

**TEST REPORT**

**Report Number: 3197074LEX-001  
Project Number: 3197074**

**Evaluation of the LCT08.2 For Class II Permissive Change**

**FCC ID: LHJLCT8201  
Industry Canada ID: 2807E-LCT8201**

**FCC Part 22 Subpart H  
FCC Part 24 Subpart E  
FCC Part 15 Subpart B  
RSS-129  
RSS-133  
RSS-GEN**

**For**

**Continental Automotive Systems**

Test Performed by:  
Intertek  
731 Enterprise Drive  
Lexington, KY 40510

Test Authorized by:  
Continental Automotive Systems  
21440 West Lake Cook Road  
Deer Park, IL 60010

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**1 JOB DESCRIPTION**

**1.1 Project Overview**

The LCT08.2 module has been modified since the original FCC certification. The following modifications were made to the LCT08.2:

- Remove the analog data modem circuit on the main pcb. The modem was used to provide data to the service center during an AMPS call.
- Remove VCC A/D line input to processor on the main pcb. This was used to ignore button presses when the VCC voltage was out of range.
- Remove one A/D mux on the main pcb.
- The main pcb board layout on the TCU is modified slightly to accommodate the above mentioned changes.

The hardware changes took place on the main pcb. No changes were made to the transmitter circuitry. This report contains a partial retest to verify that the changes listed above did not degrade the performance of the device beyond the allowable limits.

**1.2 Company Information**

Company Information	
<b>Manufacturer:</b>	Continental Automotive Systems
<b>Address:</b>	21440 West Lake Cook Road Deer Park IL 60010
<b>Contact Name:</b>	Irina Shmagin
<b>Telephone Number:</b>	(847) 932-9298

**1.3 Test Sample Information**

The LCT08.2 module is an in-vehicle monitoring system.

Test sample			
<b>Model Number:</b>	LCT08.2		
<b>Serial Number:</b>	Test Sample 1		
<b>FCC ID:</b>	LHJLCT8201		
<b>Device Category:</b>	Mobile		
<b>RF Exposure Category:</b>	General Population/Uncontrolled Environment		
<b>Transmission Modes:</b>	<b>AMPS</b>	<b>CDMA Cell</b>	<b>CDMA PCS</b>
<b>Frequency Range, MHz:</b>	824 MHz-849 MHz	824 MHz-849 MHz	1850 – 1910 MHz
<b>Maximum Conducted RF Output Power:</b>	26.8 dBm	23.42 dBm	22.88 dBm
<b>Antenna Type:</b>	Not Supplied	Not Supplied	Not Supplied
<b>Antenna Location:</b>	Externally Mounted	Externally Mounted	Externally Mounted

**1.4 System Support Equipment**

Table 1-1 contains the details of the support equipment associated with the Equipment Under Test during the testing.

Table 1-1: System Support Equipment

Description	Manufacturer	Model Number	Serial Number
Laptop	Compaq	EVO N410c	3902A783
Power Supply	Hewlett Packard	6296A	1929A03879

**1.5 Cables Used During Testing**

Table 1-2 contains the details of the cables used during the testing.

Table 1-2: Interconnecting Cables Used During Testing

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
Multi-Conductor Wiring Harness (Data/Audio)	1.2m	Yes	No	EUT	Laptop/Test Equipment
Twisted Pair – DC Power	1.2m	No	No	EUT	DC Power Supply
Twisted Pair – RS232 Signal	1.2m	No	No	EUT	Laptop
Colman Cable 50 Ohm Coax (M17/28 RG058)	1m	Yes	No	EUT	Base Station Simulator
Colman Cable 50 Ohm Coax (M17/28 RG058)	1m	Yes	No	EUT	Resistive Termination

**1.6 System Block Diagram(s)**

The diagrams below detail the interconnection of the EUT and its accessories during the testing.

Figure 1-1: Radiated Test Configuration

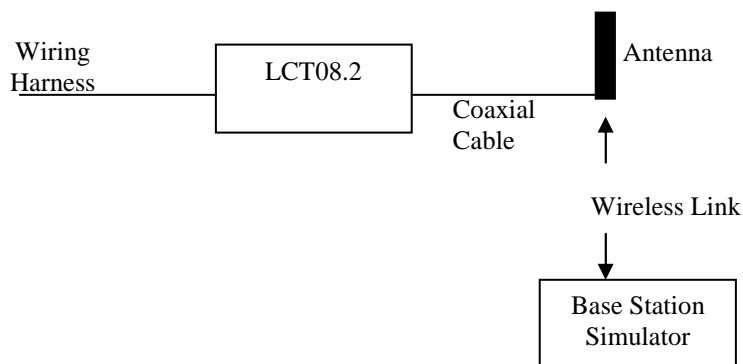
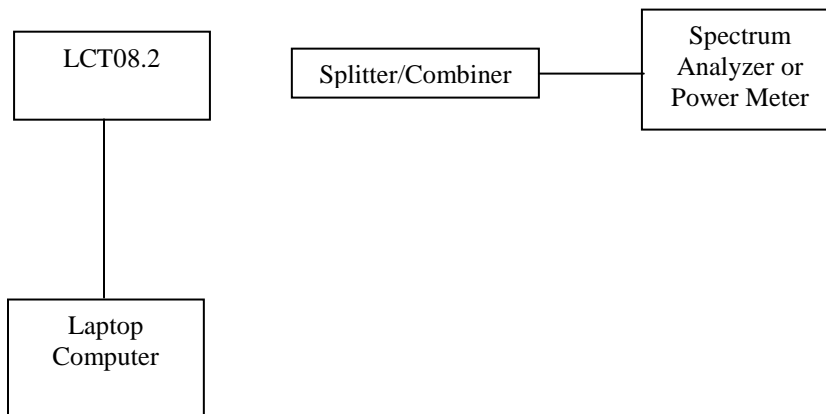


Figure 1-2: Conducted Test Configuration



**1.7 Mode(s) of operation / Engineering Judgments**

The LCT08.2 was powered by a 13VDC laboratory power supply.

The LCT08.2 comes equipped with a CDMA antenna port (SMA connector) and a removable CDMA antenna. For radiated testing, the CDMA antenna was connected to the LCT08.2. For conducted measurements the antenna was removed and a calibrated coaxial cable inserted between the CDMA port and the measuring equipment (spectrum analyzer or power meter). A base station simulator was used to force the LCT08.2 to transmit at maximum output power.

Evaluation For: Continental Automotive Systems  
 Model No: LCT08.2

FCC ID: LHJLCT8201  
 ICID:2807E-LCT8201

**2 EXECUTIVE SUMMARY**

Testing performed for: Continental Automotive Systems

Equipment Under Test: LCT08.2

Receipt of Test Sample: 12/1/2009

Test Start Date: 12/12/2009

Test End Date: 12/18/2009

The LCT08.2 was compliant with the requirements of FCC Part 15 Subpart B, Part §22, Part §24, RSS-129, and RSS-133.

FCC RULE	IC RULE	DESCRIPTION OF TEST	RESULT	PAGE
§2.1046	RSS-129 (9.2.2) RSS-133 (6.2)	RF Power Output	<b>Compliant</b>	8
§2.1051 §22.917(a) §24.238(a)	RSS-129 (8.1.1) RSS-133 (6.3) RSS-129 (9.3, 9.4) RSS-129 (10)	Out of Band Emissions at Antenna Terminals	<b>Compliant</b>	10
§15.109	RSS-129 (10) RSS-Gen (7.2.3.2)	Receiver Spurious Emission	<b>Compliant</b>	20

**2.1 Modifications required for compliance**

No modifications were implemented by Intertek. All results in this report pertain to the un-modified sample provided to Intertek.

**3 TEST FACILITY**

All testing was completed at the INTERTEK-Lexington location at 731 Enterprise Drive, Lexington Kentucky, 40510. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1 and ANSI C63.4. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters.



For radiated immunity testing, removable ferrite tiles are positioned between the transmitting antenna and the area occupied by the equipment under test. The remaining tests typically are performed outside the chamber on the conducting ground reference plane.

The Industry Canada filing number for this site is 2042M-1 The FCC registration number is 485103.

**3.1 Test Equipment**

Description	Manufacturer	Model Number	Serial Number	Calibration due date
Horn Antenna	EMCO	3115	6556	8/4/2010
Horn Antenna	Antenna Research	DRG-118/A	1086	7/3/2010
EMI Receiver	Rohde & Schwarz	ESI26	10887490.26	9/14/2010
Bilog Antenna	EMCO	3142C	00051864	12/24/2009
Preamplifier	Miteq	AFS44-00102000-30-10P-44	987410	6/17/2010
Base Station Simulator	Rhode & Schwarz	CMU200	837198089	6/24/2010

**4 CONDUCTED RF POWER**

FCC Rule: §2.1046

IC Rule: RSS-129 §9.1 and RSS-133 §6.2

**4.1 Test Procedure**

The transmitter output was connected to a calibrated coaxial cable, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The EUT was placed into a call and the transmitter output was read off the base station simulator in dBm. The power output at the transmitter antenna port was determined by adding the value of the cable insertion loss to the base station simulator power reading.

Tests were performed at three frequencies (low, middle, and high channels) and on the highest power levels, which can be setup on the transmitters.

**4.2 Test Results**

The LCT08.2 met the RF power output requirements of FCC Part 22 Subpart H and FCC Part FCC Part 24 Subpart E. The test results are shown Table 4-1.

Table 4-1 - RF Power Variation with Temperature

CDMA Cell Band			CDMA PCS Band			AMPS Band		
Channel 1013	Channel 384	Channel 777	Channel 25	Channel 600	Channel 1175	Channel 991	Channel 384	Channel 799
23.42	23.09	22.85	22.88	22.74	22.8	26.8	26.7	26.7



## 5 OUT OF BAND EMISSION AT ANTENNA TERMINALS

FCC §2.1049, FCC §2.1051, §22.917(a), FCC §24.238(a)

RSS-129 §6.3, §7.2.2, §8.1.1, §9.3, §9.4 §10

RSS-133 §6.3

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.

### 5.1 Test Procedure

Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for the Cellular band and 1 MHz or greater in the PCS band. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The Base Station Simulator was set to force the EUT to its maximum power setting. The resolution bandwidth of the spectrum analyzer was set at 1 MHz. Sufficient scans were taken to show the out of band emissions if any up to 10th harmonic.

**5.2 Test Results**

The LCT08.2 met the out of band emission at antenna terminal requirements.

Table 5-1 - Conducted Spurious Emissions

EUT Mode	TX Channel	Spurious Emission Frequency (GHz)	Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
AMPS	991	1.6517	-22.49	-13	-9.49
AMPS	384	1.6766	-22.39	-13	-9.39
AMPS	799	1.7016	-14.82	-13	<b>-1.82</b>
AMPS	799	3.3767	-34.08	-13	-21.08
CDMA Cell	1013	1.6517	-24.11	-13	-11.11
CDMA Cell	384	1.6766	-24.10	-13	-11.1
CDMA Cell	777	1.6966	-16.23	-13	<b>-3.23</b>
CDMA Cell	777	3.3767	-36.28	-13	-23.28
CDMA PCS	25	3.6923	-27.73	-13	-14.73
CDMA PCS	600	3.72745	-30.94	-13	-17.94
CDMA PCS	1175	3.79759	-24.10	-13	-11.1
CDMA PCS	1175	5.6913	-29.64	-13	-16.64

Figure 5-1: Out of band emissions at antenna terminals – AMPS 991

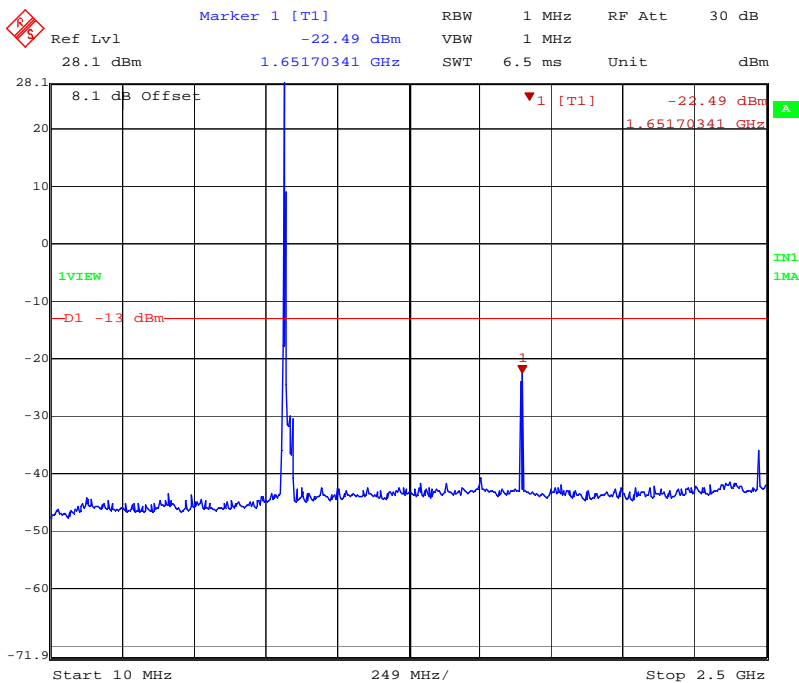
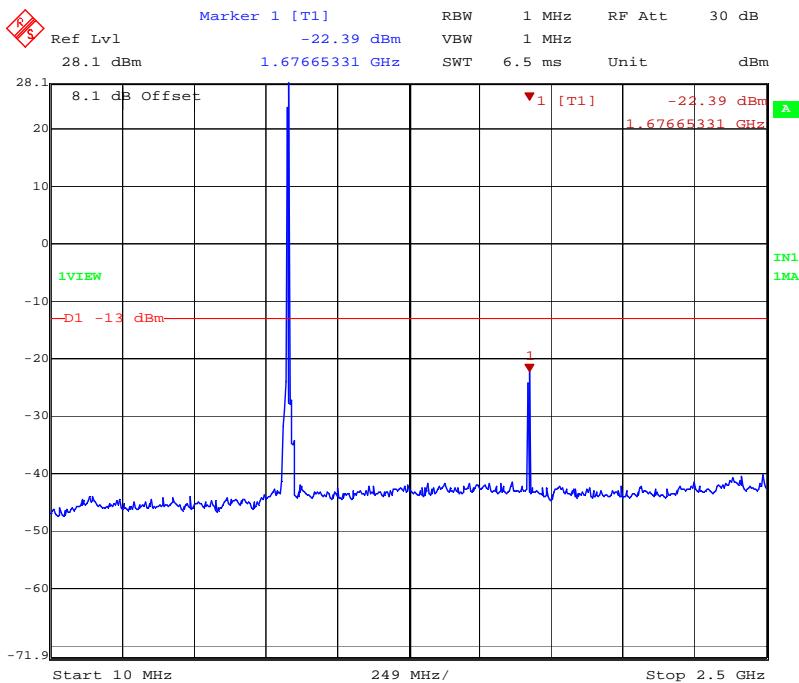
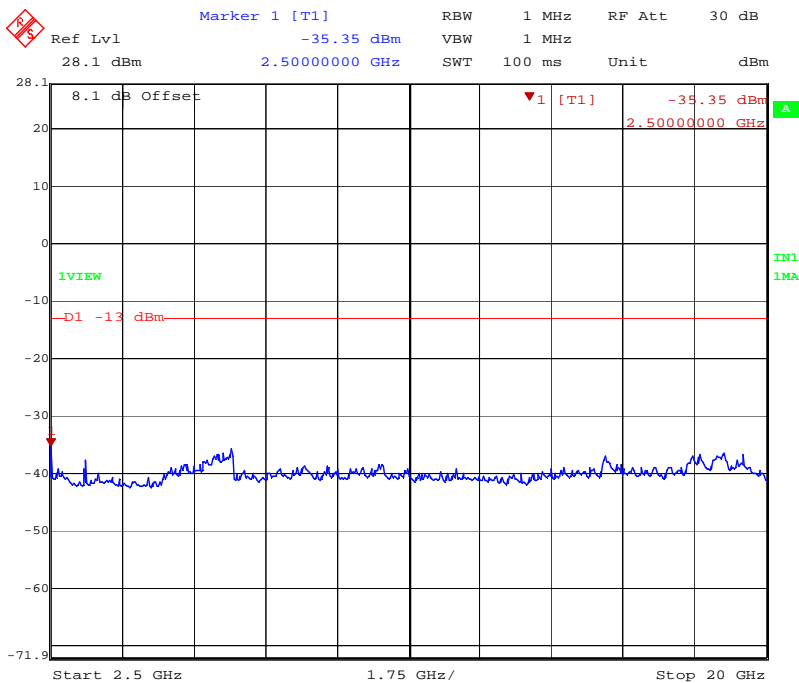


Figure 5-2: Out of band emissions at antenna terminals – AMPS 384



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Figure 5-3: Out of band emissions at antenna terminals – AMPS 799

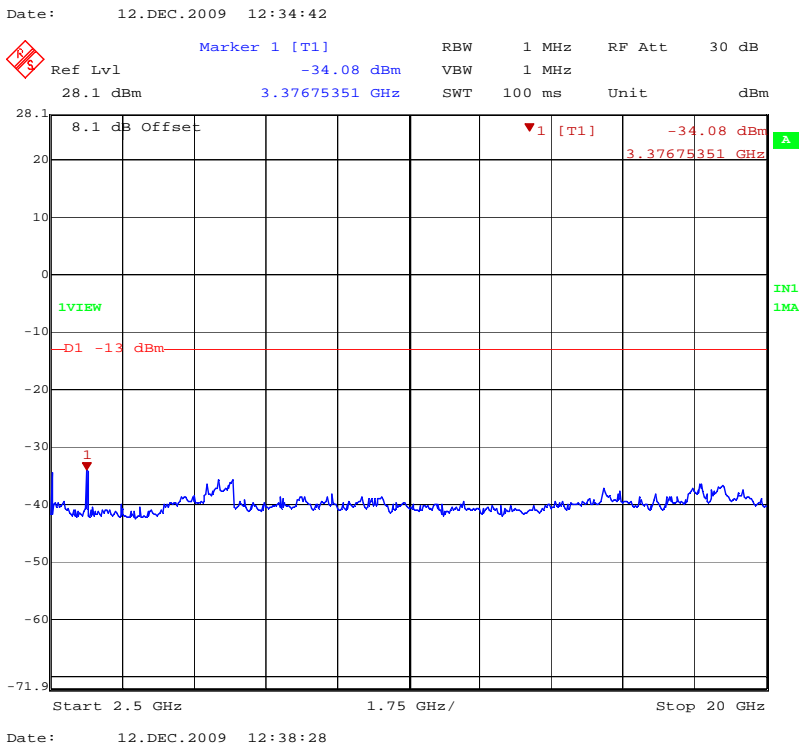
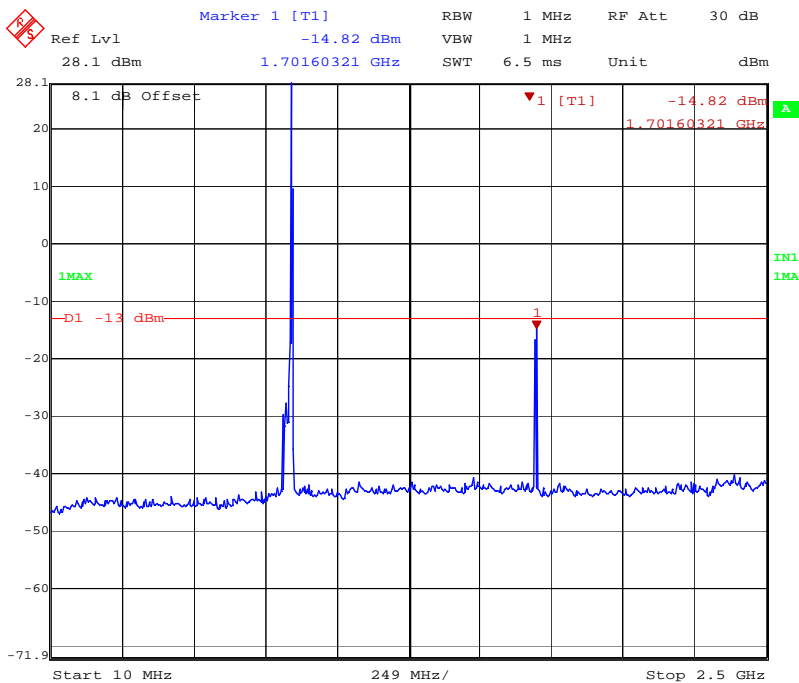


Figure 5-4: Out of band emissions at antenna terminals – CDMA Cell Channel 1013

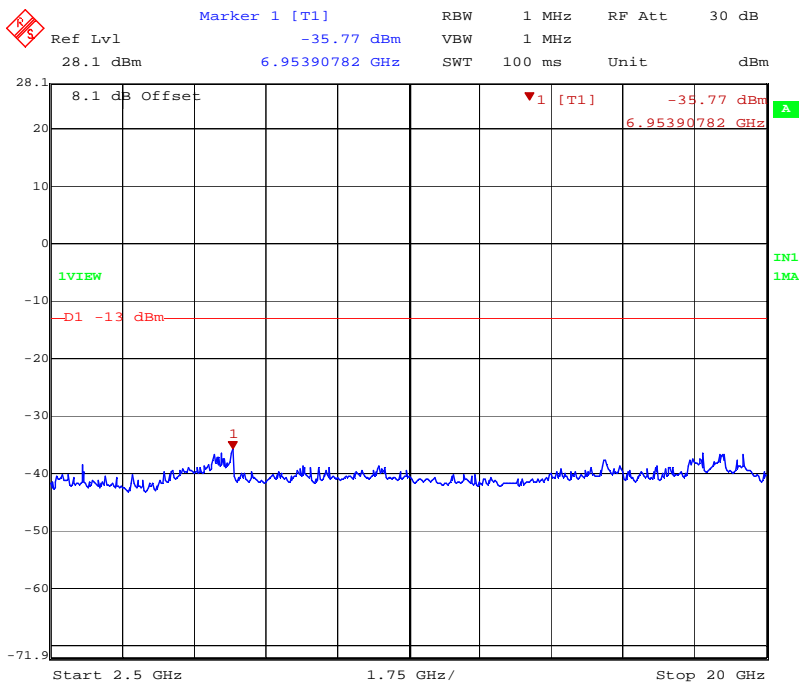
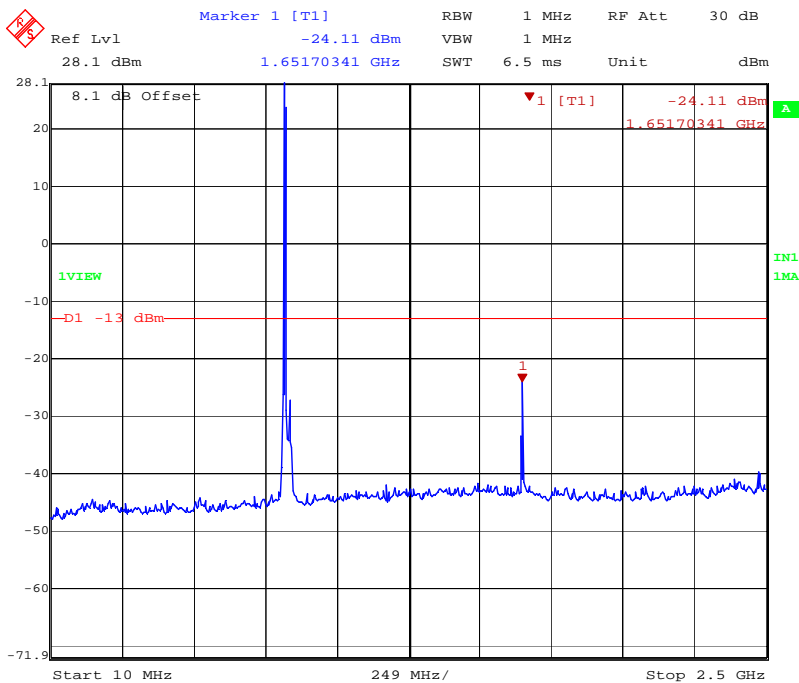
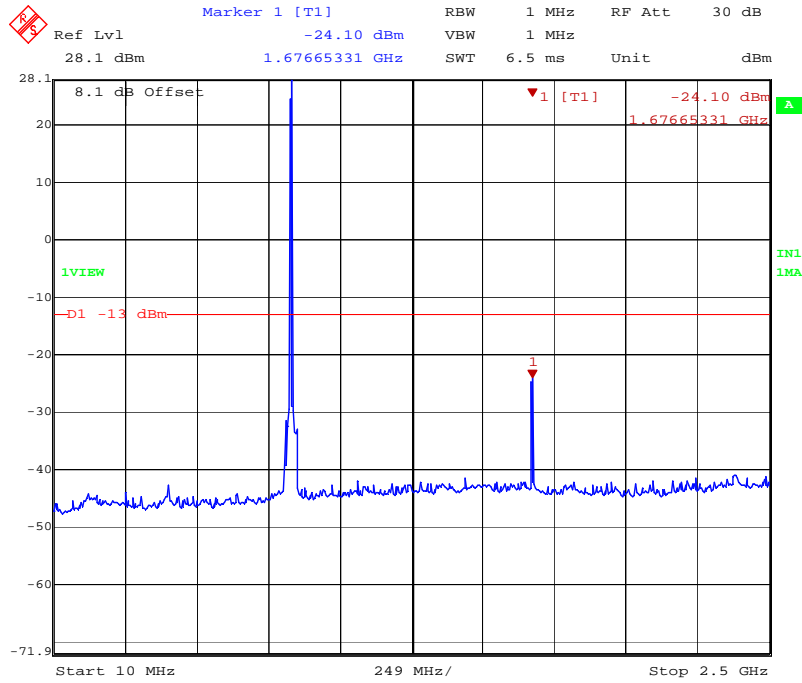


Figure 5-5: Out of band emissions at antenna terminals – CDMA Cell Channel 384

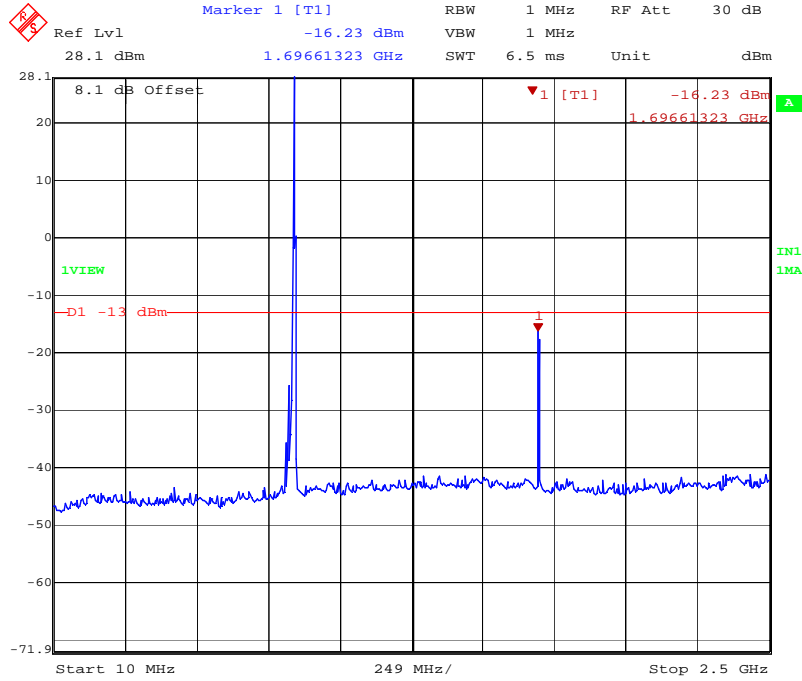


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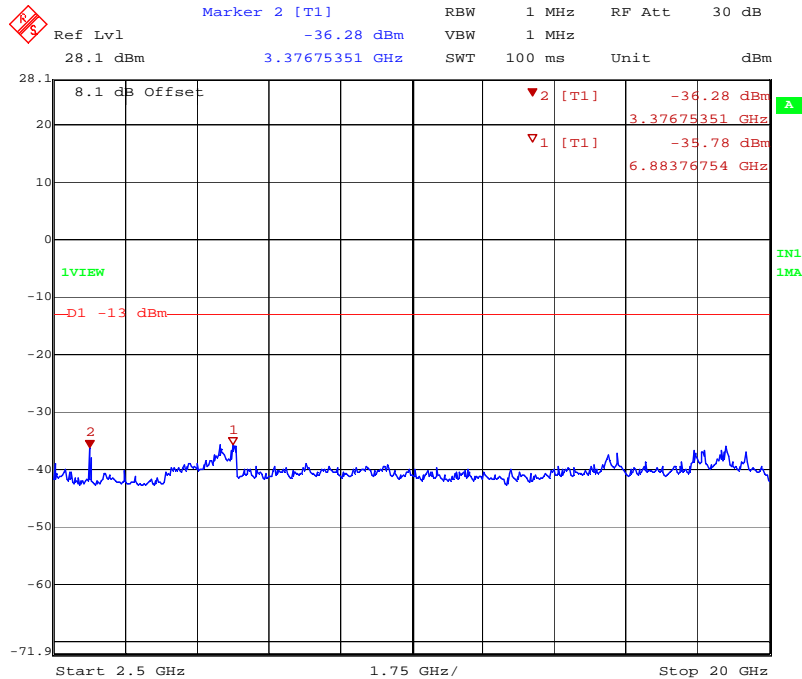


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Figure 5-6: Out of band emissions at antenna terminals – CDMA Cell Channel 777



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Figure 5-7: Out of band emissions at antenna terminals – CDMA PCS Channel 25

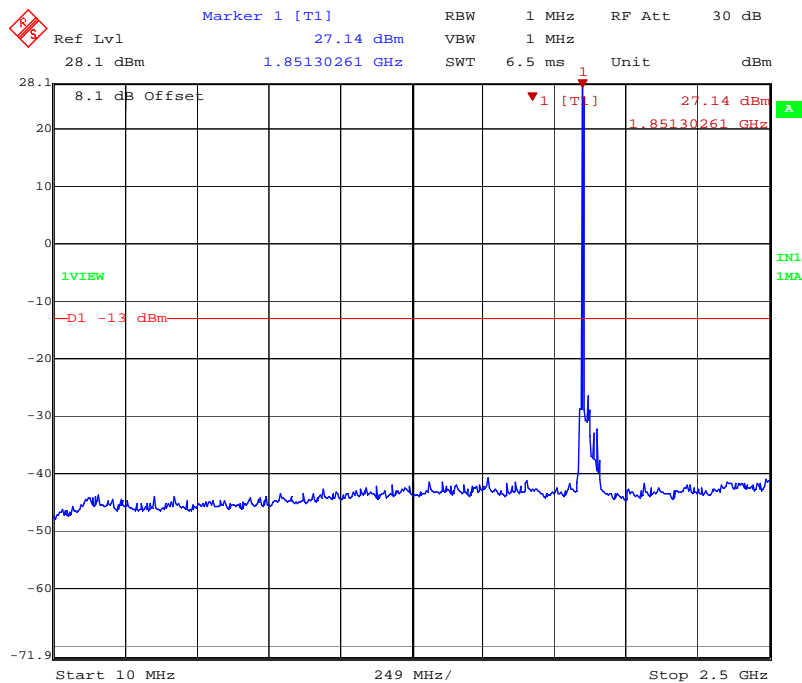


Figure 5-8: Out of band emissions at antenna terminals – CDMA PCS Channel 600

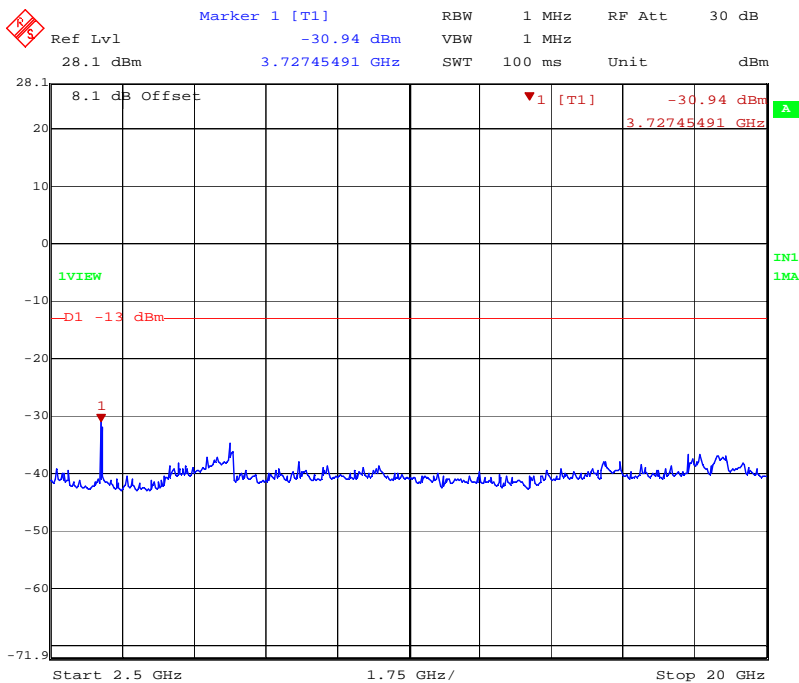
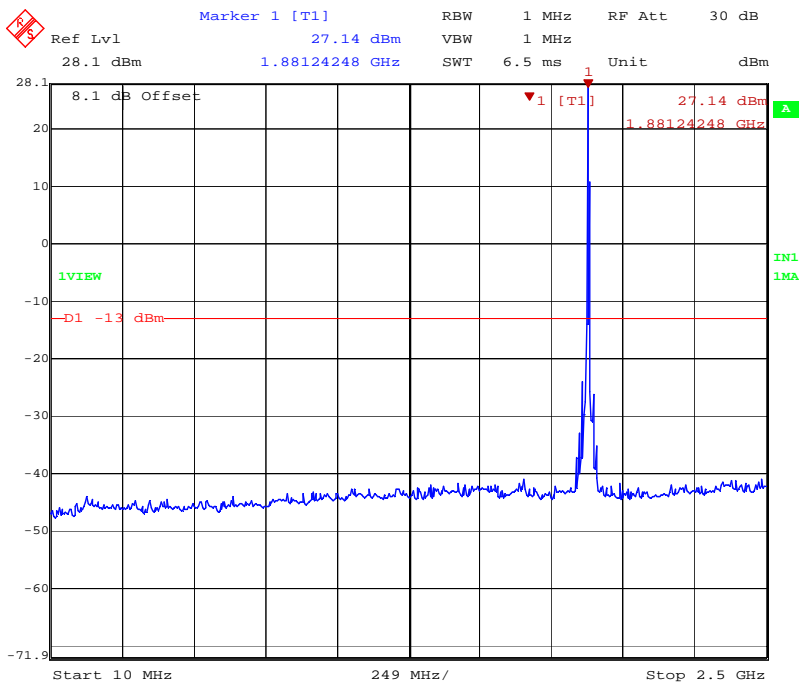
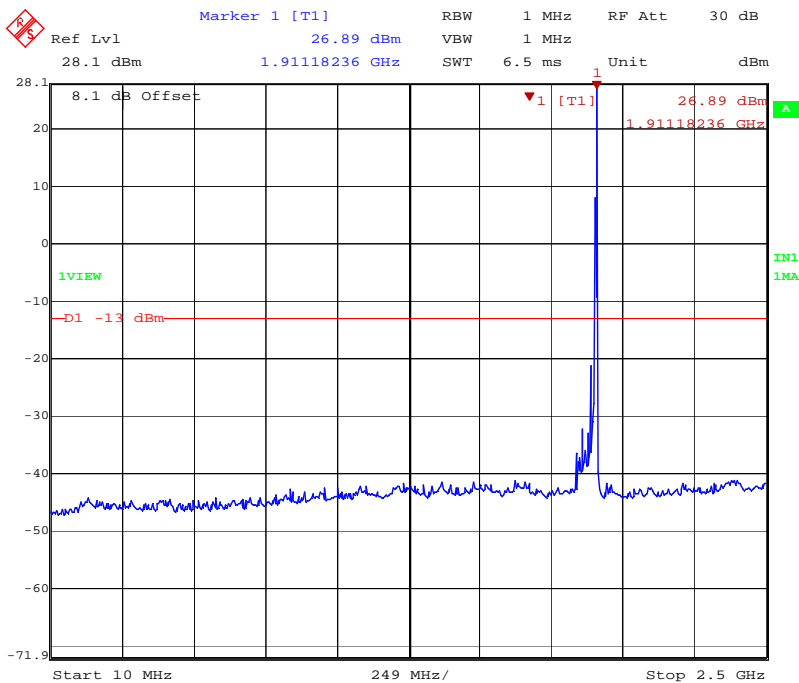
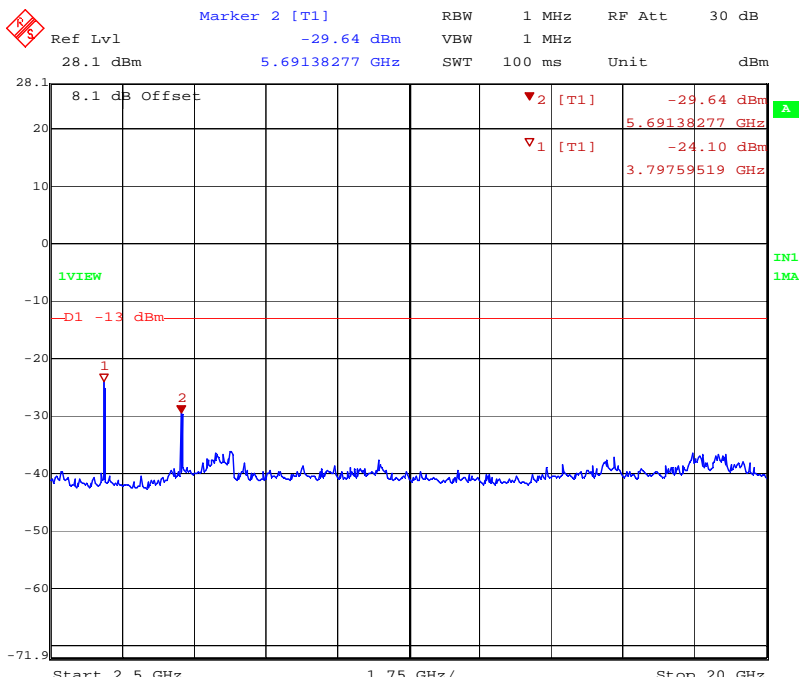


Figure 5-9: Out of band emissions at antenna terminals – CDMA PCS Channel 1175



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**6 RECEIVER SPURIOUS EMISSIONS**

FCC §15.109

RSS-GEN (7.2.3.2)

**6.1 Test Limits**

Table 6-1 Radiated Emission Limit for FCC §15.109

Radiated Emission Limits at 3 meters	
Frequency (MHz)	Quasi-Peak limits, dB (µV/m)
30 to 88	40.0
88 to 216	43.5
216 to 960	46.0
960 and up	54.0

**6.2 Test Procedure**

Measurements are made over the frequency range of 30 MHz to five times the highest frequency operating within the device. The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole. From 30 to 1000 MHz, a quasi-peak detector was used for measurement. Above 1000 MHz, average measurements were performed.

Measurements of the radiated field are made with the antenna located at a distance of 3 meters from the EUT. If the field-strength measurements at 3m cannot be made because of high ambient noise level or for other reasons, measurements may be made at a closer distance, for example 1m. An inverse proportionality factor of 20 dB per decade should be used to normalize the measured data to the specified distance for determining compliance.

The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4.

### 6.3 Test Results

The LCT08.2 is **compliant** with the radiated disturbance requirements of FCC §15.109 for a class B device. The maximized emissions data can be found in Figure 6-1 and Table 6-2.

Figure 6-1 FCC §15.109 Receiver Spurious Emissions Graphical Data

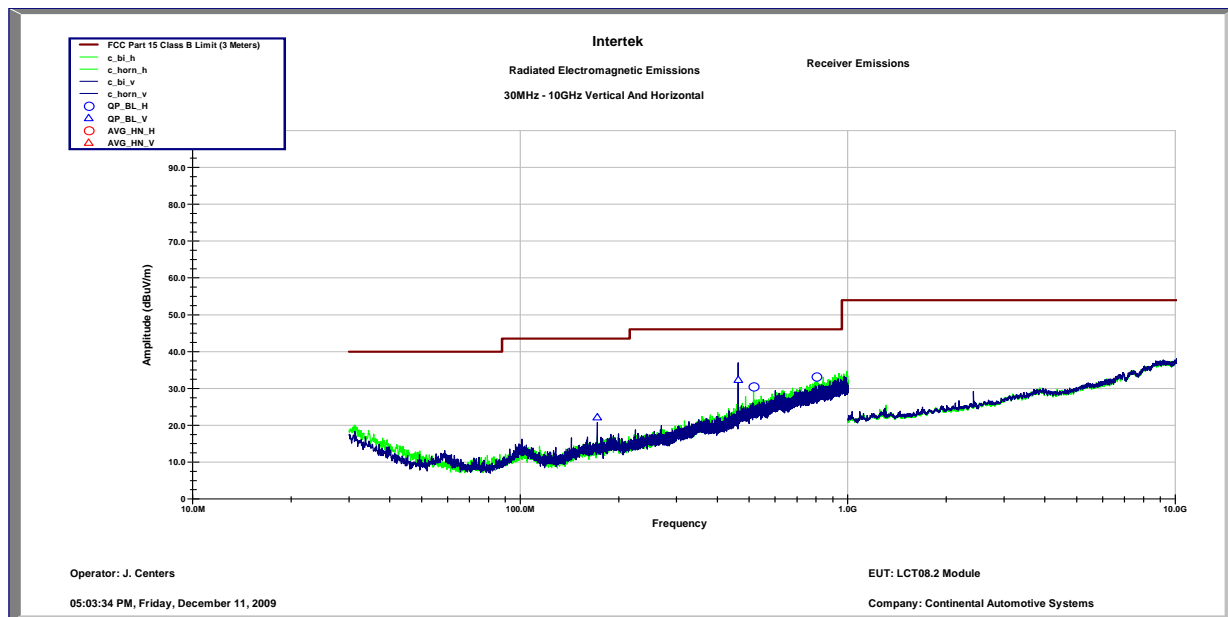


Table 6-2 FCC §15.109 Maximized Radiated Emissions

Frequency	Polarity (H/V)	Cab. (dB)	Ant. (dB)	Corr. Reading. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (deg)	Tower (cm)	Results
515.46 MHz	H	3.1	18.51	30.5	46.02	-15.52	62	195	<b>Compliant</b>
801.83 MHz	H	3.9	22.19	33.19	46.02	-12.83	329	275	<b>Compliant</b>
171.88 MHz	V	1.73	10.22	22.21	43.52	-21.31	197	350	<b>Compliant</b>
462.9 MHz	V	2.91	17.03	32.35	46.02	-13.67	2	310	<b>Compliant</b>