

**EXHIBIT 7****Measurement Procedure & Test Equipment Used**

Except where otherwise stated, all measurements are made following the Electronic Industries Association (EIA) Minimum Standard for Portable/Personal Land Mobile Communications FM or PM Equipment 25-1000 MHz-(EIA/TIA-603D) and ANSI C63:4: 2014.

This exhibit presents a brief summary of how the measurements were made, the required limits, and the test equipment used.

The following procedures are presented with this application.

1.	Test Equipment List	<u>  x  </u>
2.	RF Power Output Data	<u>  x  </u>
3.	Audio Frequency Response	<u>  x  </u>
4.	Audio Low Pass Filter Response	<u>  x  </u>
5.	Modulation Limiting	<u>  x  </u>
6.	Occupied Bandwidth	<u>  x  </u>
7.	Radiated Spurious Emissions	<u>  x  </u>
8.	Conducted Spurious Emissions	<u>  x  </u>
9.	Frequency Stability (Volt/Temp)	<u>  x  </u>
10.	Transient Frequency Behavior	<u>  x  </u>

Test Equipment List

Pursuant To FCC Rules 2.947 (d)

No.	Equipment	Model No.	Serial No.	Cal Due date
1	Computer	Hp600pd	AH429642	*Calibration not required*
2	RF Signal Generator	Agilent E4420B	MY43350219	05-Nov-2017
3	Modulation Analyzer	HP 8901B	3403A04974	04-Nov-2017
4	Audio Analyzer	HP 8903B	2836A05866	08-Apr-2017
5	Dynamic Signal Analyzer	Agilent 35670A	MY42507103	12-Jun-2016
6	PSA Series Spectrum Analyzer	Agilent E4440A	MY46185415	13-Oct-2017
7	HP DC Power Supply	HP 6032A	3415A09877	22-Jul-2017
8	Power Meter	Agilent E4412A	GB41292915	11-Jun-2017
9	Power Sensor (with 30DB Pad)	Agilent E9301B	US38485352	26-Dec-2017
10	Infiniium Oscilloscope	Agilent MSO54831D	MY42001936	8-May-2017
11	Transceiver Interface	HP 8954A	2612A00591	12-Jun-2016
12	Espec Chamber	SH-641	92009188A	27-Jan-2017
13	Dual Directional Coupler	HP 778D	14163	*Calibration not required*
14	Spectrum Analyzer	HP 8563E	3221A00221	4-Dec-2017
15	DRG Horn Freq.	SAS-571	566	2-Aug-2016
16	DRG Horn Freq.	SAS-571	1143	10-Jun-2016
17	Bilog Antenna	CBL6112B	2964	23-Apr-2016
18	Power Supply	6031A	3121A02341	12-Jun-2016
19	EMI Test Receiver	ESIB26	100336	17-Jun-2016
20	Microwave Signal Generator	SMP04	100131	25-Jun-2016
21	System Controller	SC104V	050806-1	NA
22	Turntable Flush Mount 2M	FM2011	NA	NA
23	Antenna Positioning Tower	TLT2	NA	NA
24	Test Receiver	ESIB26	827769/009	16-Jun-2016
25	Signal Analyzer	FSV40	101103	25-Jun-2016
26	5m Semi-anechoic Chamber	S800-HX	J2308	29-Apr-2016
27	Data Logger	TM320	12249289	12-Apr-2016
28	Bilog Antenna	CBL6112D	25516	23-Apr-2016

Test Name	FCC Rules Part (47 CFR)	IC Rules
RF Power Output Data	2.1046(a), 2.1033(c)(6), 2.1033(c)(7) and 2.1033(c)(8) * 90.541, 90.545(b)(4) (700 MHz) 22.565(f) (VHF & UHF), * 24.132 (900 MHz) 74.461 (VHF & UHF)	RSS-Gen Sec 6.12, RSS-119 Sec 5.4.1, * RSS 119 Sec 5.4.5 (700 MHz) * RSS 134 Sec 5.4 (900 MHz)
TX Audio Frequency Response	2.1047 and 2.1033(c)(13) 22.355	-
TX Audio Low Pass Filter Response	2.1047	-
Modulation Limiting	2.1047 74.463 (VHF & UHF)	-
Occupied Bandwidth	2.1049, 90.210, * 90.691 (800MHz), 22.359 (b) (VHF & UHF), * 24D (900MHz) 74.462(b) (VHF & UHF)	RSS GEN Sec 6.6, RSS 119 Sec 5.5, * RSS 134 (900MHz)
TX Radiated Spurious Emissions	2.1053, 90.210, 22.359 (VHF,UHF) 74.462(c) (VHF & UHF)	RSS GEN Sec 6.13, RSS 119 Sec 4.2, 5.8
TX Conducted Spurious Emissions	2.1051, 90.210, 22.359 (VHF,UHF), * 24.133 (900MHz) 80.211(c), 74.462(c) (VHF & UHF)	RSS GEN Sec 6.13, RSS 119 Sec 4.2, 5.8, * RSS 134 Sec 6.3(ii) (900MHz) RSS 182
Frequency Stability (Temp / Supply Voltage)	2.1055, 90.213, * 90.539 (700 MHz) 22.355 * 24.135 (900 MHz) 74.464 (VHF & UHF)	RSS GEN Sec 6.11 RSS 119 Sec 5.3 * RSS 134 Sec 7 (900MHz)
Transient Frequency Behavior	90.214 (VHF & UHF)	RSS 119 Sec 5.9 (VHF & UHF)
* Adjacent Channel Power	* 90.543 (700MHz)	* RSS 119 Sec 4.3, 5.8.9 (700MHz)
* 1559-1610 MHz Radiated Emissions (GNSS)	* 2.1053, 90.543 (e) (700MHz)	-

Table 2: List of FCC and IC reference

\* Note: Not Applicable for this filing

**Measurement Procedures Used for Submitted Data****RF Power Output**

Pursuant to FCC Rules 2.1046 (a)

Conducted power is measured in accordance with TIA-603-D section 2.2.1.2. The transmitter under test is connected to an Power Meter using the forward port of a 30 dB attenuator pad and power sensor.

The transmitter is operated in test mode under nominal conditions. The DC voltage applied to the transmitter are read directly from the calibrated DC Power Supply. Remote voltage sensing is used to ensure the correct DC voltage is applied to the battery terminal of DUT. This measurement is performed at the lowest, the middle, and the highest operating frequencies of the operating bandwidth of the equipment.

**Audio Frequency Response**

Pursuant FCC Rules 2.1047 (a)

Operate the transmitter under standard test conditions and monitor the output with a frequency deviation meter or calibrated test receiver. With 1000 Hz sine wave audio input applied through a dummy microphone circuit, adjust the audio input to give 20% of full rated system deviation. Maintaining a constant input voltage, vary the input frequency from 300 to 3000 Hz, and observe the deviation.

**Audio Low Pass Filter Response**

Pursuant FCC Rules 2.1047 (a)

The audio oscillator portion of an audio analyzer is connected to the input of the post limiter low pass filter. The oscillator is adjusted, at 1000 Hz and level 16dB greater than that required to produce standard test modulation. The output of the low pass filter is measured with an dynamic signal analyzer. The response is swept between the limits of 1000 Hz - 30000 Hz. Oscillator level is chosen to be as high as possible and that will not cause limiting at any frequency, and maintaining a constant input level versus frequency.

**Modulation Limiting**

Pursuant FCC Rules 2.1047 (b)

The transmitter shall be adjusted for full rated system deviation. Adjust the audio input for 60% of rated system deviation at 1000 Hz. Using this level as a reference (0 dB) vary the audio input level from the reference to a level 20 dB above it for modulation frequencies between 300 and 3000 Hz in 100Hz steps. Record the system deviation obtained as a function of the input level.

**Occupied Bandwidth**

Pursuant to FCC Rules 2.1049

Data on occupied bandwidth is presented in the form of a spectrum analyzer photograph, which illustrates the transmitter sidebands. For analog signals, the reference line for the data plot is taken of the unmodulated carrier, to which is superimposed the sideband display generated by modulating the carrier with a 2500 Hz tone at a level 16 dB greater than that required to produce 50 percent modulation. For digital voice, data, and TDMA, the reference line for the data plot is that of the peak value of the modulated carrier. For digital data, the Standard Transmitter Test Pattern is a continuously repeating 511 bit pseudo-random bit sequence based on ITU-T 0.153. If tone or digital coded squelch is indicated, photographs using both the 2500 Hz tone and the indicated squelch signal are used to modulate the transmitter. During these measurements, the instantaneous Deviation Control is set for a maximum of +5 kHz.

**Radiated Spurious Emissions**

Pursuant to FCC Rules 2.1053

**Test Site:**

The site, located at Penang, Malaysia, is in a region which is reasonably free from RF interference and has been approved by the Commission for Spurious Measurements.

The equipment is placed on the turntable, connected to a dummy RF load and then placed in normal operation using the intended power source. A broadband receiving antenna, located 3 meters from the transmitter-under-test (TUT), picks up any signals radiated from the transmitter and its operation accessories. The antenna is adjustable in height and can be horizontally and vertically polarized. A spectrum analyzer covering the necessary frequency range is used to detect and measure any radiation picked up by the above mentioned receiving antenna.

**Method of Measurement:**

The equipment is adjusted to obtain peak reading of received signals wherever they occur in the spectrum by:

- a. Adjust the spectrum analyzer for the following settings:
  - 1) Resolution Bandwidth = 100 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.
  - 2) Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.
  - 3) Sweep Speed slow enough to maintain measurement calibration.
  - 4) Detector Mode = Positive Peak.
- b. Key the transmitter.
- c. For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Then the turntable should be rotated 360° to determine the maximum reading. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

The testing procedure is repeated for both horizontal and vertical polarization of the receiving antenna. Relative signal strength is indicated on the spectrum analyzer connected to the receiving antenna. To obtain actual radiated signal strength for each spurious and harmonic frequency observed, a standard signal generator with calibrated output is connected to a dipole antenna adjusted to that particular frequency. This dipole antenna is substituted for the transmitter under test. The signal generator is adjusted in output level until a reading identical to that obtained with the actual transmitter is observed on the spectrum analyzer. Signal strength is then read directly from the generator. Actual measurements are recorded on the attached graphs.

**Conducted Spurious Emissions**

Pursuant to FCC Rule 2.1051

The output of the transmitter is connected, via a suitable attenuator, to the input of an spectrum analyzer. The level of spurious emissions, in dBm, is plotted. This data is measured at the lower, middle, and upper frequency limits of the frequency range.

Note:

RBW setting is adjusted to 100kHz for frequency below 1GHz and 1MHz for frequency above 1GHz.

**Frequency Stability**

Pursuant to FCC Rule 2.1055

A. Temperature (Non-heated type crystal oscillators):

Frequency measurements are made at the extremes of the temperature range -30 to +60 degrees centigrade and at intervals of not more than 10 degrees centigrade throughout the range. Sufficient time is allowed prior to each measurement for the circuit components to stabilize.

B. Power Supply Voltage:

The primary voltage was varied from 85% to 115% of the nominal supply voltage. Voltage is measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

**Transient Frequency Behavior**

Pursuant to FCC Rule 90.214

The output of the radio is connected to an modulation analyzer by way of a directional coupler, 30dB attenuator, and 2:1 combining network. This output is first measured with an power meter and then the power meter is replaced by the modulation analyzer, and the RF output of an signal generator is connected to the second port of the combining network at a level of 30dB less than the output level of the radio measured after the attenuator. The RF output of the signal generator is modulated with a 1kHz tone and deviation of 12.5kHz or 25kHz depending on the channel spacing. The modulation output of the modulation analyzer is connected to a digital storage oscilloscope. The signal generator is turned on first, and then the radio keyed or de-keyed depending on the particular test. The oscilloscope is triggered by way of a RF peak detector that detects the RF output of the radio by way of the directional coupler.

The picture of the oscilloscope display is stored on a floppy disk and transferred to a computer. The key up attack time plot shows the 1kHz from the RF signal generator signal from the modulation output of the modulation analyzer, and when the radio is keyed, the output signal from the radio captures the receiver of the modulation analyzer, resulting in the carrier only signal. The de-key decay time plots show the unmodulated signal from the radio and when the radio is de-keyed, the 1kHz from the RF signal generator signal captures the receiver of the modulation analyzer, resulting in the 1kHz signal shown in the plots.