ENGINEERING TEST REPORT

SILENT PARTNER
Model No.: SCOOP

FCC ID: WXMSCOOP

Applicant:
DEUCE INDUSTRIES LTD
500 Coronation Drive Unit 10
Scarborough, ON
CANADA, M1E 4V7

In Accordance With

FEDERAL COMMUNICATIONS COMMISSION (FCC)
Part 15, Subpart C, Section 15.249
Operation within 902-928 MHz band

UltraTech's File No.: DEU-007F15C249

This Test report is Issued under the Authority of Tri M. Luu, Professional Engineer, Vice President of Engineering UltraTech Group of Labs Date: December 16, 2008	
Report Prepared by: JaeWook Choi Issued Date: December 16, 2008	Tested by: Hung Trinh, RFI Technician Test Dates: November 20, 2008 & December 02, 2008

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4
Tel.: (905) 829-1570 Fax: (905) 829-8050
Website: www.ultratech-labs.com, Email: vic@ultratech-labs.com, Email: tri@ultratech-labs.com

ANSI	FC	VCI	Industry Canada	NVLAP	BSMI	Korea MIC-RRL
0685	31040/SIT	C-1376	46390-2049	200093-0	SL2-IN-E-1119R	2005-82 & 83

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 15, Subpart C, Section 15.249
Title:	Telecommunication - Code of Federal Regulations, CFR 47, Part 15
Purpose of Test:	To gain FCC Certification Authorization for Section 15.249- Operation within 902-928 MHz band.
Test Procedures:	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Environmental Classification:	Residential

1.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

1.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC 47 CFR Parts 0-19	2007	Code of Federal Regulations – Telecommunication
ANSI C63.4	2004	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
CISPR 22 EN 55022	2006 2006	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
RSS-Gen, Issue 2	2007	General Requirements and Information for the Certification of Radiocommunication Equipment
RSS-210, Issue 7	2007	Low Power Licence-Exempt Radiocommunication Devices (All frequency Bands)

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT	
Name:	DEUCE INDUSTRIES LTD
Address:	500 Coronation Drive Unit 10 Scarborough, ON CANADA, M1E 4V7
Contact Person:	Mr. John Bassili Phone #: +1 (416) 284-5481 Fax #: +1 (416) 690-4787 Email Address: bassili@scar.utoronto.ca

MANUFACTURER	
Name:	DEUCE INDUSTRIES LTD
Address:	500 Coronation Drive Unit 10 Scarborough, ON CANADA, M1E 4V7
Contact Person:	Mr. John Bassili Phone #: +1 (416) 284-5481 Fax #: +1 (416) 690-4787 Email Address: bassili@scar.utoronto.ca

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Product Name:	SILENT PARTNER
Model Name or Number:	SCOOP
Serial Number:	Test Sample
Type of Equipment:	Periodic Transmitter
Power Input Source:	3V DC Lithium disc battery
Primary User Functions of EUT:	Remote of training device for tennis

2.3. EUT'S TEHNICAL SPECIFICATIONS

Transmitters	
Exposure Category:	Portable
Intended Operating Environment:	Residential
RF Output Power Rating:	64.35 dBµV/m Quasi-Peak E-field @ 3 meters
Operating Frequency Range:	915.15 MHz
20 dB Bandwidth:	207.4 kHz
Modulation Type:	F1D
Antenna Connector Type:	Integral
Antenna Description:	Trace on PCB

2.4. LIST OF EUT'S PORTS

None

2.5. ANCILLARY EQUIPMENT

None

2.6. GENERAL TEST SETUP

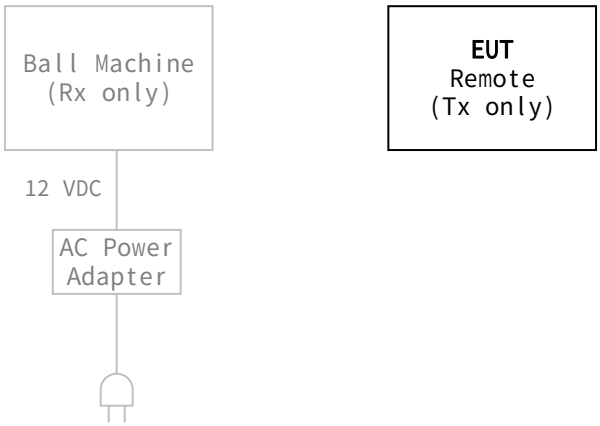


EXHIBIT 3. EUT OPERATION CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	The EUT was set to transmit in burst mode continuously by means of special setting for testing purpose only.
Special Test Software:	None
Special Hardware Used:	None
Transmitter Test Antenna:	The EUT is tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment.

Transmitter Test Signal	
Frequency	915.15 MHz

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

Powerline Conducted Emissions were performed in Ultratech's shielded room, 16'(L) by 12'(W) by 12'(H).

Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 31040/SIT 1300B3) and Industry Canada office (Industry Canada File No.: IC2049A-3). Calibration site expiry date for IC is May 17, 2009.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSIONS TEST RESULTS

FCC Sections	Test Requirements	Compliance (Yes/No)
2.1093	RF Exposure Evaluation	Categorically excluded
15.107(a)	Power Line Conducted Emissions Measurements	N/A for battery operated
15.109(a)	Radiated Emissions for Digital device	Yes
15.203	Antenna requirement (Permanently attached antenna used with this device)	Yes
15.215	20 dB Bandwidth and Band-edge Emissions	Yes
15.249(a), (c) and (d), 15.209 & 15.205	Transmitter Radiated Emissions - Fundamental, Harmonic and Spurious	Yes

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None.

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

5.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4.

5.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with requirements of UKAS Document NIS 81 with a confidence level of 95%. Please refer to EXHIBIT 6. for Measurement Uncertainties.

5.3. MEASUREMENT EQUIPMENT USED

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C64.3 and FCC 15.209.

5.4. METHOD OF MEASUREMENTS

The measurements were performed in accordance with Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4.

5.5. ESSENTIAL/PRIMARY FUNCTIONS AS DECLARED BY THE MANUFACTURER

The essential function of the EUT is for remotely controlling tennis ball machine via RF link.

5.6. SPURIOUS EMISSIONS FROM CLASS B UNINTENTIONAL RADIATORS (DIGITAL DEVICE) [15.109(A)]

5.6.1. Limits

The equipment shall meet the limits of the following table:

Test Frequency Range (MHz)	Limits @3m (dBμV/m)	EMI Detector Used	Measuring Bandwidth (kHz)
30 – 88	40.0	Quasi-Peak	RBW = 120 kHz, VBW ≥ 120 kHz
88 – 216	43.5	Quasi-Peak	RBW = 120 kHz, VBW ≥ 120 kHz
216 – 960	46.0	Quasi-Peak	RBW = 120 kHz, VBW ≥ 120 kHz
Above 960	54.0	Average	RBW = 1 MHz, VBW ≥ 1MHz

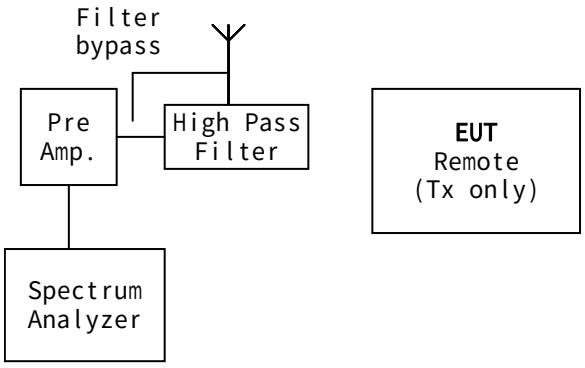
5.6.2. Method of Measurements

Refer to ULTRATECH Test Procedures, File # ULTR P001-2004, RSS-210, Issue 7 and ANSI C63.4.

The EUT shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 - 108	1000
108 – 500	2000
500 -1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

5.6.3. Test Arrangement



5.6.4. Test Data

The emissions were scanned from 30 MHz to 10 GHz at 3 meters distance. All emissions less than 20 dB below the limits were recorded.

FREQUENCY (MHz)	RF LEVEL@3m (dBuV/m)	DETECTOR USED (PEAK/QP)	ANTENNA PLANE (H/V)	LIMIT (dBuV/m)	MARGIN (dB)	PASS/ FAIL
No signal found						

5.7. EMISSION BANDWIDTH [§15.215]

5.7.1. Limits

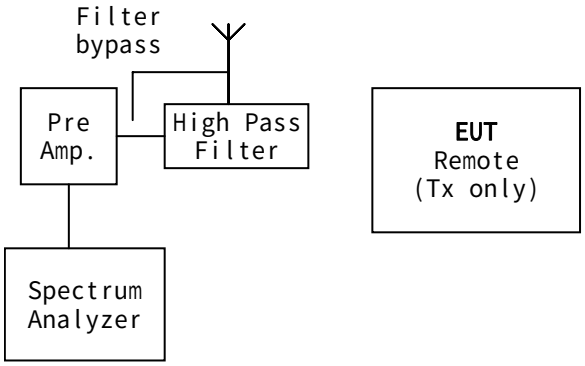
§§**15.215 (c)** Intentional radiators operating under the alternative provisions to the general emission limits, as contained in Sec. Sec. 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

5.7.2. Method of Measurements

Refer to ULTRATECH Test Procedures, File # ULTR P001-2004, §15.249(c) & ANSI C63.4.

The transmitter output was loosely coupled to the spectrum analyzer through a receiving antenna and the bandwidth of the fundamental frequency was measured with the spectrum analyzer with the resolution bandwidth of the spectrum analyzer set per ANSI C63.4.

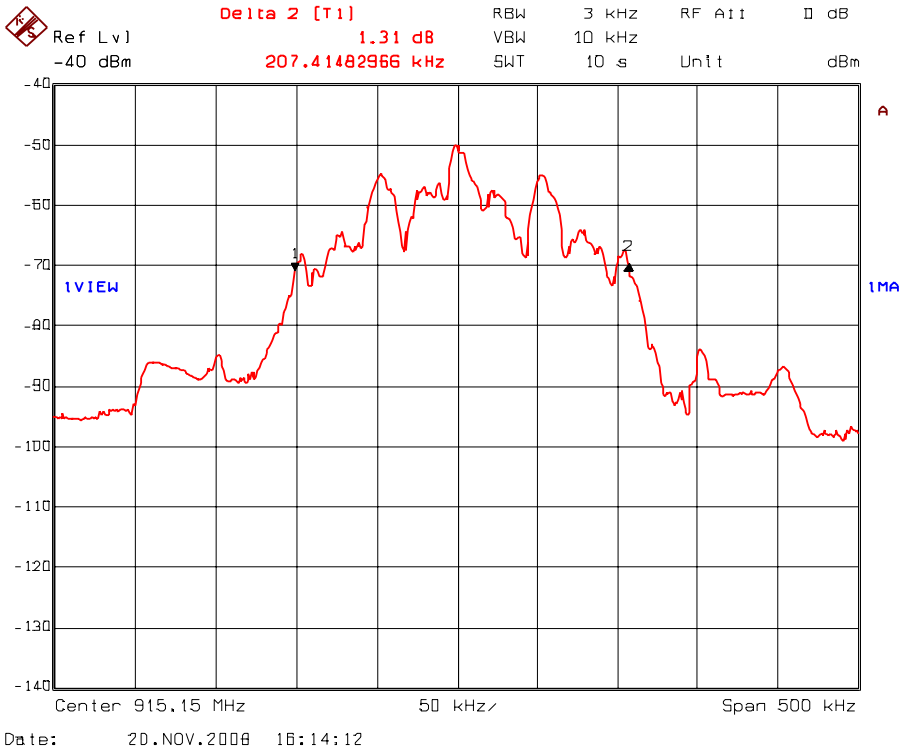
5.7.3. Test Arrangement



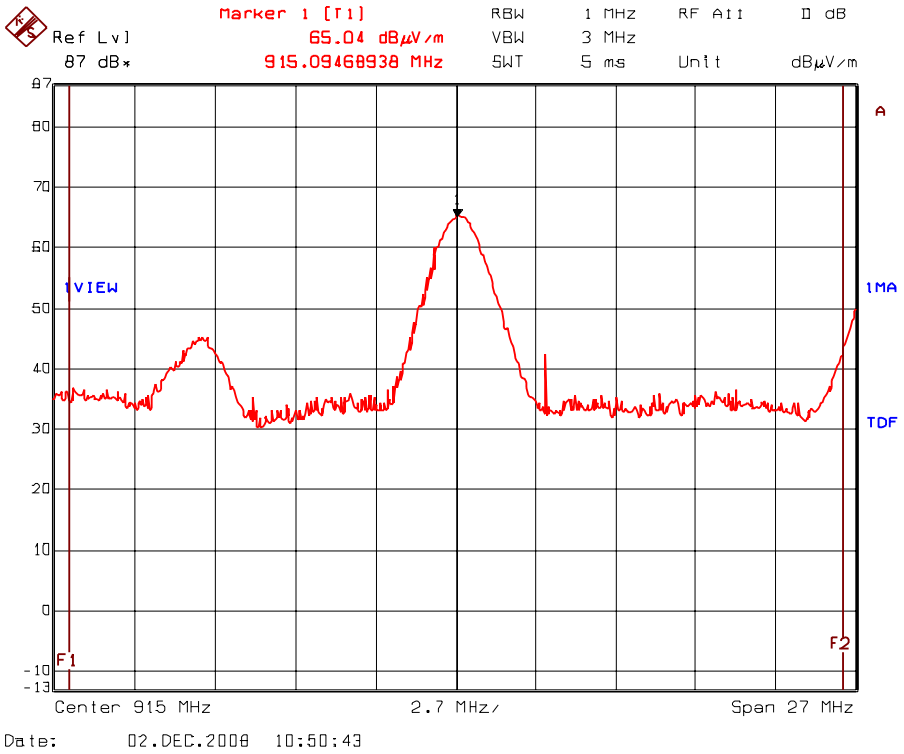
5.7.4. Test Data

Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/Fail
915.15	207.4	1085	Pass

Plot 1. 20 dB Bandwidth
Test Frequency: 915.15 MHz



Plot 2. Band-edge radiated emissions
Test Frequency: 915.15 MHz



5.8. TRANSMITTER RADIATED EMISSIONS @ 3 METERS – FUNDAMENTAL, HARMONIC & SPURIOUS EMISSIONS [§15.249(a), (c) and (d), 15.209 & 15.205]

5.8.1. Limits

The RF radiated emissions measured at 3 Meters distance shall not exceed the field strength below:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of harmonic (microvolts/meter)
902 - 928	50	500

Field Strength of Fundamental Limit @ 915.15 MHz = 94 dBµV/m quasi-peak
Field Strength of Harmonics and Spurious Limit = 54 dBµV/m average

Emissions within the restricted bands specified in §15.205(a) shall not exceed the general radiated emission limits specified in §15.209(a).

47 CFR 15.205(a) - Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

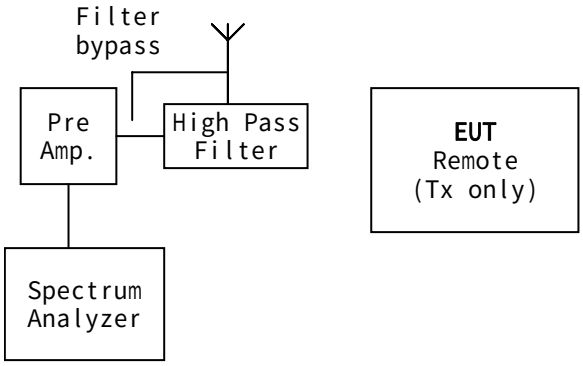
47 CFR 15.209(a) - Field Strength Limits within Restricted Frequency Bands

Frequency (MHz)	Field Strength Limits (microvolts/m)	Distance (Meters)
0.009 - 0.490	2,400 / F (KHz)	300
0.490 - 1.705	24,000 / F (KHz)	30
1.705 - 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

5.8.2. Method of Measurements

Refer to ULTRATECH Test Procedures, File # ULTR P001-2004 and ANSI C63.4.

5.8.3. Test Arrangement



5.8.4. Test Data

Frequency (MHz)	E-Field @3m (dBµV/m)	Detector Used (QP or AVG)	Antenna Plane (V/H)	§15.249(a) Limits @ 3m (dBµV/m)	§15.209 (a) Limits @ 3m (dBµV/m)	Margin (dB)
915.15	63.61	QP	V	94.0	--	-30.39
915.15	64.35	QP	H	94.0	--	-29.65
1830.30	30.47	AVG	V	--	54.0	-23.53
1830.30	30.08	AVG	H	--	54.0	-23.92
2745.45	30.73	AVG	V	--	54.0	-23.27
2745.45	31.07	AVG	H	--	54.0	-22.93
3660.60	33.92	AVG	V	--	54.0	-20.08
3660.60	34.28	AVG	H	--	54.0	-19.72
4575.75	34.12	AVG	V	--	54.0	-19.88
4575.75	35.26	AVG	H	--	54.0	-18.74

- The emissions were scanned from 30 MHz to 10 GHz at 3 meters distance and all spurious and harmonic emissions were recorded.
- The transmitter was placed in three different orthogonal positions for searching maximum field strength level.
- Quasi-peak detector is used below 1 GHz and average detector for 1GHz and above.

EXHIBIT 6. Test Equipments List

Test Instruments	Manufacturer	Model No.	Serial No.	Operating Range
24'(L) x 16'(W) x 8'(H) RF Shielded Chamber	Braden Shielding	…	…	…
Attenuator	Weinschel	46-20-34	BM1347	DC – 18 GHz
Attenuator	Weinschel	46-30-34	BM5354	DC – 18 GHz
BiConiLog Antenna	Emco	3142	10005	0.03 – 2 GHz
BiConiLog Antenna	ETS-Lindgren	3142B	1575	26 MHz – 2 GHz
EMC Analyzer	Hewlett Packard	8593EM	…	9kHz – 22 GHz
High Pass Filter	Mini-Circuits	SHP-800	10427	Cut off 710 MHz
High Pass Filter	Mini-Circuits	SHP-600	19949	Cut off 560 MHz
Horn Antenna	Emco	3155	9701-5061	1 – 18 GHz
Horn Antenna	Emco	3155	9911-5955	1 – 18 GHz
L.I.S.N.	EMCO	3825/2	89071531	9 kHz – 200 MHz 50 Ohms / 50 mH
RF Amplifier	Hewlett Packard	84498	3008A00769	1 – 26.5 GHz
RF Amplifier	Com-Power	PA-103		1 MHz – 1 GHz
Spectrum Analyzer	Rohde & Schwarz	FSEK20/B4/B21	834157/005	9 kHz – 40 GHz
Spectrum Analyzer / EMI Receiver	Hewlett Packard	8546A	3650A00371	9 kHz – 6.5 GHz Built-in amplifier 30dB
Transient Limiter	Hewlett Packard	11947A	310701998	9 kHz – 200 MHz 10 dB attenuation

EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and NIS 81 (1994).

7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Line Conducted)	PROBABILITY DISTRIBUTION	UNCERTAINTY (dB)	
		9-150 kHz	0.15-30 MHz
EMI Receiver specification	Rectangular	±1.5	±1.5
LISN coupling specification	Rectangular	±1.5	±1.5
Cable and Input Transient Limiter calibration	Normal (k=2)	±0.3	±0.5
Mismatch: Receiver VRC Γ_1 = 0.03 LISN VRC Γ_R = 0.8(9 kHz) 0.2 (30 MHz) Uncertainty limits 20Log(1±$\Gamma_1\Gamma_R$)	U-Shaped	±0.2	±0.3
System repeatability	Std. deviation	±0.2	±0.05
Repeatability of EUT	--	--	--
Combined standard uncertainty	Normal	±1.25	±1.30
Expanded uncertainty U	Normal (k=2)	±2.50	±2.60

Sample Calculation for Measurement Accuracy in 150 kHz to 30 MHz Band:

$u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)} = \pm \sqrt{(1.5^2 + 1.5^2)/3 + (0.5/2)^2 + (0.05/2)^2 + 0.35^2} = \pm 1.30$ dB

$U = 2u_c(y) = \pm 2.6$ dB

7.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Radiated Emissions)	PROBABILITY DISTRIBUTION	UNCERTAINTY (+ dB)	
		3 m	10 m
Antenna Factor Calibration	Normal (k=2)	±1.0	±1.0
Cable Loss Calibration	Normal (k=2)	±0.3	±0.5
EMI Receiver specification	Rectangular	±1.5	±1.5
Antenna Directivit	Rectangular	+0.5	+0.5
Antenna factor variation with height	Rectangular	±2.0	±0.5
Antenna phase center variation	Rectangular	0.0	±0.2
Antenna factor frequency interpolation	Rectangular	±0.25	±0.25
Measurement distance variation	Rectangular	±0.6	±0.4
Site imperfections	Rectangular	±2.0	±2.0
Mismatch: Receiver VRC Γ_1 = 0.2 Antenna VRC Γ_R = 0.67(Bi) 0.3 (Lp) Uncertainty limits 20Log(1±$\Gamma_1\Gamma_R$)	U-Shaped	+1.1 -1.25	±0.5
System repeatability	Std. Deviation	±0.5	±0.5
Repeatability of EUT		-	-
Combined standard uncertainty	Normal	+2.19 / -2.21	+1.74 / -1.72
Expanded uncertainty U	Normal (k=2)	+4.38 / -4.42	+3.48 / -3.44

Calculation for maximum uncertainty when 3m biconical antenna including a factor of k=2 is used:

$U = 2u_c(y) = 2x(+2.19) = +4.38$ dB And $U = 2u_c(y) = 2x(-2.21) = -4.42$ dB