R&D TECHNICAL REPORT

No.RD/2016/917

AIR & DDI

Reception survey of Foreign And AIR Stations in the city Area of Srinagar (J&K)

PRASAR BHARATI
RESEARCH DEPARTMENT
ALL INDIA RADIO & DOORDARSHAN

Reception survey of Foreign And AIR Stations in the city Area of Srinagar (J&K)

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Field Strength Measurement/Reception Survey Team

PROPAGATION LAB

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Introduction

Radio Kashmir Srinagar and Radio Kashmir Jammu have submitted a written complaint to DG-AIR New Delhi regarding availability of a huge network of foreign F.M. channels in the border areas and are operating in the pockets where the signal strength of AIR F.M. channels is very poor with marginal or no signal at all. It has also been pointed out that any power failure or a break down in the power transmission results in the availability of foreign services on the same frequencies.

Accordingly DG-AIR vide their letter no. 7/1/2012/D(M&C) dated 23rd December 2015 & no.7/1/2012-D(M&C) dated 16th February, has directed this Office to undertake a reception survey of all AIR stations (MW & FM) including foreign radio stations in the city areas of Jammu, Srinagar and Leh including areas near borders.

The Srinagar city survey was conducted in the month of May 2016.

Objectives

1. To carry out field strength and subjective assessment of all available AIR F.M. and Medium Wave channels in the city area of Srinagar.
2. To carry out field strength and subjective assessment of all available foreign F.M. and Medium Wave channels in the city area of Srinagar.
3. Determination of interference due to co-channel or adjacent channel transmissions.

Measuring Instruments Used

1. Anritsu make standard VHF dipole antenna.
2. Schwarz Beck make active loop antenna for MF/HF bands.
3. Rohde & Schwarz made ESPC measuring receiver.

4. Garmin made Montana 650 GPS system.
5. Sony Double Superhetrodyne receiver
6. Philips receiver (cheap)
7. Other survey related tools.

Basic Data and Transmitter Details of Radio Kashmir, Srinagar.

1. **FM 1(Shankracharya Hills)**
   - Frequency- 102.6 MHz
   - Rated Power- **10.0 kW**
   - Normal Radiated Power- **7.0 kW**
   - Program Content- CBS
   - Make- Harris Z10CD
   - Location- N 34.07911 & E 74.84109 degree.
2. **FM 2(RK Srinagar Studio complex)**
   - Frequency- 103.5 MHz
   - Rated Power- **10.0 kW**
   - Output Power- **7.0 kW**
   - Program Content- Primary/ FM Gold
   - Make-R&S 3127-075
   - Location- N 34.07270 E 74.83013 degree.
3. **Medium Wave (HPT Narbal)**
   - Frequency- 1116 kHz
   - Rated Power- **300 Kw**

- Output Power- **160 kW (53% of Rated Power)**
- Program Content- Primary.
- Make- Thomcast S7HP
- Location- N 34.11674 E 74.69249 degree.

4. **Medium & Short wave (HPT Pampore)**
   - Frequency- SW (4950 & 6110 KHz) MW (1224 KHz)
   - Rated Power- SW:**50 KW**, MW: **10KW**
   - Output Power- SW:**30 KW**, MW: **7.5 KW**
   - Program Content- Primary/Rainbow
   - Make-SW: BEL HMB144, MW:BEL HMB 163 & NEC MB 124c
   - Location- N 34.02954 E 74.90685 degree.

Measurement Methodology

In order to check the correct reception and field strength measurements, the entire city area of Srinagar was demarcated into 38 spots based on population density. This included all types of terrain and population density. At each spot, VHF measurements were carried out using standard dipole antenna installed on a 3 meter mast. For medium wave, a standard magnetic loop was used for field strength measurements.

Before the start of the actual measurements, the entire F.M. band and Medium Wave Band was scanned in the morning, afternoon and evening for obtaining frequencies of operations of foreign transmissions.

Data Collection & Mapping

Data collected from all 38 locations inside/outside city areas of Srinagar, has been tabulated (Refer map-1, 2 and 3) and results are annexed with this report. All locations are marked on Google map for reference and numbered as per data table. For subjective assessment, standard phrases of Excellent (E), Very Good (VG), Good (G), Fair (F) and Poor (P) are used for easy understanding. Terrain in the city area of Srinagar is nearly plain except at few locations where it is hilly.

As per ITU recommendations, minimum signal strength of 63dbμv/m is required for medium wave reception in primary service zone of transmitter. Signal strength of 60dbμv/m is required in VHF band (FM) at a height of 10 meters from ground in urban areas and 70dBμV/m in large city areas. Similarly RF protection ratio of 20 db is required if carrier spacing is 400 to 500 KHz in band. However due to security reasons and after getting approval from DG-AIR all FM measurements were carried out at a height of 3 meters only. Suitable correction factor may be added to interpolate the field strength readings.

Conclusion

1. **FM band:**

   The Team was not able to tune any Pakistani/Foreign FM channels in Srinagar city. The two AIR transmitters in FM band cater the need of city. Few spots were found where quality of AIR FM transmission was not up to the mark (Table 1-5). The output power of AIR FM on 102.6 MHz was 7.0 KW against the rated power of 10.0 KW. The F/S at a LOS distance of 23 Km (Magam) was only 65 dbμv/m, (corrected to 71-73 dbμv/m @ 10 meters). Coverage can be increased by radiating full power from the transmitter

Similarly the second FM transmitter of AIR is operating on 103.5 MHz with radiated power of 7.0 KW against rated power of 10.0 KW. To get proper reception in bad pockets, it is required to operate on full rated power of 10 KW.

To counter these problems, the following proposals are suggested:-

- Increase power of both AIR FM transmitters to the rated power.
- An additional low power FM transmitter is required near Pampore to cater the needs of nearby villages on hilly terrain.

2. Medium Wave band:

The reception quality of AIR MW transmitter on 1116 KHz was satisfactory in the entire city as well as in outskirts of Srinagar. The transmitter is well maintained and is located in Narbal area of Srinagar. One more Medium wave transmitter operates from HPT Pampore with very limited timings on 1224 KHz. The radiated power was only 7.5 KW in place of rated power of 10 KW.

Very poor quality Pakistani medium wave transmission was received at various locations inside the city on frequencies 972 KHz (43 dbμv/m), 1170 KHz (38dbμv/m) 1260 KHz (41dbμv/m) , 1296 KHz (37 dbμv/m) and 1332 KHz(44dbμv/m) after 8 P.M in the city areas. Out of these frequencies, the **1332 KHz** was only prominent foreign medium wave transmission available with a field strength more than 40 dbμv/m during day timings that is too at few selected location after 5P.M. Many distant International transmissions are available in Srinagar city during the night due to sky wave component of MW which includes many transmissions from Pakistan.

AM Power-For a 100 percent modulated AM transmitter, the total side band power is always one half that of the carrier power. A 300-Kw transmitter carrier that is 100 percent modulated will have a sideband power of 150 KW, with 75 KW in each sideband. The total power for the AM signal is the sum of the carrier and sideband power or 450 KW.

When the percentage of modulation is less than the optimum 100, there is much less power in the sidebands. As in the instant case of Radio Kashmir, Srinagar, for a 60 percent modulated 300KW carrier, the total power on the composite AM signal is just 354 KW.

There is a big difference between 450 KW and 354 KW.

The carrier itself conveys no information. All the transmitted information is contained within the sidebands. With less sideband power transmitted, the received signal is weaker and communication is less reliable.

Recommendations:

- Output power of Narbal medium wave transmitter operating on 1116 KHz must be raised from present 160 KW to full 300 KW (Rated Power) so as to provide minimum signal strength near Uri and Kupwara L.O.C and in some areas of POK.
- The timings of Medium wave transmitter operating on 1224 KHz may be increased to provide popular content in the city areas. At present this transmitter operates from 0700 Hrs to 1200 Hrs (5 Hours only).
- Modulation level should be maintained between 90 to 100 percent for communication reliability and good reception in normal Radio Receivers.

Terrain Legends:

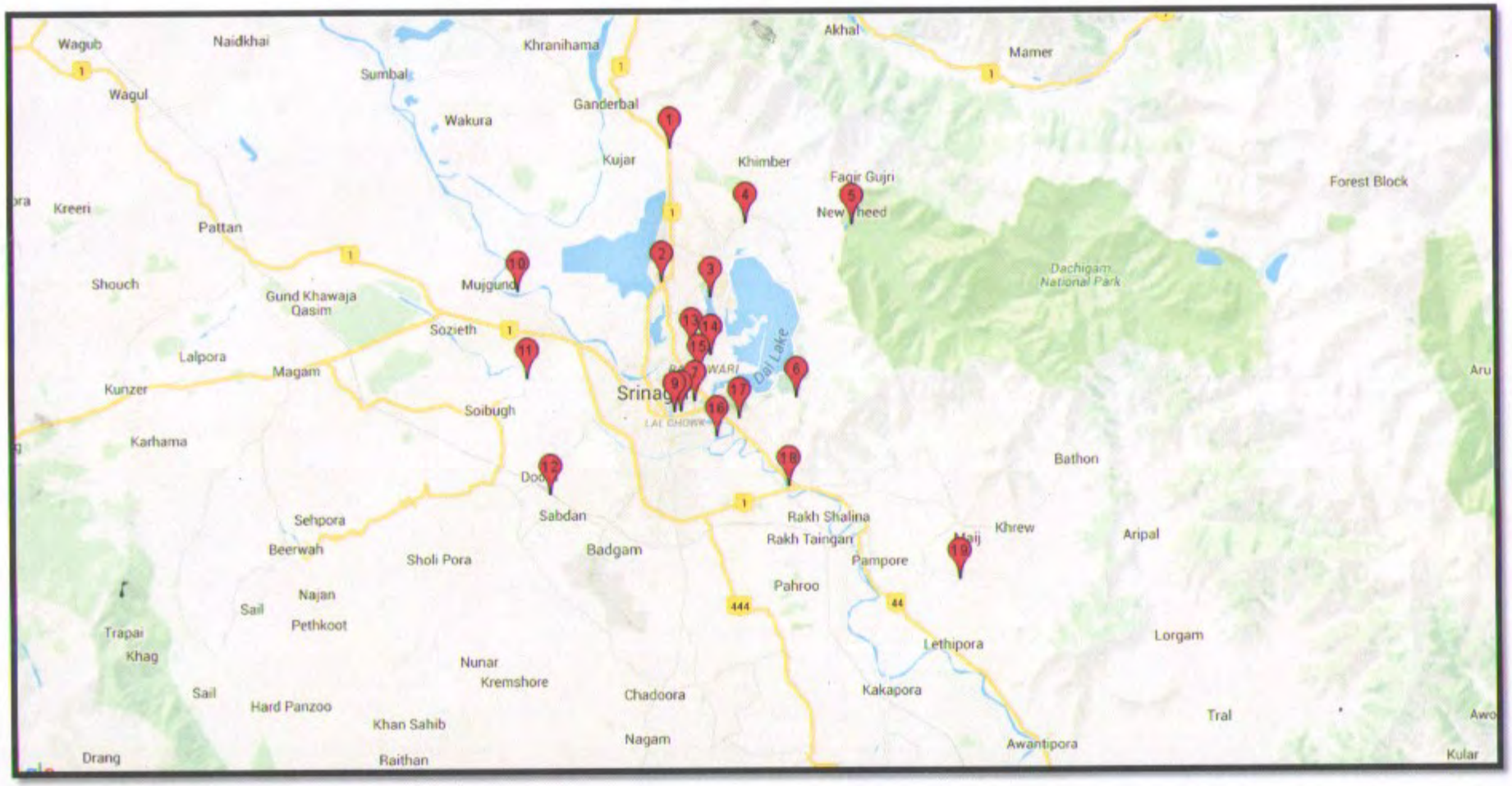
1. HT:	High Traffic	7.HD:	High population density
2. MT:	Moderate traffic	8.OA:	Open areas
3. LT:	Low Traffic	9.Hilly:	Hilly areas
4. LR:	Low rise buildings	10. Veg:	Vegitation
5. HR:	High rise buildings		
6. MR:	Medium rise buildings		

Transmitter location sites in Srinagar city

Map-1

Survey spots location in Srinagar city areas

Map-2



Survey spots location in Srinagar city areas

Map-3

Availability of Foreign & AIR Radio Station in Srinagar City areas

Table No.:1

Map reference Number	Spot/Location	Radial Distance from Xtr (FM/MW) in kM				Field Strength(FM) (dBμV/m)				Field Strength(MW) (dBμV/m)				Foreign Stations in MW Band								Terrain	Remarks
						102.6MHz		103.5MHz		1116kHz		1224 kHz		972kHz		1170kHz		1296kHz		1332kHz			
		AIR(FM) 102.6 MHz	AIR(FM) 103.5 MHz	AIR (MW) 1116 kHz	AIR(MW) 1224kHz	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio		
1	Nagbal	14	14	14	-	78	VG	80	VG	96	VG	-	-	NT	-	NT	-	NT	-	NT	-	OA/MT	
2	Soura Hospital	7.1	7.3	10.2	-	88	E	81	VG	112	VG	-	-	NT		NT		NT		NT		HD/MT	
3	Nigeen	5.4	6.0	12.7		95	E	91	E	107	VG			NT		NT		NT		NT		OA/LT	
4	Bolapora	9.2	10.0	15.3		84	E	77	VG	101	VG			NT		NT		NT		NT		MT/HD	
5	Harwan	11	12.1	25		69	G	74	VG	95	VG			NT		NT		NT		NT		VEG/LT/LD	
6	Pari Mahal	3.4	4.4	17.5	6.3	79	VG	83	VG	101	VG	48	P	NT		NT		NT		NT		VEG/LT/LD/H	

Availability of Foreign & AIR Radio Station in Srinagar City areas

Table No. 2

Map reference Number	Spot/Location	Radial Distance from Xtr (FM/MW) in kM				Field Strength(FM) (dBµV/m)				Field Strength(MW) (dBµV/m)				Foreign Stations in MW Band								Terrain	Remarks
						102.6MHz		103.5MHz		1116kHz		1224 kHz		972kHz		1170kHz		1296kHz		1332kHz			
		AIR(FM) 102.6 MHz	AIR(FM) 103.5 MHz	AIR (MW) 1116 kHz	AIR(MW) 1224kHz	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio		
7	Abdullah bridge	1.9	1.2	12.5	-	94	E	101	E	106	E			NT		NT		NT		NT		HD/HT/LR	
8	Red Cross/Ex Road Xing	2.7	1.6	12.6		90	VG	107	E	110	E			NT		NT		NT		NT		HD/HT/LR	
9	Maisuma Bazar	2.3	1.9	11.7		87	VG	105	E	108	E			NT		NT		NT		NT		HD/HT/LR	
10	Tangpora Bandipora Rd	12.4	11.9	3		80	VG	84	E	115	E			NT		NT		NT		NT		HD/HT/LR	
11	Haji Bagh	10.6	9.7	4.3		79	VG	79	E	119	E			NT		NT		NT		NT		HD/LT/OA	
12	Badgam R/S	10.5	9.3	9.8		80	VG	82	VG	107	VG			NT		NT		NT		44	P	LD/LT/OA	
13	Kohimaran Makhdoum sb	3.4	3.6	11.7	11.5	104	E	106	E	100	VG	76	VG	NT		NT		NT		NT		HT/HD/LR	
14	Naidyar	2.6	3.1	12.7	10.6	97	E	94	E	107	E	61	G	NT		NT		NT		NT		LT/HD/LR	
15	Misken Bagh	2.1	2.2	12.3	10.3	90	E	96	E	109	E			NT		NT		NT		NT		LT/HD/LR	

Availability of Foreign & AIR Radio Station in Srinagar City areas

Table No.3

Map reference Number	Spot/Location	Radial Distance from Xtr (FM/MW) in kM				Field Strength(FM) (dBμV/m)				Field Strength(MW) (dBμV/m)				Foreign Stations in MW Band								Terrain	Remarks
						102.6MHz		103.5MHz		1116kHz		1224 kHz		972kHz		1170kHz		1296kHz		1332kHz			
		AIR(FM) 102.6 MHz	AIR(FM) 103.5 MHz	AIR (MW) 1116 kHz	AIR(MW) 1224kHz	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio		
16	Kursoo Rajbagh	1.9	1.07	14.2	7.7	81	VG	105	E	102	E			NT		NT		NT		NT		HD/LT/LR	
17	Sonawar Indira Nagar	0.9	1.4	15	7.3	106	E	107	E	98	E			NT		NT		NT		NT		HD/LT/LR	
18	Athwajan	5.2	5.3	18.7	3.3	98	E	85	E	98	E			NT		NT		NT		NT		HD/HT/LR	
19	Vill: Dussu Pampore	14.8	15.3	28.7	6.7	46	P	52	P	88	VG			NT		NT		NT		NT		LD/OA/Hilly/ LT	
20	Budshah Ngr Natipora	4.5	3.5	14.1	8.3	87	VG	83	VG	102	E			NT		NT		NT		NT		HD/LR/MT	
21	Jawahar Nagar	2.9	1.6	13.2	8.7	90	E	104	E	108	E			NT		NT		NT		48	P	HD/LR/MT	
22	Mir Behari Nishat Soth	3.9	4.9	14.9	10.3	94	E	95	E	101	E	51	P	NT		NT		NT		NT		LD/OA/LT	
23	Shah Hamdan Mosque Shamswari	3.3	2.8	11	11.3	76	VG	93	E	109	E			NT		NT		NT		NT		HD/LR/LT	
24	Habba Kadal	3.1	2.3	11.2	10.9	79	VG	95	E	106	E			NT		NT		NT		NT		HD/HT/LR	

Availability of Foreign & AIR Radio Station in Srinagar City areas

Table No. 4

Map reference Number	Spot/Location	Radial Distance from Xtr (FM/MW) in kM				Field Strength(FM) (dBμV/m)				Field Strength(MW) (dBμV/m)				Foreign Stations in MW Band								Terrain	Remarks
						102.6MHz		103.5MHz		1116kHz		1224 kHz		972kHz		1170kHz		1296kHz		1332kHz			
		AIR(FM) 102.6 MHz	AIR(FM) 103.5 MHz	AIR (MW) 1116 kHz	AIR(MW) 1224kHz	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio		
25	Chattabal Moghul mohalla	5	4.1	9.4	12.6	78	VG	87	VG	108	E			NT		NT		NT		NT		LR/MT/HD	
26	Batmaloo Tengpoora	5.1	4	10	12	84	VG	90	VG	109	E			NT		NT		NT		NT		HT/MR/HD	
27	Chadoora	15.5	14.5	21.3	13.8	75	VG	67	G	100	VG			NT		NT		NT		38	P	MT/LD/LR	Audio mix of 102.6 & 103.5 observed on fr. 101.7 with weak F/S
28	Charare Sharief	25	24	29	22.6	76	VG	73	G	90	VG	80	G										Audio mix of 102.6 & 103.5 observed on fr. 101.7 with weak F/S
29	Al Fazal colony	8.1	6.9	12.1		84	VG	81	VG	109	E			NT		NT		NT				LT/LD/LR	Audio mix of 102.6 & 103.5 observed on fr. 101.7 with weak F/S
30	Rawalpora Fair bank colony	7.6	6.6	15.1	9.5	82	VG	79	VG	107	E	90	VG	NT		NT		NT				MT/LR/HD	
31	Khanmoh Village	10.3	11.2	24.6	5.1	52	P	57	P	76	G			NT		NT		NT				LT/LR/LD/Hilly/Veg	
32	Foreshore Road	7.5	8.4	15	14	98	E	91	E	98	VG	75	G	NT		NT		NT				OA/LT/LR/LAKE	
33	Bagh Ali Mardan	5.4	5.6	10.7	13.5	84	VG	77	VG	109	E			NT		NT		NT				OA/MT/LR	

Availability of Foreign & AIR Radio Station in Srinagar City areas

Table No. 5

Map reference Number	Spot/Location	Radial Distance from Xtr (FM/MW) in kM				Field Strength(FM) (dBμV/m)				Field Strength(MW) (dBμV/m)				Foreign Stations in MW Band								Terrain	Remarks
						102.6MHz		103.5MHz		1116kHz		1224 kHz		972kHz		1170kHz		1296kHz		1332kHz			
		AIR(FM) 102.6 MHz	AIR(FM) 103.5 MHz	AIR (MW) 1116 kHz	AIR(MW) 1224kHz	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio	F/S	Audio		
34	Idgah	5	4.7	9.5	13.2	92	E	88	VG	112	E			NT		NT		NT				HT/LR/HD	
35	Nund Rishi Colony Bemina	6.4	5.3	9.2	13	80	VG	89	VG	109	E			NT		NT		NT				MT/LR/HD	
36	Magam	23	22	9.8	30	65	G	69	G	104		53	P	NT		NT		NT				LR/HT/HD	
37	Qamarwari				15							55	P	NT		NT		NT				HT/LR/OA	
38	Palpora	6.2	5.5	8.1	14.1	82		92		114		60	G	NT		NT		NT				HD/MR/MT	