

MEASUREMENT AND TECHNICAL REPORT

PHILIPS INDUSTRIAL ACTIVITIES LOUVAIN
 Interleuvenlaan 74-82
 3001 Leuven
 Belgium

DATE: 22 August 2001

This Report Concerns:	Original Grant: X	Class II Change:
Equipment Type:	TS5200, Model 310120712351	
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?	Yes: Defer until:	No: X
Company Name agrees to notify the Commission by:	N/A	
of the intended date of announcement of the product so that the grant can be issued on that date.		
Transition Rules Request per 15.37?	Yes:	*No: X
(*) FCC Part 15, Paragraphs 15.231(c), (e); 15.107(a); 15.209(a)		
<p>Report Prepared by:</p> <p>TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 546 3999 Fax: 858 546 0364</p>		

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1 GENERAL INFORMATION

1.1 Product Description

NAME, MODEL, SERIAL # OF EUT:	TS5200, Model 310120712351
EUT Interface Ports and Cables:	RS232, digital, Shield DE9S with aluminum foil shield, UL listed 2464; Termination - coaxial; Connector type - metalized 9-pin D-sub female; Port termination - compliacne to RS232, 2 meters length; removable.
System Components:	Touch screen remote, Model TS5200; Docking station, Model DS5200; Serial Cable, Model RS232; AC/DC Adaptor, Model AC/DC Adaptor ITE 120V-60Hz-100mA output 12V DC 400 mA, S/N 3104 200 51192
Oscillator Frequencies:	16 MHz - Dragon Ball for main processor 32.768 kHz, Crystal, used by PLL to generate 16.67 MHz. 418 MHz, RF module for RF transmitter 416.7 Hz, LCD unit, used in EL backlight
Critical EMI Components:	3 ferrite beads, Murata, 100 MHz; 120R, on serial comm. Circuit. 3 ferrite beads, Murata, 100 MHz; 120R, on Mp;memory - in power supply

1 GENERAL INFORMATION (continued)**1.2 Related Submittal/Grant**

None

1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system are:

None

1.4 Test Methodology

Purpose of Test: To demonstrate compliance with the ANSI C63.4 setup.

TEST	FCC CFR 47 #	PASS/FAIL
Radiated	15.231(e)	Pass
Deactivation	15.231(e)	Pass
Emission Bandwidth	15.231(c)	Pass
Duty Cycle Measurements	ANSI C63.4, Appendix 14, Para. 10	Pass
Conducted Emissions	15.107(a)	Pass
Radiated Emissions	15.109(a)	Pass

Both Conducted and radiated testing were performed according to the procedures in FCC/ANSI C63.4 and CSA 108.8 - M1983. Radiated testing was performed at an antenna-to-EUT distance of 3 meters (1 - 25 GHz).

1.5 Test Facility

The open area test site and conducted measurement data were tested by:

TÜV PRODUCT SERVICE
10040 Mesa Rim Road
San Diego, CA 92121-2912
Phone: 858 546 3999
Fax: 858 546 0364

The Test Site Data and performance comply with ANSI 63.4 and are registered with the FCC, 7435 Oakland Mills Rd, Columbia Maryland 21046. All Measurement Data is acquired according to the content of FCC Measurement Procedure and ANSI C63.4, unless supplemented with additional requirements as noted in the test report.

2. SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was initially tested for FCC emission in the following configuration:

See Block Diagram.

2.2 EUT Exercise Software

None

2.3 Special Accessories

None

2.4 Modification

None

2.5 Configuration of Tested System

See Block Diagram.

3 RADIATED/DEACTIVATION EMISSION EQUIPMENT/DATA

The following data lists the significant emission frequencies, measured levels, correction factor (which includes cable and antenna corrections), the corrected reading, and the limit.

See following page(s).

Emissions Test Conditions: RADIATED EMISSIONS, FCC Part 15.231(e); 15.209(a)

The <i>RADIATED EMISSIONS</i> measurements were performed at the following test location :
--

<input type="checkbox"/> - Test not applicable
--

Canyon #1 Open Area Test Site, Carroll Canyon, San Diego
Roof
TR2, Test Room 2

Testing was performed at a test distance of:

■ - 3 meters

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
3115	251	Antenna, Double Ridge Guide	EMCO	2595	10/01
AMF-5D-010180-35-10P	719	Pre-Amplifier	Miteq	549460	*
8566B	823	Spectrum Analyzer	Hewlett Packard	2332A02751	07/02
8566B	744	Spectrum Analyzer	Hewlett Packard	2618A02913	09/01

Remarks: (*) Internal verification

SP

TEST DIST: 3 Meters

TEST SITE: Roof

BICONICAL: N/A

LOG: 244

OTHER: 251

$$CF = \text{Antenna Factor} + \text{Cable Loss} - \text{Preamplifier Gain} + \text{Preselector Loss}$$

v.beta1a

[illegible]

8

SPEC: FCC Part 15 para 15.109(a)

TEST DIST: 3 Meters

TEST SITE: 1

BICONICAL: 738

TESTED BY: Dave Bernardin

LOG PERIODIC: 738

RCVR: 466

Relative Humidity: 50%

-5.9 dB at 835.5 MHz

ver 1.8

[illegible]

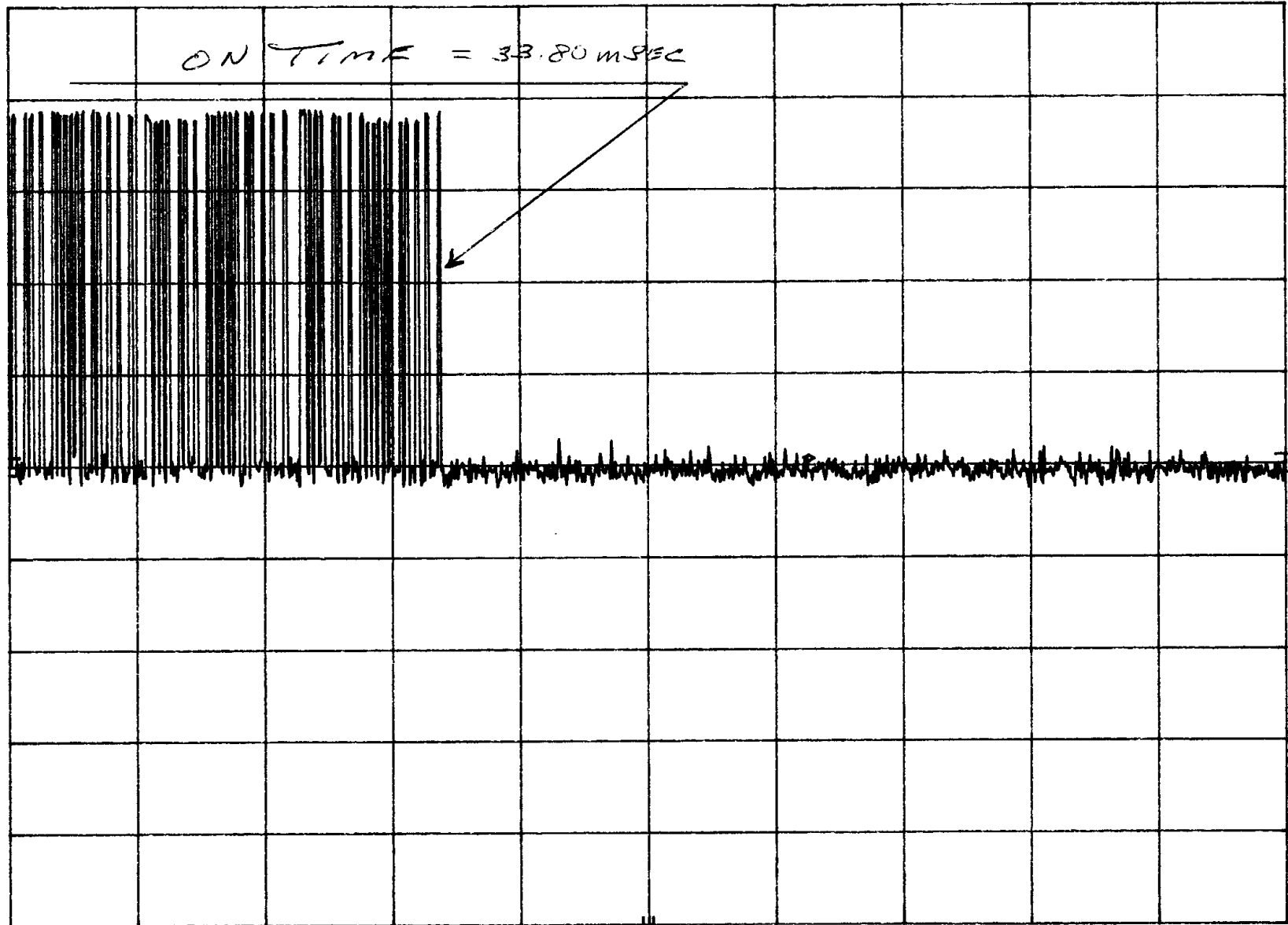
CUSTOMER: PHILIPS INDUSTRIAL
EUT: Universal Remote Control Model RS5200 + DS5200 Docking Station
TEST: Deactivation / FCC Part 15.231(e)

AUG. 3, 2001 *10/3*
TECH/ENGR *33.80*

MKR ~~62.50~~ msec
-69.30 dBm

hp REF -20.0 dBm ATTN 10 dB

10 dB/
POS PK



CENTER 417.850 MHz
RES BW 1 MHz

VBW 1 MHz

SPAN 0 Hz
SWP 100 msec *10*

CUSTOMER: PHILIPS INDUSTRIAL
EUT: Universal Remote Control Model RS5200 + DS5200 Docking Station
TEST: Deactivation / FCC Part 15.231(e)

Report No.: SC105742

AUG. 3, 2001

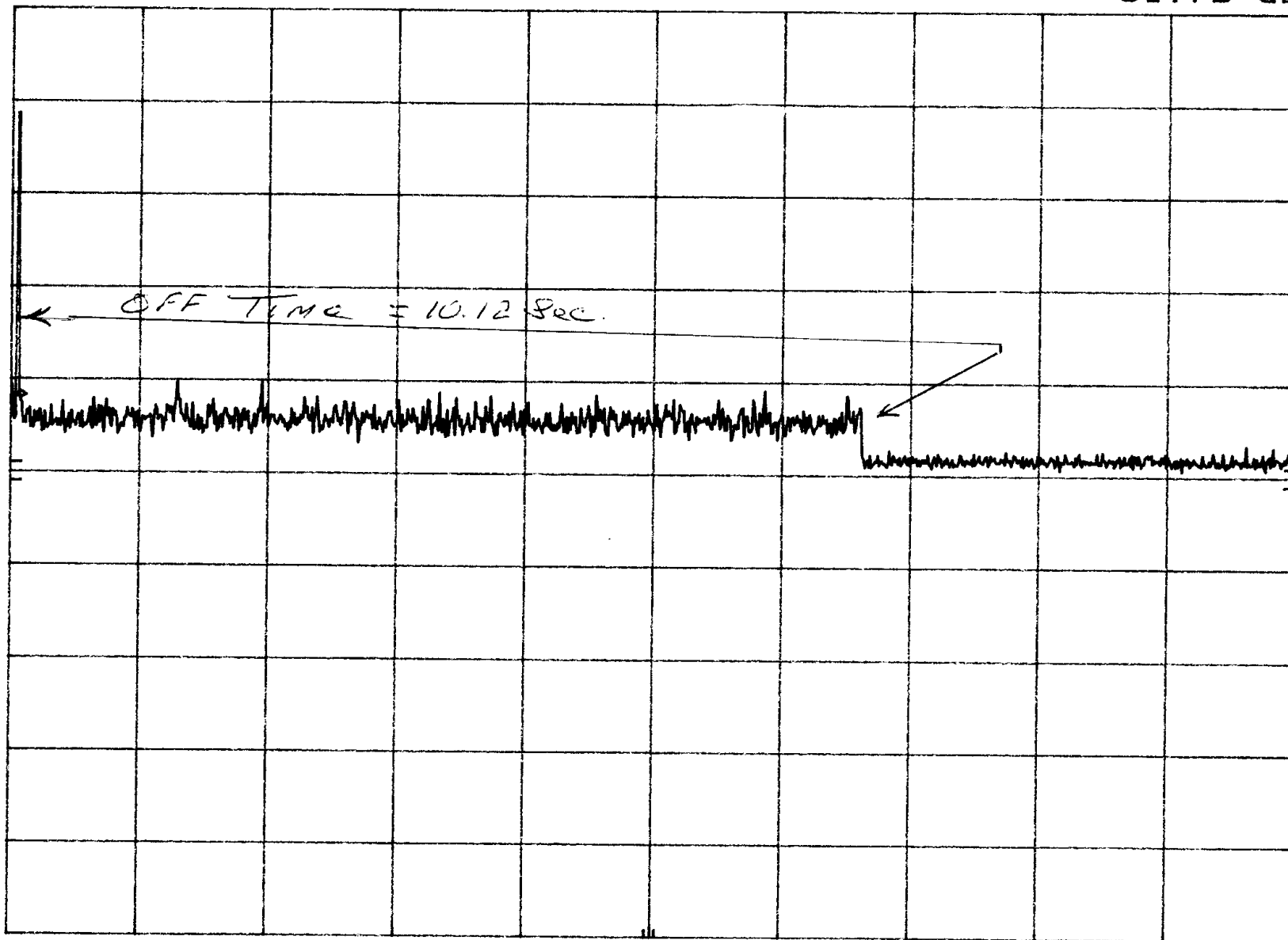
TECH/ENGR. *QVB*

MKR 105.0 msec
-61.70 dBm

hp REF -20.0 dBm ATTEN 10 dB

10 dB/

POS PK



CENTER 417.850 MHz

RES BW 1 MHz

VBW 1 MHz

SPAN 0 Hz //
SWP 15 sec

CUSTOMER: PHILIPS INDUSTRIAL
EUT: Universal Remote Control Model RS5200 + DS5200 Docking Station
TEST: Emission BW / FCC Part 15.231e

Report No.: SC105742

AUG. 3, 2001

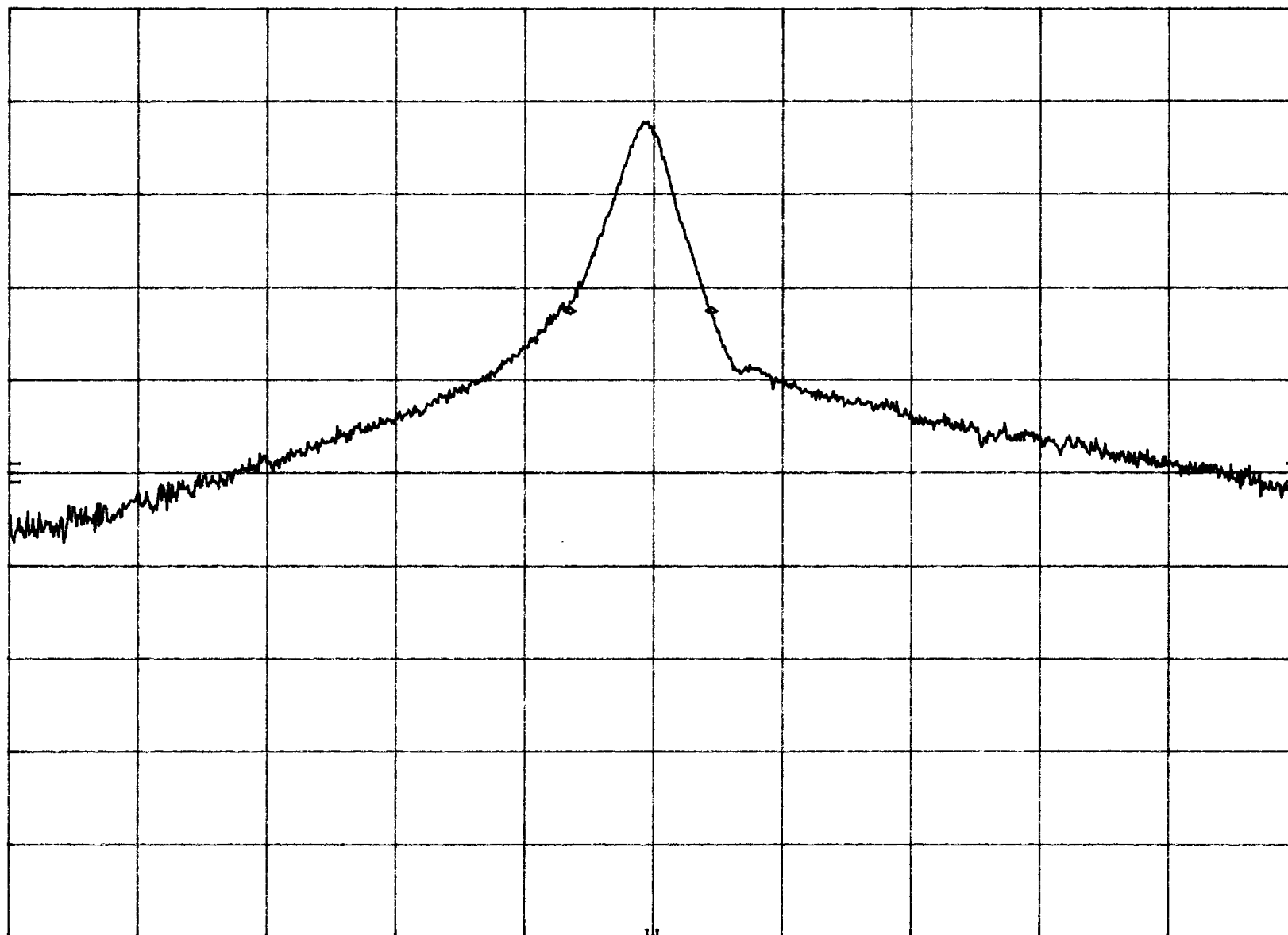
TECH/ENGR. *DB*

MKR Δ 550 kHz
.00 dB

hp REF -20.0 dBm ATTEN 10 dB

10 dB/

POS PK



CENTER 417.800 MHz

RES BW 100 kHz

VBW 100 kHz

SPAN 5.000 MHz
SWP 20 msec

Field Strength Calculation

If a preamplifier was used during the Radiated Emission Testing, it is required that the amplifier gain must be subtracted from the Spectrum Analyzer (Meter) Reading. In addition, a correction factor for the antenna, cable used and a distance factor, if any, must be applied to the Meter Reading before a true field strength reading can be obtained. In the automatic measurement, these considerations are automatically presented as a part of the print out. In the case of manual measurements and for greater efficiency and convenience, instead of using these correlation factors for each meter reading, the specification limit was modified to reflect these correlation factors at each frequency value so that the meter readings can be compared directly to the modified specification limit. This modified specification limit is referred to as the "Corrected Meter Reading Limit" or simply the CMRL, which is the actual field strength present at the antenna. The quantity can be derived in the following manner:

$$\text{Corrected Meter Reading Limit (CMRL)} = \text{SAR} + \text{AF} + \text{CL} - \text{AG} - \text{DC}$$

Where, SAR = Spectrum Analyzer Reading

AF = Antenna Factor

CL = Cable Loss

AG = Amplifier Gain (if any)

DC = Distance Correction (if any)

Assume the following situation: A meter reading of 29.4 dBuV was obtained from a Class A computing device measured at 83 MHz. Assume an antenna factor of 9.2 dB, a cable loss of 1.4 dB and amplifier gain of 20.0 dB at 83 MHz. The final field strength would be determined as follows:

$$\text{CMRL} = 29.4 \text{ dBuV} + 9.2 \text{ dB} - 1.4 \text{ dB} - 20 \text{ dB/M} - 0.0 \text{ dB}$$

$$\text{CMRL} = 20.0 \text{ dBuV/M}$$

This result is well below the FCC and CSA Class A limit of 29.5 dBuV/m at 83 MHz.

For the manual mode of measurement, a table of corrected meter reading limit was used to permit immediate comparison of the meter reading to determine if the measure emission amplitude exceeded the specification limit at that specific frequency.

4 CONDUCTED EMISSION/DUTY CYCLE EQUIPMENT/DATA

See following page(s).

Emissions Test Conditions: CONDUCTED EMISSIONS, FCC Part 15.107(a); ANSI C63.4

The *RADIATED EMISSIONS* measurements were performed at the following test location :

☐ - Test not applicable

SR-2 Shielded Room, 12' x 24 x 10 Metal Chamber
TR2, Test Room 2

Test Equipment Used :

EMI Test Receiver, Model ESHS 30; P/N 459; Rohde & Schwarz, S/N 832354/004, Cal 01/02
20 dB Attenuator, CAT-20, P/N 610, Mini-Circuits, Cal N/A
LISN, FCC-LISN-50-25-2, P/N 552, Fischer Custom Comm., S/N 113, Cal verified
HP8568B, P/N 187, Spectrum Analyzer, Hewlett Packard, Cal 11/01
2440, Oscilloscope, P/N 415, Tektronix, S/N B013020, Cal 05/02

Remarks: _____

TUV Product Service Powerline Conducted Emissions

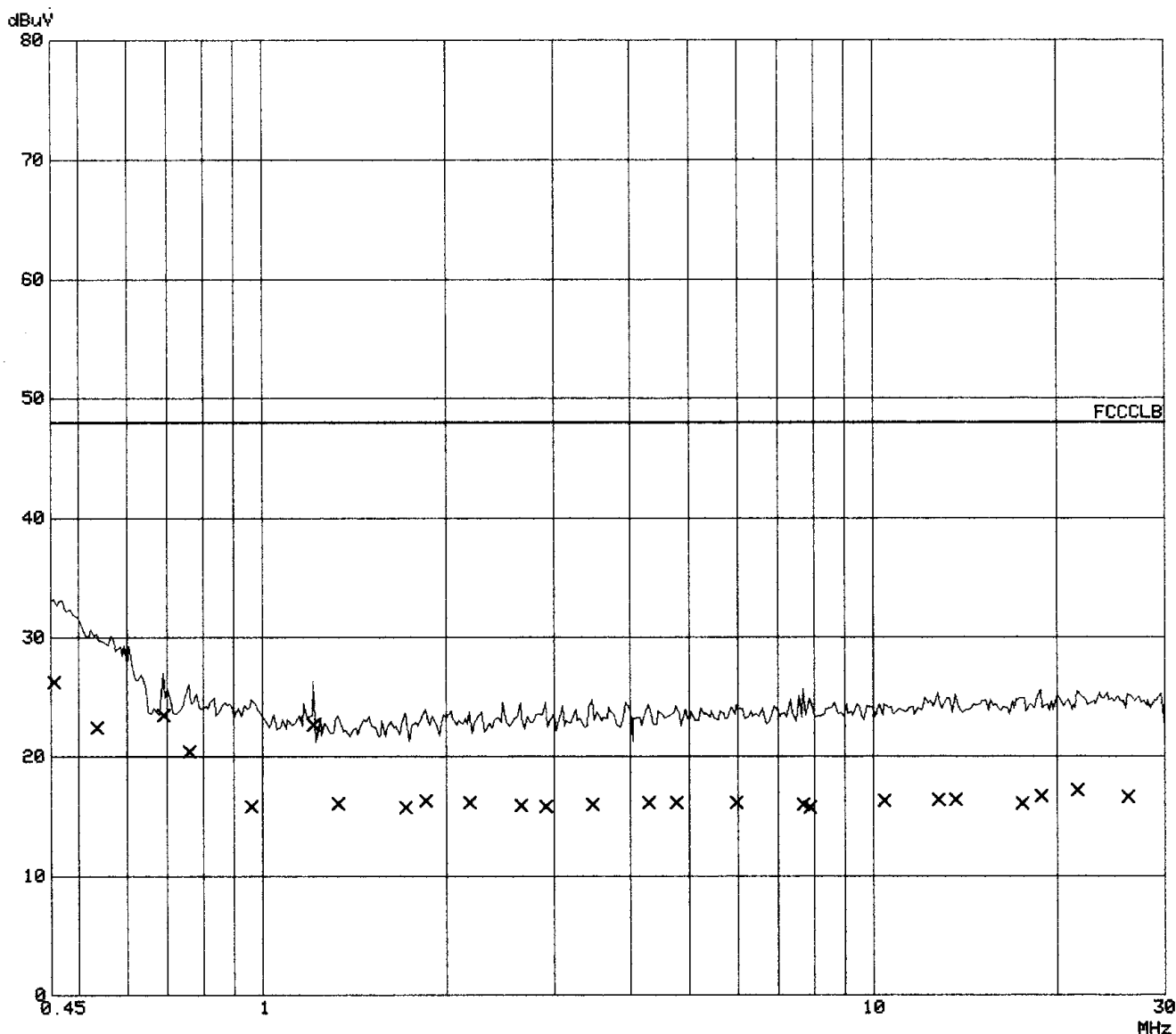
EUT: Universal Remote Control
 Manuf: Philips Industrial
 Op Cond: Transmit Mode
 Operator: Dave Bernardin *hdb*
 Test Spec: FCC Part 15.107a
 Comment: 115Vac 60Hz Line 1 Internal batteries charging
 SC 105742
 Date: 02. Aug 01 07:26

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	1M	5k	10k	PK	100ms	AUTO	LN OFF	60dB
1M	30M	5k	10k	PK	2ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	150k	30M	20dBLISN

Final Measurement: x QP
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 30dB



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TUV Product Service Powerline Conducted Emissions

EUT: Universal Remote Control
Manuf: Philips Industrial
Op Cond: Transmit Mode
Operator: Dave Bernardin *DB*
Test Spec: FCC Part 15.107a
Comment: 115Vac 60Hz Line 1 Internal batteries charging
SC 105742
Date: 02. Aug 01 07:26

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.45500	26.2 <i>DB</i>	48.0
0.53500	22.4	48.0
0.69000	23.5	48.0
0.76000	20.4	48.0
0.96000	15.9	48.0
1.21000	22.7	48.0
1.33000	16.0	48.0
1.71500	15.8	48.0
1.85000	16.3	48.0
2.18000	16.2	48.0
2.65000	15.9	48.0
2.90500	15.8	48.0
3.47500	16.0	48.0
4.29000	16.2	48.0
4.76500	16.1	48.0
5.97000	16.2	48.0
7.68500	16.0	48.0
7.87000	15.8	48.0
10.43000	16.3	48.0
12.78500	16.4	48.0
13.62000	16.4	48.0
17.54500	16.1	48.0
18.83000	16.7	48.0
21.62500	17.2	48.0
26.13500	16.7	48.0

* limit exceeded

TUV Product Service
Powerline Conducted Emissions

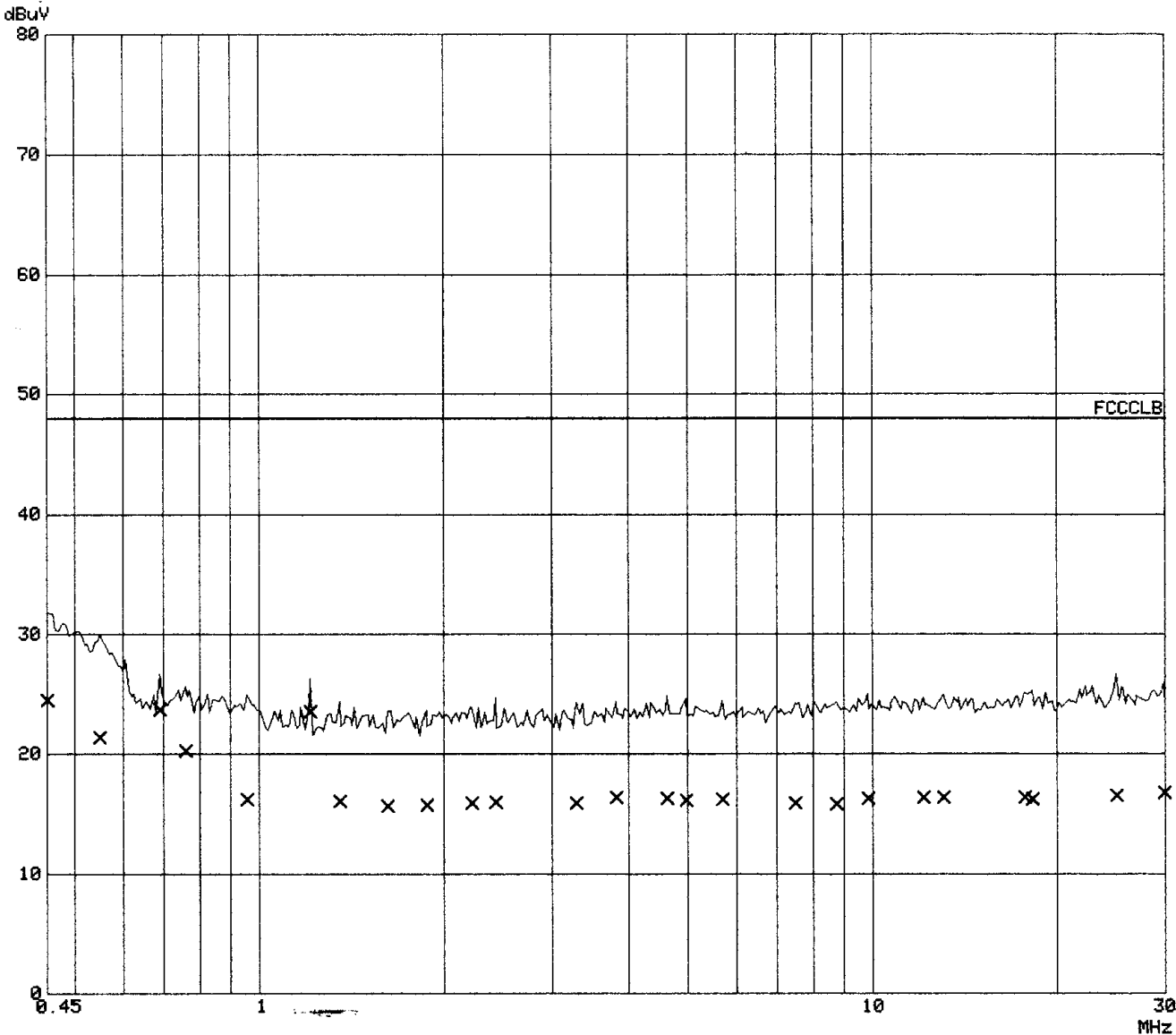
EUT: Universal Remote Control
Manuf: Philips Industrial
Op Cond: Transmit Mode
Operator: Dave Bernardin *EDB*
Test Spec: FCC Part 15.107a
Comment: 115Vac 60Hz Line 2 Internal batteries charging
SC 105742
Date: 02. Aug 01 07:34

Scan Settings (2 Ranges)

Frequencies			Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
450k	1M	5k	10k	PK	100ms	AUTO	LN OFF	60dB	
1M	30M	5k	10k	PK	2ms	AUTO	LN OFF	60dB	

Transducer No.	Start	Stop	Name
1	150k	30M	20dBLISN

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 30dB



TUV Product Service Powerline Conducted Emissions

EUT: Universal Remote Control
Manuf: Philips Industrial
Op Cond: Transmit Mode
Operator: Dave Bernardin *DB*
Test Spec: FCC Part 15.107a
Comment: 115Vac 60Hz Line 2 Internal batteries charging
SC 105742
Date: 02. Aug 01 07:34

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.45000	24.5 <i>EP</i>	48.0
0.55000	21.4	48.0
0.69000	23.8	48.0
0.76000	20.3	48.0
0.95500	16.2	48.0
1.21000	23.5	48.0
1.35500	16.0	48.0
1.62000	15.7	48.0
1.87500	15.8	48.0
2.22500	15.9	48.0
2.43000	16.0	48.0
3.29000	15.9	48.0
3.82000	16.4	48.0
4.63000	16.3	48.0
4.96000	16.1	48.0
5.70500	16.3	48.0
7.47500	15.9	48.0
8.73000	15.9	48.0
9.81500	16.3	48.0
12.12000	16.4	48.0
13.07000	16.4	48.0
17.75000	16.4	48.0
18.26000	16.3	48.0
25.04500	16.6	48.0
29.98000	16.8	48.0

* limit exceeded

TUV Product Service
Powerline Conducted Emissions

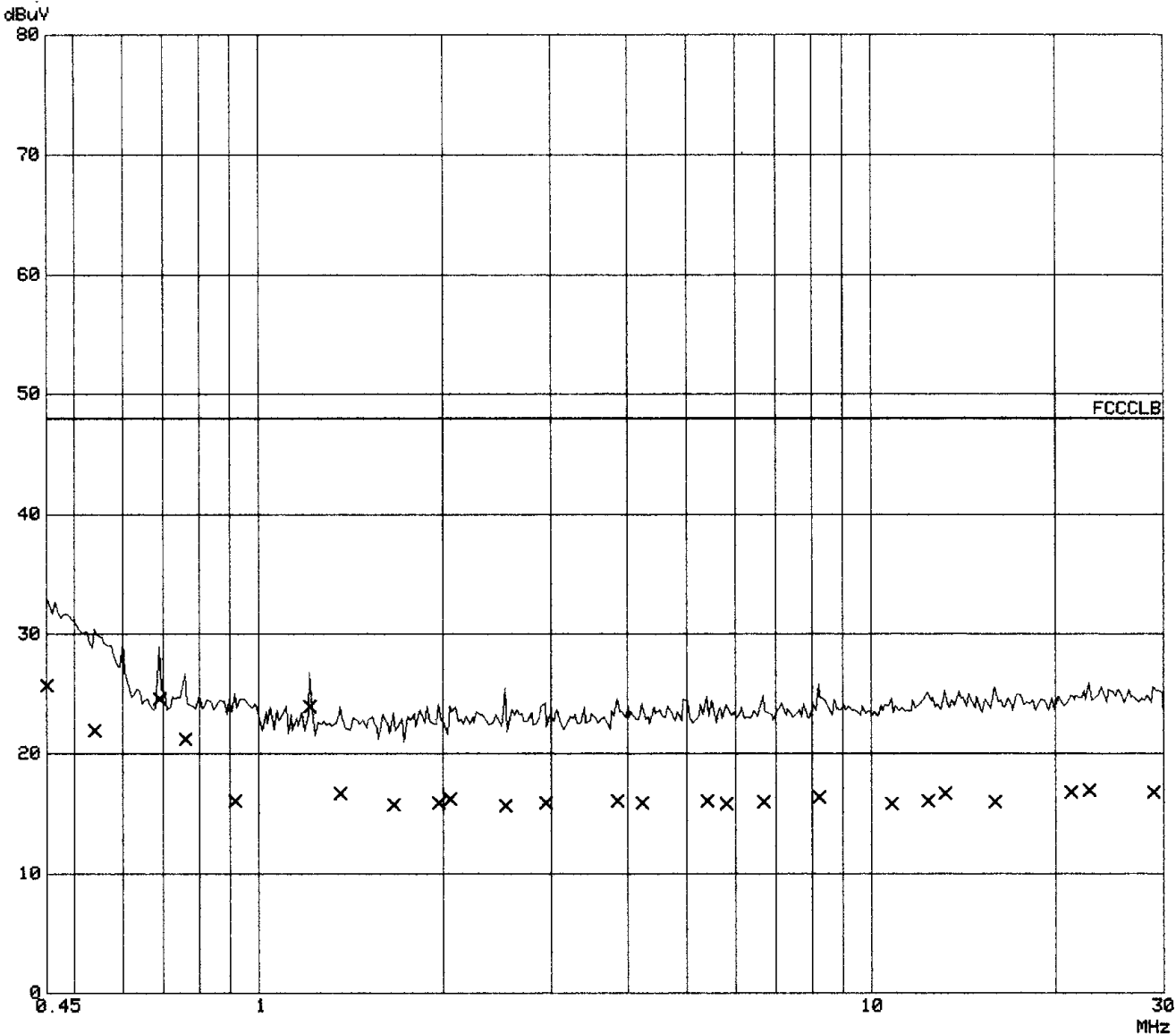
EUT: Universal Remote Control
Manuf: Philips Industrial
Op Cond: Receive Mode
Operator: Dave Bernardin *OKB*
Test Spec: FCC Part 15.107a
Comment: 115Vac 60Hz Line 1 Internal batteries charging
SC 105742
Date: 02. Aug 01 07:59

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	1M	5k	10k	PK	100ms	AUTO	LN OFF	60dB
1M	30M	5k	10k	PK	2ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	150k	30M	20dBLISN

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 30dB



TUV Product Service Powerline Conducted Emissions

EUT: Universal Remote Control
Manuf: Philips Industrial
Op Cond: Receive Mode
Operator: Dave Bernardin *DB*
Test Spec: FCC Part 15.107a
Comment: 115Vac 60Hz Line 1 Internal batteries charging
SC 105742
Date: 02. Aug 01 07:59

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.45000	25.7 <i>104.2</i>	48.0
0.54000	22.0	48.0
0.69000	24.6	48.0
0.76000	21.2	48.0
0.91500	16.1	48.0
1.21000	24.0	48.0
1.36000	16.7	48.0
1.66000	15.8	48.0
1.97000	15.9	48.0
2.05500	16.2	48.0
2.53000	15.6	48.0
2.94000	15.9	48.0
3.84500	16.1	48.0
4.23000	15.9	48.0
5.39500	16.1	48.0
5.79500	15.9	48.0
6.67000	16.0	48.0
8.22000	16.4	48.0
10.79000	15.8	48.0
12.38500	16.1	48.0
13.18000	16.7	48.0
15.93000	16.0	48.0
21.17500	16.8	48.0
22.72500	16.9	48.0
28.86000	16.8	48.0

* limit exceeded

TUV Product Service
Powerline Conducted Emissions

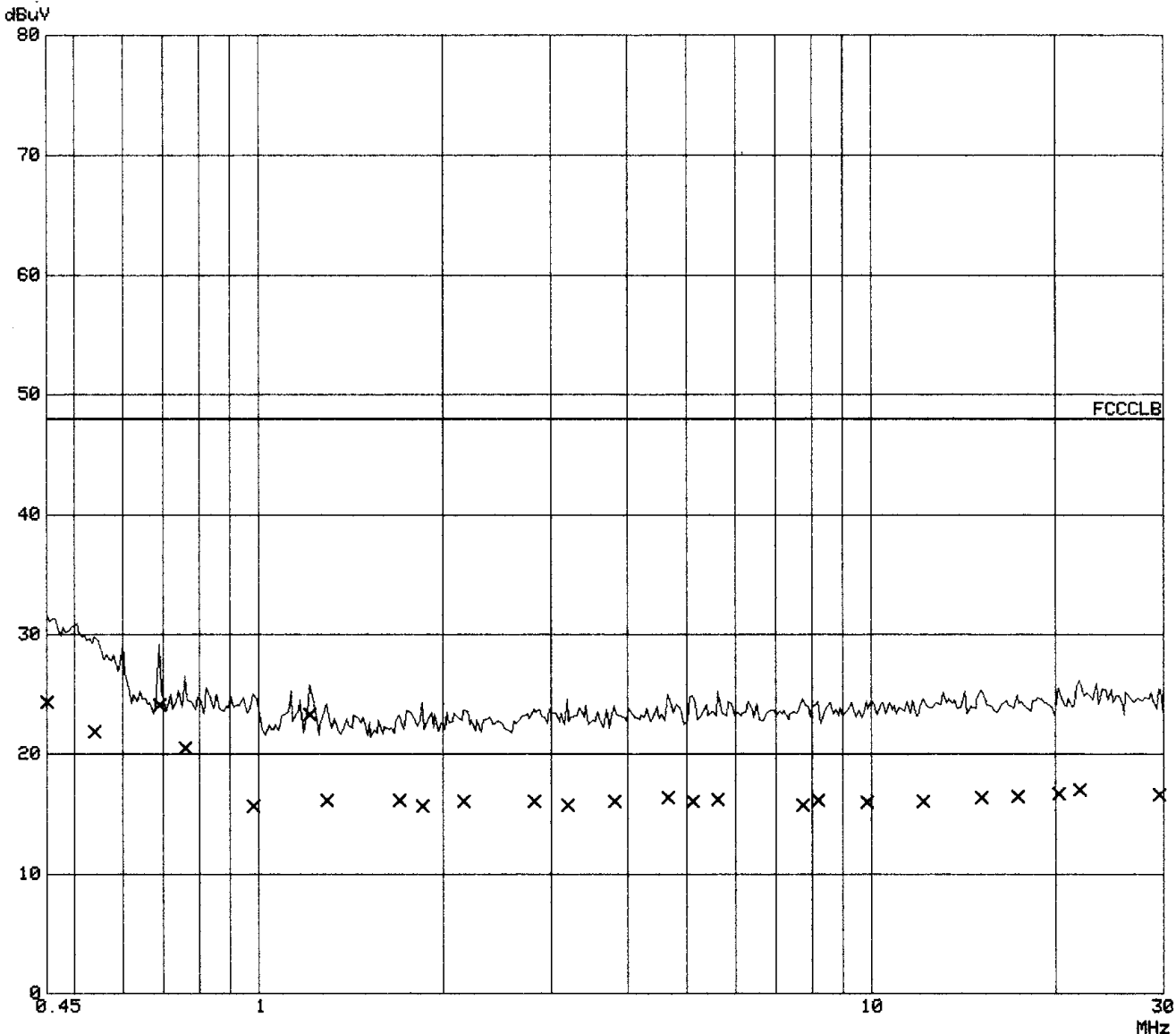
EUT: Universal Remote Control
Manuf: Philips Industrial
Op Cond: Receive Mode
Operator: Dave Bernardin *DB*
Test Spec: FCC Part 15.107a
Comment: 115Vac 60Hz Line 2 Internal batteries charging
SC 105742
Date: 02. Aug 01 07:43

Scan Settings (2 Ranges)

Frequencies			Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
450k	1M	5k	10k	PK	100ms	AUTO	LN OFF	60dB	
1M	30M	5k	10k	PK	2ms	AUTO	LN OFF	60dB	

Transducer No.	Start	Stop	Name
1	150k	30M	20dBLISN

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 30dB



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TUV Product Service
Powerline Conducted Emissions

EUT: Universal Remote Control
Manuf: Philips Industrial
Op Cond: Receive Mode
Operator: Dave Bernardin *DEB*
Test Spec: FCC Part 15.107a
Comment: 115Vac 60Hz Line 2 Internal batteries charging
SC 105742
Date: 02. Aug 01 07:43

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.45000	24.4 <i>DEB</i>	48.0
0.54000	21.9	48.0
0.69000	24.1	48.0
0.76000	20.5	48.0
0.98000	15.7	48.0
1.21000	23.3	48.0
1.29000	16.1	48.0
1.69500	16.1	48.0
1.85000	15.7	48.0
2.16000	16.1	48.0
2.81500	16.1	48.0
3.19000	15.7	48.0
3.81500	16.1	48.0
4.66000	16.4	48.0
5.10500	16.0	48.0
5.61000	16.2	48.0
7.72000	15.8	48.0
8.17500	16.2	48.0
9.82500	16.0	48.0
12.16500	16.1	48.0
15.15000	16.4	48.0
17.33500	16.5	48.0
20.23500	16.7	48.0
21.94500	17.0	48.0
29.56000	16.7	48.0

* limit exceeded

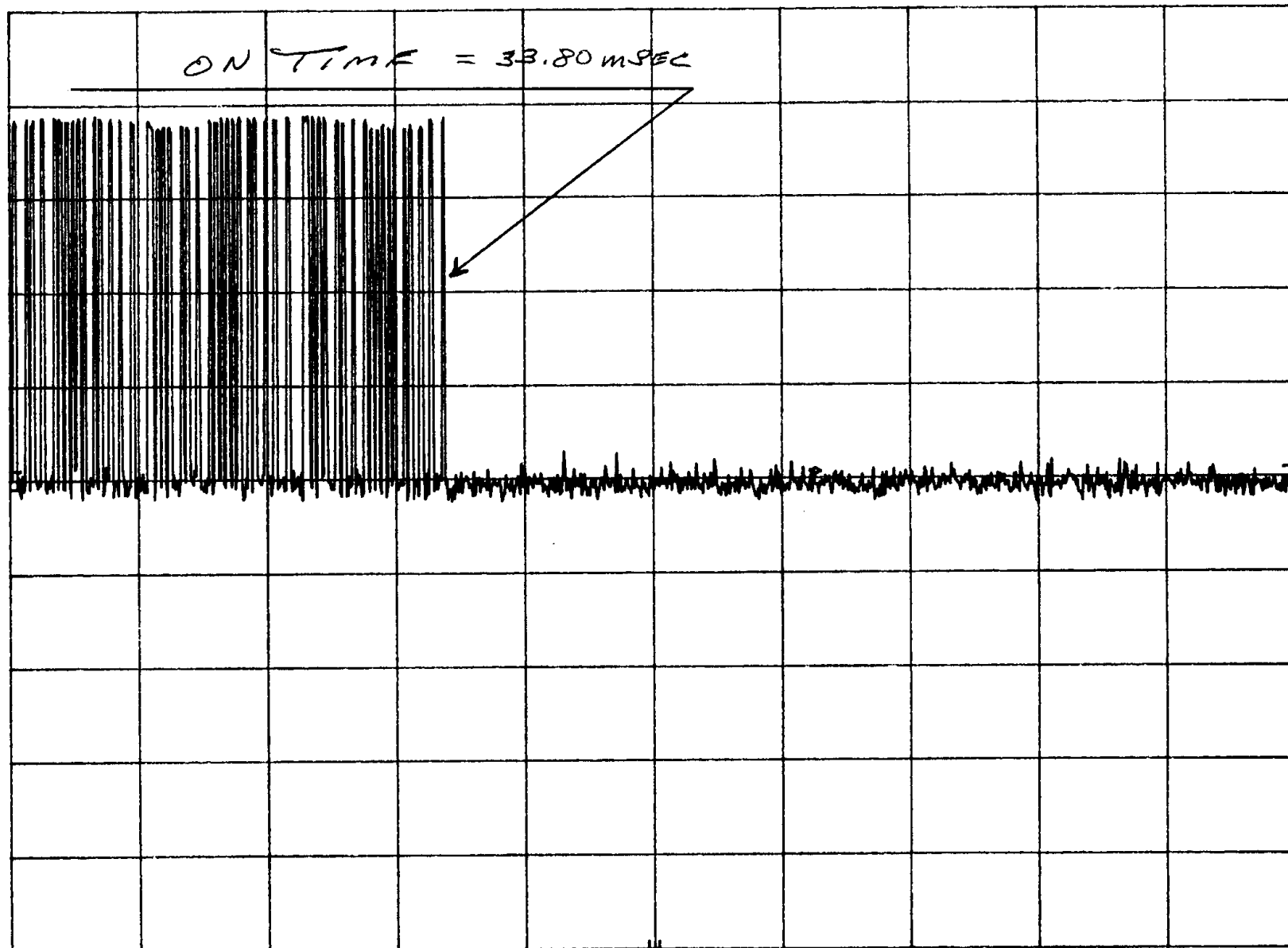
CUSTOMER: PHILIPS INDUSTRIAL
EUT: Universal Remote Control Model RS5200 + DS5200 Docking Station
TEST: Duty Cycle Measurements; Reference ANSI C63.4 Appendix I4 Para.(10)

AUG. 3, 2001 *10/23*
TECH/ENGR *33.80*
MKR ~~62.50~~ msec
-69.30 dBm

hp REF -20.0 dBm ATTEN 10 dB

10 dB/

POS PK



CENTER 417.850 MHz
RES BW 1 MHz

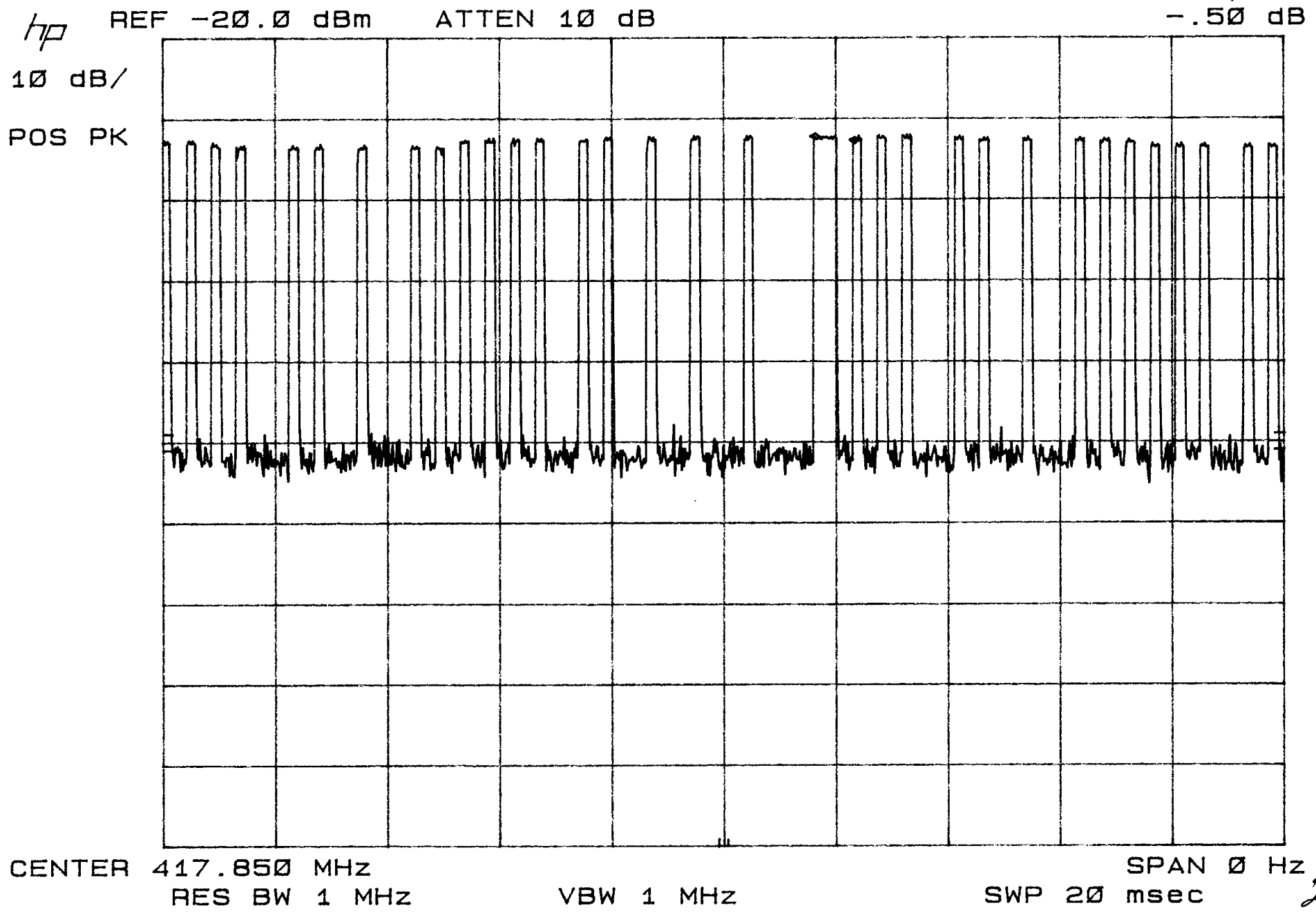
VBW 1 MHz

SPAN 0 Hz
SWP 100 msec *24*

CUSTOMER: PHILIPS INDUSTRIAL
EUT: Universal Remote Control Model RS5200 + DS5200 Docking Station
TEST: Duty Cycle Measurements; Reference ANSI C63.4 Appendix I4 Para.(10)

AUG. 3, 2001
TECH/ENGR. *OKB*

MKR Δ 700 μ sec
- .50 dB



$$\left(\frac{33.8 \mu S}{100 \mu S} \right) \cdot \left(\frac{380 \mu S}{700 \mu S} \right) = DC$$

$$20 \log (DC) = CF_{DC}$$

$$(0.34) \cdot (0.54) = 0.18 = DC$$

$$20 \log (0.18) = -14.89 \text{ dB}$$

ATTESTATION STATEMENT

GENERAL REMARKS:

PHILIPS INDUSTRIAL ACTIVITIES LOUVAIN
Interleuvenlaan 74-82
3001 Leuven
Belgium

TS5200, Model 310120712351

SUMMARY:

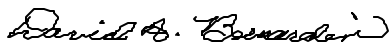
All tests were performed per *FCC Part 15, Paragraphs 15.231(c), (e); 15.107(a); 15.209(a)*.

The Equipment Under Test

■ - **Fulfills** the requirements of *FCC Part 15, Paragraphs 15.231(c), (e); 15.107(a); 15.209(a)*.

- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:



Dave Bernardin
(EMC Engineer)