

CLASS B CERIFICATION APPLICATION
UNDER PART15, SUBPART C

EUT : 7 channel control Module(Transmitter Part)

MODEL : Multi-RCU7

FCC ID : KNFMULTIRCU7TX

SRT REPORT # T2D038a

PREPARED FOR :

IOWA EXPORT-IMPORT TRADING CO.

512 TUTTLE STREET, DES MOINES, IOWA

50309-4168, U.S.A.

EMI TESTING REPORT

EUT : 7 channel control Module(Transmitter Part)

MODEL : Multi-RCU7

FCC ID : KNFMULTIRCU7TX

PREPARED FOR :

IOWA EXPORT-IMPORT TRADING CO.
512 TUTTLE STREET, DES MOINES, IOWA
50309-4168, U.S.A.

PREPARED BY :

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1. TEST REPORT CERTIFICATION

APPLICANT : IOWA EXPORT-IMPORT TRADING CO.

ADDRESS : 512 TUTTLE STREET, DES MOINES, IOWA

50309-4168, U.S.A.

EUT DESCRIPTION : 7 Channel control Module(Transmitter Part)

(A) POWER SUPPLY : 12V FROM BATTERY

(B) MODEL : Multi-RCU7

(C) FCC ID : KNFMULTIRCU7TX

FINAL TEST DATE : 06/28/2002

MEASUREMENT PROCEDURE USED :

* PART 15 SUBPART C OF FCC RULES AND REGULATIONS (47 CFR)

* ANSI C63.4 - 1992

We hereby certify that :

The measurements contained in this report were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable.

Tested By : _____ , Date: _____
(Anson Lin)

Checked By : _____ , Date: _____
(Spring Wang)

Approved By : _____ , Date: _____
(Harris W. Lai, Director)

2. TEST STATEMENT

2.1 TEST STATEMENT

1. This letter explains the test condition of this project.
2. The data shown in this report reflects the worst – case data for the condition as listed above.
3. EUT Description and Test Conditions.

The EUT is the transmitter part of a remote controller, and the remote controller can control the fan in a car.

Frequency Band : 289MHz ~ 392MHz (Exception of 322~335.4MHz)

Carrier frequency : 303.8MHz.

The carrier frequency is fixed by manufacturer, it can not be adjusted by user.

Test Mode : Range 1 : Mode 1 : 289.6200MHz

Mode 2 : 305.3600MHz

Mode 3 : 321.1912MHz

Range 2 : Mode 1 : 336.0575MHz

Mode 2 : 363.8350MHz

Mode 3 : 390.9800MHz

4. NVLAP logo is to be approved by management (it is according to NVLAP requirement if it need) before use.

2.2 DEPARTURE FROM DOCUMENT POLICIES, PROCEDURE OR SPECIFICATIONS, THE STATEMENT

1. Did have
Any departure from document policies & procedures or from specifications.
Yes _____, No ✓ .
If yes, the description as below.
2. The certificate and report shall not be reproduced except in full, without the written approval of SRT laboratory.
3. The report must not be used by the client to claim product endorsement by NVLAP or any agency the government.
4. This product is a prototype product.
5. The effect that the results relate only to the items tested.

3. RADIATED EMISSION TEST

3.1 TEST EQUIPMENT

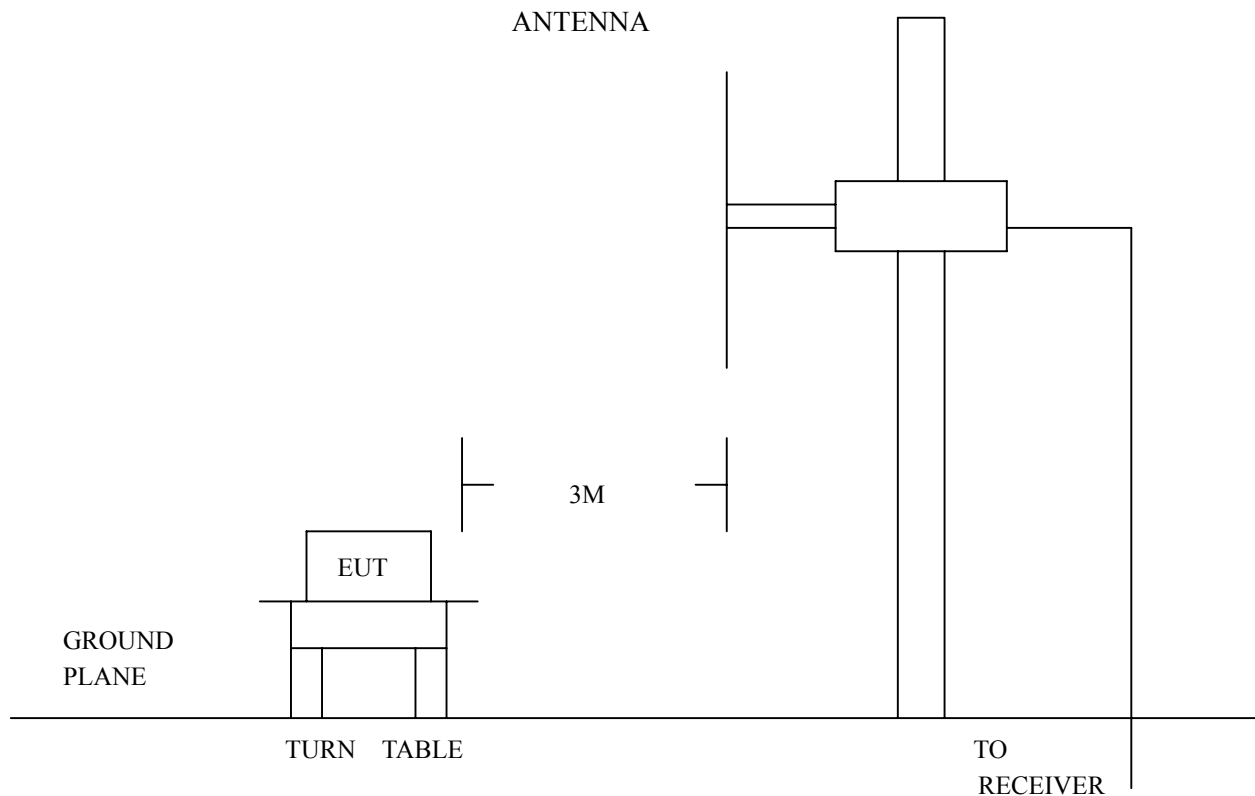
The following test equipments were used during the radiated emission test :

EQUIPMENT / FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL # / SERIAL #	DATE OF CAL. & CAL. CENTER	DUE DATE	FINAL TEST
TEST RECEIVER	9 KHz TO 2.75 MHz	R & S	ESCS30/830245/012	JULY 2001 ETC	1Y	
TEST RECEIVER	20 MHz TO 1000 MHz	R & S	ESVS30/841977/003	JUNE 2001 ETC	1Y	√
SPECTRUM ANALYZER	100 Hz TO 1500 MHz	HP	8568B/3001A04931	AUG. 2001 ETC	1Y	
SPECTRUM ANALYZER	9 KHz TO 22 GHz	HP	8593E/3322A00670	FEB. 2002 ITRI	1Y	√
SIGNAL GENERATOR	100 KHz TO 1000 MHz	HP	8648A/3636A02776	JUNE 2001 ETC	1Y	
DIPOLE ANTENNA	28 MHz TO 1000 MHz	EMCO	3121C/9611-1239	FEB. 2002 SRT	1Y	
BI-LOG ANTENNA	30 MHz TO 2 GHz	SCHAFFNER-CHASE	CBL6141A/4181	JULY 2001 ETC	1Y	√
BI-LOG ANTENNA	26 MHz TO 1100 MHz	EMCO	3143/9509-1152	SEP. 2001 SRT	1Y	
PRE-AMPLIFIER	0.1 MHz TO 1300 MHz	HP	8447D/2944A08402	MARCH 2002 SRT	1Y	
PRE-AMPLIFIER	0.1 MHz TO 1300 MHz	HP	8447D/2944A06412	JULY 2001 ETC	1Y	
HORN ANTENNA	1 GHz TO 18 GHz	EMCO	3115/9012-3619	JAN. 2002 ETC	1Y	√

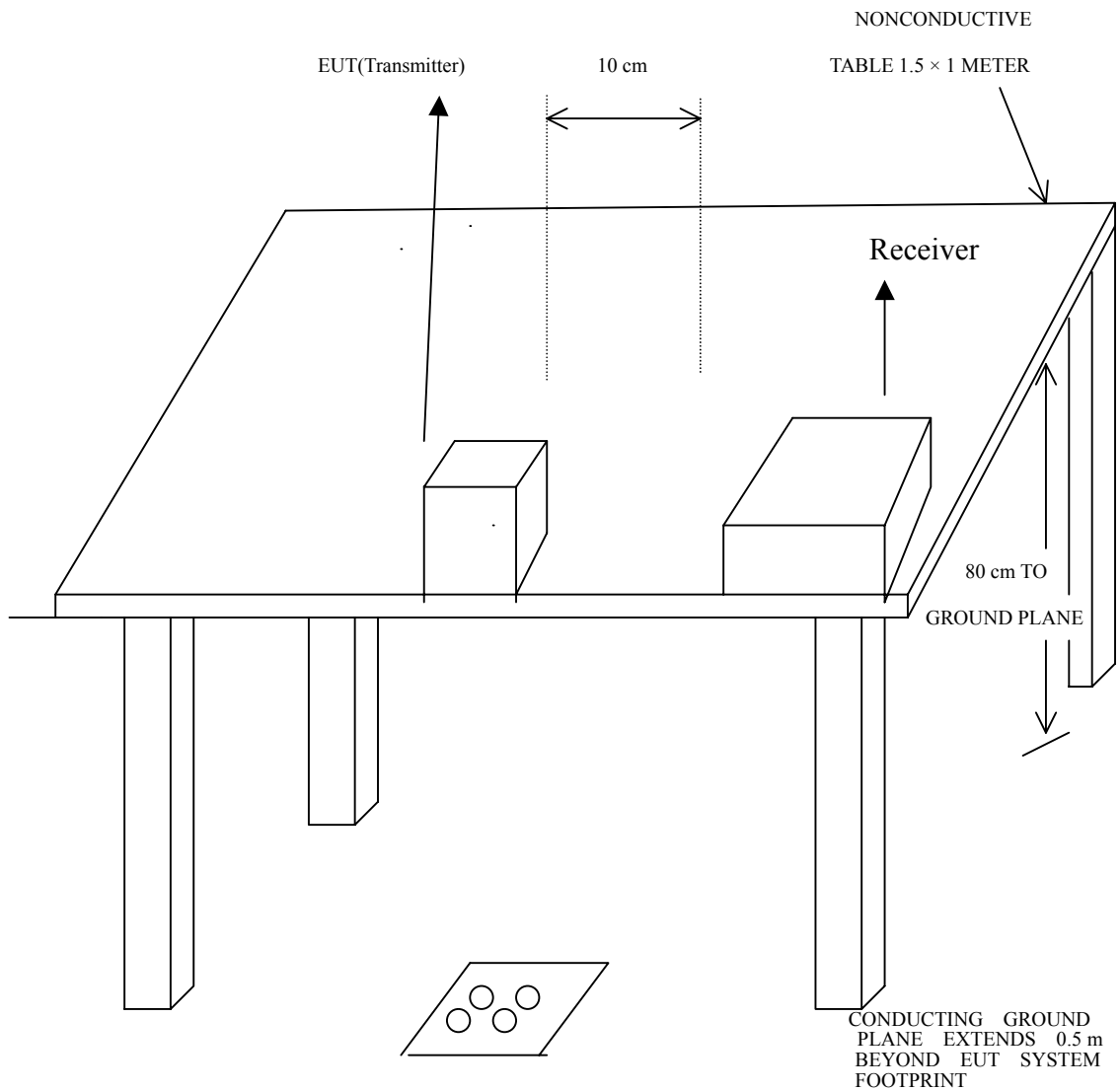
3.2 TEST PROCEDURE

- (1).The EUT was tested according to ANSI C63.4 -1992. The radiated test was performed at SRT lab's open site. This site is on file with the FCC laboratory division, reference 31040/SIT.
- (2).The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-1992.
- (3).The frequency spectrum from 30 MHz to 2 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz. Measurements were made at 3 meters.
- (4). The antenna high were varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5). The antenna polarization : Vertical polarization and horizontal polarization.

3.3 RADIATED TEST SET-UP



3.3 RADIATED TEST SET-UP



3.4 CONFIGURATION OF THE EUT

The EUT was configured according to ANSI C63.4 - 1992. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

1. EUT

DEVICE	MANUFACTURER	MODEL #	FCC ID / DoC
7 channel control Module (Transmitter Part)	IOWA EXPORT-IMPORT TRADING CO.	Multi-RCU7	KNFMULTIRCU7TX

2. INTERNAL DEVICES

DEVICE	MANUFACTURER	MODEL #	FCCID / DoC
— NONE —			

3. PERIPHERALS

DEVICE	MANUFACTURER	MODEL #	FCC ID / DoC	CABLE
RECEIVER	IOWA	Multi-RCU7	KNFMULTIRCU7RX	N/A
DC POWER SUPPLY	H.S.	5005	N/A	1.5m unshielded power cord

- **REMARK** :

- (1). Cable - S1 : Single point shielding.
S2 : 360° shielding.
S3 : Double point shielding
- (2). Cables - All 1m or greater in length - bundled according to regulations.

3.5 EUT OPERATING CONDITION

Operating condition is according to ANSI C63.4 - 1992.

1. EUT power on.
2. Continue transmitting.
3. Operating frequency : 303.8MHz.

3.6 RADIATED EMISSION LIMITS

All emission from EUT, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below :

CLASS B

FREQUENCY (MHz)	DISTANCE (m)	FIELDS STRENGTH (dBμV/m)
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
ABOVE 960	3	54.0
FUNDAMENTAL FREQ.	3	NOTE 3
SPURIOUS	3	NOTE 4

- NOTE** : 1. In the emission tables above, the tighter limit applies at the band edges.
2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.
3. Limit = $20\log(41.667 \times F - 7083.3333)$; F : Fundamental Frequency (MHz)
4. Limit = The Limit of Fundamental Frequency – 20dB

3.7 RADIATED EMISSION TEST RESULTS

Temperature:	<u>28 Deg.C</u>	Humidity:	<u>56 %RH</u>
Ferquency Range:	<u>30 – 5000 MHz</u>	Measured Distance:	<u>3m</u>
Detector:	<u>Q.P. or AV.</u>	Test Mode:	<u>Range 1 : Mode 1</u>
Tested By:	<u>Anson</u>		

FREQ. (MHz)	FACTOR (dB)	ANT. FACTOR (dB/m)	READING (dBμV)		EMISSION (dBμV/m)		LIMITS (dBμV/m)	AZ (°)	EL (M)
			HORIZ	VERT	HORIZ	VERT			
289.6200	2.3	13.0	51.3	50.1	66.6	65.4	74.5	0	1.0
579.2200	3.2	19.2	13.5	12.5	35.9	34.9	54.95	0	1.0

- REMARKS** :
- *= Measurement does not apply for this frequency.
 - Uncertainty in radiated emission measured is <+/-4dB
 - Any departure from specification : N/A
 - Factor will include cable loss and correction factor.
 - Sample calculation

$$\text{Emission(dB}\mu\text{V/m)} = \text{Factor (dB)} + \text{Ant. Factor (dB/m)} + \text{reading (dB}\mu\text{V)}$$
 - AZ(°) : Turn table azimuth
 - EL(M) : Antenna height (Meter)
 - The other emission level was very low against the limit.

3.7 RADIATED EMISSION TEST RESULTS

Temperature:	<u>28 Deg.C</u>	Humidity:	<u>56 %RH</u>
Ferquency Range:	<u>30 – 5000 MHz</u>	Measured Distance:	<u>3m</u>
Detector:	<u>Q.P. or AV.</u>	Test Mode:	<u>Range 1 :Mode 2</u>
Tested By:	<u>Anson</u>		

FREQ. (MHz)	FACTOR (dB)	ANT. FACTOR (dB/m)	READING (dBμV)		EMISSION (dBμV/m)		LIMITS (dBμV/m)	AZ (°)	EL (M)
			HORIZ	VERT	HORIZ	VERT			
305.3600	2.7	13.6	52.7	52.2	69.0	68.5	75.02	256.7	1.0
610.7210	3.8	19.1	11.6	12.3	34.5	35.2	55.02	223.9	1.0

- REMARKS** :
- *= Measurement does not apply for this frequency.
 - Uncertainty in radiated emission measured is <+/-4dB
 - Any departure from specification : N/A
 - Factor will include cable loss and correction factor.
 - Sample calculation

$$\text{Emission(dB}\mu\text{V/m)} = \text{Factor (dB)} + \text{Ant. Factor (dB/m)} + \text{reading (dB}\mu\text{V)}$$
 - AZ(°) : Turn table azimuth
 - EL(M) : Antenna height (Meter)
 - The other emission level was very low against the limit.

3.7 RADIATED EMISSION TEST RESULTS

Temperature:	<u>28 Deg.C</u>	Humidity:	<u>56 %RH</u>
Ferquency Range:	<u>30 – 5000 MHz</u>	Measured Distance:	<u>3m</u>
Detector:	<u>Q.P. or AV.</u>	Test Mode:	<u>Range 1: Mode 3</u>
Tested By:	<u>Anson</u>		

FREQ. (MHz)	FACTOR (dB)	ANT. FACTOR (dB/m)	READING (dBμV)		EMISSION (dBμV/m)		LIMITS (dBμV/m)	AZ (°)	EL (M)
			HORIZ	VERT	HORIZ	VERT			
321.1912	2.7	14.1	52.1	51.6	68.9	68.4	75.98	246.8	1.0
642.4013	3.8	20.0	13.6	11.3	37.4	35.1	55.98	219.6	1.0

- REMARKS** :
- *= Measurement does not apply for this frequency.
 - Uncertainty in radiated emission measured is <+/-4dB
 - Any departure from specification : N/A
 - Factor will include cable loss and correction factor.
 - Sample calculation

$$\text{Emission(dB}\mu\text{V/m)} = \text{Factor (dB)} + \text{Ant. Factor (dB/m)} + \text{reading (dB}\mu\text{V)}$$
 - AZ(°) : Turn table azimuth
 - EL(M) : Antenna height (Meter)
 - The other emission level was very low against the limit.

3.7 RADIATED EMISSION TEST RESULTS

Temperature:	<u>28 Deg.C</u>	Humidity:	<u>56 %RH</u>
Ferquency Range:	<u>30 – 5000 MHz</u>	Measured Distance:	<u>3m</u>
Detector:	<u>Q.P. or AV.</u>	Test Mode:	<u>Range 2 : Mode 1</u>
Tested By:	<u>Anson</u>		

FREQ. (MHz)	FACTOR (dB)	ANT. FACTOR (dB/m)	READING (dBμV)		EMISSION (dBμV/m)		LIMITS (dBμV/m)	AZ (°)	EL (M)
			HORIZ	VERT	HORIZ	VERT			
336.0575	2.7	14.2	54.4	53.8	71.3	70.7	76.8	237.7	1.0
772.1315	4.2	21.9	13.1	12.7	39.2	38.8	56.8	213.8	1.0

- REMARKS** :
1. *= Measurement does not apply for this frequency.
 2. Uncertainty in radiated emission measured is <+/-4dB
 3. Any departure from specification : N/A
 4. Factor will include cable loss and correction factor.
 5. Sample calculation

$$\text{Emission(dB}\mu\text{V/m)} = \text{Factor (dB)} + \text{Ant. Factor (dB/m)} + \text{reading (dB}\mu\text{V)}$$
 6. AZ(°) : Turn table azimuth
 7. EL(M) : Antenna height (Meter)
 8. The other emission level was very low against the limit.

3.7 RADIATED EMISSION TEST RESULTS

Temperature:	<u>28 Deg.C</u>	Humidity:	<u>56 %RH</u>
Ferquency Range:	<u>30 – 5000 MHz</u>	Measured Distance:	<u>3m</u>
Detector:	<u>Q.P. or AV.</u>	Test Mode:	<u>Range 2 :Mode 2</u>
Tested By:	<u>Anson</u>		

FREQ. (MHz)	FACTOR (dB)	ANT. FACTOR (dB/m)	READING (dBμV)		EMISSION (dBμV/m)		LIMITS (dBμV/m)	AZ (°)	EL (M)
			HORIZ	VERT	HORIZ	VERT			
363.8350	2.7	15.3	54.3	54.1	72.3	72.1	78.14	525.4	1.0
727.6713	4.2	21.1	13.6	12.1	38.9	37.54	58.14	221.5	1.0

- REMARKS** :
- *= Measurement does not apply for this frequency.
 - Uncertainty in radiated emission measured is <+/-4dB
 - Any departure from specification : N/A
 - Factor will include cable loss and correction factor.
 - Sample calculation

$$\text{Emission(dB}\mu\text{V/m)} = \text{Factor (dB)} + \text{Ant. Factor (dB/m)} + \text{reading (dB}\mu\text{V)}$$
 - AZ(°) : Turn table azimuth
 - EL(M) : Antenna height (Meter)
 - The other emission level was very low against the limit.

3.7 RADIATED EMISSION TEST RESULTS

Temperature:	<u>28 Deg.C</u>	Humidity:	<u>56 %RH</u>
Ferquency Range:	<u>30 – 5000 MHz</u>	Measured Distance:	<u>3m</u>
Detector:	<u>Q.P. or AV.</u>	Test Mode:	<u>Range 2: Mode 3</u>
Tested By:	<u>Anson</u>		

FREQ. (MHz)	FACTOR (dB)	ANT. FACTOR (dB/m)	READING (dBμV)		EMISSION (dBμV/m)		LIMITS (dBμV/m)	AZ (°)	EL (M)
			HORIZ	VERT	HORIZ	VERT			
390.9800	2.7	16.0	50.1	50.6	68.8	69.3	74.9	0	1.0
781.9510	4.2	21.9	13.1	13.4	39.2	39.5	54.9	0	1.0

- REMARKS** :
- *= Measurement does not apply for this frequency.
 - Uncertainty in radiated emission measured is <+/-4dB
 - Any departure from specification : N/A
 - Factor will include cable loss and correction factor.
 - Sample calculation

$$\text{Emission(dB}\mu\text{V/m)} = \text{Factor (dB)} + \text{Ant. Factor (dB/m)} + \text{reading (dB}\mu\text{V)}$$
 - AZ(°) : Turn table azimuth
 - EL(M) : Antenna height (Meter)
 - The other emission level was very low against the limit.

4. BANDWIDTH

4.1 Limit

$$\text{Limit} = \text{Fundmental Frequency (MHz)} \times 0.25 \%$$

4.2 Test Result

Frequency(MHz)	Test Result (KHz)	Limit (KHz)
289.62	510	720
340.38	560	850
390.98	560	977

Note : See attached plotter drawings.

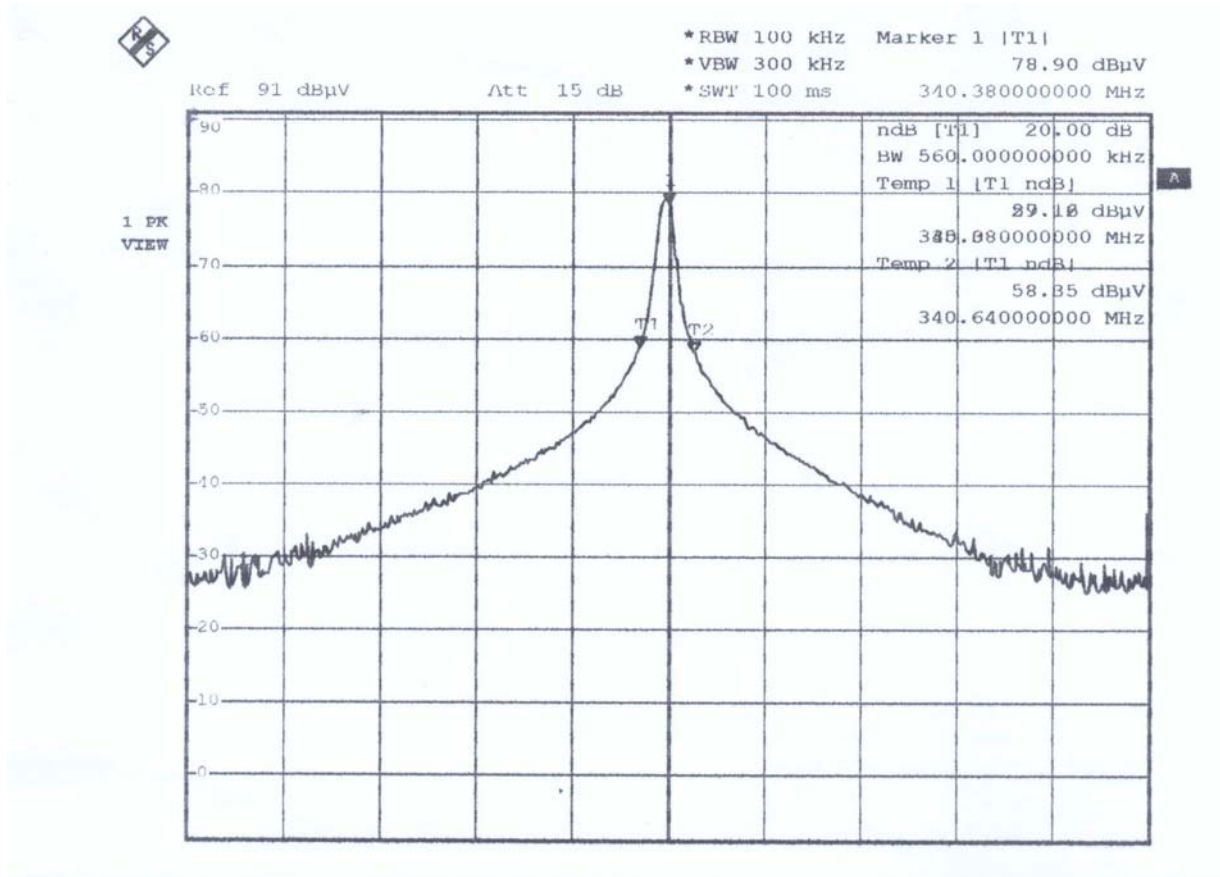
1 PK VIEW

Ref 91 dBμV Att 15 dB

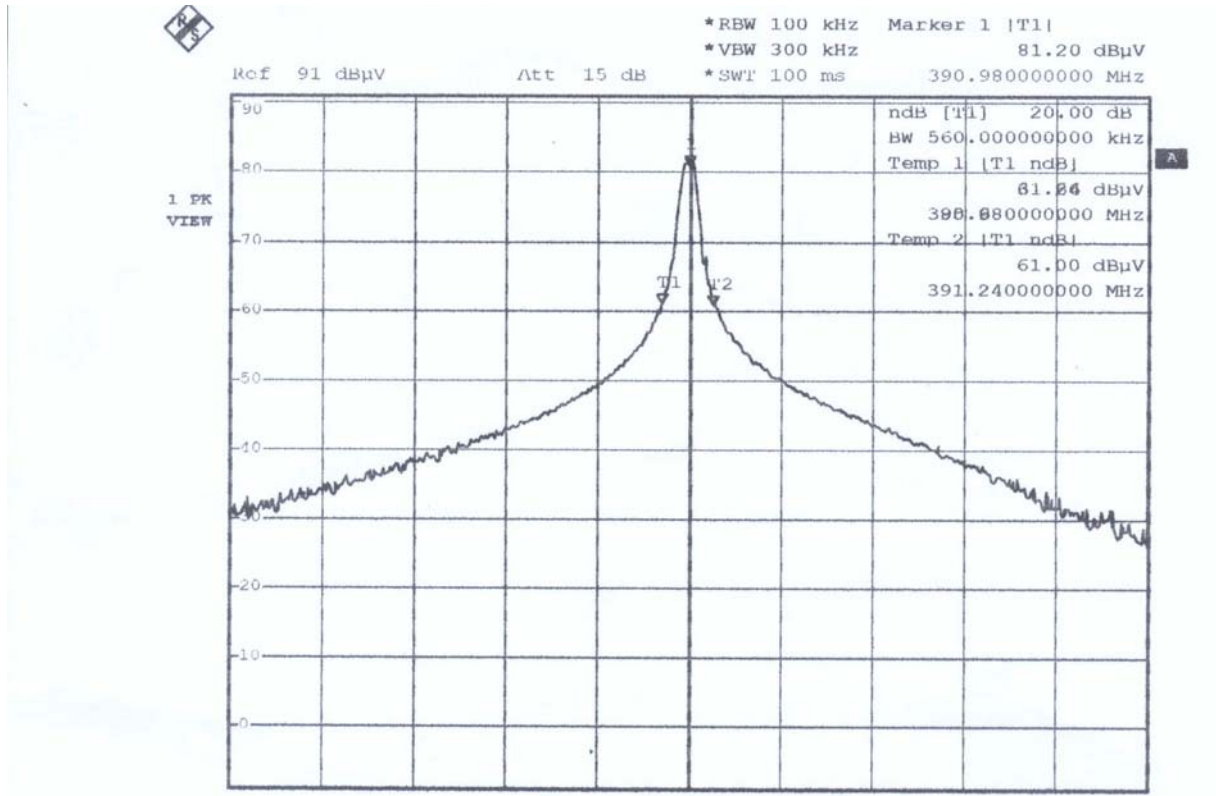
*RBW 100 kHz Marker 1 |T1|
 *VBW 300 kHz 71.05 dBμV
 *SWT 100 ms 289.62000000 MHz

ndB [T1] 20.00 dB
 BW 510.00000000 kHz
 Temp 1 [T1 ndB] 25.12 dBμV
 289.64000000 MHz
 Temp 2 [T1 ndB] 51.18 dBμV
 289.87000000 MHz

* Mode 2



* Mode 3



SPECTRUM RESEARCH & TESTING LAB.
REPORT# : T2D038a

FCC ID : KNFMULTIRCU7TX