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RA-04-24164/A/ST

FCC CERTIFICATION E.M.C. Measurement Technical Report

**standard to apply:
FCC Part 15**

**Equipment under test:
UNIVERSAL HANDSFREE CAR KIT FOR
BLUETOOTH PHONE
CK3100**


FCC ID: RKXCK3100

**Company:
PARROT**

TRANSMIT TO: M. GUERRAB

Company: PARROT

Number of pages: 3 + 4 annexes

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This document is the result of testing a specimen or a sample of the product submitted. It does not imply an assessment of the conformity of the whole manufactured products of the tested sample.

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PRODUCT: UNIVERSAL HANDSFREE CAR KIT FOR BLUETOOTH PHONE

Reference / model: CK3100

Serial number: not communicated

MANUFACTURER: PARROT

COMPANY SUBMITTING THE PRODUCT:

Company: PARROT

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Responsible: M. GUERRAB

DATE(S) OF TEST: 12 and 13 May 2004

TESTING LOCATION: EMITECH ATLANTIQUE laboratory at ANGERS (49) FRANCE
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Registration Number by FCC: 101696/FRN: 0006 6490 08

Registration Number by Industry Canada: IC4379

TESTED BY: L. BERTHAUD

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1.INTRODUCTION

This document presents the result of E.M.C. test carried out on the following equipment: UNIVERSAL HANDSFREE CAR KIT FOR BLUETOOTH PHONE CK3100 in accordance with normative reference.

2.PRODUCT DESCRIPTION

ITU Emission code: 1M00F7D

Class: B

Utilization: universal handsfree car kit for bluetooth phone

Antenna type: incorporated antenna

Operating frequency range: from 2400 MHz to 2483.5 MHz

Number of channels: 79

Channel spacing: 1 MHz

Frequency generation: SAW Resonator Crystal Synthetiser

Modulation: Frequency Hopping Spread Spectrum
 Amplitude Digital Frequency Phase

Power source: 12 Vd.c.

Power level, frequency range and channels characteristics are not user adjustable.

The details pictures of the product, the circuit boards and antennas are joined with this file.

3.NORMATIVE REFERENCE

FCC Part 15 (2003) Code of Federal Regulations
Title 47 - Telecommunication
Chapter 1 - Federal Communications Commission
Part 15 - Radio frequency devices
Subpart C - Intentional Radiators

RSS 210 Low Power Licence - Exempt
Radiocommunication Devices
(All Frequency Bands)

4.TEST METHODOLOGY

Radio performance tests procedures given in part 15:

- Paragraph 33: frequency range of radiated measurements
- Paragraph 35: measurement detector functions and bandwidths
- Paragraph 207: conducted limits
- Paragraph 205: restricted bands of operation
- Paragraph 209: radiated emission limits; general requirements
- Paragraph 247: operation within the band 2400 – 2483.5 MHz

5.ADD ATTACHMENTS FILES

- “Synoptic “*
- “Block diagram “*
- “External photos and Product labeling “*
- “Assembly of components “*
- “Internal photos “*
- “Layout pcb “*
- “Bil of materials “*
- “Schematics “*
- “Product description “*
- “User guide “*

6. TESTS AND CONCLUSIONS

Test procedure	Description of test	Criteria respected ?				Comment
		Yes	No	NAP	NAs	
FCC Part 15.205	RESTRICTED BANDS OF OPERATION	X				
FCC Part 15.207	CONDUCTED LIMITS			X		Note 4
FCC Part 15.209	RADIATED EMISSION LIMITS; general requirements	X				Note 5
FCC Part 15.247	OPERATION WITHIN THE BAND 2400-2483.5 MHz					
FCC Part 15.247	(a) (1) <i>hopping mode</i>	X				Note 1
FCC Part 15.247	(a) (1) (iii) <i>hopping timing</i>	X				Note 2
FCC Part 15.247	(b) (1) <i>max output power</i>	X				Note 6
FCC Part 15.247	(b) (5) <i>RF exposure compliance</i>	X				Note 3
FCC Part 15.247	(c) <i>intentional radiator</i>	X				
FCC Part 15.247	(d) <i>peak power spectral density</i>	X				Note 6

NAP: Not Applicable

NAs: Not Asked

Note 1: see appendix 3, the frequency hopping system have hopping channel carrier frequencies separated by 1 MHz. The system hop to channel frequencies from a pseudo randomly ordered list of hopping frequencies. Each frequency is used equally on the average by the transmitter, and separated by a minimum of 20 dB bandwidth of the hopping channel.

Note 2: the frequency hopping system use more than 15 non-overlapping channels. The timing by channel is 440 μ s (see appendix 4).
During 79 channels \times 0.4 s (part 15) = 31.6 s, any channel is used 34 times, then 34 \times 440 μ s = 14.96 ms, thus the average time of occupancy on any channel is less than 400 ms within a period of 0.4 s multiplied by the number of hopping channels employed, in normal operating mode.

Note 3: according to § 15.247 (b) (5) and § 1.1307 (b) (1), the equipment shall be operated in a manner to ensure that the public is not exposed to radio frequency energy level which exceeds the commission's guide line. this is not a portable device, the radiations structure of the device is apart from 20 centimetres of the body of the users.
this type of equipment use less than 1 mW of output power with a high signal transmitting duty factor (section 3 from Oet 65c).
the SAR measurement is not necessary.

Note 4: battery source power.

Note 5: see FCC part 15.247 (c).

Note 6: conducted measurement is not possible (integral antenna), so we used the substitution method in open field.

Conclusion:

The sample base station of UNIVERSAL HANDSFREE CAR KIT FOR BLUETOOTH PHONE CK3100 submitted to the tests complies with the regulations of the standard FCC Part 15 in accordance with the limits or criteria defined in this report.

7. PEAK OUTPUT POWER**Standard:** FCC Part 15 (03)**Test procedure:** paragraph 15.247**Test equipment:**

TYPE	BRAND	EMITECH NUMBER
Spectrum analyzer E7405A	Agilent	2287
Diode detector OD20004A	Omniyig	2469
Oscilloscope THS 720	Tektronix	0940
Antenna RGA60	Electrometrics	1938
Antenna RGA60	Electrometrics	1204
Open site	EMITECH	1274
Radio frequency generator SME06	Rohde & Schwarz	1669
High pass filter HPM11630	Micro-tronics	1673
Low noise amplifier	ALC	2648
Source power	TTI	2148

Test set up:

The system is tested in an open area test site (OATS).

The test unit is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

We use for this measure outdoor test site, by substitution method. The measuring distance between the equipment and the test antenna is 3 m. The antenna have been oriented in the two polarizations, we have recorded only highest level.

In first the spectrum analyzer is replaced by a diode detector which is connected to the vertical channel of an oscilloscope.

The equipment under test is substituted by a signal generator with a calibrated double ridged guide antenna, and its level adjusted such that the deviation of the Y-trace of the oscilloscope.

The output power level of the signal generator is measured with a calibrated RF power meter.

Then a measurement of the electro-magnetic field is realized, with a resolution bandwidth and video bandwidth adjusted at 1 MHz.

Distance of antenna: 3 meters**Antenna height:** 1 to 4 meters**Antenna polarization:** vertical and horizontal**Equipment under test operating condition:**

The equipment is in continuous transmission mode at the highest power level which the transmitter is intended to operate (hopping mode).

The equipment is fitted with an internal antenna, without connector.

Results:

Ambient temperature (°C): 17.5

Relative humidity (%): 71

Polarization of test antenna: horizontal (height: 110 cm)

Position of equipment: use position (azimuth: 300 degrees)

Sample N° 1

		Peak Output Power radiated at these frequencies (W): from 2402 MHz to 2480 MHz	Limits (W)
Normal test conditions	Nominal power source (V): 12	9.549 x 10 ⁻⁴	1*

* the frequency hopping systems use at least 75 hopping channel.

Sample n° 1 Channel 1

		Level dBμV	Cable loss dB	Antenna factor dB	Electro-magnetic field (dBμV/m):
Normal test conditions	Nominal power source (V): 12	56.05	4.4	28.1	88.55

Sample n° 1 Channel 44

		Level dBμV	Cable loss dB	Antenna factor dB	Electro-magnetic field (dBμV/m):
Normal test conditions	Nominal power source (V): 12	57.58	4.4	28.1	90.08

Sample n° 1 Channel 79

		Level dBμV	Cable loss dB	Antenna factor dB	Electro-magnetic field (dBμV/m):
Normal test conditions	Nominal power source (V): 12	55.52	4.4	28.1	88.02

Test conclusion:

RESPECTED STANDARD

8. PEAK POWER DENSITY

Standard: FCC Part 15 (03)

Test procedure: paragraph 15.247

Test equipment used:

TYPE	MANUFACTURER	EMITECH NUMBER
Spectrum analyzer E7405A	Agilent	2287
Open site	Emitech	1274
Radiofrequency generator SME06	Rohde & Schwarz	1669
Antenna RGA-60	Electrometrics	1938
Antenna RGA-60	Electrometrics	1204
Source power	TTI	2148

Measured condition:

We used the same method of the peak output power, but the oscilloscope and the diode is replaced by a spectrum analyser used in combination with an RF power meter.

Resolution bandwidth: 3 kHz

Video bandwidth: 3 kHz

Test operating condition of the equipment:

Antenna gain (relative to an isotropic antenna): not communicated, integral antenna.

The transceiver is blocking in transmit mode hopping.

Results:

Ambient temperature (°C): 17.5

Relative humidity (%): 69

Power source (V): 12

Sample n° 1 Channel 1

	Peak power density at frequency: 2402 MHz
Normal test conditions	-24.01 dBm
Limits	+8 dBm

Sample n° 1 Channel 44

	Peak power density at frequency: 2445 MHz
Normal test conditions	-20.53 dBm
Limits	+8 dBm

Sample n° 1 Channel 79

	Peak power density at frequency: 2480 MHz
Normal test conditions	-21.89 dBm
Limits	+8 dBm

Test conclusion:

RESPECTED STANDARD

9.RADIATED EMISSION PORTABLE**Standard:** FCC Part 15 (03)**Test procedure:** paragraph 15.205
paragraph 15.209
paragraph 15.247**Test equipment:**

TYPE	BRAND	EMITECH NUMBER
Test receiver ESH3	Rohde & Schwarz	1058
Test receiver ESVS 10	Rohde & Schwarz	1219
Spectrum analyzer E7405A	Agilent	2287
Loop antenna	EMCO	1406
Biconical antenna HP 11966C	Hewlett Packard	728
Log periodic antenna HL 223	Rohde & Schwarz	1999
Open site	Emitech	1274
Antenna RGA-60	Electrometrics	1204
Low-noise amplifier	Microwave DB	1922
High pass filter HP12/3200-5AA	Filtek	
Antenna WR42	IMC	1939
Power source	TTI	2148

Test set up:

The system is tested in an open area test site (OATS).

The test unit is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

Frequency range: from 9 kHz to harmonic 10 ($F_{\text{carrier}} \leq 10 \text{ GHz}$)**Detection mode:** Quasi-peak ($F < 1 \text{ GHz}$)
Average ($F > 1 \text{ GHz}$)**Bandwidth:** 120 kHz ($F < 1 \text{ GHz}$) or 100 kHz, following 15.205 or 15.247
1 MHz ($F > 1 \text{ GHz}$) or 100 kHz, following 15.205 or 15.247**Distance of antenna:** between 30 m and 3 m according the frequencies and the limits.**Antenna height:** 1 to 4 meters**Antenna polarization:** vertical and horizontal**Equipment under test operating condition:**

The equipment is in continuous hopping transmission mode.

Results:

Ambient temperature (°C): 18.5

Relative humidity (%): 68

Power source (V): 12

The polarity column refers to the antenna polarity at which the maximum emissions level is measured.

FREQUENCIES (MHz)	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
206.438	230	184	120	H	25.1	70.08*	44.98
396.546	100	218	120	H	28.1	70.08*	41.98

* limit corresponding at 20 dB below the highest level produced by the intentional radiator, in the assigned band.

Applicable limits: 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the power produced by the equipment, in 100 kHz bandwidth outside the frequency band in which the spread spectrum is operating. In addition radiated emissions which fall in the restricted band, as defined in section 15.205 (c), must also comply with the radiated emission limits specified in section 15.209 (a).

TEST CONCLUSION:

RESPECTED STANDARD

10.APPENDIXES**Appendix 1: "PHOTOGRAPHIES OF THE EQUIPEMENT UNDER TEST"**

This appendix contains 4 pages.

Appendix 2: "OPEN AREA TEST SITE, TEST SET UP"

This appendix contains 3 pages.

Appendix 3: "CHANNEL SEPARATION"

This appendix contains 4 pages.

Appendix 4: "TIMING HOPPING AND TIMING CHANNEL"

This appendix contains 7 pages.

□□□ End of report, 4 appendixes to be forwarded □□□

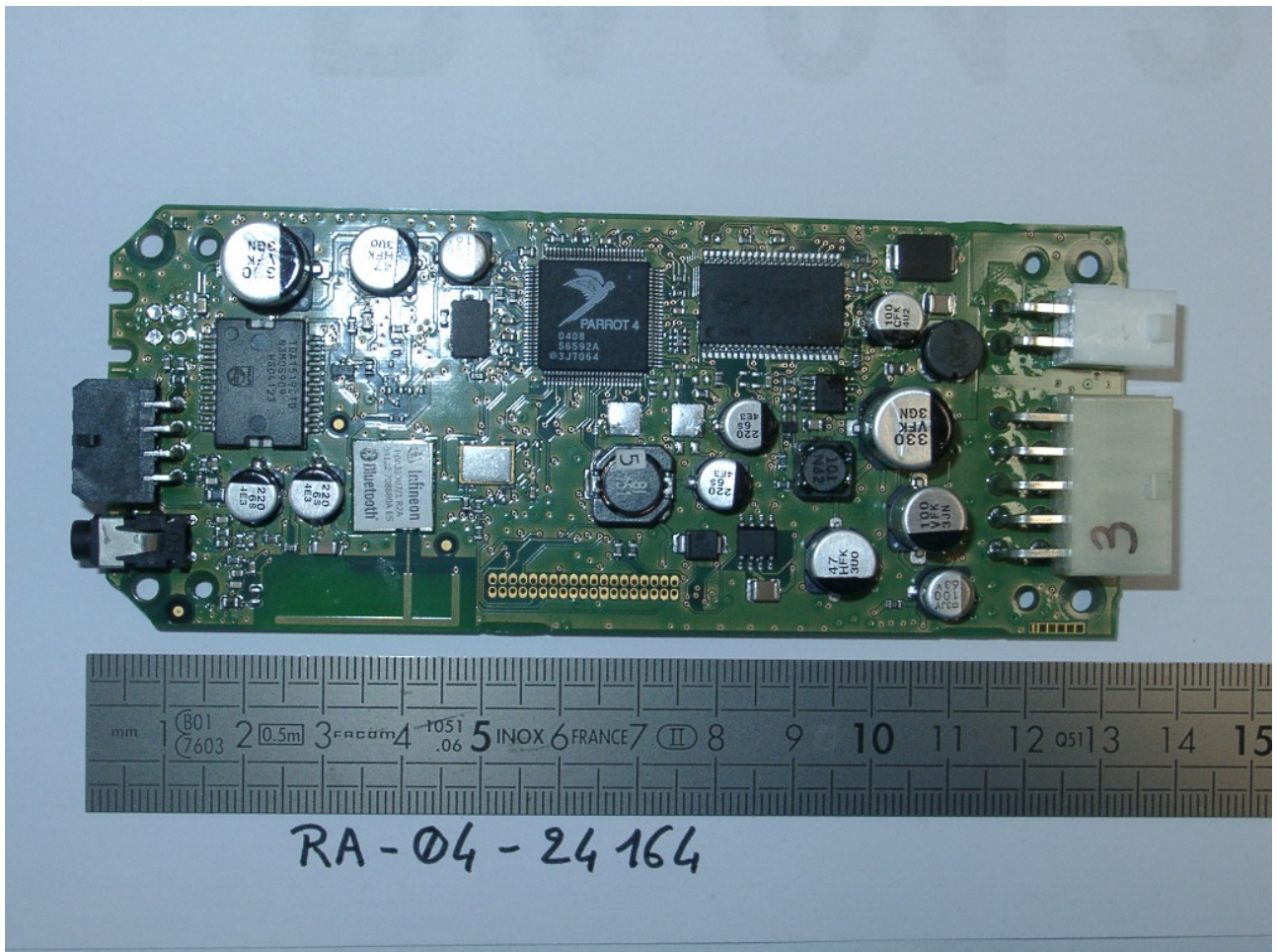
APPENDIX 1

PHOTOGRAPHIES OF THE EQUIPMENT UNDER TEST

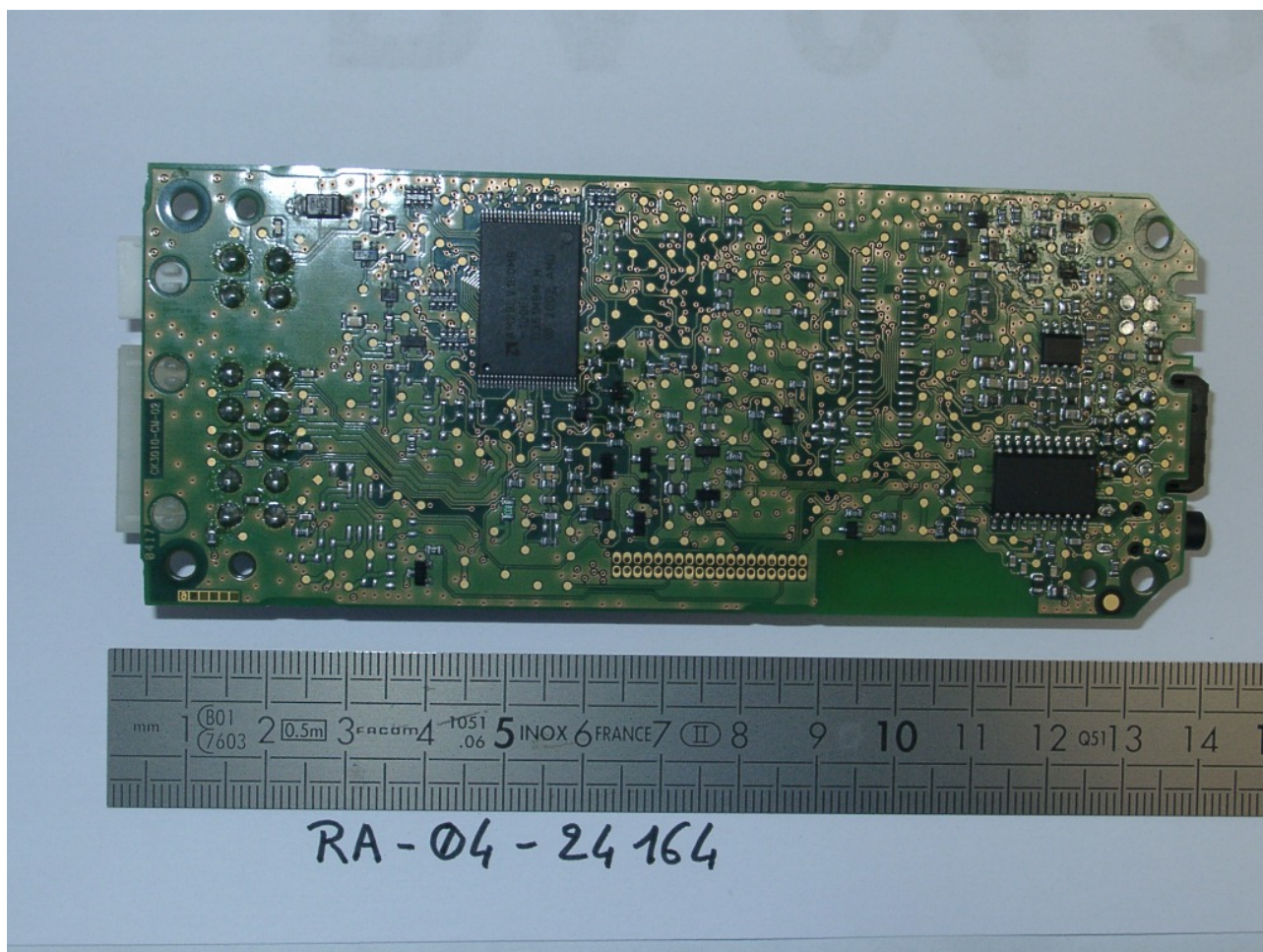
PHOTOGRAPHY OF THE EQUIPMENT UNDER TEST



Printed circuit board: face 1



Printed circuit board: face 2



APPENDIX 2

PHOTOGRAPHIES OPEN AREA TEST SITE, TEST SET UP

PHOTOGRAPHY OPEN AREA TEST SITE

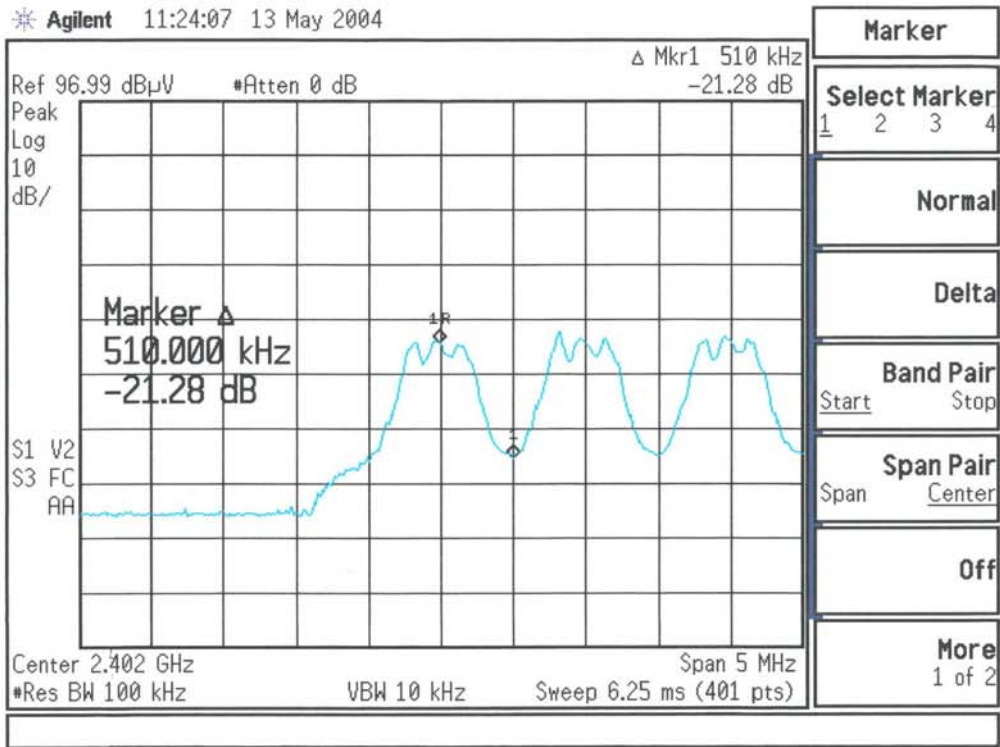


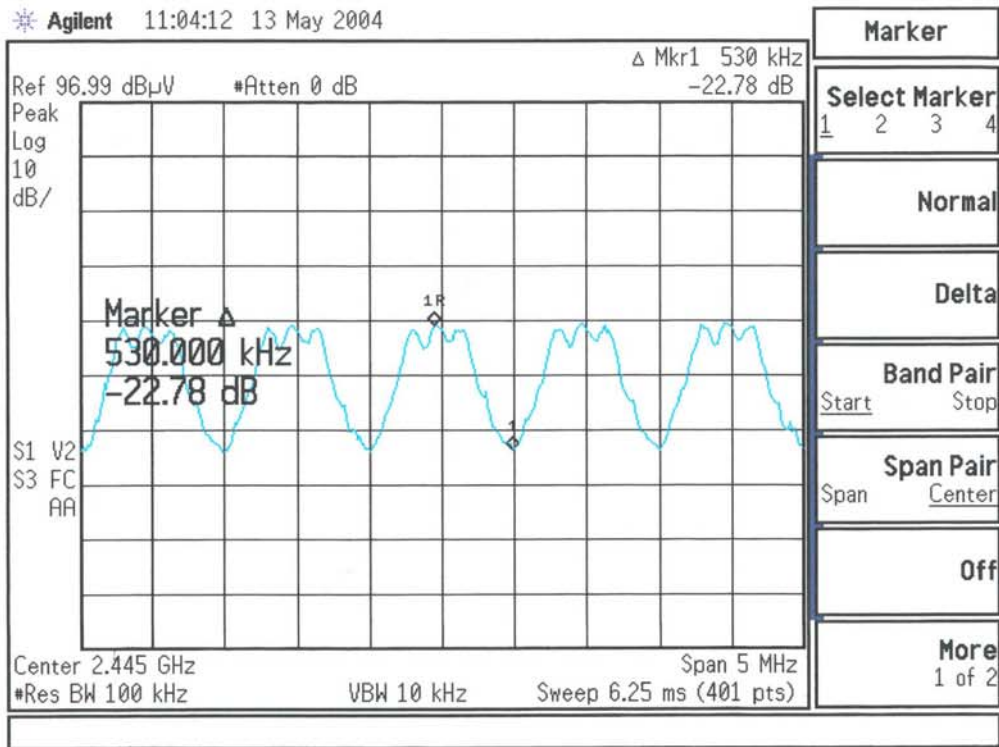
PHOTOGRAPHY TEST SET UP IN OPEN FIELD

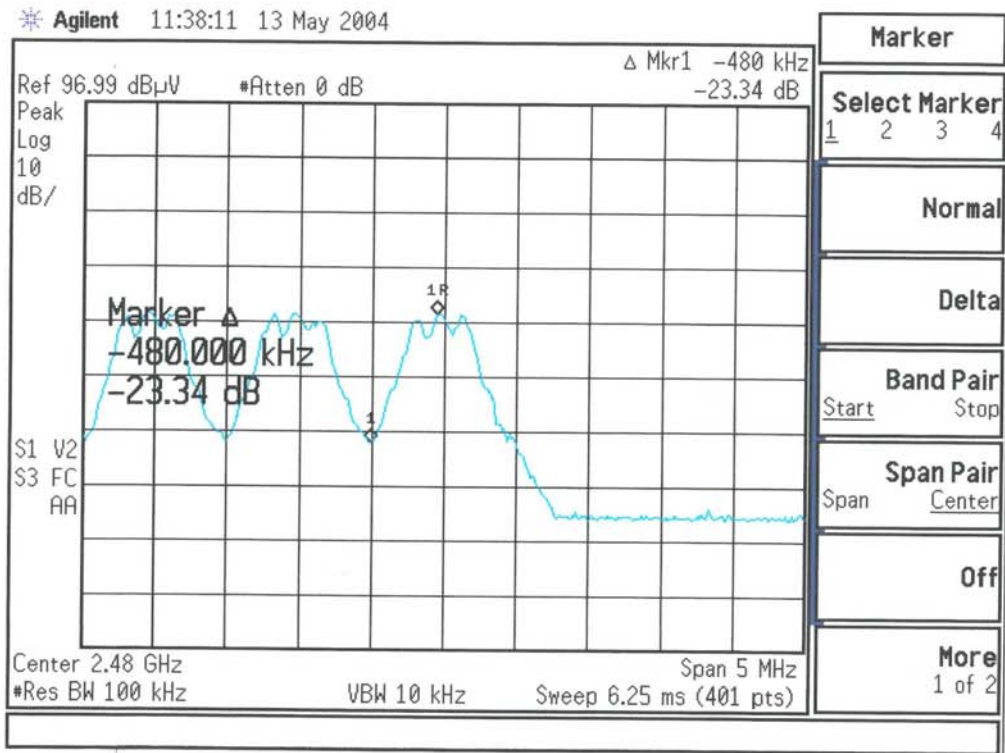


APPENDIX 3

CHANNEL SEPARATION







APPENDIX 4

TIMING HOPPING AND TIMING CHANNEL

