



Test Report No.: W7L-211129W003RF18



VARIANT FCC TEST REPORT (PART 27)

Applicant:	Honeywell International Inc Honeywell Safety and Productivity Solutions
Address:	9680 Old Bailes Road, Fort Mill, SC 29707 United States

Manufacturer or Supplier:	Honeywell International Inc Honeywell Safety and Productivity Solutions
Address:	9680 Old Bailes Road, Fort Mill, SC 29707 United States
Product:	Mobile Computer
Brand Name:	Honeywell
Model Name:	CT45-L1N-G
FCC ID:	HD5-CT45L1NG
Date of tests:	Oct. 25, 2021 ~ Jan. 17, 2022

The tests have been carried out according to the requirements of the following standard:

- FCC Part 27, Subpart C, M ANSI/TIA/EIA-603-D
- FCC Part 2 ANSI/TIA/EIA-603-E ANSI C63.26-2015

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Date: Jan. 18, 2022	Date: Jan. 18, 2022

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Test Report No.: W7L-211129W003RF18

TABLE OF CONTENTS

RELEASE CONTROL RECORD	3
1 SUMMARY OF TEST RESULTS	4
1.1 MEASUREMENT UNCERTAINTY	5
1.2 TEST SITE AND INSTRUMENTS	6
2 GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 CONFIGURATION OF SYSTEM UNDER TEST	13
2.3 DESCRIPTION OF SUPPORT UNITS	14
2.4 TEST ITEM AND TEST CONFIGURATION	14
2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS	18
3 TEST TYPES AND RESULTS	19
3.1 OUTPUT POWER MEASUREMENT	19
3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT	19
3.1.2 TEST PROCEDURES	19
3.1.3 TEST SETUP	20
3.1.4 TEST RESULTS	21
3.2 RADIATED EMISSION MEASUREMENT	29
3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT	29
3.2.2 TEST PROCEDURES	29
3.2.3 DEVIATION FROM TEST STANDARD	29
3.2.4 TEST SETUP	30
3.2.5 TEST RESULTS	31
4 INFORMATION ON THE TESTING LABORATORIES	41
5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	42



Test Report No.: W7L-211129W003RF18

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P21080006RF18	Original release	Sep. 01, 2021
W7L-P21040030RF18	Based on the original report W7L-P21080006RF18 Changed to screen is HD(1280*720) and removing a 2 nd BLE	Sep. 09, 2021
W7L-P21110009RF18	Based on the original report W7L-P21040030RF18 Changing components, add a new screen, added band CA_41C by Software.	Nov. 09, 2021
W7L-211129W003RF18	Based on the original report W7L-P21110009RF18 Changing components.	Jan. 18, 2022

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 27 & Part 2		
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT
2.1046 27.50(h)(2)	Equivalent Isotropically Radiated Power	Compliance (See Note 1)
2.1055 27.54	Frequency Stability	(See Note 2)
2.1049 27.53(m)(6)	Occupied Bandwidth	(See Note 2)
2.1051 27.53(m)(4)(6)	Band Edge Measurements	(See Note 2)
2.1051 27.53(m)(4)(6)	Conducted Spurious Emissions	(See Note 2)
2.1053 27.53(m)(4)(6)	Radiated Spurious Emissions	Compliance (See Note 1)

NOTE:

1. Per the change notice provide by manufactory, the difference is changing components, all the change no effect any RF parameter, Therefore only verify the power and radiated emission worse case. The report only show the verify test data.

2. Please refer to original report W7L-P21110009RF18.



Test Report No.: W7L-211129W003RF18

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
Radiated emissions & Radiated Power (30MHz~1GMHz)	±4.98dB
Radiated emissions & Radiated Power (1GMHz ~6GMHz)	±4.70dB
Radiated emissions (6GMHz ~18GMHz)	±4.60dB
Radiated emissions (18GMHz ~40GMHz)	±4.12dB
Conducted Output power	±2.06dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 22,21	Apr. 21,22
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	Jun. 03,21	Jun. 02,22
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 05,21	Mar. 04,22
Horn Antenna	ETS-LINDGREN	3117	00168728	Apr. 02,21	Apr. 01,22
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Aug. 25, 21	Aug. 24, 22
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 25,21	Feb. 24,22
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 03,21	Jun. 02,22
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 22,21	Apr. 21,22
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated_V 7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 03,21	Jun. 02,22
Power Meter	Anritsu	ML2495A	1506002	Apr. 07,21	Apr. 06,22
Power Sensor	Anritsu	MA2411B	1339352	May. 07,21	May. 06,22
Temperature Chamber	ESPEC	SH-242	93000855	Jun. 02,21	Jun. 01,22
MXG Analog Microwave Signal Generator	KEYSIGHT	N5183A	MY50143024	Mar. 05,21	Mar. 04,22
Power Divider	MCLI/USA	PS2-15	24880	N/A	N/A

- NOTE:**
1. The calibration interval of the above test instruments is 12 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.
 3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Mobile Computer	
BRAND NAME	Honeywell	
MODEL NAME	CT45-L1N-G	
NOMINAL VOLTAGE	3.85Vdc (Lithium-ion cell, battery)	
MODULATION TECHNOLOGY	LTE	QPSK, 16QAM, 64QAM
FREQUENCY RANGE	WCDMA IV	1712.4MHz ~ 1752.6MHz
	LTE Band 4 Channel Bandwidth: 1.4MHz	1710.7MHz ~ 1754.3MHz
	LTE Band 4 Channel Bandwidth: 3MHz	1711.5MHz ~ 1753.5MHz
	LTE Band 4 Channel Bandwidth: 5MHz	1712.5MHz ~ 1752.5MHz
	LTE Band 4 Channel Bandwidth: 10MHz	1715MHz ~ 1750MHz
	LTE Band 4 Channel Bandwidth: 15MHz	1717.5MHz ~ 1747.5 MHz
	LTE Band 4 Channel Bandwidth: 20MHz	1720MHz ~ 1745MHz
	LTE Band 12 Channel Bandwidth: 1.4MHz	699.7MHz ~ 715.3MHz
	LTE Band 12 Channel Bandwidth: 3MHz	700.5MHz ~ 714.5MHz
	LTE Band 12 Channel Bandwidth: 5MHz	701.5MHz ~ 713.5MHz
	LTE Band 12 Channel Bandwidth: 10MHz	704MHz ~ 711MHz
	LTE Band 13 Channel Bandwidth: 5MHz	779.5MHz ~ 784.5MHz
	LTE Band 13 Channel Bandwidth: 10MHz	782MHz
	LTE Band 14 Channel Bandwidth: 5MHz	790.5MHz ~ 795.5MHz
	LTE Band 14 Channel Bandwidth: 10MHz	793MHz
	LTE Band 17 Channel Bandwidth: 5MHz	706.5MHz ~ 713.5MHz
	LTE Band 17 Channel Bandwidth: 10MHz	709MHz ~ 711 MHz

	LTE Band 30 Channel Bandwidth: 5MHz	2307.5MHz ~ 2312.5MHz	
	LTE Band 30 Channel Bandwidth: 10MHz	2310MHz	
	LTE Band 66 Channel Bandwidth: 1.4MHz	1710.7MHz ~ 1779.3MHz	
	LTE Band 66 Channel Bandwidth: 3MHz	1711.5MHz ~ 1778.5MHz	
	LTE Band 66 Channel Bandwidth: 5MHz	1712.5MHz ~ 1777.5MHz	
	LTE Band 66 Channel Bandwidth: 10MHz	1715MHz ~ 1775MHz	
	LTE Band 66 Channel Bandwidth: 15MHz	1717.5MHz ~ 1772.5MHz	
	LTE Band 66 Channel Bandwidth: 20MHz	1720MHz ~ 1770MHz	
	LTE Band 71 Channel Bandwidth: 5MHz	665.5MHz ~ 695.5MHz	
	LTE Band 71 Channel Bandwidth: 10MHz	668MHz ~ 693MHz	
	LTE Band 71 Channel Bandwidth: 15MHz	670.5MHz ~ 690.5MHz	
	LTE Band 71 Channel Bandwidth: 20MHz	673MHz ~ 688MHz	
	EMISSION DESIGNATOR	LTE Band 4 Channel Bandwidth: 1.4MHz	QPSK: 1M10G7D
			16QAM: 1M10W7D
64QAM: 1M10W7D			
LTE Band 4 Channel Bandwidth: 3MHz		QPSK: 2M71G7D	
		16QAM: 2M69W7D	
		64QAM: 2M69W7D	
LTE Band 4 Channel Bandwidth: 5MHz		QPSK: 4M49G7D	
		16QAM: 4M48W7D	
		64QAM: 4M49W7D	
LTE Band 4 Channel Bandwidth: 10MHz		QPSK: 9M00G7D	
		16QAM: 8M99W7D	
		64QAM: 8M98W7D	
LTE Band 4 Channel Bandwidth: 15MHz		QPSK: 13M4G7D	
		16QAM: 13M4W7D	
		64QAM: 13M4W7D	
LTE Band 4 Channel Bandwidth: 20MHz		QPSK: 17M9G7D	
		16QAM: 17M9W7D	
		64QAM: 17M9W7D	
LTE Band 12 Channel Bandwidth: 1.4MHz	QPSK: 1M09G7D		
	16QAM: 1M09W7D		
	64QAM: 1M09W7D		



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Test Report No.: W7L-211129W003RF18

EMISSION DESIGNATOR	LTE Band 12 Channel Bandwidth: 3MHz	QPSK: 2M69G7D
		16QAM: 2M69W7D
		64QAM: 2M69W7D
	LTE Band 12 Channel Bandwidth: 5MHz	QPSK: 4M48G7D
		16QAM: 4M49W7D
		64QAM: 4M48W7D
	LTE Band 12 Channel Bandwidth: 10MHz	QPSK: 9M03G7D
		16QAM: 9M01W7D
		64QAM: 9M03W7D
	LTE Band 13 Channel Bandwidth: 5MHz	QPSK: 4M49G7D
		16QAM: 4M48W7D
		64QAM: 4M48W7D
	LTE Band 13 Channel Bandwidth: 10MHz	QPSK: 8M93G7D
		16QAM: 8M93W7D
		64QAM: 8M94W7D
	LTE Band 14 Channel Bandwidth: 5MHz	QPSK: 4M48G7D
		16QAM: 4M48W7D
		64QAM: 4M47W7D
	LTE Band 14 Channel Bandwidth: 10MHz	QPSK: 8M94G7D
		16QAM: 8M93W7D
		64QAM: 8M92W7D
	LTE Band 17 Channel Bandwidth: 5MHz	QPSK: 4M48G7D
		16QAM: 4M48W7D
		64QAM: 4M48W7D
	LTE Band 17 Channel Bandwidth: 10MHz	QPSK: 8M87G7D
		16QAM: 8M85W7D
		64QAM: 8M87W7D
	LTE Band 30 Channel Bandwidth: 5MHz	QPSK: 4M49G7D
16QAM: 4M47W7D		
64QAM: 4M48W7D		
LTE Band 30 Channel Bandwidth: 10MHz	QPSK: 8M96G7D	
	16QAM: 8M94W7D	
	64QAM: 8M95W7D	
LTE Band 66 Channel Bandwidth: 1.4MHz	QPSK: 1M11G7D	
	16QAM: 1M11W7D	
	64QAM: 1M69W7D	
LTE Band 66 Channel Bandwidth: 3MHz	QPSK: 2M70G7D	
	16QAM: 2M69W7D	
	64QAM: 2M69W7D	
LTE Band 66 Channel Bandwidth: 5MHz	QPSK: 4M50G7D	
	16QAM: 4M49W7D	
	64QAM: 4M49W7D	



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Test Report No.: W7L-211129W003RF18

	LTE Band 66 Channel Bandwidth: 10MHz	QPSK: 8M98G7D
		16QAM: 8M97W7D
		64QAM: 8M97W7D
	LTE Band 66 Channel Bandwidth: 15MHz	QPSK: 13M5G7D
		16QAM: 13M5W7D
		64QAM: 13M4W7D
	LTE Band 66 Channel Bandwidth: 20MHz	QPSK: 18M0G7D
		16QAM: 18M0W7D
		64QAM: 18M0W7D
	LTE Band 71 Channel Bandwidth: 5MHz	QPSK: 4M47G7D
		16QAM: 4M47W7D
		64QAM: 4M48W7D
	LTE Band 71 Channel Bandwidth: 10MHz	QPSK: 8M93G7D
		16QAM: 8M95W7D
		64QAM: 8M94W7D
	LTE Band 71 Channel Bandwidth: 15MHz	QPSK: 13M5G7D
		16QAM: 13M5W7D
		64QAM: 13M5W7D
	CLTE Band 71 Channel Bandwidth: 20MHz	QPSK: 18M0G7D
		16QAM: 17M9W7D
		64QAM: 18M0W7D
MAX. EIRP POWER	LTE Band 4 Channel Bandwidth: 1.4MHz	379.31mW
	LTE Band 4 Channel Bandwidth: 3MHz	215.28mW
	LTE Band 4 Channel Bandwidth: 5MHz	214.29mW
	LTE Band 4 Channel Bandwidth: 10MHz	214.29mW
	LTE Band 4 Channel Bandwidth: 15MHz	216.27mW
	LTE Band 4 Channel Bandwidth: 20MHz	217.77mW
	LTE Band 12 Channel Bandwidth: 1.4MHz	169.43mW
	LTE Band 12 Channel Bandwidth: 3MHz	163.31mW
	LTE Band 12 Channel Bandwidth: 5MHz	163.68mW
	LTE Band 12 Channel Bandwidth: 10MHz	165.58mW
	LTE Band 13 Channel Bandwidth: 5MHz	171.79mW
	LTE Band 13 Channel Bandwidth: 10MHz	173.78mW



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VERITAS

Test Report No.: W7L-211129W003RF18

	LTE Band 14 Channel Bandwidth: 5MHz	172.58mW
	LTE Band 14 Channel Bandwidth: 10MHz	174.58mW
	LTE Band 17 Channel Bandwidth: 5MHz	165.58mW
	LTE Band 17 Channel Bandwidth: 10MHz	166.34mW
	LTE Band 30 Channel Bandwidth: 5MHz	234.42mW
	LTE Band 30 Channel Bandwidth: 10MHz	235.50mW
	LTE Band 66 Channel Bandwidth: 1.4MHz	228.56mW
	LTE Band 66 Channel Bandwidth: 3MHz	229.09mW
	LTE Band 66 Channel Bandwidth: 5MHz	228.56mW
	LTE Band 66 Channel Bandwidth: 10MHz	229.09mW
	LTE Band 66 Channel Bandwidth: 15MHz	230.14mW
	LTE Band 66 Channel Bandwidth: 20MHz	231.74mW
	LTE Band 71 Channel Bandwidth: 5MHz	118.03mW
	LTE Band 71 Channel Bandwidth: 10MHz	117.76mW
	LTE Band 71 Channel Bandwidth: 15MHz	118.58mW
	LTE Band 71 Channel Bandwidth: 20MHz	118.85mW
ANTENNA TYPE	PIFA Antenna with 2.55dBi gain for LTE B4 PIFA Antenna with 1.11dBi gain for LTE B12/B17 PIFA Antenna with 0.86dBi gain for LTE B13 PIFA Antenna with 1dBi gain for LTE B14/B71 PIFA Antenna with 1.17dBi gain for LTE B30 PIFA Antenna with 2.91dBi gain for LTE B66	
HW VERSION	V1.0	
SW VERSION	OS.11.002-HON.11.002	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	USB CUP: unshielded without ferrite, 1.25 meter Earphone cable: unshielded without ferrite, 1.27 meter	
EXTREME TEMPERATURE	-10-55 °C	
EXTREME VOLTAGE	3.4V- 4.4V	



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Test Report No.: W7L-211129W003RF18

NOTE:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the user's manual.
2. This product includes the following six SKU which hardware is exactly same, the difference is described as following, Sample 1 was full test, sample 2 verify the worst case,check worst case Radiated emission:

SAMPLE	EUT CONFIGURATION INFORMATION
1	SKU ID:CT45-L1N-27D120G ,Assembled Scanner Imager: 7-S0703
2	SKU ID:CT45-L1N-28D120G ,Assembled Scanner Imager: 8 - N6803/S0803
3	SKU ID: CT45-L1N-28D120T, Assembled with Scanner: 8 - N6803/S0803 for Turkey Only
4	SKU ID: CT45-L1N-27D120T, Assembled with Scanner: 7-S0703 for Turkey Only
5	SKU ID:CT45-L1N-28D220C, Assembled with Scanner: 8 - N6803/S0803 for China Only with Android non-GMS
6	SKU ID:CT45-L1N-27D220C, Assembled with Scanner: 7-S0703 for China Only with Android non-GMS

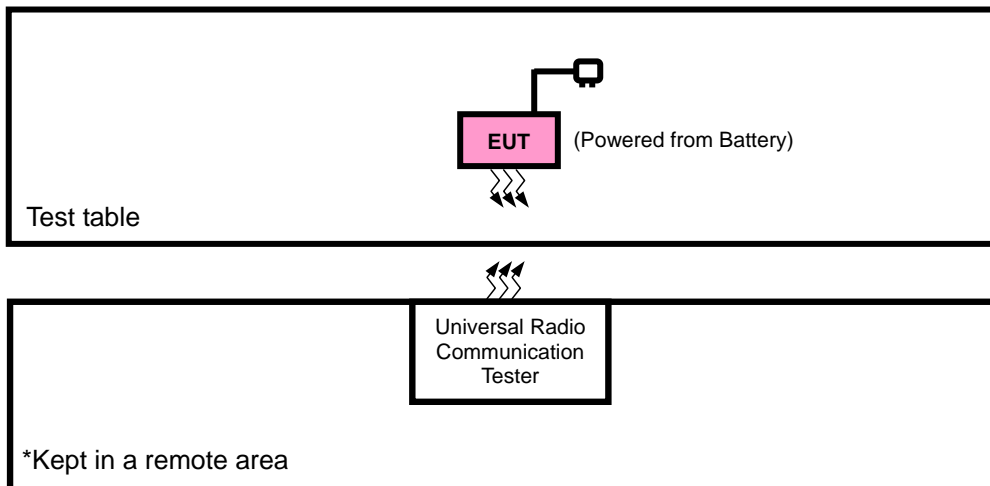
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

List of Accessory:

ACCESSORIES	BRAND	MODEL	SPECIFICATION
Battery	Honeywell	CT50-BTSC	Capacity : 3.85vdc 4020mAh
AC Adapter	HONOR	ADS-12B-06 05010E	I/P:100-240Vac, 0.3A O/P: 5Vdc, 2A
USB CUP	Honeywell	CT40-SN	Shielded, 1.25meter
Earphone	VIVO	N/A	Shielded, 1.27meter
LCD Panel 1	TZD	TS5099	5.0" HD(1280*720)
LCD Panel 2	TIANMA	TM050JVZG53	5.0" HD(1280*720)

2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST





2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m

2.4 TEST ITEM AND TEST CONFIGURATION

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on Y-plane for EIRP and X-axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

DESCRIPTION
EUT + DC Source with LTE link

LTE BAND 4

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
EIRP	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
	19965 to 20385	19965, 20175, 20385	3MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

LTE BAND 12

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	23017 to 23173	23017, 23095 , 23173	1.4MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
	23025 to 23165	23025, 23095 ,23165	3MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
	23035 to 23155	23035, 23095 ,23155	5MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
	23060 to 23130	23060, 23095 ,23130	10MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

LTE BAND 13

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	23205 to 23255	20025, 20175, 20325	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	23230	23230	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
RADIATED EMISSION	23205 to 23255	20025, 20175, 20325	5MHz	QPSK	1 RB / 0 RB Offset
	23230	23230	10MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

LTE BAND 14

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	23305 to 23355	23305, 23330, 23355	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	23330	23330	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

LTE BAND 17

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	23755 to 23825	23755, 23790, 23825	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	23780 to 23800	23780, 23790, 23800	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

LTE BAND 30

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	27685 to 27735	27685, 27710, 27735	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	27710	27710	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

LTE BAND 66

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
EIRP	131979 to 132665	131979,132322,132665	1.4MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	131987 to 132657	131987,132322,132657	3MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	131997 to 132647	131997,132322,132647	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	132022 to 132622	132022,132322,132622	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	132047 to 132597	132047,132322,132597	15MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	132072 to 132572	132072,132322,132572	20MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.



BUREAU
VERITAS

Test Report No.: W7L-211129W003RF18

LTE BAND 71

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	133147 to 133447	133147, 133247, 133447	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	133172 to 133172	133172, 133272, 133172	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	133197 to 133397	133197, 133297, 133397	15MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	133222 to 133372	133222, 133322, 133372	20MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.



Test Report No.: W7L-211129W003RF18

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP/EIRP	23deg. C, 70%RH	DC 3.85V By Battery	Jace Hu
RADIATED EMISSION	23deg. C, 70%RH	DC 3.85V By Battery	Jace Hu

2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 27

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI/TIA/EIA-603-D

ANSI/TIA/EIA-603-E

ANSI C63.26-2015

NOTE: All test items have been performed and recorded as per the above standards.



3 TEST TYPES AND RESULTS

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “User stations are limited to 2 watts” and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP

3.1.2 TEST PROCEDURES

EIRP MEASUREMENT:

Per KDB 971168 D01 Power Meas License Digital Systems v03r01 or subclause 5.2.5.5 of ANSI C63.26-2015, the relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_{\text{T}} - L_{\text{C}}$$

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P_{Meas} , typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

G_{T} = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

L_{C} = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

CONDUCTED POWER MEASUREMENT:

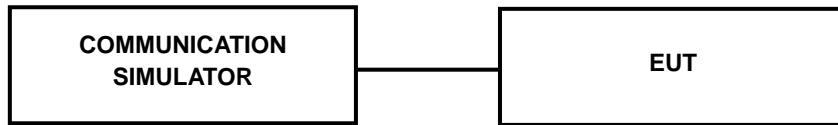
- a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.
- b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.



Test Report No.: W7L-211129W003RF18

3.1.3 TEST SETUP

CONDUCTED POWER MEASUREMENT:



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

3.1.4 TEST RESULTS

Retested Data(For reference only,it's lower than the original report)

AVERAGE CONDUCTED OUTPUT POWER (dBm)

LTE Band 4

Band/BW	Modulation	RB Size	RB Offset	Low CH 20050	Mid CH 20175	High CH 20300	MPR
				Frequency 1720 MHz	Frequency 1732.5 MHz	Frequency 1745 MHz	
4/ 20	QPSK	1	0	23.43	23.43	23.43	0
		1	50	22.86	22.86	22.86	0
		1	99	22.90	22.90	22.90	0
		50	0	22.74	22.74	22.74	1
		50	25	22.55	22.55	22.55	1
		50	50	22.44	22.44	22.44	1
		100	0	21.56	21.56	21.56	1
	16QAM	1	0	22.26	22.26	22.26	1
		1	50	22.69	22.69	22.69	1
		1	99	22.29	22.29	22.29	1
		50	0	21.68	21.68	21.68	2
		50	25	21.61	21.61	21.61	2
		50	50	21.53	21.53	21.53	2
		100	0	21.55	21.55	21.55	2
	64QAM	1	0	21.23	21.23	21.23	2
		1	50	21.70	21.70	21.70	2
		1	99	21.44	21.44	21.44	2
		50	0	20.67	20.67	20.67	3
		50	25	20.60	20.60	20.60	3
		50	50	20.54	20.54	20.54	3
		100	0	20.61	20.61	20.61	3



**BUREAU
VERITAS**

Test Report No.: W7L-211129W003RF18

LTE Band 12

Band/BW	Modulation	RB Size	RB Offset	Low CH 23060	Mid CH 23095	High CH 23130	MPR
				Frequency 704 MHz	Frequency 707.5 MHz	Frequency 711 MHz	
12/ 10	QPSK	1	0	23.12	22.99	22.96	0
		1	24	22.86	22.63	22.75	0
		1	49	22.45	22.21	22.30	0
		25	0	22.28	22.16	22.17	1
		25	12	21.83	21.87	21.69	1
		25	25	21.87	21.76	21.77	1
		50	0	21.89	21.82	21.69	1
	16QAM	1	0	22.09	22.02	21.99	1
		1	24	21.97	21.93	21.82	1
		1	49	22.03	21.72	21.88	1
		25	0	21.08	21.03	20.95	2
		25	12	21.04	20.96	20.89	2
		25	25	20.99	20.80	20.80	2
		50	0	21.19	21.01	21.07	2
	64QAM	1	0	21.24	21.09	21.01	2
		1	24	20.86	20.80	20.69	2
		1	49	20.97	20.87	20.80	2
		25	0	20.17	20.09	19.99	3
		25	12	20.04	19.93	19.89	3
		25	25	19.89	19.82	19.76	3
		50	0	20.31	20.17	20.16	3



**BUREAU
VERITAS**

Test Report No.: W7L-211129W003RF18

LTE Band 13

Band/BW	Modulation	RB Size	RB Offset	/	Mid CH 23230	/	MPR
				/	Frequency 782.0 MHz	/	
13/ 10	QPSK	1	0	/	23.55	/	0
		1	24	/	23.29	/	0
		1	49	/	23.37	/	0
		25	0	/	22.57	/	1
		25	12	/	22.54	/	1
		25	25	/	22.50	/	1
		50	0	/	22.62	/	1
	16QAM	1	0	/	22.72	/	1
		1	24	/	22.63	/	1
		1	49	/	22.52	/	1
		25	0	/	21.57	/	2
		25	12	/	21.58	/	2
		25	25	/	21.48	/	2
		50	0	/	21.57	/	2
	64QAM	1	0	/	21.79	/	2
		1	24	/	21.53	/	2
		1	49	/	21.64	/	2
		25	0	/	20.60	/	3
		25	12	/	20.63	/	3
		25	25	/	20.49	/	3
		50	0	/	20.67	/	3



**BUREAU
VERITAS**

Test Report No.: W7L-211129W003RF18

LTE Band 14

Band/BW	Modulation	RB Size	RB Offset	/	Mid CH 23330	/	MPR
				/	Frequency 793 MHz	/	
14/ 10	QPSK	1	0	/	23.43	/	0
		1	24	/	22.86	/	0
		1	49	/	22.90	/	0
		25	0	/	22.74	/	1
		25	12	/	22.55	/	1
		25	25	/	22.44	/	1
		50	0	/	21.56	/	1
	16QAM	1	0	/	22.26	/	1
		1	24	/	22.69	/	1
		1	49	/	22.29	/	1
		25	0	/	21.68	/	2
		25	12	/	21.61	/	2
		25	25	/	21.53	/	2
		50	0	/	21.55	/	2
	64QAM	1	0	/	21.23	/	2
		1	24	/	21.70	/	2
		1	49	/	21.44	/	2
		25	0	/	20.67	/	3
		25	12	/	20.60	/	3
		25	25	/	20.54	/	3
		50	0	/	20.61	/	3



**BUREAU
VERITAS**

Test Report No.: W7L-211129W003RF18

LTE Band 17

Band/BW	Modulation	RB Size	RB Offset	Low CH 23780	Mid CH 23790	High CH 23800	MPR
				Frequency 709 MHz	Frequency 710 MHz	Frequency 711 MHz	
17/ 10	QPSK	1	0	22.66	22.51	23.00	0
		1	24	22.87	22.60	23.21	0
		1	49	21.77	21.59	22.23	0
		25	0	21.93	21.81	22.28	1
		25	12	21.70	21.82	22.13	1
		25	25	21.85	21.73	22.24	1
		50	0	21.29	21.32	21.66	1
	16QAM	1	0	21.96	21.93	22.45	1
		1	24	21.93	22.02	22.36	1
		1	49	21.23	20.96	21.57	1
		25	0	20.78	20.75	21.12	2
		25	12	20.90	20.93	21.24	2
		25	25	20.82	20.79	21.31	2
		50	0	20.50	20.38	20.87	2
	64QAM	1	0	20.82	20.79	21.31	2
		1	24	20.80	20.89	21.20	2
		1	49	20.01	20.13	20.53	2
		25	0	19.84	19.72	20.06	3
		25	12	19.90	20.02	20.42	3
		25	25	19.97	19.85	20.19	3
		50	0	19.55	19.58	19.98	3



Test Report No.: W7L-211129W003RF18

LTE Band 30

Band/BW	Modulation	RB Size	RB Offset	/	Mid CH 27710	/	MPR
				/	2310.0 MHz	/	
30/ 10	QPSK	1	0	/	22.43	/	0
		1	24	/	22.16	/	0
		1	49	/	22.41	/	0
		25	0	/	21.29	/	1
		25	12	/	21.28	/	1
		25	25	/	21.21	/	1
		50	0	/	21.28	/	1
	16QAM	1	0	/	21.51	/	1
		1	24	/	21.38	/	1
		1	49	/	21.62	/	1
		25	0	/	20.13	/	2
		25	12	/	20.27	/	2
		25	25	/	20.20	/	2
		50	0	/	20.19	/	2
	64QAM	1	0	/	20.45	/	2
		1	24	/	20.27	/	2
		1	49	/	20.57	/	2
		25	0	/	19.15	/	3
		25	12	/	19.26	/	3
		25	25	/	19.24	/	3
		50	0	/	19.24	/	3

LTE Band 66

Band/BW	Modulation	RB Size	RB Offset	Low CH 132072	Mid CH 132322	High CH 132572	MPR
				Frequency 1720MHz	Frequency 1745MHz	Frequency 1770MHz	
66/ 20	QPSK	1	0	20.30	20.33	20.20	0
		1	50	20.53	20.68	20.58	0
		1	99	20.29	20.44	20.34	0
		50	0	19.16	19.42	19.37	1
		50	25	19.34	19.36	19.33	1
		50	50	19.03	19.18	19.32	1
		100	0	19.31	19.36	19.34	1
	16QAM	1	0	19.50	19.68	19.52	1
		1	50	19.51	19.60	19.68	1
		1	99	19.58	19.82	19.78	1
		50	0	18.28	18.22	18.42	2
		50	25	17.69	17.93	17.89	2
		50	50	17.91	17.94	18.05	2
		100	0	18.28	18.28	18.18	2
	64QAM	1	0	18.31	18.52	18.48	2
		1	50	18.49	18.46	18.51	2
		1	99	18.58	18.70	18.81	2
		50	0	17.33	17.42	17.23	3
		50	25	17.19	17.28	17.33	3
		50	50	17.20	17.35	17.25	3
		100	0	17.24	17.18	17.38	3

LTE Band 71

Band/BW	Modulation	RB Size	RB Offset	Low CH 133222	Mid CH 133322	High CH 133372	MPR
				Frequency 673MHz	Frequency 683MHz	Frequency 688MHz	
71/ 20	QPSK	1	0	20.95	21.19	21.07	0
		1	50	21.29	21.55	21.54	0
		1	99	21.48	21.84	21.75	0
		50	0	19.98	20.27	20.44	1
		50	25	20.27	20.48	20.42	1
		50	50	20.00	20.52	20.30	1
		100	0	20.17	20.39	20.34	1
	16QAM	1	0	19.46	19.80	19.68	1
		1	50	20.25	20.48	20.62	1
		1	99	20.62	20.98	20.98	1
		50	0	19.41	19.50	19.78	2
		50	25	19.10	19.45	19.50	2
		50	50	19.20	19.44	19.56	2
		100	0	19.10	19.21	19.20	2
	64QAM	1	0	19.13	19.55	19.52	2
		1	50	19.32	19.43	19.54	2
		1	99	19.34	19.62	19.73	2
		50	0	18.33	18.57	18.46	3
		50	25	18.19	18.44	18.45	3
		50	50	18.34	18.63	18.57	3
		100	0	18.39	18.45	18.71	3



Test Report No.: W7L-211129W003RF18

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $55 + 10 \log_{10}(P)$ dB. The limit of emission is equal to -25dBm.

3.2.2 TEST PROCEDURES

- 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. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15\text{dBi}$.

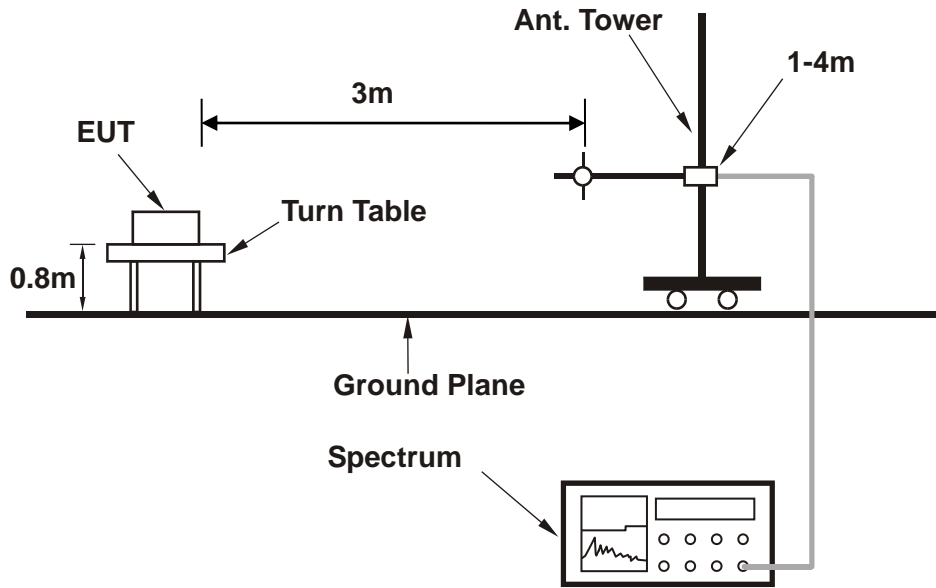
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.2.3 DEVIATION FROM TEST STANDARD

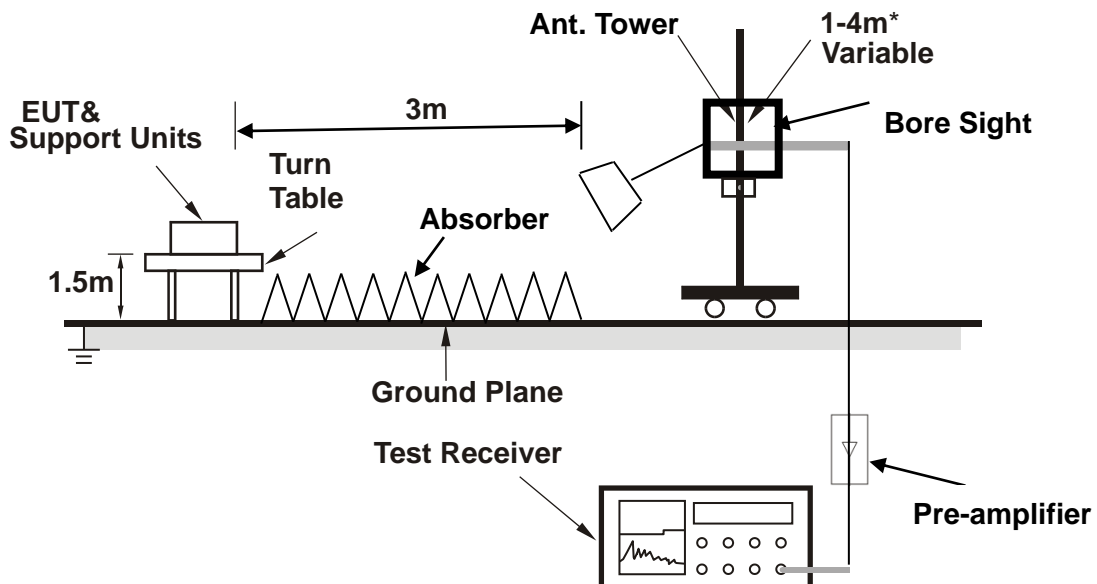
No deviation

3.2.4 TEST SETUP

< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

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



3.2.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

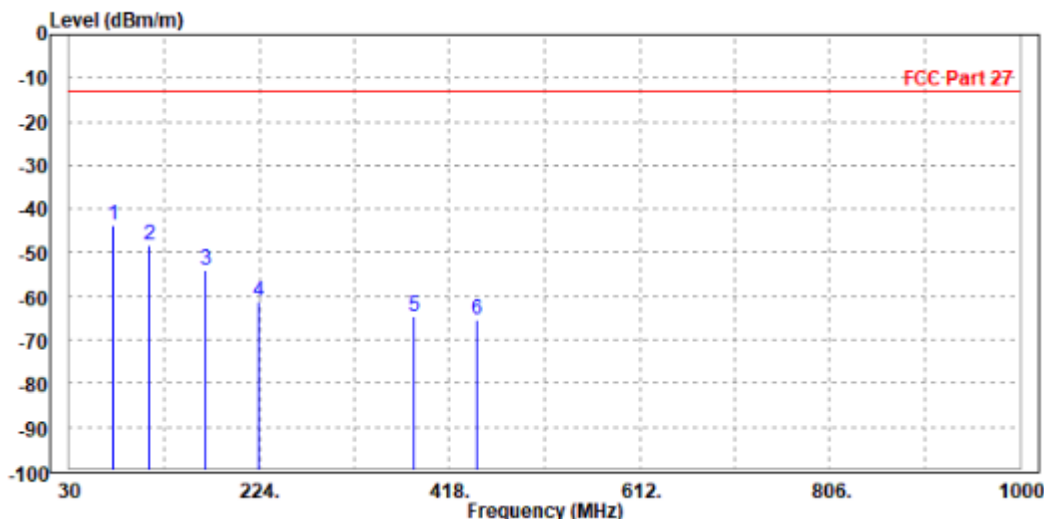
30 MHz – 1GHz data:

LTE Band 13

CHANNEL BANDWIDTH: 5MHz / QPSK

MODE	TX channel 23255	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	74.620	-43.79	-33.61	-13.00	-30.79	-10.18	Peak	Horizontal
2	111.480	-48.13	-34.58	-13.00	-35.13	-13.55	Peak	Horizontal
3	168.710	-53.94	-35.78	-13.00	-40.94	-18.16	Peak	Horizontal
4	223.030	-61.14	-44.35	-13.00	-48.14	-16.79	Peak	Horizontal
5	381.140	-64.77	-53.68	-13.00	-51.77	-11.09	Peak	Horizontal
6	446.130	-65.44	-55.02	-13.00	-52.44	-10.42	Peak	Horizontal

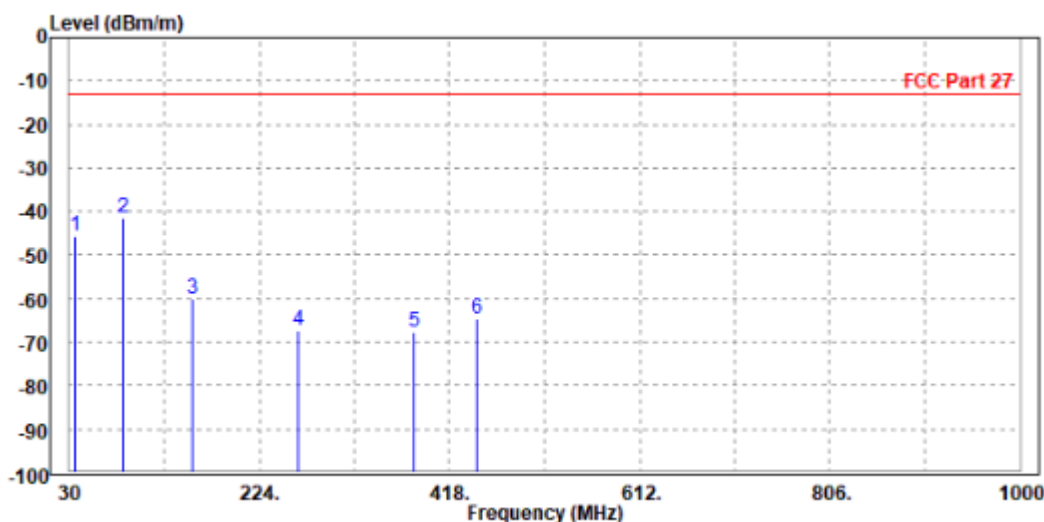




Test Report No.: W7L-211129W003RF18

MODE	TX channel 23255	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	35.820	-45.52	-44.21	-13.00	-32.52	-1.31	Peak	Vertical
2 PP	85.290	-41.62	-31.22	-13.00	-28.62	-10.40	Peak	Vertical
3	156.100	-60.13	-44.58	-13.00	-47.13	-15.55	Peak	Vertical
4	263.770	-67.27	-55.81	-13.00	-54.27	-11.46	Peak	Vertical
5	381.140	-67.73	-56.73	-13.00	-54.73	-11.00	Peak	Vertical
6	445.160	-64.55	-55.28	-13.00	-51.55	-9.27	Peak	Vertical





BUREAU VERITAS

Test Report No.: W7L-211129W003RF18

ABOVE 1GHz

Note: For higher frequency, the emission is too low to be detected.

WORST-CASE DATA

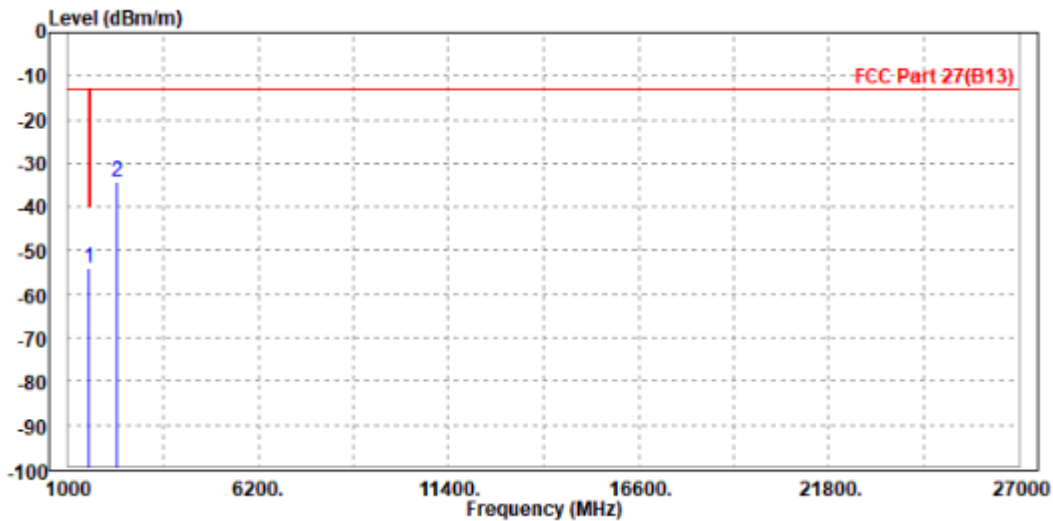
LTE B13

CHANNEL BANDWIDTH: 5MHz / QPSK

CH23205

MODE	TX channel 23205	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 1572.000	-54.05	-56.37	-40.00	-14.05	2.32	Peak	Horizontal
2	2338.500	-34.29	-42.18	-13.00	-21.29	7.89	Peak	Horizontal

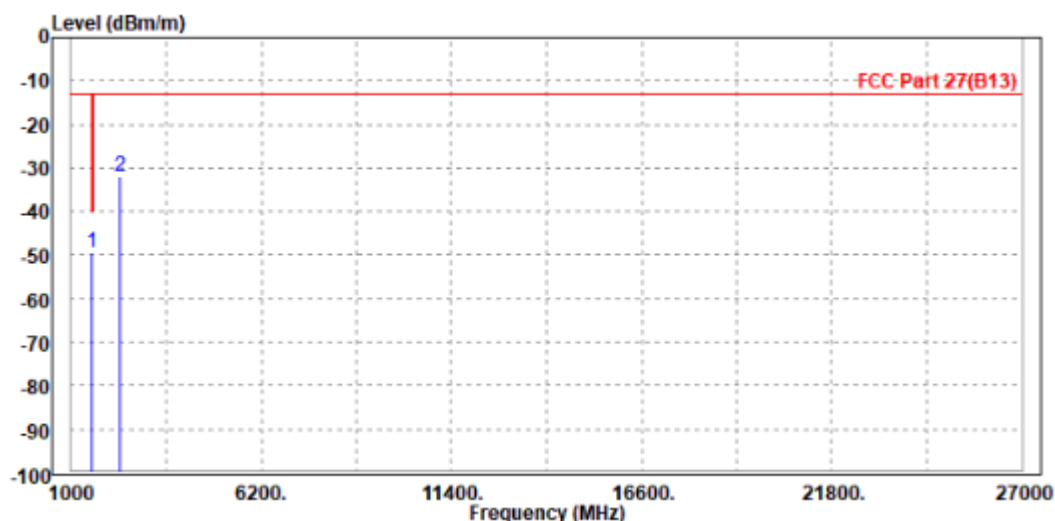




Test Report No.: W7L-211129W003RF18

MODE	TX channel 23205	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 1572.000	-49.40	-52.10	-40.00	-9.40	2.70	Peak	Vertical
2	2352.000	-32.07	-38.99	-13.00	-19.07	6.92	Peak	Vertical



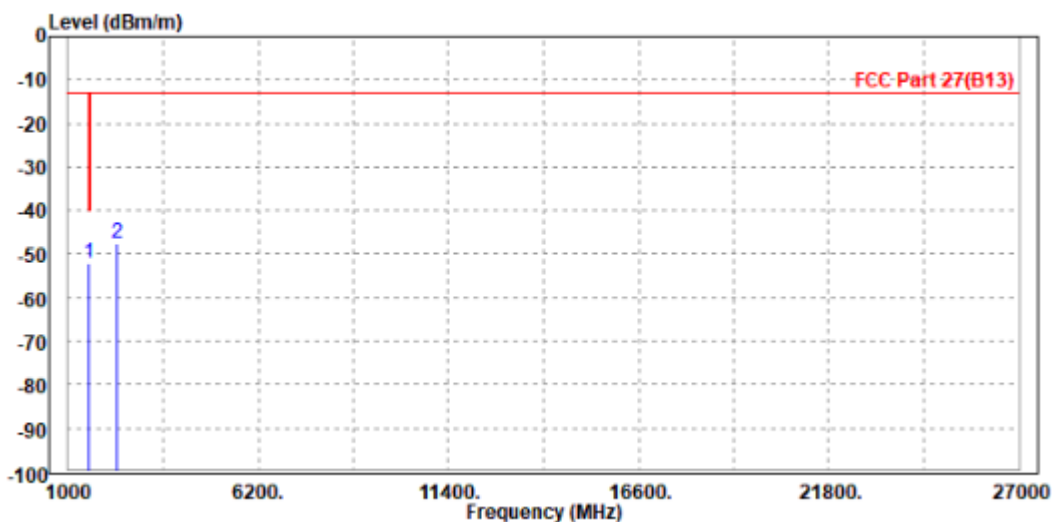


Test Report No.: W7L-211129W003RF18

CH23230

MODE	TX channel 23230	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1564.000	-52.03	-54.26	-40.00	-12.03	2.23	Peak	Horizontal
2	2352.000	-47.59	-55.49	-13.00	-34.59	7.90	Peak	Horizontal

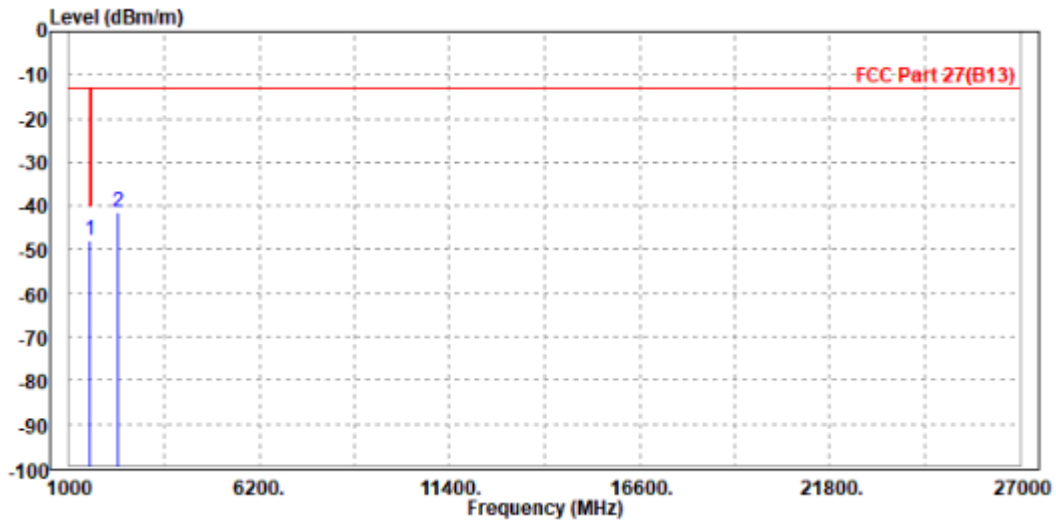




Test Report No.: W7L-211129W003RF18

MODE	TX channel 23230	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 1572.000	-47.89	-50.59	-40.00	-7.89	2.70	Peak	Vertical
2	2352.000	-41.60	-48.52	-13.00	-28.60	6.92	Peak	Vertical



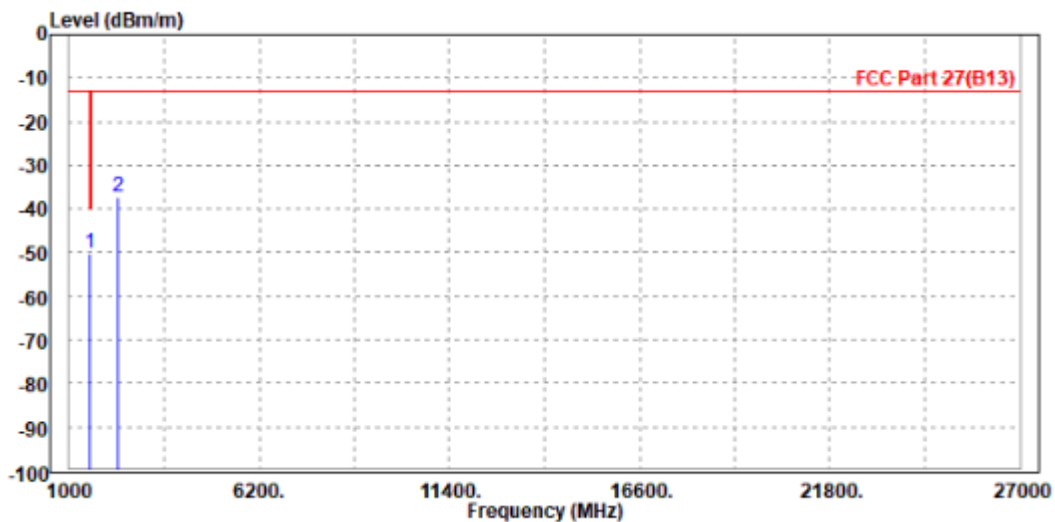


Test Report No.: W7L-211129W003RF18

CH23255

MODE	TX channel 23255	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 1569.000	-50.19	-52.48	-40.00	-10.19	2.29	Peak	Horizontal
2	2352.000	-37.39	-45.29	-13.00	-24.39	7.90	Peak	Horizontal

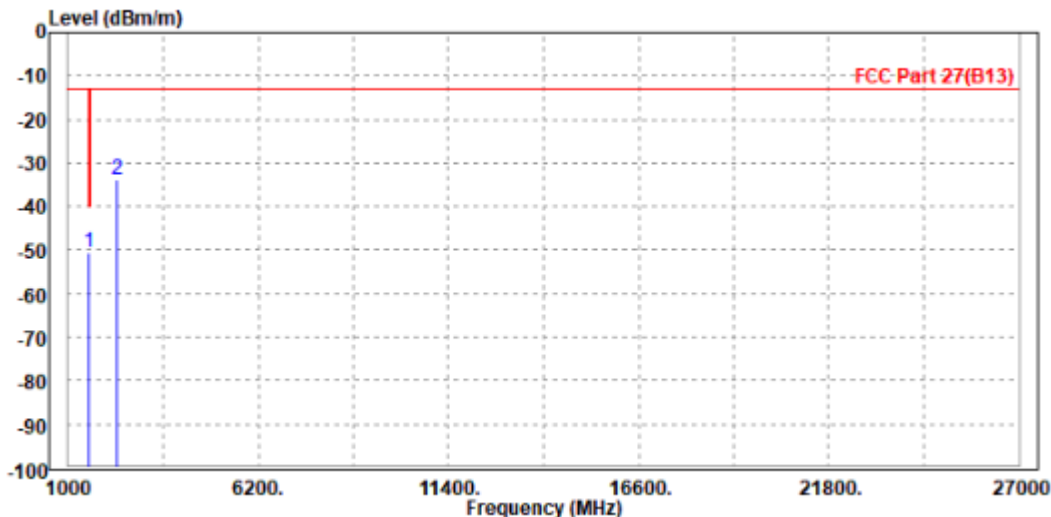




Test Report No.: W7L-211129W003RF18

MODE	TX channel 23255	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1572.000	-50.56	-53.26	-40.00	-10.56	2.70	Peak	Vertical
2	2352.000	-33.77	-40.69	-13.00	-20.77	6.92	Peak	Vertical



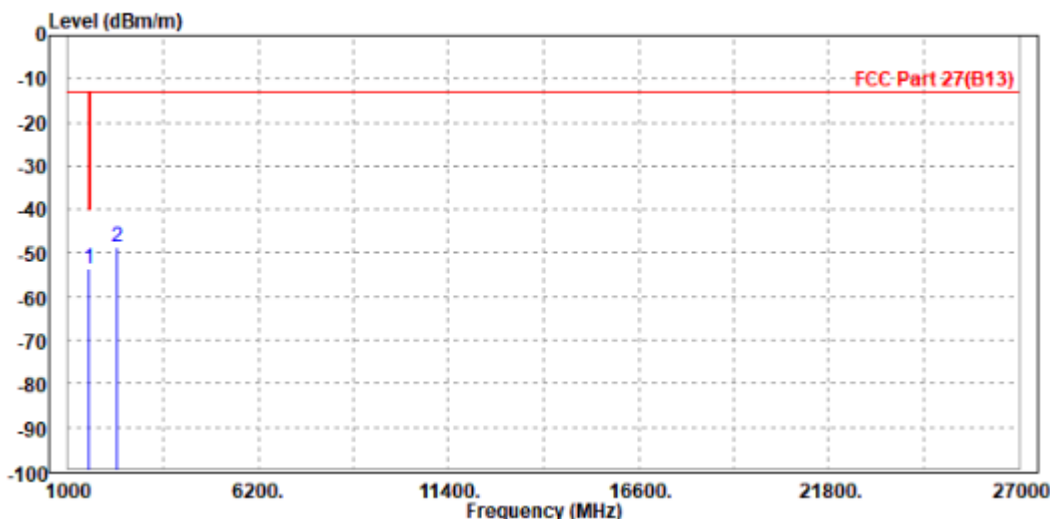


Test Report No.: W7L-211129W003RF18

CHANNEL BANDWIDTH: 10MHz /QPSK

MODE	TX channel 23230	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 1572.000	-53.51	-55.83	-40.00	-13.51	2.32	Peak	Horizontal
2	2346.000	-48.82	-56.72	-13.00	-35.82	7.90	Peak	Horizontal

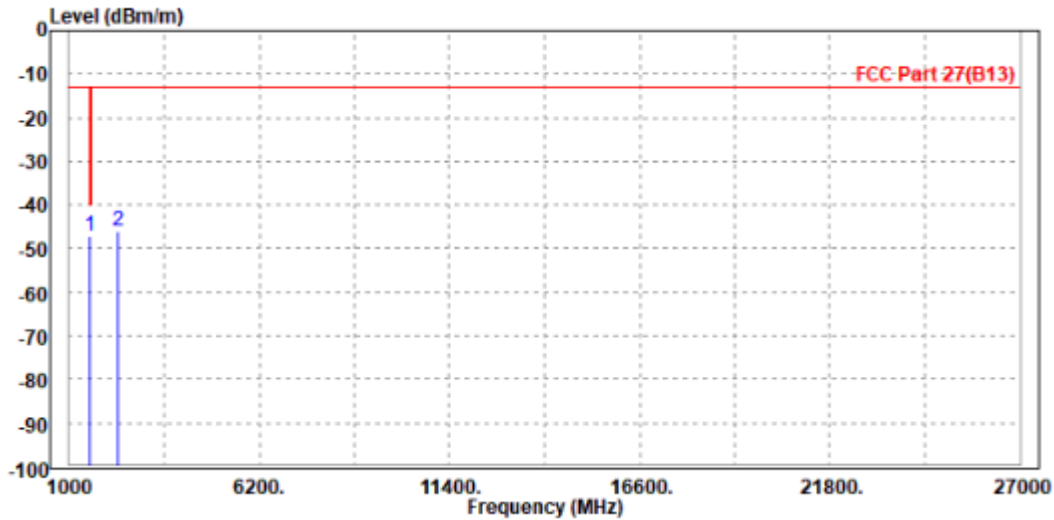




Test Report No.: W7L-211129W003RF18

MODE	TX channel 23230	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 1564.000	-47.24	-49.86	-40.00	-7.24	2.62	Peak	Vertical
2	2352.000	-45.93	-52.85	-13.00	-32.93	6.92	Peak	Vertical





Test Report No.: W7L-211129W003RF18

4 INFORMATION ON THE TESTING LABORATORIES

We, BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD., were founded in 2015 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Email: customerservice.sw@cn.bureauveritas.com

Web Site: www.adt.com.tw

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



Test Report No.: W7L-211129W003RF18

5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

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