KTL Test Report:	8L0388EUSCA
Applicant:	ADEMCO Group 165 Eileen Way Syosset, NY 11791
Equipment Under Test: (E.U.T.)	NSA 1000
FCC ID:	CFSK3852
In Accordance With:	FCC Part 22, Subpart H and RSS-118 800 MHz Cellular Subscriber Units
Tested By:	KTL Dallas, Inc. 802 N. Kealy Lewisville, TX 75057-3136
Authorized By:	Tom Tidwell, RF Engineering Lab Manager
Date:	May 1999
Total Number of Pages:	48

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R.F. Power Output Occupied Bandwidth Spurious Emissions at Antenna Terminals Field Strength of Spurious Radiation Frequency Stability Audio Frequency Response, Audio Low Pass Filter Response and Modulation Limiting

Section 1.		Summary of Test Results			
Manufacturer:	Manufacturer: Niigata Seimitsu Co. Ltd.				
Model No.:		NSA 1000			
Serial No.:		005			
General:	neral: All measurements are traceable to national standards.			ls.	
These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 22, Subpart H and RSS-118.					
$\boxtimes$	New S	ubmission		Production	n Unit
	Class l	I Permissive Change	$\square$	Pre-Produc	ction Unit
T N B	Equip	oment Code			
	THIS	TEST REPORT RELATES ONLY TO T	THE ITE	EM(S) TEST	ED.
THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. See "Summary of Test Data".					
		NVLAP LAB CODE: 100	0426-0		
TESTED BY:	ŀ	Ronald Gaytan		DATE:	03/10/99
	ł	Ronald Gaytan, Senior RF Technician			

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# Summary Of Test Data

NAME OF TEST	PARA.	SPEC.	MEAS.	RESULT
	NO.			
RF Power Output	2.1046	7W ERP	.7228 Watts	Complies
Audio Frequency Response	2.1047	6dB/Octave	Not Required	N/A
Audio Low Pass Filter Response	2.1047	Graph	Not Required	N/A
Modulation Limiting	2.1047	Graph	Not Required	N/A
Occupied Bandwidth (Voice & SAT)	2.1049	Mask	Not Required	N/A
Occupies Bandwidth (WB Data & SAT)	2.1049	Mask	See Plots	Complies
Occupied Bandwidth (ST)	2.1049	Mask	See Plots	Complies
Occupied Bandwidth (SAT)	2.1049	Mask	See Plots	Complies
Spurious Emissions at Antenna	2.1051	-13 dBm	-31.07 dBm	Complies
Terminals				
Field Strength of Spurious Emissions	2.1053	82.3 dBµV/m	64.6 dBµV/m	Complies
Frequency Stability	2.1055	2.5 ppm	0.086 ppm	Complies

**Footnotes For N/A's:** 

The Equipment Under Test is used in a wireless security system. The E.U.T. only dials to the central office when activated. Voice information cannot be transmitted.

<b>Test Conditions:</b>	Temperature:	20°C
	Humidity:	52%

# Section 2. General Equipment Specification

Frequency Range:	824 – 849 MHz
Tunable Bands:	1
Necessary Bandwidth:	40 kHz
Type of Modulation and Designator:	AMPS (40K0F1D)
Data Source:	Internal
Output Impedance:	50 ohms
RF Power Output (rated):	.631 watts
Number of Channels:	832
Duty Cycle:	Continuous
Channel Spacing:	30 kHz
<b>Operator Selection of Frequency:</b>	Software Controlled
Power Output Adjustment Capability:	Software Controlled

**Description of Modifications For Class II Permissive Change** 



**Modifications Made During Testing** 



# Theory of Operation

The NSA 1000 is used in a wireless residential / commercial security system. The E.U.T. only dials the number of the subscriber company when the security system is activated.

# System Diagram

EQUIPMENT IN TEST SETUP



	Description
Α	Ademco/Niigata Seimitsu / Wireless Security System / MO# NSA 1000 / S/N# 005
В	Ademco/Niigata Seimitsu / Test Jig / MO# NSA1010 JIG2 / S/N# None
С	Hewlett Packard / DC Power Supply / MO# 6206B / S/N# 1145A04258

### CABLES

	Description	Length(m)
1	DC Power leads 22 Gauge Stranded wire	1.0

# Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: Ron Gaytan	DATE: 03/02/99

Test Results: Complies.

### **Measurement Data:**

Channel	Output Power	Rated Power	Measured / Rated
	(dBm)	(dBm)	(dB)
384	28.6	28	0.6





NAME OF TEST: Modulation Limiting	PARA. NO.: 2.1047
TESTED BY: Ron Gaytan	DATE: 03/02/99

SAT Deviation:2.20 kHzWB Data Deviation:8.70 kHzST Deviation:8.32 kHz



# Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth (Voice & SAT) PARA. NO.: 2.1049

**TESTED BY:** Not Applicable

DATE:

# Not Applicable

**Test Results:** 

Not Applicable

**Test Data:** 

Not Applicable

NAME OF TEST: Occupied Bandwidth (WB Data)	PARA. NO.: 2.1049
TESTED BY: Ron Gaytan	DATE: 03/03/99

Test Results: Complies.

Test Data:

See attached graph(s).



# NAME OF TEST: Occupied Bandwidth (ST)

TESTED BY: Ron Gaytan

PARA. NO.: 2.1049

Y: Ron Gaytan

DATE: 03/03/99

Test Results: Complies.

Test Data:

See attached graph(s).

EQUIPMENT:	NSA 1000
FCC ID:	CFSK3852





EQUIPMENT:	NSA 1000
FCC ID:	CFSK3852



# NAME OF TEST: Occupied Bandwidth (SAT)PARA. NO.: 2.1049TESTED BY: Ron GaytanDATE: 03/03/99

Test Results: Complies.

Test Data:

See attached graph(s).

EQUIPMENT:	NSA 1000
FCC ID:	CFSK3852





EQUIPMENT:	NSA 1000
FCC ID:	CFSK3852



# Section 5. Spurious Emissions at Antenna Terminals

1	
TESTED BY: Ron GaytanDATE: 03/02/99	

Test Results: Complies.

Test Data:

See attached graphs.

EQUIPMENT:	NSA 1000
FCC ID:	CFSK3852





# Section 6. Field Strength of Spurious Emissions

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.1053
TESTED BY: Ron Gaytan	DATE: 03/01/99

Test Results:Complies.The maximum field strength is 64.6 dBuV/m @ 1.667 GHz @ 3m.

Test Data:

See attached tables.

EQUIPMENT:	NSA 1000
FCC ID:	CFSK3852

# Test Data - Radiated Emissions Test # RE-4

Emission	Ant.	Det.	Meter	Antenna	Path	RF	Corrected	Spec.	CR/SL	Pass	Notes
Frequency	Pol.	Atten.	Reading	Factor	Loss	Gain	Reading	Limit	Delta	Fail	
(MHz)	(H/V)	(dB)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Marginal	
836.5	V	0.0	117.0	20.8	8.2	28.1	117.9	46.0	71.94	Fail	KTL # 2624 FUNDAMENTAL
835.0	V	0.0	120.0	20.8	8.2	28.1	120.9	46.0	74.94	Fail	KTL # 101 FUNDAMENTAL
30.0	V	0.0	14.0	11.8	1.4	27.8	-0.6	40.0	-40.57	Pass	
122.0	V	0.0	14.0	11.4	3.0	27.0	1.5	43.5	-42.05	Pass	
290.0	V	0.0	14.0	20.7	4.9	27.2	12.3	46.0	-33.7	Pass	
836.5	Н	0.0	116.0	20.8	8.2	28.1	116.9	46.0	70.94	Fail	KTL # 2624 FUNDAMENTAL
835.0	Н	0.0	119.2	20.8	8.2	28.1	120.1	46.0	74.14	Fail	KTL # 101 FUNDAMENTAL
30.0	Н	0.0	14.0	11.8	1.4	27.8	-0.6	40.0	-40.57	Pass	
122.0	Н	0.0	14.0	11.4	3.0	27.0	1.5	43.5	-42.05	Pass	
290.0	Н	0.0	14.0	20.7	4.9	27.2	12.3	46.0	-33.7	Pass	
301.0	Н	0.0	14.0	20.4	5.0	27.3	12.1	46.0	-33.91	Pass	
550.0	Н	0.0	14.0	19.9	6.5	27.9	12.5	46.0	-33.5	Pass	
800.0	Н	0.0	14.0	21.1	8.2	28.1	15.2	46.0	-30.8	Pass	
301.0	V	0.0	14.0	20.4	5.0	27.3	12.1	46.0	-33.91	Pass	
550.0	V	0.0	14.0	19.9	6.5	27.9	12.5	46.0	-33.5	Pass	
800.0	V	0.0	14.0	21.1	8.2	28.1	15.2	46.0	-30.8	Pass	
											SCANNED 30-1000 MHz

# Radiated Emissions Photographs for Test # RE-4

FRONT VIEW:



**REAR VIEW:** 



# Test Data – Microwave Radiated Emissions Test # REM-1

Freq. (GHz)	Meter Reading (dBm)	Antenna Factor (dB)	Cable Loss (dB)	RF Gain (dB)	Conver. Factor	Corrected Reading (dBuv)	Spec. Limit (dBuv)	Pol.	Comments:
.836519	96.7	22.6	.6			120	82.2	V	KTL # 2624
.835	100	22.6	.6			123	82.2	V	Peak Detector
.835	98	22.6	.6			121	82.2	V	AVG. Detector
1.667	35	27	2.6			64.6	82.2	V	Peak Detector
1.667	34	27	2.6			63.6	82.2	V	AVG. Detector
2.504	32	29.1	3.2			64.3	82.2	V	Peak Detector
2.504	28	29.1	3.2			60.3	82.2	V	AVG. Detector
3.338	25	30.4	3.8			59.2	82.2	V	Pk. Det. Noise Floor
3.338	10	30.4	3.8			44.2	82.2	V	Avg. Det. Noise Floor
4.170	14	32	4.2			50.2	82.2	V	Pk. Det. Noise Floor
4.170	2	32	4.2			38.2	82.2	V	Avg. Det. Noise Floor
5.007	15	33.9	4.7			53.6	82.2	V	Peak Detector
5.007	3	33.9	4.7			41.6	82.2	V	AVG. Detector
5.840	15	35	5.1			55.1	82.2	V	Pk. Det. Noise Floor
5.840	3	35	5.1			43.1	82.2	V	Avg. Det. Noise Floor
7.509	16	37	5.9			58.9	82.2	V	Pk. Det. Noise Floor
7.509	2	37	5.9			44.9	82.2	V	Avg. Det. Noise Floor
8.359	16	37.5	6.3			59.8	82.2	V	Pk. Det. Noise Floor
8.359	2	37.5	6.3			45.8	82.2	V	Avg. Det. Noise Floor

# Test Data – Microwave Radiated Emissions Test # REM-1 (Continued)

Freq. (GHz)	Meter Reading (dBm)	Antenna Factor (dB)	Cable Loss (dB)	RF Gain (dB)	Conver. Factor	Corrected Reading (dBm)	Spec. Limit (dBm)	Pol.	Comments:
.836519	96.7	22.6	.6			120	82.2	Н	KTL # 2624
.835	100	22.6	.6			123	82.2	Н	Peak Detector
.835	98	22.6	.6			121	82.2	Н	AVG. Detector
1.667	30	27	2.6			59.6	82.2	Н	Peak Detector
1.667	28	27	2.6			57.6	82.2	Н	AVG. Detector
2.504	37	29.1	3.2			69.3	82.2	H	Peak Detector
2.504	36	29.1	3.2			68.3	82.2	H	AVG. Detector
3.338	32	30.4	3.8			66.2	82.2	Н	Peak Detector
3.338	30	30.4	3.8			64.2	82.2	Н	AVG. Detector
4.170	14	32	4.2			50.2	82.2	Н	Pk. Det. Noise Floor
4.170	2	32	4.2			38.2	82.2	H	Avg. Det. Noise Floor
5.007	15	33.9	4.7			53.6	82.2	H	Pk. Det. Noise Floor
5.007	3	33.9	4.7			41.6	82.2	H	Avg. Det. Noise Floor
5.840	15	35	5.1			55.1	82.2	H	Pk. Det. Noise Floor
5.840	3	35	5.1			43.1	82.2	H	Avg. Det. Noise Floor
7.509	16	37	5.9			58.9	82.2	H	Pk. Det. Noise Floor
7.509	2	37	5.9			44.9	82.2	H	Avg. Det. Noise Floor
8.359	16	37.5	6.3			59.8	82.2	H	Pk. Det. Noise Floor
8.359	2	37.5	6.3			45.8	82.2	H	Avg. Det. Noise Floor
									Scanned 1-10 Ghz

# Microwave Radiated Emissions Photographs for Test # REM-1

# FRONT VIEW:



**REAR VIEW:** 



# Section 7. Frequency Stability

NAME OF TEST: Frequenc	y Stability	PARA. NO.: 2.1055
TESTED BY: Ron Gaytan		DATE: 03/10/99
Test Results:	Complies. The worst-case frequen 0.086 ppm.	cy deviation is 72 Hz or
Measurement Data:	Standard Test Frequency: 836.5200	000 MHz

Standard Test Voltage: 6.33 Vdc

# Test Data - Frequency Stability

Frequency	Temperature	Voltage	Frequency	Frequency	Limit
(MHz)	(C°)	(VDC)	Deviation	Deviation	(ppm)
			(Hz)	(ppm)	
836.52003	50	6.33	3	0.004	2.5
836.51992	40	6.33	-8	0.010	2.5
836.52005	30	6.33	5	0.006	2.5
836.52013	20	7.28 (115%)	13	0.016	2.5
836.52020	20	6.33	20	0.024	2.5
836.52022	20	5.38 (85%)	22	0.026	2.5
836.52042	10	6.33	42	0.050	2.5
836.52056	0	6.33	56	0.067	2.5
836.52059	-10	6.33	59	0.071	2.5
836.52072	-20	6.33	72	0.086	2.5
836.52066	-30	6.33	66	0.079	2.5

# Section 8. Test Equipment List

The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items is typically 12 months from the calibration date shown.

KTL ID	Nomenclature	Manufacturer Model Number	Serial Number	Calibration Date
C1A	A O.A.T.S. Cable Set			04/03/98
CF31	Storm Cable (7.6 meters)	Semi Flex		11/11/98
100	Polarad Receiver	Rohde & Schwarz ESV	872149/28	10/07/98
101	Oscilloscope/DDM	Tektronix THS720	B032218	05/28/98
154	Power Sensor (0.10-18 GHz)	Hewlett Packard 8481A (50ohm,0.3uW-100mW)	2349A45632	02/08/99
156	Digital Power Meter	Hewlett Packard 436A	2512A22082	02/09/99
182	Limiter	Fischer FCC45013-1.2	NSN	02/05/99
494	Horn Antenna	A.H. Systems SAS-200/571	162	04/29/98
677	Receiver (1 - 18 GHz)	Electro Metrics EMC 50	185	08/26/98
946	27dB Gaing Preamp	ICC 27dB LNA	946	04/09/98
G1017B	Attenuator	Narda 776B-20	None	08/14/98
G1018	Attenuator	Narda 776B-10	None	10/27/98
G2017	Antenna, Log Periodic	A.H. Systems SAS-200/510	556	01/25/99
G2031	Biconical Antenna	ICC BCON-30300	N/A	11/17/98
G2624	Spectrum Analyzer	Hewlett Packard 8563E	3551A04428	10/05/98

# **Test Equipment List (Continued):**

The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items is typically 12 months from the calibration date shown.

KTL ID	Nomenclature	Manufacturer Model Number	Serial Number	Calibration Date
G2630	Radio Communication Service Monitor	Rohde & Schwarz CMS53	883832/018	07/23/98
G5006	Environmental Chamber	Envirotronics SH27	129010083	12/14/98
		LAB # 5 (INDOOR)		
		SITE A O.A.T.S. (OPEN AREA TEST SITE) 10 Meter Site		
	Turntable, 4 foot	RF Consultants (Automated)		CNR
	Antenna Mast, 4 Meter	EMCO Part # 1050 (Automated)		CNR
		SITE D O.A.T.S. (OPEN AREA TEST SITE) 30 Meter Site		
	Turntable Flush Mounted, Metal Covered, 12 Foot	A.H. Systems (Automated)		CNR
	Antenna Mast, 5 Meter	ICC (Automated)		CNR

# ANNEX A

# **TEST METHODOLOGIES**

NAME OF TEST: RF Po	ower Output		PARA. NO.:	2.1046
Test Conditions:	Standard Temper Standard Test Vo	rature & Humidit oltage	у	
Minimum Standard:	Para. No. 22.913(a). The E.R.P. of mobile transmitter and auxiliary test transmitter must not exceed 7 watts.			
	EIA is 19B Para. No. 3.2.1.3. The transmitter shall be compiled of 8 distinct power levels.			
	The output power shown above shall be maintained within the range of $+2$ dB, $-4$ dB of nominal dBW value			
	PL	I	II	III
	0	+6	+2	-2
	1	+2	+2	-2
	2	-2	-2	-2
	3	-6	-6	-6
	4	-10	-10	-10
	5	-14	-14	-14
	6	-18	-18	-18
	7	-22	-22	-22

# Method Of Measurement:

Detachable Antenna:

The power at antenna terminals is measured using an in-line power meter.

### Integral Antenna:

If the antenna is not detachable from the circuit then the Power Output is derived from the radiated field strength of the fundamental emission by using the plane wave relation  $GP/4\pi R^2 = E^2/120\pi$  and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent radiated power in watts

E = the maximum measured field strength in V/m

R = the measurement range (3 meters)

G = the numeric gain of the transmit antenna in relation to a halfwave dipole antenna

NAME OF TEST: Audio Frequency Response	PARA. NO.: 2.1047
--	-------------------

<b>Test Conditions:</b>	Standard Temperature & Humidity
	Standard Test Voltage

Minimum Standard:IS-19-B. From 300 to 3000 Hz the audio frequency<br/>response shall not vary more than +1 to -3 dB from a true 6dB<br/>octave pre-emphasis characteristic as referred to 1000 Hz level<br/>(with the exception of a permissible 6dB per octave roll-off from<br/>2500 to 3000 Hz).

## Method Of Measurement:

Operate the transmitter with the compressor disabled, and monitor the output with a frequency deviation meter or standard test receiver without standard 750-microsecond de-emphasis, with expander disabled, and without C-message weighted filter (see 6.6.2). Apply a sine wave audio input to the transmitter external audio input port, vary the modulating frequency from 300 to 3000 Hz and observe the input levels necessary to maintain a constant  $\pm 2.9$  kHz system deviation.

# NAME OF TEST: Audio Low Pass Filter Response PARA. NO.: 2.1047

Test Conditions:	Standard Temperature & Humidity Standard Test Voltage
Minimum Standard:	Para. No. 22.915 (d). For mobile stations, signals must be attenuated as a function of frequency as follows:
	<ul> <li>i. In the frequency ranges 3.0 to 5.9 Hz and 6.1 to 15 kHz, 40 log (f/3) dB.</li> <li>ii. In the frequency range 5.9 to 6.1 kHz, 35 dB</li> <li>iii. In the frequency range above 15 kHz, 28 dB.</li> </ul>

### Method Of Measurement:

Adjust the audio input frequency to 1000 Hz and adjust the input level to 20 dB greater than that required to produce  $\pm 8$  kHz deviation. Note the output level on the frequency deviation meter or standard test receiver. Using the output level as reference (0dB), vary the modulating frequency from 3000 Hz to 30,000 Hz and observe the change in output while maintaining a constant audio input level.

# NAME OF TEST: Modulation Limiting PARA. NO.: 2.1047

Test Conditions:	Standard Temperature & Humidity
	Standard Test Voltage

Minimum Standard: 22.915(b)

The levels of the modulating signals must be set to the values specified below and must be maintained within  $\pm 10\%$  of these values.

Voice: ±12 kHz SAT: ±2 kHz Wideband Data: ±8 kHz ST: ±8 kHz

### Method Of Measurement:

Voice: A 1 kHz audio tone is injected at levels between -45 and +20 dBVrms. The peak deviation is noted. This is repeated with a 300 Hz tone and a 3 kHz tone.

SAT:	A SAT tone is generated by the mobile station and the peak deviation is measured.
Wideband Data:	Wideband data is generated by the mobile station and the peak deviation is measured.
ST:	ST data is generated by the mobile station and the peak deviation is measured.

# NAME OF TEST: Occupied Bandwidth (Voice & SAT) PARA. NO.: 2.1049

<b>Test Conditions:</b>	Standard Temperature & Humidity
	Standard Test Voltage

- Minimum Standard:22.917(b) The mean power of any emission removed from the<br/>carrier frequency by a displacement frequency ( $f_d$  in kHz) must be<br/>attenuated below the mean power of the unmodulated carrier (P) as<br/>follows:
- (i) On any frequency removed from the carrier frequency by more than 20 kHz but not more than 45 kHz: at least 26 dB
- (ii) On any frequency removed from the carrier frequency by more than 45 kHz, up to the first multiple of the carrier frequency:

at least 60 dB or  $43 + 10 \log (P) dB$ , whichever is the lesser attenuation.

### **Method Of Measurement:**

Spectrum Analyzer Settings:

RBW: 300 Hz VBW: ≥ RBW Span: 100 kHz Sweep: Auto Mask: CELLF3E

Input Signal Characteristics (F3E/F3D):

AF1 frequency: 2.5 kHz AF1 level: 16 dB above the level sufficient to produce  $\pm 6$  kHz deviation with a 1 kHz tone. SAT: 6000 Hz SAT SAT level: sufficient to produce  $\pm 2$  kHz deviation.

### NAME OF TEST: Occupied Bandwidth (WB Data, ST & SAT) PARA. NO.: 2.1049

Test Conditions:Standard Temperature & HumidityStandard Test Voltage

- Minimum Standard:22.917(d) The mean power of any emission removed from the<br/>carrier frequency by a displacement frequency ( $f_d$  in kHz) must be<br/>attenuated below the mean power of the unmodulated carrier (P) as<br/>follows:
- (1) On any frequency removed from the carrier frequency by more than 20 kHz but not more than 45 kHz:

at least 26 dB

(2) On any frequency removed from the carrier frequency by more than 45 kHz but not more than 90 kHz:

at least 45 dB

(3) On any frequency removed from the carrier frequency by more than 90 kHz, up to the first multiple of the carrier frequency:

at least 60 dB or  $43 + 10 \log (P) dB$ , whichever is the lesser attenuation.

### Method Of Measurement:

Spectrum Analyzer Settings: RBW: 300 Hz VBW: ≥ RBW Span: 200 kHz Sweep: Auto Mask: CELLF1D

Input Signal Characteristics: RF level: Maximum recommended by manufacturer 10 kbps WB Data & SAT ST

# NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 2.1051

Test Conditions:	Standard Temperature & Humidity Standard Test Voltage
Minimum Standard:	Para. No. 22.917(b). The mean power of emissions must be attenuated below the mean power of the unmodulated carrier on any frequency twice or more than twice the fundamental emission by at least $43 + 10 \log P$ . This is equivalent to -13 dBm absolute power.

### Method Of Measurement:

Spectrum Analyzer Settings: RBW: 30 kHz (AMPS). As required for digital modulations. VBW: ≥ RBW Start Frequency: 0 MHz Stop Frequency: 10 GHz Sweep: Auto

# NAME OF TEST: Field Strength of Spurious Radiation PARA. NO.: 2.1053

<b>Test Conditions:</b>	Outdoor Range	
	Standard Test Voltage	

Minimum Standard:Para. No. 22.917(b). The mean power of emissions must be<br/>attenuated below the mean power of the unmodulated carrier on<br/>any frequency twice or more than twice the fundamental emission<br/>by at least 43 + 10 log P. This is equivalent to -13 dBm absolute<br/>power.

### **Calculation Of Field Strength Limit:**

An example of attenuation requirement of 43 + 10 Log P is equivalent to  $-13 \text{ dBm} (5 \times 10^{-5} \text{ Watts})$  at the antenna terminal. We determine the field strength limit by using the plane wave relation.

 $GP/4\pi R^2 = E^2/120\pi$ 

For emissions  $\leq 1$  GHz:

G = 1.64 (Dipole Gain)  $P = 10^{-5}$  Watts (Maximum spurious output power) R = 3m (Measurement Distance)

$$E = \frac{\sqrt{30GP}}{R}$$
$$E = \frac{\sqrt{30 \times 1.64 \times 5 \times 10^{-5}}}{3} = 0.016533 \text{ V} / \text{m} = 84.4 \text{ dB}\mu\text{V} / \text{m}$$

For emissions > 1 GHz:

G = 1 (Isotropic Gain)  $P = 1 \times 10^{-5}$  Watts (Maximum spurious output power) R = 3m (Measurement Distance)

$$E = 84.4 - 20 Log \sqrt{1.64} = 82.3 dB \mu V / m@3m$$
  
The spectrum is searched to 10 GHz.

### NAME OF TEST: Frequency Stability PARA. NO.: 2.1055

**Test Conditions:** As per measurement data.

**Minimum Standard:** 

Para. No. 22.355. The transmitter carrier frequency shall remain within the tolerances given in Table C-1.

Freq. Range (MHz)	Mobile > 3 W	Mobile ≤ 3 W
821 to 896	2.5	2.5
821 10 890	2.3	2.3

Table C-1

### Method Of Measurement:

Frequency Stability With Voltage Variation:

The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10 MHz ref, in of the signal generator. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

### Frequency Stability With Temperature Variation:

The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

# ANNEX B

# **TEST DIAGRAMS**

# Para. No. 2.1046 - R.F. Power Output



# Para. No. 2.1049 - Occupied Bandwidth



# Para. No. 2.1051 Spurious Emissions at Antenna Terminals



# Para. No. 2.1053 - Field Strength of Spurious Radiation



# Para. No. 2.1055 - Frequency Stability



# Para. No. 2.1047 – Audio Frequency Response, Audio Low Pass Filter Response And Modulation Limiting

