

FCC TEST REPORT (PART 24)

Applicant:	Particle Industries, Inc
Address:	126 Post St,4th floor, San Francisco, CA 94108 USA



Manufacturer or Supplier	Particle Industries, Inc
Address	126 Post St,4th floor, San Francisco, CA 94108 USA
Product	E Series 2G/3G Global
Brand Name	Particle
Model Name	E310, E314
FCC ID	XPY1CGM5NNN
Date of tests	Oct. 17, 2019 ~ Nov. 27, 2019

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

- FCC PART 24, Subpart E** **FCC PART 2**
 ANSI/TIA/EIA-603-D **ANSI/TIA/EIA-603-E** **ANSI C63.26-2015**

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

Remark: This test report is for internal customer use only, not as a final certification test report.

Prepared by Alex Chen Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
	
Date: Dec. 23, 2020	Date: Dec. 23, 2020

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF191017W003-2	Original release, This test report is for internal customer use only, not as a final certification test report.	Nov. 28, 2019
RFP20120027-2	Based on the original product add one model name. In this report, All test data is copied from the original test report RF191017W003-2.	Dec. 23, 2020



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 24 & Part 2		
STANDARD SECTION	TEST TYPE	RESULT
2.1046 24.232	Equivalent Isotropic Radiated Power	Compliance
2.1055 24.235	Frequency Stability	Compliance
2.1049 24.238(b)	Occupied Bandwidth	Compliance
24.232(d)	Peak to average ratio	Compliance
24.238(b)	Band Edge Measurements	Compliance
2.1051 24.238	Conducted Spurious Emissions	Compliance
2.1053 24.238	Radiated Spurious Emissions	Compliance

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
Frequency Stability	± 76.97Hz
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 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	Feb. 26,19	Feb. 25,20
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Feb. 26,19	Feb. 25,20
Bilog Antenna 1	ETS-LINDGREN	3143B	00161964	Feb. 26,19	Feb. 25,20
Bilog Antenna 2	ETS-LINDGREN	3143B	00161965	Feb. 26,19	Feb. 25,20
Horn Antenna 1	ETS-LINDGREN	3117	00168728	Feb. 26,19	Feb. 25,20
Horn Antenna 2	ETS-LINDGREN	3117	00168692	Nov. 24, 19	Nov. 23, 20
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Nov. 24, 19	Nov. 23, 20
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 26,19	Feb. 25,20
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 24,19	Jun. 23,20
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 24,19	Jun. 23,20
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Jun. 24,19	Jun. 23,20
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	Feb. 26,19	Feb. 25,20
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SM A	1505	Jun. 24,19	Jun. 23,20
Power Meter	Anritsu	ML2495A	1506002	Feb. 26,19	Feb. 25,20
Power Sensor	Anritsu	MA2411B	1339352	Feb. 26,19	Feb. 25,20
Humid & Temp Programmable Tester	Juyi	ITH-120-45-CP-AR	IAA1504-001	Jun. 24,19	Jun. 23,20
MXG Analog Microwave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 26,19	Feb. 25,20

- NOTE:**
1. The calibration interval of the above test instruments is 12 months or 24 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	E Series 2G/3G Global	
BRAND NAME	Particle	
MODEL NAME	E310, E314	
POWER SUPPLY	DC 5V from Host Uint or DC 3.7V from Li-ion battery Vnor=3.7V,Vmin=3.145V,Vmax=4.07V	
MODULATION TYPE	GSM, GPRS: GMSK WCDMA : BPSK, QPSK	
FREQUENCY RANGE	GSM, GPRS	1850.2MHz ~ 1909.8MHz
	WCDMA	1852.4MHz ~ 1907.6MHz
MAX. EIRP POWER	GSM	1919mW
	WCDMA	398mW
EMISSION DESIGNATOR	GSM	247KGXW
	WCDMA	4M07F9W
ANTENNA TYPE	Fixed External Antenna with 3.77dBi gain	
HW VERSION	V005	
SW VERSION	V1.4.0	
I/O PORTS	Refer to user's manual	

NOTE:

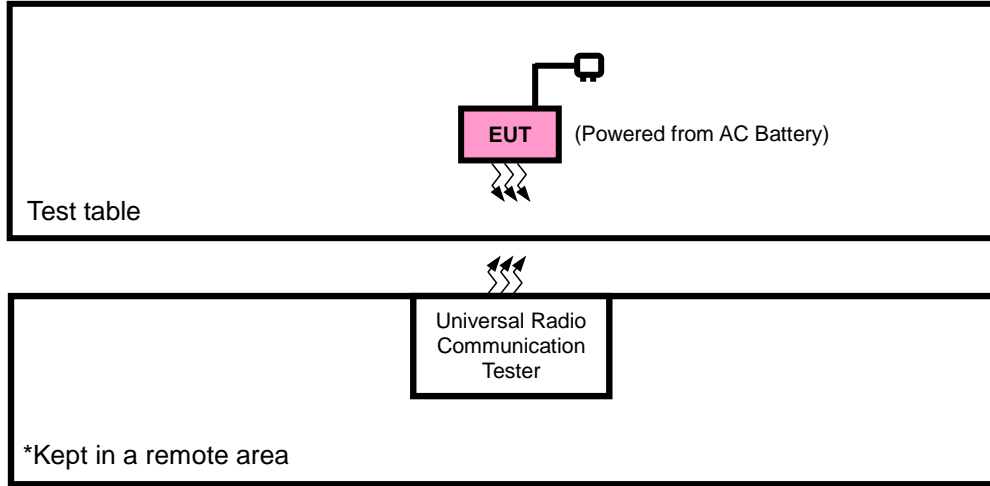
- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- The schematic and PCB of the E314 is completely the same with E310, and these two models of HW&SW is the same. Because changing the MVNO' s E-SIM card (embedded SIM card) provider from Kore to Twilio, so we plan to use different model name to sell it in market. The differences are as follows:E310 uses eSIM of Kore.E314 uses eSIM of Twilio.
- For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
- The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
GSM, GPRS	1TX/1RX
WCDMA	1TX/1RX



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	Battery	N/A	N/A	N/A	N/A
2	DC source	LONG WEI	PS-6403D	010934269	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A
2	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 in radiated emission was found when positioned on X-plane for GSM/GPRS /WCDMA. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
-	EUT + Battery with GSM ,WCDMA link

**GSM MODE**

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
EIRP	512 to 810	512, 661, 810	GSM
FREQUENCY STABILITY	512 to 810	512, 810	GSM
OCCUPIED BANDWIDTH	512 to 810	512, 661, 810	GSM
PEAK TO AVERAGE RATIO	512 to 810	512, 661, 810	GSM
BAND EDGE	512 to 810	512, 810	GSM
CONDCUDED EMISSION	512 to 810	512, 661, 810	GSM
RADIATED EMISSION	512 to 810	512, 661, 810	GSM

WCDMA MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
EIRP	9262 to 9538	9262, 9400, 9538	WCDMA
FREQUENCY STABILITY	9262 to 9538	9262, 9538	WCDMA
OCCUPIED BANDWIDTH	9262 to 9538	9262, 9400, 9538	WCDMA
PEAK TO AVERAGE RATIO	9262 to 9538	9262, 9400, 9538	WCDMA
BAND EDGE	9262 to 9538	9262, 9538	WCDMA
CONDCUDED EMISSION	9262 to 9538	9262, 9400, 9538	WCDMA
RADIATED EMISSION	9262 to 9538	9262, 9400, 9538	WCDMA

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	23deg. C, 70%RH	DC 3.7V by battery	Star Le
FREQUENCY STABILITY	23deg. C, 70%RH	DC 3.7V/3.145/4.07 by DC source	Big Wang
OCCUPIED BANDWIDTH	23deg. C, 70%RH	DC 3.7V by battery	Big Wang
BAND EDGE	23deg. C, 70%RH	DC 3.7V by battery	Big Wang
CONDCUDED EMISSION	23deg. C, 70%RH	DC 3.7V by battery	Big Wang
PEAK TO AVERAGE RATIO	23deg. C, 70%RH	DC 3.7V by battery	Big Wang
RADIATED EMISSION	23deg. C, 70%RH	DC 3.7V by battery	Star Le

2.5 EUT OPERATING CONDITIONS

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency



2.6 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 24

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

Mobile and portable stations are limited to 2 watts 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:

$$ERP \text{ or } EIRP = P_{Meas} + G_T - L_C$$

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);

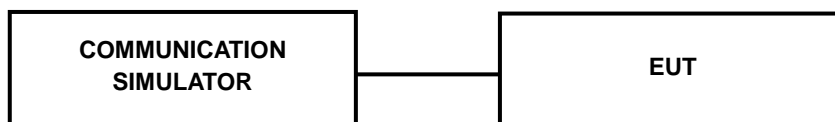
L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with WCDMA link data modulation and link up with simulator. 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)

Band	GSM1900		
Channel	512	661	810
Frequency(MHz)	1850.2	1880	1909.8
GSM (GMSK, 1Tx-slot)	28.94	28.98	29.06
GPRS (GMSK, 1Tx-slot)	28.89	28.96	29.03
GPRS (GMSK, 2Tx-slot)	28.87	28.88	28.97
GPRS (GMSK, 3Tx-slot)	28.05	28.10	28.15
GPRS (GMSK, 4Tx-slot)	26.84	26.90	26.97

Band	WCDMAII		
Channel	9262	9400	9538
Rx Channel	9662	9800	9938
Frequency (MHz)	1852.4	1880	1907.6
RMC 12.2K	21.93	22.23	22.07
HSDPA Subtest-1	21.05	21.37	21.12
HSDPA Subtest-2	20.98	21.24	21.06
HSDPA Subtest-3	20.57	20.86	20.64
HSDPA Subtest-4	20.61	20.79	20.67
HSUPA Subtest-1	20.92	21.25	21.03
HSUPA Subtest-2	19.04	19.27	19.08
HSUPA Subtest-3	20.06	20.35	20.11
HSUPA Subtest-4	18.96	19.36	19.08
HSUPA Subtest-5	20.92	21.18	20.95



EIRP POWER (dBm)

GSM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
512	1850.2	28.94	3.77	32.71	1866.38	2
661	1880.0	28.98	3.77	32.75	1883.65	2
810	1909.8	29.06	3.77	32.83	1918.67	2

WCDMA II

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
9262	1852.4	21.93	3.77	25.70	371.54	2
9400	1880.0	22.23	3.77	26.00	398.11	2
9538	1907.6	22.07	3.77	25.84	383.71	2



3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

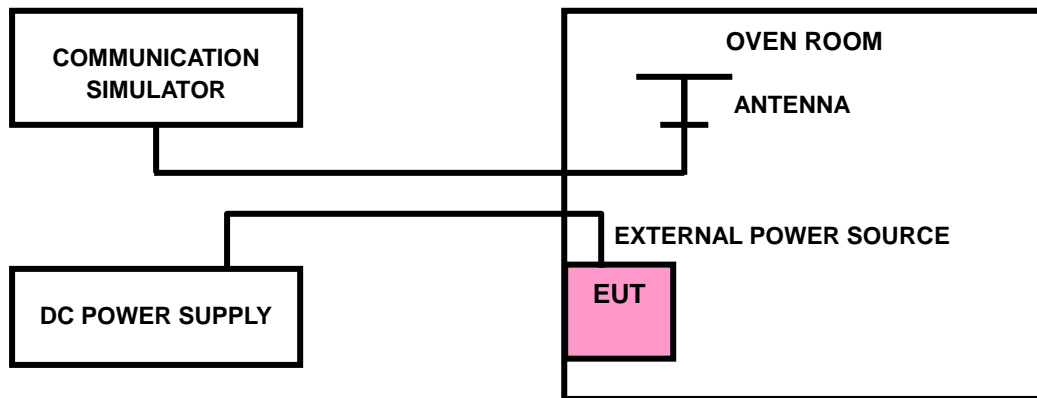
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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 $\pm 0.5^{\circ}\text{C}$ 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

GSM1900

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
V_{nor}	0.0009	0.0012	2.5
V_{min}	-0.0012	-0.0012	2.5
V_{max}	0.0009	0.0011	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max} .

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
-30	-0.0056	-0.0053	2.5
-20	-0.0051	-0.0048	2.5
-10	-0.0046	-0.0043	2.5
0	-0.0037	-0.0035	2.5
10	-0.0030	-0.0028	2.5
20	-0.0022	-0.0020	2.5
30	-0.0017	-0.0015	2.5
40	-0.0015	-0.0013	2.5
50	-0.0004	-0.0003	2.5



WCDMA BAND II

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
V_{nor}	0.0010	0.0011	2.5
V_{min}	-0.0011	-0.0009	2.5
V_{max}	0.0011	0.0011	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max} .

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
-30	-0.0055	-0.0052	2.5
-20	-0.0049	-0.0044	2.5
-10	-0.0038	-0.0036	2.5
0	-0.0034	-0.0032	2.5
10	-0.0025	-0.0024	2.5
20	-0.0018	-0.0018	2.5
30	-0.0013	-0.0019	2.5
40	-0.0010	-0.0009	2.5
50	-0.0002	-0.0001	2.5

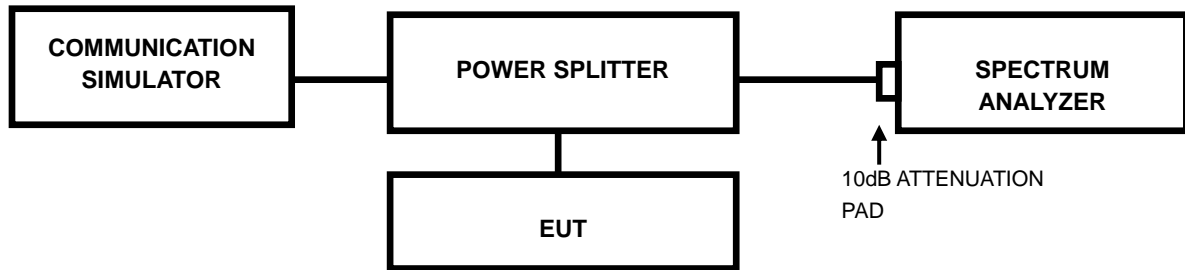


3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 TEST PROCEDURES

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

3.3.2 TEST SETUP

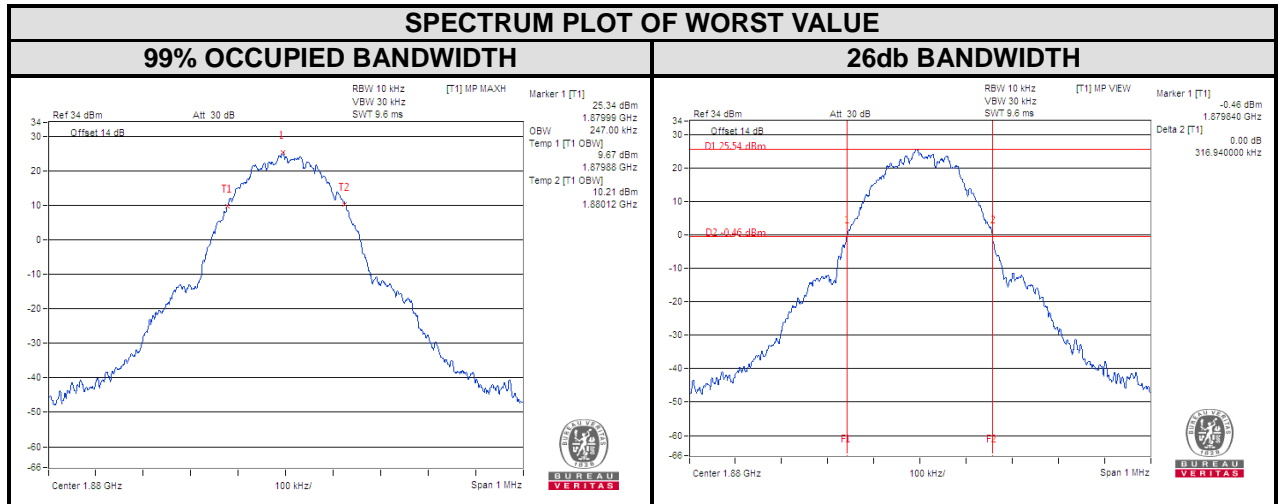




3.3.3 TEST RESULTS

GSM1900

Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)	26dB bandwidth (MHz)
		GSM	GSM
512	1850.2	246	315.772
661	1880	247	316.94
810	1909.8	244	312.558



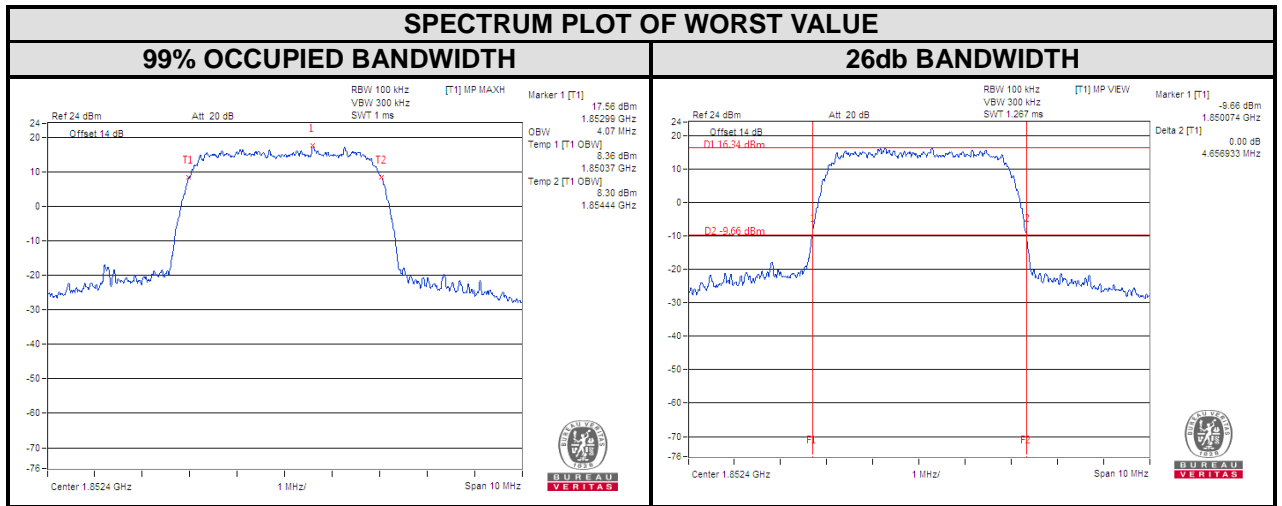


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WCDMA II

Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)	26dB bandwidth (MHz)
		WCDMA II	WCDMA II
9262	1852.4	4.07	4.657
9400	1880	4.07	4.639
9538	1907.6	4.07	4.610



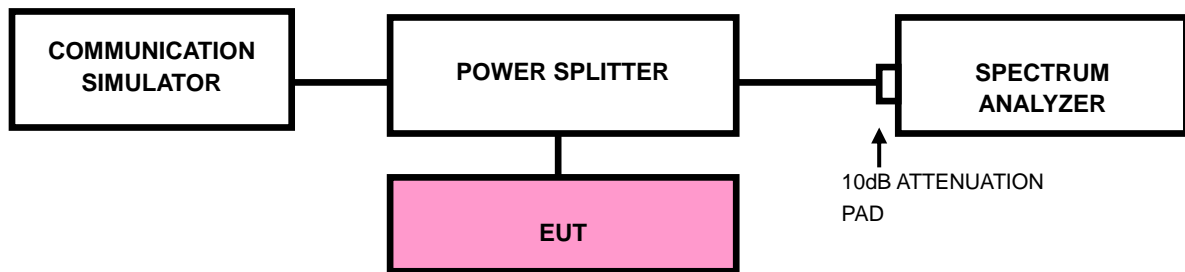


3.4 BAND EDGE MEASUREMENT

3.4.1 LIMITS OF BAND EDGE MEASUREMENT

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. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

3.4.2 TEST SETUP



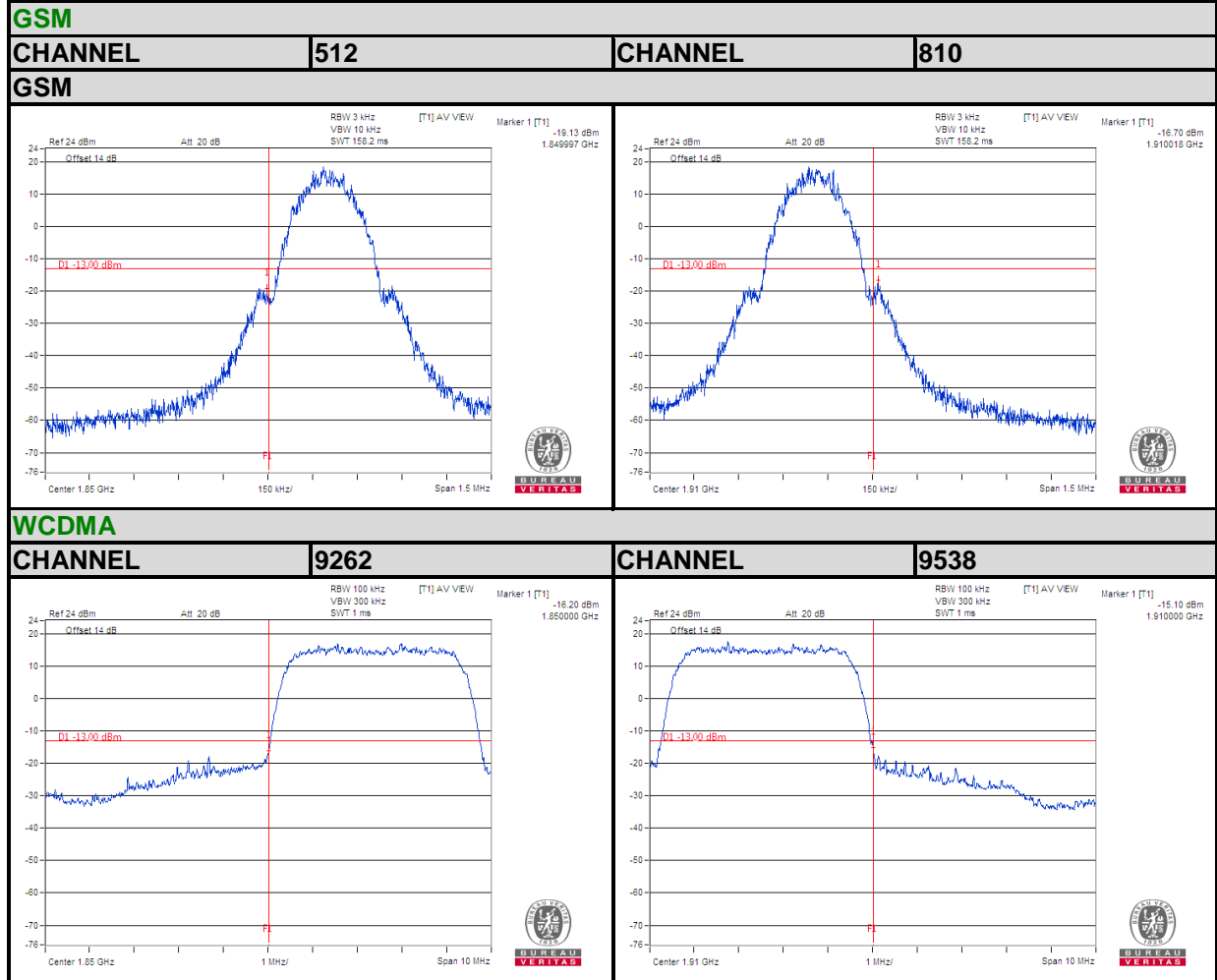


3.4.3 TEST PROCEDURES

- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 1.5 MHz. RBW of the spectrum is 10kHz and VBW of the spectrum is 30kHz (GSM/GPRS).
- c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz (WCDMA).
- d. Record the max trace plot into the test report.



4.1.1. TEST RESULTS





3.5 CONDUCTED SPURIOUS EMISSIONS

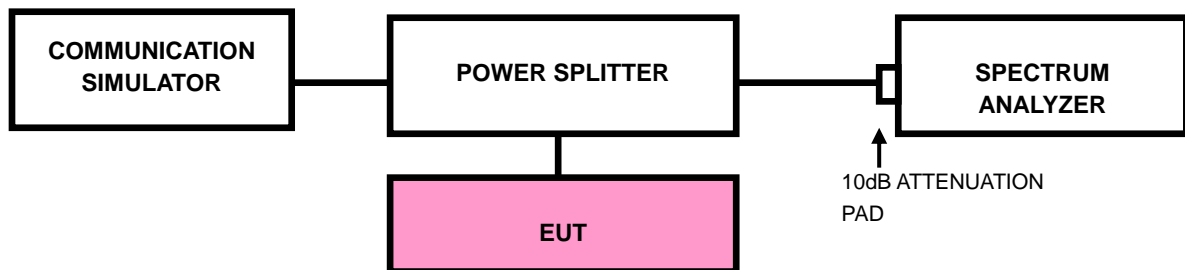
3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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. The emission limit equal to -13dBm .

3.5.2 TEST PROCEDURE

- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- b. Measuring frequency range is from 30 MHz to 19.1GHz. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

3.5.3 TEST SETUP





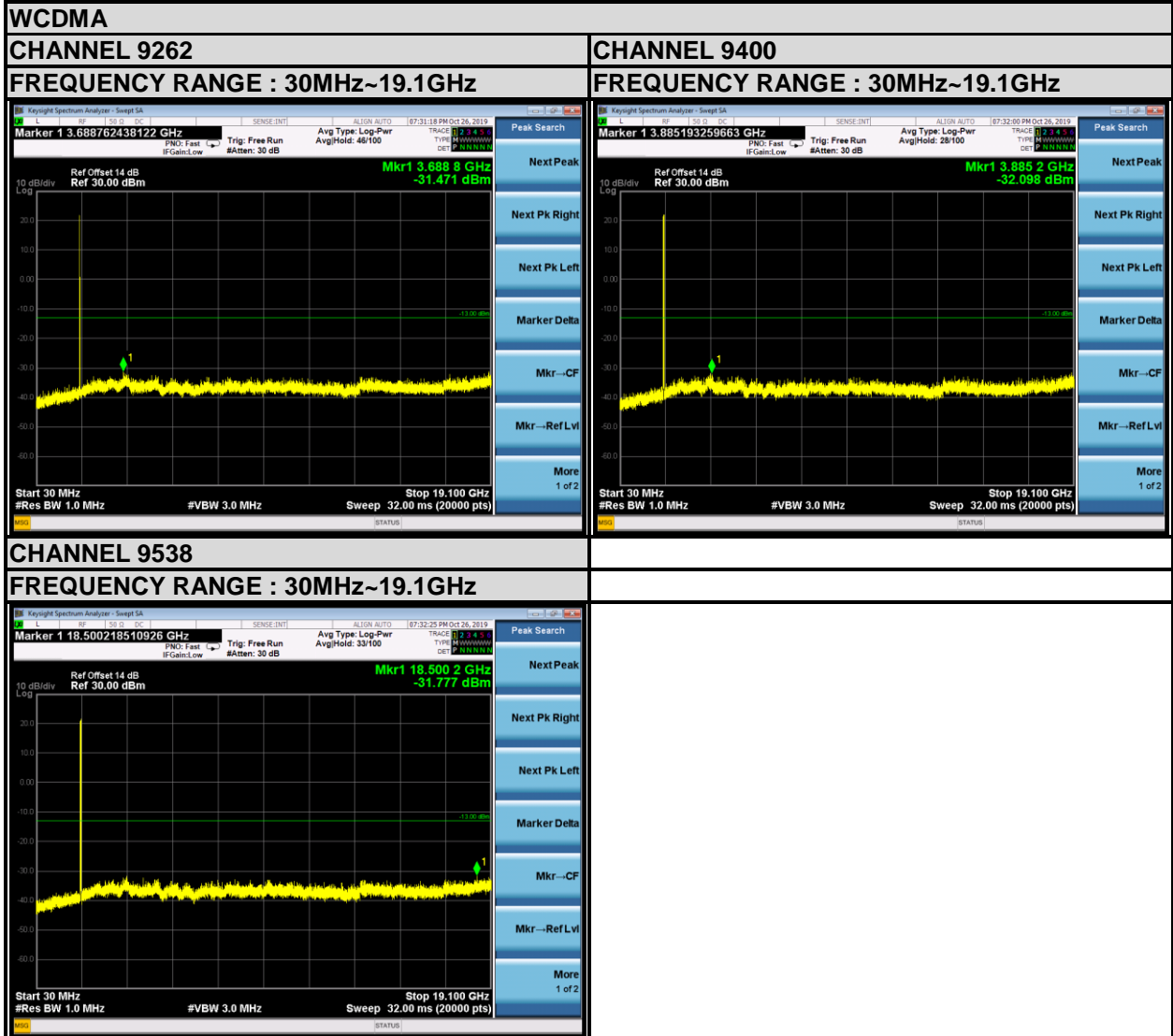
3.5.4 TEST RESULTS





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3.6 RADIATED EMISSION MEASUREMENT

3.6.1 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. The emission limit equal to -13dBm .

3.6.2 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. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn.}$

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

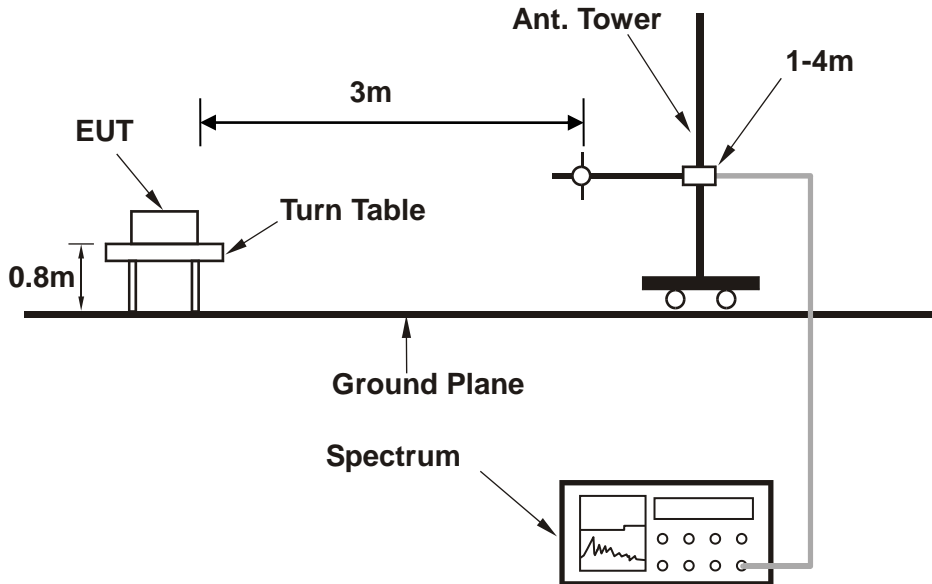
3.6.3 DEVIATION FROM TEST STANDARD

No deviation

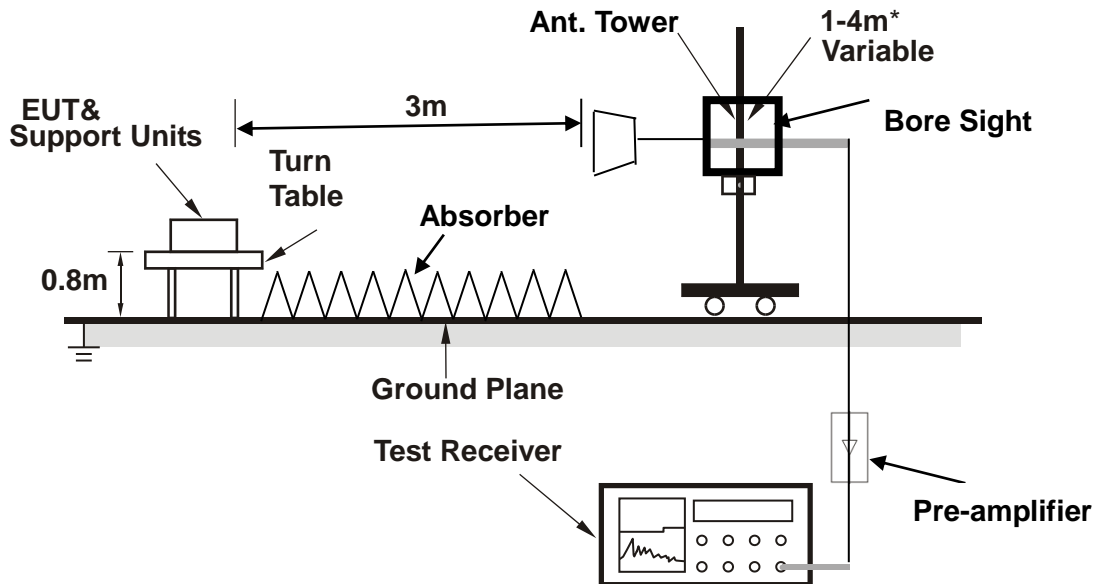


3.6.4 TEST SETUP

< 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).



3.6.5 TEST RESULTS

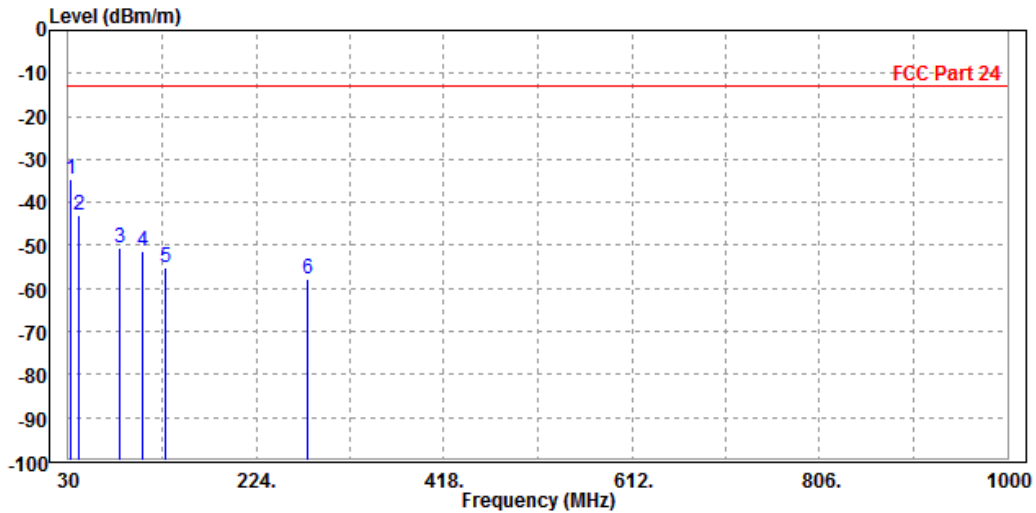
BELOW 1GHz WORST-CASE DATA

30 MHz – 1GHz data:

WCDMA Band II

MODE	TX channel 9400	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

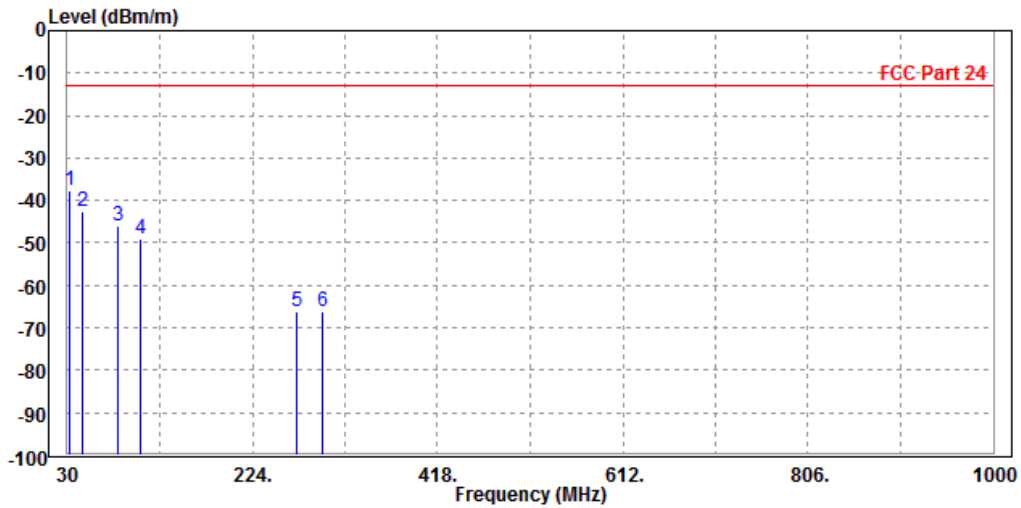
	Freq	Level	Read Level	Limit	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	31.940	-34.60	465.40	-13.00	-21.60-500.00	Peak	Horizontal
2		40.670	-43.07	456.93	-13.00	-30.07-500.00	Peak	Horizontal
3		82.380	-50.71	449.29	-13.00	-37.71-500.00	Peak	Horizontal
4		106.630	-51.38	448.62	-13.00	-38.38-500.00	Peak	Horizontal
5		130.880	-55.01	444.99	-13.00	-42.01-500.00	Peak	Horizontal
6		276.380	-57.83	442.17	-13.00	-44.83-500.00	Peak	Horizontal





MODE	TX channel 9400	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
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	31.940	-37.46	-40.21	-13.00	-24.46	2.75 Peak	Vertical
2		46.490	-42.66	-39.02	-13.00	-29.66	-3.64 Peak	Vertical
3		82.380	-45.99	-35.67	-13.00	-32.99	-10.32 Peak	Vertical
4		106.630	-48.87	-37.32	-13.00	-35.87	-11.55 Peak	Vertical
5		270.560	-66.21	-54.78	-13.00	-53.21	-11.43 Peak	Vertical
6		296.750	-66.34	-55.03	-13.00	-53.34	-11.31 Peak	Vertical





ABOVE 1GHz DATA

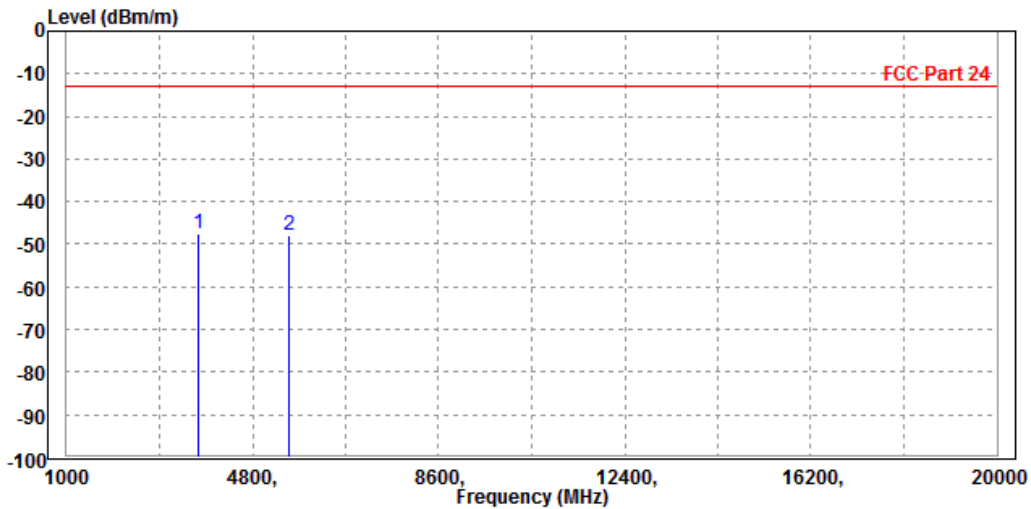
Note: For higher frequency, the emission is too low to be detected.

GSM 1900:

CH 512

MODE	TX channel 512	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

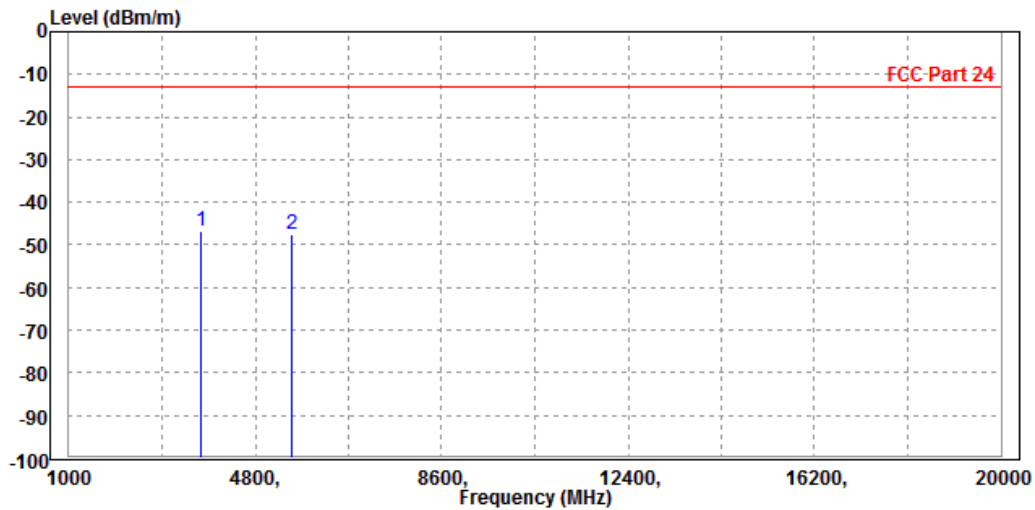
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 3698,000	-47,70	-56,48	-13,00	-34,70	8,78	Peak	Horizontal
2	5550,600	-48,06	-58,25	-13,00	-35,06	10,19	Peak	Horizontal





MODE	TX channel 512	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
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 3698,000	-46,60	-55,85	-13,00	-33,60	9,25	Peak	Vertical
2	5550,600	-47,36	-57,26	-13,00	-34,36	9,90	Peak	Vertical

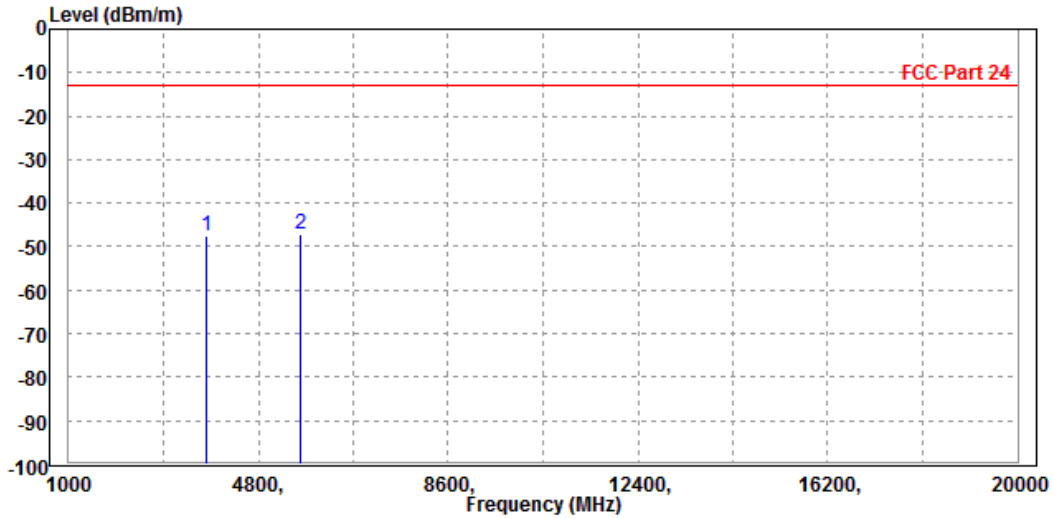




CH 661

MODE	TX channel 661	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

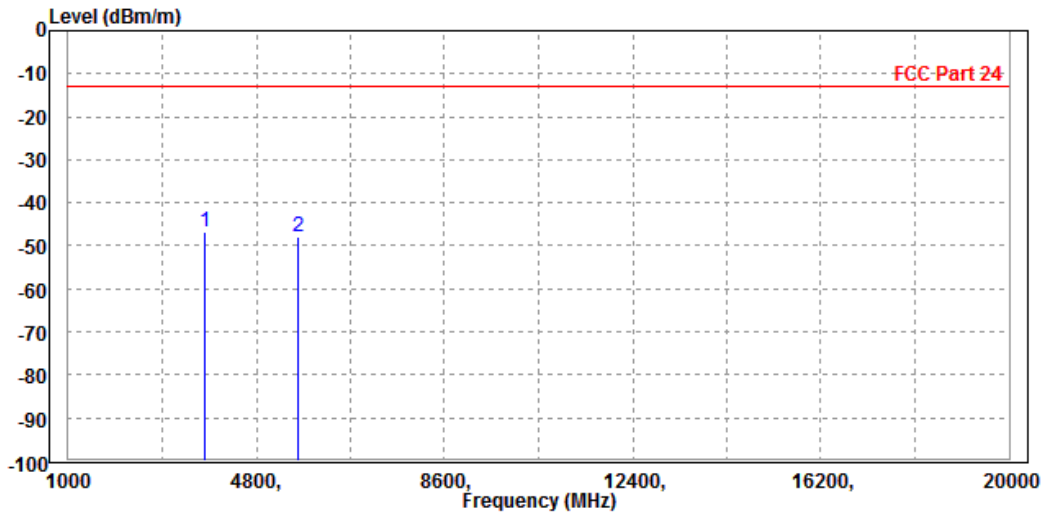
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755,000	-47,47	-56,32	-13,00	-34,47	8,85	Peak	Horizontal
2 PP	5640,000	-46,97	-57,45	-13,00	-33,97	10,48	Peak	Horizontal





MODE	TX channel 661	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
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 3755,000	-46,85	-56,12	-13,00	-33,85	9,27	Peak	Vertical
2	5640,000	-47,98	-58,23	-13,00	-34,98	10,25	Peak	Vertical

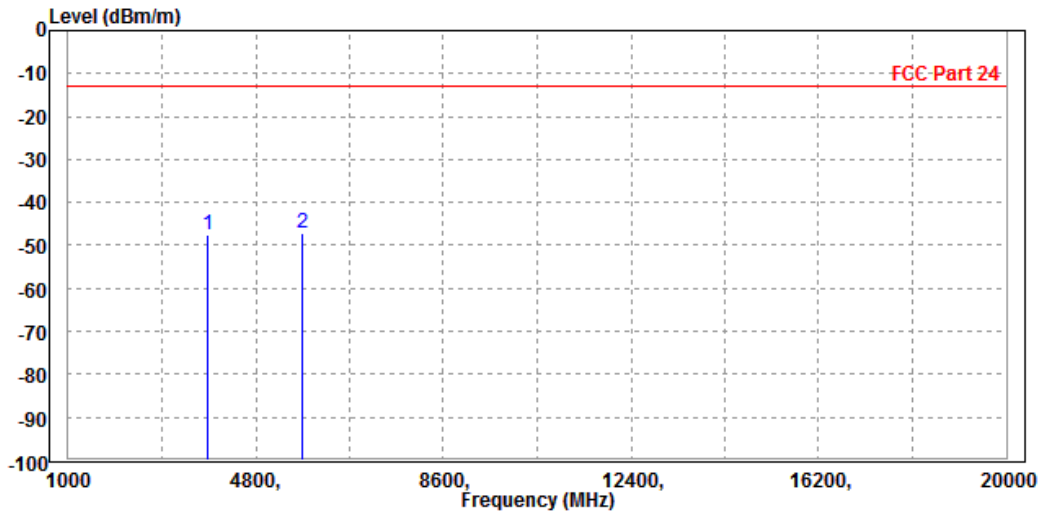




CH 810

MODE	TX channel 810	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

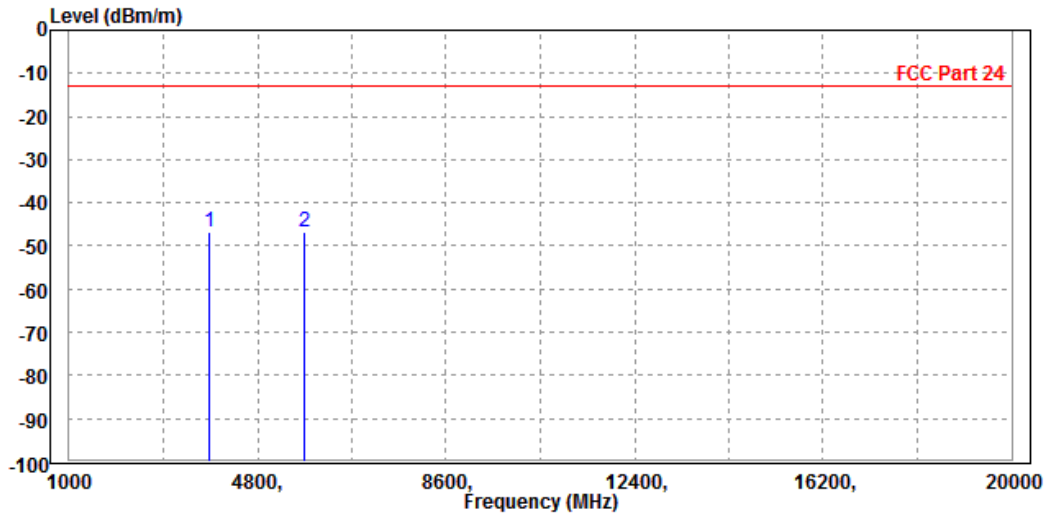
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3812,000	-47,50	-56,41	-13,00	-34,50	8,91	Peak	Horizontal
2 PP	5729,400	-47,06	-57,84	-13,00	-34,06	10,78	Peak	Horizontal





MODE	TX channel 810	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
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	3812,000	-46,94	-56,23	-13,00	-33,94	9,29	Peak	Vertical
2 PP	5729,400	-46,62	-57,21	-13,00	-33,62	10,59	Peak	Vertical



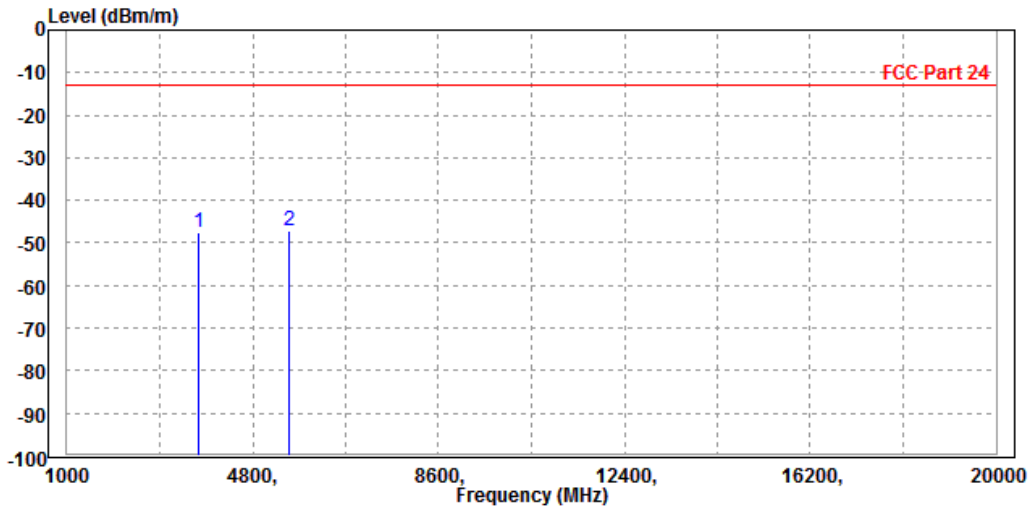


WCDMA Band II

CH 9262

MODE	TX channel 9262	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

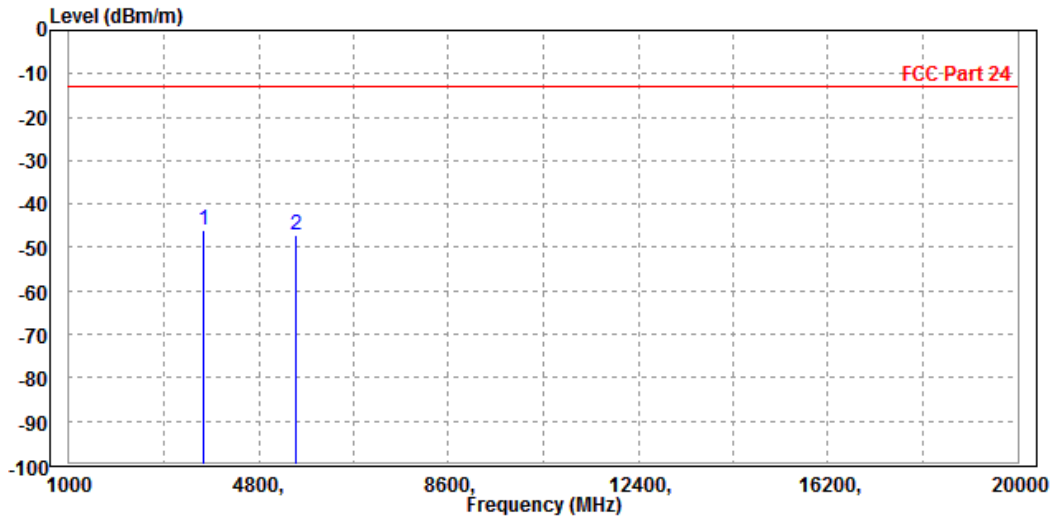
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3698,000	-47,60	-56,38	-13,00	-34,60	8,78	Peak	Horizontal
2 PP	5557,200	-47,02	-57,23	-13,00	-34,02	10,21	Peak	Horizontal





MODE	TX channel 9262	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
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 3698,000	-46,03	-55,28	-13,00	-33,03	9,25	Peak	Vertical
2	5557,200	-47,21	-57,14	-13,00	-34,21	9,93	Peak	Vertical

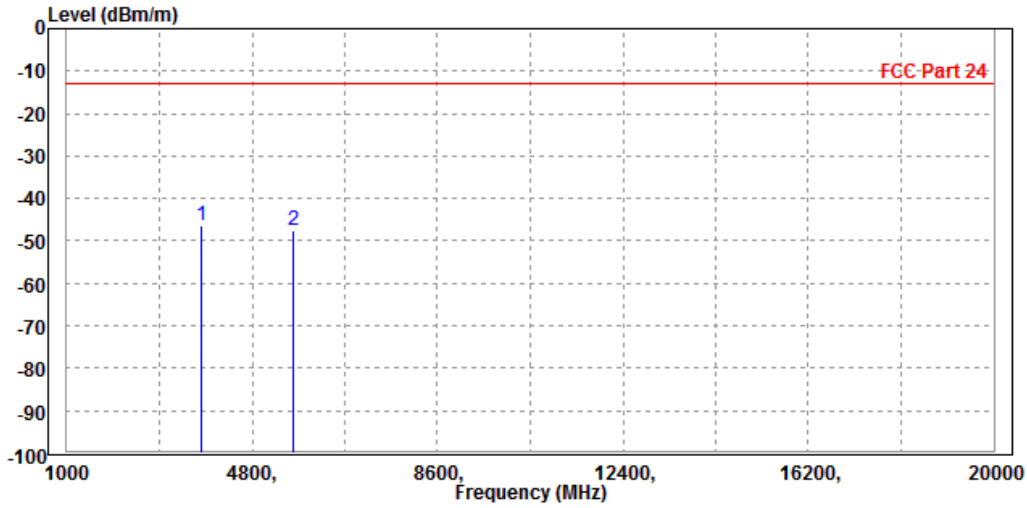




CH 9400

MODE	TX channel 9400	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

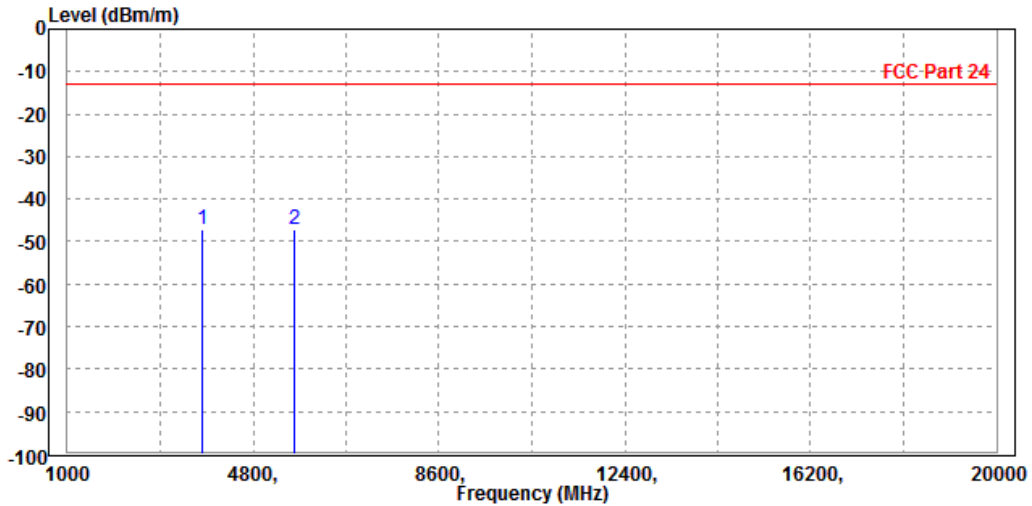
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	3755,000	-46,39	-55,24	-13,00	-33,39	8,85	Peak	Horizontal
2	5640,000	-47,38	-57,86	-13,00	-34,38	10,48	Peak	Horizontal





MODE	TX channel 9400	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
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	3755,000	-47,05	-56,32	-13,00	-34,05	9,27	Peak	Vertical
2 PP	5640,000	-47,00	-57,25	-13,00	-34,00	10,25	Peak	Vertical

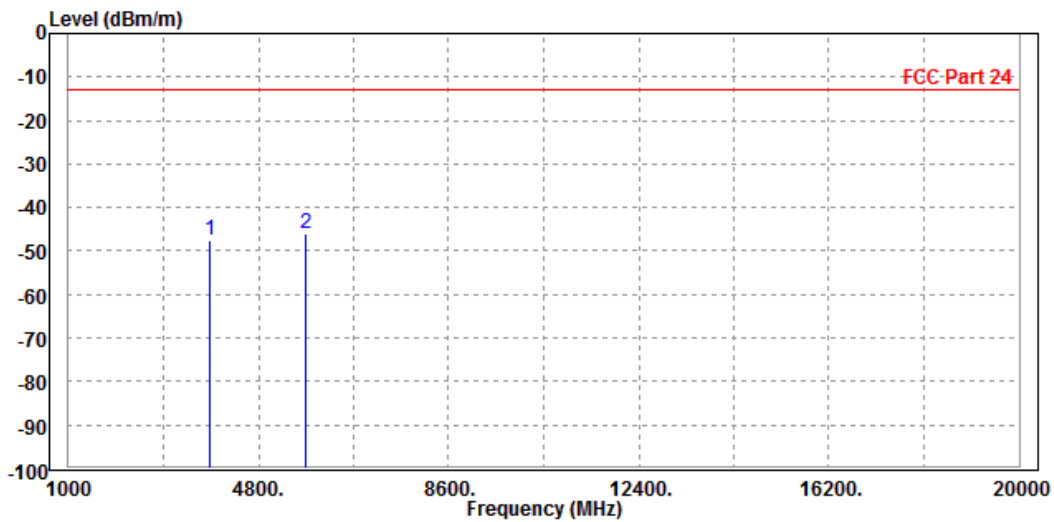




CH 9538

MODE	TX channel 9538	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

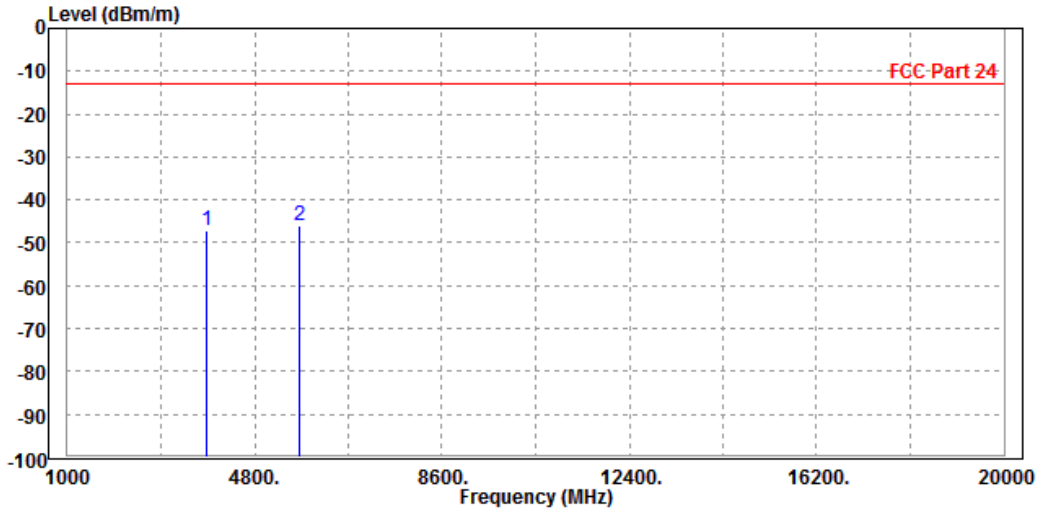
	Freq	Level	Read Level	Limit	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3815.200	-47.47	-56.38	-13.00	-34.47	8.91	Peak	Horizontal
2 PP	5731.000	-45.89	-56.67	-13.00	-32.89	10.78	Peak	Horizontal





MODE	TX channel 9538	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 3.7V by battery
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Read Freq	Level	Limit	Over	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	3812.000	-47.34	-56.63	-13.00	-34.34	9.29 Peak	Vertical
2 PP	5722.800	-45.90	-56.47	-13.00	-32.90	10.57 Peak	Vertical



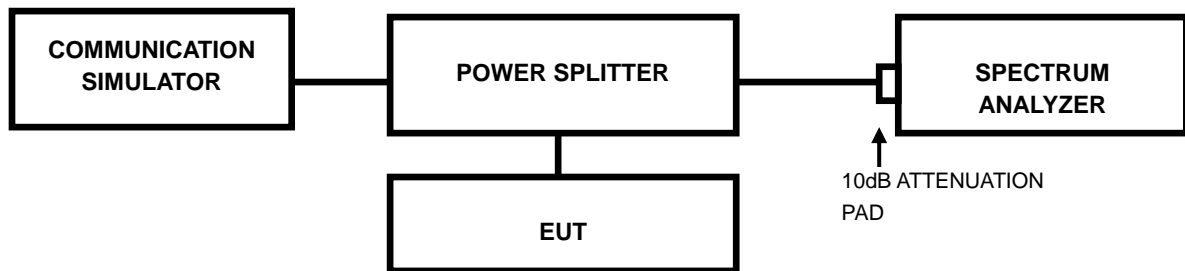


3.7 PEAK TO AVERAGE RATIO

3.7.1 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

3.7.2 TEST SETUP



3.7.3 TEST PROCEDURES

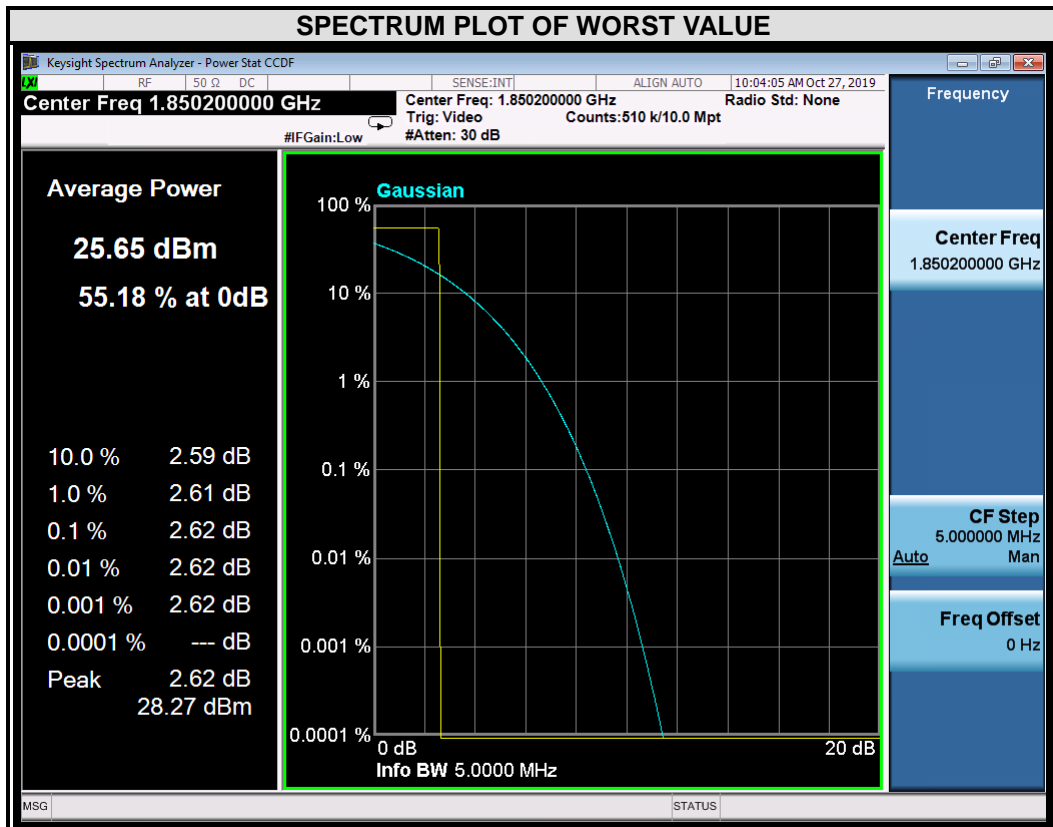
1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.



3.7.4 TEST RESULTS

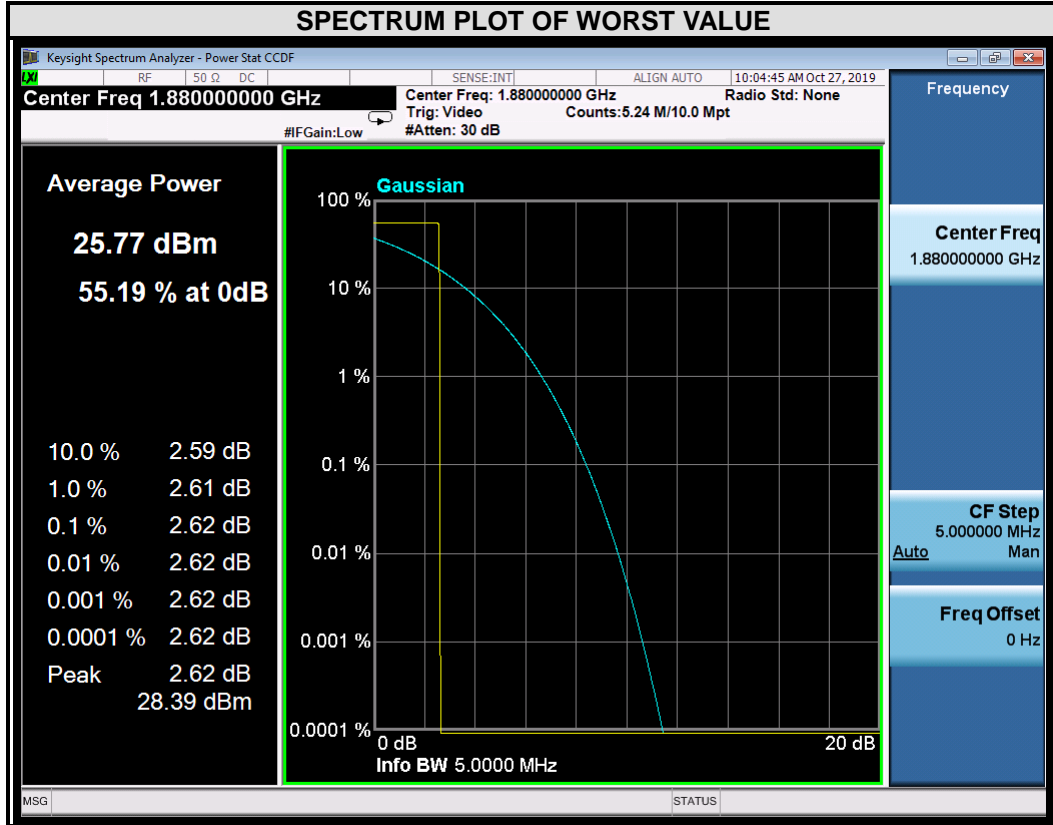
GSM

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
512	1850.2	2.62



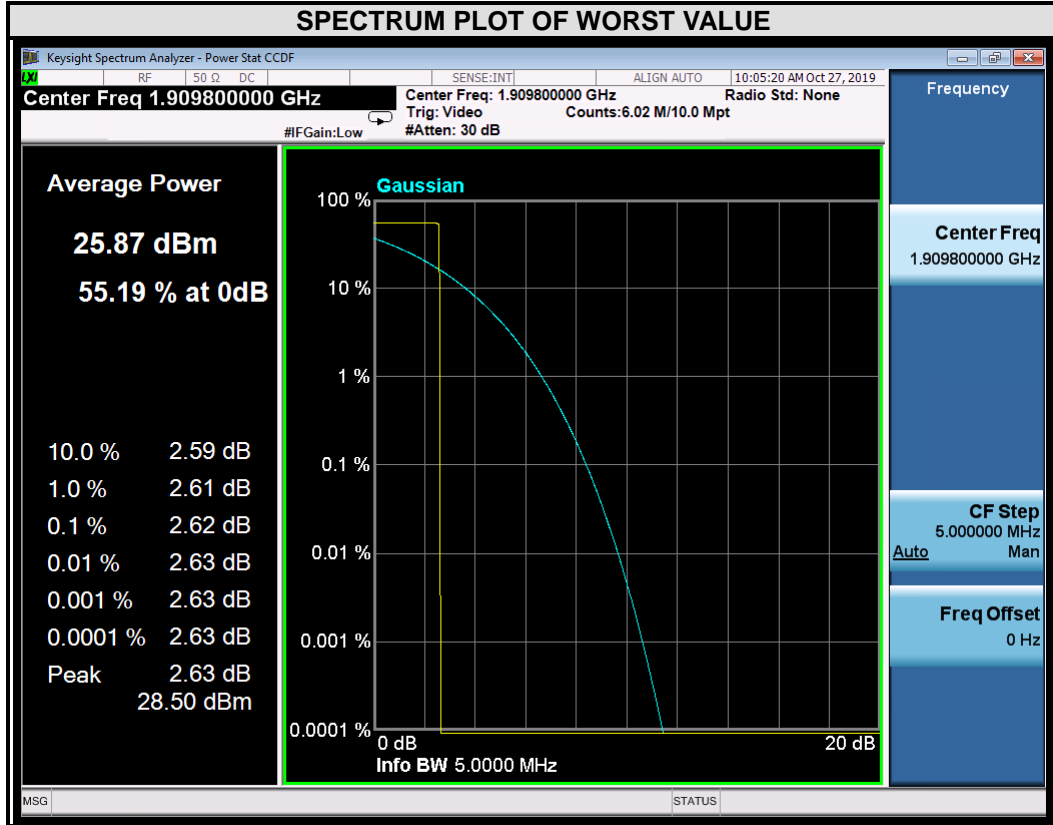


CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
661	1880	2.62





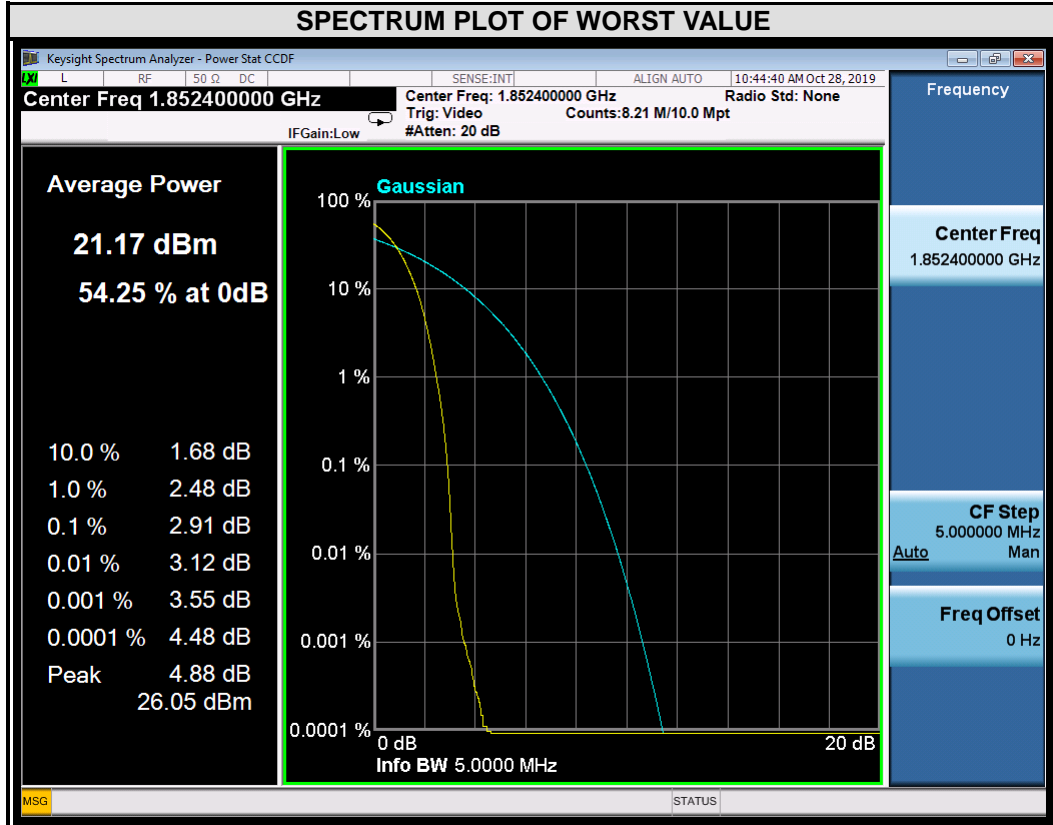
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
810	1909.8	2.62





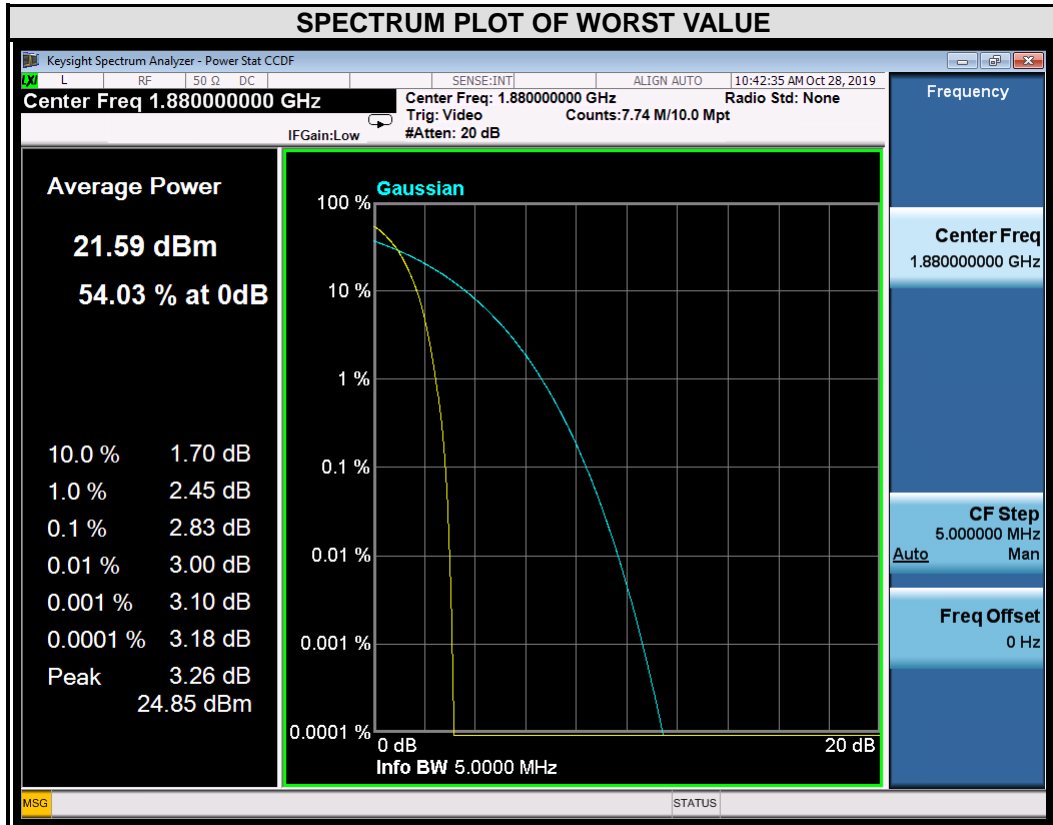
WCDMA

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
9262	1852.4	2.91



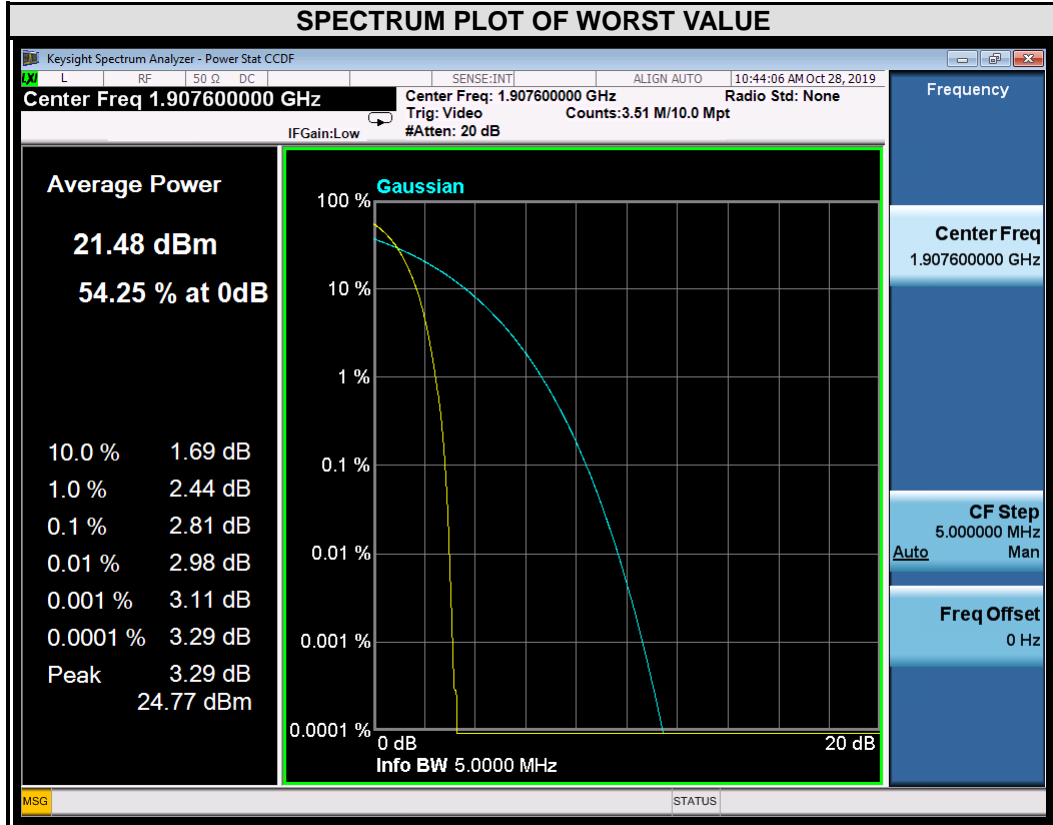


CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
9400	1880.0	2.83





CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
9538	1907.6	2.81





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VERITAS

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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Fax: +86-755-88696577

Email: customerservice.dg@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.



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VERITAS

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.

---END---