

## **5.5. Spurious Emissions Radiated**

### **5.5.1. Test Standard**

FCC: CFR Part 2.1051, CFR Part 22.917, CFR Part 24.238, CFR Part 27.53

### **5.5.2. Test Limit**

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in FCC 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. For all power levels +30dBm to 0dBm, this becomes a constant specification of -13dBm.

FCC 22.917 Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radio telephone Service.

(b) Measurement procedure. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

FCC 24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

(b) Measurement procedure. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

FCC: §27.53

(c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log (P)$  dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

(m)(4) For mobile digital stations, the attenuation factor shall be not less than  $43 + 10 \log (P)$  dB at the channel edge and  $55 + 10 \log (P)$  dB at 5.5 megahertz from the channel edges.(Channel edges are defined under §27.5 (i) Frequency assignment for the BRS/EBS band)

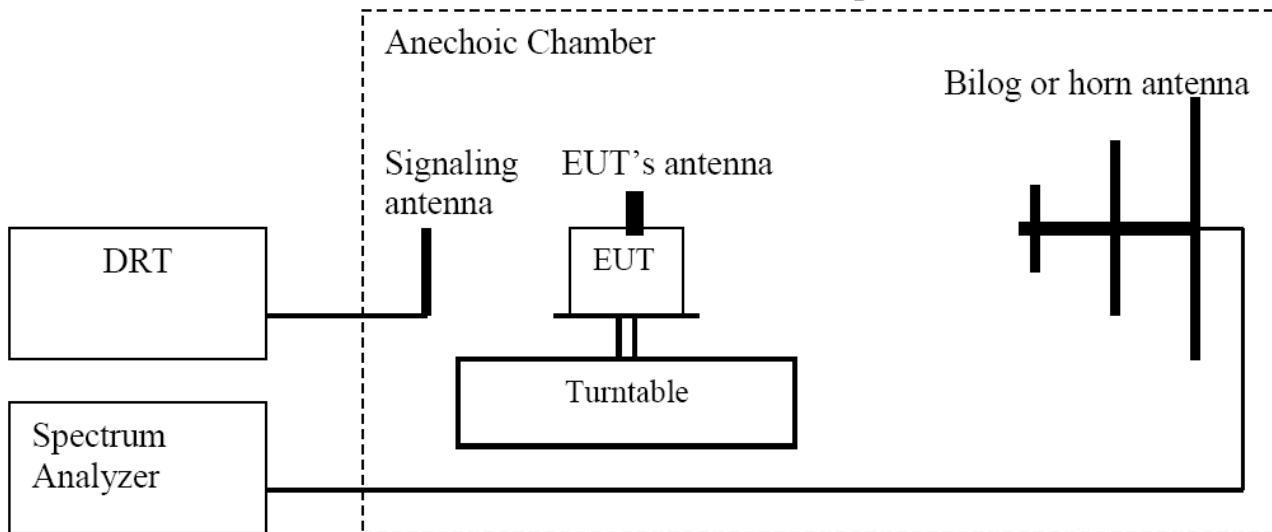
(m)(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### 5.5.3. Test Procedure

1. Connect the equipment as shown in the above diagram with the EUT's antenna in a horizontal orientation.
2. Adjust the settings of the Wideband Radio Communication Tester (CMW500) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure peak hold with the required settings.
4. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360°. Raise the measurement antenna up to 4 meters in 0.5 meters increments and rotate the EUT 360° at each height to maximize all emissions. Measure and record all spurious emissions (LVL) up to the tenth harmonic of the carrier frequency.
5. Replace the EUT with a horizontally polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (LOSS). LOSS = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the level of spurious emissions using the following equation:  
Spurious (dBm) = LVL (dBm) + LOSS (dB):
8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation:  
Spurious (dBm) = LVL (dBm) + LOSS (dB):
10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.  
(Note: Steps 5 and 6 above are performed prior to testing and LOSS is recorded by test software. Steps 3, 4 and 7 above are performed with test software.)

Spectrum analyzer settings: RBW=VBW=1MHz

### 5.5.4. Test Setup



### 5.5.5. Test Data

Test Band = GSM850

Test Mode = GSM /TM1

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBD]	dB	Level (ERP) [dBm]		[dBm]
1673.2	10.43	0.9	6.77	40.6	-24.3	Horizontal	-13
2509.8	9.65	2.1	7.45	40.1	-25.1	Horizontal	-13
1673.2	11.23	0.9	6.77	40.6	-23.5	Vertical	-13
2509.8	8.35	2.1	7.45	40.1	-26.4	Vertical	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = GSM850

Test Mode = EDGE /TM2

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBD]	dB	Level (ERP) [dBm]		[dBm]
1673.2	9.03	0.9	6.77	40.6	-25.7	Horizontal	-13
2509.8	6.45	2.1	7.45	40.1	-28.3	Horizontal	-13
1673.2	9.83	0.9	6.77	40.6	-24.9	Vertical	-13
2509.8	5.15	2.1	7.45	40.1	-29.6	Vertical	-13

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = WCDMA850

Test Mode = UMTS/TM3

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBd]	dB	Level (ERP) [dBm]		[dBm]
1672.8	-5.87	0.9	6.77	40.6	-40.6	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = GSM1900

Test Mode = GSM /TM1

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-2.43	4.6	9.53	39	-36.5	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = GSM1900

Test Mode = EDGE /TM2

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-4.63	4.6	9.53	39	-38.7	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = WCDMA1900

Test Mode = UMTS /TM3

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-2.13	4.6	9.53	39	-36.2	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 2

Test Mode = QPSK /TM4

Bandwidth=1.4MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-4.53	4.6	9.53	39	-38.6	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 2

Test Mode = 16QAM /TM5

Bandwidth=1.4MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-9.03	4.6	9.53	39	-43.1	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 2**  
**Test Mode = QPSK /TM4**  
**Bandwidth=3MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-4.63	4.6	9.53	39	-38.7	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 2**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=3MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-7.23	4.6	9.53	39	-41.3	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 2**  
**Test Mode = QPSK /TM4**  
**Bandwidth=5MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-4.53	4.6	9.53	39	-38.6	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 2**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=5MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-6.23	4.6	9.53	39	-40.3	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 2**  
**Test Mode = QPSK /TM4**  
**Bandwidth=10MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-7.03	4.6	9.53	39	-41.1	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 2**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=10MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-9.43	4.6	9.53	39	-43.5	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 2**  
**Test Mode = QPSK /TM4**  
**Bandwidth=15MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-5.63	4.6	9.53	39	-39.7	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 2**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=15MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-7.53	4.6	9.53	39	-41.6	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 2**  
**Test Mode = QPSK /TM4**  
**Bandwidth=20MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-4.13	4.6	9.53	39	-38.2	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 2**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=20MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3760	-7.33	4.6	9.53	39	-41.4	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 4**  
**Test Mode = QPSK /TM4**  
**Bandwidth=1.4MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3465	-2.71	4.1	9.41	39	-36.4	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 4**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=1.4MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3465	-5.51	4.1	9.41	39	-39.2	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 4**  
**Test Mode = QPSK /TM4**  
**Bandwidth=3MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3465	-3.51	4.1	9.41	39	-37.2	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 4**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=3MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3465	-5.61	4.1	9.41	39	-39.3	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 4**  
**Test Mode = QPSK /TM4**  
**Bandwidth=5MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3465	-4.81	4.1	9.41	39	-38.5	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 4**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=5MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3465	-2.11	4.1	9.41	39	-35.8	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 4**  
**Test Mode = QPSK /TM4**  
**Bandwidth=10MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3465	-4.41	4.1	9.41	39	-38.1	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 4**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=10MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3465	-4.01	4.1	9.41	39	-37.7	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 4**  
**Test Mode = QPSK /TM4**  
**Bandwidth=15MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3465	-3.11	4.1	9.41	39	-36.8	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 4**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=15MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3465	-7.01	4.1	9.41	39	-40.7	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 4**  
**Test Mode = QPSK /TM4**  
**Bandwidth=20MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
3465	-2.91	4.1	9.41	39	-36.6	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 4**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=20MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (ERP) [dBm]		[dBm]
3465	-7.61	4.1	9.41	39	-41.3	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 5**  
**Test Mode = QPSK /TM4**  
**Bandwidth=1.4MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
2509.5	5.45	2.1	7.45	40.1	-29.3	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 5**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=1.4MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
2509.5	2.05	2.1	7.45	40.1	-32.7	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 5**  
**Test Mode = QPSK /TM4**  
**Bandwidth=3MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
2509.5	5.95	2.1	7.45	40.1	-28.8	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 5**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=3MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
2509.5	4.15	2.1	7.45	40.1	-30.6	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 5**  
**Test Mode = QPSK /TM4**  
**Bandwidth=5MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
2509.5	5.45	2.1	7.45	40.1	-29.3	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 5**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=5MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
2509.5	1.95	2.1	7.45	40.1	-32.8	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 5**  
**Test Mode = QPSK /TM4**  
**Bandwidth=10MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
2509.5	6.15	2.1	7.45	40.1	-28.6	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 5**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=10MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
2509.5	4.75	2.1	7.45	40.1	-30	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 7**  
**Test Mode = QPSK /TM4**  
**Bandwidth=5MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5070	-9.48	6.32	10	38.5	-44.3	Horizontal	-25

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 7**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=5MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5070	-11.08	6.32	10	38.5	-45.9	Horizontal	-25

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 7**  
**Test Mode = QPSK /TM4**  
**Bandwidth=10MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5070	-8.58	6.32	10	38.5	-43.4	Horizontal	-25

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 7**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=10MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5070	-11.08	6.32	10	38.5	-45.9	Horizontal	-25

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 7**  
**Test Mode = QPSK /TM4**  
**Bandwidth=15MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5070	-9.38	6.32	10	38.5	-44.2	Horizontal	-25

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 7**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=15MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5070	-11.88	6.32	10	38.5	-46.7	Horizontal	-25

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 7**  
**Test Mode = QPSK /TM4**  
**Bandwidth=20MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5070	-8.88	6.32	10	38.5	-43.7	Horizontal	-25

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 7**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=20MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5070	-10.58	6.32	10	38.5	-45.4	Horizontal	-25

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 12**  
**Test Mode = QPSK /TM4**  
**Bandwidth=1.4MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1415	-10.07	0.9	6.77	40.6	-44.8	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 12**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=1.4MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1415	-11.97	0.9	6.77	40.6	-46.7	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 12**  
**Test Mode = QPSK /TM4**  
**Bandwidth=3MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1415	-10.37	0.9	6.77	40.6	-45.1	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

**Test Band = LTE Band 12**  
**Test Mode = 16QAM /TM5**  
**Bandwidth=3MHz**  
**Test Channel = MCH**

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1415	-12.47	0.9	6.77	40.6	-47.2	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 12  
 Test Mode = QPSK /TM4  
 Bandwidth=5MHz  
 Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1415	-9.57	0.9	6.77	40.6	-44.3	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 12  
 Test Mode = 16QAM /TM5  
 Bandwidth=5MHz  
 Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1415	-11.47	0.9	6.77	40.6	-46.2	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 12  
 Test Mode = QPSK /TM4  
 Bandwidth=10MHz  
 Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1415	-9.37	0.9	6.77	40.6	-44.1	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 12  
 Test Mode = 16QAM /TM5  
 Bandwidth=10MHz  
 Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1415	-12.07	0.9	6.77	40.6	-46.8	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 13  
 Test Mode = QPSK /TM4  
 Bandwidth=5MHz  
 Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1564	-8.77	0.9	6.77	40.6	-43.5	Horizontal	-40
2346	2.15	2.1	7.45	40.1	-32.6	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 13  
 Test Mode = 16QAM /TM5  
 Bandwidth=5MHz  
 Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1564	-9.97	0.9	6.77	40.6	-44.7	Horizontal	-40
2346	0.85	2.1	7.45	40.1	-33.9	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits  
 Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 13

Test Mode = 16QAM /TM5

Bandwidth=10MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1564	-8.77	0.9	6.77	40.6	-43.5	Horizontal	-40
2346	0.35	2.1	7.45	40.1	-34.4	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 13

Test Mode = 16QAM /TM5

Bandwidth=10MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1564	-10.57	0.9	6.77	40.6	-45.3	Horizontal	-40
2346	-1.05	2.1	7.45	40.1	-35.8	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 17

Test Mode = QPSK /TM4

Bandwidth=5MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1420	-9.07	0.9	6.77	40.6	-43.8	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 17

Test Mode = 16QAM /TM5

Bandwidth=5MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1420	-11.37	0.9	6.77	40.6	-46.1	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 17

Test Mode = QPSK /TM4

Bandwidth=10MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1420	-8.97	0.9	6.77	40.6	-43.7	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 17

Test Mode = 16QAM /TM5

Bandwidth=10MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	Polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
1420	-11.07	0.9	6.77	40.6	-45.8	Horizontal	-13

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst

case is recorded in this report

Test Band = LTE Band 38

Test Mode = QPSK /TM4

Bandwidth=5MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5190	-9.48	6.32	10	38.5	-44.3	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 38

Test Mode = 16QAM /TM5

Bandwidth=5MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5190	-10.88	6.32	10	38.5	-45.7	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 38

Test Mode = QPSK /TM4

Bandwidth=10MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5190	-8.68	6.32	10	38.5	-43.5	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst

case is recorded in this report

Test Band = LTE Band 38

Test Mode = 16QAM /TM5

Bandwidth=10MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5190	-10.88	6.32	10	38.5	-45.7	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 38

Test Mode = QPSK /TM4

Bandwidth=15MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5190	-8.08	6.32	10	38.5	-42.9	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 38

Test Mode = 16QAM /TM5

Bandwidth=15MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5190	-9.68	6.32	10	38.5	-44.5	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst

case is recorded in this report

Test Band = LTE Band 38

Test Mode = QPSK /TM4

Bandwidth=20MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5190	-9.28	6.32	10	38.5	-44.1	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 38

Test Mode = 16QAM /TM5

Bandwidth=20MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5190	-10.88	6.32	10	38.5	-45.7	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 41

Test Mode = QPSK /TM4

Bandwidth=5MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5210	-7.88	6.32	10	38.5	-42.7	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst

case is recorded in this report

Test Band = LTE Band 41  
Test Mode = 16QAM /TM5  
Bandwidth=5MHz  
Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5210	-10.48	6.32	10	38.5	-45.3	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 41  
Test Mode = QPSK /TM4  
Bandwidth=10MHz  
Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5210	-9.08	6.32	10	38.5	-43.9	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 41  
Test Mode = 16QAM /TM5  
Bandwidth=10MHz  
Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5210	-7.88	6.32	10	38.5	-42.7	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits  
Note: both of Vertical and Horizontal polarization are evaluated, and only the worst

case is recorded in this report

Test Band = LTE Band 41

Test Mode = QPSK /TM4

Bandwidth=15MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5210	-8.68	6.32	10	38.5	-43.5	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 41

Test Mode = 16QAM /TM5

Bandwidth=15MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5210	-11.58	6.32	10	38.5	-46.4	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

Test Band = LTE Band 41

Test Mode = QPSK /TM4

Bandwidth=20MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5210	-7.78	6.32	10	38.5	-42.6	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst

case is recorded in this report

Test Band = LTE Band 41

Test Mode = 16QAM /TM5

Bandwidth=20MHz

Test Channel = MCH

Freq.	SG. Level	Cable Loss	Antenna Gain	Preamp	Substitution	polarization	Limit
[MHz]	[dBm]	[dB]	[dBi]	dB	Level (EIRP) [dBm]		[dBm]
5210	-9.48	6.32	10	38.5	-44.3	Vertical	-25

The emissions don't show in above result tables are more than 20dB below the limits

Note: both of Vertical and Horizontal polarization are evaluated, and only the worst case is recorded in this report

## 5.6. Frequency Stability

### 5.6.1. Test Standard

CFR 47 (FCC) part 2.1055, 22.355 , 24.235 and 27.54

### 5.6.2. Test Limit

According to part 22.355, from 821MHz to 896MHz, for mobile device, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances 2.5ppm.

FCC: §24.235 & §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### 5.6.3. Test Procedure

#### GSM/WCDMA

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&SCMU 200 Universal Radio Communication Tester.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30 °C.
3. With the EUT, powered via nominal voltage, connected to the CMU 200 and in a simulated call on mid channel (190 for GSM 850 & 4183 for WCDMA 850& 661 for PCS1900 & 9400), measure the carrier frequency. These measurements should be made within 2 minutes of powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10 °C increments from -30 °C to +50 °C. Allow at least 1 1/2 hours at each temperature, un-powered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Re-measure carrier frequency at low and high voltage. Pau seat nominal voltage for 1/2 hours un-powered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50 °C.
7. With the EUT, powered via nominal voltage, connected to the CMU 200 and in a simulated call on mid channel (190 for GSM 850 & 4183 for WCDMA 850& 661 for PCS1900 & 9400 for WCDMA 1900), measure the carrier frequency. These measurements should be made within 2 minutes of powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 °C increments from +50 °C to -30 °C. Allow at least 1/2 hours at each temperature, un-powered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5 °C during the measurement procedure.

#### LTE

1. The transmitter output (antenna port) was connected to the BS Simulator.
2. The BS simulator was used to set the TX channel and power level and modulate the TX signal with different bit patterns.
3. BS simulator used the frequency error function and measured the peak frequency

error. Power must be removed when changing from one temperature to another or one voltage to another voltage. Power warm up is at least 15 min and power applied should perform before recording frequency error. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

4. EUT is connected the external power supply to control the DC input power. The various Volts from the minimum 10.8 Volts to 13.2 Volts. Each step shall be record the frequency error rate.
5. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.
6. Extreme temperature rule is-30°C~50°C.

#### 5.6.4. Test Setup

Connect the EUT to the Wireless Communication test set CMU200 or CMW 500 via the connector. Then measure the frequency error by the Wireless Communication test set CMU200/CMW 500. The EUT's output is matched with a  $50 \Omega$  load.

#### 5.6.5. Test Data

### Measurement Results vs. Variation of Temperature—GSM850

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	836.6	14.33	Pass
-20 °C	836.6	16.59	Pass
-10 °C	836.6	14.40	Pass
0 °C	836.6	16.53	Pass
+10 °C	836.6	15.30	Pass
+20 °C	836.6	16.14	Pass
+30 °C	836.6	17.43	Pass
+40 °C	836.6	14.92	Pass
+50 °C	836.6	15.43	Pass

### Measurement Results vs. Variation of Voltage—GSM850

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
10.8 V	836.6	14.40	Pass
12 V	836.6	15.82	Pass
13.2 V	836.6	15.50	Pass

### Measurement Results vs. Variation of Temperature—EDGE850

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	836.6	11.14	Pass
-20 °C	836.6	11.17	Pass
-10 °C	836.6	10.30	Pass
0 °C	836.6	11.53	Pass
+10 °C	836.6	14.08	Pass
+20 °C	836.6	9.17	Pass
+30 °C	836.6	11.40	Pass
+40 °C	836.6	13.62	Pass
+50 °C	836.6	13.37	Pass

### Measurement Results vs. Variation of Voltage—EDGE850

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
10.8 V	836.6	10.43	Pass
12 V	836.6	11.24	Pass
13.2 V	836.6	12.11	Pass

### Measurement Results vs. Variation of Temperature—WCDMA850

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	836.6	-10.94	Pass
-20 °C	836.6	-18.17	Pass
-10 °C	836.6	-12.71	Pass
0 °C	836.6	-13.72	Pass
+10 °C	836.6	-17.21	Pass
+20 °C	836.6	-8.29	Pass
+30 °C	836.6	-16.71	Pass
+40 °C	836.6	-14.85	Pass
+50 °C	836.6	-15.29	Pass

### Measurement Results vs. Variation of Voltage—WCDMA850

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
10.8 V	836.6	-10.71	Pass
12 V	836.6	-14.25	Pass
13.2 V	836.6	-17.12	Pass

### Measurement Results vs. Variation of Temperature—GSM1900

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	1880.0	32.29	Pass
-20 °C	1880.0	33.19	Pass
-10 °C	1880.0	32.74	Pass
0 °C	1880.0	30.15	Pass
+10 °C	1880.0	34.48	Pass
+20 °C	1880.0	33.32	Pass
+30 °C	1880.0	32.41	Pass
+40 °C	1880.0	33.90	Pass
+50 °C	1880.0	36.22	Pass

### Measurement Results vs. Variation of Voltage—GSM1900

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
10.8 V	1880.0	35.51	Pass
12 V	1880.0	33.06	Pass
13.2 V	1880.0	34.22	Pass

### Measurement Results vs. Variation of Temperature—EDGE1900

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	1880.0	33.22	Pass
-20 °C	1880.0	35.77	Pass
-10 °C	1880.0	28.86	Pass
0 °C	1880.0	29.35	Pass
+10 °C	1880.0	31.45	Pass
+20 °C	1880.0	30.93	Pass
+30 °C	1880.0	28.80	Pass
+40 °C	1880.0	26.41	Pass
+50 °C	1880.0	26.96	Pass

### Measurement Results vs. Variation of Voltage—EDGE1900

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
10.8 V	1880.0	28.83	Pass
12 V	1880.0	29.51	Pass
13.2 V	1880.0	25.76	Pass

#### Measurement Results vs. Variation of Temperature—WCDMA1900

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	1880.0	-12.37	Pass
-20 °C	1880.0	-14.27	Pass
-10 °C	1880.0	-15.43	Pass
0 °C	1880.0	-4.85	Pass
+10 °C	1880.0	-12.15	Pass
+20 °C	1880.0	-13.32	Pass
+30 °C	1880.0	-17.97	Pass
+40 °C	1880.0	-14.05	Pass
+50 °C	1880.0	-14.11	Pass

#### Measurement Results vs. Variation of Voltage—WCDMA1900

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
10.8 V	1880.0	-13.35	Pass
12 V	1880.0	-15.95	Pass
13.2 V	1880.0	-7.83	Pass

Measurement Results vs. Variation of Voltage—LTE Band 2(Bandwidth:1.4MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	1880	10.8	-14.99	PASS
		12	-18.38	PASS
		13.2	-15.69	PASS
16QAM	1880	10.8	9.47	PASS
		12	-13.78	PASS
		13.2	-16.14	PASS

Measurement Results vs. Variation of Temperature—LTE Band 2(Bandwidth:1.4MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	1880	-30 °C	-13.06	PASS
		-20 °C	-11.27	PASS
		-10 °C	-12.29	PASS
		0 °C	-13.09	PASS
		+10 °C	-18.90	PASS
		+20 °C	-13.60	PASS
		+30 °C	-20.07	PASS
		+40 °C	-15.48	PASS
		+50 °C	-13.76	PASS
16QAM	1880	-30 °C	-14.19	PASS
		-20 °C	-16.67	PASS
		-10 °C	-13.56	PASS
		0 °C	-16.48	PASS
		+10 °C	-17.08	PASS
		+20 °C	-17.94	PASS
		+30 °C	-12.67	PASS
		+40 °C	-13.07	PASS
		+50 °C	-14.06	PASS

Measurement Results vs. Variation of Voltage—LTE Band 2(Bandwidth:3MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	1880	10.8	-13.10	PASS
		12	-18.45	PASS
		13.2	-17.24	PASS
16QAM	1880	10.8	-21.24	PASS
		12	-13.95	PASS
		13.2	-12.87	PASS

Measurement Results vs. Variation of Temperature—LTE Band 2(Bandwidth:3MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	1880	-30 °C	-18.15	PASS
		-20 °C	-18.41	PASS
		-10 °C	-12.57	PASS
		0 °C	-14.99	PASS
		+10 °C	-14.09	PASS
		+20 °C	-14.68	PASS
		+30 °C	-18.02	PASS
		+40 °C	-14.39	PASS
		+50 °C	-17.42	PASS
16QAM	1880	-30 °C	-15.94	PASS
		-20 °C	-12.03	PASS
		-10 °C	-17.61	PASS
		0 °C	-13.20	PASS
		+10 °C	-19.83	PASS
		+20 °C	-17.38	PASS
		+30 °C	-16.09	PASS
		+40 °C	-12.47	PASS
		+50 °C	-18.75	PASS

Measurement Results vs. Variation of Voltage—LTE Band 2(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	1880	10.8	-10.03	PASS
		12	-18.34	PASS
		13.2	-10.99	PASS
16QAM	1880	10.8	-12.12	PASS
		12	-14.76	PASS
		13.2	-9.78	PASS

Measurement Results vs. Variation of Temperature—LTE Band 2(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	1880	-30 °C	-11.63	PASS
		-20 °C	-10.90	PASS
		-10 °C	-15.23	PASS
		0 °C	-12.92	PASS
		+10 °C	-17.17	PASS
		+20 °C	-16.15	PASS
		+30 °C	-15.01	PASS
		+40 °C	-16.89	PASS
		+50 °C	-15.64	PASS
16QAM	1880	-30 °C	-11.84	PASS
		-20 °C	-17.95	PASS
		-10 °C	-13.07	PASS
		0 °C	-17.29	PASS
		+10 °C	-12.72	PASS
		+20 °C	-15.82	PASS
		+30 °C	-19.54	PASS
		+40 °C	-20.70	PASS
		+50 °C	-12.76	PASS

Measurement Results vs. Variation of Voltage—LTE Band 2(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	1880	10.8	-12.49	PASS
		12	-15.48	PASS
		13.2	-17.91	PASS
16QAM	1880	10.8	-10.01	PASS
		12	-14.06	PASS
		13.2	-11.60	PASS

Measurement Results vs. Variation of Temperature—LTE Band 2(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	1880	-30 °C	-16.47	PASS
		-20 °C	-15.18	PASS
		-10 °C	-18.38	PASS
		0 °C	-20.93	PASS
		+10 °C	-14.46	PASS
		+20 °C	-18.70	PASS
		+30 °C	-17.05	PASS
		+40 °C	-16.09	PASS
		+50 °C	-15.66	PASS
16QAM	1880	-30 °C	-12.37	PASS
		-20 °C	21.60	PASS
		-10 °C	-15.02	PASS
		0 °C	-14.03	PASS
		+10 °C	-16.26	PASS
		+20 °C	-15.78	PASS
		+30 °C	-13.09	PASS
		+40 °C	-12.73	PASS
		+50 °C	-11.59	PASS

Measurement Results vs. Variation of Voltage—LTE Band 2(Bandwidth:15MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	1880	10.8	-13.46	PASS
		12	-18.94	PASS
		13.2	-13.90	PASS
16QAM	1880	10.8	-18.70	PASS
		12	-14.81	PASS
		13.2	-11.09	PASS

Measurement Results vs. Variation of Temperature—LTE Band 2(Bandwidth:15MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	1880	-30 °C	-15.52	PASS
		-20 °C	-10.99	PASS
		-10 °C	-14.36	PASS
		0 °C	-19.78	PASS
		+10 °C	-18.04	PASS
		+20 °C	-19.24	PASS
		+30 °C	-18.17	PASS
		+40 °C	-12.85	PASS
		+50 °C	-15.95	PASS
16QAM	1880	-30 °C	-20.71	PASS
		-20 °C	-17.55	PASS
		-10 °C	-13.56	PASS
		0 °C	-14.82	PASS
		+10 °C	-12.26	PASS
		+20 °C	-11.43	PASS
		+30 °C	-12.86	PASS
		+40 °C	-13.29	PASS
		+50 °C	-13.49	PASS

Measurement Results vs. Variation of Voltage—LTE Band 2(Bandwidth:20MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	1880	10.8	-13.58	PASS
		12	-18.31	PASS
		13.2	-18.95	PASS
16QAM	1880	10.8	-13.65	PASS
		12	-14.15	PASS
		13.2	-13.28	PASS

Measurement Results vs. Variation of Temperature—LTE Band 2(Bandwidth:20MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	1880	-30 °C	-8.98	PASS
		-20 °C	-12.36	PASS
		-10 °C	-15.96	PASS
		0 °C	-17.41	PASS
		+10 °C	-18.48	PASS
		+20 °C	-11.57	PASS
		+30 °C	-16.32	PASS
		+40 °C	-16.37	PASS
		+50 °C	-14.19	PASS
16QAM	1880	-30 °C	-12.99	PASS
		-20 °C	-24.40	PASS
		-10 °C	11.27	PASS
		0 °C	-11.96	PASS
		+10 °C	-13.39	PASS
		+20 °C	-13.96	PASS
		+30 °C	-13.26	PASS
		+40 °C	-14.88	PASS
		+50 °C	-10.40	PASS

Measurement Results vs. Variation of Voltage—LTE Band 4(Bandwidth:1.4MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	1732.5	10.8	-12.09	PASS
		12	-15.26	PASS
		13.2	-13.38	PASS
16QAM	1732.5	10.8	-15.38	PASS
		12	-11.86	PASS
		13.2	-11.40	PASS

Measurement Results vs. Variation of Temperature—LTE Band 4(Bandwidth:1.4MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	1732.5	-30 °C	-11.03	PASS
		-20 °C	-10.81	PASS
		-10 °C	-13.52	PASS
		0 °C	-11.17	PASS
		+10 °C	-11.87	PASS
		+20 °C	-9.63	PASS
		+30 °C	-14.13	PASS
		+40 °C	-11.06	PASS
		+50 °C	-10.33	PASS
16QAM	1732.5	-30 °C	-14.10	PASS
		-20 °C	-11.94	PASS
		-10 °C	-15.18	PASS
		0 °C	-14.05	PASS
		+10 °C	-11.54	PASS
		+20 °C	-13.22	PASS
		+30 °C	-10.11	PASS
		+40 °C	-13.23	PASS
		+50 °C	-13.88	PASS

Measurement Results vs. Variation of Voltage—LTE Band 4(Bandwidth:3MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	1732.5	10.8	-10.96	PASS
		12	-13.92	PASS
		13.2	-9.81	PASS
16QAM	1732.5	10.8	-12.59	PASS
		12	-13.85	PASS
		13.2	-12.13	PASS

Measurement Results vs. Variation of Temperature—LTE Band 4(Bandwidth:3MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	1732.5	-30 °C	10.04	PASS
		-20 °C	-10.71	PASS
		-10 °C	-15.75	PASS
		0 °C	-15.21	PASS
		+10 °C	-13.43	PASS
		+20 °C	-10.77	PASS
		+30 °C	-14.55	PASS
		+40 °C	-17.87	PASS
		+50 °C	-15.66	PASS
16QAM	1732.5	-30 °C	-13.82	PASS
		-20 °C	-14.79	PASS
		-10 °C	-13.58	PASS
		0 °C	13.76	PASS
		+10 °C	-16.92	PASS
		+20 °C	-11.62	PASS
		+30 °C	9.94	PASS
		+40 °C	-11.44	PASS
		+50 °C	-11.26	PASS

Measurement Results vs. Variation of Voltage—LTE Band 4(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	1732.5	10.8	-13.86	PASS
		12	-12.12	PASS
		13.2	-12.10	PASS
16QAM	1732.5	10.8	-13.48	PASS
		12	-12.03	PASS
		13.2	-13.88	PASS

Measurement Results vs. Variation of Temperature—LTE Band 4(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	1732.5	-30 °C	-12.92	PASS
		-20 °C	-10.41	PASS
		-10 °C	-16.85	PASS
		0 °C	-16.64	PASS
		+10 °C	-12.26	PASS
		+20 °C	-13.92	PASS
		+30 °C	-15.11	PASS
		+40 °C	-11.63	PASS
		+50 °C	-15.12	PASS
16QAM	1732.5	-30 °C	-9.54	PASS
		-20 °C	-9.91	PASS
		-10 °C	-10.17	PASS
		0 °C	-12.87	PASS
		+10 °C	-11.37	PASS
		+20 °C	-10.33	PASS
		+30 °C	-13.93	PASS
		+40 °C	-15.36	PASS
		+50 °C	-14.41	PASS

Measurement Results vs. Variation of Voltage—LTE Band 4(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	1732.5	10.8	-11.37	PASS
		12	15.11	PASS
		13.2	-11.37	PASS
16QAM	1732.5	10.8	-7.10	PASS
		12	11.40	PASS
		13.2	-12.32	PASS

Measurement Results vs. Variation of Temperature—LTE Band 4(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	1732.5	-30 °C	-14.18	PASS
		-20 °C	-12.39	PASS
		-10 °C	-15.98	PASS
		0 °C	-10.24	PASS
		+10 °C	-14.83	PASS
		+20 °C	-14.78	PASS
		+30 °C	-8.44	PASS
		+40 °C	-14.68	PASS
		+50 °C	-16.58	PASS
16QAM	1732.5	-30 °C	-11.83	PASS
		-20 °C	-10.33	PASS
		-10 °C	-15.64	PASS
		0 °C	-11.86	PASS
		+10 °C	-7.80	PASS
		+20 °C	-14.91	PASS
		+30 °C	-17.55	PASS
		+40 °C	-17.27	PASS
		+50 °C	-21.17	PASS

Measurement Results vs. Variation of Voltage—LTE Band 4(Bandwidth:15MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	1732.5	10.8	-12.52	PASS
		12	-15.02	PASS
		13.2	-11.84	PASS
16QAM	1732.5	10.8	-12.30	PASS
		12	-8.45	PASS
		13.2	-9.93	PASS

Measurement Results vs. Variation of Temperature—LTE Band 4(Bandwidth:15MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	1732.5	-30 °C	-19.40	PASS
		-20 °C	-19.54	PASS
		-10 °C	-17.64	PASS
		0 °C	-13.18	PASS
		+10 °C	-11.66	PASS
		+20 °C	-11.69	PASS
		+30 °C	-12.52	PASS
		+40 °C	7.28	PASS
		+50 °C	-10.91	PASS
16QAM	1732.5	-30 °C	-12.60	PASS
		-20 °C	-12.40	PASS
		-10 °C	-10.61	PASS
		0 °C	-17.15	PASS
		+10 °C	-17.15	PASS
		+20 °C	-19.50	PASS
		+30 °C	-20.13	PASS
		+40 °C	-15.08	PASS
		+50 °C	-17.40	PASS

Measurement Results vs. Variation of Voltage—LTE Band 4(Bandwidth:20MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	1732.5	10.8	-13.73	PASS
		12	-17.97	PASS
		13.2	-12.29	PASS
16QAM	1732.5	10.8	-17.14	PASS
		12	-18.53	PASS
		13.2	-17.09	PASS

Measurement Results vs. Variation of Temperature—LTE Band 4(Bandwidth:20MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	1732.5	-30 °C	-8.71	PASS
		-20 °C	-13.43	PASS
		-10 °C	-10.70	PASS
		0 °C	-11.13	PASS
		+10 °C	-11.04	PASS
		+20 °C	-12.85	PASS
		+30 °C	-9.00	PASS
		+40 °C	-8.94	PASS
		+50 °C	-9.43	PASS
16QAM	1732.5	-30 °C	-9.33	PASS
		-20 °C	-14.62	PASS
		-10 °C	-16.19	PASS
		0 °C	-14.56	PASS
		+10 °C	-14.38	PASS
		+20 °C	-15.89	PASS
		+30 °C	-9.84	PASS
		+40 °C	-9.61	PASS
		+50 °C	-8.18	PASS

Measurement Results vs. Variation of Voltage—LTE Band 5(Bandwidth:1.4MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	836.5	10.8	-11.10	PASS
		12	-11.46	PASS
		13.2	-10.71	PASS
16QAM	836.5	10.8	-12.86	PASS
		12	-13.82	PASS
		13.2	-11.99	PASS

Measurement Results vs. Variation of Temperature—LTE Band 5(Bandwidth:1.4MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	836.5	-30 °C	-11.92	PASS
		-20 °C	-8.48	PASS
		-10 °C	-10.99	PASS
		0 °C	-11.12	PASS
		+10 °C	-9.86	PASS
		+20 °C	-11.42	PASS
		+30 °C	-7.93	PASS
		+40 °C	-13.29	PASS
		+50 °C	-9.91	PASS
16QAM	836.5	-30 °C	-11.63	PASS
		-20 °C	-13.12	PASS
		-10 °C	-10.80	PASS
		0 °C	-11.00	PASS
		+10 °C	-13.86	PASS
		+20 °C	-14.29	PASS
		+30 °C	-13.29	PASS
		+40 °C	-11.92	PASS
		+50 °C	-10.03	PASS

Measurement Results vs. Variation of Voltage—LTE Band 5(Bandwidth:3MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	836.5	10.8	-11.10	PASS
		12	-11.29	PASS
		13.2	-13.83	PASS
16QAM	836.5	10.8	-14.43	PASS
		12	-11.83	PASS
		13.2	-13.26	PASS

Measurement Results vs. Variation of Temperature—LTE Band 5(Bandwidth:3MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	836.5	-30 °C	-11.50	PASS
		-20 °C	-10.70	PASS
		-10 °C	-11.42	PASS
		0 °C	-10.70	PASS
		+10 °C	-15.01	PASS
		+20 °C	-9.87	PASS
		+30 °C	-12.42	PASS
		+40 °C	-14.49	PASS
		+50 °C	-11.42	PASS
16QAM	836.5	-30 °C	-8.07	PASS
		-20 °C	-11.63	PASS
		-10 °C	-9.68	PASS
		0 °C	-14.89	PASS
		+10 °C	-13.43	PASS
		+20 °C	-15.06	PASS
		+30 °C	-9.78	PASS
		+40 °C	-9.40	PASS
		+50 °C	-10.09	PASS

Measurement Results vs. Variation of Voltage—LTE Band 5(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	836.5	10.8	-12.63	PASS
		12	-11.09	PASS
		13.2	-11.40	PASS
16QAM	836.5	10.8	-10.60	PASS
		12	-10.93	PASS
		13.2	-9.14	PASS

Measurement Results vs. Variation of Temperature—LTE Band 5(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	836.5	-30 °C	-10.61	PASS
		-20 °C	-9.63	PASS
		-10 °C	-13.62	PASS
		0 °C	-8.23	PASS
		+10 °C	-9.37	PASS
		+20 °C	-7.01	PASS
		+30 °C	-11.47	PASS
		+40 °C	-11.82	PASS
		+50 °C	-10.36	PASS
16QAM	836.5	-30 °C	-8.04	PASS
		-20 °C	-14.78	PASS
		-10 °C	-9.44	PASS
		0 °C	-8.18	PASS
		+10 °C	-10.21	PASS
		+20 °C	-16.74	PASS
		+30 °C	-12.07	PASS
		+40 °C	-13.38	PASS
		+50 °C	-14.28	PASS

Measurement Results vs. Variation of Voltage—LTE Band 5(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	836.5	10.8	-11.00	PASS
		12	-10.61	PASS
		13.2	-8.80	PASS
16QAM	836.5	10.8	-11.22	PASS
		12	-13.50	PASS
		13.2	-14.15	PASS

Measurement Results vs. Variation of Temperature—LTE Band 5(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	836.5	-30 °C	-14.23	PASS
		-20 °C	-10.17	PASS
		-10 °C	-9.46	PASS
		0 °C	-9.74	PASS
		+10 °C	-6.88	PASS
		+20 °C	-8.63	PASS
		+30 °C	-13.85	PASS
		+40 °C	-10.11	PASS
		+50 °C	-8.96	PASS
16QAM	836.5	-30 °C	-7.77	PASS
		-20 °C	-9.06	PASS
		-10 °C	-12.99	PASS
		0 °C	-13.09	PASS
		+10 °C	-14.58	PASS
		+20 °C	-14.49	PASS
		+30 °C	-10.21	PASS
		+40 °C	-14.56	PASS
		+50 °C	-15.82	PASS

Measurement Results vs. Variation of Voltage—LTE Band 7(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	2535	10.8	-19.63	PASS
		12	-21.19	PASS
		13.2	-25.86	PASS
16QAM	2535	10.8	-16.24	PASS
		12	-18.40	PASS
		13.2	-26.04	PASS

Measurement Results vs. Variation of Temperature—LTE Band 7(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	2535	-30 °C	-11.73	PASS
		-20 °C	-7.48	PASS
		-10 °C	-12.60	PASS
		0 °C	-9.77	PASS
		+10 °C	-9.87	PASS
		+20 °C	-9.38	PASS
		+30 °C	-9.03	PASS
		+40 °C	-8.44	PASS
		+50 °C	-11.86	PASS
16QAM	2535	-30 °C	-13.20	PASS
		-20 °C	-13.12	PASS
		-10 °C	-17.50	PASS
		0 °C	-12.70	PASS
		+10 °C	-11.50	PASS
		+20 °C	-15.13	PASS
		+30 °C	-12.87	PASS
		+40 °C	-11.50	PASS
		+50 °C	-10.70	PASS

Measurement Results vs. Variation of Temperature—LTE Band 7(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	2535	10.8	-17.07	PASS
		12	-23.07	PASS
		13.2	-19.58	PASS
16QAM	2535	10.8	-23.02	PASS
		12	-20.31	PASS
		13.2	-25.22	PASS

Measurement Results vs. Variation of Temperature—LTE Band 7(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	2535	-30 °C	-14.12	PASS
		-20 °C	-20.83	PASS
		-10 °C	-8.44	PASS
		0 °C	-7.85	PASS
		+10 °C	-11.96	PASS
		+20 °C	-10.99	PASS
		+30 °C	-13.83	PASS
		+40 °C	-11.27	PASS
		+50 °C	-10.77	PASS
16QAM	2535	-30 °C	-9.81	PASS
		-20 °C	-13.45	PASS
		-10 °C	-12.06	PASS
		0 °C	-11.97	PASS
		+10 °C	-11.90	PASS
		+20 °C	-13.20	PASS
		+30 °C	-11.33	PASS
		+40 °C	-9.98	PASS
		+50 °C	-11.17	PASS

Measurement Results vs. Variation of Temperature—LTE Band 7(Bandwidth:15MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	2535	10.8	-24.58	PASS
		12	-24.30	PASS
		13.2	-52.06	PASS
16QAM	2535	10.8	-12.33	PASS
		12	-20.70	PASS
		13.2	-14.68	PASS

Measurement Results vs. Variation of Temperature—LTE Band 7(Bandwidth:15MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	2535	-30 °C	-9.03	PASS
		-20 °C	-11.13	PASS
		-10 °C	-8.74	PASS
		0 °C	-9.00	PASS
		+10 °C	-12.66	PASS
		+20 °C	-13.10	PASS
		+30 °C	-12.70	PASS
		+40 °C	-14.20	PASS
		+50 °C	-13.65	PASS
16QAM	2535	-30 °C	-13.85	PASS
		-20 °C	-14.45	PASS
		-10 °C	-12.22	PASS
		0 °C	-21.64	PASS
		+10 °C	-14.82	PASS
		+20 °C	-20.11	PASS
		+30 °C	-20.33	PASS
		+40 °C	-26.21	PASS
		+50 °C	13.38	PASS

Measurement Results vs. Variation of Temperature—LTE Band 7(Bandwidth:20MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	2535	10.8	-23.16	PASS
		12	-17.85	PASS
		13.2	-21.36	PASS
16QAM	2535	10.8	-21.14	PASS
		12	-21.79	PASS
		13.2	-19.25	PASS

Measurement Results vs. Variation of Temperature—LTE Band 7(Bandwidth:20MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	2535	-30 °C	21.56	PASS
		-20 °C	20.51	PASS
		-10 °C	14.02	PASS
		0 °C	17.09	PASS
		+10 °C	-21.41	PASS
		+20 °C	17.40	PASS
		+30 °C	-19.47	PASS
		+40 °C	19.71	PASS
		+50 °C	-18.77	PASS
16QAM	2535	-30 °C	-20.70	PASS
		-20 °C	-19.24	PASS
		-10 °C	-18.01	PASS
		0 °C	-19.76	PASS
		+10 °C	16.09	PASS
		+20 °C	-17.14	PASS
		+30 °C	-15.48	PASS
		+40 °C	24.20	PASS
		+50 °C	19.20	PASS

Measurement Results vs. Variation of Temperature—LTE Band 12(Bandwidth:1.4MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	707.5	10.8	-13.22	PASS
		12	-11.64	PASS
		13.2	-15.31	PASS
16QAM	707.5	10.8	6.37	PASS
		12	-15.55	PASS
		13.2	-7.48	PASS

Measurement Results vs. Variation of Temperature—LTE Band 12(Bandwidth:1.4MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	707.5	-30 °C	19.07	PASS
		-20 °C	-27.42	PASS
		-10 °C	-20.11	PASS
		0 °C	-17.64	PASS
		+10 °C	20.41	PASS
		+20 °C	21.62	PASS
		+30 °C	-18.95	PASS
		+40 °C	15.76	PASS
		+50 °C	-19.15	PASS
16QAM	707.5	-30 °C	-22.89	PASS
		-20 °C	-16.75	PASS
		-10 °C	-18.61	PASS
		0 °C	-18.58	PASS
		+10 °C	-27.88	PASS
		+20 °C	-25.32	PASS
		+30 °C	-18.80	PASS
		+40 °C	18.45	PASS
		+50 °C	16.39	PASS

Measurement Results vs. Variation of Temperature—LTE Band 12(Bandwidth:3MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	707.5	10.8	-15.56	PASS
		12	-12.26	PASS
		13.2	-16.28	PASS
16QAM	707.5	10.8	-13.62	PASS
		12	-10.27	PASS
		13.2	-9.44	PASS

Measurement Results vs. Variation of Temperature—LTE Band 12(Bandwidth:3MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	707.5	-30 °C	-17.17	PASS
		-20 °C	19.50	PASS
		-10 °C	15.32	PASS
		0 °C	-25.29	PASS
		+10 °C	-22.80	PASS
		+20 °C	-21.86	PASS
		+30 °C	-23.62	PASS
		+40 °C	-23.12	PASS
		+50 °C	-22.32	PASS
16QAM	707.5	-30 °C	-25.53	PASS
		-20 °C	-18.35	PASS
		-10 °C	-18.15	PASS
		0 °C	-20.01	PASS
		+10 °C	19.18	PASS
		+20 °C	-20.34	PASS
		+30 °C	-15.52	PASS
		+40 °C	15.99	PASS
		+50 °C	-17.47	PASS

Measurement Results vs. Variation of Temperature—LTE Band 12(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	707.5	10.8	-13.58	PASS
		12	-13.35	PASS
		13.2	-15.45	PASS
16QAM	707.5	10.8	-10.34	PASS
		12	-6.27	PASS
		13.2	-10.16	PASS

Measurement Results vs. Variation of Temperature—LTE Band 12(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	707.5	-30 °C	22.39	PASS
		-20 °C	-24.29	PASS
		-10 °C	-23.57	PASS
		0 °C	-19.03	PASS
		+10 °C	-16.81	PASS
		+20 °C	-22.79	PASS
		+30 °C	-19.14	PASS
		+40 °C	-28.17	PASS
		+50 °C	-24.69	PASS
16QAM	707.5	-30 °C	-14.86	PASS
		-20 °C	-21.72	PASS
		-10 °C	-19.88	PASS
		0 °C	-16.78	PASS
		+10 °C	17.85	PASS
		+20 °C	-25.23	PASS
		+30 °C	-21.96	PASS
		+40 °C	-20.33	PASS
		+50 °C	-15.31	PASS

Measurement Results vs. Variation of Temperature—LTE Band 12(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	707.5	10.8	-13.42	PASS
		12	-11.03	PASS
		13.2	-16.31	PASS
16QAM	707.5	10.8	-13.29	PASS
		12	-15.89	PASS
		13.2	-7.10	PASS

Measurement Results vs. Variation of Temperature—LTE Band 12(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	707.5	-30 °C	-24.96	PASS
		-20 °C	-18.14	PASS
		-10 °C	-28.15	PASS
		0 °C	-21.01	PASS
		+10 °C	-27.98	PASS
		+20 °C	-24.32	PASS
		+30 °C	18.34	PASS
		+40 °C	-18.95	PASS
		+50 °C	-21.93	PASS
16QAM	707.5	-30 °C	-20.87	PASS
		-20 °C	-21.00	PASS
		-10 °C	19.20	PASS
		0 °C	17.48	PASS
		+10 °C	-16.47	PASS
		+20 °C	-15.44	PASS
		+30 °C	-19.30	PASS
		+40 °C	-16.35	PASS
		+50 °C	20.33	PASS

Measurement Results vs. Variation of Temperature—LTE Band 13(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	782	10.8	-13.80	PASS
		12	-13.73	PASS
		13.2	-12.26	PASS
16QAM	782	10.8	-11.99	PASS
		12	-15.62	PASS
		13.2	-7.15	PASS

Measurement Results vs. Variation of Temperature—LTE Band 13(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	782	-30 °C	21.24	PASS
		-20 °C	15.11	PASS
		-10 °C	18.01	PASS
		0 °C	14.58	PASS
		+10 °C	-26.35	PASS
		+20 °C	-23.47	PASS
		+30 °C	-19.86	PASS
		+40 °C	-21.21	PASS
		+50 °C	-23.60	PASS
16QAM	782	-30 °C	-12.19	PASS
		-20 °C	17.77	PASS
		-10 °C	-22.36	PASS
		0 °C	19.37	PASS
		+10 °C	-16.38	PASS
		+20 °C	18.93	PASS
		+30 °C	18.34	PASS
		+40 °C	22.70	PASS
		+50 °C	22.03	PASS

Measurement Results vs. Variation of Temperature—LTE Band 13(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	782	10.8	-10.13	PASS
		12	-11.87	PASS
		13.2	-10.41	PASS
16QAM	782	10.8	-8.55	PASS
		12	-8.13	PASS
		13.2	-10.87	PASS

Measurement Results vs. Variation of Temperature—LTE Band 13(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	782	-30 °C	18.64	PASS
		-20 °C	-19.33	PASS
		-10 °C	-21.11	PASS
		0 °C	-24.83	PASS
		+10 °C	-20.79	PASS
		+20 °C	-20.46	PASS
		+30 °C	-10.21	PASS
		+40 °C	-9.04	PASS
		+50 °C	-13.35	PASS
16QAM	782	-30 °C	-12.95	PASS
		-20 °C	-13.95	PASS
		-10 °C	-11.47	PASS
		0 °C	-15.19	PASS
		+10 °C	-11.59	PASS
		+20 °C	-9.93	PASS
		+30 °C	-14.29	PASS
		+40 °C	-13.18	PASS
		+50 °C	-10.09	PASS

Measurement Results vs. Variation of Temperature—LTE Band 17(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	710	10.8	-12.65	PASS
		12	-13.48	PASS
		13.2	-11.92	PASS
16QAM	710	10.8	-12.79	PASS
		12	-12.56	PASS
		13.2	-12.87	PASS

Measurement Results vs. Variation of Temperature—LTE Band 17(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	710	-30 °C	-7.18	PASS
		-20 °C	-12.73	PASS
		-10 °C	-14.36	PASS
		0 °C	-12.87	PASS
		+10 °C	-8.83	PASS
		+20 °C	-12.39	PASS
		+30 °C	-13.76	PASS
		+40 °C	-14.22	PASS
		+50 °C	-7.30	PASS
16QAM	710	-30 °C	-5.16	PASS
		-20 °C	-7.52	PASS
		-10 °C	-9.18	PASS
		0 °C	-10.59	PASS
		+10 °C	-13.35	PASS
		+20 °C	-15.56	PASS
		+30 °C	-11.07	PASS
		+40 °C	-11.40	PASS
		+50 °C	-13.88	PASS

Measurement Results vs. Variation of Temperature—LTE Band 17(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	710	10.8	-8.73	PASS
		12	-7.45	PASS
		13.2	-10.34	PASS
16QAM	710	10.8	-6.47	PASS
		12	-4.59	PASS
		13.2	-7.67	PASS

Measurement Results vs. Variation of Temperature—LTE Band 17(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	710	-30 °C	-13.13	PASS
		-20 °C	-11.66	PASS
		-10 °C	-7.00	PASS
		0 °C	-10.94	PASS
		+10 °C	-9.47	PASS
		+20 °C	-13.68	PASS
		+30 °C	-11.50	PASS
		+40 °C	-6.48	PASS
		+50 °C	-12.75	PASS
16QAM	710	-30 °C	-12.65	PASS
		-20 °C	-12.76	PASS
		-10 °C	-14.49	PASS
		0 °C	-14.76	PASS
		+10 °C	-9.27	PASS
		+20 °C	-8.78	PASS
		+30 °C	-12.06	PASS
		+40 °C	-13.07	PASS
		+50 °C	-11.43	PASS

Measurement Results vs. Variation of Temperature—LTE Band 38(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	2595	10.8	22.02	PASS
		12	-19.93	PASS
		13.2	20.53	PASS
16QAM	2595	10.8	-13.80	PASS
		12	15.75	PASS
		13.2	-22.17	PASS

Measurement Results vs. Variation of Temperature—LTE Band 38(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	2595	-30 °C	11.30	PASS
		-20 °C	-18.63	PASS
		-10 °C	20.54	PASS
		0 °C	15.09	PASS
		+10 °C	18.58	PASS
		+20 °C	15.51	PASS
		+30 °C	16.89	PASS
		+40 °C	19.98	PASS
		+50 °C	-27.69	PASS
16QAM	2595	-30 °C	-13.72	PASS
		-20 °C	19.68	PASS
		-10 °C	17.65	PASS
		0 °C	17.34	PASS
		+10 °C	-16.06	PASS
		+20 °C	-13.50	PASS
		+30 °C	-15.42	PASS
		+40 °C	-15.36	PASS
		+50 °C	12.99	PASS

Measurement Results vs. Variation of Temperature—LTE Band 38(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	2595	10.8	-23.46	PASS
		12	21.72	PASS
		13.2	18.78	PASS
16QAM	2595	10.8	20.27	PASS
		12	18.91	PASS
		13.2	-21.10	PASS

Measurement Results vs. Variation of Temperature—LTE Band 38(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	2595	-30 °C	15.25	PASS
		-20 °C	16.06	PASS
		-10 °C	-19.61	PASS
		0 °C	-17.25	PASS
		+10 °C	16.92	PASS
		+20 °C	-16.47	PASS
		+30 °C	-15.88	PASS
		+40 °C	18.14	PASS
		+50 °C	20.28	PASS
16QAM	2595	-30 °C	15.76	PASS
		-20 °C	13.83	PASS
		-10 °C	18.24	PASS
		0 °C	20.47	PASS
		+10 °C	20.00	PASS
		+20 °C	22.33	PASS
		+30 °C	26.06	PASS
		+40 °C	22.93	PASS
		+50 °C	19.61	PASS

Measurement Results vs. Variation of Temperature—LTE Band 38(Bandwidth:15MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	2595	10.8	15.59	PASS
		12	19.48	PASS
		13.2	-15.86	PASS
16QAM	2595	10.8	-12.96	PASS
		12	21.94	PASS
		13.2	22.32	PASS

Measurement Results vs. Variation of Temperature—LTE Band 38(Bandwidth:15MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	2595	-30 °C	16.38	PASS
		-20 °C	19.41	PASS
		-10 °C	22.86	PASS
		0 °C	20.47	PASS
		+10 °C	-21.07	PASS
		+20 °C	-20.48	PASS
		+30 °C	-21.47	PASS
		+40 °C	-20.36	PASS
		+50 °C	-26.11	PASS
16QAM	2595	-30 °C	22.24	PASS
		-20 °C	18.93	PASS
		-10 °C	18.81	PASS
		0 °C	23.05	PASS
		+10 °C	24.29	PASS
		+20 °C	19.81	PASS
		+30 °C	22.76	PASS
		+40 °C	16.89	PASS
		+50 °C	19.61	PASS

Measurement Results vs. Variation of Temperature—LTE Band 38(Bandwidth:20MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	2595	10.8	19.41	PASS
		12	-17.22	PASS
		13.2	16.01	PASS
16QAM	2595	10.8	17.04	PASS
		12	-15.59	PASS
		13.2	17.75	PASS

Measurement Results vs. Variation of Temperature—LTE Band 38(Bandwidth:20MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	2595	-30 °C	-18.91	PASS
		-20 °C	-18.85	PASS
		-10 °C	-24.00	PASS
		0 °C	-24.91	PASS
		+10 °C	-23.73	PASS
		+20 °C	-21.00	PASS
		+30 °C	13.56	PASS
		+40 °C	27.08	PASS
		+50 °C	20.60	PASS
16QAM	2595	-30 °C	16.72	PASS
		-20 °C	19.00	PASS
		-10 °C	-11.83	PASS
		0 °C	15.11	PASS
		+10 °C	15.56	PASS
		+20 °C	16.52	PASS
		+30 °C	18.31	PASS
		+40 °C	-13.96	PASS
		+50 °C	16.98	PASS

Measurement Results vs. Variation of Temperature—LTE Band 41(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	2605	10.8	-18.25	PASS
		12	-16.71	PASS
		13.2	18.64	PASS
16QAM	2605	10.8	17.75	PASS
		12	-26.76	PASS
		13.2	16.71	PASS

Measurement Results vs. Variation of Temperature—LTE Band 41(Bandwidth:5MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	2605	-30 °C	16.97	PASS
		-20 °C	16.91	PASS
		-10 °C	-18.75	PASS
		0 °C	-23.88	PASS
		+10 °C	-15.29	PASS
		+20 °C	-23.53	PASS
		+30 °C	17.74	PASS
		+40 °C	-24.42	PASS
		+50 °C	-20.53	PASS
16QAM	2605	-30 °C	-20.89	PASS
		-20 °C	-15.22	PASS
		-10 °C	-20.96	PASS
		0 °C	-16.58	PASS
		+10 °C	16.54	PASS
		+20 °C	-17.67	PASS
		+30 °C	16.25	PASS
		+40 °C	-22.65	PASS
		+50 °C	17.31	PASS

Measurement Results vs. Variation of Temperature—LTE Band 41(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	2605	10.8	-36.55	PASS
		12	-21.64	PASS
		13.2	-19.43	PASS
16QAM	2605	10.8	-18.85	PASS
		12	-17.29	PASS
		13.2	-24.03	PASS

Measurement Results vs. Variation of Temperature—LTE Band 41(Bandwidth:10MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	2605	-30 °C	16.78	PASS
		-20 °C	-18.04	PASS
		-10 °C	16.98	PASS
		0 °C	-25.21	PASS
		+10 °C	-18.44	PASS
		+20 °C	-23.46	PASS
		+30 °C	-21.16	PASS
		+40 °C	-19.50	PASS
		+50 °C	-27.14	PASS
16QAM	2605	-30 °C	-22.06	PASS
		-20 °C	-17.90	PASS
		-10 °C	-20.97	PASS
		0 °C	-20.54	PASS
		+10 °C	-22.90	PASS
		+20 °C	-17.72	PASS
		+30 °C	-24.13	PASS
		+40 °C	-17.05	PASS
		+50 °C	-23.09	PASS

Measurement Results vs. Variation of Temperature—LTE Band 41(Bandwidth:15MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	2605	10.8	-31.41	PASS
		12	-30.94	PASS
		13.2	17.34	PASS
16QAM	2605	10.8	19.17	PASS
		12	-16.94	PASS
		13.2	20.81	PASS

Measurement Results vs. Variation of Temperature—LTE Band 41(Bandwidth:15MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	2605	-30 °C	-21.54	PASS
		-20 °C	-25.78	PASS
		-10 °C	-21.04	PASS
		0 °C	-15.49	PASS
		+10 °C	23.06	PASS
		+20 °C	-20.64	PASS
		+30 °C	-18.42	PASS
		+40 °C	-19.93	PASS
		+50 °C	23.40	PASS
16QAM	2605	-30 °C	20.17	PASS
		-20 °C	-17.84	PASS
		-10 °C	18.44	PASS
		0 °C	-22.93	PASS
		+10 °C	-21.23	PASS
		+20 °C	-20.46	PASS
		+30 °C	-23.16	PASS
		+40 °C	-16.77	PASS
		+50 °C	-22.13	PASS

Measurement Results vs. Variation of Temperature—LTE Band 41(Bandwidth:20MHz)

Modulation	Nominal Frequency (MHz)	Voltage [Vdc]	Measured Frequency Error(Hz)	Verdict
QPSK	2605	10.8	19.67	PASS
		12	23.39	PASS
		13.2	-22.49	PASS
16QAM	2605	10.8	-19.20	PASS
		12	15.01	PASS
		13.2	20.53	PASS

Measurement Results vs. Variation of Temperature—LTE Band 41(Bandwidth:20MHz)

Modulation	Nominal Frequency (MHz)	Temperature	Measured Frequency Error(Hz)	Verdict
QPSK	2605	-30 °C	-22.95	PASS
		-20 °C	-15.39	PASS
		-10 °C	-24.00	PASS
		0 °C	-16.59	PASS
		+10 °C	21.63	PASS
		+20 °C	-20.00	PASS
		+30 °C	19.23	PASS
		+40 °C	-23.60	PASS
		+50 °C	-23.10	PASS
16QAM	2605	-30 °C	-16.77	PASS
		-20 °C	14.18	PASS
		-10 °C	14.08	PASS
		0 °C	13.95	PASS
		+10 °C	-19.33	PASS
		+20 °C	-21.34	PASS
		+30 °C	-19.13	PASS
		+40 °C	20.84	PASS
		+50 °C	-20.71	PASS

## 6. APPENDIX I PRODUCT EQUALITY DECLARATION

### Product Equality Declaration

We: FAMOCO SAS, declare on our sole responsibility the differences between the hardware revision of **NFC Android Validator** products.

The new models of **NFC Android Validator** are:

- FX925SF-ING-VWDC-PRE,011P
- FX925SF-ING-VPDC-PRE,011P
- FX925SF-ING-VWDC-PRE,010P
- FX925SF-ING-VPDC-PRE,010P

All parts of hardware revision: FX925F-P.

**NFC Android Validator** models are made of two parts, a Front Casing, and a Back Casing. The composition of each model is described below.

Models	Front Casing Models	Back Casing Models
FX925SF-ING-VWDC-PRE,011P	FC-FX925SF-ING-PRE,0112	BC-VWDC-P366C,4
FX925SF-ING-VPDC-PRE,011P	FC-FX925SF-ING-PRE,0112	BC-VPDC-P366C,4
FX925SF-ING-VWDC-PRE,010P	FC-FX925SF-ING-PRE,0102	BC-VWDC-P366C,4
FX925SF-ING-VPDC-PRE,010P	FC-FX925SF-ING-PRE,0102	BC-VPDC-P366C,4

The original models of **NFC Android Validator** are:

- FX925F PM
- FX925F WM

All parts of hardware revision: FX925F,1

They are also made of two parts, a Front Casing and a Back Casing. The composition of each model is described below.

Models	Front Casing Models	Back Casing Models
FX925F WM	FC-FX925SF-ING-PRE,0112	BC-VWDC-P366C,2
FX925F PM	FC-FX925SF-ING-PRE,0112	BC-VPDC-P366C,2

Differences between **NFC Android Validator** hardware revisions FX925F,1 and FX925F-P are listed below.

To identify product pieces described below products exploded views are at the end of this document.

*Table 1: List of differences between the two Front Casing versions of NFC Android Validators FC-FX925SF-ING-PRE,0112 and FC-FX925SF-ING-PRE,0102:*

#	Differences	FC-FX925SF-ING-PRE,0112	FC-FX925SF-ING-PRE,0102
#1	Battery	<ul style="list-style-type: none"> <li>• 1 Smartphone battery</li> </ul>	<ul style="list-style-type: none"> <li>• No smartphone battery</li> </ul>

*Table 2: List of differences between the two Back Casing versions of NFC Android Validators BC-VWDC-P447C,4 and BC-VPDC-P447C,4:*

#	Differences	BC-VWDC-P366C,4	BC-VPDC-P366C,4
#1	Mechanical parts	<ul style="list-style-type: none"> <li>• Wall mount</li> </ul>	<ul style="list-style-type: none"> <li>• Pole mount</li> </ul>

*Table 3: List of differences between the NFC Android Validator Back Casings Wall BC-VWDC-P366C,2 and BC-VWDC-P366C,4:*

#	Differences	NFC Android Validator BC-VWDC-P366C,2	NFC Android Validator BC-VWDC-P366C,4
#1	PCBA POWER	<ul style="list-style-type: none"> <li>• PCBA PWR V18 with ferrites on cables</li> </ul>	<ul style="list-style-type: none"> <li>• PCBA PWR V07</li> </ul>

*Table 4: List of differences between the NFC Android Validator Back Casing Pole BC-VPDC-P366C,4 and BC-VPDC-P366C,4:*

#	Differences	NFC Android Validator BC-VPDC-P366C,2	NFC Android Validator BC-VPDC-P366C,4
#1	PCBA PWR	<ul style="list-style-type: none"> <li>• PCBA PWR V18 with ferrites on cables</li> </ul>	<ul style="list-style-type: none"> <li>• PCBA PWR V07</li> </ul>

*Table 5: List of differences between the FX925SF-ING-VWDC-PRE,011P, FX925SF-ING-VWDC-PRE,010P, FX925SF-ING-VPDC-PRE,011P, FX925SF-ING-VPDC-PRE,010P, and FX925F WM, FX925F PM*

Models	Software version
FX925SF-ING-VWDC-PRE,011P, FX925SF-ING-VWDC-PRE,010P FX925SF-ING-VPDC-PRE,011P, FX925SF-ING-VPDC-PRE,010P	MOLY.LR12A.R2.MP.V44.1.P1
FX925F WM, FX925F PM	MOLY.LR12A.R2.MP.V44.1

-----End of Report-----