Bluetooth Test Report

Test Report Number: WR901.002a

Terminal device: FCC ID: QMNRM-124 Model: 2855i Type: RM-124 HW: 2001SW: VR100_05wk21_18.nep (Detailed information is listed in section 4).

Originator:	Cindy Trinh
Function:	TCC - Dallas – EMC
Version/Status:	1.0 Approved
Location:	TCC Directories
Date:	October 21, 2005

Change History:

Version	*Date*	*Status*	*Handled By*	*Comments*
0.1	20-Oct-05	Draft	Cindy Trinh	
0.2	21-Oct-05	Proposal	Cindy Trinh	
0.3	21-Oct-05	Review	Mark Severson	
1.0	21-Oct-05	Approved	Mark Severson	

Testing laboratory:

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Date and signatures: **October 21, 2005**

For the contents:

Cindy Trinh	Mark Severson
Test Operator	**Technical Review**

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1. GENERAL

1.1 Quality System

The quality system in place for TCC-Dallas conforms to ISO/IEC 17025 and has been audited to the standard by A2LA (American Association of Laboratory Accreditation). TCC - Dallas has also been audited using the ISO 9000 Quality System, as part of Nokia Mobile Phones, Inc., by ABS (American Bureau of Shipping) Quality Evaluations Inc.

TCC-Dallas is a recognized laboratory with the Federal Communications Commission in filing applications for Certification under Parts 15 and 18, Registration Number 100060, and Industry Canada, Registration Number IC 661.

1.2 Objective

All tests and measurement data shown was performed to determine whether the selected handset was in compliance as specified in FCC: CFR47 Parts 15.207 and 15.247.

1.3 Test Summary

Test Results: *The test result relates only to those tested devices mentioned in Section 4 of this test report.*

Test Performed	CFR 47	RSS-210	Section of Report	Complies / Does not comply / Not Tested
Radiated Emissions	15.247 (c)	6.2.2 (o), e1	7	Complies

2. STANDARDS BASIS

Testing has been carried out in accordance with:

REF.	Code of the standard	Name of the standard
1	ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.
2	FCC: CFR 47 Part 15	Code of Federal Regulations (CFR) Title 47, Part 15 – Radio Frequency Devices: Subpart B – Unintentional Radiators and Subpart C – Intentional Radiators
3	CISPR 22 / EN55022	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.
4	ICES-003	Digital Apparatus, Industry Canada
5	RSS-210	Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands)
6	RSS-212	Test Facilities and Test Methods for Radio Equipment, Industry Canada (Provisional)
7	RSP-100	Radio Equipment Certification Procedure

Note: Unless otherwise stated, (by reference to a version number and a publication date), the latest version of the above documents applies.

Deviations:

Not Applicable.

3. LIST OF ABBREVIATIONS, ACRONYMS AND TERMS

3.1 Abbreviations

dB - decibel

dBm - decibels per milliwatt (absolute measurement)

dBµV - decibel per microvolt

dBµV/m - decibel of microvolt per meter

GHz - gigahertz or 1000000000 hertz

kHz - kilohertz or 1000 hertz

MHz - megahertz or 1000000 hertz

ms - millisecond or 0.001 second

µs - microsecond or 0.000001 second

3.2 Acronyms

BT - Bluetooth

EMC - Electromagnetic Compatibility

EMI - Electromagnetic Interference

EUT - Equipment under Test

PRBS - Pseudo Random Bit Sequence

RF - Radio Frequency

3.3 Terms

Base Station Simulator (BSS) - simulates all the necessary signals that a phone would experience while on a live network. There are many types of base station simulators catering for all current protocols, i.e., GSM, AMPS, TDMA, and CDMA.

4. EQUIPMENT-UNDER-TEST (EUT)

The results in this report relate only to the items listed below:

4.1 Description of Tested Device(s):

Test Performed	Mode of Operation	Date of Receipt	Condition of Sample	Item	Identifying Information
FCC Part 15.247	BT	18-Oct-05	Functional	Phone	ESN: 03306001520 FCC ID: QMNRM-124 Type: RM-124 HW: 2001 SW: VR100_05wk21_18.nep
FCC Part 15.247	BT	18-Oct-05	N/A	Battery	Type: BL-6C Other: 3.7 vdc
FCC Part 15.247	BT	18-Oct-05	N/A	Charger	Type: AC-3U
FCC Part 15.247	BT	18-Oct-05	N/A	Headset	Type: HS-9

5. TEST EQUIPMENT LIST

The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items listed can be obtained from the Engineering Services Group within NMP, Product Creation - Dallas. Where relevant, measuring equipment is subjected to in-service checks between testing. TCC - Dallas shall notify clients promptly, in writing, of identification of defective measuring equipment that casts doubt on the validity of results given in this report.

Section of Report	NMP#	Test Equipment	Mfr. #	Model #	Calibration Due Date	Calibration Interval
7	02661	EMI Receiver	Agilent	8546A / 85460A	03-Jun-06	12 months
7	02601	Base Station	R&D	CMU-200	26-Nov-05	12 months
7	02679	Spectrum Analyzer	Agilent	E7405A	01-Jun-06	12 months
7	01472	Biconilog Antenna	ETS	3142B	16-May-06	12 months
7	00064	Horn Antenna	EMCO	3115	27-Apr-06	12 months
7	03960	Horn Antenna	EMCO	3116	06-May-06	12 months
7	02836	Turntable and Tower Controller	Sunol	FM2022 & 2846	N/A	NCR
7	04064	Base Station	R&D	CMU-200	21-Jul-06	12 months

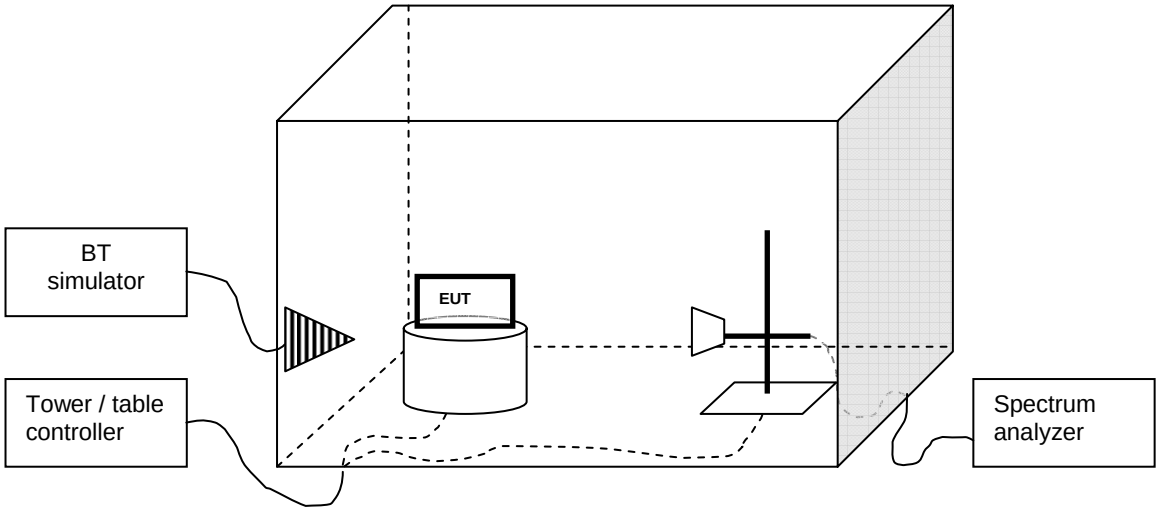
6. EUT TEST SETUPS

For each test the EUT was exercised to find out the worst case of operation modes and device configuration.

6.1 EUT test set-up (radiated measurement)

The EUT was set on a non-conductive turn table in a semi anechoic chamber. In the corner of the chamber there was a communication antenna, which was connected to the BT simulator located outside the chamber. The radiated power from the EUT was measured with an antenna fixed to a antenna tower. The tower and turn table were remotely controlled to turn the EUT and change the antenna polarization. The measured signal was routed from the measuring antenna to the spectrum analyzer. The Bluetooth simulator was used to the same as in conducted measurements.

In tests, where absolute level reporting were required, the results were corrected with all applicable factors as detailed in the result section of each measurement.



7. RADIATED EMISSIONS

Specification: FCC Part 15.247(c)(1); RSS-210 6.2.2(o), e1

7.1 Setup

Testing was performed in accordance with ANSI C63.4, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.

Used test set-up: (see section 6)

7.2 Test Results

Test Operator	Cindy Trinh
Date of Measurement	20-Oct-05 to 21-Oct-05
Temperature	22 to 24 °C
Humidity	44 to 46 %RH
Test Result	Complies

7.3 EUT operation mode

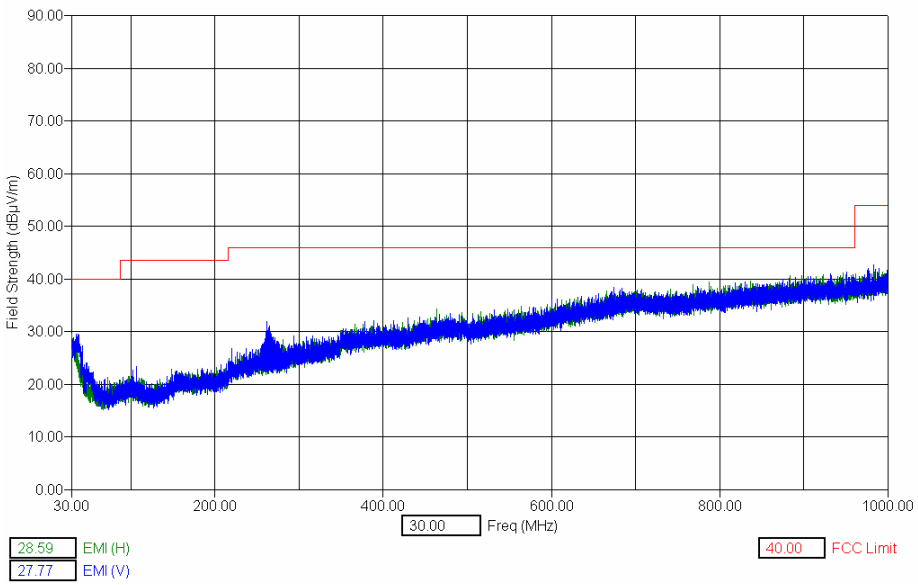
EUT operation mode	Connected, DH5, Static PRBS
EUT channel	0 (2402 MHz), 38 (2440 MHz), 78 (2480 MHz) and Hopping mode
EUT TX power level	Nominal

7.4 Pass/Fail Criteria

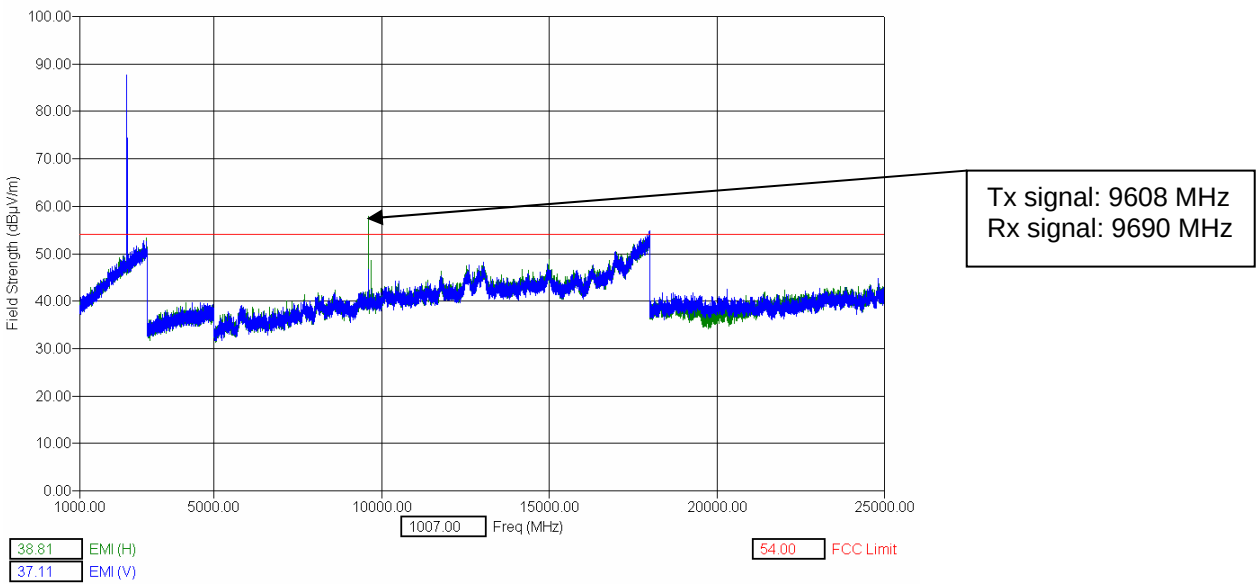
Band	Frequency Range (MHz)	FCC Class B Limit (dBµV/m at 3m)	Detector
BT	30 – 88	40	QP
BT	88 – 216	43.5	QP
BT	216 – 960	46	QP
BT	960 – 1000	54	QP
BT	> 1000	74.0/ 54.0	PK/ AV

7.5 Results

Channel 0, 30MHz to 1GHz



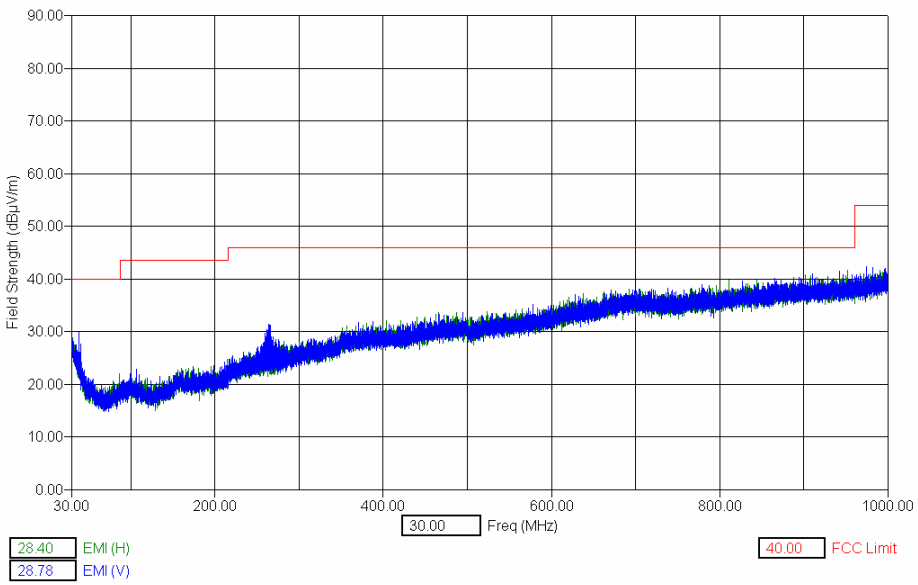
Channel 0, 1GHz to 25GHz



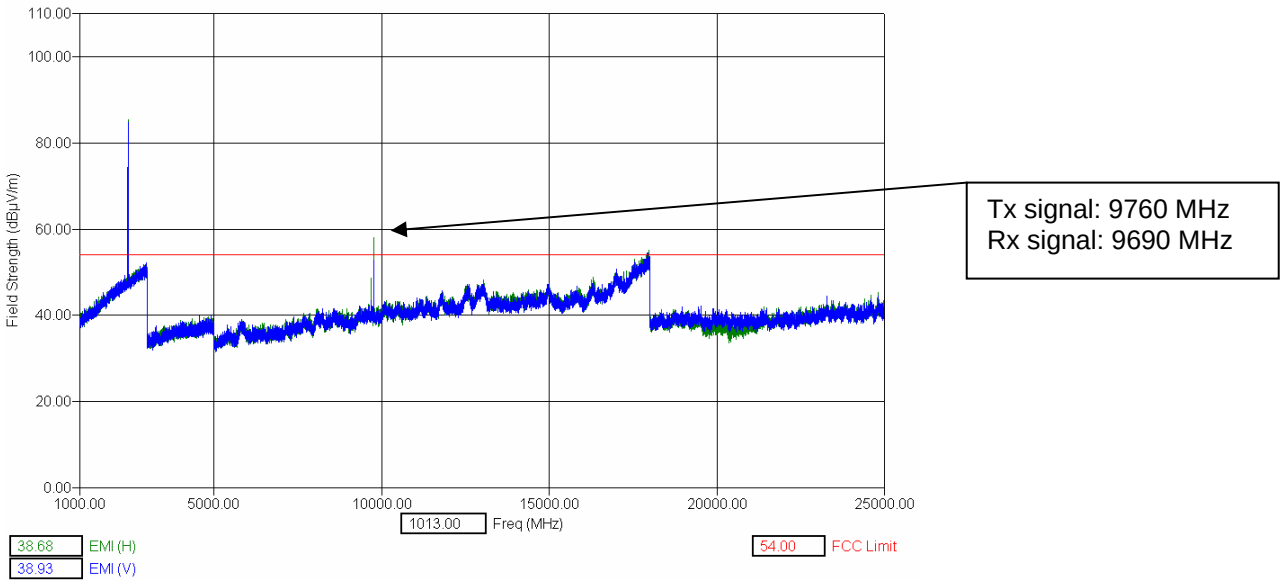
Final Measurement for channel 0

Freq (Max) (MHz)	(PEAK) EMI (dBµV/m)	(AVG) EMI (dBµV/m)	FCC Limit (dBµV/m)	(PEAK) Trace (dBµV)	Cable (dB)	Preamp (dB)	Transducer (dB)	Twr Ht (cm)	Ttbl Agl (deg)
9607.0	49.0	38.6	54.0	57.9	16.0	64.1	39.2	263.0	114.0
9608.1	49.0	38.7	54.0	57.9	16.0	64.1	39.2	190.0	195.0
9689.4	48.6	38.8	54.0	58.9	16.0	65.5	39.2	338.0	226.0
9690.1	52.8	40.8	54.0	63.1	16.0	65.5	39.2	107.0	135.0

Channel 38, 30MHz to 1GHz



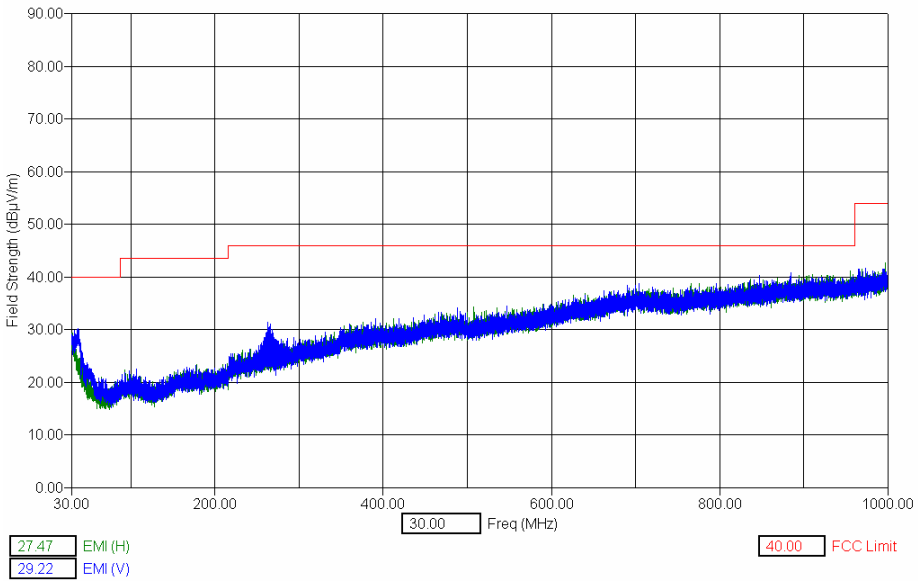
Channel 38, 1GHz to 25GHz



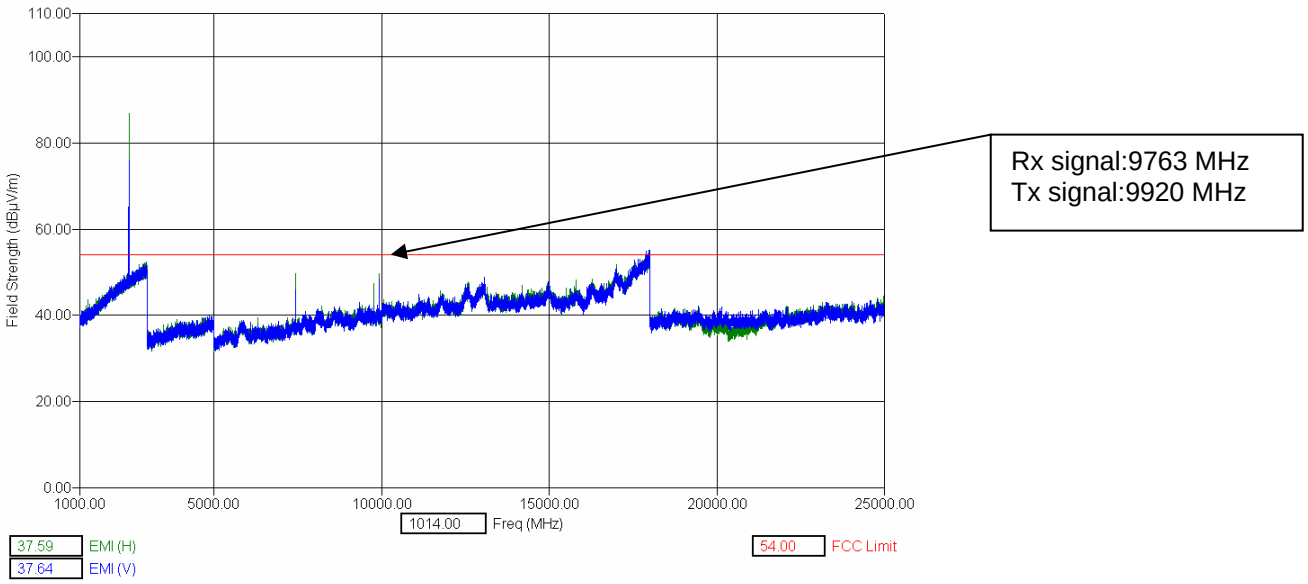
Final Measurement for channel 38

Freq (Max) (MHz)	(PEAK) EMI (dBµV/m)	(AVG) EMI (dBµV/m)	FCC Limit (dBµV/m)	(PEAK) Trace (dBµV)	Cable (dB)	Preamp (dB)	Transducer (dB)	Twr Ht (cm)	Ttbl Agl (deg)
9689.6	49.4	38.7	54.0	59.7	16.0	65.5	39.2	312.0	0.0
9689.9	50.4	40.2	54.0	60.7	16.0	65.5	39.2	163.0	28.0
9759.5	54.9	42.8	54.0	64.7	16.0	65.1	39.3	178.0	92.0
9759.7	53.5	41.9	54.0	63.3	16.0	65.1	39.3	202.0	121.0

Channel 78, 30MHz to 1GHz



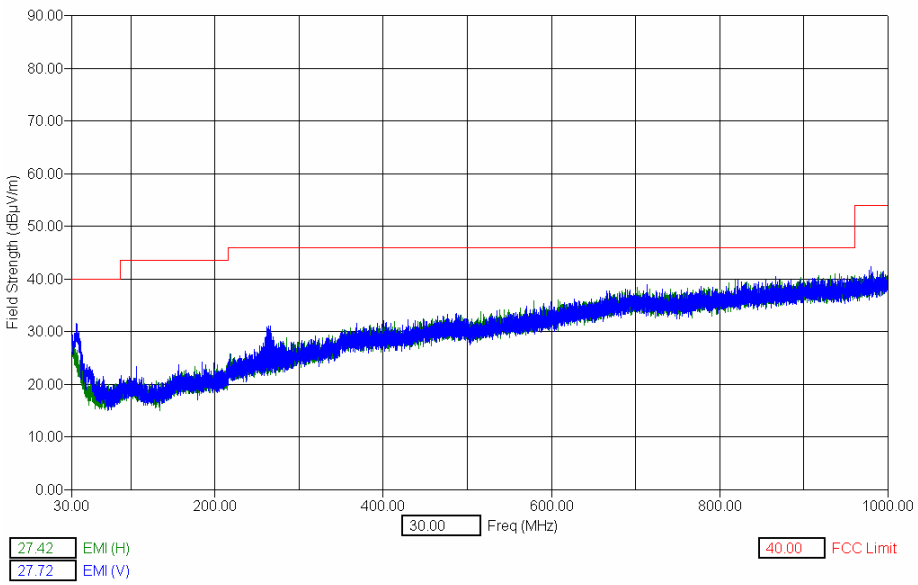
Channel 78, 1GHz to 25GHz



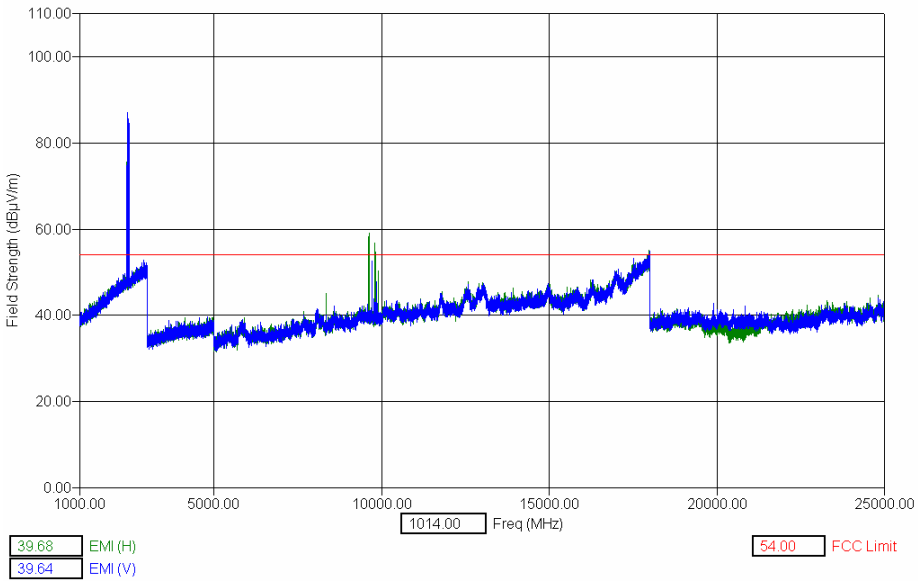
Final Measurement for Channel 78

Freq (Max) (MHz)	(PEAK) EMI (dBµV/m)	(AVG) EMI (dBµV/m)	FCC Limit (dBµV/m)	(PEAK) Trace (dBµV)	Cable (dB)	Preamp (dB)	Transducer (dB)	Twr Ht (cm)	Ttbl Agl (deg)
7439.6	53.6	42.4	54.0	66.2	13.9	64.1	37.5	130.0	182.0
7440.1	46.0	35.9	54.0	58.7	13.9	64.1	37.5	188.0	198.0
9761.8	47.7	38.2	54.0	57.5	16.0	65.1	39.3	288.0	343.0
9762.0	50.4	39.3	54.0	60.2	16.0	65.1	39.3	139.0	127.0
9919.8	50.9	38.1	54.0	60.6	16.2	65.3	39.4	148.0	210.0
9920.5	50.6	40.0	54.0	60.3	16.2	65.3	39.4	210.0	115.0

Hopping Mode, 30MHz to 1GHz



Hopping Mode, 1GHz to 25GHz



Final Measurement for Hopping Mode

Freq (Max) (MHz)	(PEAK) EMI (dBµV/m)	(AVG) EMI (dBµV/m)	FCC Limit (dBµV/m)	(PEAK) Trace (dBµV)	Cable (dB)	Preamp (dB)	Transducer (dB)	Pol	Twr Ht (cm)
8352.6	56.3	53.1	54.0	68.3	14.8	65.1	38.3	H	148.0
9610.0	48.9	38.6	54.0	57.9	16.0	64.1	39.2	H	219.0
9634.5	47.9	38.7	54.0	57.3	16.0	64.6	39.2	H	368.0
9723.1	48.2	38.5	54.0	58.5	16.0	65.5	39.2	V	394.0
9787.3	48.1	38.6	54.0	57.6	16.0	64.8	39.3	H	273.0
9810.3	47.6	38.4	54.0	57.0	16.1	64.7	39.3	H	244.0
9836.8	48.0	38.2	54.0	57.5	16.1	64.9	39.3	V	373.0
9909.0	48.1	38.4	54.0	57.8	16.2	65.2	39.3	H	270.0

Fundamental: **87.5 dBuV/m**

Freq Max (MHz)	(PK) EMI (dBuV/m)	dBc	FCC Limit (dBc)	Pol.
8352.6	56.3	-31.2	-20.0	H
9610.0	48.9	-38.6	-20.0	V
9634.5	47.9	-39.6	-20.0	H
9723.1	48.2	-39.3	-20.0	V
9787.3	48.1	-39.4	-20.0	H
9810.3	47.6	-39.9	-20.0	V
9836.8	48.0	-39.5	-20.0	H
9909.0	48.1	-39.4	-20.0	V

7.6 Emission measurement data, 1GHz - 25GHz

The measurement results were obtained as described below.

$$E[uV/m] = U_{RX} + A_{CABLE} + AF - G_{PREAMP} - C_{DISTANCE}$$

Where

U_{RX} receiver reading

A_{CABLE} Attenuation of the cable

AF Antenna factor

G_{PREAMP} Gain of the preamplifier