

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).

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.	Frequency Stability (Volt/Temp)	<u> X </u>
9.	Conducted Spurious Emissions	<u> X </u>

Test Equipment List

Measurement Equipment List- Pursuant To FCC Rules 2.947 (d)

No	Equipment	Calibration Date (next due)
1	Computer: DELL Latitude D600 Notebook, Window 2000.	*calibration not required*
2	Spectrum Analyzer: Agilent E4445A, 3 Hz – 13.2 GHz	16 th November 2014
3	Dynamic Signal Analyzer: HP35665A	13 th February 2015
4	RF Signal Generator: E4420BB, 250 kHz – 2 GHz RF Signal Generator	14 th December 2014
5	Modulation Analyzer. HP 8901B	15 th January 2015
6	Audio Analyzer .HP 8903B	22 nd January 2015
7	Power Meter. HP437B. Sensor 80401A	26 nd November 2014
8	Oscilloscope. Phillips PM3382	4 th January 2015
9	Multimeter: Hewlett Packard 34401A	25 th Julu 2017
10	HP Power supply 6031A	1 st April 2017
11	Directional Coupler: Hewlett Packard 778D, Dual Directional Coupler	*calibration not required*
12	Temperature Chamber: VOTSCH, VT4010	21 st January 2015
13	30 dB attenuator: MCE/Weinschel, model 33-30-34	*calibration not required*
14	High Pass Filter, Mini-Circuit NHP 300 & 25W	*calibration not required*
15	MCE/Weinschel 1429-4, 50 ohms terminating load	*calibration not required*
16	Microwave Generator, SMP04	23-Mar-15
17	Spectrum Analyzer/ESI Test Receiver, ESIB 40	30-Mar-15
18	Bilog Antenna [30MHz-2GHz], CBL6112B	30-May-15
19	Bilog Antenna [30MHz-2GHz], CBL6112D	28-Dec-14
20	DRG Horn Freq. 700MHz-18GHz, SAS-571	18-Oct-14
21	DRG Horn Freq. 700MHz-18GHz, SAS-571	17-Apr-15
22	Temp/Humidity Monitor, TM 320	12-Jun-15
23	SAC (5m Semi-anechoic Chamber), S800-HX	Dec-14
24	Antenna Positioning Tower (Boresight), TLT2	*calibration not required*
25	System controller, SC104V	*calibration not required*
26	Turntable. Flush Mount 2M, FM2011	*calibration not required*
27	Pre-amplifier, PAM-0118	*calibration not required*

Table 1: List of equipment used

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) * 90.545(b)(4) (700MHz) * 22.565(f) (VHF & UHF), 24.132 (900MHz)	RSS-Gen Sec 4.8, RSS-119 Sec 5.4.1, RSS 134 (900MHz)
TX Audio Frequency Response	2.1047 and 2.1033(c)(13)	-
TX Audio Low Pass Filter Response	2.1047	-
Modulation Limiting	2.1047	-
Occupied Bandwidth	2.1049, 90.210, * 90.691 (800MHz), * 22.359 (b) (VHF & UHF), 24.133 (900MHz)	RSS GEN Sec 4.6, RSS 119 Sec 5.5, RSS 134 (900MHz)
TX Radiated Spurious Emissions	2.1053, 90.210, * 22.359 (a) (VHF & UHF)	RSS GEN Sec 4.9, RSS 119 Sec 4.2, 5.8
Frequency Stability (Temp / Supply Voltage)	2.1055, 90.213, * 90.539 (700MHz)	RSS GEN Sec 4.7, RSS 119 Sec 5.3
TX Conducted Spurious Emissions	2.1051, 90.210, * 22.359 (a) (VHF & UHF), * 80.211 (c) (VHF)	RSS GEN Sec 6.2, RSS 119, * RSS 182 (VHF)

Table 2: List of FCC and IC reference

** Note: Not Applicable for this filing*

EXHIBIT 7A - RF Power Output

The RF power output is measured with the transmitter adjusted in accordance with the tune-up procedure outlined in Exhibit 10 to give the value of voltage and current as specified in Exhibit 12 as required by 2.1033(c) (8). A 50-ohm RF attenuator of proper power rating was used as a load for making these measurements.

The power measurements are made using an RF power meter and 30 dB attenuator.

EXHIBIT 7B - Audio Frequency Response

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.

EXHIBIT 7C - Audio Low Pass Filter Response

The audio oscillator portion of an HP8903B 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 HP35665A 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.

EXHIBIT 7D - Modulation Limiting

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.

EXHIBIT 7E - Occupied Bandwidth

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.

EXHIBIT 7F - Radiated Spurious Emissions

The site, located at Motorola Solutions 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:

1. Rotating the transmitter under test.
2. Adjusting the antenna height.

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.

Note:

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

EXHIBIT 7G - Frequency Stability (Supply voltage / Temperature)

- 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.

EXHIBIT 7H - Conducted Spurious Emissions

The transmitter is terminated into a 50 ohm load and interfaced with a spectrum analyzer which allows the spurious emission level relative to the carrier level to be measured directly. Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that required to produce 50% of rated system deviation at 1000 Hz. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier or as high as the state of the art permits except for that region close to the carrier equal to $\pm 250\%$ of the authorized bandwidth.

Note:

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