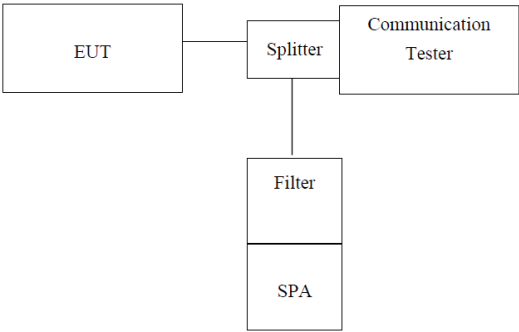


7.6 MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

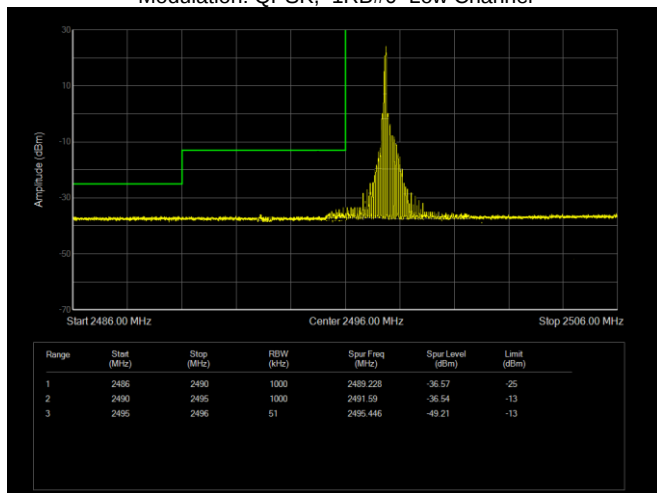
7.7 Out of band emission at antenna terminals

Test Requirement:	Part 27.53
Test Method:	FCC part2.1051
Test setup:	 <i>Note: Measurement setup for testing on Antenna connector</i>
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 3 For the out of band: Set the RBW, VBW = 1MHz, Start=10MHz, Stop= 10th harmonic. 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

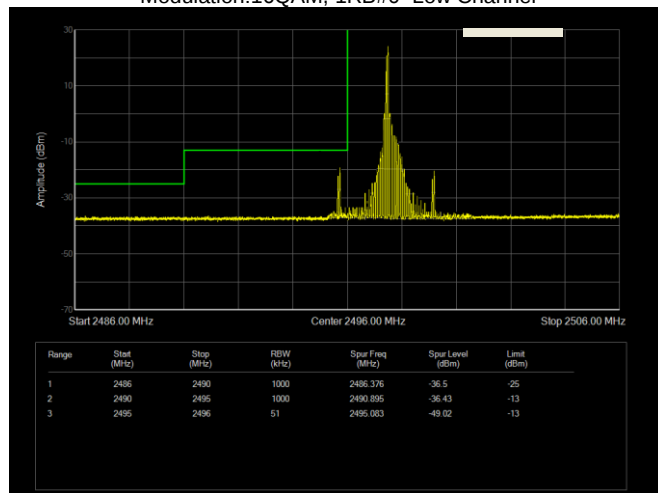
Measurement Data:

LTE FDD Band 41– 5 MHz Channel Bandwidth

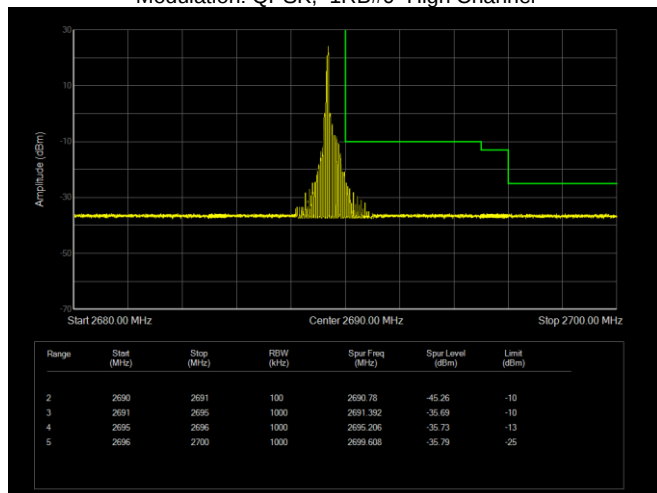
Modulation: QPSK, 1RB#0 Low Channel



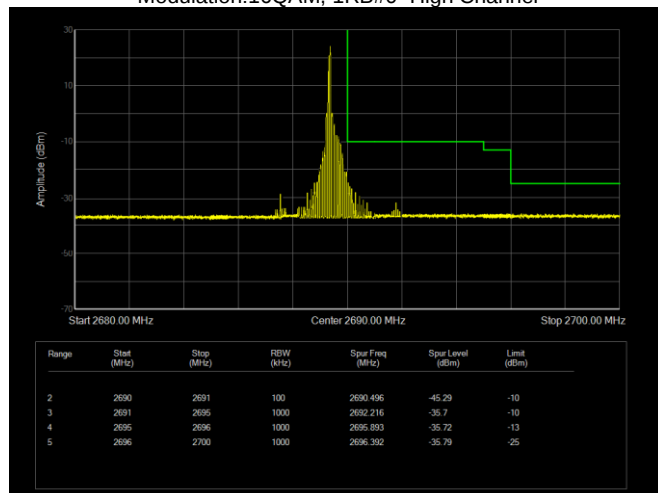
Modulation:16QAM, 1RB#0 Low Channel



Modulation: QPSK, 1RB#0 High Channel

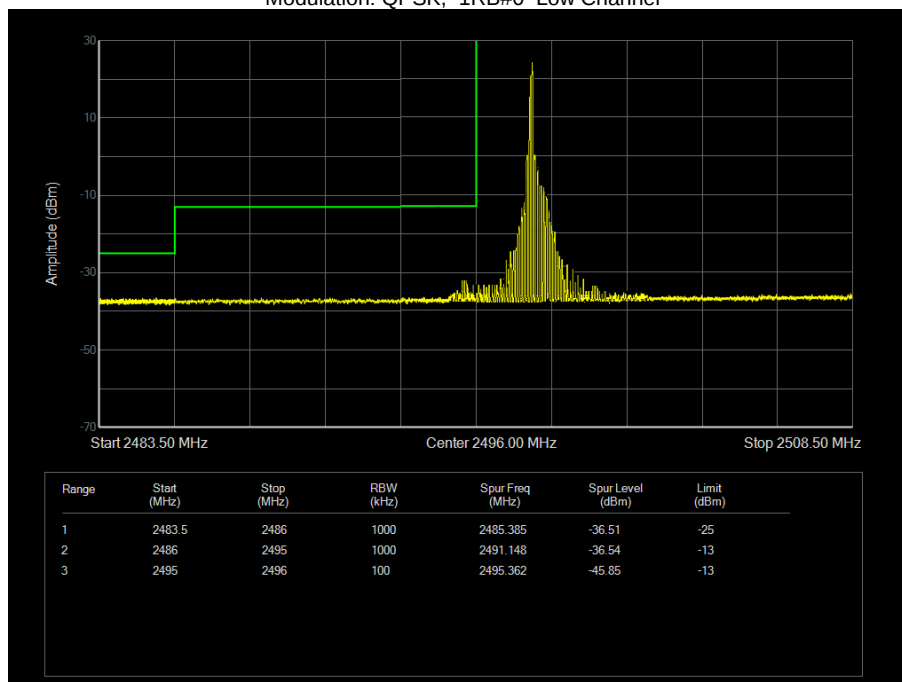


Modulation:16QAM, 1RB#0 High Channel

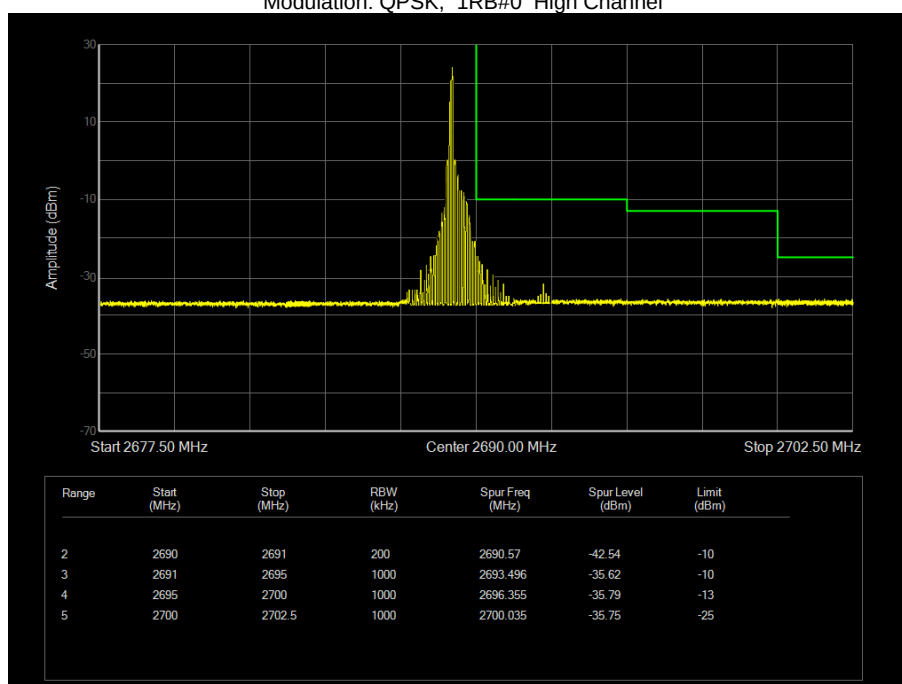


LTE FDD Band 41– 10 MHz Channel Bandwidth

Modulation: QPSK, 1RB#0 Low Channel

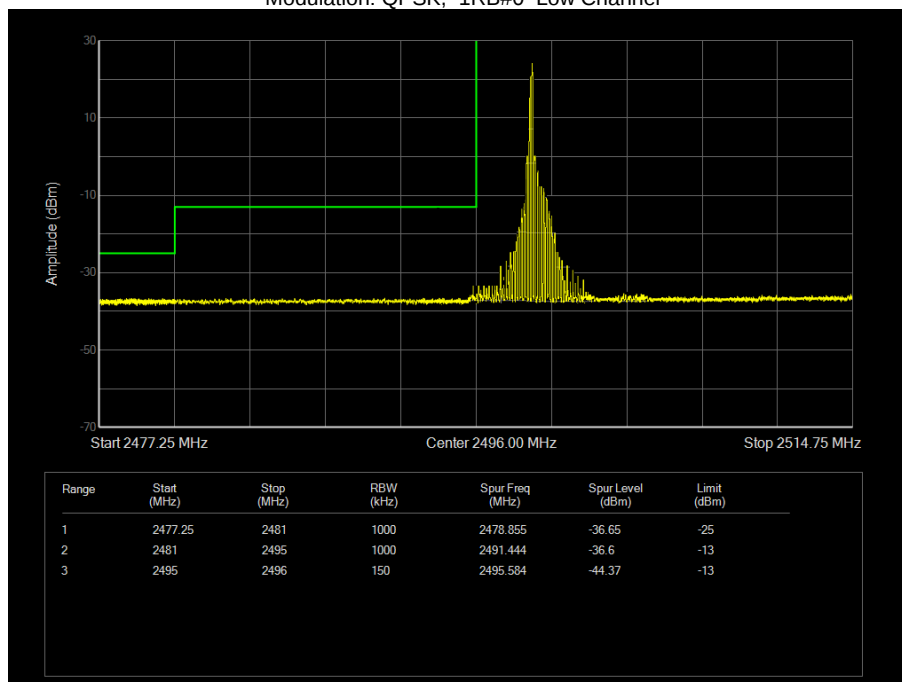


Modulation: QPSK, 1RB#0 High Channel

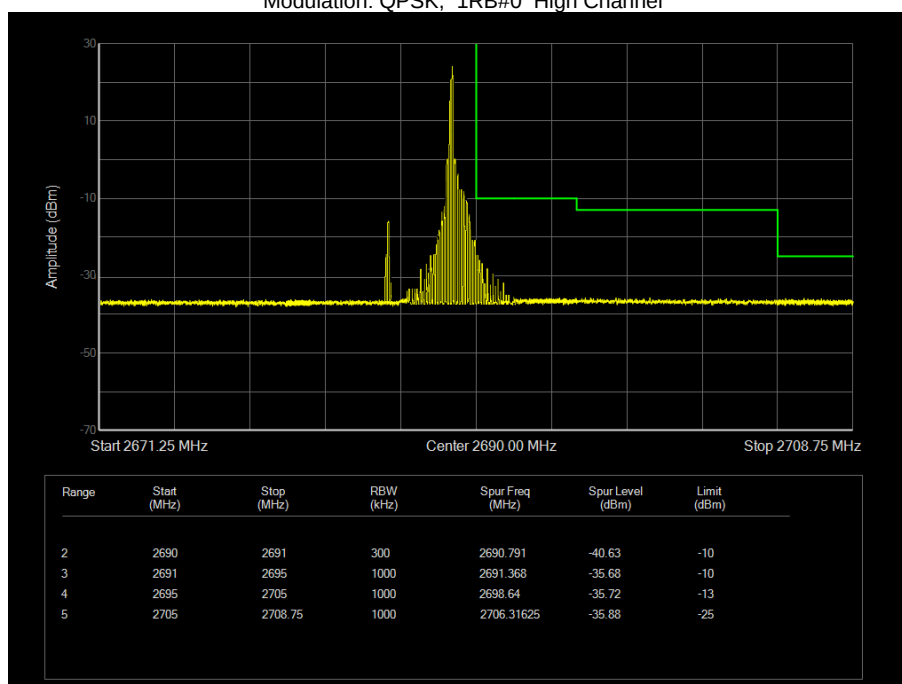


LTE FDD Band 41– 15 MHz Channel Bandwidth

Modulation: QPSK, 1RB#0 Low Channel

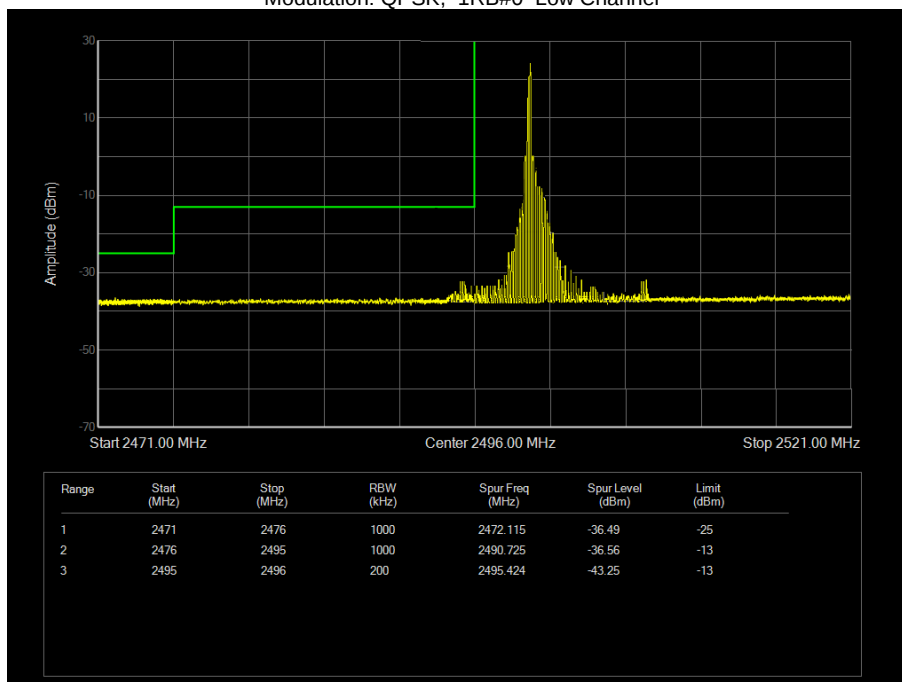


Modulation: QPSK, 1RB#0 High Channel

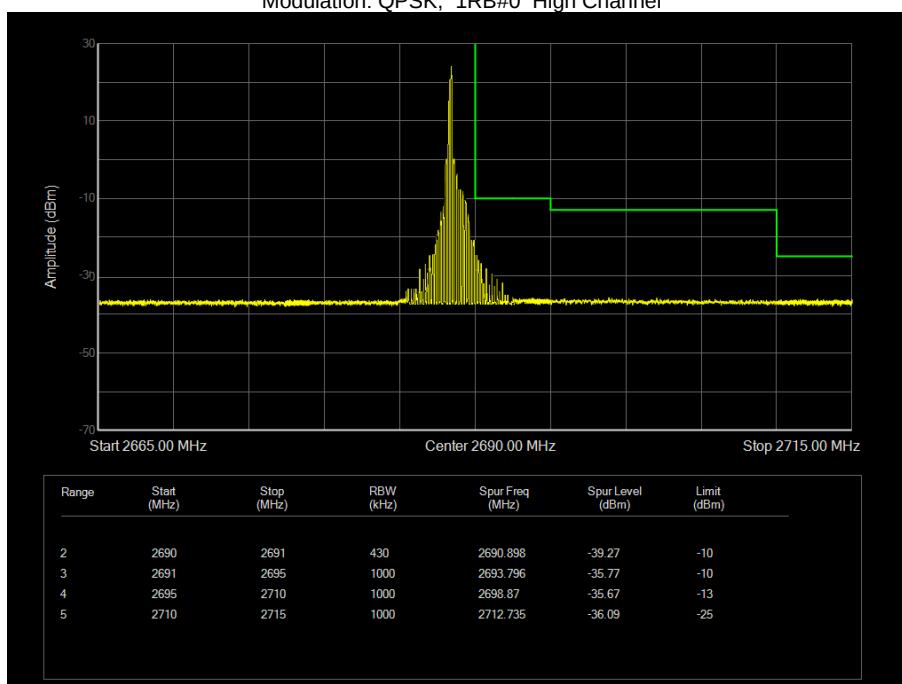


LTE FDD Band 41– 20 MHz Channel Bandwidth

Modulation: QPSK, 1RB#0 Low Channel



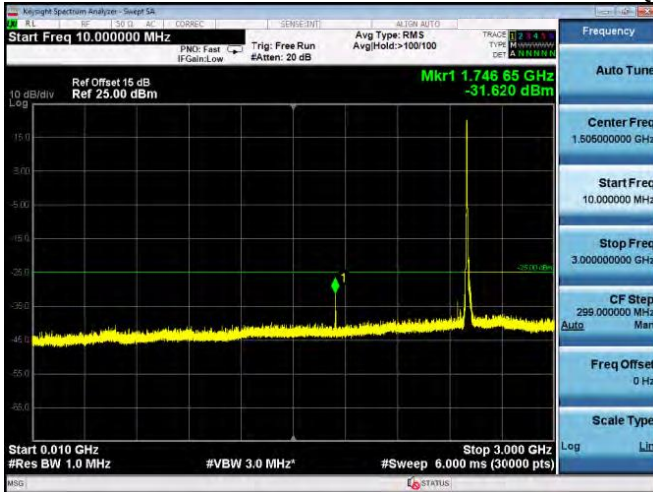
Modulation: QPSK, 1RB#0 High Channel



Spurious Emission Antenna Port

LTE FDD Band 41– 5MHz Channel Bandwidth

Modulation: QPSK, Low Channel



10MHz~3GHz



3GHz ~9GHz



9 GHz ~15 GHz



15 GHz ~26.5GHz

LTE FDD Band 41– 5 MHz Channel Bandwidth

Modulation: QPSK, Middle Channel



10MHz~3GHz



3GHz~9GHz



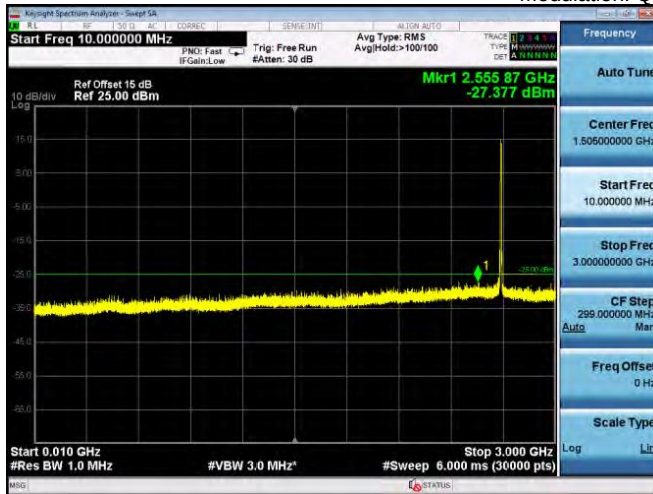
9 GHz~15 GHz



15 GHz~26.5GHz

LTE FDD Band 41– 5 MHz Channel Bandwidth

Modulation: QPSK, High Channel



10MHz~3GHz



3GHz ~9GHz



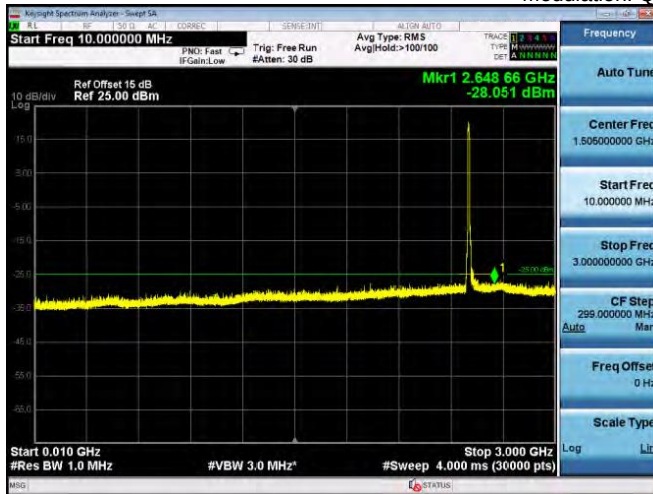
9 GHz ~15 GHz



15 GHz ~26.5GHz

LTE FDD Band 41– 10 MHz Channel Bandwidth

Modulation: QPSK, Low Channel



10MHz~3GHz



3GHz ~9GHz



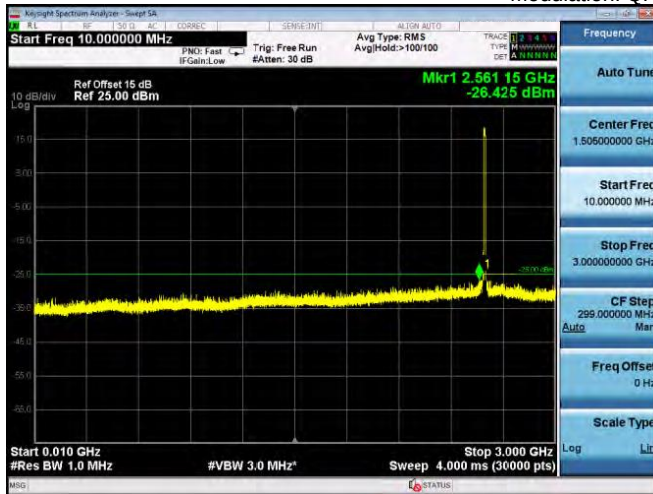
9 GHz ~15 GHz



15 GHz ~26.5GHz

LTE FDD Band 41– 10 MHz Channel Bandwidth

Modulation: QPSK, Middle Channel



10MHz~3GHz



3GHz ~9GHz



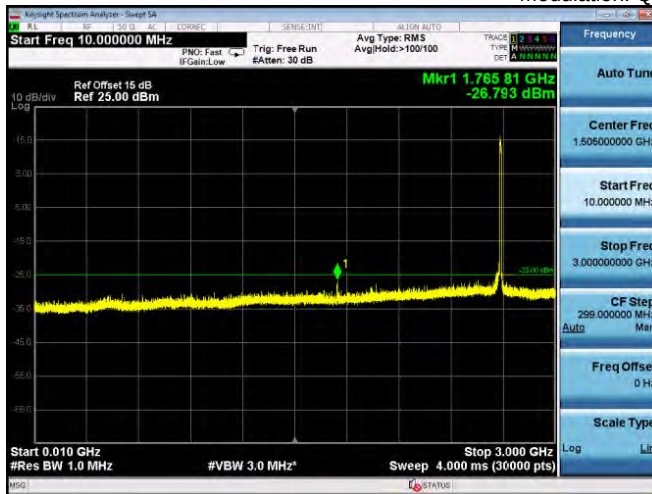
9 GHz ~15 GHz



15 GHz ~26.5GHz

LTE FDD Band 41– 10 MHz Channel Bandwidth

Modulation: QPSK, High Channel



10MHz~3GHz



3GHz ~9GHz



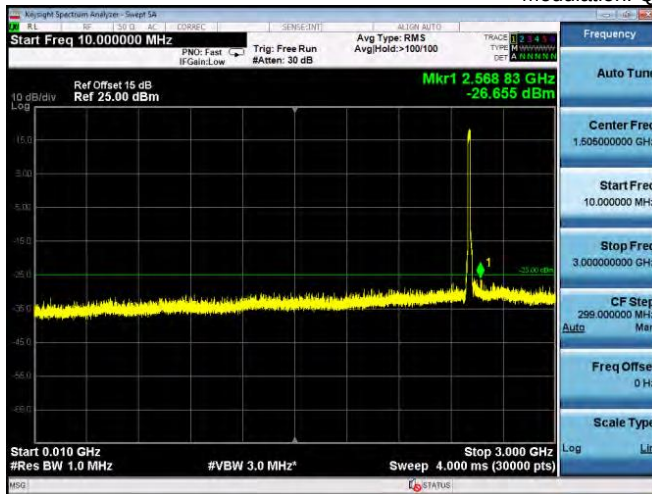
9 GHz ~15 GHz



15 GHz ~26.5GHz

LTE FDD Band 41– 15 MHz Channel Bandwidth

Modulation: QPSK, Low Channel



10MHz~3GHz



3GHz ~9GHz



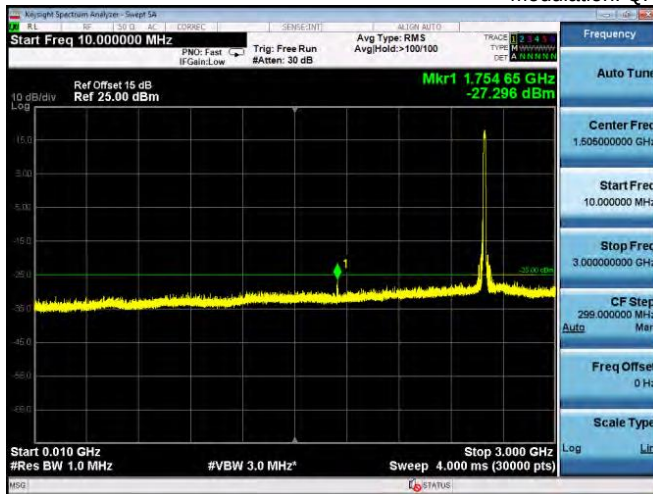
9 GHz ~15 GHz



15 GHz ~26.5GHz

LTE FDD Band 41– 15 MHz Channel Bandwidth

Modulation: QPSK, Middle Channel



10MHz~3GHz



3GHz~9GHz



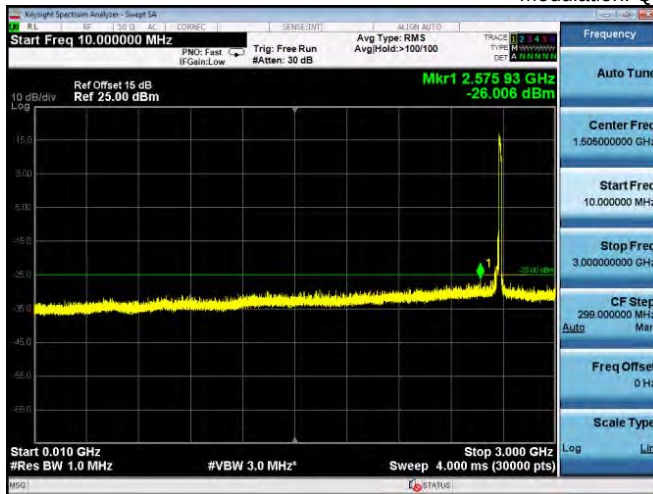
9 GHz~15 GHz



15 GHz~26.5GHz

LTE FDD Band 41– 15 MHz Channel Bandwidth

Modulation: QPSK, High Channel



10MHz~3GHz



3GHz~9GHz



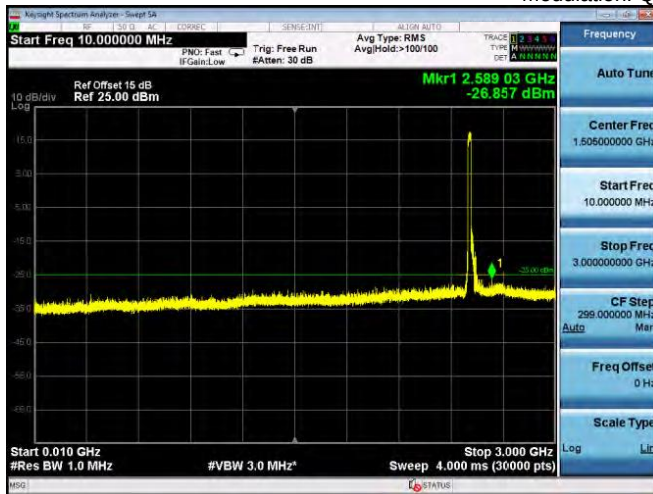
9 GHz~15 GHz



15 GHz~26.5GHz

LTE FDD Band 41– 20MHz Channel Bandwidth

Modulation: QPSK, Low Channel



10MHz~3GHz



3GHz ~9GHz



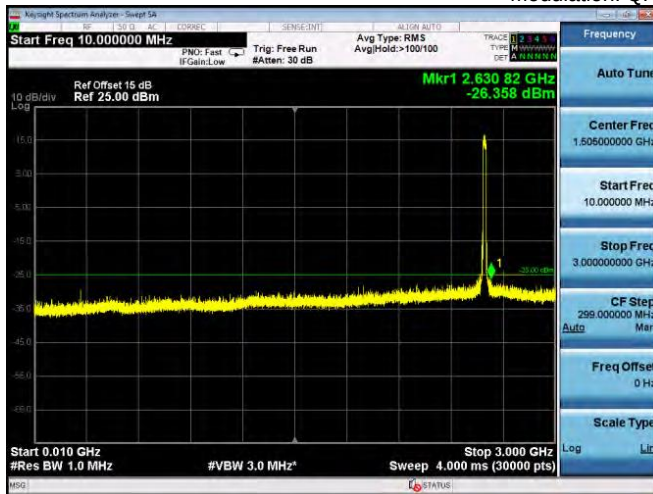
9 GHz ~15 GHz



15 GHz ~26.5GHz

LTE FDD Band 41– 20MHz Channel Bandwidth

Modulation: QPSK, Middle Channel



10MHz~3GHz



3GHz ~9GHz



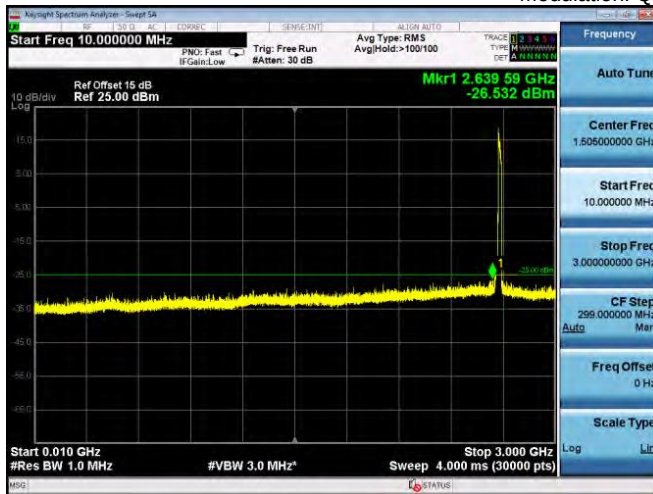
9 GHz ~15 GHz



15 GHz ~26.5GHz

LTE FDD Band 41– 20 MHz Channel Bandwidth

Modulation: QPSK, High Channel



10MHz~3GHz



3GHz~9GHz

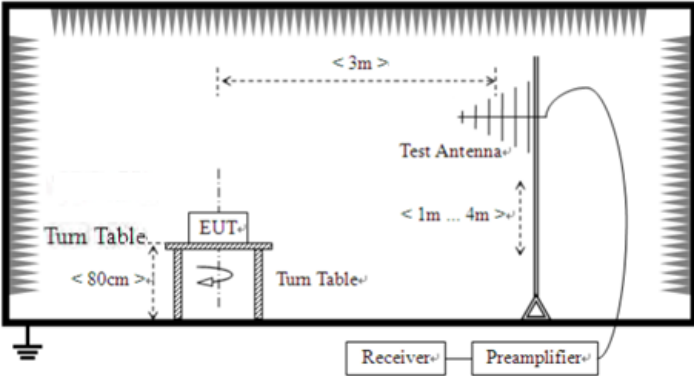
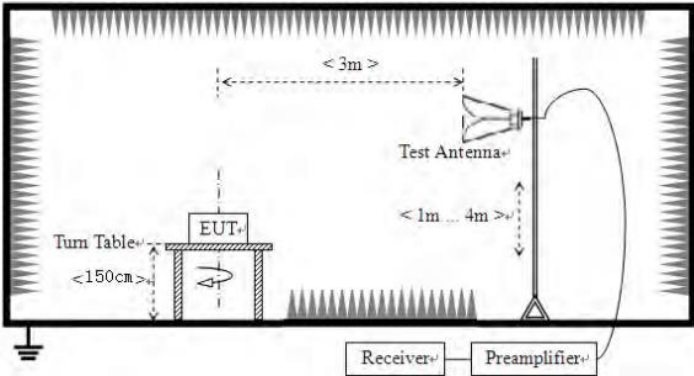
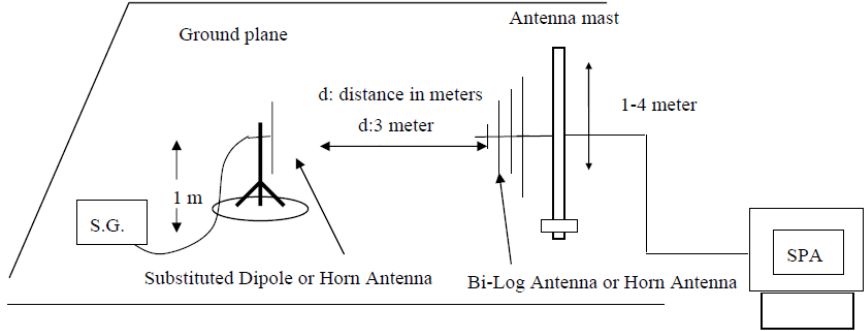


9 GHz~15 GHz



15 GHz~26.5GHz

7.8 ERP, EIRP Measurement

Test Requirement:	Part 27.50
Test Method:	FCC part 2.1046 and ANSI C63.26:2015
Limit:	LTE Band 41:2W
Test setup:	Below 1GHz  Above 1GHz  Substituted method: 
Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. 2. During the measurement, the EUT was communication with the

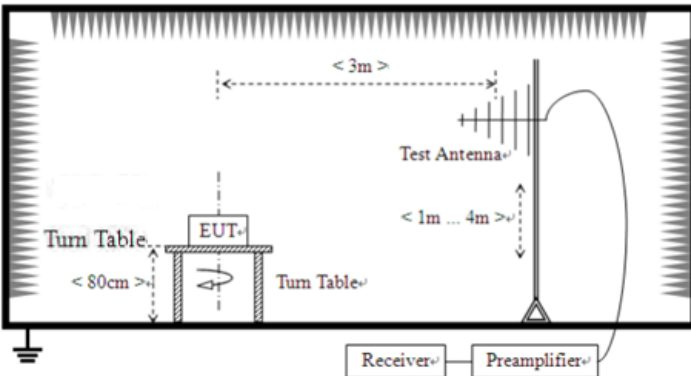
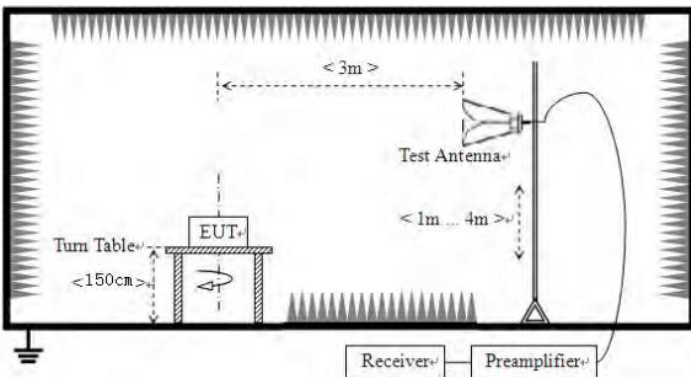
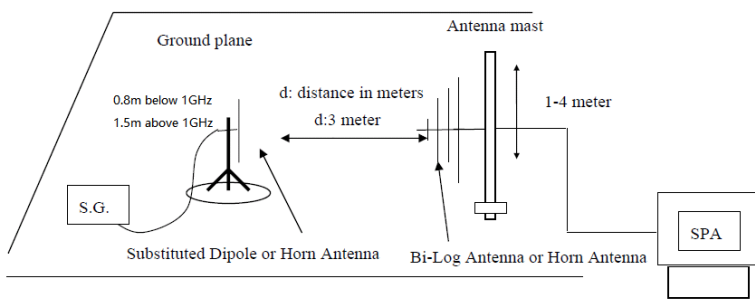
	station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated. 3. ERP in frequency band 777–787MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows: $\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$ 4. EIRP in frequency band 1710–1755MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows: $\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

Measurement Data:

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 27	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
LTE Band 41 Low Channel – 5MHz – QPSK										
2498.50	65.45	43	1.6	H	1.54	1.05	14.10	14.59	33	-18.41
2498.50	68.87	34	1.2	V	3.42	1.05	14.10	16.47	33	-16.53
LTE Band 41 Middle Channel – 5MHz – QPSK										
2593.00	65.35	65	1.5	H	1.24	1.12	14.40	14.52	33	-18.48
2593.00	68.54	310	1.1	V	3.25	1.12	14.40	16.53	33	-16.47
LTE Band 41 High Channel – 5MHz – QPSK										
2687.50	65.38	178	1.9	H	1.09	1.36	14.70	14.43	33	-18.57
2687.50	68.73	180	1.5	V	3.42	1.36	14.70	16.76	33	-16.24
LTE Band 41 Low Channel – 5MHz – 16QAM										
2498.50	65.59	98	1.9	H	1.32	1.05	14.10	14.37	33	-18.63
2498.50	68.28	110	1.1	V	3.82	1.05	14.10	16.87	33	-16.13
LTE Band 41 Middle Channel – 5MHz – 16QA										
2593.00	64.77	190	1.5	H	1.32	1.12	14.40	14.60	33	-18.40
2593.00	68.52	178	1.5	V	3.72	1.12	14.40	17.00	33	-16.00
LTE Band 41 High Channel – 5MHz – 16QAM										
2687.50	65.36	180	1.8	H	1.27	1.36	14.70	14.61	33	-18.39
2687.50	64.59	209	1.5	V	3.66	1.36	14.70	17.00	33	-16.00
LTE Band 41 Low Channel – 10MHz – QPSK										
2501.00	65.18	211	1.5	H	1.64	1.05	14.10	14.69	33	-18.31
2501.00	68.33	65	1.0	V	3.58	1.05	14.10	16.63	33	-16.37
LTE Band 41 Middle Channel – 10MHz – QPSK										
2593.00	65.29	45	2.0	H	1.24	1.12	14.40	14.52	33	-18.48
2593.00	58.72	321	2.0	V	3.73	1.12	14.40	17.01	33	-15.99
LTE Band 41 High Channel – 10MHz – QPSK										
2685.00	65.53	54	2.5	H	1.53	1.36	14.70	14.87	33	-18.13
2685.00	68.92	78	1.0	V	3.19	1.36	14.70	16.53	33	-16.47
LTE Band 41 Low Channel – 10MHz – 16QAM										
2501.00	65.39	113	2.6	H	1.25	1.05	14.10	14.30	33	-18.70
2501.00	68.71	49	1.1	V	3.72	1.05	14.10	16.77	33	-16.23
LTE Band 41 Middle Channel – 10MHz – 16QAM										
2593.00	65.53	87	1.3	H	1.21	1.12	14.40	14.49	33	-18.51
2593.00	67.89	214	1.5	V	3.72	1.12	14.40	17.00	33	-16.00
LTE Band 41 High Channel – 10MHz – 16QAM										
2685.00	64.54	85	2.1	H	1.45	1.36	14.70	14.79	33	-18.21
2685.00	68.74	158	1.5	V	3.21	1.36	14.70	16.55	33	-16.45
LTE Band 41 Low Channel – 15MHz – QPSK										
2503.50	64.86	156	1.8	H	1.32	1.07	14.20	14.45	33	-18.55
2503.50	67.97	78	1.0	V	3.21	1.07	14.20	16.34	33	-16.66

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 27	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
LTE Band 41 Middle Channel –15MHz – QPSK										
2593.00	65.78	178	2.2	H	1.04	1.12	14.40	14.32	33	-18.68
2593.00	68.31	167	1.0	V	3.28	1.12	14.40	16.56	33	-16.44
LTE Band 41 High Channel –15MHz – QPSK										
2682.50	65.87	193	1.6	H	1.12	1.33	14.65	14.44	33	-18.56
2682.50	68.13	98	1.8	V	3.21	1.33	14.65	16.52	33	-16.48
LTE Band 41 Low Channel–15MHz– 16QAM										
2503.50	65.48	92	2.1	H	1.03	1.07	14.20	14.16	33	-18.84
2503.50	68.11	78	1.5	V	3.32	1.07	14.20	16.45	33	-16.55
LTE Band 41 Middle Channel –15MHz – 16QAM										
2593.00	64.95	0	1.6	H	1.26	1.12	14.40	14.54	33	-18.46
2593.00	60.29	190	1.5	V	3.51	1.12	14.40	16.79	33	-16.21
LTE Band 41 High Channel –15MHz– 16QAM										
2682.50	65.76	189	1.5	H	1.21	1.33	14.65	14.53	33	-18.47
2682.50	68.43	78	2.0	V	3.62	1.33	14.65	16.94	33	-16.06
LTE Band 41 Low Channel–20MHz – QPSK										
2506.00	65.45	166	2.5	H	1.38	1.08	14.24	14.54	33	-18.46
2506.00	68.96	215	1.1	V	3.29	1.08	14.24	16.45	33	-16.55
LTE Band 41 Middle Channel –20MHz – QPSK										
2593.00	65.11	89	2.0	H	1.29	1.12	14.40	14.57	33	-18.43
2593.00	68.47	165	1.5	V	3.31	1.12	14.40	16.59	33	-16.41
LTE Band 41 High Channel –20MHz – QPSK										
2680.00	65.53	67	1.5	H	1.22	1.31	14.65	14.56	33	-18.44
2680.00	58.73	298	1.2	V	3.21	1.31	14.65	16.55	33	-16.45
LTE Band 41 Low Channel –20MHz – 16QAM										
2506.00	65.52	87	1.5	H	1.45	1.08	14.24	14.61	33	-18.39
2506.00	68.33	165	1.1	V	3.09	1.08	14.24	16.25	33	-16.75
LTE Band 41 Middle Channel –20MHz – 16QAM										
2593.00	65.71	182	2.5	H	1.20	1.12	14.40	14.48	33	-18.52
2593.00	68.78	92	1.5	V	3.29	1.12	14.40	16.57	33	-16.43
LTE Band 41 High Channel –20MHz– 16QAM										
2680.00	65.28	35	1.8	H	1.31	1.31	14.65	14.65	33	-18.35
2680.00	68.98	134	1.5	V	3.27	1.31	14.65	16.61	33	-16.39

7.9 Field strength of spurious radiation measurement

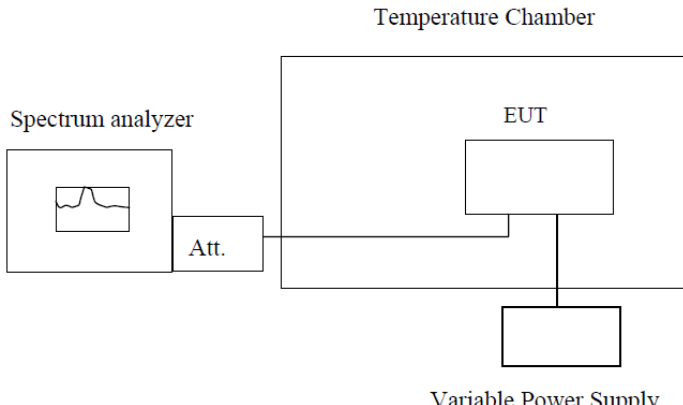
Test Requirement:	FCC Part 27.53(h)/(g)
Test Method:	FCC part 2.1053 and ANSI C63.26:2015
Test setup:	Below 1GHz  Above 1GHz  Substituted method: 
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

Measurement Data:

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
LTE BAND 41 Low Channel										
199.38	40.61	178	3.0	H	-68.98	0.15	1.12	-68.01	-25.00	-43.01
199.38	31.12	193	2.0	V	-75.89	0.15	1.12	-74.92	-25.00	-49.92
4997.00	63.45	216	3.5	H	-46.75	4.68	18.60	-32.83	-25.00	-7.83
4997.00	56.75	87	1.3	V	-49.56	4.68	18.60	-35.64	-25.00	-10.64
7495.50	54.56	167	1.7	H	-55.54	6.12	21.50	-40.16	-25.00	-15.16
7495.50	45.43	211	1.1	V	-61.75	6.12	21.50	-46.37	-25.00	-21.37
LTE BAND 41 Middle Channel										
199.38	40.98	165	1.9	H	-69.12	0.15	1.12	-68.15	-25.00	-43.15
199.38	31.21	311	2.0	V	-77.76	0.15	1.12	-76.79	-25.00	-51.79
5186.00	58.76	215	1.8	H	-49.95	4.77	19.40	-35.32	-25.00	-10.32
5186.00	53.58	276	1.7	V	-56.64	4.77	19.40	-42.01	-25.00	-17.01
7779.00	48.67	175	2.1	H	-58.96	6.26	22.20	-43.02	-25.00	-18.02
7779.00	39.54	297	1.3	V	-68.61	6.26	22.20	-52.67	-25.00	-27.67
LTE BAND 41 High Channel										
199.38	41.21	123	1.7	H	-69.87	0.15	1.12	-68.90	-25.00	-43.90
199.38	31.32	161	1.5	V	-77.12	0.15	1.12	-76.15	-25.00	-51.15
5375.00	51.56	116	2.5	H	-58.64	4.83	19.70	-43.77	-25.00	-18.77
5375.00	48.76	217	1.1	V	-66.76	4.83	19.70	-51.89	-25.00	-26.89
8062.50	38.66	89	1.5	H	-68.87	6.51	22.50	-52.88	-25.00	-27.88
8062.50	32.36	187	1.1	V	-75.45	6.51	22.50	-59.46	-25.00	-34.46

Note: 1) Absolute Level = SG Level - Cable loss + Antenna Gain
2) Margin = Absolute Level - Limit

7.10 Frequency stability

Test Requirement:	FCC Part2.1055(a)(1)(b), FCC Part2.1055(d)(1)(2)
Test Method:	FCC Part2.1055(a)(1)(b), FCC Part2.1055(d)(1)(2)
Limit:	2.5ppm
Test setup:	 Note : Measurement setup for testing on Antenna connector
Test procedure:	1. The equipment under test was connected to an external DC power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached. 7. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 8. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 9. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

Measurement Data:

LTE Band 41

Middle Channel 2593.0MHz QPSK 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12.0	12	0.0046	2.5
40		32	0.0123	2.5
30		26	0.0100	2.5
20		8	0.0031	2.5
10		10	0.0039	2.5
0		21	0.0081	2.5
-10		12	0.0046	2.5
-20		17	0.0066	2.5
-30		17	0.0066	2.5
20	10.8	8	0.0031	2.5
20	13.2	10	0.0039	2.5

Middle Channel 2593.0MHz 16QAM 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12.0	16	0.0062	2.5
40		13	0.0050	2.5
30		17	0.0066	2.5
20		10	0.0039	2.5
10		12	0.0046	2.5
0		15	0.0058	2.5
-10		15	0.0058	2.5
-20		17	0.0066	2.5
-30		21	0.0081	2.5
20	10.8	10	0.0039	2.5
20	13.2	10	0.0039	2.5

Middle Channel 2593.0MHz QPSK 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12.0	21	0.0081	2.5
40		18	0.0069	2.5
30		19	0.0073	2.5
20		10	0.0039	2.5
10		12	0.0046	2.5
0		12	0.0046	2.5
-10		15	0.0058	2.5
-20		18	0.0069	2.5
-30		14	0.0054	2.5
20	10.8	12	0.0046	2.5
20	13.2	12	0.0046	2.5

Middle Channel 2593.0MHz 16QAM 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12.0	25	0.0096	2.5
40		23	0.0089	2.5
30		18	0.0069	2.5
20		10	0.0039	2.5
10		12	0.0046	2.5
0		16	0.0062	2.5
-10		16	0.0062	2.5
-20		18	0.0069	2.5
-30		21	0.0081	2.5
20	10.8	13	0.0050	2.5
20	13.2	13	0.0050	2.5

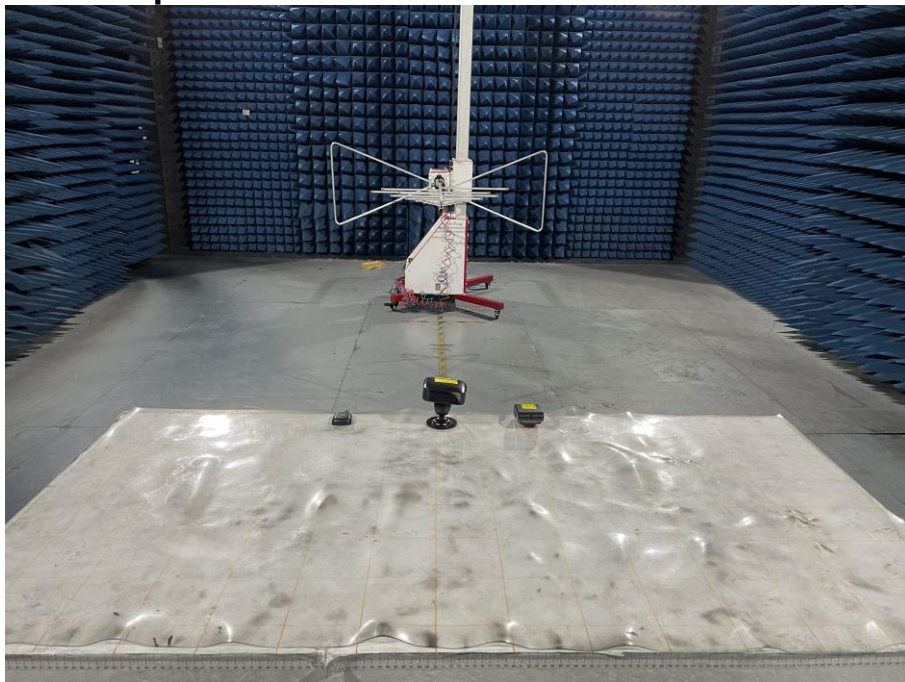
Middle Channel 2593.0MHz QPSK 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12.0	21	0.0081	2.5
40		20	0.0077	2.5
30		15	0.0058	2.5
20		13	0.0050	2.5
10		25	0.0096	2.5
0		18	0.0069	2.5
-10		20	0.0077	2.5
-20		11	0.0042	2.5
-30		16	0.0062	2.5
20	10.8	10	0.0039	2.5
20	13.2	9	0.0035	2.5

Middle Channel 2593.0MHz 16QAM 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12.0	24	0.0093	2.5
40		18	0.0069	2.5
30		17	0.0066	2.5
20		10	0.0039	2.5
10		18	0.0069	2.5
0		20	0.0077	2.5
-10		16	0.0062	2.5
-20		15	0.0058	2.5
-30		18	0.0069	2.5
20	10.8	12	0.0046	2.5
20	13.2	12	0.0046	2.5

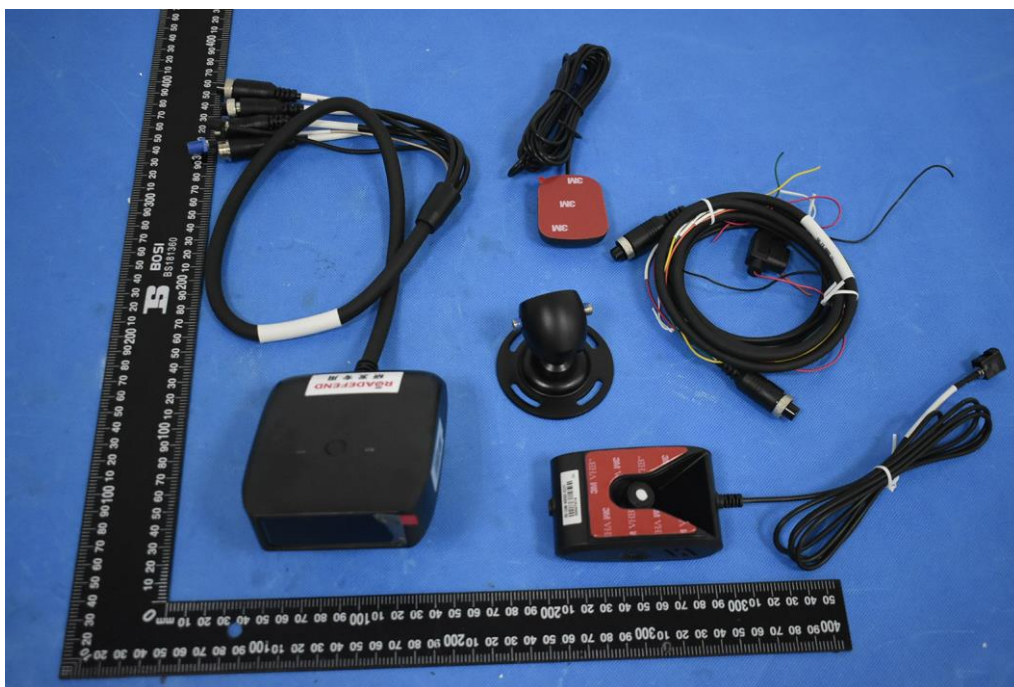
Middle Channel 2593.0MHz QPSK 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12.0	25	0.0096	2.5
40		21	0.0081	2.5
30		18	0.0069	2.5
20		10	0.0039	2.5
10		19	0.0073	2.5
0		16	0.0062	2.5
-10		24	0.0093	2.5
-20		15	0.0058	2.5
-30		18	0.0069	2.5
20	10.8	12	0.0046	2.5
20	13.2	14	0.0054	2.5

Middle Channel 2593.0MHz 16QAM 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	12.0	26	0.0100	2.5
40		25	0.0096	2.5
30		21	0.0081	2.5
20		13	0.0050	2.5
10		16	0.0062	2.5
0		12	0.0046	2.5
-10		21	0.0081	2.5
-20		23	0.0089	2.5
-30		25	0.0096	2.5
20	10.8	18	0.0069	2.5
20	13.2	14	0.0054	2.5

8 Test Setup Photo



9 EUT Constructional Details



-----End-----