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FCC PART 22H & 24E CLASS II PERMISSIVE CHANGE TEST REPORT

APPLICANT	Wilson Electronics, Inc.
ADDRESS	3301 E. Deseret Drive St. George, Utah 84790 USA
FCC ID	PWO8012SM
MODEL NUMBER	271245
PRODUCT DESCRIPTION	Mobile Wireless Cellular / PCS SmartTech Amplifier
DATE SAMPLE RECEIVED	October 11, 2006
DATE TESTED	October 19, 2006
Tested By	Nam Nguyen
Approved By	Mario de Aranzeta
TEST RESULTS	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL

THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.



Certificate # 0955-01

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COMPLIANCE STATEMENT



Certificate # 0955-01

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report and demonstrate that the equipment complies with the appropriate standards. No modifications were made to the equipment during testing in order to demonstrate compliance with these standards.

I attest that the necessary measurements were made, under my supervision, at TIMCO ENGINEERING, INC. located at 849 N.W. State Road 45, Newberry, Florida 32669.

Authorized Signatory Name: Mario de Aranzeta

Signature: On file

Function: Engineer

Date: 11/10/2006

Tester name: Nam Nguyen

Signature: On file

Date: 11/10/2006

REPORT SUMMARY

Disclaimer	The test results relate only to the items tested.
Report Purpose	To demonstrate the modified unit continues to comply with FCC Part 22 and Part 24 requirements
Applicable Rule Part(s)	Pt 22H, Pt 24 E, Pt 15.109, ANSI C63.4: 2003
Related Test Report	2851BUT6TestReport for digital interface testing

TEST ENVIRONMENT AND TEST SETUP

Test Facilities	All required tests were performed by Timco Engineering Inc. that is located at 849 NW State Road 45 Newberry, FL 32669 Timco test facilities accreditation is on file with regulatory agencies.
Test Conditions	Temperature: 26°C Relative Humidity: 50%
Deviation to the rules	There was no deviation from the test standards.
Modification to the DUT	No modification was made to the DUT.
Test Exercise (e.g. software description, test signal, etc.)	The DUT was placed in continuous transmit mode of operation.
Supporting Test Equipment	Manufacturer: Agilent Description: Dual-mode baseband generator (arbitrary waveform and real time I/Q) 250 kHz to 6 GHz Model Number: E4438C Cal Date: 01/31/06 Cal Due Date: 01/31/08

DEVICE UNDER TEST INFORMATION

Manufactured by	Willson Electronics
DUT Description	Mobile wireless, cell phone amplifier
FCC ID	PWO8012SW
Model Name	271245
Operating Frequency	Pt 22H Uplink 824 – 849 MHz Pt 22H Downlink 869 – 894 MHz Pt 24E Uplink 1850 – 1910 MHz Pt 24E Downlink 1930 – 1990 MHz
Emission Designators	300KGXW (GSM850), 300KGXW (GSM 1900) 1M28F9W (CDMA)
Modulation(s)	F9W, GXW (GSM, EDGE), G7W, F1D
User Power Range & Control	There are NO user power controls
Test Item	Pre-Production
Type of Equipment	Fixed and Mobile
Antenna Connector	N

EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/27/04	3/26/07
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
Biconnical Antenna	Eaton	94455-1	1057	CAL 12/12/05	12/12/07
Biconnical Antenna	Eaton	94455-1	1096	CAL 8/17/06	8/17/08
Biconnical Antenna	Electro-Metrics	BIA-25	1171	CAL 4/29/05	4/29/07
Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 4/13/05	4/13/07
Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 9/5/05	9/5/07
Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/13/05	4/13/07
LISN	Electro-Metrics	ANS-25/2	2604	CAL 8/27/06	8/27/08
LISN	Electro-Metrics	EM-7820	2682	CAL 4/28/05	4/28/07
Log-Periodic Antenna	Eaton	96005	1243	CAL 12/14/05	12/14/07
Passive Loop Antenna	EMC Test Systems	EMCO 6512	9706-1211	CHAR 7/10/06	7/10/08

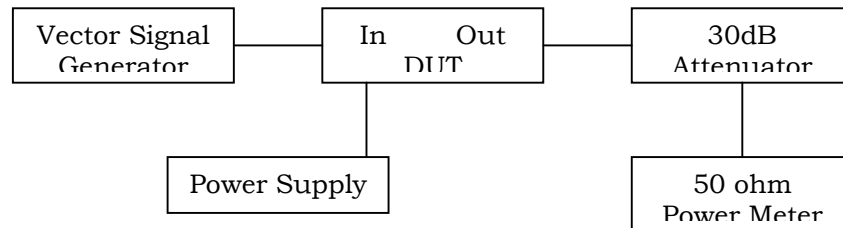
RF POWER OUTPUT

Rule Part(s) No.: Pt 2.1046(a)

Requirements:

Method of Measurement: RF power is measured by connecting a 50 ohm, resistive wattmeter to the RF output connector. With a nominal voltage of 5 VDC using the AC/DC switched mode power supply specified with this device, and the amplifier properly adjusted the RF output measures:

RF Output Power Test Setup Diagram



Test Data: 800 MHz band Uplink

Frequency MHz	Modulation	Power Output Watts
825.25	CDMA	1.02
836.5	CDMA	1.34
847.75	CDMA	0.64
824.28	GSM	0.89
836.5	GSM	1.11
848.72	GSM	0.51
824.28	EDGE	0.82
836.5	EDGE	1.05
848.72	EDGE	0.52

1900 MHz band uplink

Frequency MHz	Modulation	Power Output Watts
1851.25	CDMA	0.80
1880	CDMA	1.06
1908.75	CDMA	0.40
1850.28	GSM	0.60
1880	GSM	0.89
1909.72	GSM	0.41
1850.28	EDGE	1.00
1880	EDGE	1.05
1909.72	EDGE	0.40

The worst-case power output was found with the amplifier modulated by CDMA.

APPLICANT: WILSON ELECTRONICS, INC.

FCC ID: PWO8012SM

REPORT #: W\WILSON_PWO\78AUT6\78AUT6TestReport.doc

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Test Data: 800 MHz band downlink

Frequency MHz	Modulation	Power Output Watts
870.25	CDMA	.009
881.5	CDMA	.008
892.75	CDMA	.010
869.28	GSM	.010
881.5	GSM	.010
893.72	GSM	.012
869.28	EDGE	.010
881.5	EDGE	.009
893.72	EDGE	.012

1900 MHz band downlink

Frequency MHz	Modulation	Power Output Watts
1931.25	CDMA	.007
1960	CDMA	.010
1988.75	CDMA	.009
1930.28	GSM	.006
1960	GSM	.010
1989.72	GSM	.009
1930.28	EDGE	.006
1960	EDGE	.009
1989.72	EDGE	.008

The worst-case power output was found with the amplifier modulated by CDMA.

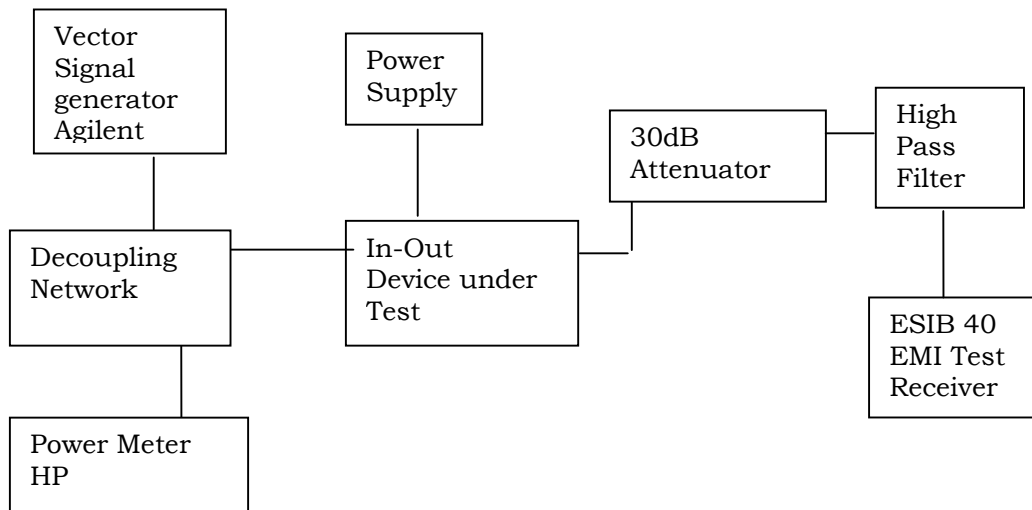
INPUT/OUTPUT MODULATED AMPLITUDE COMPARISON AND BAND-EDGES COMPLIANCE

Rule Parts No.: Pt 2.1049, Pt 2.1051, Pt 24.238, Pt 22

Requirements: 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.

Method of Measurement: On the following plot, the reference level was calibrated using a resolution bandwidth wider than the emission bandwidth. First the gain was measured for the maximum output power. Then for each frequency and type of modulation, an attenuation equals to the gain of the amplifier was added on the measurement side of the amplifier, as to overlay the input versus output modulated envelope.

Test Setup Diagram



Supporting Equipment:

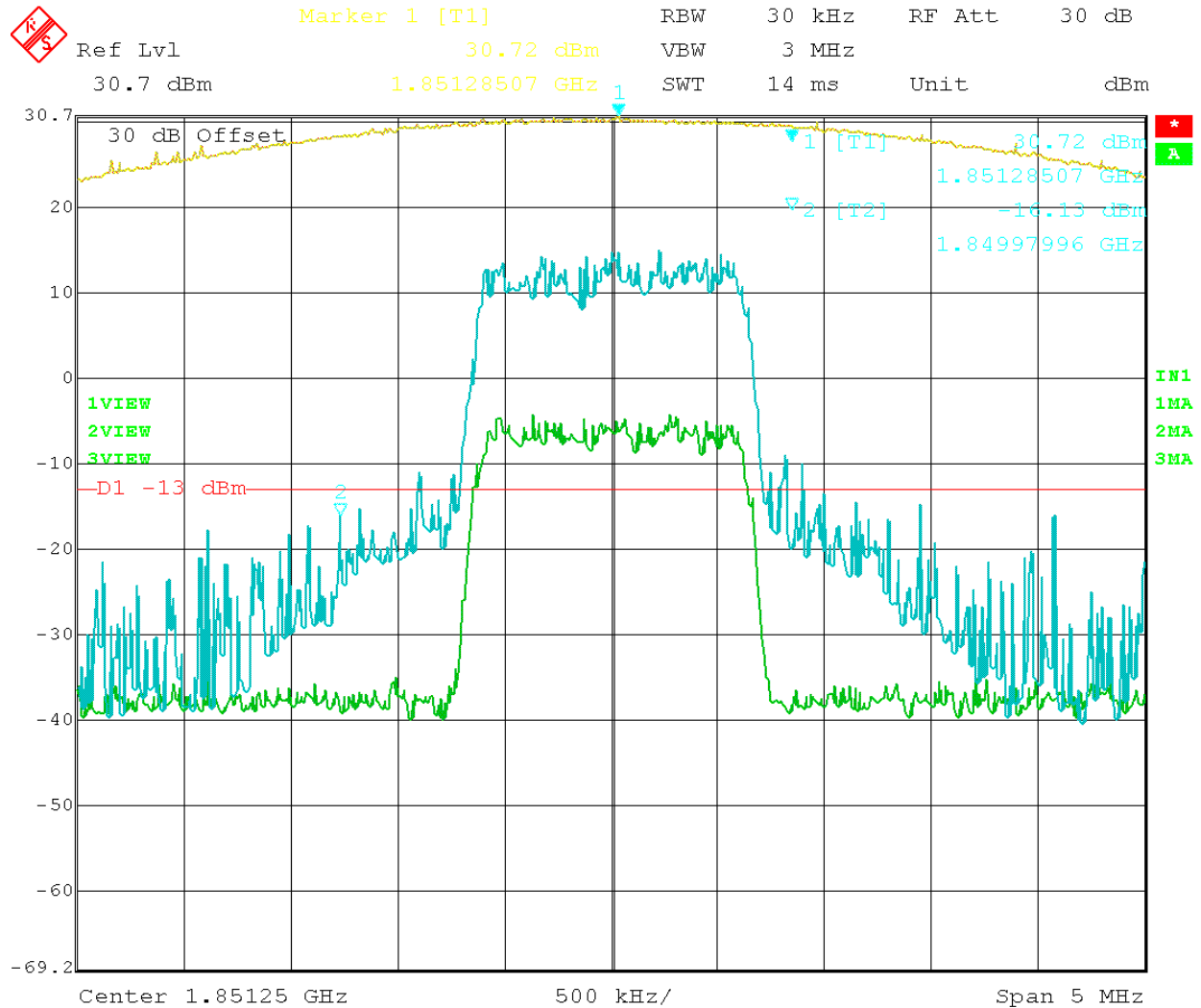
Manufacturer	Description	Model Number	Cal Date	Cal Due Date
Agilent	Dual-mode baseband generator (arbitrary waveform and real time I/Q) 250 kHz to 6 GHz	E4438C	01/31/06	01/31/08

Test Data: The data presented below is for the worst-case modulation found.

CDMA

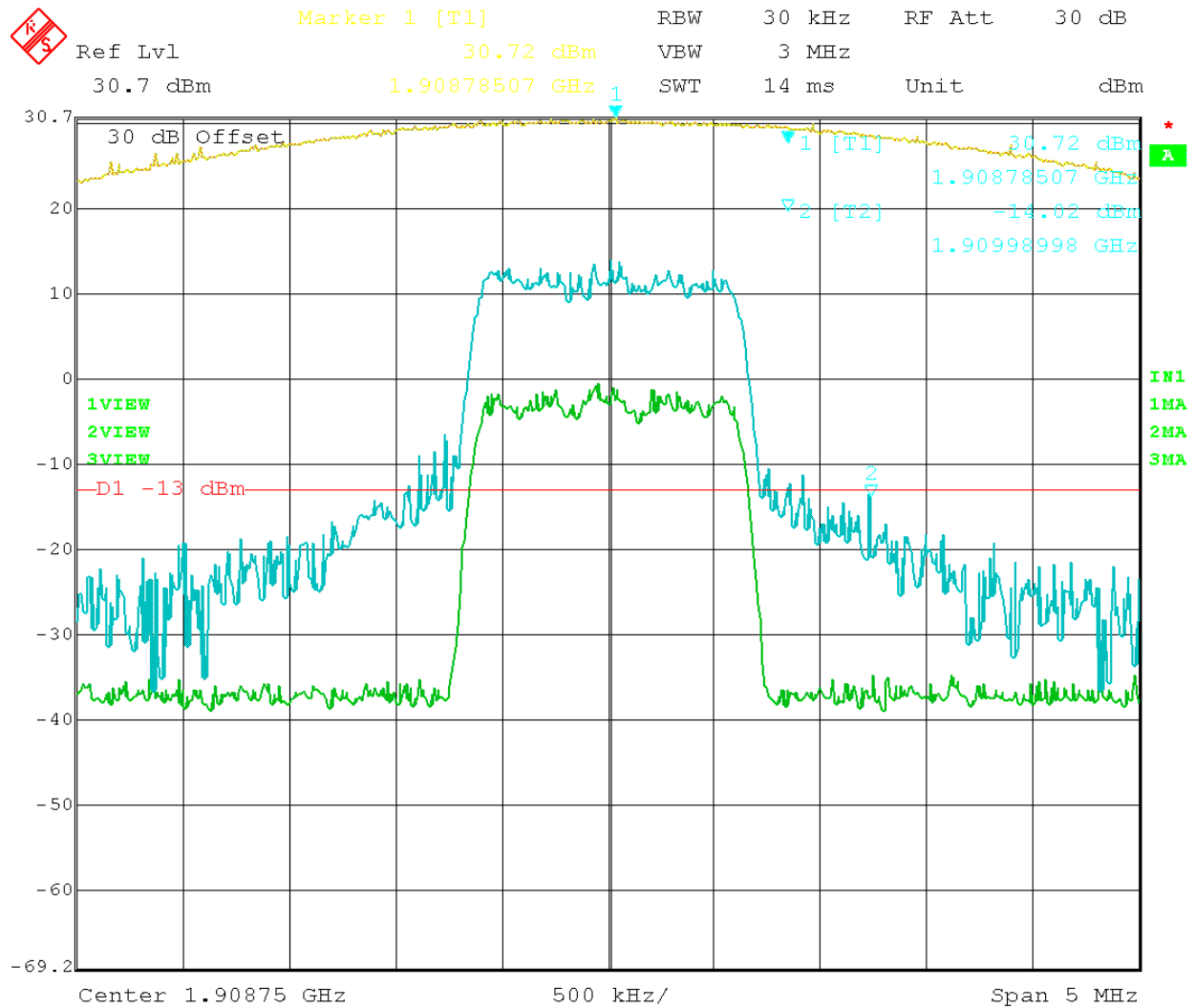
Channel (MHz)	Band-edge Frequency (MHz)	Amplitude level at the band-edge (dBm)	Limit (dBm)
1851.25	1850	-16.13	-13
1908.75	1910	-14.02	-13
825.25	824	-17.34	-13
847.75	849	-14.11	-13

The reference level on the following plots was calibrated using a 3MHz RBW=VBW.



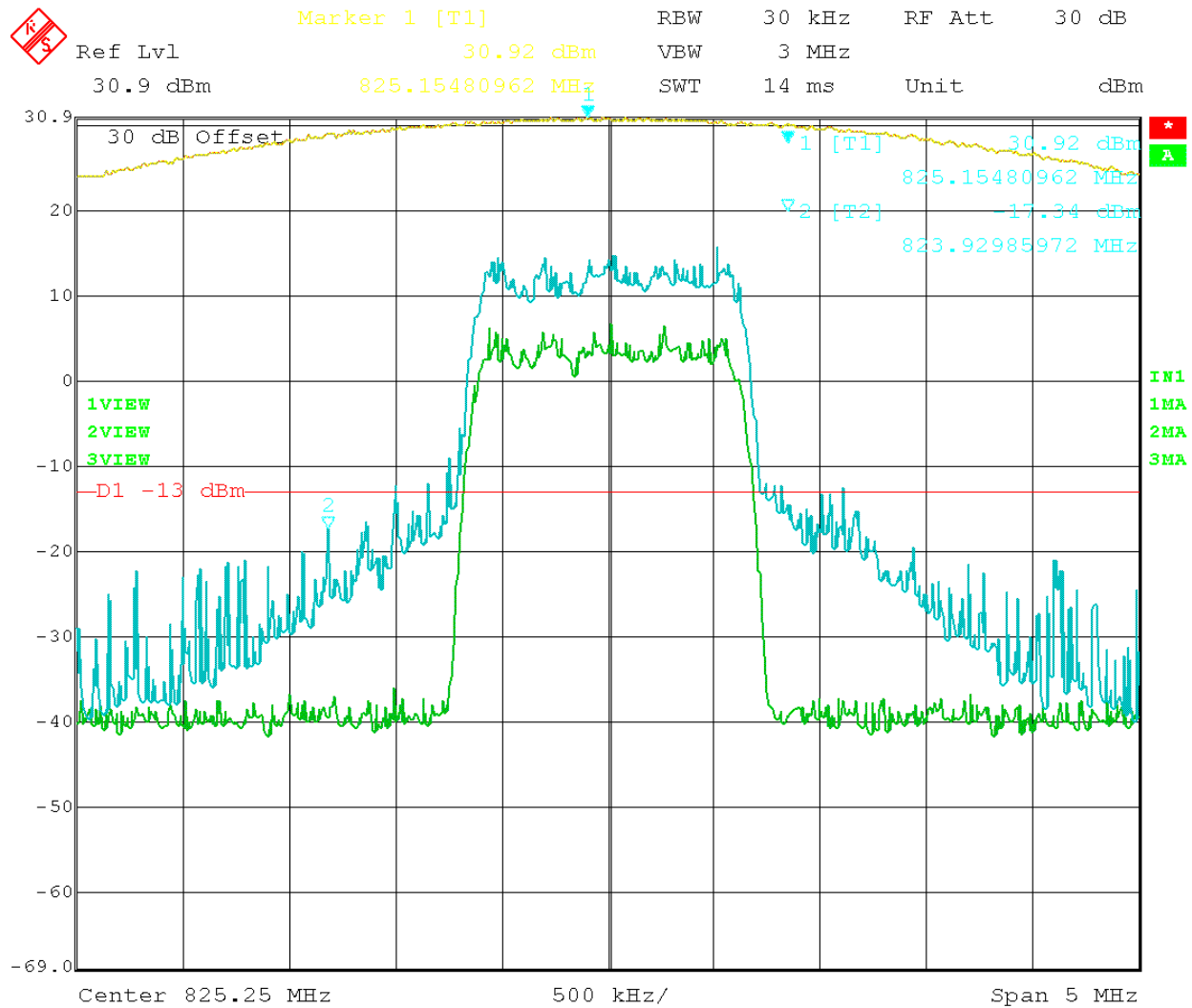
Date: 7.NOV.2006 10:48:05

Figure 1: CDMA modulation - up link 1900MHz band - In vs. Out 1851.25MHz



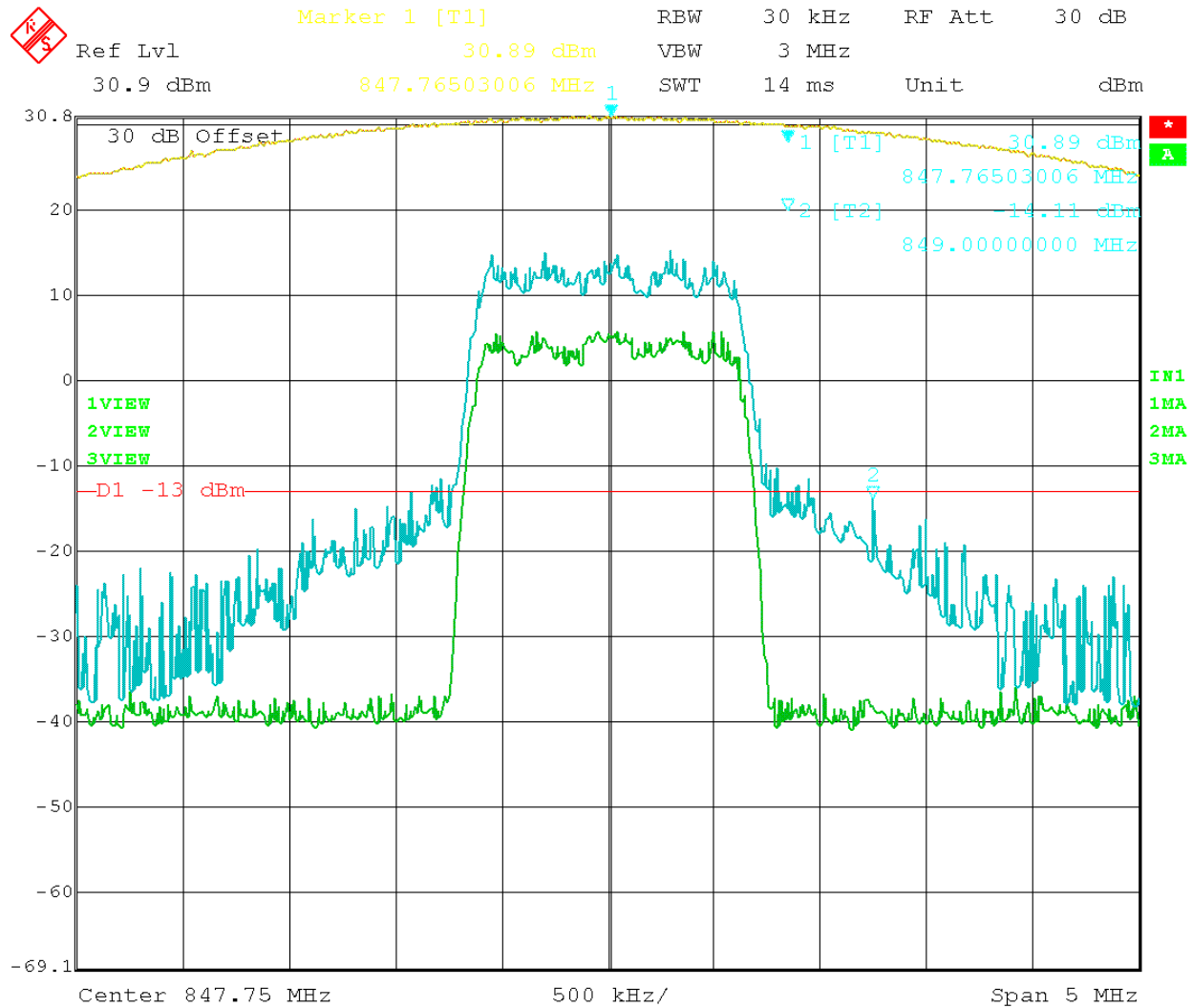
Date: 7.NOV.2006 10:38:15

Figure 2: CDMA modulation - up link 1900MHz band – In vs. Out 1908.75MHz



Date: 7.NOV.2006 11:20:59

Figure 3: CDMA modulation - up link 800MHz band – In vs. Out 825.25MHz



Date: 7.NOV.2006 11:35:37

Figure 4: CDMA modulation - up link 800MHz band – In vs. Out 847.75MHz

INTERMODULATION PRODUCT SPURIOUS EMISSIONS

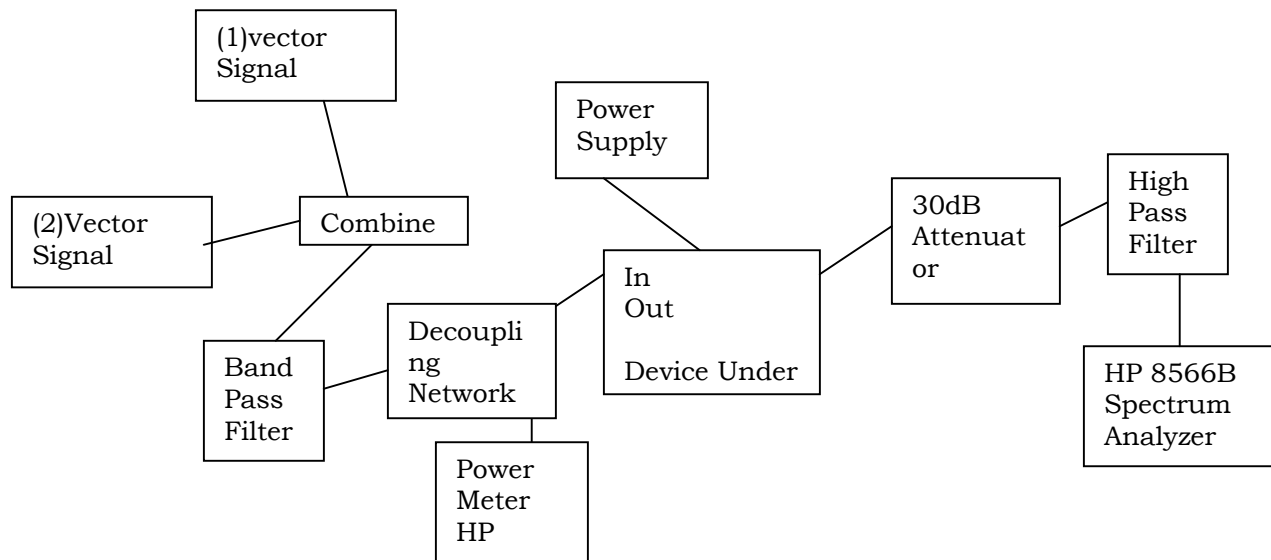
Rule Parts No.: Pt 2.1051

Requirements: Emissions must be $43 + 10 \log (P_o)$ dB below the mean power output of the transmitter or below the -13dBm

Method of Measurement: The procedure used was TIA/EIA-603 STANDARD. The spectrum was scanned from 9kHz to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer.

All the modulation type (CDMA, GSM, EDGE, and FM) were tested using the two tone test method. A CW signal was use instead of GSM, EDGE, and F1D modulations. EDGE and GSM provided the same test results and only GSM data are presented in this report. The input power to the amplifier was set at maximum drive level by combining the two tones. The two tones were chosen in such a way (1)the third order intermodulation product frequencies are located within the pass band of the EUT and (2) they produce the worst-case emissions out of band.

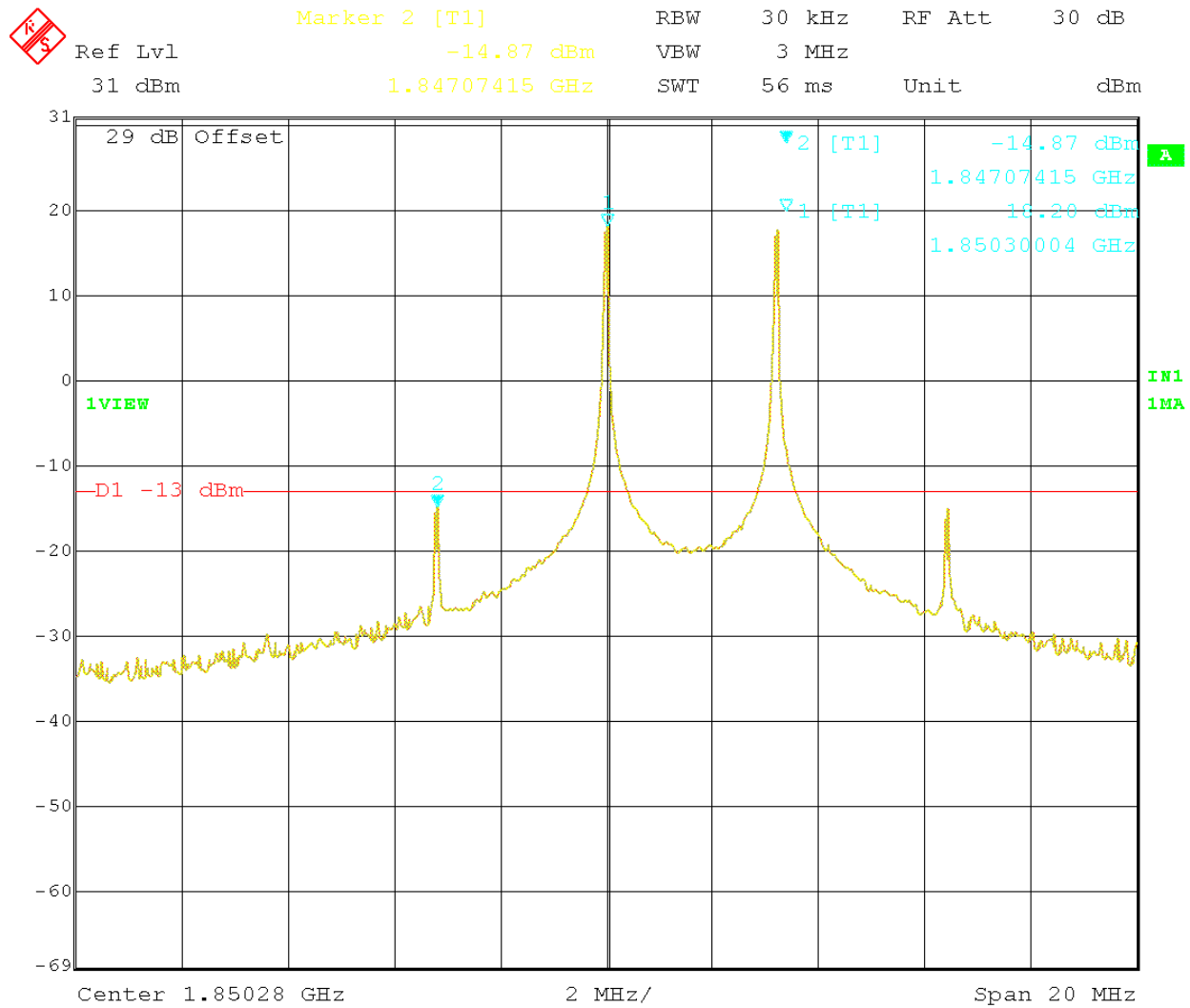
Setup Diagram



The following specific test equipments were used:

Manufacturer	Description	M/N	Cal Date	Cal Due Date
Agilent	Dual-mode baseband generator (arbitrary waveform and real time I/Q) 250 kHz to 6 GHz	E4438C	01/31/06	01/31/08

Tuned frequency (MHz)	Emission out of band frequency (MHz)	Emission level (dBm)	Limit (dBm)
1850.28	1847.07	-14.87	-13
1909.72	1912.23	-17.16	-13
1930.28	1929.38	-17.41	-13
1989.72	1990.99	-17.38	-13

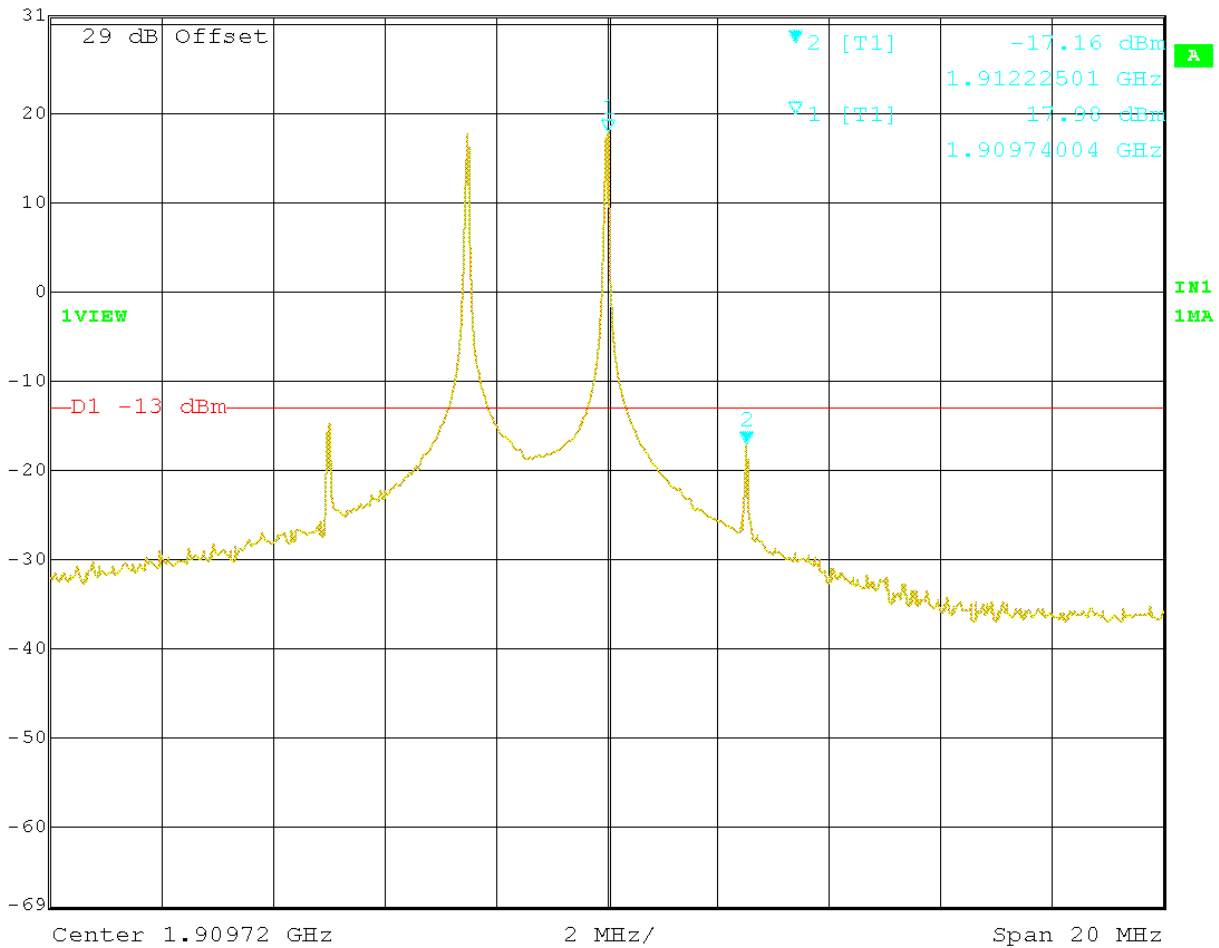


Date: 8.NOV.2006 09:49:30

Figure 5: Intermodulation 2 tones spurious emissions
Up link (1850 MHz)

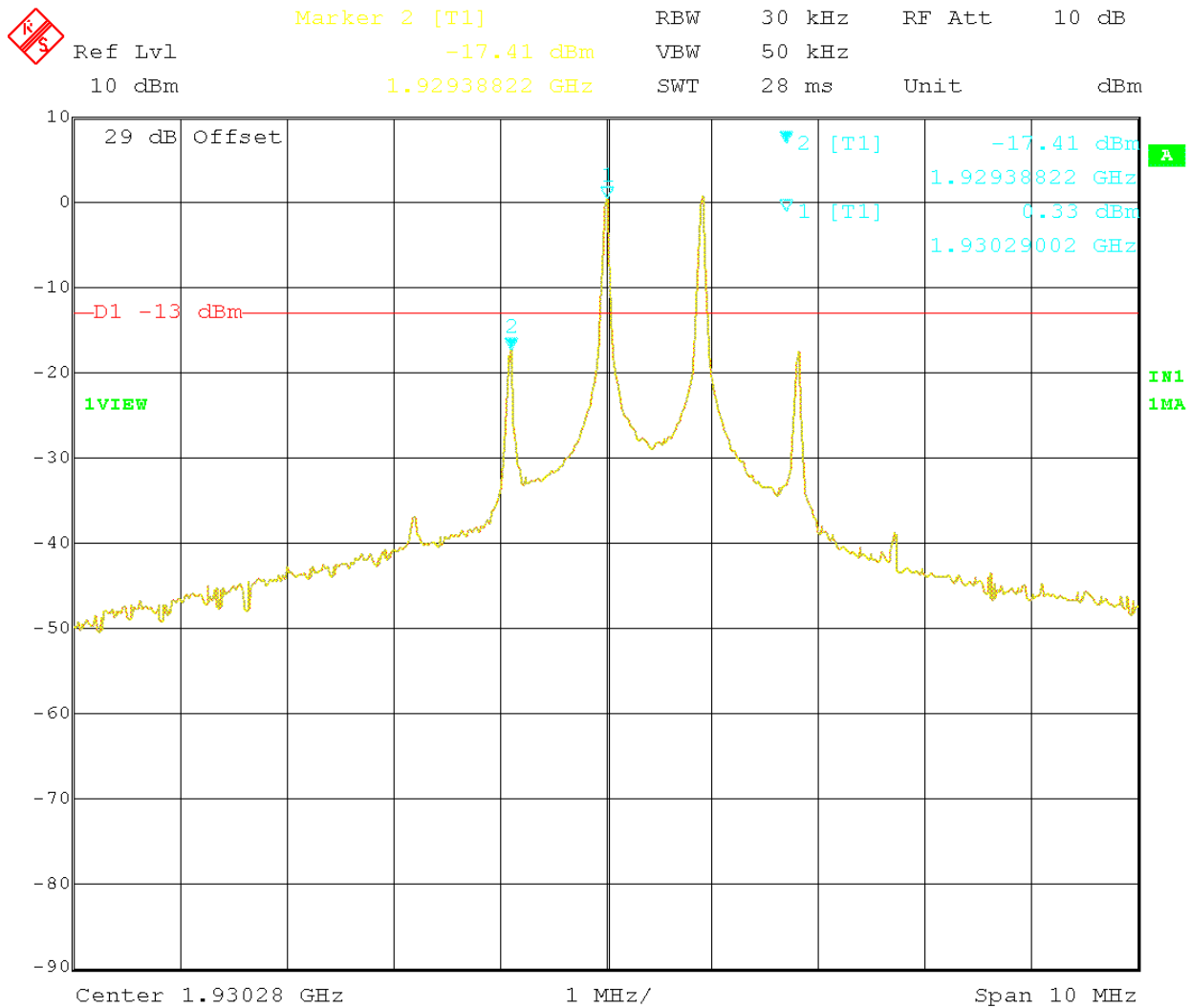


Ref Lvl 31 dBm
 Marker 2 [T1] -17.16 dBm
 1.91222501 GHz
 RBW 30 kHz
 RF Att 30 dB
 VBW 3 MHz
 SWT 56 ms
 Unit dBm



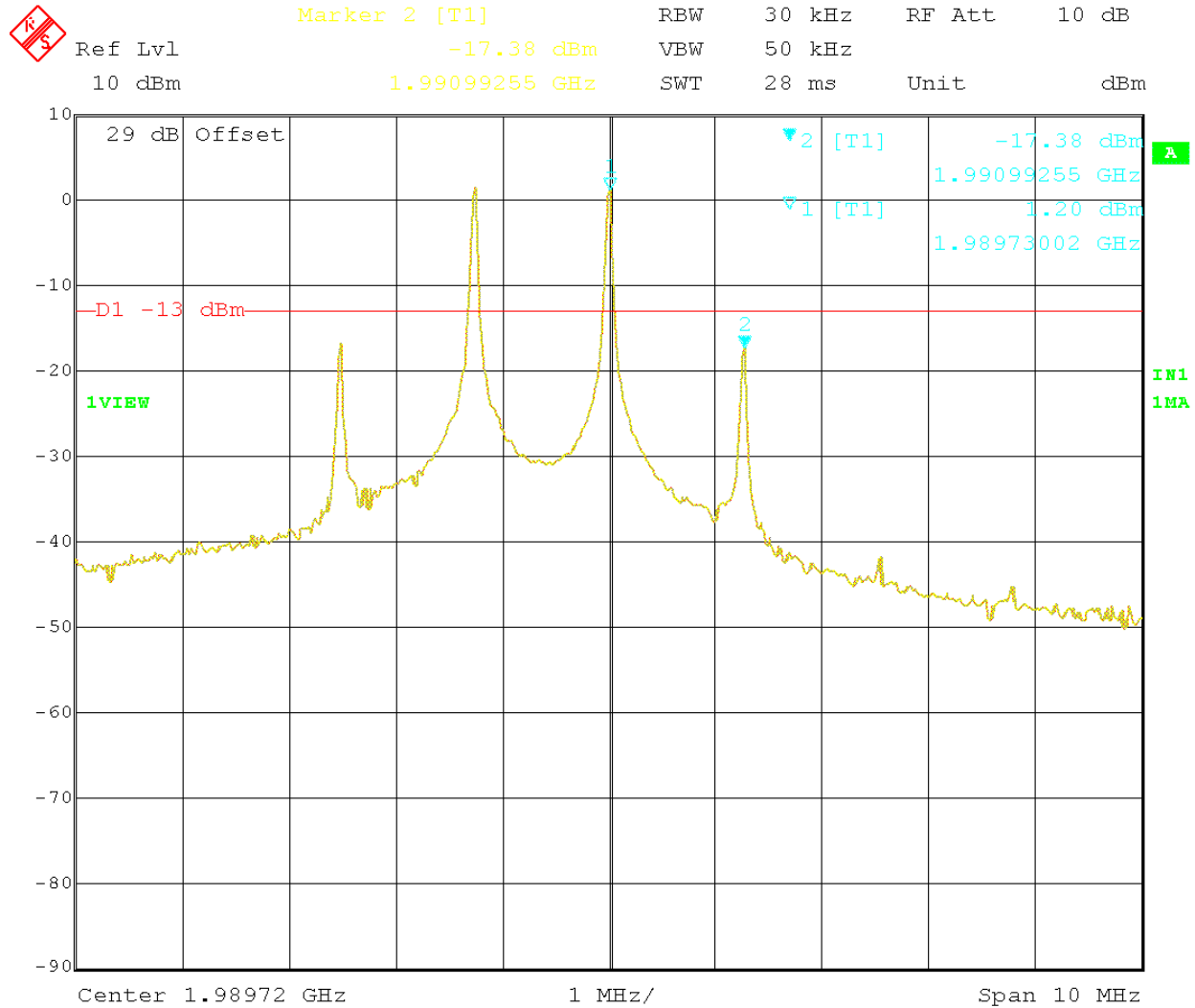
Date: 8.NOV.2006 10:04:35

Figure 6: Intermodulation 2 tones spurious emissions
Up link (1910 MHz)



Date: 9.NOV.2006 10:53:51

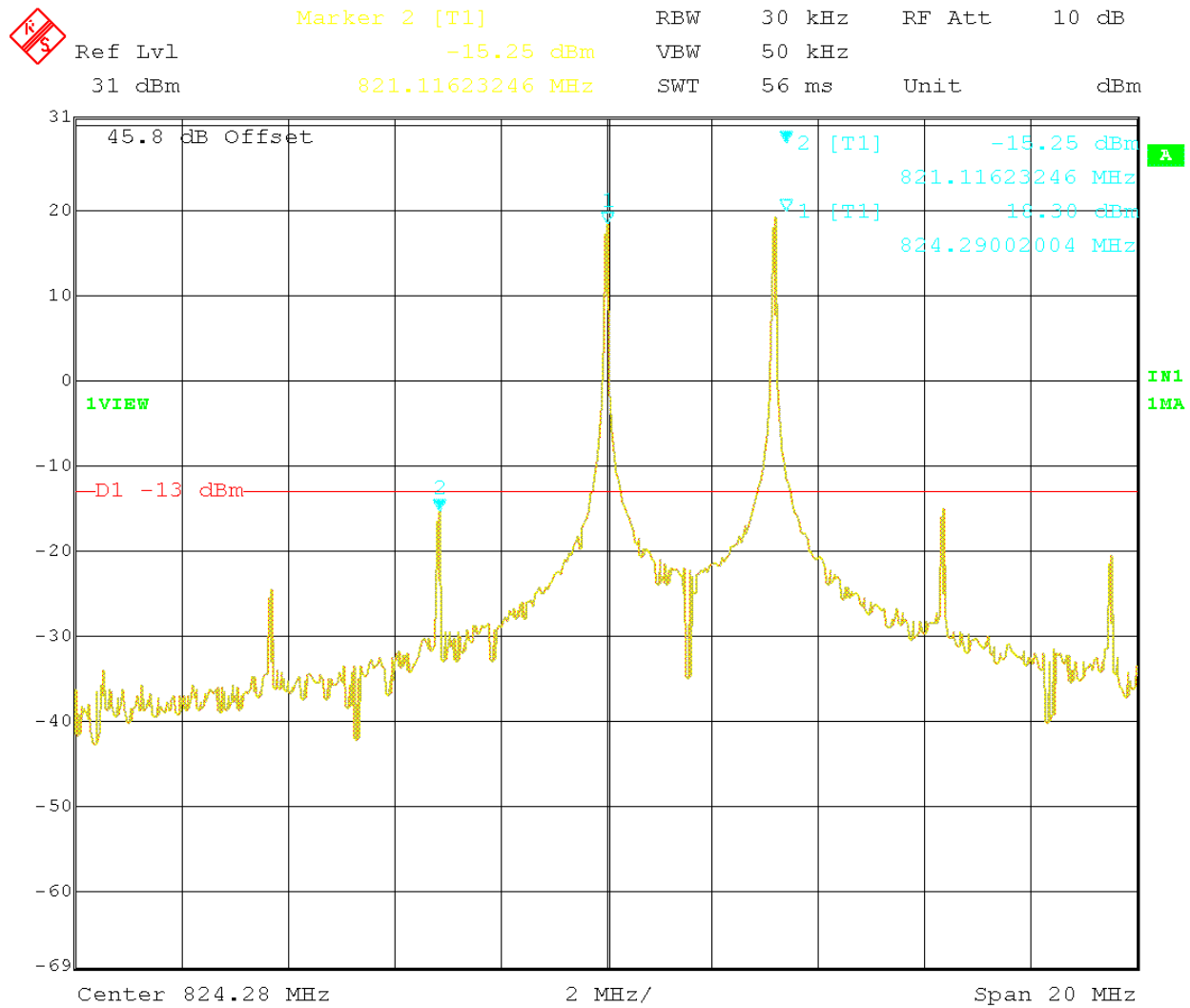
Figure 7: Intermodulation 2 tones spurious emissions
Down link (1930 MHz)



Date: 9.NOV.2006 10:58:39

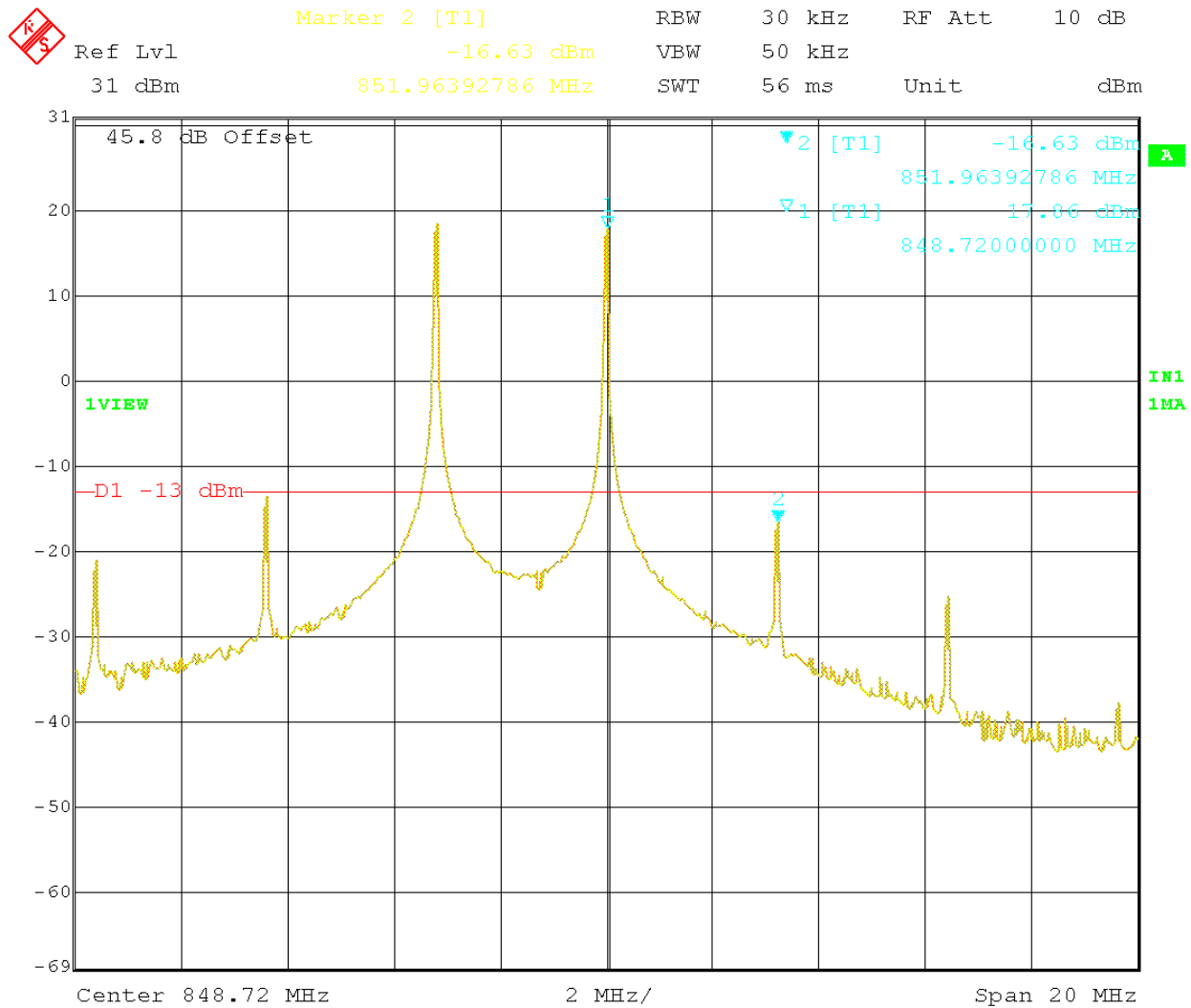
Figure 8: Intermodulation 2 tones spurious emissions
Down link (1990 MHz)

Tuned Frequency (MHz)	Emission out of band frequency (MHz)	Emission level (dBm)	Limit (dBm)
824.28	821.12	-15.25	-13
848.72	851.96	-16.63	-13
869.28	866.37	-18.88	-13
893.72	896.42	-18.82	-13



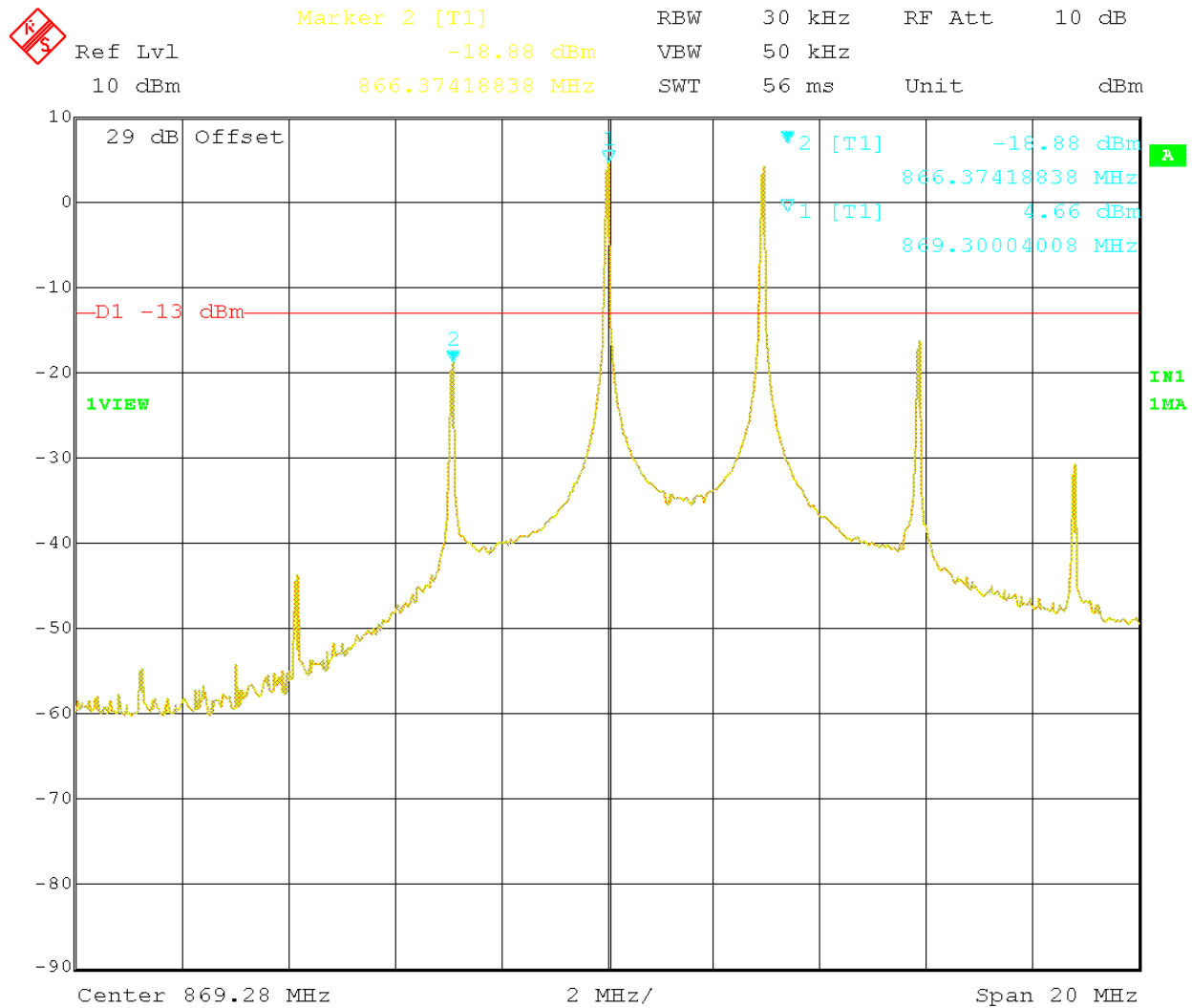
Date: 2.NOV.2006 11:23:05

Figure 9: Intermodulation 2 tones spurious emissions
Up link (824 MHz)



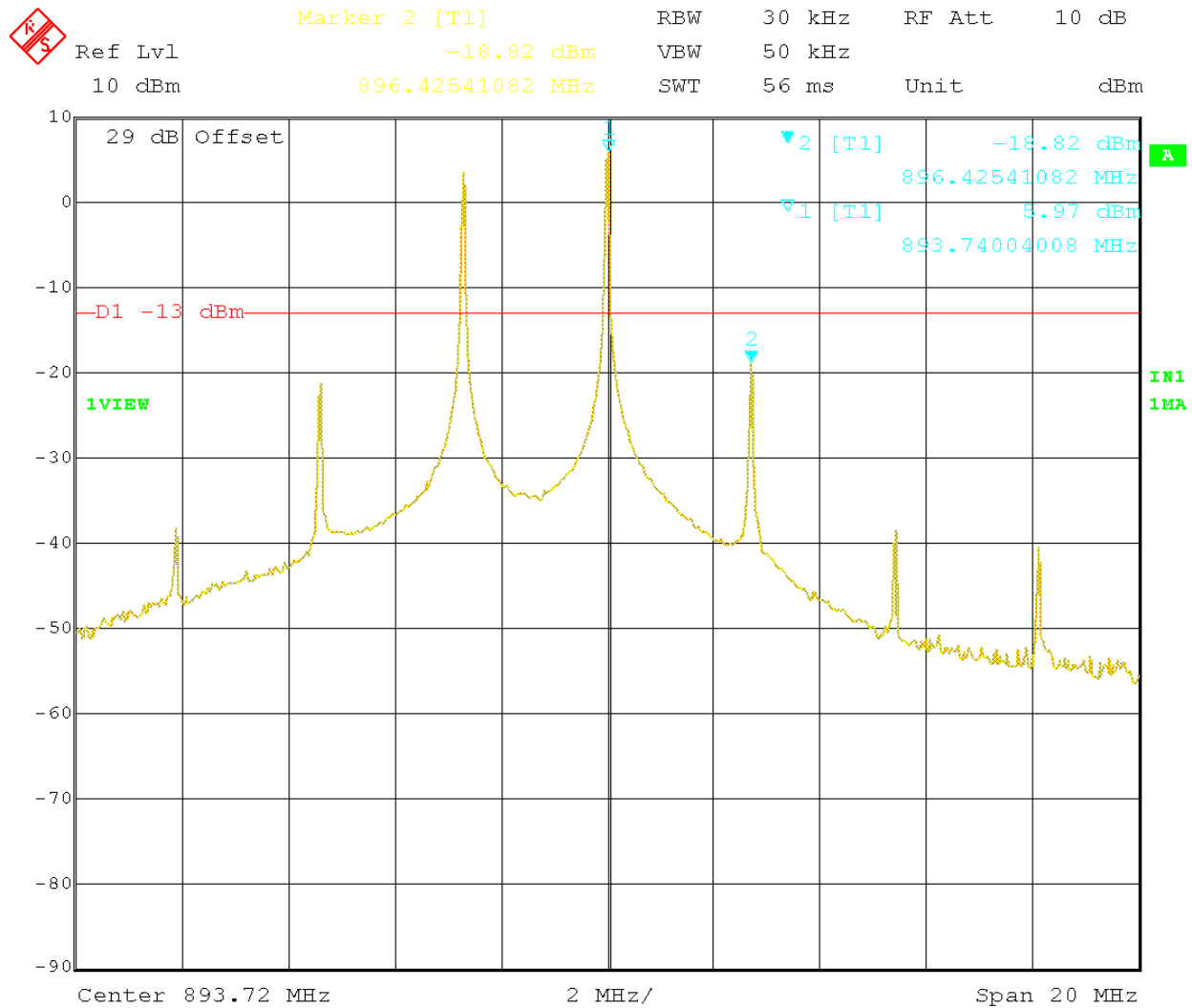
Date: 2.NOV.2006 11:32:56

Figure 10: Intermodulation 2 tones spurious emissions
Up link (849 MHz)



Date: 8.NOV.2006 11:28:03

Figure 11: Intermodulation 2 tones spurious emissions
Down link (869 MHz)



Date: 8.NOV.2006 10:52:03

Figure 12: Intermodulation 2 tones spurious emissions
Down link (894 MHz)

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Rule Parts No.: Pt 2.1051

Requirements: Emissions must be $43 + 10\log(P_o)$ dB below the mean power output of the transmitter:

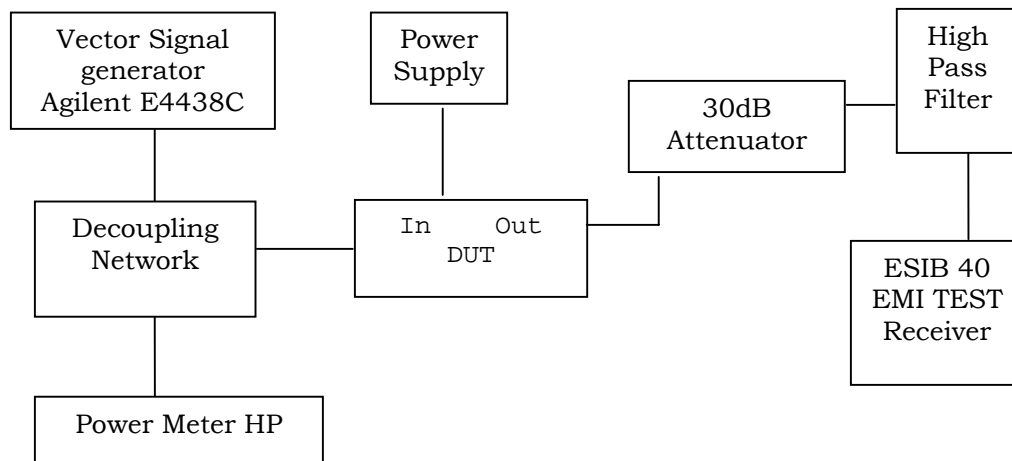
Up link: $43 + 10\log(1.00) = 43$ dBc

Down link: $43 + 10\log(0.02) = 26$ dBc

Method of Measurement: The procedure used was TIA/EIA-603 STANDARD. The spectrum was scanned from 9kHz to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer.

Data on the following page shows the level of conducted spurious responses. For analog modulation, the carrier was modulated 100% using a 2500 Hz tone. For digital modulation, the carrier is modulated to its maximum extent. The spectrum was scanned from 9kHz to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard TIA/EIA-603. All the modulation types (CDMA, GSM, EDGE, and FM) were tested at a low, mid, and high channel in each band. CW (FM) was used in place of GSM and EDGE modulations. The maximum input power was set for each test.

Conducted Spurious Emissions Test Setup Diagram



The following test equipment was used:

Manufacturer	Description	Model Number	Cal Date	Cal Due Date
Agilent	Dual-mode baseband generator (arbitrary waveform and real time I/Q) 250 kHz to 6 GHz	E4438C	01/31/06	01/31/08

Test Data:

1900 MHz Up Link:

Emission Frequency MHz	dB below Carrier (dBc)
1850.28	0
3700.56	86
5550.84	83.6
7401.12	83.4
9251.40	84.8
11101.68	84.8
12951.96	>62.0
14802.24	>62.0
16652.52	>62.0
18502.80	>62.0

Emission Frequency MHz	dB below Carrier (dBc)
1880.00	0
3760.00	92.2
5640.00	87.7
7520.00	90.2
9400.00	91.2
11280.00	89.6
13160.00	>62.0
15040.00	>62.0
16920.00	>62.0
18800.00	>62.0

Emission Frequency MHz	dB below Carrier (dBc)
1909.72	0
3819.44	88.5
5729.16	86.4
7638.88	87.5
9548.60	87.2
11458.32	87.3
13368.04	>62.0
15277.76	>62.0
17187.48	>62.0
19097.20	>62.0

1900 MHz Down Link:

Emission Frequency MHz	dB Below Carrier (dBc)
1930.28	0
3860.56	41.5
5790.84	60
7721.12	70.6
9651.40	70.2
11581.68	69.6
13511.96	>60.0
15442.24	>60.0
17372.52	>60.0
19302.80	>60.0

Emission Frequency MHz	dB Below Carrier (dBc)
1960.00	0
3920.00	46.1
5880.00	64.8
7840.00	72.6
9800.00	73.9
11760.00	70.9
13720.00	>60.0
15680.00	>60.0
17640.00	>60.0
19600.00	>60.0

Emission Frequency MHz	dB Below Carrier (dBc)
1989.72	0
3979.44	50.9
5969.16	68.2
7958.88	71.2
9948.60	71.5
11938.32	71.4
13928.04	>60.0
15917.76	>60.0
17907.48	>60.0
19897.20	>60.0

[Continued]

800 MHz Up Link:

Emission Frequency MHz	dB Below Carrier (dBc)
824.03	0
1648.06	63.7
2472.09	92.2
3296.12	87.9
4120.15	94.5
4944.18	94.3
5768.21	89.4
6592.24	>58.0
7416.27	>58.0
8240.30	>58.0

Emission Frequency MHz	dB Below Carrier (dBc)
836.50	0
1673.00	80.8
2509.50	92.1
3346.00	92.5
4182.50	93
5019.00	92.1
5855.50	89.6
6692.00	>58.0
7528.50	>58.0
8365.00	>58.0

Emission Frequency MHz	dB Below Carrier (dBc)
848.97	0
1697.94	70.3
2546.91	89.4
3395.88	89.1
4244.85	89.3
5093.82	88
5942.79	86.4
6791.76	>58.0
7640.73	>58.0
8489.70	>58.0

800 MHz Down Link:

Emission Frequency MHz	dB Below Carrier (dBc)
869.03	0
1738.06	52
2607.09	40.7
3476.12	65.1
4345.15	73.8
5214.18	72.7
6083.21	72.9
6952.24	72.6
7821.27	72
8690.30	72.8

Emission Frequency MHz	dB Below Carrier (dBc)
881.50	0
1763.00	55.6
2644.50	29.1
3526.00	68.4
4407.50	61.8
5289.00	68.8
6170.50	72.5
7052.00	68.4
7933.50	71.8
8815.00	76.2

Emission Frequency MHz	dB Below Carrier (dBc)
893.97	0
1787.94	56.7
2681.91	37.5
3575.88	67
4469.85	59.8
5363.82	73.6
6257.79	72
7151.76	73.6
8045.73	71.9
8939.70	73.5

FIELD STRENGTH OF SPURIOUS EMISSIONS

Rule Parts No.: Pt 2.1053

Requirements: Emissions must be $43 + 10\log(P_o)$ dB below the mean power output of the amplifier:

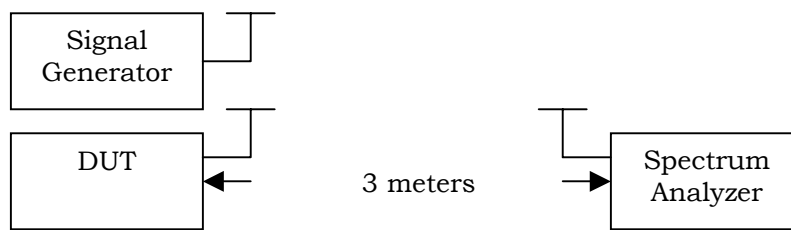
Up link: $43 + 10\log(1.12) = 43.5$ dB

Down link: $43 + 10\log(0.02) = 26.0$ dB

CW signal was used for this test.

METHOD OF MEASUREMENTS: The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental. The CW signal was used to perform this test. This test was conducted per TIA/EIA STANDARD 603 using the substitution method.

Radiated Spurious Emissions Test Setup Diagram



Equipment placed 80 cm above ground on a rotating table platform.

Test Data: The following tabulated data shows the result of the radiated field strength emissions test. The worst-case spurious emissions data are reported.

Up link:

Emission Frequency MHz	Ant. Polarity V/H	Corrected EUT Signal Reading	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
1880.00					0
3760.00	H	-48.60	1.43	7.55	72.98
5640.00	V	-54.70	1.75	8.55	78.4
7520.00	V	-58.80	2.06	8.69	82.67
9400.00	V	-53.60	2.38	9.53	76.95
11280.00	V	-55.10	2.70	8.35	79.94
13160.00	V	-44.40	3.01	9.94	67.97
15040.00	H	-43.90	3.33	10.94	66.79
16920.00	V/H	*	*	*	*
18800.00	V/H	*	*	*	*

*No other emissions were found up to the 10th harmonics - NOISE FLOOR
Down link:

Emission Frequency MHz	Ant. Polarity V/H	Corrected EUT Signal Reading	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
1960.00					0
3920.00	H	-41.70	1.46	7.55	45.61
5880.00	V	-51.90	1.79	8.88	54.81
7840.00	H	-53.80	2.12	7.80	58.12
9800.00	H	-45.40	2.45	9.33	48.52
11760.00	V	-47.40	2.78	8.33	51.85
13720.00	H	-43.50	3.11	9.51	47.10
15680.00	V/H	*	*	*	*
17640.00	V/H	*	*	*	*
19600.00	V/H	*	*	*	*

*No other emissions were found up to the 10th harmonics - NOISE FLOOR

Up link:

Emission Frequency MHz	Ant. Polarity V/H	Corrected EUT Signal Reading	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
836.50					0
1673.00	H	-60.90	1.08	5.05	87.82
2509.50	H	-53.70	1.22	6.86	78.96
3346.00	V	-59.40	1.36	7.46	84.20
4182.50	V	-57.90	1.50	7.84	82.46
5019.00	H	-55.90	1.64	7.77	80.67
5855.50	H	-52.20	1.78	8.85	76.03
6692.00	H	-55.30	1.92	8.21	79.91
7528.50	0	*	*	*	*
8365.00	0	*	*	*	*

*No other emissions were found up to the 10th harmonics - NOISE FLOOR

Down link:

Emission Frequency MHz	Ant. Polarity V/H	Corrected EUT Signal Reading	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
881.50					0
1763.00	H	-53.60	1.09	5.11	60.56
2644.50	V	-59.90	1.24	6.97	65.15
3526.00	V	-59.40	1.39	7.55	64.21
4407.50	V	-55.60	1.54	8.20	59.91
5289.00	H	-53.70	1.69	8.10	58.26
6170.50	V	-57.50	1.84	8.95	61.36
7052.00	0	*	*	*	*
7933.50	0	*	*	*	*
8815.00	0	*	*	*	*

*No other emissions were found up to the 10th harmonics - NOISE FLOOR