IC TEST REPORT
(RSS-139)

Applicant:	Particle Industries,Inc
Address:	325 9th Street, San Francisco, CA 94103, United States Of America

Manufacturer or Supplier:	Particle Industries,Inc
Address:	325 9th Street, San Francisco, CA 94103, United States Of America
Product:	Montior One DE
Brand Name:	Particle
Model Name:	MON404-DE
IC:	20127-MONEDE
Date of tests:	Oct. 11, 2023 ~ Oct. 20, 2023

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

☒ **RSS-139 Issue 4, September 29, 2022**
☒ **RSS-Gen Issue 5, Amendment 1, March 2019**
☒ **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
Simon Wang Date: Oct. 20, 2023	Luke Lu Date: Oct. 20, 2023

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P23100004RI04	Original release	Oct. 20, 2023

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: IC RSS-139, RSS-Gen		
STANDARD SECTION **RSS-Gen**	**TEST TYPE AND LIMIT**	**RESULT**
6.7	Occupied Bandwidth	See Note
6.8	Transmit antenna	Compliance
STANDARD SECTION **RSS-139**	**TEST TYPE AND LIMIT**	**RESULT**
5.4	Frequency Stability AFC Freq. Error vs. Voltage AFC Freq. Error vs. Temperature	See Note
5.5	Maximum Peak Output Power	Compliance
5.5	peak-to-average power ratio	See Note
5.6	Band Edge Measurements	See Note
5.6	Conducted Spurious Emissions	See Note
5.6	Radiated Spurious Emissions	Compliance
5.7	Transmitter Power Control	See Note

NOTE: Refer to Module report R1811A0536-R9, IC:10224A-201709BG96.

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in ETSI TR 100 028-1 V1.4.1(2001-12):

MEASUREMENT	UNCERTAINTY
Frequency Stability	±76.97Hz
Radiated emissions (9KHz~30MHz)	±2.68dB
Radiated emissions & Radiated Power (30MHz~1GHz)	±4.98dB
Radiated emissions & Radiated Power (1GHz ~6GHz)	±4.70dB
Radiated emissions (6GHz ~18GHz)	±4.60dB
Radiated emissions (18GHz ~40GHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Band Edge Measurements	±4.70dB
Peak to average ratio	±0.76dB

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	Mar. 28,23	Mar. 27,24
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.10,23	May.09,24
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.02,23	Sep.01,24
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Feb. 18,23	Feb. 17,24
Horn Antenna	ETS-LINDGREN	3117	00168692	Feb. 18,23	Feb. 17,24
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Sep.03, 23	Sep.02, 24
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 14,23	Feb. 13,24
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May. 06,23	May. 05,24
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.10,23	May.09,24
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 17,23	Feb.16,24
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 22, 23	May. 21,26
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	JS1120	3.1.36	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	50HF-010-SMA	May. 06,23	May. 05,24
Power Meter	Anritsu	ML2495A	1506002	Feb. 14,23	Feb. 13,24
Power Sensor	Anritsu	MA2411B	1339352	Feb. 14,23	Feb. 13,24
Temperature Chamber	ESPEC	SH-242	93000855	May. 06,23	May. 05,24
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 14,23	Feb. 13,24
Base station R&S CMW500	Rohde&Schwarz	CMW500	153085	May.10,23	May.09,24
DC Source	Kikusui/JP	PMX18-5A	N/A	Aug. 11,23	Aug. 10,24

NOTE: 1. The calibration interval of the above test instruments is 12 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 IC Company Number is 21771; The CAB Identifier No. is CN0007.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

EUT	Montior One DE	
BRAND NAME	Particle	
MODEL NAME	MON404-DE	
POWER SUPPLY	24Vdc (adapter or host equipment) 3.7Vdc (Li-ion, battery)	
MODULATION TECHNOLOGY	**LTE CAT-M1**	QPSK, 16QAM
FREQUENCY RANGE	**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
EMISSION DESIGNATO	**LTE Band 4 Channel Bandwidth: 1.4MHz**	QPSK: 1M12G7D
		16QAM: 939KW7D
		64QAM: /
	LTE Band 4 Channel Bandwidth: 3MHz	QPSK: 1M15G7D
		16QAM: 981KW7D
		64QAM: /
	LTE Band 4 Channel Bandwidth: 5MHz	QPSK: 1M13G7D
		16QAM: 1M02W7D
		64QAM: /
	LTE Band 4 Channel Bandwidth: 10MHz	QPSK: 1M18G7D
		16QAM: 1M07W7D
		64QAM: /
	LTE Band 4 Channel Bandwidth: 15MHz	QPSK: 1M20G7D
		16QAM: 1M06W7D
		64QAM: /
	LTE Band 4 Channel Bandwidth: 20MHz	QPSK: 1M21G7D
		16QAM: 1M11W7D
		64QAM: /

MAX. ERP/EIRP POWER	**LTE Band 4 Channel Bandwidth: 1.4MHz**	378.44mW
	LTE Band 4 Channel Bandwidth: 3MHz	369.83mW
	LTE Band 4 Channel Bandwidth: 5MHz	376.7mW
	LTE Band 4 Channel Bandwidth: 10MHz	379.31mW
	LTE Band 4 Channel Bandwidth: 15MHz	374.11mW
	LTE Band 4 Channel Bandwidth: 20MHz	381.94mW
ANTENNA TYPE	Fixed External Antenna with 3.47dBi gain for LTE B4	
HW VERSION	v1.2.0	
SW VERSION	v4.0.2	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	Cable 1: non-shielded cable, with w/o ferrite core, 1.5 meter Cable 2: non-shielded cable, with w/o ferrite core, 1.5 meter	
EXTREME TEMPERATURE	-10~60 ℃	
EXTREME VOLTAGE	3.6V - 4.2V	

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
LTE	1TX/1RX

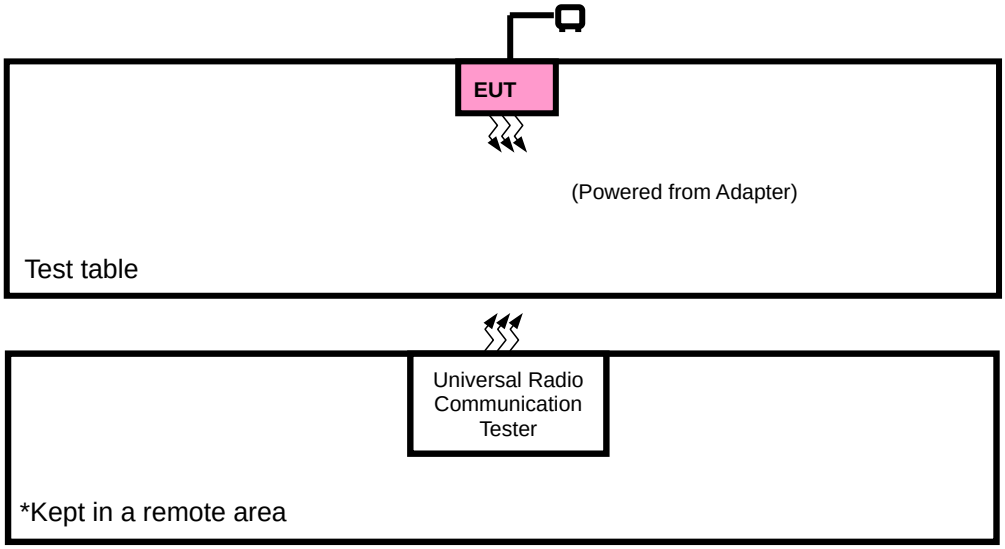
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

List of Accessory:

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
Battery	Guangdong Zhaoneng	Guangdong Zhaoneng	ZN18650-4P	Capacity: 3.7Vdc, 12200mAh
AC Adapter	TRI-MAG	TRI-MAG LLC	L6R30-240	I/P: 100-240Vac, 0.8A, O/P: 24Vdc, 1.25A
Cable 1	KAWEEI	KAWEEI technology	CBH-M12M-04 -1500	Signal Line,1.5meter
Cable 2	KAWEEI	KAWEEI technology	115-00014 CBH-M12M-08 -1500	Signal Line,1.5meter

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	Adapter	Jingsai	CLS-050200	NA	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

2.4 DESCRIPTION OF TEST MODES

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 X-plane for EIRP and X-axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	**EUT + Adapter with LTE link**

LTE BAND 4 MODE

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

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP(ERP)	24deg. C, 60%RH	DC 24V By Adapter	Jace Hu
RADIATED EMISSION	26deg. C, 56%RH	DC 24V By Adapter	James Fu

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:

Canada RSS-139, Issue 4, September 29, 2022

Canada RSS-Gen, Issue 5, Amendment 1, March 2019

ANSI C63.26 - 2015

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

2.6 TRANSMIT ANTENNA

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

Antenna Type	Fixed External antenna
Antenna Gain	3.47dBi gain for LTE B4
Impedance	50 Ω

3 TEST TYPES AND RESULTS

3.1 OUTPUT POWER MEASUREMENT AND POWER CONTROL

3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Fixed, mobile, and portable (hand-held) stat ions operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

3.1.2 TEST PROCEDURES

EIRP / ERP 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 determing the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

ERP or EIRP = $P_{Meas} + G_T – L_C$

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.

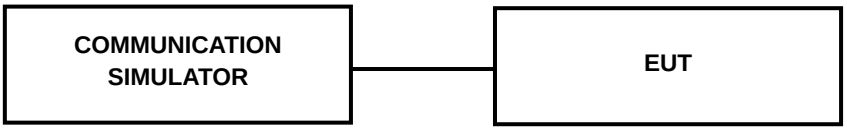
ERP=EIRP-2.15

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.

3.1.3 TEST SETUP

CONDUCTED POWER MEASUREMENT:



3.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

LTE Band 4

Band/BW	Modulation	RB Size	RB Offset	Low CH 19957	Mid CH 20175	High CH 20393
				Frequency 1710.7 MHz	Frequency 1732.5 MHz	Frequency 1754.3 MHz
4/ 1.4	QPSK	1	0	22.08	22.01	22.16
		1	5	21.88	21.92	22.22
		3	0	22.06	21.84	22.13
		3	3	21.87	21.92	22.13
		6	0	21.87	21.80	22.11
	16QAM	1	0	21.94	21.67	22.05
		1	5	22.11	21.93	22.24
		3	0	22.02	21.80	22.13
		3	3	22.09	21.91	22.31
		5	0	22.11	22.02	22.16

Band/BW	Modulation	RB Size	RB Offset	Low CH 19965	Mid CH 20175	High CH 20385
				Frequency 1711.5 MHz	Frequency 1732.5 MHz	Frequency 1753.5 MHz
4/ 3	QPSK	1	0	22.02	21.98	22.16
		1	5	21.93	21.82	22.14
		3	0	22.07	21.78	22.21
		3	3	21.93	21.90	22.18
		6	0	21.90	21.74	22.10
	16QAM	1	0	22.02	21.77	22.04
		1	5	22.01	21.86	22.18
		3	0	22.06	21.94	22.13
		3	3	22.12	21.96	22.30
		5	0	22.08	21.90	22.25

Band/BW	Modulation	RB Size	RB Offset	Low CH 19975 Frequency 1712.5 MHz	Mid CH 20175 Frequency 1732.5 MHz	High CH 20375 Frequency 1752.5 MHz
4/ 5	QPSK	1	0	22.00	21.90	22.13
		1	5	22.02	21.85	22.20
		3	0	21.98	21.89	22.19
		3	3	22.00	21.90	22.10
		6	0	21.85	21.69	22.02
	16QAM	1	0	21.99	21.74	22.11
		1	5	22.09	21.84	22.10
		3	0	22.05	21.90	22.11
		3	3	22.06	22.03	22.29
		5	0	22.16	21.97	22.23

Band/BW	Modulation	RB Size	RB Offset	Low CH 20000 Frequency 1715 MHz	Mid CH 20175 Frequency 1732.5 MHz	High CH 20350 Frequency 1750 MHz
4/ 10	QPSK	1	0	22.00	21.92	22.12
		1	5	21.99	21.91	22.14
		3	0	22.06	21.89	22.21
		3	3	21.88	21.90	22.10
		6	0	21.89	21.81	22.03
	16QAM	1	0	22.04	21.75	22.03
		1	5	22.03	21.98	22.24
		3	0	21.98	21.85	22.18
		3	3	22.02	21.94	22.32
		5	0	22.09	21.90	22.20

Band/BW	Modulation	RB Size	RB Offset	Low CH 20025 Frequency 1717.5 MHz	Mid CH 20175 Frequency 1732.5 MHz	High CH 20325 Frequency 1747.5 MHz
4/ 15	QPSK	1	0	22.09	21.97	22.06
		1	5	21.95	21.86	22.13
		3	0	21.99	21.87	22.10
		3	3	21.97	22.00	22.09
		6	0	21.97	21.70	22.05
	16QAM	1	0	22.03	21.77	22.15
		1	5	22.11	21.92	22.13
		3	0	21.95	21.90	22.16
		3	3	22.11	22.00	22.26
		5	0	22.14	21.92	22.17

Band/BW	Modulation	RB Size	RB Offset	Low CH 20050 Frequency 1720 MHz	Mid CH 20175 Frequency 1732.5 MHz	High CH 20300 Frequency 1745 MHz
4/ 20	QPSK	1	0	22.14	22.04	22.19
		1	5	22.03	21.94	22.25
		3	0	22.11	21.91	22.25
		3	3	22.02	22.01	22.21
		6	0	21.98	21.84	22.16
	16QAM	1	0	22.09	21.81	22.17
		1	5	22.13	21.99	22.25
		3	0	22.09	21.95	22.21
		3	3	22.16	22.04	22.35
		5	0	22.21	22.04	22.26

EIRP
LTE BAND 4
CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19957	1710.7	22.08	3.47	25.55	358.92	1
20175	1732.5	22.01	3.47	25.48	353.18	1
20393	1754.3	22.22	3.47	25.69	370.68	1

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19957	1710.7	22.11	3.47	25.58	361.41	1
20175	1732.5	22.02	3.47	25.49	354	1
20393	1754.3	22.31	3.47	25.78	378.44	1

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19965	1711.5	22.07	3.47	25.54	358.1	1
20175	1732.5	21.98	3.47	25.45	350.75	1
20385	1753.5	22.21	3.47	25.68	369.83	1

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19965	1711.5	22.12	3.47	25.59	362.24	1
20175	1732.5	22.12	3.47	25.59	362.24	1
20385	1753.5	22.12	3.47	25.59	362.24	1

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19975	1712.5	22.02	3.47	25.49	354	1
20175	1732.5	21.9	3.47	25.37	344.35	1
20375	1752.5	22.2	3.47	25.67	368.98	1

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19975	1712.5	22.16	3.47	25.63	365.59	1
20175	1732.5	22.03	3.47	25.5	354.81	1
20375	1752.5	22.29	3.47	25.76	376.7	1

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20000	1715	22.06	3.47	25.53	357.27	1
20175	1732.5	21.92	3.47	25.39	345.94	1
20350	1750	22.21	3.47	25.68	369.83	1

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20000	1715	22.09	3.47	25.56	359.75	1
20175	1732.5	21.98	3.47	25.45	350.75	1
20350	1750	22.32	3.47	25.79	379.31	1

CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20025	1717.5	22.09	3.47	25.56	359.75	1
20175	1732.5	22	3.47	25.47	352.37	1
20325	1747.5	22.13	3.47	25.6	363.08	1

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20025	1717.5	22.14	3.47	25.61	363.92	1
20175	1732.5	22	3.47	25.47	352.37	1
20325	1747.5	22.26	3.47	25.73	374.11	1

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20050	1720	22.14	3.47	25.61	363.92	1
20175	1732.5	22.04	3.47	25.51	355.63	1
20300	1745	22.25	3.47	25.72	373.25	1

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20050	1720	22.21	3.47	25.68	369.83	1
20175	1732.5	22.04	3.47	25.51	355.63	1
20300	1745	22.35	3.47	25.82	381.94	1

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

3.2.2 TEST PROCEDURE

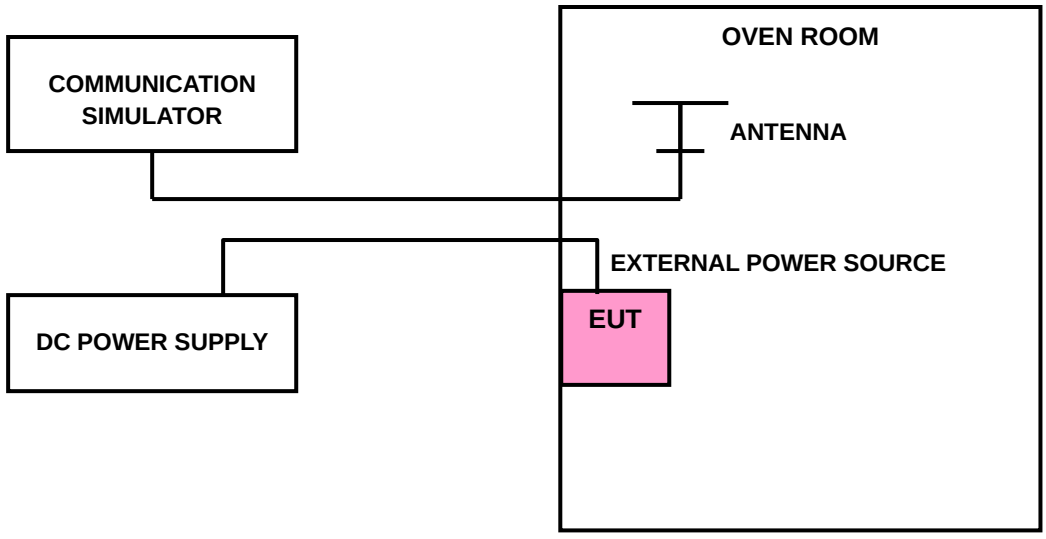
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

3.2.3 TEST SETUP



3.2.4 TEST RESULTS

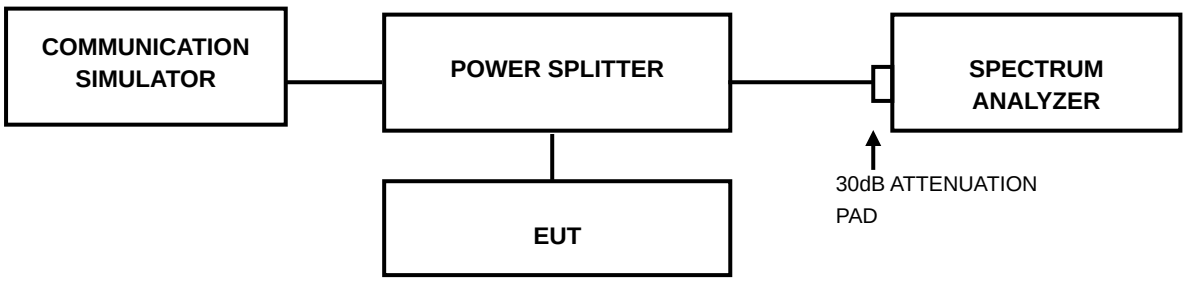
Please Refer to Module report R1811A0536-R9.

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

3.3.2 TEST SETUP



3.3.3 TEST PROCEDURES

a. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

b. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

3.3.4 TEST RESULTS

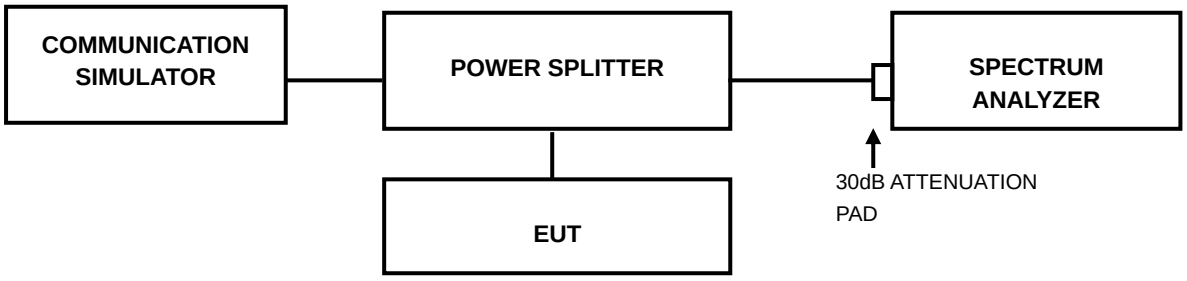
Please Refer to Module report R1811A0536-R9.

3.4 PEAK TO AVERAGE RATIO

3.4.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

3.4.2 TEST SETUP



3.4.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

3.4.4 TEST RESULTS

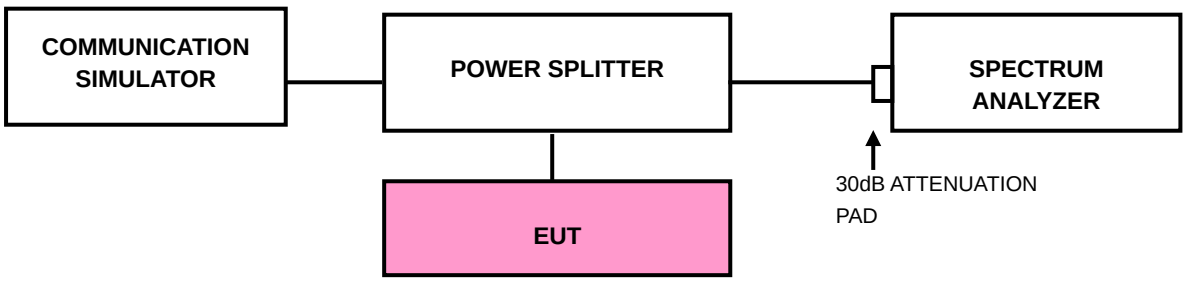
Please Refer to Module report R1811A0536-R9.

3.5 BAND EDGE MEASUREMENT

3.5.1 LIMITS OF BAND EDGE MEASUREMENT

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.
However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

3.5.2 TEST SETUP



3.5.3 TEST PROCEDURES

a) All measurements were done at low and high operational frequency range

b) Connect the transmitter to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.

c) Tune the analyzer to the nominal center frequency of the emission bandwidth (EBW)

d) .Set the resolution bandwidth (RBW) ≧ 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.

e) Beyond the 1MHz band from the band edge, RBW=1MHz was used.

f) Set the video bandwidth (VBW) to ≧3 x RBW.

g) Select the average power (RMS) display detector.

h) Set the number of measurement points to ≧ 1001.

i) Use auto-coupled sweep time.

j) Perform the measurement over an interval of time when the transmission is continuous and at its maximum power level.

k) The RF fundamental frequency should be excluded against the limit line in the operating frequency band and use RBW is 10KHz or 100KHz.

l) Record the max trace plot into the test report.

3.5.4 TEST RESULTS

Please Refer to Module report R1811A0536-R9.

3.6 CONDUCTED SPURIOUS EMISSIONS

3.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

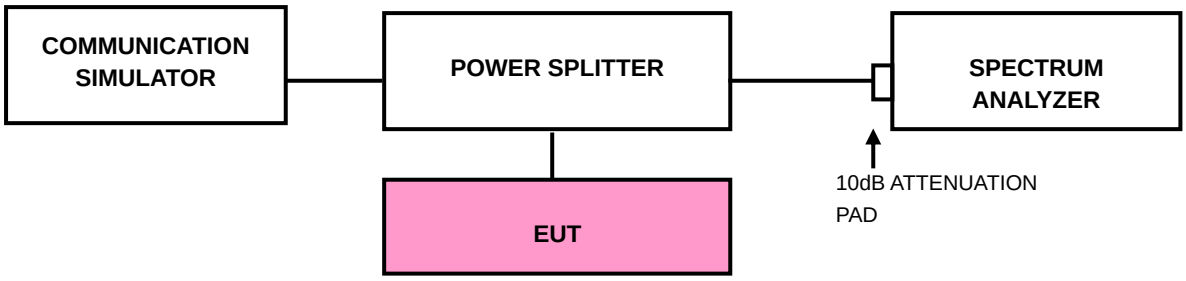
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm.

3.6.2 TEST PROCEDURE

a. The EUT makes a phone call to the communication simulator. All measurements were done at middle operational frequency range.

b. Measuring frequency range is from 9kHz up to a frequency including its 10^{th} harmonic. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

3.6.3 TEST SETUP



3.6.4 TEST RESULTS

NOTE：The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

Please Refer to Module report R1811A0536-R9.

3.7 RADIATED EMISSION MEASUREMENT

3.7.1 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 43 +10 log10(P) dB. The limit of emission equal to –13dBm

3.7.2 TEST PROCEDURES

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m/1.5m 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.P.R power - 2.15dBi.

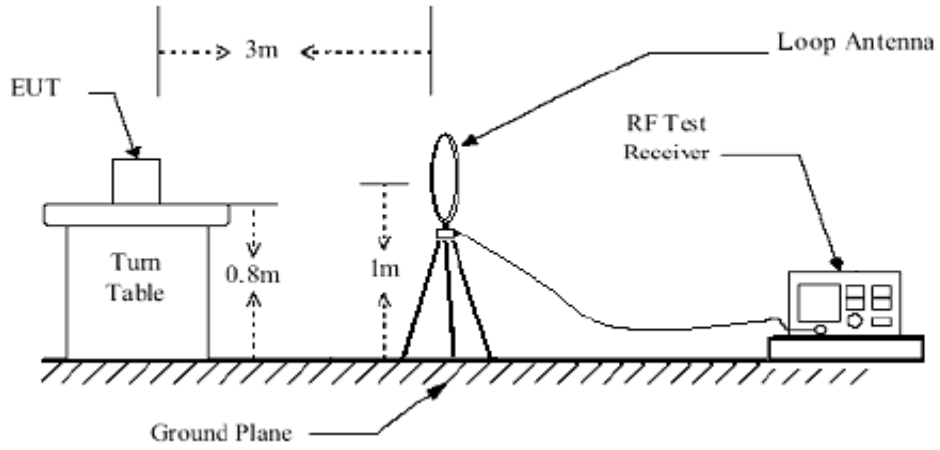
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.7.3 DEVIATION FROM TEST STANDARD

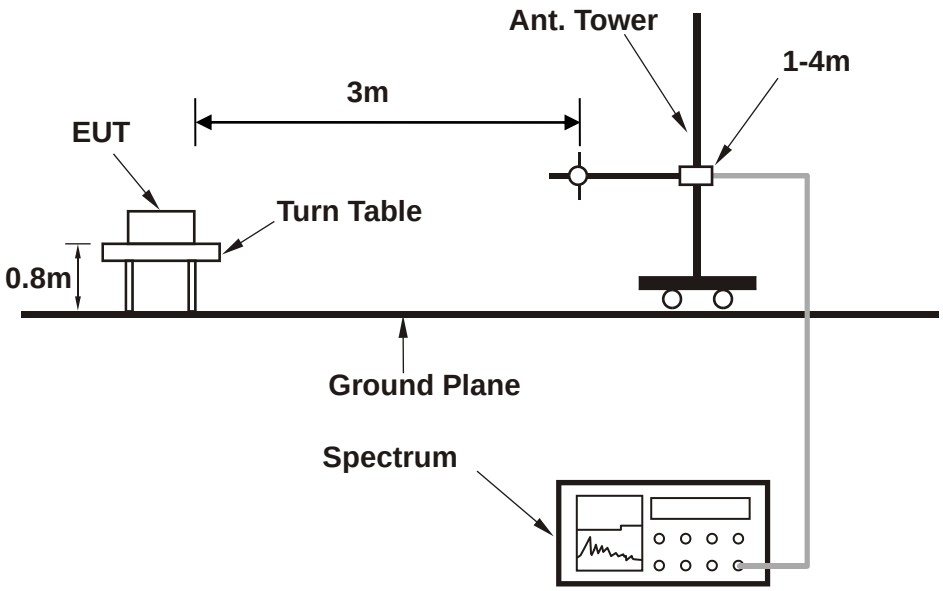
No deviation

3.7.4 TEST SETUP

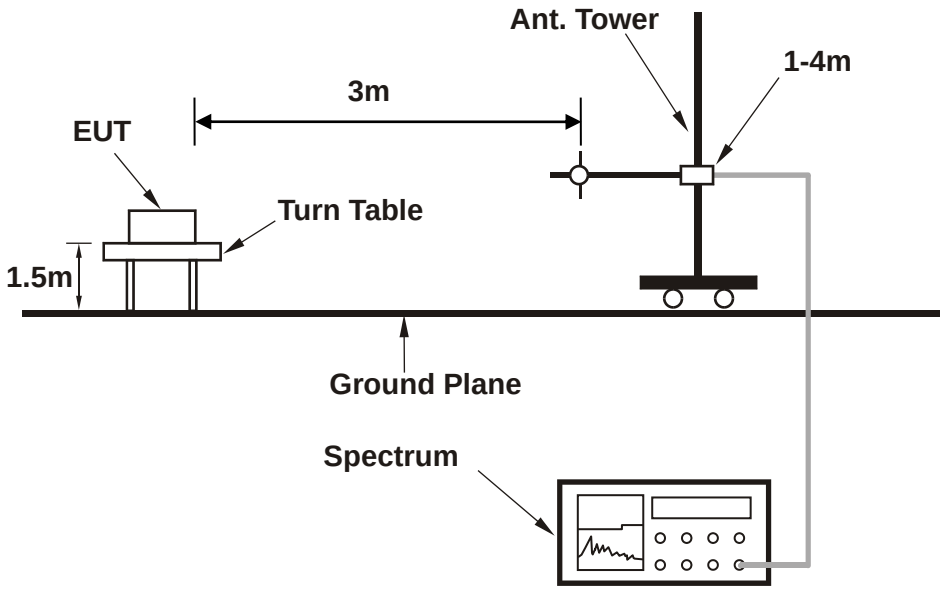
< Frequency Range below 30MHz >



< Frequency Range 30MHz~1GHz >



< Frequency Range above 1GHz >



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

3.7.5 TEST RESULTS

NOTE：The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

BELOW 1GHz WORST-CASE DATA

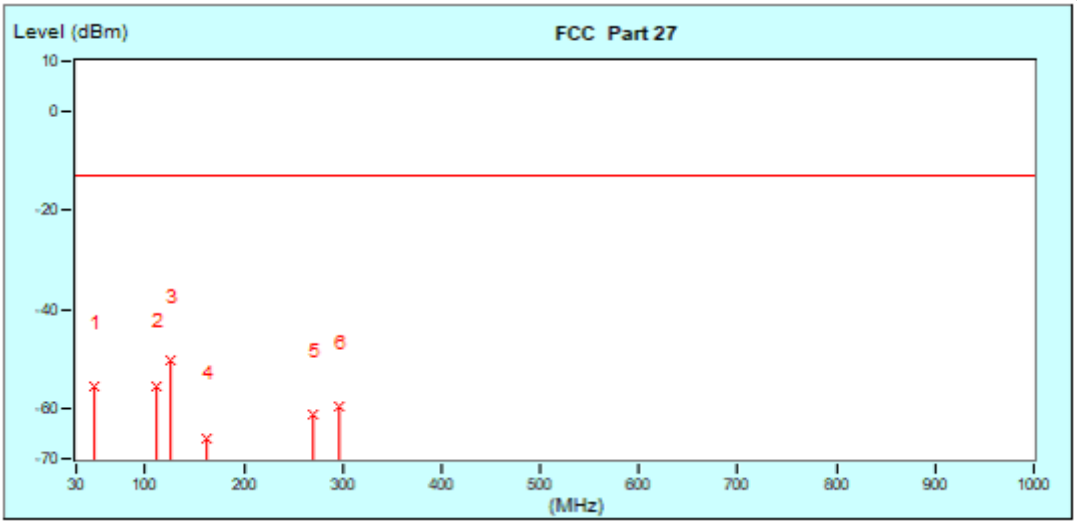
30 MHz – 1GHz data:

LTE Band 4:

CHANNEL BANDWIDTH: 10MHz / QPSK

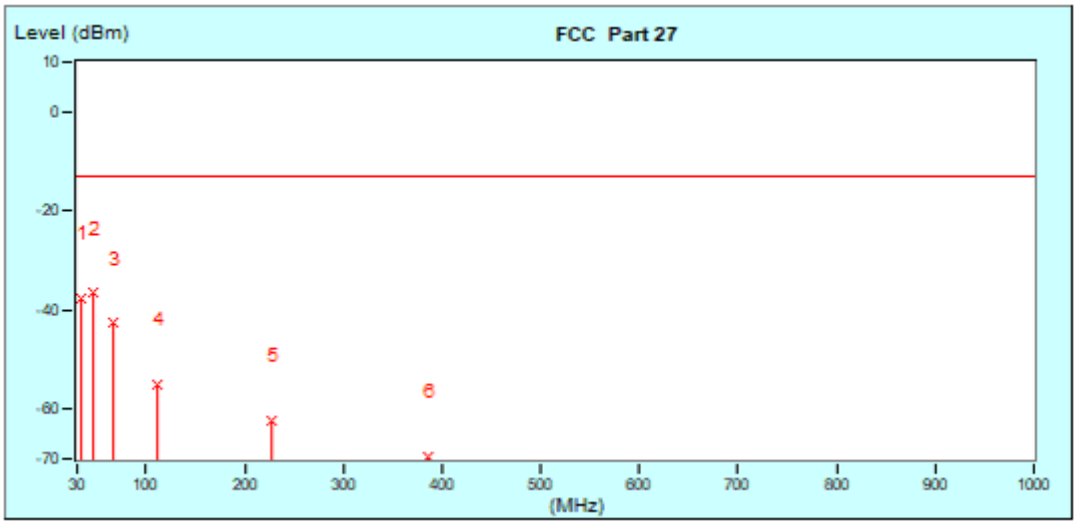
MODE	TX channel 20350	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	No.	Frequency	Factor	Reading	Emission	Limit	Margin	Tower	Table
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	48.65	-11.75	-43.84	-55.59	-13.00	-42.59	100	0
	2	110.83	-7.57	-47.80	-55.37	-13.00	-42.37	100	0
*	3	126.38	-6.40	-43.84	-50.24	-13.00	-37.24	100	0
	4	162.13	-8.14	-57.71	-65.85	-13.00	-52.85	100	0
	5	270.95	-7.48	-53.78	-61.26	-13.00	-48.26	100	0
	6	297.37	-6.48	-53.16	-59.64	-13.00	-46.64	100	0



MODE	TX channel 20350	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			

	No.	Frequency	Factor	Reading	Emission	Limit	Margin	Tower	Table
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	33.11	-1.74	-35.82	-37.56	-13.00	-24.56	100	0
*	2	45.54	-10.05	-26.57	-36.62	-13.00	-23.62	100	0
	3	67.31	-12.25	-30.48	-42.73	-13.00	-29.73	100	0
	4	110.83	-7.57	-47.42	-54.99	-13.00	-41.99	100	0
	5	227.42	-7.76	-54.41	-62.17	-13.00	-49.17	100	0
	6	385.98	-4.64	-64.88	-69.52	-13.00	-56.52	100	0



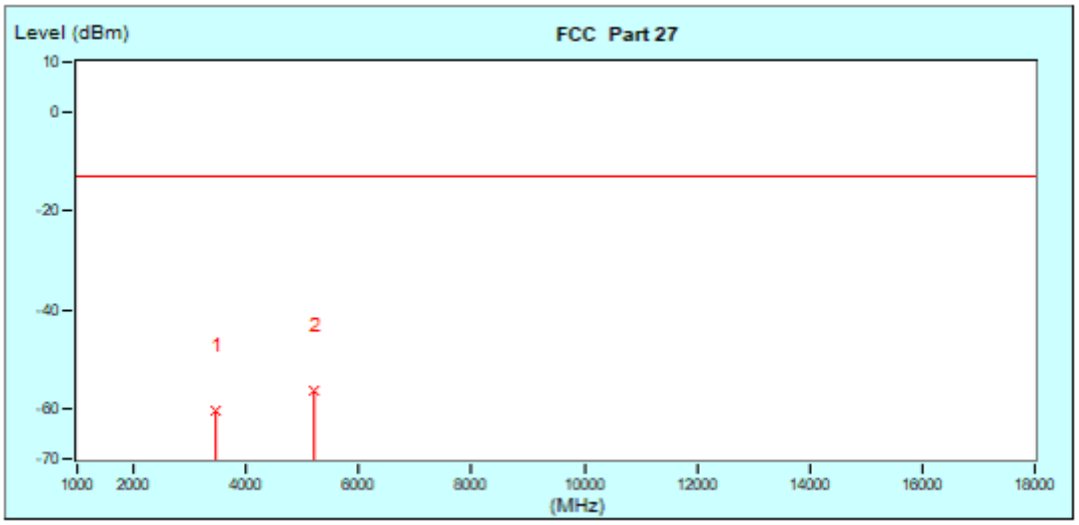
ABOVE 1GHz

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

LTE Band 4
CHANNEL BANDWIDTH: 1.4MHz / QPSK

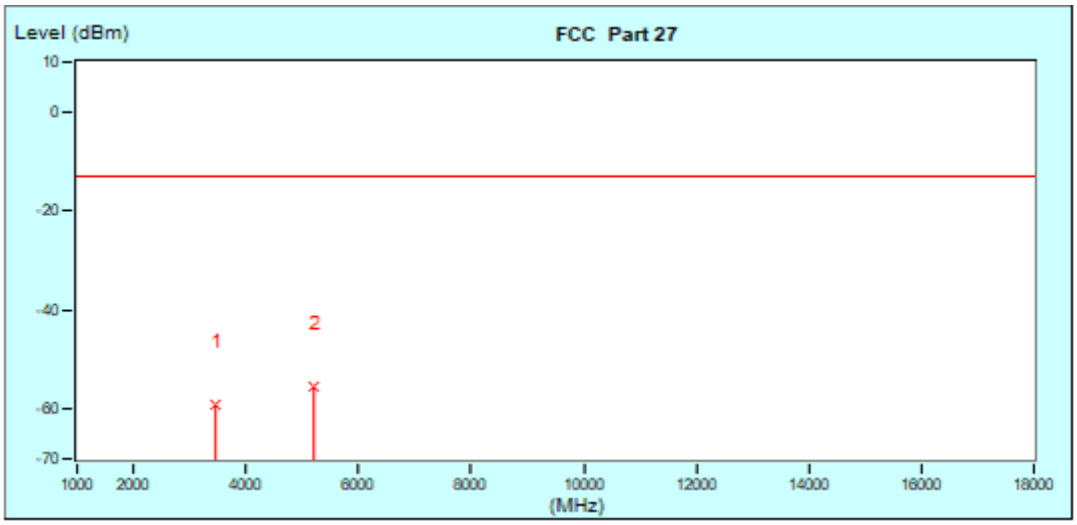
MODE	TX channel 20175	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	No.	Frequency	Factor	Reading	Emission	Limit	Margin	Tower	Table
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3465.00 (PK)	-9.27	-50.92	-60.19	-13.00	-47.19	100	0
*	2	5197.50 (PK)	-3.92	-52.19	-56.11	-13.00	-43.11	100	0



MODE	TX channel 20175	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			

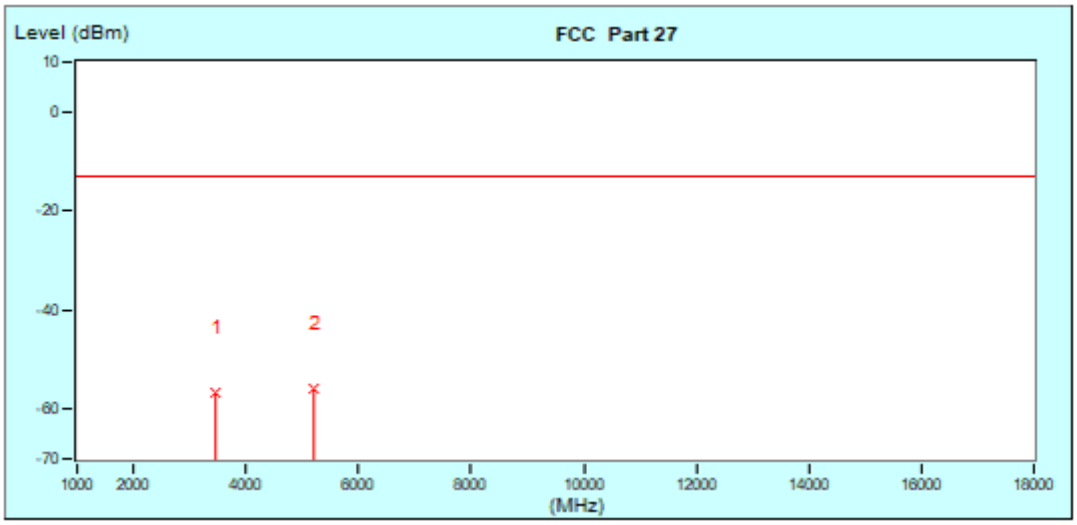
No.		Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3465.00 (PK)	-9.27	-49.84	-59.11	-13.00	-46.11	100	0
*	2	5197.50 (PK)	-3.92	-51.58	-55.50	-13.00	-42.50	100	0



CHANNEL BANDWIDTH: 3MHz / QPSK

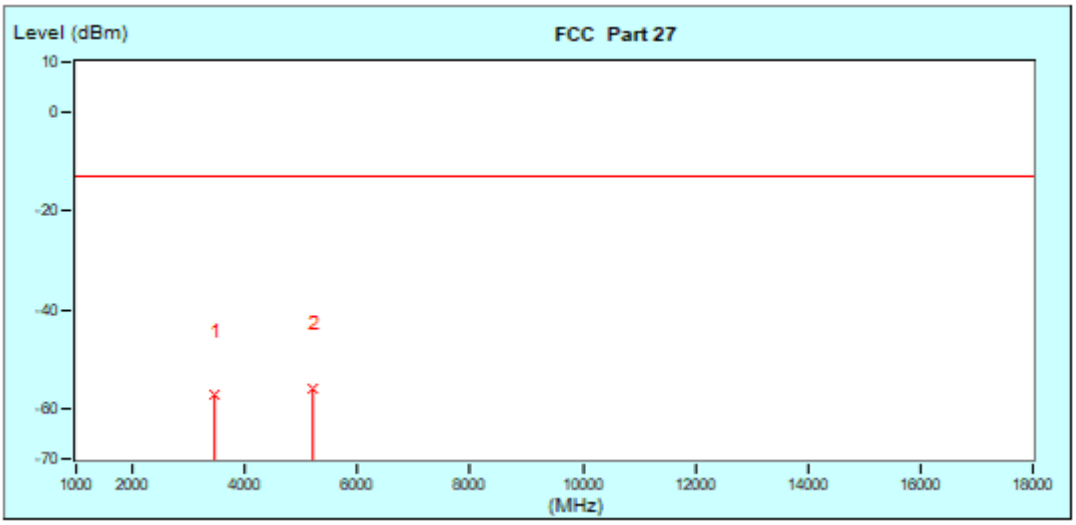
MODE	TX channel 20175	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	No.	Frequency	Factor	Reading	Emission	Limit	Margin	Tower	Table
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3465.00 (PK)	-9.27	-47.30	-56.57	-13.00	-43.57	100	0
*	2	5197.50 (PK)	-3.92	-51.86	-55.78	-13.00	-42.78	100	0



MODE	TX channel 20175	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			

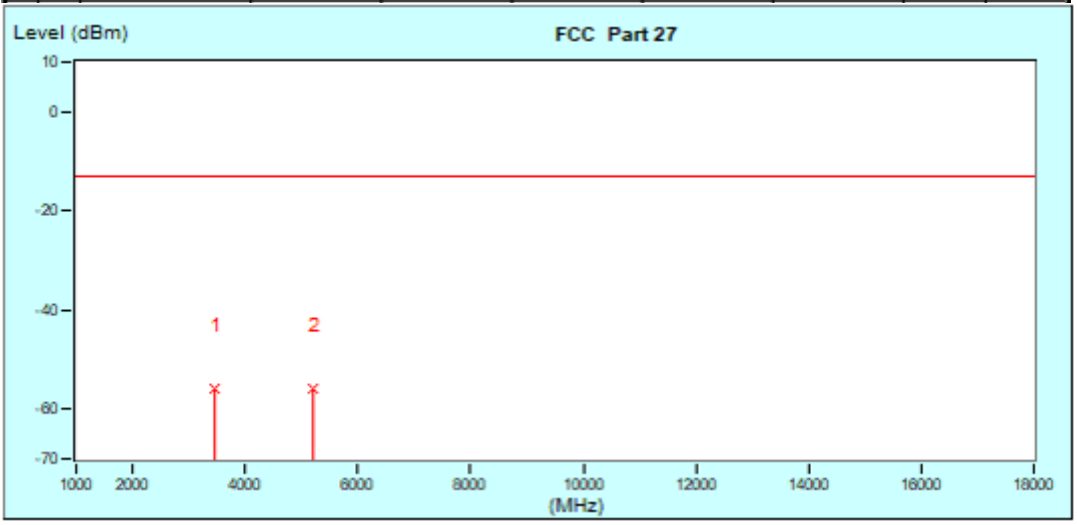
No.		Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3465.00 (PK)	-9.27	-47.87	-57.14	-13.00	-44.14	100	0
*	2	5197.50 (PK)	-3.92	-51.81	-55.73	-13.00	-42.73	100	0



CHANNEL BANDWIDTH: 5MHz / QPSK

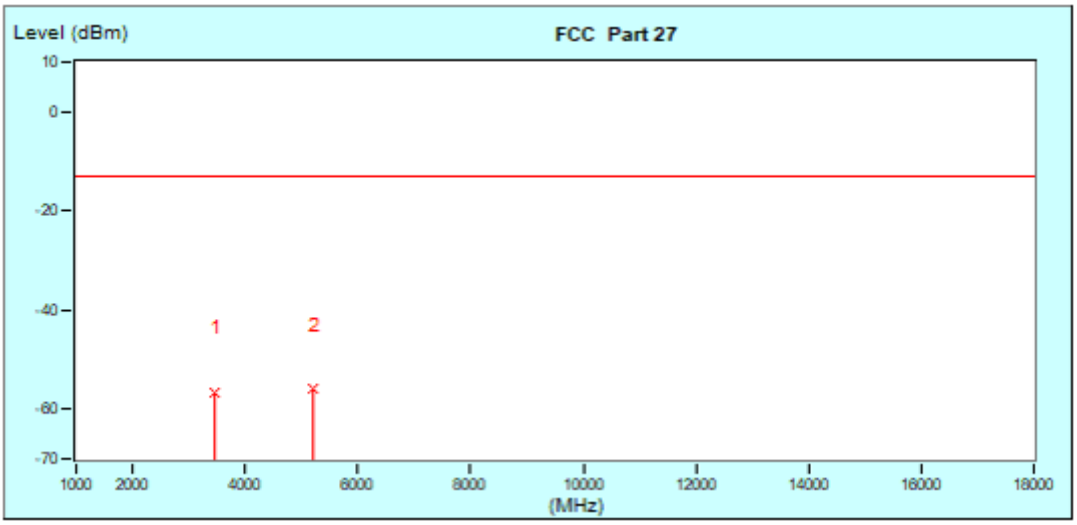
MODE	TX channel 20175	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

No.		Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
*	1	3465.00 (PK)	-9.27	-46.72	-55.99	-13.00	-42.99	100	0
	2	5197.50 (PK)	-3.92	-52.11	-56.03	-13.00	-43.03	100	0



MODE	TX channel 20175	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			

No.		Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3465.00 (PK)	-9.27	-47.27	-56.54	-13.00	-43.54	100	0
*	2	5197.50 (PK)	-3.92	-52.08	-56.00	-13.00	-43.00	100	0

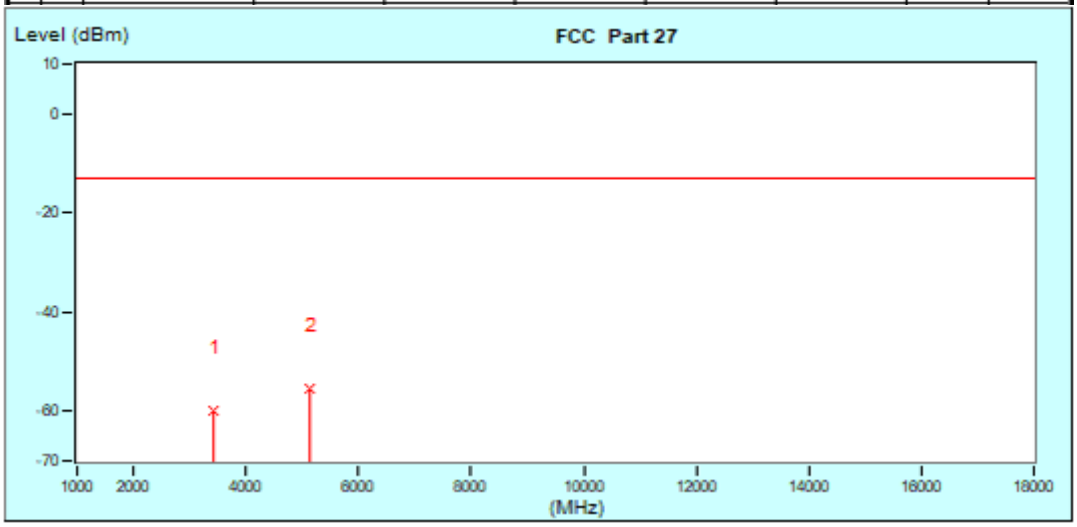


CHANNEL BANDWIDTH: 10MHz / QPSK

CH20000

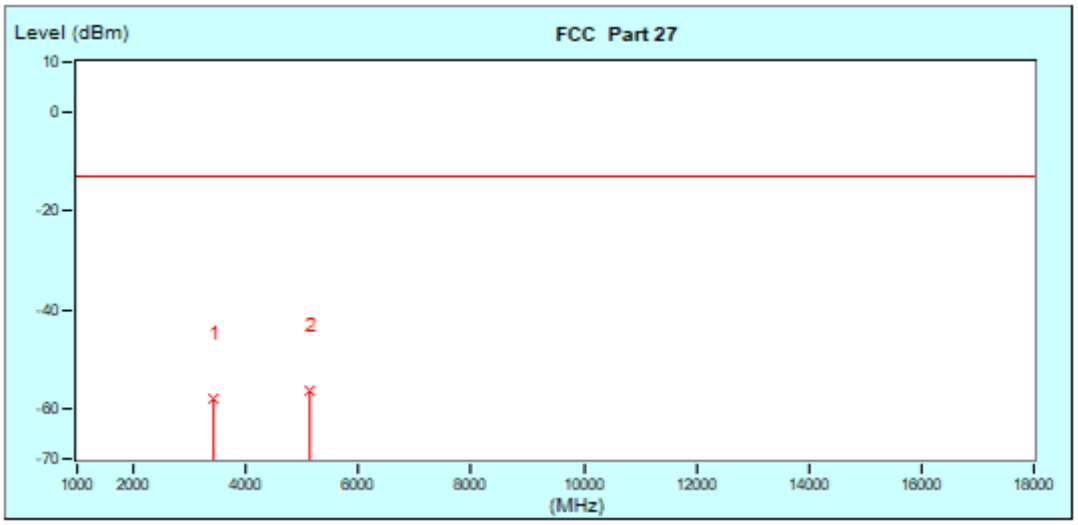
MODE	TX channel 20000	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	No.	Frequency	Factor	Reading	Emission	Limit	Margin	Tower	Table
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3430.00 (PK)	-9.40	-50.64	-60.04	-13.00	-47.04	100	0
*	2	5145.00 (PK)	-4.03	-51.38	-55.41	-13.00	-42.41	100	0



MODE	TX channel 20000	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			

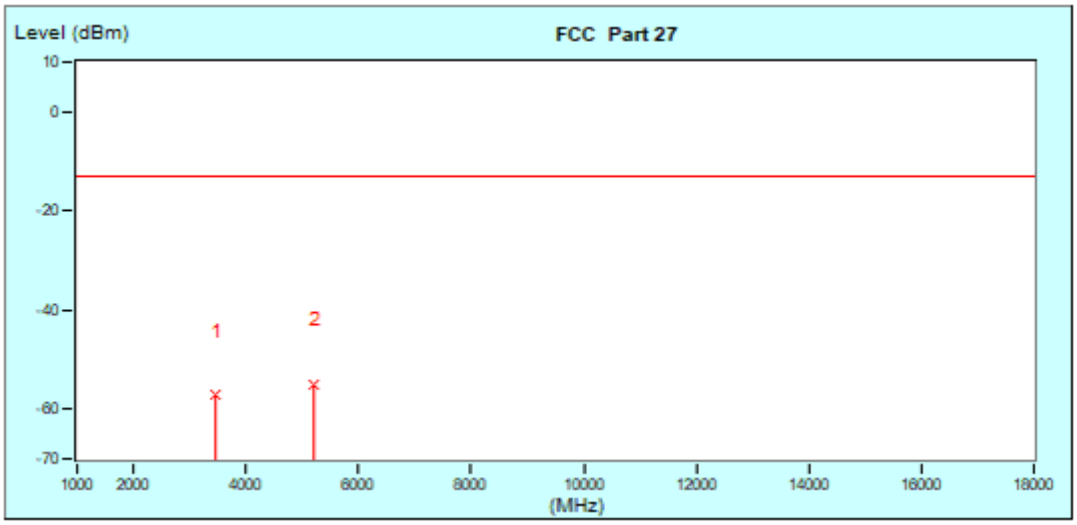
No.		Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3430.00 (PK)	-9.40	-48.35	-57.75	-13.00	-44.75	100	0
*	2	5145.00 (PK)	-4.03	-52.18	-56.21	-13.00	-43.21	100	0



CH20175

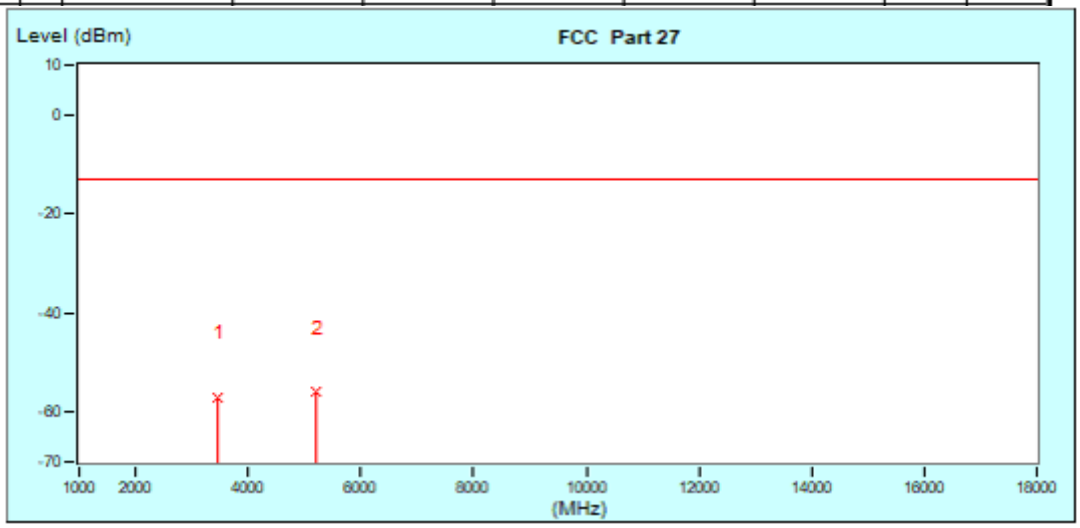
MODE	TX channel 20175	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	No.	Frequency	Factor	Reading	Emission	Limit	Margin	Tower	Table
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3465.00 (PK)	-9.27	-47.95	-57.22	-13.00	-44.22	100	0
*	2	5197.50 (PK)	-3.92	-51.04	-54.96	-13.00	-41.96	100	0



MODE	TX channel 20175	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			

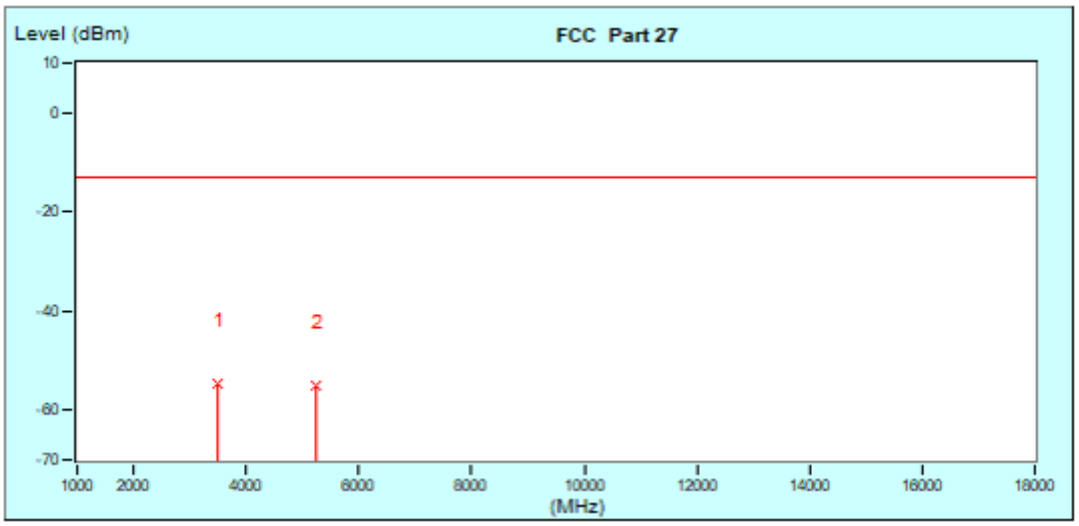
No.		Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3465.00 (PK)	-9.27	-47.60	-56.87	-13.00	-43.87	100	0
*	2	5197.50 (PK)	-3.92	-52.04	-55.96	-13.00	-42.96	100	0



CH20350

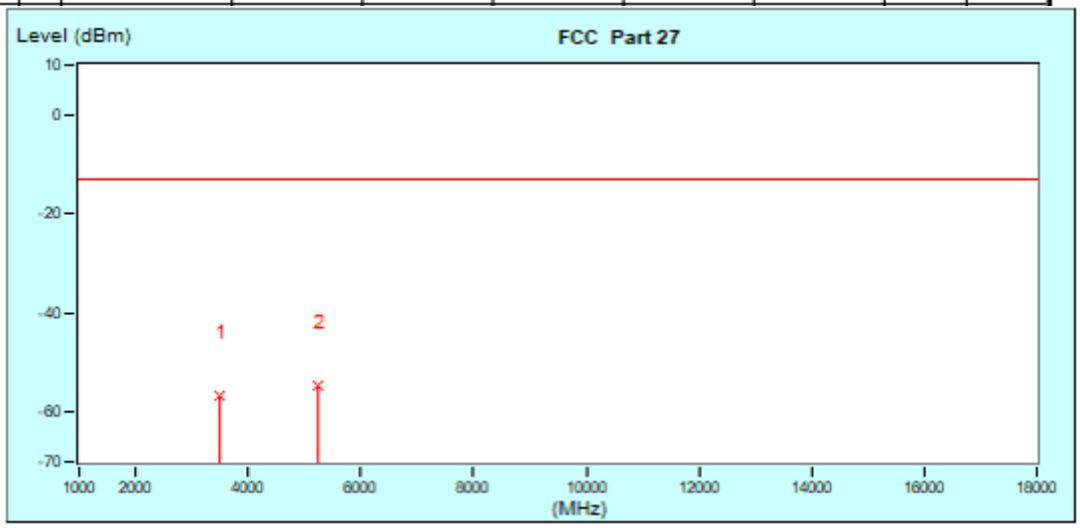
MODE	TX channel 20350	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

No.		Frequency	Factor	Reading	Emission	Limit	Margin	Tower	Table
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
*	1	3500.00 (PK)	-9.15	-45.62	-54.77	-13.00	-41.77	100	0
	2	5250.00 (PK)	-3.80	-51.37	-55.17	-13.00	-42.17	100	0



MODE	TX channel 20350	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			

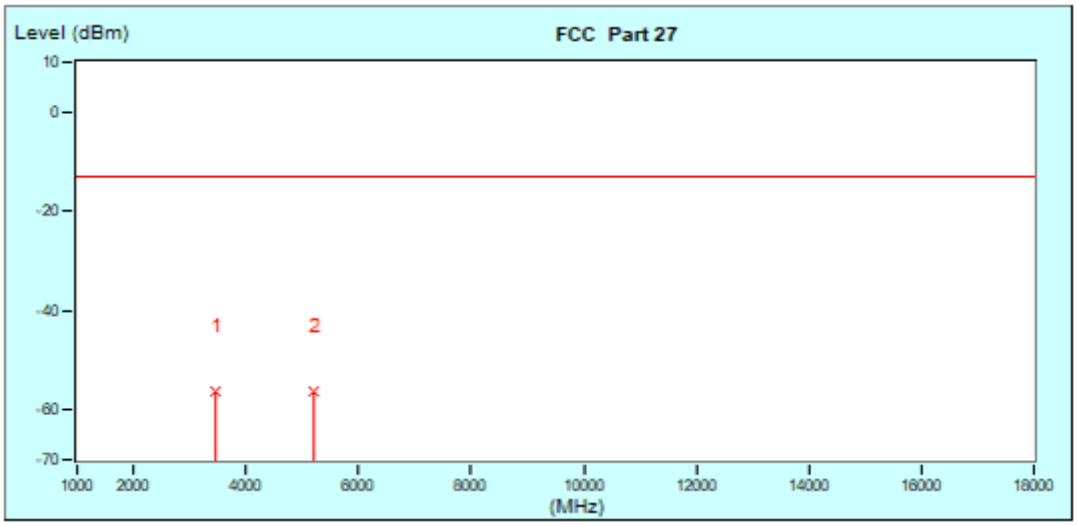
	No.	Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3500.00 (PK)	-9.15	-47.67	-56.82	-13.00	-43.82	100	0
*	2	5250.00 (PK)	-3.80	-50.98	-54.79	-13.00	-41.79	100	0



CHANNEL BANDWIDTH: 15MHz / QPSK

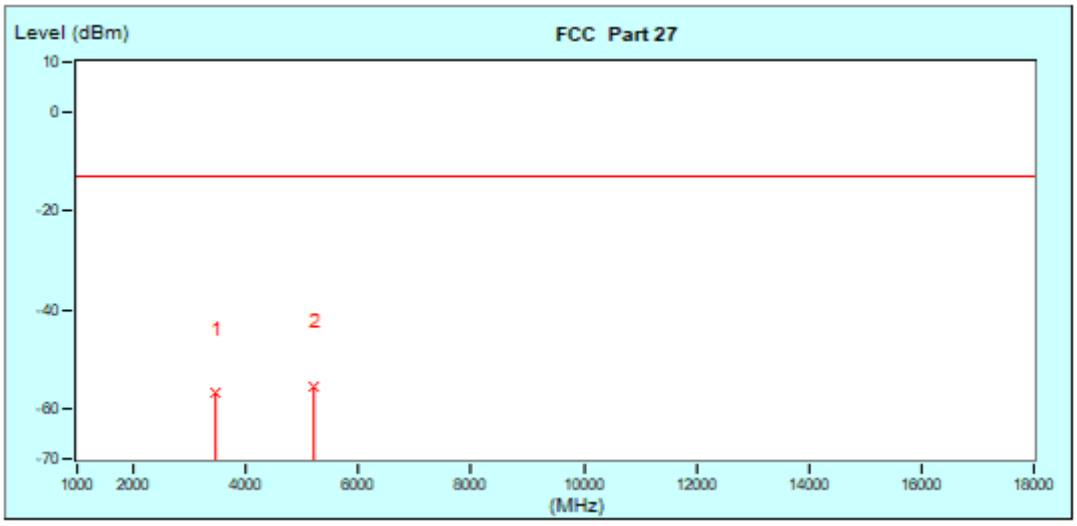
MODE	TX channel 20175	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

No.		Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3465.00 (PK)	-9.27	-46.89	-56.16	-13.00	-43.16	100	0
*	2	5197.50 (PK)	-3.92	-52.20	-56.12	-13.00	-43.12	100	0



MODE	TX channel 20175	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			

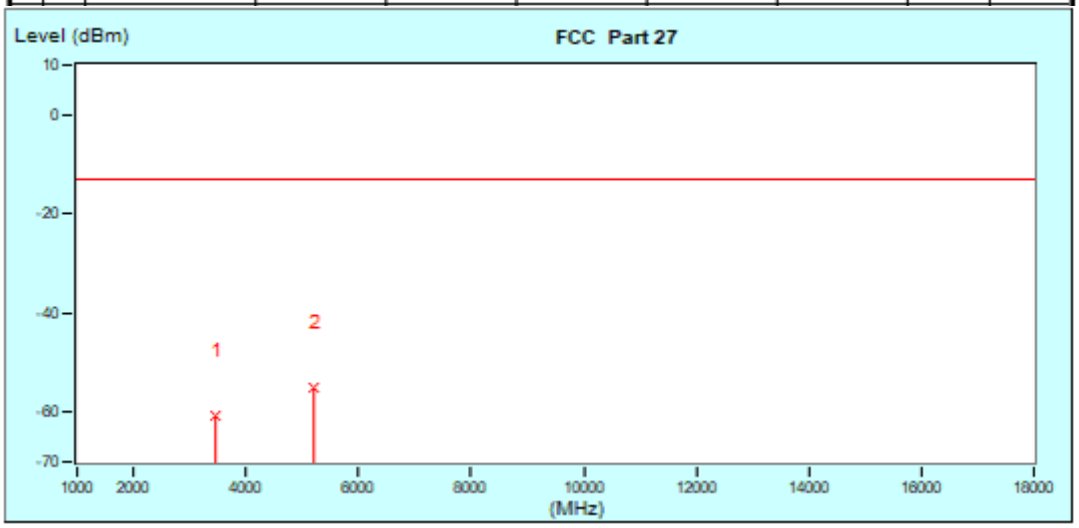
No.		Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3465.00 (PK)	-9.27	-47.36	-56.63	-13.00	-43.63	100	0
*	2	5197.50 (PK)	-3.92	-51.33	-55.25	-13.00	-42.25	100	0



CHANNEL BANDWIDTH: 20MHz / QPSK

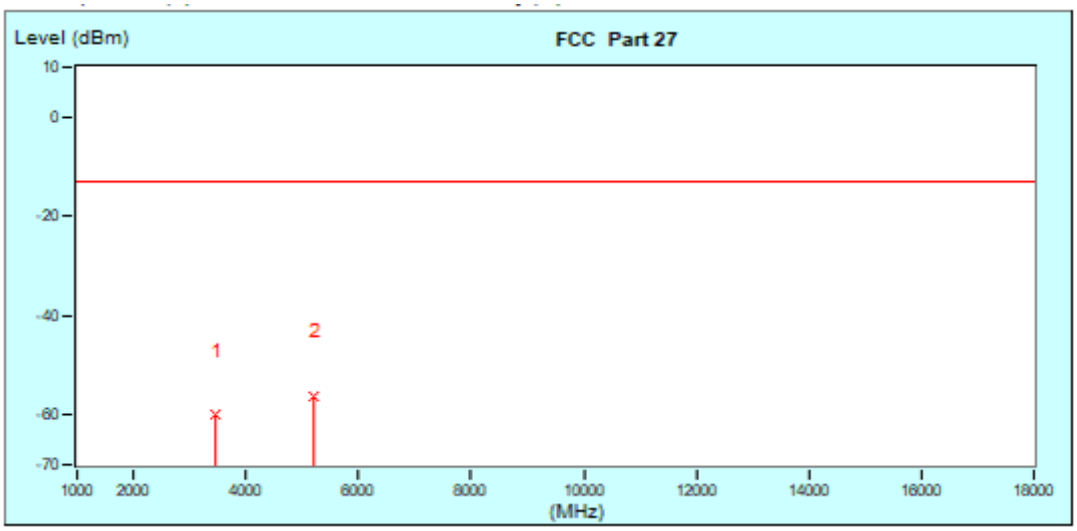
MODE	TX channel 20175	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	No.	Frequency	Factor	Reading	Emission	Limit	Margin	Tower	Table
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3465.00 (PK)	-9.27	-51.33	-60.60	-13.00	-47.60	100	0
*	2	5197.50 (PK)	-3.92	-51.05	-54.97	-13.00	-41.97	100	0



MODE	TX channel 20175	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			

No.		Frequency	Factor	Reading	Emission	Limit	Margin	Tower / Table	
		MHz	dB	dBm	dBm	dBm	dB	cm	deg
	1	3465.00 (PK)	-9.27	-50.59	-59.86	-13.00	-46.86	100	0
*	2	5197.50 (PK)	-3.92	-52.15	-56.07	-13.00	-43.07	100	0



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, and Telecom. 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:

Shenzhen EMC/RF Lab:
Tel: +86 755 8869 6566
Fax: +86 755 8869 6577

Email: customerservice.sw@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.

5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

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