

5.7.Spurious Emissions at Antenna Terminals

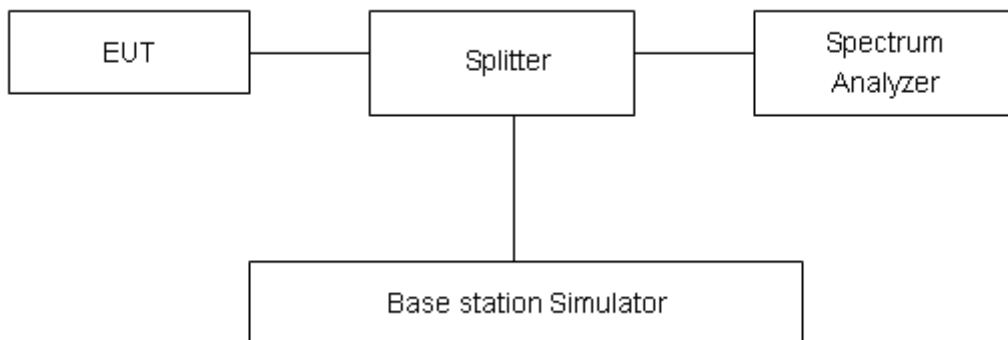
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier. The peak detector is used.set RBW 1MHz and VBW is 3MHz, Sweep is set to ATUO.

Test setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee’s frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log₁₀ (P) dB.”

Limit	-13 dBm

Measurement Uncertainty

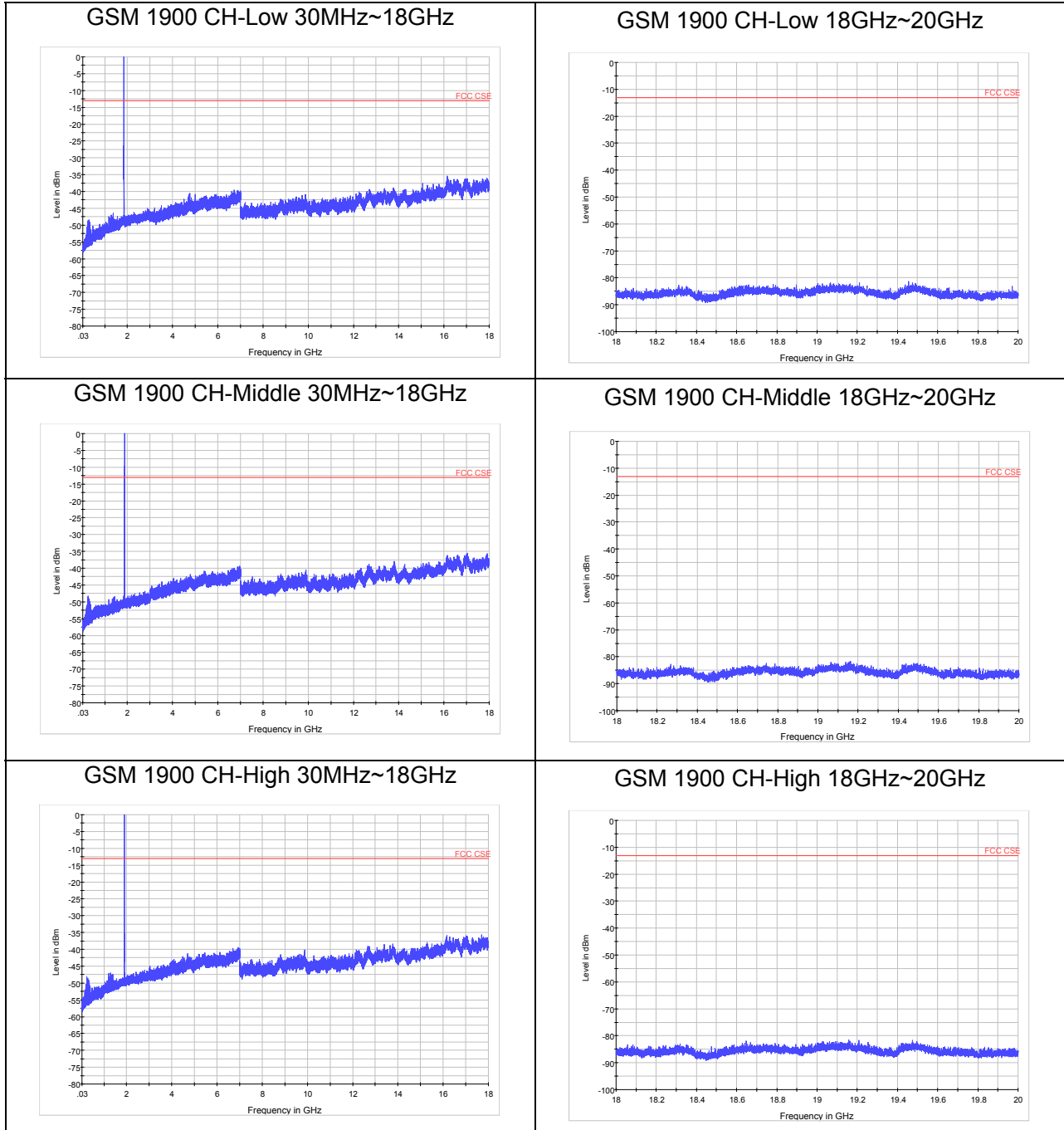
The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-18GHz	1.407 dB

Test Result

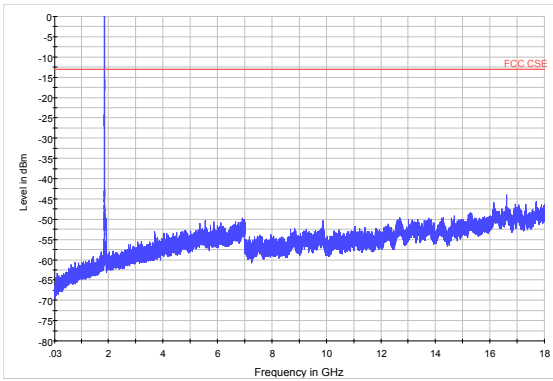
Sweep from 9 kHz to 30MHz, and the emissions more than 20 dB below the permissible value are not reported.

If disturbances were found more than 20dB below limit line, the mark is not required for the EUT.
The signal beyond the limit is carrier.

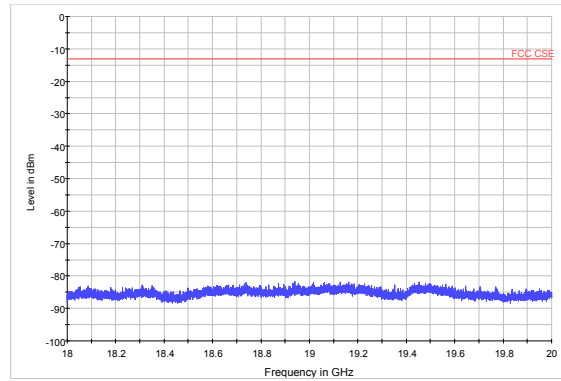




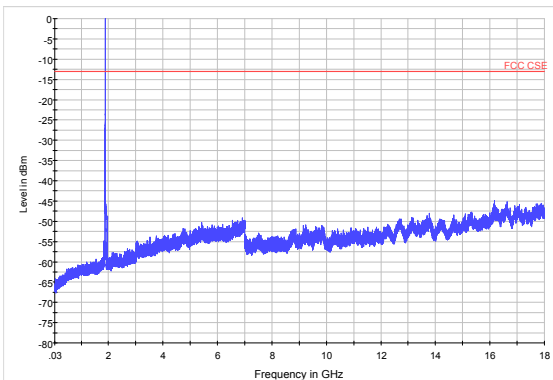
WCDMA Band II CH-Low 30MHz~18GHz



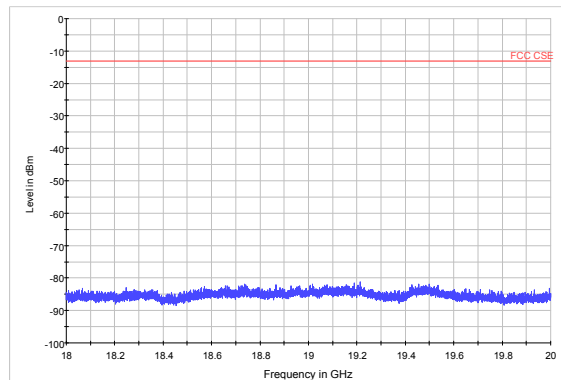
WCDMA Band II CH-Low 18GHz~20GHz



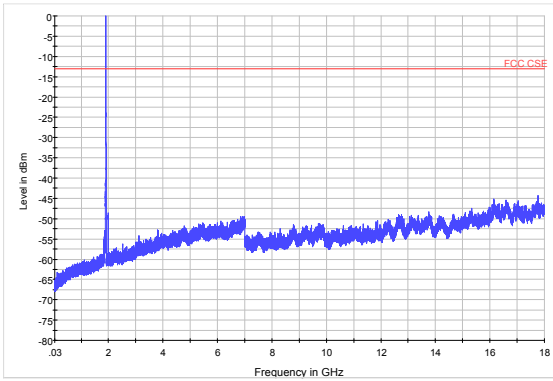
WCDMA Band II CH-Middle 30MHz~18GHz



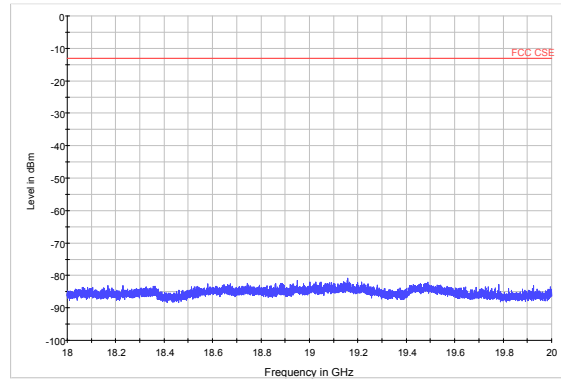
WCDMA Band II CH-Middle 18GHz~20GHz



WCDMA Band II CH-High 30MHz~18GHz

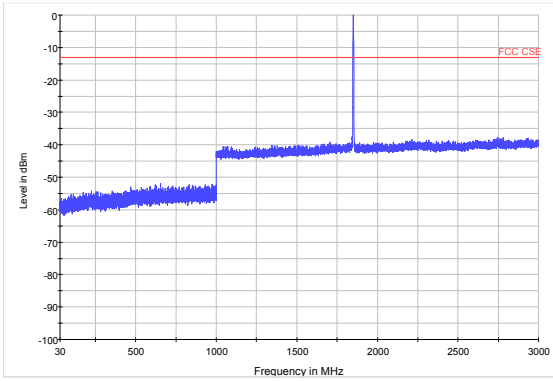


WCDMA Band II CH-High 18GHz~20GHz

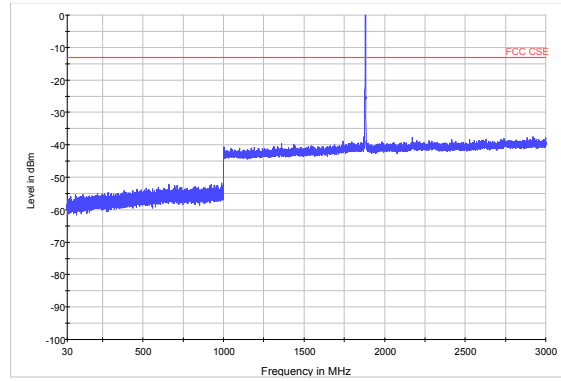




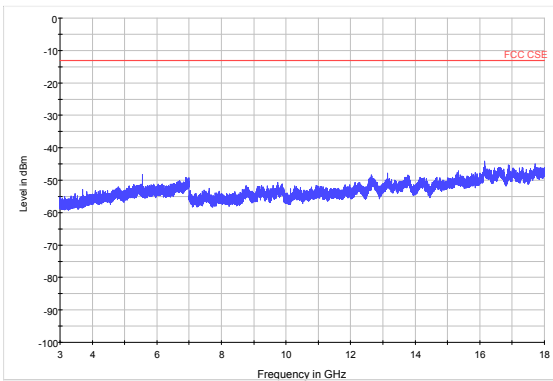
LTE Band 2 1.4MHz CH-Low 30MHz~3GHz



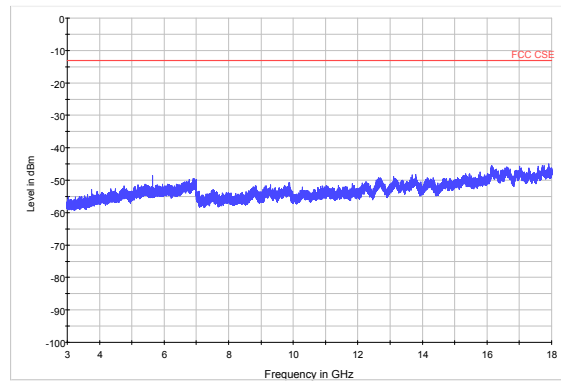
LTE Band 2 1.4MHz CH-Middle 30MHz~3GHz



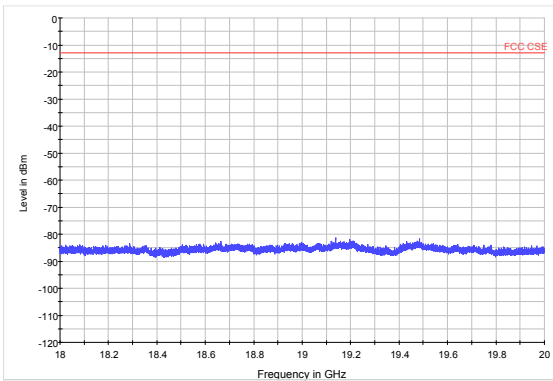
LTE Band 2 1.4MHz CH-Low 3GHz~18GHz



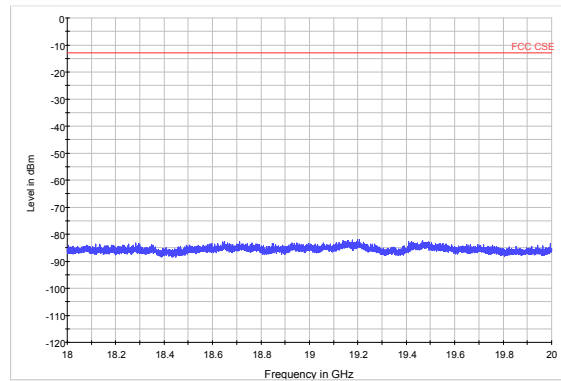
LTE Band 2 1.4MHz CH-Middle 3GHz~18GHz



LTE Band 2 1.4MHz CH-Low 18GHz~20GHz

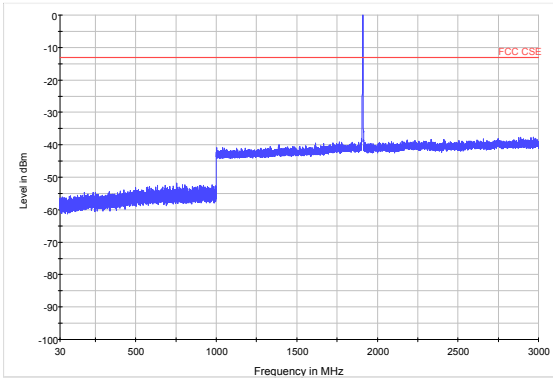


LTE Band 2 1.4MHz CH-Middle 18GHz~20GHz

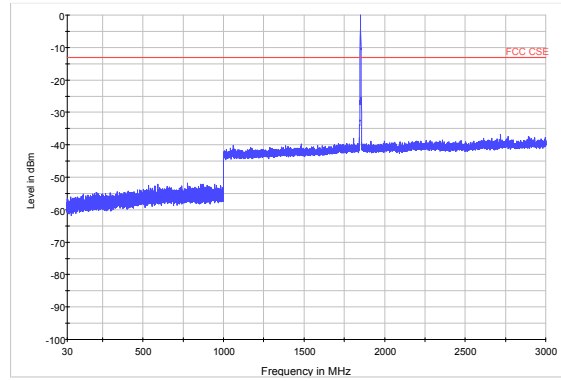




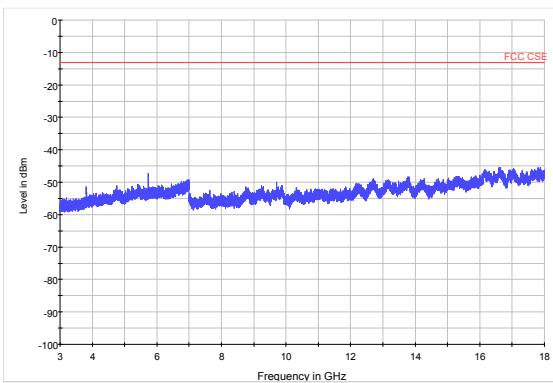
LTE Band 2 1.4MHz CH-High 30MHz~3GHz



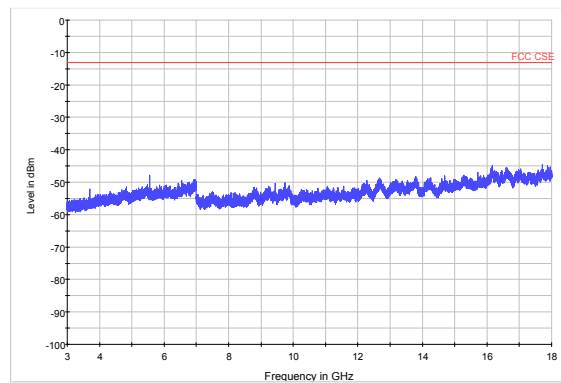
LTE Band 2 3MHz CH-Low 30MHz~3GHz



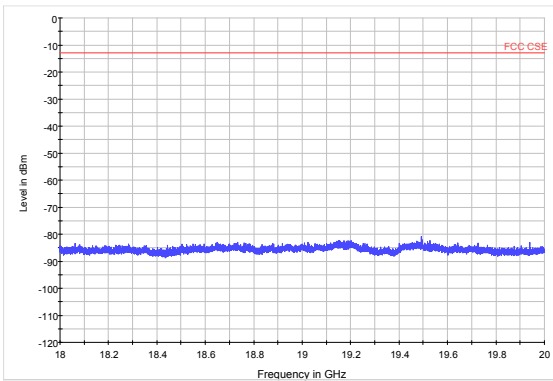
LTE Band 2 1.4MHz CH-High 3GHz~18GHz



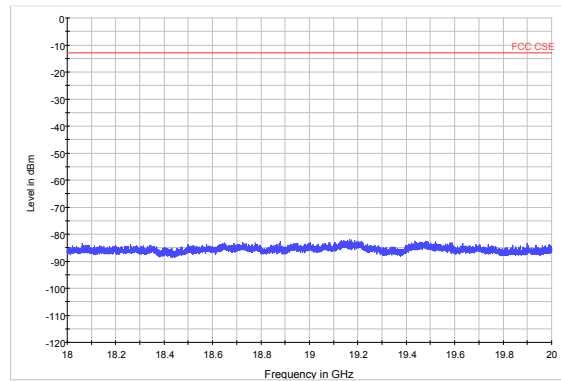
LTE Band 2 3MHz CH-Low 3GHz~18GHz



LTE Band 2 1.4MHz CH-High 18GHz~20GHz

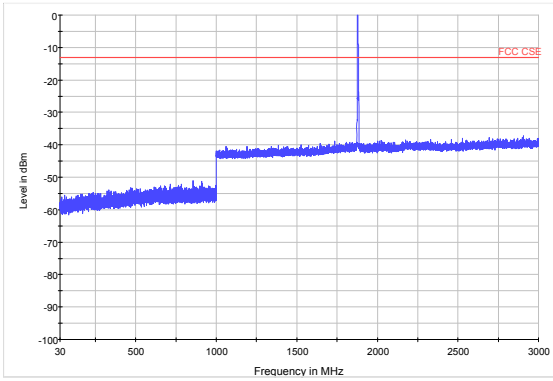


LTE Band 2 3MHz CH-Low 18GHz~20GHz

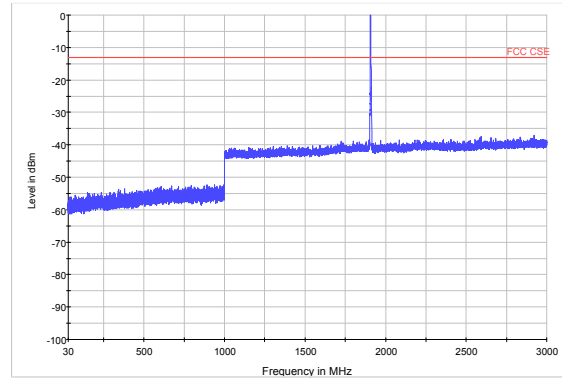




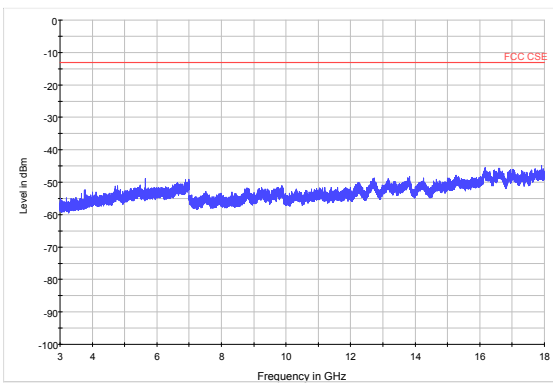
LTE Band 2 3MHz CH-Middle 30MHz~3GHz



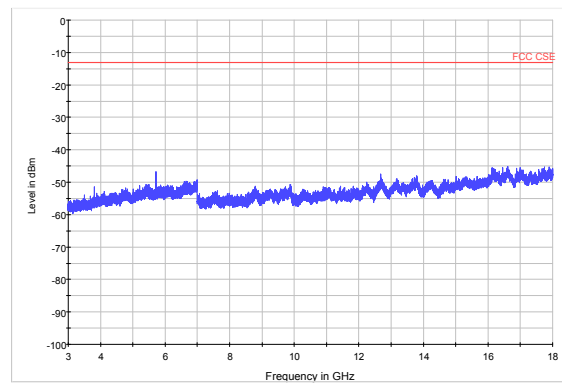
LTE Band 2 3MHz CH-High 30MHz~3GHz



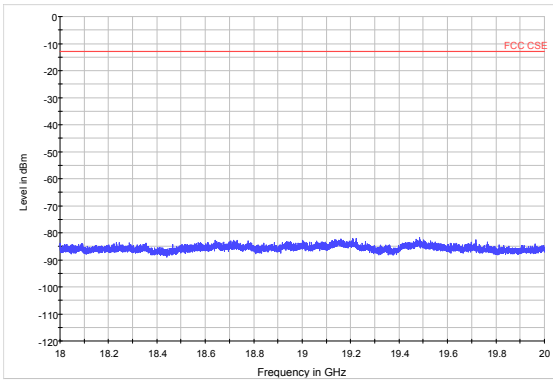
LTE Band 2 3MHz CH-Middle 3GHz~18GHz



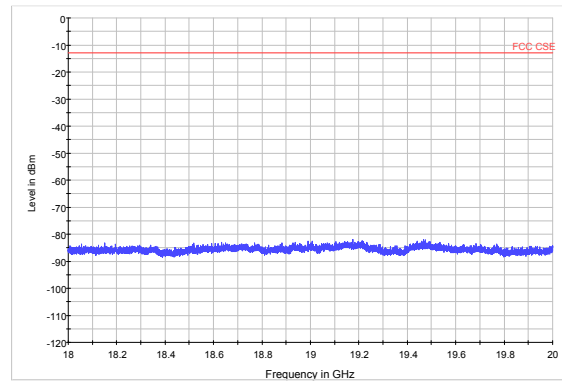
LTE Band 2 3MHz CH-High 3GHz~18GHz



LTE Band 2 3MHz CH-Middle 18GHz~20GHz

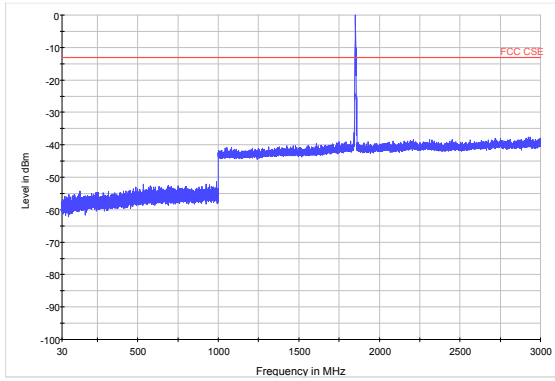


LTE Band 2 3MHz CH-High 18GHz~20GHz

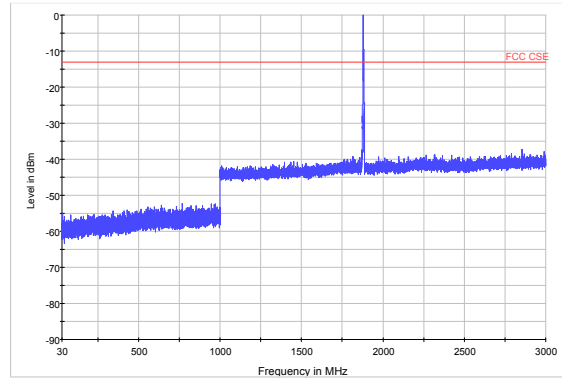




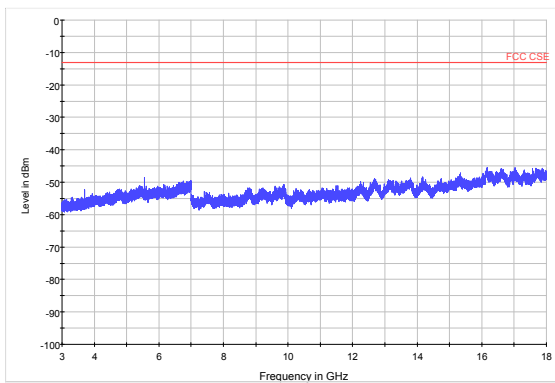
LTE Band 2 5MHz CH-Low 30MHz~3GHz



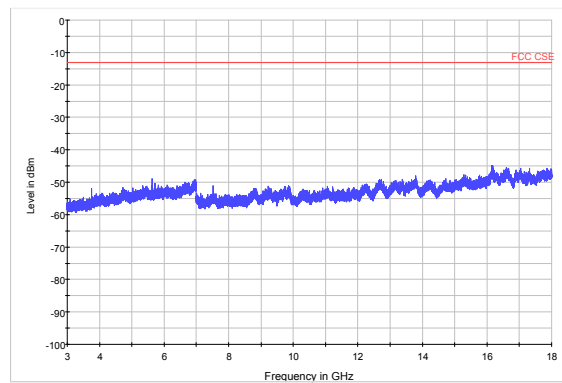
LTE Band 2 5MHz CH-Middle 30MHz~3GHz



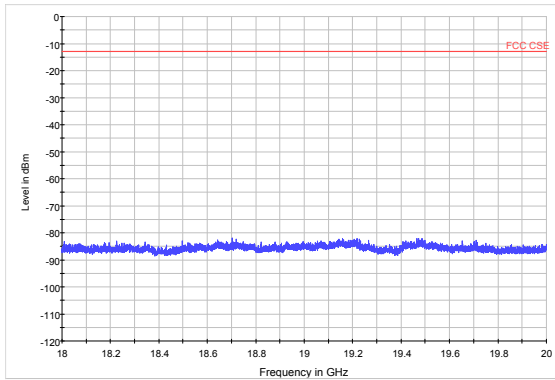
LTE Band 2 5MHz CH-Low 3GHz~18GHz



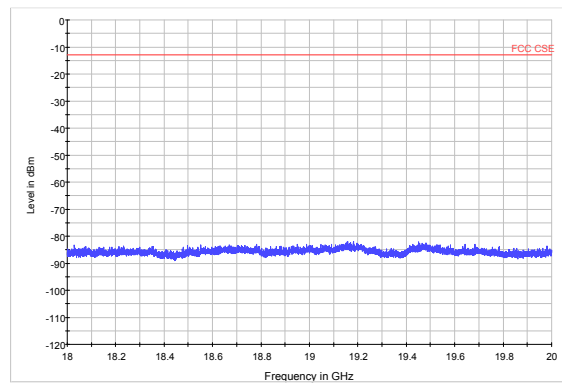
LTE Band 2 5MHz CH-Middle 3GHz~18GHz



LTE Band 2 5MHz CH-Low 18GHz~20GHz

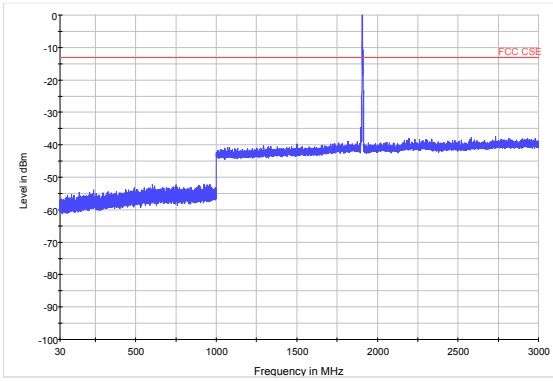


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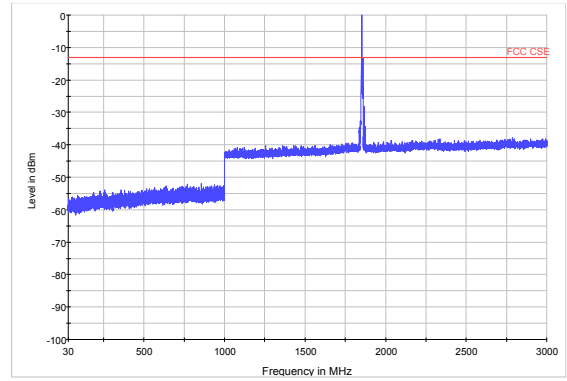




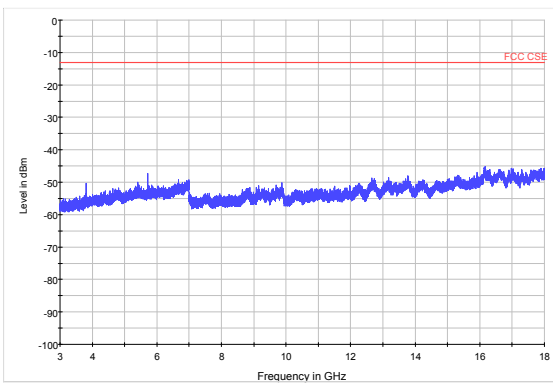
LTE Band 2 5MHz CH-High 30MHz~3GHz



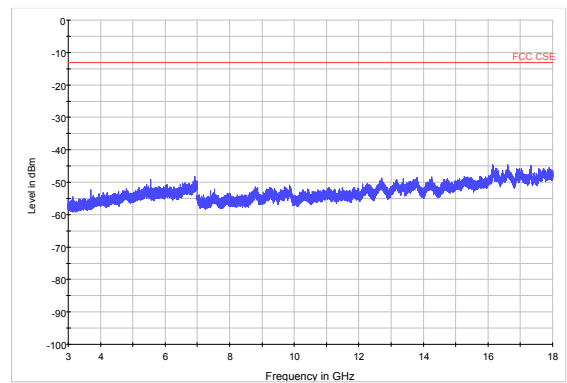
LTE Band 2 10MHz CH-Low 30MHz~3GHz



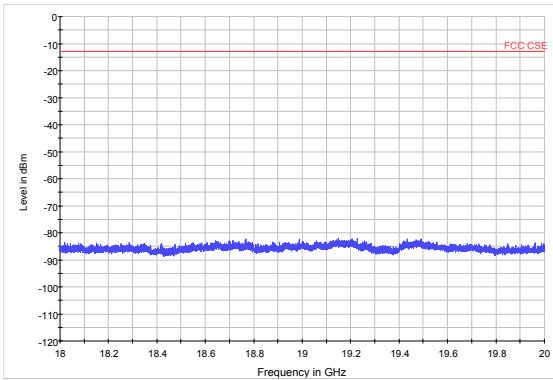
LTE Band 2 5MHz CH-High 3GHz~18GHz



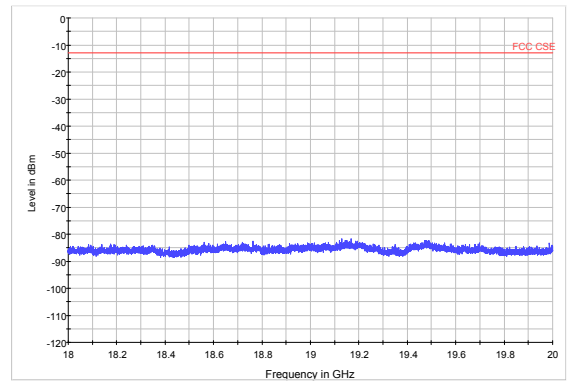
LTE Band 2 10MHz CH-Low 3GHz~18GHz



LTE Band 2 5MHz CH-High 18GHz~20GHz

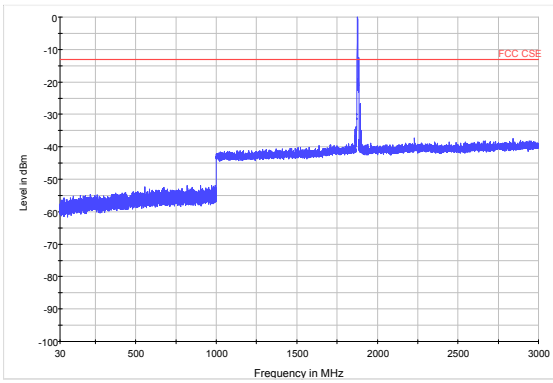


LTE Band 2 10MHz CH-Low 18GHz~20GHz

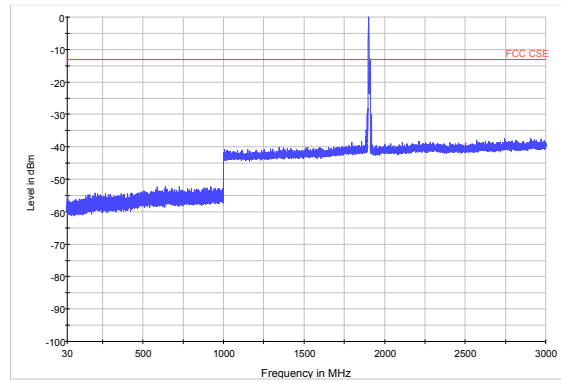




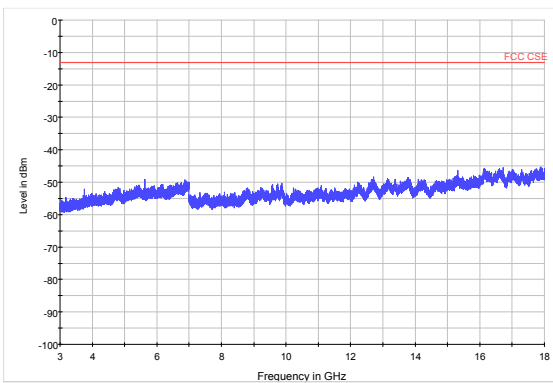
LTE Band 2 10MHz CH-Middle 30MHz~3GHz



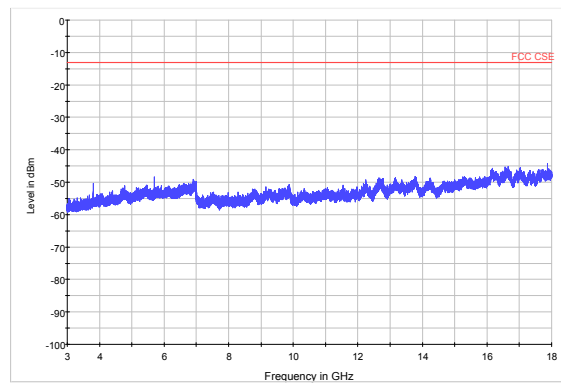
LTE Band 2 10MHz CH-High 30MHz~3GHz



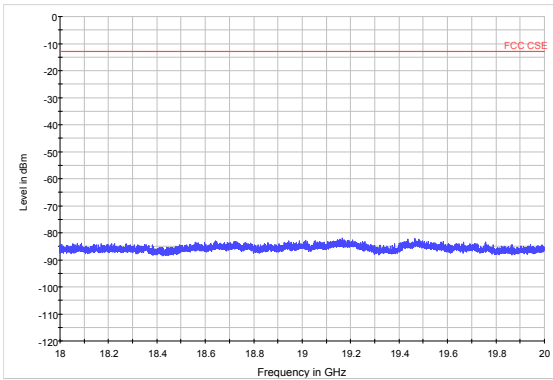
LTE Band 2 10MHz CH-Middle 3GHz~18GHz



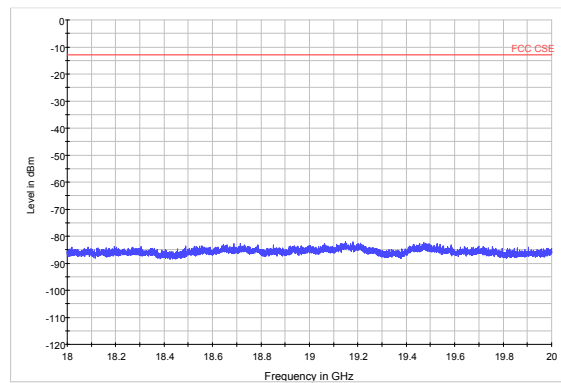
LTE Band 2 10MHz CH-High 3GHz~18GHz



LTE Band 2 10MHz CH-Middle 18GHz~20GHz

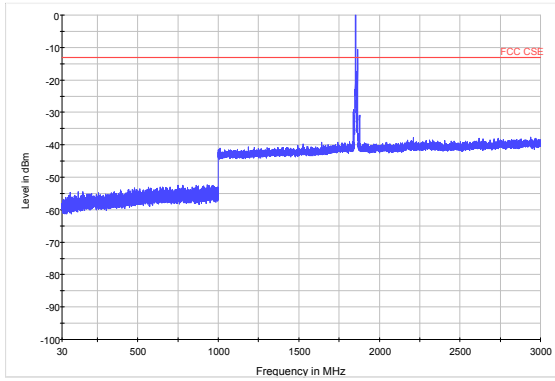


LTE Band 2 10MHz CH-High 18GHz~20GHz

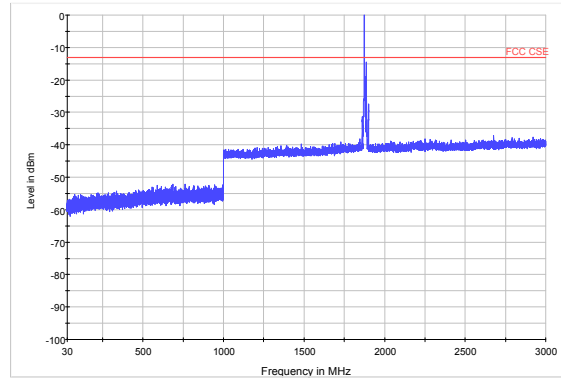




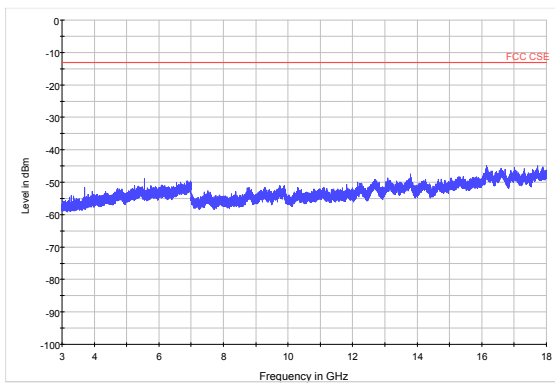
LTE Band 2 15MHz CH-Low 30MHz~3GHz



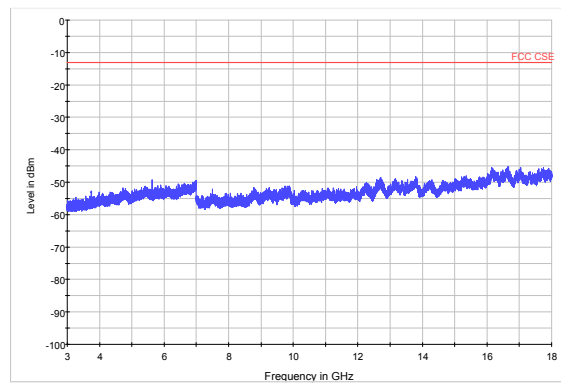
LTE Band 2 15MHz CH-Middle 30MHz~3GHz



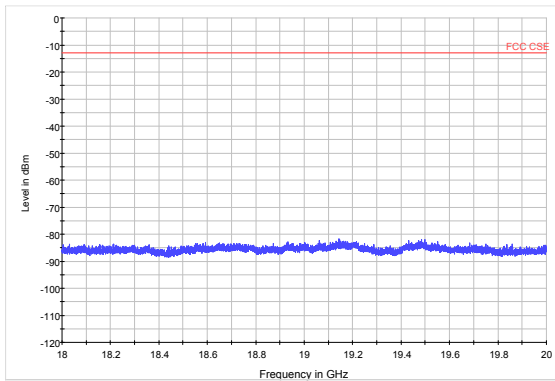
LTE Band 2 15MHz CH-Low 3GHz~18GHz



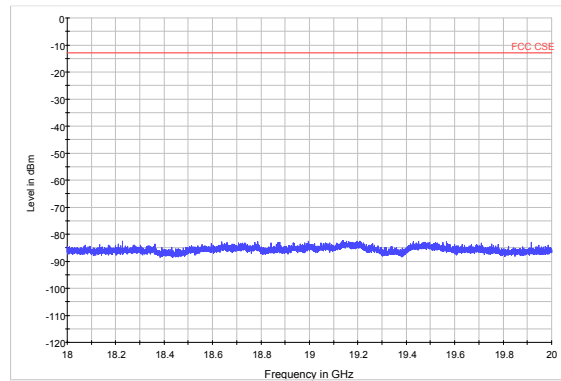
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LTE Band 2 15MHz CH-Low 18GHz~20GHz

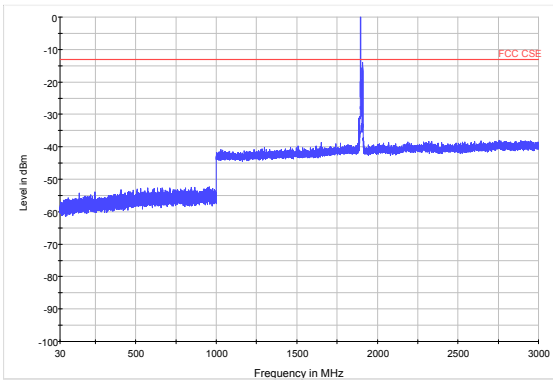


LTE Band 2 15MHz CH-Middle 18GHz~20GHz

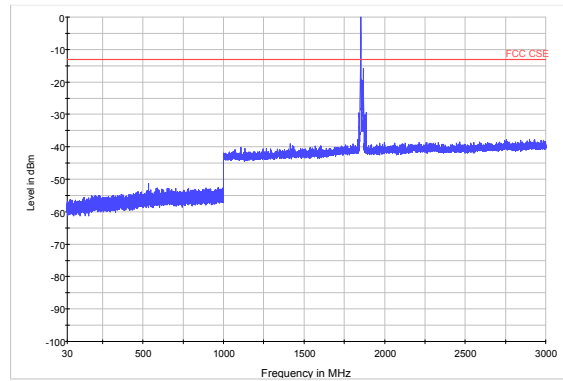




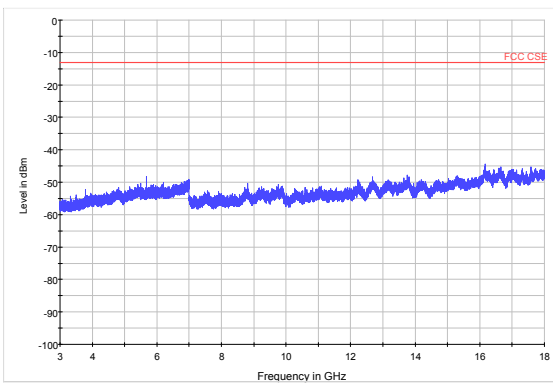
LTE Band 2 15MHz CH-High 30MHz~3GHz



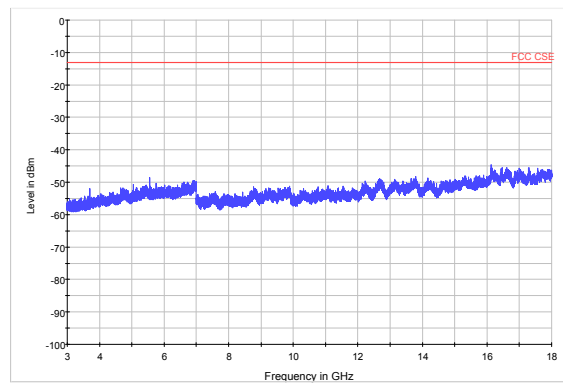
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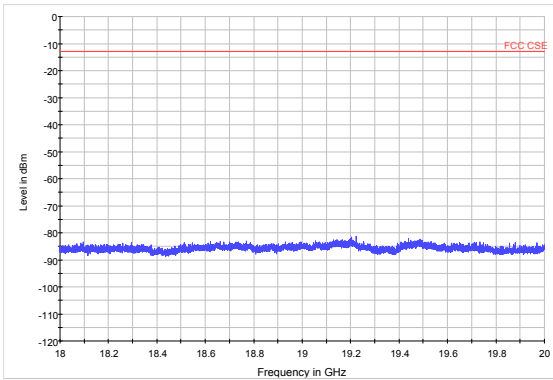
LTE Band 2 15MHz CH-High 3GHz~18GHz



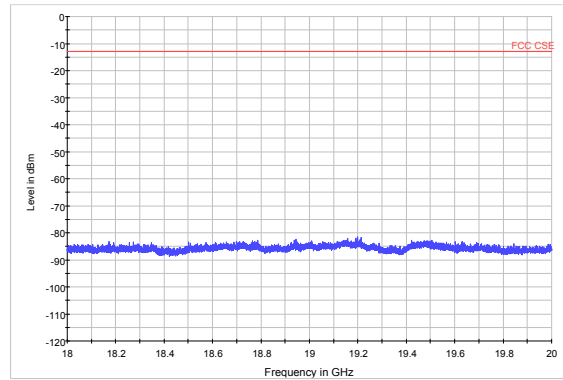
LTE Band 2 20MHz CH-Low 3GHz~18GHz



LTE Band 2 15MHz CH-High 18GHz~20GHz

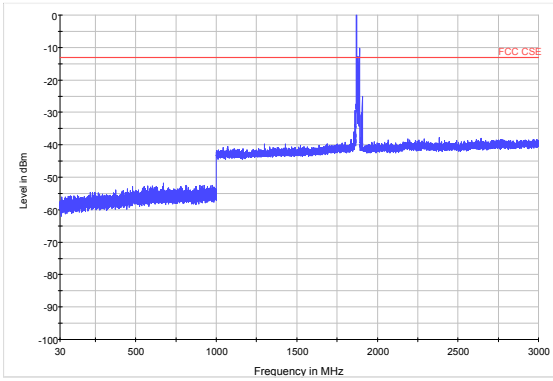


LTE Band 2 20MHz CH-Low 18GHz~20GHz

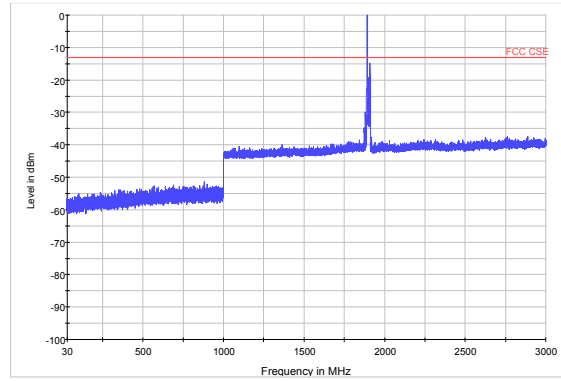




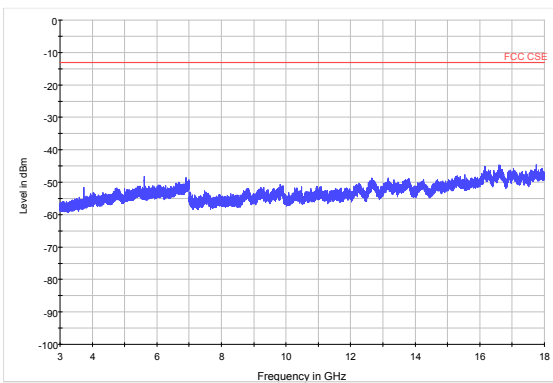
LTE Band 2 20MHz CH-Middle 30MHz~3GHz



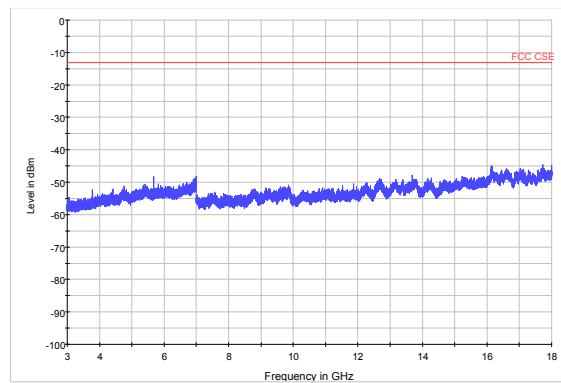
LTE Band 2 20MHz CH-High 30MHz~3GHz



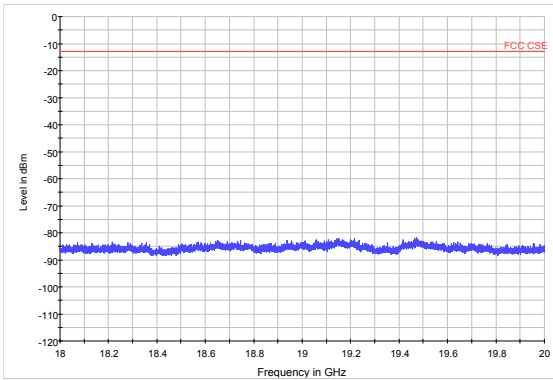
LTE Band 2 20MHz CH-Middle 3GHz~18GHz



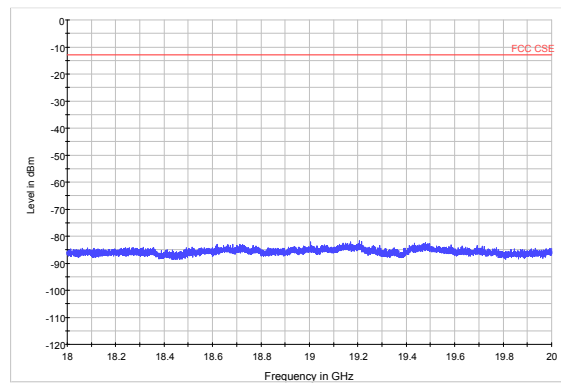
LTE Band 2 20MHz CH-High 3GHz~18GHz



LTE Band 2 20MHz CH-Middle 18GHz~20GHz



LTE Band 2 20MHz CH-High 18GHz~20GHz



5.8. Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

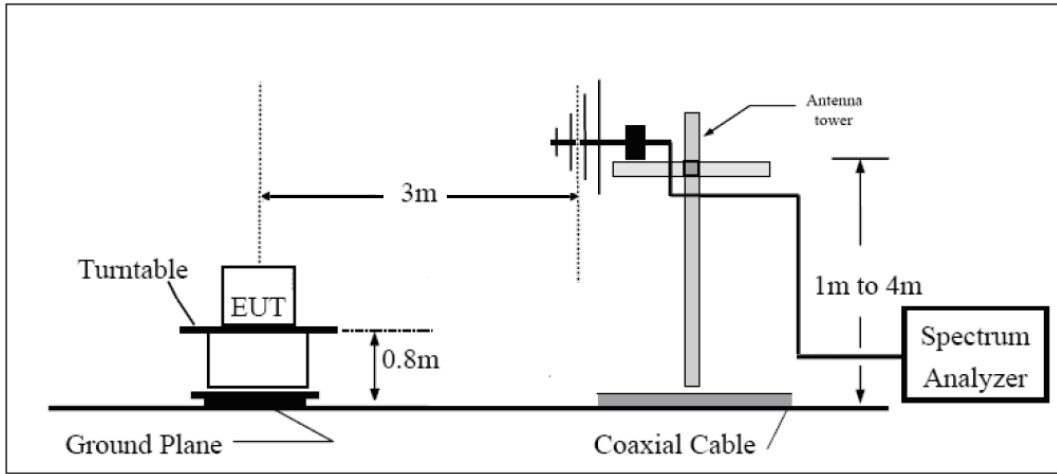
Method of Measurement

1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI/TIA-603-D-2010.
2. Above 30MHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. 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.
4. 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, And the maximum value of the receiver should be recorded as (Pr).
5. 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 (PMea) 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 (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. 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 (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAG) should be recorded after test.
7. The measurement results are obtained as described below:
Power(EIRP)=PMea- PAG - Pcl + Ga
The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP

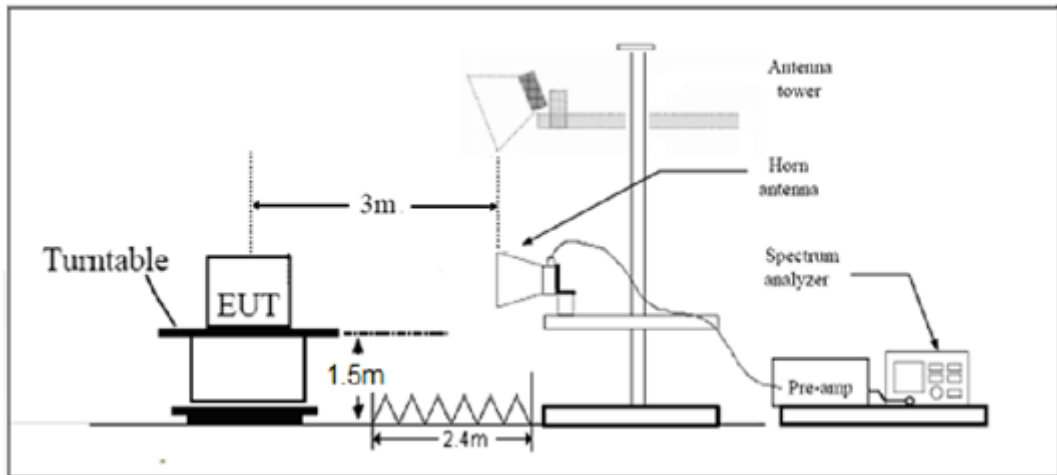
= EIRP-2.15dBi.

Test setup

30MHz~~~ 1GHz



Above 1GHz



Note: Area side: 2.4mX3.6m

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log₁₀ (P) dB.”

Limit	-13 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U = 3.55$ dB.

**Test Result**

GSM 1900 CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3700	-56.95	5.1	11.05	Horizontal	-51.0	-13.0	38.0	135
3	5551	-58.83	5.42	12.65	Horizontal	-51.6	-13.0	38.6	45
4	7401	-54.05	6.7	13.85	Horizontal	-46.9	-13.0	33.9	180
5	9251	-53.04	7.01	14.75	Horizontal	-45.3	-13.0	32.3	270
6	11101	-49.77	7.48	15.95	Horizontal	-41.3	-13.0	28.3	135
7	12951	-50.24	7.51	16.55	Horizontal	-41.2	-13.0	28.2	45
8	14802	-46.41	8.24	15.35	Horizontal	-39.3	-13.0	26.3	270
9	16652	-45.84	8.41	14.95	Horizontal	-39.3	-13.0	26.3	180
10	18502	-45.31	8.54	15.45	Horizontal	-38.4	-13.0	25.4	270

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2.The worst emission was found in the antenna is Horizontalposition.

GSM 1900 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-60.85	5.1	11.05	Horizontal	-54.9	-13.0	41.9	135
3	5640	-57.93	5.42	12.65	Horizontal	-50.7	-13.0	37.7	45
4	7520	-54.65	6.7	13.85	Horizontal	-47.5	-13.0	34.5	180
5	9400	-53.04	7.01	14.75	Horizontal	-45.3	-13.0	32.3	270
6	11280	-49.57	7.48	15.95	Horizontal	-41.1	-13.0	28.1	135
7	13160	-49.04	7.51	16.55	Horizontal	-40.0	-13.0	27.0	45
8	15040	-48.21	8.24	15.35	Horizontal	-41.1	-13.0	28.1	270
9	16920	-46.14	8.41	14.95	Horizontal	-39.6	-13.0	26.6	180
10	18800	-45.51	8.54	15.45	Horizontal	-38.6	-13.0	25.6	270

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontalposition.

GSM 1900 CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3819	-57.65	5.1	11.05	Horizontal	-51.7	-13.0	38.7	135
3	5730	-56.43	5.42	12.65	Horizontal	-49.2	-13.0	36.2	45
4	7639	-55.55	6.7	13.85	Horizontal	-48.4	-13.0	35.4	180
5	9549	-53.14	7.01	14.75	Horizontal	-45.4	-13.0	32.4	270
6	11459	-49.77	7.48	15.95	Horizontal	-41.3	-13.0	28.3	135
7	13369	-50.64	7.51	16.55	Horizontal	-41.6	-13.0	28.6	45
8	15278	-48.51	8.24	15.35	Horizontal	-41.4	-13.0	28.4	180
9	17188	-45.44	8.41	14.95	Horizontal	-38.9	-13.0	25.9	225
10	19098	-44.61	8.54	15.45	Horizontal	-37.7	-13.0	24.7	135

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2. The worst emission was found in the antenna is Horizontalposition.

WCDMA Band II CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3705	-61.35	5.1	11.05	Horizontal	-55.4	-13.0	42.4	180
3	5557	-60.13	5.42	12.65	Horizontal	-52.9	-13.0	39.9	270
4	7410	-53.95	6.7	13.85	Horizontal	-46.8	-13.0	33.8	135
5	9262	-51.54	7.01	14.75	Horizontal	-43.8	-13.0	30.8	45
6	11114	-48.27	7.48	15.95	Horizontal	-39.8	-13.0	26.8	270
7	12967	-50.14	7.51	16.55	Horizontal	-41.1	-13.0	28.1	180
8	14819	-46.61	8.24	15.35	Horizontal	-39.5	-13.0	26.5	270
9	16672	-45.44	8.41	14.95	Horizontal	-38.9	-13.0	25.9	135
10	18524	-44.61	8.54	15.45	Horizontal	-37.7	-13.0	24.7	180

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2.The worst emission was found in the antenna is Horizontalposition.



WCDMA Band II CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-60.35	5.1	11.05	Horizontal	-54.4	-13.0	41.4	270
3	5640	-58.63	5.42	12.65	Horizontal	-51.4	-13.0	38.4	135
4	7520	-53.95	6.7	13.85	Horizontal	-46.8	-13.0	33.8	45
5	9400	-50.54	7.01	14.75	Horizontal	-42.8	-13.0	29.8	270
6	11280	-48.27	7.48	15.95	Horizontal	-39.8	-13.0	26.8	180
7	13160	-50.14	7.51	16.55	Horizontal	-41.1	-13.0	28.1	270
8	15040	-46.01	8.24	15.35	Horizontal	-38.9	-13.0	25.9	135
9	16920	-45.44	8.41	14.95	Horizontal	-38.9	-13.0	25.9	180
10	18800	-45.61	8.54	15.45	Horizontal	-38.7	-13.0	25.7	270

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.

WCDMA Band II CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3815	-59.35	5.1	11.05	Horizontal	-53.4	-13.0	40.4	135
3	5723	-57.63	5.42	12.65	Horizontal	-50.4	-13.0	37.4	45
4	7630	-53.95	6.7	13.85	Horizontal	-46.8	-13.0	33.8	270
5	9538	-49.54	7.01	14.75	Horizontal	-41.8	-13.0	28.8	180
6	11446	-48.27	7.48	15.95	Horizontal	-39.8	-13.0	26.8	270
7	13353	-50.14	7.51	16.55	Horizontal	-41.1	-13.0	28.1	135
8	15261	-47.01	8.24	15.35	Horizontal	-39.9	-13.0	26.9	225
9	17168	-45.44	8.41	14.95	Horizontal	-38.9	-13.0	25.9	90
10	19076	-44.61	8.54	15.45	Horizontal	-37.7	-13.0	24.7	315

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.



LTE Band 2 1.4MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3701	-58.15	5.1	11.05	Horizontal	-52.2	-13.0	39.2	45
3	5552	-49.13	5.42	12.65	Horizontal	-41.9	-13.0	28.9	225
4	7403	-54.75	6.7	13.85	Horizontal	-47.6	-13.0	34.6	135
5	9254	-52.94	7.01	14.75	Horizontal	-45.2	-13.0	32.2	180
6	11104	-51.67	7.48	15.95	Horizontal	-43.2	-13.0	30.2	180
7	12955	-49.94	7.51	16.55	Horizontal	-40.9	-13.0	27.9	270
8	14806	-46.11	8.24	15.35	Horizontal	-39.0	-13.0	26.0	270
9	16656	-46.94	8.41	14.95	Horizontal	-40.4	-13.0	27.4	180
10	18507	-46.61	8.54	15.45	Horizontal	-39.7	-13.0	26.7	270

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2.The worst emission was found in the antenna is Horizontalposition.

LTE Band 2 1.4MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-58.45	5.10	11.05	Horizontal	-52.5	-13.0	39.5	135
3	5640	-48.73	5.42	12.65	Horizontal	-41.5	-13.0	28.5	90
4	7520	-54.05	6.70	13.85	Horizontal	-46.9	-13.0	33.9	0
5	9400	-54.14	7.01	14.75	Horizontal	-46.4	-13.0	33.4	45
6	11280	-50.87	7.48	15.95	Horizontal	-42.4	-13.0	29.4	225
7	13160	-48.74	7.51	16.55	Horizontal	-39.7	-13.0	26.7	315
8	15040	-47.11	8.24	15.35	Horizontal	-40.0	-13.0	27.0	135
9	16920	-45.04	8.41	14.95	Horizontal	-38.5	-13.0	25.5	135
10	18800	-45.61	8.54	15.45	Horizontal	-38.7	-13.0	25.7	0

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2.The worst emission was found in the antenna is Horizontalposition.



LTE Band 2 1.4MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3819	-60.35	5.10	11.05	Horizontal	-54.4	-13.0	41.4	270
3	5728	-49.23	5.42	12.65	Horizontal	-42.0	-13.0	29.0	270
4	7637	-55.65	6.70	13.85	Horizontal	-48.5	-13.0	35.5	315
5	9547	-53.94	7.01	14.75	Horizontal	-46.2	-13.0	33.2	225
6	11456	-50.87	7.48	15.95	Horizontal	-42.4	-13.0	29.4	0
7	13365	-48.74	7.51	16.55	Horizontal	-39.7	-13.0	26.7	180
8	15274	-48.71	8.24	15.35	Horizontal	-41.6	-13.0	28.6	180
9	17184	-44.74	8.41	14.95	Horizontal	-38.2	-13.0	25.2	90
10	19093	-44.61	8.54	15.45	Horizontal	-37.7	-13.0	24.7	90

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2.The worst emission was found in the antenna is Horizontalposition.

LTE Band 2 3MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3703	-59.15	5.10	11.05	Horizontal	-53.2	-13.0	40.2	270
3	5555	-50.43	5.42	12.65	Horizontal	-43.2	-13.0	30.2	135
4	7406	-54.45	6.70	13.85	Horizontal	-47.3	-13.0	34.3	45
5	9258	-52.94	7.01	14.75	Horizontal	-45.2	-13.0	32.2	270
6	11109	-50.67	7.48	15.95	Horizontal	-42.2	-13.0	29.2	0
7	12961	-49.94	7.51	16.55	Horizontal	-40.9	-13.0	27.9	0
8	14812	-46.11	8.24	15.35	Horizontal	-39.0	-13.0	26.0	225
9	16664	-46.94	8.41	14.95	Horizontal	-40.4	-13.0	27.4	45
10	18515	-46.21	8.54	15.45	Horizontal	-39.3	-13.0	26.3	0

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2.The worst emission was found in the antenna is Horizontalposition.



LTE Band 2 3MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-57.45	5.10	11.05	Horizontal	-51.5	-13.0	38.5	90
3	5640	-49.13	5.42	12.65	Horizontal	-41.9	-13.0	28.9	135
4	7520	-53.55	6.70	13.85	Horizontal	-46.4	-13.0	33.4	225
5	9400	-54.14	7.01	14.75	Horizontal	-46.4	-13.0	33.4	90
6	11280	-50.87	7.48	15.95	Horizontal	-42.4	-13.0	29.4	315
7	13160	-49.44	7.51	16.55	Horizontal	-40.4	-13.0	27.4	135
8	15040	-47.11	8.24	15.35	Horizontal	-40.0	-13.0	27.0	0
9	16920	-46.04	8.41	14.95	Horizontal	-39.5	-13.0	26.5	315
10	18800	-45.41	8.54	15.45	Horizontal	-38.5	-13.0	25.5	45

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.

LTE Band 2 3MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3817	-61.35	5.10	11.05	Horizontal	-55.4	-13.0	42.4	45
3	5726	-52.43	5.42	12.65	Horizontal	-45.2	-13.0	32.2	315
4	7634	-55.45	6.70	13.85	Horizontal	-48.3	-13.0	35.3	180
5	9543	-53.94	7.01	14.75	Horizontal	-46.2	-13.0	33.2	135
6	11451	-49.87	7.48	15.95	Horizontal	-41.4	-13.0	28.4	90
7	13360	-48.74	7.51	16.55	Horizontal	-39.7	-13.0	26.7	90
8	15268	-48.71	8.24	15.35	Horizontal	-41.6	-13.0	28.6	0
9	17177	-45.74	8.41	14.95	Horizontal	-39.2	-13.0	26.2	225
10	19085	-44.41	8.54	15.45	Horizontal	-37.5	-13.0	24.5	225

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.

LTE Band 2 5MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3705	-59.05	5.10	11.05	Horizontal	-53.1	-13.0	40.1	90
3	5558	-50.33	5.42	12.65	Horizontal	-43.1	-13.0	30.1	225
4	7410	-55.45	6.70	13.85	Horizontal	-48.3	-13.0	35.3	135
5	9263	-51.94	7.01	14.75	Horizontal	-44.2	-13.0	31.2	270
6	11115	-50.67	7.48	15.95	Horizontal	-42.2	-13.0	29.2	135
7	12968	-49.94	7.51	16.55	Horizontal	-40.9	-13.0	27.9	45
8	14820	-46.11	8.24	15.35	Horizontal	-39.0	-13.0	26.0	45
9	16673	-55.94	8.41	14.95	Horizontal	-49.4	-13.0	36.4	0
10	18525	-46.11	8.54	15.45	Horizontal	-39.2	-13.0	26.2	180

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2.The worst emission was found in the antenna is Horizontalposition.

LTE Band 2 5MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-56.05	5.10	11.05	Horizontal	-50.1	-13.0	37.1	270
3	5640	-47.23	5.42	12.65	Horizontal	-40.0	-13.0	27.0	135
4	7520	-53.35	6.70	13.85	Horizontal	-46.2	-13.0	33.2	0
5	9400	-54.14	7.01	14.75	Horizontal	-46.4	-13.0	33.4	90
6	11280	-50.87	7.48	15.95	Horizontal	-42.4	-13.0	29.4	0
7	13160	-48.44	7.51	16.55	Horizontal	-39.4	-13.0	26.4	270
8	15040	-47.11	8.24	15.35	Horizontal	-40.0	-13.0	27.0	90
9	16920	-46.04	8.41	14.95	Horizontal	-39.5	-13.0	26.5	180
10	18800	-44.41	8.54	15.45	Horizontal	-37.5	-13.0	24.5	45

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2.The worst emission was found in the antenna is Horizontalposition.

LTE Band 2 5MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3815	-60.15	5.10	11.05	Horizontal	-54.2	-13.0	41.2	45
3	5723	-51.03	5.42	12.65	Horizontal	-43.8	-13.0	30.8	315
4	7630	-56.05	6.70	13.85	Horizontal	-48.9	-13.0	35.9	315
5	9538	-54.24	7.01	14.75	Horizontal	-46.5	-13.0	33.5	135
6	11445	-50.87	7.48	15.95	Horizontal	-42.4	-13.0	29.4	315
7	13353	-48.74	7.51	16.55	Horizontal	-39.7	-13.0	26.7	315
8	15260	-47.71	8.24	15.35	Horizontal	-40.6	-13.0	27.6	180
9	17168	-45.74	8.41	14.95	Horizontal	-39.2	-13.0	26.2	90
10	19075	-45.41	8.54	15.45	Horizontal	-38.5	-13.0	25.5	315

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2.The worst emission was found in the antenna is Horizontalposition.

LTE Band 2 10MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3710	-59.25	5.10	11.05	Horizontal	-53.3	-13.0	40.3	135
3	5565	-49.23	5.42	12.65	Horizontal	-42.0	-13.0	29.0	180
4	7420	-55.45	6.70	13.85	Horizontal	-48.3	-13.0	35.3	0
5	9275	-52.94	7.01	14.75	Horizontal	-45.2	-13.0	32.2	225
6	11130	-50.97	7.48	15.95	Horizontal	-42.5	-13.0	29.5	90
7	12985	-49.94	7.51	16.55	Horizontal	-40.9	-13.0	27.9	45
8	14840	-46.11	8.24	15.35	Horizontal	-39.0	-13.0	26.0	315
9	16695	-47.94	8.41	14.95	Horizontal	-41.4	-13.0	28.4	0
10	18550	-46.61	8.54	15.45	Horizontal	-39.7	-13.0	26.7	0

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2.The worst emission was found in the antenna is Horizontalposition.



LTE Band 2 10MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760	-55.75	5.10	11.05	Horizontal	-49.8	-13.0	36.8	315
3	5640	-50.43	5.42	12.65	Horizontal	-43.2	-13.0	30.2	90
4	7520	-54.35	6.70	13.85	Horizontal	-47.2	-13.0	34.2	0
5	9400	-54.54	7.01	14.75	Horizontal	-46.8	-13.0	33.8	90
6	11280	-49.87	7.48	15.95	Horizontal	-41.4	-13.0	28.4	90
7	13160	-48.44	7.51	16.55	Horizontal	-39.4	-13.0	26.4	270
8	15040	-47.11	8.24	15.35	Horizontal	-40.0	-13.0	27.0	135
9	16920	-46.04	8.41	14.95	Horizontal	-39.5	-13.0	26.5	90
10	18800	-45.41	8.54	15.45	Horizontal	-38.5	-13.0	25.5	0

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2.The worst emission was found in the antenna is Horizontalposition.

LTE Band 2 10MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3810	-60.05	5.10	11.05	Horizontal	-54.1	-13.0	41.1	45
3	5715	-47.83	5.42	12.65	Horizontal	-40.6	-13.0	27.6	135
4	7620	-55.05	6.70	13.85	Horizontal	-47.9	-13.0	34.9	90
5	9525	-54.24	7.01	14.75	Horizontal	-46.5	-13.0	33.5	315
6	11430	-49.87	7.48	15.95	Horizontal	-41.4	-13.0	28.4	0
7	13335	-48.74	7.51	16.55	Horizontal	-39.7	-13.0	26.7	270
8	15240	-46.71	8.24	15.35	Horizontal	-39.6	-13.0	26.6	45
9	17145	-45.74	8.41	14.95	Horizontal	-39.2	-13.0	26.2	135
10	19050	-44.41	8.54	15.45	Horizontal	-37.5	-13.0	24.5	90

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2.The worst emission was found in the antenna is Horizontalposition.

LTE Band 2 15MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3715.0	-59.25	5.10	11.05	Horizontal	-53.3	-13.0	40.3	45
3	5572.5	-49.93	5.42	12.65	Horizontal	-42.7	-13.0	29.7	90
4	7430.0	-56.45	6.70	13.85	Horizontal	-49.3	-13.0	36.3	270
5	9287.5	-52.94	7.01	14.75	Horizontal	-45.2	-13.0	32.2	225
6	11145.0	-49.97	7.48	15.95	Horizontal	-41.5	-13.0	28.5	90
7	13002.5	-49.94	7.51	16.55	Horizontal	-40.9	-13.0	27.9	45
8	14860.0	-46.11	8.24	15.35	Horizontal	-39.0	-13.0	26.0	135
9	16717.5	-46.64	8.41	14.95	Horizontal	-40.1	-13.0	27.1	225
10	18575.0	-46.61	8.54	15.45	Horizontal	-39.7	-13.0	26.7	90

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2.The worst emission was found in the antenna is Horizontalposition.

LTE Band 2 15MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-56.85	5.10	11.05	Horizontal	-50.9	-13.0	37.9	135
3	5640.0	-52.83	5.42	12.65	Horizontal	-45.6	-13.0	32.6	135
4	7520.0	-54.35	6.70	13.85	Horizontal	-47.2	-13.0	34.2	45
5	9400.0	-53.14	7.01	14.75	Horizontal	-45.4	-13.0	32.4	270
6	11280.0	-50.87	7.48	15.95	Horizontal	-42.4	-13.0	29.4	135
7	13160.0	-48.14	7.51	16.55	Horizontal	-39.1	-13.0	26.1	45
8	15040.0	-47.71	8.24	15.35	Horizontal	-40.6	-13.0	27.6	180
9	16920.0	-46.04	8.41	14.95	Horizontal	-39.5	-13.0	26.5	180
10	18800.0	-45.41	8.54	15.45	Horizontal	-38.5	-13.0	25.5	45

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2.The worst emission was found in the antenna is Horizontalposition.

LTE Band 2 15MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3805.0	-59.75	5.10	11.05	Horizontal	-53.8	-13.0	40.8	45
3	5707.5	-51.03	5.42	12.65	Horizontal	-43.8	-13.0	30.8	180
4	7610.0	-54.45	6.70	13.85	Horizontal	-47.3	-13.0	34.3	180
5	9512.5	-53.24	7.01	14.75	Horizontal	-45.5	-13.0	32.5	225
6	11415.0	-49.87	7.48	15.95	Horizontal	-41.4	-13.0	28.4	0
7	13317.5	-49.74	7.51	16.55	Horizontal	-40.7	-13.0	27.7	180
8	15220.0	-46.71	8.24	15.35	Horizontal	-39.6	-13.0	26.6	270
9	17122.5	-45.74	8.41	14.95	Horizontal	-39.2	-13.0	26.2	90
10	19025.0	-45.41	8.54	15.45	Horizontal	-38.5	-13.0	25.5	0

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2.The worst emission was found in the antenna is Horizontalposition.

LTE Band 2 20MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3720.0	-58.85	5.10	11.05	Horizontal	-52.9	-13.0	39.9	180
3	5580.0	-49.83	5.42	12.65	Horizontal	-42.6	-13.0	29.6	45
4	7440.0	-55.45	6.70	13.85	Horizontal	-48.3	-13.0	35.3	135
5	9300.0	-52.94	7.01	14.75	Horizontal	-45.2	-13.0	32.2	180
6	11160.0	-49.97	7.48	15.95	Horizontal	-41.5	-13.0	28.5	225
7	13020.0	-50.94	7.51	16.55	Horizontal	-41.9	-13.0	28.9	270
8	14880.0	-46.11	8.24	15.35	Horizontal	-39.0	-13.0	26.0	0
9	16740.0	-46.64	8.41	14.95	Horizontal	-40.1	-13.0	27.1	180
10	18600.0	-45.61	8.54	15.45	Horizontal	-38.7	-13.0	25.7	135

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2.The worst emission was found in the antenna is Horizontalposition.

LTE Band 2 20MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-57.25	5.10	11.05	Horizontal	-51.3	-13.0	38.3	225
3	5640.0	-55.63	5.42	12.65	Horizontal	-48.4	-13.0	35.4	315
4	7520.0	-54.35	6.70	13.85	Horizontal	-47.2	-13.0	34.2	0
5	9400.0	-53.54	7.01	14.75	Horizontal	-45.8	-13.0	32.8	90
6	11280.0	-49.57	7.48	15.95	Horizontal	-41.1	-13.0	28.1	225
7	13160.0	-48.84	7.51	16.55	Horizontal	-39.8	-13.0	26.8	180
8	15040.0	-47.41	8.24	15.35	Horizontal	-40.3	-13.0	27.3	45
9	16920.0	-46.04	8.41	14.95	Horizontal	-39.5	-13.0	26.5	225
10	18800.0	-45.11	8.54	15.45	Horizontal	-38.2	-13.0	25.2	135

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2.The worst emission was found in the antenna is Horizontalposition.

LTE Band 2 20MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3800.0	-58.95	5.10	11.05	Horizontal	-53.0	-13.0	40.0	0
3	5700.0	-56.53	5.42	12.65	Horizontal	-49.3	-13.0	36.3	180
4	7600.0	-54.45	6.70	13.85	Horizontal	-47.3	-13.0	34.3	135
5	9500.0	-53.24	7.01	14.75	Horizontal	-45.5	-13.0	32.5	225
6	11400.0	-48.87	7.48	15.95	Horizontal	-40.4	-13.0	27.4	315
7	13300.0	-49.74	7.51	16.55	Horizontal	-40.7	-13.0	27.7	0
8	15200.0	-46.71	8.24	15.35	Horizontal	-39.6	-13.0	26.6	90
9	17100.0	-46.74	8.41	14.95	Horizontal	-40.2	-13.0	27.2	225
10	19000.0	-45.31	8.54	15.45	Horizontal	-38.4	-13.0	25.4	135

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2.The worst emission was found in the antenna is Horizontalposition.

6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
Base Station Simulator	R&S	CMU200	118133	2017-05-14	2018-05-13
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	2017-05-14	2018-05-13
Spectrum Analyzer	Agilent	N9010A	MY47191109	2017-05-20	2018-05-19
Universal Radio Communication Tester	Agilent	E5515C	MY48367192	2017-05-20	2018-05-19
Signal Analyzer	R&S	FSV30	100815	2016-12-16	2017-12-15
EMI Test Receiver	R&S	ESCI	100948	2017-05-20	2018-05-19
Signal generator	R&S	SMB 100A	102594	2017-05-14	2018-05-13
Signal generator	R&S	SMR27	100365	2017-05-14	2018-05-13
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2014-12-06	2017-12-05
Horn Antenna	R&S	HF907	100126	2014-12-06	2017-12-05
Climatic Chamber	Re Ce	PT-30B	20101891	2015-07-18	2018-07-17
Horn Antenna	ETS-Lindgren	3160-09	00102644	2015-01-30	2018-01-29
RF Cable	Agilent	SMA 15cm	0001	2017-08-04	2018-02-03
Preamplifier	R&S	SCU18	102327	2017-06-18	2018-06-17

*****END OF REPORT *****

ANNEX A: EUT Appearance and Test Setup

A.1 EUT Appearance



Front Side



Back Side

a: EUT



Adapter 1



Adapter 2



Adapter 3

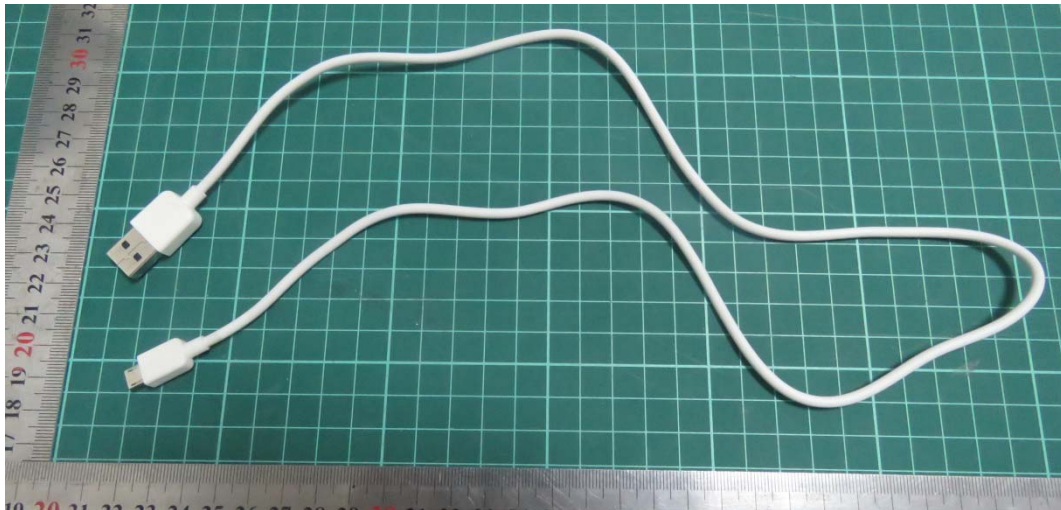


Adapter 4

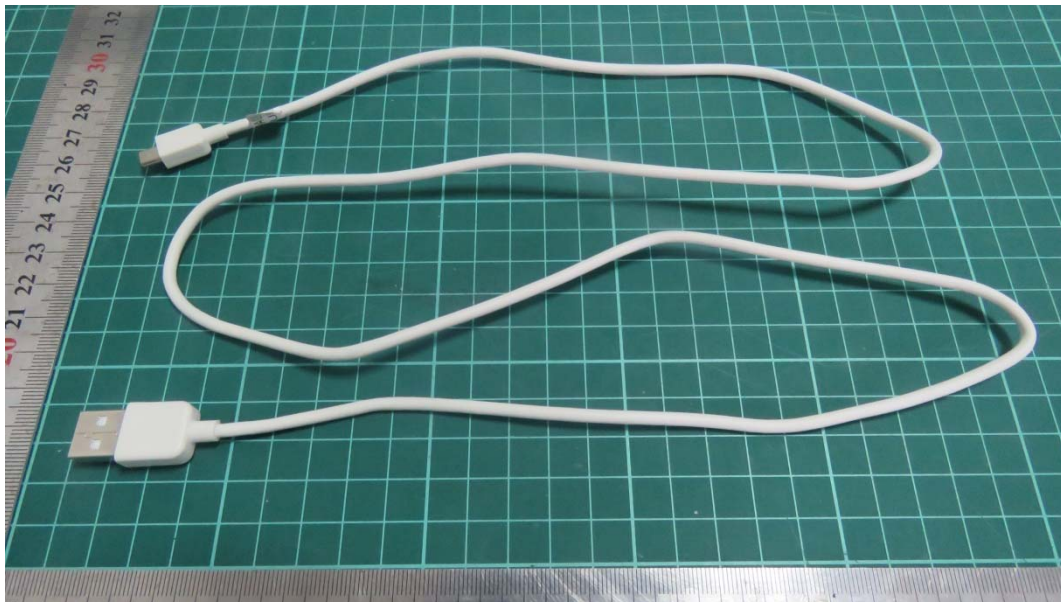


Adapter 5

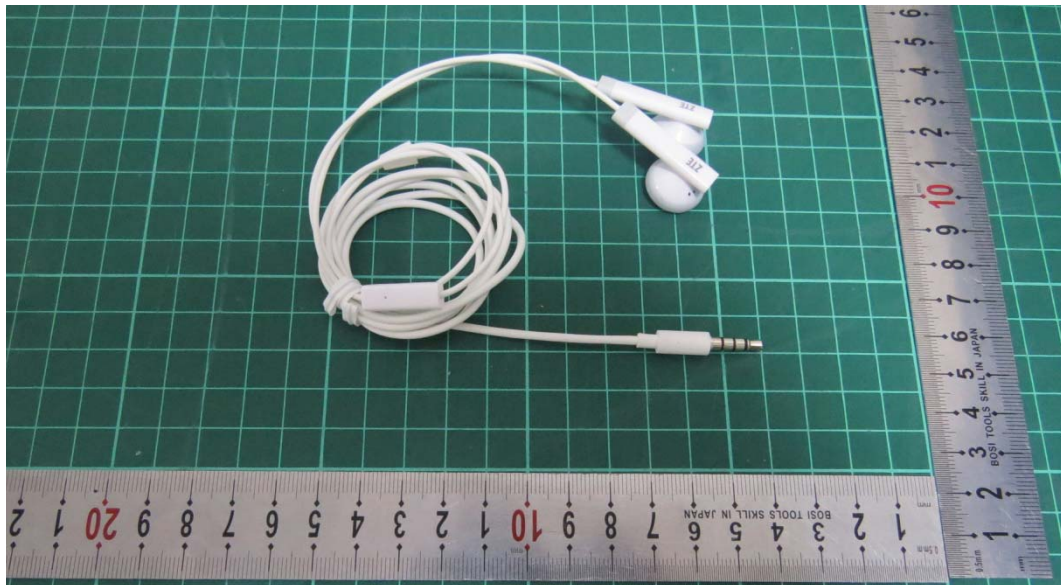
b: Adapter



USB Cable 1



USB Cable 2
c: USB Cable



Earphone 1

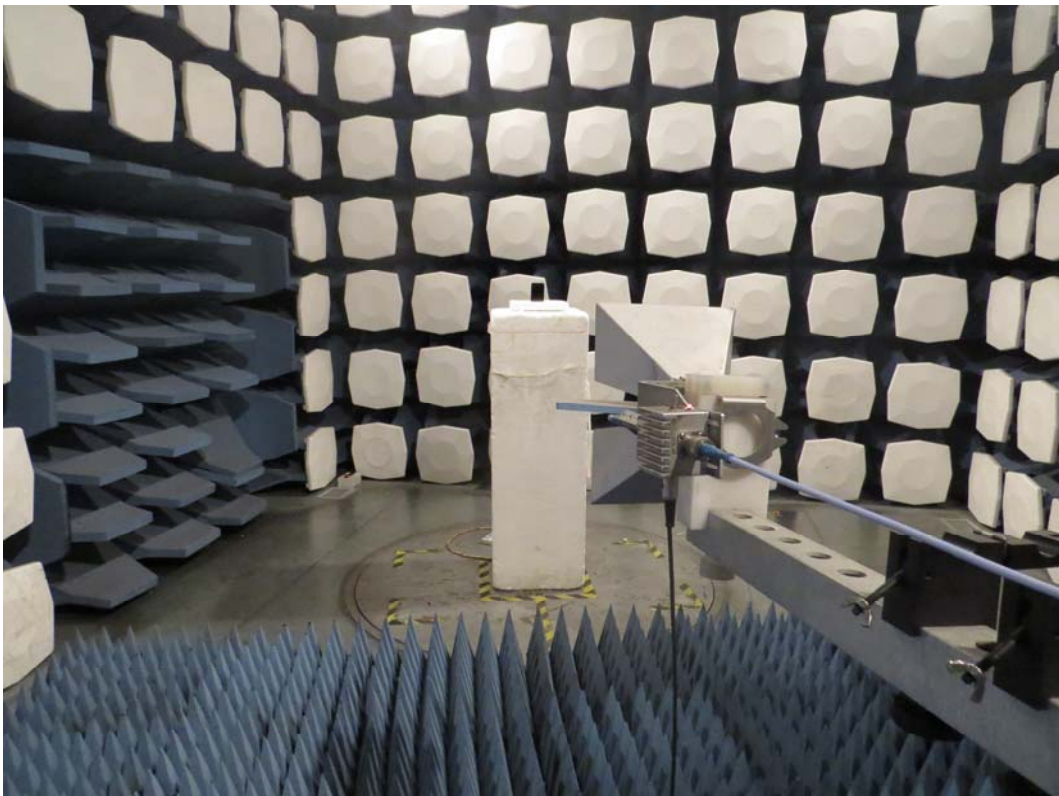
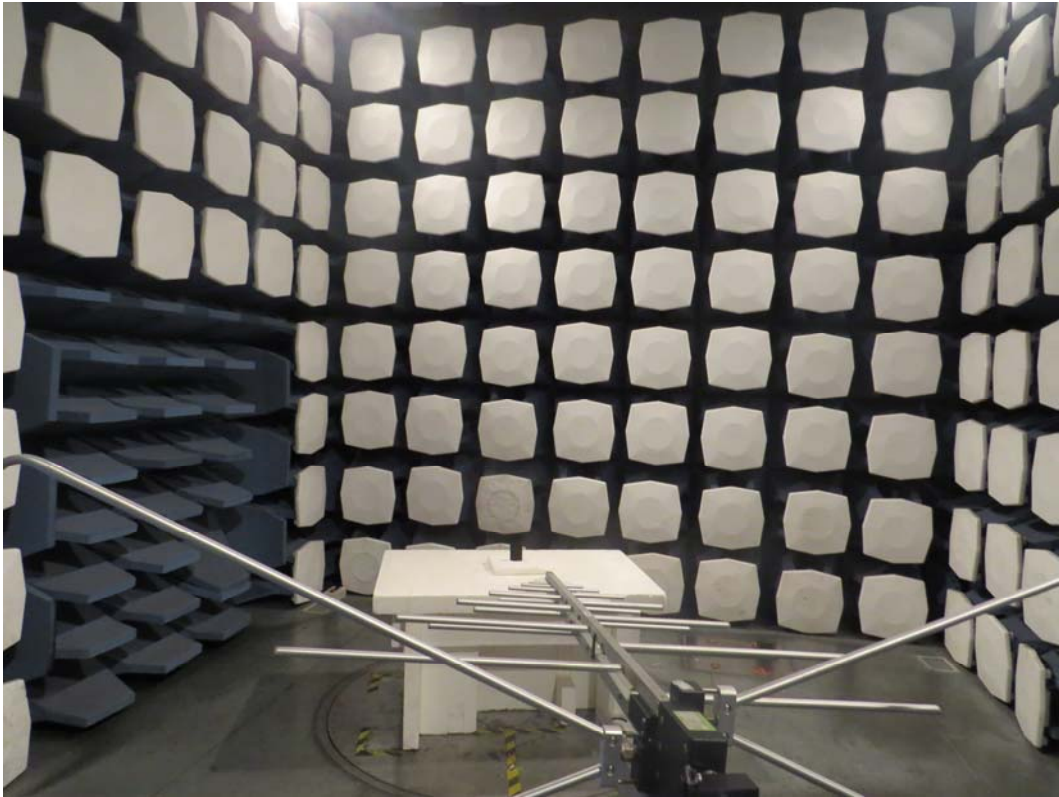


Earphone 2

d: Earphone

Picture 1 EUT and Accessory

A.2 Test Setup



Picture 2: Radiated Spurious Emissions Test setup