LABOTECH

Test Report

CFR Title 47 Sections:
Part 2 (2.201, 2.202, 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055),
Part 80 (80.209, 80.211, 80.213, 80.215, 80.273)

for

Trade name: Furuno
Model: Transceiver
for RADAR SENSOR DRS2D-NXT
Type: RTR-133

Report no.: LIC 12-21-034
Rev. 1

Date of Revised Issue: 10 September 2021

Labotech International Co., Ltd.
1-16, Fukazu-cho, Nishinomiya-shi, Hyogo, 663-8203 Japan
Tel: +81-798-63-1094 Fax: +81-798-63-1098
URL: https://www.labotech-intl.co.jp//

Report Summary

LIC project number:	LIC 04-20-0633		
Test report number of initial issue:	LIC 12-21-034	Date of initial issue	31 March 2021
Test report number of revised/replaced issue:	LIC 12-21-034, Rev.1	Date of revised/replaced issue	10 September 2021

Test report revision/ replacement history:	Rev. No	Date	Page	Item	Description of change/reason
	1	10 Sep. 2021	17	3.5 Spurious Emissions at Antenna Port, 3.5.5 Test Results	Replaced the table with another table of measured maximum emission values.
			42	7 Spurious Emission Plots measured at Antenna Terminal	Added plots of spurious emissions and divided Clause 7 into 7.1 and 7.2.
			63	8 Field Strength of Spurious Radiation Plots measured in the Spurious domain	Added Clause 8.

Test standard(s)/ Test specifications:	CFR Title 47 Sections: 2.201 - Emission, modulation, and transmission characteristics 2.202 - Bandwidths 2.1046 - RF Power Output 2.1047 - Measurements required: Modulation Characteristics 2.1049 - Occupied Bandwidth 2.1051 - Spurious Emissions at Antenna Terminals 2.1053 - Field Strength of Spurious Radiation 2.1055 - Measurements required: Frequency Stability 80.209 - Transmitter frequency tolerances 80.211 - Emission limitations 80.213 - Modulation requirements 80.215 - Transmitter power 80.273 - Radar standards (the latest version on the first day of the testing period)
Customer:	Furuno Electric Co., Ltd. 9-52 Ashihara-cho, Nishinomiya city, Hyogo, 662-8580 Japan
Manufacturer:	Furuno Electric Co., Ltd. 9-52 Ashihara-cho, Nishinomiya city, Hyogo, 662-8580 Japan
Trade name:	Furuno
Model:	Transceiver for RADAR SENSOR DRS2D-NXT
Type:	RTR-133
Product function and intended use:	Marine Radar operating in the band of 9300-9500 MHz
Number of samples tested:	One
Serial number:	1001-3600-0001
Power rating:	12–24 VDC, 2.5–1.3 A
Modifications made to samples during testing:	None
Date of receipt of samples:	18 November 2020
Test period:	From 19 January 2021 to 1 March 2021

Place of test:	Labotech International Co., Ltd. FCC Test firm Designation Number: JP2007 FCC Test firm Registration Number: 838049 - LABOTECH EMC Center 1-16 Fukazu-cho, Nishinomiya-shi, Hyogo, 663-8203 Japan - Nishinomiya Lab. 9-52 Ashihara-cho, Nishinomiya-shi, Hyogo, 662-8580 Japan
Test results/Compliance:	Passed. The test results of this report relate only to the samples tested.
Tested by:	Yukihiro Hijiri and Atsushi Takagi
Written by:	Arisa Ogino
Verified by:	Tadayuki Ekawa
Approved by:	Date: 10 September 2021 Name: Tadayuki Ekawa Title: Head engineer, Technical Department Labotech International Co., Ltd. Signature: T. Ekawa

Disclaimer:

The test results of this report relate only to the samples tested.

LIC has no responsibility for the followings except for the requirements of test standards.

- **The thing(s) in association with the test and information pertaining to it/them, which are provided by the customer; information described in Clause 1 (except for (h)) of this report and information of the cable(s) used.**
- **The matter(s) specified by the customer; Test standard(s) applied, test item(s), test conditions, criteria, object(s) to be tested or excluded, operation mode(s) and connection/configuration.**

Testing Laboratory Status

Labotech International Co., Ltd. (hereafter called “LIC”) has been holding the following status after having been assessed according to the provisions of ISO/IEC 17025 and/or the relevant rules:

(1) JAB Accredited Testing Laboratory:
- accredited by Japan Accreditation Board (JAB)
- Laboratory accreditation number: RTL03220 (Date of initial accreditation: 14 January 2011 (*))
- Scope of accreditation: Electrical testing - EMC, Climatic, Vibration and Radio tests

(2) Telefication Listed Testing Laboratory:
- listed by Telefication B. V., (The Netherlands)
- Laboratory assignment number: L116 (Date of initial listing: 26 July 1999 (*))
- for testing the following product categories/ test standards: EN 60945, IEC 61162-1/-2, IEC/EN 61162-450, IEC 62288, ETSI EN 301 843-1 / -2, ETSI EN 301 489-1 / -3 / -17

(3) TÜV Appointed EMC Test Laboratory:
- appointed by TÜV Rheinland Japan Ltd.,
- Laboratory assignment number: UA 50046428 (Date of initial appointment: 21 December 1998 (*))
- for carrying out the tests of EMC emission and immunity

(4) RMRS Recognized Testing Laboratory:
- recognized by Russian Maritime Register of Shipping (Russia)
- Laboratory recognition number: 17.13259.170 (Date of initial recognition: 27 January 2009 (*))
- for carrying out testing in the field of: Electrical measurements and tests, EMC tests, Mechanical measurements and tests, Equipment protection degree tests, and Climatic tests for Ship’s radio and navigational equipment and IEC 60945: 2002

(5) RRR Recognized Test Laboratory:
- recognized by Russian River Register (Russia)
- Certificate number: 131927 (- Date of initial recognition: 31 May 2013 (*))
- for carrying out of tests of ships radio and navigation equipment

(6) DNV GL Recognized Environmental Test Laboratory:
- recognized by Det Norske Veritas AS, Germanischer Lloyd (Norway)
- Recognition certificate number: 262.1-015854-J-12 (Date of initial recognition: 12 July 2013 (*))
- Scope of recognition: Testing according to the standards IEC 60945, IEC 61162-1/-2/-450, IEC 62288, IEC 62388 and IEC 62252 Annex E
- Application: Provisions of Environmental, interface and safety testing.

(7) CCS Recognized Test Agency:
- recognized by China Classification Society
- Recognition certificate number : DB13A00001 (Date of initial recognition : 29 January 2014 (*))
- Scope of recognition : Performance/Environmental/EMC/Special purpose/Safety precautions tests for Electrical & Electronic Product including Maritime Navigation and Radio-communication Equipment & Systems

(8) SABS EMC A-Lab program Laboratory:
- recognized by South African Bureau of Standards
- Assigned Lab number : SABS/A-LAB/0042/2018 (Date of initial recognition : 5 July 2018 (*))
- Approved List of EMC Standards : SANS 211 / 214-1 / 214-2 / 222 / 2332 / 2335, CISPR 11 / 14-1 / 14-2 / 22 / 32 / 35, SANS/IEC 60601-1-2, SANS/IEC 61326-1, IEC 61326-2-6, SANS/IEC 61000-3-2 / -3-3 / -4-2 / -4-3 / -4-4 / -4-5 / -4-6 / -4-8 / -4-11 / -6-1 / -6-2 / -6-3 / -6-4

(9) A2LA accreditted Testing Laboratory:
- accredited by American Association of Laboratory (A2LA)
- Certificate number: 5241.01 (Date of initial accreditation: 17 Jul 2019 (*))
- Scope of accreditation: Electrical testing - Emissions - Radiated and Conducted, Radio - Maritime Radio Systems, Stations in the maritime services, Private land mobile radio service, Radio / Intentional radiators, RF Exposure and EMC - Automotive Electronic Devices (AED), Machine and Vehicle

(*) The latest certification status may be found on the LIC website (https://www.labotech-intl.co.jp/).

TABLE OF CONTENTS

1 Principal Information

1.1 Equipment under test (EUT)

1.1.1 General

(a) Trade name: Furuno

(b) Manufacturer: Furuno Electric Co., Ltd.
9-52, Ashihara-cho, Nishinomiya city, Hyogo, 662-8580 Japan

(c) Model:

Transceiver for RADAR SENSOR DRS2D-NXT (EUT)

Name	Type	Serial number	Note
RADAR SENSOR	DRS2D-NXT	1001-3600-0001	--
Scanner Unit	RSB-147-133	--	--
Antenna Radiator	03P9458	--	Not used for measurements at the antenna port.
Transceiver Unit	RTR-133	--	--
Transceiver Board	03P9602	--	--
Signal Processing Board	03P9603	--	--
Power Supply Board	03P9613	--	--

Associated units (AU)

Name	Type	Serial number	Note
MULTI FUNCTION DISPLAY	TZTL12F	100030-100161	--

Ancillary equipment (AE)

Name	Type	Serial number	Note
Ethernet hub	HUB-101	011000	FURUNO
Laptop PC	Latitude 5310	P97G002	DELL

(d) FCC ID: ADB9ZWRTR133

(e) Primary function: Ship radar station operating in the band of 9300 – 9500 MHz

(f) Frequency range: Fixed frequency, X-band (9380 – 9440 MHz)

(g) Type of emission: P0N/Q0N
(Emission designator)

(h) Occupied bandwidth:

Pulse type		S1	S2	M1	M2	M3	L
Occupied bandwidth (MHz)	ch1 (P0N)	52.3	37.6	26.6	14.7	9.2	9.2
	ch2 (P0N)	52.3	37.6	26.6	14.7	8.3	8.3
	ch3 (P0N)	53.2	40.3	29.3	15.6	9.2	8.3
	ch1 (Q0N)	19.3	15.6	9.2	5.5	5.5	5.5
	ch2 (Q0N)	18.3	15.6	9.2	6.4	6.4	6.4
	ch3 (Q0N)	18.3	15.6	9.2	6.4	5.5	5.5

Note: measured data

(i) Size and mass: RADAR SENSOR: 488 mm (ϕ) × 220 mm (H), 6.5 kg

(j) Power supply: 12 – 24 VDC

1.1.2 Transceiver module

Type: RTR-133 (Contained in RADAR SENSOR)

1.1.2.1 Transmitter

(a) Assignable frequency band: Between 9300 and 9500 MHz (CFR Title 47 Sections: 80.375 (d)-(1))

(b) Type of RF generator:
- Type: Solid-state device (no magnetron)
- Peak output power: 25 W nominal

(c) Fundamental frequency:
ch1: P0N 9380 MHz/ Q0N 9400 MHz
ch2: P0N 9400 MHz/ Q0N 9420 MHz
ch3: P0N 9420 MHz/ Q0N 9440 MHz

(d) Pulse characteristics:

Pulse type	S1	S2	M1	M2	M3	L
Pulse length (μs) P0N/Q0N	0.08/5.0	0.15/7.5	0.3/11	0.6/13	1.2/15	1.2/18
PRF(Hz)	1100	1100	1100	1100	1100	1100

1.1.2.2 Receiver

(a) Passband
RF Stage: 300 MHz
IF Stage: 50 MHz

(b) Intermediate Frequency: P0N 83.75 MHz
Q0N 103.75 MHz

(c) Gain (overall): Approximately 40 dB

(d) Overall Noise Figure: 4 dB (typical)

(e) Video Output Voltage: Not available

(f) Features Provided: Sensitivity Time Controls

(g) If receiver is tunable, describe method for adjusting frequency: PLL Synthesizer

1.1.3 Antenna and Scanner

(a) Antenna specifications

Antenna model		03P9458
Length (mm)		425
Rotation diameter (mm)		488
Transmission frequency		ch1: P0N 9380MHz / Q0N 9400MHz
		ch2: P0N 9400MHz / Q0N 9420MHz
		ch3: P0N 9420MHz / Q0N 9440MHz
Horizontal beam width (-3 dB)		5.2°
Vertical beam width (-3 dB)		25°
Side lobe (max.)	Less than ±20°	-23 dB
	Outside ±20°	-25 dB
Gain		21.5 dBi
Radiator		Patch array
Polarization		Horizontal
Type of beam		Vertical fan

(b) Antenna Rotation ON-OFF Switch: Not provided

(c) Scanning (rotating or oscillating): Rotating mechanically scanned antenna

(d) Antenna Rotation Rate: 24/36/48 rpm

(e) Sector Scan: Provided

(f) Rated Loss of Transmission Line per 100 Feet: Negligible (Transmission path is only in RADAR SENSOR.)

1.1.4 Operational Features

(a) Is positive means provided to indicate whether or not the overall operation of the equipment is such that it may be relied upon to provide effective operation in accordance with its primary function:
Yes (Hardware alarms)

(b) Is the equipment for continuous operation: Yes

(c) Is provision made for operation with shore based radar beacons (RACONS): Yes (RACONS)

1.1.5 Construction Features

(a) Does equipment embody replacement units with chassis type assembly: Yes

(b) Are fuse alarms provided: No

(c) State units that are weatherproof: RADAR SENSOR (IEC 60529 – IP26)

(d) If all units are not housed in a single container, indicate number and give description of individual units:
See Clause 1.1.1 (c) of this report.

(e) Approximate space required for installation excluding RADAR SENSOR: Not applicable

1.2 Observation and comments

None.

2 Test Results Summary

Clause number of this report	CFR Title 47 Sections	Item	Result	Test engineer
3.1	2.1046 (a), 80.215	RF Power Output	Passed.	Y. Hijiri
3.2	2.201, 2.1047 (d)	Modulation Characteristics	Passed.	Y. Hijiri
3.3	2.1055 (a)(2),(d)(1),(d)(3), 80.209 (b)	Frequency Stability –temperature & voltage	Passed.	Y. Hijiri
3.4	2.202 (a), 2.1049 (c)(1), 80.209 (b), 80.211 (f)	Occupied Bandwidth	Passed.	Y. Hijiri
3.5	2.1051, 80.211 (f), 80.273	Spurious Emissions at Antenna Port	Passed.	Y. Hijiri
3.6	2.1053, 80.211 (f)	Field Strength of Spurious Radiation	Passed.	Y. Hijiri and A. Takagi

3 Test Results

3.1 RF Power Output (CFR Title 47 Sections: 2.1046 (a) and 80.215)

3.1.1 Test conditions:

For all TX (ch.1/ch.2/ch.3, S1/S2/M1/M2/M3/L) pulses, the transmitter output power was measured at the antenna port with the Antenna Radiator with a non-reflective load.

3.1.2 Test setup:

See Clause 4.

3.1.3 Test Results:

ch1, P0N

Pulse type	S1	S2	M1	M2	M3	L
Transmission mean power Pm (W)	0.002	0.004	0.008	0.016	0.032	0.032
Pulse length *T* (μs) (50% points)	0.075	0.148	0.298	0.602	1.200	1.200
Pulse Repetition Frequency (Hz)	1100	1100	1100	1100	1100	1100
Transmission pulse power Pp (W) (*)	22.8	22.8	23.3	23.7	24.1	24.1

ch1, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Transmission mean power Pm (W)	0.126	0.180	0.265	0.319	0.364	0.432
Pulse length *T* (μs) (50% points)	4.990	7.480	11.000	13.000	15.000	18.000
Pulse Repetition Frequency (Hz)	1100	1100	1100	1100	1100	1100
Transmission pulse power Pp (W) (*)	23.0	21.9	21.9	22.3	22.1	21.8

ch2, P0N

Pulse type	S1	S2	M1	M2	M3	L
Transmission mean power Pm (W)	0.002	0.003	0.007	0.015	0.030	0.030
Pulse length *T* (μs) (50% points)	0.073	0.146	0.297	0.602	1.200	1.196
Pulse Repetition Frequency (Hz)	1100	1100	1100	1100	1100	1100
Transmission pulse power Pp (W) (*)	21.9	21.6	21.9	22.3	22.6	22.9

ch2, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Transmission mean power Pm (W)	0.114	0.172	0.252	0.296	0.341	0.406
Pulse length *T* (μs) (50% points)	4.980	7.480	10.960	13.000	15.040	18.000
Pulse Repetition Frequency (Hz)	1100	1100	1100	1100	1100	1100
Transmission pulse power Pp (W) (*)	20.8	20.9	20.9	20.7	20.6	20.5

(*) P_p (W) = (P_m (W) / (T (µs) × PRF (Hz))) × 1000000

ch3, P0N

Pulse type	S1	S2	M1	M2	M3	L
Transmission mean power Pm (W)	0.002	0.003	0.006	0.013	0.027	0.027
Pulse length *T* (μs) (50% points)	0.073	0.146	0.296	0.600	1.196	1.196
Pulse Repetition Frequency (Hz)	1100	1100	1100	1100	1100	1100
Transmission pulse power Pp (W) (*)	19.3	19.2	19.5	20.0	20.4	20.4

ch3, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Transmission mean power Pm (W)	0.121	0.185	0.270	0.319	0.365	0.432
Pulse length *T* (μs) (50% points)	4.980	7.480	10.960	13.000	15.000	18.000
Pulse Repetition Frequency (Hz)	1100	1100	1100	1100	1100	1100
Transmission pulse power Pp (W) (*)	22.1	22.5	22.4	22.3	22.1	21.8

(*) P_p (W) = (P_m (W) / (T (μs) × PRF (Hz))) × 1000000

Environmental conditions observed: On 10 February 2021, 21°C to 21°C, 49%RH to 49%RH
On 15 February 2021, 22°C to 22°C, 58%RH to 58%RH
Power supply voltage measured: 24 VDC to 24 VDC

3.2 Modulation Characteristics (CFR Title 47 Sections: 2.201, 2.1047 (d))

3.2.1 Test Conditions:

The RF envelope of the output pulse was measured with an envelope detector and an oscilloscope. Each pulse spectrum was measured with a spectrum analyzer.

3.2.2 Test setup:

See Clause 4.

3.2.3 Test Results:

ch1, P0N

Pulse type	S1	S2	M1	M2	M3	L
Pulse length T (μs) (-3 dB points)	0.075	0.148	0.298	0.602	1.200	1.200
Rise time t_r (μs) (10 to 90 % amplitude)	0.028	0.027	0.027	0.027	0.027	0.028
Fall time t_f (μs) (90 to 10 % amplitude)	0.034	0.032	0.032	0.032	0.032	0.033
Pulse Repetition Frequency (Hz)	1100	1100	1100	1100	1100	1100

ch1, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Pulse length T (μs) (-3 dB points)	4.990	7.480	11.000	13.000	15.000	18.000
Rise time t_r (μs) (10 to 90 % amplitude)	0.129	0.201	0.298	0.347	0.400	0.480
Fall time t_f (μs) (90 to 10 % amplitude)	0.475	0.347	0.316	0.369	0.416	0.504
Pulse Repetition Frequency (Hz)	1100	1100	1100	1100	1100	1100

ch2, P0N

Pulse type	S1	S2	M1	M2	M3	L
Pulse length T (μs) (-3 dB points)	0.073	0.146	0.297	0.602	1.200	1.196
Rise time t_r (μs) (10 to 90 % amplitude)	0.031	0.030	0.030	0.030	0.030	0.030
Fall time t_f (μs) (90 to 10 % amplitude)	0.034	0.031	0.031	0.031	0.031	0.031
Pulse Repetition Frequency (Hz)	1100	1100	1100	1100	1100	1100

ch2, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Pulse length T (μs) (-3 dB points)	4.980	7.480	10.960	13.000	15.040	18.000
Rise time t_r (μs) (10 to 90 % amplitude)	0.137	0.208	0.302	0.353	0.406	0.487
Fall time t_f (μs) (90 to 10 % amplitude)	0.264	0.239	0.309	0.355	0.411	0.493
Pulse Repetition Frequency (Hz)	1100	1100	1100	1100	1100	1100

ch3, P0N

Pulse type	S1	S2	M1	M2	M3	L
Pulse length T (µs) (-3 dB points)	0.073	0.146	0.296	0.600	1.196	1.196
Rise time t_r (µs) (10 to 90 % amplitude)	0.032	0.028	0.028	0.028	0.027	0.028
Fall time t_f (µs) (90 to 10 % amplitude)	0.033	0.033	0.031	0.032	0.032	0.032
Pulse Repetition Frequency (Hz)	1100	1100	1100	1100	1100	1100

ch3, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Pulse length T (µs) (-3 dB points)	4.980	7.480	10.960	13.000	15.000	18.000
Rise time t_r (µs) (10 to 90 % amplitude)	0.136	0.214	0.298	0.343	0.410	0.491
Fall time t_f (µs) (90 to 10 % amplitude)	0.177	0.247	0.305	0.346	0.416	0.498
Pulse Repetition Frequency (Hz)	1100	1100	1100	1100	1100	1100

Measured Plots: See Clause 7.

Environmental conditions observed: On 12 February 2021, 20°C to 21°C, 48%RH to 49%RH
On 15 February 2021, 22°C to 22°C, 58%RH to 58%RH
On 16 February 2021, 22°C to 22°C, 43%RH to 43%RH

Power supply voltage measured: 24 VDC to 24 VDC

3.3 Frequency Stability –temperature & voltage (CFR Title 47 Sections: 2.1055 (a)(2)/(d)(1)/(d)(3), 80.209(b))

3.3.1 Test Conditions:

(1) Radar transmitter settings: All TX (S1/S2/M1/M2/M3/L) pulses

(2) Ambient temperature settings: -20°C to +50°C (10°C interval)

(3) Power supply voltage settings: 85/100/115% of nominal voltage

RADAR SENSOR: 12–24 VDC V_L: 10.2 VDC / V_{nom}: 24 VDC / V_H: 27.6 VDC

3.3.2 Test setup:

See Clause 4.

3.3.3 Frequency Tolerance Limits (Sections: 80.209(b)):

ch2, P0N

Pulse type	S1
Guard Band f(1.5/T) (MHz) (*1)	20.66
Upper limit (MHz) (*2)	9479.3
Lower limit (MHz) (*2)	9320.7

(*1) Guard Band is specified to be equal to 1.5/T MHz, where "T" is the pulse length in microseconds. (CFR Title 47 Sections: 80.209 (b))

(*2) Upper limit frequency, f(U) =9500 -1.5/T
Lower limit frequency, f(L) = 9300 +1.5/T

3.3.4 Test Results:

Complied.

Pulse type:P0N,ch1		10.2 VDC	24 VDC	27.6 VDC	Result
Frequency at maximum emission (MHz)	-20°C	9381.6	9382.5	9380.7	Complied.
	-10°C	9381.6	9380.7	9381.6	Complied.
	0°C	9381.6	9381.6	9381.6	Complied.
	+10°C	9381.6	9381.6	9380.7	Complied.
	+20°C	9381.6	9381.6	9380.7	Complied.
	+30°C	9381.8	9380.9	9381.8	Complied.
	+40°C	9381.8	9380.9	9380.9	Complied.
	+50°C	9380.7	9381.6	9380.7	Complied.

Pulse type:P0N,ch2		10.2 VDC	24 VDC	27.6 VDC	Result
Frequency at maximum emission (MHz)	-20°C	9400.8	9400.8	9401.8	Complied.
	-10°C	9400.8	9400.8	9400.8	Complied.
	0°C	9401.8	9400.8	9400.8	Complied.
	+10°C	9400.8	9400.8	9400.8	Complied.
	+20°C	9400.8	9400.8	9400.8	Complied.
	+30°C	9400.2	9400.2	9400.2	Complied.
	+40°C	9401.1	9400.2	9400.2	Complied.
	+50°C	9399.9	9400.8	9399.9	Complied.

Pulse type:P0N,ch3		10.2 VDC	24 VDC	27.6 VDC	Result
Frequency at maximum emission (MHz)	-20°C	9420.1	9420.1	9420.1	Complied.
	-10°C	9421.0	9420.1	9420.1	Complied.
	0°C	9421.0	9420.1	9421.0	Complied.
	+10°C	9420.1	9420.1	9420.1	Complied.
	+20°C	9421.0	9421.0	9421.0	Complied.
	+30°C	9420.3	9420.3	9420.3	Complied.
	+40°C	9421.2	9420.3	9420.3	Complied.
	+50°C	9420.1	9421.0	9420.1	Complied.

Pulse type:Q0N,ch1		10.2 VDC	24 VDC	27.6 VDC	Result
Frequency at maximum emission (MHz)	-20°C	9400.8	9400.8	9401.8	Complied.
	-10°C	9400.8	9400.8	9400.8	Complied.
	0°C	9400.8	9399.9	9400.8	Complied.
	+10°C	9399.9	9400.8	9399.9	Complied.
	+20°C	9400.8	9400.8	9399.9	Complied.
	+30°C	9400.2	9400.2	9400.2	Complied.
	+40°C	9400.2	9400.2	9400.2	Complied.
	+50°C	9401.8	9400.8	9400.8	Complied.

Pulse type:Q0N,ch2		10.2 VDC	24 VDC	27.6 VDC	Result
Frequency at maximum emission (MHz)	-20°C	9421.0	9420.1	9420.1	Complied.
	-10°C	9420.1	9420.1	9421.0	Complied.
	0°C	9420.1	9420.1	9421.0	Complied.
	+10°C	9420.1	9420.1	9421.0	Complied.
	+20°C	9420.1	9421.0	9421.0	Complied.
	+30°C	9421.2	9420.3	9420.3	Complied.
	+40°C	9420.3	9420.3	9420.3	Complied.
	+50°C	9421.9	9421.0	9420.1	Complied.

Pulse type:Q0N,ch3		10.2 VDC	24 VDC	27.6 VDC	Result
Frequency at maximum emission (MHz)	-20°C	9440.3	9440.3	9441.2	Complied.
	-10°C	9440.3	9441.2	9440.3	Complied.
	0°C	9441.2	9441.2	9441.2	Complied.
	+10°C	9440.3	9441.2	9439.3	Complied.
	+20°C	9440.2	9441.2	9440.2	Complied.
	+30°C	9440.5	9440.5	9440.5	Complied.
	+40°C	9440.5	9440.5	9440.5	Complied.
	+50°C	9441.2	9441.2	9440.3	Complied.

Environmental conditions observed: On 17 February 2021, 22°C to 24°C, 50%RH to 43%RH
On 18 February 2021, 22°C to 22°C, 43%RH to 43%RH
On 19 February 2021, 23°C to 23°C, 45%RH to 45%RH

Power supply voltage measured: 12 VDC to 12 VDC
24 VDC to 24 VDC

3.4 Occupied Bandwidth
(CFR Title 47 Sections: 2.202 (a), 2.1049 (c)(1), 80.209 (b), 80.211 (f))

3.4.1 Test conditions:

For all TX (ch.1/ch.2/ch.3, S1/S2/M1/M2/M3/L) pulses, the transmitter output power was measured at the antenna port with Antenna Radiator replaced with a non-reflective load.

3.4.2 Test setup:

See Clause 4.

3.4.3 Emission Limits (CFR Title 47 Sections: 80.211 (f)):

Frequency removed from the assigned frequency (*1)	Emission attenuation (mean power, dB)
50 to 100 % (of the authorized bandwidth) (*2)	At least 25
100 to 250 % (of the authorized bandwidth) (*2)	At least 35
more than 250 % (of the authorized bandwidth) (*2)	At least 43 + 10 $\log_{10}$ (mean power in watts) = -13 dBm

(*1) Assigned frequency (center frequency) =9380, 9400, 9420 and 9440 MHz (for X-band radars)
(*2) Authorized band width = 110 MHz (for X-band radars)

3.4.4 Test Results:

Complied.

Spectrum plots: See Clause 7.1.

Environmental conditions observed: On 22 February 2021, 23°C to 24°C, 52%RH to 53%RH
Power supply voltage measured: 24 VDC to 24 VDC

3.5 Spurious Emissions at Antenna Port
(CFR Title 47 Sections: 2.1051, 80.211 (f), 80.273 and ITU-R SM.329-12)

3.5.1 Test Conditions:

(a) For S1 pulse, the transmitter output power was measured with a waveguide converter as a substitute for Antenna Radiator. (*1)

(*1) Emission measurements only need to be carried out for the pulse length setting producing the widest calculated B–40 bandwidth. (IEC 62388 Ed.2/ Annex B.4.2 part)

(b) Spurious measurement range for X-band radar: 4.59 GHz to 40 GHz

Lower measurement band	Upper measurement band
From 4.59 GHz (*2) to the lower OoB boundary	From the upper OoB boundary to 40 GHz

(*2) 0.7 times of the waveguide cut-off frequency for WRJ-10 (ITU-R SM.329-12, Section 2.5)

3.5.2 Test setup:

See Clause 4.

3.5.3 Emission Limits (CFR Title 47 Sections: 80.211 (f)):

Frequency removed from the assigned frequency (*1)	Emission attenuation (mean power, dB)
More than 250% (*3) (of the authorized bandwidth) (*2)	At least 43 + 10 $\log_{10}$ (mean power in watts) = -13 dBm

(*1) Assigned frequency (center frequency) = 9380, 9400, 9420 and 9440 MHz (for X-band radars)
(*2) Authorized bandwidth = 110 MHz (for X-band radars)
(*3) Spurious measurement range for X-band radar: 4.59 GHz to 40 GHz

3.5.4 Harmonics Frequencies:

f_0 (GHz)	$1/2f_0$	$2f_0$	$3f_0$	$4f_0$
9.380	4.690	18.760	28.140	37.520
9.400	4.700	18.800	28.200	37.600
9.420	4.710	18.840	28.260	37.680
9.440	4.720	18.880	28.320	37.760

3.5.5 Test Results:

Complied.

Measured maximum emission value

Ch	Frequency (GHz)	Level (dBm)	Limit (dBm) (*1)	Margin (dB)
1	28.19	3.681 pW = -84.34	-25.34	59.00
2	18.84	8.995 pW = -80.46	-19.28	61.18
3	28.32	4.426 pW = -83.54	-25.36	58.18

(*1) Limit (dBm) = -13 dBm + pass loss.

Spectrum plots: See Clause 7.2.

Environmental conditions observed: On 25 February 2021, 23°C to 23°C, 45%RH to 45%RH
On 26 February 2021, 23°C to 23°C, 52%RH to 52%RH
On 1 March 2021, 23°C to 23°C, 48%RH to 59%RH

Power supply voltage measured: 24 VDC to 24 VDC

3.6 Field Strength of Spurious Radiation (CFR Title 47 Sections: 2.1053, 80.211 (f) and ITU-R SM.329-12)

3.6.1 Test Conditions:

(a) For S1 pulse, the transmitter output power was measured with a non-reflective load as a substitute for Antenna Radiator. (*1)

(*1) Emission measurements only need to be carried out for the pulse length setting producing the widest calculated B–40 bandwidth. (IEC 62388 Ed.2/ Annex B.4.2 part)

(b) Spurious measurement range for X-Band RADAR: 4.59 GHz to 40 GHz

Lower measurement band	Upper measurement band
From 4.59 GHz (*2) to the lower OoB boundary	From the upper OoB boundary to 40 GHz

(*2) 0.7 times of the waveguide cut-off frequency for WR90 (ITU-R SM.329-12, Section 2.5)

(c) Antenna port was terminated with dummy load.

3.6.2 Test Site: LIC EMC Center, Semi-anechoic chamber

3.6.3 Distance between the Radar and Measuring Antenna: 3 m

3.6.4 Test setup:

See Clause 4.
The GRP (Ground reference plane, metal floor) between the EUT and the measuring (receiving) antenna was lined with the radio absorbers (3.0 m × 2.4 m × 0.3 m) to reduce the influences of the reflections of the RF waves from the floor.

Measuring (receiving) the antenna height and polarization:
(a) Antenna height: EUT center (1.66 m)
(b) Antenna polarization: vertical and horizontal.

EUT height: 1.5 m

3.6.5 Field Strength Limits (CFR Title 47 Sections: 80.211 (f)):

Frequency removed from the assigned frequency (*1)	Emission attenuation (mean power, dB)
More than 250% (*3) (of the authorized bandwidth) (*2)	At least 43 + 10 $\log_{10}$ (mean power in watts) = -13 dBm

(*1) Assigned frequency (center frequency) = 9410 MHz (for X-band radars)
(*2) Authorized bandwidth = 110 MHz (for X-band radars)
(*3) Spurious measurement range for X-band radar: 4.59 GHz to 40 GHz

3.6.6 Harmonics Frequencies:

f_0 (GHz)	$1/2f_0$	$2f_0$	$3f_0$	$4f_0$
9.380	4.690	18.760	28.140	37.520
9.400	4.700	18.800	28.200	37.600
9.420	4.710	18.840	28.260	37.680
9.440	4.720	18.880	28.320	37.760

3.6.7 Test Results:

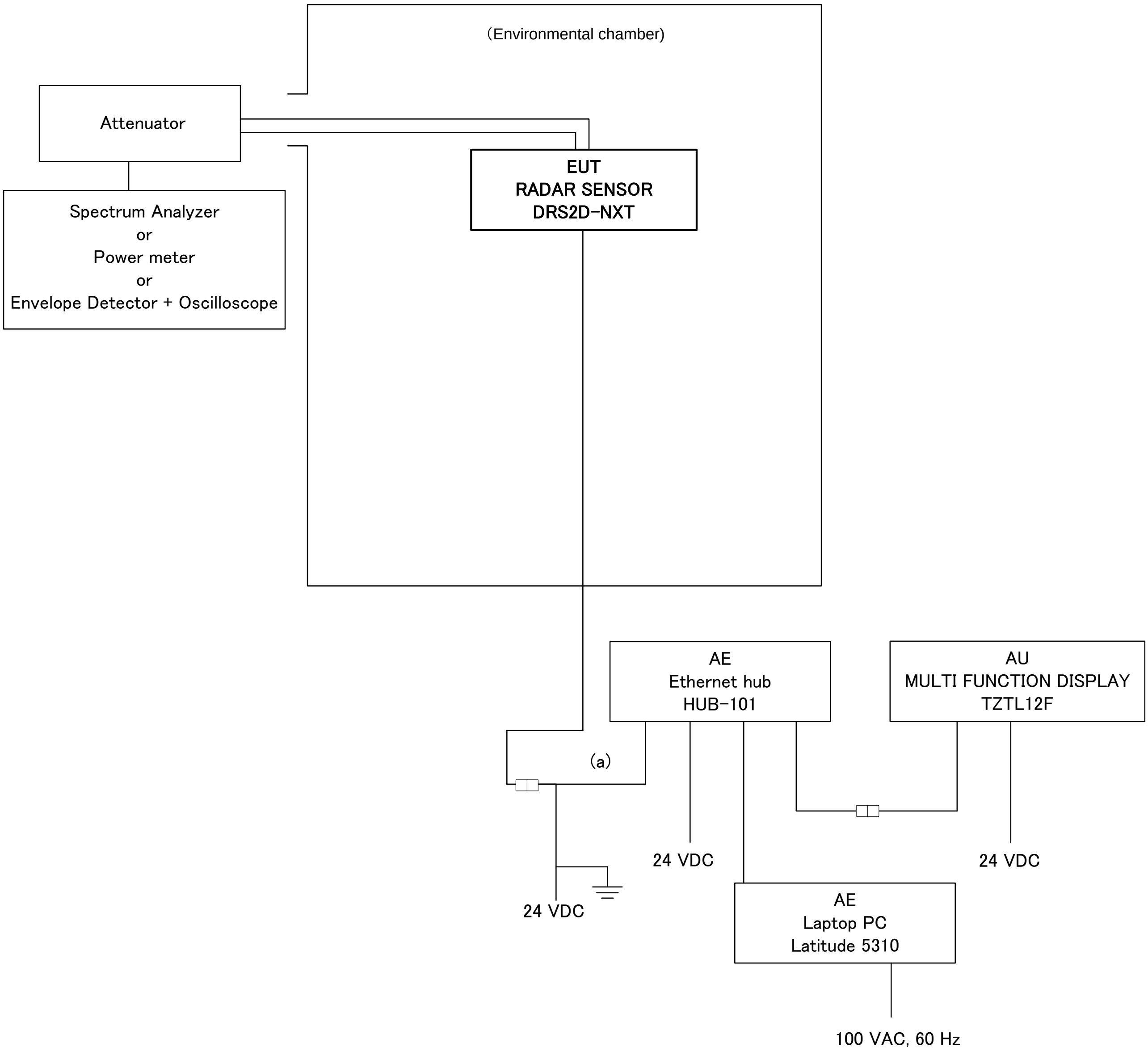
Complied.

Spectrum plots: See Clause 8.

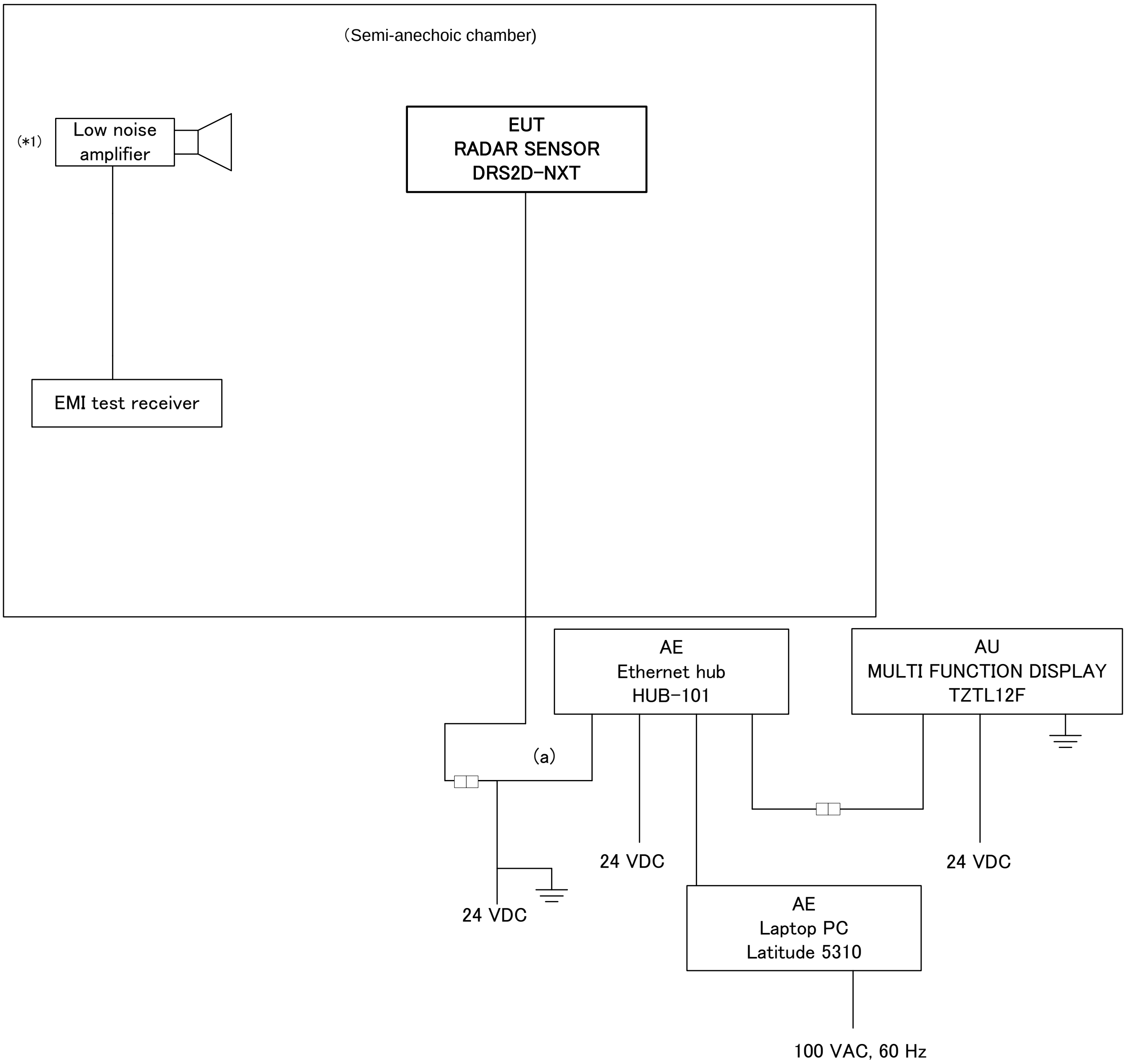
Environmental conditions observed:	On 19 January 2021, 21°C to 21°C, 34%RH to 34%RH On 21 January 2021, 19°C to 19°C, 48%RH to 48%RH
Power supply voltage measured:	24 VDC to 24 VDC

4 Test Setup for Measurements

4.1 Test Setup for Clause 3.1, 3.2, 3.3, 3.4 and 3.5



4.2 Test Setup for Clause 3.6



(*1) Used depending on measurement frequency bandwidth.

Note: AU - Associated Unit, AE - Auxiliary Equipment

Cable designations

No.	Category (*2)	Name	Type	Length (m)	Number of cables used	Cable shielded
a	P	Power/Signal cable	FRU-2P5S-FF-30M	30	1	Yes

(*2) P – Power cable, S – Signal/control cable.

5 Measuring Equipment List

Measuring/Test instruments have been appropriately calibrated/maintained according to the LIC programs/ procedures and ISO/IEC 17025. Measuring/Test instruments used for the tests are listed below.

(1) For Clause 3.1 RF Power Output

C/N	Instrument	Type	S/N	Manufacturer	Date of last calibration	Calibration interval
HT1254	UNI-DIRECTIONAL FIXED ATTENUATOR	50HF-020-50/18 N	20190304	JFW	5 March 2020	1 year
RT200	Power meter	E4419B	MY45101375	Agilent	21 February 2020	1 year
RT201	Power sensor	8481A	2349A39603	Agilent	21 February 2020	1 year
HT432	DC power supply	PAN55-20	AK003307	Kikusui	--	--
HT370	Climatic chamber (Large)	TBE-3HW5GE2F	3013000995	Espec	8 September 2020	1 year
HT723	Paperless recorder/ Dual communication logger	FX106-4-1	S5JA01445	Yokogawa	--	--
HT831	Digital multimeter	115	15540244	Fluke	12 May 2020	1 year

(2) For Clause 3.2 Modulation Characteristics

C/N	Instrument	Type	S/N	Manufacturer	Date of last calibration	Calibration interval
HT1254	UNI-DIRECTIONAL FIXED ATTENUATOR	50HF-020-50/18 N	20190304	JFW	5 March 2020	1 year
RT213	Waveguide	WRJ-10	--	Furuno	6 July 2020	1 year
HT654	Attenuator	8494B	MY42148134	Agilent	7 February 2020	1 year
HT1223	Attenuator	8495B	MY42148137	Agilent	7 February 2020	1 year
HT1221	Crystal detector	423B	MY51342422	Agilent	25 February 2020	1 year
HT972	Oscilloscope	MSO4054B	C030483	TEKTRONIX	28 February 2020	1 year
HT432	DC power supply	PAN55-20	AK003307	Kikusui	--	--
HT831	Digital multimeter	115	15540244	Fluke	12 May 2020	1 year

(3) For Clause 3.3 Frequency Stability –temperature & voltage

C/N	Instrument	Type	S/N	Manufacturer	Date of last calibration	Calibration interval
HT1254	UNI-DIRECTIONAL FIXED ATTENUATOR	50HF-020-50/18 N	20190304	JFW	5 March 2020	1 year
RT213	Waveguide	WRJ-10	--	Furuno	6 July 2020	1 year
HT654	Attenuator	8494B	MY42148134	Agilent	7 February 2020	1 year
HT1223	Attenuator	8495B	MY42148137	Agilent	7 February 2020	1 year
HT676	Spectrum analyzer	8564EC	4103A00440	Agilent	1 May 2020	1 year
HT370	Climatic chamber (Large)	TBE-3HW5GE2F	3013000995	Espec	8 September 2020	1 year
HT723	Paperless recorder/ Dual communication logger	FX106-4-1	S5JA01445	Yokogawa	--	--
HT432	DC power supply	PAN55-20	AK003307	Kikusui	--	--
HT831	Digital multimeter	115	15540244	Fluke	12 May 2020	1 year

(4) For Clause 3.4 Occupied Bandwidth

C/N	Instrument	Type	S/N	Manufacturer	Date of last calibration	Calibration interval
HT1254	UNI-DIRECTIONAL FIXED ATTENUATOR	50HF-020-50/18 N	20190304	JFW	5 March 2020	1 year
HT654	Attenuator	8494B	MY42148134	Agilent	7 February 2020	1 year
HT1223	Attenuator	8495B	MY42148137	Agilent	7 February 2020	1 year
HT676	Spectrum analyzer	8564EC	4103A00440	Agilent	1 May 2020	1 year
HT432	DC power supply	PAN55-20	AK003307	Kikusui	--	--
HT831	Digital multimeter	115	15540244	Fluke	12 May 2020	1 year

(5) For Clause 3.5 Spurious Emissions at Antenna Port

C/N	Instrument	Type	S/N	Manufacturer	Date of last calibration	Calibration interval
HT1254	UNI-DIRECTIONAL FIXED ATTENUATOR	50HF-020-50/18 N	20190304	JFW	5 March 2020	1 year
--	Adapter	X281A	--	HEWLETT PACKARD	Not applicable.	--
--	Adapter	PE9803	--	Pasternack	Not applicable.	--
--	Adapter	BL00-6256-00	--	Orient Microwave	Not applicable.	--
--	Adapter	R281B	--	HEWLETT PACKARD	Not applicable.	--
HT676	Spectrum analyzer	8564EC	4103A00440	Agilent	1 May 2020	1 year
HT432	DC power supply	PAN55-20	AK003307	Kikusui	--	--
HT831	Digital multimeter	115	15540244	Fluke	12 May 2020	1 year
KB289	Coaxial cable	SF104A/11PC35/11PC35/5500MM	800048/4A	HUBER+ SUHNER	8 August 2020	1 year
KB181	Coaxial cable	SUCOFLEX 102A	1261/2A	HUBER+ SUHNER	8 August 2020	1 year

(6) For Clause 3.6 Field Strength of Spurious Radiation

C/N	Instrument	Type	S/N	Manufacturer	Date of last calibration	Calibration interval
HT779	Semi-anechoic chamber	10mSAC	90984	Tokin	SVSWR: 7 December 2019	3 years
HT1277	Test software	EP5/RE	Ver.6.0.112	Toyo	--	--
HT1270	EMI test receiver (2 Hz to 44 GHz)	ESW44	101841	Rohde & Schwarz	8 August 2020	1 year
HT758	Broadband horn antenna (1 GHz to 6 GHz)	9120B	522	Schwarzbeck	13 August 2020	1 year
HT1263	Pre-amp. (1 GHz to 6 GHz)	00-T1885	BBB1932270	Noiseken	11 May 2020	1 year
HT759	Double ridged horn antenna & amp. (6 GHz to 18 GHz)	HAP06-18W	00000065	Toyo	13 August 2020	1 year
HT761	Double rigged horn antenna & amp. (18 GHz to 26 GHz)	HAP18-26N	00000017	Toyo	14 August 2020	1 year
HT762	Double rigged horn antenna & amp. (26 GHz to 40 GHz)	HAP26-40N	00000010	Toyo	14 August 2020	1 year
HT866	Digital multimeter	115	19170029	Fluke	13 February 2020	1 year
HT781	DC power supply	PAN60-20A	QM003356	Kikusui	--	--

6 RF Envelope and Spectrum of the Output Pulse

ch1, P0N

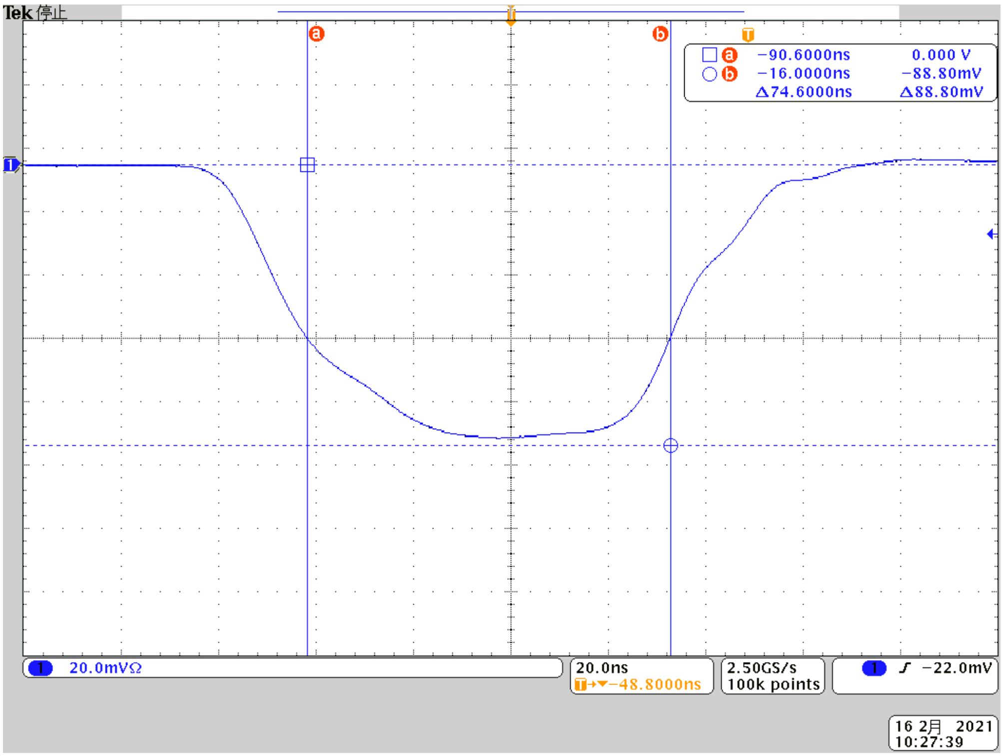


Fig. 6.1 ch1, P0N, S1 pulse envelope

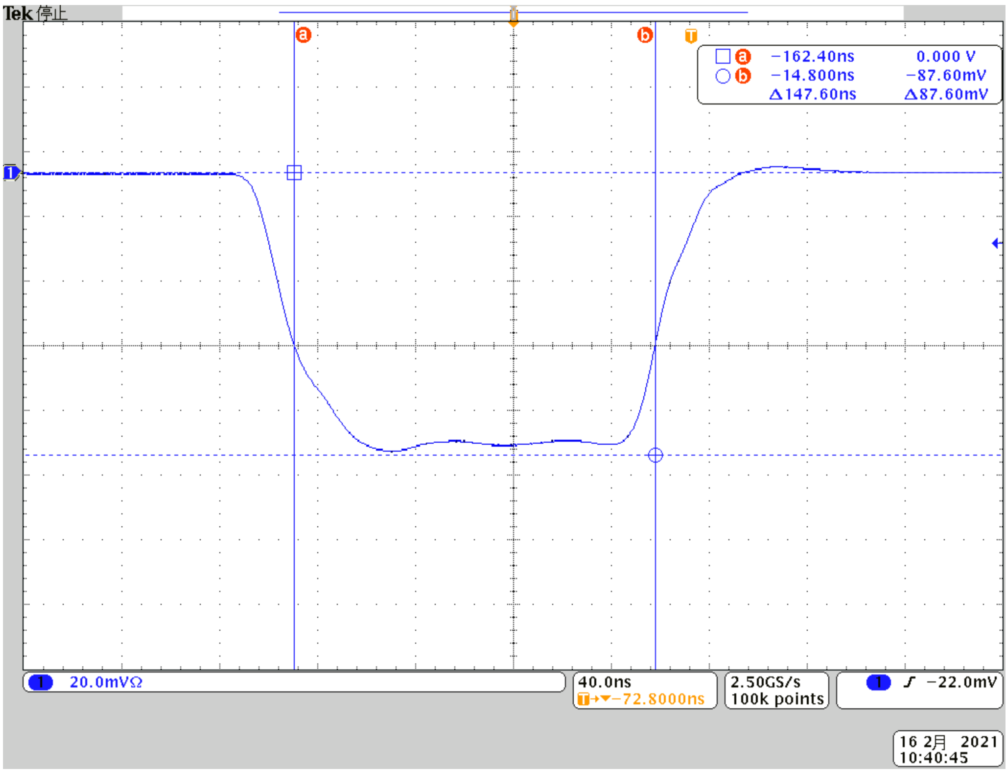


Fig. 6.2 ch1, P0N, S2 pulse envelope

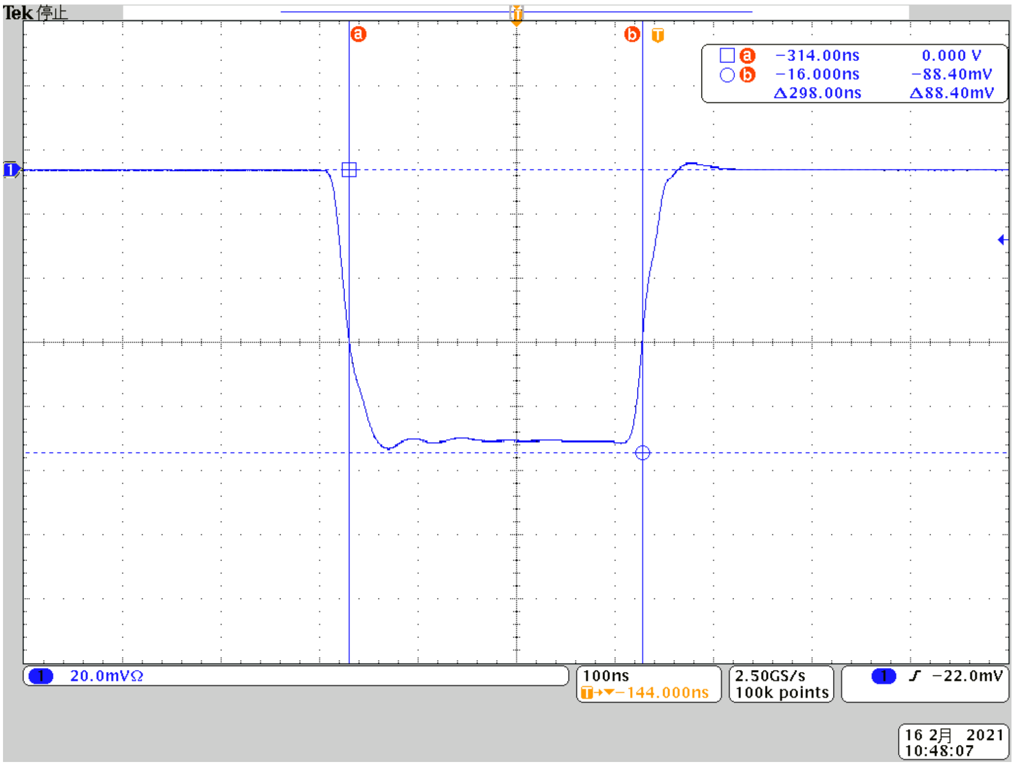


Fig. 6.3 ch1, P0N, M1 pulse envelope

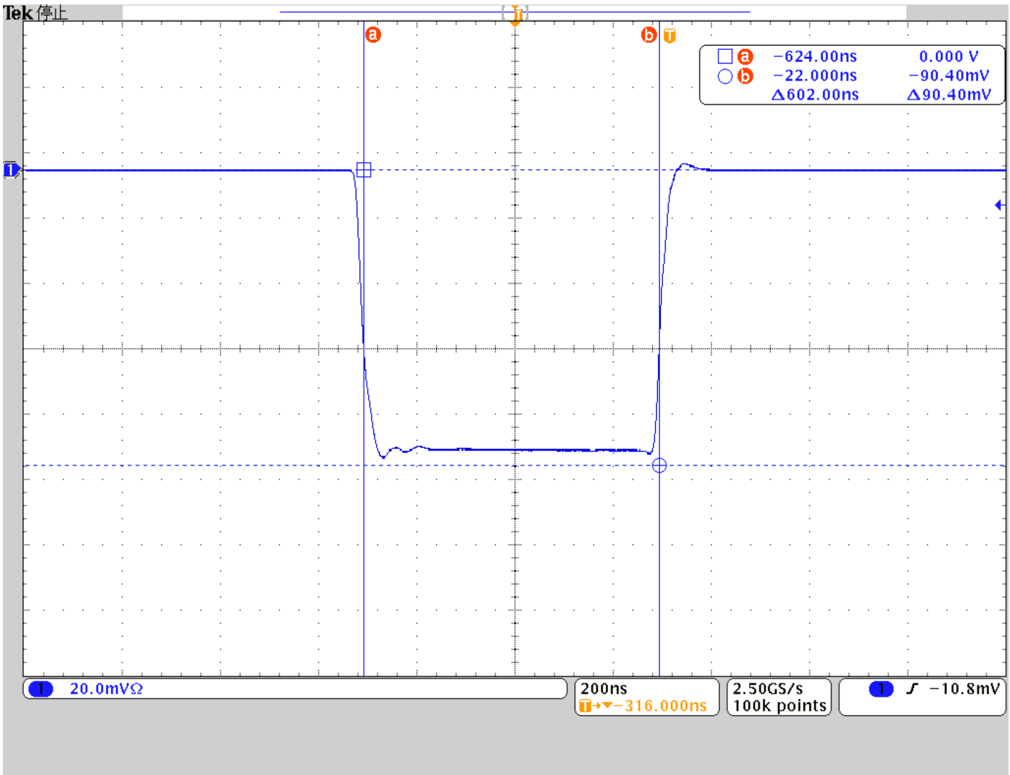


Fig. 6.4 ch1, P0N, M2 pulse envelope

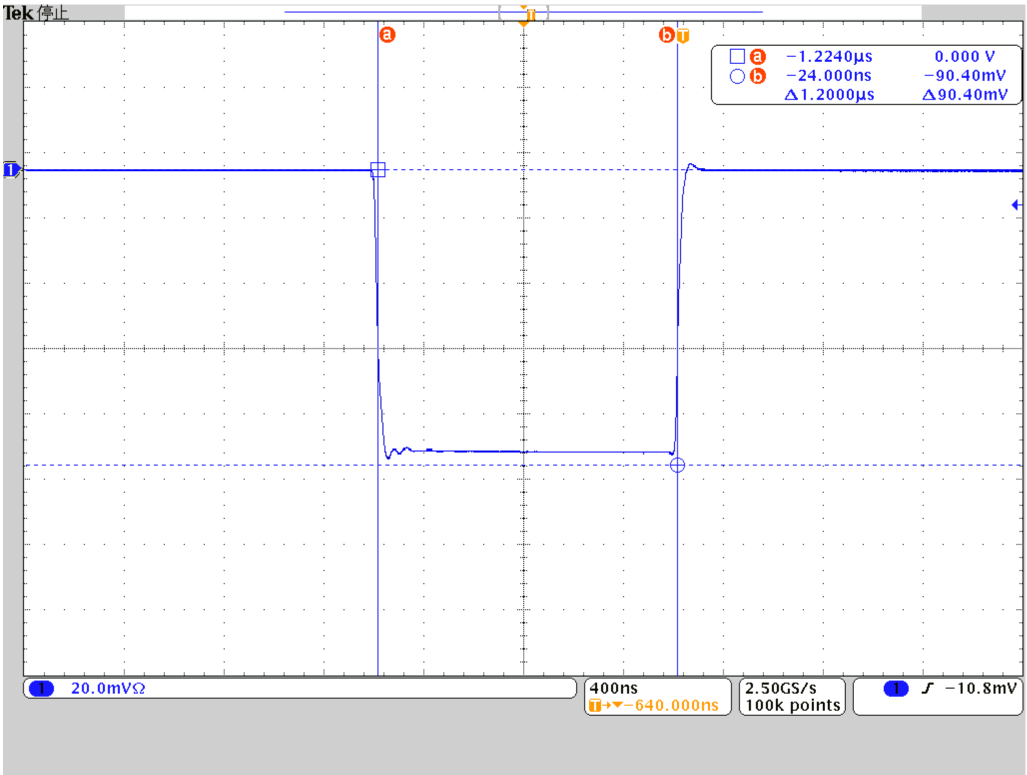


Fig. 6.5 ch1, P0N, M3 pulse envelope

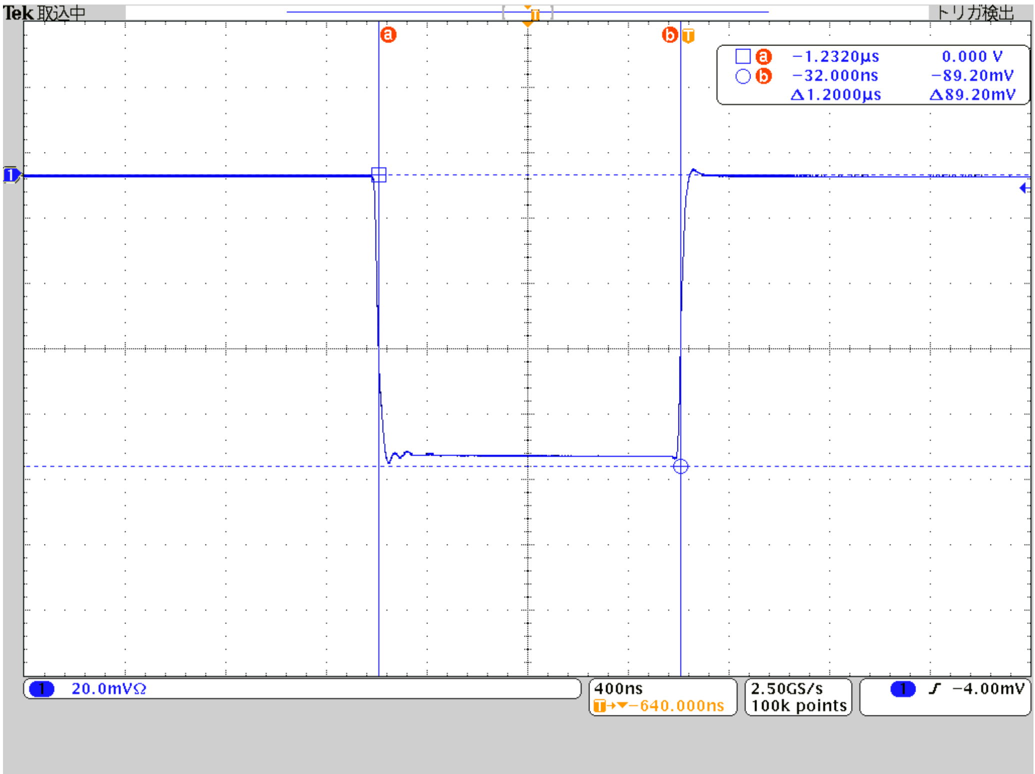


Fig. 6.6 ch1, P0N, L pulse envelope

ch1, Q0N

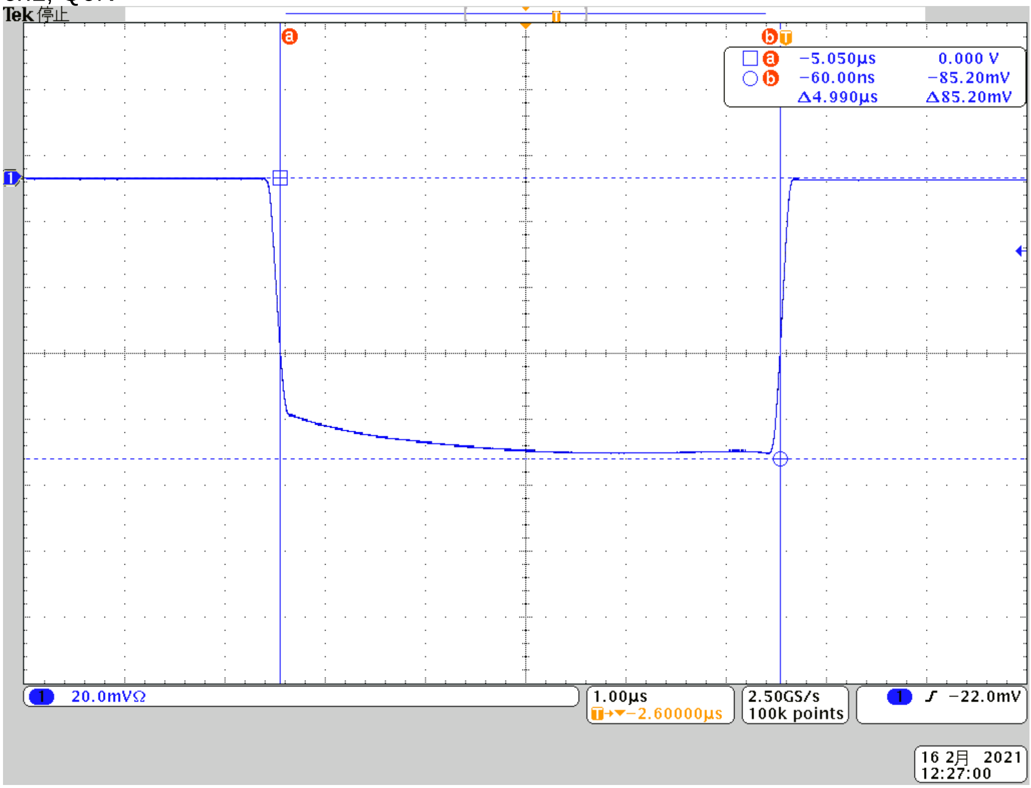


Fig. 6.7 ch1, Q0N, S1 pulse envelope

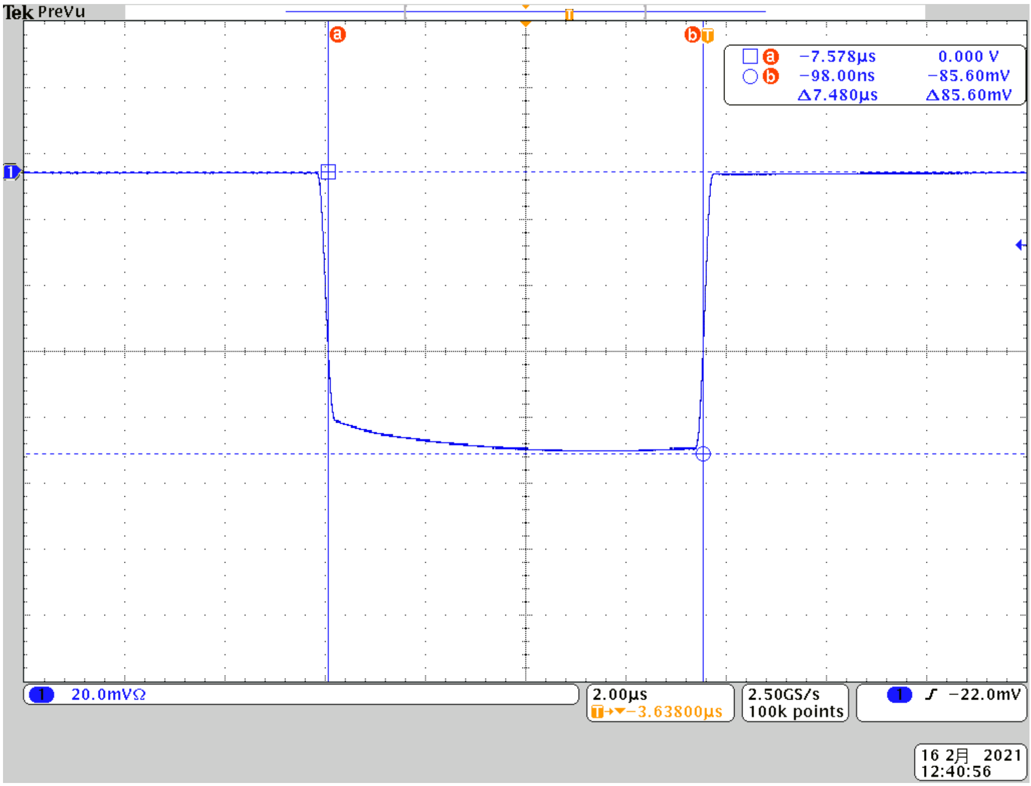


Fig. 6.8 ch1, Q0N, S2 pulse envelope

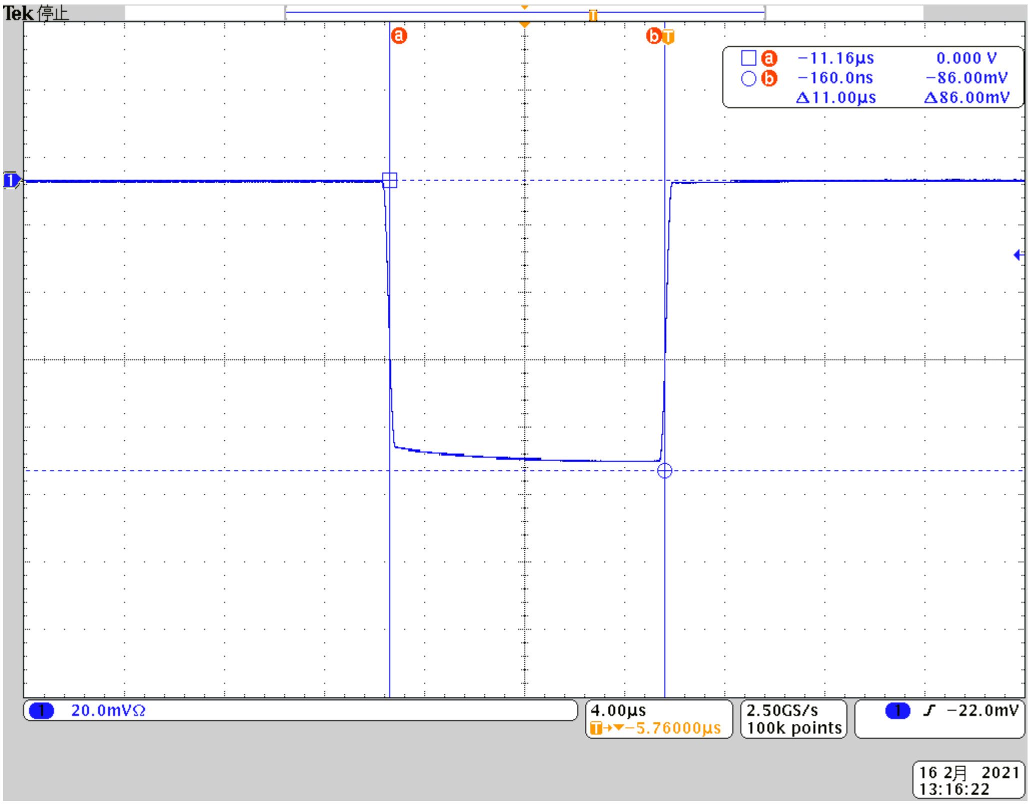


Fig. 6.9 ch1, Q0N, M1 pulse envelope

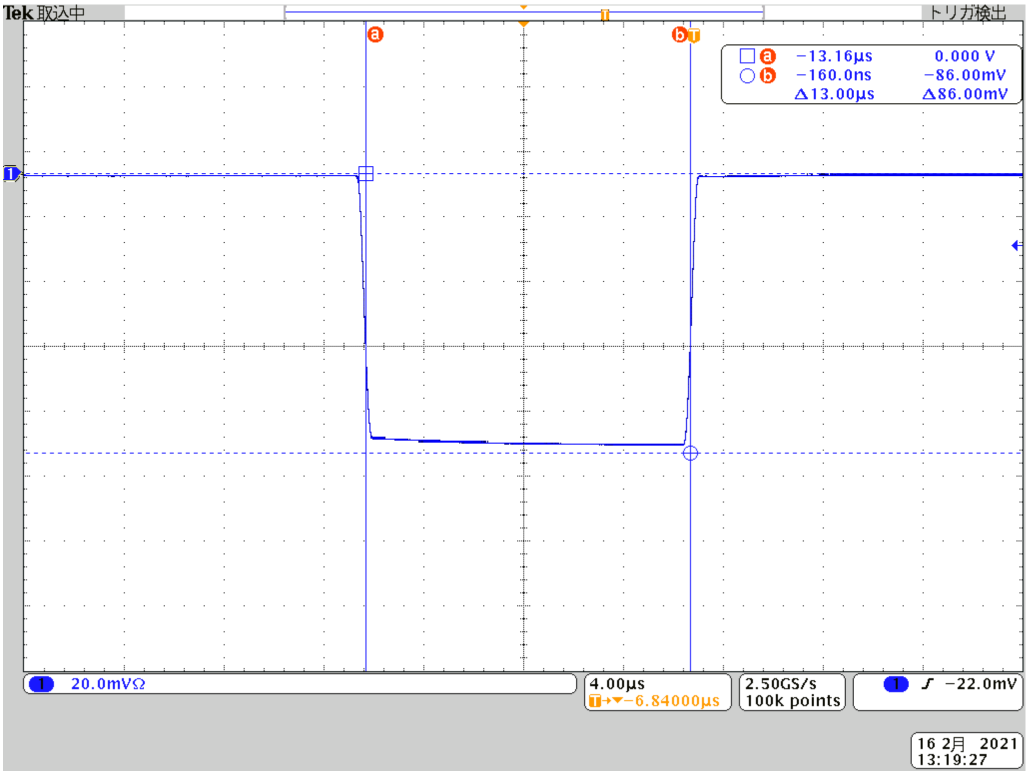


Fig. 6.10 ch1, Q0N, M2 pulse envelope

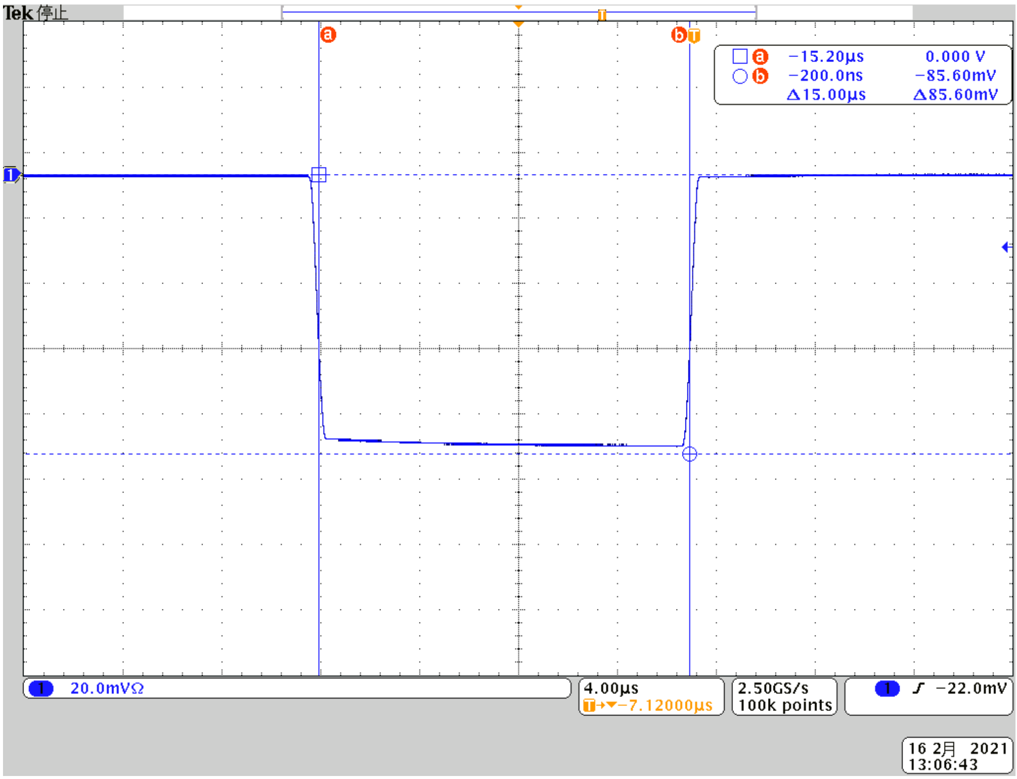


Fig. 6.11 ch1, Q0N, M3 pulse envelope

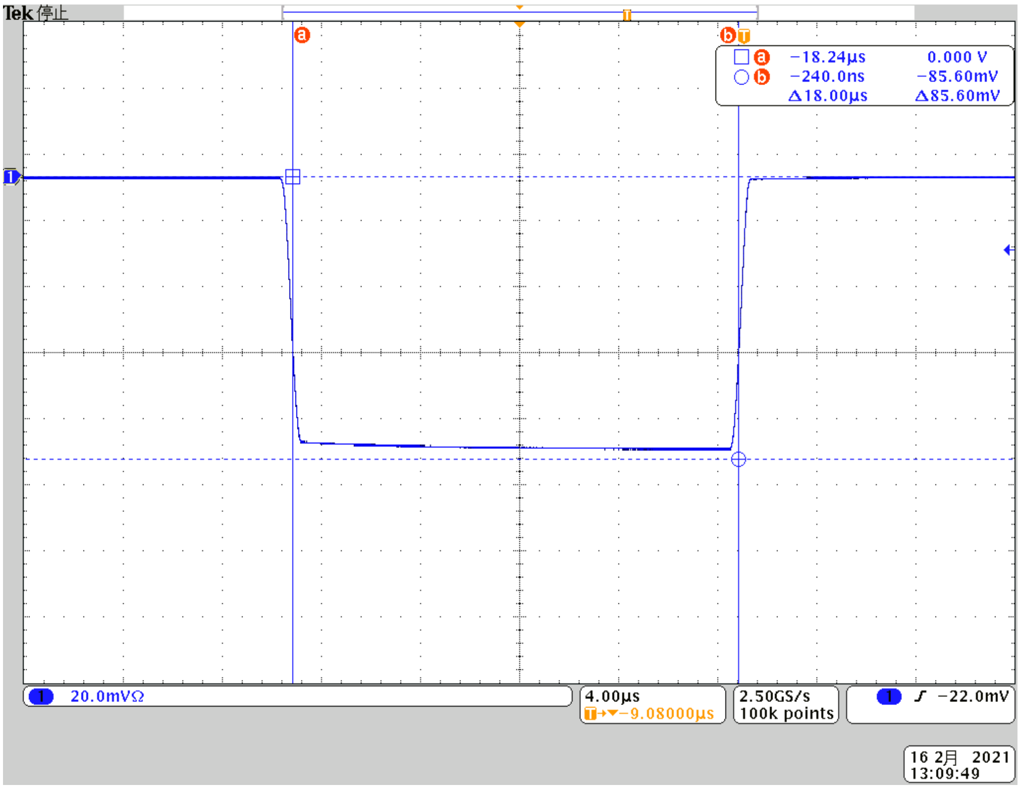


Fig. 6.12 ch1, Q0N, L pulse envelope

ch2, P0N

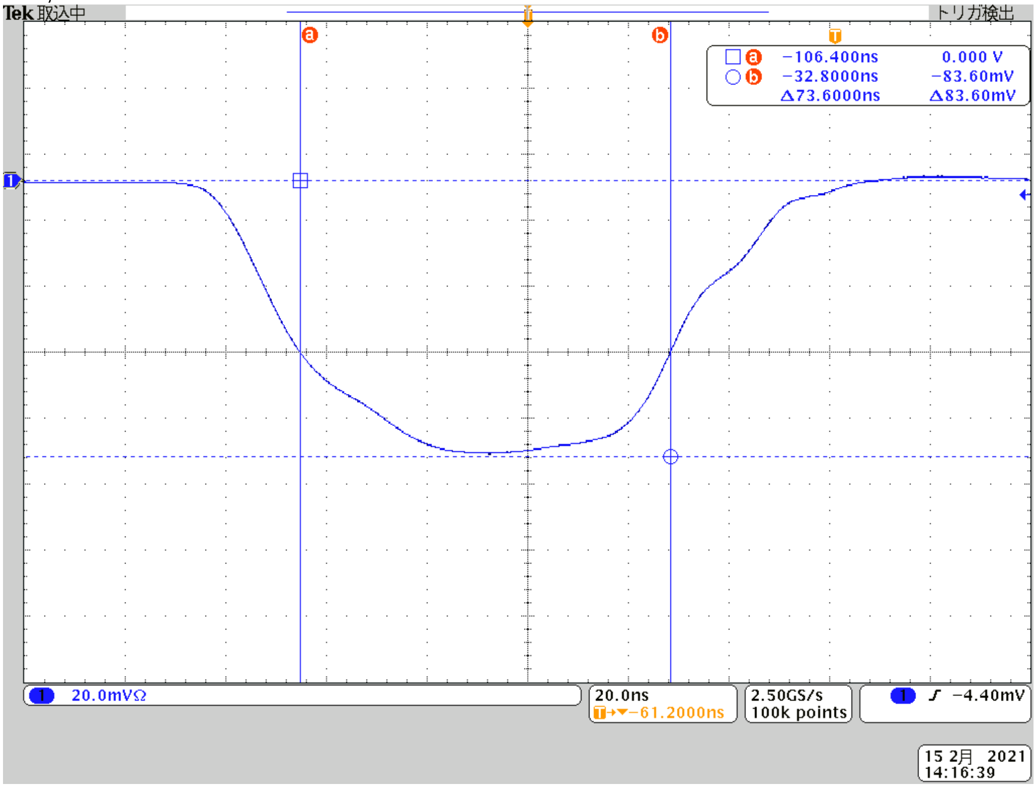


Fig. 6.13 ch2, P0N, S1 pulse envelope

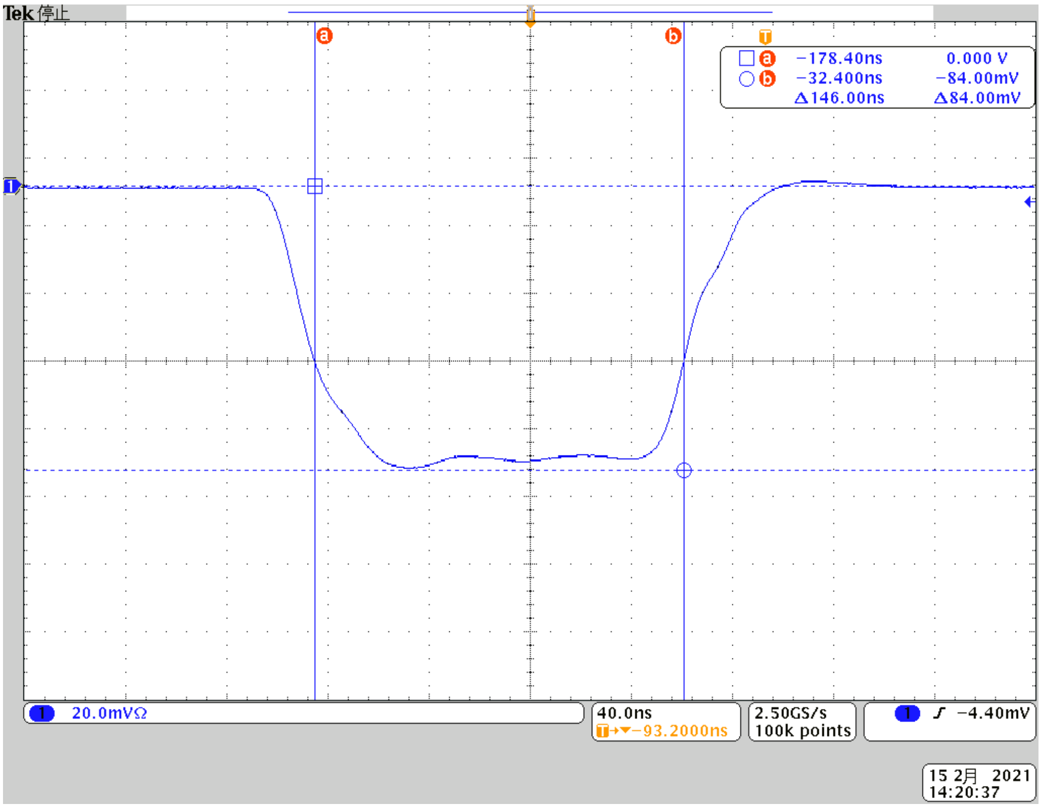


Fig. 6.14 ch2, P0N, S2 pulse envelope

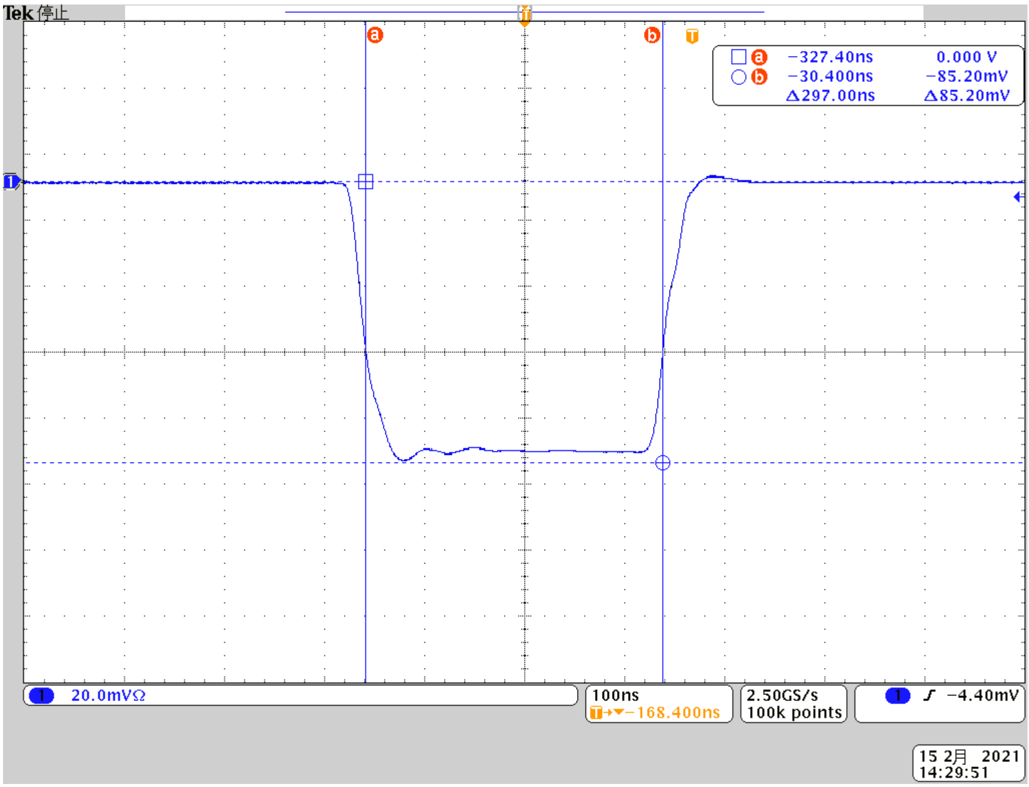


Fig. 6.15 ch2, P0N, M1 pulse envelope

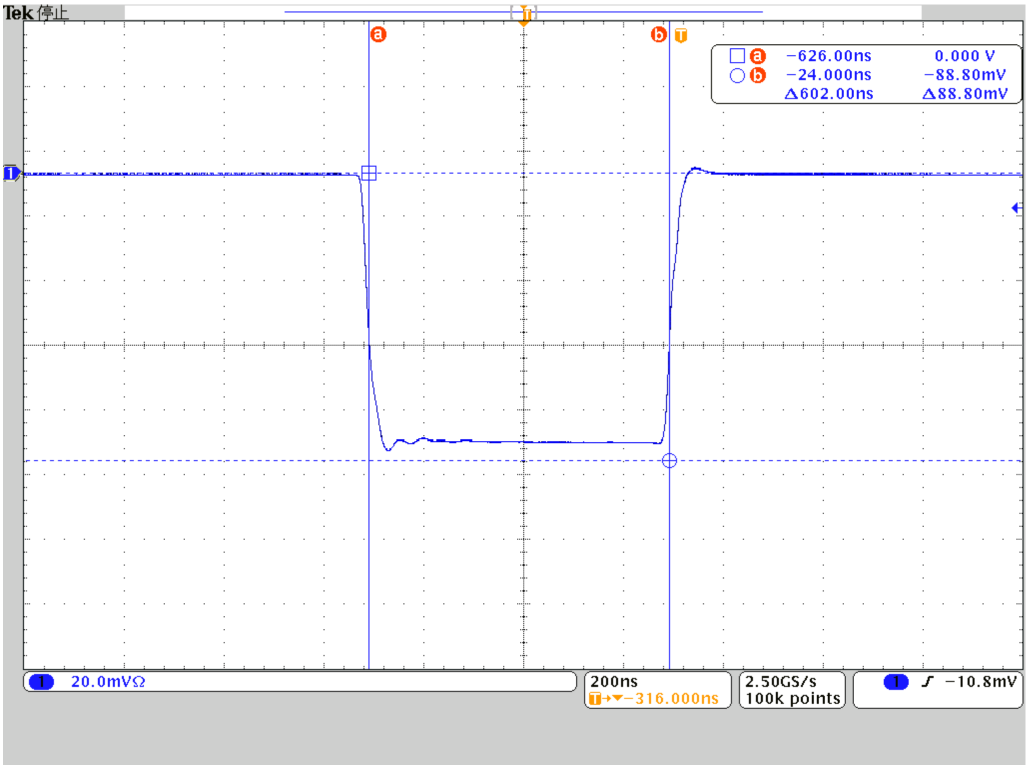


Fig. 6.16 ch2, P0N, M2 pulse envelope

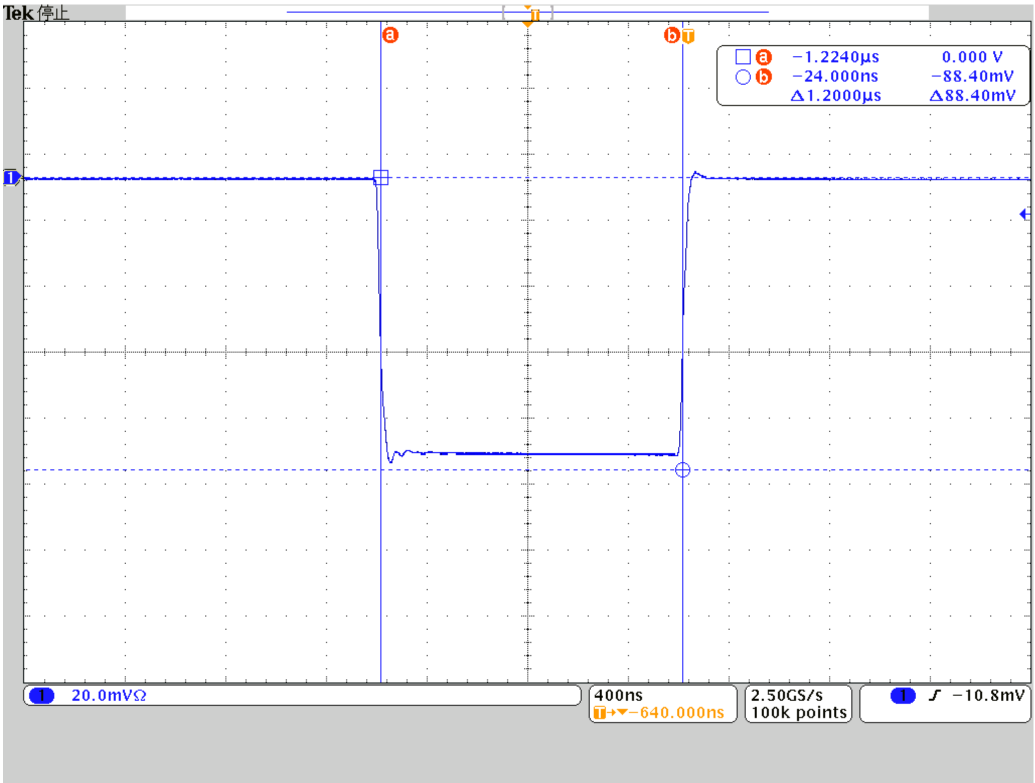


Fig. 6.17 ch2, P0N, M3 pulse envelope

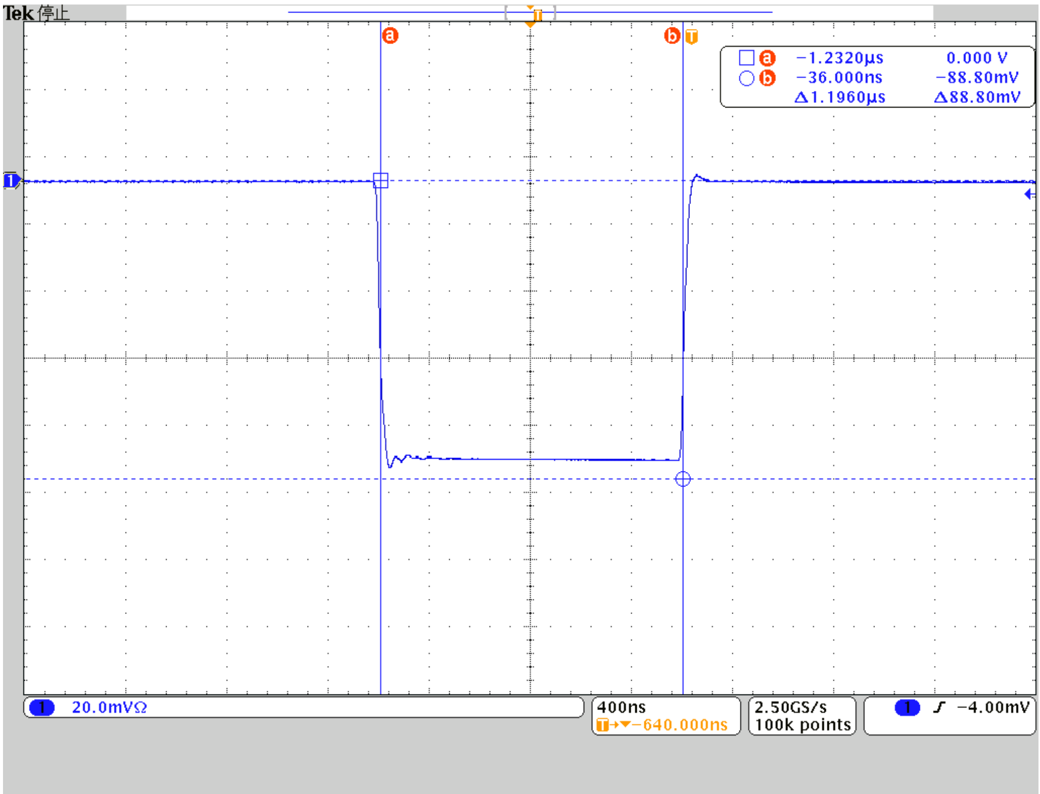


Fig. 6.18 ch2, P0N, L pulse envelope

ch2, Q0N

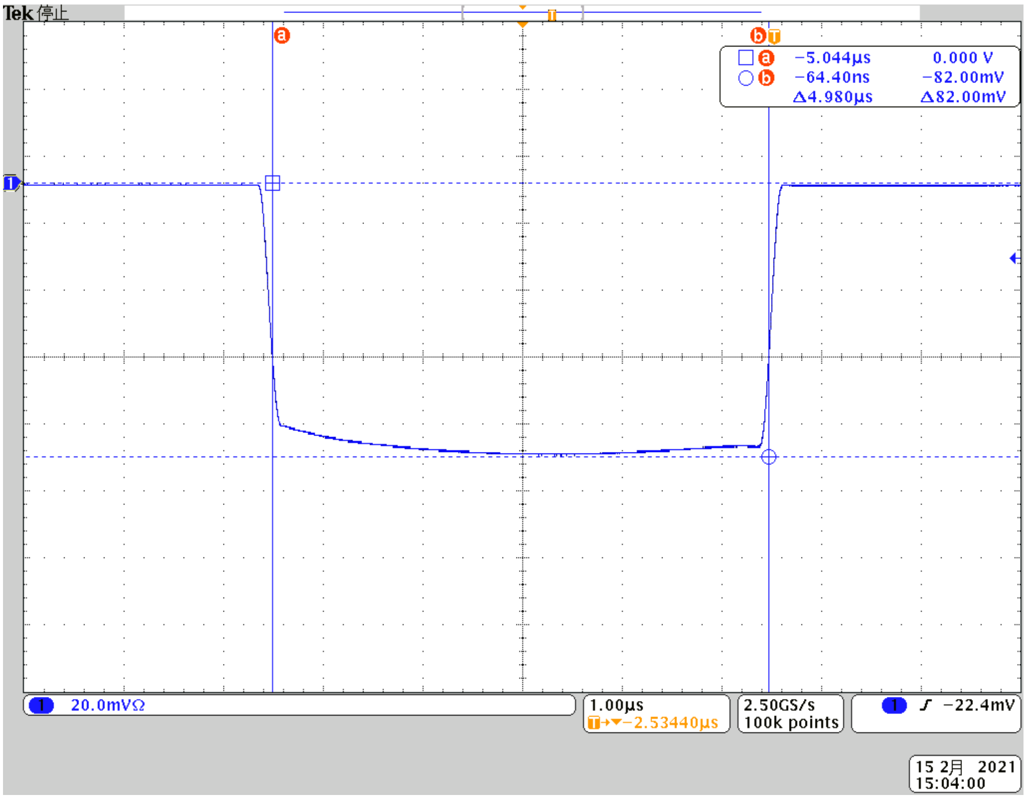


Fig. 6.19 ch2, Q0N, S1 pulse envelope

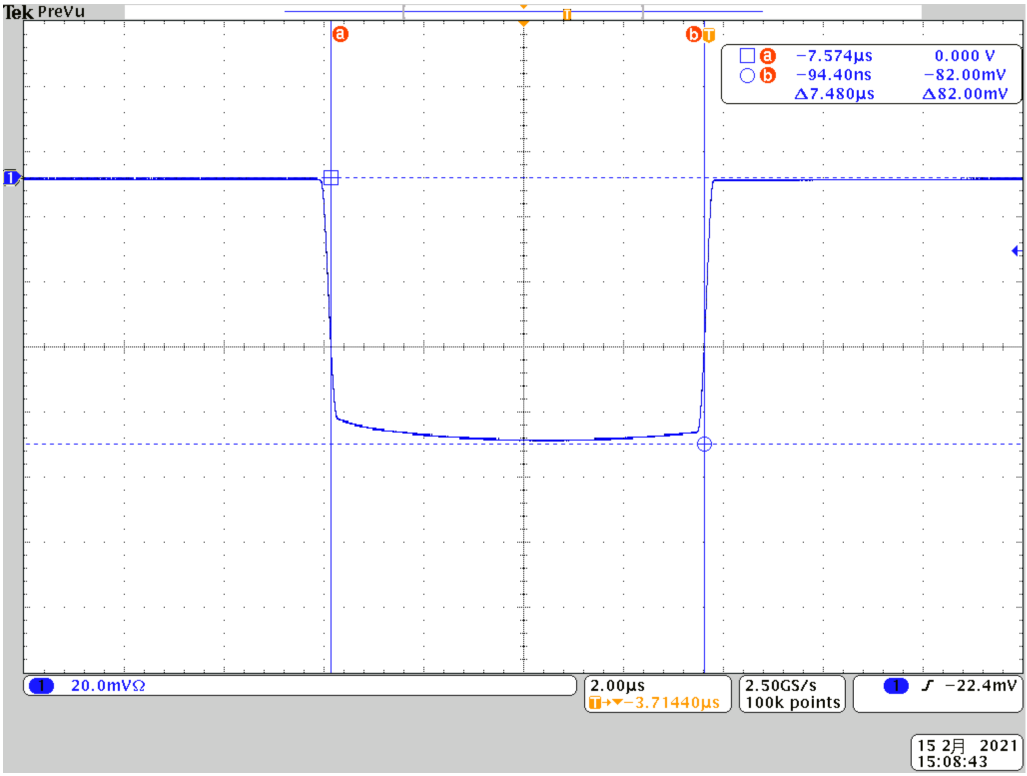


Fig. 6.20 ch2, Q0N, S2 pulse envelope

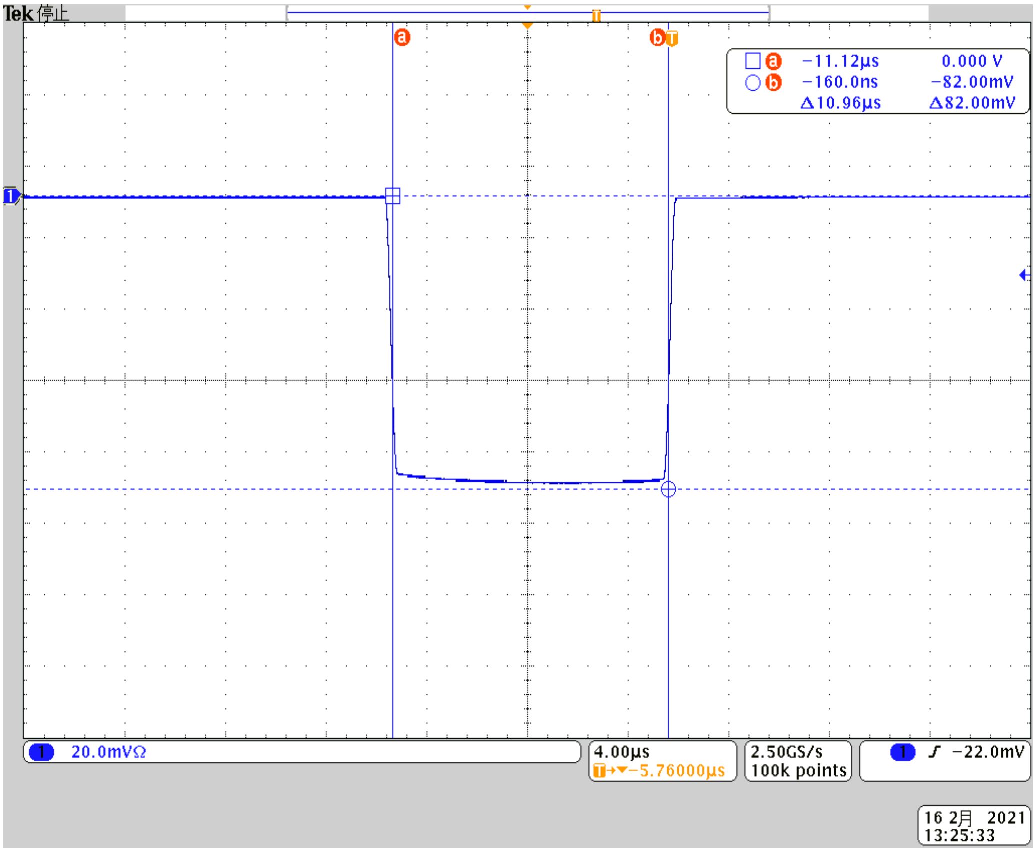


Fig. 6.21 ch2, Q0N, M1 pulse envelope

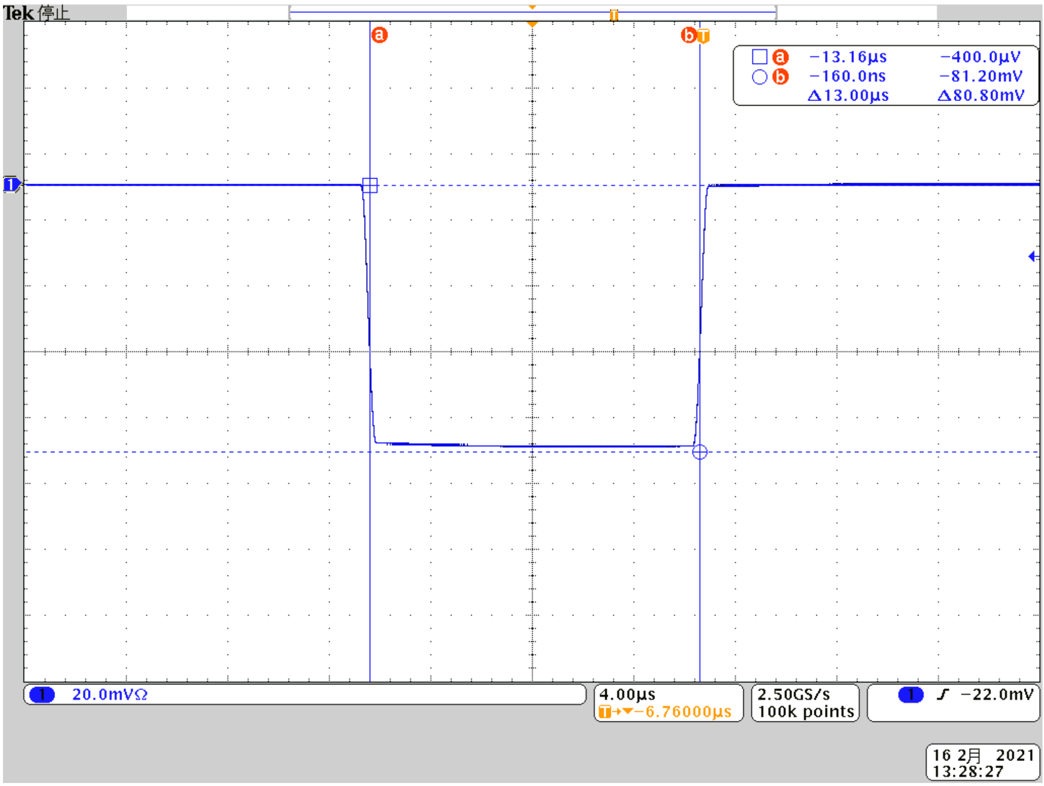


Fig. 6.22 ch2, Q0N, M2 pulse envelope

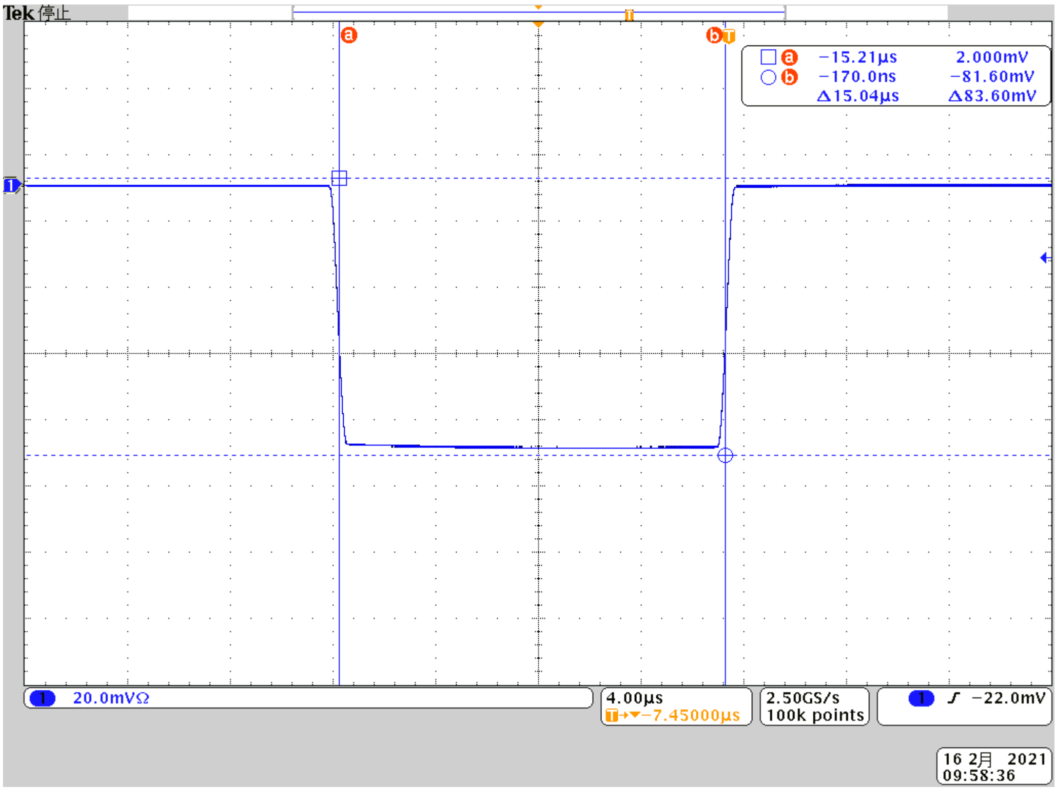


Fig. 6.23 ch2, Q0N, M3 pulse envelope

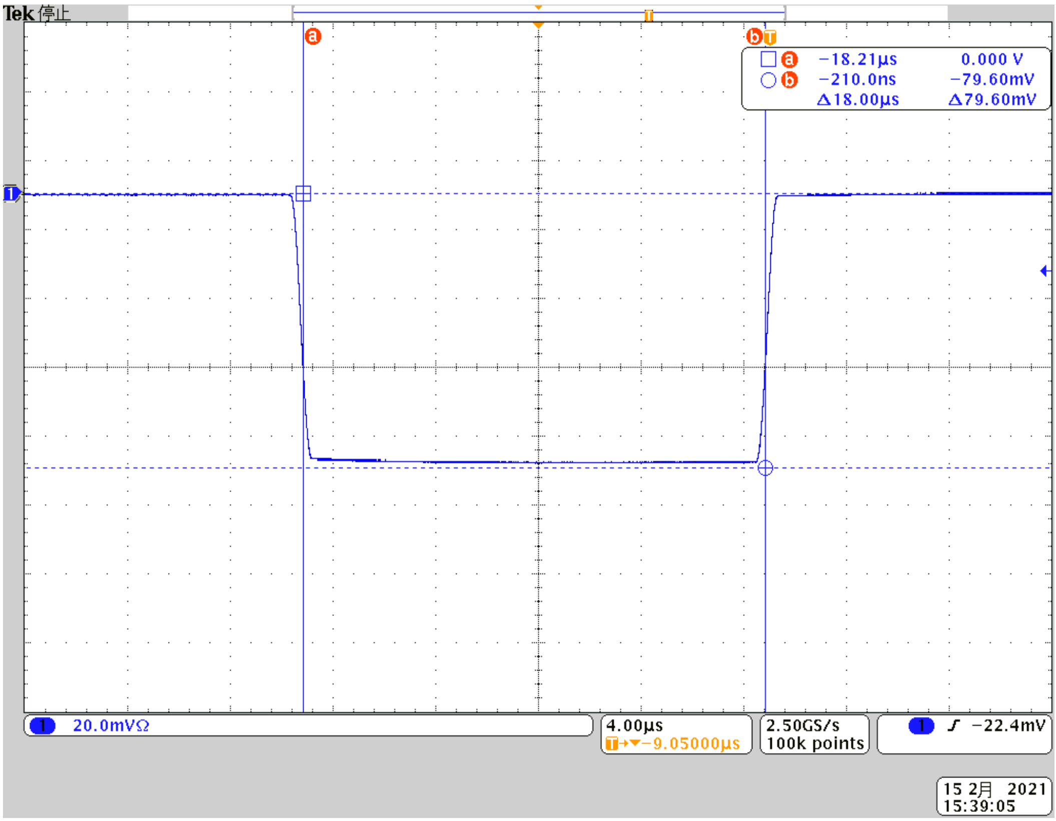


Fig. 6.24 ch2, Q0N, L pulse envelope

ch3, P0N

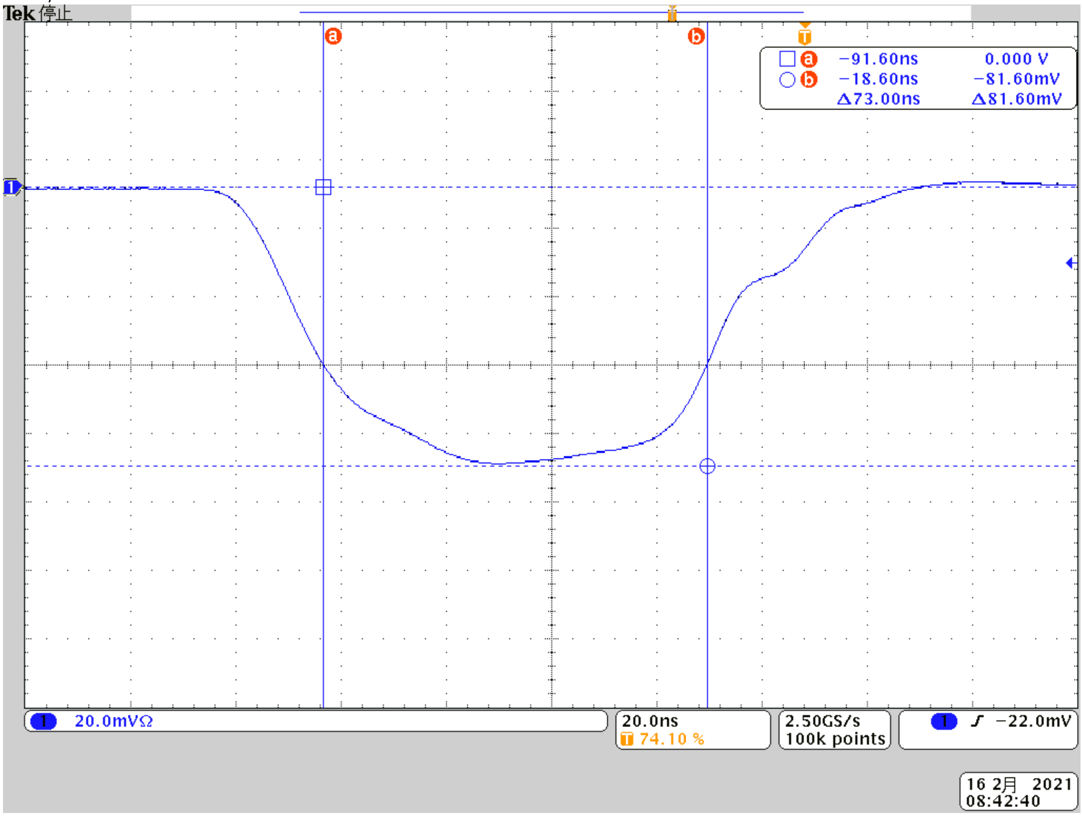


Fig. 6.25 ch3, P0N, S1 pulse envelope

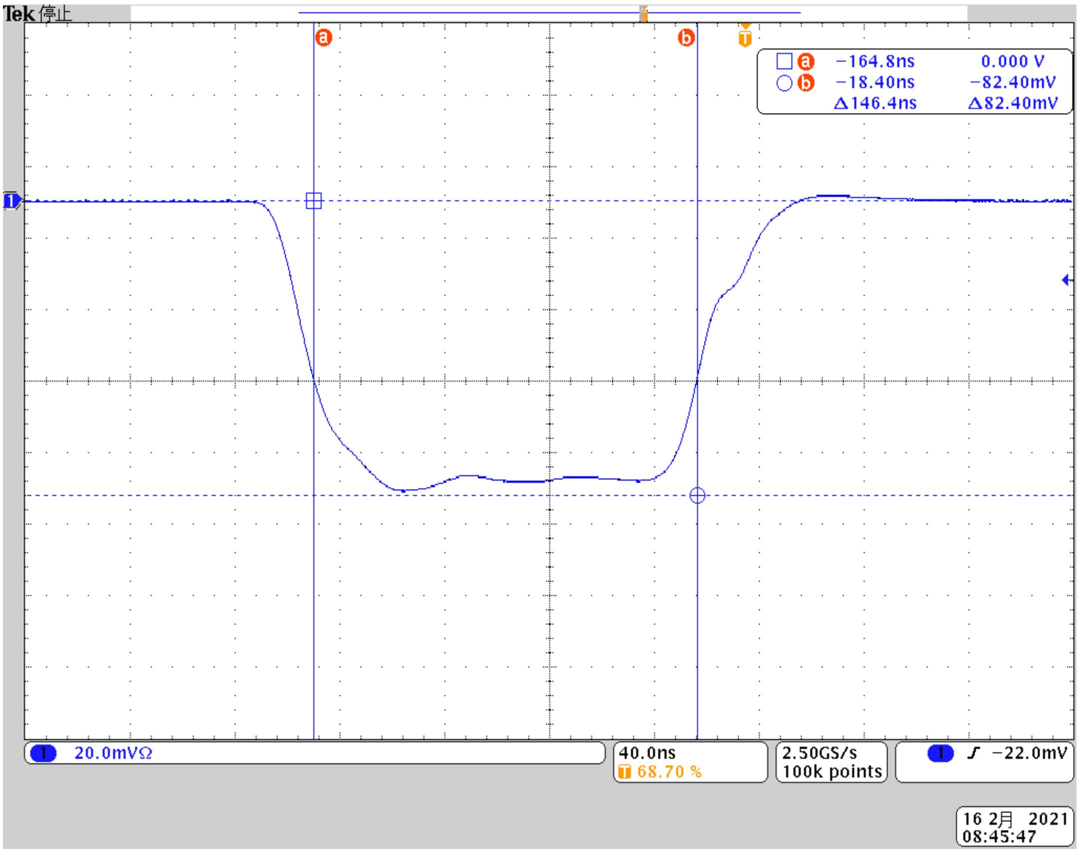


Fig. 6.26 ch3, P0N, S2 pulse envelope

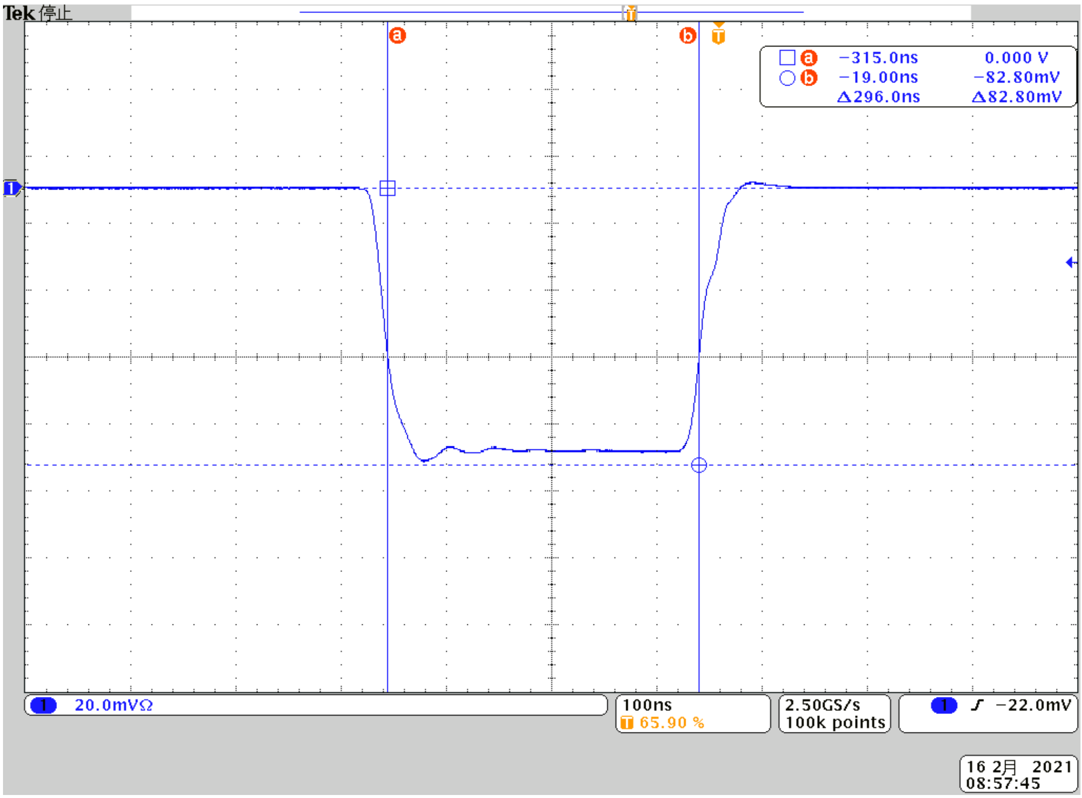


Fig. 6.27 ch3, P0N, M1 pulse envelope

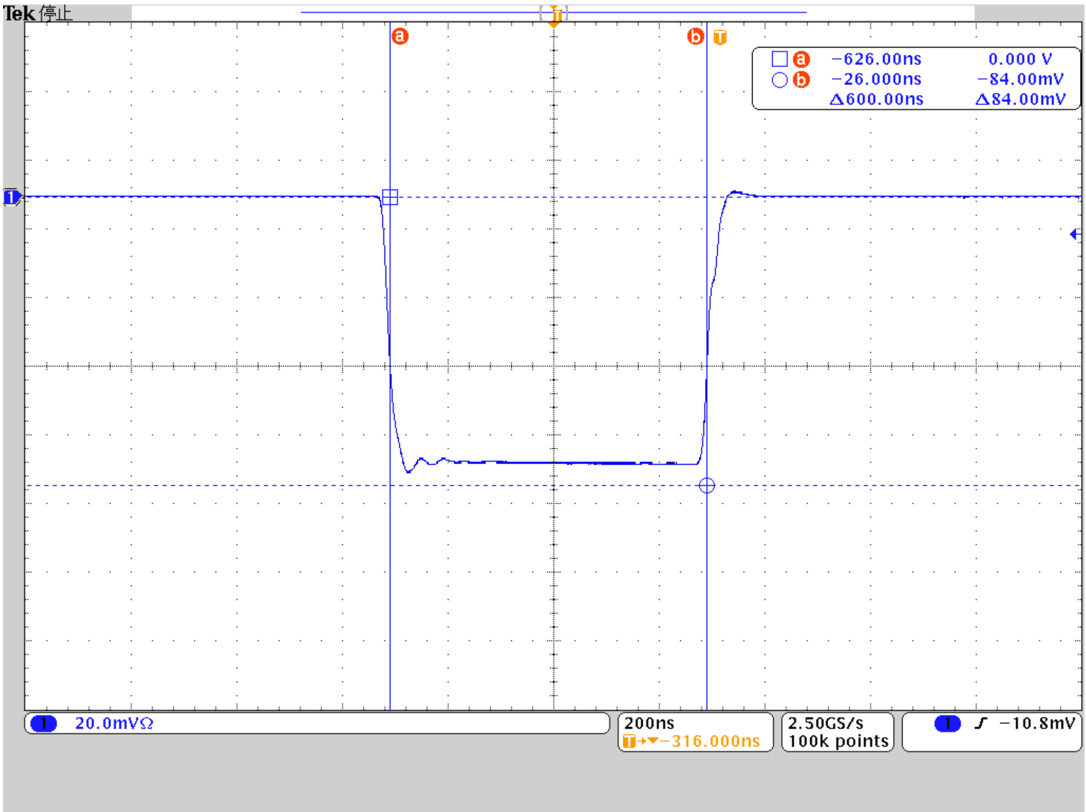


Fig. 6.28 ch3, P0N, M2 pulse envelope

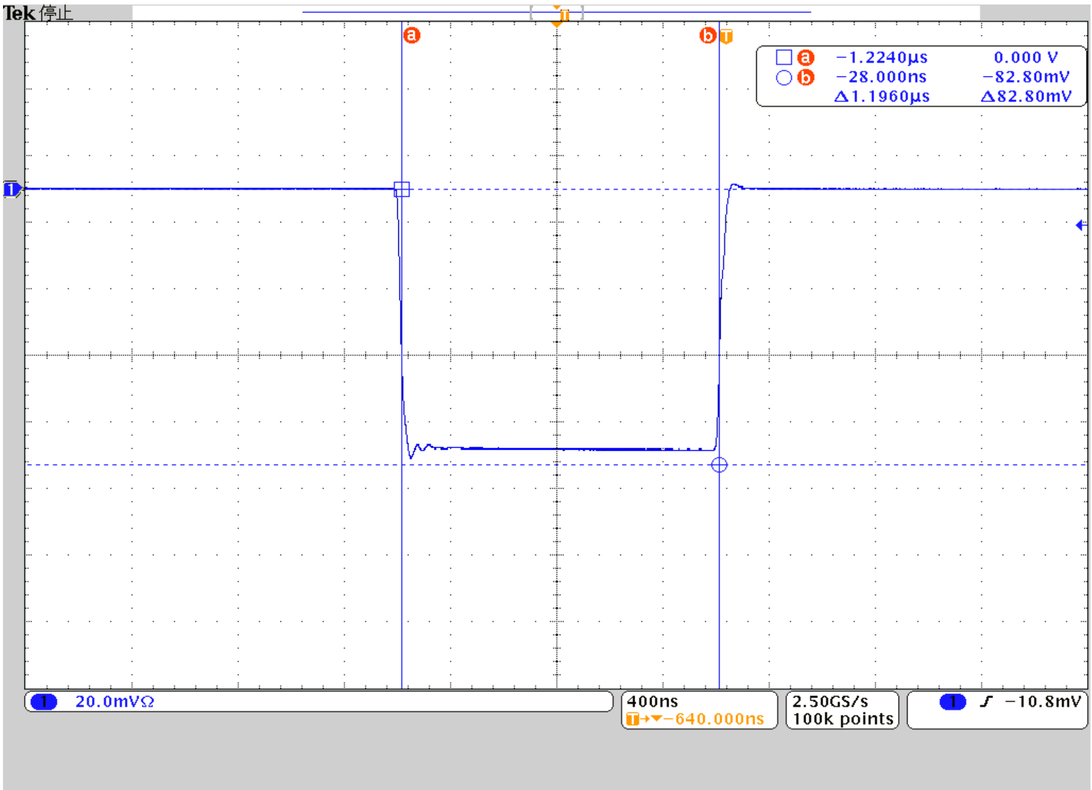


Fig. 6.29 ch3, P0N, M3 pulse envelope

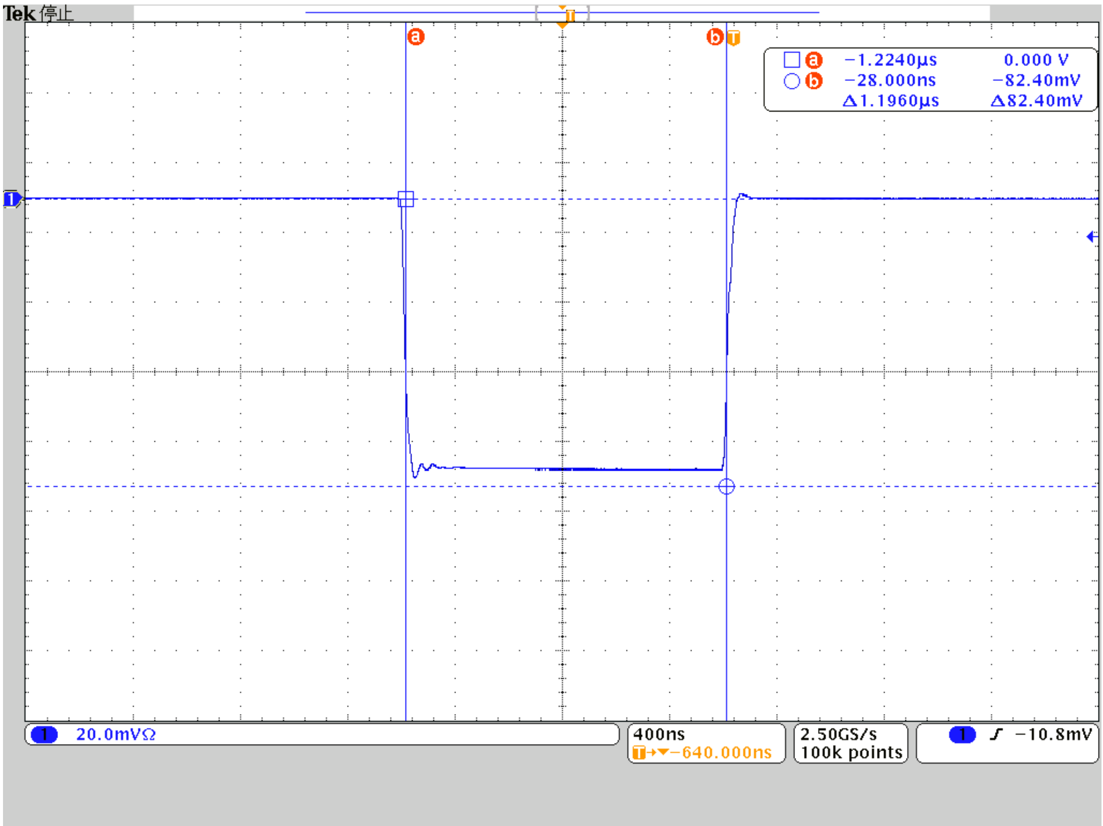


Fig. 6.30 ch3, P0N, L pulse envelope

ch3, Q0N

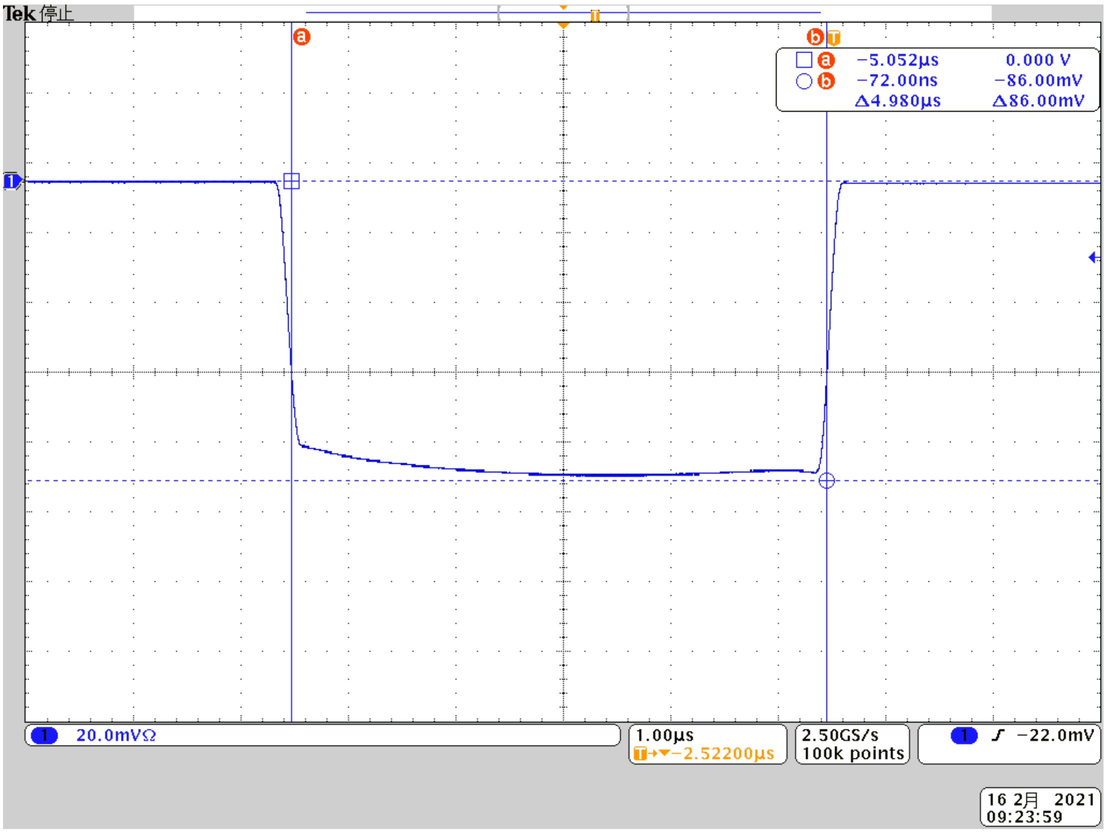


Fig. 6.31 ch3, Q0N, S1 pulse envelope

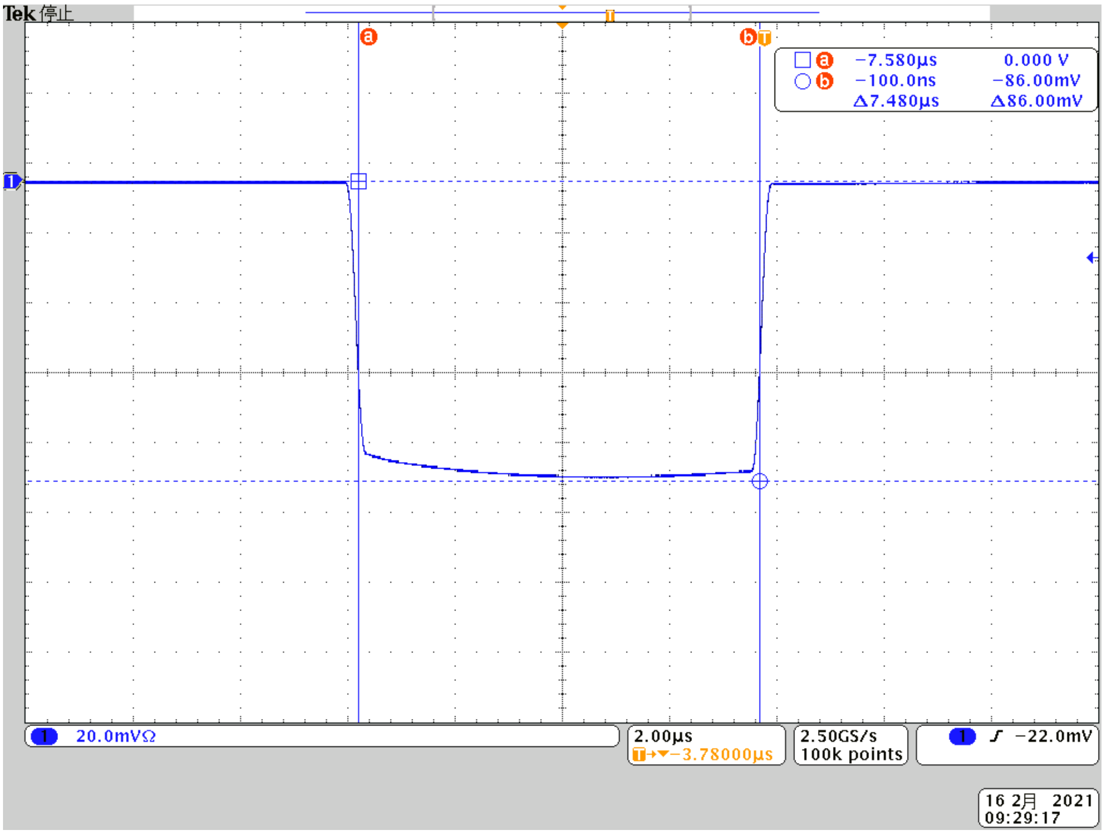


Fig. 6.32 ch3, Q0N, S2 pulse envelope

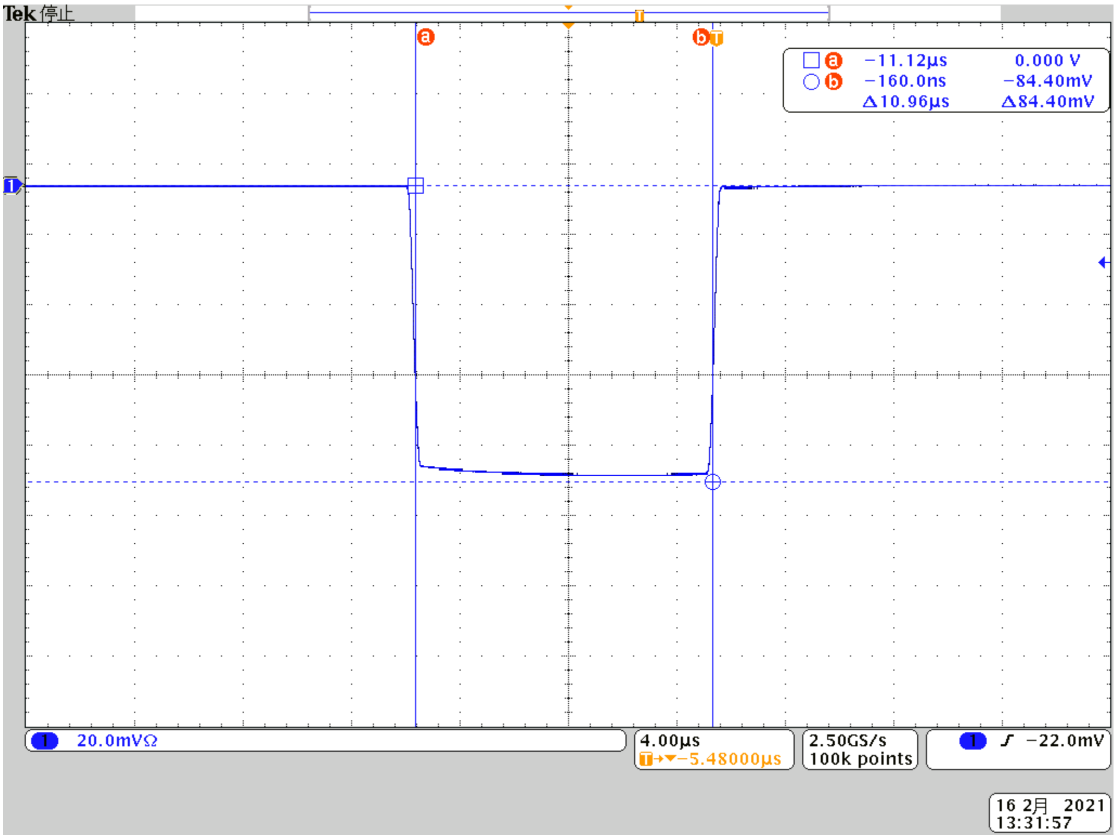


Fig. 6.33 ch3, Q0N, M1 pulse envelope

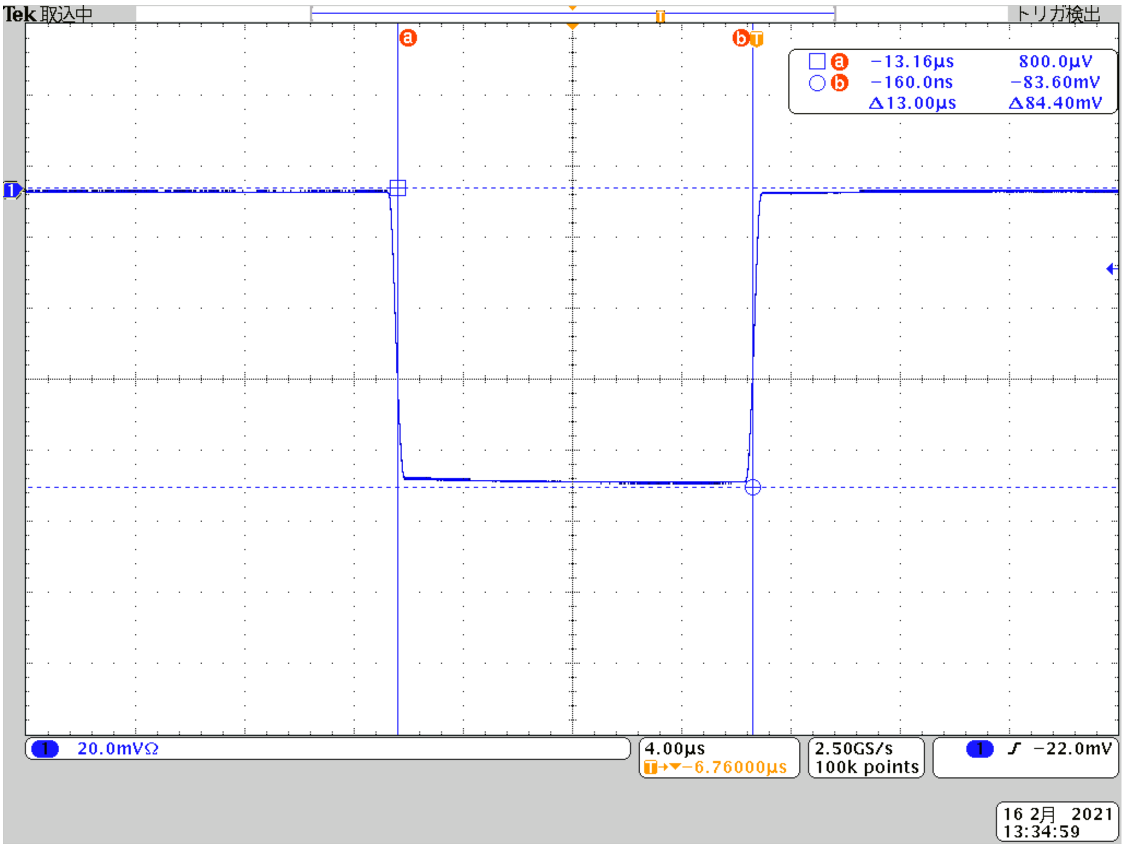


Fig. 6.34 ch3, Q0N, M2 pulse envelope

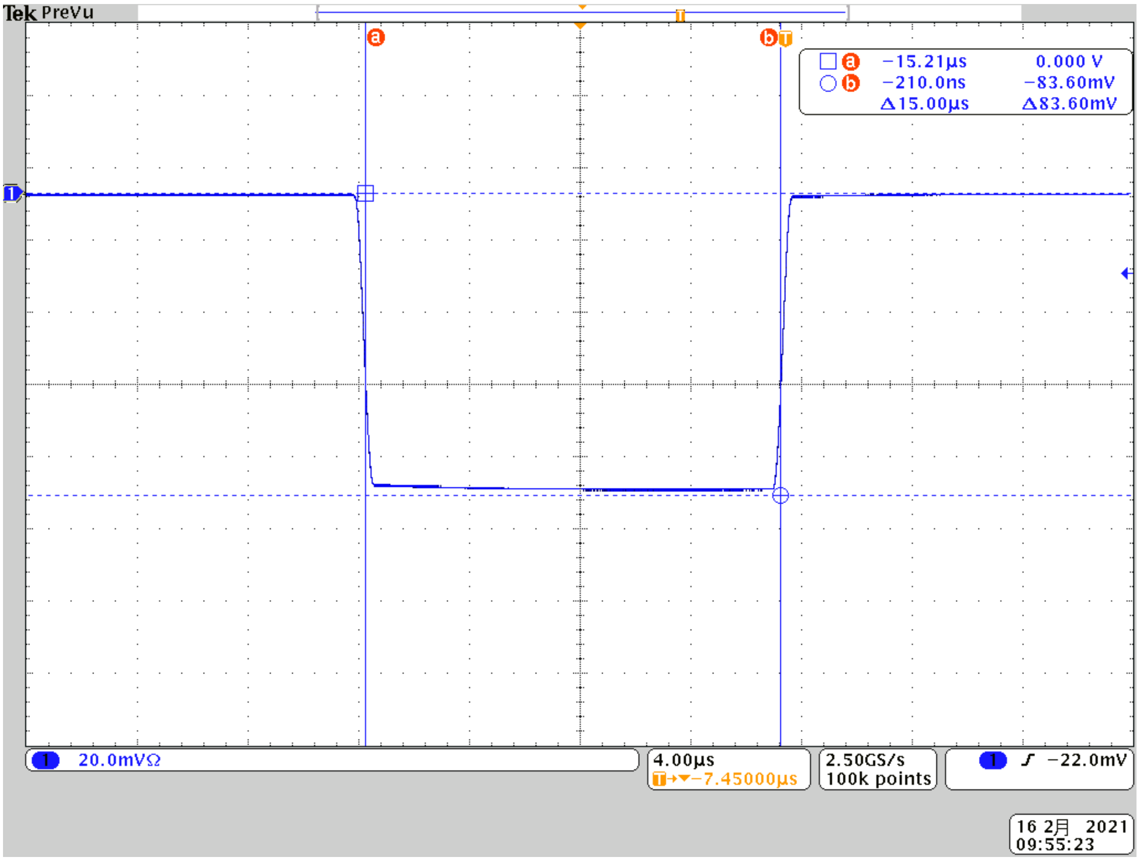


Fig. 6.35 ch3, Q0N, M3 pulse envelope

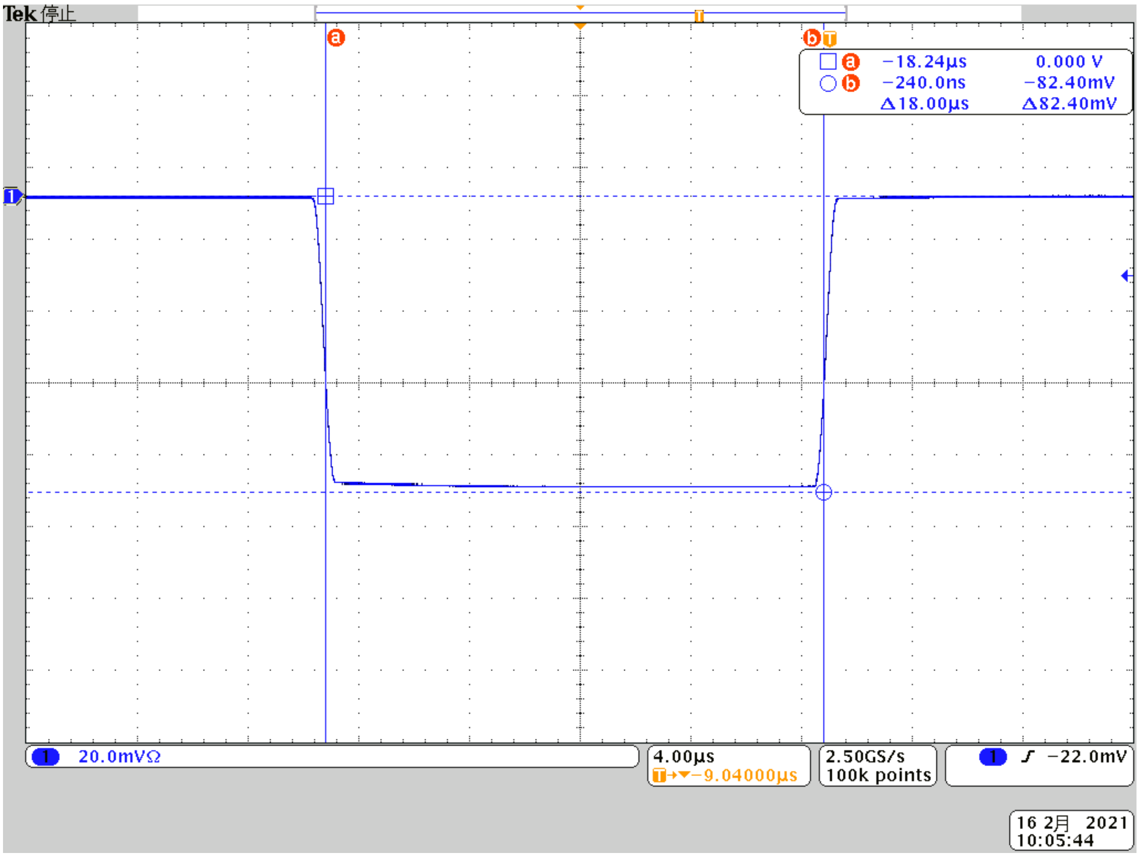
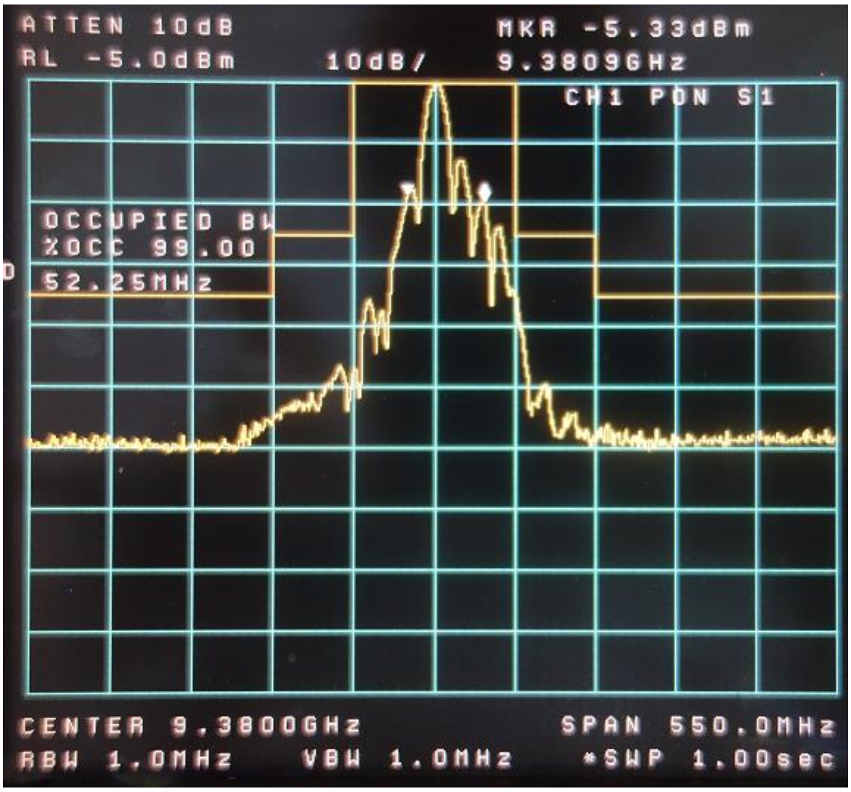


Fig. 6.36 ch3, Q0N, L pulse envelope

7 Spurious Emission Plots measured at Antenna Terminal

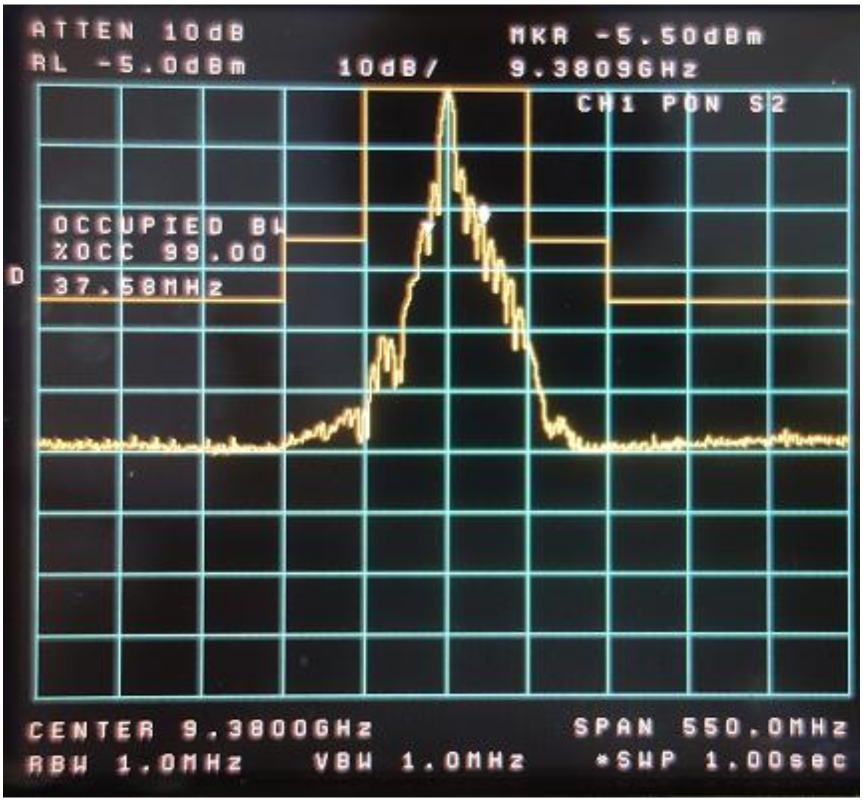
7.1 Occupied Bandwidth

ch1, P0N



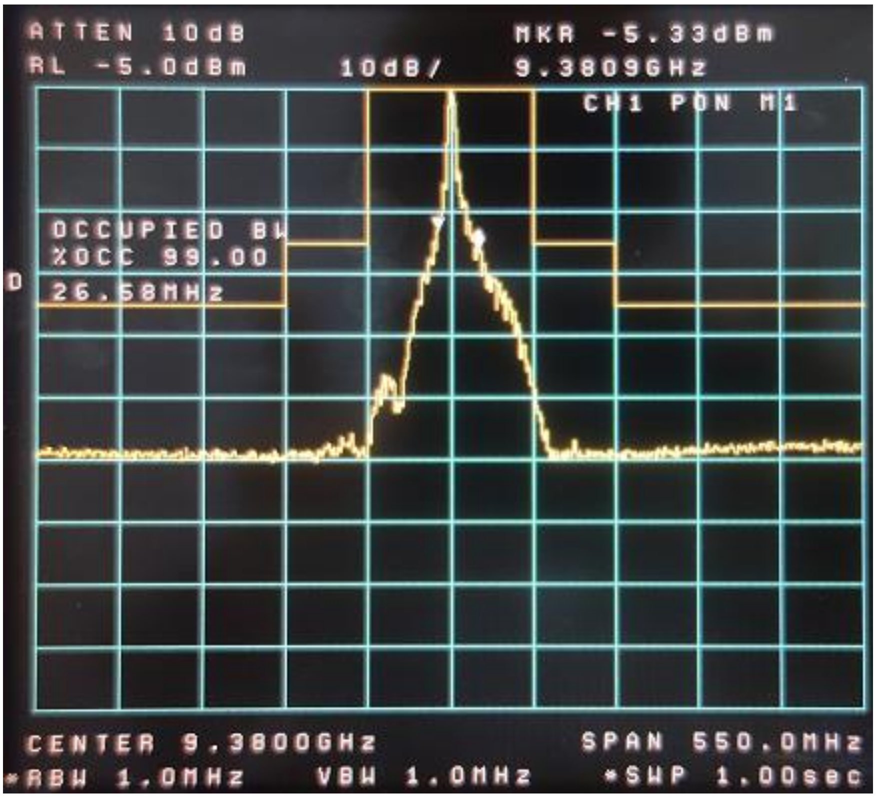
Limit

Fig. 7.1.1 ch1, P0N, S1 pulse



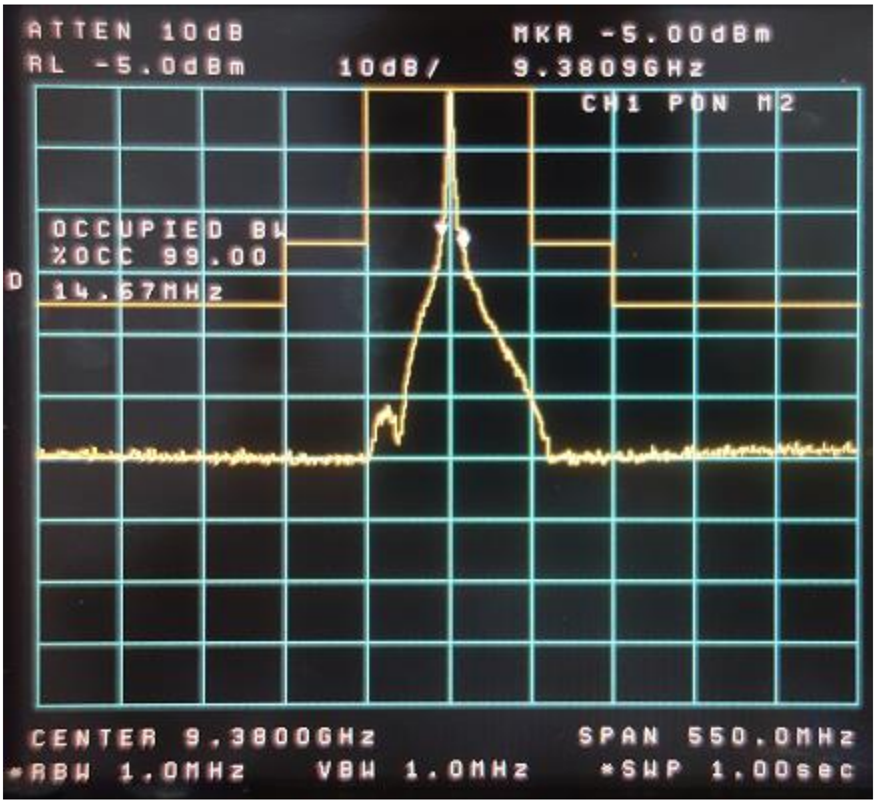
Limit

Fig. 7.1.2 ch1, P0N, S2 pulse



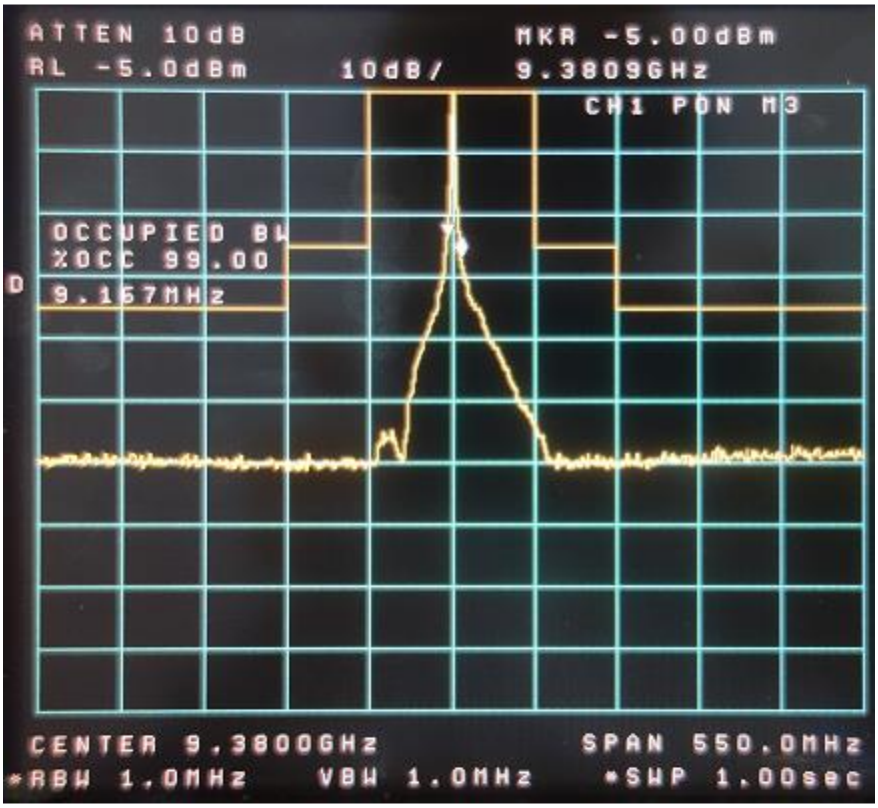
Limit

Fig. 7.1.3 ch1, P0N, M1 pulse



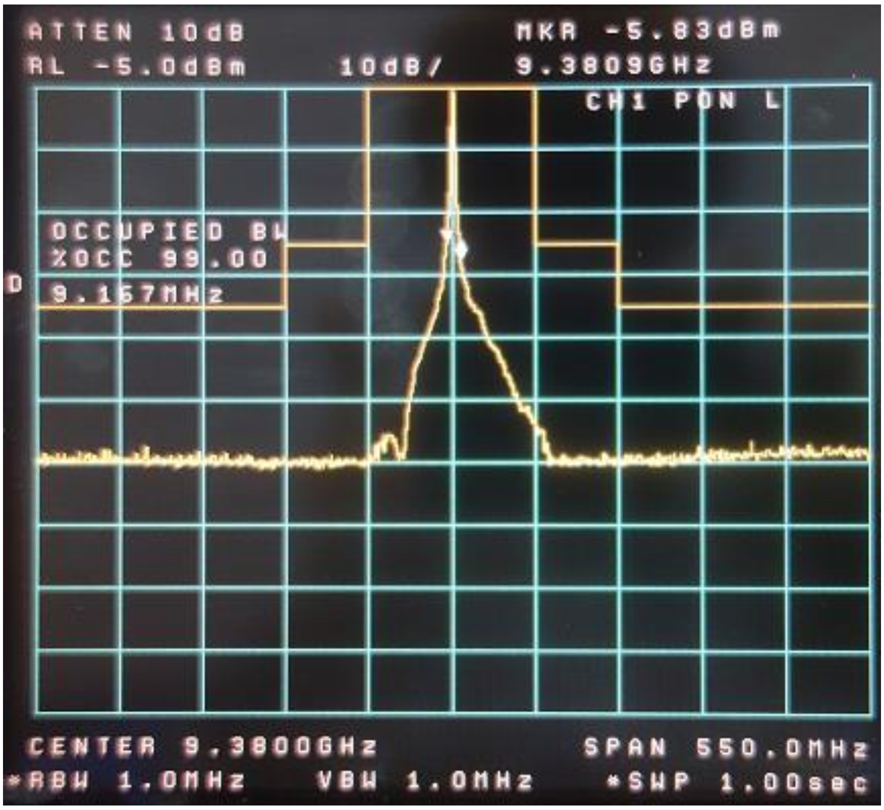
Limit

Fig. 7.1.4 ch1, P0N, M2 pulse



Limit

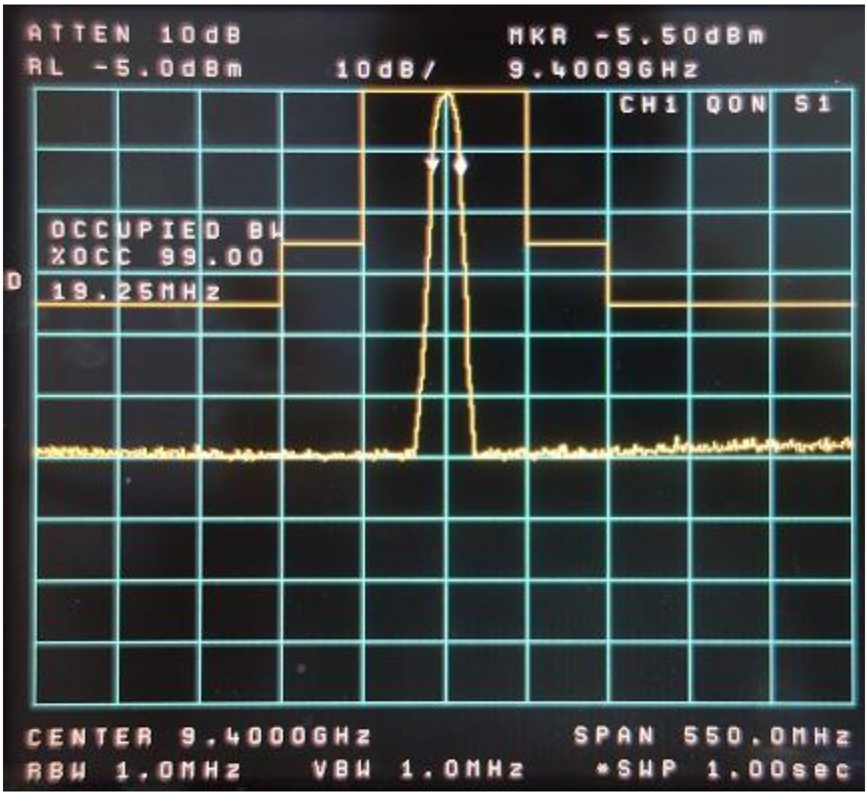
Fig. 7.1.5 ch1, P0N, M3 pulse



Limit

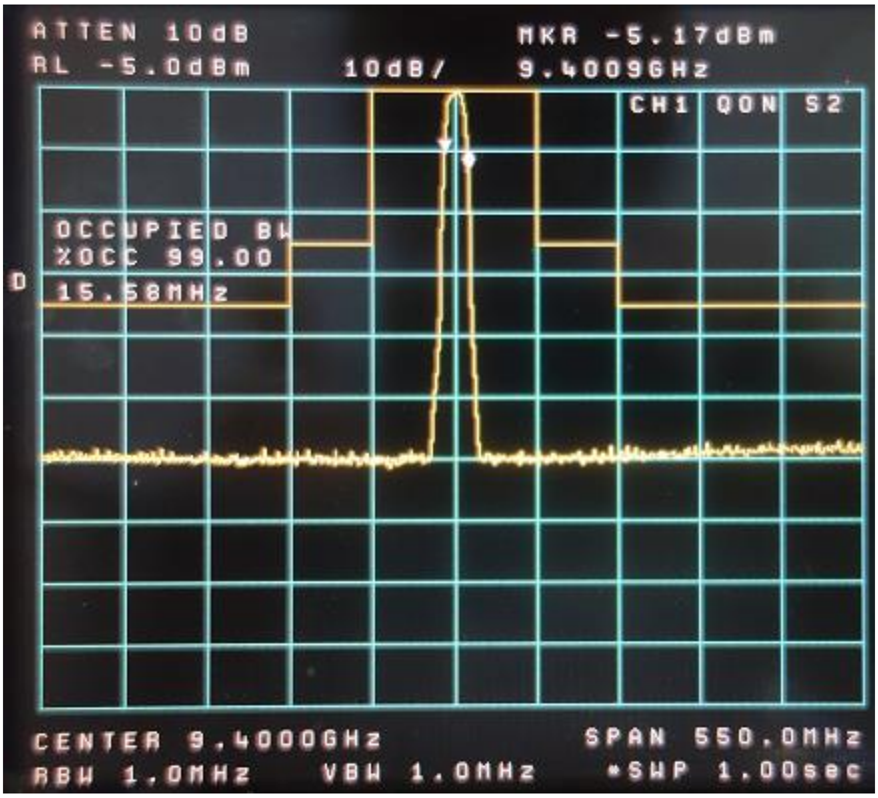
Fig. 7.1.6 ch1, P0N, L pulse

ch1, Q0N



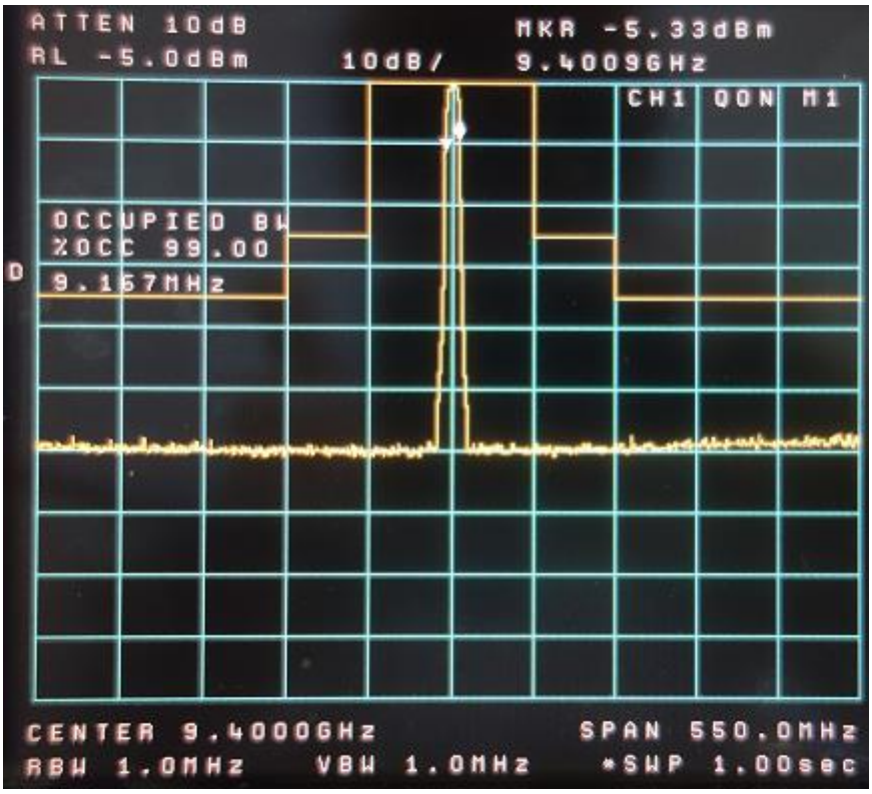
Limit

Fig. 7.1.7 ch1, Q0N, S1 pulse



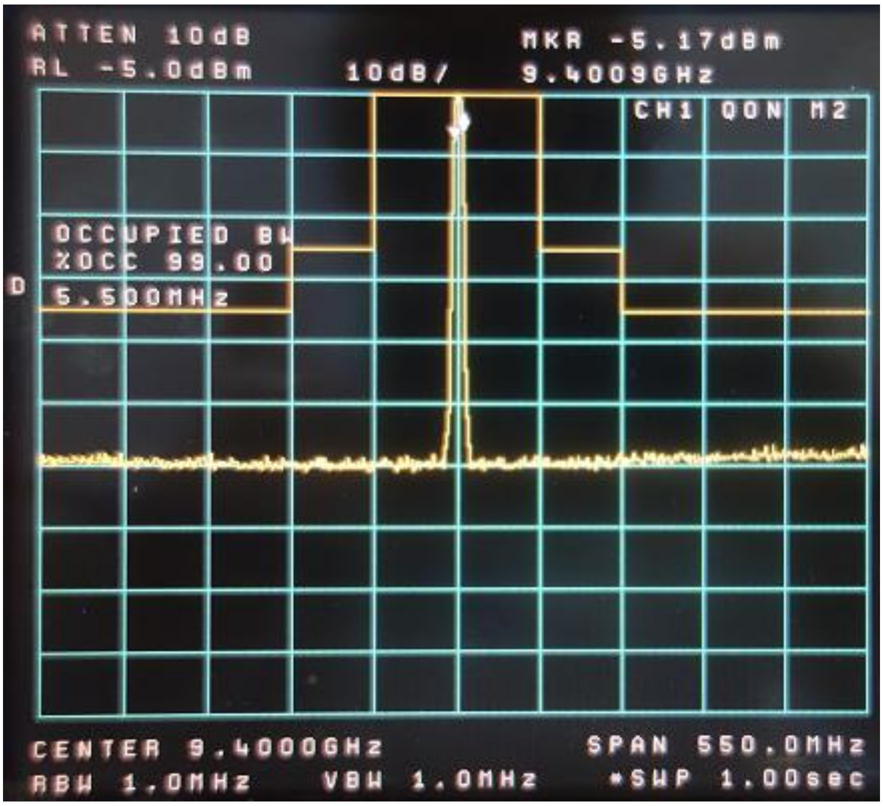
Limit

Fig. 7.1.8 ch1, Q0N, S2 pulse



Limit

Fig. 7.1.9 ch1, Q0N, M1 pulse



Limit

Fig. 7.1.10 ch1, Q0N, M2 pulse

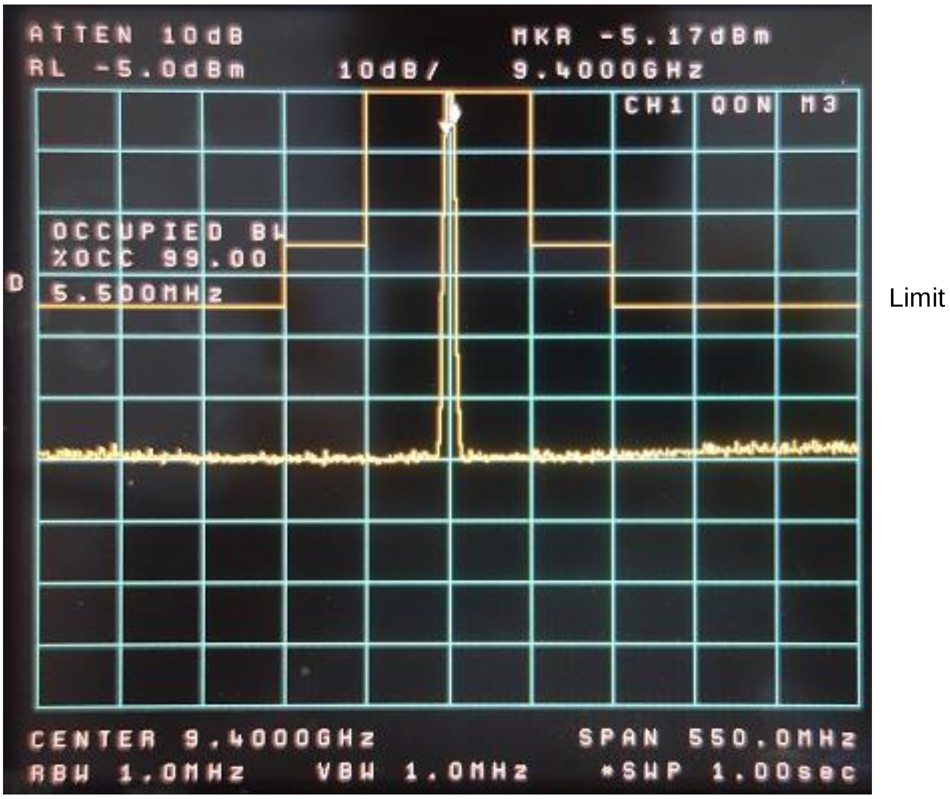


Fig. 7.1.11 ch1, Q0N, M3 pulse

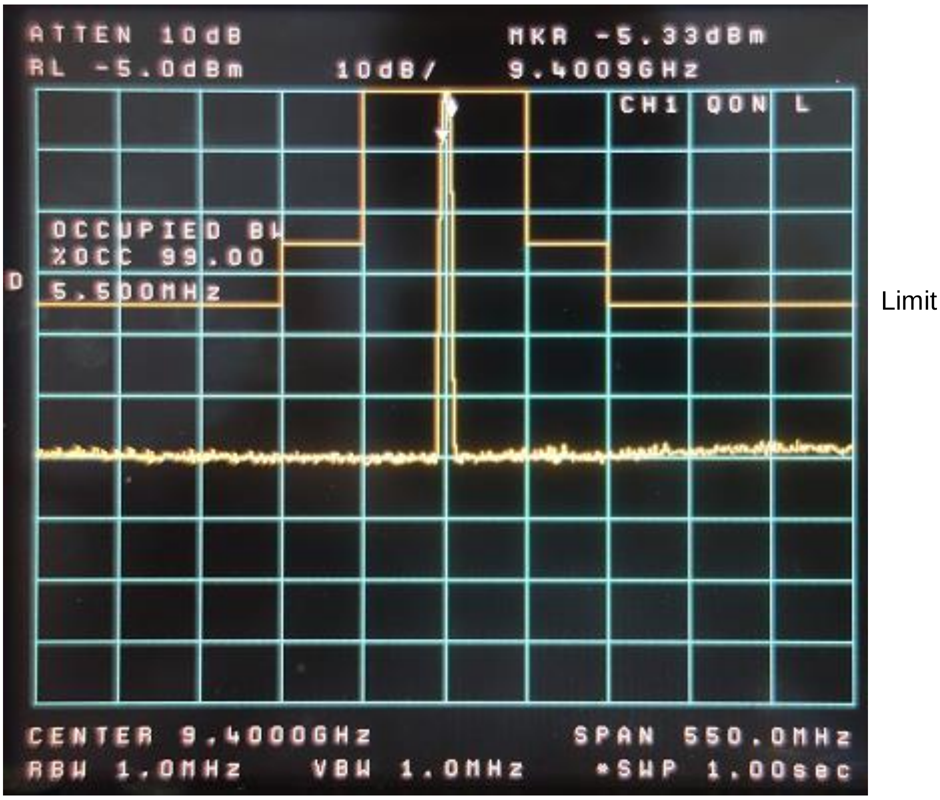
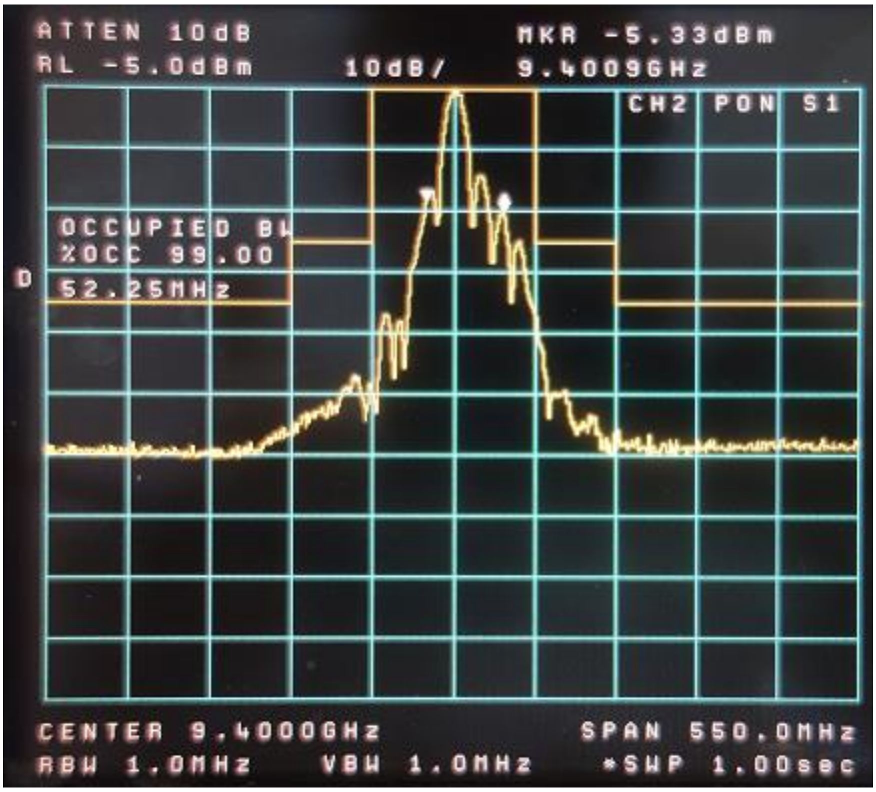


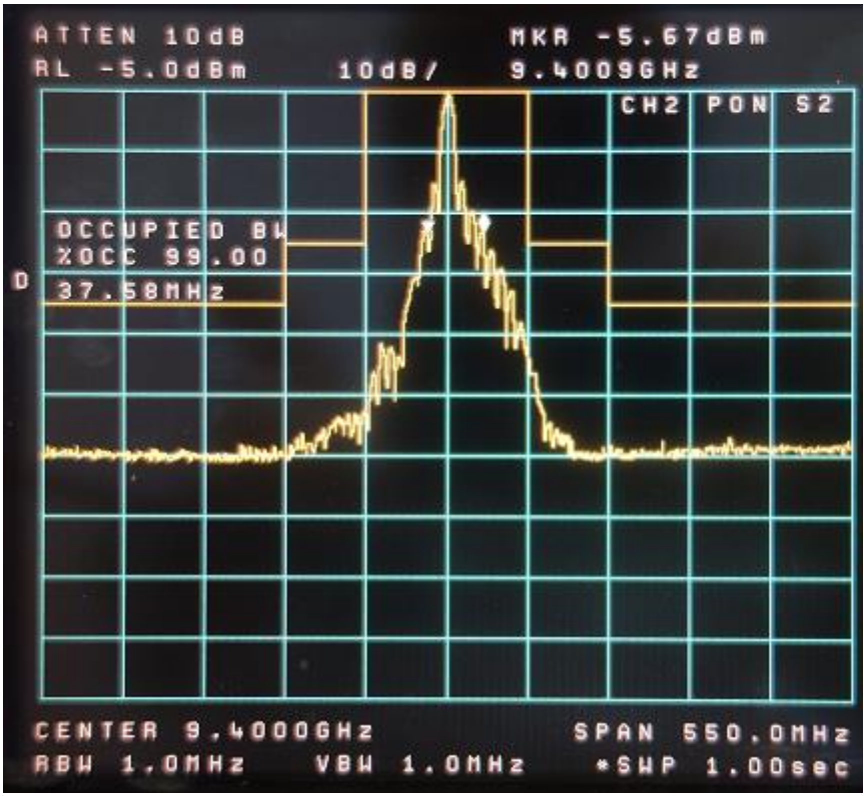
Fig. 7.1.12 ch1, Q0N, L pulse

ch2, P0N



Limit

Fig. 7.1.13 ch2, P0N, S1 pulse



Limit

Fig. 7.1.14 ch2, P0N, S2 pulse

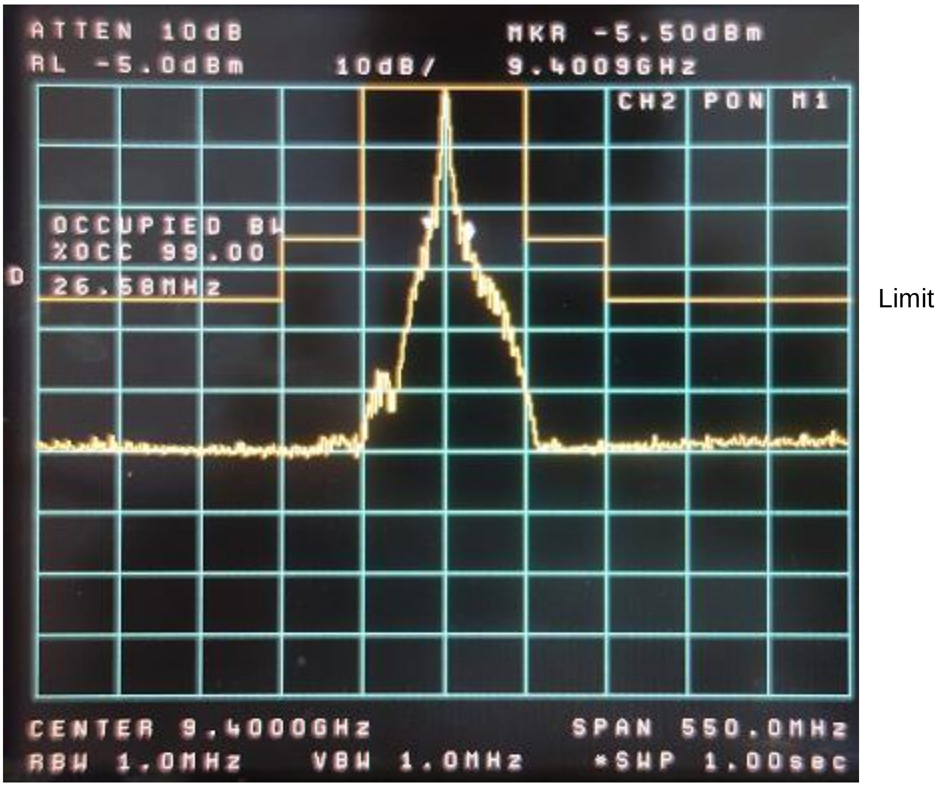


Fig. 7.1.15 ch2, P0N, M1 pulse

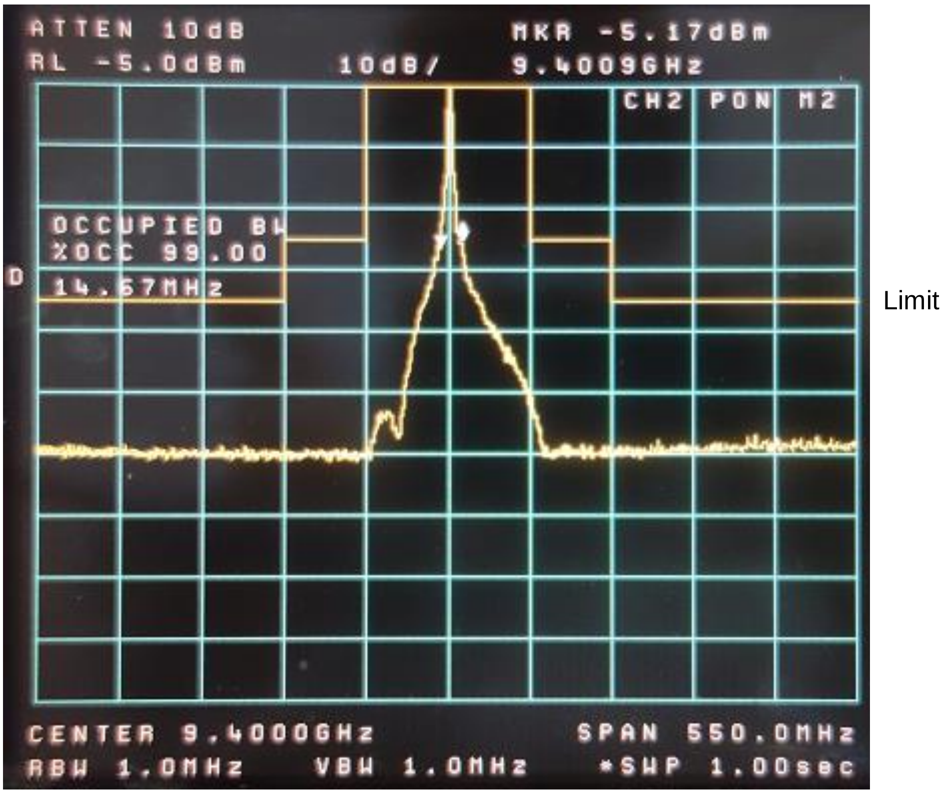
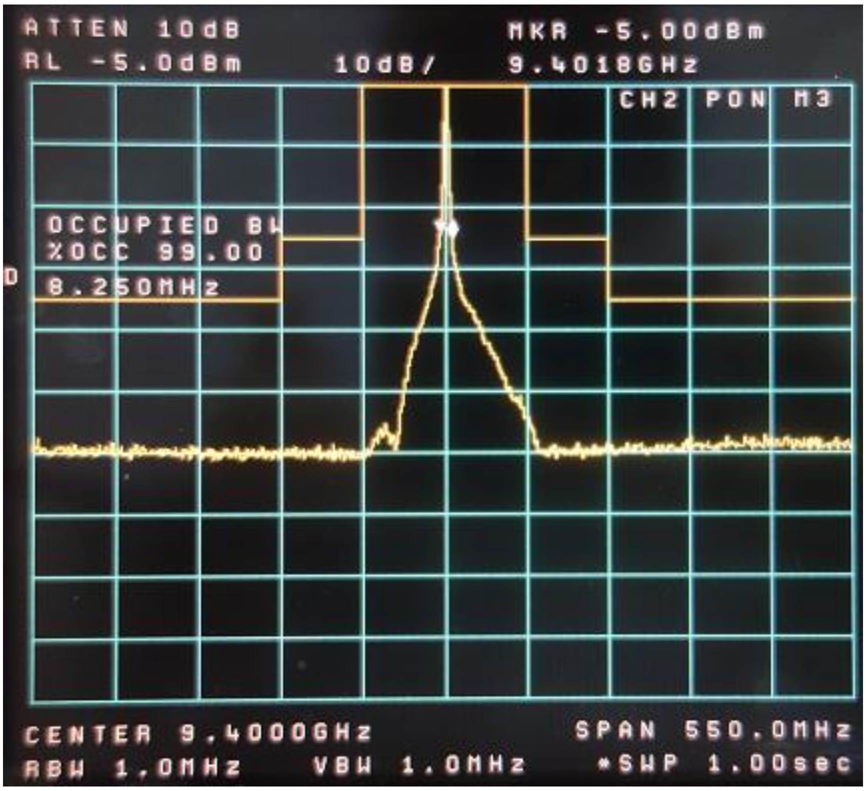
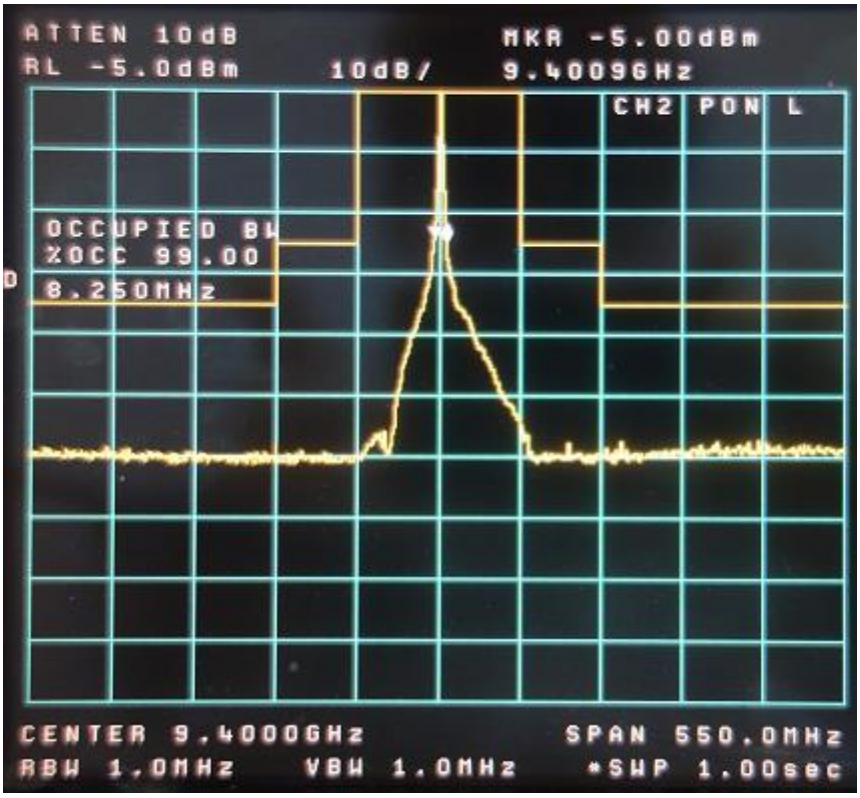


Fig. 7.1.16 ch2, P0N, M2 pulse



Limit

Fig. 7.1.17 ch2, P0N, M3 pulse



Limit

Fig. 7.1.18 ch2, P0N, L pulse

ch2, Q0N

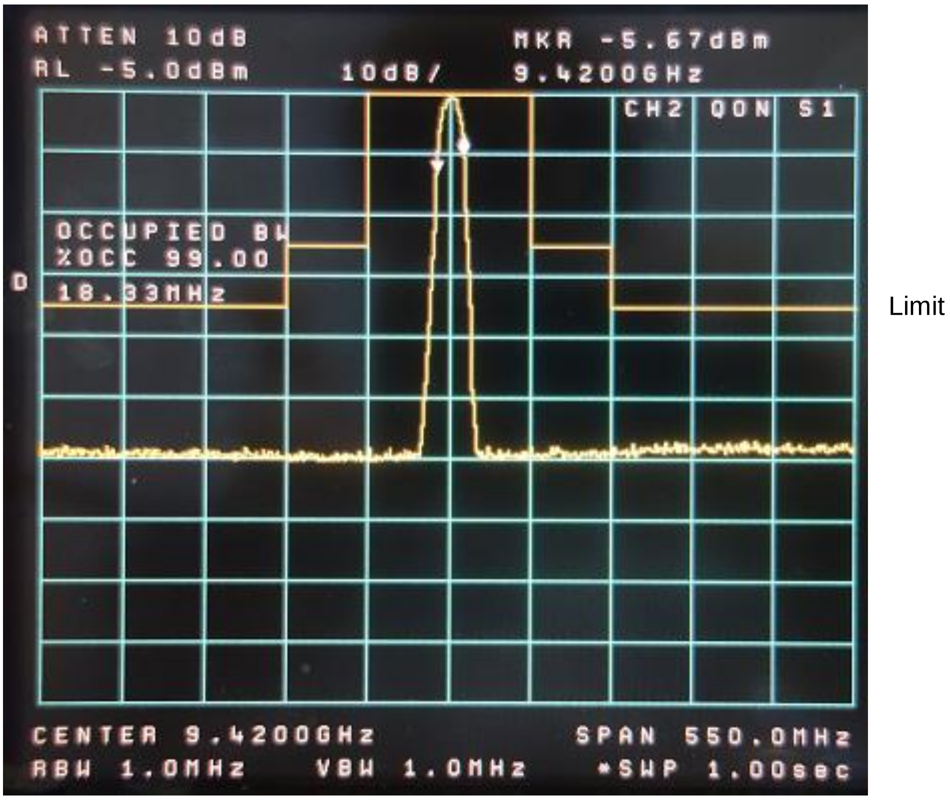


Fig. 7.1.19 ch2, Q0N, S1 pulse

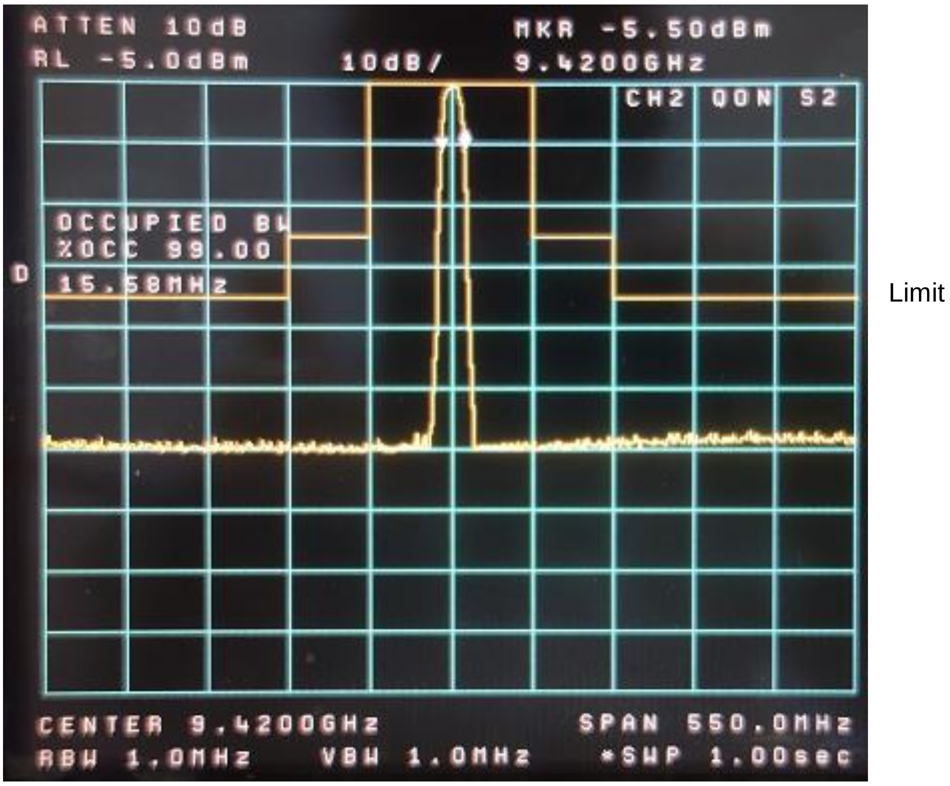


Fig. 7.1.20 ch2, Q0N, S2 pulse

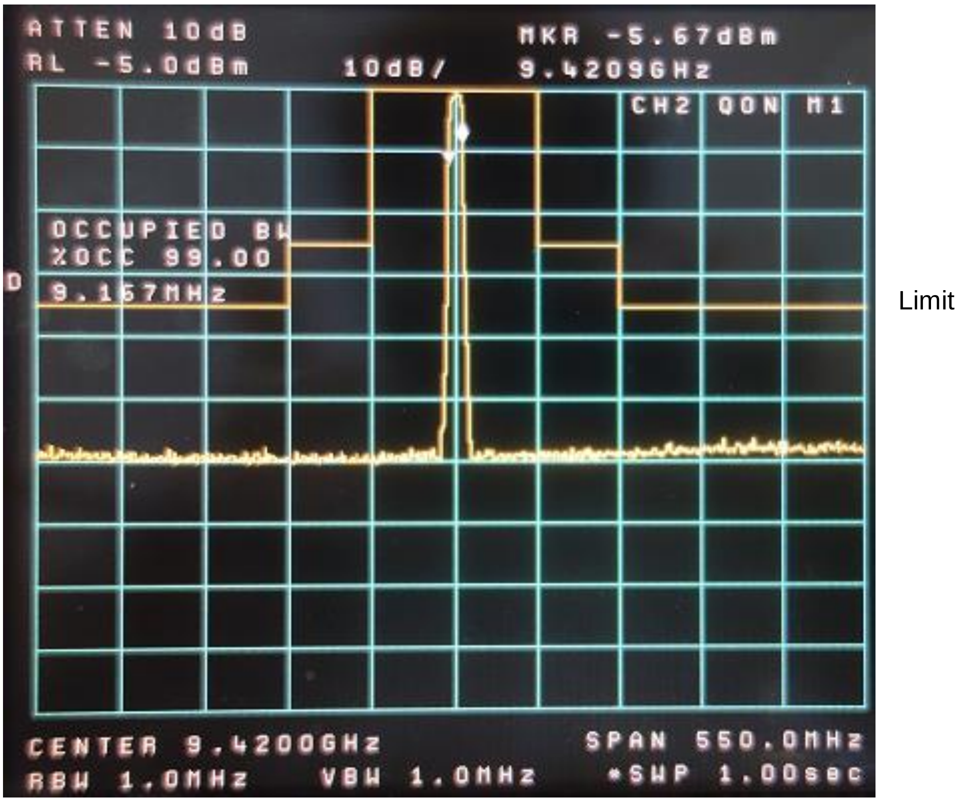


Fig. 7.1.21 ch2, Q0N, M1 pulse

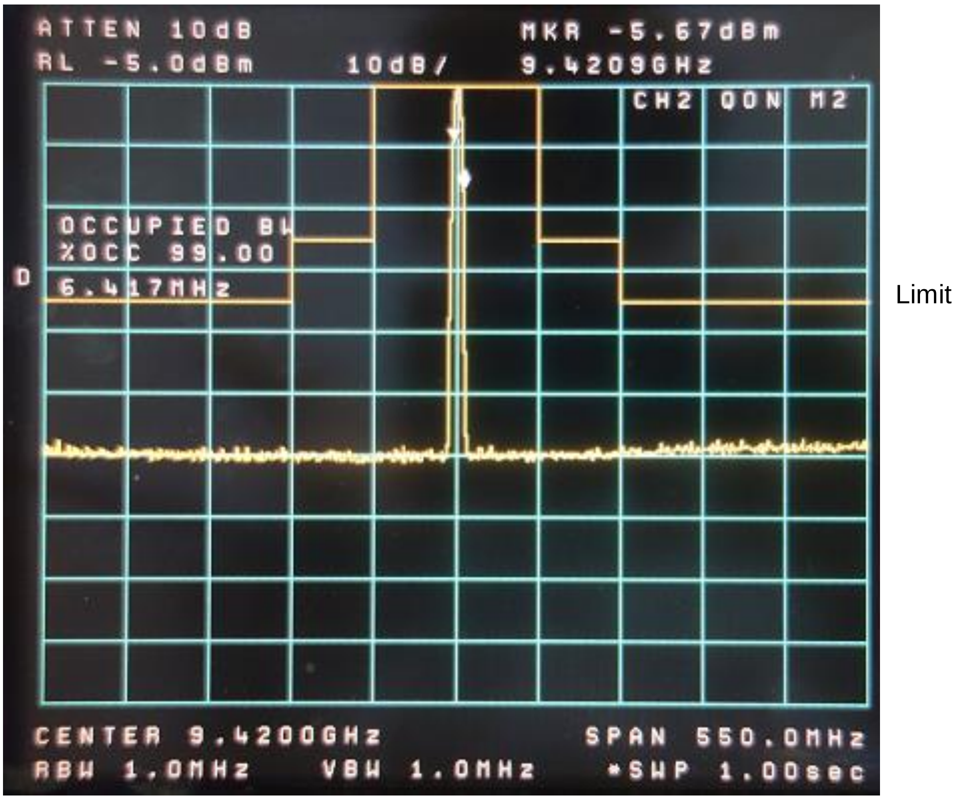
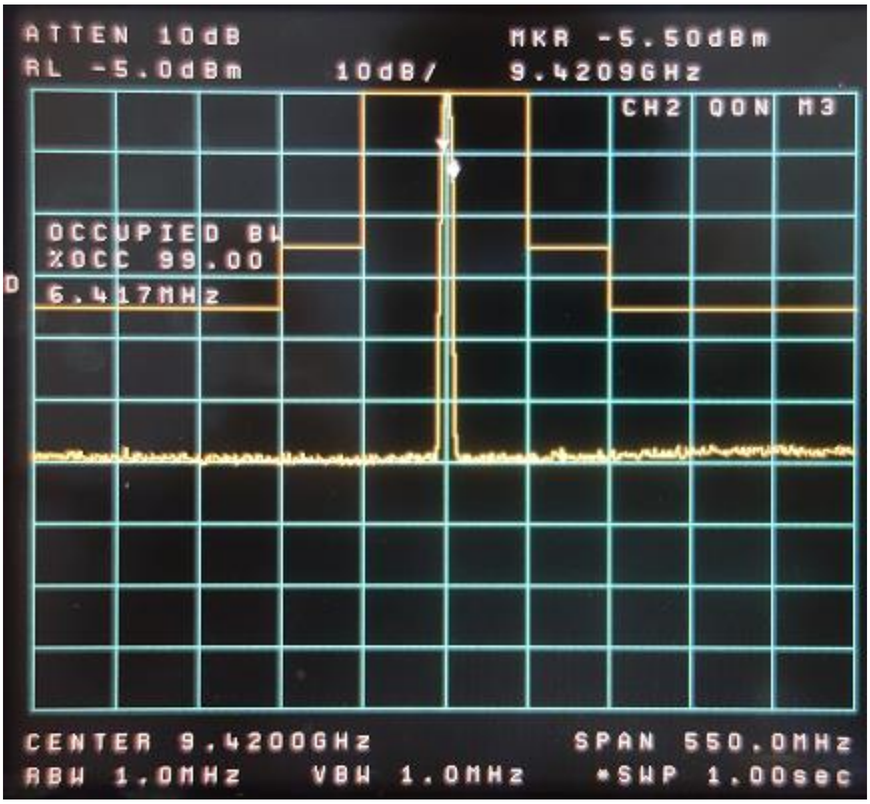
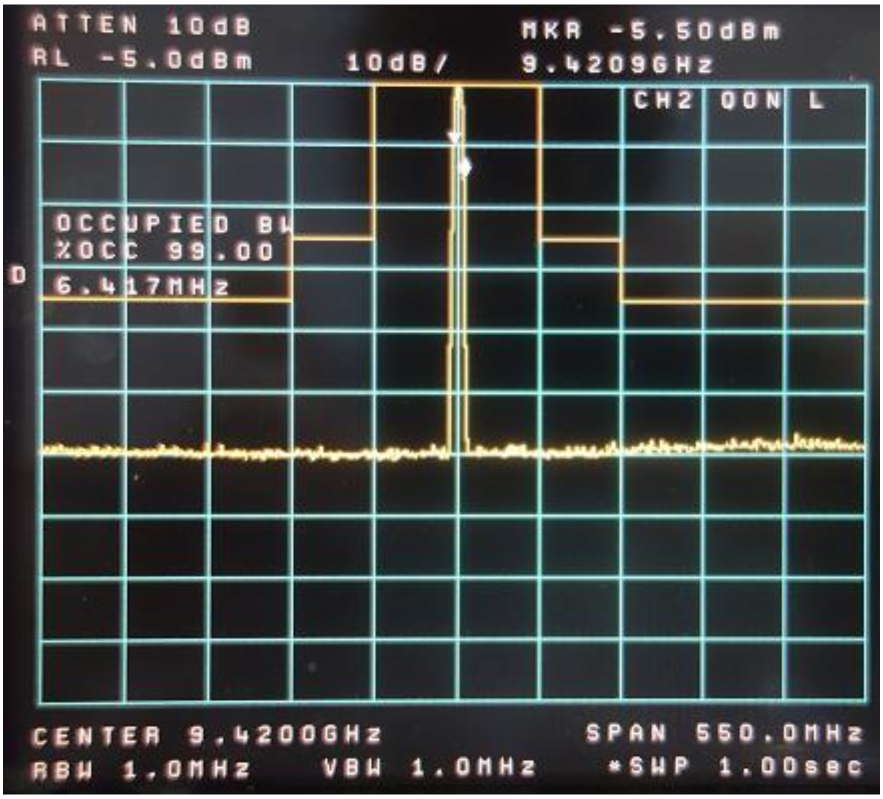


Fig. 7.1.22 ch2, Q0N, M2 pulse



Limit

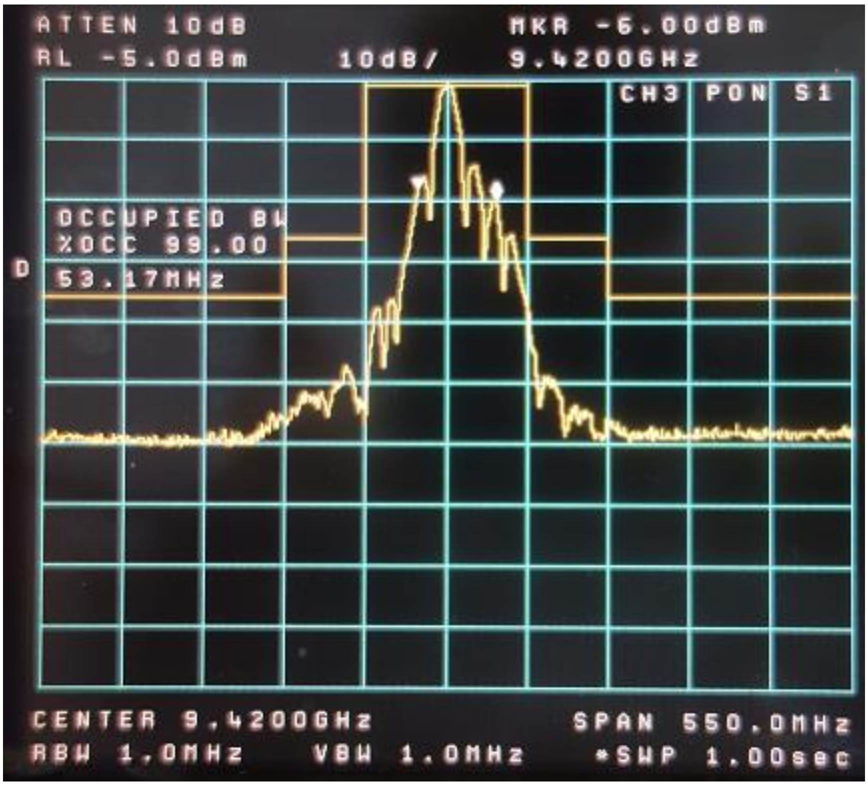
Fig. 7.1.23 ch2, Q0N, M3 pulse



Limit

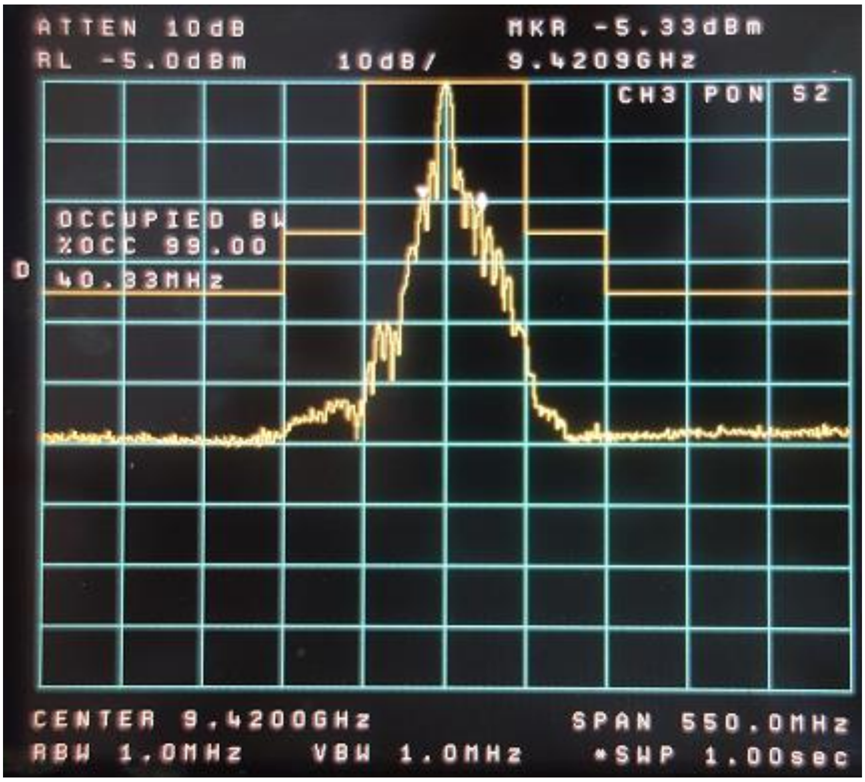
Fig. 7.1.24 ch2, Q0N, L pulse

ch3, P0N



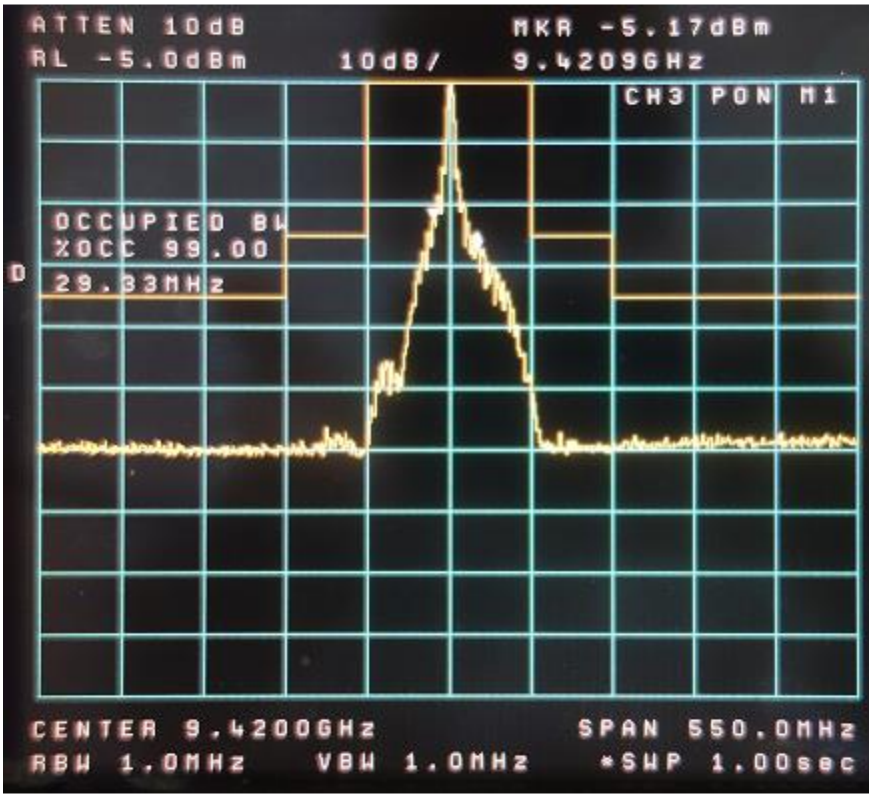
Limit

Fig. 7.1.25 ch3, P0N, S1 pulse



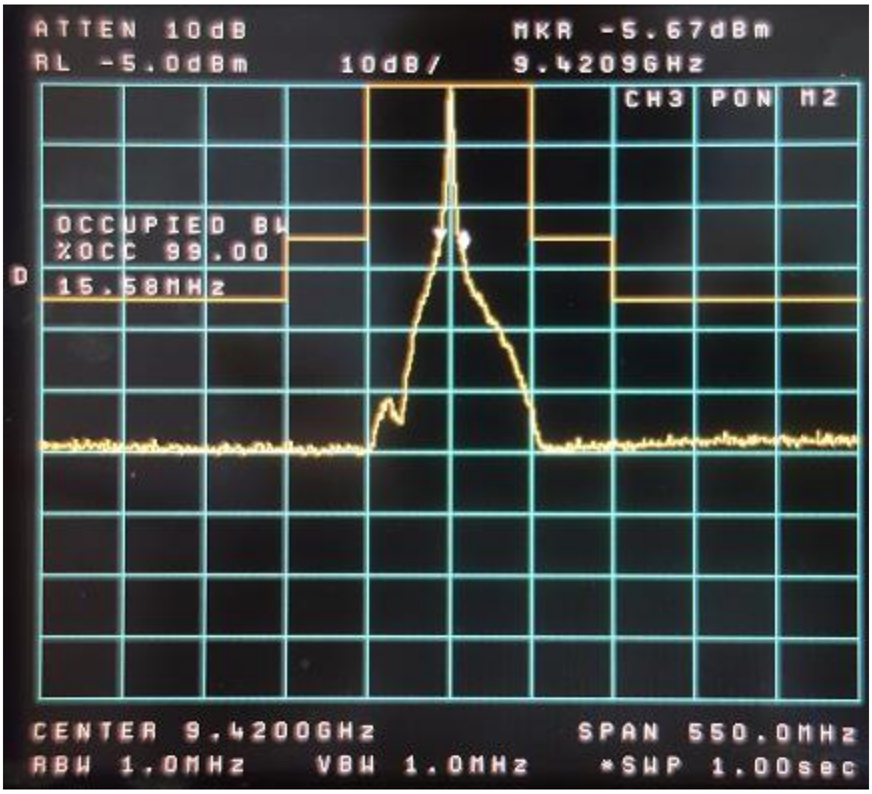
Limit

Fig. 7.1.26 ch3, P0N, S2 pulse



Limit

Fig. 7.1.27 ch3, P0N, M1 pulse



Limit

Fig. 7.1.28 ch3, P0N, M2 pulse

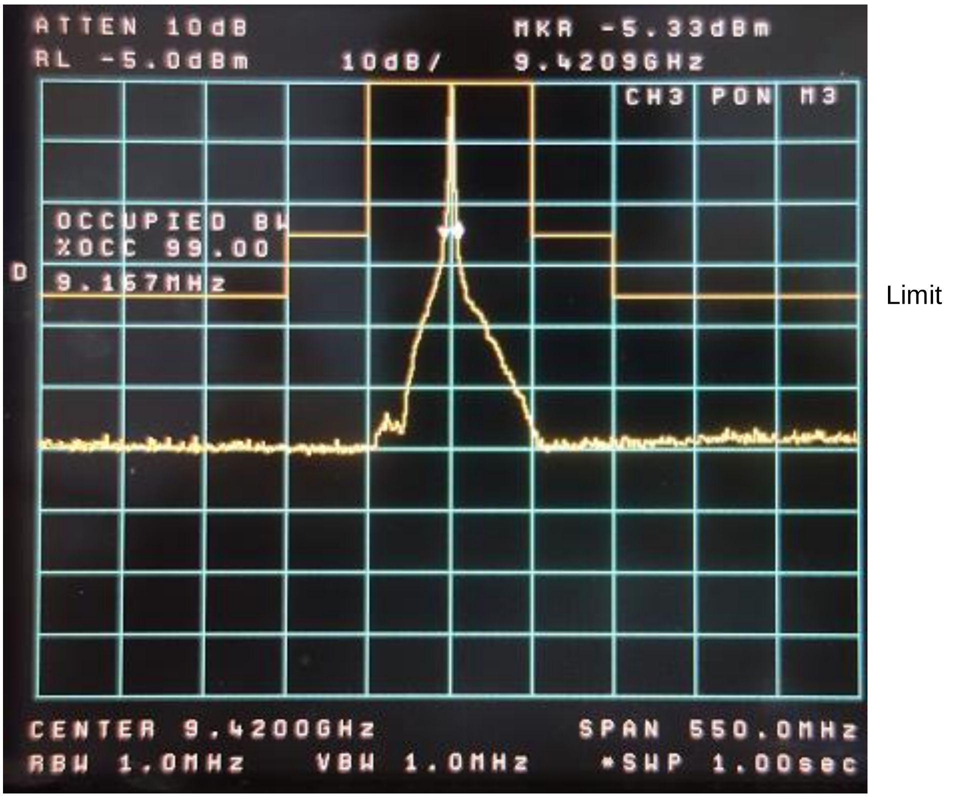


Fig. 7.1.29 ch3, P0N, M3 pulse

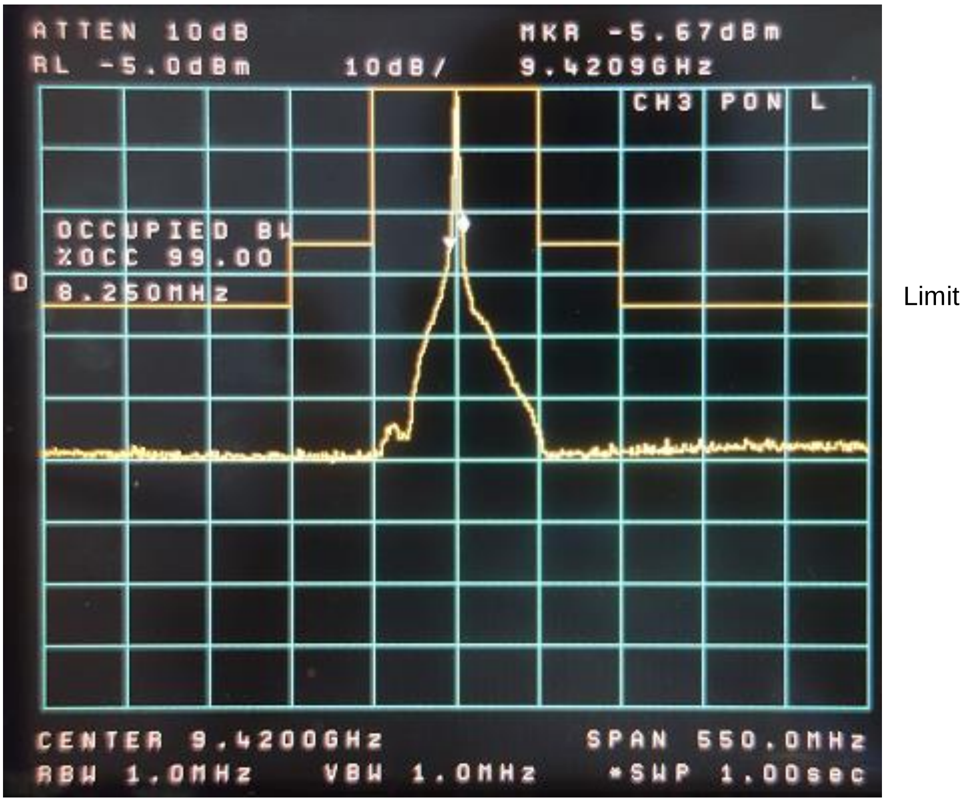


Fig. 7.1.30 ch3, P0N, L pulse

ch3, Q0N

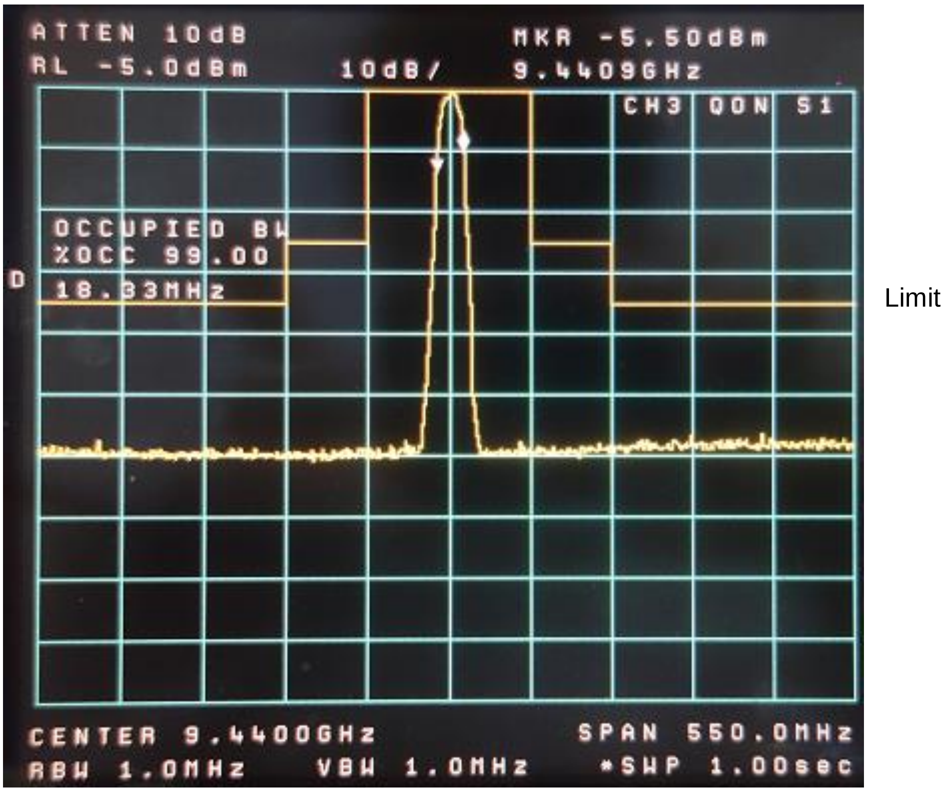


Fig. 7.1.31 ch3, Q0N, S1 pulse

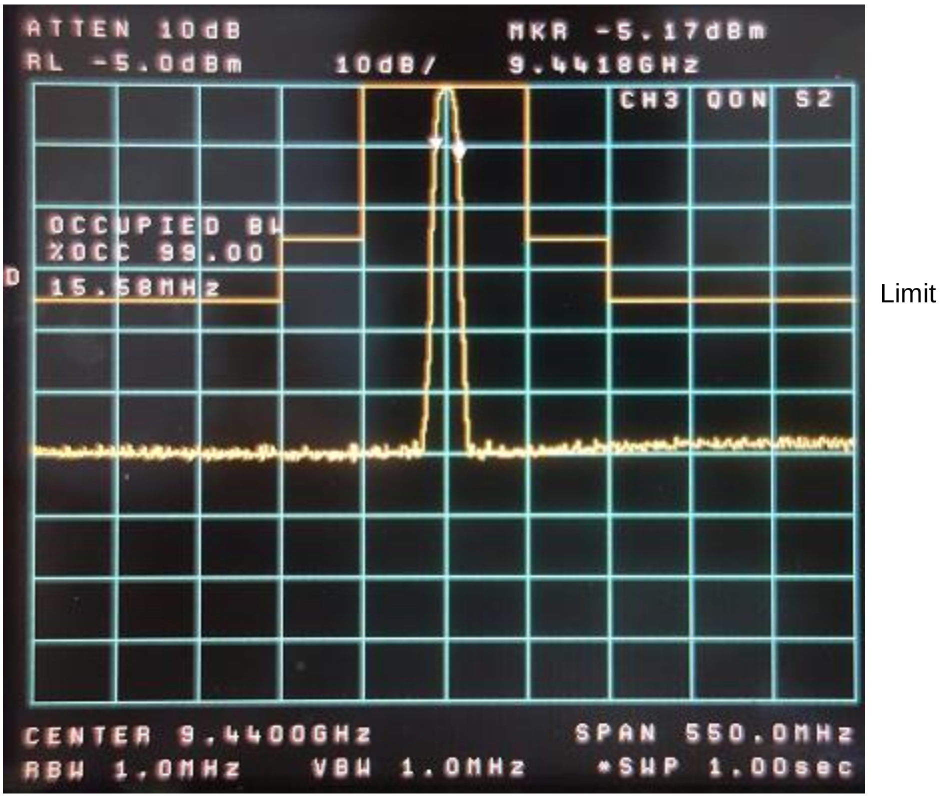
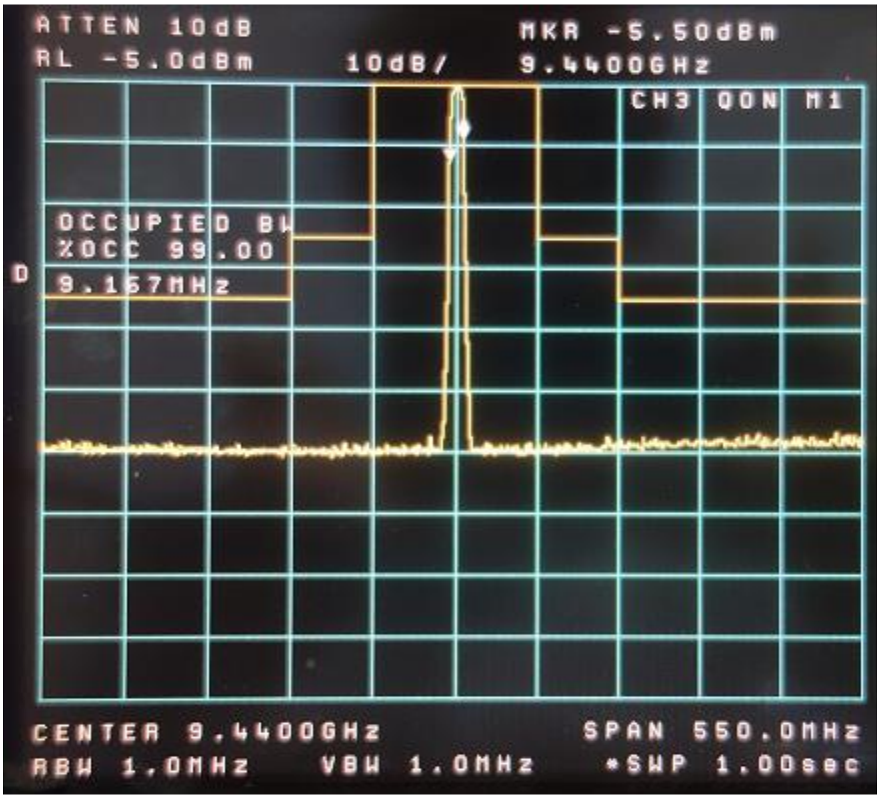
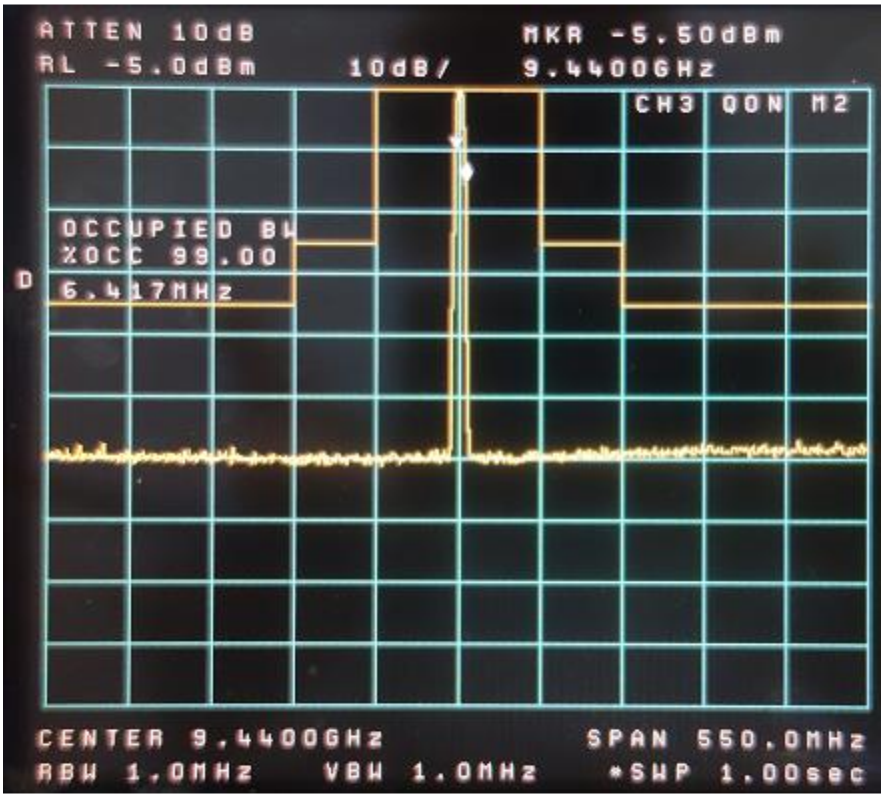


Fig. 7.1.32 ch3, Q0N, S2 pulse



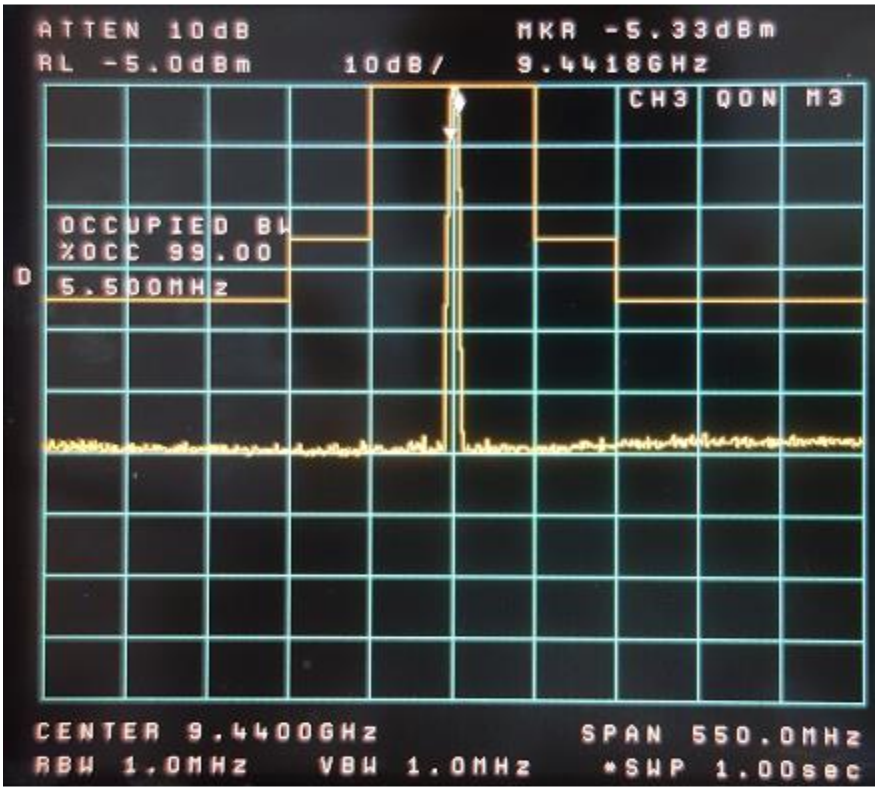
Limit

Fig. 7.1.33 ch3, Q0N, M1 pulse



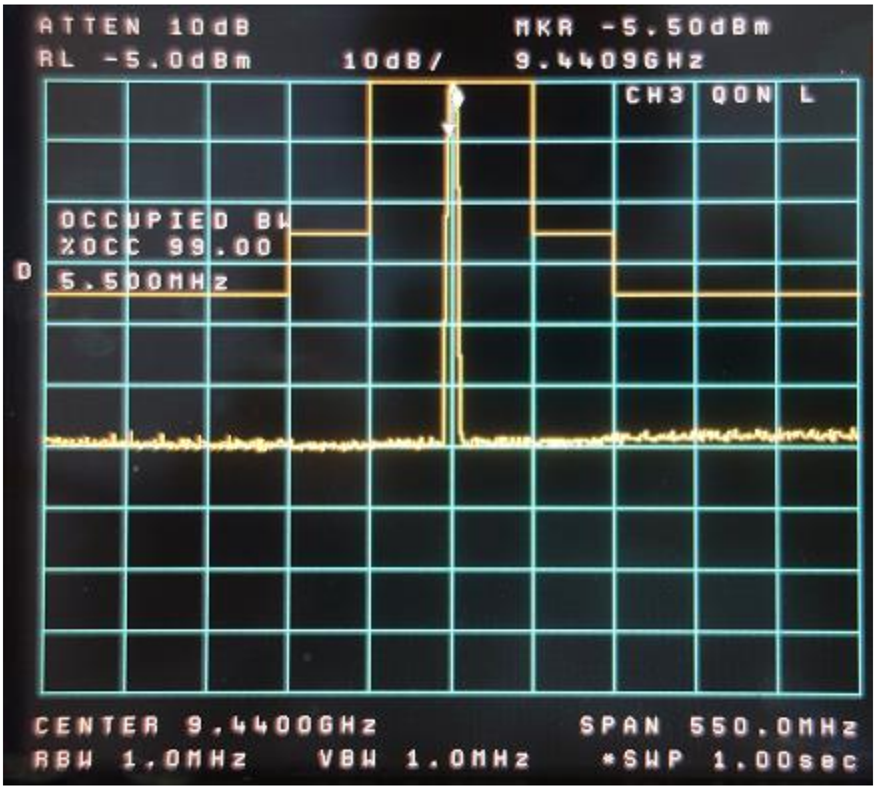
Limit

Fig. 7.1.34 ch3, Q0N, M2 pulse



Limit

Fig. 7.1.35 ch3, Q0N, M3 pulse



Limit

Fig. 7.1.36 ch3, Q0N, L pulse

7.2 Spurious Emissions

ch1, P0N+Q0N

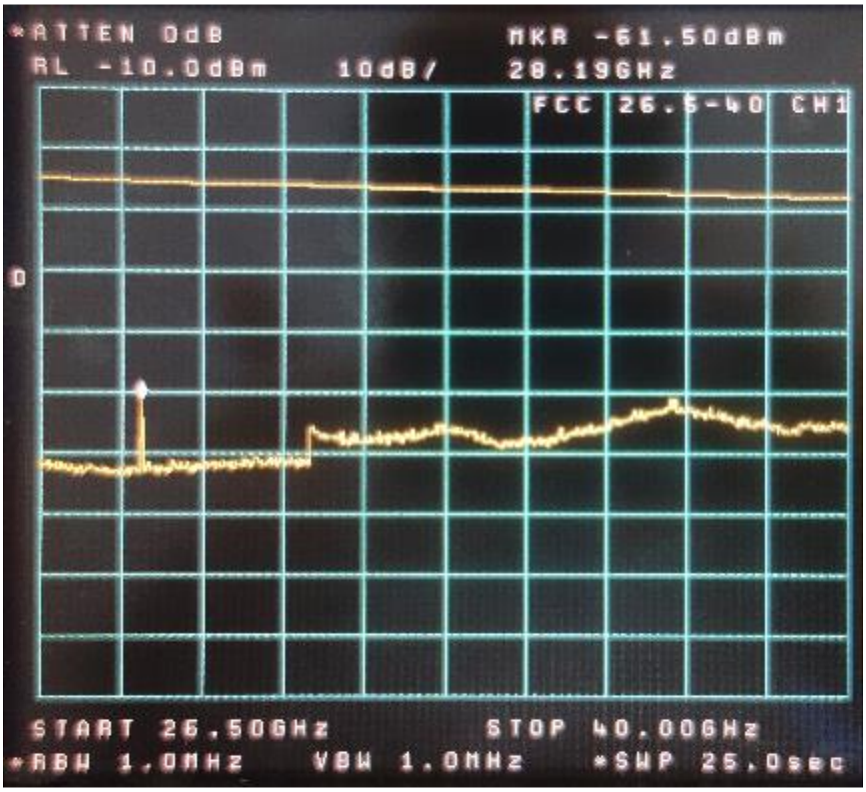


Fig. 7.2.1 ch1, Peak

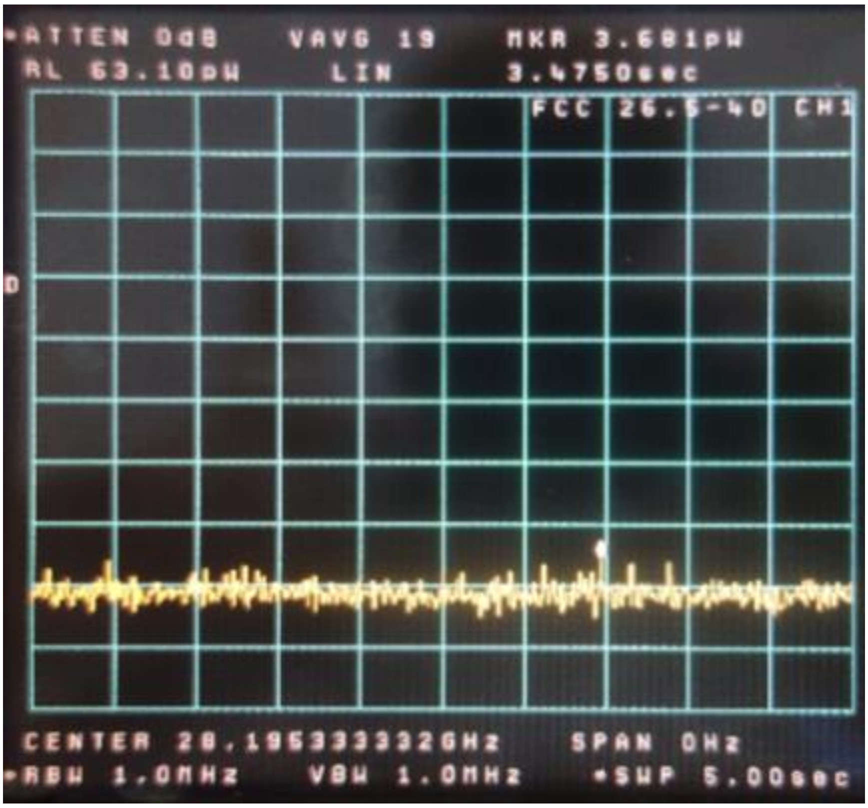


Fig. 7.2.2 ch1, Average

ch2, P0N+Q0N

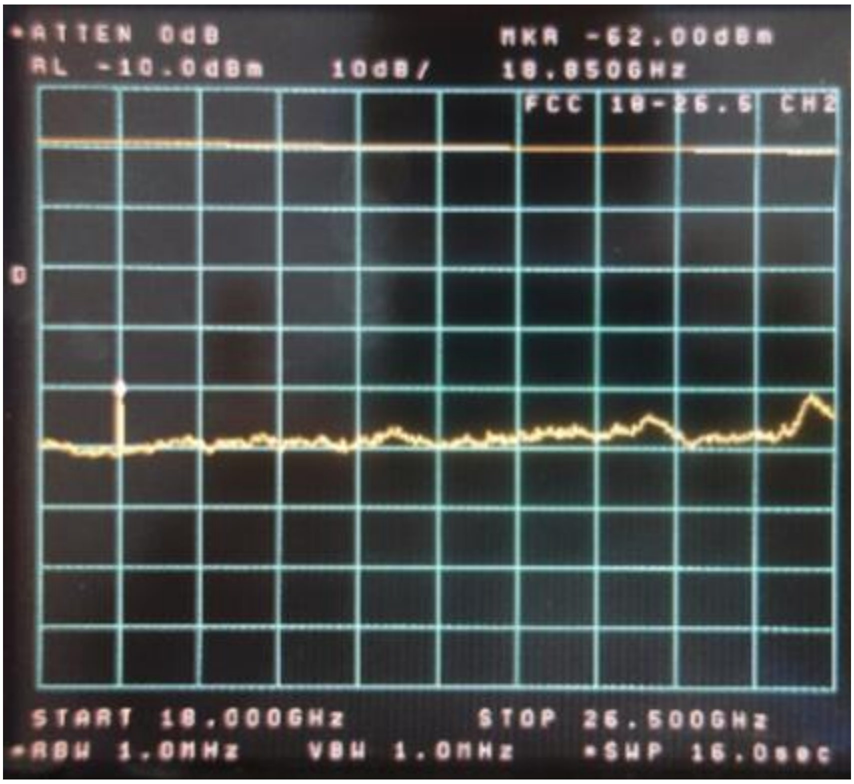


Fig. 7.2.3 ch2, Peak

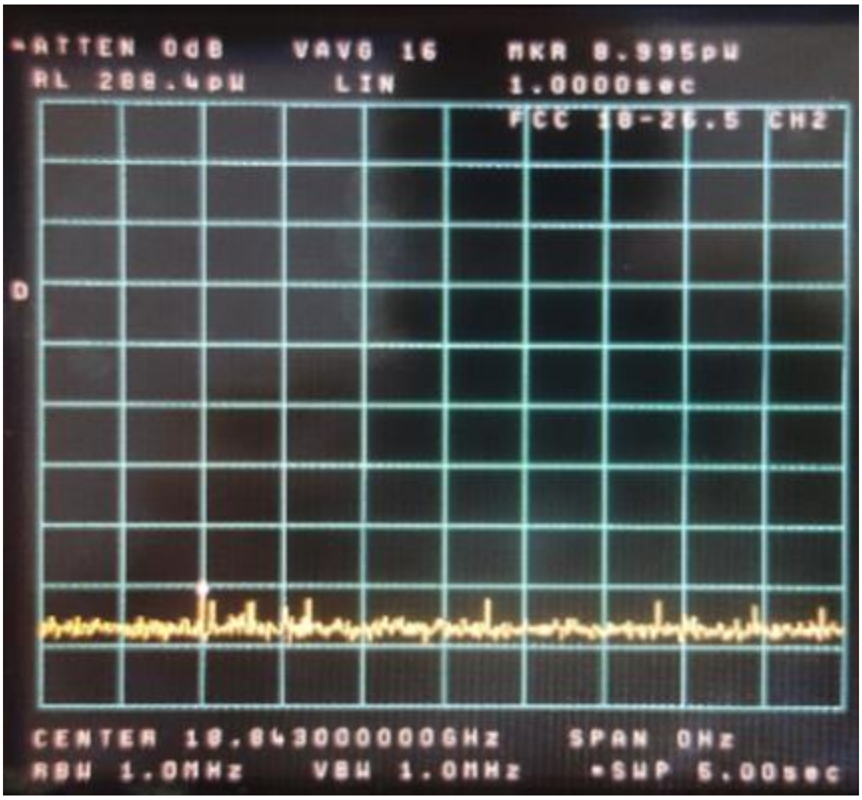


Fig. 7.2.4 ch2, Average

ch3, P0N+Q0N

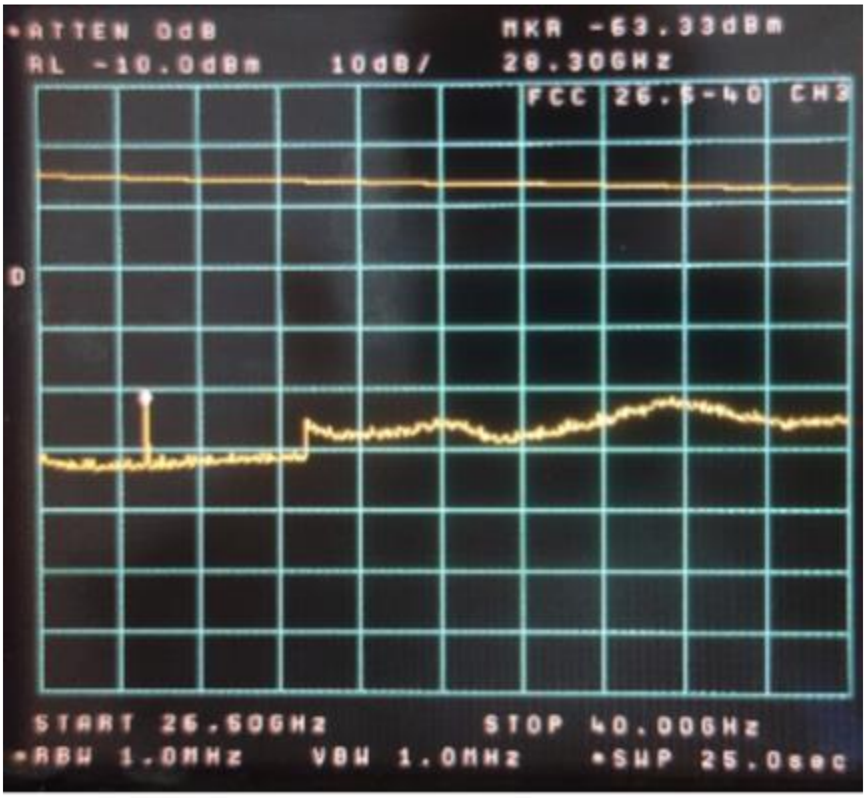


Fig. 7.2.5 ch3, Peak

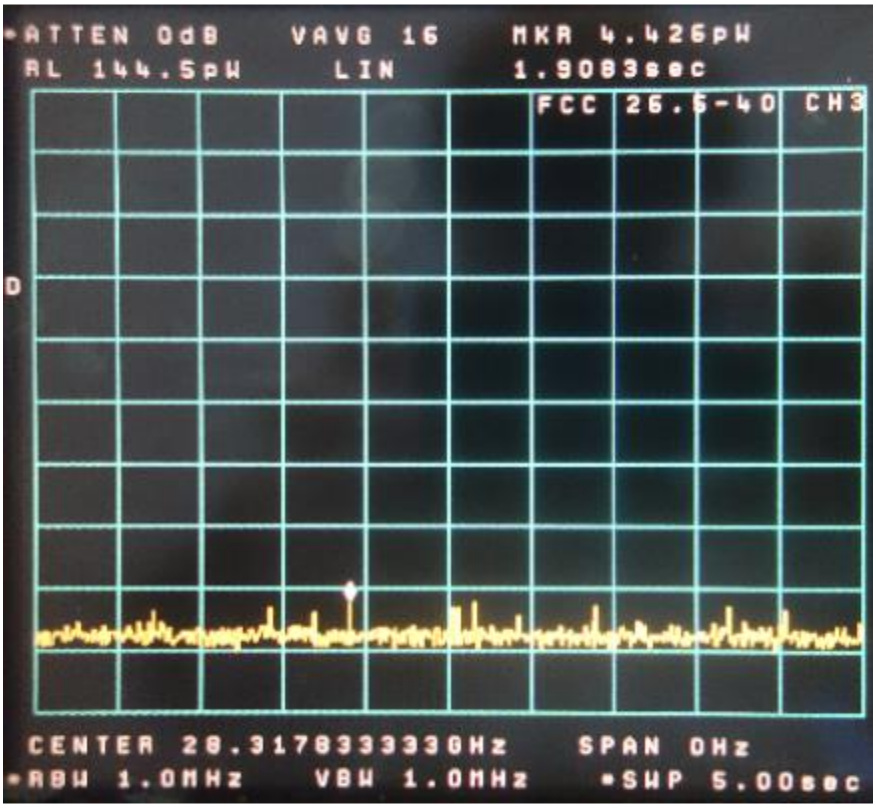


Fig. 7.2.6 ch3, Average

8 Field Strength of Spurious Radiation Plots measured in the Spurious domain

8.1 Measured maximum emission value

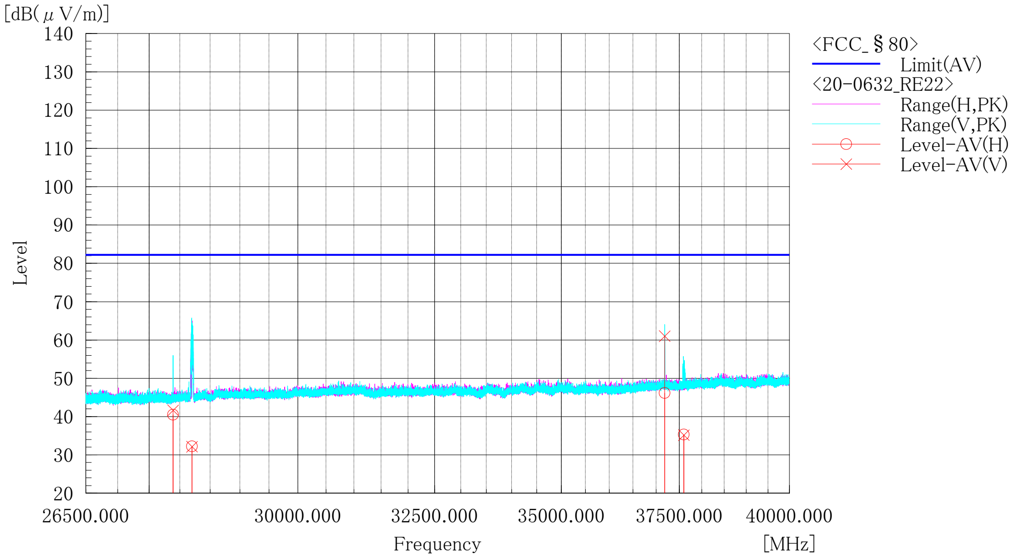
ch1

LABOTECH

<<Results of Radiated Emission>>

21 January,2021 10:23

Type_Name	: DRS2D-NXT	Limit	: FCC 47 CFR §80
Serial No.	: 1001-3600-0001	Memo1	: ch1_P0N+Q0N
Operator	: A.Takagi/Y.Hijiri	Memo2	:
Power_Supply	: 24VDC	Memo3	:
deg/%RH	: 21/34	Memo4	:



Final Result

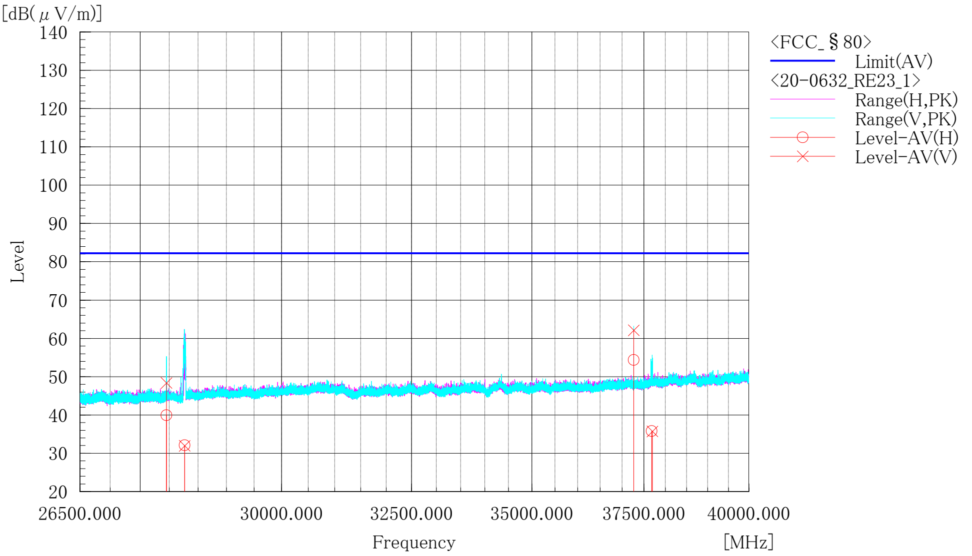
No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin AV [dB]	Height [cm]	Angle [°]
1	27888.270	H	62.44	-21.98	40.46	82.2	41.7	174.0	233.0
2	28200.050	H	55.48	-23.26	32.22	82.2	50.0	161.0	176.0
3	37183.940	H	60.93	-14.76	46.17	82.2	36.0	174.0	54.0
4	37600.300	H	50.35	-15.03	35.32	82.2	46.9	311.0	323.0
5	27888.200	V	63.61	-21.98	41.63	82.2	40.6	143.0	299.0
6	28200.190	V	55.41	-23.26	32.15	82.2	50.0	170.0	91.0
7	37184.340	V	75.79	-14.76	61.03	82.2	21.2	165.0	2.0
8	37602.620	V	50.21	-15.03	35.18	82.2	47.0	200.0	117.0

ch2

LABOTECH <<Results of Radiated Emission>> 21 January,2021 12:31

Type_Name : DRS2D-NXT
Serial No. : 1001-3600-0001
Operator : A.Takagi/Y.Hijiri
Power_Supply : 24VDC
deg/%RH : 21/34

Limit : FCC 47 CFR §80
Memo1 : ch2_P0N+Q0N
Memo2 :
Memo3 :
Memo4 :



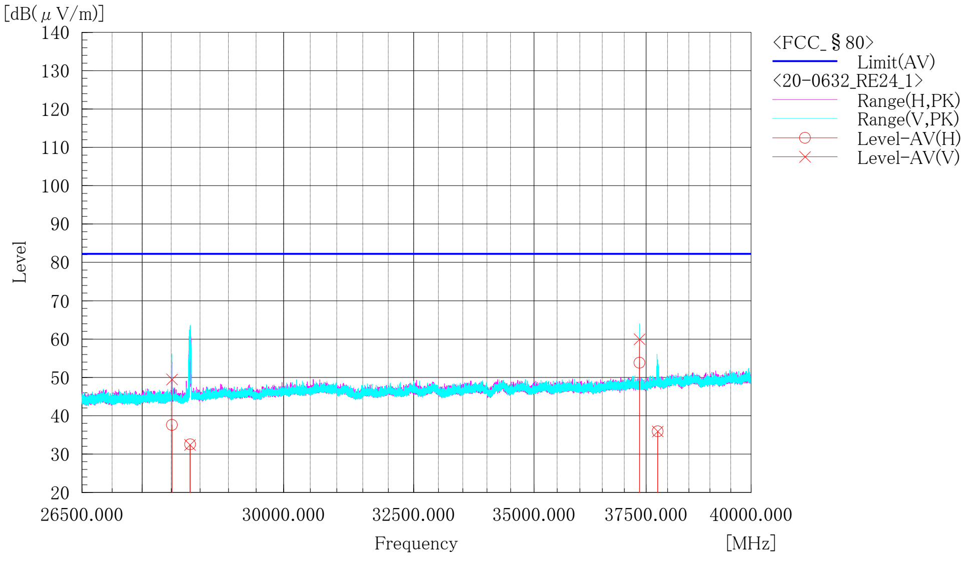
Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin AV [dB]	Height [cm]	Angle [°]
1	27948.640	H	61.84	-21.90	39.94	82.2	42.3	153.0	248.0
2	28262.710	H	55.32	-23.23	32.09	82.2	50.1	148.0	40.0
3	37265.020	H	69.06	-14.67	54.39	82.2	27.8	165.0	49.0
4	37679.490	H	50.87	-15.10	35.77	82.2	46.4	100.0	19.0
5	27948.660	V	70.28	-21.90	48.38	82.2	33.8	207.0	115.0
6	28263.350	V	55.20	-23.23	31.97	82.2	50.2	154.0	218.0
7	37264.880	V	76.79	-14.68	62.11	82.2	20.1	164.0	3.0
8	37693.050	V	50.91	-15.19	35.72	82.2	46.5	106.0	60.0

ch3

LABOTECH <<Results of Radiated Emission>> 21 January,2021 13:46

Type_Name	: DRS2D-NXT	Limit	: FCC 47 CFR §80
Serial No.	: 1001-3600-0001	Memo1	: ch3_P0N+Q0N
Operator	: A.Takagi/Y.Hijiri	Memo2	:
Power_Supply	: 24VDC	Memo3	:
deg/%RH	: 21/34	Memo4	:



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin AV [dB]	Height [cm]	Angle [°]
1	28008.940	H	59.62	-22.07	37.55	82.2	44.6	174.0	55.0
2	28324.060	H	55.42	-22.92	32.50	82.2	49.7	172.0	19.0
3	37344.630	H	68.34	-14.53	53.81	82.2	28.4	160.0	49.0
4	37764.500	H	51.22	-15.28	35.94	82.2	46.3	153.0	19.0
5	28008.430	V	71.54	-22.07	49.47	82.2	32.7	156.0	19.0
6	28319.950	V	55.36	-22.94	32.42	82.2	49.8	136.0	294.0
7	37344.830	V	74.53	-14.53	60.00	82.2	22.2	152.0	49.0
8	37763.500	V	51.21	-15.27	35.94	82.2	46.3	189.0	106.0

End of text