



Global Product Certification
EMC-EMF-Safety Approvals

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RF Exposure Report

Report Number: M130338R_FCC_MC8355_SAR_GSM-UMTS

Radio Module Under Test: WWAN GOBI3000
WWAN FCC ID: EJE-MC8355D
WWAN IC: 337J-MC8355D

Date of Issue: 10th April 2013

This Report replaces M130338_FCC_MC8355_SAR_GSM-UMTS

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RF EXPOSURE SUMMARY REPORT
Report Number: M130338R_FCC_MC8355_SAR_GSM-UMTS
FCC ID: EJE-MC8355D IC: 337J-MC8355D

1.0 GENERAL INFORMATION

Table 1

Radio Module Under Test:	MC8355
Interface Type:	Mini-PCI Module
Device Category:	Portable Transmitter
Test Device:	Pre-Production Unit
FCC ID:	<u>EJE-MC8355D</u>
IC:	<u>337J-MC8355D</u>
RF exposure Category:	General Population/Uncontrolled
Manufacturer:	Fujitsu Limited
Test Standard/s:	<ol style="list-style-type: none">1. Evaluating Compliance with FCC Guidelines For Human Exposure to Radiofrequency Electromagnetic Fields2. Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) RSS-1023. EN 62209-2:2010 Human exposure to radio frequency fields from hand-held and bodymounted wireless communication devices. Human models, instrumentation, and procedures. Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)
Statement Of Compliance:	The Fujitsu TABLET Computers with Sierra Wireless GSM/UMTS/CDMA Module MC8355 that complied (under FCC ID: N7NMC8355 and IC ID: 2417C-MC8355) also comply under FCC ID: EJE-MC8355D and IC ID: 337J-MC8355D with the FCC General public/uncontrolled RF exposure limits of 1.6mW/g per requirements of 47CFR2.1093(d).

Test Officer:



Jason Cameron

Authorised Signature:



Peter Jakubiec



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RF EXPOSURE REPORT

Report Number: M130338R_FCC_MC8355_SAR_GSM-UMTS

2.0 INTRODUCTION

The pre-certified Wireless WAN module Sierra Wireless Gobi3000, model MC8355 was evaluated for RF exposure with various individual Fujitsu Tablets and notebook PCs and certified independently last year under Sierra's own FCC ID: N7NMC8355 and IC ID: 2417C-MC8355.

Fujitsu has advised that due to SKU limitations, the FCC and IC ID on these products are required to be changed under Fujitsu's own FCC ID: EJE-MC8355D and IC ID: 337J-MC8355D. The change of ID process is completed and was Granted on 12th Sept 2012 and 13th Sept 2012 respectively.

There is no difference in the Radio modules configuration or the host products. The exact hardwares certified last year are reported here with the only difference of Label change on the products.

A KDB enquiry was submitted to the FCC with regards to this process. KDB Tracking Number 407850. This report is prepared in consultation with the TCB.

Following products are to be covered under this certification.

Convertible notebook/tablet PC models: T902 (Grant 30th July 2012) and T732 (Grant 25th Sept 2012)

Typical notebook PCs (mobile): S762/S792, E752/E782, S752/S782, U772 (Common Grant 10th April 2012)

A summary of worst case SAR results are shown in this report for the T902 notebook/tablet PC as a representative model.

Complete RF evaluation reports are provided for each of these models which are available on the FCC website.

3.0 TEST SAMPLE TECHNICAL INFORMATION

(Information supplied by the client)

3.1 WWAN Details

Transmitter:	Mini-Card Wireless WAN Module
FCC ID:	EJE-MC8355D
IC:	337J-MC8355D
Model Number:	MC8355
Manufacturer:	SIERRA WIRELESS INC
Network Standard:	GSM Release 6 /
UMTS bands :	IMT 2100 / 850 / 1900MHz(Band Class I, II, V)
GSM / EDGE bands:	850 / 900/ 1800 / 1900 MHz
Channel spacing:	200kHz(GSM), 5MHz(WCDMA)
Channel raster:	200kHz
Host model:	T902
Antenna type:	Main: Monopole, AUX: PIFA
Antenna Manufacturer:	NISSEI ELECTRIC CO. LTD.
Antenna Part Number:	Main: CP519214, AUX: CP519215
Frequency Ranges:	824.2 – 848.8 MHz and 1850.2 – 1909.8 MHz for GPRS 826.4 – 846.6 MHz and 1852.4 – 1907.6 MHz for UMTS - 848.31 MHz and 1851.25 – 1908.75 MHz for CDMA



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3.2 Test Signal, Frequency and Output Power

The DUT was provided by Fujitsu Australia Pty Ltd. It was put into operation using a Rhodes & Schwarz Radio Communication Tester CMU200. The channels utilised in the measurements were the traffic channels shown in the table below. The power level was set to Class 4 for 850 MHz and Class 1 for 1900 MHz GSM bands and class 3 for 850 and 1900 MHz UMTS bands.

3.3 Channels and Output power:

Table 2

Channel and Mode	Frequency MHz	Average Output Power dBm
GPRS Mode		
Channels 128, 190 and 251	824.2, 836.6 and 848.8	33
Channels 512, 661 and 810	1850.2, 1880 and 1909.8	30
UMTS Mode		
Channels 4132, 4183 and 4233	826.4, 836.6 and 846.6	24
Channels 9262, 9400 and 9538	1852.4, 1880 and 1907.6	24
CDMA Mode		
Channels 1013, 384 and 777	824.7, 836.52 and 848.31	23
Channels 25, 600 and 1175	1851.25, 1880 and 1908.75	23



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4.0 DETAILS OF TEST LABORATORY

4.1 Location

EMC Technologies Pty Ltd
176 Harrick Road
Keilor Park, (Melbourne) Victoria
Australia 3042

Telephone: +61 3 9365 1000
Facsimile: +61 3 9331 7455
email: melb@emctech.com.au
website: www.emctech.com.au

4.2 Accreditations

EMC Technologies Pty. Ltd. is accredited by the National Association of Testing Authorities, Australia (NATA).
NATA Accredited Laboratory Number: 5292

EMC Technologies Pty Ltd is NATA accredited for the following standards:

Table 3

AS/NZS 2772.2:	RF and microwave radiation hazard measurement
ACMA:	Radio communications (Electromagnetic Radiation - Human Exposure) Standard 2003
FCC:	Guidelines for Human Exposure to RF Electromagnetic Field OET65C 01/01
EN 50360: 2001	Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz – 3 GHz)
EN 62209-1: 2006	Human Exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models instrumentation and procedures. Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (300 MHz to 3 GHz)
EN 62209-2:2010	Human Exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models instrumentation and procedures Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)
IEEE 1528: 2003	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head Due to Wireless Communications Devices: Measurement Techniques.

Refer to NATA website www.nata.asn.au for the full scope of accreditation.



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5.0 MEASUREMENT UNCERTAINTY

The uncertainty analysis is based on the template listed in the IEEE Std 1528-2003 for both Handset SAR tests and Validation uncertainty. The measurement uncertainty of a specific device is evaluated independently and the total uncertainty for both evaluations (95% confidence level) must be less than 30%.

Table 4: Uncertainty Budget for DASYS Version 52 – DUT SAR

Error Description	Uncert. Value	Prob. Dist.	Div.	C _i (1g)	C _i (10g)	1g u _i	10g u _i	v _i
Measurement System								
Probe Calibration	6	N	1.00	1	1	6.00	6.00	∞
Axial Isotropy	4.7	R	1.73	0.7	0.7	1.90	1.90	∞
Hemispherical Isotropy	9.6	R	1.73	0.7	0.7	3.88	3.88	∞
Boundary Effects	1	R	1.73	1	1	0.58	0.58	∞
Linearity	4.7	R	1.73	1	1	2.71	2.71	∞
System Detection Limits	1	R	1.73	1	1	0.58	0.58	∞
Readout Electronics	0.3	N	1.00	1	1	0.30	0.30	∞
Response Time	0.8	R	1.73	1	1	0.46	0.46	∞
Integration Time	2.6	R	1.73	1	1	1.50	1.50	∞
RF Ambient Noise	3	R	1.73	1	1	1.73	1.73	∞
RF Ambient Reflections	3	R	1.73	1	1	1.73	1.73	∞
Probe Positioner	0.4	R	1.73	1	1	0.23	0.23	∞
Probe Positioning	2.9	R	1.73	1	1	1.67	1.67	∞
Max. SAR Eval.	1	R	1.73	1	1	0.58	0.58	∞
Post Processing	2	R	1.73	1	1	1.15	1.15	∞
Test Sample Related								
Power Scaling	0	R	1.73	1	1	0.00	0.00	∞
Test Sample Positioning	2.9	N	1.00	1	1	2.90	2.90	145
Device Holder Uncertainty	3.6	N	1.00	1	1	3.60	3.60	5
Output Power Variation – SAR Drift Measurement	4.06	R	1.73	1	1	2.34	2.34	∞
Phantom and Setup								
Phantom Uncertainty	7.5	R	1.73	1	1	4.33	4.33	∞
Liquid Conductivity – Deviation from target values	5	R	1.73	0.64	0.43	1.85	1.24	∞
Liquid Permittivity – Deviation from target values	5	R	1.73	0.6	0.49	1.73	1.41	∞
Liquid Conductivity – Measurement uncertainty	2.5	N	1.00	0.64	0.71	1.60	1.78	∞
Liquid Permittivity – Measurement uncertainty	2.5	N	1.00	0.6	0.26	1.50	0.65	∞
Temp.unc. - Conductivity	1.7	R	1.73	0.78	0.71	0.77	0.70	∞
Temp. unc. - Permittivity	0.3	R	1.73	0.23	0.26	0.04	0.05	∞
Combined standard Uncertainty (u _c)						11.5	11.4	
Expanded Uncertainty (95% CONFIDENCE LEVEL)				k= 2		23.1	22.7	

Estimated total measurement uncertainty for the DASYS measurement system was ±11.5%. The extended uncertainty (K = 2) was assessed to be ±23.1% based on 95% confidence level. The uncertainty is not added to the measurement result.



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6.0 SAR MEASUREMENT SUMMARY

The highest reported SAR values are given below are for the T902 product.

See EMC Technologies report M120637_FCC_MC8355_SAR_GSM-UMTS for the full list of measured results.

6.1 Highest SAR Results

Table: SAR MEASUREMENT RESULTS

Table 5

Configuration	Test Channel	Test Freq (MHz)	Measured 1g SAR Results (mW/g)	Compliance Result
850 MHz GPRS	128	824.2	0.641	Complied
1900 MHz GPRS	512	1850.2	0.450	Complied
850 MHz UMTS	4132	826.4	0.435	Complied
1900 MHz UMTS	9538	1907.6	0.561	Complied
1750 MHz UMTS	1427	1735.4	0.547	Complied
850 MHz Ev-Do	1013	824.7	0.515	Complied
1900 MHz Ev-Do	0025	1851.25	0.541	Complied

NOTE: The measurement uncertainty of 23.1% is not added to the result.

6.2 Multiband Evaluation

Report numbers M120603_62205ANHMW_SAR_2.4 and M120603_62205ANHMW_SAR_5.6 relate to SAR testing of a T902 sample that includes the INTEL 62205ANHMW WLAN module.

Multiband evaluation was not conducted for UMTS/GSM/CDMA WWAN (GOBI3000) and WLAN (62205ANHMW) because the ratio of the sum of highest SAR results raised to the power of 1.5 for the WWAN and WLAN (5GHz band Antenna B) to the distance between peak SAR locations of WWAN transmitting antenna and WIFI Antenna B is – $(SAR1 + SAR2)^{1.5}/R_i$, rounded to two decimal digits, and must be ≤ 0.04 , $(0.561 + 1.36)^{1.5} \text{ mW/g} / 154\text{mm} = \mathbf{0.02} < 0.04$.



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Physical layout with respective antenna distances

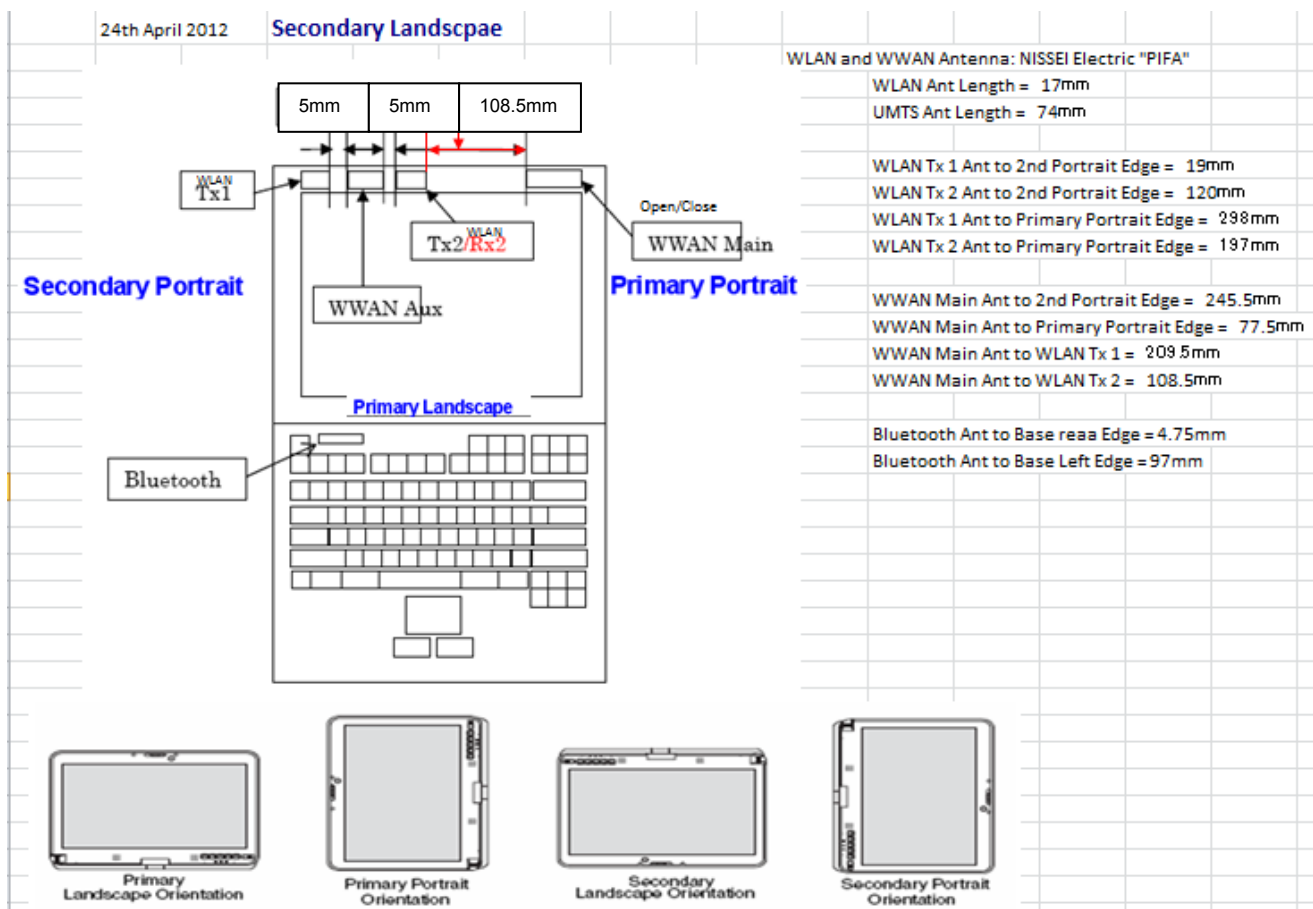
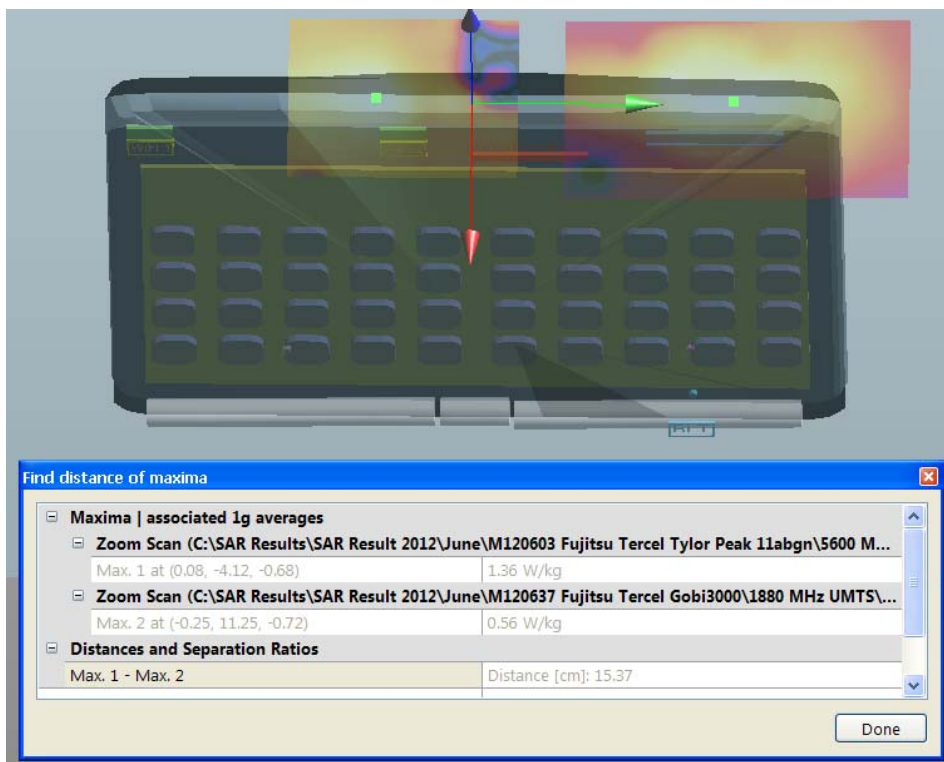


Diagram Showing distance between Peak SAR Locations WWAN (GOBI3000) and WIFI (62205ANHMW):



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7.0 COMPLIANCE STATEMENT

The SIERRA WIRELESS Mini-PCI Wireless WAN Module (GOBI3000), Model: MC8355 was found to comply with the FCC and RSS-102 SAR requirements for the products listed in this report.

The highest SAR level recorded for the T902 product was 0.641 mW/g for a 1g cube. This was below the limit of 1.6 mW/g for uncontrolled exposure, even taking into account the measurement uncertainty of 23.1 %.



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