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TEST REPORT

Report Number: **100396073LEX-001**
Project Number: **G100396073**

Report Issue Date: **6/15/2011**

Product Name: **MTSMC-EV1**
FCCID: **AU792U09J14829**
Standards: **FCC Part 22 Subpart H**
FCC Part 24 Subpart E

Tested by:
Intertek Testing Services NA, Inc.
731 Enterprise Drive
Lexington, KY 40510

Client:
Multi-Tech
2205 Woodale Drive
Mounds View, MN 55112

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TABLE OF CONTENTS

1 Introduction and Conclusion

The tests indicated in section 2 were performed on the product constructed as described in section 3. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test method, a list of the actual test equipment used, documentation photos, results and raw data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complied with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

The INTERTEK-Lexington is located 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. The test site is listed with the FCC under registration number 485103.

2 Test Summary

Page	Test full name	FCC Reference	Result
7	Conducted Output Power	§2.1046 §24.232(d)	Pass
9	Occupied Bandwidth	§2.1049, §22.917(b)(d), and §24.238(a)	Pass
12	Conducted Spurious Emissions	§2.1049, §2.1051, §22.917(a)(b), and § 24.238(a)(b)	Pass
24	Radiated Output Power	§ 22.913(a) and § 24.232(c)	Pass
24	Radiated Spurious Emissions (Transmitter)	§2.1053, §22.917(a)(b), and §24.238(a)(b)	Pass
29	Frequency Stability	§2.1055, §22.355, and §24.235	Pass

3 Description of Equipment Under Test

Equipment Under Test	
Manufacturer	Multi-Tech
Model Number	MTSMC-EV1
Serial Number	Test Sample 1
FCC Identifier	AU792U09J14829
Receive Date	4/20/2011
Test Start Date	4/20/2011
Test End Date	4/29/2011
Device Received Condition	Good
Test Sample Type	Production
Frequency Band	824MHz - 849MHz (CDMA Cell Band) 1850MHz – 1910MHz (CDMA PCS Band)
Modulation Type	CDMA
Transmission Control	Base Station Simulator
Maximum Output Power (Conducted)	23.84dBm (Cell Band) 24.05dBm (PCS Band)
Test Channels	1013, 384, and 777 (CDMA Cell Band) 25, 600, and 1075 (CDMA PCS Band)
Antenna Type	Externally Mounted (Not Supplied)
Operating Voltage	9VDC

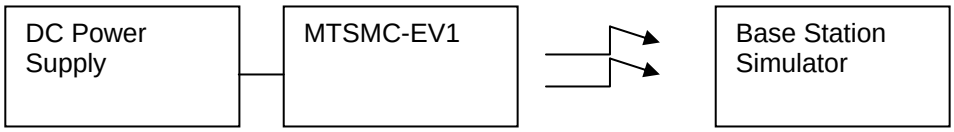
Description of Equipment Under Test
The MTSMC-EV1 is a universal socket modem.

Operating modes of the EUT:

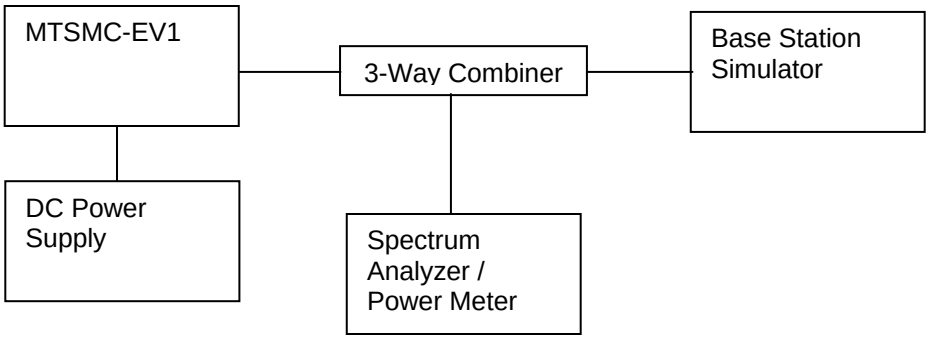
No.	Descriptions of EUT Exercising
1	Transmitting a CDMA signal
2	Receive / idle mode

3.1 System setup including cable interconnection details, support equipment and simplified block diagram

3.2 EUT Block Diagram:



Block Diagram for Radiated Tests



Block Diagram for Conducted Tests at the Antenna Port

3.3 Cables:

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
Power Cable	6 ft	No	Yes	AC/DC Power Converter	DC Input
Ethernet Cable	25 ft	No	No	Ethernet Port	Ethernet Switch
DB 25 Cable	6 ft	Yes	No	RS-232 Port	Unterminated
USB Cable	6 ft	Yes	No	USB Port	Unterminated
Speaker Cable	6 ft	No	No	Speaker Port	Speaker
Phone Cable	10 ft	No	No	ISDN Port	Unterminated
Phone Cable	10 ft	No	No	PSTN Port	Unterminated

3.4 Support Equipment:

Description	Manufacturer	Model Number	Serial Number
Antenna	Exceltek	45009713L	Not Labeled
Universal AC/DC Power Adapter	GlobTek Inc.	WR9QD1700L9P-N-MT	Not Labeled
Developer Board	Multi-Tech	MTSMP-UDK	15204213

4 Conducted Output Power

4.1 Test Limits

§ 2.1046

For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, 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 the circuit elements specified in §2.1033(c)(8).

§ 24.232 (d)

Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

4.2 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.

The peak-to-average ratio (PAR) was measured using the Complementary Cumulative Distribution Function (CCDF) measurement function of the analyzer. The CCDF function measures the probability of a signal's instantaneous power to be a specified level above its average power.

4.3 Test Equipment Used:

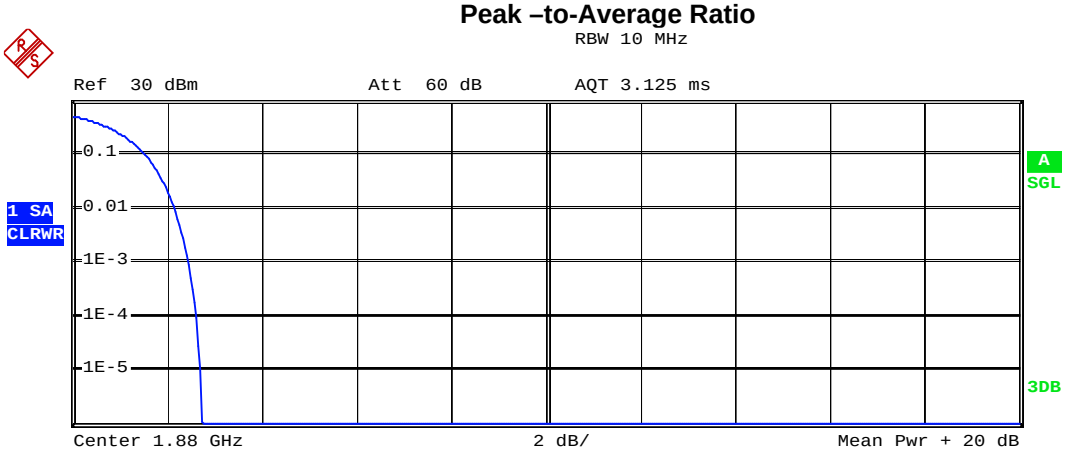
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Base Station Simulator	24036	Agilent	8960	9/7/2010	9/7/2011
Base Station Simulator	3101	Rohde & Schwarz	CMU200	7/10/2010	7/10/2011
Environmental Chamber	2071	Envirotronics	SH27C	9/1/2010	9/1/2011
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	8/27/2010	8/27/2011
Power Meter	3165	Gigatronics	8541C	8/25/2010	8/25/2011
Power Sensor	3404	Gigatronics	80601A	7/26/2010	7/26/2011
RF Combiner	E18106	Weinschel Engineering	1506A	TOU	TOU

4.4 Results:

Conducted Output Power at Nominal Temperature

	CDMA Cell Band			CDMA PCS Band		
Configuration	Channel 1013	Channel 384	Channel 777	Channel 25	Channel 600	Channel 1175
RC1 SO2	23.35	23.84	23.32	23.72	23.99	23.12
RC3 SO2	23.47	23.8	23.24	23.72	24.02	23.2
RC1 SO55	23.34	23.7	23.2	23.67	23.95	23.08
RC3 SO55	23.5	23.8	23.35	23.74	24.05	23.19
RC3 SO32	23.55	23.72	23.32	23.74	24	23.2
1x EvDO Rev. 0 FTAP	23.4	23.7	23.3	23.1	23.3	22.7
1x EvDO Rev. 0 RTAP	23.5	23.6	23.4	23.2	22.8	23
1x EvDO Rev. A FTAP	23.5	23.6	23.3	23.1	23.1	22.6
1x EvDO Rev. A RTAP	23.5	23.6	23.2	23	23.1	22.7

Peak –to-Average Ratio



Complementary Cumulative Distribution Function (100000 samples)

```
          Trace 1
Mean    16.66 dBm
Peak    19.40 dBm
Crest    2.74 dB

 10 %    1.56 dB
  1 %    2.16 dB
 .1 %    2.48 dB
.01 %    2.64 dB
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Limit = 13dB

5 Occupied Bandwidth

5.1 Test Limits

§2.1049:

The occupied bandwidth 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.

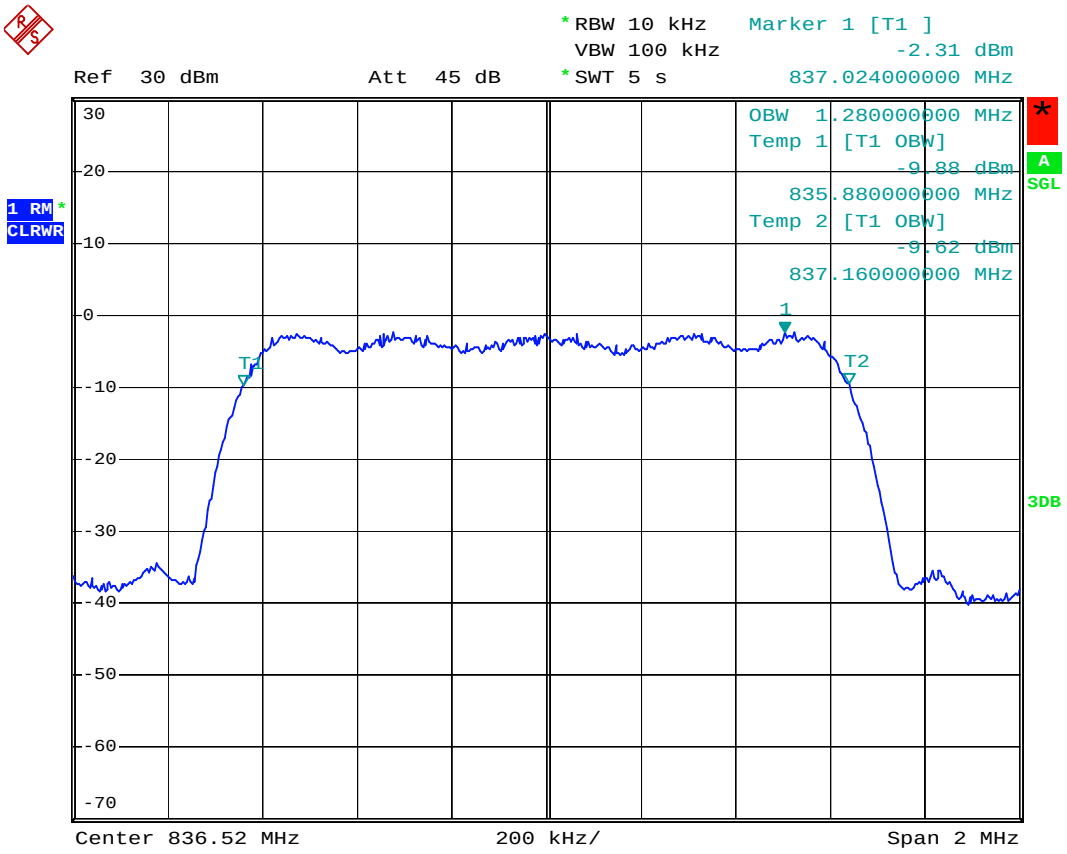
5.2 Test Procedure

The EUT was connected to a spectrum analyzer using a calibrated coaxial cable and power divider. The EUT was placed into a call using base station simulator. The base station simulator was set to force the EUT to its maximum power setting. The occupied bandwidth function of the analyzer was used to automatically generate the occupied bandwidth plots below.

5.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	8/27/2010	8/27/2011
Base Station Simulator	3101	Rohde & Schwarz	CMU200	7/10/2010	7/10/2011
RF Combiner	E18106	Weinschel Engineering	1506A	TOU	TOU

5.4 Results:



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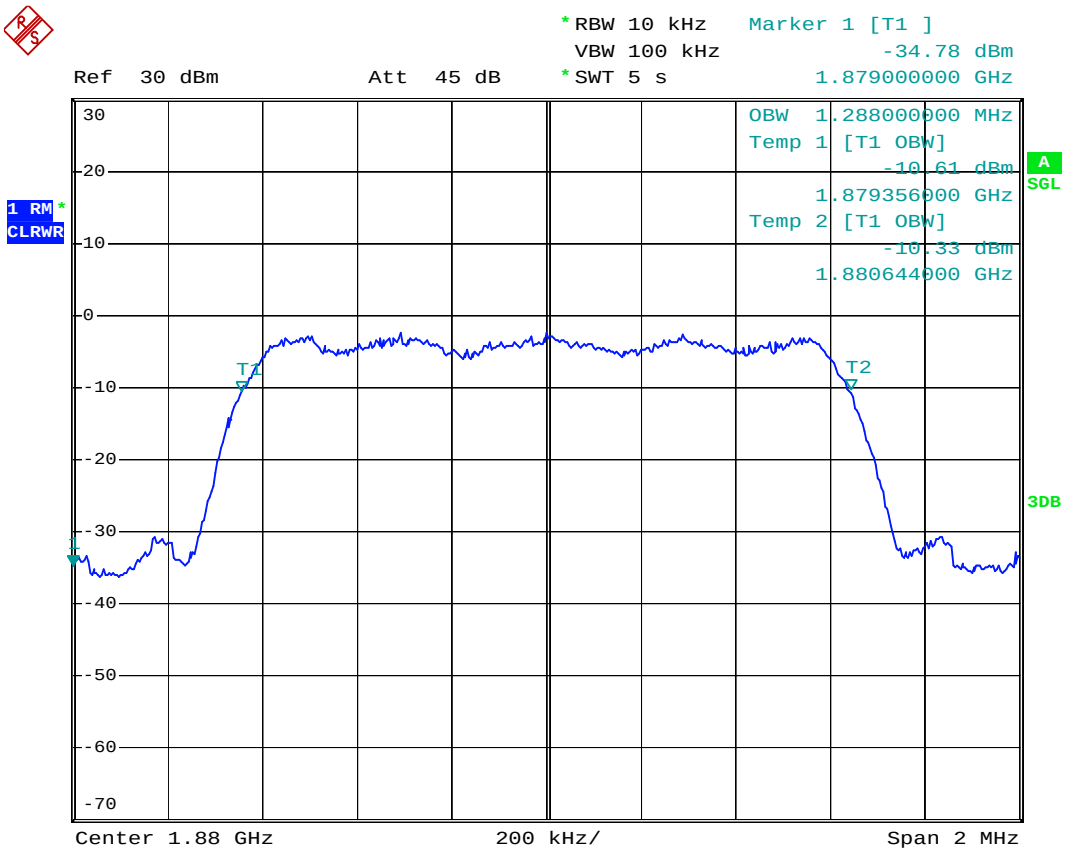
Cell Band, Mid Channel



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PCS Band, Mid Channel

6 Conducted Spurious Emissions at Antenna Terminals

6.1 Test Limits

§ 2.1049

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 under the following conditions as applicable:

(h) Transmitters employing digital modulation techniques—when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

§ 2.1051

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in §2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 22.917

(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.

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

§ 24.238

(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.

(b) Measurement procedure. Compliance with these rules 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. 1 MHz 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.

6.2 Test Procedure

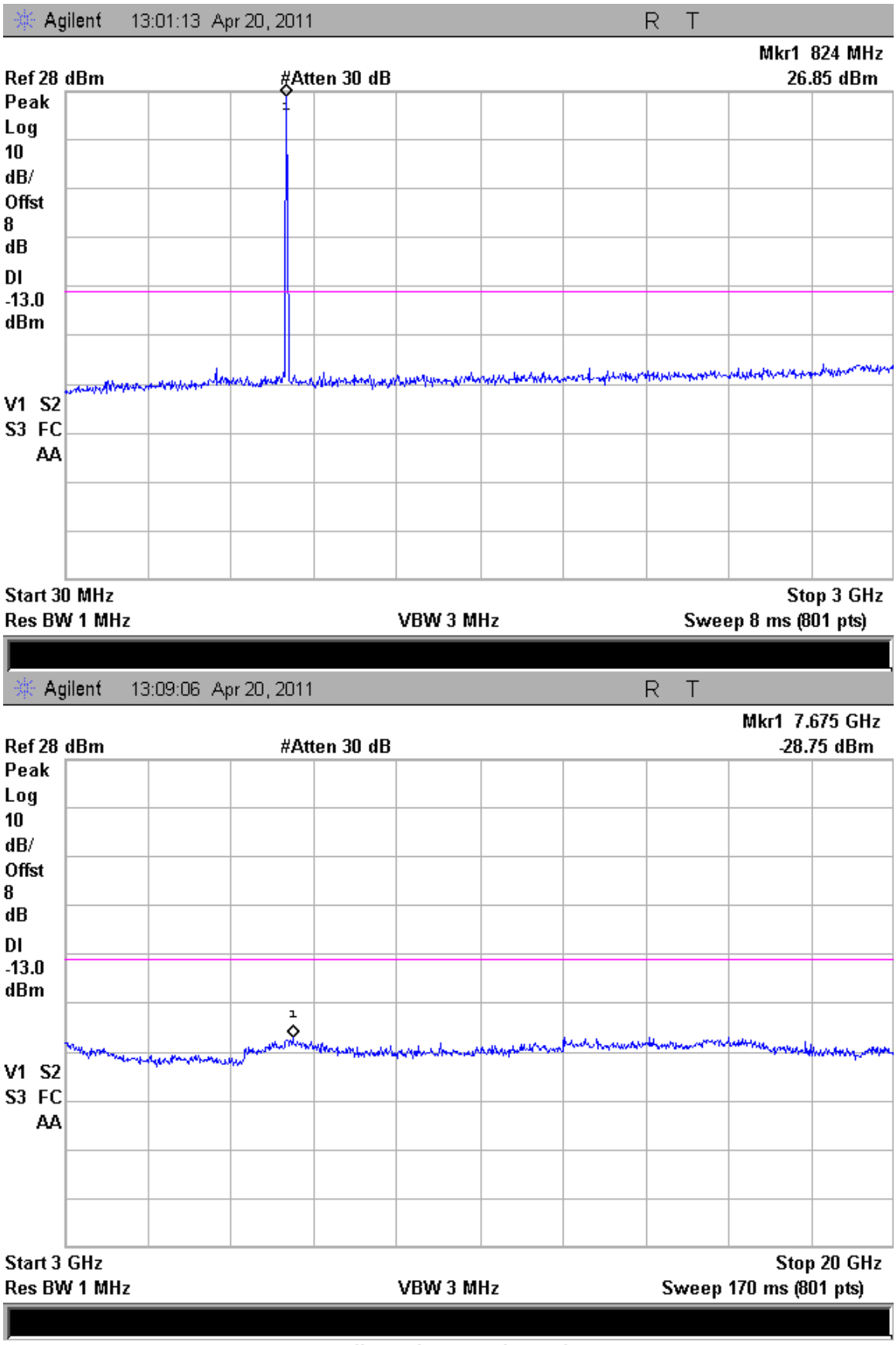
The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The base station simulator was set to force the EUT to its maximum power setting. The resolution bandwidth of the spectrum analyzer was set at 100kHz or 1MHz depending on the transmit band. Sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

6.3 Test Equipment Used:

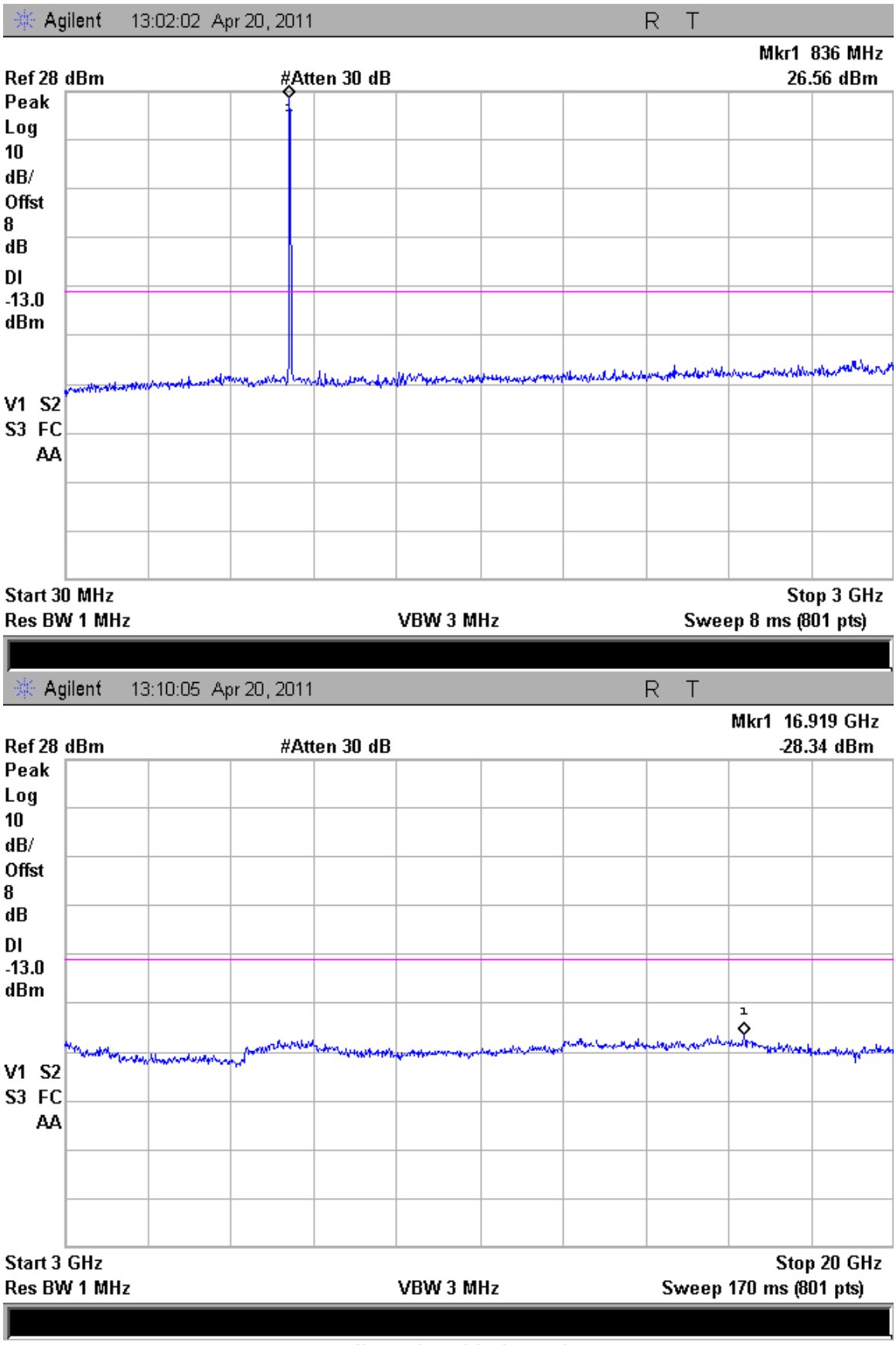
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	8/27/2010	8/27/2011
EMC Analyzer	2142	HP	E7405	9/1/2010	9/1/2011
Base Station Simulator	3101	Rohde & Schwarz	CMU200	7/10/2010	7/10/2011
RF Combiner	E18106	Weinschel Engineering	1506A	TOU	TOU

6.4 Results:

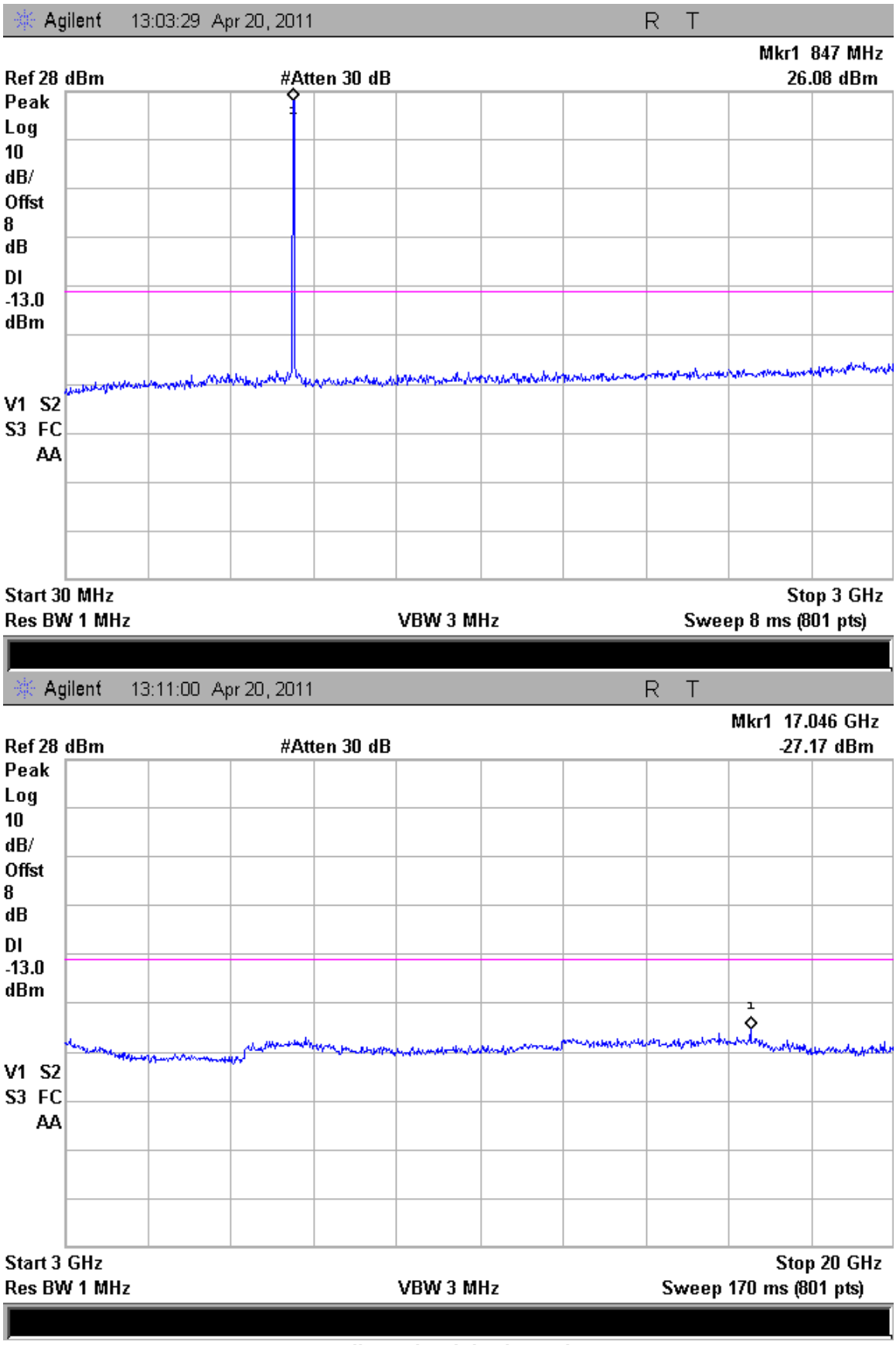
The following plots show that all spurious emissions are attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. Plots for emissions within 1MHz of the band edge as well as for emission outside of this range are shown.



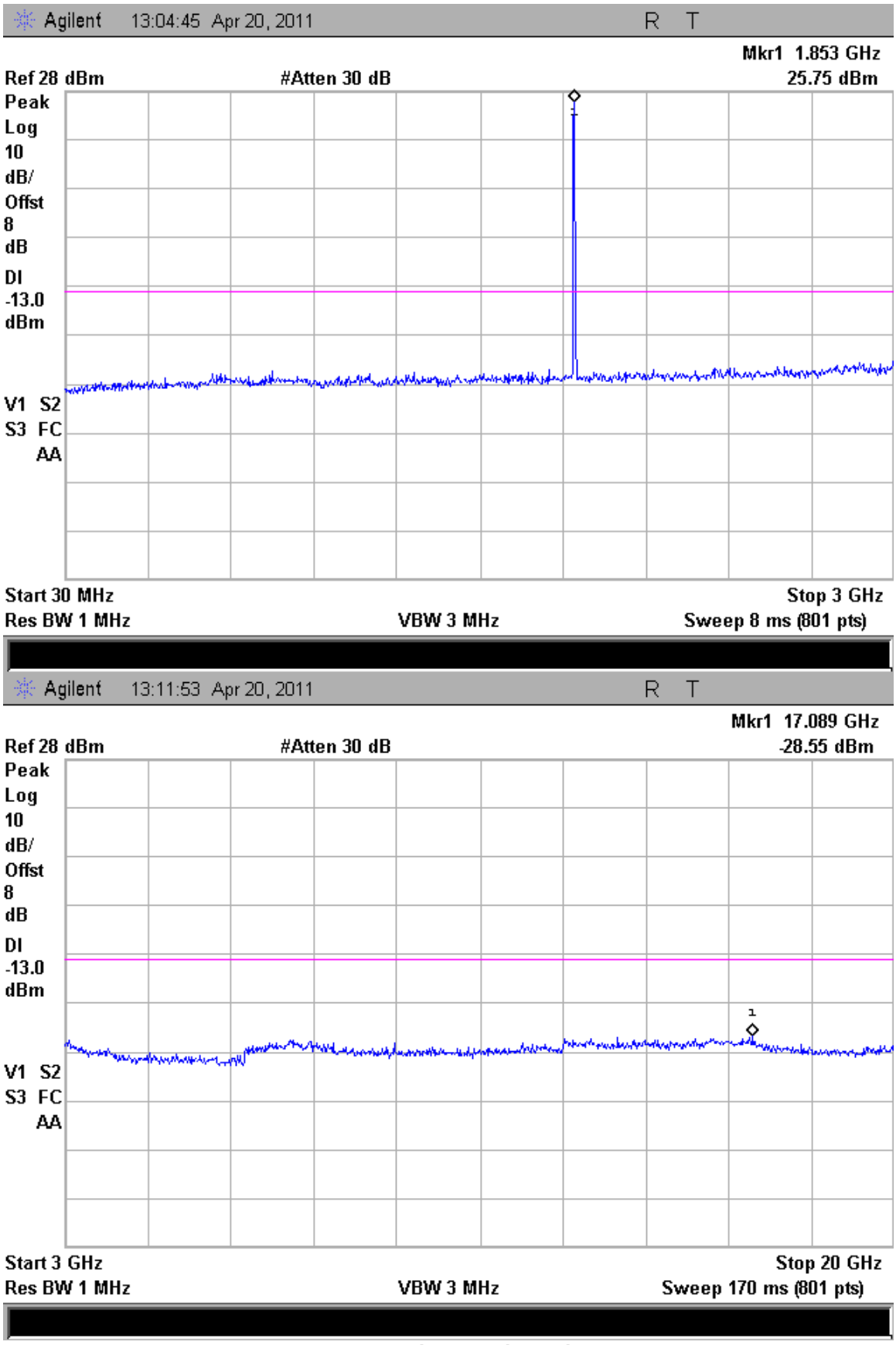
Cell Band - Low Channel



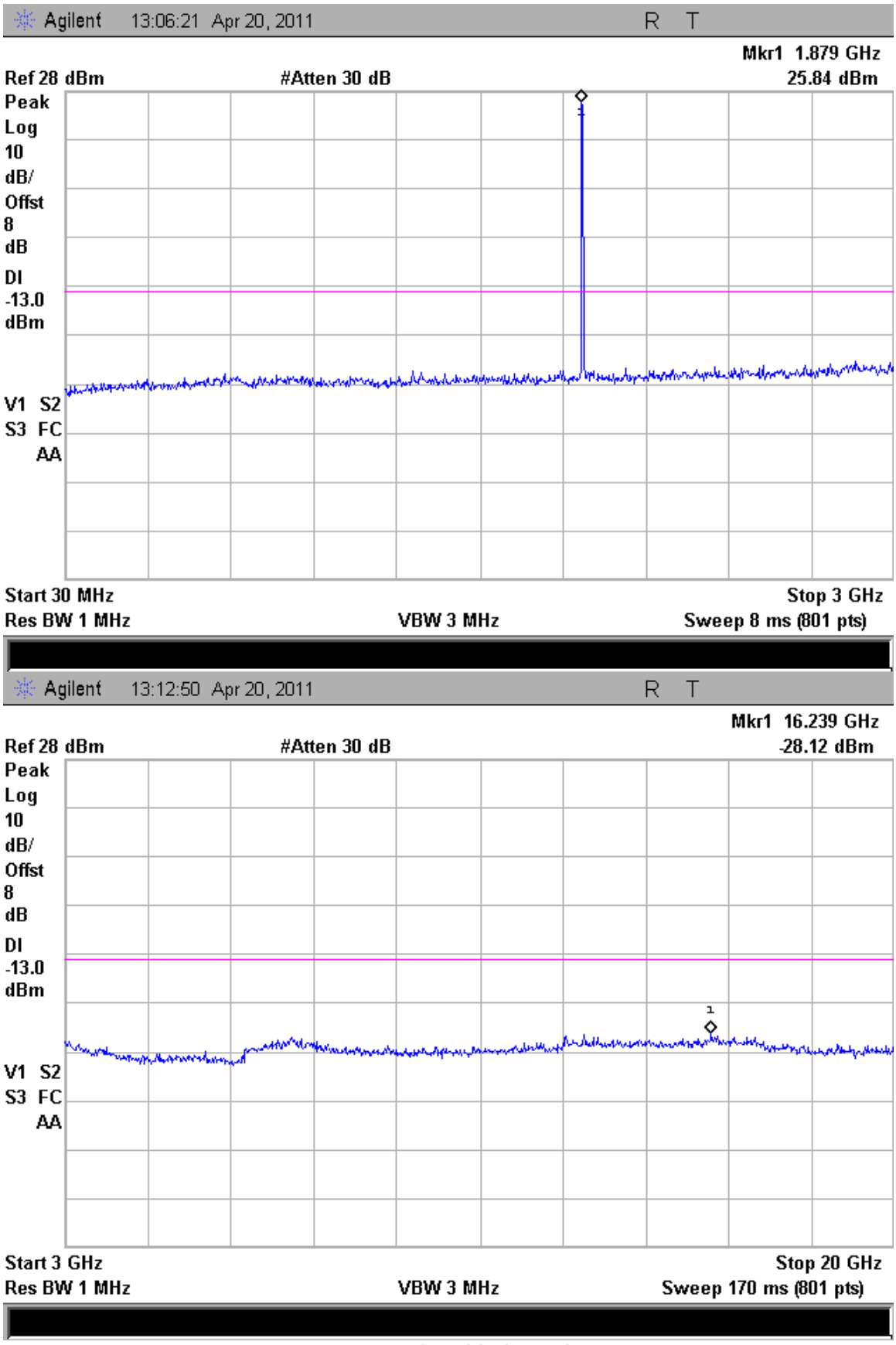
Cell Band – Mid Channel



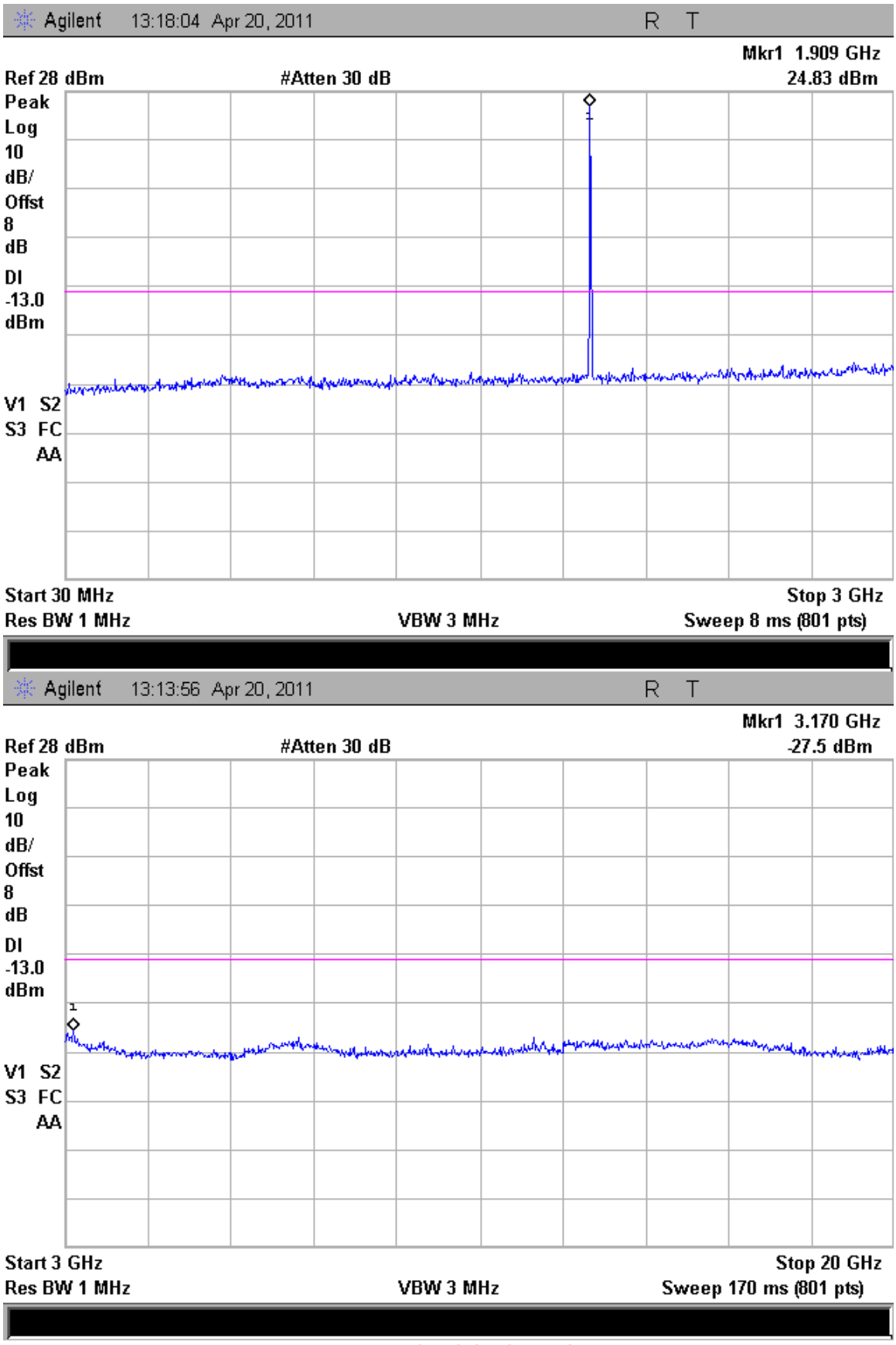
Cell Band - High Channel



PCS Band - Low Channel

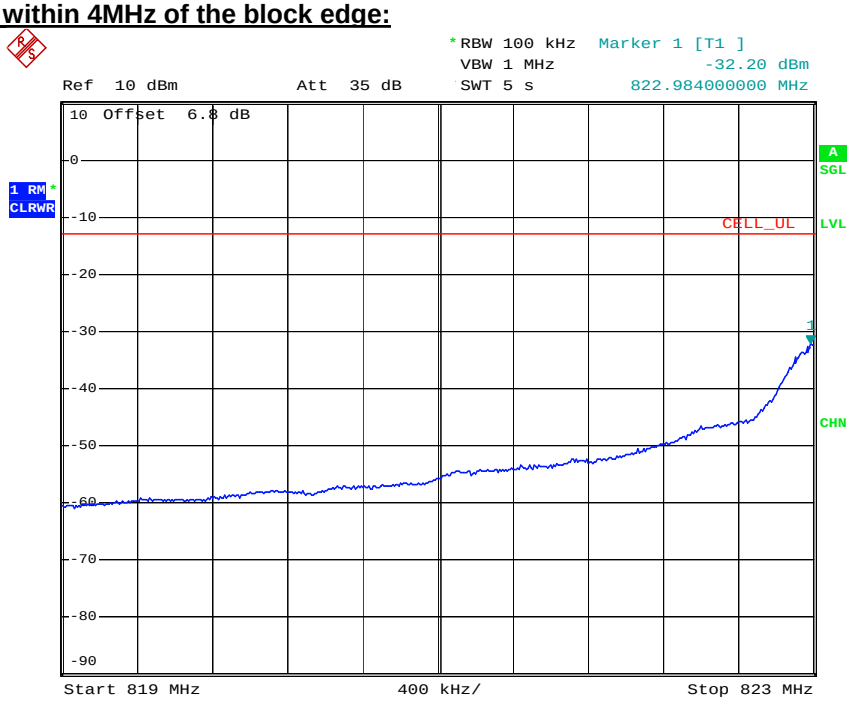


PCS Band – Mid Channel



PCS Band - High Channel

Emissions within 4MHz of the block edge:



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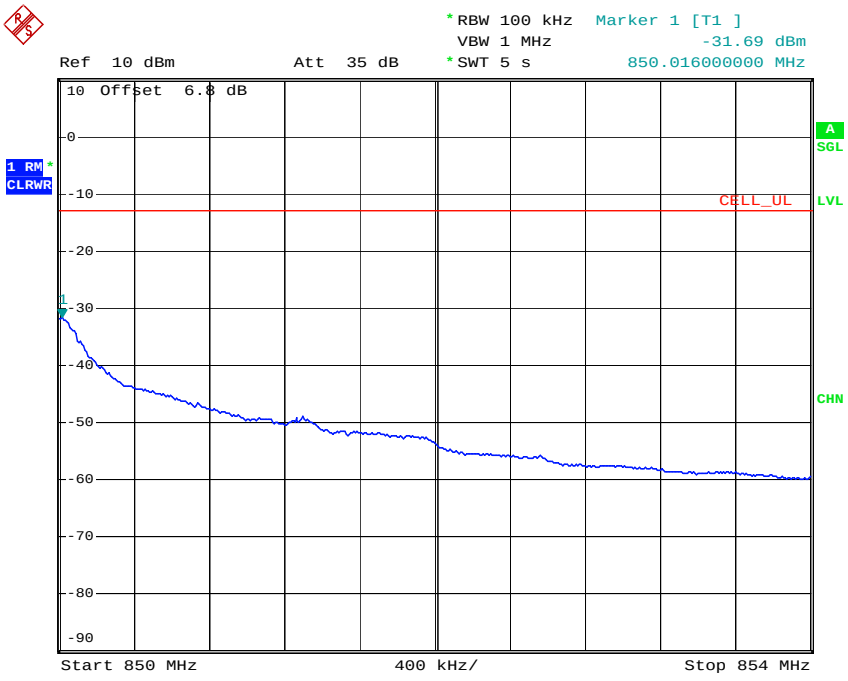
Cell Band – Low Channel



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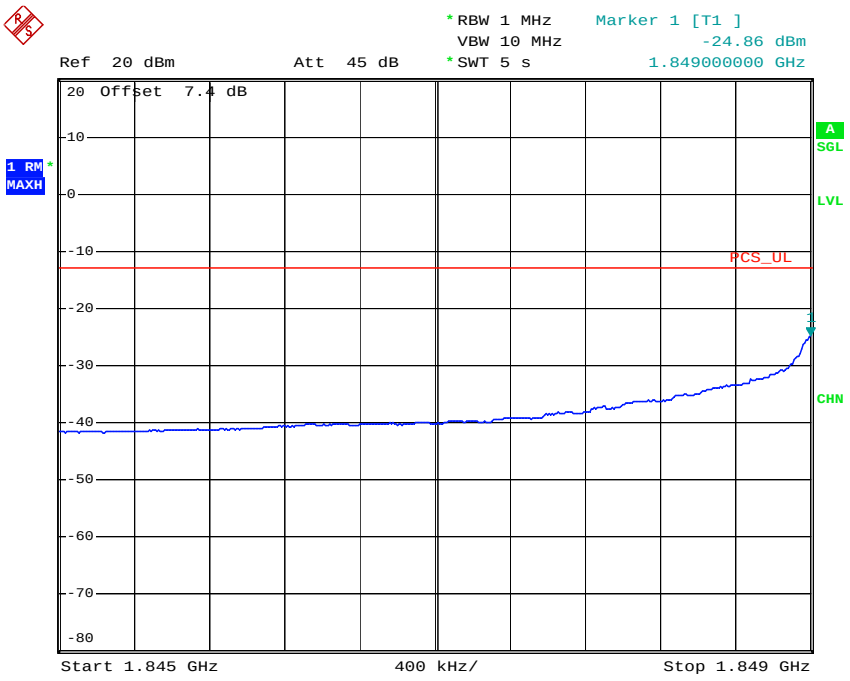
Cell Band – High Channel



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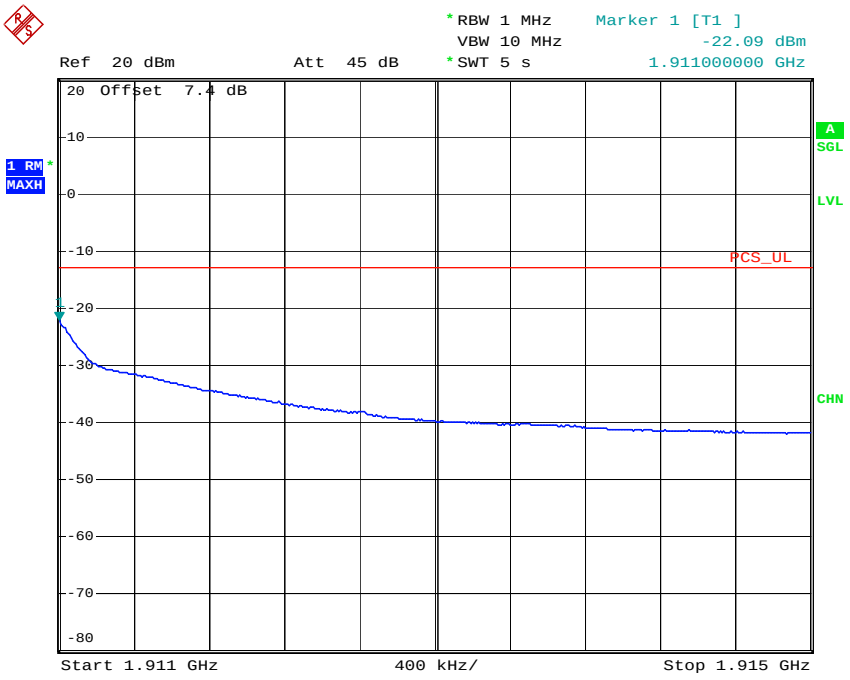
PCS Band – Low Channel



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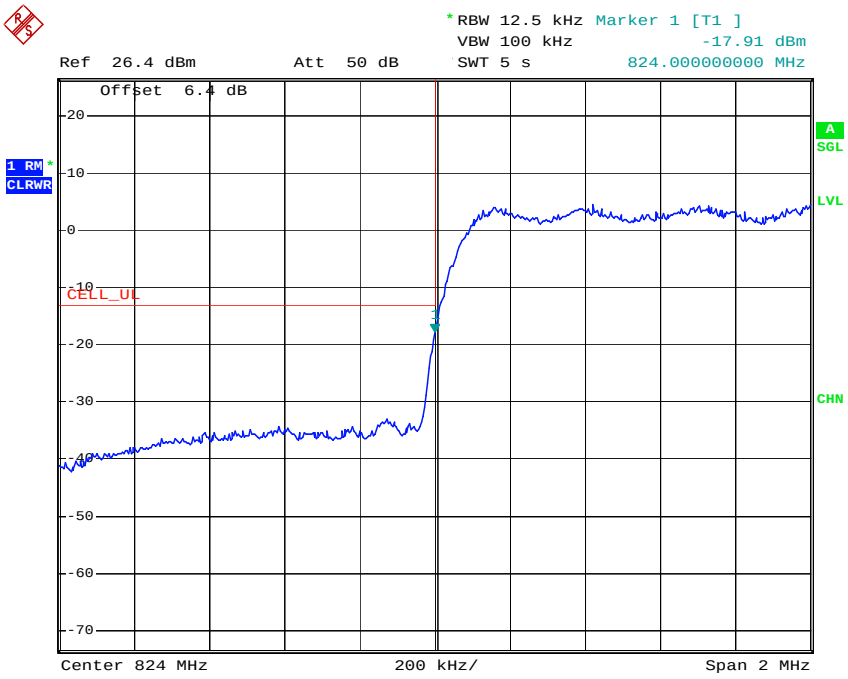
PCS Band – High Channel

Emissions within 1MHz of the band edge:



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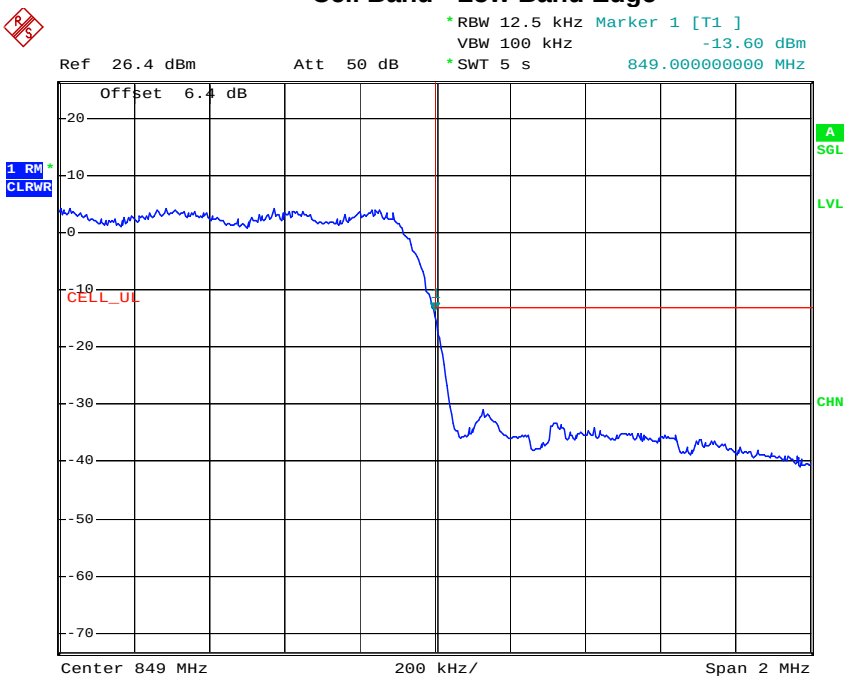
Cell Band - Low Band Edge



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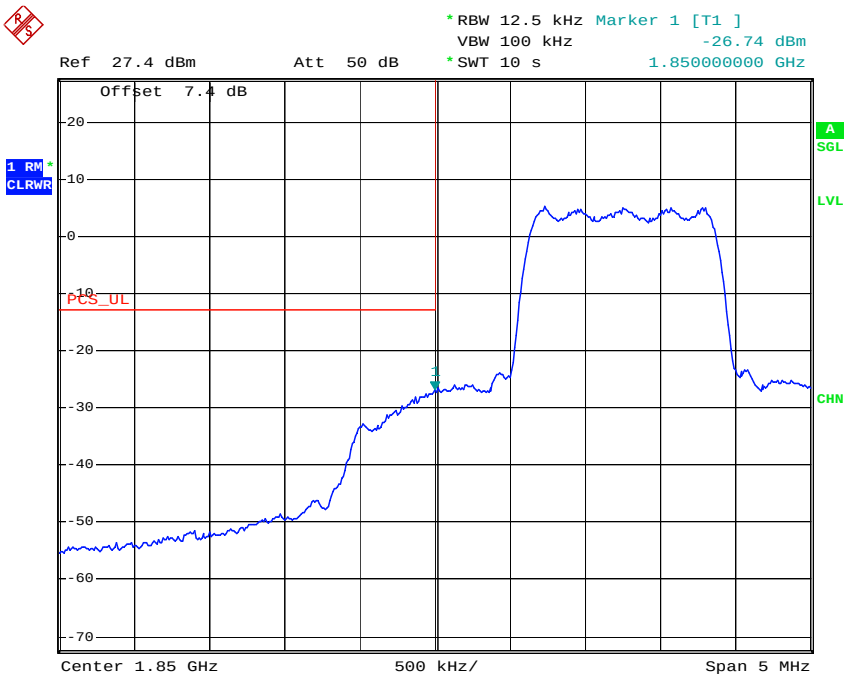
Cell Band - High Band Edge



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PCS Band - Low Band Edge

Date: 20.APR.2011 16:54:40

PCS Band - High Band Edge

7 Radiated Output Power

7.1 Test Limits

§ 22.913

(a) (2) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

§ 24.232

(c) Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

7.2 Test Procedure

Since the device is not supplied with an antenna, the maximum antenna gain was calculated to satisfy the MPE requirements of §2.1091 and the radiated output power limits. The maximum allowed antenna gain is calculated using the maximum measured conducted output power.

7.3 Results:

The MTSMC-EV1 meets the radiated power requirements of FCC §22.913 and §24.232 when an antenna of no more than 7.85 dBd (10dBi) of gain in the cell band and no more than 8.94dBi of gain in the PCS band is used.

Cell Band:

Frequency	836.52	MHz		
Limit	0.5577	mW/cm^2		
Distance	20	cm		
Conducted Power	23.84	dBm	242.1029	mW
TX Ant Gain	**10.00**	dBi		
EIRP	33.84	dBm	2421.029	mW
ERP = EIRP - 2.15	**31.69**	dBm	1475.7065	mW
Power Density	0.2066	mW/cm^2 at 20cm		

*For Cell band, the highest antenna gain was which would allow the device to meet the MPE limits from §2.1091 and not require SAR was calculated.

PCS Band:

Frequency	1880	MHz		
Limit	1.0000	mW/cm^2		
Distance	20	cm		
Conducted Power	24.05	dBm	254.09727	mW
TX Ant Gain	**8.94**	dBi		
EIRP	**32.99**	dBm	1990.6733	mW
Power Density	0.3960	mW/cm^2 at 20cm		

*For PCS band, the highest antenna gain was which would allow the device to meet the radiated output power limit was calculated.

8 Radiated Spurious Emissions (Transmitter)

8.1 Test Limits

§ 2.1053

(a) 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. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of §2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

§ 22.917

(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.

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

§ 24.238

(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.

(b) Measurement procedure. Compliance with these rules 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. 1 MHz 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.

8.2 Test Procedure

The EUT was placed on a non-conductive turntable. The measurement antenna was placed at a distance of 3 meters from the EUT. The EUT was forced to transmit at its maximum output power setting. During the tests, the antenna height and EUT azimuth were varied in order to identify the maximum level of emissions from the EUT.

The frequency range up to tenth harmonic was investigated in order to identify the spurious emission. Once the spurious emissions were identified, the power of the emission was determined using the substitution method described in TIA-603-C. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and at the spurious emissions frequency.

8.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2010	6/29/2011
Preamplifier	987410	Miteq	AFS44-00102000-30-10P-44	6/17/2010	6/17/2011
Preamplifier	SF456200904	Mini-Circuits	ZX60-3018G-S+	2/4/2011	2/4/2012
Biconnilog Antenna	00051864	ETS	3142C	12/20/2010	12/20/2011
Horn Antenna	6556	ETS	3115	8/9/2010	8/9/2011
Horn Antenna	1096	Antenna Research	DRG-118/A	7/8/2010	7/8/2011
System Controller	121701-1	Sunol Sciences	SC99V	Time of Use	Time of Use
High Pass Filter	3986-01 DC0408	Microwave Circuits, Inc.	H3G020G2	Time of Use	Time of Use
Base Station Simulator	3101	Rohde & Schwarz	CMU200	7/10/2010	7/10/2011

8.4 Results:

All radiated spurious emissions were attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB which is equivalent to -13dBm.

Worst Case Spurious Measurements

Radiated Spurious Emissions Measurement

Test Engineer: Bryan Taylor
Test Date: 4/27/2011
Temp. / Humidity / Pressure: 23.2C / 45.3% / 995.6mBar
Bandwidth Settings: RBW = VBW = 1MHz
Notes: Results represent the worst case from 3 orthogonal axis positions. Spurious emissions not reported here were below the measurement noise floor.

			A	B	C	D	E	F
Band/Channel	Spurious Frequency (MHz)	Polarity	Device Reading (dBm)	Signal Generator Level (dBm)	Cable Loss (dB)	Tx Antenna Gain (dBd)	Limit (dBm)	Radiated Spurious Emission Level (dBm)
CDMA Cell Band; Low Channel (1013)	1649.4	H	-74.56	-38.47	3.26	6.70	-13	-35.03
	1649.4	V	-77.53	-42.46	3.26	6.70	-13	-39.02
	2474.1	H	-78.08	-38.12	4.17	7.16	-13	-35.13
	2474.1	V	-78.11	-36.2	4.17	7.16	-13	-33.21
	3298.8	H	-49.8	-46.09	4.58	7.14	-13	-43.53
	3298.8	V	-38.7	-32.4	4.58	7.14	-13	-29.84
	4123.5	H	-58.1	-51.57	5.33	8.15	-13	-48.75
	4123.5	V	-57.7	-50.23	5.33	8.15	-13	-47.41
	4948.2	H	-57.73	-49.63	5.82	8.80	-13	-46.65
	4948.2	V	-58.5	-50.94	5.82	8.80	-13	-47.96
CDMA Cell Band; Mid Channel (384)	1673.04	H	-77.42	-40.96	3.30	6.70	-13	-37.56
	1673.04	V	-72.25	-36.08	3.30	6.70	-13	-32.68
	2509.56	H	-77.86	-37.33	3.97	7.43	-13	-33.87
	2509.56	V	-75.16	-32.51	3.97	7.43	-13	-29.05
	3346.08	H	-51.76	-48.36	4.63	7.19	-13	-45.81
	3346.08	V	-39.54	-35.23	4.63	7.19	-13	-32.68
	4182.6	H	-58.09	-52.1	5.19	8.15	-13	-49.14
	4182.6	V	-57.72	-52.1	5.19	8.15	-13	-49.14
	5019.12	H	-58.65	-49.94	6.19	8.87	-13	-47.26
	5019.12	V	-56.92	-49.04	6.19	8.87	-13	-46.36
CDMA Cell Band; High Channel (777)	1696.62	H	-76.86	-40.07	3.48	6.70	-13	-36.85
	1696.62	V	-78.42	-41.34	3.48	6.70	-13	-38.12
	2544.93	H	-77.36	-35.88	4.09	7.43	-13	-32.54
	2544.93	V	-78.63	-35.04	4.09	7.43	-13	-31.70
	3393.24	H	-54.18	-49.48	4.84	7.19	-13	-47.14
	3393.24	V	-43.66	-37.15	4.84	7.19	-13	-34.81
	4241.55	H	-57.67	-51.34	5.00	8.37	-13	-47.97
	4241.55	V	-57.26	-51.27	5.00	8.37	-13	-47.90
	5089.86	H	-57.28	-47.77	6.25	8.87	-13	-45.15
	5089.86	V	-57.98	-49.12	6.25	8.87	-13	-46.50
								F=B-C+D

Worst Case Spurious Measurements

Radiated Spurious Emissions Measurement

Test Engineer: Bryan Taylor
Test Date: 4/28/2011
Temp. / Humidity / Pressure: 23.2C / 45.3% / 995.6mBar
Bandwidth Settings: RBW = VBW = 1MHz
Notes: Results represent the worst case from 3 orthogonal axis positions. Spurious emissions not reported here were below the measurement noise floor.

			A	B	C	D	E	F
Band/Channel	Spurious Frequency (MHz)	Polarity	Device Reading (dBm)	Signal Generator Level (dBm)	Cable Loss (dB)	Tx Antenna Gain (dBd)	Limit (dBm)	Radiated Spurious Emission Level (dBm)
CDMA PCS Band; Low Channel (25)	3702.5	H	-58.93	-52.12	4.85	7.07	-13	-49.90
	3702.5	V	-51.81	-44.83	4.85	7.07	-13	-42.61
	5553.75	H	-67.33	-55.03	6.91	8.48	-13	-53.46
	5553.75	V	-67.59	-56.08	6.91	8.48	-13	-54.51
	7405	H	-69.76	-50.23	7.75	8.72	-13	-49.26
	7405	V	-70.48	-53.81	7.75	8.72	-13	-52.84
	9256.25	H	-72.64	-48.76	9.21	9.41	-13	-48.57
	9256.25	V	-72.31	-50.77	9.21	9.41	-13	-50.58
	11107.5	H	-71.82	-41.96	10.47	10.70	-13	-41.73
	11107.5	V	-72.07	-43.96	10.47	10.70	-13	-43.73
CDMA PCS Band; Mid Channel (600)	3760	H	-46.54	-39.3	5.20	7.07	-13	-37.43
	3760	V	-39.1	-32.2	5.20	7.07	-13	-30.33
	5640	H	-66.14	-54.27	7.09	8.84	-13	-52.52
	5640	V	-62.78	-51.7	7.09	8.84	-13	-49.95
	7520	H	-65.8	-46.2	8.01	9.02	-13	-45.19
	7520	V	-70.07	-51.97	8.01	9.02	-13	-50.96
	9400	H	-71.78	-46.56	9.15	9.52	-13	-46.19
	9400	V	-72.54	-50.21	9.15	9.52	-13	-49.84
	11280	H	-72.45	-42.61	10.16	10.65	-13	-42.13
	11280	V	-72.05	-44.39	10.16	10.65	-13	-43.91
CDMA PCS Band; High Channel (1175)	3817.5	H	-52.76	-45.24	5.00	6.73	-13	-43.51
	3817.5	V	-46.38	-40.36	5.00	6.73	-13	-38.63
	5726.25	H	-65.83	-52.4	7.06	9.27	-13	-50.19
	5726.25	V	-61.65	-50.08	7.06	9.27	-13	-47.87
	7635	H	-71.03	-49.22	8.15	9.20	-13	-48.17
	7635	V	-71.28	-52.38	8.15	9.20	-13	-51.33
	9543.75	H	-72.58	-46.93	8.41	9.77	-13	-45.57
	9543.75	V	-72.42	-49.63	8.41	9.77	-13	-48.27
	11452.5	H	-72.41	-43.95	9.51	10.54	-13	-42.92
	11452.5	V	-71.93	-46.03	9.51	10.54	-13	-45.00
								F=B-C+D

9 Frequency Stability

9.1 Test Limits

§ 2.1055, §22.355, §24.235

The frequency stability of the transmitter was required to maintain a ±2.5ppm tolerance.

9.2 Test Procedure

The equipment under test was connected to an external DC power supply and the RF output 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 inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for that purpose. After the temperature stabilized for approximately 30 minutes, the frequency error was read from the base station simulator. At 20C the input voltage was varied from 85% to 115% and the frequency stability vs input voltage was recorded.

9.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Base Station Simulator	3101	Rohde & Schwarz	CMU200	7/10/2010	7/10/2011
Environmental Chamber	2071	Envirotronics	SH27C	9/1/2010	9/1/2011
DC Power Supply	1036	Hewlett Packard	6296A	Time of Use	Time of Use
Multimeter	2021	Fluke	87	7/23/2010	7/23/2011

9.4 Results:

The tables below show the frequency stability data for both Cell and PCS Bands. In both cases the test sample met the ±2.5ppm limit.

Frequency Stability for Cell Band

Operating Freqeuncy: 836,520,000 Hz
Channel: 384
Reference Voltage: 9 VDC
Deviation Limit: 2.5 ppm
Notes: Frequency Stability in CDMA Cell Band

Voltage (%)	Power (VDC)	Temp (°C)	Frequency Error (Hz)	Deviation (%)	Deviation (ppm)
100%	5	-30	-18	-0.0000022	-0.0215
100%	5	-20	-15	-0.0000018	-0.0179
100%	5	-10	20	0.0000024	0.0239
100%	5	0	7	0.0000008	0.0084
100%	5	10	32	0.0000038	0.0383
100%	5	20	-28	-0.0000033	-0.0335
100%	5	30	33	0.0000039	0.0394
100%	5	40	-30	-0.0000036	-0.0359
100%	5	50	31	0.0000037	0.0371
100%	5	60	12	0.0000014	0.0143
115%	16	20	-10	-0.0000012	-0.0120
Batt. Endpoint	8	20	-8	-0.0000010	-0.0096

Frequency Stability for PCS Band

Operating Freqeuncy: 1,880,000,000 Hz
Channel: 600
Reference Voltage: 9 VDC
Deviation Limit: 2.5 ppm
Notes: Frequency Stability in CDMA PCS Band

Voltage (%)	Power (VDC)	Temp (°C)	Frequency Error (Hz)	Deviation (%)	Deviation (ppm)
100%	5	-30	-23	-0.0000012	-0.0122
100%	5	-20	17	0.0000009	0.0090
100%	5	-10	-14	-0.0000007	-0.0074
100%	5	0	33	0.0000018	0.0176
100%	5	10	-8	-0.0000004	-0.0043
100%	5	20	-16	-0.0000009	-0.0085
100%	5	30	-18	-0.0000010	-0.0096
100%	5	40	-8	-0.0000004	-0.0043
100%	5	50	43	0.0000023	0.0229
100%	5	60	30	0.0000016	0.0160
115%	16	20	10	0.0000005	0.0053
Batt. Endpoint	8	20	22	0.0000012	0.0117

10 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of k = 2, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty	Notes
Radiated emissions, 30 to 1000 MHz	±3.9dB	
Radiated emissions, 1 to 18 GHz	±4.2dB	
Radiated emissions, 18 to 40 GHz	±4.3dB	
Power Port Conducted emissions, 150kHz to 30 MHz	±2.8dB	

11 Revision History

Revision Level	Date	Report Number	Notes
0	6/15/2011	100396073LEX-001	Original Issue