9 - DWELL TIME ON EACH CHANNEL

9.1 Standard Applicable

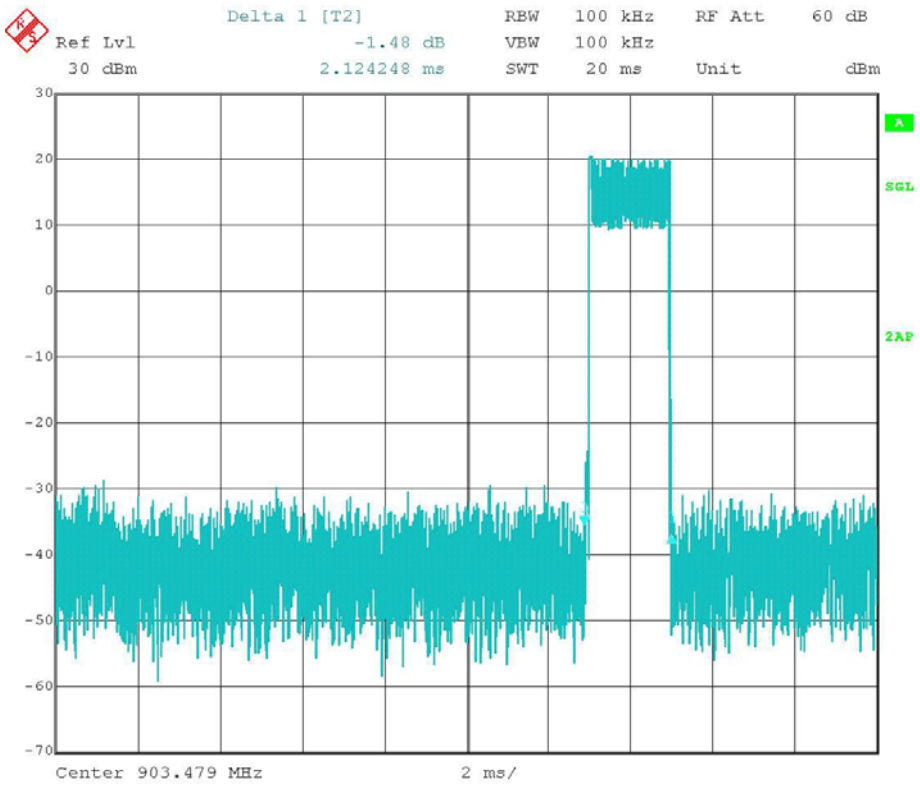
According to §15.247 (a)(1)(i), for frequency hopping system operating in the 902-928 MHz band, if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the average time of occupancy on any frequency shall not be greater than 0.4 second within a 20-second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

9.2 Measurement Procedure

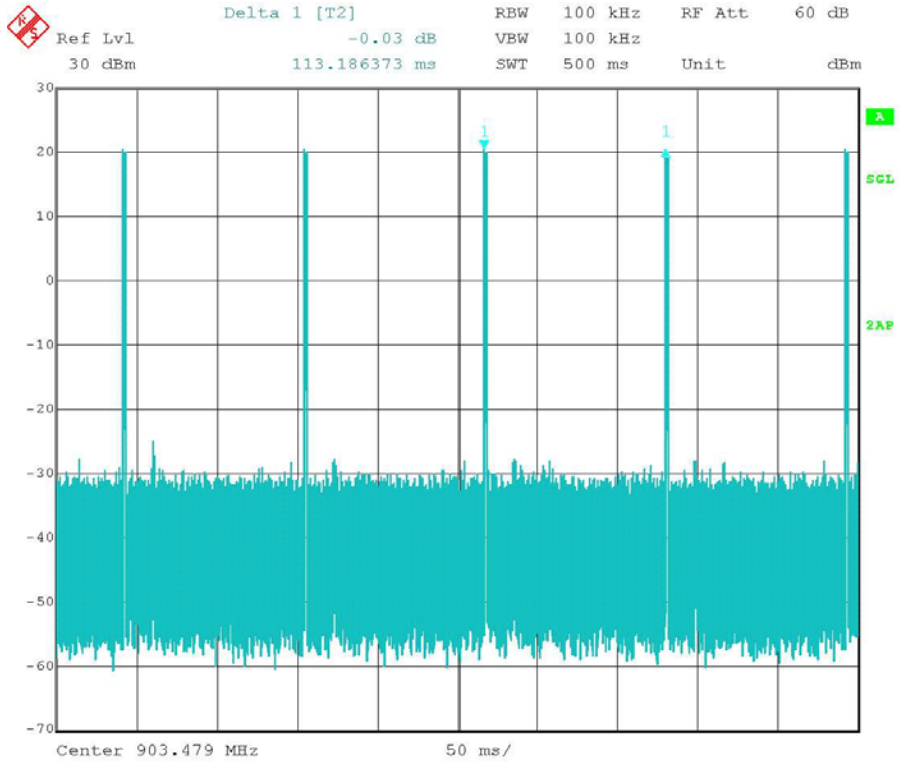
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.

9.3 Measurement Results

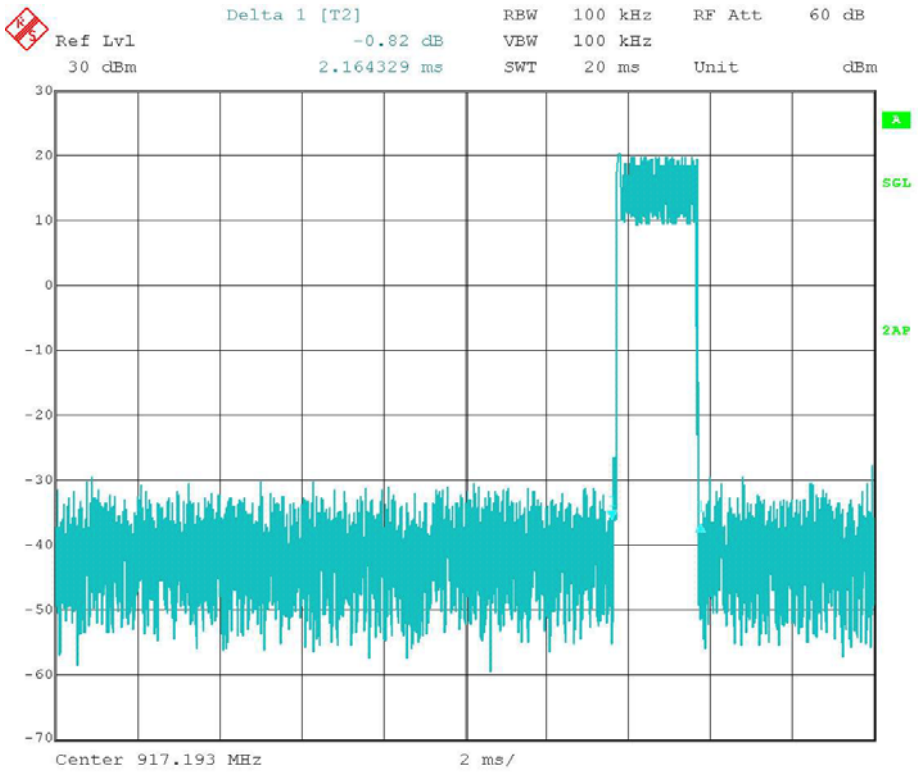
Please refer to the hereinafter plots for more details



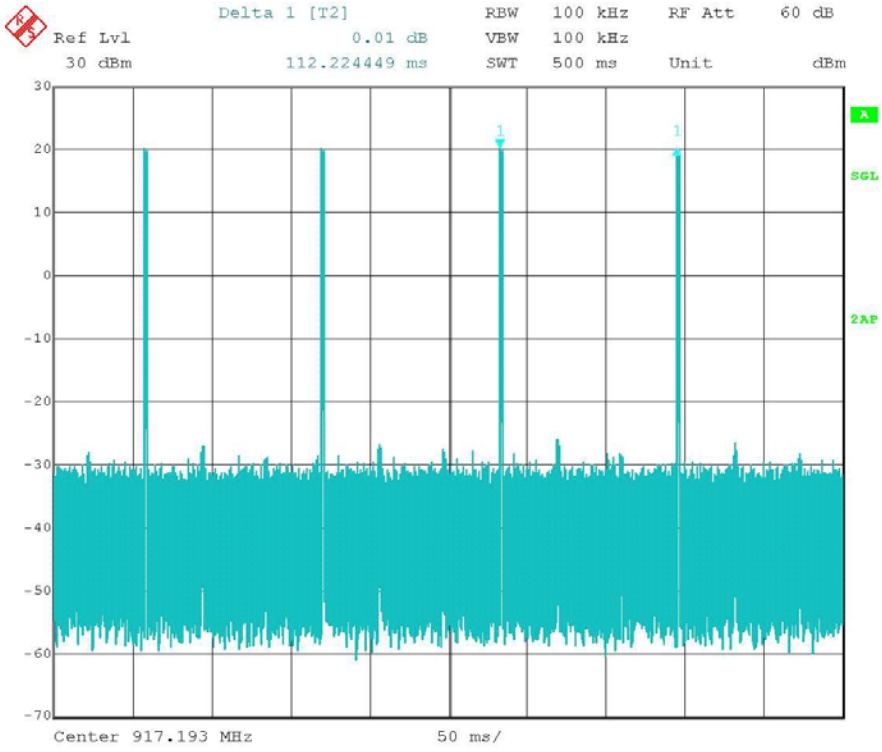
Title: TECOM T7406 DWELL TIME LOW(Base)
Date: 5.NOV.2001 09:15:39



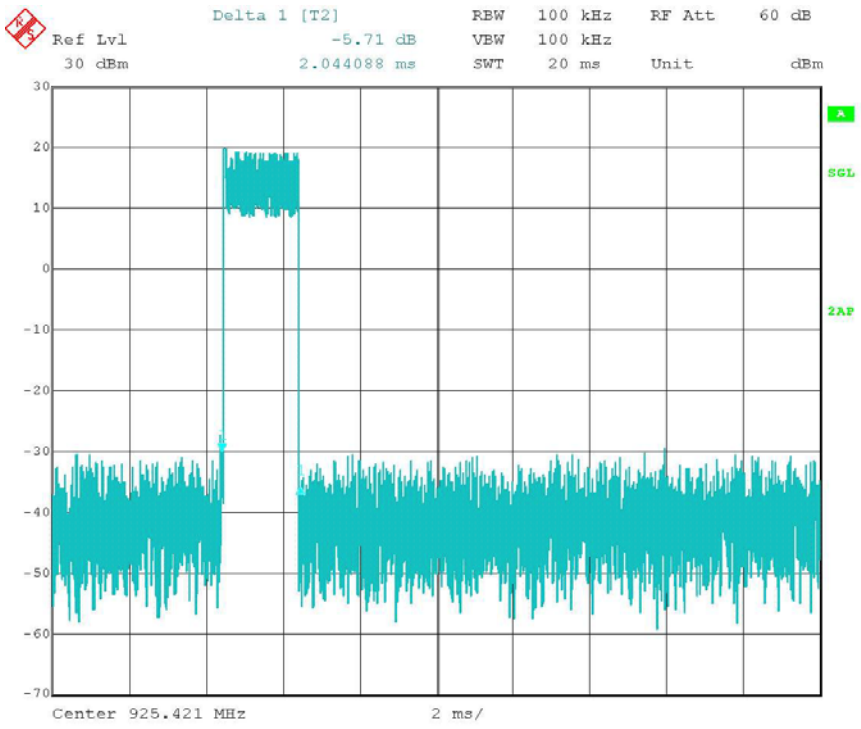
Title: TECOM T7406 DT LOW(Base)
Date: 5.NOV.2001 09:18:04



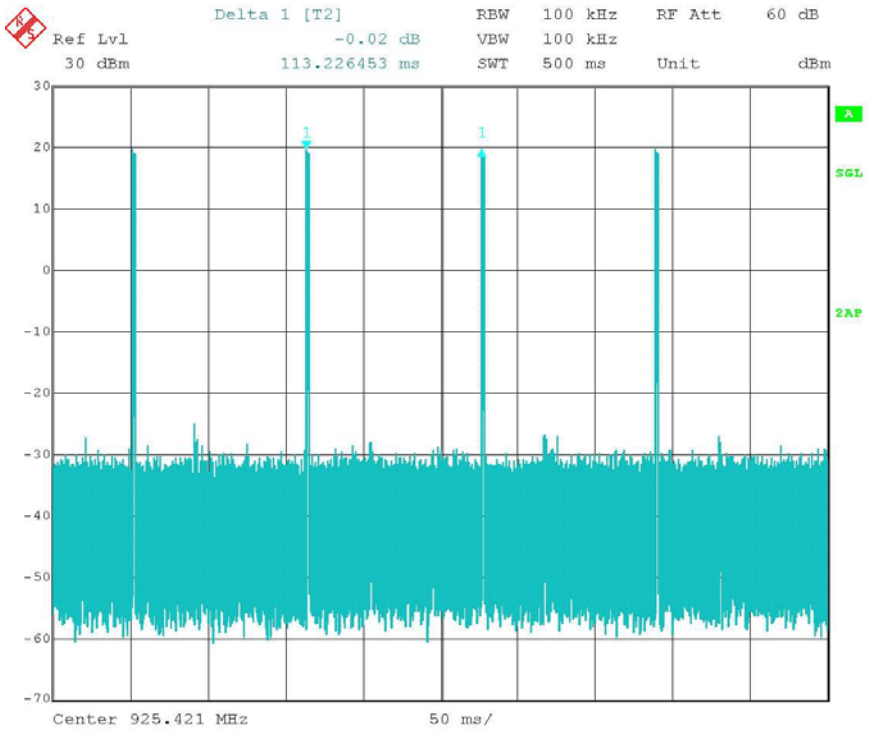
Title: TECOM T7406 DWELL TIME MIDDLE(Base)
Date: 5.NOV.2001 09:26:46



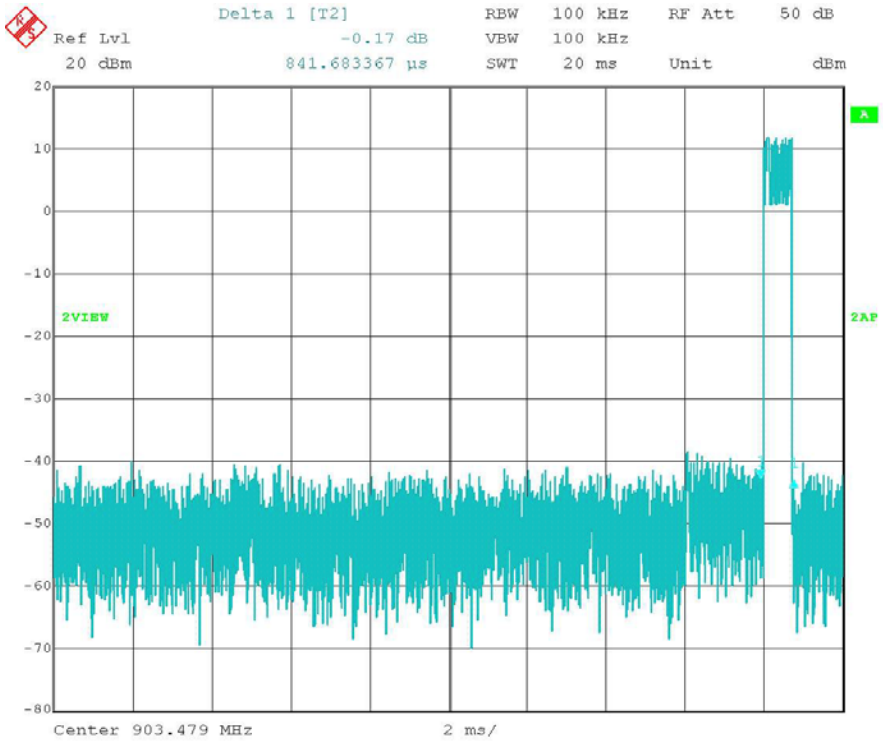
Title: TECOM T7406 DT MIDDLE(Base)
Date: 5.NOV.2001 09:20:19



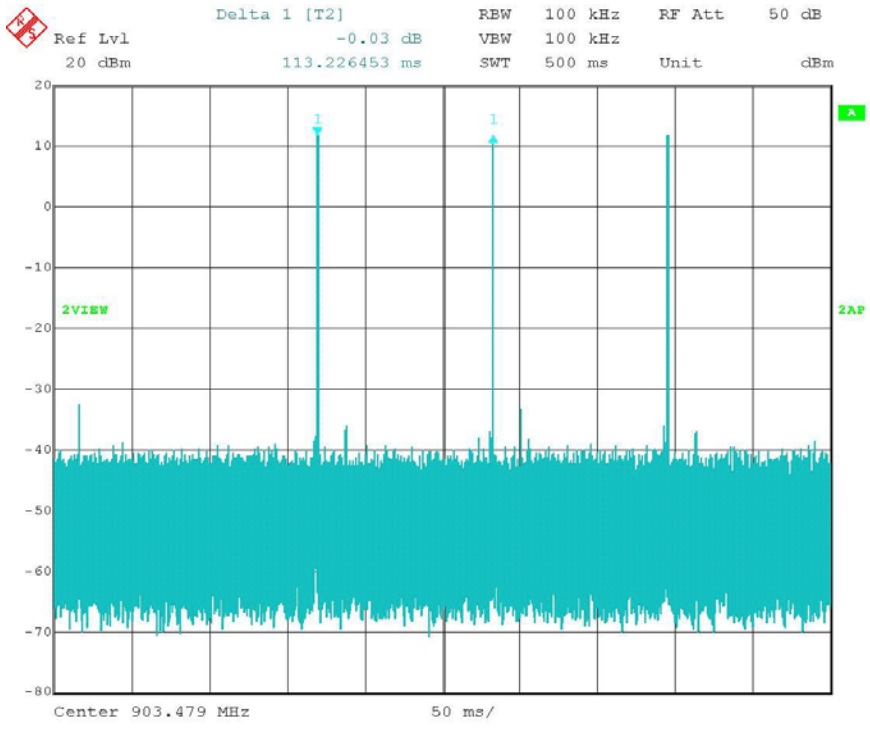
Title: TECOM T7406 DWELL TIME HIGH(Base)
Date: 5.NOV.2001 09:24:44



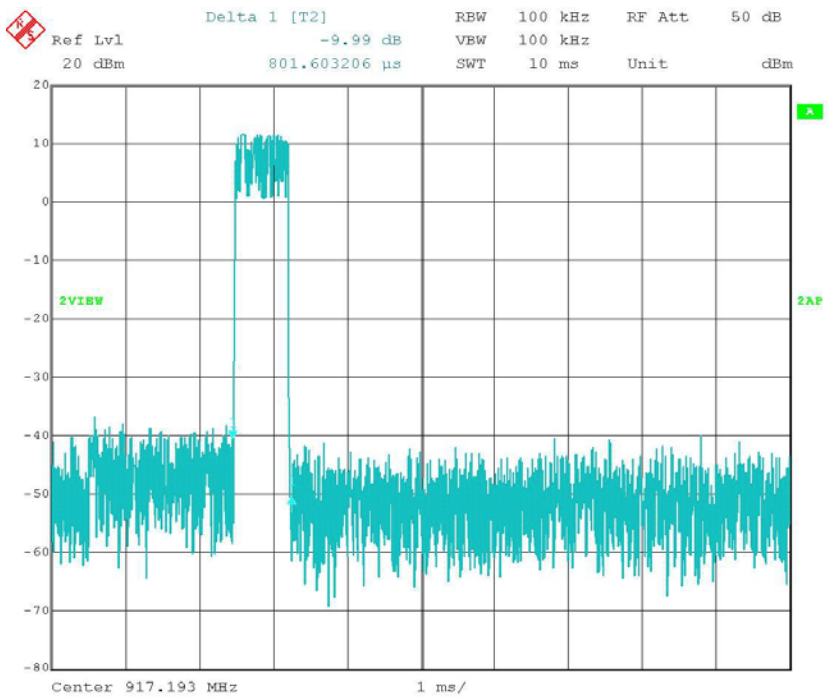
Title: TECOM T7406 DT HIGH(Base)
Date: 5.NOV.2001 09:22:08

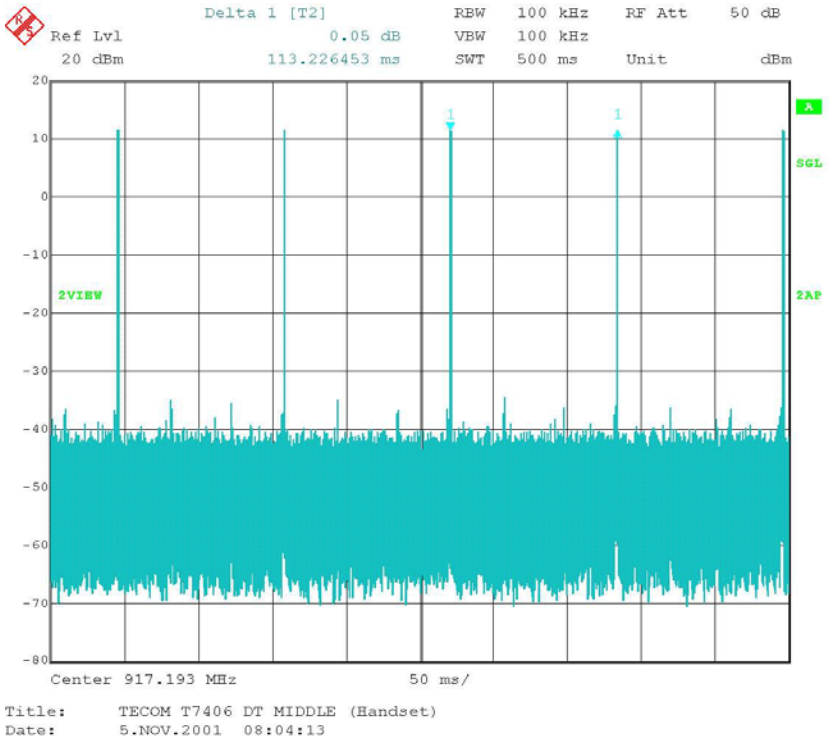


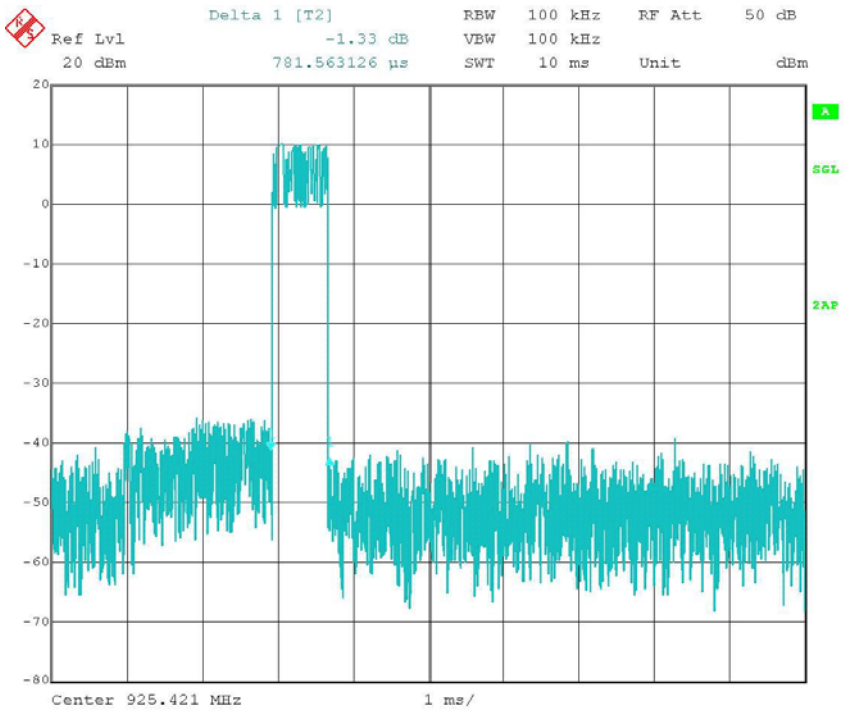
Title: TECOM T7406 DT LOW (Handset)
Date: 5.NOV.2001 07:48:44



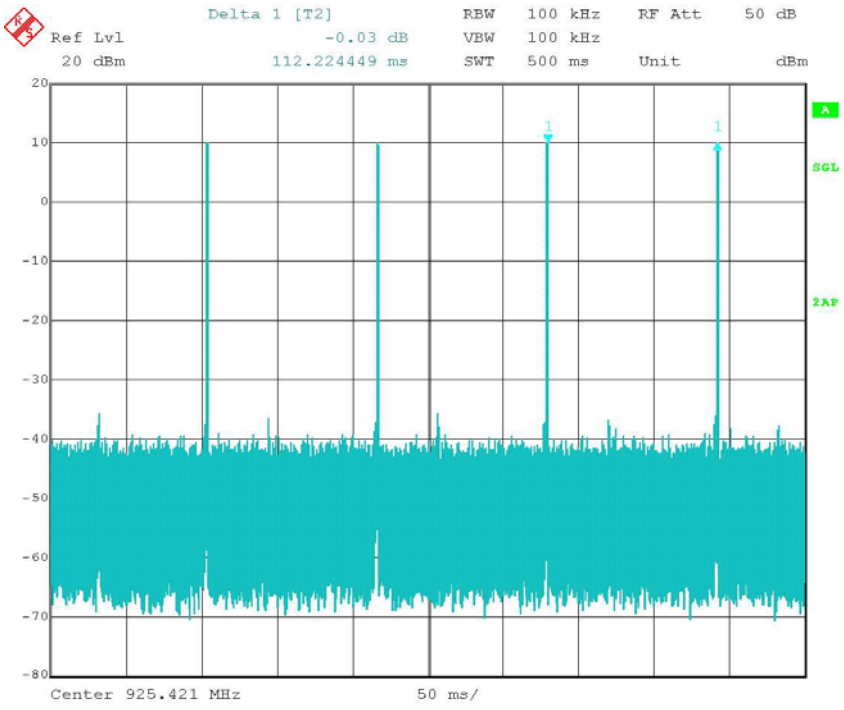
Title: TECOM T7406 DUR LOW (Handset)
Date: 5.NOV.2001 07:42:11


Delta 1 [T2]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-9.99 dB
VBW 100 kHz
20 dBm
801.603206 µs
SWT 10 ms
Unit dBm
2VIEW
2AP
Center 917.193 MHz
1 ms/
Title: TECOM T7406 DT MIDDLE (Handset)
Date: 5.NOV.2001 08:00:48


Delta 1 [T2]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
0.05 dB
VBW 100 kHz
20 dBm
113.226453 ms
SWT 500 ms
Unit dBm
SGL
2VIEW
2AP
Center 917.193 MHz
50 ms/
Title: TECOM T7406 DT MIDDLE (Handset)
Date: 5.NOV.2001 08:04:13



Title: TECOM T7406 DWELL HIGH (Handset)
Date: 5.NOV.2001 08:20:42



Title: TECOM T7406 DT HIGH (Handset)
Date: 5.NOV.2001 08:18:12

10 - ANTENNA REQUIREMENT

10.1 Standard Applicable

For intentional device, according to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to § 15.247 (1), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

10.2 Antenna Connected Construction

The directional gain of antenna used for transmitting is 0 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

11 – RF SAFETY REQUIREMENTS TO 2.1091

According to section 3 of Supplement C to OET Bulleting 65, Part 15 Transmitters are categorically excluded from Routine Environmental Evaluation by measurement or precise computations unless otherwise required by the Commissions.

The unit under evaluation has an external antenna of 0 dBi gain with a measured output power of 17.33mW at the antenna terminals.

Due to the low power of the EUT, environmental evaluation should be deemed unnecessary since the EUT's operational frequency range is 902 -928 MHz and the ERP is considerably less than 3 Watts.

A warning statement is also including in the user manual. The following is the sample.

RF Exposure Information

Important Notes: To be compliance with the FCC's RF exposure guidelines, hold the transmitter and antenna at least 2.0 cm from your face and speak in a normal voice, with the antenna pointer up and away from the face. If you wear the handset on your body while using the handset accessory, use only the manufacturers supplied belt clip for this product and ensure that the antenna is at least 2.0 cm from your body when transmitting.

Use only the supplied antenna. Unauthorized antenna, modifications, or attachments could damage the transmitter and may violate FCC regulations.

12 – SPURIOUS RADIATED EMISSION DATA

12.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is $\pm$4.0 dB.

12.2 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup in accordance with the ANSI C63.4 - 1992. The specification used was the FCC 15 Subpart C limits.

The EUT was connected to a 110 VAC / 60 Hz power source and it was placed center and the back edge of the test table. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

12.3 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR §15.33 (a) (1), the system was tested to 10000 MHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Start Frequency	30 MHz
Stop Frequency	10000 MHz
Sweep Speed	Auto
IF Bandwidth	1 MHz
Video Bandwidth	1 MHz
Quasi-Peak Adapter Bandwidth	120 kHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	1MHz

12.4 Test Procedure

For the radiated emissions test, both the EUT and all support equipment power cords were connected to the AC floor outlet since the power supply used in the EUT did not provide an accessory power outlet.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dBμV of specification limits), and are distinguished with a "**Qp**" in the data table.

12.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. - Class B Limit

12.6 Summary of Test Results

According to the data in section 11.7, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.207, and 15.247, and had the worst margin of:

For Base:

-3.4 dBμV (Ave.) at **2776.26 MHz** in the **Vertical** polarization at High Channel, **30 to 10000 MHz, 3 meters.**

-1.9 dBμV (Peak) at **2751.57 MHz** in the **Vertical** polarization at Middle Channel, **30 to 10000MHz, 3 meters.**

-1.3 dBμV (Peak) at **2710.44 MHz** in the **Horizontal** polarization at Low Channel, **30 to 10000MHz, 3 meters**.

For Handset:

-14.7 dBμV (Ave.) at **2776.23 MHz** in the **Vertical** polarization at High Channel, **30 to 10000MHz, 3 meters.**

-11.2 dBμV (Ave.) at **2751.57 MHz** in the **Horizontal** polarization at Middle Channel, **30 to 10000MHz, 3 meters.**

-7.4 dBμV (Ave.) at **2710.41 MHz** in the **Horizontal** polarization at Low Channel, **30 to 10000MHz, 3 meters.**

Unintentional Emission:

-9.8 dBμV at **353.83 MHz** in the **Vertical** polarization, **30 to 1000MHz, 3 meters.**

12.7.3.a Final Scan, Base, High Channel

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart C		
Freqency	Ampl.	Direction	Height	Polar	Antenna	Cable Loss	Amp.	Corr. Ampl.	Limit	Margin	Mode
MHz	dBµV/m	Degree	Meter	H/V	dBµV/m	dBµV/m	dB	dBµV/m	dBµV/m	dB	
925.42	116.42	245	1.2	V	24.7	4.4	30.0	115.52			
925.42	127.22	270	1.4	H	15.5	2.8	30.0	115.52			
2776.26	47.90	180	1.2	V	29.0	3.7	30.0	50.58	54.00	-3.4	Ave
2776.26	67.60	180	1.2	V	29.0	3.7	30.0	70.28	74.00	-3.7	Peak
2776.26	44.00	180	1.4	H	29.0	3.7	30.0	46.68	54.00	-7.3	Ave
3701.68	41.00	180	1.2	V	30.3	4.3	30.0	45.64	54.00	-8.4	Ave
2776.26	61.90	180	1.4	H	29.0	3.7	30.0	64.58	74.00	-9.4	Peak
3701.68	39.30	345	1.4	H	30.3	4.3	30.0	43.94	54.00	-10.1	Ave
4627.11	35.80	360	1.2	V	32.5	4.9	30.0	43.21	54.00	-10.8	Ave
3701.68	58.10	180	1.2	V	30.3	4.3	30.0	62.74	74.00	-11.3	Peak
4627.11	35.20	340	1.4	H	32.5	4.9	30.0	42.61	54.00	-11.4	Ave
4627.11	54.90	360	1.2	V	32.5	4.9	30.0	62.31	74.00	-11.7	Peak
3701.68	56.00	345	1.4	H	30.3	4.3	30.0	60.64	74.00	-13.4	Peak
1850.84	81.90	245	1.2	V	25.3	2.6	30.0	79.80	95.52	-15.7	
4627.11	50.30	340	1.4	H	32.5	4.9	30.0	57.71	74.00	-16.3	Peak
1850.84	73.30	45	1.4	H	25.3	2.6	30.0	71.20	95.52	-24.3	

12.7.3.b Final Scan, Base, Middle Channel

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart C		
Freqency	Ampl.	Direction	Height	Polar	Antenna	Cable Loss	Amp.	Corr. Ampl.	Limit	Margin	Mode
MHz	dBµV/m	Degree	Meter	H/V	dBµV/m	dBµV/m	dB	dBµV/m	dBµV/m	dB	
917.19	117.12	345	1.2	V	24.6	4.2	30.0	115.92			
917.19	117.12	270	1.4	H	24.6	4.2	30.0	115.92			
2751.57	49.40	180	1.2	V	29.0	3.7	30.0	52.08	54.0	-1.9	Ave
2751.57	68.50	180	1.4	H	29.0	3.7	30.0	71.18	74.0	-2.8	Peak
2751.57	68.00	180	1.2	V	29.0	3.7	30.0	70.68	74.0	-3.3	Peak
3668.76	66.00	360	1.2	V	30.3	4.3	30.0	70.64	74.0	-3.4	Peak
2751.57	47.90	180	1.4	H	29.0	3.7	30.0	50.58	54.0	-3.4	Ave
3668.76	45.10	360	1.2	V	30.3	4.3	30.0	49.74	54.0	-4.3	Ave
4585.95	60.20	145	1.4	H	32.5	4.9	30.0	67.61	74.0	-6.4	Peak
4585.95	60.10	230	1.2	V	32.5	4.9	30.0	67.51	74.0	-6.5	Peak
4585.95	36.20	145	1.4	H	32.5	4.9	30.0	43.61	54.0	-10.4	Ave
4585.95	36.10	230	1.2	V	32.5	4.9	30.0	43.51	54.0	-10.5	Ave
3668.76	58.60	180	1.4	H	30.3	4.3	30.0	63.24	74.0	-10.8	Peak
3668.76	35.30	180	1.4	H	30.3	4.3	30.0	39.94	54.0	-14.1	Ave
1834.38	76.00	45	1.2	V	25.3	2.6	30.0	73.90	95.5	-21.6	
1834.38	73.60	45	1.4	H	25.3	2.6	30.0	71.50	95.5	-24.0	

12.7.3.c Final Scan, Base, Low Channel

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart C		
Frequency	Ampl.	Direction	Height	Polar	Antenna	Cable Loss	Amp.	Corr. Ampl.	Limit	Margin	Mode
MHz	dBµV/m	Degree	Meter	H/V	dBµV/m	dBµV/m	dB	dBµV/m	dBµV/m	dB	
903.48	118.5	270	1.2	V	24.8	3.0	30.0	116.3			
903.48	118.5	270	1.4	H	24.8	3.0	30.0	116.3			
2710.44	70.0	180	1.4	H	29.0	3.7	30.0	72.7	74.0	-1.3	Peak
2710.44	69.2	270	1.2	V	29.0	3.7	30.0	71.9	74.0	-2.1	Peak
4517.40	44.4	180	1.2	V	32.5	4.9	30.0	51.8	54.0	-2.2	Ave
3613.92	66.9	145	1.2	V	30.3	4.3	30.0	71.5	74.0	-2.5	Peak
3613.92	46.8	145	1.2	V	30.3	4.3	30.0	51.4	54.0	-2.6	Ave
4517.40	63.8	180	1.2	V	32.5	4.9	30.0	71.2	74.0	-2.8	Peak
4517.40	40.9	360	1.4	H	32.5	4.9	30.0	48.3	54.0	-5.7	Ave
2710.44	45.0	180	1.4	H	29.0	3.7	30.0	47.7	54.0	-6.3	Ave
3613.92	42.6	360	1.4	H	30.3	4.3	30.0	47.2	54.0	-6.8	Ave
4517.40	59.5	360	1.4	H	32.5	4.9	30.0	66.9	74.0	-7.1	Peak
2710.44	44.0	270	1.2	V	29.0	3.7	30.0	46.7	54.0	-7.3	Ave
3613.92	60.6	360	1.4	H	30.3	4.3	30.0	65.2	74.0	-8.8	Peak
1806.96	72.0	180	1.4	H	25.3	2.6	30.0	69.9	96.3	-26.4	
1806.96	70.0	45	1.2	V	25.3	2.6	30.0	67.9	96.3	-28.4	

12.7.3.d Final Scan, Handset, High Channel

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart C		
Frequency MHz	Ampl. dBµV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBµV/m	Cable Loss dBµV/m	Amp. dB	Corr. Ampl. dBµV/m	Limit dBµV/m	Margin dB	Mode
925.41	106.6	270	1.2	V	24.7	4.4	30.0	105.7			
925.41	106.6	45	1.4	H	24.7	4.4	30.0	105.7			
2776.23	36.6	180	1.2	V	29.0	3.7	30.0	39.3	54.0	-14.7	Ave
2776.23	31.8	90	1.4	H	29.0	3.7	30.0	34.5	54.0	-19.5	Ave
2776.23	51.2	180	1.2	V	29.0	3.7	30.0	53.9	74.0	-20.1	Peak
3701.64	28.8	45	1.4	H	30.3	4.3	30.0	33.4	54.0	-20.6	Ave
2776.23	45.6	90	1.4	H	29.0	3.7	30.0	48.3	74.0	-25.7	Peak
3701.64	23.4	90	1.2	V	30.3	4.3	30.0	28.0	54.0	-26.0	Ave
3701.64	38.8	45	1.4	H	30.3	4.3	30.0	43.4	74.0	-30.6	Peak
1850.82	57.0	90	1.2	V	25.3	2.6	30.0	54.9	85.7	-30.8	
1850.82	56.4	45	1.4	H	25.3	2.6	30.0	54.3	85.7	-31.4	
3701.64	35.6	90	1.2	V	30.3	4.3	30.0	40.2	74.0	-33.8	Peak

12.7.3.e Final Scan, Handset, Middle Channel

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart C		
Frequency MHz	Ampl. dBµV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBµV/m	Cable Loss dBµV/m	Amp. dB	Corr. Ampl. dBµV/m	Limit dBµV/m	Margin dB	Mode
917.19	108.0	180	1.2	V	24.6	4.2	30.0	106.8			
917.19	107.0	230	1.4	H	24.6	4.2	30.0	105.8			
2751.57	40.1	180	1.4	H	29.0	3.7	30.0	42.8	54.0	-11.2	Ave
2751.57	36.9	180	1.2	V	29.0	3.7	30.0	39.6	54.0	-14.4	Ave
2751.57	55.3	180	1.4	H	29.0	3.7	30.0	58.0	74.0	-16.0	Peak
3668.76	30.2	90	1.2	V	30.3	4.3	30.0	34.8	54.0	-19.2	Ave
2751.57	50.9	180	1.2	V	29.0	3.7	30.0	53.6	74.0	-20.4	Peak
3668.76	26.5	270	1.4	H	30.3	4.3	30.0	31.1	54.0	-22.9	Ave
3668.76	40.0	90	1.2	V	30.3	4.3	30.0	44.6	74.0	-29.4	Peak
3668.76	36.9	270	1.4	H	30.3	4.3	30.0	41.5	74.0	-32.5	Peak
1834.38	59.2	270	1.4	H	25.3	2.6	30.0	57.1	95.5	-38.4	
1834.38	58.3	270	1.2	V	25.3	2.6	30.0	56.2	95.5	-39.3	

12.7.3.f Final Scan, Handset, Low Channel

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart C		
Frequency MHz	Ampl. dBµV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBµV/m	Cable Loss dBµV/m	Amp. dB	Corr. Ampl. dBµV/m	Limit dBµV/m	Margin dB	Mode
903.47	109.8	360	1.2	V	24.8	3.0	30.0	107.6			
903.47	109.8	180	1.4	H	24.8	3.0	30.0	107.6			
2710.41	43.9	90	1.4	H	29.0	3.7	30.0	46.6	54.0	-7.4	Ave
2710.41	60.6	90	1.4	H	29.0	3.7	30.0	63.3	74.0	-10.7	Peak
2710.41	40.0	180	1.2	V	29.0	3.7	30.0	42.7	54.0	-11.3	Ave
3613.88	54.3	180	1.2	V	30.3	4.3	30.0	58.9	74.0	-15.1	Peak
3613.88	33.2	45	1.4	H	30.3	4.3	30.0	37.8	54.0	-16.2	Ave
3613.88	49.7	45	1.4	H	30.3	4.3	30.0	54.3	74.0	-19.7	Peak
3613.88	28.2	360	1.2	V	30.3	4.3	30.0	32.8	54.0	-21.2	Ave
3613.88	41.3	360	1.2	V	30.3	4.3	30.0	45.9	74.0	-28.1	Peak
1806.94	60.7	270	1.2	V	25.3	2.6	30.0	58.6	87.62	-29.0	
1806.94	56.9	180	1.4	H	25.3	2.6	30.0	54.8	87.62	-32.8	

12.7.3.g Final Scan, Unintentional Emission

Indicated			Table	Antenna		Correction Factor			FCC Subpart C	
Frequency MHz	Ampl. dBµV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBµV/m	Cable Loss dBµV/m	Amp. dB	Corr. Ampl. dBµV/m	Limit dBµV/m	Margin dB
353.83	36.4	270	1.2	V	15.5	4.3	20.0	36.2	46	-9.8
424.45	33.0	270	1.2	V	17.2	3.0	20.0	33.2	46	-12.8
353.83	33.4	270	1.4	H	15.5	4.3	20.0	33.2	46	-12.8
379.28	31.2	340	1.4	H	15.8	5.3	20.0	32.3	46	-13.7
424.45	31.8	270	1.4	H	17.2	3.0	20.0	32.0	46	-14.0
345.16	33.1	340	1.2	V	15.2	3.1	20.0	31.4	46	-14.6
379.28	30.1	345	1.2	V	15.8	5.3	20.0	31.2	46	-14.8
345.16	32.5	320	1.4	H	15.2	3.1	20.0	30.8	46	-15.2

13 - CONDUCTED EMISSIONS TEST DATA

13.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is ±2.4 dB.

13.2 EUT Setup

The measurement was performed at the **O**pen **A**rea **T**est **S**ite, using the same setup per ANSI C63.4 - 1992 measurement procedure. The specification used was FCC Class B limits.

13.3 Spectrum Analyzer Setup

The spectrum analyzer was set with the following configurations during the conduction test:

Start Frequency	450 kHz
Stop Frequency	30 MHz
Sweep Speed	Auto
IF Bandwidth	100 kHz
Video Bandwidth	100 kHz
Quasi-Peak Adapter Bandwidth	9 kHz
Quasi-Peak Adapter Mode	Normal

13.4 Test Procedure

During the conducted emission test, the power cord of the host system was connected to the auxiliary outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of each modes tested to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (within -4 dBμV of specification limits). Quasi-peak readings are distinguished with a "**Qp**".

13.5 Summary of Test Results

According to the data in section 12.6, the EUT complied with the FCC Conducted margin for a Class B device, with the *worst* margin reading of:

-7.2 dBμV at **1.720 MHz** in the **Line** mode.

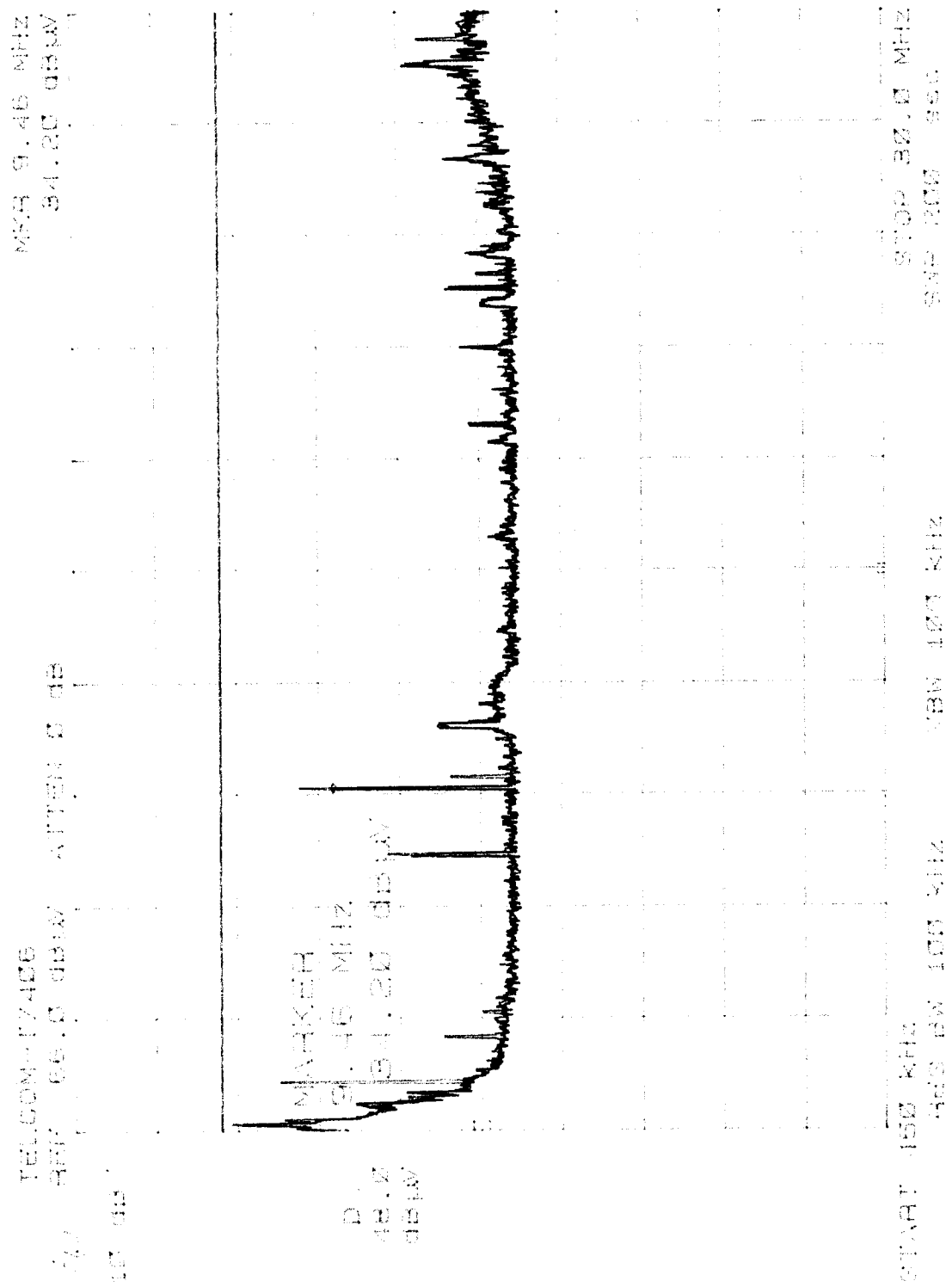
13.6 Conducted Emissions Test Data

12.6.1 Test Data, 0.45 - 30 MHz.

LINE CONDUCTED EMISSIONS				FCC CLASS B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
1.720	40.8	QP	Line	48	-7.2
9.490	38.4	QP	Line	48	-9.6
9.460	34.2	QP	Neutral	48	-13.8
7.780	27.5	QP	Line	48	-20.5
28.580	25.3	QP	Neutral	48	-22.7
7.720	24.6	QP	Neutral	48	-23.4

13.7 Plot of Conducted Emissions Test Data

Plot(s) of Conducted Emissions Test Data is presented in the following page as reference.


MKR 9.46 MHz
34.20 dBµV
TELCOM T7406
REF 66.0 dBµV
ATTEN 0 dB
MARKER
9.46 MHz
34.20 dBµV
D1
10.0
dB
CENTER 150 kHz
RES BW 100 kHz
VBW 100 kHz
SPAN 27.0 MHz
SWP 300 msec