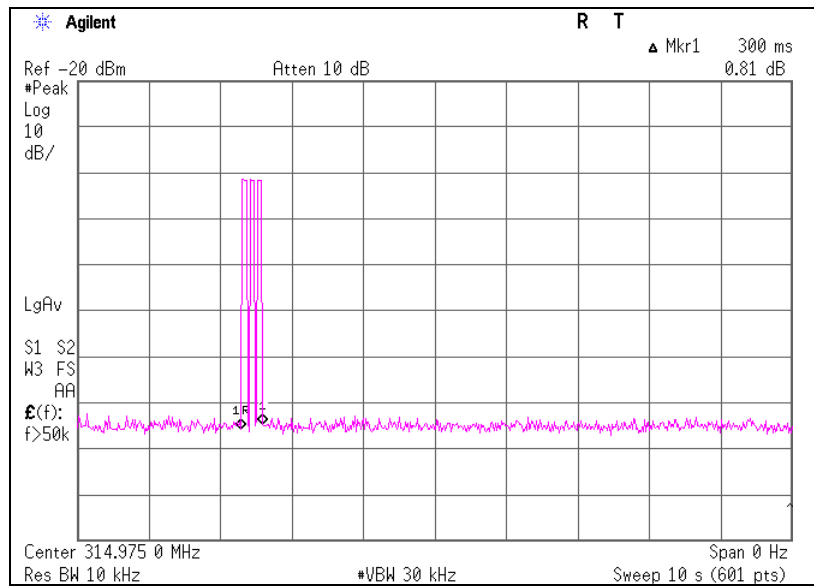


APPENDIX 2: Data of EMI test

Automatically deactivate

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
 Report No. 30CE0171-HO-01
 Date 01/21/2010
 Temperature/ Humidity 23 deg.C./ 36%
 Engineer Tomotaka Sasagawa
 Mode Normal use mode

Time of Transmitting [sec]	Limit [sec]	Result
0.30	5.00	Pass



Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission)

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	30CE0171-HO-01	
Date	01/21/2010	01/22/2010
Temperature/ Humidity	23 deg.C./ 36%	20 deg.C./ 35%
Engineer	Tomotaka Sasagawa	Katsunori Okai
Mode	(30-1000MHz)	(1-10GHz)
	Transmitting mode	

PK

Frequency [MHz]	Detector	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]		Limit dBuV/m	Margin [dB]		Remark Inside or Outside of Restricted Bands
		Hor	Ver					Hor	Ver		Hor	Ver	
314.975	PK	83.6	80.2	15.3	8.9	27.9	-	79.9	76.5	95.6	15.7	19.1	Carrier
629.950	PK	32.5	30.4	20.4	10.3	28.7	-	34.5	32.4	75.6	41.1	43.2	Outside
944.925	PK	33.2	31.4	23.4	11.5	27.9	-	40.2	38.4	75.6	35.4	37.2	Outside
1259.900	PK	55.5	56.8	25.1	2.1	33.3	-	49.4	50.7	75.6	26.2	24.9	Outside
1574.875	PK	51.1	53.1	25.7	2.3	32.9	-	46.2	48.2	73.9	27.7	25.7	Inside
1889.850	PK	57.5	59.1	26.1	2.5	32.5	-	53.6	55.2	75.6	22.0	20.4	Outside
2204.825	PK	49.2	48.3	26.7	2.6	32.4	-	46.1	45.2	73.9	27.8	28.7	Inside
2519.800	PK	42.3	42.4	27.4	2.8	32.4	-	40.1	40.2	75.6	35.5	35.4	Outside
2834.775	PK	47.2	47.4	28.1	3.0	32.3	-	46.0	46.2	73.9	27.9	27.7	Inside
3149.750	PK	45.0	46.2	28.5	3.1	32.1	-	44.5	45.7	75.6	31.1	29.9	Outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

PK with Duty factor

Frequency [MHz]	Detector	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]		Limit dBuV/m	Margin [dB]		Remark
		Hor	Ver					Hor	Ver		Hor	Ver	
314.975	PK	83.6	80.2	15.3	8.9	27.9	-5.5	74.4	71.0	75.6	1.2	4.6	Carrier
629.950	PK	32.5	30.4	20.4	10.3	28.7	-5.5	29.0	26.9	55.6	26.6	28.7	Outside
944.925	PK	33.2	31.4	23.4	11.5	27.9	-5.5	34.7	32.9	55.6	20.9	22.7	Outside
1259.900	PK	55.5	56.8	25.1	2.1	33.3	-5.5	43.9	45.2	55.6	11.7	10.4	Outside
1574.875	PK	51.1	53.1	25.7	2.3	32.9	-5.5	40.7	42.7	53.9	13.2	11.2	Inside
1889.850	PK	57.5	59.1	26.1	2.5	32.5	-5.5	48.1	49.7	55.6	7.5	5.9	Outside
2204.825	PK	49.2	48.3	26.7	2.6	32.4	-5.5	40.6	39.7	53.9	13.3	14.2	Inside
2519.800	PK	42.3	42.4	27.4	2.8	32.4	-5.5	34.6	34.7	55.6	21.0	20.9	Outside
2834.775	PK	47.2	47.4	28.1	3.0	32.3	-5.5	40.5	40.7	53.9	13.4	13.2	Inside
3149.750	PK	45.0	46.2	28.5	3.1	32.1	-5.5	39.0	40.2	55.6	16.6	15.4	Outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Duty factor (Refer to Duty factor data sheet)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

* The test was performed with PK detect. Average emission measurements were calculated with PK detect and Duty cycle factor.

* Duty Factor was calculated with the assumption of the worst condition in 100msec.

* All the measured noise was pulse emission.

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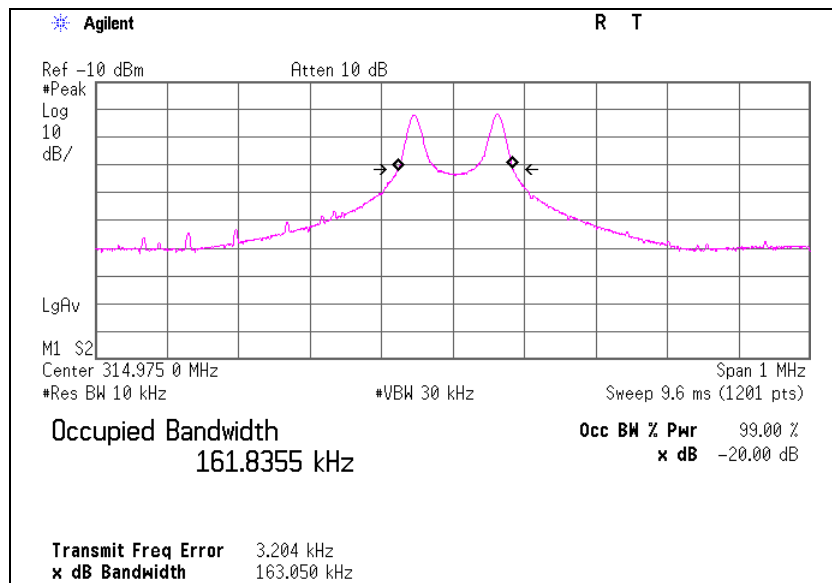
-20dB and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	30CE0171-HO-01
Date	01/21/2010
Temperature/ Humidity	23 deg.C./ 36%
Engineer	Tomotaka Sasagawa
Mode	Transmitting mode

Bandwidth Limit : Fundamental Frequency $314.975 \text{ MHz} \times 0.25\% = 787.44 \text{ kHz}$

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
163.05	787.44	Pass

99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
161.84	787.44	Pass



Duty Cycle

Test place	Head Office EMC Lab. No.6 Shielded room
Report No.	30CE0171-HO-01
Date	01/24/2010
Temperature/ Humidity	20 deg.C./ 39%
Engineer	Hironobu Ohnishi
Mode	Transmitting mode

Type	Times	ON time(One pulse) [ms]	ON time(in 51.66ms) [ms]	ON Time(in 100ms) [ms]
A	1	0.515	0.515	0.9969
B	81	0.264	21.384	41.3937
C	40	0.139	5.56	10.7627

*1)ON time(in 51.66ms) = Times * ON time(One pulse)

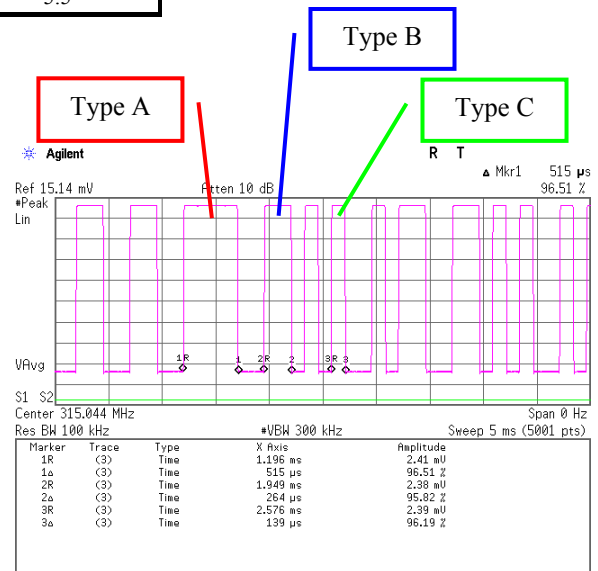
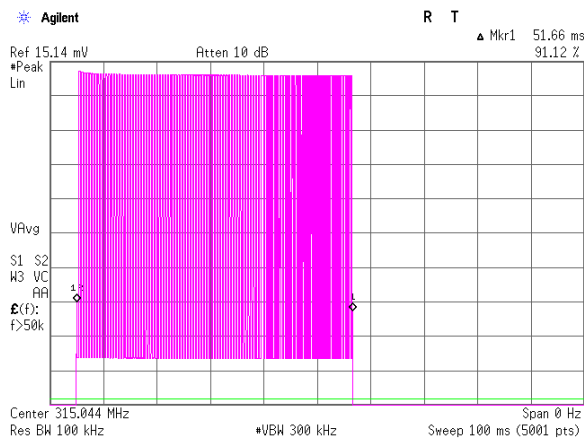
*2)ON time(in 100ms) = On time(in 51.66ms) * 100 / 51.66

*3)The train of pulses was exceeding 100msec, and that sampled 100msec was the worst case against the pulse train.

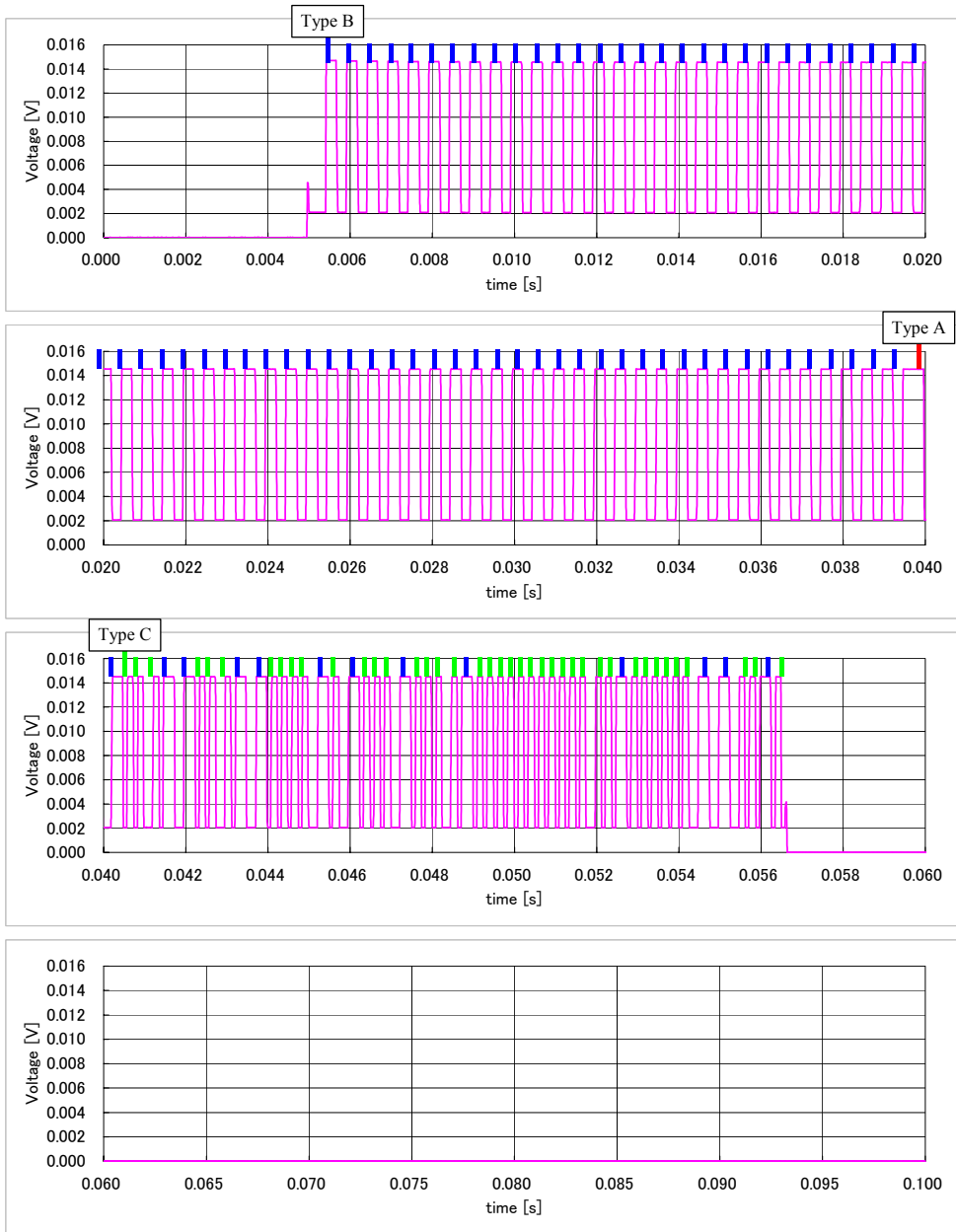
(Total)

ON time [ms]	Cycle [ms]	Duty (On time/Cycle)	Duty [dB]
53.15	100.00	0.53	-5.5

*4)Duty = $20\log_{10}(\text{ON time/Cycle})$



Duty Cycle



Receiver Spurious Emission

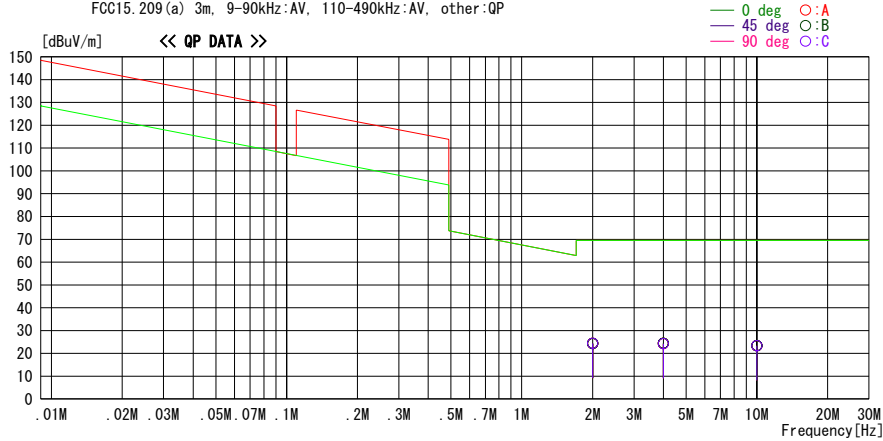
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2010/01/22

Report No. : 30CE0171-HO-01
 Power : DC 3.0V
 Engineer : Katsunori Okai

Mode / Remarks : LF Receive mode

LIMIT : FCC15.209(a) 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP
 FCC15.209(a) 3m, 9-90kHz:AV, 110-490kHz:AV, other:QP



Freq.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
2.00000	36.5	QP	19.6	0.4	32.2	24.3	69.5	45.2	45	B	0
2.00000	36.5	QP	19.6	0.4	32.2	24.3	69.5	45.2	0	A	0
2.00000	36.6	QP	19.6	0.4	32.2	24.4	69.5	45.1	90	C	0
2.00000	36.6	QP	19.6	0.4	32.2	24.4	69.5	45.1	135	B	0
2.00000	36.6	QP	19.6	0.4	32.2	24.4	69.5	45.1	0	A	0 Loop Ant Hor
4.00000	36.2	QP	19.7	0.6	32.2	24.3	69.5	45.2	90	C	0
4.00000	36.3	QP	19.7	0.6	32.2	24.4	69.5	45.1	0	A	0
4.00000	36.3	QP	19.7	0.6	32.2	24.4	69.5	45.1	135	B	0
4.00000	36.3	QP	19.7	0.6	32.2	24.4	69.5	45.1	45	B	0
4.00000	36.2	QP	19.7	0.6	32.2	24.3	69.5	45.2	0	A	0 Loop Ant Hor
10.00000	35.0	QP	19.6	0.9	32.2	23.3	69.5	46.2	90	C	0
10.00000	35.1	QP	19.6	0.9	32.2	23.4	69.5	46.1	45	B	0
10.00000	35.1	QP	19.6	0.9	32.2	23.4	69.5	46.1	0	A	0
10.00000	35.0	QP	19.6	0.9	32.2	23.3	69.5	46.2	135	B	0
10.00000	35.1	QP	19.6	0.9	32.2	23.4	69.5	46.1	0	A	0 Loop Ant Hor

CHART: WITH FACTOR, ANT TYPE: LOOP. Except for the data below: adequate margin data below the limits.
 CALCULATION: RESULT[dBuV] = READING[dBuV] + ANT FACTOR[dB] + LOSS[dB] (CABLE + ATTEN. - AMP.)

Receiver Spurious Emission

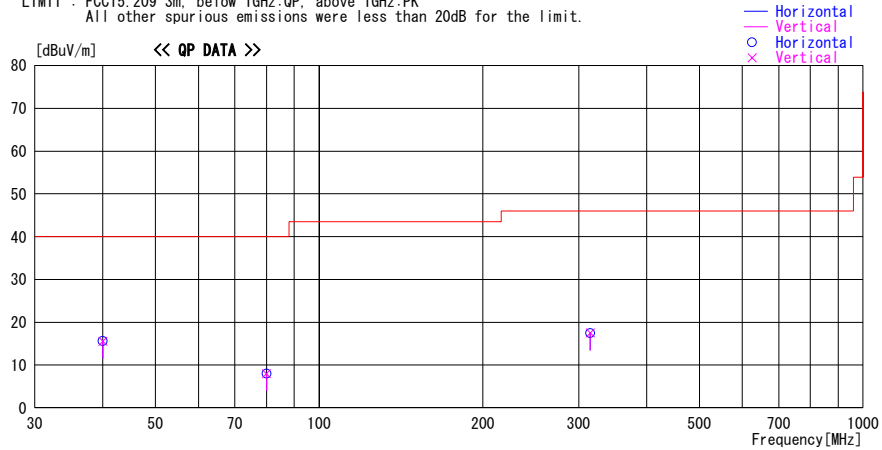
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
 Date : 2010/01/22

Report No. : 30CE0171-HO-01
 Power : DC 3.0V
 Engineer : Katsunori Okai

Mode / Remarks : LF Receive mode

LIMIT : FCC15.209 3m. below 1GHz:QP, above 1GHz:PK
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
40.000	22.4	QP	15.0	-21.8	15.6	0	100	Vert.	40.0	24.4	
40.000	22.4	QP	15.0	-21.8	15.6	0	100	Hori.	40.0	24.4	
80.000	22.2	QP	7.0	-21.2	8.0	0	100	Hori.	40.0	32.0	
80.000	22.2	QP	7.0	-21.2	8.0	0	100	Vert.	40.0	32.0	
314.975	21.2	QP	15.3	-19.0	17.5	0	100	Vert.	46.0	28.5	
314.975	21.2	QP	15.3	-19.0	17.5	0	100	Hori.	46.0	28.5	

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN
 CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

APPENDIX 3:Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2009/08/17 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2009/02/05 * 12
MJM-05	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2009/11/20 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2009/04/14 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2009/10/05 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2009/10/05 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2009/02/16 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2009/11/12 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2009/09/02 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2009/10/19 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	RE	2009/02/16 * 12
MCC-30	Coaxial cable	UL Japan	-	-	RE	2009/06/22 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2009/03/18 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2010/01/19 * 12
MCC-47	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	295123(5m) / 287573(1m)	RE	2009/11/19 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2009/09/14 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2010/02/03 * 12
MOS-24	Thermo-Hygrometer	Custom	CTH-201	0005	RE	2010/02/09 * 12

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item:

RE: Radiated emission, 99% Occupied Bandwidth, -20dB bandwidth , Automatically deactivate and Duty cycle tests

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