

Test Report

FCC ID: 2ASJR-CM2-1112120

Date of issue: June 15, 2019

Report Number:	MTi190614E099
Sample Description:	GT-Sense SMA Connectors
Model(s):	CM2-1112120, CM2-1102120
Applicant:	Globetracker, ApS
Address:	Strandgade 91, 4th Floor, DK-1401 Copenhagen K, DK
Date of Test:	Feb. 25, 2019 to June 15, 2019

Shenzhen Microtest Co., Ltd.
<http://www.mtitest.com>

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Test Result Certification

Applicant's name: Globetracker, ApS

Address: Strandgade 91, 4th Floor, DK-1401 Copenhagen K, DK

Manufacture's Name: Danchell

Address: Lyngvej 8-DK-4450 4450 Jyderup Denmark

Product name: GT-Sense SMA Connectors

Trademark: GT-Sense

Model name: CM2-1112120, CM2-1102120

Standards: FCC Part 22 Subpart H
FCC Part 24 Subpart E
FCC Part 27

Test Procedure: FCC Part 2
ANSI/TIA-603-E-2016
ANSI C63.26:2015
KDB 971168 D01 Power Meas License Digital Systems v03r01

This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Tested by:



Demi Mu

June 15, 2019

Reviewed by:



Blue Zheng

June 15, 2019

Approved by:



Smith Chen

June 15, 2019

1 General description

1.1 Feature of equipment under test (EUT)

Product name:	GT-Sense SMA Connectors
Trade name:	GT-Sense
Model name:	CM2-1112120
Serial model:	CM2-1102120
Difference in series models:	All the model are the same circuit and RF module, except the CM2-110210 has some temperature, humidity and pressure sensors removed.
Frequency range:	GPRS850: TX824.2MHz~848.8MHz /RX869.2MHz~893.8MHz; GPRS 1900: TX1850.2MHz~1909.8MHz /RX1930.2MHz~1989.8MHz; WCDMA Band II: TX1852.4MHz~1907.6MHz RX1932.4MHz~1987.6MHz; WCDMA Band IV: TX1710-1755 MHz RX2110-2155 MHz WCDMA Band V: TX826.4MHz~846.6MHz RX871.4MHz~891.6MHz;
Modulation type:	GMSK for GSM/GPRS; 8PSK for EGPRS; QPSK for WCDMA bands;
Power class:	Multi-Class12 Only 4 time slots are used for GPRS
SIM card:	The GT-Sense SMA Connectors has One SIM Card socket
Antenna Type	External Antenna
Antenna gain:	GPRS 850: 1.8dBi GPRS 1900: 3.8dBi WCDMA Band II: 3.8dBi WCDMA Band IV: 3.9dBi WCDMA Band V: 1.8dBi
Hardware version	3
Software version	60_3
Power supply:	DC 3.7V from battery or DC 36V from adapter
Battery:	DC 3.7V 1800mAh
Adapter information:	N/A

1.2 Test frequency channel

Frequency Band	Frequency	Channel	Frequency(MHz)
GPRS 850	Low	128	824.2
	Middle	190	836.6
	High	251	848.8
GPRS 1900	Low	512	1850.2
	Middle	661	1880
	High	810	1909.8
WCDMA Band II	Low	9262	1852.4
	Middle	9400	1880
	High	9538	1907.6
WCDMA Band IV	Low	1312	1712.4
	Middle	1450	1740.0
	High	1513	1752.6
WCDMA Band V	Low	4132	826.4
	Middle	4183	836.6
	High	4233	846.6

1.3 EUT operation mode

During testing, RF test program provided by the manufacture to control the Tx operation followed the test requirement. The EUT is configured to transmit continuously (duty cycle > 98 %) at the maximum power control level.

1.4 Test conditions

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

- Temperature: 15°C~35°C
- Humidity: 20%~75%
- Atmospheric pressure: 98kPa~101kPa

1.5 Testing site

Test Site	Shenzhen Microtest Co., Ltd.
Test Site Location	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.:	448573

1.6 Ancillary equipment list

Equipment	Model	S/N	Manufacturer	Certificate type
Adapter	/	/	/	/

1.7 Measurement uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, $U=2xUc(y)$

RF frequency	1×10^{-7}
RF power, conducted	± 1 dB
Conducted emission(150kHz~30MHz)	± 2.5 dB
Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	± 1 degree
Humidity	± 5 %

2 Summary of Test Result

Item	FCC Part No.	Description of Test	Result
1	2.1046, 22.913(a); 24.232(c) 27.50(d) (4)	Maximum output power	Pass
2	2.1046, 22.913(a); 24.232(c) 27.50(d)(5)	Peak to average power ratio(PAPR)	Pass
3	2.1046, 22.913(a); 24.232(c) 27.50(d)(4)	Transmitter Radiated Power (EIRP/ERP)	Pass
4	2.1049; 22.917(b); 24.238(b) 27.53(h)	Occupied Bandwidth	Pass
5	2.1051; 22.917(a); 24.238(a) 27.53(h)	Conducted spurious emissions	Pass
6	2.1051; 22.917(b); 24.238(b) 27.53(h)	Spurious emissions at band edge	Pass
7	2.1053; 22.917(a); 24.238(a) 27.53(h)	Radiated spurious emissions	Pass
8	2.1055; 22.355; 24.235 27.54	Frequency Stability	Pass

3 Test facilities and accreditations

3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd
Location	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.:	FCC Registration No.: 448573

3.2 Environmental conditions

Temperature:	20°C~30°C
Humidity	30%~70%
Atmospheric pressure	98kPa~101kPa

3.3 Measurement uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, $U=2xUc(y)$

RF frequency	1×10^{-7}
RF power, conducted	± 1 dB
Conducted emission(150kHz~30MHz)	± 2.5 dB
Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	± 1 degree
Humidity	± 5 %

3.4 Test software

Software Name	Manufacturer	Model	Version
RF Test System	Farad	LZ-RF	Lz_Rf 3A3

4 List of test equipment

Equipment No.	Equipment Name	Manufacturer	Model	Serial No.	Calibration date	Due date
MTI-E001	Spectrum Analyzer	Agilent	E4407B	MY41441082	2018/09/18	2019/09/17
MTI-E002	CMU 200 universal radio communication tester	Rohde&schwarz	CMU 200	114587	2018/09/18	2019/09/17
MTI-E004	EMI Test Receiver	Rohde&schwarz	ESPI	1000314	2018/09/18	2019/09/17
MTI-E006	Broadband antenna	schwarabeck	VULB9163	872	2018/09/18	2019/09/17
MTI-E007	Horn antenna	schwarabeck	BBHA9120D	1201	2018/09/18	2019/09/17
MTI-E014	amplifier	America	8447D	3113A06150	2018/09/18	2019/09/17
MTI-E015	Conduction Immunity Signal Generator	Schloder	CDG6000	126A1343/2015	2018/09/18	2019/09/17
MTI-E016	Coupled decoupling network	Schloder	CDA M2/M3	A2210332/2015	2018/09/18	2019/09/17
MTI-E032	Comprehensive test instrument	Rohde&schwarz	CMW500	124192	2018/09/13	2019/09/12
MTI-E034	amplifier	Agilent	8449B	3008A02400	2018/08/22	2019/08/21
MTI-E040	Spectrum analyzer	Agilent	N9020A	MY49100060	2018/09/05	2019/09/04
MTI-E041	Signal generator	Agilent	N5182A	MY49060455	2018/09/23	2019/09/22
MTI-E042	Analog signal generator	Agilent	E4421B	GB40051240	2018/09/23	2019/09/22
MTI-E043	Power probe	Dare Instruments	RPR3006W	16I00054SN016	2018/09/29	2019/09/28
MTI-E047	10dB attenuator	Mini-Circuits	UNAT-10+	15542	2018/09/24	2019/09/23
MTI-E049	spectrum analyzer	Rohde&schwarz	FSP-38	100019	2018/09/18	2019/09/17
MTI-E050	PSG Signal generator	Agilent	E8257D	MY46520873	2018/09/24	2019/09/23
MTI-E061	Active Loop Antenna 9kHz - 30MHz	Schwarzbeek	FMZB 1519 B	00044	2018/09/26	2019/09/25
MTI-E052	18-40GHz amplifier	Chengdu step Micro Technology	ZLNA-18-40G-21	1608001	2018/09/18	2019/09/17
MTI-E053	15-40G Antenna	Schwarzbeek	BBHA9170	BBHA9170582	2018/09/18	2019/09/17
MTI-B046	DC power supply	QJE	QJ3020E	015170	2018/09/18	2019/09/17

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

5 Test Result

5.1 Maximum output power and EIRP & ERP

5.1.1 Limit

For FCC 22.913: The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

For FCC 24.234: Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

5.1.2 Test method

For Conducted output power:

1. Use a universal radio communication tester, the output power of EUT was measured at the antenna terminal. The path loss was calibrated and entered as an offset into the test equipment.
2. The EUT was configured to transmit on maximum power by the radio communication tester.
3. Measured the peak and average powers.

For EIRP & ERP:

1. In many cases, the RF output power limits for licensed digital transmission devices is specified in terms of effective radiated power (ERP) or equivalent isotropic radiated power (EIRP). Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are determined by adding the transmit antenna gain to the conducted RF output power with the primary difference between the two being that when determining the ERP, the transmit antenna gain is referenced to a dipole antenna (i.e., dBd) whereas when determining the EIRP, the transmit antenna gain is referenced to an isotropic antenna (dBi).

2. The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP/EIRP} = P_{\text{Meas}} + \text{GT} - \text{LC}$$

where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as P_{Meas} , typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

dBd (ERP) = dBi (EIRP) - 2.15 dB

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

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

5.1.3 Test Result

For Conducted output power:

Band	Channel	PCL	Slot	Power(dBm)	Limit(dBm)	Verdict
GPRS850	128	5	1	32.31	38.5	PASS
GPRS850	128	5	2	31.93	38.5	PASS
GPRS850	128	5	3	30.57	38.5	PASS
GPRS850	128	5	4	29.05	38.5	PASS
GPRS850	190	5	1	32.40	38.5	PASS
GPRS850	190	5	2	32.06	38.5	PASS
GPRS850	190	5	3	30.74	38.5	PASS
GPRS850	190	5	4	29.24	38.5	PASS
GPRS850	251	5	1	32.46	38.5	PASS
GPRS850	251	5	2	32.15	38.5	PASS
GPRS850	251	5	3	30.83	38.5	PASS
GPRS850	251	5	4	29.34	38.5	PASS
GPRS1900	512	0	1	29.87	33	PASS
GPRS1900	512	0	2	29.51	33	PASS
GPRS1900	512	0	3	28.00	33	PASS
GPRS1900	512	0	4	26.46	33	PASS
GPRS1900	661	0	1	29.98	33	PASS
GPRS1900	661	0	2	29.66	33	PASS
GPRS1900	661	0	3	28.40	33	PASS
GPRS1900	661	0	4	26.99	33	PASS
GPRS1900	810	0	1	29.75	33	PASS
GPRS1900	810	0	2	29.48	33	PASS
GPRS1900	810	0	3	28.33	33	PASS
GPRS1900	810	0	4	26.98	33	PASS

Band	Channel	PCL	Slot	Power(dBm)	Limit(dBm)	Verdict
EGPRS850	128	8	1	26.72	38.5	PASS
EGPRS850	128	8	2	25.05	38.5	PASS
EGPRS850	128	8	3	23.77	38.5	PASS
EGPRS850	128	8	4	22.76	38.5	PASS
EGPRS850	190	8	1	26.94	38.5	PASS
EGPRS850	190	8	2	24.88	38.5	PASS
EGPRS850	190	8	3	24.71	38.5	PASS
EGPRS850	190	8	4	22.97	38.5	PASS
EGPRS850	251	8	1	26.95	38.5	PASS
EGPRS850	251	8	2	25.16	38.5	PASS
EGPRS850	251	8	3	23.37	38.5	PASS
EGPRS850	251	8	4	23.01	38.5	PASS
EGPRS1900	512	2	1	27.09	33	PASS
EGPRS1900	512	2	2	25.12	33	PASS
EGPRS1900	512	2	3	23.20	33	PASS
EGPRS1900	512	2	4	23.04	33	PASS
EGPRS1900	661	2	1	27.41	33	PASS
EGPRS1900	661	2	2	25.81	33	PASS

EGPRS1900	661	2	3	23.76	33	PASS
EGPRS1900	661	2	4	23.61	33	PASS
EGPRS1900	810	2	1	27.17	33	PASS
EGPRS1900	810	2	2	25.26	33	PASS
EGPRS1900	810	2	3	24.34	33	PASS
EGPRS1900	810	2	4	23.75	33	PASS

Band	Channel	Power(dBm)	Limit(dBm)	Verdict
Band II	9262	23.81	33	PASS
Band II	9400	23.56	33	PASS
Band II	9538	23.57	33	PASS
Band IV	1312	23.05	30	PASS
Band IV	1413	23.52	30	PASS
Band IV	1513	23.70	30	PASS
Band V	4132	22.89	38.5	PASS
Band V	4182	23.25	38.5	PASS
Band V	4233	22.86	38.5	PASS

Band	Channel	SubTest	Power(dBm)	Limit(dBm)	Verdict
Band II	9262	HSDPA_Sub0	22.80	33	PASS
Band II	9262	HSDPA_Sub1	22.23	33	PASS
Band II	9262	HSDPA_Sub2	22.20	33	PASS
Band II	9262	HSDPA_Sub3	22.16	33	PASS
Band II	9400	HSDPA_Sub0	22.55	33	PASS
Band II	9400	HSDPA_Sub1	22.11	33	PASS
Band II	9400	HSDPA_Sub2	22.10	33	PASS
Band II	9400	HSDPA_Sub3	22.09	33	PASS
Band II	9538	HSDPA_Sub0	21.33	33	PASS
Band II	9538	HSDPA_Sub1	20.84	33	PASS
Band II	9538	HSDPA_Sub2	20.88	33	PASS
Band II	9538	HSDPA_Sub3	20.86	33	PASS
Band IV	1312	HSDPA_Sub0	22.02	30	PASS
Band IV	1312	HSDPA_Sub1	21.56	30	PASS
Band IV	1312	HSDPA_Sub2	21.61	30	PASS
Band IV	1312	HSDPA_Sub3	21.57	30	PASS
Band IV	1413	HSDPA_Sub0	21.93	30	PASS
Band IV	1413	HSDPA_Sub1	21.48	30	PASS
Band IV	1413	HSDPA_Sub2	21.52	30	PASS
Band IV	1413	HSDPA_Sub3	21.50	30	PASS
Band IV	1513	HSDPA_Sub0	22.63	30	PASS
Band IV	1513	HSDPA_Sub1	22.17	30	PASS
Band IV	1513	HSDPA_Sub2	22.19	30	PASS
Band IV	1513	HSDPA_Sub3	22.16	30	PASS
Band V	4132	HSDPA_Sub0	21.73	38.5	PASS
Band V	4132	HSDPA_Sub1	21.29	38.5	PASS
Band V	4132	HSDPA_Sub2	21.27	38.5	PASS
Band V	4132	HSDPA_Sub3	21.26	38.5	PASS
Band V	4182	HSDPA_Sub0	22.22	38.5	PASS

Band V	4182	HSDPA_Sub1	21.77	38.5	PASS
Band V	4182	HSDPA_Sub2	21.83	38.5	PASS
Band V	4182	HSDPA_Sub3	21.78	38.5	PASS
Band V	4233	HSDPA_Sub0	21.72	38.5	PASS
Band V	4233	HSDPA_Sub1	21.25	38.5	PASS
Band V	4233	HSDPA_Sub2	21.28	38.5	PASS
Band V	4233	HSDPA_Sub3	21.27	38.5	PASS

Band	Channel	SubTest	Power(dBm)	Limit(dBm)	Verdict
Band II	9262	HSUPA_Sub1	20.78	33	PASS
Band II	9262	HSUPA_Sub2	21.28	33	PASS
Band II	9262	HSUPA_Sub3	21.81	33	PASS
Band II	9262	HSUPA_Sub4	20.80	33	PASS
Band II	9262	HSUPA_Sub5	22.80	33	PASS
Band II	9400	HSUPA_Sub1	20.60	33	PASS
Band II	9400	HSUPA_Sub2	21.12	33	PASS
Band II	9400	HSUPA_Sub3	21.57	33	PASS
Band II	9400	HSUPA_Sub4	20.62	33	PASS
Band II	9400	HSUPA_Sub5	22.53	33	PASS
Band II	9538	HSUPA_Sub1	21.04	33	PASS
Band II	9538	HSUPA_Sub2	20.61	33	PASS
Band II	9538	HSUPA_Sub3	21.04	33	PASS
Band II	9538	HSUPA_Sub4	20.16	33	PASS
Band II	9538	HSUPA_Sub5	22.12	33	PASS
Band IV	1312	HSUPA_Sub1	20.10	30	PASS
Band IV	1312	HSUPA_Sub2	20.61	30	PASS
Band IV	1312	HSUPA_Sub3	21.16	30	PASS
Band IV	1312	HSUPA_Sub4	20.17	30	PASS
Band IV	1312	HSUPA_Sub5	22.02	30	PASS
Band IV	1413	HSUPA_Sub1	20.48	30	PASS
Band IV	1413	HSUPA_Sub2	20.99	30	PASS
Band IV	1413	HSUPA_Sub3	21.51	30	PASS
Band IV	1413	HSUPA_Sub4	20.54	30	PASS
Band IV	1413	HSUPA_Sub5	22.41	30	PASS

Band IV	1513	HSUPA_Sub1	20.58	30	PASS
Band IV	1513	HSUPA_Sub2	21.11	30	PASS
Band IV	1513	HSUPA_Sub3	21.61	30	PASS
Band IV	1513	HSUPA_Sub4	20.61	30	PASS
Band IV	1513	HSUPA_Sub5	22.54	30	PASS
Band V	4132	HSUPA_Sub1	19.84	38.5	PASS
Band V	4132	HSUPA_Sub2	20.30	38.5	PASS
Band V	4132	HSUPA_Sub3	20.75	38.5	PASS
Band V	4132	HSUPA_Sub4	19.86	38.5	PASS
Band V	4132	HSUPA_Sub5	21.81	38.5	PASS
Band V	4182	HSUPA_Sub1	20.38	38.5	PASS
Band V	4182	HSUPA_Sub2	20.82	38.5	PASS
Band V	4182	HSUPA_Sub3	21.37	38.5	PASS
Band V	4182	HSUPA_Sub4	20.31	38.5	PASS
Band V	4182	HSUPA_Sub5	22.26	38.5	PASS
Band V	4233	HSUPA_Sub1	19.83	38.5	PASS
Band V	4233	HSUPA_Sub2	20.28	38.5	PASS
Band V	4233	HSUPA_Sub3	20.81	38.5	PASS
Band V	4233	HSUPA_Sub4	19.76	38.5	PASS
Band V	4233	HSUPA_Sub5	21.76	38.5	PASS

For EIRP & ERP:

For GPRS 850

Frequency (MHz)	Polarization	SG	Pcl (dB)	Ga Antenna Gain (dB)	Correction (dB)	ERP (dBm)	ERP (W)
		Level (dBm)					
824.2	H	31.68	0.39	1	2.15	30.14	1.0317
836.6	H	31.43	0.35	1.1	2.15	30.03	1.0068
848.8	H	31.52	0.32	1.2	2.15	30.25	1.0604
824.2	V	32.45	0.39	1	2.15	30.91	1.2341
836.6	V	31.43	0.35	1.1	2.15	30.03	1.0063
848.8	V	31.96	0.32	1.2	2.15	30.69	1.1711

For EGPRS 850

Frequency (MHz)	Polarization	SG	Pcl (dB)	Ga Antenna Gain (dB)	Correction (dB)	ERP (dBm)	ERP (W)
		Level (dBm)					
824.2	H	29.91	0.39	1	2.15	28.37	0.6870
836.6	H	30.15	0.35	1.1	2.15	28.75	0.7503
848.8	H	30.10	0.32	1.2	2.15	28.83	0.7634
824.2	V	29.93	0.39	1	2.15	28.39	0.6896
836.6	V	30.25	0.35	1.1	2.15	28.85	0.7668
848.8	V	30.32	0.32	1.2	2.15	29.05	0.8039

For GPRS 1900

Frequency	Polarization	SG Level	Pcl	Ga Antenna Gain	EIRP	EIRP
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(W)
1850.2	H	29.88	0.47	1.58	29.41	0.8739
1880	H	29.52	0.47	1.72	29.05	0.8043
1909.8	H	29.68	0.46	1.85	29.22	0.8350
1850.2	V	29.96	0.47	1.58	29.49	0.8890
1880	V	29.65	0.47	1.72	29.18	0.8276
1909.8	V	29.76	0.46	1.85	29.30	0.8508

For EGPRS 1900

Frequency	Polarization	SG Level	Pcl	Ga Antenna Gain	EIRP	EIRP
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(W)
1850.2	H	28.57	0.47	1.58	28.10	0.6459
1880	H	28.86	0.47	1.72	28.39	0.6898
1909.8	H	28.62	0.46	1.85	28.16	0.6540
1850.2	V	28.84	0.47	1.58	28.37	0.6871
1880	V	28.49	0.47	1.72	28.02	0.6341
1909.8	V	29.03	0.46	1.85	28.57	0.7199

For WCDMA BAND II

Frequency	Polarization	SG Level	Pcl	Ga Antenna Gain	EIRP	EIRP
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(W)
1852.4	H	22.75	0.47	1.59	23.44	0.2208
1880	H	22.50	0.47	1.72	22.88	0.1941
1907.6	H	22.38	0.46	1.84	22.49	0.1774
1852.4	V	22.67	0.47	1.59	23.44	0.2208
1880	V	22.62	0.47	1.72	22.88	0.1941
1907.6	V	22.22	0.46	1.84	22.49	0.1774

For WCDMA BAND IV

Frequency	Polarization	SG Level	Pcl	Ga Antenna Gain	EIRP	EIRP
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(W)
1712.4	H	21.86	0.39	1	22.47	0.1768
1740	H	21.90	0.35	1.1	22.65	0.1840
1752.6	H	21.72	0.32	1.2	22.60	0.1818
1712.4	V	21.25	0.39	1	21.86	0.1535
1740	V	21.37	0.35	1.1	22.12	0.1628
1752.6	V	21.22	0.32	1.2	22.10	0.1621

For WCDMA BAND V

Radiated Power (ERP) for UMTS band V							
Frequency	Polarization	SG Level	Pcl	Ga	Correction	(ERP)	ERP
(MHz)		(dBm)	(dB)	(dB)	(dBi)	(dBm)	(W)
826.4	H	23.05	0.39	1	2.15	21.51	0.1416
836.6	H	22.57	0.35	1.1	2.15	21.17	0.1309
846.6	H	22.57	0.32	1.2	2.15	21.30	0.1348
826.4	V	22.53	0.39	1	2.15	20.99	0.1256
836.6	V	22.92	0.35	1.1	2.15	21.52	0.1418
846.6	V	22.88	0.32	1.2	2.15	21.61	0.1448

5.2 Peak to average power ratio(PAPR)

5.2.1 Limit

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

5.2.2 Test method

The EUT was connected to Spectrum Analyzer and Base Station via power divider.

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.

Set the number of counts to a value that stabilizes the measured CCDF curve.

Set the measurement interval to 1 ms.

Record the maximum PAPR level associated with a probability of 0.1%.

- a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
- b) Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
- c) Set the number of counts to a value that stabilizes the measured CCDF curve;
- d) Set the measurement interval as follows:
 - 1) for continuous transmissions, set to 1 ms,
 - 2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
- e) Record the maximum PAPR level associated with a probability of 0.1%.

5.2.3 Test Result

Band	Channel	Peak-to-Average Ratio(dB)	Limit(dBm)	Verdict
GPRS850	128	2.66	13	PASS
GPRS850	190	2.66	13	PASS
GPRS850	251	2.66	13	PASS
EGPRS850	128	5.58	13	PASS
EGPRS850	190	5.57	13	PASS
EGPRS850	251	5.57	13	PASS
GPRS1900	512	2.63	13	PASS
GPRS1900	661	2.64	13	PASS
GPRS1900	810	2.63	13	PASS
EGPRS1900	512	5.27	13	PASS
EGPRS1900	661	4.95	13	PASS
EGPRS1900	810	4.87	13	PASS

Band	Channel	Peak-to-Average Ratio(dB)	Limit(dBm)	Verdict
Band II	9262	2.35	13	PASS
Band II	9400	2.67	13	PASS
Band II	9538	2.52	13	PASS
Band IV	1312	2.65	13	PASS
Band IV	1413	2.63	13	PASS
Band IV	1513	2.65	13	PASS
Band V	4132	2.50	13	PASS
Band V	4182	2.59	13	PASS
Band V	4233	3.01	13	PASS

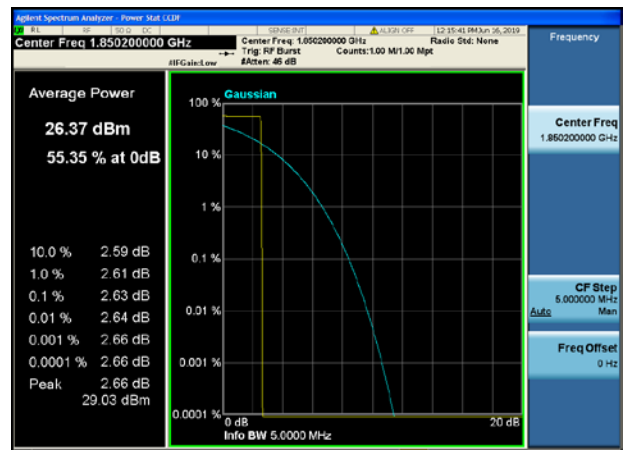
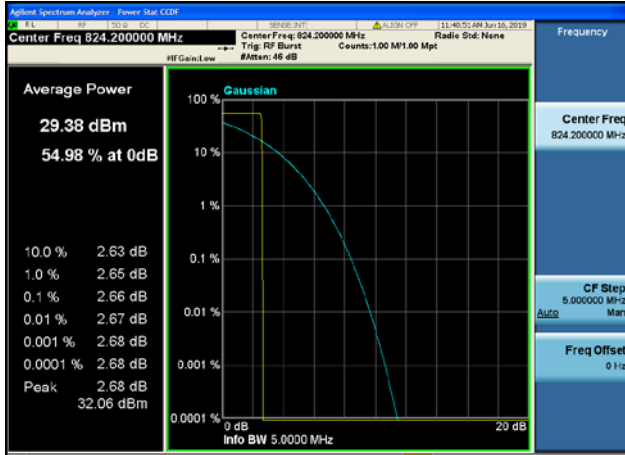
Test plot

(GPRS850)

(GPRS1900)

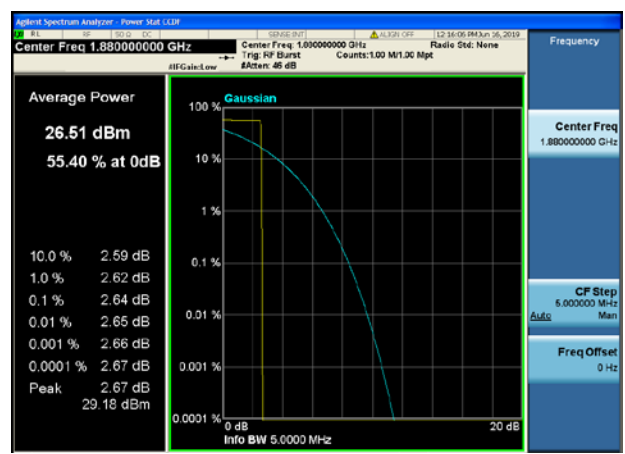
Peak-to-Average Ratio on channel 128

Peak-to-Average Ratio on channel 512



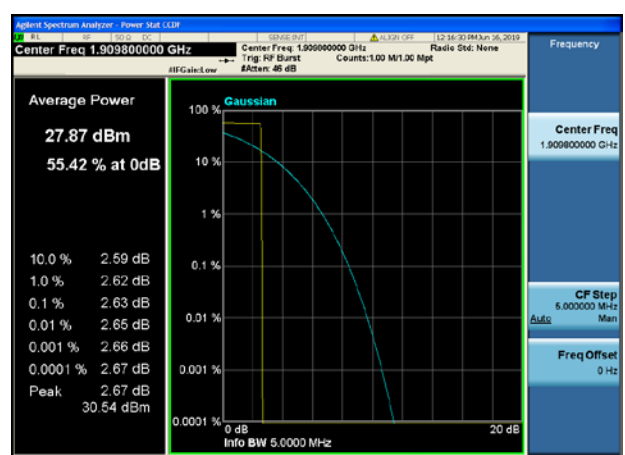
Peak-to-Average Ratio on channel 190

Peak-to-Average Ratio on channel 661



Peak-to-Average Ratio on channel 251

Peak-to-Average Ratio on channel 810



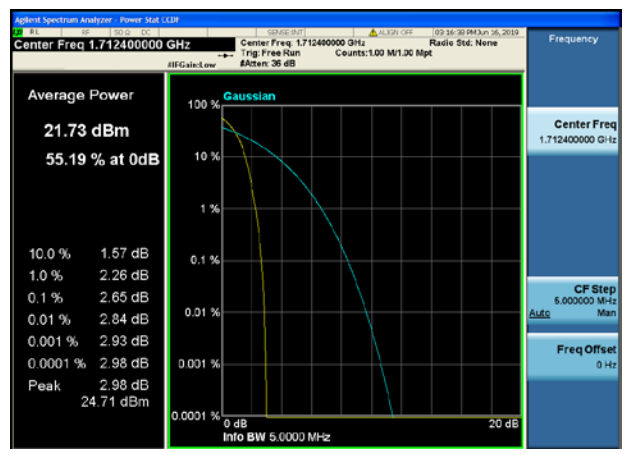
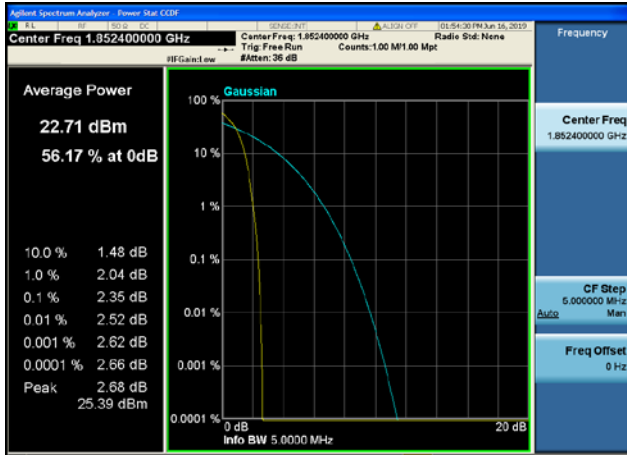
Test plot

(WCDMA BAND II)

(WCDMA BAND IV)

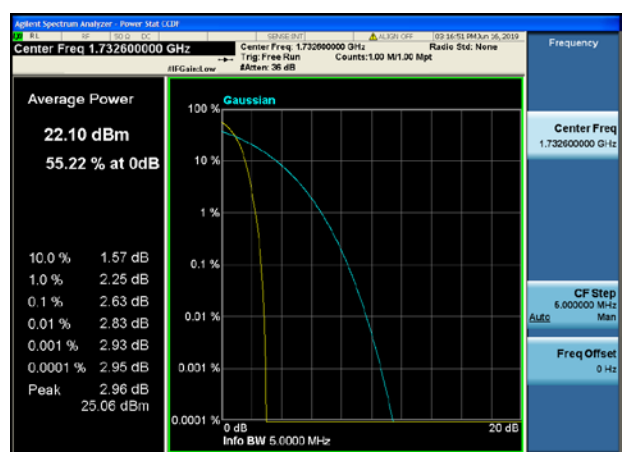
Peak-to-Average Ratio on channel 9262

Peak-to-Average Ratio on channel 1312



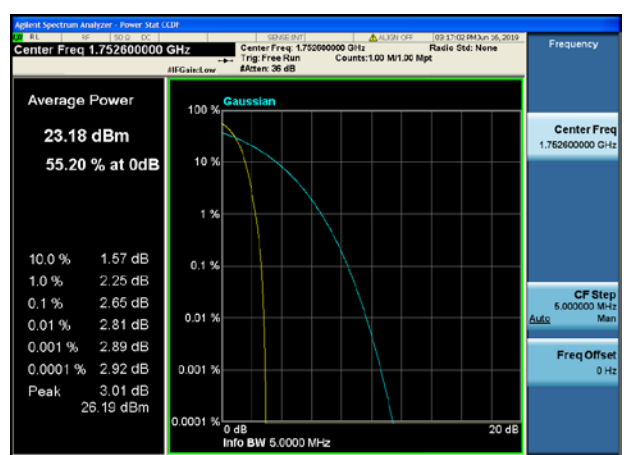
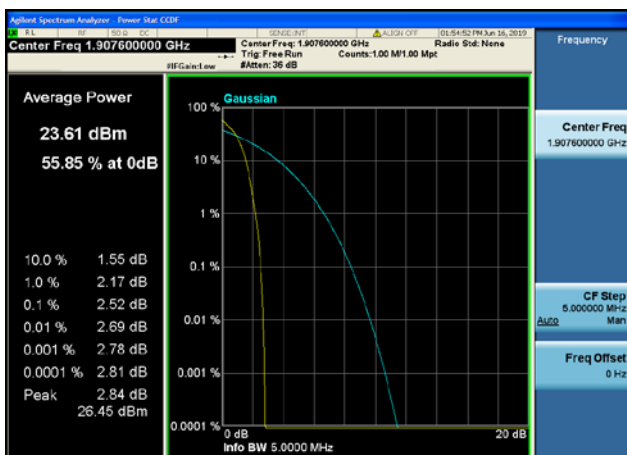
Peak-to-Average Ratio on channel 9400

Peak-to-Average Ratio on channel 1450



Peak-to-Average Ratio on channel 9538

Peak-to-Average Ratio on channel 1513



Test plot	
(WCDMA BAND V)	--
Peak-to-Average Ratio on channel 4132	--
<p>Agilent Spectrum Analyzer - Power Stat CDDF Center Freq: 826.400000 MHz Average Power: 22.39 dBm 55.52 % at 0dB Info BW: 5.0000 MHz</p>	--
Peak-to-Average Ratio on channel 4183	--
<p>Agilent Spectrum Analyzer - Power Stat CDDF Center Freq: 836.400000 MHz Average Power: 22.90 dBm 54.68 % at 0dB Info BW: 5.0000 MHz</p>	--
Peak-to-Average Ratio on channel 4233	--
<p>Agilent Spectrum Analyzer - Power Stat CDDF Center Freq: 846.600000 MHz Average Power: 22.54 dBm 53.21 % at 0dB Info BW: 5.0000 MHz</p>	--

Note: all modes of EUT have been tested; only the data of worst case mode is reported.

5.2.4 Occupied bandwidth

5.2.5 Test method

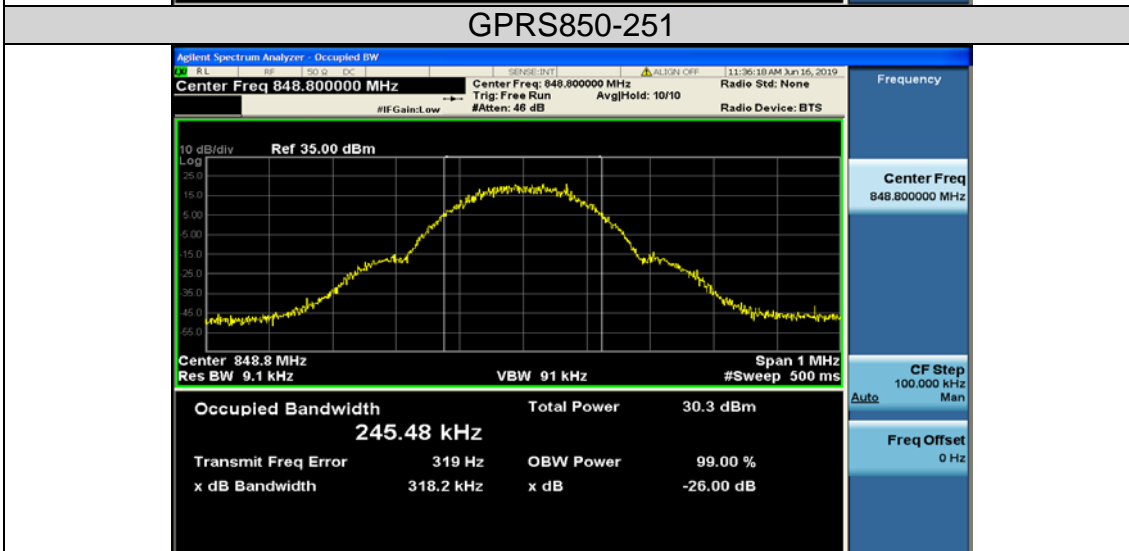
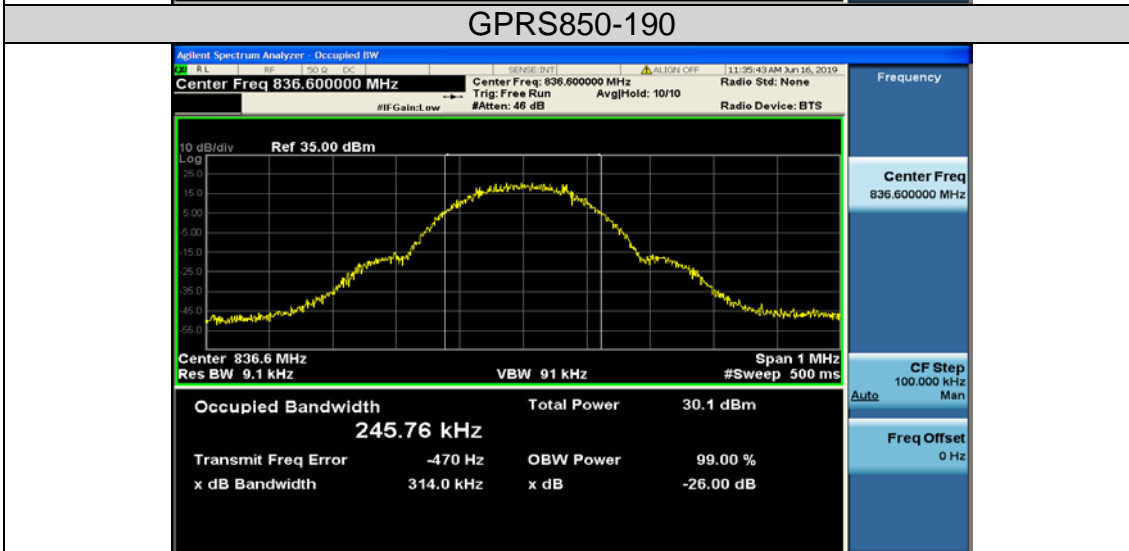
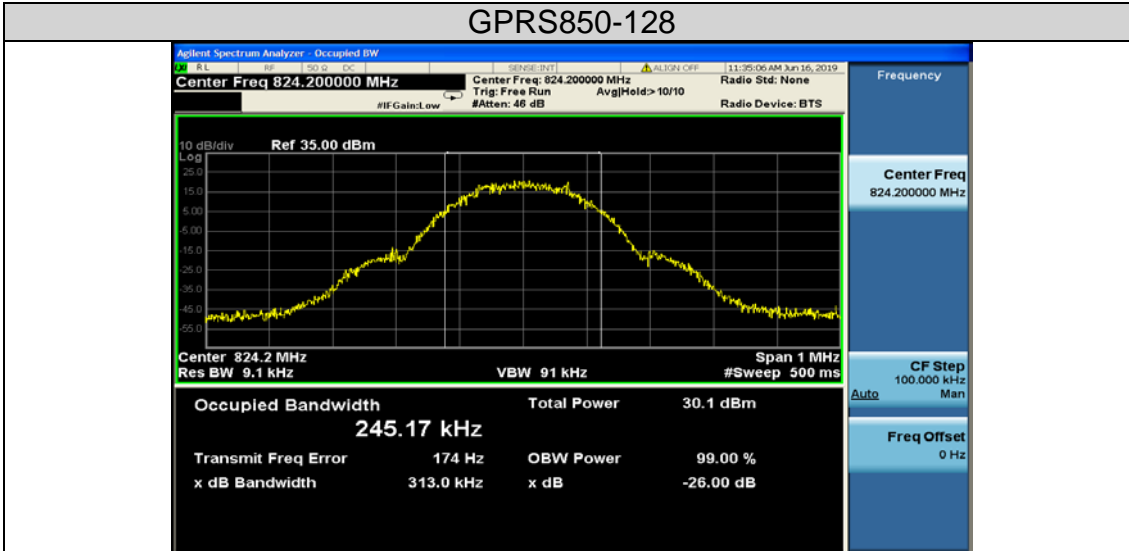
1. The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
2. The resolution bandwidth of the Spectrum Analyzer is set to at least 1% of the occupied bandwidth.
3. The low, middle and the high channels are selected to perform tests respectively.
4. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak; make a line whose value is 26dB lower than the peak; mark two points which the line intersected the waveform at; finally record the delta of the two points as the occupied bandwidth and the plot.
5. Set the Spectrum Analyzer Occupied bandwidth function to measure the 99% occupied bandwidth.

5.2.6 Test result

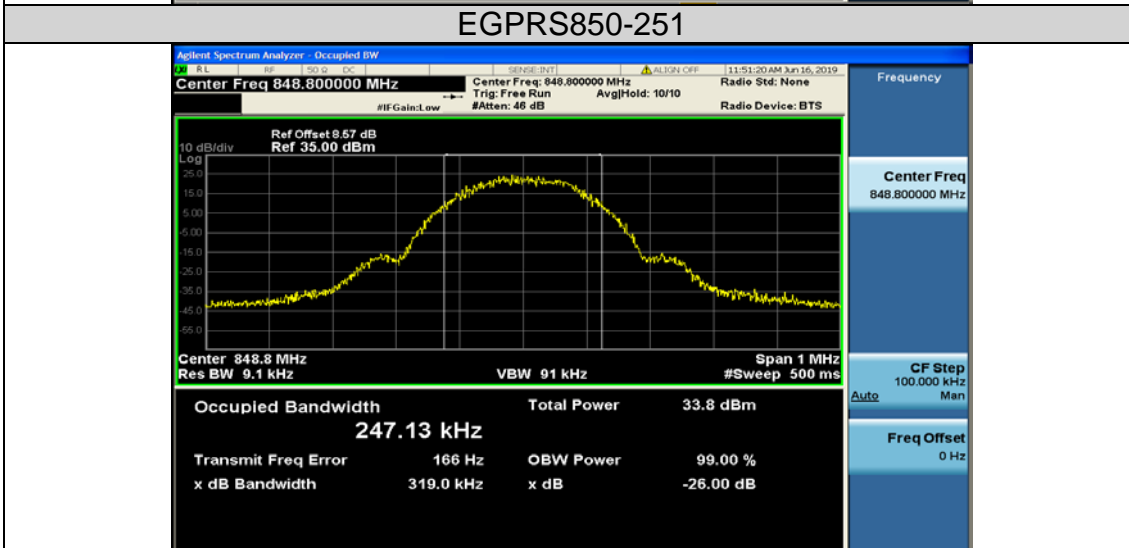
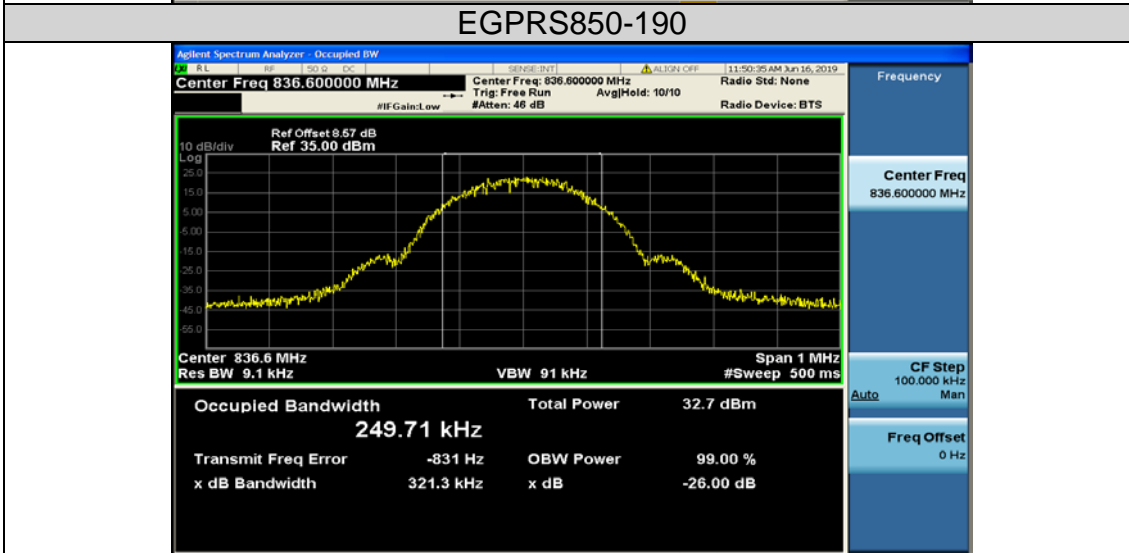
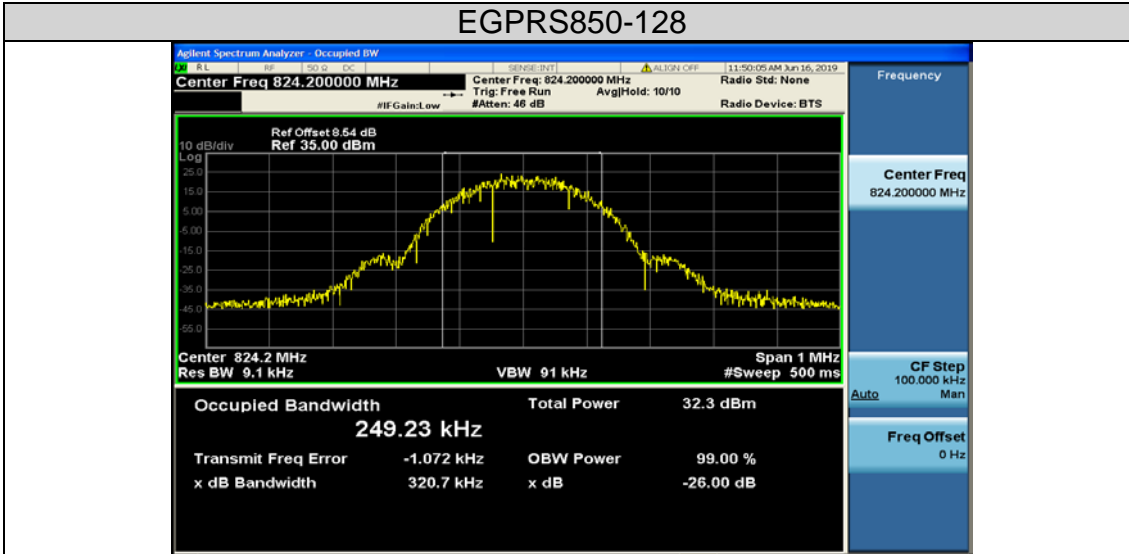
Band	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
GPRS850	128	245.17	313.0	---	PASS
GPRS850	190	245.76	314.0	---	PASS
GPRS850	251	245.48	318.2	---	PASS
EGPRS850	128	249.23	320.7	---	PASS
EGPRS850	190	249.71	321.3	---	PASS
EGPRS850	251	247.13	319.0	---	PASS
GPRS1900	512	244.05	315.3	---	PASS
GPRS1900	661	246.03	316.9	---	PASS
GPRS1900	810	244.44	314.0	---	PASS
EGPRS1900	512	252.57	323.9	---	PASS
EGPRS1900	661	255.94	324.7	---	PASS
EGPRS1900	810	256.94	329.9	---	PASS

Band	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
Band II	9262	4230.0	4924	---	PASS
Band II	9400	4214.2	4874	---	PASS
Band II	9538	4212.8	4882	---	PASS
Band IV	1312	4205.5	4885	---	PASS
Band IV	1413	4200.1	4884	---	PASS
Band IV	1513	4204.3	4866	---	PASS
Band V	4132	4221.5	4888	---	PASS
Band V	4182	4238.8	4881	---	PASS
Band V	4233	4208.5	4832	---	PASS

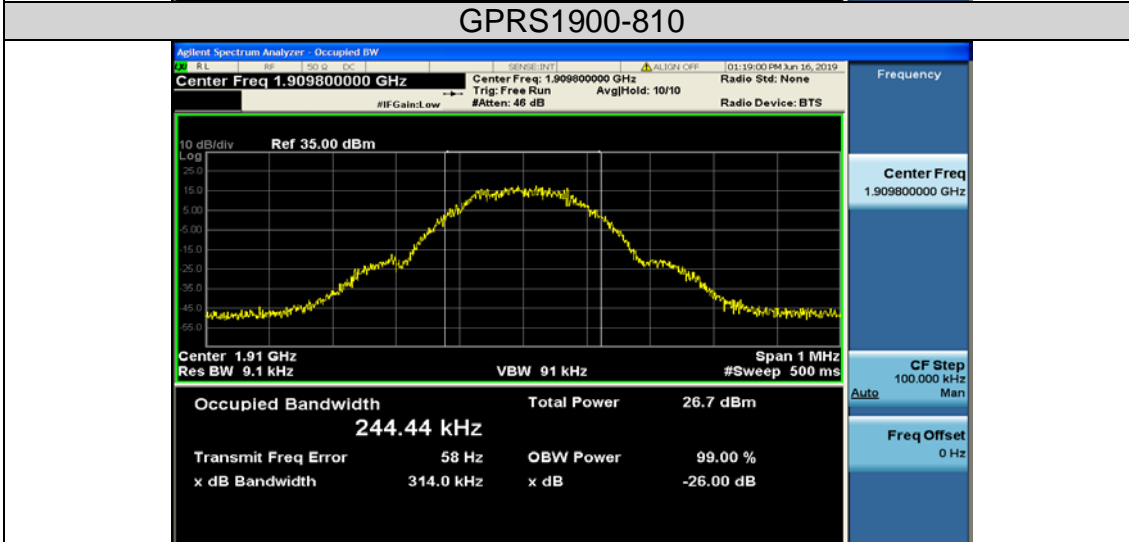
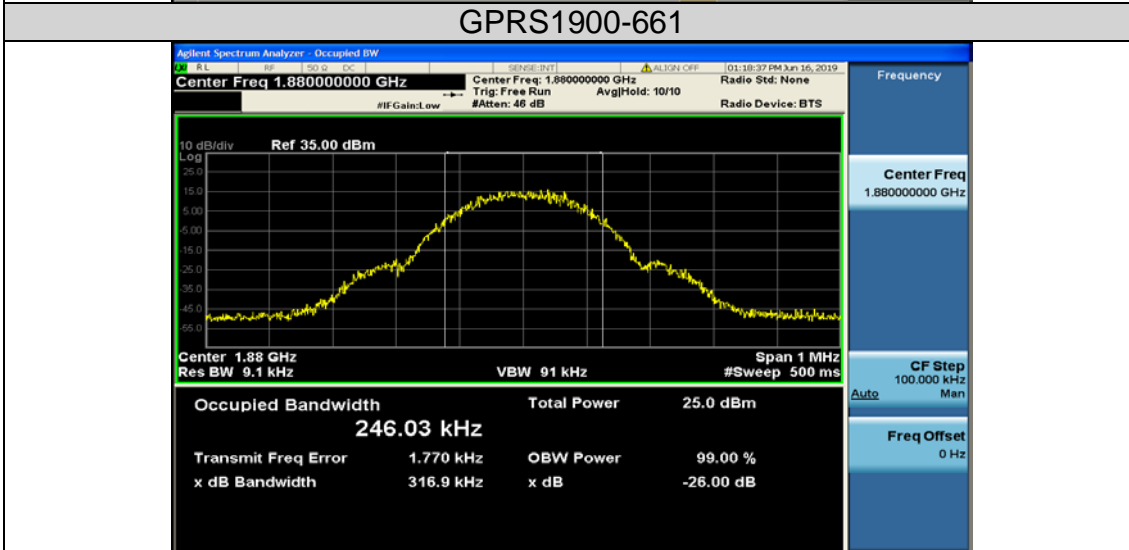
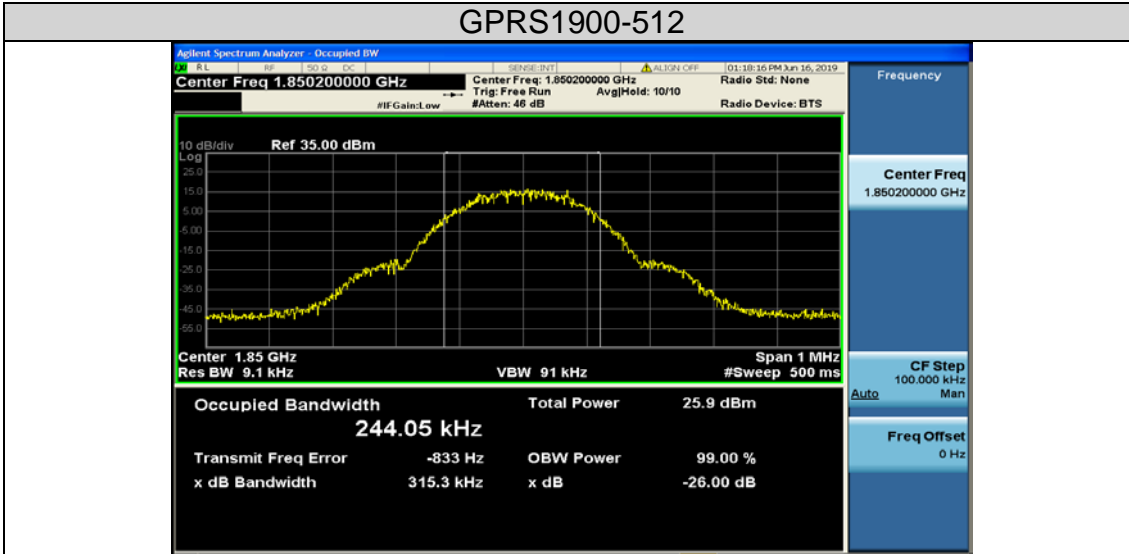
GPRS850



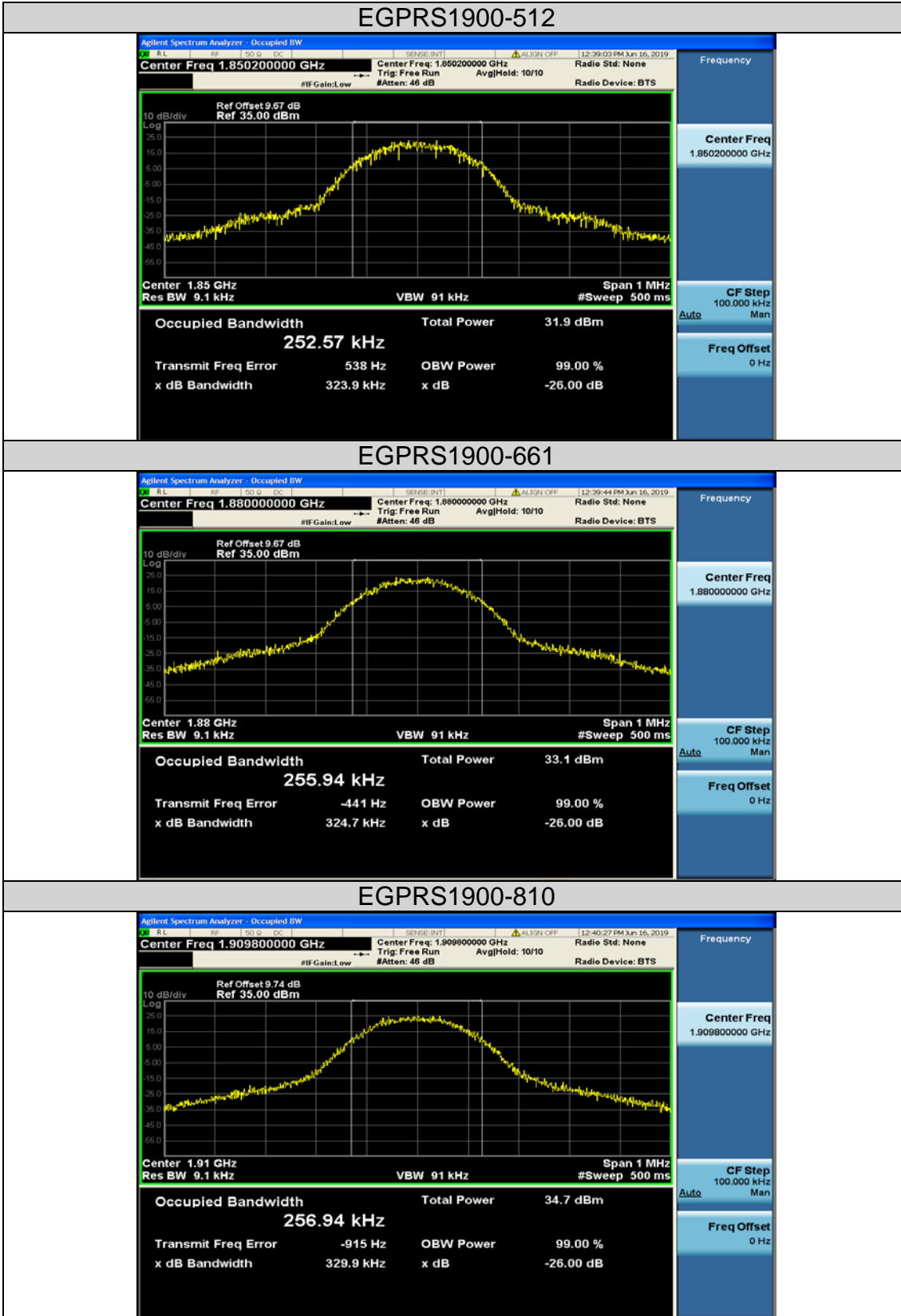
EGPRS850



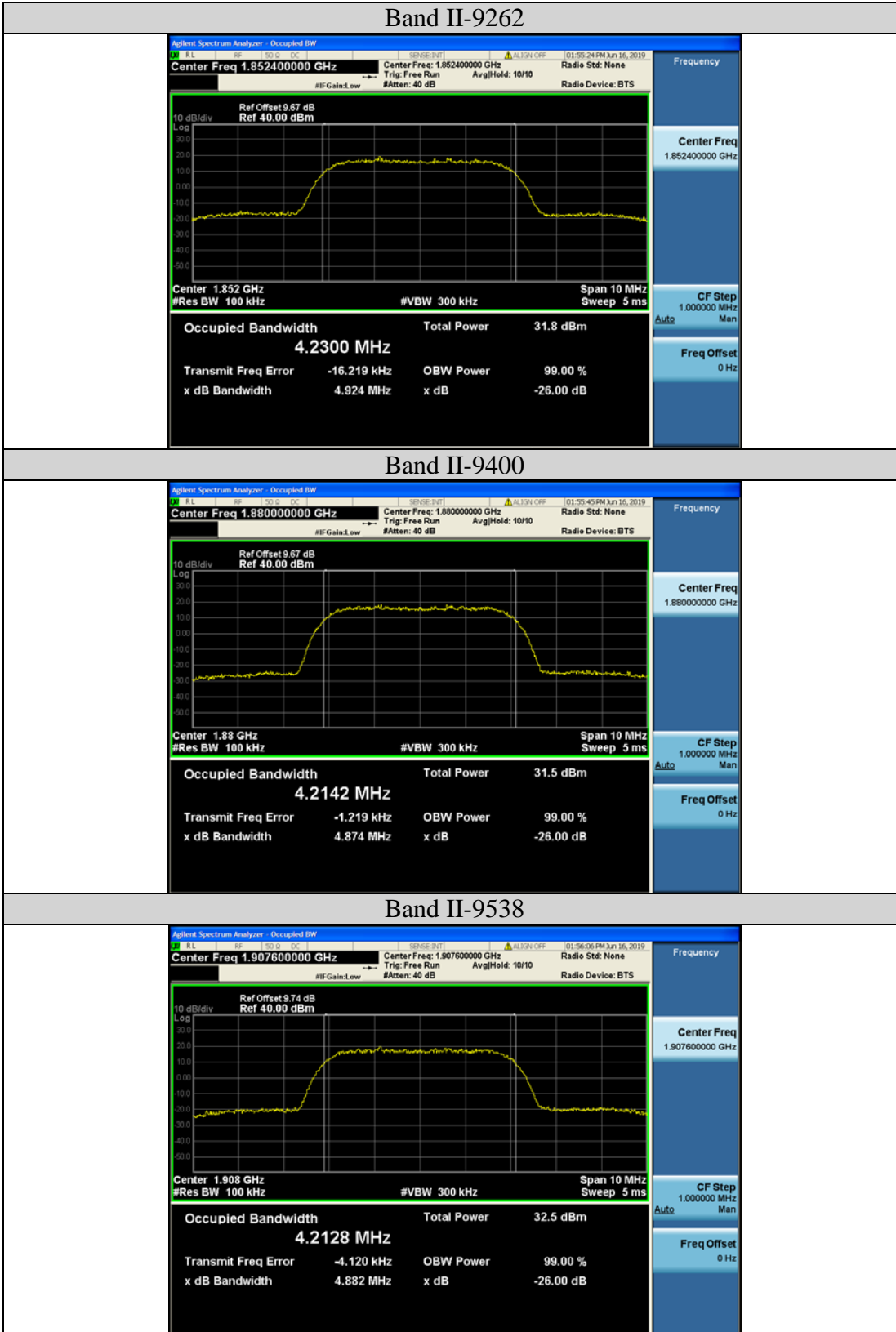
GPRS1900



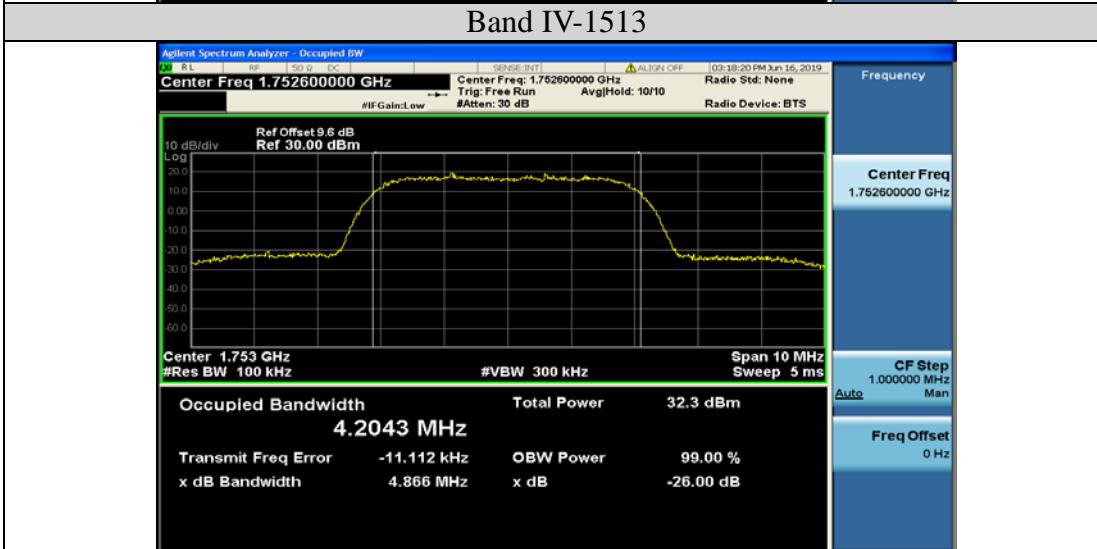
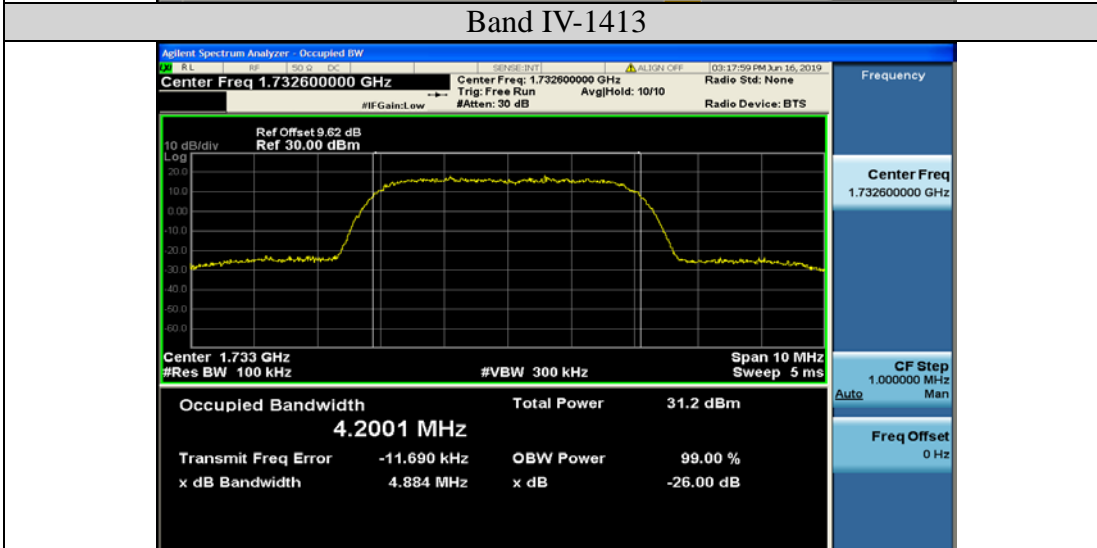
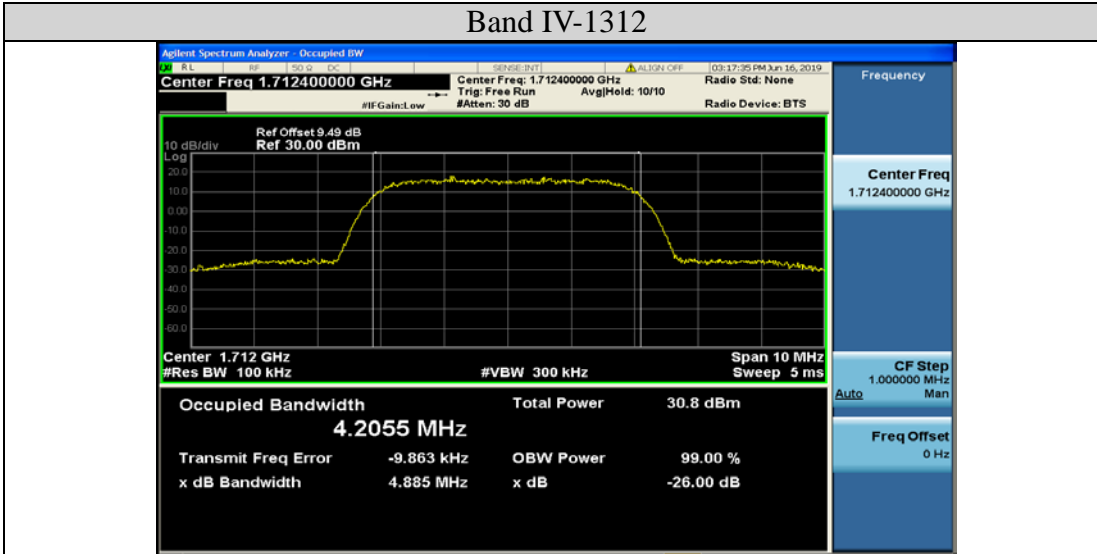
EGPRS1900



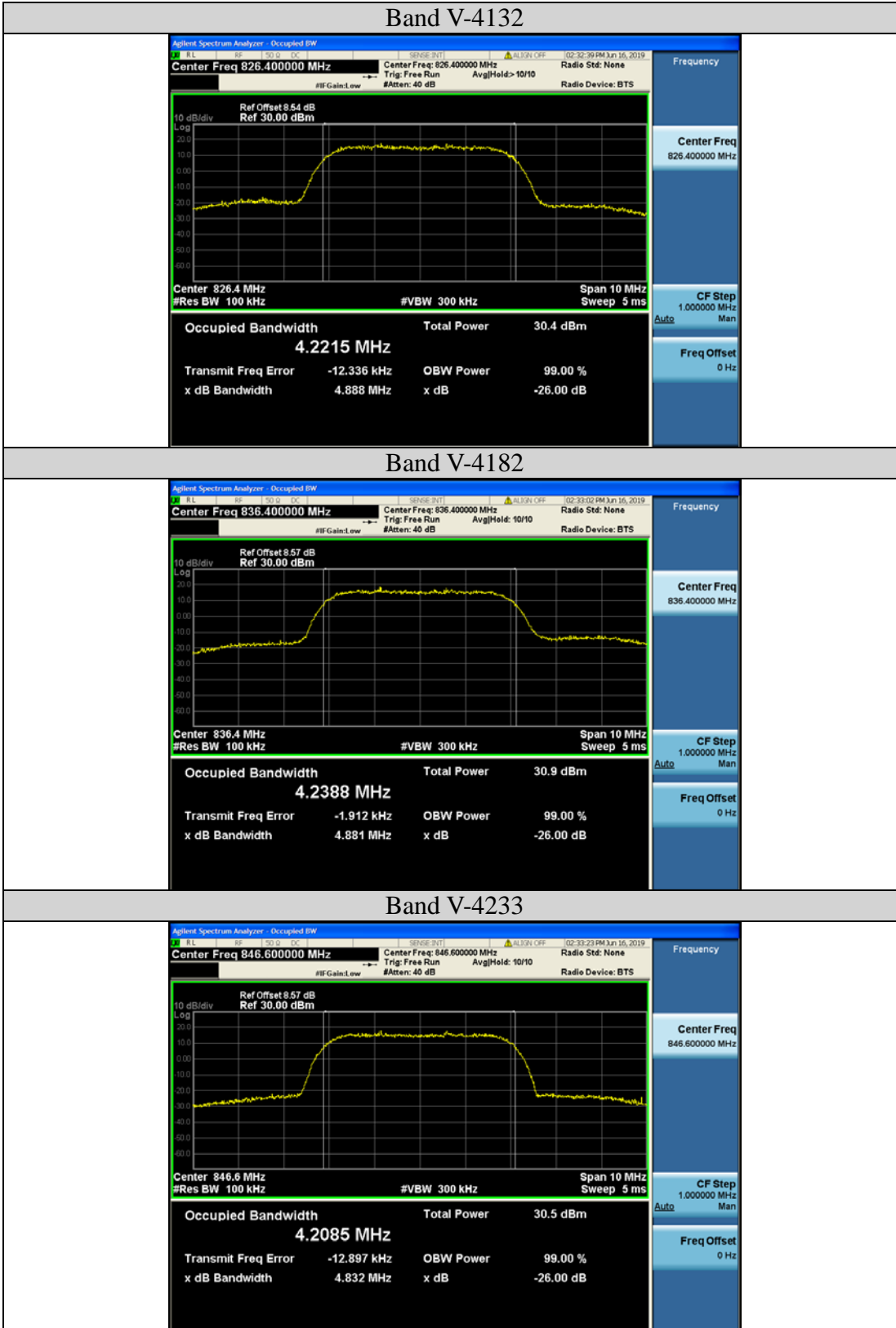
Band Band II



Band IV



Band V



Note: all modes of EUT have been tested; only the data of worst case mode is reported.

5.3 Conducted spurious emissions

5.3.1 Limits

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

5.3.2 Test method

1, The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.

2, Spectrum Setting:

Frequency bellow 1 GHz: RBW=100 kHz, VBW=300 kHz.

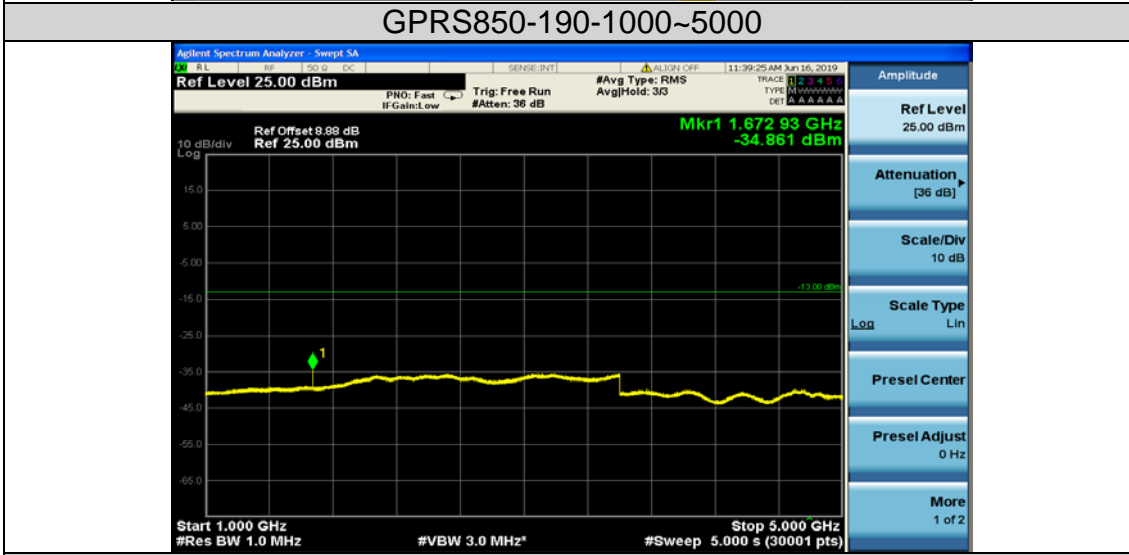
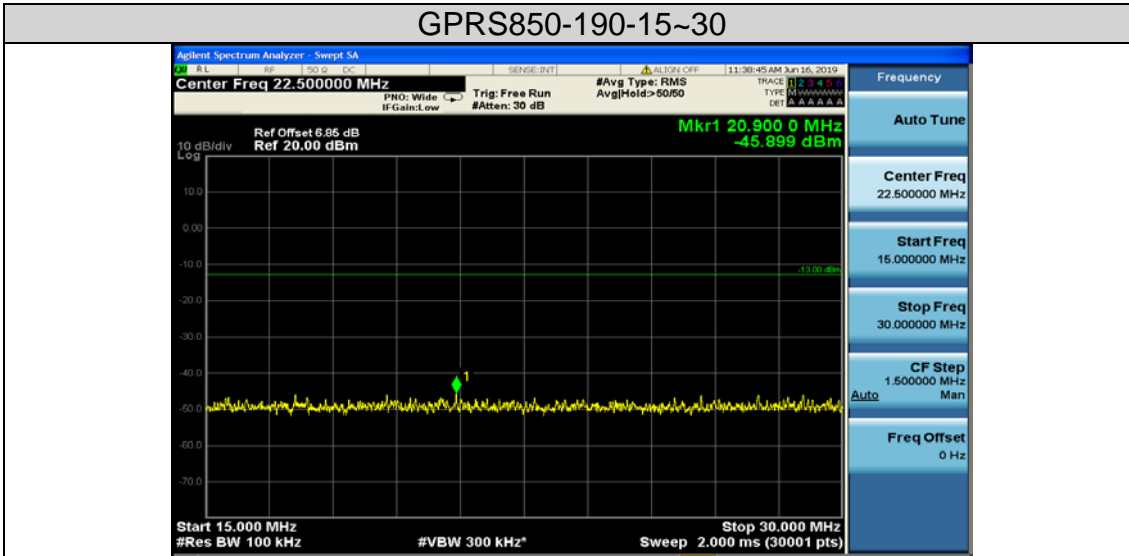
Frequency above 1 GHz: RBW=1 MHz, VBW=3 MHz.

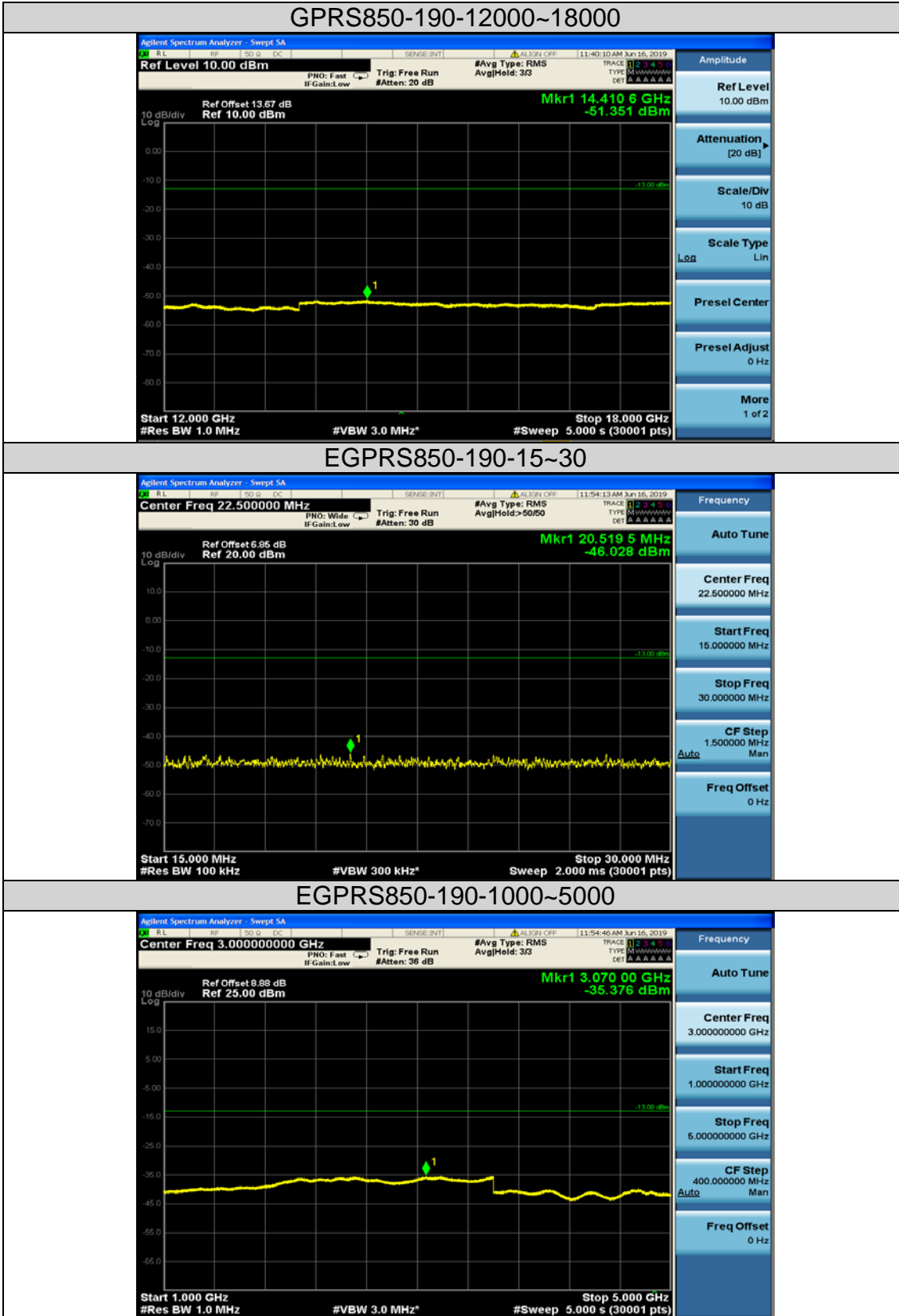
3, The low, middle and high channels of each band and mode's spurious emissions for 30 MHz to 10th Harmonic were measured by Spectrum analyzer.

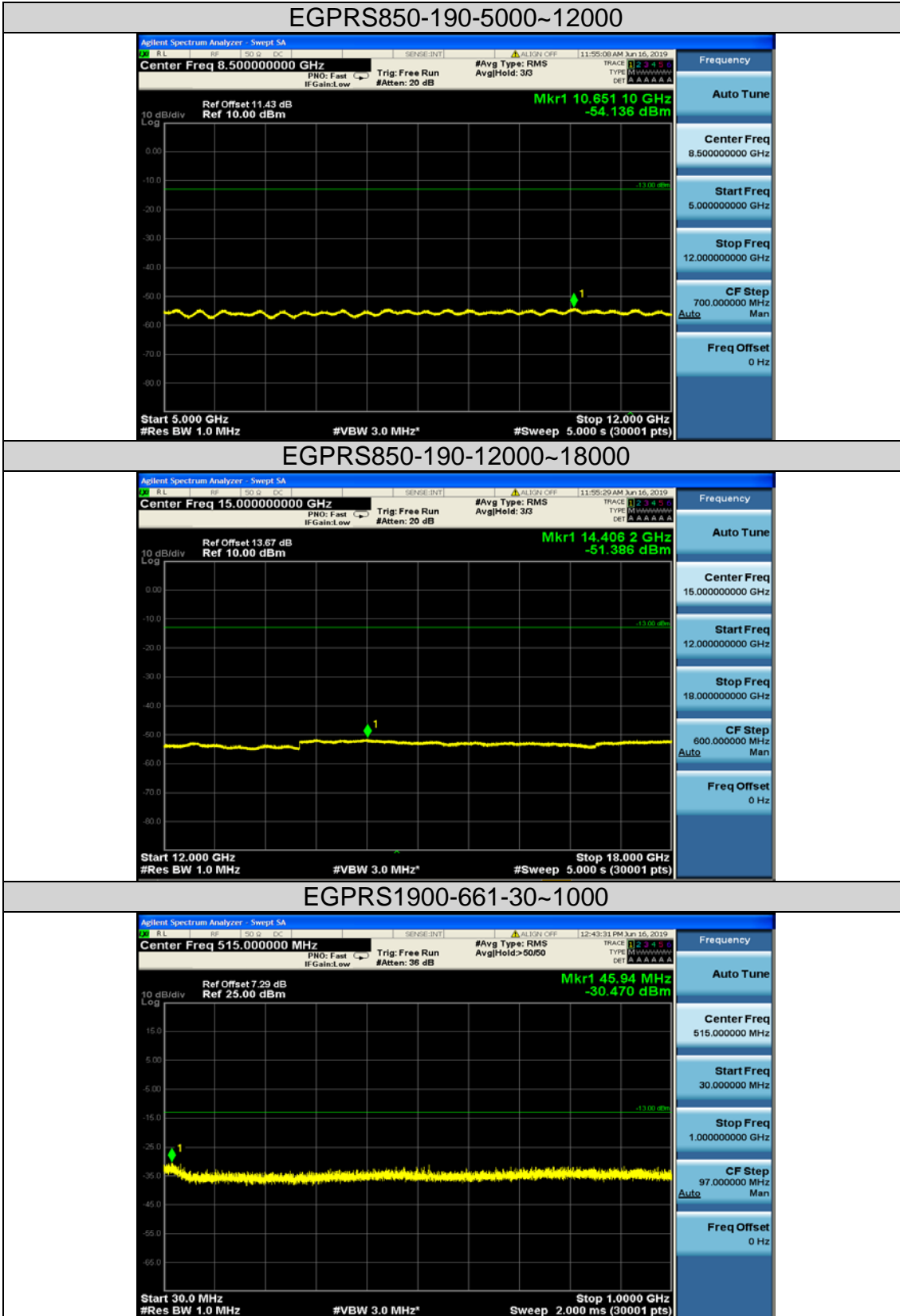
5.3.3 Test result

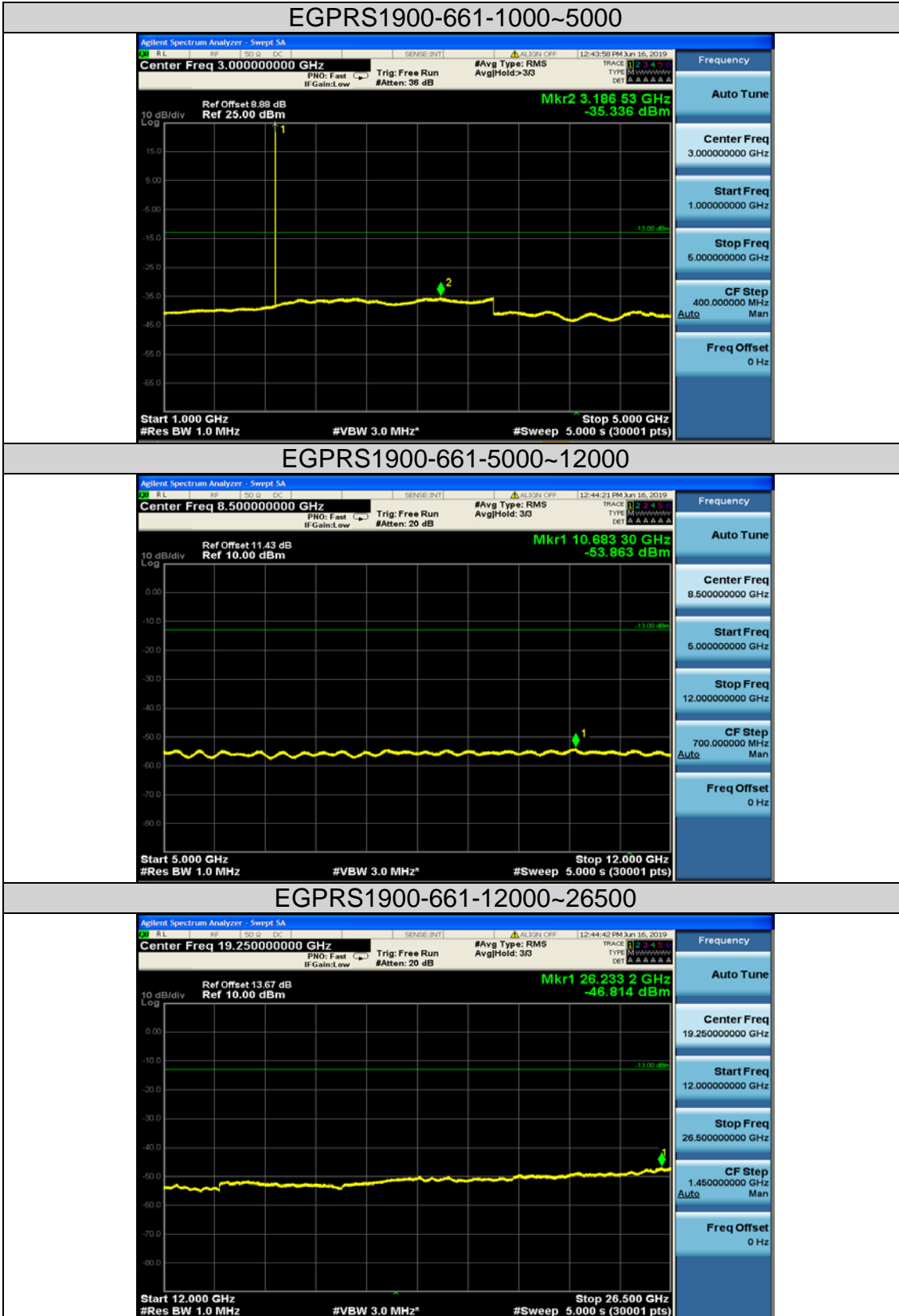
Band	Channel	Frequency Range(Mhz)	Value(dBm)	Limit(dBm)	Verdict
GPRS850	190	15~30	-45.90	-13	PASS
GPRS850	190	1000~5000	-34.86	-13	PASS
GPRS850	190	5000~12000	-54.07	-13	PASS
GPRS850	190	12000~18000	-51.35	-13	PASS
EGPRS850	190	15~30	-46.03	-13	PASS
EGPRS850	190	1000~5000	-35.38	-13	PASS
EGPRS850	190	5000~12000	-54.14	-13	PASS
EGPRS850	190	12000~18000	-51.39	-13	PASS
EGPRS1900	661	30~1000	-30.47	-13	PASS
EGPRS1900	661	1000~5000	-35.34	-13	PASS
EGPRS1900	661	5000~12000	-53.86	-13	PASS
EGPRS1900	661	12000~26500	-46.81	-13	PASS

Band	Channel	Frequency Range (Mhz)	Value(dBm)	Limit(dBm)	Verdict
Band II	9400	30~1000	-30.39	-13	PASS
Band II	9400	1000~5000	-35.48	-13	PASS
Band II	9400	5000~12000	-54.00	-13	PASS
Band II	9400	12000~20000	-49.83	-13	PASS
Band V	4182	1000~5000	-35.38	-13	PASS
Band V	4182	5000~12000	-53.97	-13	PASS
Band V	4182	12000~18000	-51.40	-13	PASS

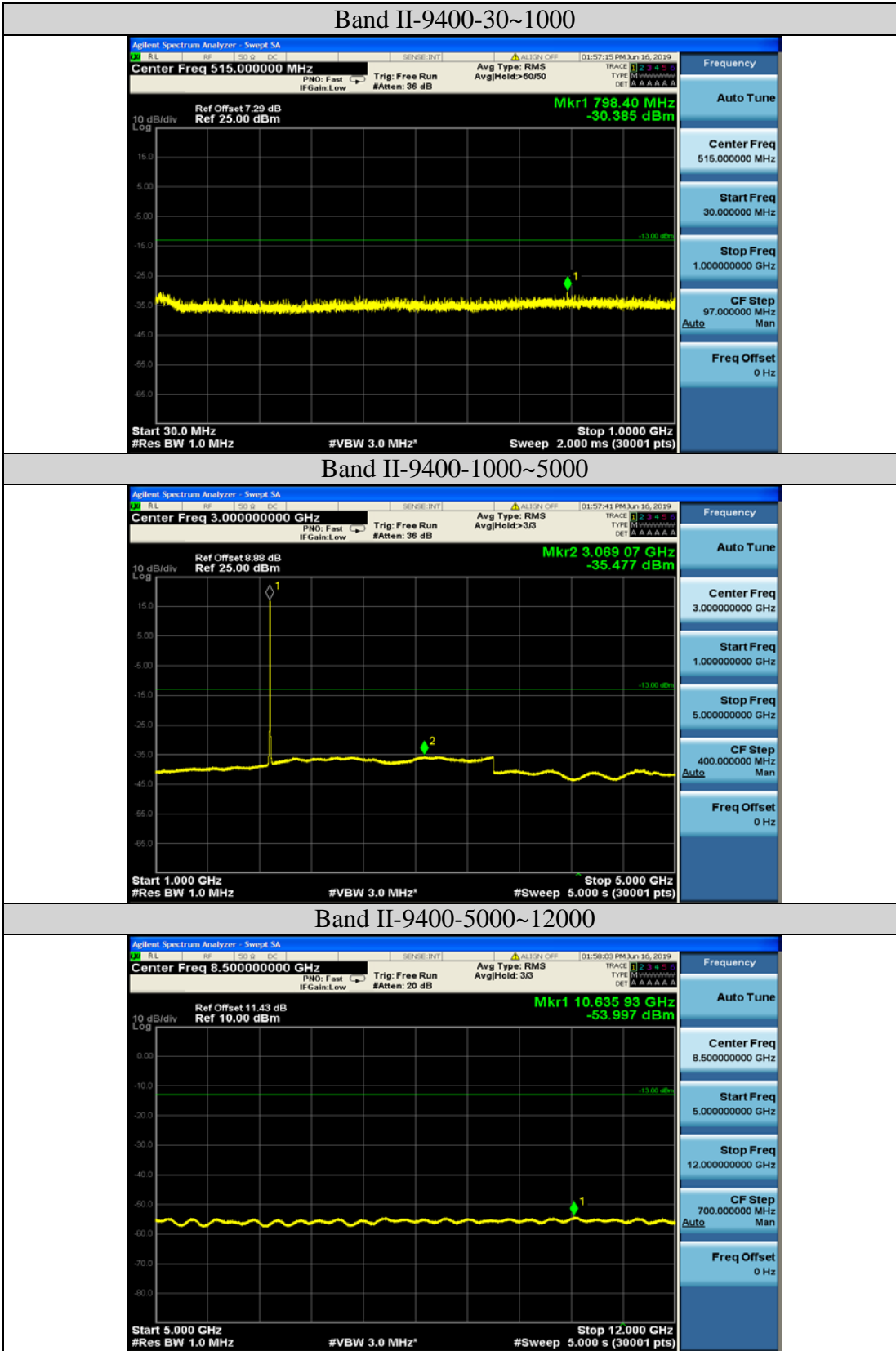






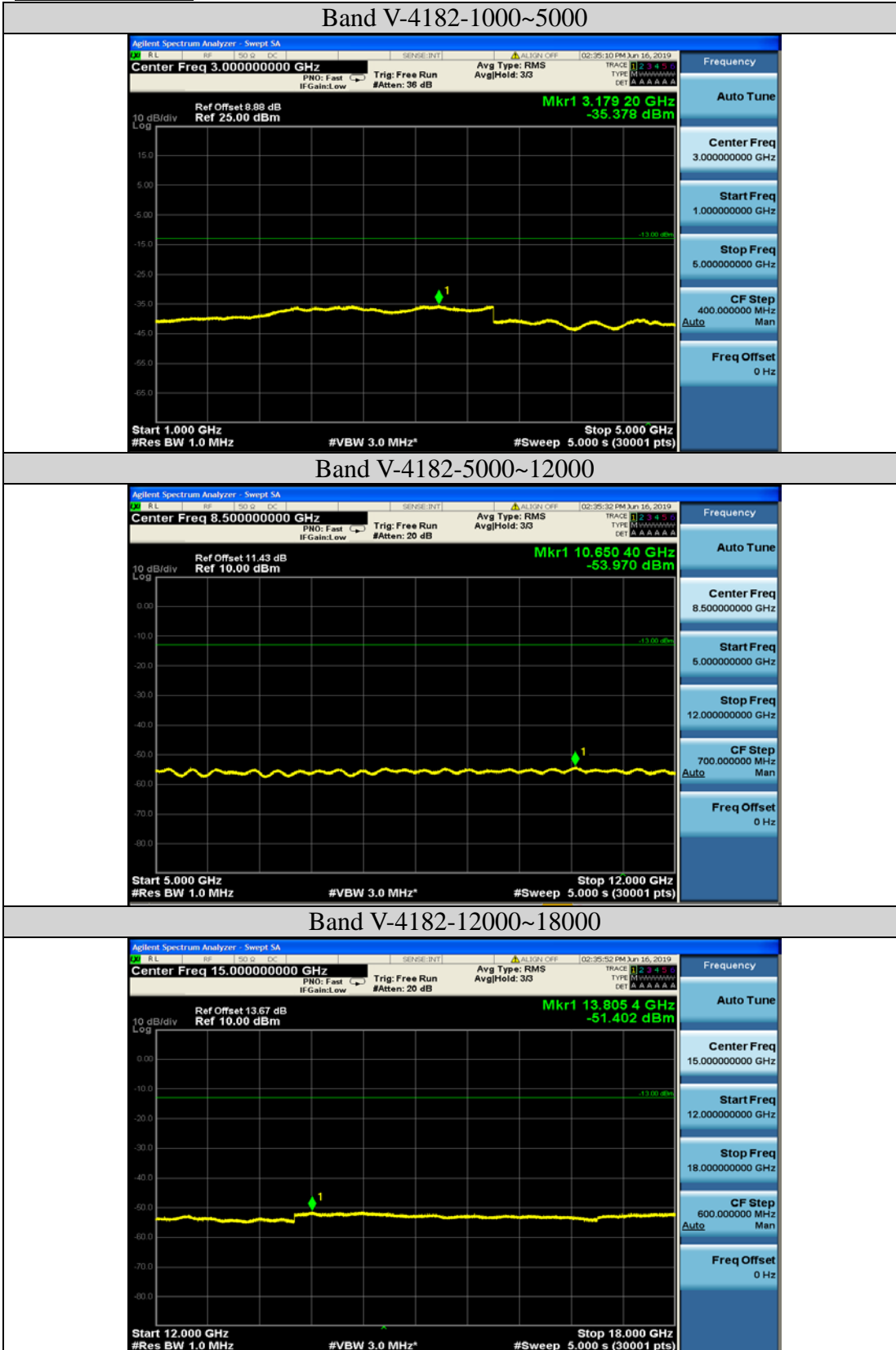


WCDMA Band II





WCDMA Band V



Note: all modes of EUT have been tested; only the data of worst case mode is reported.

5.4 Band edge

5.4.1 Limits

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, for all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm

5.4.2 Test method

The testing follows FCC KDB 971168 v03 Section 6.0.

The EUT was connected to Spectrum Analyzer and Base Station via power divider.

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.

The band edges of low and high channels for the highest RF powers were measured.

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)

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

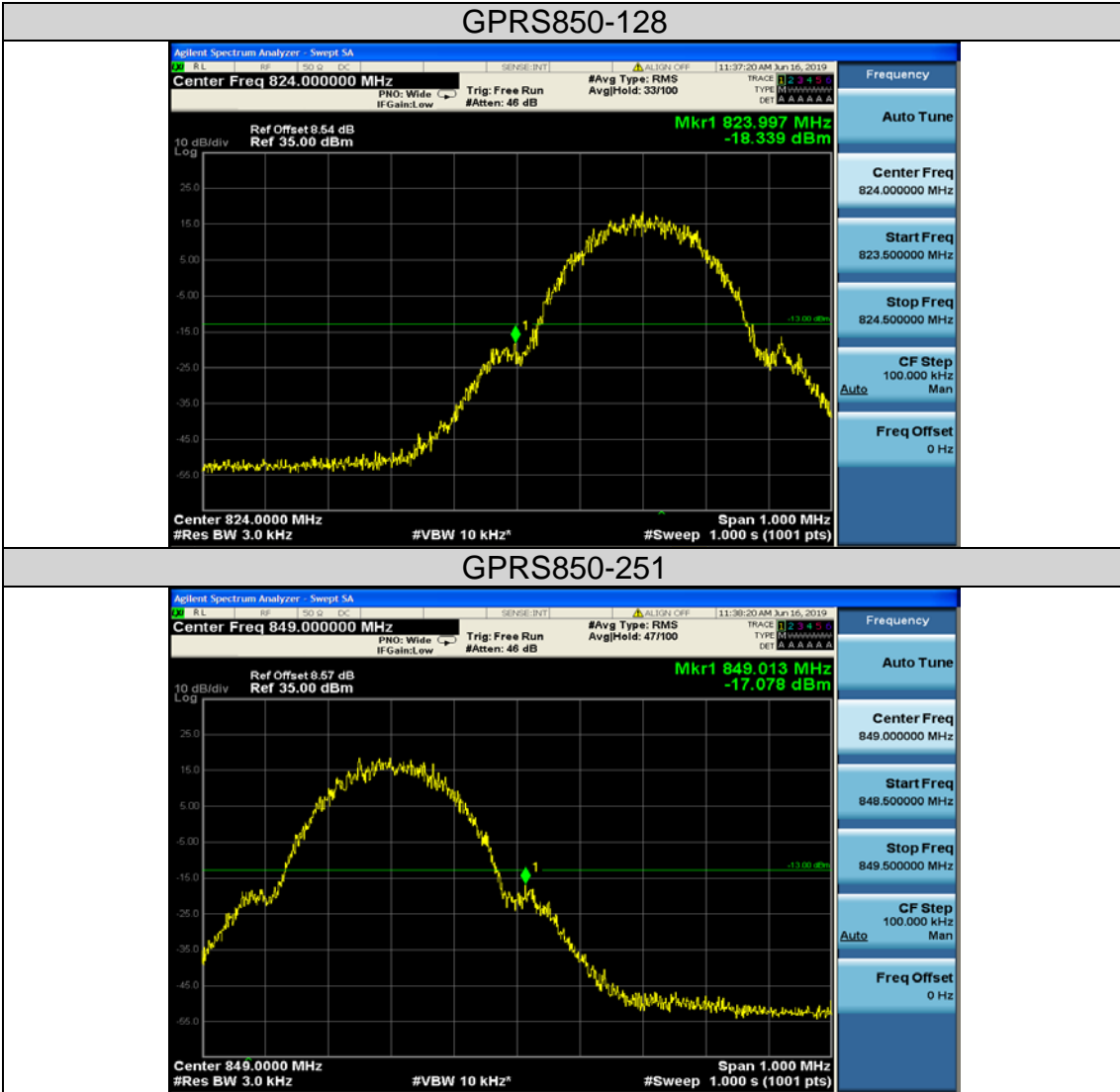
= $[30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)

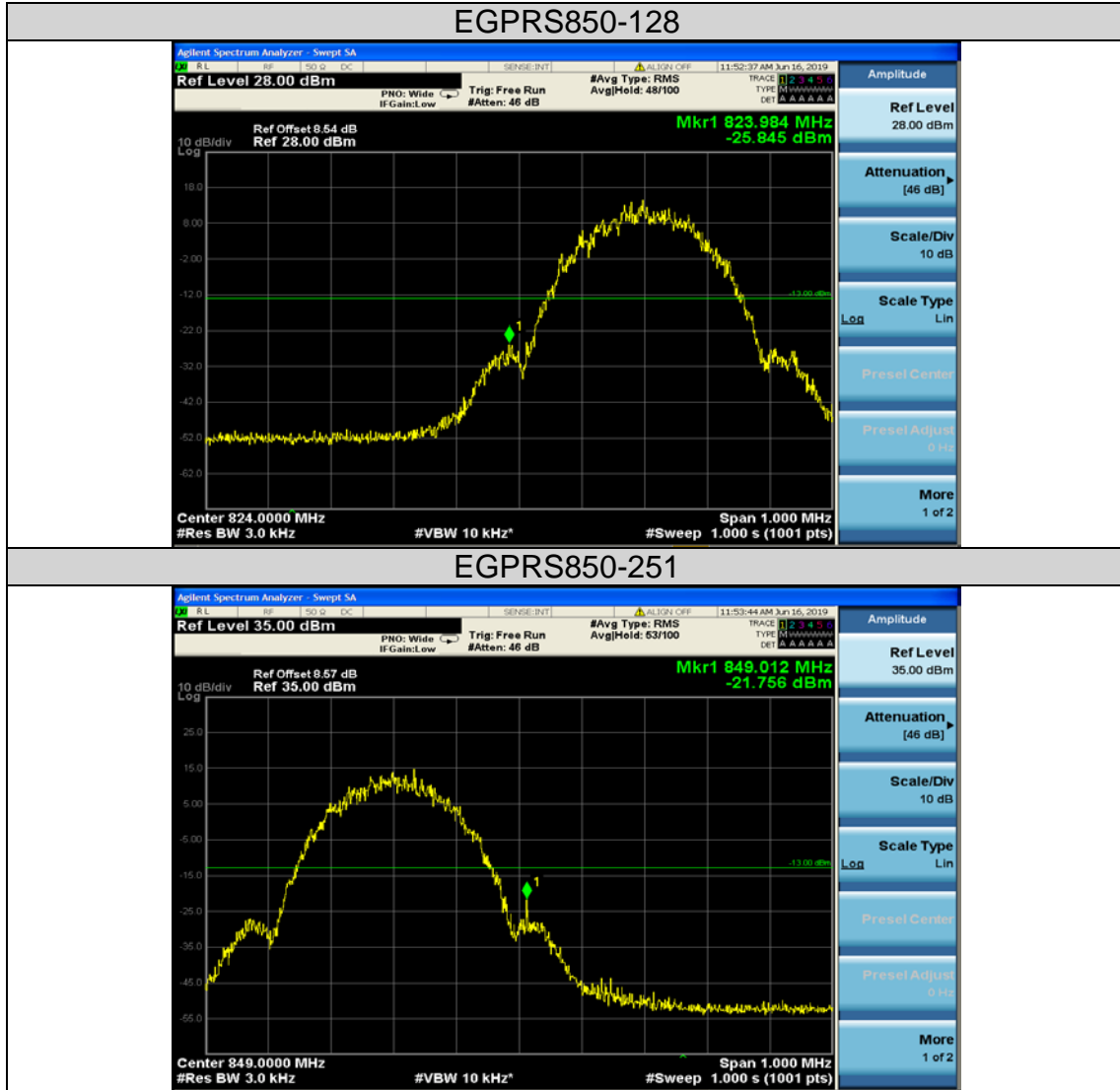
= -13dBm.

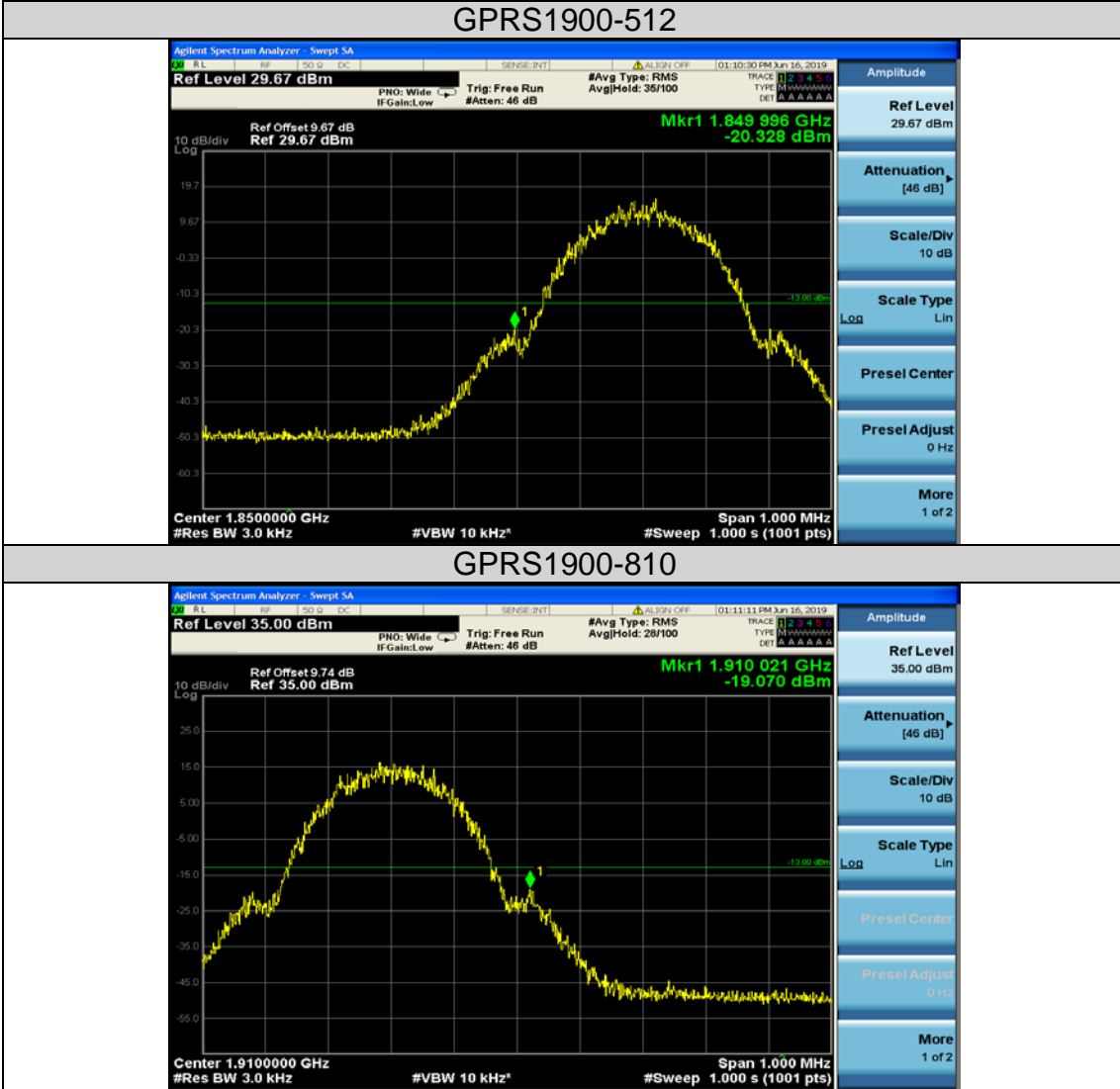
5.4.3 Test result

Band	Channel	Value(dBm)	Limit(dBm)	Verdict
GPRS850	128	-18.34	-13	PASS
GPRS850	251	-17.08	-13	PASS
EGPRS850	128	-25.84	-13	PASS
EGPRS850	251	-21.76	-13	PASS
GPRS1900	512	-20.33	-13	PASS
GPRS1900	810	-19.07	-13	PASS
EGPRS1900	512	-27.79	-13	PASS
EGPRS1900	810	-20.56	-13	PASS

Band	Channel	Value(dBm)	Limit(dBm)	Verdict
Band II	9262	-14.64	-13	PASS
Band II	9538	-15.83	-13	PASS
Band IV	1312	-16.92	-13	PASS
Band IV	1513	-15.47	-13	PASS
Band V	4132	-15.62	-13	PASS
Band V	4233	-18.14	-13	PASS







GPRS1900-810

Amplitude

Ref Level: 35.00 dBm

Attenuation: [46 dB]

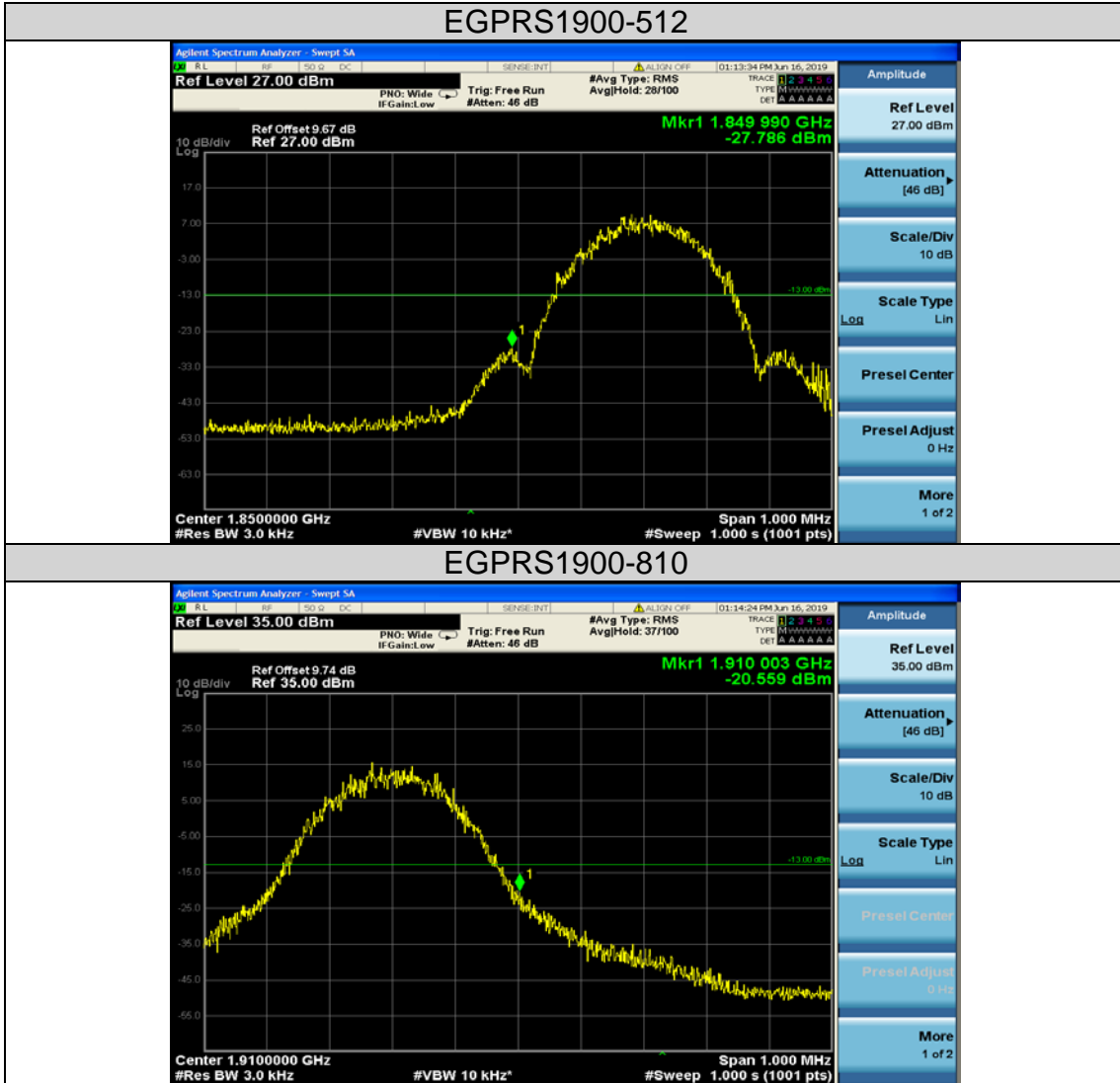
Scale/Div: 10 dB

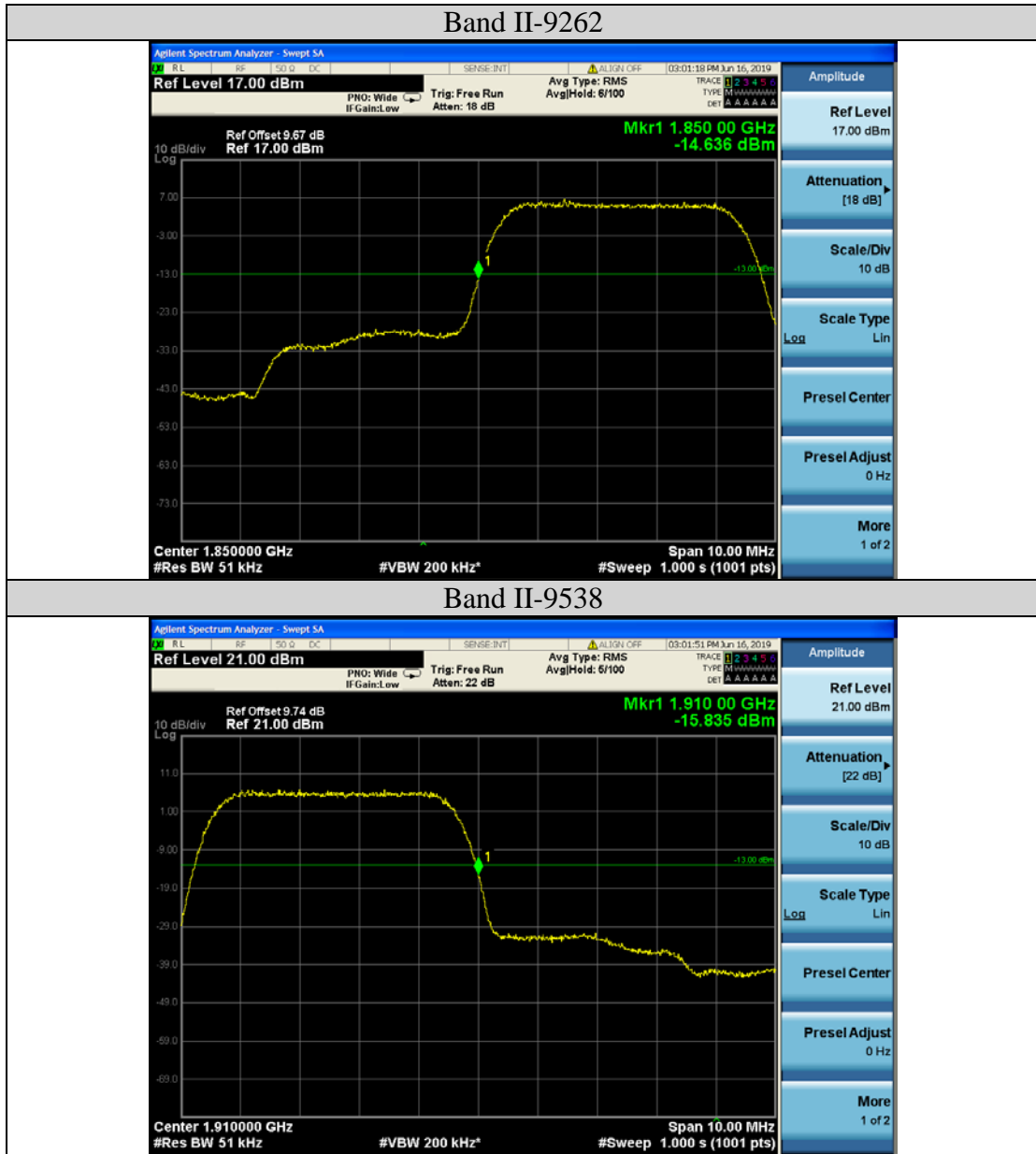
Scale Type: Log

Presel Center

Presel Adjust: 0 Hz

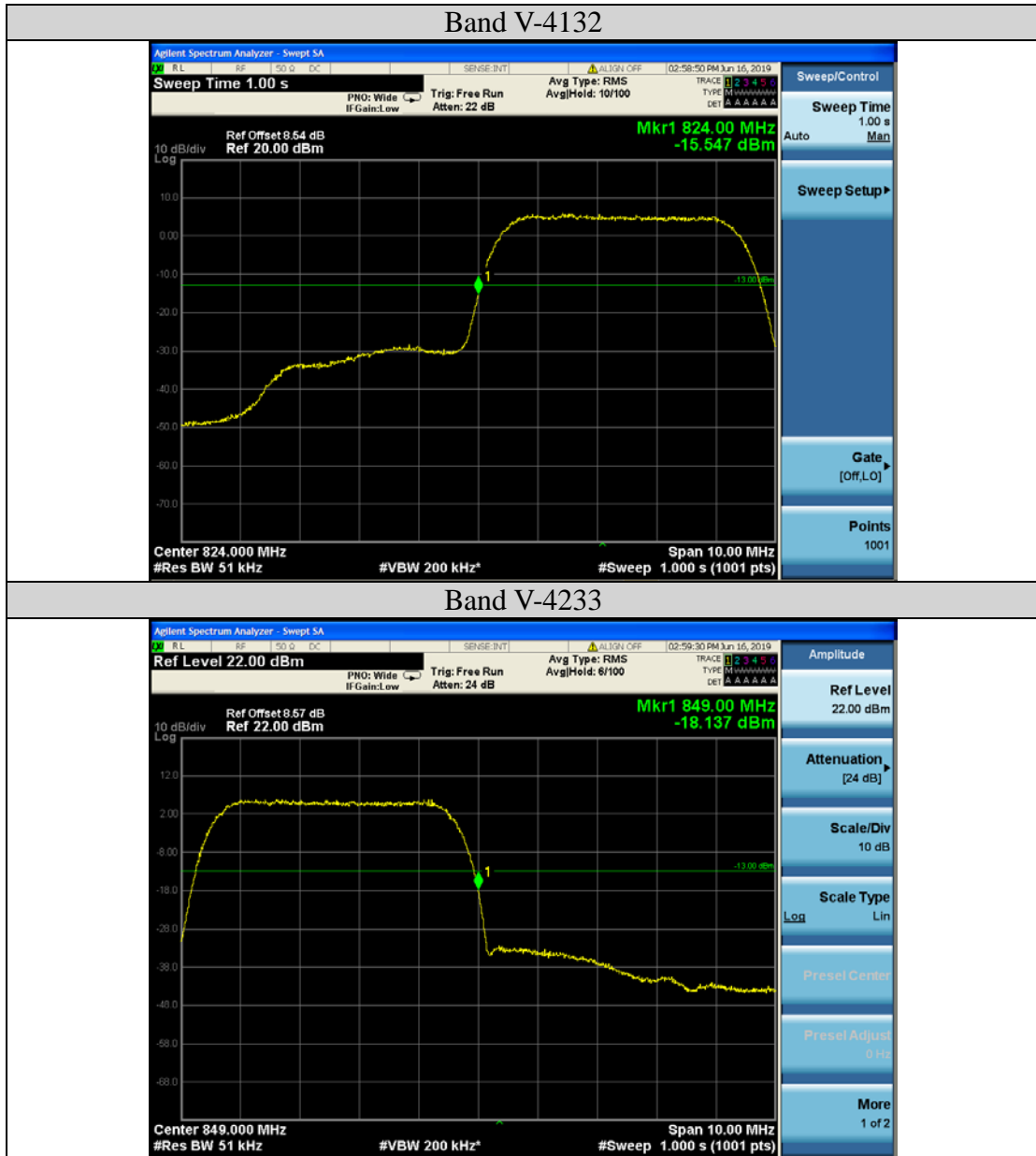
More: 1 of 2


EGPRS1900-810





Band IV-1513



Note: all modes of EUT have been tested; only the data of worst case mode is reported.

5.5 Radiated spurious emission

5.5.1 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 $43+10\log(P)$ dB

5.5.2 Test method

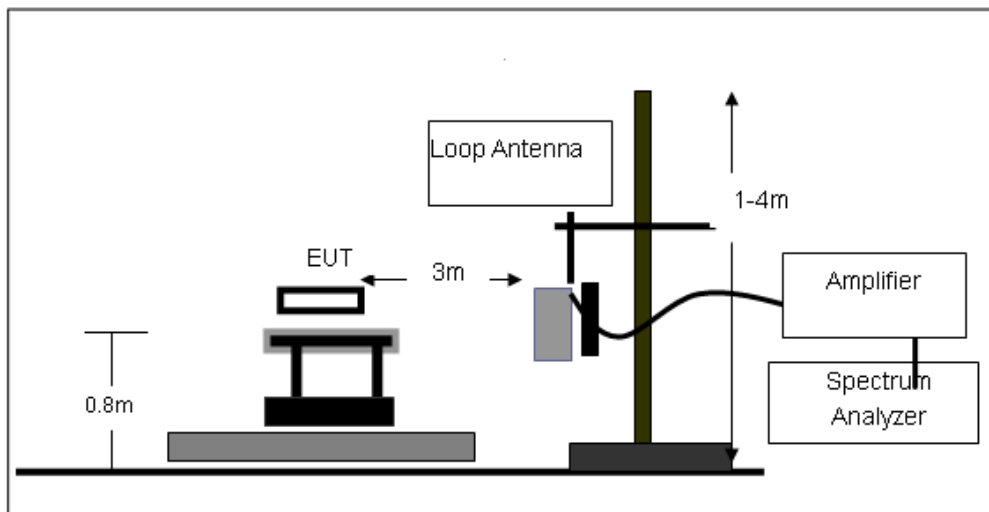
1. The test system setup as show in the block diagram above.
2. The EUT was placed on an non-conductive rotating platform in an anechoic chamber. The radiated spurious emissions from 30MHz to 10th harmonious of fundamental frequency were measured at 3 m with a test antenna and a spectrum analyzer with RBW=1 MHz, VBW=1 MHz, peak detector settings.
3. During the measurement, the EUT was enforced in maximum power and linked with a base station. All the spurious emissions at 3m were measured by rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
4. When found the maximum level of emissions from the EUT. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB= $10 \log(\text{TX power in Watts}/0.001)$ -the absolute level

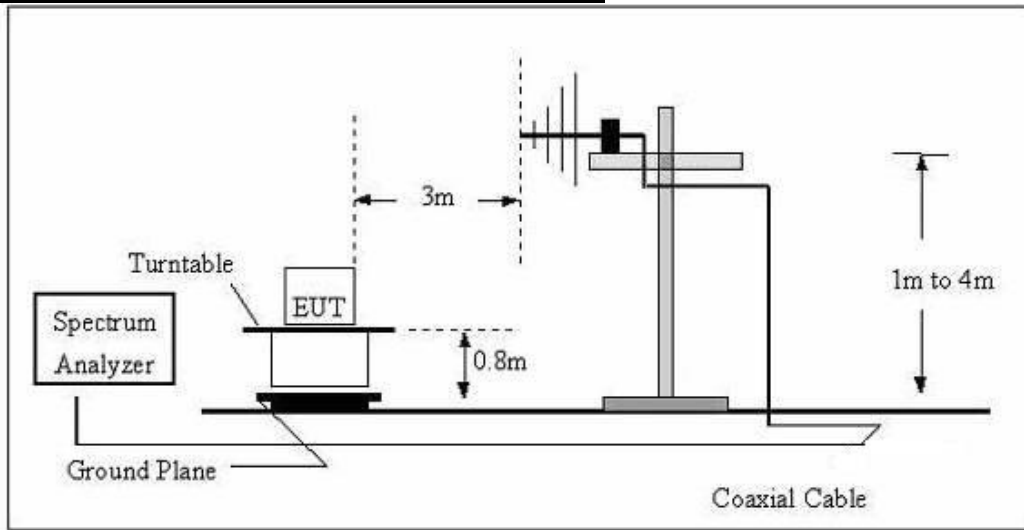
Spurious attenuation limit in dB= $43+10 \log(\text{power out in Watts})$.

5.5.3 Test setup

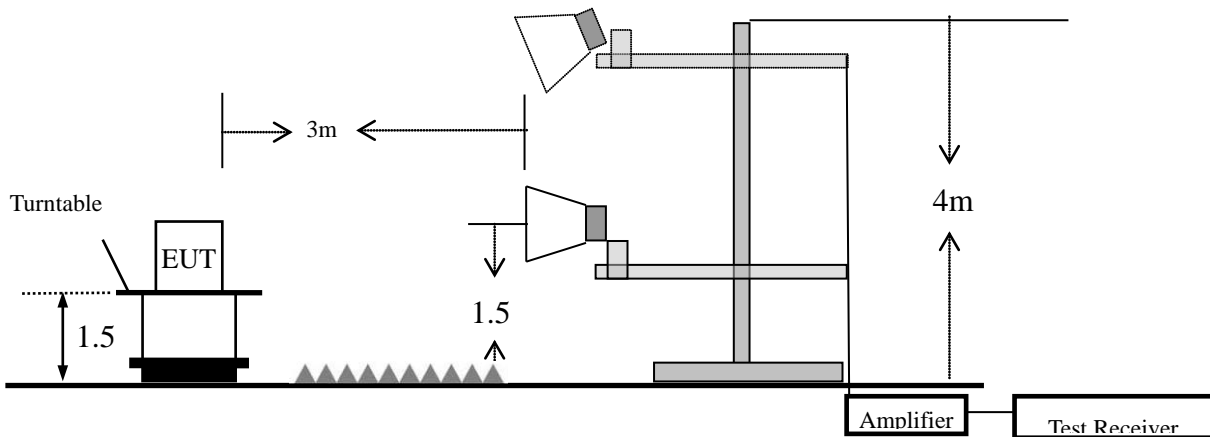
Radiated emission test-up frequency below 30MHz



Radiated emission test-up frequency 30MHz~1GHz



Radiated emission test-up frequency above 1GHz



5.5.4 Test Result

Note: All the configuration was tested and only the worse case was reported

GPRS850_Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
1648.4	-49.16	3.86	3	8.56	-44.46	-13	-31.46	H
2472.6	-53.12	4.29	3	6.98	-50.43	-13	-37.43	H
1648.4	-44.64	3.86	3	8.56	-39.94	-13	-26.94	V
2472.6	-50.80	4.29	3	6.98	-48.11	-13	-35.11	V
GPRS850_Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
1673.2	-46.71	3.9	3	8.58	-42.03	-13	-29.03	H
2509.8	-52.53	4.32	3	6.8	-50.05	-13	-37.05	H
1673.2	-42.27	3.9	3	8.58	-37.59	-13	-24.59	V
2509.8	-48.65	4.32	3	6.8	-46.17	-13	-33.17	V
GPRS850_High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
1697.6	-54.32	3.91	3	9.06	-49.17	-13	-36.17	H
2546.4	-55.28	4.32	3	6.65	-52.95	-13	-39.95	H
1697.6	-51.75	3.91	3	9.06	-46.60	-13	-33.60	V
2546.4	-52.04	4.32	3	6.65	-49.71	-13	-36.71	V

EGPRS850_Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
1648.4	-52.26	3.86	3	8.56	-47.56	-13	-34.56	H
2472.6	-53.20	4.29	3	6.98	-50.51	-13	-37.51	H
1648.4	-48.73	3.86	3	8.56	-44.03	-13	-31.03	V
2472.6	-49.37	4.29	3	6.98	-46.68	-13	-33.68	V
EGPRS850_Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
1673.2	-52.13	3.9	3	8.58	-47.45	-13	-34.45	H
2509.8	-52.82	4.32	3	6.8	-50.34	-13	-37.34	H
1673.2	-48.44	3.9	3	8.58	-43.76	-13	-30.76	V
2509.8	-49.17	4.32	3	6.8	-46.69	-13	-33.69	V
EGPRS850_High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
1697.6	-51.62	3.91	3	9.06	-46.47	-13	-33.47	H
2546.4	-52.46	4.32	3	6.65	-50.13	-13	-37.13	H
1697.6	-48.62	3.91	3	9.06	-43.47	-13	-30.47	V
2546.4	-49.58	4.32	3	6.65	-47.25	-13	-34.25	V

GPRS1900_ Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
3700.4	-51.11	5.26	3	9.88	-46.49	-13	-33.49	H
5550.6	-57.93	6.11	3	11.36	-52.68	-13	-39.68	H
3700.4	-54.04	5.26	3	9.88	-49.42	-13	-36.42	V
5550.6	-62.84	6.11	3	11.36	-57.59	-13	-44.59	V
GPRS1900_ Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	EIRP(dBm)	(dBm)	(dB)	
3760	-47.42	5.32	3	10.03	-42.71	-13	-29.71	H
5640	-56.32	6.19	3	11.41	-51.10	-13	-38.10	H
3760	-49.58	5.32	3	10.03	-44.87	-13	-31.87	V
5640	-58.39	6.19	3	11.41	-53.17	-13	-40.17	V
GPRS1900_ High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
3819.6	-58.88	5.36	3	9.62	-54.62	-13	-41.62	H
5729.4	-61.54	6.24	3	11.46	-56.32	-13	-43.32	H
3819.6	-59.95	5.36	3	9.62	-55.69	-13	-42.69	V
5729.4	-64.09	6.24	3	11.46	-58.87	-13	-45.87	V

EGPRS1900_ Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dBi)	(dBm)	(dBm)	(dB)	
3700.4	-57.83	5.26	3	9.88	-53.21	-13	-40.21	H
5550.6	-48.84	6.11	3	11.36	-43.59	-13	-30.59	H
3700.4	-57.25	5.26	3	9.88	-52.63	-13	-39.63	V
5550.6	-50.22	6.11	3	11.36	-44.97	-13	-31.97	V
EGPRS1900_ Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dBi)	EIRP(dBm)	(dBm)	(dB)	
3760	-55.62	5.32	3	10.03	-50.91	-13	-37.91	H
5640	-50.73	6.19	3	11.41	-45.51	-13	-32.51	H
3760	-50.31	5.32	3	10.03	-45.60	-13	-32.60	V
5640	-51.65	6.19	3	11.41	-46.43	-13	-33.43	V
EGPRS1900_ High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dBi)	(dBm)	(dBm)	(dB)	
3819.6	-50.47	5.36	3	9.62	-46.21	-13	-33.21	H
5729.4	-45.33	6.24	3	11.46	-40.11	-13	-27.11	H
3819.6	-39.48	5.36	3	9.62	-35.22	-13	-22.22	V
5729.4	-37.28	6.24	3	11.46	-32.06	-13	-19.06	V

WCDMA Band II _ Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
3704.8	-45.37	5.26	3	9.88	-40.75	-13	-27.75	H
5557.2	-49.58	6.11	3	11.36	-44.33	-13	-31.33	H
3704.8	-49.67	5.26	3	9.88	-45.05	-13	-32.05	V
5557.2	-55.54	6.11	3	11.36	-50.29	-13	-37.29	V
WCDMA Band II _ Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
3760	-39.20	5.32	3	10.03	-34.49	-13	-21.49	H
5640	-47.67	6.19	3	11.41	-42.45	-13	-29.45	H
3760	-46.38	5.32	3	10.03	-41.67	-13	-28.67	V
5640	-54.90	6.19	3	11.41	-49.68	-13	-36.68	V
WCDMA Band II _ High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
3815.2	-49.07	5.36	3	9.62	-44.81	-13	-31.81	H
5722.8	-54.00	6.24	3	11.46	-48.78	-13	-35.78	H
3815.2	-53.69	5.36	3	9.62	-49.43	-13	-36.43	V
5722.8	-58.00	6.24	3	11.46	-52.78	-13	-39.78	V

WCDMA Band IV _ Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
1946.4	-45.41	3.86	3	8.56	-40.71	-13	-27.71	H
3424.8	-47.70	4.29	3	6.98	-45.01	-13	-32.01	H
1946.4	-42.62	3.86	3	8.56	-37.92	-13	-24.92	V
3424.8	-42.67	4.29	3	6.98	-39.98	-13	-26.98	V
WCDMA Band IV _ Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
1982.4	-44.01	3.9	3	8.58	-39.33	-13	-26.33	H
3480	-45.53	4.32	3	6.8	-43.05	-13	-30.05	H
1982.4	-38.23	3.9	3	8.58	-33.55	-13	-20.55	V
3480	-42.28	4.32	3	6.8	-39.80	-13	-26.80	V
WCDMA Band IV _ High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
2015.2	-47.74	3.91	3	9.06	-42.59	-13	-29.59	H
3505.2	-47.86	4.32	3	6.65	-45.53	-13	-32.53	H
2015.2	-43.68	3.91	3	9.06	-38.53	-13	-25.53	V
3505.2	-45.03	4.32	3	6.65	-42.70	-13	-29.70	V

WCDMA Band V _ Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
1652.8	-46.03	3.86	3	8.56	-41.33	-13	-28.33	H
2479.2	-47.48	4.29	3	6.98	-44.79	-13	-31.79	H
1652.8	-42.70	3.86	3	8.56	-38.00	-13	-25.00	V
2479.2	-42.50	4.29	3	6.98	-39.81	-13	-26.81	V
WCDMA Band V _ Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
1672.8	-43.66	3.9	3	8.58	-38.98	-13	-25.98	H
2509.2	-45.27	4.32	3	6.8	-42.79	-13	-29.79	H
1672.8	-38.45	3.9	3	8.58	-33.77	-13	-20.77	V
2509.2	-42.90	4.32	3	6.8	-40.42	-13	-27.42	V
WCDMA Band V _ High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)		(dB)	(dBm)	(dBm)	(dB)	
1693.2	-47.33	3.91	3	9.06	-42.18	-13	-29.18	H
2539.8	-48.05	4.32	3	6.65	-45.72	-13	-32.72	H
1693.2	-44.08	3.91	3	9.06	-38.93	-13	-25.93	V
2539.8	-45.00	4.32	3	6.65	-42.67	-13	-29.67	V

5.6 Frequency stability

5.6.1 Limit

For FCC part 22.355: the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances 2.5ppm for mobile $\leq 3W$ condition.

For FCC part 24.235: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.6.2 Test method

Test Procedures for Temperature Variation:

- 1, The EUT was set up in the thermal chamber and connected with the base station.
- 2, With power off, the temperature was decreased to -30 $^{\circ}\text{C}$ and stabilized for 10 hours. Power was applied and the maximum change in frequency was recorded within one minute.
- 3, With power off, the temperature was raised in 10 $^{\circ}\text{C}$ set up to 20 $^{\circ}\text{C}$ and stabilized for 10 hours. Power was applied and the maximum change in frequency was recorded within one minute.
- 4, measure the carrier frequency error.

Test Procedures for Voltage Variation:

- 1, The EUT was placed in a temperature chamber at 25 \pm 5 $^{\circ}\text{C}$ and connected with the base station.
- 2, Reduce the primary supply voltage to the battery operating end point.
- 3, measure the carrier frequency error.

5.6.3 Test Result

GPRS:

Voltage							
Band	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GPRS850	190	VL	TN	-0.06	-0.000077	±2.5	PASS
GPRS850	190	VN	TN	-1.81	-0.002161	±2.5	PASS
GPRS850	190	VH	TN	-2.71	-0.003242	±2.5	PASS
EGPRS850	190	VL	TN	4.46	0.005326	±2.5	PASS
EGPRS850	190	VN	TN	3.62	0.004322	±2.5	PASS
EGPRS850	190	VH	TN	2.65	0.003165	±2.5	PASS
GPRS1900	661	VL	TN	3.65	0.001941	±2.5	PASS
GPRS1900	661	VN	TN	3.45	0.001838	±2.5	PASS
GPRS1900	661	VH	TN	2.26	0.001202	±2.5	PASS
EGPRS1900	661	VL	TN	7.39	0.003933	±2.5	PASS
EGPRS1900	661	VN	TN	7.39	0.003933	±2.5	PASS
EGPRS1900	661	VH	TN	5.29	0.002816	±2.5	PASS

Temperature							
Band	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GPRS850	190	VN	-30	-2.07	-0.002470	±2.5	PASS
GPRS850	190	VN	-20	-1.61	-0.001930	±2.5	PASS
GPRS850	190	VN	-10	-3.65	-0.004361	±2.5	PASS
GPRS850	190	VN	0	-6.33	-0.007564	±2.5	PASS
GPRS850	190	VN	10	-4.07	-0.004863	±2.5	PASS
GPRS850	190	VN	20	-3.07	-0.003666	±2.5	PASS
GPRS850	190	VN	30	-3.42	-0.004091	±2.5	PASS
GPRS850	190	VN	40	-3.75	-0.004477	±2.5	PASS
GPRS850	190	VN	50	-2.42	-0.002894	±2.5	PASS
EGPRS850	190	VN	-30	1.36	0.001621	±2.5	PASS
EGPRS850	190	VN	-20	4.84	0.005789	±2.5	PASS
EGPRS850	190	VN	-10	2.26	0.002701	±2.5	PASS
EGPRS850	190	VN	0	6.81	0.008143	±2.5	PASS
EGPRS850	190	VN	10	5.65	0.006754	±2.5	PASS
EGPRS850	190	VN	20	3.10	0.003705	±2.5	PASS
EGPRS850	190	VN	30	9.72	0.011616	±2.5	PASS
EGPRS850	190	VN	40	8.36	0.009995	±2.5	PASS
EGPRS850	190	VN	50	5.91	0.007062	±2.5	PASS
GPRS1900	661	VN	-30	6.81	0.003624	±2.5	PASS
GPRS1900	661	VN	-20	4.97	0.002645	±2.5	PASS
GPRS1900	661	VN	-10	2.26	0.001202	±2.5	PASS
GPRS1900	661	VN	0	9.04	0.004809	±2.5	PASS
GPRS1900	661	VN	10	8.01	0.004259	±2.5	PASS
GPRS1900	661	VN	20	4.91	0.002610	±2.5	PASS
GPRS1900	661	VN	30	5.42	0.002885	±2.5	PASS

GPRS1900	661	VN	40	8.23	0.004379	±2.5	PASS
GPRS1900	661	VN	50	1.58	0.000841	±2.5	PASS
EGPRS1900	661	VN	-30	4.97	0.002645	±2.5	PASS
EGPRS1900	661	VN	-20	7.75	0.004122	±2.5	PASS
EGPRS1900	661	VN	-10	5.04	0.002679	±2.5	PASS
EGPRS1900	661	VN	0	8.78	0.004671	±2.5	PASS
EGPRS1900	661	VN	10	6.04	0.003211	±2.5	PASS
EGPRS1900	661	VN	20	5.07	0.002696	±2.5	PASS
EGPRS1900	661	VN	30	3.00	0.001597	±2.5	PASS
EGPRS1900	661	VN	40	4.36	0.002318	±2.5	PASS
EGPRS1900	661	VN	50	2.97	0.001580	±2.5	PASS

WCDMA:

Voltage							
Band	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band II	9400	VL	TN	2.15	0.001141	±2.5	PASS
Band II	9400	VN	TN	2.85	0.001514	±2.5	PASS
Band II	9400	VH	TN	-1.02	-0.000544	±2.5	PASS
Band IV	1413	VL	TN	-1.37	-0.000788	±2.5	PASS
Band IV	1413	VN	TN	-0.60	-0.000347	±2.5	PASS
Band IV	1413	VH	TN	-3.19	-0.001841	±2.5	PASS
Band V	4182	VL	TN	0.92	0.001103	±2.5	PASS
Band V	4182	VN	TN	-0.44	-0.000522	±2.5	PASS
Band V	4182	VH	TN	0.79	0.000949	±2.5	PASS

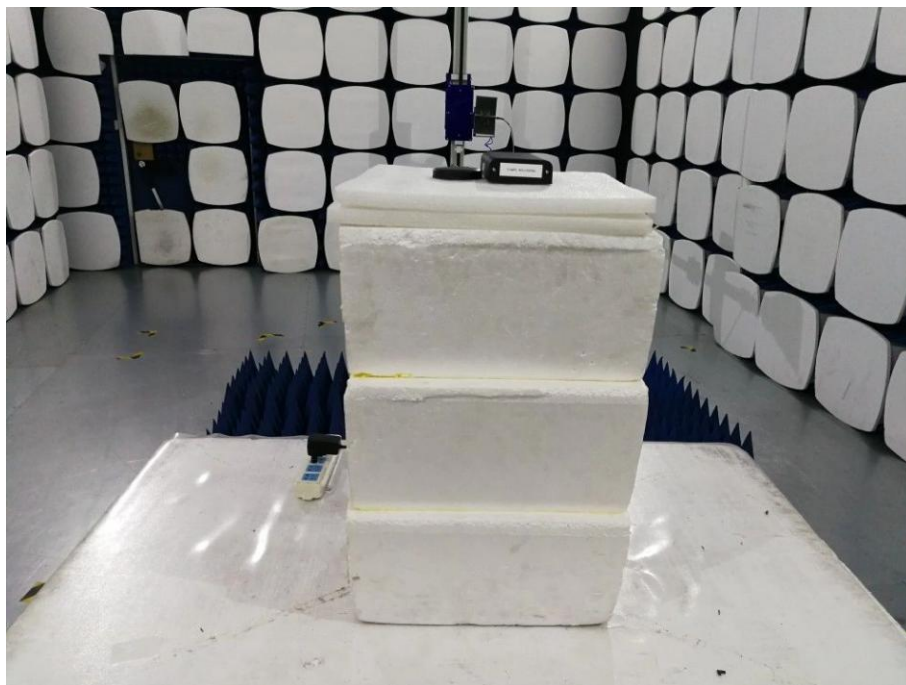
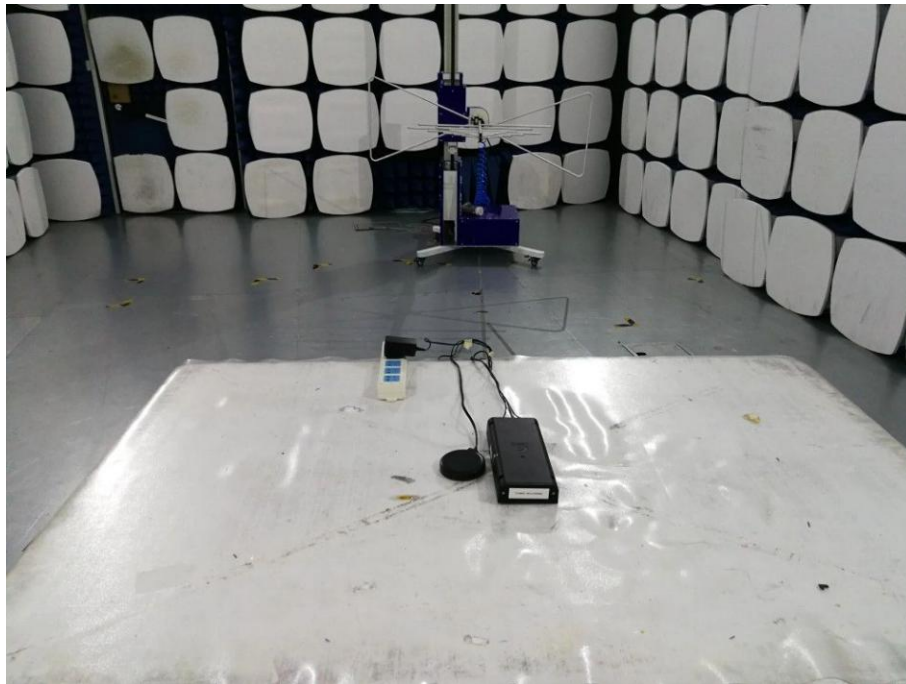
Temperature							
Band	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band II	9400	VN	-30	1.80	0.000955	±2.5	PASS
Band II	9400	VN	-20	1.58	0.000841	±2.5	PASS
Band II	9400	VN	-10	-0.66	-0.000350	±2.5	PASS
Band II	9400	VN	0	-1.17	-0.000620	±2.5	PASS
Band II	9400	VN	10	0.64	0.000342	±2.5	PASS
Band II	9400	VN	20	-4.01	-0.002131	±2.5	PASS
Band II	9400	VN	30	-3.10	-0.001647	±2.5	PASS
Band II	9400	VN	40	2.95	0.001567	±2.5	PASS
Band II	9400	VN	50	5.29	0.002812	±2.5	PASS
Band IV	1413	VN	-30	0.17	0.000099	±2.5	PASS
Band IV	1413	VN	-20	0.21	0.000124	±2.5	PASS
Band IV	1413	VN	-10	-4.89	-0.002824	±2.5	PASS
Band IV	1413	VN	0	-0.16	-0.000095	±2.5	PASS
Band IV	1413	VN	10	-4.28	-0.002469	±2.5	PASS
Band IV	1413	VN	20	-1.23	-0.000710	±2.5	PASS
Band IV	1413	VN	30	-1.85	-0.001069	±2.5	PASS
Band IV	1413	VN	40	-2.50	-0.001445	±2.5	PASS
Band IV	1413	VN	50	-2.02	-0.001168	±2.5	PASS
Band V	4182	VN	-30	2.46	0.002942	±2.5	PASS
Band V	4182	VN	-20	-1.97	-0.002352	±2.5	PASS
Band V	4182	VN	-10	0.14	0.000171	±2.5	PASS
Band V	4182	VN	0	-0.35	-0.000419	±2.5	PASS
Band V	4182	VN	10	0.87	0.001035	±2.5	PASS
Band V	4182	VN	20	0.22	0.000265	±2.5	PASS
Band V	4182	VN	30	-0.50	-0.000599	±2.5	PASS
Band V	4182	VN	40	-0.53	-0.000633	±2.5	PASS
Band V	4182	VN	50	-1.20	-0.001437	±2.5	PASS

Note:

1. Normal Voltage = 3.7V; Battery End Point (BEP) = 3.15V; Maximum Voltage = 4.26V
2. All modes of EUT have been tested; only the data of worst case mode is reported.

Photographs of the Test Setup

Radiated emission



Photographs of the EUT

See the APPENDIX 1: EUT PHOTO in the report No.: MTi190614E097-1.

----END OF REPORT----