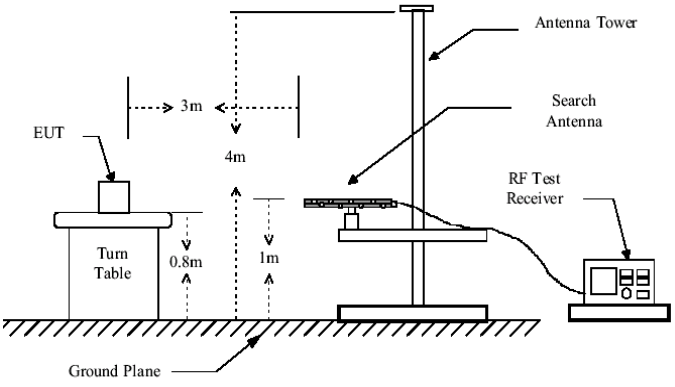
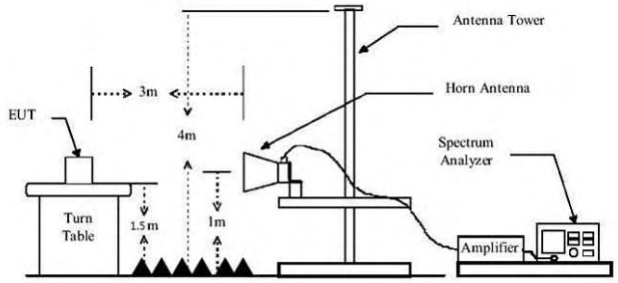
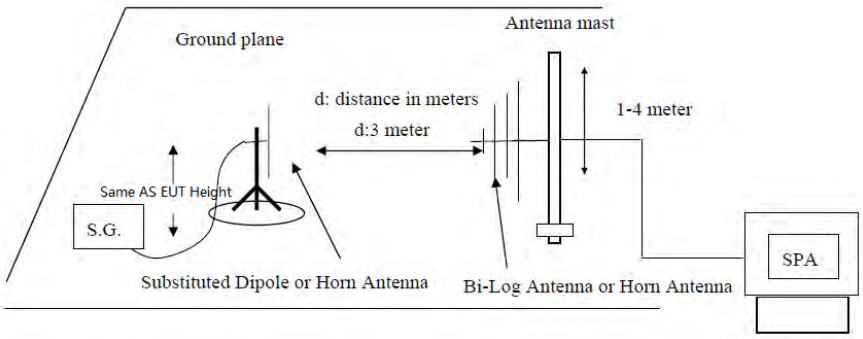
4.8 ERP, EIRP Measurement

Test Requirement:	FCC part22.913(a), FCC part24.232(b) and FCC part 27.53
Test Method:	ANSI C63.26:2015
Limit:	LTE Band 2: 2W (EIRP) LTE Band 4: 1W (EIRP) LTE Band 5(Upper Band): [7W (ERP) for FCC] LTE Band 7: 2W (EIRP)
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 were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated asfollows: ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB) 4. EIRP 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: EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass
Remark:	H,E1,E2 mean for EUT polarization of X, Y, Z

Measurement Data

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 2 (5MHz) QPSK	Lowest	25	0	H	V	20.06	33.00	Pass
					H	20.60		
				E1	V	21.90		
					H	21.18		
				E2	V	20.82		
					H	23.14		
	Middle	25	0	H	V	21.31	33.00	Pass
					H	23.14		
				E1	V	19.14		
					H	20.92		
				E2	V	19.41		
					H	22.09		
	Highest	25	0	H	V	22.94	33.00	Pass
					H	19.37		
				E1	V	20.93		
					H	23.07		
				E2	V	22.03		
					H	21.19		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 2 (10MHz) QPSK	Lowest	50	0	H	V	23.47	33.00	Pass
					H	20.52		
				E1	V	22.55		
					H	23.10		
				E2	V	23.46		
					H	20.51		
	Middle	50	0	H	V	22.40	33.00	Pass
					H	20.86		
				E1	V	20.62		
					H	21.33		
				E2	V	21.67		
					H	21.75		
	Highest	50	0	H	V	21.12	33.00	Pass
					H	23.21		
				E1	V	22.49		
					H	21.63		
				E2	V	23.00		
					H	21.66		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 2 (15MHz) QPSK	Lowest	75	0	H	V	22.32	33.00	Pass
					H	22.22		
				E1	V	23.23		
					H	23.41		
				E2	V	22.56		
					H	21.21		
	Middle	75	0	H	V	22.02	33.00	Pass
					H	23.60		
				E1	V	21.16		
					H	23.10		
				E2	V	21.97		
					H	20.78		
	Highest	75	0	H	V	23.09	33.00	Pass
					H	20.35		
				E1	V	22.82		
					H	22.60		
				E2	V	23.09		
					H	20.95		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 2 (20MHz) QPSK	Lowest	100	0	H	V	18.42	33.00	Pass
					H	22.22		
				E1	V	24.08		
					H	22.55		
				E2	V	18.62		
					H	22.74		
	Middle	100	0	H	V	19.69	33.00	Pass
					H	19.76		
				E1	V	18.43		
					H	21.14		
				E2	V	20.47		
					H	20.94		
	Highest	100	0	H	V	20.14	33.00	Pass
					H	21.96		
				E1	V	22.92		
					H	19.00		
				E2	V	21.23		
					H	22.94		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 2 (5MHz) 16 QAM	Lowest	25	0	H	V	21.85	33.00	Pass
					H	23.73		
				E1	V	22.93		
					H	22.43		
				E2	V	19.88		
					H	20.77		
	Middle	25	0	H	V	19.80	33.00	Pass
					H	23.78		
				E1	V	19.17		
					H	21.58		
				E2	V	19.60		
					H	19.69		
	Highest	25	0	H	V	20.24	33.00	Pass
					H	22.17		
				E1	V	23.00		
					H	20.53		
				E2	V	22.18		
					H	22.51		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 2 (10MHz) 16 QAM	Lowest	50	0	H	V	21.21	33.00	Pass
					H	22.37		
				E1	V	22.85		
					H	21.18		
				E2	V	21.93		
					H	22.71		
	Middle	50	0	H	V	21.25	33.00	Pass
					H	22.08		
				E1	V	22.10		
					H	20.71		
				E2	V	21.78		
					H	22.84		
	Highest	50	0	H	V	20.92	33.00	Pass
					H	22.40		
				E1	V	20.43		
					H	21.15		
				E2	V	21.42		
					H	20.22		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 2 (15MHz) 16 QAM	Lowest	75	0	H	V	22.55	33.00	Pass
					H	22.98		
				E1	V	23.14		
					H	23.17		
				E2	V	21.97		
					H	21.17		
	Middle	75	0	H	V	21.77	33.00	Pass
					H	22.93		
				E1	V	21.23		
					H	22.36		
				E2	V	21.59		
					H	20.62		
	Highest	75	0	H	V	23.38	33.00	Pass
					H	20.40		
				E1	V	22.29		
					H	22.53		
				E2	V	23.24		
					H	20.41		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 2 (20MHz) 16 QAM	Lowest	100	0	H	V	20.43	33.00	Pass
					H	22.49		
				E1	V	18.99		
					H	20.71		
				E2	V	23.73		
					H	18.51		
	Middle	100	0	H	V	20.87	33.00	Pass
					H	20.33		
				E1	V	19.13		
					H	23.35		
				E2	V	20.81		
					H	18.83		
	Highest	100	0	H	V	22.42	33.00	Pass
					H	22.11		
				E1	V	19.19		
					H	20.39		
				E2	V	20.33		
					H	21.59		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 4 (5MHz) QPSK	Lowest	25	0	H	V	20.06	30.00	Pass
					H	19.70		
				E1	V	19.83		
					H	21.08		
				E2	V	21.21		
					H	20.20		
	Middle	25	0	H	V	20.44	30.00	Pass
					H	21.90		
				E1	V	23.58		
					H	23.79		
				E2	V	21.05		
					H	23.84		
	Highest	25	0	H	V	20.69	30.00	Pass
					H	23.02		
				E1	V	20.26		
					H	20.72		
				E2	V	20.69		
					H	20.95		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 4 (10MHz) QPSK	Lowest	50	0	H	V	20.09	30.00	Pass
					H	20.12		
				E1	V	22.27		
					H	23.99		
				E2	V	19.96		
					H	19.65		
	Middle	50	0	H	V	20.27	30.00	Pass
					H	21.86		
				E1	V	22.14		
					H	22.24		
				E2	V	19.49		
					H	22.08		
	Highest	50	0	H	V	22.91	30.00	Pass
					H	21.91		
				E1	V	20.28		
					H	20.94		
				E2	V	20.88		
					H	21.34		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 4 (15MHz) QPSK	Lowest	75	0	H	V	22.40	30.00	Pass
					H	20.28		
				E1	V	20.60		
					H	24.54		
				E2	V	20.35		
					H	23.59		
	Middle	75	0	H	V	22.62	30.00	Pass
					H	22.88		
				E1	V	20.64		
					H	22.04		
				E2	V	21.43		
					H	20.95		
	Highest	75	0	H	V	21.72	30.00	Pass
					H	20.48		
				E1	V	22.61		
					H	24.32		
				E2	V	22.62		
					H	21.45		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 4 (20MHz) QPSK	Lowest	100	0	H	V	19.54	30.00	Pass
					H	20.66		
				E1	V	20.65		
					H	24.68		
				E2	V	22.10		
					H	23.94		
	Middle	100	0	H	V	23.37	30.00	Pass
					H	22.54		
				E1	V	20.65		
					H	23.55		
				E2	V	23.25		
					H	21.78		
	Highest	100	0	H	V	23.43	30.00	Pass
					H	20.80		
				E1	V	21.23		
					H	22.17		
				E2	V	21.28		
					H	24.86		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 4 (5MHz) 16 QAM	Lowest	25	0	H	V	22.75	30.00	Pass
					H	21.03		
				E1	V	20.97		
					H	21.57		
				E2	V	22.10		
					H	23.57		
	Middle	25	0	H	V	23.82	30.00	Pass
					H	23.18		
				E1	V	20.58		
					H	21.35		
				E2	V	24.20		
					H	21.82		
	Highest	25	0	H	V	19.90	30.00	Pass
					H	20.06		
				E1	V	22.62		
					H	21.91		
				E2	V	24.64		
					H	23.88		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 4 (10MHz) 16 QAM	Lowest	50	0	H	V	22.84	30.00	Pass
					H	21.44		
				E1	V	19.39		
					H	21.02		
				E2	V	23.95		
					H	24.09		
	Middle	50	0	H	V	23.11	30.00	Pass
					H	22.63		
				E1	V	19.52		
					H	20.57		
				E2	V	22.04		
					H	23.54		
	Highest	50	0	H	V	21.25	30.00	Pass
					H	23.54		
				E1	V	20.78		
					H	22.33		
				E2	V	19.92		
					H	20.80		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 4 (15MHz) 16 QAM	Lowest	75	0	H	V	22.60	30.00	Pass
					H	20.69		
				E1	V	19.87		
					H	24.04		
				E2	V	20.55		
					H	22.77		
	Middle	75	0	H	V	22.47	30.00	Pass
					H	20.34		
				E1	V	19.86		
					H	23.74		
				E2	V	23.16		
					H	24.33		
	Highest	75	0	H	V	24.21	30.00	Pass
					H	20.11		
				E1	V	23.41		
					H	20.97		
				E2	V	19.90		
					H	23.82		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 4 (20MHz) 16 QAM	Lowest	100	0	H	V	21.89	30.00	Pass
					H	20.32		
				E1	V	24.65		
					H	22.85		
				E2	V	20.84		
					H	21.99		
	Middle	100	0	H	V	19.52	30.00	Pass
					H	23.74		
				E1	V	23.12		
					H	19.19		
				E2	V	24.12		
					H	23.49		
	Highest	100	0	H	V	24.68	30.00	Pass
					H	21.73		
				E1	V	22.39		
					H	23.34		
				E2	V	22.34		
					H	24.12		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
LTE Band 5 (5MHz) QPSK	Lowest	25	0	H	V	20.67	38.45	Pass
					H	19.67		
				E1	V	20.69		
					H	21.08		
				E2	V	21.74		
					H	19.41		
	Middle	25	0	H	V	19.74	38.45	Pass
					H	21.32		
				E1	V	22.47		
					H	20.60		
				E2	V	23.70		
					H	21.73		
	Highest	25	0	H	V	19.45	38.45	Pass
					H	19.05		
				E1	V	20.42		
					H	19.71		
				E2	V	21.20		
					H	23.18		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
LTE Band 5 (10MHz) QPSK	Lowest	50	0	H	V	23.47	38.45	Pass
					H	22.51		
				E1	V	22.41		
					H	22.59		
				E2	V	22.57		
					H	22.37		
	Middle	50	0	H	V	22.16	38.45	Pass
					H	20.58		
				E1	V	20.20		
					H	21.55		
				E2	V	22.60		
					H	23.52		
	Highest	50	0	H	V	20.67	38.45	Pass
					H	21.31		
				E1	V	21.68		
					H	22.78		
				E2	V	22.05		
					H	22.59		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
LTE Band 5 (5MHz) 16 QAM	Lowest	25	0	H	V	21.20	38.45	Pass
					H	20.57		
				E1	V	20.65		
					H	20.77		
				E2	V	21.90		
					H	19.76		
	Middle	25	0	H	V	20.18	38.45	Pass
					H	21.94		
				E1	V	22.24		
					H	20.69		
				E2	V	23.09		
					H	22.19		
	Highest	25	0	H	V	19.87	38.45	Pass
					H	19.04		
				E1	V	20.50		
					H	20.26		
				E2	V	20.59		
					H	22.96		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
LTE Band 5 (10MHz) 16 QAM	Lowest	50	0	H	V	22.50	38.45	Pass
					H	23.16		
				E1	V	21.46		
					H	23.09		
				E2	V	21.18		
					H	23.31		
	Middle	50	0	H	V	21.13	38.45	Pass
					H	22.82		
				E1	V	20.20		
					H	21.19		
				E2	V	21.41		
					H	21.10		
	Highest	50	0	H	V	21.47	38.45	Pass
					H	20.75		
				E1	V	21.56		
					H	22.90		
				E2	V	21.31		
					H	21.84		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 7 (5MHz) QPSK	Lowest	25	0	H	V	20.15	33.00	Pass
					H	21.23		
				E1	V	23.15		
					H	20.17		
				E2	V	19.63		
					H	20.73		
	Middle	25	0	H	V	21.54	33.00	Pass
					H	20.02		
				E1	V	22.42		
					H	20.80		
				E2	V	20.46		
					H	22.55		
	Highest	25	0	H	V	22.13	33.00	Pass
					H	20.41		
				E1	V	20.92		
					H	23.71		
				E2	V	23.32		
					H	22.46		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 7 (10MHz) QPSK	Lowest	50	0	H	V	21.61	33.00	Pass
					H	23.76		
				E1	V	21.78		
					H	23.66		
				E2	V	22.88		
					H	23.95		
	Middle	50	0	H	V	22.59	33.00	Pass
					H	21.44		
				E1	V	21.73		
					H	24.11		
				E2	V	23.81		
					H	21.98		
	Highest	50	0	H	V	20.89	33.00	Pass
					H	23.37		
				E1	V	23.77		
					H	22.66		
				E2	V	23.13		
					H	24.20		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 7 (15MHz) QPSK	Lowest	75	0	H	V	21.86	33.00	Pass
					H	20.81		
				E1	V	19.58		
					H	22.64		
				E2	V	21.22		
					H	23.41		
	Middle	75	0	H	V	23.49	33.00	Pass
					H	21.43		
				E1	V	21.90		
					H	21.77		
				E2	V	22.87		
					H	19.54		
	Highest	75	0	H	V	21.51	33.00	Pass
					H	22.56		
				E1	V	20.44		
					H	22.60		
				E2	V	22.29		
					H	22.51		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 7 (20MHz) QPSK	Lowest	100	0	H	V	20.62	33.00	Pass
					H	21.34		
				E1	V	23.12		
					H	20.22		
				E2	V	20.98		
					H	20.84		
	Middle	100	0	H	V	21.88	33.00	Pass
					H	22.73		
				E1	V	21.08		
					H	22.73		
				E2	V	23.00		
					H	21.87		
	Highest	100	0	H	V	19.95	33.00	Pass
					H	21.73		
				E1	V	19.71		
					H	20.47		
				E2	V	20.22		
					H	19.43		

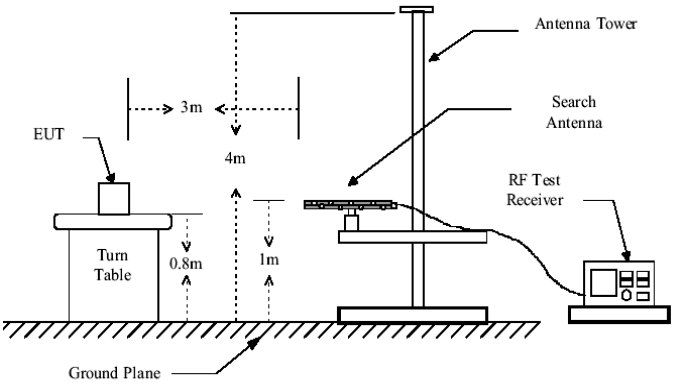
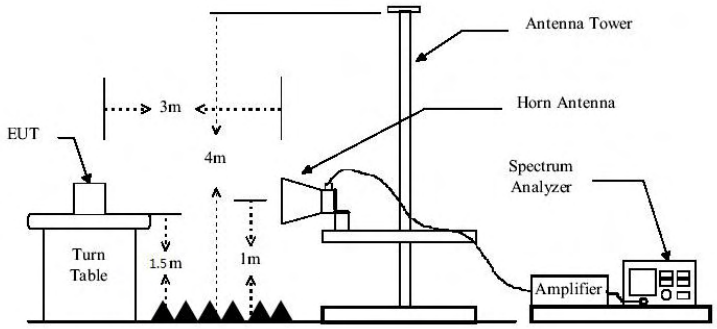
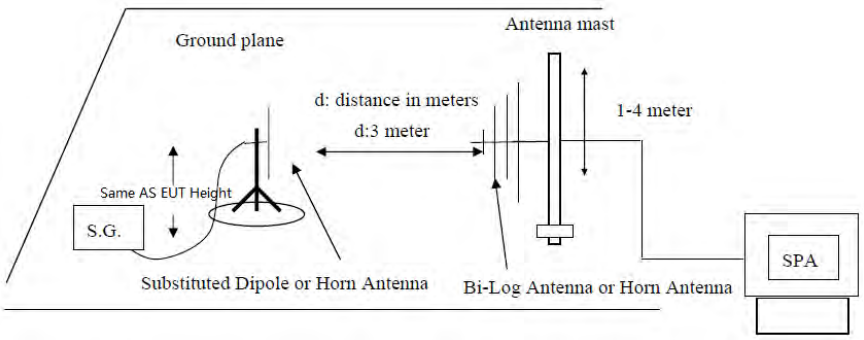
EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 7 (5MHz) 16 QAM	Lowest	25	0	H	V	22.84	33.00	Pass
					H	23.11		
				E1	V	21.50		
					H	21.80		
				E2	V	20.49		
					H	21.30		
	Middle	25	0	H	V	21.99	33.00	Pass
					H	20.14		
				E1	V	22.66		
					H	22.04		
				E2	V	23.21		
					H	21.13		
	Highest	25	0	H	V	20.64	33.00	Pass
					H	19.42		
				E1	V	21.96		
					H	20.64		
				E2	V	21.06		
					H	22.97		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 7 (10MHz) 16 QAM	Lowest	50	0	H	V	22.47	33.00	Pass
					H	23.67		
				E1	V	20.87		
					H	22.50		
				E2	V	21.89		
					H	24.34		
	Middle	50	0	H	V	22.07	33.00	Pass
					H	21.13		
				E1	V	21.49		
					H	21.31		
				E2	V	21.79		
					H	22.81		
	Highest	50	0	H	V	22.39	33.00	Pass
					H	21.53		
				E1	V	23.06		
					H	21.57		
				E2	V	22.64		
					H	21.87		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 7 (15MHz) 16 QAM	Lowest	75	0	H	V	21.35	33.00	Pass
					H	19.52		
				E1	V	23.60		
					H	21.87		
				E2	V	20.30		
					H	20.89		
	Middle	75	0	H	V	22.58	33.00	Pass
					H	21.49		
				E1	V	23.46		
					H	22.85		
				E2	V	21.80		
					H	20.44		
	Highest	75	0	H	V	21.87	33.00	Pass
					H	21.91		
				E1	V	23.65		
					H	22.94		
				E2	V	22.91		
					H	20.31		

EUT mode	Channel	RB Size	RB Offset	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LTE Band 7 (20MHz) 16 QAM	Lowest	100	0	H	V	21.65	33.00	Pass
					H	21.12		
				E1	V	22.29		
					H	22.35		
				E2	V	22.99		
					H	21.94		
	Middle	100	0	H	V	23.56	33.00	Pass
					H	20.26		
				E1	V	23.09		
					H	21.59		
				E2	V	22.20		
					H	20.37		
	Highest	100	0	H	V	22.02	33.00	Pass
					H	23.11		
				E1	V	21.78		
					H	23.44		
				E2	V	20.43		
					H	22.53		

4.9 Field strength of spurious radiation measurement

Test Requirement:	FCC part22.913(a), FCC part24.238(a) and FCC part27.53
Test Method:	ANSI C63.26:2015
Limit:	Band 2/4/5:-13dBm Band 7:-25dBm
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 tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. 3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method. 4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB)
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data

QPSK Mode:

Test mode:	LTE Band 2(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3701.40	Vertical	-43.92	-13.00	Pass
5552.10	V	-43.18		
7402.80	V	-41.99		
9253.50	V	-39.59		
11104.20	V	-37.93		
3701.40	Horizontal	-44.07	-13.00	Pass
5552.10	H	-42.78		
7402.80	H	-41.53		
9253.50	H	-39.45		
11104.20	H	-38.34		
Test mode:	**LTE Band 2(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-43.85	-13.00	Pass
5640.00	V	-43.09		
7520.00	V	-41.91		
9400.00	V	-39.53		
11280.00	V	-37.86		
3760.00	Horizontal	-44.02	-13.00	Pass
5640.00	H	-42.75		
7520.00	H	-41.47		
9400.00	H	-39.40		
11280.00	H	-38.30		
Test mode:	**LTE Band 2(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3818.60	Vertical	-43.79	-13.00	Pass
5727.90	V	-43.04		
7637.20	V	-41.86		
9546.50	V	-39.49		
11455.80	V	-37.80		
3818.60	Horizontal	-43.99	-13.00	Pass
5727.90	H	-42.68		
7637.20	H	-41.42		
9546.50	H	-39.34		
11455.80	H	-38.25		

Remark：

1. The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
2. Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
3. The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

Test mode:	LTE Band 4(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3421.40	Vertical	-44.23	-13.00	Pass
5132.10	V	-43.14		
6842.80	V	-41.31		
8553.50	V	-39.37		
10264.20	V	-37.46		
3421.40	Horizontal	-44.12	-13.00	Pass
5132.10	H	-42.36		
6842.80	H	-42.05		
8553.50	H	-39.41		
10264.20	H	-37.76		
Test mode:	**LTE Band 4(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465.00	Vertical	-43.93	-13.00	Pass
5197.50	V	-42.27		
6930.00	V	-42.00		
8662.50	V	-39.55		
10395.00	V	-37.46		
3465.00	Horizontal	-43.87	-13.00	Pass
5197.50	H	-42.55		
6930.00	H	-41.40		
8662.50	H	-39.35		
10395.00	H	-37.94		
Test mode:	**LTE Band 4(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3508.60	Vertical	-44.42	-13.00	Pass
5262.90	V	-42.75		
7017.20	V	-41.75		
8771.50	V	-39.52		
10525.80	V	-38.39		
3508.60	Horizontal	-44.24	-13.00	Pass
5262.90	H	-42.56		
7017.20	H	-42.25		
8771.50	H	-39.97		
10525.80	H	-38.16		

Remark：

1. The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
2. Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
3. The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

Test mode:	LTE Band 5(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1649.40	Vertical	-44.37	-13.00	Pass
2474.10	V	-42.72		
3298.80	V	-41.32		
4123.50	V	-39.89		
4948.20	V	-38.25		
1649.40	Horizontal	-43.59	-13.00	Pass
2474.10	H	-42.15		
3298.80	H	-42.21		
4123.50	H	-39.86		
4948.20	H	-38.27		
Test mode:	**LTE Band 5(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.00	Vertical	-43.69	-13.00	Pass
2509.50	V	-43.04		
3346.00	V	-41.55		
4182.50	V	-40.11		
5019.00	V	-38.26		
1673.00	Horizontal	-44.42	-13.00	Pass
2509.50	H	-42.37		
3346.00	H	-41.91		
4182.50	H	-39.80		
5019.00	H	-37.97		
Test mode:	**LTE Band 5(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1696.60	Vertical	-43.93	-13.00	Pass
2544.90	V	-42.77		
3393.20	V	-41.87		
4241.50	V	-40.22		
5089.80	V	-37.47		
1696.60	Horizontal	-44.00	-13.00	Pass
2544.90	H	-42.24		
3393.20	H	-41.78		
4241.50	H	-39.31		
5089.80	H	-37.59		

Remark：

1. The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
2. Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
3. The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

Test mode:	LTE Band 7(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5005.00	Vertical	-43.62	-25.00	Pass
7507.50	V	-42.92		
10010.00	V	-41.66		
12512.50	V	-39.96		
15015.00	V	-38.11		
5005.00	Horizontal	-44.48	-25.00	Pass
7507.50	H	-42.47		
10010.00	H	-41.66		
12512.50	H	-39.48		
15015.00	H	-37.76		
Test mode:	**LTE Band 7(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5070.00	Vertical	-44.38	-25.00	Pass
7605.00	V	-42.79		
10140.00	V	-41.52		
12675.00	V	-39.56		
15210.00	V	-37.54		
5070.00	Horizontal	-43.84	-25.00	Pass
7605.00	H	-42.48		
10140.00	H	-41.79		
12675.00	H	-39.59		
15210.00	H	-37.48		
Test mode:	**LTE Band 7(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5135.00	Vertical	-43.82	-25.00	Pass
7702.50	V	-42.90		
10270.00	V	-41.82		
12837.50	V	-39.92		
15405.00	V	-37.70		
5135.00	Horizontal	-43.78	-25.00	Pass
7702.50	H	-42.23		
10270.00	H	-41.61		
12837.50	H	-39.73		
15405.00	H	-37.45		

Remark：

1. The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
2. Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
3. The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

16 QAM Mode:

Test mode:	LTE Band 2 (5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3701.40	Vertical	-44.21	-13.00	Pass
5552.10	V	-42.39		
7402.80	V	-41.51		
9253.50	V	-39.92		
11104.20	V	-37.53		
3701.40	Horizontal	-43.85	-13.00	Pass
5552.10	H	-43.01		
7402.80	H	-41.78		
9253.50	H	-39.55		
11104.20	H	-37.65		
Test mode:	**LTE Band 2 (5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-43.55	-13.00	Pass
5640.00	V	-42.17		
7520.00	V	-41.92		
9400.00	V	-39.81		
11280.00	V	-38.27		
3760.00	Horizontal	-44.46	-13.00	Pass
5640.00	H	-42.21		
7520.00	H	-41.29		
9400.00	H	-39.51		
11280.00	H	-37.56		
Test mode:	**LTE Band 2 (5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3818.60	Vertical	-44.52	-13.00	Pass
5727.90	V	-42.65		
7637.20	V	-42.27		
9546.50	V	-39.40		
11455.80	V	-37.86		
3818.60	Horizontal	-44.50	-13.00	Pass
5727.90	H	-42.51		
7637.20	H	-42.18		
9546.50	H	-39.39		
11455.80	H	-37.85		

Remark：

1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.

2 Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured

3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

Test mode:	LTE Band 4(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3421.40	Vertical	-44.35	-13.00	Pass
5132.10	V	-42.38		
6842.80	V	-41.49		
8553.50	V	-39.73		
10264.20	V	-38.41		
3421.40	Horizontal	-43.60	-13.00	Pass
5132.10	H	-42.46		
6842.80	H	-41.35		
8553.50	H	-39.88		
10264.20	H	-37.84		
Test mode:	**LTE Band 4(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465.00	Vertical	-43.97	-13.00	Pass
5197.50	V	-42.64		
6930.00	V	-41.61		
8662.50	V	-39.92		
10395.00	V	-37.51		
3465.00	Horizontal	-43.87	-13.00	Pass
5197.50	H	-42.65		
6930.00	H	-41.80		
8662.50	H	-39.70		
10395.00	H	-38.14		
Test mode:	**LTE Band 4(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3508.60	Vertical	-44.27	-13.00	Pass
5262.90	V	-42.46		
7017.20	V	-42.08		
8771.50	V	-39.58		
10525.80	V	-38.41		
3508.60	Horizontal	-44.12	-13.00	Pass
5262.90	H	-43.14		
7017.20	H	-41.78		
8771.50	H	-39.62		
10525.80	H	-37.69		

Remark：

1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.

2 Remark”---“ means that the emission level is too low (20dB lower than the limit) to be measured

3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

Test mode:	LTE Band 5(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1649.40	Vertical	-44.16	-13.00	Pass
2474.10	V	-43.05		
3298.80	V	-41.40		
4123.50	V	-40.06		
4948.20	V	-37.73		
1649.40	Horizontal	-43.88	-13.00	Pass
2474.10	H	-42.62		
3298.80	H	-41.46		
4123.50	H	-40.02		
4948.20	H	-37.48		
Test mode:	**LTE Band 5(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.00	Vertical	-43.61	-13.00	Pass
2509.50	V	-42.81		
3346.00	V	-41.97		
4182.50	V	-39.88		
5019.00	V	-38.10		
1673.00	Horizontal	-43.93	-13.00	Pass
2509.50	H	-42.63		
3346.00	H	-42.16		
4182.50	H	-40.14		
5019.00	H	-37.81		
Test mode:	**LTE Band 5(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1696.60	Vertical	-43.98	-13.00	Pass
2544.90	V	-42.21		
3393.20	V	-41.44		
4241.50	V	-39.80		
5089.80	V	-37.73		
1696.60	Horizontal	-44.23	-13.00	Pass
2544.90	H	-42.62		
3393.20	H	-41.68		
4241.50	H	-39.83		
5089.80	H	-37.86		

Remark：

1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.

2 Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured

3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

Test mode:	LTE Band 7(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5005.00	Vertical	-44.47	-25.00	Pass
7507.50	V	-42.94		
10010.00	V	-42.21		
12512.50	V	-39.81		
15015.00	V	-38.18		
5005.00	Horizontal	-44.10	-25.00	Pass
7507.50	H	-42.45		
10010.00	H	-42.06		
12512.50	H	-39.30		
15015.00	H	-37.99		
Test mode:	**LTE Band 7(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5070.00	Vertical	-44.50	-25.00	Pass
7605.00	V	-42.55		
10140.00	V	-42.08		
12675.00	V	-39.97		
15210.00	V	-38.12		
5070.00	Horizontal	-43.67	-25.00	Pass
7605.00	H	-42.91		
10140.00	H	-41.33		
12675.00	H	-40.15		
15210.00	H	-38.31		
Test mode:	**LTE Band 7(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5135.00	Vertical	-43.78	-25.00	Pass
7702.50	V	-42.44		
10270.00	V	-42.25		
12837.50	V	-39.95		
15405.00	V	-38.33		
5135.00	Horizontal	-43.57	-25.00	Pass
7702.50	H	-42.91		
10270.00	H	-42.11		
12837.50	H	-40.25		
15405.00	H	-37.43		

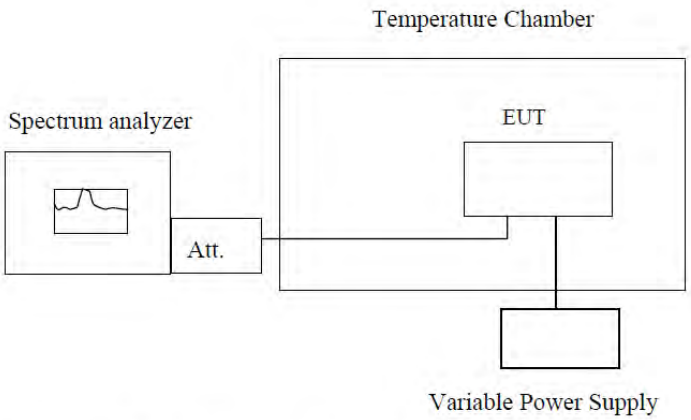
Remark：

1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.

2 Remark”---“ means that the emission level is too low (20dB lower than the limit) to be measured

3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

4.10 Frequency stability V.S. Temperature measurement

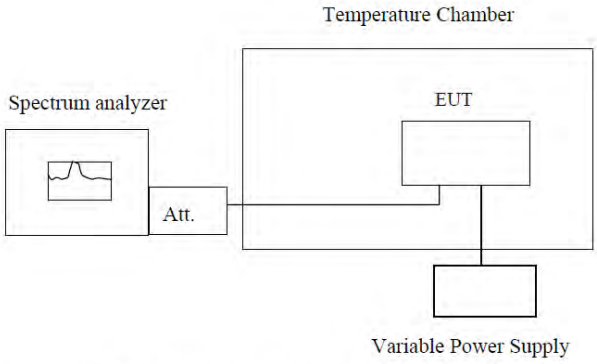
Test Requirement:	FCC Part2.1055(a)(1)(b)
Test Method:	ANSI C63.26:2015
Limit:	2.5ppm(Part 22) Within the authorized bands of operation(Part 24, Part 27)
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. The equipment under test was connected to an external 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℃ operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –20℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass
Remark:	If all frequencies stability are comply with the lower limit, then all results can be considered qualified

Measurement Data

Reference Frequency: LTE Band 2 Middle channel=18900 channel=1880MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
7.4	-20	31	0.0163	Within the authorized bands	Pass
	-10	32	0.0169		
	0	30	0.0160		
	10	-29	-0.0156		
	20	6	0.0034		
	30	14	0.0076		
	40	-13	-0.0068		
	50	10	0.0053		
	55	12	0.0063		
Reference Frequency: LTE Band 4 Middle channel=20175 channel=1732.5MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
7.4	-20	21	0.0120	2.5	Pass
	-10	27	0.0156		
	0	15	0.0088		
	10	-29	-0.0168		
	20	6	0.0035		
	30	16	0.0092		
	40	-11	-0.0063		
	50	8	0.0049		
	55	20	0.0115		
Reference Frequency: LTE Band 5 Middle channel=20175 channel=836.5MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
7.4	-20	4	0.0043	2.5	Pass
	-10	-33	-0.0399		
	0	-3	-0.0035		
	10	-2	-0.0029		
	20	22	0.0260		
	30	21	0.0247		
	40	-11	-0.0134		
	50	-2	-0.0023		
	55	14	0.0171		

Reference Frequency: LTE Band 7 Middle channel=21100 channel=2535MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
7.4	-20	32	0.0128	Within the authorized bands	Pass
	-10	30	0.0118		
	0	27	0.0107		
	10	-30	-0.0120		
	20	4	0.0015		
	30	15	0.0060		
	40	-13	-0.0053		
	50	10	0.0040		
	55	10	0.0038		

4.11 Frequency stability V.S. Voltage measurement

Test Requirement:	FCC Part2.1055(d)(1)(2)
Test Method:	ANSI C63.26:2015
Limit:	2.5ppm Band II & Band VII should be within authorized band.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. Set chamber temperature to 25 ℃. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass
Remark:	1. Manufacturer specified the battery operating end point voltage is 6.3VDC, max voltage is 8.5VDC. 2. If all frequencies stability are comply with the lower limit, then all results can be considered qualified

Measurement Data

Reference Frequency: LTE Band 2 Middle channel=18900 channel=1880MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.5	-14	-0.0076	within authorized band	Pass
	7.4	-1	-0.0007		
	6.3	17	0.0092		
Reference Frequency: LTE Band 4 Middle channel=20175 channel=1732.5MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.5	2	0.0011	2.5	Pass
	7.4	-1	-0.0007		
	6.3	23	0.0131		
Reference Frequency: LTE Band 5 Middle channel=20175 channel=836.5MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.5	-14	-0.0163	2.5	Pass
	7.4	-1	-0.0011		
	6.3	14	0.0163		
Reference Frequency: LTE Band 7 Middle channel=21100 channel=2535MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.5	5	0.0021	within authorized band	Pass
	7.4	15	0.0058		
	6.3	-11	-0.0044		

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