

RADIO TEST REPORT-LTE

47 CFR FCC Part 2&22&24

Client Information:

Applicant: MPS MAYORISTA DE COLOMBIA S.A.

Applicant add.: Autop Bog Medellin Km2.5 Parque Emp. Tecnologico, Cota, Colombia

Manufacturer: MPS MAYORISTA DE COLOMBIA S.A.

Manufacturer add.: Autop Bog Medellin Km2.5 Parque Emp. Tecnologico, Cota, Colombia

Product Information:

Product Name: Tablet PC

Model No.: 1200AS, 1200AS+, 1200AS-A, 1200AS-B, 1200AS-C, 1200AS-D

Brand Name: COIN, TOUCH+

FCC ID: 2AHVR-1200AS

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Prepared By:

Dongguan Yaxu (AiT) Technology Limited

No.22, Jinqianling 3rd Street, Jitigang, Huangjiang, Dongguan,
Guangdong, China

Tel.: +86-769-8202 0499 Fax.: +86-769-8202 0495

Date of Receipt: Mar. 02, 2022

Date of Test: Mar. 02~Mar. 27, 2022

Date of Issue: Mar. 28, 2022

Test Result: Pass

This device described above has been tested by Dongguan Yaxu (AiT) Technology Limited and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Reviewed by:


Simba Huang

Approved by:


Seal.chen

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1.SUMMARY OF TEST

1.1TEST FACILITY

The test facility is recognized, certified or accredited by the following organizations:

CNAS- Registration No: L6177

Dongguan Yaxu (AiT) technology Limited is accredited to ISO/IEC 17025:2017 general Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the competence of testing and calibration laboratories) on Aug.04, 2020

FCC-Registration No.: 703111 Designation Number: CN1313

Dongguan Yaxu (AiT) technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC —Registration No.: 6819A CAB identifier: CN0122

The 3m Semi-anechoic chamber of Dongguan Yaxu (AiT) technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 6819A

A2LA-Lab Cert. No.: 6317.01

Dongguan Yaxu (AiT) technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

1.2MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

2.GENERAL INFORMATION

2.1GENERAL DESCRIPTION OF EUTD

ProductName	Tablet PC
Trade Name	1200AS
Model Name	1200AS+
Series Model	1200AS-A, 1200AS-B, 1200AS-C,1200AS-D
Test sample(s) ID:	22030210-2
Model Difference	PCB board, structure and internal of these model(s) are the same, So no additional models were tested.
Tx Frequency:	GSM/GPRS/EDGE: 850: 824.2 MHz ~ 848.8MHz 1900: 1850.2 MHz ~ 1909.8MHz WCDMA: Band V: 826.4 MHz ~ 846.6 MHz Band II: 1852.4 MHz ~ 1907.6 MHz
Modulation Characteristics:	GMSK for GSM/GPRS; GMSK and 8PSK for EDGE WCDMA: QPSK; HSDPA:QPSK/16QAM; HSUPA:BPSK
SIM Card:	SIM 1 and SIM 2 is a chipset unit and tested as single chipset, SIM 1 is used to tested.
Antenna:	PIFA
Antenna gain:	GSM 850: 0.65dBi , PCS 1900:0.75dBi WCDMA 850: 0.65dBi, WCDMA1900: 0.75dBi,
Battery:	Rated Voltage:3.7V Charge Limit Voltage:4.2V Capacity: 4000mAh
Adapter:	Input: 100-240V~50/60Hz 0.3A max Output: DC 5V 1.5A
GPRS/EDGE Class:	Multi-Class12
Hardware version number:	N/A
Software version number:	N/A
Extreme Temp. Tolerance:	-30℃ to +50℃

2.2 LIST OF TEST EQUIPMENTS

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	R&S	FSV40	101470	2021.08.30	2022.08.29
2	EMI Measuring Receiver	R&S	ESR	101160	2021.08.30	2022.08.29
3	Low Noise Pre Amplifier	HP	HP8447E	AiT-F01319	2021.08.30	2022.08.29
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2021.08.30	2022.08.29
5	Passive Loop	ETS	6512	00165355	2020.09.05	2022.09.04
6	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2021.08.28	2022.08.27
7	Broadband Horn Antenna	SCHWARZBECK	BBHA9120D	452	2021.08.28	2022.08.27
8	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA9170367d	2020.11.24	2023.11.23
9	EMI Test Receiver	R&S	ESCI	100124	2021.08.30	2022.08.29
10	LISN	Kyoritsu	KNW-242	8-837-4	2021.08.30	2022.08.29
11	LISN	R&S	ESH3-Z2	0357.8810.54-101161-S2	2021.08.30	2022.08.29
12	Pro.Temp&Humi.chamber	MENTEK	MHP-150-1C	MAA08112501	2021.08.30	2022.08.29
13	RF Automatic Test system	MW	MW100-RFCB	21033016	2021.08.30	2022.08.29
14	Wideband Radio communication tester	R&S	CMW500	1201.0002K50	2021.08.30	2022.08.29
15	Signal Analyzer	Agilent	N9020A	9011796	2021.08.30	2022.08.29
16	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	N/A	N/A
17	temporary antenna connector(Note)	NTS	R001	N/A	N/A	N/A
Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.						

2.3 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 and ANSI C63.262015 PowerMeas. License Digital Systems with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to

find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 10th harmonic for GSM850 and WCDMA Band V.
2. 30 MHz to 10th harmonic for GSM1900 and WCDMA Band II.

All modes and data rates and positions were investigated.

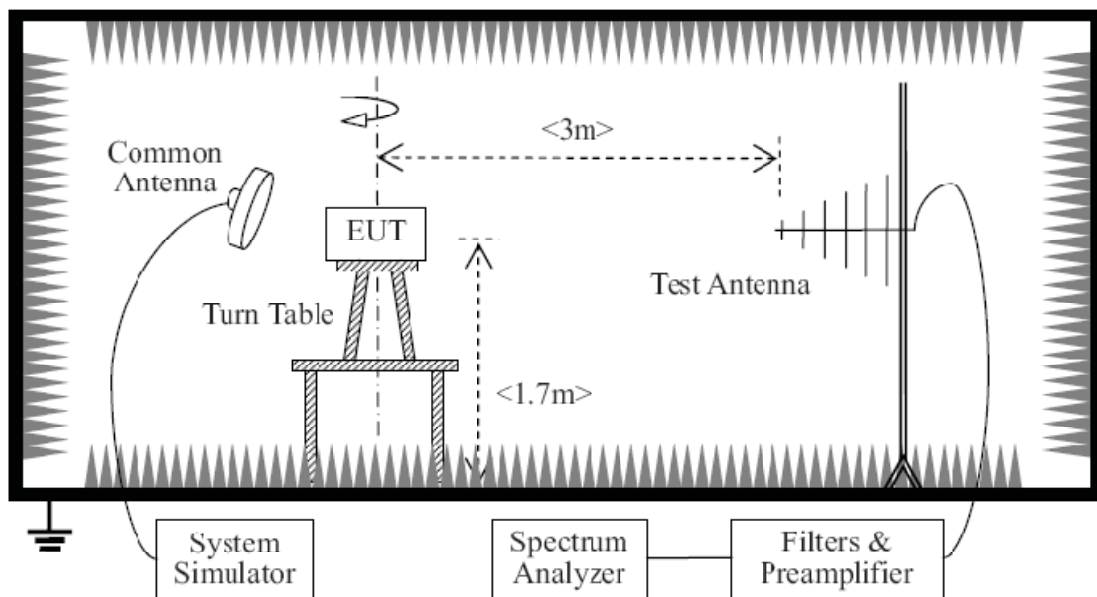
Test modes are chosen to be reported as the worst case configuration below:

	TEST MODES	
	RADIATED TCS	CONDUCTED TCS
BAND		
GSM 850	GSM LINK GPRS/EDGE CLASS 12 LINK	GSM LINK GPRS/EDGE CLASS 12 LINK
GSM 1900	GSM LINK GPRS/EDGE CLASS 12 LINK	GSM LINK GPRS/EDGE CLASS 12 LINK
WCDMA BAND V	RMC 12.2KBPS LINK	RMC 12.2KBPS LINK
WCDMA BAND II	RMC 12.2KBPS LINK	RMC 12.2KBPS LINK

RF Function	Band	Mode	Modulation	Power Class	Ant Gain(dBi)	Ant Type	SIM Card
GSM	850	GSM	GMSK	4(power control level 5)	0.5	PIFA	2 SIM 1 is used to tested.
		GPRS (Class12)	GMSK	4			
		EDGE(Class12)	GMSK, 8PSK	E2			
	1900	GSM	GMSK	1(power control level 0)			
		GPRS (Class12)	GMSK	1			
		EDGE(Class12)	GMSK, 8PSK	E2			
WCDMA	2/5	WCDMA	QPSK	3	0.50000	PIFA	2 SIM 1 is used to tested.
		HSDPA	QPSK, 16QAM				
		HSUPA	BPSK				

2.4 TEST SETUP

1. Radiated Spurious Emission Test Setup



The EUT, which is powered by USB 5V, is located in a 3m Full-Anechoic Chamber; the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading.

A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power (i.e. LTE FDD band Power Control Level = 3), and only the test result of the maximum output power was recorded.

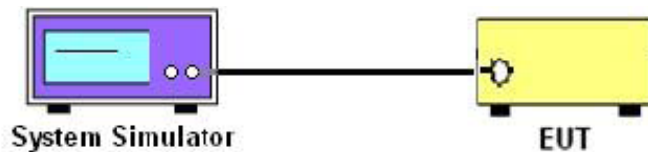
3. CONDUCTED OUTPUT POWER

3.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

3.1.1 MEASUREMENT METHOD

A system simulator was used to establish communication with the eut. Its parameters were set to force the eut transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.
Configuration follows KDB 971168 D01 v03r01.

3.1.2 TEST SETUP



3.1.3 TEST PROCEDURES

1. The transmitter output port was connected to system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest/middle/highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

Note: $ERP \text{ or } EIRP = P_{Meas} + G_T$

Where ERP or EIRP: effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas} , e.g. dBm)

P_{Meas} : measured transmitter output power, in dBm

G_T : gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

3.1.4 TEST RESULTS

GSM 850:

GSM 850			
Mode	Frequency (MHz)	AVG Power(dBm)	EIRP (dBm)
GSM (GMSK,1-Slot)	824.2	31.55	32.20
	836.6	31.59	32.24
	848.8	31.58	32.23
GPRS (GMSK,1-Slot)	824.2	31.52	32.17
	836.6	31.56	32.21
	848.8	31.57	32.22
GPRS (GMSK,2-Slot)	824.2	31.09	31.74
	836.6	31.07	31.72
	848.8	31.13	31.78
GPRS (GMSK,3-Slot)	824.2	30.64	31.29
	836.6	30.62	31.27
	848.8	30.66	31.31
GPRS (GMSK,4-Slot)	824.2	30.16	30.81
	836.6	30.14	30.79
	848.8	30.21	30.86
EGPRS (8PSK,1-Slot)	824.2	25.93	26.58
	836.6	25.97	26.62
	848.8	25.97	26.62
EGPRS (8PSK,2-Slot)	824.2	25.14	25.79
	836.6	25.20	25.85
	848.8	25.26	25.91
EGPRS (8PSK,3-Slot)	824.2	24.41	25.06
	836.6	24.45	25.10
	848.8	24.46	25.11
EGPRS (8PSK,4-Slot)	824.2	23.67	24.32
	836.6	23.68	24.33
	848.8	23.73	24.38

PCS 1900:

PCS 1900			
Mode	Frequency (MHz)	AVG Power(dBm)	EIRP (dBm)
GSM (GMSK,1-Slot)	1850.2	29.44	30.19
	1880.0	29.14	29.89
	1909.8	28.54	29.29
GPRS (GMSK,1-Slot)	1850.2	29.42	30.17
	1880.0	29.12	29.87
	1909.8	28.51	29.26
GPRS (GMSK,2-Slot)	1850.2	28.92	29.67
	1880.0	28.66	29.41
	1909.8	28.06	28.81
GPRS (GMSK,3-Slot)	1850.2	28.44	29.19
	1880.0	28.19	28.94
	1909.8	27.57	28.32
GPRS (GMSK,4-Slot)	1850.2	27.96	28.71
	1880.0	27.70	28.45
	1909.8	27.09	27.84
EGPRS (8PSK,1-Slot)	1850.2	28.11	28.86
	1880.0	28.56	29.31
	1909.8	27.94	28.69
EGPRS (8PSK,2-Slot)	1850.2	27.38	28.13
	1880.0	27.82	28.57
	1909.8	27.15	27.90
EGPRS (8PSK,3-Slot)	1850.2	26.62	27.37
	1880.0	27.11	27.86
	1909.8	26.40	27.15
EGPRS (8PSK,4-Slot)	1850.2	25.86	26.61
	1880.0	26.38	27.13
	1909.8	25.68	26.43

UMTS BAND 5			
Mode	Frequency(MHz)	AVG Power(dBm)	EIRP (dBm)
WCDMA 850 RMC	826.4	24.23	24.88
	836.6	24.15	24.8
	846.6	24.15	24.8
HSDPA Subtest 1	826.4	23.81	24.46
	836.6	23.90	24.55
	846.6	23.68	24.33
HSDPA Subtest 2	826.4	23.41	24.06
	836.6	23.43	24.08
	846.6	23.18	23.83
HSDPA Subtest 3	826.4	23.03	23.68
	836.6	23.03	23.68
	846.6	22.84	23.49
HSDPA Subtest 4	826.4	22.68	23.33
	836.6	22.70	23.35
	846.6	22.37	23.02
HSUPA Subtest 1	826.4	22.89	23.54
	836.6	22.69	23.34
	846.6	22.82	23.47
HSUPA Subtest 2	826.4	21.95	22.6
	836.6	21.78	22.43
	846.6	21.89	22.54
HSUPA Subtest 3	826.4	21.94	22.59
	836.6	21.31	21.96
	846.6	21.41	22.06
HSUPA Subtest 4	826.4	21.53	22.18
	836.6	20.91	21.56
	846.6	21.01	21.66
HSUPA Subtest 5	826.4	20.12	20.77
	836.6	19.41	20.06
	846.6	19.60	20.25

UMTS BAND II

UMTS BAND 2			
Mode	Frequency(MHz)	AVG Power(dBm)	EIRP (dBm)
WCDMA 1900 RMC	1852.4	22.93	23.68
	1880	22.65	23.40
	1907.6	22.27	23.02
HSDPA Subtest 1	1852.4	22.74	23.49
	1880	22.10	22.85
	1907.6	21.60	22.35
HSDPA Subtest 2	1852.4	22.31	23.06
	1880	21.70	22.45
	1907.6	21.17	21.92
HSDPA Subtest 3	1852.4	21.89	22.64
	1880	21.24	21.99
	1907.6	20.85	21.60
HSDPA Subtest 4	1852.4	21.49	22.24
	1880	20.84	21.59
	1907.6	20.51	21.26
HSUPA Subtest 1	1852.4	22.89	23.64
	1880	21.96	22.71
	1907.6	21.81	22.56
HSUPA Subtest 2	1852.4	22.04	22.79
	1880	21.04	21.79
	1907.6	20.91	21.66
HSUPA Subtest 3	1852.4	21.89	22.64
	1880	20.55	21.30
	1907.6	20.50	21.25
HSUPA Subtest 4	1852.4	21.53	22.28
	1880	20.08	20.83
	1907.6	20.09	20.84
HSUPA Subtest 5	1852.4	20.11	20.86
	1880	18.61	19.36
	1907.6	18.59	19.34

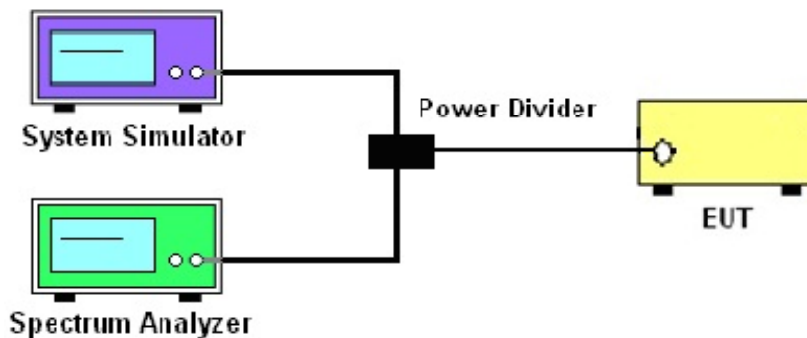
4. PEAK-TO-AVERAGE RATIO

4.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

4.1.1 MEASUREMENT METHOD

Use one of the procedures presented in 4.1.3 to measure the total peak power and record as P_{Pk}. Use one of the applicable procedures presented 4.1.3 to measure the total average power and record as P_{Avg}. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:
 $PAPR (dB) = P_{Pk} (dBm) - P_{Avg} (dBm)$.

4.1.2 TEST SETUP



4.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7 and ANSI C63.262015Section 5.2.6
2. The EUT was connected to spectrum and system simulator via a power divider
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Set the test probe and measure the peak and average power of the spectrum analyzer
5. Record the deviation as Peak to Average Ratio.

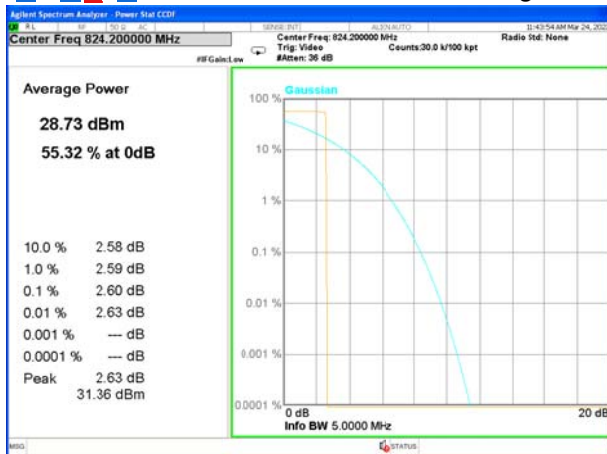
4.1.4 TEST RESULTS

GSM 850		
Mode	Frequency (MHz)	PAR
GSM 850	824.2	2.60
	836.6	2.40
	848.8	2.62
GPRS 850	824.2	2.40
	836.6	2.61
	848.8	2.62
EGPRS 850	824.2	2.62
	836.6	2.61
	848.8	2.61

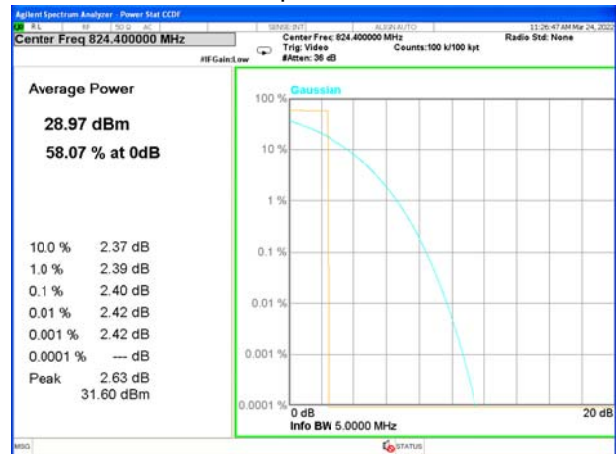
PCS 1900		
Mode	Frequency (MHz)	PAR
PCS1900	1850.2	2.65
	1880	2.63
	1909.8	2.62
GPRS1900	1850.2	2.66
	1880	2.64
	1909.8	2.62
EGPRS1900	1850.2	5.52
	1880	4.74
	1909.8	5.21

UMTS Band 2		
Mode	Frequency (MHz)	PAR
WCDMA 1900 RMC	1852.4	2.67
	1880	2.91
	1907.6	2.86
HSDPA 1900	1852.4	3.67
	1880	3.22
	1907.6	3.22
HSUPA 1900	1852.4	3.07
	1880	3.52
	1907.6	3.23

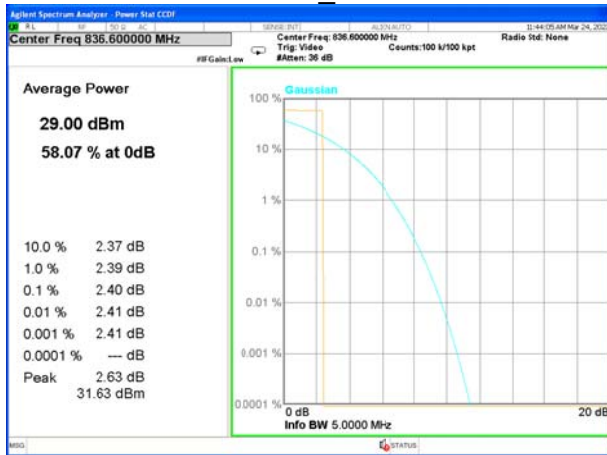
UMTS Band 5		
Mode	Frequency (MHz)	PAR
WCDMA 850 RMC	826.4	2.80
	836.6	3.04
	846.6	2.99
HSDPA 850	826.4	3.51
	836.6	3.42
	846.6	3.18
HSUPA 850	826.4	2.76
	836.6	3.25
	846.6	3.12



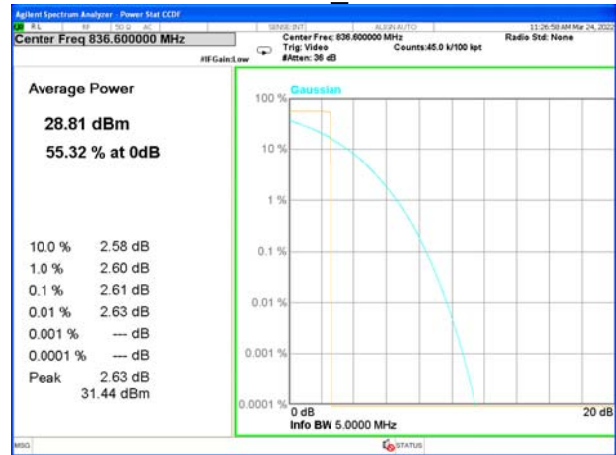
GSM850_Lower



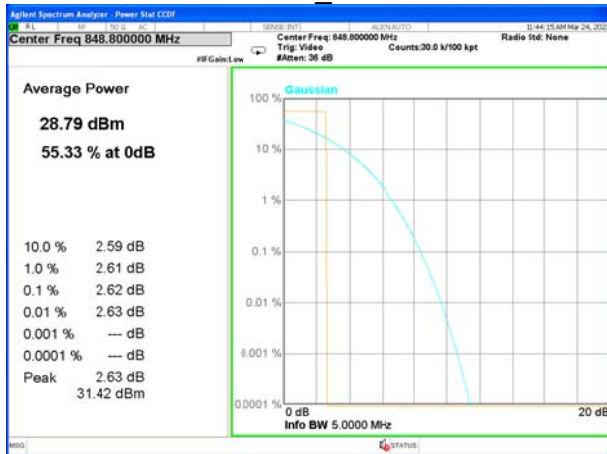
GPRS850_Lower



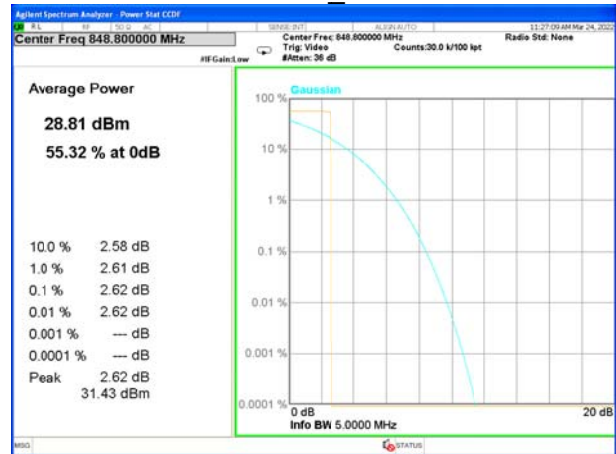
GSM850_Middle



GPRS850_Middle



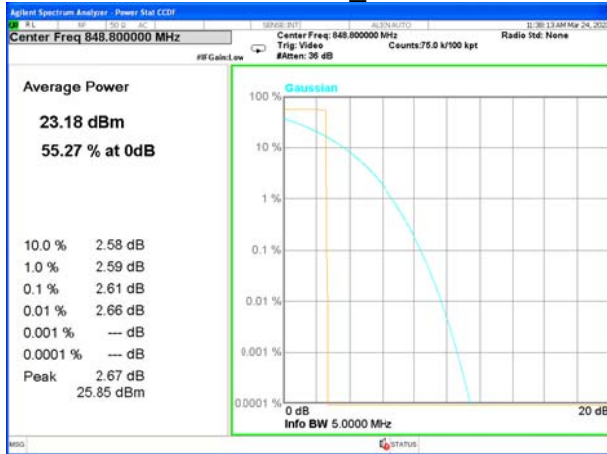
GSM850_Higher



GPRS850_Higher



EGPRS850_Low



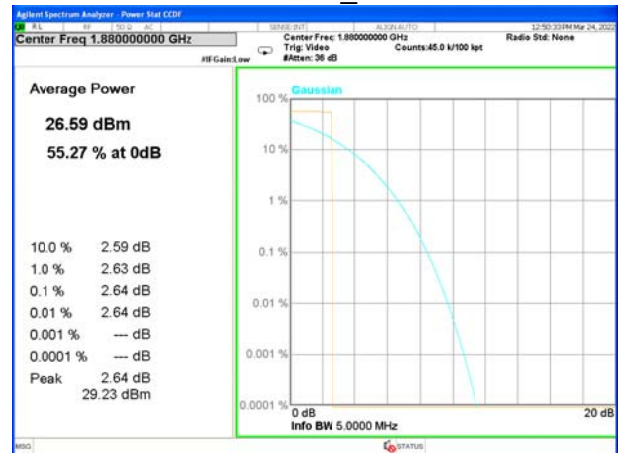
EGPRS850_High



GSM1900_Lower



GPRS1900_Lower

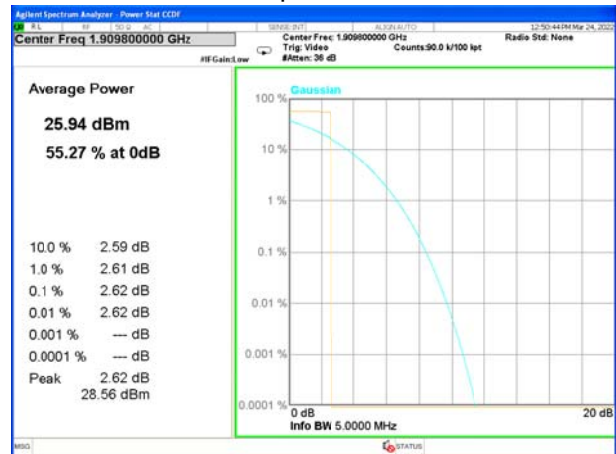


GSM1900_Middle

GPRS1900_Middle



GSM1900_Higher



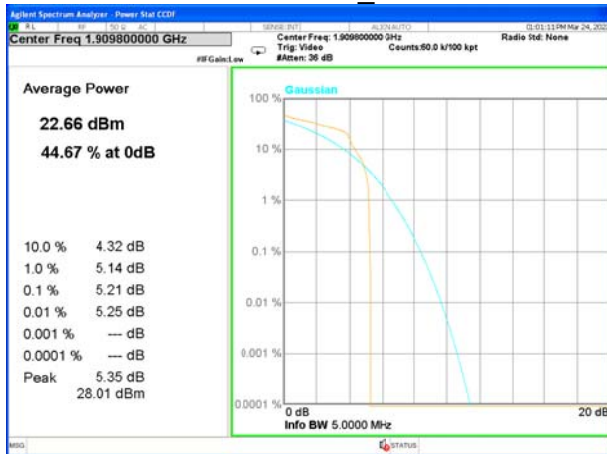
GPRS1900_Higher



EGPRS1900_Low



EGPRS1900_Middle



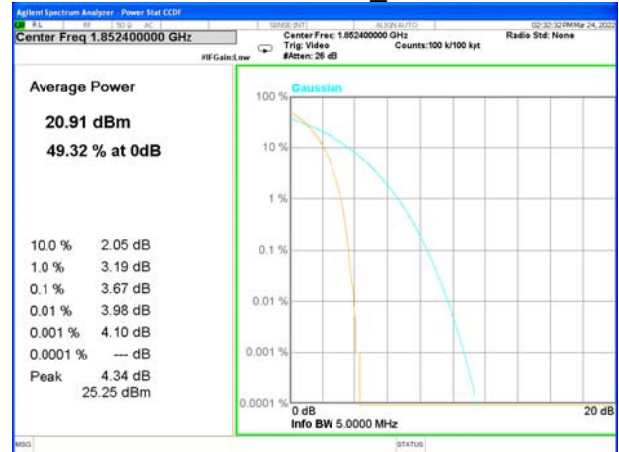
EGPRS1900_High



WCDMA Band 2_Low



WCDMA Band 2_Middle



WCDMA Band 2_High



HSDPA Band 2_Low



HSDPA Band 2_Middle

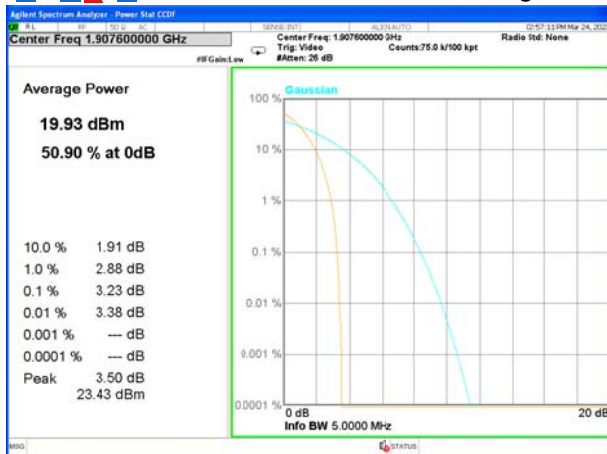


HSDPA Band 2_High

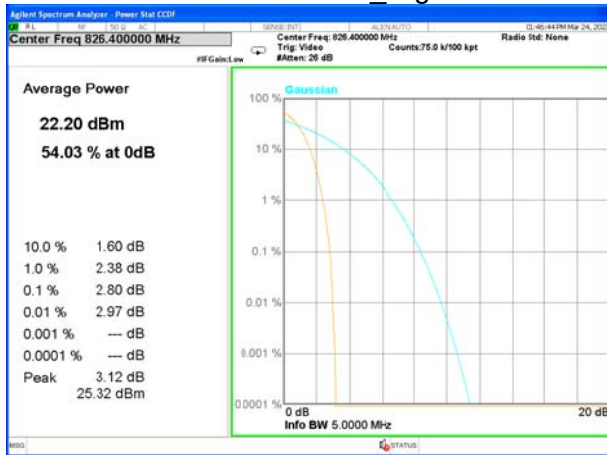


HSUPA Band 2_Low

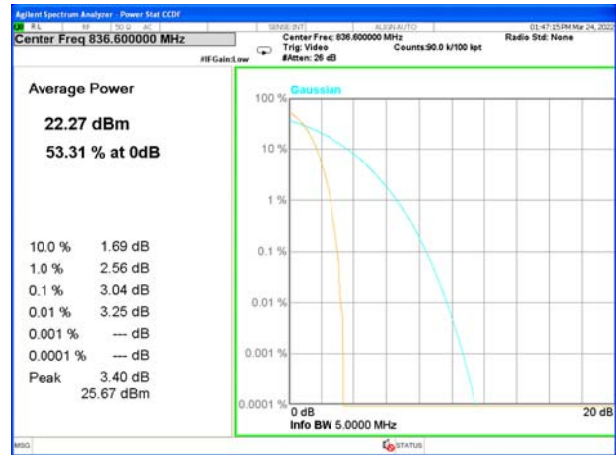
HSUPA Band 2_Middle



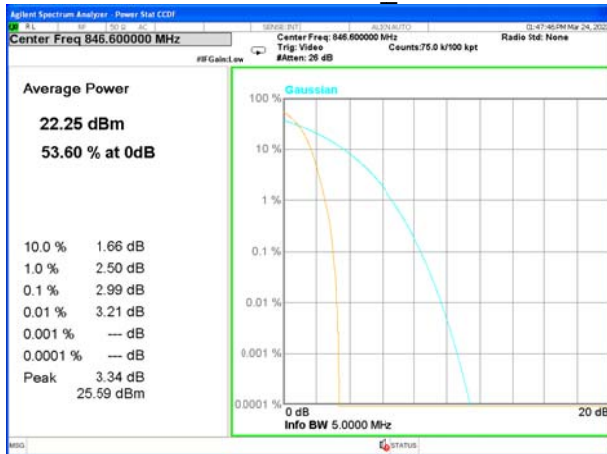
HSPA Band 2_High



WCDMA Band 5_Low



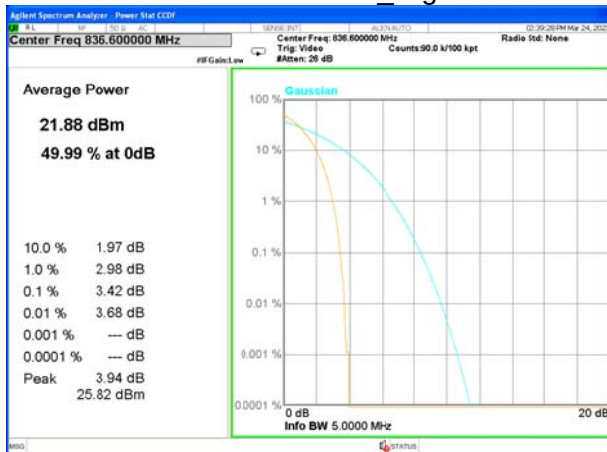
WCDMA Band 5_Middle



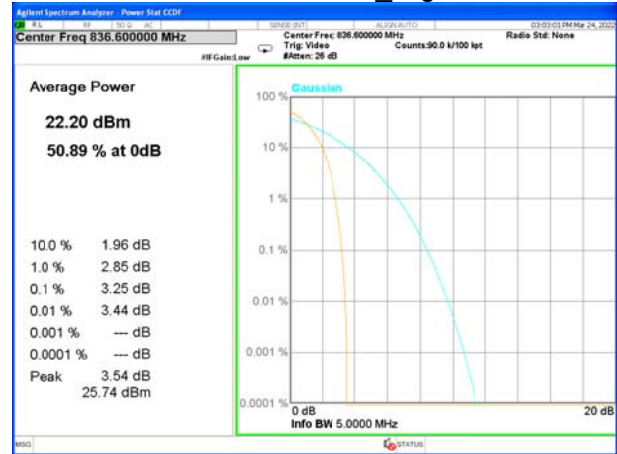
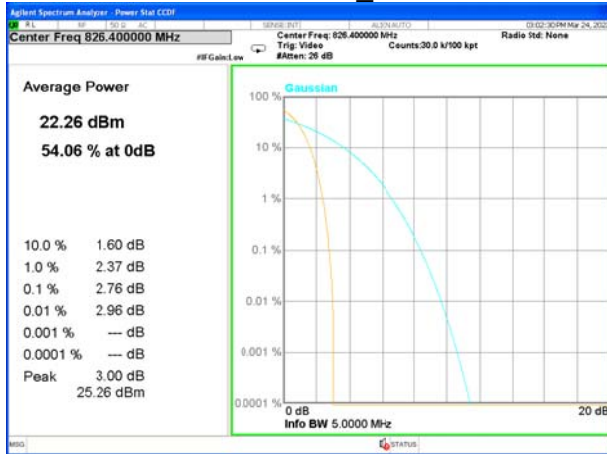
WCDMA Band 5_High



HSDPA Band 5_Low



HSDPA Band 5_Middle



HSUPA Band 5_Low



HSUPA Band 5_Middle

HSUPA Band 5_High

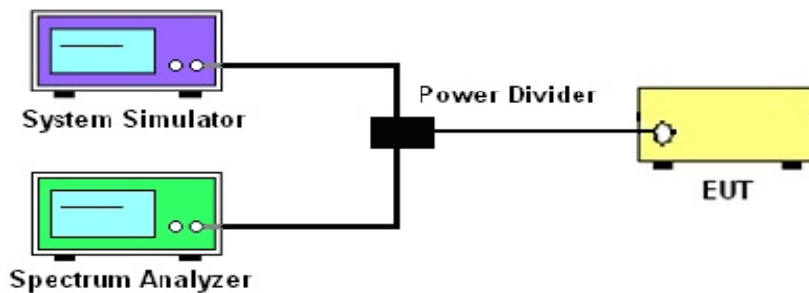
5. OCCUPIED BANDWIDTH

5.1 DESCRIPTION OF OCCUPIED BANDWIDTH MEASUREMENT

5.1.1 MEASUREMENT METHOD

1. The occupied bandwidth is 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 transmitted power.
2. The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

5.1.2 TEST SETUP



5.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01 v03r01 Section 4.2 and 4.3.
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Set the test probe and measure the Occupied Bandwidth of the spectrum analyzer.
5. Measure and record the Occupied Bandwidth from the Spectrum Analyzer.

5.1.4 MEASUREMENT RESULT

GSM Bandwidth [KHz]						
Mode	Lowest		Middle		Highest	
	99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
GSM850	246.78	313.6	246.98	312.9	246.41	318
GPRS850	247.48	321.1	246.21	317.5	246.48	315.7
EGPRS850	246.24	323.3	243.43	319.9	246.29	319.9

GSM Bandwidth [KHz]						
Mode	Lowest		Middle		Highest	
	99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
GSM1900	244.21	314.3	248.85	320.5	245.81	313.4
GPRS1900	244.92	316.6	246.56	314.1	247.31	314.4
EGPRS1900	243.81	320.7	247.48	323.6	248.28	319.5

WCDMA Bandwidth [MHz]						
Mode	Lowest		Middle		Highest	
	99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
WCDMA 2	4.144	4.651	4.147	4.65	4.155	4.642
HSDPA 2	4.141	4.66	4.1429	4.649	4.148	4.639
HSUPA 2	4.151	4.654	4.152	4.646	4.15	4.651

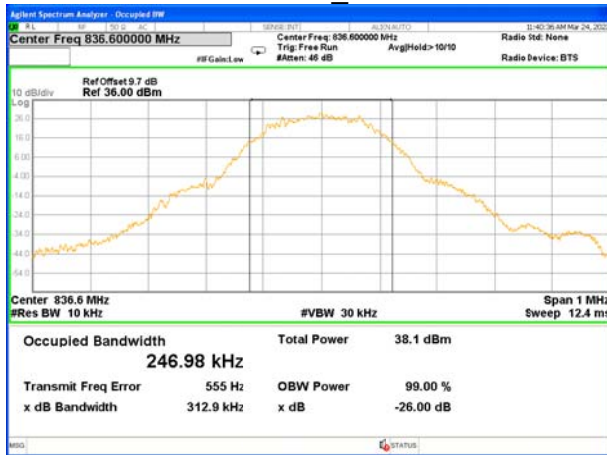
WCDMA Bandwidth [MHz]						
Mode	Lowest		Middle		Highest	
	99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
WCDMA 5	4.133	4.657	4.144	4.649	4.15	4.648
HSDPA 5	4.15	4.659	4.14	4.645	4.146	4.645
HSUPA 5	4.143	4.642	4.146	4.647	4.152	4.652



GSM850_Low



GPRS850_Low



GSM850_Middle



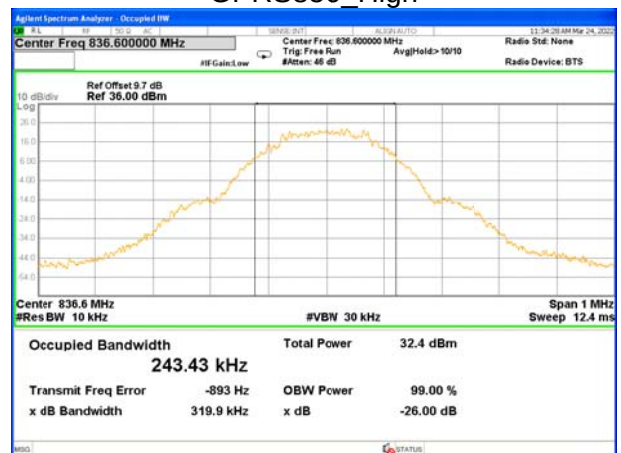
GPRS850_Middle



GSM850_High



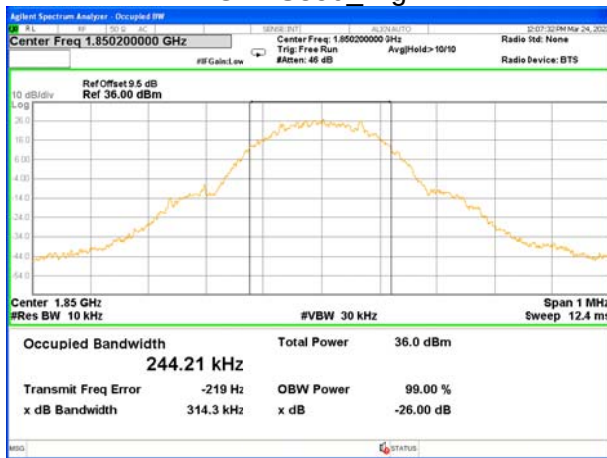
GPRS850_High



EGPRS850_Low



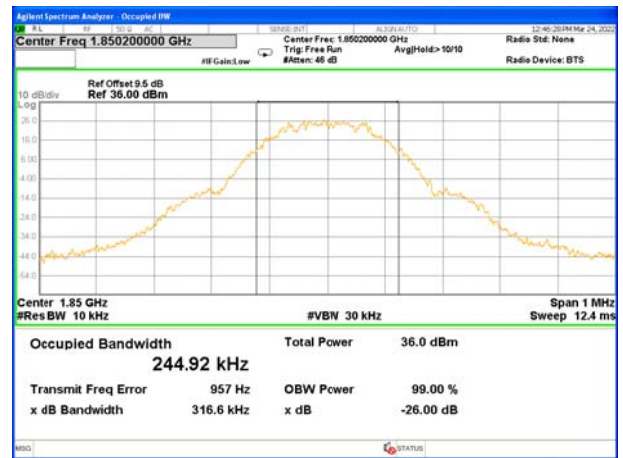
EGPRS850_High



GSM1900_Low



GSM1900_Middle



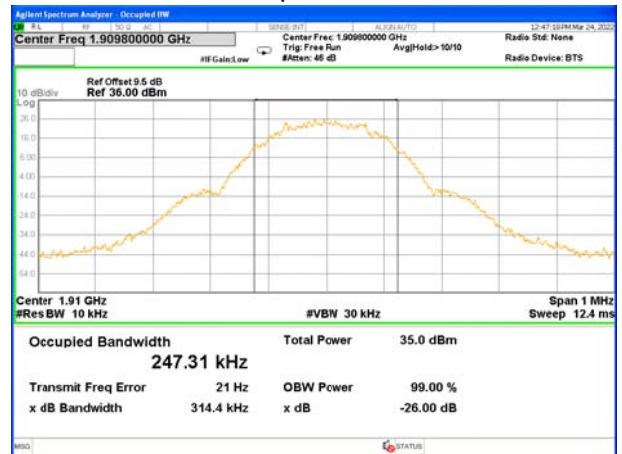
GPRS1900_Low



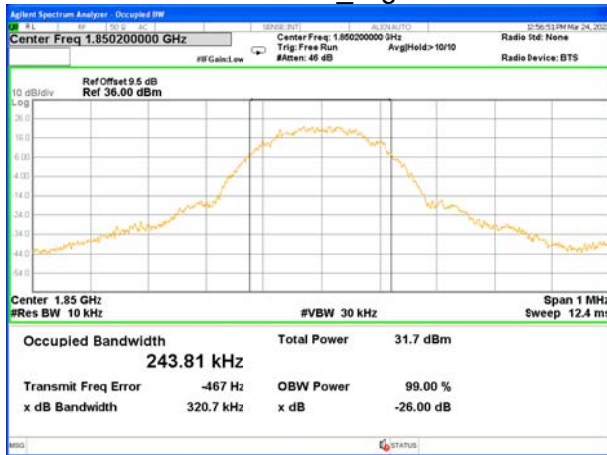
GPRS1900_Middle



GSM1900_High



GPRS1900_High



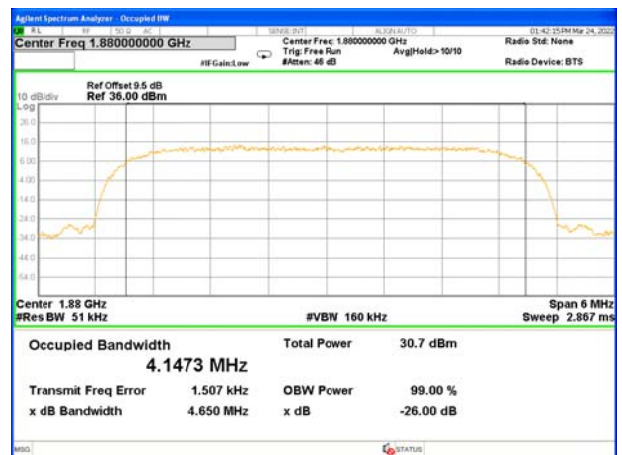
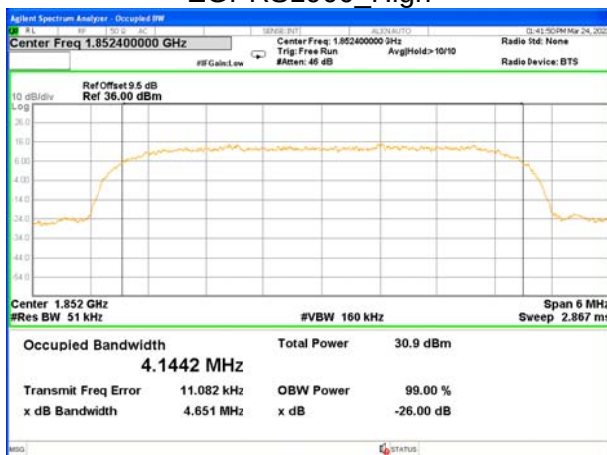
EGPRS1900_Low



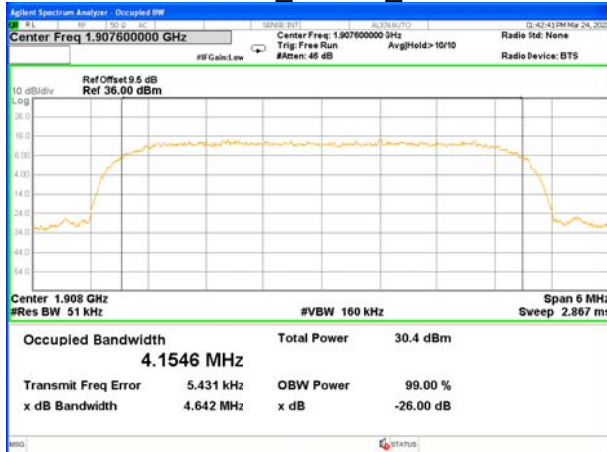
EGPRS1900_Middle



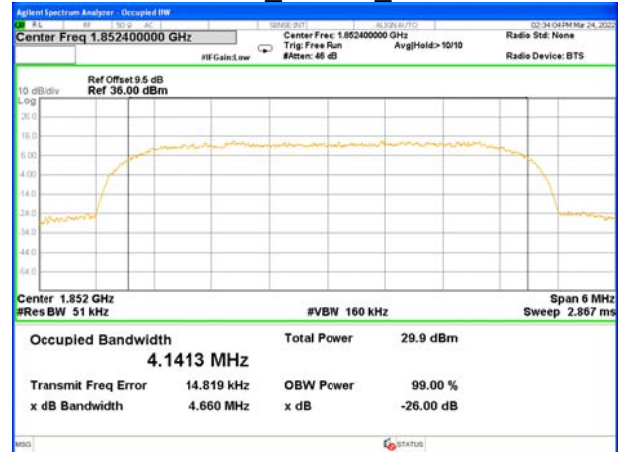
EGPRS1900_High



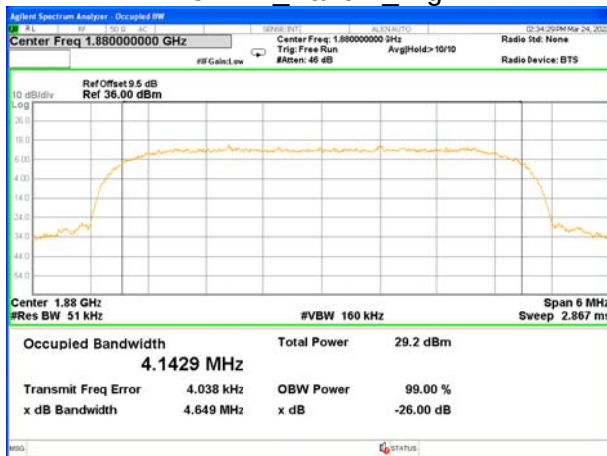
WCDMA_Band 2_Low



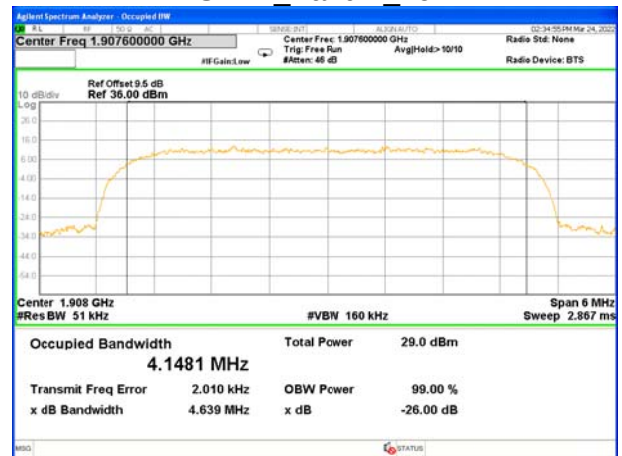
WCDMA_Band 2_Middle



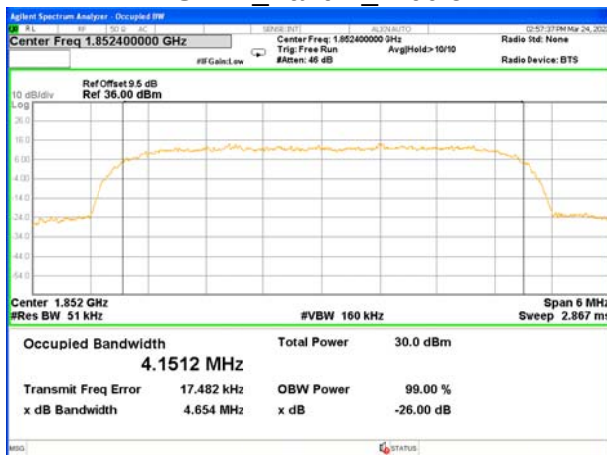
WCDMA_Band 2_High



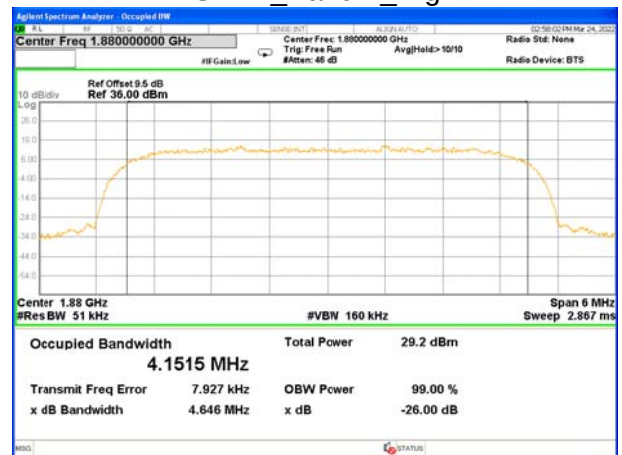
HSDPA_Band 2_Low



HSDPA_Band 2_Middle

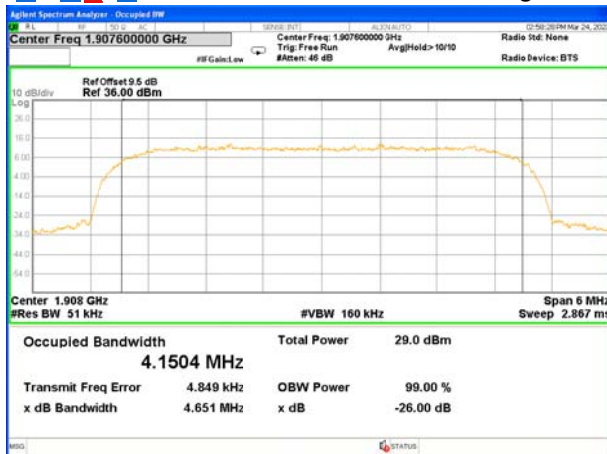


HSDPA_Band 2_High

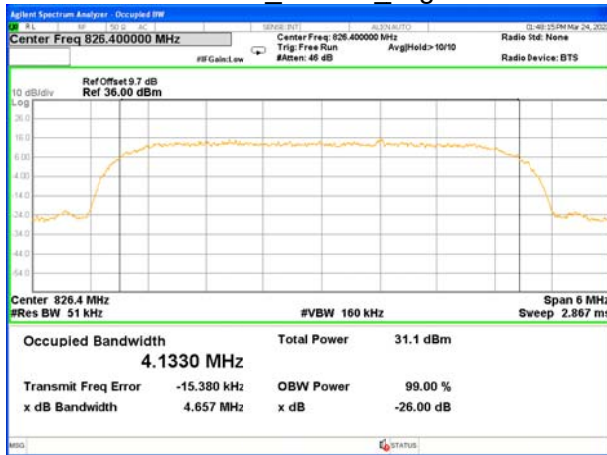


HSUPA_Band 2_Low

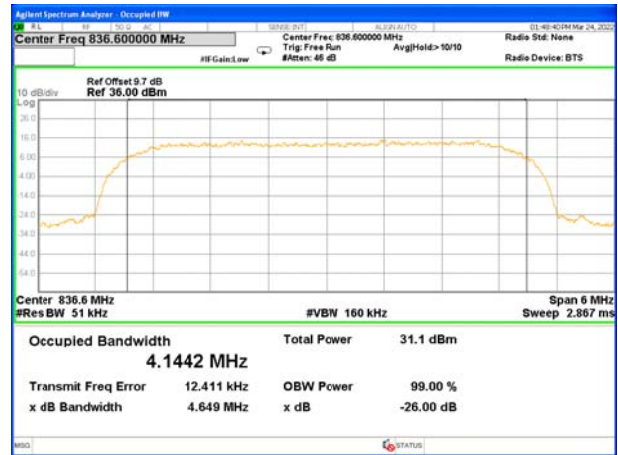
HSUPA_Band 2_Middle



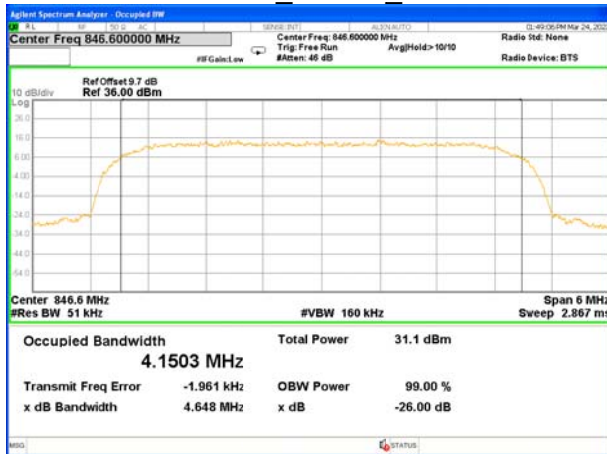
HSUPA_Band 2_High



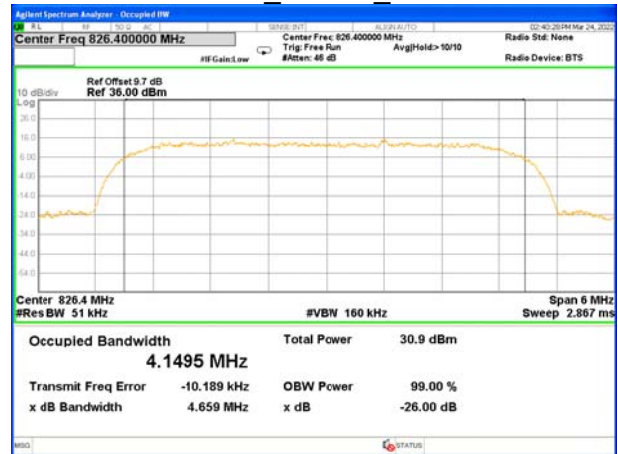
WCDMA_Band 5_Low



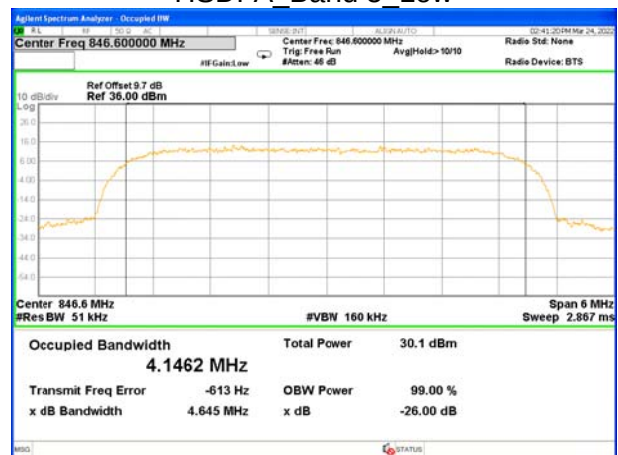
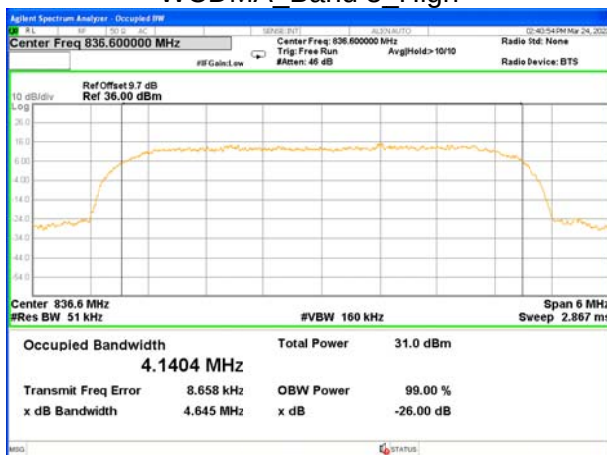
WCDMA_Band 5_Middle



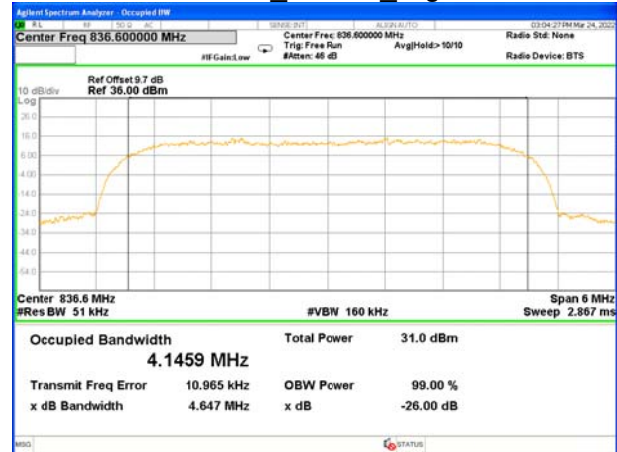
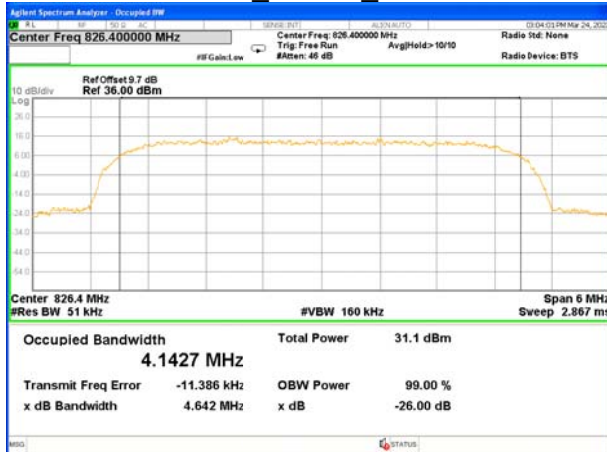
WCDMA_Band 5_High



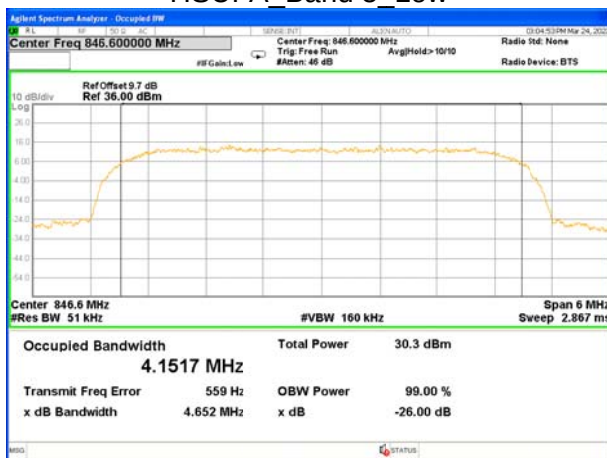
HSDPA_Band 5_Low



HSDPA_Band 5_Middle



HSUPA_Band 5_Low



HSUPA_Band 5_Middle

HSUPA_Band 5_High

6. CONDUCTED BAND EDGE

6.1 DESCRIPTION OF CONDUCTED BAND EDGE MEASUREMENT

6.1.1 MEASUREMENT METHOD

1. §22.917(a) For operations in the 824 – 849 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

2. §24.238 (a)

For operations in the 1850-1910 and 1930-1990 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 1MHz bandwidth. However, 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. §27.53 (h)

For operations in the 1710 – 1755 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

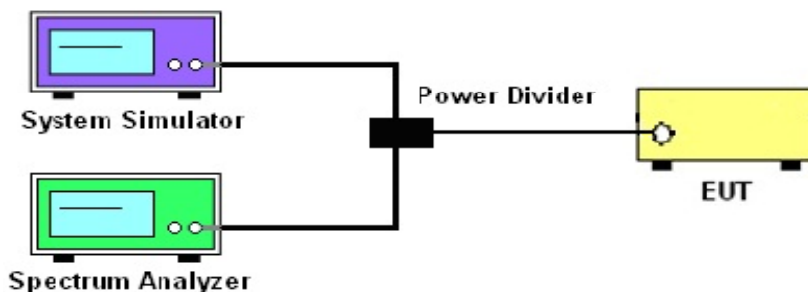
4. §27.53(m)(4)

For operations in the 2500 MHz ~ 2570 MHz band this section, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

5. §27.53 (g)

For operations in the 698 -746 MHz band, the FCC limit is $43 + 10 \log_{10}(P[\text{Watts}])$ dB below the transmitter power P(Watts) in a 100 kHz bandwidth. 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.

6.1.2 TEST SETUP



6.1.3 TEST PROCEDURES

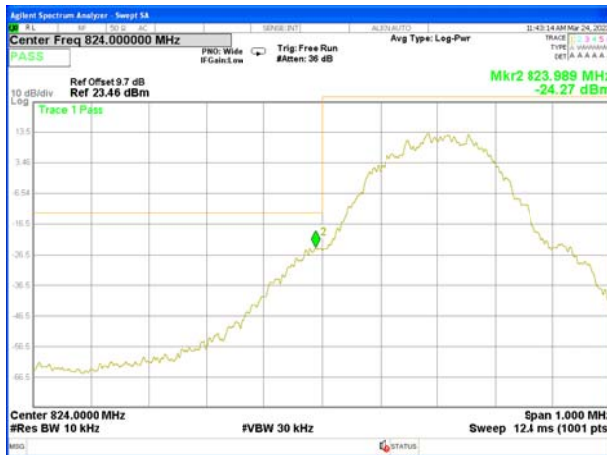
1. The testing FCC KDB 971168 D01 v03r01 Section 6.0 and ANSI C63.26 2015 Section 5.7.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured. Set RBW $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Set spectrum analyzer with RMS/AVG detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from $43 + 10 \log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10 \log(P)] \text{ (dB)}$$

$$= [30 + 10 \log(P)] \text{ (dBm)} - [43 + 10 \log(P)] \text{ (dB)}$$

$$= -13 \text{ dBm}.$$

6.1.4 MEASUREMENT RESULT



GSM850_Low



GPRS850_Low



GSM850_High



GPRS850_High



EGPRS850_Low



EGPRS850_High



GSM1900_Low



GPRS1900_Low



GSM1900_High



GPRS1900_High



EGPRS1900_Low



EGPRS1900_High



WCDMA_Band 2_Low



WCDMA_Band 2_Low



WCDMA_Band 2_High



WCDMA_Band 2_High



HSDPA_Band 2_Low



HSDPA_Band 2_Low



HSDPA_Band 2_High

HSDPA_Band 2_High



HSUPA_Band 2_Low



HSUPA_Band 2_Low



HSUPA_Band 2_High



HSUPA_Band 2_High



WCDMA_Band 5_Low



WCDMA_Band 5_High



HSDPA_Band 5_Low



HSUPA_Band 5_Low



HSUPA_Band 5_High

7. CONDUCTED SPURIOUS EMISSION

7.1 DESCRIPTION OF CONDUCTED SPURIOUS EMISSION MEASUREMENT

7.1.1 MEASUREMENT METHOD

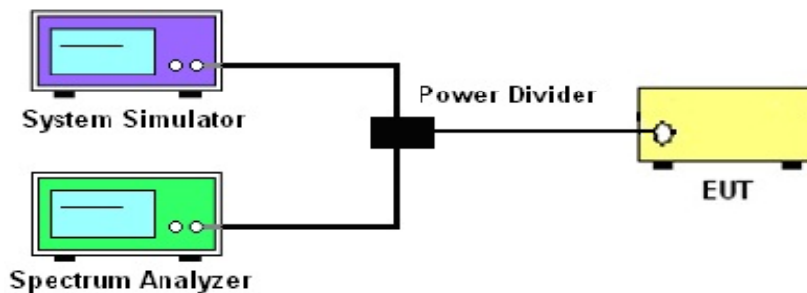
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For Band 7:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

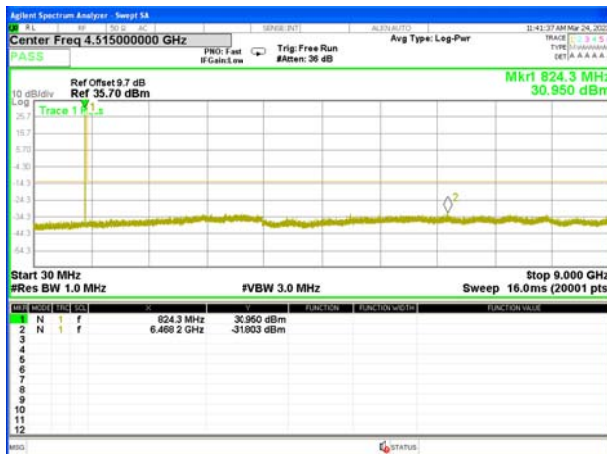
7.1.2 TEST SETUP



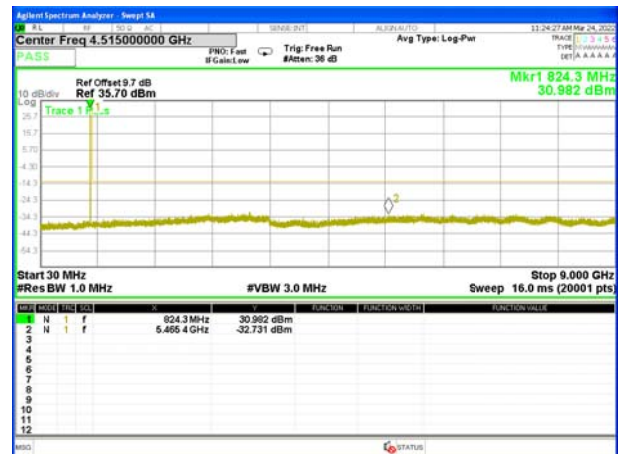
7.1.3 TEST PROCEDURES

1. The testing FCC KDB 971168 D01 v03r01 Section 6.0 and ANSI C63.26 2015 Section 5.7.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement
4. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from $43 + 10 \log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10 \log(P)] \text{ (dB)} = [30 + 10 \log(P)] \text{ (dBm)} - [43 + 10 \log(P)] \text{ (dB)}$
 $= -13 \text{ dBm}.$

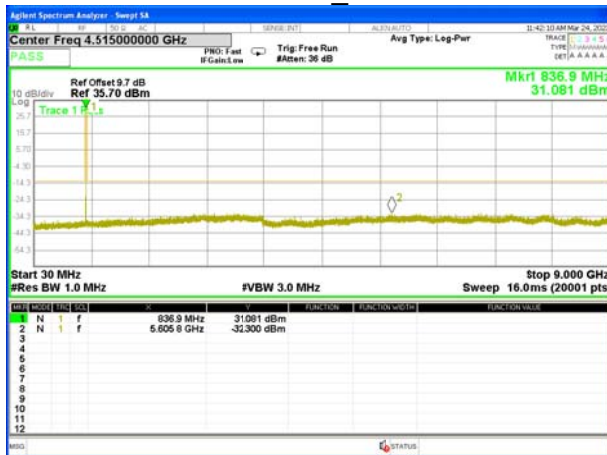
7.1.4 TEST RESULTS



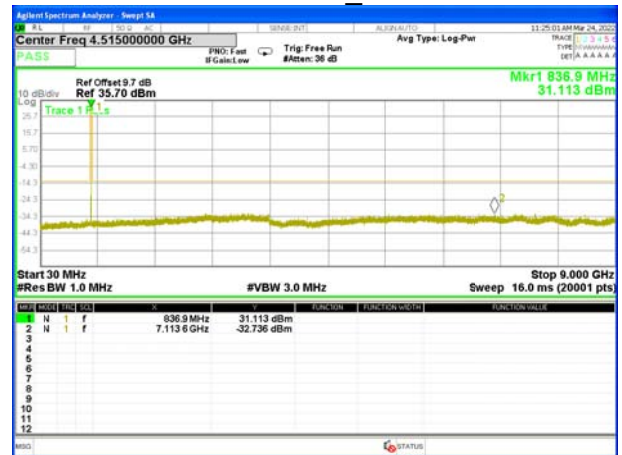
GSM850_Low



GPRS850_Low



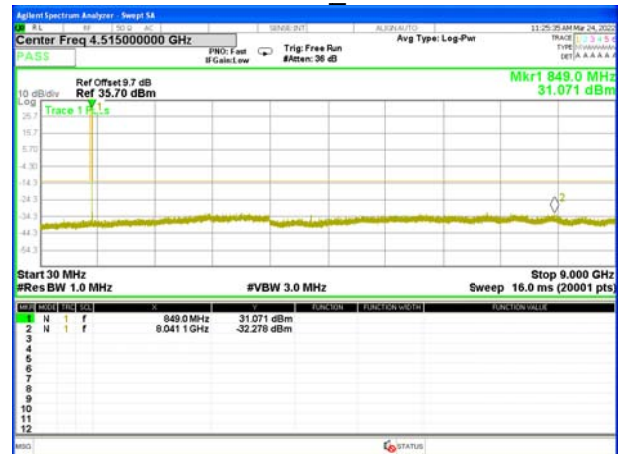
GSM850_Middle



GPRS850_Middle



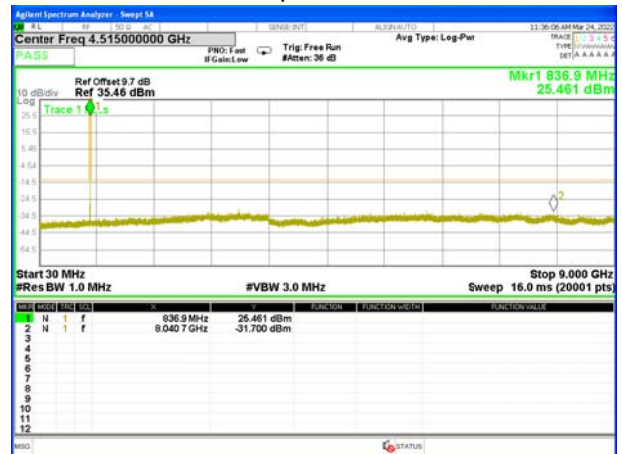
GSM850_High



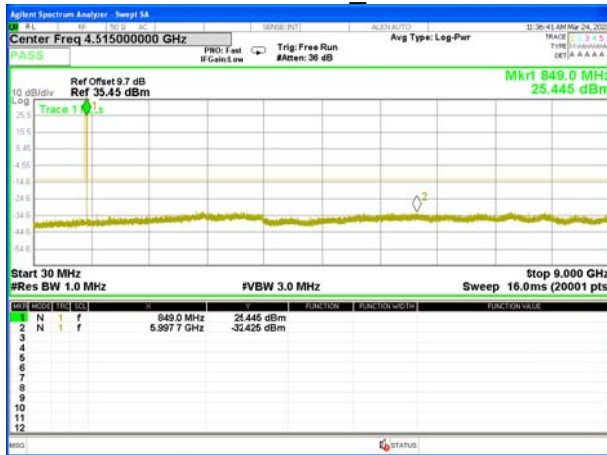
GPRS850_High



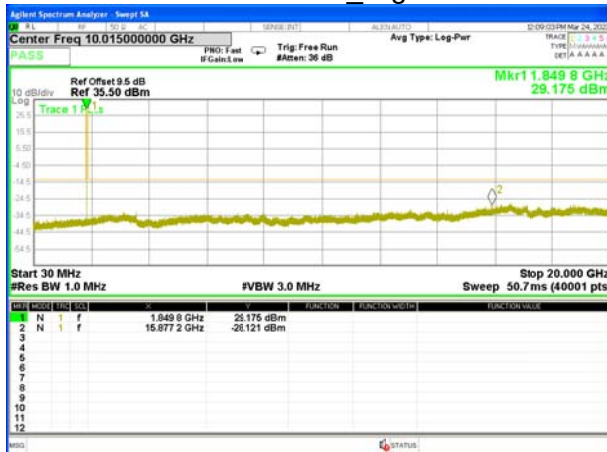
EGPRS850_Low



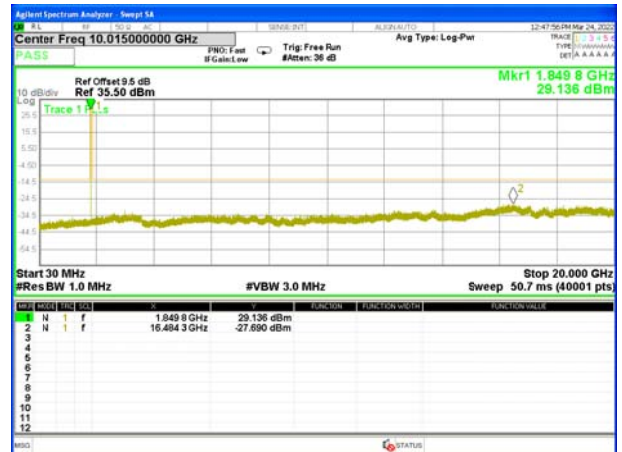
EGPRS850_Middle



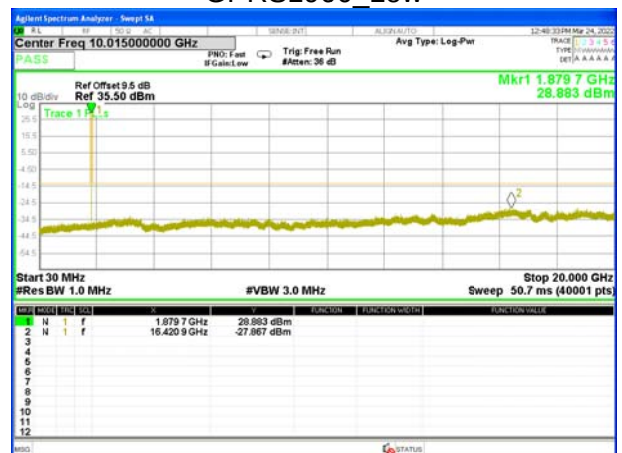
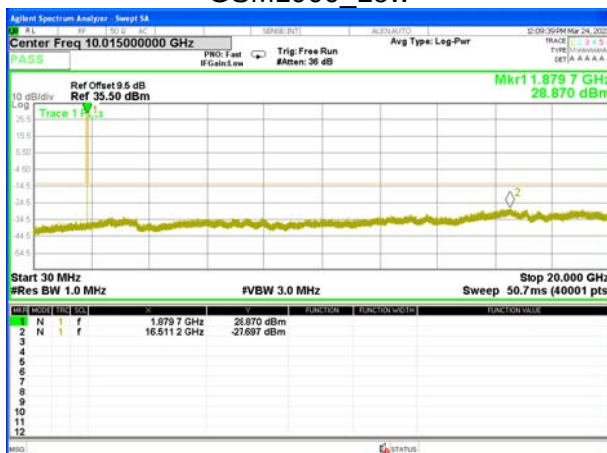
EGPRS850_High



GSM1900_Low



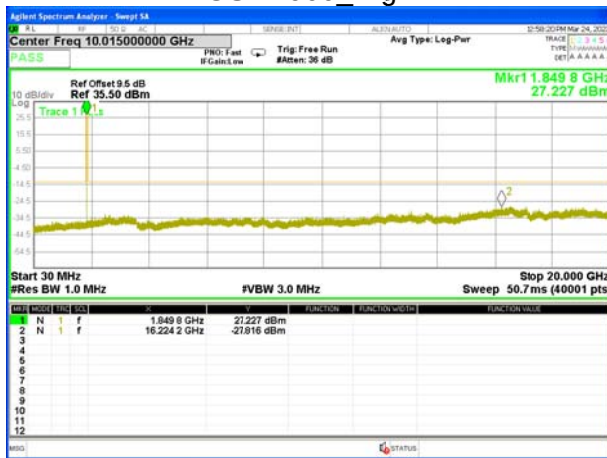
GPRS1900_Low



GSM1900_Middle



GSM1900_High

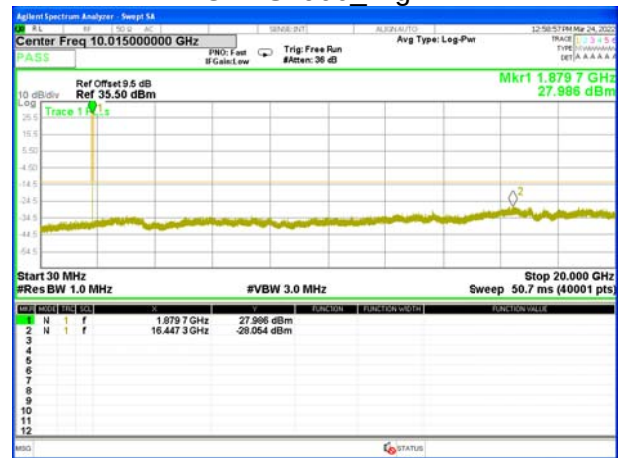


EGPRS1900_Low

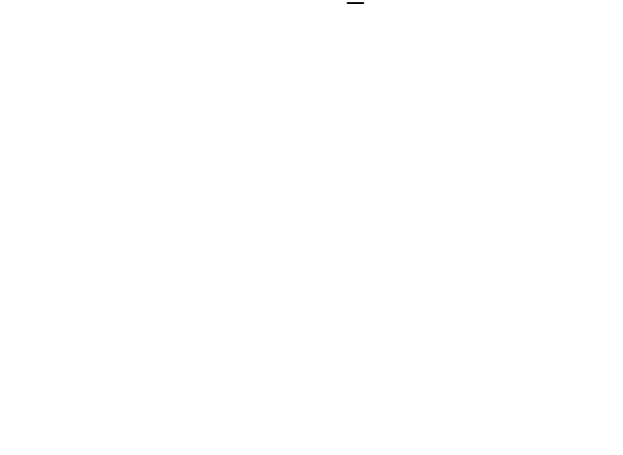


EGPRS1900_High

GPRS1900_High

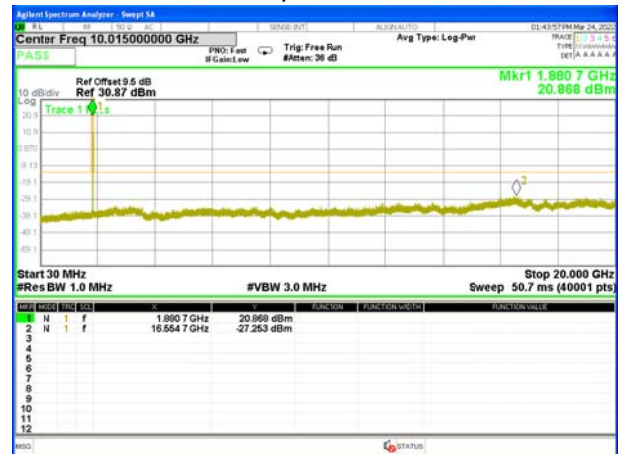


EGPRS1900_Middle

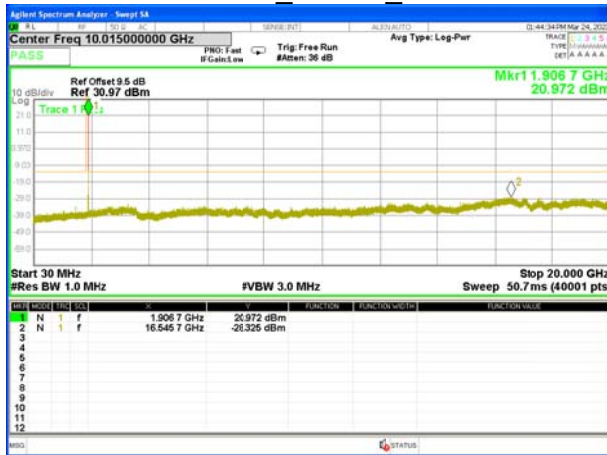




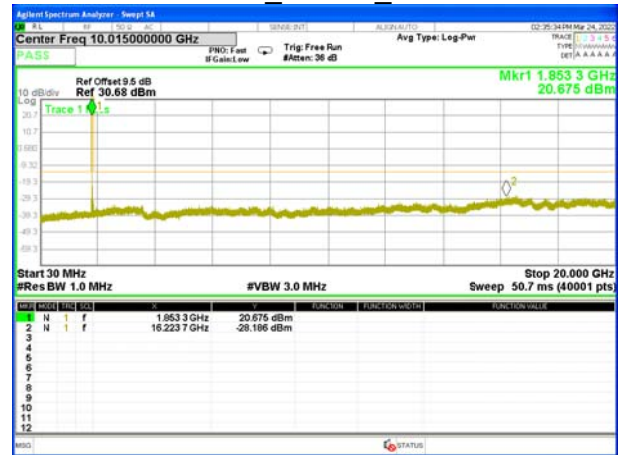
WCDMA_Band 2_Low



WCDMA_Band 2_Middle



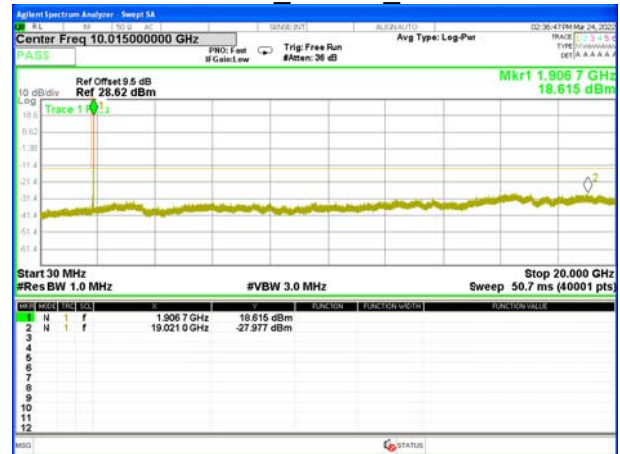
WCDMA_Band 2_High



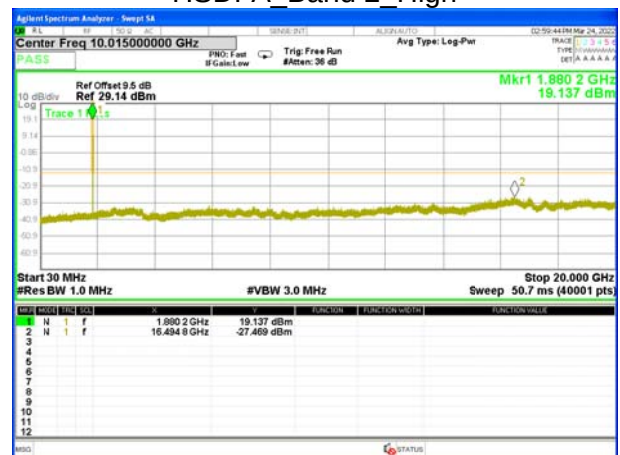
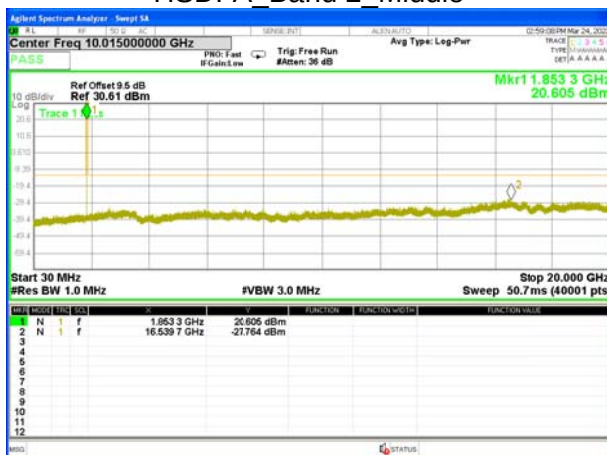
HSDPA_Band 2_Low



HSDPA_Band 2_Middle



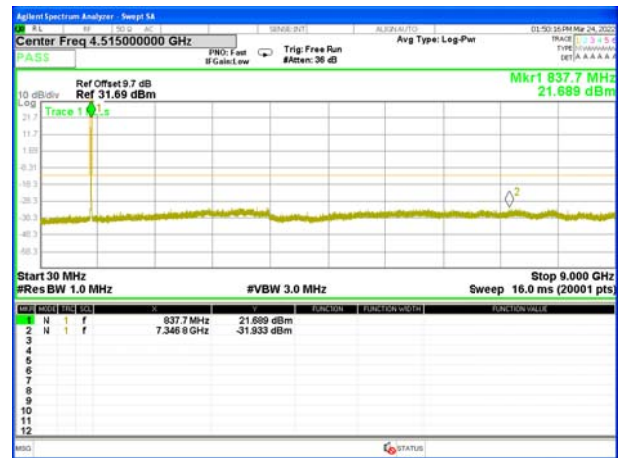
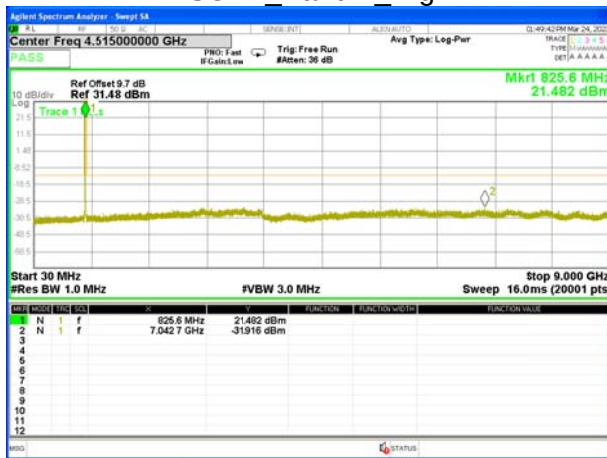
HSDPA_Band 2_High



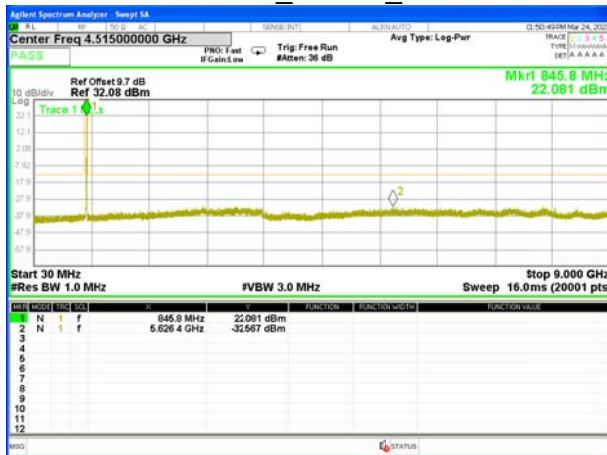
HSUPA_Band 2_Low



HSUPA_Band 2_High



WCDMA_Band 5_Low



WCDMA_Band 5_High

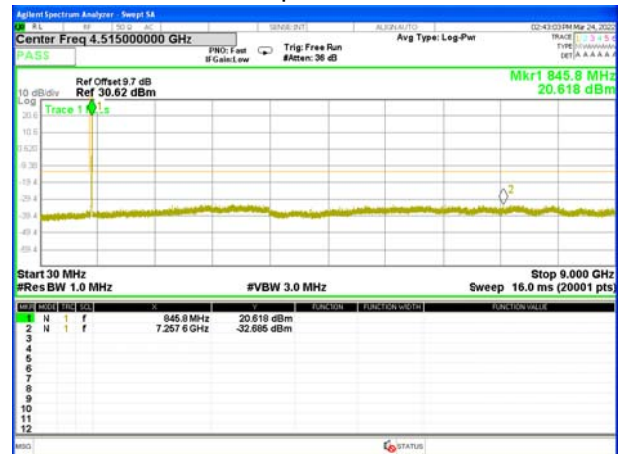


WCDMA_Band 5_Middle

HSDPA_Band 5_Low



HSDPA_Band 5_Middle



HSDPA_Band 5_High



HSUPA_Band 5_Low



HSUPA_Band 5_Middle



HSUPA_Band 5_High

8. RADIATED SPURIOUS EMISSION

8.1 DESCRIPTION OF RADIATED SPURIOUS EMISSION

8.1.1 MEASUREMENT METHOD

The radiated spurious emission was measured by substitution method according to ANSI C63.26 2015. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. For Band 7 The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

8.1.2 TEST SETUP

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, $RSE = Rx \text{ (dBuV)} + CL \text{ (dB)} + SA \text{ (dB)} + Gain \text{ (dBi)} - 107 \text{ (dBuV to dBm)}$ The SA is calibrated using following setup.

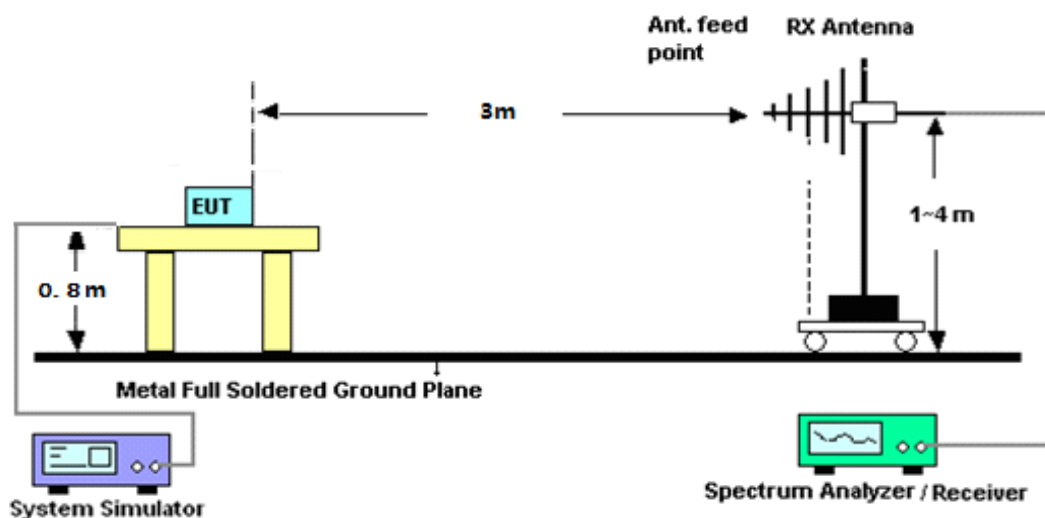
b) EUT was placed on 1.5 m non-conductive stand at a 3 m test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 m from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic measured with peak detector and 1MHz bandwidth.

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

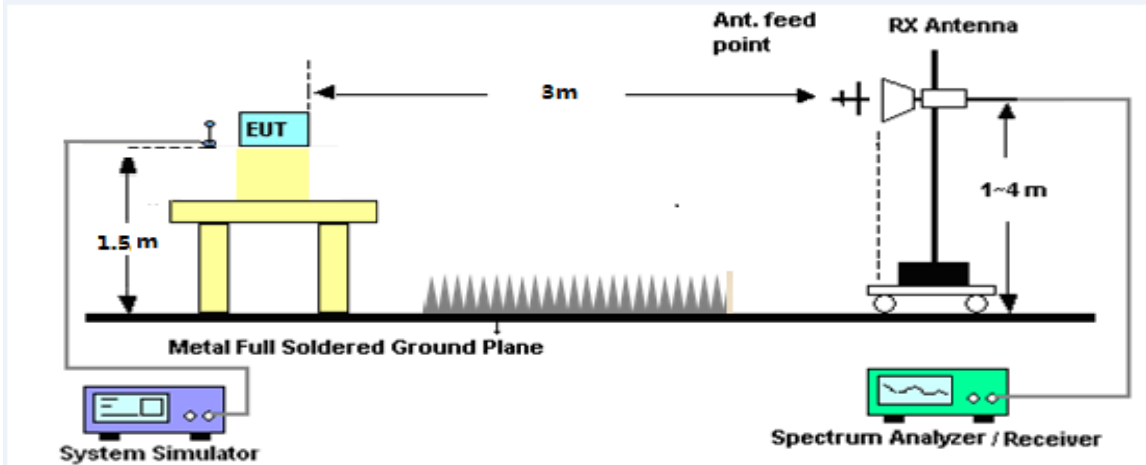
The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below:

Power = $P_{Mea} + AR_{pl}$

For radiated test from 30MHz to 1GHz



For radiated test from above 1GHz



8.1.3 TEST PROCEDURES

1. The testing FCC KDB 971168 D01 Section 7 and ANSI C63.26 2015 Section 5.5.
2. The EUT was placed on a rotatable wooden table with 1.5 meter above ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenntower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$

$$= -13\text{dBm}$$

8.1.4 TEST RESULTS

Note:(1) Spurious emissions which are attenuated by more than 20dB below the permissible value for frequency below 1000MHz.

(2) Above 3.5GHz amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value

(3)Test is divided into three directions, X/Y/Z. X pattern for the worst.

GSM 850: (30-9000)MHz							
The Worst Test Results Channel 128/824.2 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1648.17	-40.97	9.40	4.75	-36.32	-13.00	-23.32	H
2472.38	-39.24	10.60	8.39	-37.03	-13.00	-24.03	H
3296.80	-30.87	12.00	11.79	-30.66	-13.00	-17.66	H
1648.20	-43.82	9.40	4.75	-39.17	-13.00	-26.17	V
2472.46	-45.34	10.60	8.39	-43.13	-13.00	-30.13	V
3296.60	-43.73	12.00	11.79	-43.52	-13.00	-30.52	V
The Worst Test Results Channel 190/836.6 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1673.04	-40.35	9.50	4.76	-35.61	-13.00	-22.61	H
2509.73	-40.40	10.70	8.40	-38.10	-13.00	-25.10	H
3346.41	-31.52	12.20	11.80	-31.12	-13.00	-18.12	H
1672.88	-43.16	9.40	4.75	-38.51	-13.00	-25.51	V
2509.88	-45.38	10.60	8.39	-43.17	-13.00	-30.17	V
3346.25	-42.60	12.20	11.82	-42.22	-13.00	-29.22	V
The Worst Test Results Channel 251/848.8 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1697.28	-41.31	9.60	4.77	-36.48	-13.00	-23.48	H
2546.15	-40.47	10.80	8.50	-38.17	-13.00	-25.17	H
3394.93	-32.22	12.50	11.90	-31.62	-13.00	-18.62	H
1697.49	-44.55	9.60	4.77	-39.72	-13.00	-26.72	V
2546.30	-44.74	10.80	8.50	-42.44	-13.00	-29.44	V
3394.97	-42.88	12.50	11.90	-42.28	-13.00	-29.28	V

GPRS 850: (30-9000)MHz							
The Worst Test Results Channel 128/824.2 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1648.06	-41.28	9.40	4.75	-36.63	-13.00	-23.63	H
2472.29	-39.50	10.60	8.39	-37.29	-13.00	-24.29	H
3296.73	-32.06	12.00	11.79	-31.85	-13.00	-18.85	H
1648.22	-44.63	9.40	4.75	-39.98	-13.00	-26.98	V
2472.44	-45.10	10.60	8.39	-42.89	-13.00	-29.89	V
3296.65	-43.01	12.00	11.79	-42.80	-13.00	-29.80	V
The Worst Test Results Channel 190/836.6 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1672.96	-40.79	9.50	4.76	-36.05	-13.00	-23.05	H
2509.71	-39.84	10.70	8.40	-37.54	-13.00	-24.54	H
3346.42	-32.12	12.20	11.80	-31.72	-13.00	-18.72	H
1672.80	-43.73	9.40	4.75	-39.08	-13.00	-26.08	V
2509.69	-45.25	10.60	8.39	-43.04	-13.00	-30.04	V
3346.44	-43.16	12.20	11.82	-42.78	-13.00	-29.78	V
The Worst Test Results Channel 251/848.8 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1697.22	-40.74	9.60	4.77	-35.91	-13.00	-22.91	H
2546.07	-40.52	10.80	8.50	-38.22	-13.00	-25.22	H
3394.85	-32.08	12.50	11.90	-31.48	-13.00	-18.48	H
1697.48	-43.76	9.60	4.77	-38.93	-13.00	-25.93	V
2546.34	-44.32	10.80	8.50	-42.02	-13.00	-29.02	V
3395.25	-42.87	12.50	11.90	-42.27	-13.00	-29.27	V

EGPRS 850: (30-9000)MHz							
The Worst Test Results Channel 128/824.2 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1648.15	-40.98	9.40	4.75	-36.33	-13.00	-23.33	H
2472.32	-39.82	10.60	8.39	-37.61	-13.00	-24.61	H
3296.73	-31.81	12.00	11.79	-31.60	-13.00	-18.60	H
1648.46	-44.24	9.40	4.75	-39.59	-13.00	-26.59	V
2472.40	-45.39	10.60	8.39	-43.18	-13.00	-30.18	V
3296.70	-43.43	12.00	11.79	-43.22	-13.00	-30.22	V
The Worst Test Results Channel 190/836.6 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1673.15	-40.15	9.50	4.76	-35.41	-13.00	-22.41	H
2509.52	-40.45	10.70	8.40	-38.15	-13.00	-25.15	H
3346.23	-31.10	12.20	11.80	-30.70	-13.00	-17.70	H
1673.11	-43.47	9.40	4.75	-38.82	-13.00	-25.82	V
2509.55	-44.30	10.60	8.39	-42.09	-13.00	-29.09	V
3346.08	-42.87	12.20	11.82	-42.49	-13.00	-29.49	V
The Worst Test Results Channel 251/848.8 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1697.61	-41.06	9.60	4.77	-36.23	-13.00	-23.23	H
2546.37	-39.58	10.80	8.50	-37.28	-13.00	-24.28	H
3395.33	-31.44	12.50	11.90	-30.84	-13.00	-17.84	H
1697.27	-44.40	9.60	4.77	-39.57	-13.00	-26.57	V
2546.39	-44.78	10.80	8.50	-42.48	-13.00	-29.48	V
3395.09	-43.97	12.50	11.90	-43.37	-13.00	-30.37	V

DCS 1900: (30-20000)MHz							
The Worst Test Results for Channel 512/1850.2MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3700.36	-33.69	12.60	12.93	-34.02	-13.00	-21.02	H
5550.36	-34.08	13.10	17.11	-38.09	-13.00	-25.09	H
7400.84	-32.98	11.50	22.20	-43.68	-13.00	-30.68	H
3700.08	-35.84	12.60	12.93	-36.17	-13.00	-23.17	V
5550.70	-34.43	13.10	17.11	-38.44	-13.00	-25.44	V
7400.67	-32.12	11.50	22.20	-42.82	-13.00	-29.82	V
The Worst Test Results for Channel 661/1880.0MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3760.06	-33.62	12.60	12.93	-33.95	-13.00	-20.95	H
5639.87	-34.03	13.10	17.11	-38.04	-13.00	-25.04	H
7519.98	-33.17	11.50	22.20	-43.87	-13.00	-30.87	H
3760.23	-35.75	12.60	12.93	-36.08	-13.00	-23.08	V
5639.87	-34.65	13.10	17.11	-38.66	-13.00	-25.66	V
7520.15	-31.81	11.50	22.20	-42.51	-13.00	-29.51	V
The Worst Test Results for Channel 810/1909.8MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3819.68	-34.26	12.60	12.93	-34.59	-13.00	-21.59	H
5729.05	-35.46	13.10	17.11	-39.47	-13.00	-26.47	H
7639.30	-32.18	11.50	22.20	-42.88	-13.00	-29.88	H
3819.34	-34.80	12.60	12.93	-35.13	-13.00	-22.13	V
5729.31	-34.02	13.10	17.11	-38.03	-13.00	-25.03	V
7639.05	-32.25	11.50	22.20	-42.95	-13.00	-29.95	V

GPRS1900: (30-20000)MHz							
The Worst Test Results for Channel 512/1850.2MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3700.25	-33.69	12.60	12.93	-34.02	-13.00	-21.02	H
5550.29	-34.13	13.10	17.11	-38.14	-13.00	-25.14	H
7400.94	-33.02	11.50	22.20	-43.72	-13.00	-30.72	H
3700.37	-35.22	12.60	12.93	-35.55	-13.00	-22.55	V
5550.28	-35.21	13.10	17.11	-39.22	-13.00	-26.22	V
7400.71	-32.03	11.50	22.20	-42.73	-13.00	-29.73	V
The Worst Test Results for Channel 661/1880.0MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3759.82	-34.66	12.60	12.93	-34.99	-13.00	-21.99	H
5639.92	-34.64	13.10	17.11	-38.65	-13.00	-25.65	H
7519.82	-32.43	11.50	22.20	-43.13	-13.00	-30.13	H
3760.24	-35.30	12.60	12.93	-35.63	-13.00	-22.63	V
5640.30	-35.02	13.10	17.11	-39.03	-13.00	-26.03	V
7520.30	-32.34	11.50	22.20	-43.04	-13.00	-30.04	V
The Worst Test Results for Channel 810/1909.8MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3819.38	-33.44	12.60	12.93	-33.77	-13.00	-20.77	H
5729.29	-35.28	13.10	17.11	-39.29	-13.00	-26.29	H
7638.90	-33.20	11.50	22.20	-43.90	-13.00	-30.90	H
3819.48	-35.64	12.60	12.93	-35.97	-13.00	-22.97	V
5729.09	-35.01	13.10	17.11	-39.02	-13.00	-26.02	V
7639.02	-33.07	11.50	22.20	-43.77	-13.00	-30.77	V

EGPRS 1900: (30-20000)MHz							
The Worst Test Results for Channel 512/1850.2MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3700.49	-34.20	12.60	12.93	-34.53	-13.00	-21.53	H
5550.38	-34.51	13.10	17.11	-38.52	-13.00	-25.52	H
7400.51	-32.18	11.50	22.20	-42.88	-13.00	-29.88	H
3700.05	-34.92	12.60	12.93	-35.25	-13.00	-22.25	V
5550.32	-34.38	13.10	17.11	-38.39	-13.00	-25.39	V
7400.73	-32.51	11.50	22.20	-43.21	-13.00	-30.21	V
The Worst Test Results for Channel 661/1880.0MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3759.91	-34.00	12.60	12.93	-34.33	-13.00	-21.33	H
5639.84	-34.49	13.10	17.11	-38.50	-13.00	-25.50	H
7520.10	-32.70	11.50	22.20	-43.40	-13.00	-30.40	H
3759.98	-35.82	12.60	12.93	-36.15	-13.00	-23.15	V
5639.99	-35.14	13.10	17.11	-39.15	-13.00	-26.15	V
7520.29	-31.95	11.50	22.20	-42.65	-13.00	-29.65	V
The Worst Test Results for Channel 810/1909.8MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3819.44	-34.62	12.60	12.93	-34.95	-13.00	-21.95	H
5729.36	-35.21	13.10	17.11	-39.22	-13.00	-26.22	H
7639.15	-32.39	11.50	22.20	-43.09	-13.00	-30.09	H
3819.35	-34.84	12.60	12.93	-35.17	-13.00	-22.17	V
5729.32	-33.86	13.10	17.11	-37.87	-13.00	-24.87	V
7639.23	-32.27	11.50	22.20	-42.97	-13.00	-29.97	V

WCDMA Band 5: (30-9000)MHz							
The worst testresults channel 4132/826.4MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1652.05	-40.68	9.40	4.75	-36.03	-13.00	-23.03	H
2479.60	-40.15	10.60	8.39	-37.94	-13.00	-24.94	H
3305.44	-31.66	12.00	11.79	-31.45	-13.00	-18.45	H
1652.29	-43.58	9.40	4.75	-38.93	-13.00	-25.93	V
2479.56	-44.32	10.60	8.39	-42.11	-13.00	-29.11	V
3305.59	-43.71	12.00	11.79	-43.50	-13.00	-30.50	V
The Worst Test Results Channel 4183/836.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1673.23	-41.36	9.40	4.75	-36.71	-13.00	-23.71	H
2509.73	-40.24	10.60	8.39	-38.03	-13.00	-25.03	H
3346.24	-31.88	12.00	11.79	-31.67	-13.00	-18.67	H
1673.03	-44.36	9.40	4.75	-39.71	-13.00	-26.71	V
2509.88	-44.08	10.60	8.39	-41.87	-13.00	-28.87	V
3346.00	-43.41	12.00	11.79	-43.20	-13.00	-30.20	V
The Worst Test Results Channel 4233/846.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1693.24	-40.64	9.40	4.75	-35.99	-13.00	-22.99	H
2539.35	-40.03	10.60	8.39	-37.82	-13.00	-24.82	H
3385.99	-30.89	12.00	11.79	-30.68	-13.00	-17.68	H
1693.25	-43.68	9.40	4.75	-39.03	-13.00	-26.03	V
2539.52	-44.19	10.60	8.39	-41.98	-13.00	-28.98	V
3386.14	-43.68	12.00	11.79	-43.47	-13.00	-30.47	V

HSUPA Band 5: (30-9000)MHz							
The worst testresults channel 4132/826.4MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1652.44	-41.25	9.40	4.75	-36.60	-13.00	-23.60	H
2479.33	-40.31	10.60	8.39	-38.10	-13.00	-25.10	H
3305.81	-31.66	12.00	11.79	-31.45	-13.00	-18.45	H
1652.13	-44.56	9.40	4.75	-39.91	-13.00	-26.91	V
2479.70	-44.59	10.60	8.39	-42.38	-13.00	-29.38	V
3305.68	-42.73	12.00	11.79	-42.52	-13.00	-29.52	V
The Worst Test Results Channel 4183/836.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1673.13	-40.50	9.40	4.75	-35.85	-13.00	-22.85	H
2509.54	-40.65	10.60	8.39	-38.44	-13.00	-25.44	H
3346.41	-31.21	12.00	11.79	-31.00	-13.00	-18.00	H
1673.20	-43.67	9.40	4.75	-39.02	-13.00	-26.02	V
2509.53	-45.07	10.60	8.39	-42.86	-13.00	-29.86	V
3346.11	-43.96	12.00	11.79	-43.75	-13.00	-30.75	V
The Worst Test Results Channel 4233/846.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1693.31	-40.32	9.40	4.75	-35.67	-13.00	-22.67	H
2539.44	-39.23	10.60	8.39	-37.02	-13.00	-24.02	H
3386.08	-31.67	12.00	11.79	-31.46	-13.00	-18.46	H
1693.25	-43.92	9.40	4.75	-39.27	-13.00	-26.27	V
2539.41	-44.02	10.60	8.39	-41.81	-13.00	-28.81	V
3386.32	-42.84	12.00	11.79	-42.63	-13.00	-29.63	V

HSDPA Band 5: (30-9000)MHz							
The worst testresults channel 4132/826.4MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1652.22	-41.13	9.40	4.75	-36.48	-13.00	-23.48	H
2479.63	-39.82	10.60	8.39	-37.61	-13.00	-24.61	H
3305.71	-31.65	12.00	11.79	-31.44	-13.00	-18.44	H
1652.44	-43.45	9.40	4.75	-38.80	-13.00	-25.80	V
2479.37	-45.12	10.60	8.39	-42.91	-13.00	-29.91	V
3305.90	-43.14	12.00	11.79	-42.93	-13.00	-29.93	V
The Worst Test Results Channel 4183/836.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1673.20	-41.62	9.40	4.75	-36.97	-13.00	-23.97	H
2509.71	-39.17	10.60	8.39	-36.96	-13.00	-23.96	H
3346.40	-31.42	12.00	11.79	-31.21	-13.00	-18.21	H
1672.81	-43.29	9.40	4.75	-38.64	-13.00	-25.64	V
2509.44	-44.59	10.60	8.39	-42.38	-13.00	-29.38	V
3346.38	-43.94	12.00	11.79	-43.73	-13.00	-30.73	V
The Worst Test Results Channel 4233/846.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1693.31	-41.42	9.40	4.75	-36.77	-13.00	-23.77	H
2539.26	-40.50	10.60	8.39	-38.29	-13.00	-25.29	H
3385.91	-31.94	12.00	11.79	-31.73	-13.00	-18.73	H
1693.30	-43.21	9.40	4.75	-38.56	-13.00	-25.56	V
2539.16	-44.68	10.60	8.39	-42.47	-13.00	-29.47	V
3386.09	-43.44	12.00	11.79	-43.23	-13.00	-30.23	V

WCDMA Band 2: (30-20000)MHz							
The Worst Test Results for Channel 9262/1852.4MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3704.36	-34.13	12.60	12.93	-34.46	-13.00	-21.46	H
5557.29	-34.85	13.10	17.11	-38.86	-13.00	-25.86	H
7409.83	-33.40	11.50	22.20	-44.10	-13.00	-31.10	H
3704.07	-35.40	12.60	12.93	-35.73	-13.00	-22.73	V
5557.18	-35.11	13.10	17.11	-39.12	-13.00	-26.12	V
7409.68	-32.99	11.50	22.20	-43.69	-13.00	-30.69	V
The Worst Test Results for Channel 9400/1880MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3759.98	-34.28	12.60	12.93	-34.61	-13.00	-21.61	H
5639.90	-35.24	13.10	17.11	-39.25	-13.00	-26.25	H
7519.98	-32.98	11.50	22.20	-43.68	-13.00	-30.68	H
3760.23	-35.42	12.60	12.93	-35.75	-13.00	-22.75	V
5639.97	-33.99	13.10	17.11	-38.00	-13.00	-25.00	V
7519.87	-33.12	11.50	22.20	-43.82	-13.00	-30.82	V
The Worst Test Results for Channel 9538/1907.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3815.71	-34.55	12.60	12.93	-34.88	-13.00	-21.88	H
5722.21	-34.48	13.10	17.11	-38.49	-13.00	-25.49	H
7630.00	-32.29	11.50	22.20	-42.99	-13.00	-29.99	H
3815.72	-35.84	12.60	12.93	-36.17	-13.00	-23.17	V
5722.22	-34.47	13.10	17.11	-38.48	-13.00	-25.48	V
7630.21	-32.28	11.50	22.20	-42.98	-13.00	-29.98	V

HSUPA Band 2: (30-20000)MHz							
The Worst Test Results for Channel 9262/1852.4MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3704.32	-34.57	12.60	12.93	-34.90	-13.00	-21.90	H
5557.33	-35.41	13.10	17.11	-39.42	-13.00	-26.42	H
7409.52	-32.29	11.50	22.20	-42.99	-13.00	-29.99	H
3704.16	-35.96	12.60	12.93	-36.29	-13.00	-23.29	V
5557.23	-34.18	13.10	17.11	-38.19	-13.00	-25.19	V
7409.92	-33.02	11.50	22.20	-43.72	-13.00	-30.72	V
The Worst Test Results for Channel 9400/1880MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3760.09	-34.22	12.60	12.93	-34.55	-13.00	-21.55	H
5640.14	-34.73	13.10	17.11	-38.74	-13.00	-25.74	H
7519.91	-32.79	11.50	22.20	-43.49	-13.00	-30.49	H
3759.94	-34.79	12.60	12.93	-35.12	-13.00	-22.12	V
5640.27	-33.91	13.10	17.11	-37.92	-13.00	-24.92	V
7520.11	-32.61	11.50	22.20	-43.31	-13.00	-30.31	V
The Worst Test Results for Channel 9538/1907.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3815.54	-34.42	12.60	12.93	-34.75	-13.00	-21.75	H
5722.38	-34.08	13.10	17.11	-38.09	-13.00	-25.09	H
7629.96	-33.50	11.50	22.20	-44.20	-13.00	-31.20	H
3815.38	-35.27	12.60	12.93	-35.60	-13.00	-22.60	V
5722.14	-35.08	13.10	17.11	-39.09	-13.00	-26.09	V
7630.02	-32.03	11.50	22.20	-42.73	-13.00	-29.73	V

HSDPA Band 2: (30-20000)MHz							
The Worst Test Results for Channel 9262/1852.4MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3704.35	-33.45	12.60	12.93	-33.78	-13.00	-20.78	H
5557.29	-34.36	13.10	17.11	-38.37	-13.00	-25.37	H
7409.48	-32.60	11.50	22.20	-43.30	-13.00	-30.30	H
3704.49	-35.72	12.60	12.93	-36.05	-13.00	-23.05	V
5557.42	-34.02	13.10	17.11	-38.03	-13.00	-25.03	V
7409.90	-32.92	11.50	22.20	-43.62	-13.00	-30.62	V
The Worst Test Results for Channel 9400/1880MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3760.21	-34.49	12.60	12.93	-34.82	-13.00	-21.82	H
5639.87	-34.21	13.10	17.11	-38.22	-13.00	-25.22	H
7520.15	-32.33	11.50	22.20	-43.03	-13.00	-30.03	H
3759.99	-35.49	12.60	12.93	-35.82	-13.00	-22.82	V
5639.93	-34.28	13.10	17.11	-38.29	-13.00	-25.29	V
7519.91	-32.84	11.50	22.20	-43.54	-13.00	-30.54	V
The Worst Test Results for Channel 9538/1907.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3815.26	-34.64	12.60	12.93	-34.97	-13.00	-21.97	H
5722.47	-34.17	13.10	17.11	-38.18	-13.00	-25.18	H
7630.01	-33.53	11.50	22.20	-44.23	-13.00	-31.23	H
3815.24	-34.63	12.60	12.93	-34.96	-13.00	-21.96	V
5722.24	-34.04	13.10	17.11	-38.05	-13.00	-25.05	V
7629.85	-32.46	11.50	22.20	-43.16	-13.00	-30.16	V

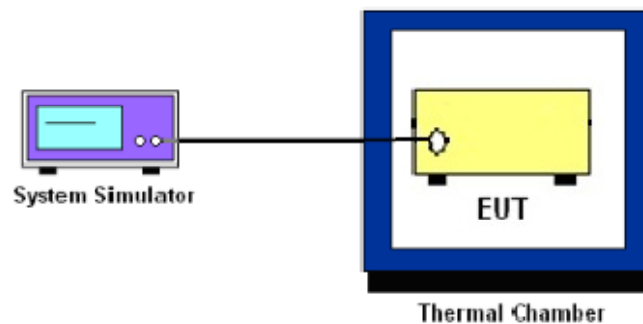
9. FREQUENCY STABILITY

9.1 DESCRIPTION OF FREQUENCY STABILITY MEASUREMENT

9.1.1 MEASUREMENT METHOD

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

9.1.2 TEST SETUP



9.1.3 TEST PROCEDURES FOR TEMPERATURE VARIATION

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

9.1.4 TEST PROCEDURES FOR VOLTAGE VARIATION

1. The testing follows FCC KDB 971168 D01v01r03 Section 9.
2. The EUT was placed in a temperature chamber at $25 \pm 5^{\circ}\text{C}$ and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

9.1.5 TEST RESULTS

Normal Voltage = 3.7V; Battery End Point (BEP) = 3.4V;Maximum Voltage =4.2V

GSM 850 /836.6MHz					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	28.13	0.034	2.5ppm	PASS
40		20.19	0.024		
30		30.54	0.037		
20		20.90	0.025		
10		29.39	0.035		
0		29.98	0.036		
-10		20.95	0.025		
-20		30.87	0.037		
-30		12.37	0.015		
20	Maximum Voltage	24.76	0.030		
20	BEP	30.56	0.037		

GPRS 850 /836.6MHz					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	24.95	0.030	2.5ppm	PASS
40		16.11	0.019		
30		30.75	0.037		
20		32.04	0.038		
10		29.35	0.035		
0		18.41	0.022		
-10		29.22	0.035		
-20		30.93	0.037		
-30		28.85	0.034		
20	Maximum Voltage	29.44	0.035		
20	BEP	20.75	0.025		

EGPRS 850 /836.6MHz					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	32.53	0.039	2.5ppm	PASS
40		25.70	0.031		
30		21.02	0.025		
20		18.58	0.022		
10		11.74	0.014		
0		25.15	0.030		
-10		21.08	0.025		
-20		21.83	0.026		
-30		19.35	0.023		
20	Maximum Voltage	32.19	0.038		
20	BEP	22.23	0.027		

GSM 1900 / 1880MHz					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	23.74	0.013	Within Authorized Band	PASS
40		21.51	0.011		
30		29.34	0.016		
20		33.54	0.018		
10		28.56	0.015		
0		15.97	0.008		
-10		33.30	0.018		
-20		36.23	0.019		
-30		27.27	0.015		
20	Maximum Voltage	33.88	0.018		
20	BEP	29.72	0.016		

GPRS 1900 / 1880MHz					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	32.08	0.017	Within Authorized Band	PASS
40		32.68	0.017		
30		33.09	0.018		
20		15.79	0.008		
10		32.55	0.017		
0		18.35	0.010		
-10		33.47	0.018		
-20		34.77	0.018		
-30		14.11	0.008		
20	Maximum Voltage	29.09	0.015		
20	BEP	25.93	0.014		

EGPRS 1900 / 1880MHz					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	29.36	0.016	Within Authorized Band	PASS
40		14.01	0.007		
30		25.37	0.013		
20		17.94	0.010		
10		14.79	0.008		
0		15.13	0.008		
-10		33.99	0.018		
-20		28.52	0.015		
-30		35.34	0.019		
20	Maximum Voltage	11.50	0.006		
20	BEP	33.56	0.018		

UMTS Band 2 /1880MHz					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	18.39	0.010	Within Authorized Band	PASS
40		34.66	0.018		
30		23.90	0.013		
20		30.22	0.016		
10		21.71	0.012		
0		15.50	0.008		
-10		22.27	0.012		
-20		24.28	0.013		
-30		21.51	0.011		
20	Maximum Voltage	33.38	0.018		
20	BEP	23.03	0.012		

HSDPA Band 2 /1880MHz					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	25.80	0.014	Within Authorized Band	PASS
40		12.94	0.007		
30		28.08	0.015		
20		36.00	0.019		
10		34.53	0.018		
0		34.17	0.018		
-10		28.21	0.015		
-20		22.09	0.012		
-30		11.96	0.006		
20	Maximum Voltage	12.39	0.007		
20	BEP	33.32	0.018		

HSUPA Band 2 /1880MHz					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	33.13	0.018	Within Authorized Band	PASS
40		25.99	0.014		
30		31.35	0.017		
20		17.96	0.010		
10		36.14	0.019		
0		12.90	0.007		
-10		13.48	0.007		
-20		20.91	0.011		
-30		28.53	0.015		
20	Maximum Voltage	14.25	0.008		
20	BEP	29.49	0.016		

UMTS Band 5 / 836.6MHz					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	16.76	0.020	2.5ppm	PASS
40		13.81	0.017		
30		17.43	0.021		
20		30.03	0.036		
10		24.50	0.029		
0		12.01	0.014		
-10		29.97	0.036		
-20		16.34	0.020		
-30		21.04	0.025		
20	Maximum Voltage	23.31	0.028		
20	BEP	33.32	0.040		

HSDPA Band 5 / 836.6MHz					
Temperature (°C)	Voltage (Volt)	Freq. Dev.	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	24.90	0.030	2.5ppm	PASS
40		27.75	0.033		
30		12.01	0.014		
20		24.82	0.030		
10		16.31	0.019		
0		12.97	0.016		
-10		22.68	0.027		
-20		34.67	0.041		
-30		14.88	0.018		
20	Maximum Voltage	32.16	0.038		
20	BEP	33.64	0.040		

HSUPA Band 5 / 836.6MHz					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	18.31	0.022	2.5ppm	PASS
40		18.34	0.022		
30		22.11	0.026		
20		24.33	0.029		
10		29.81	0.036		
0		13.78	0.016		
-10		14.99	0.018		
-20		34.62	0.041		
-30		23.82	0.028		
20	Maximum Voltage	12.14	0.015		
20	BEP	21.26	0.025		

1. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

APPENDIX —PHOTOS OF TEST SETUP



SPURIOUS EMISSION TEST SETUP (BELOW 1GHZ)

SPURIOUS EMISSION TEST SETUP (ABOVE 1GHZ)

****End of report****