



# PCTEST ENGINEERING LABORATORY, INC.

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## MEASUREMENT REPORT FCC Part 22 & 24 // IC RSS-132 & RSS-133

**Applicant Name:**  
Motorola Mobility LLC  
8000 West Sunrise Blvd.  
Plantation, FL 33322  
United States

**Date of Testing:**  
2/13 - 2/17/2014  
**Test Site/Location:**  
PCTEST Lab., Columbia, MD, USA  
**Test Report Serial No.:**  
0Y1402120377.IHD

<b>FCC ID:</b>	<b>IHDT56PJ1</b>
<b>IC CERTIFICATION NO.:</b>	<b>1090-T56PJ1</b>
<b>APPLICANT:</b>	<b>MOTOROLA MOBILITY LLC</b>

**Application Type:** Certification  
**EUT Type:** Portable Handset  
**FCC Classification:** PCS Licensed Transmitter Held to Ear (PCE)  
**FCC Rule Part(s):** §2 §22(H) §24(E)  
**IC Specification(s):** RSS-132 Issue 3 RSS-133 Issue 6  
**Test Procedure(s):** ANSI/TIA-603-C-2004, KDB 971168 v02r01  
**Test Device Serial No.:** *identical prototype* [S/N: EMC #25628 UNIT 3]

Mode	Tx Frequency (MHz)	Emission Designator	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
GSM850	824.2 - 848.8	245KGXW	0.914	29.61
EDGE850	824.2 - 848.8	233KG7W	0.190	22.79
GSM1900	1850.2 - 1909.8	249KGXW	1.127	30.52
EDGE1900	1850.2 - 1909.8	246KG7W	0.196	22.93
WCDMA850	826.4 - 846.6	4M16F9W	0.097	19.89
WCDMA1900	1852.4 - 1907.6	4M16F9W	0.218	23.38

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

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



Randy Ortanez  
President



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<b>Test Report S/N:</b> 0Y1402120377.IHD	<b>Test Dates:</b> 2/13 - 2/17/2014	<b>EUT Type:</b> Portable Handset		Page 1 of 60

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# MEASUREMENT REPORT

## FCC Part 22 & 24



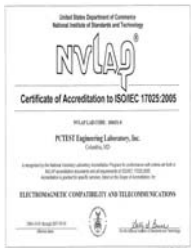
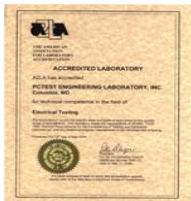
### §2.1033 General Information



**APPLICANT:** Motorola Mobility LLC  
**APPLICANT ADDRESS:** 8000 West Sunrise Blvd.  
 Plantation, FL 33322, United States  
**TEST SITE:** PCTEST ENGINEERING LABORATORY, INC.  
**TEST SITE ADDRESS:** 6660-B Dobbin Road, Columbia, MD 21045 USA  
**FCC RULE PART(S):** §2 §22(H) §24(E)  
**FCC ID:** IHDT56PJ1  
**FCC CLASSIFICATION:** PCS Licensed Transmitter Held to Ear (PCE)  
**MODE:** GSM /EDGE /WCDMA  
**FREQUENCY TOLERANCE:** ±0.00025 % (2.5 ppm)  
**Test Device Serial No.:** EMC #25628 UNIT 3     Production     Pre-Production     Engineering  
**DATE(S) OF TEST:** 2/13 - 2/17/2014  
**TEST REPORT S/N:** 0Y1402120377.IHD

### Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451A-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451A-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.



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# 1.0 INTRODUCTION

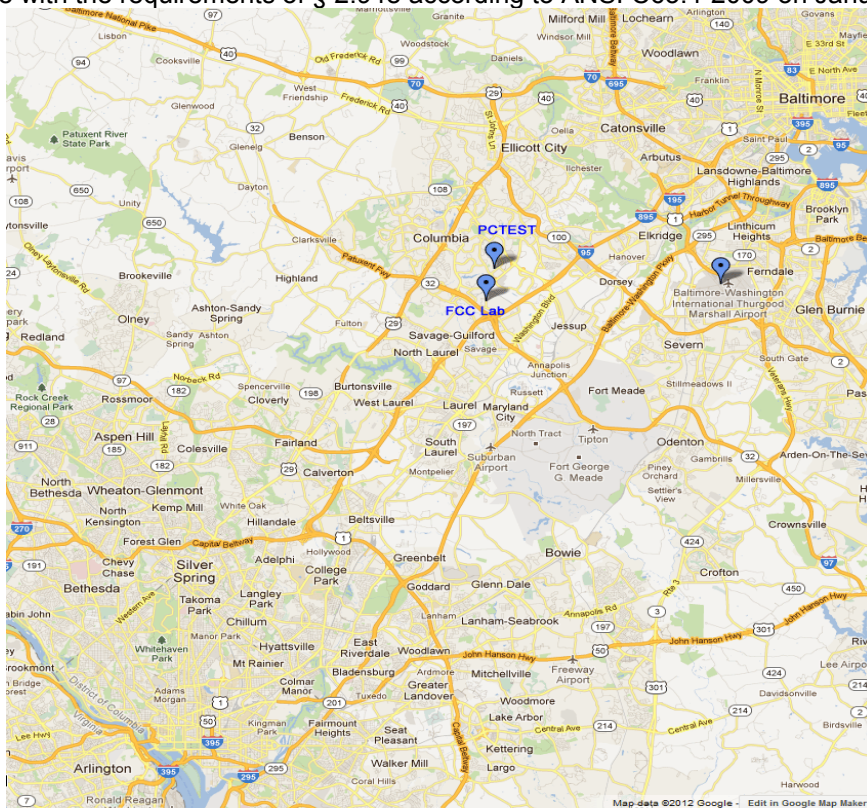
## 1.1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.



## 1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Intern't'l (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on January 10, 2012.



**Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area**

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Motorola Portable Handset FCC ID: IHDT56PJ1**. The test data contained in this report pertains only to the emissions due to the EUT's 2G/3G licensed transmitters.

### 2.2 Device Capabilities

This device contains the following capabilities:



850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, 802.11b/g/n WLAN, Bluetooth (1x,EDR, LE)

### 2.3 Test Configuration

The Motorola Portable Handset FCC ID: IHDT56PJ1 was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168 v02r01. See Section 6.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

### 2.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

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## 3.0 DESCRIPTION OF TESTS

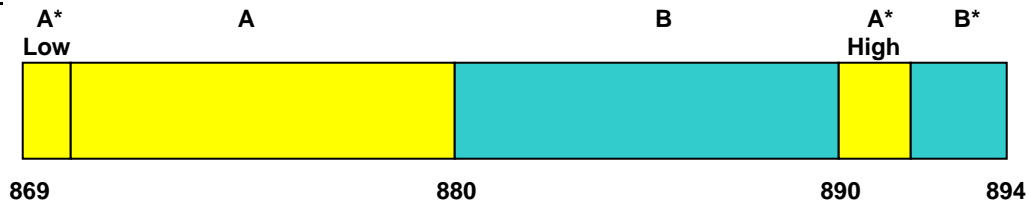
### 3.1 Evaluation Procedure

The measurement procedures described in the “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-C-2004) and “Measurement Guidance for Certification of Licensed Digital Transmitters” (KDB 971168 v02r01) were used in the measurement of the **Motorola Portable Handset FCC ID: IHDT56PJ1**.

Deviation from Measurement Procedure.....None

### 3.2 Cellular - Base Frequency Blocks

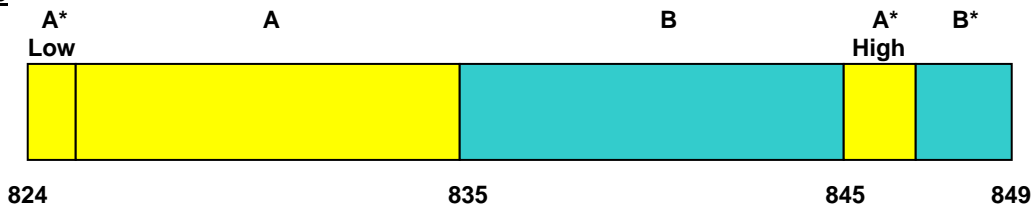
§22.905



- BLOCK 1: 869 – 880 MHz (A\* Low + A)
- BLOCK 2: 880 – 890 MHz (B)
- BLOCK 3: 890 – 891.5 MHz (A\* High)
- BLOCK 4: 891.5 – 894 MHz (B\*)

### 3.3 Cellular - Mobile Frequency Blocks

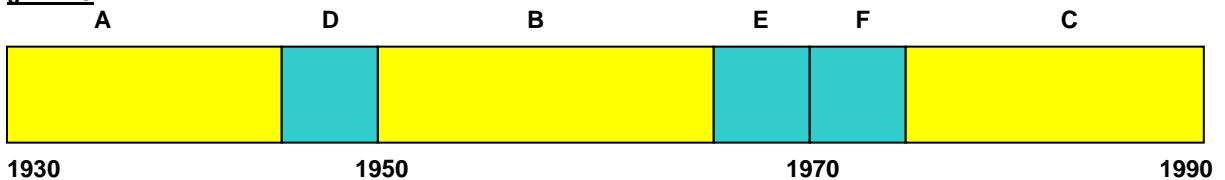
§22.905



- BLOCK 1: 824 – 835 MHz (A\* Low + A)
- BLOCK 2: 835 – 845 MHz (B)
- BLOCK 3: 845 – 846.5 MHz (A\* High)
- BLOCK 4: 846.5 – 849 MHz (B\*)

### 3.4 PCS - Base Frequency Blocks

§24.229

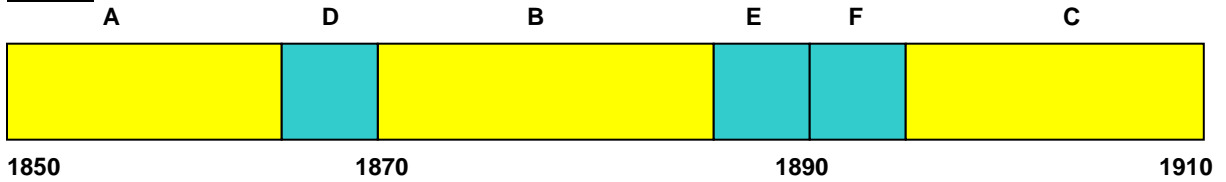


- BLOCK 1: 1930 – 1945 MHz (A)
- BLOCK 2: 1945 – 1950 MHz (D)
- BLOCK 3: 1950 – 1965 MHz (B)
- BLOCK 4: 1965 – 1970 MHz (E)
- BLOCK 5: 1970 – 1975 MHz (F)
- BLOCK 6: 1975 – 1990 MHz (C)

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### 3.5 PCS - Mobile Frequency Blocks

§24.229



BLOCK 1: 1850 – 1865 MHz (A)



BLOCK 4: 1885 – 1890 MHz (E)

BLOCK 2: 1865 – 1870 MHz (D)

BLOCK 5: 1890 – 1895 MHz (F)

BLOCK 3: 1870 – 1885 MHz (B)

BLOCK 6: 1895 – 1910 MHz (C)

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### 3.6 Radiated Measurements

**§2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) RSS-132(4.4) RSS-132(4.5.1) RSS-133(6.4) RSS-133(6.5.1)**

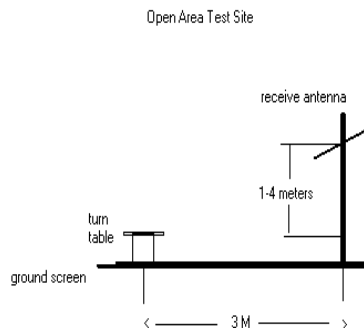
Radiated spurious emissions are investigated indoors in a semi-anechoic chamber to determine the frequencies producing the worst case emissions. Final measurements for radiated power and radiated spurious emissions are performed on the 3 meter OATS per the guidelines of ANSI/TIA-603-C-2004. The measurement area is situated on an 18 meter x 20 meter galvanized 1/2" hardware cloth as the conducting ground plane. This material is sewn together in sections 4 feet wide and 60 feet long. A total of eighteen sections are required to cover the entire measurement area. Sections are laid across the width of the pad, overlapped 1" and sewn and soldered together at intervals of 3" (7.6 cm.) The terrain of the test site is reasonably flat and level. Power and cable to the test site are buried 18" deep into the ground outside the perimeter of the site. An all-weather non-metallic housing is situated on a 2 x 3 meter area adjacent to the measurement area to house the test equipment. The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Emissions are also investigated with the receive antenna horizontally and vertically polarized. The level of the maximized emission is recorded with the spectrum analyzer using a peak detector with RBW = 1MHz, VBW = 3MHz for emissions greater than 1GHz. For emissions below 1GHz, the spectrum analyzer is set to RBW = 100kHz and VBW = 300kHz.

A half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:



$$P_d \text{ [dBm]} = P_g \text{ [dBm]} - \text{cable loss [dB]} + \text{antenna gain [dBd/dBi]}$$

Where,  $P_d$  is the dipole equivalent power,  $P_g$  is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to  $P_g \text{ [dBm]} - \text{cable loss [dB]}$ .

The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of  $43 + 10\log_{10}(\text{Power}_{\text{[Watts]}})$  specified in 22.917(a) and 24.238(a).



**Figure 3-1. Diagram of 3-meter Test Range**

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## 4.0 TEST EQUIPMENT CALIBRATION DATA



Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/29/2013	Annual	3/29/2014	N/A
-	RE2	Radiated Emissions Cable Set (VHF/UHF)	3/29/2013	Annual	3/29/2014	N/A
-	LTx2	Licensed Transmitter Cable Set	1/30/2014	Bi-annual	7/30/2014	N/A
Agilent	8449B	(1-26.5GHz) Pre-Amplifier	4/17/2013	Annual	4/17/2014	3008A00985
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/28/2013	Annual	10/28/2014	3613A00315
Agilent	N9038A	MXE EMI Receiver	1/3/2014	Annual	1/3/2015	MY51210133
Agilent	8447D	Broadband Amplifier	5/31/2013	Annual	5/31/2014	1937A03348
Agilent	N9020A	MXA Signal Analyzer	10/29/2013	Annual	10/29/2014	US46470561
Anritsu	MA2411B	Pulse Sensor	11/13/2013	Annual	11/13/2014	846215
Anritsu	ML2495A	Power Meter	10/31/2013	Annual	10/31/2014	1039008
Emco	6502	Active Loop Antenna (10k - 30 MHz)	5/31/2012	Biennial	5/31/2014	267
Espec	ESX-2CA	Environmental Chamber	4/16/2013	Annual	4/16/2014	17620
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	5/30/2012	Biennial	5/30/2014	135427
ETS Lindgren	3160-10	26.5-40 GHz Standard Gain Horn	6/6/2012	Biennial	6/6/2014	130993
Mini-Circuits	VHF-1300+	High Pass Filter	1/29/2014	Bi-annual	7/29/2014	30716
Mini-Circuits	VHF-3100+	High Pass Filter	1/29/2014	Bi-annual	7/29/2014	31144
Rohde & Schwarz	CMU200	Base Station Simulator	N/A		N/A	836536/0005
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100040
Rohde & Schwarz	TS-PR40	26.5-40 GHz Pre-Amplifier	6/6/2012	Biennial	6/6/2014	100037
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	11/1/2013	Biennial	11/1/2015	9105252TX
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/1/2013	Biennial	11/1/2015	91052523RX
Schwarzbeck	VULB-9161SE	Trilog Super Broadband Test Antenna	10/23/2013	Biennial	10/23/2015	9161-4075
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
Sunol	DRH-118	Horn Antenna (1 - 18GHz)	6/19/2013	Biennial	6/19/2015	A050307
Sunol	DRH-118	Horn Antenna (1-18 GHz)	6/19/2013	Biennial	6/19/2015	A042511

**Table 4-1. Test Equipment**

**Notes:**

1. Equipment used for signaling with a calibration date of "N/A" shown in this list was only used for maintaining a link between the piece of equipment and the EUT. This equipment was not used to make direct calibrated measurements.

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## 5.0 SAMPLE CALCULATIONS

### GSM Emission Designator

**Emission Designator = 250KGXW**

GSM BW = 250 kHz  
 G = Phase Modulation  
 X = Cases not otherwise covered  
 W = Combination (Audio/Data)

### EDGE Emission Designator

**Emission Designator = 250KG7W**

EDGE BW = 250 kHz  
 G = Phase Modulation  
 7 = Quantized/Digital Info  
 W = Combination (Audio/Data)

### WCDMA Emission Designator



**Emission Designator = 4M16F9W**

WCDMA BW = 4.16 MHz  
 F = Frequency Modulation  
 9 = Composite Digital Info  
 W = Combination (Audio/Data) (Measured at the 99.75% power bandwidth)

### Spurious Radiated Emission

**Example: Spurious emission at 3700.40 MHz**

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was  $-81.0$  dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of  $-81.0$  dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of  $-30.9$  dBm yielding  $-24.80$  dBm. The fundamental EIRP was 25.50 dBm so this harmonic was  $25.50$  dBm  $- (-24.80) = 50.3$  dBc.

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## 6.0 TEST RESULTS

### 6.1 Summary



Company Name: Motorola Mobility LLC  
 FCC ID: IHDT56PJ1  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): GSM /EDGE /WCDMA

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
<b>TRANSMITTER MODE (TX)</b>					
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 6.2
2.1051 22.917(a) 24.238(a)	Conducted Band Edge / Spurious Emissions	> 43 + log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Sections 6.3, 6.4
24.232(d)	Peak-Average Ratio	< 13 dB		PASS	Section 6.5
2.1046	Transmitter Conducted Output Power	N/A		PASS	RF Exposure Report
2.1055 22.355 24.235	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24)		PASS	Section 6.8
22.913(a.2)	Effective Radiated Power	< 7 Watts max. ERP	RADIATED	PASS	Section 6.6
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 6.6
2.1053 22.917(a) 24.238(a)	Radiated Spurious Emissions	> 43 + log <sub>10</sub> (P[Watts]) for all out-of-band emissions		PASS	Section 6.7

**Table 6-1. Summary of Test Results**

**Notes:**

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "2G/3G Automation", Version 2.3.

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## 6.2 Occupied Bandwidth

### §2.1049 RSS-Gen(4.6.1) RSS-133(2.3)

#### Test Overview

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

#### Test Procedure Used

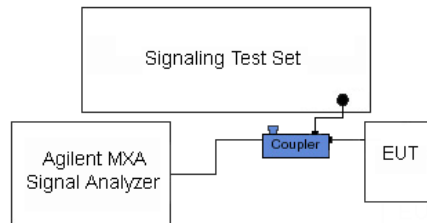
KDB 971168 v02r01 – Section 4.2

#### Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW  $\geq$  3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

#### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 6-1. Test Instrument & Measurement Setup**

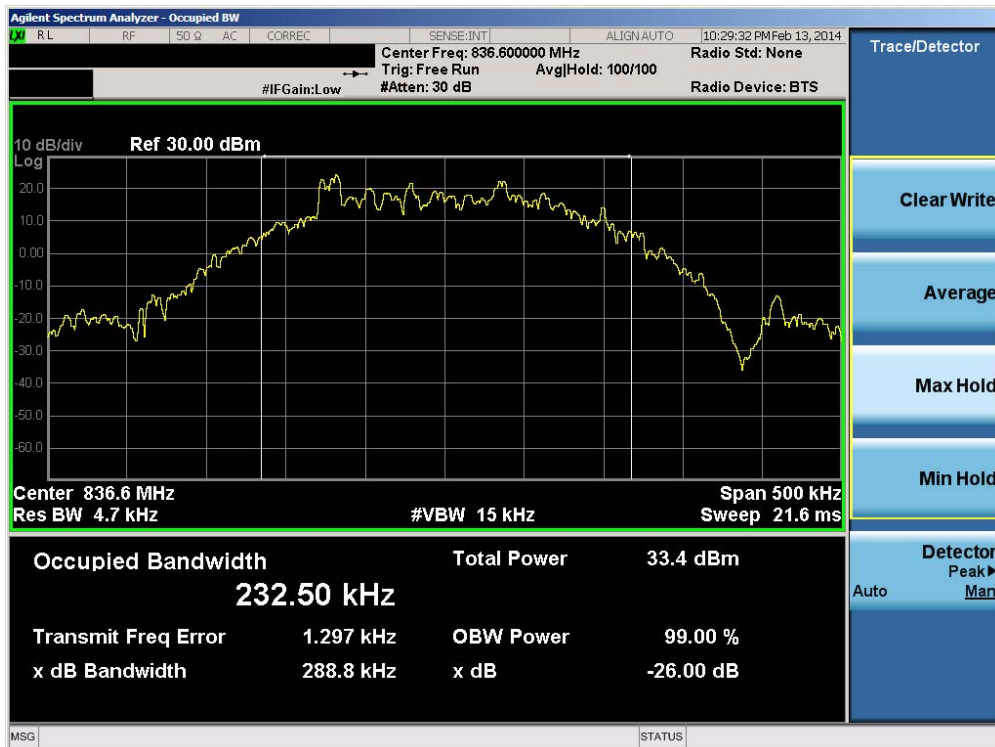
#### Test Notes

None.

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 12 of 60



Plot 6-1. Occupied Bandwidth Plot (Cellular GSM Mode – Ch. 190)

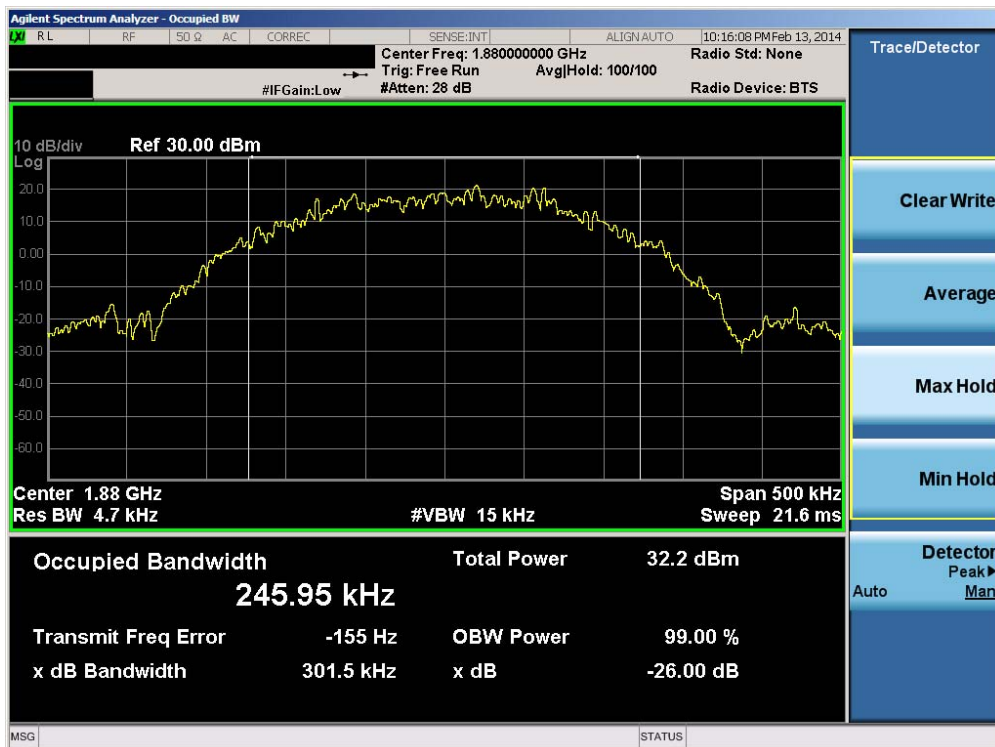


Plot 6-2. Occupied Bandwidth Plot (EDGE850 Mode – Ch. 190)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 13 of 60



Plot 6-3. Occupied Bandwidth Plot (PCS GSM Mode – Ch. 661)

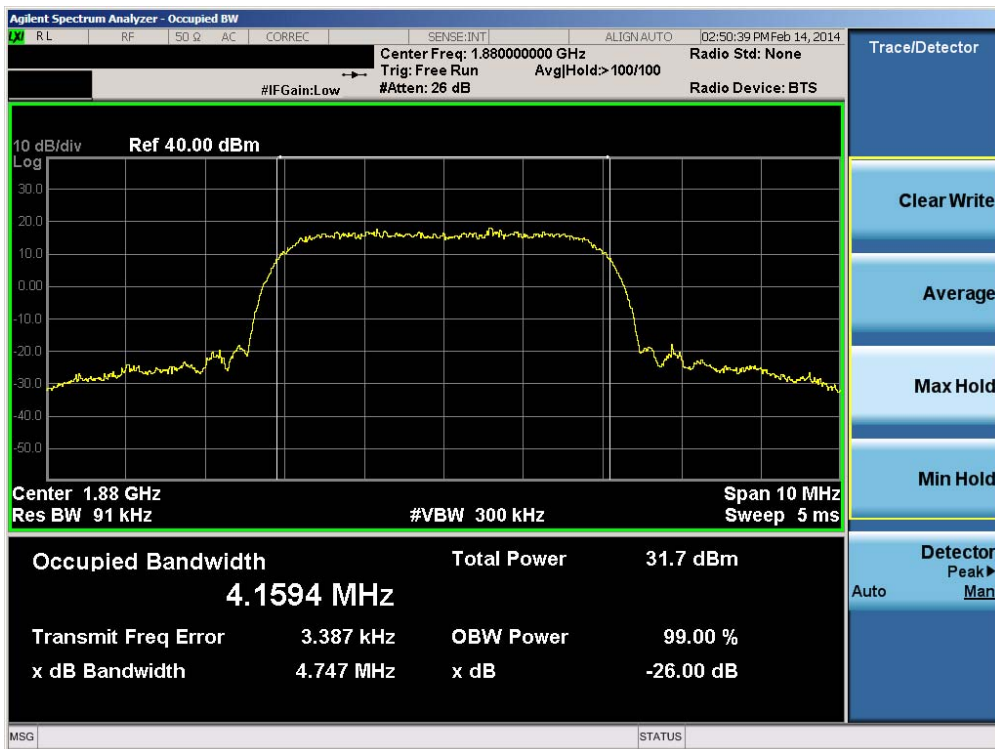


Plot 6-4. Occupied Bandwidth Plot (EDGE1900 Mode – Ch. 661)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 14 of 60



Plot 6-5. Occupied Bandwidth Plot (Cellular WCDMA Mode – Ch. 4183)



Plot 6-6. Occupied Bandwidth Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 15 of 60

### 6.3 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051 §22.917(a) §24.238(a) RSS-132(4.5.1) RSS-133(6.5.1)

#### Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

*The minimum permissible attenuation level of any spurious emission is  $43 + \log_{10}(P_{[Watts]})$ , where P is the transmitter power in Watts.*

#### Test Procedure Used

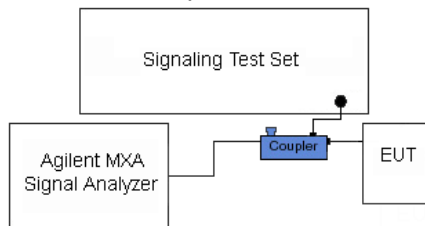
KDB 971168 v02r01 – Section 6.0

#### Test Settings

1. Start frequency was set to 30MHz and stop frequencies were set to 10GHz (Cell Band)/20GHz (PCS Band) (separated into at least two plots per channel).
2. RBW  $\geq$  100kHz
3. VBW  $\geq$  300kHz
4. Detector = RMS
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

#### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.



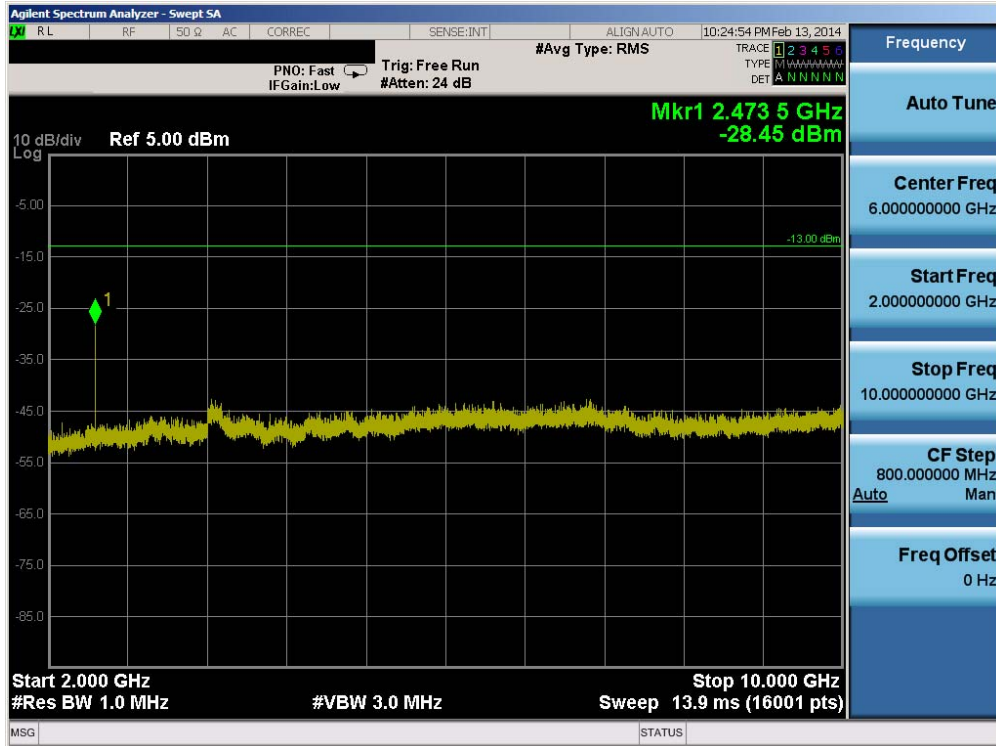
**Figure 6-2. Test Instrument & Measurement Setup**

#### Test Notes

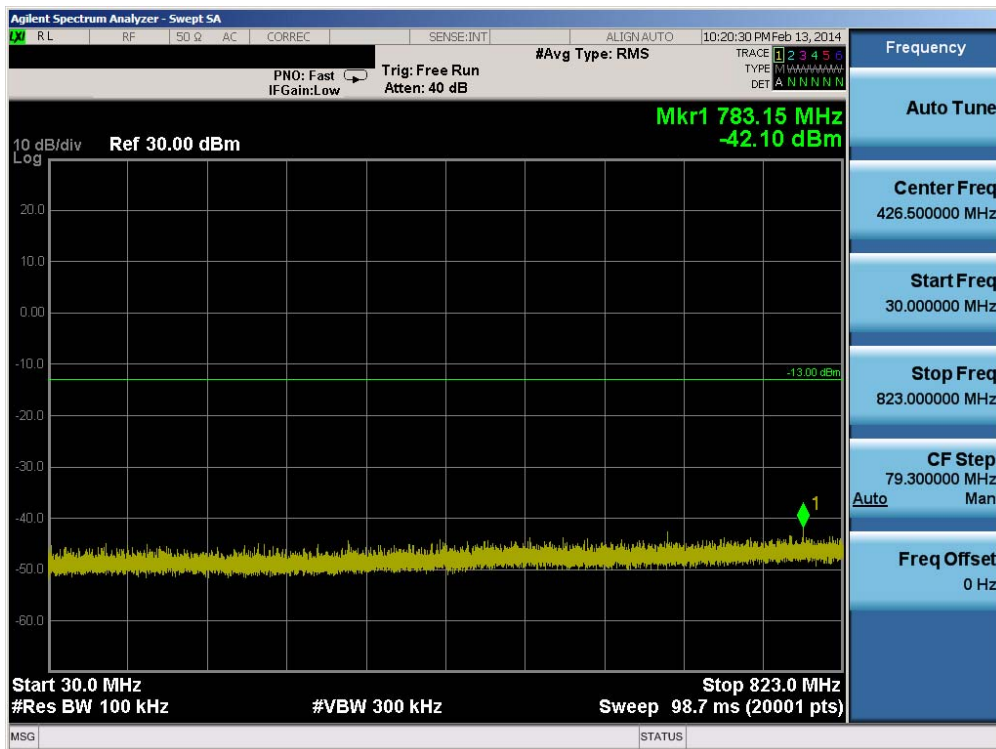
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22 and 1 MHz or greater for Part 24. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. 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 emission are attenuated at least 26 dB below the transmitter power.

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 16 of 60





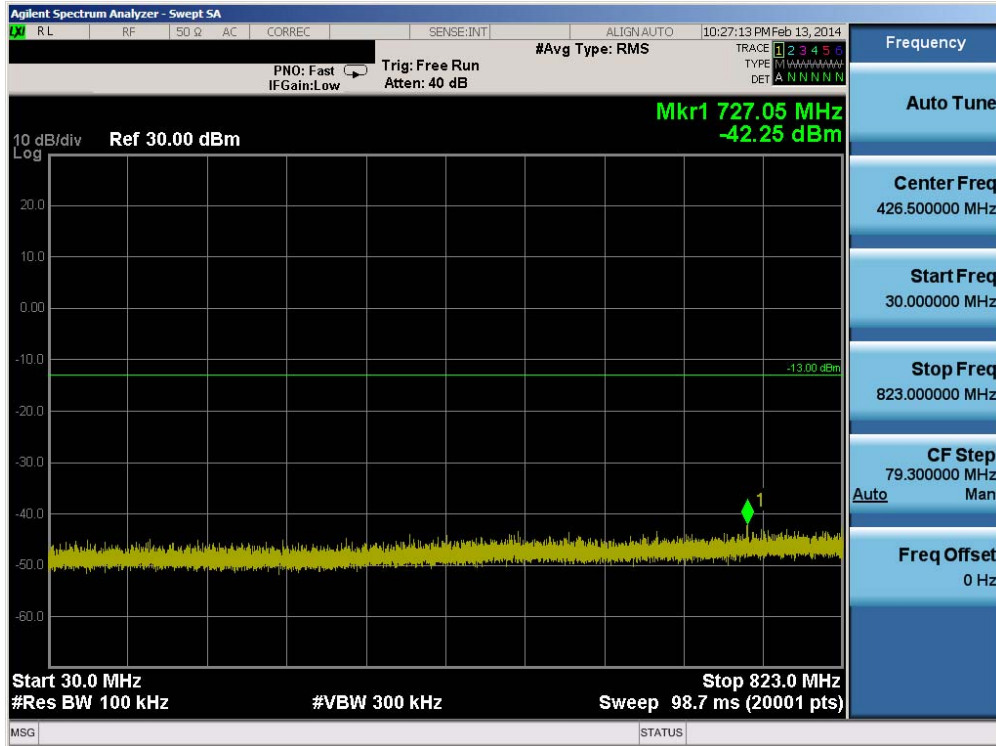
Plot 6-9. Conducted Spurious Plot (Cellular GSM Mode – Ch. 128)



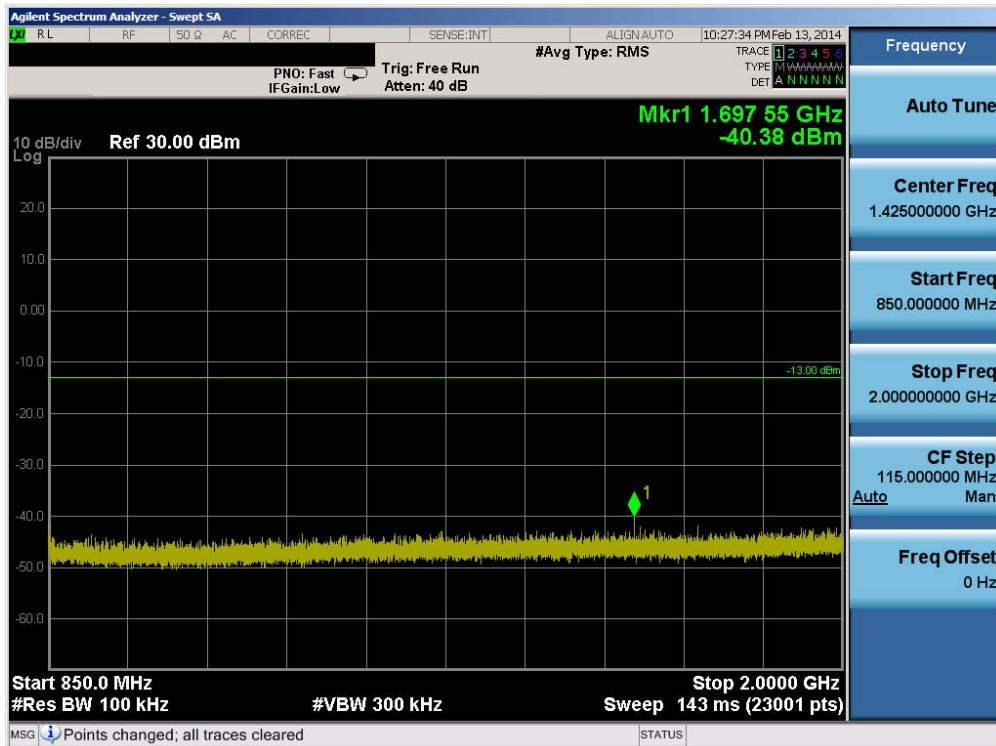
Plot 6-10. Conducted Spurious Plot (Cellular GSM Mode – Ch. 190)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 18 of 60



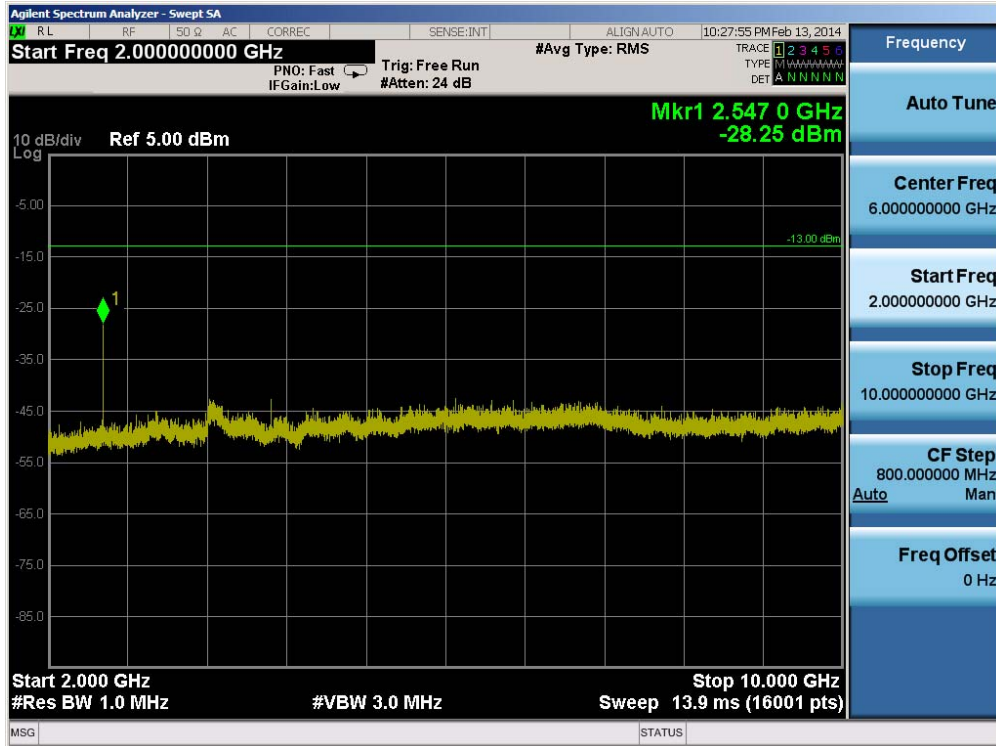


Plot 6-13. Conducted Spurious Plot (Cellular GSM Mode – Ch. 251)

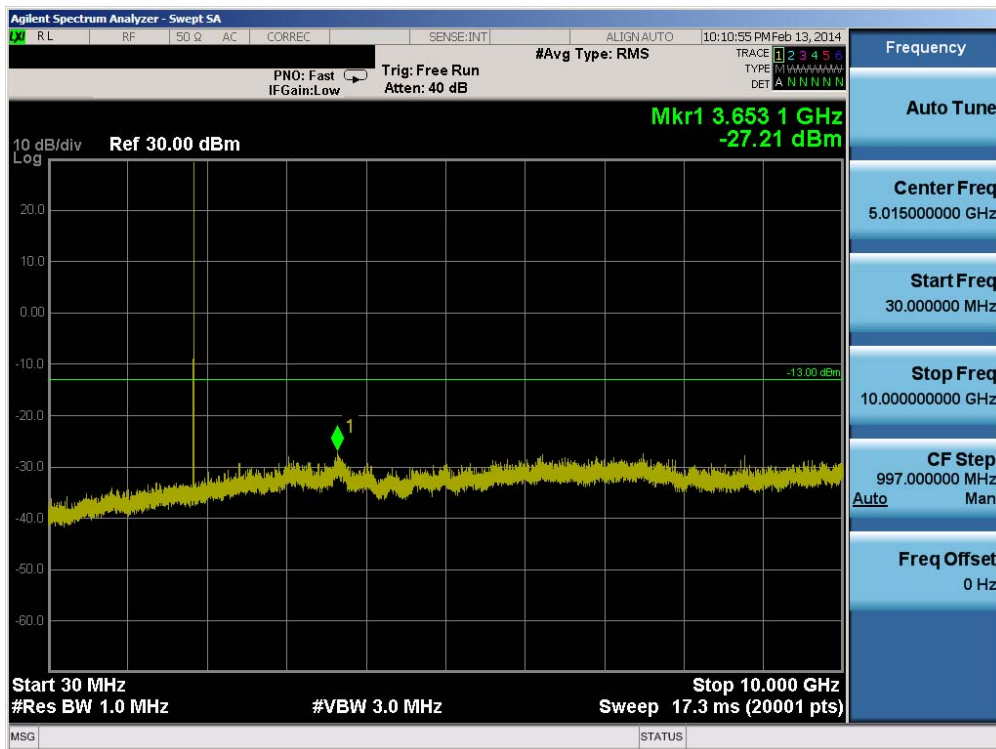


Plot 6-14. Conducted Spurious Plot (Cellular GSM Mode – Ch. 251)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 20 of 60

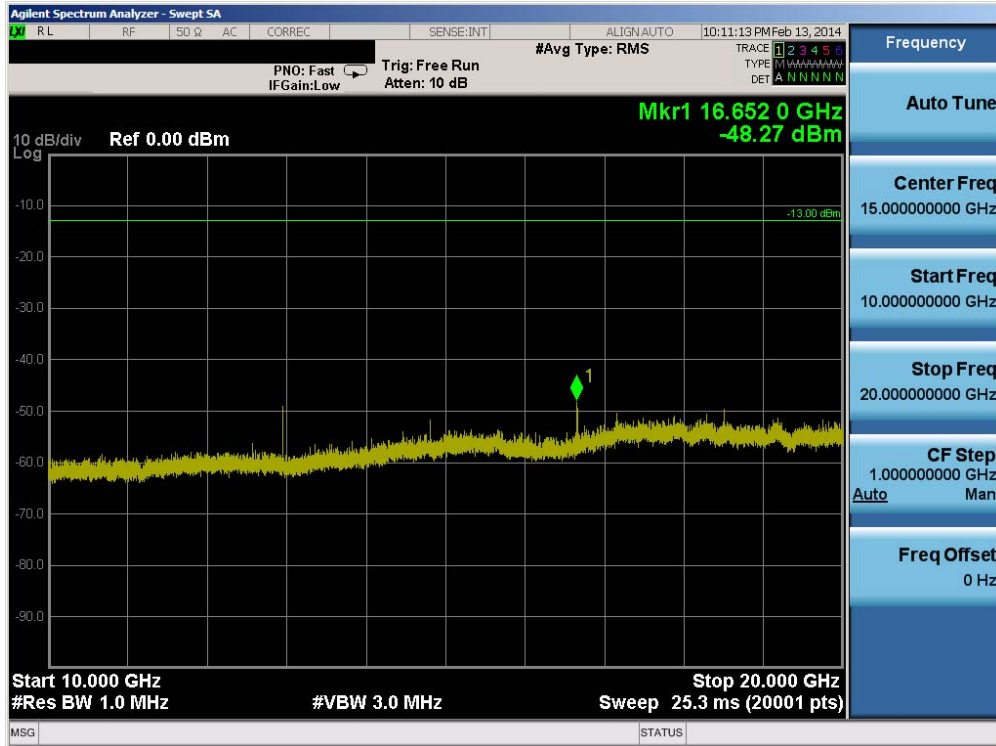


Plot 6-15. Conducted Spurious Plot (Cellular GSM Mode – Ch. 251)

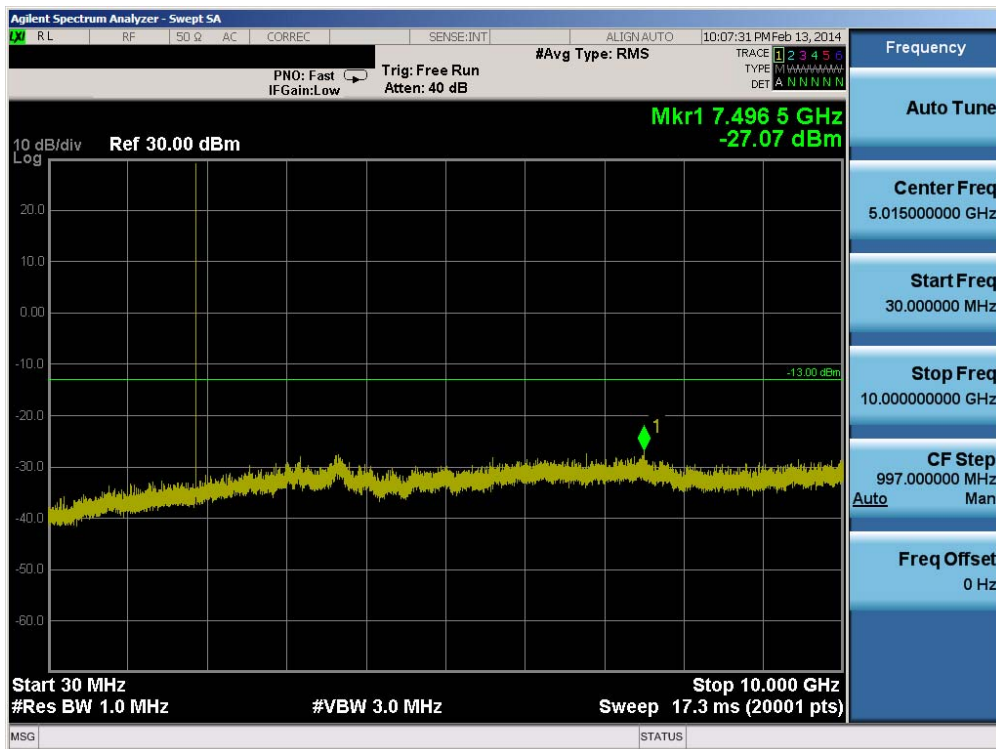


Plot 6-16. Conducted Spurious Plot (PCS GSM Mode – Ch. 512)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 21 of 60

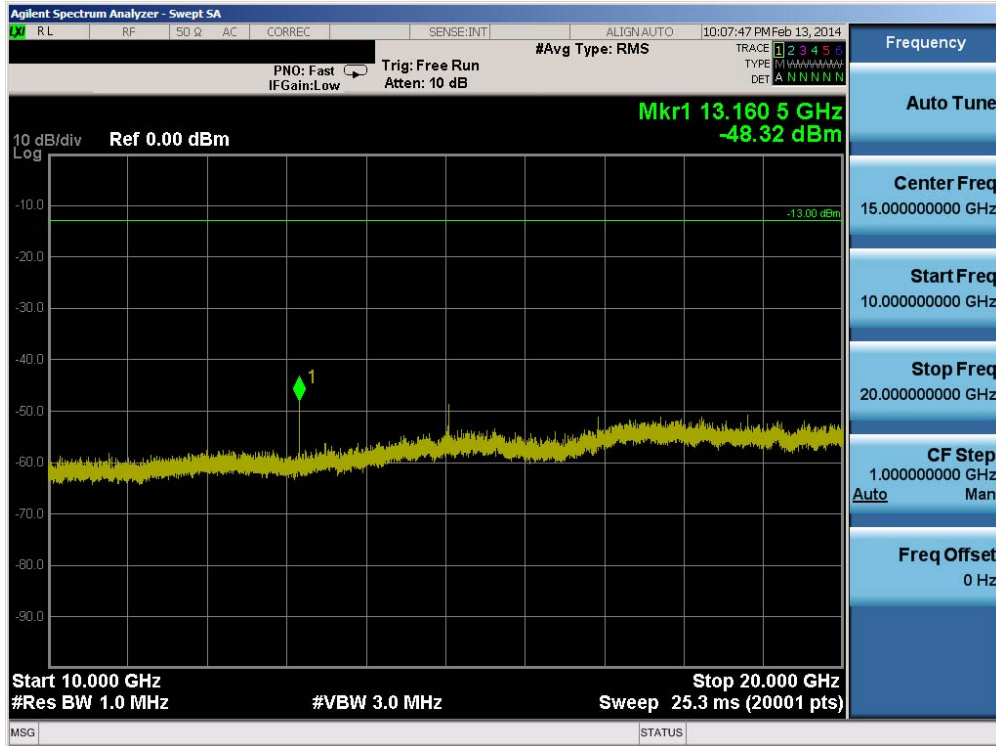


Plot 6-17. Conducted Spurious Plot (PCS GSM Mode – Ch. 512)

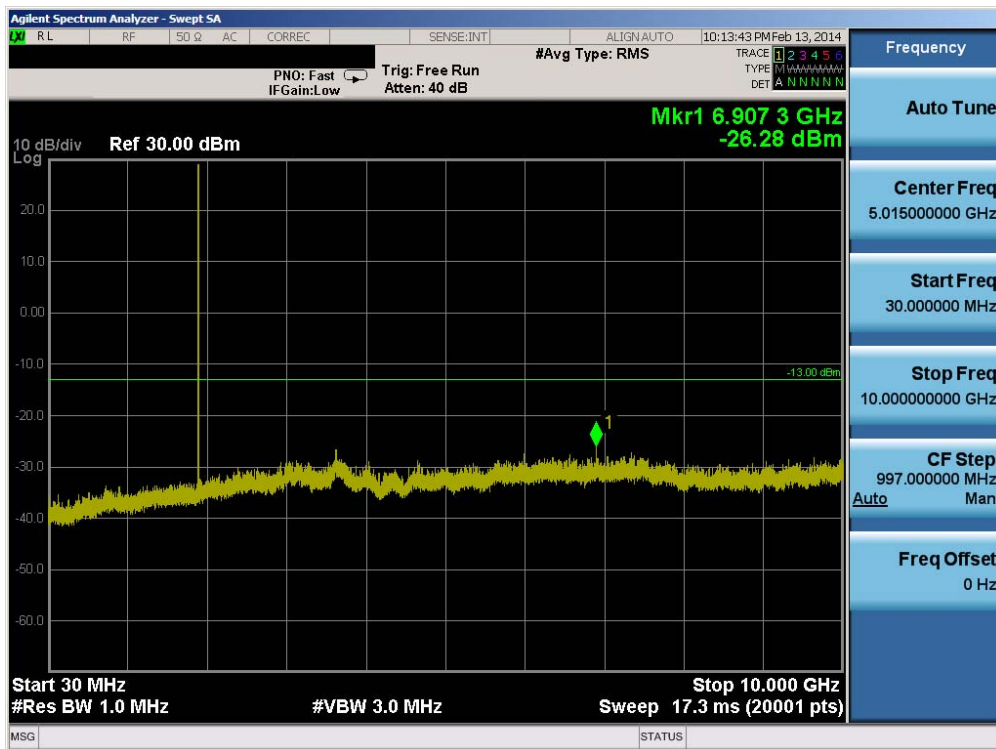


Plot 6-18. Conducted Spurious Plot (PCS GSM Mode – Ch. 661)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 22 of 60

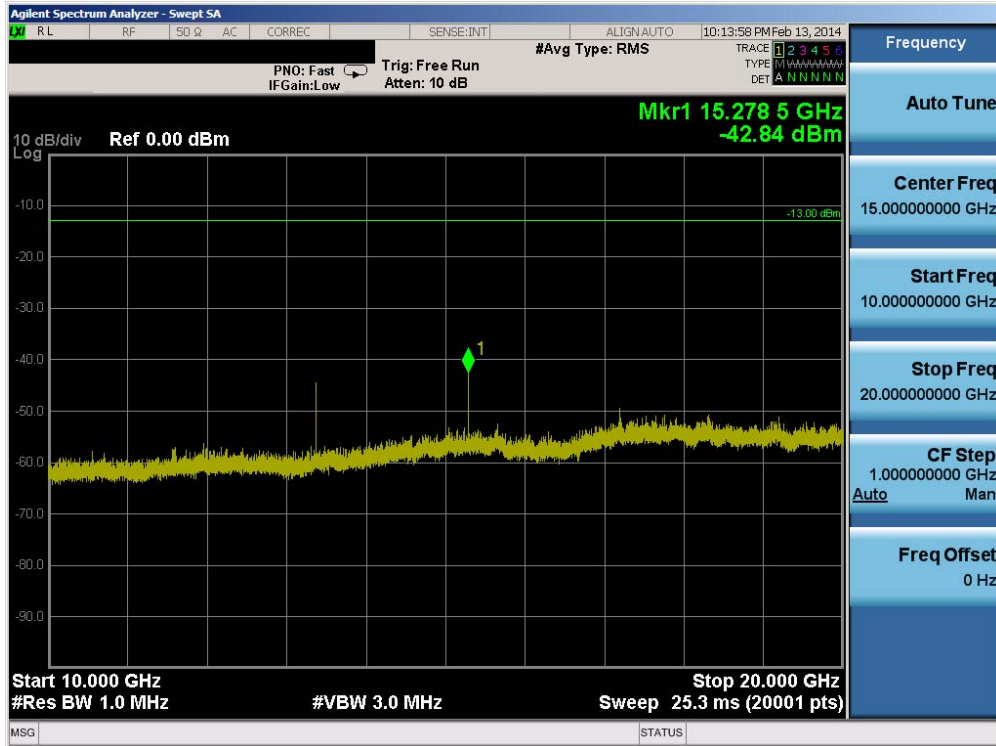


Plot 6-19. Conducted Spurious Plot (PCS GSM Mode – Ch. 661)

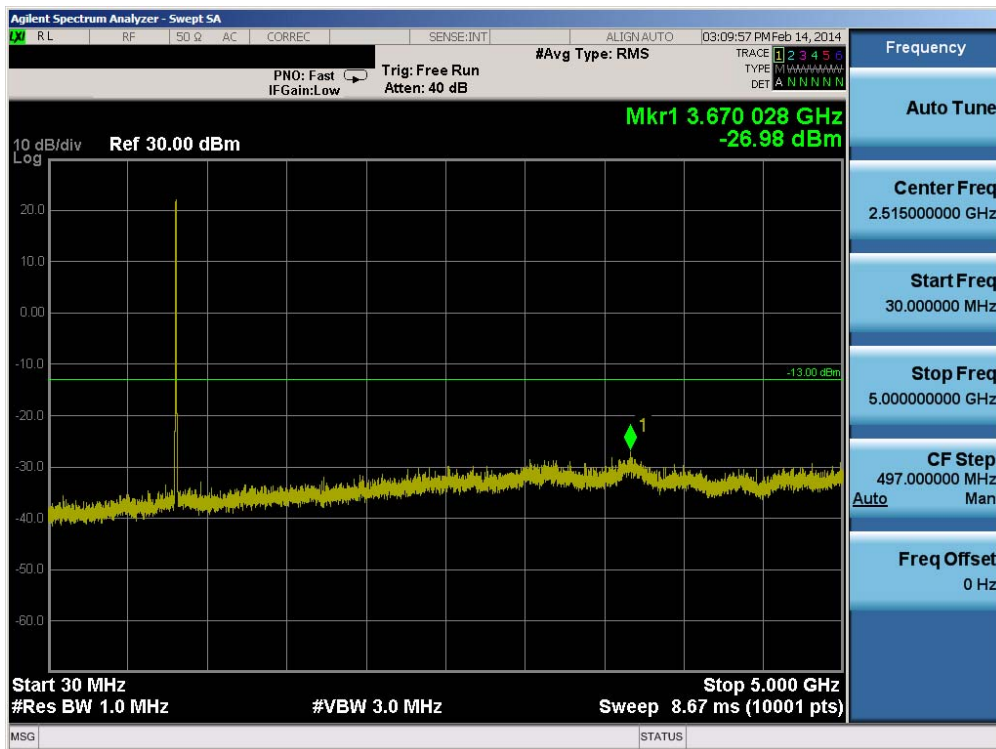


Plot 6-20. Conducted Spurious Plot (PCS GSM Mode – Ch. 810)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 23 of 60



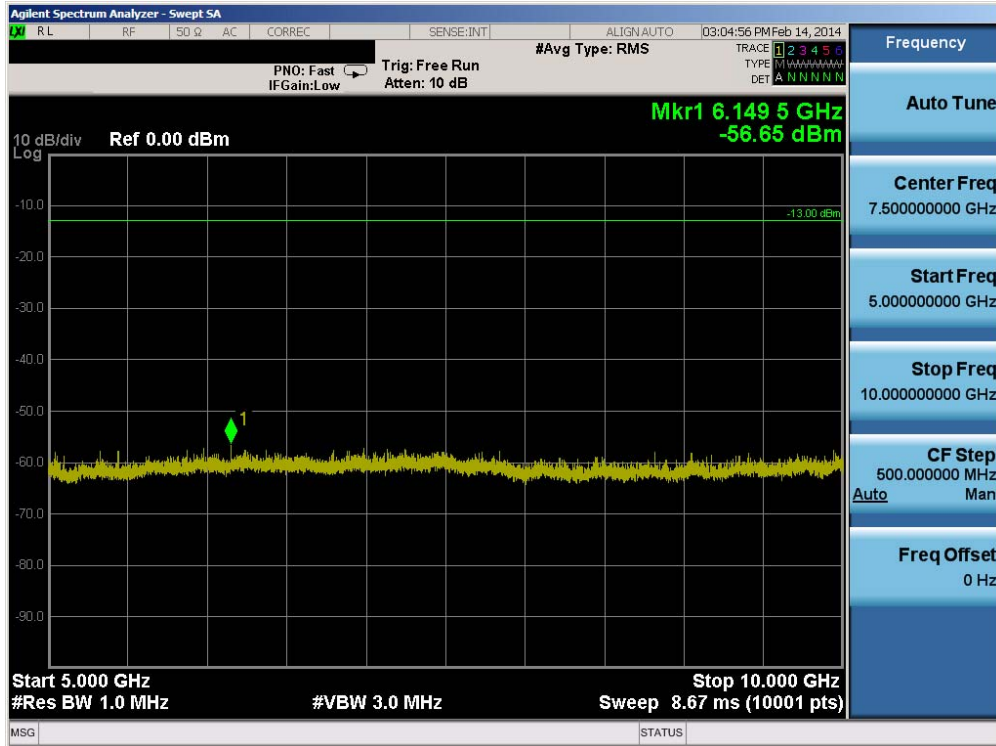
Plot 6-21. Conducted Spurious Plot (PCS GSM Mode – Ch. 810)



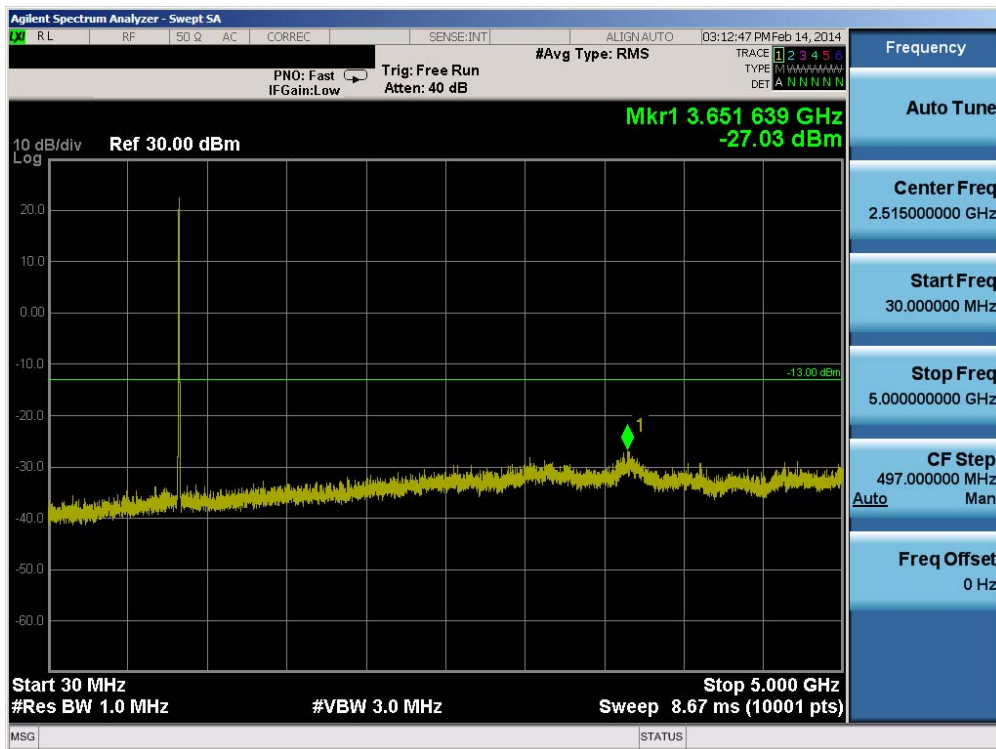
Plot 6-22. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 24 of 60





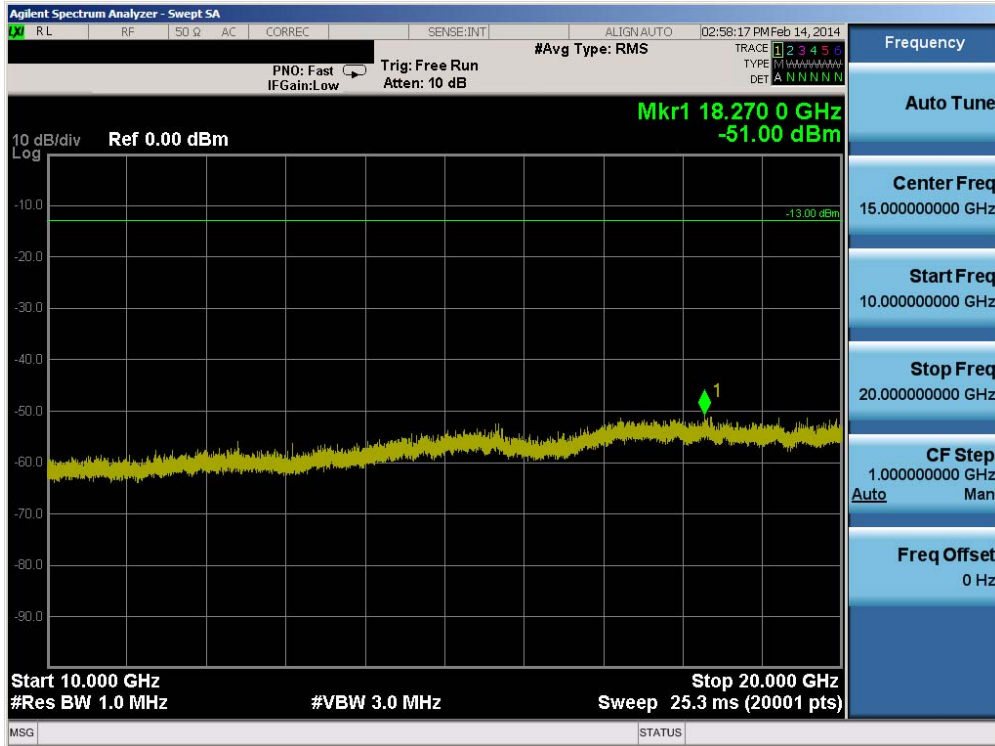
Plot 6-25. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)



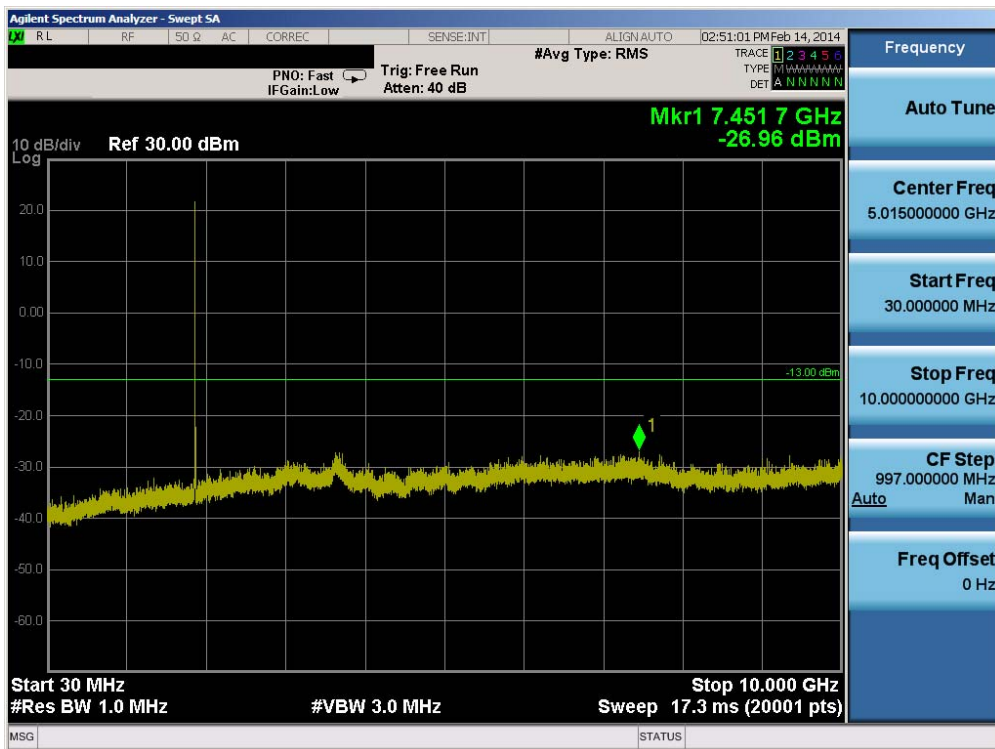
Plot 6-26. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 26 of 60





Plot 6-29. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)



Plot 6-30. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 28 of 60





## 6.4 Band Edge Emissions at Antenna Terminal

§2.1051 §22.917(a) §24.238(a) RSS-132(4.5.1) RSS-133(6.5.1)

### Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

***The minimum permissible attenuation level of any spurious emission is  $43 + \log_{10}(P_{[Watts]})$ , where  $P$  is the transmitter power in Watts.***

### Test Procedure Used

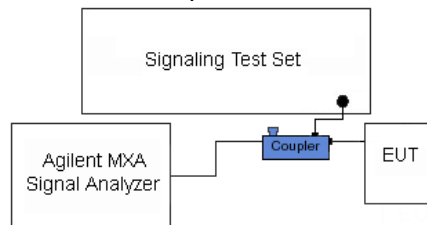
KDB 971168 v02r01 – Section 6.0

### Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW  $\geq$  1% of the emission bandwidth
4. VBW  $\geq$  3 x RBW
5. Detector = RMS
6. Number of sweep points  $\geq$  2 x Span/RBW
7. Trace mode = max hold
8. Sweep time = auto couple
9. The trace was allowed to stabilize

### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.

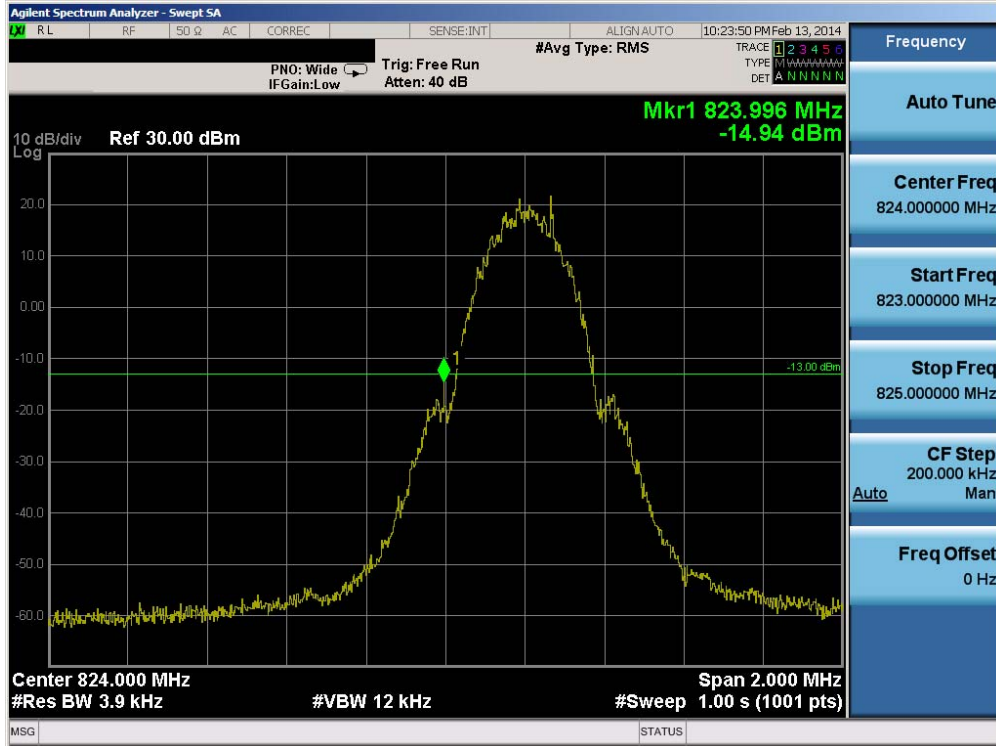


**Figure 6-3. Test Instrument & Measurement Setup**

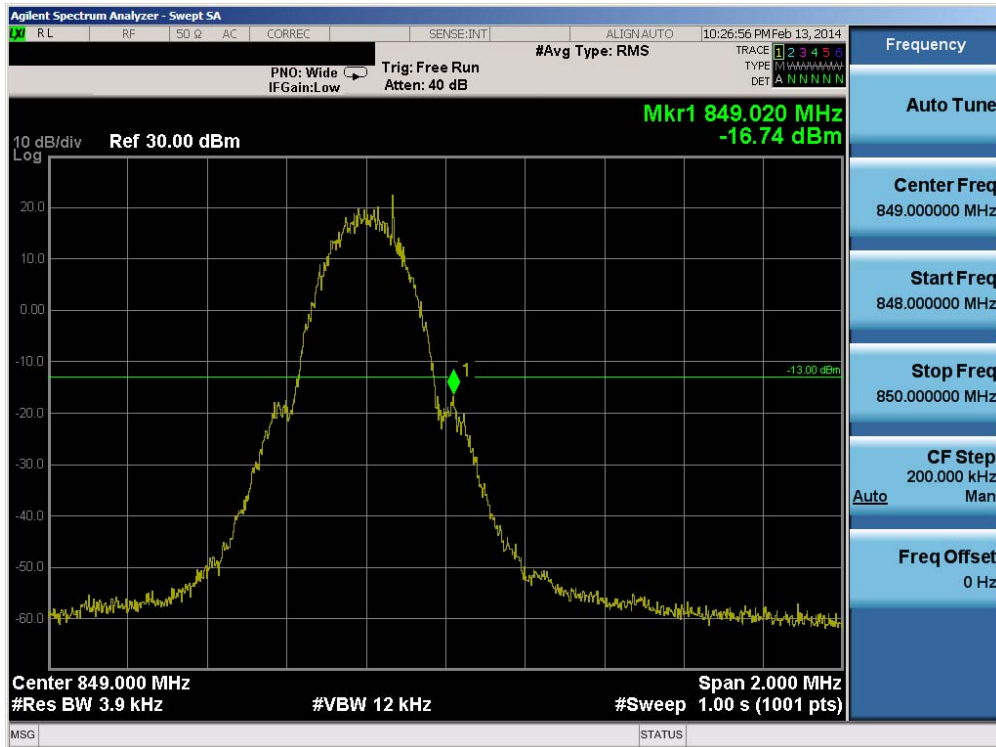
### Test Notes

Per 22.917(b) and 24.238(b), 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 to demonstrate compliance with the out-of-band emissions limit.



FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 6-34. Band Edge Plot (Cellular GSM Mode – Ch. 128)



Plot 6-35. Band Edge Plot (Cellular GSM Mode – Ch. 251)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 32 of 60



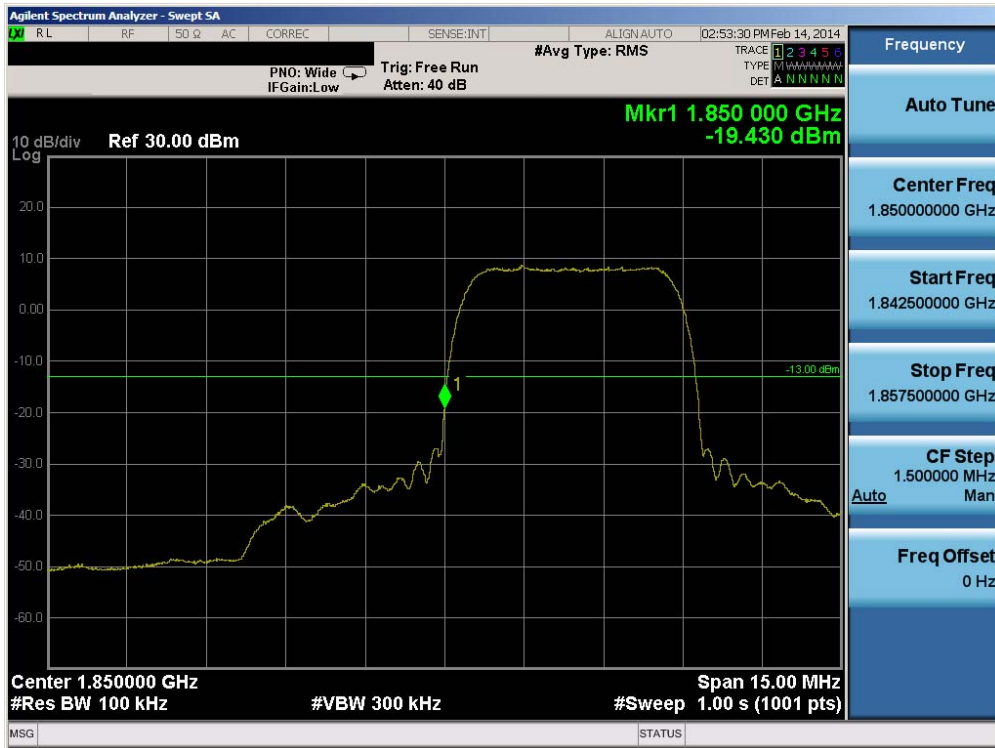


Plot 6-38. Band Edge Plot (Cellular WCDMA Mode – Ch. 4132)



Plot 6-39. Band Edge Plot (Cellular WCDMA Mode – Ch. 4233)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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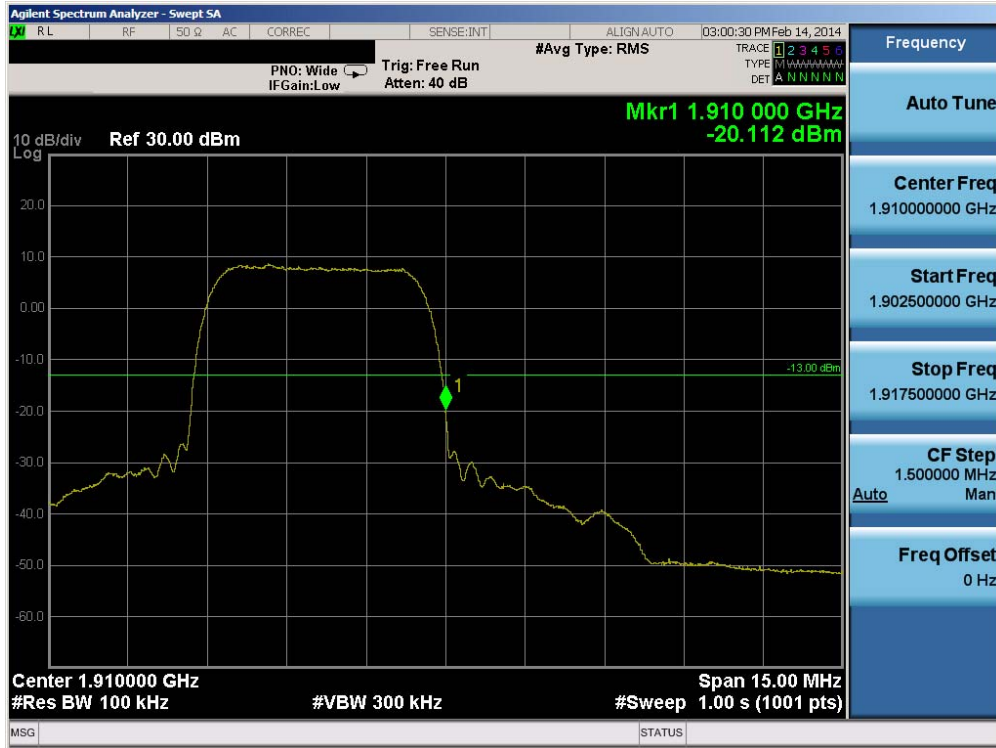


Plot 6-40. Band Edge Plot (PCS WCDMA Mode – Ch. 9262)



Plot 6-41. 4MHz Span Plot (PCS WCDMA Mode – Ch. 9262)



FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 6-42. Band Edge Plot (PCS WCDMA Mode – Ch. 9538)



Plot 6-43. 4MHz Span Plot (PCS WCDMA Mode – Ch. 9538)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 36 of 60

## 6.5 Peak-Average Ratio

§24.232(d) RSS-132(5.4) RSS-133(6.4)

### Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

### Test Procedure Used

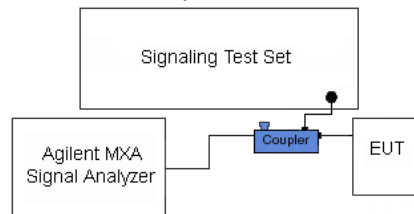
KDB 971168 v02r01 – Section 5.7.1

### Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.

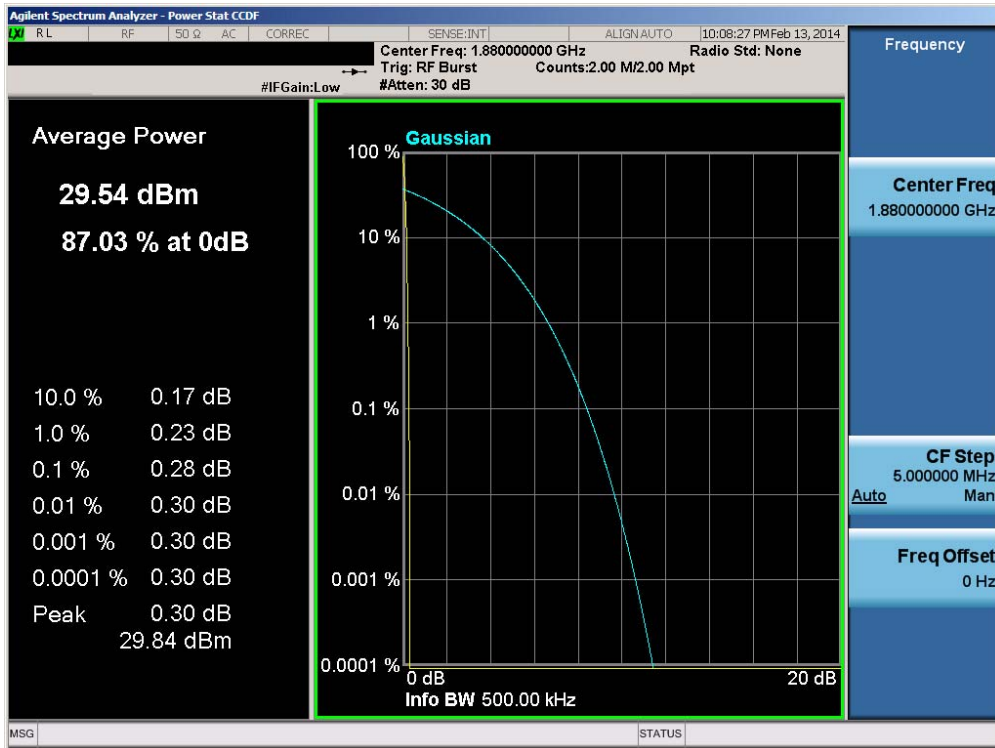


**Figure 6-4. Test Instrument & Measurement Setup**

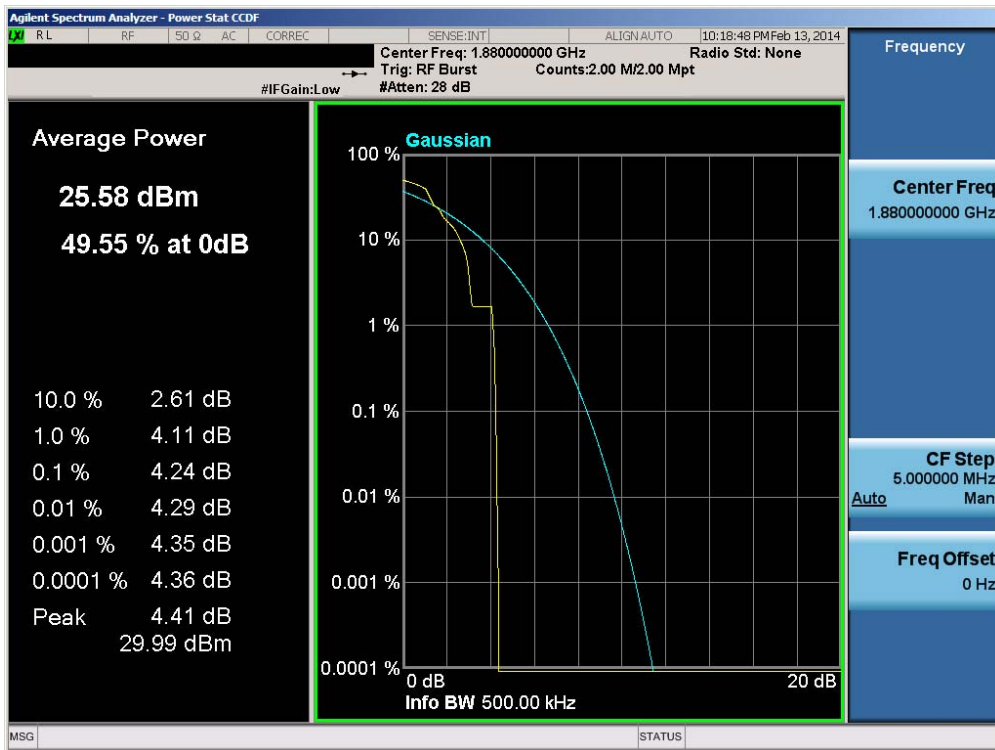
### Test Notes

None.

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 37 of 60

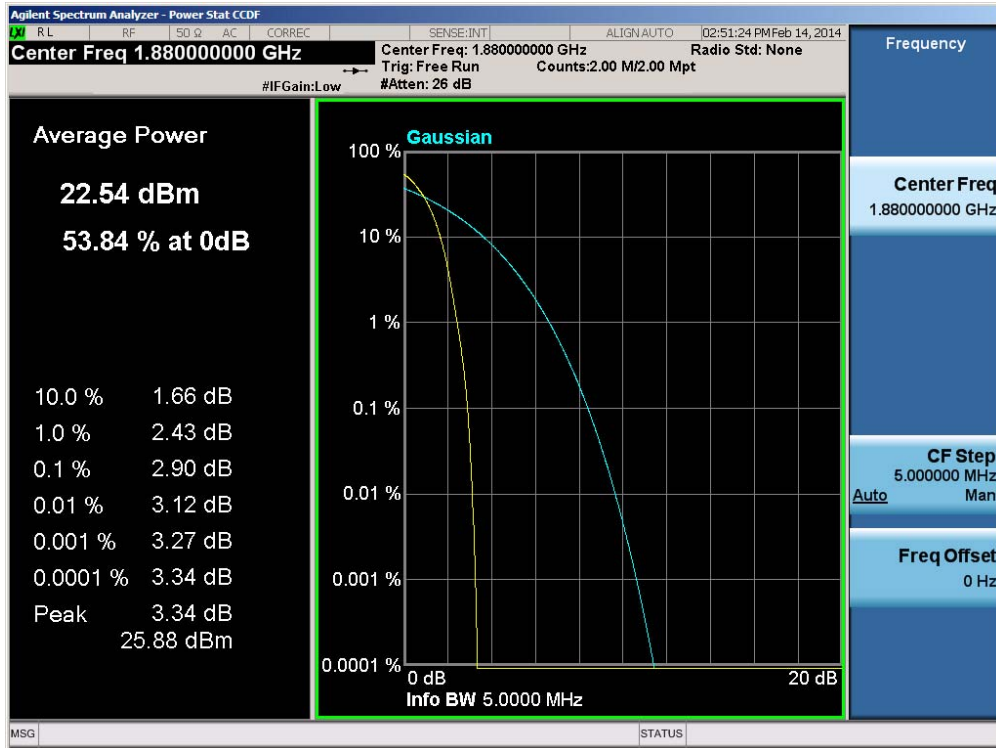


Plot 6-44. Peak-Average Ratio Plot (PCS GSM Mode – Ch. 661)



Plot 6-45. Peak-Average Ratio Plot (EDGE1900 Mode – Ch. 661)

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 38 of 60



**Plot 6-46. Peak-Average Ratio Plot (PCS WCDMA Mode – Ch. 9400)**

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset		Page 39 of 60

## 6.6 Radiated Power (ERP/EIRP) §22.913(a)(2) RSS-132(4.4) [SRSP-503(5.1.3)]

### Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.



### Test Procedures Used

KDB 971168 v02r01 – Section 5.2.1

ANSI/TIA-603-C-2004 – Section 2.2.17

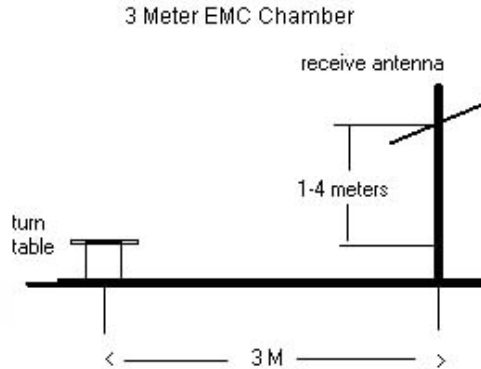
### Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW  $\geq$  3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points  $\geq$  2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".  
Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)	 Reviewed by: Quality Manager
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**Test Setup**



The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 6-5. Test Instrument & Measurement Setup**

**Test Notes**

- 1) This device was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA, and GSM/GPRS/EDGE capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 3) This unit was tested with its standard battery.
- 4) The worst case test configuration was found in the EUT in the V positioning. The data reported in the tables below was measured in this test setup.

<b>FCC ID:</b> IHDT56PJ1		<b>FCC Pt. 22 &amp; 24 / IC RSS -132 &amp; RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)</b>	 <b>Reviewed by:</b> Quality Manager
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Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBd]	EUT Pol [H/V]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.20	GSM850	Standard	30.75	-1.84	V	28.91	0.778	38.45	-9.54
836.60	GSM850	Standard	31.55	-1.94	V	29.61	0.914	38.45	-8.84
848.80	GSM850	Standard	30.68	-2.04	V	28.64	0.731	38.45	-9.81
836.60	EDGE850	Standard	24.73	-1.94	V	22.79	0.190	38.45	-15.66

**Table 6-2. ERP (Cellular GSM)**

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBd]	EUT Pol [H/V]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	Standard	19.71	-1.84	V	17.87	0.061	38.45	-20.58
836.60	WCDMA850	Standard	21.67	-1.94	V	19.73	0.094	38.45	-18.72
846.60	WCDMA850	Standard	21.93	-2.04	V	19.89	0.097	38.45	-18.56



**Table 6-4. ERP (Cellular WCDMA)**

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBi]	EUT Pol [H/V]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.20	GSM1900	Standard	18.29	7.97	V	26.26	0.423	33.01	-6.76
1880.00	GSM1900	Standard	20.67	8.02	V	28.69	0.740	33.01	-4.32
1909.80	GSM1900	Standard	22.41	8.11	V	30.52	1.127	33.01	-2.49
1909.80	EDGE1900	Standard	14.82	8.11	V	22.93	0.196	33.01	-10.08

**Table 6-3. EIRP (PCS GSM)**

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBi]	EUT Pol [H/V]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	Standard	15.40	7.98	V	23.38	0.218	33.01	-9.63
1880.00	WCDMA1900	Standard	13.64	8.02	V	21.66	0.147	33.01	-11.35
1907.60	WCDMA1900	Standard	13.99	8.10	V	22.09	0.162	33.01	-10.92

**Table 6-4. EIRP (PCS WCDMA)**

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## 6.7 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) RSS-132(4.5.1)

### Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

### Test Procedures Used

KDB 971168 v02r01 – Section 5.8

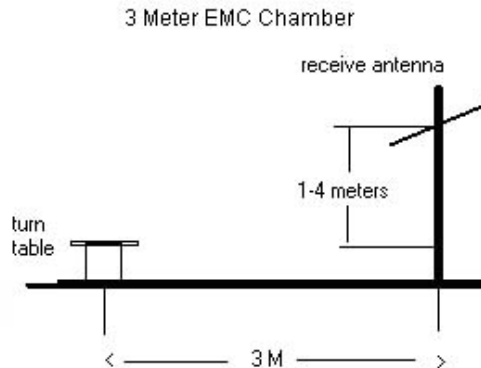
ANSI/TIA-603-C-2004 – Section 2.2.12

### Test Settings



1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW  $\geq 3 \times$  RBW
3. Span = 1.5 times the OBW
4. No. of sweep points  $\geq 2 \times$  span / RBW
5. Detector = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize

### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.





**Figure 6-6. Test Instrument & Measurement Setup**

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Test Notes**

- 1) This device was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA, and GSM/GPRS/EDGE capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 3) This unit was tested with its standard battery.
- 4) The worst case test configuration was found in the EUT in the V positioning. The data reported in the table above was measured in this test setup.
- 5) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
- 6) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

<b>FCC ID:</b> IHDT56PJ1		<b>FCC Pt. 22 &amp; 24 / IC RSS -132 &amp; RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)</b>	 <b>Reviewed by:</b> Quality Manager
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OPERATING FREQUENCY: 824.20 MHz  
 CHANNEL: 128  
 MEASURED OUTPUT POWER: 28.91 dBm = 0.778 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  41.91 dBc



FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	(dBc)
1648.40	-45.65	6.35	-39.31	H2	68.2
2472.60	-52.97	6.60	-46.37	H2	75.3
3296.80	-52.99	6.96	-46.03	H2	74.9
4121.00	-81.49	7.59	-73.89	H2	102.8
4945.20	-81.43	9.08	-72.35	H2	101.3

**Table 6-4. Radiated Spurious Data (Cellular GSM Mode – Ch. 128)**

OPERATING FREQUENCY: 836.60 MHz  
 CHANNEL: 190  
 MEASURED OUTPUT POWER: 29.61 dBm = 0.914 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  42.61 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	(dBc)
1673.20	-42.83	6.19	-36.65	H2	66.3
2509.80	-53.47	6.58	-46.89	H2	76.5
3346.40	-52.41	7.16	-45.25	H2	74.9
4183.00	-82.08	8.00	-74.09	H2	103.7
5019.60	-80.96	8.97	-71.99	H2	101.6

**Table 6-5. Radiated Spurious Data (Cellular GSM Mode – Ch. 190)**

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 848.80 MHz  
 CHANNEL: 251  
 MEASURED OUTPUT POWER: 28.64 dBm = 0.731 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  41.64 dBc



FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	(dBc)
1697.60	-43.32	6.03	-37.28	H2	65.9
2546.40	-54.73	6.71	-48.02	H2	76.7
3395.20	-52.75	7.36	-45.40	H2	74.0
4244.00	-82.41	8.27	-74.14	H2	102.8
5092.80	-80.30	8.83	-71.47	H2	100.1

**Table 6-6. Radiated Spurious Data (Cellular GSM Mode – Ch. 251)**

OPERATING FREQUENCY: 826.40 MHz  
 CHANNEL: 4132  
 MEASURED OUTPUT POWER: 17.87 dBm = 0.061 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  30.87 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	(dBc)
1652.80	-54.24	6.32	-47.92	H2	65.8
2479.20	-55.38	6.58	-48.80	H2	66.7
3305.60	-83.16	6.99	-76.17	H2	94.0
4132.00	-81.59	7.67	-73.93	H2	91.8
4958.40	-81.36	9.07	-72.29	H2	90.2

**Table 6-7. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)**

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 836.60 MHz  
 CHANNEL: 4183  
 MEASURED OUTPUT POWER: 19.73 dBm = 0.094 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  32.73 dBc



FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	(dBc)
1673.20	-55.54	6.21	-49.33	H2	69.1
2509.80	-55.86	6.56	-49.30	H2	69.0
3346.40	-83.31	7.13	-76.17	H2	95.9
4183.00	-81.87	7.94	-73.93	H2	93.7
5019.60	-81.28	8.99	-72.29	H2	92.0

**Table 6-8. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)**

OPERATING FREQUENCY: 846.60 MHz  
 CHANNEL: 4233  
 MEASURED OUTPUT POWER: 19.89 dBm = 0.097 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  32.89 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	(dBc)
1693.20	-54.70	6.06	-48.64	H2	68.5
2539.80	-56.00	6.69	-49.31	H2	69.2
3386.40	-83.49	7.32	-76.17	H2	96.1
4233.00	-82.15	8.23	-73.93	H2	93.8
5079.60	-81.15	8.86	-72.29	H2	92.2

**Table 6-9. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)**

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1850.20 MHz  
 CHANNEL: 512  
 MEASURED OUTPUT POWER: 26.26 dBm = 0.423 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  39.26 dBc



FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	(dBc)
3700.40	-49.98	9.93	-40.05	H	66.3
5550.60	-80.47	11.11	-69.37	H	95.6
7400.80	-75.51	10.74	-64.77	H	91.0
9251.00	-74.88	12.31	-62.57	H	88.8
11101.20	-72.39	12.90	-59.48	H	85.7

**Table 6-10. Radiated Spurious Data (PCS GSM Mode – Ch. 512)**

OPERATING FREQUENCY: 1880.00 MHz  
 CHANNEL: 661  
 MEASURED OUTPUT POWER: 28.69 dBm = 0.740 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  41.69 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	(dBc)
3760.00	-48.57	9.70	-38.87	H	67.6
5640.00	-80.56	11.25	-69.31	H	98.0
7520.00	-75.61	10.99	-64.62	H	93.3
9400.00	-74.60	12.26	-62.35	H	91.0
11280.00	-71.98	12.95	-59.03	H	87.7

**Table 6-11. Radiated Spurious Data (PCS GSM Mode – Ch. 661)**

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1909.80 MHz  
 CHANNEL: 810  
 MEASURED OUTPUT POWER: 30.52 dBm = 1.127 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  43.52 dBc



FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	(dBc)
3819.60	-47.84	9.48	-38.36	H	68.9
5729.40	-80.46	11.30	-69.17	H	99.7
7639.20	-75.94	11.22	-64.71	H	95.2
9549.00	-74.54	12.35	-62.19	H	92.7
11458.80	-71.24	13.12	-58.12	H	88.6

**Table 6-12. Radiated Spurious Data (PCS GSM Mode – Ch. 810)**

OPERATING FREQUENCY: 1852.40 MHz  
 CHANNEL: 9262  
 MEASURED OUTPUT POWER: 23.38 dBm = 0.218 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.38 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	(dBc)
3704.80	-54.20	9.91	-44.29	H	67.7
5557.20	-80.48	11.12	-69.36	H	92.7
7409.60	-75.54	10.76	-64.78	H	88.2
9262.00	-74.86	12.31	-62.55	H	85.9
11114.40	-72.34	12.90	-59.44	H	82.8

**Table 6-13. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9262)**

FCC ID: IHDT56PJ1	 FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1880.00 MHz  
 CHANNEL: 9400  
 MEASURED OUTPUT POWER: 21.66 dBm = 0.147 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  34.66 dBc



FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	(dBc)
3760.00	-53.33	9.70	-43.63	H	65.3
5640.00	-80.61	11.25	-69.36	H	91.0
7520.00	-75.77	10.99	-64.78	H	86.4
9400.00	-74.81	12.26	-62.55	H	84.2
11280.00	-72.40	12.95	-59.44	H	81.1

**Table 6-14. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)**

OPERATING FREQUENCY: 1907.60 MHz  
 CHANNEL: 9538  
 MEASURED OUTPUT POWER: 22.09 dBm = 0.162 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.09 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	EUT POL (H/V)	(dBc)
3815.20	-52.89	9.49	-43.40	H	65.5
5722.80	-80.66	11.29	-69.36	H	91.5
7630.40	-75.99	11.21	-64.78	H	86.9
9538.00	-74.88	12.32	-62.55	H	84.6
11445.60	-72.54	13.10	-59.44	H	81.5

**Table 6-15. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9538)**

FCC ID: IHDT56PJ1	 FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
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## 6.8 Frequency Stability / Temperature Variation

§2.1055 §22.355 §24.229 §24.235 RSS-132(4.3) RSS-133(6.3)

### Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

***For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.***

### Test Procedure Used

ANSI/TIA-603-C-2004

### Test Settings



1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

### Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

### Test Notes

None

FCC ID: IHDT56PJ1		<b>FCC Pt. 22 &amp; 24 / IC RSS -132 &amp; RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)</b>	 <b>Reviewed by:</b> Quality Manager
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### Frequency Stability / Temperature Variation (Cont'd)

§2.1055 §22.355 §24.229 §24.235 RSS-132(4.3) RSS-133(6.3)

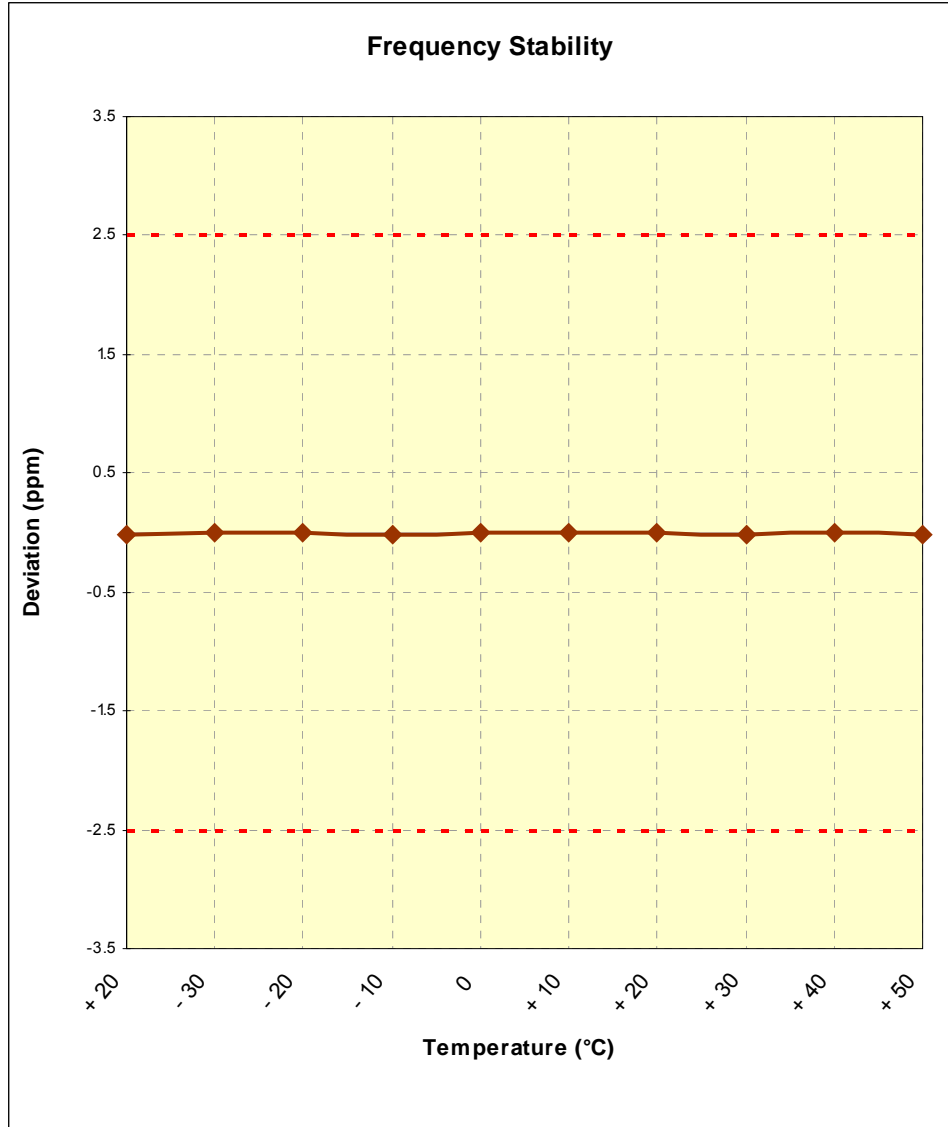
OPERATING FREQUENCY: 836,600,000 Hz  
 CHANNEL: 190  
 REFERENCE VOLTAGE: 3.8 VDC  
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,599,988	-12	-0.000014
100 %		- 30	836,599,998	-2	-0.000003
100 %		- 20	836,599,996	-4	-0.000005
100 %		- 10	836,599,992	-8	-0.000010
100 %		0	836,599,996	-4	-0.000005
100 %		+ 10	836,599,993	-7	-0.000008
100 %		+ 20	836,600,000	0	-0.000001
100 %		+ 30	836,599,989	-11	-0.000013
100 %		+ 40	836,599,994	-6	-0.000007
100 %		+ 50	836,599,984	-16	-0.000019
115 %		4.37	+ 20	836,599,981	-19
BATT. ENDPOINT	3.40	+ 20	836,599,998	-2	-0.000003



**Table 6-16. Frequency Stability Data (Cellular GSM Mode – Ch. 190)**

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Frequency Stability / Temperature Variation (Cont'd)**  
**§2.1055 §2.355 RSS-132(4.3)**



**Figure 6-7. Frequency Stability Graph (Cellular GSM Mode – Ch. 190)**

<b>FCC ID:</b> IHDT56PJ1		<b>FCC Pt. 22 &amp; 24 / IC RSS -132 &amp; RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)</b>	 <b>Reviewed by:</b> Quality Manager
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### Frequency Stability / Temperature Variation (Cont'd)

§2.1055 §22.355 RSS-132(4.3)

OPERATING FREQUENCY: 836,600,000 Hz



CHANNEL: 4183

REFERENCE VOLTAGE: 3.8 VDC

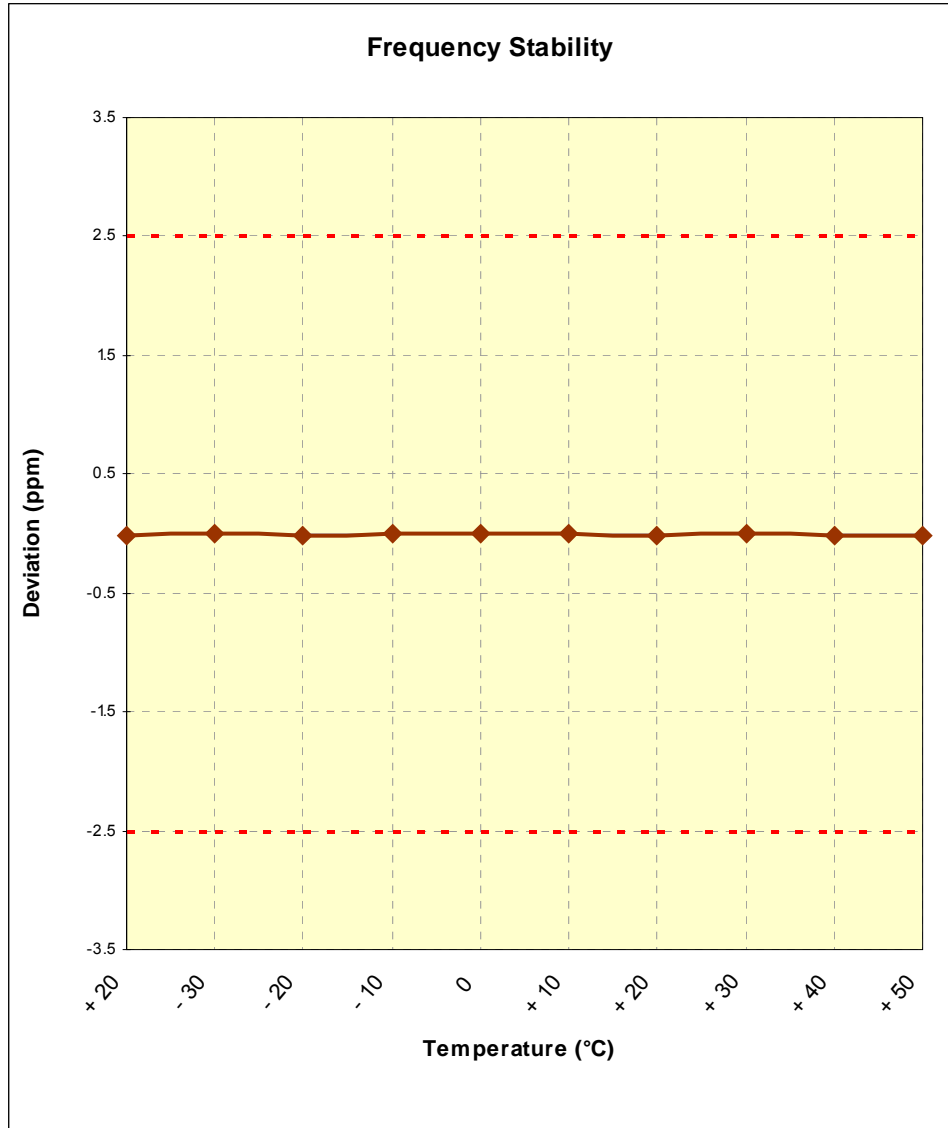
DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,599,992	-8	-0.0000009
100 %		- 30	836,599,996	-4	-0.0000005
100 %		- 20	836,599,988	-12	-0.0000014
100 %		- 10	836,599,994	-6	-0.0000007
100 %		0	836,599,995	-5	-0.0000006
100 %		+ 10	836,599,994	-6	-0.0000007
100 %		+ 20	836,599,985	-15	-0.0000018
100 %		+ 30	836,599,998	-2	-0.0000003
100 %		+ 40	836,599,990	-10	-0.0000011
100 %		+ 50	836,599,987	-13	-0.0000016
115 %		4.37	+ 20	836,599,993	-7
BATT. ENDPOINT	3.40	+ 20	836,599,991	-9	-0.0000011



**Table 6-17. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4183)**

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset	Page 54 of 60	

**Frequency Stability / Temperature Variation (Cont'd)**  
**§2.1055 §22.355 RSS-132(4.3)**



**Figure 6-8. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)**

<b>FCC ID:</b> IHDT56PJ1		<b>FCC Pt. 22 &amp; 24 / IC RSS -132 &amp; RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)</b>	 <b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1402120377.IHD	<b>Test Dates:</b> 2/13 - 2/17/2014	<b>EUT Type:</b> Portable Handset	Page 55 of 60

## Frequency Stability / Temperature Variation (Cont'd)

§2.1055 §24.235 RSS-133(6.3)

OPERATING FREQUENCY: 1,880,000,000 Hz

CHANNEL: 661



REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,993	-7	-0.0000004
100 %		- 30	1,879,999,983	-17	-0.0000009
100 %		- 20	1,879,999,980	-20	-0.0000010
100 %		- 10	1,879,999,998	-2	-0.0000001
100 %		0	1,879,999,991	-9	-0.0000005
100 %		+ 10	1,879,999,996	-4	-0.0000002
100 %		+ 20	1,879,999,994	-6	-0.0000003
100 %		+ 30	1,879,999,993	-7	-0.0000004
100 %		+ 40	1,879,999,994	-6	-0.0000003
100 %		+ 50	1,879,999,991	-9	-0.0000005
115 %		4.37	+ 20	1,879,999,991	-9
BATT. ENDPOINT	3.40	+ 20	1,879,999,995	-5	-0.0000003

Table 6-18. Frequency Stability Data (PCS GSM Mode – Ch. 661)

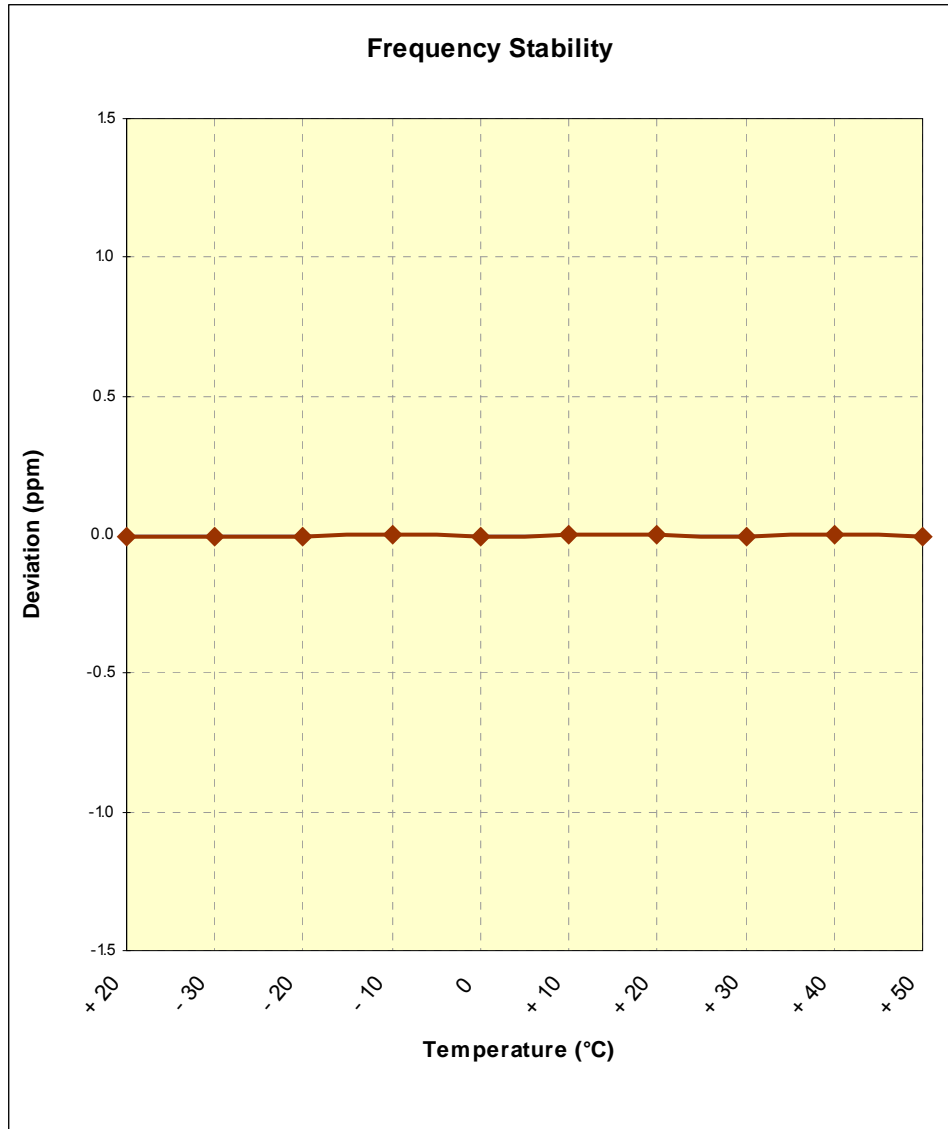
**Note:**

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset	Page 56 of 60	

**Frequency Stability / Temperature Variation (Cont'd)**

§2.1055 §24.235 RSS-133(6.3)



**Figure 6-9. Frequency Stability Graph (PCS GSM Mode – Ch. 661)**

<p>FCC ID: IHDT56PJ1</p>		<p>FCC Pt. 22 &amp; 24 / IC RSS -132 &amp; RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)</p>	<p>Reviewed by: Quality Manager</p>
<p>Test Report S/N: 0Y1402120377.IHD</p>	<p>Test Dates: 2/13 - 2/17/2014</p>	<p>EUT Type: Portable Handset</p>	<p>Page 57 of 60</p>

**Frequency Stability / Temperature Variation (Cont'd)**  
§2.1055 §24.235 RSS-133(6.3)



OPERATING FREQUENCY: 1,880,000,000 Hz  
 CHANNEL: 9400  
 REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,987	-13	-0.0000007
100 %		- 30	1,879,999,981	-19	-0.0000010
100 %		- 20	1,879,999,987	-13	-0.0000007
100 %		- 10	1,879,999,998	-2	-0.0000001
100 %		0	1,879,999,988	-12	-0.0000006
100 %		+ 10	1,879,999,990	-10	-0.0000005
100 %		+ 20	1,879,999,990	-10	-0.0000005
100 %		+ 30	1,879,999,997	-3	-0.0000001
100 %		+ 40	1,879,999,991	-9	-0.0000005
100 %		+ 50	1,879,999,995	-5	-0.0000003
115 %		4.37	+ 20	1,879,999,985	-15
BATT. ENDPOINT	3.40	+ 20	1,879,999,992	-8	-0.0000004

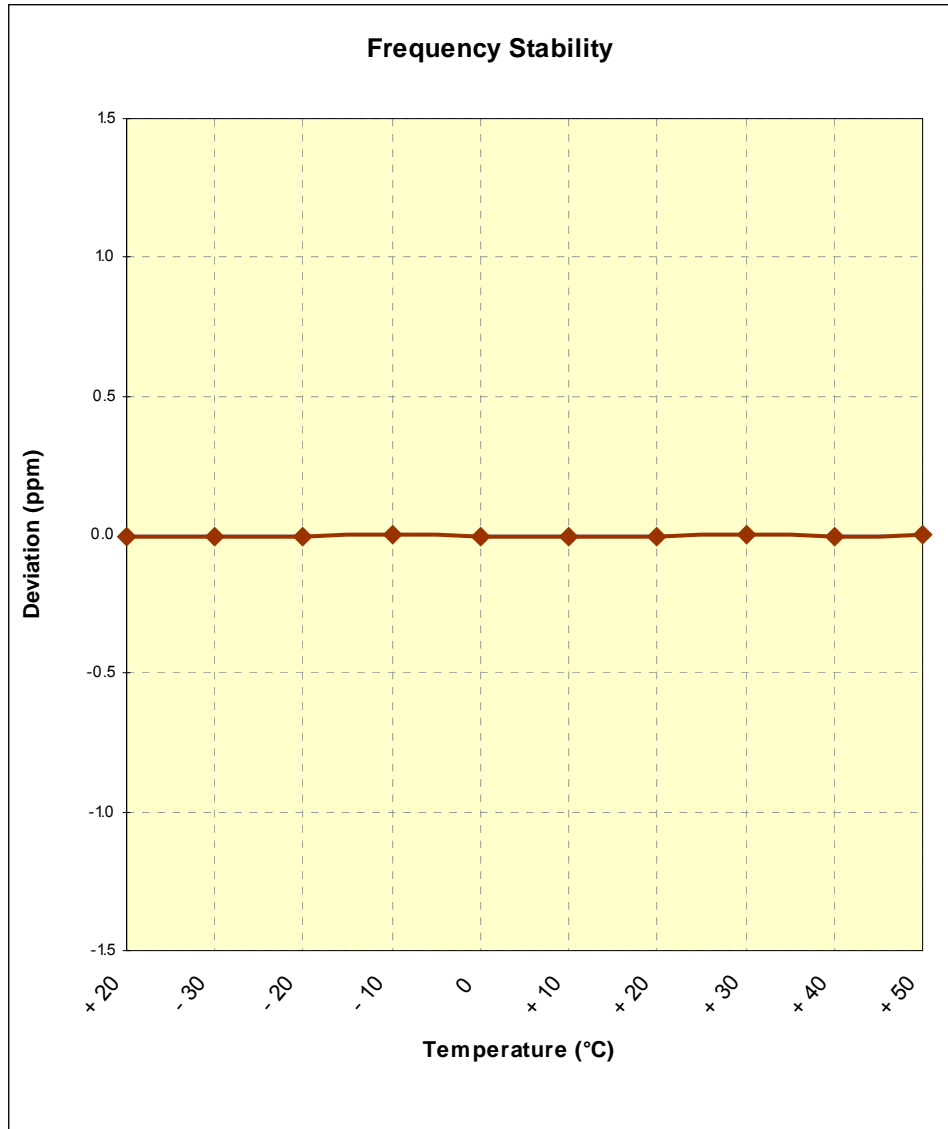
**Table 6-19. Frequency Stability Data (PCS WCDMA Mode – Ch. 9400)**

**Note:**



Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Frequency Stability / Temperature Variation (Cont'd)**  
**§2.1055 §24.235 RSS-133(6.3)**





**Figure 6-10. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)**

FCC ID: IHDT56PJ1		FCC Pt. 22 & 24 / IC RSS -132 & RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)	 Reviewed by: Quality Manager
Test Report S/N: 0Y1402120377.IHD	Test Dates: 2/13 - 2/17/2014	EUT Type: Portable Handset	Page 59 of 60

## 7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Motorola Portable Handset FCC ID: IHDT56PJ1** complies with all the requirements of Parts 2, 22, 24 of the FCC rules.

FCC ID: IHDT56PJ1		<b>FCC Pt. 22 &amp; 24 / IC RSS -132 &amp; RSS-133 GSM /EDGE /WCDMA MEASUREMENT REPORT (CERTIFICATION)</b>	 Reviewed by: Quality Manager
<b>Test Report S/N:</b> 0Y1402120377.IHD	<b>Test Dates:</b> 2/13 - 2/17/2014	<b>EUT Type:</b> Portable Handset	Page 60 of 60