Not for Reproduction CISPR/A-IEC/SC77B(JTF-TEM-Harrington/Bronaugh)01-02
Original: English October 2001

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE (CISPR)
Subcommittee A: Radio Interference Measurements and Statistical Methods
Working Group 1: EMC Instrumentation Specifications

TECHNICAL COMMITTEE 77: ELECTROMAGNETIC COMPATIBILITY
Subcommittee 77B: High Frequency Phenomena

Joint Task Force: TEM Waveguides

ERRATUM IN EXAMPLE GTEM UNCERTAINTY BUDGET OF [1]

It has been realized that the GTEM-to-FAR correlation component in the example radiated emissions budget of [1] is not entirely correct. A detailed version of Table 2 from [1] is shown below, where the "GTEM" component in row 3 has been replaced by the GTEM-to-FAR correlation and field uniformity components that were implicitly included in the previous 4.381 dB value. References [1] and [2] contain the sentence "It is permissible to use the number of test frequencies to derive and use the standard deviation of the mean, but that will not be done in this example." Actually the standard deviation of the mean is the preferred quantity for use in this type of calculation. Rather than the 2.92 dB standard uncertainty value in row 3, the expanded uncertainty value (k=2) corresponding to the standard deviation of the mean (SDoM) should have been used. For the Fig. 9 data of [2], n=370 frequencies were used for the sample standard deviation, which gives a standard deviation of the mean equal to 2.92 dB divided by the square root of 370, or SDoM = 0.15 dB. The corresponding expanded uncertainty of 0.3 dB in row 3 of the Revised Table 2 below gives a final overall expanded uncertainty of 4.1 dB.

REFERENCES

[1] CISPR/A-IEC/SC77B(JTF-TEM-Harrington/Bronaugh)01-02, "Example TEM waveguide uncertainty budget," August 2001.

[2] T. E. Harrington, and E. L. Bronaugh, "EUT directivity and other uncertainty considerations for GHz-range use of TEM waveguides," *IEEE Intl. Symp. Electromag. Compat.*, Montreal, Canada, pp. 117-122, 2001.

Table 2. Example Uncertainty Budget for Slotted-box EUT 3-position GTEM-to-FAR Correlation

Component Source		Tolerance or σ		Max VSWR				Spec. U (k=2)			Dist.	Type Eval.	Weighting	u_s
#	Name	dB	%	In	Out	Γι	Γo	dB	%	n	(A,N,R,U)	(A, B)	Factor	dB
1	spectrum analyzer	1.049		1.5		0.2		0		1	N	B	1.0000	1.049
2	pre-amp			2	2.2	0.333	0.375	1.23		19	N	A	0.2294	0.141
3	GTEM-FAR correl.				1.25		0.111	2.92		1	N	B	1.0000	1.46
4	GTEM field uniformity	4						0		1	A	B	0.4082	1.633
5	cable1	0.277						0		1	R	B	0.5774	0.16
6	cable2	0.212						0		1	R	B	0.5774	0.123
7	comb generator							0.8165		1		B	0.0000	0
Mismatch Calculation		Γ1	Γ2	--				Tot. Err.			--	--	--	--
7	pre-amp : spec ana	0.375	0.2	--				0.65	--	--	U	B	0.7071	0.462
8	GTEM : pre-amp	0.111	0.333	--				0.32	--	--	U	B	0.7071	0.228
						Combined Standard Uncertainty, u(c):					N	A	--	2.495
							Expanded Uncertainty, U:				N	A	2	4.989

Revised Table 2. Example GTEM Uncertainty Budget for Slotted-box EUT Based on GTEM-to-FAR Correlation Standard Deviation of Mean

Component Source		Tolerance or σ		Max VSWR				Spec. U (k=2)			Dist.	Type Eval.	Weighting	u_s
#	Name	dB	%	In	Out	Γι	Γo	dB	%	n	(A,N,R,U)	(A, B)	Factor	dB
1	spectrum analyzer	1.049		1.5		0.2		0		1	N	B	1.0000	1.049
2	pre-amp			2	2.2	0.333	0.375	1.23		19	N	A	0.2294	0.141
3	GTEM-FAR correl.				1.25		0.111	0.3		370	N	B	1.0000	0.15
4	GTEM field uniformity	4						0		1	A	B	0.4082	1.633
5	cable1	0.277						0		1	R	B	0.5774	0.16
6	cable2	0.212						0		1	R	B	0.5774	0.123
7	comb generator							0.8165		1		B	0.0000	0
Mismatch Calculation		Γ1	Γ2	--				Tot. Err.			--	--	--	--
7	pre-amp : spec ana	0.375	0.2	--				0.65	--	--	U	B	0.7071	0.462
8	GTEM : pre-amp	0.111	0.333	--				0.32	--	--	U	B	0.7071	0.228
						Combined Standard Uncertainty, u(c):					N	A	--	2.028
							Expanded Uncertainty, U:				N	A	2	4.057