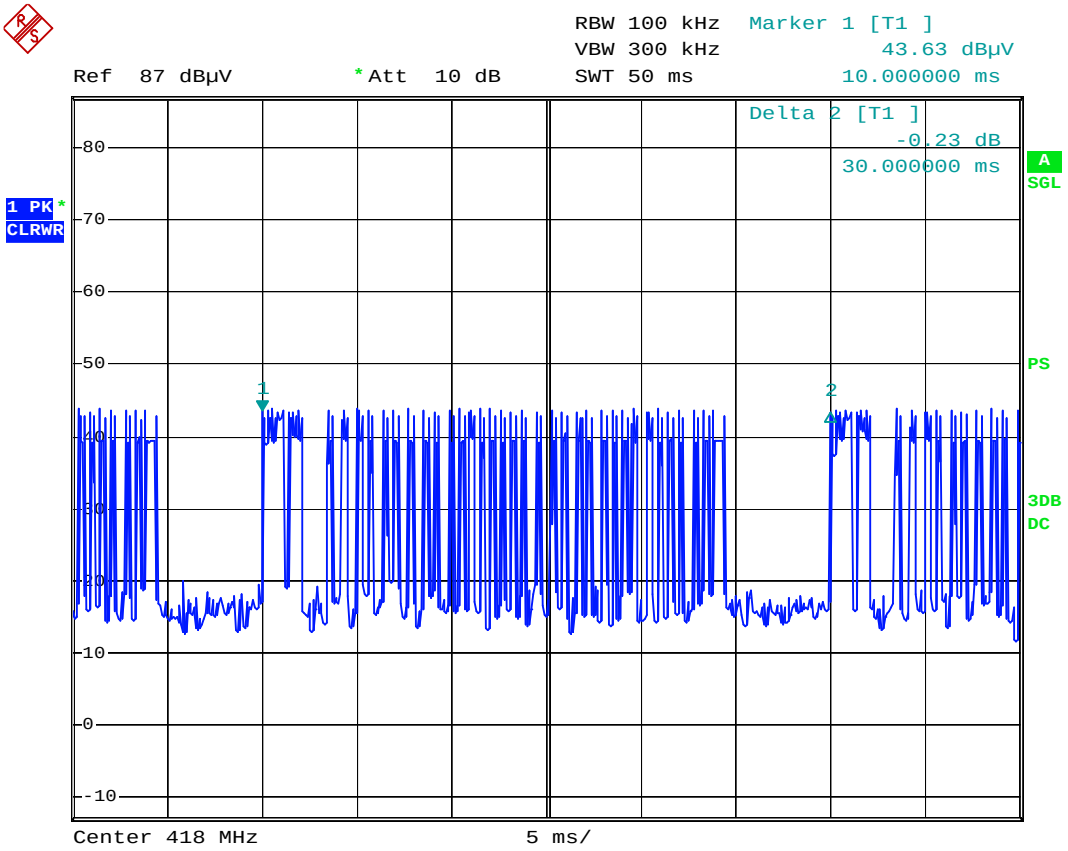


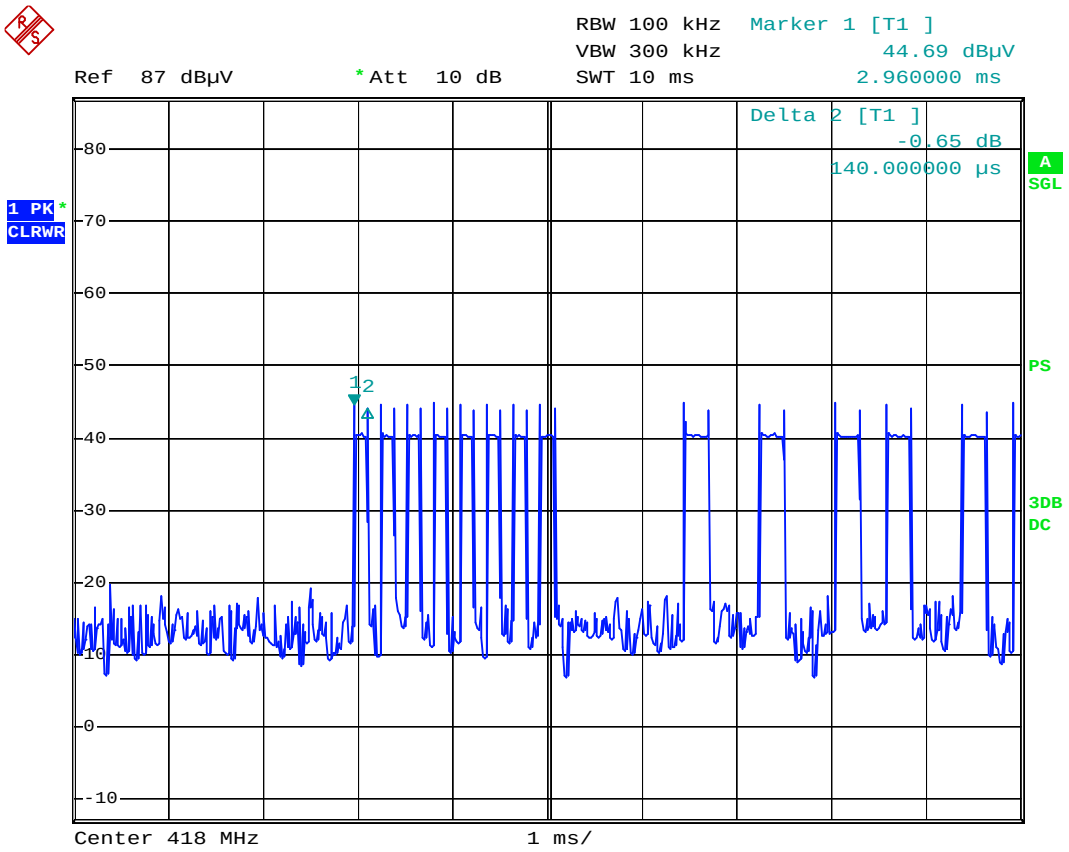
T=30.00 ms; N1=120 us, L1=8; N2=260 us, L2=32; N3=480 us, L3=1

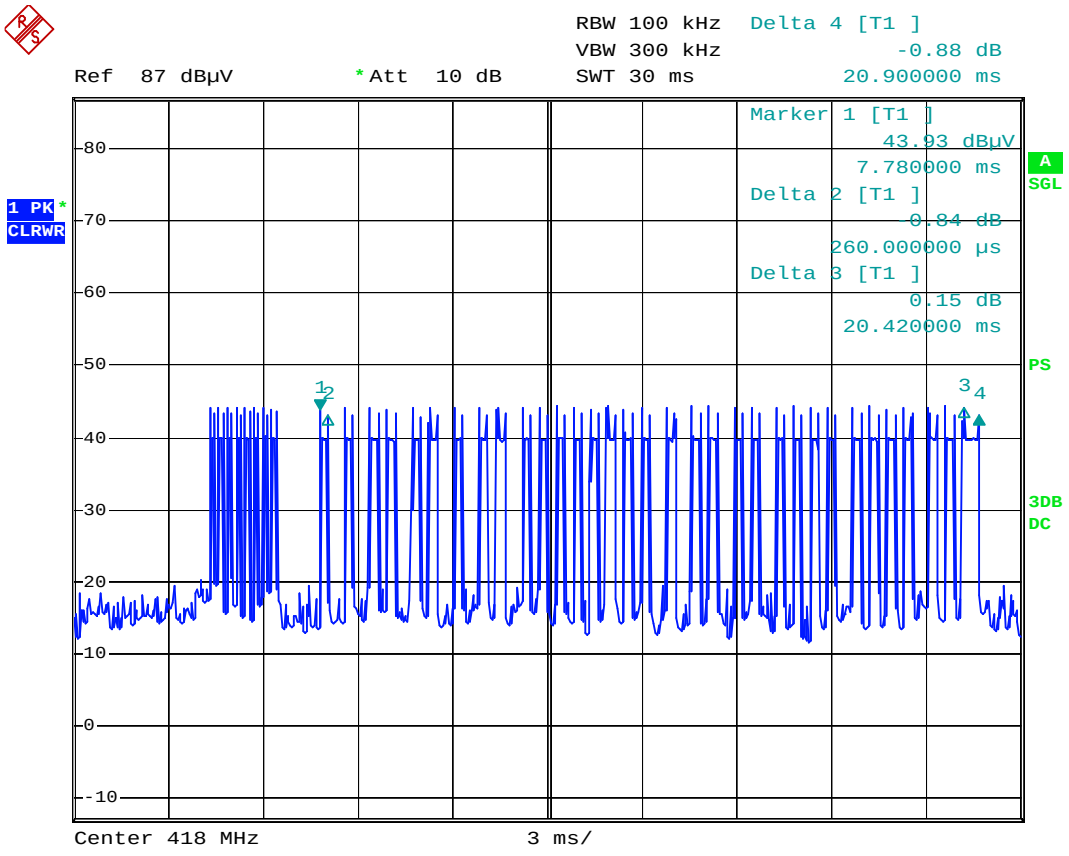
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.325333

For Button 10 – (thumbnail/folder)





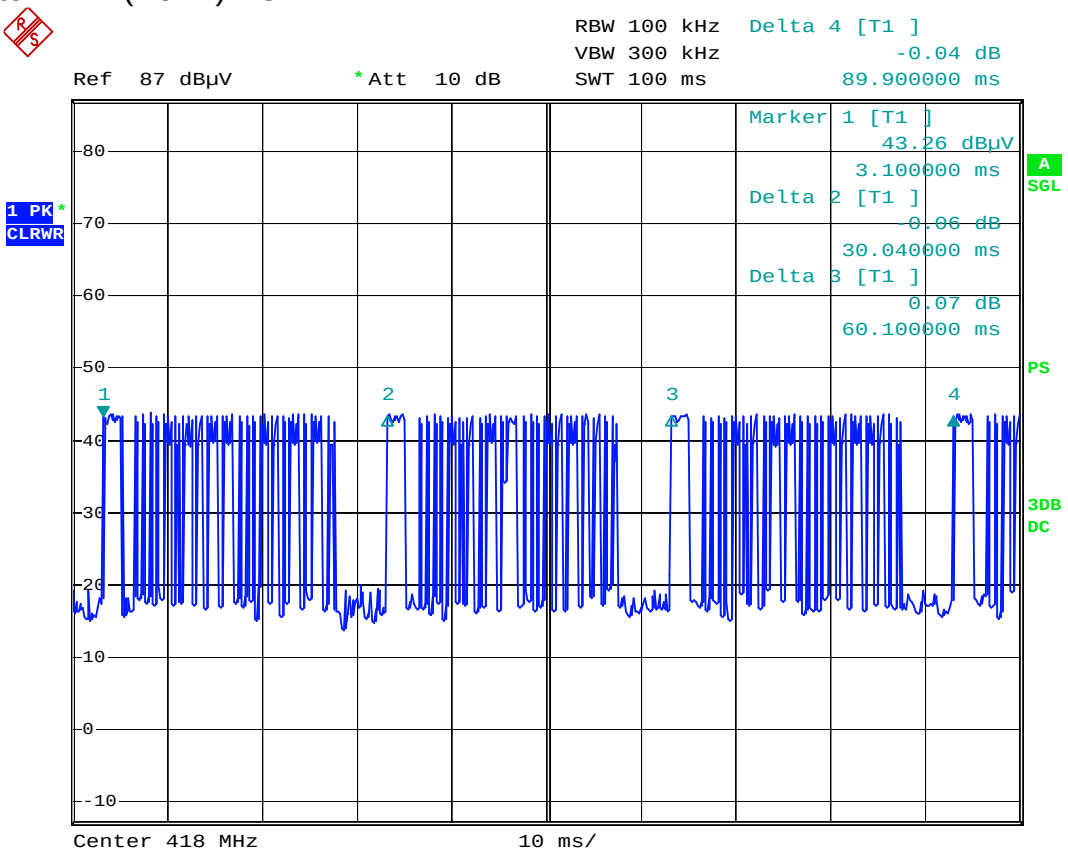


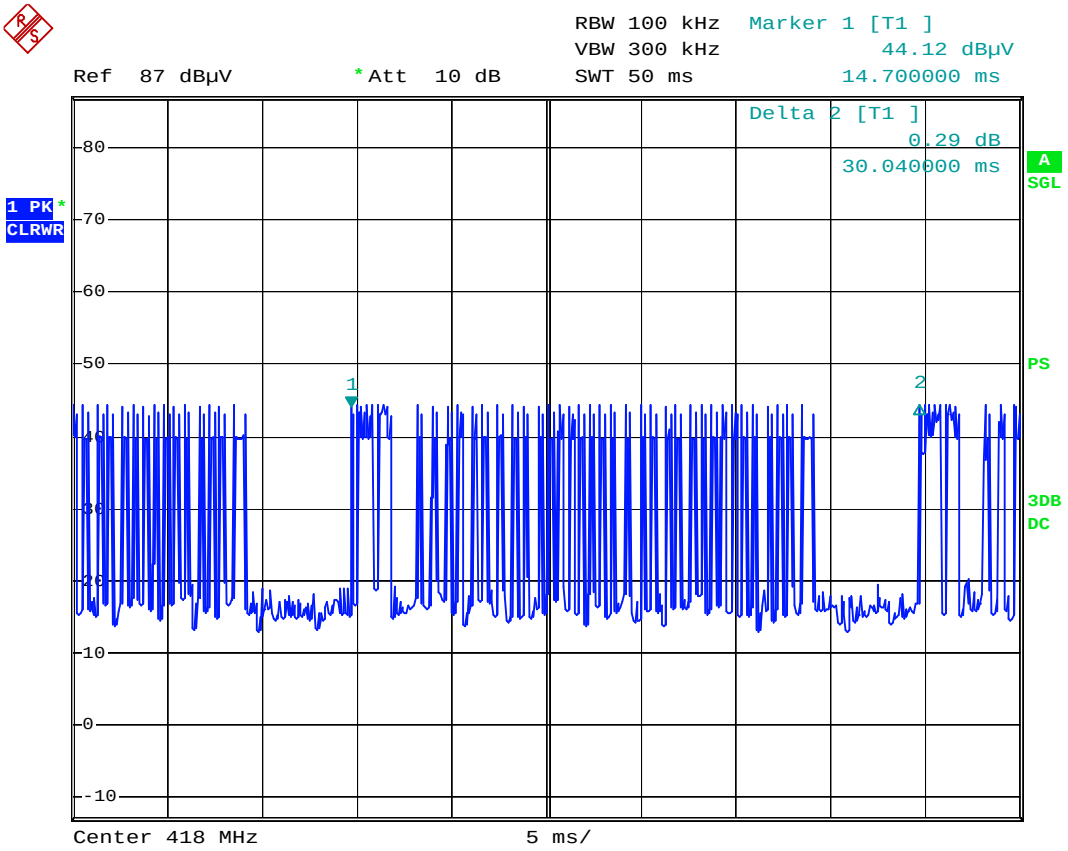


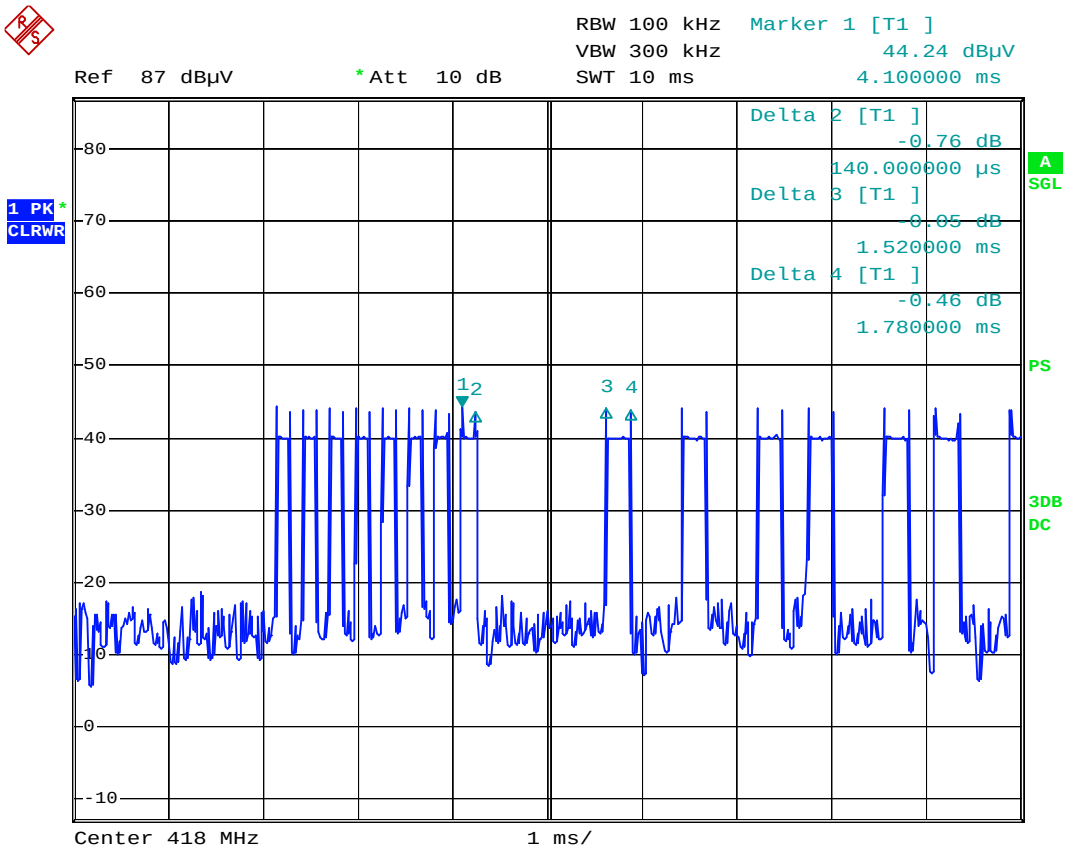
T=30.00 ms; N1=140 us, L1=8; N2=260 us, L2=32; N3=480 us, L3=1

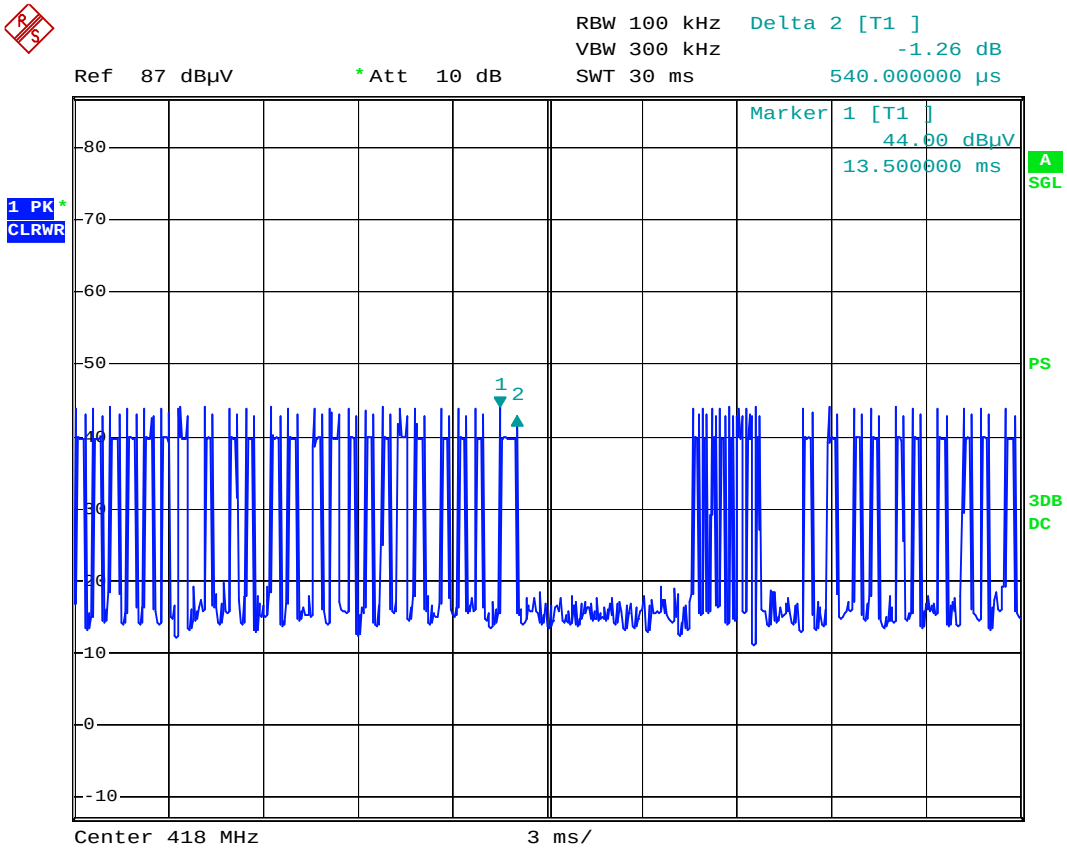
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.314667

For Button 11 – (Down) VOL-:





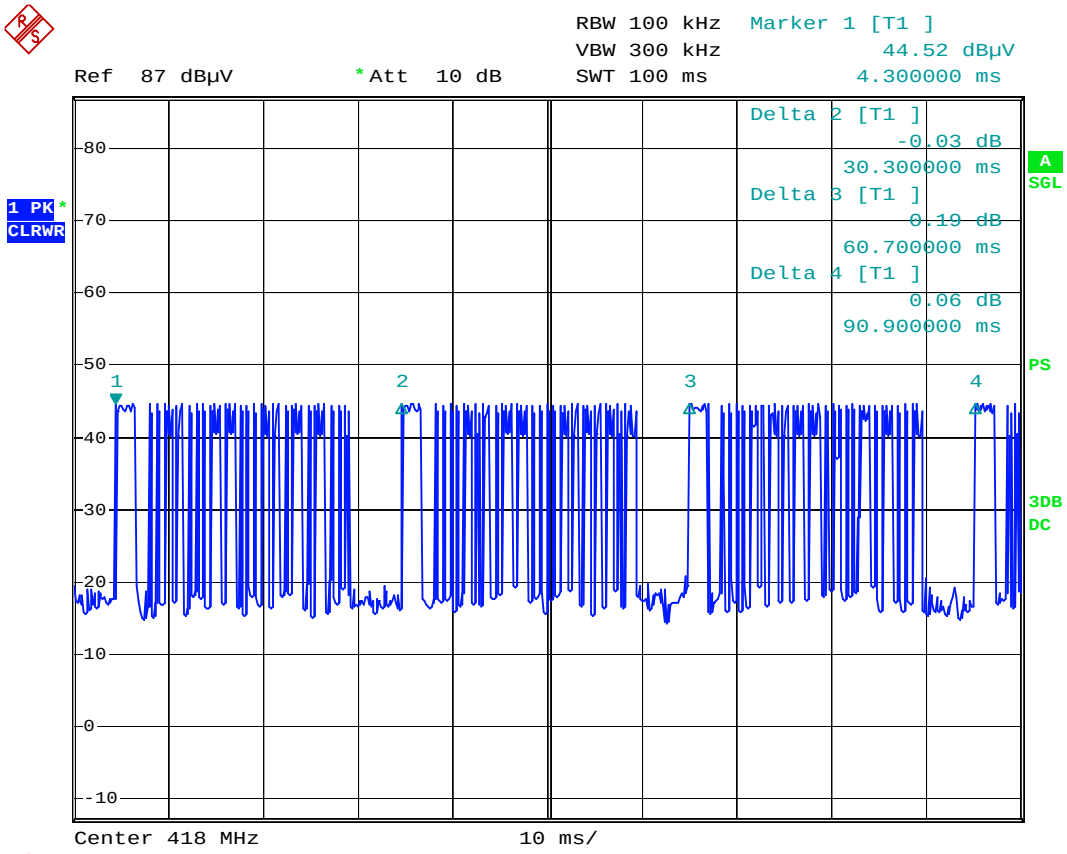


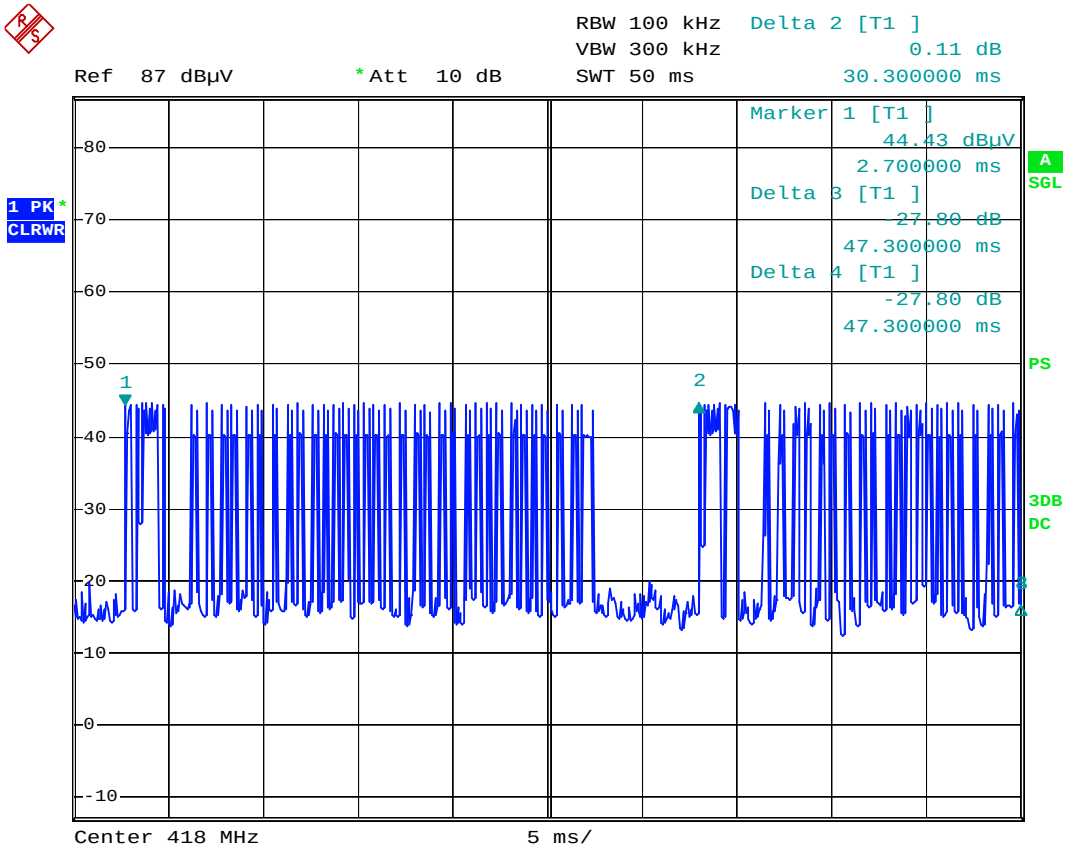


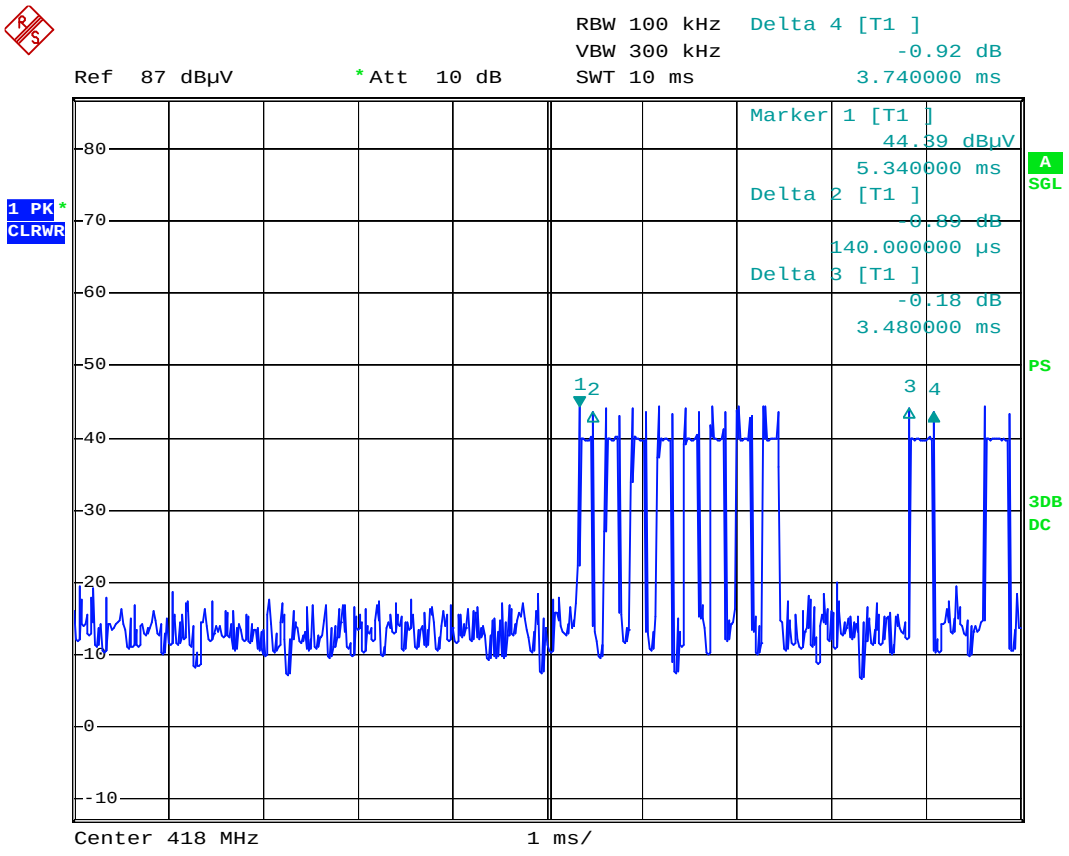
T=30.04 ms; N1=140 us, L1=8; N2=260 us, L2=32; N3=540 us, L3=1

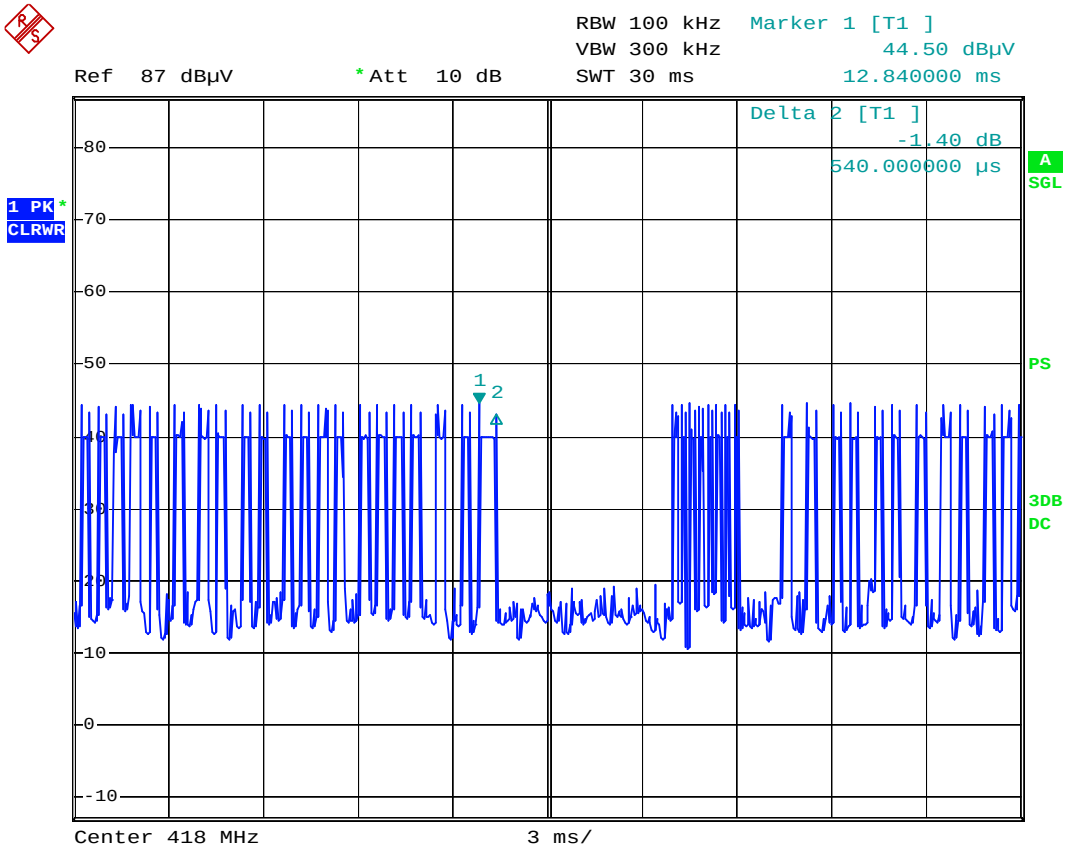
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.332224

For Button 12 – ROTATE:





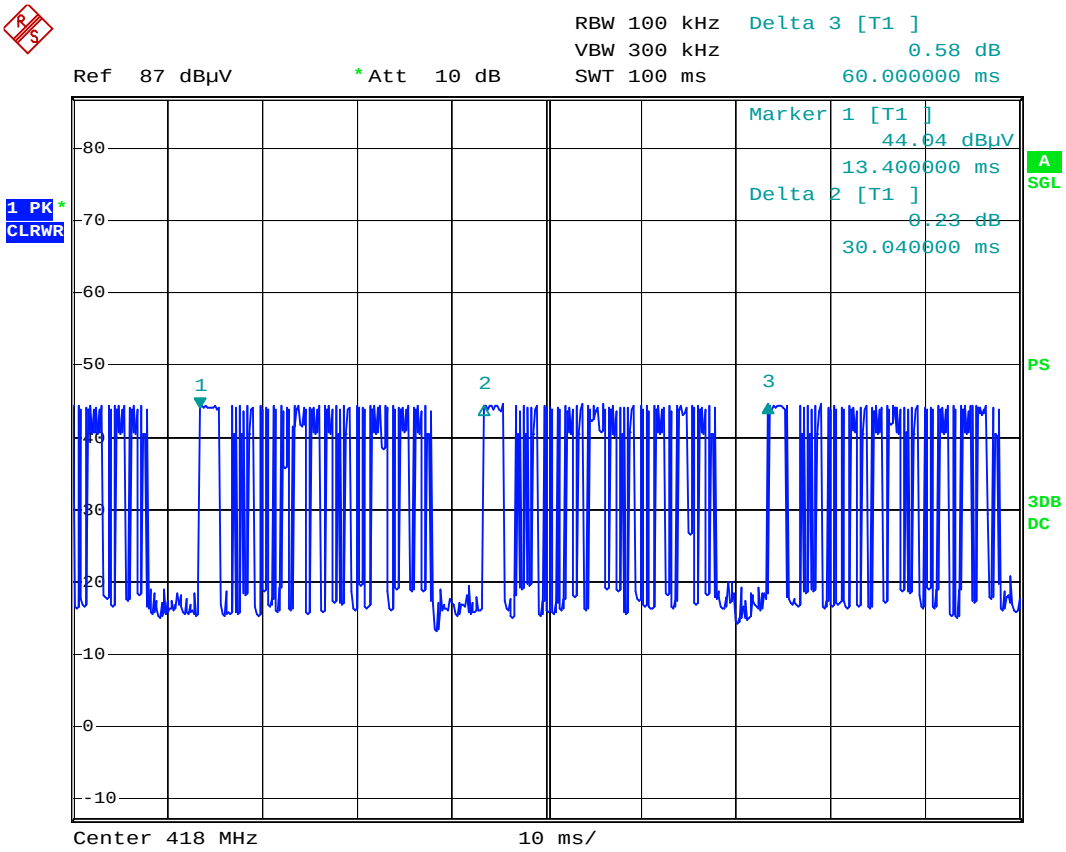


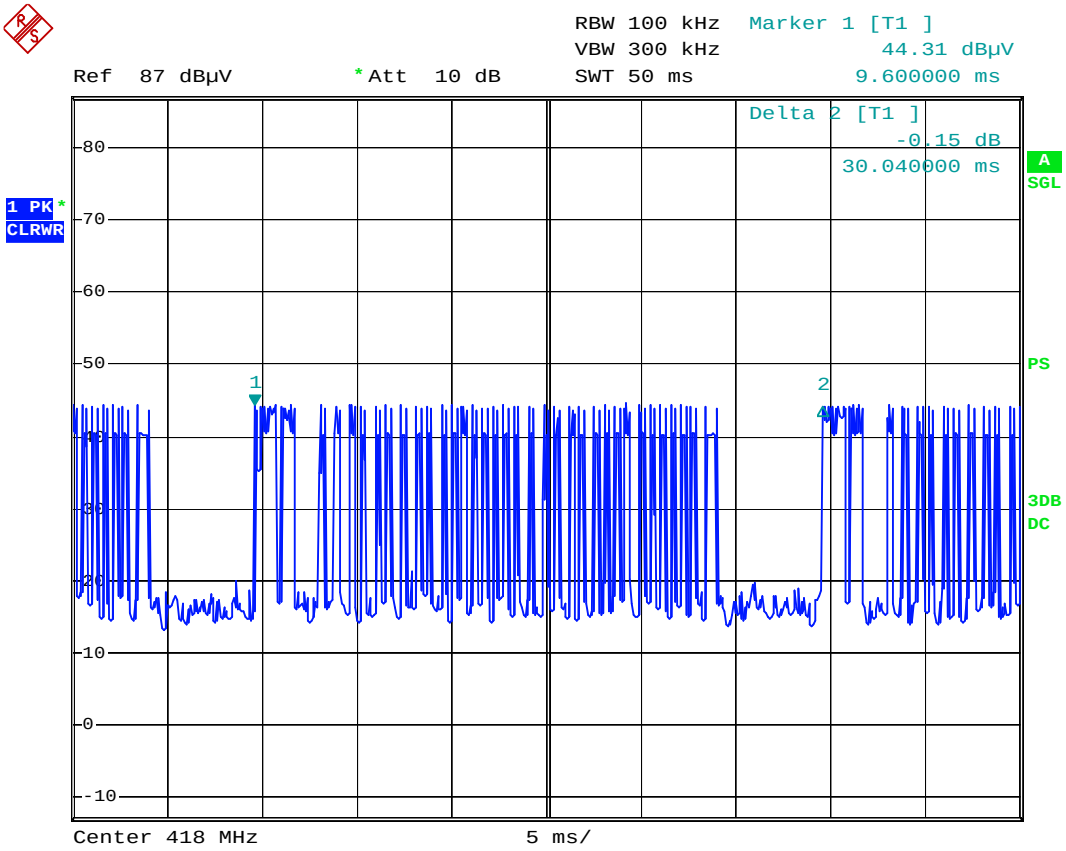


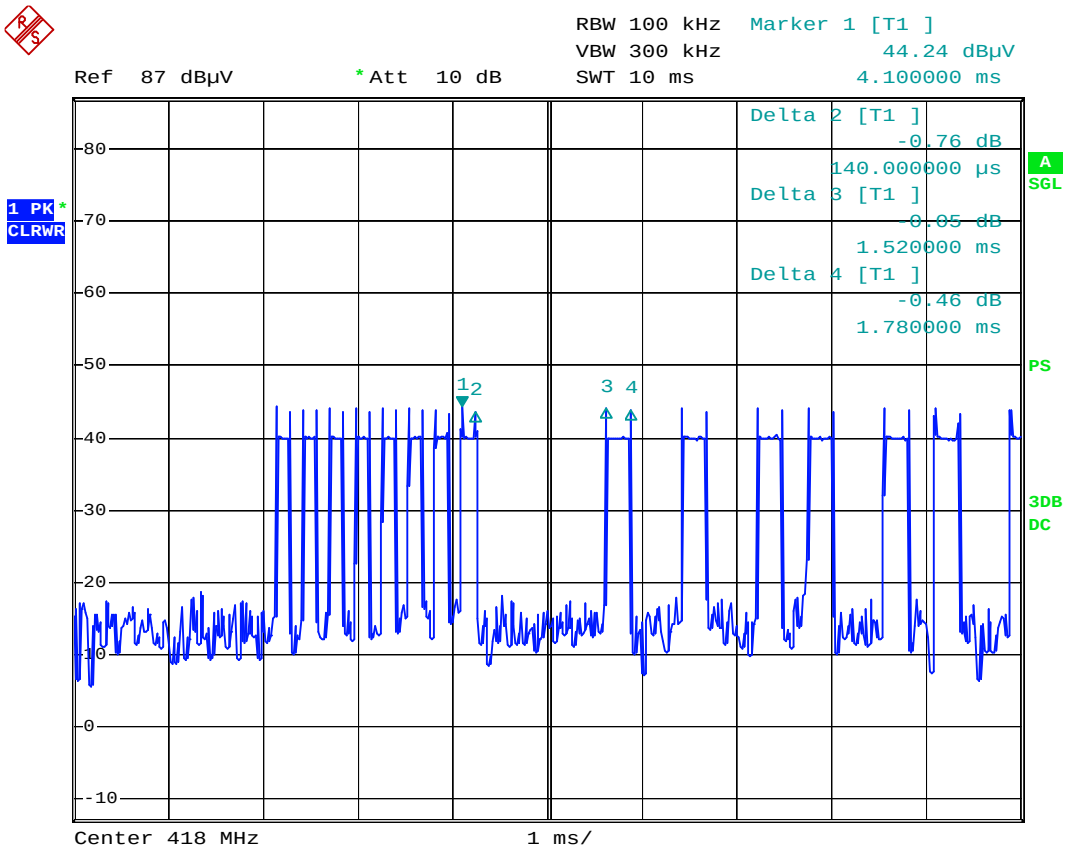
T=30.30 ms; N1=140 us, L1=8; N2=260 us, L2=32; N3=540 us, L3=1

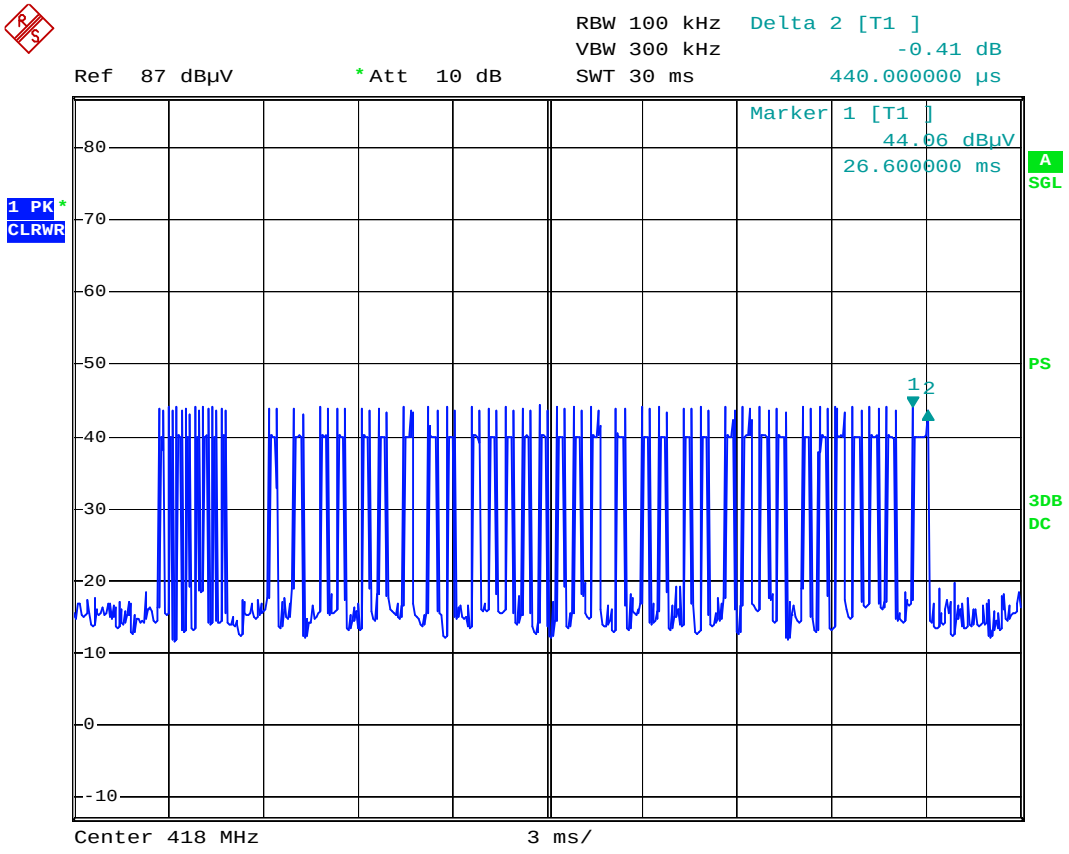
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.329373

For Button 13 – BACK:





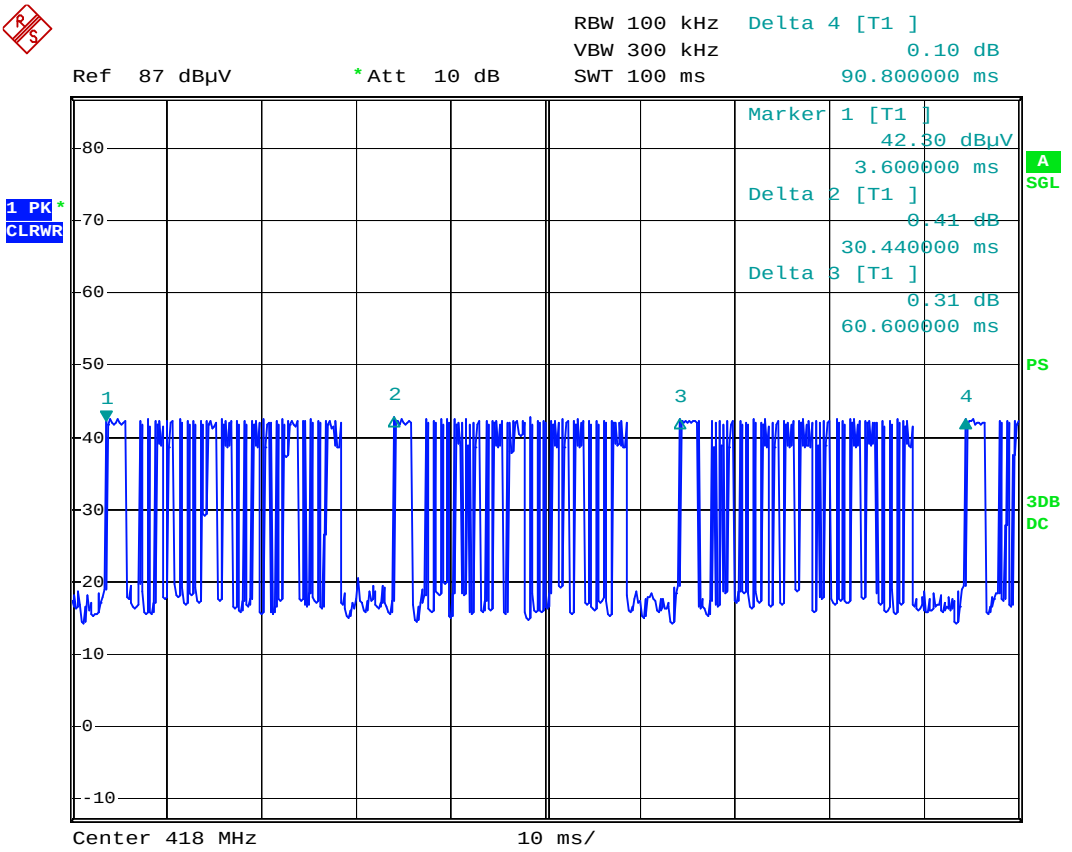


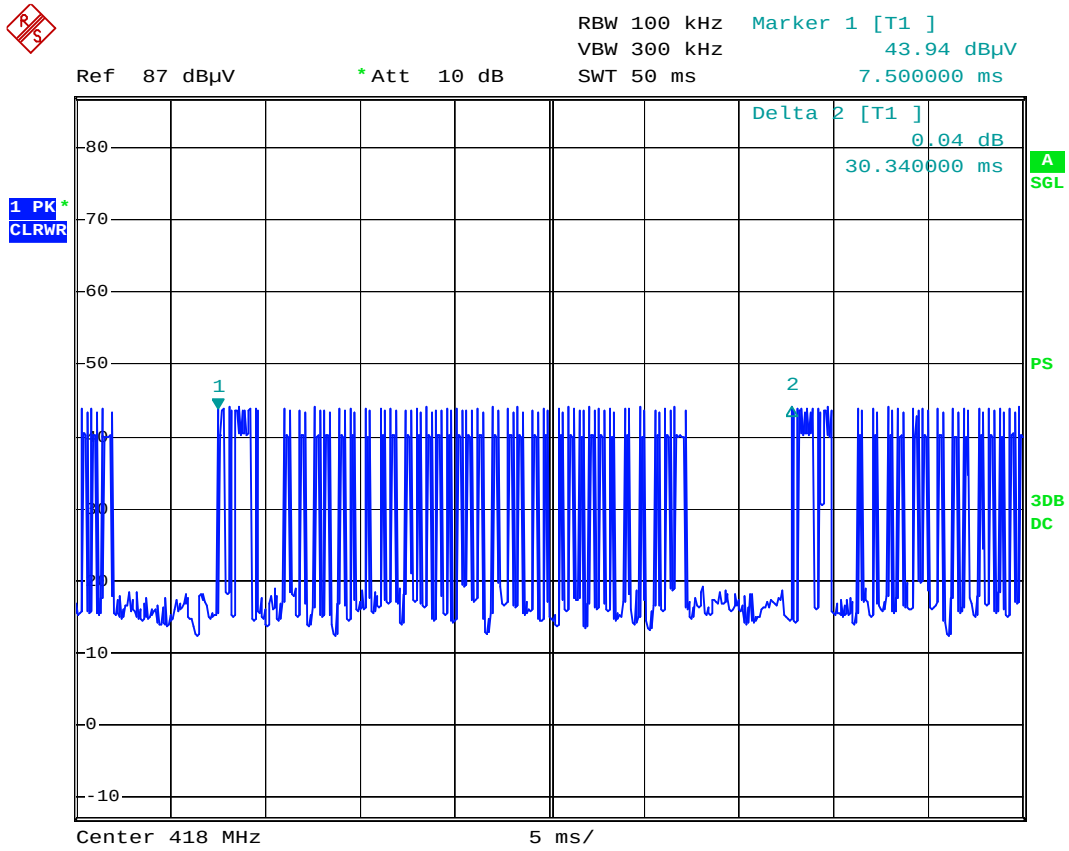


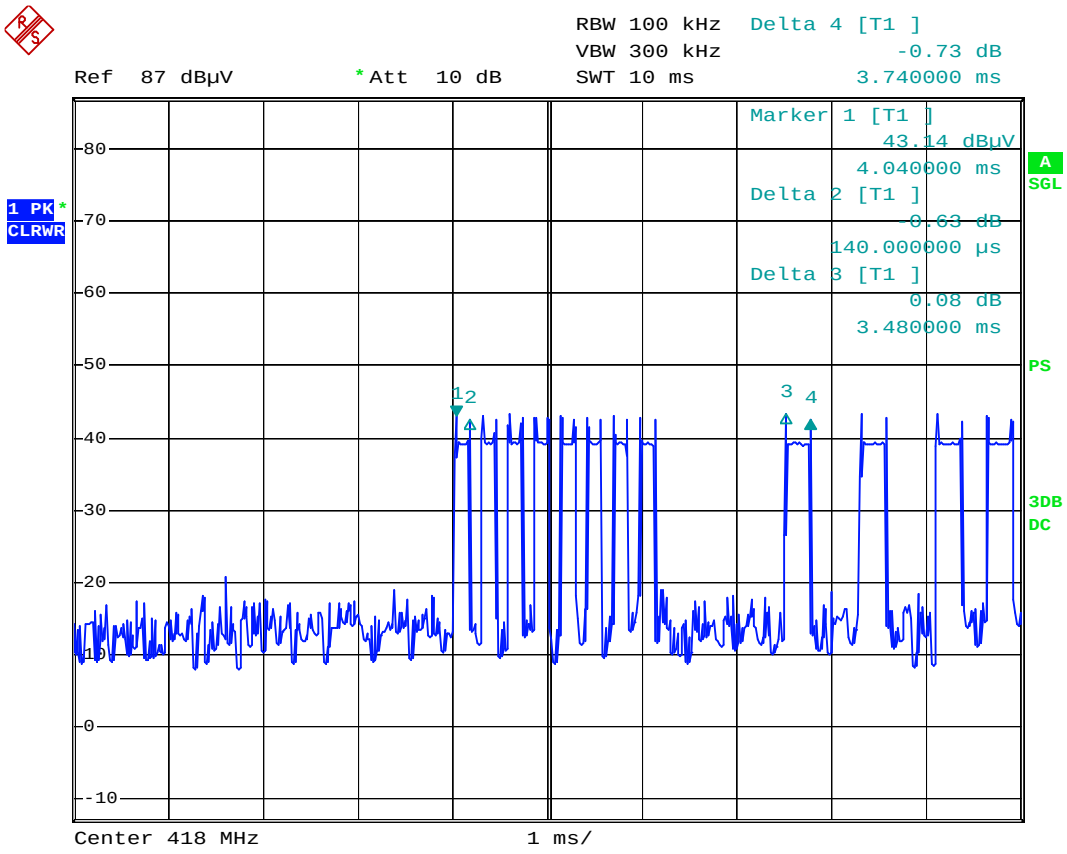
T=30.04 ms; N1=140 us, L1=8; N2=260 us, L2=32; N3=440 us, L3=1

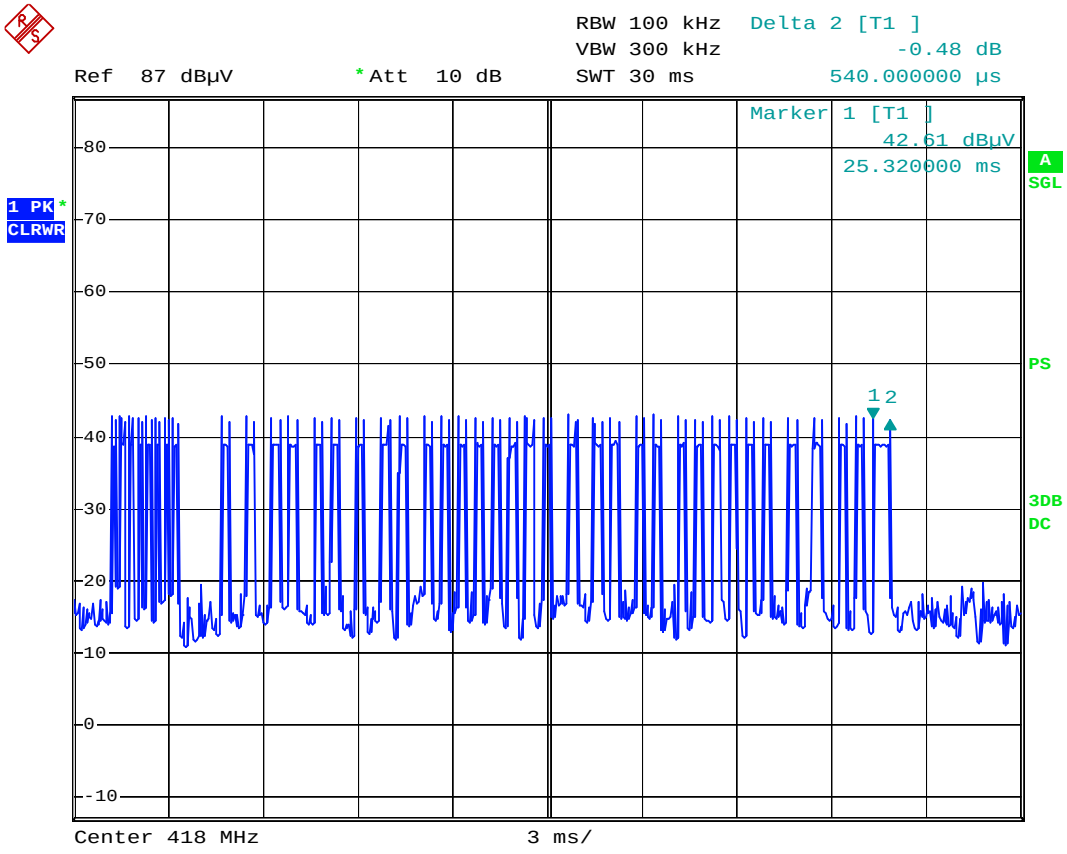
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.328895

For Button 14 – ZOOM





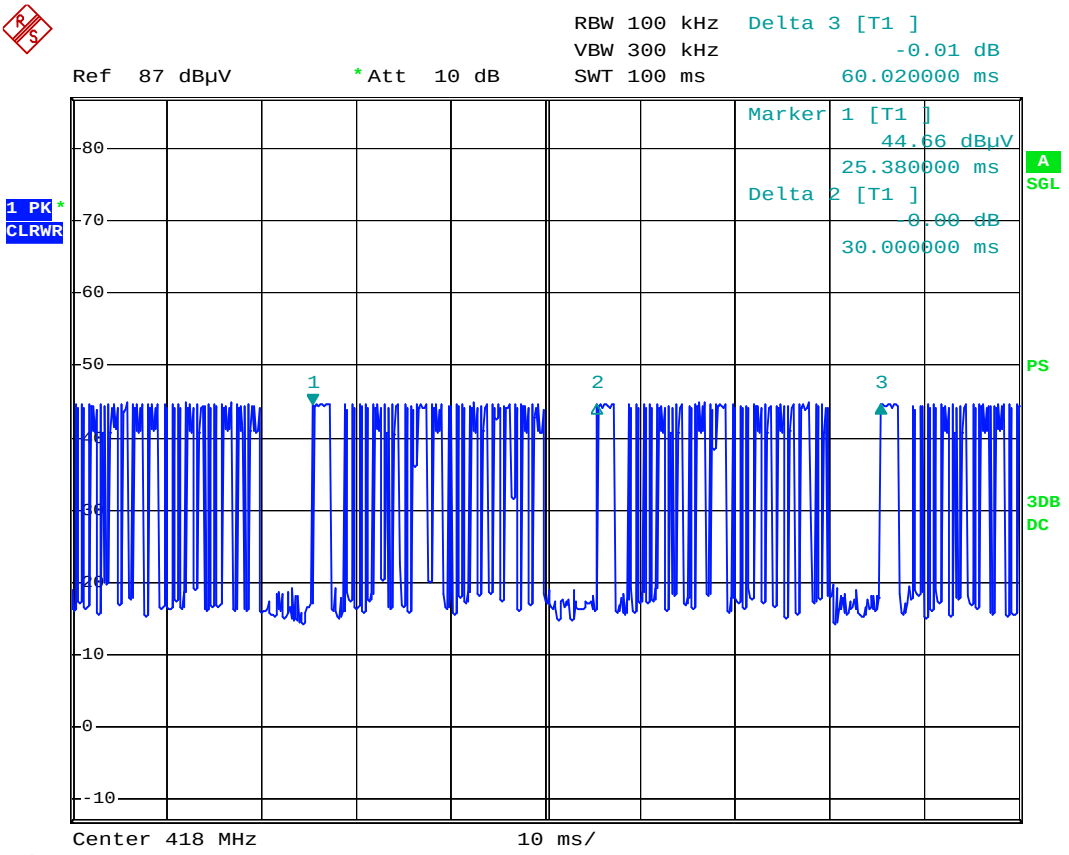


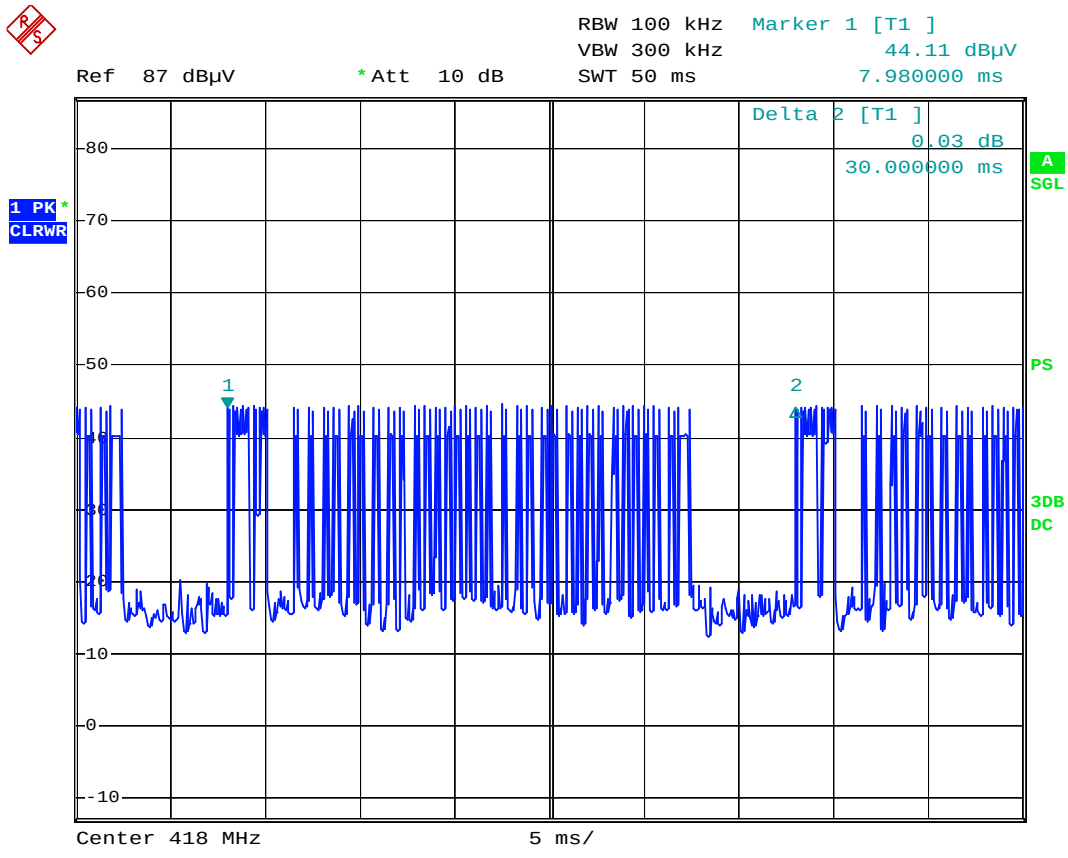


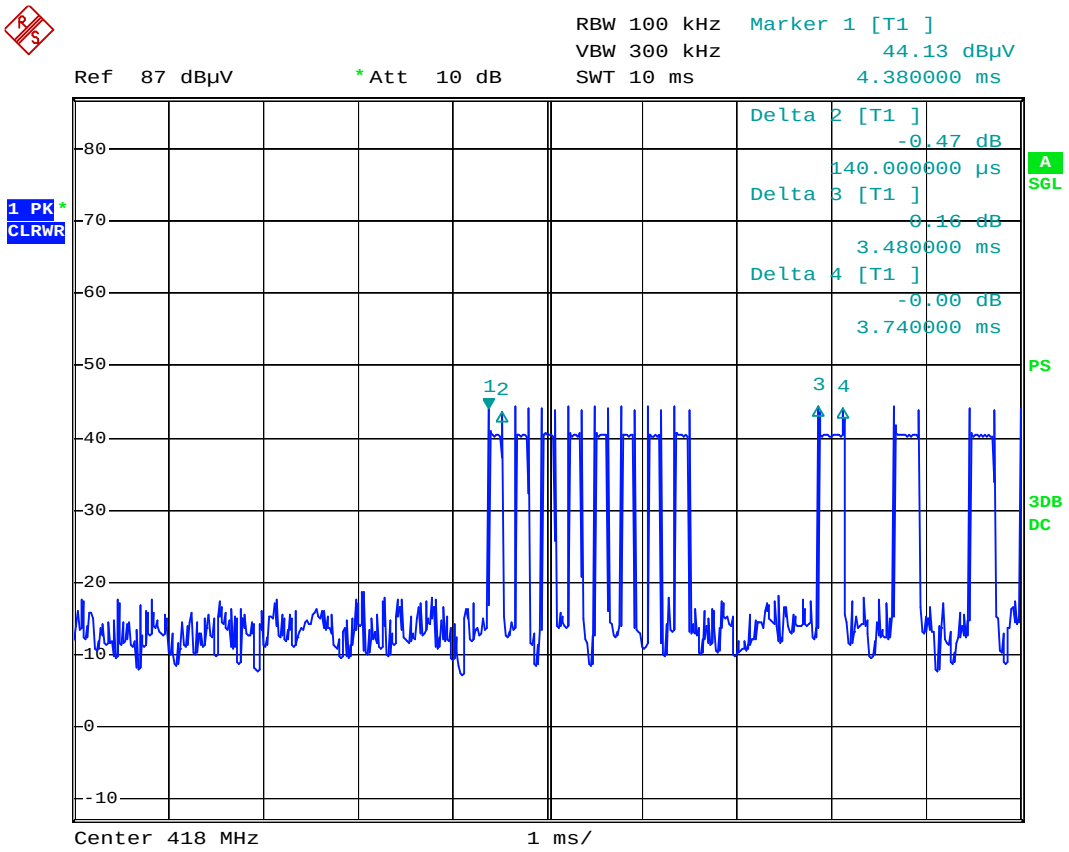
T=30.34 ms; N1=140 us, L1=8; N2=260 us, L2=32; N3=540 us, L3=1

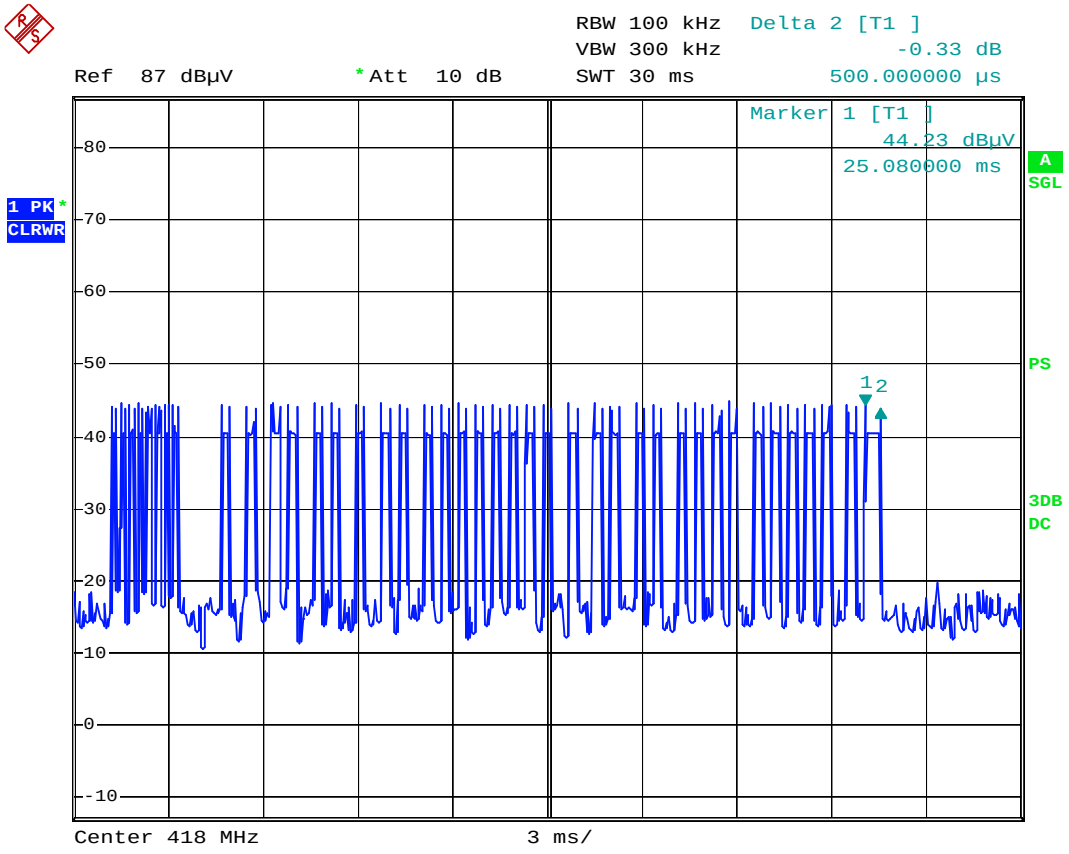
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.328939

For Button 15 – SELECT:





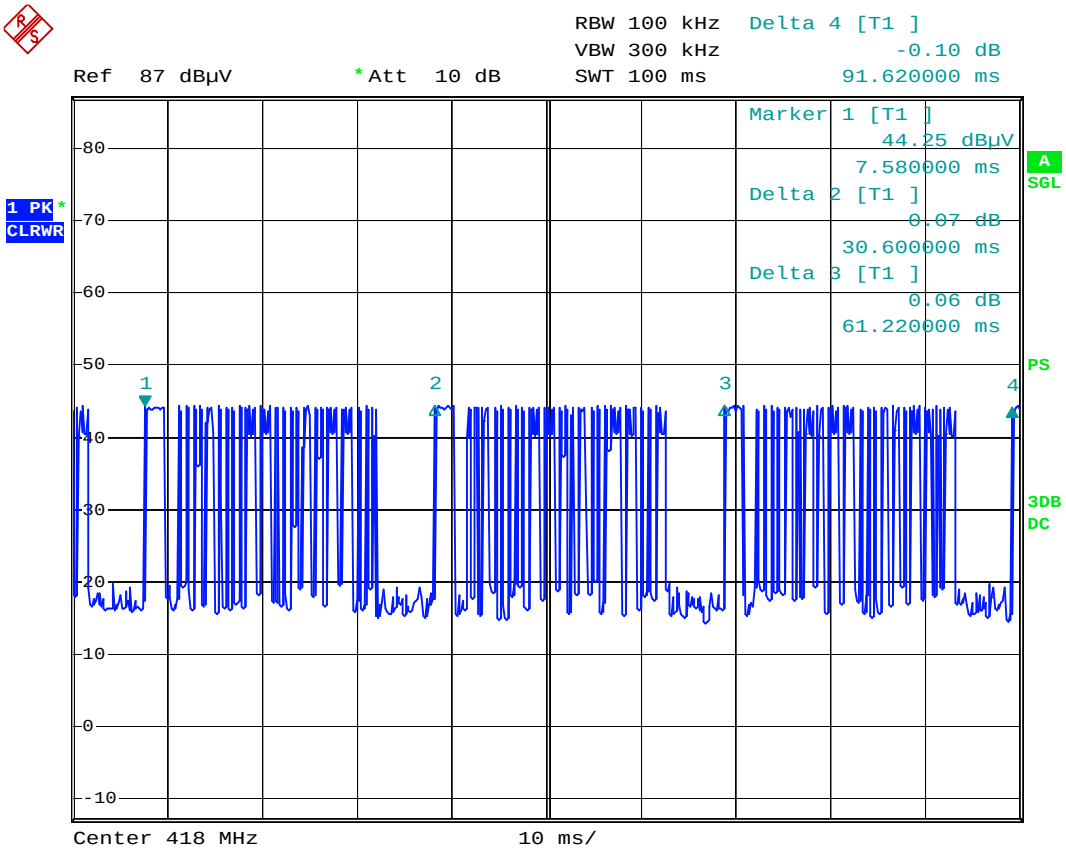


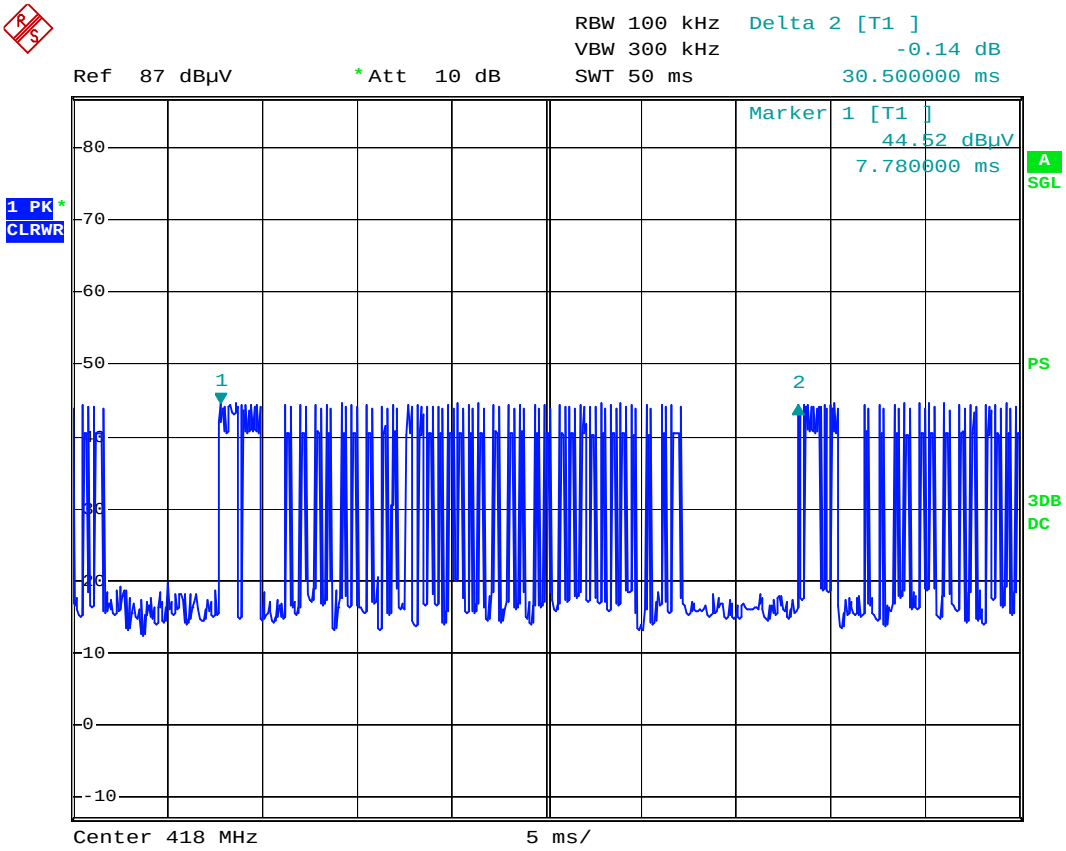


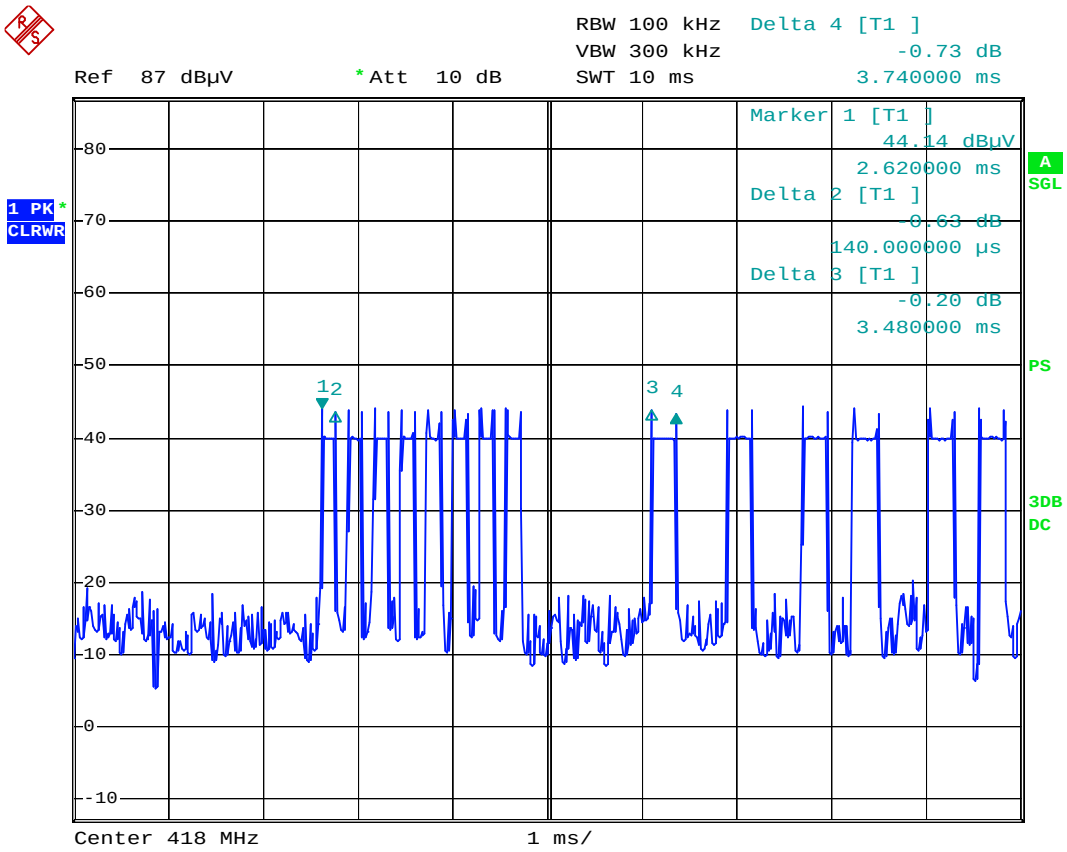
T=30.00 ms; N1=140 us, L1=8; N2=260 us, L2=32; N3=500 us, L3=1

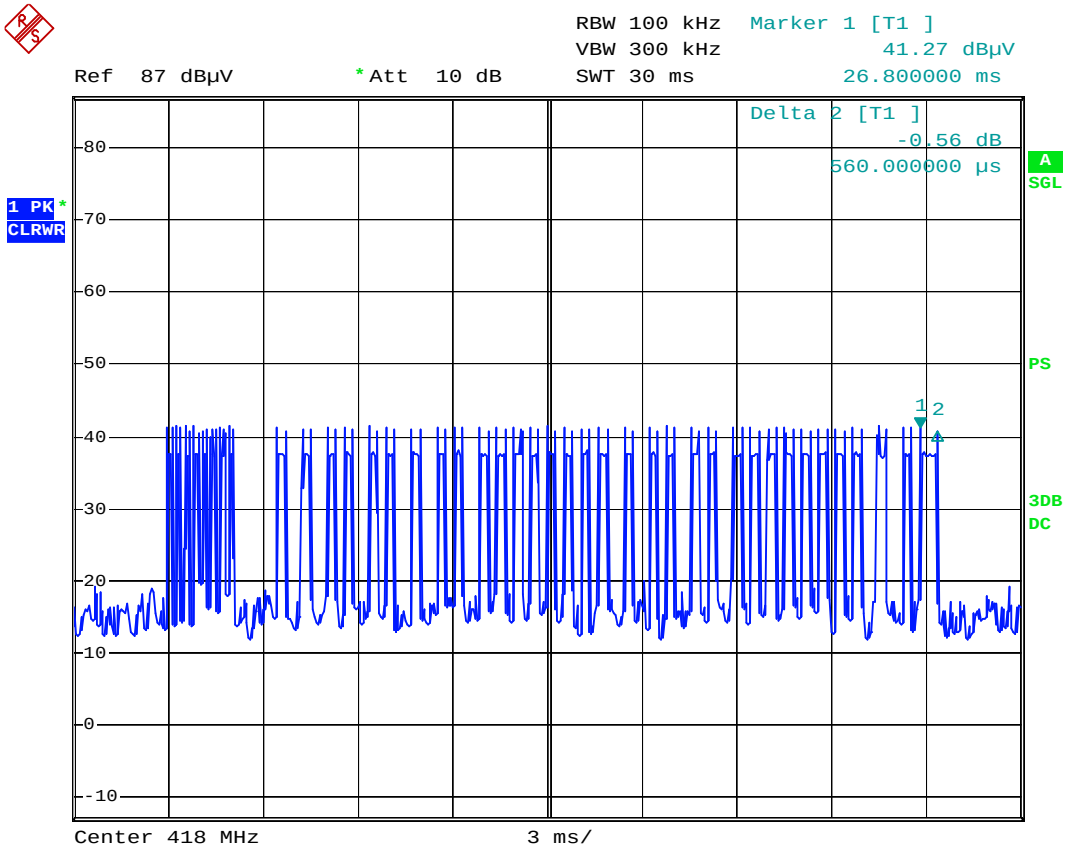
Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.331333

For Button 16 – DEL/COPY:









T=30.50 ms; N1=140 us, L1=8; N2=260 us, L2=32; N3=560 us, L3=1

Thus, Duty Cycle = (0.16*8+0.26*32+0.46*1)/31.46 = 0.327869

8.5 TEST RESULTS

EUT	:	RF Remote	**Voltage**	:	DC 3V
M/N	:	JX-1210	**Temperature**	:	26℃
Mode	:	Continuous working	**Humidity**	:	60%

Test Result: Pass

FCC Radiated Emission Test Result - Rule: 15.231(b)										
Freq. (MHz)	**Reading (dBuV)**		**Correct Factor (dB)**	**Meas. (dBuV/m)**		**Limit (dBuV/m)**		**Maargin (dB)**		**H/V**
	Peak	**AVG**		**Peak**	**AVG**	**Peak**	**AVG**	**Peak**	**AVG**	
418.0000	70.59	--	19.22	89.81	80.24	100.28	80.28	-10.47	-0.04	H
836.0000	18.96	--	25.95	44.91	35.34	80.28	60.28	-35.37	-24.94	H
1255.0000	47.59	--	-2.58	45.01	35.44	80.28	60.28	-35.27	-24.84	H
2090.0000	56.87	--	6.89	63.76	54.19	80.28	60.28	-16.52	-6.09	H
2926.0000	47.67	--	8.80	56.47	46.90	80.28	60.28	-23.81	-13.38	H
418.0000	56.96	--	19.22	76.18	66.61	100.28	80.28	-24.10	-13.67	V
836.0000	14.85	--	25.95	40.80	31.23	80.28	60.28	-39.48	-29.05	V
1255.0000	45.18	--	-2.58	42.60	33.03	80.28	60.28	-37.68	-27.25	V
2090.0000	56.09	--	6.89	62.98	53.41	80.28	60.28	-17.30	-6.87	V
2926.0000	49.64	--	8.80	58.44	48.87	80.28	60.28	-21.84	-11.41	V
FCC Radiated Emission Test Result - Rule: 15.209										
Freq. (MHz)	**Reading (dBuV)**		**Correct Factor (dB)**	**Meas. (dBuV/m)**		**Limit (dBuV/m)**		**Maargin (dB)**		**H/V**
	Peak	**QP**		**Peak**	**QP**	**Peak**	**QP**	**Peak**	**QP**	
683.1332	20.92	4.36	23.60	44.52	27.96	--	46.00	--	-18.04	H

Correct Factor = Cable loss + Antenna Factor

Measurement = Reading level + Factor

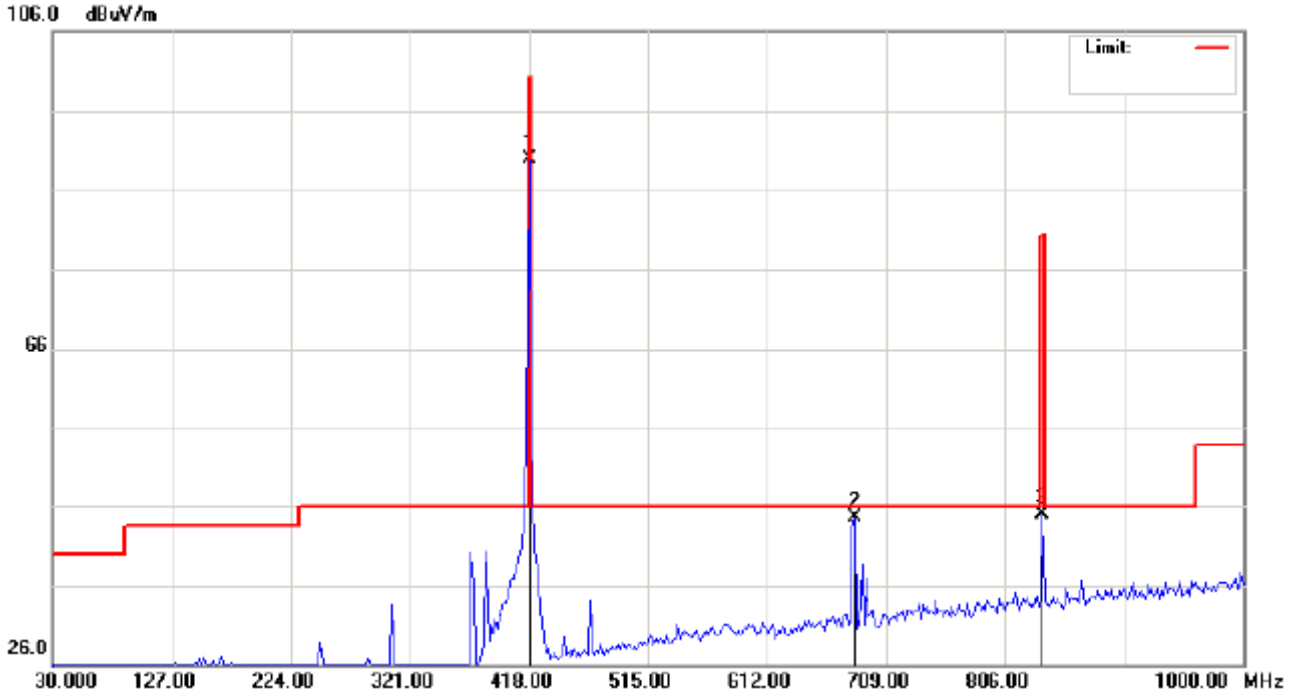
Margin = Reading in reference to limit

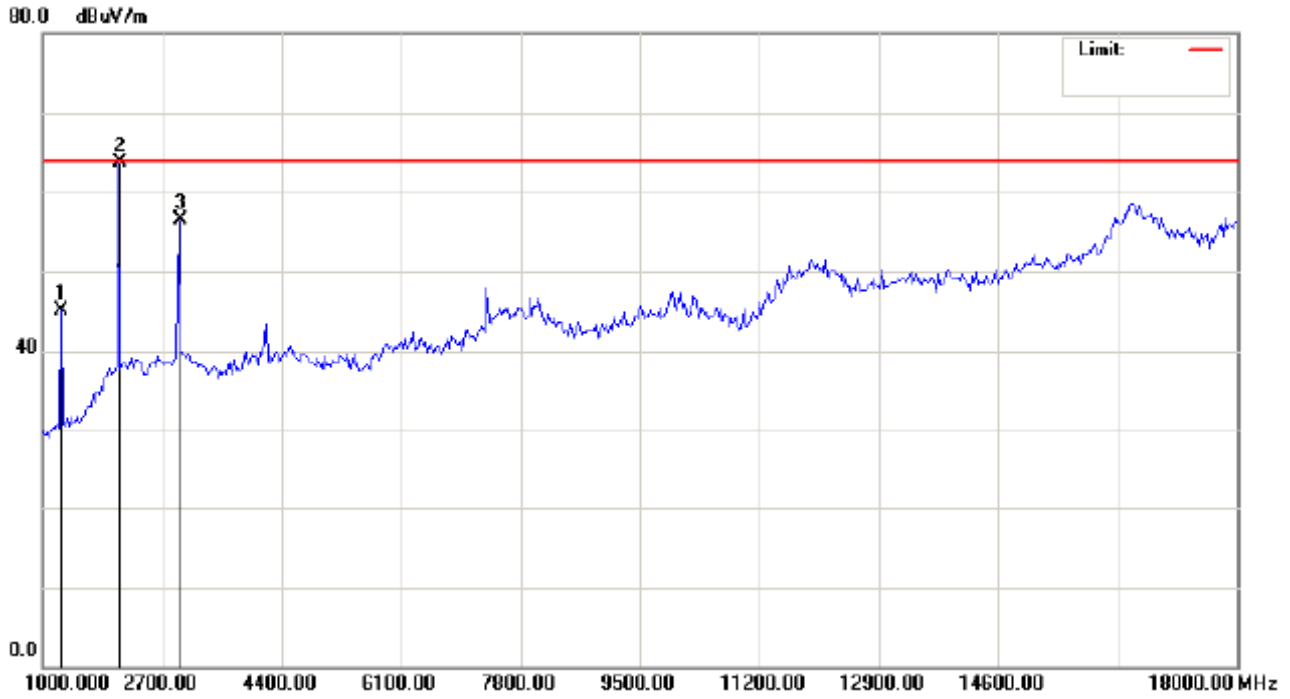
"--" = The emission level complied with the limits, with sufficient margin, so no further recheck.

AVG = Peak + 20*log (DCmax) = Peak – 9.57139

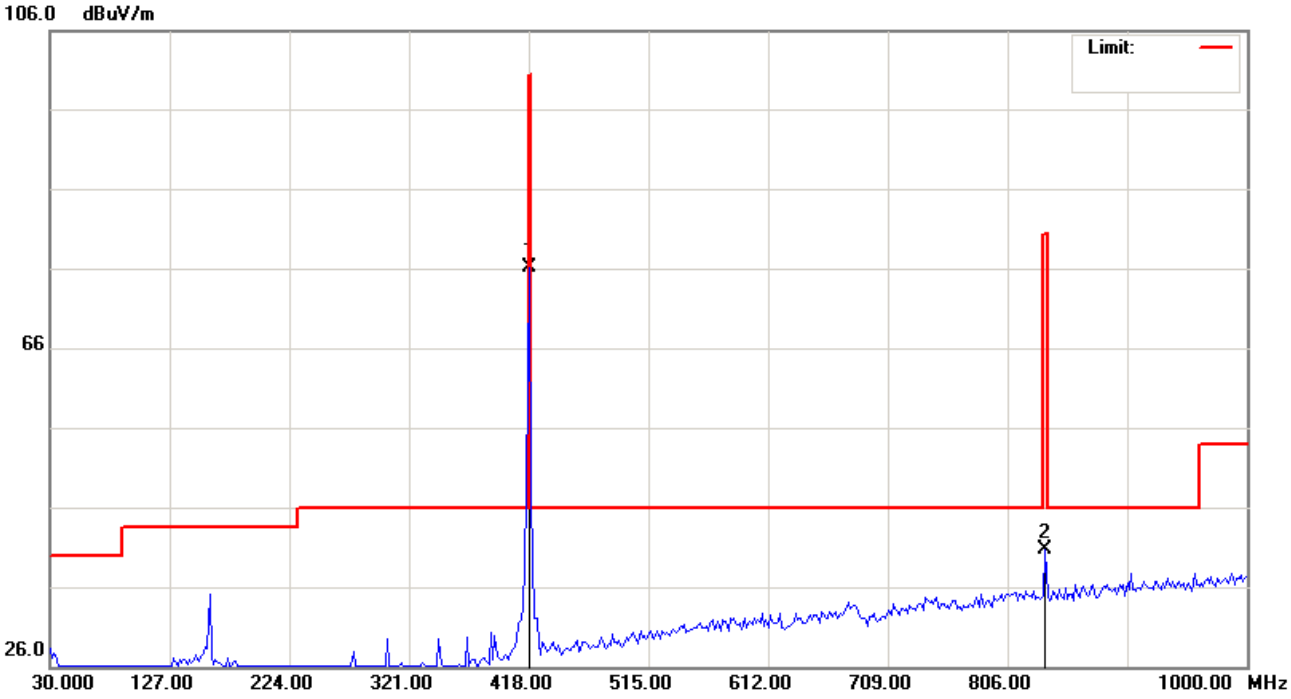
Graphs of Radiated Emissions:

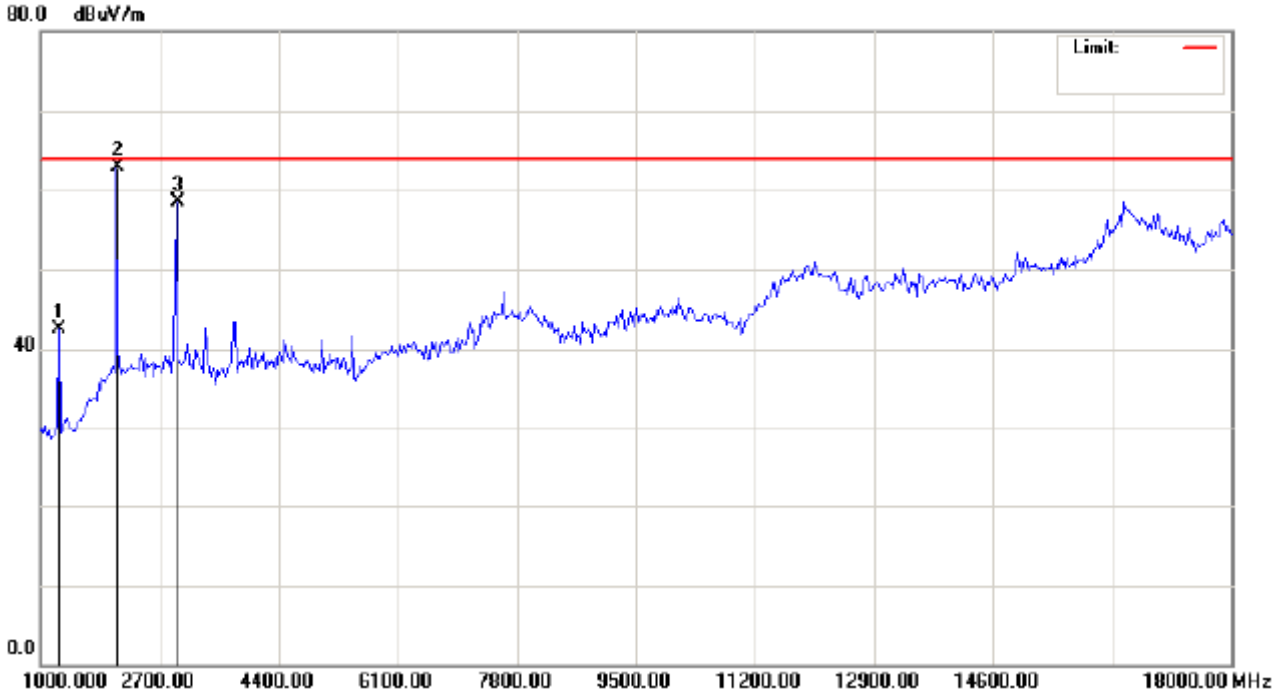
H:





V:


106.0 dBuV/m
Limit:
66
26.0
30.000
127.00
224.00
321.00
418.00
515.00
612.00
709.00
806.00
1000.00 MHz


80.0 dBuV/m
Limit:
40
0.0
1000.000
2700.00
4400.00
6100.00
7800.00
9500.00
11200.00
12900.00
14600.00
18000.00 MHz

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

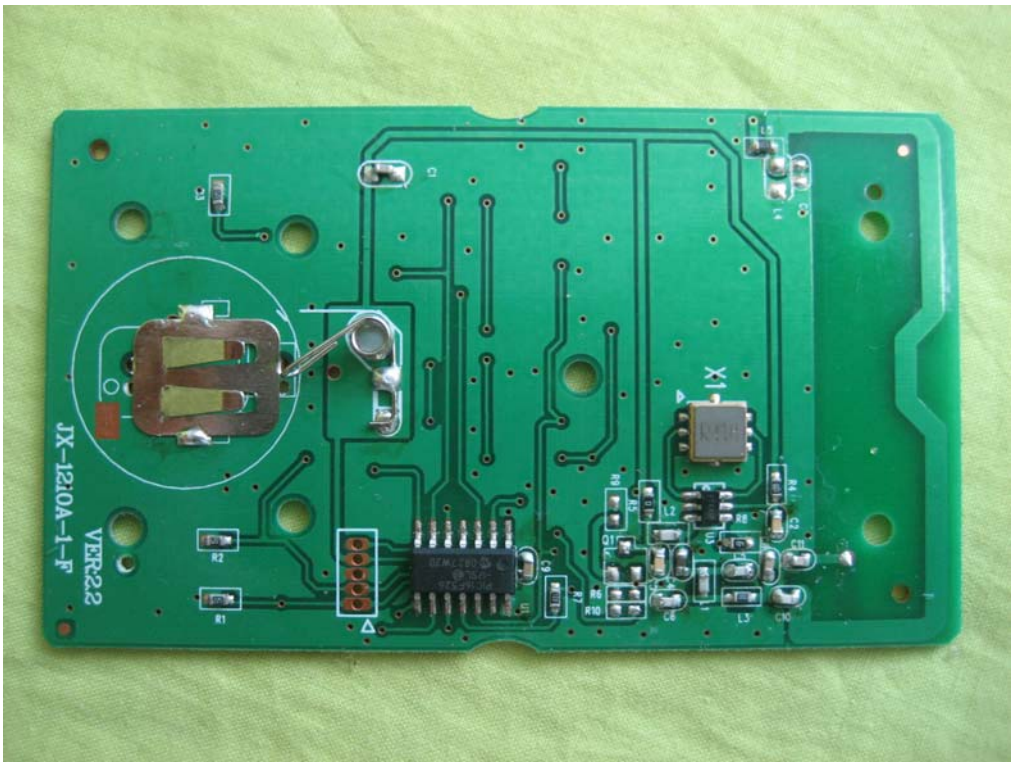
RE TEST SETUP

APPENDIX 2 EXTERNAL PHOTOGRAPHS OF EUT

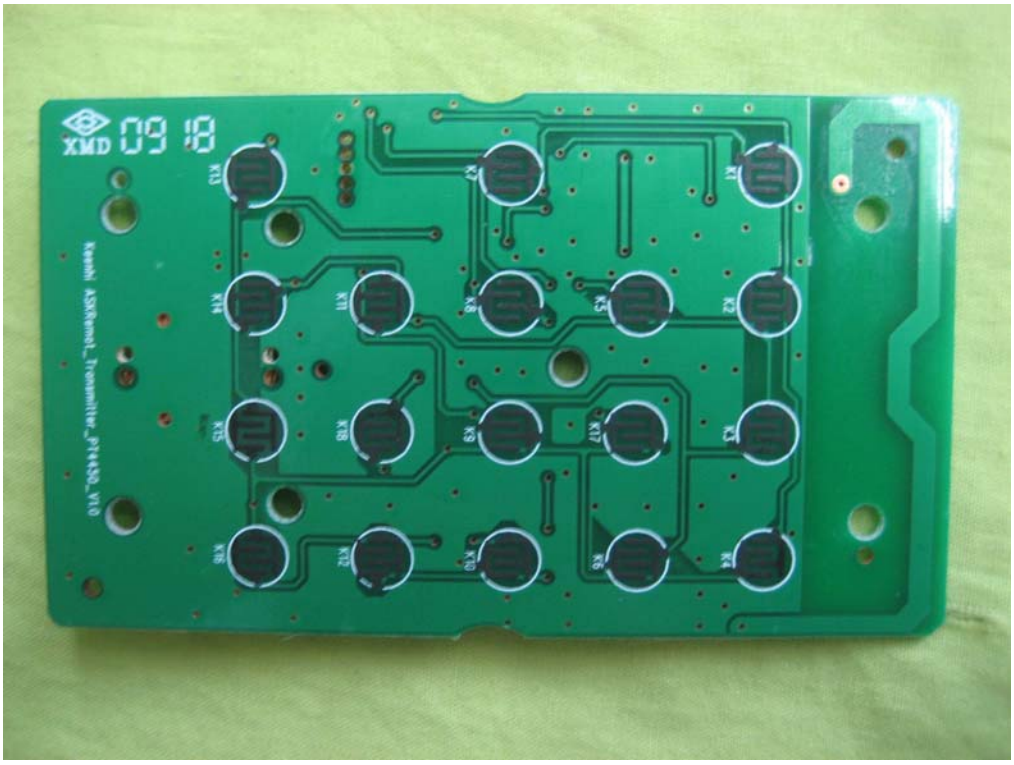
FRONT VIEW

BOTTOM VIEW

APPENDIX 3 INTERNAL PHOTOGRAPHS OF EUT



FULL VIEW



FRONT VIEW OF BATTERY

------- End of report -------