



Appendix M – Glossary of terms

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DAB Subcommittee Evaluation of the iBiquity Digital Corporation IBOC System		
Part 1 – FM IBOC		

ACR-MOS – Absolute Category Rating Mean Opinion Score. A methodology for subjectively testing audio quality where participants are presented with sound samples, one at a time, and are asked to grade them on a 5 point scale. For the NRSC FM IBOC tests, the MOS scale used was 5=Excellent, 4=Good, 3=Fair, 2=Poor, 1=Bad.

After Market – A radio designed for purchase and installation some time after purchasing an automobile.

All-digital IBOC – The third of three modes in the iBiquity FM IBOC system that increases data capacity by adding additional digital carriers. All-digital IBOC uses four frequency partitions and no analog carrier. In this mode, digital audio data rate can range from 64 kbps to 96 kbps, and the corresponding ancillary data rate will range from 213 kbps for 64 kbps audio to 181 kbps for 96 kbps audio.

ATTC – The Advance Television Technology Center, the prime lab test contractor for the FM IBOC tests.

AWGN – Additive White Gaussian Noise, also known as white noise, which contains equal energy per frequency across the spectrum of the noise employed. In the context of the FM IBOC system tests, AWGN at radio frequencies was utilized in the laboratory tests to simulate the background noise present in the FM spectrum, which affects the quality of radio reception.

Blend to Analog – The point at which the BLER of an FM IBOC receiver falls below some predefined threshold and the digital audio is faded out while simultaneously the analog audio is faded in. This prevents the received audio from simply muting when the digital signal is lost. The receiver audio will also “blend to digital” upon re-acquisition of the digital signal.

Blend to Mono – The process of progressively attenuating the L-R component of a stereo decoded signal as the received RF signal decreases. The net result is a lowering of audible noise.

BLER – Block Error Rate. A ratio of the number of data blocks received with at least one un-correctable bit to the number of blocks received.

Compatibility – When one system has little to no negative impact on another system, it can generally be considered compatible. In the case of this report, compatibility testing has been performed to determine the extent to which the addition of an FM IBOC signal will impact current analog performance.

DAB – Digital Audio Broadcasting.

D/U – Ratio of Desired to Undesired signals (usually expressed in dB).

EWG – Evaluation Working Group of the NRSC DAB Subcommittee

Extended-hybrid IBOC – The second of three modes in the iBiquity FM IBOC system that increases data capacity by adding additional carriers closer to the analog host signal. Extended-hybrid IBOC mode adds two frequency partitions around the analog carrier. In this mode, digital audio data rate can range from 64 kbps to 96 kbps, and the corresponding ancillary data rate will range from 83 kbps for 64 kbps audio to 51 kbps for 96 kbps audio.

Hybrid IBOC – The first of three modes in the iBiquity FM IBOC system that increases data capacity by adding additional carriers closer to the analog host signal. Hybrid IBOC mode adds one frequency

partition around the analog carrier and is characterized by the highest possible digital and analog audio quality with a limited amount of ancillary data available to the broadcaster. Digital audio data rate can range from 64 kbps to 96 kbps, and the corresponding ancillary data rate will range from 33 kbps for 64 kbps audio to 1 kbps for 96 kbps audio.

IBOC – In-Band/On-Channel system of digital radio where the digital signals are placed within the current AM and FM bands and within the FCC-assigned channel of a radio station.

Longley-Rice – A model used to predict the long-term median transmission loss over irregular terrain that is applied to predicting signal strength at one or more locations. Longley-Rice computations are employed both by the FCC allocations rules for FM stations to predict signal strength contours and by propagation modeling software to predict signal strengths in a two-dimensional grid on a map. The FCC implementation of Longley-Rice computations employs average terrain computations and an assumed 30-foot receive antenna height. The propagation modeling plots in this report implement Longley-Rice computations with actual terrain data and an assumed receive antenna height of 7 feet.

MPEG-2 AAC – Advanced Audio Coder, a high-quality, low bit rate perceptual audio coding system developed jointly by AT&T, Dolby Laboratories, Fraunhofer IIG, and Sony.

Multipath – An RF reception condition in which a radio signal arriving at a receiving antenna arrives by multiple paths due to reflections of the signal off of various surfaces in the environment. By traveling different distances to the receiver, the reflections arrive with different time delays and signal strengths. When multipath conditions are great enough, analog reception of FM radio broadcasts is affected in a variety of ways, including “stop-light fades,” “picket fencing,” and distortion of the received audio.

NRSC – National Radio Systems Committee, a technical standards setting body of the radio broadcasting industry, co-sponsored by the Consumer Electronics Association (CEA) and the National Association of Broadcasters (NAB).

Objective Testing – Using test equipment to directly measure the performance of a system under test. For example, the power output of a transmitter can be objectively measured using a wattmeter.

OEM – Original Equipment Manufacturer. Generally describes the “factory” radio installed in a car before purchase.

PAC – A flexible high-quality perceptual audio coding system originally developed by Lucent Technologies and later refined by iBiquity. The system can operate over a wide range of bit rates and is capable of supporting multichannel audio.

Perceptual Audio Coding – Also known as audio compression or audio bit rate reduction, this is the process of representing an audio signal with fewer bits while still preserving audio quality. The coding schemes are based on the perceptual characteristics of the human ear. Some examples of these coders are PAC, AAC, MPEG-2, and AC-3.

Protected Contour – A contour is a representation of the theoretical signal strength of a radio station that appears on a map as a closed polygon surrounding the station’s transmitter site. The FCC defines a particular signal strength contour, such as 60 dBuV/m for certain classes of station, as the Protected Contour. In allocating the facilities of other radio stations, the Protected Contour of an existing station may not be overlapped by certain interfering contours of the other stations. The Protected Contour coarsely represents the primary coverage area of a station, within which there is little likelihood that the signals of another station will cause interference with its reception.

RBDS – Radio Broadcast Data System, fully encapsulates the RDS system described below and adds additional features specific to North America such as Emergency Alert System (EAS) and Modified Mobile Broadcast Service (MMBS), a commercial nation-wide paging system.

RDS – Radio Data System, the RDS signal is a low bit rate data stream transmitted on the 57 kHz subcarrier of an FM radio signal. Radio listeners know RDS mostly through its ability to permit RDS radios to display call letters and search for stations based on their programming format. Special traffic announcements can be transmitted to RDS radios, as well as emergency alerts.

SDARS – Satellite Digital Audio Radio Service, describes satellite-delivered digital audio systems such as those from XM Radio and Sirius. The digital audio data rate in these systems is specified as being 64 kbps.

Subjective Testing – Using human subjects to judge the performance of a system. Subjective testing is especially useful when testing systems that include components such as perceptual audio coders. Traditional audio measurement techniques, such as signal-to-noise and distortion measurements, are often not compatible with way perceptual audio coders work and cannot characterize their performance in a manner that can be compared with other coders, or with traditional analog systems.

WQP – Weighted Quasi Peak,