

R&TTE Questionnaire Notes

QMF17m¹ Issue 01

- 1) Name of Applicant, persons/company applying for R&TTE tests
- 2) Brand Name/Manufacturer, Manufacturer of Equipment Under Test (If different from applicant)
- 3) Model number of the product, if prototype please state proposed model number identification
- 4) Serial Number of the equipment that will be provided as a test sample - "Equipment Under Test" (EUT)
- 5) Description/ Functions, **e.g. MP3 FM transmitter for in car use**
- 6) Size of the EUT, if cylindrical state diameter, if EUT is a system please state size of each different unit used
- 7) The normal use position, **e.g. handheld microphone for professional use in theatres**. For testing purposes we need to position the equipment as close as possible to its normal orientation, perhaps requiring a non-conductive stand or other suitable means.
- 8) Health & safety risks. **e.g. not yet safety tested, high RF power emitted, harmful substances used / generated in EUT, ionising radiation, high intensity light, etc**
- 9) The EUT must be measured for frequency stability and sometimes other parameters at the extremes of temperature that the EUT is capable of operating in. **e.g. -10°C to +55°C**
- 10) State the nominal maximum and minimum working voltage range, and maximum current consumed. State if battery powered and which type of battery is used. **e.g. 12V DC 300mA, 10V Min, 15V max, Lithium ION battery**. Max & min voltages are required to perform certain tests at extremes of voltage that the equipment may encounter.
- 11) Sometimes when integral antennas are used there are still internal RF ports provided for test purposes. These ports if available allow conducted measurements to be performed which is the preferred method.
- 12) Dependant on the type of antenna used, different test methods apply. Integral antennas are usually built into the equipment. Separate antennas are attached to a dedicated RF port, samples of each antenna intended should be provided.
- 13) **Radiated emissions testing requires the EUT's electrical connections to be fully populated as emissions often radiate out of the cables.** Listing the EUT's ports, providing leads and relevant terminations allows us to progress faster with maximising emissions from the EUT. **e.g. audio input lead, 3 pin XLR connector, 2metres long 600 Ohm termination.**
- 14) For equipment that may be tuned over a frequency range the number of units tested and test frequencies used will depend upon this information a) without changing hardware means components like filters are not changed. e.g. helical filters may need changing every 10MHz from 400 - 470MHz to achieve correct operation. b) entire product family means all possible frequencies covered by all different hardware / software configurations.
- 15) If EUT's operate over a number of frequencies then it is essential that a method of changing frequency is provided before test. Testing is performed on at least the middle frequency, usually 3 frequencies (top, middle and bottom of the range), but sometimes more. **e.g. 30 channels.**
- 16) If the EUT operates over several consecutive frequencies, this is the frequency separation between adjacent channels. Note some equipment may have a choice of spacings in which case list all **e.g. 12.5kHz, 25kHz, 200kHz, 10MHz etc**
- 17) Signal Bandwidth. This is the necessary bandwidth for the modulated signal, usually expressed as the 99% occupied bandwidth of from the space between the 6dB or 20dB points on the spectrum envelope. Note this should be less than the channel spacing. It will also be dependent upon the amount of information sent and the modulation scheme used. Please list for each possible combination. **e.g. 147kHz** (for 200kHz spacing EUT)
Amount of traffic carried. **The information sent in the above bandwidth. Please list for each possible combination. e.g. analogue voice, 9600 Baud or 4Mbit/s.**
- 18) The maximum obtainable output power the EUT can produce. **e.g. +30dBm** conducted at RF port or **1W E.R.P** (Effective Radiated Power) from integral or dedicated (fixed) antenna.
- 19) Some specifications require testing at maximum and minimum power settings if user accessible/adjustable. If this is possible please state how output power is changed/selected and details of all steps / continuously variable. **e.g. 250mW minimum, 1W maximum single step, set by dip switch.**
- 20) Modulation schemes. Where spread spectrum or similar access protocol state the underlying modulation as well. **e.g. 2FSK, 64QAM, GMSK, COFDM of a QPSK signal.**
- 21) What signal is applied to the EUT input for correct operation. **e.g. 1kHz audio tone, 9600Baud data signal, 16QAM video signal.** Other sequence - The applied data should provide for a repeatable and maximum measurement of the RF bandwidth.

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22) Disabling modulation. To ensure more accurate results, quicker test times & to fulfil the requirements of some specifications, a method of disabling the modulation is required. This may require modification of the EUT software and/or hardware.

23) Duty Cycle. This is usually a manufacturer declaration and not necessarily required to be measured. For event driven devices a description of the EUT's typical Transmit/Receive pattern is required in order to calculate the duty cycle. Note: for test purposes it is necessary to key up the transmitter into a continuous transmission, and/or the receiver into a continuous receive mode. This allows many of the tests to be performed faster, easier and with greater accuracy, hence reducing total test time. **e.g. Garage door opener ON time 10ms repeated 5 times in 1 second. On average used four times a day.**

24) Audio Devices. Some specifications require input and output Audio levels and thresholds to be stated and used for certain tests. Maximum and nominal deviations are also required in the same manner as is any FM Pre-emphasis and DE-emphasis filtering applied within the EUTs modulating circuits. **e.g. RX audio input level = -10dBV, +/- 75kHz Max Deviation, 75uS De-emphasis.**

25) Listing all image, Local oscillator, clock and any other frequencies used or generated within the EUT is a requirement of some standards and also ensures ease of test when searching for spurious emissions and responses. They also allow correct interpretation of the testing range required as some specifications call for testing from, say, the lowest frequency to the 10th harmonic of highest frequency internally generated or used. e.g. 6MHz, 8MHz, 10MHz crystals, 21.4MHz & 455KHz Image Frequencies, 400-430MHz TX frequency, 421.4-451.4MHz local oscillator frequencies, 1.6GHz CPU etc

26) Disabling mute/squelch. To fulfil the requirements of some specifications, e.g PMR radio specs, a method of disabling the mute/squelch is required to perform certain tests. This can be done by modification of software and/or hardware. **e.g. change setting of DIP switches DP3 from 0010 to 0000.**