

Variant FCC RF Test Report

APPLICANT : Motorola (Beijing) Mobility Technologies Co. LTd.
EQUIPMENT : mobile phone
BRAND NAME : Motorola
MODEL NAME : EX232
TYPE NAME : DWQ6-334411A11
FCC ID : IHDT56MQ1
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)
Tx/Rx FREQUENCY RANGE : GSM850 : 824.2 ~ 848.8 MHz /
869.2 ~ 893.8 MHz
GSM1900 : 1850.2 ~ 1909.8 MHz /
1930.2 ~ 1989.8 MHz
WCDMA Band V : 826.4 ~ 846.6 MHz /
871.4 ~ 891.6 MHz

This is a variant report which is only valid together with the original test report. The product was received on Mar. 21, 2011 and completely tested on May 07, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON International (Kunshan), the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG132121-01	Rev. 01	This is a variant report which can be referred to appendix A for product equality declaration. All the test cases were performed in original report which can be referred to Sporton Report No. FG132121 as appendix B. Based on original report, only the worst case of Radiation Emission were verified.	May 09, 2011

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3	§2.1053 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Field Strength of Spurious Radiation	$< 43 + 10\log_{10}(P[\text{Watts}])$	PASS	Under limit 22.98 dB at 1676 MHz



1 General Description

1.1 Applicant

Motorola (Beijing) Mobility Technologies Co. LTd.

No. 1, Wang Jing East Road, Chao Yang District, 100102 Beijing, P.R. China

1.2 Manufacturer

Foxconn (TianJin) Precision Industry Co. Ltd.

No. 207, Nanhai Road, TEDA, Tianjin, P.R. China, 300457

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	mobile phone
Brand Name	Motorola
Model Name	EX232
FCC ID	IHDT56MQ1
Tx Frequency	GSM850 : 824 MHz ~ 849 MHz GSM1900 : 1850 MHz ~ 1910 MHz WCDMA Band V : 824 MHz ~ 849 MHz
Rx Frequency	GSM850 : 869 MHz ~ 894 MHz GSM1900 : 1930 MHz ~ 1990 MHz WCDMA Band V : 869 MHz ~ 894 MHz
Antenna Type	Fixed Internal Antenna
HW Version	3G_850/2100_S_OMTP AVON_MP_V1.0
SW Version	Avon_02.00.00.60R
EUT Stage	Production Unit

Remark:

1. This test report recorded only product characteristics and test results of PCS Licensed Transmitter Held to Ear (PCE).
2. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958
Test Site No.	Sporton Site No.
	03CH01-KS

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- Preliminary Guidance for Receiving Applications for Certification of 3G Device. May 9, 2006.
- FCC 47 CFR Part 2, 22(H), 24(E)
- ANSI / TIA / EIA-603-C-2004
- IC RSS-132 Issue 2
- IC RSS-133 Issue 5

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU200	N/A	N/A	Unshielded, 1.8 m

2 Test Configuration of Equipment Under Test

2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for WCDMA Band V.
2. 30 MHz to 19000 MHz for GSM1900.

Test Modes	
Band	Radiated TCs
GSM 1900	■ GPRS 8 Link + Adapter 1 + Earphone
WCDMA Band V	■ RMC12.2 Kbps Link + Adapter 1 + Earphone

Note:

1. The maximum power levels are GPRS multi-slot class 8 modes for GMSK link for GSM 1900, and RMC12.2 Kbps Link mode for WCDMA band V, only these modes were used for all tests.
2. Because there are individual antennas for each WWAN and Bluetooth, the co-location test modes are not required.

3 Test Result

3.1 Field Strength of Spurious Radiation Measurement

3.1.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

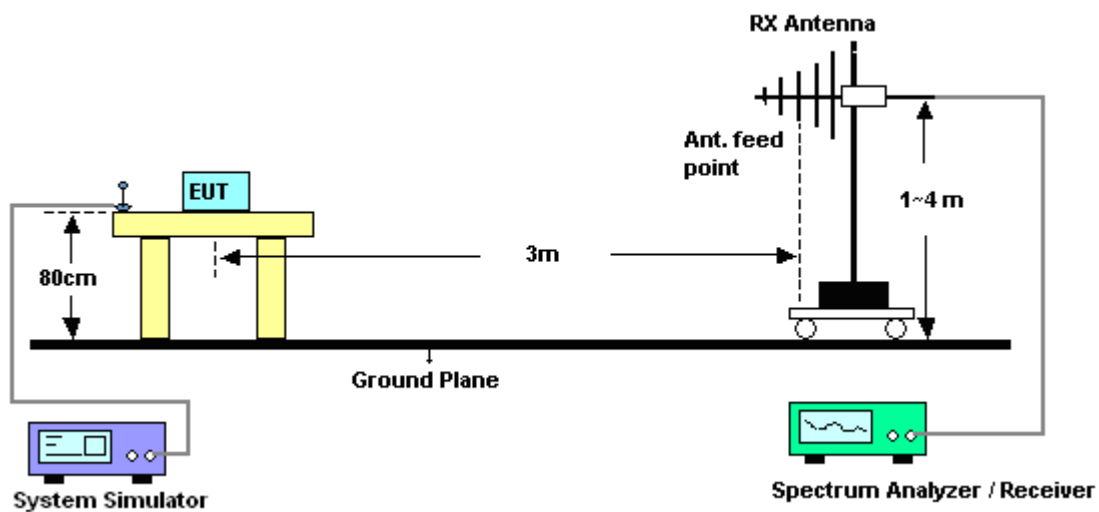
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

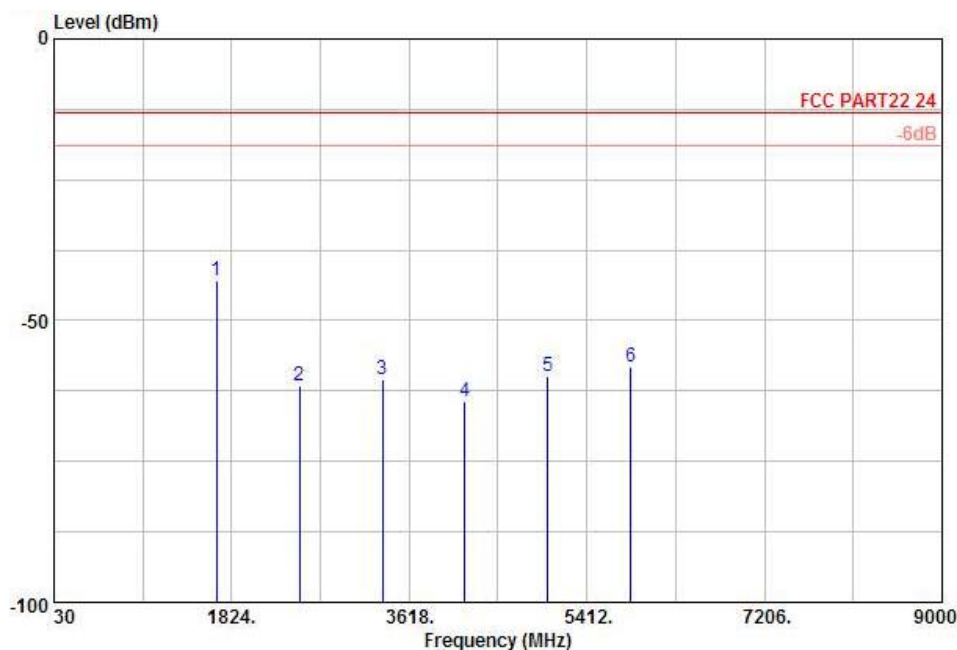
1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11. $ERP \text{ (dBm)} = EIRP - 2.15$

3.1.4 Test Setup



3.1.5 Test Result of Field Strength of Spurious Radiated

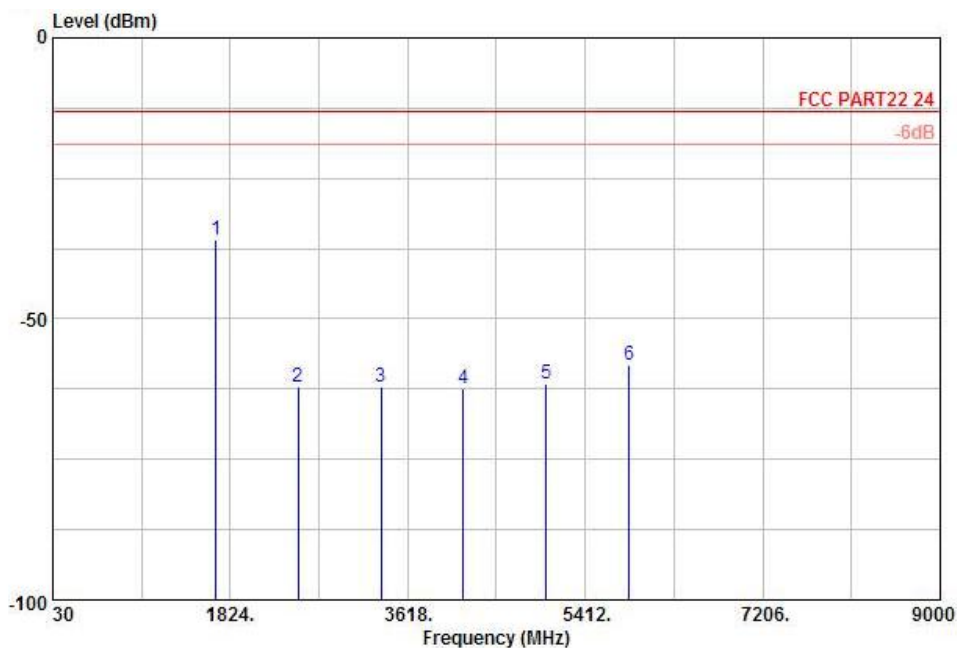
Band :	WCDMA Band V	Temperature :	20~21°C
Test Mode :	WCDMA Band V Link + Adapter 1 + Earphone	Relative Humidity :	40~41%
Test Engineer :	Jason Wang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH01-KS
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 HORIZONTAL
 Project : (FG) 132121-01
 Plane : H
 IMEI : 356397040003261

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1674	-42.98	-13	-29.98	-42.91	-43.63	0.57	3.37	H	Pass
2509	-61.57	-13	-48.57	-63.82	-63.80	0.78	5.16	H	Pass
3345	-60.45	-13	-47.45	-62.39	-64.09	0.87	6.66	H	Pass
4182	-64.30	-13	-51.30	-67.04	-68.89	0.97	7.71	H	Pass
5018	-60.01	-13	-47.01	-66.21	-65.68	1.09	8.91	H	Pass
5854	-58.10	-13	-45.10	-66.81	-64.54	1.22	9.81	H	Pass

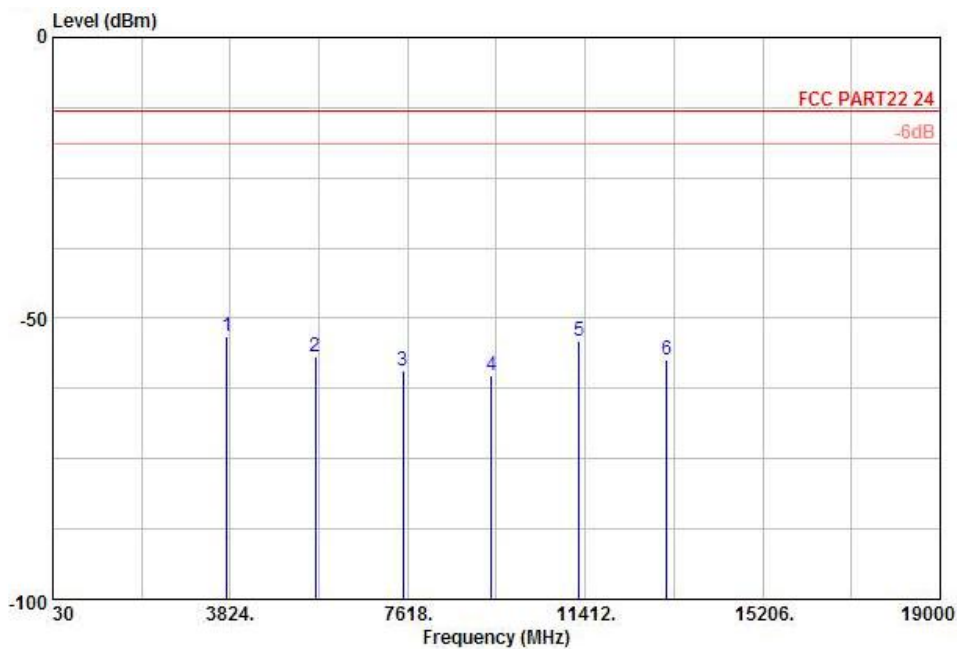
Band :	WCDMA Band V	Temperature :	20~21°C
Test Mode :	WCDMA Band V Link + Adapter 1 + Earphone	Relative Humidity :	40~41%
Test Engineer :	Jason Wang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH01-KS
Condition: FCC PART22 24 HF EIRP FACTOR-09020 VERTICAL
Project : (FG) 132121-01
Plane : H
IMEI : 356397040003261

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1676	-35.98	-13	-22.98	-41.31	-36.63	0.57	3.37	V	Pass
2509	-62.22	-13	-49.22	-65.33	-64.45	0.78	5.16	V	Pass
3345	-62.09	-13	-49.09	-64.07	-65.73	0.87	6.66	V	Pass
4182	-62.48	-13	-49.48	-66.32	-67.07	0.97	7.71	V	Pass
5018	-61.52	-13	-48.52	-66.46	-67.19	1.09	8.91	V	Pass
5854	-58.27	-13	-45.27	-66.26	-64.71	1.22	9.81	V	Pass

Band :	GSM1900	Temperature :	20~21°C
Test Mode :	GSM1900 Link + Adapter 1 + Earphone	Relative Humidity :	40~41%
Test Engineer :	Jason Wang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

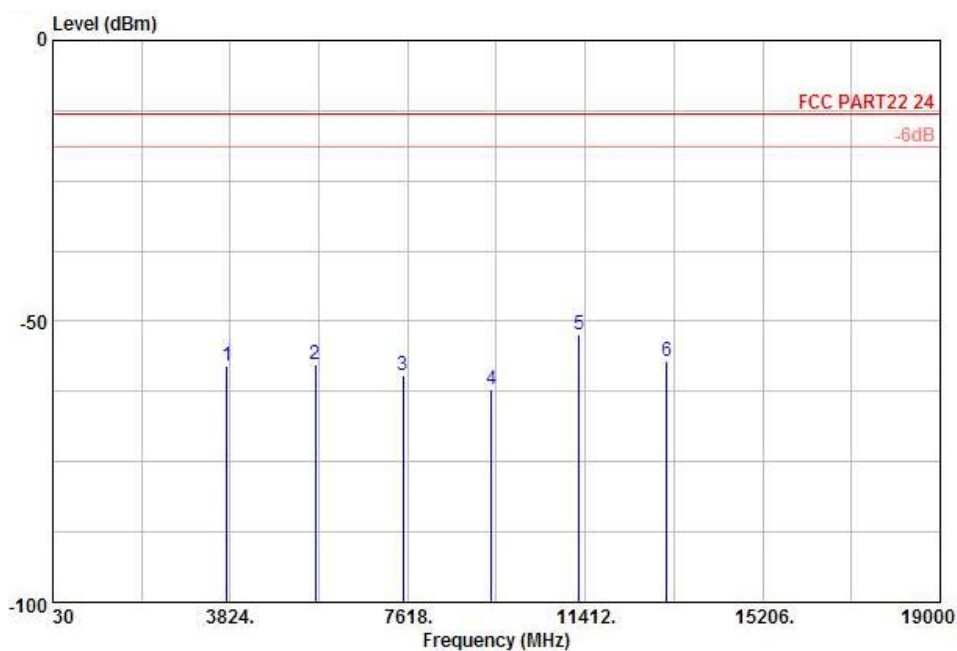


Site : 03CH01-KS
Condition: FCC PART22 24 HF EIRP FACTOR-09020 HORIZONTAL
Project : (FG) 132121-01

Plane : E2
IMEI : 356397040003261

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-53.07	-13	-40.07	-54.47	-59.45	0.78	7.16	H	Pass
5640	-56.71	-13	-43.71	-60.89	-65.25	1.04	9.58	H	Pass
7520	-59.20	-13	-46.20	-64.33	-69.31	1.35	11.46	H	Pass
9400	-60.16	-13	-47.16	-63.42	-71.22	1.75	12.81	H	Pass
11280	-53.95	-13	-40.95	-65.44	-65.04	2	13.09	H	Pass
13160	-57.31	-13	-44.31	-68.61	-69.02	2.04	13.75	H	Pass

Band :	GSM1900	Temperature :	20~21°C
Test Mode :	GSM1900 Link + Adapter 1 + Earphone	Relative Humidity :	40~41%
Test Engineer :	Jason Wang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH01-KS
Condition: FCC PART22 24 HF EIRP FACTOR-09020 VERTICAL
Project : (FG) 132121-01
Plane : E2
IMEI : 356397040003261

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-58.05	-13	-45.05	-59.42	-64.43	0.78	7.16	V	Pass
5640	-57.71	-13	-44.71	-60.93	-66.25	1.04	9.58	V	Pass
7520	-59.57	-13	-46.57	-64.06	-69.68	1.35	11.46	V	Pass
9400	-62.00	-13	-49.00	-63.22	-73.06	1.75	12.81	V	Pass
11283	-52.50	-13	-39.50	-63.74	-63.59	2	13.09	V	Pass
13160	-57.16	-13	-44.16	-68.35	-68.87	2.04	13.75	V	Pass

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 16, 2010	Nov. 15, 2011	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 07, 2010	Dec. 06, 2011	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	30MHz~2GHz	Dec. 09, 2010	Dec. 08, 2011	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Active horn antenna	com-power	AHA-118	701023	1G-18GHz	Nov. 09, 2010	Nov. 08, 2011	Radiation (03CH01-KS)
Signal Generator	R&S	SMR40	100455	10MHz~40GHz	Jan. 06, 2011	Jan. 05, 2012	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15-40GHz	Oct. 15, 2010	Oct. 14, 2011	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH01-KS)
System Simulator	R&S	CMU200	837587/066	Full-Band	Jan. 07, 2011	Jan. 06, 2012	-

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	± 0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	± 1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	± 0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	± 2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	± 1.50	Rectangular	0.87	1	0.87
Site Imperfection	± 2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\log(1-\Gamma_1\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Product Equality Declaration



Appendix B. Original Report

Please refer to Sporton report number FG132121 as below.