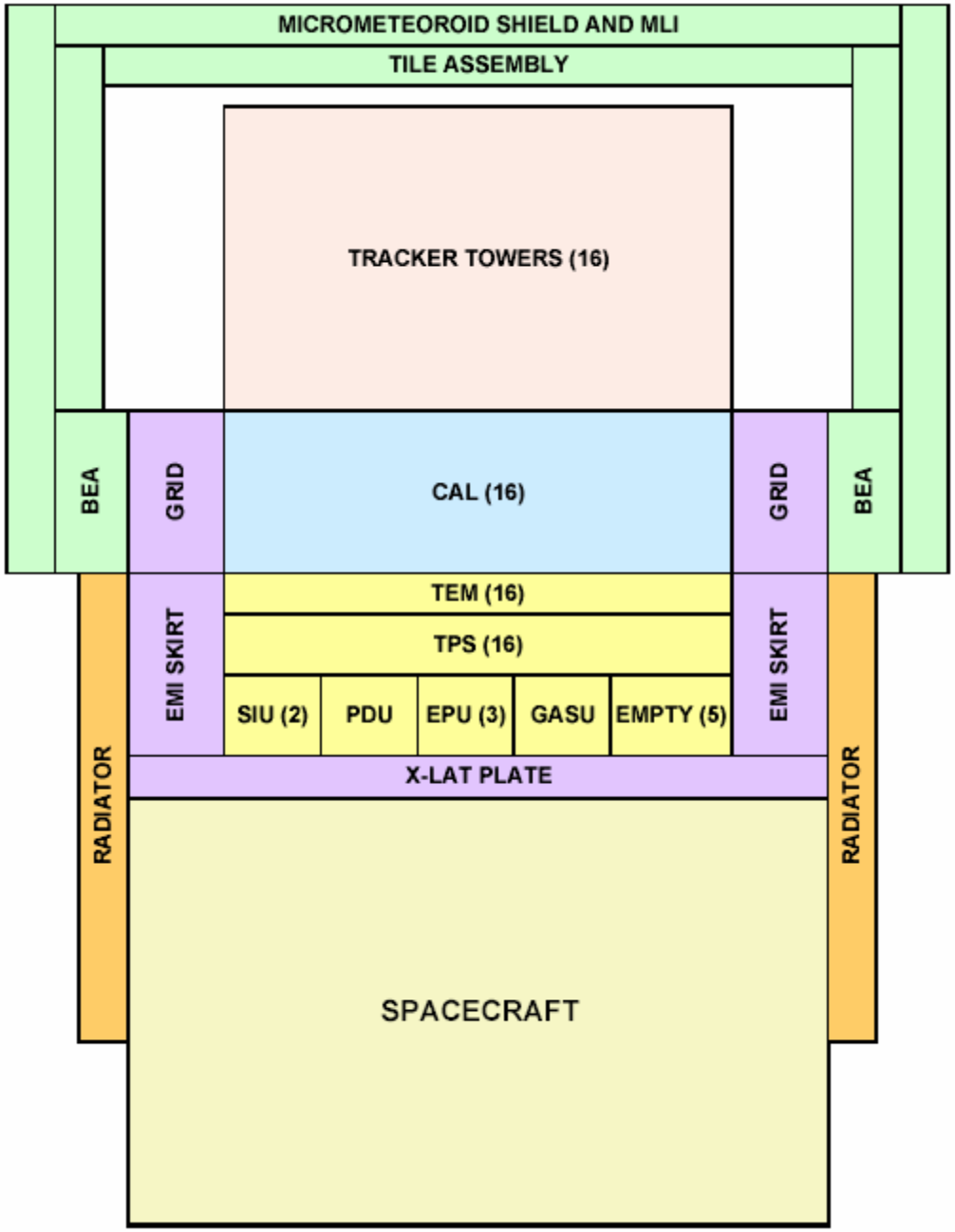
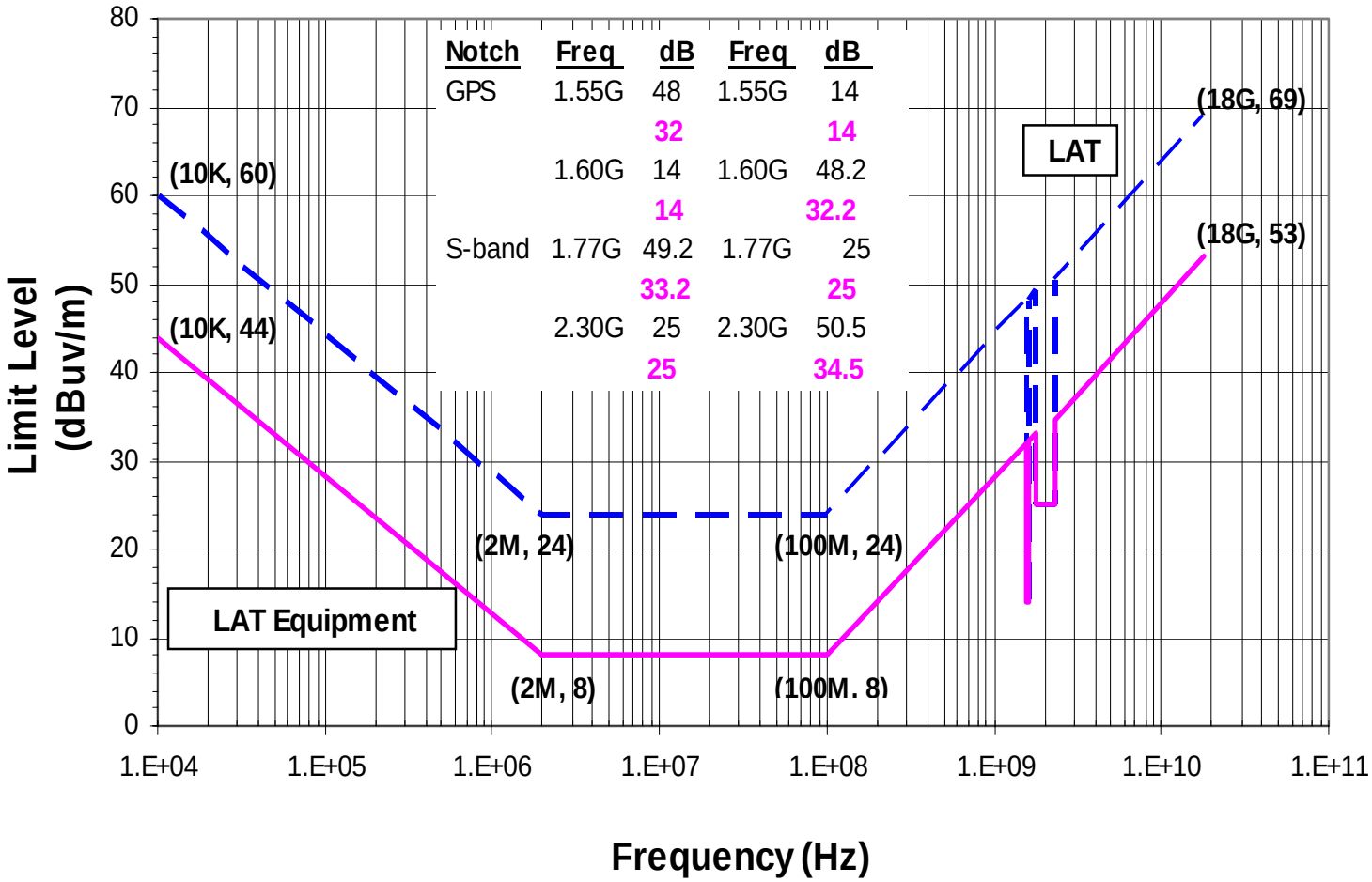
LAT EQUIPMENT EMI REQUIREMENTS

PART ONE

RADIATED EMISSIONS AND SUSCEPTIBILITY


MICROMETEOROID SHIELD AND MLI
TILE ASSEMBLY
TRACKER TOWERS (16)
BEA
GRID
CAL (16)
GRID
BEA
TEM (16)
TPS (16)
EMI SKIRT
SIU (2)
PDU
EPU (3)
GASU
EMPTY (5)
EMI SKIRT
X-LAT PLATE
RADIATOR
RADIATOR
SPACECRAFT

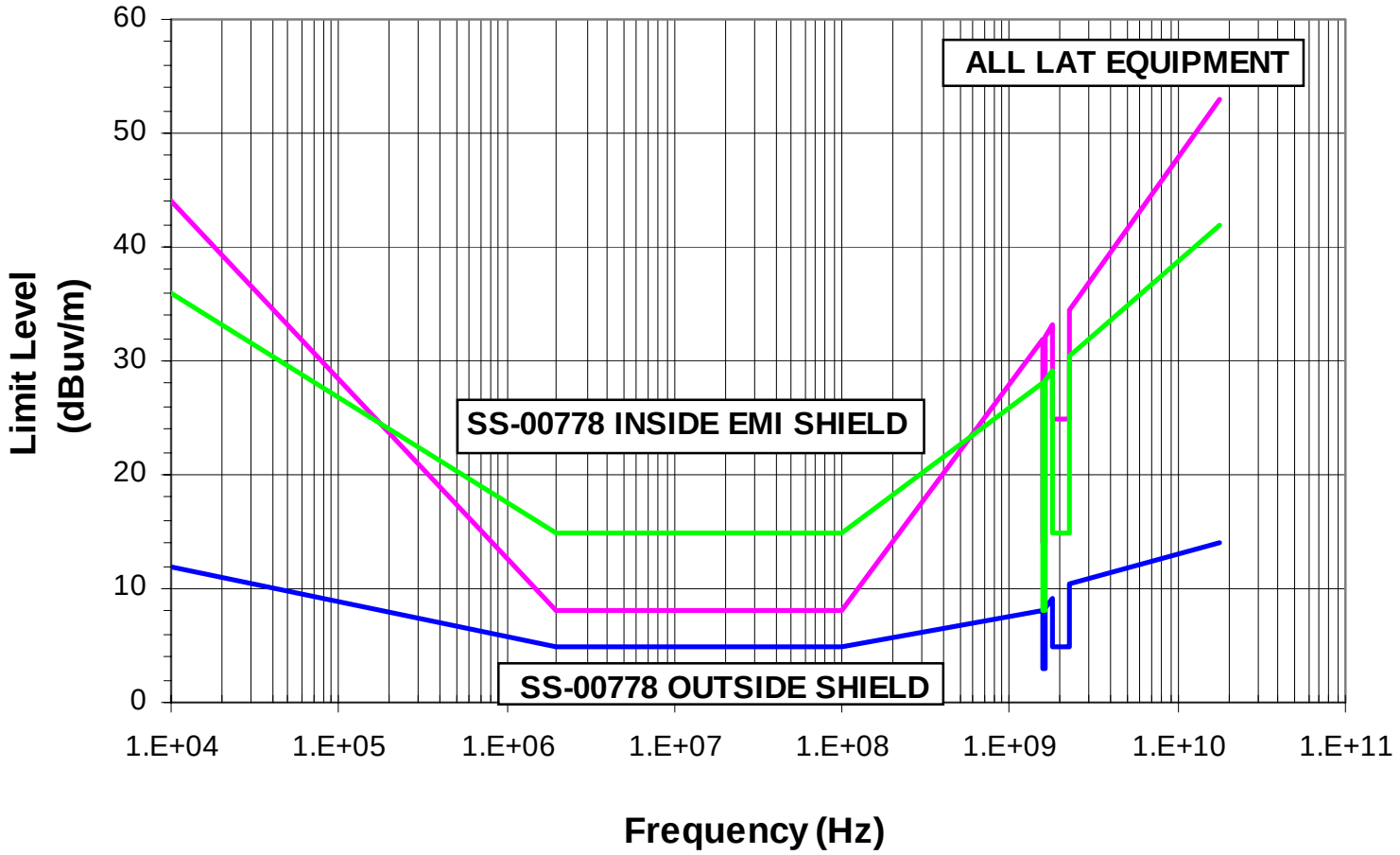
RE102


Notch Freq dB Freq dB
GPS 1.55G 48 1.55G 14
32 14
1.60G 14 1.60G 48.2
14 32.2
S-band 1.77G 49.2 1.77G 25
33.2 25
2.30G 25 2.30G 50.5
25 34.5
(10K, 60)
(10K, 44)
(18G, 69)
(18G, 53)
LAT
LAT Equipment
(2M, 24)
(100M, 24)
(2M, 8)
(100M. 8)
Limit Level (dBuv/m)
Frequency (Hz)
80
70
60
50
40
30
20
10
0
1.E+04
1.E+05
1.E+06
1.E+07
1.E+08
1.E+09
1.E+10
1.E+11

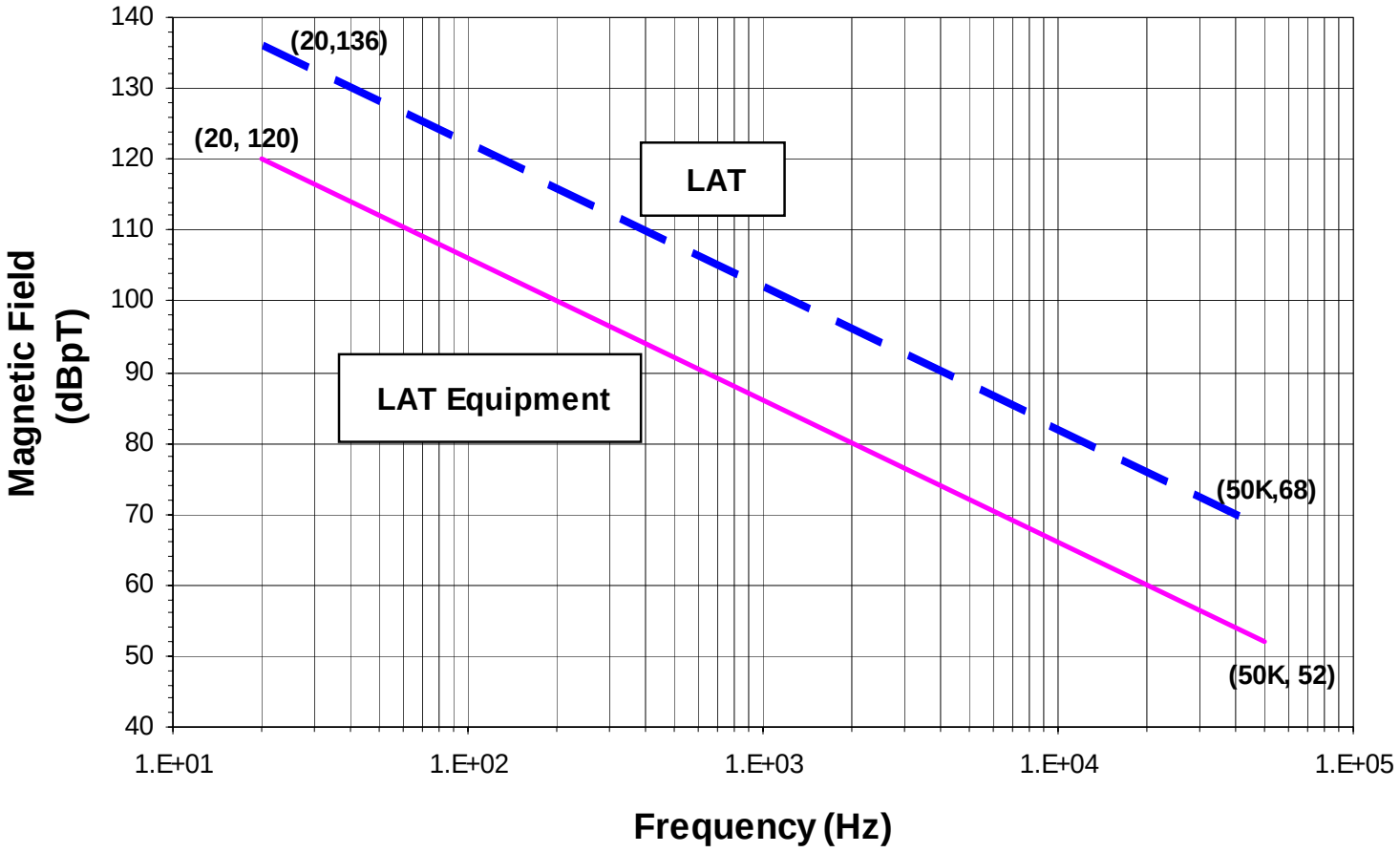
RE102

- Applicable to all LAT equipment
- RSS emissions from 78 boxes
- All equipment emitting 16 db below the LAT instrument level limit will be equivalent to this same limit
- Very conservative approach; does not take into account the SE provided by the direction and distance of the emissions

RE102


60
50
40
30
20
10
0
Limit Level (dBuv/m)
ALL LAT EQUIPMENT
SS-00778 INSIDE EMI SHIELD
SS-00778 OUTSIDE SHIELD
1.E+04
1.E+05
1.E+06
1.E+07
1.E+08
1.E+09
1.E+10
1.E+11
Frequency (Hz)

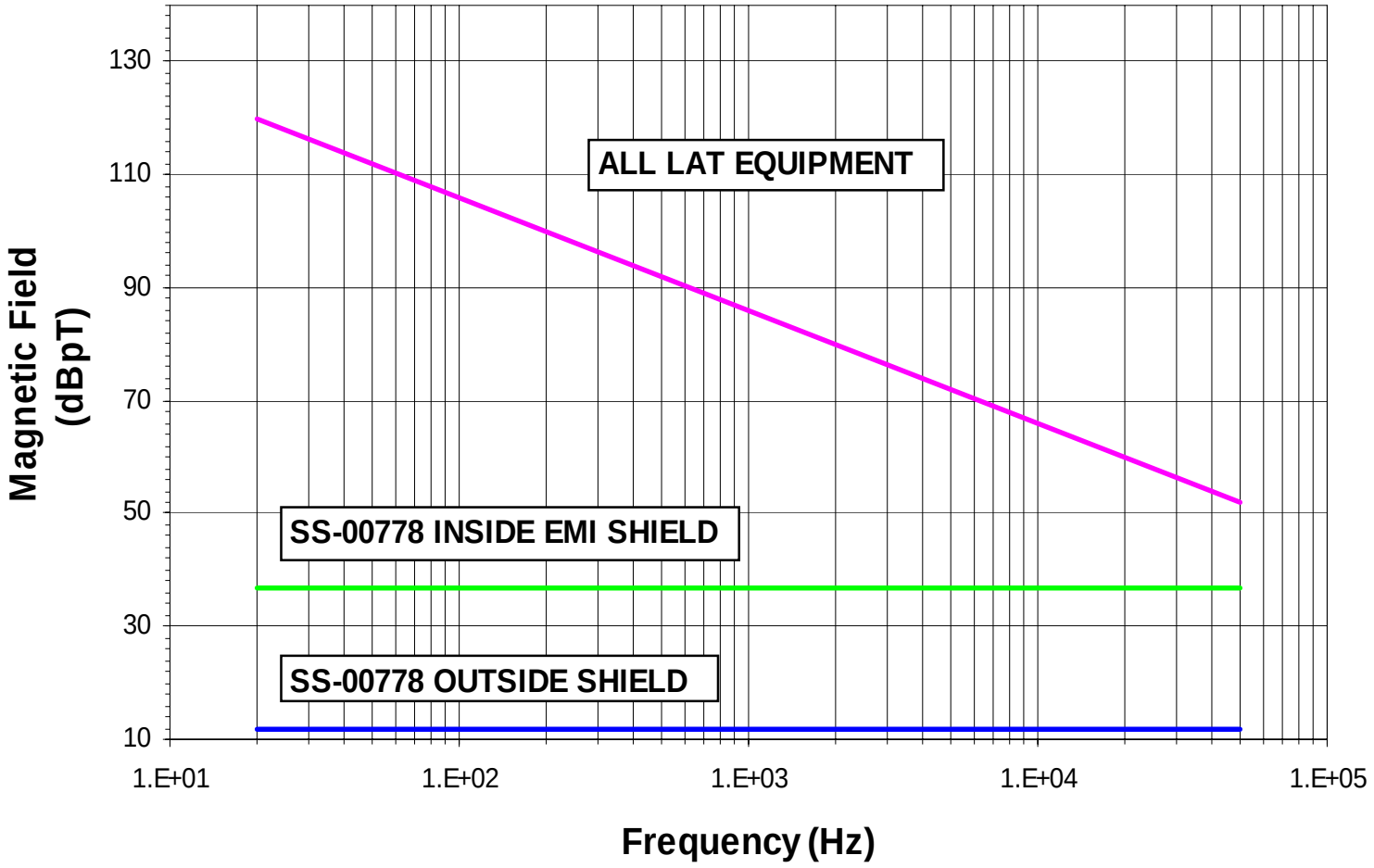
RE101


140
130
120
110
100
90
80
70
60
50
40
(20,136)
(20, 120)
LAT
LAT Equipment
(50K,68)
(50K, 52)
Magnetic Field (dBpT)
1.E+01
1.E+02
1.E+03
1.E+04
1.E+05
Frequency (Hz)

RE101

- Applicable to all LAT equipment
- RSS emissions from 78 boxes
- All equipment emitting 16 db below the LAT instrument level limit will be equivalent to this same limit
- Very conservative approach; does not take into account the SE provided by the direction and distance of the emissions

RE101


Magnetic Field (dBpT)
130
110
90
70
50
30
10
1.E+01
1.E+02
1.E+03
1.E+04
1.E+05
Frequency (Hz)
ALL LAT EQUIPMENT
SS-00778 INSIDE EMI SHIELD
SS-00778 OUTSIDE SHIELD

DEFINITIONS - SURVIVE

- Survive is defined as the ability to withstand the applied environment without any permanent loss of performance capability.
- Survival is required for both powered and unpowered states.

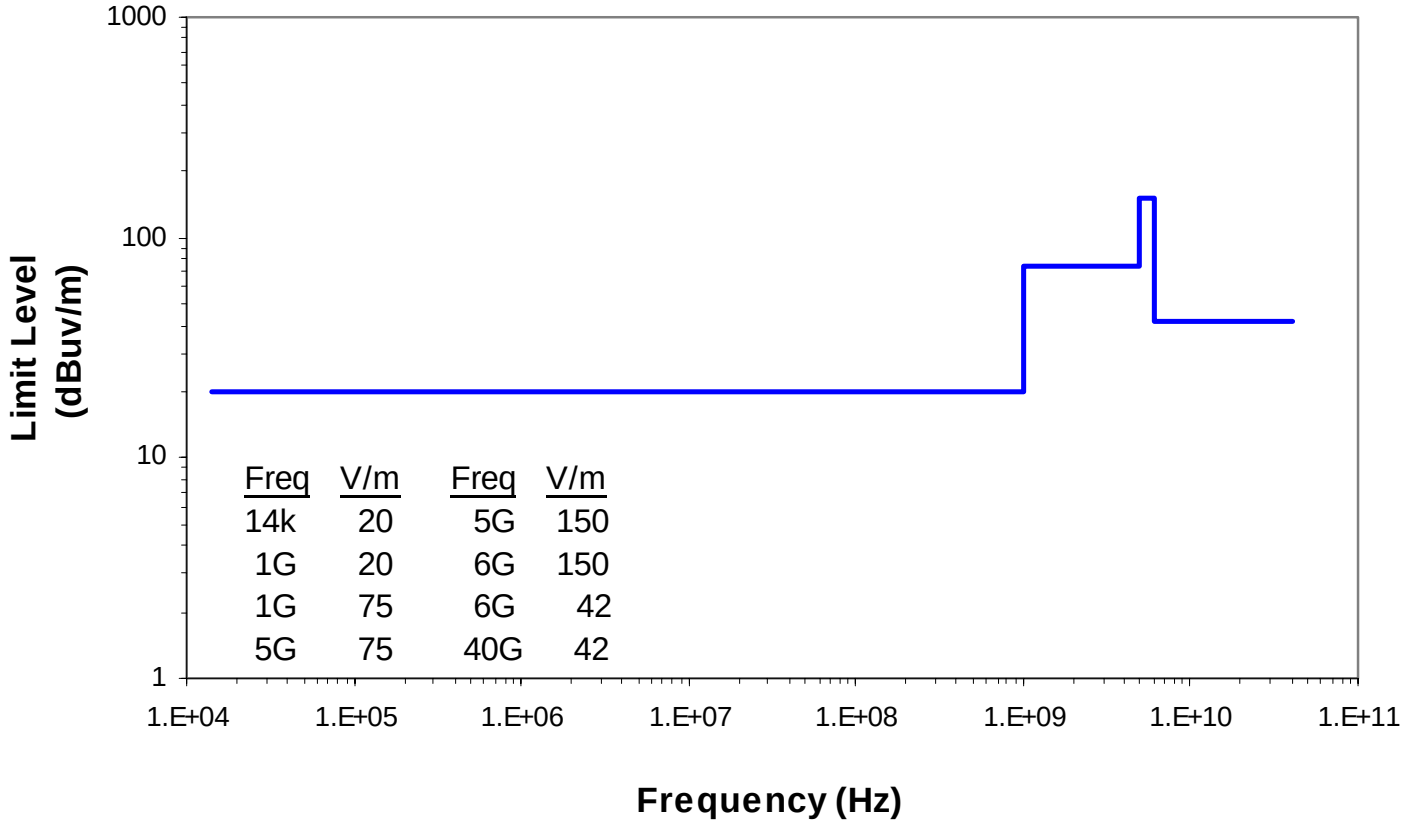
DEFINITIONS - OPERATE

- Operate is defined as the ability to withstand the applied environment without malfunction, loss of capability, change of operation state/mode, memory changes or need for outside intervention.
- Operate is the ability of an instrument to execute all ancillary and housekeeping tasks including self test but does not include the ability to take scientific data.

DEFINITIONS - PERFORM

- Perform is defined as the ability to execute its science mission or to meet its specified performance.
- Perform requires that the Operate criteria be met.

RS103 LAUNCH

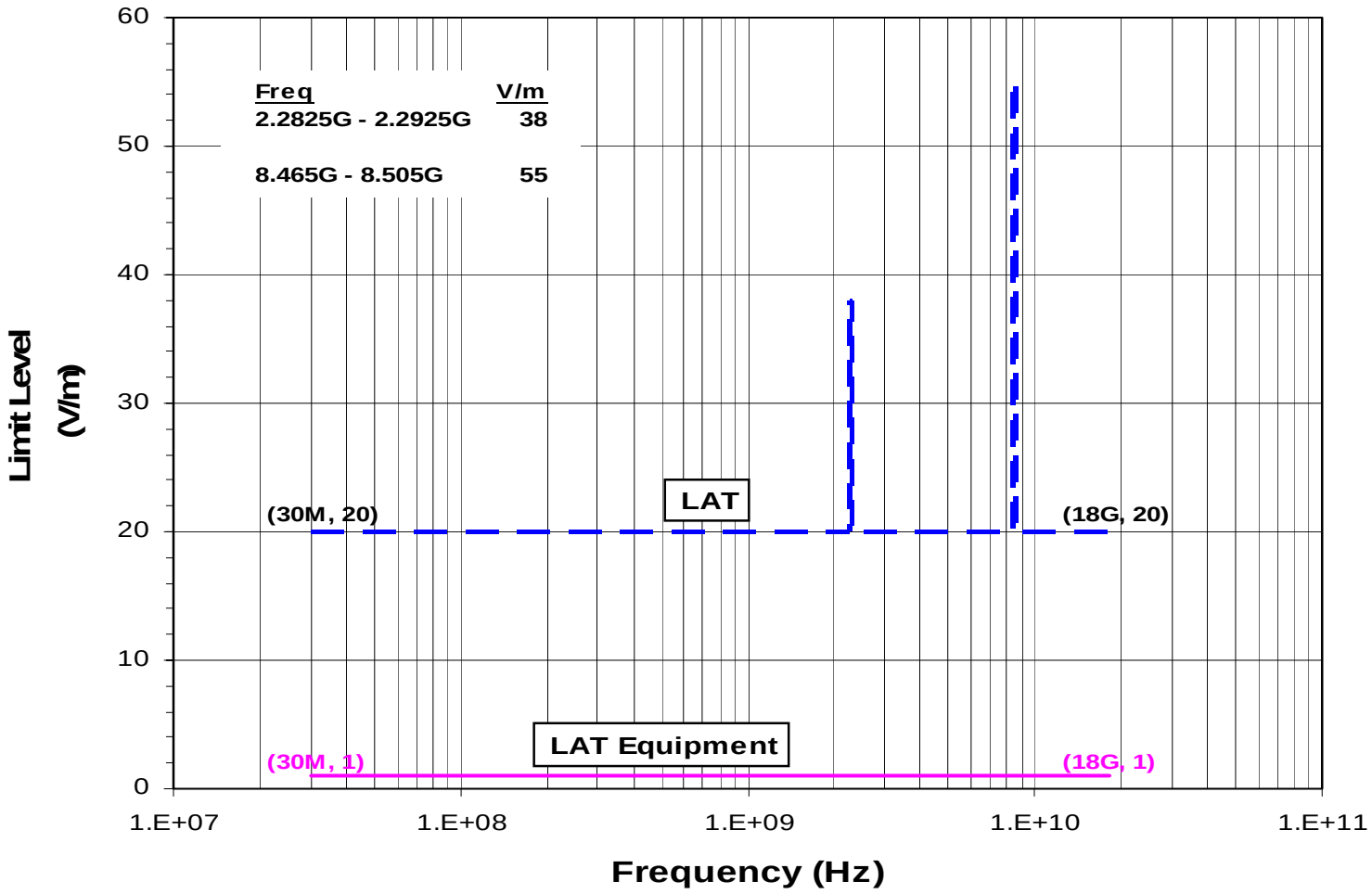


Freq	V/m	Freq	V/m
14k	20	5G	150
1G	20	6G	150
1G	75	6G	42
5G	75	40G	42

RS103 - LAUNCH

- Applicable to all LAT equipment
- This a survival requirement for both powered and unpowered equipment
- Very conservative approach; does not take into account the SE provided by the fairing, the Grid, EMI Shield, X-LAT Plate, etc.

RS103 - PERFORM



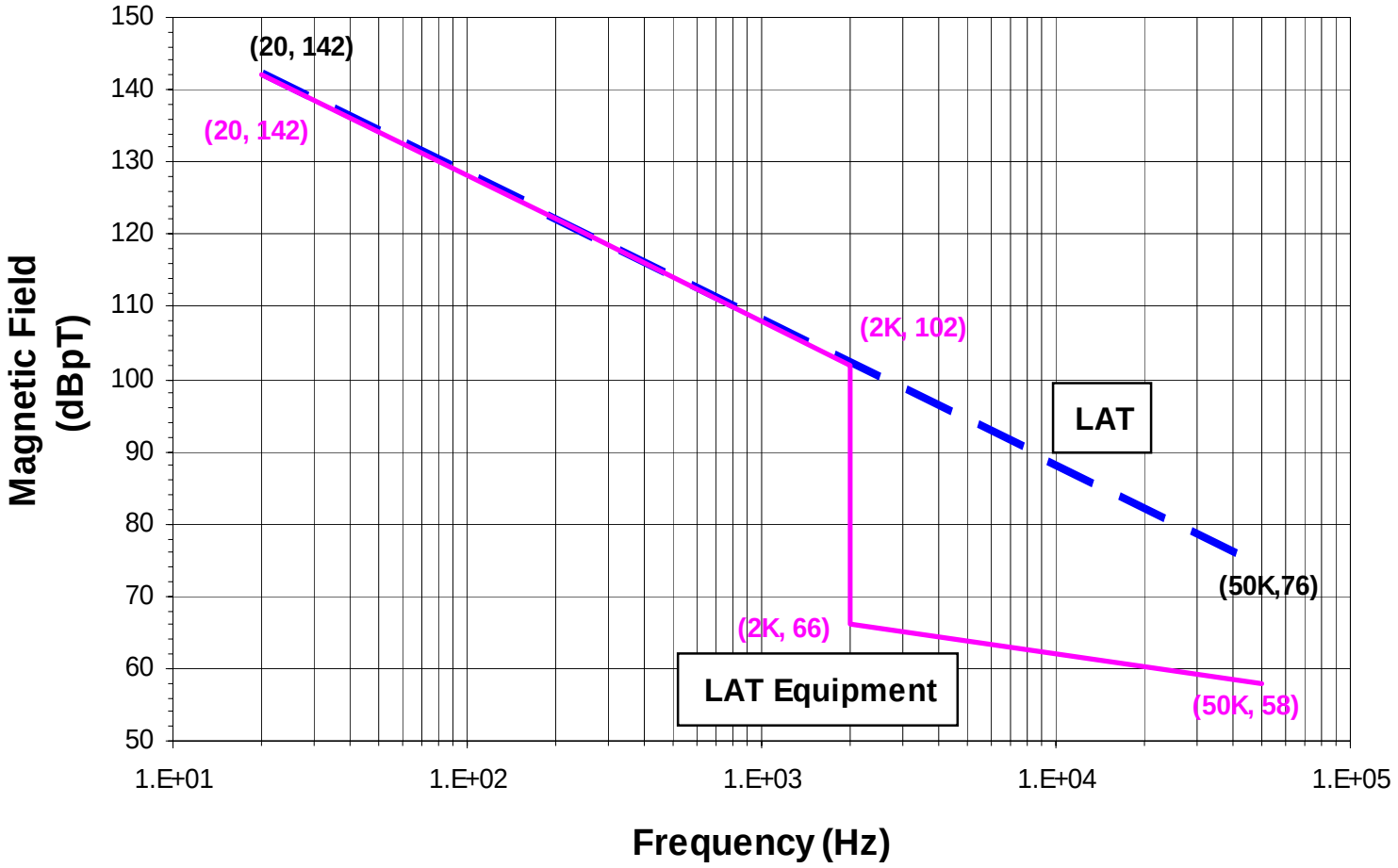
RS103

- Applicable to all equipment except for the BEA (on the exterior surface of the LAT) and the Tracker Towers (not protected by the EMI Skirt and the Grid).
- The LAT instrument levels are applicable to these units.
- The equipment levels take into account the SE afforded by the X-LAT Plate, EMI Shield, Grid, and Shield Vents in the EMI Shield.

RS103 (cont'd)

- Based on this, the limit can be set at 1 V/m and maintain a minimum 34 dB margin.
- For the S and X-band transmitters, can also set the limit at 1 V/m and maintain a 25 dB margin. (X is changing to Ku. As soon as this occurs, the LAT requirements will be reviewed.)

RS101 - PERFORM



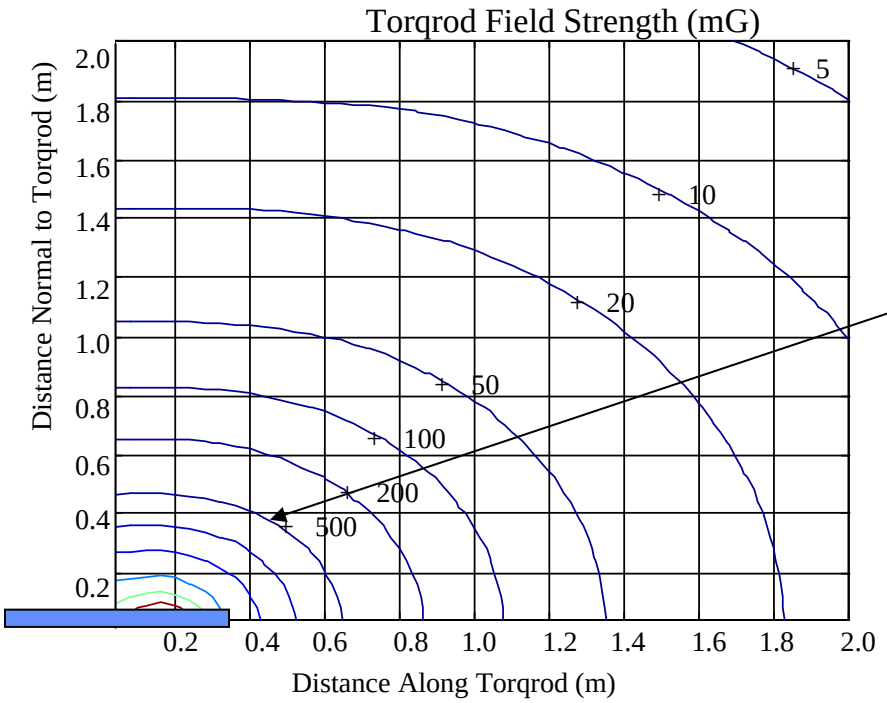
RS101

- Applicable to all equipment except for the BEA (on the exterior surface of the LAT) and the Tracker Towers (not protected by the EMI Skirt and the Grid).
- The LAT instrument levels are applicable to these units.
- The equipment levels take into account the SE afforded by the X-LAT Plate, EMI Shield, Grid, and Shield Vents in the EMI Shield.

RS101 (cont'd)

- Magnetic SE isn't effective until approximately 2 KHz
- Therefore, from 20 Hz to 2 KHz the limit is the same as the LAT instrument.
- From 2 KHz to 50 KHz maintain a 6 dB margin between RE101 and RS101.

STATIC MAGNETIC FIELD



1 Gauss Constraint for 130 A-m² Torque Rods

STATIC MAGNETIC FIELD

- Torque rods are the only significant contributor to the static magnetic field on the spacecraft.
- Per ICD paragraph 12.1.1:

  The SC shall not generate a magnetic field greater than 2 gauss in the region defined in the LAT-SC IRD.

STATIC MAGNETIC FIELD (cont'd)

- SAI is in the process of verifying that they in fact do meet this requirement.
- There should not be any need for a change to this requirement.