



**TEST REPORT OF A W-CDMA SUBSCRIBER
TERMINAL, MODEL CPE-400-2C0, BRAND SOMA
NETWORKS, IN ACCORDANCE WITH
47 CFR PART 27 (2006-10-01).**

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Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE-400-2C0
FCC ID: AEZCPE-400-2C0

MEASUREMENT/TECHNICAL REPORT

Sanyo Electric Co., Ltd.

Model : CPE-400-2C0

FCC ID: AEZCPE-400-2C0

May 24, 2007

This report concerns:	Original grant/certification	Class 2 change	Verification
Equipment type:	Licensed non-broadcast station transmitter		
Deferred grant requested per 47 CFR 0.457(d)(1)(ii) ?	Yes	No	
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The data taken for this test and report herein was done in accordance with 47 CFR Part 27 (Miscellaneous Wireless Communications Services) and the measurement procedures of ANSI C63.4: 2003. Sanyo Electric Co., Ltd. Testing Laboratory at Kobe-city, Japan, certifies that the data is accurate and contains a true representation of the emission profile of the Equipment Under Test (EUT) on the date of the test as noted in the test report. I have reviewed the test report and find it to be an accurate description of the test(s) performed and the EUT so tested.

Date: May 24, 2007

Signature:

H. Wada
Sanyo Electric Co., Ltd. Testing Laboratory



Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE-400-2C0
FCC ID: AEZCPE-400-2C0

Description of test item

Test item : W-CDMA subscriber terminal
Manufacturer : Sanyo Electric Co., Ltd.
Brand : SOMA Networks
Model : CPE-400-2C0
Serial numbers : 1307200041
Revision : -
Receipt number : 1
Receipt date : May 17, 2007

Applicant information

Applicant's representative : Mr. O. Shimizu
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Test(s) performed

Location : Kobe-city
Test(s) started : May 17, 2007
Test(s) completed : May 21, 2007
Purpose of test(s) : Type approval / certification
Test specification(s) : 47 CFR Part 27 (2006-10-01)

Test engineer(s) : K. Yamamoto *K. Yamamoto*



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Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE-400-2C0
FCC ID: AEZCPE-400-2C0

1 General information

1.1 Product description

The W-CDMA subscriber terminal, brand SOMA Networks, model CPE-400-2C0, is designed to operate in the frequency band of 701 - 713 MHz, where the definitions of the various frequency blocks in this frequency range are listed en defined in 47 CFR Part 27, section 27.5 (c).

The W-CDMA subscriber terminal, brand SOMA Networks, model CPE-400-2C0, utilizes W-CDMA technology and does not contain any analog voice circuitry.

The W-CDMA subscriber terminal, brand SOMA Networks, model CPE-400-2C0, incorporates an integral antenna, having a gain of -1.78 dBd max.

1.2 Related submittal(s) and/or Grant(s)

Not applicable.

1.3 Tested system details

Details and an overview of the system and all its components, as it has been tested, can be found in table 1 below. FCC ID's are stated in this overview where applicable. The EUT is listed in the first row of this table 1.

Description	Model number	Serial number	FCC ID	Cable descriptions
W-CDMA subscriber terminal	CPE-400-2C0	1307200041	AEZCPE-400-2C0	-Shielded USB cable to notebook computer -Unshielded ethernet cable to notebook computer -Unshielded cable to telephone 1 -Unshielded cable to telephone 2
AC/DC power adapter 100-240 VAC/1 Amps to +12 VDC/2.5 Amps	0322B1230	A30631041121	n.a.	-Unshielded DC power cord to EUT -Unshielded power cord to AC mains
Telephone	RadioShack	40332314	n.a.	-Unshielded cable to EUT
Telephone	P88-0071-0	87218758	n.a.	-Unshielded cable to EUT
Notebook computer	PSA10N-28RU1	Z3050606J	n.a. (DoC)	-Unshielded ethernet cable and Shielded USB cable to EUT

Table 1 - Tested system details overview.



Description of EUT: W-CDMA subscriber terminal
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1.4 Test methodology

The test methodology used is based on the requirements of 47 CFR Part 27 (2006-10-01), sections 27.50 (c)(3), 27.53 (f), and 27.54.

The test methods, which have been used, are based on ANSI C63.4: 2003.

Radiated emission tests above 30 MHz were performed at a measurement distance of 3 meters. Below 30 MHz the radiated emission tests were carried out at measurement distances of 3 and 10 meters. The test results regarding the radiated emission tests on frequencies below 30 MHz have been extrapolated in order to determine the field strength of the measured values at measurement distances of 30 and 300 meters.

The bandwidth of the receiver is switching automatically to the right bandwidth in accordance with CISPR 16. This is implemented in the receiver. The antenna factors are programmed in the test receiver. The receiver automatically calculates the appropriate correction factor for the utilized antenna and also the appropriate antenna factor for the cable loss. The total correction is automatically added to the measured value.

Radiated emission tests on frequencies above 1 GHz were performed with appropriate pre-amplifiers, antennas and a spectrum analyzer. At frequencies on which radiated emissions were found the level at the input of the pre-amplifier was reproduced by means of a RF signal generator. The output level of the signal generator was then increased with the antenna factor in order to obtain the actual field strength value for each individual frequency on which radiated emissions were found.

1.5 Test facility

The Federal Communications Commission has reviewed the technical characteristics of the test facilities at Sanyo Electric Co., Ltd. Testing Laboratory, located at 7-3-2 Higashimachi, Ibukidai, Nishi-ku, Kobe-city, Hyogo Prefecture, 651-2242 , Japan.

The description of the test facilities has been filed at the Office of the Federal Communications Commission. The facility has been added to the list of laboratories performing these test services for the public (47 CFR Part 2, section 2.948). Registration number of Federal Communications Commission is "352542".

The list of all public test facilities is available on the Internet at <http://www.fcc.gov>.

1.6 Product labeling

In accordance with 47 CFR Part 2.925 (a)(1), the FCC ID shall be placed on a label, which is attached to the EUT. For further details about the labeling requirements (size, legibility, etc.) as set by the Federal Communications Commission see 47 CFR Part 2.925 and 47 CFR Part 2.926.



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1.7 System test configuration

1.7.1 Justification

The system was configured for testing in a typical fashion (as an end-user would normally use it).

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.4: 2003.

Tests were performed with the EUT operating at the lowest operating frequency (channel 1: 701 MHz), the middle operating frequency (channel 2: 707 MHz) and the highest operating frequency (channel 3: 713 MHz).

Further details may be found in table 2 below.

Channel	Transmitter frequency (MHz)	Maximum rated output power (dBm,ERP)
1	701	+25.1
2	707	+25.0
3	713	+25.0

Table 2 - Specification of channels and rated maximum output power (dBm, ERP).

1.7.2 EUT exercise software

The EUT could be enabled for operation on channel 1 (701 MHz), channel 2 (707 MHz), and channel 3 (713 MHz) by means of test software, which was supplied by the manufacturer of the EUT. The test software could also be used to switch of the modulation of the carrier for those tests where this was necessary.

1.8 Special accessories

No special accessories are used and/or needed to achieve compliance with the appropriate sections of 47 CFR Part 27 (Miscellaneous Wireless Communications Services).

1.9 Equipment modifications

No modifications have been made to the equipment in order to achieve compliance with the appropriate sections of 47 CFR Part 27 (Miscellaneous Wireless Communications Services).

1.10 Configuration of the tested system

Not applicable. See table 1 in section 1.3 of this test report.

1.11 Block diagram(s) of the EUT

The block diagram is available as part of the documentation which is to be submitted to the FCC/TCB.



2 Transmitter tests

2.1 RF output power (conducted)

RF output power measurements (conducted) have been carried out in accordance with 47 CFR Part 27.50 (c)(3) and 47 CFR Part 2.1046.

The maximum RF output power (conducted) was measured directly at the antenna connector in order to obtain reliable measurement results for a worst case MPE estimation.

The tests were performed with the EUT operating at the lowest operating frequency (channel 1: 701 MHz), the middle operating frequency (channel 2: 707 MHz) and the highest operating frequency (channel 3: 713 MHz). The measurements have been performed while using a power meter which was calibrated in terms of a RMS-equivalent voltage. The power meter was used in order to enable a measurement over the full bandwidth of the channel.

Power measurement (conducted method):

The following procedure was used for the measurements.

- 1) Set the EUT to maximum power and to the lowest channel.
- 2) A power meter was used to measure the power output.
- 3) Correct for any external attenuation used for the protection of the input of the sensor head. Also set the power sensor correction by setting up the frequency range that will be measured. Correct for any measurement cable loss.
- 4) Repeat this for all other channels which are to be tested.

2.1.1 Test results

The results of the tests on the EUT, carried out in accordance with 47 CFR Part 27.50 (c)(3) and 47 CFR Part 2.1046, are depicted in table 3.

Test conditions		RF output power (conducted, dBm)		
		channel 1	channel 2	channel 3
$T_{nom} = +20\text{ }^{\circ}\text{C}$	$V_{nom} = 120\text{ VAC}$	26.9	26.8	26.8
Antenna gain (peak, dBd)		-1.78	-1.78	-1.78
Output power (calculated, dBm, ERP)		25.12	25.02	25.02

Table 3 - Maximum RF output power (conducted)



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2.2 RF output power (ERP)

RF output power measurements (ERP) have been carried out in accordance with 47 CFR Part 27.50 (c)(3) and 47 CFR Part 2.1046.

The maximum radiated RF output power was measured by using the substitution measurement method.

The tests were performed with the EUT operating at the lowest operating frequency (channel 1: 701 MHz), the middle operating frequency (channel 2: 707 MHz) and the highest operating frequency (channel 3: 713 MHz).

Power measurement (radiated method):

The following procedure was used for transmitters that do not use external antennas.

- 1) Set the EUT to maximum power and to the lowest channel.
- 2) A spectrum analyzer was used to measure the power output. The search antenna was located 3 meters from the EUT.
- 3) The spectrum analyzer resolution and video bandwidth was set to 100 kHz to measure the power output. No amplifier was used since the fundamental will cause the amplifier to saturate.
- 4) The EUT was then rotated for a complete 360 degrees and the search antenna was raised and lowered to maximize the fundamental. Both vertical and horizontal polarizations were performed. All correction factors are applied to the fundamental.
- 5) Substitution is then performed. Substitution method is performed by replacing the EUT with a Logperi antenna, which factors can be reference to a half-wave dipole, and with a signal generator. The signal generator power level is adjusted until a similar level, which was measured, in step 4, is achieved on the spectrum analyzer. The level on the signal generator is then added to the antenna factor, in dBd, which will give the corrected value.
- 6) Steps 1 to 5 are repeated for all other channels which are to be tested.

2.2.1 Test results

The results of tests on the EUT, carried out in accordance with 47 CFR Part 27.50 (c)(3) and 47 CFR Part 2.1046, are depicted in table 4 and table 5.

Test conditions	RF output power (ERP, dBm)		
	channel 1	channel 2	channel 3
Observed level on spectrum analyzer (dBm)	-9.67	-10.41	-9.72
Correction factor (dB)	34.11	34.26	33.50
Radiated RF output power (ERP, dBm)	24.44	23.85	23.78

Table 4 - Maximum RF output power (ERP) with the antenna in a vertical position



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Test conditions	RF output power (ERP, dBm)		
	channel 1	channel 2	channel 3
Observed level on spectrum analyzer (dBm)	-15.67	-16.73	-14.56
Correction factor (dB)	29.71	30.16	30.50
Radiated RF output power (ERP, dBm)	14.04	13.43	15.94

Table 5 - Maximum RF output power (ERP) with the antenna in a horizontal position



2.3 Occupied bandwidth

Occupied bandwidth measurements have been carried out in accordance with 47 CFR Part 2.1049.

Both the occupied bandwidth at -26 dB below maximum RF output power and the 99% occupied bandwidth tests were carried out. The tests were performed with the EUT operating at the lowest operating frequency (channel 1: 701 MHz), the middle operating frequency (channel 2: 707 MHz) and the highest operating frequency (channel 3: 713 MHz).

Occupied bandwidth (conducted method):

Either for analog, digital, or data modulations, occupied bandwidth was performed. The EUT was set to transmit the appropriate modulation at maximum power. The bandwidth was measured using following methods:

- 1) 26 dB was subtracted to the maximum peak of the emission. Then the display line function was used to, in conjunction with the marker delta function, to measure the emissions bandwidth.
- 2) The built-in 99% function of the spectrum analyzer was used.
- 3) For the above two methods a resolution and video bandwidth of 50 kHz (which is 1% of the maximum allowable emission bandwidth of 5 MHz, see also 47 CFR Part 27, section 27.53 (f) was used to measure the emission's bandwidth. An offset in reading in dB was set which is identical to the maximum antenna peak gain in dBd + measurement cable loss in dB.

Plots of the measurements have been made available on the next pages of this test report.

2.3.1 Test results

The results of tests on the EUT, carried out in accordance with 47 CFR Part 2.1049, are depicted in table 6 and table 7.

Test conditions		Occupied bandwidth (MHz @ -26 dB)		
		channel 1	channel 2	channel 3
$T_{nom} = +20\text{ }^{\circ}\text{C}$	$V_{nom} = 120\text{ VAC}$	4.65	4.66	4.65

Table 6 - Occupied bandwidth (-26 dB below maximum RF output power)

Test conditions		Occupied bandwidth (MHz @ 99%)		
		channel 1	channel 2	channel 3
$T_{nom} = +20\text{ }^{\circ}\text{C}$	$V_{nom} = 120\text{ VAC}$	4.13	4.15	4.13

Table 7 - Occupied bandwidth (99%)

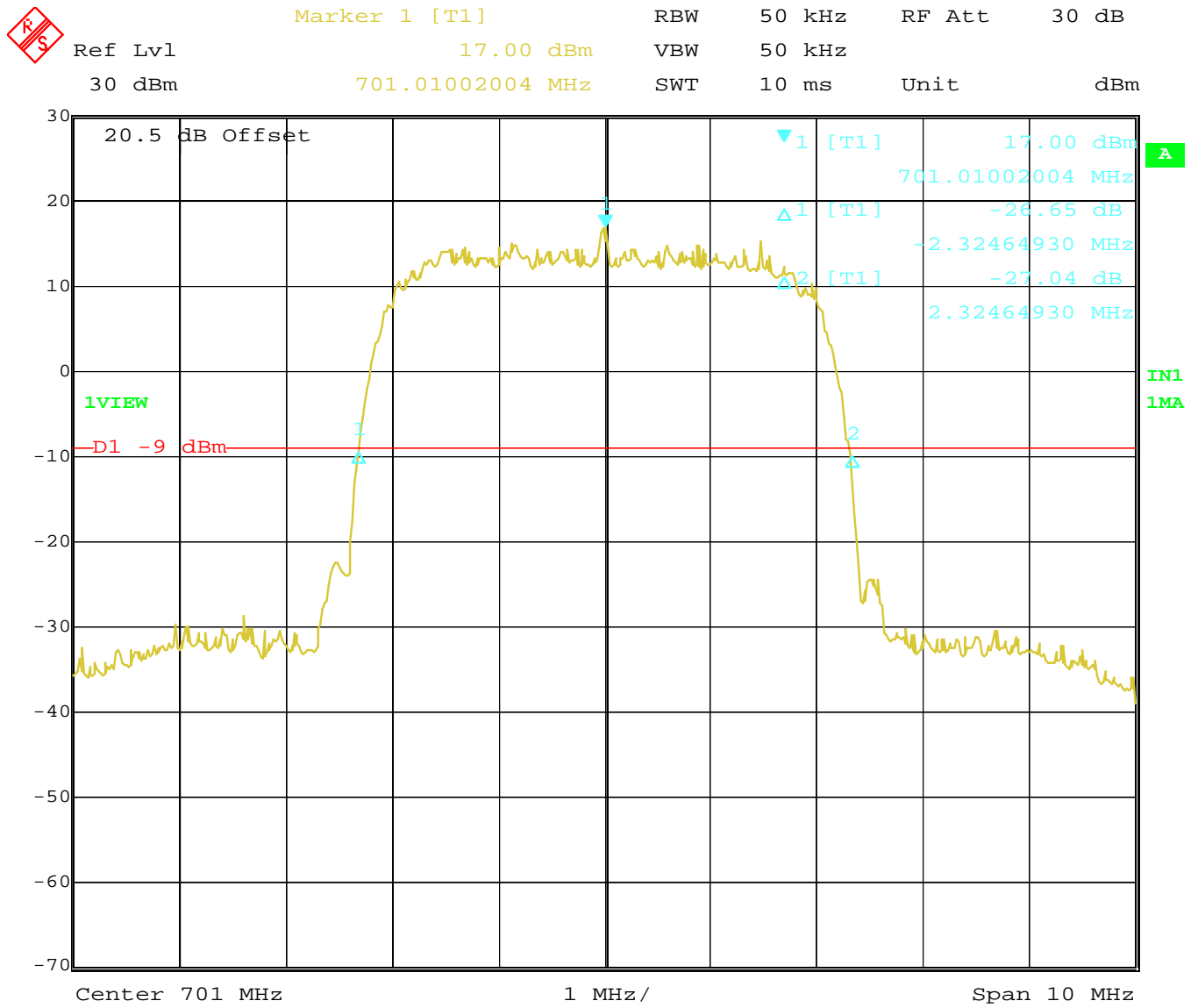
2.3.2 Limit

The maximum allowable occupied bandwidth is 5 MHz.



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2.3.3 Plots of test results (occupied bandwidth)



Date: 21.MAY.2007 14:41:26

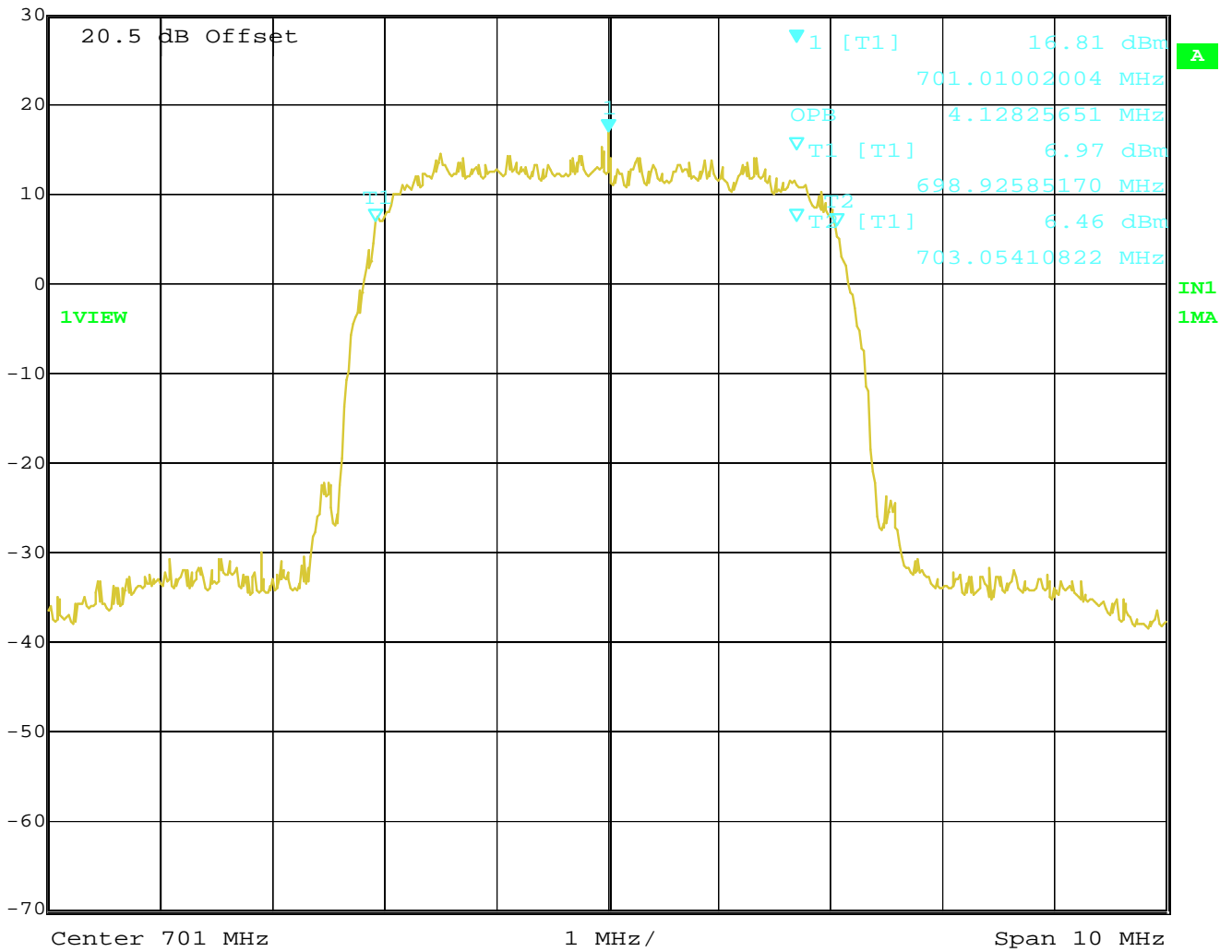
Plot 1 - Occupied bandwidth (-26 dB, channel 1, 701 MHz)



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Marker 1 [T1] RBW 50 kHz RF Att 30 dB
Ref Lvl 16.81 dBm VBW 50 kHz
30 dBm 701.01002004 MHz SWT 10 ms Unit dBm



Date: 21.MAY.2007 15:13:45

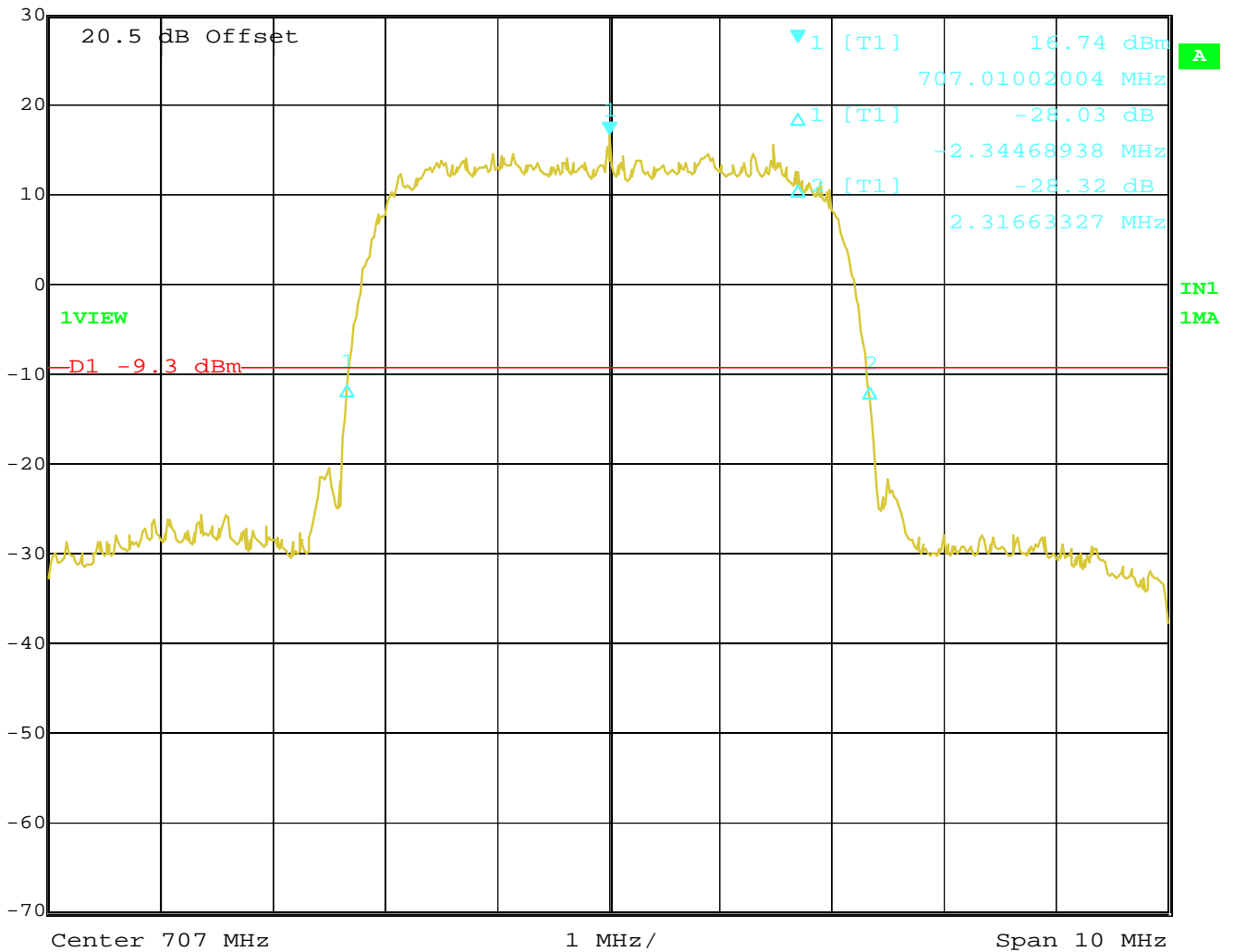
Plot 2 - Occupied bandwidth (99%, channel 1, 701 MHz)



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Marker 1 [T1] RBW 50 kHz RF Att 30 dB
Ref Lvl 16.74 dBm VBW 50 kHz
30 dBm 707.01002004 MHz SWT 10 ms Unit dBm



Date: 21.MAY.2007 14:55:50

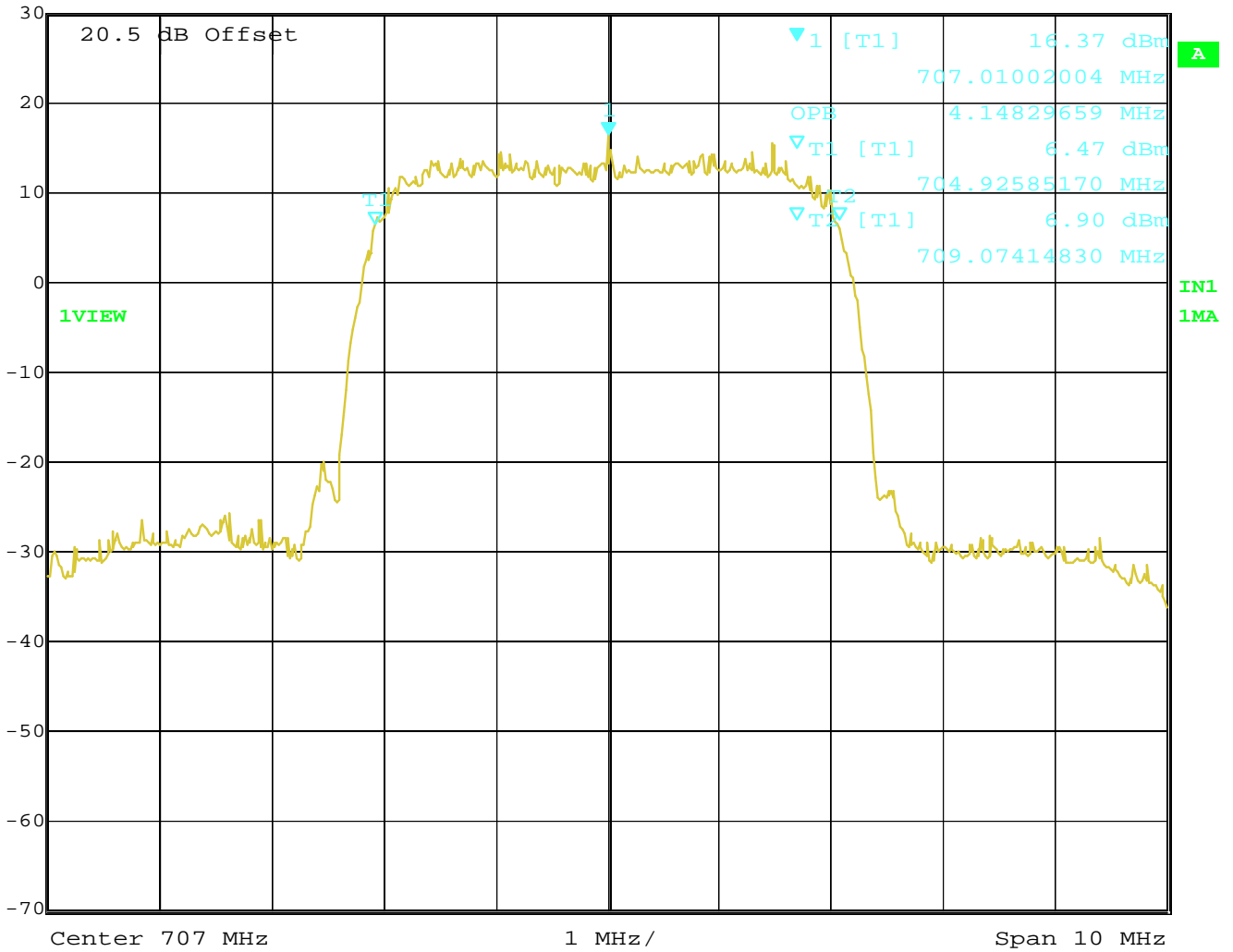
Plot 3 - Occupied bandwidth (-26 dB, channel 2, 707 MHz)



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Marker 1 [T1] RBW 50 kHz RF Att 30 dB
Ref Lvl 16.37 dBm VBW 50 kHz
30 dBm 707.01002004 MHz SWT 10 ms Unit dBm



Date: 21.MAY.2007 15:11:11

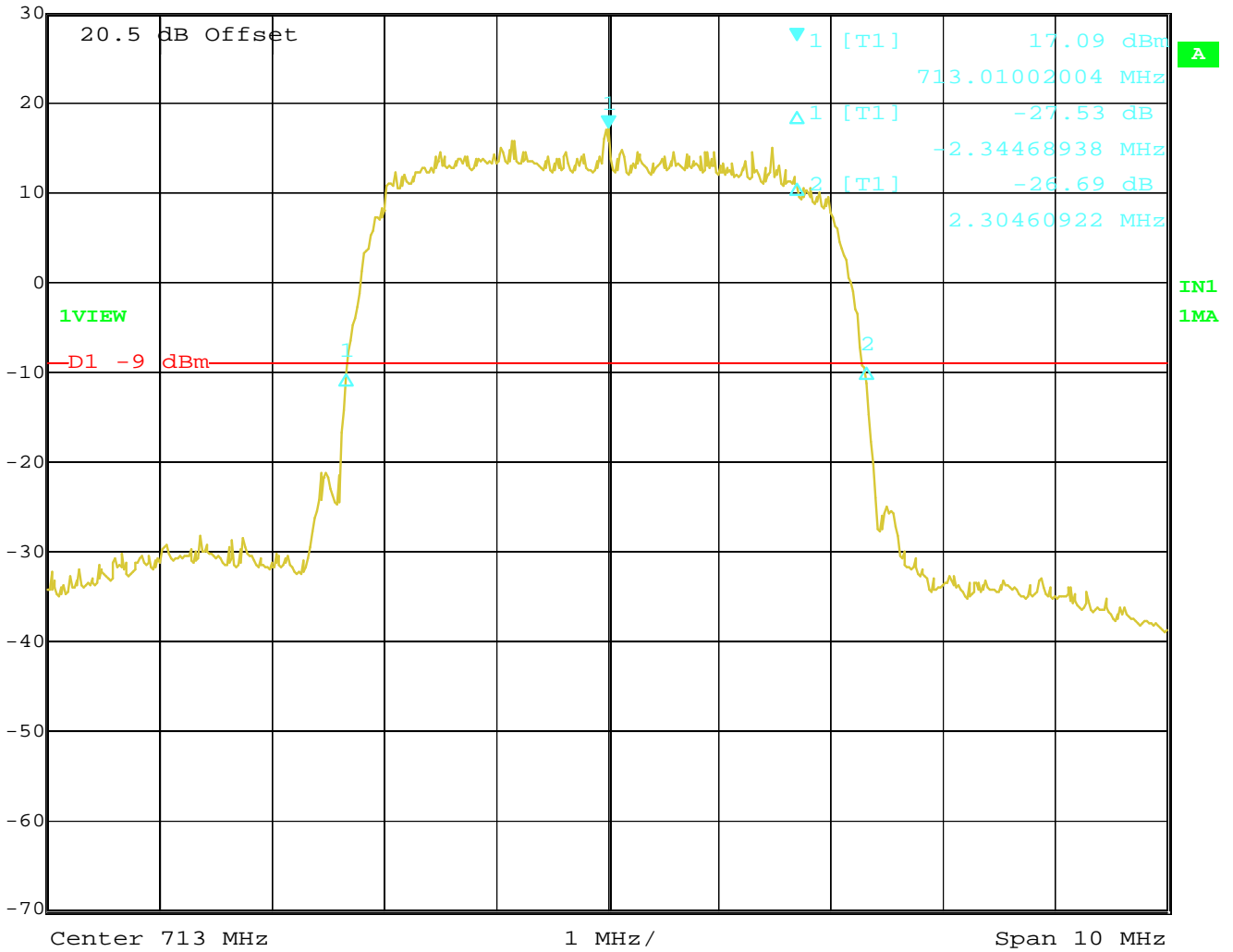
Plot 4 - Occupied bandwidth (99%, channel 2, 707 MHz)



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Marker 1 [T1] RBW 50 kHz RF Att 30 dB
Ref Lvl 17.09 dBm VBW 50 kHz
30 dBm 713.01002004 MHz SWT 10 ms Unit dBm



Date: 21.MAY.2007 14:58:47

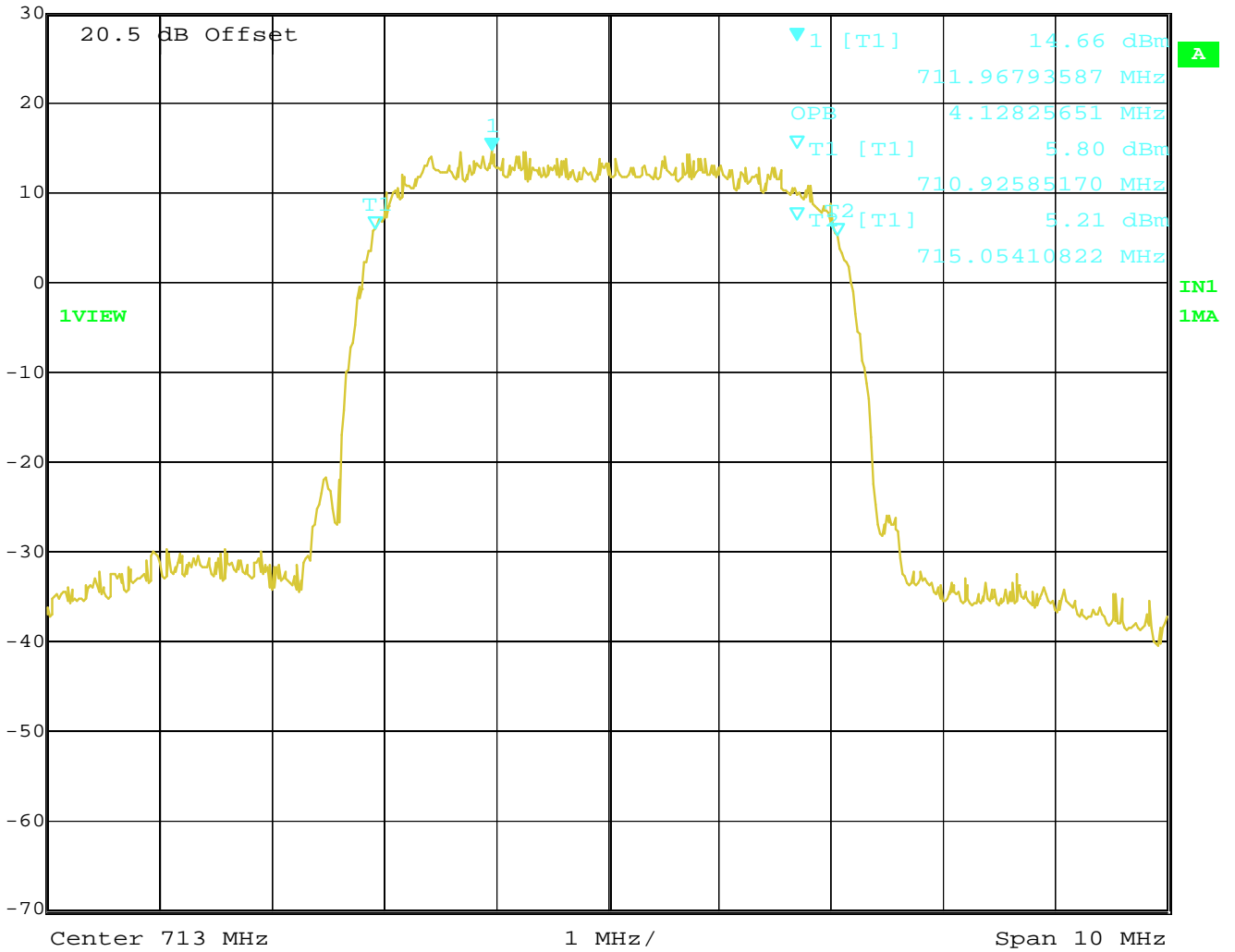
Plot 5 - Occupied bandwidth (-26 dB, channel 3, 713 MHz)



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Brand mark: SOMA Networks
Model: CPE -400-2C0
FCC ID: AEZCPE-400-2C0



Marker 1 [T1] RBW 50 kHz RF Att 30 dB
Ref Lvl 14.66 dBm VBW 50 kHz
30 dBm 711.96793587 MHz SWT 10 ms Unit dBm



Date: 21.MAY.2007 15:16:01

Plot 6 - Occupied bandwidth (99%, channel 3, 713 MHz)



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2.4 Spurious emissions at the antenna terminals

2.4.1 Spurious emissions at the antenna terminals in accordance with 47 CFR Part 27.53 (f)

Spurious emissions measurements have been carried out in accordance with 47 CFR Part 27.53 (f) and 47 CFR Part 2.1051 at the antenna terminals of the EUT.

The tests were performed with the EUT operating at the lowest operating frequency (channel 1: 701 MHz), the middle operating frequency (channel 2: 707 MHz) and the highest operating frequency (channel 3: 713 MHz).

Antenna Conducted Emissions:

For spurious emission measurements at the antenna terminal the following procedure was performed:

- 1) Set the transmitting signal on the lowest operating frequency (channel 1: 701 MHz). Power is set to maximum.
- 2) Set an offset in reading in dB which is identical to the maximum antenna peak gain in dBd + measurement cable loss in dB.
- 3) Set the spectrum analyzer display line function to -13 dBm.
- 4) Set the spectrum analyzer bandwidth to 100kHz.
- 5) For the spectrum analyzer, the start frequency was set to 30 MHz and the stop frequency set to 698 MHz. The level of all spurious or intermodulation emissions must not exceed the -13 dBm limit. Then the start frequency was set to 746 MHz and the stop frequency set to 8 GHz. The level of all spurious or intermodulation emissions must not exceed the -13 dBm limit.
- 6) Steps 2 to 5 were repeated with the transmitting signal set on all other channels which are to be tested.

Plots of the measurements have been made available on the next pages of this test report.

2.4.1.1 Test results

Please refer to the plots 7-12 on the next pages of this test report for the test results of the spurious emissions measurements in the frequency range of 30 MHz to 698 MHz and 746 MHz to 8 GHz.

2.4.1.2 Limit.

The spurious emissions limit at the antenna terminals is obtained as follows (with reference to 47 CFR Part 27.53 (f):

Maximum RF output power (radiated) is: 25.1 dBm = 0.33 Watts = P

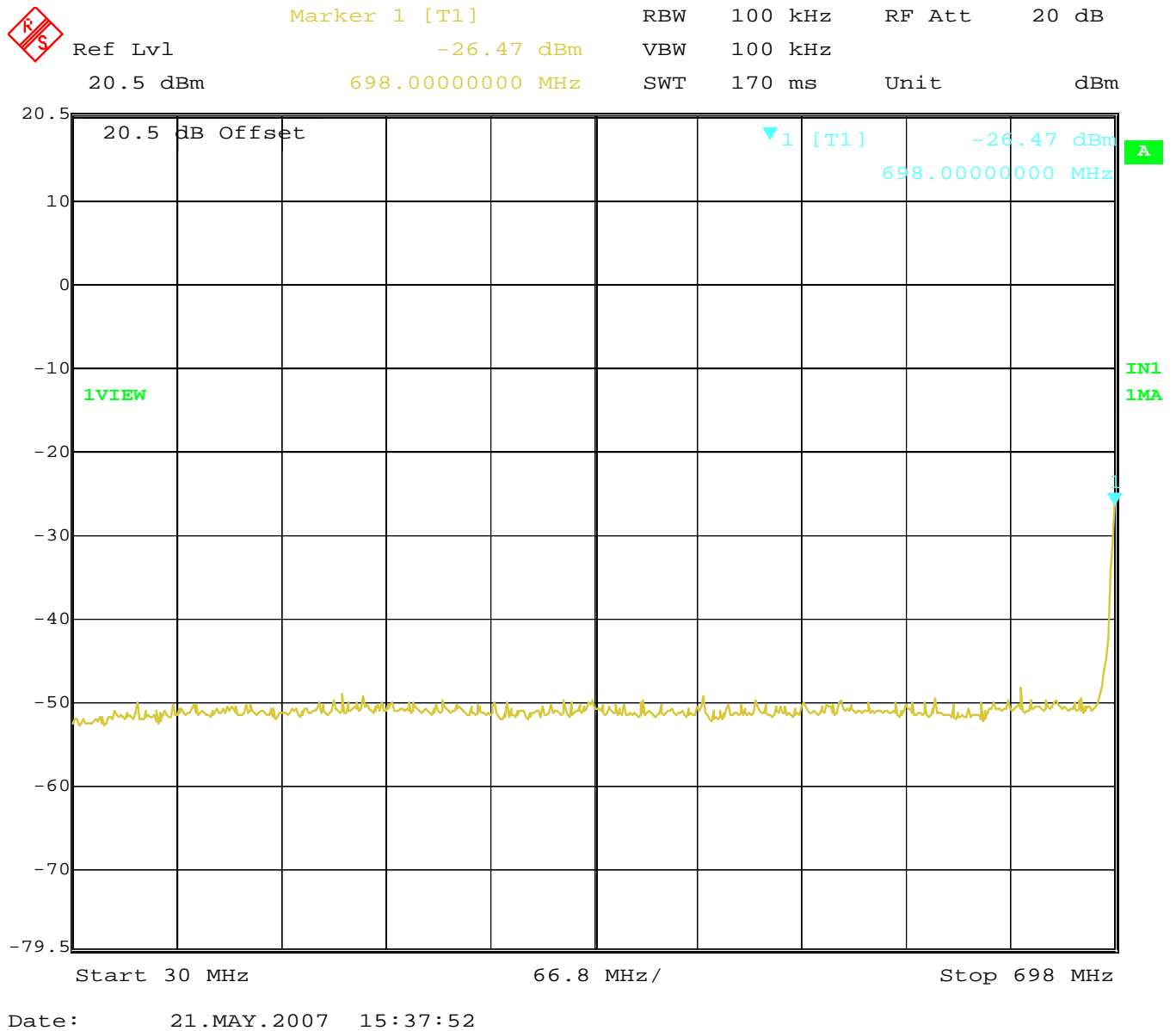
Minimum attenuation below carrier = $43 + 10 \log (P) = 38.1 \text{ dB}$

Limit is: 25.1 dBm – 38.1 dB = -13 dBm



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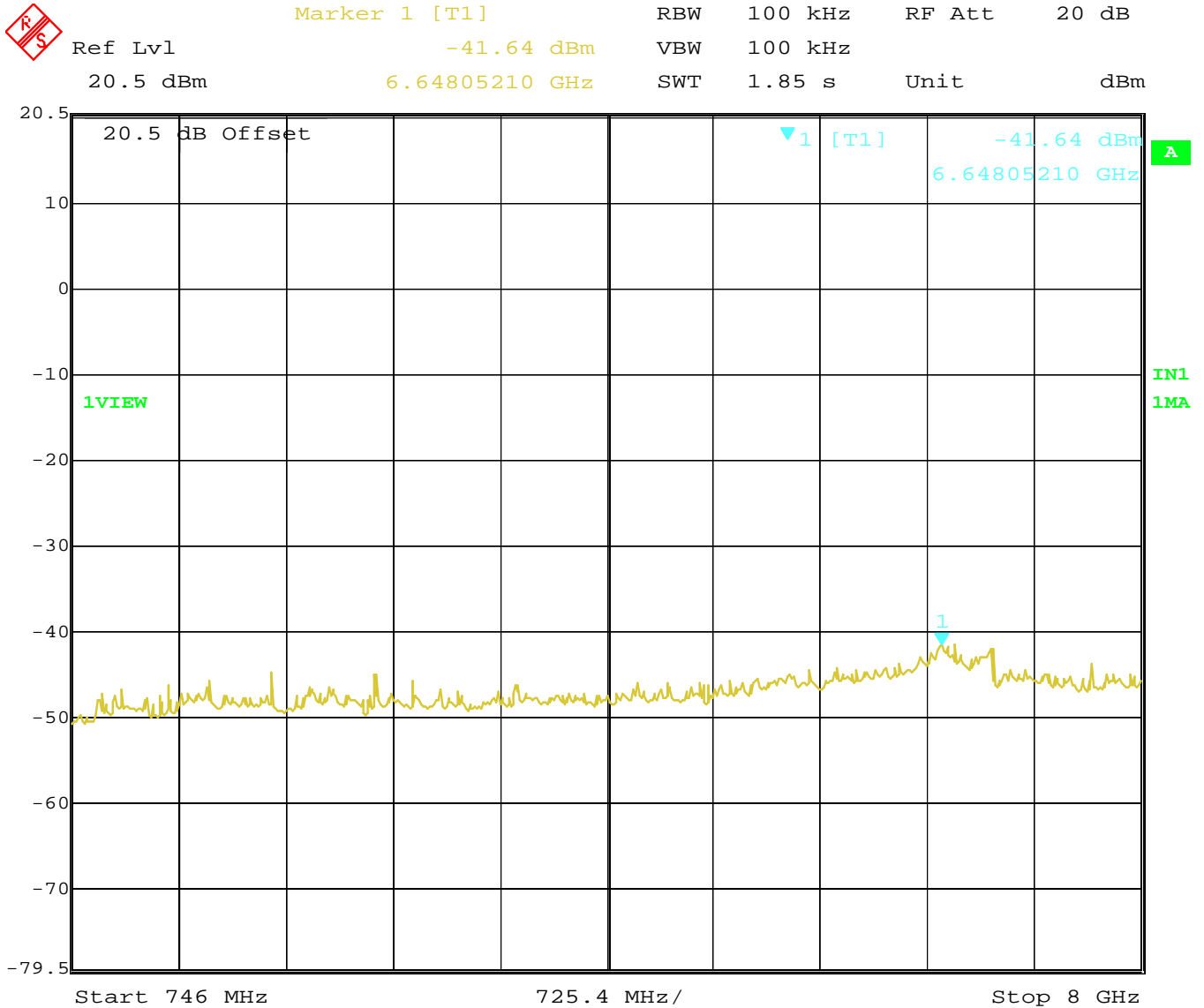
2.4.1.3 Plots of test results (spurious emissions at the antenna terminals)



Plot 7 - Spurious emissions at the antenna terminals (30 MHz to 698 MHz, channel 1, 701 MHz)



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Date: 21.MAY.2007 15:59:30

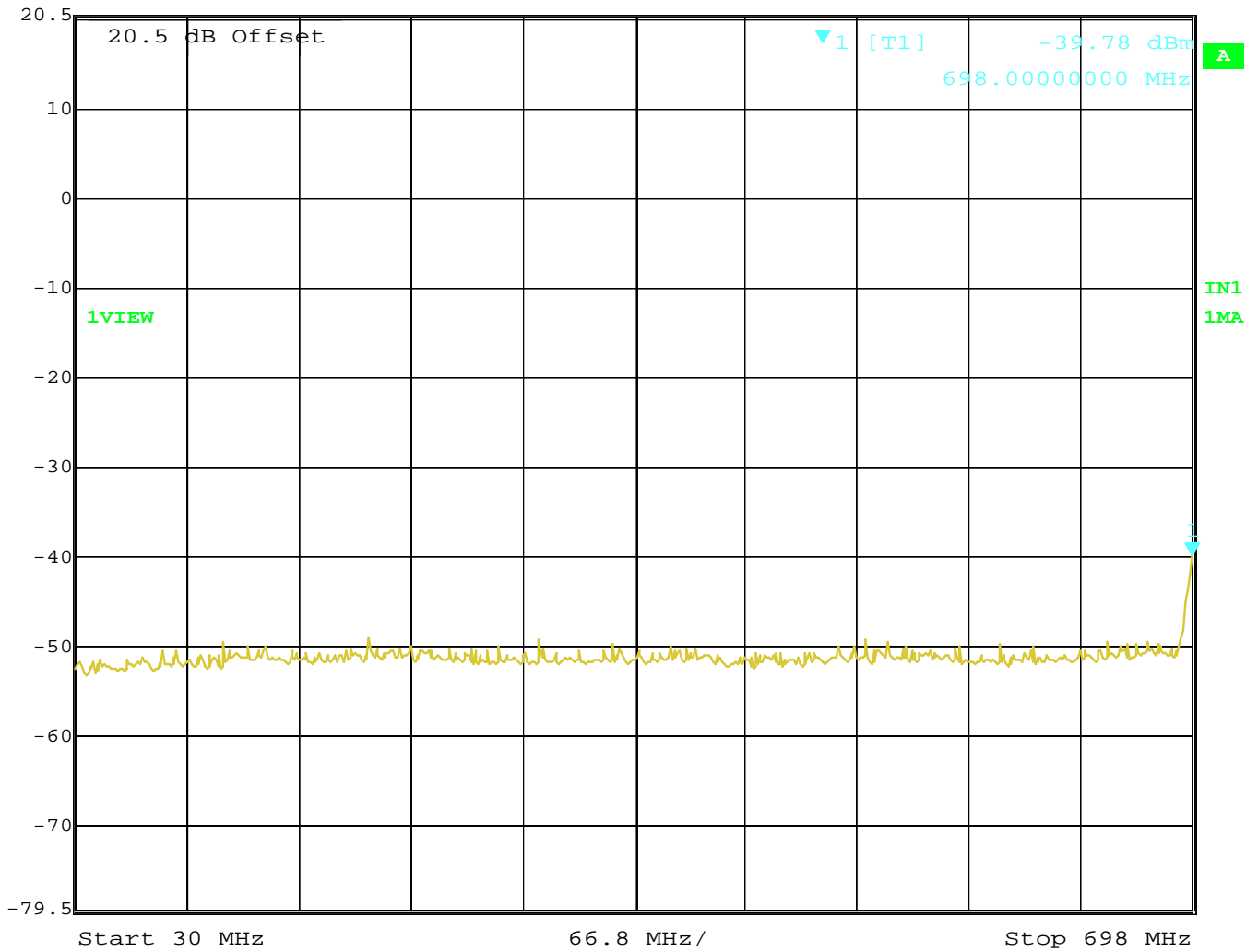
Plot 8 - Spurious emissions at the antenna terminals (746 MHz to 8 GHz, channel 1, 701 MHz)



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Marker 1 [T1] RBW 100 kHz RF Att 20 dB
Ref Lvl -39.78 dBm VBW 100 kHz
20.5 dBm 698.0000000 MHz SWT 170 ms Unit dBm



Date: 21.MAY.2007 15:40:35

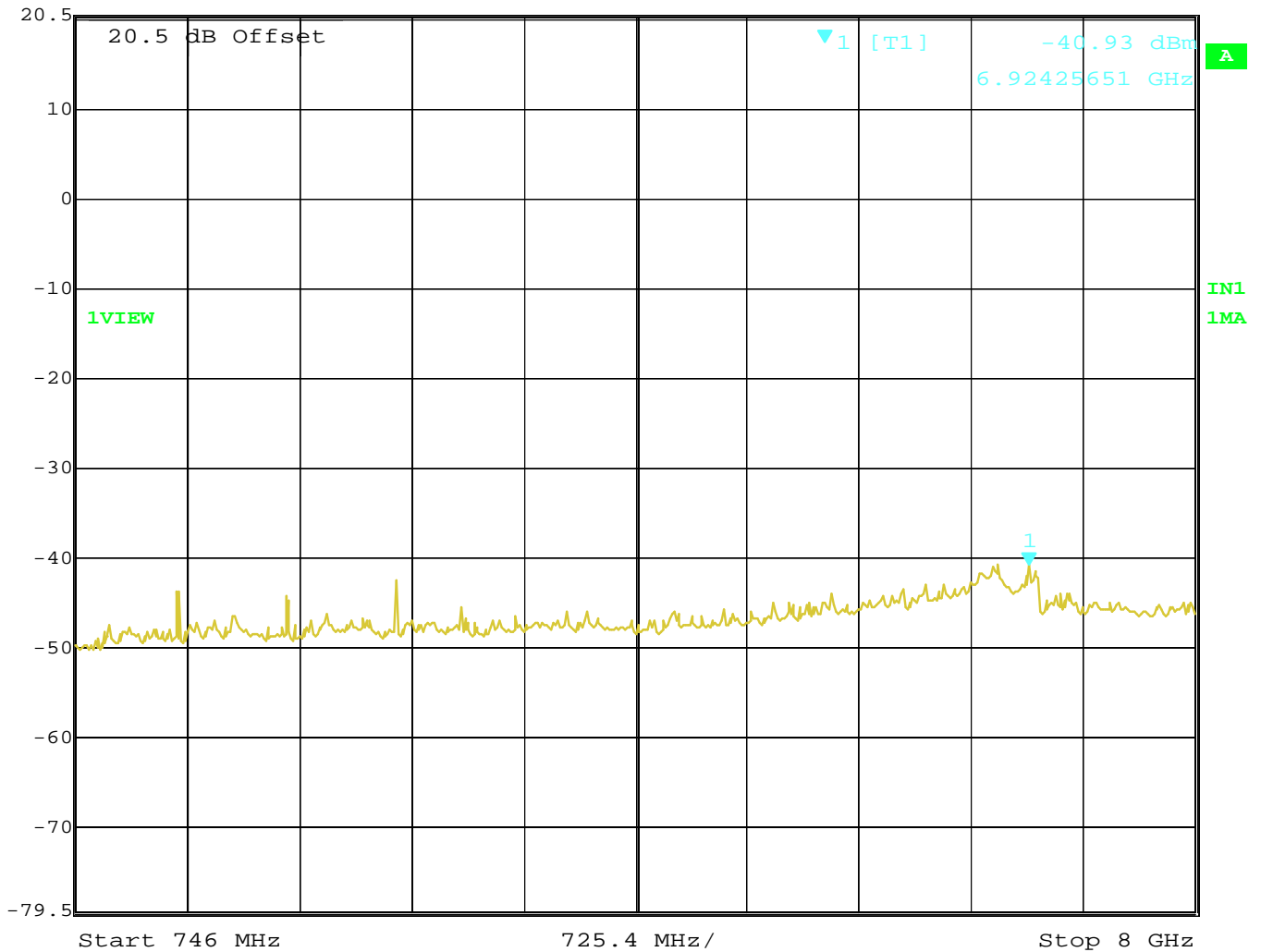
Plot 9 - Spurious emissions at the antenna terminals (30 MHz to 698 MHz, channel 2, 707 MHz)



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Marker 1 [T1] RBW 100 kHz RF Att 20 dB
Ref Lvl -40.93 dBm VBW 100 kHz
20.5 dBm 6.92425651 GHz SWT 1.85 s Unit dBm



Date: 21.MAY.2007 15:54:25

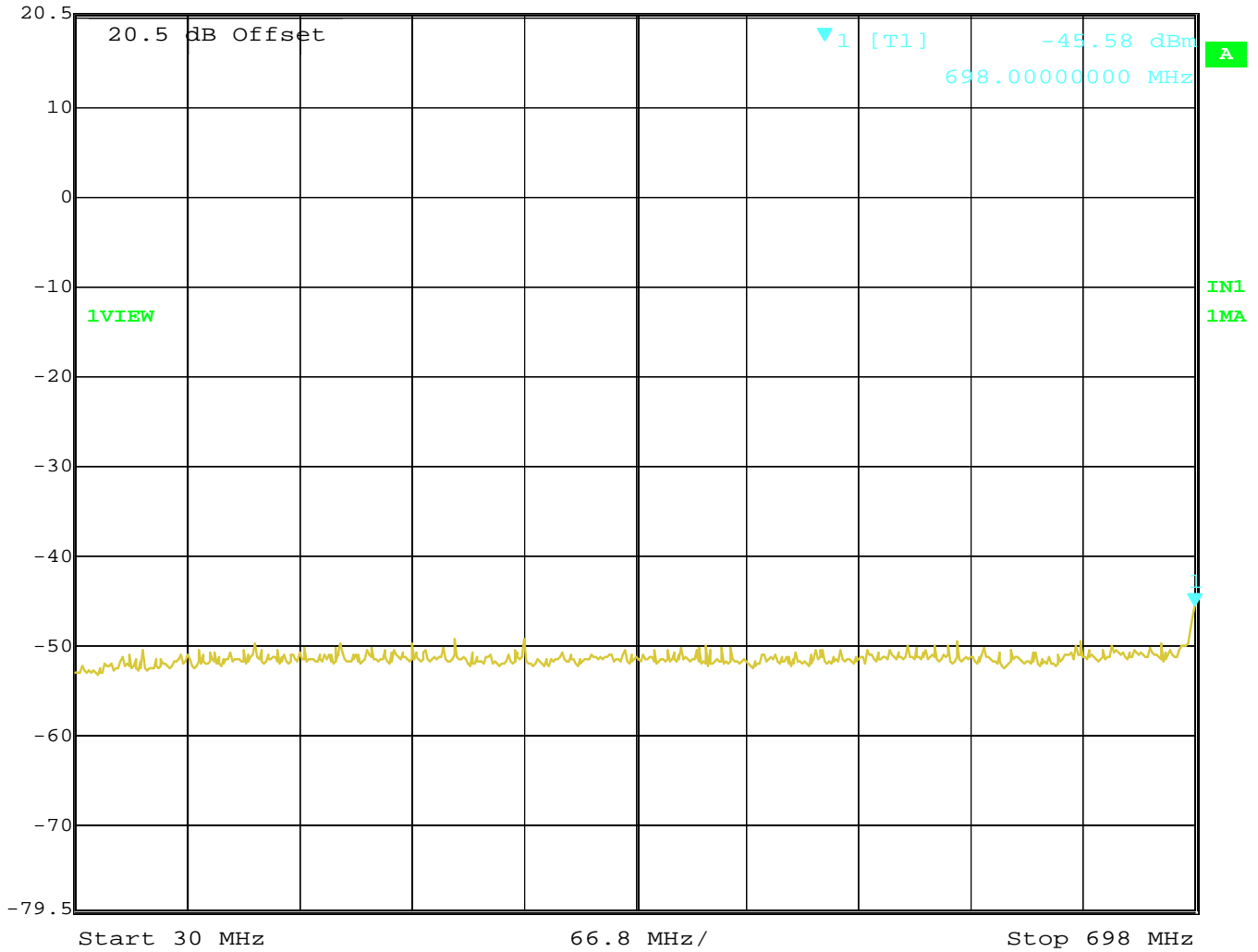
Plot 10 - Spurious emissions at the antenna terminals (746 MHz to 8 GHz, channel 2, 707 MHz)



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Brand mark: SOMA Networks
Model: CPE-400-2C0
FCC ID: AEZCPE-400-2C0



Marker 1 [T1] RBW 100 kHz RF Att 20 dB
Ref Lvl -45.58 dBm VBW 100 kHz
20.5 dBm 698.0000000 MHz SWT 170 ms Unit dBm



Date: 21.MAY.2007 15:42:01

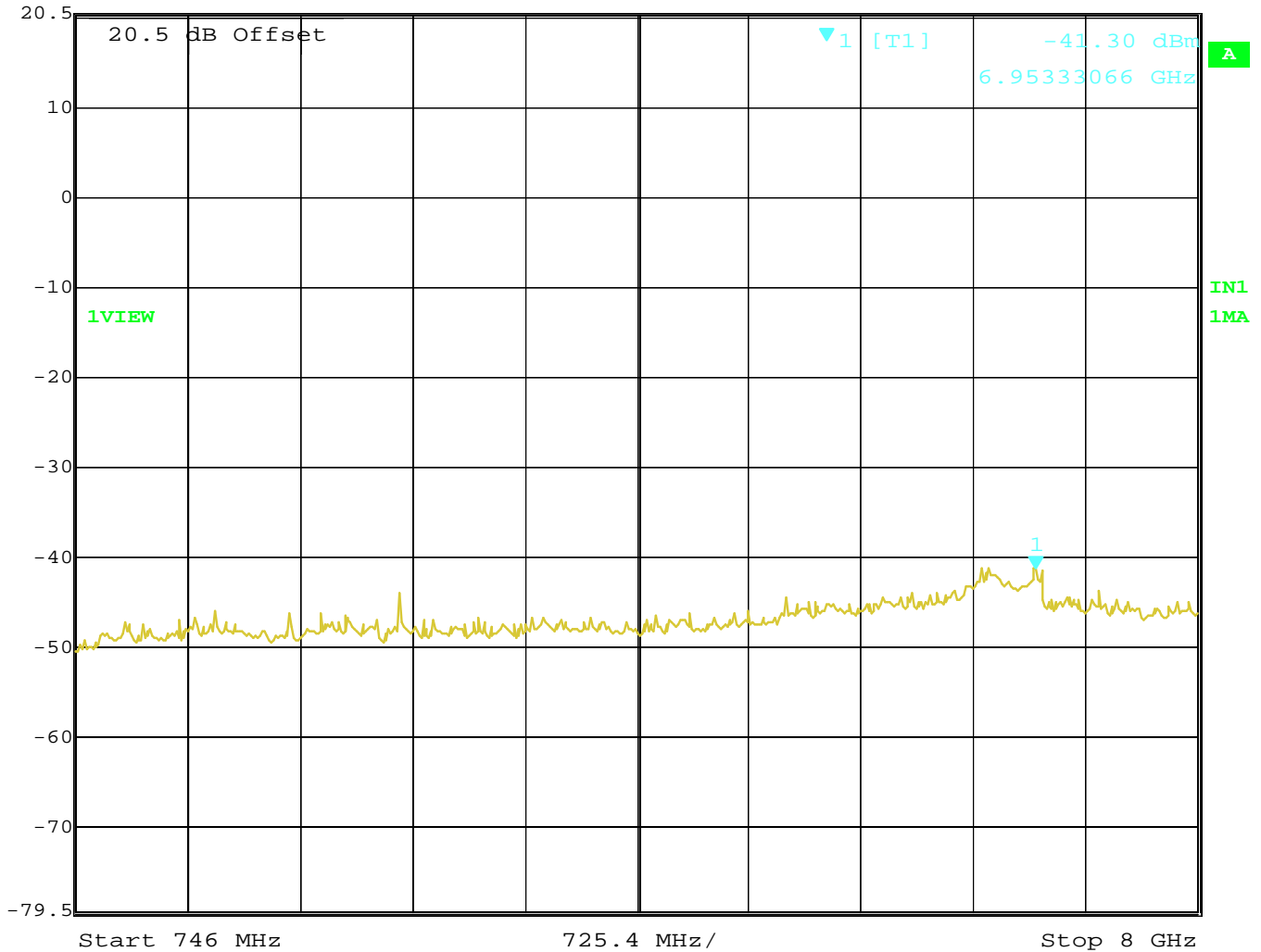
Plot 11 - Spurious emissions at the antenna terminals (30 MHz to 698 MHz, channel 3, 713 MHz)



Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE -400-2C0
FCC ID: AEZCPE-400-2C0



Marker 1 [T1] RBW 100 kHz RF Att 20 dB
Ref Lvl -41.30 dBm VBW 100 kHz
20.5 dBm 6.95333066 GHz SWT 1.85 s Unit dBm



Date: 21.MAY.2007 15:55:36

Plot 12 - Spurious emissions at the antenna terminals (746 MHz to 8 GHz, channel 3, 713 MHz)



Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE -400-2C0
FCC ID: AEZCPE-400-2C0

2.4.2 Spurious emissions (bandedges) at the antenna terminals in accordance with 47 CFR Part 27.53 (f)

Spurious emissions (bandedges) measurements have been carried out in accordance with 47 CFR Part 27.53 (f) and 47 CFR Part 2.1051 at the antenna terminals of the EUT.

The tests were performed with the EUT operating at the lowest operating frequency (channel 1: 701 MHz), the middle operating frequency (channel 2: 707 MHz) and the highest operating frequency (channel 3: 713 MHz).

Antenna Conducted Emissions:

For spurious emission measurements at the antenna terminal the following procedure was performed:

- 1) Set the transmitting signal on the lowest operating frequency in the first frequency block (channel 1: 701 MHz). Power is set to maximum.
- 2) Set an offset in reading in dB which is identical to the maximum antenna peak gain in dBd + measurement cable loss in dB.
- 3) Set the spectrum analyzer display line function to -13 dBm. Set one marker on 698.5 MHz, set a second marker on 703.5 MHz.
- 4) Set the spectrum analyzer bandwidth to 100 kHz (see also 47 CFR Part 27, section 27.53 (f)).
- 5) For the spectrum analyzer, the start frequency was set to 693.5 MHz and the stop frequency set to 713.5 MHz. The level of all spurious or intermodulation emissions must not exceed the -13 dBm limit.

- 6) Set the transmitting signal on the middle operating frequency (channel 2: 707 MHz). Power is set to maximum.
- 7) Set an offset in reading in dB which is identical to the maximum antenna peak gain in dBd + measurement cable loss in dB.
- 8) Set the spectrum analyzer display line function to -13 dBm. Set one marker on 704.5 MHz, set a second marker on 709.5 MHz.
- 9) Set the spectrum analyzer bandwidth to 100 kHz (see also 47 CFR Part 27, section 27.53 (f)).
- 10) For the spectrum analyzer, the start frequency was set to 699.5 MHz and the stop frequency set to 719.5 MHz. The level of all spurious or intermodulation emissions must not exceed the -13 dBm limit.

- 11) Set the transmitting signal on the highest operating frequency (channel 3: 713 MHz). Power is set to maximum.
- 12) Set an offset in reading in dB which is identical to the maximum antenna peak gain in dBd + measurement cable loss in dB.
- 13) Set the spectrum analyzer display line function to -13 dBm. Set one marker on 710.5 MHz, set a second marker on 715.5 MHz.
- 14) Set the spectrum analyzer bandwidth to 100 kHz (see also 47 CFR Part 27, section 27.53 (f)).
- 15) For the spectrum analyzer, the start frequency was set to 705.5 MHz and the stop frequency set to 725.5 MHz. The level of all spurious or intermodulation emissions must not exceed the -13 dBm limit.

Plots of the measurements have been made available on the next pages of this test report.

2.4.2.1 Test results

Please refer to the plots 13-15 on the next pages of this test report for the test results of the spurious emissions measurements in the frequency range of 693.5MHz to 713.5 MHz, 699.5 MHz to 719.5 MHz and 705.5 MHz to 725.5 MHz.



Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE -400-2C0
FCC ID: AEZCPE-400-2C0

2.4.2.2 Limit.

The spurious emissions limit at the antenna terminals is obtained as follows (with reference to 47 CFR Part 27.53 (f):

Maximum RF output power (radiated) is: 25.1 dBm = 0.33 Watts = P

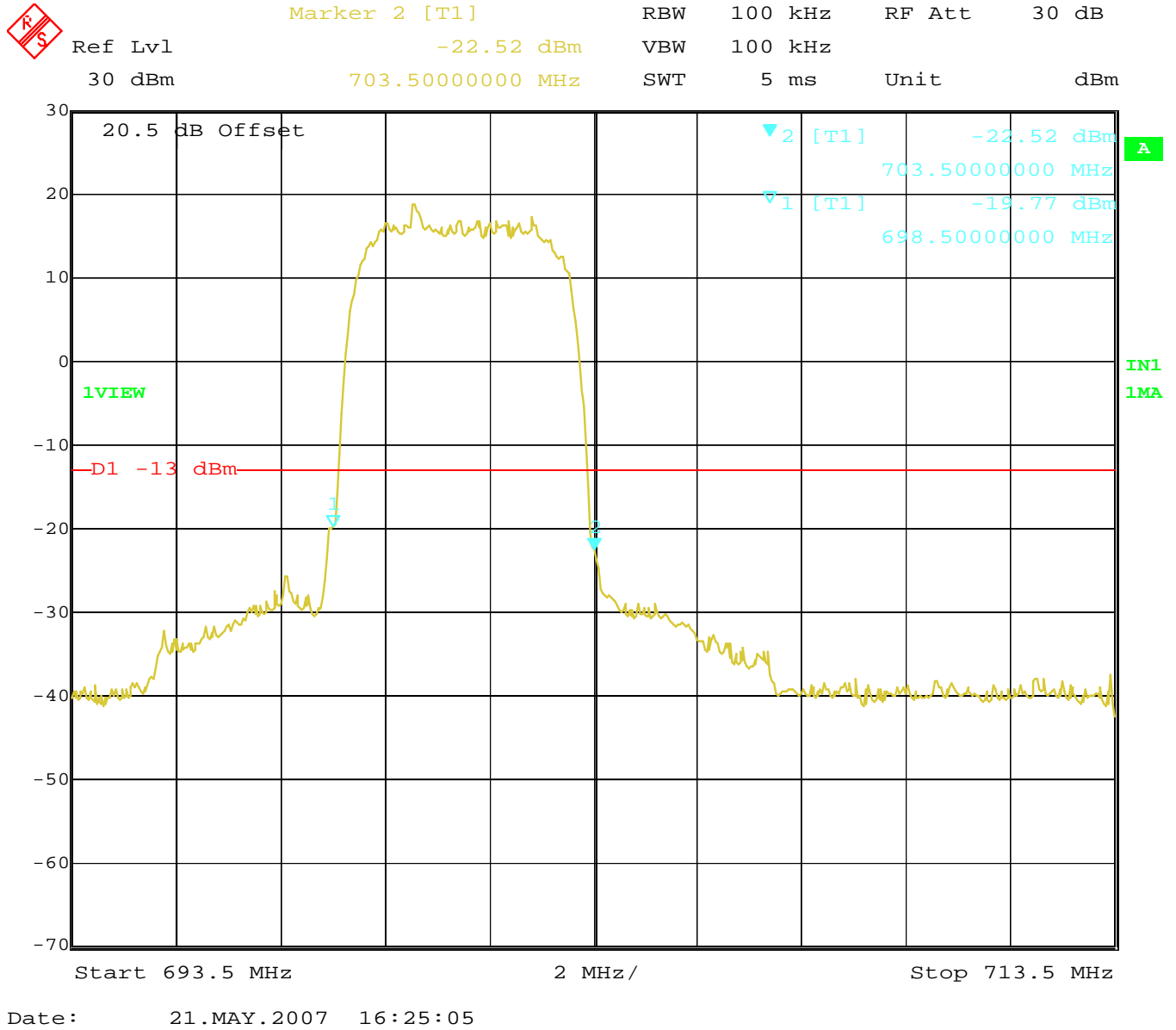
Minimum attenuation below carrier = $43 + 10 \log (P) = 38.1 \text{ dB}$

Limit is: 25.1 dBm – 38.1 dB = -13 dBm



Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE-400-2C0
FCC ID: AEZCPE-400-2C0

2.4.2.3 Plots of test results (spurious emissions (bandedges) at the antenna terminals)



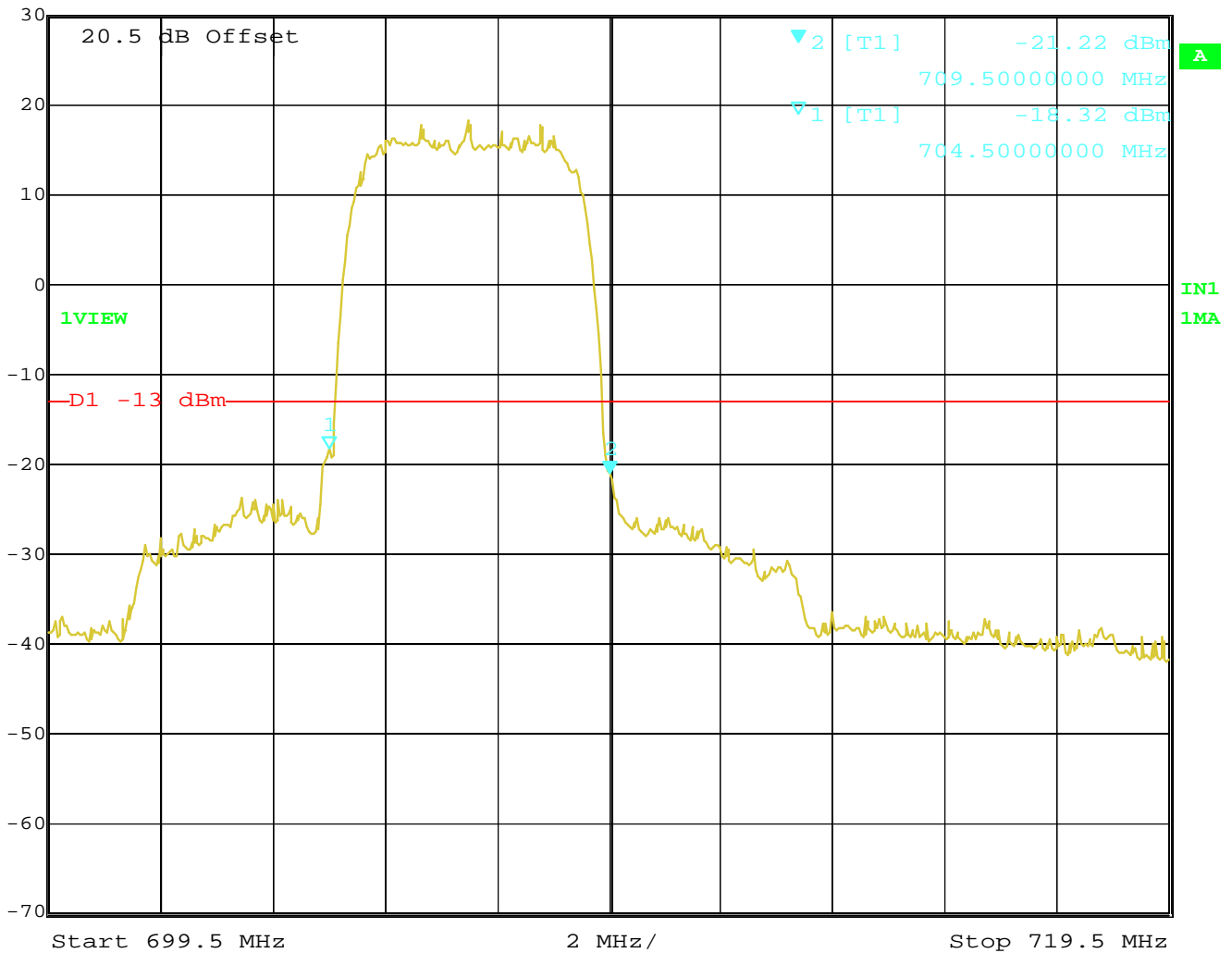
Plot 13 - Spurious emissions (bandedges) at the antenna terminals (693.5MHz to 713.5 MHz, channel 1, 701 MHz)



Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE-400-2C0
FCC ID: AEZCPE-400-2C0



Ref Lvl 30 dBm
Marker 2 [T1] 709.5000000 MHz -21.22 dBm
RBW 100 kHz RF Att 30 dB
VBW 100 kHz
SWT 5 ms Unit dBm



Date: 21.MAY.2007 16:28:47

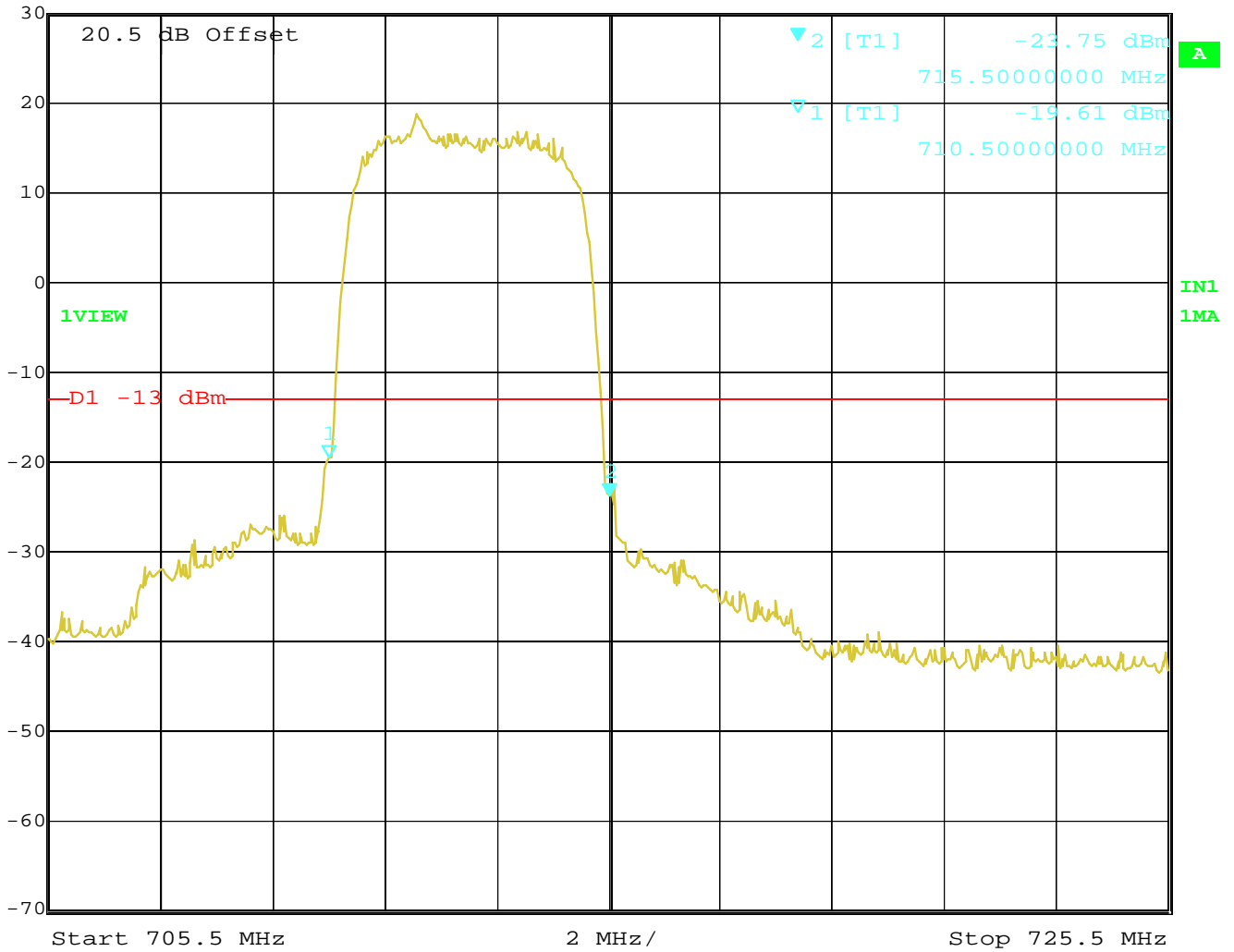
Plot 14 - Spurious emissions (bandedges) at the antenna terminals (699.5 MHz to 719.5 MHz, channel 2, 707 MHz)



Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE-400-2C0
FCC ID: AEZCPE-400-2C0



Ref Lvl 30 dBm
Marker 2 [T1] 715.5000000 MHz -23.75 dBm
RBW 100 kHz RF Att 30 dB
VBW 100 kHz
SWT 5 ms Unit dBm



Date: 21.MAY.2007 16:31:10

Plot 15 - Spurious emissions (bandedges) at the antenna terminals (705.5 MHz to 725.5 MHz, channel 3, 713 MHz)



Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE -400-2C0
FCC ID: AEZCPE-400-2C0

2.5 Radiated emissions

Radiated emissions measurements have been carried out in accordance with 47 CFR Part 27.53 (f) and 47 CFR Part 2.1053.

The tests were performed with the EUT operating at the lowest operating frequency (channel 1: 701 MHz), the middle operating frequency (channel 2: 707 MHz) and the highest operating frequency (channel 3: 713 MHz).

From pre-scans it showed that in the frequency range of 30 - 1000 MHz operation of the EUT on channel 2: 707 MHz yielded the worst-case test results. The pre-scan test results have been filed, and are available for future inspection, at the test laboratory.

In the frequency range of 1 - 8 GHz, the maximum levels of radiated emissions were measured by using the substitution measurement method.

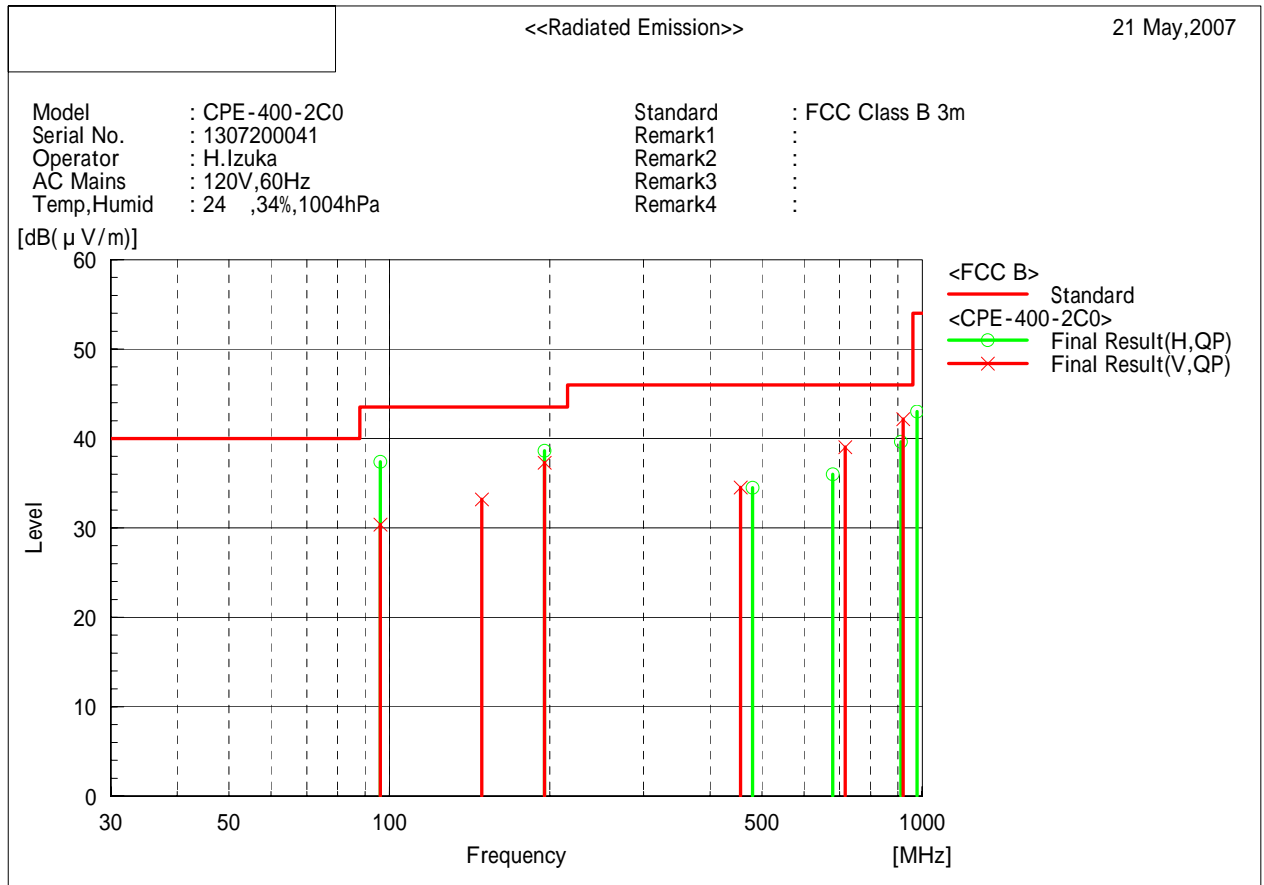
After measuring the maximum levels of the radiated emissions on channel 1: 701 MHz, channel 2: 707MHz and channel 3: 713 MHz with the spectrum analyzer, the EUT was replaced by a horn antenna which was connected to a RF generator. This combination of RF generator and horn antenna was used to reproduce the measured levels of the radiated emissions on channel 1: 701 MHz, channel 2: 707MHz and channel 3: 713 MHz and to obtain the appropriate correction factor for the test setup.



Description of EUT: W-CDMA subscriber terminal
 Manufacturer: Sanyo Electric Co., Ltd.
 Brand mark: SOMA Networks
 Model: CPE-400-2C0
 FCC ID: AEZCPE-400-2C0

2.5.1 Test results

2.5.1.1 Frequency range of 30 - 1000 MHz (EUT operating on channel 2: 707 MHz)



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	96.161	H	65.0	-27.6	37.4	43.5	6.1	182.0	83.0
2	195.446	H	57.6	-19.0	38.6	43.5	4.9	100.0	185.0
3	480.049	H	50.9	-16.4	34.5	46.0	11.5	100.0	5.0
4	678.784	H	48.2	-12.2	36.0	46.0	10.0	103.0	116.0
5	912.066	H	49.1	-9.5	39.6	46.0	6.4	143.0	176.0
6	977.215	H	51.5	-8.5	43.0	54.0	11.0	100.0	186.0
7	96.160	V	58.0	-27.6	30.4	43.5	13.1	100.0	224.0
8	149.072	V	54.7	-21.5	33.2	43.5	10.3	100.0	73.0
9	195.446	V	56.3	-19.0	37.3	43.5	6.2	100.0	213.0
10	456.036	V	51.2	-16.7	34.5	46.0	11.5	113.0	160.0
11	716.621	V	51.0	-12.0	39.0	46.0	7.0	100.0	304.0
12	921.010	V	51.7	-9.5	42.2	46.0	3.8	100.0	173.0

Graph 1 - Frequency range of 30 - 1000 MHz (EUT operating on channel 2: 707 MHz)



Description of EUT: W-CDMA subscriber terminal
 Manufacturer: Sanyo Electric Co., Ltd.
 Brand mark: SOMA Networks
 Model: CPE -400-2C0
 FCC ID: AEZCPE-400-2C0

2.5.1.2 Frequency range of 1 - 8 GHz (EUT operating on channel 1: 701 MHz)

The results of tests on the EUT in the frequency range of 1 - 8 GHz, carried out in accordance with 47 CFR Part 27.53 (f) and 47 CFR Part 2.1053, are depicted in table 8.

Frequency (GHz)	Measurement results (dBm)		Correction factor (dB)		Test results (dBm)		Resolution bandwidth (MHz)	Limits (dBm)
	V	H	V	H	V	H		
1.057	-	-50.3	-	1.3	-	-49.0	1	-13.0
1.368	-	-53.3	-	3.5	-	-49.8	1	-13.0
2.280	-	-61.7	-	8.0	-	-53.7	1	-13.0
6.711	-	-57.1	-	12.6	-	-44.5	1	-13.0
1.042	-57.5	-	2.1	-	-55.4	-	1	-13.0
1.168	-49.7	-	3.5	-	-46.2	-	1	-13.0
1.788	-59.6	-	6.1	-	-53.5	-	1	-13.0
2.122	-53.9	-	7.2	-	-46.7	-	1	-13.0

Table 8 - Frequency range of 1 - 8 GHz (EUT operating on channel 1: 701 MHz)

Note: Field strength values of radiated emissions at frequencies not listed in table 8 are more than 20 dB below the applicable limit.

2.5.1.3 Frequency range of 1 - 8 GHz (EUT operating on channel 2: 707 MHz)

The results of tests on the EUT in the frequency range of 1 - 8 GHz, carried out in accordance with 47 CFR Part 27.53 (f) and 47 CFR Part 2.1053, are depicted in table 9.

Frequency (GHz)	Measurement results (dBm)		Correction factor (dB)		Test results (dBm)		Resolution bandwidth (MHz)	Limits (dBm)
	V	H	V	H	V	H		
1.003	-	-50.8	-	0.9	-	-49.9	1	-13.0
1.067	-	-51.4	-	1.4	-	-50.0	1	-13.0
1.787	-	-52.6	-	5.8	-	-46.8	1	-13.0
2.121	-	-57.4	-	7.2	-	-50.2	1	-13.0
1.168	-57.2	-	2.1	-	-55.1	-	1	-13.0
1.365	-63.7	-	3.5	-	-60.2	-	1	-13.0
1.884	-59.3	-	6.1	-	-53.2	-	1	-13.0
2.122	-54.4	-	7.2	-	-47.2	-	1	-13.0

Table 9 - Frequency range of 1 - 8 GHz (EUT operating on channel 2: 707 MHz)

Note: Field strength values of radiated emissions at frequencies not listed in table 9 are more than 20 dB below the applicable limit.

2.5.1.4 Frequency range of 1 - 8 GHz (EUT operating on channel 3: 713 MHz)

The results of tests on the EUT in the frequency range of 1 - 8 GHz, carried out in accordance with 47 CFR Part 27.53 (f) and 47 CFR Part 2.1053, are depicted in table 10.

Frequency (GHz)	Measurement results (dBm)		Correction factor (dB)		Test results (dBm)		Resolution bandwidth (MHz)	Limits (dBm)
	V	H	V	H	V	H		
1.042	-	-51.1	-	1.3	-	-49.8	1	-13.0
1.111	-	-50.8	-	1.7	-	-49.1	1	-13.0
1.789	-	-54.4	-	5.8	-	-48.6	1	-13.0
2.135	-	-57.9	-	7.3	-	-50.6	1	-13.0
1.042	-55.0	-	1.3	-	-53.7	-	1	-13.0
1.168	-57.1	-	2.1	-	-55.0	-	1	-13.0
1.788	-56.4	-	5.8	-	-50.6	-	1	-13.0
2.122	-54.6	-	7.2	-	-47.4	-	1	-13.0

Table 10 - Frequency range of 1 - 8 GHz (EUT operating on channel 3: 713 MHz)

Note: Field strength values of radiated emissions at frequencies not listed in table 10 are more than 20 dB below the applicable limit.



Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE -400-2C0
FCC ID: AEZCPE-400-2C0

2.5.2 Limit.

The radiated emissions limit is obtained as follows (with reference to 47 CFR Part 27.53 (f)):

Maximum RF output power (ERP) is: 25.1 dBm = 0.33 Watts = P

Limit = P - (43 + (10 log (P)) dB) = 25.1 - (43 + (10 log (0.33))) = 25.1 dBm - 38.1 dB = -13 dBm

The limit expressed in dBuV/m @ 3 meters measurement distance can be calculated as follows:

-13.0 dBm = 50.1 x 10⁻³ mW = 50.1 x 10⁻⁶ Watts

$E^2 = 50.1 \times 10^{-6} / 0.3$

$E = 12.9 \times 10^{-3} \text{ V/m} = 12922.8 \text{ uV/m} = 82.2 \text{ dBuV/m @ 3 meters measurement distance}$



2.6 Frequency stability over temperature variations

Frequency stability over temperature variations tests have been carried out in accordance with 47 CFR Part 27.54 and 47 CFR Part 2.1055 (a)(1).

The tests were performed with the EUT operating at the middle operating frequency (channel 2: 707 MHz). The center frequency of the spectrum analyzer was set to channel 2 of the EUT. Resolution bandwidth (RBW) was set to 1 kHz, video bandwidth (VBW) was set to 100 Hz. The spectrum analyzer indicated the frequency in Hz.

EUT transmitted a CW signal. The RF output power level was set to the maximum value as indicated in the user instructions before the frequency stability over voltage variations test was carried out.

The reference frequency of the channel was obtained first by carrying out the test at +20 °C and 120 VAC. The frequency drift in Hz was derived from the difference between the measured frequency at +20 °C and the measured frequency at a different ambient temperature.

2.6.1 Test results

The results of tests on the EUT, carried out in accordance with 47 CFR Part 27.54 and 47 CFR Part 2.1055 (a)(1), are depicted in table 11.

Test conditions		Frequency (MHz)	Frequency stability (drift, Hz)
T = -30 °C	V _{nom} = 120 VAC	707.008411	-455
T = -20 °C	V _{nom} = 120 VAC	707.008403	-463
T = -10 °C	V _{nom} = 120 VAC	707.008624	-242
T = 0 °C	V _{nom} = 120 VAC	707.008800	-66
T = +10 °C	V _{nom} = 120 VAC	707.008816	-50
T = +20 °C	V_{nom} = 120 VAC	707.008866	0
T = +30 °C	V _{nom} = 120 VAC	707.008832	-28
T = +40 °C	V _{nom} = 120 VAC	707.008756	-110
T = +50 °C	V _{nom} = 120 VAC	707.008922	+56

Table 11 - Frequency stability over temperature variations

2.6.2 Limit

The limit was calculated from the measured occupied bandwidth (-26 dB) at +20 °C and 120 VAC. The maximum allowable occupied bandwidth is 5 MHz. The limit for the maximum allowable frequency drift was calculated from:

$(\text{maximum allowable occupied bandwidth} - \text{measured occupied bandwidth}) / 2$

$(5.00 \text{ MHz} - 4.66 \text{ MHz}) / 2 = 0.34 \text{ MHz} / 2 = 170 \text{ kHz}$



Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE -400-2C0
FCC ID: AEZCPE-400-2C0

2.7 Frequency stability over voltage variations

Frequency stability over voltage variations tests have been carried out in accordance with 47 CFR Part 27.54 and 47 CFR Part 2.1055 (d)(1).

The tests were performed with the EUT operating at the middle operating frequency (channel 2: 707 MHz). The center frequency of the spectrum analyzer was set to channel 2 of the EUT. Resolution bandwidth (RBW) was set to 1 kHz, video bandwidth (VBW) was set to 100 Hz. The spectrum analyzer indicated the frequency in Hz.

EUT transmitted a CW signal. The RF output power level was set to the maximum value as indicated in the user instructions before the frequency stability over voltage variations test was carried out.

The reference frequency of the channel was obtained first by carrying out the test at +20 °C and 120 VAC. The frequency drift in Hz was derived from the difference between the measured frequency at +20 °C and the measured frequency at a different AC mains voltage.

2.7.1 Test results

The results of tests on the EUT, carried out in accordance with 47 CFR Part 27.54 and 47 CFR Part 2.1055 (d)(1), are depicted in table 11.

Test conditions		Frequency (GHz)	Frequency stability (drift, Hz)
T = +20 °C	V _{min (-15%)} = 102 VAC	707.008782	-42
T = +20 °C	V _{nom} = 120 VAC	707.008824	0
T = +20 °C	V _{max (+15%)} = 138 VAC	707.008808	-16

Table 11 - Frequency stability over voltage variations

2.7.2 Limit

The limit was calculated from the measured occupied bandwidth (-26 dB) at +20 °C and 120 VAC. The maximum allowable occupied bandwidth is 5 MHz. The limit for the maximum allowable frequency drift was calculated from:

(maximum allowable occupied bandwidth - measured occupied bandwidth) / 2

$(5.00 \text{ MHz} - 4.66 \text{ MHz}) / 2 = 0.34 \text{ MHz} / 2 = 170 \text{ kHz}$



Description of EUT: W-CDMA subscriber terminal
 Manufacturer: Sanyo Electric Co., Ltd.
 Brand mark: SOMA Networks
 Model: CPE -400-2C0
 FCC ID: AEZCPE-400-2C0

3 List of test equipment

Test Instruments used:

ID	Instruments	Maker	S/N	LAST Cal.	Next Cal.
1	Receiver ESCS30	ROHDE&SCHWARZ	S/N:100032	6/06	12/07
2	Spectrum Analyzer FSEM30	ROHDE&SCHWARZ	S/N:100162	9/06	3/08
3	Power Meter E4416A	Agilent	S/N:MY45100546	3/06	12/07
4	Signal Generator E8257D	Agilent	S/N:MY45140938	10/05	10/07
5	Temperature and Humidity Chamber MTH-4200	SANYO	S/N:M0000300	10/04	10/07
6	Spectrum Analyzer ESIB40	ROHDE&SCHWARZ	S/N:100262	10/06	4/08

Test Accessories used:

ID	Accessories	Maker	S/N	LAST Cal.	Next Cal.
11	Selector NS4008S	TOYO Corporation	S/N:0206001	7/06	7/07 *1
12	LISN ESH2-Z5	ROHDE&SCHWARZ	S/N 825640/015	7/06	7/07
13	LISN KNW-407	Kyoritsu	S/N:8-1468-3	7/06	7/07
14	50 terminator	SUHNER	S/N:50TER011	6/04	6/07
15	Pulse Limiter ESH3Z2	ROHDE&SCHWARZ	S/N:357.8810.52	7/06	7/07 *1
16	Power Sensor E9327A	Agilent	S/N:MY44420666	3/06	9/07
17	Band Reject Filter NF-49BT+ MLFR0502	TOYO Corporation	S/N:022		
18	Attenuator (20dB) WA4	WEINSCHEL	S/N:A677		
19	Attenuator (10dB) 6810.17.A	SUHNER	S/N:-	used for 1-8GHz measurement	

*1: On-site Calibration

Test Antenna and Amp used:

ID	Antenna , Amp	Maker (frequency band)	S/N	LAST Cal.	Next Cal.
31	Biconical BBA9106	SBK (30-300MHz)	S/N:9103 2034	6/06	6/07
32	Log-Peri UHALP9108A	SBK (300M-1GHz)	S/N:0498	6/06	6/07
33	Log-Peri UHALP9108A	SBK (300M-1GHz)	S/N:0499	6/06	6/07
34	Duble Ridged Hone Ant. BBHA9120B (Receiving)	SBK (1-8GHz)	S/N:9120B 227	8/06	8/07
35	Duble Ridged Hone Ant. BBHA9120B (Radiation)	SBK (1-8GHz)	S/N:9120B 228	6/06	6/07
36	AMP NUL-5132	TSJ (30M-1GHz)	S/N:030528	7/06	7/07 *1
37	AMP TPA0108-40	TOYO Corporation (1-8GHz)	S/N:-	7/06	7/07 *1



Description of EUT: W-CDMA subscriber terminal
Manufacturer: Sanyo Electric Co., Ltd.
Brand mark: SOMA Networks
Model: CPE -400-2C0
FCC ID: AEZCPE-400-2C0

Measurement item	ID No.
RF output power (conducted)	3,16,18
Occupied bandwidth.	6,18
Spurious emissions at the antenna terminals.	6,18
Radiated Emissions (30M-1GHz)	1,2,11,17,31,32,36
Radiated Emissions (1-8GHz)	6,4,19,34,35,37
Conducted Emissions	1,2,11,12,13,14,15
Frequency stability over temperature variations & Frequency stability over voltage variations	6,5,18
Effective radiated power	6,3,4,16,32,33