

**Technical Statement
Request for Program Test Authority
KMMW-LD, Channel 14, Stockton, CA
NBC Telemundo License LLC
Construction Permit in File Number 0000105750
Facility ID 18744**

Introduction

Station KMMW-LD ("KMMW") was granted a Construction Permit to move to Channel 14 after its displacement in the aftermath of the Post-Incentive Auction Spectrum Repack. The Construction Permit is in File Number 0000105750, for Facility ID 18744, at a site overlooking Stockton, CA, known as Bear Mountain, approximately 52 km east-northeast of Stockton. Its principle operating parameters are 5.9 kW ERP, using a narrow cardioid directional antenna with its main lobe at a bearing of 226 degrees True and at a radiation center height of 96.3 m above ground level and 930.8 m above mean sea level.

In the KMMW-LD Channel 14 Construction Permit, there is a Special Condition that reads as follows:

During equipment tests the permittee shall take adequate measures to identify and eliminate objectionable interference that may be caused to existing land mobile radio facilities in the 460 – 470 MHz band authorized prior to the date this construction permit is issued. Documentation that objectionable interference will not be caused to existing land mobile radio facilities shall be submitted along with the application for license (FCC Form 347). Program test authority will not be granted without this showing. Operation will not begin until the Commission specifically grants the program test authority. Further, the Commission reserves the right to require television translator and low power television stations to go off the air until interference problems are resolved. See subsections 74.703 (e) and (f) of the Commission's Rules.

The information contained in this Technical Statement, along with the duTreil, Lundin, and Rackley (DLR) report also attached to the current application, is that needed to satisfy the requirements of the Special Condition with respect to identification and elimination of objectionable interference to Land Mobile Radio (LMR) facilities in the 460 – 470 MHz band.

Steps Taken

Three principal matters are well known to have to be successfully addressed if the outcome of broadcasting on Channel 14 with no interference to nearby LMR operations is to be achieved. Those three matters are the performance of broadcast transmission systems, the performance of LMR receiving systems, and the generation of Passive Intermodulation (PIM) anywhere between broadcast transmitters and LMR receivers. Broadcast transmission systems require careful output (i.e., spectrum mask) filter design in combination with transmitters having high-performance with respect to their out-of-band noise generation. Depending on received signal levels, LMR receivers might require evaluation for adequate selectivity to “tune out” the Channel 14 signal power, along with adequate linearity of any amplifiers used to avoid generating intermodulation products in the receiving systems. If interference still occurred after broadcast transmitters and LMR receivers were addressed, the environment might require inspection to look for potential PIM generators and probing in several forms to determine whether PIM generation was present, where, and to what extent.

The first area, the transmission system, normally is addressed as part of a design process prior to the Channel 14 system being available for testing. The last area, possible PIM generation, can be partially evaluated before a Channel 14 transmitter is available for testing if another UHF broadcast transmitter is in service at the same transmitter site but only could be conclusively analyzed when the Channel 14 signal was broadcast over the air for testing purposes. (In the KMMW-LD case, given the small number of potentially impacted LMR receivers and with the intention to reduce time and costs, it was elected not to pursue PIM testing with the one UHF broadcast transmitter on another channel that is in operation at the Bear Mountain site.) The receivers, as a practical and cost matter, could be tested only after the Channel 14 signal was being transmitted. Consequently, the three areas were prioritized to put the KMMW-LD transmitter design first, followed by evaluation of reception, leaving possible evaluation of PIM generation for last, should it prove to be needed. The latter two items both would be evaluated after the Channel 14 transmitter had been constructed and could be turned on. At the same time, it was recognized that contact with LMR operators would be necessary and that they should be identified and contacted as early in the process as reasonable.

To initiate the processes both of identifying and making contact with LMR operators who might receive interference from KMMW-LD and also to inform the design of the KMMW-LD transmission system, particularly its antenna selection and mask filter design, KMMW-LD engaged duTreil, Lundin, and Rackley, Inc., consulting engineers (DLR). DLR’s first task was to conduct a search of the FCC’s master frequency database to identify fixed LMR operations within 80 km of the Bear Mountain transmitter site with receivers operating in the 465 – 470 MHz portion of the 460 – 470 MHz band that KMMW-LD was required to protect. The 465 – 470 MHz sub-band was chosen because that is where fixed receivers intended to receive weak signals from mobile and handheld transmitters are tuned and would be most susceptible to Channel 14 interference. DLR’s second task was to analyze the locations and frequencies of the selected LMR receiving operations to determine the transmitter spectrum mask characteristics that would be required to protect those receivers from Channel 14 interference from KMMW-LD. Since LMR receivers are not licensed, DLR used the paired, licensed transmit frequencies in the 460 – 465 MHz

band to identify relevant sites and frequencies, making the assumption that receiving antenna performance would be comparable to that of the transmitting antennas at the same sites.

The DLR database extraction yielded over 2,600 records to be studied. Of those, eight were located at the Bear Mountain site, the next closest was 8 km distant, and most were 10 or more km away. Of the records for facilities at the Bear Mountain site, 3 belonged to one licensee, two belonged to a second licensee, and three other licensees each had one record associated with the site. All the records covered operation on multiple frequencies. It was determined by DLR that, if the LMR receive facilities at Bear Mountain could be protected from interference, then it safely could be assumed that all other facilities within the search distance also would be protected. Aerial photography was used to identify the likely locations of the LMR receive facilities at Bear Mountain relative to the KMMW-LD transmitting antenna. Geometries of the location relationships of the LMR receiving antennas and the KMMW transmitting antenna were studied and, as an outcome, a KMMW-LD antenna design having a reduced field at depression angles toward the LMR receiving antennas was recommended to reduce coupling between the respective antennas. Cross-polarization between the KMMW and LMR antennas through use of only horizontal polarization in the KMMW antenna also was assumed. A copy of the full DLR report is attached to the KMMW-LD License to Cover application along with this Technical Statement.

In addition to minimizing the coupling between antennas, the DLR studies included a link budget to each of the LMR receivers within 1 km of the KMMW-LD transmitting antenna. The link budget was used to determine the suppression of sideband noise radiated in the LMR spectrum that would be required to reduce the field strength of the KMMW-LD signal so as not to cause impermissible interference. The link budget studies used as an interference threshold a field strength value of 17 dB μ V/m in a 30 kHz bandwidth in the LMR spectrum, as specified in §73.687(e)(4)(ii) of the FCC rules. (See page 10 of the DLR report for suppression requirements across the LMR spectrum.) To meet the suppression requirements determined in the DLR studies, a combination mask and bandstop filter was installed in the output of the KMMW-LD transmitter. Its attenuation characteristics are shown in Figure 1 below. It should be noted that the DLR studies were based on an ERP of 15 kW, while the KMMW-LD Construction Permit, as discussed in more detail below, ultimately specified an ERP of 5.9 kW, providing 4 dB additional margin at the suppression values DLR found to be necessary at 15 kW.

The KMMW-LD Construction Permit initially included an ERP of 15 kW at a Radiation Center Height Above Ground Level (RC-AGL) of 75.7 m in its Displacement application in File Number 0000054670. In a modification of the Construction Permit granted based on that application, KMMW-LD sought to increase its antenna height and reduce its ERP as a result of two factors: First, the antenna aperture originally requested no longer was available and a move up to an open space on the tower was required, and second, the licensee of a full-service station had decided to move its transmitter closer to the KMMW-LD facility at Bear Mountain, resulting in increased predicted interference to that station and forcing KMMW-LD to give way by reducing power to avoid causing impermissible new interference to the full-service facility. A consequence of these changes was the added margin with respect to required transmitter noise suppression in the KMMW-LD transmitter output in the LMR band below Channel 14.

The KMMW-LD facility construction was completed in mid-June, 2020. Shortly thereafter, outreach was undertaken to all the LMR operators with facilities at the Bear Mountain site, in accordance with the

determinations resulting from the DLR analyses. Cooperative testing was offered with KMMW-LD operation on Channel 14 at known times and with the ability to turn it on and off on request to help in

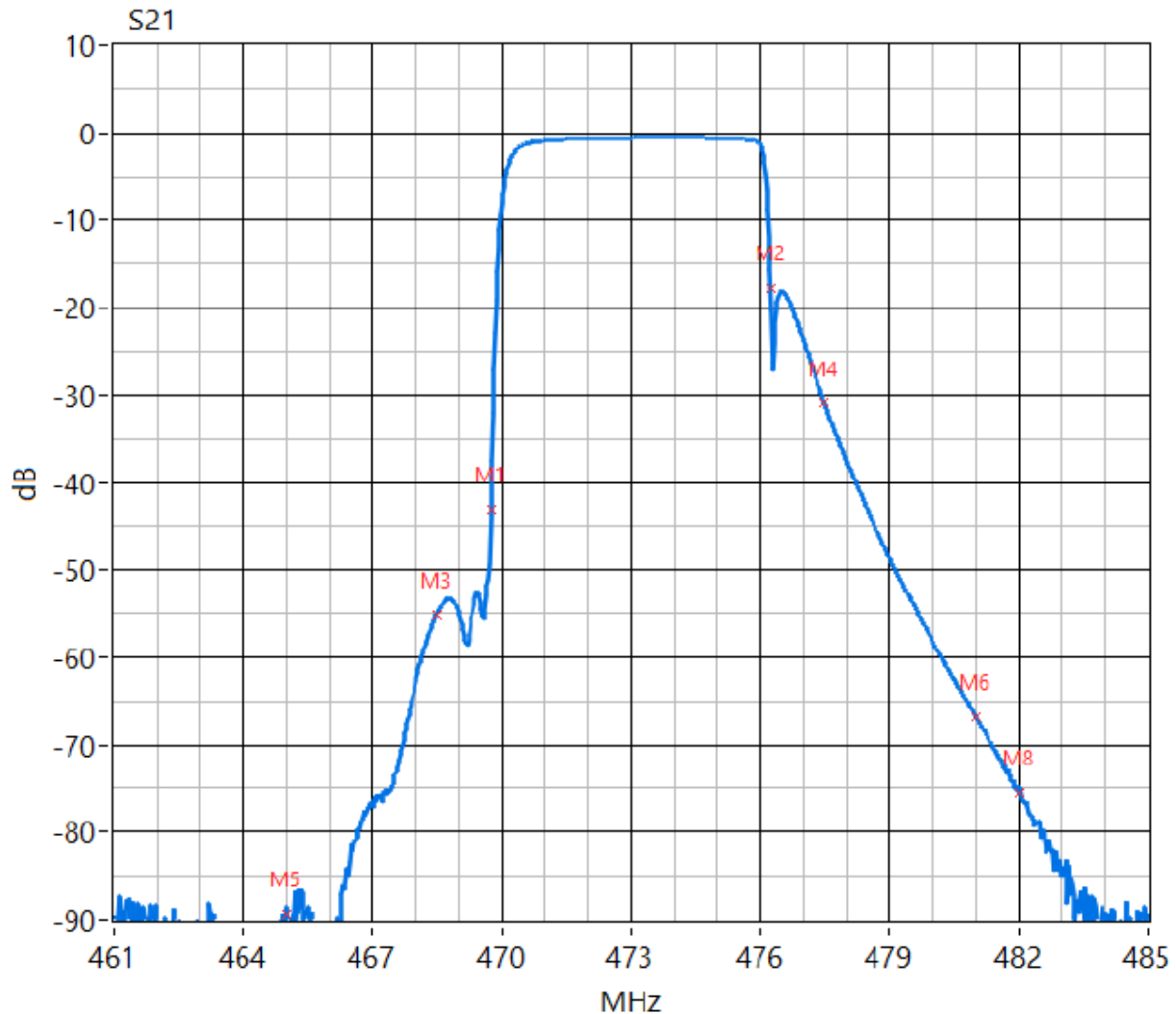


Figure 1 – Attenuation Characteristics of Combined Mask & Bandstop Filter at Output of KMMW-LD Transmitter

identifying the source of any interference that might be received. The offer included funding the cost of testing on the part of LMR operators so that there would be no financial burden on them for conducting the necessary testing.

Testing

There were five LMR licensees invited to participate in the testing program. One quickly indicated that it was not receiving interference at its Bear Mountain facility and consequently was not concerned about interference occurring elsewhere. The others, while not experiencing interference at their Bear Mountain operations, nonetheless desired also to confirm that no interference was received at their other locations, some of which were tens of km distant from Bear Mountain. Strangely, when they started checking for interference, they found it, and it was strong. Even more strangely, it was there

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even when KMMW-LD was not on the air. After considerable investigation, it turned out that there was another Channel 14 station in a nearby city that had gone on the air without contacting the LMR licensees or testing with them. So, they were unaware of its existence and operation. More significant for KMMW, however, was the fact that the other station had not installed an output filter on its transmitter that sufficiently reduced its emissions, leading to widespread interference to LMR reception at several fixed location facilities. Because the other station had not contacted the LMR operators, the operators assumed the interference they were experiencing was coming from KMMW, as it was the only new Channel 14 station to contact them and about which they knew. Somehow the other station had applied for its license, and it had been granted, without the required effort to identify and eliminate LMR interference as required by the Special Condition in its Construction Permit – the same Special Condition that KMMW is addressing with this documentation.

There was no cooperation between the other Channel 14 station and the LMR operators until it was determined that the other station was operating on Channel 14. Once that discovery was made, the other station did turn off its transmitter long enough to determine that it was the source of the interference, but it kept broadcasting on Channel 14. As a result, it took until early September and the involvement of the consulting engineer who had prepared the displacement application for the other station to get their attention and learn of their status. An output filter modification for the station's transmitter was on order. Since they had a license in hand, though, they would not go off the air and were not very cooperative about turning off their transmitter to help in identifying the source of the interference that the LMR operators were experiencing. The impact on KMMW was that it could not independently determine whether it was contributing any interference to LMR reception. Whatever interference might have existed was masked by the interference from the other station. Thus, KMMW has been stymied since mid-June in its ability to complete its testing with the LMR operators and to apply for Program Test Authority and its License to Cover its Construction Permit.

The other Channel 14 station installed its modified output filter at the beginning of the third week of September. Tests thereafter showed that the interference from the other Channel 14 had been mitigated, if not eliminated, by its installation of the transmitter output filter modification. When KMMW asked the LMR operators for testing to confirm that they were receiving no interference from its operation on Channel 14, some of the LMR licensees wanted to check their receiving sites throughout the region. Due to the wildfires in large portions of California, it took several weeks to get those tests made. In the end, all but one of the LMR operators indicated no problems. The one complained of interference, but the description it gave of the interference and the spectrum plots from an LMR service monitor did not comport with interference from a broadband, digitally modulated signal. After this was pointed out to the LMR licensee, it indicated that it was interference-free.

In summary, all the potentially impacted Land Mobile Radio operators within the region in which KMMW-LD could plausibly cause interference to them now have reported that they are not receiving any interference. None of the interference they did receive ever was from KMMW-LD. It was from the other station in the region operating on Channel 14 without proper transmitter output filtering. The interference was mistakenly associated by the LMR licensees with KMMW-LD because it was the only

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new Channel 14 operation to identify itself to the LMR operators, all of which now have indicated that they are receiving no interference from the station.

Request for Program Test Authority

From the time of the assignment of its station KMMW-LD to Channel 14, NBC Telemundo License LLC has worked proactively, in good faith, to take all the steps necessary to identify potential and real interference to Land Mobile Radio licensees and their operations in the 460 – 470 MHz band in the region around its transmitter site at Bear Mountain. As shown in this Technical Statement, it has developed technical solutions to each of the conditions at its transmitter that could cause interference from its Channel 14 operations to LMR receiving operations near its site. It has conducted testing with all those LMR licensees who agreed to participate, and it has provided numerous opportunities for such participation. In each case, KMMW-LD has provided the equipment, installation, and testing to demonstrate that any interference to LMR operations that could be caused by its operations on Channel 14 is now nonexistent. Indeed, any interference associated with it by others never did exist.

NBC Telemundo License LLC notes that some LMR licensees have declined to participate in joint facility testing. The fact that such LMR licensees have either failed or declined to participate in testing so that any possible cases of interference that might develop involving them could be proactively eliminated should not, however, be held against KMMW. Rather, it should be recognized by the FCC that the next step – KMMW beginning broadcast operations on Channel 14 – is a necessary one in the process of identifying all cases of interference and eliminating them. NBC Telemundo License LLC and its Station KMMW-LD recognize their responsibility to continue addressing any cases of interference brought to their attention by Incumbent LMR operators after KMMW-LD begins providing service on Channel 14.

For all the reasons stated and explained herein, it now is in the public interest for the FCC to grant Program Test Authority to KMMW-LD in conjunction with grant of a license for the station's move to Channel 14, as it has satisfied the Special Condition contained in its Construction Permit. Such a grant is hereby requested.