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Certification Test Report

FCC ID: EW780-6044-02
IC: 1135B-80604402

FCC Rule Part: 15.323
IC Radio Standards Specification: RSS-213

ACS Report Number: 08-0466 - 15D

Model(s): DTM602G

Test Begin Date: December 10, 2008
Test End Date: December 10, 2008

Report Issue Date: February 9, 2009



FOR THE SCOPE OF ACCREDITATION UNDER LAB Code 200612-0

This report is not be used to claim certification, approval, or endorsement by NVLAP, NIST or any government agency.

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This report contains 13 pages

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1.0 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart D of the FCC's Code of Federal Regulations and Industry Canada's Radio Standards Specification RSS-213.

1.2 Product Description

The DTM602G is a VoIP Cordless Telephone Base Station utilizing built-in Digital Enhanced Cordless Telecommunications (DECT) Base station functionality. The DTM602G provides an Ethernet connection, two TNV-2 telephone ports and one F-Type coaxial connector for connection to CATV network.

Manufacturer Contact Information:

ARRIS Group, Inc.
3871 Lakefield Dr, Suite 300
Suwanee, GA 30024
Edward R. Champion, Jr.
Regulatory/Compliance

Applicant Contact Information:

VTech Telecommunications Ltd
23/F Tai Ping Ind Center
Block 1 57 Ting Kok Rd
Tai Po, Hong Kong
Samson Man
Approbation Supervisor

Test Sample Serial Number(s):

855JBV1232301088

Test Sample Condition:

Test sample was in good working condition.

Detailed photographs of the EUT are filed separately with this filing.

1.3 Test Methodology and Considerations

The report covers only the intentional and unintentional radiated emissions and AC power line conducted emissions of the DTM602G. Data showing compliance to the remaining technical requirements for the Digital Enhanced Cordless Telecommunications (DECT) operation in accordance to FCC Part 15D and IC RSS-213 is provided in a separate report HK09020342-1

2.0 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions
5015 B.U. Bowman Drive
Buford, GA 30518
Phone: (770) 831-8048
Fax: (770) 831-8598

2.2 Laboratory Accreditations/Recognitions/Certifications

The Semi-Anechoic Chamber Test Site, Open Area Test Site (OATS) and Conducted Emissions Site have been fully described, submitted to, and accepted by the FCC, Industry Canada and the Japanese Voluntary Control Council for Interference by information technology equipment. In addition, ACS is compliant to ISO 17025 as certified by the National Institute of Standards and Technology under their National Voluntary Laboratory Accreditation Program. The following certification numbers have been issued in recognition of these accreditations and certifications:

FCC Registration Number: 894540
Industry Canada Lab Code: IC 4175A-1
VCCI Member Number: 1831

- VCCI OATS Registration Number R-1526
- VCCI Conducted Emissions Site Registration Number: C-1608

NVLAP Lab Code: 200612-0

2.3 Radiated Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The Semi-Anechoic Chamber Test Site consists of a 20' x 30' x 18' shielded enclosure. The chamber is lined with Toyo Ferrite Grid Absorber, model number FFG-1000. The ferrite tile grid is 101 x 101 x 19mm thick and weighs approximately 550 grams. These tiles are mounted on steel panels and installed directly on the inner walls of the chamber.

The turntable is 150cm in diameter and is located 160cm from the back wall of the chamber. The chamber is grounded via 1 - 8' copper ground rod, installed at the center of the back wall, it is bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is all steel, flush mounted table installed in an all steel frame. The table is remotely operated from inside the control room located 25' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Behind the turntable is a 3' x 6' x 4' deep shielded pit used for support equipment if necessary. The pit is equipped with 1 - 4" PVC chases from the turntable to the pit that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit.

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3-1 below:

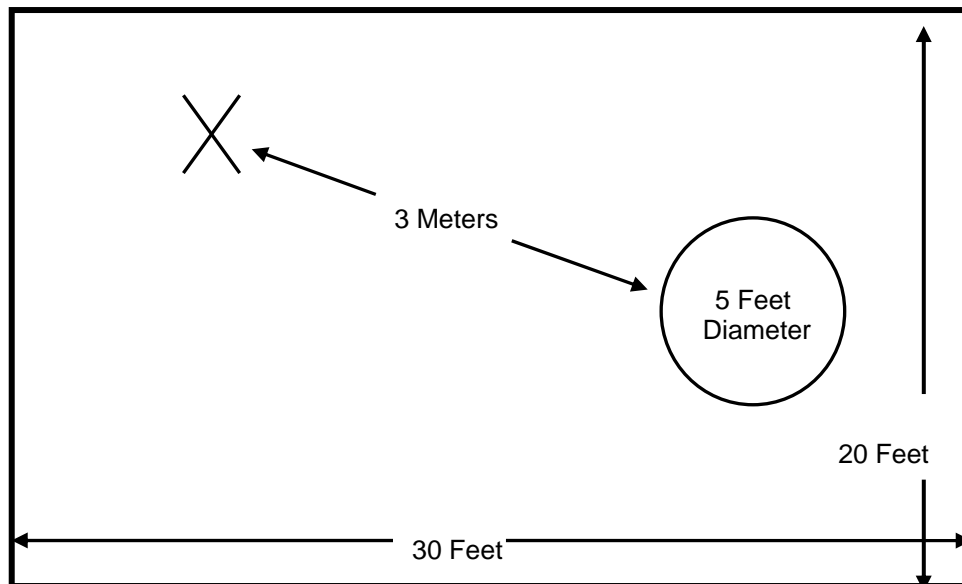


Figure 2.3-1: Semi-Anechoic Chamber Test Site

2.3.2 Open Area Tests Site (OATS)

The open area test site consists of a 40' x 66' concrete pad covered with a perforated electro-plated galvanized sheet metal. The perforations in the sheet metal are 1/8" holes that are staggered every 3/16". The individual sheets are placed to overlap each other by 1/4" and are riveted together to provide a continuous seam. Rivets are spaced every 3" in a 3 x 20 meter perimeter around the antenna mast and EUT area. Rivets in the remaining area are spaced as necessary to properly secure the ground plane and maintain the electrical continuity.

The entire ground plane extends 12' beyond the turntable edge and 16' beyond the antenna mast when set to a 10 meter measurement distance. The ground plane is grounded via 4 - 8' copper ground rods, each installed at a corner of the ground plane and bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is an all aluminum 10' flush mounted table installed in an all aluminum frame. The table is remotely operated from inside the control room located 40' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Adjacent to the turntable is a 7' x 7' square and 4' deep concrete pit used for support equipment if necessary. The pit is equipped with 5 - 4" PVC chases from the pit to the control room that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit. The pit is covered with 2 sheets of 1/4" diamond style re-enforced steel sheets. The sheets are painted to match the perforated steel ground plane; however the underside edges have been masked off to maintain the electrical continuity of the ground plane. All reflecting objects are located outside of the ellipse defined in ANSI C63.4.

A diagram of the Open Area Test Site is shown in Figure 2.3-2 below:

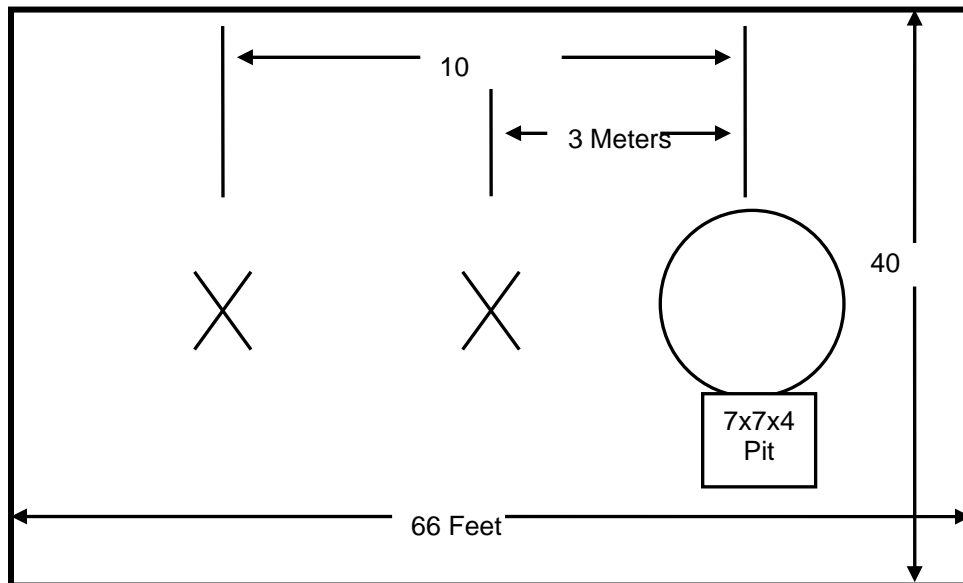


Figure 2.3-2: Open Area Test Site

2.4 Conducted Emissions Test Site Description

The AC mains conducted EMI site is located in the main EMC lab. It consists of an 8' x 8' solid aluminum horizontal group reference plane (GRP) bonded every 3" to an 8' X 8' vertical ground plane.

The site is of sufficient size to test table top and floor standing equipment in accordance with section 6.1.4 of ANSI C63.4.

A diagram of the room is shown below in figure 4.1.3-1:

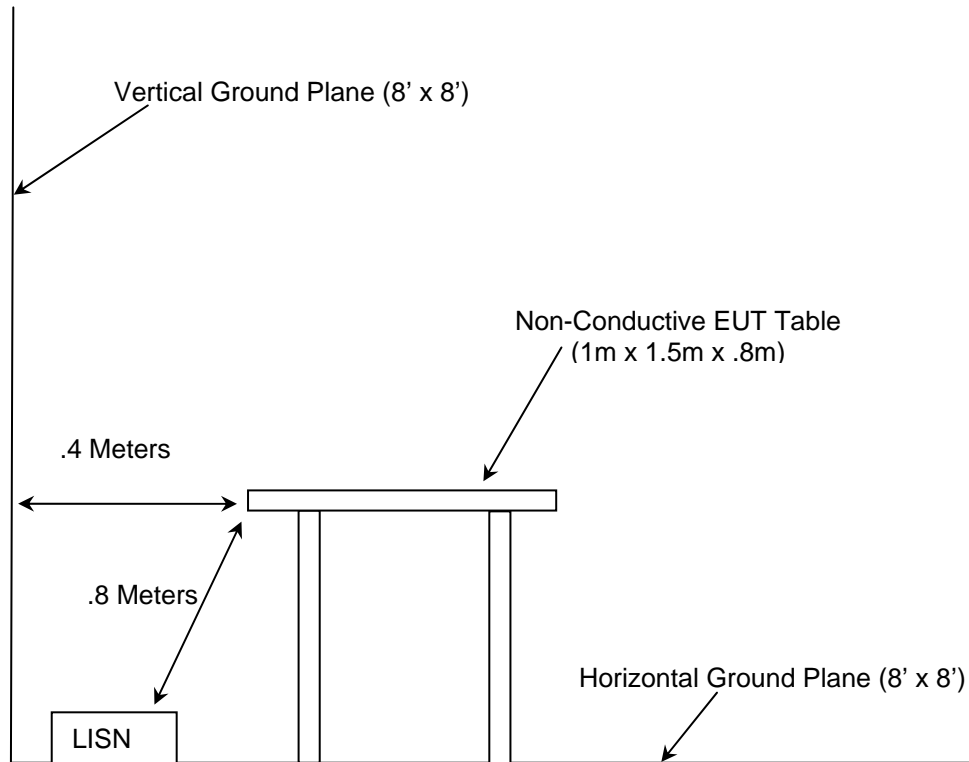


Figure 2.4-1: AC Mains Conducted EMI Site

3.0 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ❖ ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- ❖ ANSI C63.17 – 2006: Methods of Measurement of the Electromagnetic and Operational Compatibility of Unlicensed Personal Communications Services (UPCS) Devices..
- ❖ US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2008.
- ❖ US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart D: Radio Frequency Devices, Intentional Radiators, 2008.
- ❖ Industry Canada Radio Standards Specification: RSS-213 - 2 GHz Licence-exempt Personal Communications Service Devices (PCS), Issue 2 December 2005

4.0 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment

Equipment Calibration Information					
ACS#	Mfg.	Eq. type	Model	S/N	Cal. Due
1	Rohde & Schwarz	Spectrum Analyzer	ESMI - Display	833771/007	09-19-2009
2	Rohde & Schwarz	Spectrum Analyzer	ESMI - Receiver	839587/003	09-19-2009
282	Microwave Circuits	Filter	H2G020G4	74541	02-04-2010 (Note1)
338	Hewlett Packard	Amplifiers	8449B	3008A01111	10-22-2009
329	A.H. Systems	Antennas	SAS-571	721	08-06-2009
291	Florida RF Cables	Cables	SMRE-200W-12.0-SMRE	None	11-24-2009 (Note1)
292	Florida RF Cables	Cables	SMR-290AW-480.0-SMR	None	11-24-2009 (Note1)
422	Florida RF Cables	Cables	SMS-200AW-72.0-SMR	0805	02-05-2010 (Note1)

Note1: Items characterized on an annual cycle. The date shown indicates the next characterization due date.

Note2: Items verified on an annual cycle. The date shown indicates the next verification due date.

5.0 SUPPORT EQUIPMENT

Table 5-1: Support Equipment

Item #	Type Device	Manufacturer	Model/Part #	Serial #
1	Cable Modem	Arris	DTM602G	855JBV1232301088
2	Laptop Computer	Dell	Latitude D610	CN-OD4571-48643-61Q-8314
3	Telephone	Atlinks USA Inc.	29267GE2-B	N/A
4	Telephone	Atlinks USA Inc.	29267GE2-B	N/A

Table 5-2: Cable Description

Cable #	Cable Type	Length	Shield
A	AC power	6'	No
B	Ethernet	10'	No
C	RJ-11 POTS	10'	No

6.0 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

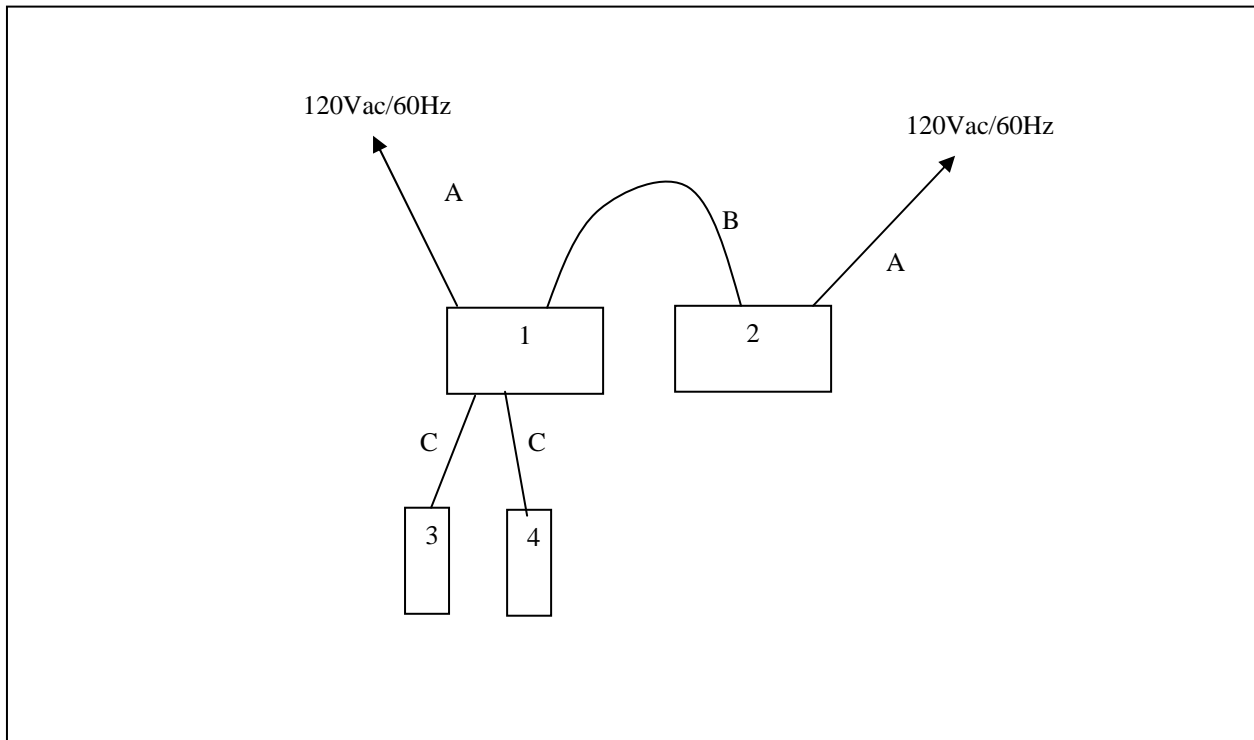


Figure 6-1: EUT Test Setup

*See Test Setup photographs for additional detail.

7.0 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement - FCC Section 15.203

The device uses a non-detachable monopole antenna with 2dBi gain.

7.2 Power Line Conducted Emissions – FCC: Section 15.207 IC: RSS-Gen 7.2.2

7.2.1 Test Methodology

ANSI C63.4 sections 6 and 7 were the guiding documents for this evaluation. Conducted emissions were performed from 150kHz to 30MHz with the spectrum analyzer’s resolution bandwidth set to 9kHz and the video bandwidth set to 30kHz. The calculation for the conducted emissions is as follows:

Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss
Margin = Applicable Limit - Corrected Reading

7.2.2 Test Results

Results of the test are shown below in Table 7.2-1.

Table 7.2-1: Conducted EMI Results

Frequency (MHz)	Uncorrected Reading (dBuV)		Total Correction Factor (dB)	Corrected Level (dBuV)		Limit (dBuV)		Margin (dB)		Line
	Quasi-Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	
Line 1										
0.22	42.9	30.1	9.80	52.70	39.90	62.82	52.82	10.1	12.9	FLO
0.24	41.2	33.9	9.81	51.01	43.71	62.10	52.10	11.1	8.4	FLO
0.49	32.6	24.5	9.90	42.50	34.40	56.17	46.17	13.7	11.8	FLO
1.09	30.7	8	9.90	40.60	17.90	56.00	46.00	15.4	28.1	FLO
3.21	39.1	27.5	9.90	49.00	37.40	56.00	46.00	7.0	8.6	FLO
4.54	38.8	27.6	9.90	48.70	37.50	56.00	46.00	7.3	8.5	FLO
Line 2										
0.22	45	34.4	9.80	54.80	44.20	62.82	52.82	8.0	8.6	FLO
0.24	39.4	33.1	9.81	49.21	42.91	62.10	52.10	12.9	9.2	FLO
0.334	34.1	26.2	9.81	43.91	36.01	59.35	49.35	15.4	13.3	FLO
0.68	33.6	14.1	9.90	43.50	24.00	56.00	46.00	12.5	22.0	FLO
1.33	35.5	28	9.90	45.40	37.90	56.00	46.00	10.6	8.1	FLO
3.21	40.9	30.2	9.90	50.80	40.10	56.00	46.00	5.2	5.9	FLO
4.54	38.6	27.1	9.90	48.50	37.00	56.00	46.00	7.5	9.0	FLO
14.4	33.6	25.1	10.11	43.71	35.21	60.00	50.00	16.3	14.8	FLO

7.3 Radiated Emissions – FCC: Section 15.109(Unintentional Radiation) IC: RSS-210 2.6

7.3.1 Test Methodology

Radiated emissions tests were performed over the frequency range of 30MHz to 10 GHz. Measurements of the radiated field strength were made at a distance of 3m from the boundary of the equipment under test (EUT) and the receiving antenna. The antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. Radiated measurements above 30MHz and below 1GHz were made with the Spectrum Analyzer's resolution bandwidth set to 120 KHz using a Quasi-peak detector. Above 1GHz, peak and average measurements are taken with the RBW and VBW were set to 1MHz and 3MHz respectively.

7.3.2 Test Results

Results of the test are given in Table 7.3.2-1 below:

Table 7.3.2-1: Radiated Emissions Tabulated Data

Frequency (MHz)	Level (dBuV)		Antenna Polarity (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg			pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
37.543	-----	40.93	V	-12.57	-----	28.36	-----	40.0	-----	11.64
45.953	-----	45.96	V	-16.00	-----	29.96	-----	40.0	-----	10.04
61.256	-----	46.16	V	-20.13	-----	26.03	-----	40.0	-----	13.97
119.49	-----	36.23	V	-12.63	-----	23.60	-----	43.5	-----	19.90
144.564	-----	47.43	V	-13.10	-----	34.33	-----	43.5	-----	9.17
249.99	-----	51.75	H	-12.10	-----	39.65	-----	46.0	-----	6.35
299.97	-----	51.44	H	-11.00	-----	40.44	-----	46.0	-----	5.56
374.975	-----	50.99	H	-8.70	-----	42.29	-----	46.0	-----	3.71
399.981	-----	47.41	H	-7.50	-----	39.91	-----	46.0	-----	6.09
797.827	-----	42.48	H	-0.34	-----	42.14	-----	46.0	-----	3.86
1597	51.03	32.92	V	-9.42	41.61	23.50	74.0	54.0	32.39	30.50
1068	40.12	27.32	V	-12.95	27.17	14.37	74.0	54.0	46.83	39.63

* Note: All emissions above 1597 MHz were attenuated below the permissible limit.

7.4 Emissions outside the Sub-Band - FCC Section 15.323(d) / IC: RSS-213 6.7.1

7.4.1 Test Methodology

Measurements are made in accordance to ANSI C63.17 sub-clause 6.1.6.2. Emissions outside the sub-band shall be attenuated below a reference power of 112 milliwatts (20.5 dBm) according to the following

1. Between the band edge and 1.25 MHz above or below the band; 30 dB
2. Between 1.25 and 2.5 MHz above and below the band; 50 dB
3. Greater than 2.5 MHz above and below the band; 60 dB

Example calculation: Band Edge at 1920 MHz. Emissions must be 30 dB down between 1920-1918.75 MHz. Emissions shall not exceed the limit of 20.5 dBm - 30 dB = -9.5 dBm

Table of sub-band emission limits for the lowest and highest fundamental frequencies used in this device are shown below in Table 7.4.1-1

Table 7.4.1-1: Emission Limits for 15.323(d) Sub-bands.

Channel	Carrier Center Frequency [MHz]	Sub-band [MHz]	Limit [dBm]
Low	1921.536	1920 - 1918.75	-9.5
		1918.75 - 1917.5	-29.5
		30 - 1917.50 & 1932.5 - 193000	-39.5
High	1928.448	1930 – 1931.25	-9.5
		1931.25 - 1932.5	-29.5
		30 – 1917.50 & 1932.5 - 193000	-39.5

As the device has a non-detachable antenna, the radiated emissions test method was used for out of band emissions compliance.

The EIRP was calculated using the following equation:

$$EIRP_{EUT} = E_{EUT\ max} + 20 \log_{10} r - 104.8.$$

Where: r = The distance in meters from the antenna to the observation point. (3m)
 E_{EUTmax} = The measured maximum fundamental field strength in dBuV/m

Data was collected with the EUT operating at maximum power.

7.4.2 Test Results

Radiated spurious emissions found in each sub-band for the lowest and highest fundamental frequencies are reported in Table 7.4.2-1 to 7.4.2-2.

Table 7.4.2-1: Radiated Emission 15.323(d) Sub-bands – Low Channel

Antenna Polarization	Frequency [MHz]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
H	1918.07	-53.50	-29.5	24.00
V	1918.07	-45.38	-29.5	15.85
H	1919.23	-37.88	-9.5	28.38
V	1919.23	-29.54	-9.5	20.04
H	3843.072	-60.00	-39.5	20.50
V	3843.072	-56.81	-39.5	17.31
V	7686.144	-50.15	-39.5	10.66
H	9607.68	-46.38	-39.5	6.88
V	9607.68	-41.80	-39.5	2.30
H	11529.216	-55.27	-39.5	15.77
V	11529.216	-52.38	-39.5	12.88
H	13450.752	-54.03	-39.5	14.53
V	13450.752	-42.2	-39.5	2.7

Table 7.4.2-2: Radiated Emission 15.323(d) Sub-bands – High Channel

Antenna Polarization	Frequency [MHz]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
H	1930.17	-38.08	-9.5	28.58
V	1930.17	-33.28	-9.5	23.78
H	1931.32	-48.85	-29.5	19.35
V	1931.32	-40.70	-29.5	11.2
H	3856.896	-59.57	-39.5	20.07
V	3856.896	-54.14	-39.5	14.64
H	9642.24	-47.13	-39.5	7.63
V	9642.24	-40.29	-39.5	0.79
H	11570.688	-49.46	-39.5	9.96
V	11570.688	-44.11	-39.5	4.61
V	13499.136	-45.64	-39.5	6.14

8.0 CONCLUSION

In the opinion of ACS, Inc. the DTM602G meets the requirements of FCC Part 15 subpart D and Industry Canada's Radio Standards Specification RSS-213.

END REPORT