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Republic of the Philippines
NATIONAL POLICE COMMISSION
NATIONAL HEADQUARTERS, PHILIPPINE NATIONAL POLICE
OFFICE OF THE CHIEF, PNP
Camp BGen Rafael T Crame, Quezon City

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APR 20 2020

MEMORANDUM CIRCULAR
NO.: 2020-038

PRESCRIBING THE TECHNICAL SPECIFICATIONS FOR TROPOSCATTER COMMUNICATION SYSTEM

1. REFERENCES:

a. NAPOLCOM Memorandum Circular (MC) No. 2019-002: "Defining the Duty and Authority of the NAPOLCOM to prescribe Minimum Standards for Uniforms, Arms, and Equipment to be Procured by the Philippine National Police" dated January 29, 2019;

b. NAPOLCOM Resolution No. 2019-753: "Prescribing the Minimum Standards for Troposcatter Communication System" dated October 3, 2019; and

c. PNP UESB Resolution No. 2019-037: "Approving the Proposed Technical Specifications for Troposcatter Communication System" dated October 14, 2019.

2. RATIONALE:

This MC sets forth the technical specifications for Troposcatter Communication System to be used by the PNP.

3. SITUATION:

The available technology for connectivity of the PNP was Line of Sight Microwave System (LOS), Satellite Communication Systems (VSAT) and through Telcos. The introduction of a very large number of VSAT terminals soon led to scarcity of available transponder space. In an attempt to free-up satellite bandwidth, there is an increase in the use of Line-Of-Sight microwave equipment. While useful, the problem in many instances was the LOS required multiple relays to maneuver around obstacles or to span distances greater than the limited range of tactical LOS links. This in turn resulted in relays being installed in unsecured areas that require force protection and had no supporting infrastructure, thus limiting the use of LOS as a complete battlefield bandwidth solution. Also, the relatively short towers used for LOS limit the distance they could communicate.

As an alternative to VSATs and LOS, the Terrestrial Beyond Line of Sight (TBLOS) terminal also known as "Troposcatter Communications System" that is capable of reaching the PNP Regional Offices in a single hop is being introduced. This gives the PNP a terminal that can meet any of its communication requirements.

Over-the-Horizon or troposcatter equipment are manufactured in various countries and are being utilized as well. Military forces of several countries have already installed or are planning large strategic tropo systems to be used for primary communication. This technology has evolved from large, heavy, low capacity terminals, to smaller, lighter, higher capacity network systems capable of transmitting digital voice, video and data over a secure link.

4. PURPOSE:

To provide and establish the technical specifications for Troposcatter Communication System that will serve as reference in the procurement of PNP wireless communication infrastructure/backbone.

5. DEFINITION OF TERMS:

a. Troposphere - the lowest layer of Earth's atmosphere, and is also where nearly all weather conditions take place with a total average height of 13 km above sea level.

b. Tropospheric Scatter also known as "TROPOSCATTER" - a method of communicating with microwave radio signals over considerable distances – often up to 300 kilometers (190 mi), and further depending on terrain and climate factors. This method of propagation uses the tropospheric scatter phenomenon, where radio waves at UHF and SHF frequencies are randomly scattered as they pass through the upper layers of the troposphere.

c. Scatter Volume - The region where the antenna beams intersect, and it is where this predictable scattering phenomena occurs.

d. Delay Spread - a measure of the multipath richness of a communications channel. In general, it can be interpreted as the difference between the time of arrival of the earliest significant multipath component and the time of arrival of the latest multipath components.

6. GUIDELINES:

a. Specifications

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1) Description

The Troposcatter Communication System is a deployable or fixed mounted system consisting of several communication equipment such as but not limited to transmitter, receiver, modem and antenna.

2) Technical Specifications

a) TROPOSCATTER RADIO SYSTEM

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(1) Frequency Range	:	3 -- 30 GHz
(2) Antenna Size	:	Manufacturer's standard
(3) Antenna Pointing	:	Automatic

(4) Power Supply	220 VAC
(5) Voltage Frequency	60 Hertz
(6) Mechanical Dimension	Within standard "U" rack mount server sizes
(7) Operating Temperature	0°C to +50°C
(8) Storage Temperature	0°C to +70°C
(9) Relative Humidity	to withstand up to 95% non-condensing

(10) Must be full feature compatible with the troposcatter modem with no media gateway needed.

b) MODEM

(1) Data Speed Rate	Able to reach 100Mbps
(2) Diversity	Minimum of 4
(3) Delay Spread/hop	Up to 7.0 µsec.
(4) Data (I/O) Interface Port	RJ-45 or latest
(5) Mounting Dimension	2RU
(6) Operating Temperature	-10°C to +55°C
(7) Storage Temperature	-32°C to +71°C
(8) Humidity Factor	able to reach 95% (non-condensing)
(9) Voltage Frequency	60 Hertz
(10) Input Current	220 VAC

(11) Must be full feature compatible with the troposcatter radio system.

5. REPEALING CLAUSE:

All other technical specifications contrary to or inconsistent with the provisions of this PNPMC are hereby rescinded, modified or amended.

6. EFFECTIVITY:

This MC shall take effect after 15 days from filing a copy thereof at the UP Law Center in consonance with Section 3, Chapter 2, Book VII of Executive Order 292 otherwise known as the "Revised Administrative Code of 1987," as amended.

ARCHIE FRANCISCO F GAMBOA
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