An Amateur Radio publication for the Microwave enthusiast

MICROWAVE NEWSLETTER

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FROM THE EDITOR

2002 – MAY

Much of this issue, certainly the technical content, is from the other side of the Atlantic. We are grateful to Dick, K2RIW, John, W3JMS, Bill W3IY and John, N8UR, for their interesting contributions. North America is also well in the limelight with the recent intercontinental EME contacts on the 24GHz band. You can read all about that in the Activity News section.

Where, you might ask, is the UK technical input these days? We'd also like to know! If you are doing anything in the way of equipment design, antenna experiments or small projects then please write in with the details.

On this side of the "Pond" we have already had two microwave contests in the UK, the first one, the Millimetre Bands Contest, being a definite success but the second one resulting in much disquiet about microwave contests in general. Once again, we urge you to join in the contest debate, even if you are not a competitive person, for the contests are, in effect, the only activity events we have, most of you only coming on the bands then and not at other times. So, read the last three of pages in the Activity News section and let us have your constructive ideas, please!

The next UK Microwave Contests are:

26 May 2002: 1st 10GHz Cumulative
9 June 2002: 2nd Millimetre Bands Contest

In this month's issue ...

News, views and articles for this newsletter are always welcome. Please send them to G3PHO (preferably by email) to the address shown below. The closing date is the Friday at the end of the first full week of the month if you want your material to be published in the next issue.

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SUBSCRIPTION ENQUIRIES SHOULD BE SENT TO RSGB HEADQUARTERS AT THE ADDRESS SHOWN AT THE TOP OF THIS PAGE AND NOT TO THE EDITOR ..

FOR SALE

From: Geoffrey Day, G4DED [g4ded@ukonline.co.uk]
I have the following which has to go, I have been told !

Part built 16ft dish with gen. 9 spars already assembled, centre hub finished, outer ring bent to radius. Materials to build 9 more spars to complete, no mesh. Could be used with just the 9 spars. All aluminium construction.

Copy of the official Curtiss-Wright Manual for the "Prop-Pitch" rotator could copy.

W2IMU WaterCooled Power Amp. for 1296MHz using pair of 3CX100 with gen, well built. Matching mixer could be modded to amp.

Can be viewed at QTHR Banbury. M40 close. Offers to Geoff Day g4ded@ukonline.co.uk

From: Mark Hughes GM4ISWM [gm4ism@bigfoot.com]
Sent: 11 May 2002

Subject: 9cm GM4ISM/B QRT

The GM4ISM personal 9cm beacon in IO86 on 3400.067MHz has been switched off due to concerns over RF exposure levels. Until I can borrow a hazard meter that covers the appropriate range, it must remain off.

I have to demonstrate (by measurement!) that no-one can be cooked! (even though people do not generally go within 20m of the antenna) Calculation shows that the RF level is 50 % of Icnirp public exposure within 1m of the antenna .. at the maximum op of the PA excluding losses!. There is no possibility of exceeding exposure limits other than by climbing up and hugging the antenna, and even then it is doubtful that SAR limits would be exceeded. Still, someone may do that I guess! Still such is the way of the world.

I will let it be known when the beacon is operational again.

73 from Mark, GM4ISM

Problems getting on 24GHz?

From: w3iy@fcc.net

Several people have asked me recently about using SMA connectors and relays at 24GHz. They work! I have tested over a dozen or so relays, including SP2T and transfer and they all work acceptably.

The Transco SMA relays are clearly the best, showing over 70dB isolation in all cases. Other brands are useable, with less than 1dB insertion loss and isolation usually over 30dB. Sure, SMA connectors have some VWSR, especially the .141 type. The .085 SMA connectors I have seen were all very good. If you have more than 10W o/p, you're probably getting in trouble and should consider waveguide instead.

But, if you're that lucky, you will probably luck into some K-connector parts too!

When in doubt...TRY IT OUT!
Good luck and 73, Bill W3IY

Website for data sheets on Qualcomm synthesizer and DDS chips

- by Kerry Banke, N6IZW [kbanke@qualcomm.com]

Since Qualcomm discontinued manufacturing its 3036 style synthesizers and 2334 DDS chips, they also removed the data sheets from their website. I happened to find a site that fortunately still has the 3236 synthesizer and 2334 DDS data sheets. The 3236 data sheets are very applicable to working with any of the 3036-3216-3236 synthesizers. The later chips have some extra features but are all compatible with the basic 3036 chip. The main difference for most amateur applications would be the reduced power requirements of the latter versions.

The data sheets can be found at:
http://www.sss-mag.com/pdf/synthbk.pdf

73 from Kerry, N6IZW

Seigy 2002 … an American visitor's perspective
~ by John Jaminet, W3HMS

Seigy is the annual French VHF/UHF/SHF Hamfest and Technical Session held in the Community Hall in the town of Seigy . It started here in 1955 in the center of France. Seigy is a very small town, close to St Aigan on the Cher River and is about 40km south of Blois and west of Orleans in the castle district. It is very centrally located and many hams can make the drive in 3-4 hours. Motel and food costs are much lower than in Paris or the Riveria.

My wife and I were there in April 1999 and decided to go again this year. The principal organizers are Michel, F5FLN; Gilles, F5JCB; and Phillipe , F6ETI. There is a Proceedings, available for about 10-15 Euros, published mostly in French with some articles in English. The entrance fee is about 5-10 Euros and that includes a half-litre bottle of wine, specially packaged and labelled for Seigy .... not bad either!

The meeting comprises two days with most activity on Saturday and some events on Sunday morning. This year the dates were 13 and 14 April. The Saturday events started at 0830 and ended about 1900. Like Dayton and other big hamfests, there is so much to do and one day seems not enough. As I had been to the Swiss and French ATV society meetings in 1996 and 1997, plus Seigy in 1999, I was constantly (and pleasantly) occupied in chatting with old friends and making new ones. I attended the ATV society, ANTA, Annual Meeting and we shopped for the "bargains of the century" in the flea market.

As to language, I read, write and speak French and was delighted to do so at Seigy. I was surprised at the number of hams who noticed my call letter/name hat and spoke in English with varying degrees of skill and confidence. Even more important was the fine welcome I felt, as expressed by the attitudes and smiles of so many chaps. So, Seigy is ideal for a pleasant Saturday hamfest combined with a visit to the castles on other days irrespective of your language(s) skills. The weather in April in central France is usually very spring-like and the terrain is easily navigable in a rental car as crowds are not yet at summer levels.

The flea market is not the usual USA variety of "tailgating", e.g. selling from the trunk of your car. In Seigy, the organizers arrange for many tables covered by a large tent, so rain is NOT a show-stopper. There were outside demonstrations of AO-40 with 70cm uplink and 2300MHz downlink.

Technically, Seigy is quite advanced. I saw a static demo by Jean-Louis, F6AGR, of 24.048GHz AO-40 reception, digital Ham ATV via a commercial satellite channel from Holland with relaying then to a TV set in the main hall. This was presented by Marc Chamley, F3YX, the Father of French ATV, using his most advanced ATV Rover mobile. The quality of FM-ATV using PAL is superb and even more impressive is the digital ATV I saw 47GHz FM-ATV demo by Rene, F6CGB from a transmitter in the hall to a receiver on the stage. I was pleased to chat with the very effective Editor of HYPER, the French monthly magazine for microwave operations, in the person of Alain, F5LWX. I wanted to attend a lecture on digital ATV by Jacques, F6AJW, but it just did not fit with my schedule ... too many nice things to do, HI!

The HYPER gang is a loose knit group that shares the work to turn out HYPER which is really a first-rate microwave magazine, published in French . Advance info about Seigy was on the French REF (ARRL/RSGB equivalent) Web site (in French). The dates in April 2003 have been set ... I just do not have them handy at the moment.

The French micro-wavers are very technically advanced. I spoke with Michel, F6BVA and his co-record holder, Gil, F5CAU about their world record on 47 GHz and other topics, including their ops on 76 and 145 GHz. I was pleased to speak with Andre Jamet, F9HX, about his article on 10 GHz super-regenerative receivers, etc, in VHF Communications, and the like. I was delighted to chat with Alain, F1ANY at the Friday night informal dinner where he was most helpful to my wife and I, as was Jean-Louis, F6AGR. Alain and colleagues are building transverters for 241GHz. They will use medical syringe needles as wave-guide for that band !!!!

I have, I suspect, omitted the names and calls of some of those who were most helpful and interesting to talk with at Seigy . It was just overwhelming to me to try and chat with so many and retain the new info I received plus keep in mind the names and calls. This was due in part that few people have badges with their names and calls and the French language, beautiful that it is, is not my first language.

All in all it was lots of fun. The chaps were most accommodating to my wife and myself. The true ham spirit of sharing info and perfecting techniques never burned brighter than among the French microwave hams.

Bravo, merci beaucoup mille fois et 73, John Jaminet, W3HMS .

Editor's Comment *.... Our grateful thanks go out to John, who wrote this article especially for the Microwave Newsletter. It looks like France has the equivalent of our Martlesham Round Table and a mini Microwave Update. Is any UK microwaver game for a visit to Seigy next year?*

DIRECTIONAL COUPLERS USED FOR VSWR AND POWER MEASUREMENT ~ by Dick Knadle, K2RIW

INTRODUCTION -- Over the years, I have heard many engineers, and some smart amateurs, express opinions that reflect a considerable misunderstanding about the operation of Directional Couplers, and how to properly use them in the measurement of Voltage Standing Wave Ratio (VSWR), and power. This memo is intended to give some basic information that may help.

At first, the average electronic technologist is mystified by at least two of the concepts of how RF behaves within transmission line structures:

(1) The concept of a Directional Coupler (DC); the idea that it favors a signal that flows in one direction, yet rejects (at least partially) a signal that flows in another direction seems (to them) to be in violation of some basic laws -- like the Law of Reciprocity.

(2) On top of this, many technologists have great difficulty believing that a normal transmission line, completely keeps separate, the signals that flow in the two directions on that line, even if those two signals originally came from the same source.

I believe that both of these principles must be absorbed (and understood), if meaningful DC measurements are to be properly executed, and believed. Here are my recommended procedures, with some partial explanations of what is taking place at each step.

A DIRECTIONAL COUPLER USED IN A VSWR OR POWER MEASUREMENT PROCEDURE

(I) DIRECTIONAL COUPLER CALIBRATION -- The first step in this procedure is to establish the quality of the Directional Coupler (DC) that you are about to use. I don't care if the label on the DC says it is a "Cadillac" or "Rolls Royce" brand, and the calibration sticker says it is traceable to "The Bureau of Standards" with and accuracy of 0.01dB; you still have to confirm that it is good working order right NOW. It is possible that the DC was thrown onto a concrete floor yesterday, and the internal termination may have been shattered. If that had happened, it could loose almost all of it's directional characteristics -- it's "Directivity."

The confirmation requirement is similar to the proper use of an Ohm Meter. Notice that a good technologist will always short the two leads together; and the Ohm meter had better read a small fraction of an ohm, before the technologist will proceed with the next measurement.

Similarly, a prudent technologist will measure the Directivity of the DC he is about to use. It is also useful to know that sometimes the DC can be used far outside the frequency range it was designed for, as long as the principle of operation is somewhat understood, and a calibration at the present frequency is performed. Here is the Directivity Confirmation procedure.

DIRECTIVITY CONFIRMATION -- Unfortunately, the Directivity Confirmation procedure requires a known good termination (dummy load), and the procedure will have an accuracy that rarely is much better than the quality of that termination being used. First apply an RF signal to the DC "input" port, with a known good termination connected to the "output" port. Position the DC so that it favors the Forward flowing signal. Place a power-measuring device at the directional port. This can be a Power Meter, Spectrum Analyzer, calibrated Crystal Detector, Scalar Network Analyzer, etc. Measure (and record) the DC's response to the forward-flowing signal (in dBm units). If, for instance, you are using a known Directional Coupler (DC) with a -10dB Coupling Coefficient, the measured power should be nearly 10 dB weaker that the power that's being applied from the signal generator. By the way, "dBm" means Decibels of signal strength with reference to a 1 milliwatt signal.

Next, reverse the DC "input" and "output" ports, and repeat (and record) the previous measurement. The difference in the two readings indicates the Directivity. For instance; if a 0.0dBm signal generator is applied to a 10dB coupler, and it measured -10dBm during the Forward Measurement, and -30dBm during the Reverse measurement, that would indicate a Directivity of

20dB (the difference in the readings). A DC of "Good" quality will show a directivity of 2 dB; that is, the apparent reflection from the termination will appear to be -20dB (an apparent VSWR of 1.22:1), even if the termination is a perfect 50 ohm resistance at the present frequency. An "Excellent" DC will show a Directivity of 30dB (an apparent VSWR of 1.065:1), and there are Instrumentation-type DCs that can display a Directivity of over 50dB (an apparent VSWR of 1.006:1). More on this later; there are ways of improving your DC's Directivity.

Simplistically, you could say that a DC that displays a Directivity of 20dB will not be able to easily resolve the Reflection Coefficient from an unknown load of better than about -20dB and there are ways to get around this. Depending on how well your DC is internally balanced, the finite Directivity (-20dB for instance) represents the degree of response it has to a signal that is flowing in the wrong direction -- this is really it's degree of imbalance. A modern Network Analyzer uses a complicated "12 point" calibration procedure to drastically improve the accuracy of a Reflection measurement it makes with it's "only Good quality" Directional Couplers.

ALTERNATE CALIBRATION PROCEDURE -- There is an alternate Calibration Procedure that does not require the inconvenience of reversing the DC to measure it's Directivity. This is to recognize that a good Short (or Open) circuit has a Reflection Coefficient of nearly -0.0dB. In this method, first measure (and record) the apparent reflected power from a Short (or Open) termination, then place the Known Good Termination on the "output" port of the DC and repeat the measurement. The difference (in dB) between the two measurements represents the DC's Directivity. When using SMA or type N connectors at 10GHz (and below), an "Open Circuit" will have Reflection Coefficient of nearly -0.0dB, and is a good calibration "short/open termination." However, if you're using a Wave Guide (WG) type DC, an open circuited WG flange makes a pretty good transmitting antenna, with a VSWR of about 1.5:1 (reflection coefficient of about -12.9dB). Therefore, don't use this as a high reflection termination. Instead, place a sheet of metal (tightly) across the WG flange as the high reflection termination.

SIGNAL GENERATOR VSWR -- There is an additional danger to the alternate calibration procedure. It is vulnerable to the VSWR of the signal generator. I would only use this procedure if there was a 10dB (or greater) pad between the signal generator and the DC. Without that pad, the reflected signal could re-reflect from the signal generator and cause a confusing reading. The signal-generator-reflected voltage can add to the incident voltage and create an apparent signal source that would appear as much as 6dB greater (or more) in magnitude -- but only during the short/open portion of the test. Also, if the DUT happens to have a rather high VSWR (reflection of greater than say -20dB), I again would recommend the use of a 10 dB pad at the signal generator.

(II) THE UNKNOWN MEASUREMENT -- Once you have confirmed that your DC is performing properly, it is time to place the Unknown Circuit (the Device Under Test [DUT]) on your DC to measure, and tune, it's Reflection Coefficient. The DUT-reflected signal can then be translated into VSWR by using a look-up table or by performing a two step calculation. **Step (1):** Convert the reflection coefficient (in dB) into a reflection Voltage, which is usually represented by the Greek letter Rho. **Step (2):** Convert the Rho magnitude into VSWR.

(1) Rho = ALOG(-dB/20)
(2) VSWR = (1 + Rho) / (1 - Rho) Where:

ALOG = Anti-LOG, or 10^(-dB/20)
Rho = |Absolute Value| of the Reflection Coefficient (as a Voltage).

The final dB of Reflection Coefficient in the numerator must be a negative number that's then divided by 20 and raised to the power of ten in formula (1). At first, some technologists will understand that the dB value is negative dBs, they place it into the formula that has another negative sign in it, that converts it to a positive value (+) and they come up with answers that are crazy.

CHEAP AND BROAD -- The beauty of using a Directional Coupler (DC) in VSWR measurement is that, generally, they are rather inexpensive, and they are rather broadband, therefore a swept frequency measurement is possible if your power detector is a fast acting one, such as a calibrated Crystal Detector (and oscilloscope), a Spectrum Analyzer, or a Scalar Network Analyzer (SNA). As you tune your DUT, it is nice to know that you are tuning for a broadband match, as opposed to an impedance match that is only effective across a narrow frequency range.

(**III) DC ALTERNATES --** There are a large number of devices that can serve as the Directional Coupler (DC). They have such names as Quadrature Hybrid, 90 Degree Hybrid, Branch Hybrid, Branch Coupler, Magic T, Ring Hybrid, Zero-180 Degree Hybrid, Wave Guide Broad Wall Coupler, Wave Guide Narrow Wall Coupler, Wave Guide Beth Hole Coupler, etc. The one kind of hybrid that can't be used this way is a Wilkinson Half Hybrid, or Zero Degree Hybrid.

(IV) DC EXTENDED FREQUENCY RANGE -- Few technologists know that a well constructed Directional Coupler (DC) has an operational frequency range that extends many octaves in the lower-frequency direction. For instance, if you plotted the Forward Response of a DC that's rated for operation from 1 to 2GHz, you would find that it has useful operation all the way down to 10MHz (and probably below). The only thing that changes is its frequency flatness, and the Coupling Coefficient decreases -- but that can be a considerable advantage. Here is what's happening:

(A) A TEM-type (non Wave Guide type) Directional Coupler has its greatest coupling at the frequency where the internal coupling section is 1/4 wave long. Above (and below) that frequency the response falls off in a very predictable manner -- it's a SINE wave of amplitude. In other words, if I was sweeping that DC that's rated for 1 to 2GHz, and I plotted the Foreword absolute Voltage response versus frequency at the Coupled Port, the resultant plot would look like a rectified SINE wave, with the horizontal axis being frequency (instead of time). There would be a zero response a zero MHz, a broad peak near 1.5GHz, a second zero near 3GHz, a second broad peak near 4.5GHz, etc. Unfortunately, a DC only has Directivity at the 1/4 wavelength frequency region and at lower frequencies -- but that still leaves many octaves of useful operation.

(B) That predictable response outside of the rated frequency range has turned into an advantage for me on many occasions, here are some examples:

(1) For my first published article, "A Stripline Amplifier/Tripler for 144 and 432MHz", Ham Radio, February, 1970, I needed to test the power output, and harmonic content, of the 144MHz section and the 432MHz tripler section of that 4CX250B amplifier. I needed a 300 watt frequency-indicating power meter, that I didn't have. A Spectrum Analyzer (SA) can do the job, but it can't tolerate the 300 watts. If I had a -30dB DC, the coupled power would be 0.3 watts and the SA could easily make the measurements. But, my company's Instrumentation Department said they didn't have a -30dB DC at that frequency range, and non of their DCs could tolerate 300 watts.

I studied what they had and found a solution. They had a Narda -10dB type N Directional Coupler rated for 8 to 12GHz and 1 watt maximum. I reasoned that the coupling section was 1/4 wave long (90 degrees in phase length) at 10GHz, the centre of it's frequency range. I then divided 144MHz by 10GHz, multiplied by 90 degrees, and reasoned that the coupling section was only 1.296 degrees long at 144MHz. The SIN of 1.296 degrees is 0.02262. Since this is a voltage response I took 20*LOG(0.02262) = -32.9dB. That means that the coupled response at 144 MHz would be -32.9 dB (weaker) than at 10GHz, where it was a -1 dB coupler. Therefore it is a -42.9 dB coupler at 144 MHz. I calibrated it at 144MHz and found it to be a -43.1 dB coupler -- close enough. And, since the internal coupled line is isolated from the main line by -43.1dB, that means that the internal 50 ohm termination would never see more than 0.015 watts when I applied 300 watts of 144MHz signal to the coupler. I similarly calibrated it at the harmonic frequencies, applied the 300 watts to it, it worked like a charm, I made all the measurements this way and they appeared in the article.

(2) In the low frequency area of a coupler's response (near 0 degrees of a SIN function) the response is almost a straight-line response that falls off at -6dB per octave (-20dB per decade) as you go down in frequency. Therefore the "-43.1dB coupler" I used at 144MHz would be a -63.1dB coupler at 14.4MHz. As you are about to see, Directional Power Meters use this principle.

(V) BIRD-TYPE POWER METERS -- It is interesting to note that the slug of a Bird Power Meter is also a less than 1/4 wave section of a Directional Coupler. The Bird slug achieves frequency flatness across it's rated frequency range by using a rectifier circuit that has a low-pass filter action that rises at 6dB per octave as you go down in frequency.

Each slug also has a finite Directivity, depending on how well it was balanced and calibrated at your favourite frequency. Therefore, be careful about falling into the trap of using a high power slug to measure the forward power of your 1 kw XMTR, and then switching to a low power slug to measure a very low VSWR. Your antenna may be perfect, and have no reflected power (voltage), but the slug's approximate 20dB of Directivity could show an apparent antenna reflection of -20dB (10 watts). That could lead you into believing that the antenna VSWR was 1.22:1.

(VI) COUPLER IMPROVEMENT TECHNIQUES -- As the above material shows, a DC that has less than ideal Directivity is really displaying a slight imbalance that causes it to slightly respond to the signal that is flowing in the wrong direction on the main line of the coupler. There are many ways of improving the DC's balance.

(1) Internally, you could re-adjust the accuracy of it's termination, or you could add a small gimmick capacitor in the correct location to improve the Directivity balance.

(2) An even better way is to use a Double Slug Tuner, a Double Stub Tuner, or a Wave Guide E - H Tuner. If you have a known good termination, you can assume that it has perfect absorption and essentially no reflection. You then place the tuner between the DC and the good termination, and adjust it until the DC shows no reflected power from the termination. You then leave the tuner connected to the same port of the DC, while you proceed with the VSWR or power measurements. When you were adjusting the tuner for a null in the DC's Reflection response, you were really creating a second small reflected signal that was equal in amplitude and 180 degrees out of phase at the DC coupled port. That created the improved balance and made the DC nearly ideal, at that frequency. The bandwidth of this DC correction technique is dependent on the amount of correction that was required. When in doubt, recheck the balance at the next frequency.

(VII) TRANSMISSION LINE DIRECTIONALITY -- When I tell a technologist that a transmission line will keep the two signals completely separate, that flow in opposite directions on a transmission line, they often don't believe it -- particularly if the two signals came from the same source. There are many RF tests that could be performed to prove this, but I have discovered that a well-informed skeptical person can always come up with an alternate explanation that supports their point of view. I have found that the best way is to use visual experiments.

(1) A pool of water is really a radial transmission medium. If I drop a pebble at the North end of the pool, waves will travel to the South. Similarly, a pebble dropped into the South end will create waves that travel to the North. If I drop pebbles at both ends of the pool, the waves will meet at the middle, and pass right through each other with no interference, as long as the waves are kept small enough (use the linear region of wave amplitude -- no white caps).

(2) I can tap the 1/4 inch guy wire on my 200 foot Rohn-55 tower and watch the wave travel up the guy wire, strike the tower, reverse in polarity, and propagate back down to me (it hit a "short circuit"). I can wait until the wave has struck the tower, and started back to me, then I can strike the wire again (with any polarity) to start a second wave going up the guy wire. As the two waves meet in the center, they pass right through each other with no interference, as long as the waves are small enough that I don't get into non-linear stretch (deflection) of the steel.

(3) I say that most linear transmission mediums obey this property -- even RF in free space. Those waves that meet in free space pass through each other with no real interference. When you move your Handy Talky Radio around a room that is reflective, you will find what you think are signal nulls. This is because you are using an antenna that has no Directivity and it is responding to (adding together, voltage-wise) at least two waves that are out of phase.

Similarly, the probe that is used on a Slotted Line VSWR setup has no directivity, and it displays the Standing Wave Ratio that is caused by the signals it picks up that flow in both directions through

the Slotted Line. Those two signals were completely independent up until the time they were combined on that non-directive probe wire and then, for the first time, they interfered with each other to generate the effect we call “a standing wave.” This measurement technique has become the classic way of specifying the Reflection Coefficient of an RF device -- its VSWR.

(VIII) LETS DO AWAY WITH VSWR -- If you took the directional probe from the slug of a Bird Power Meter and operated it on that Slotted Line, you would discover that the Standing Wave has disappeared, and you could now independently measure the amount of power (or voltage) that is flowing in each direction (by reversing the slug) -- that's really what you wanted to know in the first place.

In the past, that Slotted Line measurement was the only way you could conveniently measure the reflected voltage -- by using an interferometry technique to indirectly measure it as VSWR. It really is time that we abandon "VSWR measurements" because we don't do it that way any more. We should only discuss the Reflection Coefficient -- in watts ratio, volts ratio or dB ratio (choose your favorite units), because we now directly measure the reflected signal. We RF mavens seem to spend half our lives converting back and forth between VSWR, Voltage Reflection Coefficient (S11, S22) or Power Reflection Coefficient, just so that we can communicate with a technologist (or the data sheet) that uses the other system of units.

"VSWR" is now a "coded message". It's really time that we "Break the Code" or stop using that code when we're buying components or training the new RF recruits. I'll admit that we will have to keep mentioning it to students, for historic reasons.

(IX) TROMBONE IMPROVEMENT -- I'll warn you that these last three paragraphs will only be appreciated by a person with a rather exacting-type of personality!

Once you accept the fact that RF power can independently flow in two directions on a transmission line, you then realize that changing the length of a lossless transmission line (of the same impedance) does not change the Reflection Coefficient; thus it doesn't change the true VSWR of your antenna. However, if the Directional Coupler (DC) device you’re using (coupler or a Bird) has less than ideal Directivity, than the Reflection Coefficient, and VSWR, will appear to change. This is because there is a small amount of Forward-flowing signal (I'll call it the Leakage Signal) that's mistakenly being picked up by your coupling device, that beats against the real Reflected Signal that your coupler is now measuring (from your antenna, for instance). As you change the length of the transmission line (with a Trombone Line), the two signals go in and out of phase with each other. This will show up as a cyclicity of the apparent Reflected Signal Power, as the Trombone is operated. This assumes that your trombone can move more than one half wavelength at your frequency – you’re not going to do this at 80 meters! Although on 80 meters you could insert fixed lengths of low loss cable (of the same impedance) to get the same effect.

Knowing the operation of the system, and its shortcomings, can allow you to gain higher accuracy in the Reflection Coefficient measurement. A perfect DC or Bird would show no change in reading as the Trombone (on the antenna side) is operated. The magnitude of the "ripple" is an interferometry effect that is telling you exactly how strong is the Leakage Signal into your coupling device. Once you know the strength of the Leakage, you can subtract it out of your measurement. This is exactly the accuracy improvement procedure that is done in the microprocessor of a modern Network Analyzer. You can convert the Ripple into a Leakage Magnitude by using the following formulae:

Leakage Voltage = (a - 1) / (a + 1).
Leakage Voltage(dB) = 20*LOG[(a - 1) / (a + 1)].
a = ALOG[Ripple / 20].

Where:
Ripple is expressed in Peak-to-Peak dBs, a positive number.
LOG is calculated in base 10.

ALOG is the Anti-Log, or 10^(Ripple / 20).
"a" must be a positive number, greater than 1.

Here is a measurement example. Assume I'm measuring the Reflection Coefficient of my UHF antenna system and my DC says that the Reflection is around -19.5dB. As I operate the Trombone after the Coupler, I see a Peak reading of -19dB, and a valley reading of -21dB. That's a Peak-to-Peak reading of 2dB. The formula tells me that my Leakage Signal is 0.1146, or -18.81dB (weaker) than the Peak and Valley measurements I have made. That relative Leakage voltage was in-phase at the -19dB reading, and out-of-phase at the -21dB reading. I can choose to subtract the voltage from the -19dB, or add it to the -21dB reading. This relative voltage will thus be 1.1146, or 0.9954 (as a voltage), and I can take 20*LOG of these voltages. Thus, I can either add 0.94dB (in absolute terms) to the -19 reading, or subtract 1.06dB (in absolute terms) from the -21 dB reading. In either case the corrected reading will be an antenna Reflection Coefficient of -19.94dB.

I hope this information is useful to those who could read this far. Feel free to correct the mistakes!

73 and Good VHF/UHF/SHF DX,
From Dick K2RIW.
Grid FN30HT84DC27

The MAComm 10GHz Whitebox - notes on recent experiments
By John R. Ackermann [jra@febo.com]

Editor's note: *The MAComm "whitebox" was available in large quantities in the UK during the early 1990s. Many British microwavers made their first steps into 10GHz narrowband operation by modifying on of these bargain units, priced at around £100 brand new! We make no apologies for publishing this article as the "whitebox" has resurfaced, in great numbers, this time in the USA, during the past 18 months or so. We believe several UK operators are also still using their unit on the 3cm band ....*

I'm a member of the Midwest VHF/UHF Society, a ham group centred in Southwest Ohio (Dayton and Cincinnati, mainly). A group of us are working to put the "whitebox" on the air, using information found on G3PHO's website and help from fellow amateurs here in the USA.

I'm very interested in precise frequency measurement and have done some analysis of the whitebox local oscillator. I thought you might be interested in it, so here's a pointer to the Internet:

http://www.febo.com/time-freq/whitebox/index.html.

The bottom line is that the LO has very good frequency stability, with less than 200Hz change in a 24 hour monitoring period but there is very significant ageing for the first few weeks and it's best to burn in the LO by letting it run for at least 10, and preferably more like 20, days.

I've also put together a web page with my notes on the conversion --

http://www.febo.com/geekworks/whitebox/index.html.

There are a couple of other things there that you might also find interesting, particularly the fact that, although the LM2577 step-up (12 to 20V) power supply works really well and is extraordinarily efficient, it does have some noise at 52kHz that I found easiest to filter with a series 22uH choke; that knocks the +/-52kHz spurs in the LO output, that would otherwise be in -40dB range, down to -60dB or so.

Also, we've noticed a very interesting noise "hump" in the LO output centred about +/-400kHz from the main signal. Because it's broadband, the amplitude varies depending on the analyzer bandwidth,but, what is really interesting, is that there is a very sudden and dramatic (as in 30dB) drop in the noise as you reduce the supply voltage through a critical point at around 16.4 volts. There are spectrum analyzer pictures at the bottom of the **http://www.febo.com/geekworks/whitebox/index.html** page that show this.

I'm not sure it's a big deal, but I found the dramatic change over such a small voltage range very interesting. I wonder if there's a stage that goes out of saturation and becomes linear at that point?

73, John N8UR, jra@febo.com

ACTIVITY NEWS FROM THE WORLD ABOVE 1000MHz

INTER-CONTINENTAL DX VIA 24GHz E.M.E. !

Two emails, recently received, describe this exciting advance in amateur microwaves. Who would have thought, five or ten years ago, that 24GHz EME would be a real possibility? Well, it's here! Congratulations to all involved in these historic contacts. Read on ... (EME reports are shown in brackets) ...

Email 1: From: "Barry Malowanchuk" <ve4ma@shaw.ca> Sent: 22 April 2002:
On April 18 and 20 Sergei, RW3BP, had his first QSOs on 24GHz with Al W5LUA (M/M) and Barry VE4MA (O/M). On Sunday April 21 Sergei worked AA6IW Lars for initial #3, and a first 24GHz EME QSO for Lars. What is more remarkable is that the Moon was only at about 7.5 degree elevation for Sergei at the end of this QSO. The atmosphere normally absorbs RF at low angles on 24 and adds Rx noise from the temperature of the atmoshere. This is certainly a new 2GHz distance record (KO85ws to CN87vi). Lars observed a very much narrower spreading of RW3BP than VE4MA.

Also today, VE4MA worked VE7CLD(M/M) for a new initial #3 and a new country #3 (a first 24GHz EME QSO for Gunter), and then AA6IW (M/M) for initial #4. The Libration "smearing" was bad for these QSOs as the Moon was at a local hour angle of -25 degrees.

Unfortunately Al, W5LUA, missed all the activity as he was in New Orleans! Next month is sure to bring much activity and many new QSOs. All stations are running high power TWTs (>75 Watts), mostly courtesy of Paul Drexler W2PED. 73 from Barry, VE4MA

Email 2: From: "Sergei RW3BP" <rw3bp@co.ru>
On 18 and 20 April I had my first QSOs on 24GHz with Al, W5LUA, and Barry, VE4MA. My station: ANT 2.4m (8 feet) offset dish with rectangular horn as a feed . I can set the speed of Az and El motion to provide auto tracking with better then 0.1 degree accuracy in 30min period. TX: 50W TWT placed at the feed point on water cooled aluminium plate.PS (13kV/5.6kV) is homemade and placed at home. Rx: DB6NT LNA with 1.65dB NF. Converter and LO by RA3ACE.
I use separate feeds for TX and RX. TX/RX change-over provided by moving TWT - LNA block up and down for 40mm. It takes 0.25 s to move it down to RX position. So it is possible to get one's own echo very well. In the TX position, the RX feed is shielded by lossy rubber. It is also a good reference for noise measurements.
73 Sergei RW3BP

10GHz EME NEWS

From: Brian Coleman, G4NNS [BrianColeman@compuserve.com]
The EME activity weekend of April 20/21 bought a surge of 10GHz EME activity and, with a little help from Ian G4EZP and Keith G4FUF who were visiting, we worked eight stations off the Moon of which 5 were new (initials) bringing the total to date to 12. This with 9 watts to a 3.7m antenna. On the Sunday morning Keith, Ian and I paid a visit to the crew (G3PYB, G8ACE and G8BKE) on Walbury hill to hear G3PHO/P on Titterstone Clee make 24GHz contacts with John ACE and Peter PYB ... very impressive.

MICROWAVE CONTEST REPORTS

April Millimetre Bands Contest:

This was the first of the season's UK microwave contests and it certainly went well for a change. Usually this contest brings few out into the hills at this time of year but some **fifteen** or so 24GHz and up operators were active on Sunday, 21st April. Some very interesting new 24GHz paths were worked, largely due to the widespread use of the Milliwave half watt amplifier modules that were obtained last year. Those of you who haven't yet pressed the amp into service should so as soon as possible ...

you'll get a nice surprise when you find you can work obstructed paths that wouldn't have gone on your lower powered gear. Many of us think that the distances have not improved all that much with the higher power but Paul Widger, **G0HNW/P (Winter Hill, IO83RO)** pushed the 24GHz boundaries a little by working G3UYM/ P (Broadway, IO91CA) over 180km, a rather good distance considering it is a land path and very definitely not line of sight. Paul also tried 24GHz with **Neil, G4BRK** (home station near Swindon). Both stations heard each other's carrier but no contact ensued as the signals were just too weak for even a CW contact. This would have been over 200km and possible the longest land path worked on the band in the UK. Neil connected his 24GHz receiver to his computer where his DSP software clearly displayed Paul's signal being keyed on and off, even though it was inaudible to the ear!

Neil, G4BRK (near Swindon) continues the story in the following email report:
What a day! Seven QSO's from home on 24GHz is quite pleasing, though 4 were on Walbury! Best was G8IFT/P at 112km, closely followed by G3PHO/P on Titterstone Clee. Interesting were the trials with G3UYM/P on Broadway ... 3 attempts with Harold gave no signal, then a very weak one-way and finally a full QSO peaking 579! It all shows that it is worth repeating trials, even though it usually doesn't go ... just sometimes it pays off. The highlight of the day, though, was the second attempt with G0HNW/P. We had just decided to abandon as there were no signals and 225km was too far anyway, when Harold called in to say he could hear Paul. Within a minute, so could I (the bearing from Winter Hill is the same for me as for Broadway)!! Harold went on to make a QSO, then Paul and I continued and eventually we heard signals both ways, though too weak to copy anything. Using Spectran software on the PC here I could see Paul's signal even when it was barely audible ... CW with 10 second dashes would have been good copy! We waited an hour for a third attempt, but signals were no better then, though still there. So, a gotaway but further than I have ever heard on 24GHz before, over a very obstructed path (over Broadway).

Another Millimetre Band Contest report comes from **John Hazell, G8ACE/P (Walbury Hill, IO91GI):** Four of us gathered at Walbury. G4LDR, G3PYB, G8ACE & G8BKE, all equipped for 24GHz and some for the higher bands. Stations I worked are as follows:

24GHz: Location, trig point, Walbury.

1. G4BRK, home station
2. G3PHO/P Titterstone Clee, IO82QJ
3. G8IFT/P Brown Clee, IO82QL) (now my best 24GHz distance)
4. G3UYM/P, Broadway, IO91CA, (failed on 47G) Site move to the PMR station about 1km SE Walbury trig. point.
5. G4LDR/P Walbury (obstructed path back to trig. point.
6. G3PYB/P (Peter relocated to Lane End)

47GHz

7. G3PYB/P **76GHz**
8. G3PYB/P (Duplex fm contact as we have separate TX/RX systems). Distance about 39km I think without checking and obstructed of course! A big tree was in leaf across the field.

The test with Paul,G0HNW/P failed and we missed out with Del, G1JRU (Southampton) who was still building when we first spoke but had gone QRT (we think) by the time the four of us had finished working another station. No other stations heard on talkback. So ours is not a long list but a very satisfactory one on 24GHz. It's a shame there is so little activity on 47GHz.

I am now quite keen to try my 90cm dish on 24GHz. I feel quite pleased with the latest "plug and play rigs" I have built for 24 and 47GHz. On 24GHz I have made everything including the PCBs, just excepting the WG switch and Milliwave amp of course. My own amps take up a fair amount of space and would be more difficult to get into the box. Everything except the WG22 switch was built by me on 47GHz. That switches between the GaAsFET mw source and the transverter. Both dish feeds are homebrew but still 'splash plate' so the cassegrain is the next step I guess. 73 from John G8ACE.

Peter, G3PHO, operated on **24GHz** from three different locations during the Millimetre Bands Contest. The contest coincided with one of his mountaineering club's weekend meets in North Wales so Saturday saw him climbing the hills around Bala while Sunday saw a 6.30am start from the hut to drive to Titterstone Clee (IO82QJ) for the microwave contest. From Titterstone, he was most surprised to have six

contacts, three of them to Walbury Hill! The first contact of the day was with G0HNW/P on Winter Hill and over an immediate obstruction to the north. Even then RS58 reports were exchanged both ways over the 135km path. The Walbury contacts, G3PYB/P, G8ACE/P and G8BKE/P were a different story! The path profile was horrendous and some computer work earlier in the week suggested the 139km path would not "go" under normal conditions. In the event it did go, on ssb with weak signals both ways! G3UYM/P on Broadway was easily worked at S9+ and the session at Titterstone finished with another contact that was thought impossible .... G4BRK was worked at his home location.

Peter's next stop was the Long Myndd in Shropshire. He operated for a couple of hours from **Robin Hood's Butts (IO82NN)** on the northern edge of the ridge. Easy RS59 contacts were made with G0HNW/P, G7MRF/P and G3UKV/P, the latter two being at Merryton Low Triangle (IO93AD51). An attempt to work G3LRP (home station near Wakefield, IO93HO08) was unsuccessful. Finally, Peter drove up to **Halkyn Mountain**, near Mold in N.E. Wale **(IO83JF82)**. From there he tried unsuccessfully again with G3LRP. Surprisingly, the path to G8IFT/P (Brown Clee, IO82QL) was also a failure. However, under the Rover" contest rule, G0HNW/P and G7MRF/P were worked again, bringing the tally for the day to eleven contacts. All in all this was a very satisfying day out on 24GHz and produced Peter's highest ever score for that band. It made the 400+miles of driving over that weekend very worthwhile.

The Rover Rule is an important feature of the Millimetre Bands contests. It allows an operator to move a linear 16km (10 miles) and make repeat contacts with stations already worked. The idea is to encourage lightweight, portable operation of the type we used to have on 10GHz before the days of 10 watts TWTs, four foot dishes and large batteries! Such light weight gear is still a reality on the millimetre wavebands. However, few people have actually taken advantage of the rule. Please use it! It makes for an interesting day out and explores paths that might otherwise never be tried. If you have your gear organised properly you can make quick stops, even at the roadside, make contacts and then move on again. It is often unnecessary to use a beam antenna on the 2 metre talkback link for these contacts as path lengths are much less than those now regularly achieved on 10GHz, where at least 50 watts to an 8 element yagi is probably the minimum required for reliable contacts over, say, 300km.

From: Harold Groves, G3UYM/P [harold.groves@ntlworld.com]

I operated /P from Broadway Hill IO92CA and made 9 contacts on **24GHz**, including, for me, a best ever DX contact with Paul, G0HNW/P on Winter Hill IO83RO. This was over a 182Km path and I was very pleased to break the 150Km barrier at long last!. The path to Merryton Low has always been difficult from Broadway but I had no problems this time working Martin, G3UKV/P. It looks like the Milliwave PAs were a good investment.

By the way, it is now necessary to obtain permission beforehand to operate from the Broadway site. 73 from Harold, G3UYM.

From: Neil, G4LDR(Wiltshire) [g4ldr@btinternet.com]

When I got up on Sunday morning I still had not built my 24GHz system. I still only had receive capability. I therefore set about building a transmit system. I had to mount the 600mW PA on a heat sink (two bits of copper WG16 clamped either side with a G clamp. I had to construct a 9V supply and arrange switching of the waveguide switch (a wire connected to the battery when I wanted to transmit). I soldered flanges onto the back of the dish I acquired last year and proceeded to mount all the component parts hanging from the dish feed. I had to move the DB6NT transverter from the output of the preamp to the input of the PA when I wanted to go from receive to transmit. I ended up just holding the flanges together (I could therefore go from RX to TX in a second or two). I packed everything up and left for Walbury Hill getting there just after mid-day.

My first contact was with G8ITF/P on Brown Clee (147 km) with a 52 report. I then proceeded to have contacts with five other stations G3UYM/P, G4BRK, G3PYB/P (who had moved to Lane End Winchester) G8BKE/P and G8ACE/P (both who had moved to the PMR site east of Walbury to work G3PYB on higher bands), all 59 reports. An attempt with G0HNW/P failed. I was relying on good talkback facilities of the others on Walbury so when then they left I only had a halo, I heard

G3PHO and G3LRP calling on 144MHz but could not attract their attention (I hadn't had the time to get ready anything better). I finished off the afternoon by joining G8ACE and G8BKE at the PMR site to see them complete qsos on 47GHz and 76GHz with G3PYB at Lane End.

I have now got to box the system up and build a second transverter (to drive the PA). Probably it will not work so well.

Editor's comment... since this report was written Neil has "killed" his Milliwave PA ! This unfortunately means he is now down to very low power again on 24GHz. Is there anyone out there who can help him get back to the 600mW level he was just beginning to enjoy? Some of you have not used your Milliwave PA since you received it over a year ago. Neil was actually using his! Hoarding microwave gear is something all of us are guilty of at sometime or other but just think how many other folk are unable to be active because they lack some essential component, something you may have had gathering dust for years!

From: Martyn Vincent, G3UKV , (Telford) [ukv@globalnet.co.uk]

For the Millimetre Bands Contest my first site was "Cheshire View" near Mow Cop (IO83VC) From there I worked G0HNW/P (Winter Hill) on 24GHz very easily. Martin, G7MRF, did likewise. He went on to have a 47GHz QSO, then he and Dave, G8VZT, tried 76GHz. There was no chance at first, with rain heavy on Winter Hill and drizzle with us too. The relative humidity was around 90%. Eventually both 76GHz stations worked each other, repeating the UK record QSO at the start of the year. Dave's, G8VZT, gear was down a few dBs ... he suspects local oscillator drive level.

We then all moved to Merryton Low Triangle from where we made five further QSOs on 24GHz. Two very obstructed ones were with G3LRP, Wakefield (39Km) at 5/3 reports (a good job we both had the half watt PAs) and also G3UYM/P on Broadway (124 Km). The air really dried out after lunch (to about 25 % humidity) and frantic QSB developed on this path. I also noticed GB3ZME (IO82SQ) went from a steady signal to a rapidily fluctuating signal, even though it appears to be a fully line-of-sight path.

Other 24GHz QSOs were with G3PHO/P (Robins Butts IO92NN), G8IFT/P on Brown Clee and G0HNW/P (a second QSO from Winter Hill).

MAY MULTIBAND MICROWAVE CONTEST WEEKEND

A few reports on the May Contest weekend have come in. The highlighted sections exemplify the problems mentioned elsewhere in this issue. Here's the first report ...

From: John, G3XDY, Ipswich (JO02OB) [g3xdy@btinternet.com]

Apart from the contest activity over the 4/5th May weekend, there's not much to report here. I managed to get on for most of the Saturday and a fair bit of Sunday morning, which was more than I expected to do. Conditions on Saturday were fairly average but improved on Sunday with some good DX on 23cm and a bit of rainscatter on 3cm.

23cm: 32 QSOs, with best DX DK2GR in JN59 (741km) worked on Sunday mid-morning with reasonable signals, also DL0GTH in JO50.

13cm: 20 QSOs with best DX DG1KJG (JO30). Some tests failed on 13cm but went on the higher bands, and signals were often weakest on 13cm out of the 4 bands.

9cm: 12 QSOs with DK2MN (JO32) as best DX. M6V (IO94) was a new square and put in a good signal here.

3cm: 20 QSOs with DK2MN (JO32) the best. Some rainscatter to PA on Sunday helped. Again M6V provided a new square.

I only had a short period beaming inland on Sunday so didn't make many QSOs with the stations just out for the microwave all band contest. After working G3ZME/P on 10GHz, we QSYd to 1.3GHz but I never heard them again. A test with G3FYX on 10GHz resulted in a just detectable signal but not strong enough for a QSO.

The lack of co-ordination of the events on this weekend needs to be sorted out. If the microwave events are going to stick to a 0900-2000 Sunday slot then they are probably better run on dates that don't coincide with the IARU coordinated contests, **perhaps they should be fully aligned with the French activity days** which are always on the last Sunday of the month. **73 from John, G3XDY.**

From: Andrew Talbot, G4JNT [G4JNT@thersgb.net]

I went along to Bell Hill, IO80UU59, with some members of the Flight Refuelling Club for the May 432 and up Contest. They were operating

432MHz and I took along 10GHz and some low power 3.4GHz equipment. Paul G7EYT also had a new 10GHz transverter operational. We had rather an eventful Saturday afternoon when firstly the 432MHz antenna mast fell down as it was being erected, losing one of the two quad loops and a section of scaffold. Then, a bit later, one generator wouldn't run properly and the other one was giving voltage surges (which blew my 12V PSU) before it failed completely. In spite of many repair attempts before the sun set, we had to abandon as it got dark - so no power other than our cars charging batteries. Fortunately another club member turned up with a 2kW generator at midnight so we could continue properly. Event damage total - 1 antenna, 1 mast, 2 diesel generators, one PSU.

The result was I only worked two stations during the Trophy on Saturday before turning in for the night. However, one of them was M6V (how can that be a proper callsign ?) at 409km - only 5km short of my best Dx on 10GHz ever, also from Bell Hill ! On Sunday I returned to work a total of 12 stations on 10GHz plus one on 3.4GHz, G8IFT/P, for my first QSO on that band. Must now build a proper transverter for 3.4 with the 30W PA acquired at Martlesham.

Paul, G7EYT, operated 10GHz from the site as well and, by tail ending, was able to pick up 10 stations, including M6V which was his first ever QSO on 10GHz. 409km - not a bad initiation to microwave operating !

We also had the 'official' opening of the GB3SC# repeater complex, but you'll get more about that later from G0API. 73 from Andy G4JNT

From: John wood G4EAT (Essex) [g4eat@yahoo.co.uk]

I came on as planned at 8pm Saturday. My 144.175MHz cq had three responses from contest stations, G4LIP/P, G4MAP/P and G8P. I worked all on 10GHz but heard no others.

On Sunday 5th May I worked M1CRO/P and G4LDR on 10GHz but failed for new squares with M6V (IO94), F1GHB/P (IN88) and G4ALY/P (IO70). I also failed with G4JNT/P. A beacon check showed 10GHz conditions to be slightly below normal. I tried my new 24GHz system with G8P and M1CRO/P but had no contacts so I will check antennas ready for next contest.

Regarding beacons .... From my 110m asl Essex location (JO01HR) I normally hear GB3MHX, GB3CMS, GB3SEE and GB3CCX all the time. Between two hours after sunset and two hours after sunrise, the signals are enhanced by several dB, probably due to temperature effects on K factor. GB3CCX is often the first indication of Rain Scatter and improves over the obstructed path by several dB. On the 22nd April I heard GB3SCX for the first time at 11.00GMT, at 539, shortly after Neil, G4BRK, heard it in IO91. I called G8BKE to give him telephone feedback on the steady tropo signal. Contrary to above, it was unusual to get good mid-day tropo.

From: John Hazell,G8ACE, [hazell@cwcom.net]

Late Saturday evening, I discovered another station was going to be on Walbury. However it transpired that was for Saturday not Sunday so it all worked out. At least I was alone. Activity to the north seemed zilch. I could hear people calling G3PHO/P but nothing was heard of him at Walbury. The wind was bitterly cold, the worst I have known up there. ... such a pity the weather forecasts are so u/s now. It was raining when I arrived yet the forecast was there could be some by evening!

I worked Brown Clee again (G3ZME/P this time) on 24GHz at 147km. I think so looks a repeatable path there.

I've just been talking to G3JHM and the conclusion is that 3 events on a Bank holiday w/e is just too much. The little activity we get is further diluted almost into non-existence.

From Martyn, G3UKV (Telford):

Conditions seemed flat on all bands, with no early morning lift either on Sunday morning. We **(G3ZME/P)** had a total of 12 ops and families from the club on the site - so there was quite good club support. We decided to go for the RSGB 432MHz-248 GHz option but also to send entries for the 10GHz Trophy and Microwave Committee fiasco (see letter, page 16).

Results:

1296MHz: 27 QSOs, 4593 points claimed. Best DX DF0HS/P at 616km. Last time we had about 44 QSOs, so activity was DOWN sharply. No early morning lift to continent - only 2 QSOs outside UK.

2320MHz: 10 QSOs, 1564 points claimed. Best DX G8P at 311km. No QSOs outside UK this time. Hard going.

3400MHz: 1 QSO ! S. B'ham lads on Shenlow at 90km. Where is the activity ?

5760MHz: 4 QSOs, 402 points claimed.. Also very hard going. Best DX G3LRP at 150km.

10368Mhz: 29 scoring QSOs, 3292 points claimed. Despite 4 attempts, with signals heard each time, with F6DKW near Paris, no QSO completed. So, no QSOs outside UK again. Best DX G8P at 311km in JO01QD. 4 of the QSOs used wideband - ATV, actually. It's VERY easy to get going with this mode.

24192MHz. Just 3 QSOs, for 322 points claimed. Best DX was with John G8ACE/P on Walbury at 147km. For once the extra PA output (0.6 watts) was worth while for this QSO.

Despite the ludicrous contest arrangements, we had a great weekend as a group. Weather was dry and fairly warm. The gear all worked 100%, except for the 10GHz TX which was intermittent until the case was opened up in the first hour, and we dived in with mini blowlamp and soldering iron and fixed it fine. We hope to get on for other all-band microwave contests this year.

My home station 3cm narrow band is now back on the mast . I'm looking out for any QSOs. 73 from Martyn, G3UKV/

MICROWAVE CONTESTS .. YOUR COMMENTS ARE INVITED ...

The weekend of 4/5th May had no less than three UK microwave contests! In addition there were various Continental European contests on, including a French 144MHz event. Mail coming in suggests there was much dissatisfaction with what was both a confusing and frustrating weekend. People had to make choices regarding which one (in most cases) of the available contests they should participate in. On at the same time were: The RSGB 432 and up VHF/UHF/SHF contest (1400z Saturday to 1400z Sunday), the RSGB 10GHz Trophy Contest (Saturday, 1400-2200z), the RSGB Microwave Committee All Bands Microwave Contest (Sunday 0900-2000z), plus a 70cm Trophy contest and various Eu contests.

Those who chose to operate in both the Saturday and Sunday contests found that several of the contest groups were not too happy with having to make repeat QSOs . They were, after all, out to enter only the RSGB 432 up event. Those of us who came on as single operator stations on Sunday found activity rapidly dropped off after 1400z, when the contest groups packed up and went home. Others, who had come on for just the 10GHz Trophy on Saturday, were not motivated to come on again on Sunday to work the same group of stations as the day before. All in all, this clash of contests tended to dilute activity rather than encourage it. Only 30 or so callsigns were heard on for the Sunday event and this included several French operators.

In a telephone conversation with the Microwave Committee Contest manager, it transpired that the 10GHz Trophy situation had not been resolved since last year and that a date for it had not been set in time for the deadline he had for the Committee contest calendar to be in to RSGB HQ for publication in RadCom. Such a clash should not occur in the future as the whole microwave contest structure is coming under close scrutinity at committee level during the coming months.

Meanwhile, it behoves all of us to feed views into the committee. We know this has all been done before but circumstances have changed regarding the nature of the 10GHz Trophy and your views are earnestly required again. **Please email or post them to Steve, G4KNZ, QTHR or to steve.davies@nokia.com and also to this newsletter if you wish.**

Here are some comments received so far:

From: G3MEH [g3meh@supanet.com]
Sent: 27 April 2002

We all have our individual interests and priorities in the hobby and I only speak for myself. Currently my main interest is in VHF/UHF contesting (50MHz to 2.3GHz) and I'm fairly active in RSGB contests. I'm interested in higher bands, especially 10GHz, but find that under microwave contest rules there are not separate entry sections for portables and fixed stations. I am interested in fixed station operation and having to accept the handicap of competing with portables is a major disincentive to me.

Other niggles are, firstly, that the 10GHz Trophy contest runs concurrently with the 432MHz Trophy contest which is a qualifier for the VHF Championship. Is there any reason why the 10GHz Trophy shouldn't run on the following day, Sunday (0900-2000 as for other microwave contests) so that we're not effectively forced to choose between the two? (I note from Jan. '02 RadCom that problem is under discussion so maybe it has been sorted?) Secondly, why are wideband bonuses awarded? Ten years ago I could have understood this, but those I know who are capable of the home construction/modification needed to take that route onto the microwave bands are interested in narrowband modes only. To me the current rules give the impression of encouragement to the use of old technology.

Maybe there are other readers of the Microwave Newsletter who are not yet active on 10GHz, etc. and would be willing to come forward and suggest changes they'd like to see which would encourage them to take the plunge?

Roger Piper, G3MEH

Another email from Roger added the following points to the one shown above:

I'm looking for a few changes by the microwave community which would, I believe, not disadvantage those already involved but which would encourage me, and others like me, onto microwaves and in a way which, in my case, would not clash unnecessarily with my VHF/UHF interests.

I have a QTH which is relatively good by VHF/UHF/microwave fixed station standards but in no way can I compete, on an otherwise level playing field, with well located portable stations. One solution could be to change the sections in microwave contests to two, single operator fixed and open (all others), with a certificate awarded in each of the two sections to the leading (exclusively?) w/b entrant and the leading QRP entrant. So there would be just two sections, each with two integrated sub-sections.

Whatever happens, it's important to me and I'm sure others like me, that the 10GHz Trophy contest shouldn't continue to clash with the 432MHz Trophy contest. 73 Roger Piper, G3MEH

TELFORD & DISTRICT AMATEUR RADIO SOCIETY

Dear RSGB Microwave Committee,

All Band Microwave Contest - 5 May 2002

This time you've really done it - perhaps 'jobs for the boys' in Brussels could get a tip or two from the crazy world of 4/5 May 2002. Not only did we have four microwave contests running last weekend, but we had a mish-mash of start and finish times, different bands and different scoring rules.

Just to make the point, I've enclosed the TDARS club entry for the RSGB Microwave Committee's "All Band Microwave Contest", with all the contacts that weekend prior to 09:00 hours on Sunday morning deleted in red pen. Also by 14:00 hrs we had had enough and packed up to go home - thus no QSOs for the last 6 hours.

Our entry for the RSGB 432MHz -248GHz has been sent in separately (14:00 Sat until 14:00 Sun), and we operated for that whole period reasonably successfully. The 10GHz Trophy entry has also been submitted separately, with just a different scoring system to keep us on our toes ... at least the times tied up sensibly.

What a carry on !!

I'm sure every other microwave contestant has echoed these sentiments, so I won't labour the point. A few choice comments certainly flew over the airwaves last weekend ! None were complimentary.

Now .... for 2003 ....

1) 10GHz Trophy. Go back to the formula trialled in 2001 (but ruined by F & M) of using the overall winner of the 10GHz Cumulative contests to be declared the 10GHz Trophy winner.

2) Drop the May All Band Microwave Contest from the calendar altogether. Leave it to the RSGB 432MHz-248GHz contest, linked with IARU Societies microwave event, which I believe runs at the same time (although I can't recall any published details to encourage UK entries...)

3) Make the Microwave Committee's contests all part of the RSGB VHF Contest Committee's set-up. Presumably last weekend's mess resulted from your committee not liaising properly with the main RSGB Contest Committee. Surely they would welcome you setting the rules, even probably collating and adjudicating the results - but not "doing your own thing" quite independently. One wonders if all the Committee actually belong to the RSGB ??

However, in one area I do support your separate rules, with respect to RSGB Membership which should not be a requirement of entering any RSGB contest, but especially microwave ones where activity at the best of times is a bit thin on the ground. The days of 'Nanny knows best', and 'If you don't play my way, I'll take my ball home' should now be gone ! Should not this be Tony Blair's "inclusion" philosophy applied to our hobby ?

I shall follow any comments, correspondence, etc in either Radcom or the RSGB Microwave Newsletter with interest.

Over to you.

73,

Martyn Vincent G3UKV
(o/b/o Telford & DARS)

DUE TO LACK OF SPACE WE HAVE HAD TO HOLD THE MICROWAVE OPERATING LADDER AND TABLES OVER UNTIL NEXT MONTH ....