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APPLICANT: CHIAYO ELECTRONICS CO., LTD.

FCC ID: CINSQ-916

TEST REPORT:

EXHIBITS:

GENERAL_INFORMATION_REQUIRED
FOR_TYPE_ACCEPTANCE

2.1033 (C)(1)(2) CHIAYO ELECTRONICS CO., LTD. will manufacture the CINSQ-916 in quantity, for use under FCC RULES PART 74.801, LOW POWER AUXILIARY STATIONS.

2.1033 (C)(1) TECHNICAL_DESCRIPTION

(4) Type of Emission: 126KF3E

Bn = 2M + 2DK
M = 1000
D = 10.0KHz (Peak Deviation)
K = 1
Bn = 2(1K) + 2(45.0K)(1) = 2K +90.0K = 92.0KHz
M = 15,000
D = 10KHz
K = 1
Bn = 2(15K) + 2(48K) = 30 +96 = 126KHz

74.861(e)(5) ALLOWED AUTHORIZED BANDWIDTH = 200KHz.
(5) Frequency Range: Part 74: 614-806 & 944.00-952.00MHz
TEST FREQ = 719.17 & 947.48MHz.

(6) Power Range and Controls:UNIT has no power controls.

(7) Maximum Output Power Rating: 1.0 MilliWatts ERP.

(8) DC Voltages and Current into Final Amplifier:
FINAL AMPLIFIER ONLY
9.0V BATTERY
Vce = 8.9 Volts
Ice = 2.3mA.
Pce = 20.47mW

(9) Tune-up procedure. The tune-up procedure is given in EXHIBIT #: 7.

2.1033(C) (10) Complete Circuit Diagrams: The circuit diagram is included as EXHIBIT 6. The block diagram is included as EXHIBIT 4.

(11) The equipment label is included at exhibit 2 and the sketch of the label location is Exhibit #3.

(12) Photographs of the equipment are included as exhibit #4.

(13) Digital modulation. This unit does not use digital modulation.

2.1033(C)(14) The data required by 2.1046 through 2.1057 is submitted below.

2.1046 RF_power_output.

ERP was measured by the method described later in this report. The input power to the final stage was measured with a 9.0V supply connected in place of the 1.5V battery.

INPUT POWER: FOR 9.0 V OPERATION
(8.9V)(0.0023A) = 20.47MilliWatts

OUTPUT POWER: FOR 9.0 V OPERATION
1.0 mWATTS ERP

R.F. POWER OUTPUT

```
                                                   /-------\
          /------------------\                |  |        |
          | TRANSMITTER      |                |  |        |HP
          | UNDER TEST WITH  |               \--|        |SPECTRUM
          | INTERNAL ANTENNA|                |  |        |ANALYZER
          \------------------/                |  |        |
                             |                |  \-------/
                             |?- 3.0 meters---?|
   /-------------\
   |   SIGNAL    |  DIPOLE  |         Tuned, Calibrated
   | GENERATOR   | ANTENNA  |         Antenna which may
   |             |----------/         be raised from 1
   \-------------/                    to 4 meters above
                                      ground and changed
                                      in  polarization
```

Equipment placed 1 meter above ground on a rotatable platform. The center of the Dipole antenna at the center of the platform and the output of the signal generator adjusted to produce the same meter reading as measured for the fundamental in the radiated emissions test.

2.1047 Modulation_characteristics:

(a) AUDIO_FREQUENCY_RESPONSE

The audio frequency response was measured in accordance with TIA/EIA Specification 603 S2.2.6.2.1. with the following exceptions;

Constant Deviation Test

```
    /---------------\  /----------\    /----------\
    |  Dummy        |  | Audio    |    | RMS      |
  /-|  Microphone   |--| Generator|  /-| VOLTMETER|
  | |               |  \----------/  | \----------/
  | \---------------/                |
  |----------------------------------/
  | /------------\           /------------\   /---------\
  | |            |   |  |    |            |   | Test    |
  | | Transmitter|---/  \----|  NEAR FIELD|---| Receiver|
  \-| under test |           |  PROBE     |   |         |
    \------------/           \------------/   \---------/
```

1. The test receiver audio bandwidth was <50Hz to >20,000Hz.
2. Apply a 1000Hz tone and adjust the audio generator to produce 10% of the rated system deviation.
3. Measure frequency responce over the frequency range from 100Hz to 20,000Hz.

The audio frequency response curve is shown in EXHIBIT # 9.

(b) Modulation Limiting

2.1049 (c) Occupied_bandwidth: Using TIA/EIA 2.2.10 Accoustic Microphone Sensitivity test procedure to determine if the UUT could be put into modulation limiting and limiting could not be reached, the maximum deviation was only +40KHz. Using this test procedure the frequency of maximum sensitivity was determined to be 500Hz.

a. Test procedure diagram
OCCUPIED BANDWIDTH MEASUREMENT

```
    /---------------\ /----------\
    |Acoustic       | | Audio    |
  /-|  Mic    Spkr  |-| Generator|
  | |Chamber        | \----------/
  | \---------------/
  |
  | /------------\           /------------\   /---------\
  | |            |   |  |    |            |   | Test    |
  | | Transmitter|---/  \----|  NEAR FIELD|---| Receiver|
  \-| under test |           |  PROBE     |   |         |
    \------------/           \------------/   \---------/
```

2.1049   Occupied Bandwidth (cont)

b. Since the UUT could not be put into modulation limiting with an acoustic coupling a dummy microphone was used to connect to the UUT and a test procedure similar to TIA/EIA-603 S2.2.11 was used to measure the occupied bandwidth. Plots were made of the frequency of maximum sensitivity, at 10KHz and at the highest frequency for the UUT. Data in the plots show that all sidebands beyond the authorized bandwidth are less than 0.5% of the unmodulated carrier. The plot show the transmitter modulated with 10,000 Hz(the highest modulation frequency), adjusted for 50% modulation plus 16 dB. The spectrum analyzer was set with the unmodulated carrier at the top of the screen. The test procedure diagram and occupied bandwidth plots follow.

Test procedure diagram

OCCUPIED BANDWIDTH MEASUREMENT

```
    /---------------\ /----------\
    |  Dummy        | | Audio    |
  /-|  Microphone   |-| Generator|
  | |               | \----------/
  | \---------------/
  |
  | /------------\           /------------\   /---------\
  | |            |   |  |    |            |   | Test    |
  | | Transmitter|---/  \----|  NEAR FIELD|---| Receiver|
  \-| under test |           |  PROBE     |   |         |
    \------------/           \------------/   \---------/
```

REQUIREMENT: PART 74: 200kHz EMISSION BANDWIDTH.

2.1051   Spurious Emissions at antenna Terminals.

Not Applicable, no antenna port.

2.1053(a)(b) Field_strength_of_spurious_emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

REQUIREMENTS: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.

$$43 + 10 \log(0.001) = 43 - 30.0 = 13.0 \text{ dB}$$

TEST DATA:

EMISSION FREQUENCY MHz @ 3m	ATT. LEVEL dBuV	MARGIN dB
CARRIER 700.02MHz		
700.02	0.0	00.0
1400.00	32.50	19.5
2100.00	44.90	31.90
2800.00	51.15	38.15
3500.00	50.39	37.39
4200.00	58.21	45.21
4900.00	61.62	48.62
CARRIER 947.48MHz		
947.48	0.00	00.0
1895.00	49.41	36.41
2842.50	54.84	41.84
3790.00	52.63	39.63
4737.40	55.13	42.13

METHOD OF MEASUREMENT: The procedure used was TIA/EIA 603 paragraph 2.2.12. The spectrum was scanned from 30 to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer, an Eaton model 94455-1 Biconical Antenna, ElectroMetrics antennas models TDA, TDS-25-1, TDS-25-2 RGA 180. Measurements were made at the open field test site of TIMCO ENGINEERING INC. located at 849 NW SR 45 ROAD, NEWBERRY, FL. 32669.

2.1053(a)(b)   Field_strength_of_spurious_emissions:

Method of Measuring Radiated Spurious Emissions

```
                                      HP
                                      Spectrum
                                      Analyzer

                                      /-------\
/-----------\    |                 |  |       |
|           |    |                 |  |       |
|TRANSMITTER|----/                 \--|       |
| UNDER TEST|                      |  |       |
\-----------/                      |  |       |
     |           |                 |  \-------/
     |           |                 |
     |           |<- 3.0 meters--->|
/----------\              Tuned, Calibrated
|          |              Antenna which may
| NEW      |              be raised from 4
| BATTERY  |              to 20' above
\----------/              the ground and changed
                          in  polarization
```

Equipment placed 4' above ground
on a rotatable platform.

2.1055(a)(b)(d) Frequency_stability:

Temperature and voltage tests were performed to verify that the frequency remains within the .0050%,(50 ppm) specification limit.

The test was conducted as follows: The transmitter was placed in the temperature chamber at 25 degrees C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15 second intervals. The worse case number was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30 degrees C after which the transmitter was again allowed to stabilize for one hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15 second intervals. The worst case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 degrees C.

MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency): 719.172 000MHz

TEMPERATURE_C	FREQUENCY_MHz	PPM
-30	719.171 200	- 6.18
-20	719.177 464	- 1.64
-10	719.177 212	+ 2.19
0	719.178 579	+ 4.09
10	719.178 347	+ 3.76
20	719.177 083	+ 2.01
30	719.175 103	- 0.75
40	719.172 840	- 3.89
50	719.170 704	- 6.87

25c END BATT. Volt(9.0)= 7.65VDC 719.175 732 + 0.13

RESULTS OF MEASUREMENTS: The maximum frequency variation over the temperature range was - 6.87 to + 4.09 ppm. The maximum frequency variation at the battery end-point was +0.07 ppm.

2.1055(a)(b)(d) Frequency_stability:

Temperature and voltage tests were performed to verify that the frequency remains within the .0050%,(50 ppm) specification limit.

The test was conducted as follows: The transmitter was placed in the temperature chamber at 25 degrees C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15 second intervals. The worse case number was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30 degrees C after which the transmitter was again allowed to stabilize for one hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15 second intervals. The worst case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 degrees C.

MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency): 947.497 500MHz

TEMPERATURE_C	FREQUENCY_MHz	PPM
-30	947.470 555	-28.93
-20	947.479 465	-19.52
-10	947.486 222	-12.38
0	947.491 396	- 6.92
10	947.494 890	- 3.23
20	947.497 202	- 0.79
30	947.498 929	+ 1.03
40	947.500 472	+ 2.66
50	947.502 345	+ 4.64
25c END BATT. Volt(9.0)= 7.65VDC	947.497 971	+ 0.02

RESULTS OF MEASUREMENTS: The maximum frequency variation over the temperature range was -28.93 to + 4.64 ppm. The maximum frequency variation at the battery end-point was +0.02 ppm.

TEST EQUIPMENT LIST

1._X_Spectrum Analyzer: HP 8566B-Opt 462, S/N 3138A07786, w/ preselector HP 85685A, S/N 3221A01400, Quasi-Peak Adapter HP 8565OA, S/N 3303A01690 & Preamplifier HP 8449B-OPT H02, S/N 3008A00372 Cal. 10/17/99
2._X_Signal Generator: HP 8640B, S/N 2308A21464 Cal. 9/23/99
3.___Signal Generator: HP 8614A, S/N 2015A07428 Cal. 5/29/99
4.___Passive Loop Antenna: EMCO Model 6512, 9KHz to 30MHz, S/N 9706-1211 Cal. 6/23/97
5._X_Biconnical Antenna: Eaton Model 94455-1, S/N 1057
6._X_Log-Periodic Antenna: Electro-Metrics Model EM-6950, S/N 632
7.___Dipole Antenna Kit: Electro-Metrics Model TDA-30/1-4, S/N 153 Cal. 11/24/99
8._X_Double-Ridged Horn Antenna: Electro-Metrics Model RGA-180, 1-18 GHz, S/N 2319 Cal. 4/27/99
9.___Horn 40-60GHz: ATM Part #19-443-6R
10.___Line Impedance Stabilization Network: Electro-Metrics Model ANS-25/2, S/N 2604 Cal. 2/9/00
11._X_Temperature Chamber: Tenney Engineering Model TTRC, S/N 11717-7
12._X_AC Voltmeter: HP Model 400FL, S/N 2213A14499 Cal. 9/21/99
13.___Digital Multimeter: Fluke Model 8012A, S/N 4810047 Cal 9/21/99
14.___Digital Multimeter: Fluke Model 77, S/N 43850817 Cal 9/21/99
15.___Oscilloscope: Tektronix Model 2230, S/N 300572 Cal 9/23/99
16.___Frequency Counter: HP Model 5385A, S/N 3242A07460 Cal 10/6/99