

FCC Test Report

Test report no.: EMC_852FCC15.247_2005_SP65

FCC Part 15.247 for FHSS systems / CANADA RSS-210 Model: SP65 FCC ID: PWX-SP65 IC: 267E-SP65





Bluetooth Qualification Test Facility (BQTF)



FCC listed # 101450

IC recognized # 3925

CETECOM Inc.

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1.1 Notes

The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

TEST REPORT PREPARED BY:

EMC Engineer: Neelesh Raj

1.2 Testing laboratory CETECOM Inc. 411 Dixon Landing Road, Milpitas, CA-95035, USA Phone: +1 408 586 6200 Fax: +1 408 586 6299 E-mail: <u>lothar.schmidt@cetecomusa.com</u> Internet: <u>www.cetecom.com</u>



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1.3 Details of applicant

Name	:	SIEMENS Information and Communication Mobile LLC		
Street	:	16745 West Bernardo Drive Suite 400		
City / Zip Code	:	San Diego, CA 92127		
Country	:	USA		
Contact	:	Kevin Wolentarski		
Telephone	:	858-521-3352		
Tele-fax	:	858-521-3105		
e-mail	:	kevin.wolentarski@siemens.com		

1.4 Application details

The supplication actume		
Date of receipt test item	:	2005-02-17
Date of test	:	2005-02-17 - 2005-03-15

1.5 Test item

Manufacturer	:	SIEMENS Communications, Inc.
Street Address	:	Sudstr. 9
City / Zip Code	:	D-47475 Kamp-Lintfort
Country	:	Germany
Marketing Name	:	SP65
Model No.	:	SP65
Description	:	GSM 1900 Mobile phone with BT
FCC-ID	:	PWX-SP65
IC ID	:	267E-SP65

Additional information

:	IMEI: 35-3910-00-944930-0
:	2402MHz – 2480MHz for BT
:	GFSK
:	79
:	External
:	Battery or Charger (AC Adaptor)
:	-0.41dBm (0.9099mW) max. conducted peak power
:	3.6VDC to 4.5VDC (nominal: 3.7VDC)
:	-30° C to $+50^{\circ}$ C
	: : : : : :

1.6 Test standards: FCC Part 15 §15.247 (DA00-705) / RSS 210

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.



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2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests Performed		
Final Verdict: (only "passed" if all single measurements are "passed")	Passed	

Technical responsibility for area of testing:

2005-05-15 EMC & Radio Lothar Schmidt (Manager)

Signature

Date

Section

Name

Responsible for test report and project leader:

2005-05-15 EMC & Radio Neelesh Raj (EMC Engineer)

Date

Section

Name

Signature



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2.2 Test report

TEST REPORT

Test report no.: EMC_852FCC15.247_2005_SP65



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TEST REPORT REFERENCE

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CARRIER FREQUENCY SEPERATION





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NUMBER OF HOPPING CHANNELS

§15.247(a)

The number of hopping channels is 79 (see next 4 plots) The F1 line corresponds to the F2 line from the next plot.













Date: 01.MAR.2005 19:27:27









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TIME OF OCCUPANCY (DWELL TIME) DH1 – Packet

§15.247(a)

The system makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 times per second and so for 31.6 seconds you have 320.108 times of appearance.

Each Tx-time per appearance is 416.83µs.

So we have 320.108 * 416.834µs = 133.4ms per 31.6 seconds.







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§15.247(a)

TIME OF OCCUPANCY (DWELL TIME) DH3 – Packet

A DH3 Packets need 3 time slots for transmit and 1 for receiving, then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 times per second and so for 31.6 seconds you have 161.16 times of appearance.

Each Tx-time per appearance is 1.669ms.

So we have 161.16 * 1.669ms = 268.98ms per 31.6 seconds.





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§15.247(a)

TIME OF OCCUPANCY (DWELL TIME) DH5 – Packet

At DH5 Packets you need 5 time slots for transmit and 1 for receiving, then the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.36 times per second and so for 30 seconds you have 106.176 times of appearance.

Each Tx-time per appearance is 2.926ms.

So we have 106.176 * 2.926ms = 310.67ms per 31.6 seconds.







SPECTRUM BANDWIDTH OF FHSS SYSTEM 20 dB bandwidth

§15.247(a)

TEST CONDITIONS		20 dB BANDWIDTH (kHz)		
Frequency (MHz)		2402	2441	2480
T _{nom} (23)°C	V _{nom} (2.5)VDC	925.85	925.85	925.85

RBW / VBW as provided in the "Measurement Guidelines" (DA 00-705, March 30, 2000)

LIMIT

SUBCLAUSE §15.247(a) (1)

The maximum 20dB bandwidth shall be at maximum 1000 KHz



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§15.247(a)

SPECTRUM BANDWIDTH OF FHSS SYSTEM 20 dB bandwidth

Lowest Channel: 2402MHz





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SPECTRUM BANDWIDTH OF FHSS SYSTEM 20 dB bandwidth





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SPECTRUM BANDWIDTH OF FHSS SYSTEM 20 dB bandwidth

§15.247(a)

Highest Channel: 2480MHz







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MAXIMUM PEAK OUTPUT POWER (CONDUCTED)

§ 15.247 (b) (1)

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)			
Frequency (MHz)		2402	2441	2480	
T _{nom} (23)°C	V _{nom} (2.5)VDC	-3.28	-1.33	-0.41	
Measurement uncertainty			±0.5dBm		

RBW / VBW: 3 MHz

LIMIT

SUBCLAUSE § 15.247 (b) (1)

Frequency range	RF power output
2400-2483.5 MHz	1.0 Watt



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PEAK OUTPUT POWER (CONDUCTED)

§15.247 (b)

Lowest Channel: 2402MHz







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PEAK OUTPUT POWER (CONDUCTED)

§15.247 (b)

Mid Channel: 2441MHz







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PEAK OUTPUT POWER (CONDUCTED)

§15.247 (b)

Highest Channel: 2480MHz







MAXIMUM PEAK OUTPUT POWER (RADIATED)

§ 15.247 (b) (1)

EIRP:

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)			
Frequer	Frequency (MHz)		2441	2480	
T _{nom} (23)°C	V _{nom} (2.5)VDC	-2.86	-2.34	-1.95	
Measureme	Measurement uncertainty		±0.5dBm		
Substitution Method					

RBW/VBW: 3 MHz

LIMIT

SUBCLAUSE § 15.247 (b) (1)

Frequency range	RF power output	
2400-2483.5 MHz	1.0 Watt	



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PEAK OUTPUT POWER (RADIATED)

§15.247 (b) (1)

Lowest Channel: 2402MHz

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	TX @ 2402 MHz
Antenna:	V
EUT:	Z
Test Engineer:	NEELESH
Comment:	EIRP

SWEEP TABLE: "EIRP BT low channel"

Short Description: EIRP Bluetooth channel-2402MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
2.397GHz	2.407GHz	Max Peak	Coupled	3 MHz

Markei	r:	2.4019499 GHz	-2	2.86 dBm		
Leve	el [dBm]					
20						
10						
0						
-10						
-20						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
20						
-30						
-40						
-50	2.397G	2.4G	2.4020	2.4040	3 2	.407G
			Frequency [Hz]			



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PEAK OUTPUT POWER (RADIATED)

§15.247 (b) (1)

Mid Channel: 2441MHz

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	TX @ 2441 MHz
Antenna:	V
EUT:	Z
Test Engineer:	NEELESH
Comment:	EIRP

SWEEP TABLE: "EIRP BT Mid channel"

Short Description: EIRP Bluetooth channel-2441MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
2.436GHz	2.446GHz	Max Peak	Coupled	3 MHz





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PEAK OUTPUT POWER (RADIATED)

§15.247 (b) (1)

Highest Channel: 2480MHz

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	TX @ 2480 MHz
Antenna:	V
EUT:	Z
Test Engineer:	NEELESH
Comment:	EIRP

SWEEP TABLE: "EIRP BT High channel"

Short Description: EIRP Bluetooth channel-2480MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
2.475GHz	2.485GHz	Max Peak	Coupled	3 MHz

Markei	r:	2.4800501 GHz	-1	.95 dBm		
Leve	el [dBm]					
20						
10						
0				^		
0			Ň			
-10						
-20						
	~~					
-30						
-40						
-50						
	2.475G	2.4780	6 2.480 Frequency [Hz]	3 2.482G	6 2	.485G



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BAND EDGE COMPLIANCE

§15.247 (c)

Low frequency section (spurious in the restricted band 2310 – 2390 MHz) Average Measurement (This plot is valid for both Hopping ON & OFF)

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	TX @ 2402 MHz
Antenna:	V
EUT:	Z
Test Engineer:	NEFL FSH
Test Engineer: Comment:	L NEELESH REST. BANDEDGE AVG

SWEEP TABLE:"FCC15.247 LBE_AVG"Short Description:FCC15.247 BT Low-band-edgeLimit Line:54dBµV

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
2.31 GHz	2.412 GHz	Max Peak	Coupled	1 MHz	10 Hz	#326 horn (dBi)





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§15.247 (c)

BAND EDGE COMPLIANCE

Low frequency section (spurious in the restricted band 2310 – 2390 MHz) Peak Measurement (This plot is valid for both Hopping ON & OFF)

TRI BAND GSM MOBILE PHONE
STEINIEINS
TX @ 2402 MHz
V
Z
NEELESH
REST. BANDEDGE PEAK

SWEEP TABLE:"FCC15.247 LBE_AVG"Short Description:FCC15.247 BT Low-band-edgeLimit Line:74dBµV

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
2.31 GHz	2.412 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)





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§15.247 (c)

BAND EDGE COMPLIANCE

High frequency section (spurious in the restricted band 2483.5 – 2500 MHz) Average Measurement (This plot is valid for both Hopping ON & OFF)

TRI BAND GSM MOBILE PHONE
STEINTEINS
TX @ 2480 MHz
V
Z
NEELESH
REST. BANDEDGE AVG

SWEEP TABLE:"FCC15.247 HBE_AVG"Short Description:FCC15.247 BT High-band-edgeLimit Line:54dBµV

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
2.462 GHz	2.5 GHz	Max Peak	Coupled	1 MHz	10Hz	#326 horn (dBi)





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§15.247 (c)

BAND EDGE COMPLIANCE

High frequency section (spurious in the restricted band 2483.5 – 2500 MHz) Peak Measurement (This plot is valid for both Hopping ON & OFF)

TRI BAND GSM MOBILE PHONE
SIEMENS
TX @ 2480 MHz
V
Z
NEELESH
REST. BANDEDGE PEAK

SWEEP TABLE:"FCC15.247 HBE_AVG"Short Description:FCC15.247 BT High-band-edgeLimit Line:74dBµV

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
2.462 GHz	2.5 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)





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EMISSION LIMITATIONS Transmitter (Conducted) LIMITS § 15.247 (c) (1)

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions that fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

<u>NOTE</u>: Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.



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EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

Lowest Channel (2402MHz):







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EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

Lowest Channel (2402MHz): 9 KHz - 25GHz





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EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

Mid Channel (2441MHz):







Test report no.: EMC_852FCC15.247_2005_SP65 Issue date: 2005-03-15 Page 35 (64) **EMISSION LIMITATIONS - Conducted (Transmitter)** § 15.247 (c) (1) Mid Channel (2441MHz): 9KHz - 25GHz Marker 2 [T1] RΒW 100 kHz RF Att 10 dB Ref Lvl -58.57 dBm VBW 100 kHz 0 dBm 851.71210020 MHz SWT 6.4 s Unit dBm Ο 97 dB Offse ▼2 [T1] -58.57 dBm 851.71210020 MHz -10 ∀1 [T1] -54.68 dBm 651.31137074 MHz -20 -D1 -2 .69 dBm -30



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EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

Highest Channel (2480MHz):







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EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

Highest Channel (2480MHz): 9KHz - 25GHz





EMISSION LIMITATIONS Transmitter (Radiated)

§ 15.247 (c) (1)

LIMITS

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions that fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

NOTE:

- 1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 26.5 GHz very short cable connections to the antenna was used to minimize the noise level.
- 2. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.
- 3. All measurements are done in peak mode unless specified with plots.

Results for the radiated measurements below 30MHz according § 15.33

Frequency	Measured values	Remarks
9KHz – 30MHz	No emissions found, caused by the EUT	This is valid for all the tested channels



EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

Transmit at Lowest channel Frequency 2402MHz					
Frequency (MHz)	Level (dBµV/m)				
	Peak	Quasi-Peak	Average		
Noise floor					
Transmit a	t Middle channel I	Frequency 2441MH	L		
Frequency (MHz)	Level (dBµV/m)				
	Peak	Quasi-Peak	Average		
Noise floor					
Transmit at	Transmit at Highest channel Frequency 2480MHz				
Frequency (MHz)	Level (dBµV/m)				
	Peak	Quasi-Peak	Average		
Noise floor					



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EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1) 30MHz – 1GHz Antenna: vertical

Note: This plot is valid for low, mid & high channels (worst-case plot)

TRI BAND GSM MOBILE PHONE
SIEMENS
TX@2480MHz
V
V
NEELESH
30MHz-1GHz PEAK

SWEEP TABLE: Short Description: "BT Spuri hi 30-1G" Bluetooth 30MHz-1GHz

Short B esemption	Blactootheo				
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
30.0 MHz	1.0 GHz	Max Peak	Coupled	100 kHz	3141-#1186



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EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1) 30MHz – 1GHz Antenna: horizontal

Note: This plot is valid for low, mid & high channels (worst-case plot)

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	TX@2480MHz
Antenna:	Н
EUT:	V
Test Engineer:	NEELESH
Comment:	30MHz-1GHz PEAK

SWEEP TABLE: Short Description: "BT Spuri hi 30-1G" Bluetooth 30MHz-1GHz

Short B esemption	Blactootheo				
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
30.0 MHz	1.0 GHz	Max Peak	Coupled	100 kHz	3141-#1186

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EMISSION LIMITATIONS - Radiated (Transmitter) Lowest Channel (2402MHz): 1GHz – 3GHz § 15.247 (c) (1)

NOTE: The peak above the limit is the carrier frequency.

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	TX @ 2402 MHz
Antenna:	V
EUT:	Z
Test Engineer:	NEELESH
Comment:	1-3GHz Peak

SWEEP TABLE: Short Description: "BT Spuri hi 1-3G" Bluetooth Spurious 1-3GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
1.0 GHz	3.0 GHz	Max Peak	Coupled	1 MHz	#326 horn (dBi)

Marke	r: 2.823647295	GHz	50.37 dBµV/m	
Leve	el [dBµV/m]			
120				
110				
100				
90				
80				
00				
70				
60				
50			month and and	mummmmmm
40	mmmmmmmmmm	www.www.		
30				
	1G 1.5G	20 Frequency [Hz]	G 2.50	G 3G

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§ 15.247 (c) (1)

EMISSION LIMITATIONS - Radiated (Transmitter) Lowest Channel (2402MHz): 3GHz – 18GHz

NOTE: Peak readings are below Average limit.

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	TX @ 2402 MHz
Antenna:	V
EUT:	V
Test Engineer:	NEELESH
Comment:	3-18GHz PEAK

SWEEP TABLE:

"BT Spuri hi 3-18G" Bluetooth Spurious 3-18 GHZ

Short Description:	Bluetooth Sp	urious 3-18 GHZ				
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
3.0 GHz	18.0 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)

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EMISSION LIMITATIONS - Radiated (Transmitter)§ 15.247 (c) (1)Middle Channel (2441MHz): 1GHz – 3GHz§ 15.247 (c) (1)

NOTE: The peak above the limit is the carrier frequency.

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	TX @ 2441 MHz
Antenna:	V
EUT:	Z
Test Engineer:	NEELESH
Comment:	1-3GHz Peak

SWEEP TABLE: Short Description: "BT Spuri hi 1-3G" Bluetooth Spurious 1-3GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
1.0 GHz	3.0 GHz	Max Peak	Coupled	1 MHz	#326 horn (dBi)

Marke	r: 2.851703407	GHz	50.41 dBµV/m	
Leve	el [dBµV/m]			
120				
110				
100				
90				
80				
70				
70				
60				
50		An A when	montenna	manuthan
40	man mandant	man man man		
30	40 450			
	16 1.56	Frequency [Hz]	2.50	36

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EMISSION LIMITATIONS - Radiated (Transmitter) Middle Channel (2441MHz): 3GHz – 18GHz

§ 15.247 (c) (1)

NOTE: Peak readings are below Average limit.

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	TX @ 2441 MHz
Antenna:	V
EUT:	V
Test Engineer:	NEELESH
Comment:	3-18GHz PEAK

SWEEP TABLE: Short Description: "BT Spuri hi 3-18G" Bluetooth Spurious 3-18 GHZ

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
3.0 GHz	18.0 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)

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EMISSION LIMITATIONS - Radiated (Transmitter) Highest Channel (2480MHz): 1GHz – 3GHz § 15.247 (c) (1)

NOTE: The peak above the limit is the carrier frequency.

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	TX @ 2480 MHz
Antenna:	V
EUT:	Z
Test Engineer:	NEELESH
Comment:	1-3GHz Peak

SWEEP TABLE: Short Description: "BT Spuri hi 1-3G" Bluetooth Spurious 1-3GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
1.0 GHz	3.0 GHz	Max Peak	Coupled	1 MHz	#326 horn (dBi)

Marke	r: 2.675350701	GHz	49.72 dBµV/m	
Leve	el [dBµV/m]			
120				
110				
100				
90				
80				
70			[
60				
00				\diamond
50		· and han more	Mahman Mahaman h	when the market we want
40	mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm			
30	1G 1.5G	20		
	-	Frequency [Hz]		

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EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1) Highest Channel (2480MHz): 3GHz – 18GHz

NOTE: Peak readings are below Average limit.

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	TX @ 2480 MHz
Antenna:	V
EUT:	V
Test Engineer:	NEELESH
Comment:	3-18GHz PEAK

SWEEP TABLE: Short Description:

"BT Spuri hi 3-18G" Bluetooth Spurious 3-18 GHZ

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
3.0 GHz	18.0 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)

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EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1) 18GHz – 26.5GHz

Note 1: This plot is valid for low, mid & high channels (worst-case plot) Note 2: Peak readings are below Average limit

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	TX @ 2480 MHz
Antenna:	V
EUT:	V
Test Engineer:	NEELESH
Comment:	18-26.5GHz PEAK

SWEEP TABLE:	"BT Spuri hi 18-26.5G"
Short Description:	Bluetooth Spurious 18-26.5GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
18 GHz	26.5 GHz	Max Peak	Coupled	1 MHz	1 MHz	#141 horn (dBi)

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CO-LOCATION – (Radiated) Transmitter

The Bluetooth transmitter was co-located with the GSM transmitter. The GSM transmitter was the dominant transmitter. FCC 15.247 limits/test method were used due to the fact FCC 15.247 limits are more stringent. The channels were selected according to the highest EIRP readings of each transmitter .

EMISSION LIMITATIONS - Radiated (Transmitter) 30MHz - 1GHz Antenna: vertical

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	GSM TX@1850.2MHz AND BLUTOOTH TX@2480MHz
Antenna:	V
EUT:	V
Test Engineer:	NEELESH
Comment:	30MHz-1GHz PEAK

SWEEP TABLE: "BT Spuri hi 30-1G" Short Description:

Bluetooth 30MHz-1GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
30.0 MHz	1.0 GHz	Max Peak	Coupled	100 kHz	3141-#1186

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EMISSION LIMITATIONS - Radiated (Transmitter) 30MHz – 1GHz Antenna: horizontal

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	GSM TX@1850.2MHz AND BLUTOOTH TX@2480MHz
Antenna:	Н
EUT:	V
Test Engineer:	NEELESH
Comment:	30MHz-1GHz PEAK

SWEEP TABLE: " Short Description: F

"BT Spuri hi 30-1G" Bluetooth 30MHz-1GHz

Short Besenption	Biaetootii eo				
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
30.0 MHz	1.0 GHz	Max Peak	Coupled	100 kHz	3141-#1186

Test report no.: EMC_852FCC15.247_2005_SP65

Issue date: 2005-03-15

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EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1) 1GHz – 3GHz

NOTE: The peaks above the limit are the carrier frequency of each transmitter.

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	GSM TX@1850.2MHz AND BLUTOOTH TX@2480MHz
Antenna:	V
EUT:	Z
Test Engineer:	NEELESH
Comment:	1-3GHz PEAK

SWEEP TABLE: Short Description: "BT Spuri hi 1-3G" Bluetooth Spurious 1-3GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
1.0 GHz	3.0 GHz	Max Peak	Coupled	1 MHz	#326 horn (dBi)

Marke	r: 2.731462926	GHz	50.2 dBµV/m	
Leve	el [dBµV/m]			
120				
110				
100				
90				
00				
80				
70				
60				
50			Anthen were a little	A - A MAMMAN AND A A
40	m	mmulmindham		
-+0				
30	1G 1.5G	20	G 2.5G	3G
		Frequency [HZ]		

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EMISSION LIMITATIONS - Radiated (Transmitter) 3GHz – 18GHz

NOTE: Peak readings are below Average limit.

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	SIEMENS
Operating Mode:	GSM TX@1850.2MHz AND BLUTOOTH TX@2480MHz
Antenna:	V
EUT:	V
Test Engineer:	NEELESH
Comment:	3-18GHz PEAK

SWEEP TABLE:

"BT Spuri hi 3-18G" Bluetooth Spurious 3-18 GHZ

Short Description:	Bluetooth Sp	urious 3-18 GHZ				
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
3.0 GHz	18.0 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)

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EMISSION LIMITATIONS - Radiated (Transmitter) 18GHz – 26.5GHz

Note 1: Peak readings are below Average limit

EUT / Description:	TRI BAND GSM MOBILE PHONE
Customer:	IEMENS
Operating Mode:	GSM TX@1850.2MHz AND BLUTOOTH TX@2480MHz
Antenna:	V
EUT:	V
Test Engineer:	NEELESH
Comment:	18-26.5GHz PEAK

SWEEP TABLE: Short Description: "BT Spuri hi 18-26.5G" Bluetooth Spurious 18-26.5GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
18 GHz	26.5 GHz	Max Peak	Coupled	1 MHz	1 MHz	#141 horn (dBi)

CONDUCTED EMISSIONS

§ 15.107/207 Measured with AC/DC power adapter model# Siemens A5BHTN00116341

Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002) Limit

Frequency of Emission (MHz)	Conducted Limit (dBµV)						
	Quasi-Peak	Average					
0.15 – 0.5	66 to 56*	56 to 46*					
0.5 - 5	56	46					
5 - 30	60	50					
* Decreases with logarithm of the fre	* Decreases with logarithm of the frequency						
ANALYZER SETTINGS: RBW = 10KHz VBW = 10KHz							

Note 1: Conducted emissions were performed with bluetooth and GSM transmitters operating simultaneously.

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EUT / Description: TRI BAND GSM MOBILE PHONE Manufacturer: SIEMENS Test mode: TX@1850.2MHz AND BLUTOOTH TX@2480MHz Test Engineer: NEELESH Phase: L+N Comment: 110 volt AC

Issue date: 2005-03-15

Test report no.: EMC_852FCC15.247_2005_SP65

MEASUREMENT RESULT: "test_fin QP"

3/15/200	2:25	5PM					
Frequ	lency	Level	Transd	Limit	Margin	Line	PE
	MHz	dBµV	dB	dBµV	dB		
0.22	10000	50.40	0.0	63	12.8	N	GND

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RECEIVER SPURIOUS RADIATION

§ 15.209

Limits

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/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

NOTE:

- 1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 26.5 GHz very short cable connections to the antenna was used to minimize the noise level.
- 2. All measurements are done in peak mode unless specified with the plots. Worst case reported.

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RECEIVER SPURIOUS RADIATION 30MHz – 1GHz Antenna: vertical (worst-case plot)

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RECEIVER SPURIOUS RADIATION 30MHz – 1GHz Antenna: horizontal (worst-case plot)

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RECEIVER SPURIOUS RADIATION 1GHz – 3GHz

SWEEP Short D	P TABLE: escription:	"BT Spur Bluetooth	i hi 1-3G" Spurious 1-3GHz			
Start 1	Frequency	Stop Frequency	y Detector	Meas. Time	RBW=VBW	Transducer
1.	0 GHz	3.0 GHz	Max Peak	Coupled	1 MHz	#326 horn (dBi)
Marke	r: el [dBµV/m]	2.823647295 G	ĜHz	49.79 dBµV/m		
120						
110						
100						
90						
80						
70						
60						
50				mmmmmmm	marken markething	www.www.
40	mm	mmmmmmm	ment manual and a second secon			
30	1G	1.5G	2	 2G	2.5G	3G
			Frequency [Hz]			-

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RECEIVER SPURIOUS RADIATION 3GHz – 18GHz

§ 15.209

SWEEI Short D	P TABL	E: on:	"B Bl	T Spuri hi uetooth Sp	3-18G" urious 3-	-18 GH Z						
Start	Frequen	су	Stop Fre	equency	De	etector	Meas. T	ime	RBW	VBW	Transdu	ıcer
3.	0 GHz		18.0	GHz	Ma	ıx Peak	Couple	ed	1 MHz	1 MHz	#326 horn	(dBi)
Marke	er:		17.2845	69138 GHZ			46.7 dBj	IV/m				
Lev 130	el [dBµV/	mj										
120												
100												
80												
60												
40							0.5	h	Manna	man	m	Z
40			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m	mm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						
20	mm											
10	3G		60	3	8G	10G	12	G	14G	1	6G 1	8G
					Frequ	uency [Hz]						

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RECEIVER SPURIOUS RADIATION 18GHz – 26.5GHz

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TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Туре	Manufacturer	Serial No.
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	826880/010
03	Biconilog Antenna	3141	EMCO	0005-1186
04	Horn Antenna (700M-18GHz)	SAS-200/571	AH Systems	325
05	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240
06	2-3GHz Band reject filter	BRM50701	Microtronics	6
07	Pre-Amplifier	TS-ANA	Rohde & Schwarz	
08	Pre-Amplifier	JS4-00102600	Miteq	00616

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BLOCK DIAGRAMS Conducted Testing

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Radiated Testing

ANECHOIC CHAMBER