Test Report

FCC Rules 47 CFR
Part 2 (2.201, 2.202, 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055),
Part 80 (80.209, 80.211, 80.273),
Part 90 (90.205, 90.207, 90.209, 90.210, 90.213, 90.215),
Canada RSS-238

for

Trade name: Furuno
Model: Transceiver unit
Type: RTR-116

Report no.: LIC 12-18-048

Date of issue: 24 April 2018

Labotech International Co., Ltd.
1-16, Fukazu-cho, Nishinomiya-shi, Hyogo, 663-8203 Japan
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Report Summary

LIC project number:	LIC 04-17-0278		
Test report number of initial issue:	LIC 12-18-048	Date of initial issue	24 April 2018
Test report number of revised/replaced issue:	--	Date of revised/replaced issue	--
Test report revision/ replacement history:	--		
Test standards/Test specifications:	FCC Rules 47 CFR, 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 80.273 - Radar standards 90.205 - Power and antenna height limits 90.207 - Types of emissions 90.209 - Bandwidth limitations 90.210 - Emission masks 90.213 - Frequency stability 90.215 - Transmitter measurements RSS-238 Issue 1, July 2013 – Industry Canada Radio Standards Specification – Shipborne Radar in the 2900-3100 MHz and 9225-9500 MHz bands. RSS-Gen Issue 4, November 2014 – General Requirements for Compliance of Radio Apparatus		
Customer:	Furuno Electric Co., Ltd. 9-52 Ashihara-Cho, Nishinomiya-City, 662-8580 Japan		
Manufacturer:	Furuno Electric Co., Ltd. 9-52 Ashihara-Cho, Nishinomiya-City, 662-8580 Japan		
Trade name:	Furuno		
Model:	Transceiver unit		
Type:	RTR-116		
Product function and intended use:	Surveillance Radar (Coastal Surveillance, Vessel Traffic Services and Harbor Radar (CS/VTS/HR))		
Number of samples tested:	One		
Serial number:	R000-1800-0001		
Power rating:	100–230 VAC, 50–60 Hz, 0.8 A		
Product status:	Pre-production model		
Modifications made to samples during testing:	None		
Date of receipt of samples:	16 March 2018		
Test period:	From 19 March 2018 to 9 April 2018		
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-Hama Lab. 2-20, Nishinomiya-Hama, Nishinomiya-shi, Hyogo, 662-0934 Japan		

Test results/ Compliance:	Passed. The test results of this report relate only to the samples tested.
Tested by:	Yuya Katoh and Koji Kawai
Written by:	Shozo Hasegawa
Verified by:	Atsushi Takagi
Approved by:	24 April 2018 Name: Atsushi Takagi Title: Manager, Technical Department, Labotech International Co., Ltd. Signature: 

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 tests 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 and IEC 62288

(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:
  EN 55011, CISPR 11, EN 55012, CISPR 12,EN 55022, CISPR 22, EN 55024, CISPR 24, EN 55025, CISPR 25, EN/IEC 61000-3-2/-3, EN/IEC 61000-4-2/-3/-4/-5/-6/-8/-11, EN/IEC 61000-6-1/-2/-3/-4, EN/IEC 60945, EN/IEC 61326-1, EN/IEC 61326-2-6, EN/IEC 60601-1-2, JIS T 0601-1-2, JIS C 1806-1, ISO 11452-1/-2/-4, EN ISO 14982, IEC 62236-3-2, EN 50121-3-2.

(4) RMRS Recognized Testing Laboratory:
- recognized by Russian Maritime Register of Shipping (RMRS), (Russia)
- Laboratory recognition number: 11.02594.011
- 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 (RRR), (Russia)
- Recognition certificate number: 154262 (*)
- 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 (DNV GL), (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

Note: (*) – The current certificates may be found in the LIC web site (http://www.labotech-intl.co.jp/).

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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, 662-8580 Japan

(c) Model:

	Type	Serial Number
Transceiver unit	RTR-116	R000-1800-0001

(d) FCC ID/IC certification number: FCC: ADB9ZWRTR116 / IC: 1281B-RTR116

(e) Primary function: Surveillance Radar
(Coastal Surveillance, Vessel Traffic Services and Harbor Radar (CS/VTS/HR))

(f) Frequency range: Fixed frequency, X-band (9390-9460 MHz)
Type of emission: P0N/Q0N
(Emission designator)

(g) Occupied bandwidth:

Pulse type		S1	S2	M1	M2	M3	L
Occupied bandwidth (MHz)	Ch1(P0N)	24.8	37.6	26.6	18.3	12.8	7.3
	Ch1(Q0N)	22.0	14.7	9.2	8.3	7.3	7.3
	Ch2(P0N)	25.7	37.6	26.6	18.3	12.8	7.3
	Ch2(Q0N)	22.9	15.6	9.2	7.3	7.3	7.3
	Ch3(P0N)	26.6	37.6	27.5	19.3	13.8	8.3
	Ch3(Q0N)	22.9	15.6	9.2	7.3	7.3	7.3

Note: representative measured data.

(h) Size and mass: 484 (W) × 447 (H) × 298 (D) (mm), 19.0 kg

(i) Power supply: 100–230 VAC, 50–60 Hz

1.1.2 Transceiver

Type: RTR-116

1.1.2.1 Transmitter

(a) Assignable frequency band: Between 9300 and 9500 MHz (FCC Rule, 90.103 (b))

(b) Type of RF generator:

Type: Solid-state device (no magnetron)

Peak output power: 200 W nominal

(c) Tx frequency:

Ch1: 9403.75 MHz (P0N)/ 9423.75 MHz (Q0N)

Ch2: 9413.75 MHz (P0N)/ 9433.75 MHz (Q0N)

Ch3: 9423.75 MHz (P0N)/ 9443.75 MHz (Q0N)

(d) Pulse characteristics:

Pulse type	S1	S2	M1	M2	M3	L
Pulse length (μs) P0N/Q0N	0.06/4.68	0.15/7.02	0.3/11.7	0.5/16.38	0.7/17.13	1.2/17.13
P.R.F.(Hz)	2400	2000	1500	1060	1000	600

1.1.2.2 Receiver

(a) Passband

RF stage:	40 MHz
IF stage:	40 MHz

(b) Intermediate frequency:

1st IF (P0N) :	2073.75 MHz
1st IF (Q0N) :	2093.75 MHz
2nd IF (P0N) :	83.75 MHz
2nd IF (Q0N) :	103.75 MHz

(c) Gain (overall): Approximately 40 dB

(d) Overall noise figure: 4 dB (typical)

(e) Video output voltage: Not provided (by LAN communication)

(f) Features provided: Sensitivity Time Controls (Anti-clutter Sea)
Fast Time Constant (Anti-clutter Rain)

(g) If receiver is tunable, describe method for adjusting frequency: Not tunable.

1.1.3 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 (Display indicator)

(b) Is the equipment for continuous operation: Yes

(c) Is provision made for operation with shore based radar beacons (RACONS): No

1.1.4 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: Antenna Unit (IEC 60529 – IP56)

(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 antenna unit: Not applicable.

1.2 Observation and Comments

None.

2 Test Results Summary

Clause no. of this report	47 CFR Section and RSS Section	Item	Result	Test Engineer
3.1	2.1046 (a), 90.205(s), RSS-238 section 4.2.	RF Power Output	Passed.	K. Kawai
3.2	2.201 2.1047(d), 90.207, RSS-238 section 3.2.	Modulation Characteristics	Passed.	K. Kawai
3.3	2.1055 (a)(1),(d)(1),(d)(3), 80.209 (b), 90.213, RSS-238 section 4.1, RSS-Gen section 8.11.	Frequency Stability	Passed.	K. Kawai
3.4	2.202 (a), 2.1049 (c)(1), 80.209 (b), 80.211 (f), 90.209, 90.210 (b).	Occupied Bandwidth	Passed.	K. Kawai
3.5	2.1051, 80.211 (f), 80.273, 90.210, 90.215.	Spurious Emissions at Antenna Port	Passed.	K. Kawai
3.6	2.1053, 80.211 (f), 90.210, 90.215.	Field Strength of Spurious Radiation	Passed.	Y. Katoh

3 Test Results

3.1 RF Power Output (FCC Rule 47 CFR, 2.1046(a), 90.205(s) and RSS-238 4.2)

(1) Test conditions:

For all TX (S1/S2/M1/M2/M3/L) pulses, the transmitter output power was measured at the antenna port of the non-reflective load, which replaced the antenna radiator.

(2) Test Setup:

See Clause 4.

(3) Limits (RSS-238, 4.2):

Output Power: 240 W max (+20% of normal power) (FCC Rule 47 CFR, 90.205(s))
60 kW max (RSS-238, 4.2)

(4) Test Results:

CH1, P0N

Pulse type	S1	S2	M1	M2	M3	L
Transmission mean power Pm (W)	0.032	0.064	0.097	0.111	0.146	0.150
Pulse length *T* (μs) (-6 dB points)	0.056	0.140	0.288	0.491	0.690	1.188
PRF (Hz)	2400	2000	1500	1060	1000	600
Transmission pulse power Pp (W) (*1)	236.4	229.2	224.6	213.3	211.6	210.4

CH1, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Transmission mean power Pm (W)	2.120	2.684	3.485	3.549	3.485	2.084
Pulse length T (μs) (-6 dB points)	4.700	7.020	11.720	16.400	17.120	17.160
PRF (Hz)	2400	2000	1500	1060	1000	600
Transmission pulse power Pp (W) (*1)	188.0	191.2	198.2	204.2	203.6	202.4

CH2, P0N

Pulse type	S1	S2	M1	M2	M3	L
Transmission mean power Pm (W)	0.032	0.061	0.093	0.111	0.146	0.150
Pulse length T (μs) (-6 dB points)	0.056	0.140	0.288	0.490	0.690	1.188
PRF (Hz)	2400	2000	1500	1060	1000	600
Transmission pulse power Pp (W) (*1)	236.4	218.5	215.3	213.7	211.6	210.4

CH2, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Transmission mean power Pm (W)	2.166	2.857	3.822	3.694	3.621	2.220
Pulse length T (μs) (-6 dB points)	4.690	7.020	11.720	16.400	17.120	17.120
PRF (Hz)	2400	2000	1500	1060	1000	600
Transmission pulse power Pp (W) (*1)	192.4	203.5	217.4	212.5	211.5	216.1

CH3, P0N

Pulse type	S1	S2	M1	M2	M3	L
Transmission mean power Pm (W)	0.033	0.063	0.091	0.107	0.141	0.146
Pulse length T (μs) (-6 dB points)	0.058	0.140	0.289	0.493	0.690	1.192
PRF (Hz)	2400	2000	1500	1060	1000	600
Transmission pulse power Pp (W) (*1)	238.7	224.4	209.9	204.8	204.3	204.1

CH3, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Transmission mean power Pm (W)	2.220	2.957	3.767	3.658	3.585	2.184
Pulse length T (μs) (-6 dB points)	4.700	7.020	11.720	16.400	17.120	17.120
PRF (Hz)	2400	2000	1500	1060	1000	600
Transmission pulse power Pp (W) (*1)	196.8	210.6	214.3	210.4	209.4	212.6

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

Environmental conditions observed: On 2 April 2018, 23°C to 23°C, 59%RH to 59%RH
On 3 April 2018, 23°C to 25°C, 59%RH to 61%RH

Power supply voltage measured: 120 VAC/60 Hz to 120 VAC/60 Hz

3.2 Modulation Characteristics (FCC Rule 47 CFR, 2.201, 2.1047(d), 90.207 and RSS-238 3.2)

(1) Test Conditions:

The RF envelope of the solid-state device output pulse was measured using an envelope detector and an oscilloscope. Each pulse spectrum was measured using a spectrum analyzer.

(2) Test Setup:

See Clause 4.

(3) Test Results:

CH1, P0N

Pulse type	S1	S2	M1	M2	M3	L
Pulse length T (μs) (-6 dB points)	0.056	0.140	0.288	0.491	0.690	1.188
Rise time tr (μs)(10 - 90% amplitude)	0.040	0.032	0.032	0.032	0.033	0.031
Fall time tf (μs) (90 - 10% amplitude)	0.032	0.031	0.030	0.031	0.031	0.031
PRF (Hz) (*1)	2400	2000	1500	1060	1000	600
B_{-40} (MHz)	178.9	115.2	81.8	61.6	51.8	39.7

CH1, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Pulse length T (μs) (-6 dB points)	4.700	7.020	11.720	16.400	17.120	17.160
Rise time tr (μs) (10 - 90% amplitude)	0.144	0.212	0.340	0.480	0.500	0.480
Fall time tf (μs) (90 - 10% amplitude)	0.108	0.190	0.320	0.460	0.480	0.484
PRF (Hz) (*1)	2400	2000	1500	1060	1000	600
B_{-40} (MHz)	60.9	39.1	19.8	12.1	12.0	12.0

CH2, P0N

Pulse type	S1	S2	M1	M2	M3	L
Pulse length T (μs) (-6 dB points)	0.056	0.140	0.288	0.490	0.690	1.188
Rise time tr (μs) (10 - 90% amplitude)	0.039	0.032	0.032	0.032	0.032	0.032
Fall time tf (μs) (90 - 10% amplitude)	0.032	0.031	0.031	0.031	0.031	0.030
PRF (Hz) (*1)	2400	2000	1500	1060	1000	600
B_{-40} (MHz)	177.8	115.9	80.4	61.7	51.6	40.3

CH2, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Pulse length T (μs) (-6 dB points)	4.690	7.020	11.720	16.400	17.120	17.120
Rise time tr (μs) (10 - 90% amplitude)	0.144	0.208	0.340	0.480	0.496	0.508
Fall time tf (μs) (90 - 10% amplitude)	0.109	0.188	0.330	0.460	0.480	0.480
PRF (Hz) (*1)	2400	2000	1500	1060	1000	600
B_{-40} (MHz)	60.9	39.1	19.8	12.1	12.0	12.0

CH3, P0N

Pulse type	S1	S2	M1	M2	M3	L
Pulse length T (µs) (-6 dB points)	0.058	0.140	0.289	0.493	0.690	1.192
Rise time tr (µs) (10 - 90% amplitude)	0.040	0.031	0.031	0.031	0.031	0.032
Fall time tf (µs) (90 - 10% amplitude)	0.032	0.030	0.030	0.030	0.031	0.030
PRF (Hz) (*1)	2400	2000	1500	1060	1000	600
B_{-40} (MHz)	176.5	117.1	81.6	62.9	52.1	40.2

CH3, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Pulse length T (µs) (-6 dB points)	4.700	7.020	11.720	16.400	17.120	17.120
Rise time tr (µs) (10 - 90% amplitude)	0.144	0.212	0.344	0.490	0.500	0.490
Fall time tf (µs) (90 - 10% amplitude)	0.110	0.190	0.320	0.460	0.470	0.480
PRF (Hz) (*1)	2400	2000	1500	1060	1000	600
B_{-40} (MHz)	60.8	39.1	19.8	12.1	12.0	12.0

(*1): Pulse Repetition Frequency

Measured Plots: See Clause 6.

Environmental conditions observed: On 2 April 2018, 23°C to 23°C, 59%RH to 59%RH
On 3 April 2018, 23°C to 25°C, 59%RH to 61%RH
Power supply voltage measured: 120 VAC/60 Hz to 120 VAC/60 Hz

3.3 Frequency Stability – temperature & voltage

(FCC Rule 47 CFR, 2.1055(a)(1)/(d)(1)/(d)(3), 80.209(b), 90.213, RSS-238 4.1 and RSS-Gen 8.11)

(1) Test Conditions:

(1) Radar Transmitter Settings: All TX (S1/S2/M1/M2/M3/L) pulses
(2) Ambient Temperature Settings: -30°C to +50°C (10°C interval)
(3) Power Supply Voltage Settings: 85/100/115% of nominal voltage (85 VAC/50 Hz/120 VAC/60 Hz /264.5 VAC/60 Hz)

(2) Test Setup:

See Clause 4.

(3) Frequency Tolerance Limits

(3.1) Frequency Tolerance Limits (FCC Rule 47 CFR, 2.1055(a)(1), 80.209(b) and 90.213(a)):

CH1, P0N

Pulse type	S1	S2	M1	M2	M3	L
Guard Band f(1.5/T) (MHz) (*1)	26.60	10.74	5.21	3.05	2.17	1.26
Upper Limit (MHz) (*2)	9473.4	9489.3	9494.8	9496.9	9497.8	9498.7
Lower Limit (MHz) (*2)	9326.6	9310.7	9305.2	9303.1	9302.2	9301.3

CH1, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Guard Band f(1.5/T) (MHz) (*1)	0.32	0.21	0.13	0.09	0.09	0.09
Upper Limit (MHz) (*2)	9499.7	9499.8	9499.9	9499.9	9499.9	9499.9
Lower Limit (MHz) (*2)	9300.3	9300.2	9300.1	9300.1	9300.1	9300.1

CH2, P0N

Pulse type	S1	S2	M1	M2	M3	L
Guard Band f(1.5/T) (MHz) (*1)	26.60	10.74	5.21	3.06	2.17	1.26
Upper Limit (MHz) (*2)	9473.4	9489.3	9494.8	9496.9	9497.8	9498.7
Lower Limit (MHz) (*2)	9326.6	9310.7	9305.2	9303.1	9302.2	9301.3

CH2, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Guard Band f(1.5/T) (MHz) (*1)	0.32	0.21	0.13	0.09	0.09	0.09
Upper Limit (MHz) (*2)	9499.7	9499.8	9499.9	9499.9	9499.9	9499.9
Lower Limit (MHz) (*2)	9300.3	9300.2	9300.1	9300.1	9300.1	9300.1

CH3, P0N

Pulse type	S1	S2	M1	M2	M3	L
Guard Band f(1.5/T) (MHz) (*1)	26.04	10.68	5.19	3.04	2.17	1.26
Upper Limit (MHz) (*2)	9474.0	9489.3	9494.8	9497.0	9497.8	9498.7
Lower Limit (MHz) (*2)	9326.0	9310.7	9305.2	9303.0	9302.2	9301.3

CH3, Q0N

Pulse type	S1	S2	M1	M2	M3	L
Guard Band f(1.5/T) (MHz) (*1)	0.32	0.21	0.13	0.09	0.09	0.09
Upper Limit (MHz) (*2)	9499.7	9499.8	9499.9	9499.9	9499.9	9499.9
Lower Limit (MHz) (*2)	9300.3	9300.2	9300.1	9300.1	9300.1	9300.1

(*1): Guard Band is specified to be equal to 1.5/T MHz, where "T" is the pulse length in microseconds. (FCC Rule 47 CFR, 80.209(b))
(*2): Upper limit frequency, f(U) = 9500 -1.5/T
Lower limit frequency, f(L) = 9300 +1.5/T

(3.2) Frequency Tolerance Limits (RSS-238 4.1 and RSS 8.11):

1250 ppm (for X-band)

(4) Test Results:

Complied.

(4.1) Temperature test at the normal voltage of 120 VAC/60 Hz:

CH1, P0N

Pulse type		S1	S2	M1	M2	M3	L	Result
Frequency at maximum emission (MHz) 9403.75	-30°C	9403.7	9404.0	9403.7	9404.0	9404.0	9403.7	Complied.
	-20°C	9404.0	9403.5	9403.5	9403.7	9403.8	9403.7	Complied.
	-10°C	9403.3	9403.7	9403.7	9403.7	9403.7	9403.7	Complied.
	0°C	9403.7	9403.3	9403.7	9403.7	9403.7	9403.7	Complied.
	+10°C	9403.2	9403.7	9403.7	9403.5	9403.8	9403.8	Complied.
	+20°C	9403.7	9403.7	9403.7	9403.7	9403.7	9403.7	Complied.
	+30°C	9403.8	9403.7	9403.5	9403.7	9403.7	9403.7	Complied.
	+40°C	9403.8	9403.3	9403.5	9403.7	9403.7	9403.7	Complied.
	+50°C	9403.3	9403.7	9403.5	9403.7	9403.7	9403.7	Complied.
Deviation max. (ppm)		-53	-43	-21	32	32	11	Complied.

CH1, Q0N

Pulse type		S1	S2	M1	M2	M3	L	Result
Center Frequency (MHz) 9423.75	-30°C	9421.7	9422.7	9422.7	9423.7	9423.3	9423.7	Complied.
	-20°C	9422.3	9422.7	9422.7	9423.0	9423.3	9423.8	Complied.
	-10°C	9422.7	9423.3	9423.0	9423.3	9423.0	9423.3	Complied.
	0°C	9423.7	9423.0	9423.7	9423.3	9423.3	9423.3	Complied.
	+10°C	9421.5	9422.8	9422.5	9422.5	9422.5	9422.2	Complied.
	+20°C	9423.3	9423.3	9423.3	9423.5	9423.3	9423.7	Complied.
	+30°C	9422.8	9423.2	9423.5	9423.5	9423.8	9423.8	Complied.
	+40°C	9422.8	9423.2	9423.2	9423.2	9423.2	9422.8	Complied.
	+50°C	9423.3	9423.0	9423.7	9423.3	9423.3	9423.0	Complied.
Deviation max. (ppm)		-191	-64	-85	-106	-85	-159	Complied.

CH2, P0N

Pulse type		S1	S2	M1	M2	M3	L	Result
Frequency at maximum emission (MHz) 9413.75	-30°C	9413.7	9413.5	9413.5	9413.3	9413.7	9413.7	Complied.
	-20°C	9414.0	9413.8	9413.5	9413.7	9413.7	9413.5	Complied.
	-10°C	9413.7	9413.5	9413.5	9413.5	9413.7	9413.7	Complied.
	0°C	9414.0	9413.3	9413.7	9413.7	9413.5	9413.5	Complied.
	+10°C	9413.5	9413.5	9413.5	9413.7	9413.7	9413.7	Complied.
	+20°C	9413.2	9413.4	9413.6	9413.5	9413.5	9413.5	Complied.
	+30°C	9413.7	9413.7	9413.5	9413.7	9413.7	9413.7	Complied.
	+40°C	9413.5	9413.7	9413.5	9413.5	9413.5	9413.5	Complied.
	+50°C	9414.0	9413.3	9413.5	9413.7	9413.5	9413.7	Complied.
Deviation max. (ppm)		85	42	±11	±21	21	21	Complied.

CH2, Q0N

Pulse type		S1	S2	M1	M2	M3	L	Result
Center Frequency (MHz) 9433.75	-30°C	9432.0	9433.3	9432.7	9433.3	9433.0	9433.3	Complied.
	-20°C	9432.7	9433.3	9434.0	9433.0	9433.7	9433.4	Complied.
	-10°C	9432.7	9433.7	9433.3	9433.3	9433.3	9433.7	Complied.
	0°C	9434.0	9433.0	9434.0	9433.7	9433.7	9433.0	Complied.
	+10°C	9432.3	9432.7	9432.3	9432.7	9432.7	9433.2	Complied.
	+20°C	9433.2	9432.7	9433.0	9433.3	9433.2	9433.7	Complied.
	+30°C	9433.5	9433.8	9433.2	9433.2	9433.2	9433.8	Complied.
	+40°C	9432.8	9433.5	9433.8	9433.8	9433.8	9433.5	Complied.
	+50°C	9432.7	9432.7	9432.7	9433.0	9433.0	9433.0	Complied.
Deviation max. (ppm)		-127	117	106	-64	64	-74	Complied.

CH3, P0N

Pulse type		S1	S2	M1	M2	M3	L	Result
Frequency at maximum emission (MHz) 9423.75	-30°C	9423.0	9423.2	9423.5	9423.7	9423.7	9423.7	Complied.
	-20°C	9423.3	9423.5	9423.5	9423.7	9423.7	9423.7	Complied.
	-10°C	9423.3	9423.3	9423.7	9423.5	9423.7	9423.7	Complied.
	0°C	9423.7	9423.3	9423.7	9423.7	9423.7	9423.7	Complied.
	+10°C	9424.3	9423.7	9423.5	9423.5	9423.7	9423.7	Complied.
	+20°C	9423.5	9423.5	9423.5	9423.7	9423.7	9423.7	Complied.
	+30°C	9423.5	9423.5	9423.5	9423.5	9423.7	9423.7	Complied.
	+40°C	9423.2	9423.7	9423.3	9423.5	9423.5	9423.5	Complied.
	+50°C	9423.7	9423.8	9423.5	9423.5	9423.5	9423.7	Complied.
Deviation max. (ppm)		85	±32	±21	-21	-21	-21	Complied.

CH3, Q0N

Pulse type		S1	S2	M1	M2	M3	L	Result
Center Frequency (MHz) 9443.75	-30°C	9443.0	9443.0	9443.3	9443.0	9443.3	9443.0	Complied.
	-20°C	9443.7	9443.7	9443.3	9443.3	9443.3	9443.7	Complied.
	-10°C	9443.3	9443.0	9444.0	9443.7	9443.3	9444.0	Complied.
	0°C	9442.7	9443.0	9443.3	9444.0	9444.0	9443.7	Complied.
	+10°C	9443.7	9443.2	9443.0	9443.7	9443.7	9443.8	Complied.
	+20°C	9443.7	9443.7	9443.8	9443.0	9443.2	9442.8	Complied.
	+30°C	9443.2	9443.5	9443.8	9443.5	9443.8	9443.2	Complied.
	+40°C	9443.8	9444.2	9443.8	9443.8	9443.8	9443.8	Complied.
	+50°C	9443.8	9444.2	9444.2	9443.2	9443.5	9443.8	Complied.
Deviation max. (ppm)		-106	-74	-85	106	85	127	Complied.

(4.2) Voltage Variation at the normal temperature of +20°C:

CH1, P0N

Pulse type		S1	S2	M1	M2	M3	L	Result
Frequency at maximum emission (MHz) 9403.75	85 VAC	9403.8	9403.5	9403.5	9403.7	9403.7	9403.7	Complied.
	120 VAC	9403.7	9403.7	9403.7	9403.7	9403.7	9403.7	Complied.
	264.5 VAC	9403.5	9403.3	9403.4	9403.4	9403.5	9403.5	Complied.
Deviation max. (ppm)		-21	-43	-32	-32	-21	-21	Complied.

CH1, Q0N

Pulse type		S1	S2	M1	M2	M3	L	Result
Center Frequency (MHz) 9423.75	85 VAC	9422.5	9423.5	9423.3	9423.3	9423.5	9423.7	Complied.
	120 VAC	9423.3	9423.3	9423.3	9423.5	9423.3	9423.7	Complied.
	264.5 VAC	9422.5	9423.0	9423.3	9423.3	9423.3	9423.7	Complied.
Deviation max. (ppm)		-85	-32	0	-21	21	0	Complied.

CH2, P0N

Pulse type		S1	S2	M1	M2	M3	L	Result
Frequency at maximum emission (MHz) 9413.75	85 VAC	9413.0	9413.2	9413.4	9413.5	9413.5	9413.5	Complied.
	120 VAC	9413.2	9413.4	9413.6	9413.5	9413.5	9413.5	Complied.
	264.5 VAC	9413.7	9413.7	9413.5	9413.5	9413.5	9413.6	Complied.
Deviation max. (ppm)		53	32	-21	0	0	11	Complied.

CH2, Q0N

Pulse type		S1	S2	M1	M2	M3	L	Result
Center Frequency (MHz) 9433.75	85 VAC	9433.3	9433.8	9433.3	9433.2	9433.7	9433.5	Complied.
	120 VAC	9433.2	9432.7	9433.0	9433.3	9433.2	9433.7	Complied.
	264.5 VAC	9432.2	9432.8	9433.2	9433.3	9433.0	9433.3	Complied.
Deviation max. (ppm)		-106	117	32	-11	53	-42	Complied.

CH3, P0N

Pulse type		S1	S2	M1	M2	M3	L	Result
Frequency at maximum emission (MHz) 9423.75	85 VAC	9423.3	9423.3	9423.7	9423.7	9423.5	9423.7	Complied.
	120 VAC	9423.5	9423.5	9423.5	9423.7	9423.7	9423.7	Complied.
	264.5 VAC	9423.5	9423.5	9423.5	9423.7	9423.7	9423.7	Complied.
Deviation max. (ppm)		-21	-21	21	0	-21	0	Complied.

CH3, Q0N

Pulse type		S1	S2	M1	M2	M3	L	Result
Center Frequency (MHz) 9443.75	85 VAC	9443.3	9443.0	9442.7	9443.0	9443.2	9443.0	Complied.
	120 VAC	9443.7	9443.7	9443.8	9443.0	9443.2	9442.8	Complied.
	264.5 VAC	9443.3	9442.7	9443.5	9443.5	9443.2	9443.7	Complied.
Deviation max. (ppm)		-42	-106	-116	53	0	95	Complied.

Environmental conditions observed: On 3 April 2018, 23°C to 25°C, 59%RH to 61%RH
On 4 April 2018, 25°C to 23°C, 61%RH to 52%RH
On 5 April 2018, 23°C to 23°C, 52%RH to 52%RH

Power supply voltage measured: 120 VAC/60 Hz to 120 VAC/60 Hz

3.4 Occupied Bandwidth

(FCC Rule 47 CFR, 2.202(a), 2.1049(c)(1), 80.209(b), 80.211(f), 90.209 and 90.210(b))

(1) Test Conditions:

For all TX (S1/S2/M1/M2/M3/L) pulses, the transmitter occupied bandwidth was measured at the antenna port of the Non-reflective load, which replaced antenna radiator.

(2) Test Setup:

See Clause 4.

(3) Emission Limits (FCC Rule 47 CFR, 80.211 (f) and 90.210 (b)):

Frequency removed from the assigned frequency (*1)	Emission attenuation (mean power, dB)
50 - 100% (of the authorized bandwidth) (*2)	At least 25
100 - 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) = 9403.75, 9413.75, 9423.75, 9433.75 and 9443.75 MHz (for X-band radars)

(*2): Authorized bandwidth = 110 MHz (for X-band radars)

(4) Test Results:

Complied.

Spectrum plots: See Clause 7.

Environmental conditions observed: On 6 April 2018, 24°C to 24°C, 53%RH to 60%RH

Power supply voltage measured: 120 VAC/60 Hz to 120 VAC/60 Hz

3.5 Spurious Emissions at Antenna Port
(FCC Rule 47 CFR, 2.1051, 80.211(f), 80.273, 90.210, 90.215 and ITU-R SM.329-12):

(1) Test Conditions:
For S1 pulse, the transmitter output power was measured at the antenna port of the Non-reflective load, which replaced 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)

Spurious measurement range for X-Band RADAR: 3.68 GHz to 40 GHz

Lower measurement band	Upper measurement band
From 3.68 GHz (*1) to the lower OoB boundary	From the upper OoB boundary to 40 GHz

(*1): 0.7 times of the waveguide cut-off frequency for WRJ-9 (ITU-R SM.329-12, Section 2.5)

(2) Test Setup:
See Clause 4.

(3) Emission Limits (FCC Rule 47 CFR, 80.211 (f) and 90.210(b)):

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) = 9403.75, 9413.75, 9423.75, 9433.75 and 9443.75 MHz (for X-band radars)

(*2): Authorized bandwidth = 110 MHz (for X-band radars)

(*3): Spurious measurement range for X-band radar: 3.68 GHz to 40 GHz

(4) Harmonics Frequencies:

f_0 (MHz)	$1/2f_0$	$2f_0$	$3f_0$	$4f_0$
9403.75	4701.875	18807.5	28211.25	37615
9413.75	4706.875	18827.5	28241.25	37655
9423.75	4711.875	18847.5	28271.25	37695
9433.75	4716.875	18867.5	28301.25	37735
9443.75	4721.875	18887.5	28331.25	37775

(5) Test Results:
Complied.

Spurious emission frequency and levels measured of which margins were below 20 dB were listed in the following table.

CH	Frequency (GHz)	Level (dBm)	Limit (dBm)	Margin (dB)
1	18.85	-31.64	-13.00	18.64
1	28.29	-28.70	-13.00	15.70
2	18.88	-31.80	-13.00	18.80
2	28.31	-24.37	-13.00	11.37
3	28.31	-27.20	-13.00	14.20

Environmental conditions observed: On 9 April 2018, 20°C to 20°C, 40%RH to 56%RH

Power supply voltage measured: 120 VAC/60 Hz to 120 VAC/60 Hz

3.6 Field Strength of Spurious Radiation
(FCC Rule 47 CFR, 2.1053, 80.211(f), 90.210, 90.215 and ITU-R SM.329-12)

(1) Test Conditions:

For S1 pulse, the transmitter output power was measured at the antenna port of the Non-reflective load, which replaced 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)

(a) Spurious measurement range for X-band radar: 3.68 GHz to 40 GHz

Lower measurement band	Upper measurement band
From 3.68 GHz (*1) to the lower OoB boundary	From the upper OoB boundary to 40 GHz

(*1): 0.7 times of the waveguide cut-off frequency for WRJ-9 (ITU-R SM.329-12, Section 2.5)

(b) Antenna port was terminated with dummy load.

(2) Test Site: LIC EMC Center, Semi-Anechoic Chamber

(3) Distance between the Radar Set and Measuring Antenna: 3 m

(4) Test Setup:

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) Antenna height and polarization:

(a) Antenna height: EUT center (1.72 m)

(b) Antenna polarization: vertical and horizontal.

EUT height: 1.5 m

(5) Field Strength Limits (FCC Rule 47 CFR, 80.211 (f), and 90.210(b)):

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) = 9403.75, 9413.75, 9423.75, 9433.75 and 9443.75 MHz (for X-band radars)

(*2): Authorized bandwidth = 110 MHz (for X-band radars)

(*3): Spurious measurement range for X-Band RADAR: 3.68 GHz to 40 GHz

(6) Harmonics Frequencies:

f_0 (MHz)	$1/2f_0$	$2f_0$	$3f_0$	$4f_0$
9403.75	4701.875	18807.5	28211.25	37615
9413.75	4706.875	18827.5	28241.25	37655
9423.75	4711.875	18847.5	28271.25	37695
9433.75	4716.875	18867.5	28301.25	37735
9443.75	4721.875	18887.5	28331.25	37775

(7) Test Results:

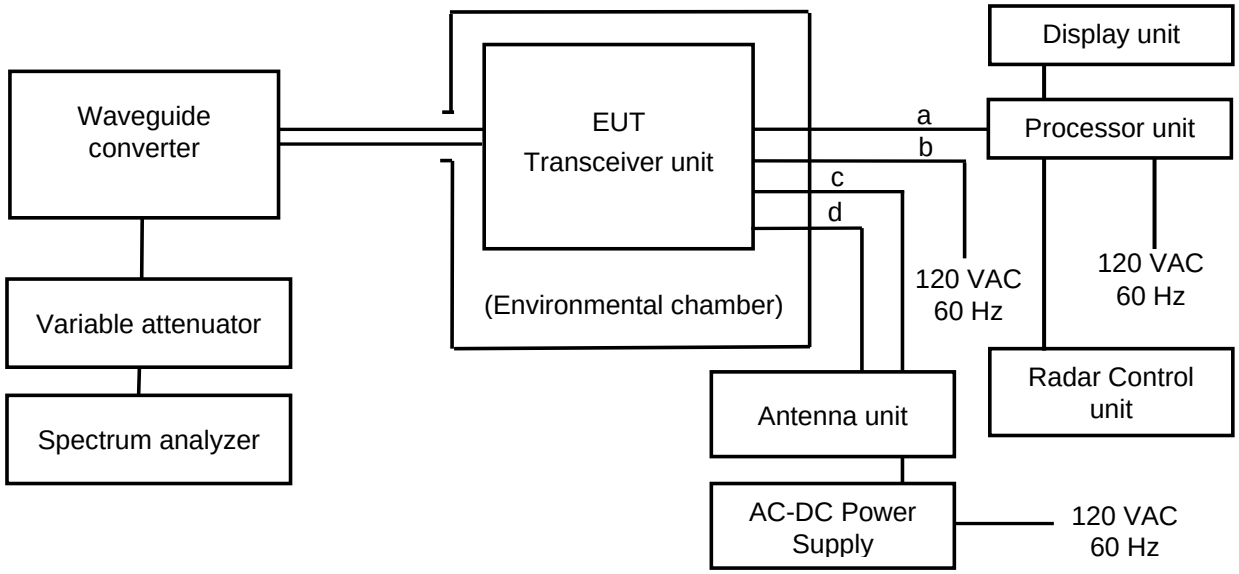
Complied.

Environmental conditions observed: On 19 March 2018, 18°C to 18°C, 42%RH to 42 %RH
On 20 March 2018, 18°C to 18°C, 48%RH to 48 %RH

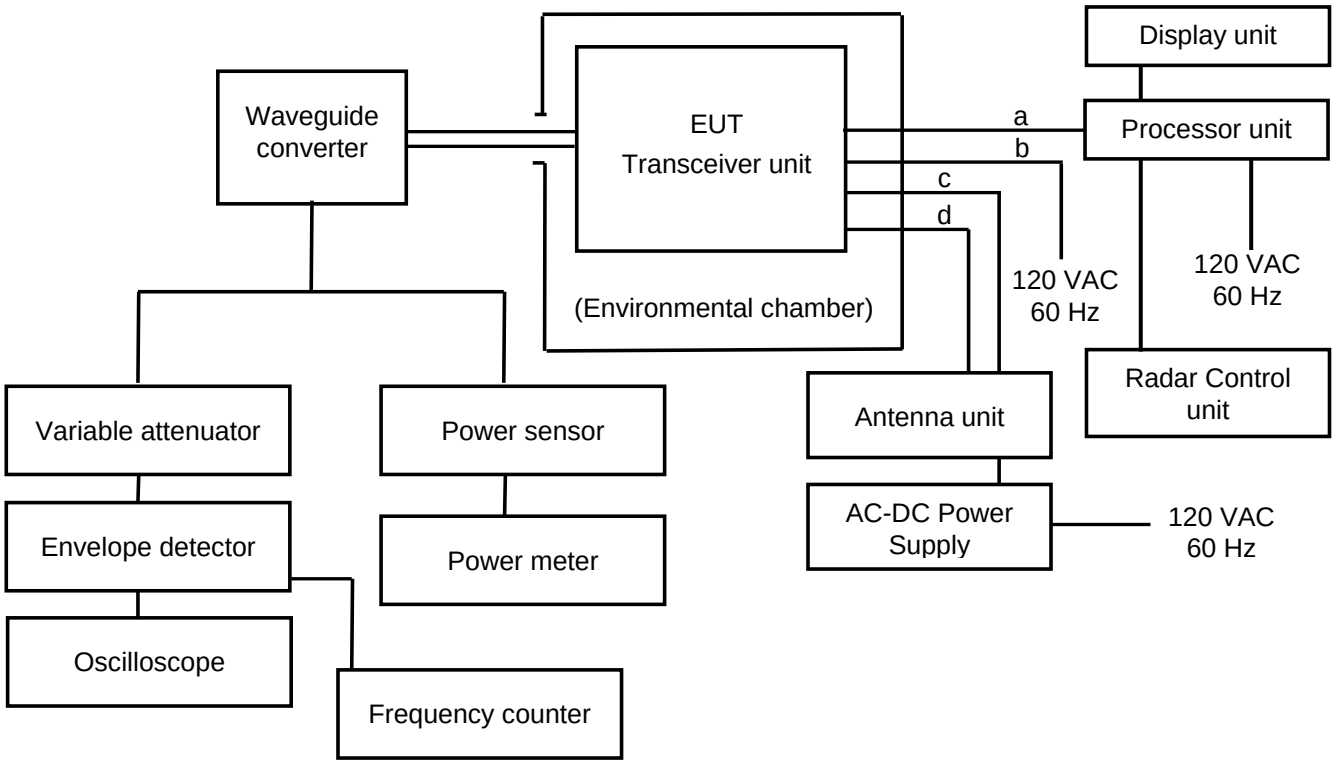
Power supply voltage measured: 120 VAC/60 Hz to 120 VAC/60 Hz

4 Test Setup for Measurements

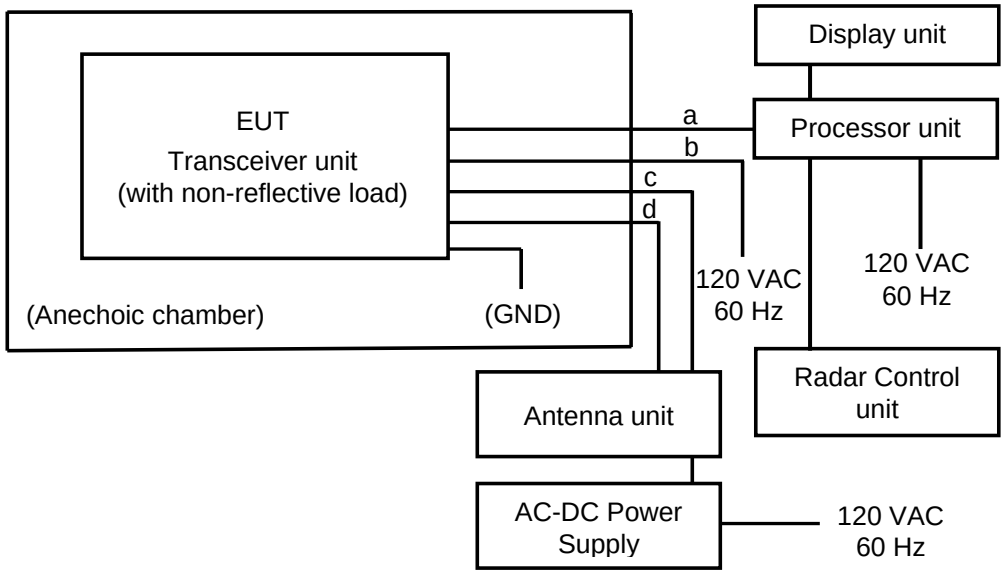
(1) Test Setup for Clauses 3.3 and 3.5



(2) Test Setup for Clauses 3.1, 3.2 and 3.4



(3) Test Setup for Clause 3.6



Cables used for the tests

No.	Name	Length (m)
a	FR-FTPC-CY	20
b	TPY-1.5	5
c	TTYCSLA-1Q	3.5
d	TTYCSLA-1	3

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.

RF Power Output

C/N	Instrument	Type	S/N	Manufacturer	Date of last calibration	Calibration interval
RT200	Power meter	E4419B	MY45101375	Agilent	16 March 2018	1 year
RT201	Power Sensor	8481A	2349A39603	Agilent	16 March 2018	1 year
--	Adapter	BL00-6254-00	--	Orient Microwave	--	--
RT255-2	AC/DC power supply	PCR4000LE	TE001770	Kikusui	--	--
HT414	Climatic chamber	PL-4KP	14004203	Espec	27 September 2017	1 year
HT726	Paperless recorder/Dual communication logger DAQSTATION FX100	FX106-4-1	S5JA01448	Yokogawa	--	--
HT1024	Digital multi-meter	233	27230019	Fluke	26 February 2018	1 year

Modulation Characteristics

C/N	Instrument	Type	S/N	Manufacturer	Date of last calibration	Calibration interval
RT213	Waveguide	WRJ-10	--	Furuno	4 July 2017	1 year
--	Adapter	BL00-6254-00	--	Orient Microwave	--	--
--	Attenuator	66-30-43	CE7304	Aeroflex/ Weinschel	--	--
HT654	Attenuator	8494B	MY42148134	Agilent	21 February 2018	1 year
HT728	Attenuator	8495B	MY42145734	Agilent	14 December 2017	1 year
740040701	Crystal detector	423B	MY42241658	Agilent	11 October 2017	1 year
808052	Frequency counter	MF2414C	6200769857	Anritsu	18 July 2017	1 year
HT972	Oscilloscope	MSO4054B	C030483	Tektronix	5 March 2018	1 year
RT255-2	AC/DC power supply	PCR4000LE	TE001770	Kikusui	--	--
HT414	Climatic chamber	PL-4KP	14004203	Espec	27 September 2017	1 year
HT726	Paperless recorder/Dual communication logger DAQSTATION FX100	FX106-4-1	S5JA01448	Yokogawa	--	--
HT1024	Digital multi-meter	233	27230019	Fluke	26 February 2018	1 year

Frequency Stability – temperature & voltage

C/N	Instrument	Type	S/N	Manufacturer	Date of last calibration	Calibration interval
RT213	Waveguide	WRJ-10	--	Furuno	4 July 2017	1 year
--	Adapter	BL00-6254-00	--	Orient Microwave	--	--
--	Attenuator	66-30-43	CE7304	Aeroflex/ Weinschel	--	--
HT654	Attenuator	8494B	MY42148134	Agilent	21 February 2018	1 year
HT728	Attenuator	8495B	MY42145734	Agilent	14 December 2017	1 year
HT676	Spectrum analyzer	8564EC	4103A00440	Agilent	12 April 2017	1 year
RT255-2	AC/DC power supply	PCR4000LE	TE001770	Kikusui	--	--
HT414	Climatic chamber	PL-4KP	14004203	Espec	27 September 2017	1 year
HT726	Paperless recorder/Dual communication logger DAQSTATION FX100	FX106-4-1	S5JA01448	Yokogawa	--	--
HT1024	Digital multi-meter	233	27230019	Fluke	26 February 2018	1 year

Occupied Bandwidth

C/N	Instrument	Type	S/N	Manufacturer	Date of last calibration	Calibration interval
RT213	Waveguide	WRJ-10	--	Furuno	4 July 2017	1 year
--	Adapter	BL00-6254-00	--	Orient Microwave	--	--
--	Attenuator	66-30-43	CE7304	Aeroflex/ Weinschel	--	--
HT654	Attenuator	8494B	MY42148134	Agilent	21 February 2018	1 year
HT728	Attenuator	8495B	MY42145734	Agilent	14 December 2017	1 year
HT676	Spectrum analyzer	8564EC	4103A00440	Agilent	12 April 2017	1 year
RT255-2	AC/DC power supply	PCR4000LE	TE001770	Kikusui	--	--
HT414	Climatic chamber	PL-4KP	14004203	Espec	27 September 2017	1 year
HT726	Paperless recorder/Dual communication logger DAQSTATION FX100	FX106-4-1	S5JA01448	Yokogawa	--	--
HT1024	Digital multi-meter	233	27230019	Fluke	26 February 2018	1 year

Spurious Emissions at Antenna Port

C/N	Instrument	Type	S/N	Manufacturer	Date of last calibration	Calibration interval
--	Attenuator	66-30-43	CE7304	Aeroflex/ Weinschel	--	--
--	Adapter	BL00-6254-00	--	Orient Microwave	--	--
--	Adapter	WR-62	PE9803	Pasternack	--	--
--	Adapter	BL00-6256-00	--	Orient Microwave	--	--
--	Adapter	WR-28	PE9826	Pasternack	--	--
--	Isolator	OMC FX0157	1A0027	--	--	--
HT676	Spectrum analyzer	8564EC	4103A00440	Agilent	12 April 2017	1 year
30-0021	Filter	CBR-X7-3A	R986500	SPC Electronics	--	--
RT255-2	AC/DC power supply	PCR4000LE	TE001770	Kikusui	--	--
HT414	Climatic chamber	PL-4KP	14004203	Tabai Espec	27 September 2017	1 year
HT726	Paperless recorder/Dual communication logger DAQSTATION FX100	FX106-4-1	S5JA01448	Yokogawa	--	--
HT1024	Digital multi-meter	233	27230019	Fluke	26 February 2018	1 year
KB288	Coaxial cable	SF104A/11SMA/ 11SMA/5500MM	800047/4A	Huber+Suhner	1 November 2017	1 year
KB289	Coaxial cable	SF104A/11PC35/ 11PC35/5500MM	800048/4A	Huber+Suhner	1 November 2017	1 year
KB181	Coaxial cable	SUCOFLEX 102A	1261/2A	Huber+Suhner	12 August 2017	1 year

Field Strength of Spurious Radiation

C/N	Instrument	Type	S/N	Manufacturer	Date of last calibration	Calibration interval
HT744	Radiated emission measurement software	EP5/RE	Ver. 6.0.10	Toyo	--	--
HT745	EMI TEST RECEIVER (20 Hz - 40 GHz)	ESU40	100243	Rohde & Schwartz	29 December 2017	1 year
HT758	Broadband horn antenna (1 GHz to 6 GHz)	BBHA9120B	522	Schwarzbeck	3 January 2018	1 year
NK004	Double rigged horn antenna	TR17206	93370015	Advantest	15 December 2017	1 year
NK012	Pre-amplifier	8449B	3008A01286	Agilent	30 January 2018	1 year
HT761	Double rigged horn antenna & amp. (18 GHz - 26 GHz)	HAP18-26N	00000017	Toyo	7 December 2017	1 year
HT762	Double rigged horn antenna & amp. (26 GHz - 40 GHz)	HAP26-40N	00000010	Toyo	7 December 2017	1 year
HT755	Pre-amp. (1 GHz - 8 GHz, Gain 40 dB)	TPA0108-40	1017	Toyo	21 July 2017	1 year
HT779	Semi-Anechoic chamber	10mSAC	90984	Tokin	--	--
HT780	Programmable AC/DC power supply	ES18000W	9128767-1+ 9128767-2	NF	--	--
--	Dummy load	4D376	R0627001	Shimada	--	--
KB181	Coaxial cable	SUCOFLEX 102A	1261/2A	Huber+Suhner	12 August 2017	1 year

6 RF Envelope and Spectrum of the output pulse

CH1, P0N

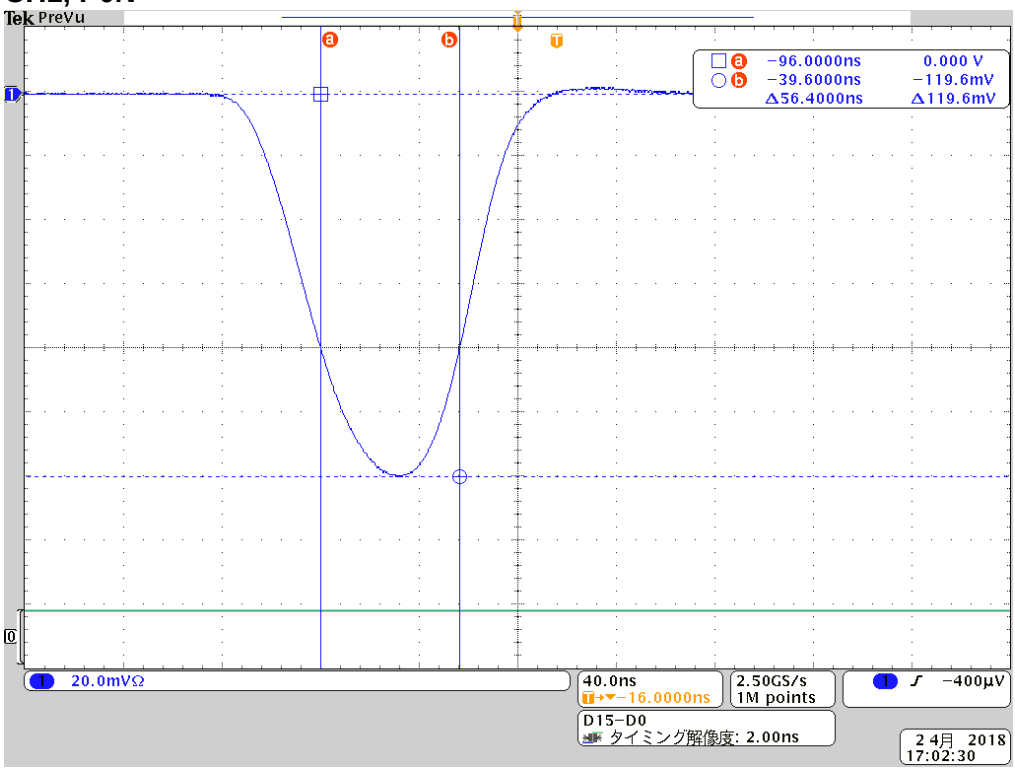


Fig. 6.1 S1 Pulse Envelope

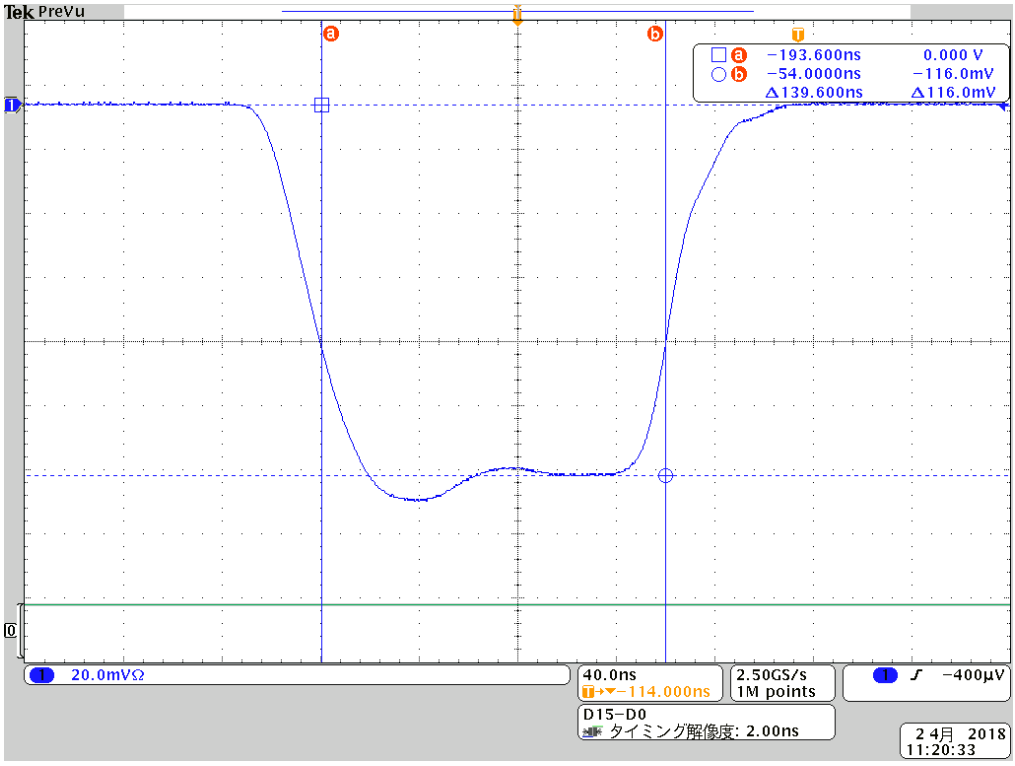


Fig. 6.2 S2 Pulse Envelope

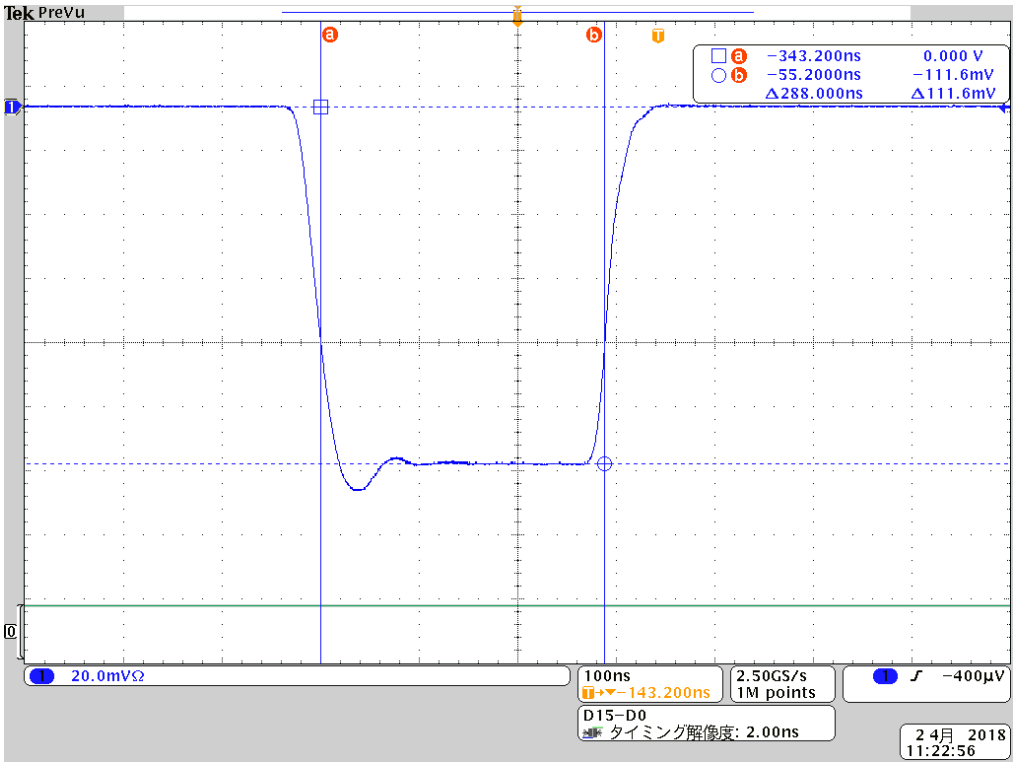


Fig. 6.3 M1 Pulse Envelope

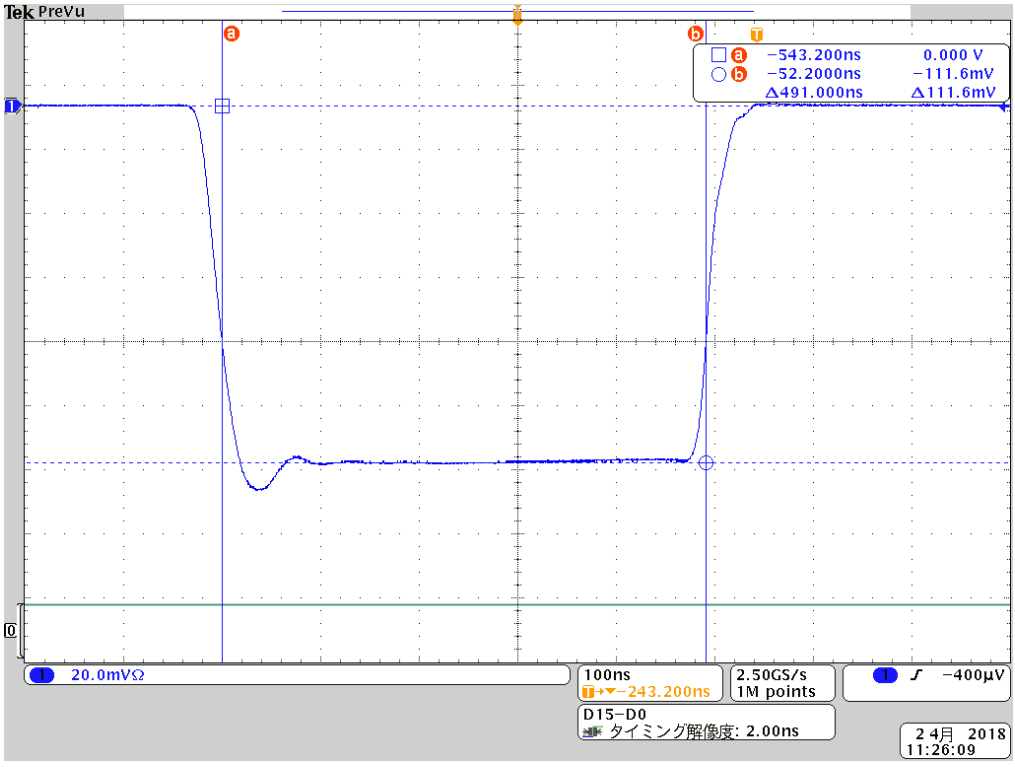


Fig. 6.4 M2 Pulse Envelope

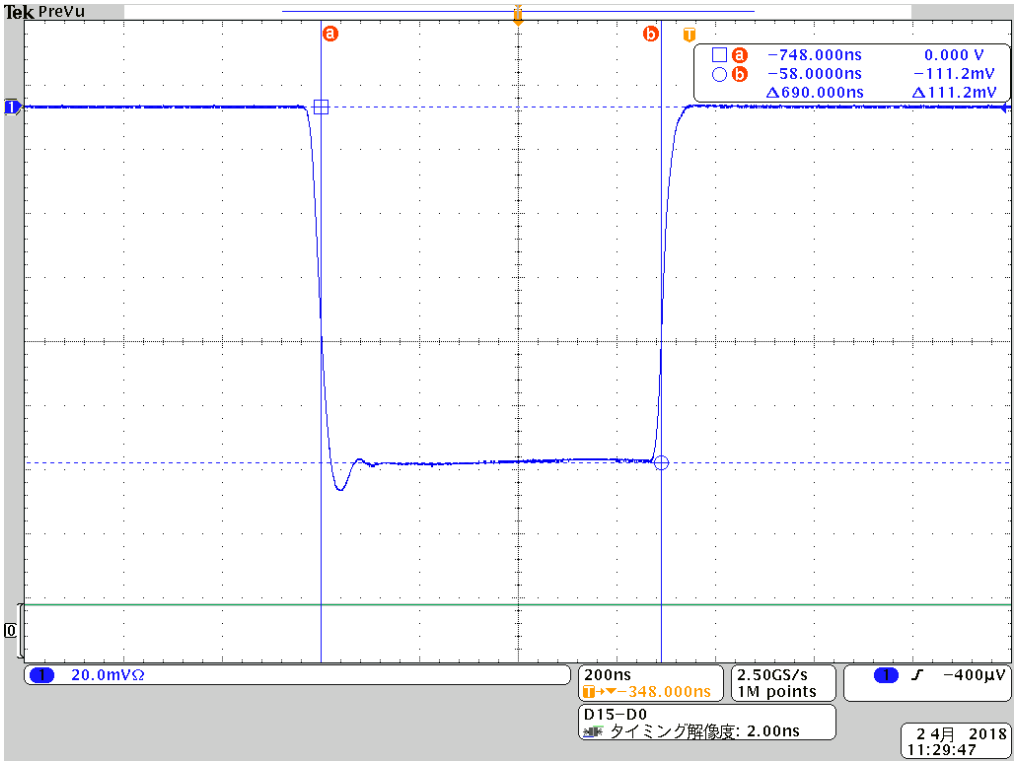


Fig. 6.5 M3 Pulse Envelope

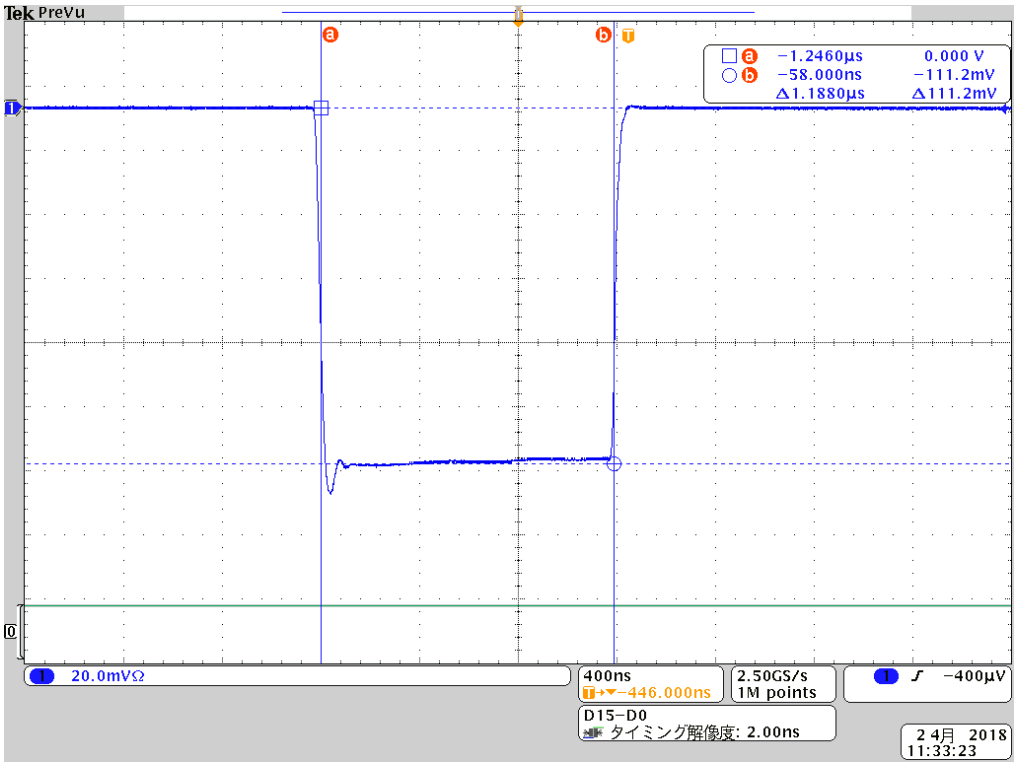


Fig. 6.6 L Pulse Envelope

CH1, Q0N

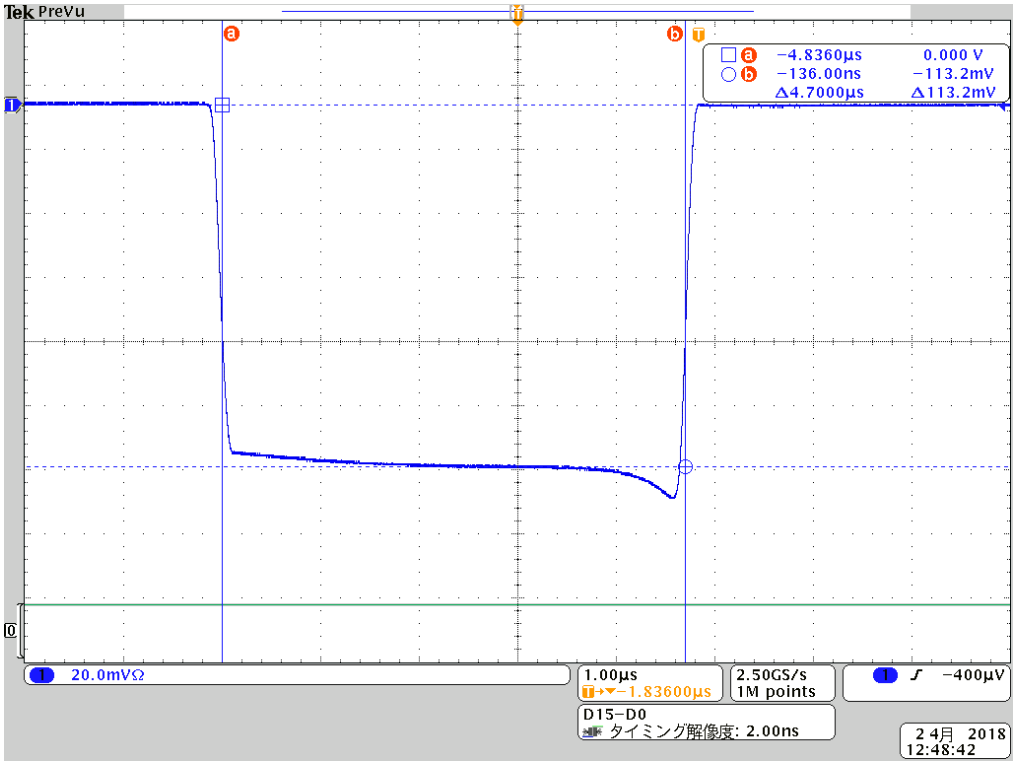


Fig. 6.7 S1 Pulse Envelope

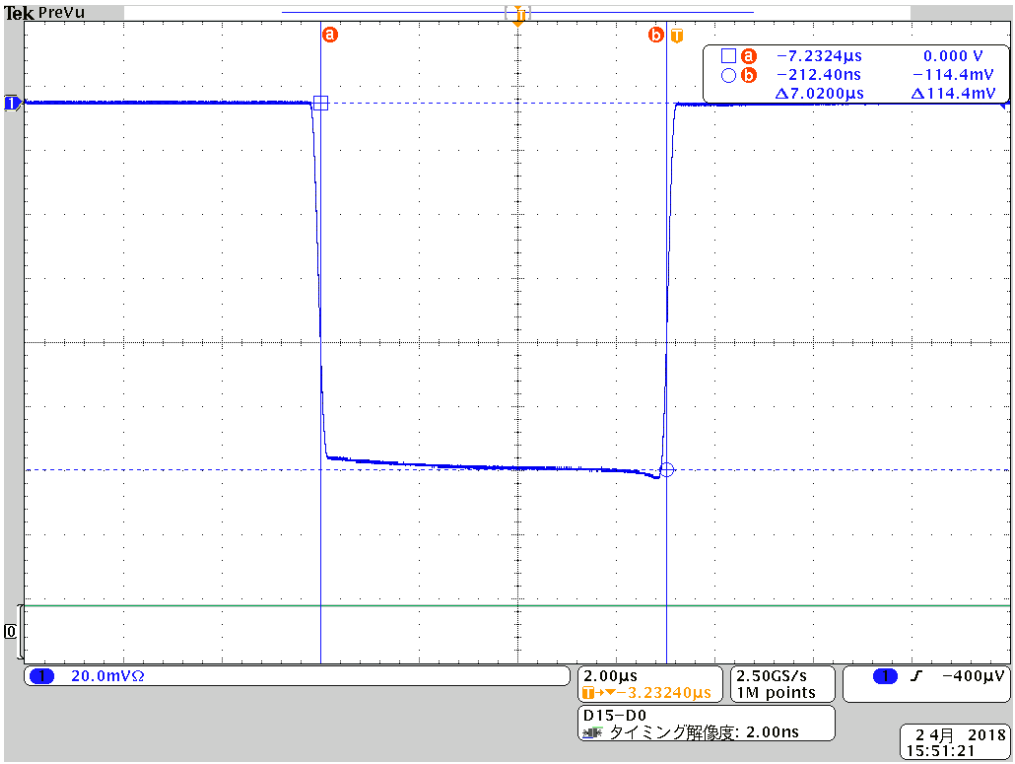


Fig. 6.8 S2 Pulse Envelope

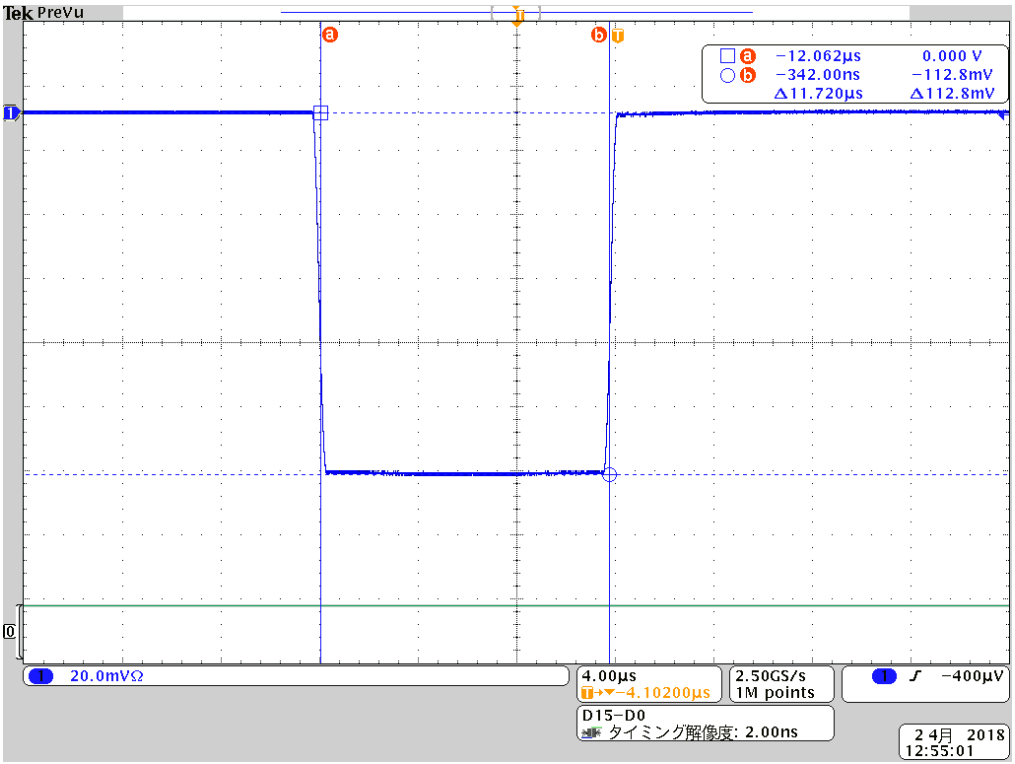


Fig. 6.9 M1 Pulse Envelope

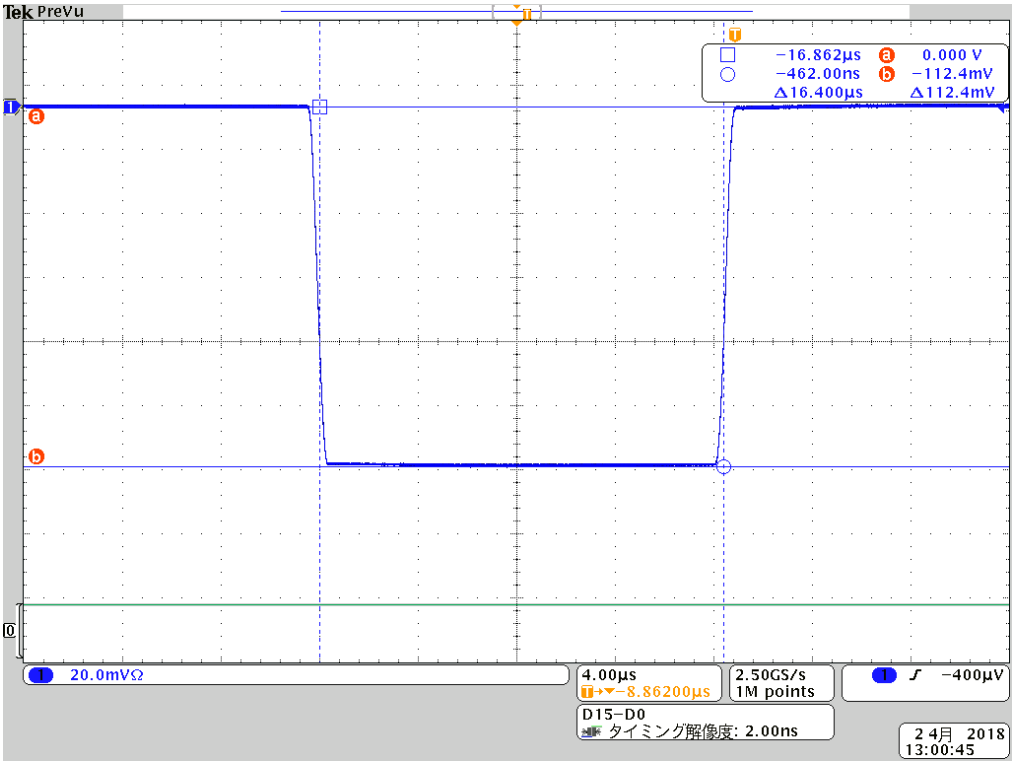


Fig. 6.10 M2 Pulse Envelope

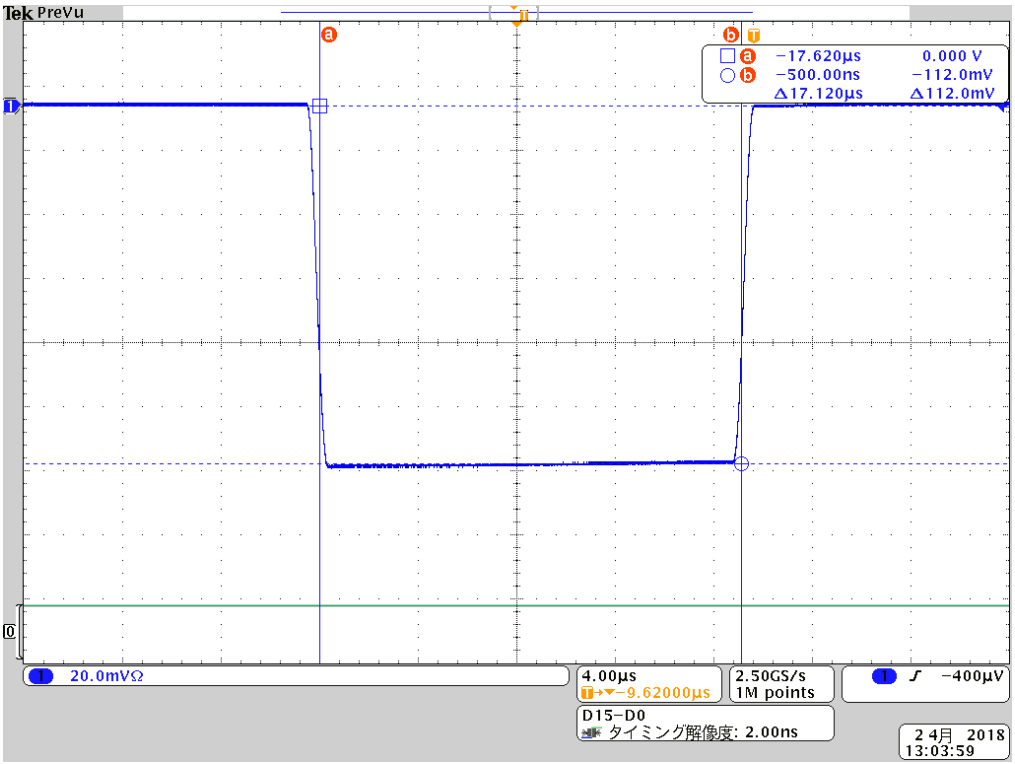


Fig. 6.11 M3 Pulse Envelope

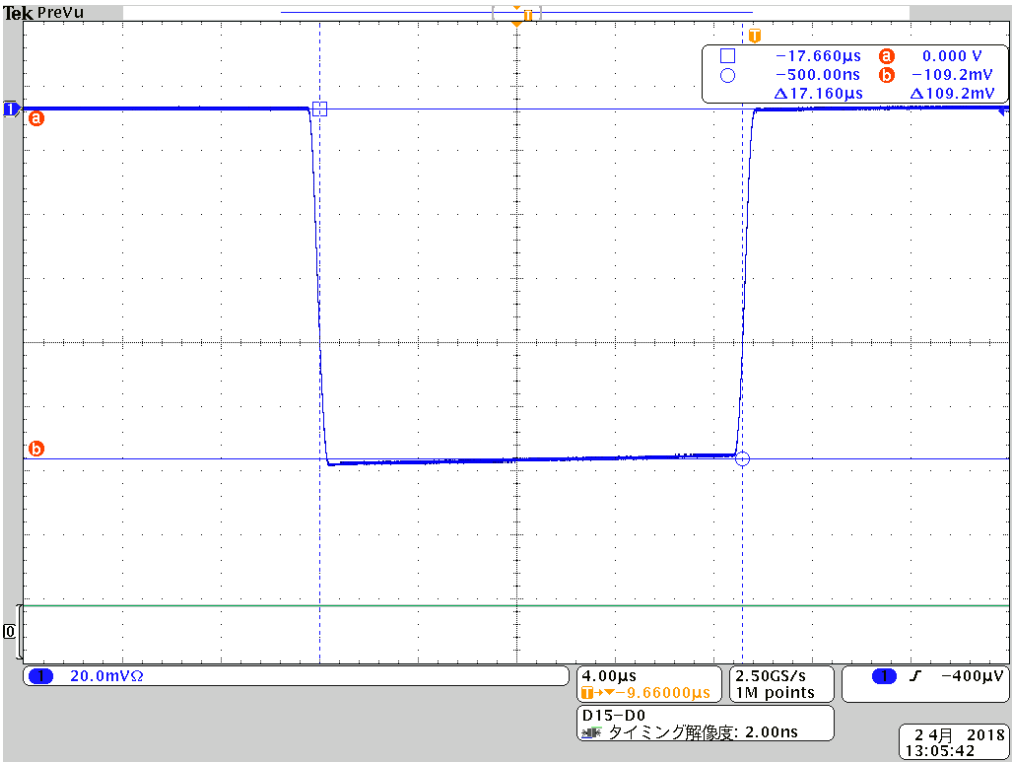


Fig. 6.12 L Pulse Envelope

CH2, P0N

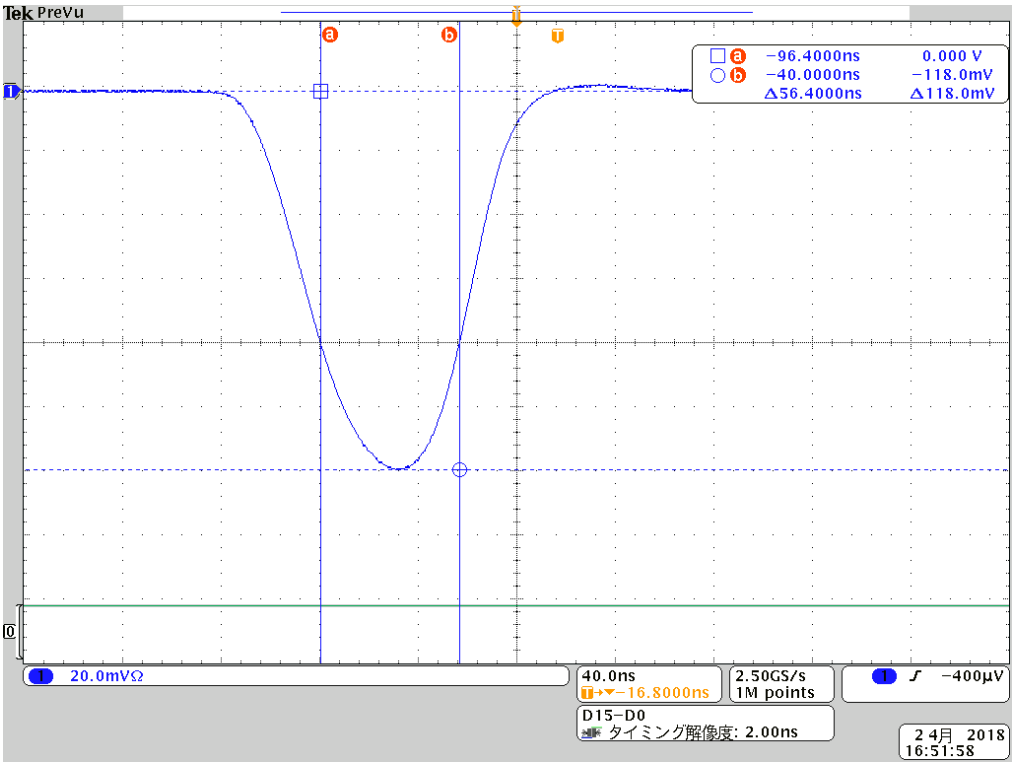


Fig. 6.13 S1 Pulse Envelope

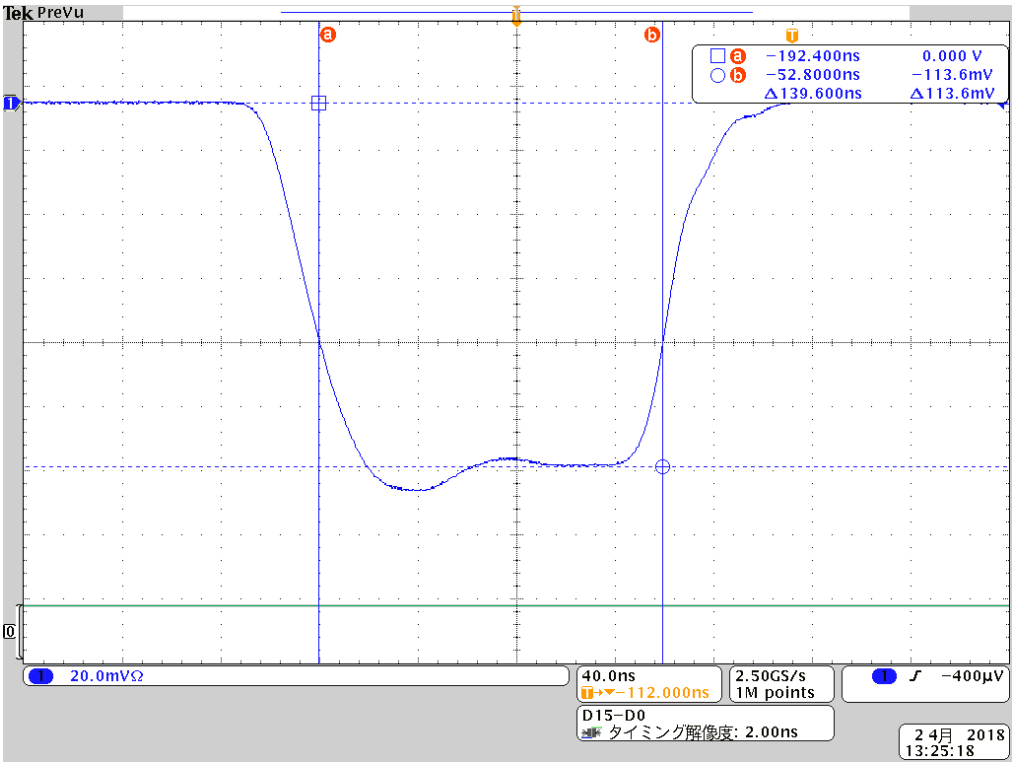


Fig. 6.14 S2 Pulse Envelope

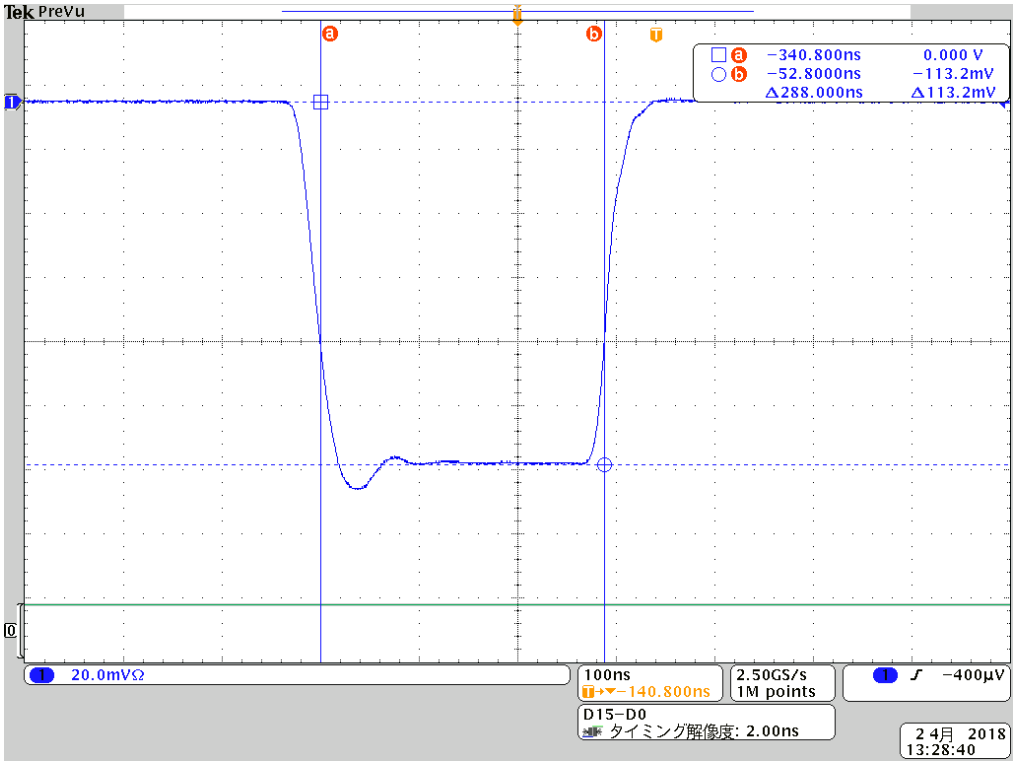


Fig. 6.15 M1 Pulse Envelope

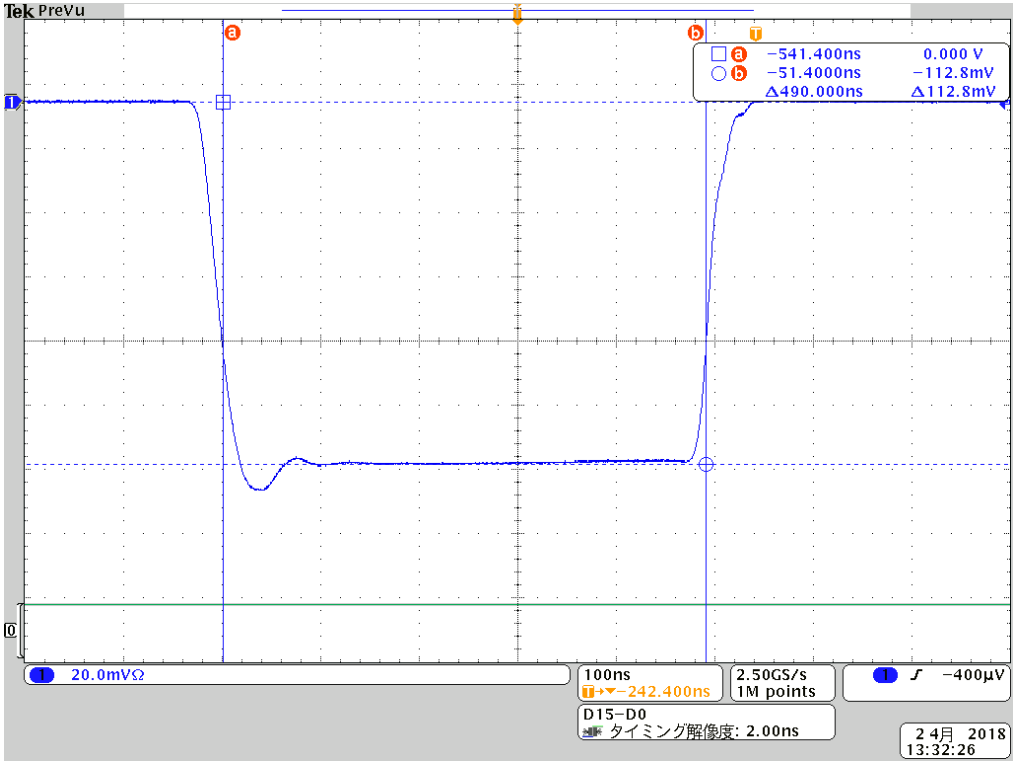


Fig. 6.16 M2 Pulse Envelope

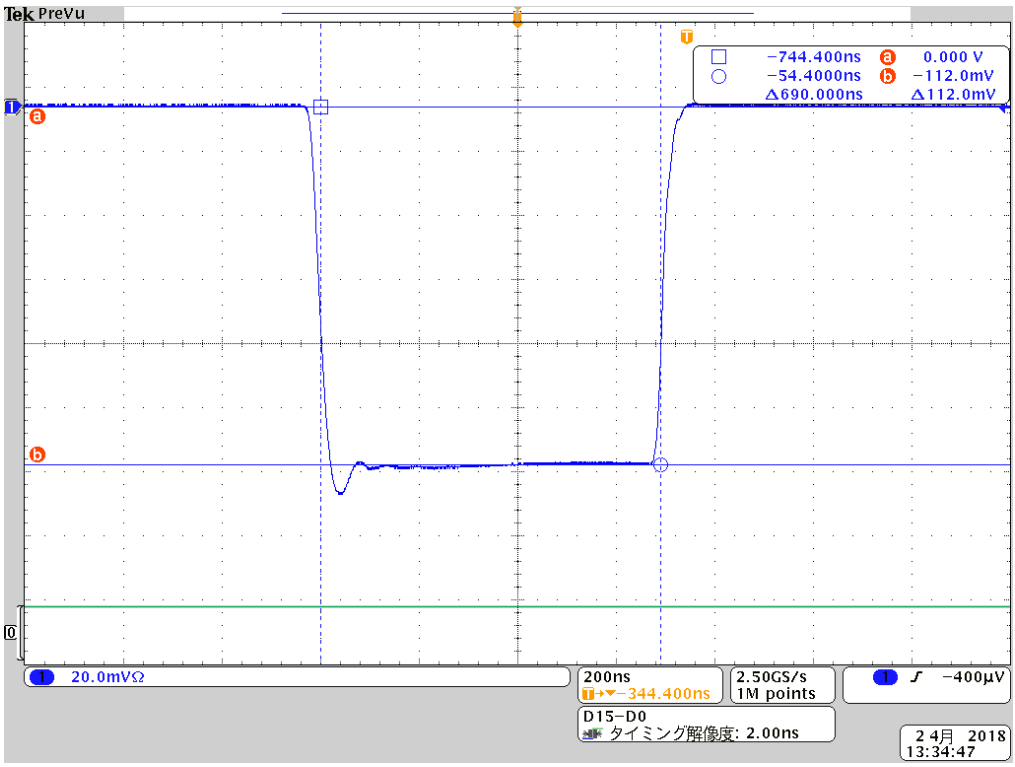


Fig. 6.17 M3 Pulse Envelope

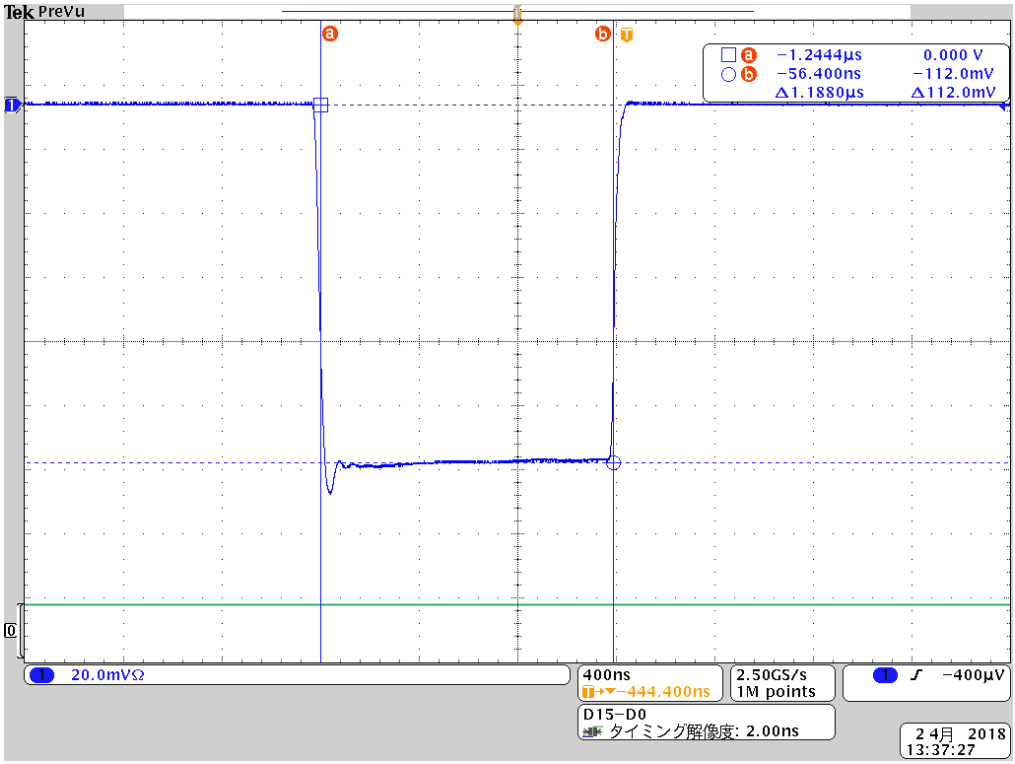


Fig. 6.18 L Pulse Envelope

CH2, Q0N

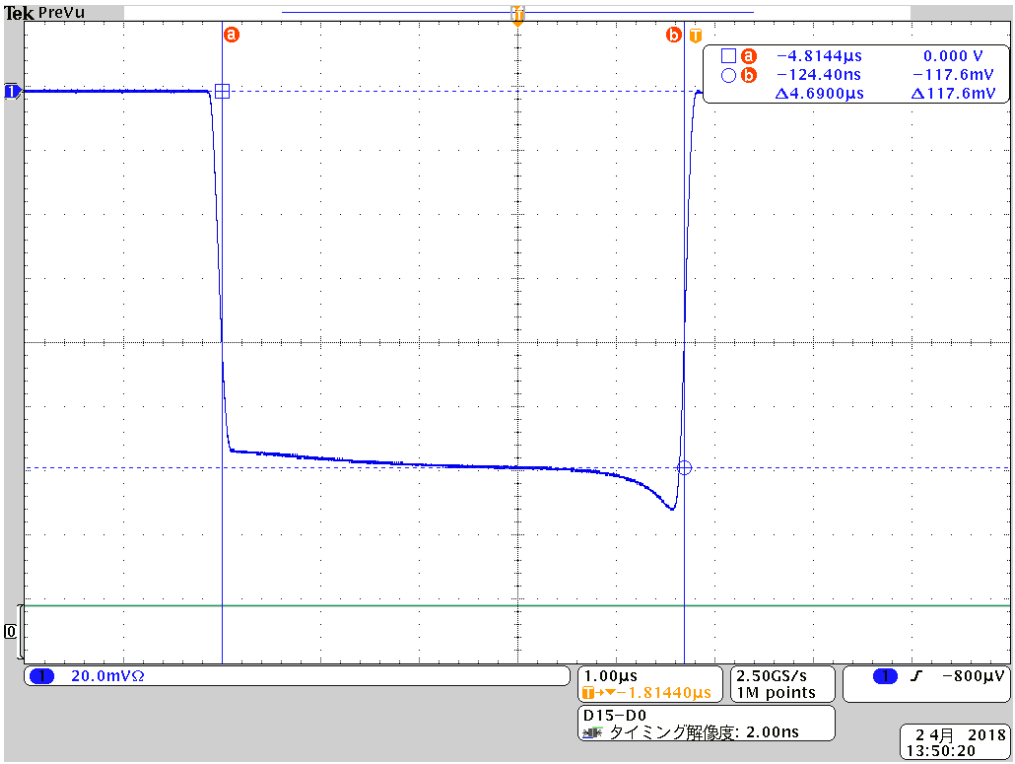


Fig. 6.19 S1 Pulse Envelope

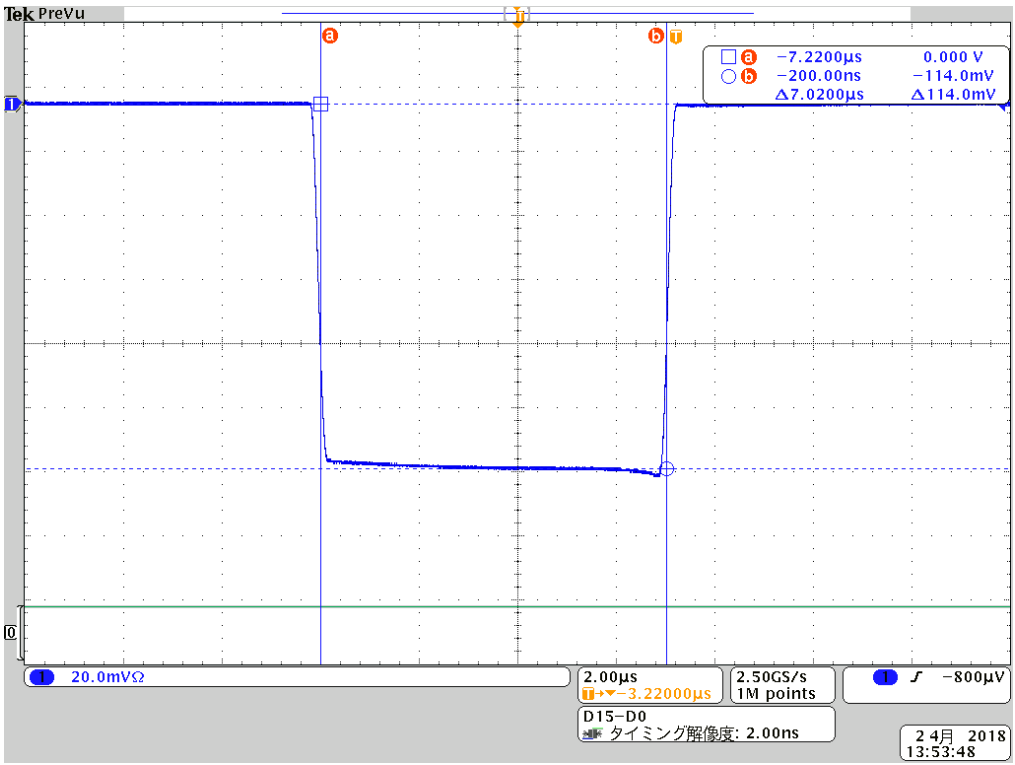


Fig. 6.20 S2 Pulse Envelope

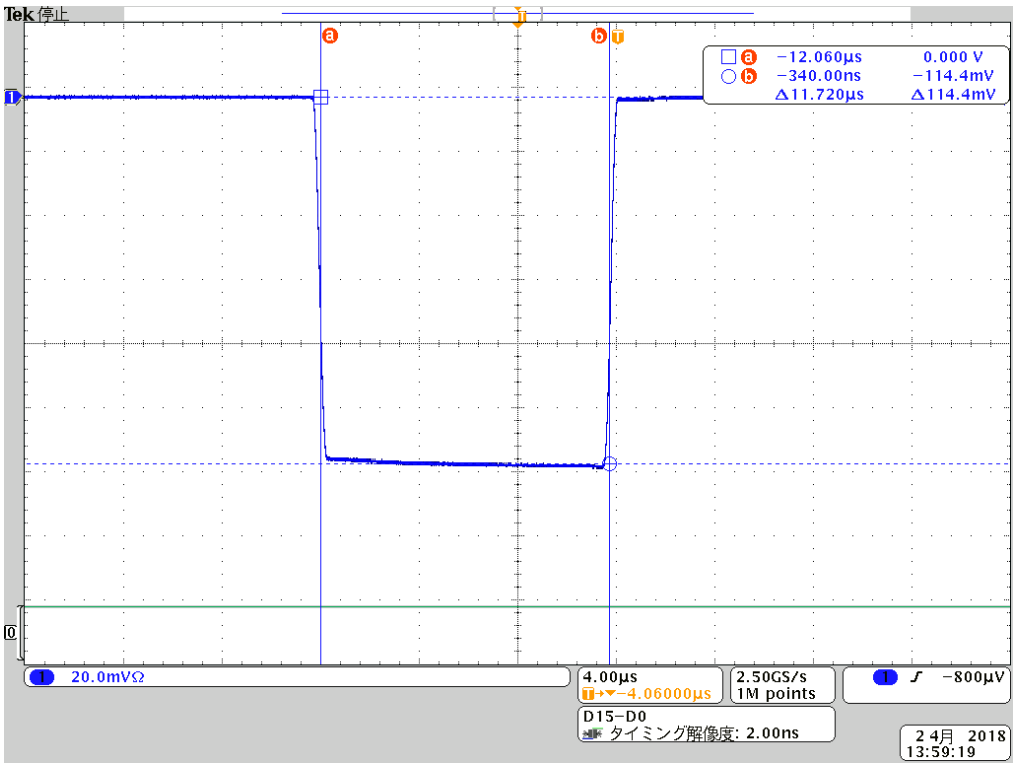


Fig. 6.21 M1 Pulse Envelope

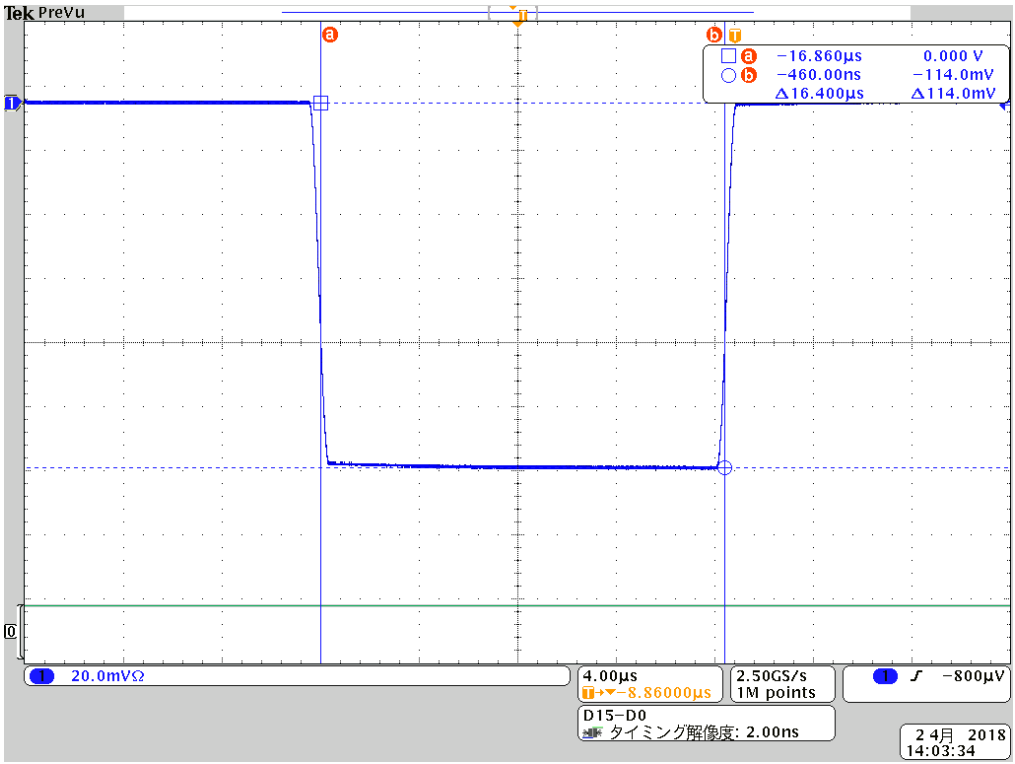


Fig. 6.22 M2 Pulse Envelope

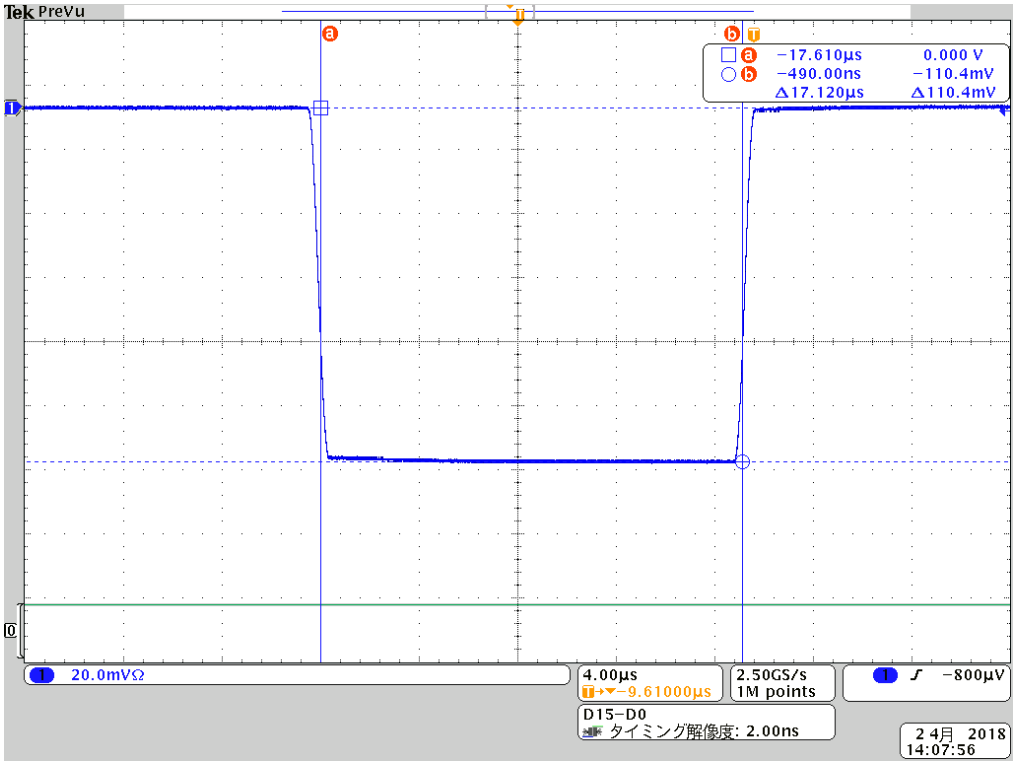


Fig. 6.23 M3 Pulse Envelope

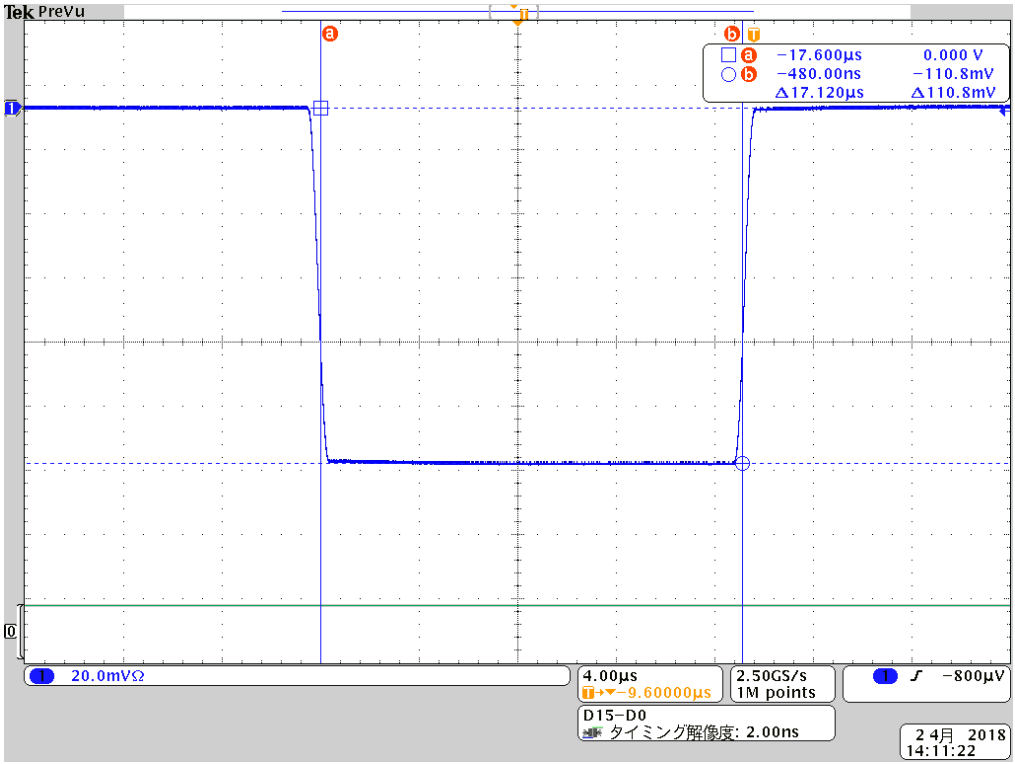


Fig. 6.24 L Pulse Envelope

CH3, P0N

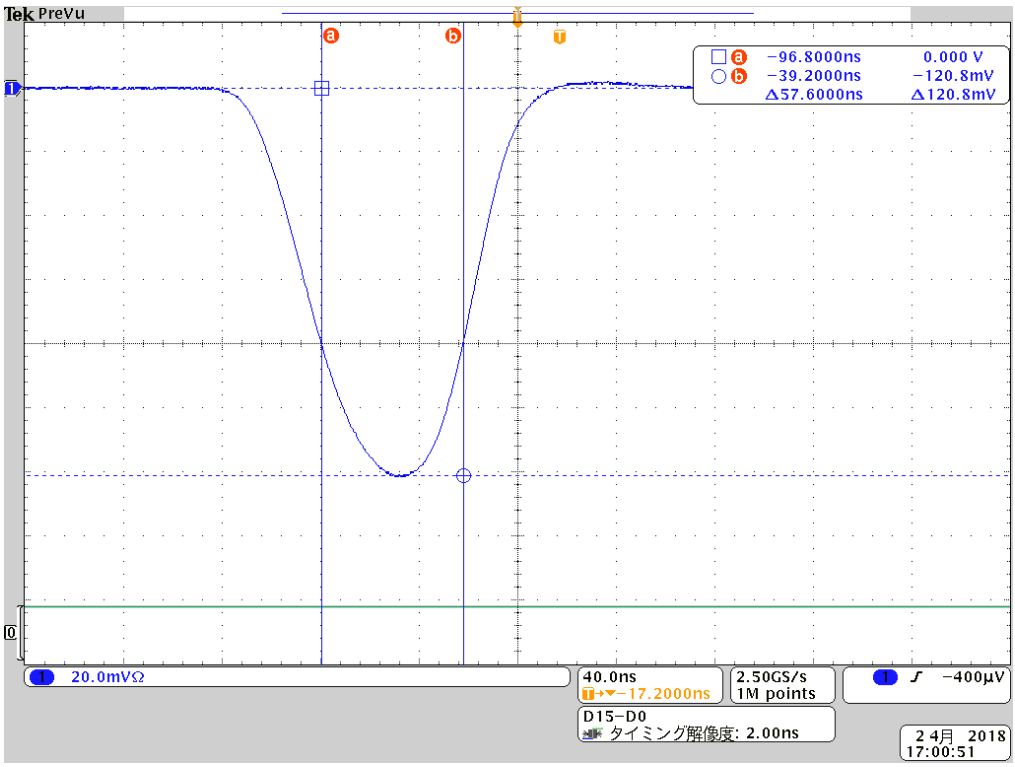


Fig. 6.25 S1 Pulse Envelope

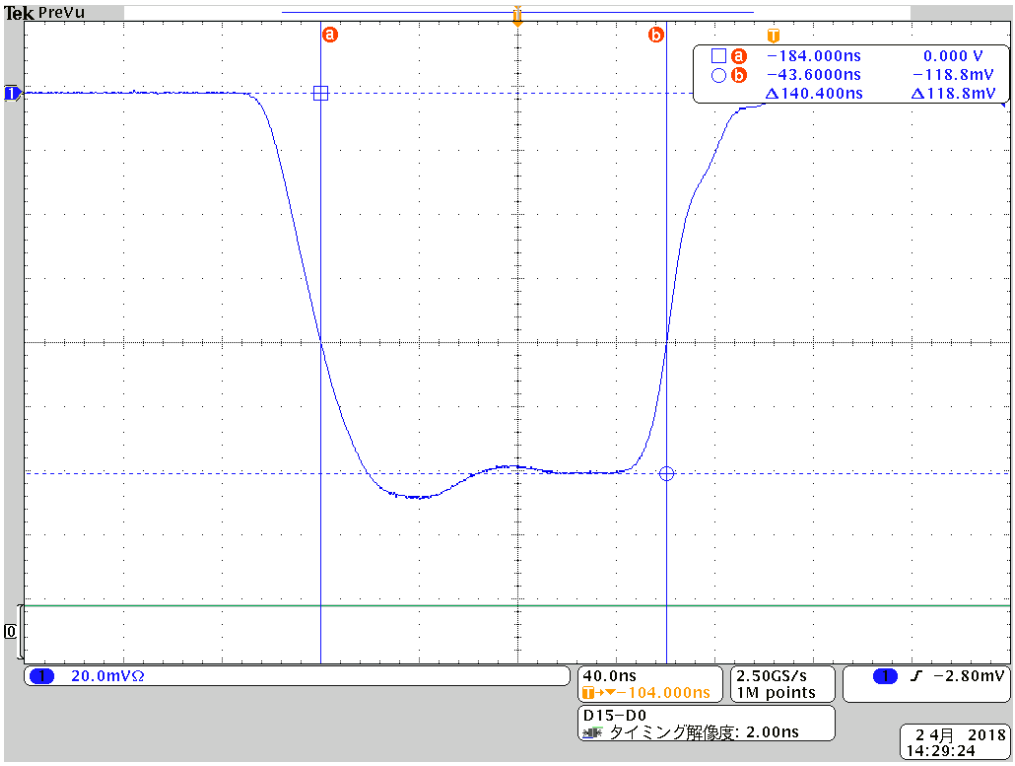


Fig. 6.26 S2 Pulse Envelope

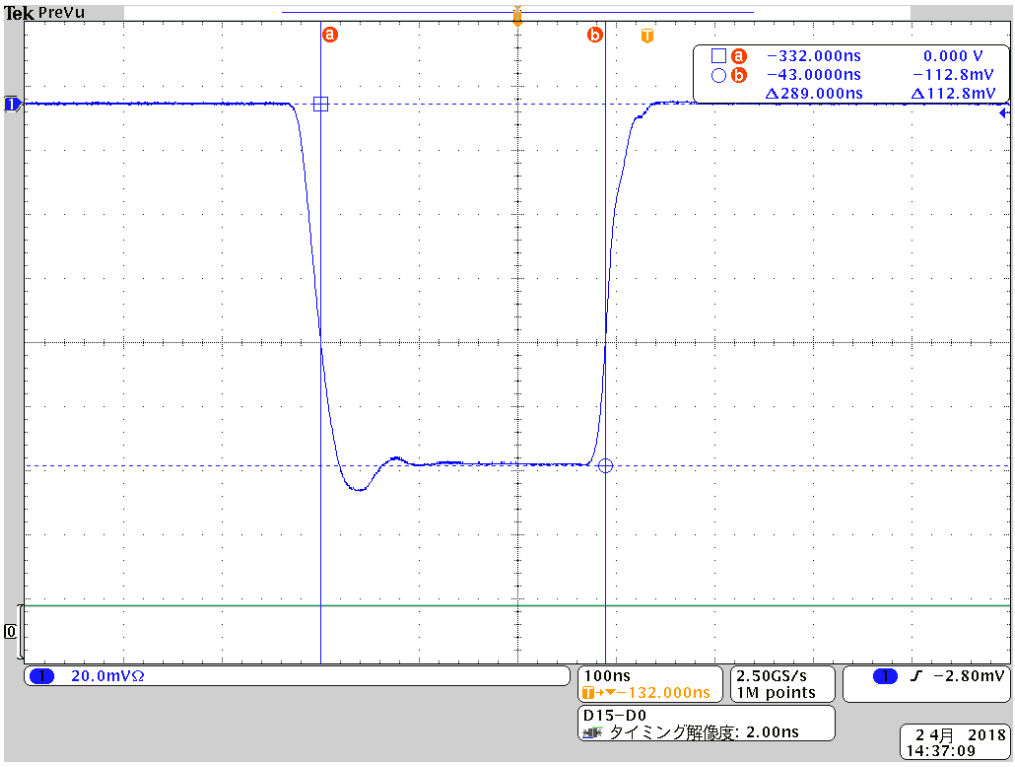


Fig. 6.27 M1 Pulse Envelope

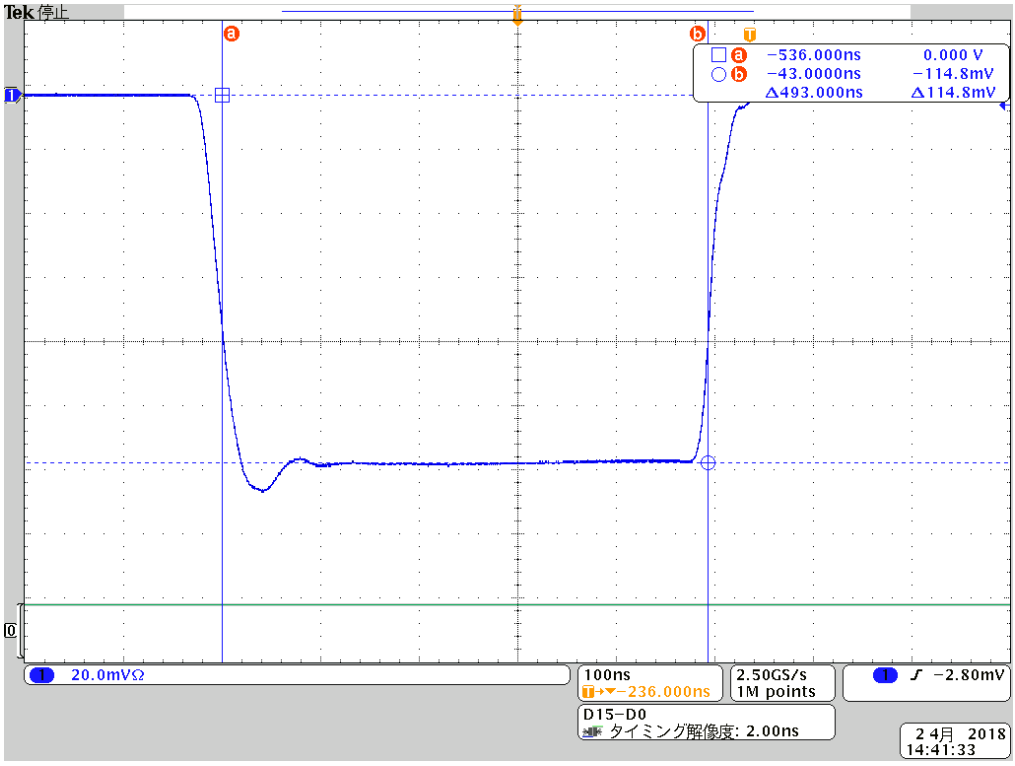


Fig. 6.28 M2 Pulse Envelope

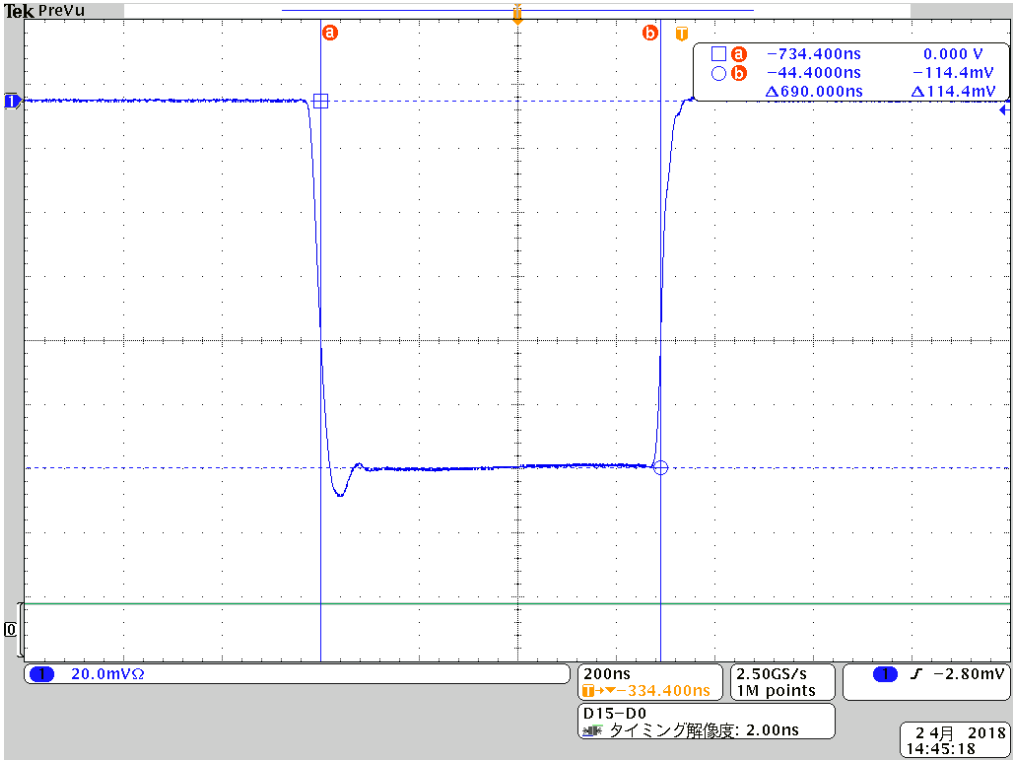


Fig. 6.29 M3 Pulse Envelope

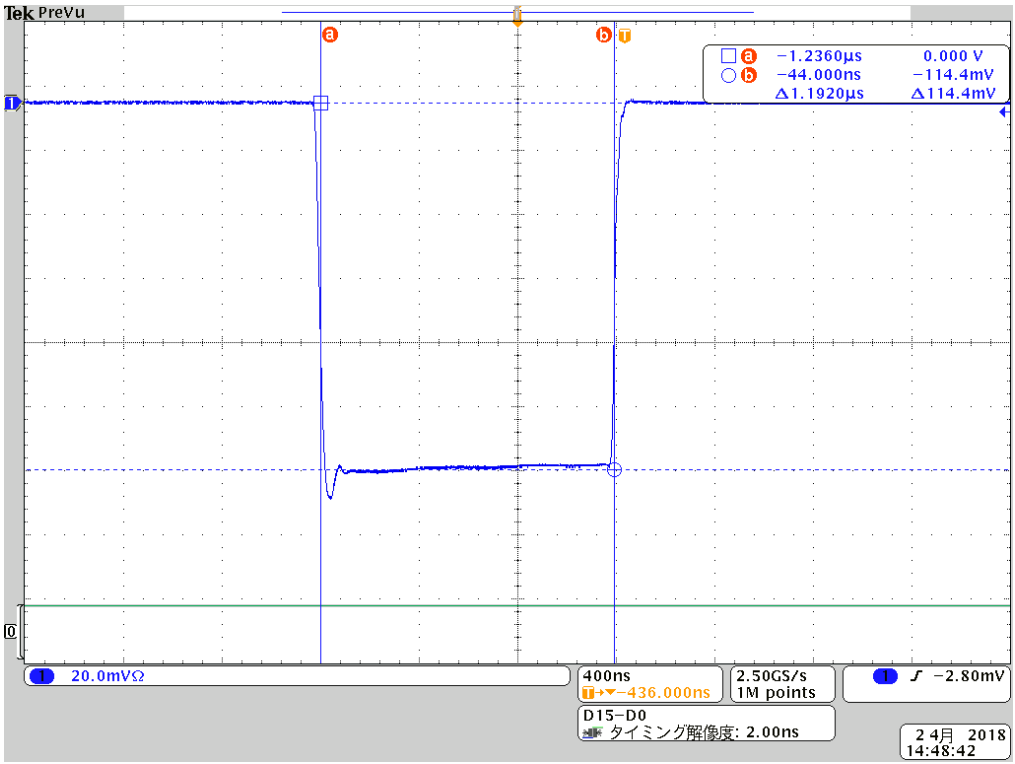


Fig. 6.30 L Pulse Envelope

CH3, Q0N

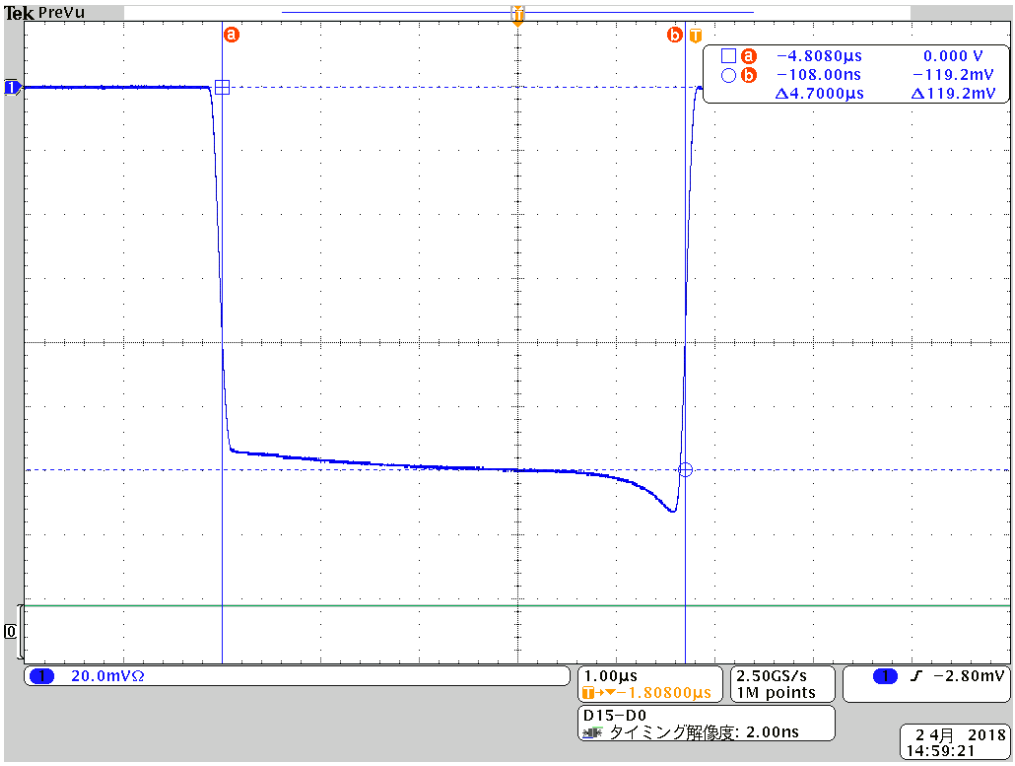


Fig. 6.31 S1 Pulse Envelope

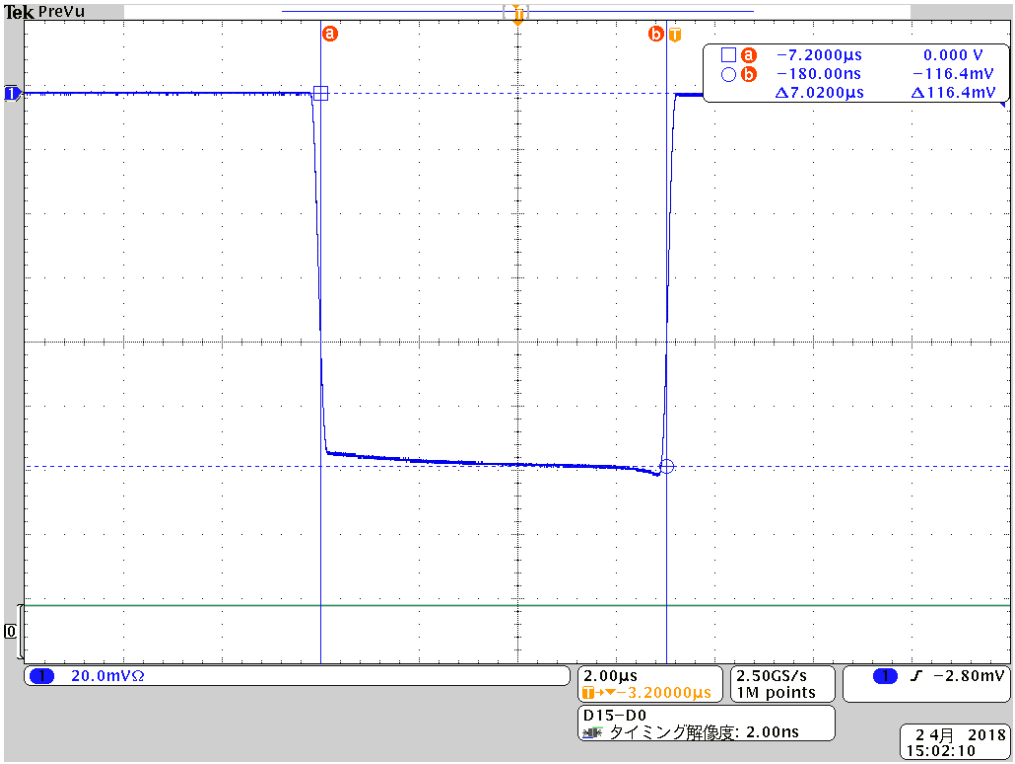


Fig. 6.32 S2 Pulse Envelope

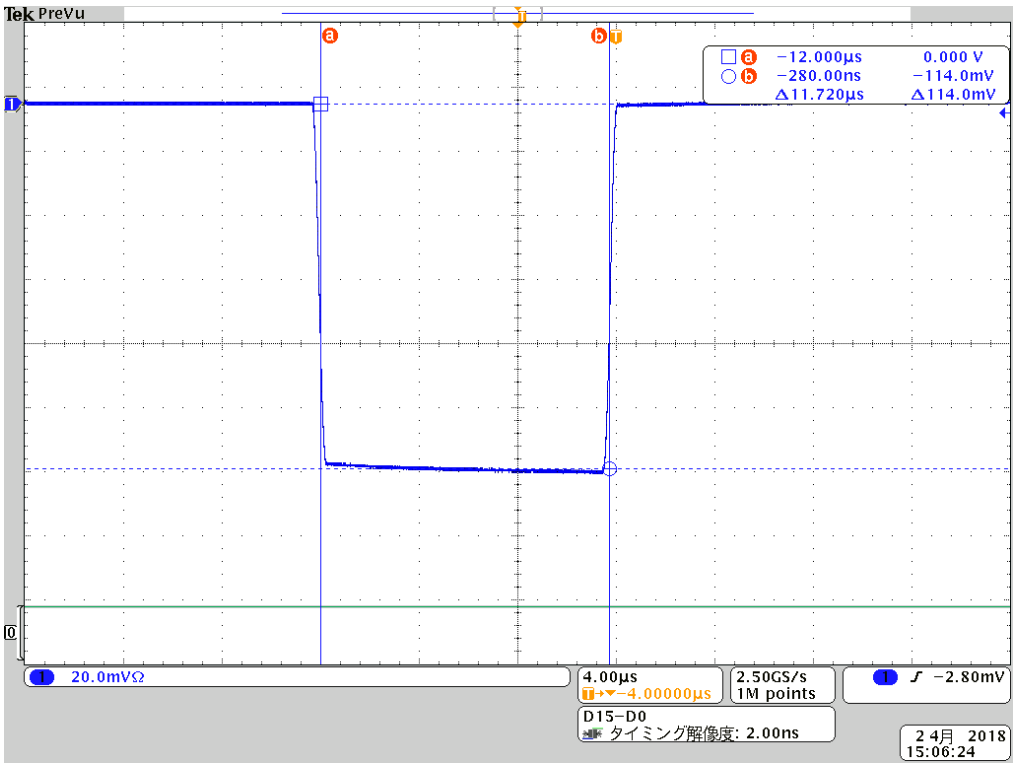


Fig. 6.33 M1 Pulse Envelope

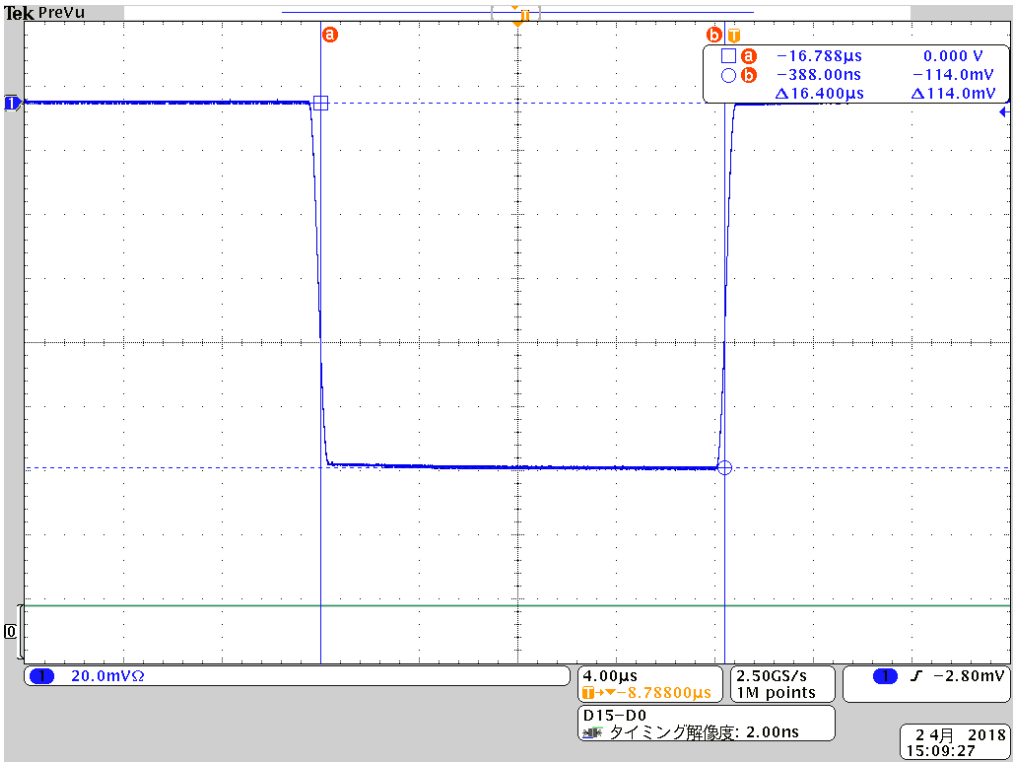


Fig. 6.34 M2 Pulse Envelope

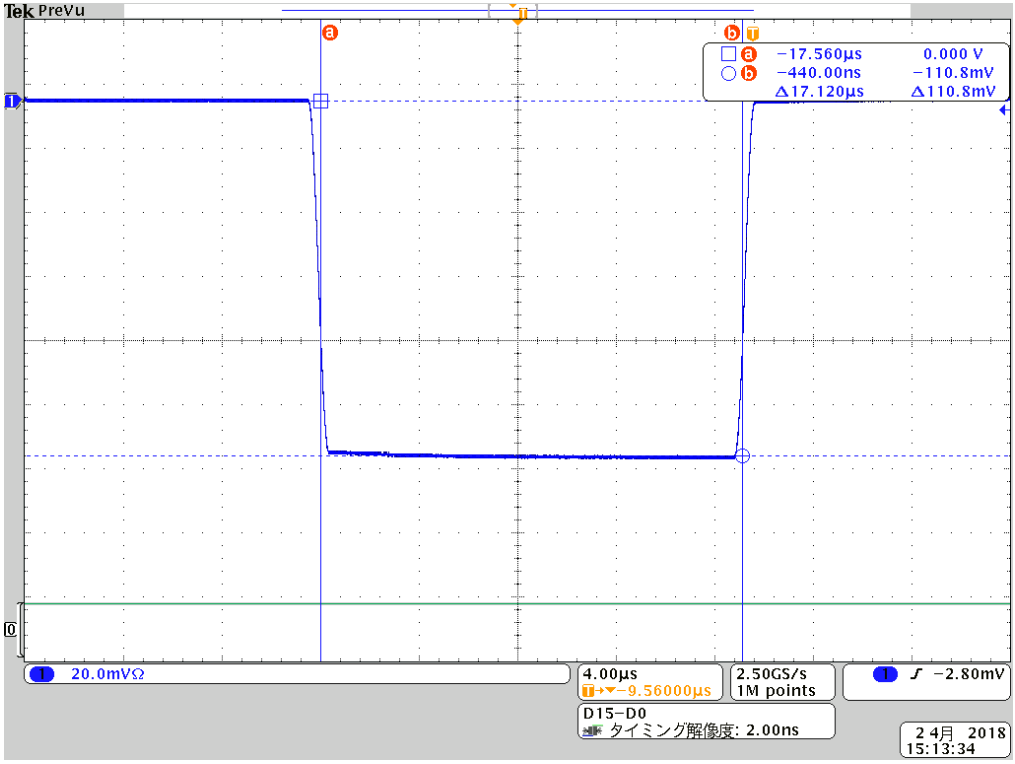


Fig. 6.35 M3 Pulse Envelope

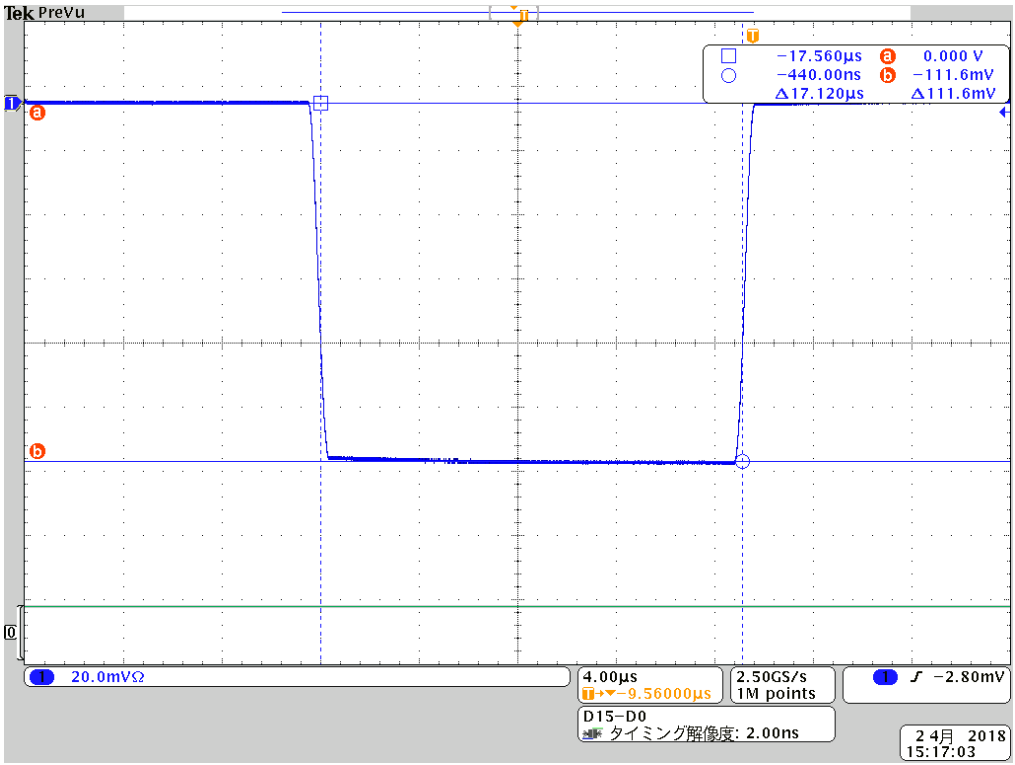


Fig. 6.36 L Pulse Envelope

7 Spurious Emission Plots measured at Antenna Terminal

CH1, P0N

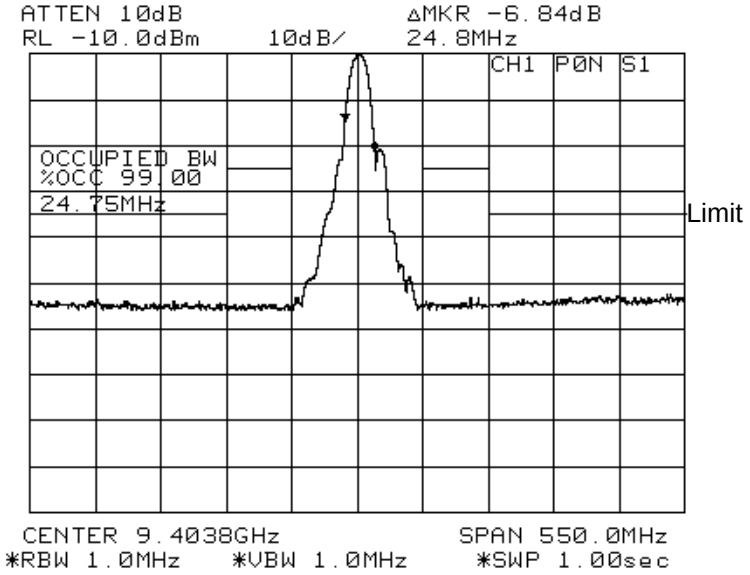


Fig. 7.1 for S1 Pulse

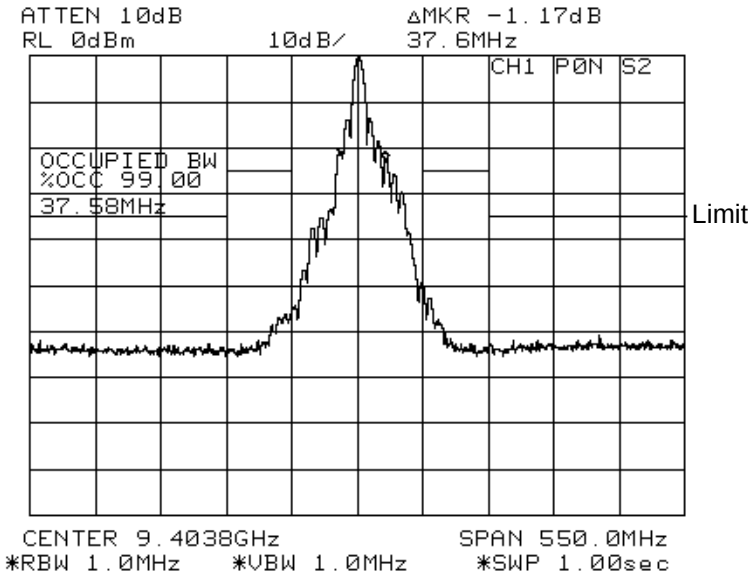


Fig. 7.2 for S2 Pulse

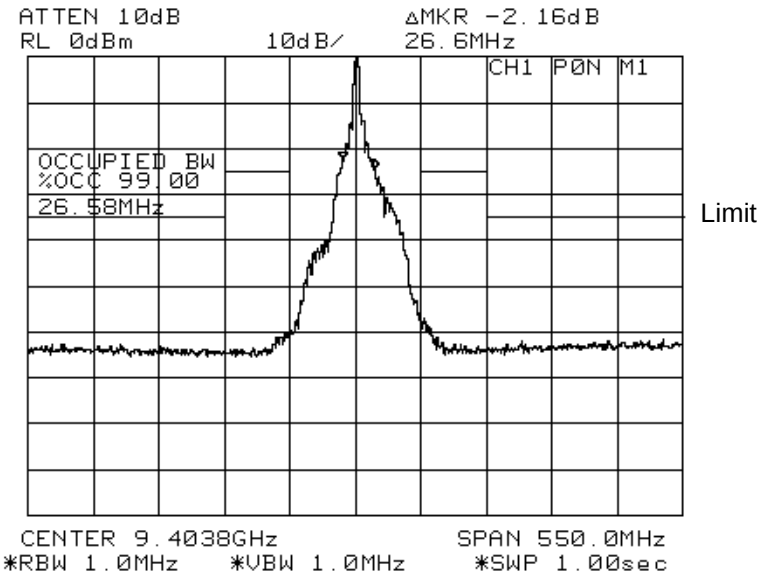


Fig. 7.3 for M1 Pulse

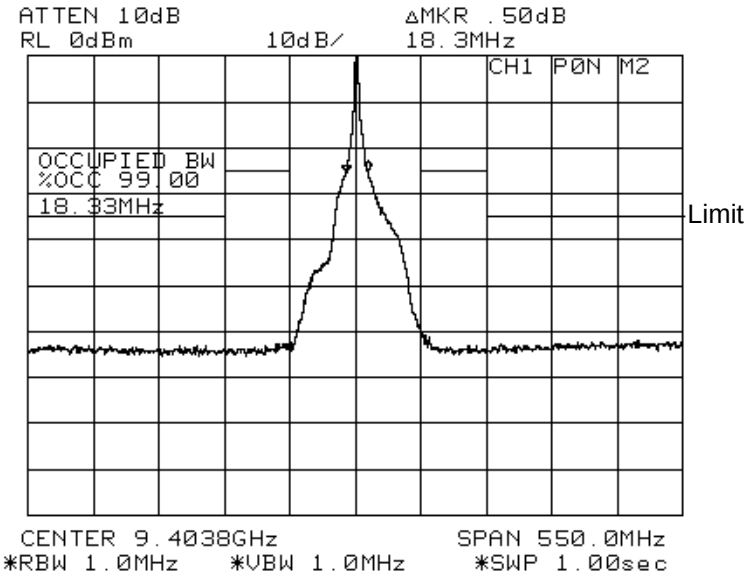


Fig. 7.4 for M2 Pulse

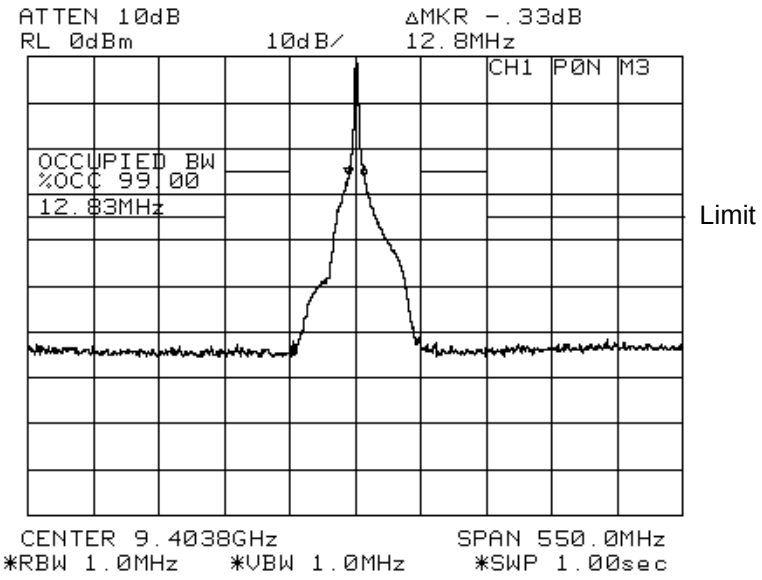


Fig. 7.5 for M3 Pulse

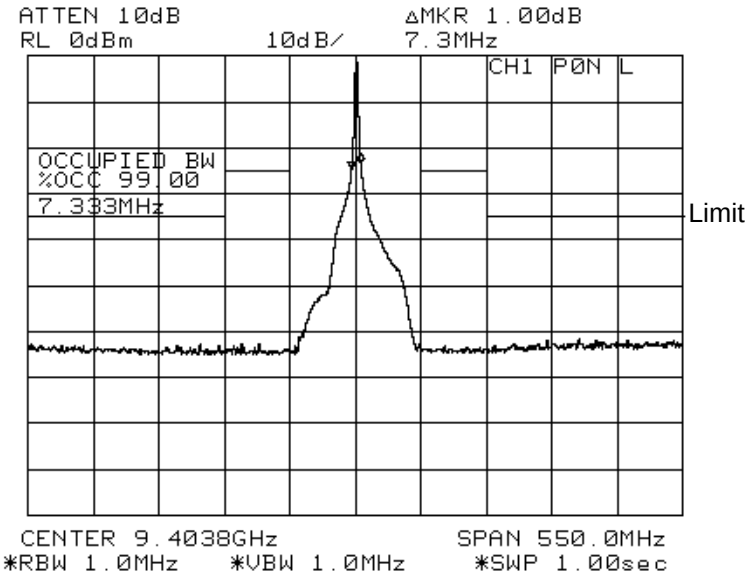


Fig. 7.6 for L Pulse

CH1, Q0N

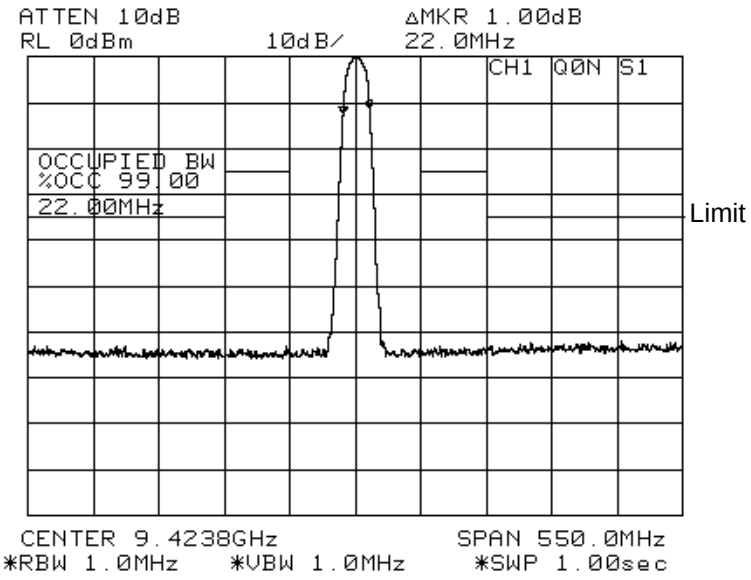


Fig. 7.7 for S1 Pulse

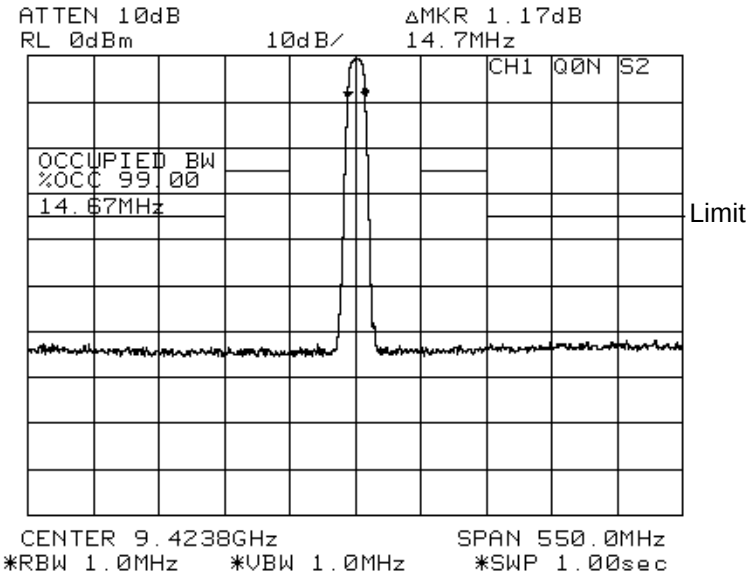


Fig. 7.8 for S2 Pulse

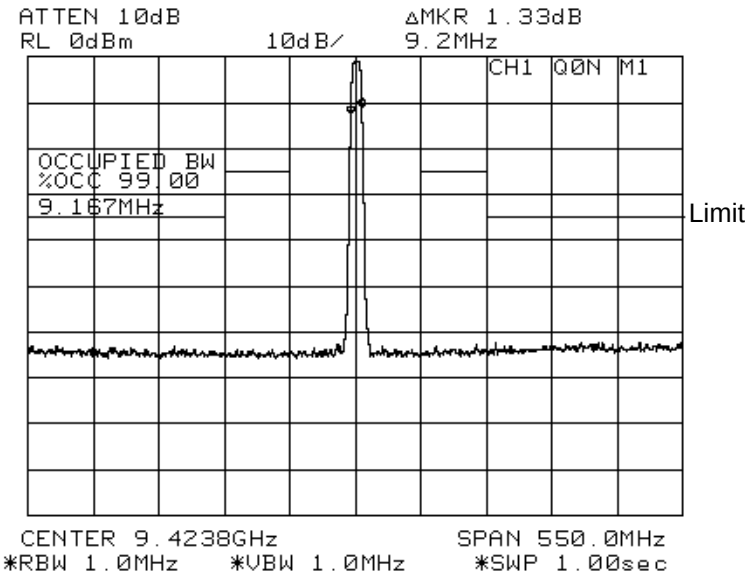


Fig. 7.9 for M1 Pulse

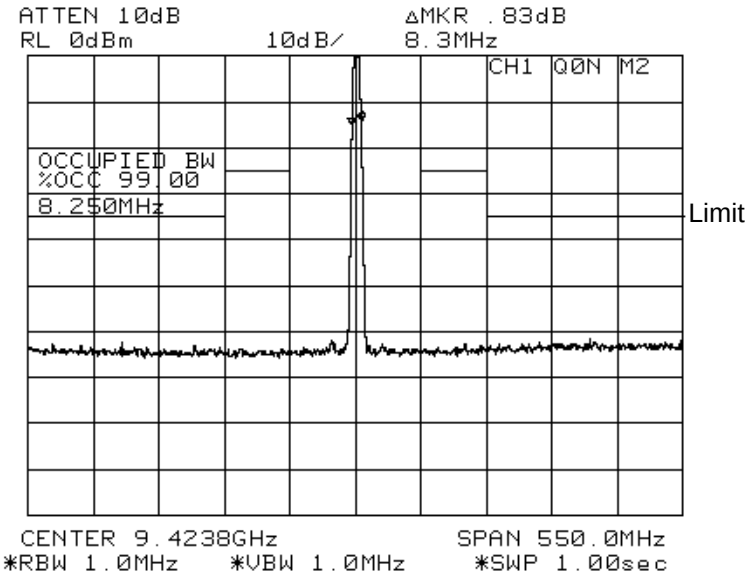


Fig. 7.10 for M2 Pulse

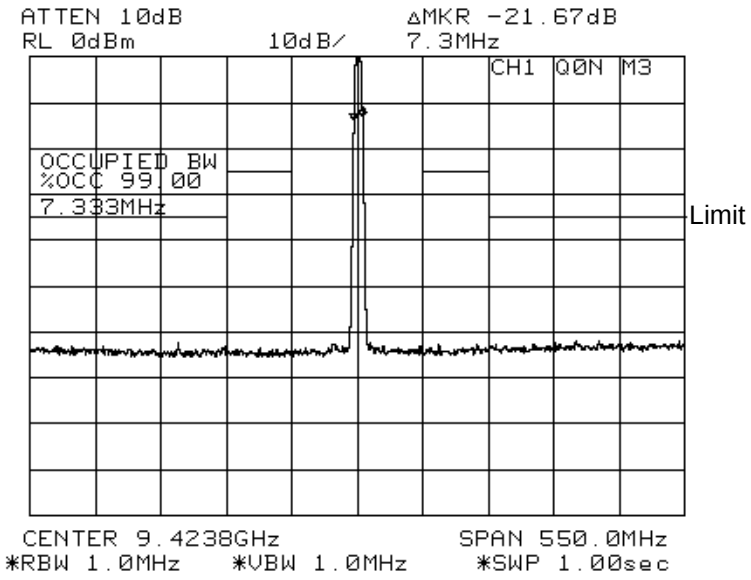


Fig. 7.11 for M3 Pulse

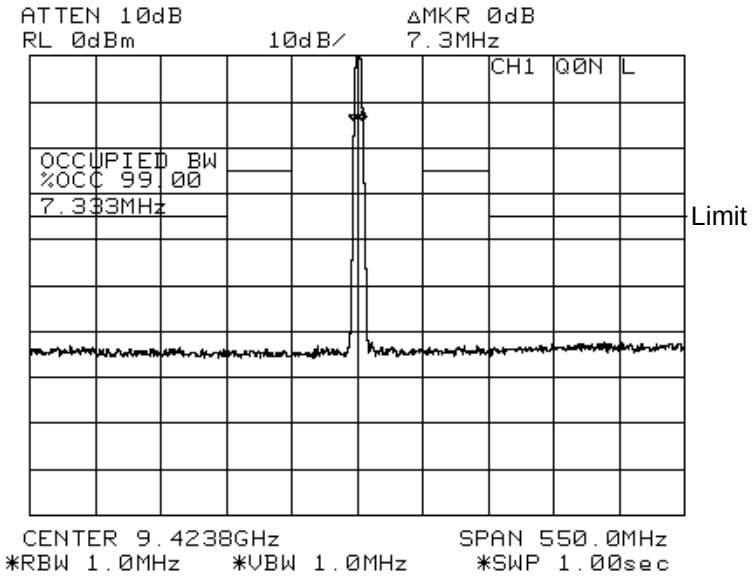


Fig. 7.12 for L Pulse

CH2, P0N

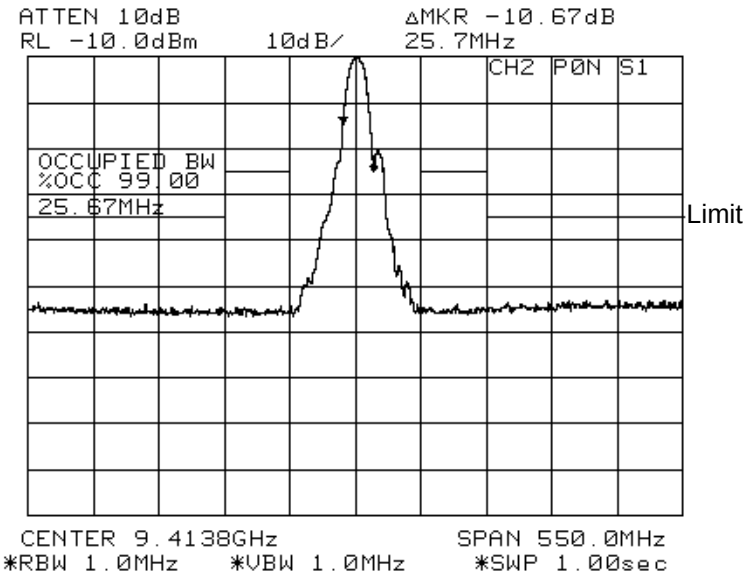


Fig. 7.13 for S1 Pulse

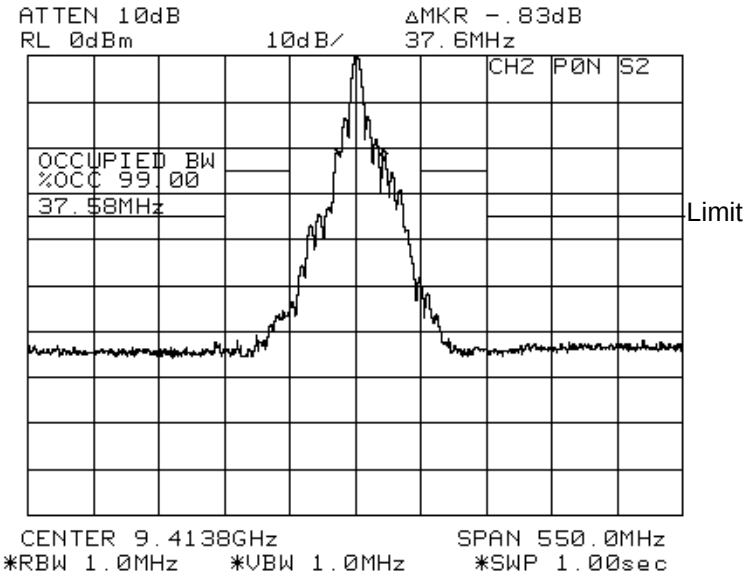


Fig. 7.14 for S2 Pulse

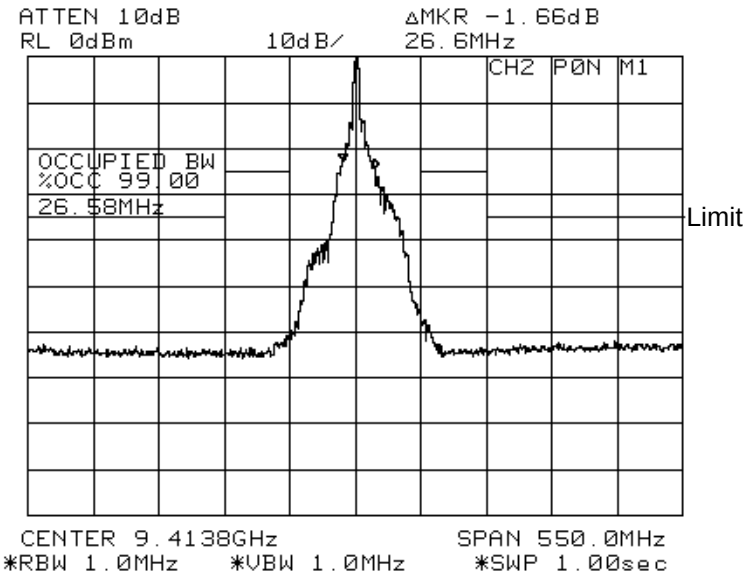


Fig. 7.15 for M1 Pulse

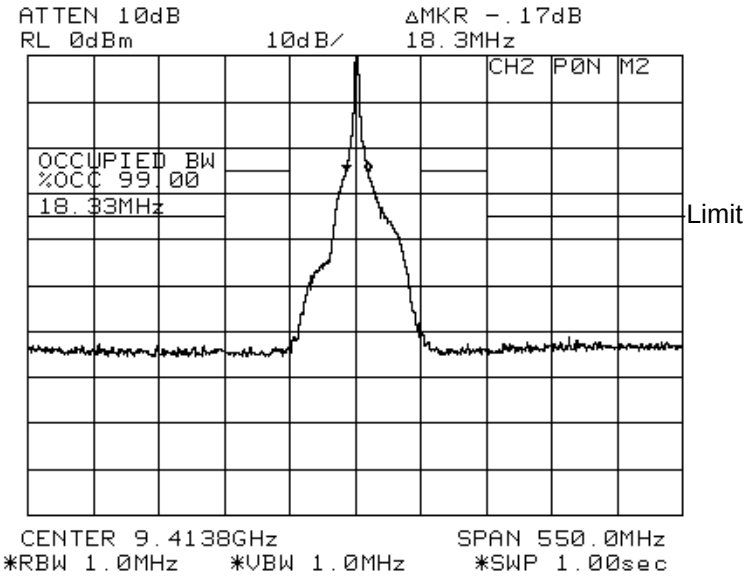


Fig. 7.16 for M2 Pulse

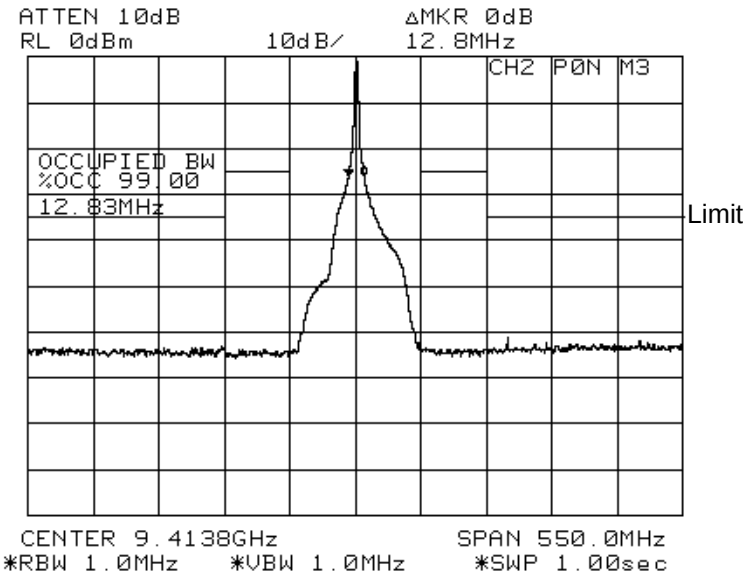


Fig. 7.17 for M3 Pulse

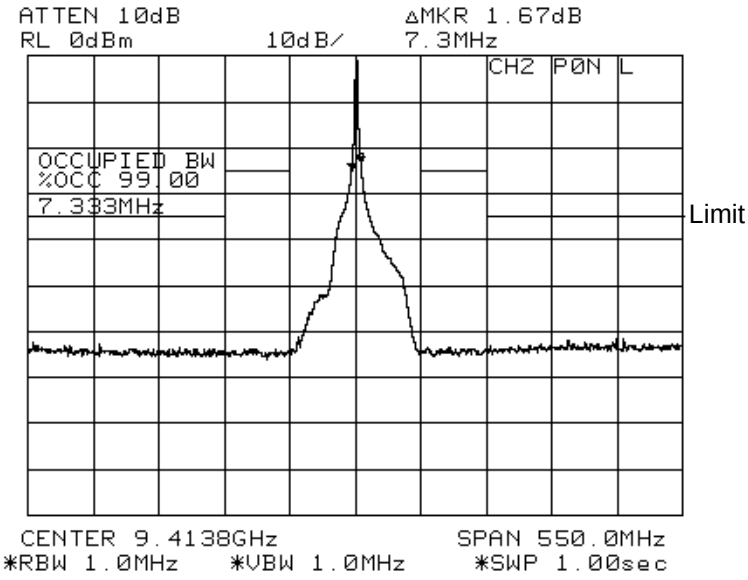


Fig. 7.18 for L Pulse

CH2, Q0N

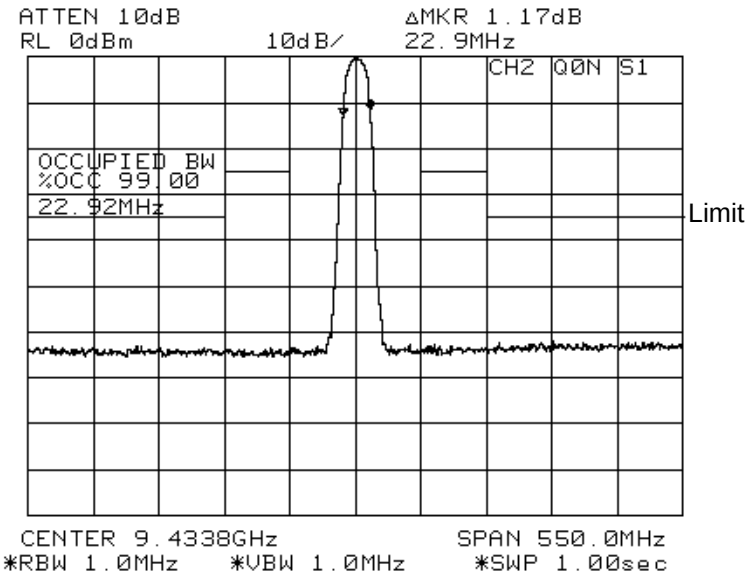


Fig. 7.19 for S1 Pulse

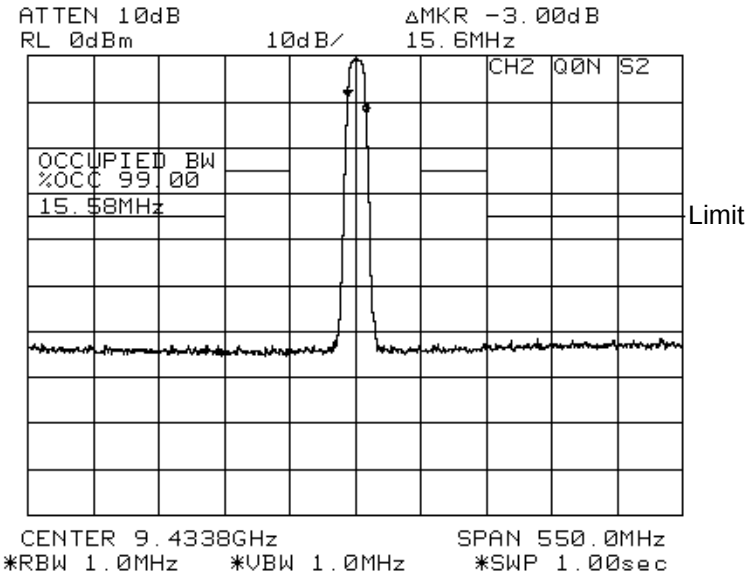


Fig. 7.20 for S2 Pulse

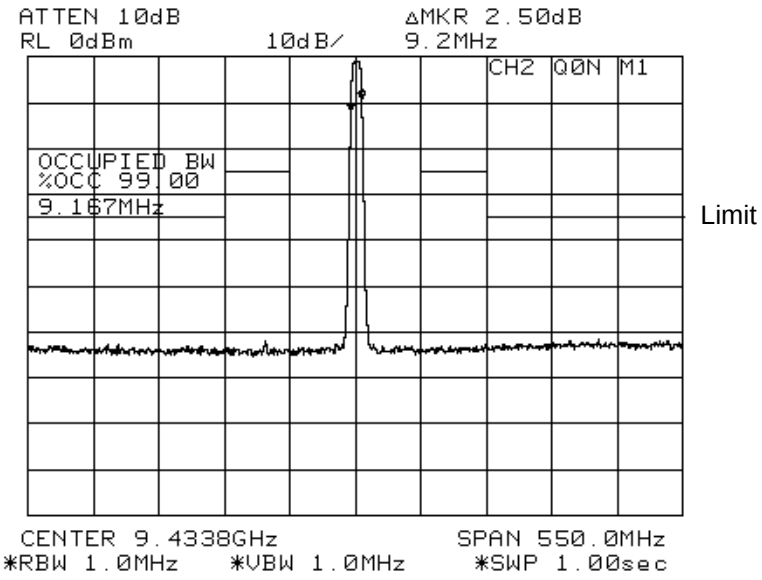


Fig. 7.21 for M1 Pulse

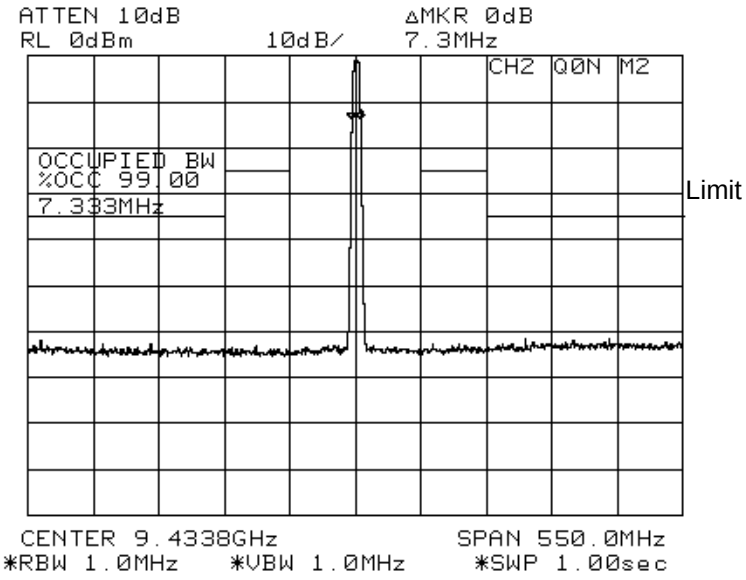


Fig. 7.22 for M2 Pulse

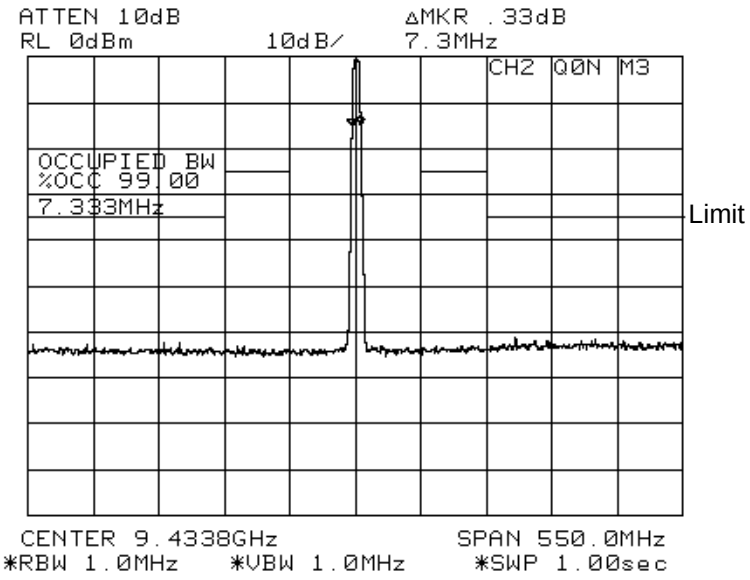


Fig. 7.23 for M3 Pulse

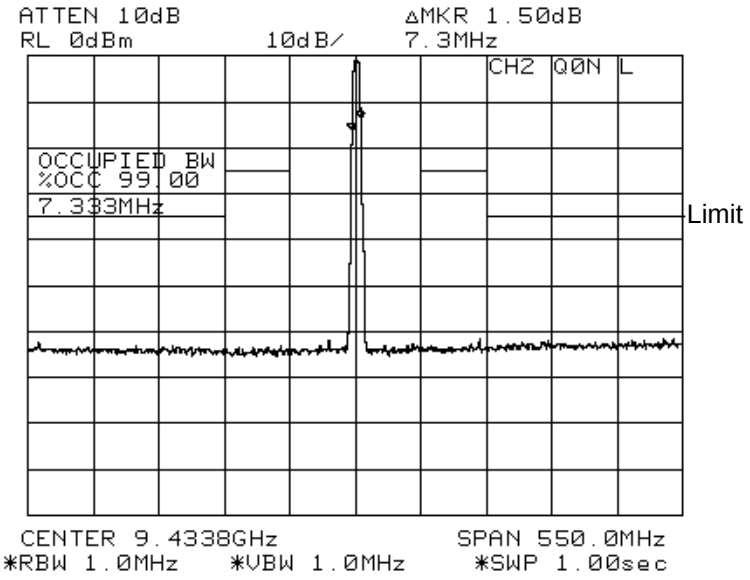


Fig. 7.24 for L Pulse

CH3, P0N

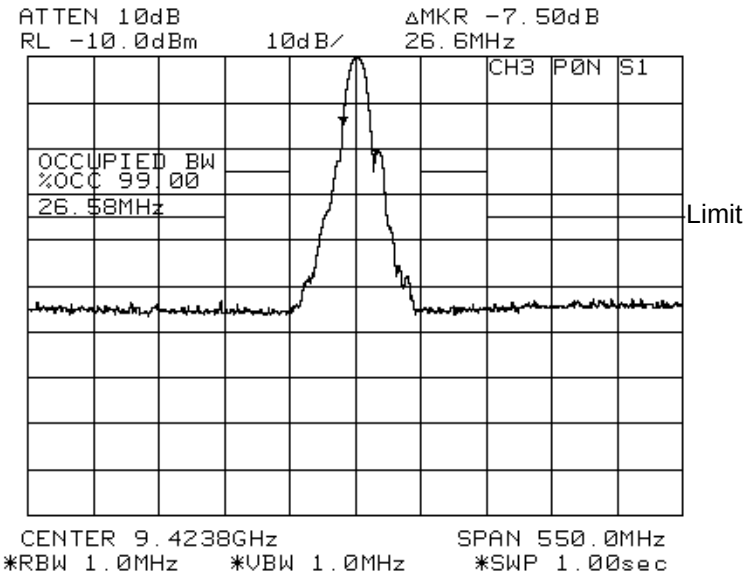


Fig. 7.25 for S1 Pulse

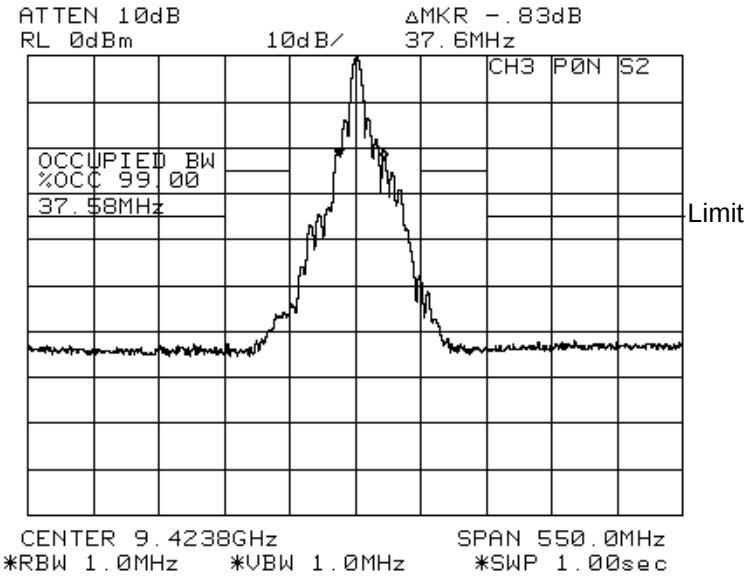


Fig. 7.26 for S2 Pulse

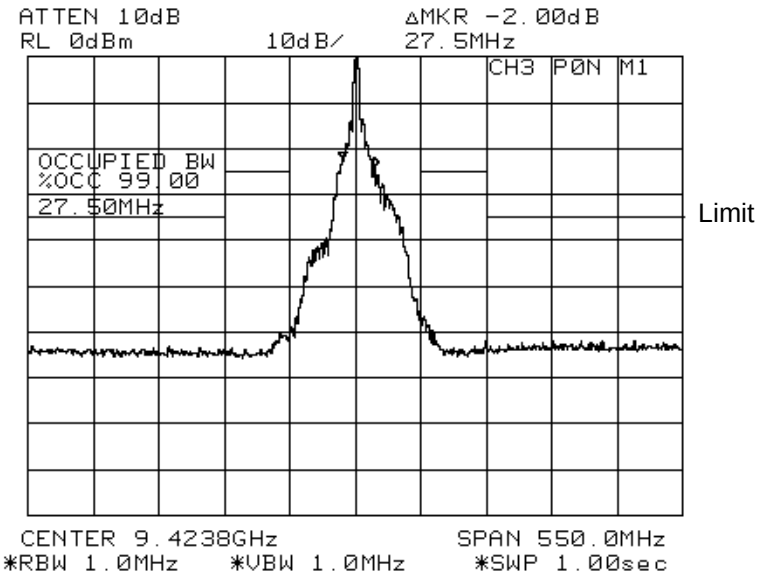


Fig. 7.27 for M1 Pulse

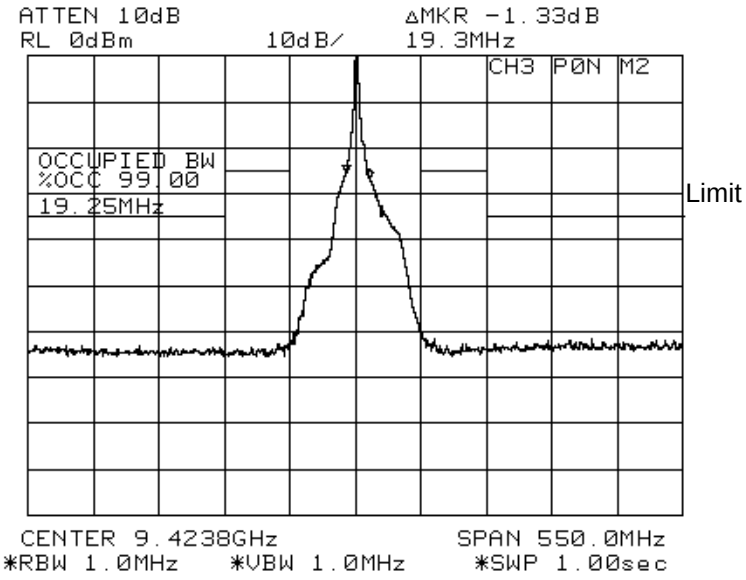


Fig. 7.28 for M2 Pulse

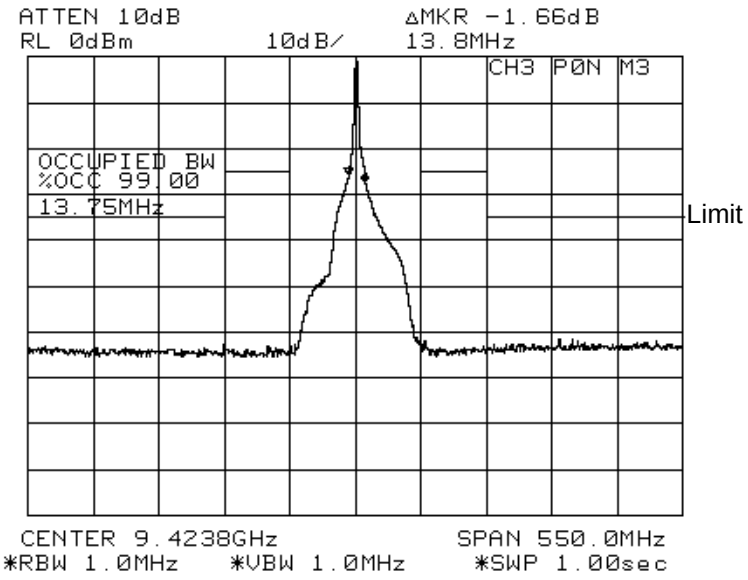


Fig. 7.29 for M3 Pulse

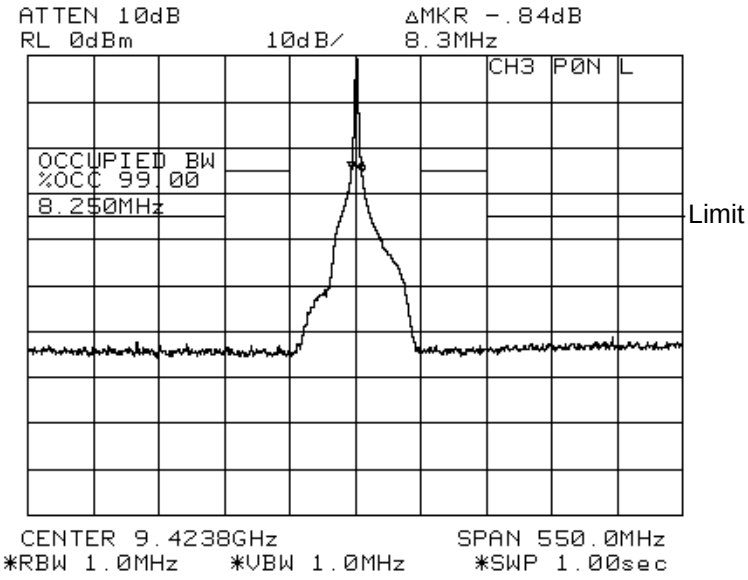


Fig. 7.30 for L Pulse

CH3, Q0N

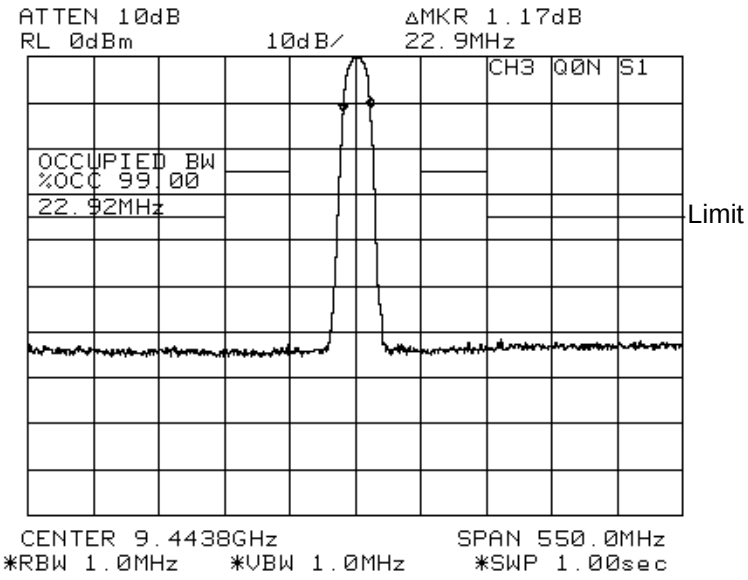


Fig. 7.31 for S1 Pulse

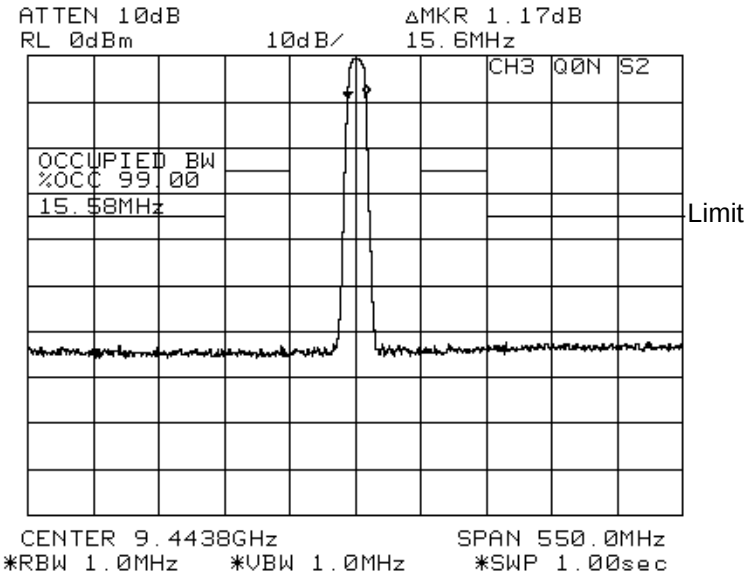


Fig. 7.32 for S2 Pulse

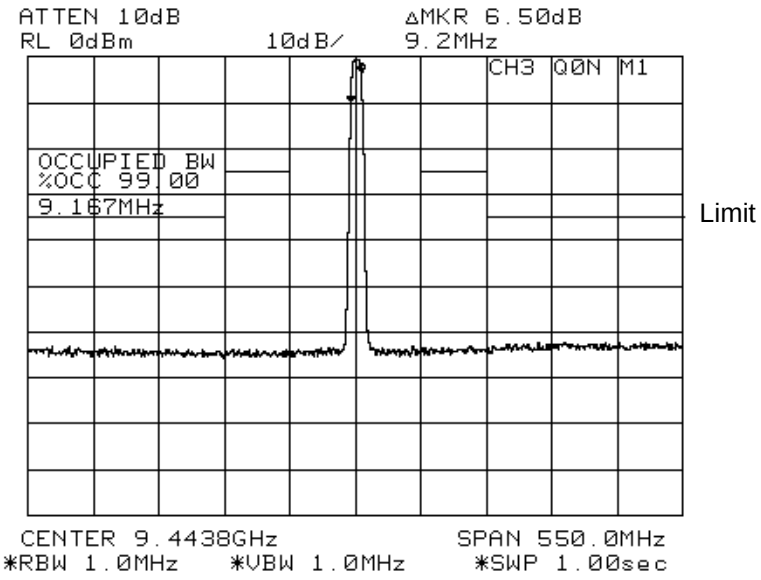


Fig. 7.33 for M1 Pulse

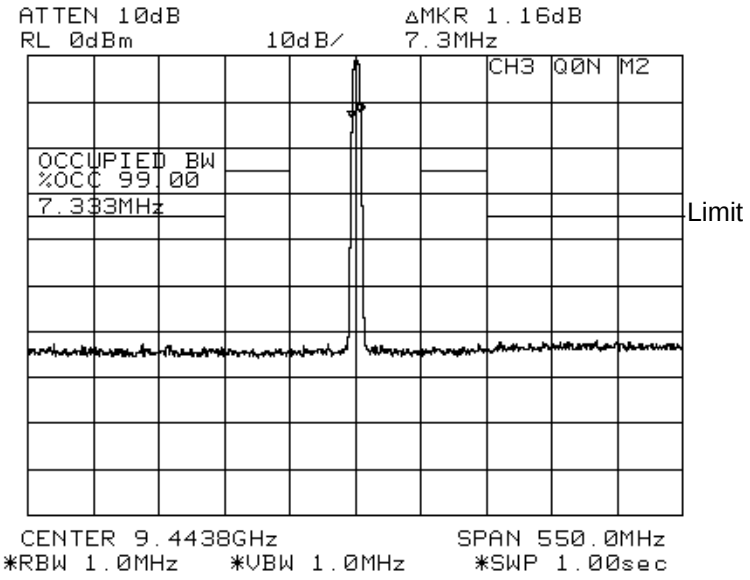


Fig. 7.34 for M2 Pulse

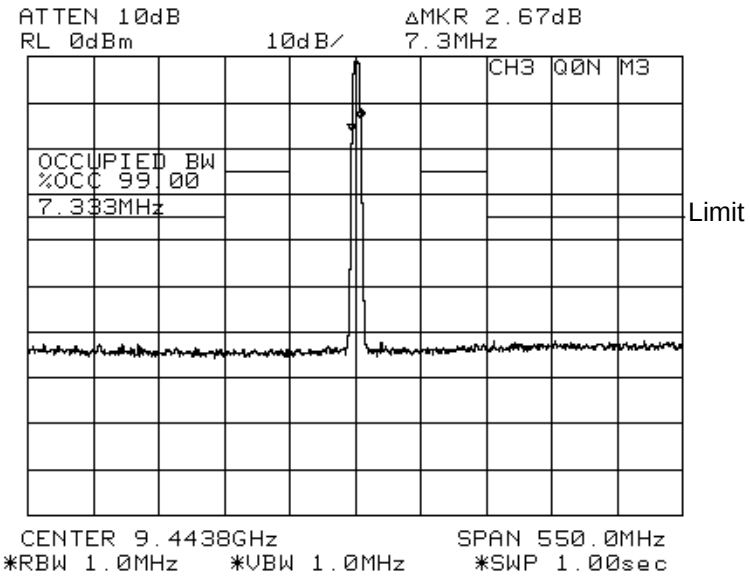


Fig. 7.35 for M3 Pulse

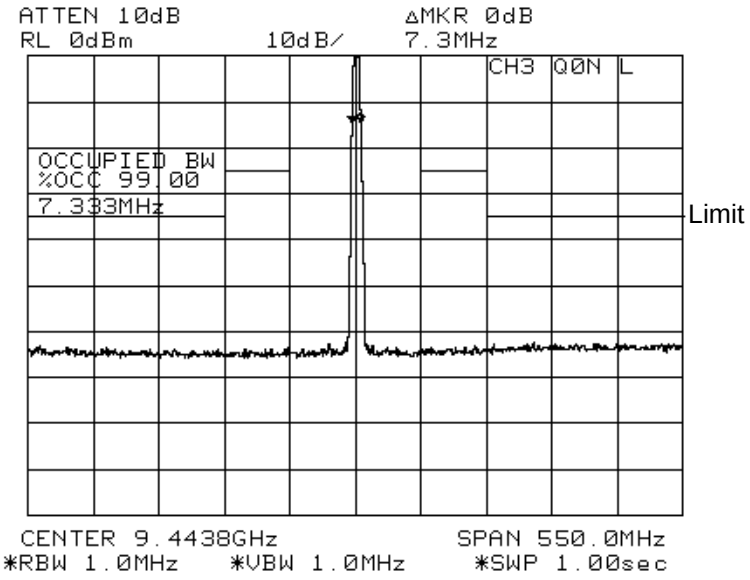


Fig. 7.36 for L Pulse

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