SAN BERNARDINO MICROWAVE SOCIETY, Incorporated

FOUNDED IN 1955

A NON-PROFIT AMATEUR TECHNICAL ORGANIZATION DEDICATED TO THE ADVANCEMENT OF COMMUNICATIONS ABOVE 1000 MC.

W6IFE Newsletter

September 2010 Edition

President John Oppen KJ6HZ 4705 Ninth St Riverside, CA 92501951-288-1207 john.d.open@boeing.com.
Vice President Doug Millar, K6JEY 2791 Cedar Ave Long Beach, CA 90806 562-424-3737 dmillar@moonlink.net
Recording Sec Larry Johnston K6HLH 16611 E Valeport Lancaster CA 93535 661-264-3126 k6hlh@sbcglobal.net
Corresponding Sec Jeff Fort Kn6VR 10245 White Road Phelan CA 92371 909-994-2232 jnjfort@Verizon.net
Treasurer Dick Bremer, WB6DNX 1664 Holly St Brea CA 92621 714-529-2800 rabremer@sbcglobial.net
Editor Bill Burns, WA6QYR 247 Rebel Rd Ridgecrest, CA 93555 760-375-8566 bburns@ridgenet.net
Webmaster Dave Glawson, WA6CGR 1644 N. Wilmington Blvd Wilmington, CA 90744 310-977-0916 wa6cgr@ham-radio.com
ARRL Interface Frank Kelly, WB6CWN PO Box 1246, Thousand Oaks, CA 91358 805 558-6199 fm.kelly@verizon.net
W6IFE License Trustee Ed Munn, W6OYJ 6255 Radcliffe Dr. San Diego, CA 92122 858-453-4563 remunn@earthlink.net.

At the **September 2, 2010** SBMS meeting the "Tech Talk" will be a "Signal Level meter Throw down" with Dougie Flay. It will be a program comparing several signal level meters good points and bad points as well as uses. I think it will be surprising what you can do and how cheap they are. I will have three examples to look at. Some for sale. Doug K6JEY We will also do some planning for the September weekend. There will be a short report on the EME Conference in Dallas. Several of the members went and learned a lot.
Should there be a Square Deal Doug sale? I have a few things. "Engineer John" could also do some selling as well. If you have some wants, you might want to post them on the reflector before the meeting. Ok. Look forward to seeing you at the meeting and at dinner beforehand. Doug K6JEY
The SBMS meets at the American Legion Hall 1024 Main Street (south of the 91 freeway) in Corona, CA at 1900 hours local time on the first Thursday of each month.

REMINDER- NO PARKING IN THE CHURCH LOT

It is with deep regret to announce the passing of Dick Kolbly, K6HIJ. A number of SBMS friends attended the "Celebration of his Life" at St. Joseph's in Barstow, CA. Dick was a senior member of SBMS and long time treasurer. In earlier days he had been employed at Hy-Gain where he designed the High tower antenna among others at the time. Dick had been part of the Goldstone Deep Space operation with JPL. His recent adventures at Event Horizons included the design and construction of many 24 GHz waveguide switches which many hams have in their 24 GHZ rigs.

Scheduling
September 11-13 September VHF QSO Party
September 18-19 ARRL 10 GHZ and UP second half

SBMS sponsored MUD 2010 October 21 to 24 Cerritos Sheraton Hotel. Website is microwaveupdate.org. Preregistration on line $35. Hotel info on the web site. Thursday Tours. Friday talks and swap meet. Saturday talks, noise figure measurements, banquet and speaker. Sunday antenna measurements. Papers due 1 September for proceedings.

Wants and Gots for sale.
For Sale 30w 1296 MHz kit $50 + $5 for shipping Chris Shoaff cshoff@yahoo.com
For Sale- microwave oven leak detectors 0-5-10mv/cm2 2.45 GHz +/- 1.4 GHz and Digital Video Camera with recorder +12.0 MP still Dig Camera + MP3 all in one, 16x zoom new in box Mike KI6OQT@yahoo.com
For Sale TS-403 2-4 GHz signal generator $10 Bill bburns@ridgenet.net
For Sale 10 GHz slotted waveguide antennas $60 kit $85 assembled plus shipping Dan W6DFW W6DFW@apex-scientific.com

Reports from the first weekend of the ARRL 10 GHz and Up contest.
Frazier Peak (DM04MS) in Ventura County, CA was a busy place this weekend.
At one point there were 8 hams doing microwave at the peak (Tony KC6QHP, Frank WB6CWN, Miguel W6YLZ, Paul N6LL, Glenn KE6HPZ, Dave N6TEB, Dick WB6JDH, and Kent W6WCI). All 8 had 10 GHz, 3 had 24, and one on 47 GHz.
Weather was perfect for microwaving and conditions were pretty darn good.
Frank worked Gary AD6FP on 10 and 24 GHz at 526 km, (just a few miles short of the record on 24), I managed 412 km on 24 with my lesser setup, and unfortunately no contacts on 47 GHz (but we definitely tried!).

Before the contest, about 65 operators in the California/Arizona/Nevada/Utah area posted their plans! While I certainly did not work everyone it was great that there were lots of people on the air. There was a group in San Diego with 9 operators in one spot, many of them first-timers!
Here are some pictures from the weekend:
http://www.flickr.com/photos/kc6qhp/sets/72157624663090403/
And a video compilation:
http://www.youtube.com/watch?v=AkSqBV4bcuc-Tony KC6QHP

Utah or bust! Or Utah AND bust.
Well, the trek to Brian Head, UT was nowhere near as productive as I had hoped. There were two obstacles that prevented us from making more than
2(!)contacts. First, of course, the band conditions where absolutely perfect - if one was trying to run a commercial point to point link.
There was no weather, no inversions, no tropo scatter, no ducting. Just clear dry air and free space loss. I worked WA6CDR at Potosi, and Dave, WA7GIE at DN30VO... and that's IT.
The other obstacle to completing more contacts was people. Lots of people. Up there at Brian Head, there were no less than 200 people that stopped by to say hello and ask what we were doing. I guess having a 4 foot dish on a huge tripod perched near the edge of a cliff attracts a bit of attention. Even if conditions had been perfect, this would have been a serious detriment to actually operating. It turned out to be an excellent PR opportunity for ham radio, and everyone was friendly and quite interested. I was even visited by a ham that specifically went there to see our operation. There's a potential new microwaver up and coming in Utah.
I eventually gave up trying to operate there, and moved to Blowhard, which is just a few miles away. No sooner had I got set up and a car load of people stopped and unloaded to ask what we were doing! No matter, conditions there were bad, too, and NO contacts were made from that location, being too close to Brian Head to work CDR and GIE again.
The biologist setting up her DF rig to track condors wasn't bothered a bit by our being there, and we ended up asking her more questions than the other way around. Trying to work anyone was almost a complete waste of time. Stopping by to do a quick fix on a broken Cactus radio nearby made the trip worthwhile.
No other signals were heard from either Brian Head or Blowhard, no beacons, no nothing. Just lots of sun noise, when the need for a sanity check became overwhelming.
The highlight of the expedition was working WA6CDR while we were mobile.
As soon as we were south of the Virgin River Gorge on I15, we proceeded to make regular contacts with Robin up on Potosi. NBFM was used, and many of the contacts were full quieting and nearly toll quality - all from a moving vehicle. Best DX while mobile was 154 km.
For those of you at the previous meeting, who saw my propagation predictions for Brian Head and other sites, I reran the predictions minus any possible... Even Arizona turned out to be out of reach!
Potosi was considerably better, in spite of a few minor difficulties and equally bad propagation, the new rig performed well, and best DX was 702 KM. The Frazier beacon was detectable - and that's about it.
I'm not ready to write off Brian Head as a potentially good location to operate from, but from my experience, and Robin's from several years ago, it would seem that unless there is a good chance of better than average conditions, we're probably better off going elsewhere. In this case, Hepburn's predictions were right on target.
73, Mel - WA6JBD, and Tisza - KI6DBR
P.S. Send me your contest plans for next month!

Email discussions about 5760 MHz band and equipment--
Hello, I am looking for power FET to build 5.7GHz/6cm power amplifier. My target is more than 10W Pout, up to 50W. Even 2 devices in parallel could be the solution.
I have found following options:
Toshiba TIM5359 or TIM5964 series
Fujitsu/Eudyna FLM5359 or FLM5964 series

I still didn't find any source where single units can be bought for reasonable price.
Do you have any tip where to look or have some unit in the drawer and willing to sell?
Thank you. Vladimir OK1FNX

Hi Vladimir and others!
Have you notes that Mitsubishi has also 5.6GHz internally matched FET's?
MGFC36v5258 (36dBm)
MGFC40v5258 (40dBm)
MGFC42v5258 (42dBm)
Couple components, PCB and cooling.. That's it! and PA is ready.
BR, Matti

There are quite a few ops with 5760 up here in the Northeast, but I understand about trying to get a contact on that band in the less populated areas of the Southeast.
A couple or 3 yrs. ago, we had this same discussion about adding 5760 to the 10GHz and up weekends. It was probably discussed at many of the weak signal club meetings and conferences across the country, at that time. At N.E.W.S.
we discussed and debated it. My recollection is that we had a club vote on whether to promote the idea, and although it had some support, it lost.
SBMS has a 2.3 GHz and up contest in May. That one, the UHF contest, and the Microwave Sprints, are fine events already geared to play on 5.7 GHz.
But, some folks felt that 5.7 should be added to the 10GHz & up contest.
The case for adding it, in our discussion a couple yrs ago, centered on the premise to add it as a separate band, almost like a separate contest at the same time, so that it might not affect 10GHz activity negatively.
The arguments against were:
Space requirements in the rover vehicle, (for that contest--usually a car or small station wagon) Adding another band would fracture activity and decrease already declining activity on 10 GHz.
Most 10GHz & up contest entrants really enjoy the event the way it is and feel that more bands equal more complication.
Those were the comments that I remembered from our discussion a couple of yrs ago.
We know the band works well--it's the highest band worked on the Hawaii to Calif. path so far, and that's not for lack of trying on 10GHz.
And, Rick, you should get extra points (not penalized!) for helping a new ham to get on 5760 during the contest. A minor change of rules could easily accommodate that situation. Maybe someone from the ARRL is reading here and could help.
Just my 1.9 cents worth 73 Mark K1MAP

Hello, for the PA part there used to be surplus Avantek AWP-64100 PAs with about 10W output that were designed in replacement of their TWT equivalent on AT&T microwave links. The pile of stock must have been very high since I even got one shipped over the pond and there's probably still the possibility to find units particularly in the US. They have excellent mechanical design and are built like battleships although the final transistors are indeed quite fragile. The original polarization system working on a feedback principle may not be adequate for SSB work and should indeed be replaced, there is a description here:
http://www.nr6ca.org/avantek-amp.html
I blew one of the finals but could find Mitsubishi's replacements (transistors must be paired).
73! Edouard, F4EXB.

My experience with microwave work, other than 1296 is limited to using some borrowed gear from Bill, AF4OD and included my first ever contacts on 2304, 5760, and 10 GHz. It was amazing to listen to how the stations all seemed to get louder as I moved up in frequency. I'm also a glorified appliance operator whose construction skills are of no use on frequencies this high. I'd love to add the 5760 band to my rover, which currently tops out at 2304. Several folks have mentioned that it's an inexpensive band to get started on? I'd love to purchase a complete working station, or assemble the parts to construct one (maybe I can find a microwave Elmer down here in the SE) I'd appreciate recommendations for getting started on this band.
73, Les Rayburn, N1LF/R

From: Ron Hooper
To: Les Rayburn
Cc: microwave@lists.valinet.com; Vic
Subject: Re: [Mw] Getting Started on 5760

Hi Les I wish N!LF/R and AF4OD/R would look over this way for WB4SLM and I during the contest. Our stations are more than adequate to work you, even in Alabama grids EM63 and EM64.
Ron W4WA

Well, over here in the "Old Country" we've been running joint 10GHz and 5.7GHz Cumulative contests for at least a decade, if not more. The effect has been a very good increase in activity, helped of course by the availability of DB6NT kitsets and, more recently, some excellent surplus units from the Wellington VHF Group in New Zealand and other sources.
Our present UK Microwave Group summer contest program includes:
Lowland Microwave Contests: 1.2GHz + 2.3GHz + 3.4GHz
10 + 5.7 + 24GHz cumulatives... personally, I'm not fond of having 24GHz
out with these other two bands :-)
24 + 47GHz contests ... dedicated millimetre wave contests
I have no problem using the same dish for 10 and 5.7. I just change the feedhorn on a prime focus 4 footer. The 5.7GHz feed is a classic VE4MA type with about 4 feet of FSJ150 heliax while the 10GHz feed is a Chaparral with a four foot flexible waveguide. Of course, it's also possible to use a single dual mode feed horn for 10 and 5.7 if your antenna has a high f/.D ratio.
5.7GHz is an excellent microwave band and exhibits characteristics of the bands either side of it. Rain scatter is often superb and there have been many times when I've able work more than 600km into France via aircraft scatter from my portable location.
Give the band a go you guys! 73 Peter G3PHO Editor: UK Microwave Group's Scatterpoint newsletter
www.microwavers.org

5760 with 7/8 helix
Assuming no severe bends, it does not mode at 5760. If anyone has evidence one way or the other, please speak up.
John

By the way, even though Andrew LDF5-50A 7/8" Foam Heliax is only rated
To 5.000 GHz. my understanding is that it is still low loss at 5760
73, John, K1AE

The problem is one of moding, it's about big enough for waveguide modes that may or may not reach the other end in phase with the coax mode. And the rub is that the relative phases and the conversion efficiency back and forth will depend on the bends of the coax, both their radius, and the bend angles. A perfectly straight piece with no accidental dents will probably stay in coax mode, but any asymmetry from bends or dings may lead to more losses from the transformation to waveguide modes.
73, Jerry, K0CQ

I have been using several lengths of 7/8 on 5760 over the years some short some long. And, I have done some measurements. I have never had any change in loss with typical slow bends. I have seen no evidence at all of moding.
Also, on the same note, I have used long runs and short runs of Andrew
1/2 inch on 10.368 - again outside of the recommended use range, with no problems whatsoever. I think that in both cases we operate near the edge, but from my experience 5760 on 7/8 - and 10368 on 1/2 inch work quite well for tower runs.
Tom WA1MBA

I believe the difference in it working or moding is one of what the dielectric is in the line. The max frequencies are specified because of calculations that show that it can mode above a certain frequency (with a safety factor for the spec) but these are based on air dielectric line. Low Density Foam (LDF) filled line I think causes the moding frequency to increase allowing use higher than what is typically specified without any ill results. As Tom points out.....test it first...if it works....use it. 73 Fred

I'm not sure how Andrew comes up with the max use frequency which is caused by circular waveguide moding, but there is clearly a conservative value published by Andrew. At the very bottom of my connector page is a link to a cutoff calculation (put together by VHF South with my help) which is fairly accurate:

http://www.wa1mba.org/rfconn.htm and I calculate that 7/8 begins to mode at just above 5760.
It's true that dielectric changes the picture; it lowers the first mode frequency by the velocity factor. LDF has foam (obviously) and a high velocity factor. Tom

Gents I have used LDF5-50 on 5760 without problems too, but the cautionary tales about sharp bends are probably justified. I used FSJ4-50 (1/2 " Super flex) on 10-GHz some yeas ago and got almost nothing out of it. There was a tight bend involved, (tighter than normal 1/2" heliax would allow) but this did cause waveguide modes to launch and kill the signal. Temporarily straightening out the feeder cured the problem, but I had to replace the run with LDF2-50 as I needed to have bends. I have used the same cable without problems when it is mostly straight.
Bearing mind that this was at 10368MHz and the feeder is rated to 10200 MHz and actually very little above it ratings... I though I would get away with it. so be warned, the specs are probably right, but are worst case scenarios
Mark GM4ISM

Foam coax is notorious for being inconsistent. The foam density, and hence the dielectric constant and the velocity of propagation vary a lot according to processing parameters and very likely the atmospheric pressure at the time of manufacture. The dielectric will LOWER the frequency where moding is possible. Then the fact that the coax runs through an extrusion press to mold the foam on the center conductor gives room for a certain periodicity in the dielectric density because the plastic extruder pump is usually a piston pump so the pressure changes through its cycle. For as long as there has been coax there have been coaxes that had much increased (mismatch) losses at some UHF or microwave frequency because that periodicity matched half wave or whole wave spacing. Even with individual bead supported air line that was a problem if the bead spacing was regular. Section 5.5 of MIT rad lab vol 9, Microwave Transmission Circuits.
And in my Andrew catalog #35 (1991) different 1/2" foam cables have different velocities of propagation AND diameter and so rated maximum frequency.
To add further complication, there are a range of diameters of both conductors in heliax and the lowest moding frequency should vary according to whether the corrugations match or not. If the pitch of the two conductor corrugations don't match, there could be a periodicity of mismatch loss about the wavelength of where they match. There is nothing in perfect coax and connectors to excite moding. A bend is not great at causing that mode conversion unless its extreme, a more likely mode conversion trigger is a ding in the outer conductor or a coupling link to a cavity at the end. An asymmetry.
Digging into Marcuvitz Waveguide Handbook (Rad Lab vol 10) there are complications in computing the cutoff frequency of the waveguide modes of coax. There is a simple approximation and a complex computation where the solution involves finding the nth nonvanishing root of the Bessel-Neuman Combination which is tabulated. These are a function of the ratio of center to outer conductor diameters, and the effects of dielectric other than air are neglected. This computation is complicated by the corrugations of heliax which gives a range of cutoff frequencies using mins and maxs of the two diameters, plus the dielectric "constant"
tolerance from foam extrusion and raises the question, "if the mode can exist at one place in the coax will it propate past a short section where it can't exist." E.g. can evanescent modes propagate past restrictions?
I recall reports of hams using coax and connectors well beyond the minimum frequency (by a factor of 1.5 or 1.6) for waveguide modes and reporting no unusual losses. That surely is possible if there are no asymmetries to cause mode conversions. But one must keep in mind that a particular length, asymmetry, or frequency can have higher losses than expected from such a mode conversion. The trade off is whether the smaller coax without a mode conversion possibility has less loss than the larger coax even with loss due to mode conversion. I suspect it's true that the loss of 7/8" at 5760 even if there is some mode conversion is detectably less than the loss of 1/2" where mode conversion loss is guaranteed to not be a factor.
So we have a couple data points where 7/8" foam heliax passed 5760 without excess loss. Has anyone encountered a problem at 5790 with the same heliax or had a sample that gave trouble at 5760?
This question is much like that of using WR62 on 10368. Conservative design calculations say not, yet the actual frequency of large loss is lower, but being very close to cutoff, the guide wavelength changes rapidly with frequency so that matching can vary a lot with a small (100 MHz, is that small?) change in frequency. We don't change frequency more than 1 MHz at the outside and then the change in guide wavelength isn't a problem. And a waveguide in hand and working is a whole lot handier than not having waveguide to fill a gap between rig and antenna.
Andrew does show different cut off frequencies for foam and air dielectric heliax. Part of that has to come from the dielectric and part from the difference in center conductor diameter required to maintain the characteristic impedance with the dielectric in place.

73, Jerry, K0CQ

Hope I don't sound too arrogant or write a book either. But I have installed hundreds of spread spectrum hops. We almost exclusively use LDF4.5, 5/8" Andrews. For short runs sometimes we use LMR400 or 1/2", some time even use Elliptical Wave guide. Andrews made 5/8" especially for the band.
I once asked why we didn't use 7/8" and got the lecture about moding (sp). There was a period when customers were upgrading from the 2.4 band to the 5.8 band. The radios looked identical so the thought at the time was just to swap out the dish and radios and reuse the 7/8" coax. I heard all the stories about problems they were having so they switched to either 1/2" or 5/8"
There was one story about a newbie that ran out of 5/8" and decided to use 7/8" instead. Couldn't get anything to work. Return loss was good, power out good but no path. Got a long extension cord and sent the power meter up top and no power up top. He didn't believe the guy so he had the tower crew unfasten the cable and bring the top end down to the ground. It was making a big U turn half way up the tower. Put the power meter on it and he had power. He called the tower guy all sorts of names. Re ran the coax up and still nothing.
After a while another crew shows up with path boxes. Path the dishes with them and got the expected signal. Hooked the 7/8" back up nothing down on the ground. He called back to the shop and explained his problem, then let it out he was using 7/8" After a few name calling 5/8 was sent out and replace the 7/8" and everything worked fine.
I've seen a site where 7/8" was used and it worked. But as a rule in the commercial world, we use 5/8"
So there is my nickels worth.
I'm putting up a 2' dish on my tower between the HF and 6 meter beam. And will be using 5/8" down to the shack for my 5760 station. Will use LMR400 to go around the rotor. But that is another topic.n3IZN

Good day from FM19kj, My first microwave contacts were on 5.7G, using a homebrew system borrowed from WA0QII (SK) in the early 1990's. Rod had at least 3 setups and after working him cross-town a couple of times, I was hooked. We played around with bouncing the signals off water towers and airplanes flying into BWI airport. The IF radios were 223 FM handhelds, and we each had to tune to weird frequencies (222.4x in my case) to "net" the systems around 5760.1.
There are at least 50 different callsigns in my log from 25 grids and well over 2,500 Qs (these are conservative estimates, I stopped counting).
By the next VHF contest (June 1995, I think), I had a snow sled dish with triband feed, and borrowed systems for 2.3 and 5.7G. Gerry Rodski (SSB Electronics) very patiently walked me through the bands as I roved around Hazelton, PA, and was willing to use FM on his huge 5.7G setup--the contacts were a little tricky as it was difficult to tune around with the FM IF radio--Gerry had to find me. But it worked, and I made
6 contacts in two grids during that effort; the 5.7G gear was heavy and difficult to rove with, but it was worth it!
The most contacts I had roving on 5.7G were just over 50, twice. Once, on Blue Knob PA (3100', FN00rg), in thick fog/rain, I had a huge pileup on the band: it didn't really matter where I pointed the dish (by then, I had the "normal" set up of a DEM 'verter, Avantek ~10w amp, and 27" "Kruth dish" with homebrew dual band feed)--I worked other rovers in VA, big guns in PA, MD, and WV--a real blast--the other bands were not especially enhanced except some rain scatter on 10G. I've experienced this "fog
enhancement" several times, but it is generally spotty. The other big "pileup" on
6G was from the south end of the eastern shore of VA, just north of the long Chesapeake Bay Bridge Tunnel (FM27). Some strong coastal enhancement improved conditions on all of the microwave bands, and we had fun working stations on 5.7G and 10G as far north as FN32 and FN41 (800km/500mi)--again, stations were piled up on 5760.1 waiting for me...what a hoot!
In short: 5.7G works when 10G doesn't, sometimes, and is a great band to cut one's microwave "teeth" on!
73 Brian

This should help with 5.76 GHz if the price isn't prohibitive. One ERA-6 between the mixer output and this amplifier should get you there...Ben/K4QF

Toshiba terrestrial device broadens the spectrum May 26, 2010 Microwave power MMIC is suited to RF-Microwave Pre-Amplifier Applications and supports C-band frequency from 5.65 to 8.50GHz

Toshiba has added a 4watt (W) C-Band GaAs Monolithic Microwave Integrated Circuit (MMIC) for satellite applications.

Product Characteristics	TMD0608-4
Frequency	5.65 to 8.50 GHz
Band	C-Band
Output Power, P1dB (typ.)	35.5dBm
Power Gain, G1dB (typ.)	27.0dB
Drain Current, IDD (typ.)	2.6 Amps

The TMD0608-4 has output power at 1dB gain compression point (P1dB) of 35.5 dBm (typ.), power gain at 1dB gain compression point (G1dB) of 27dB (typ.), and is housed in a hermetically sealed package.

Discussions by SBMS members at Dick Kolbly's services.

Another view of the SBMS group at the Kolbly service.

Many friends came to the Kolbly Celebration of Life.

The radio cake made by Tisza, KI6DBR for the party at Dick Kolbly's Celebration of Life. The San Bernardino Microwave Society is a technical amateur radio club affiliated with the ARRL having a membership of over 90 amateurs from Hawaii and Alaska to the east coast and beyond. Dues are $15 per year, which includes a badge and monthly newsletter. Your mail label CA 93555, bburns@ridgenet.net, or phone 760-375-8566. The newsletter is generated about the 15th of the month and put into the mail at least the week prior to the meeting. This is your newsletter. SBMS Newsletter material can be copied as long as SBMS is identified as source.

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