



FCC/IC Test Report

FOR:

Model Name: 1E60326G07

FCC ID: Q371E60326REB
IC ID: 4638A-1E60326REB

47 CFR Part 2, 22, 24
RSS-132 Issue 2
RSS-133 Issue 5

TEST REPORT #: EMC_TRANE_002_12001_WWAN
DATE: 2012-04-11



Bluetooth
Bluetooth Qualification
Test Facility
(BQTF)

CTIA Authorized Test Lab
LAB CODE 20020328-00

FCC listed:
A2LA Accredited

IC recognized #
3462B-1

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Table of Contents

1	Assessment	3
2	Administrative Data.....	4
2.1	Identification of the Testing Laboratory Issuing the Radio Test Report.....	4
2.2	Identification of the Client	4
2.3	Identification of the Manufacturer	4
3	Equipment under Test (EUT)	5
3.1	Specification of the Equipment under Test	5
3.2	Identification of the Equipment Under Test (EUT)	6
3.3	Identification of Accessory equipment.....	6
4	Subject of Investigation	7
5	Summary of Measurement Results.....	8
6	Measurements.....	10
6.1	RF Power Output.....	10
6.1.1	<i>References</i>	10
6.1.2	<i>Measurement requirements:.....</i>	10
6.1.3	<i>Limits:</i>	10
6.1.4	<i>Conducted Output Power Measurement procedure.....</i>	11
6.1.5	<i>Radiated Output Power Measurement procedure.....</i>	12
6.1.6	<i>RF Power Output 850MHz band.....</i>	13
6.1.7	<i>RF Power Output 1900MHz band.....</i>	14
6.1.8	<i>Results</i>	15
6.2	Spurious Emissions Radiated	21
6.2.1	<i>References</i>	21
6.2.2	<i>Measurement requirements:.....</i>	21
6.2.3	<i>Limits:</i>	21
6.2.4	<i>Radiated out of band measurement procedure:</i>	23
6.2.5	<i>Sample Calculations for Radiated Measurements</i>	24
6.2.6	<i>Radiated out of band emissions results on EUT- Transmit Mode:.....</i>	25
6.3	Test Equipment and Ancillaries used for tests	40
7	Block Diagrams	41
8	Revision History	42

1 Assessment

The following device was tested against the applicable criteria specified in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations and Industry Canada Standards RSS 132 and RSS 133 and no deviations were ascertained during the course of the tests performed.

Company	Description	Model #
Thermo King Corp. Ingersoll	Radio Expansion Board 'REB" Telematics board for transport refrigeration	1E60326G07

Responsible for Testing Laboratory:

2012-04-11	Compliance	Sajay Jose (Lab Manager)	
Date	Section	Name	Signature

Responsible for the Report:

2012-04-11	Compliance	David Lang (Test Engineer)	
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section3. CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Radio Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Test Lab Director:	Heiko Strehlow
Responsible Project Leader:	Sajay Jose

2.2 Identification of the Client

Applicant's Name:	Thermo King Corp. Ingersoll
Street Address:	314 W 90th Street
City/Zip Code	Minneapolis, MN 55420
Country	USA
Contact Person:	Sofronio Eduardo Tan
Phone No.	952-887-3105
Fax:	---
e-mail:	eduardo_tan@irco.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as applicant
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name:	1E60326G07
Product Type:	The REB (Radio Expansion Board) is a wireless communication platform that offers fleet owners the ability to monitor their refrigerated units. Cellular and GPS capabilities communicate with a web-based application.
Hardware Revision :	Rev F
Software Revision :	A010
FCC-ID:	Q371E60326REB
IC-ID :	4638A-1E60326REB
Frequency:	GSM 850: 824.2-848.8MHz; PCS 1900: 1850.2-1909.8MHz
Type(s) of Modulation:	GMSK, 8PSK, QPSK
Number of channels:	GSM850: 125 and PCS 1900: 300
Antenna Type:	<u>Multi Band Antenna Z3400:</u> Antenna Gain @ 850 MHz = 5.2dBi (measured ERP + 2.14dB – measured Conducted Output Power) Antenna Gain @ 1900 MHz = -0.19dBi <u>Max. Conducted Peak Output Power measured:</u> 824.2MHz: 30.08dBm = 1018.59mW 836.6MHz: 30.11dBm = 1025.65mW 848.16MHz: 30.16dBm = 1037.53mW 1850.2MHz: 29.97dBm = 993.12mW 1880MHz: 30.18dBm = 1042.32mW 1909.8MHz: 29.78dBm = 950.60mW
Power Supply:	12 VDC (Battery powered – 925- CCA wet cell)
Temperature Range:	-40°C to +85°C Antenna info

Note: The EUT includes a pre-certified GSM module (Cinterion AC65I FCC ID: QIPAC65I) and a pre-certified WiFi module (FCC ID: RUJ-LR802UKN2).

3.2 Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	HW Version	SW Version	Notes
1	G0023251144REB	Rev F	A010	---

3.3 Identification of Accessory equipment

AE #	Type	Manufacturer	Model	Serial Number
1	Multi Band Antenna	PCTEL	Z3400	none

4 Subject of Investigation

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in the following test standards:

- 47 CFR Part 2: Title 47 of the Code of Federal Regulations: Chapter I-Federal Communications Commission Frequency allocations and radio treaty matters; general rules and regulations.
- 47 CFR Part 22: Title 47 of the Code of Federal Regulations: Chapter I-Federal Communications Commission subchapter B- common carrier services; Part 22- Public mobile services
- 47 CFR Part 24: Title 47 of the Code of Federal Regulations: Chapter I-Federal Communications Commission subchapter B- common carrier services; Part 24- Personal communication services
- RSS 132- Issue 2: Spectrum management and telecommunication policy- Radio Standards Specifications Cellular telephones employing new technologies operating in the bands 824-849MHz and 869-894MHz
- RSS 133- Issue 5: Spectrum management and telecommunication policy- Radio Standards Specifications- 2GHz personal communication services

This test report is to support a request for new equipment authorization under the FCC ID **Q371E60326REB** and IC ID **4638A-1E60326REB**.

All testing was performed on the product referred to in Section 3 as EUT.

5 Summary of Measurement Results

850 Band:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046 §22.913 (a) RSS132 4.4	RF Output Power	Nominal	GSM 850	■	□	□	□	Complies
§2.1055 §22.355 RSS132 4.3	Frequency Stability	Nominal	GSM 850	□	□	□	■	Complies
§2.1049 §22.917(b) RSS132 4.2	Occupied Bandwidth	Nominal	GSM 850	□	□	□	■	Complies
§2.1051 §22.917 RSS132 4.5	Band Edge Compliance	Nominal	GSM 850	■	□	□	□	Complies
§2.1051 §22.917 RSS132 4.5	Conducted Spurious Emissions	Nominal	GSM 850	□	□	□	■	Complies
§2.1053 §22.917 RSS132 4.5	Radiated Spurious Emissions	Nominal	GSM 850	■	□	□	□	Complies

Note: NA= Not Applicable;

NP= Not Performed.

Results leveraged from Module test report # MDE_SIEM_0714_FCCb issued by InterLab (October 01, 2007).

1900 Band:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046 §24.232 (a) RSS133 6.4	RF Output Power	Nominal	GSM 1900	■	□	□	□	Complies
§2.1055 §24.235 RSS133 6.3	Frequency Stability	Nominal	GSM 1900	□	□	□	■	Complies
§2.1049 §24.238(b) RSS133 6.2	Occupied Bandwidth	Nominal	GSM 1900	□	□	□	■	Complies
§2.1051 §24.238 RSS133 6.5	Band Edge Compliance	Nominal	GSM 1900	■	□	□	□	Complies
§2.1051 §24.238 RSS133 6.5	Conducted Spurious Emissions	Nominal	GSM 1900	□	□	□	■	Complies
§2.1053 §24.238 RSS133 6.5	Radiated Spurious Emissions	Nominal	GSM 1900	■	□	□	□	Complies

Note: NA= Not Applicable;

NP= Not Performed.

Results leveraged from Module test report #MDE_SIEM_0714_FCCc issued by InterLab (October 01, 2007).

6 Measurements

6.1 RF Power Output

6.1.1 References

FCC: CFR Part 2.1046, CFR Part 22.913, CFR Part 24.232
IC: RSS-Gen Section 4.8; RSS 132 Section 4.4; RSS 133 Section 6.4

6.1.2 Measurement requirements:

6.1.2.1 FCC 2.1046: RF power output.

Power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on circuit elements as specified. The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

6.1.2.2 RSS-Gen 4.8: RF power output.

Transmitter output power measurements shall be carried out before the unwanted emissions test. The transmitter output power value, obtained from this test, serves as the reference level used to determine the unwanted emissions.

6.1.3 Limits:

6.1.3.1 FCC 22.913 (a) Effective radiated power limits.

The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts.

6.1.3.2 FCC 24.232 (b)(c) Power limits.

(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).
(c) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement over the full bandwidth of the channel.

6.1.3.3 RSS-132 Section 4.4

The transmitter output power shall not exceed the limits given in SRSP-503.

SRSP-503: The maximum EIRP shall be 11.5W for mobile stations.

6.1.3.4 RSS-133 Section 6.4

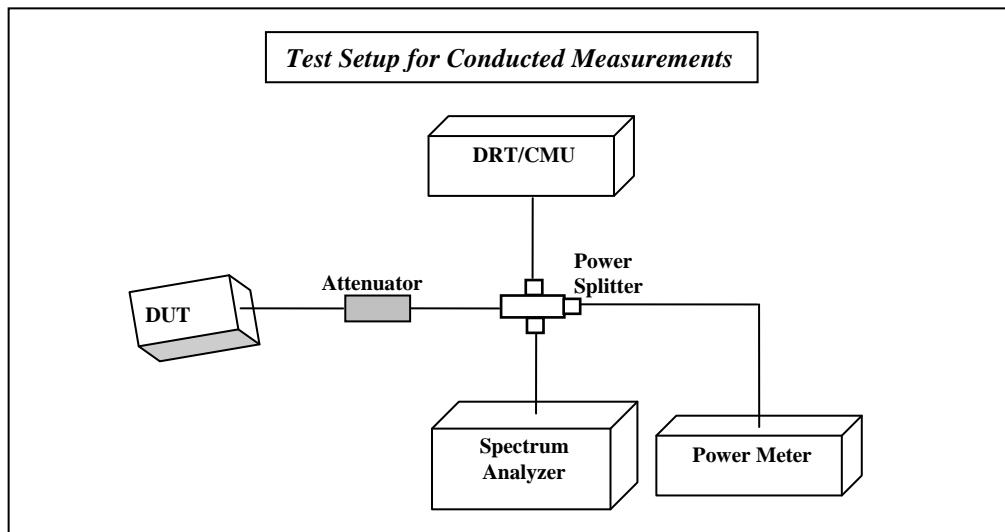
The average equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510.

SRSP-510: Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p.

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

6.1.4 Conducted Output Power Measurement procedure

Ref: TIA-603C 2004 2.2.1 Conducted Carrier Output Power Rating



1. Connect the equipment as shown in the above diagram. A Digital Radio Communication Tester (DRT- CMU200 here) is used to enable the EUT to transmit and to measure the output power.
2. Adjust the settings of the DRT to set the EUT to its maximum power at the required channel.
3. Record the output power level measured by the DRT.
4. Correct the measured level for all losses in the RF path.
5. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

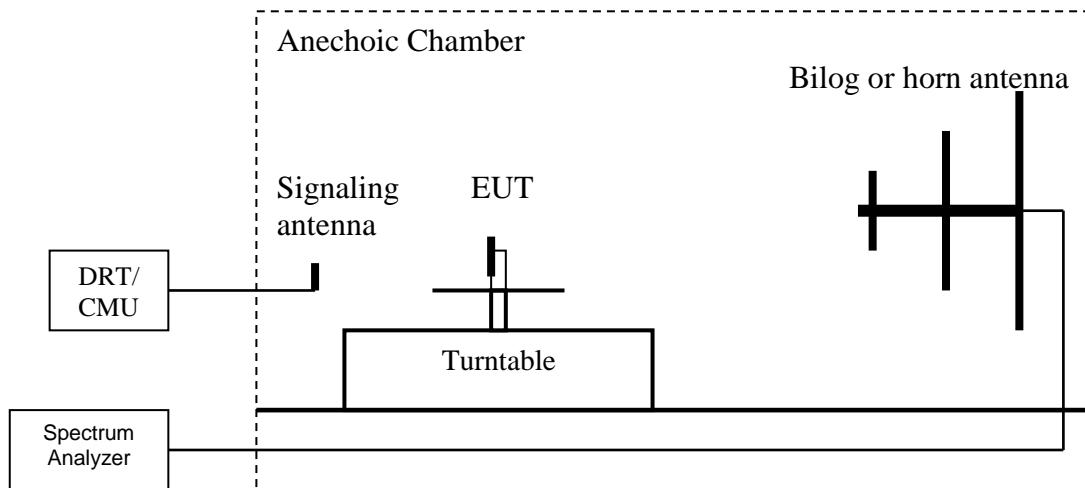
Spectrum Analyzer Settings:

GSM: RBW=3MHz; VBW=10MHz; Span=10MHz; Detector: Peak- Max Hold;
Sweep time: Auto.

Average measurements performed using RMS detector functionality of the Spectrum Analyzer.

6.1.5 Radiated Output Power Measurement procedure

Ref: TIA-603C 2004 -2.2.17.2 Effective Radiated Power (ERP) or Effective Isotropic Radiated Power (EIRP)



1. Connect the equipment as shown in the above diagram with the EUT's antenna in center of the turn table.
2. Adjust the settings of the Digital Radio Communication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4. Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
5. Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS**). **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the ERP using the following equation:
ERP (dBm) = **LVL** (dBm) + **LOSS** (dB)
8. Determine the EIRP using the following equation:
EIRP (dBm) = **ERP** (dBm) + 2.14 (dB)
9. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

Spectrum analyzer settings: RBW=VBW=5MHz

(Note: Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4, 7 and 8 above are performed with test software.)

6.1.6 RF Power Output 850MHz band

Limit: FCC: Nominal Peak Output Power < 38.45 dBm (7W)

IC: Nominal Peak Output Power < 40.60 dBm (11.5W)

Measurement Uncertainty (Conducted): ± 0.5 dB

Measurement Uncertainty (Radiated): ± 3.0 dB

GSM 850: GMSK Mode		
Frequency (MHz)	Conducted Peak Power (dBm)	Radiated Power ERP (dBm)
824.2	30.08	30.87
836.6	30.11	32.38
848.8	30.16	33.22

6.1.6.1 Measurement Result

Pass.

6.1.7 RF Power Output 1900MHz band

Limit: Nominal Peak Output Power < 33 dBm (2W)

PAR many not exceed 13dB

Measurement Uncertainty (Conducted): ± 0.5 dB

Measurement Uncertainty (Radiated): ± 3.0 dB

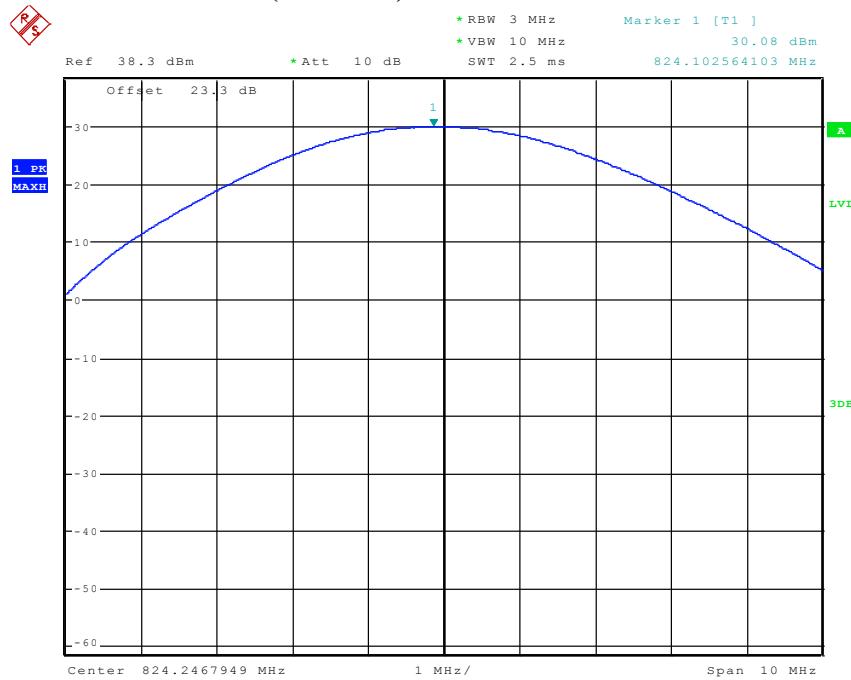
GSM 1900: GMSK Mode		
Frequency (MHz)	Conducted Peak Power (dBm)	Radiated Power EIRP (dBm)
1850.2	29.97	29.78
1881	30.18	28.58
1909.8	29.75	29.19

6.1.7.1 Measurement Result

Pass.

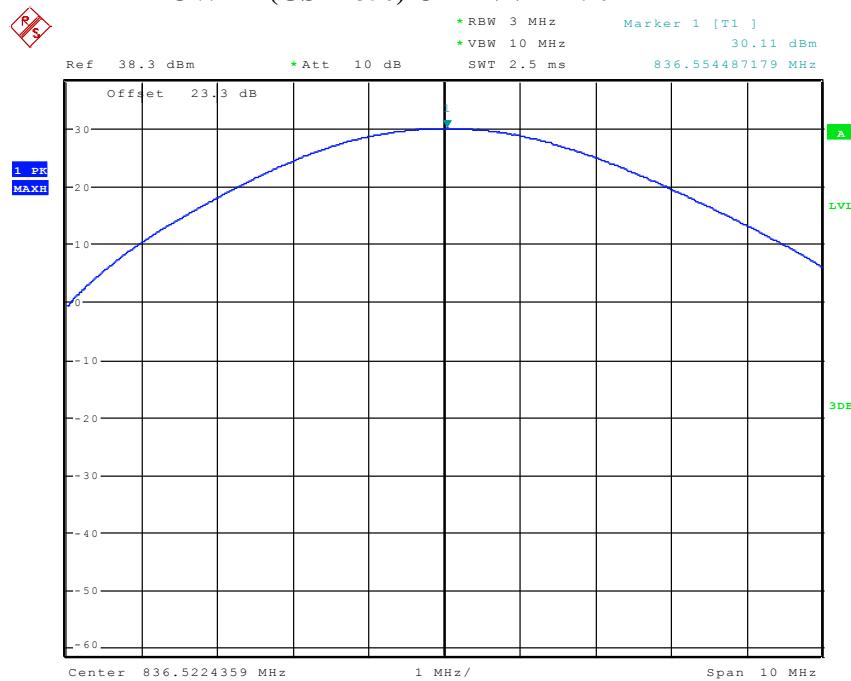
6.1.8 Results

CONDUCTED PEAK POWER (GSM 850) CHANNEL 128



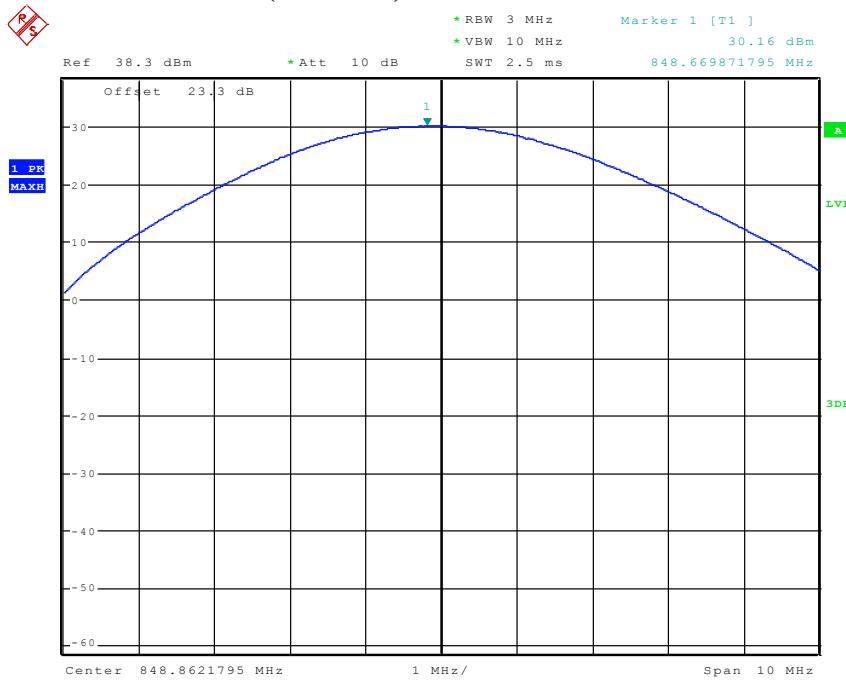
Date: 17.JAN.2012 13:19:58

CONDUCTED PEAK POWER (GSM 850) CHANNEL 190



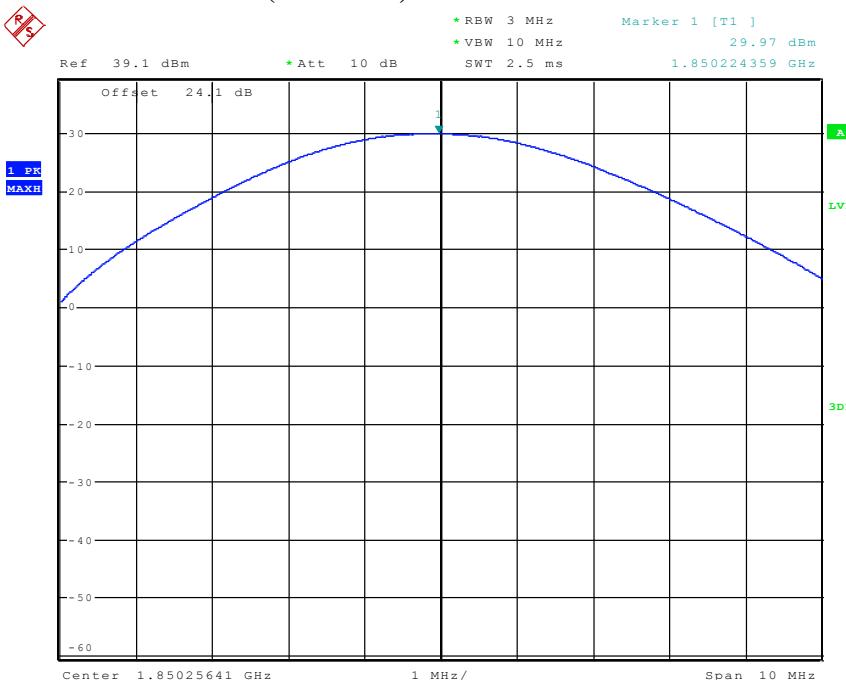
Date: 17.JAN.2012 13:18:41

CONDUCTED PEAK POWER (GSM 850) CHANNEL 251



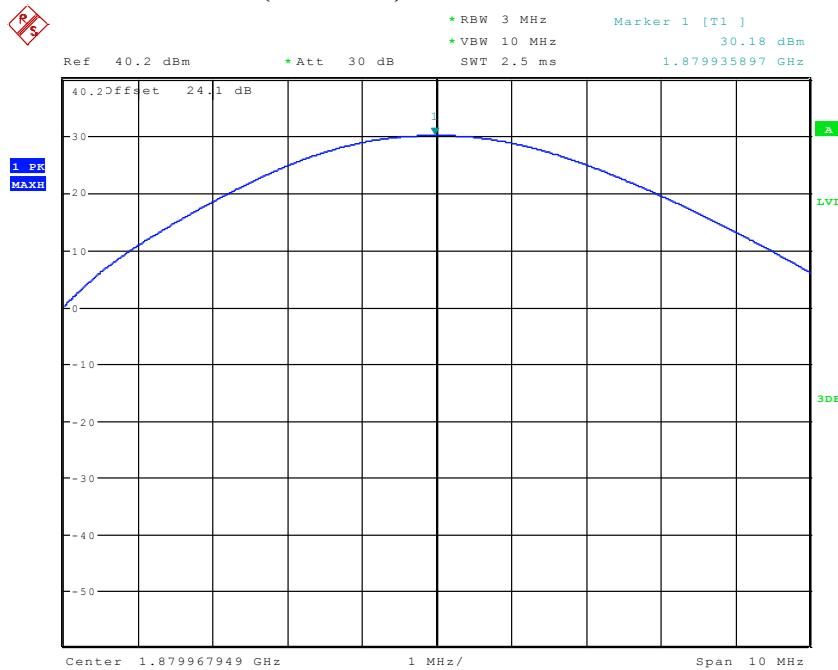
Date: 17.JAN.2012 13:17:25

CONDUCTED PEAK POWER (PCS-1900) CHANNEL 512



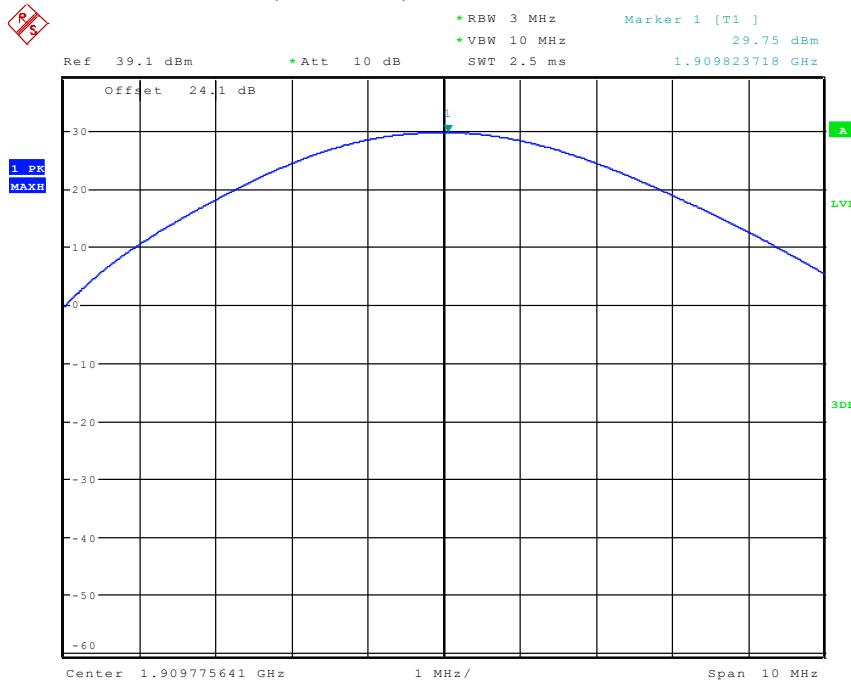
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CONDUCTED PEAK POWER (PCS-1900) CHANNEL 661



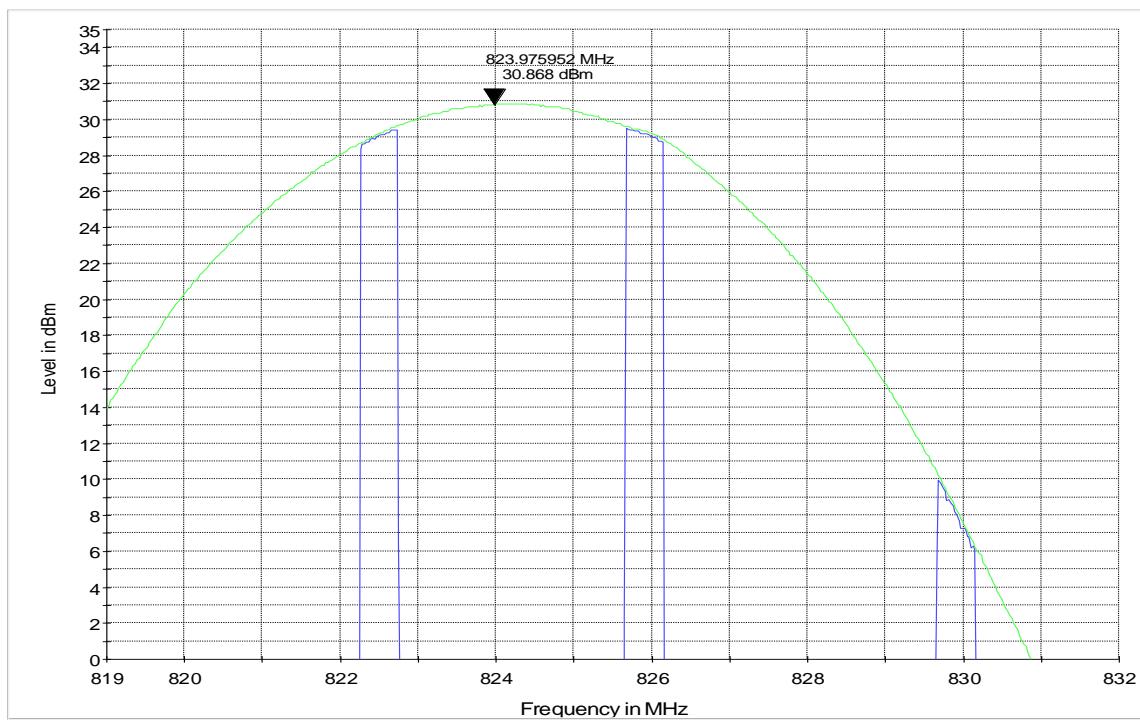
Date: 17.JAN.2012 11:20:57

CONDUCTED PEAK POWER (PCS-1900) CHANNEL 810

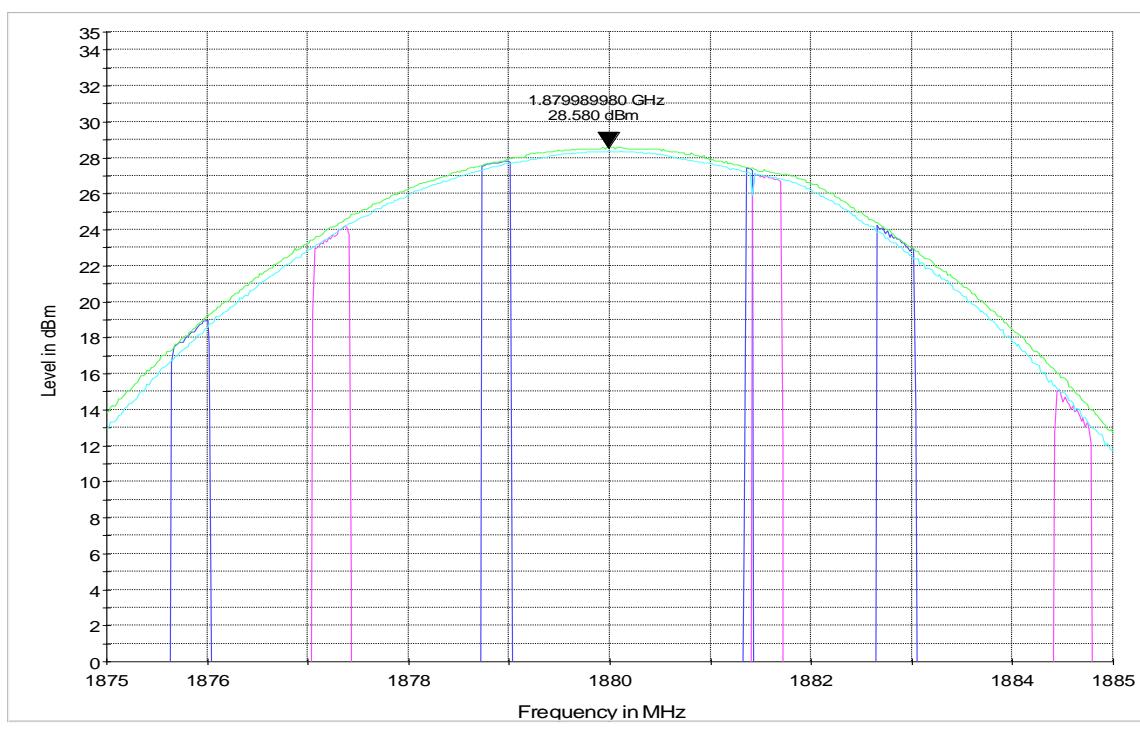


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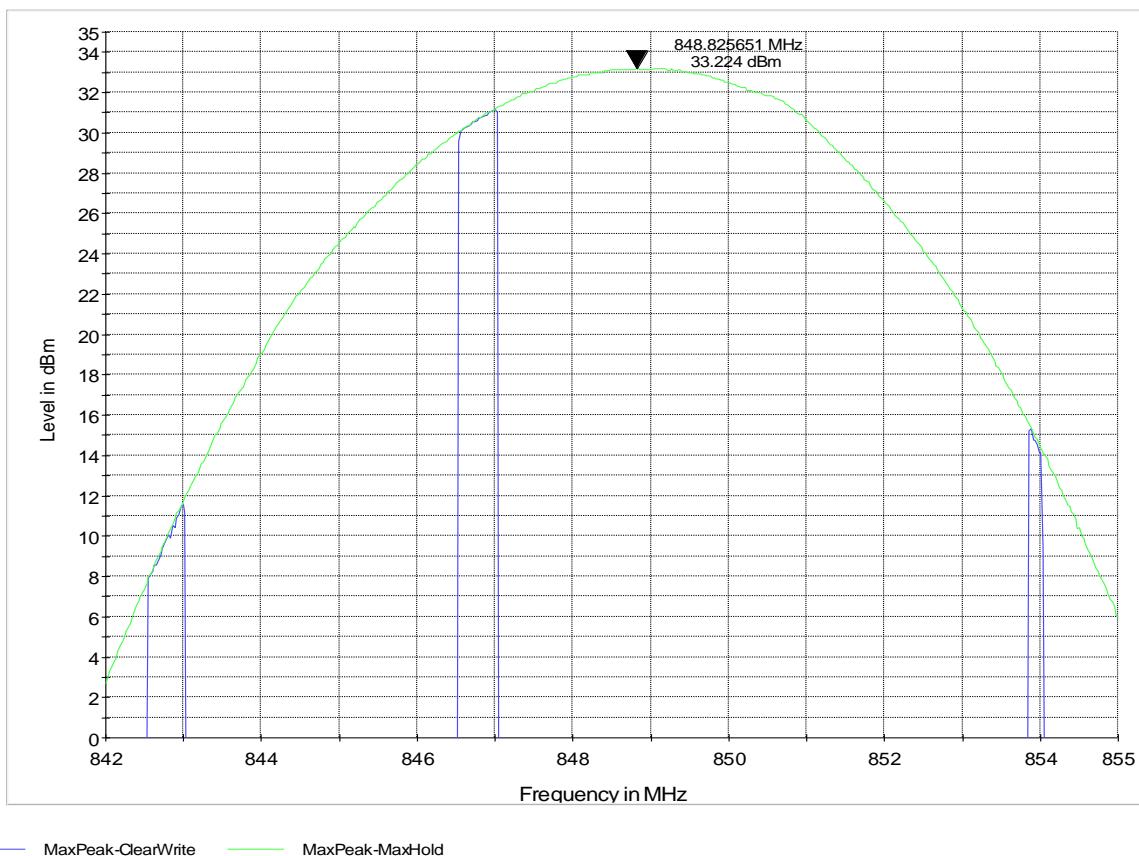
ERP (GSM 850) CHANNEL 128



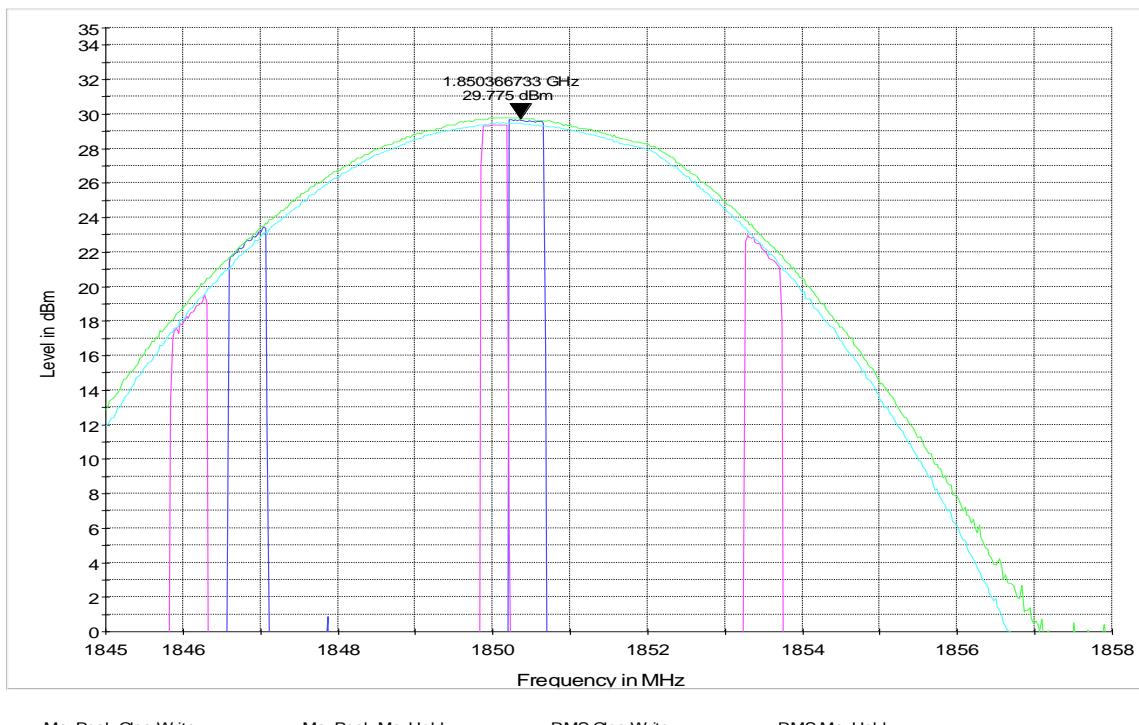
ERP (GSM 850) CHANNEL 190



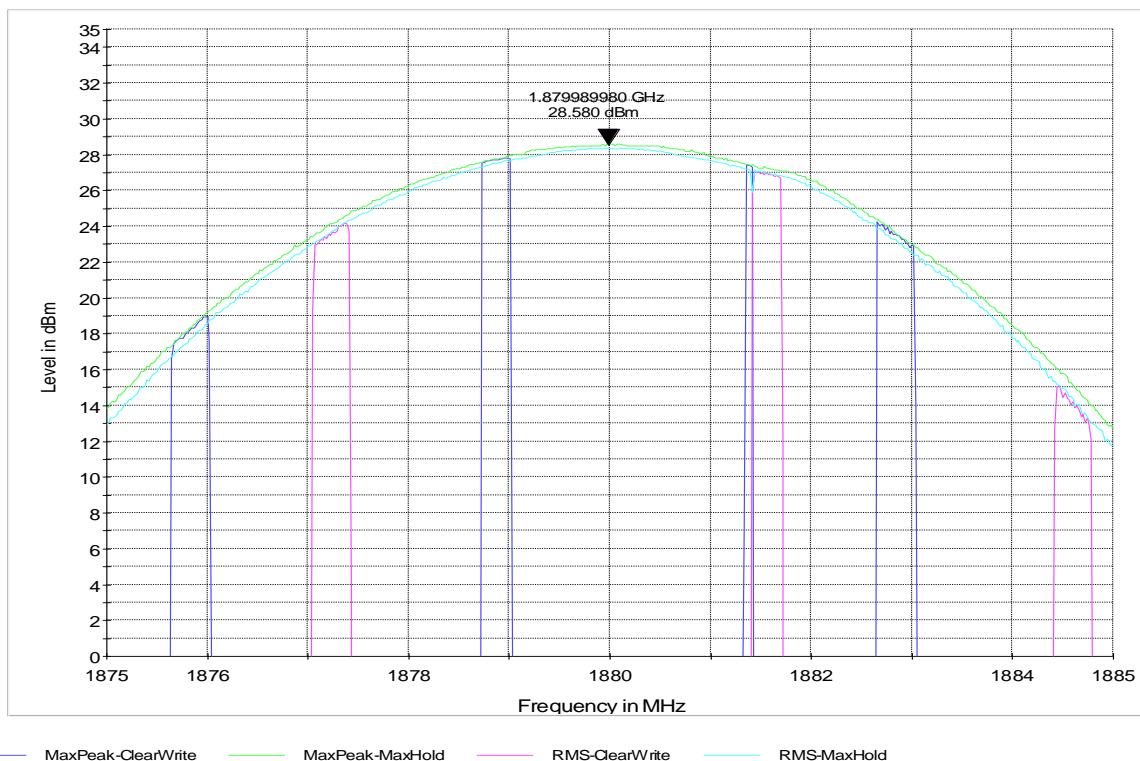
ERP (GSM 850) CHANNEL 251



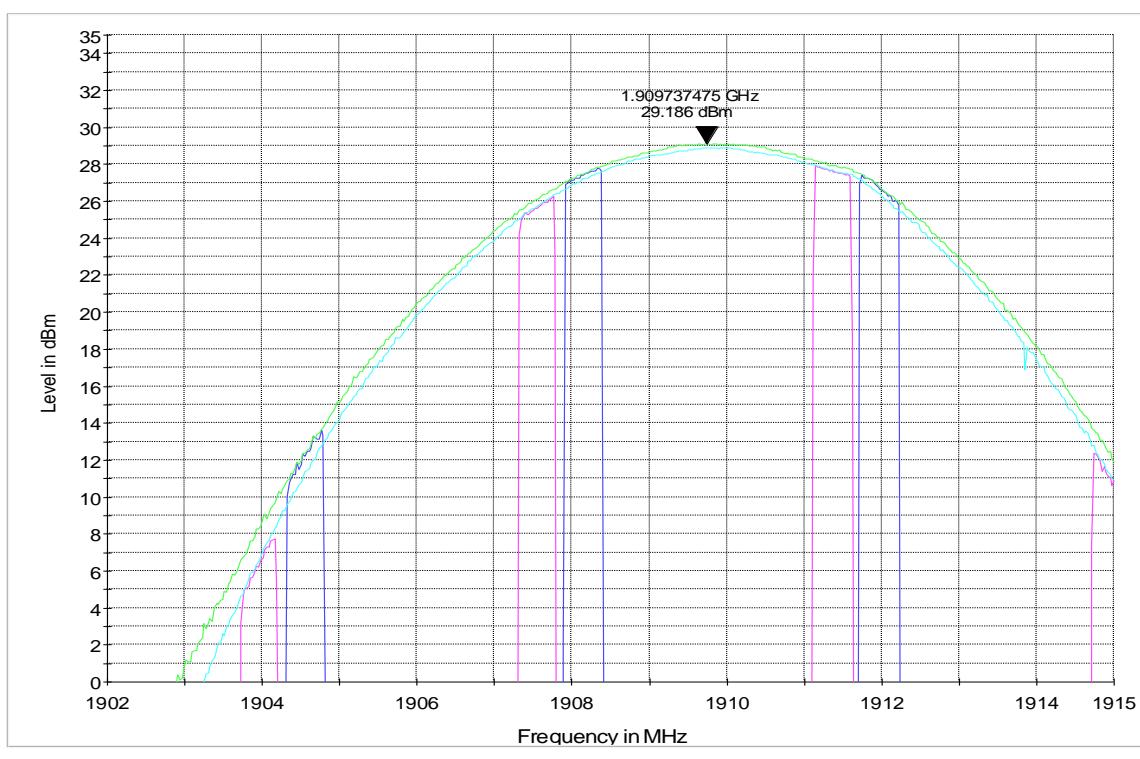
EIRP (PCS-1900) CHANNEL 512



EIRP (PCS-1900) CHANNEL 661



EIRP (PCS-1900) CHANNEL 810



6.2 Spurious Emissions Radiated

6.2.1 References

FCC: CFR Part 2.1053, CFR Part 22.917, CFR Part 24.238
IC: RSS-Gen Section 4.9; RSS 132 Section 4.5; RSS 133 Section 6.5

6.2.2 Measurement requirements:

6.2.2.1 FCC 2.1053: Field strength of spurious radiation.

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission.

6.2.2.2 RSS-Gen 4.9: Transmitter unwanted spurious emissions

The same parameter, peak power or average power, used for the transmitter output power measurement shall be used for unwanted emission measurements.

The search for unwanted emissions shall be from the lowest frequency internally generated or used in the device (local oscillator, intermediate or carrier frequency), or from 30 MHz, whichever is the lower, to the 5th harmonic of the highest frequency generated without exceeding 40 GHz.

6.2.3 Limits:

(a) *Out of band 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.

For all power levels +30dBm to 0dBm, this becomes a constant specification of -13dBm.

6.2.3.1 FCC 22.917 Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(b) *Measurement procedure.* Compliance with these provisions 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 of 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.

6.2.3.2 FCC 24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, 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 of 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.

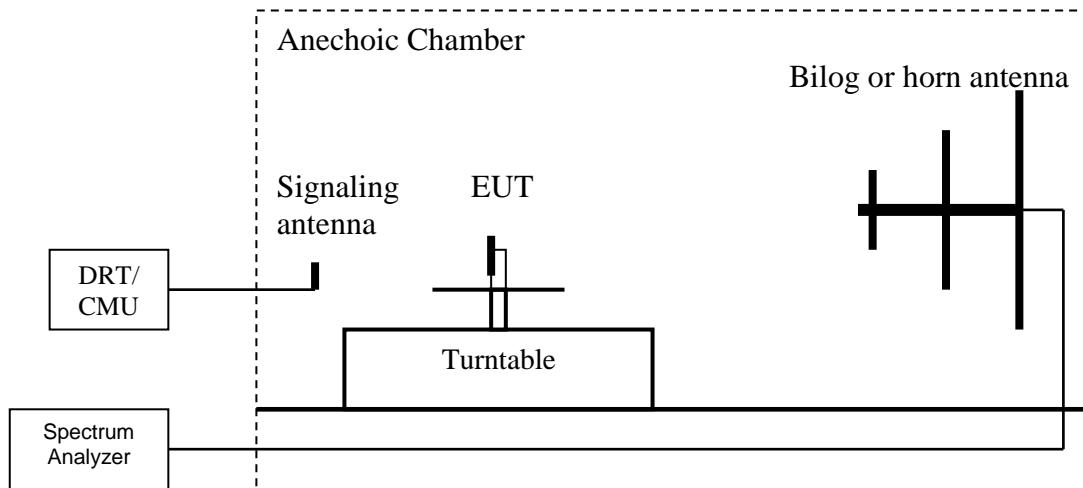
6.2.3.3 RSS-132 Section 4.5.1.1 and RSS-133 Section 6.5.1

In the first 1.0 MHz band immediately outside and adjacent to the licensee's frequency block, the power of emissions per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in watts) by at least $43 + 10 \log_{10}(P)$, dB. After the first 1.0 MHz, the power of emissions shall be attenuated below the transmitter output power by at least $43 + 10 \log_{10}(P)$, dB, in any 100 kHz bandwidth.

After the first 1.5 MHz, the power of emissions shall be attenuated below the transmitter output power by at least $43 + 10 \log_{10}(P)$, dB, in any MHz of bandwidth.

6.2.4 Radiated out of band measurement procedure:

Ref: TIA-603C 2004- 2.2.12 Unwanted emissions: Radiated Spurious



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a horizontal orientation.
2. Adjust the settings of the Digital RadioCommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure peak hold with the required settings.
4. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360°. Raise the measurement antenna up to 4 meters in 0.5 meters increments and rotate the EUT 360° at each height to maximize all emissions. Measure and record all spurious emissions (**LVL**) up to the tenth harmonic of the carrier frequency.
5. Replace the EUT with a horizontally polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS**). **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the level of spurious emissions using the following equation:
Spurious (dBm) = **LVL** (dBm) + **LOSS** (dB):
8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation:
Spurious (dBm) = **LVL** (dBm) + **LOSS** (dB):
10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.
(Note: Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4 and 7 above are performed with test software.)

Spectrum analyzer settings: RBW=VBW=1MHz

6.2.5 Sample Calculations for Radiated Measurements

6.2.5.1 Power Measurements using Substitution Procedure:

The measurement on the Spectrum Analyzer is used as a basis for the Substitution procedure. The EUT is replaced with a Signal Generator and an antenna. The setting on the Signal Generator is varied until the Spectrum Analyzer displays the original reading. EIRP is calculated as-

EIRP (dBm)= Signal Generator setting (dBm)- Cable Loss (dB)+ Antenna Gain (dBi)

Eg:

Frequency (MHz)	Measured SA (dB μ V)	Signal Generator setting (dBm)	Antenna Gain (dBi)	Dipole Gain (dBd)	Cable Loss (dB)	EIRP (dBm)
1000	95.5	24.5	6.5	0	3.5	27.5

Measurement Survey:

The site is constructed in accordance with ANSI C63.4 requirements and is recognized by the FCC to be in compliance for a 3m site. The spectrum is scanned from 30MHz to the 10th harmonic of the highest frequency generated by the EUT.

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the GSM-850 & PCS-1900 bands. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the GSM-850 & PCS-1900 band into any of the other blocks respectively. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

Radiated emission measurements were made only with Circuit Switched mode GMSK modulation because this mode represents the worse case emission for all the modulations for GSM. All measurements are done in horizontal and vertical antenna polarization; and on three orientations of the EUT. The plots show the worst case where it is not indicated otherwise. Unless mentioned otherwise, the peaks in the plots are from the carrier frequency.

6.2.6 Radiated out of band emissions results on EUT- Transmit Mode:

6.2.6.1 Test Results Transmitter Spurious Emission GSM850:

Harmonic	Tx ch-128 Freq. (MHz)	Level (dBm)	Tx ch-190 Freq. (MHz)	Level (dBm)	Tx ch-251 Freq. (MHz)	Level (dBm)
1	824.2	17.63	836.6	-3.1	848.8	25.63
2	1648.4	NF	1673.2	NF	1697.6	-35
3	2472.6	NF	2509.8	NF	2546.4	NF
4	3296.8	NF	3346.4	NF	3395.2	NF
5	4121	NF	4183	NF	4244	NF
6	4945.2	NF	5019.6	NF	5092.8	NF
7	5769.4	NF	5856.2	NF	5941.6	NF
8	6593.6	NF	6692.8	NF	6790.4	NF
9	7417.8	NF	7529.4	NF	7639.2	NF
10	8242	NF	8366	NF	8488	NF

NF = Noise Floor
Measurement Uncertainty: ± 3 dB

6.2.6.2 Measurement Result

Pass.

Legend for the plots:

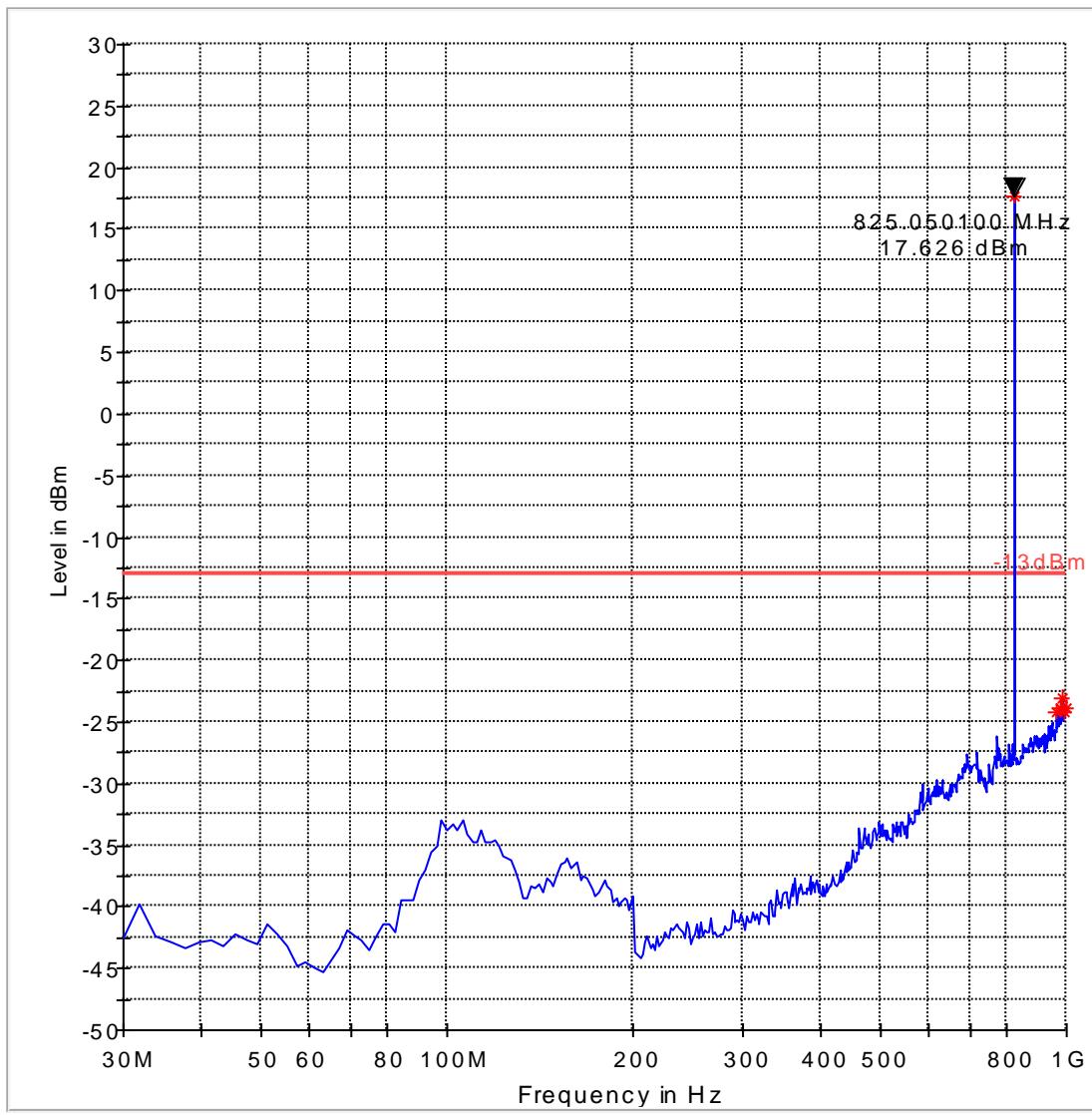
- -13dBm.LimitLine
- Preview Result
- * Data Reduction Result
- ◆ Final Measurement Result

Radiated Spurious Emissions (GSM-850) Tx: Low Channel
Test results 30M-1GHz

Description:

EUT Name: 1E60326G07
Manufacturer: Thermoking
IMEI: 35718402019305903
Comment: Battery-New Cable antenna

FCC 22 30-1000MHz



— -13 dBm Limit Line — . — Preview Result 1 * Data Reduction Result

Test results 1GHz-9GHz

Description:

EUT Name: 1E60326G07

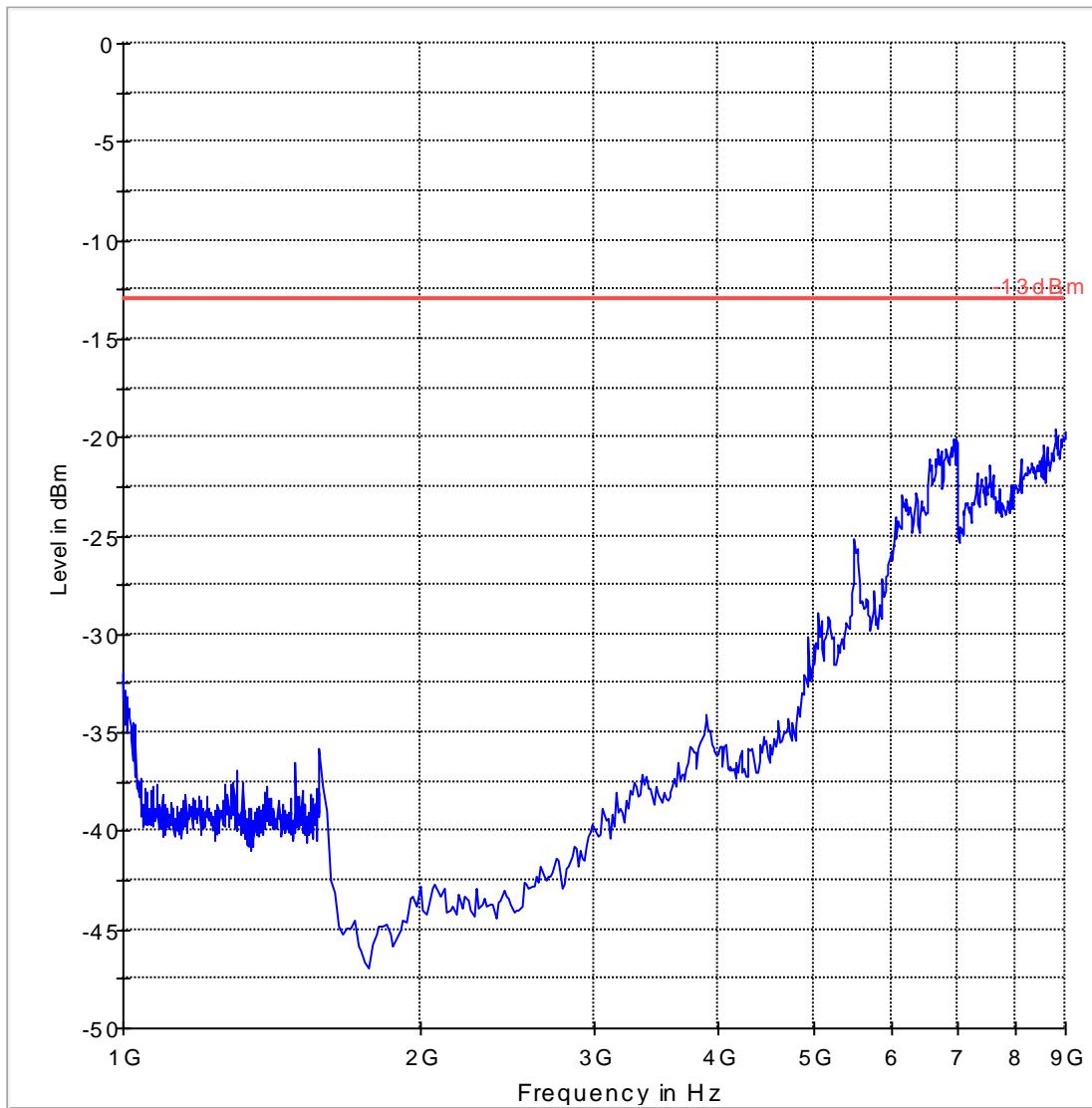
Manufacturer: Thermoking

IMEI: 35718402019305903

Comment:

Battery-New Cable antenna

FCC 22 1-9GHz



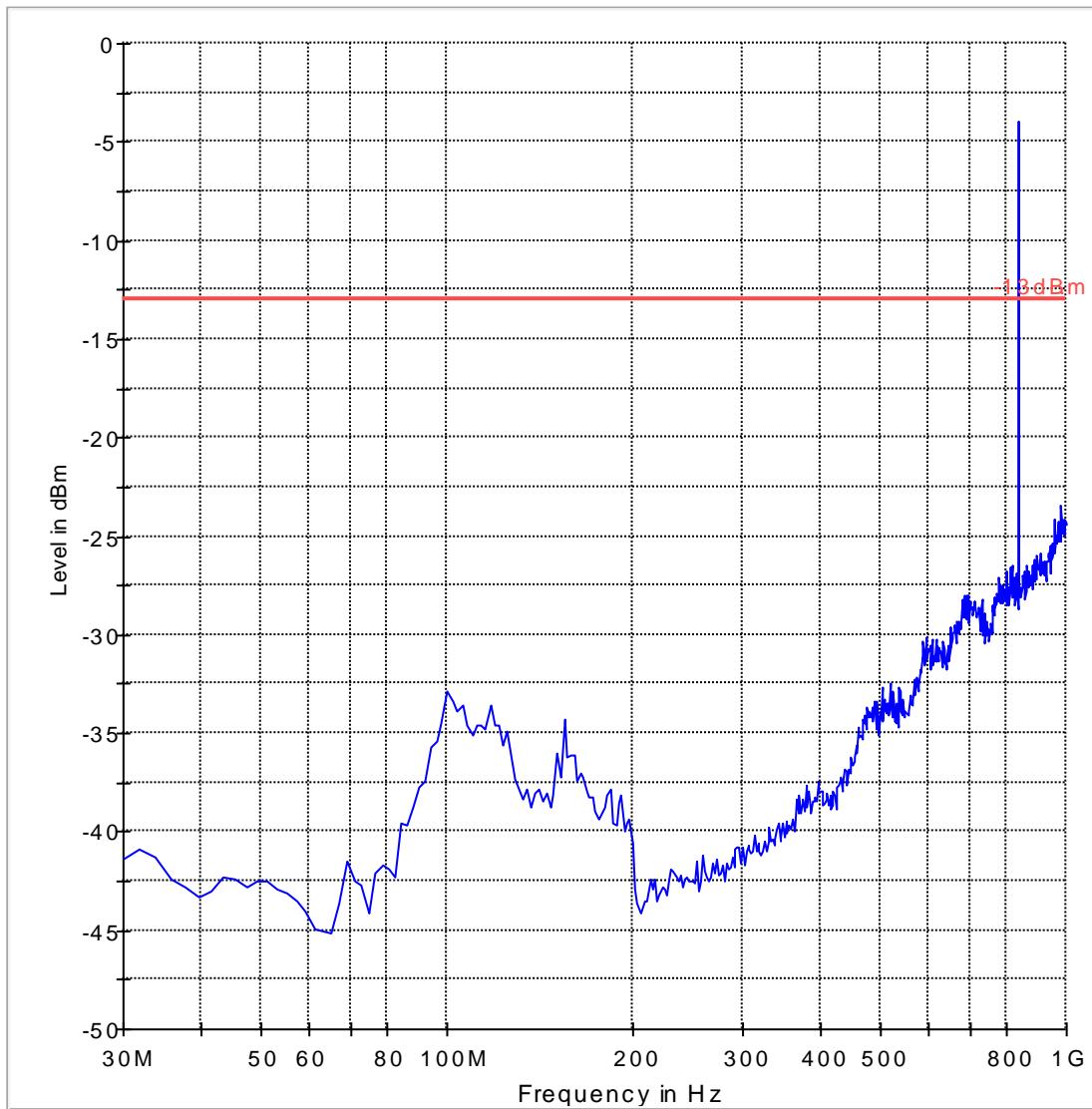
Radiated Spurious Emissions (GSM-850) Tx: Mid Channel

Test results 30M-1GHz

Description:

EUT Name: 1E60326G07
Manufacturer: Thermoking
IMEI: 35718402019305903
Comment: Battery-New Cable antenna

FCC 22 30-1000MHz



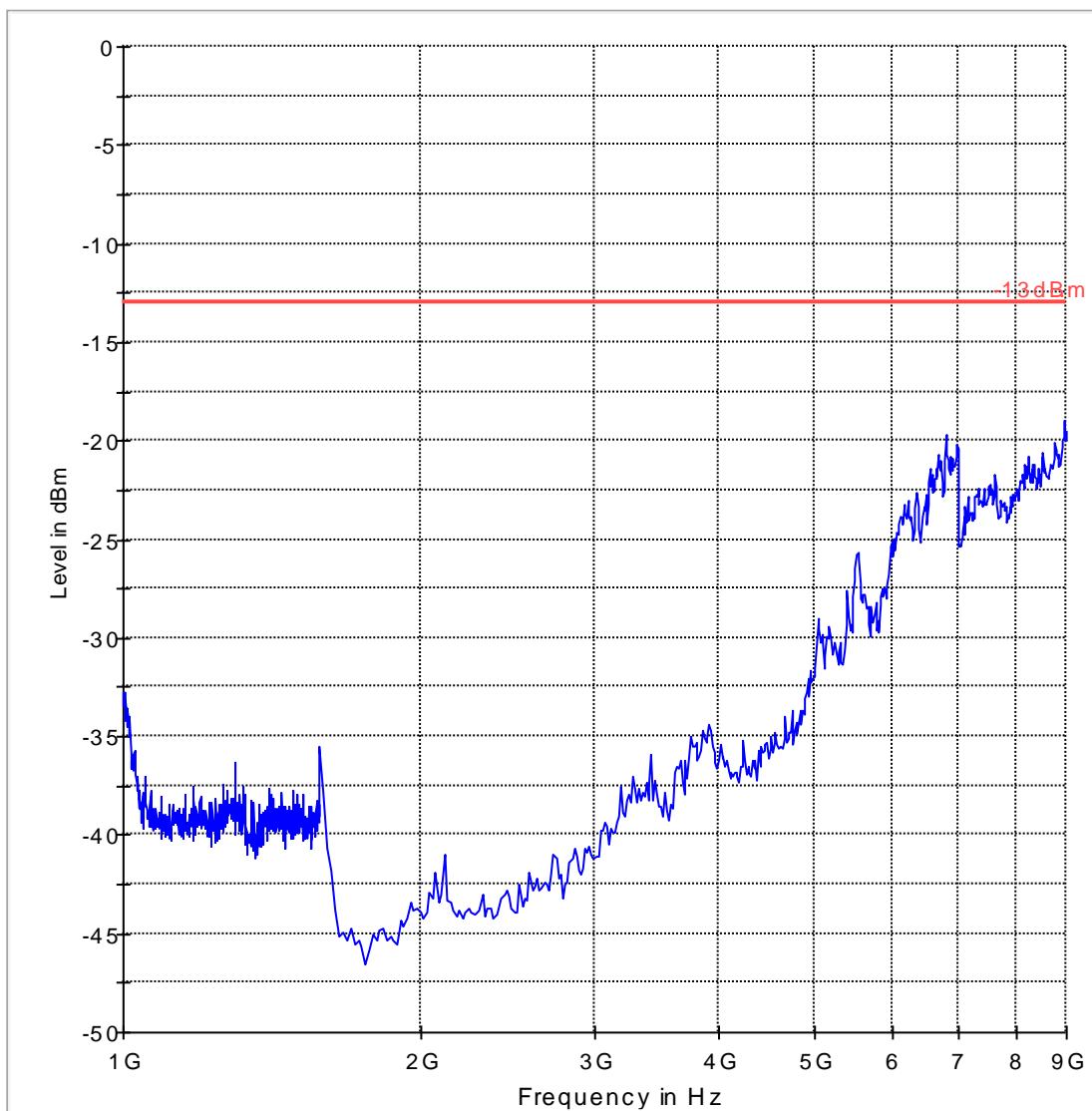
—13 dBm Limit Line — Previous Result 1 — .

Test results 1GHz-9GHz

Description:

EUT Name: 1E60326G07
Manufacturer: Thermoking
IMEI: 35718402019305903
Comment: Battery-New Cable antenna

FCC 22 1-9GHz



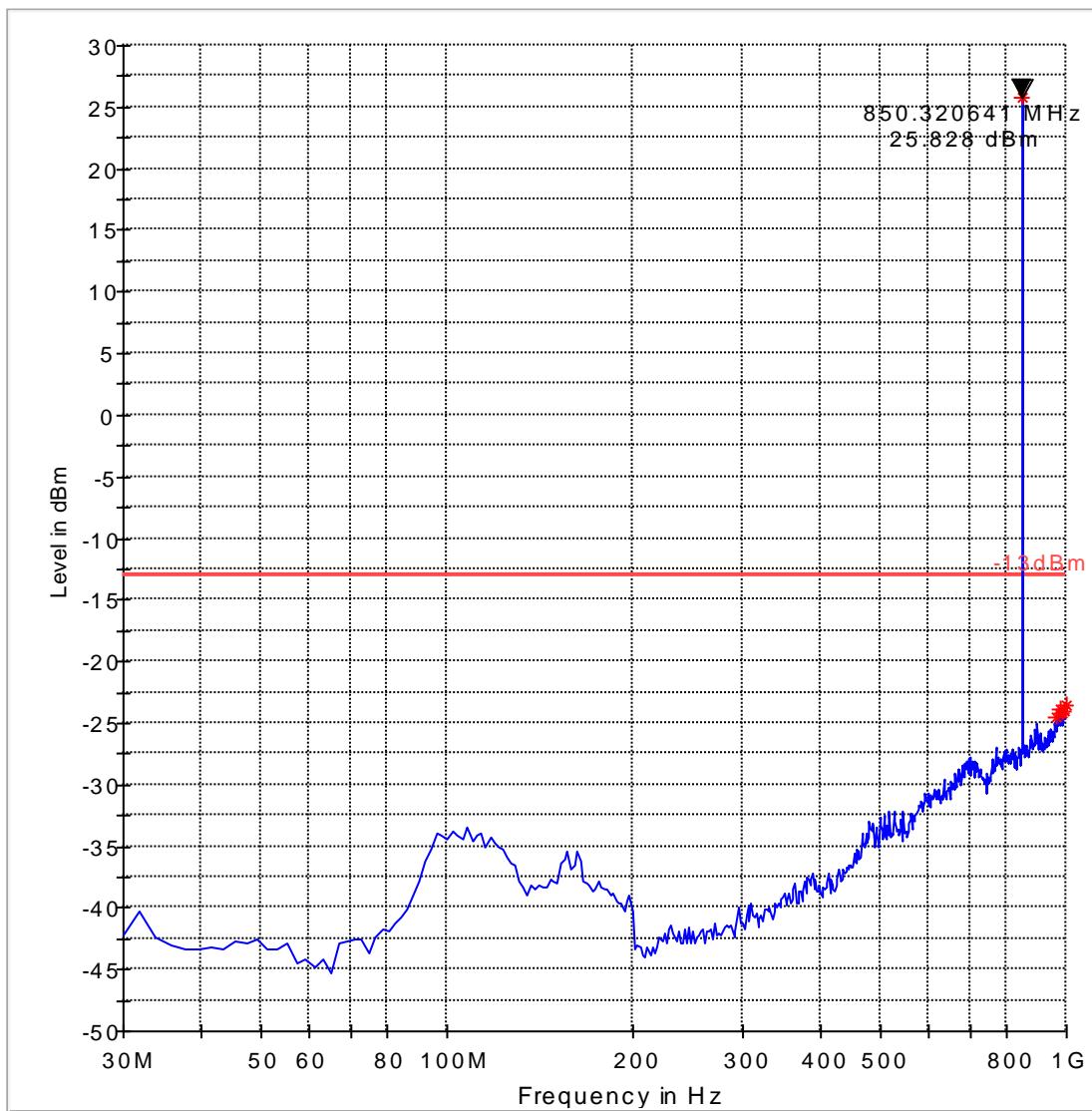
Radiated Spurious Emissions (GSM-850) Tx: High Channel

Test results 30M-1GHz

Description:

EUT Name: 1E60326G07
Manufacturer: Thermoking
IMEI: 35718402019305903
Comment: Battery-New Cable antenna

FCC 22 30-1000MHz



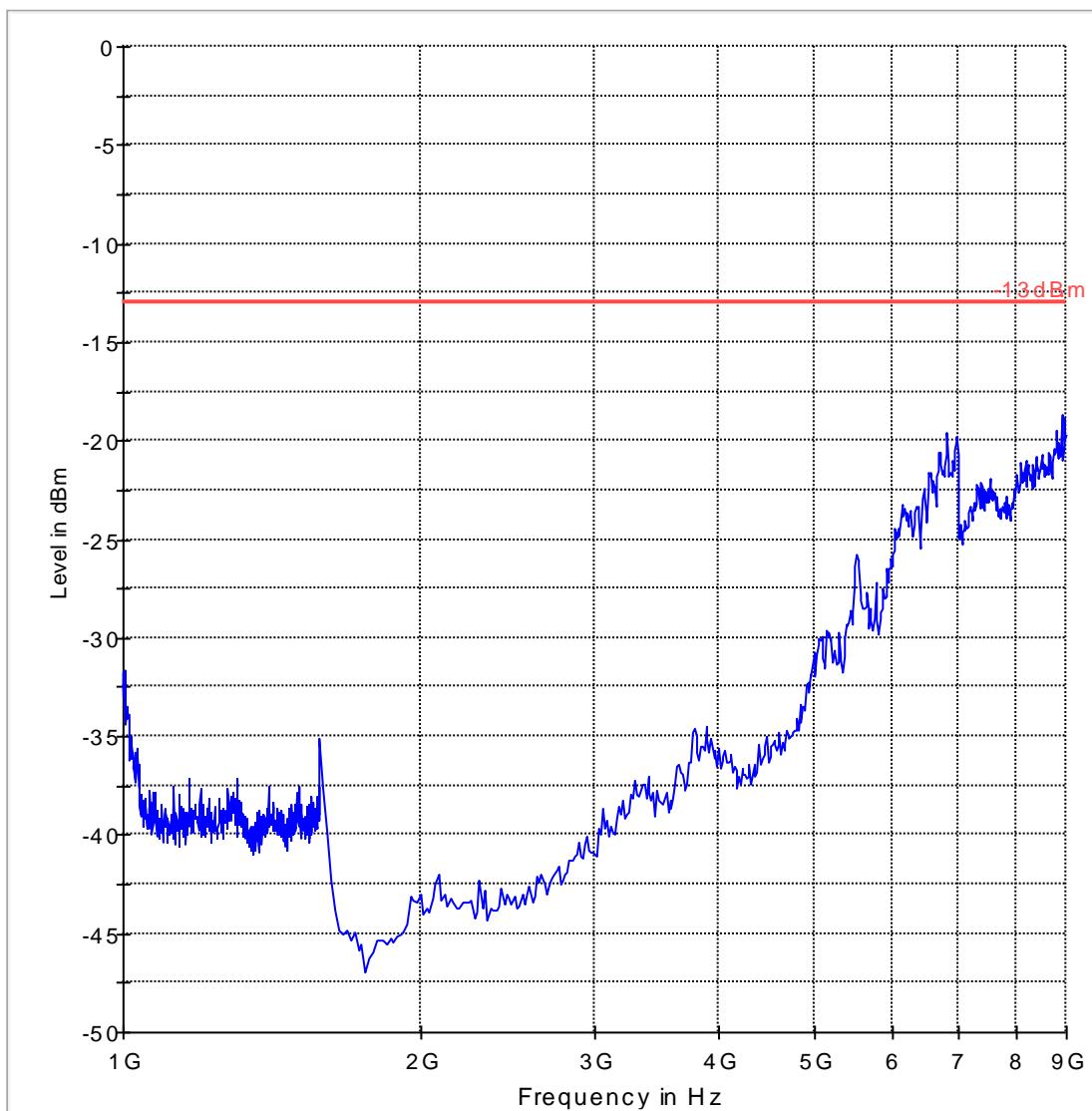
— -13 dBm . Lim itL in e — . — — — Preview Result 1 * Data Reduction Result

Test results 1GHz-9GHz

Description:

EUT Name: 1E60326G07
Manufacturer: Thermoking
IMEI: 35718402019305903
Comment: Battery-New Cable antenna

FCC 22 1-9 GHz



-13 dBm . Limit Line [P r e v i e w R e s u l t 1](#)

6.2.6.3 Test Results Transmitter Spurious Emission PCS-1900:

Harmonic	Tx ch-512 Freq.(MHz)	Level (dBm)	Tx ch-661 Freq. (MHz)	Level (dBm)	Tx ch-810 Freq. (MHz)	Level (dBm)
1	1850.2	-	1880.0	-	1909.8	-
2	3700.4	-43.5	3760	NF	3819.6	-25.7
3	5550.6	NF	5640	NF	5729.4	NF
4	7400.8	NF	7520	NF	7639.2	NF
5	9251	NF	9400	NF	9549	NF
6	11101.2	NF	11280	NF	11458.8	NF
7	12951.4	NF	13160	NF	13368.6	NF
8	14801.6	NF	15040	NF	15278.4	NF
9	16651.8	NF	16920	NF	17188.2	NF
10	18502	NF	18800	NF	19098	NF

NF = Noise Floor
Measurement Uncertainty: ± 3 dB

6.2.6.4 Measurement Result

Pass.

Legend for the plots:

- -13dBm.LimitLine
- Preview Result
- * Data Reduction Result
- ◆ Final Measurement Result

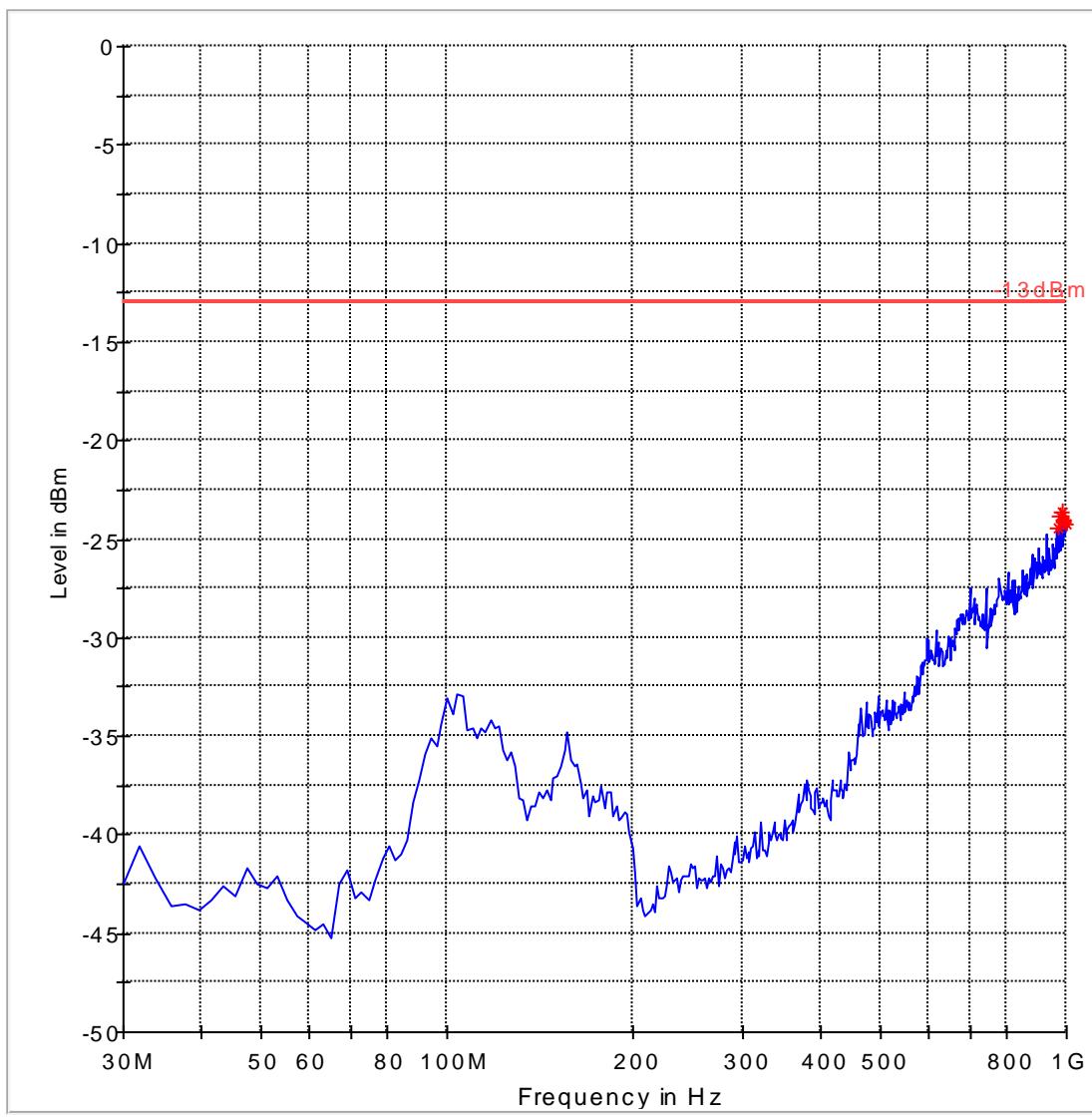
Radiated Spurious Emissions (GSM-1900) Tx: Low Channel

Test results 30M-1GHz

Description:

EUT Name: 1E60326G07
Manufacturer: Thermoking
IMEI: 35718402019305903
Comment: Battery-New Cable antenna

FCC 22 30-1000MHz



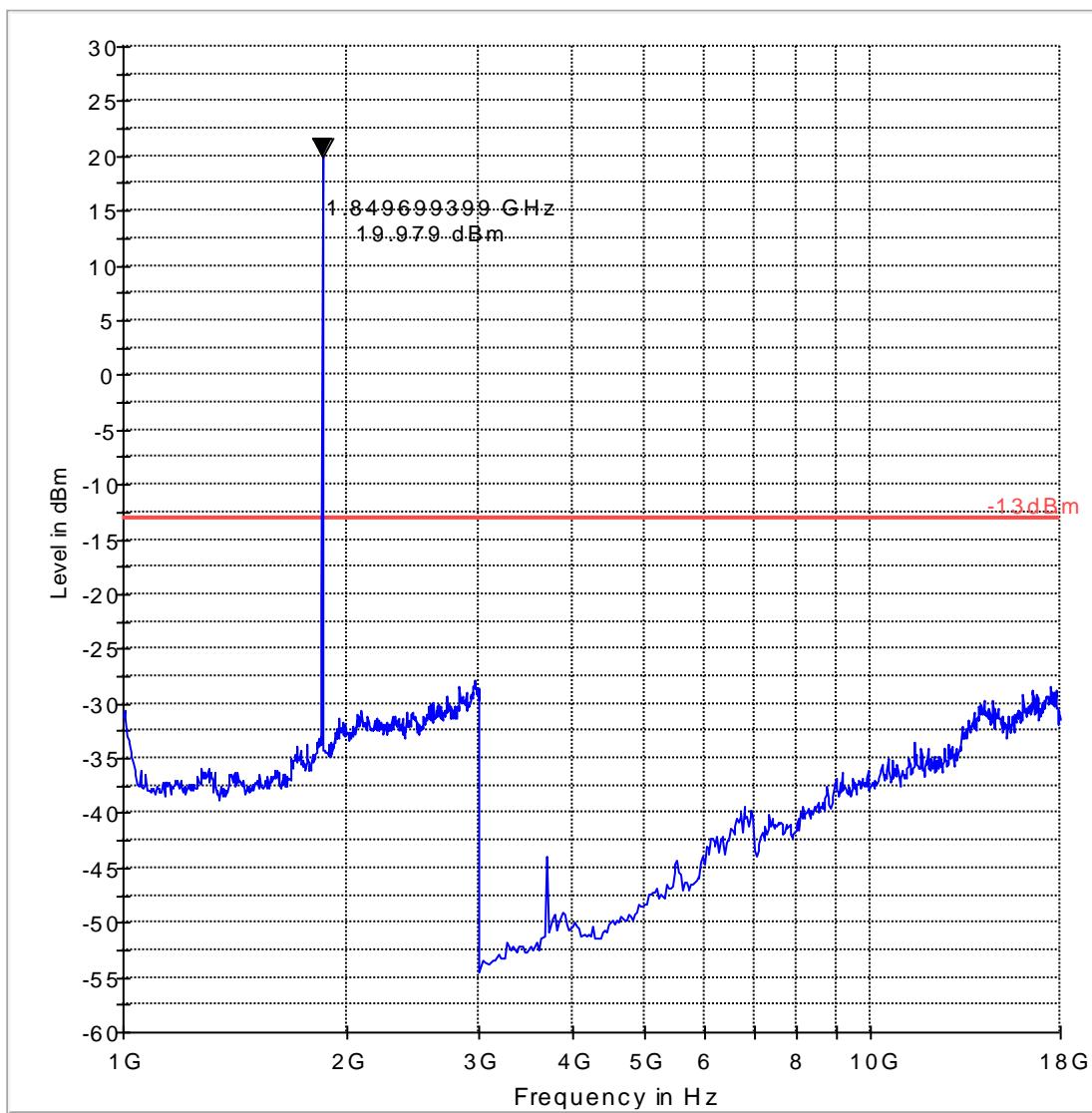
—13 dBm Limit Preview Result 1 * Data Reduction Result

Test results 1GHz-18GHz

Description:

EUT Name: 1E60326G07
Manufacturer: Thermoking
IMEI: 35718402019305903
Comment: Battery-New Cable antenna

FCC 24 1-18GHz



-13 dBm .L im itL in e

P r e v i w R e s u l t 1

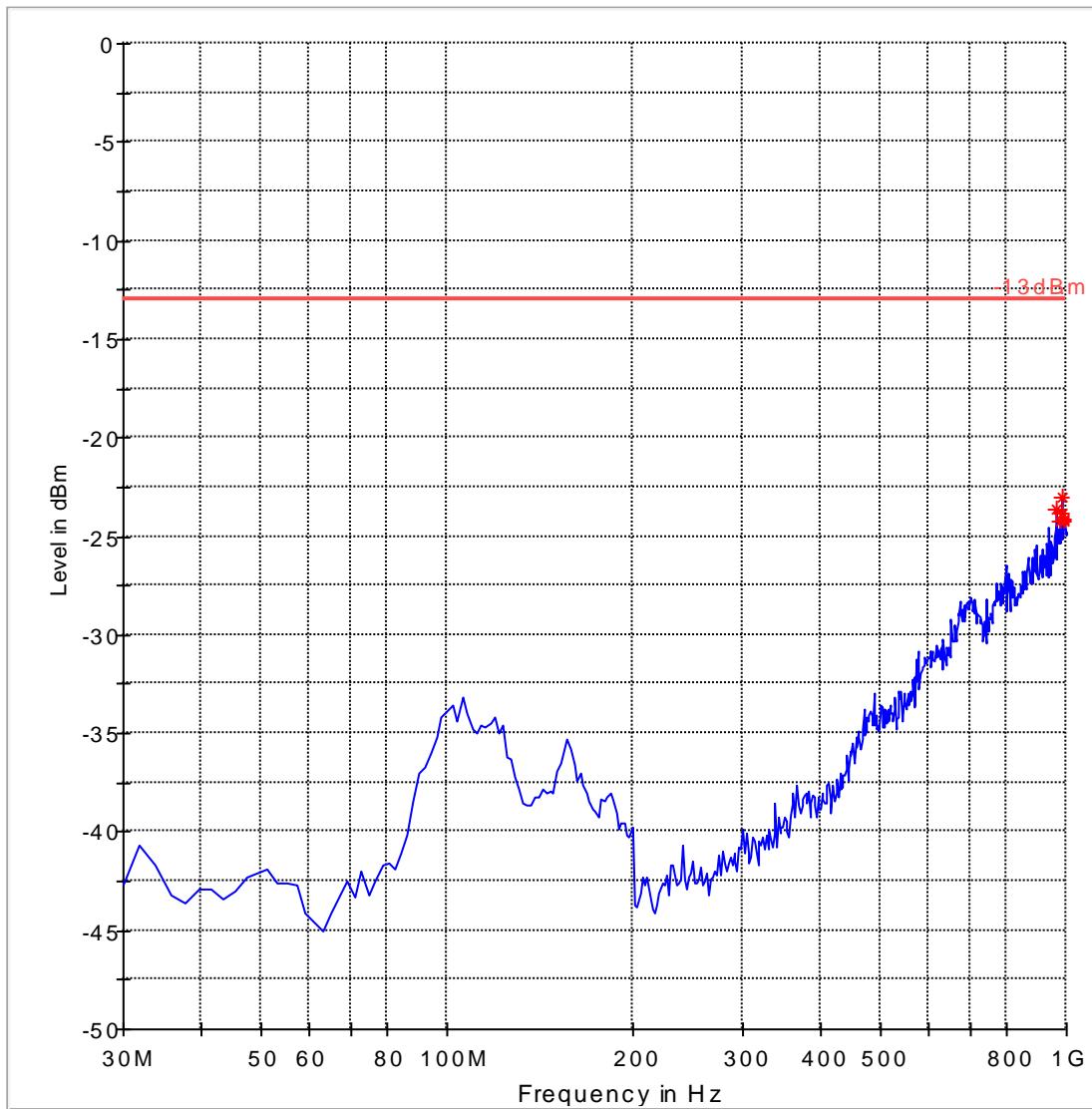
Radiated Spurious Emissions (GSM-1900) Tx: Mid Channel

Test results 30M-1GHz

Description:

EUT Name: 1E60326G07
Manufacturer: Thermoking
IMEI: 35718402019305903
Comment: Battery-New Cable antenna

FCC 22 30-1000MHz



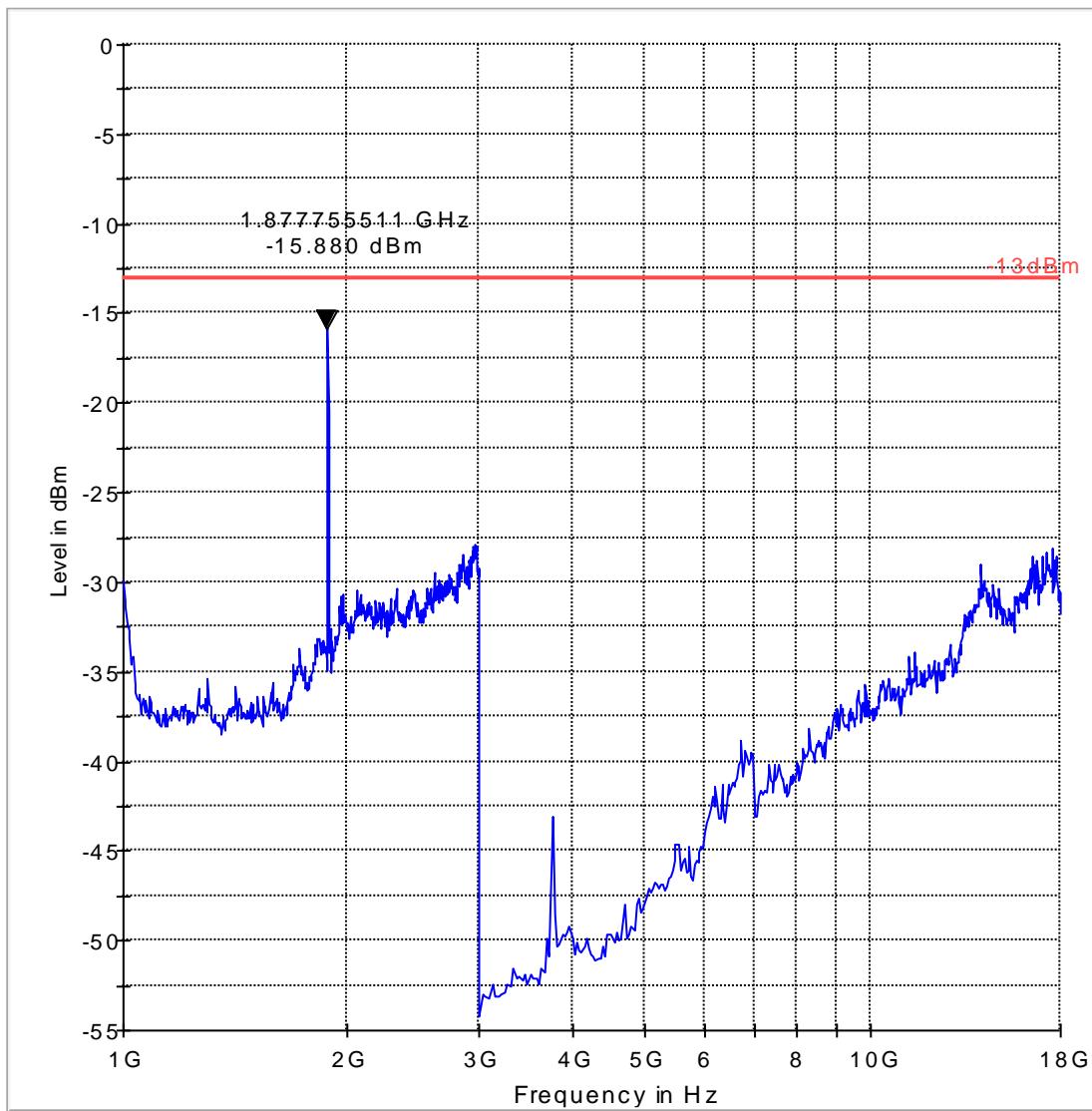
— -13 dBm . Lim it L in e — . — — — P r e v i e w R e s u l t 1 * — — — D a t a R e d u c t i o n R e s u l t

Test results 1GHz-18GHz

Description:

EUT Name: 1E60326G07
Manufacturer: Thermoking
IMEI: 35718402019305903
Comment: Battery-New Cable antenna

FCC 24 1-18GHz



-13 dBm . Lim it L in e .

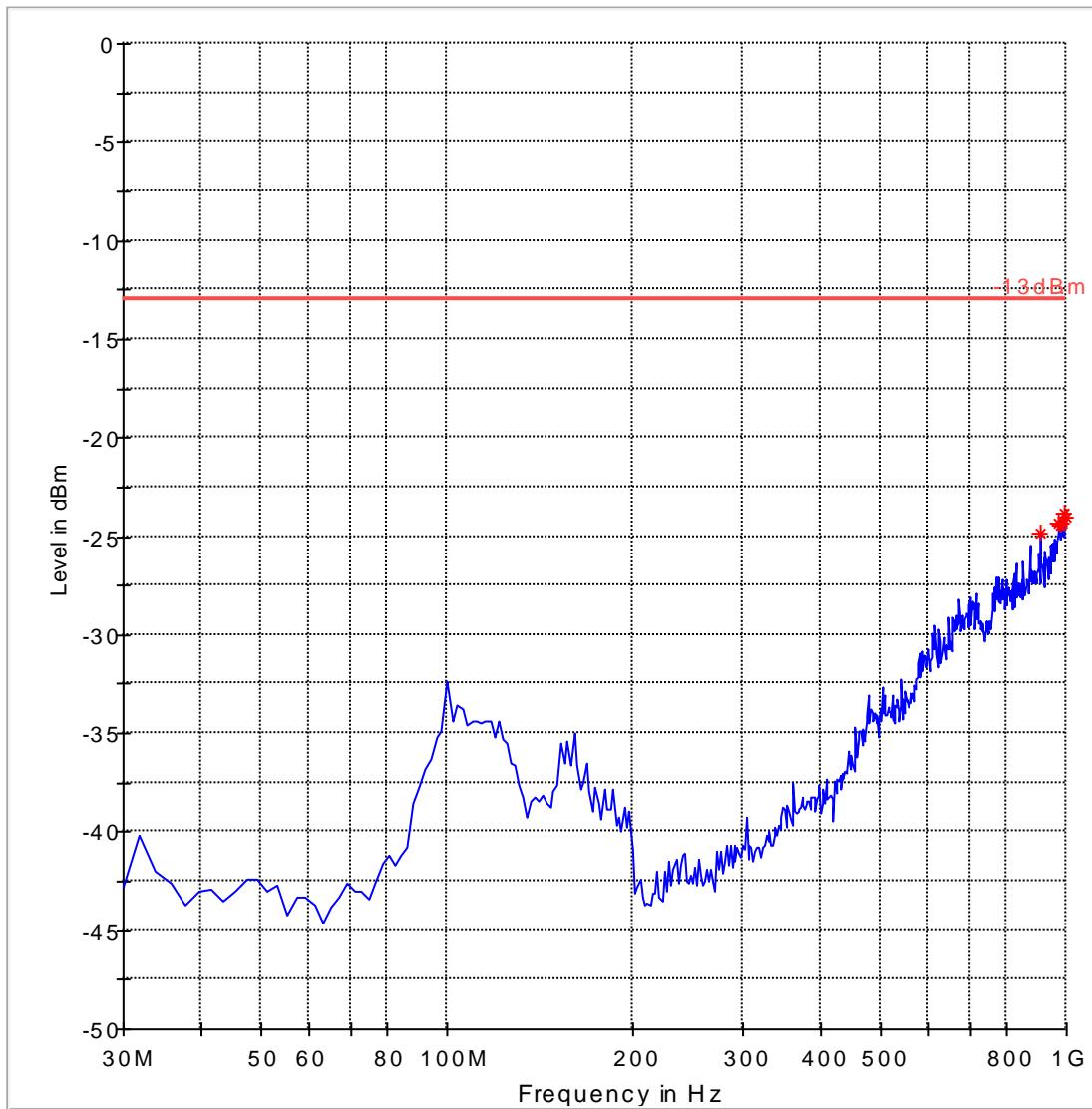
Previ w R esu lt 1

Radiated Spurious Emissions (GSM-1900) Tx: High Channel
Test results 30M-1GHz

Description:

EUT Name: 1E60326G07
Manufacturer: Thermoking
IMEI: 35718402019305903
Comment: Battery-New Cable antenna

FCC 22 30-1000MHz



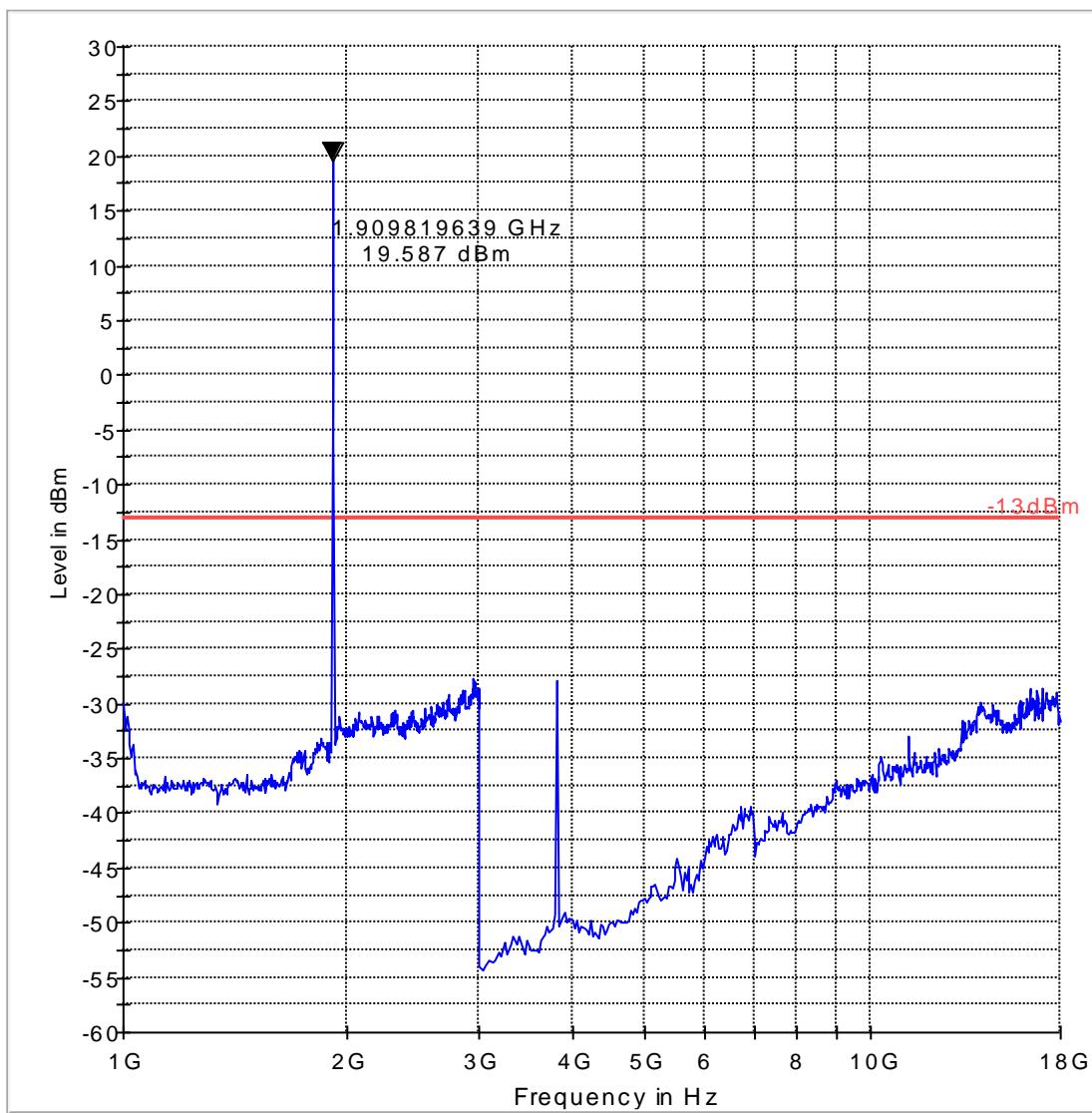
—13 dBm . Lim it L in e — Previous Result 1 — . * Data Reduction Result

Test results 1GHz-18GHz

Description:

EUT Name: 1E60326G07
Manufacturer: Thermoking
IMEI: 35718402019305903
Comment: Battery-New Cable antenna

FCC 24 1-18GHz



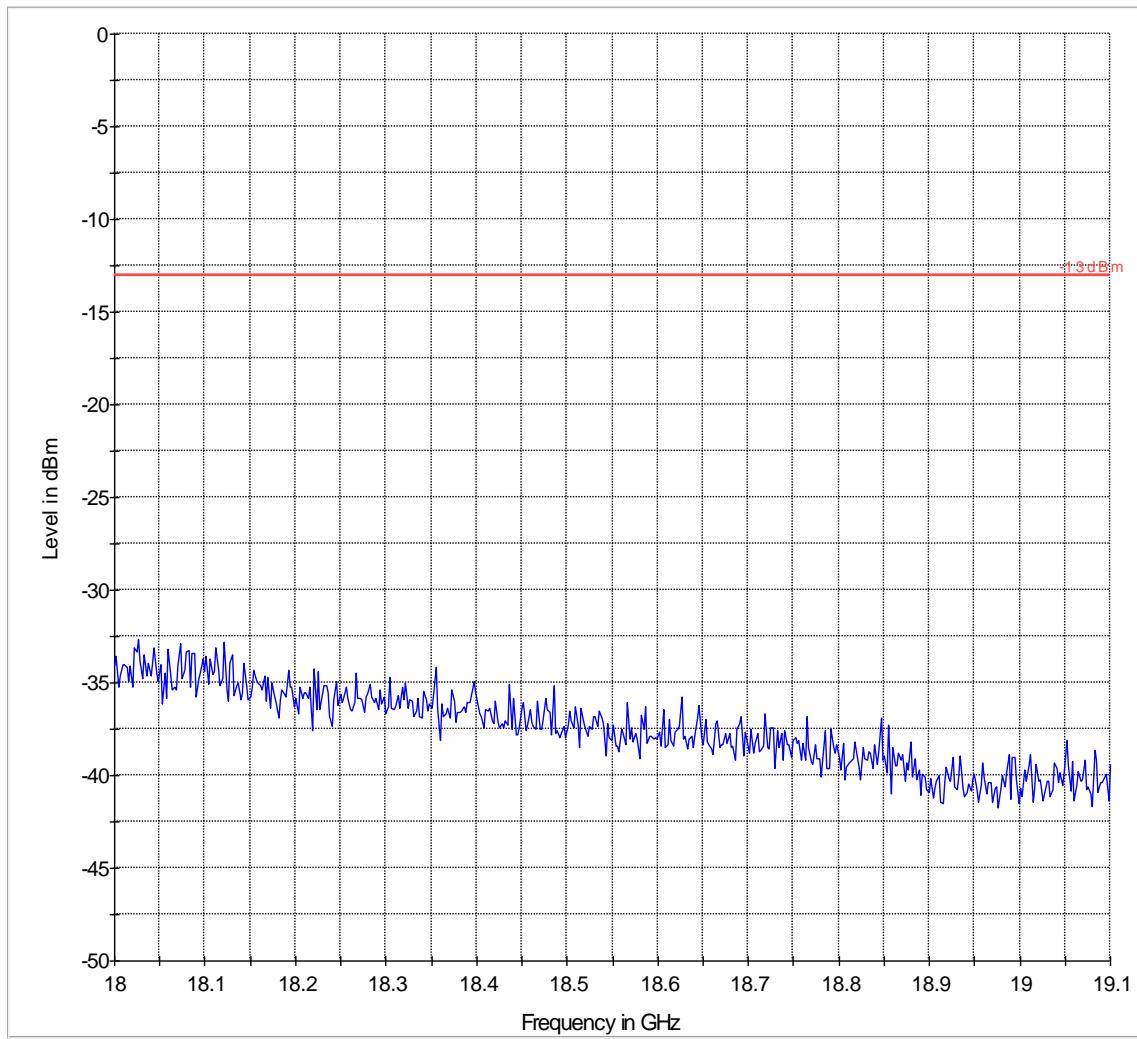
-13 dBm .L im itL in e .

Preview Result 1

Test results 18GHz-19.1GHz

Note: Worst case representation of all channels

Description:
EUT Name: 1E60326G07
Manufacturer: Thermoking
IMEI: 35718402019305903
Comment: Battery-New Cable antenna

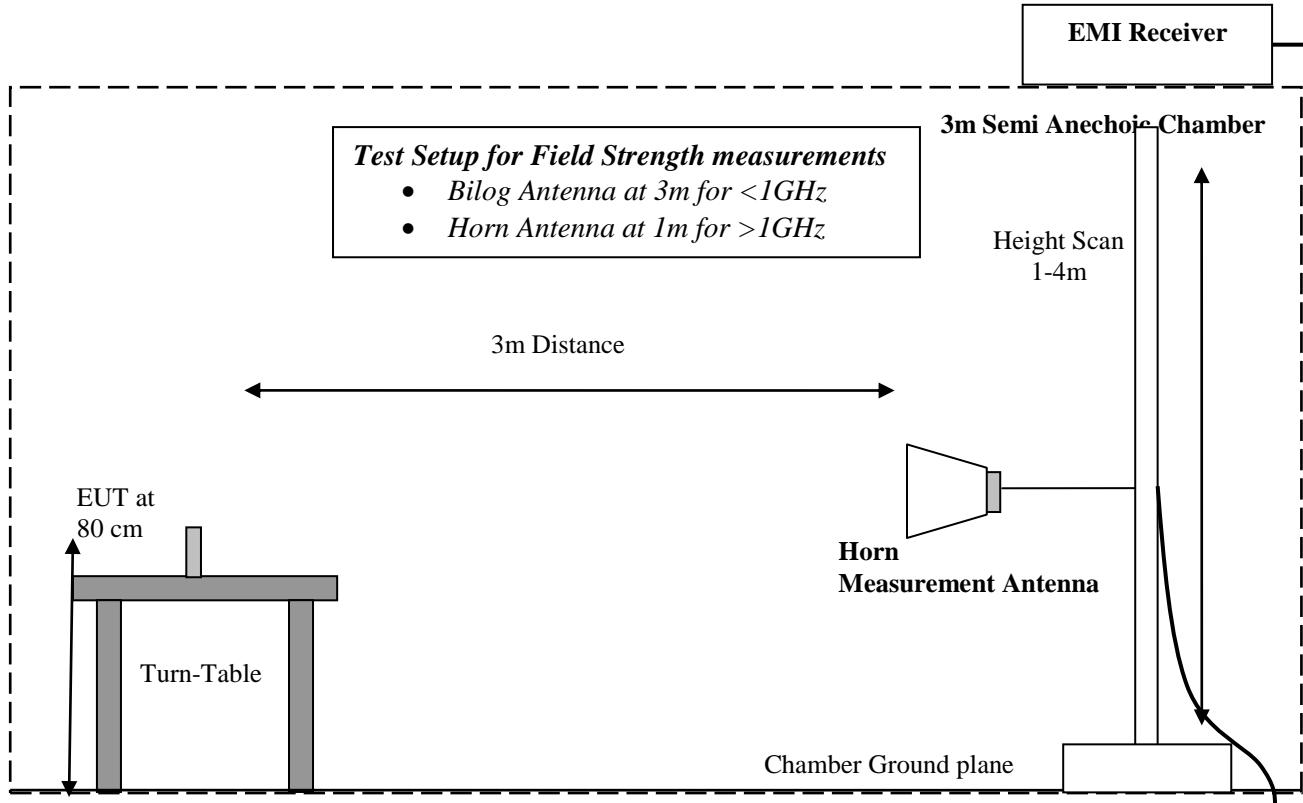
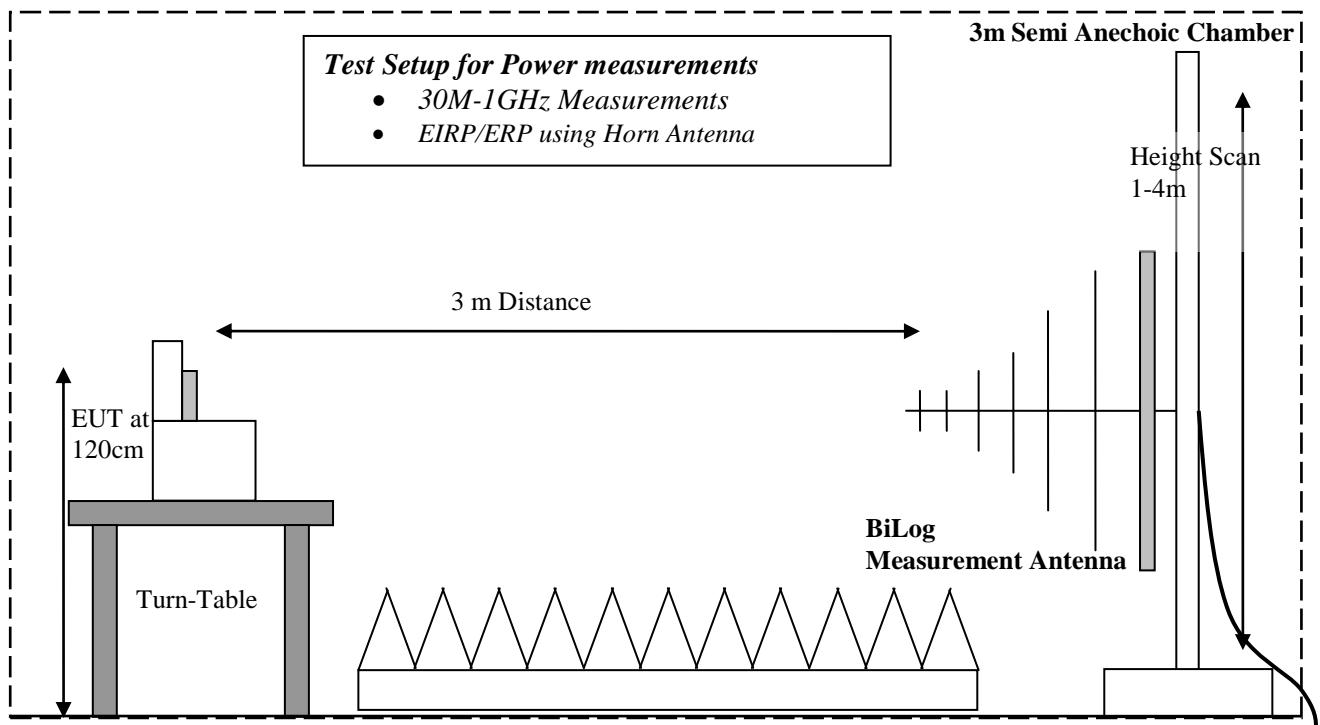


— -13dBm.LimitLine — Preview Result

6.3 Test Equipment and Ancillaries used for tests

Instrument/Ancillary	Model	Manufacturer	Serial No.	Cal Date	Cal Interval
Radio Communication Tester	CMU 200	Rohde & Schwarz	101821	May 2011	2 Years
EMI Receiver/Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2011	2 Years
Spectrum Analyzer	FSU	Rohde & Schwarz	200302	May 2011	2 Years
Loop Antenna	6512	EMCO	00049838	Aug 2011	3 years
Biconilog Antenna	3141	EMCO	0005-1186	Apr 2012	3 years
Horn Antenna (1-18GHz)	3115	ETS	00035111	Apr 2012	3 years
Horn Antenna (18-40GHz)	3116	ETS	00070497	Aug 2011	3 years
Communication Antenna	IBP5-900/1940	Kathrein	n/a	n/a	n/a
High Pass Filter	5HC2700	Trilithic Inc.	9926013	Part of system calibration	
High Pass Filter	4HC1600	Trilithic Inc.	9922307	Part of system calibration	
6GHz High Pass Filter	HPM50106	Microtronics	001	Part of system calibration	
Pre-Amplifier	JS4-00102600	Miteq	00616	Part of system calibration	
Power Smart Sensor	R&S	NRP-Z81	100161	May 2011	2 Years
Multimeter	MM200	Klein	N/A	Apr 2011	2 Years
Temp Hum Logger	TM320	Dickson	03280063	Feb 2012	1 Year
Temp Hum Logger	TM325	Dickson	5285354	Feb 2012	1 Year

7 Block Diagrams



8 Revision History

Date	Report Name	Changes to report	Report prepared by
2012-04-11	EMC_TRANE_002_12001_WWAN	First Version	D.Lang