



NMB Technologies Corporation
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Narrative Statement Describing Facilities for
Experimental License Application File #0108-EX-PN-2017
Correspondence Reference Number 40482
Under FCC Rules Part 5 Subpart E

Prepared For

Douglas Young
Federal Communications Commission
Office of Engineering and Technology
Electromagnetic Compatibility Division
Experimental Licensing Branch
445 12th Street SW
Washington, DC 20554

February 12, 2018

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Re: FCC Experimental Licensing System Application File #0108-EX-PN-2017;
Correspondence Reference Number 40482; and
FCC CORES Registration Number 0026995456

Dear Mr. Young,

The following is a Narrative Statement in response to Correspondence Reference Number 40482, to describe the facilities to be used for experiments and the eligibility criteria under Part 5 Subpart E of the FCC Rules for NMB Technologies Corporation's FCC Experimental Licensing System Application File #0108-EX-PN-2017.

Introduction

The facilities are located at 28690 Haas Road, Wixom, MI 48393 (approx. 42.52°N, 83.52°W). The property consists of one building (conference room, equipment control room, restroom facilities, break room, and attached 2-bay garage / workshop / storage space); a 6-meter tall triangular-constructed aluminum tower next to the building for mounting transmitting antennas, with a positioner to change antenna polarization (named as "Far-Field" or "FF Tower"); a 9-meter diameter steel-plate turntable 60 meters away from the building capable of supporting vehicles weighing up to 20,000 pounds, and able to be rotated through 360 degrees in azimuth; and a gantry arm / arch system for mounting transmitting antennas able to be rotated through 180 degrees in elevation from 0 degree (zenith, at a variable height of 6 to 8 meters above the site ground, depending on the type of vehicle being tested and antenna placement) to +/-90 degrees (horizon) on either side of the turntable diameter (named as "Near-Field" or "NF Gantry" or "Arch").

Business Background

Until July 31, 2017, the facilities were operated under the business name Mitsumi Electronics Corporation, as a US division of Mitsumi Electric Co., Ltd. headquartered in Japan. In December 2015, Mitsumi Electric Co., Ltd. and Minebea Co., Ltd. (another company with headquarters in Japan) began discussions for business integration. Discussions continued through 2016, and in January 2017 the two companies merged operations in Japan under the name MinebeaMitsumi. As of August 1, 2017, the US-based operations Mitsumi Electronics Corporation and NMB Technologies Corporation (a division of Minebea) were merged under the NMB Technologies Corporation business name.

Facilities Description Details

The facilities located at 28690 Haas Road, Wixom, MI 48393 (referred to hereafter as “NMBTC test site”) were constructed in 2007-2008 as a location to support the development of antennas for automotive (OEM, Tier 1 supplier, Tier 2 supplier, etc.) and aftermarket use in the following general broadcast frequency bands:

- AM/FM
- VHF and UHF television
- Cellular telephone (North America and other areas; 3G, 4G, LTE, LTE-A, etc.)
- Satellite navigation (GPS, GNSS, etc.)
- Digital Audio Broadcast (DAB)
- SDARS (SiriusXM)
- 2.4 GHz Wi-Fi and Bluetooth
- 5 GHz Wi-Fi
- DSRC
- others as determined by project teams

The NMBTC test site supports measurements in the frequency range of 50 MHz to 8.5 GHz with over-the-air broadcasts and laboratory-generated RF signals as required by internal project teams and external customers. Measurements at frequencies below 50 MHz (such as AM, European long-wave or medium-wave, etc.) are supported only via over-the-air broadcast signals, if available. Laboratory-generated RF signals are used as single-frequency CW signals (meaning there is no modulation used, no program information or content provided, etc.), as part of a stepwise sweep in a frequency range of interest, on an intermittent basis (i.e. not on a continuously-broadcasting signal).

The NMBTC test site provides antenna measurement data on full-scale vehicles weighing up to 20,000 pounds with an antenna under test (AUT) mounted in various locations around the vehicle; or antenna measurement data for an AUT at the component level, with or without a ground plane. The measurement data are provided as test reports with graphical plots of radiation patterns and tables of performance information such as average gain, maximum-to-minimum ratio, standard deviation, etc.; data are also available as files of measured dB values for customers to examine with their own methods of analysis.

AUT data are measured using various test equipment (network analyzers, amplifiers, other antennas, positioning equipment, etc.) as part of an integrated measurement system assembled by OrbitFR. A partial list of equipment in use is provided later in this document.

The NMBTC test site was developed as an antenna test facility to evaluate performance characteristics of various antenna assemblies for the frequency bands listed above, but primarily for evaluation of antennas used with the SiriusXM broadcast service. As part of the development process, in 2009 the test site acquired SiriusXM certification as a recognized facility for the measurement of passive antennas at the component level and at the vehicle level for submission to SiriusXM under their Type Approval process.

See the end of this document for additional information, images, etc.

Eligibility Criteria Under FCC Part 5 Subpart E

Eligibility criteria for the NMBTC test site are listed below, as outlined by section number under FCC Part 5 Subpart E, Program Experimental Radio licenses.

§5.302. NMBTC meets the eligibility criteria of this section as a manufacturer that integrates radio frequency equipment (antenna) into our end product (the antenna itself, and RF modules used in automobiles and commercial consumer products and equipment).

§5.302(a). The radio frequency experimentation will be conducted in a defined geographic area under the control of NMBTC. The NMBTC test site is real estate property owned by NMBTC at 28690 Haas Road, Wixom, MI 48393; telephone number +1 (248) 446-5770.

§5.302(b). Institutional processes to monitor and manage research projects include written and documented procedures for the operation of equipment during radio frequency experiments, individual training on the test equipment, and training for analysis and presentation of the measured data.

§5.302(c). Personnel engaged in the radio frequency experiments have educational background and practical knowledge for these experiments, with a minimum of 10 years experience.

§5.303. The radio frequency experimentation will be conducted in the frequency range 50 MHz to 8.5 GHz using existing over-the-air broadcast signals, or laboratory-generated RF CW signals without modulation or programming content. Laboratory-generated signals will be transmitted only on an intermittent basis as part of a stepwise frequency sweep in the frequency bands of interest. Radio frequency experimentation will also be conducted in the frequency range 30 KHz to 50 MHz using existing over-the-air broadcast signals, if available.

§5.304. The radio frequency experimentation will be conducted in a defined geographic area as described in this document, the real-property facilities located at 28690 Haas Road, Wixom, MI 48393; telephone number +1 (248) 446-5770.

§5.305(a). An environmental assessment is not required under §5.63(a).

§5.305(b). An orbital debris mitigation plan is not required under §5.64.

§5.305(c). A non-disclosure of proprietary information is not required by NMBTC as part of the justification for the license application.

§5.305(d). The radio frequency experimentation will not be conducted as part of a market trial. The radio frequency experimentation is intended solely to evaluate antennas under test for their performance characteristics to meet customer criteria.

§5.307. The responsible party for the Program Experimental Radio License, at the time of the application, is Bruce Fuester. Contact information is as follows:

Bruce Fuester

Electrical Engineer

NMB Technologies Corporation

Office: 40000 Grand River Avenue, Suite 200

Novi, MI 48375

desk +1 (248) 426-5313

cell +1 (734) 972-8111

email bfuester@nmbtc.com

Test Site: 28690 Haas Road

Wixom, MI 48393

+1 (248) 446-5770

§5.308. The “Stop Buzzer” point of contact during radio frequency experiments is Bruce Fuester. Contact information is included in the preceding paragraph.

Conclusion

The NMBTC test site is available to external customers in addition to internal project teams to measure antenna performance characteristics on a fee basis. Our contact information is given above as the Novi, MI office address and telephone numbers. We may also be contacted at our main office telephone number, +1 (248) 426-8448, or by fax at +1 (248) 426-8985.

If you have any questions regarding this Narrative Statement in conjunction with our FCC Experimental Licensing System Application File #0108-EX-PN-2017 and Correspondence Reference Number 40482, please feel free to contact us through any of the means given above.

Sincerely,

Bruce Fuester

Electrical Engineer

NMB Technologies Corporation

email bfuester@nmbtc.com

FCC CORES Registration Number 0026995456

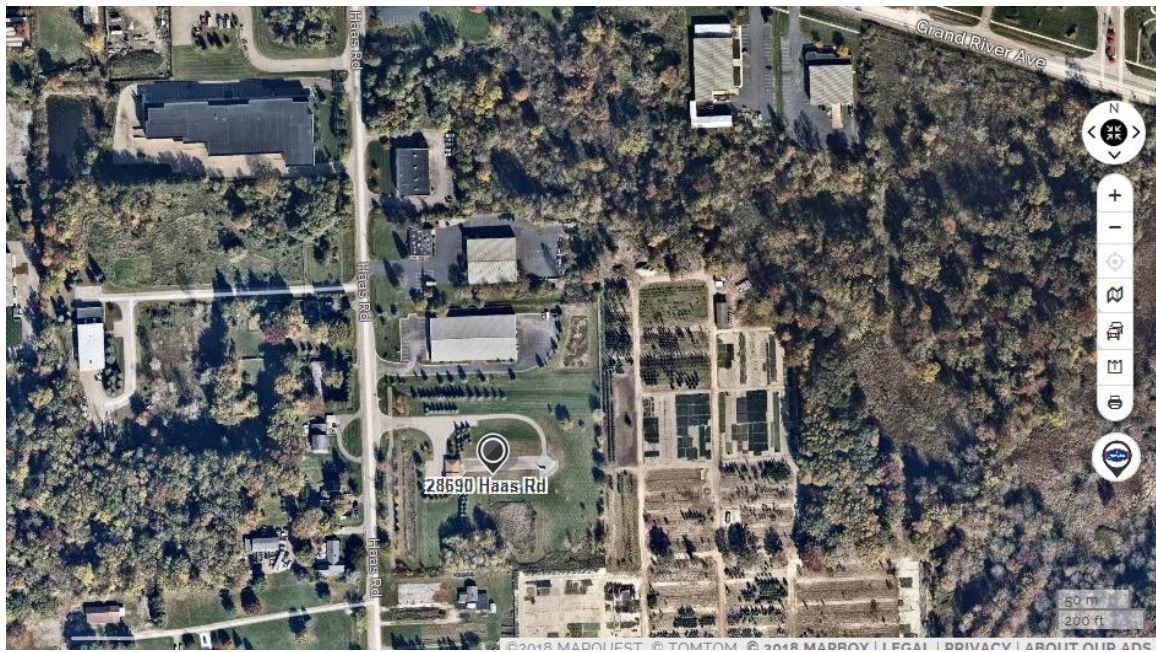
Additional Information

Partial List of Test Equipment (subject to change due to upgrades, replacement, additions, etc.):

Manufacturer	Model	Description	Calibration Status
OrbitFR	959Spectrum	Software for antenna measurements and analysis, version 6 / version 7.2	
OrbitFR	AL-560-1P	Positioner, used to rotate transmitting antenna on FF Tower	
OrbitFR	AL-1770-1	Positioner, used to rotate transmitting antenna on NF Gantry	
Keysight (Agilent / HP)	8753D	Network Analyzer, 30 KHz – 6 GHz	due by 01 March 2018
Keysight	E5072A	Network Analyzer, 30 KHz – 8.5 GHz	due by 21 Feb 2018 (in process as of 2/13/18)
ARA – Seavey	AS24-15D/B	2-foot dia. parabolic dish with feed antenna, dual polarization	
ARA – Seavey	SGA-20W	Rectangular waveguide horn antenna, 1.6-2.5 GHz	
ETS-Lindgren	3109	Biconical dipole, 20-300 MHz	
ETS-Lindgren	3121D	Tuned dipole antenna set, 20-1000 MHz	
ETS-Lindgren	3164-10, qty. 2	Open-boundary quad-ridge horn antennas, dual polarization, 400 MHz – 10 GHz	
Flann Microwave	08240-10, 10240-20, 12240-20, 14240-20, 16240-20	Rectangular waveguide horn antennas, 1.7-12.5 GHz	
Amplifier Research	10W1000CM2	Amplifier, 500 KHz – 1 GHz	
Lucix	S10M100L2804	Amplifier, 10 MHz – 12 GHz	
Mini-Circuits	various models	Amplifiers, up to 18 GHz	
Miteq	AFS42-00101200-S-20P-42	Amplifier, 100 MHz – 12 GHz	

Images:

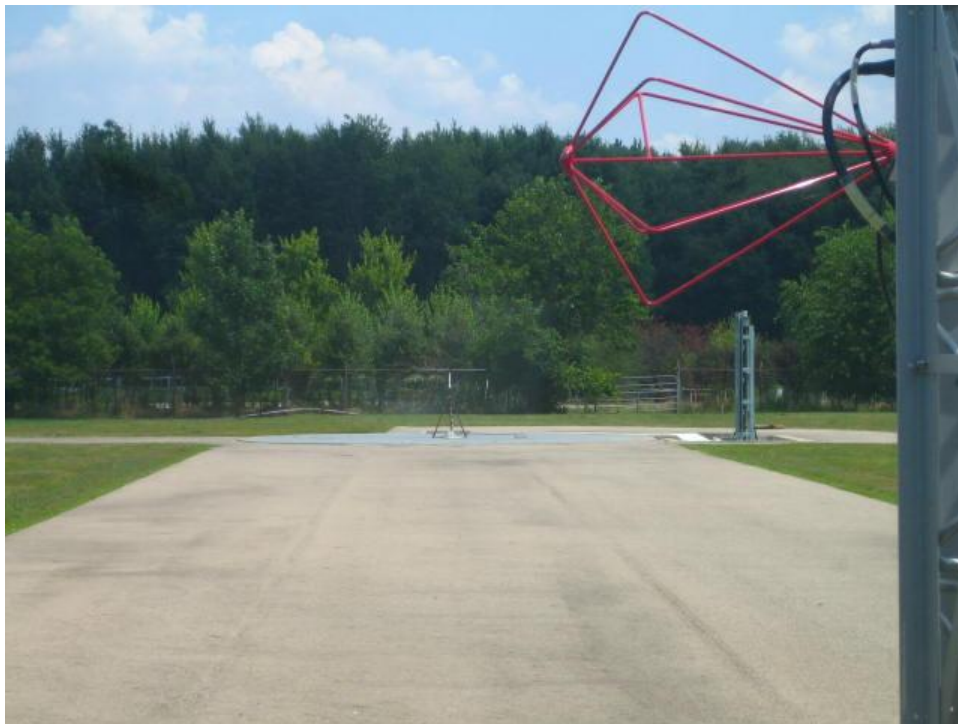
NMBTC Test Site, satellite views



Sample photographs of test setup, Near-Field measurement



Sample photographs of test setup, Far-Field measurement



AXIS DEFINITIONS	
AXIS	LABEL
AZIMUTH	A/1
ARM	B/2
ELEVATOR	C/3
POLARIZATION	D/4

POWER CONSUMPTION (APPROX.)	
ITEM	POWER
COMPUTER	4A @ 115VAC
POS. CTRL.	7A @ 115 VAC
HP8753D	3A @ 115VAC
RF COMPONENTS	1A @ 115VAC
DE-ICER	30A @ 230VAC (4PLCS)

RF POWER TRANSMISSION	
ANTENNA CONFIG.	POWER
FAR FIELD	1 WATT MAX
NEAR FIELD	1 WATT MAX

