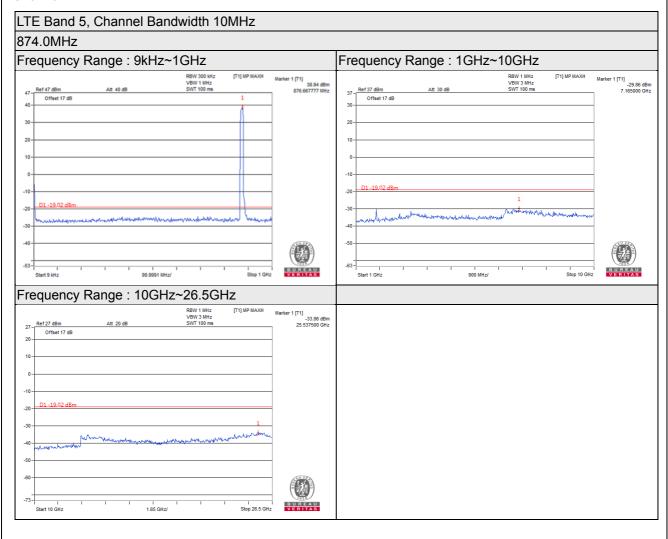


QPSK_loT Signal at Top



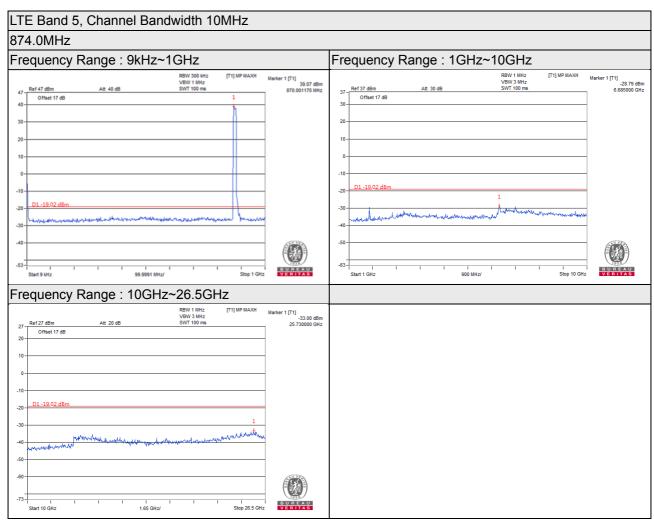












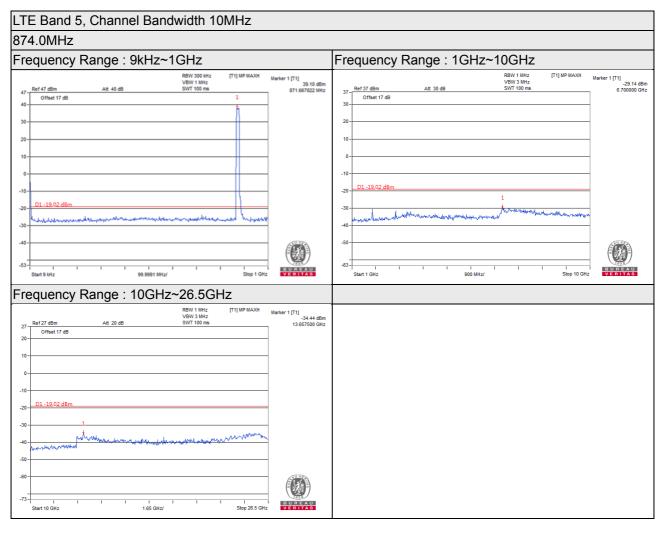












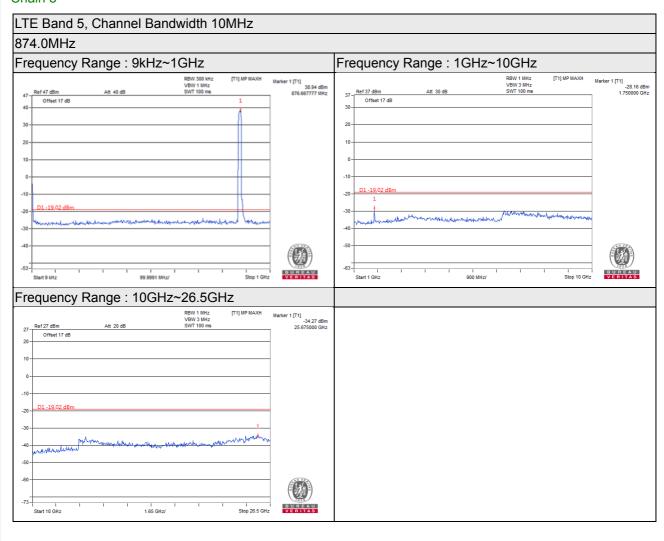






















For NB-IoT In-Band: QPSK_IoT Signal at Bottom

Chain (

















QPSK_loT Signal at Top



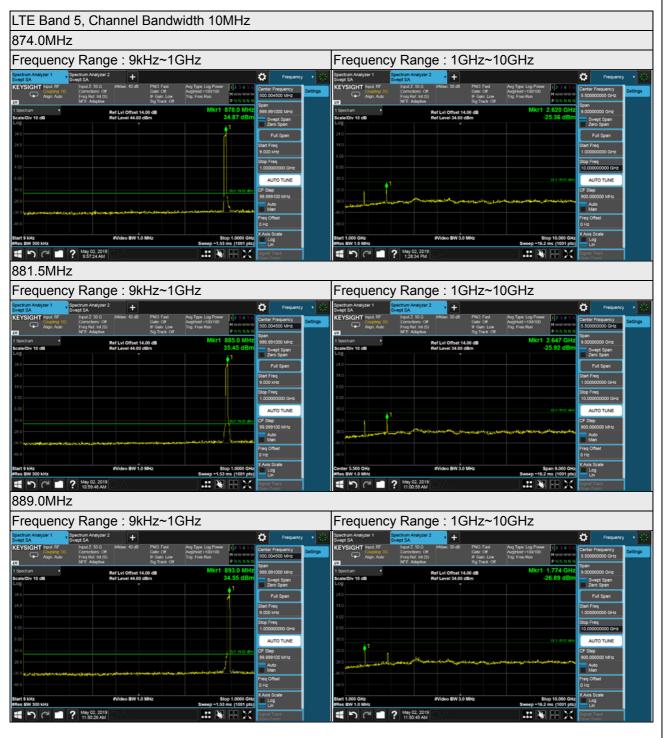














4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

4.8.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- c. EIRP = Output power level of S.G TX cable loss + Antenna gain of substitution horn.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power 2.15dBi.

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.8.3 Deviation from Test Standard

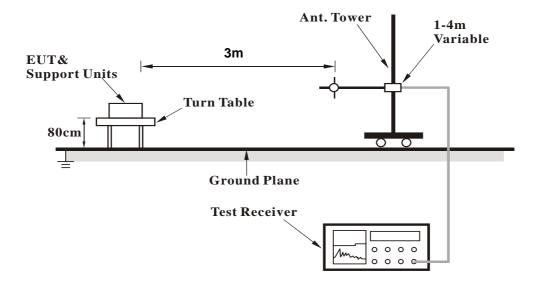
No deviation.

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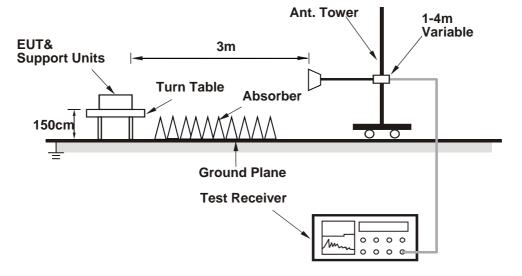


4.8.4 Test Setup

For Radiated Emission below or equal 1GHz



For Radiated Emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).



4.8.5 Test Results

Below 1GHz

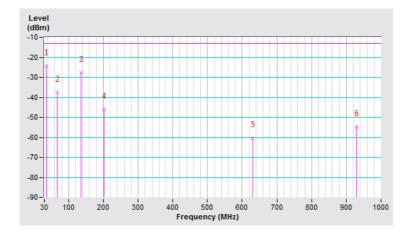
For NB-IoT Guard Band:

Channel Bandwidth: 10MHz

Mode	881.5MHz	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

	Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)		
1	35.82	-25.5	-8.2	-15.9	-24.1	-13.0	-11.1		
2	67.83	-28.8	-36.6	-1.0	-37.6	-13.0	-24.6		
3	135.73	-19.4	-24.3	-3.2	-27.5	-13.0	-14.5		
4	202.66	-36.0	-44.0	-2.1	-46.1	-13.0	-33.1		
5	630.43	-60.2	-63.9	3.6	-60.3	-13.0	-47.3		
6	929.19	-60.7	-58.4	3.7	-54.7	-13.0	-41.7		

Remarks: ERP (dBm)= S.G Value (dBm) + Correction Factor (dB).

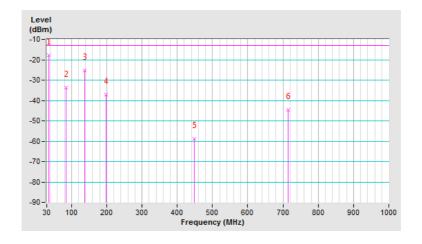


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Mode	881.5MHz	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

	Antenna Polarity & Test Distance: Vertical at 3 M									
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	36.79	-6.2	-2.7	-15.2	-17.9	-13.0	-4.9			
2	84.32	-26.6	-34.2	0.4	-33.8	-13.0	-20.8			
3	136.70	-20.0	-22.1	-3.2	-25.3	-13.0	-12.3			
4	197.81	-34.0	-34.6	-2.4	-37.0	-13.0	-24.0			
5	449.04	-56.2	-62.1	3.4	-58.7	-13.0	-45.7			
6	713.85	-48.7	-48.2	3.5	-44.7	-13.0	-31.7			



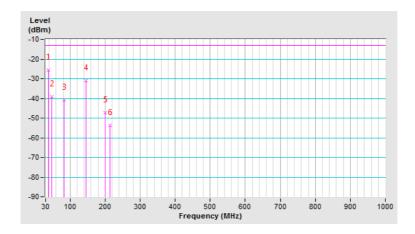


For NB-IoT In-Band:

Channel Bandwidth: 10MHz

Mode	881.5MHz	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Han Wu		

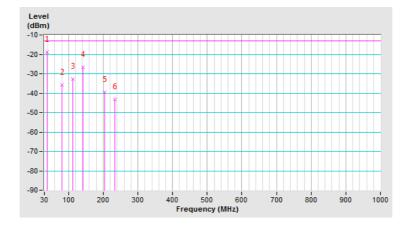
	Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)		
1	37.76	-26.6	-10.8	-14.7	-25.5	-13.0	-12.5		
2	48.43	-37.1	-30.5	-8.7	-39.2	-13.0	-26.2		
3	82.38	-33.2	-41.2	0.4	-40.8	-13.0	-27.8		
4	145.43	-23.8	-27.8	-3.1	-30.9	-13.0	-17.9		
5	200.72	-36.8	-44.9	-2.3	-47.2	-13.0	-34.2		
6	214.30	-43.2	-51.7	-2.0	-53.7	-13.0	-40.7		





Mode 881.5MHz		Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Han Wu		

	Antenna Polarity & Test Distance: Vertical at 3 M									
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	37.76	-7.1	-4.0	-14.7	-18.7	-13.0	-5.7			
2	81.41	-29.0	-36.3	0.5	-35.8	-13.0	-22.8			
3	112.45	-23.2	-30.3	-2.5	-32.8	-13.0	-19.8			
4	140.58	-21.8	-23.5	-3.0	-26.5	-13.0	-13.5			
5	203.63	-35.6	-37.4	-2.1	-39.5	-13.0	-26.5			
6	233.70	-38.8	-41.6	-1.7	-43.3	-13.0	-30.3			





Above 1GHz

For NB-IoT Guard Band: QPSK_IoT Signal at Bottom

Channel Bandwidth: 10MHz

Mode	874.0MHz	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

	Antenna Polarity & Test Distance: Horizontal at 3 M									
No. Freq. (MHz) Reading (dBm) S.G Power Value (dBm) Factor (dB) ERP (dBm) Limit (dBm) Margin (d										
1	1748.00	-56.8	-50.0	0.5	-49.5	-13.0	-36.5			
		Anter	nna Polarity & T	Test Distance: \	Vertical at 3 M					
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1748.00	-57.4	-51.1	0.5	-50.6	-13.0	-37.6			

Remarks: ERP (dBm)= S.G Value (dBm) + Correction Factor (dB).

Mode	881.5MHz	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

	Antenna Polarity & Test Distance: Horizontal at 3 M									
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1763.00	-55.8	-49.3	0.5	-48.8	-13.0	-35.8			
		Anter	nna Polarity & T	Test Distance: `	Vertical at 3 M					
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1763.00	-56.6	-50.7	0.5	-50.2	-13.0	-37.2			



Mode	889.0MHz	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

	Antenna Polarity & Test Distance: Horizontal at 3 M									
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1778.00	-56.2	-50.0	0.4	-49.6	-13.0	-36.6			
		Anter	nna Polarity & T	Γest Distance: '	Vertical at 3 M					
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1778.00	-57.5	-51.9	0.4	-51.5	-13.0	-38.5			

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QPSK_loT Signal at Top

Channel Bandwidth: 10MHz

Mode	874.0MHz	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

	Antenna Polarity & Test Distance: Horizontal at 3 M									
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1748.00	-56.8	-50.0	0.5	-49.5	-13.0	-36.5			
		Anter	nna Polarity & T	est Distance: \	Vertical at 3 M					
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1748.00	-57.2	-51.0	0.5	-50.5	-13.0	-37.5			

Remarks: ERP (dBm)= S.G Value (dBm) + Correction Factor (dB).

Mode	881.5MHz	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

	Antenna Polarity & Test Distance: Horizontal at 3 M									
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1763.00	-56.5	-50.0	0.5	-49.5	-13.0	-36.5			
		Anter	nna Polarity & T	Test Distance: \	Vertical at 3 M					
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1763.00	-57.4	-51.5	0.5	-51.0	-13.0	-38.0			



Mode	889.0MHz	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

	Antenna Polarity & Test Distance: Horizontal at 3 M									
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1778.00	-56.1	-49.9	0.4	-49.5	-13.0	-36.5			
		Anter	nna Polarity & T	Test Distance: `	Vertical at 3 M					
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1778.00	-57.5	-51.9	0.4	-51.5	-13.0	-38.5			

Report No.: RF180905C04A Reference No.: 190130C14



For NB-IoT In-Band: QPSK_IoT Signal at Bottom

Channel Bandwidth: 10MHz

Mode	874.0MHz	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Han Wu		

	Antenna Polarity & Test Distance: Horizontal at 3 M									
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1748.00	-57.1	-50.4	0.5	-49.9	-13.0	-36.9			
		Anter	nna Polarity & T	Test Distance: \	Vertical at 3 M					
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1748.00	-57.8	-51.5	0.5	-51.0	-13.0	-38.0			

Remarks: ERP (dBm)= S.G Value (dBm) + Correction Factor (dB).

Mode	881.5MHz	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Han Wu		

	Antenna Polarity & Test Distance: Horizontal at 3 M									
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1763.00	-56.3	-49.9	0.5	-49.4	-13.0	-36.4			
		Anter	nna Polarity & T	est Distance: \	Vertical at 3 M					
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)			
1	1763.00	-57.9	-52.0	0.5	-51.5	-13.0	-38.5			



Mode	889.0MHz	Frequency Range	1GHz ~ 18GHz	
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz	
Tested By	Han Wu			

	Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	
1	1778.00	-56.1	-49.9	0.4	-49.5	-13.0	-36.5	
	Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	
1	1778.00	-57.7	-52.1	0.4	-51.7	-13.0	-38.7	

Report No.: RF180905C04A Reference No.: 190130C14



QPSK_loT Signal at Top

Channel Bandwidth: 10MHz

Mode	874.0MHz	Frequency Range	1GHz ~ 18GHz	
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz	
Tested By	Han Wu			

	Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	
1	1748.00	-56.5	-49.7	0.5	-49.2	-13.0	-36.2	
		Anter	nna Polarity & T	Test Distance: \	Vertical at 3 M			
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	
1	1748.00	-58.1	-51.9	0.5	-51.4	-13.0	-38.4	

Remarks: ERP (dBm)= S.G Value (dBm) + Correction Factor (dB).

Mode	881.5MHz	Frequency Range	1GHz ~ 18GHz	
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz	
Tested By	Han Wu			

	Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	
1	1763.00	-56.8	-50.3	0.5	-49.8	-13.0	-36.8	
	Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	
1	1763.00	-58.2	-52.4	0.5	-51.9	-13.0	-38.9	



Mode	889.0MHz	Frequency Range	1GHz ~ 18GHz	
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz	
Tested By	Han Wu			

	Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	
1	1778.00	-56.2	-50.0	0.4	-49.6	-13.0	-36.6	
		Anter	nna Polarity & T	Test Distance: \	Vertical at 3 M			
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	
1	1778.00	-57.0	-51.4	0.4	-51.0	-13.0	-38.0	



5 Pictures of Test Arrangements	
Please refer to the attached file (Test Setup Photo).	



Appendix - Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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Tel: 886-3-3183232 Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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