REPORT ON

FCC CFR 47: Parts 15, 22 and 24 Testing in support of an
Application for Grant of Equipment Authorisation
of a Sendo SND321 Dual-Band Mobile Handset

FCC ID: P6PSND321

COMMERCIAL-IN-CONFIDENCE

Report No OR613836/01 Issue 1 **March 2005**

Product Service

Product Service

Competence. Certainty. Quality

TUV Product Service Ltd, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuvps.co.uk; www.babt.com

REPORT ON FCC CFR 47: Parts 15, 22 and 24 Testing in support of an Application for Grant of Equipment Authorisation of a Sendo SND321 Dual-Band Mobile Handset

FCC ID: P6PSND321

Report No OR613836/01 Issue 1

March 2005

PREPARED FOR

Sendo Limited
Hatchford Way
Sheldon
BIRMINGHAM
B26 3RZ

PREPARED BY

M D Foley
Project Manager

APPROVED BY

T J Pither
UKAS Signatory

DATED 31st March 2005

DISTRIBUTION

Sendo Ltd	Copy 1
TUV Product Service Ltd	Copy 2
	Copy No 1

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47: Parts 15, 22 and 24. The sample tested was found to comply with the requirements defined in the applied rules.
Test Engineers;

R Small

T Guy

UKAS TESTING 0141 Group

Product Service

CONTENTS

Product Service

CONTENTS (cont.)

Section **Page No**

Product Service

SECTION 1

REPORT SUMMARY

FCC CFR 47: Part 15, 22 and 24 Testing in support of an
Application for Grant of Equipment Authorisation
of a Sendo SND321 Dual-Band Mobile Handset

1.1 STATUS

EQUIPMENT UNDER TEST	Sendo SND321 Dual-Band Mobile Handset
OBJECTIVE	To undertake measurements to determine the Equipment Under Test's (EUT's) compliance with the specification.
NAME AND ADDRESS OF CLIENT	Sendo. Limited.
MODEL NUMBER	SND321
SERIAL NUMBER	0200D02BS100051 – Sample 1 0300D02BS100032 – Sample 2
HARDWARE VERSION	3.00
SOFTWARE VERSION	140-P-01_8C
TEST SPECIFICATION / ISSUE / DATE	FCC CFR 47: Part 15, Subparts B and C, August 2002, Part 22, Subpart H and Part 24, Subpart E, October 2004
NUMBER OF ITEMS TESTED	Two
SECURITY CLASSIFICATION OF EUT	Commercial In Confidence
DISPOSAL REFERENCE NUMBER DATE	Held pending disposal Not Applicable Not Applicable
ORDER NUMBER	PO_SND4500019785
DATE	February 2005
START OF TEST	23rd February 2005
FINISH OF TEST	3rd March 2005
RELATED DOCUMENTS	ANSI C63.4 2001. Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. FCC Public Notice document (DA 00-705 released 30 March 2000)

1.2 INTRODUCTION

The information contained within this report is intended to show limited verification of compliance of the Sendo SND321 to the requirements of FCC Specification Parts 15, 22 and 24.

Testing was carried out in support of an application for Grant of Equipment Authorisation in the name of Sendo

1.3 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out is shown below.

1.3.1 Brief Summary of Results for Configuration 1

Test	Spec Clause	Test Description	Result	Comments
Section 2: Part 15 Tests				
2.1	15.207	Conducted Emissions on Power Lines	Pass	Sample 1
2.2	2.1053, 15.109	Radiated Spurious Emissions	Pass	Sample 1
Section 3: Part 22 Tests				
3.1	22.913 (a)	Maximum Peak Output Power – Radiated	Pass	Sample 1
3.2	22.913 (a)	Maximum Peak Output Power - Conducted	Pass	Sample 2
3.3	2.1047(d)	Modulation Characteristics	Pass	Sample 2
3.4	2.1049, 22.917 (b)	Occupied Bandwidth	Pass	Sample 2
3.5	2.1051, 22.905)	Spurious Emissions at Antenna Terminals	Pass	Sample 2
3.6	2.1053, 22.917	Radiated Spurious Emissions	Pass	Sample 1
3.7	2.1051, 22.917(a)	Conducted Spurious Emissions	Pass	Sample 2
3.8	2.1055, 22.355	Frequency Stability Under Temperature Variations	Pass	Sample 2
3.9	2.1055, 22.355	Frequency Stability Under Voltage Variations	Pass	Sample 2
Section 4: Part 24 Tests				
4.1	2.1046, 24.232	Maximum Peak Output Power – Conducted	Pass	Sample 2
4.2	2.1046, 24.232	Maximum Peak Output Power - Radiated	Pass	Sample 1
4.3	2.1047(d)	Modulation Characteristics	Pass	Sample 2
4.4	2.1049, 24.238(b)	Occupied Bandwidth	Pass	Sample 2
4.5	2.1051, 24.229	Spurious Emissions at Antenna Terminals	Pass	Sample 2
4.6	2.1053 and 24.238	Radiated Spurious Emissions	Pass	Sample 1
4.7	2.1051, 24.238(a)	Conducted Spurious Emissions	Pass	Sample 2
4.8	2.1055, 24.135(a)	Frequency Stability Under Temperature Variations	Pass	Sample 2
4.9	2.1055, 24.135 (a)	Frequency Stability Under Voltage Variations	Pass	Sample 2

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Sendo SND321 Dual Band Mobile Handset operates from a 3.7 volt battery.

1.4.2 Modes of Operation and Test Configuration

The two Configurations of the SND321 Handset, detailed below were set up, in turn, for all tests in a Semi-Anechoic Chamber, Screened Enclosure or Test Hall as appropriate and tested in accordance with the specification.

Configuration	Hardware Configuration	Operation Mode
1	MS + PSU	GSM Speech
2	MS + SHF	GSM Speech

Key:
MS – Mobile Station
PSU – Power Supply Unit
SHF– Simple Hand Free

Modes of operation of the EUT during testing were as follows:

Applicable testing was carried out with the EUT transmitting at maximum power or receiving as detailed in Section 1.5.3.

1.4.3 Test Mode 1: PCS1900MHz Transmitting on the following channels and frequencies;

Bottom Channel	512:	1850.2MHz
Middle Channel	661:	1880.0MHz
Top Channel	810:	1909.8MHz

Test Mode 2: GSM850MHz Transmitting on the following channels and frequencies

Bottom Channel	128:	824.20MHz
Middle Channel	189/190:	836.40/836.60MHz
Top Channel	251:	848.80MHz

1.5 TEST CONDITIONS

For Radiated Spurious Emissions testing, the EUT was set-up simulating a typical user installation on the Alternative Open Field Test Site identified in Appendix A, and tested in accordance with the applicable specification.

The Sendo SND321 was powered by;
A 120V AC/DC Power supply for configuration 1.
Its own internal battery for configuration 2.

1.6 DEVIATIONS FROM THE STANDARD

Not Applicable

1.7 MODIFICATION RECORD

No modifications were made to the Test Item during the tests.

1.8 TESTING LOCATION

All testing was carried out at:

TUV Product Service Ltd
Segensworth Road
Fareham
Hampshire
PO15 5RH

Product Service

SECTION 2

TEST DETAILS

FCC CFR 47: Part 15 Testing in support of an
Application for Grant of Equipment Authorisation
of a Sendo SND321 Dual-Band Mobile Handset

2.1 CONDUCTED EMISSIONS ON POWER LINES

2.1.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.207

2.1.2 Equipment Under Test

SND321

2.1.3 Date of Test

27th February 2005

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified within the Test Equipment Used table shown in Section 3.1.

Items: 26, 27, 28, 29, 30 & 31

2.1.5 Test Procedure

Test performed in accordance with ANSI C63.4.

Conducted Emission Measurements were undertaken within the semi-anechoic chamber. Emissions were measured on the Live and Neutral Lines in turn.

Emissions were formally measured using a Quasi-Peak and Average Detectors, which meet the CISPR requirements. The details of the worst-case emissions for the Live and Neutral Lines are presented in the following tables.

The EUT was supplied from a 120V, 60Hz supply for configuration 1 and its internal battery for Configuration 2.

2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.6 Test Results

The EUT met the Class B requirements of FCC CFR 47: Part 15 Subpart C, Section 15.207 for Conducted Emissions on the Live and Neutral Lines.

Measurements were made with the EUT in Idle Mode (see Section 1.3.3 for details).

Configuration 1 (GSM850)

EUT Rx on Middle Channel 189 (836.4MHz) – Live Line

Emission Frequency (MHz)	Average Level (dBµV)	Quasi-Peak Level (dBµV)	Average Limit (dBµV)	Quasi-Peak Limit (dBµV)
0.1608	12.7	33.0	55.3	65.4
0.1687	13.2	32.6	54.9	65.0
0.1854	12.1	31.9	52.2	64.3
0.2160	5.9	29.9	52.8	63.0
0.2264	5.9	29.5	52.6	62.5
0.2532	5.2	28.7	51.7	61.6

The margin between the specification requirements and all other emissions were 33.2dB or more below the specified Quasi-Peak limit and 47.0dB or more below the Average limit.

EUT Rx on Middle Channel 189 (836.4MHz) – Neutral Line

Emission Frequency (MHz)	Average Level (dBµV)	Quasi-Peak Level (dBµV)	Average Limit (dBµV)	Quasi-Peak Limit (dBµV)
0.1590	12.8	32.7	55.5	65.0
0.1727	16.7	31.8	54.9	64.8
0.1789	18.7	31.5	54.4	64.5
0.1987	11.6	30.4	53.7	63.6
0.2160	5.6	29.3	52.8	63.0
0.2416	4.8	28.2	51.9	62.1

The margin between the specification requirements and all other emissions were 34.0dB or more below the specified Quasi-peak limit and 47.3dB or more below the specified Average limit.

2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.6 Test Results - continued

Configuration 1 (GSM 1900)

EUT Rx on Middle Channel 661 (1880.0MHz) – Live Line

Emission Frequency (MHz)	Average Level (dBµV)	Quasi-Peak Level (dBµV)	Average Limit (dBµV)	Quasi-Peak Limit (dBµV)
0.1572	13.4	33.2	55.5	65.7
0.1717	17.3	32.5	54.9	65.0
0.1876	12.1	31.7	54.2	64.1
0.2160	5.9	29.9	52.8	63.0
0.2562	5.2	28.6	51.5	61.6
0.2718	4.7	27.9	51.0	60.9

The margin between the specification requirements and all other emissions were 33.2dB or more below the specified Quasi-Peak limit and 47.0dB or more below the Average limit.

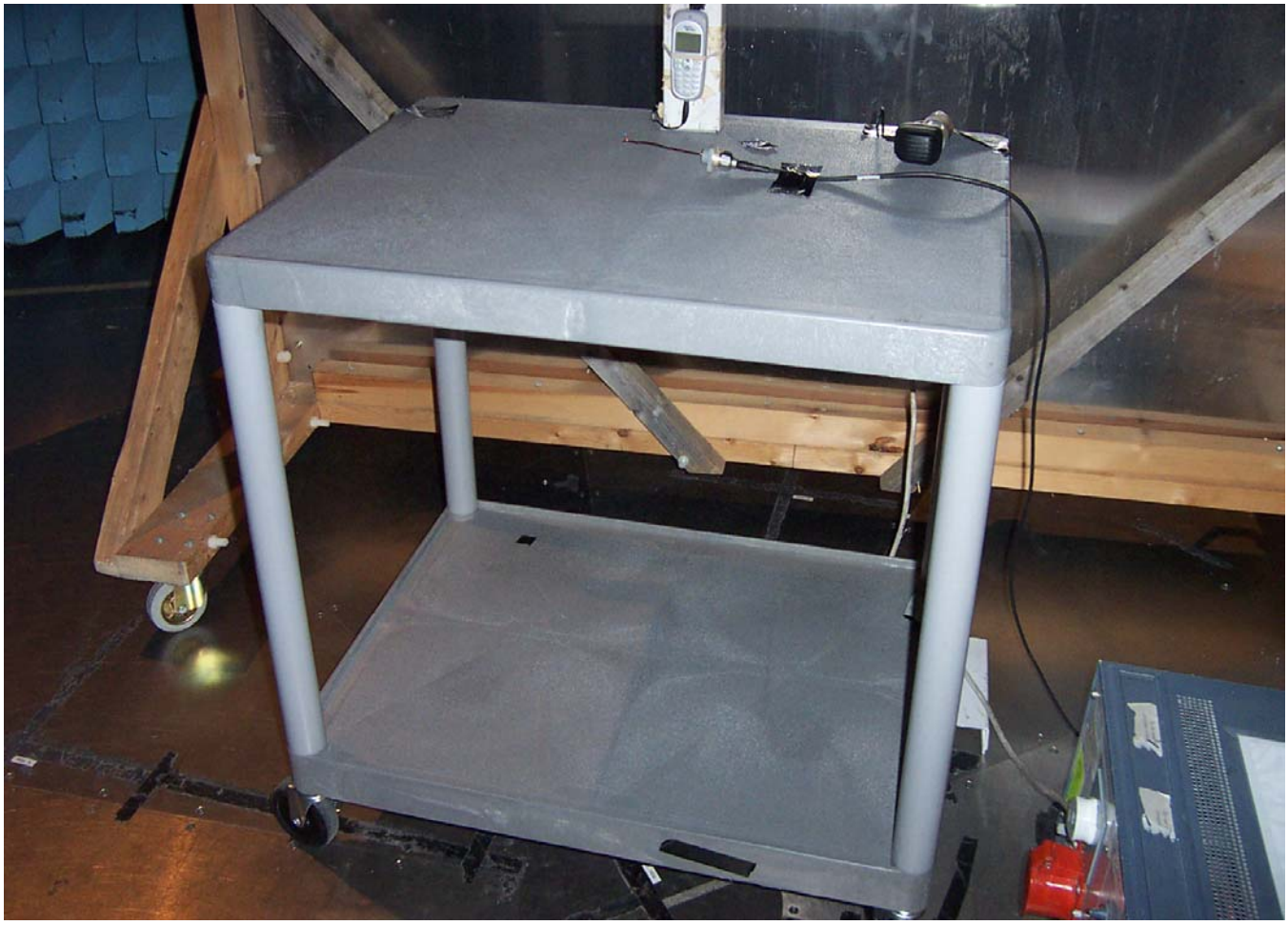
EUT Rx on Middle Channel 661 (1880.0MHz) – Neutral Line

Emission Frequency (MHz)	Average Level (dBµV)	Quasi-Peak Level (dBµV)	Average Limit (dBµV)	Quasi-Peak Limit (dBµV)
0.1572	12.8	32.8	55.5	65.7
0.1932	11.6	30.8	53.7	63.9
0.2173	5.6	29.1	52.8	63.0
0.2547	4.8	27.7	51.5	61.9
0.2655	4.4	27.1	51.3	61.2
0.3281	2.4	23.8	49.5	59.4

The margin between the specification requirements and all other emissions were 35.7dB or more below the specified Quasi-peak limit and 47.3dB or more below the specified Average limit.

2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.7 Set Up Photograph



Conducted Emissions Set Up Photograph

2.2 SPURIOUS RADIATED EMISSIONS

2.2.1 Specification Reference

FCC CFR 47: Part 15 Subpart B, Section 15.109

2.2.2 Equipment Under Test

SND321

2.2.3 Date of Test

24th February 2005

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified within the Test Equipment Used table shown in Section 3.1.

Items: 13-26

2.2.5 Test Procedure

Test Performed in accordance with ANSI C63.4.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT, the list of emissions was then confirmed or updated under Anechoic Chamber (3 metres) conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions identified within the range 30MHz – 1GHz were then formally measured using a CISPR Quasi-Peak detector.

The measurements were performed at a 3m distance unless otherwise stated.

2.2 SPURIOUS RADIATED EMISSIONS - continued

2.2.6 Test Results

Equipment Designation: Unintentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart B, Section 15.109 for Spurious Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in IDLE Mode (see Section 1.3.3 for details).

Configuration 1

No emissions were detected in Idle mode within 20dB of the limit.

Class B Limits (Measurement Distance 3m)

Frequency Range MHz	Field Strength µV/m	Quasi Peak Field Strength dBµV/m
30-88	100	39.0
88-216	150	43.5
216-960	200	46.4
960-1000	500	49.5

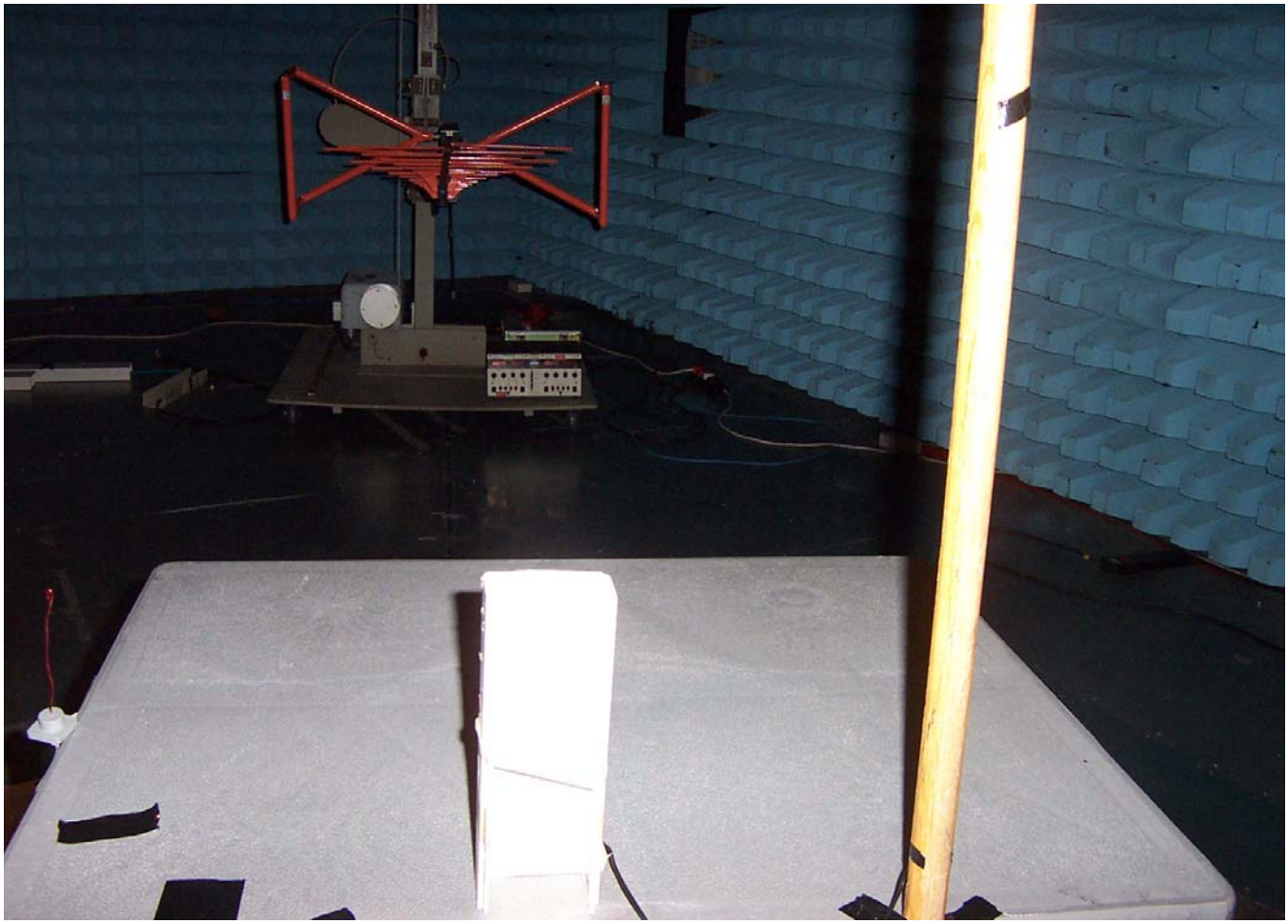
Configuration 2

No emissions were detected in Idle mode within 20dB of the limit.

Class B Limits (Measurement Distance 3m)

2.2 SPURIOUS RADIATED EMISSIONS - continued

2.2.7 Set Up Photograph



Set Up Photograph

Product Service

SECTION 3

TEST DETAILS

FCC CFR 47: Part 22 Testing in support of an
Application for Grant of Equipment Authorisation
of a Sendo SND321 Dual-Band Mobile Handset

3.1 MAXIMUM PEAK OUTPUT POWER - RADIATED

3.1.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 22.913(a)

3.1.2 Equipment Under Test

SND321

3.1.3 Date of Test

23rd February 2005

3.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as within the Test Equipment Used table shown in Section 5.1.

Items: 13 - 26

3.1.5 Test Procedure

Test Performed in accordance with ANSI C63.4.

The EUT contains an antenna port and therefore the Maximum Peak Output Power was made using the conducted method.

The Spectrum Analyser was tuned to the test frequency. The device Output Power setting was controlled as specified in the Product Information, Section 1.5 of this document. The device was then rotated through 360 degrees until the highest power level was observed in both horizontal and vertical polarisation. The device was then replaced with a substitution antenna, whose input signal the antenna was adjusted to until the received level matched that of the previously detected emission.

3.1 MAXIMUM PEAK OUTPUT POWER - RADIATED- continued

3.1.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 22 Subpart H, Section 22.913(a) for Effective Radiated Power.

Configuration 1 (GSM850)

Measurements were made with the EUT in GSM850 Mode (see Section 1.3.3 for details).

Frequency (MHz)	Raw Result (dBm)	Substitution Level (dBm)	Substitution Antenna Gain (dB)	Result ERP (dBm)	Result ERP (mW)	Limit ERP (dBm)	Limit ERP (mW)
824.20	-10.6	19.3	3.4	22.7	186	38.45	7000
836.40	-9.3	18.9	3.4	22.3	178	38.45	7000
848.80	-6.2	23.7	3.5	27.2	525	38.45	7000

Configuration 2 (GSM850)

Measurements were made with the EUT in GSM850 Mode (see Section 1.3.3 for details).

Frequency (MHz)	Raw Result (dBm)	Substitution Level (dBm)	Substitution Antenna Gain (dB)	Result ERP (dBm)	Result ERP (mW)	Limit ERP (dBm)	Limit ERP (mW)
824.20	-8.8	21.1	3.4	24.4	175	38.45	7000
836.40	-7.4	22.5	3.4	25.9	389	38.45	7000
848.80	-5.9	24.0	3.5	27.5	562	38.45	7000

3.2 MAXIMUM PEAK OUTPUT POWER - CONDUCTED

3.2.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 22.913(a)

3.2.2 Equipment Under Test

SND321

3.2.3 Date of Test

1st March 2005

3.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 3.1” within the Test Equipment Used table shown in Section 5.1.

Items: 1, 2, 3, 4, 5, 6, 7, 8

3.2.5 Test Procedure

Using a spectrum analyser and attenuator(s), the output power of the EUT was measured at the antenna terminals. The EUT supports a GMSK modulation scheme. The carrier power was measured with GMSK modulation on timeslot 3.

The spectrum analyser RBW and VBW were set to 1MHz and the path loss measured and entered as a reference level offset.

3.2 MAXIMUM PEAK OUTPUT POWER - CONDUCTED - continued

3.2.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 22 Subpart H, Section 22.913(a) for Effective Radiated Power.

Configuration 1 (GSM850)

Measurements were made with the EUT in GSM850 Mode (see Section 1.3.3 for details).

3.7 V DC Supply

Maximum Power - GMSK

Frequency (MHz)	Output Power (dBm)	Path Loss (dB)	Result (dBm)	Result (W)
824.2	12.98	16.59	29.57	0.906
836.6	12.83	16.78	29.61	0.914
848.8	12.85	16.93	29.78	0.951

Configuration 2 (GSM850)

Measurements were made with the EUT in GSM850 Mode (see Section 1.3.3 for details).

3.7 V DC Supply

Minimum Power - GMSK

Frequency (MHz)	Output Power (dBm)	Path Loss (dB)	Result (dBm)	Result (mW)
824.2	-11.61	16.59	4.98	3.15
836.6	-11.78	16.78	5.00	3.16
848.8	-12.11	16.93	4.82	3.03

Limit	≤7W or <+38.45dBm

Remarks

EUT complies with CFR 47 2.1046 and 22.913(a). The EUT does not exceed 7W or +38.45dBm at the measured frequencies.

Test Equipment Used:
1, 2, 3, 4, 5, 6, 7, 8
……

3.3 MODULATION CHARACTERISTICS

3.3.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1047 (d)

3.3.2 Equipment Under Test

SND321

3.3.3 Date of Test

8th March 2005

3.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified within the Test Equipment Used table shown in Section 5.1.

Items: 1, 2, 3, 4, 5, 6, 7, 8

3.3.5 Test Procedure

Two plots are shown on the following pages showing the EUT transmitting with the display in the time domain:

Plot 1: EUT transmitting with GMSK modulation showing one timeslot

Plot 2: EUT transmitting with GMSK modulation showing one frame with one timeslot active.

3.3 MODULATION CHARACTERISTICS

3.3.5 Modulation Description

DETAILED DESCRIPTION OF S1 (SND321) MODULATION SYSTEM

A detailed description of the modulation system employed is provided in this exhibit, per the requirements of § 2.1033(c)(13).

In general, the GSM system utilizes a Time Division Multiple Access (TDMA) scheme with eight basic physical channels per carrier. Carrier separation is 200 kHz. The basic radio resource is a time slot that lasts approximately 577 µs during which information is transmitted at a modulation rate of approximately 270.833 kb/s. The modulation scheme is Gaussian MSK (GMSK) with a bandwidth-time (BT) product of 0.3.

The following description of the GSM modulation system is taken directly from Chapter 4 of Volume 1, Radio Path Physical Layer, in the Personal Communications Services, Air Interface Specification, J-STD-007.

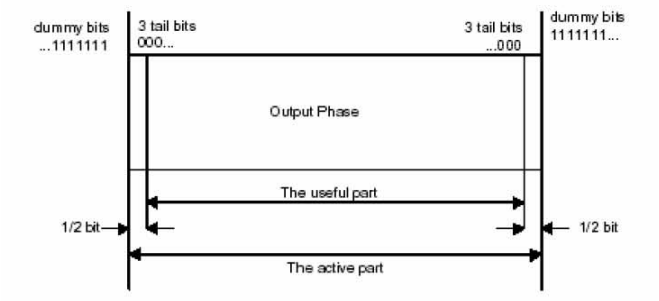
4.0 Modulation
This chapter defines the theoretical requirements of the modulator, inclusive of the differential encoder. The modulator receives the bits from the encryption unit and produces and RF modulated signal. The information bits are first differentially encoded and then passed to the modulator. The modulation is GMSK (Gaussian Minimum Shift Keying) with a BT product of 0.3.

4.1 Modulation Format
4.1.1 Modulating Bit Rate

The modulating bit rate is 1/T = 1625/6 kb/s (approximately 270.833 kb/s).

4.1.2 Start and Stop of the Burst

The bits contained within a burst are defined in Chapter 2. For the purpose of the modulator specification as follows, the bits entering the differential encoder prior to the first bit of the burst and following the last bit of the burst are consecutive logical ones and are denoted by the term dummy bits which define the start and end points of the useful and active parts of the burst as shown in Figure 4.1. The actual state of these bits is left to the manufacturer's implementation subject to the requirement that all performance specifications of this volume are met. Nothing is specified about the actual phase of the modulator output signal outside of the useful part of the burst. Figure 4.1 depicts the relationship between the active and useful part of the burst, the tail bits and dummy bits for a normal burst. The useful part of the burst lasts for 147 modulating bits.



3.3 MODULATION CHARACTERISTICS

3.3.5 Modulation Description

Figure 4.: Normal Burst

4.1.3 Differential Encoding

Each data value di = [0,1] is differentially encoded. The output of the differential encoder is:
d'i = di ⊕ di-1 where ⊕ denotes modulo 2 addition.
The modulating data value _i input to the modulator is: _i = 1 - 2d'i where _i _ {-1, 1}

4.1.4 Filtering

The modulating data values □i as represented by Dirac pulses excite a linear filter with impulse response
defined by:
g(t) = h(t) □rect(t/T)

where the function rect(x) is defined by rect(t/T) = 1/T for t< T/2
rect(t/T) = 0 otherwise
and □means convolution. h(t) is defined by

$$h(t) = \frac{e^{\left(\frac{-t^2}{2\sigma^2 T^2}\right)}}{\sqrt{2\pi}\sigma T}$$ where σ = √{ln(2)}/(2πBT) and BT = 0.3

where B is the 3 dB bandwidth of the filter with impulse response h(t) and T is the duration of the one input data bit.

4.1.5 Output Phase

The phase of the modulated signal is:

$$\vartheta(t') = \sum_i \alpha i \pi h \int_{-\infty}^{t'-iT} g(u)du$$

where the modulating index h is ½ (maximum phase change in radians is ½ per data interval).

The time reference t' = 0 is the start of the active part of the burst as shown in Figure 4. The is also the start of the bit period of bit number 0 (the first tail bit) as defined in chapter 2.

4.1.6 Modulation

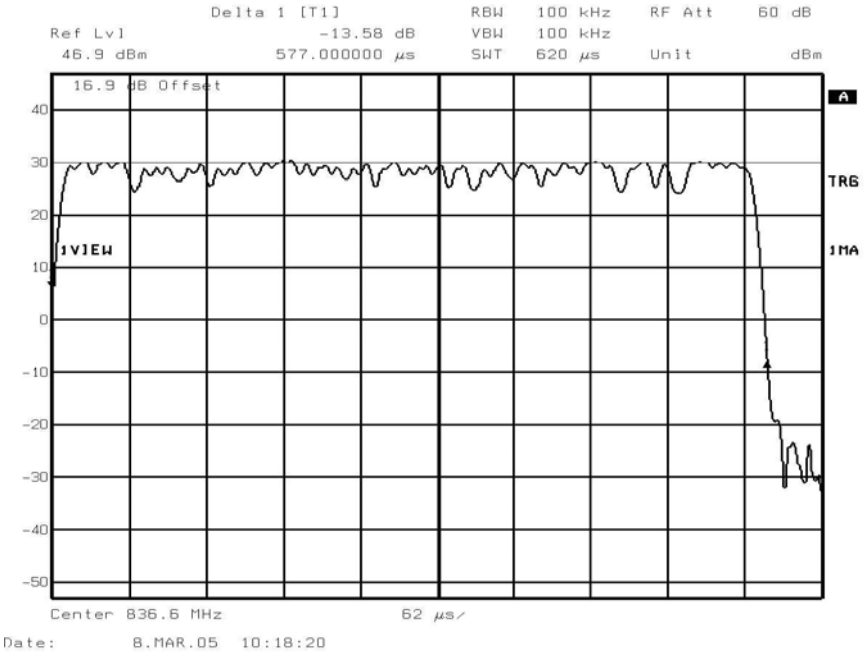
The modulated RF carrier, except for start and stop of the TDMA burst may therefore be expressed as:

$$x(t') = \sqrt{\frac{2Ec}{T}}\cos(2\pi f_o t' + \varphi(t') + \vartheta_o$$

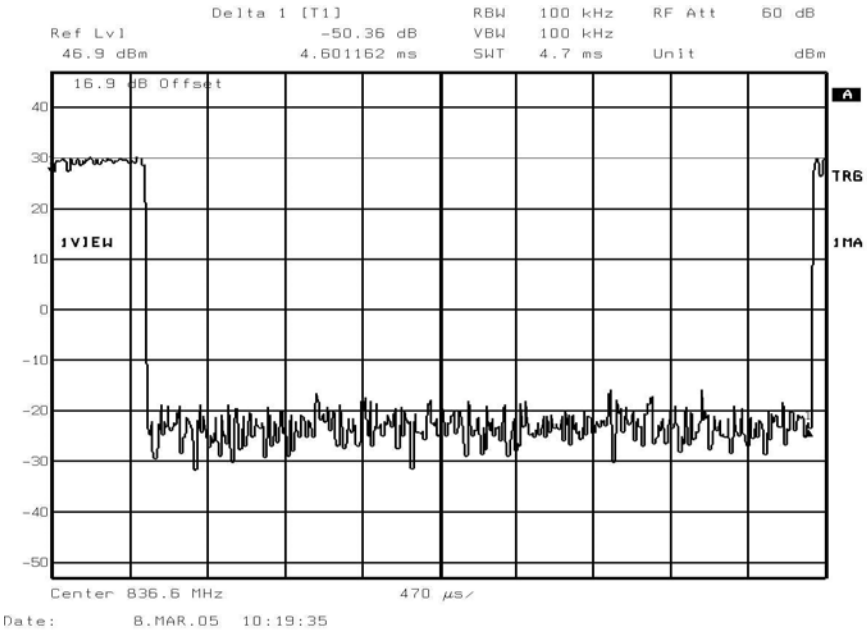
where Ec is the energy modulating bit, fo is the center frequency, and o is a random phase and is constant during one burst.

3.3 MODULATION CHARACTERISTICS

3.3.6 Test Results



Plot (1)



Plot (2)

3.4 OCCUPIED BANDWIDTH

3.4.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1049(h), 22.917(b)

3.4.2 Equipment Under Test

SND321

3.4.3 Date of Test

4th March 2005

3.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as within the Test Equipment Used table shown in Section 5.1.

Items: 1, 2, 3, 4, 5, 6, 7, 8

3.4.5 Test Procedure

The EUT was transmitting at maximum power, modulated with all timeslots active. Using a resolution bandwidth of 10 kHz and a video bandwidth of 30 kHz, the –26dBc points were established and the emission bandwidth determined.

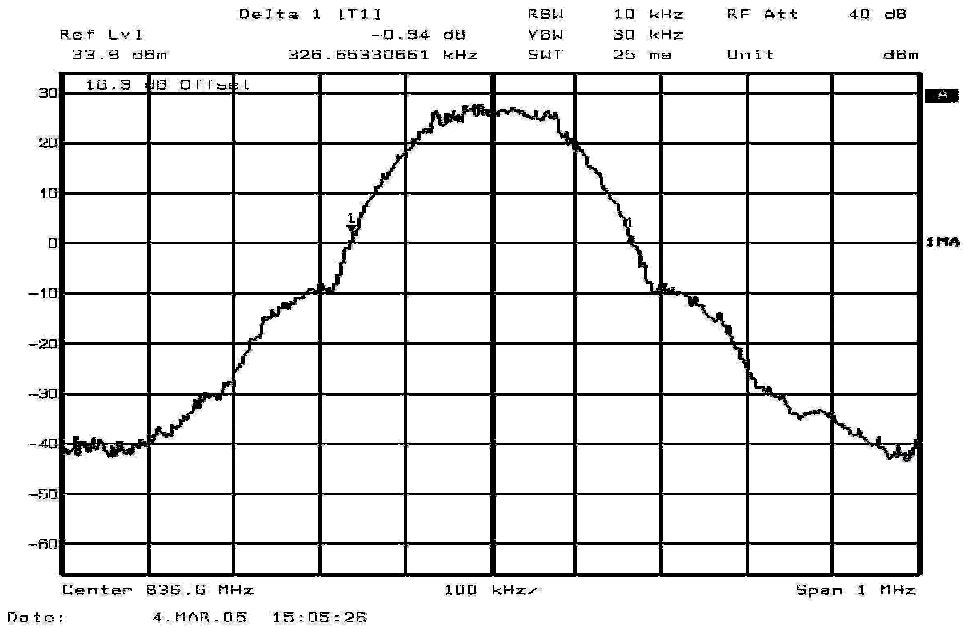
The plot below shows the resultant display from the Spectrum Analyser.

3.4 OCCUPIED BANDWIDTH

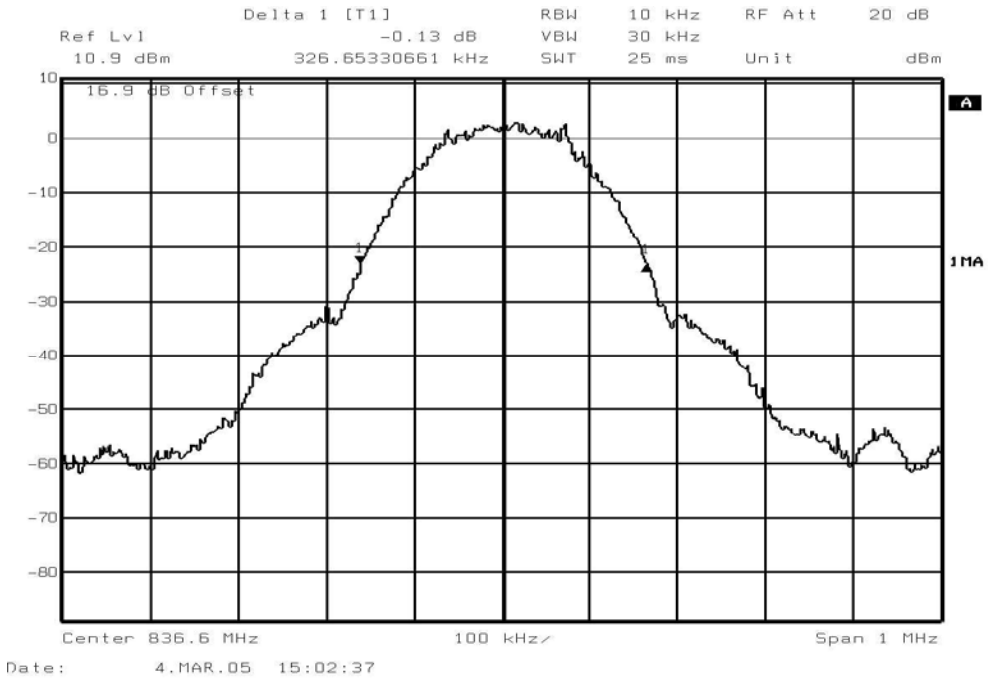
3.4.6 Test Results

Occupied Bandwidth As Defined By The –26dBc Points

Maximum Power - GMSK



Minimum Power – GMSK



3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

3.5.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1051, 22.905

3.5.2 Equipment Under Test

SND321

3.5.3 Date of Test

4th March 2005

3.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as within the Test Equipment Used table shown in Section 5.1.

Items: 1, 2, 3, 4, 5, 6, 7, 8

3.5.5 Test Procedure

In accordance with 22.917(e), any emissions outside of the block edges shall be attenuated by at least 43 + 10 log(P). The measurements are shown to ±1MHz from the block edges. The plots shown under the Spurious Emissions section covers the required range of 9kHz to 9GHz.

The reference power and path losses of all channels used for testing in each frequency block were measured. It was found that there was <0.5dB variation in all channels, thus the worst case reference level offset was used throughout. Having entered the reference level offset, the limit line was displayed, showing the –13dBm, (43+10logP), limit.

Below are the Frequency Blocks the EUT was tested against along with the tested channels.

Communication Channel Pair Blocks

Frequency Block (MHz)	Lower Block Edge Test Channels/Frequencies	Upper Block Edge Test Channels/Frequencies
A (824.0 – 835.0)	Channel : 129 Frequency : 824MHz	Channel : 180 Frequency : 834MHz
A (845.0 – 846.5)	Channel : 234 Frequency : 845MHz	Channel : 238 Frequency : 846MHz
B (835.0 – 845.0)	Channel : 184 Frequency : 835MHz	Channel : 230 Frequency : 844MHz
B (846.5 – 849.0)	Channel : 241 Frequency : 846MHz	Channel : 250 Frequency : 848MHz

3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

3.5.6 Test Results

The channels shown in the table above are the minimum and maximum channels that can be used in each block to maintain compliance. Channels used outside of those stated in the table exceed the specification limits, thus they cannot be used.

The channels outside of those shown in the table above were not tested at lower power levels to determine a level at which compliance would be achieved. Therefore, to maintain compliance, only the channels shown in the table above shall be used.

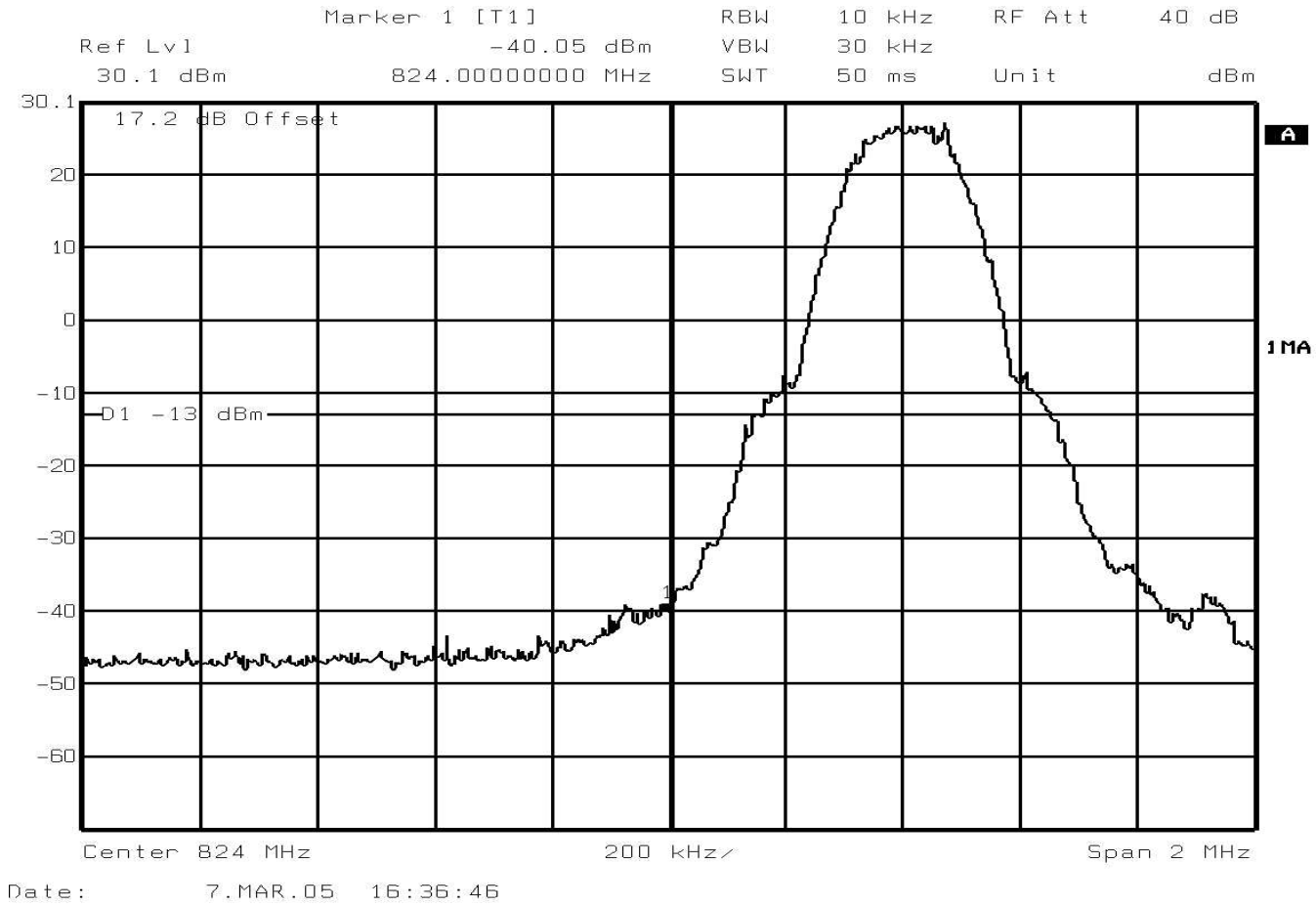
The measurement plots are shown on the following pages.

3.6 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

3.5.6 Test Results –Continued

Block Edge Measurement with EUT Transmitting on Full Power On Channel 129, (824.40MHz)
GMSK Modulation

Block A
824.0 – 835.0MHz

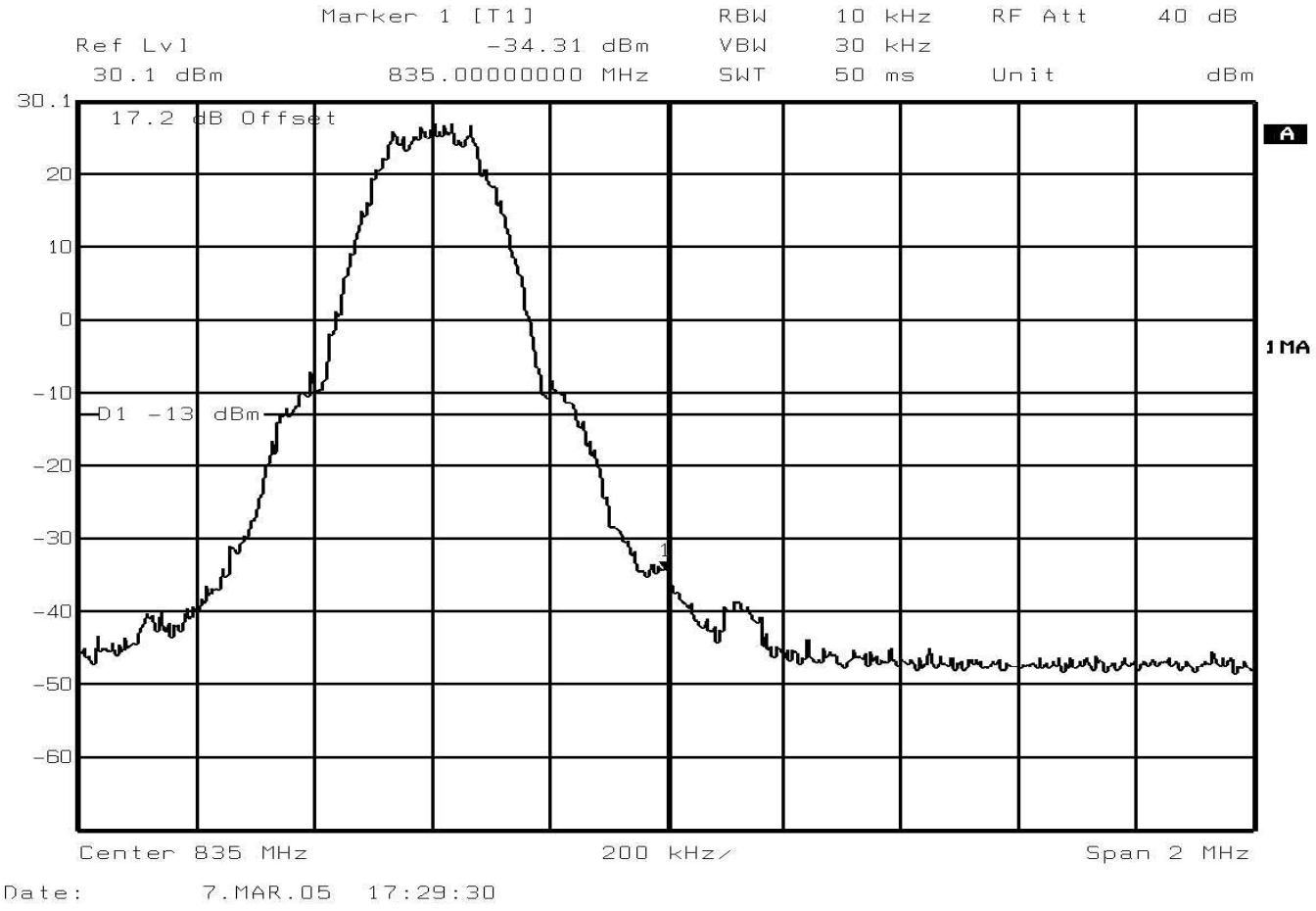


3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

3.5.6 Test Results –Continued

Block Edge Measurement With EUT Transmitting on Full Power On Channel 180, (834.60MHz)
GMSK Modulation

Block A
824.0 – 835.0MHz

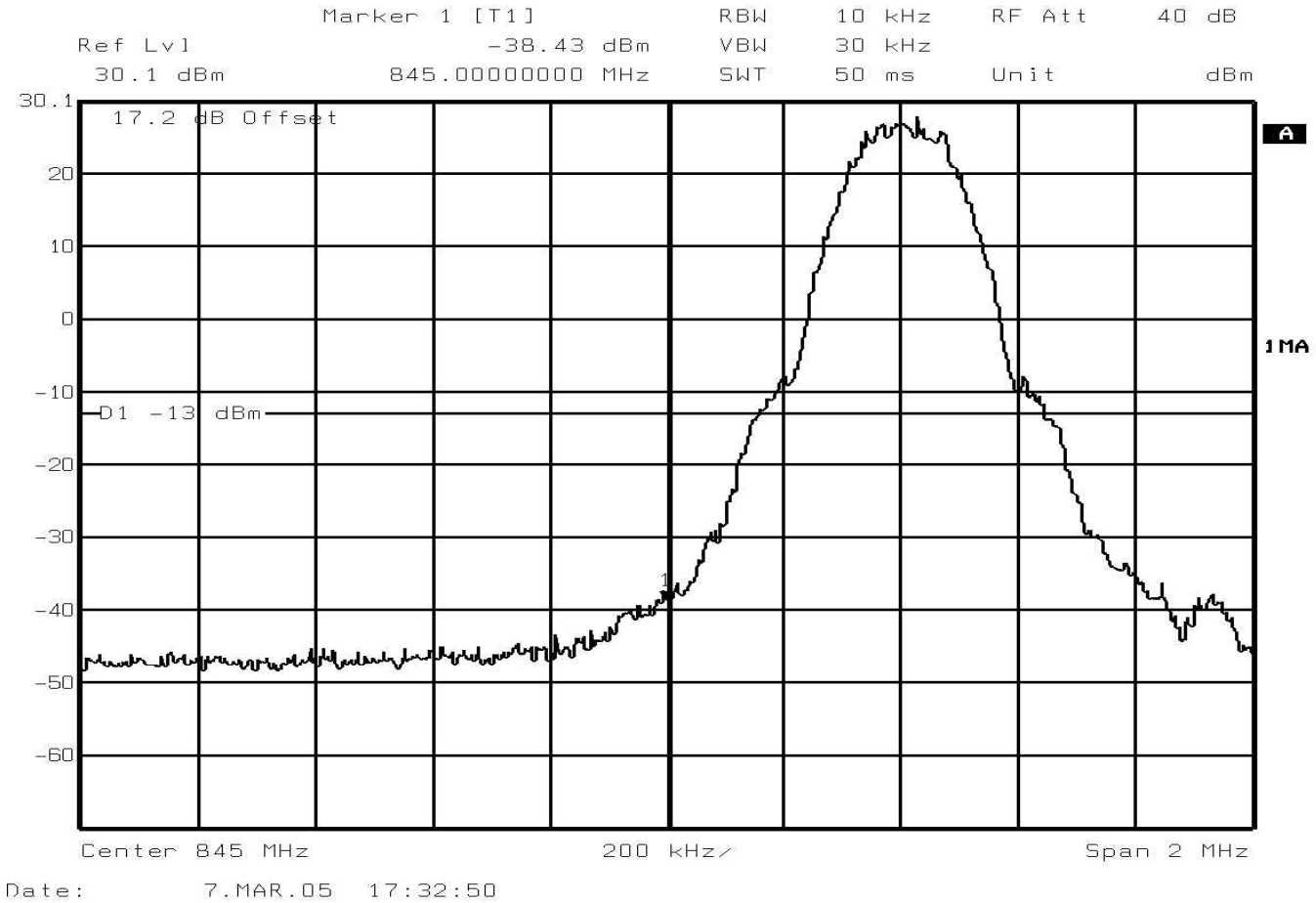


3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

3.5.6 Test Results –Continued

Block Edge Measurement With EUT Transmitting on Full Power On Channel 234, (845.4MHz)
GMSK Modulation

Block A
845.0 – 846.5MHz

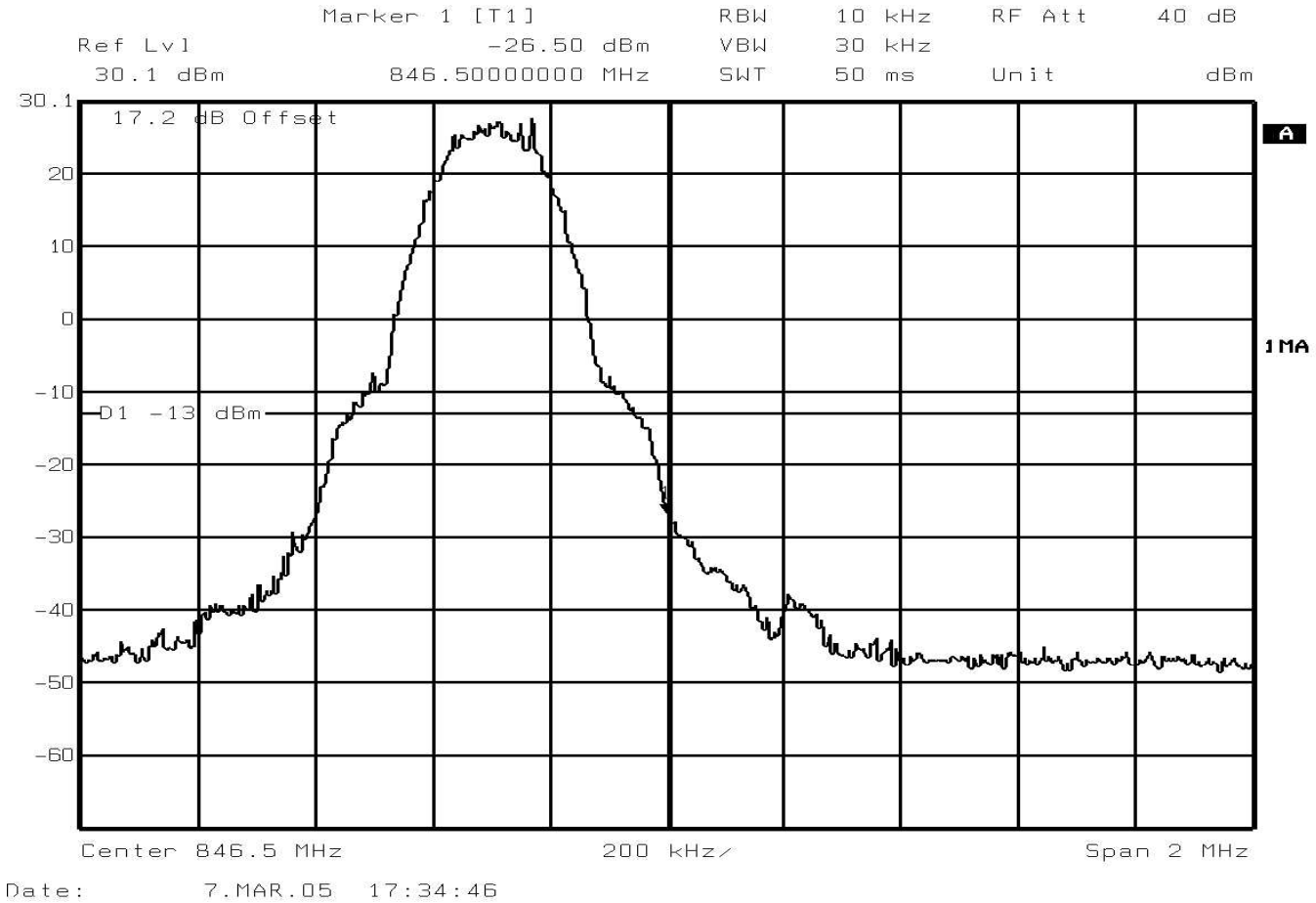


3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

3.5.6 Test Results –Continued

Block Edge Measurement With EUT Transmitting on Full Power On Channel 238, (846.2MHz)
GMSK Modulation

Block A
845.0 – 846.5MHz

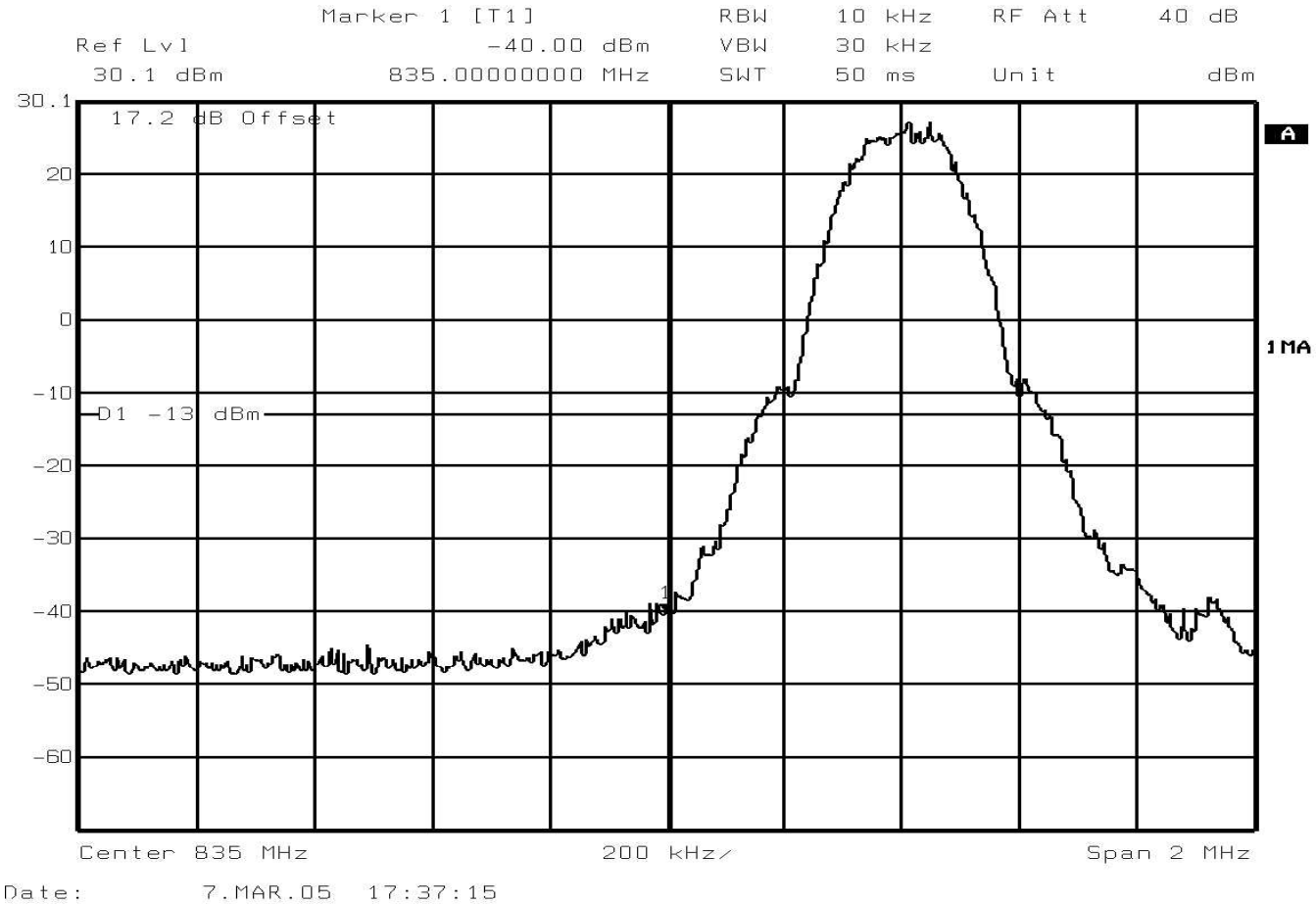


3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

3.5.6 Test Results –Continued

Block Edge Measurement With EUT Transmitting on Full Power On Channel 184, (835.4MHz)
GMSK Modulation

Block B
835.0 – 845.0MHz

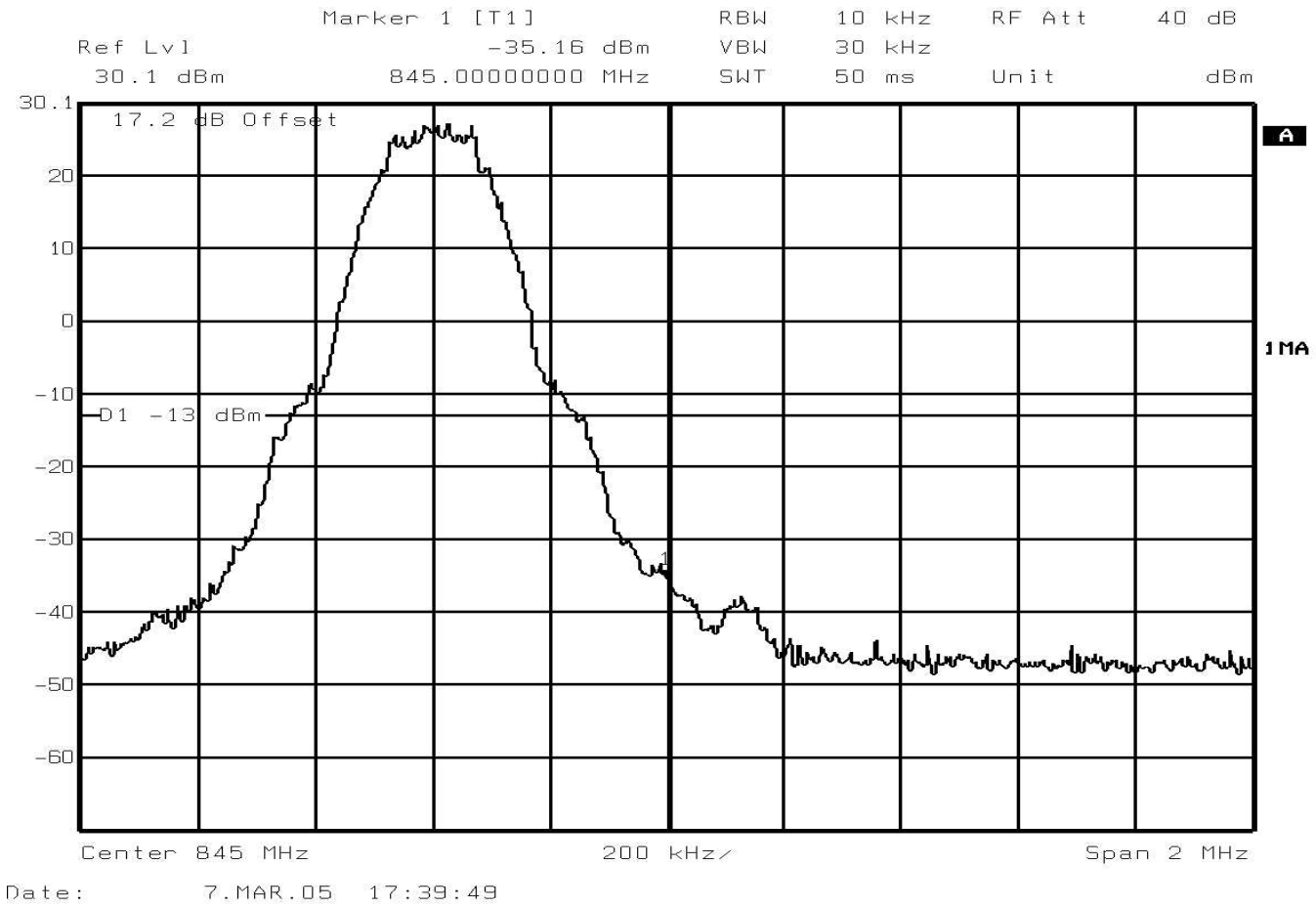


3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

3.5.6 Test Results –Continued

Block Edge Measurement With EUT Transmitting on Full Power On Channel 230, (844.6MHz)
GMSK Modulation

Block A
835.0 – 845.0MHz

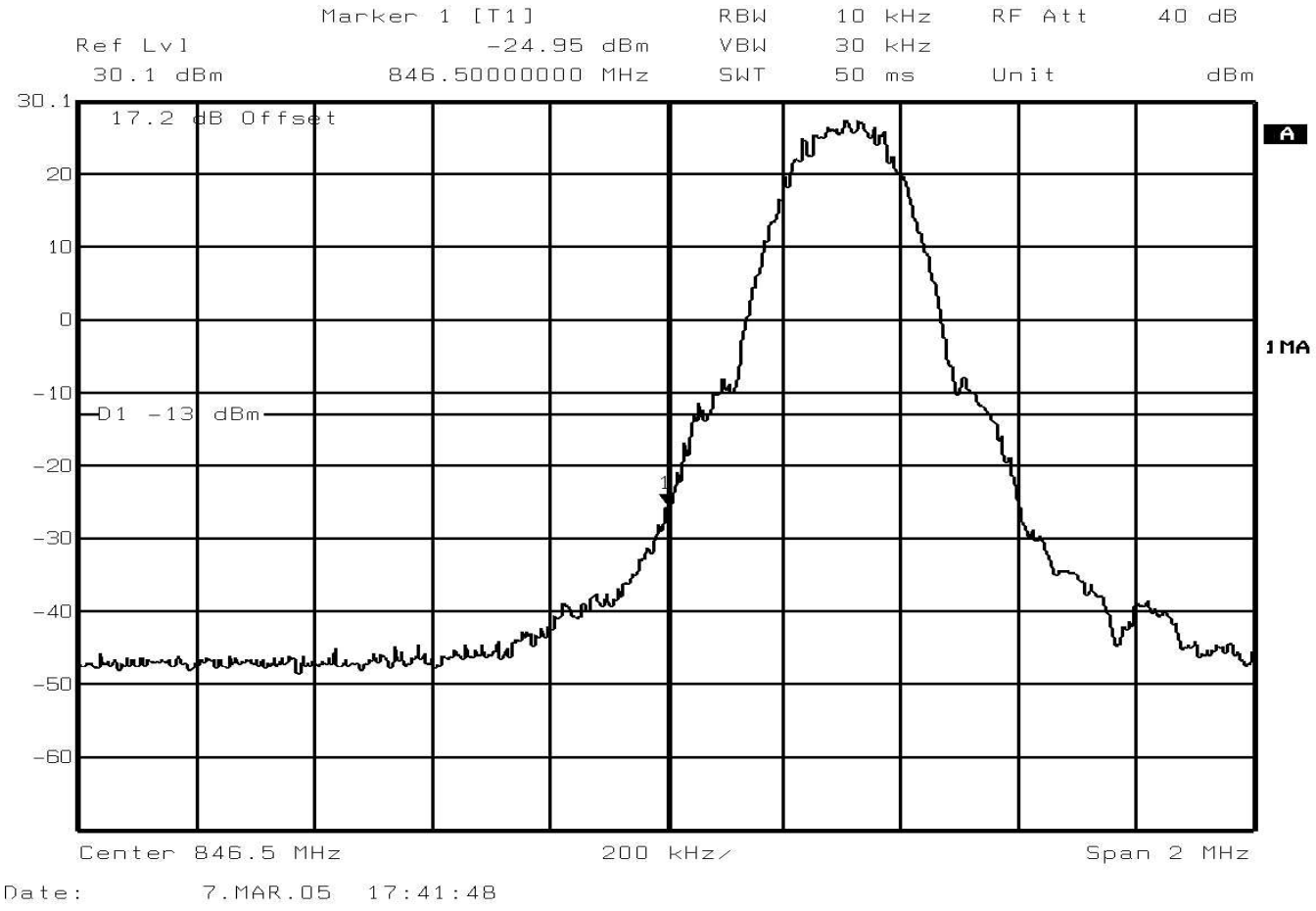


3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

3.5.6 Test Results –Continued

Block Edge Measurement With EUT Transmitting on Full Power On Channel 230, (846.8MHz)
GMSK Modulation

Block B
846.5 – 849.0MHz

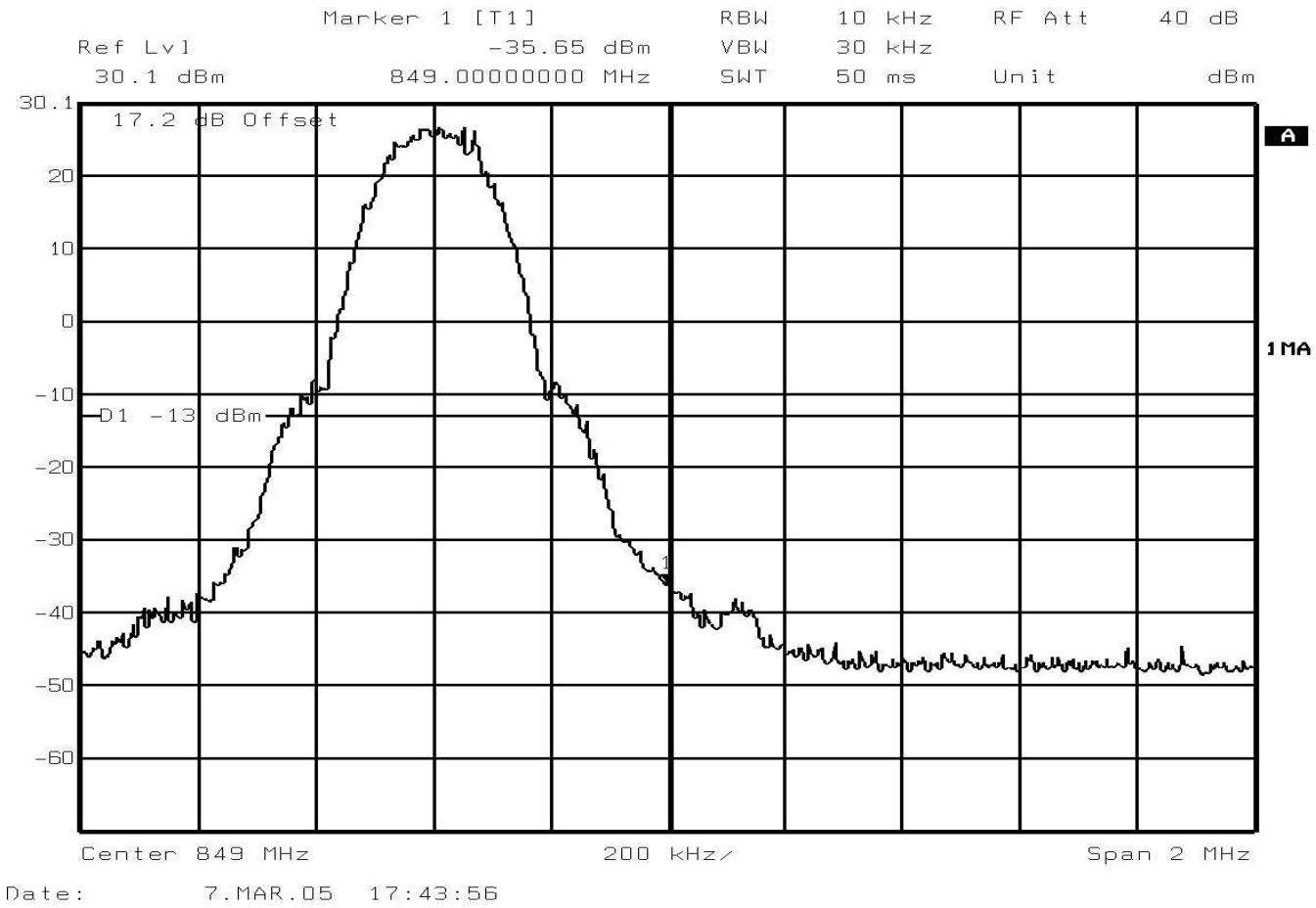


3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (+/-1MHz)

3.5.6 Test Results –Continued

Block Edge Measurement With EUT Transmitting on Full Power On Channel 241, (846.8MHz)
GMSK Modulation

Block B
846.5 – 849.0MHz



3.6 RADIATED SPURIOUS EMISSIONS

3.6.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1051, 22.917(a)

3.6.2 Equipment Under Test

SND321

3.6.3 Date of Test

2nd March 2005

3.6.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as within the Test Equipment Used table shown in Section 5.1.

Items: 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26

3.6.5 Test Procedure

Test Performed in accordance with ANSI C63.4.

In order to determine the Radiated Emission Limits, measurements of transmitter power (P) were first carried out on the top, middle and bottom channels using a peak detector, and the results are shown in the following table.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT, the list of emissions was then confirmed or updated under Anechoic Chamber (3 metres) conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions identified within the range 30MHz – 1GHz were then formally measured using a CISPR Quasi-Peak detector.

Emissions identified within the range 1GHz – 9GHz were then formally measured using Peak and Average Detectors, as appropriate.

The measurements were performed at a 3m distance unless otherwise stated.

3.6 RADIATED EMISSIONS - continued

3.6.5 Test Procedure

The limits for Spurious Emissions have been calculated, as shown in the table below using the following formula:

Field Strength of Carrier -(43 + 10Log (P)) dBµV/m

Where:
Field Strength is measured in dBµV/m
P is Declared Transmitter Power in Watts

Configuration 1 (GSM850)

Carrier Frequency GHz	Carrier Field Strength dBµV/m	Measured Power W	Limit for Spurious Emissions dBµV/m
824.2	122.4	0.489	62.5
836.4	123.8	0.537	83.5
848.8	124.9	0.616	84.0

Configuration 2 (GSM850)

Carrier Frequency GHz	Carrier Field Strength dBµV/m	Measured Power W	Limit for Spurious Emissions dBµV/m
824.2	122.6	0.489	83.7
836.4	124.0	0.537	83.7
848.8	125.6	0.616	84.7

These limits have been used to determine Pass or Fail for the harmonics measured and detailed in the following tables.

Product Service

3.6 RADIATED EMISSIONS - continued

3.6.6 Test Results - continued

30MHz – 1GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 22, Subpart H, 22.917(a) for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in GSM850 Mode (see Section 1.3.3 for details).

Configuration 1

EUT Tx on Bottom Channel (824.20MHz)

No emissions were detected within 20dB of the limit.

The test limit being 82.5dBµV/m

EUT Tx on Middle Channel (836.40MHz)

No emissions were detected within 20dB of the limit.

The test limit being 83.5dBµV/m

EUT Tx on Top Channel (848.80MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Test Limit
MHz	H/V	cm	deg	dBµV/m	dBµV/m
838.0	H	100	105	50.0	84.0

Product Service

3.6 RADIATED EMISSIONS - continued

3.6.6 Test Results - continued

30MHz – 1GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 22, Subpart H, 22.917(a) for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in GSM850 Mode (see Section 1.3.3 for details).

Configuration 2

EUT Tx on Bottom Channel (824.20MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Test Limit
MHz	H/V	cm	deg	dBµV/m	dBµV/m
873.0	V	100	057	48.7	83.7

EUT Tx on Middle Channel (836.40MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Test Limit
MHz	H/V	cm	deg	dBµV/m	dBµV/m
873.0	V	100	067	48.2	83.7

EUT Tx on Top Channel (848.80MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Test Limit
MHz	H/V	cm	deg	dBµV/m	dBµV/m
840.2	H	100	061	48.3	84.7
873.2	V	100	062	48.4	84.7

Product Service

3.6 RADIATED EMISSIONS - continued

3.6.6 Test Results - continued

1GHz – 9GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 22, Subpart H, 22.917(a) for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in GSM850 Mode (see Section 1.3.3 for details).

Configuration 1

EUT Tx on Bottom Channel (824.20MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Test Limit
MHz	H/V	cm	deg	dBµV/m	dBµV/m
1.648	H	100	280	67.3	82.5
4.121	H	100	006	59.0	82.5
5.770	V	100	037	68.1	82.5
6.593	H	100	275	60.5	82.5
8.241	H	100	221	68.2	82.5

EUT Tx on Middle Channel (836.40MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Test Limit
MHz	H/V	cm	deg	dBµV/m	dBµV/m
1.672	H	100	275	67.2	83.5
4.182	H	100	187	65.2	83.5
5.018	H	100	323	62.2	83.5
5.855	H	100	037	73.6	83.5
6.691	H	100	037	62.5	83.5
8.363	V	100	222	71.5	83.5

Product Service

3.6 RADIATED EMISSIONS - continued

3.6.6 Test Results - continued

1GHz – 9GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 22, Subpart H, 22.917(a) for Radiated Emissions (30MHz – 1GHz).

EUT Tx on Top Channel (848.80MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Test Limit
MHz	H/V	cm	deg	dBµV/m	dBµV/m
1.697	H	100	306	67.8	84.0
4.243	H	100	189	70.6	84.0
5.092	V	100	160	62.1	84.0
5.941	H	108	022	72.9	84.0
6.790	V	100	183	60.6	84.0
8.487	H	109	232	69.8	84.0

ABBREVIATIONS FOR ABOVE TABLES

H Horizontal Polarisation V Vertical Polarisation

Product Service

3.6 RADIATED EMISSIONS - continued

3.6.6 Test Results - continued

1GHz – 9GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 22, Subpart H, 22.917(a) for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in GSM850 Mode (see Section 1.3.3 for details).

Configuration 2

EUT Tx on Bottom Channel (824.20MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Test Limit
MHz	H/V	cm	deg	dBµV/m	dBµV/m
1.648	V	100	310	64.9	83.7
4.122	H	100	174	60.0	83.7
5.765	H	100	042	68.5	83.7
6.594	H	100	276	61.7	83.7
8.241	V	102	223	69.9	83.7

EUT Tx on Middle Channel (836.40MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Test Limit
MHz	H/V	cm	deg	dBµV/m	dBµV/m
1.672	H	121	207	61.6	83.7
4.182	H	100	175	65.5	83.7
5.018	H	100	317	62.2	83.7
5.855	V	100	261	73.4	83.7
6.691	V	100	175	62.8	83.7
8.364	V	109	172	67.8	83.7

3.6 RADIATED EMISSIONS - continued

3.6.6 Test Results - continued

1GHz – 9GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 22, Subpart H, 22.917 (a) for Radiated Emissions (30MHz – 1GHz).

EUT Tx on Top Channel (848.80MHz)

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Test Limit
MHz	H/V	cm	deg	dBµV/m	dBµV/m
1.697	H	100	253	62.7	84.7
4.242	H	100	186	69.6	84.7
5.094	V	100	164	61.4	84.7
5.945	H	100	296	72.5	84.7
6.789	V	100	177	60.3	84.7
8.487	V	100	168	71.8	84.7

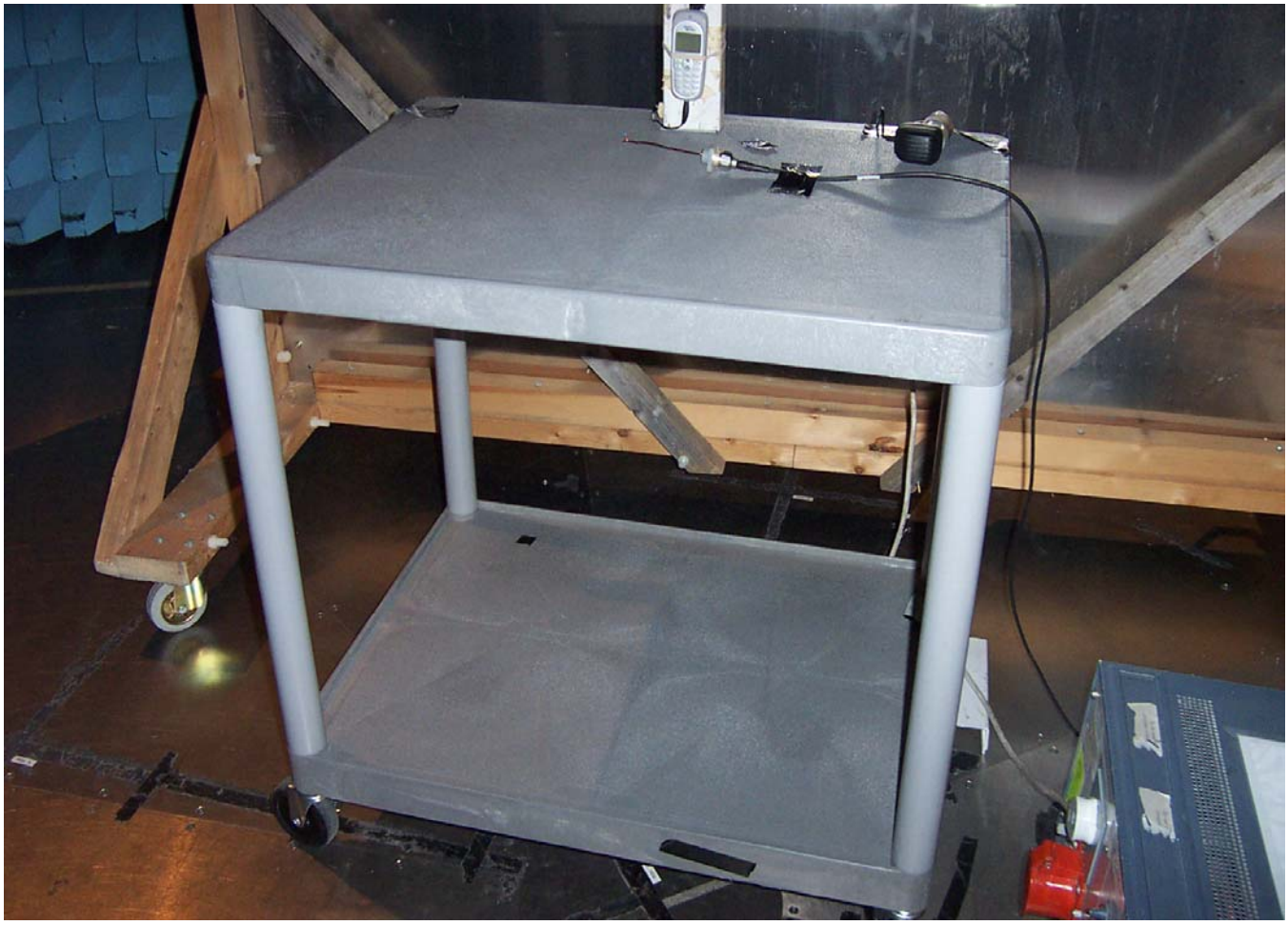
ABBREVIATIONS FOR ABOVE TABLES

H Horizontal Polarisation V Vertical Polarisation

Product Service

3.6 RADIATED EMISSIONS - continued

3.6.7 Set Up Photograph



Radiated Emissions Set Up Photograph

3.7 SPURIOUS EMISSIONS

3.7.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1051, 22.917 (a)

3.7.2 Equipment Under Test

SND321

3.7.3 Date of Test

2nd March 2005

3.7.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as within the Test Equipment Used table shown in Section 5.1.

Items: 1, 2, 3, 4, 5, 6, 7, 8

3.7.5 Test Procedure

In accordance with Part 2.1051, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 9kHz to 9GHz. The EUT was set to transmit on full power on timeslot 3 and minimum power on timeslot 3. The EUT was tested on Bottom, Middle and Top channels for both power levels. The resolution and video bandwidths were set to 1MHz thus meeting the requirements of Part 22.917(b). The spectrum analyser detector was set to Max Hold.

From 9kHz to 1.4GHz, an attenuator was used. For measuring the range 1.4GHz to 9GHz, an attenuator and high pass filter were used. This was to reduce saturation effects in the spectrum analyser.

The maximum path loss across the measurement band was used as the reference level offset to ensure worst case.

In addition, measurements were made up to the 10th harmonic of the fundamental.

3.7.6 Test Results

See test plots.

Remarks

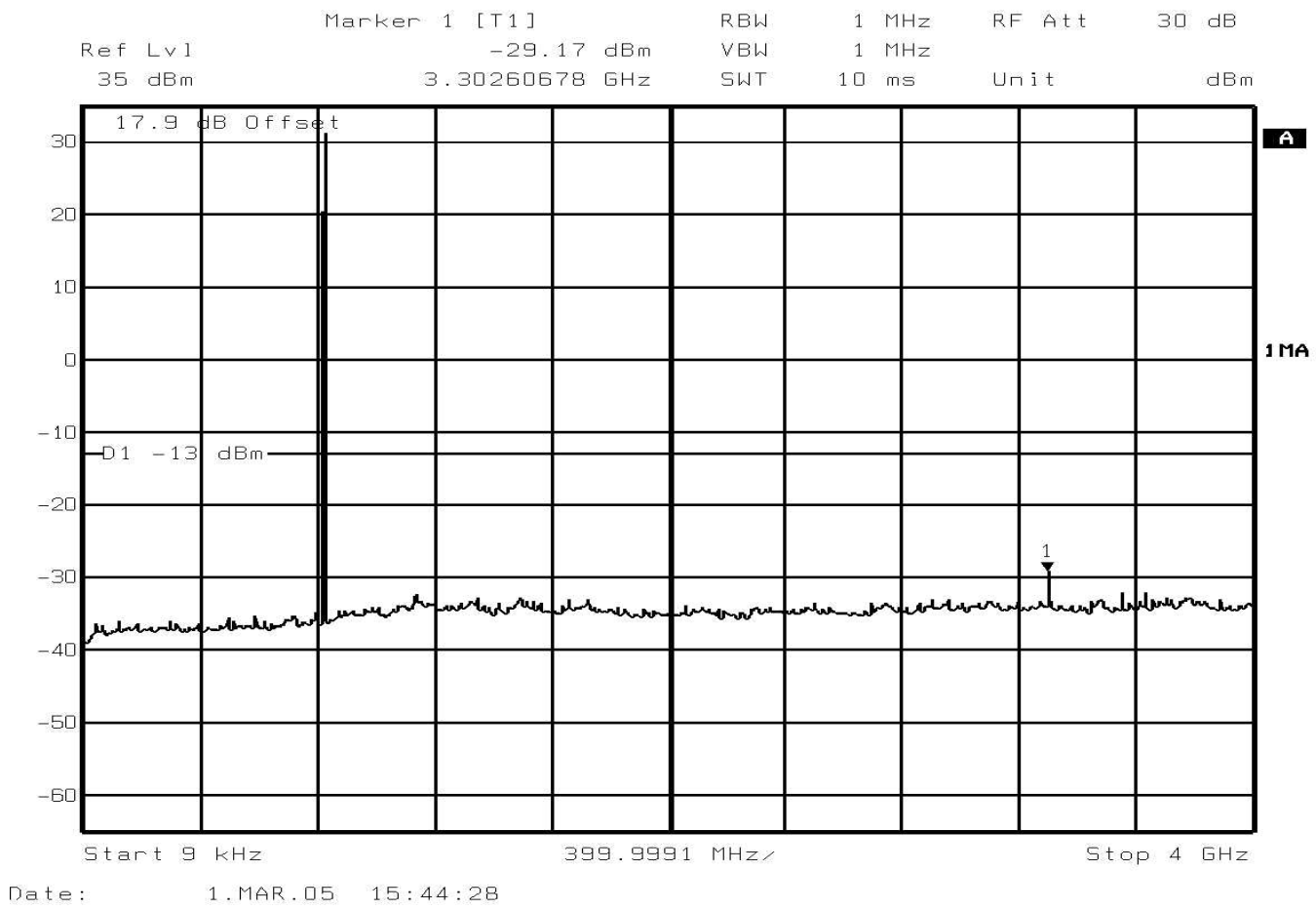
The EUT passed the requirements laid out in 22.917(a).

The plots on the following pages show the frequency spectrum from 9kHz to 9GHz of the EUT

3.7 SPURIOUS EMISSIONS

3.7.6 Test Results

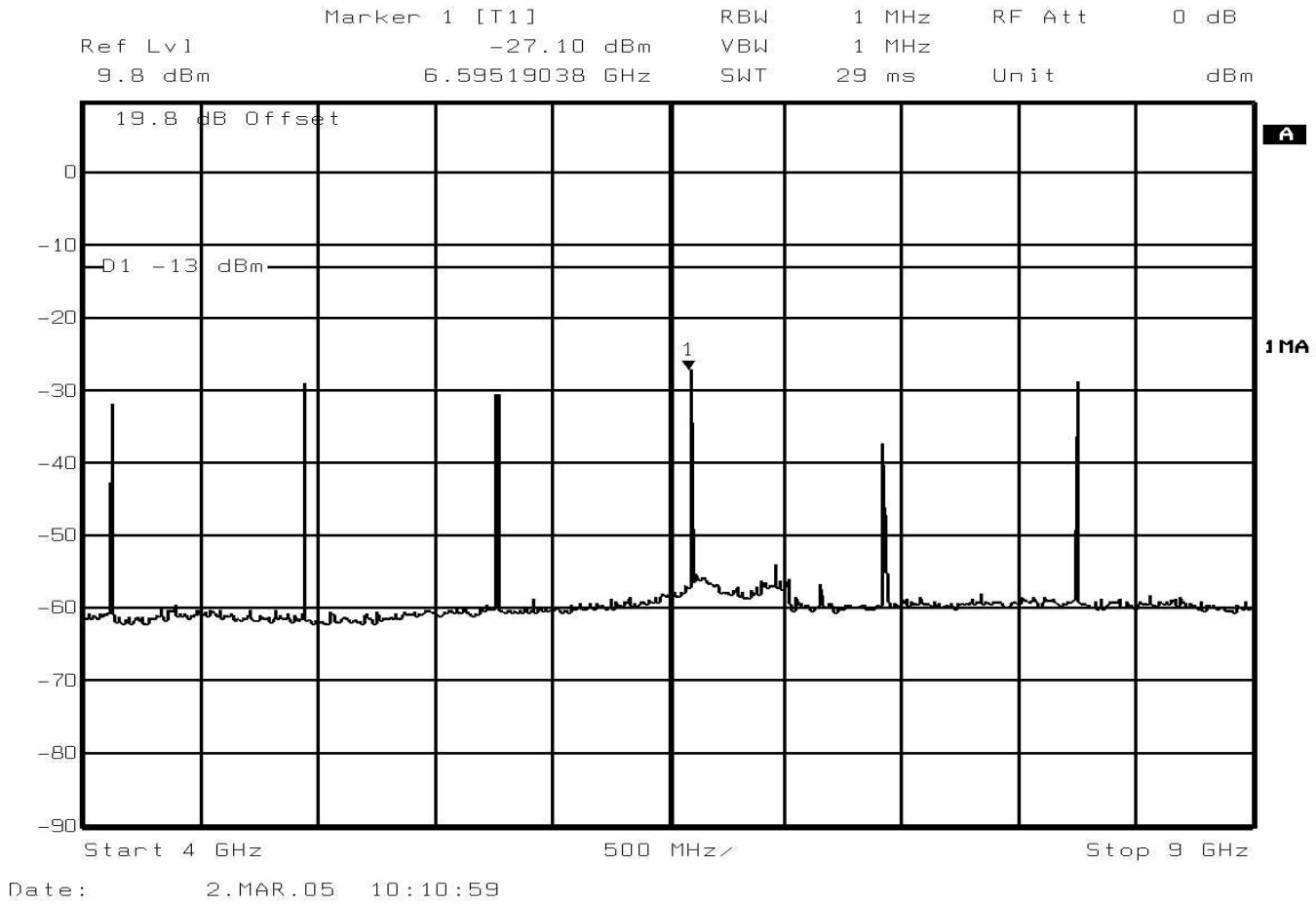
Spurious Emissions (9kHz – 4.0GHz)
Channel 128, (824.2MHz) – Maximum Power - GMSK
3.7V DC Supply



3.7 SPURIOUS EMISSIONS

3.7.6 Test Results - Continued

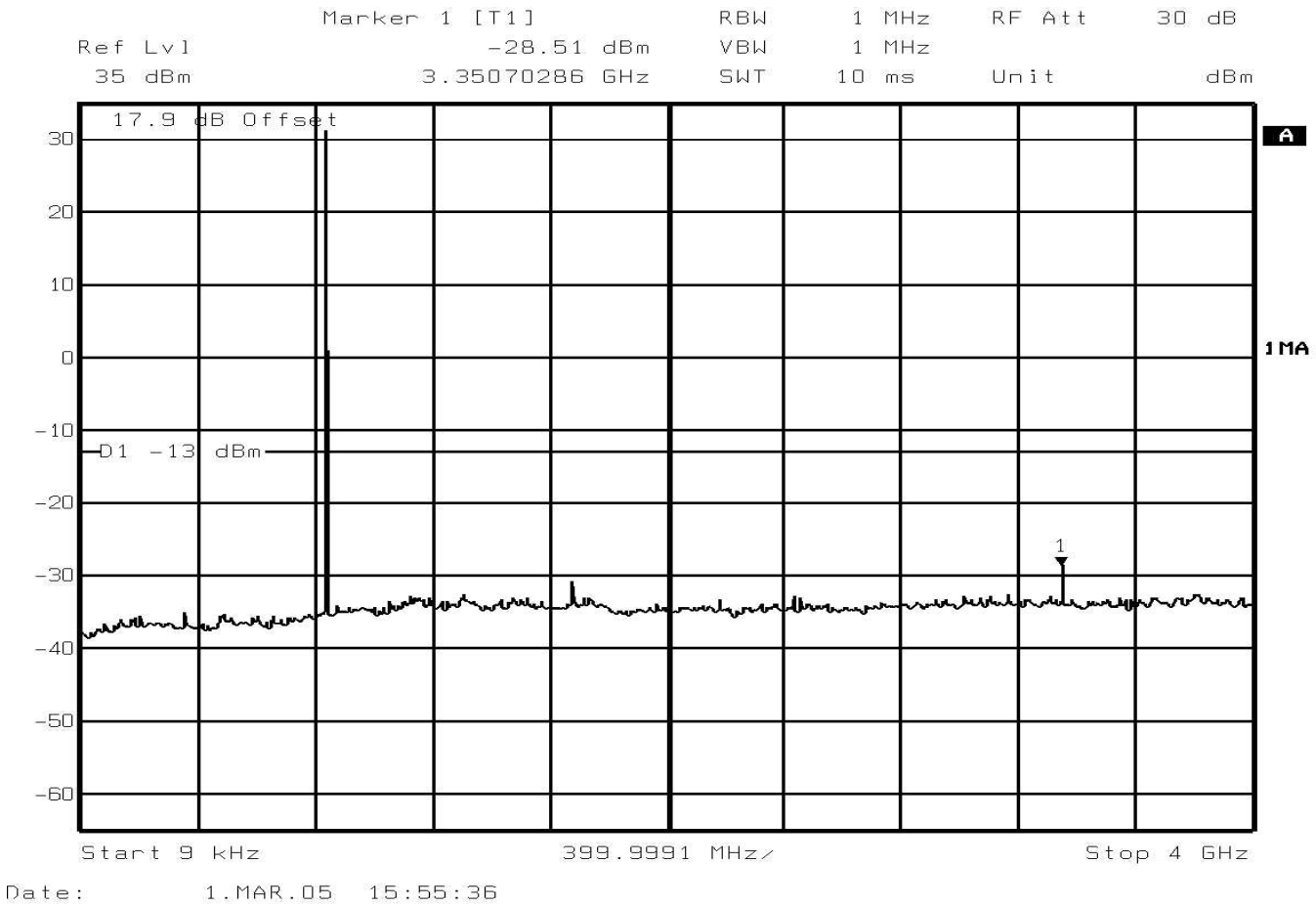
Spurious Emissions (4.0GHz – 9.0GHz)
Channel 128, (824.2MHz) – Maximum Power - GMSK
3.7V DC Supply



3.7 SPURIOUS EMISSIONS

3.7.6 Test Results - Continued

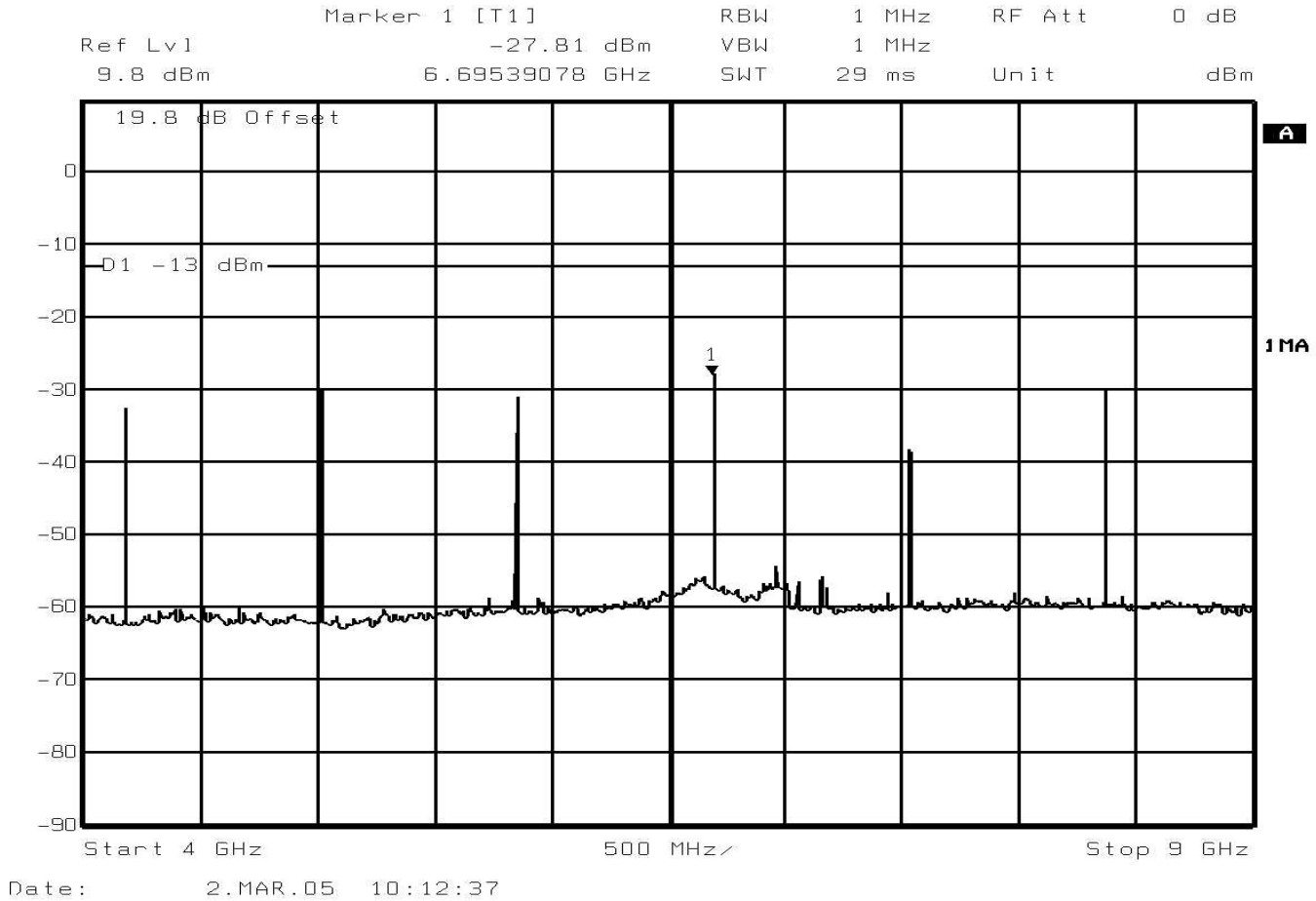
Spurious Emissions (9kHz – 4.0GHz)
Channel 189, (836.4MHz) – Maximum Power - GMSK
3.7V DC Supply



3.7 SPURIOUS EMISSIONS

3.7.6 Test Results - Continued

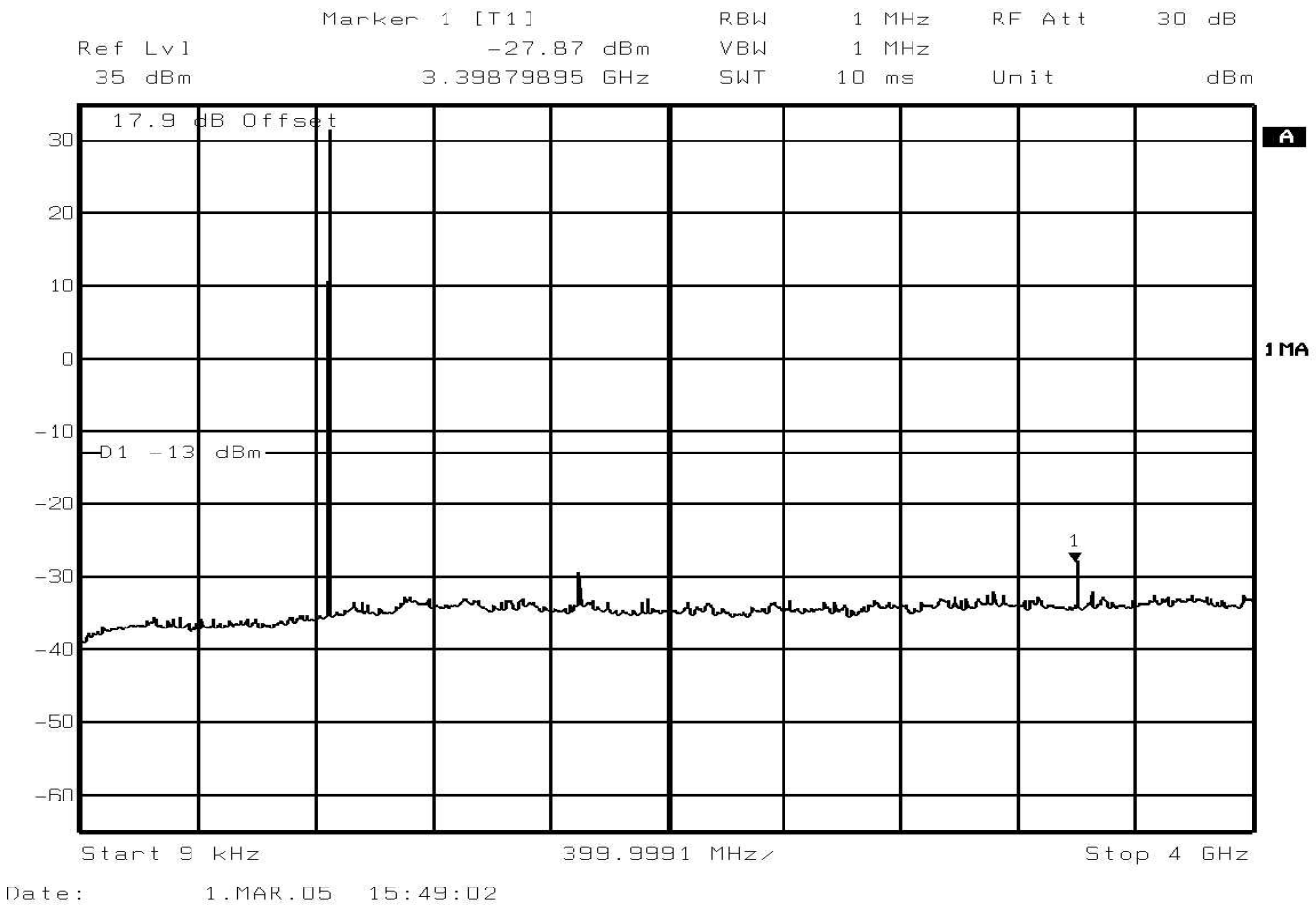
Spurious Emissions (4.0GHz – 9.0GHz)
Channel 189, (836.4MHz) – Maximum Power - GMSK
3.7V DC Supply



3.7 SPURIOUS EMISSIONS

3.7.6 Test Results - Continued

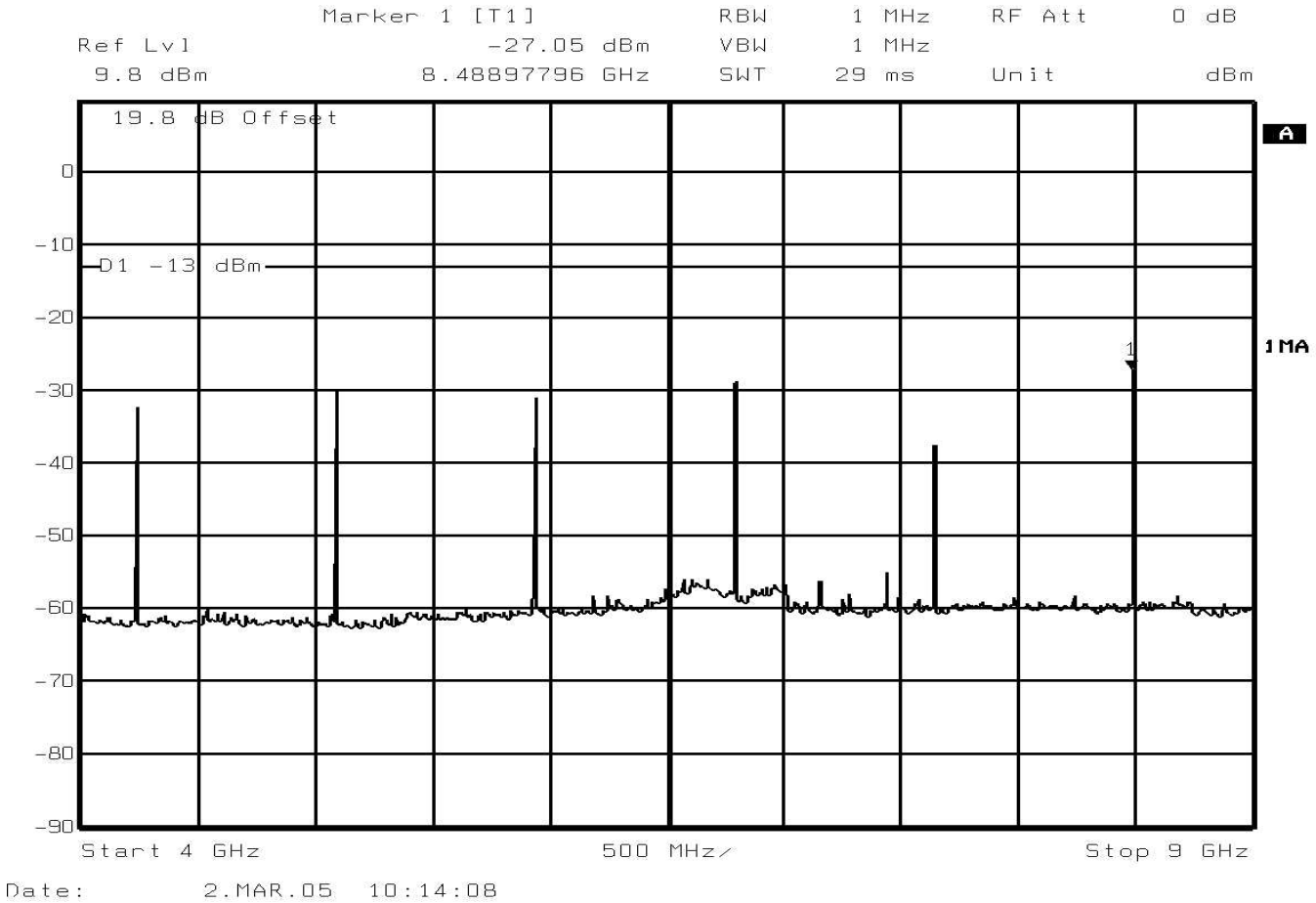
Spurious Emissions (9kHz – 4.0GHz)
Channel 251, (848.8MHz) – Maximum Power - GMSK
3.7V DC Supply



3.7 SPURIOUS EMISSIONS

3.7.6 Test Results - Continued

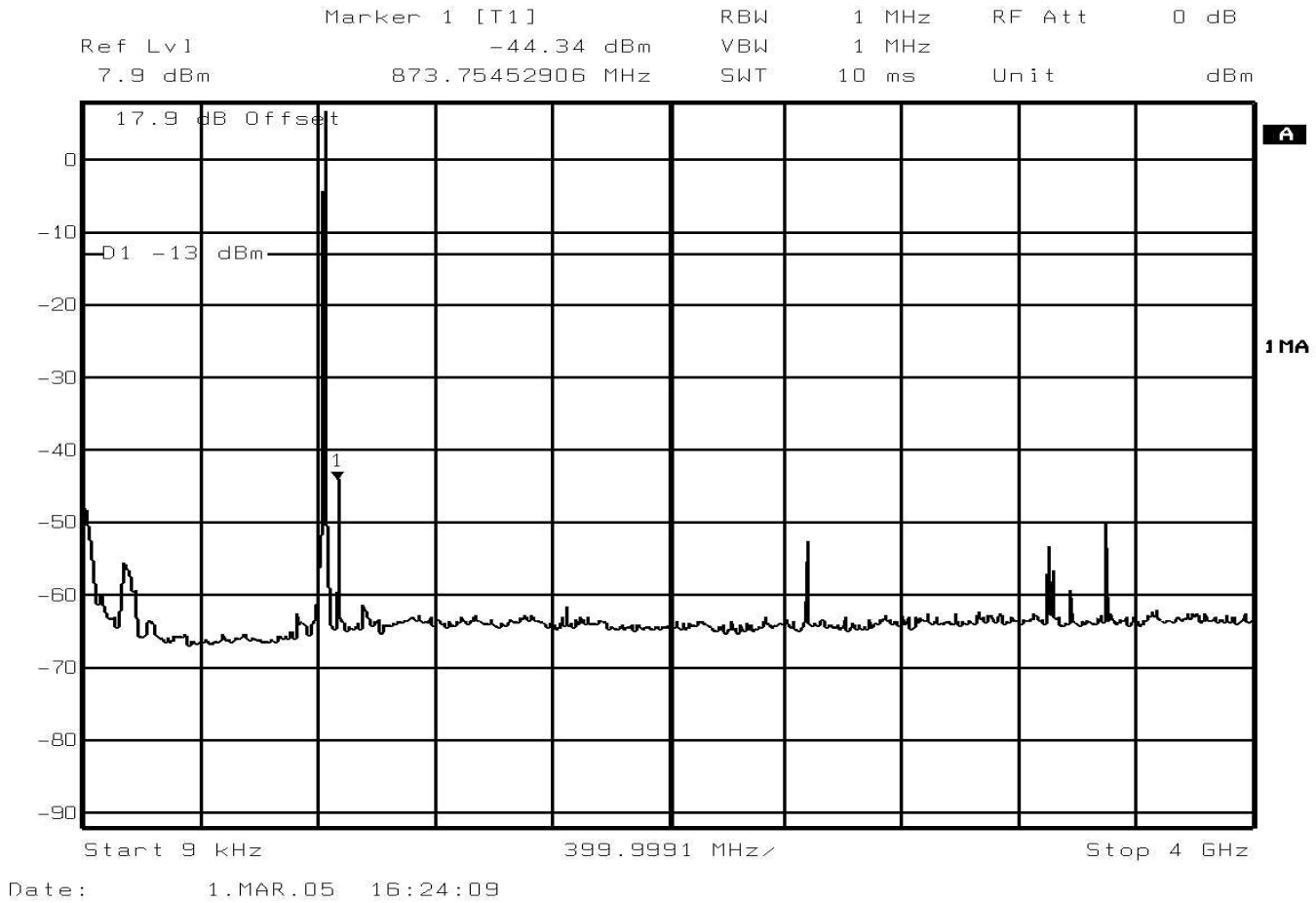
Spurious Emissions (4.0GHz – 9.0GHz)
Channel 251, (848.8MHz) – Maximum Power - GMSK
3.7V DC Supply



3.7 SPURIOUS EMISSIONS

3.7.6 Test Results - Continued

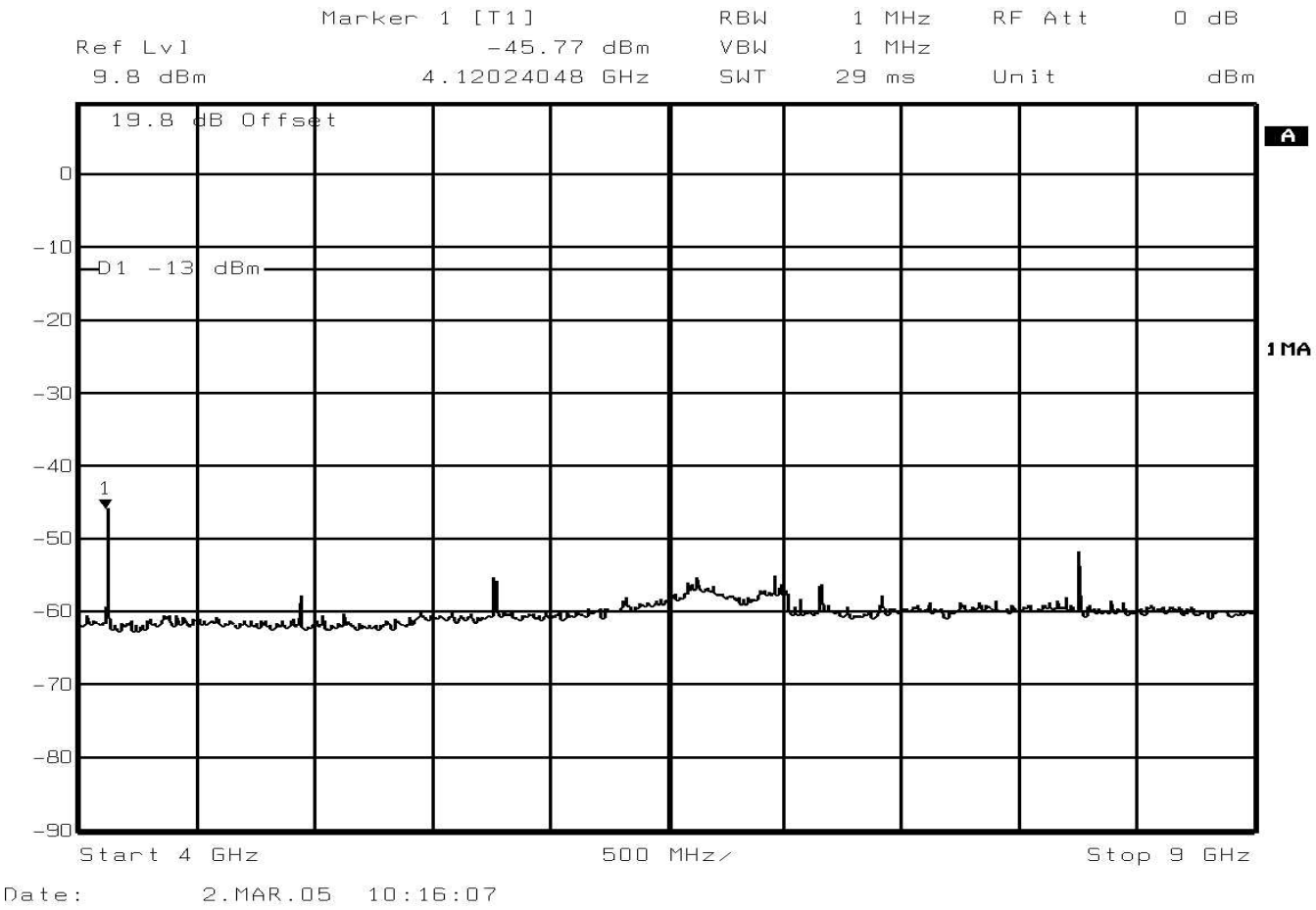
Spurious Emissions (9kHz – 4.0GHz)
Channel 128, (824.2MHz) – Minimum Power - GMSK
3.7V DC Supply



3.7 SPURIOUS EMISSIONS

3.7.6 Test Results - Continued

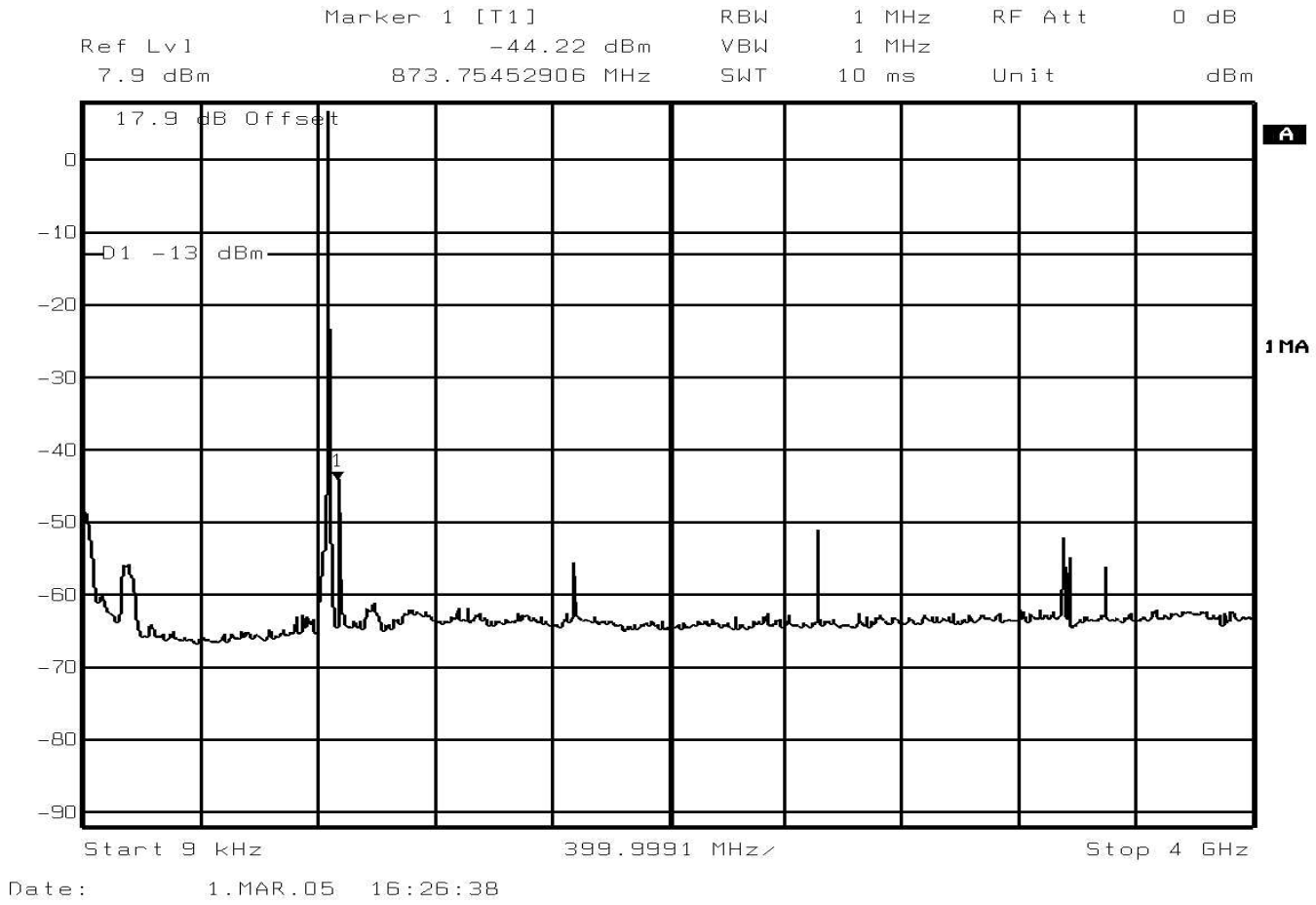
Spurious Emissions (4.0GHz – 9.0GHz)
Channel 128, (824.2MHz) – Minimum Power - GMSK
3.7V DC Supply



3.7 SPURIOUS EMISSIONS

3.7.6 Test Results - Continued

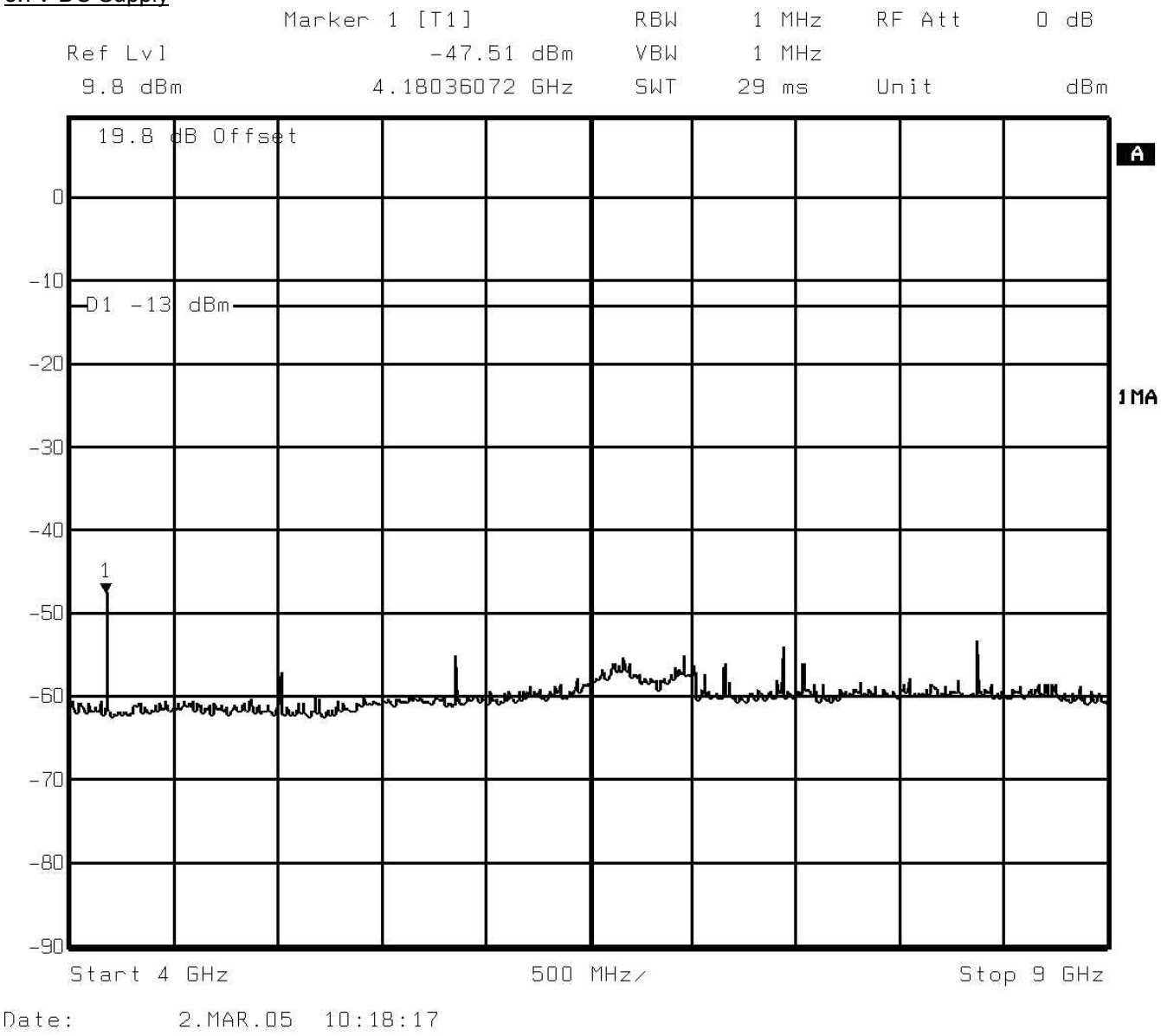
Spurious Emissions (9kHz – 4.0GHz)
Channel 189, (836.4MHz) – Minimum Power - GMSK
3.7V DC Supply



3.7 SPURIOUS EMISSIONS

3.7.6 Test Results - Continued

Spurious Emissions (4.0GHz – 9.0GHz)
Channel 189, (836.4MHz) – Minimum Power - GMSK
3.7V DC Supply

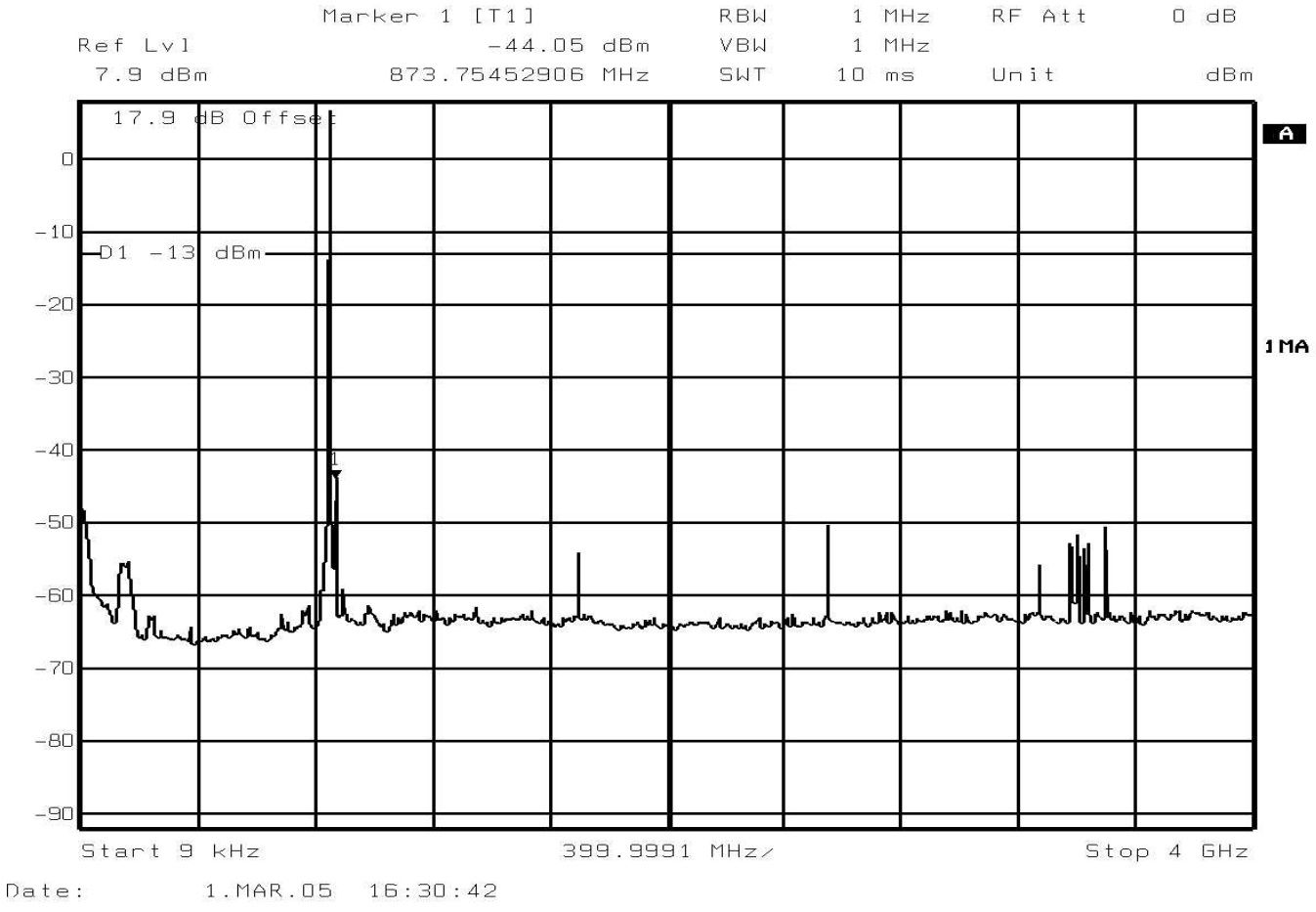


Product Service

3.7 SPURIOUS EMISSIONS

3.7.6 Test Results - Continued

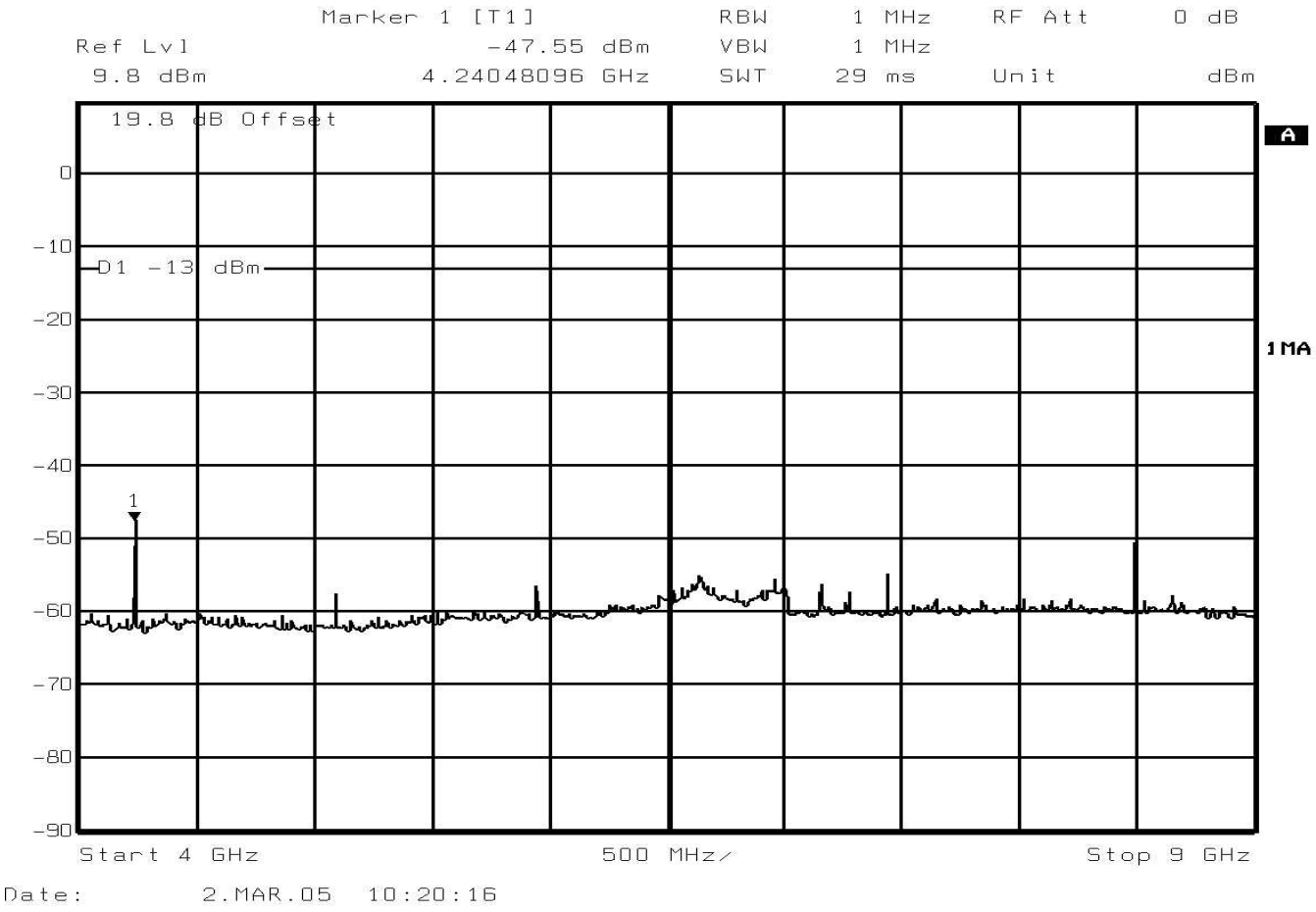
Spurious Emissions (9kHz – 4.0GHz)
Channel 251, (848.8MHz) – Minimum Power - GMSK
3.7V DC Supply



3.7 SPURIOUS EMISSIONS

3.7.6 Test Results - Continued

Spurious Emissions (4.0GHz – 9.0GHz)
Channel 251, (848.8MHz) – Minimum Power - GMSK
3.7V DC Supply



3.7 SPURIOUS EMISSIONS - Continued

Harmonic Emissions Channel 128 (824.2MHz) – Maximum Power

Frequency (GHz)	Raw Result (dBm)	Path Loss (dB)	Corrected Result (dBm)	Limit (dBm)
1648.4	-58.99	17.5	-41.49	-13.0
2472.6	-65.45	17.3	-48.15	-13.0
3296.8	-50.25	17.2	-33.05	-13.0
4121.0	-51.43	17.7	-33.73	-13.0
4945.2	-48.21	17.8	-30.41	-13.0
5769.4	-49.16	17.9	-31.26	-13.0
6593.6	-46.77	17.9	-28.87	-13.0
7417.8	-56.33	17.6	-38.93	-13.0
8242.0	-47.53	17.5	-30.03	-13.0

Harmonic Emissions Channel 190 (836.6MHz)– Maximum Power

Frequency (GHz)	Raw Result (dBm)	Path Loss (dB)	Corrected Result (dBm)	Limit (dBm)
1673.2	-57.20	17.5	-39.70	-13.0
2509.8	-66.96	17.5	-49.46	-13.0
3346.4	-50.61	17.2	-33.41	-13.0
4183.0	-50.87	17.2	-33.67	-13.0
5019.6	-48.92	17.9	-31.02	-13.0
5856.2	-49.77	18.0	-31.77	-13.0
6692.8	-46.95	17.6	-29.35	-13.0
7529.4	-57.11	17.7	-39.41	-13.0
8366.0	-46.99	18.1	-28.89	-13.0

3.7 SPURIOUS EMISSIONS - Continued

Harmonic Emissions Channel 251 (848.8MHz) – Maximum Power

Frequency (GHz)	Raw Result (dBm)	Path Loss (dB)	Corrected Result (dBm)	Limit (dBm)
1697.6	-54.92	17.5	-37.42	-13.0
2546.4	-66.65	17.4	-49.25	-13.0
3395.2	-49.61	17.2	-32.41	-13.0
4244.0	-51.50	17.8	-33.70	-13.0
5092.8	-49.06	17.4	-31.66	-13.0
5941.6	-49.93	17.9	-32.03	-13.0
6790.4	-48.10	17.8	-30.30	-13.0
7639.2	-56.14	17.6	-38.54	-13.0
8488.0	-46.49	18.0	-28.49	-13.0

Harmonic Emissions Channel 128 (824.2MHz) – Minimum Power

Frequency (GHz)	Raw Result (dBm)	Path Loss (dB)	Corrected Result (dBm)	Limit (dBm)
1648.4	-78.90	17.5	-61.40	-13.0
2472.6	-70.26	17.3	-52.96	-13.0
3296.8	-70.58	17.2	-53.38	-13.0
4121.0	-65.78	17.7	-48.08	-13.0
4945.2	-77.06	17.8	-59.26	-13.0
5769.4	-73.68	17.9	-55.78	-13.0
6593.6	-76.21	17.9	-58.31	-13.0
7417.8	-75.68	17.6	-58.08	-13.0
8242.0	-70.37	17.5	-52.87	-13.0

3.7 **SPURIOUS EMISSIONS -** Continued

Harmonic Emissions Channel 190 (836.6MHz) – Minimum Power

Frequency (GHz)	Raw Result (dBm)	Path Loss (dB)	Corrected Result (dBm)	Limit (dBm)
1648.4	-78.92	17.5	-61.42	-13.0
2472.6	-69.58	17.5	-52.08	-13.0
3296.8	-70.49	17.2	-53.29	-13.0
4121.0	-66.12	17.2	-48.92	-13.0
4945.2	-76.70	17.9	-58.80	-13.0
5769.4	-74.90	18.0	-56.90	-13.0
6593.6	-75.31	17.6	-57.71	-13.0
7417.8	-74.93	17.7	-57.23	-13.0
8242.0	-70.60	18.1	-52.50	-13.0

Harmonic Emissions Channel 251 (848.8MHz) – Minimum Power

Frequency (GHz)	Raw Result (dBm)	Path Loss (dB)	Corrected Result (dBm)	Limit (dBm)
1673.2	-77.18	17.5	-59.68	-13.0
2509.8	-68.71	17.4	-51.31	-13.0
3346.4	-69.10	17.2	-51.90	-13.0
4183.0	-67.25	17.8	-49.45	-13.0
5019.6	-76.78	17.4	-59.38	-13.0
5856.2	-75.15	17.9	-57.25	-13.0
6692.8	-75.42	17.8	-57.62	-13.0
7529.4	-72.93	17.6	-55.36	-13.0
8366.0	-70.01	18.0	-52.01	-13.0

3.8 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

3.8.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1055, 22.355

3.8.2 Equipment Under Test

SND321

3.8.3 Date of Test

8th March 2005

3.8.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as within the Test Equipment Used table shown in Section 5.1.

Items: 2, 3, 4, 5, 6, 10, 11

3.8.5 Test Procedure

The EUT was set to transmit on maximum power with all timeslots active. A Digital Communication Analyser, (CMU200), was used to measure the frequency error. The average result was taken over 200 bursts. The temperature was adjusted between –30ºC and +50ºC in 10º steps as per 2.1055.

3.8.6 Results

3.7V DC Supply - GMSK Modulation

Temperature Interval (ºC)	Test Frequency (MHz)	Deviation (Hz)	Limit (kHz)
-30	836.6	-16	±2.092
-20	836.6	-16	±2.092
-10	836.6	-12	±2.092
0	836.6	-13	±2.092
+10	836.6	+12	±2.092
+20	836.6	-10	±2.092
+30	836.6	-15	±2.092
+40	836.6	-11	±2.092
+50	836.6	-12	±2.092

Remarks

EUT complies with CFR 47 Part 22.355. The frequency stability of the EUT is sufficient to keep it within the authorised frequency blocks at any temperature interval across the measured range.

Test Equipment Used:

2, 3, 4, 5, 6, 10, 11

3.9 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

3.9.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 2.1055, 22.355

3.9.2 Equipment Under Test

SND321

3.9.3 Date of Test

8th March 2005

3.9.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as within the Test Equipment Used table shown in Section 5.1.

Items: 2, 3, 4, 5, 6, 10, 11

3.9.5 Test Procedure

Measurement Method

The EUT was set to transmit on maximum power on timeslot 3. A Digital Communication Analyser, (CMU200), was used to measure the frequency error. The average result was taken over 200 bursts.

3.9.6 Results

3.7V DC Supply

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Deviation Limit (kHz)
3.7	836.6	-10	±2.092

Remarks

EUT complies with CFR 47 Part 22.355. The EUT does not exceed ±2.092kHz at the measured frequency either at nominal or voltage variation.

Product Service

SECTION 4

TEST DETAILS

FCC CFR 47: Part 24 Testing in support of an
Application for Grant of Equipment Authorisation
of a Sendo SND321 Dual-Band Mobile Handset

4.1 MAXIMUM PEAK OUTPUT POWER (CONDUCTED)

4.1.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.232(b), 2.1046

4.1.2 Equipment Under Test

SND321

4.1.3 Date of Test

15th March 2005

4.1.4 Test Equipment Used (See Section 5.1 for details)

The major items of test equipment used for the above tests are identified as within the Test Equipment Used table shown in Section 5.1.

Items: 1, 2, 3, 4, 5, 6, 7, 8

4.1.5 Test Procedure

Using a spectrum analyser and attenuator(s), the output power of the EUT was measured at the antenna terminals. The EUT supports GSM only. The device is a class 1 mobile. The carrier was modulated by it's normal GMSK modulation and measurements performed on Timeslot 3.

The spectrum analyser RBW and VBW were set to 1MHz and the path loss measured and entered as a reference level offset.