Above 1GHz:



TEST PROCEDURE

- EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0 m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in six channels were measured with peak detector.
- 2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
- 3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (P_r).
- 4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
- A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}), the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} - G_a

We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below: Power(EIRP)= P_{Mea} - P_{cl} - G_a

6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

<u>LIMIT</u>

Modulation Type: FM

FCC Part 22.359, 74.462, 80.211 and 90.210 and RSS Gen, RSS 119 Issue 11 (12.5 kHz bandwidth only): On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz at least:

Low: 50 + 10 log (Pwatts) = 50 + 10log (4.00) = 56.02dB

High: 50 + 10 log (Pwatts) = 50 + 10log (4.22) = 56.25 dB

Note: In general, the worse case attenuation requirement shown above was applied.

Calculation: Limit (dBm) =EL-50-10log10 (TP)

Notes: EL is the emission level of the Output Power expressed in dBm, In this application, the EL is 36.23dBm. Limit (dBm) = $36.23-50-10\log_{10}(4.22) = -20$ dBm

Modulation Type: 4FSK

FCC Part 22.359, 74.462, 80.211 and 90.210 and RSS Gen, RSS 119 Issue 11 (12.5 kHz Bandwidth only): On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz at least:

Low: 50 + 10 log (Pwatts) = 50 + 10log (4.12) = 56.15dB High: 50 + 10 log (Pwatts) = 50 + 10log (4.21) = 56.24dB

Note: In general, the worse case attenuation requirement shown above was applied. Calculation: Limit (dBm) =EL-50-10log10 (TP)

Notes: EL is the emission level of the Output Power expressed in dBm, In this application, the EL is 36.23 dBm. Limit (dBm) = $36.23-50-10\log_{10}(4.21) = -20$ dBm

TEST RESULTS

Remark: We tested Op 1 to Op 4. recorded worst case at Op 1, Op 3.

Note: 1. In general, the worse case attenuation requirement shown above was applied. 2. The measurement frequency range from 30 MHz to 5 GHz.

Test plot as follows:

















4.10. Receiver Radiated Spurious Emssion

TEST APPLICABLE

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

TEST CONFIGURATION

(A) Radiated Emission Test Set-Up, Frequency below 1000MHz



(B) Radiated Emission Test Set-Up, Frequency above 1000MHz



TEST PROCEDURE

- 1 The EUT was placed on a turn table which is 0.8m above ground plane.
- 2 Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° C to 360°C to acquire the highest emissions from EUT
- 3 And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 4 Repeat above procedures until all frequency measurements have been completed.

RECEIVER RADIATED SPOUIOUS LIMIT

For unintentional device, according to § 15.109(a) and RSS-Gen, except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

TEST RESULTS

Remak:

- 1. The Radiated Measurement (Standby mode /Receiver mode) are performed to the three channels (the high channel, the middle channel and the low channel), the datum recorded below is the worst case for each channel separation; and the EUT shall be scanned from 30 MHz to the 5th harmonic of the highest oscillator frequency in the digital devices or 1 GHz whichever is higher.
- 2.Test performed at Op 5, Op 6 and Op 7 operation mode respectively.And the datum append below is the worst case at 450.5MHz(*Test* Frequency) of each operation mode.









Mark	Frequency MHz	Level dBuv/m	Factor dB	Reading dBu∨/m	Limit dBu∨/m	Margin dB	Polarization	Det.
1	1388.04	31.27	-8.07	39.34	74.00	42.73	HORIZONTAL	Peak
2	1835.66	32.39	-8.11	40.50	74.00	41.61	HORIZONTAL	Peak
3	2066.10	33.18	-6.30	39.48	74.00	40.82	HORIZONTAL	Peak
4	2475.97	34.66	-5.23	39.89	74.00	39.34	HORIZONTAL	Peak
5	2771.84	36.24	-3.95	40.19	74.00	37.76	HORIZONTAL	Peak
6	4307.18	39.02	0.60	38.42	74.00	34.98	HORIZONTAL	Peak







5. Test Setup Photos of the EUT









6. External and Internal Photos of the EUT

External photos of the EUT











Internal photos of the EUT

















.....End of Report.....