FCC PART 22H, 24E, 27
ISED RSS-131, ISSUE 2, JULY 2003

TEST AND MEASUREMENT REPORT

For

Mobile Communications Inc.

230 Earl Steward Drive,
Aurora, Ontario, Canada, L4G6V8

FCC ID: S4RBMU650
IC: 3585A-BMC653

Report Type:	**Product Type:**
Original Report	Consumer Wide-Band Booster

	Frank Wang
Prepared By:	Test Engineer
Report Number:	R1607216-222427 Rev A
Report Date:	2016-09-06
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Reviewed By:	RF Lead

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1607216-222427	Original	2016-08-04
1	R1607216-222427 Rev A	Add Model: BMZ653	2016-09-06

1 General Information

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Mobile Communications Inc.* and their product:
FCC models: BMUX650 & BMUZ650, FCC ID: S4RBMU650
ISED models: BMX650, BMZ650, BMX653 and BMZ653, IC: 3585A-BMC653
which will henceforth be referred to as the EUT (Equipment under Test). The EUT is a wide-band consumer bi-directional booster.

Note: BMUX650 was used for testing. Please refer to Appendix I- DOS for details.

1.2 Mechanical Description

The EUT measures approximately 4.56" (L) x 2.15" (W) x 1.25" (H), and weighs approximately 1.2 Lbs.
The test data gathered are from typical production sample, serial number: 3000506, assigned by BACL.

1.3 Objective

This type approval report was prepared on behalf of *Mobile Communications Inc.* in accordance with Part 2, Subpart J, Part 20.21, Part 22 Subpart H, Part 24 Subpart E, and Part 27 of the Federal Communication Commission's rules and ISED RSS-131, Issue 2, July 2003.

The objective was to determine compliance with FCC/ISED Rules for Spurious Radiated Emissions.

1.4 Related Submittal(s)/Grant(s)

None.

1.5 Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J and as well as the following parts:

Part 20.21- Signal Boosters
Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Broadband PCS
Part 27 -Miscellaneous Wireless Communications Services

ISED RSS-131, Zone Enhancers for the Land Mobile Service

Applicable Standards: TIA/EIA603-D, FCC KDB 935210.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Parameter	Measurement uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.57 dB
Power Spectral Density, conducted	±1.48dB
Unwanted Emissions, conducted	±1.57dB
All emissions, radiated	±4.0 dB
AC power line Conducted Emission	±2.0 dB
Temperature	±2 º C
Humidity	±5 %
DC and low frequency voltages	±1.0 %
Time	±2 %
Duty Cycle	±3 %

1.7 Test Facility

Bay Area Compliance Laboratories Corp. (BACL) is:

A- ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2005 by A2LA (Test Laboratory Accreditation Certificate Number 3279.02),*** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2005 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report..

BACL's ISO/IEC 17025:2005 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

B- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.03)*** to certify

- For the USA (Federal Communications Commission):

1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
3- All Telephone Terminal Equipment within FCC Scope C.

- For the Canada (Industry Canada):

1 All Scope 1-Licence-Exempt Radio Frequency Devices;
2 All Scope 2-Licensed Personal Mobile Radio Services;
3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
4 All Scope 4-Licensed Maritime & Aviation Radio Services;
5 All Scope 5-Licensed Fixed Microwave Radio Services
6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.

- For Singapore (Info-Communications Development Authority (IDA)):

1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2

- For the Hong Kong Special Administrative Region:

1 All Radio Equipment, per KHCA 10XX-series Specifications;
2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.

- For Japan:

1 MIC Telecommunication Business Law (Terminal Equipment):
- All Scope A1 - Terminal Equipment for the Purpose of Calls;
- All Scope A2 - Other Terminal Equipment

2 Radio Law (Radio Equipment):
- All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
- All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
- All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

C- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.01)*** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

1 Electronics and Office Equipment:
- for Telephony (ver. 3.0)
- for Audio/Video (ver. 3.0)
- for Battery Charging Systems (ver. 1.1)
- for Set-top Boxes & Cable Boxes (ver. 4.1)
- for Televisions (ver. 6.1)
- for Computers (ver. 6.0)
- for Displays (ver. 6.0)
- for Imaging Equipment (ver. 2.0)
- for Computer Servers (ver. 2.0)

2 Commercial Food Service Equipment
- for Commercial Dishwashers (ver. 2.0)
- for Commercial Ice Machines (ver. 2.0)
- for Commercial Ovens (ver. 2.1)
- for Commercial Refrigerators and Freezers

3 Lighting Products
- For Decorative Light Strings (ver. 1.5)
- For Luminaires (including sub-components) and Lamps (ver. 1.2)
- For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
- For Integral LED Lamps (ver. 1.4)

4 Heating, Ventilation, and AC Products
- for Residential Ceiling Fans (ver. 3.0)
- for Residential Ventilating Fans (ver. 3.2)

5 Other
- For Water Coolers (ver. 3.0)

D- ***A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:***

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Industry Canada - IC) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):
  - BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
  - NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - Radio & Teleterminal Equipment (R&TTE) Directive 1995/5/EC
    US -EU EMC & Telecom MRA CAB
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA)
  APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Development Authority - IDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - ENERGY STAR Recognized Test Laboratory – US EPA
  - Telecommunications Certification Body (TCB) – US FCC;
- Vietnam: APEC Tel MRA -Phase I;

http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to TIA/EIA-603-D.
The final qualification test was performed with the EUT operating at normal mode.

2.2 EUT Exercise Software

There was no exercise software with the EUT; signal was sent through EUT using a signal generator.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 EUT Internal Configuration

Manufacturer	Description	Model	Serial Number
Mobile Communication	PCB	BMUX650	-

2.5 Local Support Equipment List and Details

No local Support Equipment utilized.

2.6 Power Supply and Line Filters

Manufacturers	Descriptions	Models	Serial Numbers
Smooth Talker	AC/DC Adapter	BLC240603000WU	-

2.7 Interface Ports and Cabling

Cable Description	Length (m)	From	To
RF cable	< 1	Signal Generator	Input/EUT
RF cable	< 1	Output/EUT	Spectrum Analyzer

3 Summary of Test Results

FCC & ISED Rules	Description of Tests	Results
FCC §2.1053, §22.917(a), §24.238(a), §27.53 ISED RSS-131 §6.4	Spurious Radiated Emissions	Compliant
FCC §2.1091 ISED RSS-102	RF Exposure	Compliant

Note: Other testing results please refer to reports BMUX650 (FCC) and BMX650 (ISED) provided by Mobile Communications, Inc.

4 FCC §2.1053, §22.917, §24.238, §27.53 & ISED RSS-131 §6.4 - Spurious Radiated Emissions

4.1 Applicable Standards

According to FCC §22.917 the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to FCC §24.238(a) the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to FCC §27.53,

(c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 +10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands mobile and portable stations;

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.\

According to IC-RSS 131 §6.4, Spurious Emissions:

Spurious emissions of zone enhancers and translators shall be suppressed as much as possible. Spurious emissions shall be attenuated below the rated power of the enhancer by at least: 43 + 10 Log10(P_{rated} in watts), or 70 dB, whichever is less stringent. Note: If the minimum standard is not met, check to see if the input signal generators have a high harmonic content.

4.2 Test Procedure

The transmitter was placed on the turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 log (TX Power in Watts/0.001) – the absolute level
Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

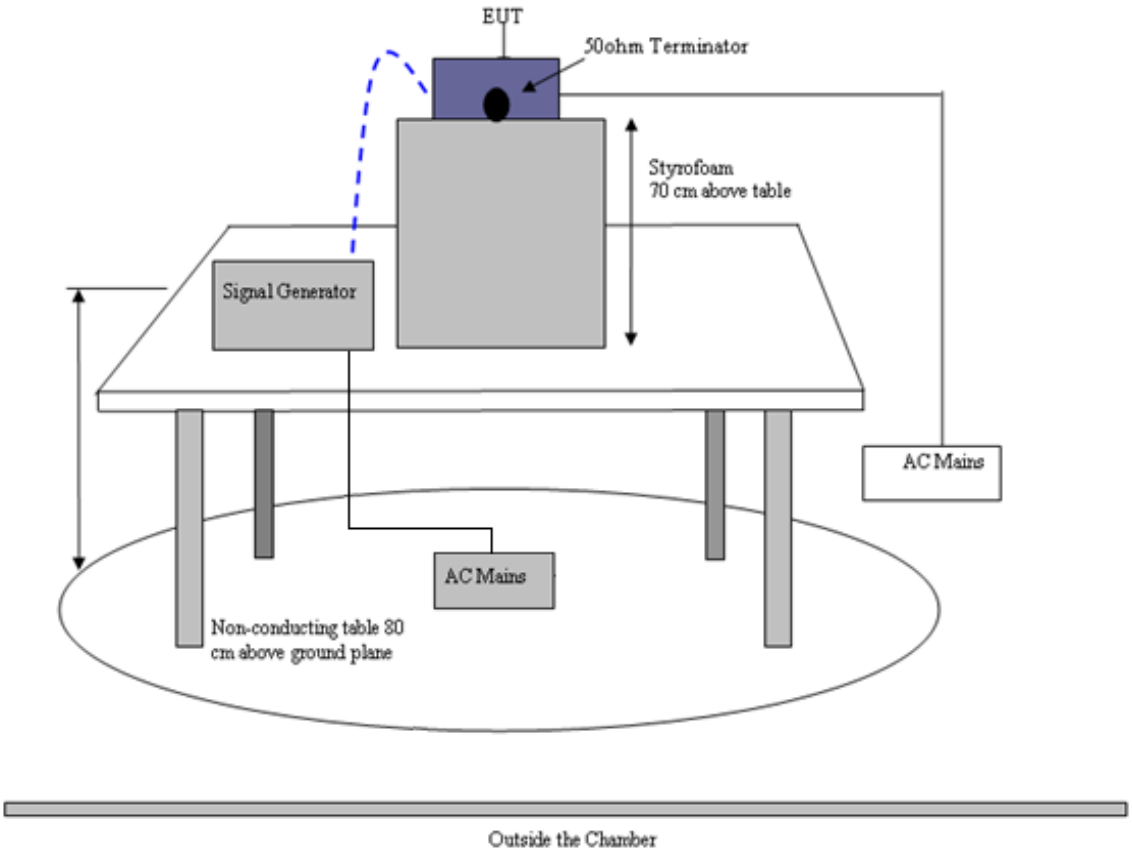
4.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-11-12	1 year
Sunol Science Corp	System Controller	SC99V	011003-1	N/R	N/R
Sunol Sciences	Antenna, Biconi-Log	JB1	A013105-3	2015-07-11	2 years
A.R.A	Antenna, Horn	DRG-118/A	1132	2015-09-21	2 years
HP	Pre-Amplifier	8447D	2944A06639	2016-06-08	1 year
Suirong	30 ft conductive emission cable	LMR 400	-	2016-03-05	1 year
-	SMA cable	-	C0001	Each time[1]	N/A
IW Microwave	High Frequency Cable	DC-1531	KPS-1501A3960KPS	2015-08-10	1 year
HP	Pre-Amplifier	8449B	3008A01978	2015-09-02	1 year
COM-POWER	Antenna, Dipole	AD-100	721033DB1, 2, 3, 4	2014-11-03	2 years
Sunol Sciences	Antenna, Horn	DRH-118	A052704	2015-03-09	2 years
HP	Generator, Signal	83650B	3614A00276	2015-08-19	1 year

Statement of Traceability: BACL Corp. *attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

4.4 Test Setup Block Diagram

Radiated Emissions Testing



4.5 Test Environmental Conditions

Temperature:	20-21° C
Relative Humidity:	47-49 %
ATM Pressure:	101.4-101.6 kPa

The testing was performed by Frank Wang on 2016-7-29 in 5 Meter Chamber 2.

4.6 Test Results

Band 2

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBm)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
Uplink, 1880 MHz											
87.87	-50.57	0	300	H	87.87	-57.71	0	0.071	-57.781	-13	-44.781
50	-54.94	0	300	V	50	-50.72	0	0.071	-50.791	-13	-37.791
3760	-54.32	341	300	H	3760	-50.81	10.338	0.87	-41.342	-13	-28.342
3760	-54.94	223	300	V	3760	-50.22	10.348	0.87	-40.742	-13	-27.742
Downlink, 1960 MHz											
51.72	-51.63	320	300	H	51.72	-52.72	0	0.071	-52.791	-13	-39.791
50.12	-46.93	0	300	V	50.12	-42.71	0	0.071	-42.781	-13	-29.781
2404	-59.02	320	300	H	2404	-56.4	9.344	0.695	-47.751	-13	-34.751
2433	-60.43	320	300	V	2433	-58.42	9.361	0.695	-49.754	-13	-36.754

Band 25

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBm)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
Uplink, 1882.5 MHz											
89.53	-50.29	0	300	H	89.53	-57.43	0	0.071	-57.501	-13	-44.501
51.57	-46.58	0	300	V	51.57	-42.36	0	0.071	-42.431	-13	-29.431
3765	-54.47	164	300	H	3765	-50.98	10.338	0.87	-41.512	-13	-28.512
3765	-54.49	264	300	V	3765	-49.79	10.348	0.87	-40.312	-13	-27.312
Downlink, 1962.5 MHz											
51.72	-51.63	0	300	H	51.72	-52.72	0	0.071	-52.791	-13	-39.791
50.12	-46.93	0	300	V	50.12	-42.71	0	0.071	-42.781	-13	-29.781
1280	-60.27	0	300	H	1280	-60.78	7.031	0.335	-54.084	-13	-41.084
1040	-60.41	0	300	V	1040	-63.13	5.862	0.335	-57.603	-13	-44.603

Band 5

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBm)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
Uplink, 836.5 MHz											
88.2	-50.22	0	300	H	88.2	-57.36	0	0.071	-57.431	-13	-44.431
51.02	-47.06	0	300	V	51.02	-42.84	0	0.071	-42.911	-13	-29.911
1673	-57.43	200	300	H	1673	-62.53	9.013	0.423	-53.94	-13	-40.94
1673	-57.52	360	300	V	1673	-62.41	8.948	0.423	-53.885	-13	-40.885
Downlink, 881.5 MHz											
51.57	-52.38	0	300	H	51.57	-53.47	0	0.071	-53.541	-13	-40.541
49.98	-46.52	0	300	V	49.98	-42.3	0	0.071	-42.371	-13	-29.371
1000	-59.42	0	300	H	1000	-62.03	5.993	0.335	-56.372	-13	-43.372
1720	-60.79	0	300	V	1720	-62.26	8.948	0.423	-53.735	-13	-40.735

Band 12

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBm)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
Uplink, 707 MHz											
89.95	-50.41	0	300	H	89.95	-57.55	0	0.071	-57.621	-13	-44.621
51.47	-47.11	0	300	V	51.47	-42.89	0	0.071	-42.961	-13	-29.961
1414	-53.72	303	300	H	1414	-60.87	7.638	0.423	-53.655	-13	-40.655
1414	-54.4	257	300	V	1414	-61.04	6.426	0.423	-55.037	-13	-42.037
Downlink, 737 MHz											
51.72	-52.05	0	300	H	51.72	-53.14	0	0.071	-53.211	-13	-40.211
50.07	-46.8	0	300	V	50.07	-42.58	0	0.071	-42.651	-13	-29.651
1160	-59.07	0	300	H	1160	-59	6.667	0.335	-52.668	-13	-39.668
1080	-58.65	0	300	V	1080	-60.48	6.426	0.335	-54.389	-13	-41.389

Band 17

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBm)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
Uplink, 710 MHz											
87.67	-50.32	0	300	H	87.67	-57.46	0	0.071	-57.531	-13	-44.531
51.18	-46.82	0	300	V	51.18	-42.6	0	0.071	-42.671	-13	-29.671
1420	-55.83	320	300	H	1420	-62.45	7.638	0.423	-55.235	-13	-42.235
2130	-56.5	320	300	H	2130	-59.63	8.066	0.591	-52.155	-13	-39.155
1424	-54.65	255	300	V	1424	-61.24	7.557	0.423	-54.106	-13	-41.106
Downlink, 740 MHz											
51.63	-52.35	0	300	H	51.63	-54.44	0	0.071	-54.511	-13	-41.511
50.02	-46.9	0	300	V	50.02	-42.68	0	0.071	-42.751	-13	-29.751
1000	-59.19	0	300	H	1000	-61.8	5.993	0.335	-56.142	-13	-43.142
1000	-59.13	0	300	V	1000	-61.13	5.862	0.335	-55.603	-13	-42.603

Band 13

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBm)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
Uplink, 782 MHz											
88.88	-50.65	0	300	H	88.88	-57.79	0	0.071	-57.861	-13	-44.861
51.12	-47.01	0	300	V	51.12	-42.79	0	0.071	-42.861	-13	-29.861
1561	-57.01	360	300	H	1561	-63.47	8.618	0.423	-55.275	-13	-42.275
1565	-56.41	275	300	V	1565	-63.37	8.63	0.423	-55.163	-13	-42.163
Downlink, 751 MHz											
51.65	-52.4	0	300	H	51.65	-53.49	0	0.071	-53.561	-13	-40.561
51.48	-46.6	0	300	V	51.48	-42.38	0	0.071	-42.451	-13	-29.451
1080	-59.89	0	300	H	1080	-62.5	6.477	0.335	-56.358	-13	-43.358
1000	-60.37	0	300	V	1000	-62.37	5.862	0.335	-56.843	-13	-43.843

Band 4

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBm)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
Uplink, 1732.5 MHz											
87.55	-50.67	0	300	H	87.55	-57.81	0	0.071	-57.881	-13	-44.881
51.25	-47.39	0	300	V	51.25	-43.17	0	0.071	-43.241	-13	-30.241
3465	-53.75	256	300	H	3465	-51.74	9.634	0.87	-42.376	-13	-29.976
3465	-51.06	200	300	V	3465	-47.61	9.583	0.87	-38.897	-13	-25.897
Downlink, 2132.5 MHz											
51.65	-52.34	0	300	H	51.65	-53.43	0	0.071	-53.501	-13	-40.501
49.85	-46.69	0	300	V	49.85	-42.47	0	0.071	-42.541	-13	-29.541
1040	-60.78	0	300	H	1040	-63.39	5.993	0.335	-57.732	-13	-44.732
1160	-60.44	0	300	V	1160	-60.31	6.618	0.335	-54.027	-13	-41.027

5 FCC §2.1091 & ISED RSS-102 - RF Exposure

5.1 Applicable Standard

According to FCC §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* ($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

5.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

5.3 MPE Results

Band 5:

Maximum peak output power at antenna input terminal (dBm):	25.6
Maximum peak output power at antenna input terminal (mW):	363.08
Prediction distance (cm):	20
Prediction frequency (MHz):	824.2
Maximum Antenna Gain, typical (dBi):	1
Maximum Antenna Gain (numeric):	1.259
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.091
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	0.5495

Band 12 & Band 17

Maximum peak output power at antenna input terminal (dBm):	26.3
Maximum peak output power at antenna input terminal (mW):	426.58
Prediction distance (cm):	20
Prediction frequency (MHz):	699.2
Maximum Antenna Gain, typical (dBi):	1
Maximum Antenna Gain (numeric):	1.259
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.107
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	0.466

Band 13:

Maximum peak output power at antenna input terminal (dBm):	25.9
Maximum peak output power at antenna input terminal (mW):	389.045
Prediction distance (cm):	20
Prediction frequency (MHz):	746.2
Maximum Antenna Gain, typical (dBi):	1
Maximum Antenna Gain (numeric):	1.259
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.097
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	0.4975

Band 2 & Band 25

Maximum peak output power at antenna input terminal (dBm):	26.0
Maximum peak output power at antenna input terminal (mW):	398.107
Prediction distance (cm):	20
Prediction frequency (MHz):	1852.4
Maximum Antenna Gain, typical (dBi):	1
Maximum Antenna Gain (numeric):	1.259
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.0997
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

Band 4:

Maximum peak output power at antenna input terminal (dBm):	27.4
Maximum peak output power at antenna input terminal (mW):	549.5409
Prediction distance (cm):	20
Prediction frequency (MHz):	1712.4
Maximum Antenna Gain, typical (dBi):	1
Maximum Antenna Gain (numeric):	1.259
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.1377
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

The device is compliant with the requirement MPE limit for uncontrolled exposure at the distance of 20 cm.

5.4 ISED Exemption of RF Exposure Evaluation

According to ISED RSS-102, Issue 5 section 2.5.2 exemption limits for routine evaluation.

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

• at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

The maximum e.i.r.p. of device is less than the exemption limits. Routine RF exposure evaluation is not required.

Refer to 3585A-BMC653 IC Test Report V1.2 Section 3.6