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Laboratory Test Report

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Report No.: 9630-00

Date Issued: 14 October 2005

SUBJECT: Tuneable FM Transmitter (TFMT)
Rating: 12 V d.c.

REQUESTED BY: Phitek Systems Ltd
Level 4 Avon House
2 Kingdon Street
Newmarket
Auckland
New Zealand

INSTRUCTIONS: Test for compliance with 47 "Code of Federal Regulations: Part 15 Radio frequency devices. Subpart C – Intentional Radiators".

CONTENTS: General
Test Specification
Date of test
Description
Results: FCC 47 Part 15:2002
Scans: - 15.209 Radiated Emissions 30 MHz – 1000 MHz
- 15.209 Radiated Emissions 1000 MHz – 1008 MHz
- 15.215(c) Emission bandwidth 90.1 MHz – 90.3 MHz

SUMMARY: All test results in this report in relation to the Tuneable FM Transmitter confirmed that the specimens complied with the relevant provisions of 47 "Code of Federal Regulations: Part 15 Radio frequency devices. Subpart C – Intentional Radiators".

APPROVED BY:

Manuel Shimasaki
IANZ Signatory

TESTED BY:

Brian Drumm
EMC Compliance Engineer

PREPARED BY:

Anna Hardie
Admin Assistant

GENERAL

- a) As detailed in this report, four specimens of the Tuneable FM Transmitter were received for testing.
- b) The results detailed in this report are based on the specimens labelled S1 in conjunction with a cigarette lighter adaptor cable with a ferrite choke at the EUT end.
- c) The specimens were tested for compliance with Electromagnetic Interference (EMI) in accordance with 47 “Code of Federal Regulations: Part 15 Radio frequency devices. Subpart C – Intentional Radiators”. Parkside Laboratories is an FCC listed facility, registration number 96815.
- d) Radiated emission measurements between 7 MHz and 30 MHz were conducted by EMC Technologies Ltd whose FCC listed facility registration number is 90838. Refer to their report No. 50925.1.
- e) All testing was carried out under the following environmental conditions, unless otherwise noted:

Ambient temperature	15 °C to 35 °C
Relative humidity	30 % to 60 %
Atmospheric pressure	86 kPa to 106 kPa.

- f) Note: N/R = Not Relevant to design assessed, N/T = Not Tested at manufacturer’s request, EUT = Equipment Under Test, DNC = Did Not Comply.
- g) The reported expanded uncertainties (U) listed below are based on standard uncertainties multiplied by a coverage factor $k = 2$, and define an interval $\pm U$ providing a level of confidence of approximately 95 %. The uncertainty calculations have been carried out in accordance with IANZ requirements.

Radiated EMI Measurement	30 – 1000 MHz	± 4.6 dB
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- h) For radiated emission measurements, maximum peak disturbance scans were performed over the entire frequency range of 30 MHz to 1.08 GHz while varying the products azimuth 0° to 360° and the antenna height, from 1 to 4 meters with both horizontal and vertical polarities. The 15 maxima were then subjected to a Quasi-Peak analysis for > 1 s at each point where the exact azimuth, height, polarity and frequency of the disturbance occurred. All 15 quasi-peak points were manually verified and ambient signal results removed.

TEST SPECIFICATION

FCC 47 Part 0 to 19 :2002

“47 Code of Federal Regulations: Part 15 Radio frequency devices. Subpart C – Intentional Radiators”.

This specification was applicable at the time of testing.

DATE OF TEST

Testing was completed on 28 September 2005.

DESCRIPTION

The Phitek TFMT operated from 88.2 MHz to 107.8 MHz in 100 kHz steps and had provision to store 6 frequencies in memory.

It was housed in a white plastic case of two halves press fitted together. Between the front and rear parts was a black rubber grommet with space to accommodate a 175mm audio input cord which was stored by wrapping around the case.

On the front of the case was a circular opening with a black rubber insert. The insert had an opening which exposed an LCD display showing frequency and audio input levels. Spaced around the rubber insert were push button controls for power, frequency up and down and a memory function.

On the back of the case was a battery compartment and on the bottom was a socket for the connection of d.c. power.

Supplied with the Phitek TFMT was a 1.8 meter power cord with a d.c. plug and ferrite choke at the device end and a cigarette light adaptor at the other.

The lowest frequency generated in the Phitek TFMT was 7.6 MHz, the highest was 107.8 MHz.

Dimensions: L 80 x W 55 x D 25 [mm]



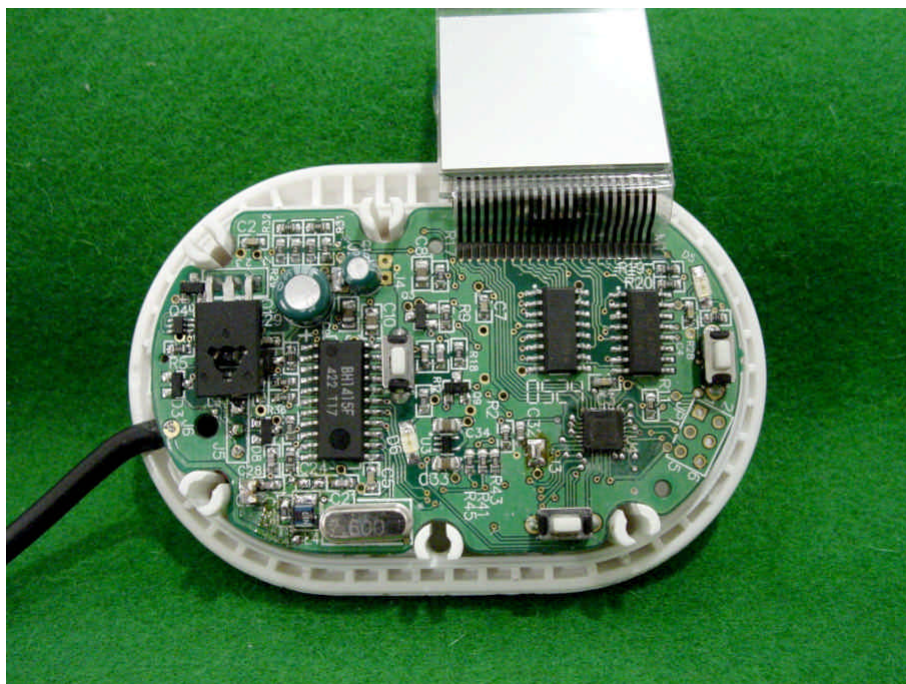
Tuneable FM Transmitter: General showing power and audio cables



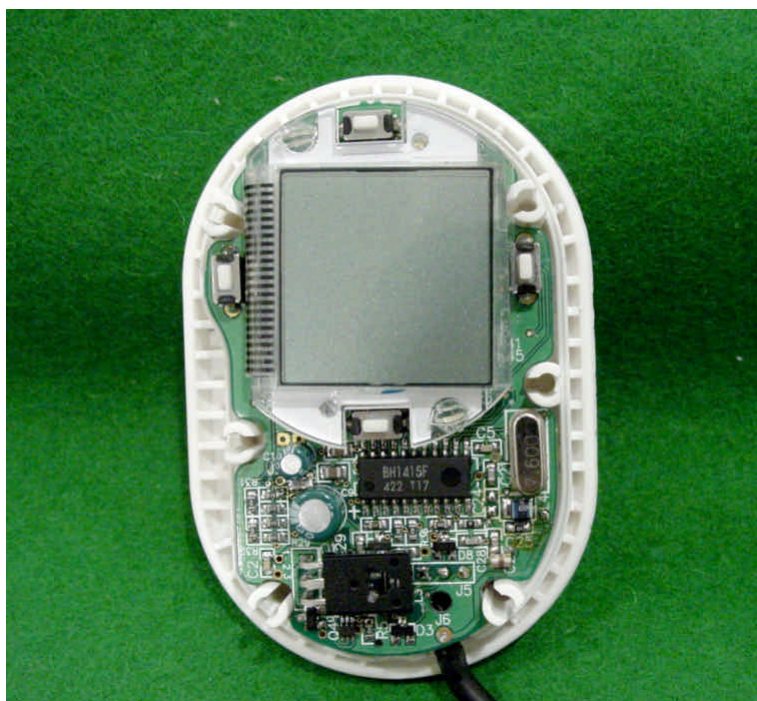
Tuneable FM Transmitter: Front view



Tuneable FM Transmitter: Rear view



Tuneable FM Transmitter: Internal view



Tuneable FM Transmitter: Internal view(2)

RESULTS: FCC 47 Part 15:2002 “Code of Federal Regulations: Title 47 Telecommunication. Part 15 Radio frequency devices”.

SUBPART A – GENERAL

Applied

Clause 15.1 Scope of this part

Applied

Clause 15.3 Definitions

Noted

Clause 15.5 General conditions of operation

Noted

Clause 15.7 Special temporary authority

N/R

Clause 15.9 Prohibition against eavesdropping

N/A

Clause 15.11 Cross reference

Noted

Clause 15.13 Incidental radiators

Noted

Clause 15.15 General technical requirements

Noted

Clause 15.17 Susceptibility to interference

Noted

Clause 15.19 Labelling requirements

Complied

The labelling required by (a)(3) was in the user manual, as permitted by (a)(5).

Clause 15.21 Information to user

Complied

A warning against modification was included in the user manual

Clause 15.23 Home-built devices

N/R

Clause 15.25 Kits

Noted

Clause 15.27 Special accessories

Noted

Clause 15.29 Inspection by the Commission

Noted

Clause 15.31 Measurement standards

Applied

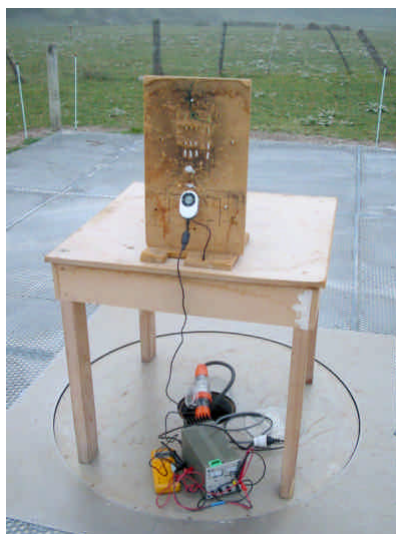
The measurements were made at an Open Air Test Site as required by paragraph (d).

Measurements were made between 10.2 and 13.8 V d.c. using a cigarette lighter power adaptor fitted with a ferrite choke at the EUT end of the cable.

The measurements were carried out at a distance of 3 m in accordance with paragraph (f).

Measurements were made at all radials around the (EUT) at 1 degree increments as required by paragraph (f)(5).

Measurements of radiated power were done on 88.2, 88.5, 98.0 and 107.8 MHz, near the bottom, middle and top of the band of operation as required by paragraph (m).



Tuneable FM Transmitter : Radiated Emissions Setup

Clause 15.32 Test procedures for CPU boards and computer power supplies Noted

Clause 15.33 Frequency range of radiated measurements Applied

Radiated measurements were made from 7 MHz to 1008 MHz.

Measurements between 7 MHz and 30 MHz were conducted by EMC Technologies Ltd at their Auckland laboratory, FCC Registration Number: 90838.

Please refer to their report No. 50925.1.

Clause 15.35 Measurement detector functions and bandwidths Applied

The measuring equipment used was a Rohde & Schwarz ESCS 30 receiver complying with the requirements of paragraphs (a) and (b).

Clause 15.37 Transition provisions for compliance with the rules Noted

SUBPART B – UNINTENTIONAL RADIATORS N/R

SUBPART C - INTENTIONAL RADIATORS Applied

Clause 15.201 Equipment authorisation requirement Noted

Clause 15.203 Antenna requirement Applied

The Phitek Tuneable FM Transmitter had a permanently attached antenna.

Clause 15.204 External radio frequency power amplifiers and antenna modifications Noted

Clause 15.205 Restricted bands of operation Noted

Clause 15.207 Conducted limits N/R

Clause 15.209 Radiated emission limits, general requirements

Applied

Emissions from the (EUT) did not exceed the limits specified in paragraph (a). A frequency scan is attached.

The level of unwanted emissions did not exceed the level of the fundamental emission as required by paragraph (c).

Measurements below 1000 MHz were made using a quasi-peak detector and above 1000 MHz using an average detector as required by paragraph (d).

Clause 15.211 Tunnel radio systems

N/R

Clause 15.213 Cable locating equipment

N/R

Clause 15.214 Cordless telephones

N/R

Clause 15.215 Additional provisions to the general radiated emission limitations

Noted

Clause 15.217 Operation within the band 160 – 190 kHz

N/R

Clause 15.219 Operation within the band 510 – 1705 kHz

N/R

Clause 15.221 Operation within the band 525 – 1705 kHz

N/R

Clause 15.223 Operation within the band 1.705 – 10 MHz

N/R

Clause 15.225 Operation within the band 13.553 – 13.567 MHz

N/R

Clause 15.227 Operation within the band 26.96 – 27.28 MHz

N/R

Clause 15.229 Operation within the band 40.66 – 40.70 MHz

N/R

Clause 15.231 Periodic operation in the band 40.66 – 40.70 MHz and above 70 MHz

N/R

Clause 15.233 Operation within the bands 43.71 – 44.49 MHz, 46.60 – 46.98 MHz, 48.75 – 49.51 MHz and 49.66 – 50.0 MHz

N/R

Clause 15.235 Operation within the band 49.82 – 49.90 MHz

N/R

Clause 15.237 Operation in the bands 72.0 – 73.0 MHz, 74.6 – 74.8 MHz and 75.2 – 76.0 MHz

N/R

Clause 15.239 Operation in the band 88 – 108 MHz

Complied

Emissions were confined within a 200 kHz bandwidth lying wholly within the frequency range 88 - 108 MHz. A bandwidth scan is attached.

Emissions from the (EUT) did not exceed 250 μ V (48 dB μ V) per metre at 3 m as required by paragraph (b).

The field strength of any emissions from the (EUT) outside of the 200 kHz band did not exceed the general radiated emission limits in 15.209 as required by paragraph (c).

Clause 15.241 Operation in the band 174 – 216 MHz

N/R

Clause 15.242 Operation in the bands 174 – 216 MHz and 470 – 668 MHz

N/R

Clause 15.243 Operation in the band 890 – 940 MHz

N/R

Clause 15.245 Operation in the bands 902 – 928 MHz, 2435 – 2465 MHz, 5785 – 5815 MHz, 10500 – 10550 MHz and 24075 – 24175 MHz

N/R

Clause 15.247 Operation in the bands 902 – 928 MHz, 2400 – 2483.5 MHz and 5725 – 5850 MHz N/R

Clause 15.249 Operation in the bands 902 – 928 MHz, 2400 – 2483.5 MHz, 5725 – 5875 MHz and 24.0 – 24.25 GHz N/R

Clause 15.251 Operation in the bands 2.9 – 3.26 GHz, 3.267 – 3.332 GHz, 3.339 – 3.3458 GHz and 3.358 – 3.6 GHz N/R

Clause 15.253 Operation in the bands 46.7 – 46.9 GHz and 76.0 – 77.0 GHz N/R

Clause 15.255 Operation in the band 57 – 64 GHz N/R

SUBPART D – UNLICENSED PERSONAL COMMUNICATIONS SERVICE DEVICES N/R

SUBPART E – UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES N/R

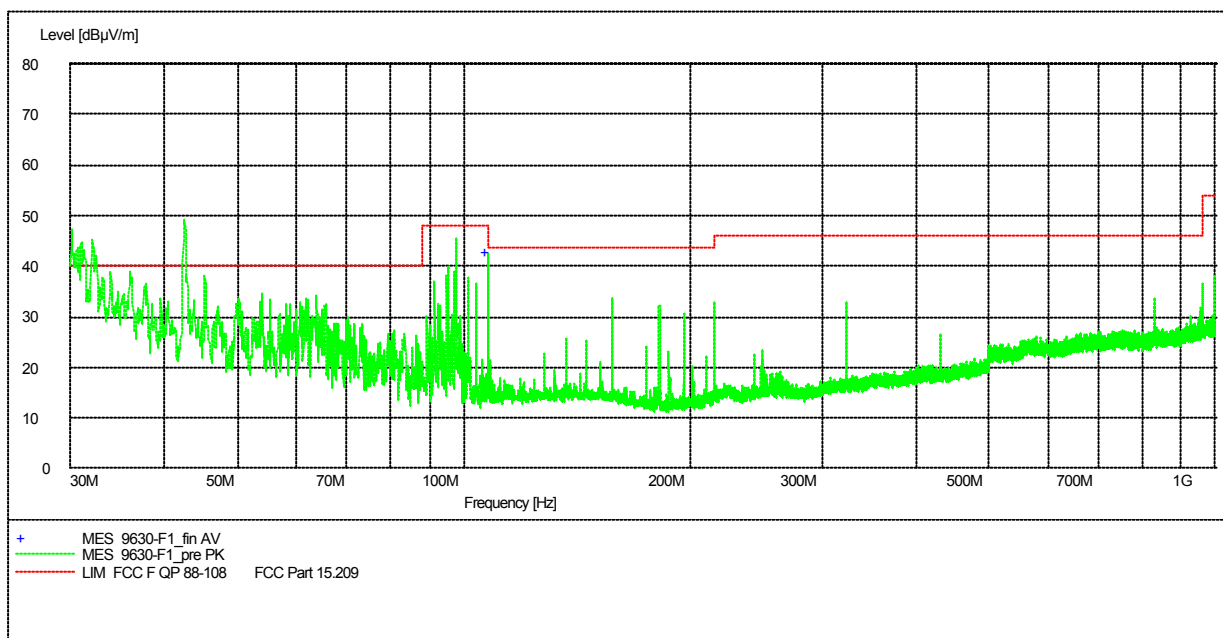
SUBPART F – ULTRA-WIDEBAND OPERATION N/R

RADIATED EMISSIONS SCAN 30 MHz – 1 GHz

EUT: Tuneable FM Transmitter
 Manufacturer: Phitek
 Operating Condition: 107.8 MHz, black d.c. power cord
 Test Site: OATS - Birdlings Flat
 Operator: Brian Drumm
 Test Specification: FCC 15.209
 Comment: 13.8 V d.c. input to black PSU.
 Start of Test: 31/08/05 / 3:08:57

SCAN TABLE: "EN 55022 Field"

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	60.0 kHz	MaxPeak	5.0 ms	120 kHz	BILOG JUN 05 TL1218



MEASUREMENT RESULT: "9630-F1_fin AV"

07/10/2005 10:54am

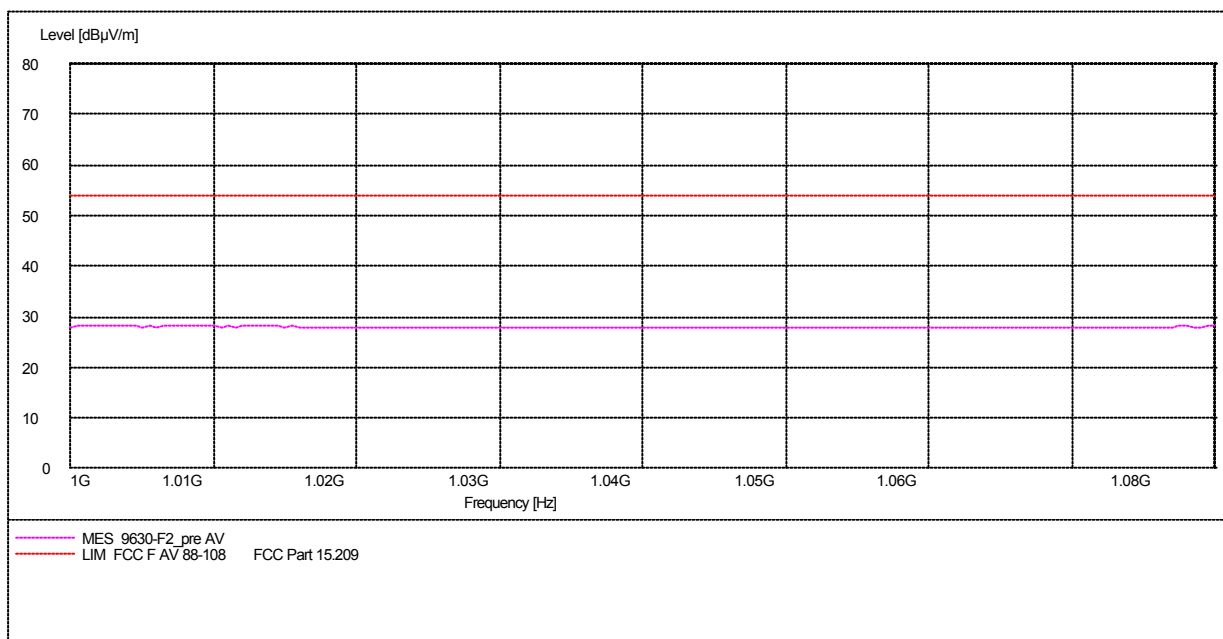
Frequency MHz	Level dBµV/m	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
107.800000	42.80	48.0	5.2	100	229	Vertical

RADIATED EMISSIONS SCAN 1000 – 1008 MHz

EUT: Tuneable FM Transmitter
 Manufacturer: Phitek
 Operating Condition: 107.8 MHz, black d.c. power cord
 Test Site: OATS - Birdlings Flat
 Operator: Brian Drumm
 Test Specification: FCC 15.209
 Comment: 13.8 V d.c. input to black PSU.
 Start of Test: 31/08/05 / 4:00:45

SCAN TABLE: "EN 55022 Field"

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	2.0 GHz	500.0 kHz	MaxPeak	5.0 ms	1 MHz	TL1218 JUN 05

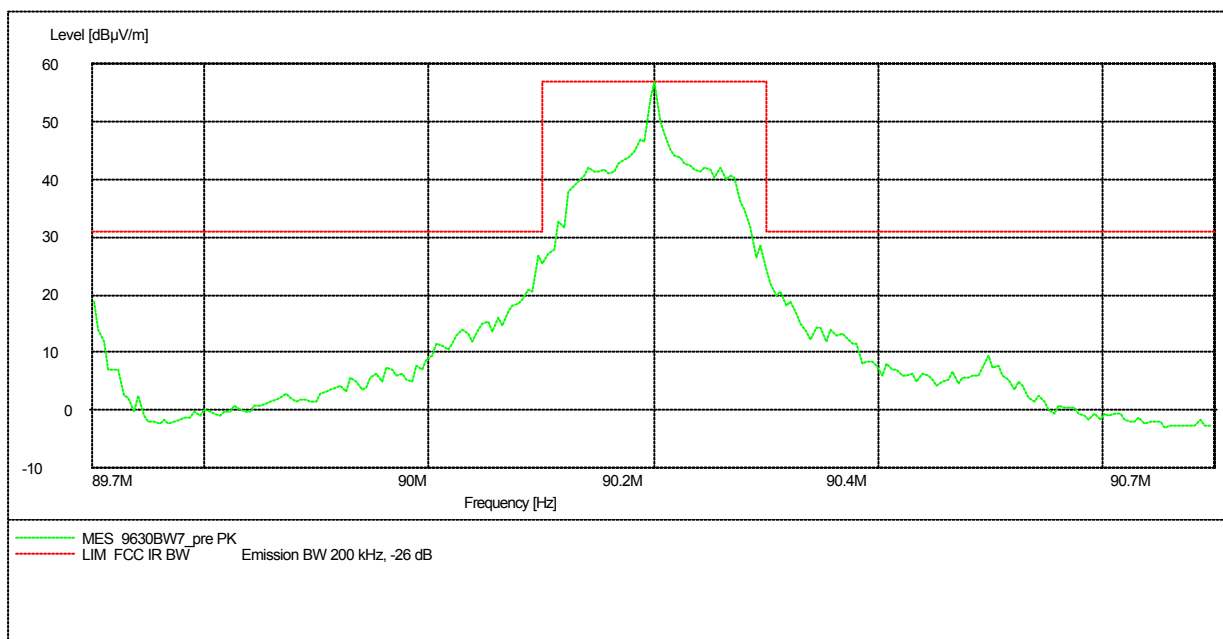


200 kHz BANDWIDTH SCAN

EUT: TFMT Stereo FM transmitter
 Manufacturer: Phitek
 Operating Condition: 12V d.c. to cigarette lighter adapter
 Test Site: Semi Anechoic Chamber
 Operator: Brian Drumm
 Test Specification: FCC part 15
 Comment: Modulated with music from CD player with max volume
 Start of Test: 16/09/2005 / 10:08:02am

SCAN TABLE: "FCC Bandwidth"

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	4.5 kHz	Average	50.0 ms	9 kHz	TL1218 JUN 05



END OF REPORT