8.6 PEAK TO AVERAGE RATIO

8.6.1 Applicable Standard

According to FCC 27.50(a)(1) (b)

8.6.2 Conformance Limit

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

8.6.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.6.4 Test Procedure

The EUT was connected to Spectrum Analyzer and Base Station via power divider.
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
Set the number of counts to a value that stabilizes the measured CCDF curve.
Set the measurement interval to 1 ms.
Record the maximum PAPR level associated with a probability of 0.1%.
a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
c) Set the number of counts to a value that stabilizes the measured CCDF curve;
d) Set the measurement interval as follows:
1) for continuous transmissions, set to 1 ms,
2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
e) Record the maximum PAPR level associated with a probability of 0.1%.

8.6.5 Test Results

Temperature:	24℃	Test Date:	March 2, 2015
Humidity:	53 %	Test By:	KING KONG

Mode	Band Width (MHz)	Modulation	Uplink Channel Number	RB Size	RB Offset	P. A .R (dB)	Limit (dB)	Verdict
LTE Band 4	3MHz	QPSK	19965	1	0	5.30	13	PASS
			20175	1	0	4.32	13	PASS
			20385	1	0	5.25	13	PASS
		16-QAM	19965	1	0	5.80	13	PASS
			20175	1	0	4.46	13	PASS
			20385	1	0	5.77	13	PASS

Temperature: 24℃ Test Date: March 2, 2015
Humidity: 53 % Test By: KING KONG

Mode	Band Width (MHz)	Modulation	Uplink Channel Number	RB Size	RB Offset	P. A .R (dB)	Limit (dB)	Verdict
LTE Band 4	5MHz	QPSK	19975	1	0	5.42	13	PASS
			20175	1	0	4.29	13	PASS
			20375	1	0	5.33	13	PASS
		16-QAM	19975	1	0	5.86	13	PASS
			20175	1	0	4.46	13	PASS
			20375	1	0	5.77	13	PASS

Temperature: 24℃ Test Date: March 2, 2015
Humidity: 53 % Test By: KING KONG

Mode	Band Width (MHz)	Modulation	Uplink Channel Number	RB Size	RB Offset	P. A .R (dB)	Limit (dB)	Verdict
LTE Band 4	20MHz	QPSK	20050	1	0	4.12	13	PASS
			20175	1	0	3.71	13	PASS
			20300	1	0	4.00	13	PASS
		16-QAM	20050	1	0	5.54	13	PASS
			20175	1	0	5.13	13	PASS
			20300	1	0	5.48	13	PASS

Temperature: 24℃ Test Date: March 2, 2015
Humidity: 53 % Test By: KING KONG

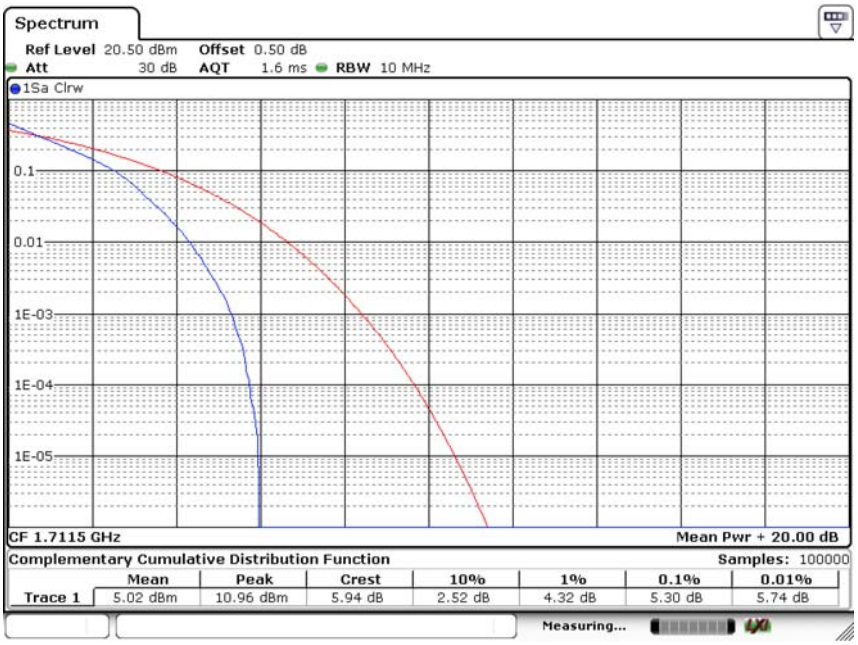
Mode	Band Width (MHz)	Modulation	Uplink Channel Number	RB Size	RB Offset	P. A .R (dB)	Limit (dB)	Verdict
LTE Band 13	5MHz	QPSK	23205	1	0	5.28	13	PASS
			23230	1	0	5.48	13	PASS
			23255	1	0	5.45	13	PASS
		16-QAM	23205	1	0	5.71	13	PASS
			23230	1	0	5.97	13	PASS
			23255	1	0	5.71	13	PASS

Temperature: 24℃ Test Date: March 2, 2015
Humidity: 53 % Test By: KING KONG

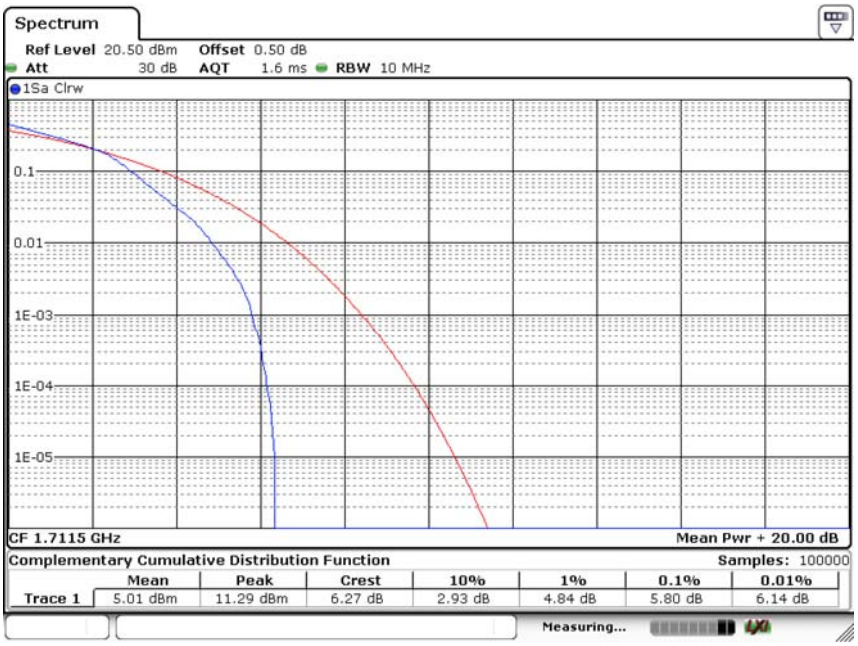
Mode	Band Width (MHz)	Modulation	Uplink Channel Number	RB Size	RB Offset	P. A .R (dB)	Limit (dB)	Verdict
LTE Band 13	10MHz	QPSK	23230	1	0	5.25	13	PASS
		16-QAM	23230	1	0	5.80	13	PASS

All the modulation modes were tested, the data of the worst mode are described in the following table

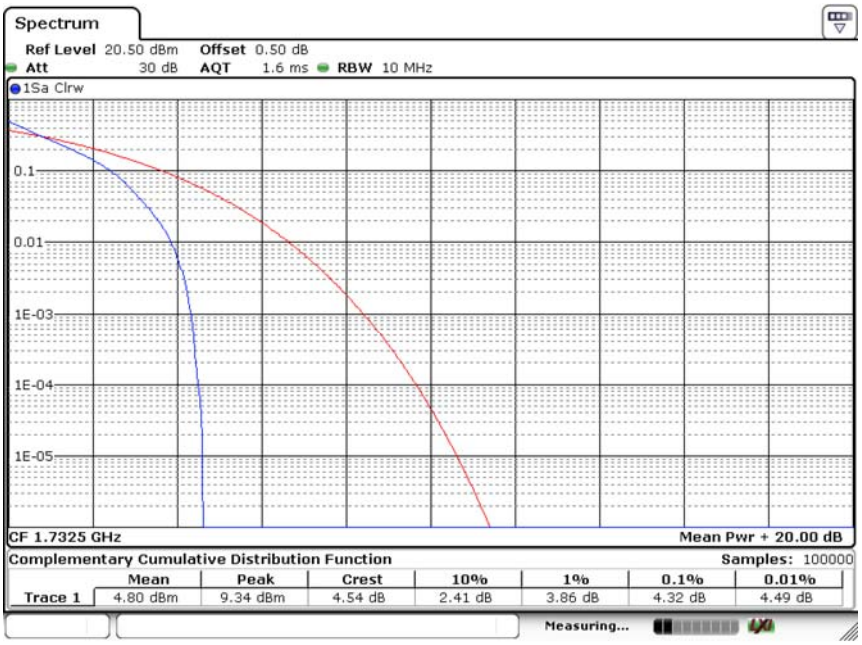
Test Model	LTE Band 4	
	3MHz Bandwidth/ QPSK	
	1RB /0 offset	Low Channel



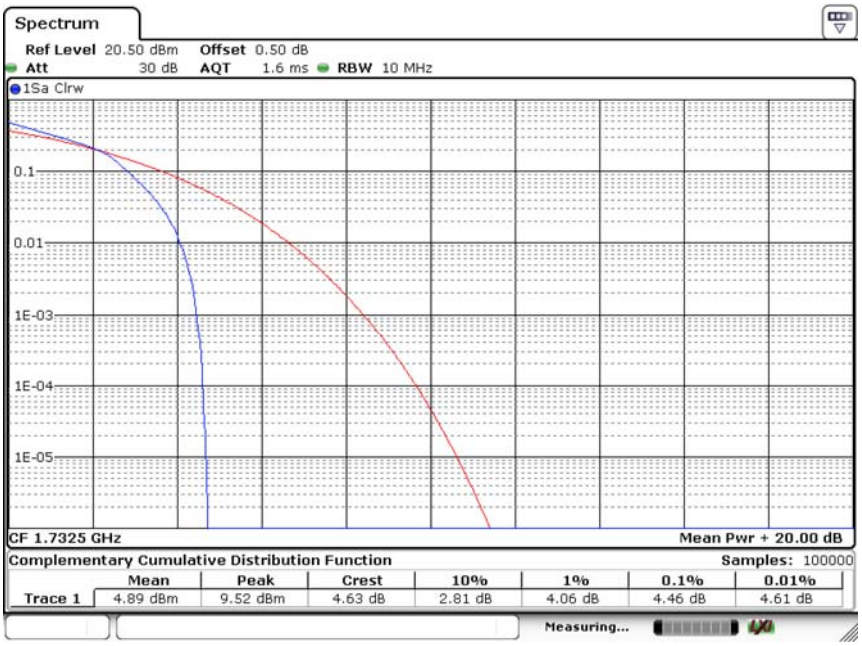
Test Model	LTE Band 4	
	3MHz Bandwidth/ 16-QAM	
	1RB /0 offset	Low Channel



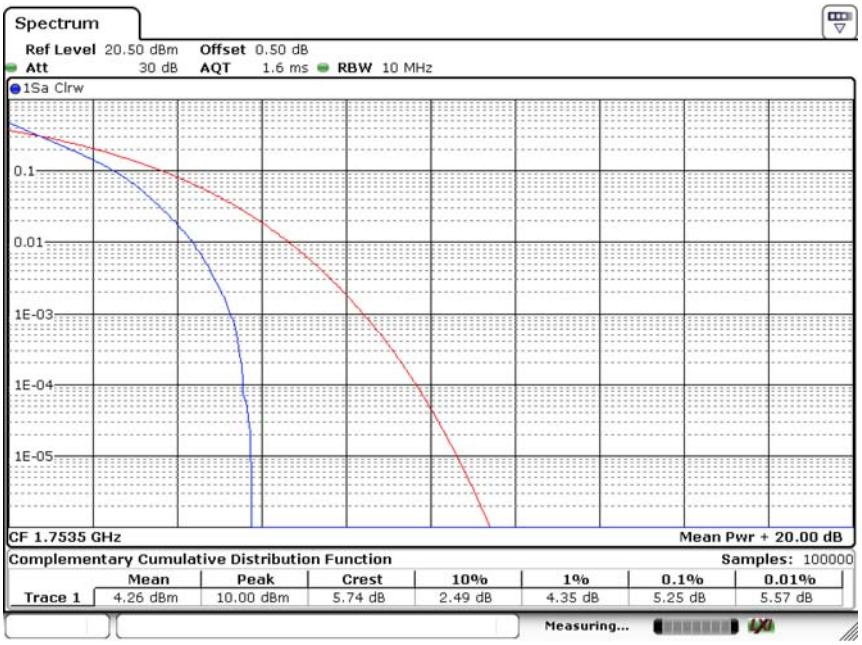
Test Model	LTE Band 4	
	3MHz Bandwidth/ QPSK	
	1RB /0 offset	Middle Channel



Test Model	LTE Band 4	
	3MHz Bandwidth/ 16-QAM	
	1RB /0 offset	Middle Channel

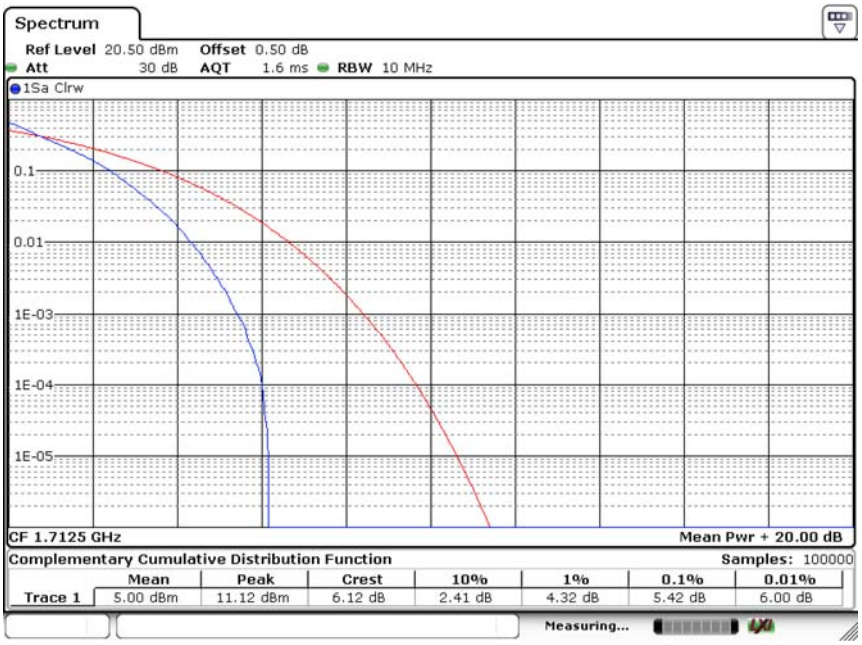


Test Model	LTE Band 4	
	3MHz Bandwidth/ QPSK	
	1RB /0 offset	High Channel

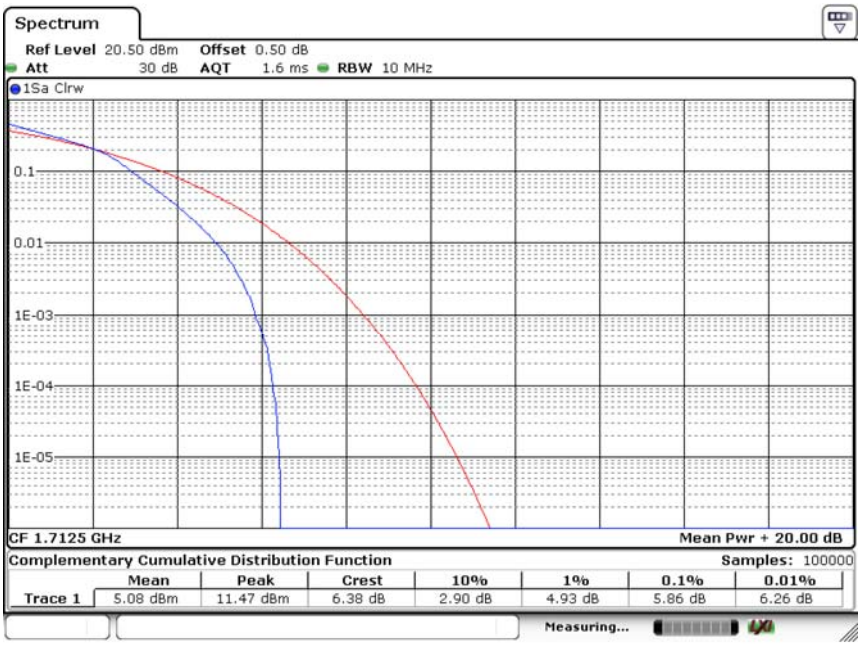


Test Model	LTE Band 4	
	3MHz Bandwidth/ 16-QAM	
	1RB /0 offset	High Channel

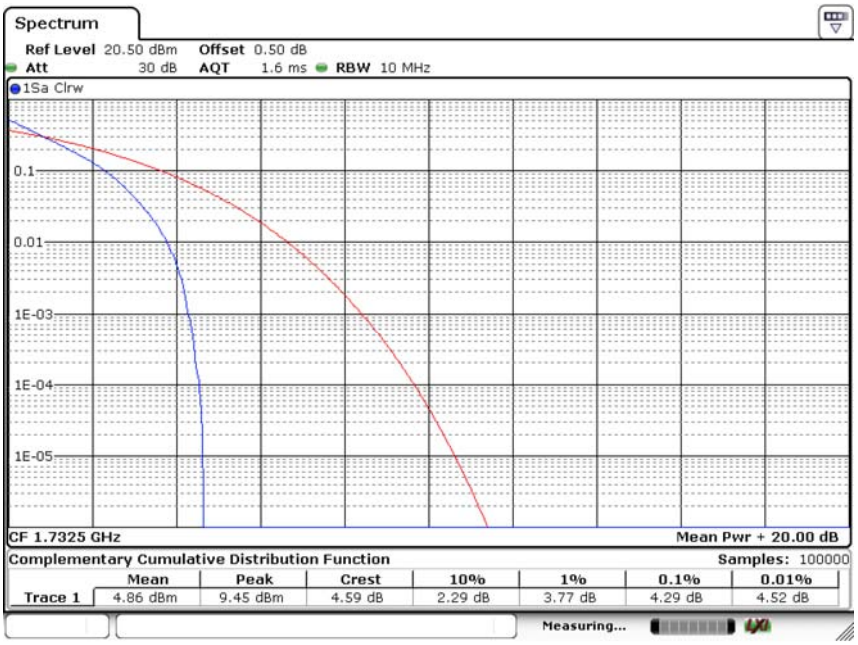
Test Model	LTE Band 4	
	5MHz Bandwidth/ QPSK	
	1RB /0 offset	Low Channel



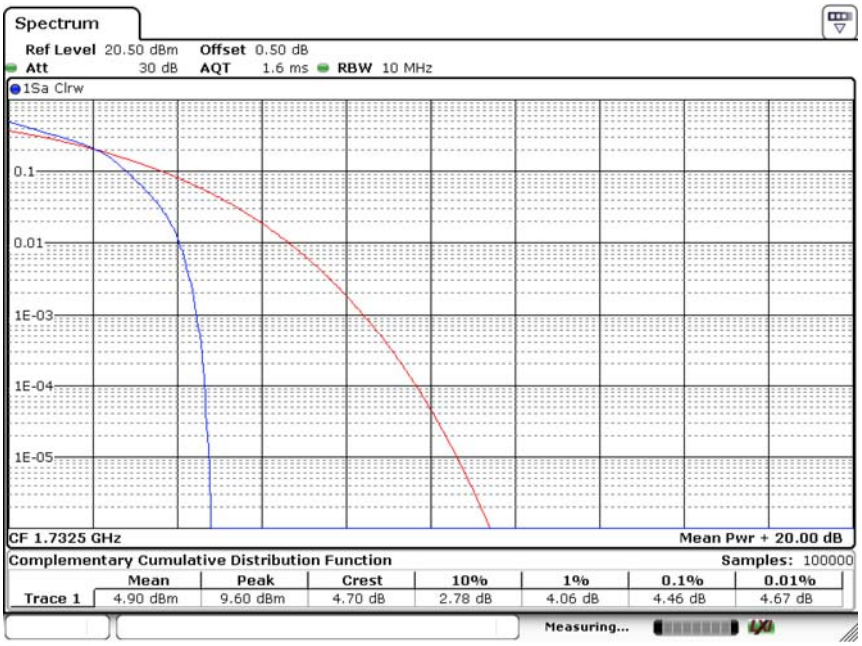
Test Model	LTE Band 4	
	5MHz Bandwidth/ 16-QAM	
	1RB /0 offset	Low Channel



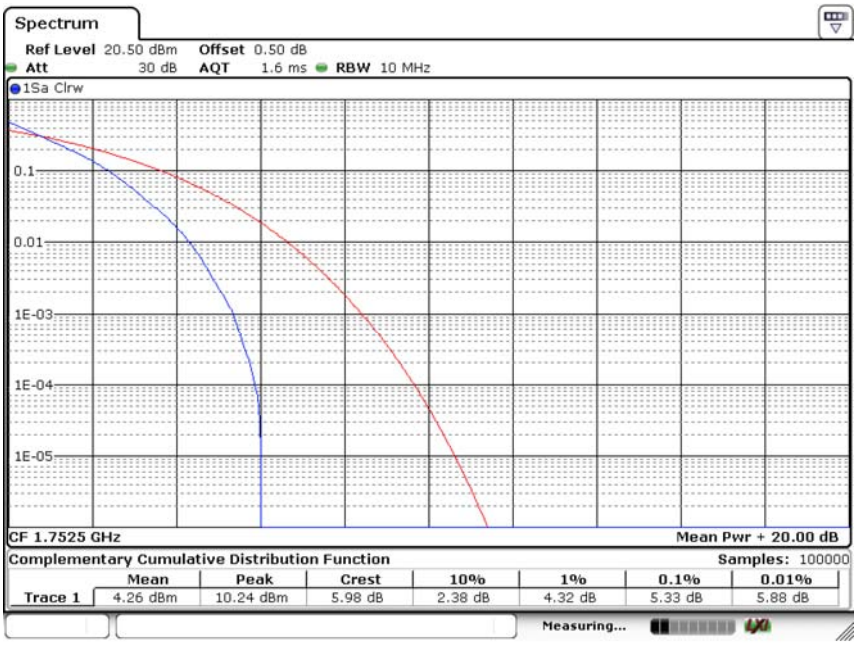
Test Model	LTE Band 4	
	5MHz Bandwidth/ QPSK	
	1RB /0 offset	Middle Channel



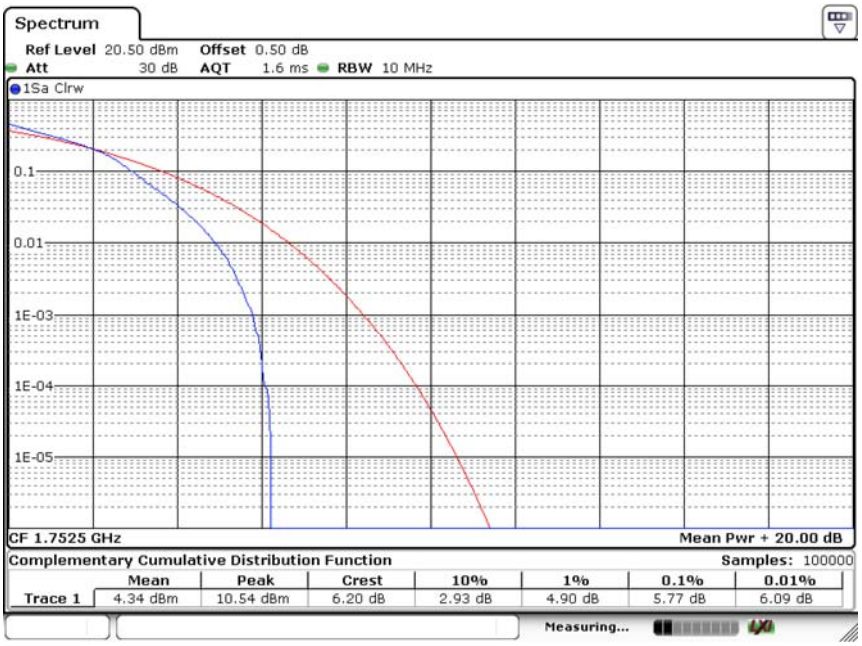
Test Model	LTE Band 4	
	5MHz Bandwidth/ 16-QAM	
	1RB /0 offset	Middle Channel



Test Model	LTE Band 4	
	5MHz Bandwidth/ QPSK	
	1RB /0 offset	High Channel

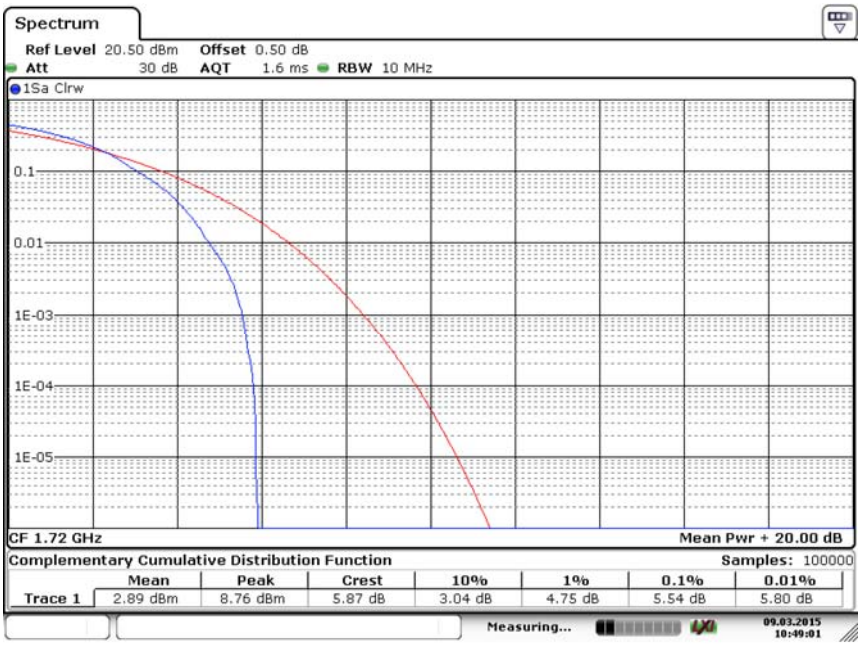


Test Model	LTE Band 4	
	5MHz Bandwidth/ 16-QAM	
	1RB /0 offset	High Channel

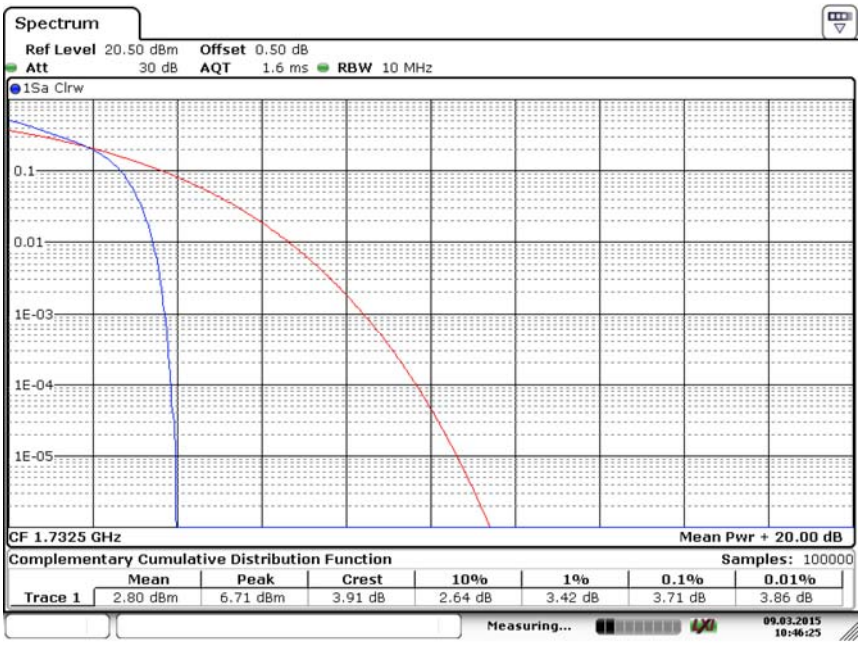


Test Model	LTE Band 4	
	20MHz Bandwidth/ QPSK	
	1RB /0 offset	Low Channel

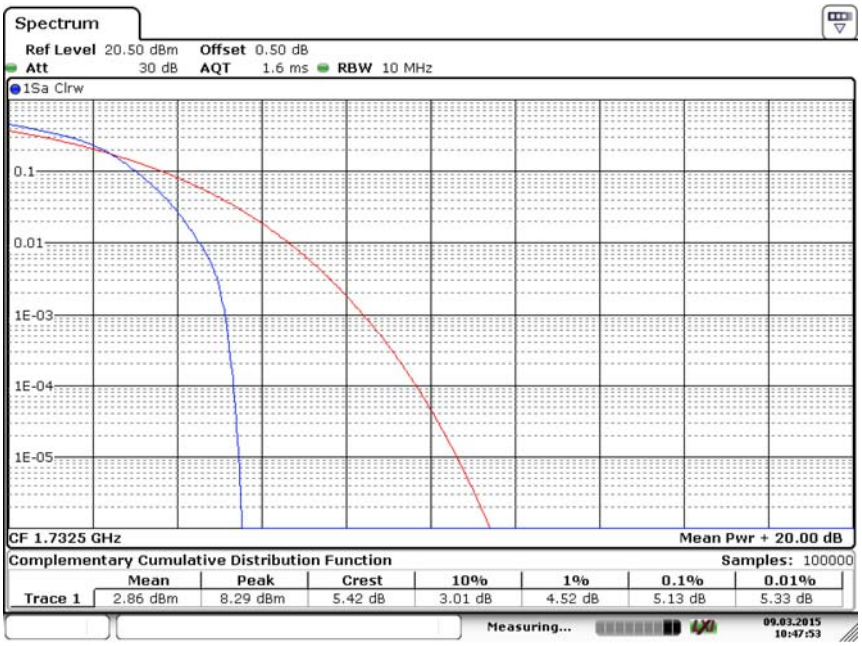
Test Model	LTE Band 4	
	20MHz Bandwidth/ 16-QAM	
	1RB /0 offset	Low Channel



Test Model	LTE Band 4	
	20MHz Bandwidth/ QPSK	
	1RB /0 offset	Middle Channel



Test Model	LTE Band 4	
	20MHz Bandwidth/ 16-QAM	
	1RB /0 offset	Middle Channel

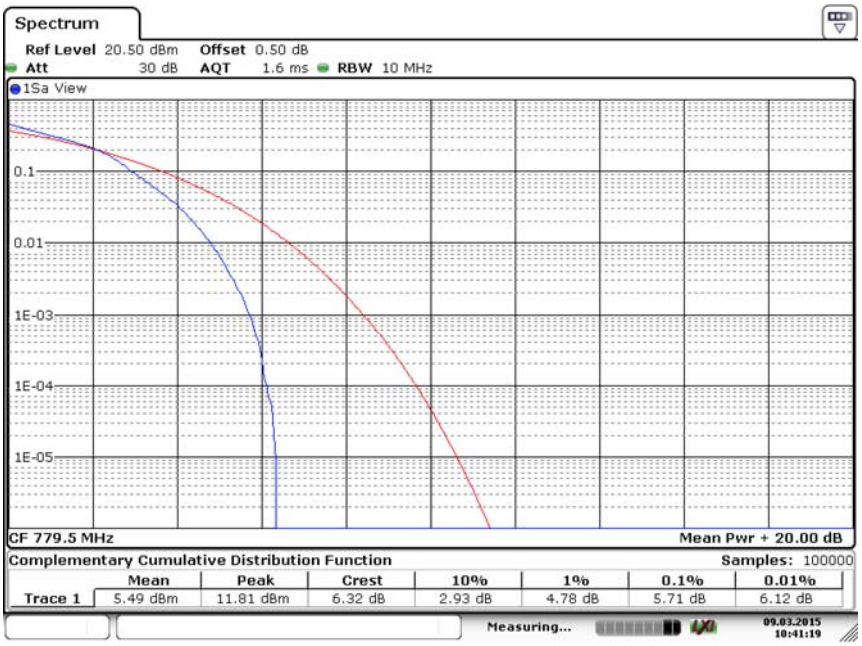


Test Model	LTE Band 4	
	20MHz Bandwidth/ QPSK	
	1RB /0 offset	High Channel

Test Model	LTE Band 4	
	20MHz Bandwidth/ 16-QAM	
	1RB /0 offset	High Channel

Test Model	LTE Band 13	
	5MHz Bandwidth/ QPSK	
	1RB /0 offset	Low Channel

Test Model	LTE Band 13	
	5MHz Bandwidth/ 16-QAM	
	1RB /0 offset	Low Channel

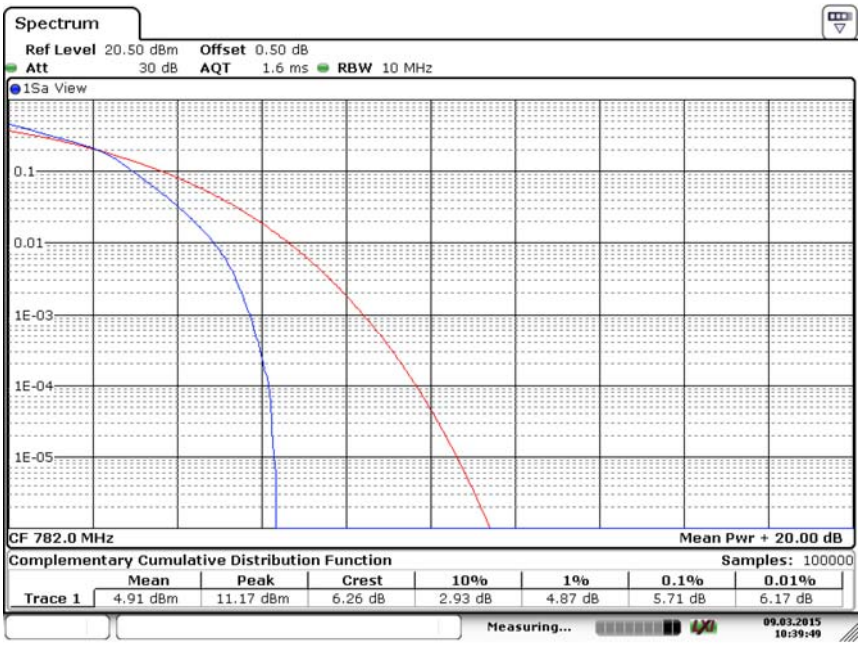


Test Model	LTE Band 13	
	5MHz Bandwidth/ QPSK	
	1RB /0 offset	Middle Channel

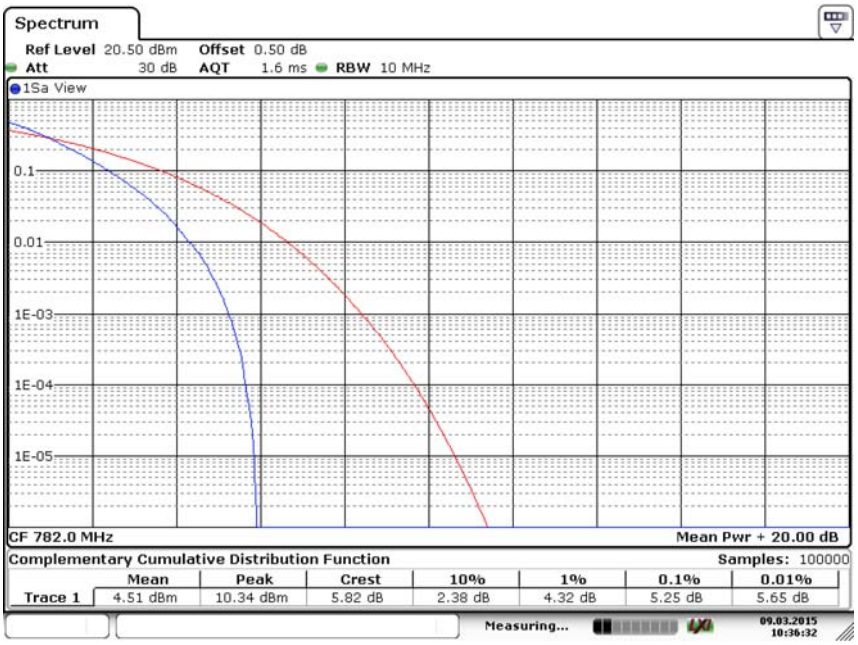
Test Model	LTE Band 13	
	5MHz Bandwidth/ 16-QAM	
	1RB /0 offset	Middle Channel

Test Model	LTE Band 13	
	5MHz Bandwidth/ QPSK	
	1RB /0 offset	High Channel

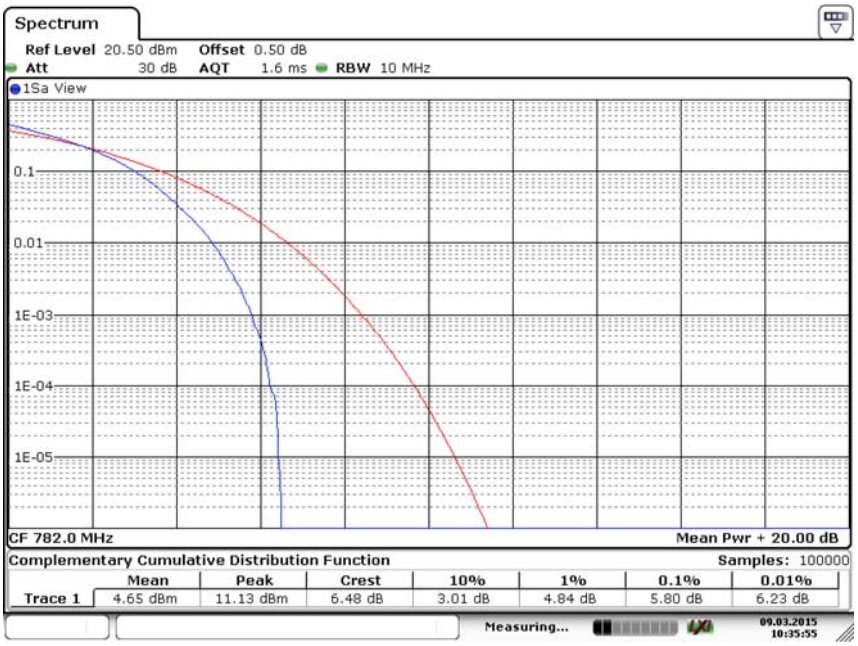
Test Model	LTE Band 13	
	5MHz Bandwidth/ 16-QAM	
	1RB /0 offset	High Channel



Test Model	LTE Band 13	
	10MHz Bandwidth/ QPSK	
	1RB /0 offset	Middle Channel



Test Model	LTE Band 13	
	10MHz Bandwidth/ 16-QAM	
	1RB /0 offset	Middle Channel



8.7 CONDUCTED EMISSION TEST

8.7.1 Applicable Standard

According to FCC Part 15.207(a)

8.7.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50
Note: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

8.7.3 Test Configuration

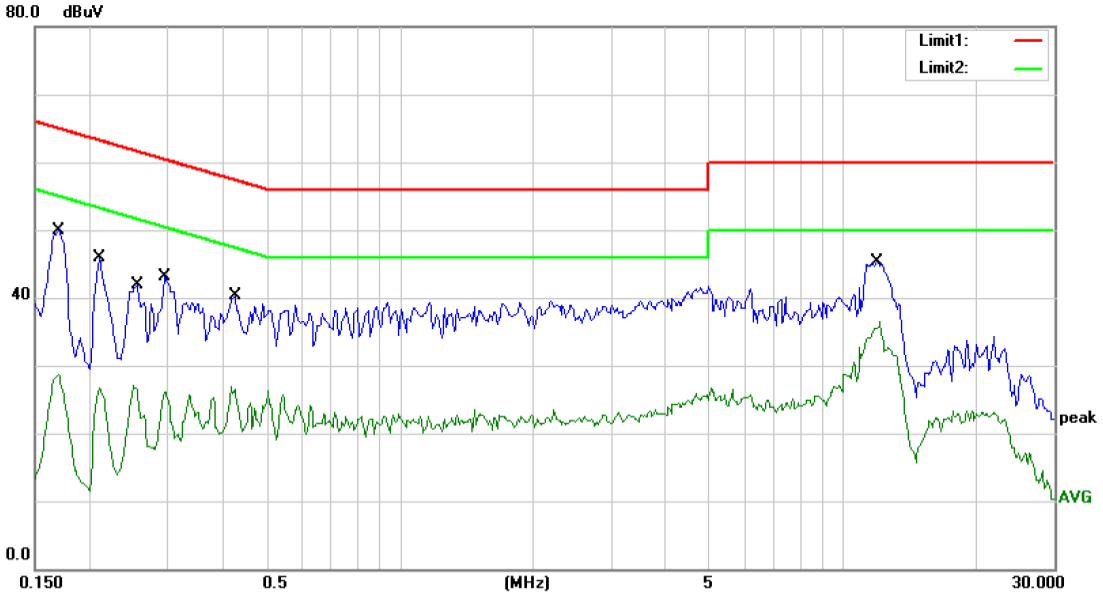
Test according to clause 7.3 conducted emission test setup

8.7.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

8.7.5 Test Results

PASS.



Site Conduction #1 Phase: *L1* Temperature: 24

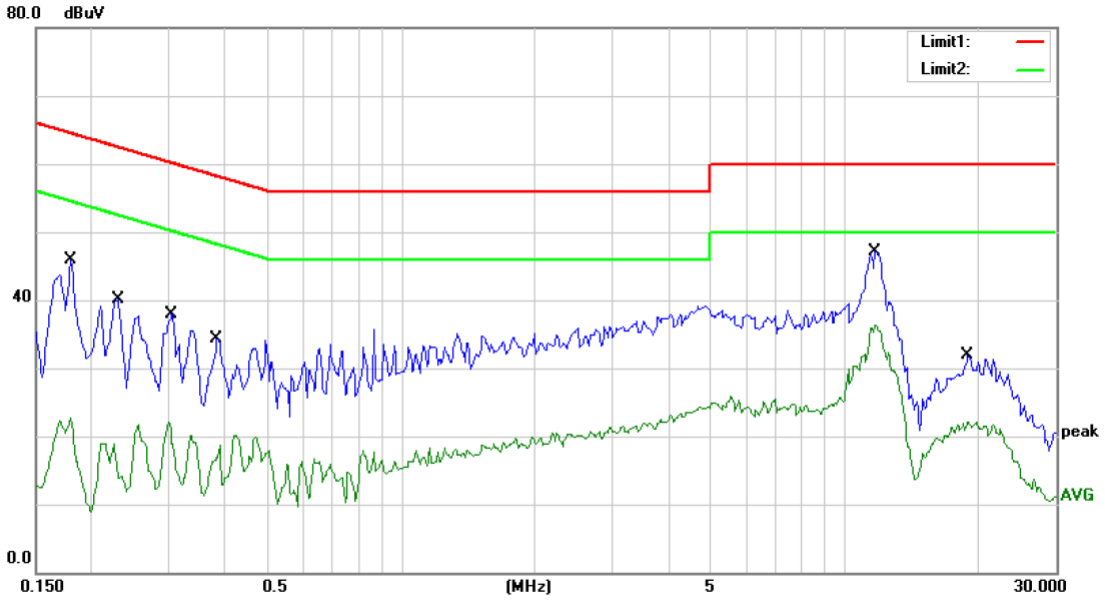
Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 53 %

Mode: ON

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1700	50.00	0.00	50.00	64.96	-14.96	QP	
2		0.1700	28.68	0.00	28.68	54.96	-26.28	AVG	
3		0.2100	45.83	0.00	45.83	63.21	-17.38	QP	
4		0.2100	26.72	0.00	26.72	53.21	-26.49	AVG	
5		0.2550	27.06	0.00	27.06	51.59	-24.53	AVG	
6		0.2550	42.00	0.00	42.00	61.59	-19.59	QP	
7		0.2950	43.05	0.00	43.05	60.38	-17.33	QP	
8		0.2950	26.14	0.00	26.14	50.38	-24.24	AVG	
9		0.4250	26.86	0.00	26.86	47.35	-20.49	AVG	
10		0.4250	40.37	0.00	40.37	57.35	-16.98	QP	
11		11.9500	45.23	0.00	45.23	60.00	-14.77	QP	
12	*	11.9500	36.41	0.00	36.41	50.00	-13.59	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: XY



Site Conduction #1 Phase: N Temperature: 24

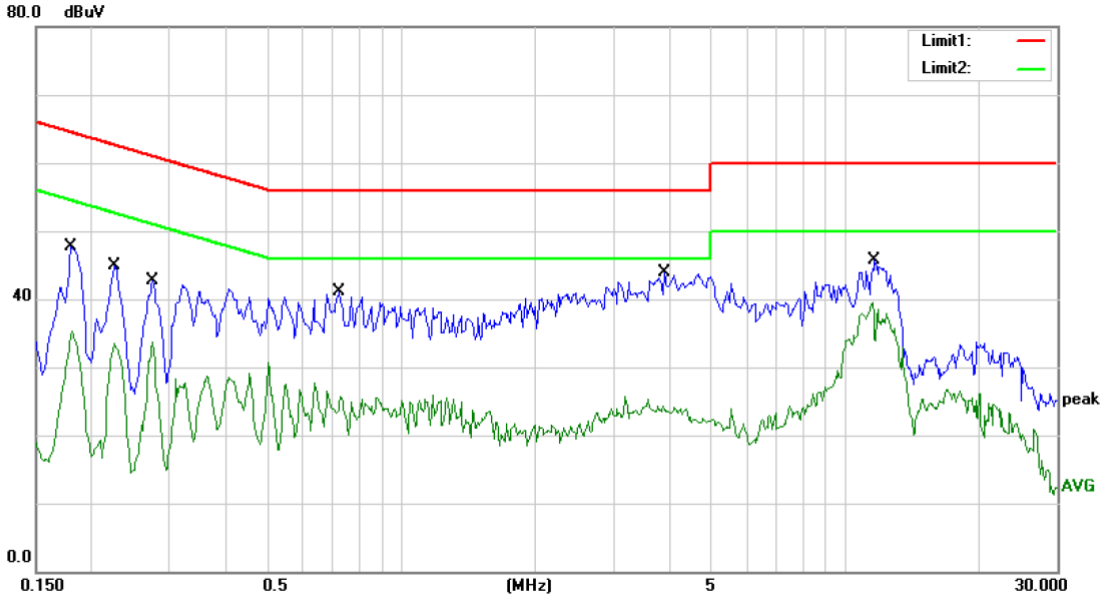
Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 53 %

Mode: ON

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1800	45.99	0.00	45.99	64.49	-18.50	QP	
2		0.1800	22.71	0.00	22.71	54.49	-31.78	AVG	
3		0.2300	40.08	0.00	40.08	62.45	-22.37	QP	
4		0.2300	21.73	0.00	21.73	52.45	-30.72	AVG	
5		0.3050	37.99	0.00	37.99	60.11	-22.12	QP	
6		0.3050	22.08	0.00	22.08	50.11	-28.03	AVG	
7		0.3850	34.36	0.00	34.36	58.17	-23.81	QP	
8		0.3850	20.20	0.00	20.20	48.17	-27.97	AVG	
9	*	11.7250	47.03	0.00	47.03	60.00	-12.97	QP	
10		11.7250	36.39	0.00	36.39	50.00	-13.61	AVG	
11		18.9750	31.89	0.00	31.89	60.00	-28.11	QP	
12		18.9750	22.19	0.00	22.19	50.00	-27.81	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: XY



Site Conduction #1 Phase: *L1* Temperature: 24

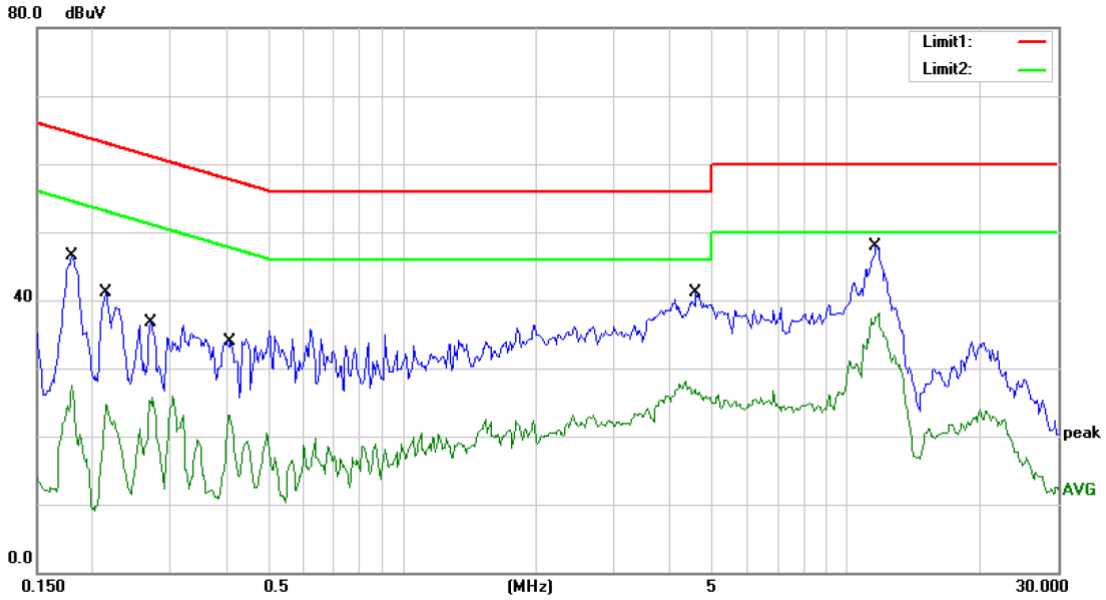
Limit: (CE)FCC PART 15 class B_QP Power: AC 240V/50Hz Humidity: 53 %

Mode: ON

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1800	47.63	0.00	47.63	64.49	-16.86	QP	
2		0.1800	35.26	0.00	35.26	54.49	-19.23	AVG	
3		0.2250	44.96	0.00	44.96	62.63	-17.67	QP	
4		0.2250	33.56	0.00	33.56	52.63	-19.07	AVG	
5		0.2750	42.78	0.00	42.78	60.97	-18.19	QP	
6		0.2750	33.67	0.00	33.67	50.97	-17.30	AVG	
7		0.7250	41.09	0.00	41.09	56.00	-14.91	QP	
8		0.7250	26.41	0.00	26.41	46.00	-19.59	AVG	
9		3.9100	43.89	0.00	43.89	56.00	-12.11	QP	
10		3.9100	25.65	0.00	25.65	46.00	-20.35	AVG	
11		11.6500	45.70	0.00	45.70	60.00	-14.30	QP	
12	*	11.6500	39.55	0.00	39.55	50.00	-10.45	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: XY



Site Conduction #1 Phase: *N* Temperature: 24

Limit: (CE)FCC PART 15 class B_QP Power: AC 240V/50Hz Humidity: 53 %

Mode: ON

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1800	46.43	0.00	46.43	64.49	-18.06	QP	
2		0.1800	27.45	0.00	27.45	54.49	-27.04	AVG	
3		0.2150	41.02	0.00	41.02	63.01	-21.99	QP	
4		0.2150	24.62	0.00	24.62	53.01	-28.39	AVG	
5		0.2701	36.65	0.00	36.65	61.11	-24.46	QP	
6		0.2701	25.70	0.00	25.70	51.11	-25.41	AVG	
7		0.4100	33.88	0.00	33.88	57.65	-23.77	QP	
8		0.4100	23.16	0.00	23.16	47.65	-24.49	AVG	
9		4.5950	41.07	0.00	41.07	56.00	-14.93	QP	
10		4.5950	28.20	0.00	28.20	46.00	-17.80	AVG	
11		11.6750	47.84	0.00	47.84	60.00	-12.16	QP	
12	*	11.6750	38.01	0.00	38.01	50.00	-11.99	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: XY

8.8 ANTENNA APPLICATION

8.8.1 Antenna Requirement

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The EUT has 2 antennas:

Main Antenna	LTE band 4/Antenna Gain:2dBi
	LTE band 13/Antenna Gain:0.5dBi
Auxiliary Antenna	LTE band 4/Antenna Gain:0.5dBi
	LTE band 13/Antenna Gain:-2.5dBi

The antenna can't be replaced by the user, which in accordance to section 15.203, please refer to the internal photos.

A licensee that owns its antenna structure(s) must not allow such antenna structure(s) to become a hazard to air navigation. In general, antenna structure owners are responsible for registering antenna structures with the FCC if required by part 17 of this chapter, and for installing and maintaining any required marking and lighting. However, in the event of default of this responsibility by an antenna structure owner, the FCC permittee or licensee authorized to use an affected antenna structure will be held responsible by the FCC for ensuring that the antenna structure continues to meet the requirements of part 17 of this chapter. See §17.6 of this chapter.

(a) Marking and lighting. Antenna structures must be marked, lighted and maintained in accordance with part 17 of this chapter and all applicable rules and requirements of the Federal Aviation Administration. For any construction or alteration that would exceed the requirements of section 17.7 of this chapter, licensees must notify the appropriate Regional Office of the Federal Aviation Administration (FAA Form 7460-1) and file a request for antenna height clearance and obstruction marking and lighting specifications (FCC Form 854) with the FCC, WTB, 1270 Fairfield Road, Gettysburg, PA 17325.

(b) Maintenance contracts. Antenna structure owners (or licensees and permittees, in the event of default by an antenna structure owner) may enter into contracts with other entities to monitor and carry out necessary maintenance of antenna structures. Antenna structure owners (or licensees and permittees, in the event of default by an antenna structure owner) that make such contractual arrangements continue to be responsible for the maintenance of antenna structures in regard to air navigation safety

8.8.2 Result

PASS.

END OF REPORT