Test Lab
Cert 2951.01

FCC TEST REPORT

(PART 22)

Product: smartphone

Model Name: Ilium L1120

FCC ID: ZC4L1120

Applicant: Corporativo Lanix S.A. de C.V.

Address: Carretera Internacional Hermosillo-Nogales Km 8.5, Hermosillo Sonora, Mexico

Manufacturer: Shenzhen Tinno Mobile Technology Corp.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF170324W002-3	Original release	Apr. 14, 2017

1 CERTIFICATION

PRODUCT:	smartphone
BRAND NAME:	LANIX
MODEL NAME:	Ilium L1120
APPLICANT:	Corporativo Lanix S.A. de C.V.
TESTED:	Mar. 25, 2017 ~ Apr. 13, 2017
TEST SAMPLE:	Identical Prototype
TEST STANDARDS:	**FCC PART 22, Subpart H** ANSI/TIA/EIA-603-D

The above equipment has been tested by **Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch,** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : _____ , **DATE:** Apr. 14, 2017
(Harry Li / Engineer)

APPROVED BY : _____ , **DATE:** Apr. 14, 2017
(Sam Tung / Manager)

SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 22 & Part 2			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
2.1046 22.913 (a)	Effective Radiated Power	PASS	Meet the requirement of limit.
2.1055 22.355	Frequency Stability	PASS	Meet the requirement of limit.
2.1049 22.917b	Occupied Bandwidth	PASS	Meet the requirement of limit.
--	Peak to average ratio*	PASS	Meet the requirement of limit.
22.917	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 22.917	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -4.06dB at 2512Hz.

* Refer to KDB 971168 D01 Power Meas License Digital Systems v02r02.

2.1 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	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.90dB
	30MHz ~ 1GHz	4.06dB
	1GHz ~ 18GHz	4.58dB
	18GHz ~ 40GHz	1.94dB

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

2.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Mar. 05,17	Mar. 04,18
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	Nov. 04,16	Nov. 03,17
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Mar. 05,17	Mar. 04,18
Bilog Antenna 1	Teseq	CBL 6111D	30643	Jul. 14, 16	Jul. 13, 17
Bilog Antenna 2	Teseq	CBL 6111D	27089	Jul. 14, 16	Jul. 13, 17
Loop antenna	Daze	ZN30900A	0708	Nov. 28, 16	Nov. 27, 17
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	May 18,16	May 17,17
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062557	May 18,16	May 17,17
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m*8.8m	NSEMC006	Mar. 12,16	Mar. 11,18
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-SMA	1505	Jul. 27, 16	Jul. 26, 17
Horn Antenna (15GHz-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170147	Mar. 02,17	Mar. 01,18
Horn Antenna (15GHz-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170242	Mar. 02,17	Mar. 01,18
Amplifier	Burgeon	BPA-530	100220	Mar. 05,17	Mar. 04,18
Amplifier (9kHz-1GHz)	SONOMA	310D	186955	Feb. 10,17	Feb. 09,18
Pre-Amplifier(1-18G)	HP	8449B	3008A00409	Apr. 25,16	Apr. 24,17
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 04,16	Nov. 03,17
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.05,16	Sep. 04,17
Signal Generator	Agilent	N5183A	MY50140980	Nov. 04,16	Nov. 03,17

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 10m 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 502831.

2 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	smartphone	
BRAND NAME	LANIX	
MODEL NAME	Ilium L1120	
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.85Vdc (Li-ion, battery)	
MODULATION TYPE	**GSM/GPRS/EDGE**	GMSK
	WCDMA	BPSK,QPSK
FREQUENCY RANGE	**GSM/GPRS/EDGE**	824.2MHz ~ 848.8MHz
	WCDMA	826.4MHz ~ 846.6MHz
MAX. ERP POWER	**GSM**	476mW
	EDGE	215mW
	WCDMA	75mW
EMISSION DESIGNATOR	**GSM**	247KGXW
	EDGE	247KG7W
	WCDMA	4M22F9W
ANTENNA TYPE	Fixed Internal antenna with -0.5dBi gain	
HW VERSION	V1	
SW VERSION	Ilium L1120_TELCEL_SW_01	
I/O PORTS	Refer to user's manual	
DATA CABLE	USB cable: non-shielded, detachable, 1.0m Earphone cable: non-shielded, detachable, 1.0m	

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT was powered by the following adapter:

ADAPTER	
BRAND:	Lanix
MODEL:	Ilium L1120-C
INPUT:	AC 100-240V, 250mA
OUTPUT:	DC 5V, 1550mA

3. The EUT matched the following USB cable and Earphone:

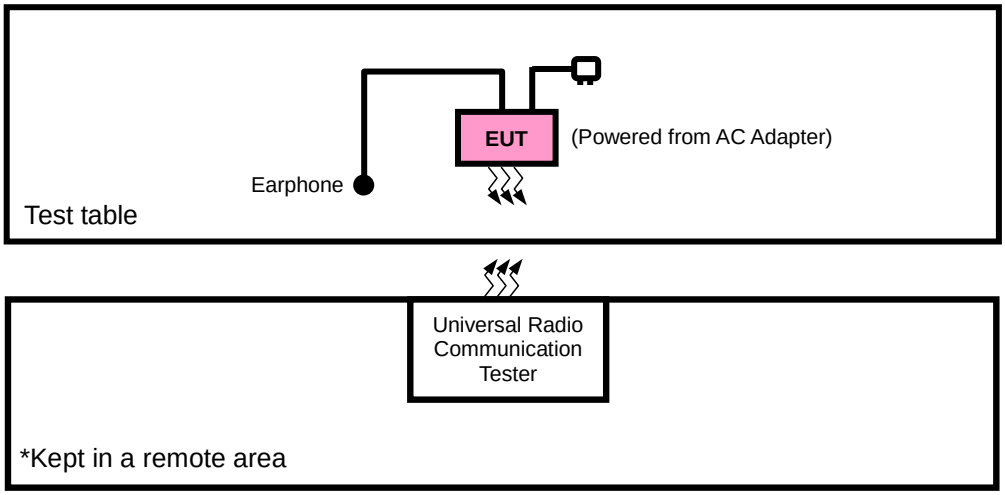
USB CABLE	
BRAND:	LANIX
MODEL:	Ilium L1120
SIGNAL LINE:	1.0 METER

EARPHONE	
BRAND:	LANIX
MODEL:	Ilium L1120
SIGNAL LINE:	1.0 METER

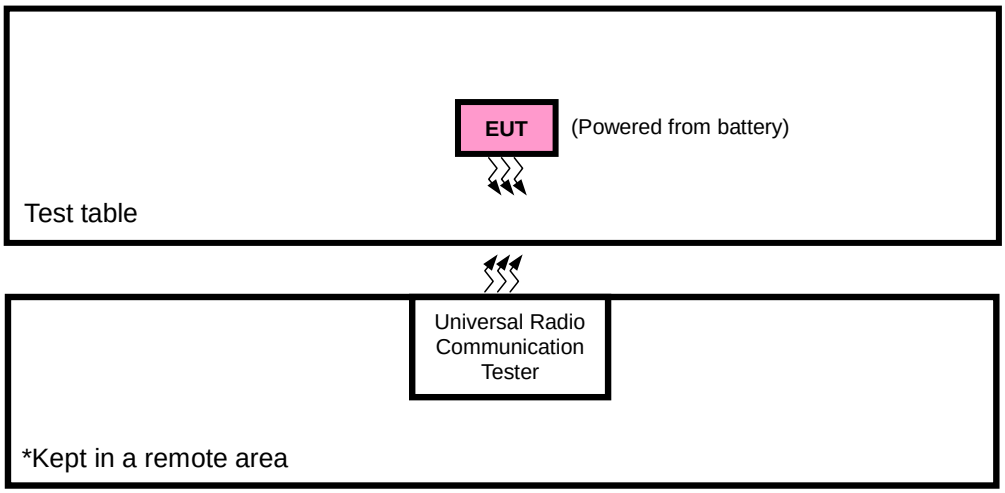
4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION



FOR CONDUCTED & E.R.P. TEST



3.3 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
2	PC	HP	A6608CN	3CR83825X3	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m
2	AC Line: Unshielded, Detachable 1.5m

NOTE:

1. All power cords of the above support units are non shielded (1.8m).

3.4 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 ERP and radiated emission was found when positioned on X-plane for GSM/WCDMA. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	**EUT + Adapter + USB Cable+ Earphone with GSM ,WCDMA**
B	EUT + Battery with **GSM ,WCDMA**

GSM MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
B	ERP	128 to 251	128, 189, 251	GSM, EDGE
B	FREQUENCY STABILITY	128 to 251	128, 251	GSM, EDGE
B	OCCUPIED BANDWIDTH	128 to 251	128, 189, 251	GSM, EDGE
B	BAND EDGE	128 to 251	128, 251	GSM, EDGE
B	CONDCUDETED EMISSION	128 to 251	189	GSM, EDGE
A	RADIATED EMISSION	128 to 251	128, 189, 251	GSM, EDGE

WCDMA MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
B	ERP	4132 to 4233	4132, 4182, 4233	WCDMA
B	FREQUENCY STABILITY	4132 to 4233	4132, 4233	WCDMA
B	OCCUPIED BANDWIDTH	4132 to 4233	4132, 4182, 4233	WCDMA
B	BAND EDGE	4132 to 4233	4132, 4233	WCDMA
B	CONDCUDETED EMISSION	4132 to 4233	4182	WCDMA
A	RADIATED EMISSION	4132 to 4233	4132, 4182, 4233	WCDMA

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	23deg. C, 62%RH	3.85Vdc from Battery	Wenliang Wu
FREQUENCY STABILITY	23deg. C, 62%RH	3.85Vdc from Battery	Wenliang Wu
OCCUPIED BANDWIDTH	23deg. C, 62%RH	3.85Vdc from Battery	Wenliang Wu
BAND EDGE	23deg. C, 62%RH	3.85Vdc from Battery	Moon Xiong
CONDCUDETED EMISSION	23deg. C, 62%RH	3.85Vdc from Battery	Moon Xiong
RADIATED EMISSION	23deg. C, 60%RH	5Vdc from adapter	Tony Zou

3.5 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

3.6 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 22

KDB 971168 D01 Power Meas License Digital Systems v02r02

ANSI/TIA/EIA-603-D

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

4 TEST TYPES AND RESULTS

4.1 OUTPUT POWER MEASUREMENT

4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Mobile / Portable station are limited to 7 watts e.r.p.

4.1.2 TEST PROCEDURES

EIRP / ERP MEASUREMENT:

a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, GPRS & EDGE, and 5MHz for WCDMA mode.

b. 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.

c. 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 b. Record the power level of S.G

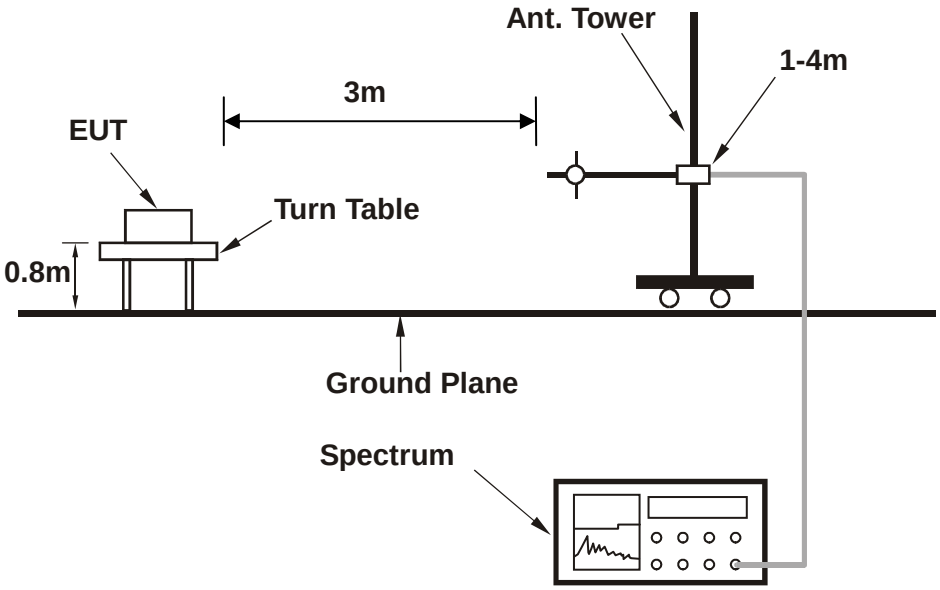
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with GSM, GPRS & 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.

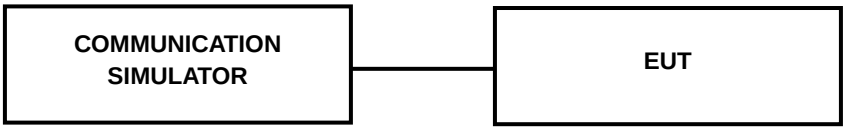
4.1.3 TEST SETUP

EIRP / ERP MEASUREMENT:



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

CONDUCTED POWER MEASUREMENT:



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

4.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

Band	GSM850		
Channel	128	189	251
Frequency (MHz)	824.2	836.4	848.8
GSM	32.37	**32.39**	32.38
GPRS 8	32.36	32.38	32.37
GPRS 10	31.13	31.15	31.14
GPRS 11	29.08	29.10	29.09
GPRS 12	28.09	28.11	28.10
EDGE 8 (MCS9)	26.77	26.79	26.78
EDGE 10 (MCS9)	24.99	25.01	25.00
EDGE 11 (MCS9)	22.92	22.94	22.93
EDGE 12 (MCS9)	21.89	21.91	21.90

Band	WCDMA V		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	22.32	22.35	**22.48**
HSPA			
HSDPA Subtest-1	21.01	21.04	21.17
HSDPA Subtest-2	20.99	21.02	21.15
HSDPA Subtest-3	20.39	20.42	20.55
HSDPA Subtest-4	20.40	20.43	20.56
HSUPA Subtest-1	21.28	21.31	21.44
HSUPA Subtest-2	19.32	19.35	19.48
HSUPA Subtest-3	20.31	20.34	20.47
HSUPA Subtest-4	19.36	19.39	19.47
HSUPA Subtest-5	21.33	21.36	21.44

ERP POWER (dBm)

GSM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
128	824.2	-16.71	33.56	14.70	29.51	H
189	836.4	-15.92	33.63	15.56	35.97	H
251	848.8	-15.58	33.57	15.84	38.35	H
128	824.2	-5.90	34.24	26.19	415.53	V
189	836.4	-5.66	34.59	26.78	**475.99**	V
251	848.8	-5.86	34.62	26.61	458.46	V

REMARKS: 1. ERP Output Power (dBm) = SPA LVL (dBm) + Correction Factor (dB) -2.15(dB).
2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

EDGE

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
128	824.2	-22.09	33.56	9.32	8.55	H
189	836.4	-21.54	33.63	9.94	9.86	H
251	848.8	-20.96	33.57	10.46	11.11	H
128	824.2	-9.16	34.24	22.93	196.16	V
189	836.4	-9.15	34.59	23.29	213.11	V
251	848.8	-9.14	34.62	23.33	**215.43**	V

REMARKS: 1. ERP Output Power (dBm) = SPA LVL (dBm) + Correction Factor (dB) -2.15(dB).
2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

WCDMA

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
4132	826.4	-25.18	33.56	6.23	4.20	H
4182	836.4	-25.50	33.63	5.98	3.96	H
4233	846.6	-25.65	33.57	5.77	3.77	H
4132	826.4	-13.96	34.24	18.13	64.95	V
4182	836.4	-13.82	34.59	18.62	72.71	V
4233	846.6	-13.75	34.62	18.72	**74.52**	V

REMARKS: 1. ERP Output Power (dBm) = SPA LVL (dBm) + Correction Factor (dB) -2.15(dB).
2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.2.2 TEST PROCEDURE

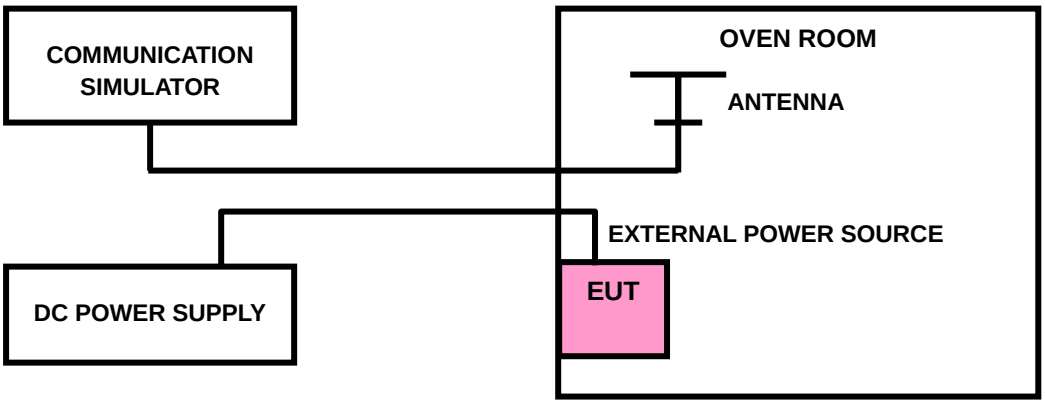
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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.

4.2.3 TEST SETUP



4.2.4 TEST RESULTS

GSM 850

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
3.85	0.0028	0.0038	2.5
3.44	0.0026	0.0028	2.5
4.4	0.0023	0.0023	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.44Vdc to 4.4Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
-30	-0.0136	-0.0128	2.5
-20	-0.0126	-0.0119	2.5
-10	-0.0113	-0.0107	2.5
0	-0.0096	-0.0090	2.5
10	-0.0076	-0.0071	2.5
20	-0.0062	-0.0058	2.5
30	-0.0059	-0.0055	2.5
40	-0.0048	-0.0045	2.5
50	-0.0037	-0.0035	2.5
60	-0.0026	-0.0024	2.5

EDGE 850

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
3.85	0.0039	0.0039	2.5
3.44	0.0029	0.0032	2.5
4.4	0.0024	0.0028	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.44Vdc to 4.4Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
-30	-0.0133	-0.0125	2.5
-20	-0.0126	-0.0119	2.5
-10	-0.0117	-0.0111	2.5
0	-0.0112	-0.0106	2.5
10	-0.0087	-0.0083	2.5
20	-0.0073	-0.0069	2.5
30	-0.0055	-0.0052	2.5
40	-0.0049	-0.0047	2.5
50	-0.0038	-0.0037	2.5
60	-0.0033	-0.0032	2.5

WCDMA Band V

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
3.85	0.0037	0.0036	2.5
3.44	0.0031	0.0031	2.5
4.4	0.0025	0.0024	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.44Vdc to 4.4Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

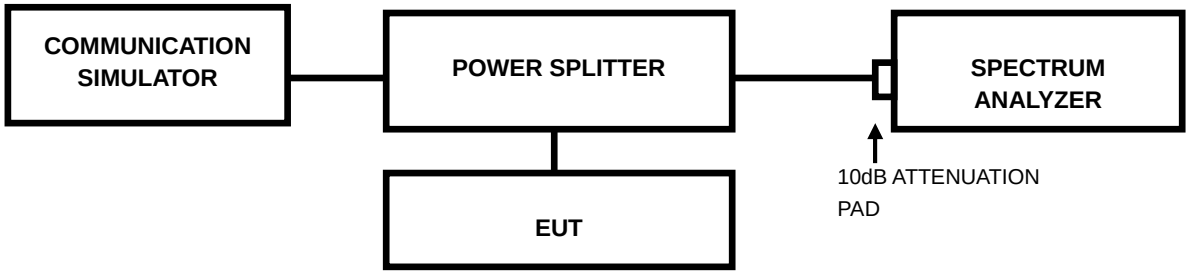
TEMP. (℃)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
-30	-0.0118	-0.0128	2.5
-20	-0.0110	-0.0120	2.5
-10	-0.0095	-0.0104	2.5
0	-0.0081	-0.0090	2.5
10	-0.0070	-0.0078	2.5
20	-0.0062	-0.0070	2.5
30	-0.0048	-0.0054	2.5
40	-0.0037	-0.0043	2.5
50	-0.0031	-0.0036	2.5
60	-0.0020	-0.0025	2.5

4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 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.

4.3.2 TEST SETUP

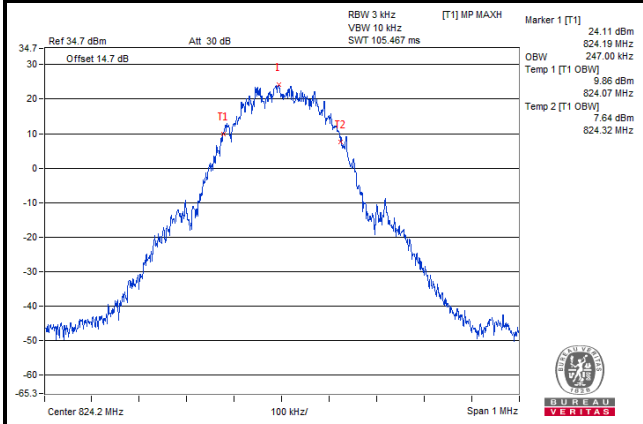


4.3.3 TEST RESULTS

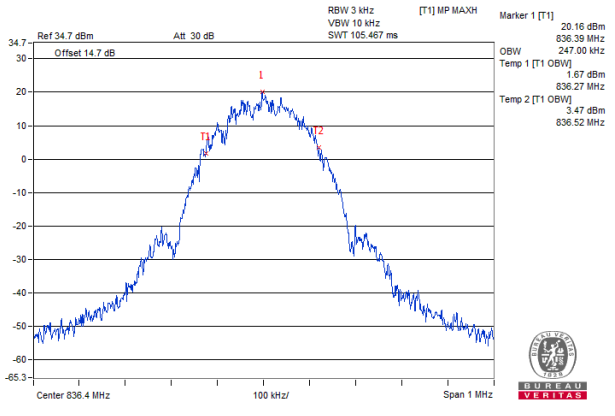
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)
		GSM	EDGE			WCDMA
128	824.2	247.00	246.31	4132	826.4	4.21
189	836.4	244.00	247.00	4182	836.4	4.21
251	848.8	243.00	246.00	4233	846.6	4.22

SPECTRUM PLOT OF WORST VALUE

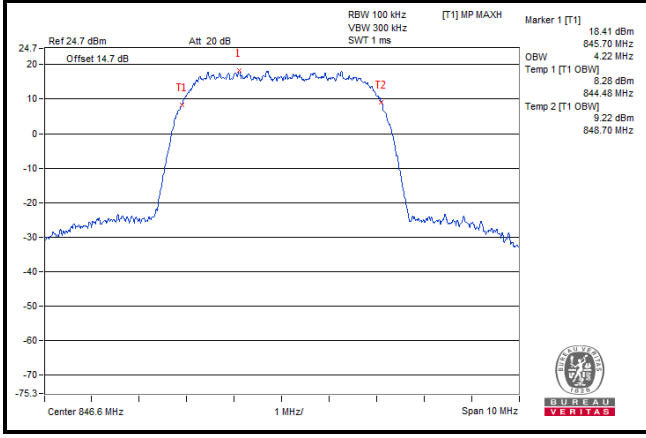
GSM



EDGE



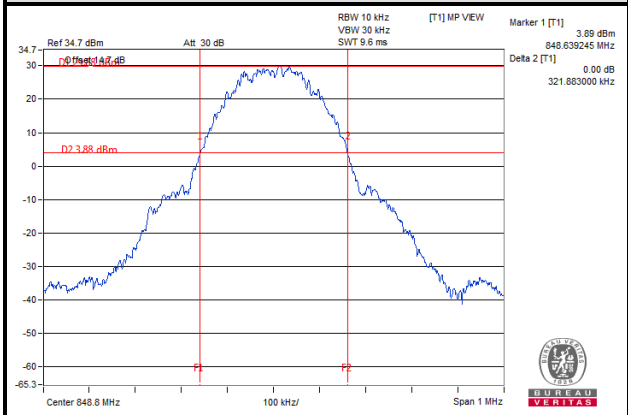
WCDMA



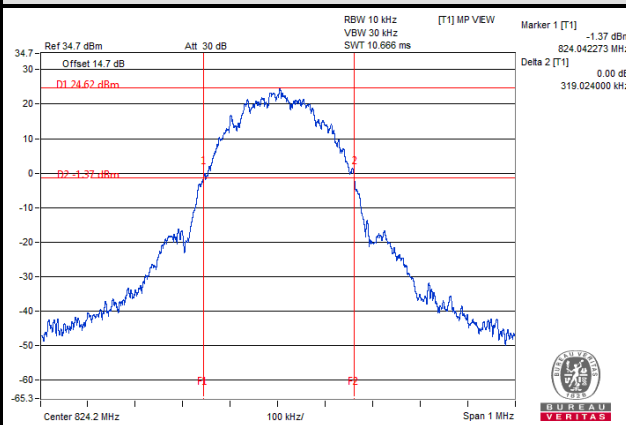
CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (MHz)
		GSM	EDGE			WCDMA
128	824.2	318.35	319.02	4132	826.4	4.88
189	836.4	304.03	318.65	4182	836.4	4.86
251	848.8	321.88	317.31	4233	846.6	4.90

SPECTRUM PLOT OF WORST VALUE

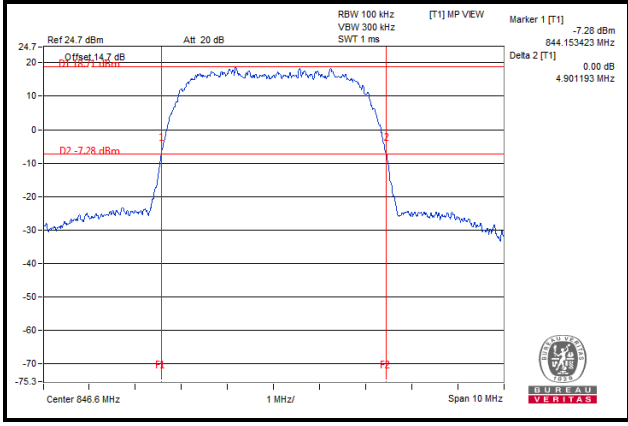
GSM



EDGE



WCDMA

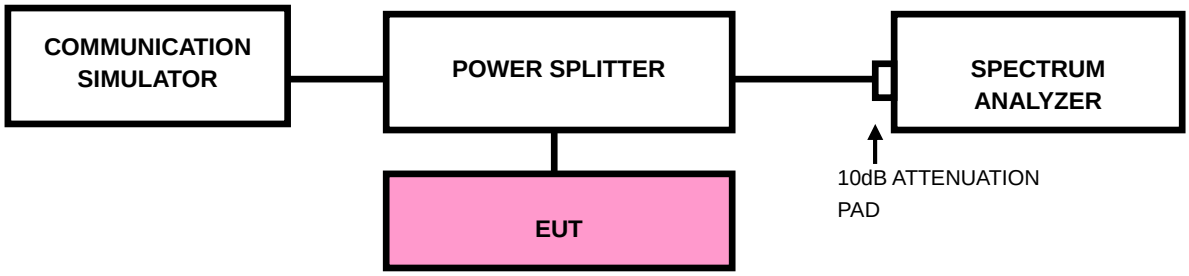


4.4 BAND EDGE MEASUREMENT

4.4.1 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.

4.4.2 TEST SETUP



4.4.3 TEST PROCEDURES

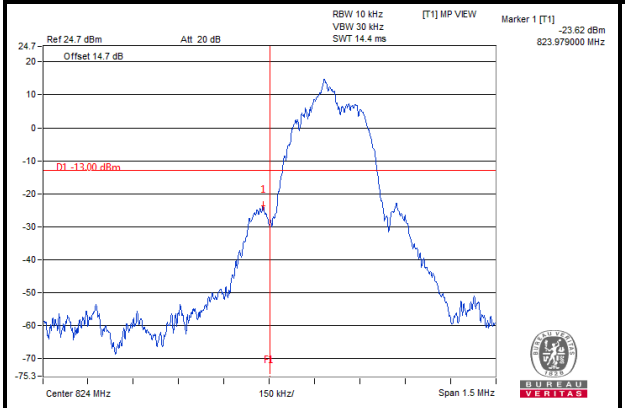
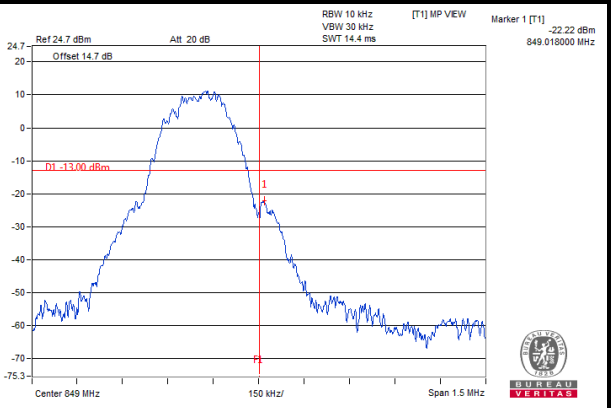
a. All measurements were done at low and high operational frequency range.

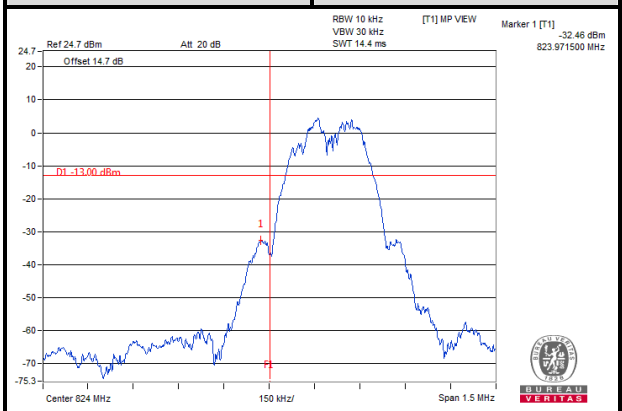
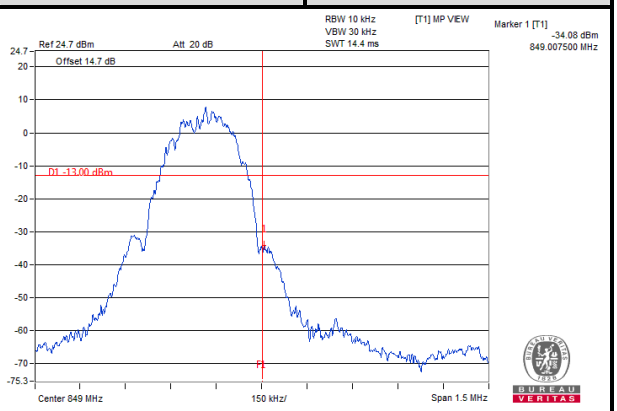
b. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RBW of the spectrum is 10kHz and VBW of the spectrum is 30kHz (GSM/GPRS/ EDGE).

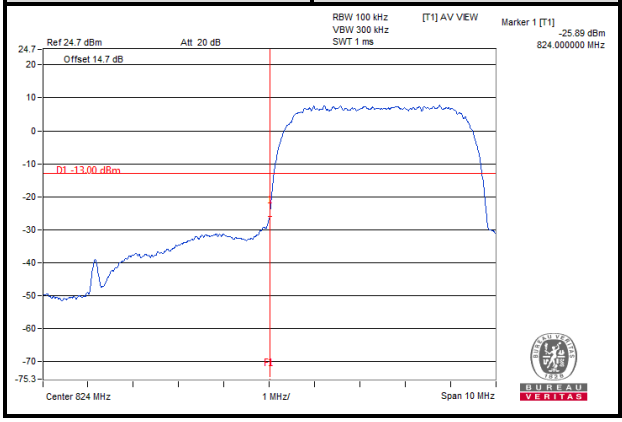
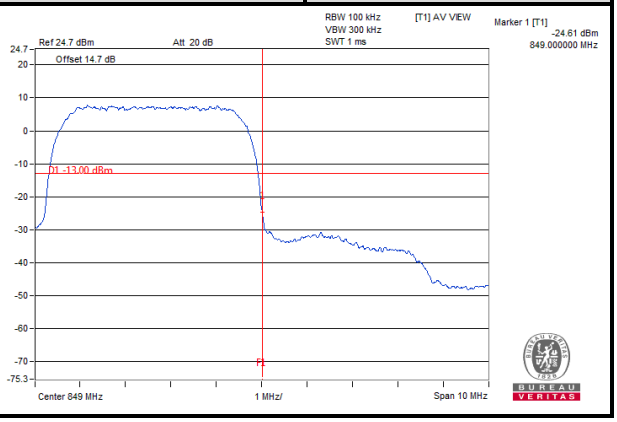
c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz (WCDMA).

d. Record the max trace plot into the test report.

4.4.4 TEST RESULTS

GSM			
CHANNEL	128	CHANNEL	251
			

EDGE			
CHANNEL	128	CHANNEL	251
			

WCDMA			
CHANNEL	4132	CHANNEL	4233
			

4.5 CONDUCTED SPURIOUS EMISSIONS

4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

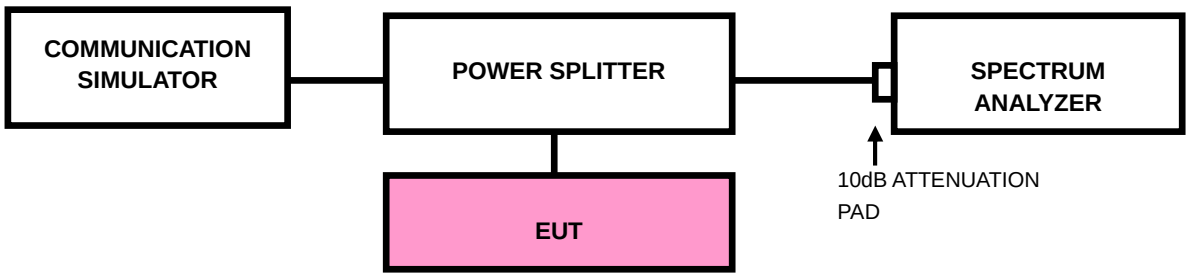
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

4.5.2 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 9 kHz to 9GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

4.5.3 TEST SETUP

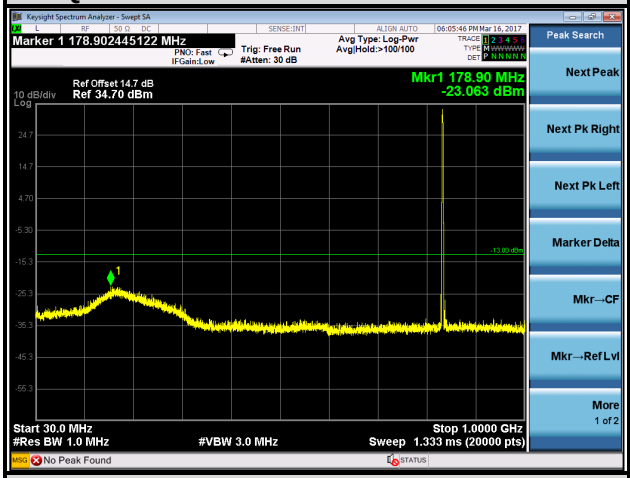


4.5.4 TEST RESULTS

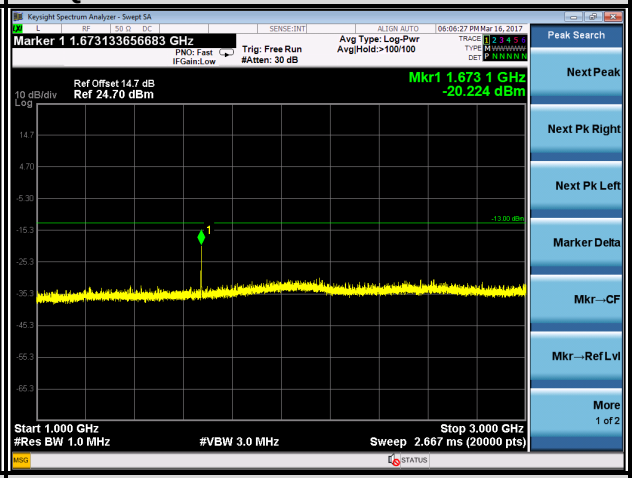
GSM

CHANNEL 189

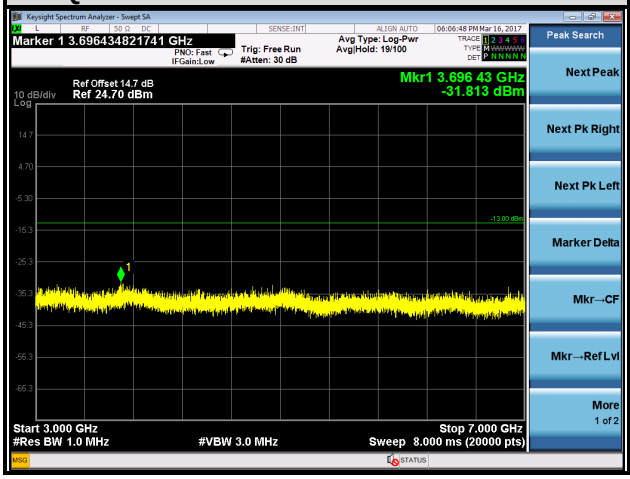
FREQUENCY RANGE : 30MHz~1GHz



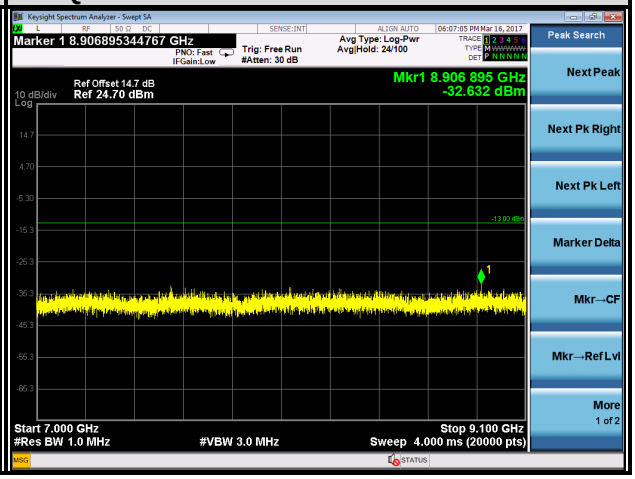
FREQUENCY RANGE : 1GHz~3GHz



FREQUENCY RANGE : 3GHz~7GHz



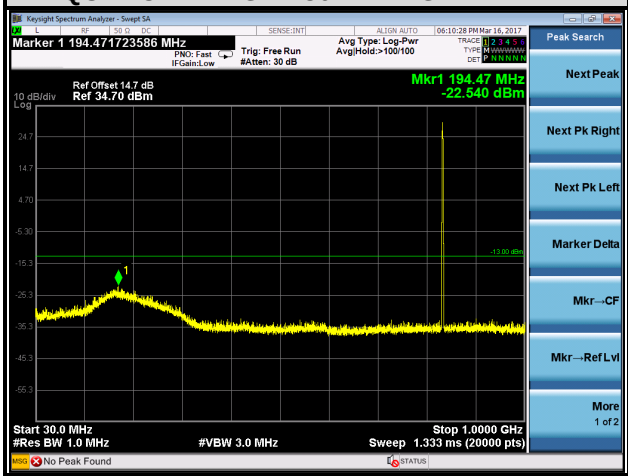
FREQUENCY RANGE : 7GHz~9GHz



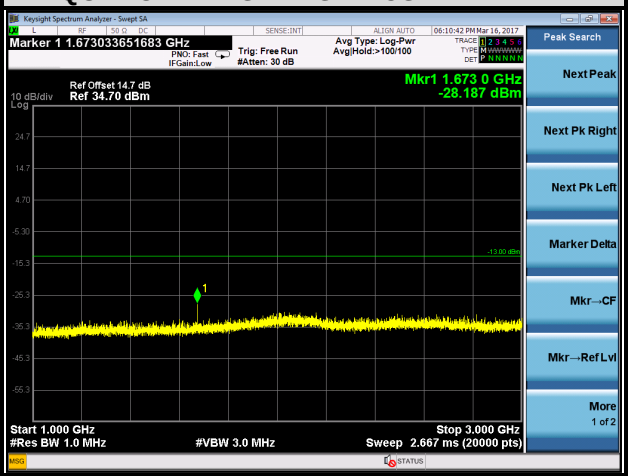
EDGE

CHANNEL 189

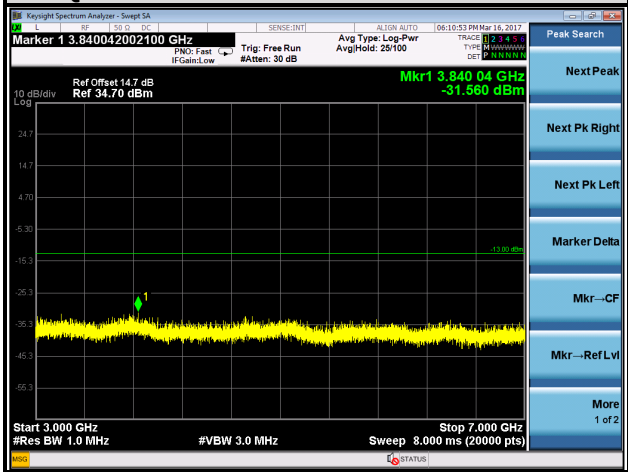
FREQUENCY RANGE : 30MHz~1GHz



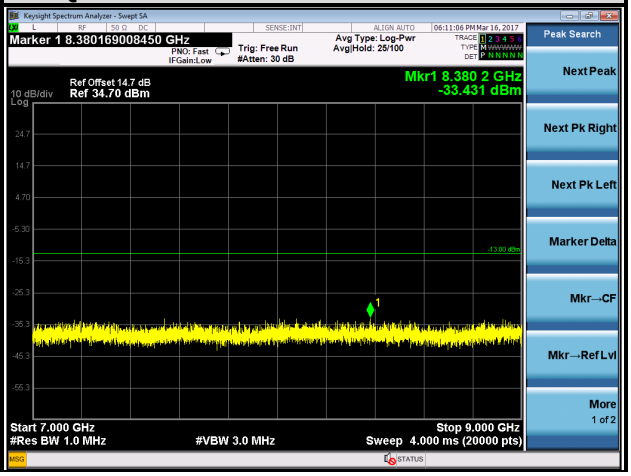
FREQUENCY RANGE : 1GHz~3GHz



FREQUENCY RANGE : 3GHz~7GHz



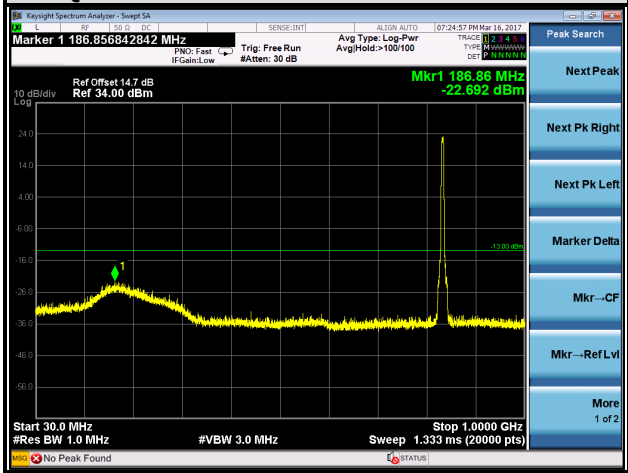
FREQUENCY RANGE : 7GHz~9GHz



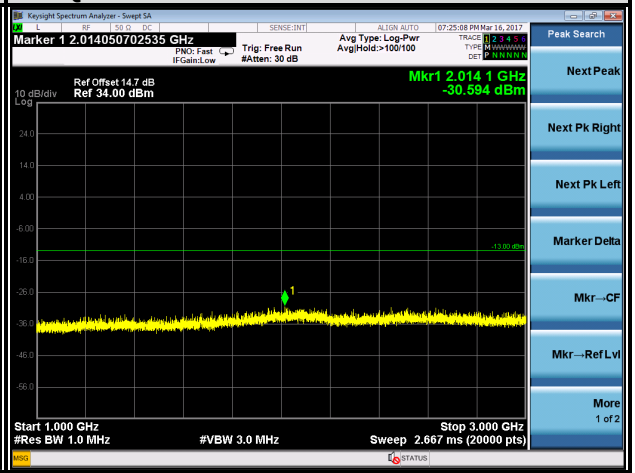
WCDMA

CHANNEL 4182

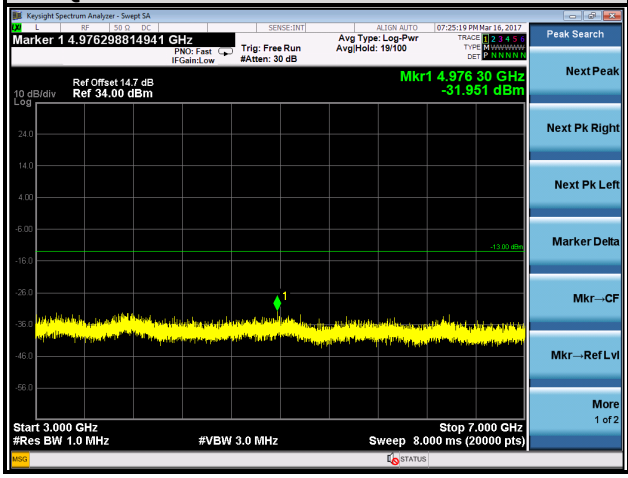
FREQUENCY RANGE : 30MHz~1GHz



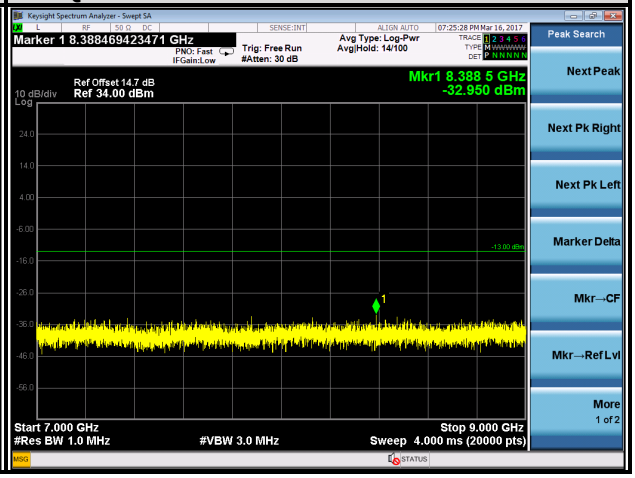
FREQUENCY RANGE : 1GHz~3GHz



FREQUENCY RANGE : 3GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz



4.6 RADIATED EMISSION MEASUREMENT

4.6.1 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.

4.6.2 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. 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.

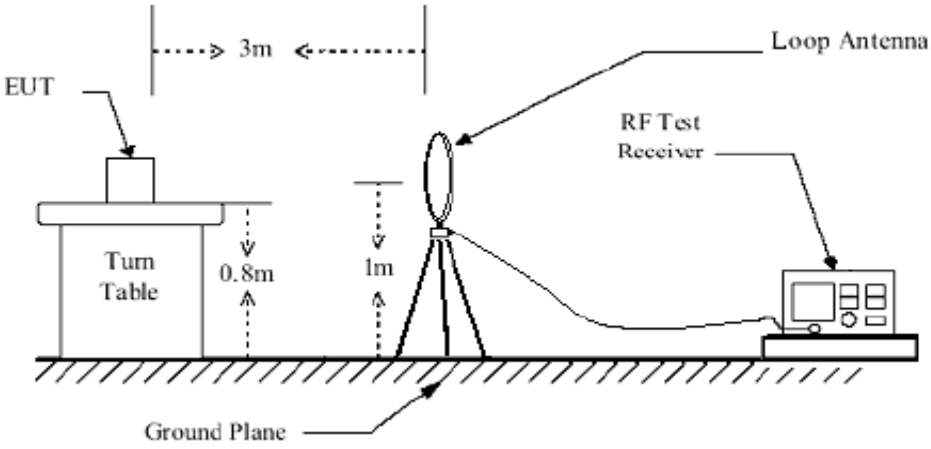
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.6.3 DEVIATION FROM TEST STANDARD

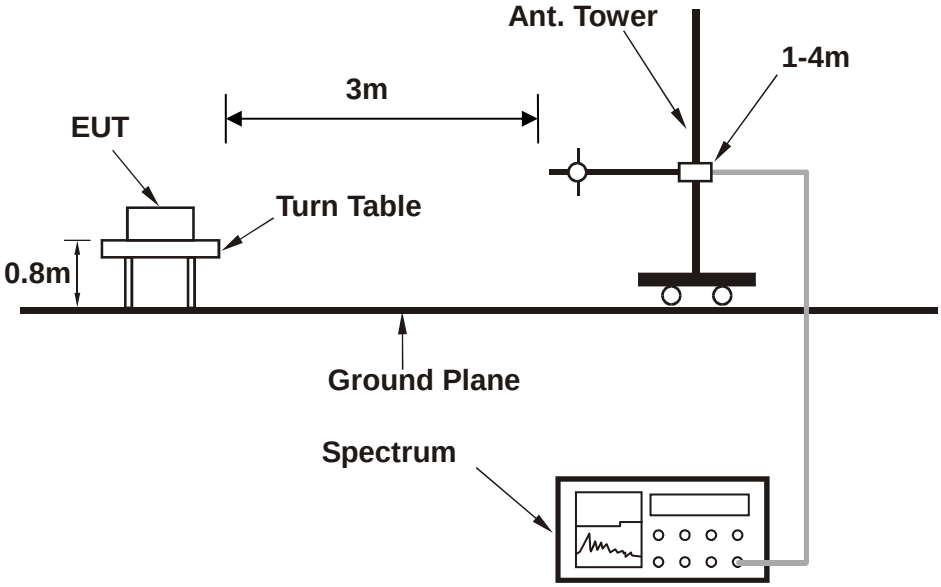
No deviation

4.6.4 TEST SETUP

<Below 30MHz>



<Above 30MHz>



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

4.6.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

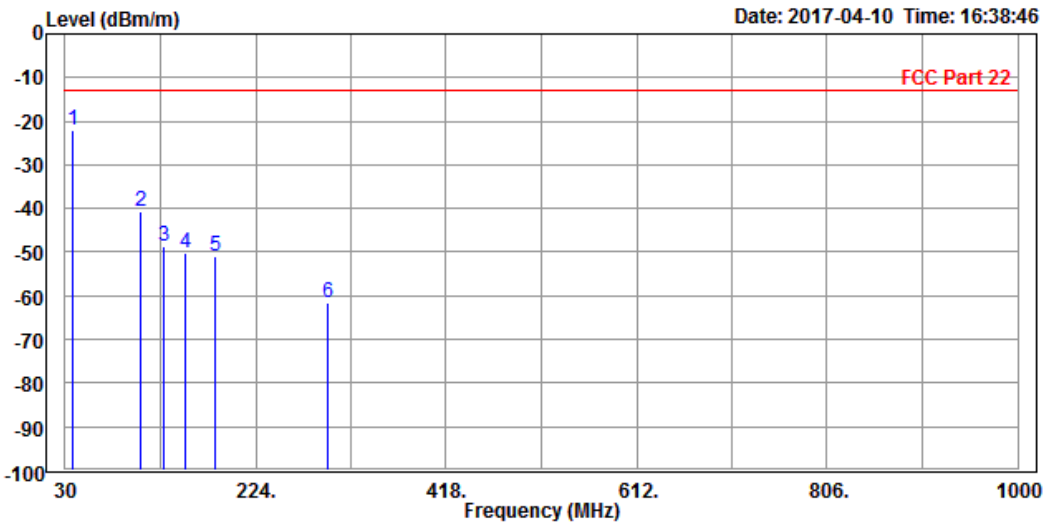
9 KHz – 30 KHz data: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

30 MHz – 1GHz data:

GSM 850:

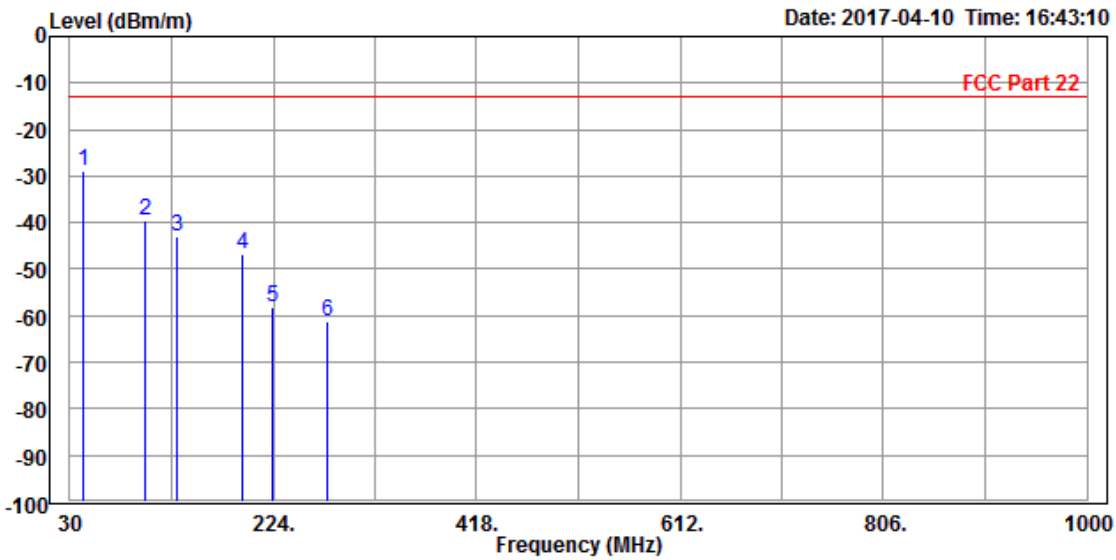
MODE	TX channel 189	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	**INPUT POWER**	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	37.760	-22.09	-34.33	-13.00	-9.09	12.24	Peak	Horizontal
2		106.630	-40.51	-27.97	-13.00	-27.51	-12.54	Peak	Horizontal
3		129.910	-48.58	-32.30	-13.00	-35.58	-16.28	Peak	Horizontal
4		152.220	-50.04	-31.06	-13.00	-37.04	-18.98	Peak	Horizontal
5		182.290	-50.98	-33.28	-13.00	-37.98	-17.70	Peak	Horizontal
6		297.720	-61.60	-47.68	-13.00	-48.60	-13.92	Peak	Horizontal



MODE	TX channel 189	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
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	42.610	-29.03	-26.76	-13.00	-16.03	-2.27	Peak	Vertical
2	101.780	-39.72	-28.81	-13.00	-26.72	-10.91	Peak	Vertical
3	131.850	-42.92	-30.90	-13.00	-29.92	-12.02	Peak	Vertical
4	194.900	-46.71	-35.43	-13.00	-33.71	-11.28	Peak	Vertical
5	223.030	-58.06	-47.02	-13.00	-45.06	-11.04	Peak	Vertical
6	275.410	-61.38	-49.97	-13.00	-48.38	-11.41	Peak	Vertical



ABOVE 1GHz DATA

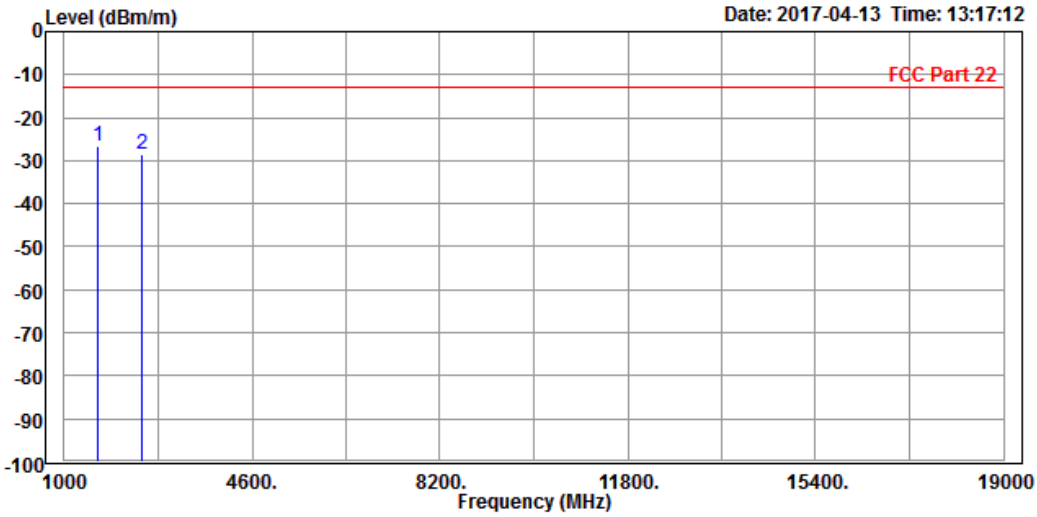
Note: For higher frequency, the emission is too low to be detected.

GSM 850

CH 128:

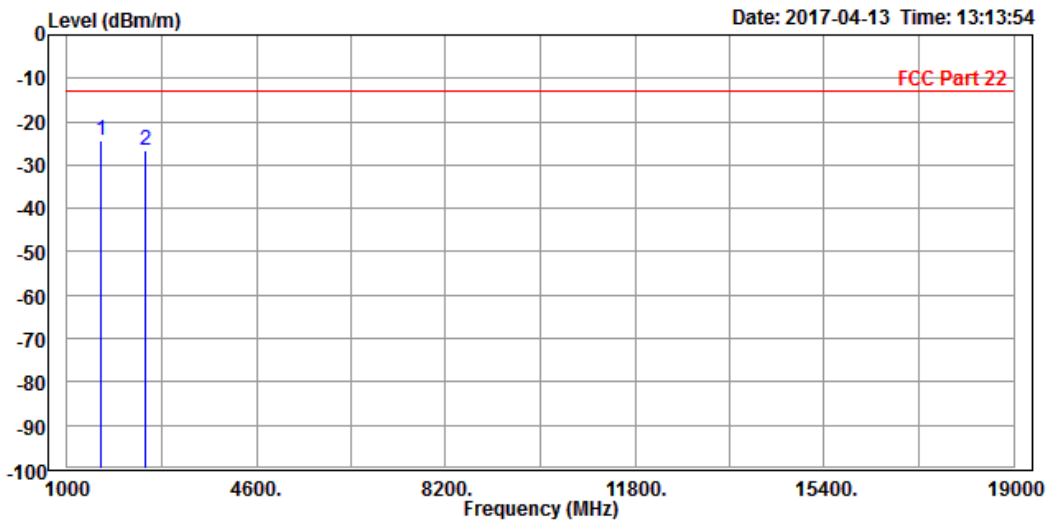
MODE	TX channel 128	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1648.000	-26.56	-21.59	-13.00	-13.56	-4.97	Peak	Horizontal
2		2476.000	-28.61	-26.96	-13.00	-15.61	-1.65	Peak	Horizontal



MODE	TX channel 128	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

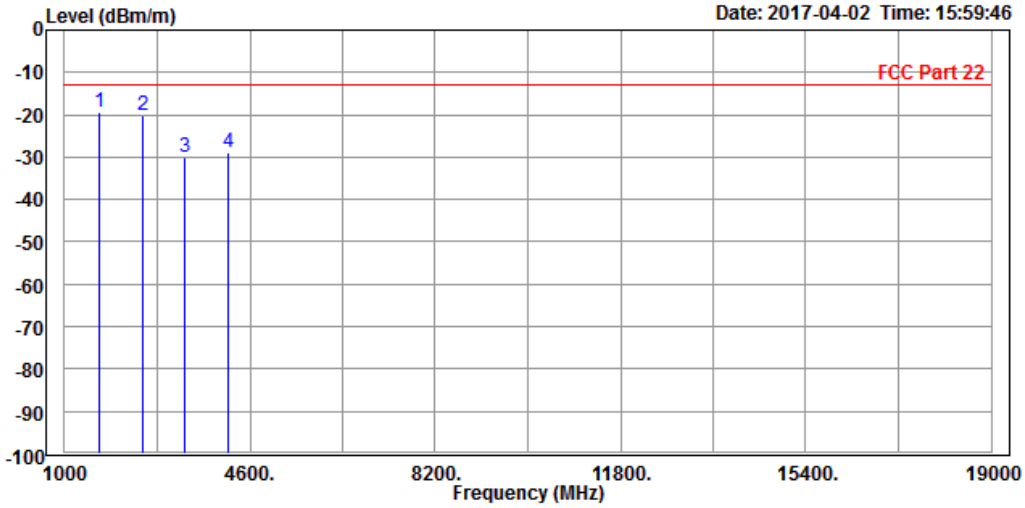
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1648.000	-24.23	-20.68	-13.00	-11.23	-3.55	Peak	Vertical
2		2476.000	-26.63	-26.46	-13.00	-13.63	-0.17	Peak	Vertical



CH 189:

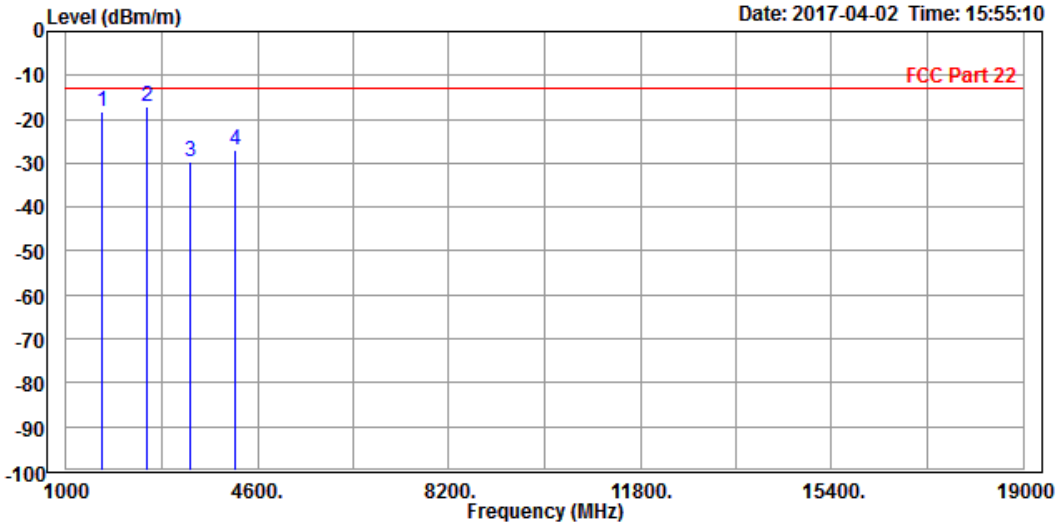
MODE	TX channel 189	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1666.000	-19.32	-14.50	-13.00	-6.32	-4.82	Peak	Horizontal
2		2512.000	-20.25	-18.66	-13.00	-7.25	-1.59	Peak	Horizontal
3		3340.000	-30.16	-31.71	-13.00	-17.16	1.55	Peak	Horizontal
4		4186.000	-28.96	-34.16	-13.00	-15.96	5.20	Peak	Horizontal



MODE	TX channel 189	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

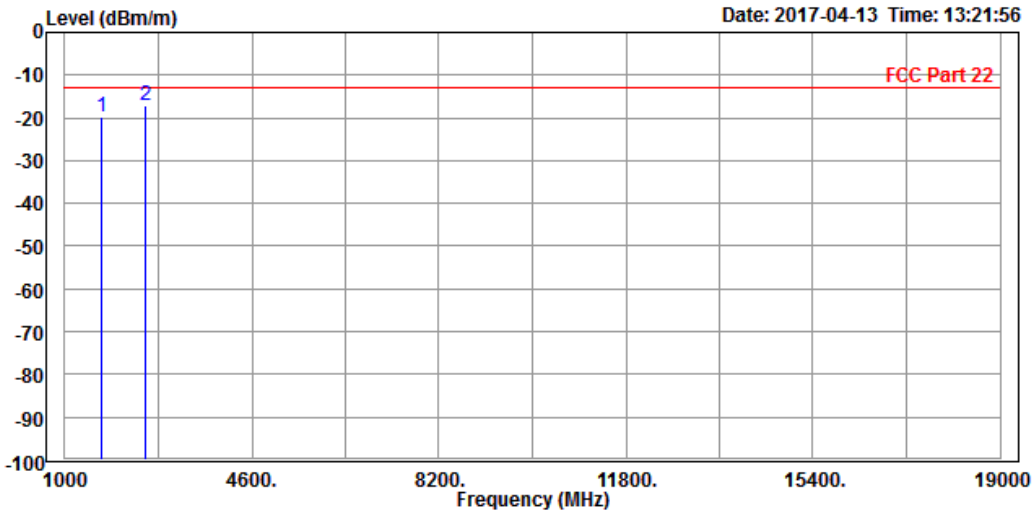
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		1666.000	-18.09	-14.71	-13.00	-5.09	-3.38	Peak	Vertical
2	PP	2512.000	-17.06	-16.94	-13.00	-4.06	-0.12	Peak	Vertical
3		3340.000	-29.52	-31.89	-13.00	-16.52	2.37	Peak	Vertical
4		4186.000	-27.17	-32.70	-13.00	-14.17	5.53	Peak	Vertical



CH 251:

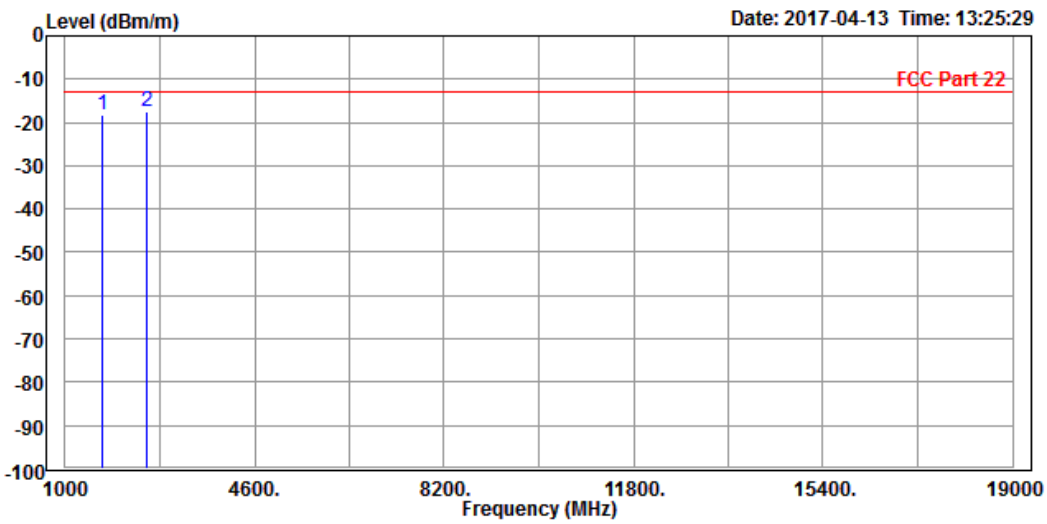
MODE	TX channel 251	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		1702.000	-19.80	-15.28	-13.00	-6.80	-4.52	Peak	Horizontal
2	PP	2548.000	-17.16	-15.71	-13.00	-4.16	-1.45	Peak	Horizontal



MODE	TX channel 251	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
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		1702.000	-18.36	-15.31	-13.00	-5.36	-3.05	Peak	Vertical
2	PP	2548.000	-17.48	-17.51	-13.00	-4.48	0.03	Peak	Vertical

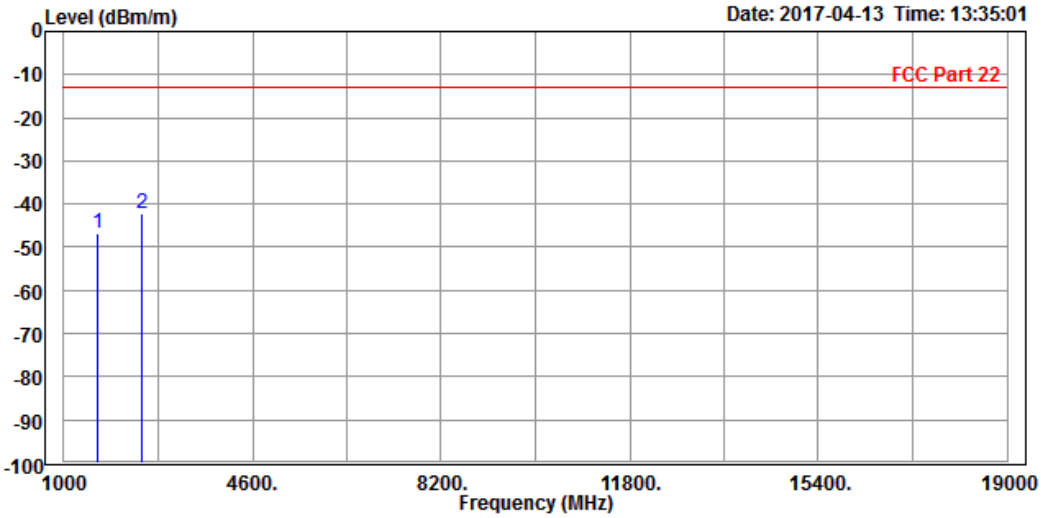


EDGE 850:

CH 128:

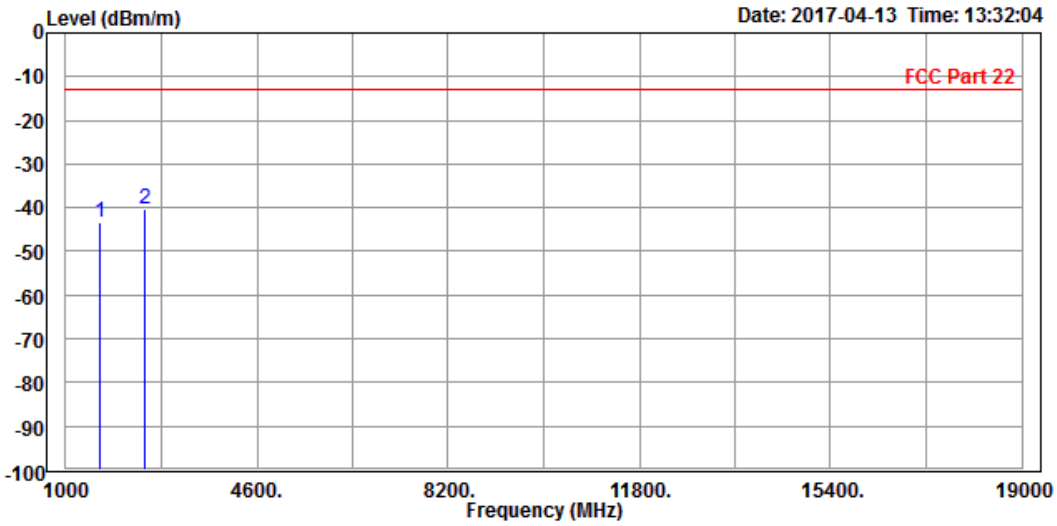
MODE	TX channel 128	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		1648.000	-46.84	-41.87	-13.00	-33.84	-4.97	Peak	Horizontal
2	PP	2476.000	-42.33	-40.68	-13.00	-29.33	-1.65	Peak	Horizontal



MODE	TX channel 128	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

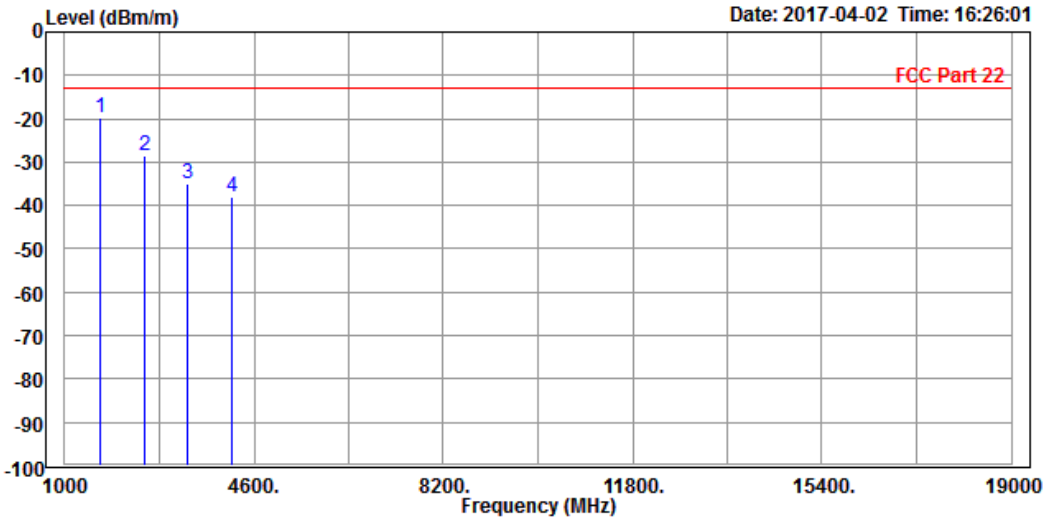
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		1648.000	-43.39	-39.84	-13.00	-30.39	-3.55	Peak	Vertical
2	PP	2476.000	-40.32	-40.15	-13.00	-27.32	-0.17	Peak	Vertical



CH 189:

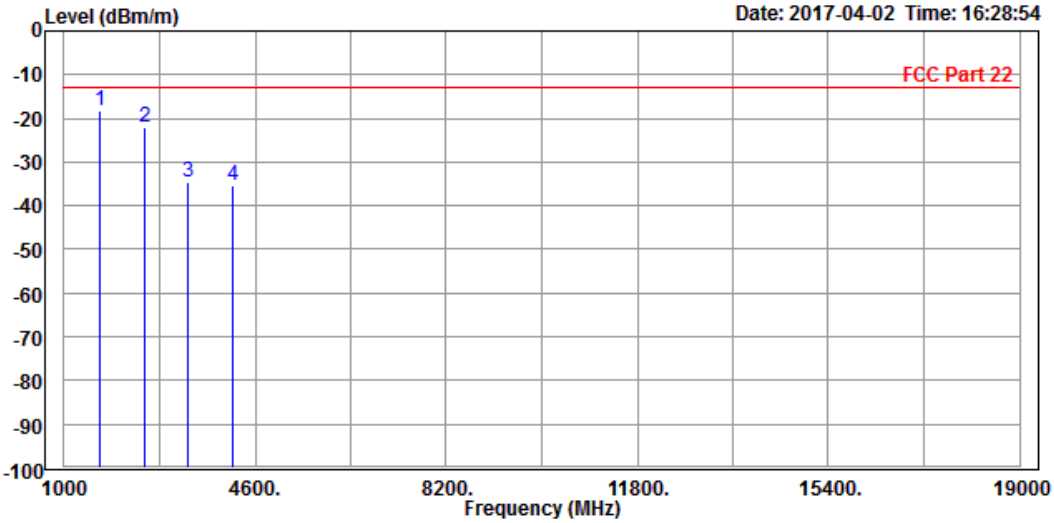
MODE	TX channel 189	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1666.000	-19.61	-14.79	-13.00	-6.61	-4.82	Peak	Horizontal
2		2512.000	-28.47	-26.88	-13.00	-15.47	-1.59	Peak	Horizontal
3		3340.000	-34.98	-36.53	-13.00	-21.98	1.55	Peak	Horizontal
4		4186.000	-37.88	-43.08	-13.00	-24.88	5.20	Peak	Horizontal



MODE	TX channel 189	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

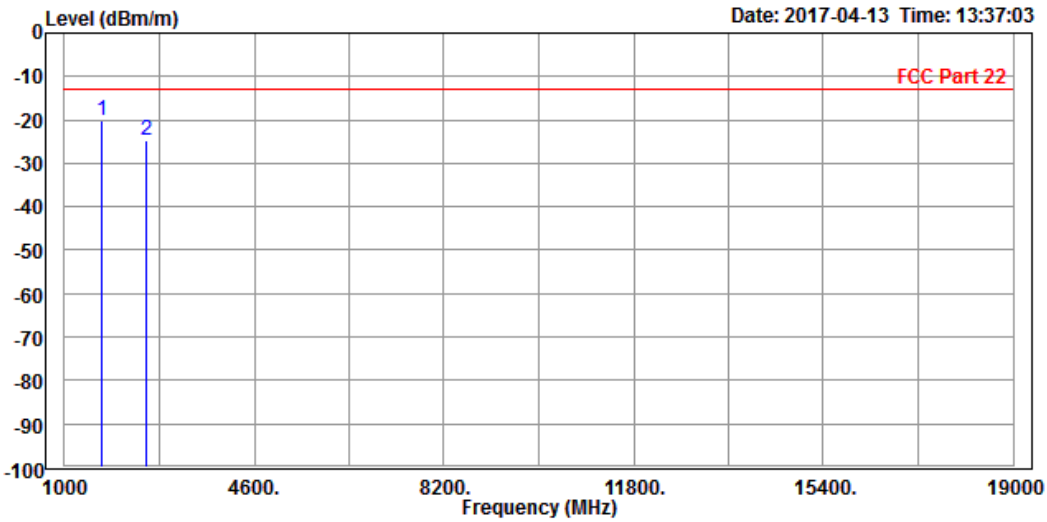
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1666.000	-18.42	-15.04	-13.00	-5.42	-3.38	Peak	Vertical
2		2512.000	-22.20	-22.08	-13.00	-9.20	-0.12	Peak	Vertical
3		3340.000	-34.74	-37.11	-13.00	-21.74	2.37	Peak	Vertical
4		4186.000	-35.19	-40.72	-13.00	-22.19	5.53	Peak	Vertical



CH 251:

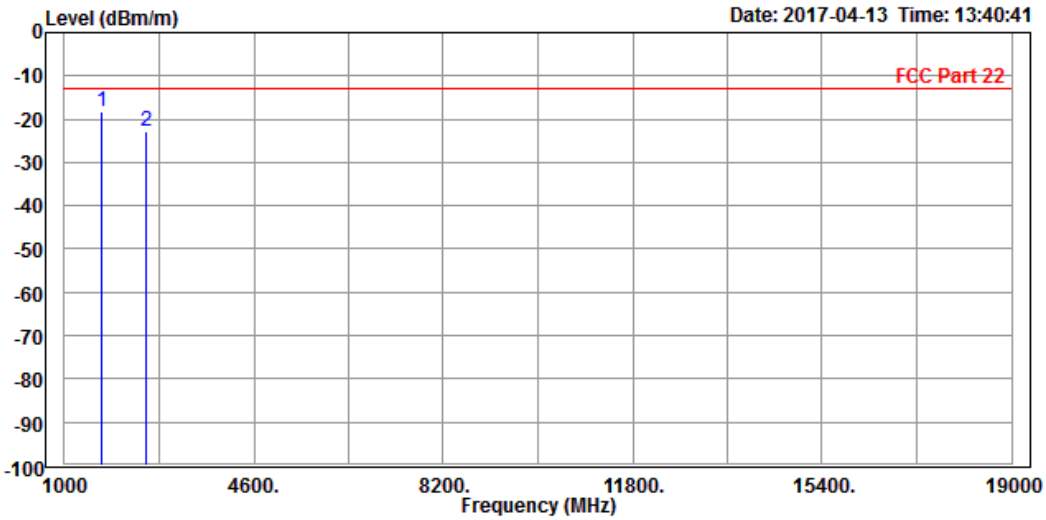
MODE	TX channel 251	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1702.000	-20.16	-15.64	-13.00	-7.16	-4.52	Peak	Horizontal
2		2548.000	-24.88	-23.43	-13.00	-11.88	-1.45	Peak	Horizontal



MODE	TX channel 251	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
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	1702.000	-18.44	-15.39	-13.00	-5.44	-3.05	Peak	Vertical
2		2548.000	-22.84	-22.87	-13.00	-9.84	0.03	Peak	Vertical

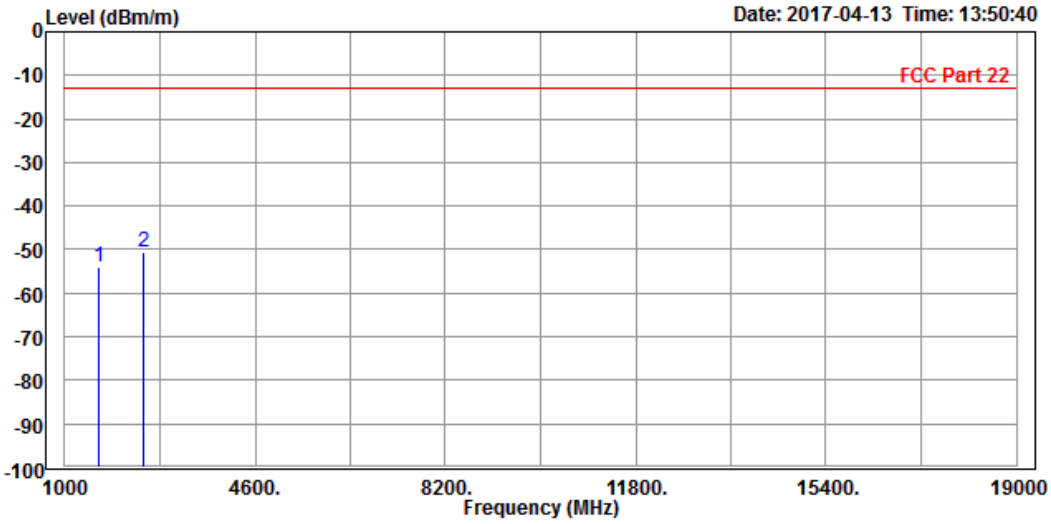


WCDMA Band V:

CH 4132:

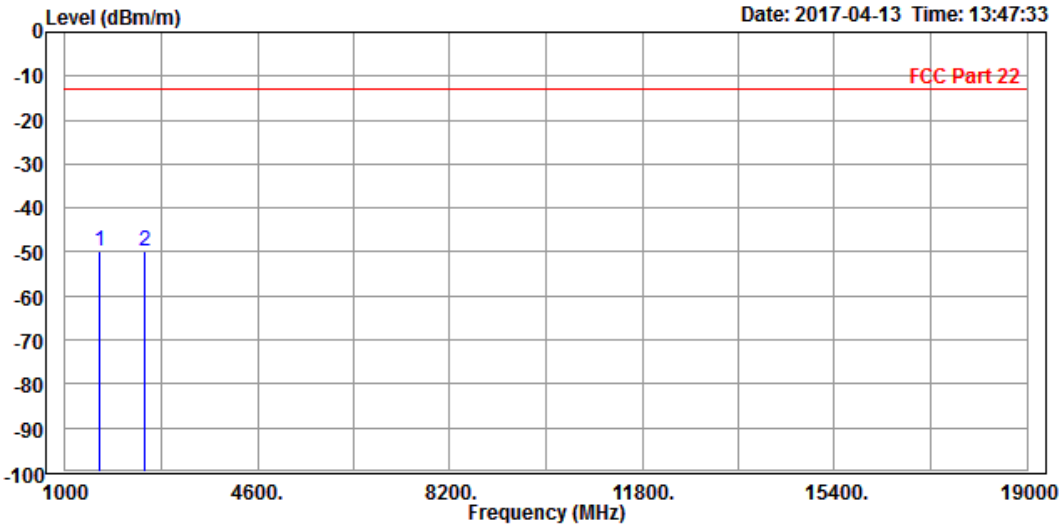
MODE	TX channel 4132	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		1648.000	-53.84	-48.87	-13.00	-40.84	-4.97	Peak	Horizontal
2	PP	2476.000	-50.45	-48.80	-13.00	-37.45	-1.65	Peak	Horizontal



MODE	TX channel 4132	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

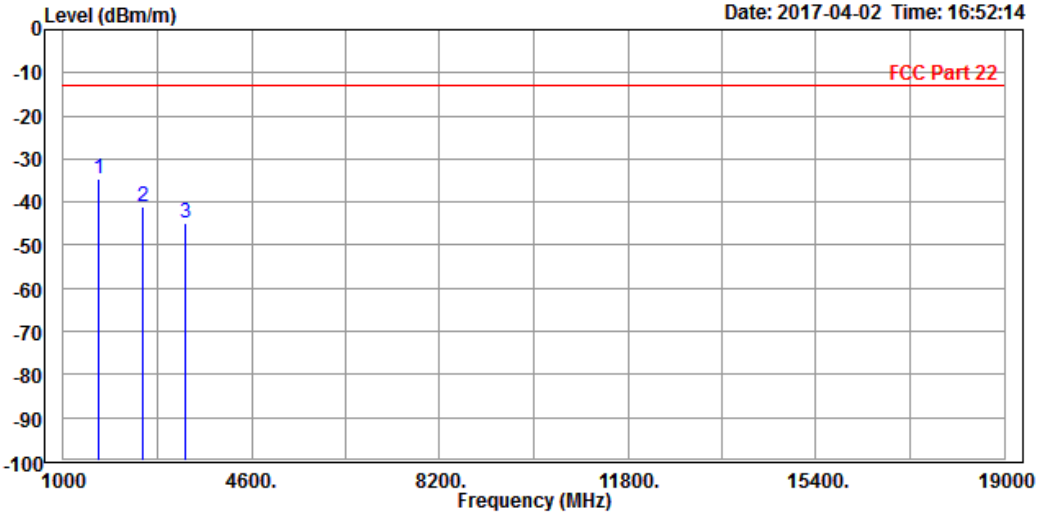
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		1648.000	-49.68	-46.13	-13.00	-36.68	-3.55	Peak	Vertical
2	PP	2476.000	-49.63	-49.46	-13.00	-36.63	-0.17	Peak	Vertical



CH 4182:

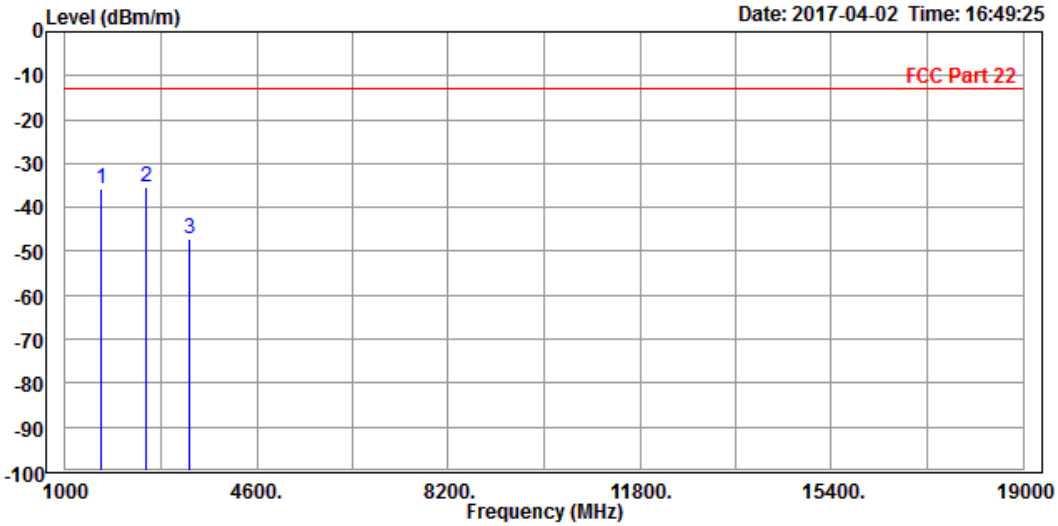
MODE	TX channel 4182	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1666.000	-34.64	-29.82	-13.00	-21.64	-4.82	Peak	Horizontal
2		2512.000	-40.92	-39.33	-13.00	-27.92	-1.59	Peak	Horizontal
3		3340.000	-45.02	-46.57	-13.00	-32.02	1.55	Peak	Horizontal



MODE	TX channel 4182	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

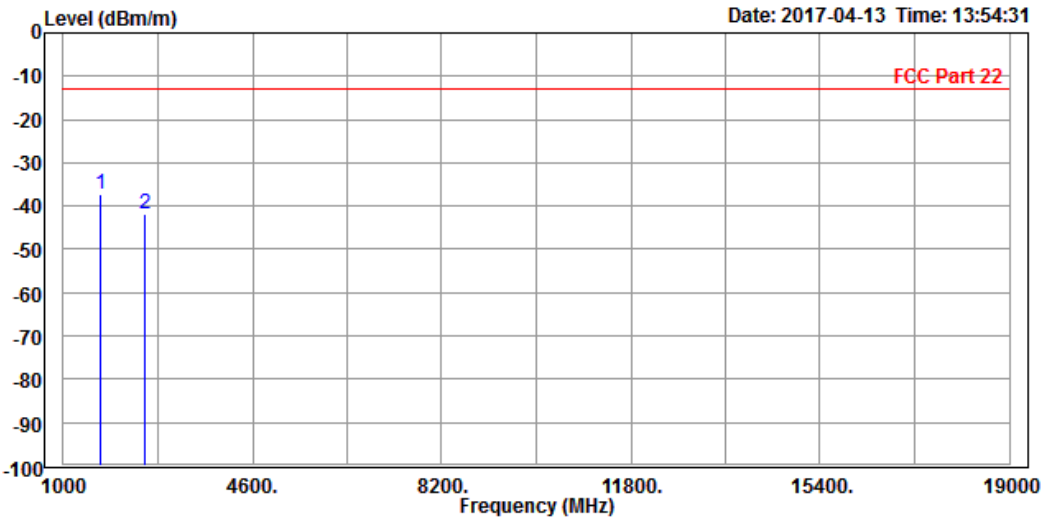
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		1666.000	-35.69	-32.31	-13.00	-22.69	-3.38	Peak	Vertical
2	PP	2512.000	-35.52	-35.40	-13.00	-22.52	-0.12	Peak	Vertical
3		3340.000	-47.12	-49.49	-13.00	-34.12	2.37	Peak	Vertical



CH 4233:

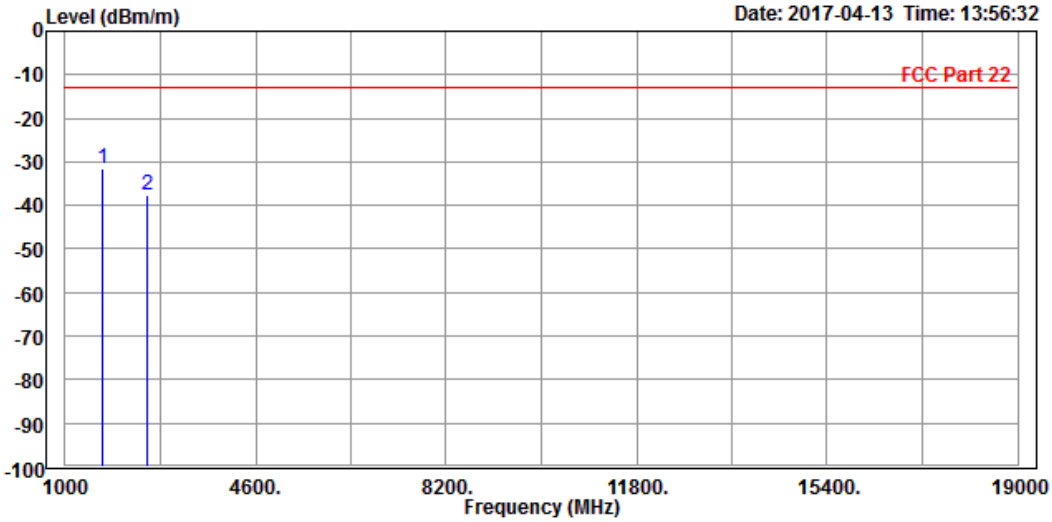
MODE	TX channel 4233	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1702.000	-37.26	-32.74	-13.00	-24.26	-4.52	Peak	Horizontal
2	2548.000	-41.76	-40.31	-13.00	-28.76	-1.45	Peak	Horizontal



MODE	TX channel 4233	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
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	1702.000	-31.60	-28.55	-13.00	-18.60	-3.05	Peak	Vertical
2		2548.000	-37.63	-37.66	-13.00	-24.63	0.03	Peak	Vertical

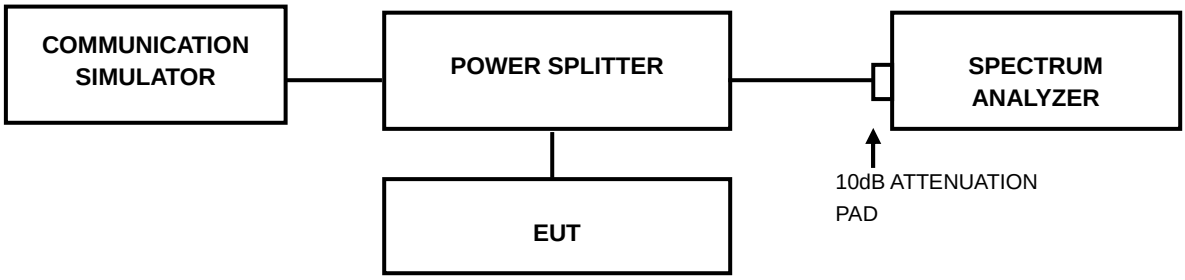


4.7 PEAK TO AVERAGE RATIO

4.7.1 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

4.7.2 TEST SETUP



4.7.3 TEST PROCEDURES

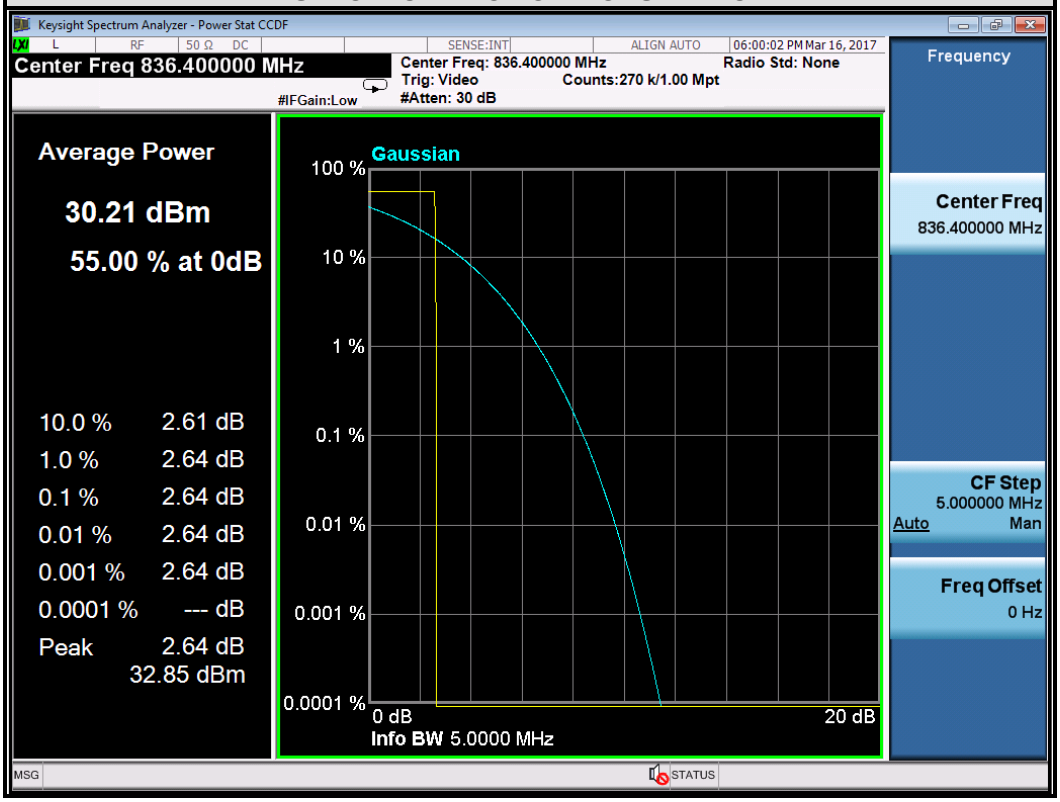
1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

4.7.4 TEST RESULTS

GSM

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
189	836.4	2.64

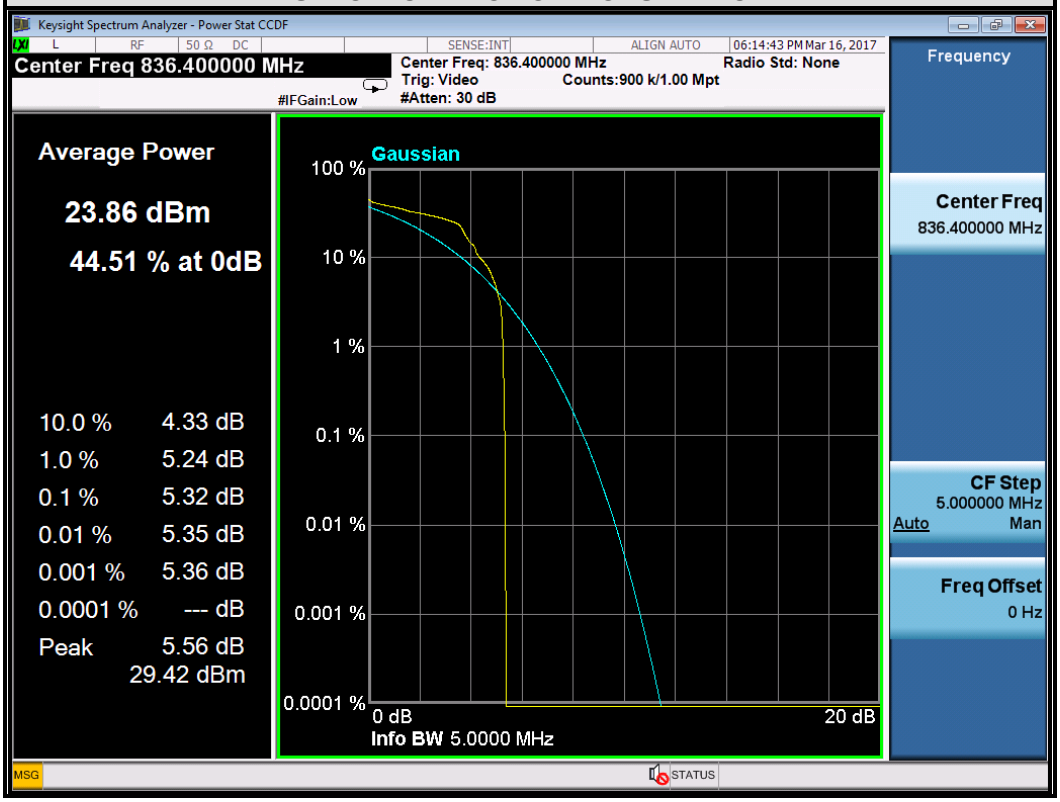
SPECTRUM PLOT OF WORST VALUE



EDGE

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
189	836.4	5.32

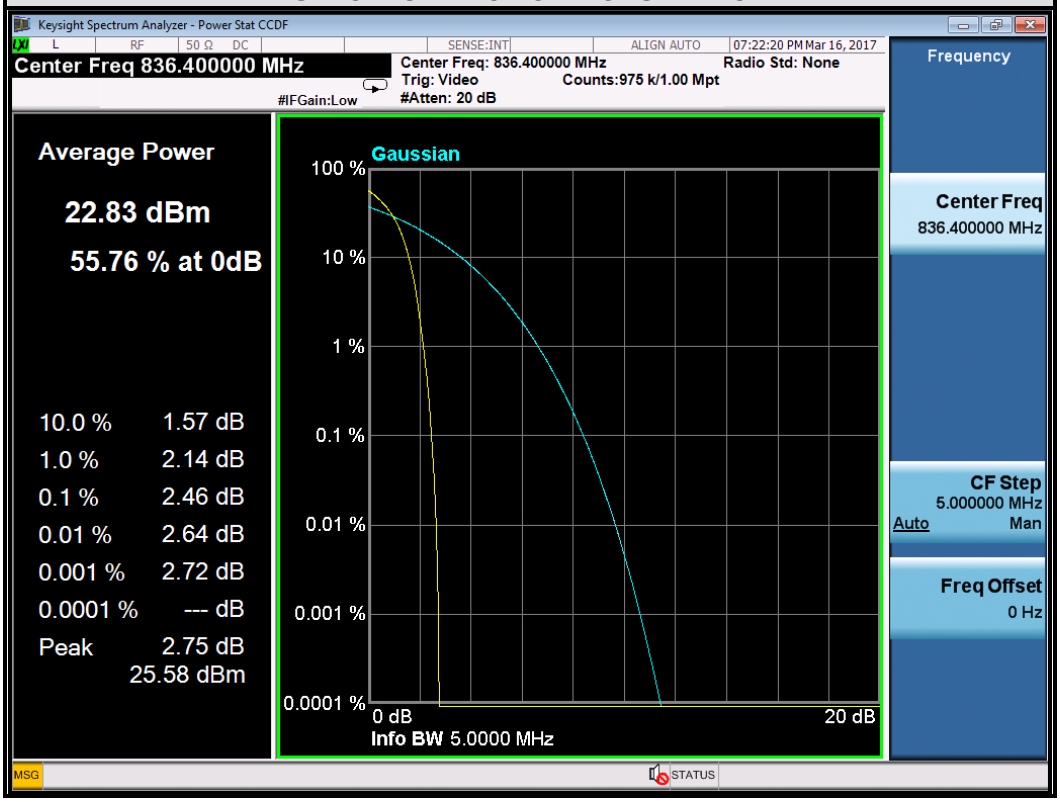
SPECTRUM PLOT OF WORST VALUE



WCDMA

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
4182	836.4	2.46

SPECTRUM PLOT OF WORST VALUE



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch, were founded in 2002 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:

Dongguan EMC/RF Lab:
Tel: +86-769-85935656
Fax: +86-769-85931080

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.

7 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---