



RADIO TEST REPORT

Test Report No. : 28CE0024-YK-C

Applicant : TOPCON CORPORATION
Type of Equipment : Global Mapping System
Model No. : GMS-2Pro
FCC ID : LCB-841221
Test Standard : FCC Part15 Subpart C: 2007
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.

Date of test: October 22, 23, 24, 25, 26 and 29, 2007

Tested by: T. Arai & T. Imamura
Tatsuya Arai Toyokazu Imamura

Approved by: O. Watatani
Osamu Watatani
Manager of Yamakita EMC Lab.

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MF060b (18.06.07)

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1 Applicant Information

Company Name : TOPCON Corporation
Brand or Trade name : TOPCON
Address : 75-1 Hasunuma-cho, Itabashi-ku, Tokyo-to, 174-8580 Japan
Telephone Number : +81-3-3966-2634
Facsimile Number : +81-3-3966-0038
Contact Person : Hiroto Shibuya

2 Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : Global Mapping System
Model No. : GMS-2Pro
Serial No. : 0014
Rating : DC7.4V
Country of Manufacture : Japan
Receipt Date of Sample : October 22, 2007
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No modification by the test lab.

2.2 Product Description

Model No. GMS-2Pro is a Global Mapping System.

GMS-2Pro gathers position data in the field by a built-in GPS receiver and real-time differential correction. Simultaneously, the image and angle data of the target can be acquired by built-in camera.

The clock frequency used in EUT:

CPU Clock: 13MHz (Ext), 520MHz (Int), GPS: 20MHz

Bluetooth module: 32.768kHz, 26MHz, 20MHz, 13MHz

Bluetooth

Equipment type	: Transceiver
Frequency of operation	: 2402-2480MHz
Bandwidth & channel spacing	: 79MHz & 1MHz
Type of modulation	: FHSS
Antenna type	: CHIP antenna
Antenna connector type	: N/A
Antenna gain	: +2dBi
ITU code	: F1D
Operating voltage (Inner)	: +3.3V
Operation temperature range	: -20 to +50 deg.C.

GPS Receiver

Frequency of operation	: 1.575GHz, 1.602GHz
Intermediate Frequency	: 1401MHz, 1429MHz
IF Filter bandwidth	: 22MHz
Antenna type	: Microstrip antenna
Antenna connector type	: H.FL-R-SMT
Operating voltage (Inner)	: +5V, +3.3V, +1.8V
Operation temperature range	: -20 to +50 deg.C.

FCC Part15.31 (e)

The Bluetooth module is provided with stable power supply (DC 3.3 V), therefore, the equipment complies power supply regulation.

FCC Part15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the module. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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3 Test Specification, Procedures and Results

3.1 Test specification

Test specification : FCC Part15 Subpart C: 2007
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits, general requirements
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz,
and 5725-5850MHz

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC 15. 207	-	N/A	14.4dB (0.2680MHz, QP, N, Tx 2402MHz, DH5)	Complied
Carrier Frequency Separation	FCC Public Notice DA 00-705	FCC 15.247 (a)(1)	Conducted	N/A	*See data.	Complied
20dB Bandwidth	FCC Public Notice DA 00-705	FCC 15.247 (a)(1)	Conducted	N/A		Complied
Number of Hopping Frequency	FCC Public Notice DA 00-705	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell time	FCC Public Notice DA 00-705	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Maximum Peak Output Power	FCC Public Notice DA 00-705	FCC 15.247 (b)(1)	Conducted	N/A		Complied
Spurious Emission	FCC Public Notice DA 00-705	FCC 15.247 (d) & 15.209	Conducted / Radiated	N/A	4.5dB (4882.00MHz, AV, Horizontal, Tx 2441MHz, DH5)	Complied

Note: UL Japan's EMI Work Procedures No.QPM05 and QPM15.

In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2003 13. Measurement of intentional radiators RSS-Gen 4.6.1	RSS-Gen 4.6.1	Conducted -		Complied

* Other than above, no addition, exclusion nor deviation has been made from the standard.

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3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

	No.1 open site	No.2 open site	No.1 anechoic chamber
Conducted emission			
150kHz-30MHz	2.8 dB	2.8 dB	2.8 dB
Radiated emission (3m)			
30-300MHz	4.5 dB	4.4 dB	4.5 dB
300-1000MHz	4.3 dB	4.3 dB	4.3 dB
1GHz<	5.7 dB	5.7 dB	5.7 dB

Antenna port conducted test	
Below 1GHz	±0.4dB
1GHz and above	±0.7dB

Conducted Emission Test

The data listed in this test report has enough margin, more than site margin.

Radiated Emission Test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.5 Test Location

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Telephone number : +81 465 77 1011

Facsimile number : +81 465 77 2112

NVLAP Lab. code : 200441-0

No. 1 test site has been fully described in a report submitted to FCC office, and accepted on August 26, 2005 (Registration No.: 95486).

IC Registration No. : 2973B-1

No. 2 test site has been fully described in a report submitted to FCC office, and accepted on April 4, 2005 (Registration No.: 466226).

IC Registration No. : 2973B-3

No. 1 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on November 2, 2005 (Registration No.: 95967).

IC Registration No. : 2973B-2

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 shielded room	8.0 x 5.0 x 2.5	No.1 Semi-anechoic chamber	10.0 x 7.5 x 5.7
No.2 shielded room	5.0 x 4.0 x 2.5		
No.3 shielded room	4.0 x 5.0 x 2.7		

Open test site	Maximum measurement distance
No.1 open test site	30m
No.2 open test site	10m

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4 System Test Configuration

4.1 Justification

The system was configured in typical fashion (as a customer would normally use it) for testing.

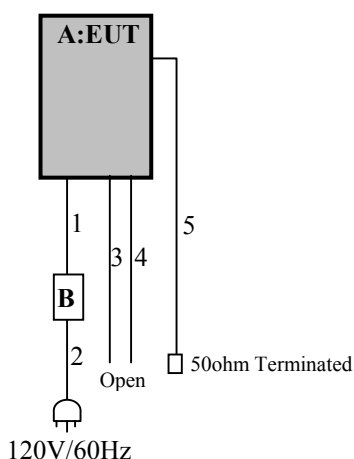
Test mode: Transmitting
- Low channel : 2402MHz
- Middle channel : 2441MHz
- High channel : 2480MHz
- Hopping
- Inquiry

Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT.

However, the limit level 125mW of AFH mode was used for the test.

The EUT has no EDR mode.

4.2 Configuration of Tested System



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID (Remarks)
A	Global Mapping System	GMS-2Pro	0014	TOPCON POSITIONING SYSTEMS, Inc	LCB-841221 (EUT)
B	AC Adaptor	A20A1-12MP	-	AK II TECHNOLOGY Co, LTD.	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Connector	Cable	
1	DC cable	1.4	Shielded	Shielded	-
2	AC cable	1.9	Unshield	Unshield	-
3	USB cable	1.5	Shielded	Shielded	-
4	RS 232C cable	1.4	Shielded	Shielded	-
5	GPS Antenna cable	2.0	Shielded	Shielded	-

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5 Conducted Emissions

5.1 Operating environment

The test was carried out in No.2 shielded room.

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.8m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT and peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN) and excess AC cable was bundled in center. A drawing of the set up is shown in the photos of Appendix 1.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT operation mode : Transmitting, Receiving

5.4 Test procedure

The EUT was connected to a LISN (AMN). An overview sweep with peak detection has been performed. The Conducted emission measurements were made with the following detector function of the test receiver.

Detector: QP/AV
IF Bandwidth: 9kHz

5.5 Results

Summary of the test results : Pass

Date : October 29, 2007 Test engineer : Tatsuya Arai

6 Carrier Frequency Separation

Test Procedure

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass

Date : October 24, 2007 Test engineer : Tatsuya Arai

7 20dB Bandwidth & Occupied Bandwidth (99%)

Test Procedure

The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass

The channel separation in Hopping mode and Inquiry mode was separated by 25kHz and 2/3 of the 20dB bandwidth.

Date : October 24, 2007 Test engineer : Tatsuya Arai

8 Number of Hopping Frequency

Test Procedure

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass

Date : October 24, 2007 Test engineer : Tatsuya Arai

9 Dwell Time

Test Procedure

The Dwell time was measured with a spectrum analyzer connected to the antenna port.

Measurement was performed with the packet type of DH1, DH3, DH5, 3DH1, 3DH3 and 3DH5.

Summary of the test results: Pass

Date : October 26, 2007 Test engineer : Tatsuya Arai

10 Maximum Peak Output Power

Test Procedure

The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass

Date : October 24, 2007 Test engineer : Tatsuya Arai

11 Out of Band Emissions (Antenna Port Conducted)

Test Procedure

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a conducted measurement.

Summary of the test results: Pass

Date : October 26, 2007 Test engineer : Tatsuya Arai

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12 Out of Band Emissions (Radiated)

12.1 Operating environment

The test was carried out in No.1 anechoic chamber.

12.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane. A drawing of the set up is shown in the photos of Appendix 1.

12.3 Test conditions

Frequency range : 30MHz - 26GHz
 Test distance : 3m
 EUT operation mode : Transmitting

12.4 Test procedure

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m. The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

Measurements were performed with QP, PK, and AV detector.

The radiated emission measurements were made with the following detector function of the test receiver.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
Detector IF Bandwidth	QP: BW 120kHz	PK: RBW: 1MHz/VBW: 1MHz, AV: RBW: 1MHz/VBW: 200Hz (Pulse emission) RBW: 1MHz/VBW: 10Hz (Except pulse emission)
Measuring antenna	Biconical (30-300MHz) Logperiodic (300MHz-1GHz)	Horn

The equipment was previously checked at each position of three axes X, Y and Z. The position in which the maximum noise occurred was chosen to put into measurement. See the table below and photographs in page 14. With the position, the noise levels of all the frequencies were measured.

	Below 1GHz	Above 1GHz
Horizontal	Y	Y
Vertical	Y	Z

12.5 Band edge

Band edge level at 2400MHz is less than 20dB of peak point of the carrier. Refer to the data of Out of Band Emissions (Antenna Port Conducted).

Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209. Refer to the data of Radiated emission.

12.6 Results

Summary of the test results : Pass
 No noise was detected above the 5th order harmonics.

Date : October 23 and 25, 2007 Test engineer : Tatsuya Arai and Toyokazu Imamura

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APPENDIX 1: Photographs of test setup

Page 12	:	Conducted emission
Page 13	:	Radiated emission
Page 14	:	Pre-check of the worst position

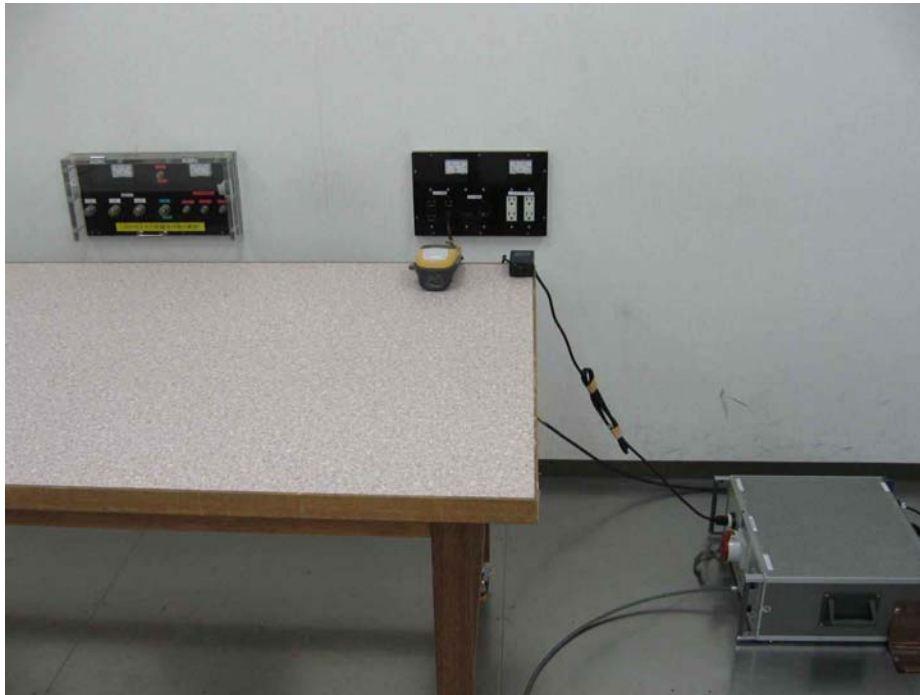
APPENDIX 2: Test Data

Page 15 - 24	:	Conducted emission
Page 25	:	Carrier Frequency Separation
Page 26 - 28	:	20dB Bandwidth
Page 29 - 33	:	Number of Hopping Frequency
Page 34 - 47	:	Dwell time
Page 48	:	Maximum Peak Output Power
Page 49 - 66	:	Out of Band Emissions (Antenna Port Conducted)
Page 67 - 84	:	Out of Band Emissions (Radiated)
Page 85	:	Duty Cycle
Page 86 - 88	:	Occupied Bandwidth

APPENDIX 3: Test instruments

Page 89	:	Test instruments
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Conducted emission



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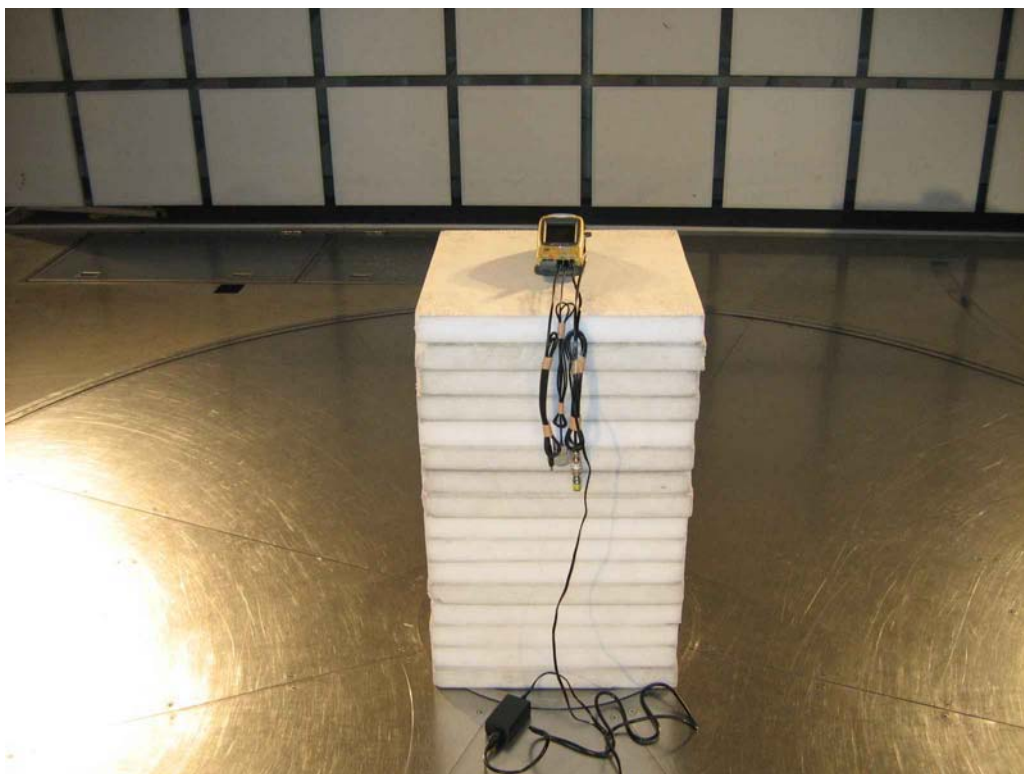
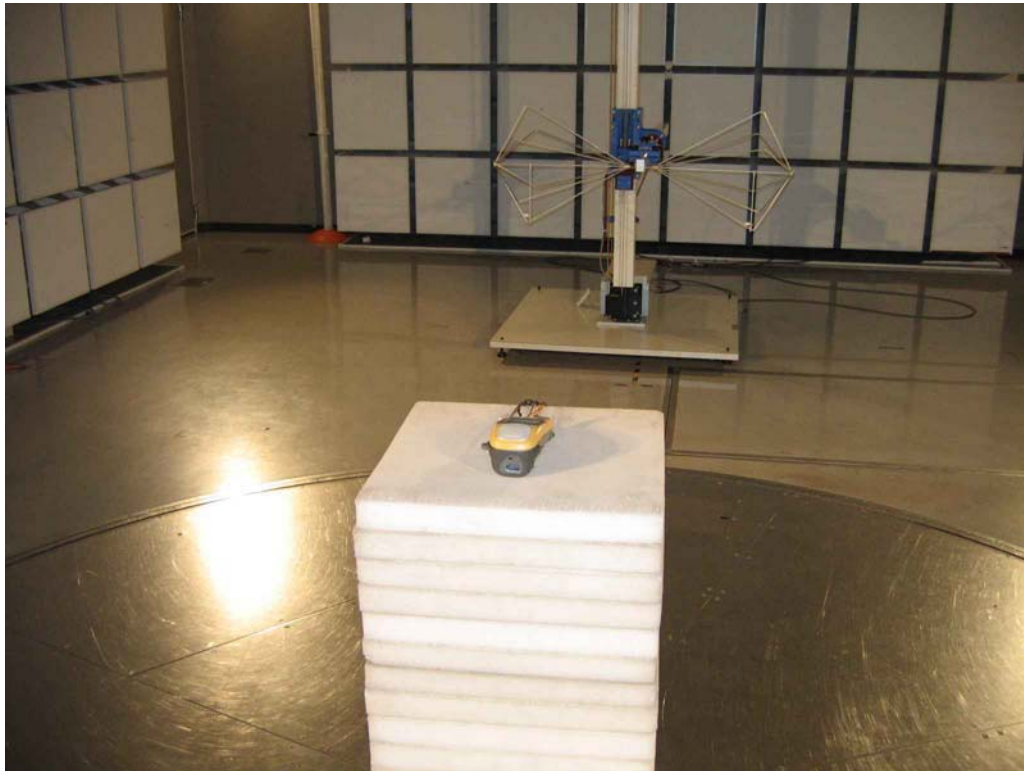
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Radiated emission



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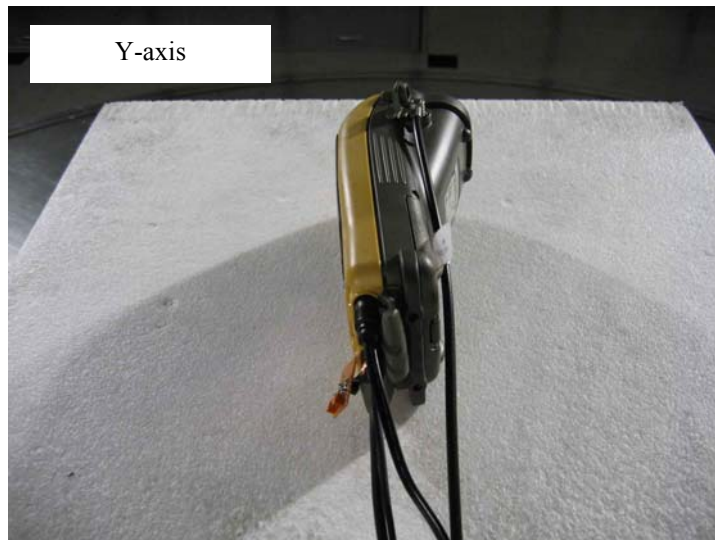
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Pre-check of the worst position

X-axis



Y-axis



Z-axis



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DATA OF CONDUCTION TEST

UL Japan, Inc.
YAMAKITA No.1 SHIELD ROOM
Report No. : 28CE0024-YK-C

Applicant : TOPCON Corporation
Kind of Equipment : Global Mapping System
Model No. : GMS-2Pro
Serial No. : 0014
Power : AC120V/60Hz
Mode : Transmitting 2402MHz (DH5)
Remarks : -
Date : 10/29/2007
Phase : Single Phase
Temperature : 23 °C
Humidity : 58 %
Regulation : FCC Part15C § 15. 207. (CISPR Pub.22)
Engineer : Tatsuya Arai

No.	FREQ. [MHz]	READING(N)		READING(L1)		LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
		QP	AV	QP	AV				QP	AV	QP	AV	QP	AV
		[dB μ V]		[dB μ V]					[dB]		[dB μ V]		[dB μ V]	
1.	0.1500	43.5	-	43.7	-	0.1	0.1	0.0	43.9	-	66.0	56.0	22.1	-
2.	0.2680	45.1	36.1	46.6	31.8	0.1	0.1	0.0	46.8	36.3	61.2	51.2	14.4	14.9
3.	0.4035	33.2	-	34.2	-	0.1	0.2	0.0	34.5	-	57.8	47.8	23.3	-
4.	1.9213	30.0	-	29.8	-	0.1	0.3	0.0	30.4	-	56.0	46.0	25.6	-
5.	3.8713	31.3	-	33.9	-	0.2	0.5	0.0	34.6	-	56.0	46.0	21.4	-
6.	4.4844	36.7	21.8	38.4	23.5	0.2	0.6	0.0	39.2	24.3	56.0	46.0	16.8	21.7

CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

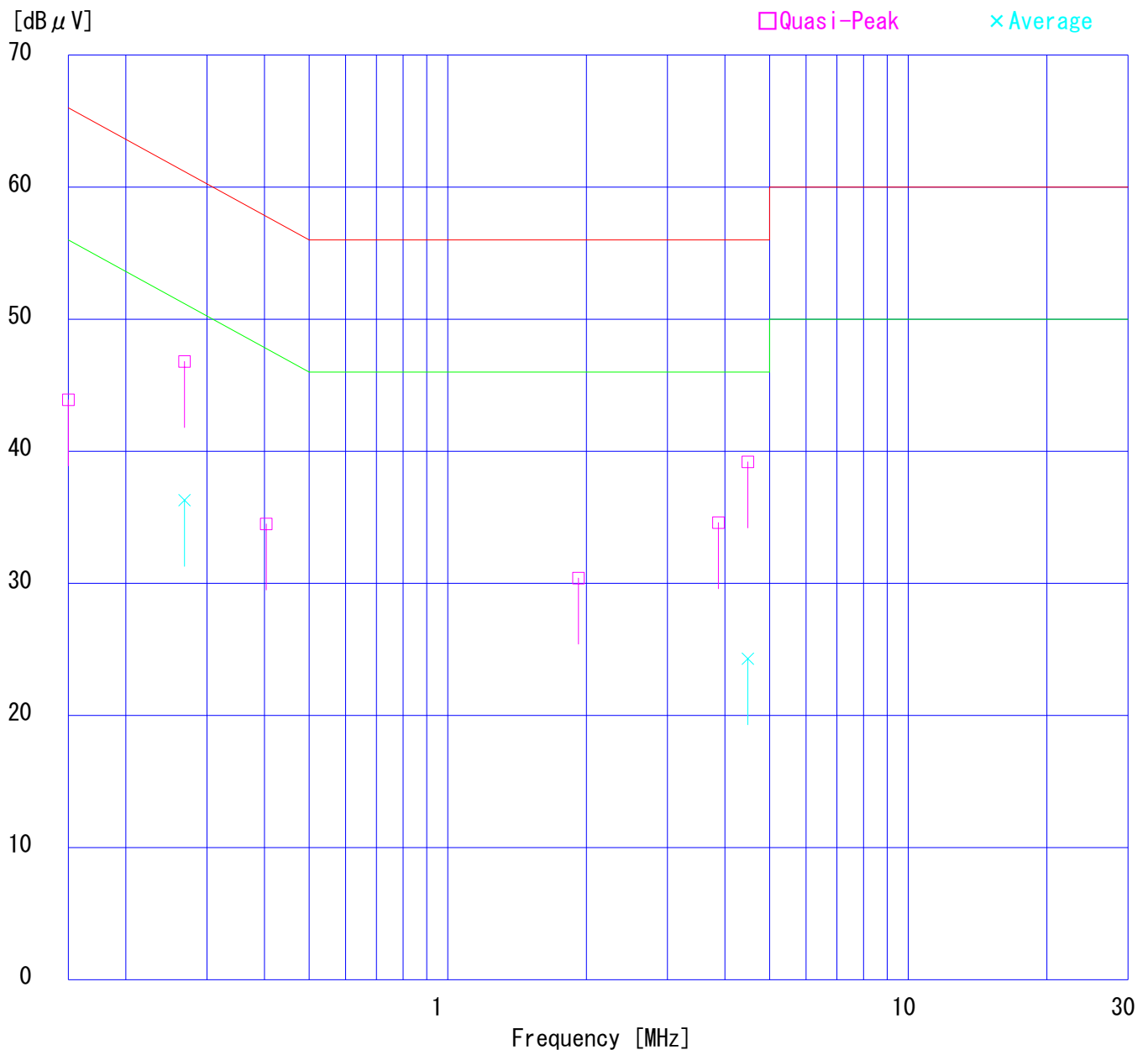
■KLS-01(NSLK8126) ■COAXIAL CABLE:KCC-14/15/16/18
■PULSE LIMITTER:KPL-01(PL01) ■EMI RECEIVER:KTR-02(ESCS30)

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Remarks : -
Date : 10/29/2007
Phase : Single Phase
Temperature : 23 °C
Humidity : 58 %
Regulation : FCC Part15C § 15. 207. (CISPR Pub. 22)

Engineer : Tatsuya Arai



DATA OF CONDUCTION TEST CHART

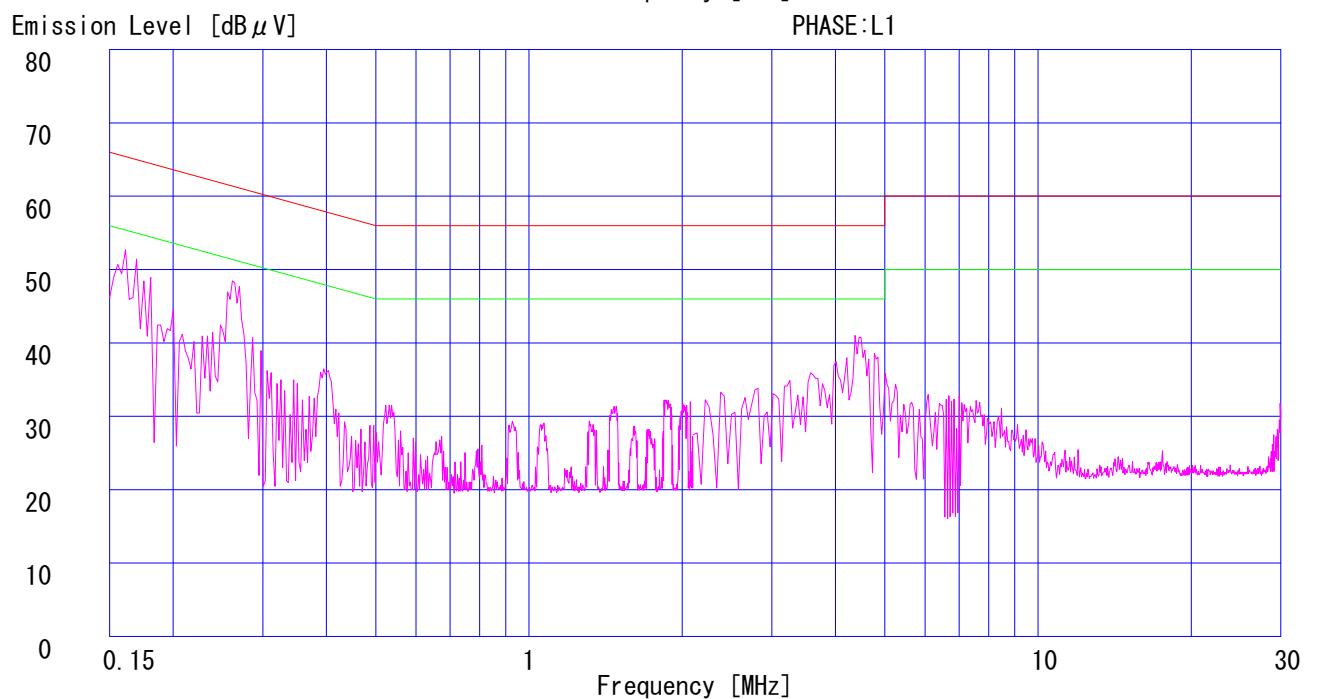
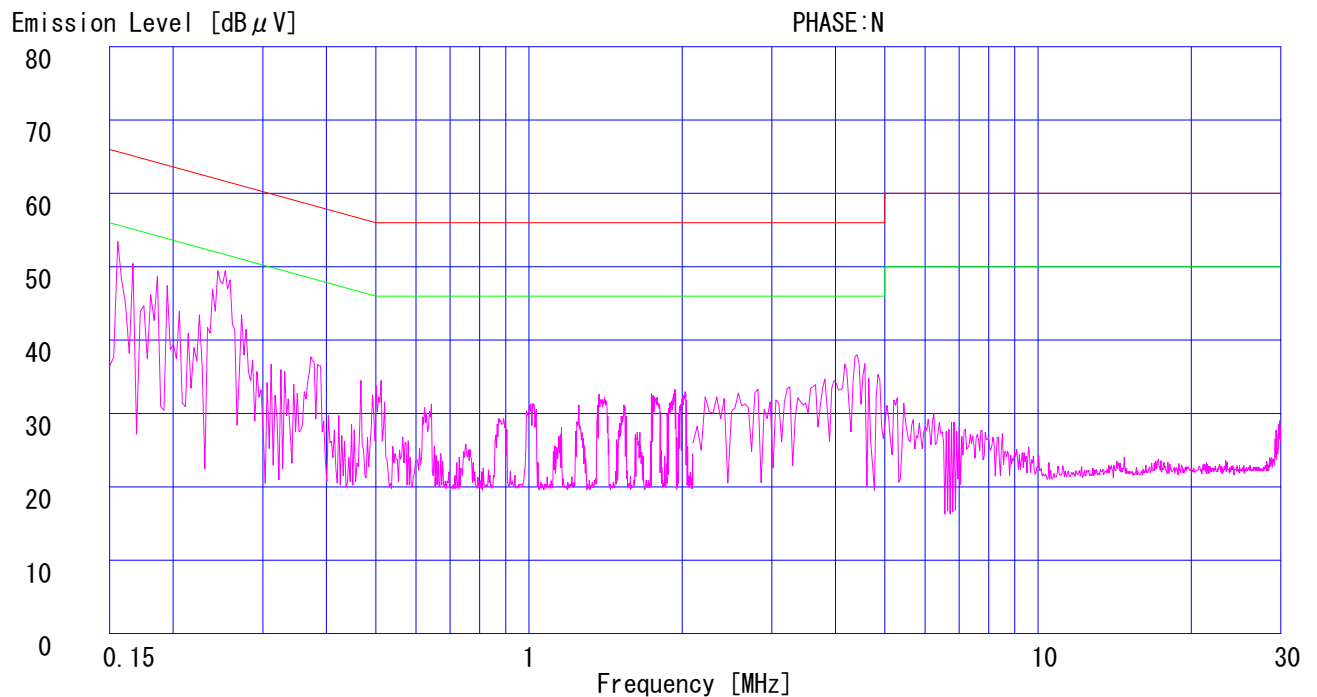
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Model No. : GMS-2Pro
Serial No. : 0014
Power : AC120V/60Hz
Mode : Transmitting 2402MHz (DH5)
Remarks : -
Date : 10/29/2007
Phase : Single Phase
Temperature : 23 °C
Humidity : 58 %
Regulation 1 : FCC Part15C § 15.207. (CISPR Pub. 22)
Regulation 2 : None

Engineer : Tatsuya Arai



DATA OF CONDUCTION TEST CHART

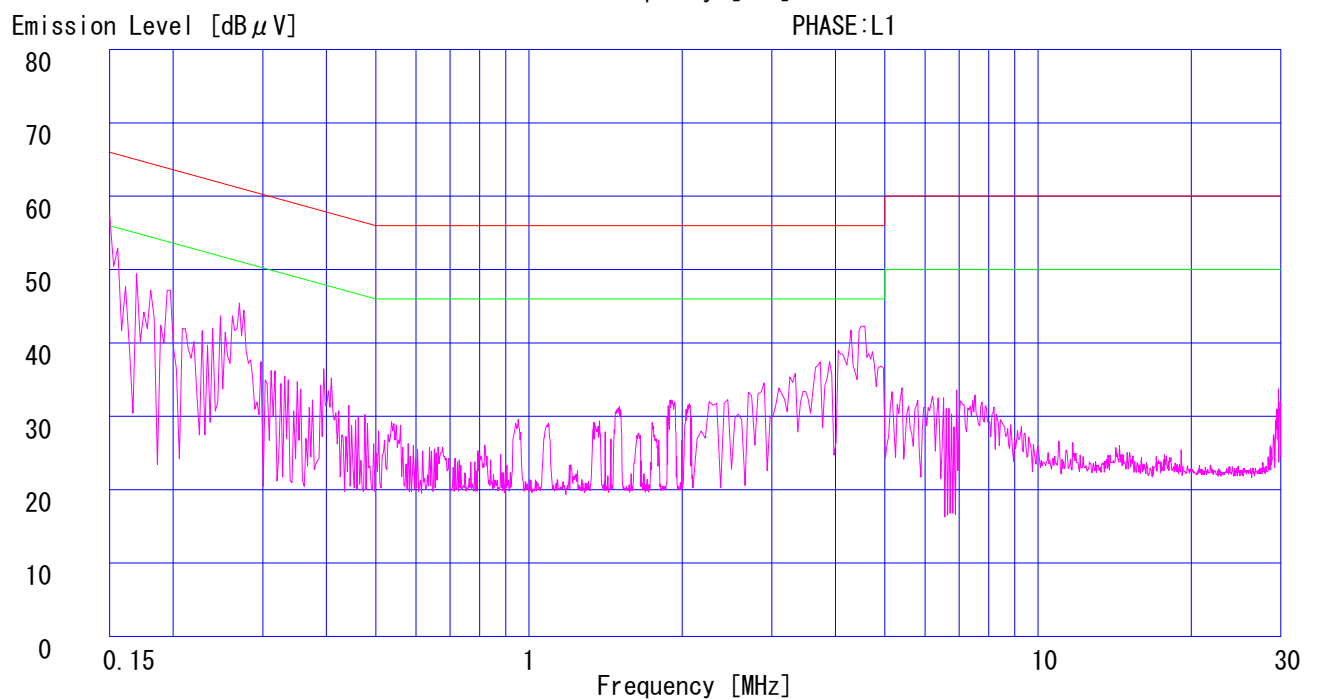
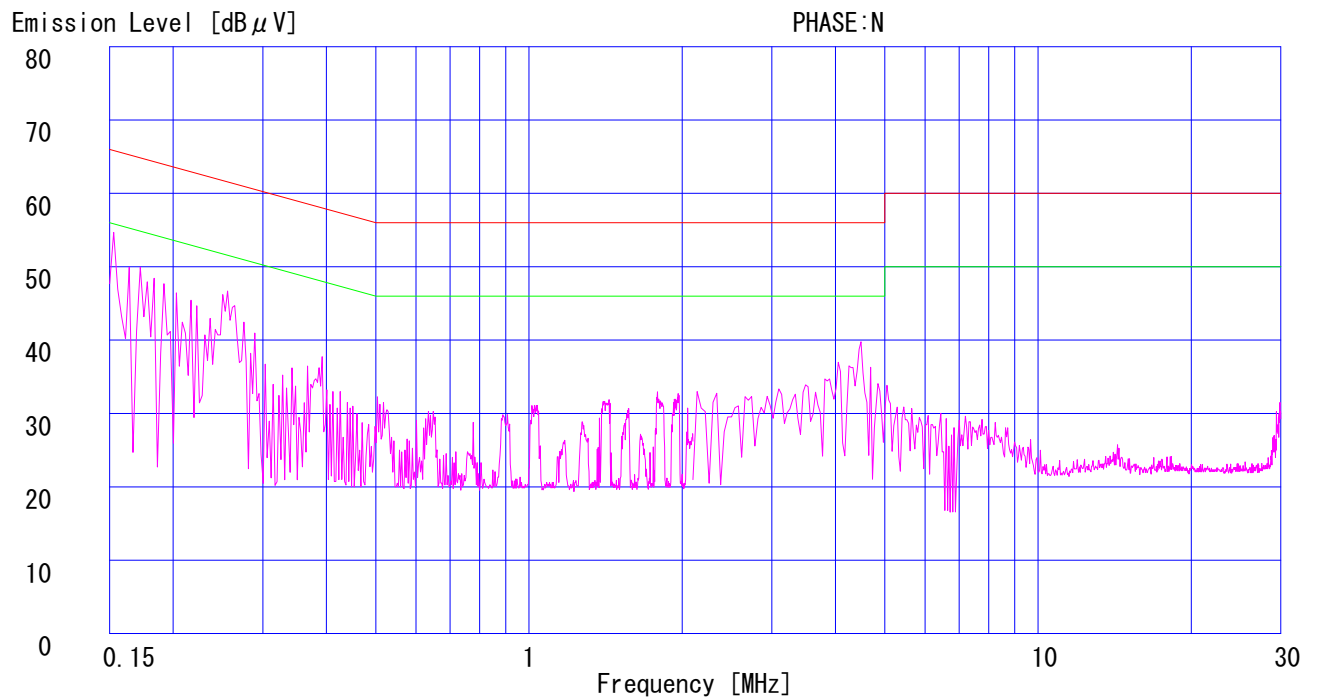
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YAMAKITA No.1 SHIELD ROOM

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Applicant : TOPCON Corporation
Kind of Equipment : Global Mapping System
Model No. : GMS-2Pro
Serial No. : 0014
Power : AC120V/60Hz
Mode : Transmitting 2441MHz (DH5)
Remarks : -
Date : 10/29/2007
Phase : Single Phase
Temperature : 23 °C
Humidity : 58 %
Regulation 1 : FCC Part15C § 15.207. (CISPR Pub. 22)
Regulation 2 : None

Engineer : Tatsuya Arai



DATA OF CONDUCTION TEST CHART

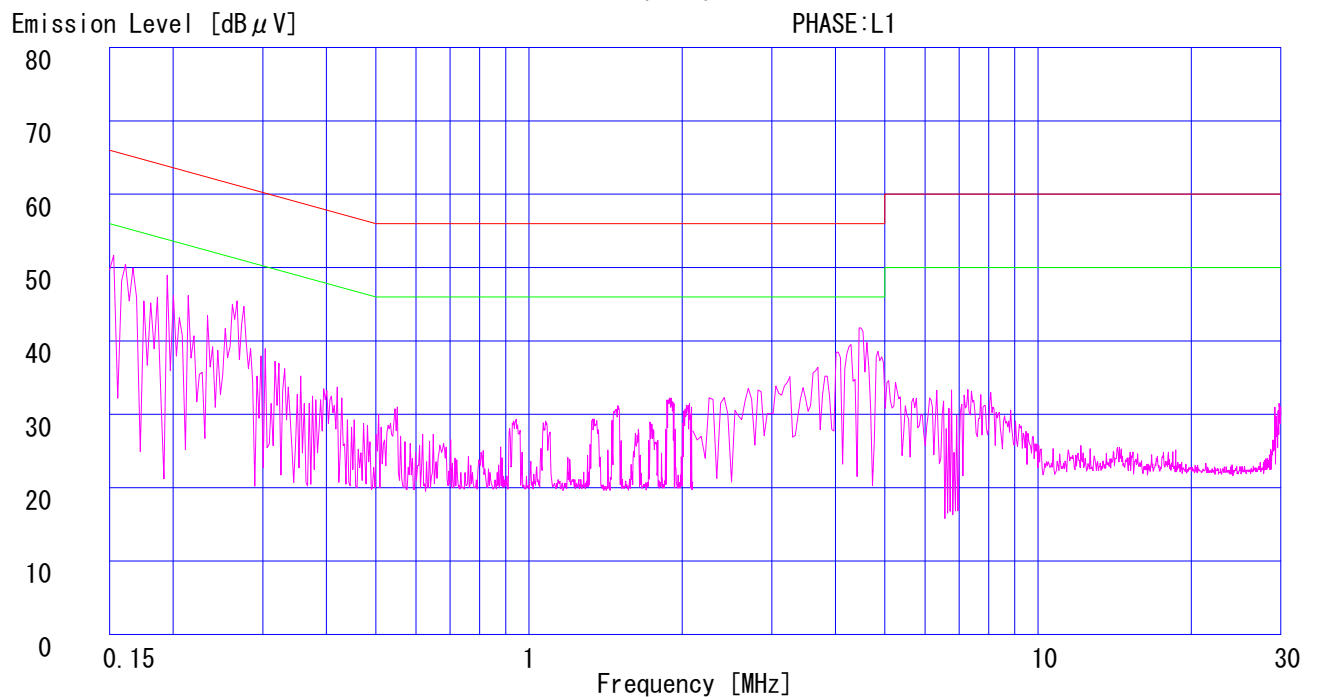
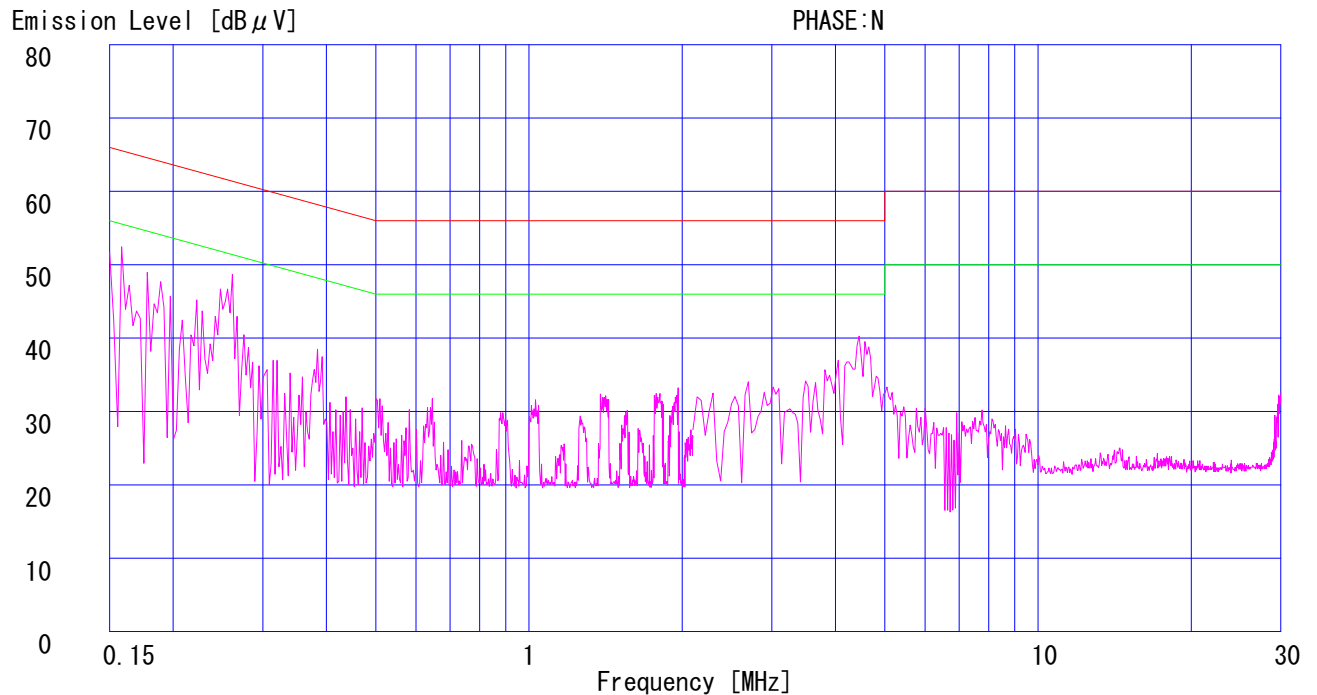
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Model No. : GMS-2Pro
Serial No. : 0014
Power : AC120V/60Hz
Mode : Transmitting 2480MHz (DH5)
Remarks : -
Date : 10/29/2007
Phase : Single Phase
Temperature : 23 °C
Humidity : 58 %
Regulation 1 : FCC Part15C § 15.207. (CISPR Pub. 22)
Regulation 2 : None

Engineer : Tatsuya Arai



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Date : 10/29/2007
Phase : Single Phase
Temperature : 23 °C
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Engineer : Tatsuya Arai

No.	FREQ. [MHz]	READING(N)		READING(L1)		LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
		QP [dB μ V]	AV [dB μ V]	QP [dB μ V]	AV [dB μ V]				QP [dB]	AV [dB μ V]	QP [dB μ V]	AV [dB μ V]	QP [dB]	AV [dB]
1.	0.1500	44.1	-	43.6	-	0.1	0.1	0.0	44.3	-	66.0	56.0	21.7	-
2.	0.2710	44.0	35.4	44.7	29.5	0.1	0.1	0.0	44.9	35.6	61.1	51.1	16.2	15.5
3.	0.4059	31.9	-	32.3	-	0.1	0.2	0.0	32.6	-	57.7	47.7	25.1	-
4.	1.9215	29.6	-	29.8	-	0.1	0.3	0.0	30.2	-	56.0	46.0	25.8	-
5.	3.7200	32.6	-	34.7	-	0.2	0.5	0.0	35.4	-	56.0	46.0	20.6	-
6.	4.5543	36.7	20.7	39.5	23.5	0.2	0.6	0.0	40.3	24.3	56.0	46.0	15.7	21.7

CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

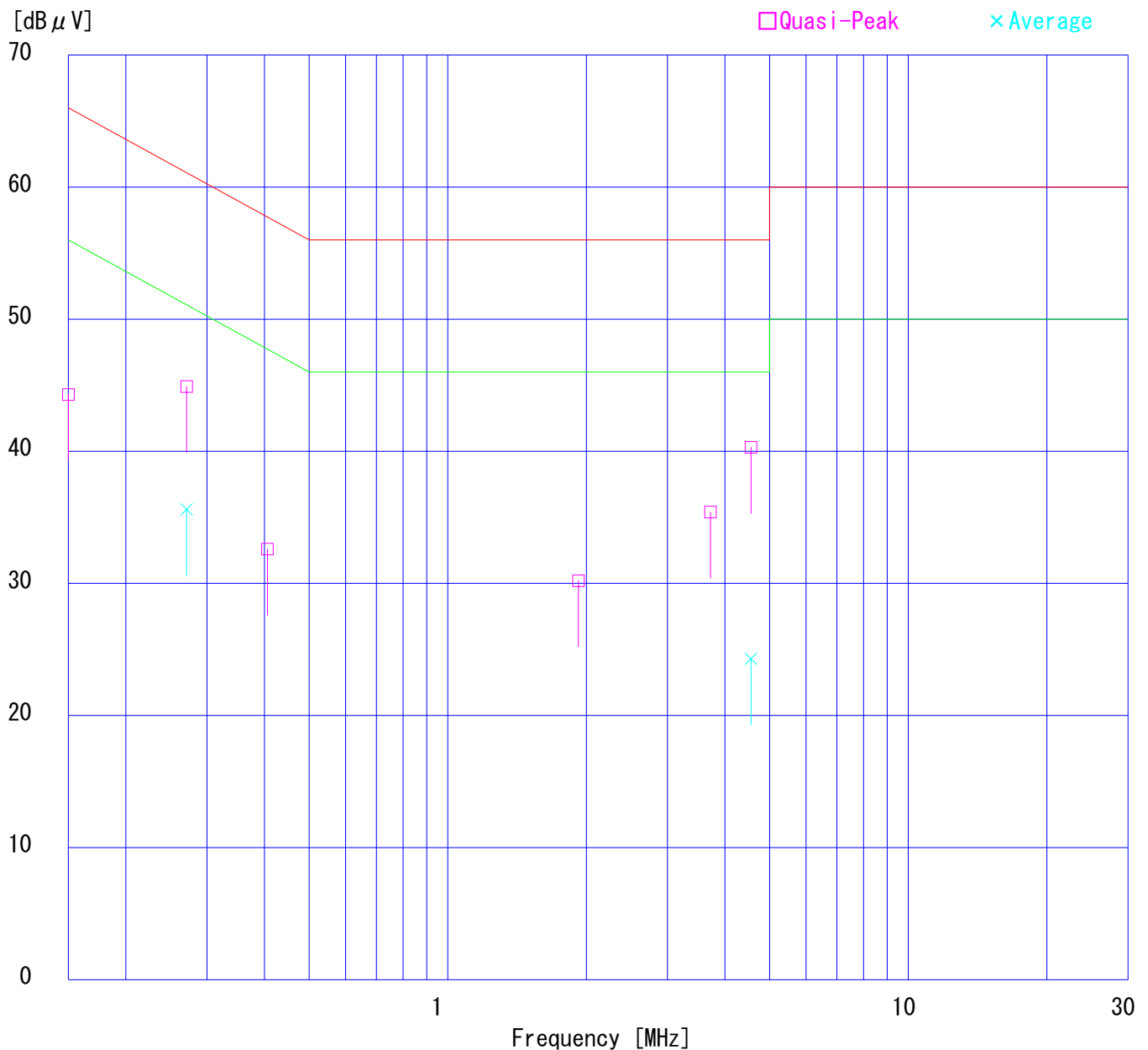
■KLS-01 (NSLK8126) ■COAXIAL CABLE:KCC-14/15/16/18
■PULSE LIMITTER:KPL-01 (PL01) ■EMI RECEIVER:KTR-02 (ESCS30)

DATA OF CONDUCTION TEST

UL Japan, Inc.
YAMAKITA No.1 SHIELD ROOM
Report No. : 28CE0024-YK-C

Applicant : TOPCON Corporation
Kind of Equipment : Global Mapping System
Model No. : GMS-2Pro
Serial No. : 0014
Power : AC120V/60Hz
Mode : Transmitting 2402MHz (3DH5)
Remarks : -
Date : 10/29/2007
Phase : Single Phase
Temperature : 23 °C
Humidity : 58 %
Regulation : FCC Part15C § 15. 207. (CISPR Pub. 22)

Engineer : Tatsuya Arai



DATA OF CONDUCTION TEST CHART

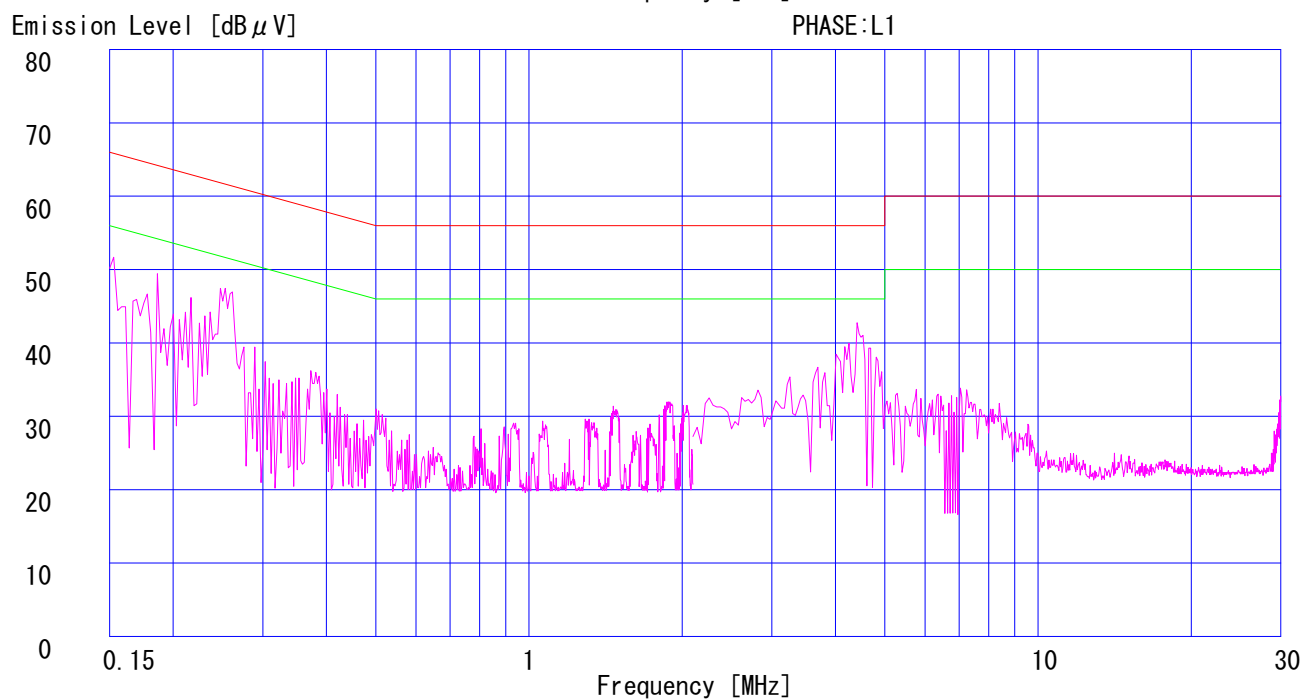
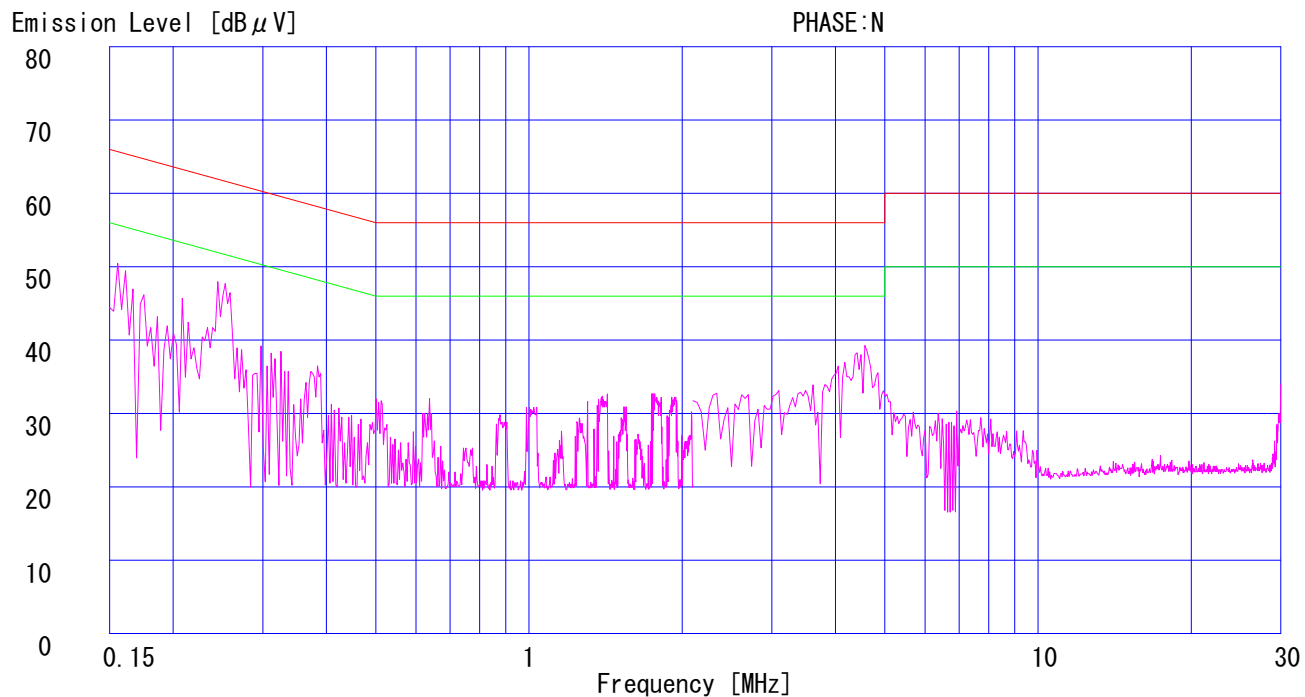
UL Japan, Inc.

YAMAKITA No.1 SHIELD ROOM

Report No. : 28CE0024-YK-C

Applicant : TOPCON Corporation
Kind of Equipment : Global Mapping System
Model No. : GMS-2Pro
Serial No. : 0014
Power : AC120V/60Hz
Mode : Transmitting 2402MHz (3DH5)
Remarks : -
Date : 10/29/2007
Phase : Single Phase
Temperature : 23 °C
Humidity : 58 %
Regulation 1 : FCC Part15C § 15.207. (CISPR Pub. 22)
Regulation 2 : None

Engineer : Tatsuya Arai



DATA OF CONDUCTION TEST CHART

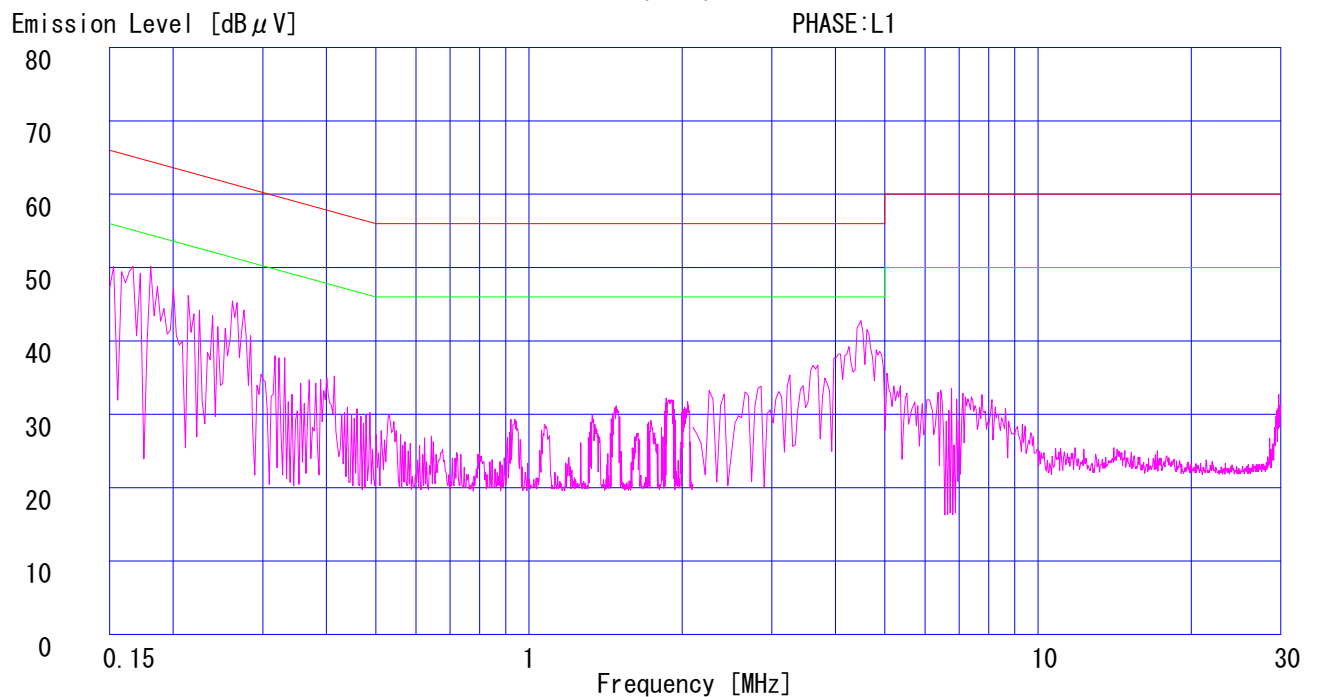
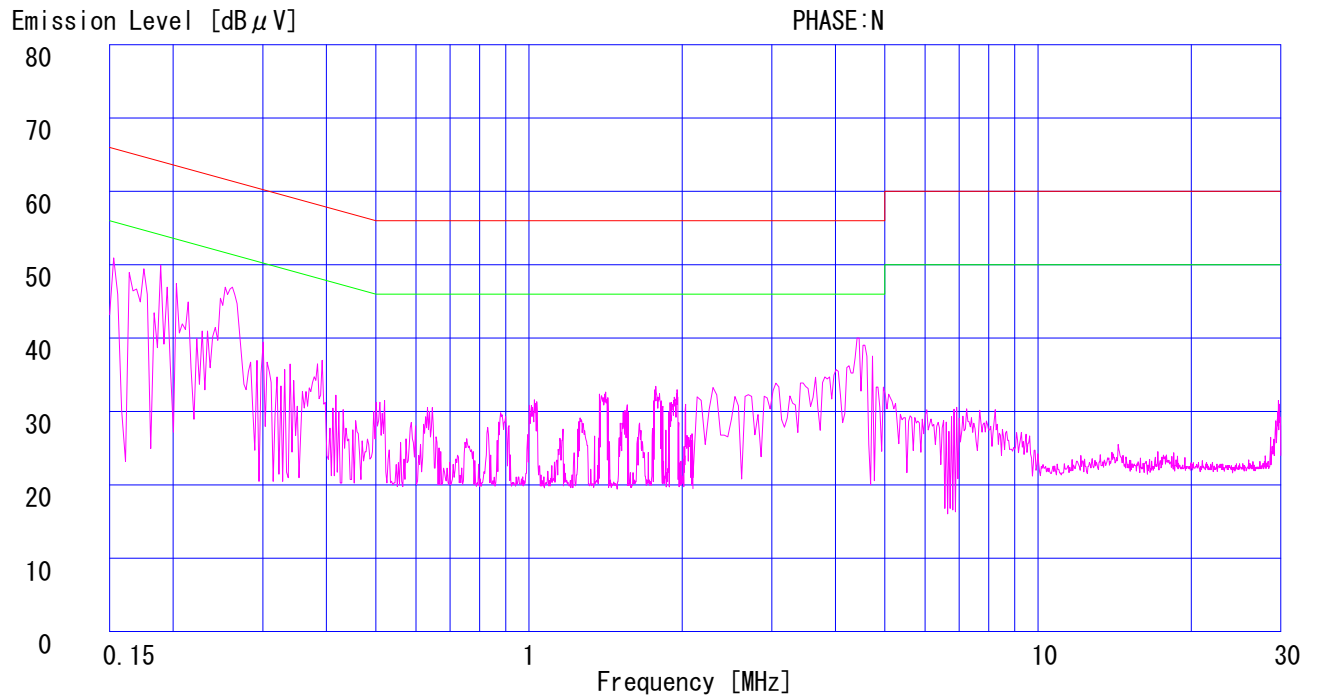
UL Japan, Inc.

YAMAKITA No.1 SHIELD ROOM

Report No. : 28CE0024-YK-C

Applicant : TOPCON Corporation
Kind of Equipment : Global Mapping System
Model No. : GMS-2Pro
Serial No. : 0014
Power : AC120V/60Hz
Mode : Transmitting 2441MHz (3DH5)
Remarks : -
Date : 10/29/2007
Phase : Single Phase
Temperature : 23 °C
Humidity : 58 %
Regulation 1 : FCC Part15C § 15.207. (CISPR Pub. 22)
Regulation 2 : None

Engineer : Tatsuya Arai



DATA OF CONDUCTION TEST CHART

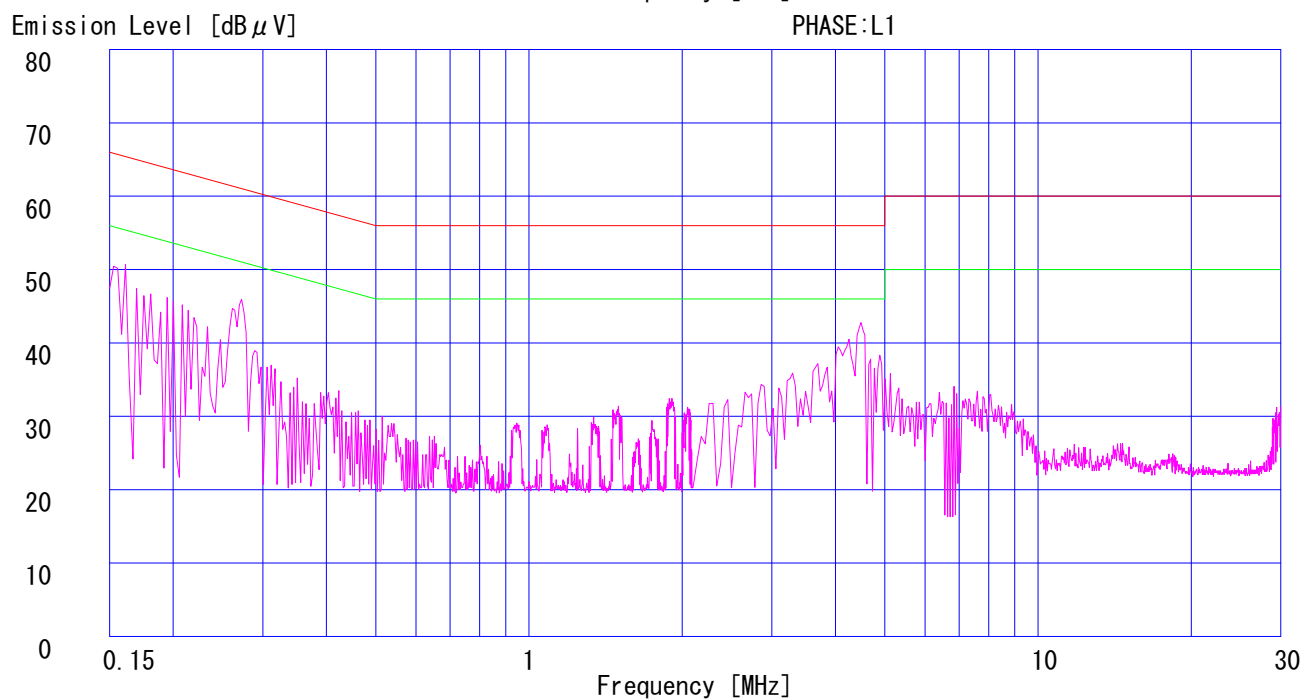
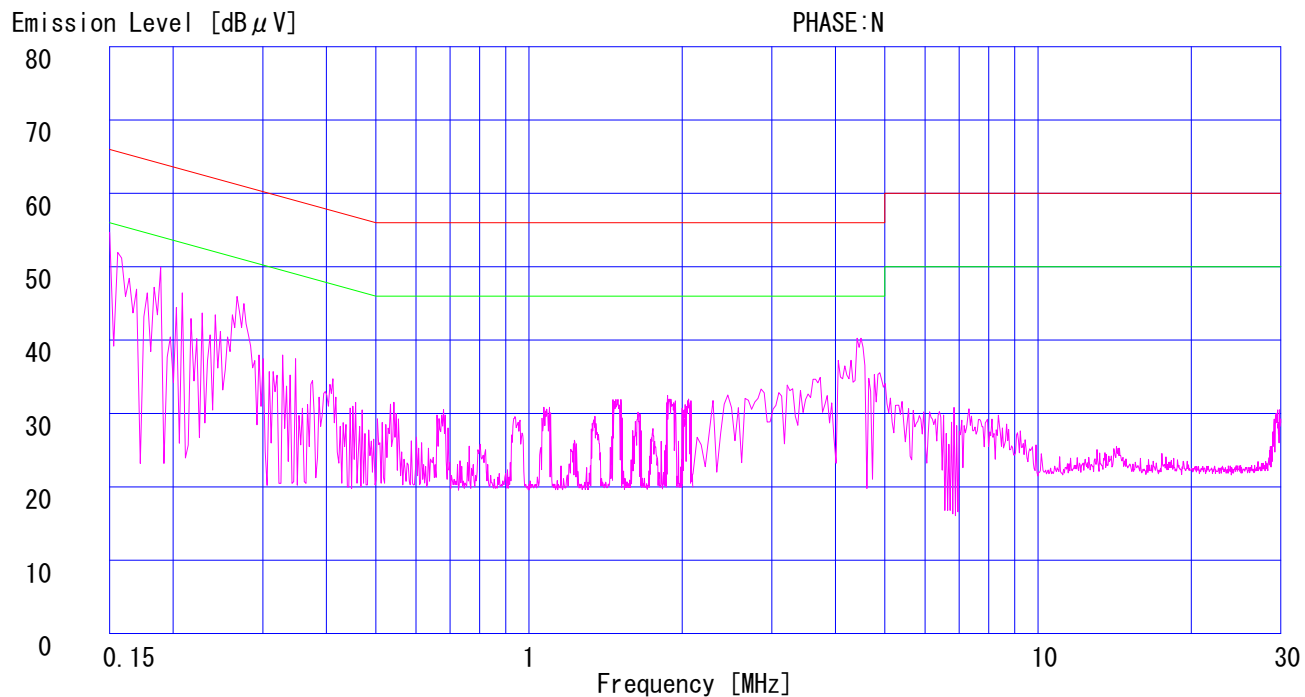
UL Japan, Inc.

YAMAKITA No.1 SHIELD ROOM

Report No. : 28CE0024-YK-C

Applicant : TOPCON Corporation
Kind of Equipment : Global Mapping System
Model No. : GMS-2Pro
Serial No. : 0014
Power : AC120V/60Hz
Mode : Transmitting 2480MHz (3DH5)
Remarks : -
Date : 10/29/2007
Phase : Single Phase
Temperature : 23 °C
Humidity : 58 %
Regulation 1 : FCC Part15C § 15.207. (CISPR Pub. 22)
Regulation 2 : None

Engineer : Tatsuya Arai



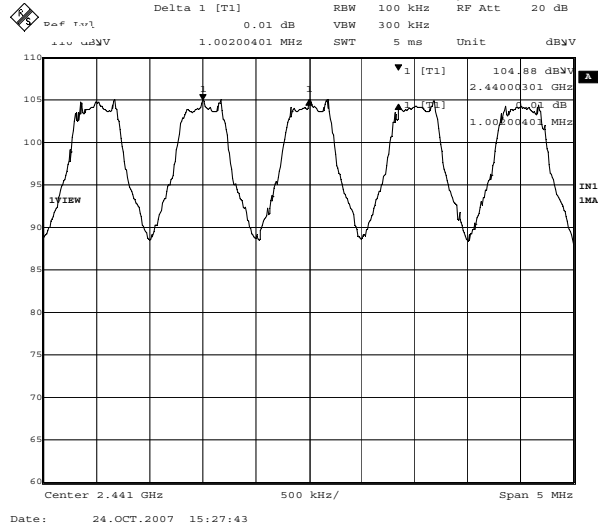
Channel Separation: FCC 15.247(a)(1)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

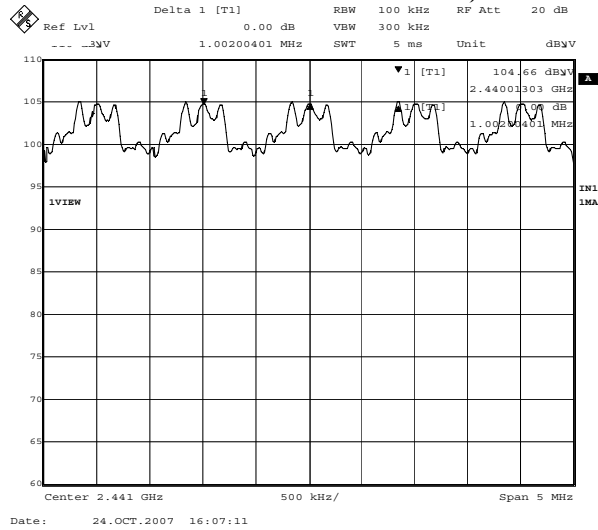
UL Japan, Inc. Yamakita No.2 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)
DATE : 2007/10/24
TEMP/HUMI : 24deg.C./49%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

Limit: $\geq 25\text{kHz}$ or $2/3 * 20\text{dB Bandwidth}$ (Power : No greater than 125mW)

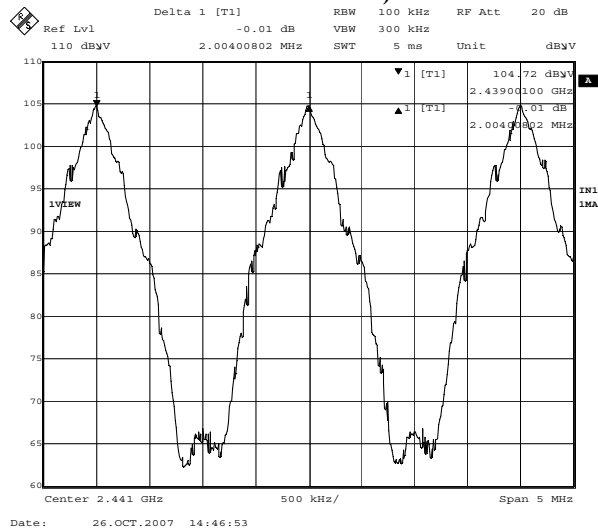
1. Hopping, DH5: 1.002MHz ($2/3 * 20\text{dB Bandwidth}$: $2/3 * 1.142\text{MHz} = 761.3\text{kHz}$)



2. Hopping, 3DH5: 1.002MHz ($2/3 * 20\text{dB Bandwidth}$: $2/3 * 1.401\text{MHz} = 934.0\text{kHz}$)



3. Inquiry: 2.004MHz ($2/3 * 20\text{dB Bandwidth}$: $2/3 * 1.112\text{MHz} = 741.3\text{kHz}$)



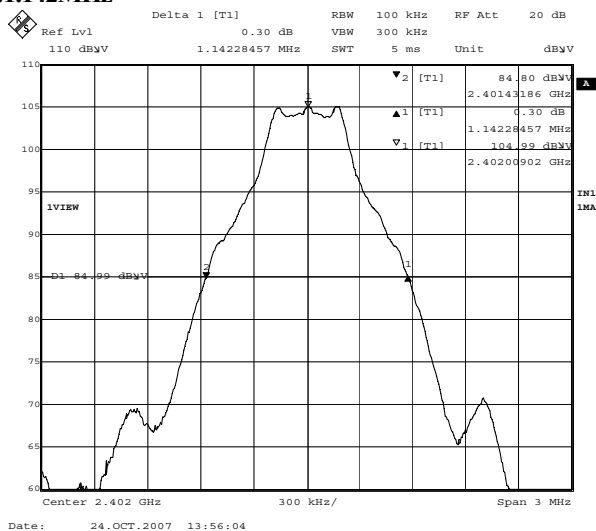
20dB Bandwidth: FCC 15.247(a)(1)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

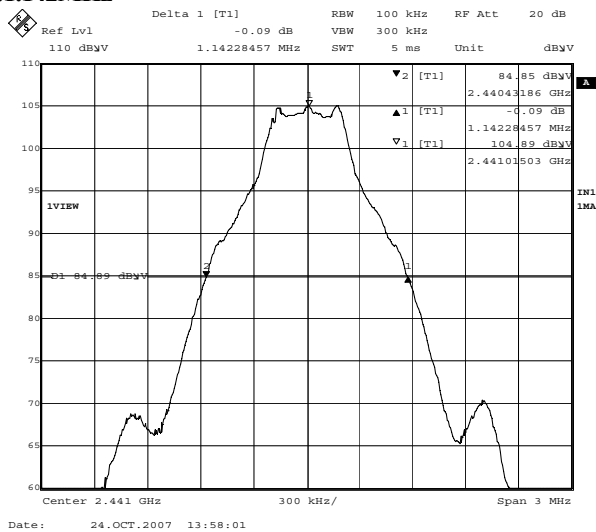
UL Japan, Inc. Yamakita No.2 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)
DATE : 2007/10/24
TEMP/HUMI : 24deg.C./49%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

[Hopping off, DH5]

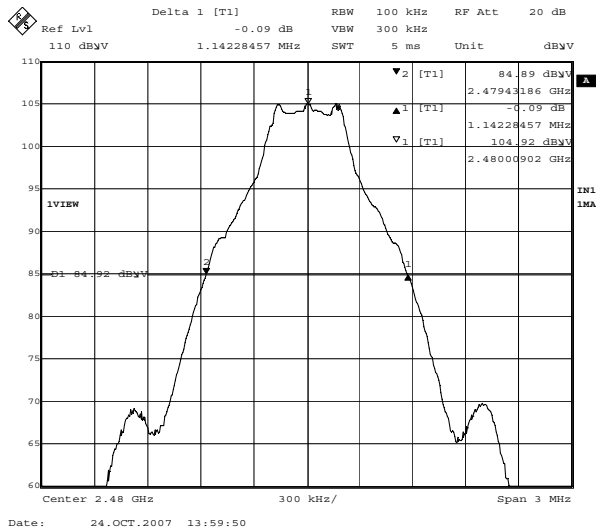
1. ch : 2402MHz/20dB Bandwidth:1.142MHz



2. ch : 2441MHz/20dB Bandwidth:1.142MHz



3. ch : 2480MHz/20dB Bandwidth:1.142MHz



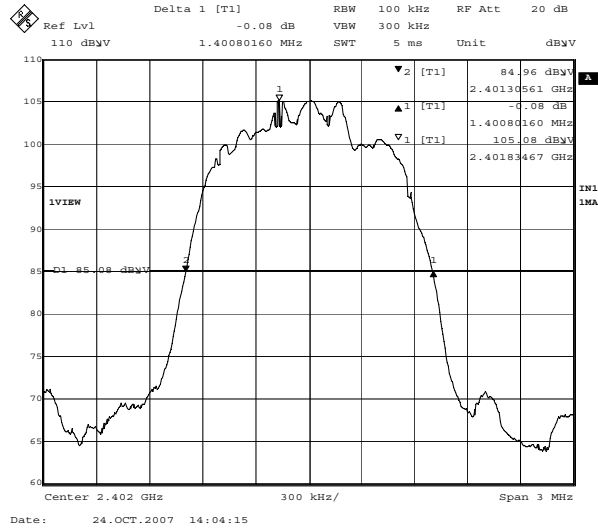
20dB Bandwidth: FCC 15.247(a)(1)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

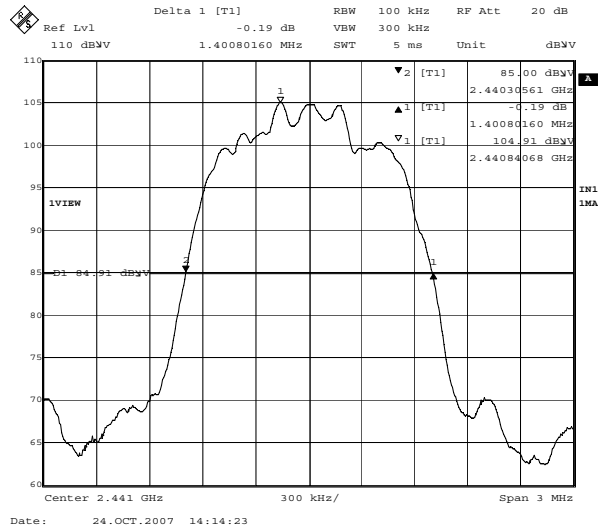
UL Japan, Inc. Yamakita No.2 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)
DATE : 2007/10/24
TEMP/HUMI : 24deg.C./49%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

[Hopping off, 3DH5]

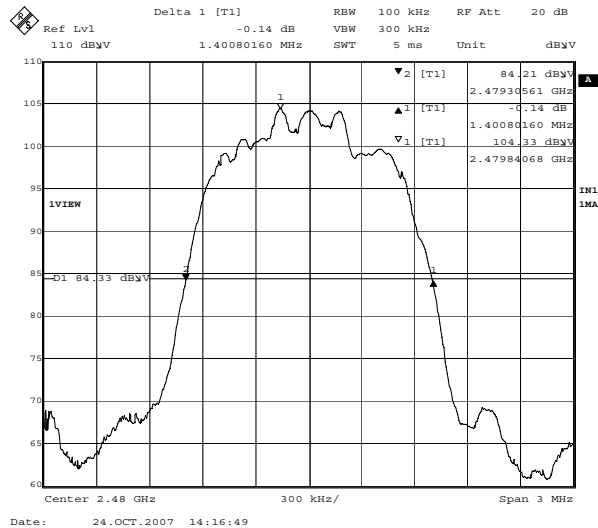
4. ch : 2402MHz/20dB Bandwidth:1.401MHz



5. ch : 2441MHz/20dB Bandwidth:1.401MHz



6. ch : 2480MHz/20dB Bandwidth:1.401MHz



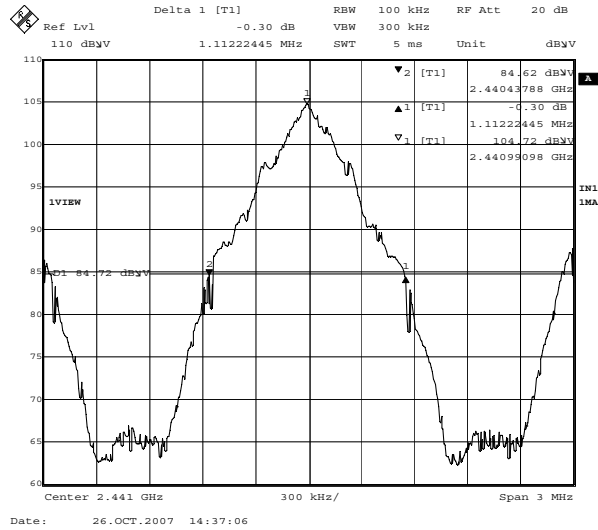
20dB Bandwidth: FCC 15.247(a)(1)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

UL Japan, Inc. Yamakita No.2 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)
DATE : 2007/10/24
TEMP./HUMI : 24deg.C./49%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

[Inquiry]

7. Inauiry/20dB Bandwidth:1.112MHz



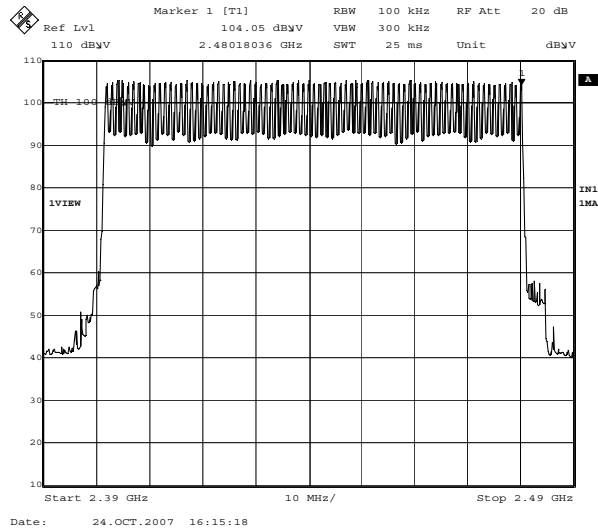
Channel Utilization: FCC 15.247(a)(1)(iii)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

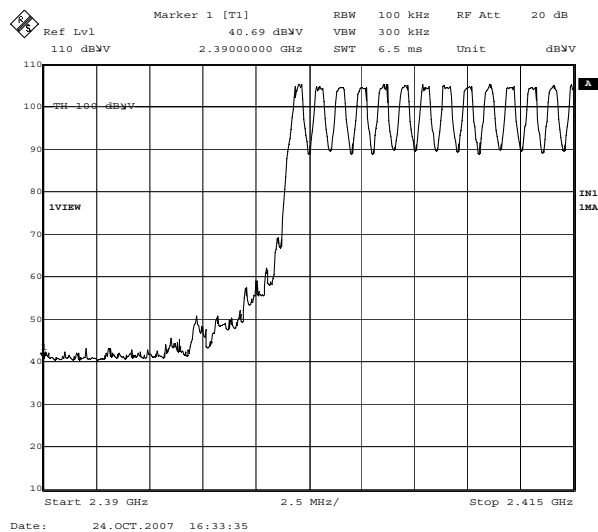
UL Japan, Inc. Yamakita No.2 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/24
TEMP./HUMI : 24deg.C./49%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

Hopping, DH5: 79ch

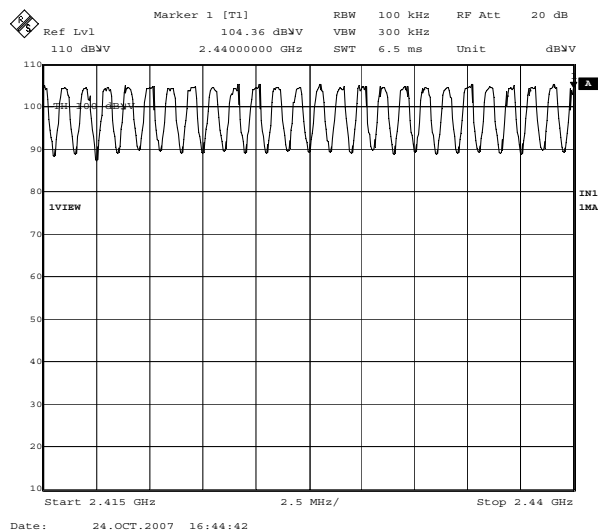
1.



2.



3.

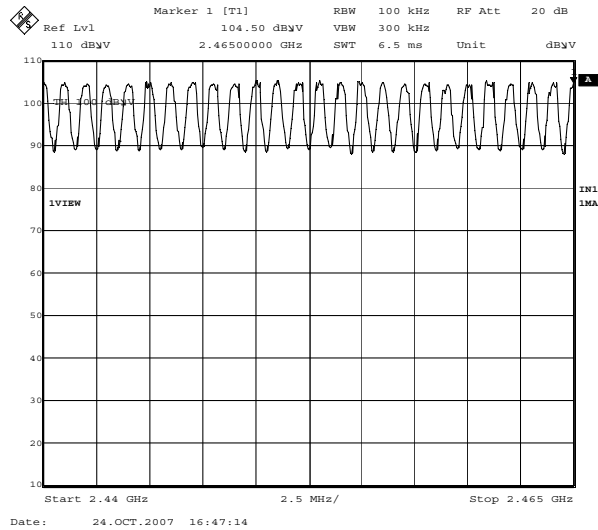


Channel Utilization: FCC 15.247(a)(1)(iii)

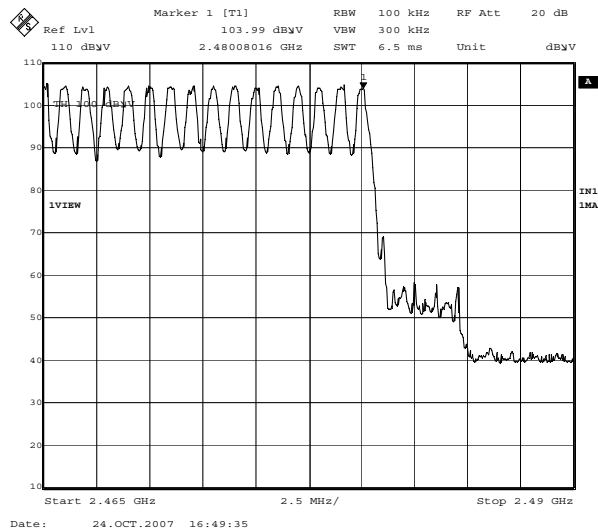
COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

UL Japan, Inc. Yamakita No.2 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/24
TEMP./HUMI : 24deg.C./49%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

4.



5.



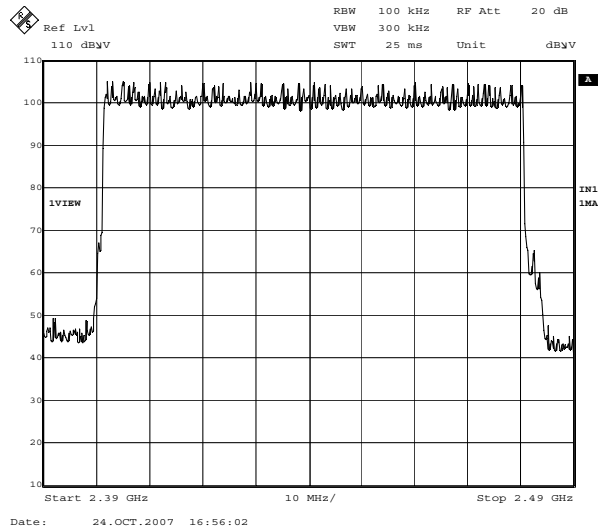
Channel Utilization: FCC 15.247(a)(1)(iii)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

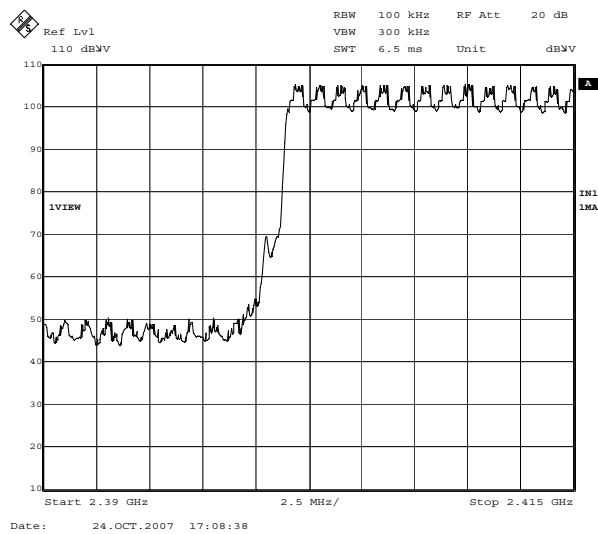
UL Japan, Inc. Yamakita No.2 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/24
TEMP./HUMI : 24deg.C./49%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

Hopping, 3DH5: 79ch

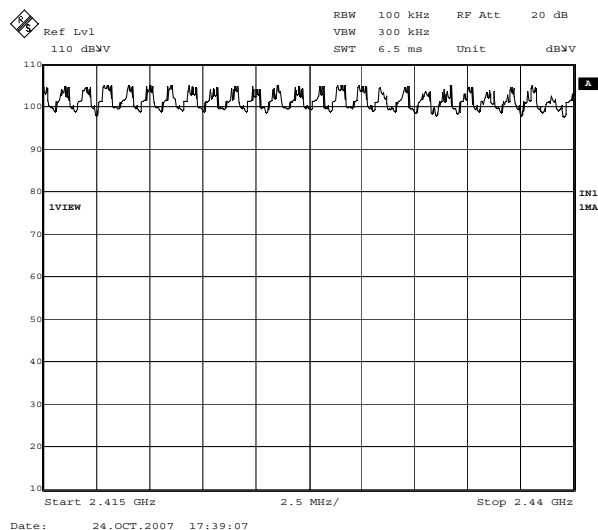
1.



2.



3.

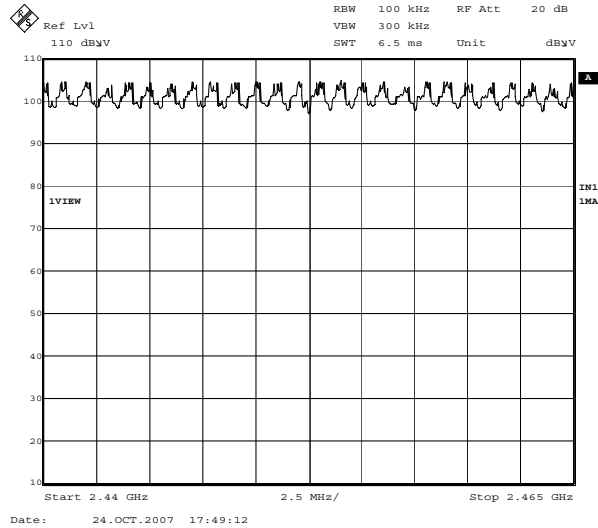


Channel Utilization: FCC 15.247(a)(1)(iii)

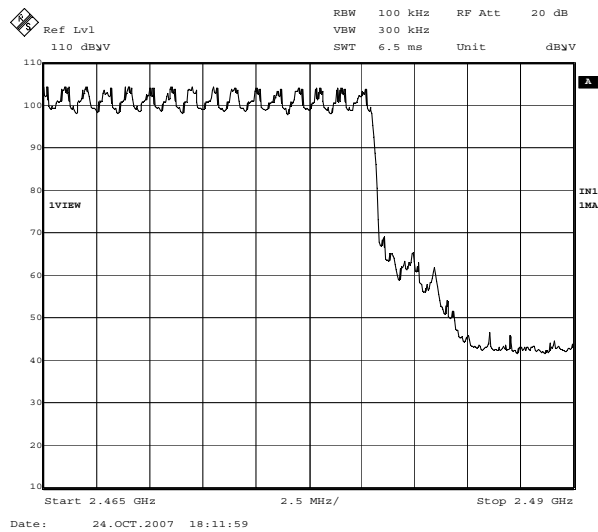
COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

UL Japan, Inc. Yamakita No.2 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/24
TEMP./HUMI : 24deg.C./49%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

4.



5.

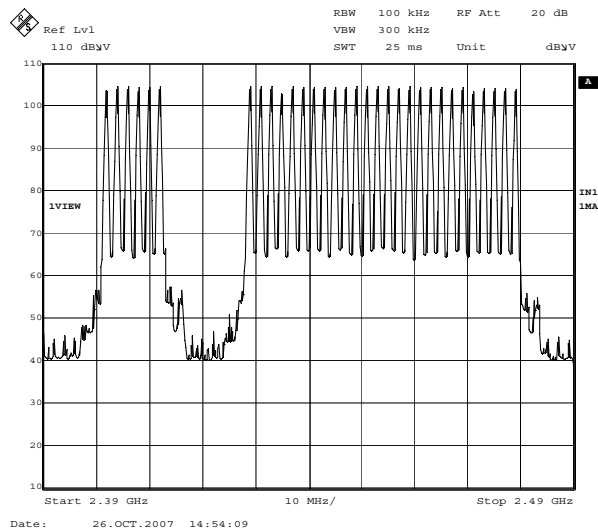


Channel Utilization: FCC 15.247(a)(1)(iii)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

UL Japan, Inc. Yamakita No.2 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/24
TEMP./HUMI : 24deg.C./49%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

1. Inquiry: 32ch



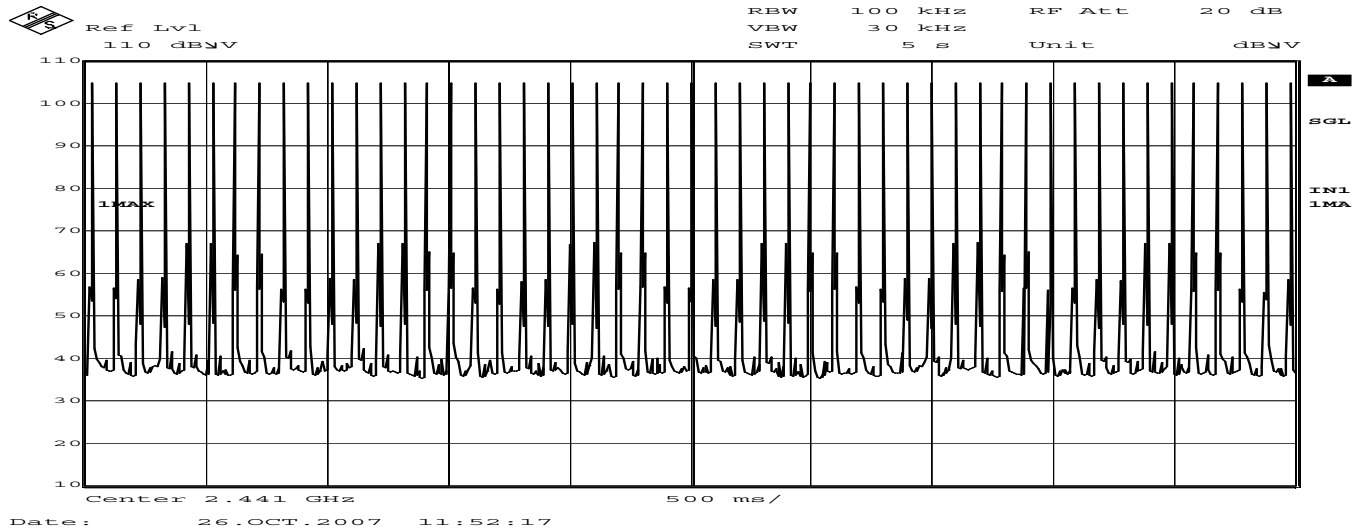
Dwell Time: FCC 15.247(a)(1)(iii)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

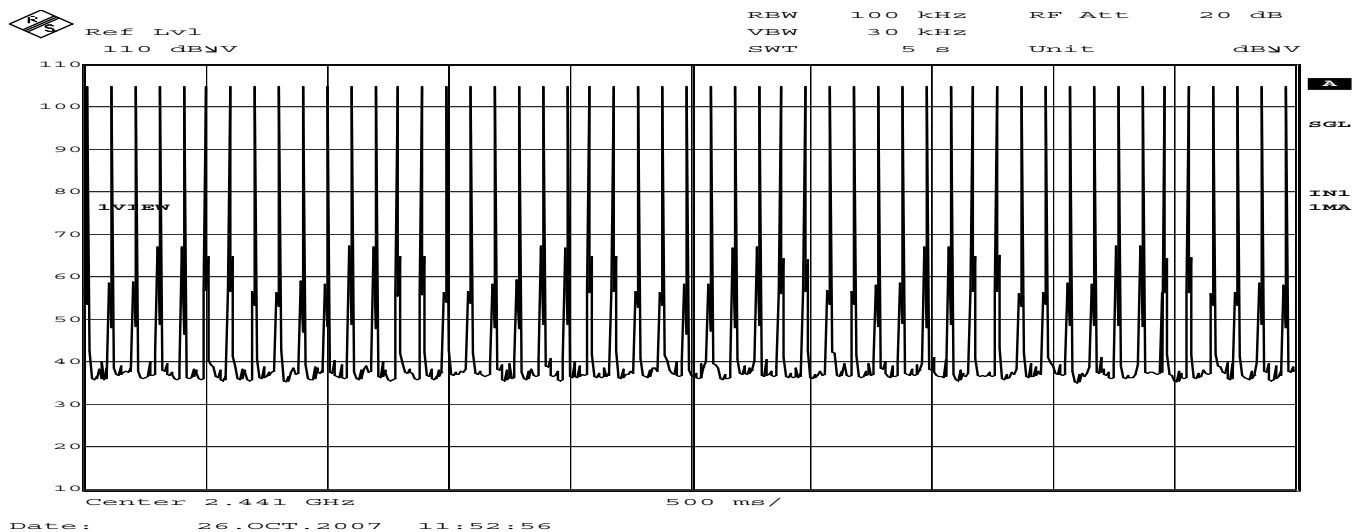
UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

Hopping (DH1):

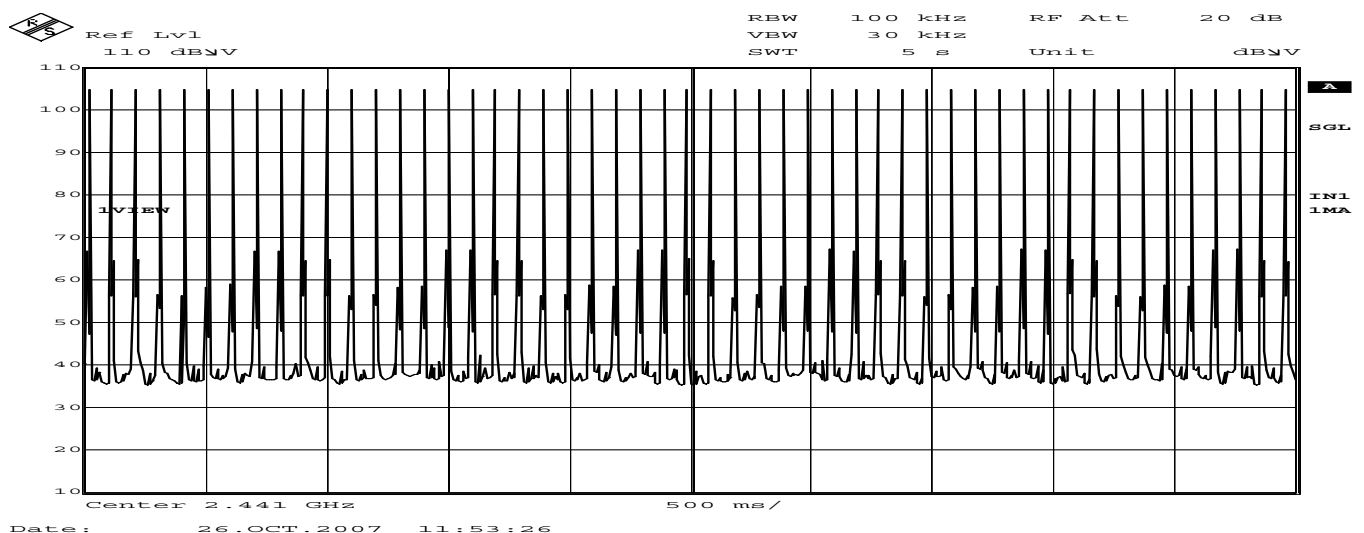
Count 1



Count 2



Count 3

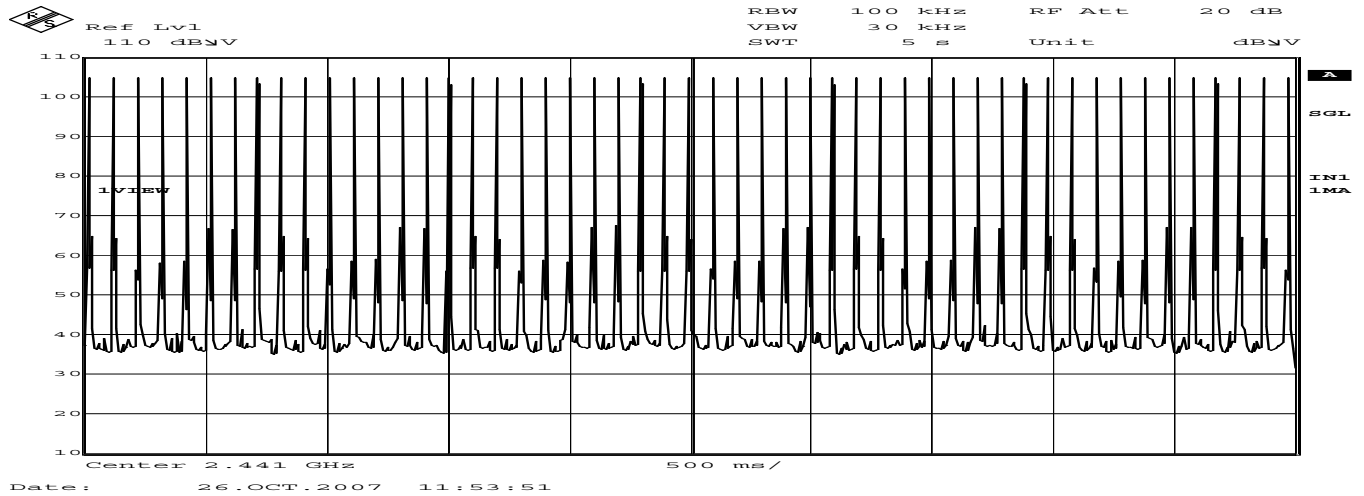


Dwell Time: FCC 15.247(a)(1)(iii)

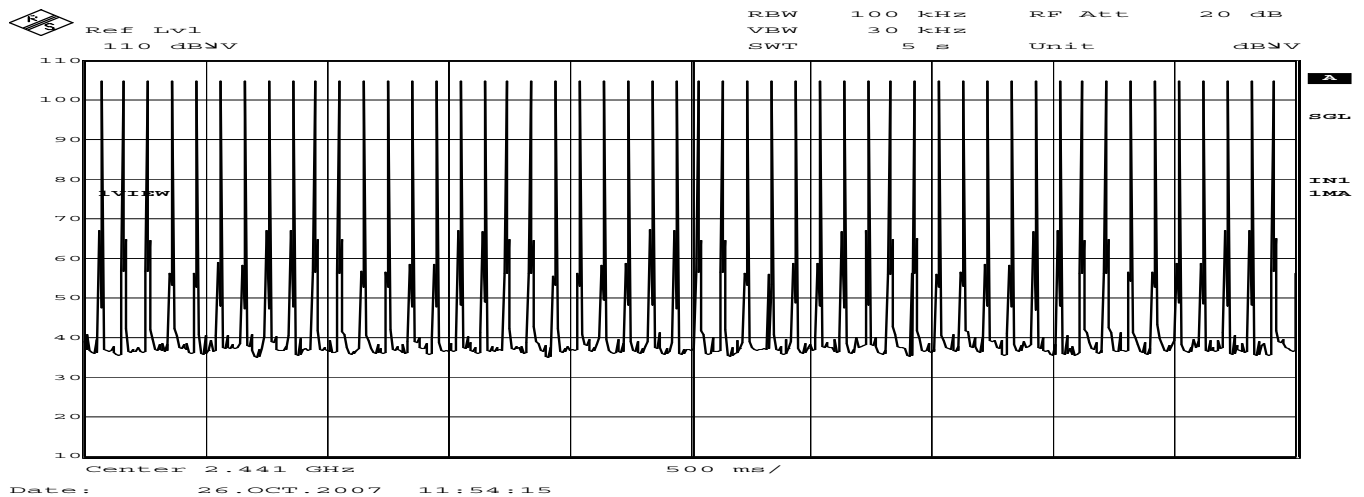
COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

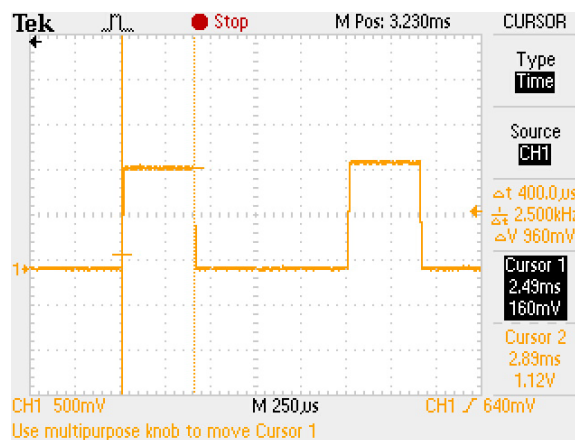
Count 4



Count 5



Duty cycle(Hopping DH1)



Average times of rising in 5 sec. of sweep = $(51 + 51 + 51 + 51 + 50) / 5 = 50.8$

Average times of rising in 1 sec. = $50.8 / 5s = 10.16$

Average times of rising in 0.4x = $0.4 * 79ch * 10.16 = 321.06$

Dwell time = $321.06 * 0.400 = 128.42$ [ms]

Limit : Dwell Time < 0.4[s]

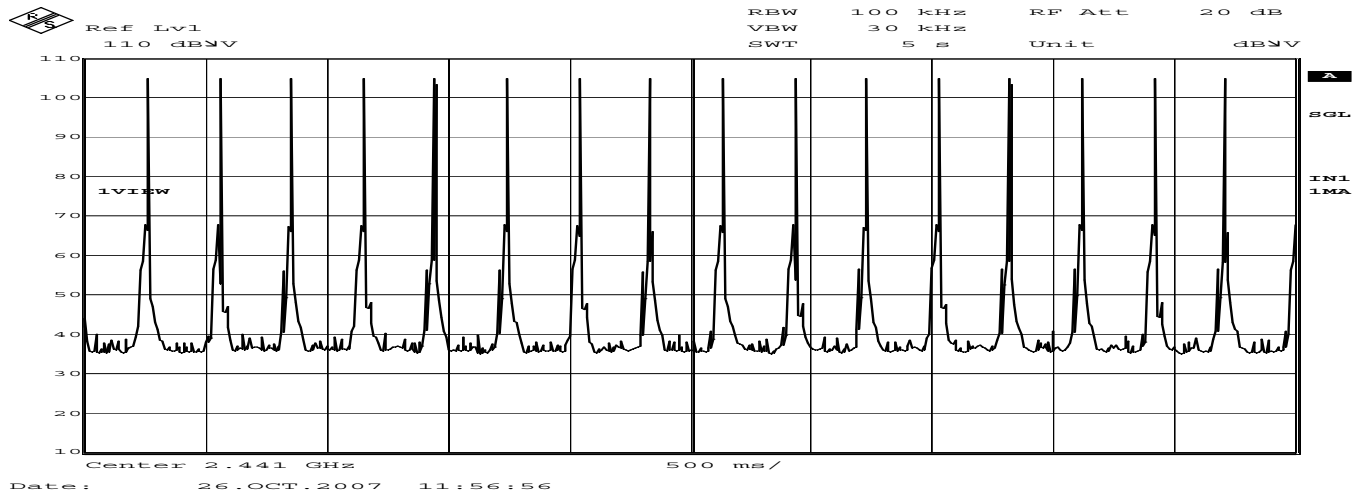
Dwell Time: FCC 15.247(a)(1)(iii)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

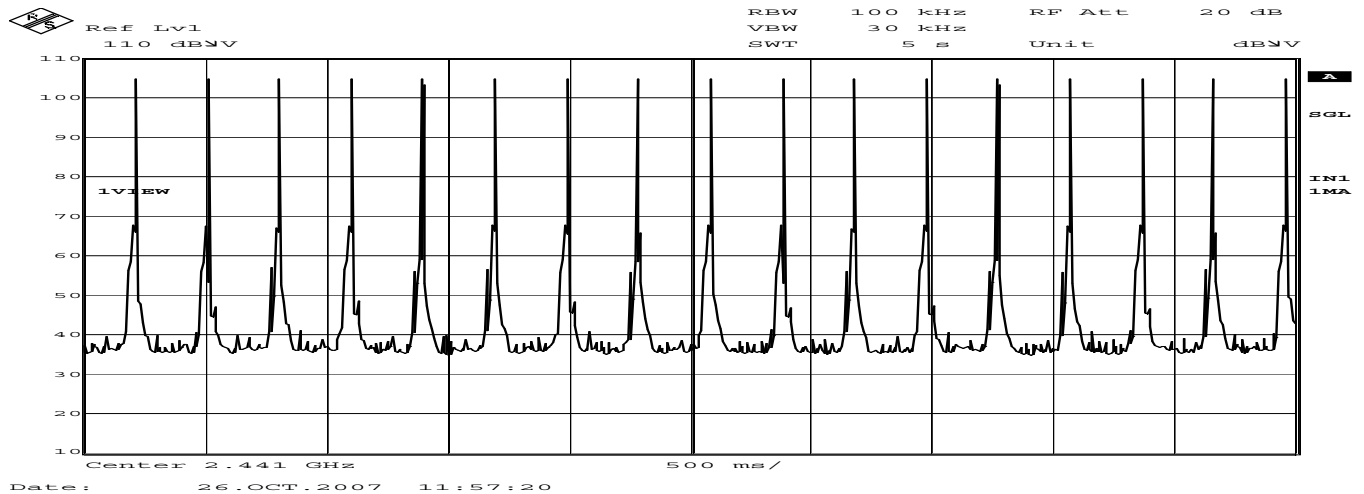
UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

Hopping (DH3):

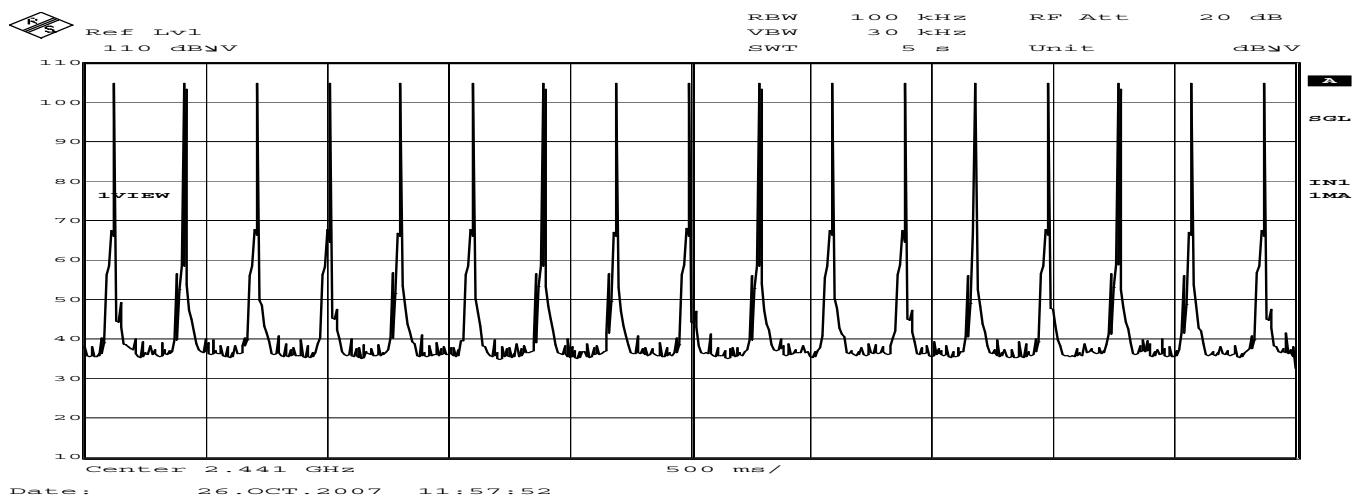
Count 1



Count 2



Count 3

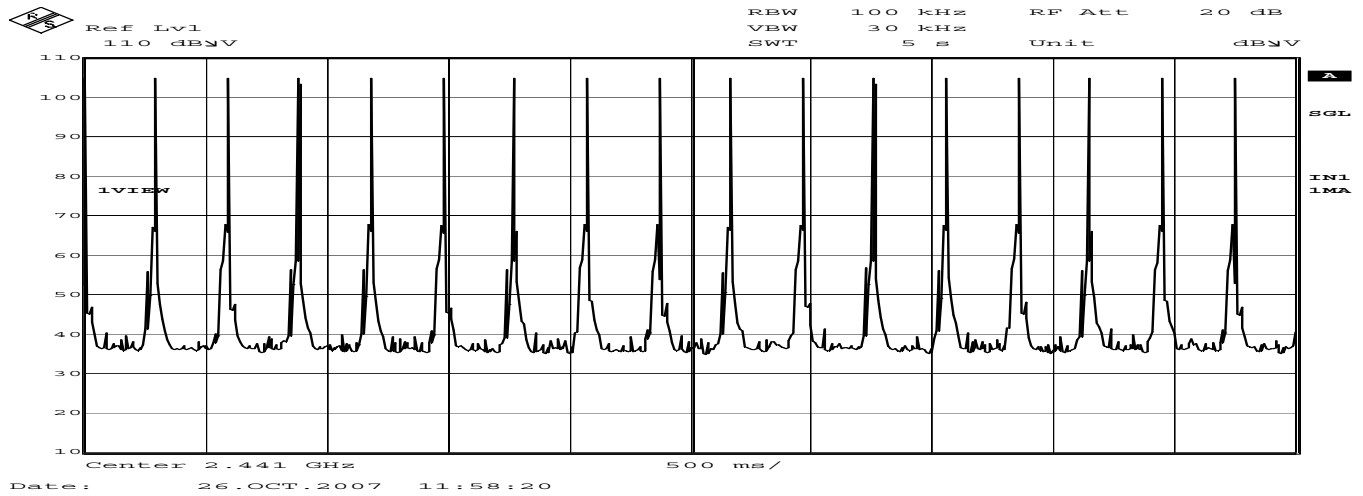


Dwell Time: FCC 15.247(a)(1)(iii)

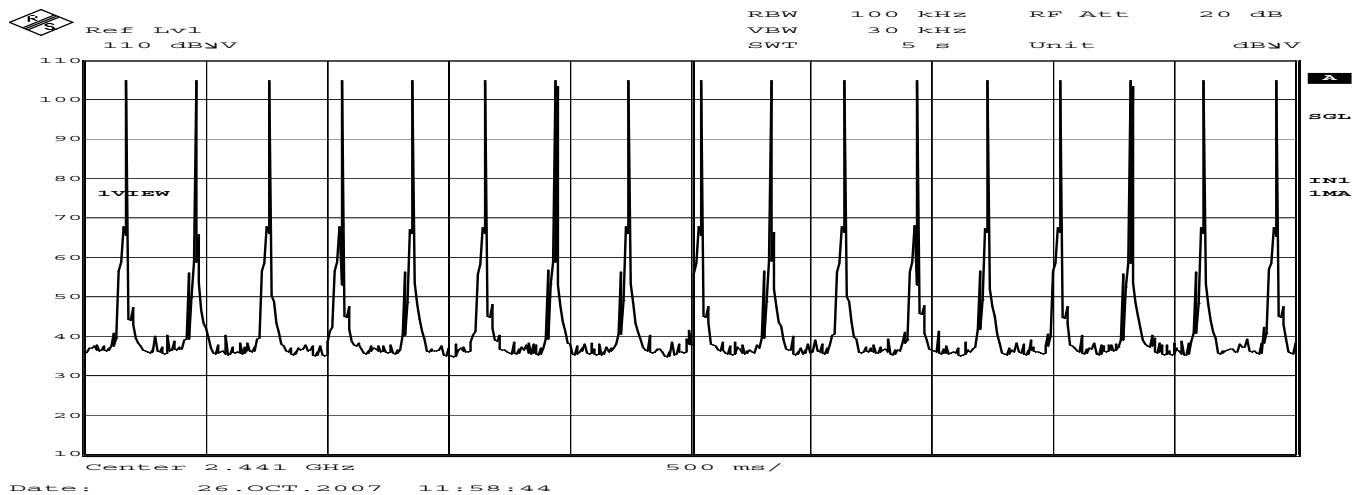
COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

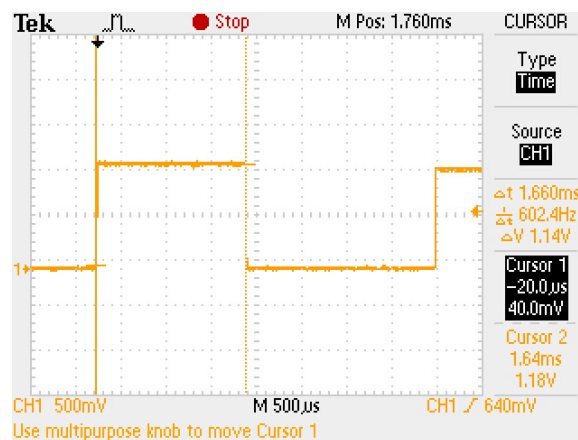
Count 4



Count 5



Duty cycle(Hopping DH3)



Average times of rising in 5 sec. of sweep = $(17 + 17 + 17 + 17 + 17) / 5 = 17$

Average times of rising in 1 sec. = $17 / 5s = 3.4$

Average times of rising in 0.4x = $0.4 * 79ch * 3.4 = 107.44$

Dwell time = $107.44 * 1.66 = 178.35 [ms]$

Limit : Dwell Time < 0.4[s]

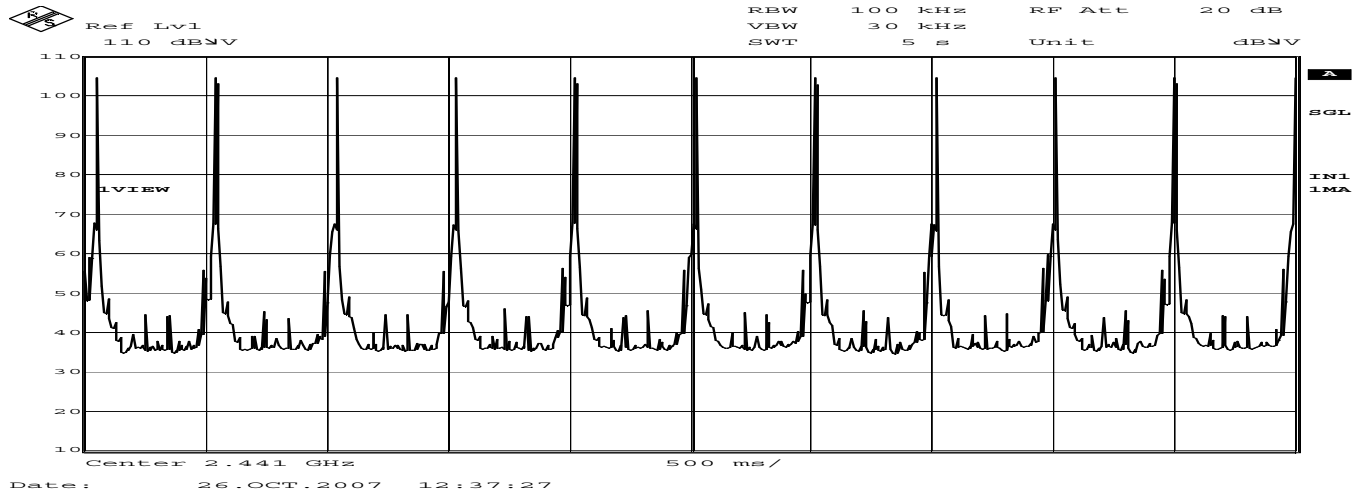
Dwell Time: FCC 15.247(a)(1)(iii)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

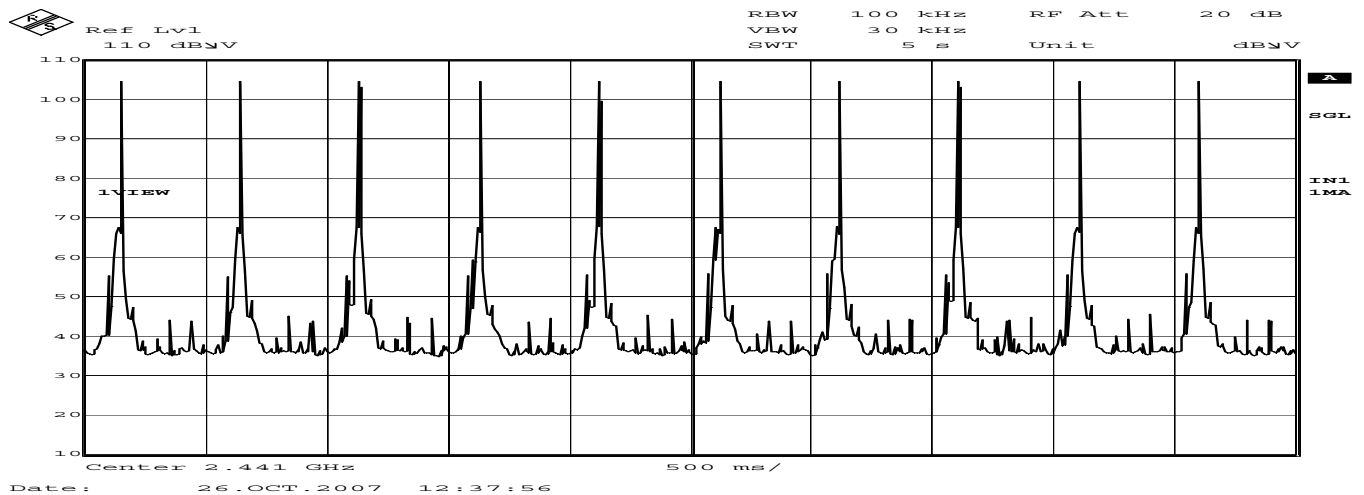
UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

Hopping (DH5):

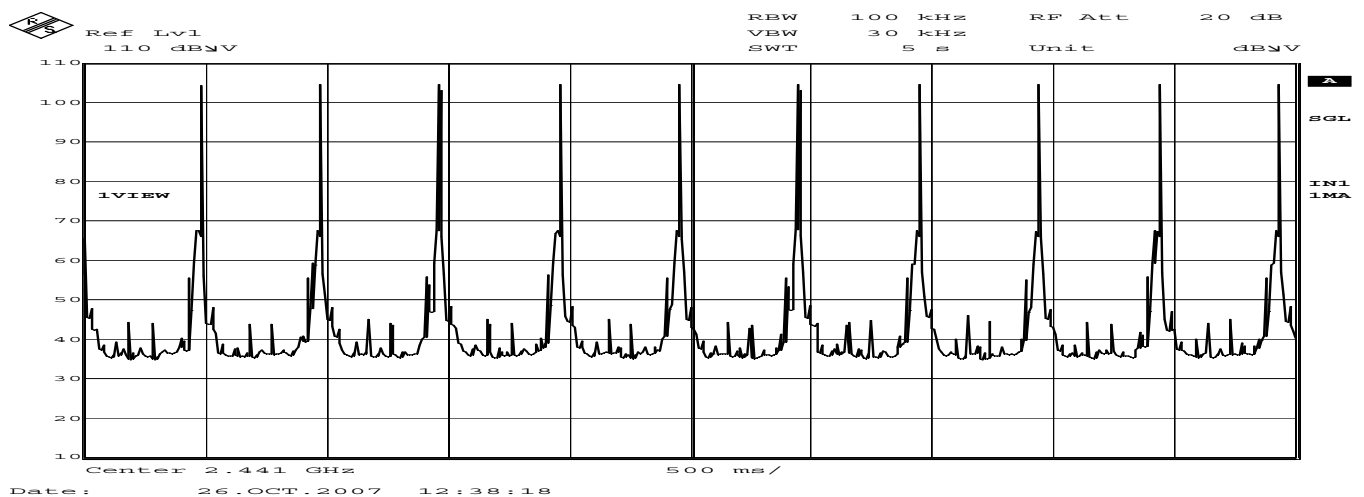
Count 1



Count 2



Count 3

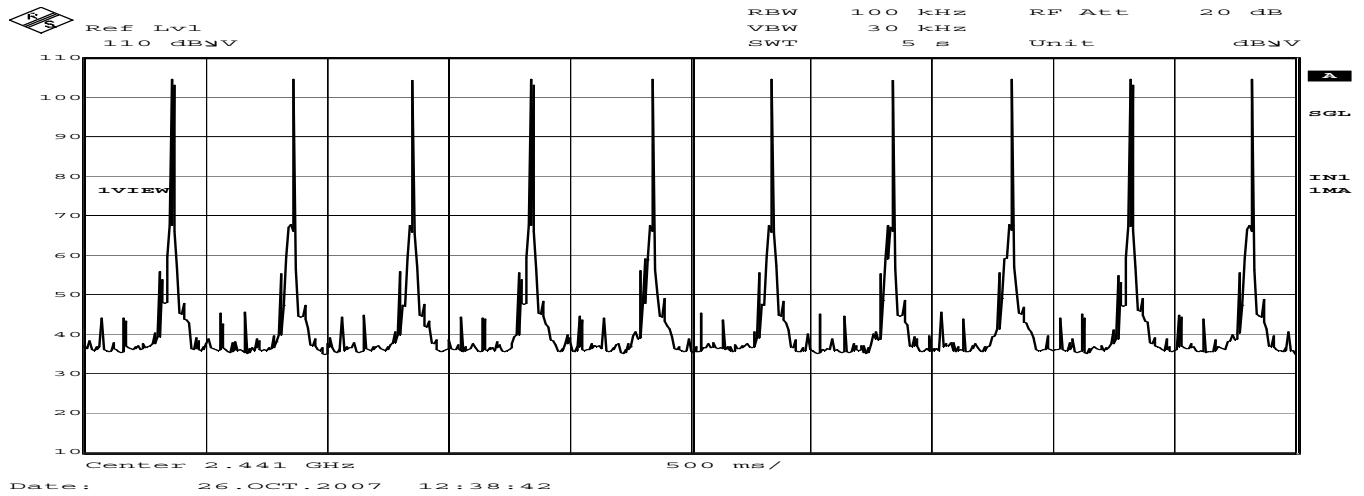


Dwell Time: FCC 15.247(a)(1)(iii)

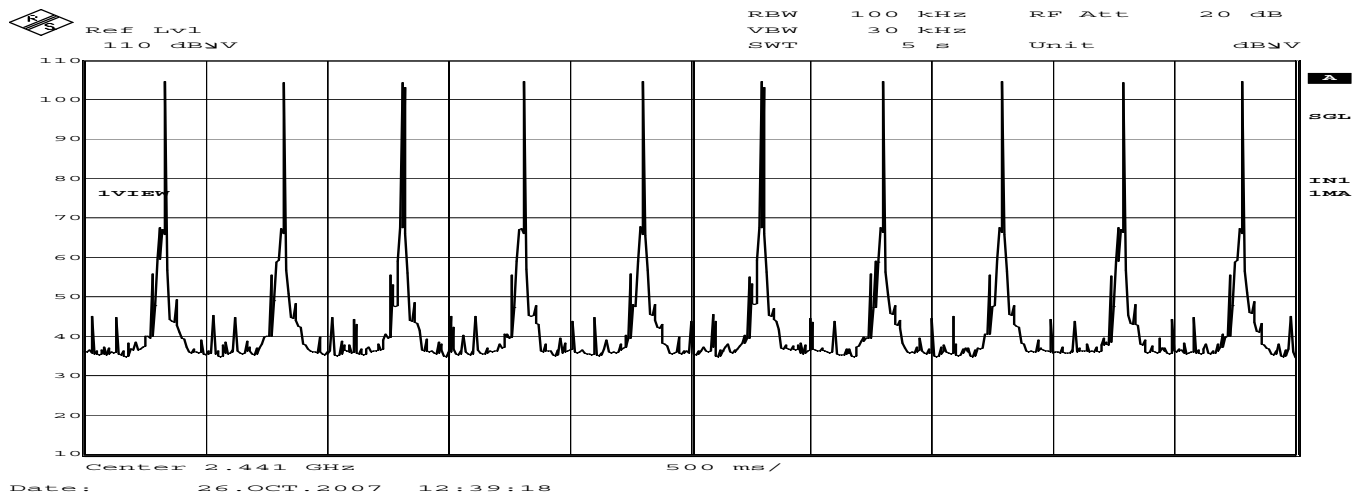
COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

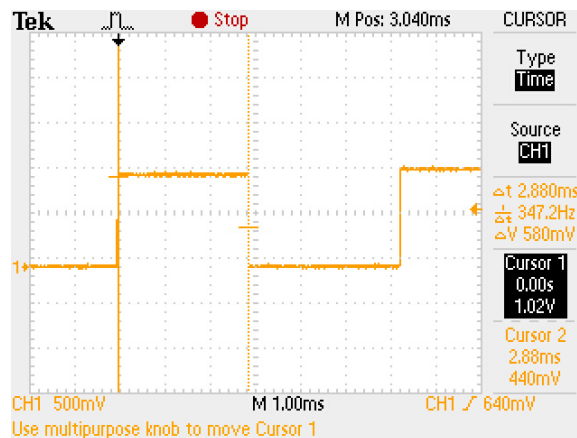
Count 4



Count 5



Duty cycle(Hopping DH5)



Average times of rising in 5 sec. of sweep = $(11 + 10 + 10 + 10 + 10) / 5 = 10.2$

Average times of rising in 1 sec. = $10.2 / 5s = 2.04$

Average times of rising in 0.4x = $0.4 * 79ch * 2.04 = 64.5$

Dwell time = $64.5 * 2.88 = 185.76 [ms]$

Limit : Dwell Time < 0.4[s]

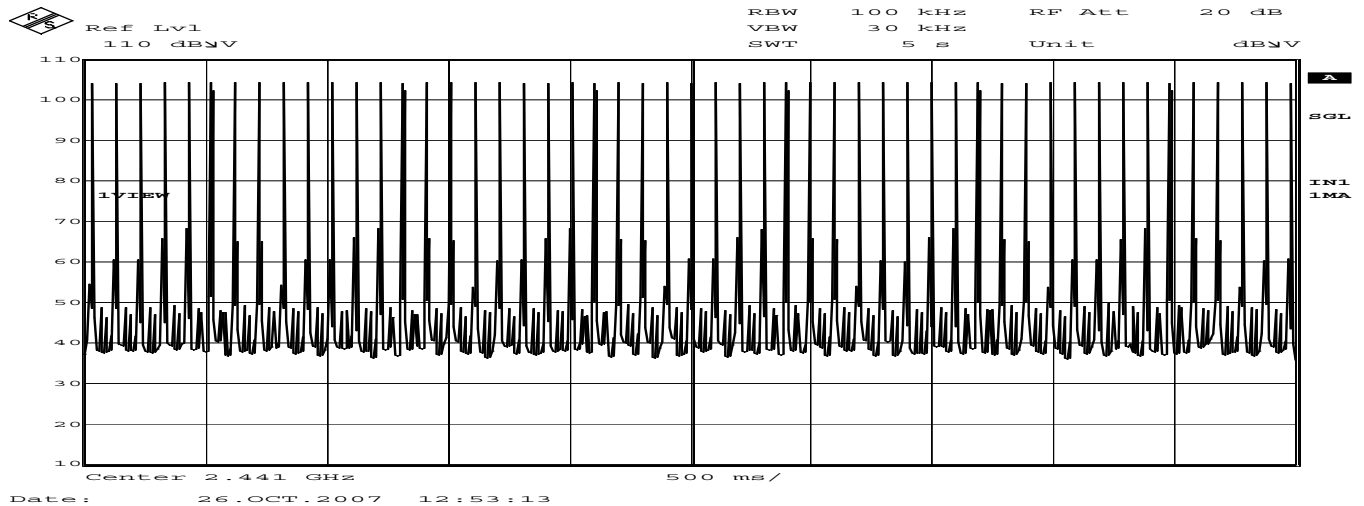
Dwell Time: FCC 15.247(a)(1)(iii)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

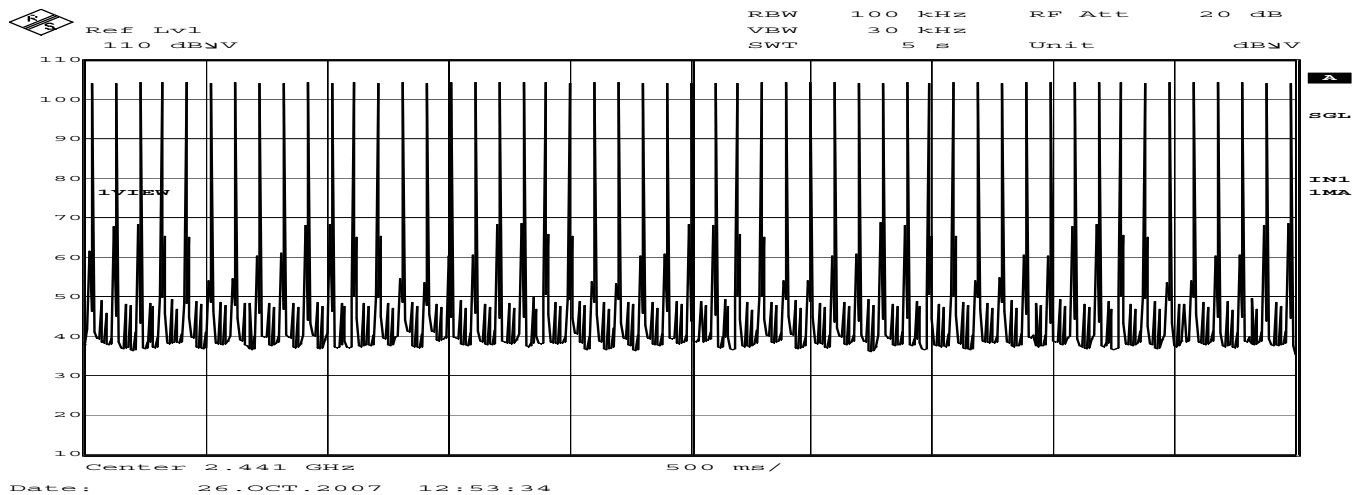
UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

Hopping (3DH1):

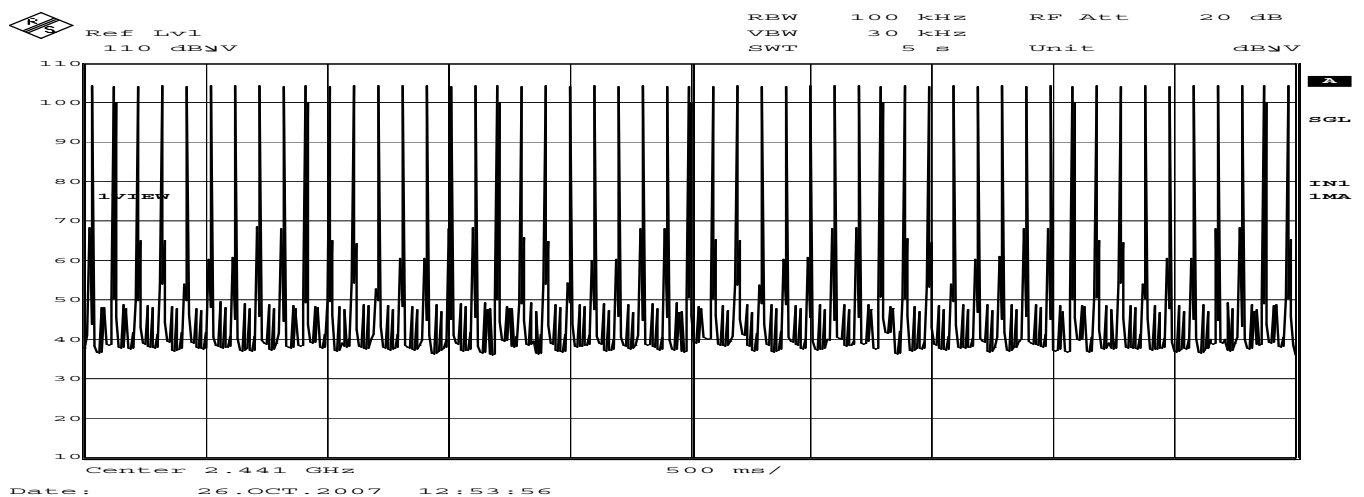
Count 1



Count 2



Count 3

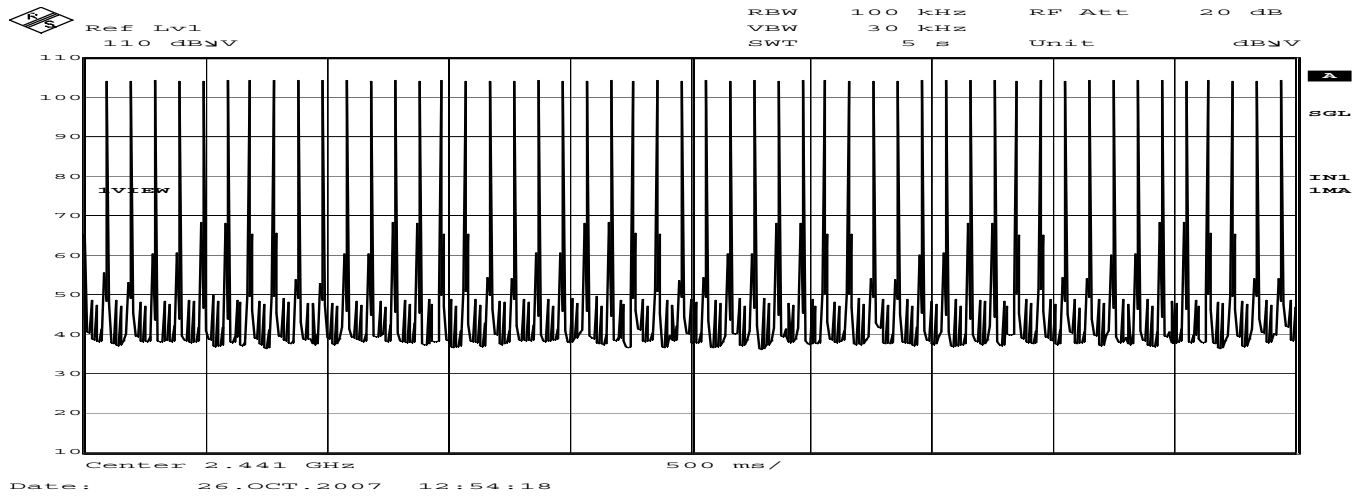


Dwell Time: FCC 15.247(a)(1)(iii)

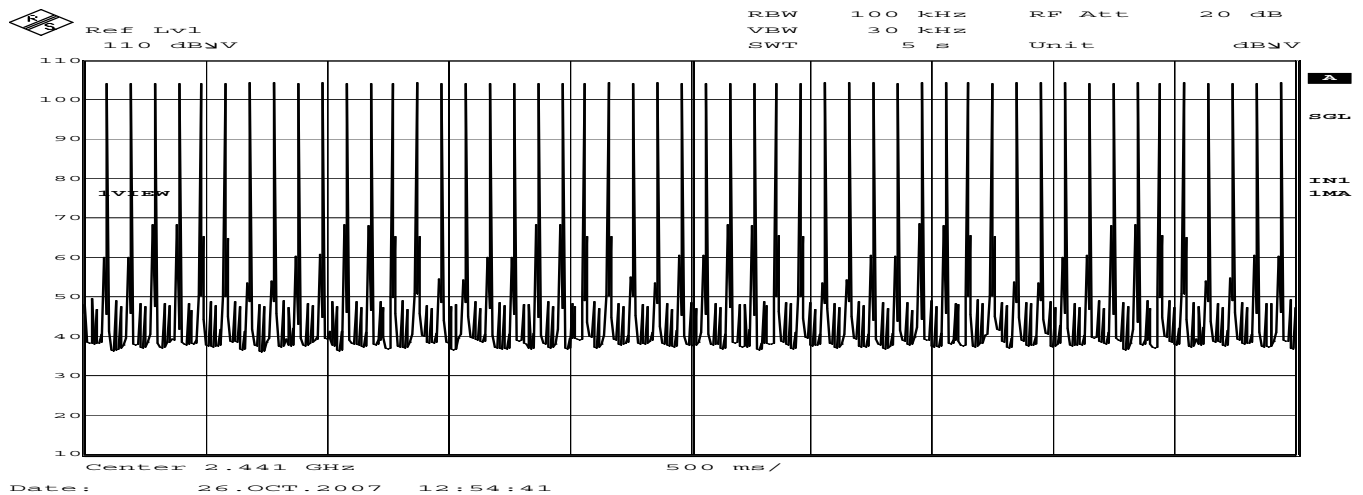
COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

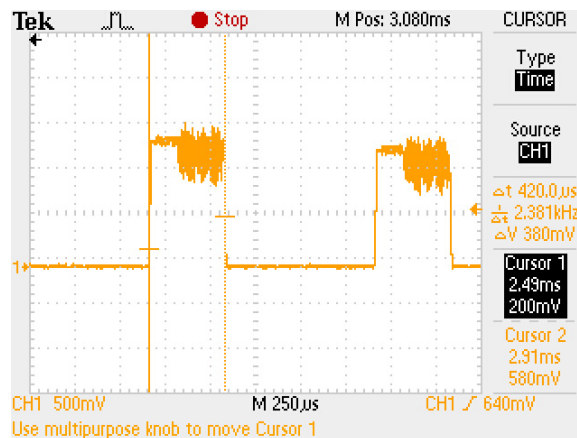
Count 4



Count 5



Duty cycle(Hopping 3DH1)



Average times of rising in 5 sec. of sweep = $(51 + 50 + 51 + 50 + 50) / 5 = 50.4$

Average times of rising in 1 sec. = $50.4 / 5s = 10.08$

Average times of rising in 0.4x = $0.4 * 79ch * 10.08 = 318.53$

Dwell time = $318.53 * 0.420 = 133.78$ [ms]

Limit : Dwell Time < 0.4[s]

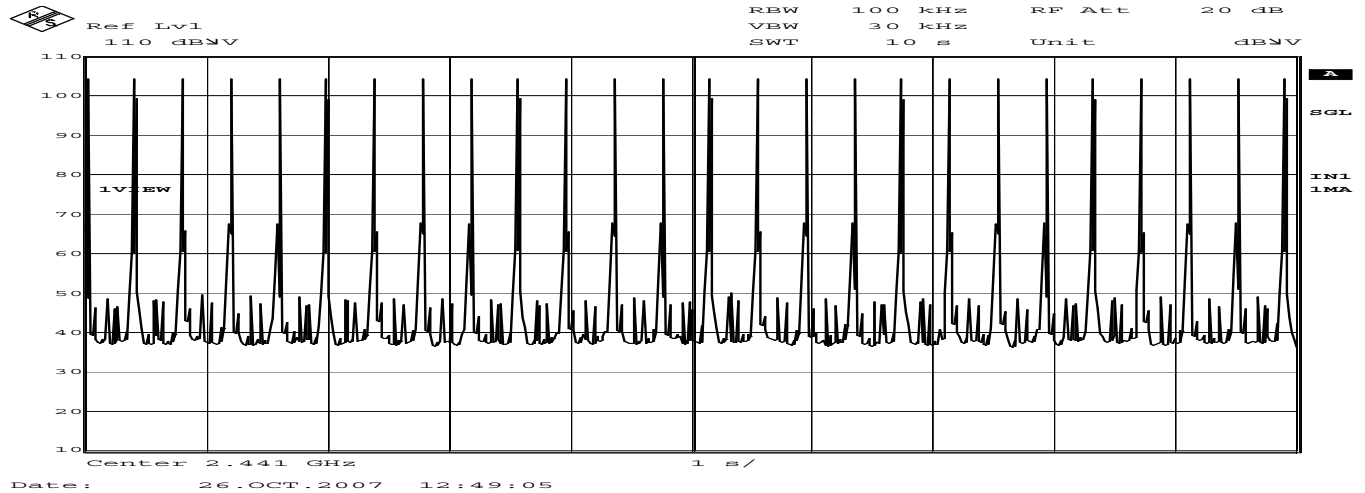
Dwell Time: FCC 15.247(a)(1)(iii)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

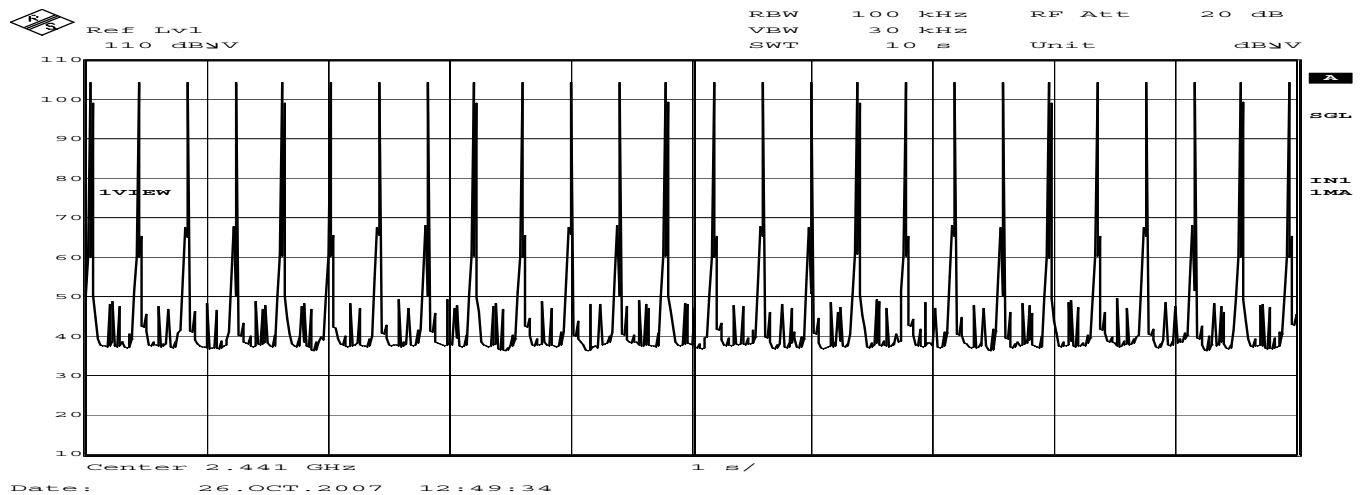
UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

Hopping (3DH3):

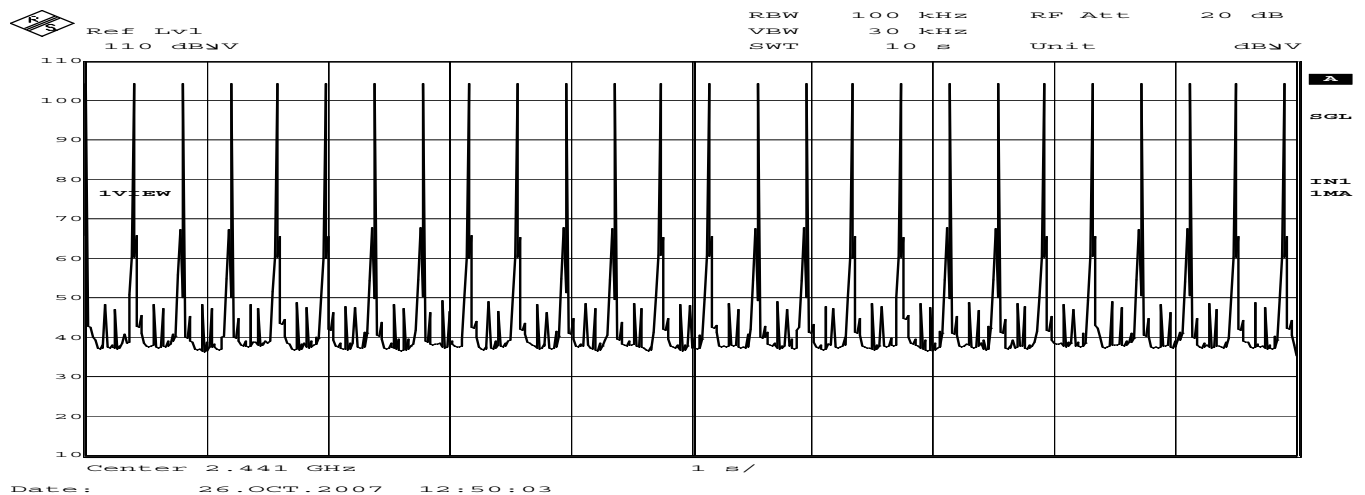
Count 1



Count 2



Count 3

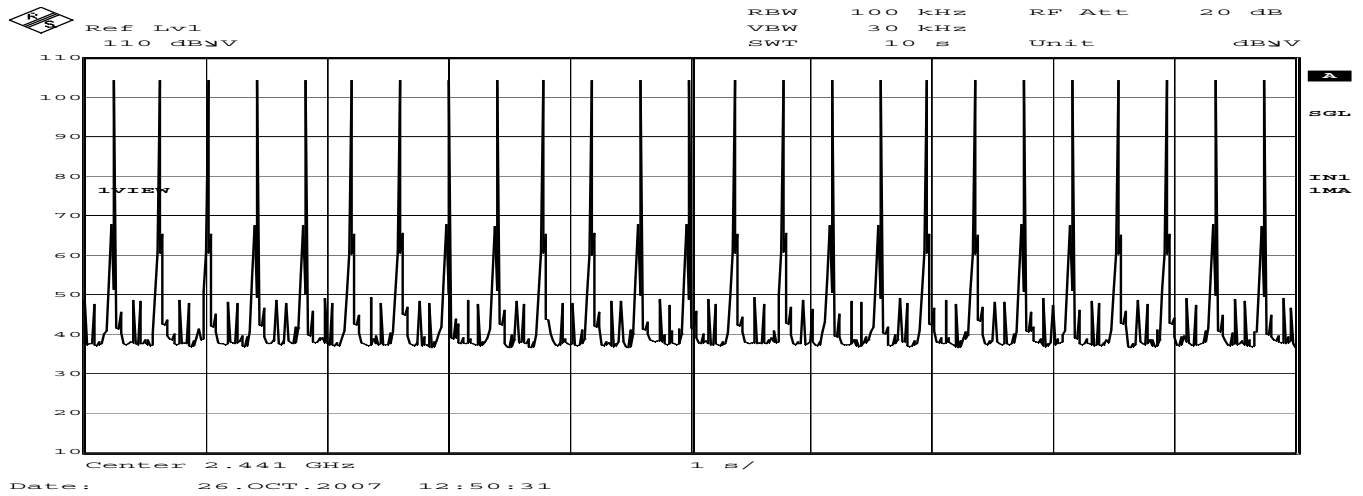


Dwell Time: FCC 15.247(a)(1)(iii)

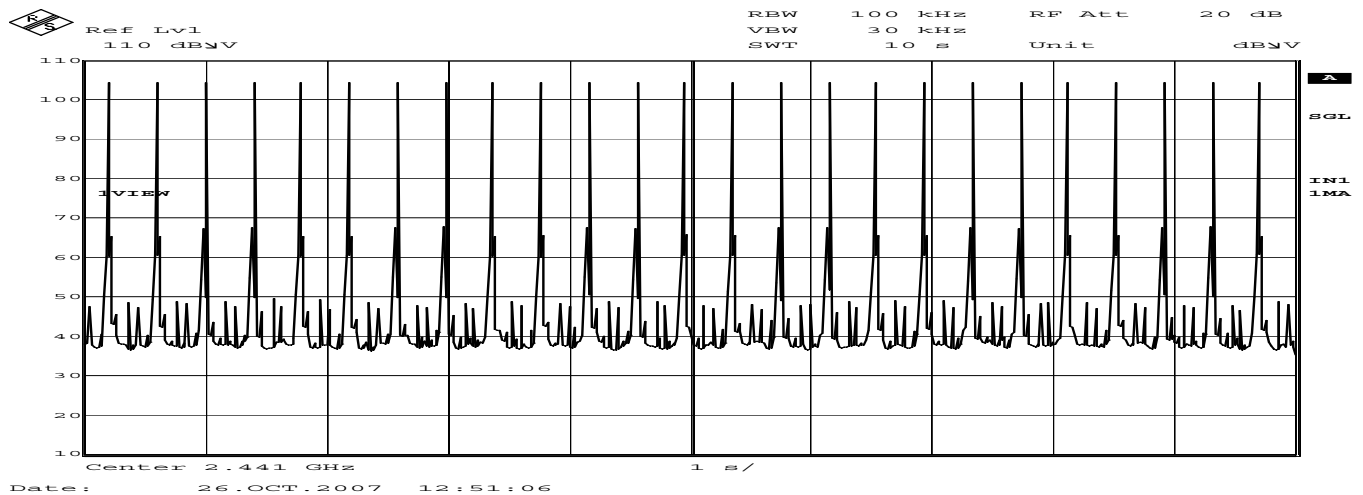
COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

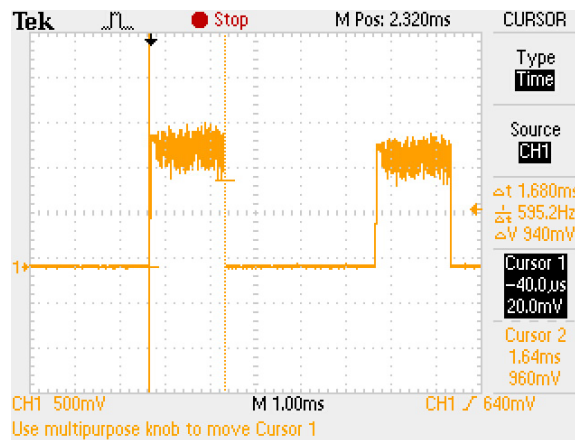
Count 4



Count 5



Duty cycle(Hopping 3DH3)



Average times of rising in 10 sec. of sweep = $(26 + 26 + 26 + 25 + 25) / 5 = 25.6$

Average times of rising in 1 sec. = $25.6 / 10s = 2.56$

Average times of rising in 0.4x = $0.4 * 79ch * 2.56 = 80.90$

Dwell time = $80.90 * 1.68 = 135.91$ [ms]

Limit : Dwell Time < 0.4[s]

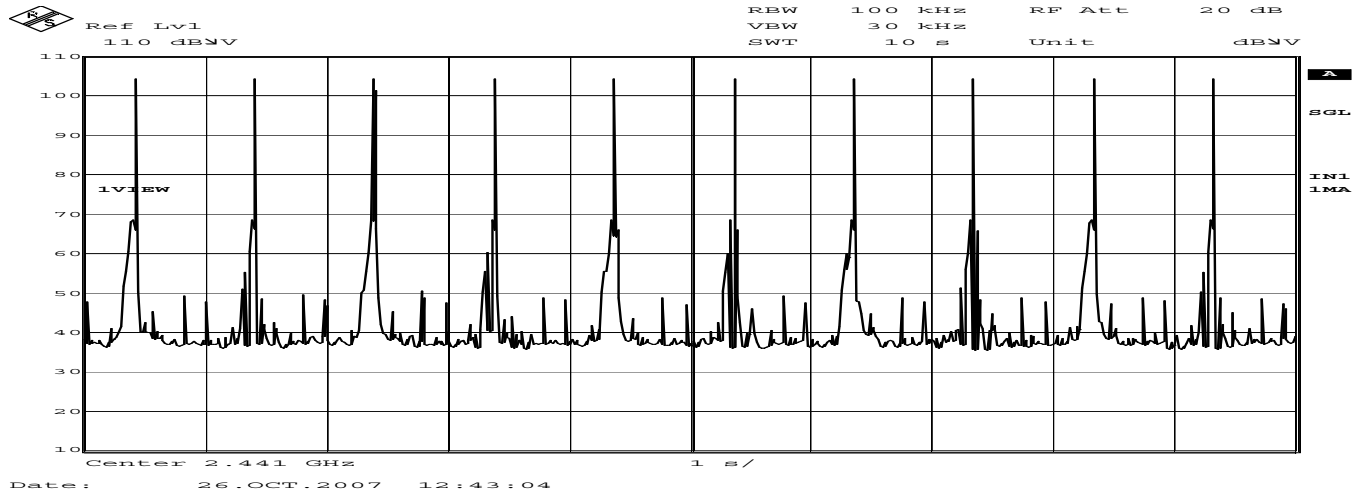
Dwell Time: FCC 15.247(a)(1)(iii)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

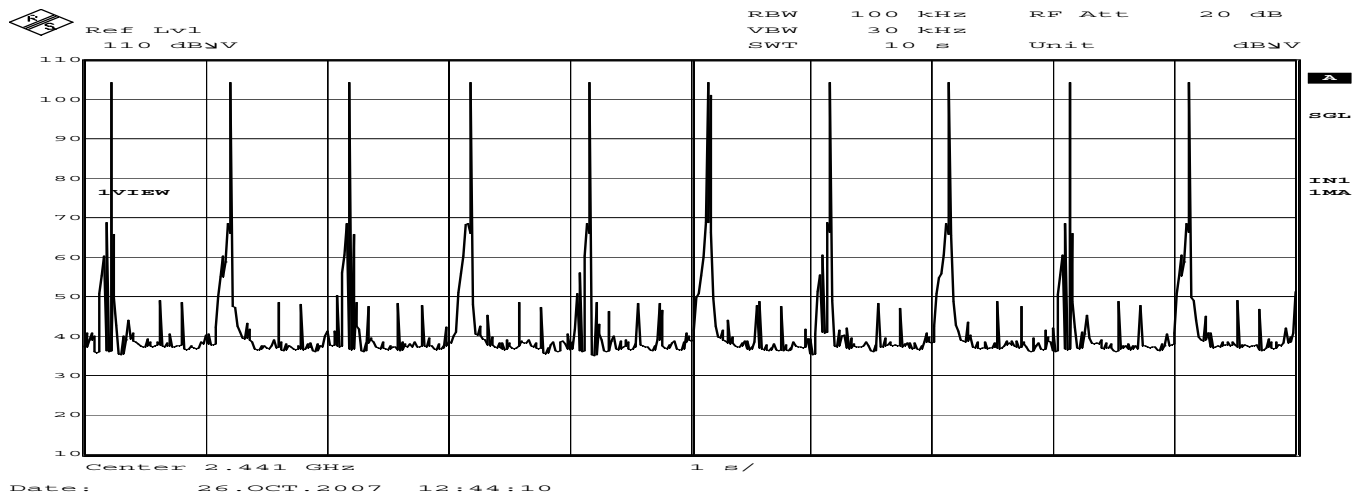
UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

Hopping (3DH5):

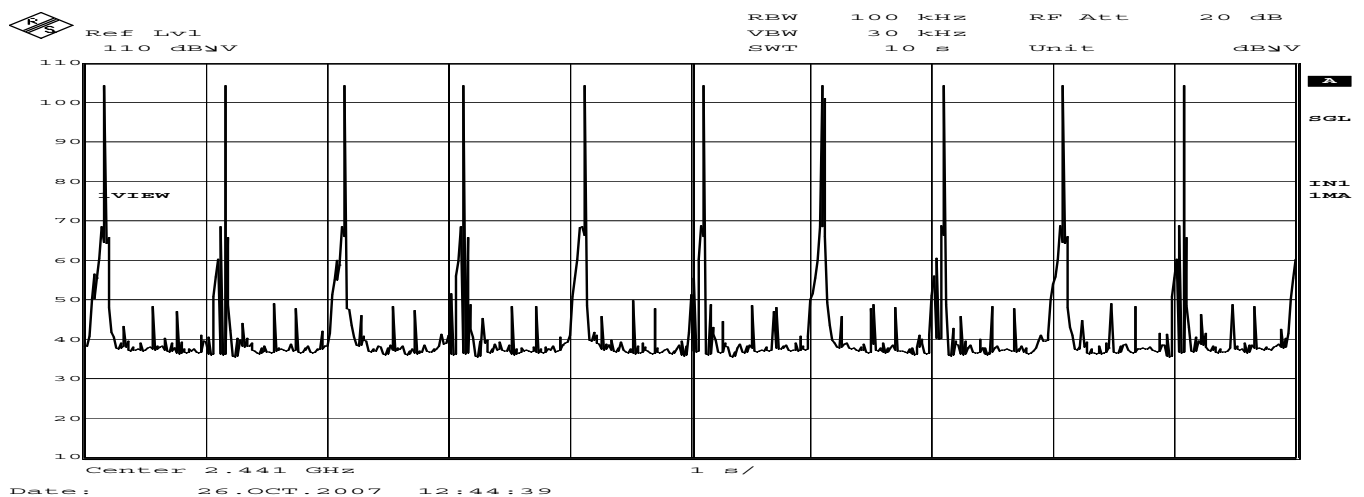
Count 1



Count 2



Count 3

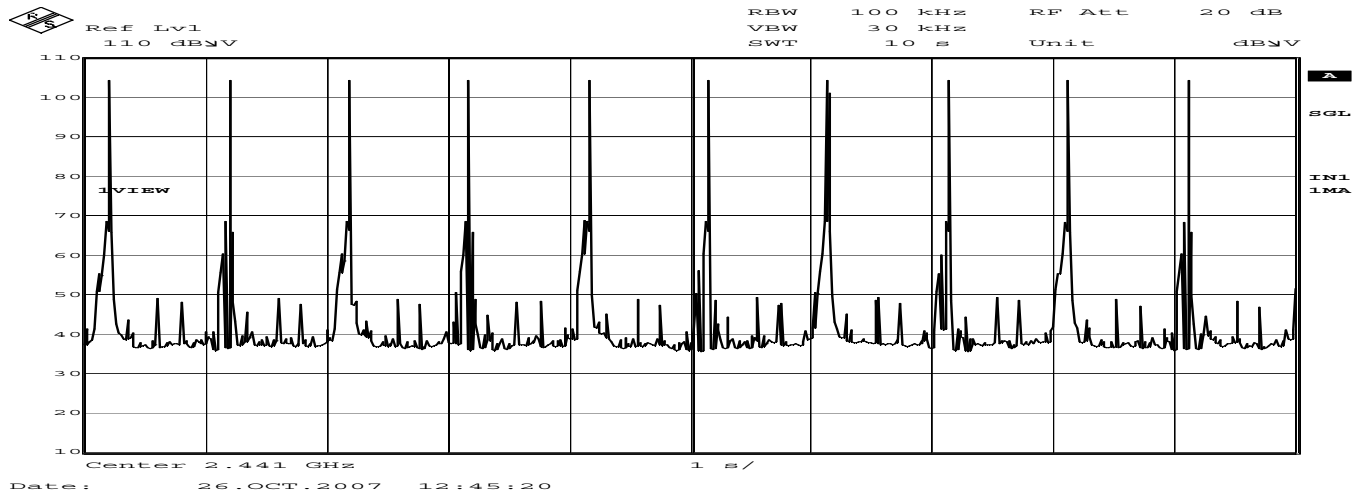


Dwell Time: FCC 15.247(a)(1)(iii)

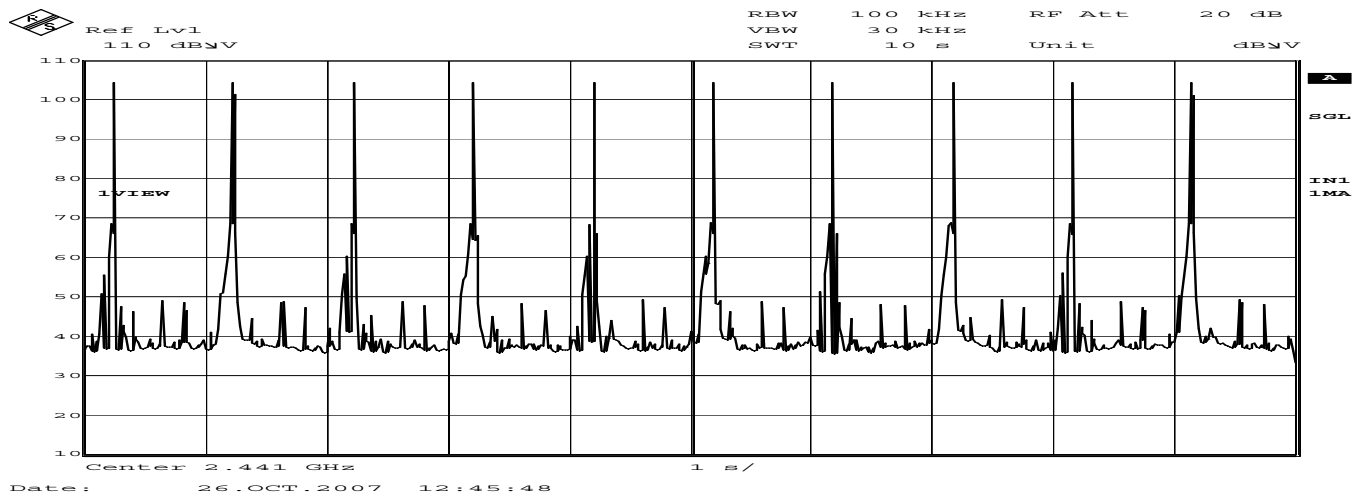
COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

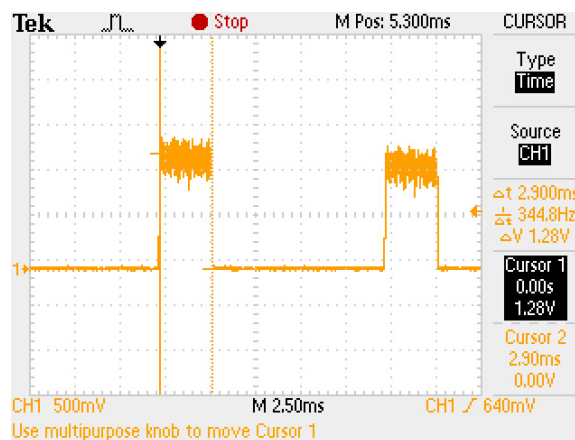
Count 4



Count 5



Duty cycle(Hopping 3DH5)



Average times of rising in 10 sec. of sweep = $(10 + 10 + 10 + 10 + 10) / 5 = 10.0$

Average times of rising in 1 sec. = $10.0 / 10s = 1.00$

Average times of rising in 0.4x = $0.4 * 79ch * 1.00 = 31.60$

Dwell time = $31.60 * 2.90 = 91.64$ [ms]

Limit : Dwell Time < 0.4[s]

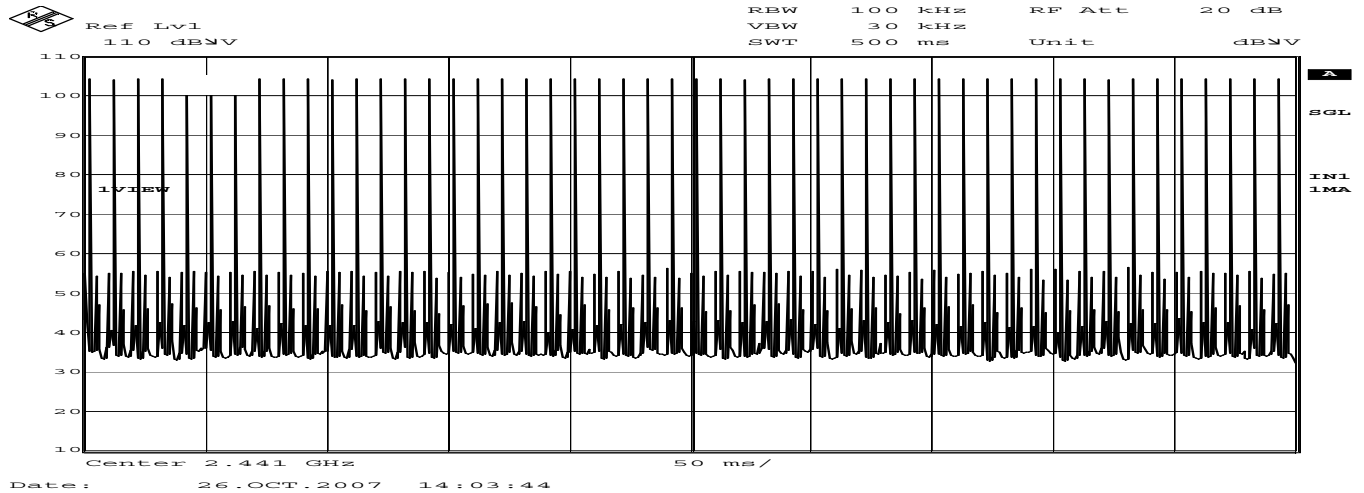
Dwell Time: FCC 15.247(a)(1)(iii)

COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

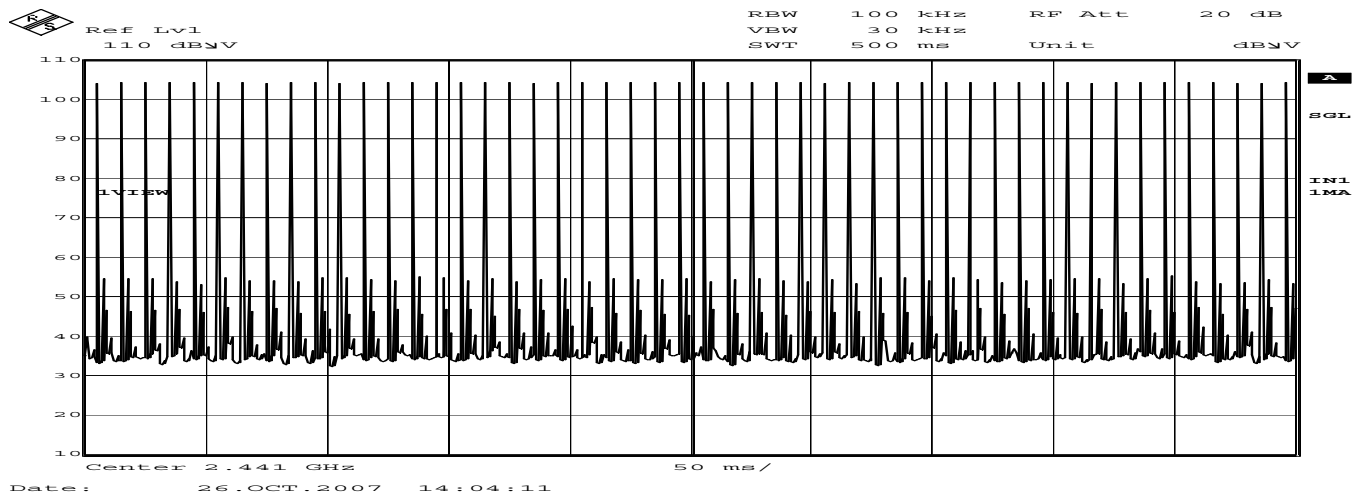
UL Japan, Inc. Yamakita No.4 Shielded Room
REPORT NO : 28CE0024-YK-C
REGULATION : Fcc Part15SubpartC 247(a)(1)(iii)
DATE : 2007/10/26
TEMP./HUMI : 24deg.C./61%
TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

Inquiry:

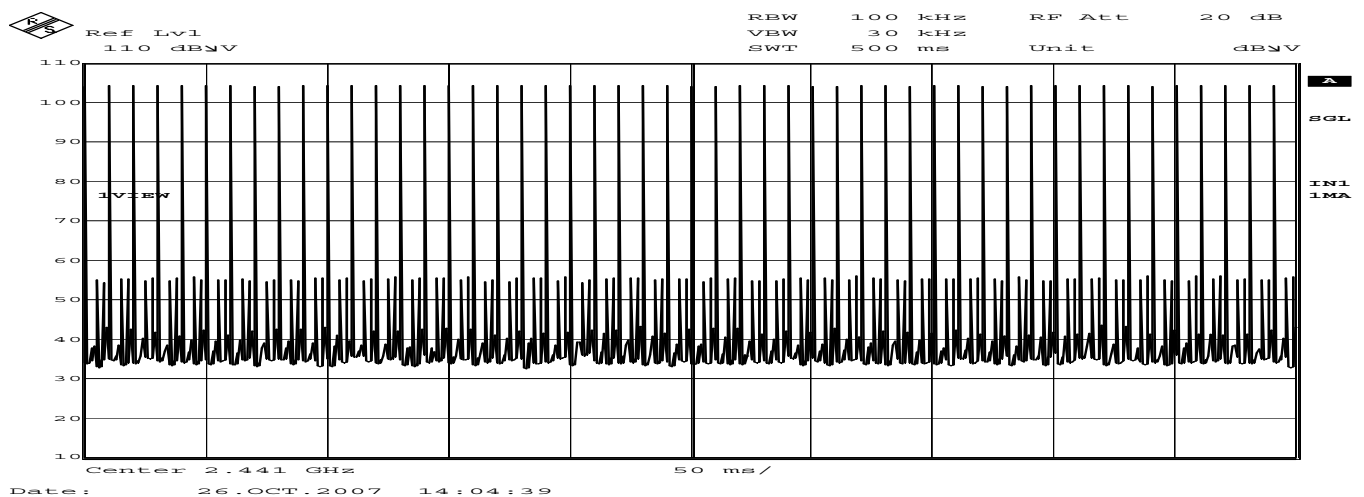
Count 1



Count 2



Count 3

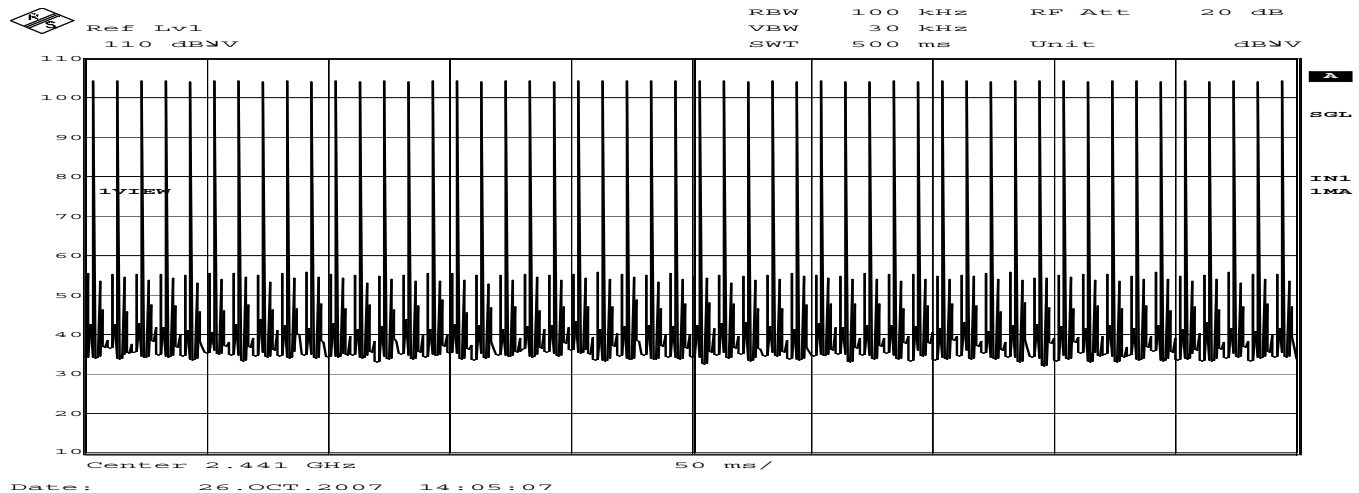


Dwell Time: FCC 15.247(a)(1)(iii)

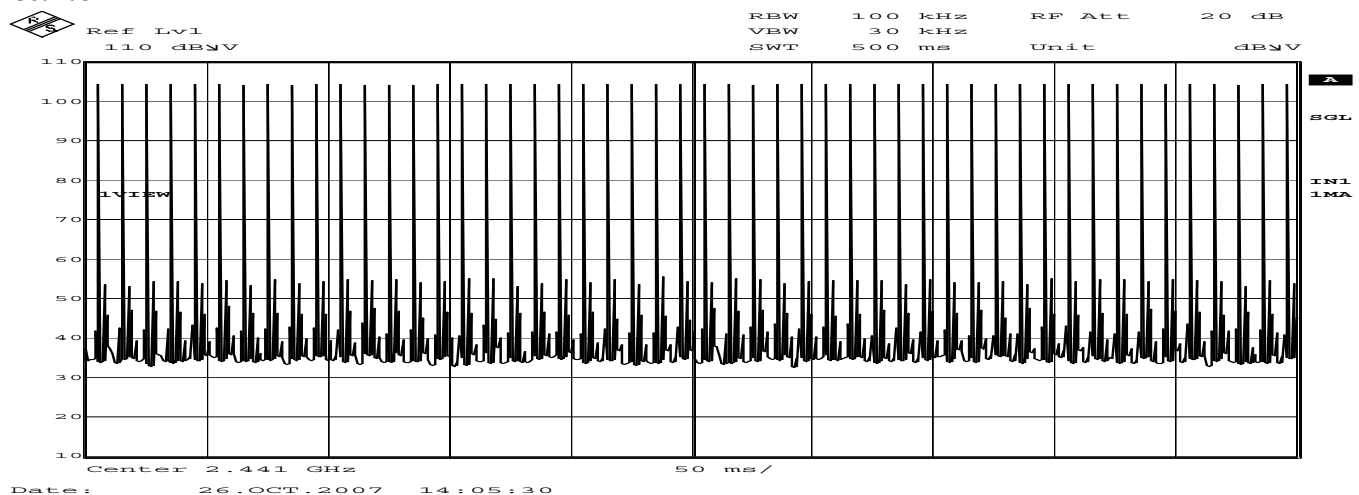
COMPANY : TOPCON Corporation
EQUIPMENT : Global Mapping System
MODEL NUMBER: GMS-2Pro
SERIAL NUMBER: 0014
FCC ID : LCB-841221
POWER : DC7.4V

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TEST MODE : Transmitting
ENGINEER : Tatsuya Arai

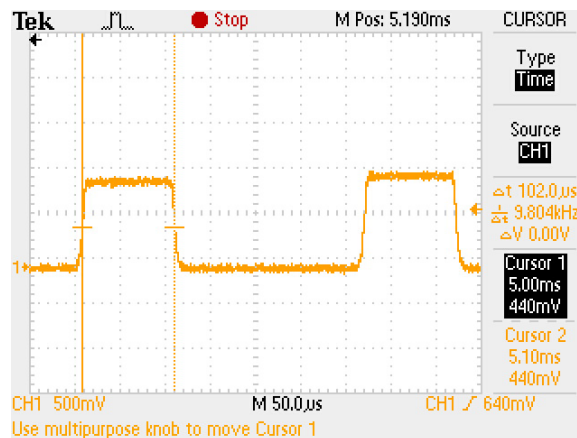
Count 4



Count 5



Duty cycle(Inquiry)



Average times of rising in 0.5 sec. of sweep = $(50 + 50 + 50 + 50 + 50) / 5 = 50.0$

Average times of rising in 1 sec. = $50.0 / 0.5s = 100.0$

Average times of rising in 0.4x = $0.4 * 32ch * 100.0 = 1280.0$

Dwell time = $1280.0 * 0.102 = 130.56 [ms]$

Limit : Dwell Time < 0.4[s]