Shenzhen Most Technology Service Co., Ltd.
No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.

TEST REPORT

FCC Part 22 Subpart H / Part 24 Subpart E

Report Reference No.....:	**MTEB23040135-R5**
FCC ID.....:	**2BBV2-VT31**
Compiled by (position+printed name+signature) .:	File administrators Alisa Luo
Supervised by (position+printed name+signature) .:	Test Engineer Sunny Deng
Approved by (position+printed name+signature) .:	Manager Yvette Zhou
Date of issue.....:	April 28,2023
Testing Laboratory Name.....:	**Shenzhen Most Technology Service Co., Ltd.**
Address.....:	No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.
Applicant's name.....:	**M/s Linkwell Telesystems Pvt. Ltd.**
Address.....:	B-45 & 46, Electronics Complex, Kushaiguda, Hyderabad-500062, Telangana, India
Test specification.....:	
Standard.....:	**FCC Part 2, FCC Part 22 Subpart H, FCC Part 24 Subpart E ANSI/TIA-603-E-2016, ANSI C63.26-2015**

Test item description.....:	Tablet
Trade Mark.....:	VISIONTEK
Manufacturer.....:	**M/s Linkwell Telesystems Pvt. Ltd.**
Model/Type reference.....:	VT 31
Listed Models .....:	N/A
Ratings.....:	DC 3.8V(by Battery) DC 5V
Modulation .....:	GMSK/8PSK
Hardware version.....:	M866YC
Software version .....:	V1.0
Frequency.....	GSM850,PCS1900
Result.....:	**PASS**

TEST REPORT

Equipment under Test	:	Tablet
Model /Type	:	VT 31
Listed Models		N/A
Remark		N/A
Applicant	:	**M/s Linkwell Telesystems Pvt. Ltd.**
Address	:	B-45 & 46, Electronics Complex, Kushaiguda, Hyderabad-500062, Telangana, India
Manufacturer	:	**M/s Linkwell Telesystems Pvt. Ltd.**
Address	:	B-45 & 46, Electronics Complex, Kushaiguda, Hyderabad-500062, Telangana, India

Test Result:	**PASS**

Contents

1 Revision History

Revision	Issue Date	Revisions	Revised By
00	2023-04-28	Initial Issue	Alisa Luo

2 SUMMARY

2.1 TEST STANDARDS

The tests were performed according to following standards:
FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS
FCC Part 22 Subpart H: PRIVATE LAND MOBILE RADIO SERVICES.
FCC Part 24 Subpart E: PUBLIC MOBILE SERVICES
ANSI/TIA-603-E-2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
ANSI C63.26-2015: IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
FCCKDB971168D01 Power Meas License Digital Systems

2.2 Test Description

Cellular Band (824-849MHz paired with 869-894MHz)

Test Item	FCC Rule No.	Requirements	Verdict
Effective(Isotropic) Radiated Output Power	§2.1046, §22.913	FCC: ERP ≤ 7W.	Pass
Modulation Characteristics	§2.1047	Digital modulation	N/A
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §22.917	≤-13dBm/1%*EBW, in 1MHz bands immediately outside and adjacent to The frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §22.917	FCC: ≤ -13dBm/100kHz, from 9kHz to 10th harmonics but outside authorized operating frequency ranges.	Pass
Field Strength of Spurious Radiation	§2.1053, §22.917	FCC: ≤ -13dBm/100kHz.	Pass
Frequency Stability	§2.1055, §22.355	≤ ±2.5ppm.	Pass
NOTE 1: For the verdict, the “N/A” denotes “not applicable”, the “N/T” de notes “not tested”.			

PCS Band (1850-1915MHz paired with 1930-1995MHz)

Test Item	FCC Rule No.	Requirements	Verdict
Effective(Isotropic) Radiated Output Power	§2.1046, §24.232	EIRP ≤ 2W	Pass
Peak-Average Ratio	§2.1046, §24.232	FCC:Limit≤13dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §24.238	≤ -13dBm/1%*EBW, In 1MHz bands immediately outside and adjacent to The frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §24.238	≤-13dBm/1MHz, from 9kHz to10th harmonics but outside authorized Operating frequency ranges.	Pass
Field Strength of Spurious Radiation	§2.1053, §24.238	≤ -13dBm/1MHz.	Pass
Frequency Stability	§2.1055, §24.235	FCC: within authorized frequency block.	Pass
NOTE 1: For the verdict, the “N/A” denotes “not applicable”, the “N/T” de notes “not tested”.			

Remark:
1. The measurement uncertainty is not included in the test result.

2.3 Address of the test laboratory

Shenzhen Most Technology Service Co., Ltd.
No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

2.4 Test Facility

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

FCC-Registration No.: 0031192610

Shenzhen Most Technology Service Co., Ltd. EMC Laboratory 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.

A2LA-Lab Cert. No.: 6343.01

Shenzhen Most Technology Service Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

2.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01"Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 1"and TR-100028-02 "Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 2 " and is documented in the Shenzhen Most Technology Service Co., Ltd.quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Most Technology Service Co., Ltd.is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)
Conducted Power	9KHz~18GHz	0.61 dB	(1)
Spurious RF Conducted Emission	9KHz~40GHz	1.22 dB	(1)
Band Edge Compliance of RF Emission	9KHz~40GHz	1.22 dB	(1)
Occupied Bandwidth	9KHz~40GHz	-	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95%
(2) confidence level using a coverage factor of k=1.96.

3 GENERAL INFORMATION

3.1 Environmental conditions

Date of receipt of test sample	:	2023.03.25
Testing commenced on	:	2023.03.26
Testing concluded on	:	2023.04.28

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

3.2 General Description of EUT

Product Name:	Tablet
Model/Type reference:	VT 31
Power Supply：	DC 3.8V(by Battery) DC 5V
Testing sample ID：	MT23040072
GSM	
Operation Band:	GPRS850/GPRS1900
Power Class:	GSM850:Power Class 4/ PCS1900:Power Class 1
GPRS/EDGE Multislot Class	EGPRS/GPRS: Multi-slot Class 12
GSM/GPRS Operation Frequency	GSM850:824.2MHz-848.8MHz/PCS1900:1850.2MHz-1909.8MHz
Modilation Type:	GMSK/8PSK
Antenna type:	PIFA antenna
Antenna gain:	GPRS850: -5.69dBi GPRS1900: 1.41dBi

Note: For more details, refer to the user's manual of the EUT.

3.3 Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The CUM500 used to control the EUT staying in continuous transmitting and receiving mode for testing. Regards to the frequency band operation : the lowest、middle and highest frequency of channel were selected to perform the test, then shown on this report.

Test Frequency:

Test Mode	TX/RX	RF Channel		
		Low(L)	Middle (M)	High (H)
GSM850	TX	Channel 128	Channel 190	Channel 251
		824.2 MHz	836.6 MHz	848.8 MHz
	RX	Channel 128	Channel 190	Channel 251
		869.2 MHz	881.6 MHz	893.8 MHz
Test Mode	TX/RX	RF Channel		
		Low(L)	Middle (M)	High (H)
GSM1900	TX	Channel 512	Channel 661	Channel 810
		1850.2 MHz	1880.0 MHz	1909.8 MHz
	RX	Channel 512	Channel 661	Channel 810
		1930.2 MHz	1960.0 MHz	1989.8 MHz

Test Modes:

The test mode(s) are selected according to relevant radio technology specifications.

Test Mode	Test Modes Description
Mode 1	GPRS
Mode 2	GSM
Mode 3	EGPRS

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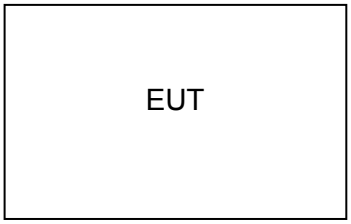
3.4 Block Diagram of Test Setup



3.5 Test Item (Equipment Under Test) Description*

Short designation	EUT Name	EUT Description	Serial number	Hardware status	Software status
EUT A					
EUT B					

*: declared by the applicant. According to customers information EUTs A and B are the same devices.

3.6 Auxiliary Equipment (AE) Description

AE short designation	EUT Name (if available)	EUT Description	Serial number (if available)	Software (if used)
AE 1	-			
AE 2	-			

3.7 Antenna Information*

Short designation	Antenna Name	Antenna Type	Frequency Range	Serial number	Antenna Peak Gain
Antenna 1	---	PIFA Antenna	2.4 – 2.5 GHz	---	GPRS850:-5.69dBi GPRS1900:1.41dBi
Antenna 2					

*: declared by the applicant.

3.8 Equipments Used during the Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware versions	Last Cal.	Cal. Interval
1.	L.I.S.N.	R&S	ENV216	100093	/	2023/03/17	1 Year
2	Three-phase artificial power network	Schwarzback Mess	NNLK8129	8129178	/	2023/03/17	1 Year
3.	Receiver	R&S	ESCI	100492	V3.0-10-2	2023/03/17	1 Year
4	Receiver	R&S	ESPI	101202	V3.0-10-2	2023/03/17	1 Year
5	Spectrum analyzer	Agilent	9020A	MT-E306	A14.16	2023/03/17	1 Year
6	Bilong Antenna	Sunol Sciences	JB3	A121206	/	2023/03/17	1 Year
7	Horn antenna	HF Antenna	HF Antenna	MT-E158	/	2023/03/17	1 Year
8	Loop antenna	Beijing Daze	ZN30900B	/	/	2023/03/17	1 Year
9	Horn antenna	R&S	OBH100400	26999002	/	2023/03/17	1 Year
10	Wireless Communication Test Set	R&S	CMW500	/	CMW-BASE-3.7.21	2023/03/17	1 Year
11	Spectrum analyzer	R&S	FSP	100019	V4.40 SP2	2023/03/17	1 Year
12	High gain antenna	Schwarzbeck	LB-180400KF	MT-E389	/	2023/03/17	1 Year
13	Preamplifier	Schwarzbeck	BBV 9743	MT-E390	/	2023/03/17	1 Year
14	Pre-amplifier	EMCI	EMC051845SE	MT-E391	/	2023/03/17	1 Year
15	Pre-amplifier	Agilent	83051A	MT-E392	/	2023/03/17	1 Year
16	High pass filter unit	Tonscend	JS0806-F	MT-E393	/	2023/03/17	1 Year
17	RF Cable(below1GHz)	Times	9kHz-1GHz	MT-E394	/	2023/03/17	1 Year
18	RF Cable(above 1GHz)	Times	1-40G	MT-E395	/	2023/03/17	1 Year
19	RF Cable (9KHz-40GHz)	Tonscend	170660	N/A	/	2023/03/17	1 Year

Note: The Cal.Interval was one year.

3.9 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID:2BBV2-VT31 filing to comply with of the FCC Part 22 and Part 24 Rules.

3.10 Modifications

No modifications were implemented to meet testing criteria.

3.11 Environmental conditions

Radiated Emission:

Temperature:	23 ° C
Humidity:	48 %
Atmospheric pressure:	950-1050mbar

Conducted testing：

Temperature:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

4 TEST CONDITIONS AND RESULTS

4.1 Output Power

LIMIT(Conducted Output Power)

GSM850				
Function	**Power step**	**Nominal output power (dBm)**	**Power &Multislot class**	**Operation class**
GSM	5	33dBm(2W)	4	/
GPRS	3	33dBm(2W)	12	B
EDGE	6	27dBm(0.5W)	12	B

PCS1900				
Function	**Power step**	**Nominal output power (dBm)**	**Power &Multislot class**	**Operation class**
GSM	0	30dBm(1W)	1	/
GPRS	3	30dBm(1W)	12	B
EDGE	5	26dBm(0.5W)	12	B

LIMIT (Radiated Output Power)

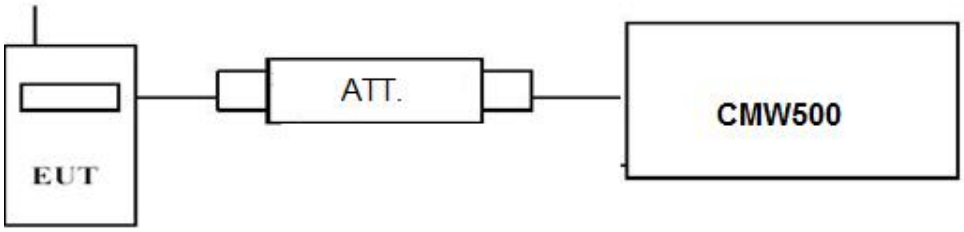
According to 22.913(a) and 24.232(c), the ERP should be not exceed following table limits:

GSM850(GPRS850,EDGE850)		
Function	**Power Step**	**Burst Peak ERP (dBm)**
GSM	5	≤38.45dBm (7W)
GPRS	3	≤38.45dBm (7W)
EDGE	6	≤38.45dBm (7W)

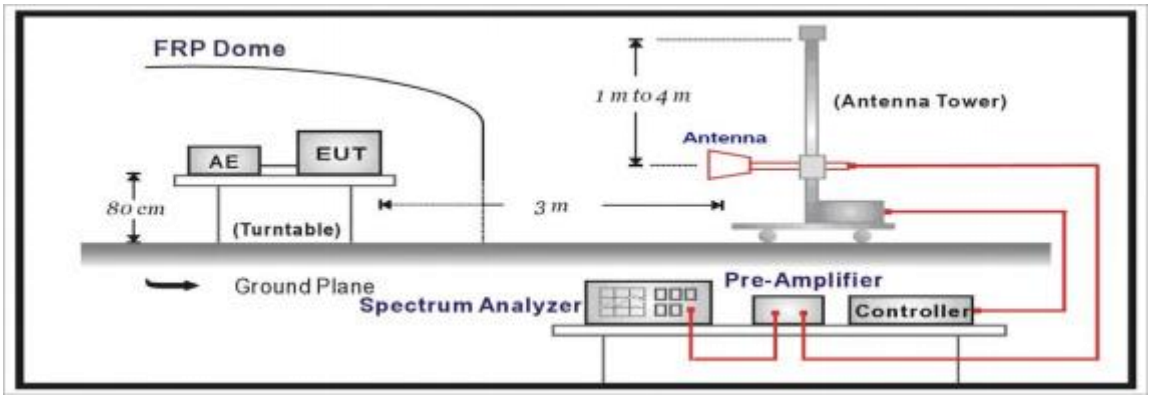
PCS1900(GPRS1900,EDGE1900)		
Function	**Power Step**	**Burst Peak EIRP (dBm)**
GSM	0	≤33dBm (2W)
GPRS	3	≤33dBm (2W)
EDGE	5	≤33dBm (2W)

TEST CONFIGURATION

Conducted Power Measurement



Radiated Power Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

Conducted Power Measurement:

a) Place the EUT on a bench and set it in transmitting mode.
b) Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU500 by a Directional Couple.
c) EUT Communicate with CMU500 then selects a channel for testing.
d) Add a correction factor to the display of spectrum, and then test.

Radiated Power Measurement:

a) The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
b) The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
c) The output of the test antenna shall be connected to the measuring receiver.
d) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
e) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
f) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
h) The maximum signal level detected by the measuring receiver shall be noted.
i) The transmitter shall be replaced by a substitution antenna.
j) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
k) The substitution antenna shall be connected to a calibrated signal generator.
l) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
m) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
n) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.

o) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

p) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

TEST RESULTS

Conducted Measurement:
TEST RESULTS

Band	Channel	Frequency	Power	Gain	Verdict
GSM850	128	824.2	33.04	-5.69	PASS
GSM850	190	836.6	32.75	-5.69	PASS
GSM850	251	848.8	32.74	-5.69	PASS
GPRS850 1	128	824.2	32.74	-5.69	PASS
GPRS850 1	190	836.6	32.76	-5.69	PASS
GPRS850 1	251	848.8	32.75	-5.69	PASS
GPRS850 2	128	824.2	31.99	-5.69	PASS
GPRS850 2	190	836.6	31.94	-5.69	PASS
GPRS850 2	251	848.8	32.27	-5.69	PASS
GPRS850 3	128	824.2	30.02	-5.69	PASS
GPRS850 3	190	836.6	30.42	-5.69	PASS
GPRS850 3	251	848.8	30.06	-5.69	PASS
GPRS850 4	128	824.2	29.40	-5.69	PASS
GPRS850 4	190	836.6	28.93	-5.69	PASS
GPRS850 4	251	848.8	28.97	-5.69	PASS
EGPRS850 1	128	824.2	33.08	-5.69	PASS
EGPRS850 1	190	836.6	32.76	-5.69	PASS
EGPRS850 1	251	848.8	33.07	-5.69	PASS
EGPRS850 2	128	824.2	32.28	-5.69	PASS
EGPRS850 2	190	836.6	32.00	-5.69	PASS
EGPRS850 2	251	848.8	32.30	-5.69	PASS
EGPRS850 3	128	824.2	30.43	-5.69	PASS
EGPRS850 3	190	836.6	30.02	-5.69	PASS
EGPRS850 3	251	848.8	30.45	-5.69	PASS
EGPRS850 4	128	824.2	29.37	-5.69	PASS
EGPRS850 4	190	836.6	28.95	-5.69	PASS
EGPRS850 4	251	848.8	28.95	-5.69	PASS

Band	Channel	Frequency	Power	Gain	Verdict
GSM1900	512	1850.2	29.62	1.54	PASS
GSM1900	661	1880	29.77	1.54	PASS
GSM1900	810	1909.8	29.92	1.54	PASS
GPRS1900 1	512	1850.2	29.63	1.54	PASS
GPRS1900 1	661	1880	29.80	1.54	PASS
GPRS1900 1	810	1909.8	29.95	1.54	PASS
GPRS1900 2	512	1850.2	28.53	1.54	PASS
GPRS1900 2	661	1880	28.65	1.54	PASS
GPRS1900 2	810	1909.8	28.85	1.54	PASS
GPRS1900 3	512	1850.2	26.29	1.54	PASS
GPRS1900 3	661	1880	26.45	1.54	PASS
GPRS1900 3	810	1909.8	26.66	1.54	PASS
GPRS1900 4	512	1850.2	25.19	1.54	PASS
GPRS1900 4	661	1880	25.39	1.54	PASS
GPRS1900 4	810	1909.8	25.56	1.54	PASS
EGPRS1900 1	512	1850.2	24.23	1.54	PASS
EGPRS1900 1	661	1880	24.12	1.54	PASS
EGPRS1900 1	810	1909.8	24.74	1.54	PASS
EGPRS1900 2	512	1850.2	23.44	1.54	PASS
EGPRS1900 2	661	1880	23.50	1.54	PASS
EGPRS1900 2	810	1909.8	23.56	1.54	PASS
EGPRS1900 3	512	1850.2	21.46	1.54	PASS
EGPRS1900 3	661	1880	21.76	1.54	PASS
EGPRS1900 3	810	1909.8	21.71	1.54	PASS
EGPRS1900 4	512	1850.2	20.75	1.54	PASS
EGPRS1900 4	661	1880	20.60	1.54	PASS
EGPRS1900 4	810	1909.8	20.57	1.54	PASS

Radiated Measurement:

Remark:
1. We were tested all Configuration refer 3GPP TS151 010.
2. EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)
3. ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.

Note: 1.We tesed Horizontal and Vertical,and Recorded the worst data at the Vertical

GSM 850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.20	-13.54	2.42	8.45	2.15	36.82	27.16	38.45	11.29	V
836.60	-14.79	2.46	8.45	2.15	36.82	26.2	38.45	12.25	V
848.80	-13.33	2.53	8.36	2.15	36.82	27.05	38.45	11.4	V

GSM 1900

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.20	-13.98	3.41	10.24	33.6	26.45	33.01	6.56	V
1880.00	-14.2	3.49	10.24	33.6	26.15	33.01	6.86	V
1909.80	-14.35	3.55	10.23	33.6	25.93	33.01	7.08	V

GPRS 850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.20	-13.54	2.42	8.45	2.15	36.82	27.16	38.45	11.29	V
836.60	-14.31	2.46	8.45	2.15	36.82	25.83	38.45	12.62	V
848.80	-12.88	2.53	8.36	2.15	36.82	27.09	38.45	11.36	V

GPRS 1900

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.20	-13.98	3.41	10.24	33.6	26.45	33.01	6.56	V
1880.00	-14.32	3.49	10.24	33.6	26.03	33.01	6.98	V
1909.80	-12.89	3.55	10.23	33.6	27.39	33.01	5.62	V

EGPRS 850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.20	-13.54	2.42	8.45	2.15	36.82	27.16	38.45	11.29	V
836.60	-15.32	2.46	8.45	2.15	36.82	25.34	38.45	13.11	V
848.80	-12.71	2.53	8.36	2.15	36.82	27.79	38.45	10.66	V

EGPRS 1900

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.20	-13.98	3.41	10.24	33.6	26.45	33.01	6.56	V
1880.00	-14.69	3.49	10.24	33.6	25.66	33.01	7.35	V
1909.80	-12.75	3.55	10.23	33.6	27.53	33.01	5.48	V

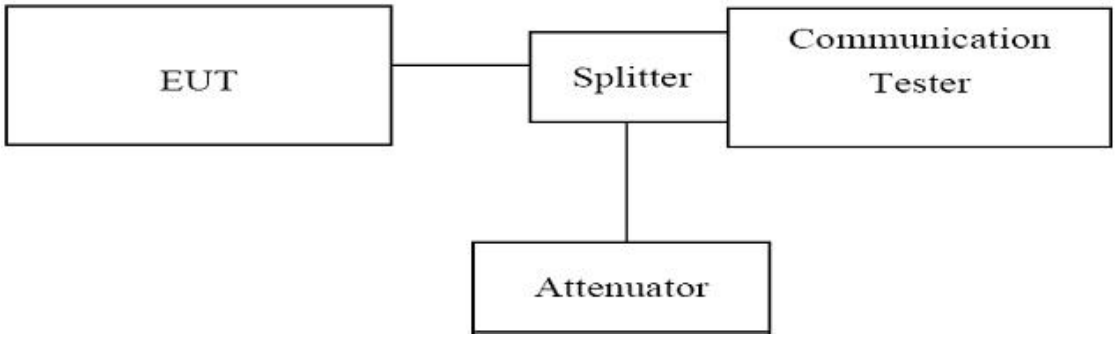
Remark:
4. *EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)*
5. *ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.*

4.2 Occupied Bandwidth and Emission Bandwidth

LIMIT

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of PCS1900 band and GSM850 band. The table below lists the measured 99% Bandwidth and -26dBc Bandwidth.

TEST CONFIGURATION



TEST PROCEDURE

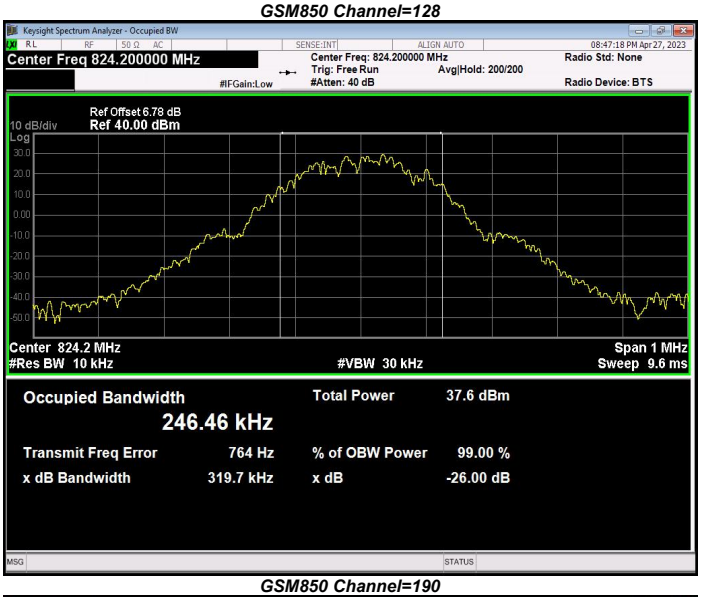
1. The EUT was set up for the max output power with pseudo random data modulation;
2. The Occupied bandwidth and Emission Bandwidth were measured with Aglient Spectrum Analyzer N9020A (peak);
3. Set RBW=5.1KHz,VBW=51KHz,Span=1MHz,SWT=500ms;
4. Set SPA Max hold and View, Set 99% Occupied Bandwidth/ Set -26dBc Occupied Bandwidth
5. These measurements were done at 3 frequencies, 1850.20 MHz, 1880.00 MHz and 1909.80 MHz for PCS1900 band; 824.20MHz, 836.60 MHz and 848.80 MHz for GSM850 band. (Low, middle and high of operational frequency range).

TEST RESULTS

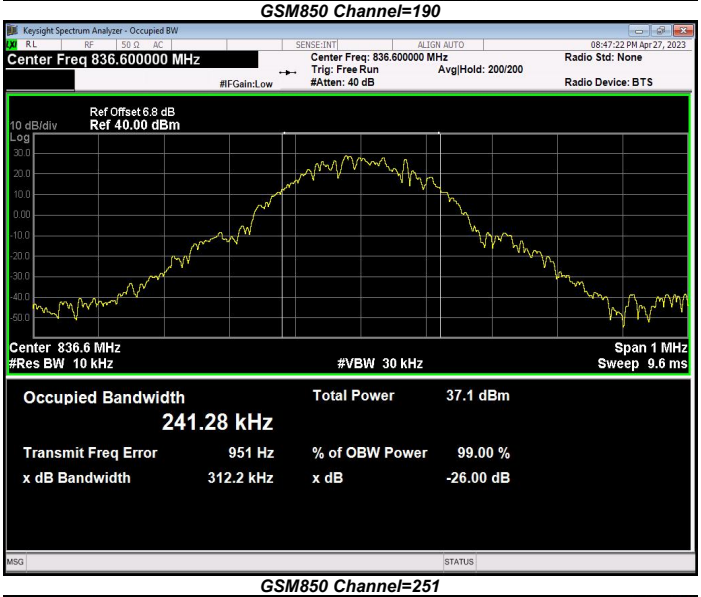
Occupied bandwidth

Band	Channel	Frequency (MHz)	99% OBW (kHz)	-26dB EBW (kHz)	Verdict
GSM850	128	824.2	246.46	319.7	PASS
GSM850	190	836.6	241.28	312.2	PASS
GSM850	251	848.8	245.87	315.5	PASS
GPRS850	128	824.2	252.02	307.1	PASS
GPRS850	190	836.6	247.28	304.4	PASS
GPRS850	251	848.8	248.92	321.3	PASS
EGPRS850	128	824.2	239.58	299.3	PASS
EGPRS850	190	836.6	239.53	304.6	PASS
EGPRS850	251	848.8	243.59	318.2	PASS
GSM1900	512	1850.2	246.39	316.4	PASS
GSM1900	661	1880	244.68	314.5	PASS
GSM1900	810	1909.8	244.73	318.7	PASS
GPRS1900	512	1850.2	245.13	311.4	PASS
GPRS1900	661	1880	242.43	323.4	PASS
GPRS1900	810	1909.8	245.30	311.9	PASS
EGPRS1900	512	1850.2	251.80	319.5	PASS
EGPRS1900	661	1880	250.67	295.9	PASS
EGPRS1900	810	1909.8	248.21	314.8	PASS

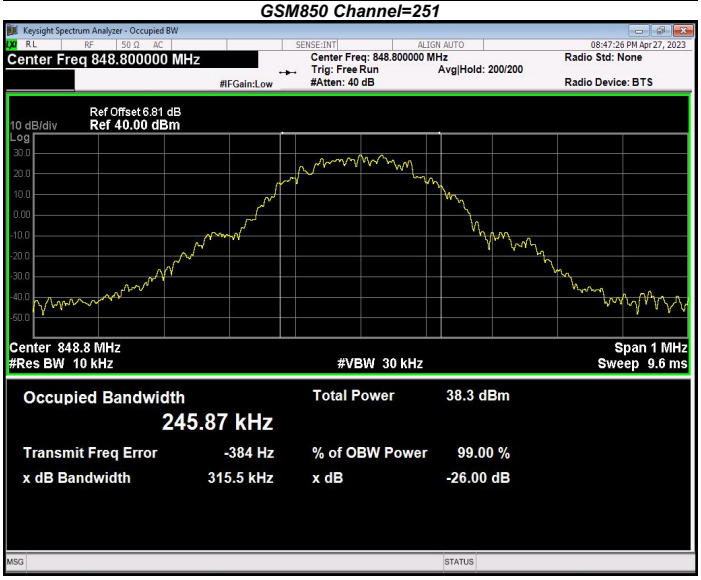
GSM850 Channel=128



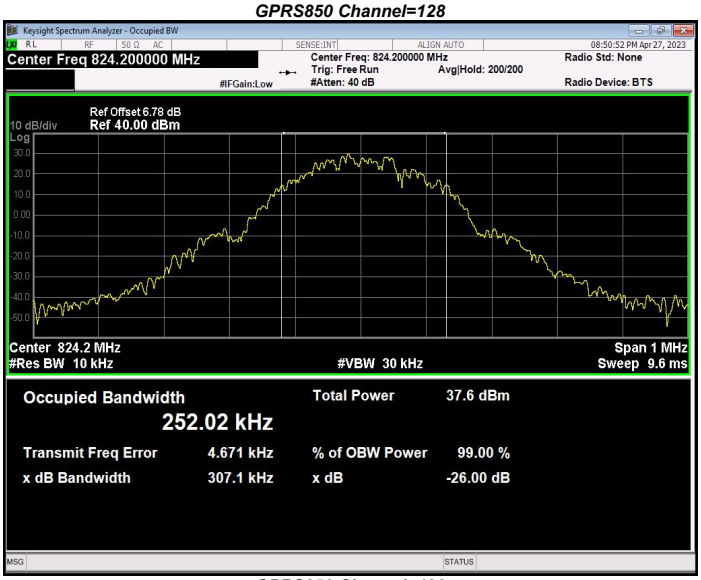
GSM850 Channel=190



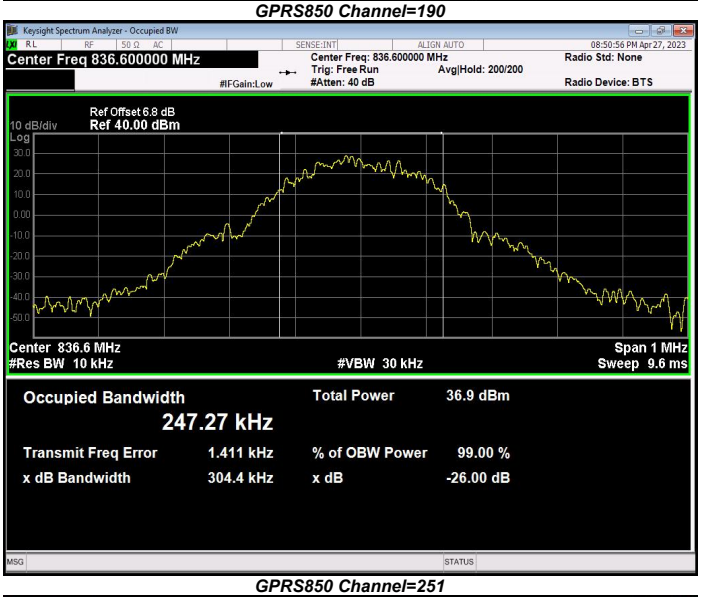
GSM850 Channel=251



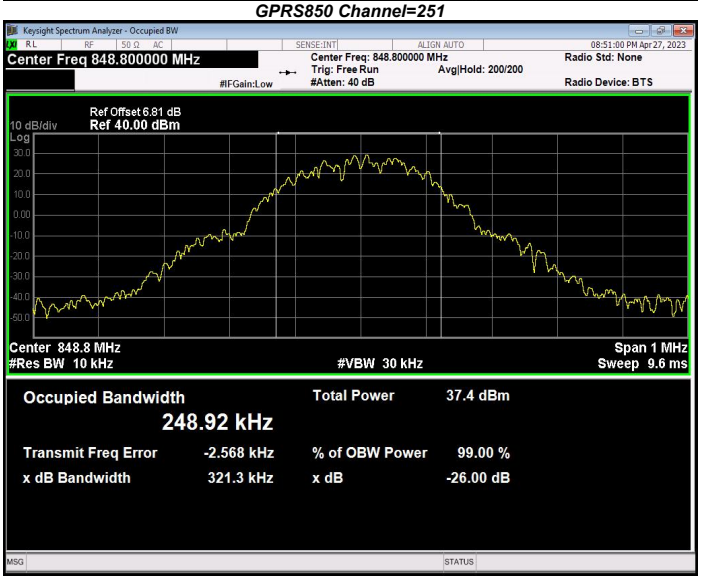
GPRS850 Channel=128



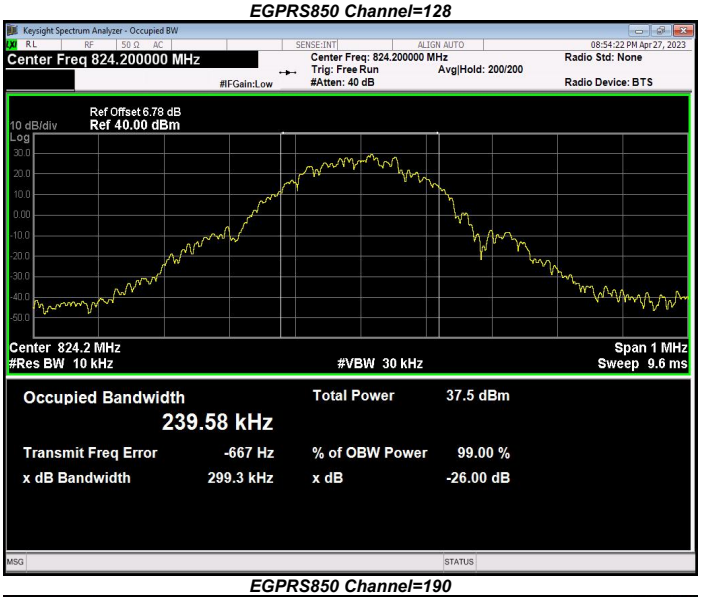
GPRS850 Channel=190



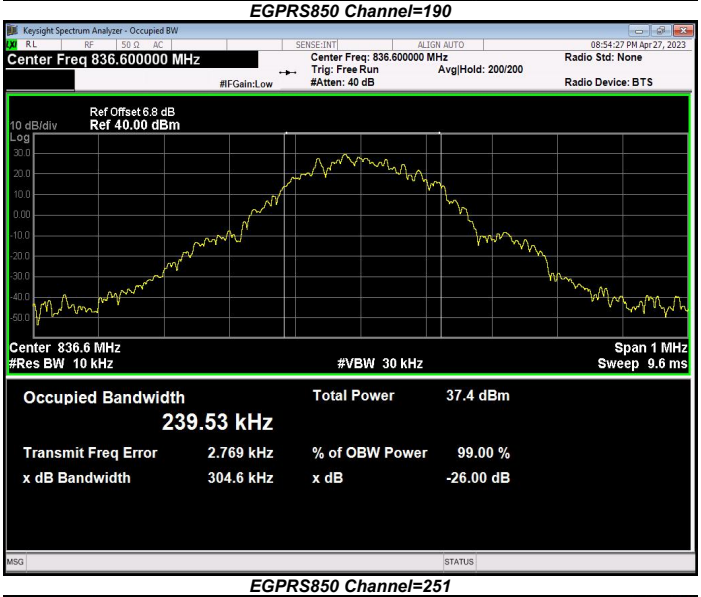
GPRS850 Channel=251



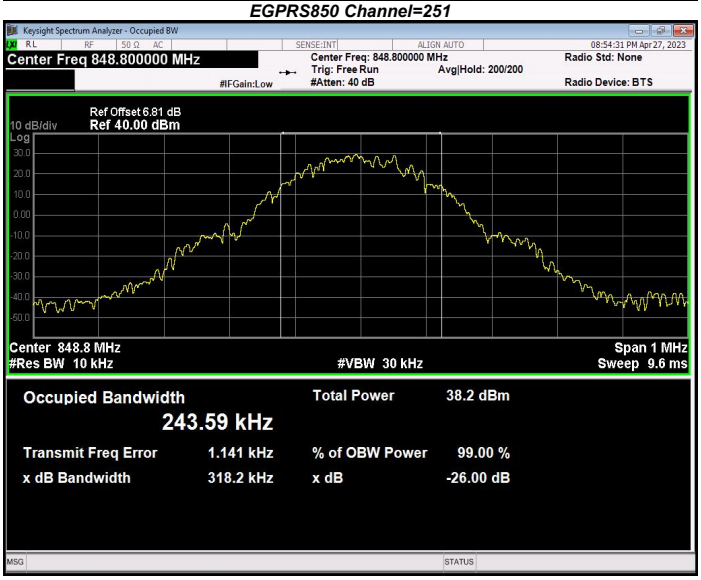
EGPRS850 Channel=128



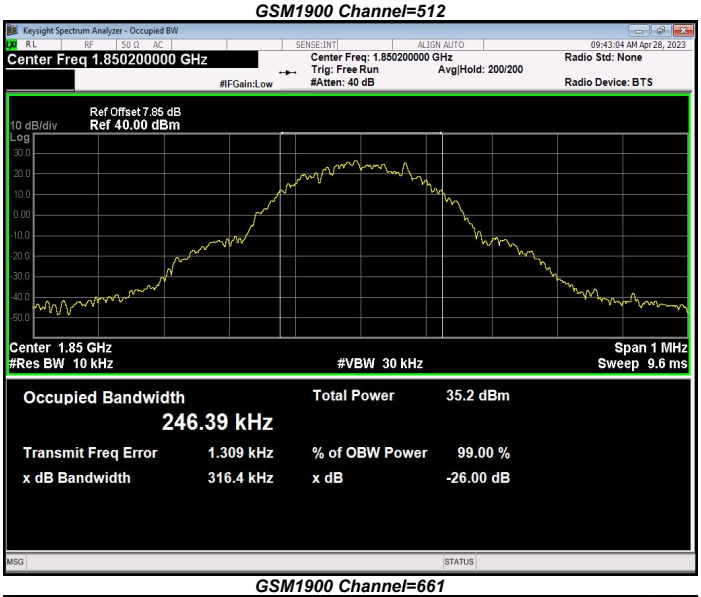
EGPRS850 Channel=190



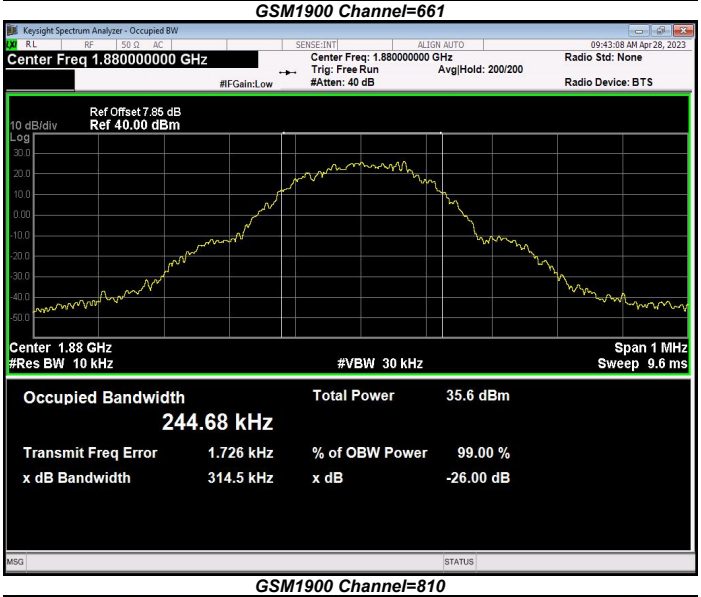
EGPRS850 Channel=251



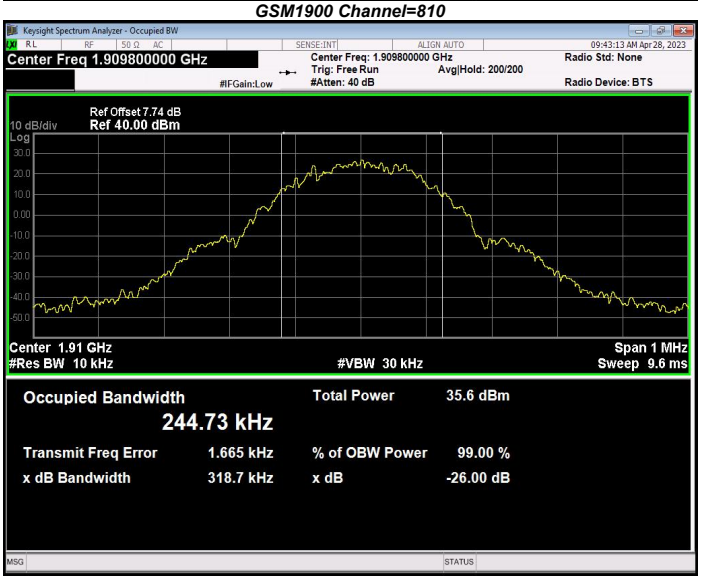
GSM1900 Channel=512



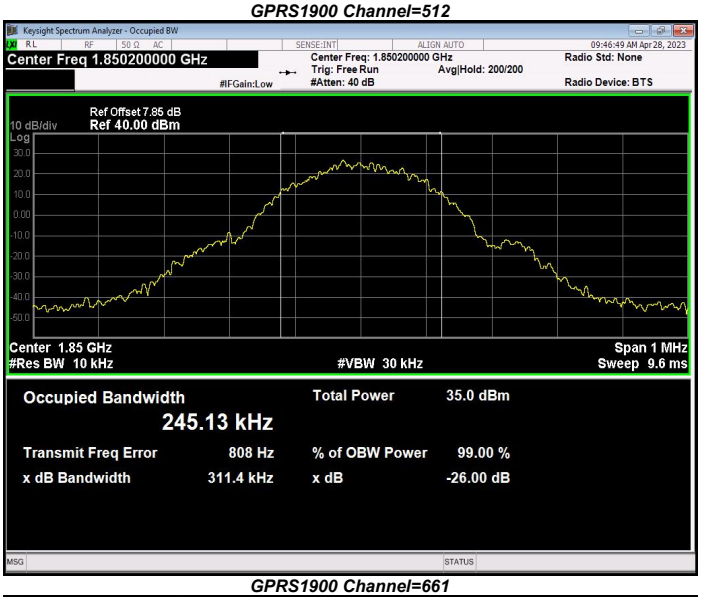
GSM1900 Channel=661



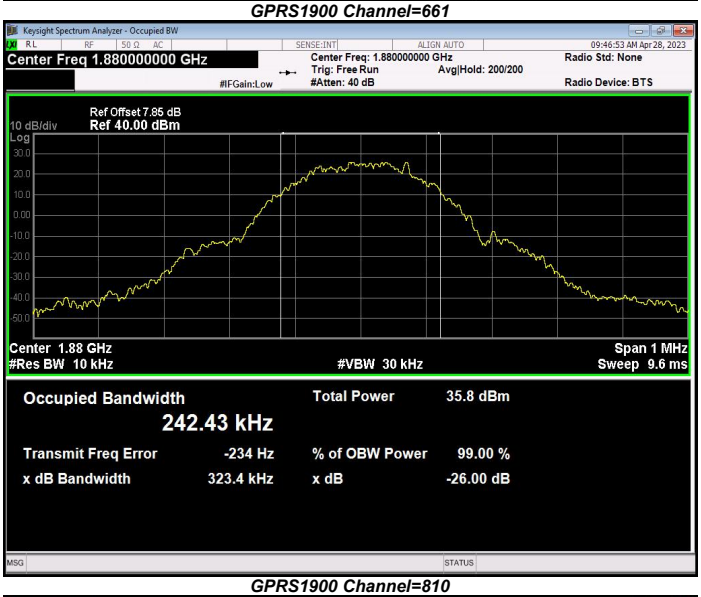
GSM1900 Channel=810



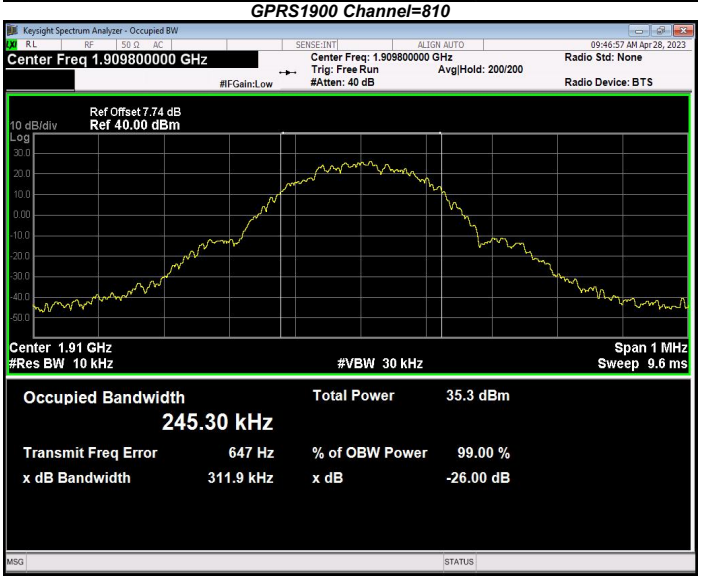
GPRS1900 Channel=512



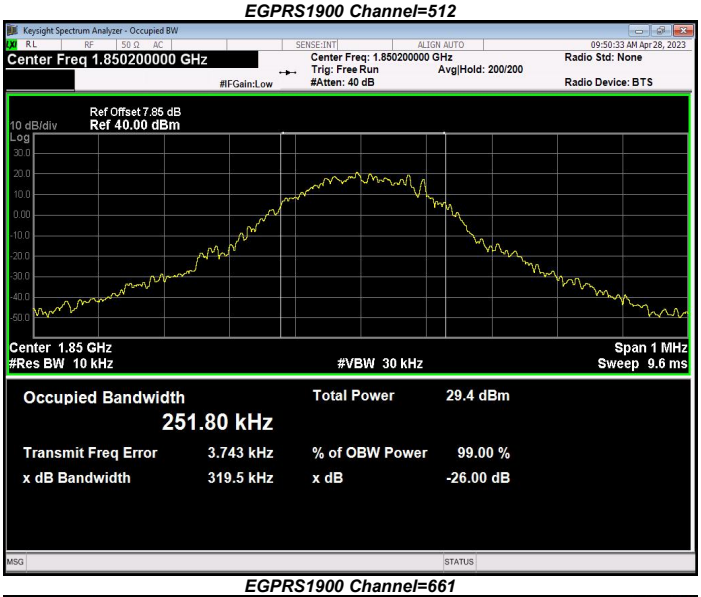
GPRS1900 Channel=661



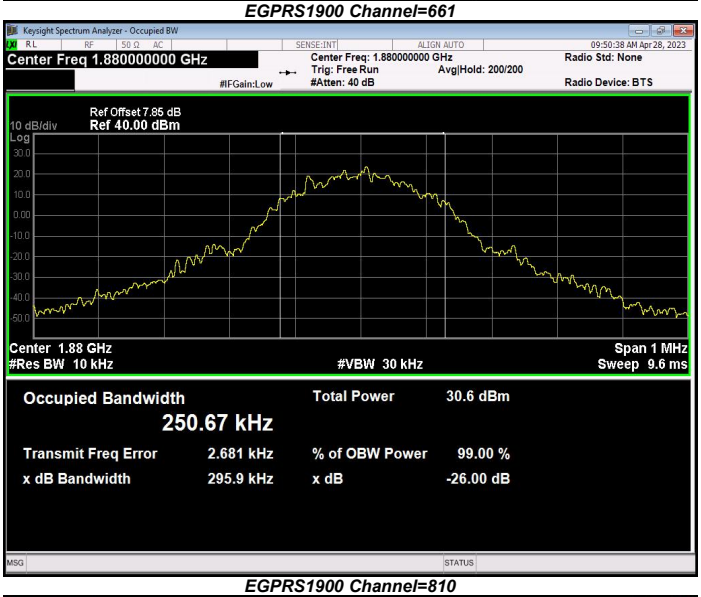
GPRS1900 Channel=810



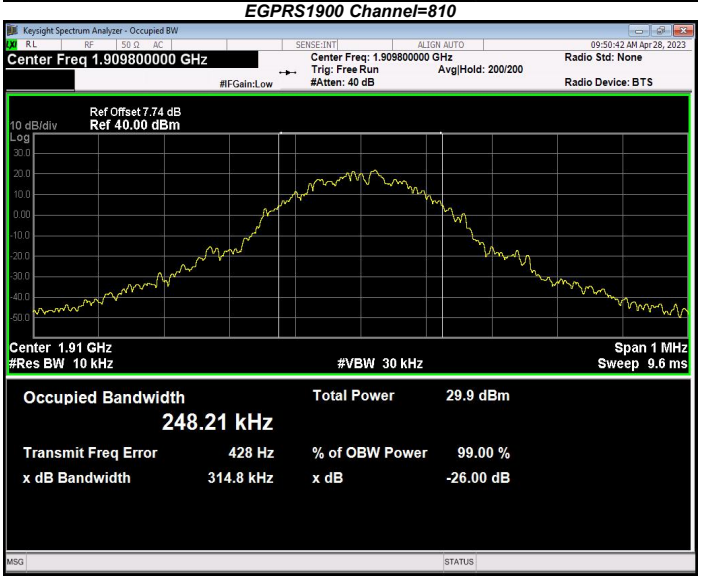
EGPRS1900 Channel=512



EGPRS1900 Channel=661



EGPRS1900 Channel=810

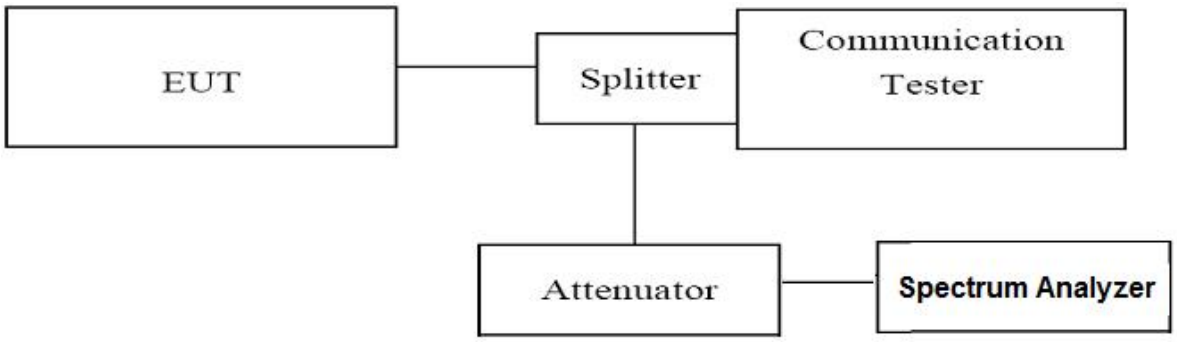


4.3 Band Edge compliance

LIMIT

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 + 10log (P) dB.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was set up for the max output power with pseudo random data modulation;
2. The power was measured with Aglient Spectrum Analyzer N9020A;
3. Set RBW=5.1KHz,VBW=51KHz,Span=3MHz,SWT=300ms, Dector: RMS;
4. These measurements were done at 3 frequencies, 1850.20 MHz, 1880.00 MHz and 1909.80 MHz for PCS1900 band; 824.20 MHz, 836.60 MHz and 848.80 MHz for GSM850 band. (bottom, middle and top of operational frequency range).

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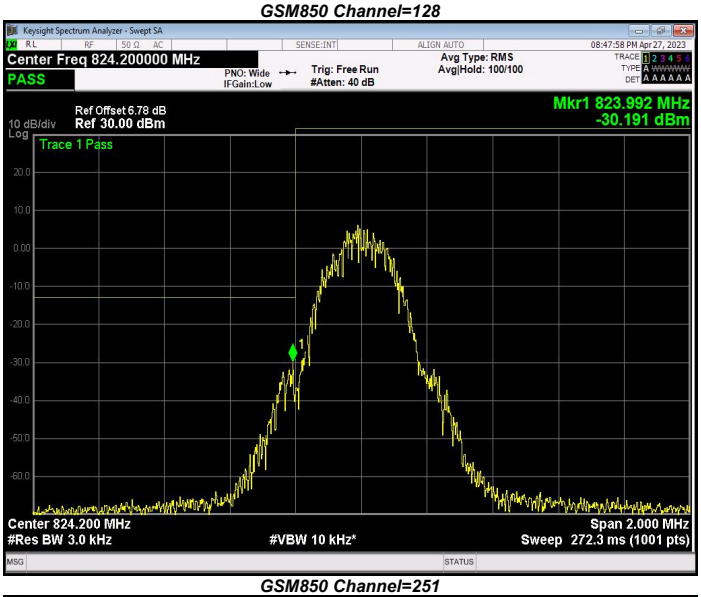
TEST RESULTS

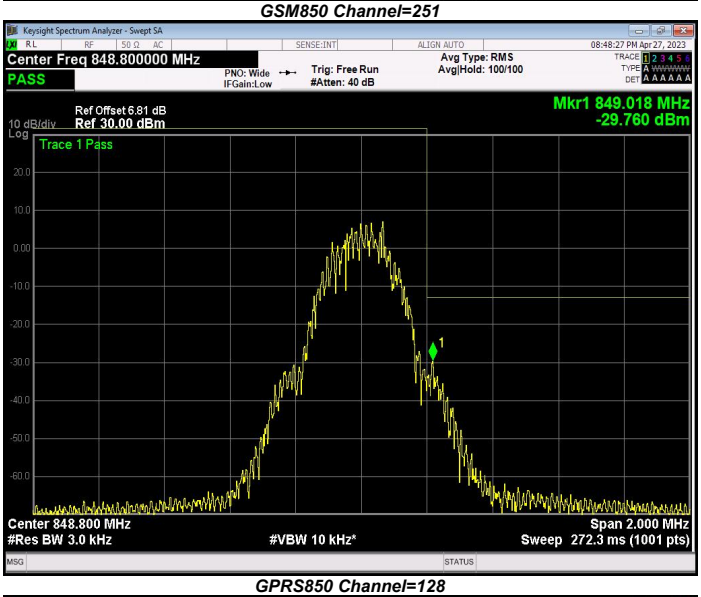
Band edge

Band	Channel	Frequency (MHz)	Spur Freq (MHz)	Spur Level (dBm)	Limit (dBm)	Verdict
GSM850	128	824.2	823.99	-30.19	-13	PASS
GSM850	251	848.8	849.02	-29.76	-13	PASS
GPRS850	128	824.2	823.98	-29.75	-13	PASS
GPRS850	251	848.8	849.01	-29.24	-13	PASS
EGPRS850	128	824.2	823.98	-31.57	-13	PASS
EGPRS850	251	848.8	849.02	-31.15	-13	PASS
GSM1900	512	1850.2	1849.99	-30.61	-13	PASS
GSM1900	810	1909.8	1910.02	-29.70	-13	PASS
GPRS1900	512	1850.2	1849.98	-31.72	-13	PASS
GPRS1900	810	1909.8	1910.01	-31.33	-13	PASS
EGPRS1900	512	1850.2	1849.97	-37.82	-13	PASS
EGPRS1900	810	1909.8	1910.01	-35.43	-13	PASS

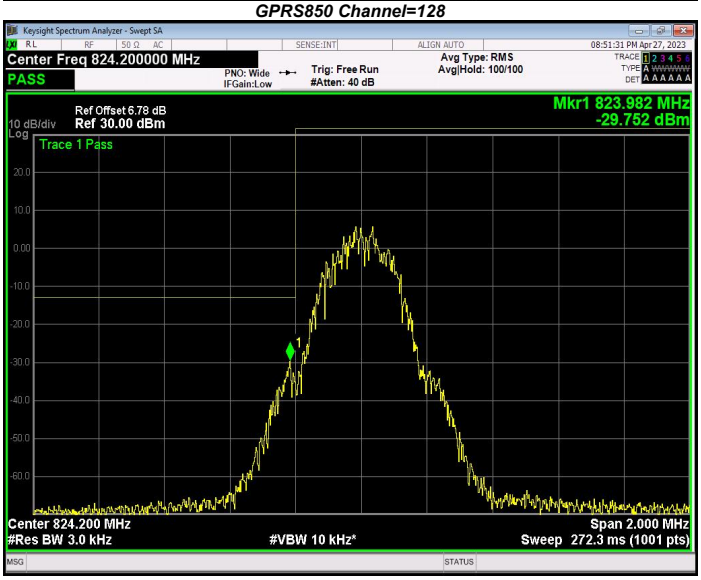
GSM850 Channel=128



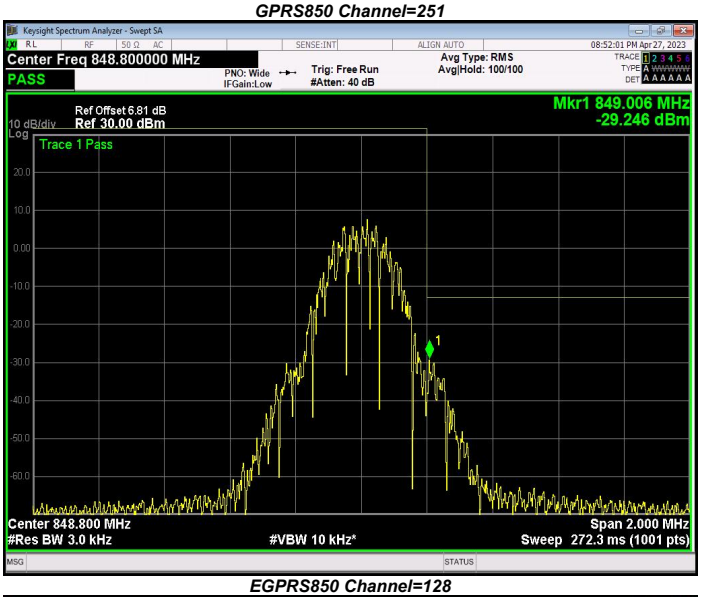
GSM850 Channel=251



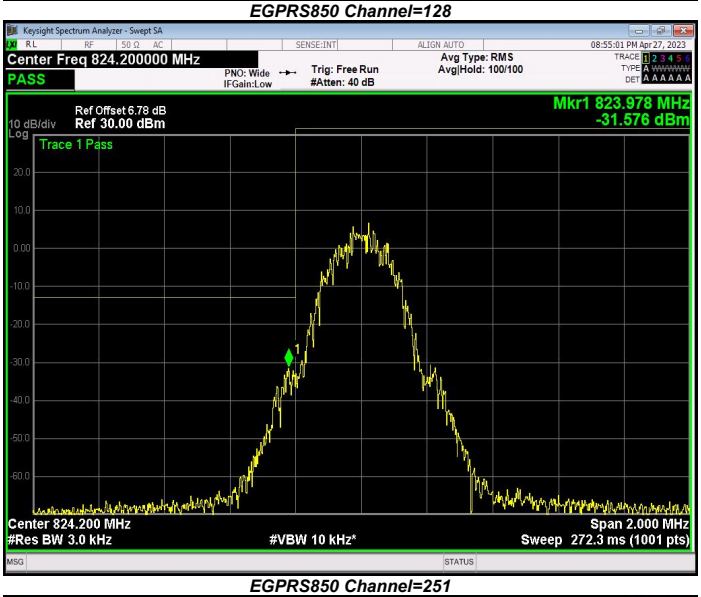
GPRS850 Channel=128



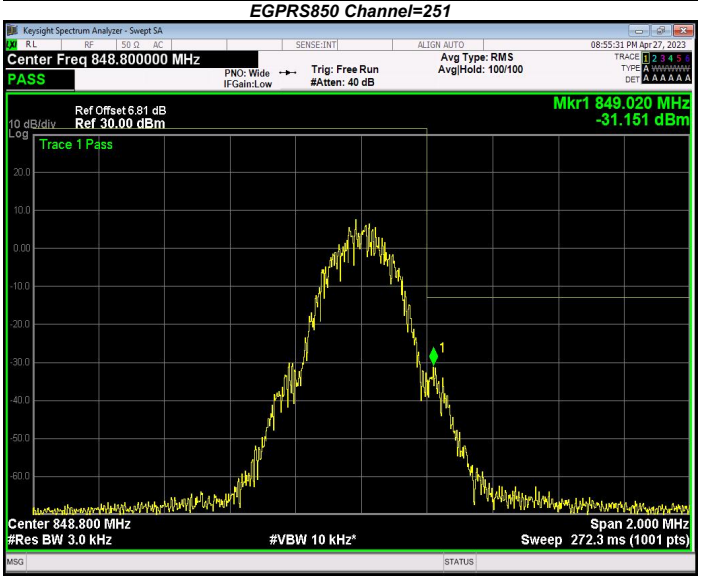
GPRS850 Channel=251



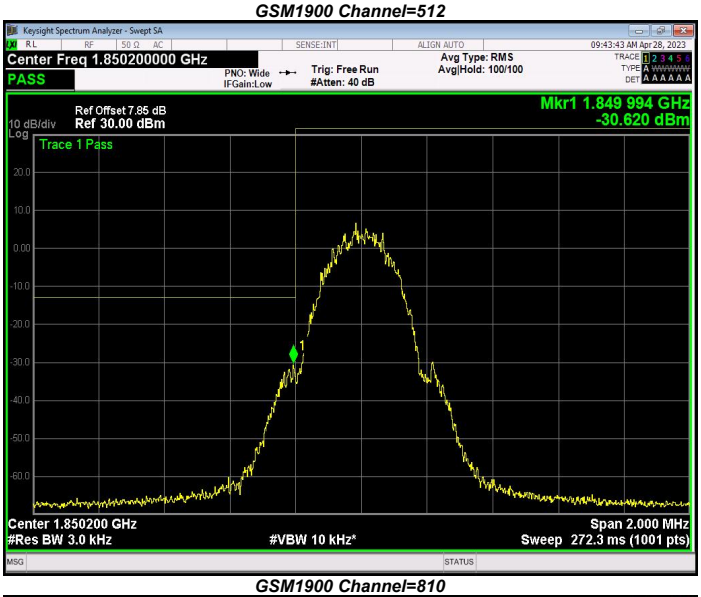
EGPRS850 Channel=128



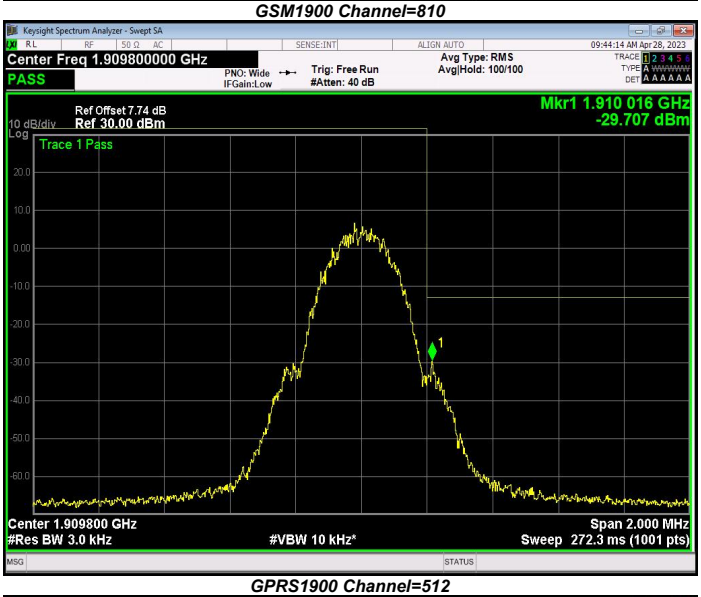
EGPRS850 Channel=251



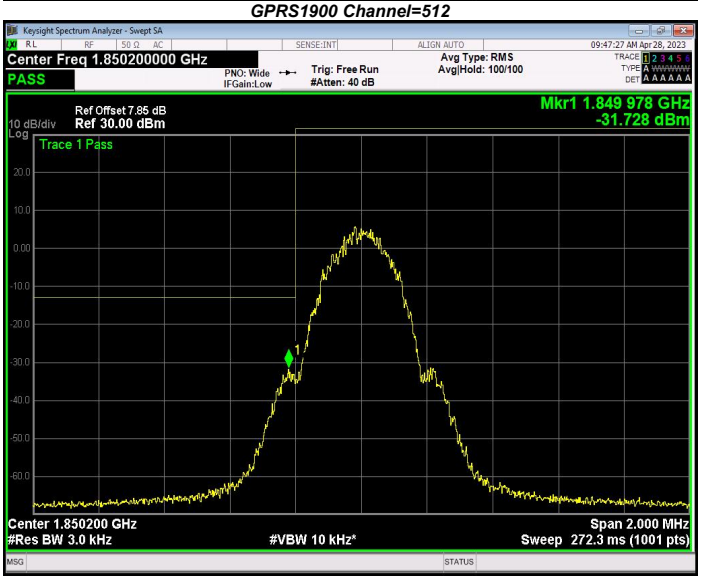
GSM1900 Channel=512



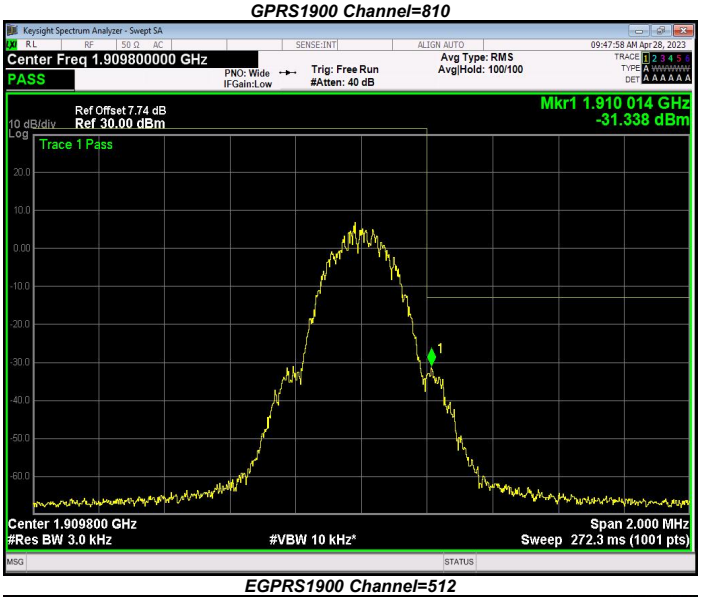
GSM1900 Channel=810



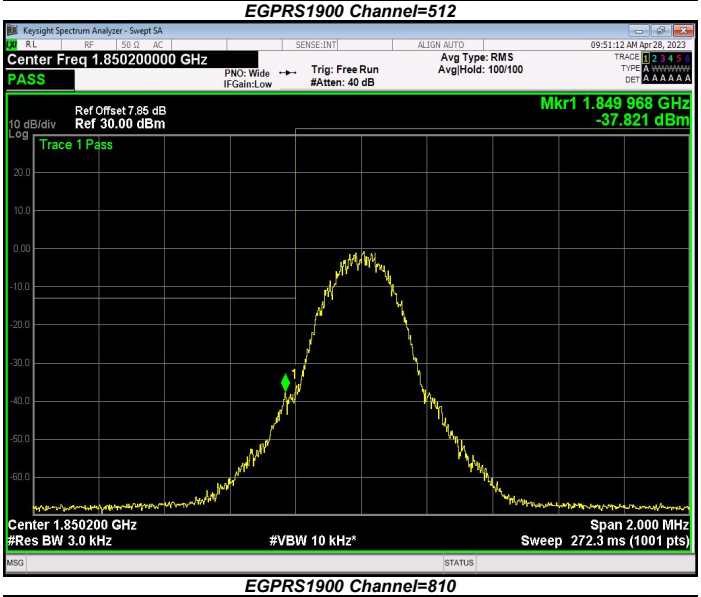
GPRS1900 Channel=512



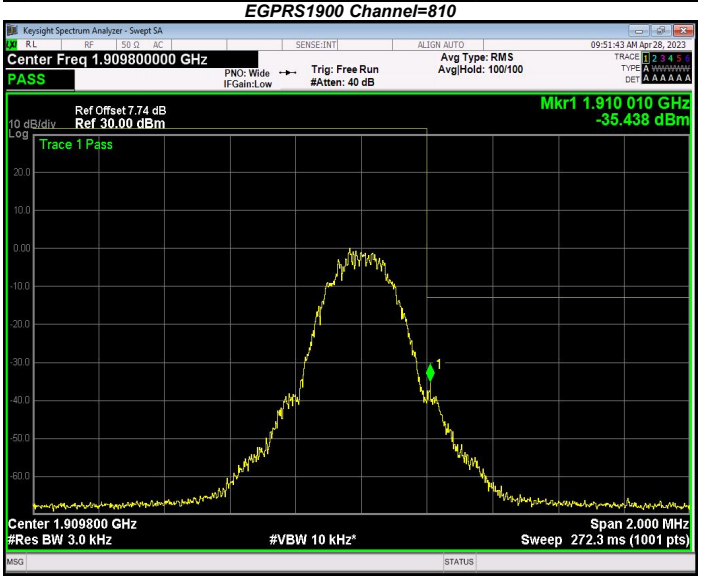
GPRS1900 Channel=810



EGPRS1900 Channel=512



EGPRS1900 Channel=810



4.4 Spurious Emission

LIMIT(Radiated Spurious Emssion)

According to 24.238 and 22.917 specify that 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 specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Frequency	Channel	Frequency Range	Verdict
GSM 850	Low	9KHz-10GHz	PASS
	Middle	9KHz -10GHz	PASS
	High	9KHz -10GHz	PASS
PCS 1900	Low	9KHz -20GHz	PASS
	Middle	9KHz -20GHz	PASS
	High	9KHz -20GHz	PASS

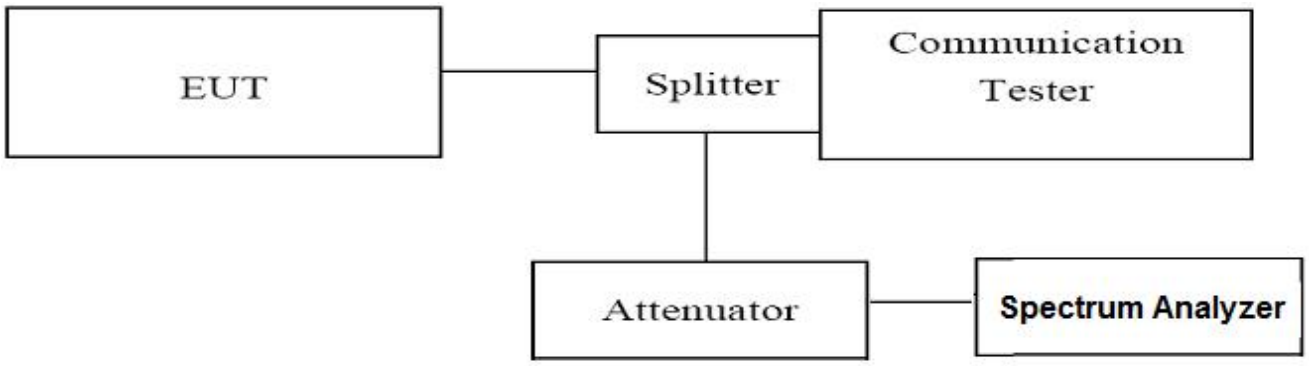
LIMIT(Spurious Emssion on Antenna Port)

Part 24.238 and Part 22.917 specify that 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.

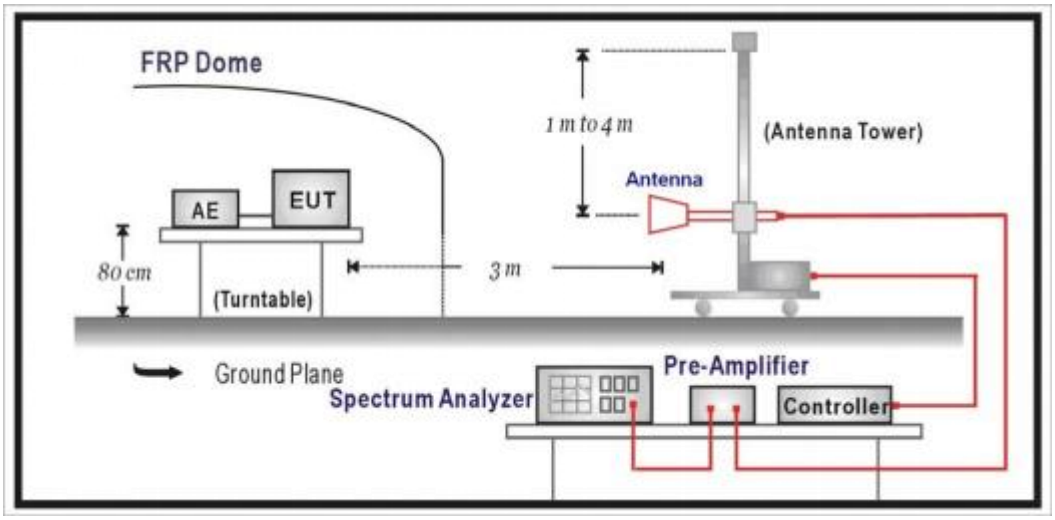
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

Conducted Spurious Measurement:

1. The EUT was set up for the max output power with pseudo random data modulation;
2. The power was measured with Agilent Spectrum Analyzer N9020A (peak);
3. These measurements were done at 3 frequencies, 1850.20 MHz, 1880.00 MHz and 1909.80 MHz for PCS1900 band; 824.20 MHz, 836.60 MHz and 848.80 MHz for GSM850 band. (Low, middle and high of operational frequency range).

Radiated Spurious Measurement:

1. EUT was placed on a 0.80 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 0.80m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test. The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} + G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

8. In order to make sure test results more clearly,we set frequency range and sweep time for difference frequency range as follows table:

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
GSM 850	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3
PCS 1900	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2