

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION REFERENCING TEST DATA ACROSS SEPARATE EQUIPMENT VERIFICATION

OF

Product Name: Smart Phone
Brand Name: Nokia
Model No.: TA-1023
Model Difference: N/A
FCC ID: 2AJOTTA-1023
Report No.: ER/2017/90041
Issue Date: Sep. 06, 2017
FCC Rule Part: §15.247, Cat: DTS & DSS
 2, 22H & 24E & 27B, C & L
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Date of test: Jun. 29, 2017
Date of EUT Received: Jun. 24, 2017



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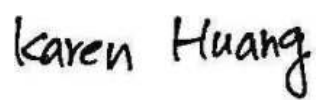
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Revision History

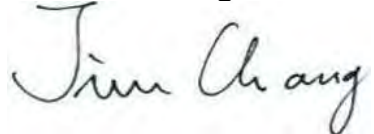
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Test By:  **Date:** Sep. 06, 2017

Tin Lin / Engineer

Prepared By:  **Date:** Sep. 06, 2017

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1 GENERAL INFORMATION

1.1 Product description

General:

Product Name:	Smart Phone	
Brand Name:	Nokia	
Model No.:	TA-1023	
Model Difference:	N/A	
Hardware Version:	890	
Software Version:	V0.140	
USB Cable:	Model No.: CUBB01M-FA010-DH, Supplier: Nokia	
Headset:	Model No.: WH-108, Supplier: Nokia	
Power Supply:	3.85Vdc from Rechargeable Li-ion Polymer Battery or 5V from AC/DC Adapter	
	Battery:	Model No.: HE338, Supplier: Nokia
	Adapter:	Model No.: FC0102, Supplier: Nokia
Referencing test data across separate equipment:	Spot-check data based on the worst-case result in the original FCC ID: 2AJOTTA-1023 filing.	

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1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

ANSI C63.10:2013

FCC KDB 558074 D01 DTS Meas. Guidance

FCC 47 CFR Part 2, 22, 24, 27

ANSI / TIA / EIA 603-D-2010

KDB971168 D01 Power Meas license Digital System

KDB941225 of the Output power Procedure of (SAR Measurement Procedures for 3G Devices, WCDMA / HSPA) was used for EUT and Base station setting.

TS 151 010-1 is used to set, and measure the output power.

Note: All test items have been performed and record as per the above standards.

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803 (TAF code 0513)

FCC Registration Numbers are: 509634

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

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2.5 Configuration of Tested System

Fig 2-1 Radiated Emission Configuration (for BT/BLE)

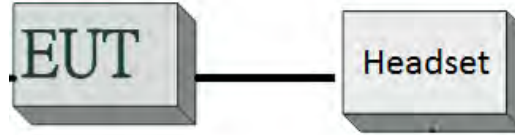


Fig 2-2 Radiated Emission Configuration (for WLAN)

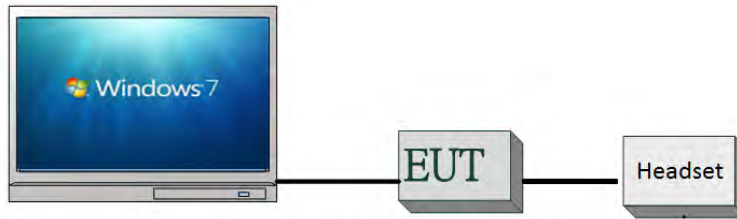
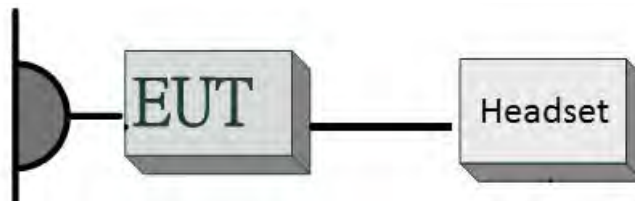


Fig 2-3 Radiated Emission Configuration (for WWAN)



Remote Side



Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2	Bluetooth Test Software	N/A	N/A	N/A	N/A	N/A
3	Notebook	Lenovo	L420	LR-7HXZA	N/A	Un-shield
4	Headset	Nokia	WH-108	N/A	N/A	N/A
5	Universal Radio Communication Tester	Anritsu	MT8820C	6200307563	shielded	Un-shielded

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3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.247(d)	Radiated Spurious Emission	Compliant
§2.1053 §22.917(a) §24.238(a) §27.53(g) §27.53(h) §27.53(m)	Field Strength of Spurious Radiation	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
3. Investigation has been done base on the worst case of original FCC ID: 2AJOTTA-1023

RADIATED EMISSION TEST:

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	Worst Case Position H / E1 / E2
802.11b	1 to 11	6	DSSS	1	E2
Bluetooth	0 to 78	39	8-DPSK	1	E2
Bluetooth LE	0 to 39	19	GFSK	1	E2

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	Worst Case Position H / E1 / E2
GPRS 850	128 to 251	128, 190, 251	E2
GPRS 1900	512 to 810	512, 661, 810	H
HSDPA Band II	4132 to 4233	4132, 4183, 4233	H
HSDPA Band IV	9262 to 9538	9262, 9400, 9583	H
HSDPA Band V	9262 to 9538	9262, 9400, 9583	E2

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE	Worst Case Position H / E1 / E2
LTE B2	18625 to 19175	18625, 18900, 19175	5MHz	QPSK	1 RB, 0 RB Offest	H
LTE B4	19965 to 22385	19965, 20175, 22385	3MHz	16QAM,	1 RB, 0 RB Offest	H
LTE B7	20775 to 21425	20775, 21100, 21425	5MHz	QPSK,	1 RB, 0 RB Offest	H
LTE B12	23035 to 23155	23035, 23095, 23155	5MHz	16QAM	1 RB, 24 RB Offest	E2
LTE B17	23755 to 23825	23755, 23790, 23825	5MHz	16QAM	1 RB, 0 RB Offest	E2
LTE B38	37775 to 38225	37775, 38000, 38225	5MHz	QPSK,	1 RB, 0 RB Offest	H

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5 MEASUREMENT UNCERTAINTY

Radiated Spurious Emission:

Measurement uncertainty (Polarization : Vertical)	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : Horizontal)	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

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

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6 RADIATED SPURIOUS EMISSION MEASUREMENT

6.1 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESC17	100760	05/11/2017	05/10/2018
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/25/2017	04/24/2018
Loop Antenna	ETS-Lindgren	6502	148045	09/20/2016	09/19/2017
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/19/2016	12/18/2017
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/04/2017	08/03/2018
Pre-Amplifier	Agilent	8447D	2944A07676	01/03/2017	01/02/2018
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/03/2017	01/02/2018
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_RX	9	01/05/2017	01/04/2018
3m Site NSA	SGS	966 chamber	N/A	07/01/2017	06/30/2018
Low Loss Cable	Huber Suhner	966 TX	1	01/05/2017	01/04/2018
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2016	12/11/2017
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/05/2017	01/04/2018

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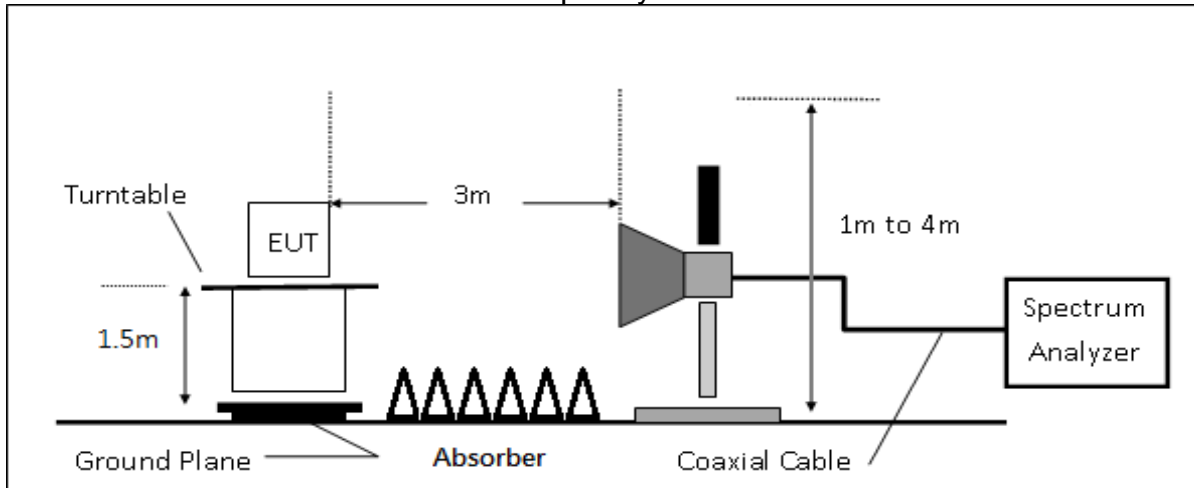
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6.2 Test SET-UP

Radiated Emission Test Set-UP Frequency Over 1 GHz



6.3 Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
2. The EUT was placed on a turn table with 1.5m for frequency > 1GHz above ground plane.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
5. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
6. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
8. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
9. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
10. Repeat above procedures until all default test channel measured were complete.

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6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note :

“F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

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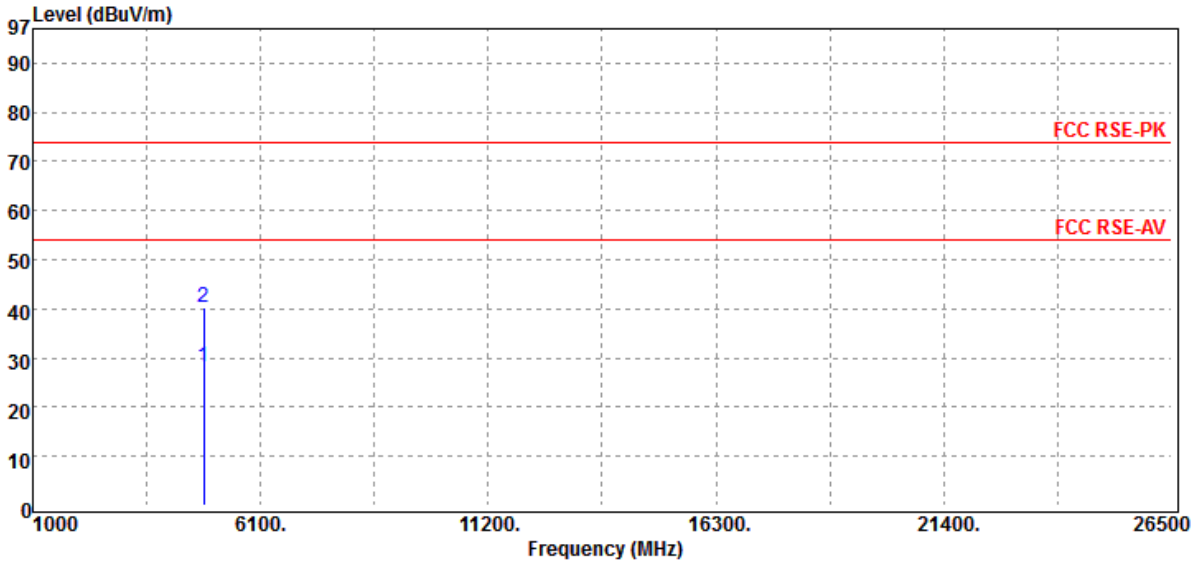
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6.5 Measurement Result

(WLAN)

Operation Band	:802.11b	Test Date	:2017-06-29
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Mike
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



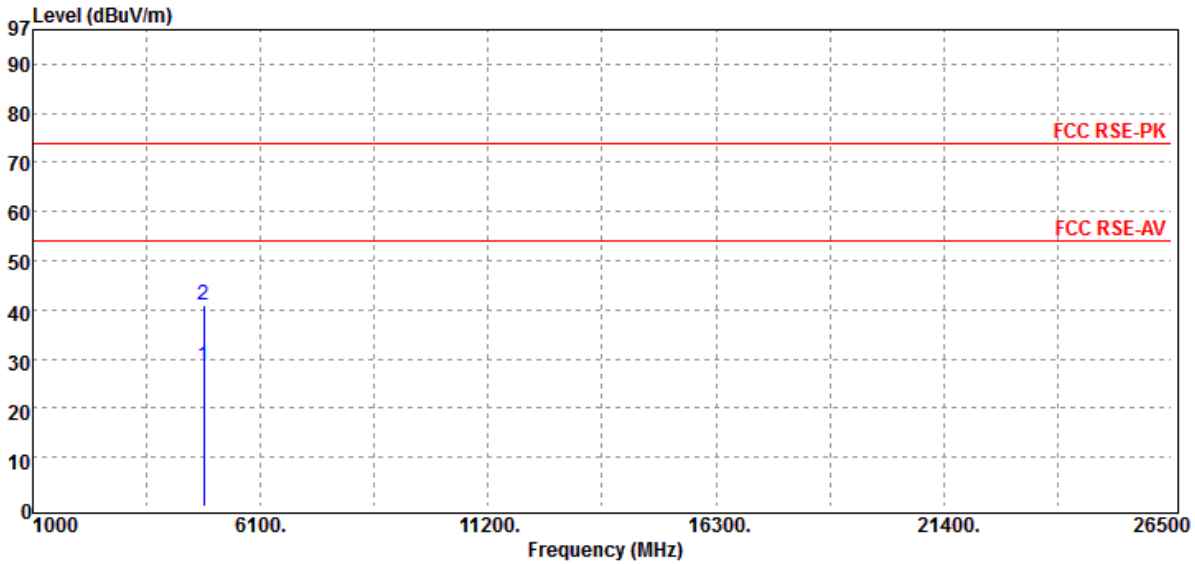
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Safe Margin dB
4824.00	H	Average	23.11	4.93	28.04	54.00	-25.96
4824.00	H	Peak	35.23	4.93	40.16	74.00	-33.84

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Operation Band	:802.11b	Test Date	:2017-06-29
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Mike
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4824.00	H	Average	23.58	4.93	28.51	54.00	-25.49
4824.00	H	Peak	36.14	4.93	41.07	74.00	-32.93

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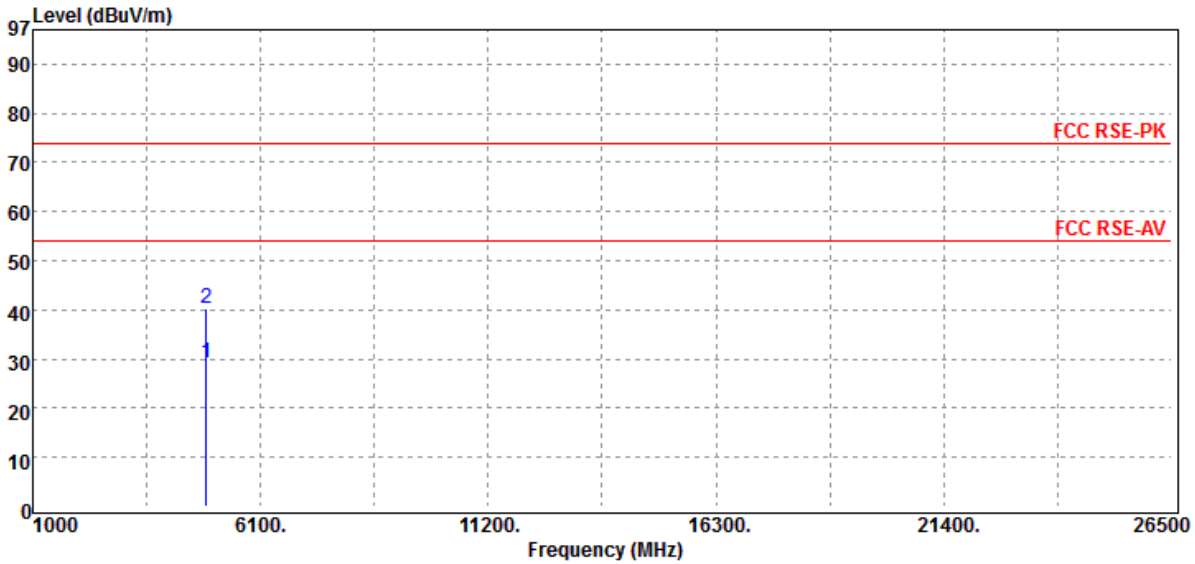
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(BT)

Operation Band	:EDR(3M)	Test Date	:2017-06-29
Fundamental Frequency	:2441 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4882.00	H	Average	24.09	5.18	29.27	54.00	-24.73
4882.00	H	Peak	35.09	5.18	40.27	74.00	-33.73

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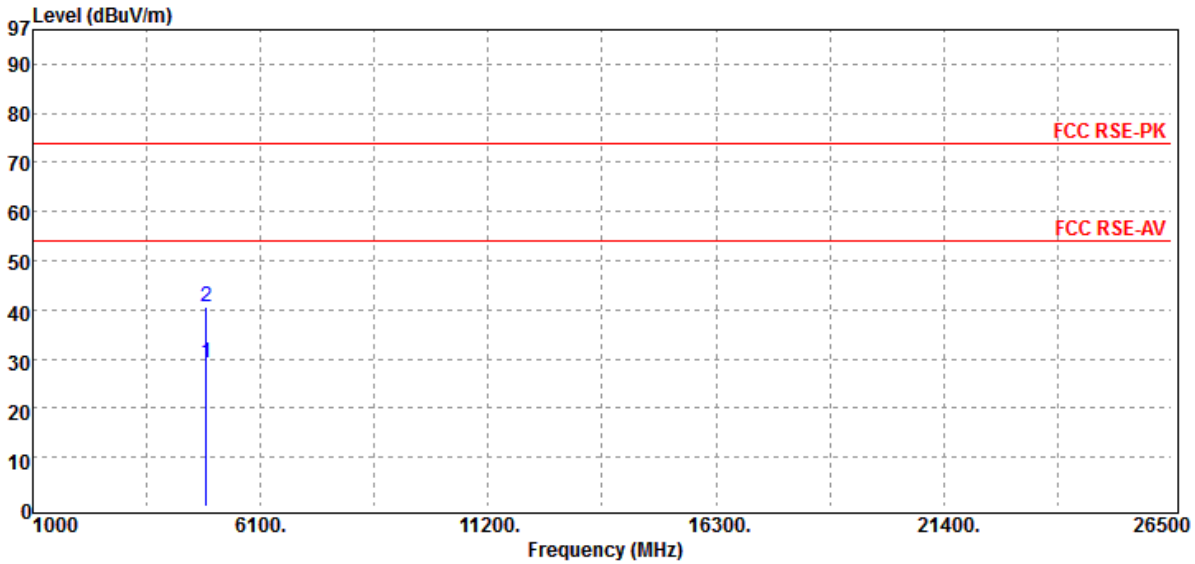
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Operation Band	:EDR(3M)	Test Date	:2017-06-29
Fundamental Frequency	:2441 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4882.00	H	Average	23.89	5.18	29.07	54.00	-24.93
4882.00	H	Peak	35.35	5.18	40.53	74.00	-33.47

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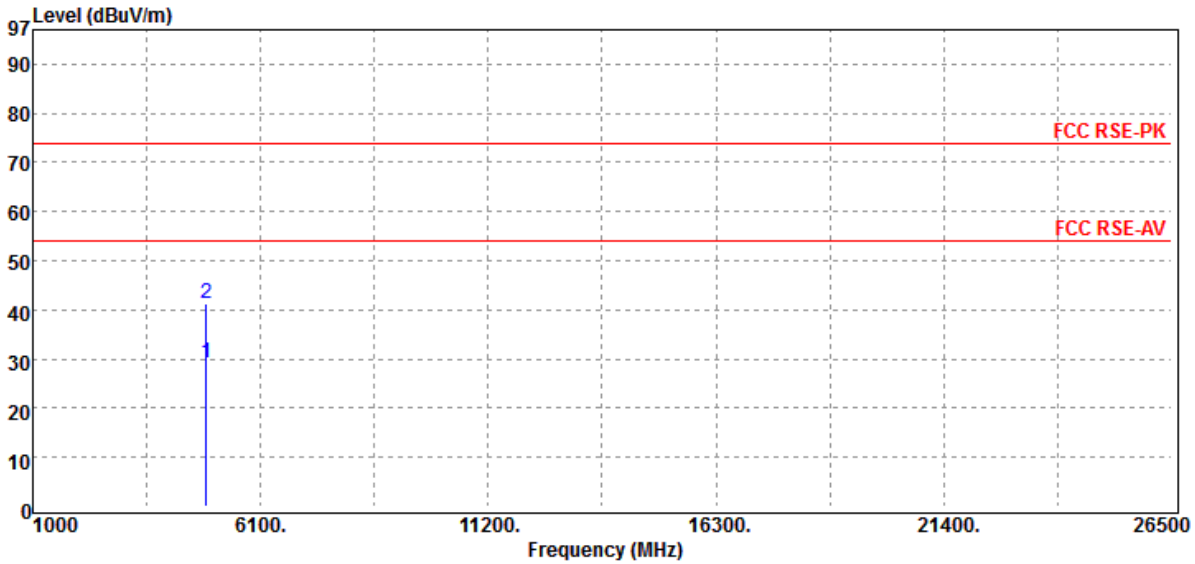
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(BLE)

Operation Band	:BLE	Test Date	:2017-06-29
Fundamental Frequency	:2442 MHz	Temp./Humi.	:21 deg_C / 61 RH
Operation Mode	:Tx CH MID	Engineer	:Mike
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4884.00	H	Average	23.87	5.20	29.07	54.00	-24.93
4884.00	H	Peak	36.09	5.20	41.29	74.00	-32.71

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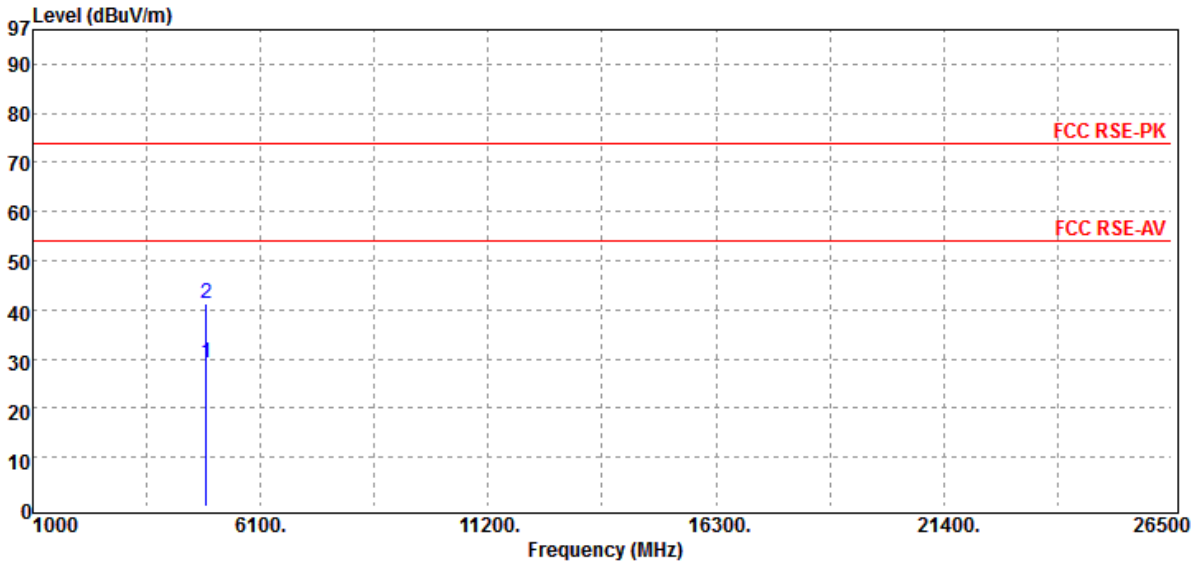
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Operation Band	:BLE	Test Date	:2017-06-29
Fundamental Frequency	:2442 MHz	Temp./Humi.	:21 deg_C / 61 RH
Operation Mode	:Tx CH MID	Engineer	:Mike
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4884.00	H	Average	24.08	5.20	29.28	54.00	-24.72
4884.00	H	Peak	36.18	5.20	41.38	74.00	-32.62

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7 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

7.1 Standard Applicable

According to FCC §2.1053,

FCC §22.917(a) , §24.238(a) , §27.53(g)(h) , the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than $43 + 10 \log$ (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm).

FCC §27.53 (m) (4) shall not be less than $55 + 10 \log$ (mean output power in watt) dBc below the mean power output outside a license's frequency block (-25dBm).

Table 2 — Unwanted Emissions for Mobile, Portable and Low-Power Fixed Subscriber Equipment

Frequency (MHz)	Attenuation (dB)
<2200	$43 + 10 \log_{10}(p)$
2200 - 2288	$70 + 10 \log_{10}(p)$
2288 - 2292	$67 + 10 \log_{10}(p)$
2292 - 2296	$61 + 10 \log_{10}(p)$
2296 - 2300	$55 + 10 \log_{10}(p)$
2300 - 2305	$43 + 10 \log_{10}(p)$
2305 - 2320	$43 + 10 \log_{10}(p)$ ^{Note}
2320 - 2324	$55 + 10 \log_{10}(p)$
2324 - 2328	$61 + 10 \log_{10}(p)$
2328 - 2337	$67 + 10 \log_{10}(p)$
2337 - 2341	$61 + 10 \log_{10}(p)$
2341 - 2345	$55 + 10 \log_{10}(p)$
2345 - 2360	$43 + 10 \log_{10}(p)$ ^{Note}
2360 - 2365	$43 + 10 \log_{10}(p)$
2365 - 2395	$70 + 10 \log_{10}(p)$
>2395	$43 + 10 \log_{10}(p)$

Note: Measured at the edges of the highest and lowest frequency range(s) in which the equipment is designed to operate. See Section 5.2 for the permitted frequency ranges for various equipment types.

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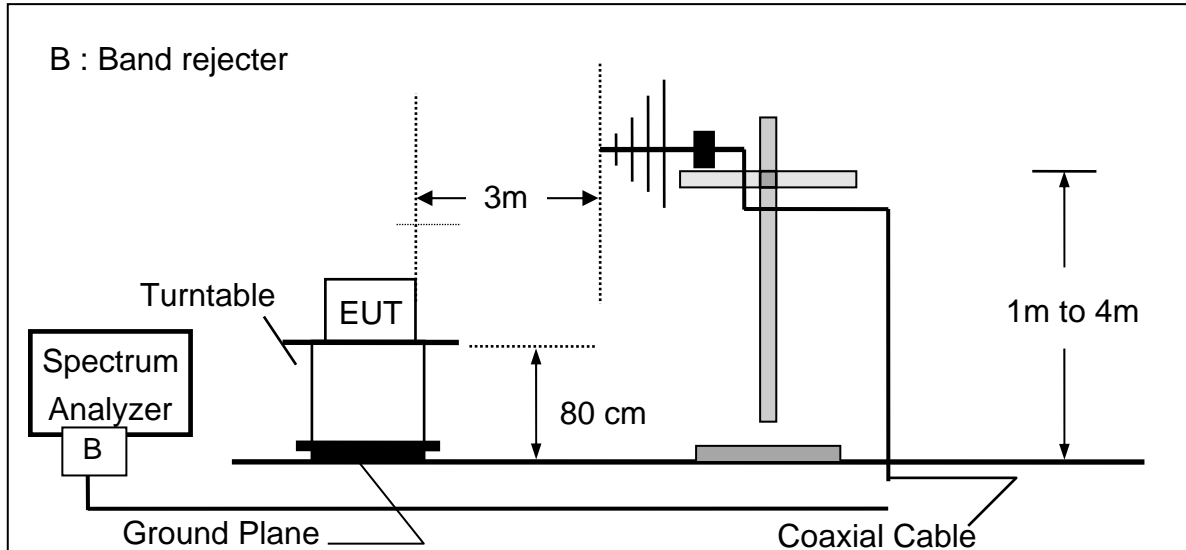
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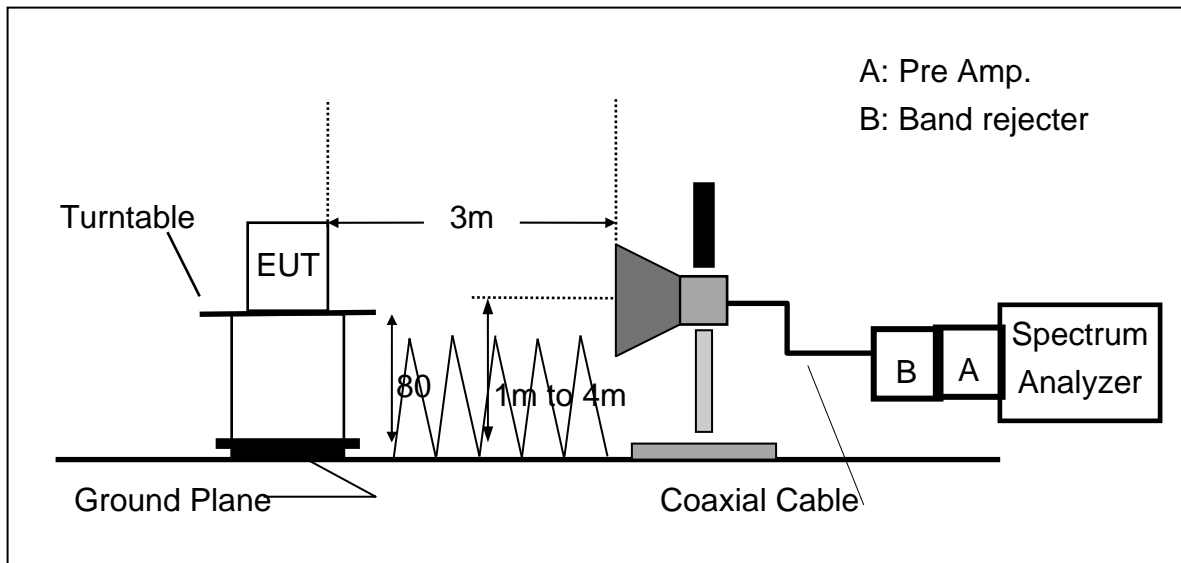
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7.2 EUT Setup

Radiated Emission Test Set-Up, Frequency Below 1000MHz



Radiated Emission Test Set-UP Frequency Over 1 GHz



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7.3 Measurement Procedure:

The EUT was placed on a non-conductive; the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequencies (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

$$\text{ERP (dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

$$\text{EIRP (dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBi)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
 “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
 “---” : denotes Noise Floor.

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7.4 Measurement Equipment Used:

ERP, EIRP MEASUREMENT EQUIPMENT List 966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESC17	100760	05/11/2017	05/10/2018
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/25/2017	04/24/2018
Loop Antenna	ETS-Lindgren	6502	148045	09/20/2016	09/19/2017
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/19/2016	12/18/2017
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/04/2017	08/03/2018
Pre-Amplifier	Agilent	8447D	2944A07676	01/05/2017	01/04/2018
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/05/2017	01/04/2018
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_RX	9	01/05/2017	01/04/2018
3m Site NSA	SGS	966 chamber	N/A	07/01/2017	06/30/2018
Low Loss Cable	Huber Suhner	966 TX	1	01/05/2017	01/04/2018
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2016	12/11/2017
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/05/2017	01/04/2018
Radio Communication Analyer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018

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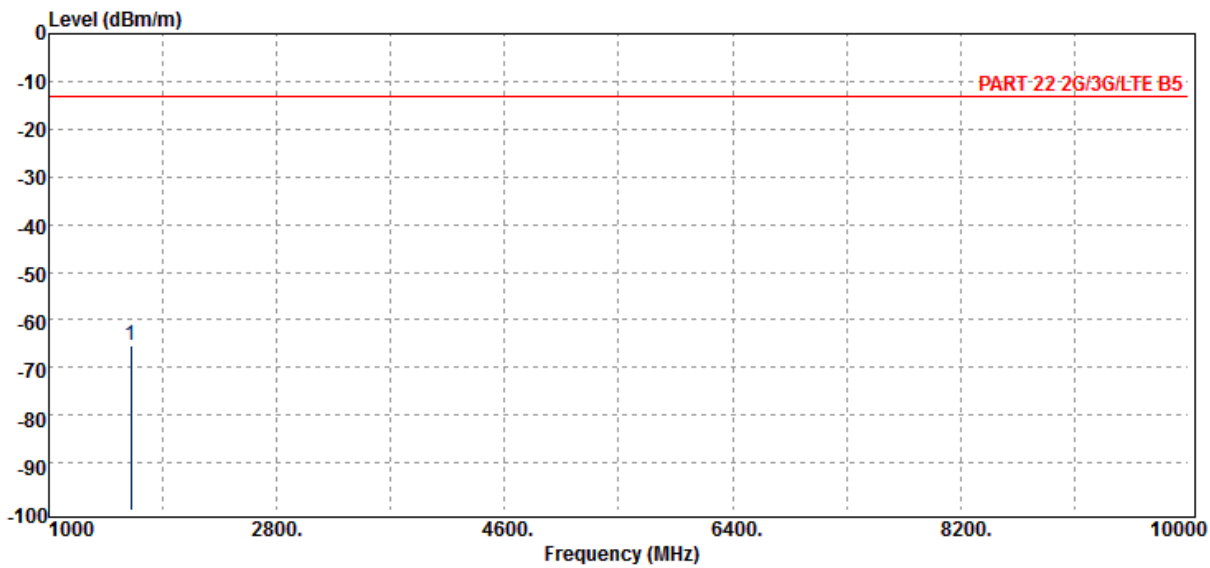
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7.5 Measurement Result:

Radiated Spurious Emission Measurement Result: GSM 850 Mode (The Worst Case)

Operation Band :GPRS 850 Temp./Humi. :21 deg_C / 62 RH
 Fundamental Frequency :824.2 MHz Engineer :Tin
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane Measurement Antenna :VERTICAL
 Pol. :



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
1648.40	H	-65.25	-68.14	7.11	-4.22	-13.00	-52.25

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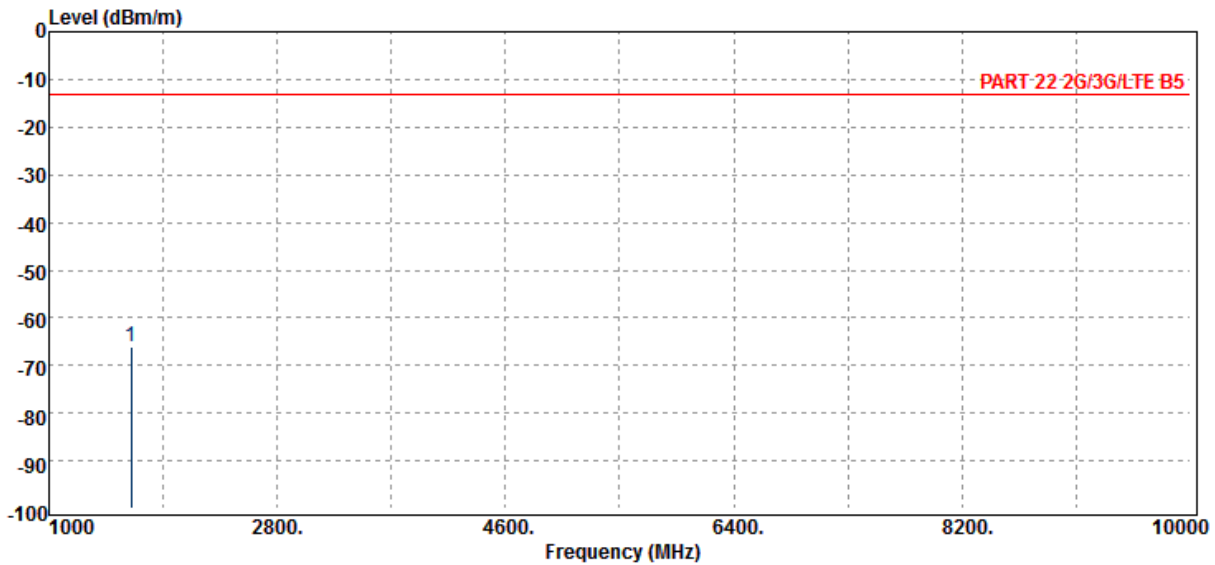
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Operation Band	:GPRS 850	Temp./Humi.	:21 deg_C / 62 RH
Fundamental Frequency	:824.2 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
1648.40	H	-66.11	-68.99	7.11	-4.22	-13.00	-53.11

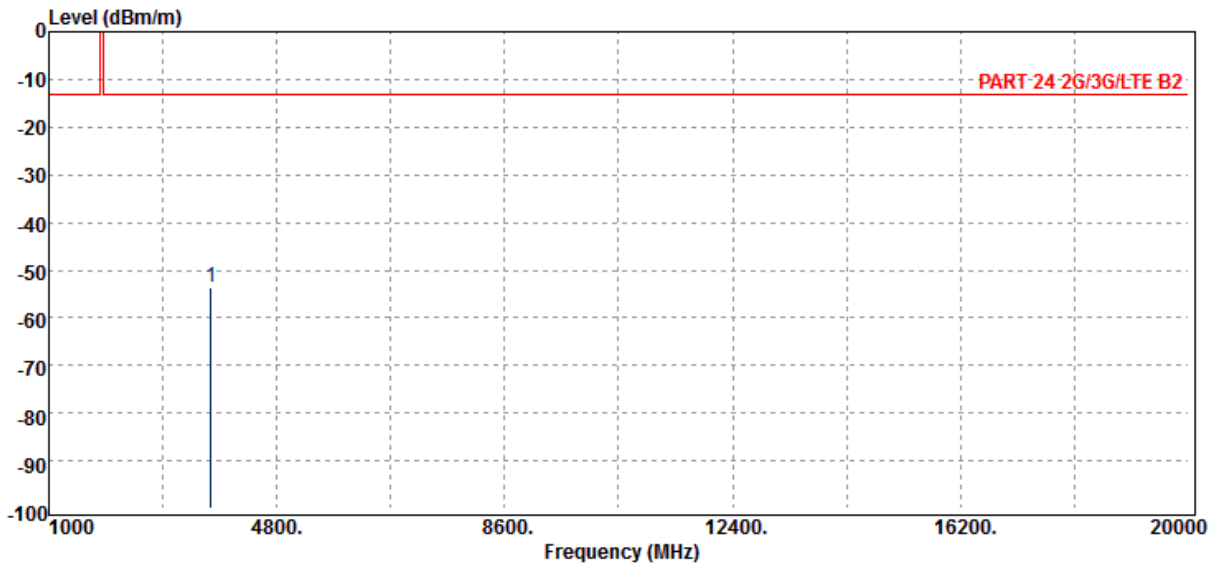
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Radiated Spurious Emission Measurement Result: GPRS 1900 Mode (The Worst Case)

Operation Band :GPRS 1900 Temp./Humi. :21 deg_C / 62 RH
 Fundamental Frequency :1850.2 MHz Engineer :Tin
 Operation Mode :Tx CH LOW
 EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



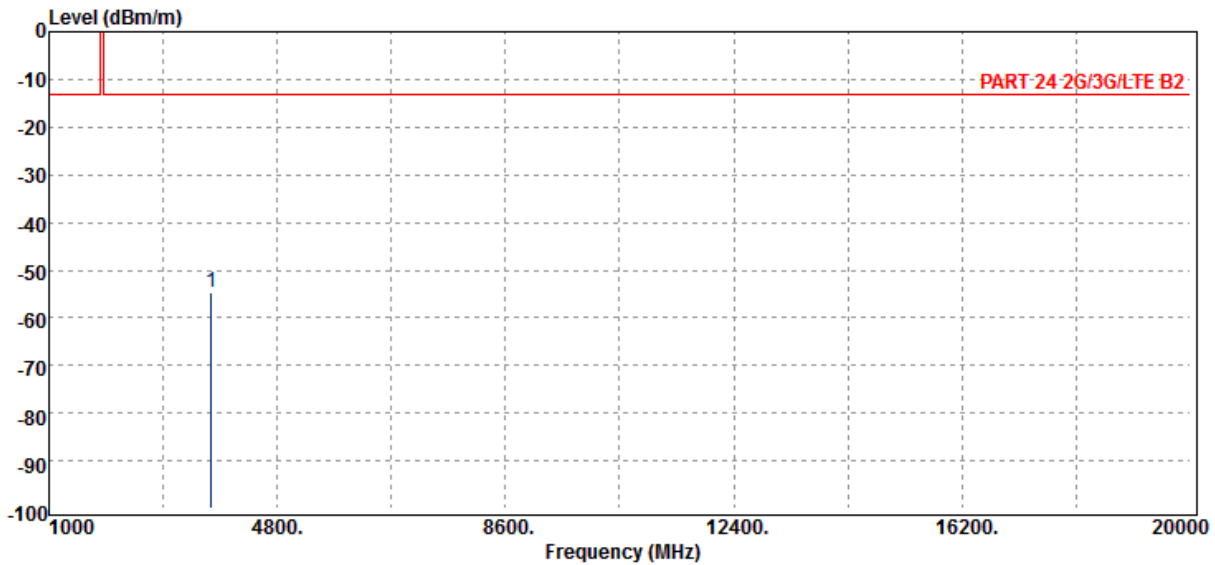
Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
3700.40	H	-53.47	-59.34	12.44	-6.58	-13.00	-40.47

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Operation Band	:GPRS 1900	Temp./Humi.	:21 deg_C / 62 RH
Fundamental Frequency	:1850.2 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:H Plane	Measurement Antenna	:HORIZONTAL
		Pol.	



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
3700.40	H	-54.84	-60.70	12.44	-6.58	-13.00	-41.84

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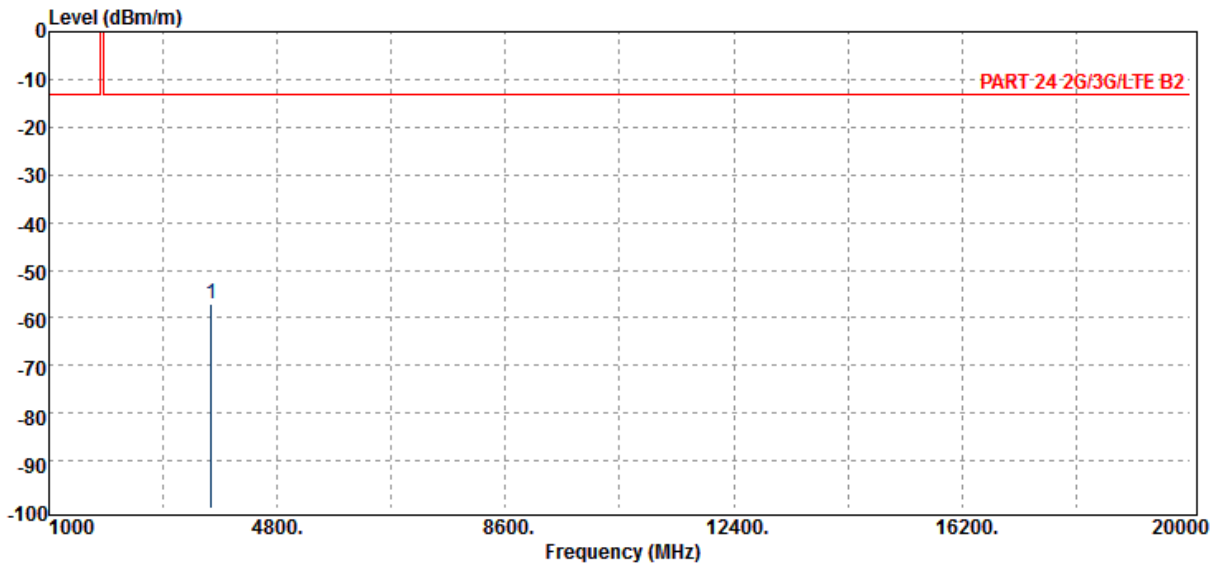
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Radiated Spurious Emission Measurement Result: WCDMA Band 2 Mode (The Worst Case)

Operation Band :HSDPA B2 Temp./Humi. :21 deg_C / 62 RH
 Fundamental Frequency :1852.4 MHz Engineer :Tin
 Operation Mode :Tx CH LOW
 EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
3704.80	H	-57.06	-62.92	12.44	-6.58	-13.00	-44.06

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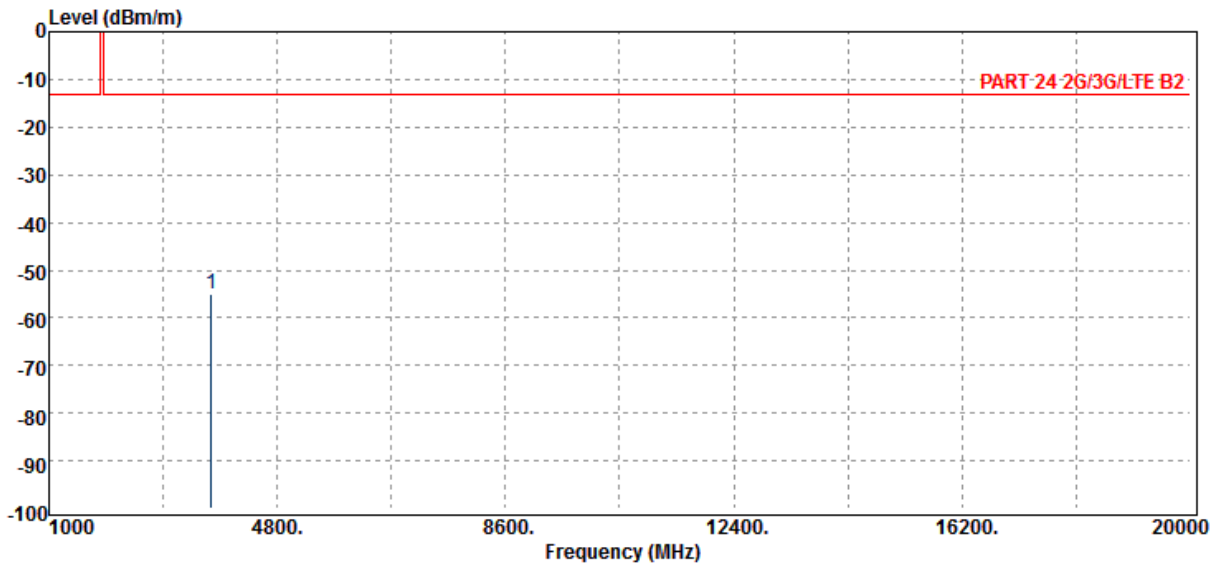
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Operation Band	:HSDPA B2	Temp./Humi.	:21 deg_C / 62 RH
Fundamental Frequency	:1852.4 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
3704.80	H	-55.05	-60.91	12.44	-6.58	-13.00	-42.05

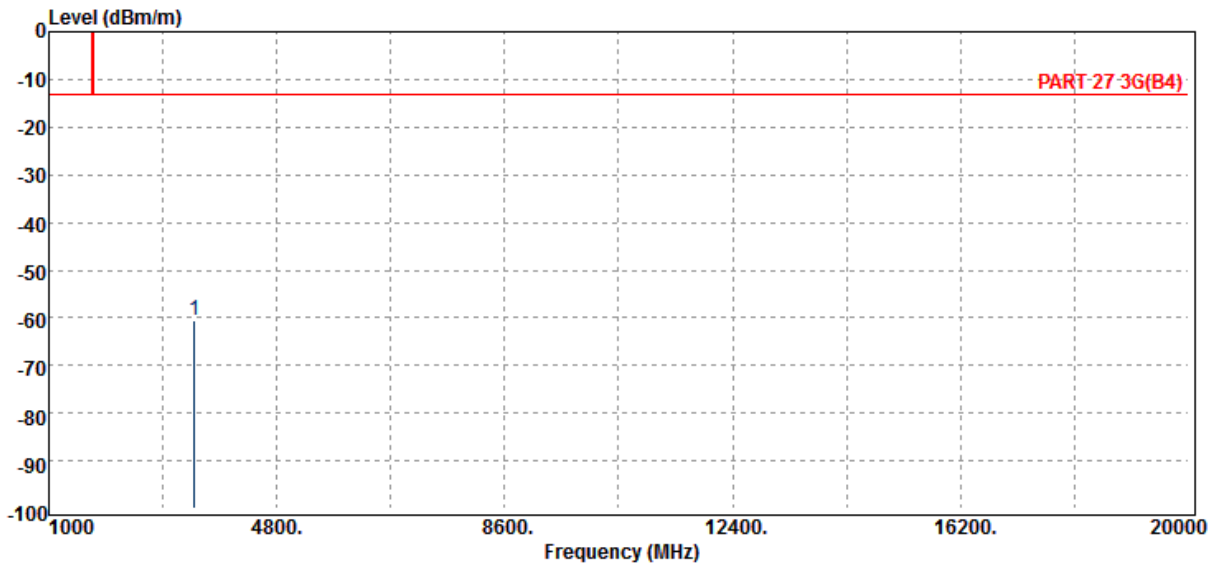
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Radiated Spurious Emission Measurement Result: WCDMA Band 4 Mode (The Worst Case)

Operation Band :HSDPA B4 Temp./Humi. :21 deg_C / 62 RH
 Fundamental Frequency :1712.4 MHz Engineer :Tin
 Operation Mode :Tx CH LOW
 EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
3424.80	H	-60.60	-66.64	12.27	-6.23	-13.00	-47.60

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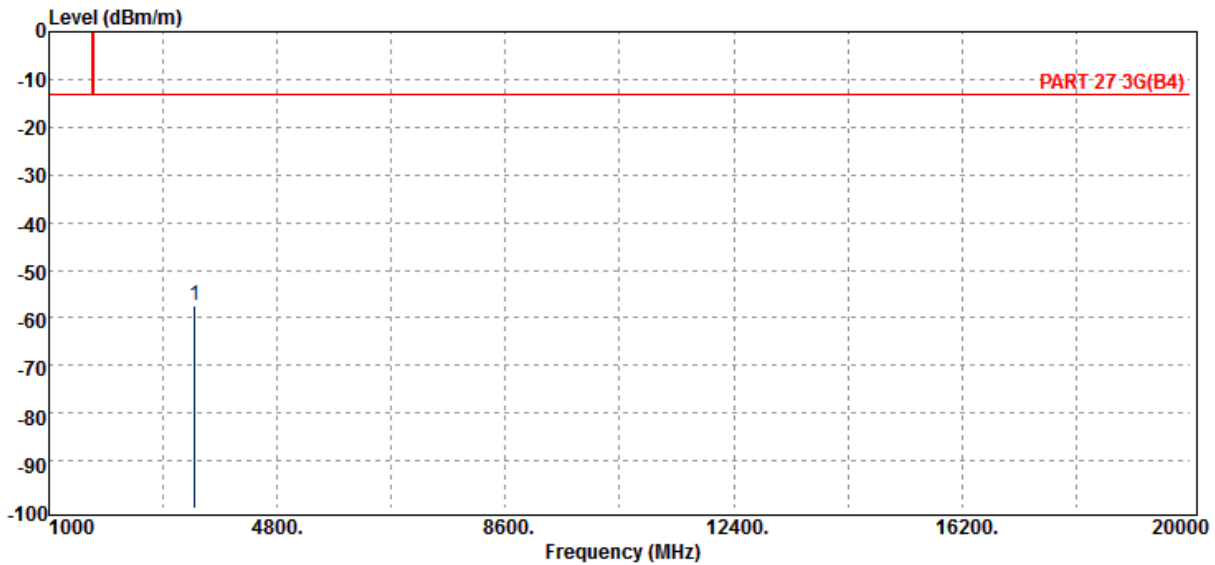
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Operation Band	:HSDPA B4	Temp./Humi.	:21 deg_C / 62 RH
Fundamental Frequency	:1712.4 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
3424.80	H	-57.56	-63.60	12.27	-6.23	-13.00	-44.56

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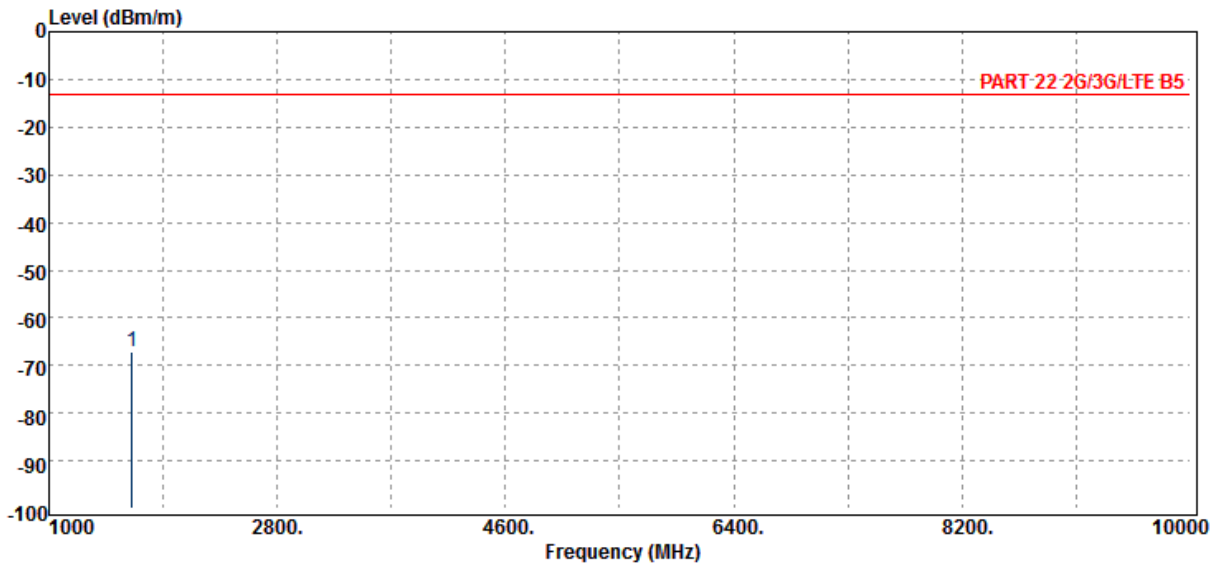
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Radiated Spurious Emission Measurement Result: WCDMA Band 5 Mode (The Worst Case)

Operation Band :HSDPA B5 Temp./Humi. :21 deg_C / 62 RH
 Fundamental Frequency :826.4 MHz Engineer :Tin
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL



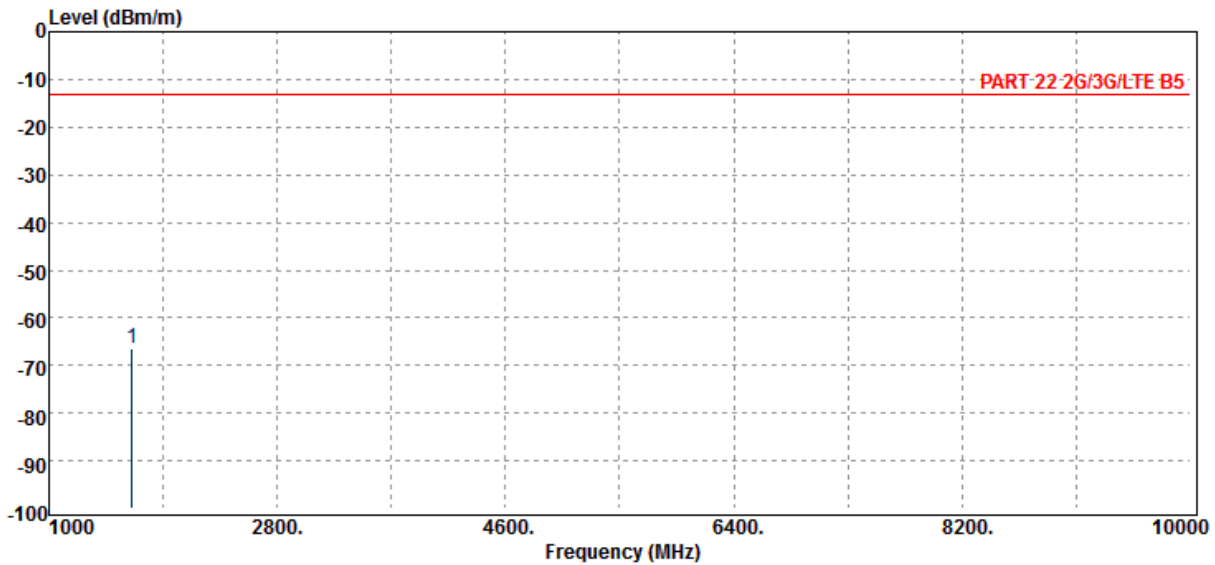
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
1652.80	H	-67.06	-69.95	7.12	-4.24	-13.00	-54.06

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Operation Band	:HSDPA B5	Temp./Humi.	:21 deg_C / 62 RH
Fundamental Frequency	:826.4 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
1652.80	H	-66.32	-69.21	7.12	-4.24	-13.00	-53.32

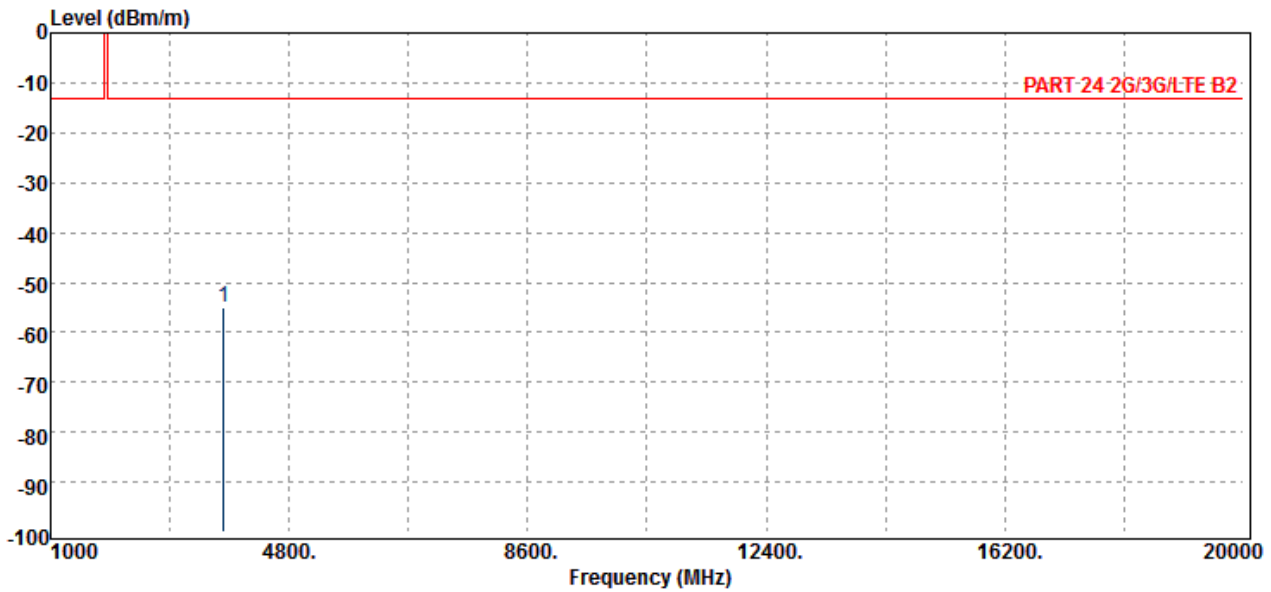
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Radiated Spurious Emission Measurement Result: LTE-Band 2 (The Worst Case)

Operation Band :LTE B2 Temp./Humi. :23 deg_C / 62 RH
 Fundamental Frequency :1880.0 MHz Engineer :Tin
 Operation Mode :Tx CH MID
 EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
3760.00	H	-57.48	-63.33	12.45	-6.60	-13.00	-44.48

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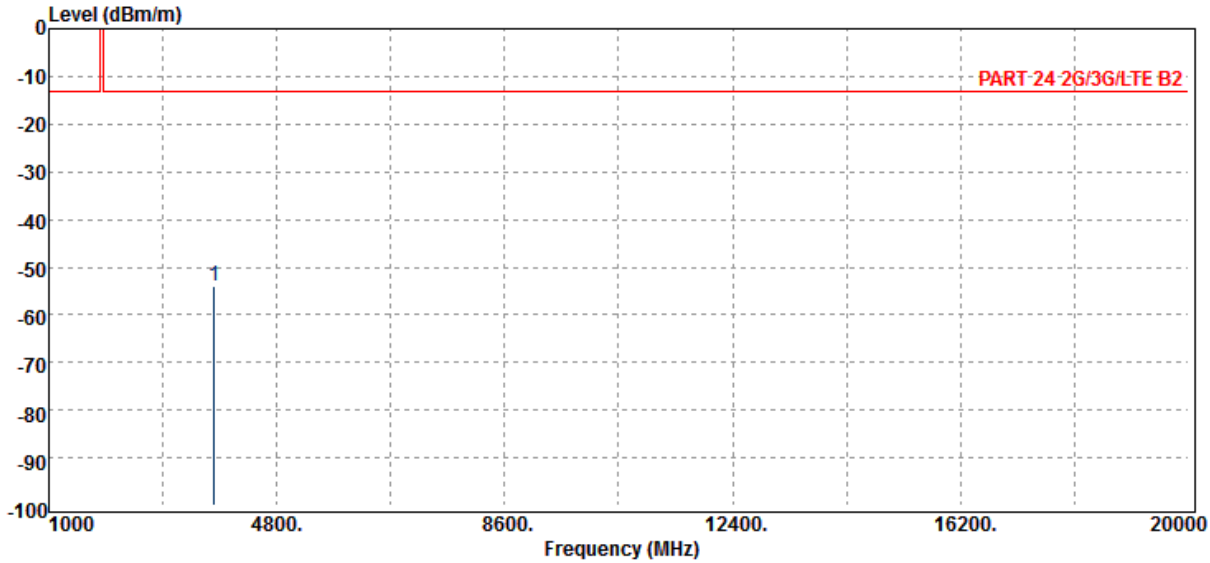
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Operation Band	:LTE B2	Temp./Humi.	:23 deg_C / 62 RH
Fundamental Frequency	:1880.0 MHz	Engineer	:Tin
Operation Mode	:Tx CH MID		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
3760.00	H	-54.03	-59.89	12.45	-6.60	-13.00	-41.03

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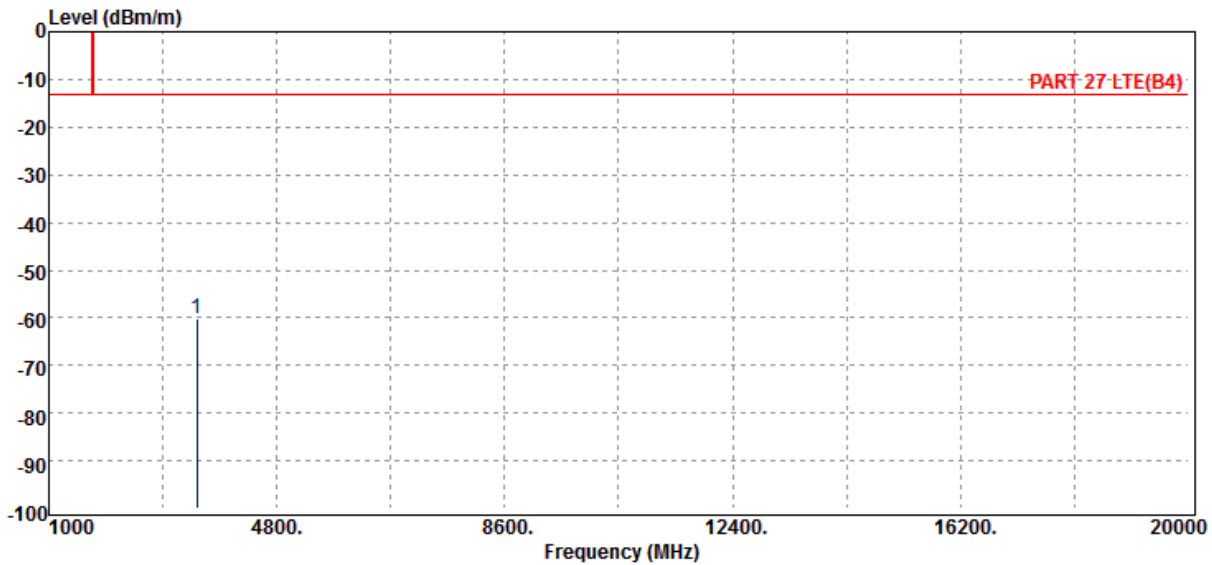
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Radiated Spurious Emission Measurement Result: LTE-Band 4 (The Worst Case)

Operation Band :LTE B4 Temp./Humi. :23 deg_C / 62 RH
 Fundamental Frequency :1732.5 MHz Engineer :Tin
 Operation Mode :Tx CH MID
 EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



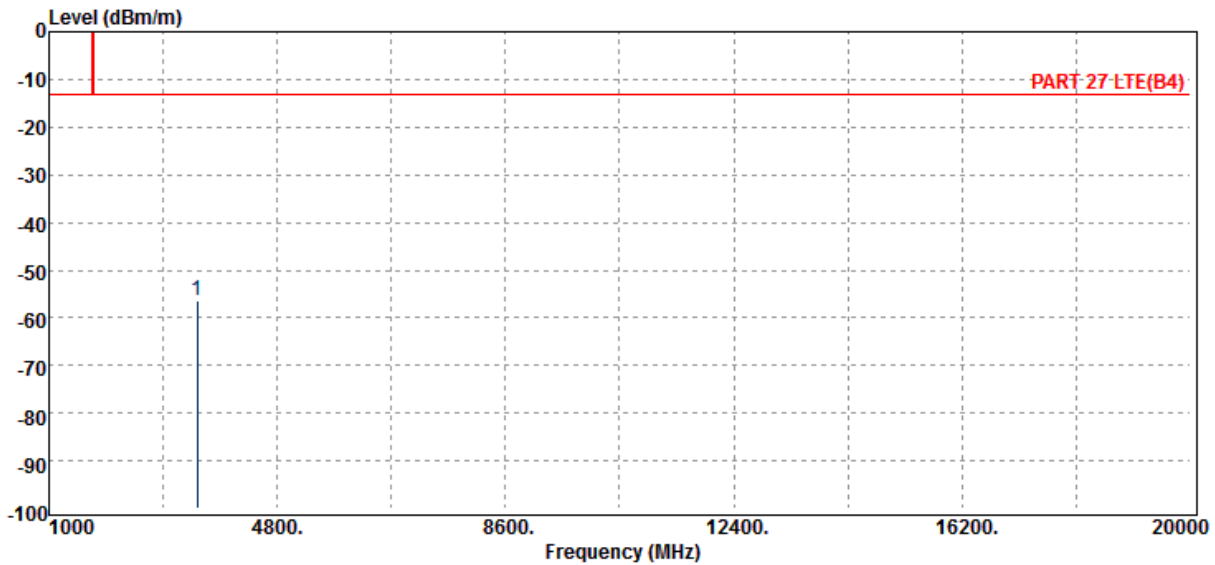
Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
3465.00	H	-60.24	-66.33	12.34	-6.25	-13.00	-47.24

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Operation Band	:LTE B4	Temp./Humi.	:23 deg_C / 62 RH
Fundamental Frequency	:1732.5 MHz	Engineer	:Tin
Operation Mode	:Tx CH MID		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
3465.00	H	-56.46	-62.55	12.34	-6.25	-13.00	-43.46

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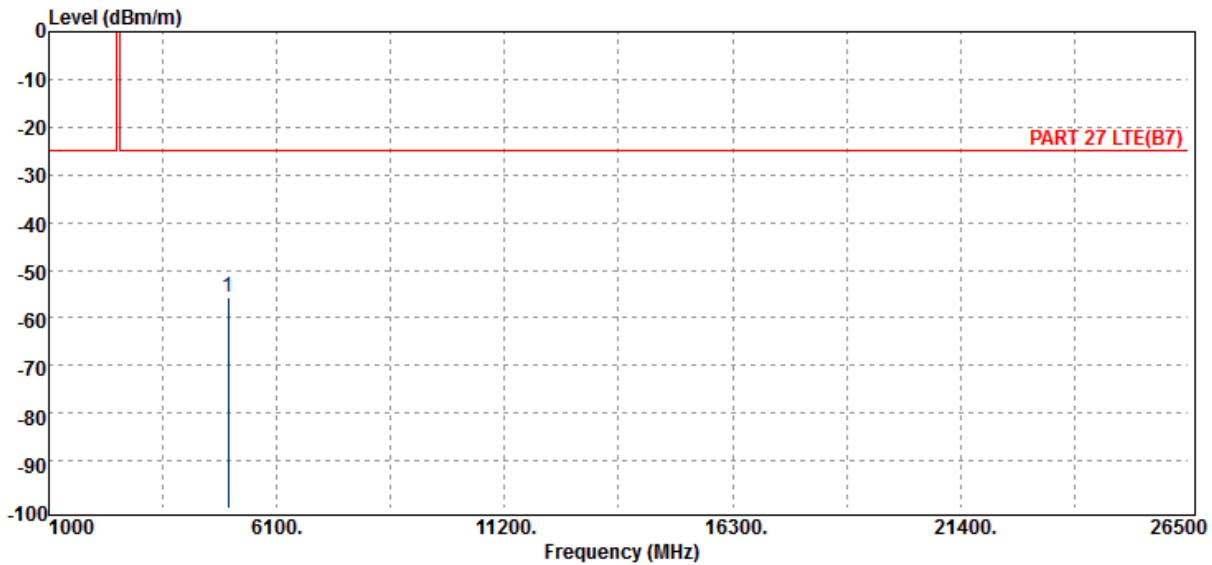
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Radiated Spurious Emission Measurement Result: LTE-Band 7 (The Worst Case)

Operation Band :LTE B7 Temp./Humi. :21 deg_C / 62 RH
 Fundamental Frequency :2507.5 MHz Engineer :Tin
 Operation Mode :Tx CH LOW
 EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
5015.00	H	-55.58	-60.48	12.71	-7.81	-25.00	-30.58

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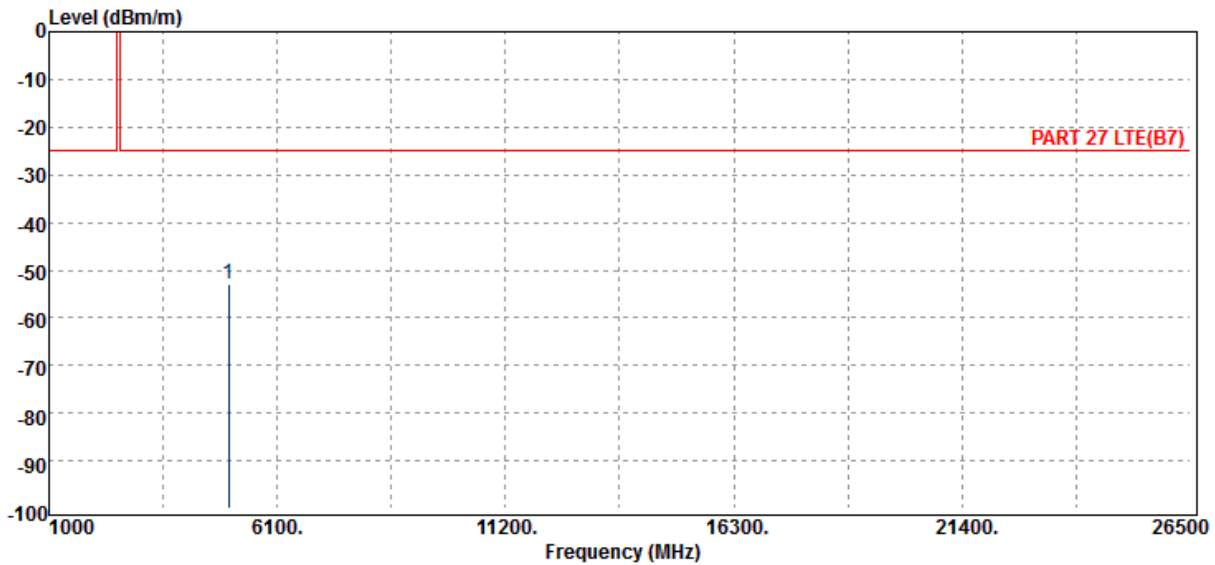
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Operation Band	:LTE B7	Temp./Humi.	:21 deg_C / 62 RH
Fundamental Frequency	:2507.5 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
5015.00	H	-53.07	-57.96	12.71	-7.81	-25.00	-28.07

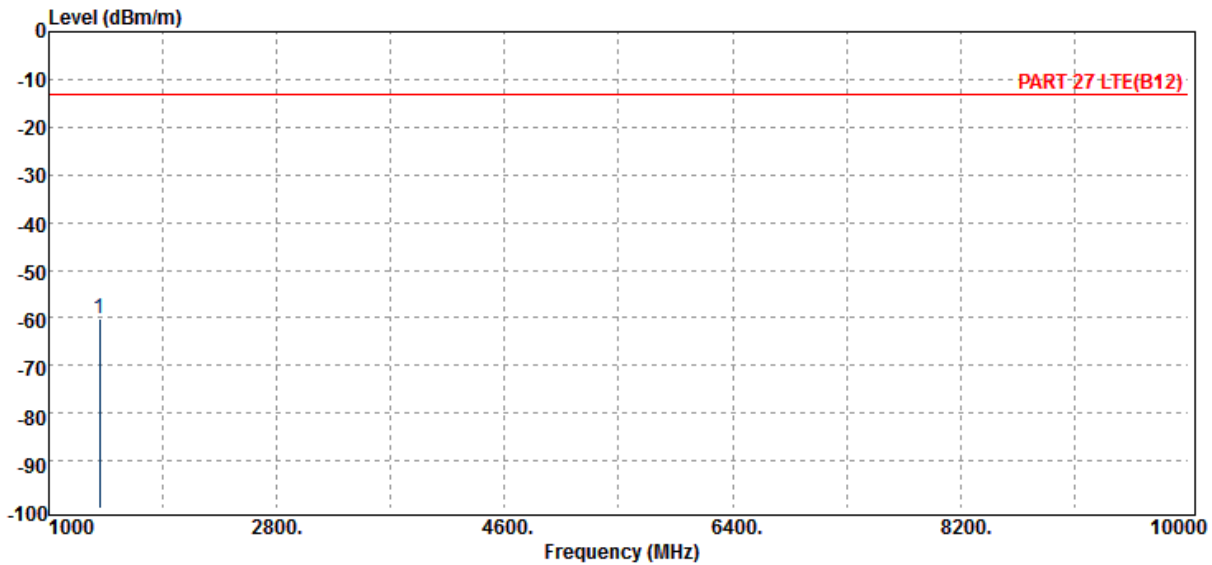
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Radiated Spurious Emission Measurement Result: LTE-Band 12 (The Worst Case)

Operation Band :LTE B12 Temp./Humi. :21 deg_C / 62 RH
 Fundamental Frequency :700.5 MHz Engineer :Tin
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL



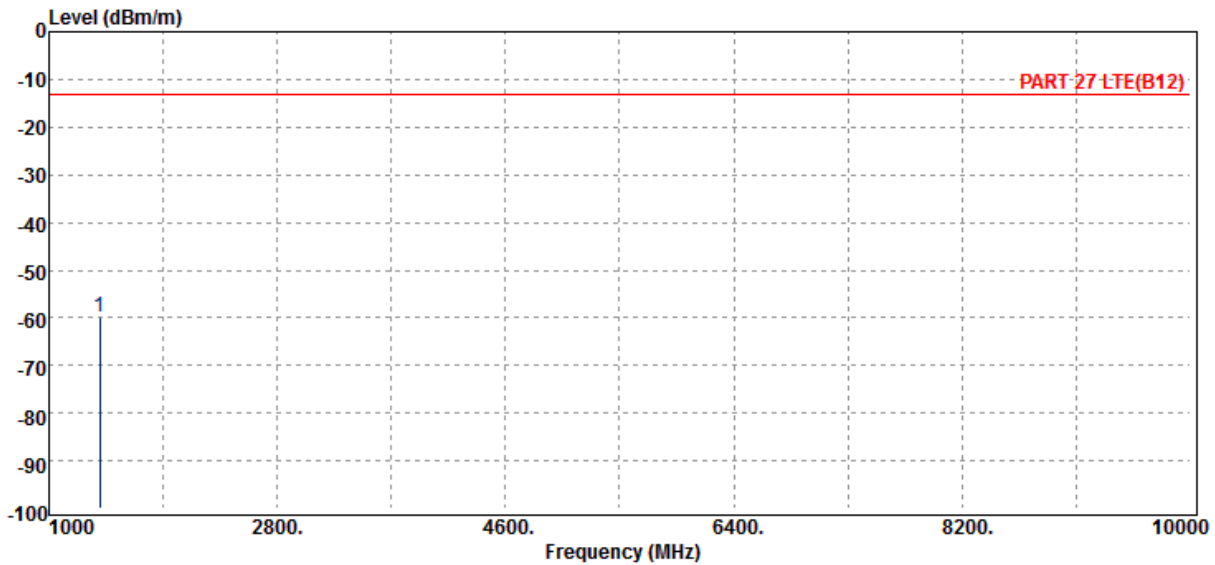
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
1401.00	H	-60.05	-64.43	8.28	-3.89	-13.00	-47.05

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Operation Band	:LTE B12	Temp./Humi.	:21 deg_C / 62 RH
Fundamental Frequency	:700.5 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
1401.00	H	-59.69	-64.08	8.28	-3.89	-13.00	-46.69

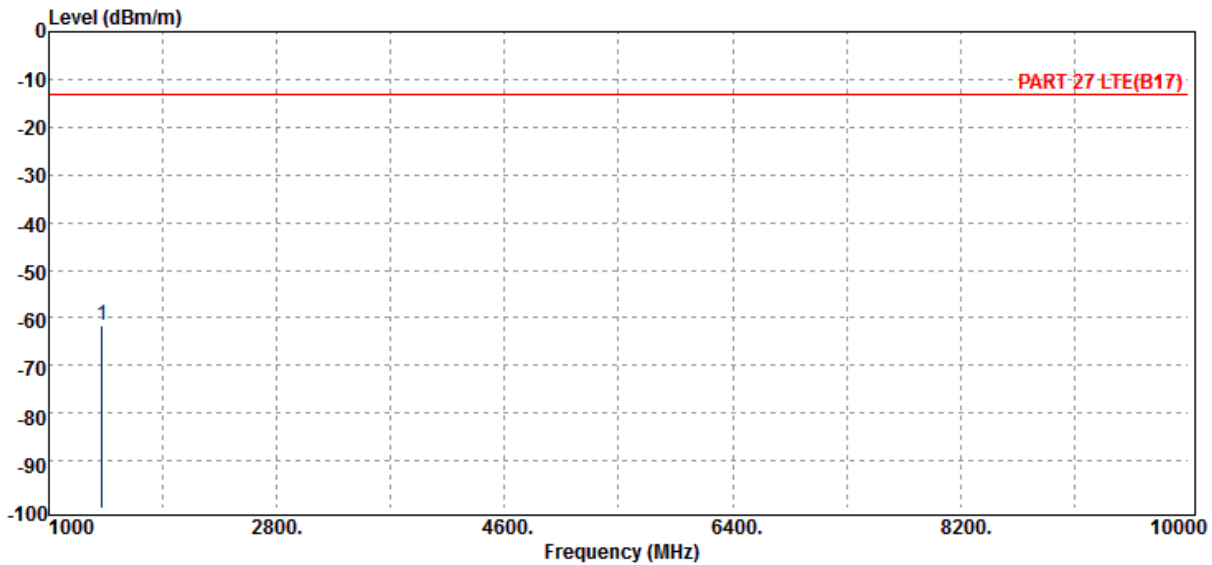
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Radiated Spurious Emission Measurement Result: LTE-Band 17 (The Worst Case)

Operation Band :LTE B17 Temp./Humi. :21 deg_C / 62 RH
 Fundamental Frequency :710.0 MHz Engineer :Tin
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL



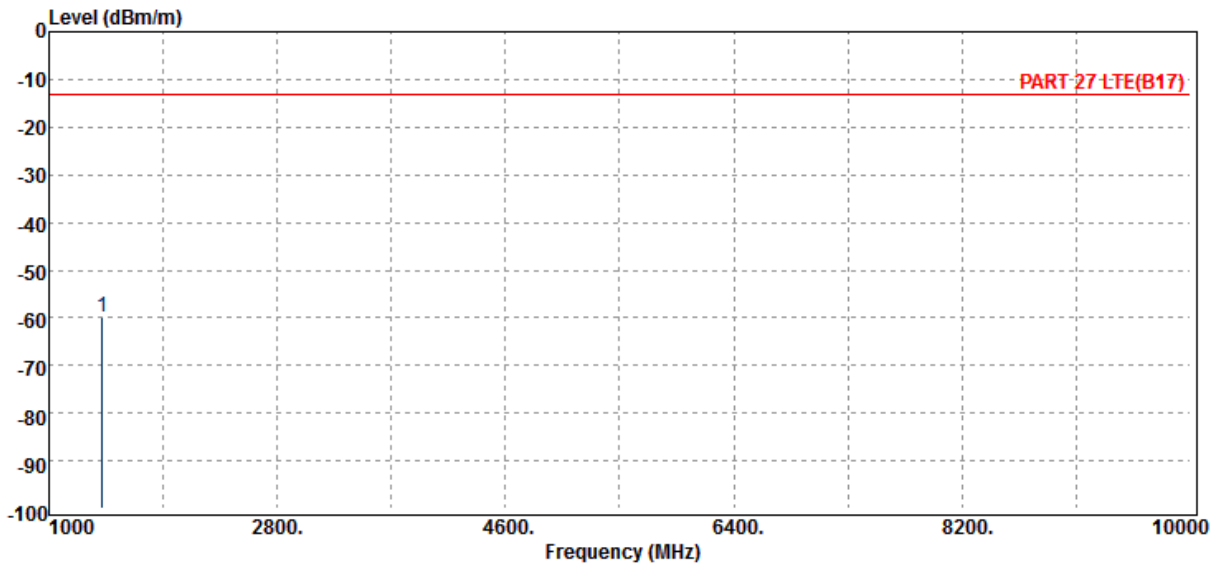
Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
1420.00	H	-61.68	-66.12	8.36	-3.92	-13.00	-48.68

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Operation Band	:LTE B17	Temp./Humi.	:21 deg_C / 62 RH
Fundamental Frequency	:710.0 MHz	Engineer	:Tin
Operation Mode	:Tx CH MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	ERP dBm	SG Output Level dBm	Antenna Gain dBd	Cable Loss dB	Limit dBm	Margin dB
1420.00	H	-59.79	-64.23	8.36	-3.92	-13.00	-46.79

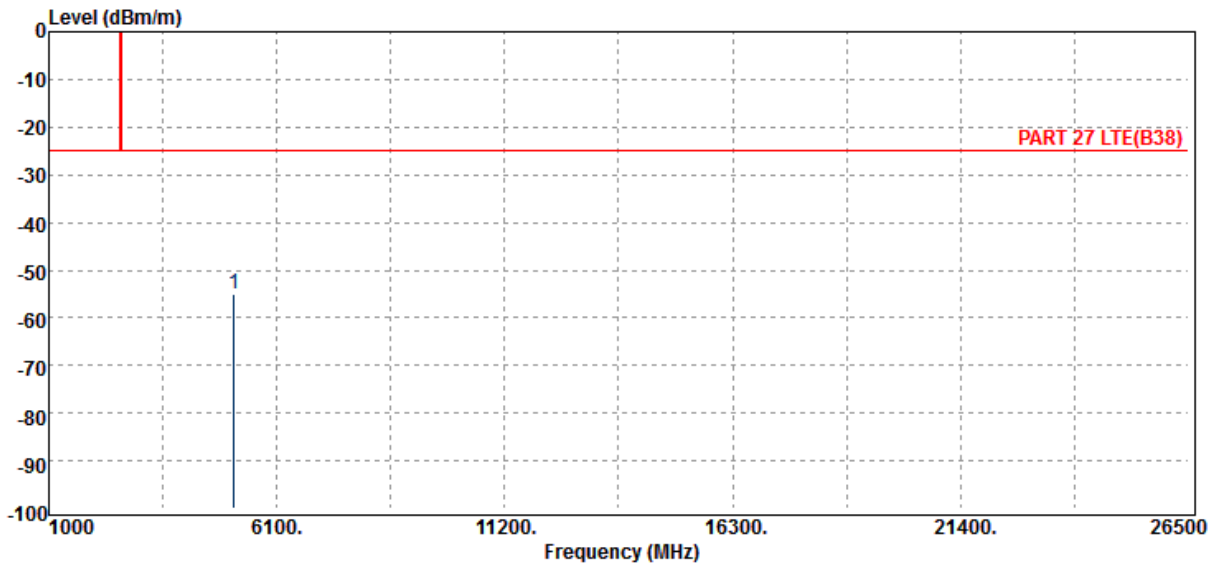
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Radiated Spurious Emission Measurement Result: LTE-Band 38 (The Worst Case)

Operation Band :LTE B38 Temp./Humi. :22 deg_C / 61 RH
 Fundamental Frequency :2575 MHz Engineer :Tin
 Operation Mode :Tx CH LOW
 EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



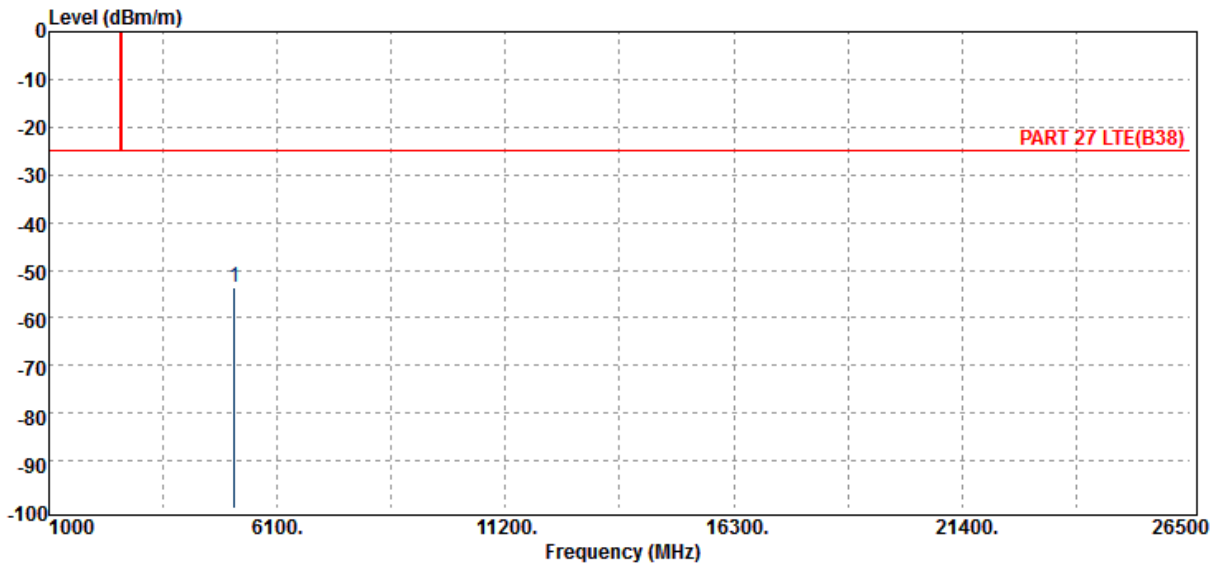
Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
5150.00	H	-55.16	-59.98	12.76	-7.94	-25.00	-30.16

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Operation Band	:LTE B38	Temp./Humi.	:22 deg_C / 61 RH
Fundamental Frequency	:2575 MHz	Engineer	:Tin
Operation Mode	:Tx CH LOW		
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit dBm	Margin dB
5150.00	H	-53.71	-58.53	12.76	-7.94	-25.00	-28.71

~ End of Report ~

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