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FCC 47 CFR PART 22 SUBPART H

CERTIFICATION TEST REPORT

For

4G Smart phone

Model Name: BRIO L1 PLUS, Brio L1 E

Trademark: XTRATECH

REPORT NO: ES150716209E4

ISSUE DATE: July 31, 2015

Prepared for

XTRATECH COMPUTERS S.A.

Ciudadela Profesor Aguirre Abad,solar 40 de la manzana 118

Prepared by

SHENZHEN EMTEK CO., LTD.

Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China
TEL: 86-755-26954280
FAX: 86-755-26954282

TEST RESULT CERTIFICATION

Applicant:	XTRATECH COMPUTERS S.A. Ciudadela Profesor Aguirre Abad,solar 40 de la manzana 118
Manufacturer:	IT TEK Corp. 1970 NW 129 AV. UNIT 105- Miami FL, 33182 USA
Product Description:	4G Smart phone
Model Number:	BRIO L1 PLUS, Brio L1 E
File Number:	ES150716209E4
Date of Test:	July 17, 2015 to July 31, 2015

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 2, Subpart J, June 11, 2014 FCC 47 CFR Part 22, Subpart H, May 9, 2014	**PASS**

The above equipment was tested by SHENZHEN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2 and Part 22

The test results of this report relate only to the tested sample identified in this report.

Date of Test : July 17, 2015 to July 31, 2015

Prepared by : Andy Wei

Andy Wei/Editor

Reviewer : Joe Xia

Joe Xia/Supervisor

Approve & Authorized Signer :

Lisa Wang/Manager

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1 EUT TECHNICAL DESCRIPTION

Characteristics	Description
Product Name:	4G Smart phone
Model Number:	BRIO L1 PLUS, Brio L1 E
Operating Frequency Range(s):	GSM850: TX824.2MHz~848.8MHz/RX869.2MHz~893.8MHz; PCS1900: TX1850.2MHz~1909.8MHz/RX1930.2MHz~1989.8MHz; WCDMA Band V: TX826.4MHz~846.6MHz /RX871.4MHz~891.6MHz; WCDMA Band II: TX 1852.4 MHz ~ 1907.6 MHz /RX 1932.4 MHz ~1987.6 MHz; LTE Band 4: Tx 1710.7 MHz ~ 1754.3 MHz /RX 2110.7 MHz ~ 2154.3 MHz: 2412-2462MHz for 802.11b/g; 2412-2462MHz for 802.11n(HT20); 2422-2452MHz for 802.11n(HT40); 2402-2480MHz for Bluetooth;
Number of Channels:	124 Channels for GSM850; 299 Channels for PCS1900; 102Channels for WCDMA V; 277Channels for WCDMA II; 11 channels for 802.11b/g; 11 channels for 802.11n(HT20); 7 channels for 802.11n(HT40); 79 channels for Bluetooth 3.0 DSS; 40 channels for Bluetooth 4.0 DTS;
Modulation:	QPSK, 16QAM for LTE Band; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n; DSSS with DBPSK/DQPSK/CCK for 802.11b; GFSK, pi/4-DQPSK, 8DPSK for Bluetooth 3.0 DSS; GFSK for Bluetooth 4.0 DTS;
Antenna Type:	integral antenna;
Antenna Gain:	1dBi for GSM850; 1dBi for WCDMA 850;
RF Output Power:	GSM850 32.70 dBm max; WCDMA 850 22.40 dBm max;
Power supply	DC supply: DC 3.7V(Internal rechargeable lithium battery) or DC 5V supplied by external power
	Adapter supply: Model: W12-010N3B Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2A
Temperature Range:	-20°C ~ +50°C

Note: for more details, please refer to the User's manual of the EUT.

2 SUMMARY OF TEST RESULT

FCC Part Clause	Test Parameter	Verdict	Remark
§2.1046(a)	RF Power Output	PASS	
§2.1047	Modulation Characteristics	PASS	
§2.1049	Occupied Bandwidth	PASS	
§22.913(a)(2) §2.1046	Effective Radiated Power	PASS	
§2.1051 §22.917(a) §90.210(g)	Spurious Emission at Antenna Terminal Band Edge Emission	PASS	
§22.913(a)(2)	Peak To Average Ratio	PASS	
§2.1055 §22.355	Frequency Stability	PASS	
§2.107	Power Line Conducted Emission	PASS	
§15.209	Receiver Radiation Emission	PASS	
§22.917(a)	Receiver Spurious Emission	PASS	
NOTE1: N/A (Not Applicable)			

RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for FCC ID: 2ADVA-L1PLUS filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

The composite system is compliance with Subpart B is authorized under a DOC procedure

Modified Information

Version.	Summary	Date of Rev.	Report No.
Ver.1.0	Original Report	2015-07-31	ES150716209E4

3 TEST METHODOLOGY

3.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:
FCC 47 CFR Part 2, Subpart J
FCC 47 CFR Part 22, Subpart H
FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

3.2 MEASUREMENT EQUIPMENT USED

3.2.1 Conducted Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Calibration Date	Indate
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/17/2015	1 year
L.I.S.N.	Schwarzbeck	NNLK8129	8129203	05/17/2015	1 year
50Ω Coaxial Switch	Anritsu	MP59B	M20531	N/A	N/A
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	05/17/2015	1 year
Voltage Probe	Rohde & Schwarz	TK9416	N/A	05/17/2015	1 year
I.S.N	Rohde & Schwarz	ENY22	1109.9508.02	05/17/2015	1 year

3.2.2 Radiated Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Calibration Date	Indate
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/17/2015	1 year
Pre-Amplifier	HP	8447D	2944A07999	05/17/2015	1 year
Bilog Antenna	Schwarzbeck	VULB9163	142	05/17/2015	1 year
Loop Antenna	ARA	PLA-1030/B	1029	05/17/2015	1 year
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/17/2015	1 year
Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/17/2015	1 year
Cable	Schwarzbeck	AK9513	ACRX1	05/17/2015	1 year
Cable	Rosenberger	N/A	FP2RX2	05/17/2015	1 year
Cable	Schwarzbeck	AK9513	CRPX1	05/17/2015	1 year
Cable	Schwarzbeck	AK9513	CRRX2	05/17/2015	1 year

3.2.3 Radio Frequency Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Calibration Date.	Indate
Spectrum Analyzer	Agilent	E4407B	88156318	05/15/2015	1 year
Power meter	Anritsu	ML2495A	0824006	05/15/2015	1 year
Power sensor	Anritsu	MA2411B	0738172	05/15/2015	1 year
Radio Communication Tester	R&S	CMU200	1100.0008.02	05/15/2015	1 year
Radio Communication Tester	R&S	CMW500	12010002K50-140822-2K	05/15/2015	1 year

Remark: *Each piece of equipment is scheduled for calibration once a year.*

3.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

During all testing, EUT is in link mode with base station emulator at maximum power level.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

- Test Mode and system config

- GSM850 GSM/ GPRS mobile config

A call is set up by the SS according to the generic call set up procedure on a channel with ARFCN in the Mid ARFCN range, power control level set to Max power. MS TXPWR_MAX_CCH is set to the maximum value supported by the Power Class of the Mobile under test
Call parms: BCH set :Cell Band :GSM850
TCH set: Traffic Band: GSM850
Traffic channel: CH128/CH189/CH251
MS transmitter level:0
Coding scheme: CS-4
Multislot config: 1up,1dowm
Active cell: GSM850/GSM/ GPRS

- GSM850 GSM/ EGPRS mobile config

A call is set up by the SS according to the generic call set up procedure on a channel with ARFCN in the Mid ARFCN range, power control level set to Max power. MS TXPWR_MAX_CCH is set to the maximum value supported by the Power Class of the Mobile under test
Call parms: BCH set :Cell Band :GSM850
TCH set: Traffic Band: GSM850
Traffic channel: CH128/CH189/CH251
MS transmitter level:0
Coding scheme: CS-5
Multislot config: 1up,1dowm
Active cell: GSM850/GSM/EGPRS

- UMTS 850 REL99 mobile config

Transmitting performance test of the EUT is implemented during communicating with the SS via air interface. The procedure is using normal call protocol until the UE is communicating on traffic channel basically. On the traffic channel, the UE provides special function for testing that is called Logical Test Interface and the UE is tested using this function. (Refer to T TS 134.109 and TS 134.121).
Transmitting or receiving bit/symbol rate for test channel is shown in the following table .

Bit / Symbol rate for Test Channel

Type of User Information	User Bit Rate	DL DPCH Symbol Rate	UL DPCH Bit Rate	Remarks
12.2 kbps reference measurement channel	12.2 kbps	30 kbps	60 kbps	Standard Test

Transmitter Physical channel configuration

Mode	Rel99
Loopback mode	Test mode1
Rel99 RMC	12.2 kbps RMC
HSDPA FRC	Not applicable
HSUPA Test	Not applicable
Power control algorithm	Algorithm2
βc	Not applicable
βd	Not applicable
βec	Not applicable
Bc/βd	8/15
βhs	Not applicable
βed	Not applicable

- UMTS 850 HSDPA Rel5 mobile config

Transmitting performance test of the EUT is implemented during communicating with the SS via air interface. The procedure is using normal call protocol until the UE is communicating on traffic channel basically. On the traffic channel, the UE provides special function for testing that is called Logical Test Interface and the UE is tested using this function. (Refer to TS 134.109 and TS 134.121).
Transmitting or receiving bit/symbol rate for test channel is shown in the following table .

Bit / Symbol rate for Test Channel

Type of User Information	User Bit Rate	DL DPCH Symbol Rate	UL DPCH Bit Rate	Remarks
12.2 kbps reference measurement channel	12.2 kbps	30 kbps	60 kbps	Standard Test

Transmitter Physical channel configuration

Mode	HSDPA Rel5			
subtest	1	2	3	4
Loopback mode	Test mode1			
Rel99 RMC	12.2 kbps RMC			
HSDPA FRC	H-Set1			
HSUPA Test	Not applicable			
Power control algorithm	Algorithm2			
βc	2/15	12/15	15/15	15/15
βd	15/15	15/15	8/15	4/15
Bd(SF)	64			
Bc/βd	2/15	12/15	15/8	15/4
βhs	4/15	24/15	30/15	30/15
MPR(s\dB)	0	0	0.5	0.5
D_{ACK}	8			
D_{NAK}	8			
DCQI	8			
Ack-Nack Repetition Factor	3			
CQI feedback	4ms			
CQI repetition factor	2			
Ahs=βhs/βc	30/15			

- UMTS 850 HSUPA Rel6 mobile config

Transmitting performance test of the EUT is implemented during communicating with the SS via air interface. The procedure is using normal call protocol until the UE is communicating on traffic channel basically. On the traffic channel, the UE provides special function for testing that is called Logical Test Interface and the UE is tested using this function. (Refer to TS 134.109 and TS 134.121).
Transmitting or receiving bit/symbol rate for test channel is shown in the following table .

Bit / Symbol rate for Test Channel

Type of User Information	User Bit Rate	DL DPCH Symbol Rate	UL DPCH Bit Rate	Remarks
12.2 kbps reference measurement channel	12.2 kbps	30 kbps	60 kbps	Standard Test

Transmitter Physical channel configuration

Mode	HSUPA Rel6				
subtest	1	2	3	4	5
Loopback mode	Test mode1				
Rel99 RMC	12.2 kbps RMC				
HSDPA FRC	H-Set1				
HSUPA Test	HSUPA loopback				
Power control algorithm	Algorithm2				
βc	11/15	6/15	15/15	2/15	15/15
βd	15/15	15/15	9/15	15/15	0
βec	209/225	12/15	30/15	2/15	5/15
βed	1309/225	94/75	47/15	56/75	47/15
βc/βd	11/15	6/15	15/9	2/15	-
βhs	22/15	12/15	30/15	4/15	5/15
D E-DPCCH	6	8	8	5	7
DHARQ	0	0	0	0	0
AG index	20	12	15	17	12
ETFCI	75	67	92	71	67
Associated Max UL data rate kbps	242.1	174.9	482.8	205.8	308.9
Reference E_TFCIs	E_TFCI 11 E_TFCI PO4 E_TFCI 67 E_TFCI PO18 E_TFCI 71 E_TFCI PO23 E_TFCI 75 E_TFCI PO 26 E_TFCI 81 E_TFCI PO 27		E_TFCI 11 E_TFCI PO4 E_TFCI 92 E_TFCI PO18	E_TFCI 11 E_TFCI PO4 E_TFCI 67 E_TFCI PO18 E_TFCI 71 E_TFCI PO23 E_TFCI 75 E_TFCI PO 26 E_TFCI 81 E_TFCI PO 27	

■ Test Frequency and Channels

Frequency Band	☐ GSM850		☐UMTS 850	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)
CH_H	251	848.8	4233	846.6
CH_M	189	836.4	4182	836.4
CH_L	128	824.2	4132	826.4

4 FACILITIES AND ACCREDITATIONS

4.1 FACILITIES

All measurement facilities used to collect the measurement data are located at
Bldg 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

4.2 LABORATORY ACCREDITATIONS AND LISTINGS

Description	
EMC Lab	edited by CNAS, 2013.10.28 certificate is valid until 2016.10.29 Laboratory has been assessed and proved to be in compliance with CNAS-CL01: 2006(identical to ISO/IEC17025: 2005) Certificate Registration Number is L229 edited by TUV Rheinland Shenzhen, 2010.5.25 Laboratory has been assessed according to the requirements ISO/IEC 17025. edited by FCC, October 28, 2010 Certificate Registration Number is 406365. Accredited by FCC, February 28, 2013 Certificate Registration Number is 709623. edited by Industry Canada, May 24, 2008 Certificate Registration Number is 46405-4480

5 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

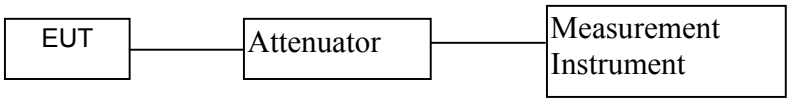
Parameter	Uncertainty
Radio Frequency	±1x10^-5
Maximum Peak Output Power Test	±1.0dB
Conducted Emissions Test	±2.0dB
Radiated Emission Test	±2.0dB
Power Density	±2.0dB
Occupied Bandwidth Test	±1.0dB
Band Edge Test	±3dB
All emission, radiated	±3dB
Antenna Port Emission	±3dB
Temperature	±0.5℃
Humidity	±3%

Measurement Uncertainty for a level of Confidence of 95%

6 SETUP OF EQUIPMENT UNDER TEST

6.1 RADIO FREQUENCY TEST SETUP 1

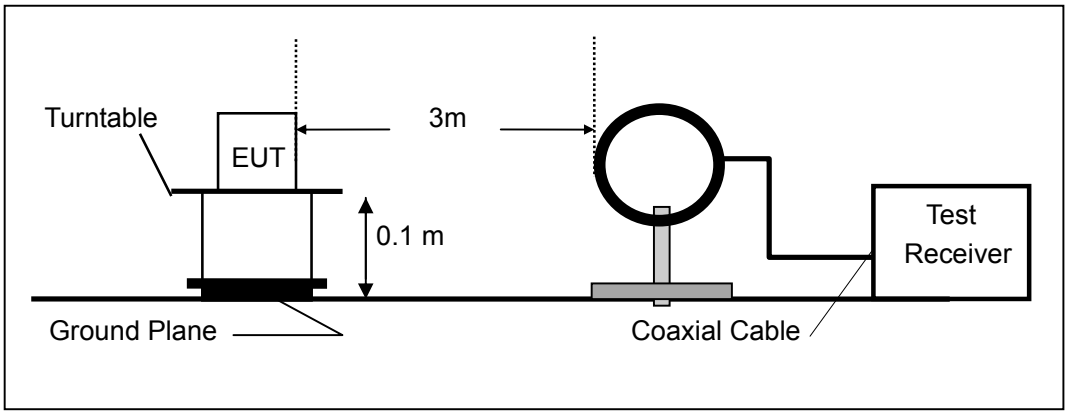
The component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by software to emit the specified signals for the purpose of measurements.



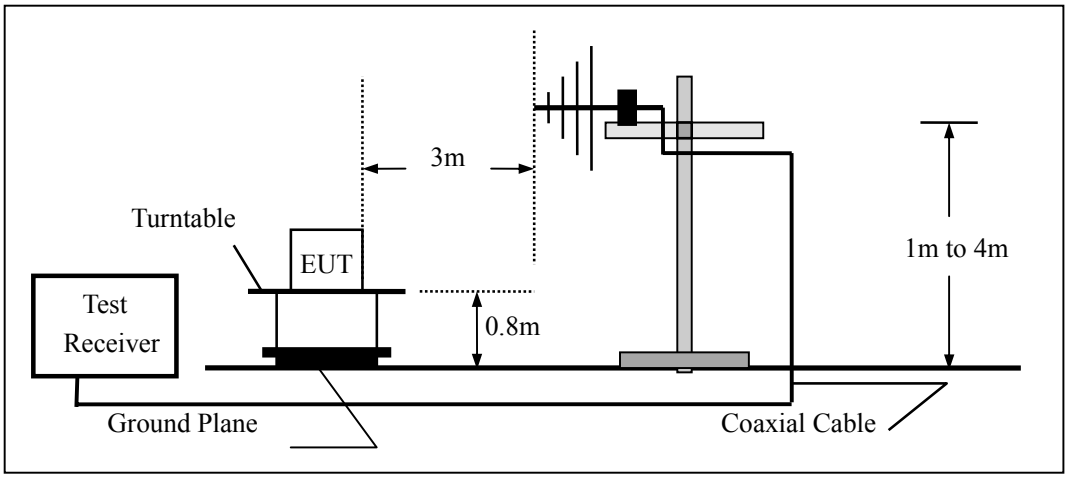
6.2 RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.
The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

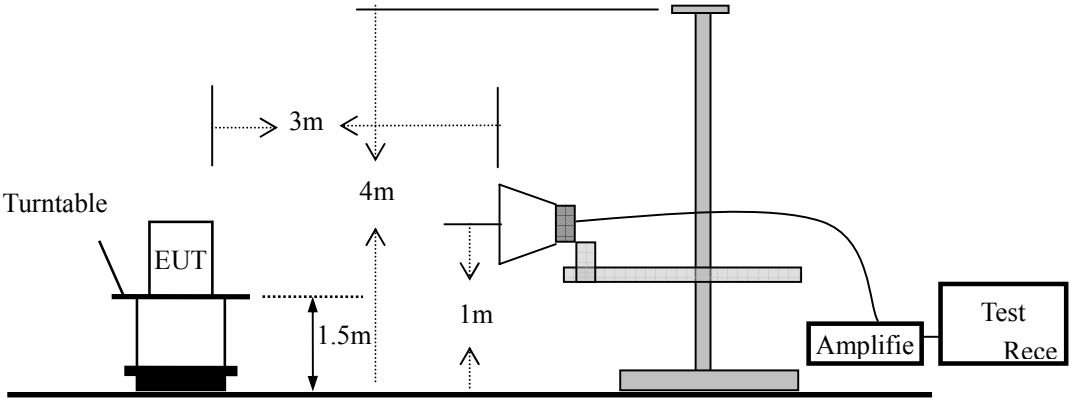
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz

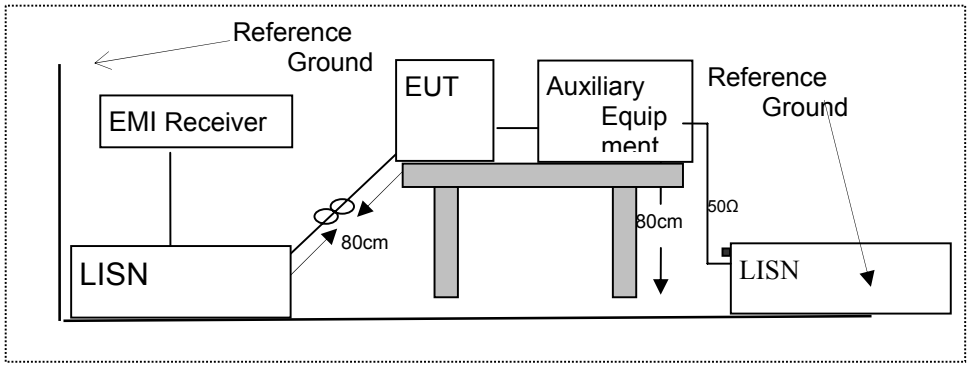


(c) Radiated Emission Test Set-Up, Frequency above 1000MHz

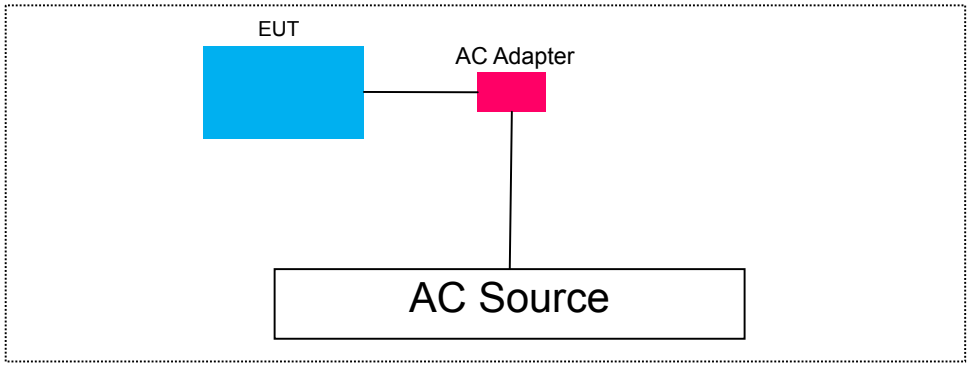


6.3 CONDUCTED EMISSION TEST SETUP

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.
Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.
According to the requirements in ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



6.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



6.5 SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1.	Notebook	ASUS	P45V	N/A	
	Tablet	dreamtab	DMTAB-NV08B	N/A	

Notes:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

7 TEST REQUIREMENTS

7.1 RF OUTPUT POWER

7.1.1 Applicable Standard

According to FCC Part 2.1046 and FCC Part 22.913(a)(2) and FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

7.1.2 Conformance Limit

Extend coverage on a secondary basis into cellular unserved areas, as those areas are defined in §22.949, the ERP of base transmitters and cellular repeaters of such systems must not exceed 1000 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts(38.5dBm).

7.1.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

7.1.4 Test Procedure

Connect the EUT to Universal Radio Communication Tester CMU200 or CMU500 via the antenna connector. A call is set up by the SS according to the generic call set up procedure on a channel with ARFCN in the ARFCN range, power control level set to Max power. The frequency band is set as selected frequency,
The RF output of the transmitter was connected to base station simulator.
Set EUT at maximum average power by base station simulator.
Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
Set VBW ≥ 3 × RBW.
Number of points in sweep ≥ 2 × span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
Sweep time = auto.
Detector = RMS (power averaging).
Set sweep trigger to “free run”.
Trace average at least 100 traces in power averaging (i.e., RMS) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the on and off periods of the transmitter.
Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10 log (1/0.25) = 6 dB if the duty cycle is a constant 25%.
Measure lowest, middle, and highest channels for each bandwidth and different modulation.
Measure and record the results in the test report.

7.1.5 Test Results

All the modulation modes were tested, the data of the worst mode are described in the following table.

Temperature : 28℃ Test Date : July 30, 2015
Humidity : 65 % Test By: Andy

Operation Mode	Channel Number	Channel Frequency (MHz)	Averge Result (dBm)	Limit (dBm)	Verdict
GSM850	128	824.2	32.61	N/A	PASS
	189	836.4	32.64	N/A	PASS
	251	848.8	32.70	N/A	PASS
GPRS850	128	824.2	32.60	N/A	PASS
	189	836.4	32.63	N/A	PASS
	251	848.8	32.68	N/A	PASS
NOTE1: N/A (Not Applicable)					

Temperature : 28℃ Test Date : July 30, 2015
Humidity : 65 % Test By: Andy

Operation Mode	Channel Number	Channel Frequency (MHz)	Averge Result (dBm)	Limit (dBm)	Verdict
WCDMA 850	4132	826.4	22.36	N/A	PASS
	4182	836.4	22.33	N/A	PASS
	4233	846.6	22.40	N/A	PASS
NOTE1: N/A (Not Applicable)					

Note:

We performed test at both Polarization H and V and compared which is greater value. The greater result will be submitted into the report.

Peak ERP(dBm)= P_{Mea} -P_{cl} -P_{Ag} -G_a.

7.2 MODULATION CHARACTERISTICS

7.2.1 Applicable Standard

According to FCC Part 2.1047 and FCC Part 22H and FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

7.2.2 Conformance Limit

No specific modulation characteristics requirement limits.

7.2.3 Test Configuration

Test according to clause 6.1 radio frequency test setup

7.2.4 Test Procedure

Connect the EUT to Universal Radio Communication Tester CMU200 or CMU500 via the antenna connector. A call is set up by the SS according to the generic call set up procedure on a channel with ARFCN in the Mid ARFCN range, power control level set to Max power. MS TXPWR_MAX_CCH is set to the maximum value supported by the Power Class of the Mobile under test,The frequency band is set as selected frequency, test method was according to 3GPP TS 51.010 and 3GPP TS 34.121. and 3GPP2 C.S0011/TIA-98-E for 1XRTT.and 3GPP2 C.S0033-0/tia-866 for Rel.0 and 3GPP2 C.S0033-A for Rev.A The waveform quality and constellation of the was tested.

7.2.5 Test Results

PASS

7.3 OCCUPIED BANDWIDTH

7.3.1 Applicable Standard

According to FCC Part 2.1049 and FCC Part 22H and FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

7.3.2 Conformance Limit

No specific modulation characteristics requirement limits.

7.3.3 Test Configuration

Test according to clause 6.1 radio frequency test setup

7.3.4 Test Procedure

Connect the EUT to Universal Radio Communication Tester CMU200 or CMU500 via the antenna connector. A call is set up by the SS according to the generic call set up procedure on a channel with ARFCN in the Mid ARFCN range, power control level set to Max power. MS TXPWR_MAX_CCH is set to the maximum value supported by the Power Class of the Mobile under test,

■ 99% Occupied bandwidth

The following procedure shall be used for measuring (99 %) power bandwidth

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.

c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.

d) NOTE—Steps a) through c) may require iteration to adjust within the specified tolerances.

e) Set the detection mode to peak, and the trace mode to max hold..

f) Use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.

g) If the instrument does not have a 99 % power bandwidth function, the trace data points are to be recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99 % power bandwidth is the difference between these two frequencies.

h) The OBW shall be reported by providing plot(s) of the measuring instrument display. The frequency and amplitude axes and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

■ 26 dB Occupied bandwidth

The reference value is the highest level of the spectral envelope of the modulated signal.

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.

b) The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.

c) Set the reference level of the instrument as required to prevent the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.

d) NOTE—Steps a) through c) may require iteration to adjust within the specified tolerances.

e) The dynamic range of the spectrum analyzer at the selected RBW shall be at least 10 dB below the target "-X dB down" requirement (i.e., if the requirement calls for measuring the –26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference value).

f) Set the detection mode to peak, and the trace mode to max hold.

g) Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).

h) Determine the "-X dB down amplitude" as equal to (Reference Value – X). Alternatively, this calculation

can be performed by the analyzer by using the marker-delta function.
i) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the "–X dB down amplitude" determined in step g). If a marker is below this "-X dB down amplitude" value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
j) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display. The frequency and amplitude axes and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s)

7.3.5 Test Results

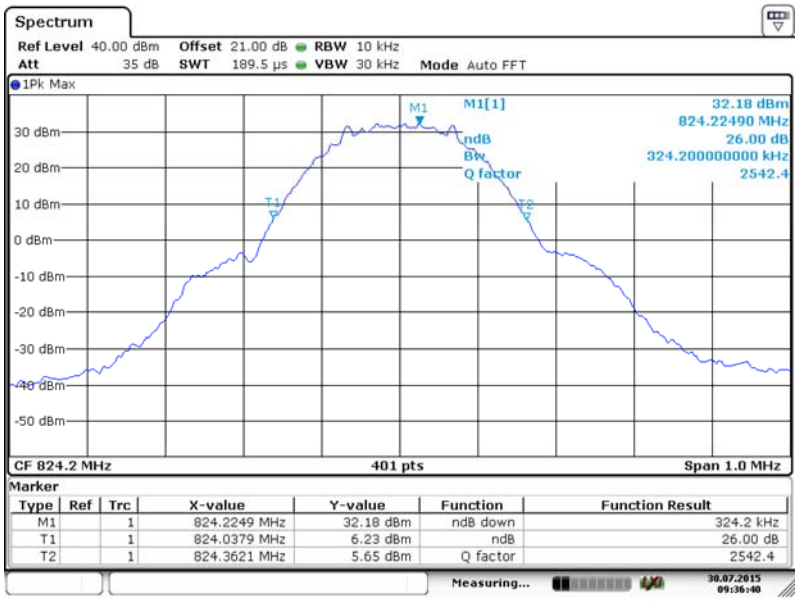
Temperature :	28℃	Test Date :	July 30, 2015
Humidity :	65 %	Test By:	Andy

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
GSM 850	128	824.2	324.2	N/A	PASS
	189	836.4	319.2	N/A	PASS
	251	848.8	319.2	N/A	PASS
EGPRS 850	128	824.2	321.7	N/A	PASS
	189	836.4	321.7	N/A	PASS
	251	848.8	321.7	N/A	PASS
NOTE1: N/A (Not Applicable)					

Temperature :	28℃	Test Date :	July 30, 2015
Humidity :	65 %	Test By:	Andy

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
WCDMA 850	4132	826.4	4863	N/A	PASS
	4182	836.4	4863	N/A	PASS
	4233	846.6	4863	N/A	PASS
NOTE1: N/A (Not Applicable)					

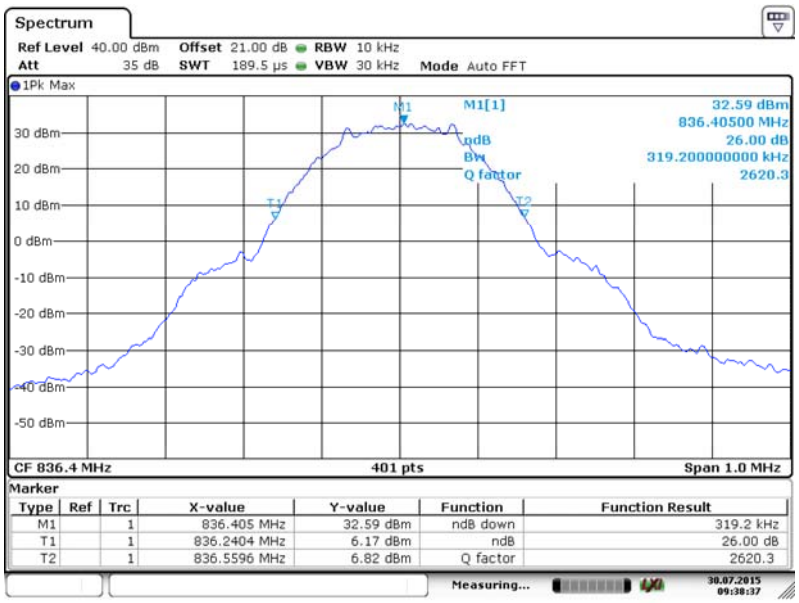
Test Model	Occupied Bandwidth GSM850 Test Channel	☐CH128



P

Date: 30.JUL.2015 09:36:40

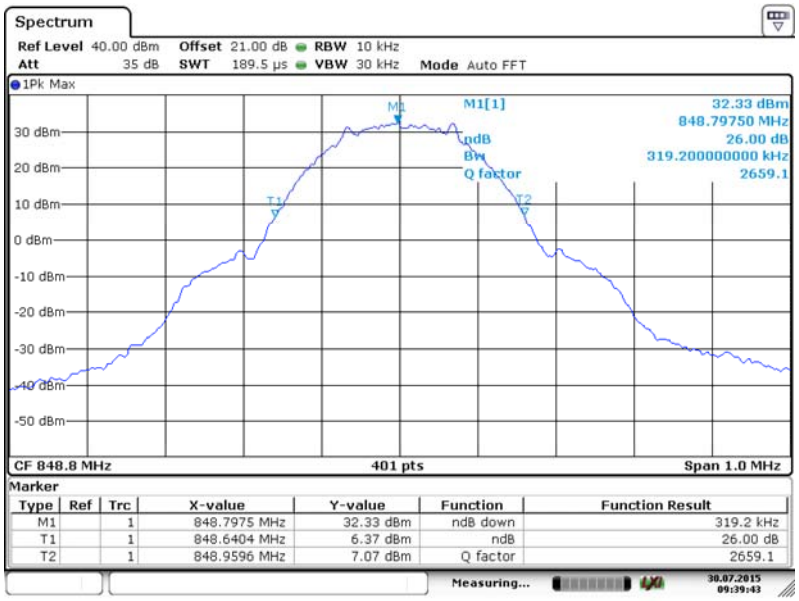
Test Model	Occupied Bandwidth GSM850 Test Channel	☐CH189



P

Date: 30.JUL.2015 09:38:37

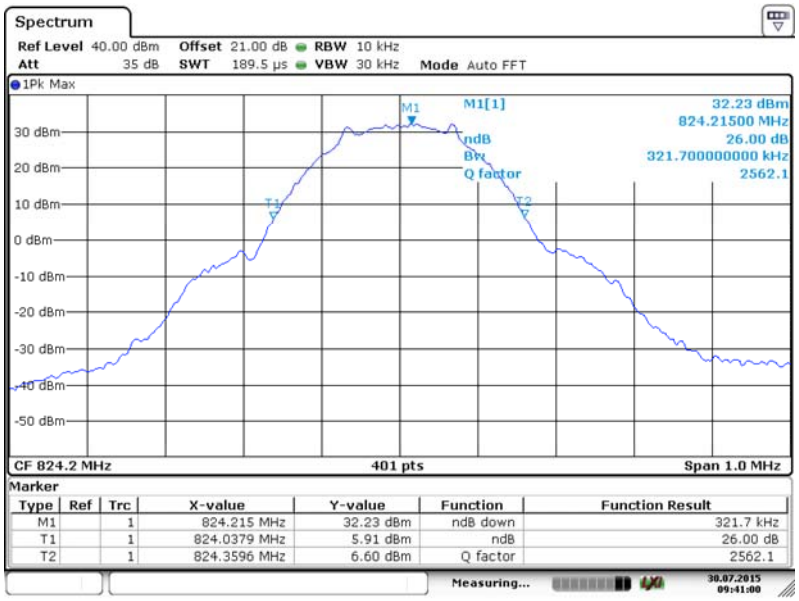
Test Model	Occupied Bandwidth GSM850	
	Test Channel	☐CH251



P

Date: 30.JUL.2015 09:39:43

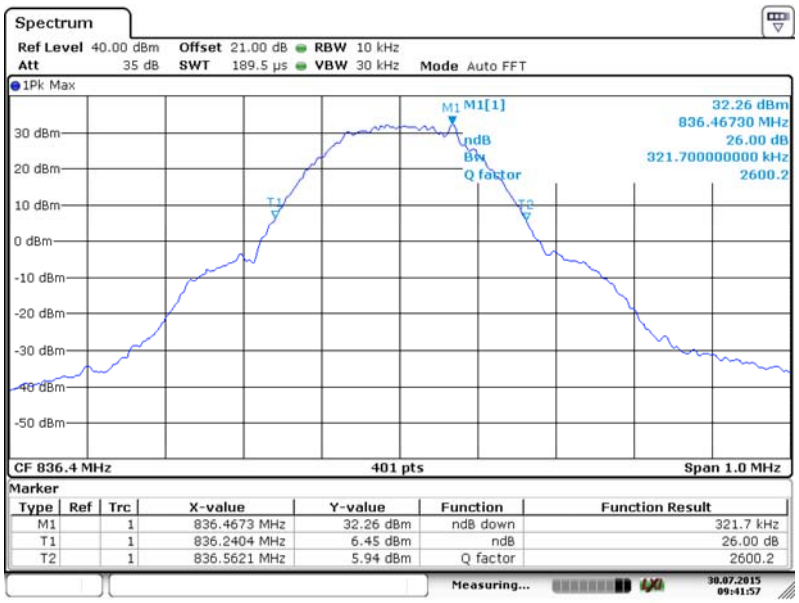
Test Model	Occupied Bandwidth EGPRS 850 Test Channel	☐CH128



P

Date: 30.JUL.2015 09:41:00

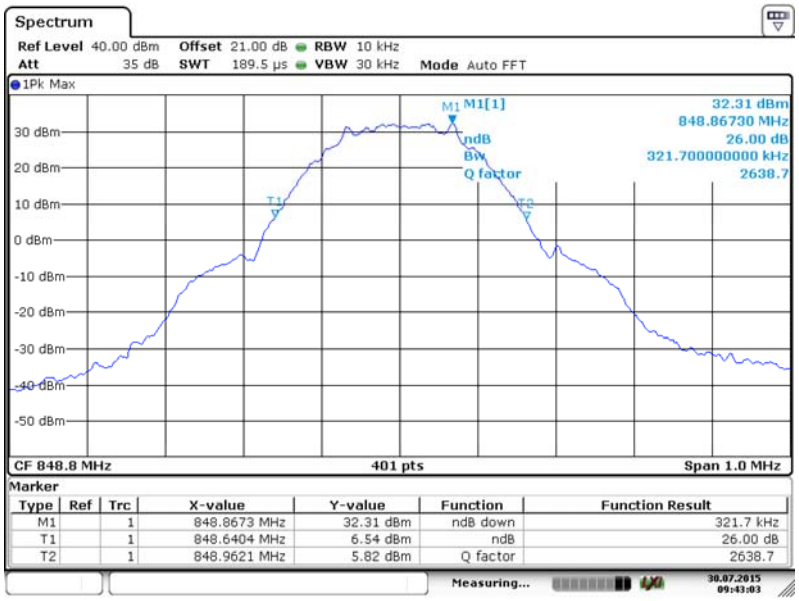
Test Model	Occupied Bandwidth EGPRS 850 Test Channel	☐CH189



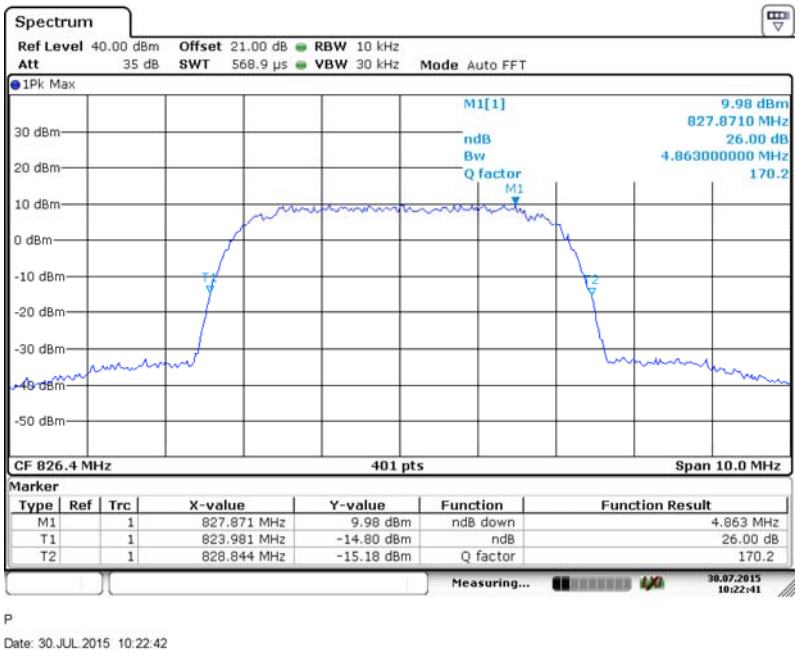
P

Date: 30.JUL.2015 09:41:56

Test Model	Occupied Bandwidth EGPRS 850	
	Test Channel	☐CH251



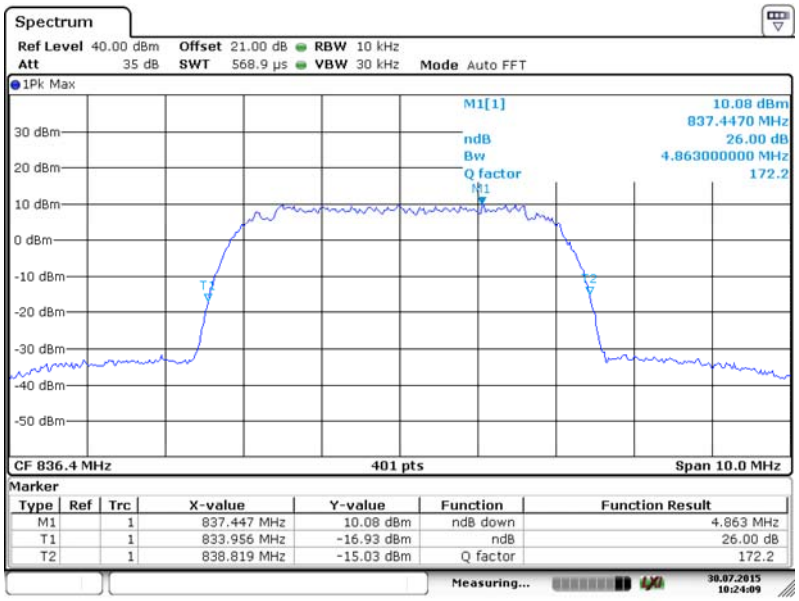
Test Model	Occupied Bandwidth WCDMA 850	
	Test Channel	☐CH4132



P

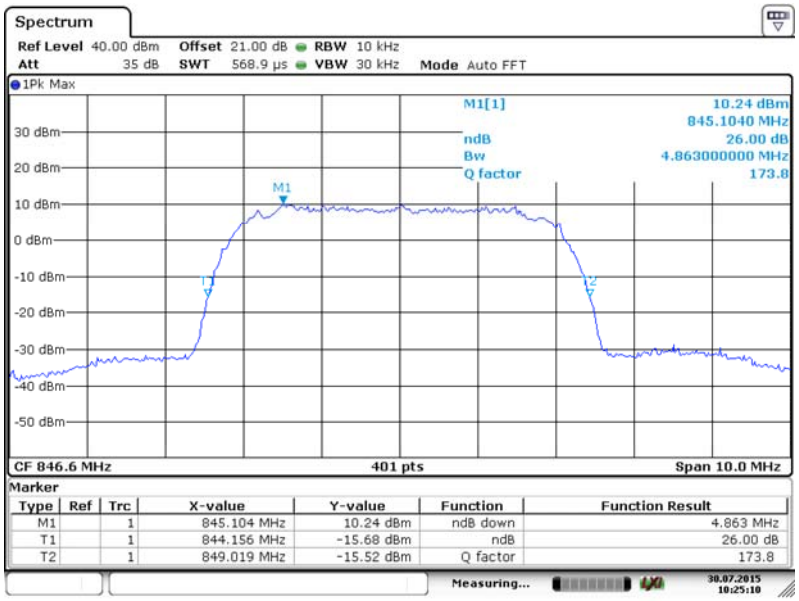
Date: 30.JUL.2015 10:22:42

Test Model	Occupied Bandwidth WCDMA 850 Test Channel ☐CH4182



P
Date: 30.JUL.2015 10:24:09

Test Model	Occupied Bandwidth WCDMA 850 Test Channel ☐CH4233



P
Date: 30.JUL.2015 10:25:09

7.4 EFFECTIVE ISOTROPIC RADIATED POWER

7.4.1 Applicable Standard

According to FCC Part 2.1046 and FCC Part 22.913(a)(2) and FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

7.4.2 Conformance Limit

Extend coverage on a secondary basis into cellular unserved areas, as those areas are defined in §22.949, the ERP of base transmitters and cellular repeaters of such systems must not exceed 1000 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts(38.5dBm).

7.4.3 Test Configuration

Test according to clause 6.2 radio frequency test setup

7.4.4 Test Procedure

Connect the EUT to Universal Radio Communication Tester CMU200 or CMU500 via the antenna connector. A call is set up by the SS according to the generic call set up procedure on a channel with ARFCN in the Mid ARFCN range, power control level set to Max power. MS TXPWR_MAX_CCH is set to the maximum value supported by the Power Class of the Mobile under test
The instrument must have an available measurement/resolution bandwidth that is equal to or exceeds the OBW. If this capability is available, then the following procedure can be used to determine the total peak output power.

a) Set the RBW ≥ OBW.
b) Set VBW ≥ 3 × RBW.
c) Set span ≥ 2 × RBW
d) Sweep time = auto couple.
e) Detector = peak.
f) Ensure that the number of measurement points ≥ span/RBW.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the peak amplitude level.

The EUT was placed on a turn table which is 0.8m above ground plane.Maximum procedure was performed on the six highest emissions to ensure EUT compliance.And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.Repeat above procedures until all frequency measured was complete.
A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUTthrough 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) weremeasured with peak detector.
The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
The EUT shall be replaced by a substitution antenna. The test setup refers to figure below. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antennapolarization.
A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna.
The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
The measurement results are obtained as described below:
Power(EIRP)=PMea- PAg - Pcl - Ga
This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

ERP can be calculated from EIRP by subtracting the gain of the dipole,
ERP = EIRP -2.15dBi.

7.4.5 Test Results

Temperature :	28℃	Test Date :	July 31, 2015
Humidity :	65 %	Test By:	Andy

Operation Mode	Channel Number	Channel Frequency (MHz)	E.I.R.P Result (dBm)	Limit (dBm)	Verdict
GSM850	128	824.2	29.42	38.5	PASS
	189	836.4	29.38	38.5	PASS
	251	848.8	29.41	38.5	PASS
GPRS850	128	824.2	29.35	38.5	PASS
	189	836.4	29.30	38.5	PASS
	251	848.8	29.40	38.5	PASS
WCDMA850	4132	826.4	27.51	38.5	PASS
	4182	836.4	27.55	38.5	PASS
	4233	846.6	27.25	38.5	PASS
NOTE1: N/A (Not Applicable)					

Note:

We performed test at both Polarization H and V and compared which is greater value.
The greater result will be submitted into the report.
Peak ERP(dBm)= P_{Mea} -P_{cl} -P_{Ag} -G_a.

7.5 SPURIOUS EMISSION AT ANTENNA TERMINAL

7.5.1 Applicable Standard

According to FCC Part 2.1051 and FCC Part 22.917(a) and part90.210(g) and FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

7.5.2 Conformance Limit

- Radiated Spurious Emission out of Band

The power of any emission 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.

- 100KHz Band Edg Emissions:

The power of any emission 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.

- Emission Mask

For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:
(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 10 kHz, but no more than 250 percent of the authorized bandwidth: At least 116 log (fd/6.1) dB, or 50 + 10 log (P) dB, or 70 dB, whichever is the lesser attenuation;
(2) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB

7.5.3 Test Configuration

Test according to clause 6.2 radio frequency test setup

7.5.4 Test Configuration

Connect the EUT to Universal Radio Communication Tester CMU200 or CMU500 via the antenna connector. A call is set up by the SS according to the generic call set up procedure on a channel with ARFCN in the Mid ARFCN range, power control level set to Max power. MS TXPWR_MAX_CCH is set to the maximum value supported by the Power Class of the Mobile under test.
Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
then the following procedure can be used to determine spurious emission

a) RBW = 1 MHz for f ≥ 1 GHz(1GHz to 25GHz), 100 kHz for f < 1 GHz(30MHz to 1GHz), 200Hz for f<150KHz(9KHz to 150KHz), 9KHz for f<30MHz(150KHz to 30KHz)
b) Set VBW ≥ 3 × RBW.
c) Set span wide enough to fully capture the emission being measured
d) Sweep time = auto couple.
e) Detector = peak.
f) Ensure that the number of measurement points ≥ span/RBW.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the peak amplitude level.

Step1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
Step2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
Step3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
Step4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
Step5. Make the measurement with the spectrum analyzer's RBW , VBW , taking the record of

maximum spurious emission.
Step6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
Step7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
Step8. Taking the record of output power at antenna port.
Step9. Repeat step 7 to step 8 for another polarization.
Step10. Emission level (dBm) = output power + substitution Gain.Test Results

7.5.5 Test Results

■ Spurious Emission below 30MHz (9KHz to 30MHz)

Temperature:	24℃	Test Date:	July 30, 2015
Humidity:	53 %	Test By:	King Kong
Test mode:	TX Mode		

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
--	--	--	--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor

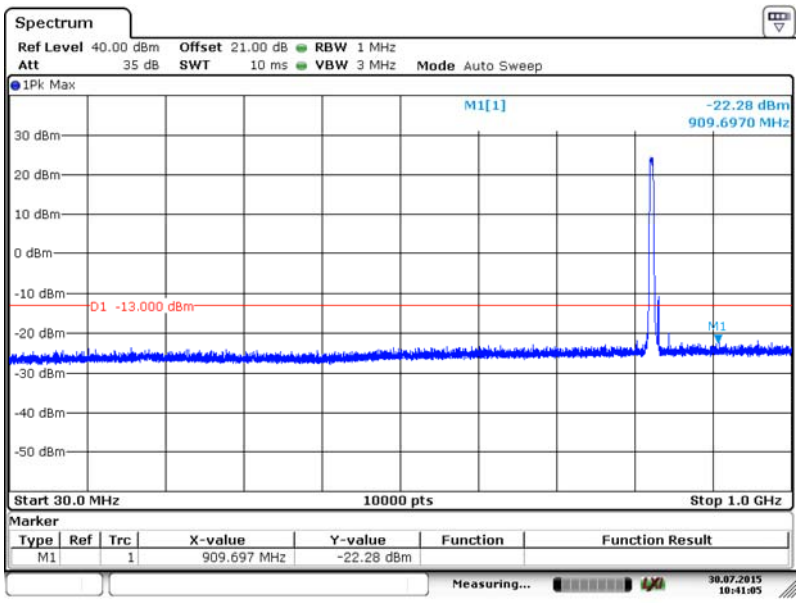
■ Spurious Emission below 1GHz (30MHz to 1GHz)

Temperature :	28℃	Test Date :	July 30, 2015
Humidity :	65 %	Test By:	Andy

Test Mode	Channel Number	Channel Frequency (MHz)	Worst Result Mode	Verdict
GSM 850	128	824.2	☐GSM	PASS
	189	836.4		PASS
	251	848.8		PASS
GPRS 850	128	824.2	☐GPRS	PASS
	189	836.4		PASS
	251	848.8		PASS
WCDMA 850	4132	826.4	☐WCDMA850	PASS
	4182	836.4		PASS
	4233	846.6		PASS
NOTE1: N/A (Not Applicable)				

All modes have been tested, and the worst result recorded was report as below:

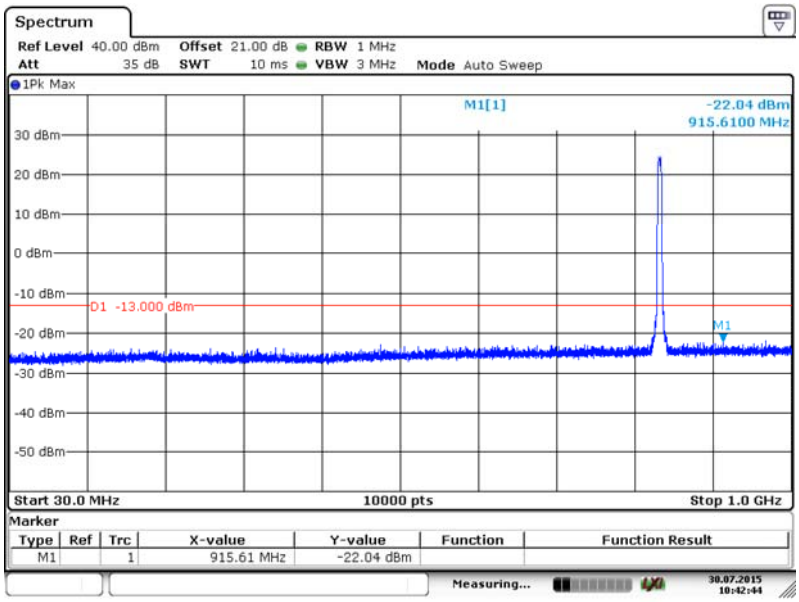
Test Model	Spurious Emission below 1GHz (30MHz to 1GHz) GSM 850	Channel 189



P

Date: 30.JUL.2015 10:41:04

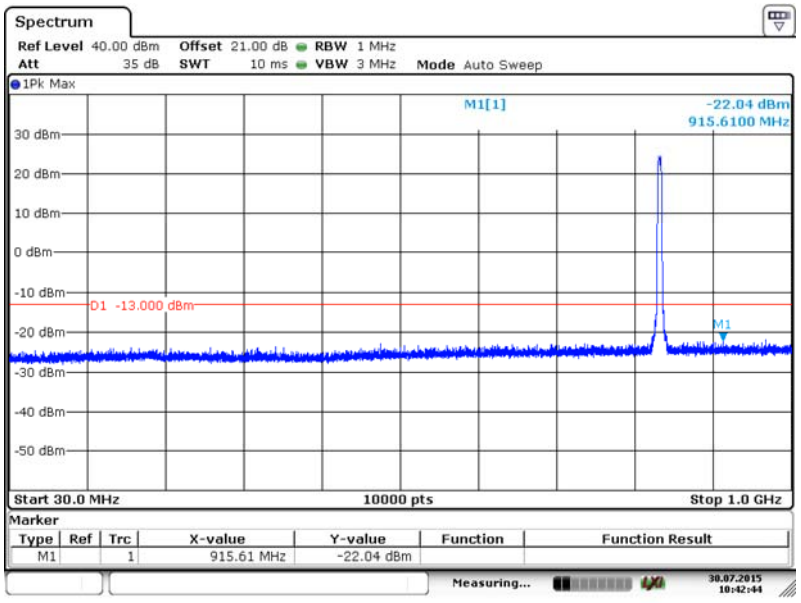
Test Model	Spurious Emission below 1GHz (30MHz to 1GHz) EGPRS 850	Channel 189



P

Date: 30.JUL.2015 10:42:44

Test Model	Spurious Emission below 1GHz (30MHz to 1GHz)	
	WCDMA 850	Channel 4182



P

Date: 30.JUL.2015 10:42:44

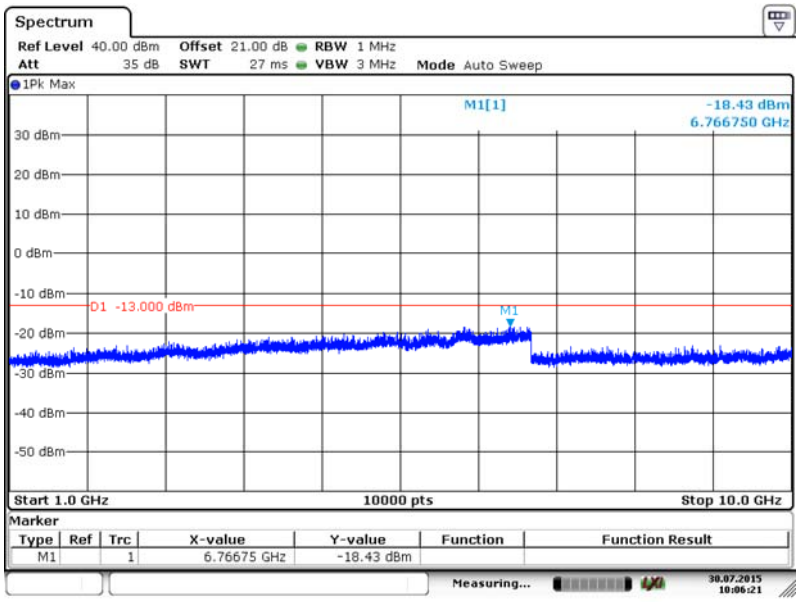
■ Spurious Emission Above 1GHz (1GHz to 9GHz)

Temperature :	28℃	Test Date :	July 30, 2015
Humidity :	65 %	Test By:	Andy

Test Mode	Channel Number	Channel Frequency (MHz)	Worst Result Mode	Verdict
GSM 850	128	824.2	☐GSM	PASS
	189	836.4		PASS
	251	848.8		PASS
GPRS 850	128	824.2	☐GPRS	PASS
	189	836.4		PASS
	251	848.8		PASS
WCDMA 850	4132	826.4	☐WCDMA	PASS
	4182	836.4		PASS
	4233	846.6		PASS
NOTE1: N/A (Not Applicable)				

All modes have been tested, and the worst result recorded was report as below:

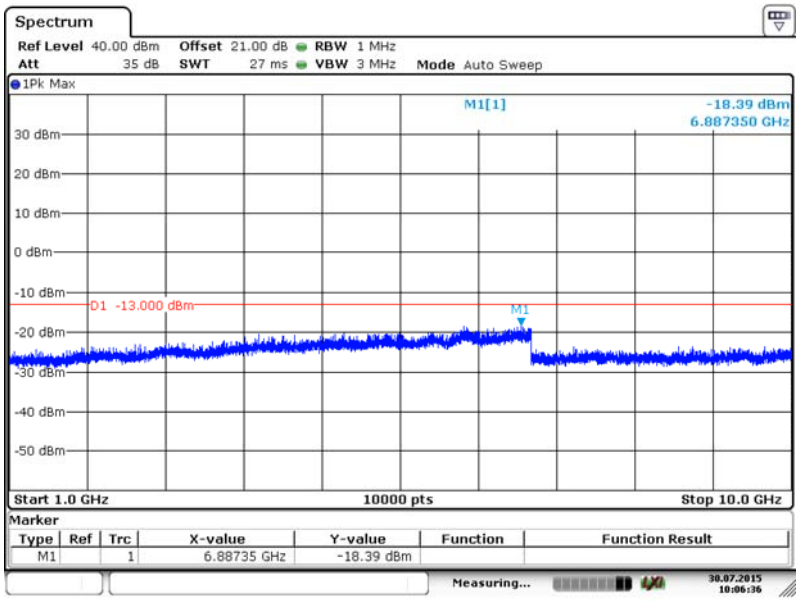
Test Model	Spurious Emission Above 1GHz (1GHz to 9GHz) GSM 850	Channel 189



P

Date: 30.JUL.2015 10:06:21

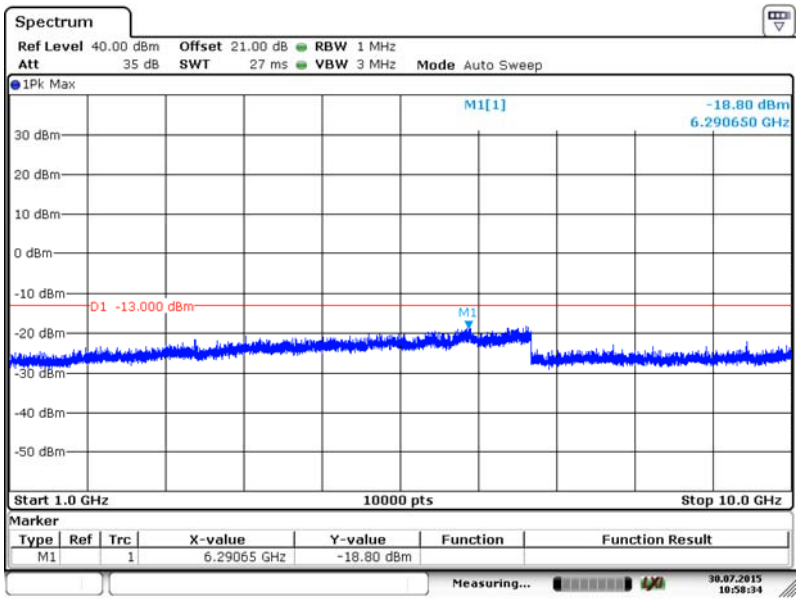
Test Model	Spurious Emission Above 1GHz (1GHz to 9GHz) EGPRS 850	Channel 189



P

Date: 30.JUL.2015 10:06:36

Test Model	Spurious Emission Above 1GHz (1GHz to 9GHz)	
	WCDMA 850	Channel 4182



P

Date: 30.JUL.2015 10:58:34

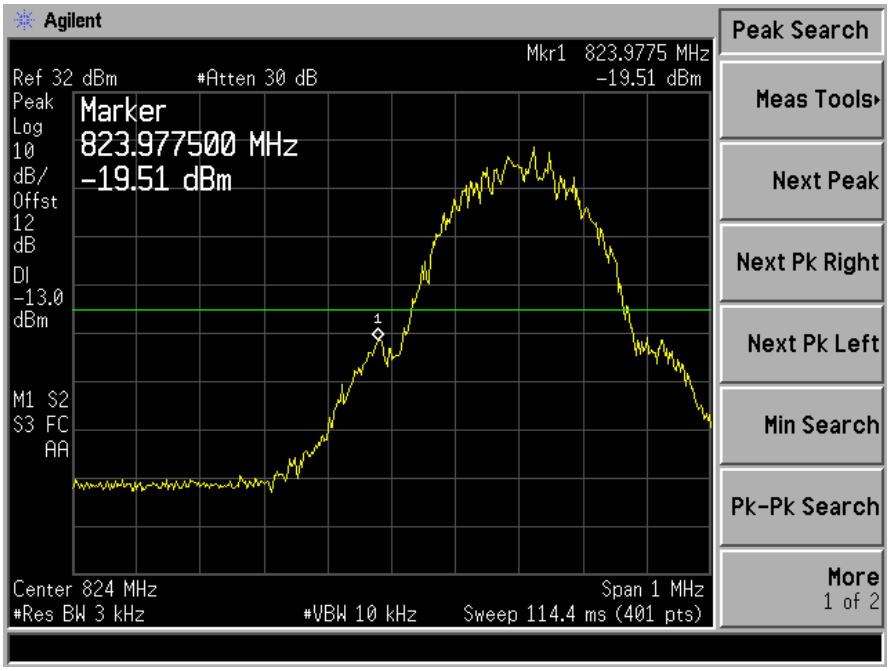
■ Band Edge Emission

Temperature :	28℃	Test Date :	July 30, 2015
Humidity :	65 %	Test By:	Andy

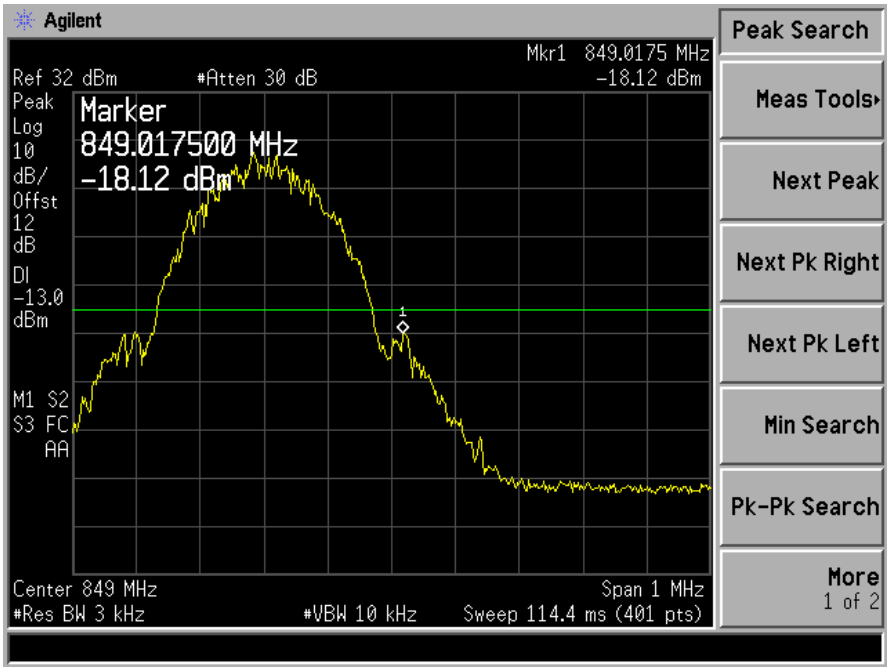
Test Mode	Channel Number	Channel Frequency (MHz)	Worst Result Mode	Verdict
GSM 850	128	824.2	☐GSM	PASS
	189	836.4		PASS
	251	848.8		PASS
GPRS 850	128	824.2	☐GPRS	PASS
	189	836.4		PASS
	251	848.8		PASS
WCDMA 850	4132	826.4	☐WCDMA	PASS
	4182	836.4		PASS
	4233	846.6		PASS
NOTE1: N/A (Not Applicable)				

All modes have been tested, and the worst result recorded was report as below

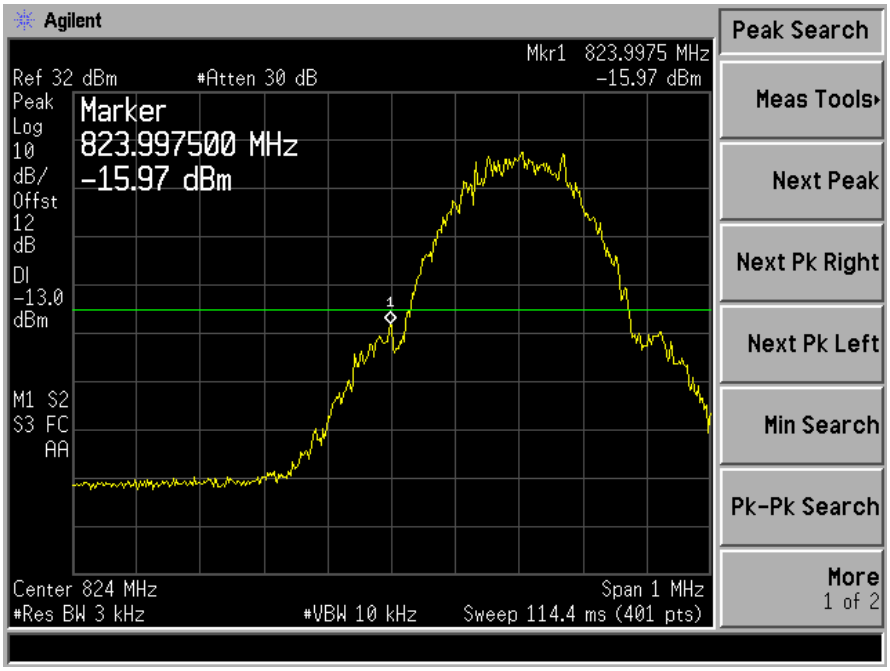
Test Model	Band Edge Emission GSM 850	Channel 128



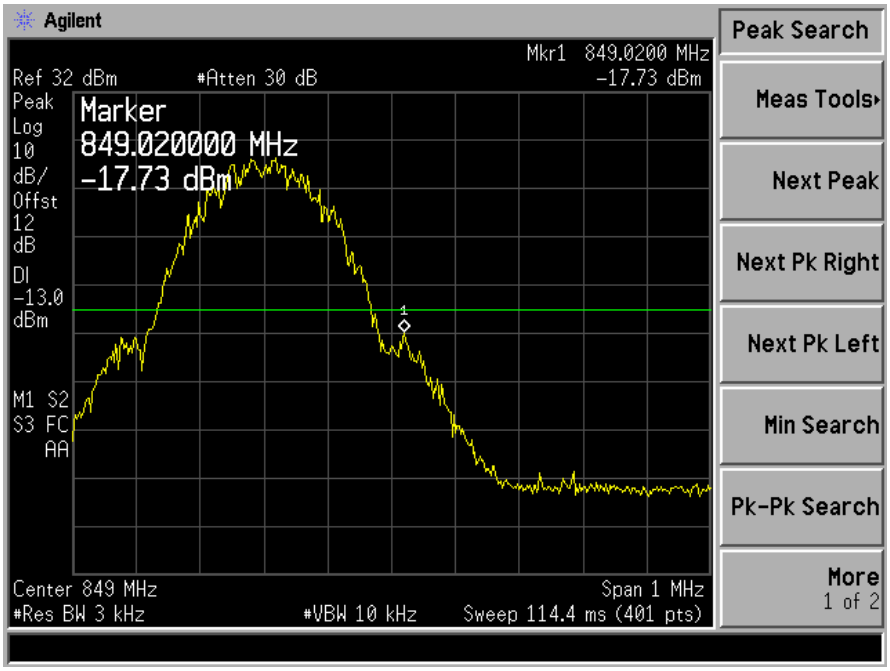
Test Model	Band Edge Emission GSM 850	Channel 251



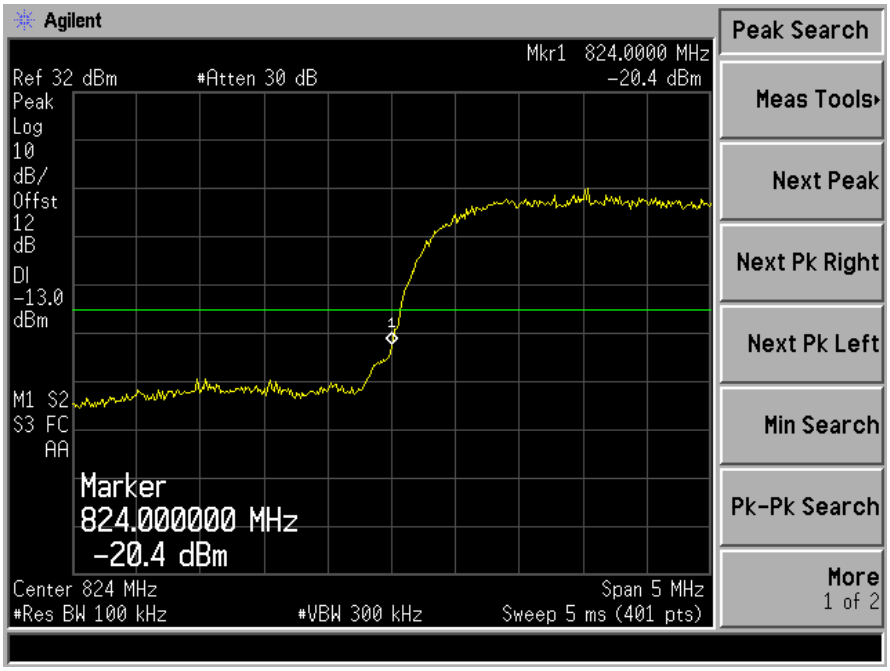
Test Model	Band Edge Emission GPRS 850	Channel 128



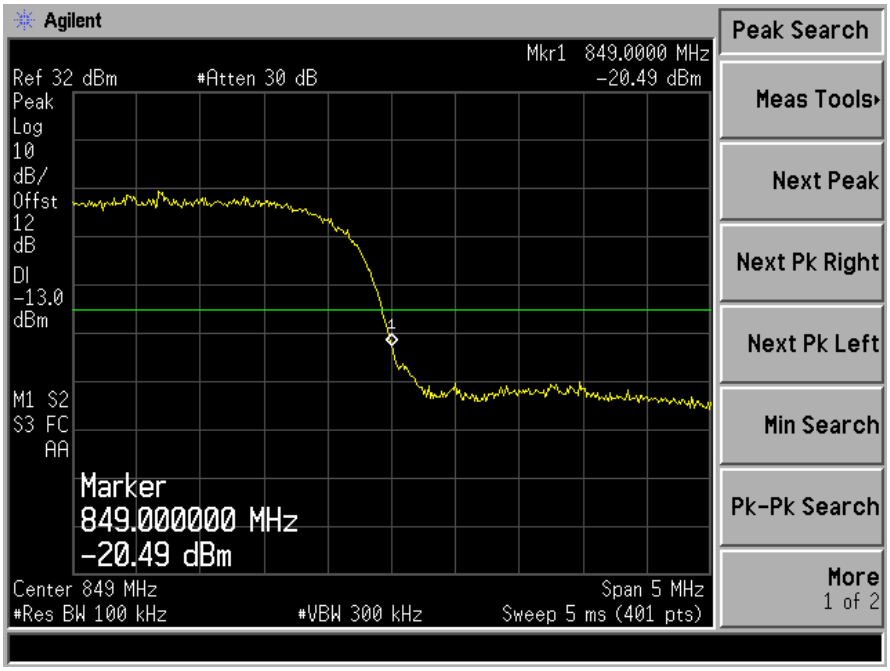
Test Model	Band Edge Emission GPRS 850	Channel 251



Test Model	Band Edge Emission WCDMA 850	Channel 4132



Test Model	Band Edge Emission WCDMA 850	Channel 4233



7.6 PEAK TO AVERAGE RATIO

7.6.1 Applicable Standard

According to FCC 22.913 and FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

7.6.2 Conformance Limit

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

7.6.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

7.6.4 Test Procedure

The EUT was connected to Spectrum Analyzer and Base Station via power divider.
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
Set the number of counts to a value that stabilizes the measured CCDF curve.
Set the measurement interval to 1 ms.
Record the maximum PAPR level associated with a probability of 0.1%.
a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
c) Set the number of counts to a value that stabilizes the measured CCDF curve;
d) Set the measurement interval as follows:
1) for continuous transmissions, set to 1 ms,
2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
e) Record the maximum PAPR level associated with a probability of 0.1%.

7.6.5 Test Results

Temperature:	24℃	Test Date:	July 30, 2015
Humidity:	53 %	Test By:	KING KONG

Operation Mode	Channel Number	Channel Frequency (MHz)	P. A .R (dB)	Limit (dB)	Verdict
GSM 850	128	824.2	4.21	13	PASS
	189	836.4	4.31	13	PASS
	251	848.8	4.20	13	PASS
EGPRS 850	128	824.2	4.21	13	PASS
	189	836.4	4.37	13	PASS
	251	848.8	4.25	13	PASS
WCDMA 850	4132	826.4	5.01	13	PASS
	4182	836.4	5.11	13	PASS
	4233	846.6	5.06	13	PASS
NOTE1: N/A (Not Applicable)					

7.7 FREQUENCY STABILITY

7.7.1 Applicable Standard

According to FCC Part 2.1055 and FCC Part 22.355 and FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

7.7.2 Conformance Limit

According to part 22.355, from 821MHz to 896MHz, for mobile device, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances 2.5ppm.

7.7.3 Test Configuration

Test according to clause 6.1 radio frequency test setup

7.7.4 Test Procedures

Connect the EUT to Universal Radio Communication Tester CMU200 or CMU500 via the antenna connector. A call is set up by the SS according to the generic call set up procedure on a channel with ARFCN in the ARFCN range, power control level set to Max power. MS TXPWR_MAX_CCH is set to the maximum value supported by the Power Class of the Mobile under test.
EUT was placed at temperature chamber and connected to an external power supply.
Temperature and voltage condition shall be tested to confirm frequency stability.
(a) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10^{o} centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short-term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.
(b) The frequency stability shall be measured with variation of primary supply voltage as follows:
(1) Vary primary supply voltage from 95 to 105 percent of the nominal value for other than hand carried battery equipment.
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point, which shall be specified by the manufacturer.

7.7.5 Test Results

Operation Mode	Channel Number	Test Condition		Channel Frequency (MHz)	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)
		Voltage (V)	Temp (℃)				
GSM 850	CH128	Vnom	-20	824.2	-14	-0.016	2.5
			-10	824.2	-15	-0.018	2.5
			0	824.2	-10	-0.012	2.5
			10	824.2	-16	-0.019	2.5
			20	824.2	-15	-0.018	2.5
			30	824.2	-15	-0.018	2.5
			40	824.2	-17	-0.020	2.5
			50	824.2	-13	-0.015	2.5
		85% Vnom	20	824.2	-15	-0.018	2.5
		115% Vnom	20	824.2	-11	-0.013	2.5
	CH 189	Vnom	-20	836.4	-14	-0.017	2.5
			-10	836.4	-11	-0.013	2.5
			0	836.4	-13	-0.016	2.5
			10	836.4	-14	-0.017	2.5
			20	836.4	-11	-0.013	2.5
			30	836.4	-13	-0.016	2.5
			40	836.4	-14	-0.017	2.5
			50	836.4	-11	-0.013	2.5
		85% Vnom	20	836.4	-13	-0.016	2.5
		115% Vnom	20	836.4	-14	-0.017	2.5
	CH 251		-20	848.8	-17	-0.020	2.5
			-10	848.8	-10	-0.011	2.5
			0	848.8	-15	-0.017	2.5
			10	848.8	-12	-0.014	2.5
			20	848.8	-11	-0.012	2.5
			30	848.8	-15	-0.017	2.5
			40	848.8	-11	-0.012	2.5
			50	848.8	-12	-0.014	2.5
		85% Vnom	20	848.8	-13	-0.015	2.5
		115% Vnom	20	848.8	-14	-0.016	2.5
VERDICT				PASS			

Operation Mode	Channel Number	Test Condition		Channel Frequency (MHz)	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)
		Voltage (V)	Temp (℃)				
GPRS 850	CH 128	Vnom	-20	824.2	-14	-0.017	2.5
			-10	824.2	-11	-0.013	2.5
			0	824.2	-13	-0.016	2.5
			10	824.2	-14	-0.017	2.5
			20	824.2	-11	-0.013	2.5
			30	824.2	-13	-0.016	2.5
			40	824.2	-14	-0.017	2.5
			50	824.2	-11	-0.013	2.5
		85% Vnom	20	824.2	-13	-0.016	2.5
		115% Vnom	20	824.2	-14	-0.017	2.5
	CH 189	Vnom	-20	836.4	-12	-0.014	2.5
			-10	836.4	-14	-0.016	2.5
			0	836.4	-10	-0.011	2.5
			10	836.4	-12	-0.014	2.5
			20	836.4	-11	-0.013	2.5
			30	836.4	-17	-0.020	2.5
			40	836.4	-13	-0.015	2.5
			50	836.4	-15	-0.017	2.5
		85% Vnom	20	836.4	-11	-0.013	2.5
		115% Vnom	20	836.4	-12	-0.014	2.5
	CH 251		-20	848.8	-14	-0.017	2.5
			-10	848.8	-11	-0.013	2.5
			0	848.8	-13	-0.016	2.5
			10	848.8	-14	-0.017	2.5
			20	848.8	-11	-0.013	2.5
			30	848.8	-13	-0.016	2.5
			40	848.8	-14	-0.017	2.5
			50	848.8	-11	-0.013	2.5
		85% Vnom	20	848.8	-13	-0.016	2.5
		115% Vnom	20	848.8	-14	-0.017	2.5
VERDICT				PASS			

Operation Mode	Channel Number	Test Condition		Channel Frequency (MHz)	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)
		Voltage (V)	Temp (℃)				
WCDMA 850	CH 4132	Vnom	-20	826.4	-14	-0.017	2.5
			-10	826.4	-11	-0.013	2.5
			0	826.4	-13	-0.016	2.5
			10	826.4	-14	-0.017	2.5
			20	826.4	-11	-0.013	2.5
			30	826.4	-13	-0.016	2.5
			40	826.4	-14	-0.017	2.5
			50	826.4	-11	-0.013	2.5
		85% Vnom	20	826.4	-13	-0.016	2.5
		115% Vnom	20	826.4	-14	-0.017	2.5
	CH 4182	Vnom	-20	836.4	-14	-0.017	2.5
			-10	836.4	-11	-0.013	2.5
			0	836.4	-13	-0.016	2.5
			10	836.4	-14	-0.017	2.5
			20	836.4	-11	-0.013	2.5
			30	836.4	-13	-0.016	2.5
			40	836.4	-14	-0.017	2.5
			50	836.4	-11	-0.013	2.5
		85% Vnom	20	836.4	-13	-0.016	2.5
		115% Vnom	20	836.4	-14	-0.017	2.5
	CH 4233	Vnom	-20	846.6	-14	-0.016	2.5
			-10	846.6	-12	-0.014	2.5
			0	846.6	-13	-0.015	2.5
			10	846.6	-10	-0.011	2.5
			20	846.6	-15	-0.017	2.5
			30	846.6	-13	-0.015	2.5
			40	846.6	-14	-0.016	2.5
			50	846.6	-16	-0.018	2.5
		85% Vnom	20	846.6	-12	-0.014	2.5
		115% Vnom	20	846.6	-15	-0.017	2.5
VERDICT				PASS			

7.8 POWER LINE CONDUCTED EMISSIONS

7.8.1 Applicable Standard

According to FCC Part 15.207(a)

7.8.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50
Note: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

7.8.3 Test Configuration

Test according to clause 6.3 conducted emission test setup

7.8.4 Test Procedure

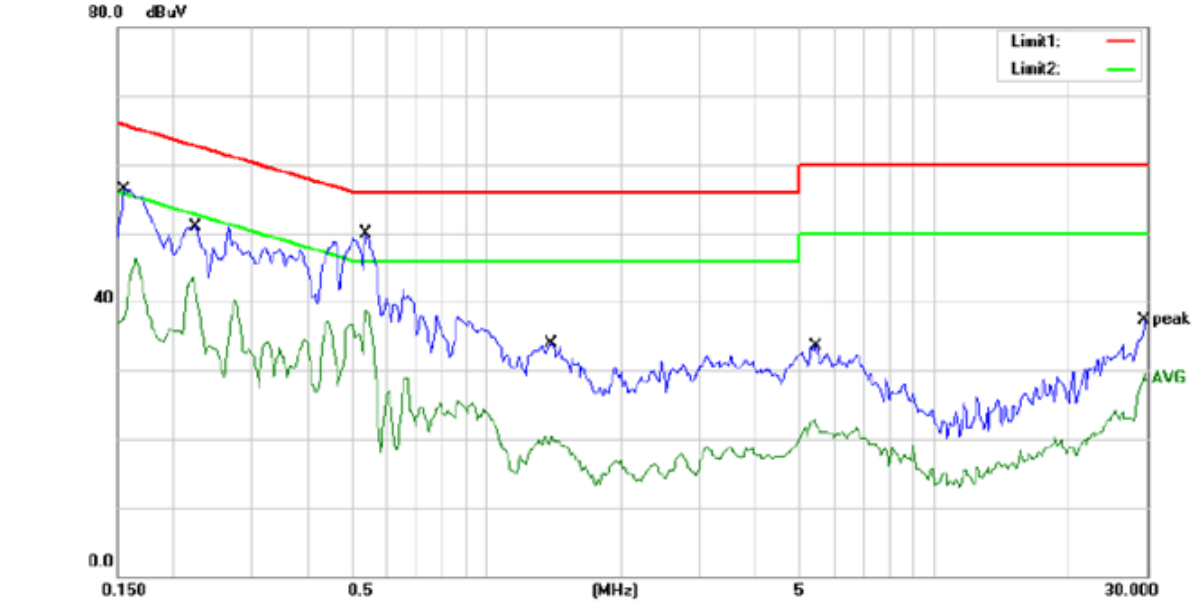
The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

7.8.5 Test Results

. Test Mode	Channel Number	Channel Frequency (MHz)	Worst Result Mode	Verdict
GSM 850	128	824.2	☐GSM	PASS
	189	836.4		PASS
	251	848.8		PASS
GPRS 850	128	824.2	☐ GPRS	PASS
	189	836.4		PASS
	251	848.8		PASS
WCDMA 850	4132	826.4	☐WCDMA 850	PASS
	4182	836.4		PASS
	4233	846.6		PASS
NOTE1: N/A (Not Applicable)				

All modes have been tested, and the worst result recorded was report as below

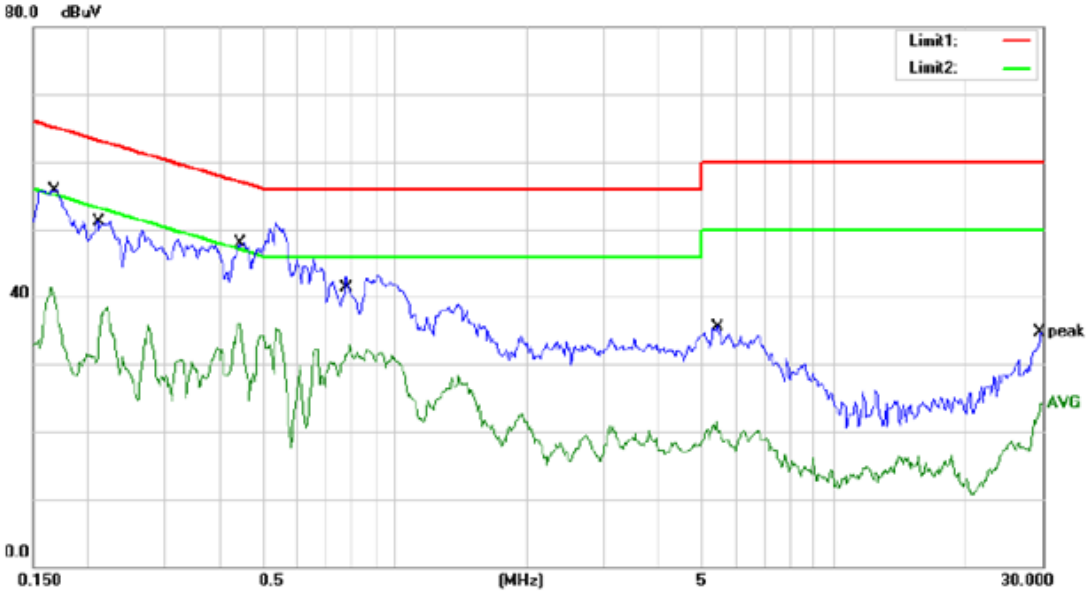
Test Model	Spurious Emission below 30MHz (0.15MHz to30MHz)		
	GSM 850	Test Channel	Channel 189



Site Conduction #1 Phase: N Temperature: 26

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1550	56.28	0.00	56.28	65.73	-9.45	QP	
2		0.1550	46.22	0.00	46.22	55.73	-9.51	AVG	
3		0.2200	50.92	0.00	50.92	62.82	-11.90	QP	
4		0.2200	43.55	0.00	43.55	52.82	-9.27	AVG	
5	*	0.5350	49.90	0.00	49.90	56.00	-6.10	QP	
6		0.5350	38.73	0.00	38.73	46.00	-7.27	AVG	
7		1.4000	33.83	0.00	33.83	56.00	-22.17	QP	
8		1.4000	20.35	0.00	20.35	46.00	-25.65	AVG	
9		5.3900	33.60	0.00	33.60	60.00	-26.40	QP	
10		5.3900	22.95	0.00	22.95	50.00	-27.05	AVG	
11		29.5000	37.21	0.00	37.21	60.00	-22.79	QP	
12		29.5000	29.54	0.00	29.54	50.00	-20.46	AVG	

Test Model	GSM 850	Spurious Emission below 30MHz (0.15MHz to30MHz) Test Channel	Channel 189



Site Conduction #1 Phase: L1 Temperature: 26

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1650	55.92	0.00	55.92	65.21	-9.29	QP	
2		0.1650	41.22	0.00	41.22	55.21	-13.99	AVG	
3		0.2104	51.19	0.00	51.19	63.19	-12.00	QP	
4		0.2104	38.55	0.00	38.55	53.19	-14.64	AVG	
5	*	0.4450	50.90	0.00	50.90	56.97	-6.07	QP	
6		0.4450	36.09	0.00	36.09	46.97	-10.88	AVG	
7		0.7900	43.18	0.00	43.18	56.00	-12.82	QP	
8		0.7900	32.83	0.00	32.83	46.00	-13.17	AVG	
9		5.3900	35.60	0.00	35.60	60.00	-24.40	QP	
10		5.3900	21.45	0.00	21.45	50.00	-28.55	AVG	
11		29.6500	34.71	0.00	34.71	60.00	-25.29	QP	
12		29.6500	24.11	0.00	24.11	50.00	-25.89	AVG	

7.9 RECEIVER SPURIOUS EMISSION

7.9.1 Applicable Standard

According to FCC Part 2.1051 and FCC Part 22.917(a) and FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

7.9.2 Conformance Limit

The power of any emission 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.

7.9.3 Test Configuration

Test according to clause 6.2 radio frequency test setup

7.9.4 Test Configuration

Connect the EUT to Universal Radio Communication Tester CMU200 or CMU500 via the antenna connector.
The EUT was communicated with the BTS simulator through Air interface. The Mobile Station operated on the typical channel and the Mobile Station worked in idle mode, transmitter was not work in this test. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
then the following procedure can be used to determine spurious emission

a) RBW = 1 MHz for f ≥ 1 GHz(1GHz to 25GHz), 100 kHz for f < 1 GHz(30MHz to 1GHz), 200Hz for f<150KHz(9KHz to 150KHz), 9KHz for f<30MHz(150KHz to 30KHz)
b) Set VBW ≥ 3 × RBW.
c) Set span wide enough to fully capture the emission being measured
d) Sweep time = auto couple.
e) Detector = peak.
f) Ensure that the number of measurement points ≥ span/RBW.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the peak amplitude level.

Step1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
Step2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
Step3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
Step4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
Step5. Make the measurement with the spectrum analyzer's RBW , VBW , taking the record of maximum spurious emission.
Step6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
Step7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
Step8. Taking the record of output power at antenna port.
Step9. Repeat step 7 to step 8 for another polarization.
Step10. Emission level (dBm) = output power + substitution Gain.Test Results

7.9.5 Test Results

. Test Mode	Channel Number	Channel Frequency (MHz)	Worst Result Mode	Verdict
GSM 850	128	824.2	☐GSM	PASS
	189	836.4		PASS
	251	848.8		PASS
GPRS 850	128	824.2	☐GPRS	PASS
	189	836.4		PASS
	251	848.8		PASS
WCDMA 850	4132	826.4	☐WCDMA	PASS
	4182	836.4		PASS
	4233	846.6		PASS
NOTE1: N/A (Not Applicable)				

All modes have been tested, and the worst result recorded was report as below

GSM850 (GSM Link), 9KHz to 30MHz

The low frequency, which started from 9KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line, and that was not reported per 2.1057 (c).

GSM850 (GSM Link), 30MHz to 1GHz

Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Middle Channel 189 (836.40MHz)							
505.5	H	-44.57	3.04	-2.50	-50.11	-13.00	-37.11
505.5	V	-43.40	3.04	-2.50	-48.94	-13.00	-35.94

GSM850 (GSM Link), Above 1GHz

Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Middle Channel 189 (836.40MHz)							
2415.60	H	-52.37	6.85	-2.80	-62.02	-13.00	-49.02
2415.60	V	-53.16	6.85	-2.80	-62.81	-13.00	-49.81

GSM850 (GPRS 12 Link), 9KHz to 30MHz

The low frequency, which started from 9KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line, and that was not reported per 2.1057 (c).

GSM850 (GPRS 12 Link), 30MHz to 1GHz

Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Middle Channel 189 (836.40MHz)							
485.30	H	-46.38	3.15	-2.51	-52.04	-13.00	-39.04
485.30	V	-45.58	3.15	-2.51	-51.24	-13.00	-38.24

GSM850 (GPRS 12 Link), Above 1GHz

Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Middle Channel 189 (836.40MHz)							
2315.60	H	-50.38	7.12	-2.24	-59.74	-13.00	-46.74
2315.60	V	-49.66	7.12	-2.24	-59.02	-13.00	-46.02

WCDMA Band V 9KHz to 30MHz

The low frequency, which started from 9KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line, and that was not reported per 2.1057 (c).

WCDMA Band V 30MHz to 1GHz

Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Middle Channel 4182 (836.50MHz)							
715.30	H	-52.30	2.12	-2.10	-56.52	-13.00	-43.52
715.30	V	-51.66	2.12	-2.10	-55.88	-13.00	-42.88

WCDMA Band V Above 1GHz

Frequency (MHz)	Ant. Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Middle Channel 4182 (836.50MHz)							
1830.25	H	-47.35	7.13	10.05	-44.43	-13.00	-31.43
1830.25	V	-48.13	7.13	10.05	-45.21	-13.00	-32.21
2715.60	H	-49.56	7.50	11.26	-45.80	-13.00	-32.80
2715.60	V	-51.26	7.50	11.26	-47.50	-13.00	-34.50
4120.80	H	-53.68	9.12	12.86	-49.94	-13.00	-36.94
4120.80	V	-55.30	9.12	12.86	-51.56	-13.00	-38.56

END OF REPORT