HCT CO.,LTD
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CE REPORT

CE Certification

Applicant Name:
Facebook
Address:
1 Hacker Way,
Menlo Park, CA 94025

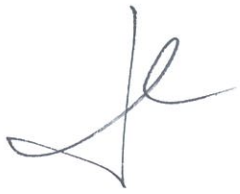
Date of Issue:
November 10, 2017
Location: HCT CO., LTD.,
HCTA, 47610 Kato Road,
Fremont, CA 94538, US

Report No.: HCT-R-1711-CXXX

MODEL	**: Connect-1 GSM BTS**
APPLICANT	**: Facebook**

EUT Type:	**Base transceiver station**
Frequency :	**DL: 935 MHz ~ 960 MHz** **UL: 890 MHz ~ 915 MHz**
Max. RF Output Power:	**1 W x 2 port (Total 2 W)**
Date of Test :	**October 9, 2017 ~ October 26, 2015**
Harmonized Standard(s) applied:	**ETSI EN 301 502 V12.5.2 (2017-03)**

All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



Report prepared by : Hwang Gu Kim
Engineer of Telecommunication Testing Center

Report approved by : Yong Hyun Lee
Manager of Telecommunication Testing Center

Report Revision

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1711-CXXX	2017-11-10	- This report is not a formal certificate report and it is an engineering pre-scanning certificate report.

CONTENTS

1. CLIENT INFORMATION

The EUT has been tested by request of

Company	Facebook 1 Hacker Way, Menlo Park, CA 94025
Contact Point	-

2. Equipment Under Test (EUT)

2.1 Identification of the EUT

EUT Type	Base transceiver station
Model	Connect-1 GSM BTS
Serial number	SA1718C0450A10013
RF Band	Base transceiver station
Channel Bandwidth	200 KHz
Max.RF Output Power	1 W × 2 port (Total 2 W)
H.W Version	Rev. C
S.W Version	Release 0.1
Input Voltage	- Aux = 24Vdc, PoE = 48Vdc, Solar = 16-28Vdc
Size (mm)	(L x W x H) 349 x 209 x 137
Weight (kg)	-
Temperature Condition	-20 ~ 55 °C
Humidity Condition	IP65
Manufacturer	Various
Trade Name	-
CENELEC Rule Part(s)	EN 301 502 V12.2.5

TYPE OF EQUIPMENT			
▣ BTS	☐ Micro BTS	☐ Pico BTS	☐ Other
☐ Muticarrier BTS class			
☐ Wide Area	☐ Medium Range	▣ Local Area	
Max. Number of Transceivers: 2		Dedicated BCCH Transceivers: -	
BTS Power Measurement Position: ☐ Input to Combiner ▣ Antenna Connector ☐ DTX		Slow Frequency Hopping: ☐ Baseband ☐ Synthesizer ☐ Receiver Diversity	

TRANSMITTER TECHNICAL CHARACTERISTICS	
Transmitter frequency range: ▣ P-GSM 900 (935 - 960 MHz) ☐ DCS 1800 (1 805 – 1 880 MHz) ☐ Other	☐ E-GSM 900 (925-960 MHz) ☐ Dual Band

TRANSMITTER RF POWER CHARACTERISTICS	
Maximum rated transmitter output power (per transceiver as stated by manufacturer) at BTS RF output connecter (per carrier) – as declared by manufacturer	1 W

TRANSMITTER MODULATION INPUT CHARACTERISTICS		
Supporting modulation: ▣ GMSK ▣ 8-PSK ☐ 16-QAM	☐ 32-QAM ☐ QPSK ☐ AQPSK	Modulation bit rate: - Type of modulation: 8PSK

RECEIVER TECHNICAL CHARACTERISTICS
RECEIVER-FREQUENCY
Method of Frequency Generation ☐ Crystal ▣ Synthesizer ☐ Other Intermediate Frequencies ☐ 1st MHz ☐ 2nd MHz ☐ 3rd MHz Is local oscillator injection frequency higher or lower than the receiver nominal frequency? ☐ Higher (for channel to) ☐ Lower (for channel to) ☐ Identical. Details TX : MHz, RX : MHz
RECEIVER FREQUENCY RANGE
▣ P-GSM 900 (890 - 915 MHz) ☐ E-GSM 900 (880-915 MHz) ☐ DCS 1800 (1 710 – 1 785 MHz) ☐ Dual Band ☐ Other
RECEIVER FREQUENCY ALIGNMENT RANGE
☐ Receiver Diversity

AUTOMATIC EQUIPMENT SWITCH OFF
If the equipment is designed to automatically switch off at a predetermined voltage level whitch is higher or lower in value than the battery minimum calculated values this shall be clearly stated. ☐ Applies V cut-off voltage ▣ Does not apply

POWER SOURCE	
☐ AC mains	State voltage
AC supply frequency (Hz) VAC Max Current Hz	
☐ Single phase	☐ Three phase
And / Or	
▣ External DC supply	
V Aux = 24Vdc, PoE = 48Vdc, Solar = 16-28Vdc	
Battery	
☐ Nickel Cadmium	▣ Lead acid (Vehicle requlated)
☐ Alkaline	☐ Leclanche
☐ Lithium	▣ Other Details : Solar
Volts nominal.	
End point voltage as quoted by equipment manufacturer V	

DUPLEX OPERATION (BASE STATION ONLY)		
Is the equipment intended for Duplex operation:	▣ Yes	☐ No
Is the equipment fitted with separate transmitter and receiver antenna sockets:	☐ Yes	▣ No
Is the equipment fitted with a duplex filter as an integral part of the equipment with a single antenna connection socket:	☐ Yes	▣ No
Is the duplex filter externally fitted and connected to the main equipment by co-axial cable(s):	☐ Yes	▣ No
Type and make of duplex filter:		

CO-SITING OPERATION		
Is the equipment suitable for co-siting with:		
GSM900	☐ Yes	▣ No
DCS1800	☐ Yes	▣ No

2.2 Test Configuration

Band		
GSM Band	Direction of transmission	GSM Base Station System relevant frequency band
GSM 900	Transmit	935 MHz to 960 MHz
	Receive	890 MHz to 915 MHz

Single carrier		
	RF Channels (ARFCN)	Maximum total power (GMSK/8-PSK)
B	935.2 MHz (1)	30 / 30
M	947.6 MHz (63)	30 / 30
T	959.8 MHz (124)	30 / 30

2.3 Additional information about the EUT

The EUT consists of the following units:

Units	Type / Model
	**Base transceiver station / Connect-1 GSM BTS**

3. Test Specification

All of the test methods are described in the Environmental Testing Manual ETSI EN 301 502 V12.5.2 (2017-03)

The tests are outlined in the ETSI EN 301 502 V12.5.3 (2017-03)operation Conditions.

A summary of the reference standard is listed below:

ETSI EN 301 502 Global System for Mobile communications (GSM); Harmonized EN for Base Station Equipment covering the essential requirements of article 3.2 of the R&TTE Directive (2017-03)

ETSI TS 151 021 Digital cellular telecommunications system (Phase 2+); Base Station System (BSS) equipment specification; Radio aspects (2015-01)

4. Standard Environmental Test Conditions

Normal Temperature :	**+ 15 ℃ to + 55 ℃**
Extreme Temperature :	**- 40 ℃ to + 55 ℃**
Relative humidity:	**20 % to 85 %**
Air pressure	**860 mbar to 1 060 mbar**
Extreme Power Source	**-38 VDC ~ - 57 VDC**

5. Test Summary

The results in this report apply only to sample tested:

Test Case	Applied standard	Result
Mean transmitted RF carrier power	ETSI EN 301 502 Clause 4.2.2	**PASS**
Adjacent channel power	ETSI EN 301 502 Clause 4.2.4	**FAIL**
Spurious emissions from the transmitter antenna connector	ETSI EN 301 502 Clause 4.2.5	**FAIL**
Intermodulation attenuation	ETSI EN 301 502 Clause 4.2.6	**PASS**
Intra Base Station System intermodulation attenuation	ETSI EN 301 502 Clause 4.2.7	**PASS**
Wideband noise and intra BSS intermodulation attenuation in multicarrier operation	ETSI EN 301 502 Clause 4.2.8	**NA**
Reference Interference Level	ETSI EN 301 502 Clause 4.2.11	**No Test**
Receiver static sensitivity	ETSI EN 301 502 Clause 4.2.9	**No Test**
Blocking Characteristics	ETSI EN 301 502 Clause 4.2.12	**No Test**
Intermodulation characteristics	ETSI EN 301 502 Clause 4.2.13	**No Test**
AM suppression	ETSI EN 301 502 Clause 4.2.14	**No Test**
Spurious emissions from receiver antenna connector	ETSI EN 301 502 Clause 4.2.15	**No Test**
Radiated spurious emissions	ETSI EN 301 502 Clause 4.2.16	**No Test**

6. Test Equipment

No.	Instrument	Model No.	Due to Calibration	Manufacture	Serial No.
☒	Spectrum Analyzer 3 ㎐ ~ 26.5 ㎓	N9020A	10/12/2018	AGILENT	MY52091291
☒	Vector Signal Generator (100 kHz ~ 6 GHz)	SMU200A	06/04/2018	Rohde & Schwarz	101568
☒	Universal Radio Communication Test Set	CMU300	09/20/2018	Rohde & Schwarz	10035228
☒	Fixed Attenuator (DC ~ 18 ㎓,30 dB, 50 W)	PE7019-30	01/11/2018	PASTERNACK	-
☒	DC Power Supply (0 ~ 120 V , 0 ~ 4 A)	6655A	06/04/2018	HEWLTT PACKARD	3201A00215
☒	Temp & Humidity Chamber	1207C	04/07/2018	Test EQUITY	60164
☒	Power Amp (20 MHz ~ 1000 MHz)	7150LC - CE	-	KALMUS	-
☒	Reject filter	BRM50706-02	05/16/2018	MICRO-TRONICS	G003
☒	BI-DIRECTIDNAL COUPLER	SM-C-869908	-	RME Filters, Inc.	0S2B1-RME-U-0085
☒	High Pass filter	1.5HPF	07/16/2018	MICRO-TRONICS	-

7. Transmitter measurements

7.1 Mean transmitted RF carrier power

7.1.1 Normal Condition

- ANT1

Maximum Output Power 30 dBm (GMSK), 30 dBm (8-PSK) per carrier, Single Carrier

Power Control Level	Transmitter Power (dBm)					
	Bottom Channel 1 (935.2 MHz)		Middle Channel 63 (947.6 MHz)		Top Channel 124 (959.8 MHz)	
	GMSK	8-PSK	GMSK	8-PSK	GMSK	8-PSK
Highest static power level 0	30.66	30.09	30.94	30.34	28.90	28.33
Deviation from maximum declared power (dB)	0.66	0.09	0.94	0.34	-1.10	-1.67

- ANT 2

Maximum Output Power 30 dBm (GMSK), 30 dBm (8-PSK) per carrier, Single Carrier

Power Control Level	Transmitter Power (dBm)					
	Bottom Channel 1 (935.2 MHz)		Middle Channel 63 (947.6 MHz)		Top Channel 124 (959.8 MHz)	
	GMSK	8-PSK	GMSK	8-PSK	GMSK	8-PSK
Highest static power level 0	29.71	29.10	30.45	29.82	29.89	29.34
Deviation from maximum declared power (dB)	-0.29	-0.90	0.45	-0.18	-0.11	-0.66

Limits : Clause 4.2.2.2

Absolute Level – Maximum Power under normal conditions	± 2.0 dB

7.1.2 Extreme Condition

- ANT1

Maximum Output Power 30 dBm (GMSK), 30 dBm (8-PSK) per carrier

Test Conditions	Power Control Level	Transmitter Power (dBm)				
		Middle				
		Channel 63 (947.6 MHz)				
		TRU 1				
		GMSK	8-PSK	AQPSK	16-QAM	32-QAM
Tmin(-40.0 °C)	0	32.12	31.60	-	-	-
Tmin(+55.0 °C)	0	31.13	30.48	-	-	-
Deviation from maximum declared power (dB)		2.12	1.60	-	-	-

- ANT2

Maximum Output Power 30 dBm (GMSK), 30 dBm (8-PSK) per carrier

Test Conditions	Power Control Level	Transmitter Power (dBm)				
		Middle				
		Channel 63 (947.6 MHz)				
		TRU 1				
		GMSK	8-PSK	AQPSK	16-QAM	32-QAM
Tmin(-40.0 °C)	0	30.34	29.80	-	-	-
Tmin(+55.0 °C)	0	29.22	28.53	-	-	-
Deviation from maximum declared power (dB)		0.34	-0.21	-	-	-

Limits : Clause 4.2.2.2

Absolute Level – Maximum Power under extreme conditions	± 2.5 dB

7.2 Adjacent channel power

7.2.1 Spectrum due to modulation and wideband noise

- ANT1

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation

Measurement		Adjacent Channel Power (dBc)					
		Bottom		Middle		Top	
		Channel 1		Channel 63		Channel 124	
		935.2 MHz		942.4 MHz		959.8 MHz	
Offset (kHz)		(-)	(+)	(-)	(+)	(-)	(+)
100		-9.00	-9.80	-8.70	-9.20	-8.70	-9.50
200		-36.30	-37.10	-36.00	-36.60	-36.10	-37.20
250		-40.30	-42.40	-40.20	-41.90	-40.50	-42.10
400		-60.50	-60.80	-59.70	-60.60	-60.60	-61.60
600		-68.60	-68.90	-66.80	-67.00	-67.60	-68.40
800		-72.10	-72.10	-72.10	-71.90	-66.60	-67.50
1000		-76.40	-76.20	-75.40	-74.90	-75.30	-75.70
1200		-78.90	-77.90	-78.20	-77.60	-77.90	-78.10
1400		-80.30	-80.00	-79.70	-78.70	-79.30	-79.80
1600		-77.30	-76.70	-80.60	-79.30	-78.80	-78.60
1800		-82.60	-81.40	-82.10	-80.90	-81.60	-81.90
		Adjacent Channel Power (dBm)					
Range	Offset (MHz)	(-)	(+)	(-)	(+)	(-)	(+)
Offset 1.8 – 6 MHz	937.01	-49.87	-	-	-	-	-
	933.38	-	-49.88	-	-	-	-
	949.41	-	-	-49.66	-	-	-
	945.78	-	-	-	-50.00	-	-
	961.61	-	-	-	-	-52.39	-
	952.05	-	-	-	-	-	-50.78

Maximum Output Power 30.0 dBm per carrier, 8-PSK Modulation

Measurement		Adjacent Channel Power (dBc)					
		Bottom		Middle		Top	
		Channel 1		Channel 63		Channel 124	
		935.2 MHz		942.4 MHz		959.8 MHz	
Offset (kHz)		(-)	(+)	(-)	(+)	(-)	(+)
100		-7.20	-8.10	-6.70	-7.30	-7.20	-7.50
200		-23.20	-23.30	-23.10	-23.40	-27.50	-27.50
250		-30.80	-31.20	-31.00	-31.10	-35.30	-35.80
400		-47.20	-47.30	-47.00	-47.30	-47.90	-49.00
600		-52.90	-53.40	-53.80	-53.30	-59.40	-59.90
800		-63.00	-62.70	-62.80	-62.20	-61.90	-62.60
1000		-68.60	-67.70	-67.80	-67.20	-70.40	-71.00
1200		-72.10	-72.00	-71.50	-71.80	-75.50	-76.10
1400		-75.30	-75.20	-75.90	-74.90	-77.80	-78.40
1600		-76.60	-76.50	-78.80	-77.60	-76.00	-76.50
1800		-80.10	-79.40	-80.40	-79.00	-79.90	-80.00
		Adjacent Channel Power (dBm)					
Range	Offset (MHz)	(-)	(+)	(-)	(+)	(-)	(+)
Offset 1.8 – 6 MHz	937.01	-49.05	-	-	-	-	-
	933.39	-	-49.10	-	-	-	-
	949.43	-	-	-48.82	-	-	-
	945.78	-	-	-	-49.55	-	-
	961.63	-	-	-	-	-52.02	-
	952.07	-	-	-	-	-	-49.79

-NOTE

Red shaded parts are fail data.

- ANT2

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation

Measurement		Adjacent Channel Power (dBc)					
		Bottom		Middle		Top	
		Channel 1		Channel 63		Channel 124	
		935.2 MHz		942.4 MHz		959.8 MHz	
Offset (kHz)		(-)	(+)	(-)	(+)	(-)	(+)
100		-8.50	-9.30	-8.40	-9.30	-8.50	-9.50
200		-35.60	-37.00	-35.80	-36.80	-35.60	-37.20
250		-41.10	-43.20	-40.60	-43.40	-41.30	-43.30
400		-60.00	-61.90	-59.80	-61.60	-60.20	-61.90
600		-69.10	-69.40	-67.10	-67.80	-66.70	-67.10
800		-73.70	-73.90	-72.30	-72.20	-64.90	-65.70
1000		-76.80	-76.70	-75.80	-76.00	-75.20	-76.30
1200		-78.80	-78.30	-78.50	-78.60	-77.70	-78.30
1400		-80.00	-79.50	-80.10	-79.60	-79.10	-79.70
1600		-79.50	-78.40	-81.10	-80.10	-78.50	-79.10
1800		-82.10	-81.30	-81.70	-81.30	-80.40	-81.70
		Adjacent Channel Power (dBm)					
Range	Offset (MHz)	(-)	(+)	(-)	(+)	(-)	(+)
Offset 1.8 – 6 MHz	937.07	-52.08	-	-	-	-	-
	933.14	-	-51.67	-	-	-	-
	949.45	-	-	-51.04	-	-	-
	945.54	-	-	-	-50.90	-	-
	961.60	-	-	-	-	-52.42	-
	952.26	-	-	-	-	-	-50.27

Maximum Output Power 30.0 dBm per carrier, 8-PSK Modulation

Measurement		Adjacent Channel Power (dBc)					
		Bottom		Middle		Top	
		Channel 1		Channel 63		Channel 124	
		935.2 MHz		942.4 MHz		959.8 MHz	
Offset (kHz)		(-)	(+)	(-)	(+)	(-)	(+)
100		-7.40	-8.20	-7.50	-8.10	-7.50	-8.00
200		-25.00	-25.60	-24.80	-25.40	-29.80	-30.40
250		-32.90	-33.10	-32.90	-33.40	-38.10	-39.10
400		-47.60	-47.80	-48.00	-48.50	-50.00	-50.80
600		-55.10	-55.30	-55.80	-55.80	-61.10	-61.80
800		-64.80	-64.50	-65.40	-65.30	-63.50	-64.10
1000		-69.50	-69.10	-69.50	-69.30	-72.50	-73.50
1200		-74.20	-74.20	-74.20	-74.50	-76.00	-76.70
1400		-78.10	-77.70	-78.30	-78.30	-77.80	-78.50
1600		-76.10	-75.30	-79.70	-78.40	-76.30	-77.00
1800		-80.10	-79.80	-80.40	-80.20	-79.60	-81.00
		Adjacent Channel Power (dBm)					
Range	Offset (MHz)	(-)	(+)	(-)	(+)	(-)	(+)
Offset 1.8 – 6 MHz	937.00	-51.05	-	-	-	-	-
	929.97	-	-51.02	-	-	-	-
	949.40	-	-	-50.42	-	-	-
	945.78	-	-	-	-50.59	-	-
	961.60	-	-	-	-	-52.34	-
	952.26	-	-	-	-	-	-50.42

-NOTE

Red shaded parts are fail data.

Limits : Clause 4.2.4.1.2

Normal BTS								
Power Level (dBm) as measured in step b)	Maximum relative level (dB) at specified carrier offsets (kHz), using specified measurement (filter) bandwidths (kHz):							
	100	200	250	400	600 to < 1 200	1 200 to < 1 800	1 800 to < 6 000	> 6 000 [2]
	Measurement (filter) bandwidth; 30 kHz						Measurement (filter) bandwidth; 100 kHz	
41	≤ +0.5	≤ -30	≤ -33	≤ -60 [1]	≤ -68	≤ -71	≤ -73	≤ -80
Allowable Failures	0				3			12
Limit of Failure (dBm)	-				≤ -36			≤ -36

NOTE 1: For equipment supporting QPSK, AQPSK, 8-PSK, 16-QAM or 32-QAM, at normal symbol rate, the requirement at these modulations is -56 dB.
NOTE 2: For equipment belonging to the multicarrier BTS class, the requirement also applies for the frequency offset of 6 MHz.

7.2.2 Switching transients spectrum

- ANT1

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation

Measurement		Adjacent Channel Power (dBc)					
		Bottom		Middle		Top	
		Channel 1		Channel 63		Channel 124	
		935.2 MHz		942.4 MHz		959.8 MHz	
		TRU 1		TRU 1		TRU 1	
Timeslot Power Levels	Offset (kHz)	(-)	(+)	(-)	(+)	(-)	(+)
0 (maximum static power level)	400	-54.70	-54.00	-57.10	-54.80	-57.60	-59.60
	600	-61.90	-61.50	-64.50	-64.70	* -36.70	* -37.30
	1200	* -42.90	* -42.30	-78.60	-78.10	-78.50	-79.30
	1800	-80.00	-77.30	-83.20	-83.20	-82.50	-82.50
Alternate Timeslots (maximum static level 0)	400	-	-	-	-	-	-
	600	-	-	-	-	-	-
	1200	-	-	-	-	-	-
	1800	-	-	-	-	-	-

Maximum Output Power 30.0 dBm per carrier, 8-PSK Modulation

Measurement		Adjacent Channel Power (dBc)					
		Bottom		Middle		Top	
		Channel 1		Channel 63		Channel 124	
		935.2 MHz		942.4 MHz		959.8 MHz	
		TRU 1		TRU 1		TRU 1	
Timeslot Power Levels	Offset (kHz)	(-)	(+)	(-)	(+)	(-)	(+)
0 (maximum static power level)	400	-43.80	-43.20	-41.50	-41.00	-45.50	-45.10
	600	-45.10	-48.30	-44.90	-44.50	-56.70	-57.70
	1200	* -39.50	* -37.60	-67.40	-66.40	-77.70	-75.90
	1800	-82.00	-82.00	-78.10	-77.00	-81.20	-81.20
Alternate Timeslots (maximum static level 0)	400	-	-	-	-	-	-
	600	-	-	-	-	-	-
	1200	-	-	-	-	-	-
	1800	-	-	-	-	-	-

- ANT2

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation

Measurement		Adjacent Channel Power (dBc)					
		Bottom		Middle		Top	
		Channel 1		Channel 63		Channel 124	
		935.2 MHz		942.4 MHz		959.8 MHz	
		TRU 1		TRU 1		TRU 1	
Timeslot Power Levels	Offset (kHz)	(-)	(+)	(-)	(+)	(-)	(+)
0 (maximum static power level)	400	-55.20	-55.50	-54.80	-56.90	-57.40	-60.00
	600	-64.40	-61.40	-64.90	-64.50	-63.60	-63.70
	1200	* -44.20	* -45.80	-80.40	-82.30	-79.50	-77.70
	1800	-78.90	-79.20	-83.40	-83.40	-83.30	-83.30
Alternate Timeslots (maximum static level 0)	400	-	-	-	-	-	-
	600	-	-	-	-	-	-
	1200	-	-	-	-	-	-
	1800	-	-	-	-	-	-

Maximum Output Power 30.0 dBm per carrier, 8-PSK Modulation

Measurement		Adjacent Channel Power (dBc)					
		Bottom		Middle		Top	
		Channel 1		Channel 63		Channel 124	
		935.2 MHz		942.4 MHz		959.8 MHz	
		TRU 1		TRU 1		TRU 1	
Timeslot Power Levels	Offset (kHz)	(-)	(+)	(-)	(+)	(-)	(+)
0 (maximum static power level)	400	-44.70	-45.10	-44.20	-45.90	-46.30	-46.30
	600	-48.30	-48.50	-50.00	-49.40	-58.40	-59.30
	1200	* -42.80	* -44.70	* -42.00	* -44.20	-76.10	-80.70
	1800	-82.30	-82.30	-81.90	-81.90	-81.20	-82.10
Alternate Timeslots (maximum static level 0)	400	-	-	-	-	-	-
	600	-	-	-	-	-	-
	1200	-	-	-	-	-	-
	1800	-	-	-	-	-	-

- NOTE

The absolute value limit (-36 dBm) was applied to the measured values indicated by *.

Red shaded parts are fail data.

Limits : Clause 4.2.3.2

Offset (kHz)	Limit (DCS 1 800)	
	GMSK	8-PSK
400	≤ -50 dBc or ≤ -36 dBm	≤ -50 dBc or ≤ -36 dBm
600	≤ -58 dBc or ≤ -36 dBm	≤ -58 dBc or ≤ -36 dBm
1 200	≤ -66 dBc or ≤ -36 dBm	≤ -66 dBc or ≤ -36 dBm
1 800	≤ -66 dBc or ≤ -36 dBm	≤ -66 dBc or ≤ -36 dBm

7.3 Spurious emissions from the transmitter antenna connector

7.3.1 Spurious emissions from the transmitter antenna connector, Inside the BTS transmit band

- ANT1

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation

Frequency (MHz)	Spurious Emission Level (dBm)
	Bottom
	Channel 1
	935.2 MHz
937.10	-55.40
941.39	-51.81

Frequency (MHz)	Spurious Emission Level (dBm)
	Middle
	Channel 63
	942.4 MHz
935.95	-52.23
945.62	-55.24
949.40	-54.09
954.17	-52.27

Frequency (MHz)	Spurious Emission Level (dBm)
	Top
	Channel 124
	959.8 MHz
950.89	-54.79
957.92	-51.15

- ANT2

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation

Frequency (MHz)	Spurious Emission Level (dBm)
	Bottom
	Channel 1
	935.2 MHz
937.40	-56.44
943.55	-52.27

Frequency (MHz)	Spurious Emission Level (dBm)
	Middle
	Channel 63
	942.4 MHz
941.56	-52.19
945.76	-55.68
949.53	-54.79
953.70	-52.36

Frequency (MHz)	Spurious Emission Level (dBm)
	Top
	Channel 124
	959.8 MHz
951.13	-54.44
957.72	-49.85

Note : All results indicate the maximum detected level in the measurement range.

Limits : Clause 4.2.5.1.2

Limit	≤ -36 dBm

7.3.2 Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band

- ANT1

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Bottom

Measurement Range (MHz)	Channel 1	
	935.2 MHz	
	Frequency (MHz)	Emission Level (dBm)
0.1 to 50	0.25	-68.83
50 to 500	477.90	-64.94
500 to 905	876.62	-57.83
905 to 915	911.07	-57.13
915 to 925	925.00	-50.95
925 to 930	929.87	-51.98
930 to 933	933.00	-55.96
962 to 965	962.04	-67.06
965 to 970	965.31	-61.97
970 to 980	979.85	-57.38
980 to 1000	991.36	-57.94
1000 to 1500	1296.50	-57.95
1500 to 7000	3654.63	-41.98
7000 to 12750	12508.44	-51.79

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Middle

Measurement Range (MHz)	Channel 63	
	947.6 MHz	
	Frequency (MHz)	Emission Level (dBm)
0.1 to 50	0.25	-68.53
50 to 500	91.25	-65.11
500 to 905	875.81	-57.80
905 to 915	909.81	-57.12
915 to 925	925.00	-57.20
925 to 930	929.77	-55.65
930 to 933	932.56	-58.50
962 to 965	962.48	-60.47
965 to 970	965.14	-55.78
970 to 980	970.04	-55.61
980 to 1000	982.28	-57.88
1000 to 1500	1008.00	-58.05
1500 to 7000	3687.63	-41.76
7000 to 12750	12521.38	-51.76

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Top

Measurement Range (MHz)	Channel 125	
	959.8 MHz	
	Frequency (MHz)	Emission Level (dBm)
0.1 to 50	0.25	-67.44
50 to 500	484.40	-64.95
500 to 905	877.03	-58.34
905 to 915	912.10	-57.32
915 to 925	924.98	-59.69
925 to 930	929.98	-59.60
930 to 933	932.80	-63.69
962 to 965	962.27	-58.70
965 to 970	965.05	-56.11
970 to 980	970.12	-54.55
980 to 1000	980.06	-57.99
1000 to 1500	1325.50	-58.32
1500 to 7000	3679.38	-41.96
7000 to 12750	12545.82	-51.83

Remarks

All results indicate the maximum detected level in the measurement range.

All Timeslots

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Bottom

Measurement Range (MHz)	Channel 1	
	935.2 MHz	
	Frequency (MHz)	Emission Level (dBm)
460.4 to 467.6	466.94	-74.39
488.8 to 496.0	494.26	-74.08
1 805 to 1 880	1870.40	-49.84

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Middle

Measurement Range (MHz)	Channel 63	
	947.6 MHz	
	Frequency (MHz)	Emission Level (dBm)
460.4 to 467.6	461.16	-74.35
488.8 to 496.0	489.12	-74.04
1 805 to 1 880	1822.03	-72.18

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Top

Measurement Range (MHz)	Channel 125	
	959.8 MHz	
	Frequency (MHz)	Emission Level (dBm)
460.4 to 467.6	467.46	-74.59
488.8 to 496.0	490.38	-74.32
1 805 to 1 880	1810.70	-72.61

Remarks

All results indicate the maximum detected level in the measurement range.

This equipment supports a single carrier, so it does not measure the receive band.

All Timeslots

- ANT2

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Bottom

Measurement Range (MHz)	Channel 1	
	935.2 MHz	
	Frequency (MHz)	Emission Level (dBm)
0.1 to 50	0.25	-70.34
50 to 500	490.35	-65.33
500 to 905	869.73	-58.11
905 to 915	908.83	-57.25
915 to 925	924.86	-52.24
925 to 930	929.51	-52.26
930 to 933	931.23	-56.60
962 to 965	962.42	-67.92
965 to 970	965.14	-61.50
970 to 980	979.79	-57.44
980 to 1000	983.98	-58.27
1000 to 1500	1303.50	-58.48
1500 to 7000	1870.24	-44.36
7000 to 12750	7481.68	-51.70

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Middle

Measurement Range (MHz)	Channel 63	
	947.6 MHz	
	Frequency (MHz)	Emission Level (dBm)
0.1 to 50	0.25	-69.89
50 to 500	482.65	-65.24
500 to 905	885.14	-57.76
905 to 915	906.61	-57.17
915 to 925	924.93	-57.56
925 to 930	930.00	-54.87
930 to 933	930.81	-59.05
962 to 965	962.11	-60.77
965 to 970	965.08	-56.52
970 to 980	970.05	-56.65
980 to 1000	999.82	-58.04
1000 to 1500	1001.00	-57.98
1500 to 7000	5685.59	-40.57
7000 to 12750	12501.25	-51.72

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Top

Measurement Range (MHz)	Channel 125	
	959.8 MHz	
	Frequency (MHz)	Emission Level (dBm)
0.1 to 50	0.25	-68.95
50 to 500	493.55	-65.32
500 to 905	876.62	-58.13
905 to 915	907.92	-57.26
915 to 925	924.77	-59.39
925 to 930	929.96	-58.96
930 to 933	930.62	-63.38
962 to 965	962.00	-57.30
965 to 970	965.02	-54.98
970 to 980	970.34	-56.17
980 to 1000	980.06	-58.08
1000 to 1500	1002.50	-58.01
1500 to 7000	3672.34	-41.58
7000 to 12750	12560.20	-51.74

Remarks

All results indicate the maximum detected level in the measurement range.

All Timeslots

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Bottom

Measurement Range (MHz)	Channel 1	
	935.2 MHz	
	Frequency (MHz)	Emission Level (dBm)
460.4 to 467.6	463.71	-74.63
488.8 to 496.0	489.60	-74.39
1 805 to 1 880	1870.48	-49.40

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Middle

Measurement Range (MHz)	Channel 63	
	947.6 MHz	
	Frequency (MHz)	Emission Level (dBm)
460.4 to 467.6	467.24	-74.42
488.8 to 496.0	489.32	-74.11
1 805 to 1 880	1807.70	-72.33

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Top

Measurement Range (MHz)	Channel 125	
	959.8 MHz	
	Frequency (MHz)	Emission Level (dBm)
460.4 to 467.6	463.95	-74.45
488.8 to 496.0	489.04	-74.23
1 805 to 1 880	1833.05	-72.61

Remarks

All results indicate the maximum detected level in the measurement range.

This equipment supports a single carrier, so it does not measure the receive band.

All Timeslots

Limits : Clause 4.2.5.2.2

Frequency Range (MHz)	Limit (dBm)
0.009 to 1000	≤ -36
1000 to 12750	≤ -30
880 to 915 (RX Band)	≤ -98
460.4 to 467.6	≤ -57
488.8 to 496.0	≤ -57
921 to 960	≤ -57

7.3.3 Conducted spurious emissions from the transmitter antenna connector, in 3G bands outside the BTS transmit band

- ANT1

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Bottom

Measurement Range (MHz)	Channel 1	
	935.2 MHz	
	Frequency (MHz)	Emission Level (dBm)
832 to 862	859.66	-72.52
791 to 821	818.60	-73.41
1 900 to 1 920	1908.18	-72.20
1 920 to 1 980	1963.26	-71.97
2 010 to 2 025	2018.21	-71.62
2 110 to 2 170	2130.64	-71.08
2 300 to 2 400	2391.90	-70.78
2 500 to 2 570	2558.31	-70.42
2 620 to 2 690	2669.70	-70.17
2 570 to 2 620	2584.50	-70.48

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Middle

Measurement Range (MHz)	Channel 63	
	947.6 MHz	
	Frequency (MHz)	Emission Level (dBm)
832 to 862	861.40	-72.58
791 to 821	804.68	-73.32
1 900 to 1 920	1918.68	-71.90
1 920 to 1 980	1932.24	-71.89
2 010 to 2 025	2021.88	-71.51
2 110 to 2 170	2159.98	-71.07
2 300 to 2 400	2394.90	-70.71
2 500 to 2 570	2534.44	-70.42
2 620 to 2 690	2668.20	-70.24
2 570 to 2 620	2605.40	-70.46

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Top

Measurement Range (MHz)	Channel 125	
	959.8 MHz	
	Frequency (MHz)	Emission Level (dBm)
832 to 862	860.08	-73.21
791 to 821	798.56	-71.51
1 900 to 1 920	1919.70	-40.39
1 920 to 1 980	1920.00	-68.45
2 010 to 2 025	2019.20	-72.00
2 110 to 2 170	2149.36	-71.62
2 300 to 2 400	2379.20	-71.11
2 500 to 2 570	2510.22	-70.40
2 620 to 2 690	2645.30	-70.38
2 570 to 2 620	2579.95	-70.73

Remarks

All results indicate the maximum detected level in the measurement range.

Red shaded parts are fail data.

All Timeslots

- ANT2

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Bottom

Measurement Range (MHz)	Channel 1	
	935.2 MHz	
	Frequency (MHz)	Emission Level (dBm)
832 to 862	853.96	-72.85
791 to 821	820.58	-73.78
1 900 to 1 920	1914.66	-72.34
1 920 to 1 980	1945.56	-72.15
2 010 to 2 025	2024.00	-71.79
2 110 to 2 170	2164.30	-71.44
2 300 to 2 400	2373.40	-71.09
2 500 to 2 570	2543.40	-70.56
2 620 to 2 690	2630.75	-69.76
2 570 to 2 620	2574.20	-70.66

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Middle

Measurement Range (MHz)	Channel 63	
	947.6 MHz	
	Frequency (MHz)	Emission Level (dBm)
832 to 862	859.54	-72.65
791 to 821	801.56	-73.56
1 900 to 1 920	1918.84	-72.04
1 920 to 1 980	1949.94	-72.05
2 010 to 2 025	2014.05	-71.70
2 110 to 2 170	2161.78	-71.35
2 300 to 2 400	2387.60	-70.88
2 500 to 2 570	2507.77	-70.43
2 620 to 2 690	2663.15	-70.37
2 570 to 2 620	2570.95	-70.61

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation, Top

Measurement Range (MHz)	Channel 125	
	959.8 MHz	
	Frequency (MHz)	Emission Level (dBm)
832 to 862	857.41	-73.00
791 to 821	798.59	-70.75
1 900 to 1 920	1919.70	-37.81
1 920 to 1 980	1920.00	-66.40
2 010 to 2 025	2022.74	-71.81
2 110 to 2 170	2146.12	-71.28
2 300 to 2 400	2397.50	-70.95
2 500 to 2 570	2541.93	-70.55
2 620 to 2 690	2647.00	-70.37
2 570 to 2 620	2579.75	-70.60

Remarks

All results indicate the maximum detected level in the measurement range.

Red shaded parts are fail data.

All Timeslots

Limits : Clause 4.2.5.3.2

Limit	≤ -62 dBm

7.4 Intermodulation attenuation

7.4.1 In the operating TX band (935 MHz – 960 MHz)

- ANT 1

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation

Interfering Signal Offset (MHz)	Intermodulation Product Power								
	Channel 1 935.2 MHz (B)			Channel 63 947.6 MHz (M)			Channel 124 959.8 MHz (T)		
	Freq. (MHz)	Value (dBc)	Limit (dBc)	Freq. (MHz)	Value (dBc)	Limit (dBc)	Freq. (MHz)	Value (dBc)	Limit (dBc)
-6.2	/	/	/	935.2	-78.33	-60	947.4	-75.28	-60
	/	/	/	953.8	-77.80	-60	/	/	/
	/	/	/	929.0	-82.21	-70	941.2	-78.78	-70
	/	/	/	960.0	-80.35	-70	/	/	/
-3.2	/	/	/	941.2	-78.52	-60	953.4	-75.50	-60
	/	/	/	950.8	-77.64	-60	/	/	/
	/	/	/	938.0	-78.31	-70	950.2	-74.55	-70
	/	/	/	954.0	-78.41	-70	/	/	/
-2	/	/	/	943.6	-79.29	-60	955.8	-79.66	-60
	/	/	/	949.6	-76.50	-60	/	/	/
	/	/	/	941.6	-79.93	-70	953.8	-79.22	-70
	/	/	/	951.6	-78.81	-70	/	/	/
-0.8	/	/	/	946.0	-79.36	-60	958.2	-73.95	-60
	/	/	/	/	/	/	/	/	/
	/	/	/	945.2	-78.40	-70	957.4	-79.55	-70
	/	/	/	949.2	-79.45	-70	/	/	/
0.8	/	/	/	/	/	/	/	/	/
	936.8	-78.81	-60	949.2	-79.52	-60	/	/	/
	/	/	/	946.0	-79.60	-70	/	/	/
	937.6	-79.78	-70	950.0	-78.06	-70	/	/	/
2	/	/	/	945.6	-77.28	-60	/	/	/
	939.2	-80.62	-70	951.6	-78.74	-60	/	/	/
	/	/	/	943.6	-79.18	-70	/	/	/
	941.2	-80.86	-70	953.6	-79.59	-70	/	/	/
3.2	/	/	/	944.4	-78.84	-60	/	/	/
	941.6	-77.49	-70	954.0	-78.37	-60	/	/	/
	/	/	/	941.2	-78.39	-70	/	/	/
	944.8	-77.83	-70	957.2	-79.49	-70	/	/	/
6.2	/	/	/	941.4	-77.63	-60	/	/	/
	947.6	-77.94	-70	960.0	-79.17	-60	/	/	/
	/	/	/	935.2	-78.38	-70	/	/	/
	953.8	-81.78	-70	966.2	-88.80	-70	/	/	/

- ANT 2

Maximum Output Power 30.0 dBm per carrier, GMSK Modulation

Interfering Signal Offset (MHz)	Intermodulation Product Power								
	Channel 1 935.2 MHz (B)			Channel 63 947.6 MHz (M)			Channel 124 959.8 MHz (T)		
	Freq. (MHz)	Value (dBc)	Limit (dBc)	Freq. (MHz)	Value (dBc)	Limit (dBc)	Freq. (MHz)	Value (dBc)	Limit (dBc)
-6.2	/	/	/	935.2	-78.79	-60	947.4	-76.15	-60
	/	/	/	953.8	-77.52	-60	/	/	/
	/	/	/	929.0	-80.18	-70	941.2	-79.48	-70
	/	/	/	960.0	-79.26	-70	/	/	/
-3.2	/	/	/	941.2	-78.16	-60	953.4	-76.65	-60
	/	/	/	950.8	-80.23	-60	/	/	/
	/	/	/	938.0	-78.77	-70	950.2	-75.64	-70
	/	/	/	954.0	-79.11	-70	/	/	/
-2	/	/	/	943.6	-80.67	-60	955.8	-79.21	-60
	/	/	/	949.6	-79.14	-60	/	/	/
	/	/	/	941.6	-81.25	-70	953.8	-79.13	-70
	/	/	/	951.6	-81.10	-70	/	/	/
-0.8	/	/	/	946.0	-78.95	-60	958.2	-74.07	-60
	/	/	/	/	/	/	/	/	/
	/	/	/	945.2	-80.57	-70	957.4	-79.33	-70
	/	/	/	949.2	-79.79	-70	/	/	/
0.8	/	/	/	/	/	/	/	/	/
	936.8	-72.98	-60	949.2	-79.83	-60	/	/	/
	/	/	/	946.0	-79.03	-70	/	/	/
	937.6	-80.77	-70	950.0	-80.92	-70	/	/	/
2	/	/	/	945.6	-78.833	-60	/	/	/
	939.2	-80.57	-60	951.6	-81.196	-60	/	/	/
	/	/	/	943.6	-80.791	-70	/	/	/
	941.2	-80.40	-70	953.6	-81.914	-70	/	/	/
3.2	/	/	/	944.4	-80.597	-70	/	/	/
	941.6	-77.78	-60	954.0	-74.313	-70	/	/	/
	/	/	/	941.2	-74.165	-70	/	/	/
	944.8	-77.99	-70	957.2	-74.706	-70	/	/	/
6.2	/	/	/	941.4	-73.242	-70	/	/	/
	947.6	-73.49	-60	960.0	-75.27	-70	/	/	/
	/	/	/	935.2	-74.763	-70	/	/	/
	953.8	-77.49	-70	966.2	-86.083	-70	/	/	/

Limits : Clause 4.2.6.2

For measurements in the relevant TX band

Normal BTS								
Power Level (dBm) as measured in step b)	Maximum relative level (dB) at specified carrier offsets (kHz), using specified measurement (filter) bandwidths (kHz):							
	100	200	250	400	600 to < 1 200	1 200 to < 1 800	1 800 to < 6 000	> 6 000 [2]
	Measurement (filter) bandwidth; 30 kHz						Measurement (filter) bandwidth; 100 kHz	
39	≤ +0.5	≤ -30	≤ -33	≤ -60 [1]	≤ -66	≤ -69	≤ -71	≤ -70 dBc or ≤ -36 dBm
Third order intermodulation products	≤ -60 dBc or ≤ -36 dBm							

NOTE 1: For equipment supporting QPSK, AQPSK, 8-PSK, 16-QAM or 32-QAM, at normal symbol rate, the requirement at these modulations is -56 dB.
NOTE 2: For equipment belonging to the multicarrier BTS class, the requirement also applies for the frequency offset of 6 MHz.

7.4.2 In the operating RX band (880 MHz – 915 MHz)

This equipment supports a single carrier, so it does not measure the receive band.

7.5 Intra Base Station System intermodulation attenuation

7.5.1 In the operating RX band (880 MHz – 915 MHz)

This equipment supports a single carrier, so it does not measure the receive band.

Limits : Clause 4.2.7.2

For measurements in the relevant RX band

Limit	≤ -98 dBm

7.5.2 In the operating TX band (925 MHz – 960 MHz)

Refer to 7.2.1 Spectrum due to modulation and wideband noise and 7.3.1 Spurious emissions from the transmitter antenna connector, Inside the BTS transmit band

Limits : Clause 4.2.4.1.2

Normal BTS								
Power Level (dBm) as measured in step b)	Maximum relative level (dB) at specified carrier offsets (kHz), using specified measurement (filter) bandwidths (kHz):							
	100	200	250	400	600 to < 1 200	1 200 to < 1 800	1 800 to < 6 000	> 6 000 [2]
	Measurement (filter) bandwidth; 30 kHz						Measurement (filter) bandwidth; 100 kHz	
41	≤ +0.5	≤ -30	≤ -33	≤ -60 [1]	≤ -68	≤ -71	≤ -73	≤ -80
Allowable Failures	0				3			12
Limit of Failure (dBm)	-				≤ -36			≤ -36

NOTE 1: For equipment supporting QPSK, AQPSK, 8-PSK, 16-QAM or 32-QAM, at normal symbol rate, the requirement at these modulations is -56 dB.
NOTE 2: For equipment belonging to the multicarrier BTS class, the requirement also applies for the frequency offset of 6 MHz.

8. Measurement uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Discipline	Frequency / Parameter	Uncertainty
Transmitted RF carrier power	Absolute RF power level power	±1,0 dB
Spectrum due to modulation and wideband noise	absolute RF power	±1,0 dB
	Relative RF power offsets < 0.1 MHz	±0,5 dB
	Relative RF power offsets 0.1 to 1.8 MHz	> 50 dB □ ±0,7 dB ≥ 50 dB □ ±1,5 dB
	Relative RF power offsets > 1.8 MHz	±2,0 dB
Switching transients spectrum	Absolute power level	±1,5 dB
	Relative power	> 50 dB □ ±0,7 dB ≥ 50 dB □ ±1,5 dB
Conducted spurious emissions from the antenna connector, inside the BTS transmit band		±1,5 dB
Conducted spurious emissions from the antenna connector, outside the BTS transmit band	f ≤ 2 GHz	±1,5 dB
	2 GHz < f ≤ 4 GHz	±2,0 dB
	f > 4 GHz	±4,0 dB
	In RX band	±3,0 dB
Conducted spurious emissions from the antenna connector, in 3G bands	f ≤ 2 GHz	±1,5 dB
	2 GHz < f ≤ 4 GHz	±2,0 dB
	f > 4 GHz	±4,0 dB
Intermodulation attenuation and Intra base station system intermodulation attenuation	Outside RX band, absolute value	±1,5 dB
	Outside RX band, relative value	±2,0 dB
	Inside RX band, absolute value	+4 dB / -3 dB
Wideband noise and intra BSS intermodulation attenuation in multicarrier operation	IM Outside RX band, absolute value	±1,5 dB
	IM Outside RX band, relative value	±2,0 dB
	IM Inside RX band, absolute value	+4 dB / -3 dB
	Wideband Noise Absolute power	±1,0 dB
	Wideband Noise Relative < 0.1 MHz	±0,5 dB
	Wideband Noise Relative 0.1 to 1.8 MHz	> 50 dB □ ±0,7 dB ≥ 50 dB □ ±1,5 dB
	Wideband Noise Relative > 1.8 MHz	±2,0 dB